Lake Superior NERR Monitoring

National Estuarine Research Reserve System-Wide Monitoring Program

Tracey Ledder, LSNERR Monitoring Coordinator

National Estuarine Research Reserve System

- Funded under Coastal Management Act
- NOAA partnership with States
- Conservation and research on public lands
- Long-term data on estuaries
- LSNERR unique with UW-Extension,
  emphasis on working with students
  - 2 staff UW-Superior employees
  - 3.5 staff UW-Extension
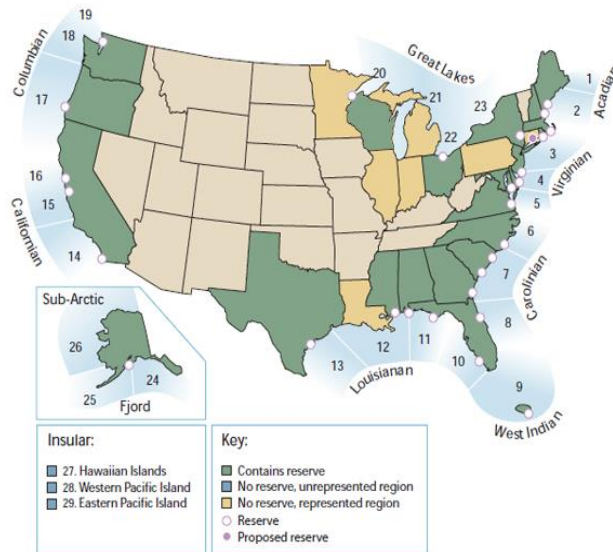- Core programs Research (SWMP), Education, Coastal Training, Stewardship
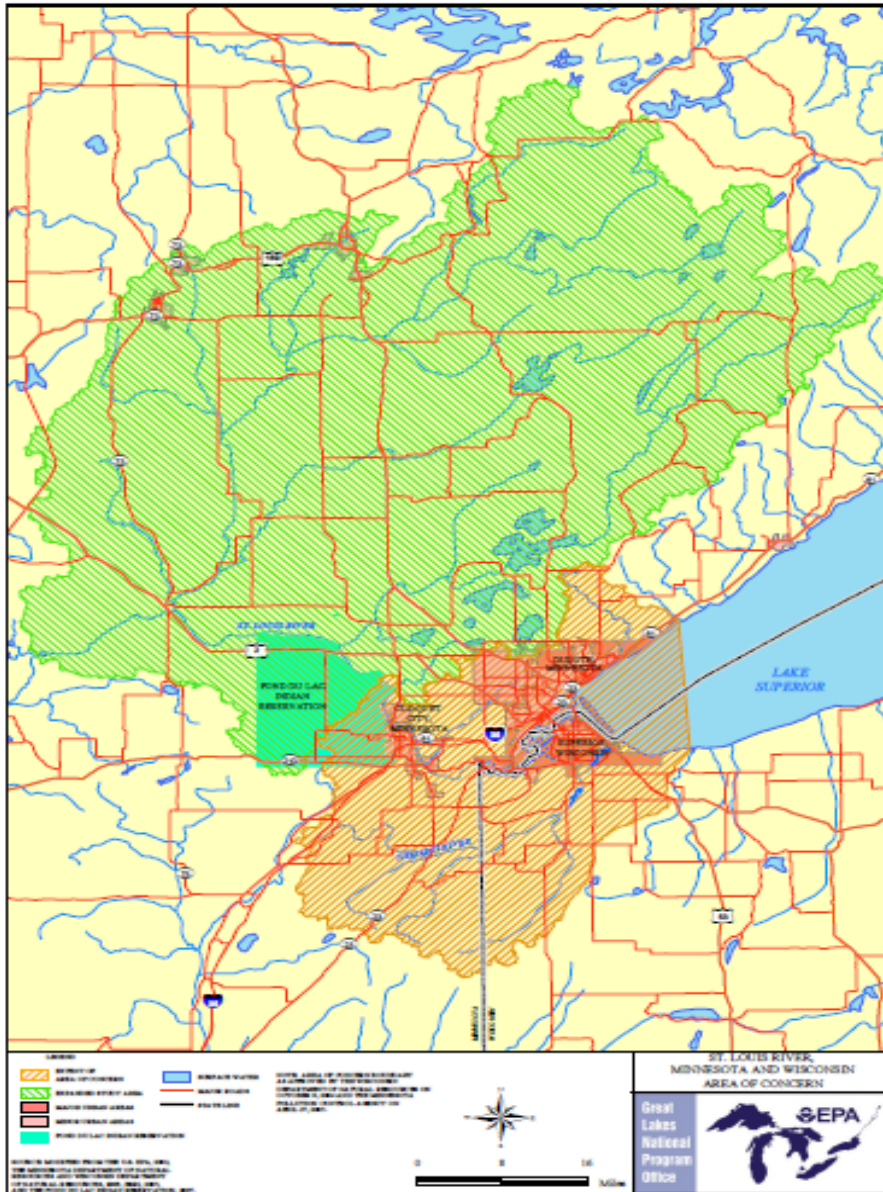
www.nerrs.noaa.gov

