

**Contract:** 18-081-000-A590  
**Project Name:** Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education – FINAL REPORT



This project is funded in part by a Texas Coastal Management Program grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration Award No. NA17NOS4190139.

Contact: Kacy Ray, Coastal Program Manager, [kray@abcbirds.org](mailto:kray@abcbirds.org), 614.218.8838

### **Project Description:**

The Texas coast represents critical habitat for many beach-nesting species, including the Wilson's Plover (*Charadrius wilsonia*), Snowy Plover (*Charadrius nivosus*), Black Skimmer (*Rynchops niger*) and Least Tern (*Sterna antillarum*). The Wilson's Plover Conservation Plan (Zdravkovic 2013) estimates 31% of the Wilson's Plover population nests along the Texas coast. Unfortunately, the number of breeding pairs for the Wilson's Plover, Black Skimmer and several other beach-nesting species have been in a steady state of decline since the 1970's due to human disturbance and habitat loss related to coastal development, recreation, erosion, subsidence, and sea level rise.

American Bird Conservancy (ABC) and their partners use a three-pronged approach composed of monitoring, protection and stewardship through public education to conserve declining beach-nesting bird species. ABC and partners collaborate with area land managers to implement adaptive strategies that mitigate human disturbances caused by unintended recreational conflicts with breeding coastal birds. Long-term, we strive to maintain or increase reproductive success of declining species. Season-to-season, we engage and educate the public and land/resource managers on how to become stewards for the birds.

Our core partnership team includes: Coastal Bend Bays and Estuaries Program (CBBEP), Gulf Coast Bird Observatory (GCBO), Houston Audubon Society (HAS), and U.S. Fish and Wildlife Service (USFWS). Together we identified areas where birds were breeding, informed land resource managers, monitored reproductive output, and provided education and outreach to the public at nesting sites and during community events. Conservation activities took place during the 2018 breeding season (March – September). Monitoring, education, and stewardship occurred at important beach-nesting breeding sites on the upper and central coast of Texas

## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education

(Figure 1). ABC used Coastal Management Program (CMP) Cycle 22 funding to carry out activities associated with conserving our focal declining species.

### Task 1: Land Manager Partnership Develop and Nesting Site Identification

ABC and partners have established partnerships with the land managers at the sites (Figure 1) we worked at. These land managers include: USFWS National Wildlife Refuge System, Galveston Park Board of Trustees, Brazoria County, City of Freeport, DOW Chemical, Lower Colorado River Authority, Matagorda County, Texas Parks and Wildlife Department State Parks Division, Texas General Land Office, and the City of Port Aransas.

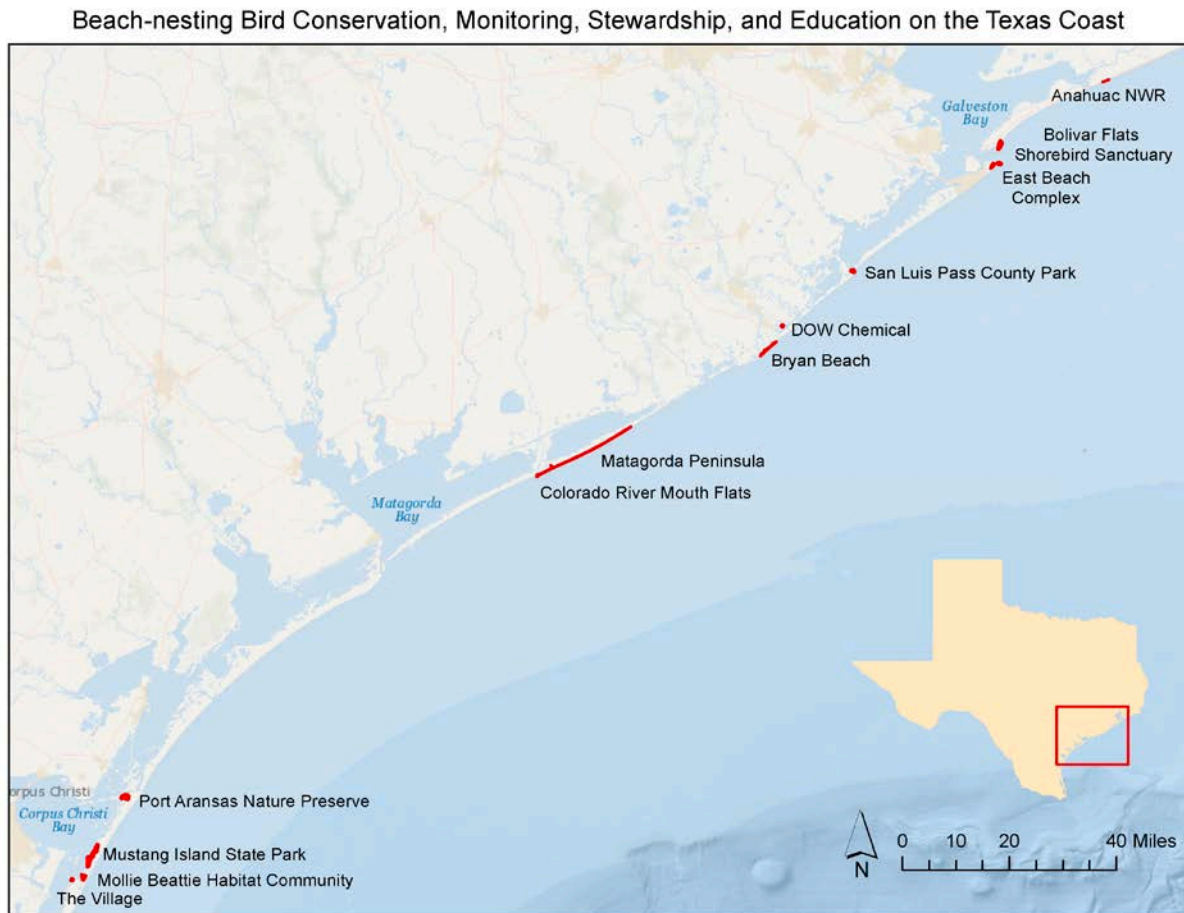


Figure 1. Map of sites for American Bird Conservancy and partners' Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education project in 2018.

### Deliverables:

1. List of established land/resource manager partnerships  
This was submitted by the due date 2/1/2018, but is also included in this final report.
2. Maps showing breeding bird site locations  
This was submitted by the due date 5/30/2018, but is also included in this final report.

## **Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education**

### **Task 2: Provide Nesting Area Protection Recommendations**

Once nesting began at our sites, ABC and partners worked with local land managers to cease vehicular trash collections (if applicable) within the nesting areas for the extent of the nesting season. Our team asked land managers to help the birds by not entering nesting areas during the breeding season, and by putting lids on trash cans or making more cans available to the public to reduce the presence of avian predators. When large public events were scheduled near bird nesting areas, we provided recommendations to land managers to minimize impacts and stress to the birds.

East Beach is the site we monitor where human recreation is the highest. This year during an annual Frisbee tournament that took place adjacent to the bird nesting area, our team conducted stewardship and education with the participants and general public to ensure that Frisbees and people didn't accidentally enter the sensitive bird area. East Beach has a horse vendor that is present during the breeding season and we worked with the vendor and the Galveston Park Board (East Beach land manager) to ensure that the horseback riding path minimized disturbance to the birds. The annual AIA Sandcastle Competition that historically took place during the early summer was moved to the end of August, so we didn't have to address this event at East Beach in 2018. A 'Jeep Go Topless' event took place during the spring along the upper Texas coast. This event impacted our sites at East Beach and Anahuac NWR. We worked with the Galveston Park Board and the Jeep rally leaders to inform them of nesting areas and to ensure that these areas were avoided. At Anahuac NWR, a Least Tern colony was nesting on the beach and we worked with refuge staff and volunteers to redirect Jeeps around the nesting area on the beach.

We worked with the General Land Office to protect a Least Tern and Wilson's Plover nesting area at Packery Flats in Corpus Christi. We were able to successfully redirect foot traffic to fishing areas – all of the nests in the posted area hatched successfully and young chicks were able to fledge (i.e. become flight capable).

All of our reports and recommendations for land managers are included in Appendix 1 in reports and summaries we prepared for them.

### **Deliverables:**

1. Recommendations to area land managers – these were included in monthly progress reports throughout the grant performance period and are also available in Appendix 1.
2. Final list of all recommendations made to area land managers  
Due Date: 3/31/2019 – Please see Appendix 1.

## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education

### Task 3: Monitor Reproductive Output of Beach-Nesting Birds

ABC and partners monitored breeding sites 2-3 times each week to assess reproductive output of the Wilson's and Snowy Plovers, Least Terns and Black Skimmers. These data are presented in Table 1 and was shared with all land managers in the reports in Appendix 1. Data presented here is cumulative across all sites. Reports for land managers (Appendix 1) present results by site or region.

Table 1. 2018 reproductive metrics (compared to 2017) for ABC and partners' collaborative Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education for Wilson's and Snowy Plovers, Least Terns and Black Skimmers at selected sites along the Texas coast. Apparent Nest Success is presented as a percentage based on successfully hatched nests divided by the total number of nests. Nest fate percentages may not add up to exactly 100% due to rounding error.

<b>Reproductive Metric</b>	<b>2017</b>	<b>2018</b>
# of Sites Monitored (effort)	13	12
# of Acres Monitored	2975	2676
# of Breeding Pairs	133	135
# of Nests Monitored	238	111
Apparent Nest Success <b>(Plover species ONLY)</b>	47/238 = <b>19.7%</b>	57/111 = <b>51.4%</b>
Failure – Predation	39/238 = <b>16.4%</b>	15/111 = <b>13.5%</b>
Failure – Washout	101/238 = <b>42.4%</b>	14/111 = <b>12.6%</b>
Failure – Abandonment	8/101 = <b>3.4%</b>	4/111 = <b>3.6%</b>
Failure – Human Caused**	1/238 = <b>0.40%</b>	1/111 = <b>0.09%</b>
Failure – Unknown	42/238 = <b>17.6%</b>	21/111 = <b>18.9%</b>
# of fledges	24	58

#### Deliverables:

1. Data sheet/metrics used to monitor birds were provided by the due date of December 14, 2018.

## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education

2. Monthly monitoring updates were made in progress reports submitted by the 10<sup>th</sup> of each month.

### Task 4: Education & Stewardship at Nesting Sites

ABC staff, partners, and trained volunteers interacted with beach goers during holidays and beach events to provide educational materials and information about the birds – we refer to this as nest site stewardship. We explained how to avoid negatively impacting the nesting areas and allowed interested parties to look at the birds through a scope. Volunteers were recruited at local educational events ABC and partners attended from years past and in 2018 such as, Audubon chapters and Master Naturalist groups. Our team also set up educational table displays and gave presentations at local community events. We participated in the spring GLO’s Adopt-A-Beach program to setup education booths at registration sites in Galveston, Surfside, and Corpus Christi. Table 2 outlines all of the education events we attended in 2018, along with the number of people reached at each function. Following the table are photographs from some of our outreach/education events (Figures 2 – 5) which are deliverables under this task. In 2018, we had 39 volunteers who put in 425.75 hours of time towards the project (Appendix 2).

Table 2. American Bird Conservancy and partners’ stewardship, engagement, and stewardship activities during the 2018 breeding bird season (March-August) along the Texas coast.

Outreach/Education Function	# of People Reached
Monitoring (talking to people opportunistically)	85
Nest Site Stewardship	291
Land Manager / Agency Engagement	
<i>Galveston Planning Commission meeting</i>	28
<i>Galveston Park Board Beach Maintenance Advisory Committee meeting</i>	25
<i>Various: Freeport, Dow Community Relations, Lower Colorado River Authority Park Operations</i>	6
Community Engagement & Outreach	
<i>River Oaks Elementary School, Galveston</i>	40
<i>San Luis Pass Galveston trash cleanup</i>	9
<i>GLO Adopt-A-Beach Surfside Beach</i>	28

## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education

<b>Outreach/Education Function</b>	<b># of People Reached</b>
<i>GLO Adopt-A-Beach Matagorda Beach</i>	70
<i>GLO Adopt-A-Beach Packery Flats (Corpus Christi)</i>	15
<i>Migration Celebration Brazoria National Wildlife Refuge</i>	70
<i>Gulf Coast Bird Observatory Summer Bird Camp</i>	24
<i>Trash Bash, Galveston</i>	60
<i>Bay Day Festival, Galveston</i>	124
<i>World Ocean's Day, Galveston</i>	82
<i>Earth Day Bay Day, Corpus Christi</i>	359
<b>DIRECT TOTAL</b>	<b>1,316</b>
<hr/>	
Facebook & Other Indirect Reach	
<i>Help Gulf Birds</i>	75,885
<i>Houston Audubon Society</i>	4,494
<i>Gulf Coast Bird Observatory</i>	1,190
<i>Gulf Crossings September Newsletter (Gulf Coast Bird Observatory)</i>	1,800
<b>INDIRECT TOTAL</b>	<b>83,369</b>

**Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education**



Figure 2. (a) Artist Boat’s World Oceans Day in Galveston, (b) River Oaks Elementary School 5<sup>th</sup> grade class at East Beach in Galveston, (c) volunteer stewards at East Beach, (d) trash cleanup volunteers standing next to trash cleaned up on the byside of San Luis Pass, Galveston Island (Texas, 2018).

## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education



Figure 3. Travis Ly is mesmerized by a close look at an adult Wilson's Plover banded on July 8, 2018 at Matagorda Peninsula, Texas. Photo by Lesley Goodman.



Figure 4. Educational chick and parent matching game at Earth Day Bay Day on 7 April 2018 (left), and nest display at GLO beach cleanup/ stewardship event on 21 April 2018 (right).



## Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education



Figure 5. Gulf Coast Bird Observatory (GCBO), gives a program on shorebird conservation to GCBO Summer Bird Camp participants: A. Robin Bjork demonstrates Wilson's Plover broken-wing behavior, B. Cutouts of birds and tracks used for artificial nests, C. Bjork discusses Least Tern nesting, and D. Bjork works with kids at an artificial nest constructed on GCBO grounds in a field exercise to identify factors threatening shorebird nesting. Photos by Emma Shelly.

## **Beach-Nesting Bird Conservation Through Monitoring, Stewardship, and Education**

### **Deliverables:**

1. Public interactions were reported in monthly progress reports and this is a data element in our Excel data tracking files. These data are included in this final report.
2. Monthly outreach updates were provided in monthly progress reports and are summarized in their entirety in this final report.
3. A complete list of events attended and the number of people reached are summarized in their entirety in this final report.
4. A list of volunteers recruited for the entire 2018 breeding season are included in Appendix 2.
5. Photos from outreach and education events are included in this final report.
6. Copies of educational materials have already been included in monthly reports or directly sent to the GLO-CMP prior to this final report.
7. Monthly social media updates were provided in monthly progress reports and totals are included in this final report.

### **Task 5: Project Reporting**

ABC prepared monthly reports and deliverables on time and sent them to CMPReceipts@GLO.TEXAS.GOV. This final report summarizes all work completed under each task, including finalized breeding and outreach metrics, and photos from community-based events.

