FINAL REPORT

FEDERAL AID GRANT NO. F13AF01189 (T-75-1)

ASSESSING THE EXTENT AND DENSITY OF CHICKEN TURTLE POPULATIONS IN SOUTHEASTERN OKLAHOMA

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

1 October, 2013 through 31 December, 2017

ASSESSING THE EXTENT AND DENSITY OF CHICKEN TURTLE POPULATIONS IN SOUTHEASTERN OKLAHOMA

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Project Leader: Day B. Ligon, Department of Biology, Missouri State University

Project Participants: Donald T. McKnight, Joshua Harmon, M.Sc. students

Executive Summary:

The chicken turtle (*Deirochelys reticularia*) is an aquatic species in the family Emydidae that is native to the southeastern United States. Three subspecies are recognized, including the eastern chicken turtle (*D. r. reticularia*), Florida chicken turtle (*D. r. chrysea*), and western chicken turtle (*D. r. miaria*). The western subspecies primarily occurs west of the Mississippi River, and a growing body of evidence suggests that it has ecologically and genetically diverged more from the eastern and Florida subspecies than the latter two have from one another. In Oklahoma, the chicken turtle is listed as a Tier II Species of Greatest Conservation Concern. It has historically occurred from the southeastern corner of the state to as far northwest as McClain County, southwest of Norman. However, records have been temporally infrequent and often widely distributed geographically, leaving open the question of the species' present patterns of occurrence in the state. The objectives of this study were to: 1) estimate the distribution and abundance of western chicken turtles in Atoka, Choctaw, and Pushmataha counties by trapping a range of wetlands in the Muddy Boggy and Clear Boggy river drainages; 2) continue monitoring western chicken turtles at Boehler Seeps and Sandhills Preserve in Atoka County, including movement patterns and habitat use; and 3) catalog occurrence and numbers of other herpetofauna encountered that are listed in the Oklahoma Comprehensive Wildlife Conservation Plan in order to assess the overall conservation value of the different habitats that were sampled. We identified 21 wetlands of varying types that we sampled; these were in addition to another 8 wetlands that we sampled in previous years (2012–2013). In combination with our previous inventory efforts, we have identified 57 species of reptiles and amphibians in the Muddy Boggy and Clear Boggy creek drainages, 54 of which were detected within the 198-ha confines of Boehler Seeps and Sandhills Preserve. We found western chicken turtles at 9 locations, 3 of which appeared to support robust populations. All three were naturally-formed beaver ponds. Four western chicken turtles were trapped in an artificial wetland at a Wetland Reserve Program (WRP) site. Although these animals likely did not constitute a sustainable population, their presence suggests that, with moderate adjustments in management protocols, such wetlands could provide important resources for the species.

