FINAL PERFORMANCE REPORT

Federal Aid Grant No. F20AP00055 (E-76-R-6)

Cooperative Surveys and Coordination of Federally-Listed and Candidate Species in Oklahoma

Oklahoma Department of Wildlife Conservation

January 1, 2020 - December 31, 2020

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State: Oklahoma **Grant Number:** F20AP00055 (E-76-R-6)

Grant Program: Cooperative Endangered Species Conservation Fund, Traditional Conservation Grants Program

Grant Title: Cooperative Surveys and Coordination of Federally-Listed and Candidate Species in Oklahoma

Grant Period: January 1, 2020 – December 31, 2020

Project Leader: Matt Fullerton (January – August); Kurt Kuklinski (August – December)

Executive Summary:
ODWC staff utilized the "Cooperative Surveys and Coordination of Federally-listed and Candidate Species in Oklahoma" grant (E-76-R-6) to complete important work regarding federally-listed Threatened and Endangered (T&E) species in 2020. Staff participated in planning and coordination of collaborative surveys for T&E species, reviewed multiple USFWS Federal Register Notices regarding T&E species Status Assessments, listing decisions, and critical habitat definitions, and communicated appropriately throughout ODWC for comment and response to notices. ODWC also contributed to the WAFWA Endangered Species working group virtual meeting and provided an update on Oklahoma T&E species issues and status. ODWC staff assisted USFWS Tulsa ESO with multiple surveys and monitoring efforts directed at T&E species. Significant fieldwork effort was expended by ODWC staff to complete Arkansas River Shiner population monitoring surveys, and Neosho Mucket population assessment surveys. Annual population monitoring surveys targeting Leopard Darter were cancelled due to impacts and restriction of COVID-19.

Objectives:
To assist ESA Section 10 federally-permitted biologists from federal agencies, including (but not limited to) the U.S. Fish and Wildlife Service, U.S. Forest Service, and U.S. Army Corps of Engineers with both routine and short-term projects aimed at monitoring, researching, and surveying federally-listed and candidate species across the state of Oklahoma. Emphasis will be placed on the Interior Least Tern, Northern Long-eared Bat, Gray Bat, Ozark Big-eared Bat, Arkansas River Shiner, Leopard Darter, Neosho Mucket, Rabbitsfoot, Ouachita Rock Pocketbook, American Burying Beetle, and Rattlesnake Master-borer Moth.

Summary of Progress:
Each year, biologists from the Oklahoma Department of Wildlife Conservation (ODWC)'s Wildlife Diversity Program assist staff from various partnering agencies in conducting monitoring and recovery projects for species either designated as federal candidates or those federally-listed as threatened or endangered under the Endangered Species Act. Such projects may range from inter-agency route monitoring efforts (e.g. Leopard Darter, Arkansas River Shiner) while others may be relatively short-term and specific (e.g. genomics studies or

population augmentations). All such activities are conducted with federally-permitted biologists on site, most often a U.S. Fish and Wildlife Service (USFWS) biologist.

The Canadian and Cimarron Rivers in central and northwest Oklahoma support breeding populations of the federally endangered Interior Least Tern (Sterna antillarum) and threatened Arkansas River Shiner (Notropis girardi). The Least Tern and the Arkansas River Shiner are found, or are potentially present, in both the Cimarron and the Canadian Rivers where they require similar riverine habitat conditions that are maintained by periodic flooding events - long reaches of shallow, braided river channel with numerous barren sandbars and islands. The riverine habitat used by both species has declined in quality as a result of the alteration of the historic flooding cycles in both river systems by human manipulations to the rivers and their tributaries such as reservoir construction, dredging, channel straightening and dewatering. These changes have resulted in a reduction in the frequency and magnitude of flooding events that scour the vegetation within the flood plain and redistribute sediments to form sandbars. These alterations in surface flows have created a pathway for invasive species, such as the saltcedar (Tamarix spp.). When the need and opportunity arises, biologists from ODWC plan to monitor nesting Interior Least Terns throughout various locations in Oklahoma. In addition, ODWC personnel occasionally assist the U.S. Army Corps of Engineers (USACE) with the monitoring of Interior Least Tern nesting colonies throughout the Arkansas River watershed.

