GLOS DMAC

Great Lakes Observing System: Data Management and Communications

Tad Slawecki (LimnoTech)

Great Lakes Workshop Series on Remote Sensing of Water Quality

Workshop #2
May 7-8 2014

Overview

- Philosophical Preamble
- Some Technical Detail
- A Few Illustrations

The Availability of Research Data Declines Rapidly with Article Age

Current Biology, Volume 24, Issue 1, 94-97, 19 December 2013

10.1016/j.cub.2013.11.014

Authors

Timothy H. Vines ✉, Arianne Y.K. Albert, Rose L. Andrew, Florence Débarre, Dan G. Bock, Michelle T. Franklin, Kimberly J. Gilbert, Jean-Sébastien Moore, Sébastien Renaut, Diana J. Rennison See Affiliations

Highlights

- We examined the availability of data from 516 studies between 2 and 22 years old
- The odds of a data set being reported as extant fell by 17% per year
- Broken e-mails and obsolete storage devices were the main obstacles to data sharing
- Policies mandating data archiving at publication are clearly needed

Virtuous Data Management

- ***vir·tu·ous*** */ˈvərCHo͞oəs/. Having or showing high moral standards.*
- ***mor·al*** */ˈmôrəl/. Concerned with the principles of right and wrong behavior and the goodness or badness of human character.*

Managing data to ensure its availability and utility is a ~~good~~ best practice to be strongly encouraged.

What's Virtuous?

- Virtuous Data Management is based on discoverability, transparency and interoperability:
  - Development and publication of metadata in accessible catalogs.
  - Use of appropriate detail and a controlled vocabulary in metadata and datasets.
  - Publication of data using open standards.

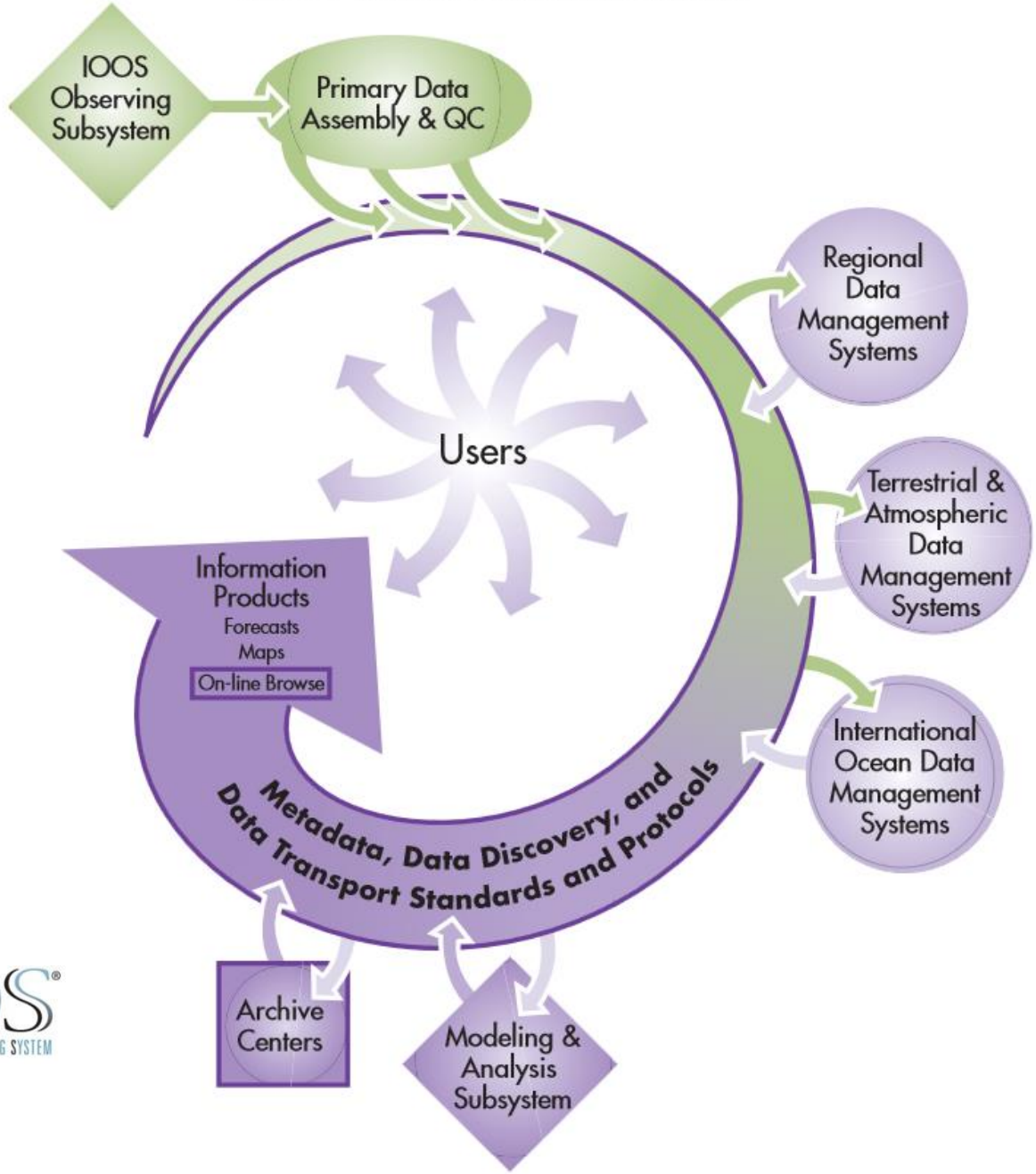
What's Virtuous?

