Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Maine

Local Groups Key to Mousam Lake Restoration

Waterbody Improved

For decades, Maine's Mousam Lake received increased stormwater runoff from shoreland development, lawns, roads and aging septic systems. Phosphorus in the stormwater led to increased algal growth and subsequent impairments to water quality, including decreased water clarity and dissolved oxygen. Following 10 years of intensive nonpoint source (NPS) pollution control projects, water clarity in Mousam is three feet deeper, and the lake now attains water quality standards. The Maine Department of Environmental Protection (MDEP) removed Mousam Lake from its section 303(d) impaired waters list in 2006.

Problem

Mousam Lake, a three-mile-long lake in southern Maine, attracts boaters, anglers, and vacationers with its sandy shores and excellent cold and warm water fisheries. One of the largest lakes (863 acres) in Maine's southernmost county, Mousam's watershed encompasses 21 square miles, and its shoreline is heavily developed with 700 seasonal and year-round homes. In addition, the lake features a frequently used public boat ramp.

Lake residents and local activists first noticed problems with the lake's water quality in the late 1970s. Changes in the watershed, especially the gradual conversion of forested land into developed land and septic systems, resulted in increased stormwater runoff from residential areas, lawns and roads. Phosphorus in the stormwater led to excessive algal growth, which, in turn, caused increases in chlorophyll *a* levels and decreases in water clarity and dissolved oxygen. From 1980 to 1992, the lake experienced a steady decline in trophic state. In 1998 MDEP designated Mousam Lake as impaired for aquatic life support and added the lake to the state's section 303(d) list.

The Total Maximum Daily Load (TMDL) assessment developed for Mousam Lake in 2003 identified shoreland development as the largest source (51 percent) of phosphorus to the lake. Relatively high-density development in shoreland areas (i.e., numerous houses and gravel roads) increased stormwater runoff and erosion. In addition, aging septic systems in the sandy soils around the lake increased phosphorus in ground water that enters the lake. The TMDL estimated that the annual external phosphorus loading (556 kg/year) would need to be reduced by 27 percent (150 kg/year).

Project Highlights

Since 1997, the York County Soil and Water Conservation District (SWCD), Mousam Lake Region Association (MLRA), the towns of Acton and Shapleigh, and MDEP collaborated to identify and mitigate NPS pollution sources and foster long-term watershed stewardship. In 1997 a watershed survey documented key NPS pollution sites including erosion at residential sites, private camp roads and driveways. In 1999 a U.S. Environmental Protection Agency (EPA) section 319 grant was used to install and demonstrate conservation practices at six project sites and to initiate watershed stewardship and education programs (see Figure 1).

Figure 1. Vegetated buffer planting at the foot of Mousam Lake.

From 2001 to 2006, EPA, Maine Department of Agriculture and MDEP funded additional erosion control practices. Cost share agreements with public and private landowners resulted in best management practices being installed at 45 priority NPS sites and an associated reduction in pollutant loading to the lake by more than 150 tons of sediment and 130 pounds of phosphorus per year. Work included stabilizing erosion at developed shoreland properties and improving gravel road surfaces and roadside drainage. In addition, more than 250 other landowners received technical assistance to reduce erosion on their properties. The Mousam Lake Youth Conservation Corps (YCC) program was established

with section 319 funds in 2001 to install practices, raise local awareness and commitment to lake protection, and involve local youth in stewardship. The program was so effective and popular that the towns and MLRA fully funded the YCC from 2002 through 2007, enabling the YCC to complete 115 projects in the watershed.

In addition, more than 200 residents attended workshops known as Septic Socials to learn about septic system function, proper maintenance and water conservation. These socials, modeled after a successful Washington State Sea Grant program, were led by project staff and local septic system professionals, and hosted by local residents in their homes.

The high-profile work around Mousam Lake inspired lake protection efforts on several neighboring lakes. Most notably, the Acton Wakefield Watersheds Alliance (in Maine and New Hampshire) formed in 2004 and started its own YCC program.

