

FINAL PERFORMANCE REPORT

STATE: Oklahoma

GRANT NUMBER: F09AP00238 (E-73-R-1)

GRANT PROGRAM: Endangered Species Act, Traditional Section 6

GRANT NAME: Least Tern Monitoring in the Canadian River Landowner Conservation Cooperative

GRANT PERIOD: May 15, 2009 through April 30, 2012

PRINCIPLE INVESTIGATOR: Priscilla H. C. Crawford, Oklahoma Biological Survey, University of Oklahoma

A. ABSTRACT

A multifaceted conservation program was implemented for the nesting Interior Least Tern (*Sternulla antillarum*) population on the Canadian River near Norman, Oklahoma. Informational materials were developed to aid outreach and education efforts within the local community. These included a brochure, informational display and an educational poster about Least Terns and the other wildlife species that share their prairie river habitat. During the second and third years of the grant, we conducted surveys along the Canadian River to locate Least Tern nesting colonies. Each colony was monitored weekly between May and August to estimate its population size and reproductive success. One component of colony monitoring was the protection of colonies against human disturbance. When necessary, we placed signs and psychological barriers (e.g. caution tape) around the perimeter of the nesting area in order to discourage human entry into the colony and potential disturbance to nests and chicks. Least Tern surveys and colony monitoring occurred within a portion of the Canadian River that is known as the Canadian River Landowner Conservation Cooperative, which is comprised of private landowners who have entered into conservation agreements with the Oklahoma Natural Areas Registry program. The Conservation Cooperative encompasses approximately 18 miles of the Canadian River extending from the northwest side of Norman downstream to Green Valley Farms in Lexington, Oklahoma. During the 2010 nesting season, 21-25 pairs of Least Terns nested at four colony sites. In 2011, Least Terns were monitored at three colony sites that contained a combined population of 17 or 18 pairs. Human disturbance at the nesting colonies was limited in 2010, but was much more widespread and problematic because of the severe drought conditions that existed during the 2011 nesting season. During the 2011 nesting season, signs and psychological barriers had to be erected at two of the three colonies in an attempt to control human access.

B. OBJECTIVE

To monitor the breeding population of Interior Least Terns (*Sternulla antillarum*) and build support for the conservation of breeding habitat on private lands along the Canadian River in central Oklahoma.

C. NEED:

The Canadian River in central Oklahoma supports nesting colonies of the federally endangered Interior population of the Least Tern (*Sternula antillarum*). Least Terns arrive in Oklahoma from their wintering grounds during the month of May and depart from the state in late August and early September. During their short breeding season, the terns nest in small colonies on the bare sand of sandbars, islands and beaches along the larger interior rivers. These nesting habitats are maintained by the periodic scouring of the river channel and the redistribution of sediment by large flood events that occur naturally during the spring and fall months. The quality and quantity of Least Tern nesting habitat has declined over the past century as a result of multiple factors. One of the most significant of these is the alteration of historic flooding cycles as a result of human manipulation of rivers through the construction of impoundments to create reservoirs, the dredging of river channels and the dewatering of rivers. Additional factors include the establishment and spread of exotic invasive plant species along river channels (e.g. tamarisk, Russian olive) and, in urbanizing areas, human activity that includes the use of recreational off-road vehicles.

This project was implemented to monitor the success of Least Tern colonies in the Canadian River Landowner Conservation Cooperative near Norman, Oklahoma. The Cooperative is comprised of approximately 15 landowners along the Canadian River in Cleveland and McClain counties who have signed voluntary agreements with the Oklahoma Natural Areas Registry program to conserve native habitats and wildlife. This reach of the Canadian River has been affected by the construction of upstream impoundments that have reduced the magnitude of periodic flood events. Subsequently, this reduction in flooding disturbance has reduced the abundance of suitable nesting habitat along the river. The remaining nesting habitat is further affected by human recreation on the river because of its proximity to a urban population centers (e.g. Norman, Moore, Oklahoma City) and the difficulty of excluding people and vehicles from the river because traditional means, such as fencing, are periodically destroyed by floods. This project conserves Least Tern colonies by 1) monitoring colonies to determine reproductive success and the causes of reproductive failure, 2) posting signage around nesting colonies, when needed, to discourage human trespass near nests and chicks, and 3) conducting educational outreach to the local community to raise awareness of the terns and the factors that affect their population.

