

Surface Water Quality in Bayfield County

Bayfield County Livestock Committee
June 3 and 4, 2015



Lakewide Action and Management Plan (LAMP)



**Lake Superior
Binational Program**

Today's talk

- Briefly describe water quality regulation that guide monitoring efforts
- Describe state water quality monitoring efforts
- Surface water quality conditions

Clean Water Act

Mission of the WI DNR

To protect and enhance our natural resources:

Our air, land and water;

Our wildlife, fish and forests

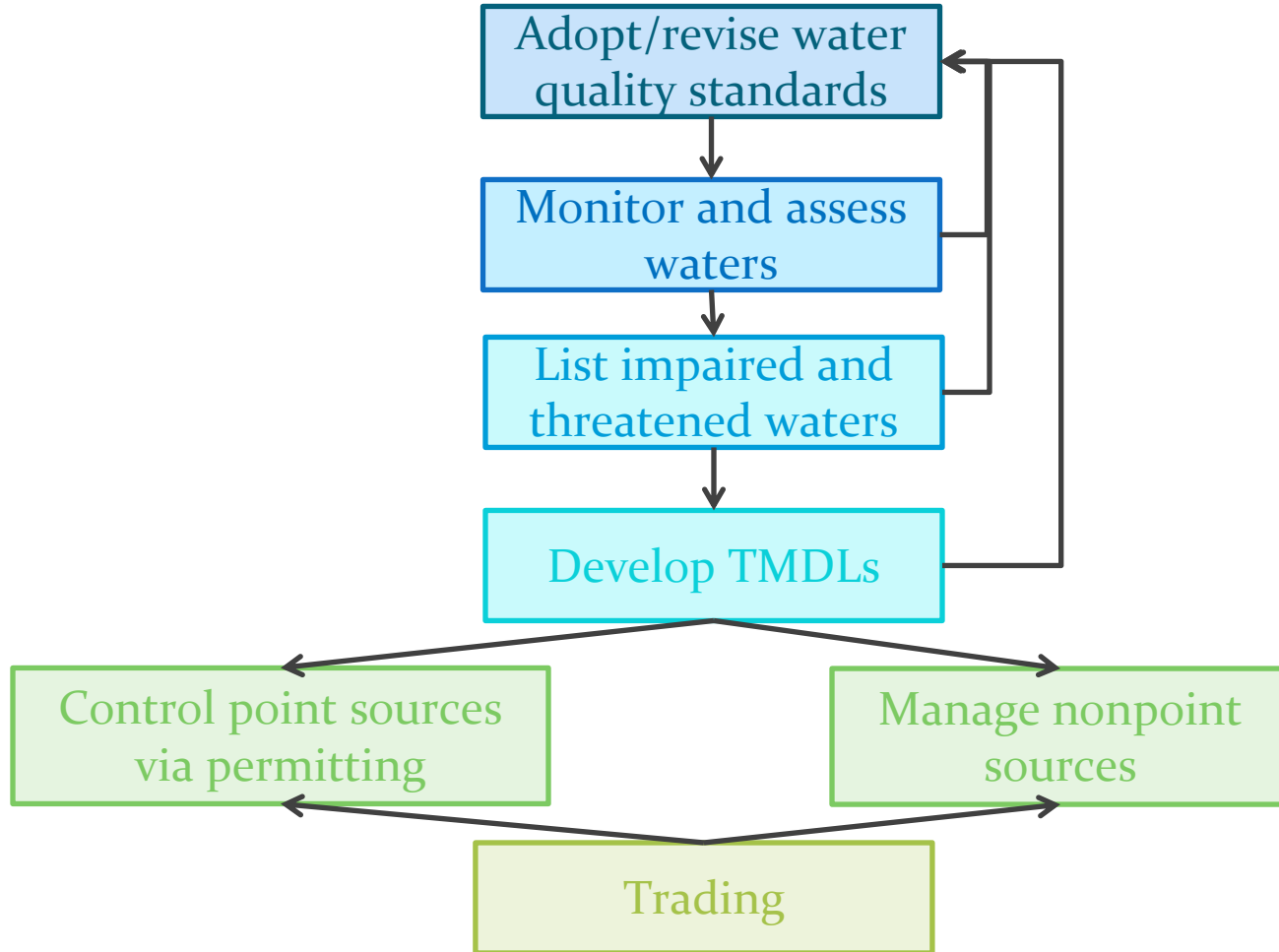
*And the ecosystems that sustain
all life...*



