Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Mississippi

Lake Hazle Recovers from Development Impairments

Waterbody Improved

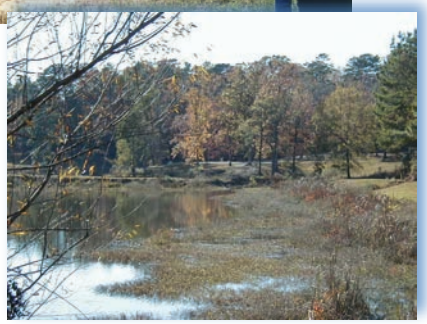
Stormwater runoff from commercial and residential development caused significant water quality impacts in Lake Hazle. The problem persisted through the 1990s, degrading the lake to the point that it only partially supported its aquatic life use support designation. Mississippi placed Lake Hazle on its 303(d) list in 1996. To address the growing problem, project partners installed various best management practices (BMPs), which allowed Lake Hazle to be delisted in 2004.

Problem

Lake Hazle is in Copiah County, south of Jackson, Mississippi. The 22-acre lake, owned and maintained by the city of Hazlehurst, is primarily designed and used for public recreation. In the 1980s, commercial and residential development around Lake Hazle led to significant impacts on its water quality.

While restoration efforts began in the early 1990s and monitoring data indicated overall water quality improvements, Lake Hazle nonetheless showed water quality impairments from nutrients, pH, siltation, organic enrichment/low dissolved oxygen (DO), thermal modification, oil and grease, and suspended solids. This information led the state to conclude that Lake Hazle only partially supported its aquatic life use support designation. As a result, Mississippi placed Lake Hazle on its 303(d) list of impaired waters in 1996. In 1998 the lake remained on the 303(d) list's *monitored section* for organic enrichment/low DO, pH, and nutrients. It was also included on the 1998 list's *evaluated section* (listed without actual monitoring data) for siltation and oil and grease.

Lake Hazle before the restoration project, almost completely filled in with silt.



Lake Hazle as it appears today, supporting aquatic life.

Project Highlights

In June 1990, project partners received section 319 support to upgrade the water quality and the recreational resources of Lake Hazle. Over a 5-year period, the partners implemented several BMPs affecting a 23-acre area. They planted vegetation at six heavily eroded sites, created a grade-stabilization structure to impede polluted runoff, and installed two water/sediment control basins to slow runoff and allow sediment to settle out before reaching the lake.

Outreach and education also played an important role. Project partners arranged to publish informative articles in the local newspaper. They also led field tours for landowners to observe firsthand the BMPs' pollutant-removal effectiveness.

Table 1. Lake Hazle water quality data from August 2001 and 2003

Date	Nitrate-nitrite (mg/L)	Total Kjeldahl nitrogen (mg/L)	Total phosphorus (mg/L)	Turbidity (NTU)	Oil & grease (mg/L)
Aug. 2001	< 0.02	0.5	0.04	11	--
Aug. 2001	< 0.02	0.5	0.05	12	--
Aug. 2001	< 0.02	0.5	0.11	10	--
Aug. 2001	< 0.02	0.5	0.04	7	--
Aug. 2003	--	--	--	4	< 5
Aug. 2003	--	--	--	--	< 5
Aug. 2003	--	--	--	6	< 5
Aug. 2003	--	--	--	4	< 5
Aug. 2003	--	--	--	11	< 5
Aug. 2003	--	--	--	7	< 5
State screening level	**< 1.0**	**< 1.5**	**< 0.2**	**< 100**	**--**

Mississippi does not have numeric water quality standards for nutrients, sediment, siltation, or turbidity. Therefore, state water quality experts compare available data for these parameters with screening levels that are based on literature or scientific *rules of thumb*. All data for these parameters were below the state screening levels and justified Lake Hazle's delisting. Mississippi has neither a numeric water quality standard nor a screening level for oil and grease. Best professional judgment determined that oil and grease concentrations less than 5 mg/L meet the applicable state narrative water quality standard.

Table 2. Average Lake Hazle dissolved oxygen concentrations in 2003 and 2004

24-Hour sampling period	Type of data	Number of samples	Average DO (mg/L)
08/07/03–08/08/03	automatic data sonde logging at 30-minute intervals	58	6.6
08/14/03–08/15/03		56	5.0
06/10/04–06/11/04		96	7.3

The aquatic life criterion for dissolved oxygen is > 4 mg/L (under specific sampling conditions and frequency).

Results

Lake Hazle began to show the beneficial effects of the BMPs after several years of vegetative growth and sediment retention. Their implementation resulted in an estimated soil savings of about 2,240 tons per year. Water quality studies gave additional quantitative evidence of the restoration's success. Studies in 2001 and 2003, for example, showed that nutrient, turbidity, and oil and grease concentrations in Lake Hazle were within acceptable water quality screening levels. In addition, DO data collected during three separate 24-hour monitoring events in 2003 and 2004 met water quality standards. Tables 1 and 2 summarize these findings.

On the basis of the monitoring results, nutrients, turbidity, organic enrichment, low DO, and oil and grease were eliminated as causes of impairment. Lake Hazle once again fully attained its aquatic life use support designation and was delisted in 2004.

Partners and Funding

This project was supported by $45,641 in section 319 funds. The Mississippi Soil and Water Conservation Commission (MSWCC) and participating landowners contributed an additional $47,168 in matching funds, in-kind services, and materials. MSWCC led in the selection and installation of BMPs. The local Soil and Water Conservation District, the city of Hazlehurst, and the Southwest Mississippi Resource Conservation and Development District oversaw public outreach efforts. Other partners included the Copiah County Soil and Water Conservation District, U.S. Environmental Protection Agency, Mississippi Department of Environmental Quality, and USDA Natural Resources Conservation Service.

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