Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Vermont

Cleanup of Leaked Petroleum Restores Whetstone Brook

Waterbody Improved

Oil leaking from a nearby underground storage tank caused sheens and degraded biological communities in Whetstone Brook. This resulted in the state placing the waterbody on its 303(d) list in 1998 for aesthetic and aquatic life support use impairments. Project partners removed the storage tank and much of the leaked oil from the area. Several years later, biological assessments showed that Whetstone Brook once again met state water quality standards. Vermont removed the brook's aesthetic and aquatic life use impairments from its 303(d) list in 2004.

Problem

Whetstone Brook, a 7-mile stream in the southern Vermont town of Brattleboro, is a tributary within the state's Lower Connecticut River Basin. The Vermont Department of Environmental Conservation (VT DEC) classifies Whetstone Brook 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."

In 1990 citizens and VT DEC staff first observed oil sheens in a 0.2-mile segment near the mouth of the brook. The following year, VT DEC located the petroleum source—a leaking underground storage tank at a nearby gas station. Cleanup efforts began immediately.

VT DEC monitoring staff member taking field notes on Whetstone Brook. Monitoring is scheduled to resume in 2008.

The leak and residual groundwater contaminant plume created an aesthetic nuisance and impaired aquatic life for several years. VT DEC monitored macroinvertebrates in Whetstone Brook using the EPT index—a measure of pollution-sensitive, aquatic insects inhabiting a waterbody. Streams showing high EPT richness are less likely to be polluted than streams showing low richness in the same geographic region. In addition, VT DEC evaluated Whetstone Brook's biotic integrity (BI), which measures the presence of pollution-tolerant species. High BI values characterize streams with poor water quality and dominated by pollution-tolerant species.

Monitoring results indicated that Whetstone Brook failed to meet Vermont's Class B water quality standards for aesthetics and aquatic life support. As a result, Vermont placed Whetstone Brook on its 303(d) list of impaired waters in 1998. VT DEC identified oil/grease as the primary cause of impairment.

Project Highlights

Once VT DEC identified the pollution source, the agency and gas station owner quickly initiated work to remove the storage tank and recover much of the leaked oil. By 1996, they had removed the storage tank and—with the help of a soil vapor extraction system—up to 4,000 gallons of oil from the surrounding soil and groundwater.

Even with the cleanup effort, however, residual petroleum in contaminated groundwater continued seeping into the brook until late 1999. VT DEC continued to monitor biological communities, look for oil sheens, and measure oil seepage along the streambank.

Results

The accompanying table compares key Whetstone Brook biomonitoring results with Class B water guidelines. Data highlighted in bold indicate the waterbody's failure to meet aquatic life support biocriteria for Vermont Class B waters. These data led to Whetstone Brook being added to Vermont's 303(d) list in 1998.

The monitoring team reassessed the segment in 2002 and found significant biological improvement. However, before 2004 (when Vermont revised its listing methodology for impaired waters), a waterbody could not be removed from the state's impaired list until 2 years of biological monitoring data showed compliance with water quality standards. Such compliance was confirmed in 2003. The EPT richness, BI values, and other biological indicators for both years remained well within the Class B guideline. In addition, the team found no evidence of oil sheens either year.

Because of these findings, VT DEC concluded that oil/grease no longer impaired Whetstone Brook's aesthetic and aquatic life uses. As a result, Vermont removed the waterbody from its 303(d) list in 2004. Whetstone Brook is scheduled to be monitored again in 2008.

Partners and Funding

Remediation costs for this effort totaled $440,000, with $430,000 coming from Vermont's Petroleum Cleanup Fund and the remainder from the service station owner. VT DEC spent another $68,000 on the groundwater investigation that tracked the leaking oil to its source. In addition, approximately $3,000 in section 319 funding supported the participation of agency monitoring staff.

Whetstone Brook Biomonitoring Results

Sampling site	Date	Assessment rating	EPT	BI
0.2	9/15/1998	Fair	**17.0**	**4.56**
0.2	9/17/2002	Very good	23.0	2.78
0.2	9/11/2003	Very good	20.5	3.33
		Class B Guideline	> 16.0*	< 4.50

* In 1998, the Class B Guideline for EPT was 18. Vermont changed the guideline to 16 in 2002.

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