Section 6 (Texas Traditional) Report Review

Attachment to letter dated _____

TPWD signature date on report October 30, 2006

Project Title: Evaluation of Oil-Gas Infrastructure for Potential Increased Risk of Raptor Predation on Lesser Prairie-Chickens (*Tympanuchus pallidicinctus*)

Final or Interim Report? Final

Grant #: E-65-R

Reviewer Station: West Texas Suboffice, Arlington ESFO

Lead station was contacted and concurs with the following comments:
☐ Yes ☐ No ☒ Not applicable (reviewer is from lead station)

Interim Report (check one):

☐ is acceptable as is

☐ is acceptable as is, but comments below need to be addressed in the next report

☐ needs revision (see comments below)

Final Report (check one):

☒ is acceptable as is

☐ is acceptable, but needs minor revision (see comments below)

☐ needs major revision (see comments below)

Comments:

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E-65-R

Endangered and Threatened Species Conservation

EVALUATION OF OIL-GAS INFRASTRUCTURE FOR POTENTIAL INCREASED RISK OF RAPTOR PREDATION ON LESSER PRAIRIE CHICKENS (*TYMPANUCHUS PALLIDICINCTUS*)

Prepared by:

Clint Boal

TEXAS PARKS & WILDLIFE

Robert Cook
Executive Director

Matt Wagner
Program Director, Wildlife Diversity

Mike Berger
Division Director, Wildlife

29 October 2006

FINAL REPORT

STATE: ____Texas_____ **GRANT NUMBER:** ___E-65-R___

GRANT TITLE: Evaluation Of Oil-Gas Infrastructure For Potential Increased Risk Of Raptor Predation On Lesser Prairie Chickens (*Tympanuchus Pallidicinctus*)

REPORTING PERIOD: ____8/01/05 to 9/30/06__

OBJECTIVE(S):
To assess:
1) the frequency of occurrence of raptors at Lesser Prairie Chicken leks with and without oil-gas development structures, and
2) the efficacy of using a remote monitoring system to assess incidence of raptor predation attempts at a Lesser Prairie Chicken lek during an initial one-year pilot study.

Significant Deviation:

None.

Summary Of Progress:

Please see Attachment A.

Location: Lipscomb County, Texas.

Cost: Financial Status Report was not available at time of this report.

Prepared by: _Craig Farquhar_____ **Date:** October 29, 2006

Approved by: _____ **Date:** October 30, 2006
Neil (Nick) E. Carter
Federal Assistance Coordinator

Attachment A

USFWS SECTION 6 RESEARCH PROJECT

PILOT STUDY: EVALUATION OF OIL-GAS INFRASTRUCTURE FOR POTENTIAL INCREASED RISK OF RAPTOR PREDATION ON LESSER PRAIRIE CHICKENS (*TYMPANUCHUS PALLIDICINCTUS*)

Final Report

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Submission Date

27 October 2006

PILOT STUDY: EVALUATION OF OIL-GAS INFRASTRUCTURE FOR POTENTIAL INCREASED RISK OF RAPTOR PREDATION ON LESSER PRAIRIE CHICKENS (*TYMPANUCHUS PALLIDICINCTUS*)

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Summary: We assessed the efficacy of using video-recording systems as a method of assessing raptor predation at Lesser Prairie Chicken leks. We found the systems held promise for the stated objective, but identified several minor problems that require solutions before such systems can be effectively deployed. Specifically, time-lapse recording is not effective; real-time video is required to adequately document and identify raptors at leks. The resolution of cameras and depth of field also needs to be improved upon. This may partially be remedied by switching to real-time video, and partially by improving camera quality (high resolution cameras) and recording mechanism (digital versus tape). The pilot study was effective in allowing us to identify problems and solutions for the full study of raptor predation on Lesser Prairie Chicken leks in context of oil and gas development infrastructure that we will be initiating with the 2007 breeding season.

