



# NONPOINT SOURCE SUCCESS STORY

## Arkansas

### Reducing Agricultural Runoff Reduces Lead in Bayou DeView

#### Waterbodies Improved

High lead levels due to runoff from row crop areas impaired Arkansas' Bayou DeView. As a result, the Arkansas Department of Environmental Quality (ADEQ) added four segments of the stream (58.2 miles total) to the state's 2012 Clean Water Act (CWA) section 303(d) list of impaired waters for lead impairment. Watershed partners initiated watershed assessments and implemented best management practices (BMPs) to abate sediment runoff from row crops in the watershed. The lead levels in Bayou DeView declined, prompting ADEQ to remove the four segments from the 2014 CWA section 303(d) list for lead impairment.

#### Problem

Bayou DeView (Waterbody AR-4B-8020302) is an 83-mile-long waterway that flows through parts of Woodruff, Monroe, Poinsett, Cross, Craighead and Jackson counties in northeastern and east-central Arkansas (Figure 1). The stream traverses the eastern flank of the Cache River watershed and is included within its boundaries. Bayou DeView's relatively large watershed (approximately 30 percent of the entire Cache River watershed) begins in Craighead County, Arkansas, and ends with the stream's confluence with the Cache River in Monroe County, Arkansas. ADEQ has listed Bayou DeView as a Channel-Altered Delta Ecoregion Stream.

Runoff from agricultural row crop fields was contributing excess lead to Bayou DeView. An ADEQ assessment, performed between 4/1/2006 and 3/31/2011, examined the stream's existing 2002–2003 data and found that reach 004 (21.2 miles long), reach 005 (8.6 miles long), reach 006 (10.2 miles long) and reach 007 (18.2 miles long) did not meet the state's water quality standard for lead. A stream is considered impaired if more than one sample during the 3-year period of record exceeds its applicable criteria for lead, which varies based on water hardness. Data showed three criteria exceedances in 2003, prompting ADEQ to add four consecutive upstream reaches to the state's 2012 CWA section 303(d) list of impaired waters for lead (Table 1). ADEQ completed draft total maximum daily loads for lead and total dissolved solids for the Cache River and Bayou DeView in 2012.

#### Project Highlights

In 2001 the Jackson County Conservation District (JCCD) and The Nature Conservancy (TNC) began providing financial and technical assistance to help landowners implement water control and

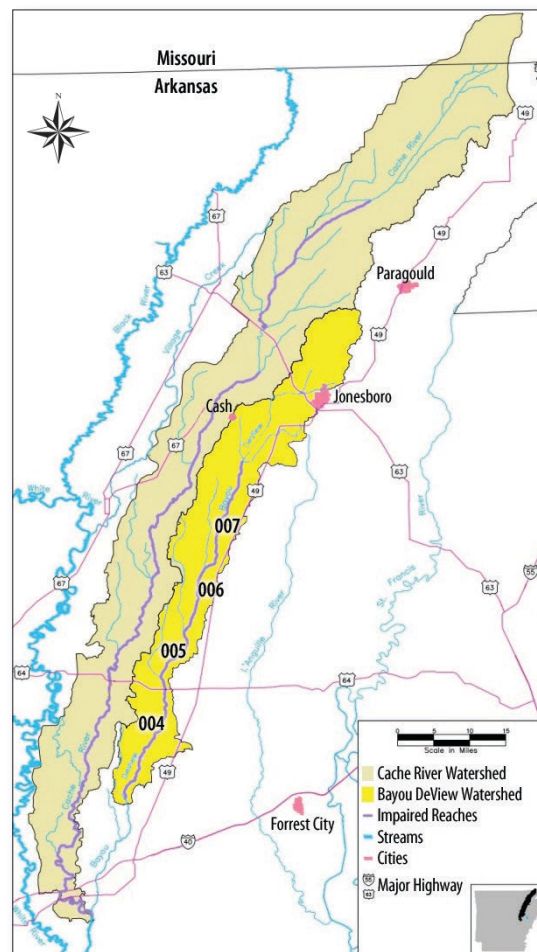


Figure 1. Bayou DeView is a tributary of the Cache River in eastern Arkansas.