Our knowledge of the population sizes and trends for Arkansas River Shiners and Least Terns are generally incomplete and limited in large part because of the poor access that biologists have to their habitat most of which is privately owned and not easily reached by public roads or other access points. Several opportunities exist for accessing the Cimarron and Canadian rivers via state-owned lands such as the Packsaddle Wildlife Management Area, and the recently acquired Cimarron Bluff and Cimarron Hills WMAs. This project would provide funding to assist ODWC personnel in periodically surveying these areas to assess and monitor the populations of federally listed and candidate species. Additionally, the USFWS Oklahoma Ecological Services Field Office (OESFO) currently monitors Arkansas River Shiner populations at several bridge crossings on the Canadian River. This proposed project would provide funding to ODWC to assist the Service with this monitoring effort.

The Little River system in southeastern Oklahoma and southwestern Arkansas supports all of the known populations of the federally threatened Leopard Darter (Percina pantherina). The Leopard Darter is an intermittent spawner and was likely never high in abundance, even historically. Habitat loss and from anthropogenic activities have caused overall population declines, with reservoir construction having the greatest impact. Reservoir impoundments prevent the movement of Leopard Darters between the populations in each of the major tributaries of the Little River (e.g. Glover River and Mountain Fork River) and therefore isolate and hinder gene flow between populations. Critical Habitat is designated for this species in portions of the Little River, Glover Creek, and the Mountain Fork River within McCurtain and Pushmataha counties, OK, and in Polk County, AR (50 CFR 17.95(e)). Among the priority tasks identified in the Leopard Darter Recovery Plan are the identification of important Leopard Darter habitat and monitoring of the remaining populations. Staff from both the OESFO and the U.S. Forest Service (USFS) have monitored Leopard Darters for more than 20 years at traditional (fixed) locations. It is important to continue this effort and to conduct surveys at other sites that

potentially support this species. In December 2016, the USFWS drafted a plan titled “A Plan of Artificial Gene-flow for the Threatened Leopard Darter, Percina pantherina” to address both genetic drift and declining effective population sizes (Ne) of fragmented Leopard Darter populations throughout the Little River watershed. One component of the plan involves exploring the possibility of augmenting currently extant populations of P. pantherina that have declined in past years due to a combination of anthropogenic and/or environmental factors (e.g. Cossatot River). While the plan does suggest capturing adult fish as one possible pathway, USFWS has initially opted to obtain larval Leopard Darters during the known spawning period (February – April). Larval fish are captured out of select access points along the Glover and upper Little Rivers and transported to the Tishomingo National Fish Hatchery for identification. This proposed project would provide funding to ODWC to assist the USFWS in monitoring Leopard Darter populations, assessing their current distribution, and providing support in the capture of larval fish for the artificial gene flow plan.

The Ozark Plateau National Wildlife Refuge (OPNWR) owned by USFWS in Adair County is managed with a focus on federally-listed bats, including the threatened Northern Long-eared Bat (Myotis septentrionalis), endangered Gray Bat (M. grisescens), and endangered Ozark Big-eared Bat (Corynorhinus townendii ingens). The Sally Bull Hollow Unit of the OPNWR contains three entrances to a cave system called the Duncan-Fields Cave System. This particular cave is an important winter hibernaculum for M. septentrionalis and is thought to currently house one of the largest concentrations of the species rangewide. Since 2015, biologists from both the Refuge and an environmental consulting firm have deployed mistnets and harp traps at the three cave entrances on the Sally Bull Hollow Unit during “spring emergence” and “fall swarming” periods in March and September. Creation of this grant would allow ODWC staff to further assist USFWS and consulting firm staff with mistnet deployment, banding, and data recording of federally-listed and declining bats on the OPNWR.

