Minnesota’s Use of Remote Sensed Data
Wetlands, Streams, and Lakes

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Work to Date

• 2006 – Hyperspectral Airborne Imagery for assessing wetland quality
• 2010 – Hyperspectral Airborne Imagery for Stream Quality
• Ongoing – Partnership with DNR – High resolution aerial imagery to track wetland quantity
• Ongoing – remote sensed satellite Secchi Transparency
Summary – Remote Sensing of Wetland Quality

- Collected detailed plant and community observations, along with reflectance data of wetlands, in support of analysis of remote sensing imagery
- Establishing spectral bands of different plant species and developing a library of spectral signatures for aquatic plant species or groups
- Determine ability to map aquatic plants with hyperspectral image data
- Determine data needs to accurately classify wetlands and wetland health
- Cost Prohibitive
Airborne Hyperspectral Remote Sensing of Rivers

- Large order rivers
  - Mississippi, MN, St Croix
- Assess spatial distribution of water quality
- VSS, chl-a, TSS
- Limitations include cost and clear weather conditions required

Remote Sensing and Assessments

• In 2010 MPCA assessed the quality of Boundary Water lakes using historical remote sensed Secchi transparency.
• This resulted in designations of full support for aquatic recreation use for 533 lakes that met the Secchi transparency threshold for the ecoregion.
• For lakes where data indicated a potential water quality problem, insufficient information was assigned.
Remote Sensing Applications

• MPCA is utilizing remote sensed Secchi transparency to provide cursory water quality information and prioritization for lakes with no water quality data.

• This is provided in tabular and written formats on a watershed scale (Hydrologic Unit Code 8 scale)

<table>
<thead>
<tr>
<th>Lake ID</th>
<th>Lake Name</th>
<th>Remote Sensed Secchi (m) from 2008</th>
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<tbody>
<tr>
<td>18017300</td>
<td>Bass</td>
<td>3.6</td>
</tr>
<tr>
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<td>Bass</td>
<td>3.1</td>
</tr>
<tr>
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<td>Morrison</td>
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<td>18024600</td>
<td>Greenwood</td>
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<tr>
<td>11046300</td>
<td>Variety</td>
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<td>Island</td>
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</tr>
<tr>
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<td>South Haynes</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Wrap Up

• Cost is an issue
• Remote Sensing for Lakes is working and provides a high level snapshot, ability for trends, and planning
• Stream and Wetland quality rely on airplane flyovers – cost prohibitive
• If public interest existed to track/fund – Harmful Algal Bloom/real time algae tracking would be of interest