

Cimarron Basin High Priority Issue

Arkansas River Shiner

January 2009

Issue

A portion of the Cimarron River is listed as critical habitat for the federally threatened Arkansas River Shiner, by the U.S. Fish & Wildlife Service. Coordination is needed among local landowners and the federal and state agencies responsible for managing the Arkansas River Shiner to identify solutions that may improve the condition of the species' habitat, to promote and restore healthy ecosystems, to maintain the integrity of landowners' rights, and to determine if the fish is extirpated from Kansas and if recovery is possible.

Description

The Arkansas River shiner (*Notropis girardi*) is a small minnow with a rounded snout and small mouth. Shiners are usually sandy above and silver laterally, grading to white on the belly. Dorsal scales are typically outlined with dark pigment. The shiner feeds mostly on aquatic invertebrates and spawns during the months of May, June and July in conjunction with flows following heavy rains. Eggs drift with the current during high flows until hatching occurs. If conditions are favorable, the shiner may reproduce several times during this period.



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The U.S. Fish and Wildlife Service (USFWS) listed the Arkansas River shiner as threatened under the Endangered Species Act (ESA) in November 1998. Prior to listing, USFWS stated that limited survey data suggested the shiner only occupied 205 miles of its historic range. Historically, almost the entire Cimarron River main stem and several major tributaries were inhabited by the shiner. The shiner was last captured from the Cimarron River in August 2004 near Guthrie, Oklahoma by SWCA Environmental Consultants. A recent study of fish in Kansas reported that "Due to the lengthy absence of reported collections of the Arkansas River Shiner, *Notropis girardi*, from Kansas (and the attendant lack of probab-

ity of reproductive populations), we propose its addition to the list of extirpated fishes in Kansas."⁽⁵⁾

Protection of the Species

The ESA requires that when a federal action (such as funding through grants) may affect a listed species, the responsible agency or individual must enter into consultation with the USFWS. Activities on federal lands or federal actions that may affect the Arkansas River shiner or its critical habitat will require consultation with the USFWS. Individuals, organizations, states, local and tribal governments and other non-federal entities are affected by the designation of critical habitat only if their actions occur on federal lands, require a federal permit, license or other authorization, or involve federal funding.

Portions of the critical habitat designation for the federally threatened Arkansas River Shiner include the Cimarron River in Clark, Comanche, Seward and Meade counties from the US Highway 54 bridge downstream to the Kansas-Oklahoma border (Figure 1).

