

## **The effects of salinity on a lake primary producer: *Azolla pinnata***

*Azolla (Azolla pinnata)* are small floating aquatic ferns found in temperate and tropical climates. They are used as green manure, feed for land animals, and used for lake remediation because they remove metallic compounds from water. *Azolla* are primary producers that can convert unusable atmospheric nitrogen to useable nitrates and ammonia needed for protein synthesis. This allows *azolla* to grow in a wide range aquatic environments. Salt concentration in the water has a detrimental effect on the growth of *azolla*. Understanding changes in salt concentrations of ponds and lakes is important because elevated salinity alters lake ecosystems by reducing plant growth. For example, salinity in Cayuga lake and surrounding tributaries, as well as groundwater, has been increasing over time, rising at annual rates of about 1.5 to 3.7 mg/L/year. So, what minimum salt concentration negatively impacts aquatic plant growth? The goal of this study was to measure changes in salinity on *azolla* fitness and growth. Based on literature and previous research, we hypothesized that increased salinity will reduce total biomass and decrease photosynthetic efficiency. To test this hypothesis, live *azolla* plants were ordered from Carolina biological supply company. They were grown at three different salinities (5, 10 and 20 mM NaCl) in nutrient alga-gro™ solutions at 22°C under 100  $\mu\text{mol m}^{-2} \text{s}^{-1}$  of photosynthetically active radiation on a 18/6 h light/dark cycle in a controlled growth chamber. Plant growth containers were placed on a shaker table under a very gentle orbital cycle to keep solutions mixed during growth trials. We found that salinity negatively affects plant growth, supporting our hypothesis. Changes in photosynthetic efficiency will be measured using a fluorescence imaging system. This will allow us to assess if salinity changes impact chloroplast thylakoid membrane function in *azolla* plants.