

# Great Lakes Large Aquatic Ecosystem (LAEs) Project

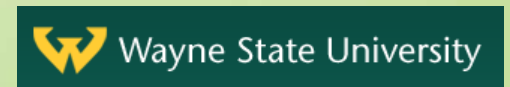


**EN2014**

**February 26, 2014**

**Presented by:**

**Michael Beaulac, Michigan DEQ  
Daniel Jeng, enfoTech & Consulting Inc.**



**enfoTech**

# Topics

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- ◆ 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



# Team Introductions

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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
enfoTech	Tony Jeng, Daniel Jeng, Yu Wang, Charlie Tsai



# 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

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## ◆ 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<sup>2</sup>, 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)

# Areas of Concern Defined

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- ◆ 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



# Project Goals

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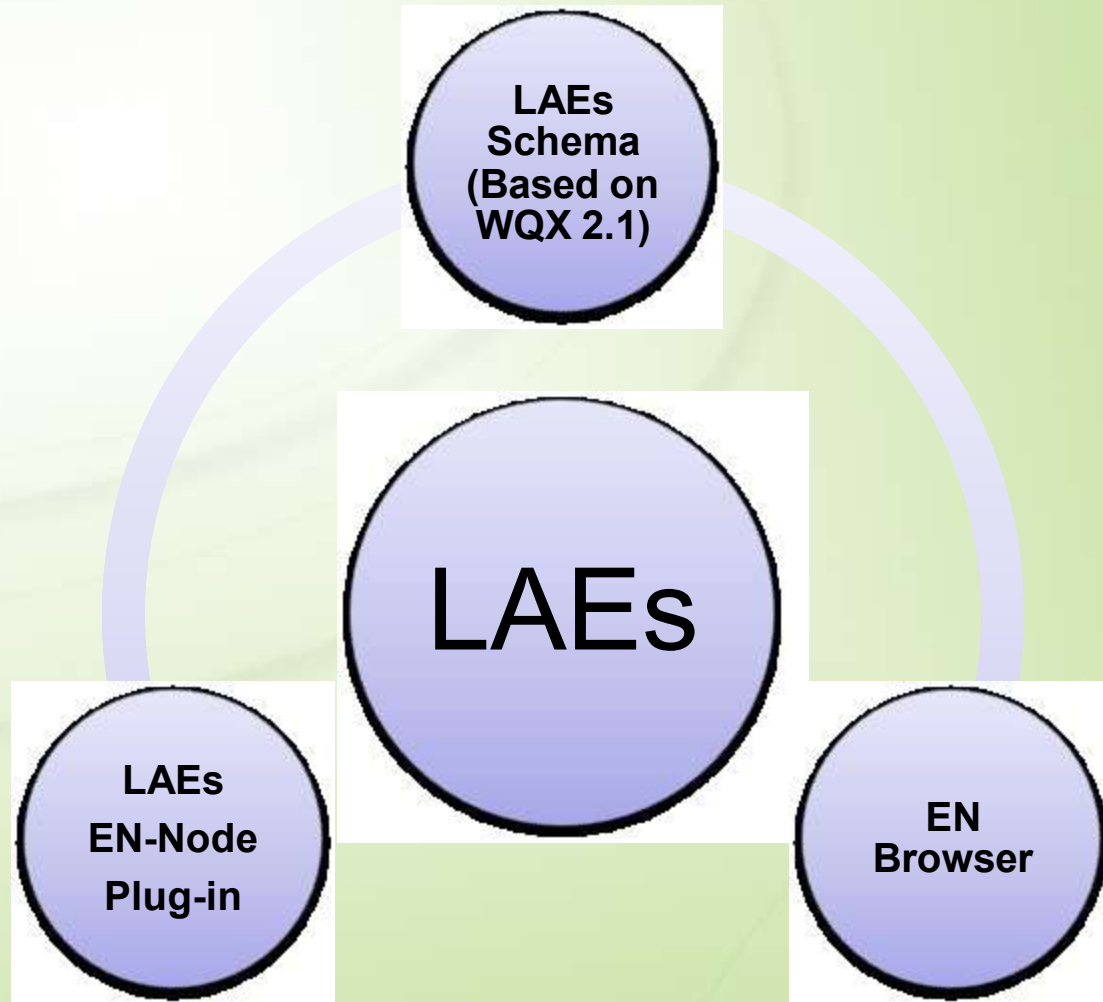
The project team aims to:

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



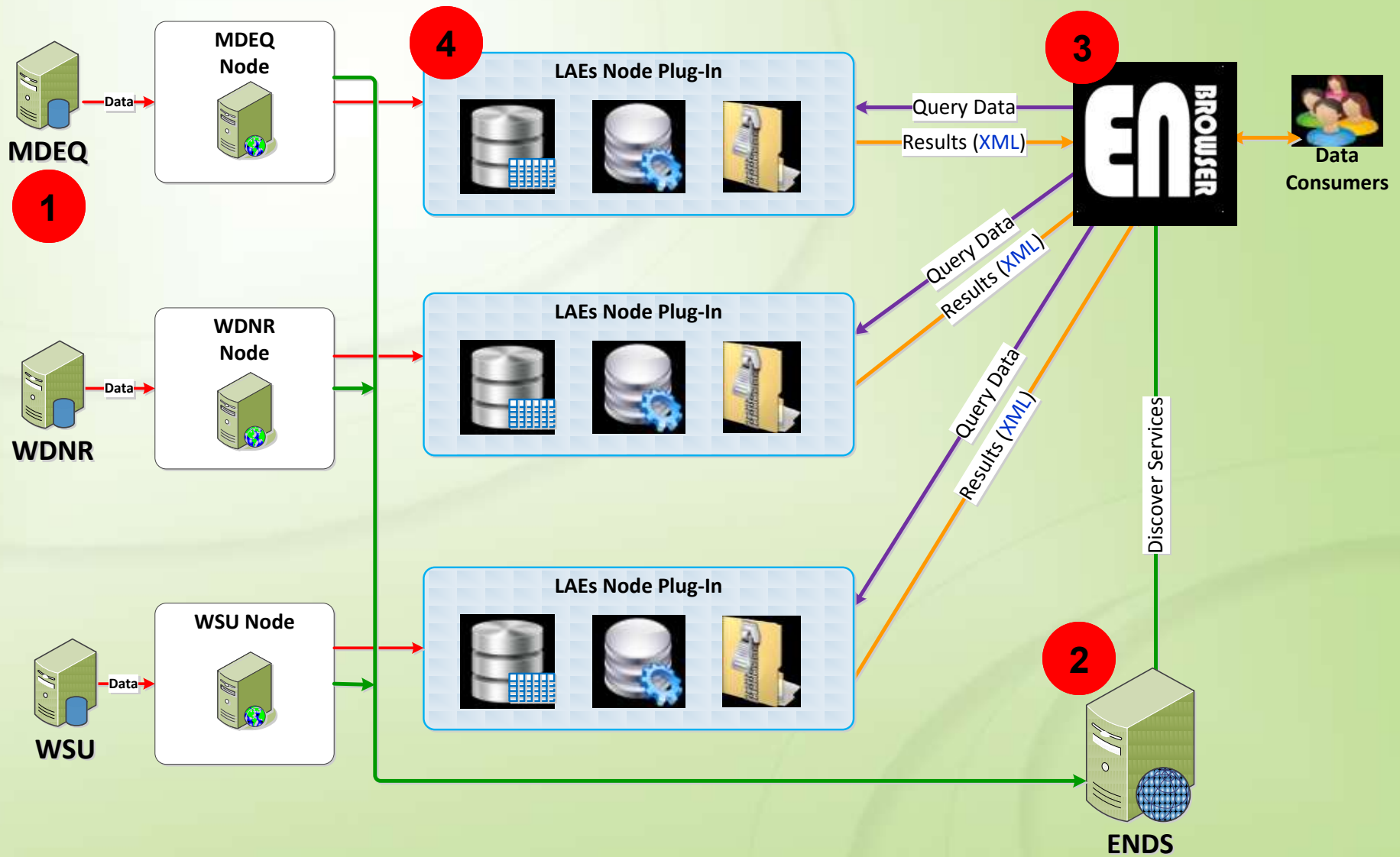
# Project Components

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# Data Publishing Overview



# Potential Use Cases and Questions

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## 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?

