Report of Plains Leopard Frog (*Lithobates blairi*) Surveys Conducted at NICHES Land Trust Properties, 2020

Nathan J. Engbrecht
Herpetologist
Division of Fish and Wildlife
Indiana Department of Natural Resources

In September of 2019, we were contacted by citizen scientist John Burris regarding an observation of sate endangered Plains Leopard Frogs along the Wabash River in Clinton, Indiana. A subsequent visit by the DNR herpetology team confirmed Burris' discovery, and led to additional finds at two DNR Fish and Wildlife properties upstream in Vermillion County. Shortly thereafter, Burris identified yet another site along the Wabash River in Tippecanoe County. These surprising discoveries revealed that visual surveys along the Wabash River can be used to locate Plains Leopard Frogs during late summer and fall, effectively creating a second sampling window during a time of year when conducting frog surveys is generally less effective. This development prompted us to refine our sampling strategy for the 2020 field season, focusing primarily on the "Middle Wabash" corridor and its tributaries. The following report contains the results of surveys conducted at NICHES Land Trust properties along the Middle Wabash River corridor in Tippecanoe, Warren, and Fountain counties during the 2020 field season.

Methods

We have developed a three-prong sampling approach for locating Plains Leopard Frogs that includes the use of automated recording units (ARUs), manual ("by ear") call surveys, and visual surveys conducted during late summer and fall when the frogs are present along river banks. Several 2020 surveys were conducted on properties owned by NICHES Land Trust, including Roy Whistler Wildlife Area, Shawnee Bottoms Natural Area, Wabash Bottoms, Indian Creek Basin, and Weiler-Leopold Nature Preserve, and Pecan Basin Reserve.

Manual call surveys were conducted at Pecan Basin and Indian Creek Basin on 15 May and 3 June, respectively. We deployed ARUs at Shawnee Bottoms, Wabash Bottoms, Weiler -Leopold, and Roy Whistler that were programmed to record 4 hours after sunset. Units were deployed on 1 Apri1 and recordings were collected through early May. Recordings stopped when either the batteries died or the memory cards filled up, sometimes on different dates but all recorded through April and into early May. At the beginning of the 2020 field season, the wetland at Roy Whistler was one of the only known Plains Leopard Frog breeding sites in the state, and we viewed it as an opportunity to collect calling data that might aid our recording analyses and allow for an examination of calling metrics (e.g. diel and seasonal patterns).

Automated recording units deployed at Roy Whistler Wildlife Area (left) and near "Scott Pond" at Shawnee Bottoms Natural Area (right).

Results

The collective results of surveys involving all sampling methods are as follows:

Roy Whistler Wildlife Area – Plains Leopard Frog present; calls detected on ARU. Other species detected: Spring Peeper (*Pseudacris crucifer*), Western Chorus Frog (*Pseudacris triseriata*)*, Northern Leopard Frog (*Lithobates pipiens*), and Gray Treefrog (*Hyla versicolor*).

Shawnee Bottoms Natural Area – Plains Leopard Frog present; calls detected on ARU placed next to Scott Pond. Project collaborator John Burris photographed a specimen on the Wabash River bank strongly suggestive of a Plains Leopard Frog but not all diagnostic features were visible from the angle the photo was taken. Other species detected: Pickerel Frogs (*Lithobates palustris*), Spring Peeper, Western Chorus Frog, Gray Treefrog, Northern Leopard Frogs, and American Toad (*Anaxyrus americanus*).

Wabash Bottoms – No Plains Leopard Frogs detected. Other species detected: Spring Peeper, Western Chorus Frog, Gray Treefrog, and American Toad.

Indian Creek Basin – Brief manual call survey was interrupted by a storm, Plains Leopard Frogs not detected. Other species detected: Blanchard's Cricket Frog (*Acris blanchardi*).

Weiler-Leopold Nature Preserve – No Plains Leopard Frogs detected. Other species detected: Spring Peeper, Western Chorus Frog, American Toad, and Gray Treefrog.

