2009: Return of the Fish

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In November 2009, representatives from Friends of the Santa Cruz River (FOSCR), Arizona Game and Fish Department (AGFD), U. S. Fish and Wildlife Service (USFWS) and the Sonoran Institute conducted fish surveys at six sites along the Santa Cruz River (SCR) between Nogales and Tubac. These sites (upstream to downstream) included Nogales Wash at Ruby Road, Rio Rico Bridge, Palo Parado, Santa Gertrudis, Tubac Bridge, and Chavez Siding. Nogales Wash is a tributary of the mainstem Santa Cruz River and is located upstream of the Nogales International Wastewater Treatment Plant (NIWWTP).

FOSCR has recognized that little fish and macroinvertebrate information has been collected consistently in recent years from the Mexican border to the end of perennial flow, and has been working with AGFD and USFWS to establish a consistent monitoring program. FOSCR has been instrumental in instituting a more complete survey for all species. The federally endangered Gila topminnow (*Poeciliopsis occidentalis*) has been collected in this section of the SCR, but none have been collected in the mainstem SCR since 2003. Previous sampling by AGFD and USFWS has focused on collecting Gila topminnow. Monitoring the health and diversity of the macrofauna provides yet another tool for gauging the health of the river. The health of the river in turn will affect the abundance of other terrestrial plants and animals that depend on it.

In recent years, fish surveys have been fairly dismal. In 2007 and 2008 when surveys were conducted, very few fish were observed. In 2007, two native longfin dace were collected in Nogales Wash and several others not collected were observed at that location. In 2008, results were similarly disappointing, with two native longfin dace (*Agosia chrysogaster*) collected in the mainstem SCR while none were collected in Nogales Wash. The nonnative and usually ubiquitous western mosquitofish (*Gambusia affinis*) was conspicuously absent except for one that was captured in 2007.

Fish surveys conducted this year took place after improvements were made to the NIWWTP in June. These improvements appear to have had a significant impact on the ability of fish and macroinvertebrates to survive in the river. Two hundred thirty longfin dace were collected at the Nogales Wash site, and a total of 142 were collected at the five mainstem sites combined. Numerous nonnative western mosquitofish were collected at the three downstream sites that tended to have slower flows.

A study conducted by USFWS in 1997 concluded that un-ionized ammonia was the primary toxicant responsible for fish mortality. The fish that are native to this stretch of river are incredibly adapted to environmental extremes such as drought and high temperatures but have no defenses against this and other types of pollutants. Representatives from FOSCR and the Sonoran Institute have recorded improved water quality since the NIWWTP improvements including reduced levels of un-ionized ammonia. Even though there is still little species diversity, fish abundance in the river has obviously improved. The improvements to the NIWWTP have opened up the possibility for Gila topminnow and other native fish present higher in the watershed to disperse and persist lower in the system.