# 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..



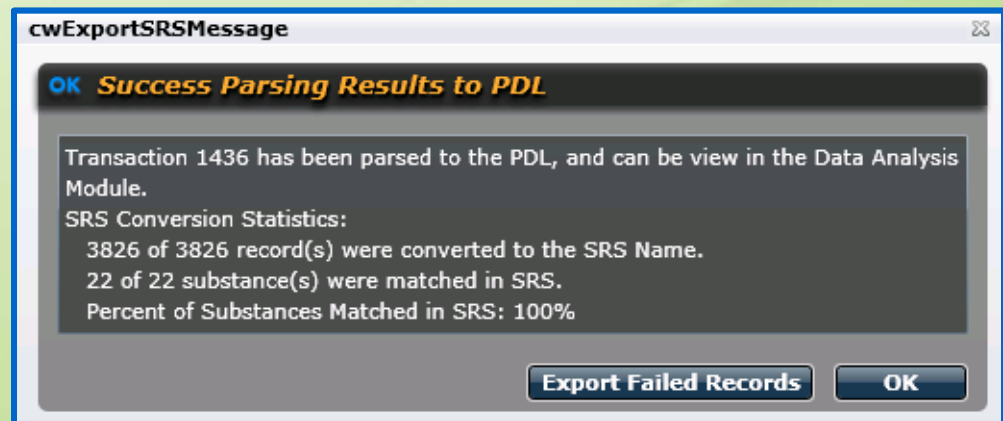
# EN Browser: Data Discovery (2/2)

- ◆ Data consumers can construct their queries/solicits and request data

The screenshot displays the EN Browser interface, which is used for data discovery. The top navigation bar includes links for Home, Keyword Search, Data Discovery (highlighted), Transactions, Data Analysis, and Projects. The user is logged in as 'njnode\_user@dep.state.nj.us (Production)'. The main content area is divided into two columns. The left column, titled 'Dataflow', lists various data sources: OWWOX (Office of Water Water Quality Data Exchange), PNW (Pacific Northwest Water), WQX (Water Quality Exchange for publishing water quality data), Wisconsin DNR Production Node v2, WQP (Water Quality Portal), and WY (Water Quality). The right column, titled 'Node/Services', provides details for each service, including version, last update, and URL. The 'WQP' service is selected, and its details are shown in the 'Request Parameter Information' section. This section includes a 'General Information' tab with fields for Service Provider (EPA Storet), Organization (a dropdown menu with options like 0800257, 0800257\_WQX, 0800597, 0800650, and none0859), Site Id (a text input field), Site Type (a dropdown menu with options like Atmosphere, Estuary, Facility, Lake, Reservoir, Impoundment, and Land), Country Code (a dropdown menu with options like CANADA, MEXICO, and UNITED STATES OF AMERICA), State Code, County Code, and HUC (a text input field with a 'Select HUC from Map' button). The 'Activity Information' section is also visible at the bottom.

# 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".



# 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



# EN Browser: Data Analysis (1/4)

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



# EN Browser: Data Analysis (2/4)

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

The screenshot shows the EN Browser interface with a map of the Great Lakes region. A blue circular search radius is centered on Grand Rapids, Michigan. The map displays the states of Wisconsin and Michigan, and the Great Lakes (Superior, Michigan, Huron, Erie, and Ontario). The interface includes a map control panel on the left, a search bar at the bottom, and 'Ok' and 'Cancel' buttons.

