

Land Uses Plus Heavy Storms Fuel Algae Blooms
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Conversion of natural lands to urban land uses in lake watersheds leads to increased storm-water flows, stream bank erosion, accelerated lakesedimentation and higher lake nutrient levels resulting in more frequent and severe algae blooms.

Severe flood damage, closed swimming beaches and intense algae blooms have been repeatedly in the headlines over the past month. In the Chautauqua Lake watershed, it appears that repeated heavy rain storm events saturated watershed soils and subsequent heavy rains flushed pollutants containing nutrients such as phosphorus from watershed surfaces into tributaries and into the Lake. In a more usual summer, the lake's watershed would have had more capacity to absorb and filter these pollutants before they reached major lake tributaries and the lake. This summer, the watershed's and lake's natural filtration systems were no match for the excessive levels of nutrients in the lake and watershed—hence heavy algae blooms have been experienced in both basins of the lake from mid to late July through early September.

In Chautauqua Lake, severe algae blooms have closed beaches and resulted in “no swimming” advisories for weeks. Severe algae blooms are the result of excessive concentrations of nutrients in lake waters. Past research on Chautauqua Lake over the last forty years indicated that phosphorus and nitrogen are both limiting nutrients to summer algae blooms here. Sufficient levels of each must be present for a blooms to occur. Research across the country indicates that water quality in water bodies is directly related to the percentage of forest cover in the basin or watershed for the receiving body of water. Water quality degradation as measured by turbidity (cloudiness from eroded soil particles or algae) and nutrients is directly related to the percentage of impervious surfaces in the watershed. The more developed a watershed, the less forest cover, and the more lawns, rooftops, streets and parking lots, the more degraded ar stream or lake. The more we develop our watersheds, the less capacity they have to absorb and store precipitation and absorb and filter pollutants. Quick rain water runoff from rooftops, parking lots lawns and streets is quickly channeled to lake tributaries via road ditches, which short-circuit pre-existing overland flow patterns. Overfilled tributaries lose their banks to erosion releasing soils to the torrent of water at an accelerating pace. More and more mud and nutrients reach the lake. Research completed by Princeton Hydro (March 2008) for the Chautauqua Lake Management Commission is quoted to say, “Calculated trophic state indices for the different [water quality]

parameters were all high, indicating a hypereutrophic status for Chautauqua Lake in August, 2007.” These high numbers found in this lake, “are associated with increased probabilities of encountering nuisance conditions, such as nuisance algal blooms,” stated this report. The important plant nutrient phosphorus, usually the limiting nutrient in lakes, was found to be at concentrations above the threshold for nuisance algal growth. “Chlorophyll *a* concentrations at in-lake sampling sites were extremely high.” High chlorophyll *a* concentrations indicate intense algal blooms. The report states, “These concentrations are not acceptable for a recreational water body.” It was noted that, “Dense blooms of cyanobacteria (blue-green algae), which indicate a state of eutrophication were identified throughout the lake and verified through sampling... Cyanobacteria cause surface scums, have little value as a food source, and can be toxic to wildlife and humans.”

Princeton Hydro’s second Chautauqua Water Quality Report, adds: “... the majority of the watershed-based pollutant loading to Chautauqua Lake occurs as a result of storm events. In turn the development and implementation of a Watershed Management Plan is warranted for the long term reduction of these pollutant loadings.”

The Chautauqua Lake Management Commission (CLMC), a county advisory body, has the responsibility given to it by the Chautauqua County Legislature to develop and monitor a management plan for Chautauqua Lake and its watershed. Chautauqua County has contracted with Bergman Associates and The Academy of Natural Sciences to develop this plan under the guidance of the CLMC, its technical and advisory committees. The CLMC held a meeting at Long Point State Park on August 18th to inform the public of preliminary recommendations and gain public input on those recommendations. The draft plan is scheduled to be completed later this year. Draft reports available to the public to date can be found at:

<http://gis.bergmannpc.com/ChautauquaLakeWatershed/documents.html>.

Investment in responsible watershed management is cost-effective. Trying to recoup lost tourism spending, damaged infrastructure or investing in removing mud and debris from our lakes is very costly and in some cases not economically feasible. You can earn more about watershed management at the USAEPA Watershed Academy Web online training module entitled, “Eight Tools of Watershed Protection in Developing Areas,” at <http://www.epa.gov/watertrain/protection> . It is an excellent introduction to actions that should be initiated to manage our valuable waterways.

The Chautauqua Watershed Conservancy (CWC) is a local, private, not-for-profit, 501(c)(3) organization with a mission to preserve and enhance the water quality, scenic beauty and ecological health of the lakes, streams and watersheds of the Chautauqua region. It implements and advocates for the implementation of effective watershed tools to conserve and restore naturally functioning watershed pollution control systems inherent in forests, wetlands, floodplains, streamsides and shore lands to control nutrients, sediments and flooding. Its education, pollution prevention and watershed conservation work is funded primarily by membership donations. It has led efforts conserving over 600 acres of important watershed lands over the last 14 years. To join or for more information, please call 664-2166.

Caption:

Photo by CWC