



# NONPOINT SOURCE SUCCESS STORY

## Oklahoma

### Conservation Practices Improve Water Quality in Brazil Creek

#### Waterbody Improved

Low dissolved oxygen (DO) concentrations resulted in impairment of Brazil Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Pollution from crop, grazing and forested lands contributed to this impairment. Implementing conservation practice systems (CPs) to promote better land management decreased runoff of sediment, nutrients, and other oxygen-demanding substances and resulted in improved oxygen levels. As a result, Oklahoma removed the DO impairment from Brazil Creek in 2008 from its CWA section 303(d) list.

#### Problem

The Brazil Creek Watershed covers approximately 156,448 acres (ac) in Haskell, Latimer, and LeFlore counties in Oklahoma (Figure 1). The improved portion of Brazil Creek drains from the creek's headwaters near the town of Red Oak in Haskell County to the confluence with the Poteau River near the town of Shady Point in LeFlore County. Land use in the watershed is about 38 percent grazing lands (managed pasture and rangeland), and 57 percent forested and shrubland. Less than one percent of the watershed is in cropland. The watershed is also home to more than 30 contracted poultry growing operations, producing around 3.3 million broilers per year, the majority of which were built between 1998 and 2005. The primary agricultural products from the watershed are broiler chickens, cattle and hay. In addition, a significant number of natural gas wells exist in the upper portion of the watershed.

Water quality monitoring conducted between the late 1990s and the mid-2000s determined that challenges with grazing lands, animal waste, and forest management contributed to a 2002 listing of the 17.83-mile stream as being impaired by low DO. Data showed that 16 percent of samples were below the DO standard. A waterbody is considered impaired for DO if more than 10 percent 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. A waterbody is considered fully supporting if less than 10 percent of samples have DO values less than the "attaining" of 6 mg/L from April 1 through June 15 or below 5.0 mg/L the remainder of

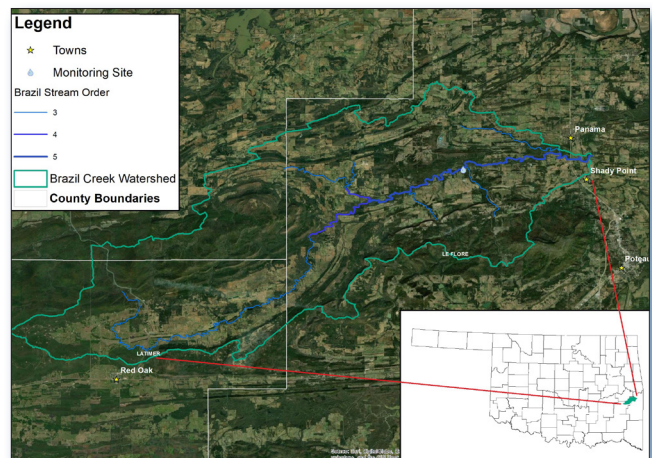


Figure 1. The Brazil Creek watershed is in southeastern Oklahoma.

the year. A waterbody that falls between these two cases is considered undetermined. Based on these results, Oklahoma added segment 220100030010\_00 to the CWA section 303(d) lists in 2002 for nonattainment of the Warm Water Aquatic Community (WWAC) beneficial use.

#### Story Highlights

More than 110 landowners in the watershed worked with the Haskell, Latimer, and LeFlore county conservation districts; the Natural Resources Conservation Service (NRCS); and the Oklahoma Conservation Commission (OCC) to implement CPs through Oklahoma NRCS's Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CStWP), and general conservation technical assistance

program, and through the OCC's State Cost Share Program (SCSP). From 2002 to 2020, landowners improved grazing and animal waste management, which reduced runoff of sediment, nutrients and other pollutants by increasing vegetative cover and reducing bare soil and by protecting animal waste from runoff.

Landowners implemented riparian forest buffers (143 ac), brush management (1,053 ac), cover crops (67 ac), critical area planting (12 ac), fencing (90,887 feet [ft]), forage harvest management (121 ac), firebreak (12,693 ft), heavy use area protection (1,707 square feet), herbaceous weed control (55 ac), comprehensive nutrient management plans (13 plans), nutrient management (1,328 ac), pasture and hayland planting (1,126 ac), pest management (739 ac), ponds (33 ponds), animal mortality/composting structures (7 structures), prescribed burning (150 ac), prescribed grazing (3,091 ac), seasonal high tunnels (2 tunnels), tree planting (18 ac), roofs and covers (2 systems), upland wildlife habitat management (17 ac), waste facilities (13 structures), waste recycling (709 tons), watering facility (1 tank), water well (1 well), and well decommissioning (1 well). In addition, at least 1,028 acres were enrolled in CStwP, which facilitated additional practices to improve animal waste; grazing management; and soil, nutrient, and energy management.

## Results

The OCC documented improved water quality in Brazil Creek due to installation of CPs through its statewide nonpoint source Rotating Basin Ambient Monitoring Program. By 2008, the DO concentrations had improved such that less than 10 percent of the measured values were below the "not attaining" criteria (Figure 2). More than 10 percent of samples were below the "attaining" criteria; therefore, Brazil Creek is considered undetermined with respect to DO. However, many streams in this portion of the ecoregion are considered undetermined for DO; it is believed to be a naturally occurring condition. Brazil Creek is now considered to be a category 2 stream; attainment of its WWAC beneficial use is undetermined due to DO, although fully supported for all other WWAC parameters and all other assessed uses.

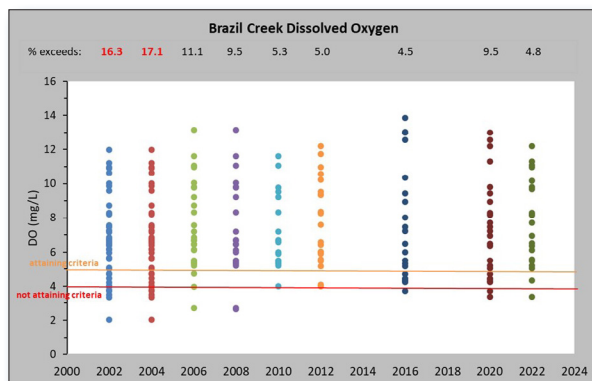


Figure 2. Levels of DO in Brazil Creek improved with the installation of CPs.

## 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 \$500,000 in EPA 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately \$376,519 of these federal and state matching funds have been devoted to Brazil Creek.

From 2002 to 2020, NRCS invested a minimum of \$361,000 for CP implementation in Oklahoma through EQIP; additional financial assistance was provided through CStwP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance. Finally, the OCC; Haskell, Latimer, and LeFlore county conservation districts; and landowners funded more than \$115,163 worth of CPs (at least \$56,462 of which was funded by landowners through the SCSP).



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## For additional information contact:

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