Introduction

The interstate *Assessment and Conservation Strategy for the Lesser Prairie Chicken* (Mote et al. 1998) identified evaluation of impacts of land use practices and fragmentation as important research and conservation needs for Lesser Prairie Chickens (*Tympanuchus pallidicinctus*; hereafter LPCH), which are a Candidate species (USFWS 2003). In particular, identification and evaluation of the impacts of oil and gas activities and infrastructure on prairie grouse species have been noted as research needs for conservation planning for the species (Lyon and Anderson 2003, Jamison et al. 2002, Harmon 2002, Forest Guardians et al. 2002, Massey 2001).

An overlooked and potentially important impact of oil and gas development is the role of associate infrastructure (e.g., pump-jacks, associated storage tanks) as perches for predatory birds near leks. Normally, LPCH leks and breeding habitat are in areas without elevated structures (i.e., structures that could be used as perches by raptors). A perch provides a raptor the luxury of sitting stationary and conserving energy for long periods while scanning the immediate area for potentially vulnerable prey. Birds of prey (i.e., raptors) have been identified as a primary mortality threat to adult and juvenile LPCHs (Giesen 1998). Diurnal raptor species reported to prey upon LPCHs include Red-Tailed Hawks (*Buteo jamaicensis*), Rough-Legged Hawks (*B. lagopus*), Ferruginous Hawks (*B.*

regalis), Prairie Falcons (*Falco mexicanus*), Cooper's Hawks (*Accipiter cooperii*), Northern Harrier (*Circus cyaneus*), and Golden Eagles (*Aquila chryseatos*) (Campbell 1950, Sell 1979, Ahlborn 1980, Merchant 1982, Haukos and Broda 1989). However, all of these accounts are anecdotal (e.g., Davis 2002) and the rates and impact of raptor depredation on prairie chickens, and the possible influences of human provided perches, remain unknown.

One problem in evaluating the rates of raptor predation at LPCH leks, and the role of man-made perches in increasing raptor activity, is the time required to observe such incidences. Therefore, an inexpensive, time-effective method with which to assess raptor activity at LPCH leks is needed. We conducted this pilot study to evaluate the efficacy of using time-lapse video monitoring as a means of detecting raptor activity and predation attempts at LPCH leks.

Methods

Our goal for this pilot study was to evaluate the efficacy of using a remote monitoring system to assess incidences of raptor predation attempts at LPCH leks. Our specific questions were:

1. Will the monitoring systems have the depth of field and resolution to allow identification of raptor species and LPCH numbers and activity?
2. Will time-lapse settings be efficient in recording data?
3. Will single systems suffice for monitoring, or will multiple systems with overlapping fields of view be necessary?

We set up video cameras at two active LPCH leks on a private ranch in Lipscomb County, Texas. Lipscomb County is the northeastern most county of the Texas Panhandle. We placed two systems with overlapping fields of view at one lek (Lek 1) and one video-monitoring system at another lek (Lek 2). Each system consisted of a weather-resistant, bracket-mounted, color video camera (Models CCM660W and OC225, Clover Electronics®, Los Alamitos, CA, USA), a 960-hour time-lapse VCR (Model SL800, Security Labs®, Noblesville, IN, USA), a 12V DC to 115V AC 140-watt power inverter (Part No. 22-145, Radio Shack®, Fort Worth, TX, USA), a 12V DC battery terminal adapter for connecting the batteries to the power inverter (Part No. 270-1527, Radio Shack®, Fort Worth, TX, USA), a 6-outlet power strip (Part No. SCP15, RCA®, Socorro, TX, USA), and a 13" color television for directing the camera and programming the VCR timer during installation. The video systems were powered by two, 12-volt, deep-cycle marine batteries connected in parallel. All of the system components were housed in a weather resistant and lockable plastic storage bin (approximately 66cm long x 45cm wide x 41cm deep), camouflaged with spray paint. Cameras were mounted on wooden posts approximately 1m above the ground. However, following destruction of two cameras by cattle rubbing against the post, we mounted cameras on 2.54cm by 2.54cm wooden posts hose clamped to metal t-posts. The cameras were attached to the wooden posts 2m above the ground to reduce risk of damage due to rubbing by cattle.

