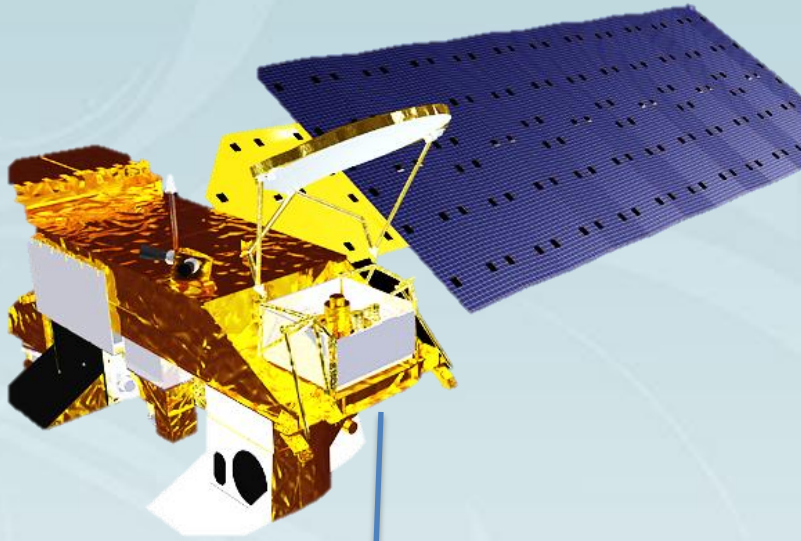

Recap of Great Lakes Remote Sensing Workshop

NOAA Great Lakes Environmental Research Laboratory
Ann Arbor, MI
May 8-9, 2012

John Bratton, GLERL Acting Director

Credit:

NASA Visible Earth, provided by the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE

http://eoimages.gsfc.nasa.gov/images/imagerecords/52000/52939/S1999114182039.png

Workshop Objective

Developing a Strategic View for Remote Sensing of the Great Lakes

Connecting the pieces

- Regional remote sensing needs and capabilities for ecosystem-based resource management
- Existing plans for delivering remote sensing data products for the Great Lakes and other freshwater bodies
- Developing a remote sensing community in the region
- Serving stakeholder requirements

Who attended

- University of Toledo
- University of Wisconsin Cooperative Extension
- Michigan State University
- University of Michigan - Atmospheric, Ocean and Space Sciences
- University of Wisconsin – Madison
- University of Minnesota
- Michigan Tech Research Institute
- Cornell University
- Eastern Michigan University
- Environment Canada
- NASA
- U.S. Fish and Wildlife Service
- NOAA National Weather Service
- NOAA Great Lakes Environmental Research Laboratory
- NOAA National Environmental Satellite, Data, & Information Service
- NOAA National Ocean Service
- Limnotech
- Pennsylvania Department of Environmental Protection
- Wisconsin Department of Natural Resources
- Minnesota Department of Natural Resources
- Great Lakes Observing System (GLOS)

Overarching Questions

Exploring Opportunities

- How can the Great Lakes remote sensing community (developers, providers, and users) make remote sensing products and technology more visible, accessible, functional, and usable in Great Lakes research and applications?
- Where have we been - where are we now - where should we be in the future?
- Should there be a community-based, regional remote sensing plan for the Great Lakes basin?

Desired Outcomes

- A clear understanding of the status of remote sensing in the Great Lakes
- Establishment of a core working group to draft a Regional Remote Sensing Plan for the Great Lakes
- Publishable workshop summary report

Goals

Assess current capabilities overall and with regard to CoastWatch

1. Identify the set of Great Lakes-specific derived products remote sensing has, and can provide. After initial presentations and discussion, summarize the developmental status of each.
2. Identify key research questions that need addressing over the next five years (what is the integrated Remote Sensing Plan for the Great Lakes?).
3. Identify user/stakeholder needs and future products; what products and services would the Great Lakes community wish to see developed at the workshop, and within the near term? To be addressed during break-out sessions.
4. Identify ground-truth and cal/val needed to support remote sensing product development and additional sensor needs. To be addressed during break-out sessions.
5. Establish requirements documents for retrieved and derived Great Lakes remote sensing products (steered by CORL/IORD):
    a) Temporal cycle - daily, weekly, monthly return pass.
    b) Resolution
    c) Acceptable precision/accuracy
    d) Formats standardized for the user community