I. BACKGROUND AND NEED:

The western chicken turtle (*Deirochelys reticularia miaria*) possesses many unusual traits. In contrast to most other turtles in the Emydidae family, chicken turtles are primarily carnivorous, inhabit small ephemeral wetlands, grow rapidly, and have short life spans (Gibbons and Greene, 1978; Gibbons, 1987; Jackson, 1996; Demuth and Buhlmann, 1997). However, little is known about the western subspecies, as the majority of chicken turtle research has been conducted on the eastern (*D. r. reticularia*) subspecies. Nevertheless, it is important to recognize that *D. r. miaria* is in great need of conservation, due in part to its unusual traits. A short life span, restricted diet, and restricted habitat may have profound negative impacts on the proliferation of a species that is losing habitat due to human activities. Generally, chicken turtles are found in low abundance and maintain small populations (Jackson, 1988; Buhlmann, 1995; Buhlmann et al., 2008). They are endangered in Missouri and Virginia where a single population exists in each state (Buhlmann, 1995; Johnson, 2000; Buhlmann et al., 2008). *Deirochelys r. miaria* inhabits the southeastern part of Oklahoma where it is listed as a Tier II Species of Greatest Conservation Need (Oklahoma Comprehensive Wildlife Conservation Strategy). A population was discovered at The Nature Conservancy's Boehler Seeps and Sandhills Preserve (BSSP), located in Atoka County, Oklahoma in 2008 (Patton and Wood, 2009). The property is mostly wooded, and includes two lakes formed by beaver dams. Gibbons and Greene (1978) and Buhlmann (1995) have stated that neither their life history nor their ecological roles are well understood. As a result, a study at BSSP has been in progress since 2012 to assess some of the life history traits of the western subspecies, including population status and density. Although the population at BSSP was detected in a study conducted 10 years ago, the status and size of the population was not determined until recently. A subset of individuals collected at BSSP in 2012 were fitted with radio-transmitters and were tracked during the summers of 2012–2014. Over the years, with the use of telemetry and extensive trapping, details about their movements, seasonal activity, reproductive patterns, and population size and status have been investigated. In 2013, three individuals that were captured by Patton and Wood in 2008 were found in a beaver pond on private property 6.5 km east of BSSP. This finding suggests the existence of a metapopulation. When a population is small and secluded it is thought that survivorship is low because a single environmental event such as a drought or conversion of land for agriculture could effectively drive the population to extinction (Gilpin and Soule, 1986). Translocation has even been suggested to ensure the future of the population in Virginia (Buhlmann, 1995). Thus, the effects of immigration and emigration on a small population are significant, as it allows gene flow and sustainability of low abundance. With this knowledge, it became imperative to search for other populations or wetlands that may provide habitat for *D. r. miaria* in the area. In 2014–2017, research efforts were expanded to determine their population ecology by identifying and surveying sites in a pattern radiating out from BSSP. Twenty-seven wetlands surrounding BSSP were trapped, as we predicted that success could be found by trapping areas that surrounded an already-identified population. The expansion was also important to investigate locations of *D. r. miaria* in other counties including Pushmataha and Chocktaw, since their presence in Atoka County had already been established. We continued to monitor the population at BSSP even as trapping efforts were expanded further from the property and into the other two counties.

During our efforts searching for *D. r. miaria*, many other herpetofauna were encountered. During this study, we encountered eight species of Greatest Conservation Need, including: One Tier I Species (alligator snapping turtle [*Macrochelys temminckii*]), three Tier II Species (crawfish frog [*Lithobates areolatus*], western mudsnake [*Farancia abacura reinwardtii*], and

western chicken turtle [*Deirochelys reticularia miaria*]), and four Tier III Species (spiny softshell turtle [*Apalone spinifera*], Mississippi map turtle [*Graptemys pseudogeographica kohnii*], eastern river cooter [*Pseudemys concinna concinna*] and razor-backed musk turtle [*Sternotherus carinatus*]) (Oklahoma Comprehensive Wildlife Conservation Strategy). In total since we began research in 2012, we have cataloged 53 species of reptiles and amphibians at BSSP, plus four additional testudine species in nearby wetlands. All four new species are classified in Oklahoma as Species of Greatest Conservation Need. Such high biodiversity in a limited geographical area may be unequalled elsewhere in Oklahoma, and highlights the value of BSSP—and the Muddy Boggy and Clear Boggy creek drainages more broadly—as a critical biodiversity hotspot in the state.

II. OBJECTIVES

Objective 1: To estimate the distribution and abundance of western chicken turtles in Atoka, Choctaw, and Pushmataha counties by trapping suitable wetlands in the Muddy Boggy and Clear Boggy river drainages.

Objective 2: To continue monitoring western chicken turtles at Boehler Seeps and Sandhills Preserve in Atoka County, including movement patterns, habitat use, reproductive patterns, and demography using a combination of trapping and radio telemetry.

Objective 3: To catalog occurrence and numbers of other herpetofauna encountered that are listed in the Oklahoma Comprehensive Wildlife Conservation Plan in order to assess the overall conservation value of the different habitats that are sampled.

