NONPOINT SOURCE SUCCESS STORY

Arizona

Implementing Septic and Cesspool Upgrade Projects Reduces Total Nitrogen Levels in Tonto Creek

Waterbodies Improved

Two reaches of Tonto Creek were listed on the state's 1996 Clean Water Act (CWA) section 303(d) list of impaired waters for nutrients due to pollution from cesspools and leaking septic systems. Beginning in 2007, with the help of CWA section 319 funding, Gila County worked with local landowners to upgrade or replace failing septic systems that were contributing partially treated effluent to Tonto Creek. As a result, nitrogen levels decreased enough to remove total nitrogen from the list of impairments for both reaches of Tonto Creek in 2016.

Problem

Upper Tonto Creek is in the Tonto National Forest in Gila County, Arizona (Figure 1). Tonto Creek flows approximately 73 miles before draining into Theodore Roosevelt Lake. The Arizona Department of Environmental Quality (ADEQ) added two reaches (segments AZ15060105-013A_00 [8.1 miles long] and AZ15060105-013B_00 [8.5 miles long]) of Tonto Creek to the state's CWA section 303(d) list of impaired waters in 1996 for nutrients (due to pollution from cesspools and leaking septic systems). *Escherichia coli* was added as a source of impairment in 1998.

Total maximum daily load (TMDL) reports were completed in 2004 for *E. coli* and in 2005 for total nitrogen. The TMDL identified several nonpoint sources as contributors to total nitrogen concentrations in Tonto Creek including recreational uses and unincorporated communities/summer home clusters.

The TMDL was written for the annual mean standard for total nitrogen, which is 0.5 milligrams per liter (mg/L) (the single sample maximum [SSM] is 2 mg/L). The total nitrogen standard is not tied to a particular designated use but is instead intended to protect Theodore Roosevelt Lake from eutrophication. The critical condition for total nitrogen in Tonto Creek is the late spring to early fall recreation season. The Arizona NEMO's 2008 *Watershed-Based Plan: Salt Watershed*, researched and written by the University of Arizona, gives an excellent overview of the watershed in which the Tonto Creek is located.

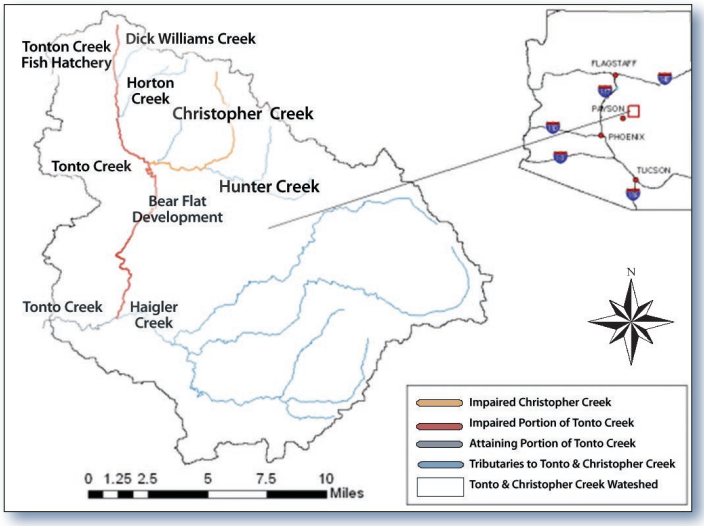

Figure 1. The Tonto Creek watershed is in central Arizona.

Story Highlights

ADEQ provided funding through three CWA section 319(h) grants for water quality improvement projects in Tonto Creek (Figure 2). All three projects involved upgrades to septic systems or on-site sewer projects. The first grant funded a two-phase project by Gila County Division of Health and Human Services in 2007. In the first phase, numerous septic systems were upgraded or replaced, including two cesspools close to the Tonto Creek and four failing septic systems that were discharging into Thompson Draw, a tributary of Tonto Creek. The second phase of the Gila County septic system upgrade project was completed 2 years after the first phase. Phase two included upgrading

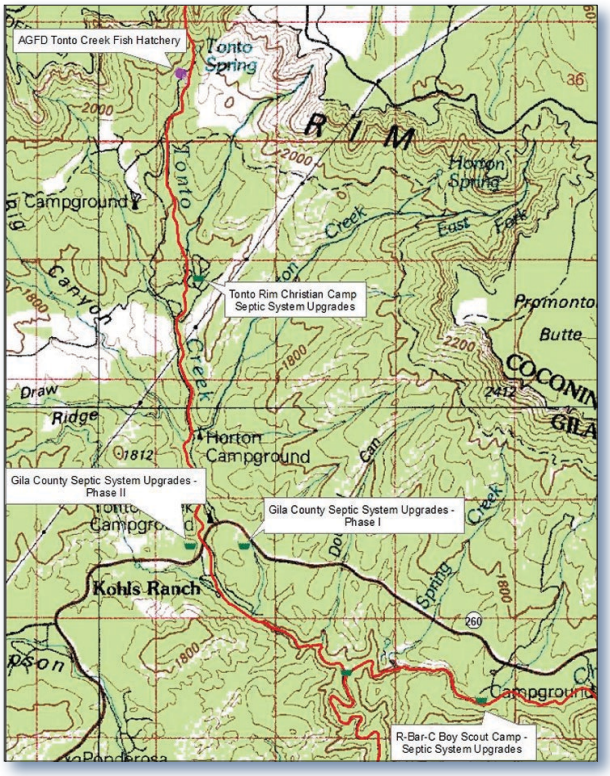

Figure 2. Septic system upgrades were completed in several watershed locations.

Figure 3. This home had a failing septic system that was upgraded.

or replacing five septic systems on or near the creek (Figure 3). The third, and most recent, project was the Tonto Rim Christian Camp Water Quality Improvement Project on Tonto Creek in 2010. The entire septic system was replaced and upgraded.

Table 1. Total nitrogen annual mean in Tonto Creek stream reaches 13A and 13B.

Tonto Creek reach #	Annual mean total nitrogen (in mg/L) [a]	
	2013	2014
AZ15060105-013A_00	0.499	0.405
AZ15060105-013B_00	0.406	0.308

[a] Data from the U.S. Environmental Protection Agency's Grant Reporting and Tracking System (GRTS) database.

Additionally, Arizona Game and Fish Department made gradual upgrades to the Tonto Creek Fish Hatchery outfall to reduce nutrient loading into Tonto Creek. The upgrades included improving wetlands at the outfall, reducing the number of large fish in the "show pond," and improving the settling tanks. These upgrades did not use ADEQ CWA section 319(h) grant funds because they are related to meeting Arizona Pollutant Discharge Elimination System permit conditions.

Results

Effectiveness monitoring occurred from 2006 to 2014. After analyzing the 2013 and 2014 data, there is evidence to support removing both reaches of Tonto Creek (reaches 13A and 13B) from the impairment list for total nitrogen. Data showed that total nitrogen levels in both reaches were below the total nitrogen standard of 0.5 mg/L as an annual mean in both 2103 and 2014 (Table 1). As a result, AZDEQ removed nitrogen from the list of impairments for both reaches of Tonto Creek in 2016. The reaches will remain listed as impaired for phosphorus and *E. coli*.

Partners and Funding

Partners for these projects include Gila County, Kohls Ranch Homeowners Association, and Tonto Rim Christian Camp. Gila County's Phase I project included $168,311 in match (staff time and supplies). For Phase II, Gila County provided $172,200 in match (staff time and supplies). The Tonto Rim Christian Camp matched their nonpoint source grant with $98,273 from various sources. The matching funds were tied to a total of $740,000 in CWA section 319 funding.

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