FINAL PERFORMANCE REPORT

Federal Aid Grant Number F14AP00821 (E-76-R-3)

Surveys of Listed and Candidate Aquatic Species in Oklahoma

Oklahoma Department of Wildlife Conservation

October 1, 2014 through September 30, 2016

FINAL PERFORMANCE REPORT

State: Oklahoma **Grant Number:** F14AP00821 (E-76-R-3)

Grant Program: Endangered Species Act Section 6

Grant Name: Surveys of Listed and Candidate Aquatic Species in Oklahoma

Grant Period: October 1, 2014 – September 30, 2016

Principal Investigator: Matt Fullerton, Oklahoma Department of Wildlife Conservation

I. Need:

Population monitoring is necessary to periodically assess the status of federally-listed species to evaluate the effectiveness of population management techniques and determine whether progress is being made toward recovery goals. Population monitoring is equally important for candidate species and those species that are under evaluation for potential federal listing because it provides information regarding population trends and overall stability. Riverine systems of Oklahoma support three federally-listed species of fish, five federally-listed freshwater mussels, and one federally-listed bird. Additionally, at least 5 fish and mussel species in the state are currently under review for potential listings under the Endangered Species Act. As a result of the number and diversity of species of shared conservation interest, there are many potential opportunities for cooperative monitoring efforts between the U.S. Fish and Wildlife Service (Service) and the Oklahoma Department of Wildlife Conservation (ODWC). This grant provided financial assistance to the ODWC to foster cooperative monitoring efforts with the Service for selected aquatic species.

The Canadian and Cimarron rivers in central and northwest Oklahoma support breeding populations of the federally endangered Interior Least Tern (*Sterna antillarum*), the threatened Arkansas River Shiner (*Notropis girardi*), and the Arkansas Darter (*Etheostoma cragini*), a former federal candidate. In western Oklahoma, the Arkansas Darter is restricted to the Cimarron River watershed and is found in heavily vegetated side channels and sloughs and in several tributary streams near vegetated seeps and springs. The Least Tern and the Arkansas River Shiner are found, or 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. This habitat also is used by the Snowy Plover (*Charadrius alexandrinus*), a rare migratory shorebird that nests on some of the larger sandbars that are used by nesting colonies of Least Terns. The riverine habitat used by all of these 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. Additional impacts include altered flow patterns from invasive plants such as the saltcedar (*Tamarix* spp.), a species that has encroached upon these river systems and further altered their habitat structure. The decline in sandbar habitat due to the reduced magnitude and frequency of flooding events and the alteration of river ecosystems by invasive species are two of the

conservation issues identified for large river landscapes in the Oklahoma Comprehensive Wildlife Conservation Strategy. Our knowledge of the population sizes and trends for Arkansas River Shiners, Least Terns and Arkansas Darters are 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 provided funding to assist ODWC personnel in periodically surveying these areas to assess and monitor the populations of federally listed and candidate species. Additionally, the Tulsa Field Office for the Service currently monitors Arkansas River Shiner populations at several bridge crossings on the Canadian River.

The Little River system in southeastern Oklahoma and southwestern Arkansas supports all of the known populations of the federally-threatened Leopard Darter (*Percina pantherina*). Throughout its range, the Leopard Darter has never been common, but its status has declined in recent decades as a result of habitat loss and habitat fragmentation due to the construction of reservoirs. These reservoirs 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 these populations and further endanger the species. 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. The U.S. Fish and Wildlife Service's Tulsa Field Office has monitored Leopard Darters for more than 20 years as traditional locations. It is important to continue this effort and to conduct surveys at other sites that potentially support this species. This proposed project provided funding to ODWC to assist the Service in monitoring Leopard Darter populations and assessing their annual distribution.

The upper portion of the Red River system (e.g. the Red and Washita rivers upstream from Texoma Reservoir) support several species of fish that are endemic to that watershed. Two of these species, the Red River Pupfish (*Cyrinodon rubrofluviatilis*) and the Red River Shiner (*Notropis bairdii*) have expanded their ranges into other river systems as a result of accidental human translocations and introductions. However, the endemic Prairie Speckled Chub (*Macrhybopsis australis*) remains confined to the Red River and are currently undergoing a status review for a potential listing under the Endangered Species Act. A better understanding of its distribution, population size and population trend are needed. A survey and monitoring effort were to be attempted as an activity of this project.