D. APPROACH:

Prior to the nesting season, the principle investigator made contact with landowners along the Canadian River in Cleveland and McClain counties to encourage them to renew their partnership or become new partners with the Natural Areas Registry program to conserve important habitats and species on their properties. Community outreach presentations were made to schools and adult groups in the local area to raise awareness of the plight of the Interior Least Tern. Early in the nesting season, surveys were conducted along the Canadian River to locate Least Tern nesting colonies. Once a colony was located, then permission was sought from the landowner(s) to access and monitor the colony. If permission was granted, the colony was monitored approximately once per week through the nesting period (mid-May through mid-August). During monitoring field visits, the observers counted adult and juvenile terns, located nests, determined the fates of nests and looked for signs of human disturbance to the nesting area. If human disturbance was determined to have a negative effect on Least Tern nests or nesting

success, then warning signs and psychological barriers (e.g. police caution tape) were placed around the nesting colony to deter human visitation.

E. RESULTS and DISCUSSION:

SUMMARY OF 2011 NESTING SEASON:

All field activities were carried out by Priscilla Crawford, principle investigator, and Elise Clopton, research assistant. Prior to the nesting season, Priscilla Crawford contacted the cooperating landowners along the Canadian River in Cleveland and McClain counties. During these contacts, the landowners were reminded of the annual arrival of Least Terns in early summer and of their voluntary participation in the Oklahoma Natural Areas Registry program. Permission was sought to access their properties for survey and monitoring purposes and to erect caution tape and signs around nesting colonies if needed.

The field season began in mid-May. We originally planned to use kayaks to float the Canadian River in late May or early June to search for Least Tern nesting colonies between Indian Hills Road on the north end of the study area and Lexington/Purcell on the south end. However, the severe drought conditions that occurred throughout the Canadian River watershed this year resulted in low-water levels in the late spring and summer that were too low to navigate effectively. As a consequence, we did not search for new colony locations and concentrated our monitoring efforts at the three accessible locations where terns nested in 2010 – Indian Hills, Lindsey and Green Valley Farms. In May and June, we also monitored the historic Jenkins colony site where Least Terns has nested in the 1990s; however, no terns nested at this location in 2011. Each colony location was monitored approximately every week from mid-May until the terns that occupied that colony had completed nesting and abandoned it. The results are summarized below and in Table 1.

The drought this summer resulted in unusually low water levels in the Canadian River throughout the nesting season. This allowed easy vehicle/ATV access along the river and we observed a substantial increase in traffic this year at all colony sites. The extreme heat recorded for this summer also may have been a contributing factor to the higher rates of nest abandonment that we observed. The combination of increased disturbance, predation pressure, and extreme heat and drought made this a difficult breeding season for Least Terns in the study area.

Indian Hills Colony:

The adult Least Tern population at the Indian Hills colony fluctuated from 10 to 11 birds during May and June. By the end of June it appeared that four pairs were established in the colony with four nests. The first three chicks were observed during the last week of June. During the month of July, we observed an increase in the number of adult terns (fluctuating between 8 and 13 birds) and two new nests were initiated. By the end of July, all of the eggs within the nests in the colony had hatched and there were 9 Least Tern offspring of which six were able to fly and the remaining three were young chicks. Tern numbers in the colony dropped rapidly in August as adult birds and fledglings left the colony. Two chicks remained in the colony on August 4th and both of these were capable of flight by August 9th. During the summer, there were six nesting attempts by five or six pairs. These nests resulted in eight chicks that survived to fledge (1.3 or 1.6 chicks per pair).

Snowy Plovers were present in the colony from mid-May through late July, but none were observed during August. The number of adult Snowy Plovers varied from four to six and there were at least three active nests in mid-June. In early July, there were ten Snowy Plover chicks in the colony, but by my mid-July it was difficult to reliably distinguish adult Snowy Plovers from recently fledged juveniles. Snowy Plover numbers (adults and juveniles) peaked at 13 to 14 birds between 7 July and 19 July, but declined after that.

