Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Maine

Cobbossee Lake Restored: 35 Years of Sustained Work Succeeds

Waterbody Improved

Cobbossee Lake had a long history of nuisance algae blooms that turned its once sparkling clear, trout-filled water murky green. Nonpoint source pollution in Cobbossee Lake's watershed, as well as pollution from upstream lakes, delivered excess phosphorus into the lake. Elevated phosphorus levels promoted algae blooms, which discouraged recreation, spoiled aquatic habitat, and caused the lake to not meet water quality standards. After 35 years of restoration work, including upstream alum treatments and widespread installation of best management practices (BMPs), Cobbossee Lake exhibits remarkably improved water clarity. The lake has been free of nuisance algae blooms for the past 10 years and now attains water quality standards. This impressive recovery prompted the Maine Department of Environmental Protection (DEP) to remove Cobbossee Lake from Maine's section 303(d) impaired waters list in 2006.

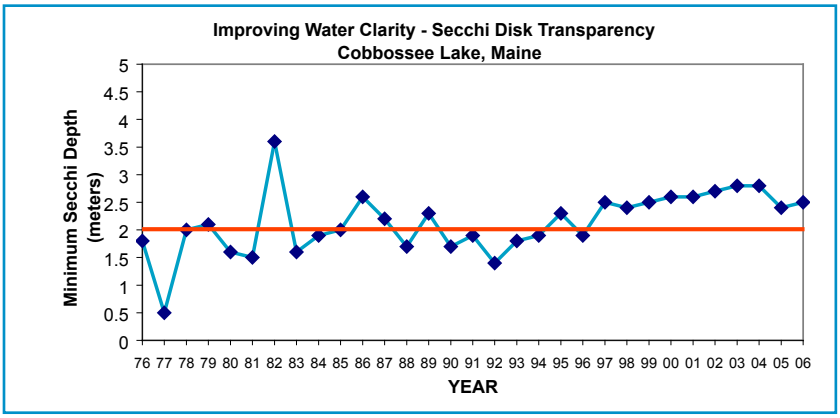
Problem

Cobbossee Lake (short for Cobbosseecontee), a large 5238-acre lake in central Maine, is valued by people for fishing, swimming, boating, and wildlife. One of Maine's premier bass fishing lakes, Cobbossee Lake is also a secondary source of drinking water for Maine's capital—Augusta.

In the 1960s water quality in Cobbossee Lake began to deteriorate. Elevated nutrient (i.e., phosphorus) levels spurred the growth of noxious blue-green algae, which reduced water clarity, formed green surface scums, and depleted oxygen in the bottom waters of the lake. The excess phosphorus in Cobbossee Lake's watershed was caused by soil erosion and runoff from agricultural, residential, and commercial lands, and the gradual conversion of forested land into developed land. The other significant source of phosphorus came from Annabessacook Lake, immediately upstream of Cobbossee. At one time, Annabessacook received sewage discharges from the town of Winthrop, and this nutrient-rich sewage caused algae blooms. Although sewage discharges to Annabessacook Lake were eliminated by 1977, the phosphorus in the lake's sediments continued to recycle and flow into Cobbossee Lake.

The Total Maximum Daily Load (TMDL) assessment developed for Cobbossee Lake in 1995 estimated that two-thirds of the external phosphorus load came from the lake's direct 32–square-mile watershed, and one-third came from the indirect upstream watershed. Agriculture accounted for about 60 percent of the phosphorus and developed lands accounted for about 40 percent of the phosphorus load. The TMDL showed that in-lake phosphorus needed to be reduced to 15 parts per billion (ppb), or 5,904 kg P/yr, for Cobbossee to attain Maine's water quality criterion for water clarity (more than 2 meters of Secchi Disc Transparency).

Governor Baldacci (left) and DEP Commissioner Littell (right) recognize cleanup of Cobbossee Lake



Minimum Secchi Depth readings (1976–2006) indicate no nuisance algal blooms have occurred since 1997. Maine's definition of a nuisance algae bloom is a minimum Secchi Disc Transparency of less than 2.0 meters in lakes.

Project Highlights

Cobbossee Watershed District (CWD), formed in 1973, collaborated with nine municipalities, Maine DEP, and federal agencies to restore Cobbossee Lake. In the 1970s and 80s, funding from EPA's Clean Lakes Program and United States Department of Agriculture's (USDA) Farm Bill Program helped farmers reduce polluted runoff on 31 dairy farms. Other farmers in this area received technical support from Maine DEP and USDA.

EPA funded two alum treatments that contributed to Cobbossee Lake's recovery. Alum forms an aluminum hydroxide precipitate that removes phosphorus from the water column and forms a long-lasting barrier on the lake bottom that substantially reduces phosphorus released from sediment. In 1978, CWD conducted an alum treatment in Annabessacook Lake. In 1986, an alum treatment and watershed BMP-implementation at another upstream lake, Cochnewagon, further reduced phosphorus inputs to Cobbossee Lake.

In addition, CWD helped towns and landowners adopt erosion control BMPs at homes, on town roads, and on private camp roads. In the early 1990s, five towns adopted ordinances requiring that new developments be designed to meet strict phosphorus allocation standards for stormwater runoff. Under two EPA section 319-funded projects in the 1990s, a significant number of erosion control and nutrient management practices were installed on dairy farms, along roads, and on residential properties. One of these section 319 projects was in Jock Stream, a major tributary responsible for one-third of the phosphorus loading from Cobbossee Lake's direct watershed.

Results

Cobbossee Lake now meets water quality standards, which in Maine means that the lake has a stable or improving trophic state and has been free of culturally induced algae blooms. Maine DEP removed Cobbossee Lake from the state's 303(d) list during the 2006 cycle.

Partners and Funding

CWD provided sustained leadership, water quality assessment, and technical services. Many local, state, and federal partners contributed funding and services over the years. Key partners include watershed towns, the Kennebec County Soil and Water Conservation District (SWCD), USDA, Maine DEP, EPA, Maine Department of Transportation, Cobbossee Lake Association, Annabessacook Lake Improvement Association, and Friends of Cobbossee Watershed.

From 1975 to 1985, EPA provided more than $1 million in Clean Lakes grants for diagnostic studies and restoration activities, including alum treatments and BMP installations, throughout the CWD. Two EPA section 319-funded projects helped control NPS in the watershed. From 1995 to 1998, CWD demonstrated effective erosion and sediment control BMPs using $35,820 in section 319 funds and $23,880 in matching funds. From 1999 to 2004, Kennebec County SWCD reduced phosphorus and sediment export from roads and farms in the Jock Stream watershed using $220,040 in section 319 funds and $152,117 in matching funds.

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For additional information, contact:

Norm Marcotte, Maine Department
of Environmental Protection
207-287-3901 • norm.g.marcotte@maine.gov

William Monagle, CLM, Cobbossee Watershed District
207-377-2234 • cwd@fairpoint.net