### **Deliverables:**

1. Monthly progress reports and reimbursement requests were sent monthly by the 10<sup>th</sup> with the exception of March 2019 when we were preparing the final report.
2. The draft final report was shared with the GLO-CMP by March 15, 2019, as agreed upon in the work plan.
3. Final Report  
Due Date: 3/31/2019
4. Project closeout form  
Due Date: 3/31/2019

**Appendix 1.**  
**Reports and Recommendations to Land Managers**

**American Bird Conservancy – Houston Audubon Society  
Gulf Beach-nesting Bird Conservation Program**

**Anahuac National Wildlife Refuge  
November 6, 2018**



(Photo by Ray Hennesy)

Submitted by:  
Kristen Vale and Kacy L. Ray  
American Bird Conservancy

## INTRODUCTION

American Bird Conservancy (ABC), Houston Audubon Society (HAS), and other Texas partners have implemented a Beach-nesting Bird Conservation Program along the Texas coast since 2012. Through this program, we seek to advance conservation efforts for the species Least Tern (*Sternula antillarum*) and Watch List species Wilson's Plover (*Charadrius wilsonia*, Red status), and Snowy Plover (*Charadrius nivosus*, Red status), and Black Skimmers (*Rynchops niger*, Yellow status) by implementing protective measures (i.e. signs and fencing) and public outreach at sites where these declining species occur. The goal of the program is to maintain and increase these threatened populations through conservation activities we implement on the ground.

This 2018 breeding season was the first full season of beach nesting bird monitoring and protection at the beach tract owned and managed by Anahuac National Wildlife Refuge (NWR). The site was partially protected and monitored in 2017 in response to Black Skimmers using the refuge beach for nesting late in the season.

## STUDY SITE

The Anahuac National Wildlife Refuge (NWR) Gulf beach site is owned and managed by Anahuac NWR (Figure 1). We surveyed a 1.35-mile-long stretch of public beach located on the Bolivar Peninsula approximately 4 miles southwest of High Island, Texas and immediately adjacent to Highway 87. A vehicular barrier separates the highway from the beach property and a moderate amount of shell debris and dune vegetation accumulates just south of the barrier. This portion of the property provides an attractive site for beach nesting birds. As a public beach, it is open to vehicles and pedestrians, and experiences a moderate amount of traffic daily.

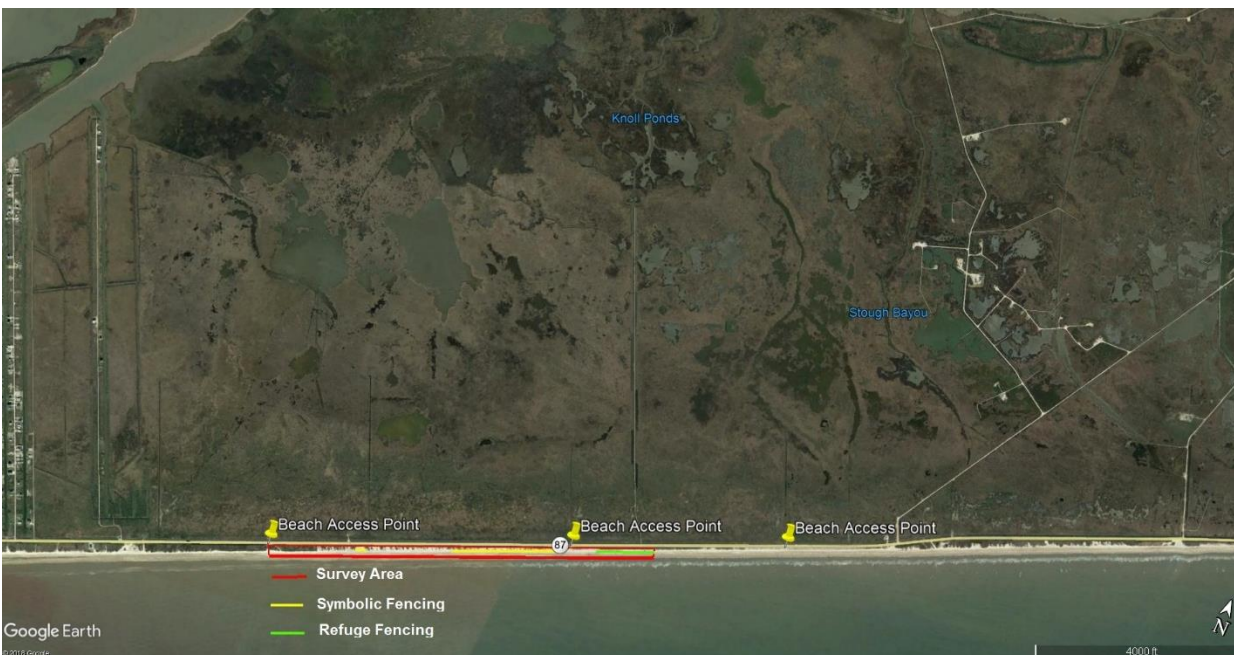


Figure 1. Survey area and symbolic fencing placement at Anahuac National Wildlife Refuge beach, Bolivar Peninsula, Texas (2018).

### Posted Area

In 2017, we posted the nesting bird habitat late in the breeding season (August 9) in response to Black Skimmers nesting on the refuge beach. In 2018, we fenced off the nesting area on May 19 with the help of some Boy Scouts from Troop 548 (Figure 2). We protected the nesting habitat after the Least Terns started nesting on the refuge beach, which was the same weekend of the annual Jeep Go Topless weekend rally on Bolivar Peninsula.



Figure 2. Boy Scout Troop 548 assisted with installing symbolic fencing at Anahuac National Wildlife Refuge this 2018 breeding season.

Figure 3 shows the various signs we use at monitoring sites. We used the “Please Share the Beach...” in both English and Spanish and “Watch for Flightless Chicks” signs at Anahuac in 2017 and 2018.



Figure 3. Informative signs used in combination with symbolic fencing at sites along the Texas coast.

**Results**

Data from the 2017 breeding season was collected from August 9 – August 24. Data from the 2018 breeding season was collected from May 19 – July 31. Bird estimates from the 2017 are highly likely to be an underestimate since we began monitoring late in the breeding season.

Table 1 outlines the reproductive output of Least Terns, Black Skimmers, and Wilson’s Plovers using the Anahuac NWR beach tract during the 2017 and 2018 breeding season.

Table 1. Results from the 2017 and 2018 breeding season at Anahuac National Wildlife Refuge.

	Least Tern		Black Skimmer		Wilson’s Plover	
	Breeding Pairs	Fledges	Breeding Pairs	Fledges	Breeding Pairs	Fledges
<b>2017</b>	19	19	3	0	0	0
<b>2018</b>	40	1	2	0	3	1

During the 2018 season, we monitored the fate of seven Least Tern nests that were outside the symbolic fencing near the high tide line. We do not typically monitor colonial bird nest fates (due to causing disturbance), but in this case we thought it prudent since the nests were unprotected. Three nests were run over by vehicles and four nests had an unknown nest fate.

**Discussion**

Grackles were a significant disturbance to the nesting birds in 2018 compared to 2017 at Anahuac NWR. We suspect grackles depredated a substantial numbers of nests -- we would often find empty nest cups with no evidence of another predator or human disturbance where grackles were commonly observed perching or harassing nesting birds. Harassment by grackles to nesting Least Terns had a negative impact on the reproductive output of these birds.

Least Terns have historically nested at this location (personal communication, Winnie Burkett). When we posted in 2017, there were already chicks on the ground. This leads us to believe that grackles were not as prevalent in 2017 as they were in 2018. The habitat changed post Harvey, causing the beach to become narrower more this year, pushing vehicles closer to the nesting area (Figure 4).



Figure 4. Symbolic signs and fencing installed on August 9 at Anahuac National Wildlife Refuge (left) versus the signs partially covered after high tides from Tropical Storm Harvey, September 6 (right, 2017).

The narrow strip of refuge beach is hemmed in by the highway and the portion of the beach where people drive. This leaves a small area for nesting birds to use. Because this area is so narrow, it is challenging to protect the habitat and give the birds enough of a buffer to safely nest and raise their young (Figure 5). We found evidence that people parked in the fenced area while we were not on site. This likely negatively impacted nesting; however, we did not find destroyed nests or dead adult birds or chicks.





Figure 5. Least Tern nest (inside red circle) between tire tracks at Anahuac National Wildlife Refuge during the 2018 breeding season.

Trash is a hazard to the nesting birds (and other wildlife and humans) and much of what is on the Anahuac beach tract is washed ashore (Figure 6). The county was out picking up trash at least once during the 2018 season when we were present. This gave us the opportunity to educate county workers about the birds nesting in the posted area. We asked that they distance themselves as much as possible from the posted area so as not to disturb the birds. We picked up trash during surveys. Common trash items included single-use plastic bags, plastic bottles, and other pieces of broken plastic.



Figure 6. Plastic vinegar bottle washed ashore next to a Least Tern nest at Anahuac National Wildlife Refuge.

#### **Management Implications / Recommendations**

- We suggest to continue with posting the sensitive bird habitat and interacting with the public to educate them about these declining species.
- It may be helpful to drivers and visitors to install permanent signs within the refuge beach property and at each beach access point stating rules and regulations, as well as seasonal educational signs and materials about the nesting birds to better protect the nesting habitat.
- It may be beneficial to work closely with the county on trash pickup to keep the beach as clean as possible to minimize attracting grackles and gulls to the location. The grackles were the primary reason the site had such low reproductive output.
- We suggest removing the invasive salt cedar along the beach to help reduce crowding out valuable beach-nesting bird habitat, as well as to reduce perching structures for grackles.
- If plausible, explore the options of closing this portion of the beach to vehicles since it is refuge property. It could still be accessed via foot. This could be accomplished through the use of bollards and informative signs. There are beach access points that would allow people to park and access the beach tract via foot.

**Houston Audubon – American Bird Conservancy  
Gulf Beach-nesting Bird Conservation Program**

**Annual Report  
November 9, 2018**



Submitted by:

Kristen Vale<sup>1</sup>, Daniel Elting<sup>2</sup>, Kacy L. Ray<sup>1</sup>, and Richard E. Gibbons<sup>2</sup>

<sup>1</sup>American Bird Conservancy, <sup>2</sup>Houston Audubon

## INTRODUCTION

American Bird Conservancy (ABC), Houston Audubon Society (HAS), and other Texas partners have implemented a Beach-nesting Bird Conservation Program along the Texas coast since 2012. Through this program, we seek to advance conservation efforts for the species Least Tern (*Sternula antillarum*) and Watch List species Wilson's Plover (*Charadrius wilsonia*, Red status), and Snowy Plover (*Charadrius nivosus*, Red status), and Black Skimmers (*Rynchops niger*, Yellow status) by implementing protective measures (i.e. signs and fencing) and public outreach at sites where these declining species occur. The goal of the program is to maintain and increase these threatened populations through conservation activities we implement on the ground.

Our program is funded via grants from National Fish and Wildlife Foundation (NFWF), US Fish and Wildlife Service (USFWS) Coastal Program, the Texas General Land Office's (GLO) Coastal Management Program, and other private foundations.

## FOCAL SITE(S)

### East Beach

East Beach is bordered by Big Reef Nature Park to its north and the East End Lagoon Nature Preserve (previously reported as Apffel Park) to its west. Both are comprised of salt marsh, intertidal pools, and sand and mud flats (Figure 1). Portions of East Beach and Big Reef (117 ac) are designated as critical habitat for threatened wintering Piping Plovers by U.S. Fish and Wildlife Service (Unit TX-35: Big Reef). All together the area creates a dynamic coastal habitat, making it an important site for several nesting bird species as well as providing stopover and wintering habitat for thousands of shorebirds and other wildlife. Approximately 145 acres of East Beach, 25 acres of Big Reef, and 120 acres of East End Lagoon Nature Preserve are regularly monitored. Currently, all breeding activity occurs at East Beach and Big Reef; however, the sites are referenced collectively as East Beach Complex unless noted otherwise.



Figure 1. The East Beach Complex sites include East Beach, Big Reef Nature Park and East End Lagoon Nature Preserve, Galveston, Texas (2018).

## RESULTS

Protection, monitoring, and outreach for beach-nesting birds began on March 15, 2018 and continued through July 31, 2018 when the last chick fledged. We report data here from March 20 – July 31, 2018.

## Protected Areas

We protected nesting areas at East Beach by installing seasonal fencing (called symbolic fencing) and signs to prevent and discourage pets, humans, and vehicles from entering. We posted nesting areas with yellow informative signs in both English and Spanish reading: “Please Share the Beach; Stay Back from Bird Nesting Area” or “Por Favor Comparta la Playa; Alejese de Las Areas de Anidacion de Aves” attached to 6 ft. wooden posts or metal T-post (Figure 2a, 2b). Once chicks hatched, chick warning signs reading: “Watch for Flightless Chicks; Proceed with Extreme Caution” were posted in areas where chicks were likely to be found outside of protected areas (Figure 2c).



Figure 2. Informative signs used in combination with symbolic fencing at East Beach, Galveston (2017).

We erected symbolic fencing and protective signs at East Beach on March 15. Within the East Beach Complex, the 1.5 mile perimeter of symbolic fencing erected around the sensitive nesting area at East Beach protected 56 acres of nesting habitat within the larger restricted access area delineated by bollards and cable. We monitored 308 acres of nesting habitat within East Beach Complex (163 acres at East Beach, 26 acres at Big Reef, 119 acres at East End Lagoon). We did not observe any of the target species nesting at the East End Lagoon.

## Wilson’s Plovers

We estimated 18 Wilson’s Plover breeding pairs at East Beach Complex. Average Wilson’s Plover adult counts during the breeding season included 28 adults at East Beach Complex (range 16 – 40 birds, Figure 4). Evidence of fall pre-migratory staging was observed on June 26 when we documented an above average of 27 Wilson’s Plovers exhibiting non-breeding loafing behavior on the nearby shoreline of Bolivar Flats (across the shipping channel from East Beach). The switch in behavior occurred after a combination of high tides and consecutive days of rain that hit our coastline from June 17-21 causing active nests to wash out. Pre-migratory staging was in full swing by July 3, when we observed a group of 22 Wilson’s Plovers roosting together on the shoreline and another group of 48 roosting together in the interior flats of Bolivar Flats. See Appendix 1 for reproductive output metrics for Wilson’s Plovers from 2014 – 2018.

