OVERVIEW: Chazy Lake sediment core study

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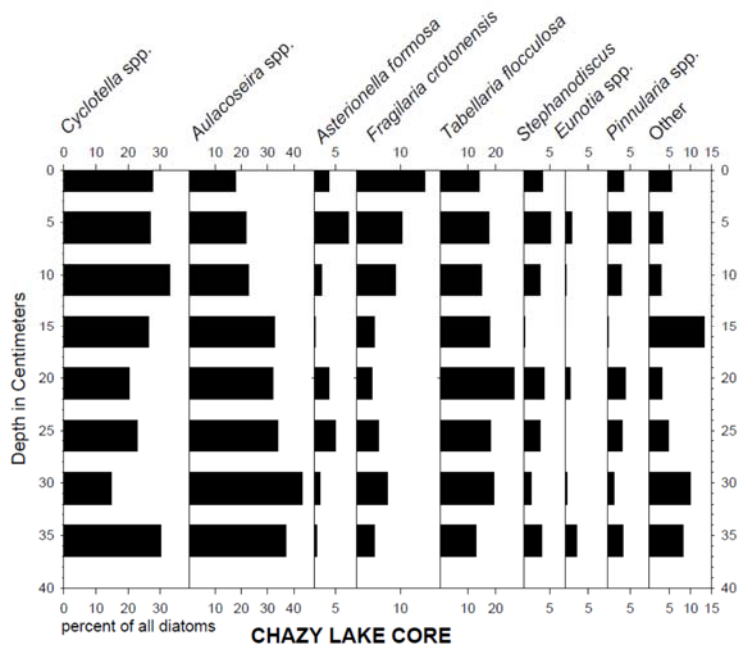
Students in the Paleoecology course at Paul Smith's College collected a sediment core from a mid-lake site on Chazy Lake during the winter of 2019 and analyzed the microscopic fossils of diatom algae in the core for their class project. By using the known ecology of diatom "indicator" species found in different layers of the core, the student made basic inferences regarding the condition of the lake during the last century or so. No radiometric dates were obtained for the core due to cost limitations, so the timing of changes in the diatom community was estimated on the basis of dated cores from other Adirondack lakes. A chart of the results is included below, with percentages of each diatom species plotted against depth (vertical axis, with youngest layers on top and oldest on the bottom):



Two of the species are used as indicators of nutrient enrichment in Adirondack lakes: *Asterionella formosa* and *Fragilaria crotonensis*. Slight increases in their percentages in the upper (younger) section of the core suggest that some form of nutrient enrichment has been occurring in Chazy Lake in recent decades. Warming of the lake surface due to the well-documented climatic warming trend in the region can also cause similar changes by increasing summer stratification which, in turn, can reduce dissolved oxygen supplies in the deeper waters and thereby release nutrients from the sediments on the lake bed. The small magnitude of the increase suggests that water clarity remains good for now, but the change does indicate a trend toward decreasing water quality that could eventually become more problematic.

Fluctuations in the percentages of bottom-dwelling diatoms (mainly *Pinnularia* and "other") might be related to fluctuations in water level associated with the dam, which can wash shallow-water species such as these into the main lake when the shoreline erodes or is exposed when lake levels rise or fall. The lack of dates for the core, however, prevents us from confirming this relationship.

CONCLUSIONS: The diatom record indicates that a slight trend of decreasing water clarity may be occurring in Chazy Lake due to nutrient enrichment, warming, or a combination of the two. Residents are encouraged to identify and control possible sources of nutrient enrichment (lawn fertilizer, shoreline erosion, septic systems, etc.) and to monitor water clarity and oxygen profiles regularly. Warming in future could also amplify the effects of nutrient enrichment going forward, making it advisable to address such nutrient sources pro-actively before they become more of a problem.