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INHS TECHNICAL REPORT

Aquatic Turtle Surveys of the Embarras River Bottoms State Habitat Area (ERBSHA) in Lawrence County, Illinois

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PROJECT SUMMARY

This report details results of herpetological surveys with an emphasis on aquatic turtles in Embarras River Bottoms State Habitat Area (ERBSHA) in Lawrence County Illinois. Four sampling sessions each consisting of four day and three night were conducted by INHS aquatic ecologist / herpetologist A.R. Kuhns from June through October 2015. Sampling in June and early August focused on lentic wetlands and trap locations were paired to other long term monitoring stations within the property (**Figure 2**). September and October sampling sessions focused on the Embarras River proper that flows through the ERBSHA property. Seven freshwater turtle species were documented during the surveys. Additionally, six frog species and six snake species were encountered during the surveys. Notable captures include the Northern Musk Turtle, *Sternotherus odoratus*, and Spiny Softshell, *Apalone spinifera*, which represents the first documentations of the species in Lawrence County, Illinois; 18 Smooth Softshell, *Apalone mutica*, which is and endangered species in Illinois; and Eastern Ribbon Snake, *Thamnophis sauritus*, which is protected as a threatened species in Illinois. All sampling was conducted under an Illinois Department of Natural Resources (IDNR) Scientific collecting permit and IDNR Public Lands Research Permit to A.R. Kuhns and an IDNR State Threatened and Endangered Species Permit 05-11S (sub-permittee). Survey methods are approved under University of Illinois IACUC protocol 14000.

Surveys Conducted By: Andrew R. Kuhns, Ecologist / Herpetologist

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Cover Photo: Smooth Softshell, *Apalone mutica*, captured in a single-throated, baited hoop trap set in the Embarras River, within the Embarras River Bottoms State Habitat Area in September 2015.

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INTRODUCTION

The Embarras River Bottoms State Habitat Area (ERBSHA; **Figure 1**) was created as mitigation for the contamination of the old Indian Refinery south of Lawrenceville, IL and is managed by the Illinois Department of Natural Resources (IDNR). The habitat area currently consists of approximately 2,200 acres of bottomland forest and wetland habitat. In addition to the acreage, funds were provided to restore and enhance the quality of the habitat area. A four phase management and monitoring plan for the site was drafted by the IDNR and approved as a roadmap for restoration. Phase I of the plan includes 1) securing the site with boundary markers and gates, 2) baseline management such as brush cutting, mowing, bank stabilization, and oil-well management; and 3) baseline monitoring of flora and fauna within the property.

As one of the first steps towards capturing baseline data about the site, monitoring stations (**Figure 2**) were installed in the various habitat types throughout the site to 1) monitor vegetative succession, 2) as sites for point count bird surveys, and 3) camera traps for other wildlife. An initial effort to determine freshwater turtle species composition was conducted in 2013. Among other sampling efforts, the survey documented three species, Painted Turtles, *Chrysemys* picta, Snapping Turtle, *Chelydra serpentina*, and Sliders, *Trachemys scripta* from 20 traps set throughout the property.

This report builds upon the work done by IDNR to establish monitoring stations and set baseline information about the herpetological fauna of the ERBSHA site. The objective of this report is to increase the knowledge base of the amphibians and reptiles of the ERBSHA site with a special emphasis on freshwater turtle species. Additionally, results will aid in setting a baseline of turtle species composition to assess the effects of ongoing habitat restoration on the herpetofaunal community at the site.

PROJECT AREA

The 2,200 acre site consists of lowland floodplains along approximately 8 km of the Embarras River. It encompasses parts of Sections 7, 8, 17, 18, 20, 21, 22, 26, 27, 28, and 34 of Township 3 N, Section 11 W of the USGS 7.5' Quadrangle Map (**Figure 1**). The habitat within the conservation area includes: mesic floodplain forest, old field habitat (both sand prairie and wet savanna), upland forest, and wetlands. The majority of the property has been disturbed by either agricultural use or oil reclamation.

