

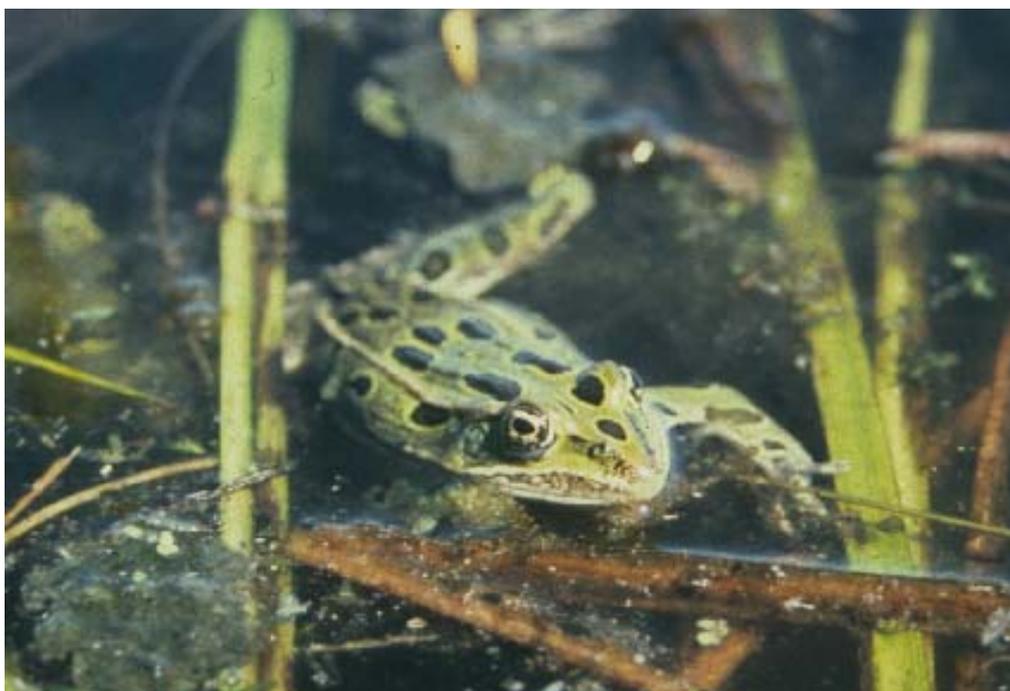


Northern Prairie Wildlife Research Center

**EFFECTS OF CONSERVATION PROGRAMS ON  
AMPHIBIANS IN SEASONAL WETLANDS OF THE  
PRAIRIE POTHOLE REGION'S GLACIATED PLAIN:  
FY2006 Progress Report**

**March 28, 2007**

**Report to:  
United States Department of Agriculture  
Farm Service Agency &  
Natural Resources Conservation Service**