II. Project Objective:

To monitor populations of aquatic species that are federal candidate species, federally listed as endangered or threatened, or under evaluation by the U.S. Fish and Wildlife Service for potential federal listing. Species that will be specifically addressed will be the Leopard Darter, Arkansas River Shiner, Interior Least Tern, Arkansas Darter and Prairie Speckled Chub in the Cimarron, Canadian, Red and Little river watersheds.

III. Approach:

This grant provided funding for the following activities:

1) Arkansas River Shiner: Assisting the personnel of the U.S. Fish and Wildlife Service's Tulsa Field Office with their annual monitoring survey of the Arkansas River Shiner in the Cimarron and Canadian rivers. All fish collections within these rivers will be made in coordination with the Tulsa Field Office and no shiner collections will be made independently from their staff to eliminate unnecessary take. The survey schedule will be established by the U.S. Fish and Wildlife Service's Tulsa Field Office staff, and will likely take place in October 2014, June/July 2015, October 2015, and June/July 2016.

2) Arkansas Darter: As the opportunities arise, fish surveys will be conducted in the Cimarron River and its tributaries where potentially suitable habitat exists - vegetated seeps, springs and runs, especially those that support water cress. These surveys will be conducted primarily by means of hand nets and seines with the intention of releasing the fish alive back at the survey location. The primary area of emphasis will be the state-owned Cimarron Bluff and Cimarron Hills wildlife management areas, but neighboring private lands may be surveyed if landowner permission can be obtained. These opportunities will most likely occur in July and August of 2015.

   Additionally, a subset of sites with recent (<25 years) occurrence data in northeastern Oklahoma will be surveyed for this species. The sites that will be chosen are ones at which the species has been previously documented or sites in close proximity and within the same stream watershed.

3) Leopard Darter: Assisting the personnel of the U.S. Fish and Wildlife Service's Tulsa Field Office with their annual summer monitoring of the Leopard Darter populations in the Little River and its major tributaries in July of 2015. These surveys are primarily visual surveys conducted with the use of snorkeling equipment. All surveys will be conducted in conjunction with U.S. Fish and Wildlife Service personnel to eliminate unnecessary disturbance or take of Leopard Darters.

4) Least Tern: Periodically conducting surveys for Least Terns on the Canadian River at Packsaddle WMA and the Cimarron River at Cimarron Hills and Cimarron Bluffs WMAs. Tern surveys will be conducted each year, although all three WMAs may not be surveyed each year. These surveys will be visual and will consist of searching suitable nesting habitat for tern colonies, and counting or estimating the number of pairs, nests and/or chicks. Surveys and monitoring will take place in June, July and August of 2015. Notes will be taken if Snowy Plovers or other shorebird species are located during the course of the tern surveys.

5) Neosho Madtom: Assisting the U.S. Fish and Wildlife Service with field surveys for the Neosho Mucket in the Neosho and/or Spring rivers if this effort is undertaken during the grant year.

6) Prairie Speckled Chub: As opportunities arise, seining surveys will be conducted in the upper Red River above Lake Texoma to determine the presence and relative abundance of the Prairie Speckled Chub, These surveys will be conducted primarily by means of hand nets and seines with the intention of releasing the fish alive back at the survey location. The Prairie

Speckled Chub was part of a multi-species listing petition to the U.S. Fish and Wildlife and its status will be assessed in the near future. Surveys will take place at county road and highway crossings along the Red River and on private land if landowner permission can be obtained.

7) Preparing an annual report of each survey's results, and coordinating with other aquatic conservation partners through meetings and presentations at conferences.

