NONPOINT SOURCE SUCCESS STORY

Alabama

Joes Branch Restoration: Illustrating a Model Watershed Approach

Waterbody Improved

As urbanization grew in Joes Branch watershed, construction, impervious areas, and stormwater quantity and force caused massive turbidity and erosion of stream channels and drainageways. The Alabama Department of Environmental Management (ADEM) added Joes Branch to the 2008 Clean Water Act (CWA) section 303(d) list of impaired waterways for not fully supporting its use classification of fish and wildlife (F&W) due to a siltation impairment. Dedicated partnerships levered funding sources to implement targeted best management practices that improved water quality; as a result, ADEM removed the segment from the CWA section 303(d) list in 2020.

Problem

Joes Branch begins in Spanish Fort, Alabama, before flowing into Daphne and converging with D'Olive Creek past the Lake Forest subdivision's dam. It then discharges into D'Olive Bay and eventually into Mobile Bay (Figure 1). The watershed is comprised of 64 percent urban and 19 percent forested land. It encompasses an area of 0.97 square miles. Between 2001 and 2016, the developed land in the Joes Branch watershed increased by nearly 24 percent. Increased impervious surfaces reduced rain infiltration rates and increased the overall volume and velocity of stormwater. This caused severe erosion and headcuts of streams and drainage channels and decreased the total amount of retention areas.

A study by the Geological Survey of Alabama in 2007, which assessed the sedimentation rates in streams in the D'Olive Creek watershed, identified elevated suspended sediment loads within the 1.57-mile segment of Joes Branch. ADEM concluded that Joes Branch no longer supported its F&W use classification due to a siltation impairment resulting from land development; consequently, ADEM included the waterbody on the 2008 CWA section 303(d) list.

Folley Creek was selected as the reference station for this site. When assessing impairment, ADEM's reference condition approach considers ambient water quality data from reference streams in the same ecoregions with characteristically similar watersheds.

ADEM allotted CWA section 319 money from the U.S. Environmental Protection Agency (EPA), which partially supported the *Watershed Management*

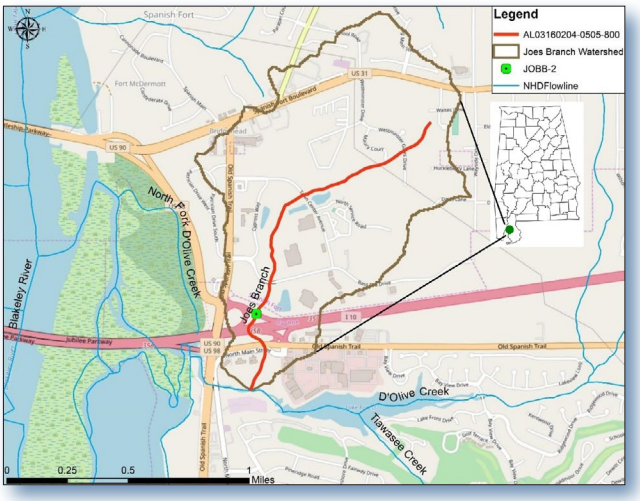

Figure 1. Joes Branch watershed empties into D'Olive Bay in southwest Alabama.

Plan for the D'Olive Creek, Joes Branch, and Tiawasee Creek Watersheds–Daphne, Spanish Fort, and Baldwin County, Alabama (WMP). The goal of the plan was to identify scientifically supported and economically effective restoration activities to improve the health and habitat of the impaired waters. Through the WMP development effort, a pathway to recovery was identified.

Story Highlights

The successful delisting of Joes Branch is due to a network of partners and restoration efforts that spanned 6 years and targeted five discrete areas covering stream reaches, wetlands, floodplains, and two detention ponds. For the restoration video, select here; for further information, visit Mobile Bay National Estuary Program's (MBNEP) website.

Photo Courtesy of MBNEP

Figure 2. Incised headcut of the Joes Branch channel.

Photo Courtesy of Thompson Engineering

Figure 3. Step pool conveyance system in Joes Branch.

The first project, called JB1, created a series of step pools that restored a degraded channel with an active head cut (Figure 2). These pools cause high-velocity water to slow down and infiltrate, which fosters stream channel habitat restoration (Figure 3). This project was the first of its kind in the D'Olive Creek Watershed, and it showed the National Fish and Wildlife Foundation (NFWF) that continued investment in the watershed was justified. A second project (JB2), continued the step pool conveyance system downstream and completed wetland restoration and floodplain realignment. Section 319 funds were used to help restore the wetlands downgradient of the step pools.

ADEM also allocated CWA section 319 funds to add additional step pools to a transition between projects known as JB1 and JB2 (1,400 feet of NFWF-funded stream restoration downstream). This project connected the two restorations and provided a more stable water flow path. It also further stabilized the channel and provided additional habitat.

Results

Post-restoration monitoring of Joes Branch by Marlon Cook revealed sediment loading had reduced by 90–95 percent. Separate monitoring and analysis by ADEM's Water Quality Branch determined that Joes Branch had been restored to support its water use classification of fish and wildlife. ADEM's reference condition approach was used to compare ambient water quality data from reference streams in characteristically similar regions of Alabama, known as ecoregions.

The median total suspended solid concentration (7.0 milligrams per liter [mg/L]) from Joes Branch were considerably less than the ecoreference guideline concentration (10 mg/L). In addition, the turbidity samples were less than the applicable numeric criterion. Based on a review of the data, ADEM removed Joes Branch from the CWA section 303(d) list in 2020.

Partners and Funding

The restoration effort received two prestigious awards: the International Green Apple Award and the Gulf Guardian Award for Partnerships. MBNEP was a neutral entity that brought restoration partners together. The cities of Spanish Fort and Daphne used resources and partnerships to restore the waterbody. NFWF's Gulf Environmental Benefit Fund recognized the targeted approach and committed $12 million dollars to restoring the D'Olive Creek watershed, with almost $3 million in federal funding allocated to Joes Branch. CWA section 319(h) funds from multiple fiscal years totaled $919,668 in federal funding; watershed partners provided $712,382 in match.

Partners included NFWF; EPA Region 4; Mississippi–Alabama Sea Grant Consortium; City of Daphne; City of Spanish Fort; Baldwin County; Thompson Engineering; Alabama Power; Lake Forest Property Owners Association; Westminster Village Retirement Community; Alabama Department of Transportation; North State Environmental; Southern Excavators, LLC; Geological Survey of Alabama; Cook Hydrogeology, LLC; and others.

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