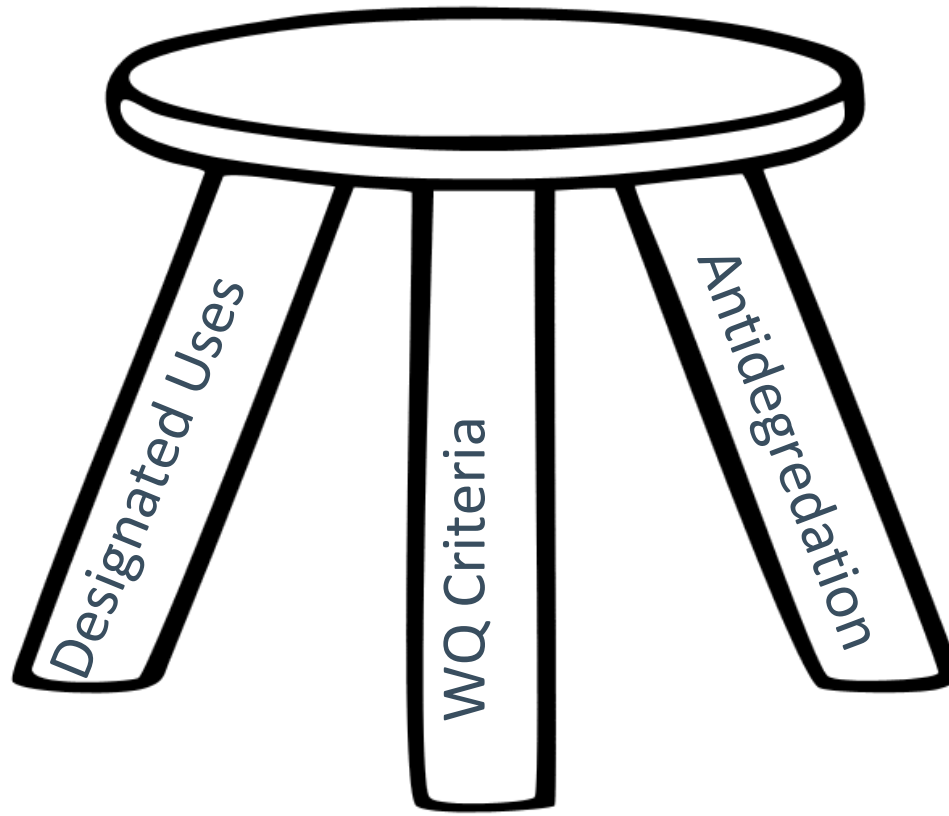
Goal of the Clean Water Act

*“Restore and maintain the
chemical, physical and biological
integrity of the Nation’s
waters...”*