METHODS

Four rounds of trapping occurred in 2015: 02 through 05 June; 04 through 07 August; 25 through 28 August; 30 September through 02 October. Traps were set the first day, checked the next three days and pulled on the fourth day. Thus, each trapping session resulted in three separate samples of turtles per round. The predominant trap type used was collapsible hoop traps of various diameters (12", 20", and 26"). Utilizing different diameter of traps allowed for trapping

in various depths of water while still allowing the top of the trap to remain out of water and prevent turtles from drowning. Additionally, a two chambered, un-baited fyke net with a single lead was deployed in one wetland during the June and August sampling sessions.

Hoop traps were baited with invasive Asian carp, sourced from throughout the state. To prepare the bait, the fish was frozen whole and then sliced into approximately 1" cross sections (or steaks) using a reciprocating saw. Bait was hung from the center of the trap using either drainage tile sock, or suet bird feeders. With few exceptions, bait was changed daily.

During the June and early August sampling sessions I focused on wetlands within ERBSHA. In an effort to have trapping locations coincide with long term monitoring stations, traps were set at wetlands closest to the stations that were holding water (Table 2). In addition to setting turtle traps, transects were set and surveyed, and cover-boards were checked at each long-term monitoring location. Transects starting points were set as the pole denoting the long term monitoring station location and extended 50 m in a random direction with the stipulation that transects could not terminate on a vehicle path or regularly mowed area. The end of each transect was marked with a 6' narrow steel stake and flagged with orange flagging tape. Also at each long term monitoring station a pair of tin cover-boards (installed by IDNR in the spring of 2015) was flipped each time the traps were checked. The identity of all herptiles was recorded for all trap, cover-board, and transect samples. During the 04 through 07 August sampling session, only stations north of Billet Rd were sampled. The section south of Billet Road was inaccessible due to wet conditions. One trap location was replaced during the second sampling session because the traps at the original location were stolen. The new sampling station was set in an area that would receive less visitation and decrease the odds of trap theft. In addition to the set sampling that occurred at stations, I recorded all incidentally encountered amphibians and reptiles observed while travelling to the different locations. All species encountered are noted as such in **Appendix A**

The late August and September sessions were restricted to the Embarras River channel. Traps were set and checked via canoe and kayak. Traps placed in the Embarras River were 26" diameter single-throated hoop traps, also baited with invasive Asian carp. Traps were set with the entrance facing downstream and were selectively set along exposed sandbars in the Embarras River in an effort to document the state endangered Smooth Softshell, *Apalone mutica*. During these trapping sessions the long term monitoring stations were not checked as it was not logistically possible to sample both the wetlands and the river in a day.

All trap captures are reported as Catch Per Unit Effort (CPUE). For turtle surveys, the unit of effort is typically a trap night. As an example, if four traps are set for 3 nights in a sampling session, the total effort for that sample is 4x3 or 12 trap nights. The total number of captures per species is then divided by the total trap nights to generate the CPUE score. Thus, in the example above, if 6 individuals of a species were captured in those 12 trap nights, the CPUE for that species would be 0.5. CPUE is a means of standardizing results when effort is not equal between or among sites and more robust estimators are not warranted due to lack of robustness of the data.

RESULTS

Wetland Surveys

Turtle Trapping: Four of the monitoring stations were inaccessible for the duration of this study. Station R15-2P, the farthest south of the stations, is accessible only by crossing an old oxbow slough of the Embarras River. During both rounds of sampling in 2015 the water was too high to safely cross. In the northern unit of the site, a beaver dam has created a large pond that made R4-1P, R5-2P, and R6-1P inaccessible. Additionally, stations R13-1P and R13-2P were sampled in round one but were inaccessible for the second round of sampling.

The six long term monitoring stations I had access to were sampled for 144 trap nights and yielded five species of freshwater turtle (**Table 1**). Hoop traps never captured more than 3 species at any of the wetlands sampled and no turtles were captured at station R13-1P. Slider turtles were the most numerous species encountered (CPUE: Round 1= 0.77; Round 2 = 0.91), followed by Painted Turtle (CPUE: Round 1 = 0.28; Round 2 = 0.12) and Snapping Turtle (CPUE: Round 1 = 0.22; Round 2 = 0.17). Two species, Northern Musk Turtle, *Sternotherus odoratus*, and Spiny Softshell, *Apalone spinifera*, were represented by a single individual. Additionally, the lone Northern Musk Turtle encountered was captured in the fyke net.