St. Louis River

Largest US Tributary to Lake Superior

Largest working harbor on the Great Lakes

Area of Concern due to legacy pollution and habitat degradation

NERR emphasis on Lake Superior estuaries across the basin (monitoring, research, partnerships)

System-Wide Monitoring Program Tier 1 required of every NERR

WQ	MET	NUTCHla
• 4 sites • Deployed data sondes • 15-minute data • Real-time	• 1 site • 15-minute data • Real-time	• 4 sites • Grab samples 1x per month • Diel samples 1x per month at 1 site

WQ

- Temperature
- Specific conductivity
- Salinity
- pH
- Dissolved Oxygen (% and mg/L)
- Depth
- Turbidity
- Chlorophyl

Equipment

- Sondes: YSI 6600 V2s and EXO2
- Two-week to Four-week deployment
- More bio-fouling in summer means shorter deployments
- Optical probes are used due to their durability and ease of maintenance. Less susceptible to drifting.
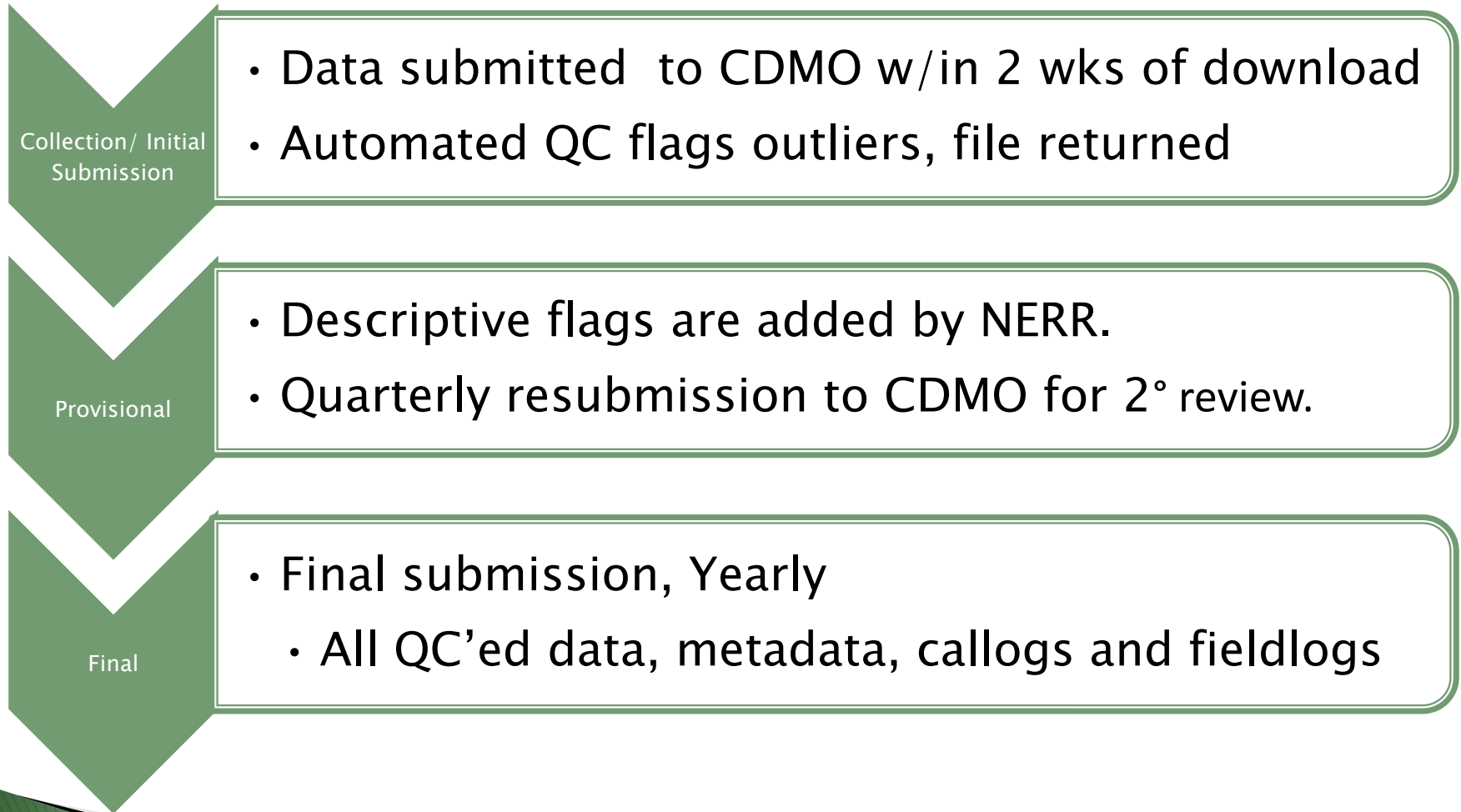
Calibration of Equipment

