



Project Background

Mackworth-Enviro partnered with a lake association in Sanford, Maine to address nutrient runoff from a local golf course higher up in the watershed.

The project was a pilot application for Mackworth’s nutrient barrier technology, with a target of 40% reduction in total phosphorus from the inlet stream. The Mackworth team designed, fabricated, and installed a three-barrier system, or NRB (nutrient reduction barrier), within Country Club Brook.

The main project goals were to reduce the concentration of phosphorus entering the lake, reduce algae and aquatic plant growth, and enhance overall water quality.

Design and Performance Results

The system design was based on results of prior applications in NY, IN, and ME. The first two barriers focused on filtration, with the first barrier screening out larger debris and the second barrier acting as the workhorse for filtering fine sediments. There was also a third experimental barrier downstream that was designed to test the efficacy of various reagents for further dissolved nutrient removal.

The data was collected during three sampling seasons (May- September) from 2018 to 2020.

Over the course of three years, the Bauneg Beg Lake system averaged a 55% total phosphorus removal and a 60% ortho-phosphate removal from the inlet stream per season.

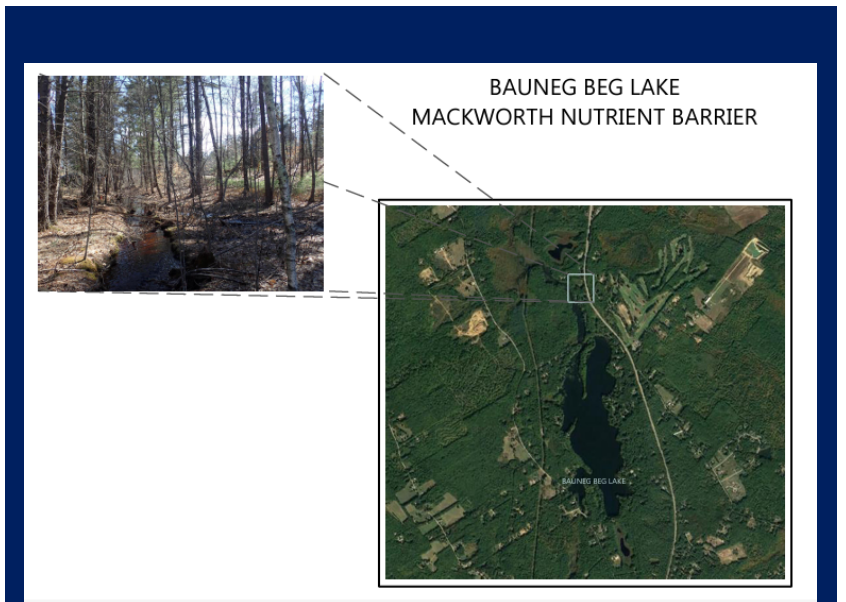


Figure 3. Aerial view and closeup of project site



Figure 4. Map of County Club Brook with sampling locations

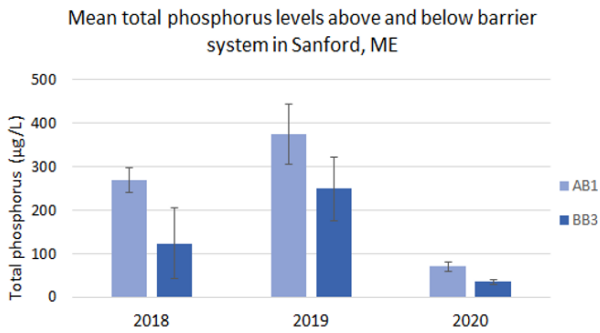


Figure 1. Mean total phosphorus levels above (AB1) and below (BB3) barrier system from 2018-2020