III. METHODS

To determine the distribution of *D. r. miaria* and generate population estimates, a variety of wetland types were trapped, and a variety of trap designs were employed to maximize the likelihood of detecting the species where it occurred. The models of traps that we used included: three ringed, single-opening, single-throated hoop nets that were 0.9 m, 0.75 m, and 0.6 m in diameter; three ringed, single-throated, single-opening D-hoop nets that were 0.5 m diameter, double-throated hoop nets 0.6 m diameter, double-opening, single-throated metal minnow traps 0.2 m diameter, and home-made three ringed, single-opening, single-throated metal traps 0.9m diameter. The number and types of traps used per body of water varied depending on depth, size, and vegetational composition of each wetland. As many as 60 traps were placed in a wetland at any given time. Twenty-five leads that were 6 m long were paired with traps to increase capture rates. Both baited and unbaited traps were used, and canned sardines were used as bait (Congdon et al. 1983; Buhlmann 1995; Demuth and Buhlmann 1997; Amerongen 2003; Dinkelacker and Hilzinger 2009). Unbaited traps were always paired with leads. The trapping sites included various wetlands, including natural beaver ponds, man-made ponds (in wooded and pasture environments), oxbows, sloughs (oxbow-like wetlands of seeming anthropogenic origins), and lakes. All wetlands were located in the watersheds of the Muddy and Clear Boggy Creeks in Atoka, Choctaw, and Pushmataha Counties.

Traps were visited every day or every-other day, depending on distribution of traps and size of the wetland. All organisms that were captured in the trap were recorded, with explicit

notes on all amphibians and reptiles encountered. Turtles of all species were measured and weighed. All turtles were given scute notches; some species were given a notch code that was specific to the wetland in which they were captured, whereas other species were given unique notches to enable individual identification. Chicken turtles were additionally injected with Passive Integrated Transponder (PIT) tags out of concern that the thin marginal scutes that are characteristic of the species might not retain notch codes long-term. PIT tags were inserted under the left bridge of the plastron, between the shell and the coelomic membrane, use a spring-loaded syringe equipped with a 6-gauge needle inserted from the rear inguinal pocket. Surgical glue was used to close injection holes to prevent the loss of tags. After processing, all species were released near the site of capture, but away from the traps to reduce the likelihood of immediate recapture.

Chicken Turtles—Newly captured *D. r. miaria* were measured and weighed like all other turtle species. Each was given a unique notch code along their marginal scutes and a PIT tag for future identification. Tail lengths were also measured as a method for determining sex (Buhlmann et al., 2008). Each individual was also carefully aged to the best of our ability by counting scute annuli. Recaptured *D. r. miaria* were measured and examined for health, PIT tag retention, and reproductive status. A portable ultrasound (Echo Camera SSD-500V, Hitachi Aloka Medical, Inc. Tokyo, Japan) was also used to aid in determining sex and following the progression of follicles/eggs of females through the reproductive season. The subset of *D. r. miaria* with radio-transmitters contained one of three models to compensate for size (PD–2 2.5g, RI–2B 10g, and RI–2B 15g; Holohil Systems Ltd., Corp., Ontario Canada). These radio-transmitters were used to periodically assess turtles' whereabouts and were used to recapture individuals as needed to track reproductive condition. Females carrying shelled eggs were taken to a local veterinarian (All Animal Veterinary Hospital, Atoka County) for X-rays. X-rays were a useful tool in observing clutch size as well as egg size (Appendix A). Overall, the use of the radio-transmitters allowed for regular evaluation of reproductive status, habitat use, migratory patterns, and estivation patterns.