- Calibration of sondes within 24 hours of deployment.
- Side-by-side reading for retrieval/deployment.
- Calibration logs are kept with precalibration, calibrated, and post deployment values.
- Field logs are kept with field measurement and observations.

Data submission process.

Collection/ Initial Submission
- Data submitted to CDMO w/in 2 wks of download
- Automated QC flags outliers, file returned

Provisional
- Descriptive flags are added by NERR.
- Quarterly resubmission to CDMO for 2° review.

Final
- Final submission, Yearly
  - All QC'ed data, metadata, callogs and fieldlogs

Objective: Long-term Quality Data

Deployment and retrieval at BA

System-Wide Monitoring Program Tier 1 at every NERR

WQ	MET	NUTCHla
• 4 sites • Deployed data sondes • 15-minute data • Real-time	• 1 site • 15-minute data • Real-time	• 4 sites • Grab samples 1x per month • Diel samples 1x per month at 1 site

MET

- Air Temp and humidity
- Barometric Pressure
- Wind speed and direction
- Rain
- Photosynthetically Active Radiation
- Total Solar Radiation
- GOES (monthly data logger download)

MET

Pokegama Bay
Water Quality
and
Weather

System-Wide Monitoring Program Tier 1 at every NERR

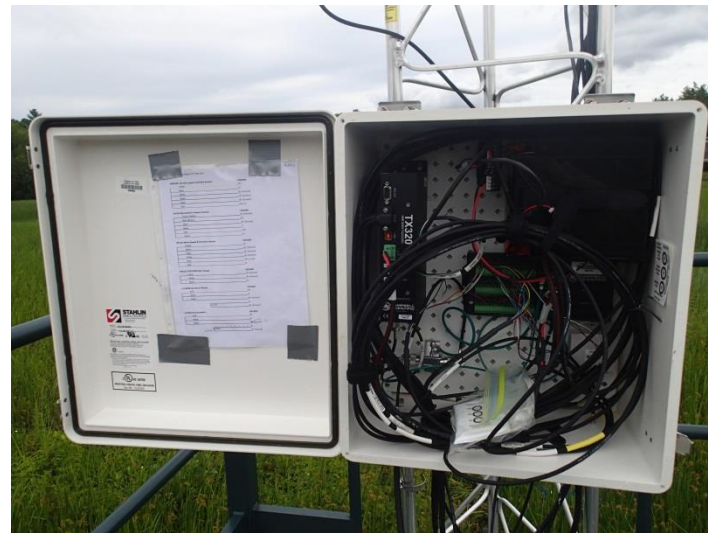| WQ	MET	NUTCHla
• 4 sites • Deployed data sondes • 15-minute data • Real-time	• 1 site • 15-minute data • Real-time	• 4 sites • Grab samples 1x per month • Diel samples 1x per month at 1 site