IV. Results:

Arkansas River Shiner

ODWC staff from the Wildlife Diversity Program assisted the US Fish and Wildlife Service's OESFO with surveys and monitoring for Arkansas River Shiners (*Notropis girardi*) during the following periods:

October 2014
June 2015
October 2015
June 2016

Beginning in 2014, USFWS staff determined that greater emphasis should be placed on fall sampling as a continued effort to collect young of year *N. girardi* that may be too small during June to accurately capture and identify. Between the Texas state line east (downstream) to the interstate 75 bridge near Calvin, OK, Fish & Wildlife Service biologists have designated at least 17 surveys sites along the Canadian river in Oklahoma, however not every site is surveyed each year (Fig. 1). All collected samples from both spring and fall surveys were sent to the Oklahoma State University (OSU) Cooperative Fish and Wildlife Unit for identification and enumeration; actual enumeration and processing of the collected samples is conducted under a separate, though related, Section 6 grant on the campus of OSU.

Fall 2014 sampling took place during the week of October 6th. ODWC personnel assisted with seine-haul sampling at ten sites. Summer 2015 sampling took place during the week of June 8th. ODWC personnel assisted with seine-haul sampling at six sites; due to an excessive amount of rainfall received in the previous weeks, high flows on the river prevented any additional surveys downstream from the Highway 9/Norman site in Cleveland Co. Fall 2015 surveys were conducted during the week of October 5th and ODWC personnel assisted at twelve sites. Summer 2016 sampling occurred during the week of June 6th and ODWC personnel assisted with seine hauls at only 9 sites; as in 2015, high river flows prevented any further sampling downstream of the Norman, OK site.

As in previous years, Arkansas River Shiners were captured at most locations except for the upper-most and furthest downstream sites; however they were not the numerically dominant species at any site. Other species captured in conjunction with Arkansas River Shiners included Red Shiner (*Cyprinella lutrensis*), Sand Shiner (*Notropis stramineus*), Plains Killifish (*Fundulus zebrinus*), Red River Pupfish (*Cyprinodon rubrofluvatilis*), Bullhead Minnow (*Pimephales vigilax*) and Emerald Shiner (*Notropis atherinoides*). Captured in smaller numbers were Plains Minnow (*Hybognathus placitus*), Brook Silverside (*Labidesthes sicculus*), Suckermouth Minnow

(*Phenacobius mirabilis*), River Carpsucker (*Carpiodes carpio*), Green Sunfish (*Lepomis cyanellus*), Orange-spotted Sunfish (*Lepomis humilis*) and Largemouth Bass (*Micropterus salmoides*).

Since the species is presumed to be extirpated in the Cimarron River, no surveys for Arkansas River Shiners were conducted at any sites along the Cimarron River during the grant segment.

Leopard Darter

ODWC staff from the Wildlife Diversity program assisted USFWS and US Forest Service staff with the annual two-week survey during the summers of 2015 and 2016 in July/August for the Leopard Darter (*Percina pantherina*) in McCurtain, Le Flore, and Pushmataha counties in southeastern Oklahoma. ODWC staff assisted with depletion and snorkeling surveys at 18 fixed sites that are sampled every year; in addition, surveys were conducted at several rotational sites which are surveyed on an average of every 3 years (Fig. 2). These sites are located on the Little River, Glover River, and the upper Mountain Fork River shown in Figure 2. A total of 15 Leopard Darters were counted collectively at 15 sites in 2015. High water levels and low visibility due to turbidity levels limited the number of sites that were sampled during the rotational period in 2015.

In July 2016, sampling conditions were much more favorable and a total of 131 Leopard Darters were counted at 20 sites.

