Changes in the Littoral Aquatic Plant Community of Onondaga Lake from 1991 to 2006

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Aquatic plants are an important component to the littoral zone ecosystem; they provide food to aquatic organisms, habitat to fish, refugia to young-of-the-year fish, and stabilize sediment. As with other biological communities within lakes, aquatic plant communities will change as the result of environmental degradation and alteration. Whole-lake aquatic plant surveys were performed in Onondaga Lake during the summers of 1991, 2000, 2002, 2004, 2005, and 2006. In 1991, forty 100m transects were deployed at stratified-random intervals along the shoreline, and the presence or absence of rooted plants recorded in 0.1 m^{-2} quadrats located at 1 m intervals along each transect. For 2000 and after, a point-intercept technique was utilized in which the presence or absence of plants at predetermined points was utilized. A GPS unit was utilized to navigate to the predetermined location. Presence of plants was determined using a plant rake, or visually in shallow water. All plant data was analyzed based on the frequency of occurrence of plants in the littoral zone, defined for this purpose as water depths less than or equal to 5m. In addition to frequency of each species, the total cover of plants of any species, average number of species per point or quadrat, and species richness per year were calculated. In 1991, only 13% of all quadrats had a plant present. In contrast, during the period 2000 to 2006 the percent cover of plants at littoral points ranged from 70.7% to 83.3%. The average number of plants per quadrat in 1991 was 0.125, while in 2005 the average number of species per littoral zone point was 2.63. The total number of species observed during the survey in 1991 was 5, while the total species list for the 2006 survey was 16. Individual species distributions also changed radically during this period, including *Ceratophyllum demersum* (from 0.3% in 1991 to 34.1% in 2006), *Elodea canadensis* (from not found in 1991 to 69% in 2005), *Heteranthera dubia* (from 2% in 1991 to 44.6% in 2000), *Myriophyllum spicatum* (from 0.06% in 1991 to 53.5% in 2005), *Potamogeton crispus* (from 0.3 in 1991 to 41.1% in 2004), *Potamogeton foliosus* (from not found in 1991 to 41.3% in 2006), and *Stuckenia pectinata* (from 11% in 1991 to 45.8% in 2000). While the exact causes of this dramatic change in littoral vegetation cannot be determined from observation alone, previous experimental research substantiates that the simultaneous change in several environmental parameters may have allowed an increase in plant growth, including increased water clarity, decreased salinity, and decreased calcium loading rates.