



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Vermont

Logging Management Restores Dowsville Brook

Waterbody Improved

Erosion and sediment runoff from poorly managed logging operations degraded the biological communities in Vermont's Dowsville Brook and Dowsville Brook Tributary #1. As a result, Vermont placed both streams (combined into one listed segment) on its 1998 Clean Water Act (CWA) section 303(d) list for aquatic life use impairments due to excessive sediment. Implementing Vermont's accepted management practices for logging operations and the subsequent cessation of logging in the watershed brought the streams into compliance with Vermont's water quality standards. Vermont removed this segment from the CWA section 303(d) list in 2010.

Problem

Dowsville Brook (Figure 1) is a 4-mile-long stream in north-central Vermont that drains a forested watershed bordering Camel's Hump State Forest in the Town of Duxbury. The headwaters of the Dowsville Brook watershed are at approximately 1,900 feet of elevation. Tributary #1 feeds into Dowsville Brook near its mouth in the vicinity of Vermont Route 100. The Vermont Department of Environmental Conservation (VTDEC) has classified the streams as Class B waters—a designation defined as "suitable for bathing and recreation, irrigation and agricultural uses; aquatic biota sustained by high quality habitat; good aesthetic value; acceptable for public water supply with filtration and disinfection."

VTDEC monitored macroinvertebrates in both streams using several different techniques, including the EPT index (short for the macroinvertebrate order names Ephemeroptera, Plecoptera and Trichoptera). The index is a measure of number and types of pollution-sensitive, aquatic insects inhabiting a waterbody. Streams with a high EPT value contain a greater richness (diversity) of pollution-sensitive aquatic insects, indicating higher water quality. VTDEC also assessed macroinvertebrate densities (total number of organisms present) and the percentage of macroinvertebrates consisting of pollution-tolerant worms of the taxonomic class Oligochaeta.

Biological monitoring found that short segments (approximately 0.5 miles) of each stream did not fully meet Vermont's Class B water quality standards for aquatic life in 1997. Both segments had low macroinvertebrate densities and the Dowsville Brook segment had a low EPT value as well. These

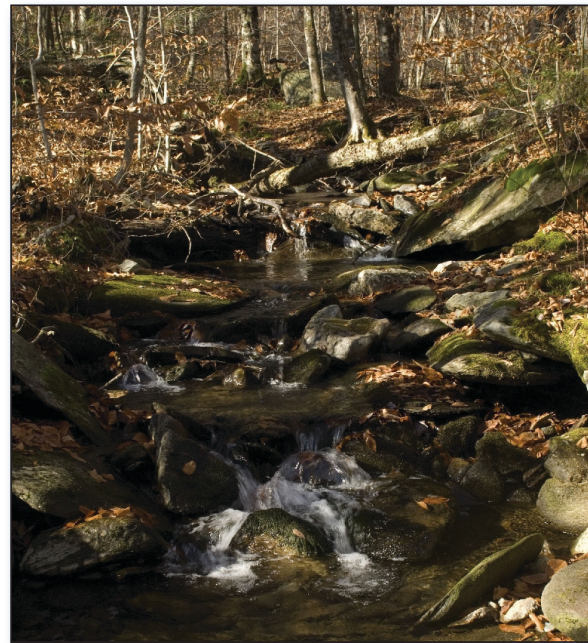


Figure 1. Dowsville Brook is near the Town of Duxbury, VT.

findings put the segments in noncompliance with Vermont Class B water quality standards for aquatic life support. As a result, Vermont placed the two stream segments (combined into listing VT08-19) on its CWA section 303(d) list of impaired waters in 1998. VTDEC attributed the impairments to sediment in runoff from logging road construction areas, stream crossings and forest clear-cuts. The sediment smothered benthic (bottom-dwelling insect) habitat in the streams.



Figure 2. A VTDEC staff member collects biomonitoring data.

Project Highlights

Major logging operations occurred in both watersheds in 1997. Large amounts of sediment from logging roads (both during and after construction) were transported by runoff to streams. In addition, a large clear-cut operation occurred in the Tributary #1 watershed, resulting in substantial erosion of soil from the steep terrain. Part way through the logging operation, the logging company installed several practices consistent with Vermont's accepted management practices for logging operations, including inserting a plastic liner under a main bridge crossing Dowsville Brook, installing waterbars to dissipate flows along the roads, and adding silt fences and hay bales to slow water flow and capture sediment. The logging operations ended in 1998, and the tree canopy was found to be 90 percent restored by the next stream monitoring effort in 2008 and 2009.

Results

Implementing logging erosion management practices helped to control sediment transported from a temporary logging operation. Cessation of the logging operation allowed the remaining damaged areas of the watershed to revegetate naturally. Biomonitoring conducted in 2008 and 2009 (Figure 2) shows that biological integrity has improved as a result. Data show that Dowsville Brook experienced substantial increases in macroinvertebrate density and EPT richness between the 1997 and 2009 sample dates (Table 1). As a result, VTDEC assigned Dowsville Brook a rating of "excellent-very good" in 2009. Data for Dowsville Brook Tributary #1 showed

Table 1. Dowsville Brook and Tributary #1 Biomonitoring Results (1996–2009)

Sampling site	Date	Assessment Rating	EPT Index Score	Macroinvertebrate Density (Individuals/Square Meter)	Percent of Individuals from Oligochaeta
Dowsville (mile 4.1)	9/9/1996	Excellent	22	653	0
	10/9/1997	Fair	15	183	1.1
	9/4/2009	Excellent-Very good	21	754	0.3
Dowsville Tributary #1 (mile 1.7)	9/26/1997	Fair	18	216	0.89
	10/24/2008	Very good	24	1452	0.87
	10/2/2009	Good	16	1296	0.94
Class B Guideline			≥ 16.0	≥ 300	≤ 12.0

Note: Values in red indicate non-compliance.

little change in EPT (the Class B guideline was met for all three sample years), but did show a major increase in density, earning ratings of "very good" and "good" in 2008 and 2009, respectively. All of these ratings indicate compliance with Vermont's water quality standards.

The data indicate that the erosion control practices and subsequent re-growth of the forest canopy reduced sediment delivery to the streams, improved stream habitat and allowed both streams to meet Vermont water quality standards by the fall of 2009. As a result, the state removed listing ID VT08-19 (which includes both the Dowsville Brook and Dowsville Brook Tributary #1 segments) from its CWA section 303(d) list in 2010. The streams are scheduled to be monitored again in 2014.

Partners and Funding

A few key partners worked to minimize the erosion caused by logging in the Dowsville Brook watershed. VTDEC staff conducted site bioassessments and aquatic studies. Vermont Department of Forests, Parks and Recreation provided oversight and technical assistance to the state's logging contractor to ensure proper implementation of Vermont's accepted management practices for logging operations. Approximately \$3,000 in CWA section 319 funds supported stream monitoring work by VTDEC.



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

EPA 841-F-11-001II
September 2011

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