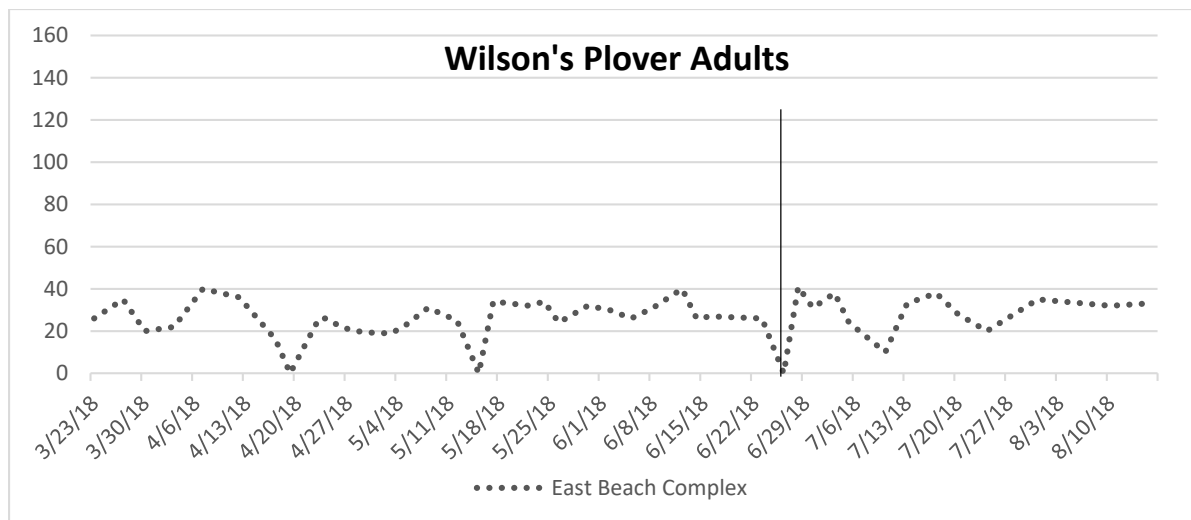


Figure 4. Survey counts of adult Wilson’s Plovers at East Beach Complex, Galveston, Texas, from March 23 – August 16, 2018. The vertical line indicates the beginning of pre-migratory staging on June 26.

We found the first nest on April 7 at East Beach. The majority of nesting within the East Beach Complex occurred at East Beach (proper). Wilson’s Plover observations at East End Lagoon were of birds feeding. Peak nest counts occurred on May 8 at East Beach (n = 10 nests, Figure 5). Plover nesting halted after high tide and rain event from June 17-21 that washed out all of the Wilson’s Plover nests. No new nests were found after the storm.

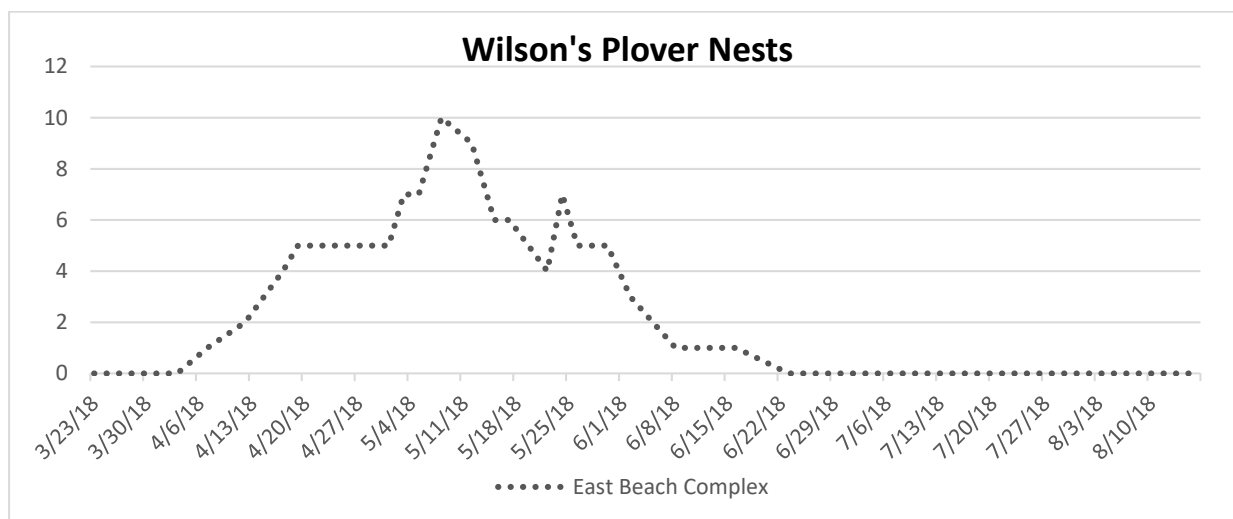


Figure 5. Survey counts of active Wilson’s Plover nests at Bolivar Flats, East Beach Complex, and San Luis Pass County Park in Texas during the 2018 breeding season.

We monitored 22 Wilson’s Plover nests at East Beach Complex (Table 2). There was an apparent nest success (raw percentage of nests that hatched at least one egg) of 71.4% at East Beach Complex.

Table 2. Wilson’s Plover nest fates monitored at East Beach Complex, Galveston, Texas during the 2018 nesting season.

Nest Fates	East Beach	Big Reef	Total
Hatched	13	2	15
Unknown	3	0	3
Washout	0	0	0
Depredated	4	0	4
<i>Coyote</i>	4	-	-
<i>Ghost Crab</i>	-	-	-
<i>Unknown Predator</i>	-	-	-
Abandoned	0	0	0
Human Caused	0	0	0
<b>Total</b>	<b>20</b>	<b>2</b>	<b>22</b>

Peak counts of Wilson’s Plover chicks (downy and feathered) occurred on June 12 at East Beach Complex with 17 chicks. We observed the first fledged chicks at East Beach on June 23, when six fledged chicks were seen that day. Based on peak counts, band re-sights, and brood territories, we estimated 22 from East Beach Complex.

### Snowy Plovers

We estimated three Snowy Plover breeding pairs based on weekly bird counts and established territories at East Beach. Survey counts include an average of two Snowy Plover adults at East Beach (range 1 – 5 birds, Figure 6). We found the first nest on March 30. We documented four nests; two hatched (nest success of 50%), one was abandoned, and one had an unknown nest fate. Two Snowy Plover chicks fledged from East Beach; productivity was 1.0%. The chicks were documented as fledged on June 8. The second brood was believed to have been predated by a coyote right after hatching, as there were coyote tracks that lead to the nest cup where the chicks were last seen. The abandoned nest was incubated by a banded female who left all three eggs one week prior to hatching and wasn’t seen at East Beach again until pre-migratory staging. The male was never seen incubating the nest after the banded female disappeared. Evidence of pre-migratory staging was observed on July 17 (n = 12 birds) as Snowy Plover counts continued to increase with each survey at East Beach; all were feeding and roosting birds. See Appendix 1 for reproductive output metrics for Snowy Plovers from 2014 – 2018.

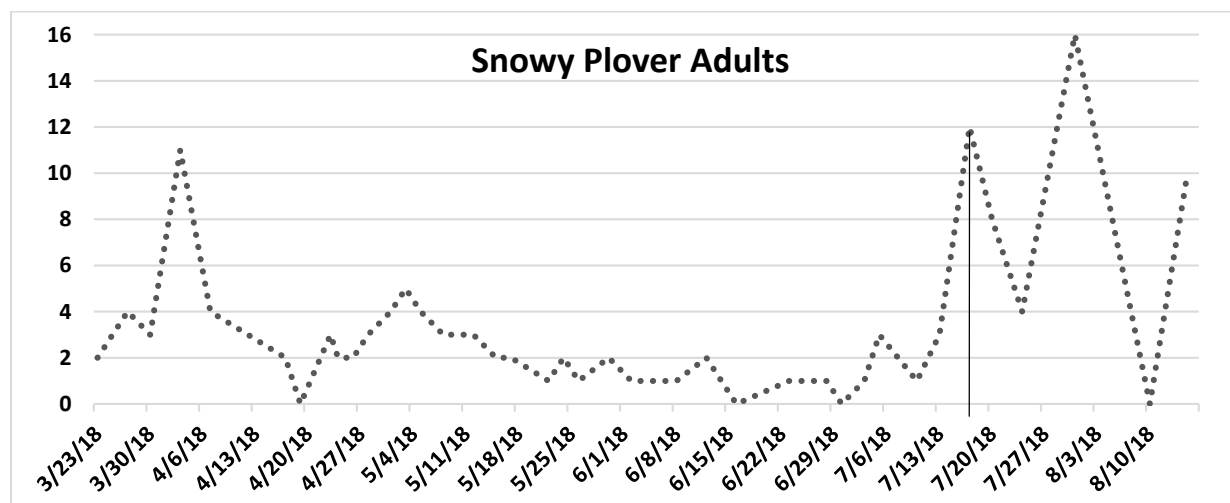


Figure 6. Survey counts of adult Snowy Plovers at East Beach, Galveston, Texas from March 23 - August 15, 2018. The vertical line indicates the first evidence of pre-migratory staging on July 17.

**Least Terns**

Based on peak counts, we estimated 39 Least Tern breeding pairs at East Beach Complex on June 5. We estimated breeding pairs as individuals observed in the nesting habitat exhibiting courtship or nesting behavior since terns were frequently moving as habitats were flooded. Survey counts during the breeding season include an average of 57 adult Least Terns at East Beach (range 4 – 172 birds, Figure 7). See Appendix 1 for reproductive output metrics for Least Terns from 2014 – 2018.

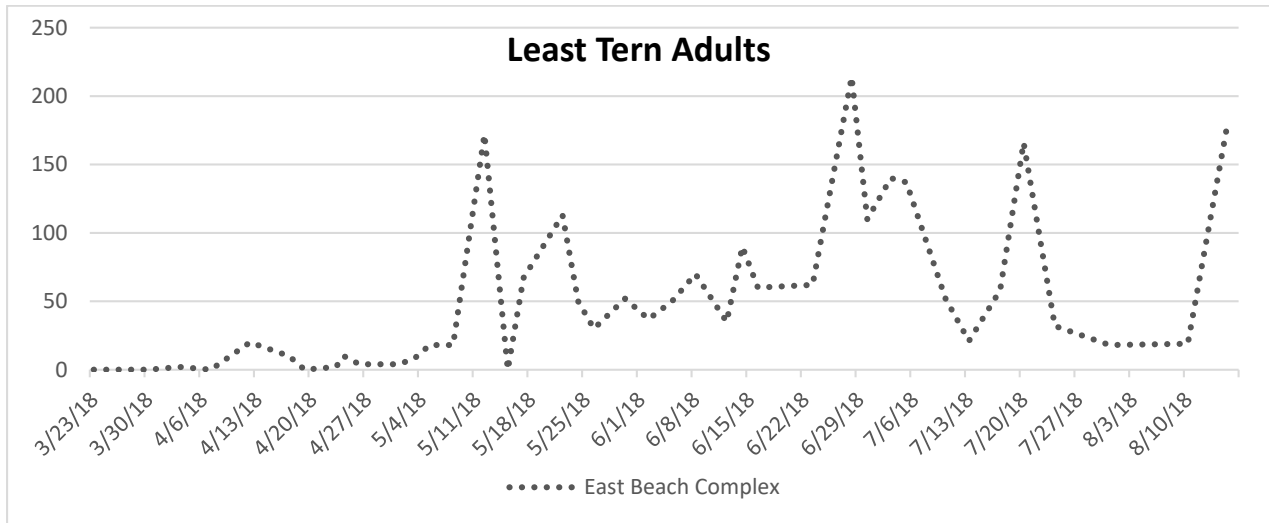


Figure 7. Survey counts of adult Least Terns at East Beach Complex, Galveston, Texas from March 23- August 16, 2018.

We found the first Least Tern nest on April 23 at East Beach Complex. Nest counts peaked on May 30 (n=27 nests, Figure 8) at East Beach Complex. Productivity and nest hatch rate was high before a storm event from June 17-21 washed out a large number of active nests and small chicks. No nests hatched successfully or chicks fledged after this event. We estimated a total of two from East Beach Complex. This resulted in a productivity rate of 0.05 fledges/pair.



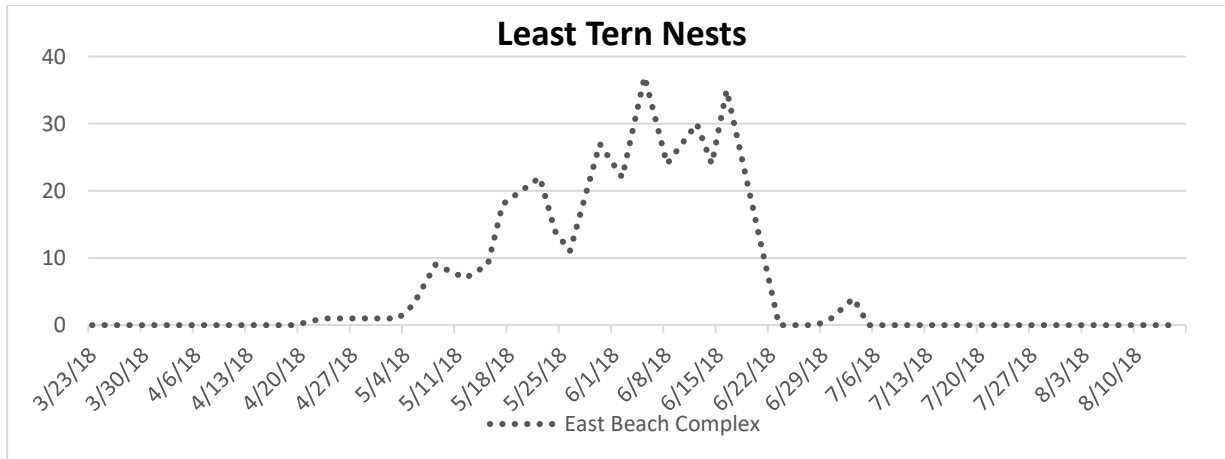


Figure 8. Survey counts of active Least Tern nests at East Beach Complex, Galveston, Texas during the 2018 nesting season.

Least Terns occasionally nested outside the symbolic fencing we erected at East Beach Complex. We marked the nests with small stakes and flagging tape and closely monitored each of these highly vulnerable nests and recorded hatch success or failure. On a few occasions it was decided that fencing could be extended to encompass the nests, and then we no longer monitored the nest fate intensively. Three nests were outside the fencing at East Beach Complex -- two nests washed out and one was abandoned.

### Black Skimmers

Black Skimmers were observed exhibiting breeding behavior East Beach. This season marked the first year we recorded breeding behavior at East Beach.

We recorded high counts of four breeding pairs at East Beach on June 8. We did not approach the Black Skimmers territory to reduce the risk of the birds abandoning the site. The birds were easily spooked from the slightest disturbances and often flushed from their territory for several minutes. Therefore, we were not able to confirm if there were Black Skimmer nests at East Beach. Ultimately, the skimmers left the site after the rains from June 17-21.

### Nest Site Disturbance

Disturbances within the nesting habitat, either those observed causing stress to the birds or tracks left in the sand, were tallied to provide an index of the types and disturbance occurrences at East Beach Complex (Table 4). We separated the disturbances into those caused by natural predators and human-influenced disturbances.

