Federal scientists assisting with collection of Topeka shiners

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Acknowledgements:
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Kansas Department of Wildlife and Parks
Missouri Department of Conservation
United States Fish and Wildlife Service
Kingsbury Family Foundation for Endangered Wildlife

Topeka shiner photos by Garold Sneegas

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Kansas Aquatic Mesocosm Program

Topeka Shiner Behavior Research and Captive Breeding Program

Kansas Biological Survey and University of Kansas

Kansas Aquatic Mesocosm Program, aerial view

Established in 1977 and now with more than 200 outdoor tanks and earthen ponds, the Kansas Aquatic Mesocosm Program is used to study the biology and ecology of aquatic plants and animals as well as the physical and chemical conditions of aquatic habitats. This work continues to support the management and development of water resources in the state and region.

View of one of the ponds

Current projects include:

- growth and behavior of native fish species
- changes in biota with different pond and reservoir management practices
- aerial remote sensing of aquatic environmental conditions
- fate and effects of chemical contaminants in aquatic habitats
- reservoir environment and management with continuing sedimentation

Experimental ponds

Experimental tanks

Seining for Topeka shiners in Deep Creek, KS

In May 2002, 291 Topeka shiners (*Notropis topeka*) were collected from Deep Creek near Manhattan, KS, under the supervision of the US Fish and Wildlife Service. These fish were then placed in tanks and ponds that had been prepared with gravel substrate to simulate natural stream breeding sites. Orange-spotted sunfish (*Lepomis humilis*) were also added since it appears

Tank array, Kansas Aquatic Research Station

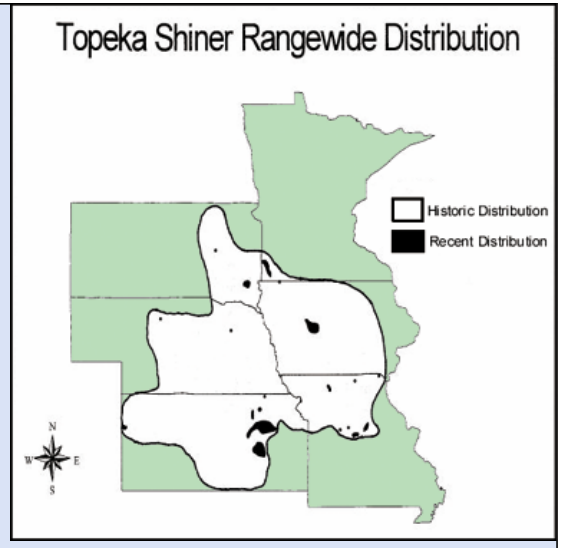
(though is not confirmed) that Topeka shiners share the breeding nests of the larger and more aggressive sunfish, using them to better guard eggs and young from intruders.

Also in 2002 most of the remaining Topeka shiners (94 from an isolated and genetically different population in Willow Creek near the Kansas/Colorado border were relocated to our aquatic facility by the US Fish and Wildlife Service. These fish were to be maintained and propagated until excessive predation by largemouth bass could be reduced in this less than one-acre natural site or a new, more protected site could be found.

Topeka shiner (Notropis topeka)

The breeding behaviors of male and female Topeka shiners in the tanks and ponds are closely examined and also documented with underwater cameras during the breeding season from May through August each year. Tanks and ponds with and without orange-spotted sunfish are used to determine the importance and exact interactions of this relationship. From these studies and from observations at natural stream sites, reasons are being sought for the continuing fragile existence of this federally endangered fish in Kansas streams and elsewhere.

Orange-spotted sunfish (left) and Topeka shiner sharing a nest



In 2002 nearly 600 progeny were produced and harvested from the initial year of this first successful large-scale Topeka shiner captive breeding program in North America. In 2003, by contrast, having refined our methods based on new knowledge gained from the previous year we were able to produce nearly 10,000 young shiners. Our captive breeding methods, as well as a number of fish, are now provided to wildlife conservation programs and researchers through the region. In 2003 the Missouri Department of Conservation Warsaw Fish Hatchery received 106 of our fish; and, using our breeding methods, they were able to hatch and rear a large number of Topeka shiners that were distributed to a number of national and regional conservation and research organizations. Many of these fish were returned to us as Missouri began to work with their own populations. Our work with Topeka shiners at the research station and in natural stream sites continues to focus on behavior and ecology, and we also continue to refine captive breeding methods to help establish and support larger-scale breeding programs in the region.

Endangered and Threatened Species

What is a "federally endangered" species?

A federally endangered species is "one that is in danger of extinction throughout all or a significant portion of its range, as a result of

- habitat change, reduction, or destruction;
- overhunting or excessive capture;
- disease or predation;
- lack of regulation or management, or
- other natural or manmade factors." (US Fish and Wildlife Service)

Federally endangered species are protected under the Endangered Species Act of 1973, which

- restricts taking, transporting, or selling of a species
- allows the development and application of recovery plans;
- provides protection for a species' habitat; and
- provides federal aid to state wildlife agencies under cooperative agreements.

What is a "federally threatened" species?

A threatened species is "one that is likely to become endangered in the foreseeable future." (US Fish and Wildlife Service)

Are there other federally endangered fish in Kansas?

Yes. In addition to the Topeka shiner, the pallid sturgeon (*Scaphirhynchus alba*) and the Arkansas River shiner (*Notropis girardi*) are federally endangered. The Neosho madtom (*Noturus placidus*) is a federally threatened fish.