

Frogs, Toads, and Bats Oh My!

Population Surveys of frogs, toads, and bats on islands of the Chippewa River

Breana Meyer, John Schoen,
Chris Wojan

Faculty advisors:
Dr. Chris Floyd (Department of Biology),
Dr. Garry Running (Department of Geography and Anthropology),
Dr. Eric Merten (Department of Biology at Wartburg College)

University of Wisconsin-Eau Claire



Objectives

- Determine which species of anurans (frogs and toads) and bats occupy or use islands of the Chippewa River in west-central Wisconsin
- Obtain rough estimates of anuran and bat densities on and around the islands
- Provide information that will help guide wildlife management on the islands

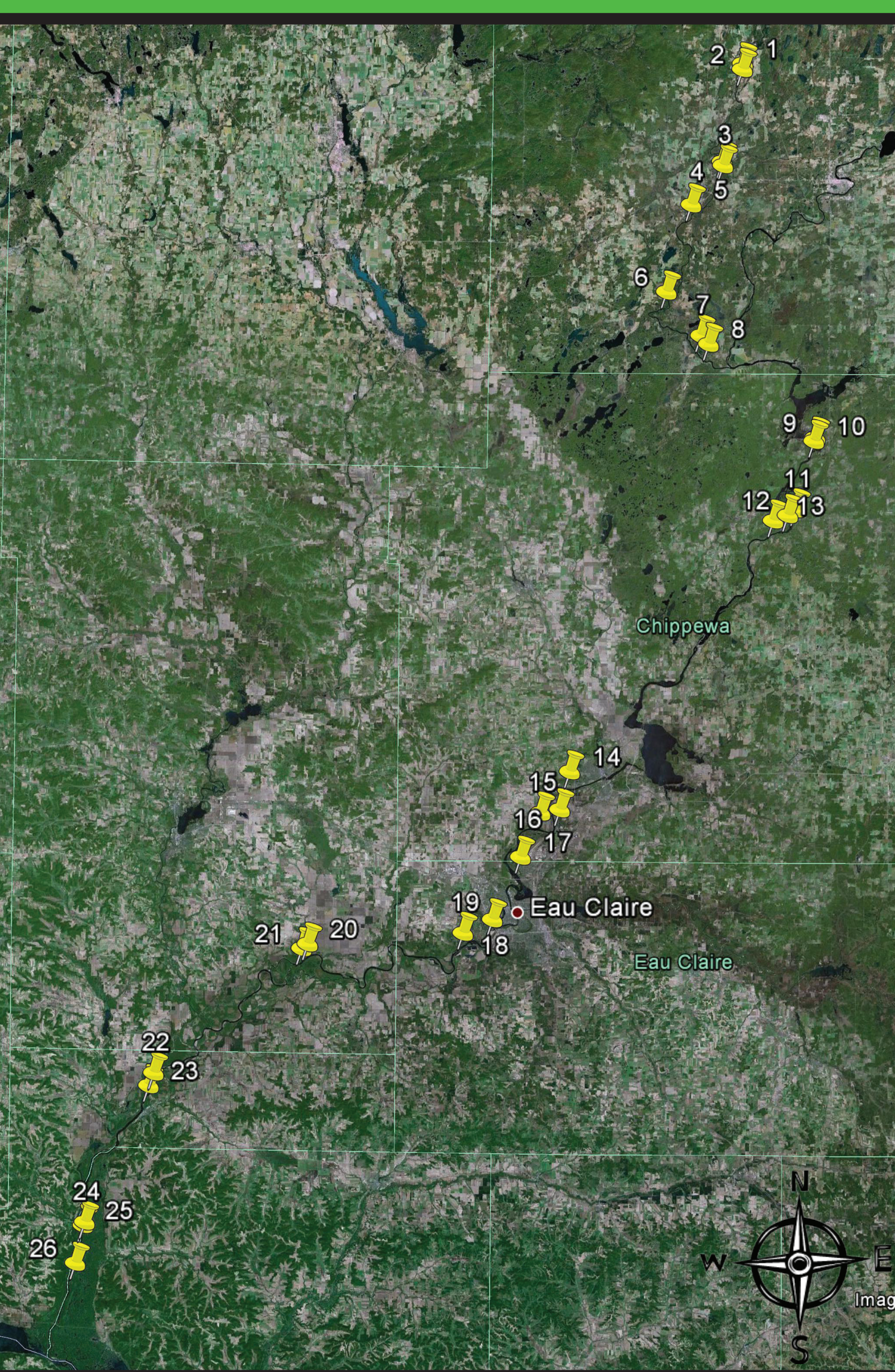
Why is this Important?