As part of a 2016 programmatic Section 7 consultation, the Tulsa District of USACE has formalized an agreement to designate a 3,110 acre portion of the Ft. Gibson Wildlife Management Area as a mitigation property for the endangered American Burying Beetle (Nicrophorus americanus, ABB). USACE has committed to assisting ODWC in habitat management and overall enhancement of the property for the benefit of N. americanus. One of the commitments set forth by USACE is to conduct a biannual survey for ABBs to monitor both the presence and relative abundance of the species. This grant would allow both Wildlife Diversity Program and Regional ODWC staff to assist USACE with ABB trap deployment and data recording, as needed.

With the recent federal listing of two freshwater mussel species, the Neosho Mucket (Lampsilis rafinsqueana) and the Rabbitsfoot (Quadrula cylindrica), interest has increased among various state and federal agencies to conduct cooperative conservation and recovery projects for these species. Such projects may have a focus on genomic analysis while others concern captive propagation techniques for eventual population augmentation. While most of the activity may be primarily restricted to a lab setting or aquaculture facility, assistance from ODWC is occasionally requested to assist with mussel searches and collections. Creation of this grant would allow ODWC staff to assist USFWS biologists and other partners with various mussel projects that may require assistance in surveying and/or handling of federally-listed mussels in

the field. The Rattlesnake Master-borer Moth (Papaipema enryngii) is a moth species that was designated as a federal Candidate species in 2013. This species relies completely on Rattlesnake Master (Eryngium yuccifolium), a plant that is often associated with moist soils in tallgrass prairies and woodlands. The only state record for P. eryngii is from Osage County on the Tallgrass Prairie Preserve owned by The Nature Conservancy. Through the State Wildlife Grants Program, ODWC funded a project with the University of New Hampshire from 2014 – 2017 for the purposes of assessing the current presence and distribution of the species on the Tallgrass Prairie Preserve. No individuals of P. eryngii were found during the duration of the project; however, Arkansas Game and Fish Commission recently funded a project in which P. eryngii was documented on various sites within the Arkansas River Valley ecoregion, an area that continues into east-central Oklahoma. This grant would allow ODWC staff to conduct passive roadside surveys for patches of E. yuccifolium in June – August of 2021 so that individual plant stems can be examined for possible presence of P. eryngii larvae.

2020 Planning and Coordination Activities:

ODWC personnel from Wildlife Diversity and Fisheries Division attended a collaborative ESA Section 6 meeting with USFWS Tulsa Environmental Services Office (ESO) to plan and coordinate surveys for 2020. A presentation was given to the ODWC Fisheries Division Hatchery Section about the status and surveys of Arkansas River Shiner, Leopard Darter, and Peppered Chub. Multiple Rabbitsfoot mussel Species Status Assessment meetings and webinars were attended. Mussel sampling results were entered into a database and archived. A USFWS Purple Lilliput listing decision notice was reviewed and a report provided to ODWC Administration. Quarterly WAFWA Endangered Species working group conference calls/webinars were attended, and updates on ODWC projects were presented. The proposed USFWS Listing Rule and Critical Habitat definition for Peppered Chub was reviewed and discussed among ODWC staff.

Surveys Conducted in 2020:

Arkansas River Shiner: ODWC Wildlife Diversity staff assisted USFWS Tulsa ESO staff to complete June surveys for Arkansas River Shiner on the South Canadian River. Fall population monitoring surveys were also completed by ODWC and USFWS Tulsa ESO staff on the South Canadian River. In total, 10 surveys were completed by ODWC personnel in 2020.

Leopard Darter: 2020 Leopard Darter monitoring surveys were cancelled by USFWS Tulsa ESO due to COVID-19 restrictions and concerns.