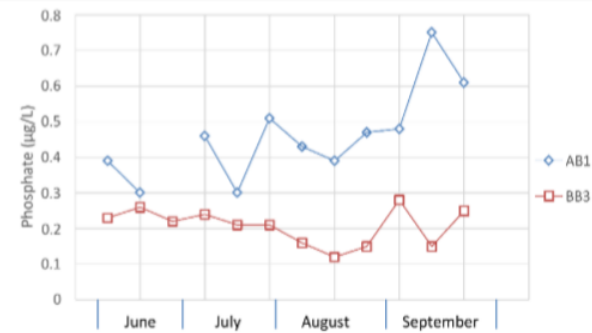


Figure 2. Ortho-phosphate levels above (AB1) and below (BB3) barrier system over time in the 2019 season

Discussion and Next Steps

The plan is to continue research on different reagents and experimental design. Mackworth also teamed up with a group of researchers at the University of Southern Florida for another NRB demonstration project.

While this project exemplifies application on a small scale, Mackworth technology can scale to much larger projects as well.

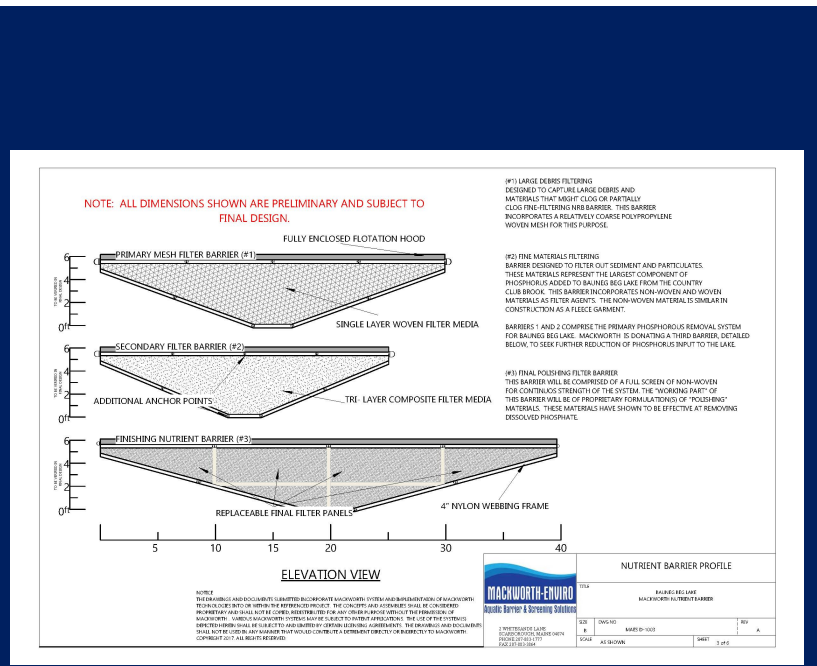


Figure 5. Tri barrier system engineering design

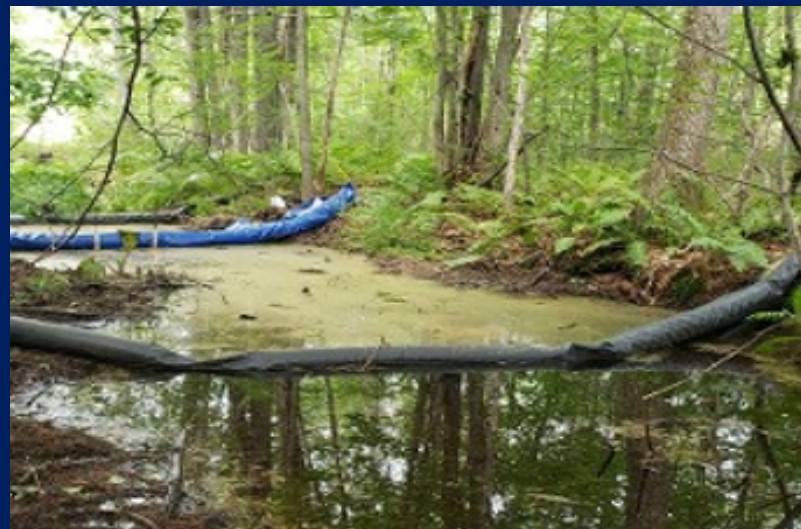


Figure 6. Downstream view of deployed system

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