FINAL PERFORMANCE REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. TX E-178-R

(F15AP00721)

Endangered and Threatened Species Conservation

Present Status of the American Burying Beetle (*Nicrophorus americanus*) in extreme NE Texas; is this species still present in Texas?

Prepared by:

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8 September 2017

FINAL REPORT

STATE: Texas GRANT NUMBER: TX E-178-R-1

GRANT TITLE: Present Status of the American Burying Beetle (*Nicrophorus americanus*) in extreme NE Texas; is this species still present in Texas?

REPORTING PERIOD: 1 September 2015 to 31 August 2017

OBJECTIVE(S). To determine the true status of *N. americanus* in its known northeastern Texas range..

Segment Objectives:

Task 1. Acquire Survey Areas- Current-throughout one year project (August 2016).
Task 2: Field Preparation- May 2016.
Task 3: Field Survey- May 2016 -August 2016.

Significant Deviations:

None.

Summary Of Progress:

Please see Attachment A.

Location: Fannin, Lamar, Red River, Bowie, and Franklin counties, Texas.

Cost: Costs were not available at time of this report, they will be available upon completion of the Final Report and conclusion of the project.

Prepared by: Craig Farquhar Date: 8 September 2017

Approved by: _____ Date: 8 September 2017
C. Craig Farquhar

ATTACHMENT A

Final Report

Present Status of the American Burying Beetle (*Nicrophorus americanus*) in extreme NE Texas; is this species still present in Texas?

Texas Parks and Wildlife Department
United States Fish and Wildlife Service Section 6 Grant
TX E-178-R

TPWD Contract
479259

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Reporting period
May 2016 – August 2017

Abstract

Surveys for the *Nicrophorus americanu*s (American Burying Beetle) in the northeastern counties of Texas adjacent to the Red River during 2016 have produced no captures of this species. The entire budget of $12,006.00 was just enough to conduct trapping of 529 trap nights over a transect of approximately 90 miles running from the vicinity of the Caddo National Grasslands in Fannin County, across Lamar County to northern Red River County. Southern Red River County was a focus for the eastern terminus because of historical records from Lennox Woods and the presence of suitable habitat in the outcrop zone of the Nacatoch Sand and its associated woodland. This long transect required the use of two trapping teams, two vehicles and seven people. People involved in the survey include, Dr. William Godwin (SHSU), Ms. Bethany Walker (SHSU), Mr. James Willett (SHSU), Mr. James Hernandez (SHSU), Mr. Arthur Perkins (DESCO), Mr. Chris Little (DESCO, and Mr. Justin Rowland (DESCO).

Introduction

In a 2015 Texas Parks and Wildlife/ United States Fish and Wildlife Service Section 6 grant program Priority List of Project Topics (FY 2015) identifies *Nicrophorus americanu*s (American Burying Beetle) as a species in need of additional research; specifically, projects concerning the distribution and population status of the species in northeastern Texas. *Nicrophorus americanus* was listed as an endangered species in 1989 (Federal Register 54(133): 29652-29655) but not conclusively documented from Texas until Godwin and Minich. (2005) reported discovery of a viable population in Lamar County on the Camp Maxey Military Reservation. The population at Camp Maxey was studied intensively until 2007 by Godwin and Minich. After this date, the only recorded sighting of the species is by Mike Quinn August 30, 2008. This is, to the best of our knowledge, is the last known record of *N. americanus* in Texas despite investigations conducted at various northeast Texas USDA National forests, by Godwin at the Red River Army Depot (2007), and during numerous surveys for industrial pipelines over the last 5 years.

The healthy populations observed by Godwin and Minich have not been observed over the last six years; thus, it appears the populations observed in the Red River Valley that were abundant as recently as 2007 have become extirpated.

Objective and Location

To determine the true status of *Nicrophorus americanus* in its known Texas range in the counties of Fannin, Lamar, and Red River (Figure 1).

Summary of Tasks

Task 1: Survey areas were first identified, then determined to be at least 100 meters away from one another using GPS Data. In Red River County, there were nine traps placed in the communities of Cuthand, two in Box Elder, and one each in Spring Hill, White Rock,

Greenwood, Silver City, Peters Creek, and Kanawha. These traps were placed on private lands with the assistance of Gary Cheatwood, who made this part of the survey possible by his assistance. Another two traps were located on private lands near Negley. Fourteen traps were placed in Lamar County in the Pat Mayse Wildlife Management Area as well as two traps in Fannin County in the Caddo National Grasslands.