NUTCHLa

- Ammonium

- Nitrite, nitrate

- Phosphate

- Chlorophyll a

- Total Phosphorus, Suspended Solids

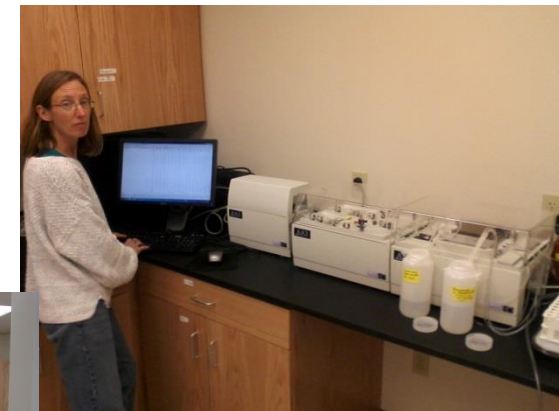*Optional*

NUTCHLa

Boathouse Restaurant Kitchen Before

- 2012 – contract out to LLO

- 2013 – EPAMED and AOC Partners

Thanks!

- 2014 – Complete lab space and added analytical equipment

- Yearly QC report of all data, metadata, SOPs

Lake Superior NERR Lab After

Centralized Data Management Office
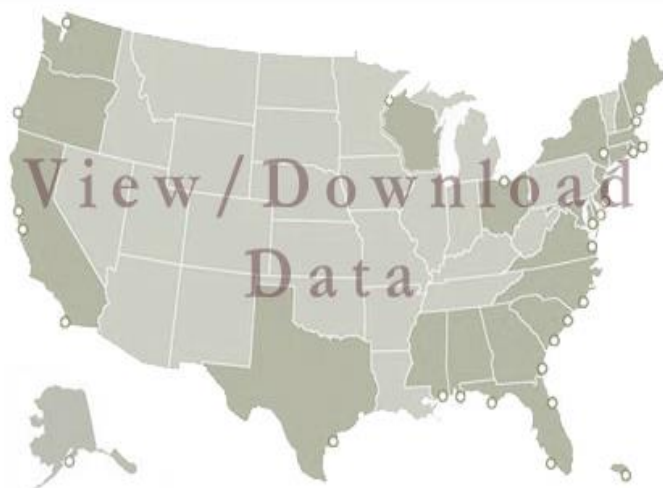
| Home | About CDMO | About Data | Get Data | Web Services | Contact CDMO |

Available Data
CDMO Manual (PDF)
Data Policy
Data Citation
Data QA/QC
Parameters
Metadata

View / Download Data

View/Download Data

Real Time Monitoring Data

Choose Reserve... ▾

CBMJBMET 12/05/13 08:30 AM
CBMOCWQ 12/05/13 08:45 AM

Chesapeake Bay MD

Air Temperature: 8.6 °C (47 °F)

Wind Speed: 2.7 m/Sec (06 mph)

Water Temperature: 6.4 °C (44 °F)

Salinity: 1.3 PPT

Dissolved Oxygen: 9.1 mg/L

CDMO News

The CDMO is excited to announce the launch of our new **SWMP Mobile application**. Near real-time SWMP data is now available on your smartphone or tablet at: www.nerrsdata.org/mobile

Our **Data Export System** has been updated and now has enhanced graphing capabilities! Want to easily export or graph data? If so, check out our Data Export System!

Department of Commerce | NOAA | National Ocean Service | Ocean and Coastal Resource Management | NERRS | Webmaster

Site hosted by NOAA National Estuarine Research Reserve, Centralized Data Management Office.

http://cdmo.baruch.sc.edu/aboutDataMenu.cfm

Data Export System

The DES was developed to provide the majority of users with quick and easy access to SWMP data. The DES utilizes a map-based interface and offers single station exports, yearly authenticated file downloads (these may include non-standard nutrient parameters), charting, and a current conditions display for real-time stations.

