Continuous Temperature Monitoring - Wisconsin

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Wisconsin Department of Natural Resources
Began as citizen monitoring project in 2015

This end of the logger must be at least 1 foot below the water surface.

Safety rope

1-2 feet below surface

Zip ties

Mean July temperature
10 Regional Monitoring Network Lakes

<table>
<thead>
<tr>
<th></th>
<th>Deep</th>
<th>Shallow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Seepage</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Brown | Clear | Brown | Clear

1 in = 73 miles
## Monitoring Initiative Funds

<table>
<thead>
<tr>
<th>Item</th>
<th>Per Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolyan buoy</td>
<td>$130</td>
</tr>
<tr>
<td>fishing float</td>
<td>$5</td>
</tr>
<tr>
<td>hardware</td>
<td>$30</td>
</tr>
<tr>
<td>temperature loggers</td>
<td>$130</td>
</tr>
<tr>
<td>newspaper ad (required for permit)</td>
<td>$100</td>
</tr>
<tr>
<td>dissolved oxygen loggers</td>
<td>$1,250</td>
</tr>
<tr>
<td>tools, incidentals</td>
<td>$200</td>
</tr>
</tbody>
</table>

**TOTAL**  $725 - $1375

with 2 – 7 temperature loggers
Permits

Miscellaneous Structures

Waterway Marker
Our System

<--- Waterway marker permit required (buoy)

1m

Floating informational buoy
½” galvanized steel quick link
3/16” galvanized steel rope loop secured with thimble and cable clamps
Fishing float (some lakes)
Steel rope with loggers attached
Steel rope loop secured with thimble and cable clamps
5/16” galvanized steel quick link
¼” galvanized steel chain
Two cinder blocks

<--- Lake surface

Additional loggers near thermocline in some lakes

<--- Lake bottom

<--- Miscellaneous structure permit required (anchor)
Our System

Floating informational buoy ➞ Lake surface
½” galvanized steel quick link
3/16” galvanized steel rope loop secured with thimble and cable clamps
Fishing float (some lakes)
Steel rope with loggers attached
Steel rope loop secured with thimble and cable clamps
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¼” galvanized steel chain
Two cinder blocks ➞ Lake bottom
Our System

Floating informational buoy  ← Lake surface
½” galvanized steel quick link
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Two cinder blocks  ← Lake bottom
Our System - lessons

• Measure logger position from the bottom in lab
• Measure depth from surface of top logger after deployment
• May need to remeasure depths in boat if lake is high / low
• Removal is physically demanding
• Steel cable can cut into aluminum watercraft – rope is better for boat and hands!
• Good data management is essential! Track logger id’s, deployment, raw data files, etc.
• Check buoy before ice on!
Next Steps...

- Protocol
- Train regional staff
- Data management
- Purchase loggers

Thanks to:
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