



NONPOINT SOURCE SUCCESS STORY

Oklahoma

Turbidity Levels in Sulphur Creek are Reduced through Voluntary Agricultural Conservation Programs

Waterbody Improved

Elevated turbidity levels resulted in the impairment of Sulphur Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2008. Grazing and hay production contributed to these impairments, and implementation of conservation practice systems (CPs) to promote better quality grazing lands decreased turbidity levels in the creek. As a result, Sulphur Creek was removed from Oklahoma's 2012 CWA section 303(d) list for turbidity. Sulphur Creek now partially supports its fish and wildlife protection (FWP) beneficial use.

Problem

Sulphur Creek is a 14.61-mile stream that flows through southeastern Bryan County, Oklahoma, before discharging to the Blue River (Figure 1). The Blue River is one of Oklahoma's highest quality large rivers, due in part to its geology and spring-fed sources, but also due to the overall land management in its watershed. Land use in the 20,709-acre Sulphur Creek watershed is primarily grasslands (66 percent of total) for beef cattle and hay production. About 28 percent of the watershed is forested, and 5 percent is developed land (primarily highways and roads). Less than 1 percent of the watershed is cropland. The small town of Bennington (which had a 2010 census population of 334) is on the eastern side of the watershed.

Grazing and hayland management contributed to excess turbidity in Sulphur Creek. It was listed as impaired for turbidity in 2008 when 13 percent of assessed baseflow turbidity samples violated Oklahoma water quality standards. An Oklahoma stream is considered to violate the turbidity standard when more than 10 percent of baseflow samples are higher than 50 nephelometric turbidity units (NTU). In a relatively clear stream like Sulphur Creek, this excess turbidity can significantly affect the biological community by smothering habitat, clogging gills, and limiting sight-lines for predation (Figure 2). On the basis of these assessment results, Oklahoma added Sulphur Creek (OK410600010030_00) to the 2008 CWA section 303(d) list for nonattainment of the FWP beneficial use due to turbidity.

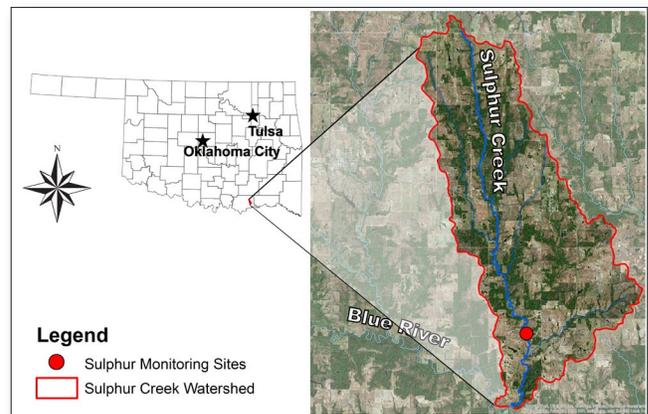


Figure 1. Land use in the Sulphur Creek watershed is primarily grasslands for grazing and hay production.

Project Highlights

Landowners in the watershed worked with the Bryan County Conservation District, the U.S. Department of Agriculture (USDA) 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, as well as through the OCC's Locally Led Cost-Share Program (LLCP). From 2008 to 2017, landowners voluntarily improved many acres of grasslands, pasture, and hay meadows, which reduced runoff of sediment and other pollutants by decreasing erosion, stabilizing head cuts and gullies, and better utilizing available grazing lands (Table 1).



Figure 2. Sulphur Creek in southeastern Oklahoma is a shallow, sandy-bottomed stream.

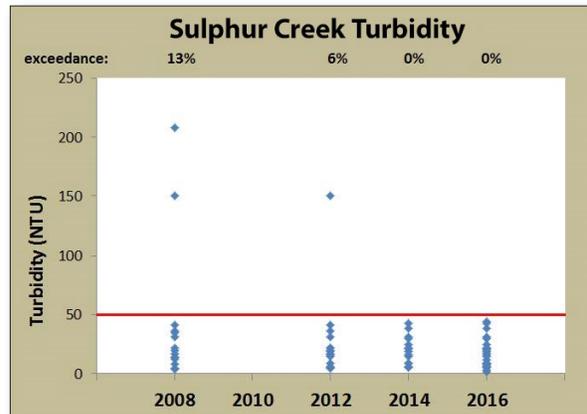


Figure 3. Turbidity decreased in Sulphur Creek as producers focused on improving pasture management.

Results

Through its statewide nonpoint source Rotating Basin Ambient Monitoring Program, the OCC documented improved water quality in Sulphur Creek due to landowners implementing CPs. The installed practices worked to decrease erosion and reduce turbidity. Monitoring data compiled for the 2008 Integrated

Report showed excessive turbidity in Sulphur Creek, when 13 percent of baseflow samples exceeded the state water quality standard of 50 NTU. However, by 2012 turbidity values had decreased such that fewer than 6 percent of samples exceeded 50 NTU; this decreasing trend continues through the 2016 assessment (Figure 3). On the basis of these data, Sulphur Creek was removed from the Oklahoma CWA section 303(d) list for turbidity in 2012. This change resulted in partial support of its FWP beneficial use. Monitoring in Sulphur Creek will continue in order to track progress towards full support of these beneficial uses.

Table 1. CPs installed in the Sulphur Creek watershed (2008–2017).

Practice type installed	Amount	
	2008-2012	2012-2017
Brush management (acres)	60.2	19.2
Critical area planting (ac)	2	2.8
Fence (ft)	9,479	6,034
Forage and biomass planting (ac)	0	0
Forage harvest management (ac)	438	--
Grade stabilization structure	4	4
Integrated pest management (ac)	383	--
Livestock access to waterbodies (ac)	10	--
Improved grazing management (ac)	10	--
Nutrient management (ac)	279	--
Pond	11	1
Prescribed grazing (ac)	4,861	51.6
Rotation of supplement/feeding areas (ac)	10	--
Wetland creation (ac)	1	--

Notes: ac = acres; ft = feet

Partners and Funding

The OCC monitoring program is supported by U.S. Environmental Protection Agency (EPA) CWA section 319 funds at an average annual statewide cost of \$1 million. Approximately \$500,000 in EPA CWA section 319 funds support statewide water quality educational efforts through Blue Thumb. Working in partnership with the Bryan County conservation district, NRCS supplied approximately \$140,000 for implementation of CPs in the watershed through NRCS EQIP. The LLCP provided \$4,680 matched by \$4,959 from landowners. A large number of practices were funded by landowners based on recommendations through NRCS general technical assistance and conservation planning.



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