

Minnesota's Use of Remote Sensed Data

Wetlands, Streams, and Lakes

Rebecca Flood

Minnesota Pollution Control Agency
Assistant Commissioner

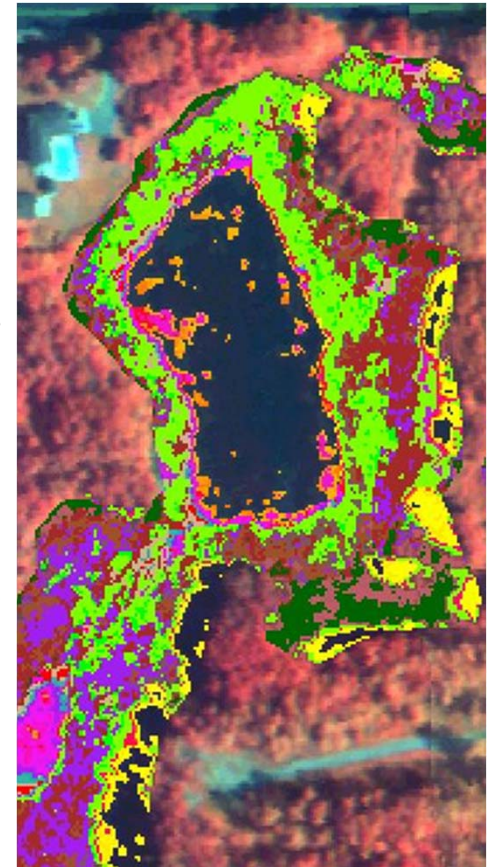
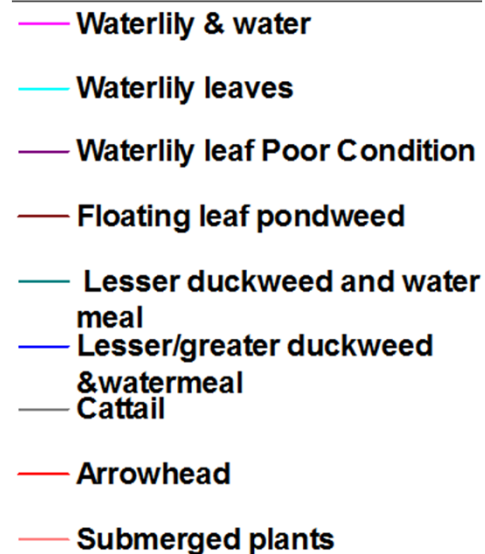
August 2016

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

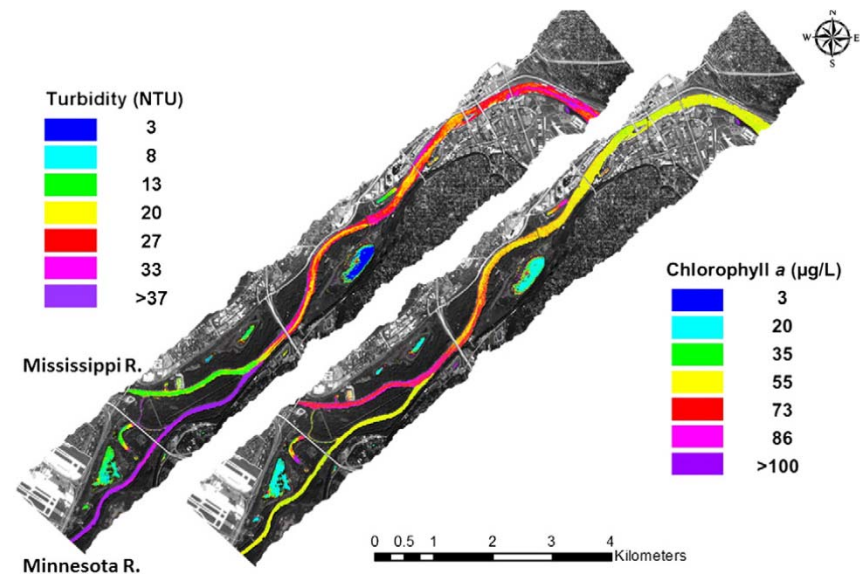
Summary – Remote Sensing of Wetland Quality