IV. RESULTS

During our trapping efforts targeting *D. r. miaria*, we observed and documented eight Species of Greatest Conservation Need. Results for the captures of species listed the Oklahoma Comprehensive Wildlife Conservation Strategy (Table 1). *Lithobates areolatus* (crawfish frogs) were heard calling from five new pools; in one of these pools the density was of 60–80 calls per minute, indicating that a large group of males had congregated. The locations of *L. areolatus* pools that we have identified since 2012 are shown in Figure 1. Additionally, one individual was observed crossing the road in McGee Creek State Park (Figure 1). Two *Farancia abacura reinwardtii* (western mud snakes) were captured in turtle traps in Beaver Pond 2. One *Macrochelys temminckii* (alligator snapping turtle) was incidentally encountered after it was inadvertently captured and shown to us by a local resident who collected the specimen from the Muddy Boggy Creek. The remaining turtle species were all captured by turtle trap while searching for *D. r. miaria*. Sixty-four new *A. spinifera* (spiny softshell turtle), 61 new *G. p. kohnii* (Mississippi map turtle), 167 new *P. c. concinna* (eastern river cooter), and 107 new *S. carinatus* (razorback musk turtle) were captured. It is important to note that *A. spinifera*, *G. p. kohnii*, and *P. c. concinna* were given common notches when encountered at sites other than Beaver Ponds 1 or 2, so recaptures from this year and previous years were generally

indiscernible. A total of 135 *S. carinatus* were captured with 107 of them being new and 28 being recaptures from 2013.

Chicken Turtles—Eighty-six *D. r. miaria* were captured in 2014–2017 from just 8 of the wetlands that we surveyed. The majority of these captures (92%) occurred in three wetlands; just 1–4 individual chicken turtles were caught in any other single wetland. The locations of collected individuals and trap sites are shown in Figure 2 and Table 2 (**both redacted; available by special request**). Details about all the *D. r. miaria* that we captured are described in Table 3. Importantly, the three 'primary' wetlands should not be considered stable, self-contained populations; movements among the three wetlands were commonplace, and all three wetlands experienced dramatic draining events during the course of our study when beaver dams broke. Ironically, these draw-downs consistently occurred during heavy rain events when pressure on the dams caused them to rupture. During these events, chicken turtles likely emigrated to other nearby wetlands. Such environmental events highlight the critical need for networks of suitable wetlands within a navigable terrestrial matrix for this species to persist and thrive.

We targeted four Wetland Reserve Program (WRP) sites in the Muddy Boggy and Clear Boggy creek drainages to survey, but ultimately surveyed just two of them due to flooding that made them inaccessible or because the seasonal cycles on which many of the wetlands were managed did not correspond with chicken turtle activity seasons (many were drained during summer to promote crop growth and then filled in winter to serve as stop-overs for migratory waterfowl). Four chicken turtles were in fact captured at one of the two WRP sites (Table 2 [**redacted**]), suggesting that this type of anthropogenic habitat has potential for sustaining populations of the species. This is not altogether surprising; Red Slough Wildlife Management Area in McCurtain County is known to support a population of western chicken turtles. A site in southeastern Missouri (Mingo National Wildlife Refuge) that is dominated by wetlands which are managed for migratory waterfowl historically also supported a population of western chicken turtles, although surveys conducted in the last decade suggest the species may now be extirpated from the site. Finally, abandoned fish hatchery ponds have supported populations of western chicken turtles in several locations throughout the subspecies' range, including in Oklahoma (V. Hutchison, pers. comm.), Arkansas (D. McKnight, unpublished data), and Mississippi. Thus, we predict that anthropogenically managed wetlands in our study area could provide important habitat with only minor adjustments in management strategies.

V. RECOMMENDATIONS

(1) Large-scale habitat preservation in the Muddy Boggy and Clear Boggy creek drainages should be pursued, with particular focus on networks of vegetated, shallow wetlands—such as those created by beaver. Wooded uplands are of equal importance to the conservation of western chicken turtles, both to serve as safe corridors between wetlands and to provide suitable habitat during periods of terrestrial dormancy. These conservation measures are likely to benefit not just western chicken turtles, but also one of the most biodiverse herpetofaunal communities in Oklahoma.