There was sporadic ATV traffic at this colony site in June, but very little of it was in the immediate area of the nests. Because most of the traffic and human activity occurred on the opposite side of the river, we did not set up any signs or psychological fencing around the colony in an effort to be less noticeable. The incidence of vehicular disturbance increased throughout the months of July and August, but a majority of the nests were in an area above the riverbed where the human traffic was greatest and therefore there was little human disturbance in the immediate area around the nests.

Lindsey Colony:

The adult Least Tern population at the Lindsey Colony began at five birds in mid-May and grew to eight by the end of May. The Lindsey Colony fluctuated between 8 and 10 adults, and five nests were established by 13 June. In mid June, the Norman area received a severe wind and hail storm that may have destroyed some nests and may have been responsible for the reduced number of nests during our 17 June monitoring trip. If so, it appears that the adult pairs renested within the colony because the number of nests had increased back to five by 23 June. The first chicks (3) were observed on 30 June.

The Lindsey Colony experienced trespass problems and ATV use through the nesting season. Psychological fencing and signs were erected on 13 June to protect the nesting site. The Lindsey Colony continued to receive substantial human disturbance throughout July and into early August when the colony was abandoned. There were multiple breaches of the psychological fencing that we had erected. Each weekend, and especially the 4th of July weekend, was an active period for human disturbance.

Sand mining operations existed in the vicinity of the Lindsey Colony and early in the nesting season they cooperated with us and the Game Wardens to protect the birds and to report trespass. However, in July, sand miners began to excavate sand on a sandbar just outside of the area where we had placed psychological fencing in spite of our multiple discussions with the operators. The Game Warden and the USFWS were contacted regarding the sand mining activity. The sand miners gave the impression of cooperation, but continued not to understand that the entire sandbar was Least Tern habitat, rather than just the fenced-off portion. Sand mining ceased temporarily in mid-July, but resumed between 1 August and 9 August after the miners took down the signs and some of the fencing without asking permission.

During the month of July, the number of tern chicks in the colony varied from one to five. Throughout the month, we observed that some of the chicks did not remain in the fenced area and this made them vulnerable to passing ATVs and other human disturbance. At least one nest was destroyed during the second week of July, but we could not determine whether this was related to weather or to ATV activity. The last active nest in the colony was abandoned during the last week of July. Chick mortality appeared to be high at this colony with four chicks

disappearing during the last two weeks of July. An adult tern was found dead on 18 July. This was reported to the USFWS and the bird's body was transferred to the USFWS law enforcement agents. On 1 August, we observed only one adult and one juvenile tern at the colony site. A batch of adult feathers also was found that day and tracks on the ground indicated that a raptor attack may have been responsible. No terns were seen after 9 August and we removed all fencing on 11 August.

Green Valley Farms Colony:

The Green Valley Farms colony started the nesting season as the largest one in the study area. The adult Least Tern population held steady with around 14 birds during our observations in May and June. We observed courting behavior in May and the first nests were established during the first week of June. Throughout June, the colony's population remained stable and contained six to seven nests, although no tern chicks hatched during the month. One to three Snowy Plovers were seen within this colony in June, but no nests or chicks were observed.

The Green Valley Farms colony received little to no ATV traffic prior to 1 July, therefore no signs were posted or fencing erected. However, beginning around 1 July, the colony became a victim to off road vehicles and we suspect that one nest was lost during the first week. The number of adult terns at the colony declined as the intensity of human disturbance increased. By 19 July, the adult numbers had dropped from 14 to 4 as disturbance continued and nests were lost. We worked with the landowner of the site, who was very concerned about the tern colony and the impact of trespassing, to post large "No Trespassing" signs on 1 July and to post "Tern Colony – Do Not Enter" signs on July 15. However, trespass and disturbance continued throughout the month.

On 15 July, we documented the take of a nest with one chick and one egg by an ATV (based upon tracks left at the site). Despite the disturbance, we observed six chicks in the colony (probably from three nests). By 31 July, four of the chicks were able to fly. On 3 August, we observed two adult terns, two offspring that were able to fly, and two chicks that were not able to fly. We observed no terns on 12 August, or any of the following days, and we believe that the last two chicks did not reach maturity. We removed all signs and fencing on 12 August.