Natural disturbances, those caused by natural predators or other environmental factors, were frequently documented. Predator species such as grackles, Crested Caracaras, coyotes, and Laughing Gulls were often present. We documented an increase in disturbance from grackles this season. They were frequently observed perched on our symbolic fencing posts and on the growing vegetation and shrubs along the dune line (Figure 9a). We occasionally observed Crested Caracaras hunting in the nesting habitat at East Beach. We documented the same Crested Caracara territory in the same shrubs since 2014 within the middle of the East End Lagoon flats. We observed a family of five birds hunting the flats during one survey (Figure 9b). Coyote tracks were less frequently observed at East Beach Complex

this season compared to last season, though we documented coyotes as the cause of some nest failures. For the second year in a row, the symbolic fencing (i.e. bailer’s twine) was frequently severed at East Beach, sometimes multiple sections in a row, and the perpetrator was nearly always a coyote. Coyote tracks were the only evidence left behind where the line was severed; the area was either void of human tracks or human tracks were not close enough to have broken the line.

Table 4. Types and number of disturbance occurrences observed within the nesting habitat at East Beach Complex, Galveston, Texas, during the 2018 breeding season.

Predator Disturbance	Observed	Tracks	Human Disturbance		
			Observed	Tracks	Observed
Grackle	129	-	Vehicle	1	4
Laughing Gull	36	-	ATV	8	4
Gull-billed Tern	4	-	Helicopter	11	-
Yellow-crowned Night-Heron	43	-	Banner Plane	4	-
Crested Caracara	33	-	Paraglider	1	-
Northern Harrier	-	-	Drone	1	-
Peregrine Falcon	2	-	Human	12	14
Merlin	-	-	Photographer	1	-
Osprey	4	-	Horse	2	3
Great Blue Heron	1	-	Dog	-	-
Coyote	2	23	Unleashed Dog	1	-
Diamondback Rattlesnake	1	-	Unleashed Cat	1	-
Ghost Crab	-	-	Kite	4	-
Cat	-	-			
Raccoon	-	-			
Mouse	2	-			
Fire Ants	X	-			

The horse vendor and Galveston Police ride their horses and ATVs, respectively, along the beach shoreline more frequently on the weekends. They are not tallied each time they are observed along the shoreline, rather when they are seen as a disturbance to the nesting birds or chicks (Table 4). We were able to reach out to the majority of staff and inform them about the nesting birds, fencing, and the possibility of chicks being on the shoreline and they respected posted areas. There was one case of a vehicle that drove through symbolic fencing and into the nesting habitat at East Beach (Figure 9c).

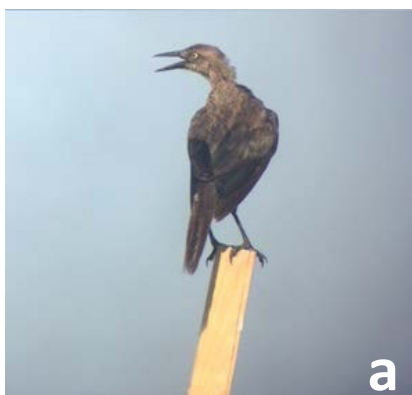




Figure 9. (a) grackle perched on our symbolic fencing post, (b) Crested Caracara family in the East End Lagoon flats, (c) vehicle tracks that drove through symbolic fencing and into the nesting habitat at East Beach (2018).

### Banding and Re-sighting

This is the fifth year of trapping and banding Wilson’s Plovers and the fourth year we have banded Snowy Plovers at East Beach Complex (Table 5).

Table 5. Wilson’s Plovers adults and chicks banded at East Beach Complex in Galveston, Texas during the 2018 breeding season.

Site	Wilson’s Plovers		Snowy Plovers	
	Adults	Chicks	Adults	Chicks
East Beach Complex	20	8	1	6

On August 7, we found a dead breeding female Wilson’s Plover that we banded this 2018 season at East Beach. Her red band and white code was “PN”. She was found on the shoreline of Bolivar Flats amongst loafing Wilson’s Plovers. There was no visible wounds and no obvious injury related to the band. Houston Audubon collected the bird for later necropsy.

We used resight data to determine return rates of our banded plovers (i.e. how many plovers banded in previous years returning in subsequent years). Current return rates include 3 of 8 (37.5%) adult Wilson’s Plovers banded in 2017, 8 of 13 (61.5%) banded in 2016, 7 of 15 banded in 2015 (46.7%), and at least 4 of 16 (25.0%) banded in 2014 returned this year. No Wilson’s Plover chicks banded in 2017 (n=11), 2016 (n=20), 2015 (n=7), or 2014 (n=18) were resighted this season. There were two birds that had missing bands, therefore we weren’t able to determine if the birds were banded as an adult or chick.

The one adult Snowy Plover banded in 2017 returned (100%) and nested once again at East Beach. Neither of the two chicks banded in 2017 were resighted. Two of the four (50%) adult Snowy Plovers banded in 2015 returned to East Beach, and one of them nested at East Beach.

### Outreach

We educated 468 people about beach-nesting birds through opportunistic public outreach to beach-goers while monitoring and nest-site stewardship, community engagement, and outreach events (Table 6). Stewardship is conducted by the HAS-ABC avian technicians and volunteer stewards. We focus our volunteer efforts more intensely at East Beach than other upper coast focal sites because the most

people visit this location. We employed 25 volunteers who put in a total of 154.75 hours to assist us in stewardship activities.

Table 6. Number of people reached through stewardship and community outreach at sites in Texas (2018).

<b>Outreach Function</b>	<b># of People Reached</b>
Monitoring	85
Stewardship (including volunteers)	15
Community Engagement	
<i>River Oaks Elementary School</i>	40
<i>San Luis Pass trash cleanup</i>	9
<i>Galveston Planning Commission meeting</i>	28
<i>Galveston Park Board BMAC meeting</i>	25
Outreach Event	
<i>Trash Bash</i>	60
<i>Bay Day Festival</i>	124
<i>World Ocean's Day</i>	82
Facebook (Help Gulf Birds and Houston Audubon)	
<i>Help Gulf Birds</i>	75885
<i>Houston Audubon</i>	4494
<b>TOTAL</b>	<b>9145</b>

We participated in three outreach events this season where we set up a booth. We were welcomed back for a third year by both Galveston Bay Foundation's Bay Day Festival and Artist Boat's World Oceans Day (Figure 10). We attended one new event, the Trash Bash registration station at Virginia Point Peninsula Preserve outside of Galveston. We were asked by Galveston Bay Chapter of Texas Master Naturalists to speak to the 5<sup>th</sup> grade class of River Oaks Elementary School about beach-nesting birds while in the field which was followed by a trash cleanup at East Beach. We also organized a trash cleanup on the bayside of Galveston Island at San Luis Pass. Lastly, we gave public comment during the Galveston Planning Commission meeting and Galveston Park Board Beach Maintenance Advisory Committee meeting in support of a proposed beach raking regulation change on Galveston Island that would prevent beach raking 10 feet seaward of the dune vegetation line. This would improve beach-nesting bird and nonbreeding bird habitat.

We employ social media such as Facebook, to reach people beyond the beach. Our team posts pictures and news about nesting activity on ABC's *Help Gulf Birds* and Houston Audubon's Community Facebook pages ([www.facebook.com/FishSwimPlay/](http://www.facebook.com/FishSwimPlay/); [www.facebook.com/houstonaudubon](http://www.facebook.com/houstonaudubon)). During the breeding season, we have reached a combined total of 80,379 people on the aforementioned Facebook pages.



Figure 10. (a) Artist Boat’s World Oceans Day, (b) River Oaks Elementary School 5<sup>th</sup> grade class at East Beach, (c) volunteer stewards at East Beach, (d) trash cleanup volunteers standing next to trash cleaned up on the bayside of San Luis Pass, Galveston Island (2018).

## DISCUSSION

### Weather

The weather this season had less of an impact on nesting birds compared to the previous three seasons. This was attributed to fewer rain events, abnormally low tides, and the absence of the very high spring tide that typically washes out the majority of nests and chicks early in the season. The inclement weather we did have was late this season (e.g. June 17-21, July 4) when many nests had already hatched or chicks had fledged or grew old enough to potentially avoid high water. Still, these two rain events impacted the nesting habitat and washed out multiple eggs and chicks.

### Disturbance

Grackles were a significant disturbance to the nesting birds compared to previous seasons. We suspect grackles depredated a numbers of nests we had to document with an unknown nest fate -- we would often find empty nest cups with no evidence of another predator or human disturbance where grackles were commonly observed perching or harassing nesting birds.

Trash continues to be a hazard to the nesting birds. After each weekend, especially after a holiday weekend, we picked up the trash inside the nesting habitat while conducting our survey, sometimes spending up to an hour collecting it. Common trash items included single-use plastic bags, single serving chip bags, and water bottles. We collected four abandoned kites at East Beach that landed in the nesting habitat (Figure 11a) – kites can be viewed by nesting birds as avian predators and kite string can be akin to fishing line in that birds can become entangled in it and become injured or die.

This season we observed an increase in Least Terns and Wilson’s Plovers incorporating trash into their nests. Several nests at East Beach were placed next to trash that collected near the high tide line or was blown into the nesting habitat (Figure 11b). We did not observe any direct harm to adults, nests, or chicks that were directly adjacent to plastic trash.



Figure 11. (a) abandoned kite in the nesting habitat at East Beach, Galveston, Texas, (b) Wilson’s Plover nest with white styrofoam pieces used to line the nest cup (2018).

To minimize disturbance and direct mortality to chicks (i.e. visitors inadvertently stepping on chicks), we placed “Watch for flightless chicks” signs in areas where broods were feeding or were at risk of being stepped on (Figure 12a).

This season we installed two permanent signs at East Beach that read “All Dogs Must Be On A Leash; Important Bird Area.” They were placed adjacent to the nesting habitat where unleashed dogs are commonly seen, one by the South Jetty parking area and one at the border of the swimming and no swimming area (Figure 12b).



Figure 12. (a) temporary sign installed at East Beach in Galveston, Texas to help keep chicks safe, and (b) one of two permanent leashed dog signs installed at East Beach (2018).

Two separate occasions vehicles drove through the symbolic fencing at East Beach into the nesting habitat (Figure 9c), one vehicle entering from the free parking area and another from the jetty parking lot. These trespasses were reported to East Beach management and addressed.

We took precautions at the beginning of this breeding season to prevent disturbances from the horseback riding vendor. We spoke with the horse guides and informed them of sensitive nesting areas and ways they could help prevent disturbance to the nesting birds, which included staying along the Gulf and Houston Ship Channel's shoreline in front of the dunes and in front of the fenced nesting habitat. We also asked them not to go behind any stand-alone nesting bird signs. They adhered to our recommendations.

### Habitat

This is the second season we observed trailing fuzzybean (*Strophostyles helvola*), also known as sand bean or wild bean, growing at East Beach (Figure 13). Trailing fuzzybean is a vine in the pea family (Fabaceae) that is native to the region. It grows in sandy soils, often colonizing in open habitats such as coastal dunes, woodlands, clearings, and abandoned cropland (USDA 2006). The vine growth tends to concentrate and grow densely in higher elevated dunes; however, we have observed it spreading and growing into low-lying, open sandy areas with sparse vegetation favored by beach-nesting birds, reducing the amount of nesting habitat for future nesting seasons. We will continue to monitor the growth of the vine at our monitoring sites and may recommend the removal of the vine if the plant significantly spreads throughout the habitat and has a negative influence on available nesting habitat.



Figure 13. Trailing fuzzybean (*Strophostyles helvola*) growing within and over existing dune vegetation at East Beach in Galveston, Texas (2017).

Other vegetation along the shoreline at East Beach is becoming more vegetated and dense with shrubs (e.g. salt cedar) and vines, and grackles were frequently observed perched on the vegetation. This may also be a contributing factor to the increase of grackles in the nesting habitat.

Storms during the 2017-2018 nonbreeding season, including Hurricane Harvey which brought catastrophic flooding on the upper Texas coast from August 25-29, 2017, altered the nesting habitat positively at East Beach. The Houston Ship Channel at East Beach widened in places and an increase of sand blew into the nesting habitat throughout the breeding season which helped increase the elevation in areas and create and build up existing dunes.

## RECOMMENDATIONS

We recommend that GPBT consider removing two metal posts and one “No Swimming” sign located inside the nesting habitat. The posts were used as perches by avian predators and were observed causing a disturbance to the nesting birds. We also suggest adding more signage in more high pedestrian traffic areas to address park rules and regulations and wildlife conservation areas, specifically along the pedestrian route to the jetty from the jetty parking lot. Regulatory signage such as “No Vehicles Beyond This Point” and educational signage asking visitors to not run through groups of birds or to feed birds (i.e. Laughing Gulls, grackles) is suggested. Laughing Gulls are a frequent disturbance to the nesting birds at East Beach and are often observed lingering in the parking lots where they are hand fed by visitors. ABC is willing to assist GPBT in relocating signs and/or developing verbiage for new signage and literature.

We encourage more lids be put on all trash bins directly adjacent to the nesting habitat in the fish parking area and to remove the row of trash bins directly along the bollard line that separates the conservation area from the parking lot. This is to prevent trash from blowing into the nesting habitat and to prevent birds from pulling out trash of the bins. Windblown trash was frequently picked up within the habitat. Common trash items blown in include plastic bags, chip bags, water bottles, and beach balls. Laughing Gulls and Great-tailed Grackles were still observed picking through and pulling out trash from the bins.

We suggest that GPBT help coordinate a training for all horse vendor guides at the beginning of each breeding season where we can train the guides about the birds that nest at East Beach, what to look for, and how to reduce disturbance to the birds. This is intended to further protect the birds and their habitats when we are not onsite and to help the guides become stewards of this important nesting area.

## CITATIONS

U.S. Department of Agriculture (USDA). 2006. Plant Guide: Trailing Fuzzybean (*Strophostyles helvula*).



## **APPENDIX 1**

Reproductive Metrics for Wilson's Plover, Snowy Plover, and Least Tern  
2014 – 2018

### Wilson's Plover

Reproductive Metric	2014	2015	2016	2017	2018
# breeding pairs	15	17	10	20	18
# nests monitored	14	29	17	36	22
Apparent Nest Success	8	7	9	12	15
Failure – Predation	0	7	2	6	4
Failure – Washout	2	13	1	12	0
Failure – Abandonment	0	1	0	1	0
Failure – Human-Caused	1	0	0	0	0
Failure - Unknown	3	1	5	5	3
# Fledges	7	6	7	3	22
Productivity (fledges/pair)	<b>0.46</b>	<b>0.35</b>	<b>0.70</b>	<b>0.15</b>	<b>1.22</b>

### Snowy Plover

Reproductive Metric	2014	2015	2016	2017	2018
# breeding pairs	3	5	3	3	3
# nests monitored	5	10	1	5	4
Apparent Nest Success	4	1	0	2	2
Failure – Predation	0	6	1	0	0
Failure – Washout	1	3	0	2	0
Failure – Abandonment	0	0	0	0	1
Failure – Human-Caused	0	0	0	0	0
Failure - Unknown	0	0	0	1	1
# Fledges	3	0	1*	0	2
Productivity (fledges/pair)	<b>1.00</b>	<b>0.00</b>	<b>0.33</b>	<b>0.00</b>	<b>0.66</b>

\*This nest was not found but the chick/fledge was seen at a later date.