- Sustainability and provenance, too:
  - Long-term access to metadata and data
  - Credit where it's due.

What is DMAC?


PowerVault MD1200

IOOS Data Communications



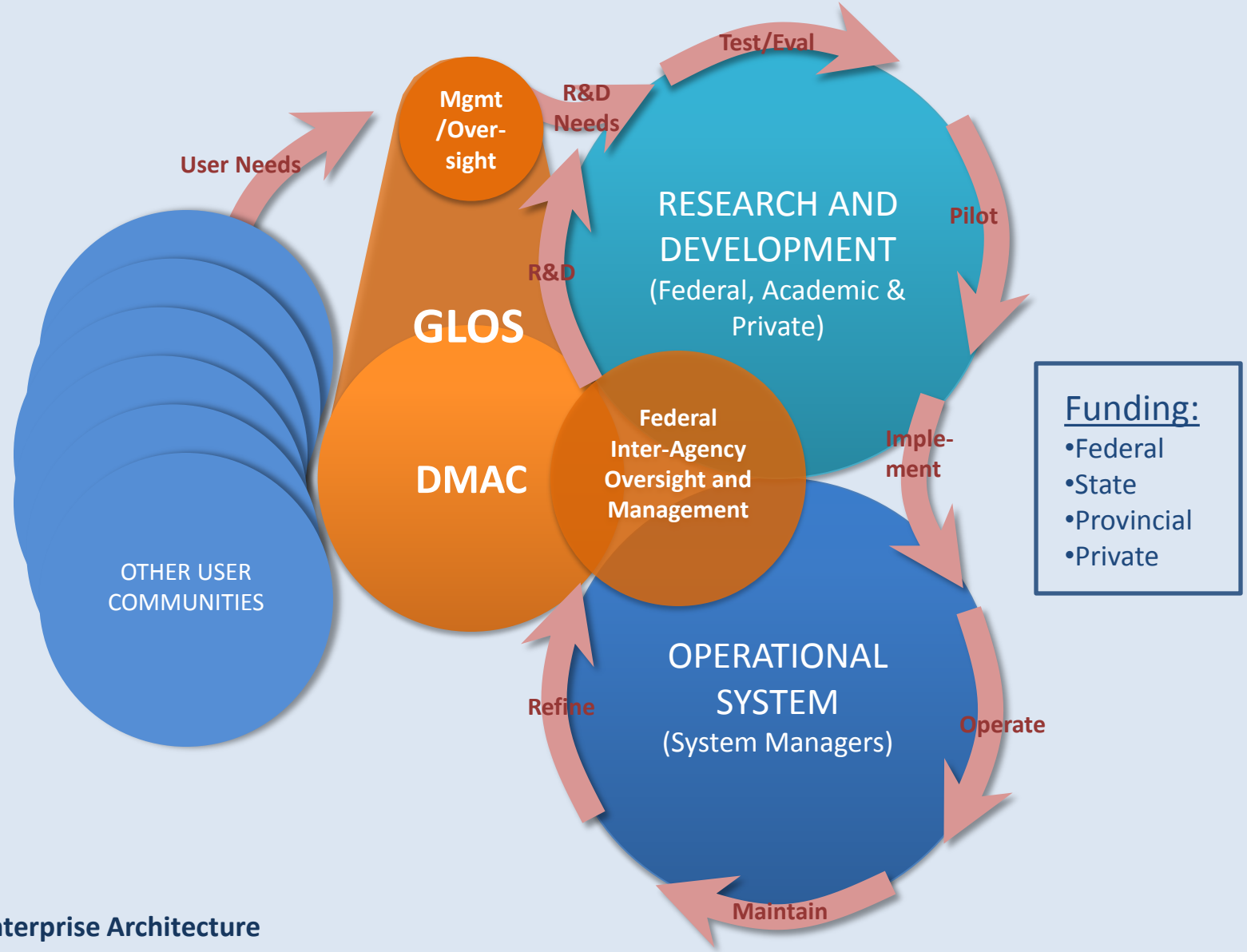
IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

What is DMAC?