- 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

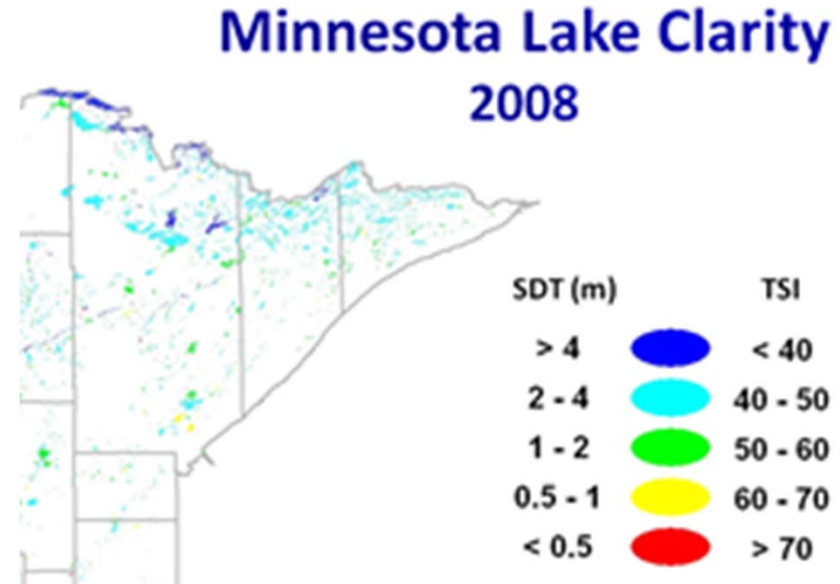
- Large order rivers
 - Mississippi, MN, St Croix
- Assess spatial distribution of water quality
- VSS, chl-a, TSS
- Limitations include cost and clear weather conditions required



Olmanson, L.G., Bauer, M.E., and Brezonik, P.L. 2013 Airborne hyperspectral remote sensing to assess spatial distribution of water quality characteristics in large rivers: the Mississippi River and its tributaries in Minnesota. *Remote Sensing of Environment*. 130:254-265. DOI:10.1016/j.rse.2012.11.023.

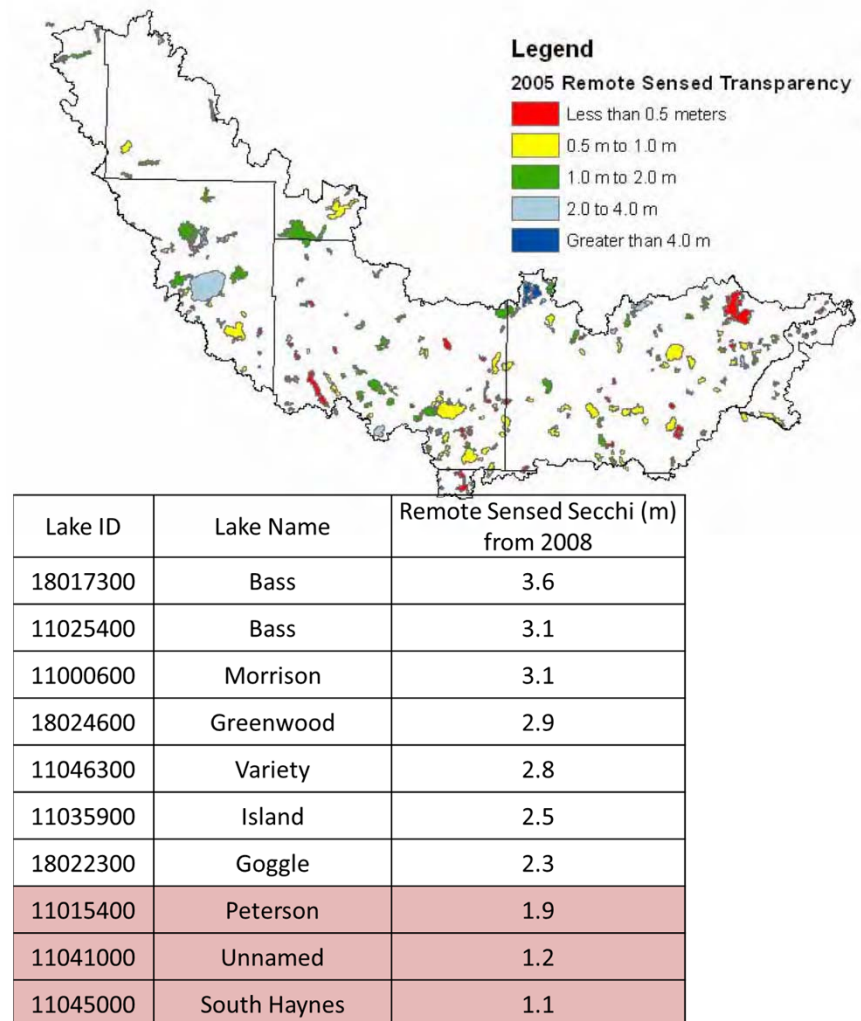
Remote Sensing and Assessments

- 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)



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