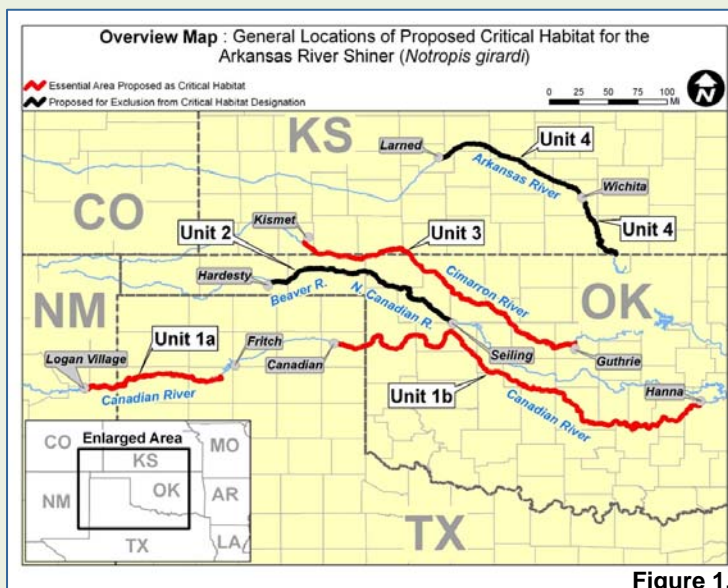


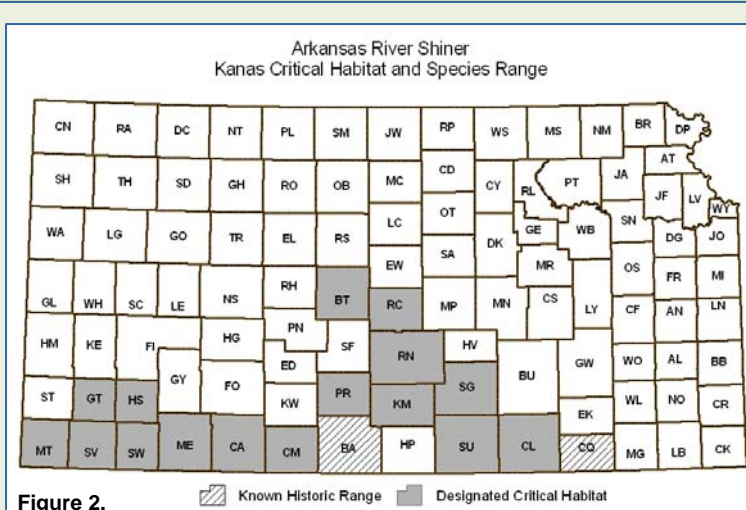
Figure 1.

The Arkansas River shiner receives protection in Kansas under the Kansas Nongame and Endangered Species Conservation Act of 1975 (Figure 2). Any time an eligible project is proposed that will impact the species preferred habitats within its probable range, the project sponsor must contact Kansas Department of Wildlife and Parks. Kansas Critical Habitat, as described by Kansas Administrative Regulations, for the Arkansas River shiner in the basin includes all reaches of the main stem Cimarron River located within the state.

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Reasons for Species Decline

Declines in the Arkansas River Shiner populations cannot be isolated to a single factor; any combination of changes may have contributed to a reduction in the species' range and abundance. Reductions in streamflow and the occurrence and magnitude of high flow events, most likely produced by the diversion of water for irrigation have altered the nature of streambeds impacting the opportunities for shiner spawning.

Competition with introduced fishes also contributed to diminished distribution and abundance of the shiner in the Cimarron River. Incidental capture of the shiner and potential introductions of non-native minnows during pursuit of commercial baitfish species may contribute to reduced population sizes. The adverse affects of drought and other natural factors may have also contributed to the species' decline in this region.

Invasion of phreatophytic non-native plants, such as tamarisk (salt cedar) and Russian Olive, have further depleted streamflow and produced water quality changes that are not favorable to the Arkansas River Shiner. Naturally occurring saline inflows are concentrated by the high water use of phreatophytes. In some areas, tamarisk growths have narrowed the stream channels and resulted in deepening of the streams.

Cimarron River and High Plains Aquifer Conditions

Ground water table declines in the Ogallala-High Plains aquifer caused by high-volume, consumptive pumping of ground water for irrigation have occurred near the Cimarron River in southwest Kansas. These water level declines have decreased or eliminated ground water dis-

charge to the perennial stretches of the river, thereby decreasing flow to or shortening the length of the perennial reaches. The primary area of perennial stretch shortening has occurred in northwest Seward County. The main location of current decrease in perennial streamflow is in southeast Seward County and southwest Meade County.⁽²⁾

Saltwater derived from mineral dissolution from the Permian bedrock intrudes into the overlying Ogallala-High Plains aquifer in southeast Seward County and southwest Meade County. Saline water that intrudes to the Ogallala-High Plains aquifer affects the usability of water in parts of the aquifer for irrigation and domestic use due to the high sodium and chloride contents. The saline water in the High Plains aquifer discharges into the overlying Cimarron River in these same counties. The river generally increases in salinity through this area. The decrease in fresh ground water discharge, caused by declines in the High Plains aquifer upstream of the saline water intrusion has resulted in an increase in the salinity of the river.⁽³⁾

While the degree of sensitivity of the Arkansas River shiner to salinity of the water in its habitat is not well defined, studies have found that more species are present in water of lower conductivity.⁽¹⁾ USFWS has indicated that water quality degradation within the river basin can cause localized impacts to shiner populations.⁽⁷⁾

The presence of invasive non-native, salt-loving plants such as tamarisk may contribute to the degradation of water quality in the Cimarron River in Kansas. Salt cedar growths consume larger quantities of water than native vegetation and draw salts up to the surface from deep in the soil. These salts are secreted on the plants' leaves,



Tamarisk Control. Photo courtesy Susan Metzger, KWO

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which fall every year and give rise to increasingly saline surface and shallow soils. Salt cedar will tolerate this accretion of salt up to levels of 36,000 Mg/L, while native growths can only tolerate salinities on the order of 1,500 Mg/L.⁽¹⁾ When the area of growth is inundated by flooding or river rises, the salt is undoubtedly dissolved in the floodwaters and increases the salinity of the streamflow.