Task 2: Pitfall traps and lids, modeled after Bedick *et al.* (2004), were constructed prior to the survey efforts. All personnel were trained on identification, collecting, baiting, and recording techniques at the Sam Houston State Natural History Collections in Huntsville, Texas.

Task 3: Field Survey methods were conducted using guidelines set out in the US Fish and Wildlife's American Burying Beetle Recovery Plan (1991), with the modifications to improve beetle survival recommended by Bedick *et al.* (2004). The sampling method and equipment used followed that of Creighton *et al.* (1993) with alterations proposed by Bedick *et al.* (2004) incorporated. At each survey site, the Pitfall traps were buried, covered, and then baited with aged chicken (100- 150 grams). Kozol *et al.*, (1988) reported that *N. americanus* does not show significant preference for avian or mammalian carcasses. Traps, if successful, were intended to safely detain individuals of *N. americanus* in 5-gallon vessels containing moist soil Bedick *et al.* (2004). In the event of catching the ABB, every effort would be established to prevent the death of the specimen. Traps were allowed to operate overnight to collect the nocturnal species. Every morning the traps were examined between 5:30 and 10:00 am. Locations of trap sites were recorded using Garmin GPS units and recorded in decimal degrees to 5 decimal places (Table 1). Eventually, four survey units were designated based on county and/or location: Fannin, Lamar, North and South Red River (Table 1). Overall, there were 529 total trap-nights recorded. Nearly all survey units accumulated between approximately 100 and 220 trap-nights; the only exception was that of the Fannin County unit of two trap locations (see below).

Significant Deviations

The Fannin County survey unit did not reach 100 total traps as outlined in the approach section. It was highly unlikely that *Nicrophorus americanus* would be in that location. More effort was spent in the vicinity of Pat Mayse WMA/Camp Maxey and favorable areas of Red River County because those areas had known populations in the past, while the Caddo National

Grasslands had been surveyed by the P.I. in 2007 with only negative results. Soils to the west of the Lamar County line seem to tend to become less friable and unsuitable for *N. americanus*.

Results & Discussion

Despite a widespread placement, bracketing the entire known range of the species in Texas, the 35 pitfall traps that were allowed to run for an acummulated 529 trap-nights produced no evidence of *N. americanus*. These results suggest the Texas extirpation *N. americanus* The possibility of extirpation was first advanced by Bauer (2010) in a masters thesis and attributed to episodes of higher than average temperatures recoreded in northeast Texas after 2005-06. These high temperatures or associated drought may have adversely affected the Texas population. This is notion is supported by Creighton *et al.* (1993), who collected a majority of their Oklahoma specimen during the cooler weeks late August/early September. Future surveys conducted during the relative cool of late summer may have the potential to yield more promising results. Concurrently, in July of 2016, at the request of Anita Barstow (USFWS) our team partnered with the Choctaw Nation at their capitol in Atoka County, Oklahoma to teach their tribal environmental scientists how to conduct surveys. This effort was not done using any resources from TPWD Contract 479259**.** The Choctaw Nation representatives efforts were negative.

Furthermore, SHSU has also conducted surveys in July and August of 2017 in partnership with the same DESCO team. These surveys in areas of Oklahoma just north of the Red River have consistently produced positive results. In light of these results we have more confidence that our negatives in Texas are a result of the absence of beetles and not an artifact of methodology. Surveys in 2017 in Oklahoma produced considerable numbers of 2017 beetles; that is, beetles that were freshly emerged this year. This indicates that 2017 was a good year for ABB reproduction.

This pattern of results suggests that, given the unusually wet year that was 2017, and the popular hypothesis that hot dry years have adversely affected the Texas population, and that the Texas population may have been a peripheral sink population originating in Oklahoma…that further surveys in NE Texas in 2018 would be warranted.

However, observations in the field since the Principle Investigator's first experience with this species in 2004 and some thoughts on the wild turkey (*Meleagris gallopavo*) deserve some discussion here given the nexus betwwen game management and endangered species management under the TPWD jurisdiction. The American burying beetle begins to appear in baited traps much later than other members of the genus. The author noted the early presence of *Nicrophorus* species except *N. americanus* in the early work at Camp Maxey. That early work in 2003-2006 often began in May because it was not well understood that *N. americanus* was a later emerger. Camp Maxey also had abundant populations of wild turkey and soon it was noted that *N. americanus* began to appear in traps about the time that larger turkey poults were observed. Ferrari (2014) reported *N. americanus* as attracted to carrion traps in Oklahoma no earlier than July (Figure 2). The other three species of *Nicrophorus* are present in May.

