Lake Eustis EcoSummary
February 2015

Lake Condition Index (LCI): A biological assessment tool developed by the Florida Department of Environmental Protection to indicate ecosystem health and identify impairment in Florida lakes

Watershed Characteristics

Located in central Lake County, the 7,806-acre Lake Eustis is surrounded largely by a mix of residential, commercial and agricultural lands. Discharges from Lake Dora represented 33.6% of estimated Total Phosphorus (TP) loading and 50.0% of estimated Total Nitrogen (TN) loading. Discharges from Lake Harris-Little Lake Harris represented 9.3% of estimated TP loading and 26.1% of estimated TN loading to Lake Eustis. Aside from Lake Dora discharges, the largest single source of TP loading was from agriculture other than muck farms, which represented 18.9% of estimated TP loading and 4.6% of estimated TN loading. Additionally, in previous years, the City of Eustis discharged waste water into Trout Lake, which subsequently entered Lake Eustis at the north east corner of the lake. There are significant differences in the sediment substrate in Lake Eustis, with the north half dominated by muck and the south half still partially comprised of sand. Because Lake Eustis is larger than 1000 acres in size, two separate LCIs were performed, one on the north end and one on the south end. The benthic grabs for Lake Eustis were taken in March of 2015.

Utricularia inflata in Lake Eustis
hydrilla fragment in Lake Eustis
Results

Both Lake Eustis North and Lake Eustis South improved in LCI scores and secchi depth readings from 2012. Lake Eustis North received a good rating on the LCI and Lake Eustis South a very good rating on the LCI score. Twenty three different macroinvertebrate taxa were collected on both the north and south portions of the lake. On Lake Eustis North and South the most abundant macroinvertebrate species collected was the oligochaete, *Limnodrilus hoffmeisteri*, comprising 25% and 28% of the total population of macroinvertebrates, respectively. The Order Diptera (true flies) which include the Families Chironomidae (chironomids or midges) and Ceratopogonidae (biting midges) were 37% of the total population of macroinvertebrates in the south portion and 48% in the north portion of the lake. The changes in Lake Eustis LCI scores from 2012 to 2015, were due largely to an increase in the number of different taxa present (diversity), the decrease in percent diptera and the increased number of pollution sensitive species present. Lake Eustis North increased from 20 taxa in 2012 to 23 taxa in 2015. The principal changes Lake Eustis north included increases in aquatic snail populations and in pollution sensitive diptera species. The Lake Eustis South LCI score dramatically increased from 18.94 in 2012 to 57.81 in 2015, due largely to a decrease in the percentage of Diptera or chironomids present, an increase in total taxa (diversity), and the presence of pollution sensitive mayfly, dragonfly and caddisfly species. Lake Eustis North LCI received a Hulbert Index score of 4. Lake Eustis South received a Hulbert Index score of 9. The Hulbert Index is based on the number of pollution-intolerant lake macroinvertebrate species present. Therefore, higher Hulbert Index scores indicate a greater number of pollution sensitive species present or better water quality.

*Hydrilla verticillata*, an exotic submerged plant which is often problematic in lake systems, was seen in the south portion of Lake Eustis. While some fragments of hydrilla were seen floating at the surface, no stands of rooted hydrilla were observed. Hydrilla may reproduce via fragments (vegetatively), tubers and turions. Abundant stands of native submerged vegetation including *Utricularia inflata* (big floating bladderwort), *Najas guadalupensis* (southern naiad) and *Potamogeton illinoensis* (Illinois pondweed) were observed in Lake Eustis South. *Chara spp.* (muskgrass) was also contained in a sample grab from Lake Eustis South. The secchi scores (water clarity) for both sides of Lake Eustis improved from a depth of 0.8M in 2012 to 1.5M in 2015.

<table>
<thead>
<tr>
<th>LCI SCORES</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2012</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eustis South</td>
<td>19.88</td>
<td>33.12</td>
<td>30.85</td>
<td>26.69</td>
<td>18.94</td>
<td>57.81</td>
</tr>
<tr>
<td>Eustis North</td>
<td>26.59</td>
<td>26.49</td>
<td>22.89</td>
<td>21.18</td>
<td>28.89</td>
<td>35.44</td>
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</tbody>
</table>
Three of the twelve benthic samples taken in the south portion of the lake were predominately muck while seven of the twelve northern lake samples were primarily muck.
Significance
The Lake County Water Authority has an off-line alum system or NuRF (Nutrient Reduction Facility) located on the Apopka-Beauclair Canal that came online in March of 2009. This will reduce the total phosphorus load from Lake Apopka by as much as 81% annually. Elimination of such a large upstream source of total phosphorus could dramatically improve water quality in Lake Eustis and other downstream lakes. This could increase recreation on the lake by eliminating persistent algal blooms, eventually leading to reestablishment of beneficial vegetation, improved pollution sensitive macroinvertebrate populations with increased macroinvertebrate diversity and a more productive sportfish population. The Lake County Water Authority will continue to monitor the macroinvertebrates in Lake Eustis in order to assess the NuRF project impacts on the ecosystem health.

Suggestions
Lakeside property owners can help keep the lake healthy by minimizing, or eliminating, the use of pesticides, herbicides and inorganic fertilizers, by preserving native shorezone vegetation, by minimizing impervious surfaces on their properties, by being careful with the use and storage of petroleum products, and by properly maintaining septic or sewer systems.

For more information, please contact:
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References