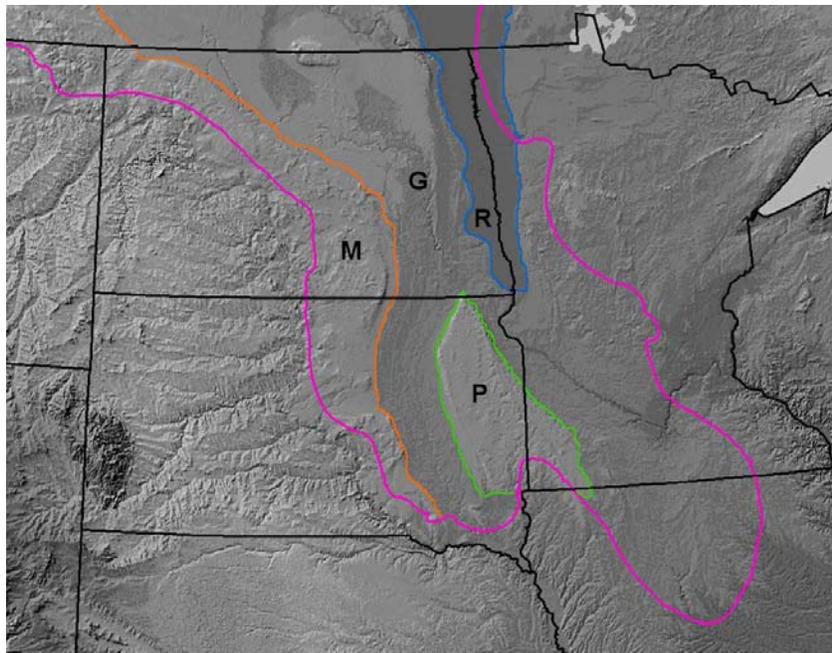


**Prepared by:  
David M. Mushet, Ned H. Euliss, Jr., and Caleb J. Balas  
United States Geological Survey  
Northern Prairie Wildlife Research Center  
8711 37<sup>th</sup> Street SE  
Jamestown, ND 58401**

## BACKGROUND INFORMATION

The primary purpose of this project is to evaluate amphibian communities of seasonal wetlands in the Prairie Pothole Region (PPR) of the United States and to begin collection of baseline information needed to incorporate the quantification and monitoring of amphibians into the larger Integrated Landscape Monitoring (ILM) framework (Prairie Pilot Science Team 2006). ILM is a five-year science thrust of U.S. Geological Survey that was initiated in FY2006. The goal of the science thrust is to develop a monitoring framework that can be used to observe, monitor, understand, and predict landscape change and its implications to natural resources and ecosystem processes at multiple spatial and temporal scales. The ILM Prairie Pilot is one of four pilot studies implemented to test the efficacy of developing such a framework. The geographic focus of the ILM Prairie Pilot is the PPR of the United States (Figure 1) while the other three pilots have focuses on the Great Basin, Puget Sound, and the Lower Mississippi River Alluvial Valley. Partner agencies of the ILM Prairie Pilot include the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture (USDA) Farm Service Agency, and the USDA Natural Resources Conservation Service.

Representatives of each partner agency identified a list of specific ecological functions their respective agencies were interested in using as performance measures of specific conservation practices, programs, and land management activities. One performance measure of the PPR landscape identified as being of great interest to



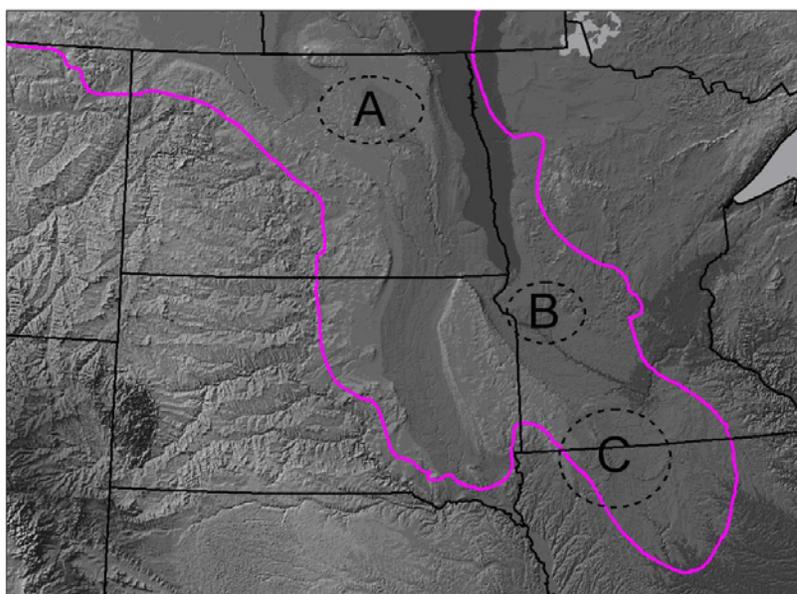
**Figure 1.** The prairie pothole region of the United States: (M) Missouri Coteau, (G) Glaciated Plains, (R) Red River Valley, and (P) Prairie Coteau.

partner agencies is the landscape's ability to support and maintain native amphibian populations. In this progress report, we update information provided in our FY2005 progress report (Mushet et al. 2006) and provide preliminary information from data collected during FY2006.