- "… the DMAC [Data Management and Communications] subsystem must make data and products discoverable and accessible, and must provide essential metadata regarding information sources, methods, and quality."
  - Delivery of accurate and timely data;
  - Full life-cycle management of observations;
  - Robust yet flexible data exchange.
  - http://www.ioos.gov/library/dmac_implementation_2010.pdf

DMAC and Concept of Operations:

GLOS Enterprise System Management, Development, and User Framework



GLOS Enterprise Architecture

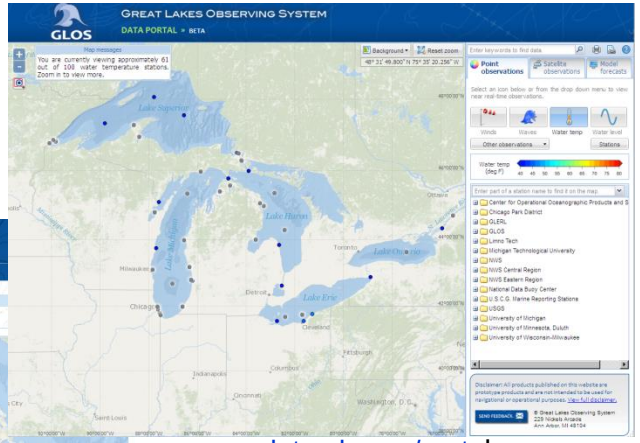
How is DMAC Virtuous?

- Discoverability: ISO-compliant metadata
  - CSW (GeoNetwork)
- Interoperability: adherence to standards
  - SOS, WMS, WFS (52N SOS, ncWMS)
  - OPenDAP, NetCDF (TDS)
- Transparency: vocabulary and harmonization
- Sustainability and provenance; QA/QC

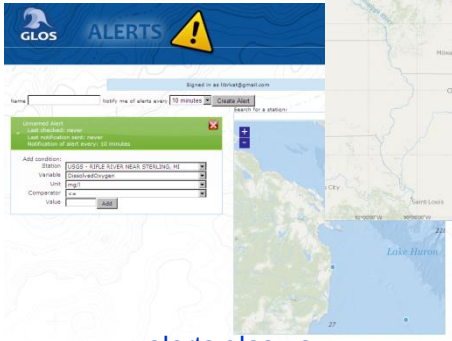
Harvested data

Metadata / XML database

searching

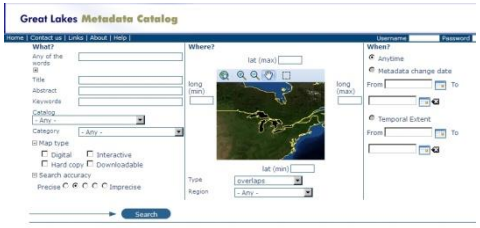


data.glos.us/portal



alerts.glos.us

GeoNetwork Metadata



boaters.glos.us

Illustrations

Great Lakes Metadata Catalog

Home | Contact us | Links | About | Help |

Username Password Login

What?

Any of the words: iugls

Title

Abstract

Keywords

Catalog: - Any -

Category: - Any -

Map type

- Digital
- Interactive
- Hard copy
- Downloadable

Search accuracy

Precise ○ ● ○ ○ ○ Imprecise

Where?

lat (max)

long (min)

long (max)

lat (min)

Type: overlaps

Region: - Any -

When?

- Anytime
- Metadata change date

From To

- Temporal Extent

From To

Search

CLOSE SE

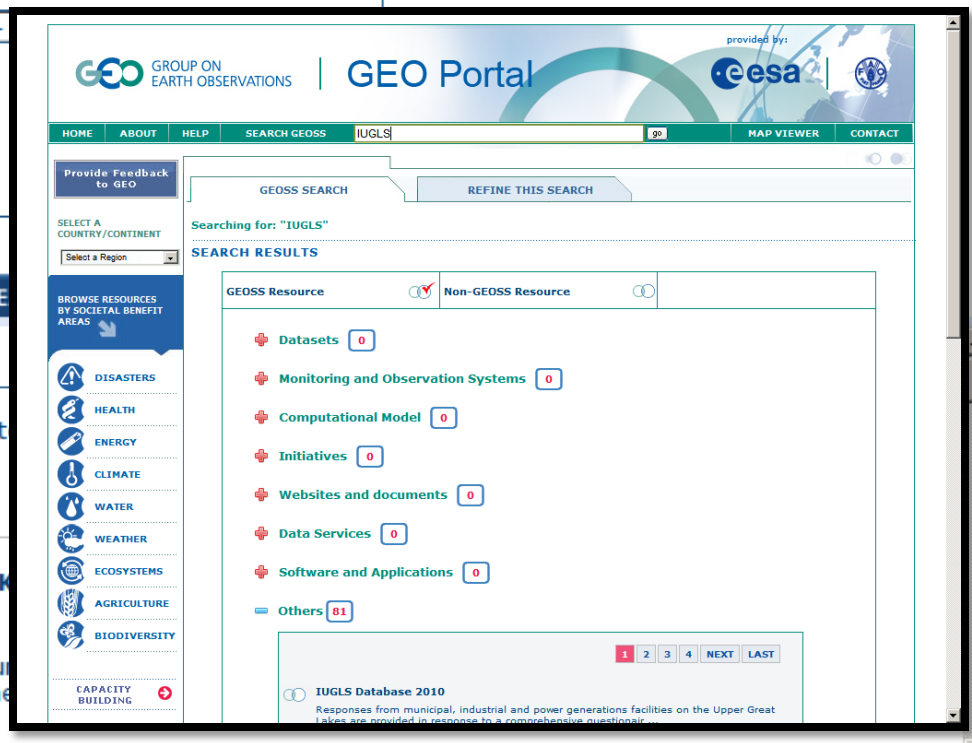
Welcome to the Great Lakes Geospatial Metadata Catalog