To launch the Data Export System, click here.

Advanced Query System

The AQS was developed to specifically address the data delivery needs of those end-users looking for large amounts of data exported in a format that can be easily imported and manipulated for data analysis. The AQS offers three different query options allowing for mass downloads of annual files, customized queries for specific parameters and multiple stations in the same file, and an option to merge water quality, meteorological and nutrient datasets.

To launch the Advanced Query System, click here.

Real Time Data Application

The Real Time Application allows users to view near real time data, real time gauges, and 24 hour graphs with multiple parameters. You may use a bookmarked link to directly access the station of interest, or browse and select your station. The display will update automatically with the latest information as it comes in.

To launch the Real Time Data Application, click here.

GIS Application

The GIS Application gives users access to Reserve boundary, watershed boundary, and high resolution reserve habitat maps. In addition, Google Earth KML files are available for the Reserve boundaries, watershed boundaries, and monitoring station locations.

To launch the GIS Application, click here.

Edit   View   Favorites   Tools   Help

NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM
Centralized Data Management Office

| Home | About CDMO | About Data | Get Data | Web Services | Contact CDMO |

Real Time Data Application *Powered By The Centralized Data Management Of*

| Select your real time station | Your selected station details | Graphing Tools / More Info |

Quick search of all real time stations listed: ACEBPMET ▼   **Filter Real Time Stations By Data*

ACEBPMET - Weather Station

KACSDWQ
LKSBAWQ
LKSOLWQ
LKSPOMET
MARABWQ

oo Combahee Edisto Ba
e: Bennett's Point   Lat/Long: 32.5587,

View Real Time Data from ACEBPMET

ACEFCWQ - Water Station

ACEFCWQ - Ashepoo Combahee Edisto Bas

Data Type: Water   Station Name: Fishing Creek   Lat/Long: 32.6358,

View Real Time Data from ACEFCWQ

ACESPWQ - Water Station

ACESPWQ - Ashepoo Combahee Edisto Bas

Data Type: Water   Station Name: St. Pierre   Lat/Long: 32.5233,

View Real Time Data from ACESPWQ

APAEBMET - Weather Station

Tools   Help

LKSPOMET - Lake Superior, WI

Click here for a bookmark link

Latest observations from LKSPOMET

DateTimeStamp: 12/05/2013 07:00 (LST)

Air Temperature: -10.7 (Celsius)   24 hour chart

Relative Humidity: 81 (%)   24 hour chart

Barometric Pressure: 984 (mb)   24 hour chart

Wind Speed: 0.0 (m/s)   24 hour chart

Wind Direction: 0 (degrees)   24 hour chart

Total PAR: 0.0 (mm/m^2)   24 hour chart

Cumlative Precip.: 0.0 (mm)   24 hour chart

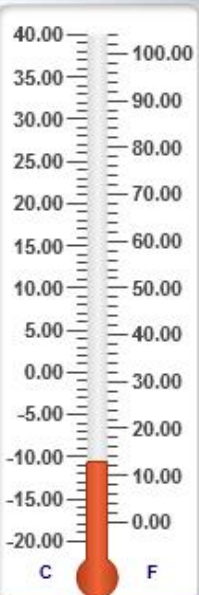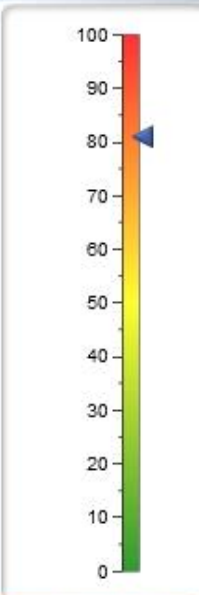## Google interactive map (46.67236,-92.135614):

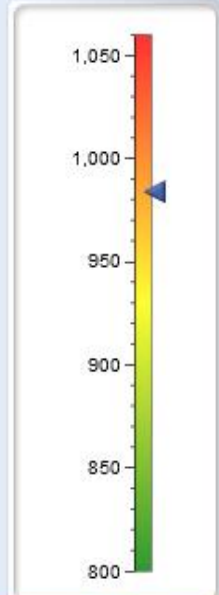Imagery ©2013 DigitalGlobe, USDA Farm Service Agency – Terms of Use

