Great Lakes Large Aquatic Ecosystem (LAEs) Project
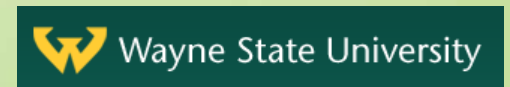

EN2014

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Presented by:
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Daniel Jeng, enfoTech & Consulting Inc.

Topics

- Team Introductions

- Project Drivers, Goals & Background

- Project Components
  - Data Publishing: LAEs Data Exchange and LAEs EN-Node Plug-in
  - Data Discovery and Analysis: EN Browser

- Use Case

- Upcoming Timelines

- Q/A

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Team Introductions

Organization	Team Members
Michigan DEQ	Michael Beaulac Jason Smith Sara Raja
Wisconsin DNR	Kate Barrett
Wayne State University	Shawn McElmurry
Great Lakes Commission	Stuart Eddy
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What is a Large Aquatic Ecosystem?

Partially encompassed, multi-jurisdictional sized water bodies that can include:

◆ Freshwater and marine wetlands, rivers, lakes, and coastal estuaries,

◆ Interdependent biotic communities that are structured by biological interactions and abiotic environmental factors.

Examples: **Great Lakes**, Chesapeake Bay, Puget Sound, Gulf of Maine, Mississippi Delta & Gulf of Mexico, etc.

LAEs Project Objective & Drivers

◆ **Project Objective:**

 ▸ Pilot a data sharing mechanism to support

  ▸ environmental quality,

  ▸ human health,

  ▸ climate change impacts, and

  ▸ planning long-term sustainability for a large aquatic ecosystem

◆ **Project Drivers:**

 ▸ Preserve the Great Lakes – 94,000 mi^2, six quadrillion gallons of fresh water

 ▸ Support critical restoration initiatives:
  ▸ Great Lakes Water Quality Agreement
  ▸ Great Lakes Restoration Initiative
  ▸ Areas of Concern

 ▸ Support assessments via better collaboration (NGOs & government)

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Areas of Concern Defined

- A location that has experienced environmental degradation
- Tied to the US-Canada Great Lakes Water Quality Agreement
  - 25 AOCs in the US
  - 9 AOCs in Canada
 - 5 AOCs shared by both countries

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Project Goals

The project team aims to:

1. Publish environmental data for their respective organizations:
    I. Bio-survey, contaminated sediment, fish tissue analysis, chemical and bacteriological analyses of water, etc.
    II. Each LAEs partner → publish Station and Activity/Results web services