Aggregate Results matching search criteria : 1-10/97 (page 1/10), 0 select

COHESIVE SHORELINE EROSION MODELLING FRAMEWORK

Abstract: Geomorphic Solutions developed a modelling framework docu... outlines the modelling tools that would be used as well as the...

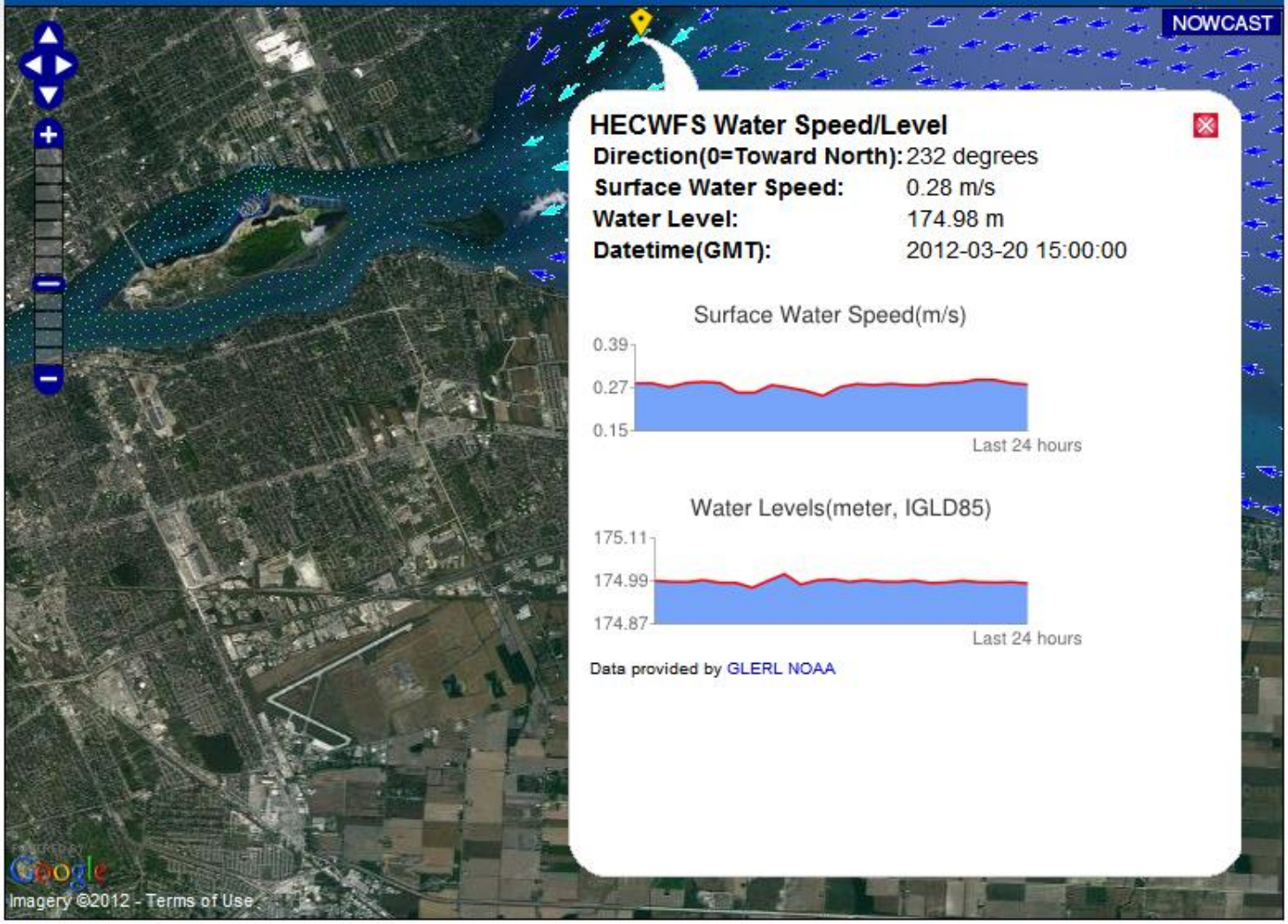
Keywords: COHESIVE SHORELINE, CORMODEL, EROSION, MODELLING