Management Plans

The Canadian River Municipal Water Authority (CRMWA) has prepared an approved Arkansas River Shiner Management Plan for the Canadian River in Texas and New Mexico.⁽¹⁾ The Oklahoma Farm Bureau has drafted a similar management plan for the Canadian and Cimarron Rivers. The purpose of these plans is to improve the condition of the Arkansas River Shiner habitat and to promote and restore healthy ecosystems. Additional goals of these plans include the exclusion for the need to designate some portions of the critical habitat and the eventual de-listing of the Arkansas River Shiner upon reestablishment of the species.

Recovery plans can be prepared by USFWS to list the specific actions needed to reverse the declines of a species. A recovery plan for the Arkansas River Shiner in Kansas has not yet been developed.

Opportunities for Watershed Improvement

Control of salt cedar will encourage sustained river flows by preventing peak flood flows from being excessively reduced as the floods progress downstream. If the shiner is present and viable in the Cimarron River in Kansas, this should help induce spawning and provide for more efficient egg transport during spawning. Control of salt cedar will also restore more natural flow regimes and increase the daily volume of water in the stream. Water quality will be improved by eliminating the excess salinity caused by the salt cedar.

There are many resources in Kansas that promote conservation and watershed ecosystem health, including the Kansas Watershed Restoration and Protection Strategies (WRAPS). Watershed partnerships such as WRAPS in the [Cimarron basin](#) could form coordinated approaches for long-term management of tamarisk and reestablishment of native vegetation, as well as, other activities that may improve the quality and quantity of water conditions in the basin.

Recommended Actions

1. Determine, monitor and document the status of Arkansas River shiner populations in Kansas.
2. Pursue opportunities with the U.S. Fish and Wildlife Service to delist the Kansas Cimarron River as critical habitat for the Arkansas River Shiner.
3. Evaluate the riparian and stream conditions of the Cimarron River within the critical habitat reach, and seek opportunities to protect and restore the ecosystem health.
4. Complete a hydrologic Modflow model of the Groundwater Management District No. 3 and determine the ground water – surface water conditions along the Cimarron River within the critical habitat reach.
5. Target state and privately-funded tamarisk control projects to the Cimarron River within the critical habitat reach to improve the riparian conditions.
6. Continue facilitating discussion and cooperation between local property owners, U.S. Fish and Wildlife Service, Kansas natural resource agencies and organizations and other interested stakeholders.



Point of Rocks Outcrop Overlooking Cimarron River
Photo courtesy Kansas Geological Survey

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Resources

1. Canadian River Municipal Water Authority. June 2005. *Arkansas River Shiner (Nortopis girardi) Management Plan for the Canadian River from U.S. Highway 54 at Logan, New Mexico to Lake Meredith, Texas.*
2. Kansas Geological Survey. June 2005. Open File Report 2005-26. *Hydrogeologic Characteristics and Hydrologic Changes in the Cimarron River Basin, Southwestern Kansas.*
3. Kansas Geological Survey. September 2005. Open File Report 2005-27. *Water Quality in the High Plains Aquifer and the Cimarron River in Seward and Meade Counties, Kansas.*
4. Oklahoma Farm Bureau Legal Foundation. August 2005. *Arkansas River Shiner (Nortopis girardi) Management Plan for Portions of the Canadian River in Oklahoma and Texas and the Cimarron River in Oklahoma and Kansas.*
5. Haslouer, Stephen G., Kansas Dept of Health and Environment, Mark E. Eberle, David R. Edds, Keith B. Gido, Chris S. Mammoliti, James R. Triplett, Joseph T. Collins, Donald A. Distler, Donald G. Huggins and William J. Stark. 2005. *Current status of native fish species in Kansas.* Kansas Academy of Science. quote from p 44.
6. United States Fish and Wildlife Service, 1998: Final Rule to List the Arkansas River Basin Population of the Arkansas River Shiner (*Notropis girardi*) As Threatened (Federal Register/Vol. 63 No. 225/ Monday November 23, 1998).
7. United States Fish and Wildlife Service. 2001: Final Designation of Critical Habitat for the Arkansas River Basin Population of the Arkansas River Shiner (Federal Register /Vol 66, No. 65/ Wednesday, April 4, 2001).



Tamarisk Shrub.