2. Leverage enhanced version of EN Browser → query, consolidate and analyze LAEs data for assessment of AOCs

3. Promote project resources, tools and lessons learned to advance the technical capabilities of other large ecosystems

Project Components
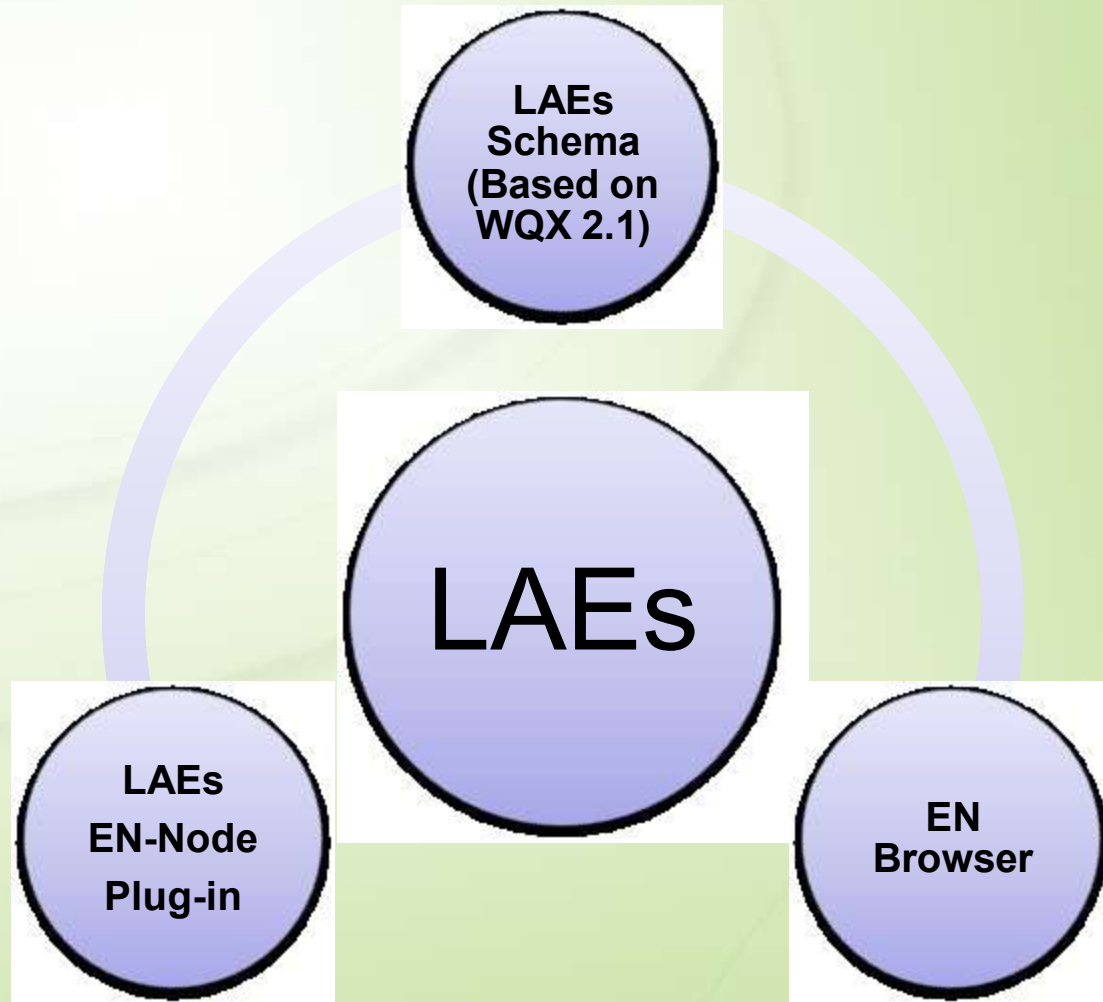
Data Publishing Overview
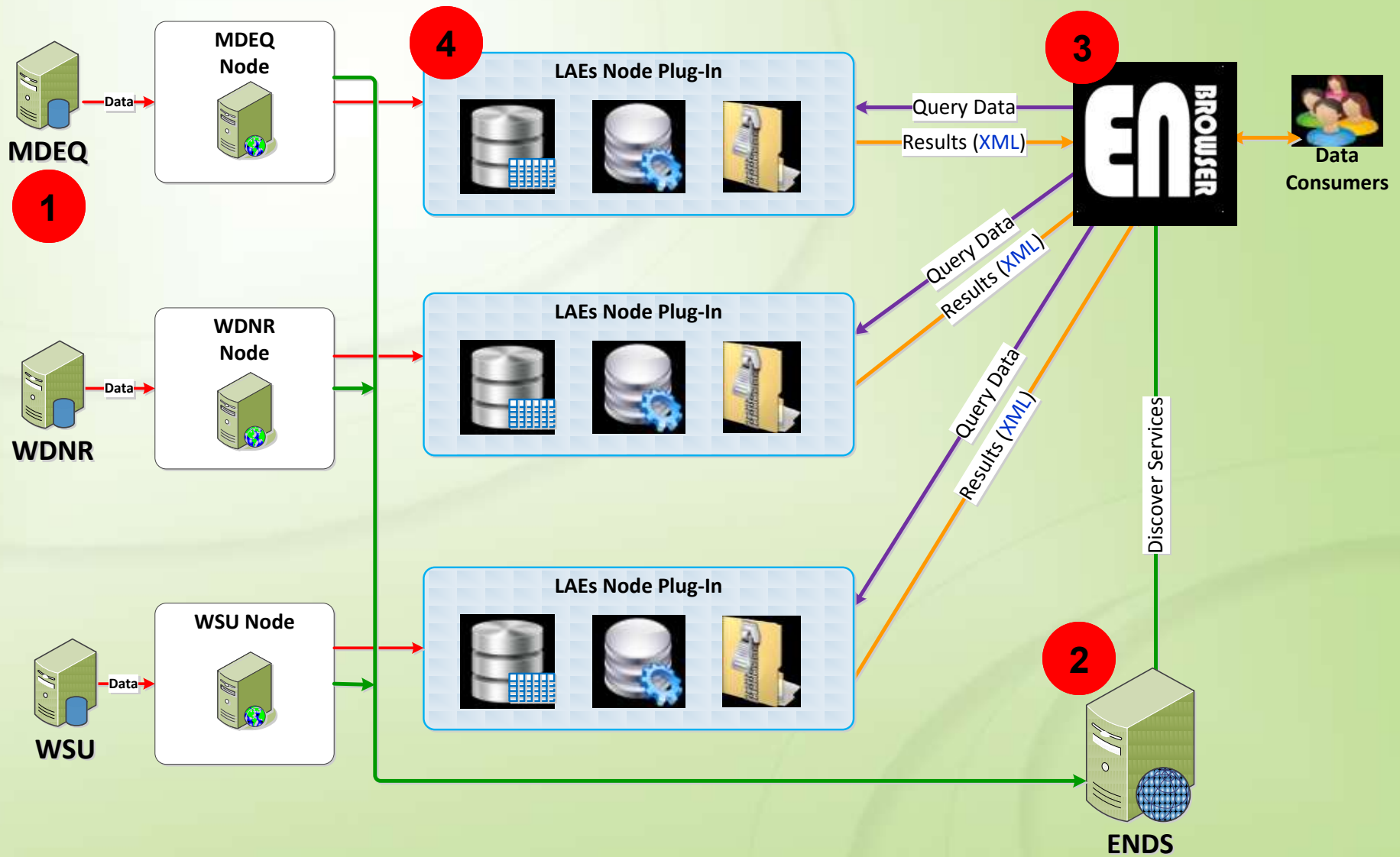
Potential Use Cases and Questions

