

## Autumn Lake Foam Phenomenon

~~The autumn biochemical transformations across our local landscape is under way. Throughout the natural surroundings, are subtle seasonal indicators such as foliage color and size, that can display symptomatic clues to a plant's health and the possible impacts of a variety of environmental conditions during the growing season, such as drought. Similar to plant foliage, Owasco Lake can display symptoms of health through a variety of seasonal indicators, such as an abundance of cyanobacteria during warm temperatures.~~

During late summer and autumn months, lake foam can accumulate along the shorelines of The Finger Lakes, and meander on the water surface in long "streaks"; ~~that move~~ moving in sync with wind and wave currents. On any given autumn day, ~~across~~ the 11 square miles of surface area of Owasco Lake, miles of white streaks and sudsy windrows can be seen in the lake, and along the respective 22 miles of shoreline, ~~respectfully~~. Similar to plant foliage, Owasco Lake can display symptoms of health through a variety of seasonal indicators, such as an abundance of cyanobacteria during warm temperatures, and presence of lake foam during the transition into autumn.

Concerns about lake foam on Owasco Lake are often expressed by vigilant residents. At first glance, the foam appears to be identical to detergent or soap suds, ~~making it easy to simply correlate~~ which can lead to the suspicion that the source may be a nearby car wash, laundromat, business, farm, or residential septic system, discharging cleaning products into the lake. However, a closer inspection of the lake foam ~~often~~ reveals distinct differences in ~~lake foam~~ composition from synthetic foams, predominantly odor and feel. Natural foams emit an "earthy" scent and

are not filmy, while synthetic detergents are typically injected with, and smell of, perfumes and are filmy to the touch.

The autumn foam phenomenon is certainly not unique to Owasco Lake. The Finger Lakes, including Canandaigua Lake, experience similar occurrences and subsequent public concerns. ~~As recent as~~ In late 2019, the Canandaigua Lake Watershed Association (CLWA) embarked on a mission to address concerns and determine the source of the foam. ~~CLWA contracted with Global Aquatic Research (GAR), and initiated~~ A robust, phased effort ~~was initiated by the CLWA, contracting with Global Aquatic Research (GAR), in late summer of last year~~ to draw foam samples from the lake and analyze chemical characteristics through advanced laboratory techniques.

The results of this initial analysis by GAR were released earlier this year, ~~providing and provided~~ analysis of lake foam composition, ~~including~~ and the ingredients and conditions necessary for its development. According to the GAR analysis, the chemical "signatures" in the Canandaigua Lake foam suggest the origin is from within the lake itself and has direct and indirect relationships to water quality. Foam occurs naturally in lakes when the top layer of water is stirred by wind and waves, ~~which mixes~~ mixing air and "foaming agents". The foaming agents are, primarily "chains" of organic sugars or carbohydrates, known as polysaccharides, ~~as well as~~ oils or surfactants, from decomposing plants. These compounds are not very water soluble and tend to ride along the water surface. Depending on wind direction and wave action, streaks of foam can form and migrate to the shoreline where they create windrows or mash and accumulate into larger areas of dense surface foam.

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So, why are areas and streaks of foam larger in some lakes and locations than others? The GAR research on Canandaigua Lake determined a plausible explanation for this question, which may also prove as an indicator of lake health and changes that occur ~~occurring~~ throughout Canandaigua Lake, as well as other Finger Lakes. Through their micro analysis, GAR has identified phytoplankton, including cyanobacteria (also known as HABs), as a direct source of foam-creating polysaccharides found in Canandaigua Lake. They concluded, “cyanobacteria release polysaccharides outside of their cells in order to create large colonies and to regulate their environment. These “exopolysaccharides” or “EPSs” are produced in large quantities during phytoplankton blooms and change the chemistry of the surface of the lake”. Their analysis indicates ~~offers~~ a correlation between cyanobacteria and lake foam. -From

these results, parallels can be drawn that would suggest that ingredients that create ~~creating~~ foam on Canandaigua Lake closely resemble those in other Finger Lake, such as Owasco Lake. If cyanobacteria blooms can clue us in to high nutrient levels within the water column, certainly then lake foam may be our late season “foliage” indicator.

A continuation and increase of ~~Continuing~~ efforts to reduce nutrient migration from the landscape to nearby waters, will help our lakes ~~will~~ see reductions in harmful algal blooms (HABs) and lake foam. -Conscious efforts to use less commercial lawn fertilizers, planting trees and shrubs along the shoreline and streams, expanding the use of best practices in all corners of the landscape, and stabilizing soils will achieve and preserve high levels of water quality for drinking water and recreation in Owasco Lake.



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