



Project Background

In 2014, Mackworth completed its TechStart grant to test their Nutrient Reduction Filter Barriers. MTI awarded Mackworth a Seed Grant to conduct technology testing at selected southern Maine lake locations, and to demonstrate and refine the technology to maximize the reduction of nutrients, especially phosphorus, entering lakes and ponds through a stream or culvert. This technology can be used by itself to reduce the nutrient loading being added to a lake system, or it can be used in conjunction with lake remediation treatment systems to increase the clarity, dissolved oxygen levels, and overall water quality.

The NRBs were deployed as technology demonstration and testing/development systems in late June at two Maine lakes, Long Lake, and Crystal Lake. Each barrier was made of impermeable material with windows for installation of test panels with various combinations of filtering geotextiles and treatment for removing dissolved nutrients, especially phosphates. The work was supported in part by seed grant funds from the Maine Technology Institute. Mackworth was supported by a regional team of partners and professionals including Dr. Karen Wilson, a professor in ecology and limnology at the University of Maine, the Maine non-profit Lakes Environmental Association, the town of Bridgton and the City of Portland, Maine-based international geotextile manufacturer TexTech, Lake Savers of Michigan, and Spilldam Environmental of Massachusetts.

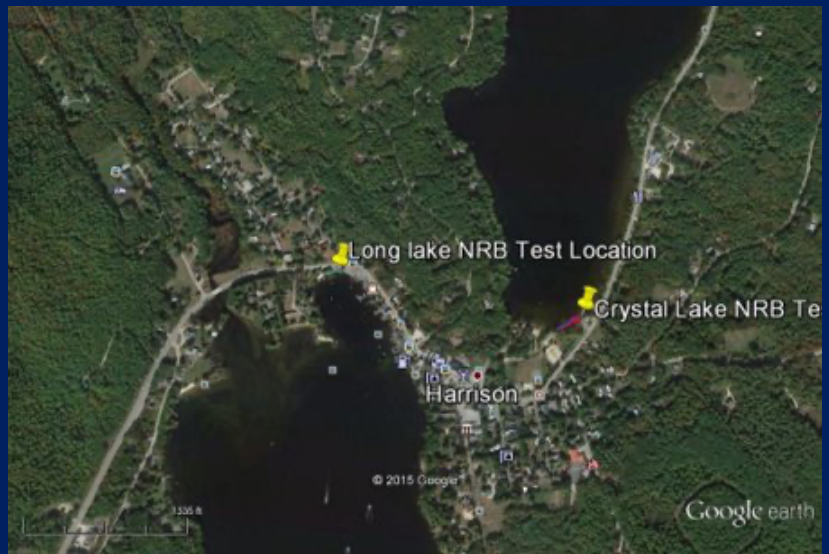


Figure 1. Aerial view of barrier placements (yellow pins) for NRB technology demonstration project



Figure 2. Deployed barriers at Crystal Lake (left) and Long Lake (right)

Performance Results and Discussion

Results indicated the presence of the barrier had a positive effect in reducing suspended solids and nutrients entering into the lake.

Testing of the performance of individual filter panels yielded results that were not conclusive. Two reasons for this were identified. One was the lack of rain through much of the summer. In the absence of stormwater flows, there are no appreciable amounts of sediment and nutrients inside the barrier or outside, so the effect of settling and filtration is not in play. The second confounding variable on the panel testing was an anomaly of the sampling procedure that was not anticipated nor considered until late in the program. This aspect was further addressed by additional sampling (November), but low flows and low suspended sediment and nutrient concentrations were present at that time.

Since this demonstration, Mackworth-Enviro partnered with Lake Savers LLC for various other NRB projects, conducted bench scale tests and additional field testing to refine the sampling approach, and get some direct results on the tested modifications to future test procedures will be incorporated to address them.

The study provided valuable data to guide next steps, demonstrate NRB performance, and support presentations establishing Mackworth-Enviro’s credentials and the technology’s effectiveness in addressing lake and pond eutrophication.

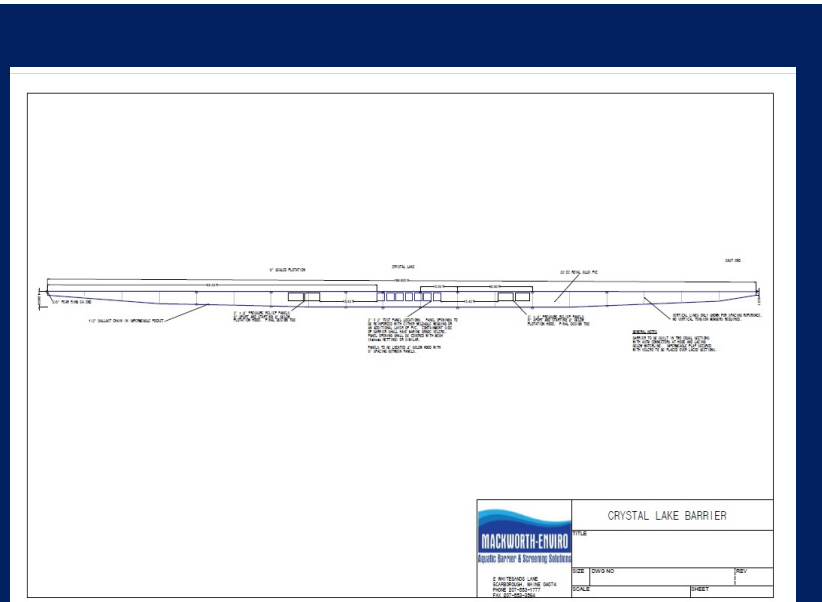


Figure 3. NRB design for Crystal Lake

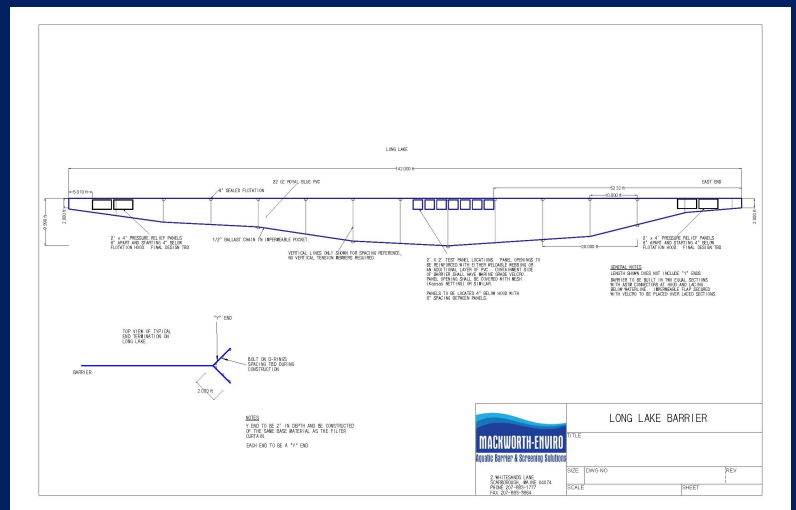


Figure 4. NRB design for Long Lake

Contact Mackworth-Enviro for more information

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