ML&SA Leader’s Institute
Mike and Sarah Litch - Class of 2005

Our Class Project
Watershed Landowner’s Handbook
and Stewardship Checklist Manual
Glen Lake/Crystal River Location
## Watershed Information

<table>
<thead>
<tr>
<th></th>
<th>Big Glen</th>
<th>Little Glen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>4,870 acres</td>
<td>1,400 acres</td>
</tr>
<tr>
<td>Max. Depth</td>
<td>130 ft.</td>
<td>13 ft.</td>
</tr>
<tr>
<td>Avg. Depth</td>
<td>70 ft.</td>
<td>6.2 ft.</td>
</tr>
<tr>
<td>Shoreline</td>
<td>10.5 miles</td>
<td>6.5 miles</td>
</tr>
<tr>
<td>Trophic State</td>
<td>Oligotrophic</td>
<td>Mesotrophic</td>
</tr>
</tbody>
</table>

### Watershed

- **12,415 acres**
- Lake area to watershed ratio: 1:1.98
- Hydraulic residence time: 8.45 years
One Lake Association’s Efforts to Foster Stewardship

“It’s All About the Water”
Monitoring

CLMP Monitoring

- Secchi Disk Transparency
- Total Phosphorus
- Chlorophyll a
- Aquatic Plant ID and Mapping
- Exotic Aquatic Plant Watch
Water Quality Committee
Volunteers at work monitoring our Lakes and Stream

John Lund

Andy DuPont, Bruce Lichliter

Cal Killen

Emery/Sharon Blanksma
Elaine Pentilla, Barb LeJeune

June and Gerry Powley,
Mike Litch, Rob Karner

Sarah Litch , Linda Stephan

Bruce Lichliter

John Hayes

Cal Killen, John Hayes

Roy and Elaine Pentilla

Gerry and June Powley
Watershed Biologist Monitoring

Field Biologist

- Hydrolab tests - DO, T, pH, Cond
- Plankton tows - Vert and Horiz
- Sediment analysis - Mich 10 metal
- Shoreline survey oversight
  Cladophora, buffer condition, invasives
- Riparian property evaluation and consultation
- E.coli
- Microcystis
Watershed Entry Road Signs (12)
Building the Boat Washing Shed - 2006
Power Spray Operation
Two of our Competent Staff - 2011
Timed Self Power Wash Now Available
CLMP Plant Surveys

- Aquatic Plant Identification & Mapping
- Exotic Plant Watch
Aquatic Plants Cataloged

Sago Pondweed

Curley Leaf Pondweed
One boat for 2 and 4 foot depths, another boat for 8 foot depths
Additional Surveys

- Cladophora Survey
- Shoreline Survey
- Phragmites and Coltsfoot
Glen Lake Association Shoreline Survey
A Study to Enhance Protection of our Treasured Resource

We wanted answers to these questions:

* How are we doing toward protecting our waters from nutrient and sediment inflow?
* How much shoreline erosion are we experiencing?
* What shoreline practices should we focus on to guard against identified threats?
Scope

- 682 shoreline properties surveyed – 17 miles of shoreline

- 5 GLA volunteers and Rob Karner, Glen Lake – Crystal River Watershed Biologist, were the surveyors
## Greenbelt Buffer Rating System

Points added for Total Score

<table>
<thead>
<tr>
<th>Greenbelt Length</th>
<th>None</th>
<th>&lt;10%</th>
<th>10-25%</th>
<th>25-75%</th>
<th>&gt;75%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</table>

<table>
<thead>
<tr>
<th>Greenbelt Avg. Depth</th>
<th>None</th>
<th>&lt;10'</th>
<th>10-40'</th>
<th>&gt;40'</th>
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<tbody>
<tr>
<td></td>
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<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Turf</th>
<th>&gt;75%</th>
<th>25-75%</th>
<th>10-25%</th>
<th>&lt;10%</th>
<th>0%</th>
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<tbody>
<tr>
<td></td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Greenbelt Density</th>
<th>None</th>
<th>Sparse</th>
<th>Medium</th>
<th>Dense</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species Diversity</th>
<th>Uniform</th>
<th>Several</th>
<th>Many</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Erosion</th>
<th>None</th>
<th>Minor</th>
<th>Severe</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Erosion Control Structures</th>
<th>Sea Wall</th>
<th>Riprap</th>
<th>Biotechnical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical Structures</th>
<th>All</th>
<th>Groundcover</th>
<th>Understory</th>
<th>Overstory</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
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</table>

### Total Rating

<table>
<thead>
<tr>
<th>Action Recommended</th>
<th>Average</th>
<th>Excellent/ Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>-9 to 0</td>
<td>1 to 9</td>
<td>10 to 16</td>
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</table>
Shoreline Survey Results
Conducted by the Glen Lake Association

Tom and Phyl Davis
8298 S Dunns Farm Rd.
Tax ID Number: 007-006-010-60

This Shoreline Survey evaluates the size of your shoreline greenbelt, percentage of turf, tree density-species diversity, understory/vegetation, and erosion. The evaluation designates three categories: Excellent/Very Good, Average, and Action Recommended.

According to the survey, your property category (based on tax parcel) is:

Excellent/Very Good

July 2010
Coltsfoot is Surveyed and Controlled
Purple loosestrife is identified in shoreline surveys, can be controlled with a beetle.
Glen Lake Annual Stewardship Awards
Lake-friendly Landscaping
Invasive Species Ordinance

Passed by Glen Arbor and Empire Township