Anuran and bat populations have been declining all over the world, due to habitat loss, infectious diseases, environmental contaminants, and climate change^{1,2,3,4}. Effective conservation and management strategies require a good understanding of populations and their habitats^{5,6}. For many anurans and bats the most important habitats are isolated and or seasonally flooded wetlands and associated forests⁷, which are increasingly threatened by commercial and agricultural development⁸.

The Lower Chippewa River Valley has one of the largest stretches of undeveloped forest and wetland habitats in eastern North America; these habitats include many islands in the Chippewa River⁹. These patches of riverine habitat are relatively isolated and pristine; they also vary greatly in size, shape, and patterns of inundation and vegetation succession. The islands, thus, may offer valuable protection for breeding anurans and foraging bats^{10,11}. Only the tree communities have been well studied on the islands; the vertebrate populations are poorly understood.

Study Area and Time Frame

The study area is a 120 mile stretch of the Chippewa River that starts in Imalone, WI and ends at Battle Island in the Tiffany Bottoms State Natural Area. The research was conducted on 26 islands along this stretch, which are managed by the US Bureau of Land Management. This research was conducted from May through July 2012.



From: Google Earth Pro

Sources

¹ MacKenzie, S.P., A.M. Hatten, and P.A. Hayes. 2002. A review of the global conservation status of bats. *Oryx* 36:18-34.
² Jackson, V.J., and P. Curran. 2003. The global decline of amphibian populations. *Conservation Biology* 17:271-281.
³ Pilon, P., D.P. Squires, and J. Squires. 2003. Amphibian and reptile populations in the Great Lakes region. *Endangered Species Research* 6:1-3.
⁴ Lindenberg, L.S., S. King, J.C. Cove, and C. Smith. 2006. Habitat associations of foraging anurans in the Lower Wisconsin River alluvial valley, Wisconsin. *Wetlands* 26:70-74.
⁵ Baska, M.T. 2009. Habitat associated and temporal patterns of bat activity in a diverse forest landscape of southern New England. *Biodiversity & Conservation* 18:23-26.
⁶ Gorman, C.L., J. Wilson, C.L. Wilson, K. Gaudin, et al. 1994. Amphibian diversity and abundance in a fragmented landscape. *Conservation Biology* 8:107-110.
⁷ Gorman, C.L., J. Wilson, C.L. Wilson, K. Gaudin, et al. 1994. Amphibian diversity and abundance in a fragmented landscape. *Conservation Biology* 8:107-110.
⁸ Gorman, C.L., J. Wilson, C.L. Wilson, K. Gaudin, et al. 1994. Amphibian diversity and abundance in a fragmented landscape. *Conservation Biology* 8:107-110.
⁹ Gorman, C.L., J. Wilson, C.L. Wilson, K. Gaudin, et al. 1994. Amphibian diversity and abundance in a fragmented landscape. *Conservation Biology* 8:107-110.
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Methods

- Acoustic surveys of anuran and bat populations were conducted on 26 BLM islands.
 - Protocols for the anuran surveys were adapted from those of the North American Amphibian Monitoring Program and the Wisconsin Frog and Toad Survey.
 - Bat acoustic surveys were conducted using a mobile detection device in coordination with citizen-based, Wisconsin Bat Monitoring Program run by the Wisconsin DNR. Calls were recorded using the AnaBat SD2 CF Bat Detector w/PDA. Stationary and river transect surveys were conducted.
- On islands with ephemeral ponds depletion and mark-recapture methods were conducted to estimate anuran abundance.
 - Habitat characteristics of each island were also assessed.
 - Elevation (with Topcon RL-Ha rotating laser) was measured, and then standardized using data from gaging stations.
 - Conductivity and water temp of ephemeral ponds was measured with Denver Instruments pH/Ion/Conductivity Meter.



