

# Effects of wetland type and land use practices on movement and habitat selection by northern leopard frogs (*Rana pipiens*)

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## Abstract:

Declining amphibian populations and the recent discovery of deformities in Minnesota has prompted researchers to investigate the quality of habitats available to amphibians. **The objectives of our study are to 1) develop methods of applying radio transmitters to northern leopard frogs and 2) describe post-breeding movement and habitat use by these frogs in various wetland types in the Driftless Area of southeastern Minnesota.** During summer 2000, we evaluated methods of attaching radio transmitters with external harnesses; these attachment methods proved unsuccessful. In winter 2001, we evaluated methods to surgically implant radio transmitters. Results indicate that body-cavity implants minimize transmitter loss and adverse effects as compared to other methods. In spring 2001, movements and habitat use of northern leopard frogs (*Rana pipiens*) will be examined in three wetland types (i.e., natural, agricultural, and an urban) to identify favorable habitat characteristics and specific risk factors associated with these environments. This information will be used by resource managers in making decisions regarding leopard frog habitat conservation and enhancement.

## Study sites



Winona and Houston Counties in the Driftless Area



Northern leopard frog

The Driftless Area Ecoregion contains thousands of farm ponds, constructed with cost-sharing dollars from the US Department of Agriculture and the states. These ponds were created to prevent soil erosion and increase wildlife habitat, yet no studies have been conducted to determine how the ponds benefit wildlife. Constructed farm ponds potentially represent significant breeding, rearing, and overwintering habitat for amphibians in the Driftless Area Ecoregion of southeastern Minnesota, western Wisconsin, and northeastern Iowa, a landscape where natural wetlands are scarce.

## Partners:

- U.S. Geological Survey
- Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative Commission on Minnesota Resources
- University of Wisconsin-LaCrosse
- U.S. Fish and Wildlife Service
- Zoological Society of Milwaukee
- USDA Natural Resources Conservation Service
- Winona State University

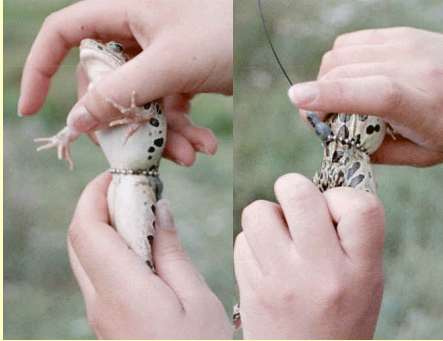




## Objective 1: External attachment

### Methods

- We captured 28 frogs and attached 2-g transmitters (Holohill, Inc. model BD-2G) with 4 harness types (nickel bead chain, aluminum bead chain, cable tie, and elastic band).
- Frogs were released in a wet meadow adjacent to a natural pond.
- Frogs were located and their health evaluated every 2 to 4 days from 1 August to 26 October 2000.

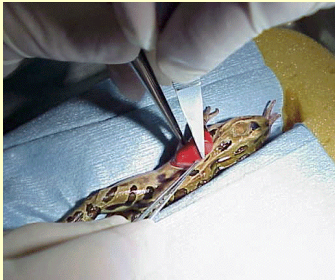


Transmitter harnesses caused skin lesions

### Results

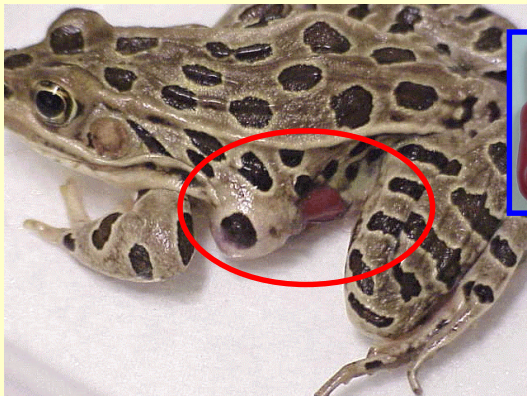
- Transmitter loss and skin lesions were common with all harness types.
- These results indicate that external attachment methods are not suitable for studies evaluating long term movement and habitat use of northern leopard frogs.

