Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
New Hampshire

Stakeholders Cooperate to Control Sediment Inputs and Restore Navigability

Waterbody Improved

By the late 1990s navigation in Middle Brook canal was extremely difficult and the upper end of the canal was impassable due to sediment deposition and resulting shallow water depths. The sediments in the canal were largely attributed to runoff from eroding unpaved roadways, flooding caused by an undersized culvert, and erosion from a nearby boat ramp and beach. The canal was listed as impaired for secondary contact recreation on New Hampshire's 2004 303(d) list. To reduce erosion and sedimentation throughout the sub-watershed, the Balmoral Improvement Association (BIA) partnered with state and local agencies on stormwater management projects. BIA and the New Hampshire Department of Environmental Services (DES) also partnered on a successful dredging project to restore the canal to navigable depths. As a result, Middle Brook Canal is no longer impaired for secondary contact recreation, and DES removed the impairment from New Hampshire's 2006 303(d) list of impaired waters.

Problem

Middle Brook is a tributary that enters Lake Winnipesaukee's Moultonborough Bay in the town of Moultonborough. Situated in a 75-acre sub-watershed, the canal is a 2,000-foot-long by 50-foot-wide man-made inlet at the mouth of Middle Brook (Figure 1). The canal provides access to boat docks for 39 canal-front residents. There is a boat ramp and a beach located on the southeast corner of the canal's confluence with Moultonborough Bay. The canal is within the Balmoral homeowner's association neighborhood. Balmoral consists of approximately 400 homes, about half of which are seasonal homes, and the other half are primary residences.

Historically the canal's approximately 10-foot depth allowed for the safe passage of boats into Lake Winnipesaukee. Residents who routinely used the canal began noticing sediment accumulation and reduced canal depth as early as the 1980s. By 2003, sediments from unpaved roads, undersized culverts, and an eroding boat ramp and beach resulted in drastically reduced water depths and visible sediment deltas. In addition to causing navigation difficulties, the sediments reduced water depths and exacerbated the growth of invasive species and other aquatic plants. By 2004, Middle Brook Canal was listed as impaired on New Hampshire's 303(d) list for secondary contact recreation due to sedimentation/siltation.

Figure 1. Summer 2008 photograph showing boats in the restored Middle Brook Canal.

Project Highlights

BIA undertook several projects in the sub-watershed to reduce sediment inputs to the canal. Beginning in 2000, BIA hired contractors to install a concrete boat ramp and "no wake" buoys to mitigate boat-related erosion and sediment transport. To reduce erosion caused by flooding and high flow velocities, BIA worked with engineers and consultants to increase the size of the canal's inlet culvert. BIA also hired crews to crown roads, pave critical sections of dirt roads, stabilize roadside swales, and implement a street sweeping program.

BIA worked with the DES Invasive Species Program to identify invasive species, and then collaborated on an agreement with a contractor who chemically treated milfoil growing in the canal.

After addressing the major erosion problems in the watershed, BIA received a U.S. Environmental Protection Agency (EPA) section 319 grant to restore the canal to navigable depths. An engineering firm hired by BIA completed a dredging plan, submitted permit applications for approval, and collected sediments for laboratory analysis. A local dredging company then removed tons of accumulated sediment from the canal (Figure 2) and created a 5.5-foot deep trapezoidal channel to allow for safe boat passage.

Figure 2: Dredge removing accumulated sediment from the mouth of Middle Brook Canal (Fall 2004).

To protect the canal from future sedimentation, BIA continues to operate a street sweeping program. In addition, BIA conducted a public education campaign to help reduce erosion and halt the spread of invasive species. Through project signs and key chains, boaters were asked to refrain from power-loading boats onto trailers, warned against spreading milfoil, and reminded of the no wake zone in and around the canal. Information was also provided to residents on best management practices, such as proper yard waste disposal, that should be followed around the home.

Results

After several years of BMP installations, dredging, street sweeping, and public education efforts, Middle Brook Canal has been returned to a navigable channel which is no longer impaired by sedimentation/siltation. The dredging removed approximately 3,780 tons of sediment from the canal. Post-implementation surveys indicated that boaters could navigate the canal without difficulty. Secondary contact recreation was restored in the canal and the impairment was removed from NH's 2006 303(d) list; however, Middle Brook Canal remains listed for mercury.

Partners and Funding

The work to restore recreational uses at Middle Brook Canal involved the cooperation of BIA, local residents, the town of Moultonborough, DES, and EPA. BIA funded and managed all of the erosion and sediment control projects, and also provided the required non-federal cash match through a coordinated fundraising effort with all 39 canal-front residents. DES provided technical assistance and administered the EPA section 319 grant that funded a portion of this project. The town continues to provide street sweeping for some of the area roads.

In 2003 EPA provided a $51,126 section 319 grant to dredge and restore the canal to navigable depths. BIA provided $51,057 in cash and in-kind match and completed the project in 2005. In 2001 BIA provided $23,000 for roadway runoff improvements, and $10,160 for the new boat ramp and no-wake signs. Funding and in-kind services continue to be provided by BIA and the town for ongoing road runoff maintenance activities. In addition, between 2000 and 2003 BIA provided $7,500 for milfoil treatment.

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