John and Chris prepare to conduct a depletion survey.



John conducts a depletion survey.



Bucket of captured Gray tree frogs for depletion survey



Breana counts frogs from the depletion survey.



Bucket of captured Green frogs for depletion survey



Breana conducts an acoustic bat survey.



AnaBat SD2 CF Bat Detector

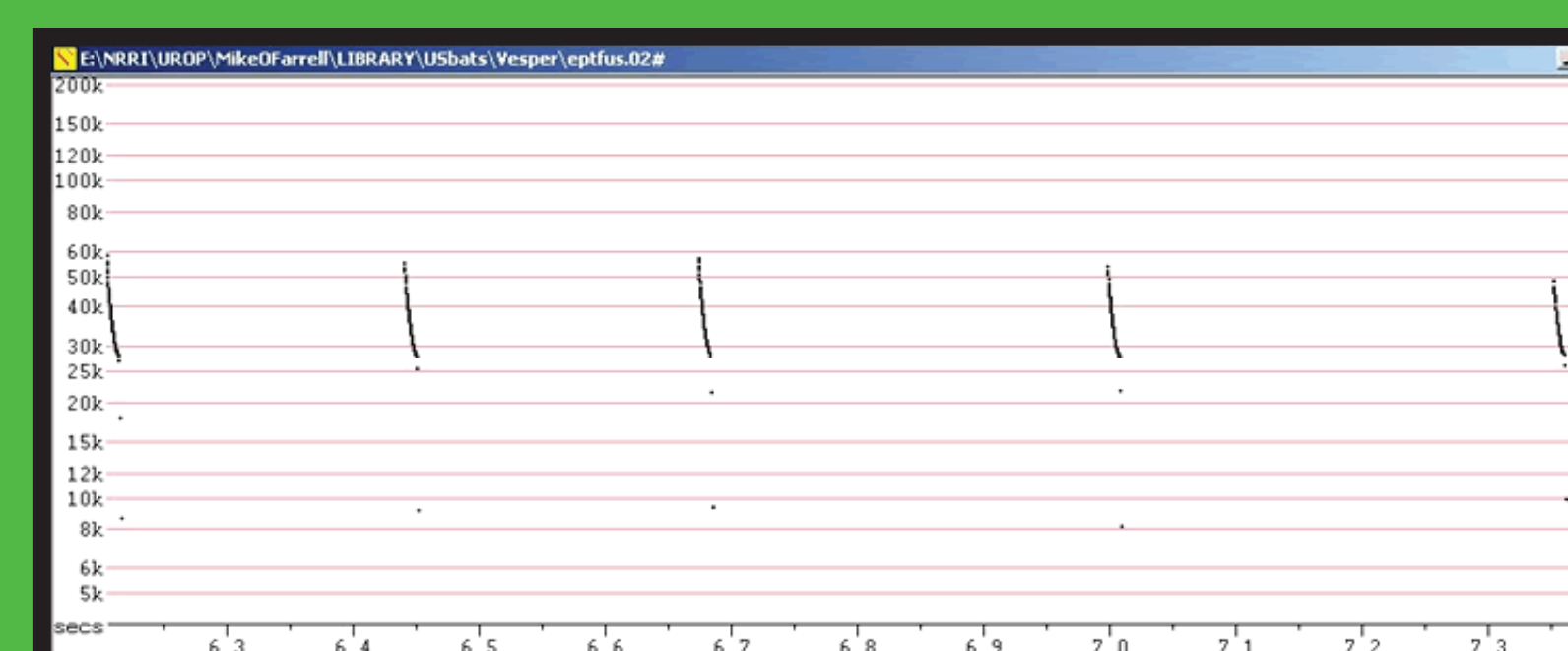
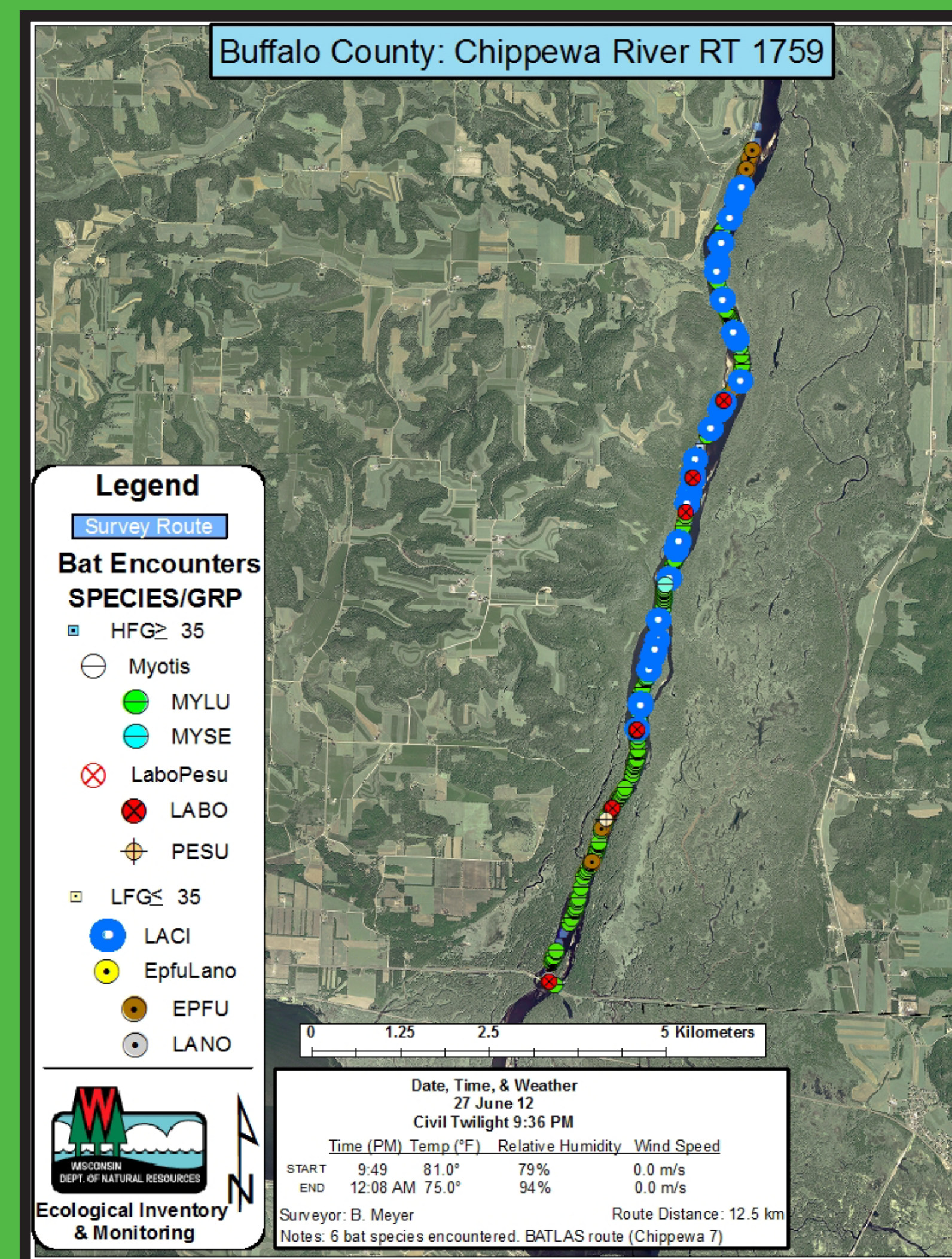
From: <http://www.flickr.com/photos/johnbullas/7542360038/>