## FIELD WORK AND PRELIMINARY RESULTS

In 2005, we followed the procedures approved for this project (Euliss and Laubhan 2005) to sample the amphibian communities of 40 seasonal wetlands in the PPR. The wetlands were distributed among three sampling locations in northern, central, and southern portions of the PPR Glaciated Plains (Figure 2). Twelve of the wetlands (4 in each region) were drained/farmed wetlands, 16 wetlands (4 in the northern, 4 in the central, and 8 in the southern region) were formerly drained/farmed wetlands that had been hydrologically restored and placed into a conservation program, and 12 wetlands (4 in each region) were reference wetlands (i.e., non-drained wetlands in native prairie). We sampled each wetland six times throughout the summer (once in May, twice in June, twice in July, and once in August) with visual encounter surveys (Heyer et al. 1994),

amphibian funnel traps (Mushet et al. 1997), egg mass surveys (Crouch and Paton 2000), and automatic recorders (Bowers 1998, Heyer et al. 1994). In 2006, we repeated our 2005 sampling to obtain an additional year's data on the amphibian communities of each wetland; we also performed diurnal call surveys during our visits to each wetland. All data from



**Figure 2.** Areas of wetland site selection in the PPR of the United States. (A) Devils Lake, ND, (B) Morris, MN, and (C) Spirit Lake, IA.

both years have been entered into computer databases and are currently undergoing additional quality control checks in preparation for final analyses. Although final data analyses have not been conducted, data from our 2005 and 2006 sampling have produced the following **preliminary results**; note that some of the 2005 results may be slightly different from those provided in our 2005 progress report (Mushet et al. 2006). These differences reflect changes resulting from the inclusion of 2005 call survey data in our species occurrence estimates and may be adjusted further as additional quality control checks of call survey data are conducted.

- **Species detected in 2005 and 2006:**

- Northern leopard frog (*Rana pipiens*)
- Chorus frog (*Pseudacris maculata/triseriata*)
- Wood frog (*Rana sylvatica*)
- Gray tree frog (*Hyla versicolor/chrysoscelis*)
- Tiger salamander (*Ambystoma tigrinum*)
- Canadian toad (*Bufo hemiophrys*)
- Great Plains toad (*Bufo cognatus*)
- American toad (*Bufo americanus*)

- **Anurans:**

- ***In both 2005 and 2006, chorus frogs and northern leopard frogs had the highest rates of occurrence in our sample wetlands; Canadian and Great Plains toads had the lowest.***
  - In both 2005 and 2006, chorus frogs had the highest frequency of occurrence, being found in 95% and 75% of the wetlands, respectively. Northern leopard frogs had the second highest frequency of occurrence (70% in 2005 and 68% in 2006), followed by wood frogs (48% and 45%), and gray tree frogs (43% and 40%).
  - In 2005, American toads occurred in 48% of the wetlands, Canadian toads in 18%, and Great Plains toads in 10% of the wetlands. In 2006, American, Canadian, and Great Plains toads occurred in 43%, 20%, and 5% of the wetlands, respectively.

- **Salamanders:**

- *Tiger salamanders were found in 40% of the wetlands sampled each year.*

- **Species-habitat relationship:**

- *All frog species sampled occurred at a greater frequency in restored wetlands than in drained/farmed wetlands.*

- In 2005, chorus frogs occurred in all of the conservation program wetlands and in 83% of the drained/farmed wetlands. In 2006, northern leopard frogs also had a greater frequency of occurrence in conservation program wetlands (81%) versus drained/farmed wetlands (42%). Wood frogs occurred in 44% and 33% of the conservation program and drained/farmed wetlands, respectively, and grey tree frogs occurred in 50% and 33%, respectively. The above trends held true in 2006 with chorus frogs occurring in 94% and 42% of the conservation and drained/farmed wetlands, respectively; northern leopard frogs in 75% and 33%; wood frogs in 56% and 17%; and grey tree frogs in 44% and 33%, respectively.