Interior Least Tern

Due to time limitations, we did not conduct any surveys or monitoring of Interior Least Tern activity on either the Cimarron Hills Wildlife Management Area (WMA) or Packsaddle WMA in 2015 - 2016. Cimarron Hills WMA occurs on the east side of the Cimarron River in Woods County, Oklahoma and encompasses approximately the southern half of a large salt flat known as the Little Salt Plain. Because of its bare, sandy terrain and its proximity to the Cimarron River, this salt flat has been a traditional nesting area for Interior Least Terns and for Snowy Plovers (*Charadrius alexandrinus*); however no Least Terns and few Snowy Plovers nested on the salt flat in 2012 or 2013 as a result of the on-going drought. During the three-year drought, no surface flow occurred in the Cimarron River during the summer months when Least Terns normally would be nesting. Drought conditions persisted in the region through the winter and spring of 2014 (January through May), but a period of increased rainfall occurred between June and August of 2015 that returned surface flow to the Cimarron River. Surface water conditions, and presumably the local food supply, would not have been adequate for rearing chicks in the early weeks of the Least Tern nesting season in 2014. Although increased rainfall in the region may have been beneficial, very high river flows resulting from extended periods of rainfall may have been detrimental to Least Terns throughout the state during the nesting seasons of 2015 and 2016; however, it is unknown if Interior Least Terns experienced a successful nesting season on or near the Cimarron River during these time periods.

Neosho Madtom

During the grant period, ODWC staff did not assist with any Neosho Madtom (*Noturus placidus*) surveys. To the knowledge of ODWC, no population monitoring surveys for this species were conducted in Oklahoma by USFWS-OESFO staff during the grant period (2014 – 2016).

Arkansas Darter

The Arkansas Darter (*Etheostoma cragini*) was designated as federal candidate in 1995 and remained a candidate species, until the U.S. Fish and Wildlife Service conducted another 12-month finding and removed it from candidate status on October 6th 2016.

In October 2014, ODWC personnel conducted Arkansas Darter surveys along the mainstem of the Cimarron River in Beaver and Harper counties. Each surveyor had a dipnet and searched vegetation along the river bank. Two sites were surveyed, with ±75 Arkansas Darters found at one site in Beaver County, northwest of the town of Gate, OK (Fig. 4).

On June 29th, 2015, staff from both ODWC and the USFWS-OESFO conducted a survey for the Arkansas Darter throughout the Cimarron River watershed within the counties of Beaver, Harper, Woodward, and Woods. A list of potential and historic sites was compiled, and many of these were visited where accessible. These included Cottonwood Creek, Crooked Creek, Cimarron River (mainstem), Buffalo Creek, Sleeping Bear Creek, Traders Creek, Horse Creek, Redoubt Creek, and Day Creek. Two of these sites, including Redoubt Creek and Day Creek, were entirely dry. Each surveyor used a dip net to sample each site; total search time was also recorded. Out of 9 sites sampled, a total of ± 60 Arkansas Darters were found at three sites (Crooked Creek and Cimarron River mainstem). Following extreme drought conditions between 2011 and 2013, 2014 and 2015 experienced adequate and sustained rainfall, presumably benefitting the Arkansas Darter in northwest Oklahoma.

Due to time and personnel constraints, no surveys for Arkansas Darters were conducted during 2016.

Prairie Speckled Chub

Due to a combination of personnel changes and time constraints, no surveys for the Prairie Chub (*Macrhybopsis australis*) in the Red River were conducted under this project from 2014 – 2016. In addition, no Prairie Speckled Chub surveys were conducted by USFWS-OESFO staff during the grant period. However, ODWC Fisheries personnel from the Streams Program began fish community sampling in the Red River during 2016 and subsequently detected *M. australis* at several locations.

Figure 1. (a) Arkansas river shiner (*Notropis girardi*) captured during Fall 2015 sampling. (b) Map depicting sampling locations for *Notropis girardi* on the Canadian River. *(Note: ODWC does not assist with Texas sampling sites, which are outside of the scope of this project)*

(a)

(b)