Bat Results

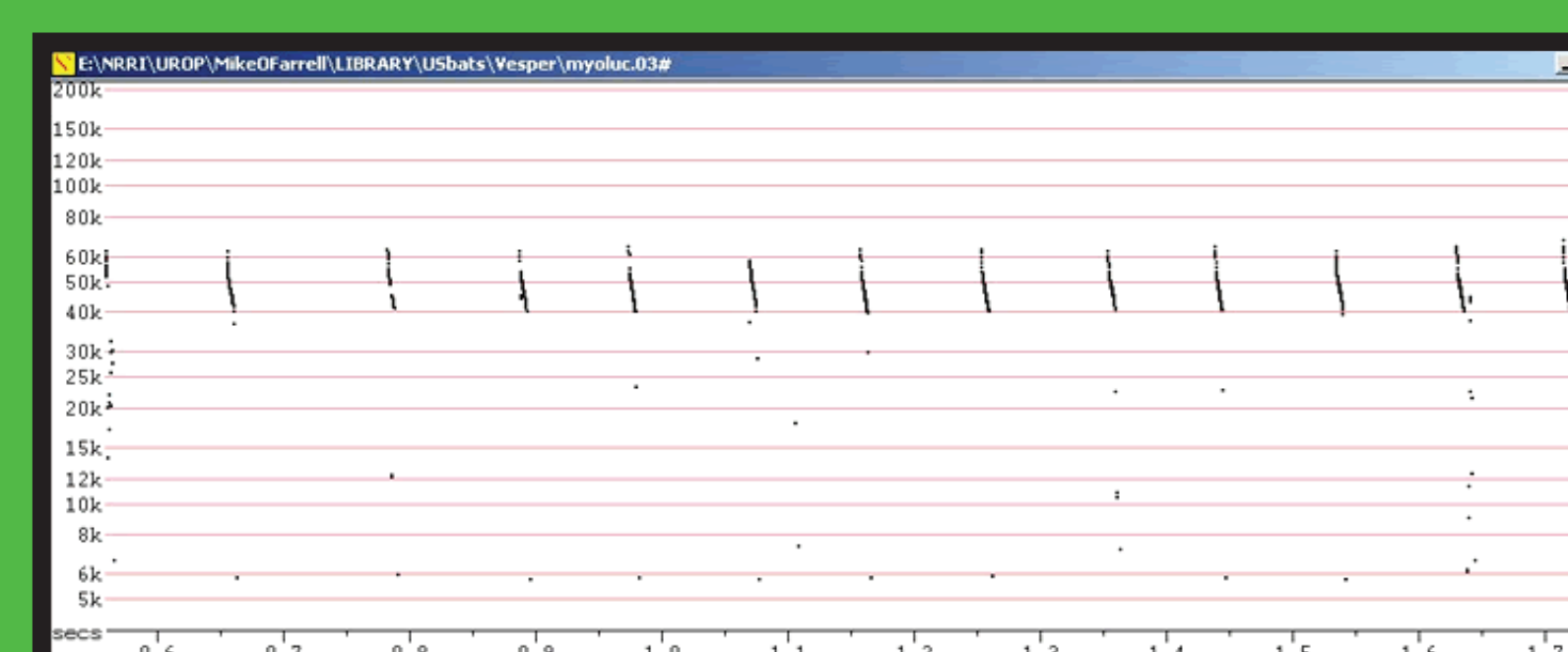
All information recorded during the bat surveys was uploaded to the WBMP bat survey website (<http://wiatri.net/-Inventory/Bats/SecureData/Welcome.cfm>). The WBMP staff used this information to identify bat species by their calls and generate shape files and maps of recorded bat locations (example of map below). Below the map is an example of a Big Brown Bat call (*Eptesicus fuscus*; top) and a Little Brown Bat call (*Myotis lucifugus*; bottom). The species identified during the acoustic surveys on the Chippewa River were:

- Myotis lucifugus* (Little Brown Bat)
- Eptesicus fuscus* (Big Brown Bat)
- Lasiurus borealis* (Eastern Red Bat)
- Lasiurus cinereus* (Hairy Bat)

