



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Vermont

Local Farmers Help Restore South Bay by Reducing Phosphorus in Runoff

Waterbody Improved

Beginning in the 1960s and 1970s, phosphorus inputs from agricultural lands caused South Bay to exceed Vermont's water quality criterion for phosphorus. The state added the bay to its Clean Water Act section 303(d) list in 1992 on the basis of available phosphorus data. Since then, landowners throughout the watershed have implemented conservation practices designed to control phosphorus associated with manure, fertilizers and sediment. Monitoring from 2005 to 2007 showed that the bay now attains water quality standards, and Vermont is proposing to remove it from the section 303(d) list in 2008.

Problem

South Bay is a fairly shallow body of water at the southern end of Lake Memphremagog, a large lake spanning the border between Vermont and Quebec (Figure 1). The 470-acre South Bay is fully on the Vermont side of the border, near the city of Newport in Orleans County. The Vermont Department of Environmental Conservation (VTDEC) classifies South Bay as a Class B water, a designation defined as "suitable for bathing and recreation, irrigation and agricultural uses; good fish habitat; good aesthetic value; acceptable for public water supply with filtration and disinfection."

Vermont's water quality standards specify a phosphorus criterion of 25 micrograms per liter ($\mu\text{g}/\text{L}$) for South Bay, a standard first adopted in 1991. The Vermont water quality standards express the 25 $\mu\text{g}/\text{L}$ as an annual average value. Phosphorus monitoring data from the 1960s and 1970s show that South Bay exceeded the 25 $\mu\text{g}/\text{L}$ criterion; therefore, VTDEC placed South Bay on its section 303(d) list in 1992.

A 1993 report by the Quebec/Vermont Working Group Managing the Lake Memphremagog and Its Environment identified the primary cause of impairment to be nonpoint source runoff from the large number of farms in the two tributary watersheds that were operating without basic conservation practices. Four small wastewater treatment plants were also operating in these watersheds and contributing some phosphorus to the bay, but the majority of phosphorus inputs were linked to agricultural nonpoint sources.



Figure 1. This Google Earth™ image shows South Bay, VT. A small portion of Lake Memphremagog is visible in the upper left.

Project Highlights

Between 1985 and 2004, the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and the Vermont Agency of Agriculture, Food and Markets worked with local farmers to establish conservation practices on about 90 of the approximately 140 farms in the Barton River and Black River watersheds—the two watersheds draining to South Bay. Funding from the USDA's PL83-566 Small Watershed Program helped support conservation work in these watersheds in the early 1980s. EPA section 319 funds (mid-1990s)

and a special EPA congressional earmark grant (early 2000s) helped reduce landowner cost-share amounts for conservation practices to boost farmer participation in the program. Vermont Agency of Agriculture funds allowed yet more farms to join the program between 1998 and 2004. The farmers implemented conservation practices that primarily addressed manure storage, barnyard runoff management and nutrient management.

Results

The data presented in Table 1 show that the phosphorus levels exceeded the standard frequently in the early years (1960s and 1970s). South Bay phosphorus data were not collected during the 1980s and 1990s, but sampling resumed in 2005. While the phosphorus levels slightly exceeded the criterion of 25 µg/L in 2005, data from both 2006 and 2007 indicate compliance with the standard. Accordingly, the state is proposing that South Bay be removed from the 303(d) list in 2008.

Table 1. South Bay average annual phosphorus levels

Year	Mean Phosphorus Concentration (µg/L)
1966	33.0
1969	26.2
1970	95.0
1972	59.6
1974	17.0
1975	18.4
1976	19.1
1977	26.0
2005	25.2
2006	23.0
2007	23.5

Source: VTDEC

Partners and Funding

USDA's Natural Resource Conservation Service provided primary financial and technical assistance, through the PL83-566 Small Watershed Program and the Environmental Quality Incentive Program. USDA cost-share assistance to agricultural conservation projects within the Barton and Black River watersheds totaled approximately \$1.3 million between 1985 and 2004. EPA contributed approximately \$300,000 through both the Clean Water Act section 319 program and a separate grant authorized by Congress. The Vermont Agency of Agriculture, Food and Markets contributed an additional \$270,000 in cost-share assistance and provided engineering design services for conservation practices installed during the later years of the project period. Farmers and landowners contributed approximately \$630,000 in matching funds for the conservation practices. The Orleans Natural Resources Conservation District provided nutrient management assistance to farmers and helped coordinate and oversee the project. VTDEC conducted water quality monitoring and supported the development of watershed plans for this basin.



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