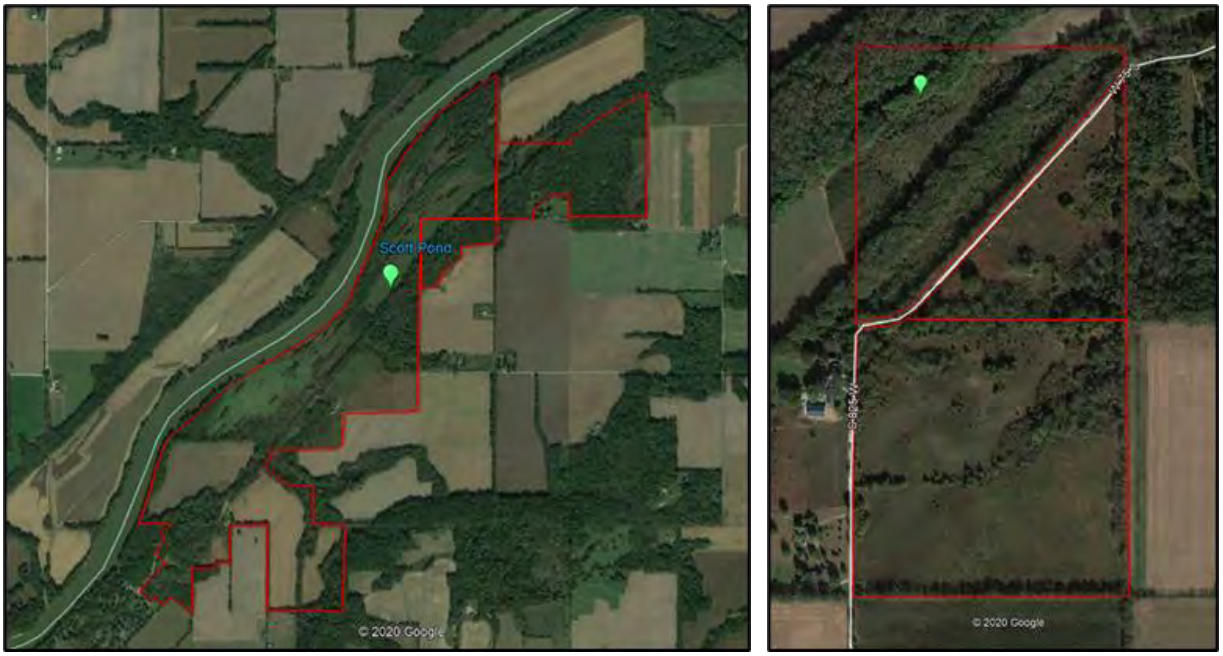
Pecan Basin Reserve – Plains Leopard Frogs were not detected at Pecan Basin, however, we heard calling less than 1 mile south and ca. 1.7 miles north of the preserve. In both situations the frogs were calling from flooded areas within the alluvial plain. So far, visual and manual call surveys have not confirmed Plains Leopard Frogs at Pecan Basin although we suspect the frogs may use it during terrestrial forays.

In addition to these localities, we also identified Plains Leopard Frogs at three sites along the Vermillion River, one site on the Little Vermillion River, and at two new sites along the Wabash River—one in Parke County and one in Vermillion County. Our collaborator John Burris found a single and clearly diagnostic Plains Leopard Frog at Black Rock Barrens Nature Preserve in Warren County and at a new site near the Iroquois River in Newton County. All Plains Leopard Frogs records will be submitted for inclusion in the Heritage Database.

*Chorus frogs detected in this study are being considered Western Chorus Frogs (*Pseudacris triseriata*). While Boreal Chorus Frogs (*Pseudacris maculata*) have been documented in parts of northwest Indiana, genetic analysis would be needed to distinguish between these two species. For the purpose of this report, we are defaulting to the Western Chorus Frog designation since it appears the predominate species in this portion of the state.

Habitat, Distribution, and Conservation Considerations

Plains Leopard Frogs have been difficult to assess in Indiana due to a nearly 30-year dearth of records beginning in the late 1970's. Recent discoveries confirm the frog's persistence in western Indiana, and surveys conducted over the past two field season have revealed an interesting distributional pattern associated with riparian corridors. While surveys are ongoing, the available data suggest the Wabash and Iroquois River corridors are important habitat features for Indiana's Plains Leopard Frog populations. Along the Wabash, all seven identified breeding (or at least calling) sites are located within the alluvial plain, typically in shallow wetlands away from the main river channel. The Scott Pond site at Shawnee Bottoms appears to be the exception. One calling site on the Iroquois River is an oxbow wetland immediately adjacent to the river channel that experiences deep flooding; a second site is in an agricultural field several hundred meters from the river. Additional sites will likely be discovered along both rivers. To my knowledge, all recent terrestrial observations of Plains Leopard Frogs in Indiana have been within the vicinity of these two rivers.