### Least Tern

Reproductive Metric	2014	2015	2016	2017	2018
# breeding pairs	63	95	62	50	39
# Fledges	24	3	7	0	2
Productivity (fledges/pair)	<b>0.38</b>	<b>0.03</b>	<b>0.11</b>	<b>0.00</b>	<b>0.05</b>

# Shorebird Monitoring at Bryan Beach

- Part of larger coast-wide program
  - Partners: American Bird Conservancy, Houston Audubon Society, Gulf Coast Bird Observatory, Coastal Bend Bays & Estuaries Program
- Breeding season (mid-Mar – Aug)
  - Monitor nesting Wilson's Plovers and Least Terns
- Nonbreeding season (mid-Jul – May)
  - Monitor wintering Piping & Snowy Plovers
- Outreach
  - Public education, all seasons
- Symbolic fencing, semi-permanent fencing, and other signage
  - Protect nesting, foraging, and resting birds





# Bryan Beach Highlights

- $\leq 15$  breeding pairs of Wilson's Plovers
- Nest success 0% - 30%
- Erected semi-permanent signage and temporary symbolic fencing/signs at nesting/resting/foraging areas
- Briefed police force on nesting bird needs
- Erected semi-permanent fence to protect former state park area from ATV/UTV/4WD truck access
- Organized a citizen's patrol group (2017)
- Performed outreach on beach to educate public

# Bryan Beach Challenges

- Birds nest on the ground behind the dunes
- Birds and dunes are both protected resources, however...
- Most people are unaware of these protections
- We have documented:
  - People driving through dunes on a regular basis
  - Dumping of trash
  - Shooting of protected bird species
- Enforcement is difficult due to lack of signage and constraints on police availability



# Bryan Beach



Continued trash dumping

Public beach entrance

BB 0

BB 1

First Area Road

BB 2

Middle Area

BB 3

Big Flats

BB 4

Second Washout

BB 5

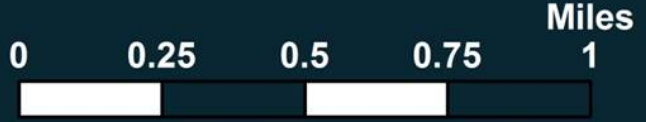
BB 6

Last Washout

Brazos River

**The shorebird survey:**

- Beach-front: continuous 1-km transects along (BB 0–BB 6) and
- Back-beach sites (5 pink polygons).





GCBO fence protecting back flats bird habitat at “Big Flats” study site was cut open and new ORV trail to access back dunes is developing.





Big Flats fence repaired (Dec 21, 2018)





Dune erosion from illegal ORV trails



Illegal ORV trail at Big Flats” study site (right side of pic) is well-used; but to avoid muddy conditions on it, a new, now even muddier trail was forged recently.



# Dune impacts from ORVs





# Dune Impacts from ORVs





# Dumping, Improper Disposal



# Illegal Gun Use

- Hunting is legal in our survey areas, but we have observed:
- Shooting of clay pigeons behind the dunes
- Illegal shooting of protected bird species
- Target practice with semi-automatic weapons near beach





2 Royal Terns shot but still  
alive on March 30, 2015





**Shotgun shells at Middle Area back-beach site**



# Plover and Least Tern Nest Monitoring and Disturbance in The Nature Preserve at Charlies Pasture in Port Aransas



with financial support in-part from:



**Sixth Year  
Annual Report  
November 20, 2018**

## Introduction

American Bird Conservancy and its partners are working to protect beach-nesting sites for solitary and colonial nesting birds such as Snowy Plovers (SNPL), Wilson's Plovers (WIPL), and Least Terns (LETE) with the long-term conservation goal of maintaining or increasing their nesting success. To determine current nesting success for these species and to establish a baseline for management practices contributing to increasing populations, ABC has provided funding to an independent contractor to monitor nesting sites at the Nature Preserve at Charlie's Pasture in Port Aransas.

## Study Site

The Nature Preserve at Charlie's Pasture in Port Aransas is a protected site and before Hurricane Harvey visitors were restricted to an elevated boardwalk with educational signs detailing shorebird conservation in the area. The boardwalk was destroyed by the hurricane and to date, visitors are not allowed inside the breeding habitat. The site is largely composed of hard-packed sand, salt, and blue-green algal flats with small pockets of vegetated mounds (Figures 1,2), which occasionally flooded during high tide or after heavy rainfall. The surveyed area of this site was approximately 303 acres.

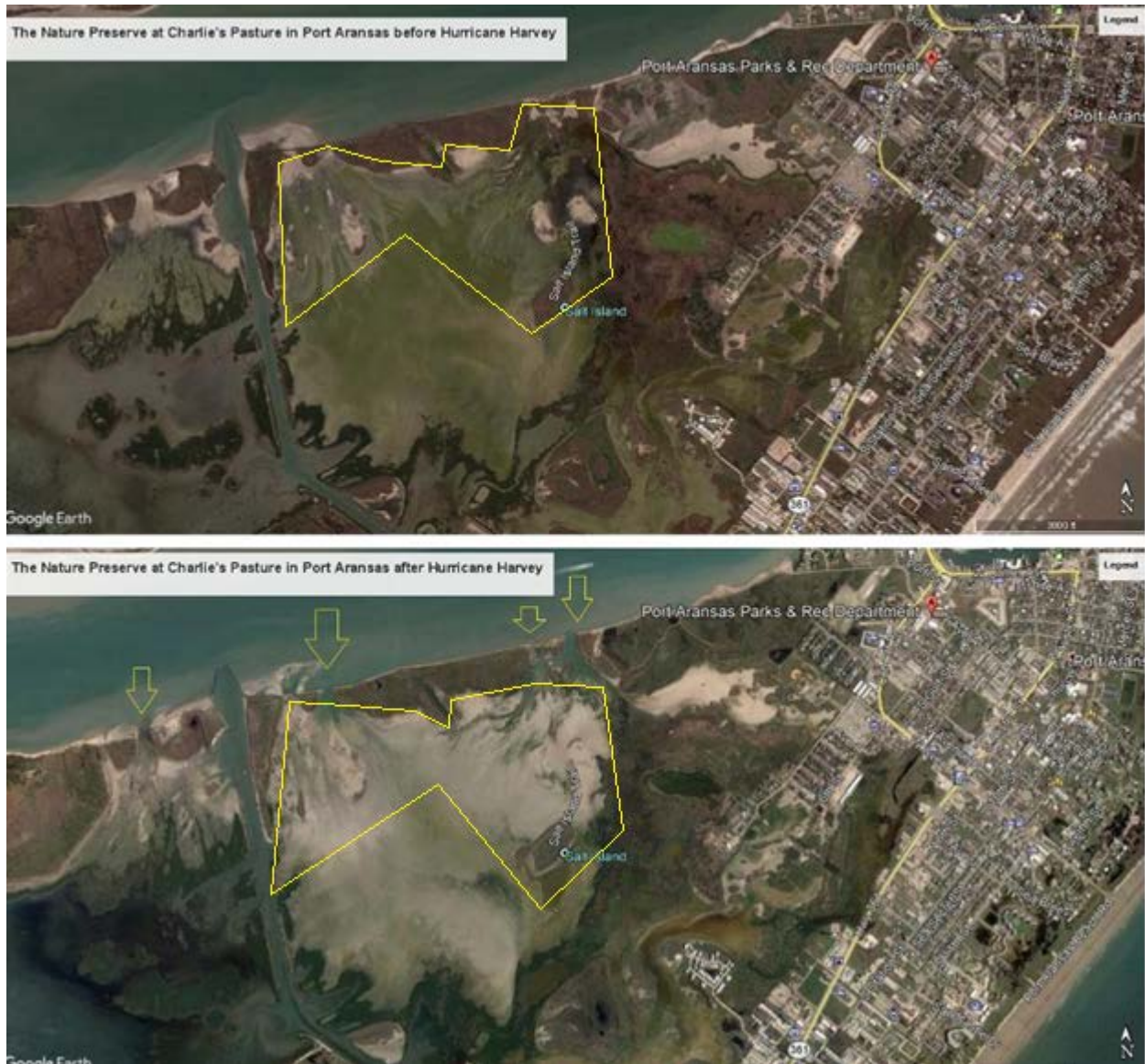


Figure 1 (top). Satellite image of The Nature Preserve at Charlie's Pasture in Port Aransas Survey Area in Port Aransas, Texas before Hurricane Harvey. Note areas of sand and algal flats.

Figure 2 (bottom). Satellite image of The Nature Preserve at Charlie's Pasture in Port Aransas Survey Area in Port Aransas, Texas immediately after Hurricane Harvey. Note several locations where water freely enters the preserve. Most of the sand pushed into the Preserve by Harvey has since eroded.

## Methods

### Nest searching

Wilson's Plovers typically place their nests among or underneath vegetation (Figure 3), while Snowy Plovers and Least Terns usually nest in open flats with no plant affiliation (Figures 4, 5). We began each survey by recording the current weather data including temperature, wind speed and direction, cloud cover, and tide status. We started each survey with a full scan of the site using a spotting scope. If target

species were observed we walked towards their location looking for adult birds. During surveys, we utilized the track mode on a Garmin GPS and overlaid the data into Google Earth to ensure that all suitable nesting habitats were being thoroughly searched.



Figure 3. Wilson's Plover nest surrounded by saltwort.



Figure 4. Snowy Plover nest in open algal flat, lined with shells.



Figure 5. Least Tern nest with minimal nest lining and no plant cover.

Once plover adults were located, possible presence of a nest nearby was inferred from their behavior. If adults vocalized and remained in the area, we attempted to find a nest, either by walking through suitable habitat nearby or by backing away from the adults and watching to see if the adult returned to its nest. The first method was most useful because we honed in on adult behavior indicative of territory defense: adults were observed sneaking away from a nest or they were extremely agitated by our presence (i.e. staying very close to the observer and/or performing a broken wing display). If the adults were not seen leaving the nest or the nest could not be found by walking through the vegetation, we used the second approach.

Least Tern nests were typically easier to find, since the adults usually fly directly off the nest and land close to them. The best approach to locate tern nests was to sit on the perimeter of colonies and search for incubating terns using a spotting scope and binoculars.

When we found a plover nest, we marked the location with a handheld Garmin GPS. Photographs were taken of all plover nests and their surroundings. We floated eggs from new nests in a shallow plastic container filled with fresh water to estimate the hatch date (Niver 2000). Hatch dates were estimated on a 25-day scale for Wilson's Plovers and 24 days for Snowy Plovers.

Nests of non-target species, including Black-Necked Stilt, Common Nighthawk, Willet, and Horned Lark were sometimes found incidentally while searching for target species nests. We marked these nests with a GPS waypoint but did not monitor them throughout incubation.

## Nest monitoring

We checked all plover nests two to three times per week during incubation. When we re-visited a known nest and found it empty with no adults or chicks nearby, we checked its projected hatch date. If the nest was empty more than two days before its hatch date, we assumed the nest had failed and then

searched the immediate area for signs of failure cause such as predator tracks (Figure 6), large egg fragments and/or yolk, or flooding (Figure 7). We categorized nests as successfully hatched if 1) we saw chicks in the nest cup or nearby with a banded adult from that nest, 2) we found pipping fragments (small 1-3 mm) pieces of eggshell that occur only when chicks pip out of their eggs (Mabee 1997, Figure 8), or 3) a nest had missing eggs which were due to hatch based on float data, had no signs of depredation and adults displaying brooding behavior in the area.



Figure 6. Coyote tracks next to a depredated Least Tern nest (yolk visible in lower left corner).



Figure 7. A sand flat at The Nature Preserve at Charlie's Pasture in Port Aransas, Texas flooded after heavy rainfall.

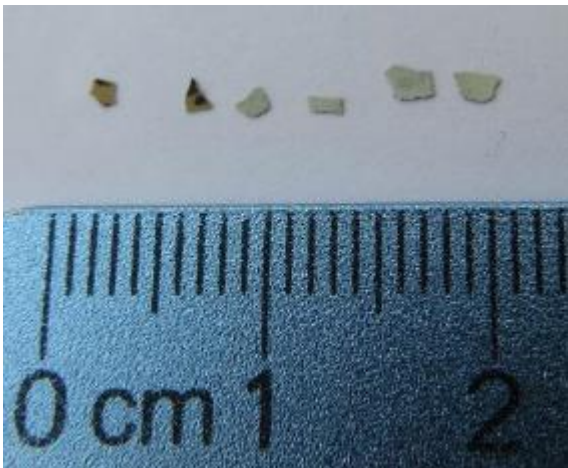


Figure 8. Eggshell fragments found in three successful nests. The left two show the outside camouflaged colors; the four right-most fragments show the light blue color of the insides of the shells.

## Breeding pairs

We estimated number of breeding pairs for plovers by following banded birds (see Trapping and Banding section), and documenting nest sites and established territories. We adjusted our estimate for re-nests by accounting for banded birds that we observed nesting again after a documented failure. For

Least Terns, we calculated breeding pairs by using the greatest number of nests recorded in a single day (Burger et al 1994).

## Data recording and entry

Field notes and weather measurements were recorded every day. These notes included new GPS waypoints, number of adult and young target birds seen, disturbance occurrences, new nests, and the status of revisited nests. We also collected multiple data points for active nests, including date found, date of each egg laid (if observed), projected hatch date, actual hatch date, and nest fate. All data were managed in Microsoft Excel. A photograph and waypoint were taken for each plover nest.

## Disturbance

All signs of disturbance were recorded. These disturbances included sightings or tracks of vehicles, coyotes, domestic dogs, feral hogs, raccoons, avian predators, humans, and aircraft (Figures 9, 10).



Figure 9. Feral Pig in The Nature Preserve at Charlie's Pasture in Port Aransas, Texas.



Figure 10. Crested Caracaras in The Nature Preserve at Charlie's Pasture in Port Aransas, Texas.

## Trapping and Banding

Adult Snowy and Wilson's Plovers were trapped using a box trap set over the nest. We used a square beige PVC frame with an open bottom and netted sides that was propped up with a stick to allow birds into the trap (Figure 11). This "drop trap" method was used in a variety of vegetated and open habitats.

We attached over 100 m of braided fishing line on a reel to the prop stick. The trapper walked at least 35 m away (or more) and hid behind vegetation or flat against the ground holding the reel. Once the plover was sitting on its nest, the trapper pulled the fishing line to drop the entire box over the bird. We moved as quickly as possible to remove the



Figure 11. Drop trap set over a vegetated Wilson's Plover nest.

bird from the trap in order to minimize any risk of injury to the bird or nest, and the trap was immediately removed from the area. Plover chicks were opportunistically caught by hand (i.e. in or around the nest cup) and banded.

We banded plovers (adults and chicks) with a uniquely numbered metal band above the right ankle. For Snowy Plovers, a single red or modified red Darvic band (red with a white pinstripe made of tape) was placed on the upper left leg as a regional identifier. A brown year marker (2018) Darvic band was put on the lower left leg. Chicks received only regional markers and metal bands. We put unique Darvic color combinations on adult Snowy Plovers on the lower right leg (Figure 12). Year markers for previous years and species include (lower left leg): Red in 2017 for all plovers, (lower left leg): Yellow in 2016 for all plovers, black in 2014 for all plovers, medium blue for Wilson's Plovers in 2013, and grey for Snowy Plovers in 2012. We banded adult WIPL with a USGS unique number coded metal band on the upper right leg, a black and white two letter alpha code on the upper left leg and a brown year marker Darvic band on the lower left leg (Figure 13).