Neosho Mucket: During the last week of August and the first week of September, we conducted freshwater mussel surveys at 14 sites on the Illinois River to search specifically for the endangered Neosho Mucket (*Lampsilis rafinesqueana*). The ODWC is a partner in a multi-state effort to assess the genetic composition of Neosho Mucket populations in each watershed throughout the species' range. DNA samples can be collected non-invasively from Neosho Muckets by collecting mucus swabs along the mantle of living individuals. In Oklahoma, the last known Neosho Mucket populations occur in the Illinois River upstream from Lake Tenkiller and we set a goal of finding at least 15 live muckets from which we could collect swabs.

We conducted timed-searches for Neosho Mucket at eight sites on August 26 and 27, and at six sites on September 2 and 3, 2020. At each site, we searched for mussels for a minimum of 30 minutes. Where mussels were present, we searched for longer periods of time. Searches were conducted using a combination of aquascopes, snorkeling, and grubbing. In shallow, clear water that was less than three feet deep, we used aquascopes to search the substrate of the river looking for exposed shells or syphons that would indicate the presence of a mussel. An aquascope is a cone-shaped viewing device with a clear plastic lens on the bottom surface. The aquascope can be submerged up to 18 inches under the water and provides an unobstructed view (no sun glare) under the water. Once a mussel was found using an aquascope, it was captured by hand and placed into a mesh bag temporarily until the site had been thoroughly searched. Snorkeling was used in a similar manner as the aquascopes but in areas where the water was approximately two to six feet deep and relatively clear. Grubbing was a technique that we used in water that was murky or turbid and generally two to four feet deep. It involved running our hands over the substrate of the river bottom and searching, by touch, for partially embedded mussel shells. As mussels were detected using all three methods, they were placed in a mesh bag and kept submerged until the site was thoroughly surveyed. Once the survey was complete, the mussels were placed in a temporary holding area underwater and identified. Neosho Muckets were lifted out of the water and a swab was inserted between the valves of the shell to collect a mucus sample from the mantle cavity. Each swab was placed in a tube of 100% alcohol for storage and labeled with the information for the mucket from which it was collected. After processing, all mussels were returned to their site of collection and placed foot-first into the substrate partially. In this position, each mussel's syphons remained above the substrate and the mussel was able to bury itself into the substrate to the extent of its choosing.

We located a total of 18 mussels that we identified as Neosho Muckets or suspected Neosho Muckets. Mucus swabs were collected and preserved from all 18 individuals. At the 14 sites that we searched, we found live mussels at six sites, and one or more Neosho Muckets were documented at five of the six locations. Out of the 18 sites, one had a large mussel population (199 mussels of 14 species), and two had modest mussel populations (16 mussels each of five and four species). Three sites had small mussel populations of one to four individuals and one or two species each. The results of our timed-searches at each site are described below. We also included the measurement from the 18 Neosho Muckets that were swabbed.

On August 26 and 27, 2020, the survey team was comprised of six ODWC biologists - Curtis Tackett, Mark Howery, Matt Fullerton, Tony Rodger, Trevor Starks, and Drew Wallace. Because the Neosho Mucket is a federally listed species, only biologists Matt Fullerton and Curtis Tackett handled the Neosho Muckets that were found. During the two-day survey period, eight locations were searched as listed below:

Wednesday August 26, 2020

Site # 1: ~ 1,000 feet upstream from the Chewey Bridge (36.1062, -94.7822)
Approximately 1 hour of search effort
No live mussels were found, but we did find relatively fresh shells from two Bluefer.

Site #2: Stunkard Public Access Point (36.0885, -94.8368)

Thirty (30) minutes of search effort
No live mussels or shells were found.

Site #3: Peavine Hollow Public Access Point (36.0632, -94.8843)
Thirty (30) minutes of search effort
No live mussels or shells were found.

Site #4: Immediately upstream from Edmondson Public Access Point (36.0317, -94.9111)
Thirty (30) minutes of search effort
No live mussels were found but we found multiple shells of Bluefer.