GREAT LAKES OBSERVING SYSTEM

HURON-ERIE CORRIDOR WATERWAYS FORECAST SYSTEM

Date: 2012-03-20 15:00:00 GMT | Change Time Zone | Change Units | Change Model Output | Help



Base Layers

- (•) Satellite Map
- ( ) Street Map
- ( ) Hybrid Map
- ( ) Terrain Map

HECWFS Visualization

- [x] Surface Water Speed
- [ ] Model Grid

Legend

Surface Water Speed (m/s)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 -

Tools Legend

Pan The Map

Reveal Data for Map Points

Need help? Click here.

Nowcast WMS-T URL: http://michigan.glin.net/glos/hecwfs/nowcast/wms
Forecast WMS-T URL: http://michigan.glin.net/glos/hecwfs/forecast/wms
Data download in ESRI Shp format: 2012-03-20 15:00:00 GMT
Data download in NetCDF format: HTTP Data Download

Lake Erie | GLOS Boaters' Fo

data.glos.us/boaters/erie

CalLite changes | CalLite issues | Wundermap | NWS Weather | Calendar | Uverse | 4957 High Meadow Ln... | Newsmap | Other

GLOS

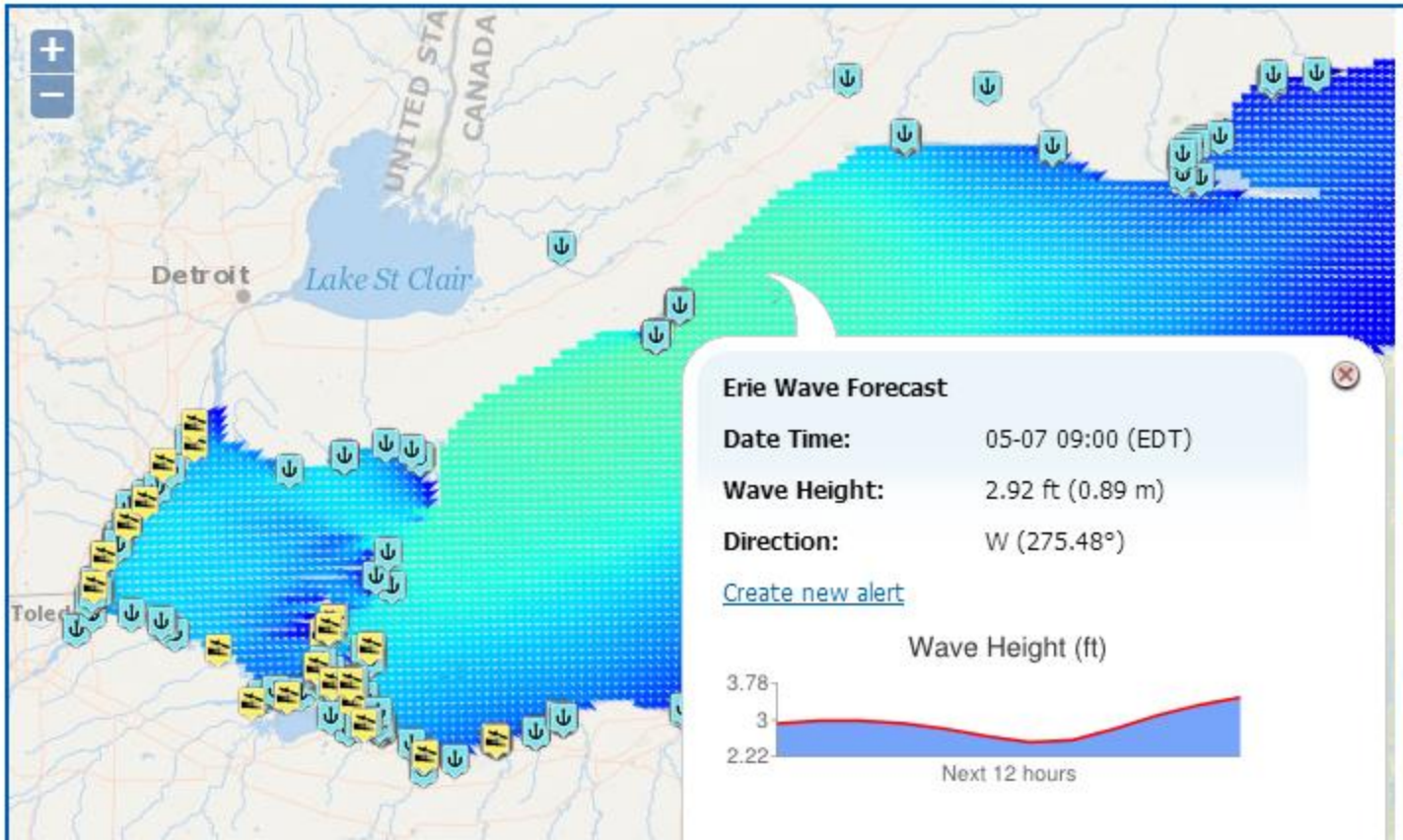
GREAT LAKES OBSERVING SYSTEM BOATERS' FORECAST

KNOWLEDGE. SAFETY. BOATING

USERS GUIDE | GET ALERTS | ABOUT | AMENITIES & SERVICES

LAKE ERIE

Lake Superior | Lake Michigan | Lake Huron | Huron-Erie Corridor | Lake Erie | Lake Ontario | St. Lawrence River



Map Options and Legend

Zoom to Region

Marina Services

- [x] ESRI Ocean Basemap
- [ ] Google Hybrid
- [ ] OSM Street Map

Show map data for

Model Time: Latest: 05/07 09 EDT

- [ ] Water Currents
- [ ] Water Depth
- [x] Waves
- [ ] Surface Temperature

GREAT LAKES OBSERVING SYSTEM

