



NONPOINT SOURCE SUCCESS STORY

Kentucky

Watershed Planning and Wastewater Investment Leads to Clarks River Delisting

Waterbody Improved

The Kentucky Division of Water (DOW) added a 7.5-mile segment of Clarks River (miles 13.1–20.55) to the 2008 Clean Water Act (CWA) section 303(d) list/Integrated Report as impaired for primary contact recreation (PCR) due to *Escherichia coli*. In 2011, the U.S. Environmental Protection Agency (EPA) approved DOW's bacteria total maximum daily load (TMDL) for parts of Clarks River, which called for large reductions in *E. coli* loadings from point and nonpoint sources of pollution. After years of watershed planning, wastewater improvements and agricultural best management practice (BMP) installations in the Clarks River watershed, *E. coli* data collected in 2015 indicates the segment fully supports its PCR designated use. As a result, DOW proposed delisting the *E. coli* impairment for this Clarks River segment in the 2018/2020 Integrated Report to Congress.

Problem

Clarks River drains into the Tennessee River in the Jackson Purchase region in western Kentucky (Figure 1). Clarks River is approximately 63 miles long and drains a 299-square-mile watershed dominated by agriculture (55%), forest (32%), and developed lands (8.58%) in Marshall, Calloway, McCracken, and Graves counties. The drainage area is made up of 10 subwatersheds and includes the cities of Benton and Murray. Fecal coliform and *E. coli* sampling of Clarks River (miles 13.1–20.55) from 2004–2006 indicated this segment only partially supported the PCR designated use, resulting in its placement on the 2008 CWA section 303(d) list of impaired waters. Additional monitoring supported development of a 2011 TMDL for multiple bacteria impairments throughout the watershed.

Story Highlights

The CWA section 319(h) program funded an early watershed-based plan for the Clarks River watershed. This plan identified agriculture, septic systems, stream-bank erosion and permitted wastewater systems as primary pollution sources of concern. The Chestnut Creek subwatershed was identified as a priority watershed, resulting in an EPA-approved watershed plan directly upstream of the Clarks River segment (miles 13.1–20.55). Implementation funding for the Clarks River watershed plan supported repair of 40 septic

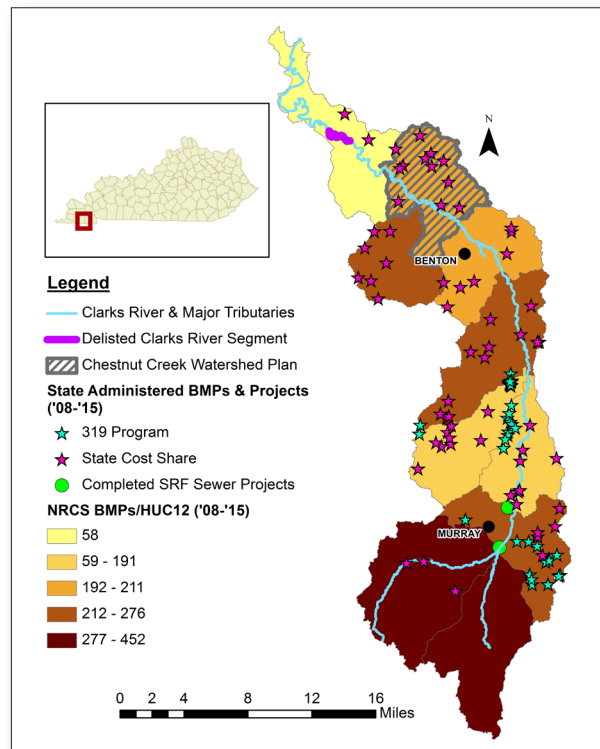


Figure 1. Clarks River is in western Kentucky.

systems and the building of one community waste lagoon to replace another cluster of 40 failing septic systems (see Figure 1). Additionally, the Kentucky Division of Conservation installed over 100 state

cost-share-funded BMPs (Figure 2). In 2008–2015, the Natural Resources Conservation Service (NRCS) funded and installed 2,521 BMPs across nearly 40,000 acres in the Clarks River watershed, including riparian buffers, stream exclusion fencing, and cover crops.

