NONPOINT SOURCE SUCCESS STORY

Oklahoma

Conservation Partnership Improves Water Quality in Bird Creek (Hughes County)

Waterbody Improved

High ammonia, total dissolved solids (TDS), and pH levels resulted in impairment of Bird Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002 (for pH), 2010 (for ammonia) and 2012 (for TDS). Pollution from grazing lands contributed to these impairments. Implementing conservation practice systems (CPs) to promote better land management decreased pH, ammonia, and TDS levels in the watershed. As a result, Oklahoma removed the pH impairment in 2006 and the ammonia and TDS impairments in 2016 from its CWA section 303(d) lists. Bird Creek now fully supports its warm water aquatic community (WWAC) and partially supports its agricultural (AG) designated beneficial uses.

Problem

The Bird Creek watershed covers approximately 22,000 acres in Hughes and Seminole counties in southeastern Oklahoma (Figure 1). Land use in the watershed is about 69 percent hay grazing lands and 28 percent forest land. A small percentage of agricultural lands are cropped in the watershed, and there are four small hog-growing facilities. A portion of Holdenville, Oklahoma (population 5,547), lies in the watershed, although the monitoring station was placed upstream of the tributary draining the town to avoid potential point source impacts.

Water quality sampling in the late 1990s determined that challenges with grazing land management contributed to a 2002 listing of a 13.81-mile segment of the stream as impaired by pH when at least 13 percent of pH readings fell outside acceptable pH limits. A stream is considered impaired for pH if more than 10 percent of samples fall outside a range of 6.5–9 standard pH units. Later, samples collected from 2004 through 2009 and assessed in 2010 found that at least 21 percent of ammonia concentrations were outside acceptable limits for toxicity based on temperature and pH. A stream is considered to violate standards for ammonia if more than 10 percent of samples are outside acceptable limits.

Finally, in the 2012 assessment, at least 12 percent of TDS samples exceeded the water quality standard. A stream is considered impaired by pH when more than

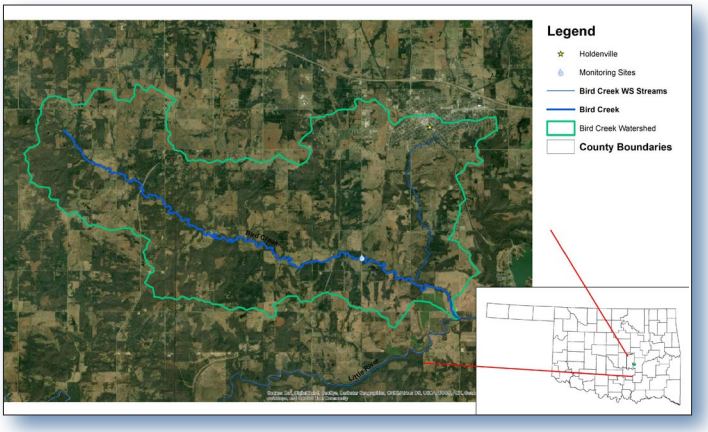

Figure 1. The Bird Creek watershed is in Hughes and Seminole counties, Oklahoma.

10 percent of samples are higher than 700 milligrams per liter (mg/L). Based on these results, Oklahoma added segment OK520800010050_00 to the CWA section 303(d) lists in 2002 (for pH), 2010 (for ammonia), and 2012 (for TDS) for nonattainment of the WWAC and AG designated beneficial uses.

Story Highlights

More than 30 landowners in the watershed worked with the Hughes and Seminole county conservation districts, the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), and the Oklahoma Conservation Commission (OCC) to implement CPs through various programs, including OCC's Locally Led Cost Share Program (LLCP) and Oklahoma

NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP) and general conservation technical assistance program.

From 2000 to 2018, landowners improved pasture, hay meadows and animal waste management, which reduced runoff of ammonia, salts and other pollutants by improving grazing land vegetative cover and improving animal waste and nutrient management. Landowners implemented brush management (3 acres [ac]), upland wildlife habitat management (338 ac), contour farming (17 ac), conservation crop rotation (110 ac), fencing (17,807 feet), forage harvest management (579 ac), firebreaks (5,280 feet), pasture and hayland planting (199 ac), prescribed grazing (2,875 ac), filter strips (1 ac), no-till (110 ac), nutrient management (1,749 ac), critical area planting (17 ac), and pest management (1,496 ac). Partners also installed two pumping plants, one water well, 12 ponds, and 13,200 feet of irrigation pipeline and three sprinkler systems. Programs funded 20 tons of hog waste transfer off-farm and waste recycling on 161 ac. At least 950 ac in the watershed were enrolled in the CSP program, which recognizes producers for continued progress in meeting conservation goals.

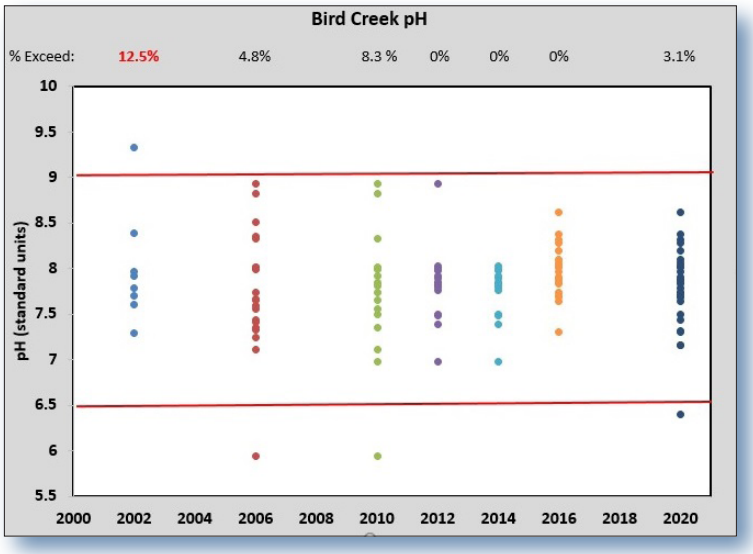

Figure 2. pH levels in Bird Creek improved with installation of CPs.

Results

The OCC documented improved water quality in Bird Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program. By 2006, pH exceedances had dropped to 5 percent and remained at similar or lower levels through the 2020 assessment period (Figure 2). By 2016, ammonia and TDS exceedances had dropped to less than 10 percent and therefore were within allowable limits. Based on these data, Oklahoma removed Bird Creek from the CWA section 303(d) list for pH in 2006 and ammonia and TDS in 2016. Bird Creek now fully supports its WWAC and partially supports its AG beneficial uses.

Partners and Funding

The OCC monitoring program is supported by the U.S. Environmental Protection Agency's (EPA's) CWA section 319 funding at an average annual statewide cost of $1 million. Approximately $500,000 in EPA 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately $252,675 of these federal and state matching funds have been devoted to Bird Creek.

From 2000 to 2018, NRCS supplied more than $25,000 for CP implementation in Oklahoma through EQIP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Additional funds were provided through CSP. Finally, the OCC, Seminole and Hughes county conservation districts and landowners funded more than $26,067 worth of CPs (at least $12,137 of which was funded by landowners through the LLCP).

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For additional information contact:

Shanon Phillips
Oklahoma Conservation Commission
405-522-4728 • shanon.phillips@conservation.ok.gov