(2) Artificial wetlands, including WRPs and abandoned hatchery ponds, support robust chicken turtle populations elsewhere in the species' range. WRPs in the Muddy Boggy and Clear Boggy creek drainages may become more attractive habitat to western chicken

turtles if water levels are managed to fit a seasonal pattern that better matches the activity patterns of the species.

(3) Western chicken turtles exhibit a patchy but predictable distribution, with the most robust populations in Oklahoma occurring in natural beaver-formed wetlands. This distribution pattern makes populations highly sensitive to poaching. Therefore, we strongly discourage disseminating locality data provided in this report, except when appropriate to meet legitimate conservation or research objectives.

VI. SIGNIFICANT DEVIATIONS

There have been no significant deviations.

VII. EQUIPMENT

No equipment exceeding $5,000 in cost was purchased for this project.

VIII. PREPARED BY: Day B. Ligon, Department of Biology, Missouri State University

DATE: 10 February, 2018

APPROVED BY: _____

Fisheries Division Administration
Oklahoma Department of Wildlife Conservation

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Andrea Crews, Federal Aid Coordinator
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REFERENCES

Amerongen, K.K. 2003. Biodiversity of the fresh water turtle community in the Weeks Bay watershed Baldwin County Alabama. M.S. Thesis. University of South Alabama, USA.

Buhlmann, K.A. 1995. Habitat use, terrestrial movements, and conservation of the turtle, *Deirochelys reticularia* in Virginia. Journal of Herpetology 29:173–181.

Buhlmann, K.A., Gibbons, J. W., and D. R. Jackson. 2008. *Deirochelys reticularia* (Latreille 1801)–Chicken Turtle. Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle specialist Group. 5:014.1–014.6.

Congdon J.D., J.W. Gibbons, and J.L. Greene. 1983. Parental investment in the chicken turtle (*Deirochelys reticularia*). Ecology 64:419–425.

Demuth J.P. and K.A. Buhlmann. 1997. Diet of the turtle *Deirochelys reticularia* on the Savannah River site, South Carolina. J. Herpetology. 31:450–453

Dinkelacker, S. and N. Hilzinger. 2009. Ecology of the western chicken turtle (*Deirochelys reticularia miaria*) in the Arkansas Valley: development of survey and monitoring protocols for rare and secretive species. Arkansas Game and Fish Department Final Report. 29 pp.

Gibbons, J.W. and J.L. Greene. 1978. Selected aspects of the ecology of the chicken turtle, *Deirochelys reticularia* (Latreille) (Reptilia, Testudines, Emydidae). Journal of Herpetology 12:237–241

Gilpin, M.E. and M.E. Soule. 1986. Population vulnerability analysis. In M. E. Soule (ed.), Conservation Biology: The Science of Scarcity and Diversity, pp. 19–34. Sinauer, Sunderland, Massachusetts.

Jackson, D.R. 1988. Reproductive Strategies of Sympatric Freshwater Emydid Turtles in Northern Peninsular Florida. Bull. Florida State Museum. Biol. Sci. 33:113-158.

Johnson, T.R. 2000. The Amphibians and Reptiles of Missouri. Missouri. Dept. of Cons. 2nd Ed. 188–190.

McKnight, D.T., J.R. Harmon, J.L. McKnight, and D.B. Ligon. 2015. The spring-summer nesting and activity patterns of the Western chicken turtle (*Deirochelys reticularia miaria*). Copeia 103:1043–1047.

McKnight, D.T., Harmon, J.H., McKnight, J.L., and D.B. Ligon. 2015. Taxonomic biases of seven methods used to survey a diverse herpetofaunal community. Herpetological Conservation and Biology. 10(2):666–678.

Oklahoma Department of Wildlife Conservation. Oklahoma Comprehensive Wildlife Strategy. http://www.wildlifeactionplans.org/pdfs/action_plans/ok_action_plan.pdf *Accessed on* 17 January 2012.