Cover-boards and Transects: Nothing was detected under the cover-boards or transects during the June round of sampling. The second round of sampling, in early August, produced 3 frog species and 2 snake species (**Table 2**).

River Surveys

Three species of freshwater turtle were captured in 58 trap nights of sampling the Embarras River (**Table 3**). Slider Turtles were again the most frequently captured species (CPUE: Round 1 = 0.74; Round 2 = 0.49), but two species, Smooth Softshell, and Ouachita Map Turtle, were detected in the river that were absent from the wetland samples.

DISCUSSION

Sampling at ERBSHA proved to be challenging due to hydrologic conditions of the site. Initial plans were to sample the site once each in May, June, July and August. However, as shown above, this proved impossible in 2015. I was unable to initiate any sampling at the site until June due to flooded conditions at the site. During that initial sampling session, the water rose over 3 feet in some wetlands, making it difficult to set traps in such a way to keep captured animals from drowning. Two additional sampling sessions were cancelled in July due to wet conditions at the site and during the early August sampling round I was still unable to access the southern portion of the site. Further, one sampling location had to be changed when traps set overnight were stolen. These factors have precluded an in depth analysis of occupancy and detection that I was hoping to provide with this study.

Despite these difficulties, sampling remained productive in determining species composition of the site. Cover boards set at the long term monitoring stations were probably set too late to be of great value in 2015. Heyer (1994) suggests setting cover-boards the year before sampling begins to have the greatest

odds of their success. Regardless, cover-boards did start to become productive by August, with Northern Watersnake, Common Gartersnakes, and Southern Leopard Frogs, all being found underneath them (**Table 2**). Transects were run with minimal success during 2015 although they did document four species (**Table 2**). By time the site was accessible in June, the vegetation was already well established along most transects, making observations of herpetofauna difficult. Regardless, these two sampling methods will be of value in the long term monitoring of the site. As repeated visits to the monitoring stations continue, and observations are recorded, a wealth of data should come from them.

The initial turtle survey in 2014 detected three species in ERBSHA. In 2015, those three species and three additional species of freshwater turtle were captured. In fact, every species of freshwater turtle currently known to occur in Lawrence County, Illinois was detected during this study (**Appendix D**). As is the norm in southern Illinois, the turtle community was dominated by the Slider Turtle, *Trachemys scripta*. This is also the case farther south in Gallatin County, IL (Dreslik et al. 2005) and in the backwaters of the Mississippi River (Dreslik and Phillips 2005). The Common Snapping Turtle, *Chelydra serpentina*, and Painted Turtle, *Chrysemys picta*, are also common species that inhabit many of the states wetlands and the two species were captured with equal regularity in this study. In the northern parts of the state, the Painted Turtle often replaces the Slider as the most numerous species.

The fourth most frequently encountered species the Smooth Softshell, *Apalone mutica,* was only encountered in the Embarras River channel. This is not surprising as it is considered a specialist species that prefers flowing currents over sandy substrates. Because the Smooth Softshell is afforded protection as an endangered species in Illinois (IESPB 2015), the 18 individuals, including 8 mature females, captured is promising. The lack of recaptures of this species prevents even a rudimentary estimate of population size. However, all individuals were marked (triangular notch at 5:00), so long term monitoring at the site may result in re-capture of these individuals and allow for a preliminary population estimate. Additionally, blood samples were taken from all Smooth Softshell captures and were accessioned into the INHS tissue collection.

The fifth most encountered species Ouachita Map Turtle, *Graptemys ouachitensis*, was also only captured in traps set in the Embarras River. All three individuals were males and were captured on the same day of sampling. While, map turtles typically inhabit riverine systems, they can also be found in backwater lakes and sloughs adjacent to rivers. While not captured, one Ouachita Map Turtle was tentatively identified basking on top a hoop traps set at R7-4P North during the first sampling session. Certainly, map turtles may be more abundant in the wetlands of ERBSHA than indicated from this study. This species is not often captured in hoop traps as they are typically not attracted to the cut fish used as bait.