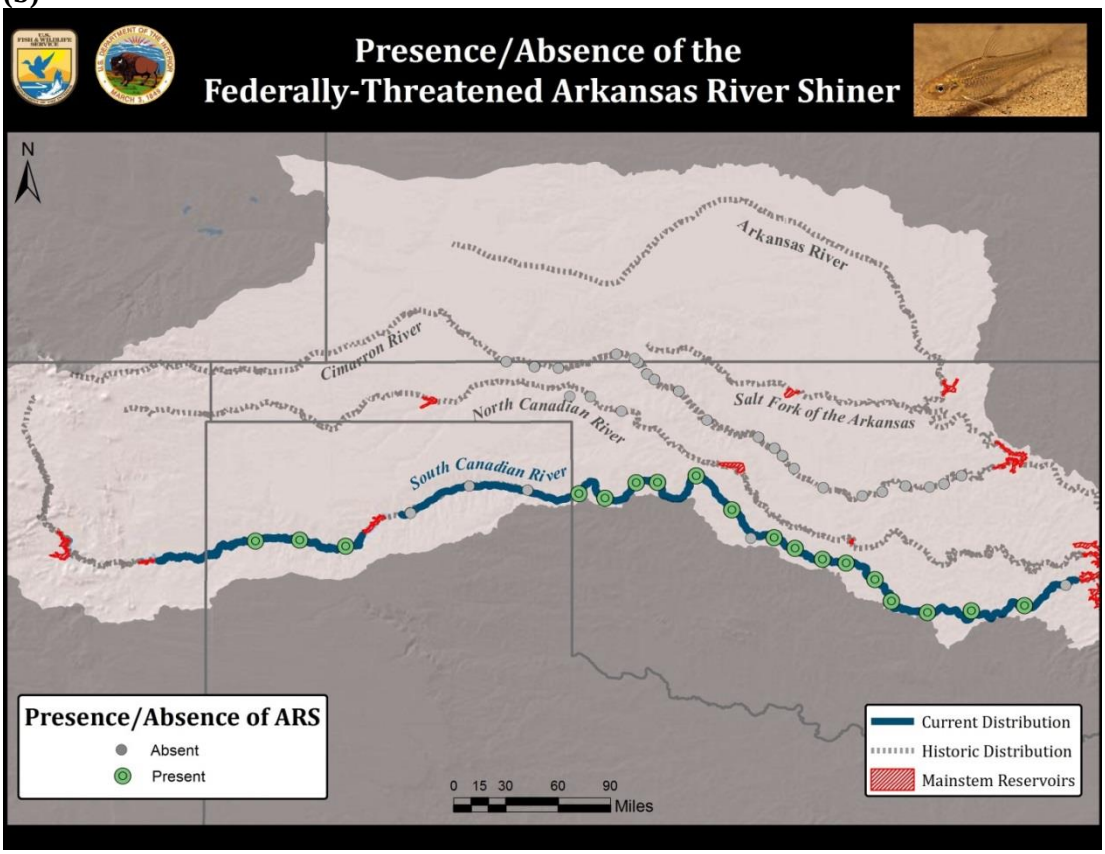

Presence/Absence of the
Federally-Threatened Arkansas River Shiner
N
Arkansas River
Cimarron River
North Canadian River
Salt Fork of the Arkansas
South Canadian River
Presence/Absence of ARS
Absent
Present
0 15 30 60 90
Miles
Current Distribution
Historic Distribution
Mainstem Reservoirs

Figure 2. Map depicting monitoring sites for *Percina pantherina* in Southeast Oklahoma and Southwest Arkansas.