Patton, T. and J. Wood. 2009. A Herpetofaunal Survey of the Boehler Seeps Preserve, with Reports of New County Records and Recommendations for Conservation Efforts. Oklahoma Academy of Science. 89:63–74

Vogt, R.C. 1980. New methods for trapping aquatic turtles. Copeia 1980:368–371.

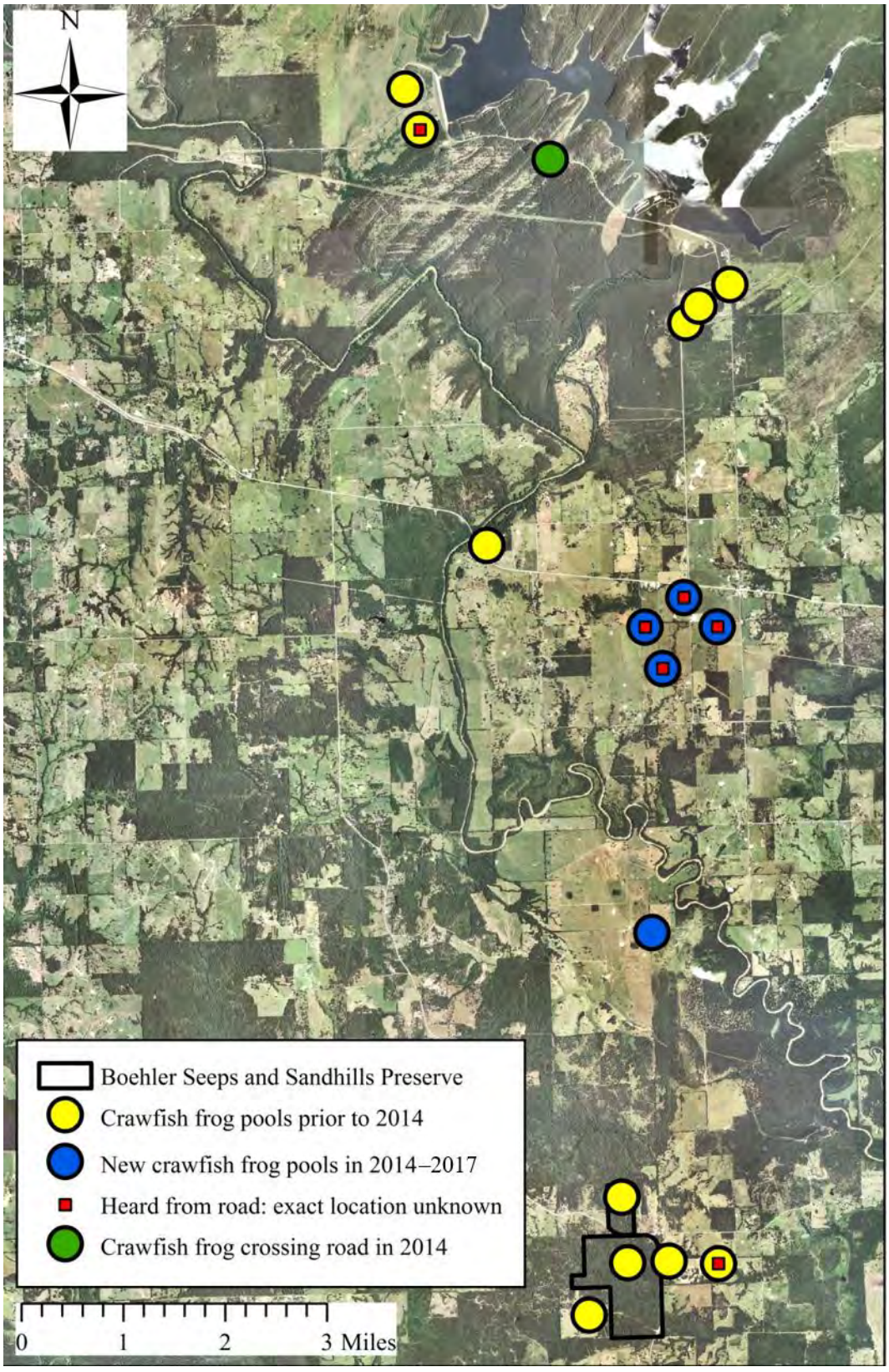

Figure 1. Map of the locations of crawfish frogs (*L. areolatus*) determined from call surveys.