Site #5: No Head Hollow Access Point (35.9657, -94.9103)
Approximately one hour of search effort
We found two (2) live Neosho Mucket and two (2) live Bluefer. We also found approximately 20 sets of shells that were primarily from Bluefer, but with a few valves from Wabash Pigtoe and Plain Pocketbook.

Site #6 Echota Public Access Area (35.9431, -94.9135)
Thirty (30) minutes of search effort in a backwater slough.
We found one (1) live Neosho Mucket and one (1) live Bluefer.

Thursday August 27, 2020

Site #7: Access area below Lake Frances Dam (36.1291, -94.5664)
Approximately three (3) hours of search time
Wabash Pigtoe (*Fuscanaia flava*) – 57
Pistolgrip (*Tritogonia verrucosa*) – 43
Three-horn Wartyback (*Obliquaria reflexa*) – 24
Plain Pocketbook (*Lampsilis cardium*) – 23
Bluefer (*Potamilus purpurata*) – 15
Flutedshell (*Lasmigona costata*) – 8
suspected pigtoe species (*Pleurobema* sp.) – 7
suspected Neosho Mucket (*Lampsilis rafinesqueana*) – 6
Pimpleback (*Quadrula pustulosa*) – 5 (1 of these was smooth)
Threeridge (*Amblema plicata*) – 3
Fragile Papershell (*Leptodea fragilis*) – 3
Deertoe (*Truncilla truncata*) - 3
suspected Pond Mussel (*Ligumia subrostrata*) - 1
suspected Gulf Mapleleaf (*Quadrula nobilis*) – 1

Site # 8 New Combs Bridge/Edmondson Access immediately downstream (36.0321, -94.9178)
Approximately one (1) hour of search time
No live mussels or shells were found.

Neosho Mucket Measurements

Neosho Mucket - No Head Access #1
7 growth rings
length – 105.46 mm
width – 70.72 mm
height – 42.57 mm

Neosho Mucket – No Head Access #2
10+ growth rings
length – 103.09 mm
width – 79.66 mm
height – 48.29 mm

Neosho Mucket – Echota #1
8+ growth rings
length – 97.92 mm
width – 76.28 mm
height – 47.95 mm

Neosho Mucket – Lake Francis Dam #1
8 growth rings
length – 94 mm
width – 55 mm
height – 40 mm

Neosho Mucket – Lake Francis Dam #2
9 growth rings
length – 101 mm
width – 75 mm
height – 45 mm

Neosho Mucket – Lake Francis Dam #3
8 growth rings
length – 115 mm
width – 82 mm
height – 48 mm

Neosho Mucket – Lake Francis Dam #4
7 growth rings
length – 101 mm
width – 74 mm
height – 41 mm

Neosho Mucket – Lake Francis Dam #5
9 growth rings
length – 100 mm

width – 79 mm
height – 43 mm

Neosho Mucket – Lake Francis Dam #6
10 growth rings
length – 123 mm
width – 91 mm
height – 40 mm

On September 2 and 3, 2020, our search effort was focused on a reach of the Illinois River upstream and downstream from the Carnes Ford bridge and public access site. The field team was comprised of Curtis Tackett, Trevor Starks, Matt Fullerton, Mark Howery, Tony Rodger, and John West. Additionally, Blake Podhajsky from ODWC's Outdoor Oklahoma television crew traveled with us to film the survey.

On Wednesday September 2, 2020, we put in at the Carnes Ford Public Access Site (low water bridge) and kayaked upstream approximately 1.25 miles to first site, then worked downstream from there.

Site #1
Backwater channel approximately 1.25 miles upstream from Carnes Ford; some channel shifting had occurred since last aerial imagery was taken; site is at 36.1319, -94.6470

Sixteen (16) live mussels were found, plus a fresh shell from a Fragile Papershell. Most of the mussels were in two areas of shallow water (< 3.5 feet) with silt overlying gravel substrate. We had a combined search time of 3.5 hours.