We recorded data at LPCH leks from 4 April to 7 May, 2006. We programmed the VCRs to record daily from 0700 to 1200 hours and from 1800 to 2000 hours. This resulted in 7 hours of video data recorded daily. Record speeds were set at 96 hours at Lek 1and at 72 hours at Lek 2 to evaluate different tape record speeds. These speeds allowed recording of 7 days of data per video cassette tape and was within the charge life of the batteries. We experimented with this schedule to maximize efficiency in recording during the periods of primary activity while requiring fewer visits to the leks. Fewer visits to the leks equates to decreased potential disturbance, less gas required, and more days of video data. Video tapes were reviewed for analysis following the end of the study period.

Results

We recorded 417 hours of data at the two LPCH leks. At Lek 1, we recorded 166 hours with one camera and 117 hours with the second camera. At Lek 2 we recorded 134 hours. Based on review of the video data, we believe the systems have promise as a tool for assessing not only occasions of raptor predation at leks, but behavioral aspects and activity patterns of lekking LPCHs. For example, lekking LPCHs were easily viewed in the video tapes and our data indicated LPCHs displayed on the lek from record start time of 0700 hours to about 0930 hours, and again from about 1900 to 2000 hours. Lekking stopped during periods of rainfall. We also were able to detect, and in some cases identify, raptors flying over leks. Northern Harriers were detected early in April, and Swainson's Hawks were detected later in April. In one instance, we detected what appears to be a Swainson's Hawk making a swoop at something on the lek while LPCHs were displaying. It was interesting that the LPCHs did not appear to respond to the hawk. In another instance we observed a Swainson's Hawk foraging on the ground at a lek, apparently capturing grasshoppers.

Despite some success with the video review, we also identified several problems that need to be resolved for future use of such as system. For example, even though LPCHs were easily detectable in the video recordings, the video resolution, depth of field limitations, and time-lapse recording prevented making out details of the activities. A similar problem occurred for flying raptors. Ultimately, we found time-lapse recording to not be a viable approach for documenting raptor predation attempts at prairie chicken leks. At the pre-set 72 and 96 hour record speeds, most raptors appeared in only 1 to 3 video frames. This presented two problems. The brevity of raptors on the video rendered it quite difficult to detecting them during video review. Additionally, slow record speeds result in blurring of images when freeze framed; this makes identification of flying birds challenging. The obvious solution to this problem is to record at real-time speeds. This would limit recordings to a maximum of 6 or 8 hours, depending on the tape media used. This would be sufficient to capture the primary lekking periods. However, video tapes would need to be changed out daily. An alternative is to use digital recorders which allow a much greater volume of data collection. We are currently experimenting with the use, data volume, and data archiving possibilities of a digital recorder.

Another problem we found with the system was that the resolution and depth of field were less than desirable for this study. This was in part due to the equipment we tested,

and in part due to the time-lapse recording. There are several potential remedies for this. The first is to do away with time-lapse recording and go to a real-time system, which will need to be done regardless for the reasons stated above. The use of overlapping cameras, such as we experimented with at Lek 1, did not satisfactorily solve this problem. This is because both cameras were similar distances from the lekking birds. Since it may be disruptive to put a recording system in the middle of a lek, all cameras in an overlapping arrangement would likely still have resolution and depth of field problems because of distance to the lekking birds. The most likely solution at this point is to use higher resolution cameras, possibly coupled with digital recorders. We are exploring what is currently available and affordable on the market.