Table 1. Summary of amphibian and reptile species ranked in the Oklahoma Comprehensive Wildlife Conservation Strategy that were captured, 2014–2017.

Species	No. Individuals	State Conservation Tier
Anura		
Lithobates areolatus	2	II
Caudata		
Siren intermedia nettingi	3	II
Squamata (Serpentes)		
Farancia abacura reinwardtii	3	II
Testudines		
Apalone spinifera	91	III
Deirochelys reticularia miaria	86	II
Graptemys pseudogeographica kohnii	63	III
Macrochelys temminckii	1	I
Pseudemys concinna	193	III
Sternotherus carinatus	135	III

Table 3. List of western chicken turtles (*Deirochelys reticularia miaria*) captured.

Wetland	Carapace Length (mm)	Plastron Length (mm)	Mass (g)	Sex	Age (Scute Annuli)	Captured in Previous Study (Y/N)
Beaver Pond 4	144	122	410	M	—	Y
Beaver Pond 5	92	84	140	M	3	N
Beaver Pond 5	81	73	97	M	3	N
Beaver Pond 5	145.5	129	580	M	—	N
Beaver Pond 5	143	122.5	430	M	—	N
Beaver Pond 5	186	167.5	1150	F	—	N
Beaver Pond 5	150	126	500	M	—	N
Beaver Pond 5	108	95.5	200	F	3	N
Beaver Pond 5	131	115.5	380	F	4	N
Beaver Pond 5	91	80	120	M	3	N
Beaver Pond 5	56	52.5	39	J	2	N
Beaver Pond 5	55.5	50.5	35	J	2	N
Beaver Pond 5	129	118	360	F	4	N
Beaver Pond 5	148	139	510	M	—	Y
Beaver Pond 5	143	124	420		—	Y
Beaver Pond 5	172	146	810	M	—	Y
Beaver Pond 5	125	109	290	M	—	Y
Beaver Pond 5	171	149	790	M	—	Y
Beaver Pond 5	153	135	540	M	—	Y
Beaver Pond 5	119	109	290	F	—	N
Beaver Pond 5	92.5	81	120	M	—	N
Beaver Pond 5	95.5	86	140	F	—	N
Beaver Pond 5	87	81.5	130	J/F	—	N
Beaver Pond 5	95.5	84	100	M	—	N
Beaver Pond 5	110.5	96.5	190	M	—	N
Beaver Pond 5	92.5	83.5	130	M	—	N
Beaver Pond 5	149.5	132.5	530	F	—	N
Beaver Pond 5	138	118	390	M	—	N
Beaver Pond 5	156.5	136	600	M	—	N
Beaver Pond 5	82	76.5	110	M	—	N
Beaver Pond 5	112.5	100	230	F	—	N
Beaver Pond 5	128	116.5	320	F	—	N
Beaver Pond 5	120	110.5	280	F	—	N
Beaver Pond 5	98	87.5	140	M	—	N
Beaver Pond 5	122	109	280	F	—	N
Beaver Pond 5	118	106	240	F	—	N
Beaver Pond 5	122.5	109	275	F	—	N

Table 3. continued (pg. 2 of 3)