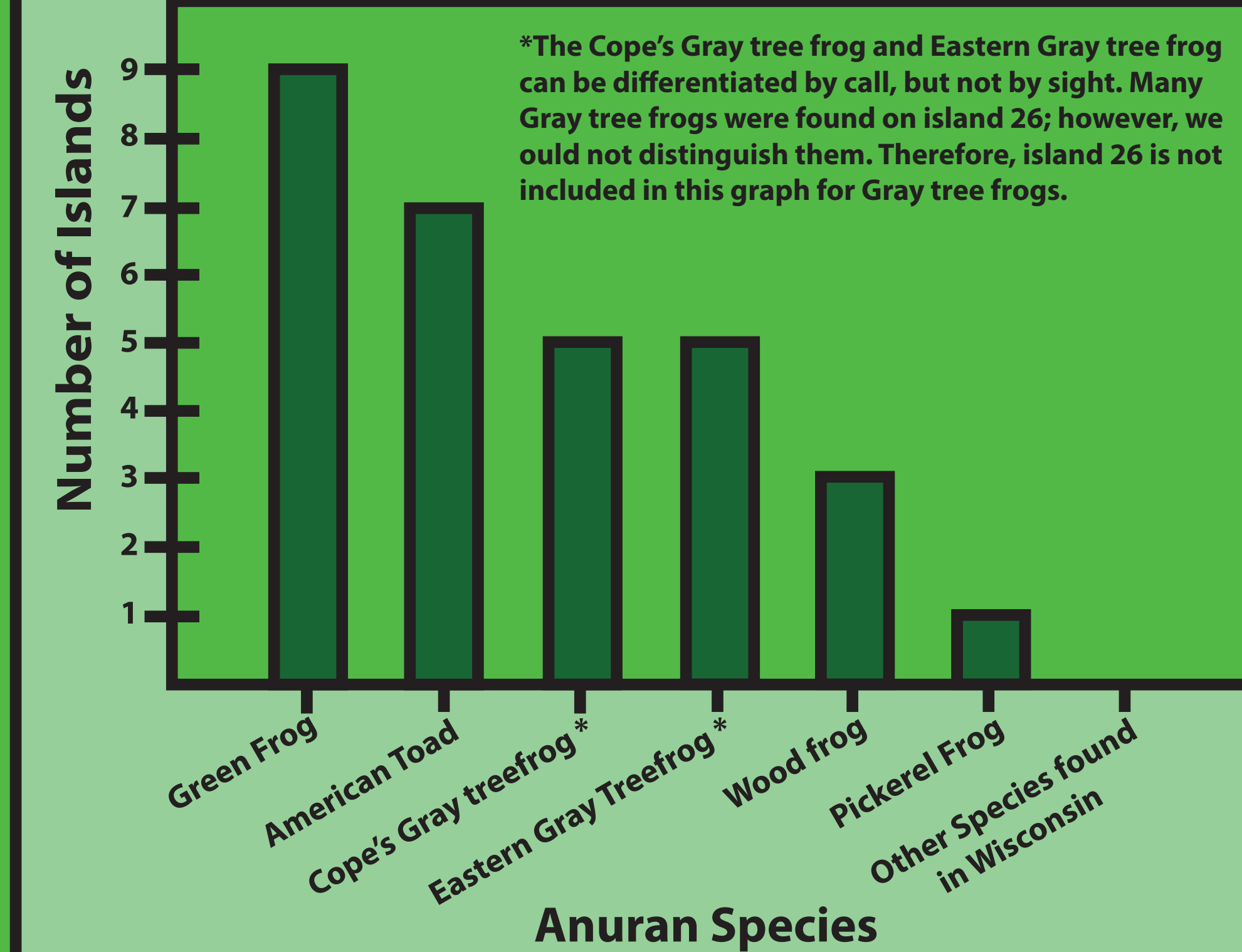
Detailed information on the species recorded is still being analyzed.



