



# NONPOINT SOURCE SUCCESS STORY

# Louisiana

## Implementing Best Management Practices Decreases Nutrient and Turbidity Levels in Joe's Bayou

### Waterbody Improved

Runoff of fertilizer and sediment from agricultural lands caused high turbidity and low dissolved oxygen in Joe's Bayou. As a result, the Louisiana Department of Environmental Quality (LDEQ) added Joe's Bayou to the 1990 Clean Water Act (CWA) section 303(d) list of impaired waters for failing to attain its fish and wildlife propagation (FWP) designated use. Local landowners decreased the runoff of fertilizer and sediment by implementing agricultural best management practices (BMPs) within the watershed. Turbidity, nitrogen and phosphorus are trending downward. LDEQ is hopeful that, with ongoing implementation, turbidity will continue to decline and dissolved oxygen levels will meet the water quality standard.

### Problem

Joe's Bayou (LDEQ subsegment 081002) is in Louisiana's Ouachita River Basin. The bayou flows for 78 miles through East Carroll Parish and empties into Bayou Macon. Land use/land cover in the Joe's Bayou subsegment is primarily agricultural; soybeans, corn, and cotton are the primary crops (Figure 1). The suspected source of impairment in Joe's Bayou was runoff of sediment and fertilizer from agricultural fields. This runoff threatened the health of fish and wildlife in Joe's Bayou.

Louisiana's water quality standards for FWP in Joe's Bayou require that no more than 10 percent of samples collected on a monthly or near-monthly basis for dissolved oxygen may be below 5.0 milligrams per liter (mg/L). Samples collected in 1990 showed that two of the eight values for dissolved oxygen were below the standard. Currently, Joe's Bayou has no numerical criteria for turbidity; however, high turbidity values were also a concern. Therefore, in 1990, Joe's Bayou was listed as impaired for FWP due to turbidity, dissolved oxygen, nitrogen and phosphorus.

The nitrogen and phosphorus impairments were listed as a result of the causal relationship between excess fertilizer runoff and falling oxygen levels: high nutrient loading facilitates algal growth and oxygen depletion as the algae dies off and decomposes. The turbidity impairment was also suspected to be from the excess fertilizer runoff.

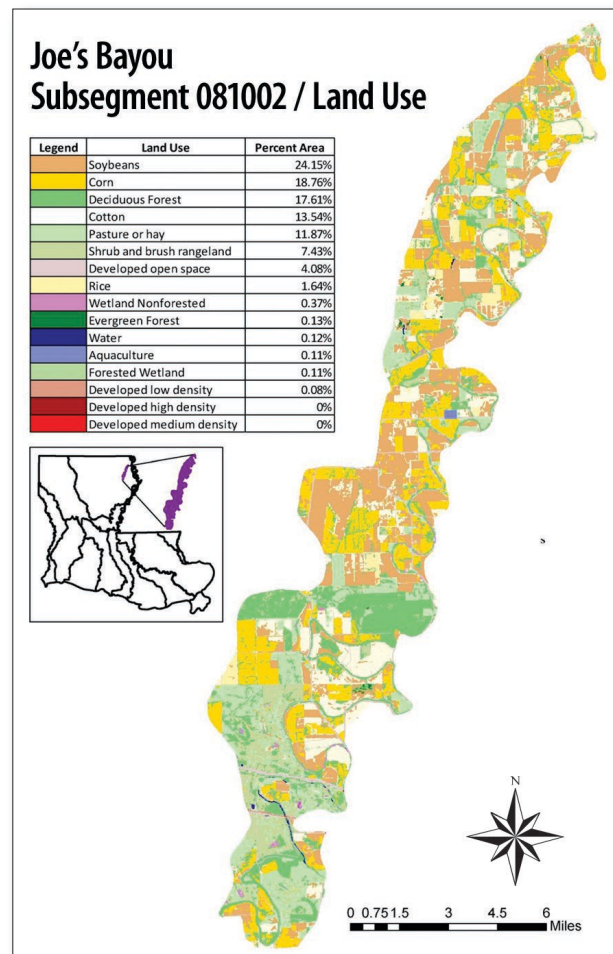


Figure 1. Land use/land cover map of Joe's Bayou.

