



# NONPOINT SOURCE SUCCESS STORY

## Oklahoma

### Managing Rangeland and Cropland Improves Water Quality in Timber Creek

#### Waterbody Improved

Low dissolved oxygen (DO) concentrations resulted in impairment of Timber Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2012. Pollution from rangeland and cropland contributed to this impairment. Implementing conservation practice systems (CPs) to promote better land management decreased runoff of pollutants and resulted in improved water quality. As a result, Oklahoma removed the DO impairment in 2018 from its CWA section 303(d) list. Timber Creek now fully supports its warm water aquatic community (WWAC) beneficial use.

#### Problem

The Timber Creek watershed covers approximately 40,024 acres (ac) in Beckham and Roger Mills counties and drains into the North Fork of the Red River (Figure 1). Land use in the watershed is about 54% rangeland, 18% cropland, and 20% shrub land. Much of the shrub land is found in riparian areas where channel incision prevents easy removal of woody species. Included in the watershed are seven upstream flood control structures built by the Natural Resources Conservation Service (NRCS) to reduce flooding in the Red River basin. Much of the watershed has been terraced to help reduce soil loss of the highly erodible soils, but gullies and eroded areas are still prevalent. The primary agricultural crops are cattle and wheat, and at least eight natural gas wells are operating in the watershed.

Water quality monitoring in the early 2000s determined that challenges with rangeland and cropland management contributed to a 2012 listing of the 12.01-mile stream as being impaired for DO, when 12% of samples were below acceptable criteria (Figure 2). A WWAC waterbody is considered impaired for DO if more than 10% of samples fall below the "not attaining" criteria of 5.0 milligrams per liter (mg/L) from April 1 through June 15 or below 4.0 mg/L during the remainder of the year. Based on these results, Oklahoma added segment 311510010090\_00 to the CWA section 303(d) list in 2012 for nonattainment of the WWAC beneficial use.

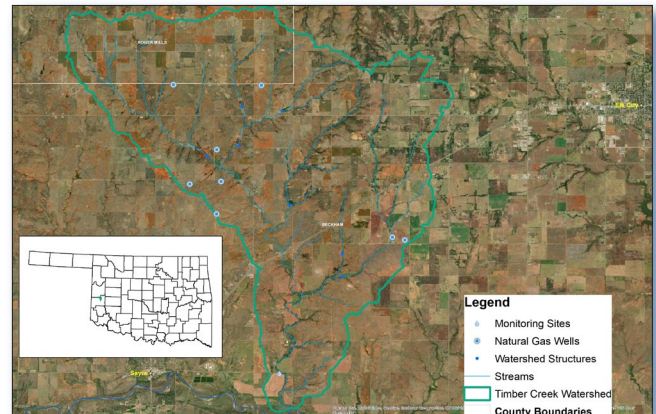


Figure 1. Timber Creek is in western Oklahoma.

#### Story Highlights

Approximately 30 landowners in the watershed worked with the North Fork of the Red River and Upper Washita conservation districts, NRCS, and the Oklahoma Conservation Commission (OCC) to implement CPs through Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and general conservation technical assistance program; the Farm Service Agency's Conservation Reserve Program (CRP); and the OCC's State Cost Share Program (SCSP). From 2002 to 2020, landowners improved cropland and grazing land management, which reduced runoff of pollutants by increasing vegetative cover and increasing infiltration. Landowners implemented access control (46 ac), brush management (165 ac), conservation cover (582 ac),



Figure 2. Monitoring along Timber Creek.

conservation crop rotation (68 ac), cover crop (258 ac), fence (7,805 feet [ft]), forage harvest management (341 ac), groundwater testing (2), heavy use area protection (2.9 ac), livestock pipeline (156 ft), no-till (115 ac), nutrient management (797 ac), pasture and hayland planting (924 ac), pest management (424 ac), prescribed grazing (1,483 ac), rangeland planting (46 ac), reduced tillage management (216 ac), strip till residue management (112 ac), upland wildlife habitat management (454 ac), watering facilities (5), and water wells (5). In addition, at least 1,530 acres were enrolled in CSP, indicating that natural resources concerns had been previously addressed and enhancement management was occurring on those acres.

## Results

The OCC documented improved water quality in Timber Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program. By 2018, DO concentrations had improved and less than 8% were below acceptable criteria (Figure 3). Based on these results, Timber Creek was removed from the 2018 CWA section 303(d) list and now fully supports its WWAC beneficial use (Figure 4).

## Partners and Funding

The OCC monitoring program is supported by U.S. Environmental Protection Agency's (EPA's) CWA section 319 funding at an average annual statewide cost of \$1 million. Approximately \$600,000 in EPA 319 funds support statewide water quality educational

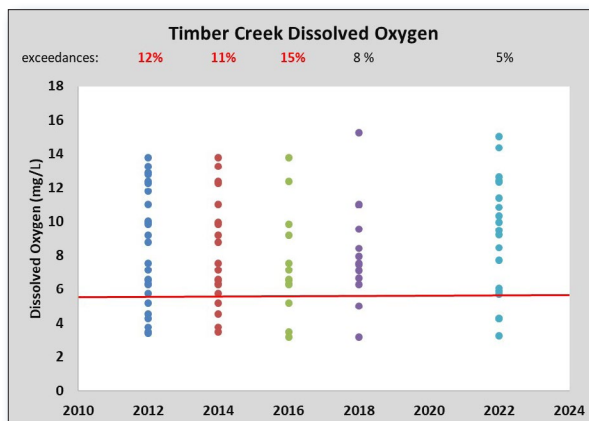


Figure 3. DO increased with CP installation.



Figure 4. Timber Creek supports the Plains Killifish.

efforts through Blue Thumb. Approximately \$211,255 of these federal and state matching funds have been devoted to Timber Creek.

From 2002 to 2020, NRCS invested at least \$95,000 for CP implementation in the Timber Creek watershed through EQIP and CSP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Additional FSA dollars supported CRP practices. Finally, the OCC, the North Fork of the Red River and Upper Washita conservation districts, and landowners funded more than \$31,654 worth of CPs (at least \$17,937 of which was funded by landowners through the SCSP).



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