## Objective 1: Internal implant

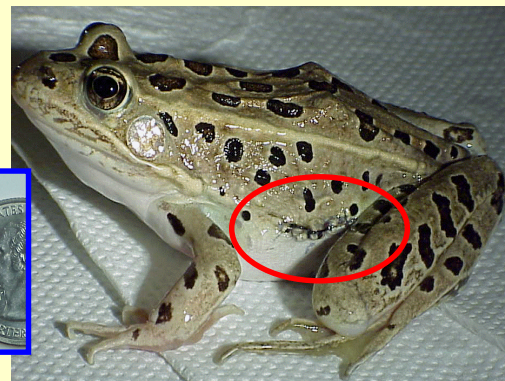


### Methods

- We implanted 2-g dummy transmitters under the skin (subcutaneous) or into the body cavity of 18 northern leopard frogs.
- In the laboratory, we monitored these frogs to evaluate transmitter retention and adverse effects.



Subcutaneous implant – exposed transmitter



Body-cavity implant

### Results

- Implants into the body cavity yielded lower transmitter loss and fewer adverse health effects as compared to subcutaneous implants.
- These results indicate that body-cavity implants may be more suitable for studies evaluating long-term movement and habitat use of northern leopard frogs as compared to other techniques.



## Objective 2: Movement and habitat use



Natural



Agricultural



Urban

### Implant and tracking

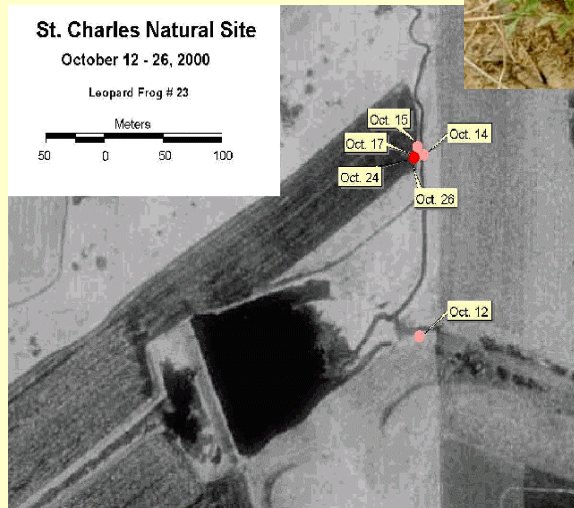
- Radio transmitters will be implanted into 15 adult leopard frogs from each wetland type (i.e., natural, agricultural, urban).
- Radio-tagged frogs will be tracked 2 to 3 times per week from May until hibernation (October).

### Data collected at frog locations

- GPS coordinates
- Land cover type (e.g., row crop, forest)
- Vegetation cover within 1 m of the frog

### Data from GIS interpretation

- Availability of land cover types
- Coverages of frog telemetry locations



Movement of a radio-tagged leopard frog in October 2000

### The data analysis will determine

- Habitat selection by comparing habitat use to habitat availability with compositional analysis.
- Home range size with harmonic mean, minimum convex polygon and bivariate normal home range models.
- Post-breeding movement patterns and potential risk factors associated with wetland type.
- Favorable habitat characteristics of constructed wetlands for leopard frogs.

### USGS Amphibian Websites:

<http://www.umesc.usgs.gov/terrestrial/amphibians>  
<http://bbs-pwrc.er.usgs.gov/armi/index.cfm>  
<http://www.frogweb.gov/>  
<http://www.mp2-pwrc.usgs.gov/FrogWatch/index.htm>  
<http://www.nwhc.usgs.gov/>  
<http://www.nbii.gov/about/error.html>  
<http://www.npwrc.usgs.gov/narcam/>

