NONPOINT SOURCE SUCCESS STORY

Oklahoma

Conservation Practices Improve Dissolved Oxygen Levels in Fish Creek

Waterbody Improved

Low dissolved oxygen (DO) levels resulted in the impairment of Fish Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Pollution from grazing lands contributed to this impairment. Implementing conservation practice systems (CPs) to promote better agricultural land management improved DO levels in the creek. As a result, Oklahoma removed Fish Creek from its 2008 CWA section 303(d) list for DO. Fish Creek now partially supports its Fish and Wildlife Propagation (FWP) designated beneficial use.

Problem

Fish Creek is a 16.84-mile tributary to the Elm Fork of the Red River in Beckham and Greer counties in the arid southwest corner of Oklahoma (Figure 1). Land use in the 20,482-acre watershed is about 98 percent rangeland. Less than 1 percent of the watershed is cropland. Challenges with rangeland management contributed to listing the stream as impaired for DO in 2002 when 32 percent of samples violated the DO criteria for a warm water aquatic community. A stream is considered impaired if more than 10 percent of samples violate the criteria. Oklahoma added Fish Creek (OK311800000130_00) to the 2002 CWA section 303(d) list for nonattainment of its FWP designated beneficial use.

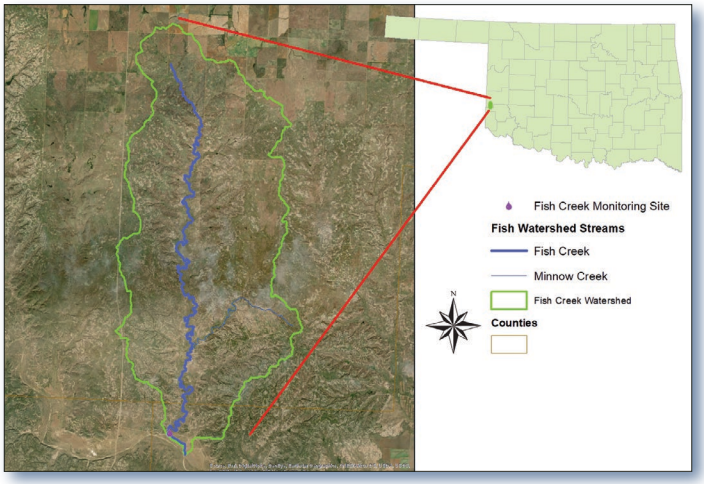

Figure 1. Fish Creek is in southwestern Oklahoma.

Story Highlights

Landowners in the watershed worked with the North Fork of the Red River and Greer County conservation districts, the U.S. Department of Agriculture's 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.

CPs installed between 2005 and 2017 focused on reducing the impacts of grazing on rangeland in the watershed (Table 1). At least 3,000 acres (ac) were enrolled in the CStwP, which encourages producers to adopt further innovations that improve grazing management.

Results

The OCC documented improved water quality in Fish Creek due to installation of CPs. The installed CPs worked to decrease the runoff of oxygen-demanding pollutants to downstream waterbodies. Monitoring data compiled for the 2002 integrated report showed that Fish Creek DO levels violated water quality standards 32 percent of the time (Figure 2). However, by the 2008 assessment, DO levels had improved and were violating criteria only 5 percent of the time. Based on these data, Fish Creek was removed from the CWA section 303(d) list for DO in 2008. Although the stream remains listed due to poor fish collections and is, therefore, only partially supporting its FWP beneficial use, recent fish collections have improved. The creek is expected to be delisted and fully support its FWP in the future.

Table 1. CPs installed in the Fish Creek watershed.

Practice name	Amount installed
Rotation of supplement and feeding areas	5,766 ac
Brush management	1,401 ac
Improved grazing management	988 ac
Watering facility	1
Nutrient management	116 ac
Integrated pest management	2,261 ac
Prescribed grazing	5,201 ac
Livestock pipeline	4,816 ft
On-farm forage based grazing system	2,144 ac
Heavy use area protection	0.2 ac
Grazing management to improve wildlife habitat	2,144 ac

Partners and Funding

The OCC monitoring program is supported by the U.S. Environmental Protection Agency's (EPA) CWA section 319 funds at an average annual statewide cost of $1 million. Approximately $500,000 in EPA section 319 funds support statewide water quality educational efforts through Blue Thumb. Approximately $237,229 of these federal and matching state funds have been devoted to Fish Creek. From 2002 to 2017, NRCS supplied approximately $20,000 for implementation of CPs in the watershed through NRCS EQIP. Additional funds were provided through NRCS for CStwP. In addition, many practices were funded by landowners based on recommendations through NRCS general technical assistance and conservation planning.

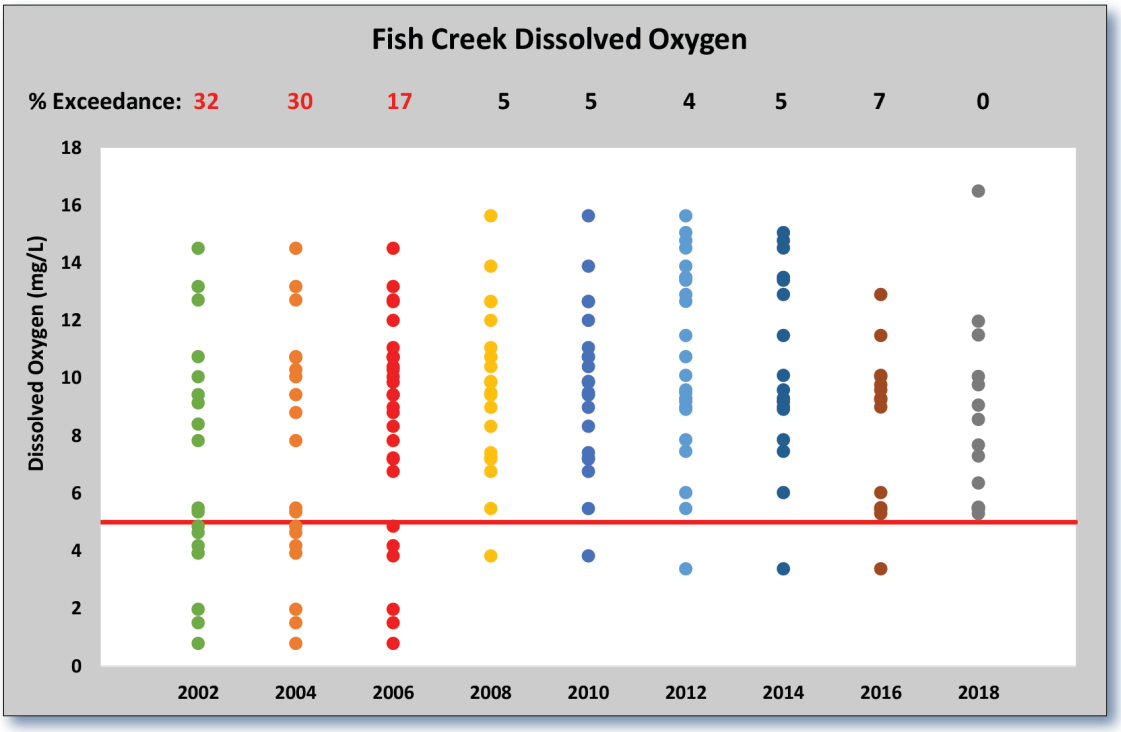

Figure 2. DO concentrations in Fish Creek improved after CPs were installed.

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