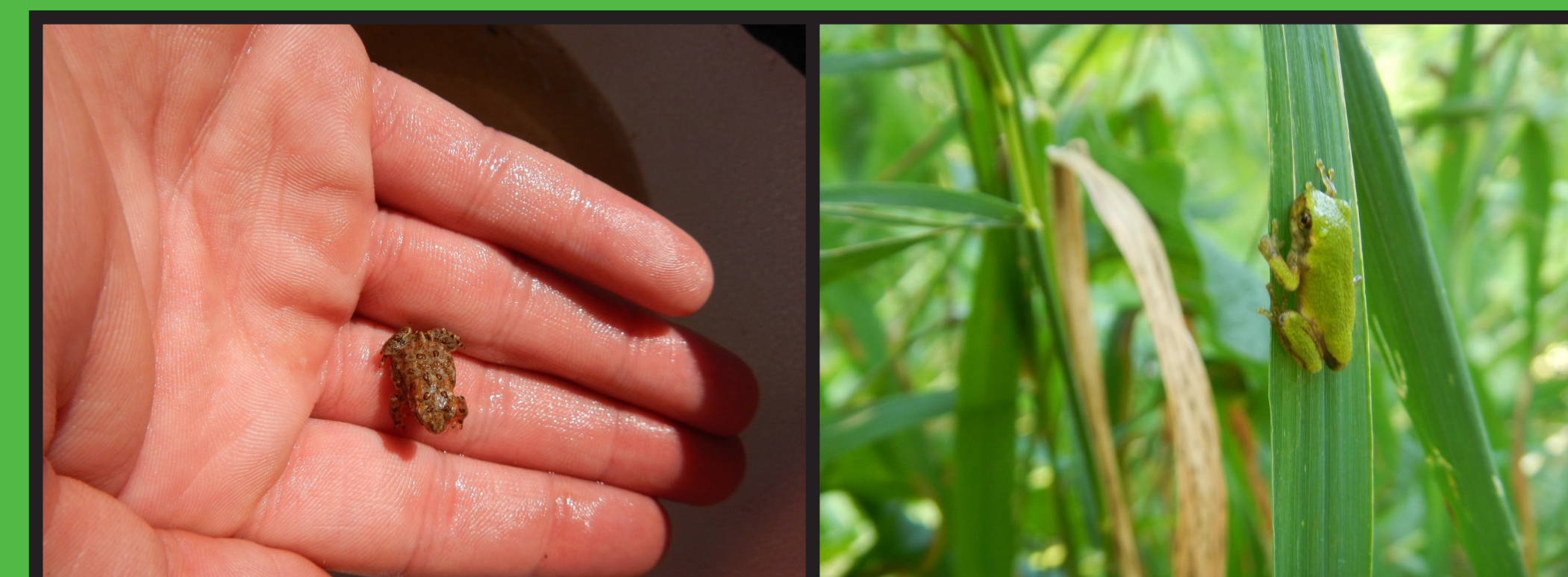
Both from: <http://www.nri.umn.edu/bats/information/echolocation.asp>



Results of Anuran Surveys



The graph above shows the results from our anuran surveys conducted from May through July 2012. Sample sizes of mark recapture and depletion surveys were not large enough to produce conclusive results on population estimates. More surveys will be conducted in 2013 to produce these results. The pictures below show the anuran species caught during the surveys



Top Left: American Toad (*Bufo americanus*)

Top Right: Gray Tree Frog (*Hyla* sp.)



Center Left: Wood Frog (*Lithobates sylvaticus*)

Bottom Left: Green Frog (*Lithobates clamitans*)

Bottom Right: Pickerel Frog (*Lithobates palustris*)



Unforeseen challenges and future plans

The spring of 2012 was one of the earliest and warmest in history; this was followed by an extremely dry summer. As a result, we missed the breeding season for many of the anuran species. Our plan in 2013 is to re-survey most of the islands, with a special emphasis on the islands with ephemeral ponds. We will also do bat surveys at the ephemeral ponds.

Acknowledgements

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