Discussion

This pilot study was beneficial in evaluating time-lapse systems as a means of monitoring LPCH activity and raptor predation at leks. We found that they systems we examined were too limited in capacity for effective monitoring. However, we have identified remedies for these limitations and are currently exploring options in terms of improved equipment and recording speeds. If improved resolution can be obtained with higher resolution cameras and digital recorders, we believe one or two cameras, depending on lek size, will be sufficient for monitoring LPCH leks. If user friendly digital recorders with sufficient hard drive space allows for real-time recording, systems may be left unattended for several days. If not, daily change out of video tapes would suffice. This will allow the construction of a system that will allow monitoring of LPCH leks to not only identify rates of raptor predation attempts, but have the added benefit of allowing an examination of LPCH lekking behavior and activity patterns in context of factors such as ambient weather conditions, time of day, and disturbance. Through this pilot study we have developed a more refined, full study of raptor predation at LPCH leks associated with oil and gas activity infrastructure. This full study will begin during the 2007 lekking season and include a graduate research student from Texas Tech University.

Literature Cited

Ahlborn, G.G. 1980. Brood-rearing habitat and fall-winter movements of Lesser Prairie Chickens in eastern New Mexico. M.S. Thesis, New Mexico State University, Las Cruces.

Campbell, H. 1950. Note on the behavior of Marsh Hawks toward Lesser Prairie Chickens. Journal Wildlife Management 14:477-478.

Davis, D. 2002. Small game management: lesser prairie chicken management (project 3). Final Report to Federal Aid in Wildlife Restoration, W-104-R Project 3. New Mexico Game and Fish Department, Santa Fe, New Mexico, USA.

Forest Guardians, J. Bailey, Audubon New Mexico, New Mexico Audubon Council, Animal Protection of New Mexico, Chihuahuan Desert Conservation Alliance, REP Environmental Education Foundation, New Mexico Chapter of Republicans for Environmental Protections, Southwest Environmental Center, Defenders of Wildlife, and T&E Inc. 2002. Lesser Prairie-Chicken Areas of Critical Environmental Concern: A Petition to the New Mexico BLM. T & E, Inc. Cortaro, Arizona, USA.

Geisen, K.M. 1998. Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*). In The Birds of North America, No. 364 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Harmon, S. 2002. Candidate and listing priority assignment form: lesser prairie chicken (April 2002). United States Fish and Wildlife Service, Tulsa Oklahoma, USA.

Haukos, D.A., and G.S. Broda. 1989. Northern Harrier (*Circus cyaneus*) predation of lesser prairie-chicken (*Tympanuchus pallidicinctus*). Journal Raptor Research 23:182-183.

Jamison, B. E., J. A. Dechant, D. H. Johnson, L. D. Igl, C. M. Goldade, and B. R. Euliss. 2002. Effects of management practices on grassland birds: Lesser Prairie-Chicken. USGS Northern Prairie Research Center, Jamestown, North Dakota.

Lyon, A. G., and S. H. Anderson. 2003. Potential gas development impacts on sage grouse nest initiation and movement. Wildlife Society Bulletin 31: 486-491.

Massey, M. 2001. Long-range plan for the management of Lesser Prairie Chickens in New Mexico 2002-2006. Federal Aid in Wildlife Restoration Grant W-104-R41, Project 3.4.

Merchant, S.S. 1982. Habitat-use, reproductive success, and survival of female Lesser Prairie Chickens in two years of contrasting weather. M.S. Thesis, New Mexico State University, Las Cruces.

Mote, K. D., R. D. Applegate, J. A. Bailey, K. E. Geisen, R. Horton, J. L. Sheppard, Technical Editors. 1998. Assessment and conservation strategy for the lesser prairie-chicken (*Tympanuchus pallidicinctus*). Kansas Department of Wildlife and Parks, Emporia, Kansas, USA. 51pp.

Sell, D.L. 1979. Spring and summer movements and habitat use by Lesser Prairie Chicken females in Yoakum County, Texas. M.S. Thesis, Texas Tech University, Lubbock.

USFWS. 2003. Candidate and listing priority assignment form: lesser prairie chicken. United States Fish and Wildlife Service, Tulsa OK, USA.