Results

Following a decade of local watershed management and restoration efforts, Mousam Lake now meets water quality standards. As seen in Figure 2, water clarity in recent years (2002–2006) was one meter deeper than the lows experienced in the early 1990s (1989–1992). The water quality data trend from 1997 through 2006 indicates that Mousam Lake has a stable or improving trophic state and meets Maine's water quality standards for lakes. MDEP removed Mousam Lake from its 303(d) list in 2006 because all trophic parameters indicated a persistent improvement or stabilization of water quality/trophic state.

Partners and Funding

York County SWCD provided sustained leadership, technical services and grants management. Other key partners include Pat Baldwin (a longtime watershed resident and advocate for lake protection programs), the towns of Acton and Shapleigh, MLRA, MDEP, Maine Department of Transportation (MDOT), and EPA.

Since 1997, federal- and state-funded projects helped prompt widespread implementation of erosion control practices. EPA provided $230,000 in section 319 and 604(b) grants, and the Maine Department of Agriculture provided $40,000 toward these efforts. In addition, MDOT fixed three major erosion problems associated with state roads. The local match for the restoration work exceeded $400,000. Each year since 2002, the towns of Acton and Shapleigh have provided approximately $39,000 per year, for a total of $234,000, to fund the YCC program. In addition, MRLA provided a $17,500 cash match, and local residents, road associations and towns provided $151,000 of in-kind matches.

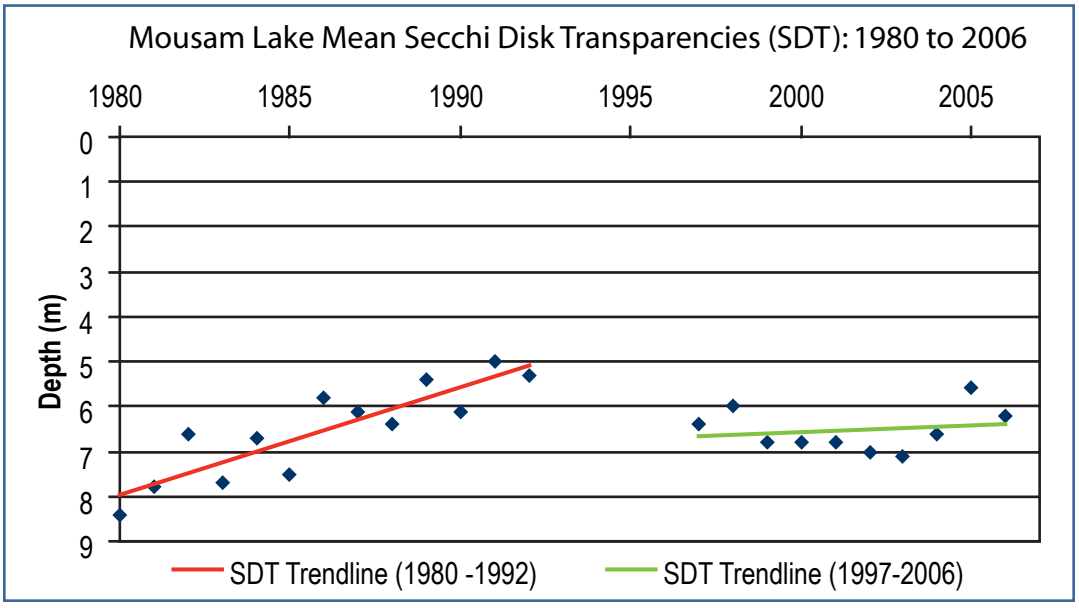

Figure 2. Mousam Lake Mean Secchi Disk Transparencies (SDT) from 1980 to 2006. Annual mean Secchi depth readings from 1980 to 1992 indicate a trend (red line) toward reduced water clarity. Secchi readings from 1997 to 2006 indicate a trend (green line) toward stable and improved water clarity. (Note: no data were collected between 1993 and 1996.)

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

EPA 841-F-08-001A
February 2008

For additional information contact:

Wendy Garland, Maine DEP
207-822-6300 • wendy.garland@maine.gov

Joe Anderson, York County Soil and Water Conservation District
207-324-0888 • janderson@yorkswcd.org