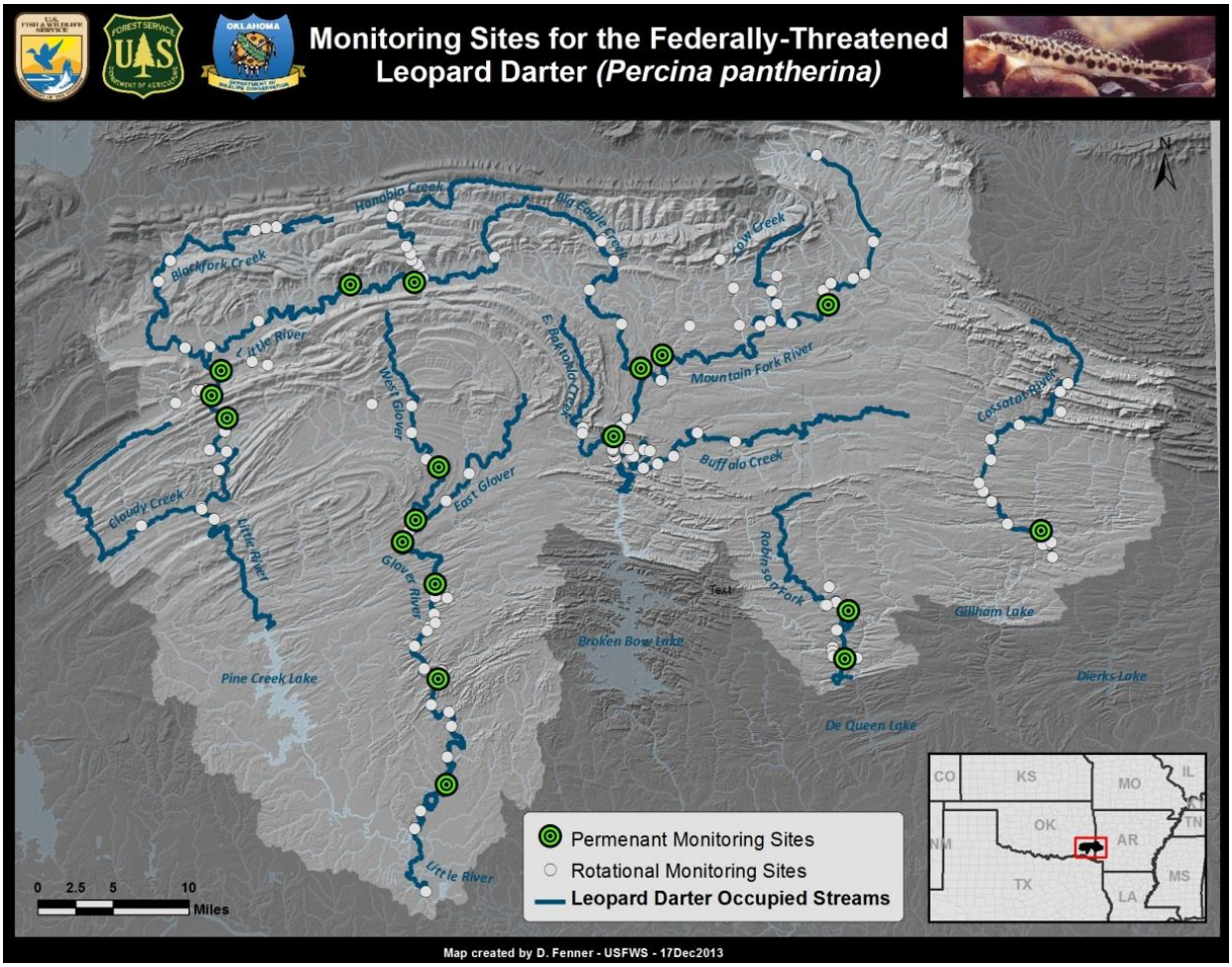


Figure 3. Arkansas Darters (*Etheostoma cragini*) captured and released from the Cimarron River (mainstem), Beaver County, October 20, 2014.