1. WDNR & MDEQ:

   ➤ Are total phosphorus (TP) and dissolved oxygen (DO) substantially impaired in the Lower Menominee River AOC relative to levels considered impaired by WDNR?

   ➤ Are TP and DO levels impaired relative to 303(d) listing criteria?

2. WDNR & MDEQ:

   ➤ What Lake Michigan studies collected benthic macroinvertebrate data and/or fish tissue data?

   ➤ Who are the study contacts?

   ➤ Can these studies be used to ID a reference site for proposed study that will help establish a baseline for Degradation of Benthos Beneficial Use Impairment (BUI) in an AOC?

3. WSU:

   ➤ Is there a correlation between decline of macroinvertebrate species in Clinton River to climate-induced changes in sediment transport?

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EN Browser: Data Discovery (1/2)

◆ Using the EN Browser, data consumers can discover LAEs data…

Note: The LAEs project team is in the process of publishing their services. Using the EN Browser to query existing WQX data services are illustrated in the subsequent slides..
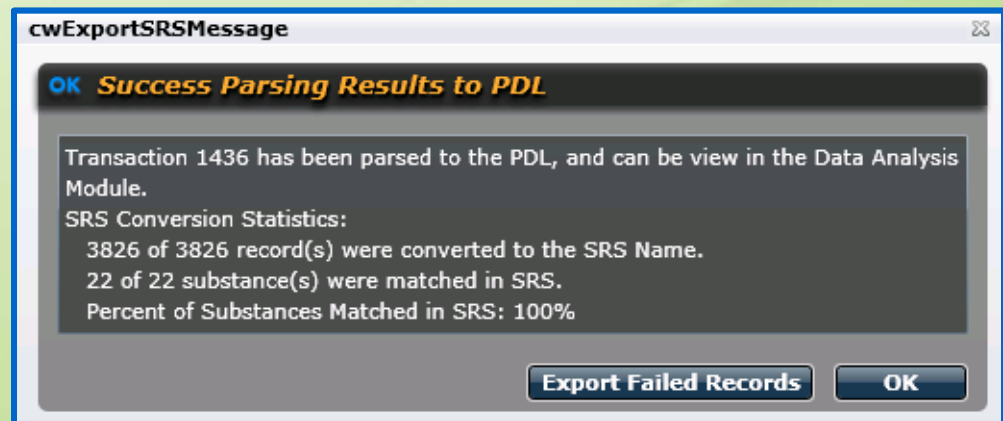

Water Quality

Ambient water quality data can include projects, monitoring locations, samples, and results and may include chemical, biological, physical habitat, or water organism population counts.

Map View · Environmental Interest View · ALL Browse All Services

Air Emissions · Air Quality · All · Regulated Consumer Products · Toxic Release · Indoor Air Quality · Facility Inventories · Drinking Water · Waste Management · Wastewater · Environmental Incident/ Emergency Response · Chemical Storage · Water Quality · Response Resources · Ground Water

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EN Browser: Data Discovery (2/2)

◈ Data consumers can construct their queries/solicits and request data

EN Browser: Data Harmonization (1/2)

◆ Data consumers can consolidate data from multiple requests by parsing the data into their Personal Data Library (PDL)

◆ To facilitate data analysis, a Substance Registry Services (SRS) Conversion function is available

- SRS function searches EPA's SRS library to find possible matches with the substance names specified in the original data set.

- If a match is found, the original substance is replaced with the EPA SRS substance name.

- Example: Data sources may report "Phosphorus" as "Phosphate-phosphorus", "Phosphorus as P", "Phosphorus as PO4". The SRS Conversion converts matching synonyms to the official EPA substance name of "Phosphorus".

cwExportSRSMessage

OK *Success Parsing Results to PDL*

Transaction 1436 has been parsed to the PDL, and can be view in the Data Analysis Module.
SRS Conversion Statistics:
    3826 of 3826 record(s) were converted to the SRS Name.
    22 of 22 substance(s) were matched in SRS.
    Percent of Substances Matched in SRS: 100%

Export Failed Records   OK

EN Browser: Data Harmonization (2/2)

◆ SRS Conversion Example

Transaction ID	Data Flow	Original Substance Name ▲	SRS Substance Name
1438	WQX	1,1,1-Trichloroethane	Ethane, 1,1,1-trichloro-
1438	WQX	1,1,2,2-Tetrachloroethane	Ethane, 1,1,2,2-tetrachloro-
1438	WQX	1,1,2-Trichloroethane	Ethane, 1,1,2-trichloro-
1438	WQX	1,1-Dichloroethane	Ethane, 1,1-dichloro-
1438	WQX	1,1-Dichloroethylene	Ethene, 1,1-dichloro-
1438	WQX	1,2-Dichloroethane	Ethane, 1,2-dichloro-
1438	WQX	1,2-Dichloropropane	Propane, 1,2-dichloro-
1438	WQX	Acidity, hydrogen ion (H+)	
1438	WQX	Alkalinity, total	
1438	WQX	Alkalinity, total as CaCO3	
1438	WQX	Alpha particle	Alpha particle
1438	WQX	Aluminum	Aluminum
1438	WQX	Ammonia-nitrogen	Ammonia-nitrogen
1438	WQX	Ammonia-nitrogen as N	
1438	WQX	Arsenic	Arsenic
1438	WQX	Barium	Barium
1438	WQX	Benzene	Benzene
1438	WQX	Beta particle	Beta particle
1438	WQX	Biochemical oxygen demand, standard conditions	
1438	WQX	Boron	Boron