The Spiny Softshell, *Apalone spinifera*, was represented by a single individual during this study. Spiny Softshell are not as catholic in their habitat requirements as are Smooth Softshell, therefore, it is somewhat surprising that only one individual was captured. Little is known about the interactions of the two softshell species. By sampling only sand bars in the river, I may have reduced the likelihood of capturing Spiny Softshell. While canoeing the Embarras River between sandbars a great number of softshell turtles were observed but identifying characteristics could not be discerned before they dove off their basking perches. Thus it is possible that the lack of Spiny Softshell in this sample is a result of sampling bias. The lone individual captured was from R7-4P South which does have discernable flow during the sampling sessions. Conversely, the fact that none were captured in the 2013 sample may indicate that they truly are uncommon in ERBSHA. Of note, this individual is the first documented record of the Spiny Softshell in Lawrence County, IL.

The other least encountered species Northern Musk Turtle, *Sternotherus odoratus*, was not captured in baited hoop traps at all. The lone individual, a female, was captured in the fyke net set west of R7-2P in the wetland colloquially known as Fishtail. *Sternotherus* are poor swimmers and generally frequent shallow waters where they can extend their heads to the surface while resting on the bottom. This may have some role in why none were captured in hoop traps as the water where traps were set was typically 18" or deeper. The lead of the fyke net in which the individual was captured extended nearly to shore (**Plate 3**) and may have intercepted the individual as it was walking the shallows of the wetland. Of note, this individual is the first documented record of the Northern Musk Turtle in Lawrence County, IL.

In conclusion, this study has produced a baseline for the freshwater turtle fauna and provided proof of concept for continued monitoring of other herpetofauna via cover-boards and transect sampling. This study detected three species of conservation concern in the state of Illinois (**Appendices A & C**) and suggests that there may be a sizeable population of the state endangered Smooth Softshell in the Embarras River within the site. Additionally, the captures of Northern Musk Turtle and Spiny Softshell, are the first records of the species from Lawrence County, Illinois. Long term monitoring of the herpetofaunal population at ERBSHA will be challenging. Floodplain dynamics are fluid and thus it is difficult to set regimented schedules for sampling. Although set scheduling of sampling may prove difficult, the long term monitoring stations should provide valuable information on the inhabitants of the site. Through repeated visits to the stations when and if conditions allow, it should be possible to continue to gain a better understanding of the inhabitants of the site and to detect trends in species composition as the site undergoes restoration.

ACKNOWLEDGEMENTS

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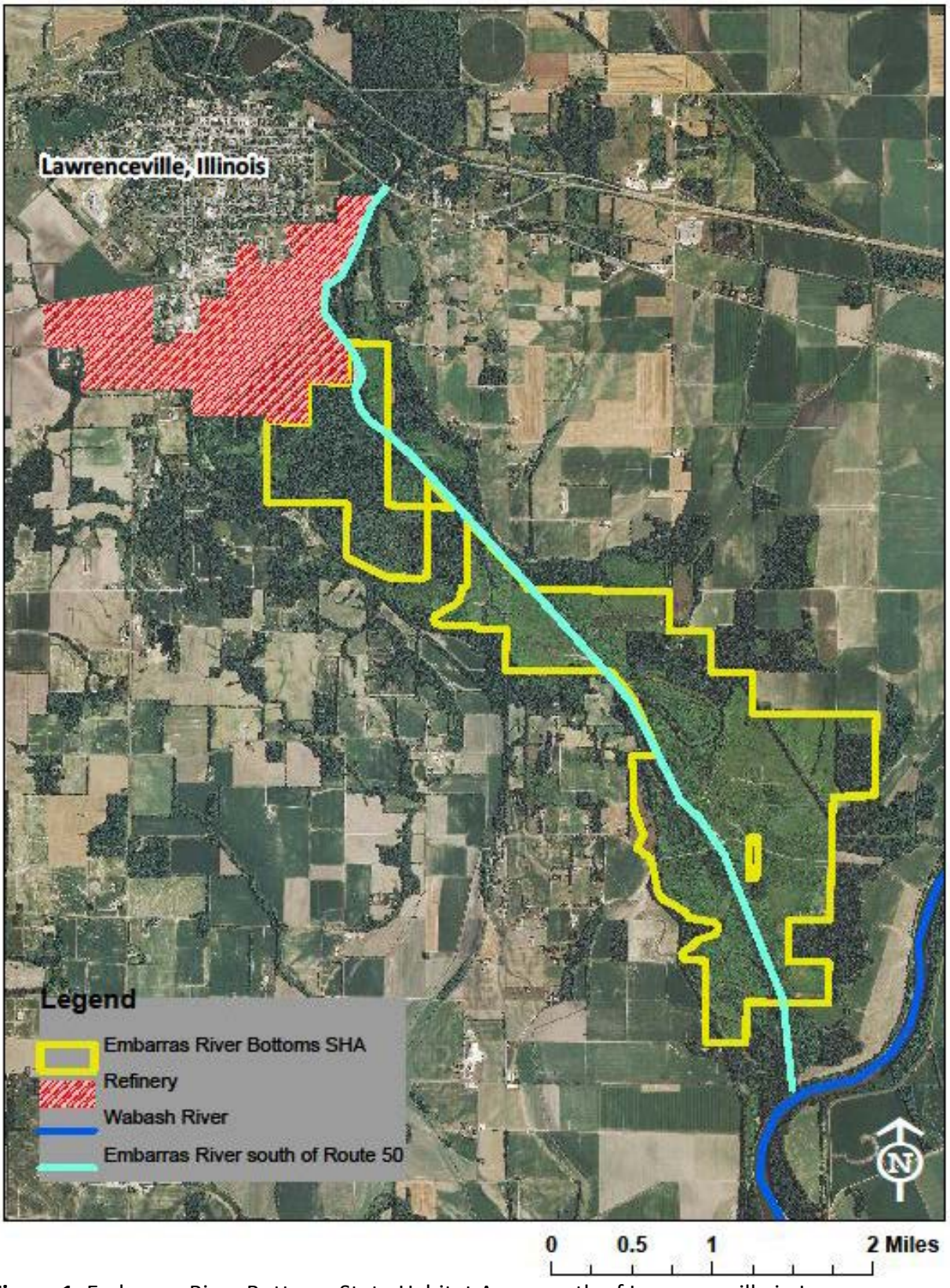