DATA PORTAL

GLOS

Background | Reset zoom

40° 26' 16.188" N 78° 23' 25.728" W

Enter keywords to find data.

Point observations | Satellite observations | Model forecasts

Select an icon below or from the drop down menu to view near real-time observations.

Winds | Waves | Water temp | Water level

Other observations | Stations

Wave height (ft) 0 1 2 3 4 5 6 7 8 9 10

Enter part of a station name to find it on the map.

- Center for Operational Oceanographic Products and Services
- Chicago Park District

Lake Superior

Lake Michigan

Milwaukee

Chicago

Indiana

48°00'00"N

46°00'00"N

44°00'00"N

LimnoTech Station Holland Buoy

LimnoTech Station Holland Buoy

8:30 am today (EDT)

AirTemperature	46.69 F	WaterTemperature (profile)	view plot
Dew Point	36.48 F		
Significant Wave Period	2.620333 s	Wind Gust	19.05 knots 21.92 mph
SignificantWaveHeight	1.74 ft	WindDirection	110.4 deg
WaterTemperature	36.51 F	WindSpeed	14.99 knots 17.25 mph

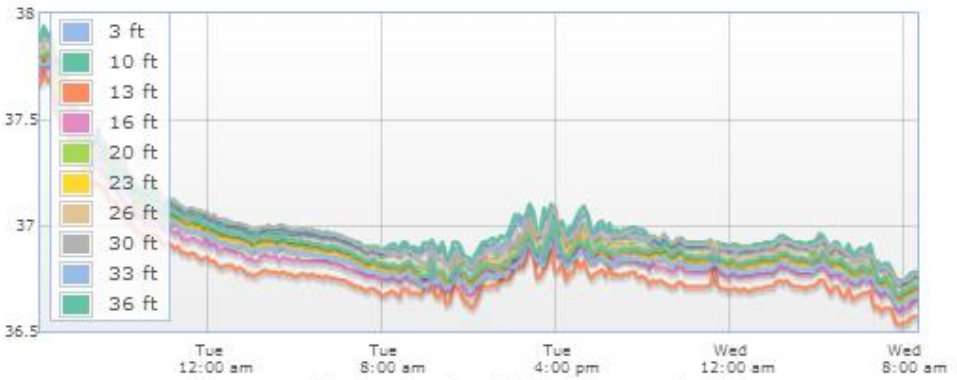
Click here for station information.

Click here for alternate station information.

LimnoTech Station Holland Buoy

View as chart | View as data table | Export data

WaterTemperature (F)



Mouseover the line to view details. Times are in EDT.

Grant and Purdue Civil

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Research Reserve System

eporting Stations

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data.glos.us/portal/#

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GREAT LAKES OBSERVING SYSTEM