Turkey nesting in SE Oklahoma occurs in the first half of May (Whitaker 2017) (Figure 3). Information from the National Wild Turkey Foundation states that incubation takes 26-28

days. By their second week (late June), the poults are feeding with the hen and more exposed to predation. The sixth week (July) is a critical date for the poults, beyond which, their survival rates improve. The timing of this development places high mortality of larger poults in time with the emergence of *N. americanus* adults. This coincidence of timing makes the authors interested in exploring ways to link N. americanus development to wild turkeys. Wild turkey populations are well known to be adversely affected by drought and associated temperature extremes (Israel 2013). So given the unusual correlation between the two species, more investigation is warranted. If *N. americanus* biology could be correlated with wild turkey populations, then population fluctuations of the turkey might be identified as a factor affecting the endangered species and wild turkey augmentation programs could be linked with the management of the endangered species.

Table 1: ABB Trap Locations

Survey Unit *(Total Trap Nights)*	Location	Latitidue	Longitude	Soil Composition	Local Vegitation
Fannin *(21)*	Caddo	33.71561	-95.91109	Very Fine Sandy Loam	Forest
		33.76165	-95.86996	Fine Sandy Loam	Forest
Lamar *(170)*	Pat Mayse	33.77977	-95.70438	Fine Sandy Loam	Forest
		33.78558	-95.66555	Clay Loam	Forest
		33.78839	-95.62781	Fine Sandy Loam	Forest
		33.79144	-95.70432	Clay	Forest
		33.80102	-95.67990	Fine Sandy Loam	Forest
		33.80165	-95.70564	Fine Sandy Loam	Forest
		33.80554	-95.69543	Fine Sandy Loam	Forest
		33.81211	-95.68356	Fine Sandy Loam	Forest
		33.81290	-95.71396	Clay Loam	Forest
		33.81326	-95.69882	Fine Sandy Loam	Forest
		33.81586	-95.69878	Fine Sandy Loam	Forest
		33.81717	-95.67521	Fine Sandy Loam	Forest
		33.81991	-95.68523	Clay Loam	Forest
		33.83131	-95.69001	Clay Loam	Forest
S. Red River *(214)*	Box Elder	33.47600	-94.95273	Clay Loam	Pasture
		33.48409	-94.84565	Fine Sandy Loam	Pasture
	Cuthand	33.41828	-95.10879	Fine Sandy Loam	Woodland
		33.44706	-95.10953	Fine Sandy Loam	Woodland/Pasture
		33.46095	-94.99500	Fine Sandy Loam	Pasture
		33.46211	-95.10165	Fine Sandy Loam	Woodland/Pasture
		33.46219	-95.06302	Fine Sandy Loam	Woodland/Pasture
		33.46668	-95.08559	Fine Sandy Loam	Woodland/Pasture
		33.47962	-95.11320	Fine Sandy Loam	Woodland/Pasture
		33.47965	-95.09679	Annona Loam	Pasture
		33.48954	-95.11323	Wrightsville Soils	Woodland/Pasture
	Peters Creek	33.39460	-94.79062	Annona Loam	Woodland
N. Red River *(124)*	Greenwood	33.80574	-94.96910	Whakana/Elysian Soils	Pasture
	Kanawha	33.85650	-95.27880	Fine Sandy Loam	Forest
	Negley	33.74285	-95.08082	Annona Loam	Woodland/Forest
		33.75965	-95.08493	Wrightsville Soils	Woodland/Pasture
	Silver City	33.86250	-95.05422	Fine Sandy Loam	Woodland/Pasture
	Spring Hill	33.62946	-94.66458	Fine Sandy Loam	Woodland/Pasture
	White Rock	33.67560	-94.92684	Clay Loam	Pasture

