



NONPOINT SOURCE SUCCESS STORY

Maine

Septic System Repairs and Manure Storage Practices Reduce Bacteria Levels in Pottle Brook

Waterbody Improved

High *Escherichia coli* bacteria from both human and animal sources caused the Maine Department of Environmental

Protection (DEP) to place Pottle Brook on its 2002 Clean Water Act (CWA) section 305(b)/303(d) list of impaired waters. Maine DEP partnered with the local government to conduct sanitary surveys that identified problem areas needing to be addressed. Implementing best management practices (BMPs), including the repair and replacement of a number of septic systems by property owners and improvements in manure storage practices by a horse paddock owner, reduced bacteria levels in the brook to those that are closer to the Maine Class B water quality standard. The downward trends in bacteria levels and improved water quality are expected to continue.

Problem

Pottle Brook is a small Class B stream in Perry and Robbinston, Maine, with a length of 2 miles and a watershed area of 3.1 square miles (Figure 1). The brook flows easterly and drains into Passamaquoddy Bay. The sparsely populated watershed is only 1 percent developed; the predominant cover type is forest (82 percent), with a small amount of agriculture (3.4 percent) consisting primarily of hayfield.

In 2002 Pottle Brook (segment ME0105000203_508R02) was included in Maine's Integrated Water Quality Monitoring and Assessment Report (CWA section 303[d] report) because monitoring data showed that *E. coli* bacteria levels exceeded the Maine Class B geometric mean water quality standard of 64 most probable number per 100 milliliters (mpn/100 mL). DEP suspected the excessive bacteria in the brook could be due to malfunctioning septic systems, animal waste, pet waste or other nonpoint sources.

Project Highlights

Maine DEP conducted water quality monitoring at five locations (Figure 2) from 2007 through 2015 to better understand the nature of the impairment and to help identify bacteria sources. Five sampling locations were distributed throughout the watershed, with two located on the mainstem and three on tributaries. The sampling sites included NPT01 (on the mainstem at U.S. Route 1) and NPTUA05 (on the Lake Road tribu-



Figure 1. The Pottle Brook watershed (dark green).

tary). In 2009 Maine DEP developed a statewide total maximum daily load for bacteria, which included an assessment of Pottle Brook.

To determine the sources and location of bacteria in the Pottle Brook watershed, Maine DEP and the town of Perry conducted sanitary surveys in 2010–2011 that resulted in 19 properties being inspected (Figure 3). Of the inspected sites, six were identified as having septic system and/or animal waste problems, several of which were located adjacent to a tributary of the brook

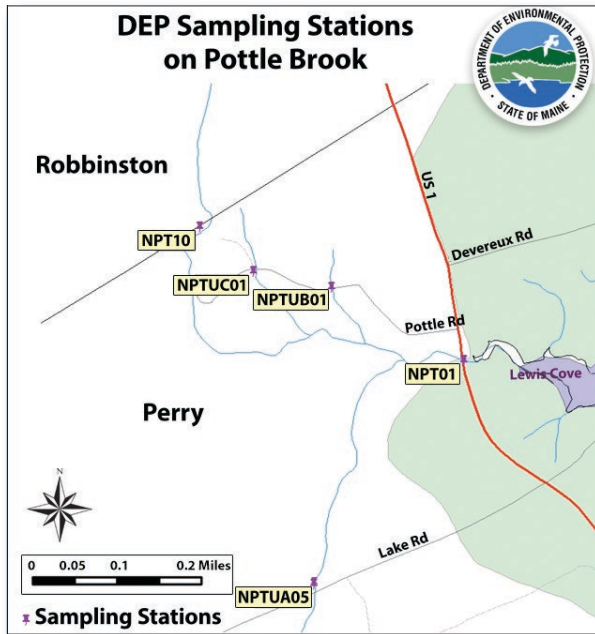


Figure 2. Sampling sites in the Pottle Brook watershed.

that runs under Lake Road (“Lake Road tributary”). The town of Perry prompted property owners with identified issues to address problems and, as a result, homeowners replaced or repaired malfunctioning septic systems, and a horse paddock owner in the watershed adopted better manure management practices for a paddock containing approximately 15 horses. Six sites were treated overall, including four within the Lake Road tributary subwatershed of Pottle Brook.

Results

Bacteria levels have dropped over time. In 2007 and 2010 the *E. coli* bacteria geometric mean for water samples taken from Pottle Brook at sampling site NPT01 was 84 and 129 mpn/100 mL, respectively, exceeding the Maine geometric mean standard of 64 mpn/100 mL for class B waters. In 2015 water quality sampling showed that the *E. coli* geometric mean for Pottle Brook lowered to 77 mpn/100 mL. Also in 2015, five of the six samples were well below the instantaneous (single sample) standard of 236 mpn/100 mL.

This improvement in water quality on the mainstem of Pottle Brook can be partly attributed to reduced bacteria levels observed in the Lake Road tributary (at site NPTUA05), where several malfunctioning septic systems were repaired. In 2010 the geometric



Figure 3. DEP employee performs sanitary survey.

mean for the Lake Road tributary was 154 mpn/100 mL. Following septic system repairs, bacteria levels lowered to less than 44 mpn/100 mL, which attains the class B standard of 64 mpn/100 mL (Figure 4).

Partners and Funding

The town of Perry (including its licensed plumbing inspector, property owners and a horse paddock owner) partnered with the Maine DEP’s Division of Environmental Assessment and Division of Water Quality Management to perform sanitary surveys, oversee septic system repair/replacement and improvements in animal waste management. U.S. Environmental Protection Agency CWA section 319 funds supported DEP staff services and Americorps volunteer participation.

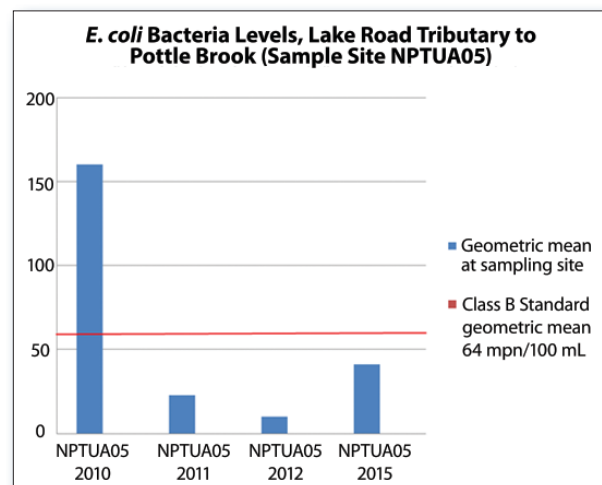


Figure 4. Bacteria levels declined after project implementation.



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

EPA 841-F-16-001FF
November 2016

For additional information contact:

Greg Beane
Maine DEP, Division of Environmental Assessment
207-299-4703 • greg.e.beane@maine.gov