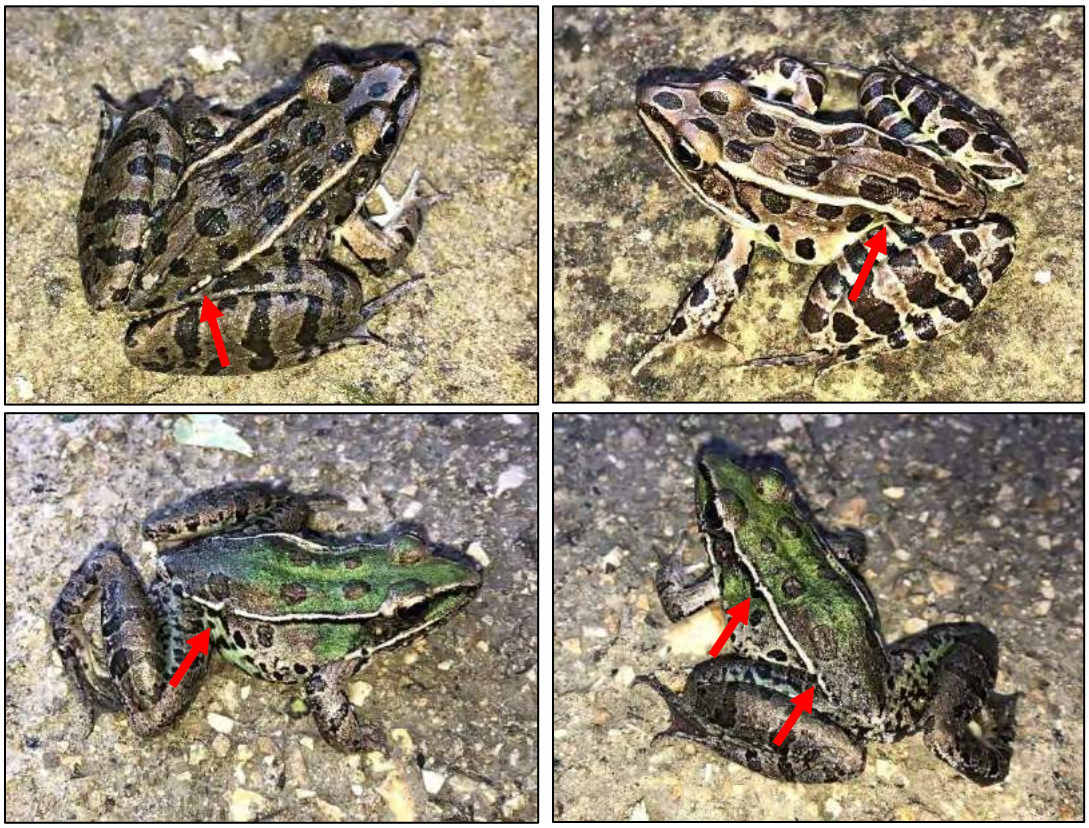
Plains Leopard Frog calling localities at Shawnee Bottoms (left) and Roy Whistler (right).

This year's observations on the Vermillion and Little Vermillion rivers in west-central Indiana indicate Plains Leopard Frogs utilize habitats along the main channel of these Wabash tributaries at least during the fall season. While frogs at these sites presumably breed in nearby wetlands, late season forays along river's edge allow for hydration during autumn dry spells. This behavior allowed us to easily locate frogs hiding beneath rocks along moist riverbanks and exposed shorelines.


Plains Leopard Frog site along the Vermillion River in Eugene, Vermillion County. Both Plains and Northern Leopard Frogs were found beneath rocks on the exposed shore during fall surveys.

Incidentally, our surveys also revealed information about the distribution of Northern Leopard Frogs and Southern Leopard Frogs (*Lithobates sphenocephalus*) where they are sympatric with Plains Leopard Frogs along the Middle Wabash corridor. During our surveys, we identified Northern Leopard Frogs at several new localities south of where they had previously been documented. This includes new county records for Warren, Fountain, and Vermillion counties.

At some sites, we observed frogs exhibiting features intermediate of two or more leopard frog species. In most cases, these suspected hybrids appeared intermediate between Plains and Northern Leopard Frogs; however, we found frogs exhibiting a range of characteristics between all three species along the Wabash at Covington. A genetic analysis of frogs at this site will be needed to understand the prevalence of hybridization and the identity of various individual frogs. Hybridization may serve as a legitimate conservation threat in situations where Plains Leopard Frogs are unable to produce sustainable numbers of "pure" offspring.



Upper left: Plains Leopard frog showing the diagnostic broken and inset portion of the dorsolateral fold and lack of light edges around dorsal spots. Upper right: Northern Leopard Frog (brown morph) showing continuous dorsolateral fold and light edges around dorsal spots (the light edges are typically absent in Indiana's other two leopard frog species). Bottom photos: frog exhibiting features of a Southern Leopard Frog but with interruptions in the dorsolateral folds—a feature not typical of Southern Leopard Frogs and suggestive of hybridization.