Figure 12. Adult SNPL with full complement of bands in The Nature Preserve at Charlie's Pasture in Port Aransas, Texas.



Figure 13. Adult WIPL with full complement of bands in The Nature Preserve at Charlie's Pasture in Port Aransas, Texas.

Due to the total number of birds present and limited staff, it was not possible to band all nesting birds at these sites. Typically, only one bird of a pair was incubating the eggs at a time, so only one could be trapped unless we revisited the nest while the other adult was incubating. The goal was to uniquely identify a sufficient number of birds to allow for some detection of re-nesting and/or interactions between individuals with a known nesting history.

## Results

### Totals for Adults and Breeding Metrics

The estimated number of breeding pairs observed was 16 Wilson’s Plovers, 30 Snowy Plovers, and 41 Least Terns (Table 1). The Total number of nests was 16 Wilson’s Plover, 31 Snowy Plover, and approximately 41 Least Tern. The maximum number of fledglings observed during a single survey was 10 Wilson’s Plover, 5 Snowy Plover, and 12 Least Tern.

Table 1. Average number of adults during the core breeding season (April-June), estimated number of breeding pairs, total nests located, and max high counts for chicks observed during a single survey during the 2018 season. WIPL=Wilson’s Plover, SNPL=Snowy Plover, LETE=Least Tern

	Port Aransas		
	WIPL	SNPL	LETE
<b>Average # Adults (Apr-Jun)</b>	16	16	26
<b>Estimated # of Pairs</b>	16	30	41
<b>Total Nests</b>	16	31	41
<b>Max # Downy Chicks</b>	2	3	6
<b>Max # Feathered Chicks</b>	0	2	6
<b>Max # Flight Capable</b>	10	5	12

### Nest fates

#### Wilson’s Plover

The total number of nests found at The Nature Preserve at Charlie’s Pasture in Port Aransas (n=16) was 6% lower than the five-year average (n=17). The total number of Wilson’s Plover nests that successfully hatched in 2018 (n=13) was 81%, which is higher than the five-year average of 18% successfully hatched nests (n=3). No Wilson’s Plovers nests were depredated in 2018 compared to the five-year average of 35% depredated (n=6). While there were a few severe thunderstorms during the breeding season, no Wilson’s Plover nests washed away in 2018 compared to the five-year average of 24% (n=4). Four Wilson’s Plover chicks were banded this year and 10 fledglings were observed on 22 June before large numbers of Wilson’s Plover adults began roosting/pre-migratory grouping on site on 2 July (Table 2, Figure 14).

Table 2. Five-year average for Wilson's Plover nest fates (2013-2017) vs 2018 nest fates for the Nature Preserve at Charlie's Pasture in Port Aransas, Texas. WIPL=Wilson's Plover

WIPL	Port Aransas	
	5yr Average	2018
Hatched	3	13
Depredated	6	0
Washout	4	0
Abandoned	1	0
Unknown	4	3
Other failure	0	0
<b>Total Nests</b>	<b>17</b>	<b>16</b>

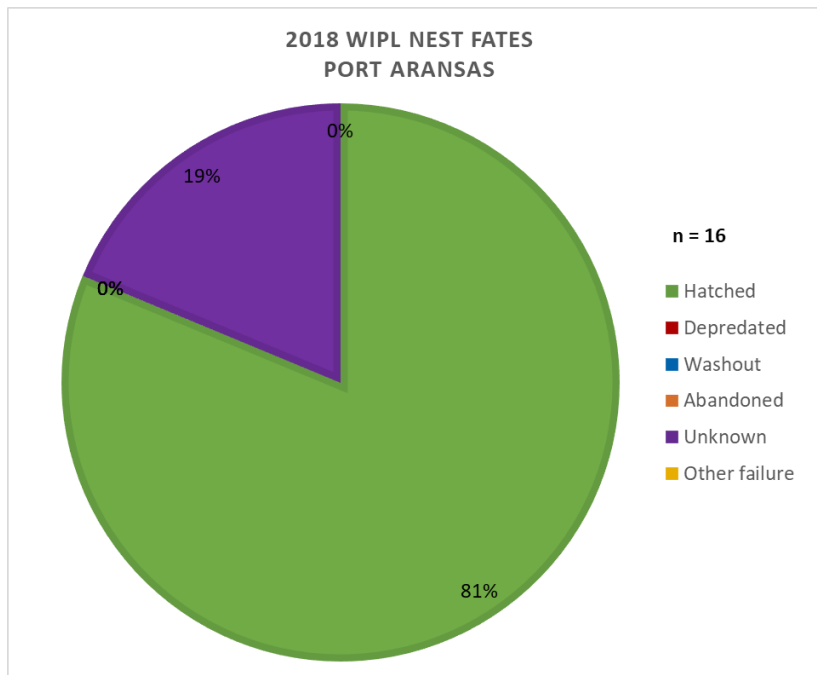


Figure 14. Nest fates for Wilson's Plover (WIPL) at the Nature Preserve at Charlie's Pasture in Port Aransas, Texas in 2018.

### Snowy Plover

The number of nests found in 2018 (n=31) was 72% higher than the five-year average (n= 18). The total number of Snowy Plover nests that successfully hatched in 2018 (n=10) was 32%, which is higher than the five-year average of 17% successfully hatched nests (n=3). This year depredation claimed 19% (n=6) of nests compared to the five-year average of 22% (n=4). This season a few thunderstorms contributed to the 26% of nests that washed out (n=8), which is close to the five-year average of 27% (n=5). Nine percent of nests (n=3) were abandoned this season compared to the five-year average of six percent (n=1). 10% of nests had unknown failure (n=3) compared to the five-year average of 22% (n=4). Five Snowy Plover chicks were banded this year and five fledglings were observed on 22 June (Tables 1, 3).



This year at the Nature Preserve at Charlie’s Pasture in Port Aransas, Snowy Plover nest fates were 32% hatched, 19% predated, 26% flooded, 10% abandoned, 10% were unknown failure, and 3% failed to hatch (Table 3, Figure 15).

Table 3. Five-year average for Wilson’s Plover nest fates (2013-2017) vs 2018 nest fates for the Nature Preserve at Charlie’s Pasture in Port Aransas, Texas. SNPL=Snowy Plover

SNPL	Port Aransas	
	5yr Average	2018
Hatched	3	10
Depredated	4	6
Washout	5	8
Abandoned	1	3
Unknown	4	3
Other failure	1	1
<b>Total Nests</b>	<b>18</b>	<b>31</b>

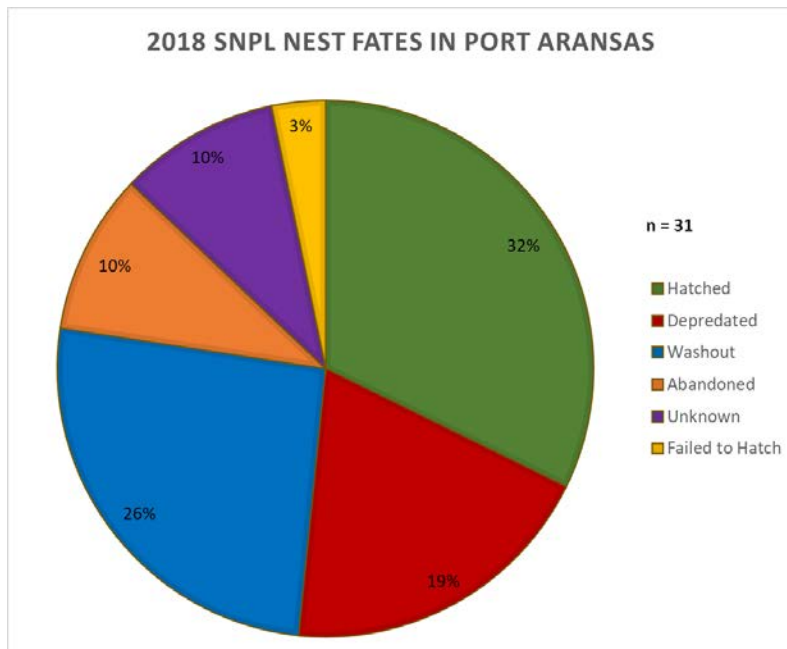


Figure 15. Nest fates for Snowy Plover (SNPL) at the Nature Preserve at Charlie’s Pasture in Port Aransas, Texas in 2018.

Least Tern

This season the average number of adults on site was 30. The estimated number of breeding pairs was 41. The estimated number of nests was 41. The max number of downy chicks observed during a single survey was six. The max number of feathered chicks observed during a single survey was six, and the max number of fledglings observed was 12 (Table 1).

### Common Nighthawk

One Common Nighthawk nest was located and monitored this season in the Nature Preserve at Charlie's Pasture. The nest hatched successfully (Figure 16).



Figure 16. Common Nighthawk adult (left) at the Nature Preserve in Charlie's Pasture in Port Aransas and Common Nighthawk chick (right) observed at Packery Flats on Mustang Island, Texas, 2018.

### Disturbance

We recorded disturbances when something traveled close enough to the target species to disrupt ordinary behavior. Fresh predator tracks within 50 yards of known nesting habitat were considered disturbances in addition to visual sightings. The most common sources of disturbance in 2018 were feral pigs (47 sightings of individuals or fresh tracks), coyotes (21 sightings of individuals or fresh tracks), racoons (15 sightings of individuals or fresh tracks), and low flying aircraft (7 sightings, Table 4). Fewer raccoon and coyote disturbances were observed following hurricane Harvey in the 2018 breeding season compared to 2017. There was an increase in feral pig disturbances and depredations in 2018 compared to 2017 (Figure 17).

Table 4. Disturbances (tracks and sightings) observed in 2018 at the Nature Preserve at Charlie's Pasture in Port Aransas, Texas.

Disturbance	Port Aransas
Coyote	21
Raccoon	15
Dog	0
Pig	47
Bird	1
Human	1
Vehicle	0
Aircraft	7

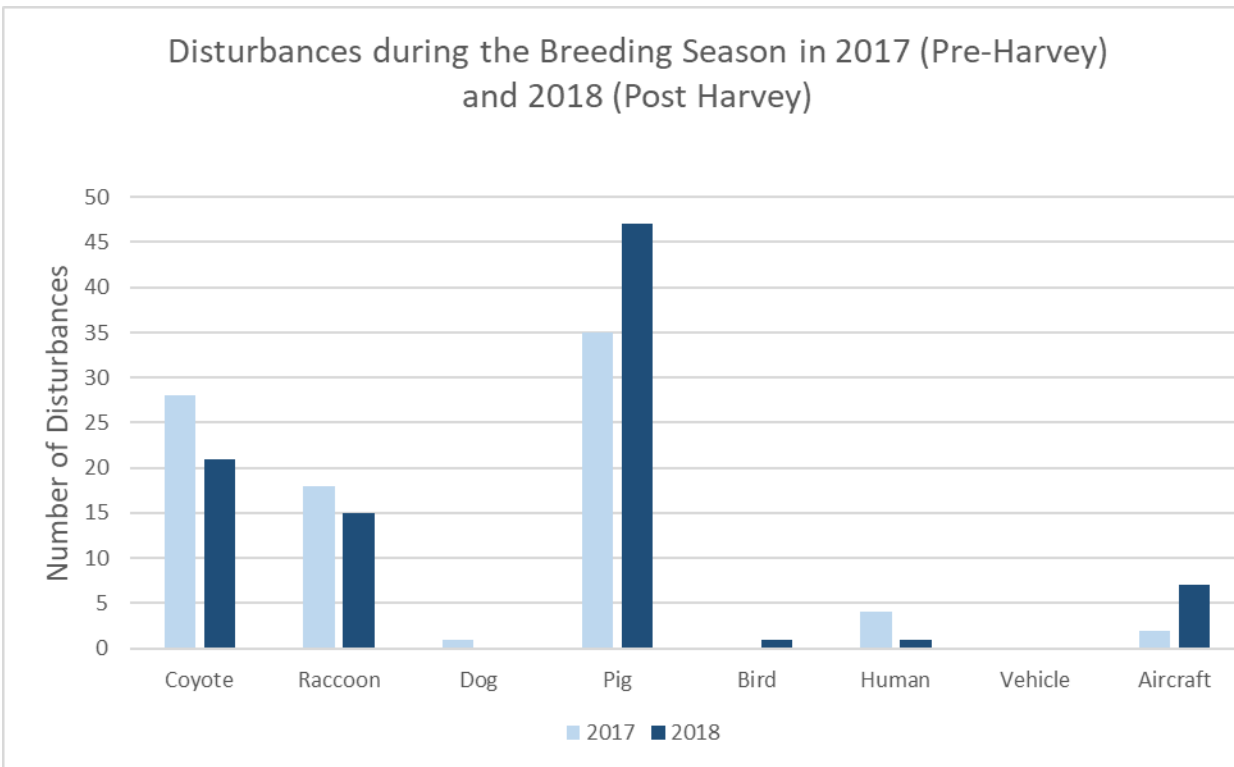
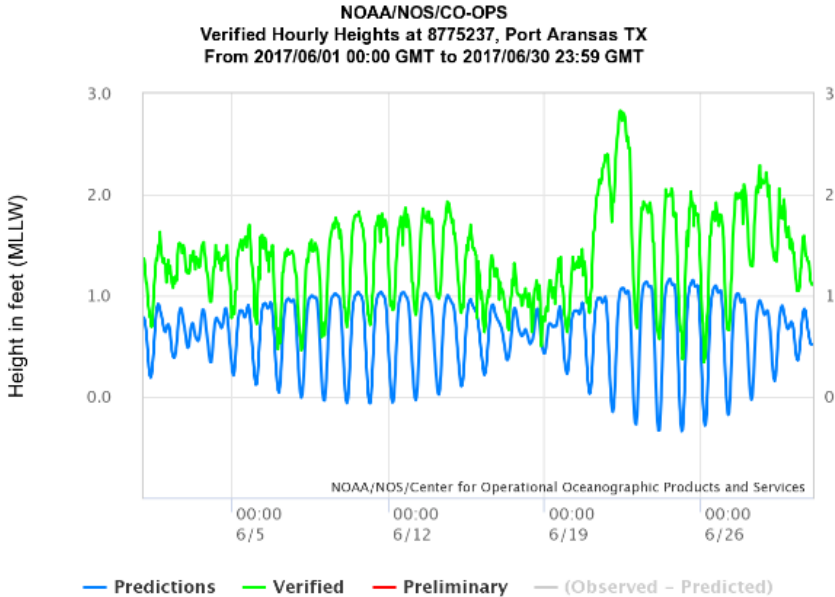


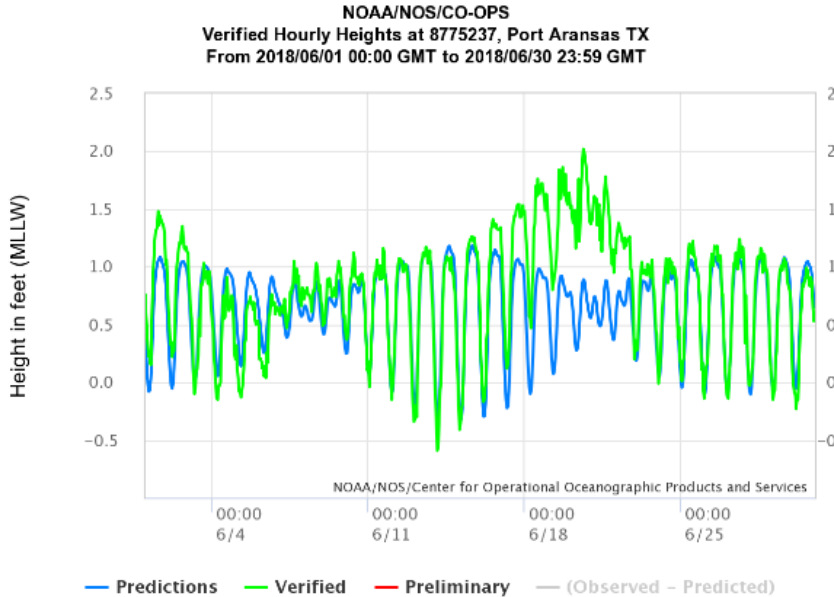
Figure 17. Comparison of disturbance observations during the 2017 and 2018 breeding seasons in the Nature Preserve at Charlie's Pasture in Port Aransas - pre and post hurricane Harvey in South Texas.