- *Tiger salamanders occurred at a greater frequency in restored wetlands than in drained/farmed wetlands.*

- In both 2005 and 2006, tiger salamanders occurred in 56% of the conservation program wetlands. Tiger salamanders did not occur in farmed wetlands either year.

- *The occurrence of toads in restored and drained/farmed wetlands varied by species.*

- In 2005, American toads were found more often in conservation program wetlands than in drained/farmed wetland (63% and 25%, respectively). In 2006, the occurrence of American toads in conservation program wetlands dropped to 31% but still was greater than their occurrence in drained/farmed wetlands which remained at 25%.
- Canadian and Great Plains toads displayed a different trend than frogs, salamanders, or American toads. In 2005, Canadian toads occurred almost equally in conservation program and drained/farmed wetlands (19% and 17%

respectively). In 2006, Canadian toads occurred more often in drained/farmed wetlands (25%) than conservation program wetlands (19%). In both 2005 and 2006, Great Plains toads did not occur in conservation program wetlands. However, in 2005 this species occurred in 33% of the drained/farmed wetlands and 17% in 2006.

- **Potential differences among the three Glaciated Plains regions sampled:**

- *Amphibian occurrence in drained/farmed wetlands varied by geographical region.*
  - In North Dakota wood frogs, chorus frogs, and Great Plains toads occurred in drained/farmed wetlands both years; leopard frogs occurred in drained/farmed wetlands in 2005, but not in 2006.
  - In Minnesota, leopard frogs, wood frogs, chorus frogs, gray tree frogs, and Canadian toads occurred in drained/farmed wetlands in both 2005 and 2006.
  - In Iowa, only chorus frogs and American toads occurred in drained/farmed wetlands in 2005 and only American toads were found in these wetlands in 2006.
- *Wetlands sampled in the central Glaciated Plains supported the highest amphibian diversity.*
  - Wetlands sampled near Morris, Minnesota had the greatest diversity of amphibians (7 species) versus North Dakota (5 species) and Iowa (6 species).

## **PLANS FOR FY2007**

A detailed comparison of the amphibian communities of drained/farmed, restored, and reference wetlands in the PPR and development of logistic regression models that identify best fitting and most parsimonious models describing relationships between amphibian species presence/absence and explanatory variables will be completed as a Master's Thesis. This thesis will serve as the final report for this project and has an expected completion date of 31 December

2007. Although the information contained in the thesis will provide information valuable in identifying factors that contribute to sustainable amphibian populations in the PPR, the scope of the work was limited to a single wetland type (seasonal) and only three land-use categories (drained/farmed, restored, and reference). Thus, although providing important baseline information, the information will not be a complete representation of amphibian communities in the PPR and will fall short of providing the information needed to fully incorporate amphibian quantification and monitoring into the ILM framework. However, as identified in the original study plan (Euliss and Laubhan 2005), data collection, analysis, and interpretation activities associated with this project have been instrumental in identifying additional information needs and potential tools and techniques to meet these needs. Even more importantly, this project has helped generate interest in obtaining the additional information and developing tools and techniques needed to fully incorporate amphibian community quantification and monitoring into the ILM framework.

A work plan for what has been described as Tier 2 of the ILM Prairie Pilot is currently being drafted. This work plan includes the collection of additional information and refinement of tools and techniques needed to quantify and monitor amphibian communities within the ILM framework. In Tier 2 of the ILM Prairie Pilot, the use of frame-based modeling techniques (Starfield et al. 1993) and GIS tools, such as ecological niche factor analysis (Hirzel et al. 2002), will be explored as a means of incorporating amphibian community quantification and monitoring into the ILM framework. Tier 3 of the ILM Prairie Pilot will involve the establishment of an ILM framework across the PPR. Amphibian communities will be incorporated into this framework as one of the multiple and simultaneous goods and services to be quantified and monitored across the PPR landscape. Inclusion of amphibian communities within the larger ILM Prairie Pilot is largely a result of the effort and information gained from our current evaluation of the effects of conservation programs on amphibians in seasonal wetlands of the PPR's Glaciated Plain.

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