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EN Browser: Data Analysis (1/4)

◆ Using the EN Browser, data consumers can analyze WQX data via a GIS map…

◆ Use the point-radius search feature to search for all monitoring locations and sampling results within a specified radius

EN Browser: Data Analysis (3/4)

- Graph data to assess sampling results and identify potentially impaired areas
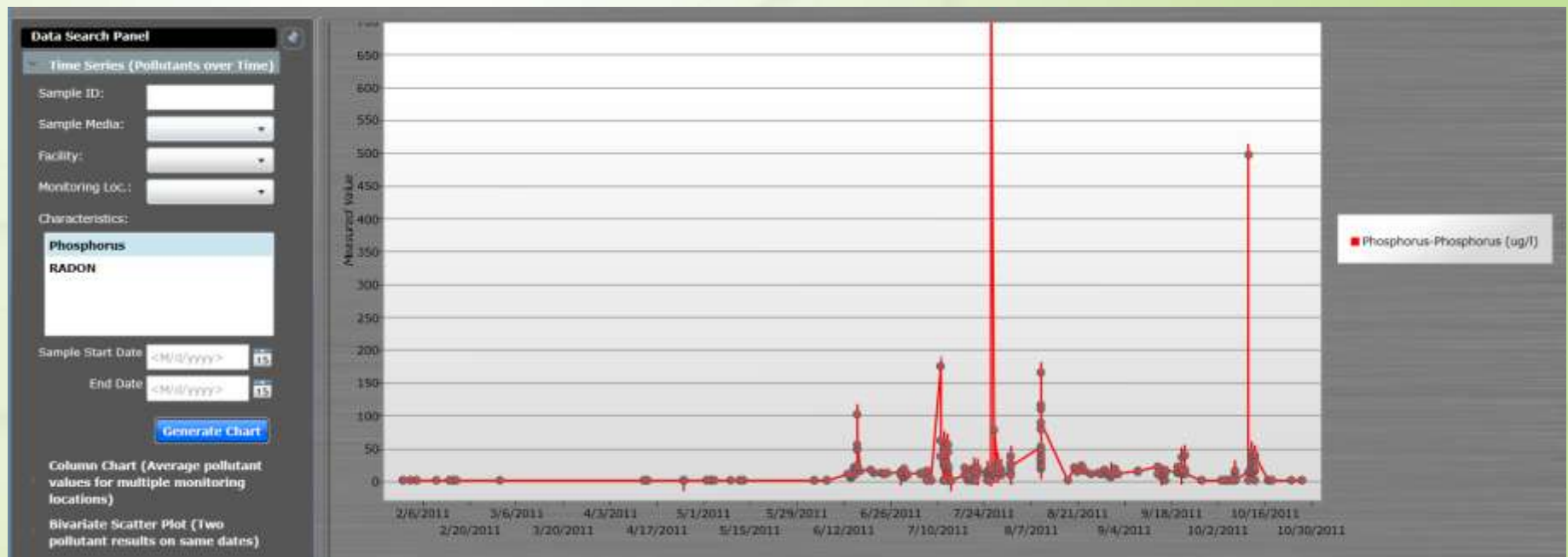
EN Browser: Data Analysis (4/4)

◆ Export consolidated datasets to Excel for offline analysis or import into other statistical analysis tools

Upcoming Timelines

Sept 2013

April 2014

We are here!

- Development has been completed
- LAEs data exchange has been reviewed and approved by the ENLC
- The project team is in the process of publishing their LAEs data

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Questions and Answers