Water Quality Framework



Water Quality Standards

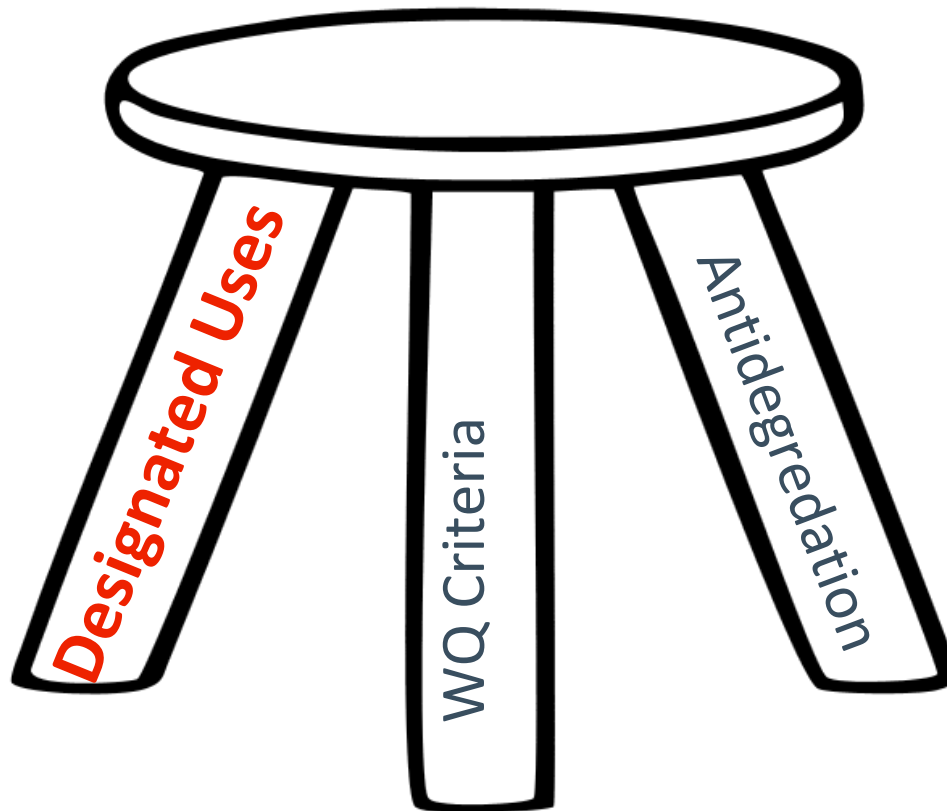


Water Quality Standards

Human Health

Recreation

Wildlife



Fish and Aq Life

- Cold water
- Warm water sports fish
- Warm water forage fish
- Limited forage fish
- Limited aquatic life

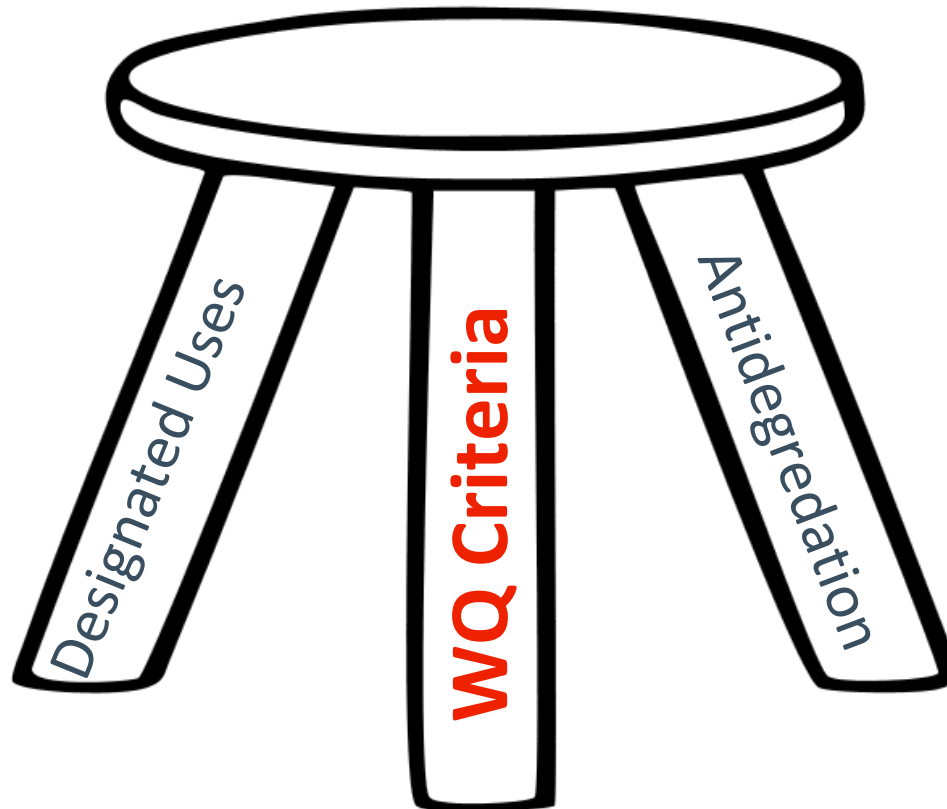
“water quality [must] provide for the protection and propagation of fish, shellfish and wildlife and recreation in and on the water..”

