

ORAL PRESENTATION

THE IMPORTANCE OF WATER LEVEL CHANGES AND SHORELINE DEVELOPMENT IN THE EUTROPHICATION OF A SEEPAGE LAKE

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Berry Lake is a small seepage lake in northeastern Wisconsin that has historically undergone water level fluctuations on the order of 2.5 meters. At the present time most of the lakeshore has fairly intensive development. Some of the dwellings are seasonal residents but an increasing number are full time residents. While it is unclear how climate change will affect the nutrient status of lakes, one hypothesis is that fluctuating water levels will result in higher nutrient levels as a result of the concentration of nutrients during low water levels and the introduction of nutrients as water levels rise with the flooding of the previously dry and vegetated shoreline. Shoreline homes contribute nutrients to lakes through increased runoff as well as effluent from septic systems.

A sediment core was collected to estimate changes that have occurred during the latter part of the Holocene period. The diatom community was used to infer changes in nutrient levels. The dominant diatoms were taxa associated with macrophytes with planktonic species, e.g. *Cyclotella michiganiana* only comprising a small part of the community. Prior to 1930 the dominant taxa were *Navicula vulpina* and an undescribed species of *Navicula*. The latter species is similar to *N. wildii* and *N. cryptofallax*. The unknown *Navicula* differs from the other two taxa by the striae being further apart from each other around the central area compared with elsewhere in the cell. Also the axial area around the central area is more enlarged than in similar species.

With the onset of development around 1930, *Achnanthydium minutissima* and benthic Fragilariaceae, e.g. *Staurosira construens* and *Staurosirella elliptica*, increased in importance. The abundance of *A. minutissima* peaked around 1980 while the benthic Fragilariaceae were highest near the top of the core.

The diatom community in the core indicates that nutrient levels increased more as a result of shoreline development than the result of water level fluctuations. During the 1930s water levels were very low and they were at their highest during the mid 1980s. The diatom community indicated that low water levels and subsequent reflooding of previously dry shorelines did not increase nutrients. Instead nutrient levels increased as a result of the intensification of development during the last 20 years.