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Commentary

Developing a Great Lakes remote sensing community

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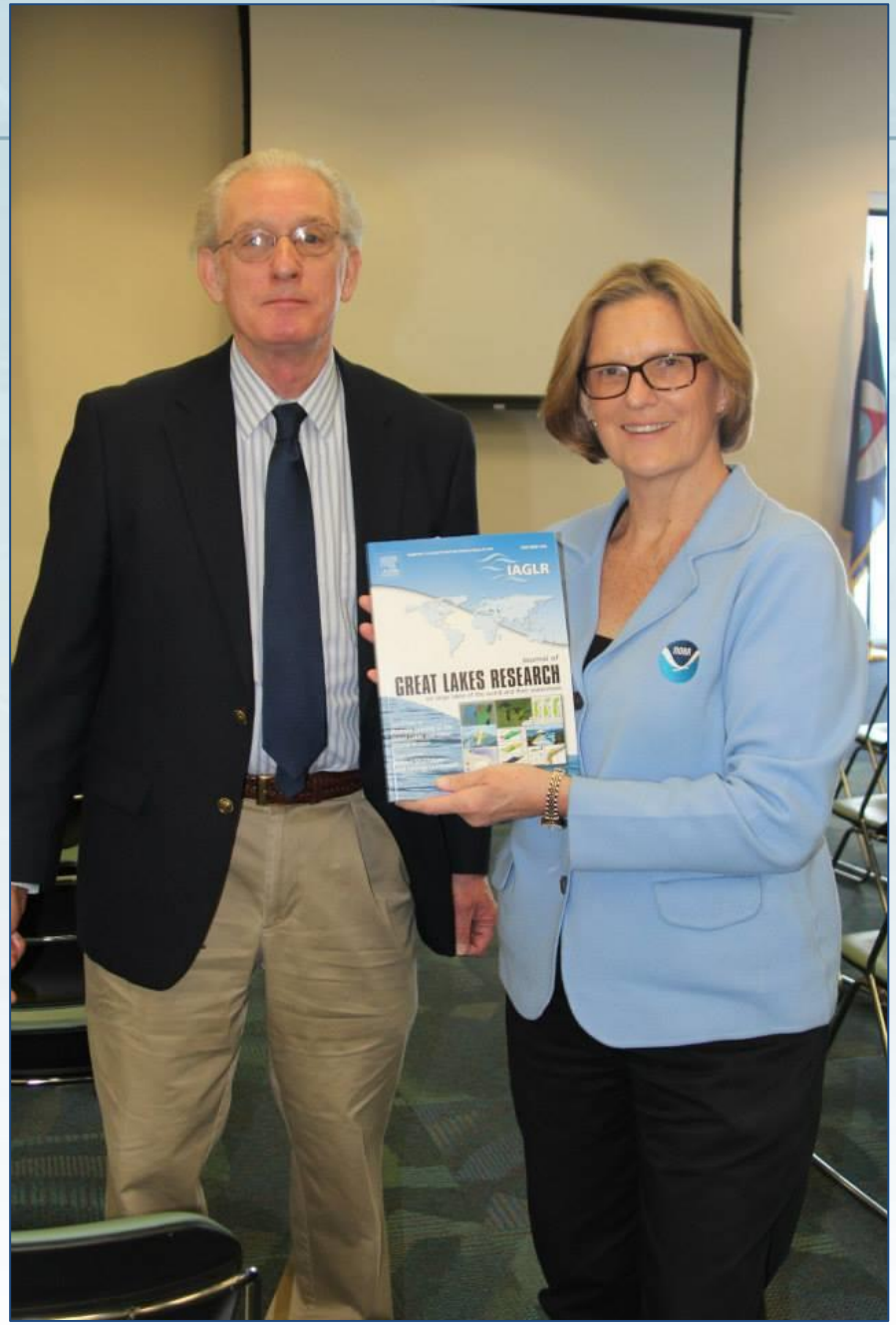
Introduction

Observational data collection of the Laurentian Great Lakes has advanced during the past decade to such a level as to allow real-time analysis from moorings and near real-time from satellite data. Ocean color satellite-based remote sensing provides a rich data set that when properly analyzed allows for the generation of geospatial maps of chlorophyll, dissolved organic carbon, suspended minerals, harmful algae blooms (HABs), surface plumes, benthic vegetation communities, pri-

coastal zone color scanner (CZCS), satellite optical measurements of pigments and sediment became accessible. Despite the relatively coarse CZCS spatial resolution, investigators working in the coastal ocean and Great Lakes demonstrated that satellite sensors presented an enabling technology to the natural sciences and resources communities. Additionally, Leshkevich (1985) described lake ice estimates and classification during winter, demonstrating satellite data was useful for supporting regional remote sensing research year-round.

Currently, regional remote sensing applications are derived from a suite of airborne and satellite sensors that includes radar sensors aboard RADARSAT 1\2 and Envisat, and optical sensors on Landsat, SeaWiFS, MODIS, MERIS, VIIRS and HICO. Recent airborne prototype hyperspectral imager (HSI) data from NASA Glenn Research Center have also successfully shown the ability to quantify an annual harmful algal bloom (HAB) occurring in the West Basin area of Lake



Former Acting NOAA Administrator (and former astronaut) Dr. Kathy Sullivan with George Leshkevich and *JGLR* Special Issue on Remote Sensing at GLERL, 19 February 2014

Questions

Workshop for Remote Sensing of Coastal and Inland Waters

Mouw and Greb,
Eos, Transactions American Geophysical Union
Volume 93, Issue 39, page 375, 25 September 2012

Madison, Wisconsin, 20–22 June 2012

Coastal and inland water bodies, which have great value for recreation, food supply, commerce, transportation, and human health, have been experiencing external pressure from direct human activities and climate change. Given their societal and economic value, understanding issues of water quality, water quantity, and the impact of environmental change on the ecological and biogeochemical functioning of these water bodies is of interest to a broad range of communities. Remote sensing offers one of the most spatially and temporally comprehensive tools for observing these waters. While there has been some success with remotely observing these water bodies, many challenges still remain, including algorithm performance, atmospheric correction, the relationships between optical properties and biogeochemical parameters, sufficient spatial and spectral resolution, and a lack of uncertainty estimates over the wide range of environmental conditions encountered across these coastal and inland water bodies.