DATA PORTAL

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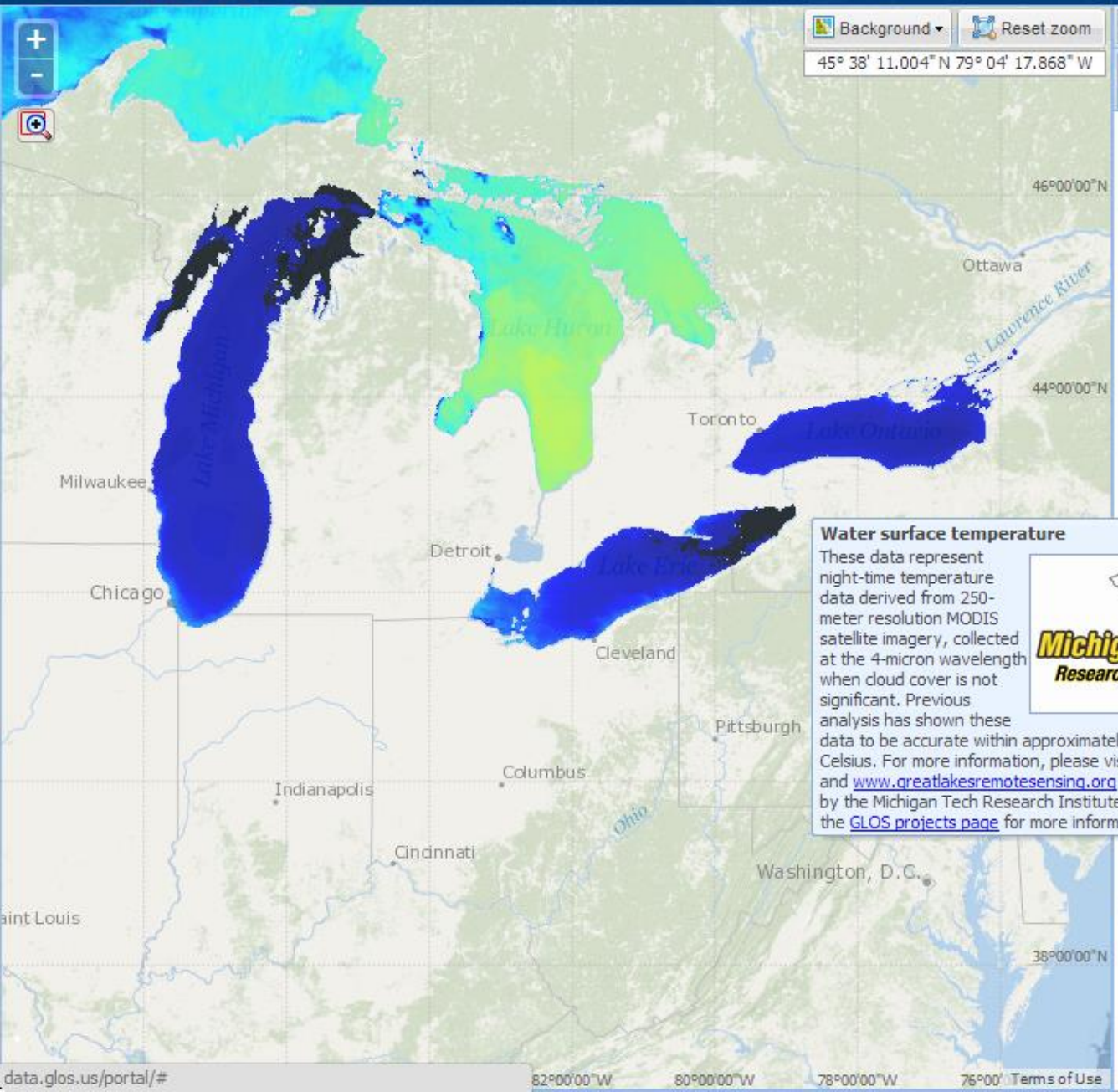

Enter keywords to find data.

Point observations | **Satellite observations** | Model forecasts

These overlays are in near-real time. The weather hazard layers are controlled separately below.

Type: Water surface temperature

Contrast

Water surface temperature (deg F)

Satellite data generally unavailable from early November to late March due to cloud cover.

Lake Erie : Apr 19
Lake Huron : Oct 15
Lake Michigan : Apr 23
Lake Ontario : Apr 24
Lake Superior : Oct 10

Learn more about this data

zards? Yes No

by clicking in a yellow, orange, or red map.

ngs Watches Advisories

Water surface temperature

These data represent night-time temperature data derived from 250-meter resolution MODIS satellite imagery, collected at the 4-micron wavelength when cloud cover is not significant. Previous analysis has shown these data to be accurate within approximately 1/2 degree Celsius. For more information, please visit www.mtri.org and www.greatlakesremotesensing.org - data are provided by the Michigan Tech Research Institute (MTRI). Or visit the GLOS projects page for more information.