Figure 1. Embarras River Bottoms State Habitat Area, south of Lawrenceville in Lawrence County, Illinois

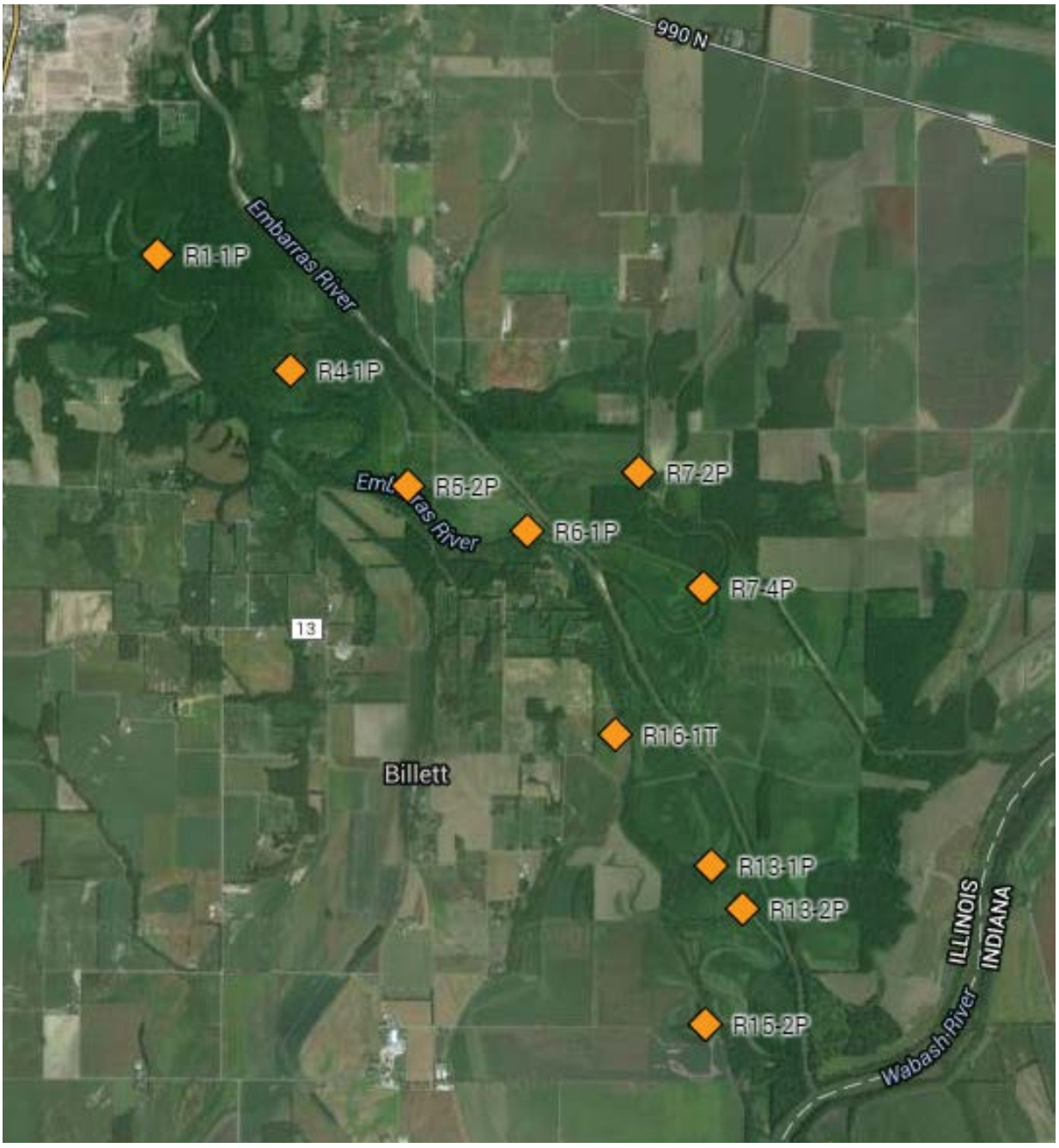

Figure 2. Location of long term monitoring stations in ERBSHA.

Appendix A

Herpetofaunal species recorded from Lawrence County, Illinois

* Denotes species documented in this survey
+ denotes new observation of the species in the county

Amphibians

Salamanders
Ambystoma maculatum
Ambystoma opacum
Ambystoma texanum
Ambystoma tigrinum
Plethodon cinereus
Plethodon glutinosus
Siren intermedia
Hemidactylium scutatum
Notophthalmus viridescens
Cryptobranchus alleganiensis

Frogs
Acris blanchardi *****
Pseudacris crucifer
Pseudacris triseriata
Hyla versicolor- chrysoscelis *****
Anaxyrus fowleri *****
Scaphiopus holbrookii
Lithobates areolatus
Lithobates catesbeianus
Lithobates clamitans *****
Lithobates sphenocephalus *****
Lithobates sylvaticus

Reptiles

Turtles
Apalone mutica *****
Apalone spinifera ***, +**
Chelydra serpentina *****
Chrysemys picta *****
Graptemys ouachitensis *****
Trachemys scripta *****
Terrapene carolina *****
Sternotherus odoratus ***, +**

Lizards
Plestiodon fasciatus
Plestiodon laticeps

Snakes
Coluber constrictor *****
Heterodon platirhinos
Lampropeltis calligaster
Nerodia erythrogaster *****
Nerodia sipedon *****
Pantherophis spiloides *****
Storeria dekayi
Thamnophis sauritus *****
Thamnophis sirtalis *****

Appendix B
Plates of stations sampled at ERBSHA in 2015

Plate 1. Wetland at station 07-2P West in ERBSHA

Plate 2. Wetland at 07-2P East in ERBSHA.

Plate 3. Fyke net set in same wetlands as station 07-2P West at ERBSHA.

Plate 4. Wetland sampled as 07-4P North at ERBSHA. Note one of the coverboards is visible in the foreground of the image

Plate 5. Station 07-4P South. This was the only location where a Spiny Softshell was captured.

Plate 6. Original location of sampling station R16-1T. It is denoted as R16-1T South in Table 1. The traps were stolen from this location so the site was changed to that depicted in Plate 7.

Plate 7. Replacement location for monitoring station R16-1T. Denoted as R16-1T North in Table 1.

Plate 8. One of the five sand bar sampled on the Embarras River during the second two rounds of sampling at ERBSHA in 2015. Numerous Smooth Softshell turtles were captured at this sandbar.