Nutrients in Savery Pond

Several studies have been performed to characterize excessive nutrient concentrations (eutrophication) in Savery Pond (links below). Phosphorus is typically the controlling nutrient for eutrophication of freshwater bodies, however, in some cases, nitrogen can also control algal blooms. Sources of phosphorus and nitrogen include: fertilizers, septic systems, road runoff, and natural nutrient cycling.

A 1970s-era pond assessment collected baseline data, including vegetation and algal surveys. The baseline assessment found that the Savery Pond is eutrophic, noted elevated phosphorus concentrations, and stated that nitrogen concentrations indicate a large agricultural influence.

FEM commissioned a study in 2012 to assess pond conditions (algae, nutrients, temperature, turbidity, pH/alkalinity and dissolved oxygen). This study and supplemental technical assessment identified the following potential causes of algal blooms:
•   Nutrient effluents from cranberry bog operations, particularly concentrated in pond sediments;
•   Sub-surface discharge from improperly constructed septic systems;
•   Runoff from fertilizer applications;
•   Reduced “flushing” of spring inflow to the pond, due to increased nearby municipal groundwater pumping
•   Trends/variations in temperature and annual precipitation.

FEM is one of several organizations participating in the Plymouth Ponds and Lakes Stewardship (PPALS) project. The PPALS program sampled 39 lakes in 2014, and summarized key pond information and the results of sampling in a recently published “Ponds and Lakes Atlas”. Regarding Savery Pond, the Pond Atlas notes that:
•   Phosphorus and nitrogen concentrations are exceptionally high (the highest out of all 39 ponds sampled).
•   Chlorophyll-a, an indicator of algal density, was also exceptionally high.
•   Dissolved oxygen concentrations, averaged over the entire water column, were low relative to other ponds. (Algae consume dissolved oxygen, which is needed by fish).
•   Visibility through the water column was low (below the State target for swimming), likely associated with high density of suspended algae (phytoplankton).

FEM is currently in the process of formulating a monitoring plan that will identify the most critical factors for eutrophication and observed algal blooms. The monitoring plan includes input from stakeholders, researchers/scientists and government agency staff. Data collection is intended to form the basis of a pond nutrient assessment, which will ultimately lead to a nutrient management plan that includes solutions to reduce/eliminate algal blooms and eutrophication.

It should be noted that Savery Pond is not alone in its struggle with nutrient and algae management. Agricultural activity and septic-system effluent have impaired other ponds both locally (see Plymouth Ponds and Lakes Atlas) and in other regions with abundant freshwater ponds (e.g. Maine, Wisconsin, Minnesota, Michigan). White Island Pond is a great example of a local pond impaired by eutrophication that performed the necessary data collection, developed a management plan, and took corrective actions that helped to reverse algal blooms (links below).

Key Links:
- 1970s Era Baseline Study
- 2012 Aquatic Control Technology (ACT) Water and Sediment Quality Survey of Savery Pond
- 2013 Supplemental Technical Assessment: Comments to ACT Study
- Plymouth Ponds and Lakes Stewardship Project
- Plymouth Ponds and Lakes Atlas
- Massachusetts Cyanobacteria Advisories and Algae Information (including up-to-date advisories)
- White Island Pond Water Quality & Management Options Assessment, and Phosphorus Mitigation Program
- White Island Pond Conservation Alliance