### Weather and Nest Timing

The weather for the breeding season in 2018 was mostly warm and dry with one large rain event on June 20 (approximately 13 inches). The actual tides at Port Aransas in 2018 were closer to the predicted averages compared to previous years (Figure 18).



JUNE 2017



JUNE 2018

Figure 18. Observed Water Levels in June 2017 and June 2018 in Port Aransas compared to predictions based on 19-year averages for the Mean Higher High Water levels.

### Nest Timing

The first Snowy Plover initiated nesting March 2<sup>nd</sup>, one month before the Wilson's Plovers (April 2<sup>nd</sup>) and about 2 months before Least Terns (April 25<sup>th</sup>, Figure 20). All sites received over 13 inches of rain in 48 hours during the week of June 18<sup>th</sup>. Nesting of all target species tapered off after this event.

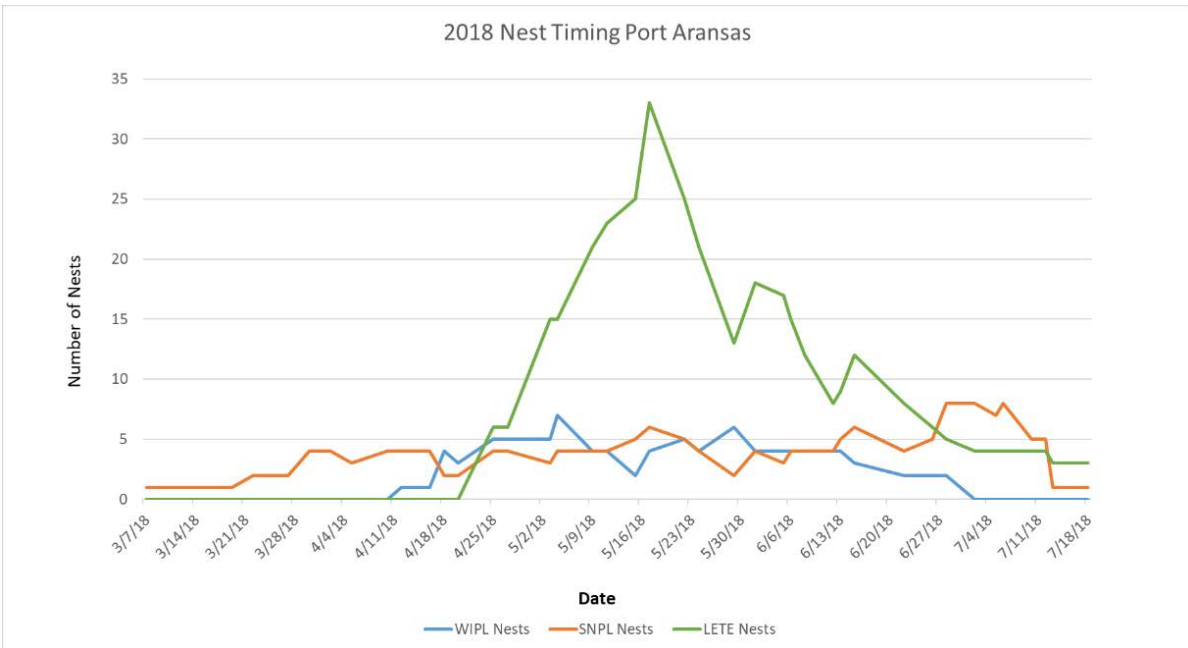


Figure 20. Nest timing for Wilson's Plovers (WIPL), Snowy Plovers (SNPL), and Least Terns (LETE) in the Nature Preserve at Charlie's Pasture in Port Aransas, Texas, 2018.

## Banding Efforts

We banded 35 adult and pre-fledgling plovers in 2018. We banded nine adult Wilson's Plovers and four chicks, and 17 adult Snowy Plovers and five chicks (Figure 28, Table 4). One Snowy Plover captured on a nest was banded in 2012 and we replaced the old faded bands with new darvic bands (Figure 22).

Table 4. Number of plovers banded in the Nature Preserve at Charlie's Pasture in Port Aransas. WIPL=Wilson's Plover, SNPL=Snowy Plover

Year Banded	WIPL adults	WIPL chicks	SNPL adults	SNPL chicks
2016	6	1	13	2
2017	9	5	12	7
2018	9	4	17	5



Figure 21. Banded Snowy Plover chick in the Nature Preserve at Charlie's Pasture in Port Aransas, Texas, 2018.



Figure 22. Snowy Plover banded in 2012 with faded plastic bands (left) which were replaced with new darvic bands (right) in the Nature Preserve at Charlie's Pasture in Port Aransas, Texas, 2018.

## Re-nests

One banded Snowy Plover was observed re-nesting this season in the Nature Preserve at Charlie's Pasture in Port Aransas after heavy rains flooded it's first nest. No Wilson's Plover re-nests were observed this season.

## Discussion

A dry breeding season coupled with lower water levels consistent with predicted tide values resulted in increased breeding success for plovers and terns this year. We observed fledglings of all target species this season while in past seasons fledglings were rarely observed. Fewer coyotes, less human interference, and regular water/tide levels created a more suitable environment for plover and tern nest success. Although fewer in number compared to previous years, rain events and nest depredations had the largest negative impacts on focal species this season. Coyotes, raccoons, feral hogs, avian predators, and low flying aircraft were all observed this season.

Of the 19% of Snowy Plover nests depredated this season, all nests were predated by feral hogs. Fewer coyotes could be one of the factors related to the increased success of feral hogs in the Nature Preserve at Charlie's Pasture in Port Aransas. Fresh hog prints crossing through prime breeding habitat were observed nearly every survey. The preserve was closed to the public this season which eliminated pedestrian traffic through the habitat and provided additional breeding areas for the birds. In the past birds breeding adjacent to the boardwalk would leave their nests for several minutes each time a person passed. There is reduced habitat for plovers to nest in since Hurricane Harvey destroyed the seawall and permanently inundated several areas previously used by nesting birds (Figures 23, 24). The remaining breeding areas were more densely populated by target species this season and the birds benefitted greatly from reduced pedestrian traffic.

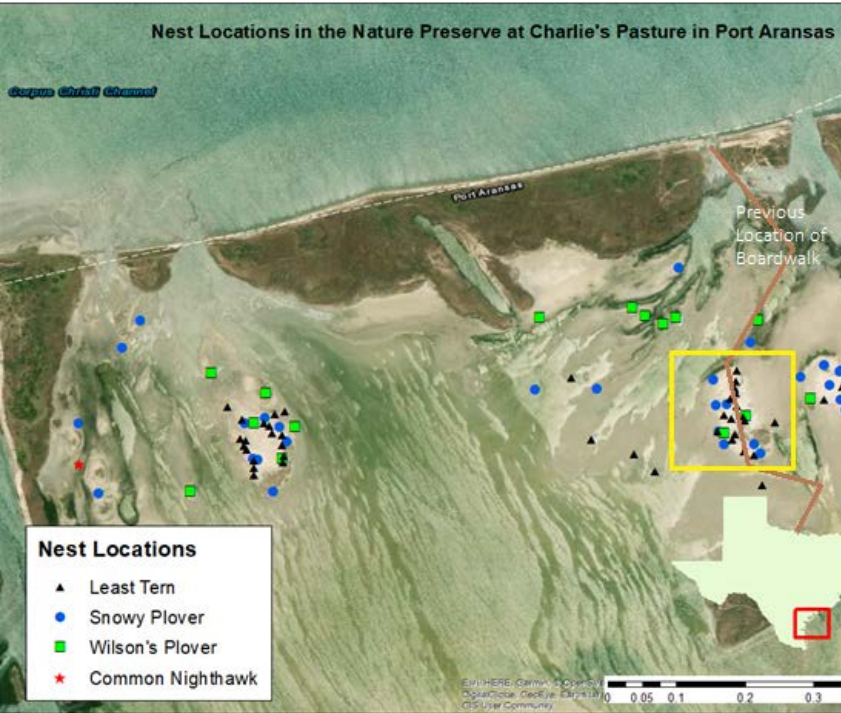


Figure 23. Nest locations of target species during the breeding season in 2018 at The Nature Preserve at Charlie's Pasture in Port Aransas, Texas. Note the previous boardwalk location (brown line) crossing through densely populated habitat on high ground in the light-colored sandy area (yellow square).

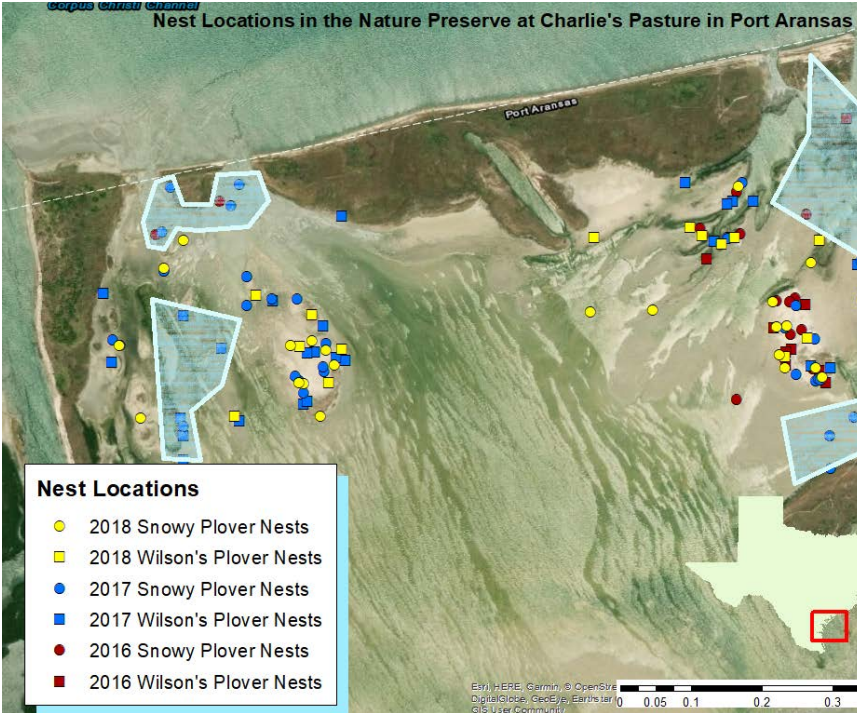


Figure 24. Habitat nesting areas (light blue shading) of target species during the 2016 and 2017 breeding seasons that were no longer available (frequently inundated by the breached ship channel) in 2018 due to changes in the habitat created by Hurricane Harvey at the Nature Preserve at Charlie's Pasture in Port Aransas, Texas.



### Recommendations

The boardwalk in the Nature Preserve at Charlie's Pasture in Port Aransas was destroyed by Hurricane Harvey in 2017. Plovers breeding this season utilized areas previously occupied by the boardwalk. If a new boardwalk is installed, we recommend it take an alternate path through an area that does not cross through breeding habitat, such as along the water (Figure 25).

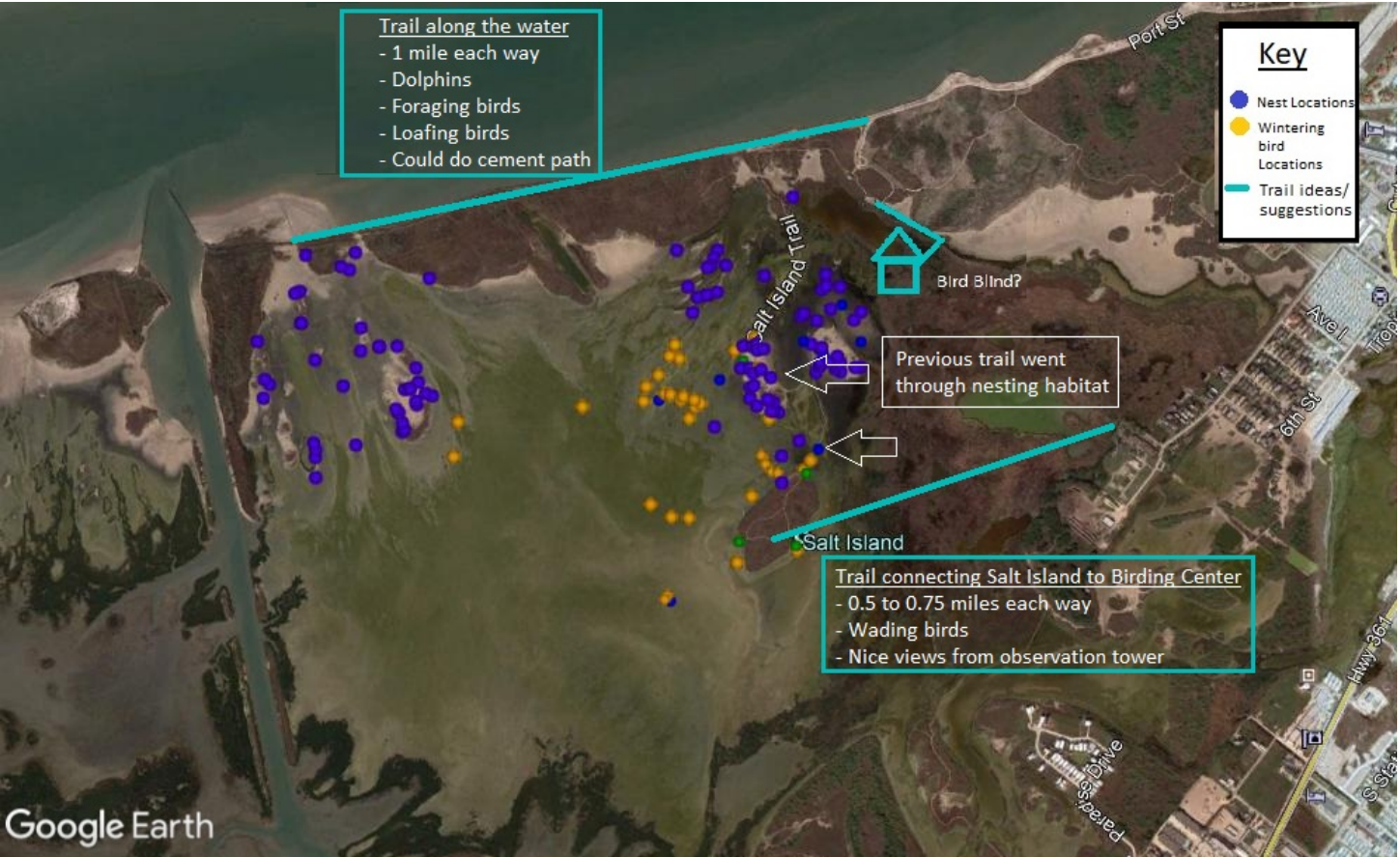


Figure 25. Trail recommendation/suggestion with least impact to nesting birds the Nature Preserve at Charlie's Pasture in Port Aransas, Texas.