In 2011, DOW developed a bacteria TMDL for 40 stream segments in the Clarks River watershed. Clean Water State Revolving Fund (CWSRF) provided assistance to upgrade the wastewater systems of multiple point sources that had been identified by watershed plans and in the Clarks River TMDL as likely bacteria sources. CWSRF funds helped extend sanitary sewer service to approximately 100 residences in Draffenville, decommissioned three failing septic systems or package plants, and upgraded Murray’s Bee Creek wastewater treatment plant.

Results

Following substantial watershed planning and investment, new data demonstrate the Clarks River segment from miles 13.1 to 20.55 is now meeting water quality standards for *E. coli*. Limited sampling during separate PCR seasons from 2011 to 2014 suggested the stream segment could support its designated use, but more data were needed to recommend a delisting. In 2015 DOW conducted monthly sampling, with five of the six sample results remaining below the water quality criteria (Figure 3). Because fewer than 20% of sampling results exceeded the criteria, DOW proposed delisting *E. coli* as a cause of impairment for the Clarks River assessment unit (miles 13.1–20.55) in the 2018/2020 Integrated Report to Congress.

Partners and Funding

The Clarks River watershed received significant partner engagement, spearheaded by a 2009 Clarks River watershed plan and a 2016 Chestnut Creek watershed plan. In addition to EPA and DOW, key partners include the Jackson Purchase Foundation, the Marshall County Fiscal Court, the City of Murray, Kentucky NRCS, and the Kentucky Division of Conservation. Each partner played different roles, with the Jackson Purchase Foundation focused on implementing section 319(h)-funded septic system and residential wastewater initiatives, while the City of Murray and the Marshall County Fiscal Court leveraged nearly \$67 million in CWSRF loans to improve wastewater infrastructure.



Figure 2. Partners installed many BMPs.

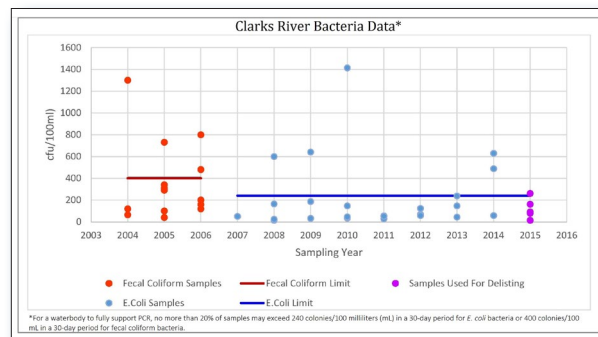


Figure 3. Bacteria data (2004–2015), including data that prompted the 2008 listing (red) and the data leading to the proposed delisting in 2018/2020 (purple).

The Kentucky NRCS and Division of Conservation provided technical and financial assistance for agricultural BMPs. The Division of Conservation collaborated on the Clarks River watershed plan implementation and invested over \$701,000 in BMPs through the Kentucky Soil Erosion and Water Quality Cost Share Program.

DOW’s Nonpoint Source and Basin Team Section provided extensive planning and technical assistance for projects throughout the watershed. In particular, the Four Rivers Basin Coordinator, Maggie Morgan, conducted significant outreach and fostered community engagement that made this delisting possible. Nearly \$1 million in CWA section 319(h) grants supported monitoring, implementation and watershed planning activities, including the Clarks Fork Watershed-Based Plan (\$108,300) and implementation (\$436,970), a Four Rivers Basin Coordinator (\$79,699) and the Chestnut Creek Watershed Plan (\$125,000). DOW developed the 2011 Clarks River TMDL using two section 319(h) grants totaling over \$243,000.



U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-21-001T
October 2021

For additional information contact:

Josiah Frey
Kentucky Division of Water
502-782-0164 • josiah.frey@ky.gov