Neosho Mucket (*Lampsilis rafinesqueana*) – 8
Bluefer (*Potamilus purpurata*) – 3
Fragile Papershell (*Leptodea fragilis*) – 3
Wabash Pigtoe (*Fusconaia flava*) – 1
Plain Pocketbook (*Lampsilis cardium*) - 1

Neosho Mucket Measurements

Neosho Mucket #1
Length – 130 mm
Width – 93 mm
Height – 54 mm

Neosho Mucket #2
Length – 141 mm
Width – 101 mm
Height – 60 mm

Neosho Mucket #3
Length – 110 mm
Width – 84 mm

Neosho Mucket #5
Length – 121 mm
Width – 91 mm
Height – 46 mm

Neosho Mucket #6
Length – 100 mm
Width – 71 mm
Height – 39 mm

Neosho Mucket #7
Length – 146 mm
Width – 101 mm

Height – 56 mm

Height – 56 mm

Neosho Mucket #4
Length – 131 mm
Width – 93 mm
Height – 59 mm

Neosho Mucket #8
Length – 121 mm
Width – 86 mm
Height – 50 mm

Site #2
Backwater cove on the protected side of a river bend approximately 0.25 miles downstream from Site #1; location: 36.1314, -94.6523

Combined search time approximately 2.5 hours; most mussels found in silt overlying gravel near the mouth of the cove in 2.5 to 4.0 feet of water
Sixteen (16) live mussels found; however, none of these were Neosho Mucket.
Bluefer (*Potamilus purpurata*) - 8
Fragile Papershell (*Leptodea fragilis*) - 6
Pistolgrip (*Tritogonia verrucosa*) – 1
Wabash Pigtoe (*Fusconaia flava*) – 1

On Thursday September 3, 2020, we put in at the Carnes Ford Public Access Site (low water bridge) and kayaked downstream approximately 1.5 miles to the first site, then worked back upstream from there. We searched four locations in total and numbered them #3 through #6 in keeping with the site numbers from September 2.

Site #3
Small backwater cove on the right descending side of the river; location: 36.1533, -94.6930
The site appeared to have been overtopped by water during a high flow event within the past year; the site had a silty substrate.
We expended a search time of thirty (30) minutes, but no live mussels were found.

Site # 4
Small backwater cove on the right descending side of the river; **location: ; 36.1537, -94.6839**
The site appeared to be the lower end of an old river channel. The backwater area was much smaller than it appeared in 2018 Google Earth imagery due to channel erosion. The site had a silty substrate and warm water with an abundance of Cardinal Shiners.
We expended a search time of less than 20 minutes due to the site's small size, and no live mussels or shells were found.

Site #5
Backwater cove on the right descending bank; location: 36.1474, -94.6728
This site appeared to be the remnant of a former river channel. The substrate was primarily sand, silt, and fine gravel, Our search time was 1.50 hours and we found one live mussel (a Neosho Mucket) plus shells and single valves from Threeridge, Neosho Mucket, Bluefer, and Pimpleback.

Neosho Mucket (*Lampsilis rafinesqueana*) – 1

Neosho Mucket #9
Length – 121 mm
Width – 81 mm
Height – 48 mm

Site #6
Side channel with an emergent stand of American Water-willow (Justicia americana); Location: 36.1429, -94.6684.
The substrate at the site was a mix of sand and fine gravel in front of the water-willow stand and silt behind it. We expended thirty (30) minutes of search time but found no live mussels, but one relatively fresh Neosho Mucket shell from a small individual (less than 40 mm in length).

III. SIGNIFICANT DEVATIONS

There were no significant deviations from the grant approach or objectives. COVID-19 impacts and subsequent restrictions did limit collaborative fieldwork efforts between ODWC and other agencies in 2020.

VI. EQUIPMENT

No equipment exceeding $5,000 in cost was purchased in 2020.

VII. PREPARED BY

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Date: February 16, 2021

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