## Literature Cited

- Burger, J., Parsons, K., Wartenberg, D., Safina, C., O'Connor, J., and Gochfeld, M. 1994. Biomonitoring Using Least Terns and Black Skimmers in the Northeastern United States. *Journal of Coastal Research*, 10(1), 39 – 47. (p. 41)
- Mabee, T. J. (1997) Using Eggshell Evidence to Determine Nest Fate of Shorebirds. *The Wilson Bulletin* Published by Wilson Ornithological Society. 109(2): 307-313. URL: <http://www.jstor.org/stable/4163813>. Accessed 14 Aug 2013
- McIvor, A.L., Spencer, T., Möller, I. and Spalding, M. (2013) The response of mangrove soil surface elevation to sea level rise. Natural Coastal Protection Series: Report 3. Cambridge Coastal Research Unit Working Paper 42. Published by The Nature Conservancy and Wetlands International. 59 pages. ISSN 2050-7941. URL: <http://coastalresilience.org/science/mangroves/surface-elevation-and-sea-level-rise>. Accessed 14 Aug 2013.
- Nizer, R. A. 2000. An Evaluation of Captive Rearing as a Management Tool for Piping Plovers in the Great Plains. Master's Thesis, University of Wisconsin-Madison.
- Placyk, J.S. Jr., and B.A. Harrington. 2004. Prey abundance and habitat use by migratory shorebirds at coastal stopover sites in Connecticut. *Journal of Field Ornithology* 75:223-231.
- Spruzen, F.L., A.A.M. Richardson, and E.J. Woehler. 2008. Influence of environmental and prey variables on low tide shorebird habitat use within the Robbins Passage wetlands, Northwest Tasmania. *Estuarine, Coastal and Shelf Science* 78:122-134.
- Thibault, M. and R. McNeil. 1995. Predator-prey relationship between Wilson's Plovers and fiddler crabs in northeastern Venezuela. *Wilson Bulletin* 107:73-80



## Wilson's Plover and Least Tern Reproductive Output in Packery Flats 2016-2018



Satellite image of Packery Flats Survey Area (311 acres). Red circle: Symbolic fencing around nesting habitat (~4.5 acres).



Symbolic fencing with informational signs surrounding frequently disturbed nesting habitat installed Spring 2018.

Wilson's Plover	2017	2018
<b>Average # Adults (Apr-Jun)</b>	13	14
<b>Estimated # of Pairs</b>	8	8
<b>Total Nests</b>	11	8
<b>Max # Flight Capable</b>	5	11

Least Tern	2017	2018
<b>Average # Adults (Apr-Jun)</b>	18	16
<b>Estimated # of Pairs</b>	23	20
<b>Total Nests</b>	23	20
<b>Max # Flight Capable</b>	2	9

Average number of adults during the core breeding season (April-June), estimated number of breeding pairs, total nests located, and max high counts for flight capable chicks observed during a single survey in the 2017 and 2018 season.

Wilson's Plover	Packery Flats		
	5 yr Average	2017	2018
Hatched	3	1	8
Depredated	3	2	0
Washout	3	7	0
Abandoned	1	0	0
Unknown	2	1	0
Other failure	0	0	0
<b>Total Nests</b>	<b>11</b>	<b>11</b>	<b>8</b>
<b>Nest Success</b>	<b>27%</b>	<b>9%</b>	<b>100%</b>

### Recommendations:

- Continue to post seasonal protections for birds
- Implement educational signage
- Install doggie-doo bag dispenser

Five-year average for Wilson's Plover nest fates (2013-2017) vs. 2017 and 2018 nest fates for Packery Flats.

**Appendix 2.**  
**List of 2018 Volunteers**

## American Bird Conservancy Volunteers and Hours for 2018 Breeding Season

Date	Name	Site	Event	Work Description	Hours	Email
3/15/2018	Denis Deer	East Beach	NA	Install fencing	4.00	<a href="mailto:djdmad1@hotmail.com">djdmad1@hotmail.com</a>
3/17/2018	Joe Pinteralli	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	6.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
3/17/2018	Eric Pinteralli	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	6.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
3/17/2018	JP Pinteralli	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	6.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
3/17/2018	Alexander Pinteralli	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	6.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
3/17/2018	Charles Ribardo	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	
3/17/2018	Pete Ribardo	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	
3/17/2018	Jarrett Gandy	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	3.50	<a href="mailto:jarrettgandyphone@gmail.com">jarrettgandyphone@gmail.com</a>
3/17/2018	Olen Gandy	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	3.50	<a href="mailto:jarrettgandyphone@gmail.com">jarrettgandyphone@gmail.com</a>
3/17/2018	Kenneth Cugan	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	
3/17/2018	Justin Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:lalyce9@hotmail.com">lalyce9@hotmail.com</a>
3/17/2018	Laura Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:lalyce9@hotmail.com">lalyce9@hotmail.com</a>
3/17/2018	Cameron Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:lalyce9@hotmail.com">lalyce9@hotmail.com</a>
3/17/2018	Colby Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:lalyce9@hotmail.com">lalyce9@hotmail.com</a>
3/17/2018	Val Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:valesc66@yahoo.com">valesc66@yahoo.com</a>
3/17/2018	Daniel Eschenburg	Bolivar Flats	JP's Eagle Scout Project	lectric Fencing Installatio	5.50	<a href="mailto:valesc66@yahoo.com">valesc66@yahoo.com</a>
5/15/2018	Mary Anne Deer	East Beach	NA	Bird trapping and bandii	2.75	<a href="mailto:djdmad1@hotmail.com">djdmad1@hotmail.com</a>
5/15/2018	Denis Deer	East Beach	NA	Bird trapping and bandii	2.75	<a href="mailto:djdmad1@hotmail.com">djdmad1@hotmail.com</a>
5/19/2018	Joe Pinteralli	Bolivar Flats	Jeep Rally weekend	Install wet sand sign, prc	3.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/19/2018	Eric Pinteralli	Bolivar Flats	Jeep Rally weekend	Install wet sand sign, prc	3.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/19/2018	JP Pinteralli	Bolivar Flats	Jeep Rally weekend	Install wet sand sign, prc	3.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/19/2018	Joe Pinteralli	Anahuac NWR	Jeep Rally weekend	Install signs and fencing	4.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/19/2018	Eric Pinteralli	Anahuac NWR	Jeep Rally weekend	Install signs and fencing	4.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/19/2018	JP Pinteralli	Anahuac NWR	Jeep Rally weekend	Install signs and fencing	4.50	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
5/27/2018	Belinda Clifton	East Beach	Memorial Day weekend	Stewardship	4.00	<a href="mailto:bclifton01@gmail.com">bclifton01@gmail.com</a>
5/28/2018	Wayne O'Quin	East Beach	Memorial Day weekend	Stewardship	4.00	<a href="mailto:aliceoquin@gmail.com">aliceoquin@gmail.com</a>
5/28/2018	Alice O'Quin	East Beach	Memorial Day weekend	Stewardship	4.00	<a href="mailto:aliceoquin@gmail.com">aliceoquin@gmail.com</a>
5/30/2018	Belinda Clifton	East Beach	NA	Bird trapping and bandii	1.75	<a href="mailto:bclifton01@gmail.com">bclifton01@gmail.com</a>
7/21/2018	Roger Phillips	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:rphillrn@yahoo.com">rphillrn@yahoo.com</a>
7/21/2018	Brenna Edwards	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:brennalee25@gmail.com">brennalee25@gmail.com</a>
7/21/2018	Sammy Tullous	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:sktullous@gmail.com">sktullous@gmail.com</a>
7/21/2018	Nancy Kendrick	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:AllAreStarStuff@gmail.com">AllAreStarStuff@gmail.com</a>
7/21/2018	Robin Yates	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:Rob.kyates@gmail.com">Rob.kyates@gmail.com</a>
7/21/2018	Joe Pinteralli	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
7/21/2018	Eric Pinteralli	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
7/21/2018	JP Pinteralli	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>
7/21/2018	Alexander Pinteralli	San Luis Pass-Galveston	Bayside trash cleanup	trash cleanup	3.00	<a href="mailto:jpinteralli@yahoo.com">jpinteralli@yahoo.com</a>

**Total # of Volunteers**

**26**

**Total Volunteer Hours 154.75**

## Gulf Coast Bird Observatory Volunteers and Hours for 2018 Breeding Season

<u>Date</u>	<u>Name</u>	<u>Site</u>	<u>Work Description</u>	<u>Hours</u>	<u>Email / Phone</u>
8/16/2018	Amelia Grider	Dow Chemical	Monitoring assistance	9.50	<a href="mailto:acg0036@tigermail.auburn.edu">acg0036@tigermail.auburn.edu</a>
8/23/2018	Amelia Grider	Dow Chemical	Monitoring assistance	2.00	<a href="mailto:acg0036@tigermail.auburn.edu">acg0036@tigermail.auburn.edu</a>
8/25/2018	Amelia Grider	Dow Chemical	Monitoring assistance	9.00	<a href="mailto:acg0036@tigermail.auburn.edu">acg0036@tigermail.auburn.edu</a>
8/30/2018	Amelia Grider	Dow Chemical	Monitoring assistance	2.00	<a href="mailto:acg0036@tigermail.auburn.edu">acg0036@tigermail.auburn.edu</a>
5/17/2018	Annie Montgomery	Matagorda Peninsula	Monitoring assistance	10.50	<a href="tel:979.451.9010">979.451.9010</a>
5/22/2018	Annie Montgomery	Matagorda Peninsula	Monitoring assistance	9.00	<a href="tel:979.451.9010">979.451.9010</a>
5/24/2018	Annie Montgomery	Bryan Beach	Monitoring assistance	9.00	<a href="tel:979.451.9010">979.451.9010</a>
5/30/2018	Annie Montgomery	Matagorda Peninsula	Monitoring assistance	10.00	<a href="tel:979.451.9010">979.451.9010</a>
7/18/2018	Brooks Short	Dow Chemical	Dow escort	2.00	<a href="tel:979.548.1340">979.548.1340</a>
7/25/2018	Brooks Short	Dow Chemical	Dow escort	2.00	<a href="tel:979.548.1340">979.548.1340</a>
6/9/2018	Hope Blutworth	Matagorda Peninsula	Monitoring assistance	9.00	<a href="mailto:hopeathome@aol.com">hopeathome@aol.com</a>
4/11/2018	Janet Price	Matagorda Peninsula	Symbolic fencing repair Adopt-A-Beach	4.00	<a href="mailto:janprice11@gmail.com">janprice11@gmail.com</a>
4/21/2018	Janet Price	Matagorda Peninsula	Outreach	4.00	<a href="mailto:janprice11@gmail.com">janprice11@gmail.com</a>
			Stewardship - reported		
4/30/2018	Janet Price	Matagorda Peninsula	vandalism to fencing	1.00	<a href="mailto:janprice11@gmail.com">janprice11@gmail.com</a>
5/23/2018	Keith Wise	Dow Chemical	Dow escort	1.50	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
5/30/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
6/6/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
7/5/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
8/16/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
8/23/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
8/30/2018	Keith Wise	Dow Chemical	Dow escort	2.00	<a href="mailto:krwise@sbcglobal.net">krwise@sbcglobal.net</a>
7/7/2018	Lesley Goodman	Matagorda Peninsula	Monitoring assistance	9.50	<a href="mailto:lesleymgood@gmail.com">lesleymgood@gmail.com</a>
7/7/2018	Travis Ly	Matagorda Peninsula	Monitoring assistance	9.50	<a href="mailto:lesleymgood@gmail.com">lesleymgood@gmail.com</a>
6/14/2018	Lynn Bjork	Matagorda Peninsula	Monitoring assistance	11.00	<a href="tel:970.224.2226">970.224.2226</a>
6/15/2018	Lynn Bjork	Bryan Beach	Monitoring assistance	10.00	<a href="tel:970.224.2226">970.224.2226</a>
5/14/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
5/18/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
5/21/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
5/24/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
5/29/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
6/7/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
6/11/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>

6/14/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
6/18/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
6/21/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
6/27/2018	Maria Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:matkins1@comcast.net">matkins1@comcast.net</a>
5/14/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
5/18/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
5/21/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
5/24/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
5/29/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/7/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/11/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/14/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/18/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/21/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
6/27/2018	Oron Atkins	Matagorda Peninsula	Monitoring assistance	5.00	<a href="mailto:oronatkins@comcast.net">oronatkins@comcast.net</a>
4/4/2018	Ron Weeks	Dow Chemical	Dow escort	2.00	<a href="mailto:ronweeks@sbcglobal.net">ronweeks@sbcglobal.net</a>
5/16/2018	Ron Weeks	Dow Chemical	Dow escort	2.00	<a href="mailto:ronweeks@sbcglobal.net">ronweeks@sbcglobal.net</a>
6/13/2018	Ron Weeks	Dow Chemical	Dow escort	2.00	<a href="mailto:ronweeks@sbcglobal.net">ronweeks@sbcglobal.net</a>
8/1/2018	Ron Weeks	Dow Chemical	Dow escort	2.00	<a href="mailto:ronweeks@sbcglobal.net">ronweeks@sbcglobal.net</a>
4/20/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
4/27/2018	Willem deGroot	Dow Chemical	Dow escort	1.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
5/2/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
5/4/2018	Willem deGroot	Dow Chemical	Dow escort	1.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
5/11/2018	Willem deGroot	Dow Chemical	Dow escort	1.50	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
5/17/2018	Willem deGroot	Dow Chemical	Dow escort	1.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
6/19/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
6/26/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
7/11/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>
8/9/2018	Willem deGroot	Dow Chemical	Dow escort	2.00	<a href="mailto:awillem0@dow.com">awillem0@dow.com</a>

**TOTAL # VOLUNTEERS**

**13**

**TOTAL VOL HRS 271.00**