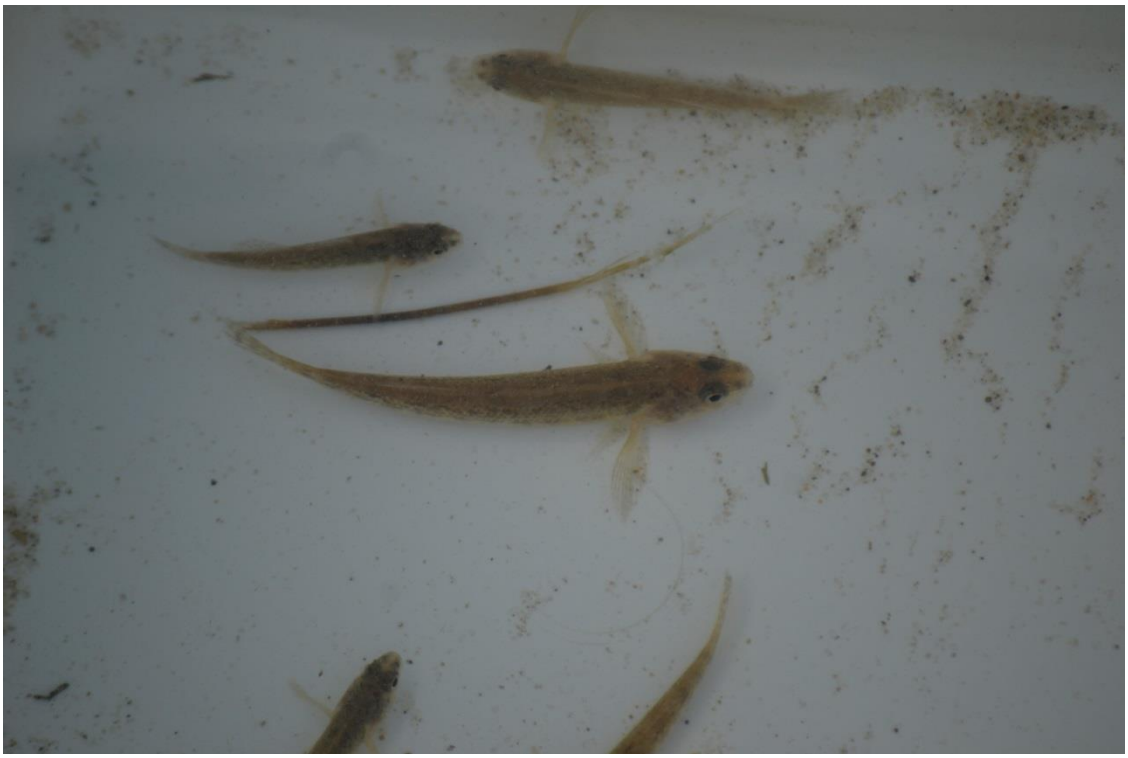
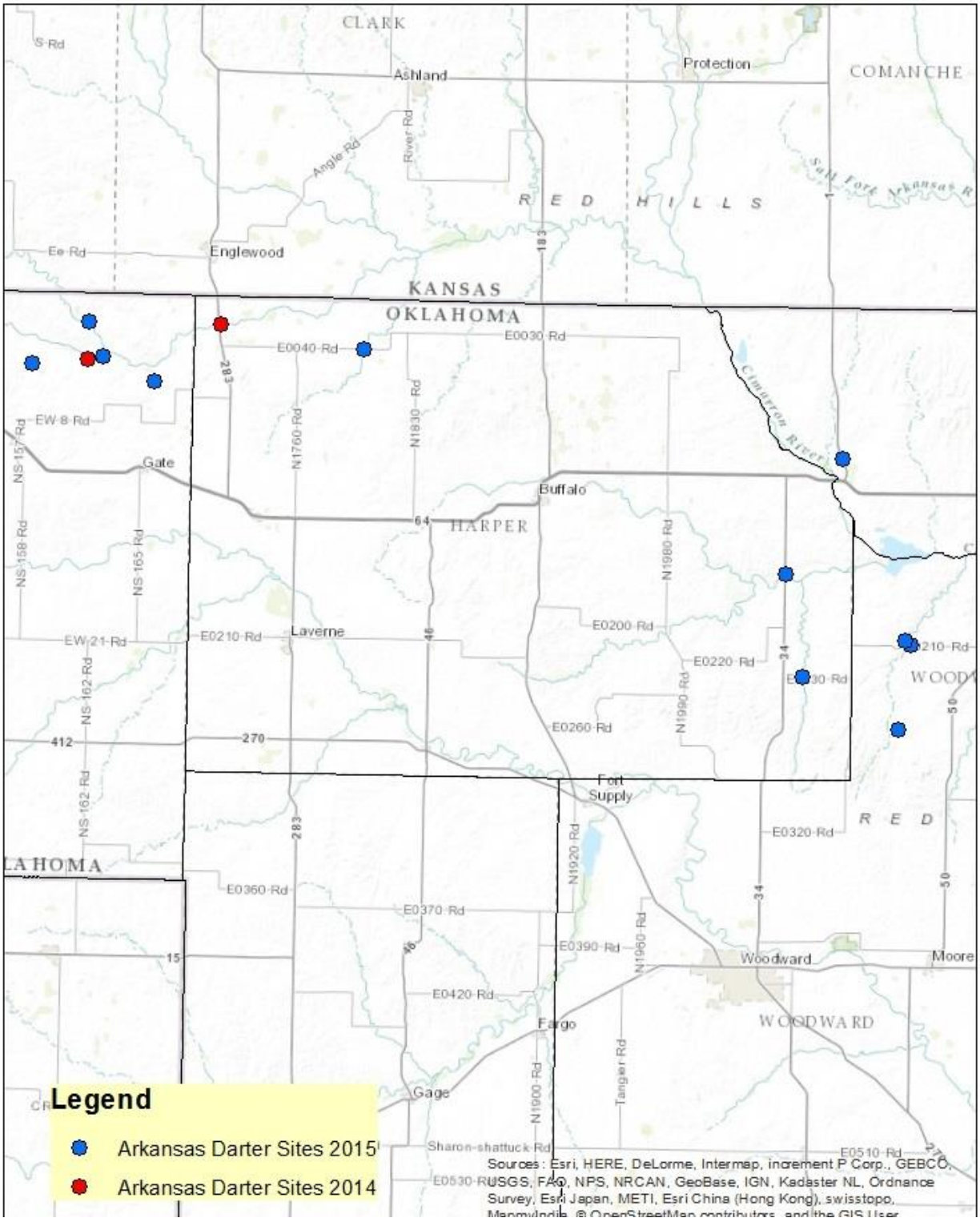