Post-nesting Season Activities:

Priscilla Crawford discussed future protection strategies for the nesting colonies with Brian Gourgues, USFWS Law Enforcement Special Agent. She also initiated the development of an outreach program for central Oklahoma to raise awareness of the environmental issues affecting large sandy rivers (prairie rivers) and the wildlife that they support, specifically the Least Tern. Priscilla and Elise Clopton developed a presentation for the annual conference of the Natural Areas Association. This presentation discusses our experiences monitoring and protecting the tern on private lands. Elise made contact with other biologists attempting to protect rare species with the threat of ATV traffic and they shared experiences and strategies for tackling the problem. Priscilla sent follow-up letters to the Canadian River landowners that have Natural Areas Registry agreements to remind them of the options that they have for assistance in reducing trespassing. The letter also discussed the significant increase in ATV traffic in 2011 and the devastating effect it had on the tern population.

OVERVIEW OF 2010 NESTING SEASON:

During the 2010 nesting season, Priscilla Crawford and two seasonal assistants, Melissa Hinton and Jackie Paritte, monitored nesting activity at four colony sites. These included three locations where Least Terns had been known to nest in previous years – west end of Indian Hills Road (Indian Hills Colony), west end of Lindsey Street (Lindsey Colony) and the south side of the town of Lexington (Green Valley Farms Colony). The fourth colony was a new site that was located approximately three miles upstream from the Lindsey Colony during an early June kayaking survey of the river. This colony was named the Main Street Colony and it was monitored only sporadically because of the limited access to the site.

The Indian Hills Colony supported between 6 and 8 nesting pairs of Least Terns and at least 12 chicks hatched from 6 monitored nests. Additionally, 2 pairs of Snowy Plovers nested in the colony and successfully reared at least 5 chicks. The Green Valley Farms Colony supported 7 pairs of nesting Least Terns; however, a flood event in the second week of July appeared to destroy all but 1 or 2 nests. No re-nesting occurred at the colony, but 2 fledgling were produced from chicks that survived the July flood. The Lindsey Colony was occupied by 3 pairs of Least Terns; however, none of the nesting attempts were successful. The Main Street Colony supported 5 to 7 pairs of Least Terns, but it was not monitored with sufficient frequency to determine the fates of all nesting attempts.

Human disturbance of the nesting colonies was sparse or non-existent at the Indian Hills and Green Valley Farms colonies. Human disturbance also appeared to be limited at the Main Street Colony because of its remote position relative to public roads, but this the colony was not monitored as frequently as the other three. Human disturbance in the form of ATV traffic and sand mining activities were frequent at the Lindsey Colony and may have been a contributing factor to its lack of nesting success.

During the first year of the project, a cooperative agreement could not be established before the nesting season. As a result, none of the colony monitoring that occurred in 2009 was charged to this grant. However, some grant funding was used after the 2009 nesting season to develop and print a poster and educational outreach materials about Least Terns and the other wildlife species that share their prairie river habitat.

F. SIGNIFICANT DEVIATIONS:

None

G. PREPARED BY: _____

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H. DATE: July 2, 2012

I. APPROVED BY: _____
Wildlife Division Administration

John Stafford, Federal Aid Coordinator

Table 1. Summary of Least Tern and Snowy Plover Observations during the 2011 Nesting Season.

| Date | Colony | LETE Adults | LETE Nests | LETE Juvenile | SNPL Adults | SNPL Nests | SNPL Juveniles | Comments/Threats |
|-----------|--------------|----------------|---------------|------------------|----------------|---------------|-------------------|--|
| 18-May-11 | Green Valley | 14 | | | | | | no ATV tracks; coyote tracks |
| 2-Jun-11 | Green Valley | 12 | 1 | | | | | no ATV tracks; coyote tracks |
| 7-Jun-11 | Green Valley | 13 | 6 | | | | | no ATV tracks; coyote tracks; bald eagle |