MichiganTech Research Institute

SEND FEEDBACK

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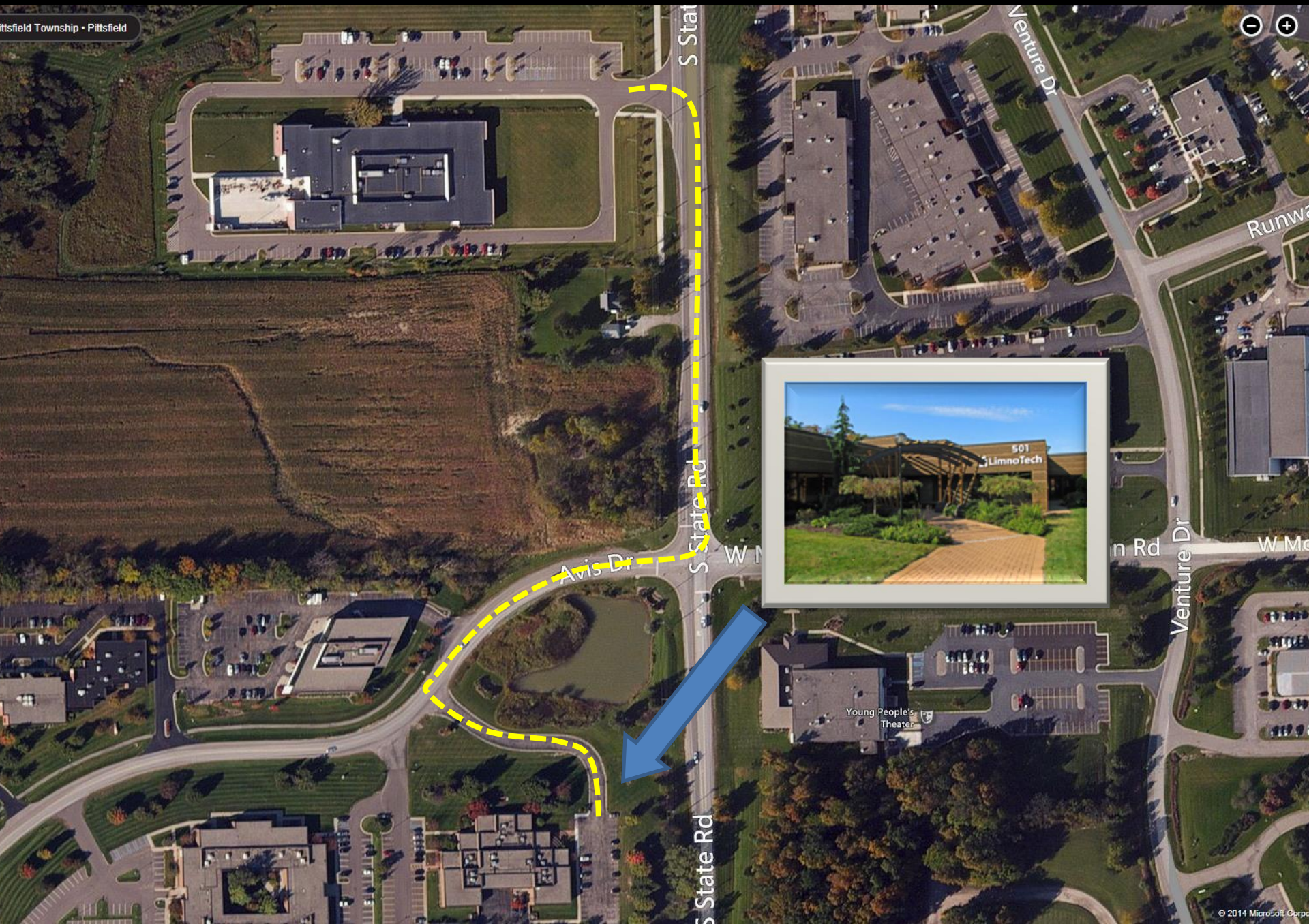
Takeaways

- There are best management practices for data
  - Discoverable, transparent, interoperable, sustainable, creditable
- IOOS/GLOS DMAC implements virtuous data management
  - Based on open standards and technology
- Can GLOS help me?

Who is DMAC?

- GLOS staff and contractors (LimnoTech, RPS, GLC, MTRI):
  - Kelli, Tad, Kelly, Guan, Nate;
  - Joe, Eoin, Christine, Colin.
- IOOS and other NOAA groups.
- Data and product contributors.

Questions? tad@limno.com!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Proceedings of the National Academy of Sciences of the United States of America

PNAS

Heavy use of equations impedes communication among biologists

Tim W. Fawcett[1] and Andrew D. Higginson

Author Affiliations

Edited† by Robert M. May, University of Oxford, Oxford, United Kingdom, and approved June 6, 2012 (received for review April 4, 2012)

Abstract

Most research in biology is empirical, yet empirical studies rely fundamentally on theoretical work for generating testable predictions and interpreting observations. Despite this interdependence, many empirical studies build largely on other empirical studies with little direct reference to relevant theory, suggesting a failure of communication that may hinder scientific progress. To investigate the extent of this problem, we analyzed how the use of mathematical equations affects the scientific impact of studies in ecology and evolution. The density of equations in an article has a significant negative impact on citation rates, with papers receiving 28% fewer citations overall for each additional equation per page in the main text. Long, equation-dense papers tend to be more frequently cited by other theoretical papers, but this increase is outweighed by a sharp drop in citations from nontheoretical papers (35% fewer citations for each additional equation per page in the main text). In contrast, equations presented in an accompanying appendix do not lessen a paper's impact. Our analysis suggests possible strategies for enhancing the presentation of mathematical models to facilitate progress in disciplines that rely on the tight integration of theoretical and empirical work.