## Project Highlights

LDEQ developed a watershed implementation plan for Joe's Bayou in 2005 and updated it in 2011 and 2012. As a part of this plan, the Louisiana Department of Agriculture and Forestry (LDAF) used CWA section 319 funds to reduce sources of nonpoint source pollution in the Joe's Bayou watershed. Beginning in 2006, LDAF and the U.S. Department of Agriculture's Natural Resources Conservation Service worked with local landowners to implement multiple agricultural BMPs in the lower and upper Joe's Bayou watersheds, including conservation crop rotation, irrigation land leveling, nutrient management, cover crops, residue and tillage management, and structures for water control. The BMPs were implemented on approximately 4,000 acres of the watershed. Two watershed monitoring projects were also funded as part of this plan through CWA section 319 funds with the University of Louisiana at Monroe as the Principal Investigator: "Watershed Monitoring in the Ouachita River Basin – Upper Joe's Bayou" and "Watershed Monitoring in the Ouachita River Basin – Lower Joe's Bayou." Both projects included collecting water quality monitoring data to identify additional priority areas in the watershed for BMP implementation. In Upper Joe's Bayou, 29 water quality sampling events occurred at five sites from March 2010 and August 2011. In Lower Joe's Bayou, 25 sampling events occurred at five sites from January 2012 to June 2013.

## Results

As a result of the BMP implementation work implemented since 2006, average 2013/2014 nitrate-nitrite and phosphorous concentrations have decreased by 55 and 43 percent, respectively, compared to the 1999 period (Figure 2).

In addition, average turbidity levels declined 73 percent from 339.4 Nephelometric Turbidity Units (NTU) for samples collected in 1999, down to 92.3 NTU for samples collected in 2013 and 2014. LDEQ is hopeful that, with continuing implementation, dissolved oxygen levels will meet the water quality standard, and turbidity will continue to decrease.

## Partners and Funding

LDEQ provided approximately \$50,000 in CWA section 319 funds to develop the watershed implementation plan for Joe's Bayou. LDEQ also provided \$139,041 in CWA section 319 funds with the University of Louisiana at Monroe providing \$63,328 of in-kind match, for a total of \$202,369 for the two watershed monitoring projects in the Ouachita River Basin. Lastly, LDAF provided \$251,432 in CWA section 319 funds from 2002 through 2008, along with landowner in-kind match of \$479,340, for a total of \$730,772.

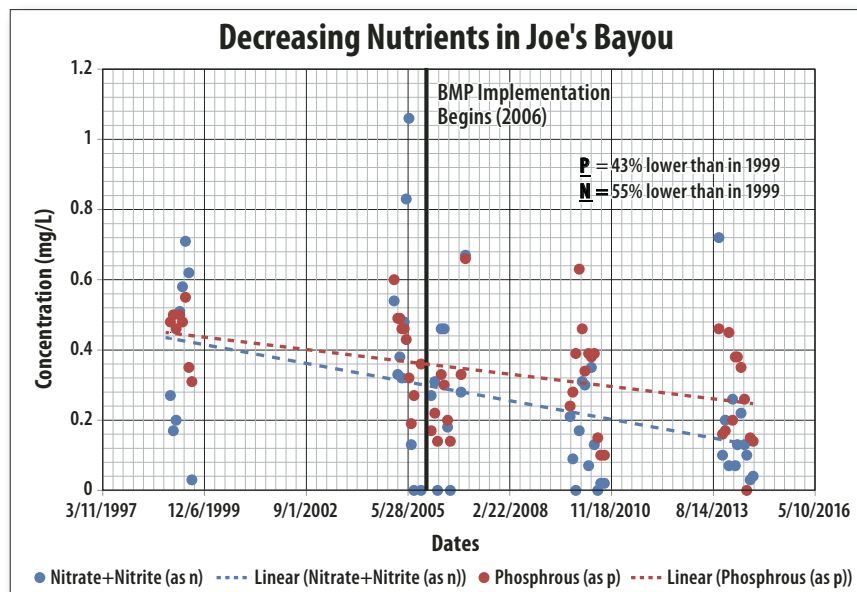


Figure 2. Data collected from LDEQ station 0797 show that nutrient levels in Joe's Bayou decreased between 1999 and 2013.



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