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Floating wetlands islands to improve water quality at Lake Hopatcong

By **Fred S. Lubnow**, Ph.D., Princeton Hydro, LLC

A lake's water quality can be determined by a number of factors, the most notable factor being the amount of algal growth and abundance of aquatic plants present. Excessive algae and aquatic plant growth thrives on high nutrient concentrations, specifically phosphorous for most freshwater systems. Elevated concentrations of phosphorus are the primary reason for this excessive growth in Lake Hopatcong in Morris and Sussex Counties. The majority of this phosphorus enters the lake through various watershed-based sources (e.g. stormwater and onsite wastewater treatment systems). Thus, the Restoration Plan for Lake Hopatcong focuses heavily on addressing these watershed-based sources of phosphorus in order to improve the lake's water quality.

There are several methods of reducing of phosphorous in a lake's watershed. Watershed management measures include stormwater management, enhanced onsite wastewater treatment, goose control, and the use of non-phosphorous fertilizers. Many of these have been implemented at Lake Hopatcong as a means of reducing the amount of phosphorus available for nuisance algal and aquatic plant growth.

Some of the most effective means to reduce the phosphorous load entering a lake is the creation and establishment of vegetated Best Management Practices (BMPs) such as stormwater wetlands, riparian lakeshore buffers and biofiltration/rain garden structures. Wetland systems tend to have some of the highest rates of phosphorus uptake. The vegetation and associated microbial communities within wetland systems will filter out and assimilate phosphorous. Unfortunately, most developed lake communities, particularly in the Mid-Atlantic region of the United States, often don't have much space available lakeside for the installation of vegetated BMPs. This is where floating wetland islands (FWIs) come into play.

Floating wetlands reduce phosphorous

FWIs are an alternative to watershed-based constructed wetlands or similar conventional vegetated BMPs. FWIs are composed of woven, recycled, plastic material which floats in water. Vegetation is planted directly in the plastic material of the FWI with some peat and mulch. The FWI is positioned near-shore (within the no wake zone). The vegetation grows on the FWI, rooting through the plastic material and creating an excellent habitat for phosphorous removal. A set of ten FWI cells, 5 feet by 10 feet, achieving a total surface area of 500 sq. ft., are being installed along the shoreline of Ashley Cove, Jefferson Township. These FWI cells will divert some of the existing nutrients in the cove away from the nuisance mat algae and weeds and into the plants on the FWI cells.



Installation of floating wetland islands at Ashley Cove in July 2014 at Lake Hopatcong

As the FWI removes phosphorous from the lake, less phosphorous is available for nuisance aquatic plant growth and algae. In addition, FWIs also provide an excellent refuge habitat that attracts beneficial forage fish and gamefish. Another value of the FWIs is that they can be planted with attractive, native vegetation, creating an aesthetic amenity for the lake.

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FWIs can provide other benefits such as shoreline protection. However, while these ecosystem functions are certainly beneficial, nutrient uptake, particularly phosphorous removal, tends to be one of the primary uses for FWIs.

A number of studies have estimated that one 250-ft. FWI can remove approximately 10 lbs. of total phosphorus per year. Since one pound of phosphorus has the potential to generate up to 1,100 lbs. of wet algae biomass, then one 250-ft. FWI could prevent the growth of up to 11,000 lbs. of wet algae biomass.

Essentially, the FWIs divert phosphorus that would otherwise stimulate nuisance algal growth into the more desirable native wetland vegetation on top of the island. Since ten FWI cells have been installed in Ashely Cove at Lake Hopatcong with a total surface of 500 ft., these Islands are expected to remove approximately 20 lbs. of total phosphorous from the water per year, resulting in a reduction of wet algae biomass in the cove of approximately 22,000 lbs.

Planting native

Typically only native and robust vegetation is planted on the FWIs; but whenever possible, species that also produce attractive flowers are used. Some of the species that have typically been planted on the FWIs, especially in lakes throughout the Mid-Atlantic states, include sweet-scented Joe Pye weed (*Eutrochium purpureum*), swamp rose-mallow (*Hibiscus moscheutos*), soft rush (*Juncus effusus*), great blue lobelia (*Lobelia siphilitica*), green-headed coneflower (*Rudbeckia laciniata*), broadleaf arrowhead (*Sagittaria latifolia*), New England aster (*Symphotrichum novae-angliae*), New York ironweed (*Vernonia noveboracensis*), common milkweed (*Asclepias syriaca*), and butterfly weed (*Asclepias tuberosa*).

Species of milkweed are frequently planted on the FWIs since they produce attractive flowers that attract monarch butterflies. Additionally, over time, we have seen other desirable species, such as ferns and mosses, inoculate and grow on the FWIs. Occasionally, undesirable species such as reed canarygrass will be seen on the FWIs, but if such species are removed as soon as they are observed, they do not pose a major problem of taking over the island.

The FWI cells being installed in Lake Hopatcong's Ashley Cove were purchased through a Non-Point Source 319(h)-grant that was awarded to the Lake Hopatcong Commission by the New Jersey Department of Environmental Protection. This grant covers the costs of the purchase and installation of the FWI cells as well as this year's water quality monitoring of the lake. The grant is currently being administrated by the Lake Hopatcong Foundation.

More info

Star Ledger article - www.nj.com/morris/index.ssf/2014/07/floating_wetland_islands_installed_at_lake_hopatcong_to_prevent_algae_growth.html

Lake Hopatcong News article - <http://lakehopatcongnews.com/c13-local-news/floating-wetland-islands-installed-on-lake-hopatcong/>

About the author - Fred S. Lubnow, PhD, is Director of Aquatic Programs at Princeton Hydro. He can be reached at flubnow@princetonhydro.com or (908) 237-5660.