

Progress toward water quality improvement: Macrophytes. AMP 2013 Annual Report.
(Assessment Measure)

AMENDED CONSENT JUDGMENT GOAL

Expansion of the areal coverage and increase in diversity of macrophyte community, where number of species and biomass in the littoral zone (6 m water depth) are comparable to other regional lakes. Increase percent cover of littoral zone to optimal levels (40% – 60%) for largemouth bass habitat, to achieve desired use of the lake for warmwater fish reproduction.

Hypotheses to be tested:	Status:																												
Metro improvements and watershed phosphorus load reductions indirectly result in increased areal coverage of macrophytes in the littoral zone of Onondaga Lake.	<ul style="list-style-type: none"> Metro improvements to reduce nutrient loading were implemented in 2004 (BAF) and 2005 (HRFS) Areal coverage in the littoral zone has increased between 2000 and 2013 																												
Metro improvements and watershed phosphorus load reductions indirectly result in increased number of macrophyte species in Onondaga Lake.	<ul style="list-style-type: none"> The number of macrophyte species has increased from 5 in 1991 to 23 in 2010 (not assess in 2013) 																												
Current Conditions with Historical Comparison																													
Community Composition (Lakewide)	<table border="1"> <thead> <tr> <th>Year</th> <th>Number of species present</th> <th>Dominant species by relative % cover</th> </tr> </thead> <tbody> <tr> <td>1991:</td> <td>5</td> <td><i>no data</i></td> </tr> <tr> <td>2000:</td> <td>10</td> <td>Sago pondweed (52%) Common waterweed (26%)</td> </tr> <tr> <td>2005:</td> <td>17</td> <td>Common waterweed (62%) Coontail (19%)</td> </tr> <tr> <td>2010</td> <td>23</td> <td>Coontail (30%) Common waterweed (23%) Water stargrass (17%)</td> </tr> </tbody> </table>	Year	Number of species present	Dominant species by relative % cover	1991:	5	<i>no data</i>	2000:	10	Sago pondweed (52%) Common waterweed (26%)	2005:	17	Common waterweed (62%) Coontail (19%)	2010	23	Coontail (30%) Common waterweed (23%) Water stargrass (17%)													
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Aerial Photographs (Percent indicates percent coverage of littoral zone. Aerial photographs were obtained in June prior to 2006, in August from 2006 to 2010, in September in 2011, and in August in 2012 and 2013.	<table border="1"> <tbody> <tr> <td>2000:</td> <td>85 acres (11%)</td> <td>2007:</td> <td>210 acres (27%)*</td> </tr> <tr> <td>2001:</td> <td>134 acres (17%)</td> <td>2008:</td> <td>314 acres (40%)*</td> </tr> <tr> <td>2002:</td> <td>142 acres (18%)</td> <td>2009:</td> <td>382 acres (50%)*</td> </tr> <tr> <td>2003:</td> <td>267 acres (34%)</td> <td>2010:</td> <td>409 acres (54%)</td> </tr> <tr> <td>2004:</td> <td>No data</td> <td>2011:</td> <td>398 acres (51%)</td> </tr> <tr> <td>2005:</td> <td>378 acres (49%)</td> <td>2012:</td> <td>505 acres (65%)</td> </tr> <tr> <td>2006:</td> <td>183 acres (24%)*</td> <td>2013:</td> <td>387 acres (50%)</td> </tr> </tbody> </table>	2000:	85 acres (11%)	2007:	210 acres (27%)*	2001:	134 acres (17%)	2008:	314 acres (40%)*	2002:	142 acres (18%)	2009:	382 acres (50%)*	2003:	267 acres (34%)	2010:	409 acres (54%)	2004:	No data	2011:	398 acres (51%)	2005:	378 acres (49%)	2012:	505 acres (65%)	2006:	183 acres (24%)*	2013:	387 acres (50%)
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Factors affecting macrophyte community	<ul style="list-style-type: none"> Sediment texture (oncolites are nutrient-poor and unstable), light penetration, salinity, zebra mussels 																												

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(Assessment Measure) (continued).

Monitoring and Assessment Program

Lake Monitoring

- Survey species composition, percent cover, and biomass every 5 years, from 2000 to 2018. Potential modifications to include one final survey in 2018.
- Annual aerial photographs of littoral zone to estimate acres of macrophytes. Potential modifications to include one final aerial survey in 2018.

Metrics to track over time

- Number of species (richness)
 - Percent cover
 - Biomass
-

Tools for Decision Making

Qualitative and Quantitative Analysis

Compare to baseline survey in 2000

¹In 1991, Madsen used transects at 40 sites that extended either 100 m from shore or to a depth of 5 m, whichever was shorter. The Counties 2000, 2005, and 2010 macrophyte reports contain sections that were also analyzed to a depth of 5 m or 100 m from shore, so as to standardize these analyses with those used by Madsen in 1991. Madsen reported his results on a frequency of occurrence basis only.