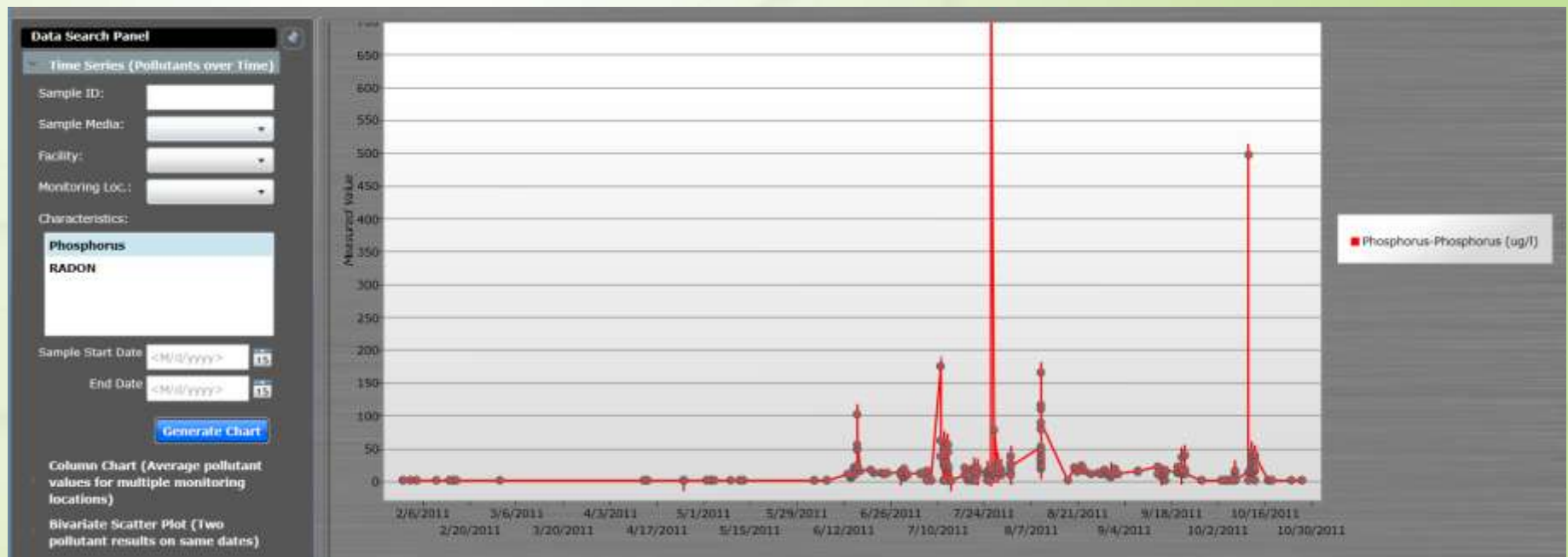
\* press and hold **SHIFT** key then mouse click and drag to the area

Selected Value:



# 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

The screenshot displays the EN Browser interface. On the left is the 'Data Management Panel' with various search and management options. The 'Search By Sample Result' section is active, with 'Data Flow' set to 'WQX'. The main area shows a table of 20 records. At the bottom right, there are 'Export All' and 'Delete' buttons.

Delete	TransactionID	SampleIdentifier	FacilitySiteIdentifier	FacilitySiteName	MonitoringLocationIdentifier	MonitoringLocationName	Dataflow
<input type="checkbox"/>	2065	11NPSWRD_WQX-1DA05D02554B4C22A5B017F882			11NPSWRD_WQX-ISRO_01		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-8CE8FF442A6F46AFBAFD7C7B35C			11NPSWRD_WQX-ISRO_01		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-DC513617AB754F7295BD680F03			11NPSWRD_WQX-ISRO_01		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-44E7C4A3334D40CFB4649D2C86			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-09EF74FC857546EBBF23D6A5BC			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-09EF74FC857546EBBF23D6A5BC			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-09EF74FC857546EBBF23D6A5BC			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-09EF74FC857546EBBF23D6A5BC			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-B27BAE6D0E974FD49E5213CC80			11NPSWRD_WQX-ISRO_02		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-CA7684F8D66B4C03BDE53ACE39			11NPSWRD_WQX-ISRO_03		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-BB12D3A95D4D4D41B6E284CE94			11NPSWRD_WQX-ISRO_03		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-BB12D3A95D4D4D41B6E284CE94			11NPSWRD_WQX-ISRO_03		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-C6DFF91231294BFDA31A540271			11NPSWRD_WQX-ISRO_03		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-C6DFF91231294BFDA31A540271			11NPSWRD_WQX-ISRO_03		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-D40EB6C3EB81457B919AF952E4			11NPSWRD_WQX-ISRO_04		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-D812502D4AFD497FB828111884			11NPSWRD_WQX-ISRO_04		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-D812502D4AFD497FB828111884			11NPSWRD_WQX-ISRO_04		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-C52B9A5414A94FBD4FFC953461			11NPSWRD_WQX-ISRO_04		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-4B02855354164A8DBFD4C2D776			11NPSWRD_WQX-ISRO_05		WQX
<input type="checkbox"/>	2065	11NPSWRD_WQX-975DAFD806F5413891F08696D7			11NPSWRD_WQX-ISRO_05		WQX

# 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



# Questions and Answers

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