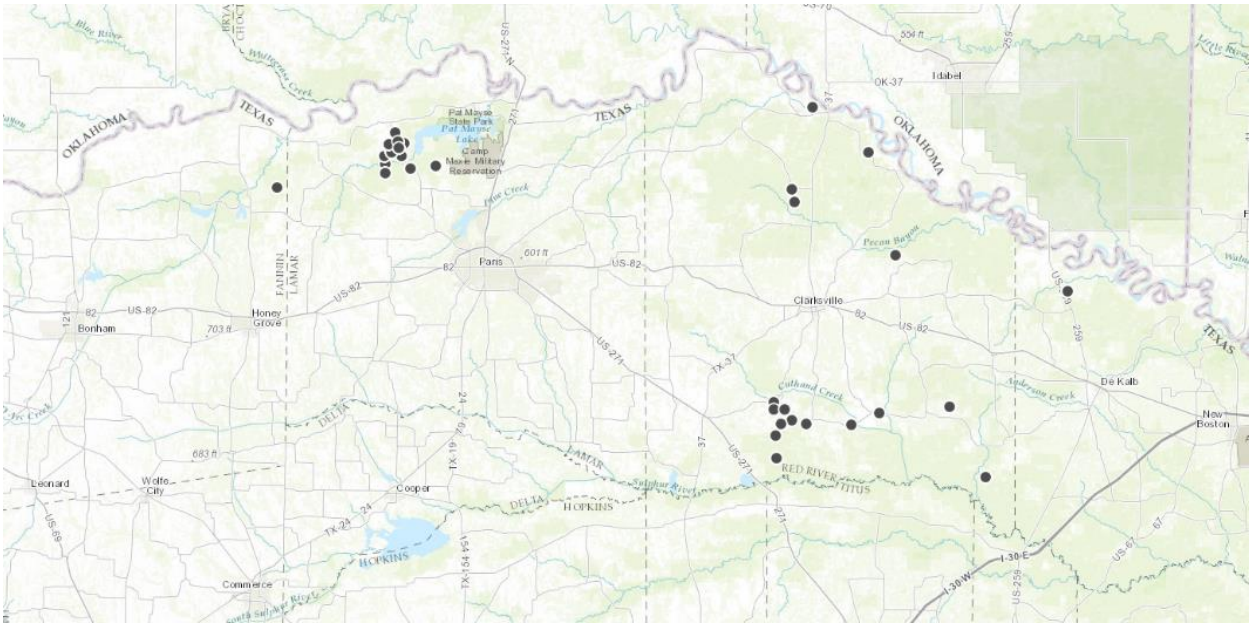

Figure 1: Map of trap locations.

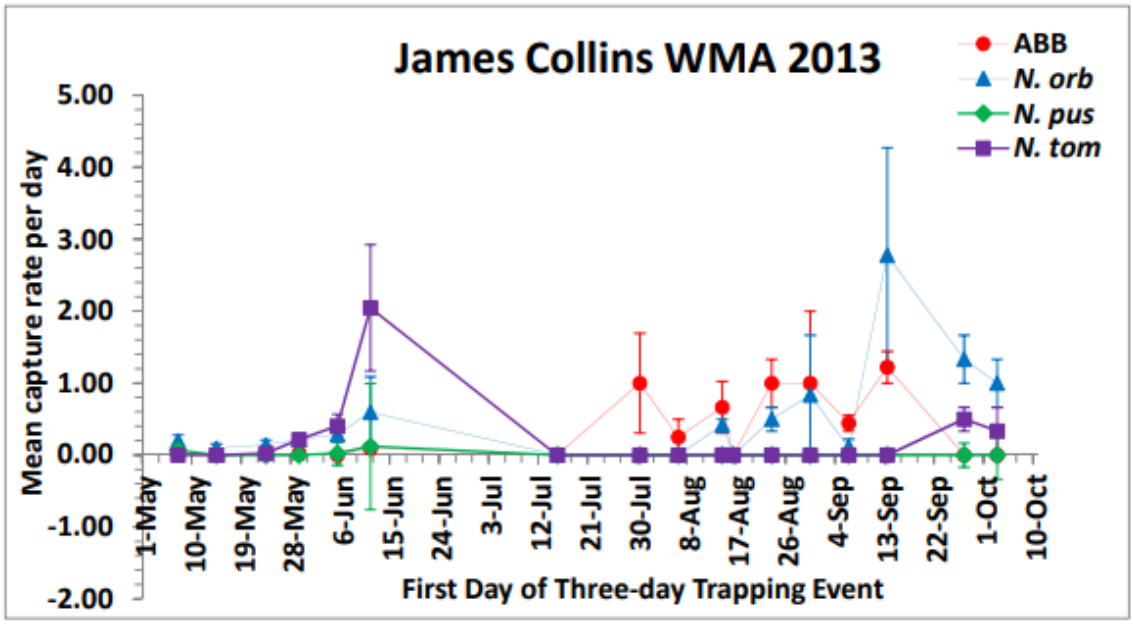

Figure 2: Ferrari (2014) reported on the phenology of carrion beetles in eastern Oklahoma.