conveyance BMPs to manage the discharge of drainage water from agricultural fields. Many landowners took advantage of this opportunity; they installed 430 water control structures, preventing

**Table 1. Water Quality Data for Bayou DeView**

Sample Date	Lead Level (µg/L)	Hardness	Water Quality Criteria for Lead (µg/L)
7/29/2002	BDL	96	2.41
10/22/2001	BDL	87	2.16
3/25/2002	BDL	29	0.64
11/4/2002	BDL	77	1.89
1/7/2003	1.48*	46	1.07
3/10/2003	1.38*	36	0.81
4/28/2003	2.47*	28	0.61
6/23/2003	BDL	64	1.54
8/25/2003	1.15	161	4.21

µg/L = Micrograms per liter

BDL = Below detection limit

\* = Exceeds applicable water quality criteria

approximately 36,980 tons of soil from eroding and entering Bayou DeView. These BMPs help to prevent sediment (which carries lead) from leaving agricultural fields by controlling the rate, velocity and volume of field runoff (Figure 2). By slowing the runoff and preventing the sediment from reaching the stream, the BMPs decrease the amount of lead that enters the stream.

In 2004 TNC proposed a work plan for a series of integrated sediment, hydrology, geomorphology and biology monitoring surveys. The surveys culminated in a report and spatial relational database containing a priority ranking of the Cache River's tributary streams. Because of the short length of the study (one year), however, no flow regime or water quality trends could be established for statistical predictions.



Figure 2. A project participant installs a drop pipe structure, which will allow the discharge runoff water to empty directly into Bayou DeView rather than drain across an erosion-prone field.

From 2006 until 2009, TNC began a second phase of the project. Critical stream bank erosion areas were identified, ranked and prioritized based on the sediment contribution from the subwatersheds to the Cache River main stem. This information was used for future implementation projects designed to reduce sediment inputs in the watershed through BMP installation; it also allowed for a system of ranking streams in the priority watershed. As a result, ANRC was able to make data-driven management decisions concerning funding allocation in the watershed.

The Cross County Conservation District (CCCD) installed water conveyance and control structures in the watershed from 2009 to 2011. This project included approximately 115,600 feet of pipe for water conveyance and water control structures, resulting in an estimated soil savings of 219,660 tons per year. The project will further reduce the amount of lead and sediment entering Bayou DeView.

## Results

ANRC and its partners successfully addressed erosion from agricultural row crop sources and lead levels dropped as a result. ADEQ collected 12 samples in 2011–2012; of those, 10 samples had no detectable lead and two samples had very low lead levels that fell well below the applicable water quality criteria. Therefore, ADEQ has removed the four reaches from Arkansas' 2014 CWA section 303(d) list for lead impairment. The stream remains listed as impaired for turbidity.

## Partners and Funding

The following partners helped to restore the four reaches of Bayou DeView and the Cache River: local landowners in the watershed, the JCCD, CCCD, TNC, ANRC, ADEQ, the U.S. Department of Agriculture's Natural Resources Conservation Service and the U.S. Environmental Protection Agency (EPA). ANRC provided EPA CWA section 319 funds to partners for several projects.

The JCCD and TNC used \$250,000 in CWA section 319 funds to help local landowners identify problem areas and purchase materials for implementing BMPs. The JCCD and TNC also provided \$200,400 in cash and in-kind match to purchase and install materials. The CCCD used \$450,000 in CWA section 319 funds to help purchase BMP materials. The CCCD also provided \$450,000 in cash and in-kind match to purchase and install materials.

TNC used \$294,751 in CWA section 319 funds to identify, quantify and rank stream segments on the basis of the levels of sediment and nutrient load contributed to the main stem Cache River, its tributaries and the associated bottomland hardwood and riverine wetlands. These data were used for future projects designed to reduce sediment inputs in the watershed through BMPs. TNC also provided \$247,220 in cash and in-kind match to identify priority stream segments in the watershed and install monitoring stations.



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