With its grassland habitat largely destroyed, does this threatened species have a future in the Prairie State?

Conservation & Management of the Imperiled Ornate Box Turtle

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Radio transmitters are helping biologists understand the population dynamics of the ornate box turtle.

For up to seven long months each year, beneath the sandy soils in Illinois, small populations of ornate box turtles brumate, the scientific term for reptile hibernation.

Because these populations are small and isolated, this imperiled species was listed as an Illinois threatened species in 2009 (see sidebar). With 99 percent of Illinois' original prairies destroyed, the decline in ornate box turtle numbers is attributed to the loss of habitat.

Ornate box turtles (*Terrapene ornata*) are long-lived, slow reproducing land turtles that have a solitary lifestyle. Historically, ornates ranged over larger areas of Illinois, but today's surviving populations are separated—and surrounded—by non-native and disturbed habitats. To help guide conservation and management efforts for this threatened species, understanding population dynamics, habitat use and home ranges in natural, disturbed and fragmented landscapes is critical.

In 2008, the U.S. Fish & Wildlife Service began a long-term research study in Carroll County to identify management strategies needed for the conservation of ornate box turtles.

The study began with a small, isolated population of ornates at the 360-acre Thomson Sand Prairie within the Upper Mississippi River National Wildlife & Fish Refuge. In 2009, the study area expanded to include the nearly 4,000-acre Lost Mound Sand Prairie, and the Department of Natural Resources joined as a project partner. Lost Mound, formerly Savanna Army Depot, historically had a large population of ornates, but decades of military activity combined with overgrazing by cattle reduced the population to a few individuals.

Two years of radio telemetry studies have provided important information on ornate ecology.

Nine turtles have been monitored since May 2008, and 28 radioed turtles studied during the 2009-2010 hibernation period—26 at Thomson and two at Lost Mound.

The Thomson turtles exhibit normal home ranges, averaging 7.5 acres with ranges from 2.5 to nearly 62 acres. The Lost Mound turtles originated from other areas (located 7 and 21 miles away), were released together in May

USFWS employee Rhoni Hartsock attaches a radio transmitter to one of the Illinois-threatened ornate box turtles.

The ornate box turtle was listed as threatened in Illinois in October 2009 due to a noted decrease in statewide status and distribution. Prior to 1980, the species was known from 38 counties, and recent records document occurrences in only 15 counties. While habitat loss is considered the majority threat to the species, roads and unsustainable collection by turtle enthusiasts also present serious threats. Possession of ornate box turtles, or other animals on the Illinois list of endangered and threatened species, without permit from the DNR, is a violation of the Illinois Endangered Species Protection Act. Typically, violations are a Class A misdemeanor, punishable by a fine of up to $2,500 and/or up to 12 months in jail. Violations also may be upgraded to a felony if the activity exceeds certain limits.

2009 and exhibit extended home ranges. The Lost Mound sub-adult male initially travelled 2 miles north before returning near the release site, having a summer home range of 360 acres. He then again travelled 2 miles north to hibernate. The old male initially travelled 1 mile south before returning near the release site, having a summer home range of 22 acres. He traveled 2 miles south to hibernate.

Understanding ornate box turtle hibernation patterns plays a critical role in development of a habitat management program, such as scheduling the timing of prescribed burns and other activities to ensure that they do not negatively impact the turtles or specific habitat features.

In 2008, all radioed turtles were in hibernation by October 26. In 2009, all were in hibernation by October 21; however, several days of 60-70 degree temperatures caused some turtles to emerge during the first week of November.

Interestingly, many of the radioed turtles returned to almost the exact same location to hibernate each year. Turtles began to emerge from hibernation on April 16, 2009 and within only a few days most turtles had emerged. One adult female hibernated for seven months.

An experimental Headstart Project was implemented in 2009 to re-establish ornate box turtles at Lost Mound. Headstarting is the process of raising hatchlings in captivity until they are 10 months old, allowing them to obtain a larger body size and advanced body development that decreases the chances of hatchling predation, a major cause of mortality.

The four eggs obtained in 2009 were successfully hatched at Niabi Zoo, one of the many organizations working to conserve and protect this imperiled species.

(Photo by Jennifer Ryan, Assistant Zoo Director Niabi Zoo.)

It takes a community

It takes the skills and resources of a community of partners to undertake a project of this magnitude. Fortunately, the number and diversity of partners is increasing.

- Iowa State University's "Turtle Camp" began studies at the Thomson Sand Prairie in the early 1990s and their long-term population data has provided important information. Since 2007, inner-city high school students from ISU's "Turtle Camp" Ecology Program have assisted in ornate field work.
- DNR is expanding their role to actively monitor two sand prairies.
- Niabi Zoo is providing animal care for the Headstart Program.
- The Illinois Natural History Survey's Lost Mound Corps of Discovery participants have provided hundreds of volunteer hours searching for ornates with hand-held radio receivers.
- The U.S. Army's Construction Engineering Research Laboratory in Champaign has provided 10 Automatic Receiving Units to enhance the radio telemetry study.
- In 2008, the West Carroll Intermediate School in Thomson began participating in a USFWS Nature of Learning program and adopted a 4th grade education curriculum on the prairies of northwest Illinois.
- Further expansion of the project may involve private landowners in the vicinity of the populations.

Four eggs were obtained from a gravid female at the Thomson Prairie on June 8 and taken to the Niabi Zoo in Coal Valley. All four eggs hatched the first week of August, and the turtles were cared for at the zoo until their release at Lost Mound in the spring of 2010. Radios affixed to these turtles for a minimum of two years after release will provide valuable information.

Information from the nine radioed turtles has provided information on the size of home ranges and length of brumation (hibernation).

The project will greatly expand in 2010 by a number of factors:

- The number of sites to be monitored will increase from two to seven, including five federal and two state-owned sand prairies in northwest Illinois.
- A population viability model and other analyses will be performed to determine the long-term viability of turtles at each site.
- The number of radioed turtles will increase from 28 to 60.
- Telemetry equipment will be upgraded from hand-held receivers to Automatic Receiving Units, providing continuous monitoring capabilities.
- Field searches for ornates will become more efficient by using the "Tennessee Turtledogs," six specially trained Boykin spaniels that have worked on research and urban development projects in the southeast and mid-Atlantic states locating box turtles.

In addition to being recently listed as threatened in Illinois, the Illinois Wildlife Action Plan lists the ornate box turtle as one of the species in greatest need of conservation. This project may provide important information for recovering the species, and assessing the feasibility of re-establishing a viable population of ornates at the Lost Mound Sand Prairie—the largest remnant sand prairie in Illinois that also may be ideal habitat for repatriating this species.

Understanding the population dynamics and habitat utilization of ornate box turtles in northwest Illinois, and identifying appropriate prairie management techniques, will serve to conserve and protect this imperiled species.

(Photo by Eric Tomasovic.)

(Photo by Rhoni Hartsock.)

Jeramie Strickland monitors the location of an ornate box turtle as part of the radio telemetry study.

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