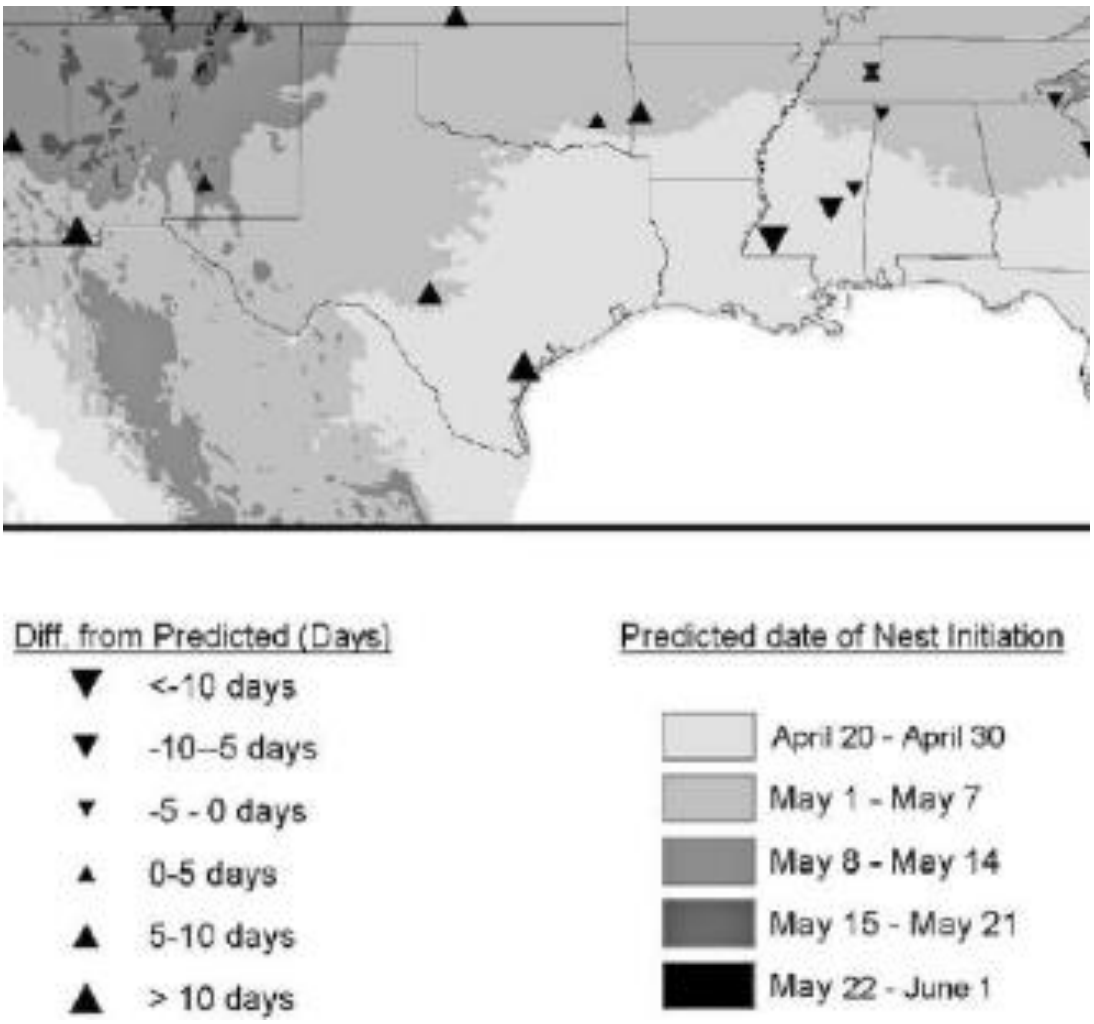

Figure 3: Wild Turkey nest initiation in the area of Texas where *N. americanus* is known to occur begins about the first half of May (from Whitaker et al. 2017).

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