Wetland	Carapace Length (mm)	Plastron Length (mm)	Mass (g)	Sex	Age (Scute Annuli)	Captured in Previous Study (Y/N)
Beaver Pond 5	130	117	350	F	—	N
Beaver Pond 5	207.5	185	1350	F	—	N
Beaver Pond 5	133.5	118	350	F	—	N
Beaver Pond 5	89	82.5	125	J/F	—	N
Beaver Pond 5	180	160	900	F	—	N
Beaver Pond 5	159	141	600	F	—	N
Beaver Pond 5	201	178.5	1250	F	—	N
Beaver Pond 5	136	122	400	F	—	N
Beaver Pond 5	211.5	184	1450	F	—	N
Beaver Pond 1	149	133	440	M	—	N
Beaver Pond 1	142	125	440	M	—	N
Beaver Pond 1	153	134	600	M	—	N
Beaver Pond 1	97	87	150	M	—	N
Beaver Pond 1	109	97	210	F	2	N
Beaver Pond 1	119.5	104	260	M	≥5	N
Beaver Pond 1	135	118	360	M	—	N
Beaver Pond 1	160	144	580	M	—	Y
Beaver Pond 1	137	120	425	M	—	Y
Beaver Pond 1	149	133	490	M	—	Y
Beaver Pond 1	208	182	1375	F	—	Y
Beaver Pond 1	161	169.5	680	M	—	Y
Beaver Pond 1	124	114	310	M	≥5	Y
Beaver Pond 1	150	129	450	M	—	N
Beaver Pond 1	131	118	370	F	—	Y
Beaver Pond 1	93	83	130	J/F	3	N
Beaver Pond 1	151	134	470	M	—	Y
Beaver Pond 1	130	114	330	M	—	Y
Oxbow 1	165	140.5	720	M	—	N
Beaver Pond 2	138.5	126	460	F	5	Y
Beaver Pond 2	80	73	95	M	4	Y
Beaver Pond 2	169.5	142	750	M	—	Y
Beaver Pond 2	157	137	580	M	—	Y
Beaver Pond 2	191	171	1175	F	—	Y
Beaver Pond 2	145.5	129	500	M	—	Y
Beaver Pond 2	171	149	790	M	—	Y
Beaver Pond 2	194	172	1175	F	—	Y
Beaver Pond 2	143.5	126	450	M	—	N

Table 3. continued (pg. 3 of 3)

Wetland	Carapace Length (mm)	Plastron Length (mm)	Mass (g)	Sex	Age (Scute Annuli)	Captured in Previous Study (Y/N)
Beaver Pond 2	98	86.5	150	J/F	3	N
Beaver Pond 2	170.5	142	750	M	—	Y
Beaver Pond 2	112	100	225	M	5	Y
Beaver Pond 2	100	90	150	M	5	Y
Beaver Pond 2	165	150	750	F	6	Y
Beaver Pond 2	193.5	172.5	1250	F	—	Y
Beaver Pond 2	159.5	139.5	570	M	—	Y
WRP 1	145.5	130.5	460	M	5	N
WRP 1	137.5	121	390	M	—	N
WRP 1	174.5	149	820	M	—	N
WRP 1	122	110	250	M	—	N
Pond 6/Pond 7*	145	127	460	M	—	N

*Indicates a turtle that was captured in two adjacent wetlands in the same season.

Table 4. Turtle community composition in Beaver Pond 5 (BP5) in 2015. This wetland was the largest of 3 that appeared to support a large western chicken turtle population. Except when water levels were low, it also supported more western chicken turtles than any other known wetland in Oklahoma.

Species	Number of Individuals	%
Deirochelys reticularia miaria	30	6%
Chelydra serpentina	12	2%
Pseudemys concinna	7	1%
Sternotherus odoratus	90	18%
Graptemys pseudogeographica kohnii	1	0%
Kinosternon subrubrum hippocrepis	62	12%
Trachemys scripta elegans	296	59%
Apalone spinifera	2	0.4%

APPENDIX A

Example of X-ray images that were used to ascertain clutch size and egg dimensions in gravid female western chicken turtles. Translucent ovoids are calcified eggs; the opaque circular object is a coin (U.S. quarter) that was included in X-ray scans to serve as a size standard.