Figure 4. Picture depicting habitat on the Cimarron River (mainstem) in Beaver Co. where *E. cragini* was found in high densities (±50 individuals / hour searched), October 2014.

Figure 5. Map depicting locations surveyed and/or attempted to survey during October 2014 and June-July 2015 for *E. cragini* in the Cimarron River and tributaries.



V. Significant Deviations: Severe spring flooding conditions substantially reduced the extent of field surveys for Arkansas River Shiners during spring of 2015 and 2016. No sites downstream from the Norman (Highway 9) sampling site were accessible during these periods.

Because of a change in the fall sampling dates for Arkansas River Shiners from September to October (to increase the probability of detecting young-of-year shiners), the fall sampling that would have, in past years, occurred during this reporting period, will occur, and be reported on, during the subsequent reporting period.

The Leopard Darter and Arkansas River Shiner are the only two species under this grant that are surveyed annually, and within a relatively narrow time period. The Neosho Madtom and Interior Least Tern (Canadian & Cimarron river) are only surveyed intermittently, with multiple years potentially occurring between surveys. Since monitoring of the Prairie Chub is now a component of the ODWC Stream Program's community sampling, surveys for this species will be removed as a component of this grant.

Spring / summer flooding also precluded a substantial portion of the normal sampling effort for Interior Least Terns.

Prepared By: Matt Fullerton, Endangered Species Biologist
Oklahoma Department of Wildlife Conservation

Date: November 14, 2016

Approved by: _____

Wildlife Division Administration
Oklahoma Department of Wildlife Conservation

Approved by: _____

Andrea Crews, Federal Aid Coordinator
Oklahoma Department of Wildlife Conservation

LITERATURE CITED

U.S. Fish and Wildlife Service. 2005. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Arkansas River Basic Population of the Arkansas River Shiner (*Notropis girardi*). Federal Register Vol. 70, No. 197. 590808-59846.

U.S. Fish and Wildlife Service. 1978. Endangered and Threatened Wildlife and Plants; Final Threatened Status and Critical Habitat for the Leopard Darter (*Percina pantherina*). Federal Register Vol. 43, No. 19. 3711-3716.

U.S. Fish and Wildlife Service. 2011. Neosho Madtom (*Noturus placidus*): Fact Sheet. U.S. Fish and Wildlife Service, Southwest Region. Tulsa, Oklahoma, USA.