| | | | | | | | |
|-----------|--------------|----|---|---|----|----|---|
| 16-Jun-11 | Green Valley | 14 | 6 | | 1 | | no ATV tracks; coyote tracks |
| 24-Jun-11 | Green Valley | 15 | 7 | | 3 | | no ATV tracks, coyote tracks |
| 1-Jul-11 | Green Valley | 14 | 7 | | 3 | | ATV tracks through colony |
| 8-Jul-11 | Green Valley | 13 | 6 | | | | ATV tracks through colony; coyote tracks |
| 15-Jul-11 | Green Valley | 10 | 2 | 4 | | | ATV tracks through colony; coyote tracks; lost one nest |
| 19-Jul-11 | Green Valley | 4 | 1 | 2 | | | ATV tracks through colony; coyote tracks; found a crushed nest with egg and chick appears that some chicks were lost; may have been predation |
| 3-Aug-11 | Green Valley | 2 | | 4 | | | ATV tracks through colony |
| 17-May-11 | Indian Hills | 11 | | | 4 | | significant ATV traffic |
| 31-May-11 | Indian Hills | 4 | | | 5 | 1 | significant ATV traffic, and other human disturbance |
| 6-Jun-11 | Indian Hills | 6 | 1 | | 6 | 1 | significant ATV traffic, and other human disturbance, but it is on other side of river |
| 16-Jun-11 | Indian Hills | 7 | 3 | | 5 | 3 | significant ATV traffic, and other human disturbance, but it is on other side of river |
| 23-Jun-11 | Indian Hills | 7 | 4 | | 4 | 3 | significant ATV traffic, and other human disturbance, but it is on other side of river |
| 30-Jun-11 | Indian Hills | 8 | 2 | 3 | 5 | 5 | significant ATV traffic, and other human disturbance, but it is on other side of river |
| 7-Jul-11 | Indian Hills | 8 | 4 | 4 | 4 | 10 | significant ATV traffic, and other human disturbance in colony |
| 15-Jul-11 | Indian Hills | 12 | 4 | 6 | 6 | 3 | significant ATV traffic, and other human disturbance in colony |
| 19-Jul-11 | Indian Hills | 13 | 2 | 6 | 13 | | significant ATV traffic |
| 28-Jul-11 | Indian Hills | 10 | | 9 | 9 | | significant ATV traffic |
| 4-Aug-11 | Indian Hills | 2 | | 2 | | | significant ATV traffic; one chick lost, others probably left area |
| 18-May-11 | Lindsey | 5 | | | | | typical ATV traffic |
| 1-Jun-11 | Lindsey | 8 | | | | | typical ATV traffic |

| | | | | | |
|-----------|---------|----|---|---|--|
| 6-Jun-11 | Lindsey | 7 | | | typical ATV traffic, sand mining op is dumping in river to make bridge to sandbar |
| 13-Jun-11 | Lindsey | 10 | 5 | | typical ATV traffic |
| 17-Jun-11 | Lindsey | 8 | 3 | | typical ATV traffic; lost two nests, probably to recent wind storm |
| 23-Jun-11 | Lindsey | 9 | 5 | | typical ATV traffic, ATV damage to flagging; sand mining at other end of sandbar |
| 27-Jun-11 | Lindsey | 8 | 3 | | typical ATV traffic, ATV damage to flagging; sand mining at other end of sandbar; 2 nests lost, probably to ATV |
| 30-Jun-11 | Lindsey | 10 | 3 | 3 | typical ATV traffic, ATV damage to flagging; sand mining at other end of sandbar, tried to convince him to move off sandbar |
| 4-Jul-11 | Lindsey | 8 | 3 | 1 | typical ATV traffic |
| 6-Jul-11 | Lindsey | 7 | 3 | 2 | typical ATV traffic |
| 11-Jul-11 | Lindsey | 7 | 1 | 4 | typical ATV traffic; lost one nest, could be weather or ATV related |
| 18-Jul-11 | Lindsey | 6 | 1 | 5 | typical ATV traffic; found dead adult |
| 22-Jul-11 | Lindsey | 6 | 1 | 2 | typical ATV traffic |
| 15-Jul-11 | Lindsey | 4 | | 5 | typical ATV traffic; sand mining pulled out |
| 1-Aug-11 | Lindsey | 1 | | 1 | typical ATV traffic; found adult feathers; one nest abandoned |
| 9-Aug-11 | Lindsey | | | | no birds; sand miner took down barriers without asking |

SNPL = snowy plover
LETE = interior least tern

Coordinates (calculated from Google Earth)
34.983896° -97.345638° Green Valley Farms
35.290947° -97.565746° Indian Hills
35.202685° -97.498194° Lindsey Colony