Google

Real Time Station Photo:

Air Temperature

40.00 — 100.00
35.00 — 90.00
30.00 — 80.00
25.00 — 70.00
20.00 — 60.00
15.00 — 50.00
10.00 — 40.00
5.00 — 30.00
0.00 — 20.00
-5.00 — 10.00
-10.00 — 0.00
-15.00
-20.00
C   F

Relative Humidity

100
90
80
70
60
50
40
30
20
10
0

Barometric Pressure

1,050
1,000
950
900
850
800

Total PAR

3,000
2,500
2,000
1,500
1,000
500
0
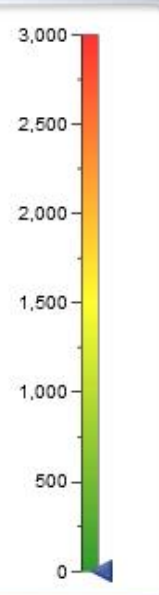
Cumulative Precip

100
80
60
40
20
0
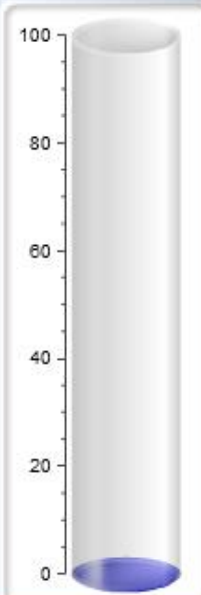
Wind Speed & Wind Direction

N NNW NNE NW NE WNW ENE W E WSW ESE SW SE SSW SSE S

10 8 6 4 2 0
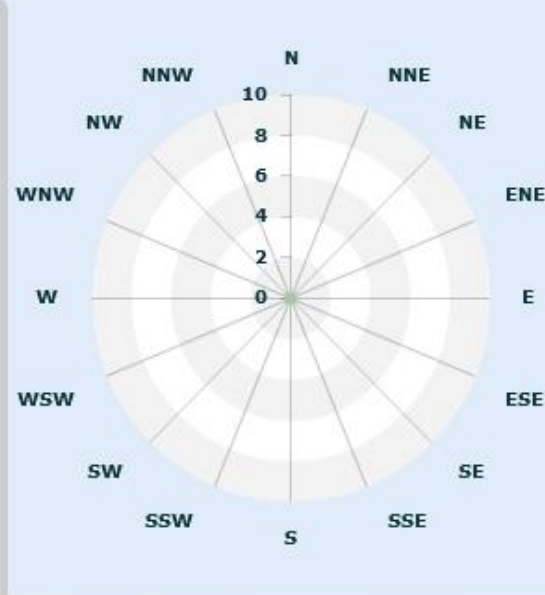
Choose Reserve | **Choose Sampling Station** | View or Download Data | Submit Info | Complete!

Please select a sampling station from Lake Superior, WI:

Filter sampling stations by data type: [All Stations ▼]

Station Name	SWMP	Real Time ▼	Status	Data Type	Station Code
Pokegama Bay	P	Yes	Active	meteorological	PO
Oliver Bridge	P	Yes	Active	water quality	OL
Blatnick Bridge	P	No	Active	water quality	BL
Barker's Island	P	No	Active	nutrient	BA
Blatnick Bridge	P	No	Active	nutrient	BL

Your Station Selection: Choose above

[**Proceed with this Station >>**]

[Map | Satellite | Hybrid | Terrain]

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What's Next

- In 2014 SWMP Tier I completed
- Add parameters of interest to partners as funding allows (TP/TN, sulfate, etc)
- Move onto SWMP Tier II (biological – vegetation surveys, and periphyton/diatoms?)
- Sentinel Site work combines with SWMP
- Wild Rice Restoration
- Habitat Research and Restoration

Ribbon Cutting April 2014

LSNERR Website
http://lsnerr.uwex.edu

CDMO NERRS Data
http://cdmo.baruch.sc.edu/

NOAA NERRS Website
www.nerrs.noaa.gov