In the Midwest, Farm Ponds Work for Wildlife

By Melinda Knutson and Madelon Wise, USGS Upper Midwest Environmental Sciences Center

Small ponds in agricultural regions of the Midwest may provide important breeding habitat for frogs, toads, and salamanders, especially at-risk species. In a region where 95 percent of the land is privately owned, most in agricultural use, identifying high quality breeding habitats located on agricultural land may be the key to sustaining populations of many amphibian species.

To understand the public benefits of specific agricultural conservation practices, USGS is documenting the wildlife habitat values of constructed farm ponds. Researcher Melinda Knutson, of the Upper Midwest Environmental Sciences Center, La Crosse, Wisc., said that USGS began the farm pond study to identify farm management practices that benefit amphibians.

"The Minnesota legislature was concerned about amphibians because of the disappearance of the cricket frog from Minnesota and reports of malformed frogs in several counties," Knutson explained. "They supported our research to find out whether the thousands of small farm ponds in southeastern Minnesota, built with primarily with tax dollars, are helping amphibians or not."

Knutson and her USGS colleagues, William Richardson and Brent Knights, studied 40 ponds in southeastern Minnesota in 2000 and 2001. They found that despite intensive agricultural use adjacent to the ponds, these ponds harbor an abundance of frogs and toads. The scientists documented the presence of 10 species of amphibians, along with many other species of wildlife. The findings are at http://www.umesc.usgs.gov/ terrestrial/amphibians/mknutson _5003869.html.

The study's good news is that all types of farm ponds supported some amphibian species, and very few malformations were found. Similar amphibian species were observed in constructed farm ponds and natural wetlands; in fact, the scientists discovered that some species even seem to prefer constructed ponds. If appropriate buffer strips were in place, many frogs reproduced well in ponds surrounded by row crops like corn and soybeans.

Leopard frog tadpole survival was similar between ponds surrounded by row crops and natural ponds. The amphibians' reproductive success was, however, negatively affected by high concentrations of nitrogen, the presence of fish, and cattle wading in the pond.

In addition, recent laboratory studies by other research groups indicate that the weed-killer atrazine, commonly found in water in agricultural landscapes, can induce abnormal hormone levels and sexual development in amphibians, changes that are not evident in field studies. The farm pond study did not examine hormone levels of amphibians.

With additional USGS Amphibian Research and Monitoring Initiative funding, the team expanded the study to examine hazards to northern leopard frogs after they leave the breeding pond in the spring. By attaching radio transmitters to frogs, the team could follow frogs around as they moved between reeding ponds, summer foraging areas, and wintering sites. Haying practices in grasslands and road crossings were the primary agricultural hazards identified.

The USGS research has application to public policy because innovative revisions of the 2002 Farm Bill go beyond traditional price support and conservation reserve payments to farmers. The Conservation Security Program pays farmers to conserve soil, produce clean water, and provide wildlife habitat on working agricultural land. Documenting the wildlife values of small farm ponds may influence state and federal funding for these conservation practices.

"This was truly a collaborative project," said Knutson." Most of the ponds were on private agricultural land, whose owners generously allowed us access to study their ponds."

Funding for the project came from the USGS Center, the Legislative Commission on Minnesota Resources, and the USGS Amphibian Research and Monitoring Initiative. Researchers also worked with the University of Wisconsin, La Crosse; Simpson Colege, Iowa; the U.S> Fish and Wildlife Service; the USDA Natural Resources Conservation Service; as well as USGS hydrologists.

Shawn Weick, USGS Upper Midwest Environ-mental Sciences Center, showing USGS Director Dr. Chip Groat and Dr. Jeff Keay tadpoles from a Midwestern farm pond. James Nissen, of the US Fish and Wildlife Service, is

Above, Agricultural Farm Pond in southeastern Minnesota. USGS photo by Andy Kimball. At left, Eastern gray treefrog, (Hyla versicolor). Photos by Joel Jahimiak.