Water Quality Standards

Sound scientific rationale

Sufficient parameters to protect the designated uses

Multiple uses support the most sensitive use



NR 102

- Temp
- DO
- pH
- Total Phos

NR 105

- Toxic substances

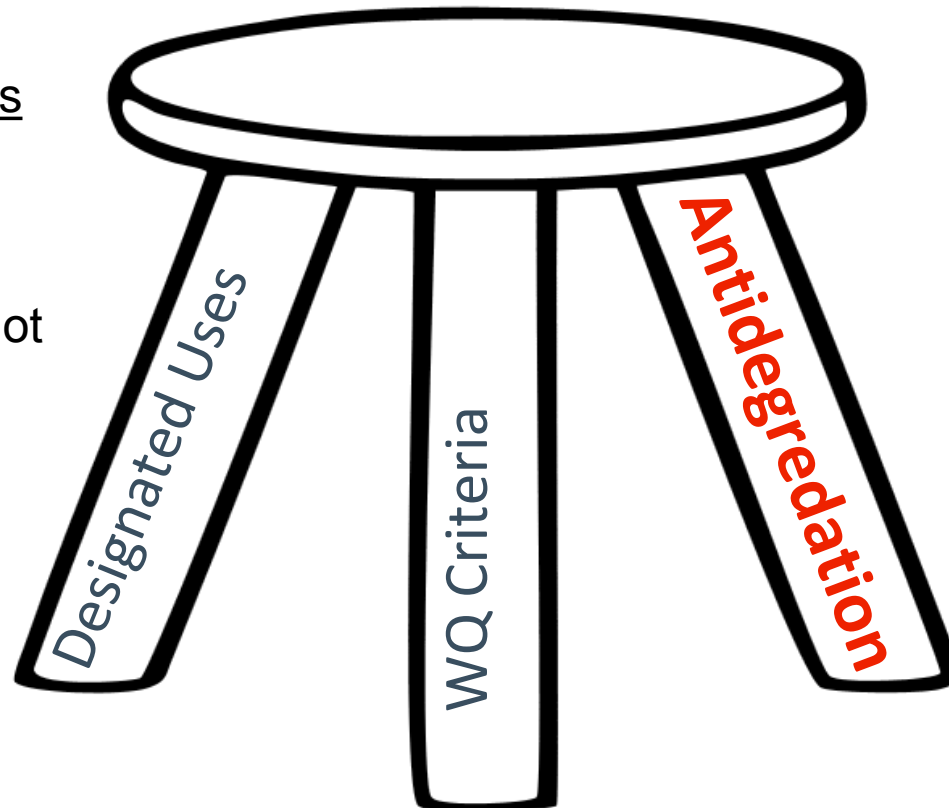
“states shall adopt criteria for ‘priority pollutants’ to protect designated uses”

Water Quality Standards

Outstanding/
Exceptional
Resource Waters

NR 102

“waters... may not
be lowered in
quality.”



ORW – 7.6% of
streams

ERW – 11% of
streams

“States shall adopt an antidegradation standard applicable to all waters of the Great Lakes system and identify the methods for implementing such a standard”

Exceptional/Outstanding RW



In Bayfield Co:

- 414 miles ERW/ORW
- 6% ERW
- 16% ORW

EPA's Elements of a State Monitoring Strategy

- What is the overall quality of waters in the State?
- To what extent is water quality changing over time?
- What are the problem areas needing restoration/protection?
- How effective are CWA projects/programs?

What is the overall quality of Wi waters?

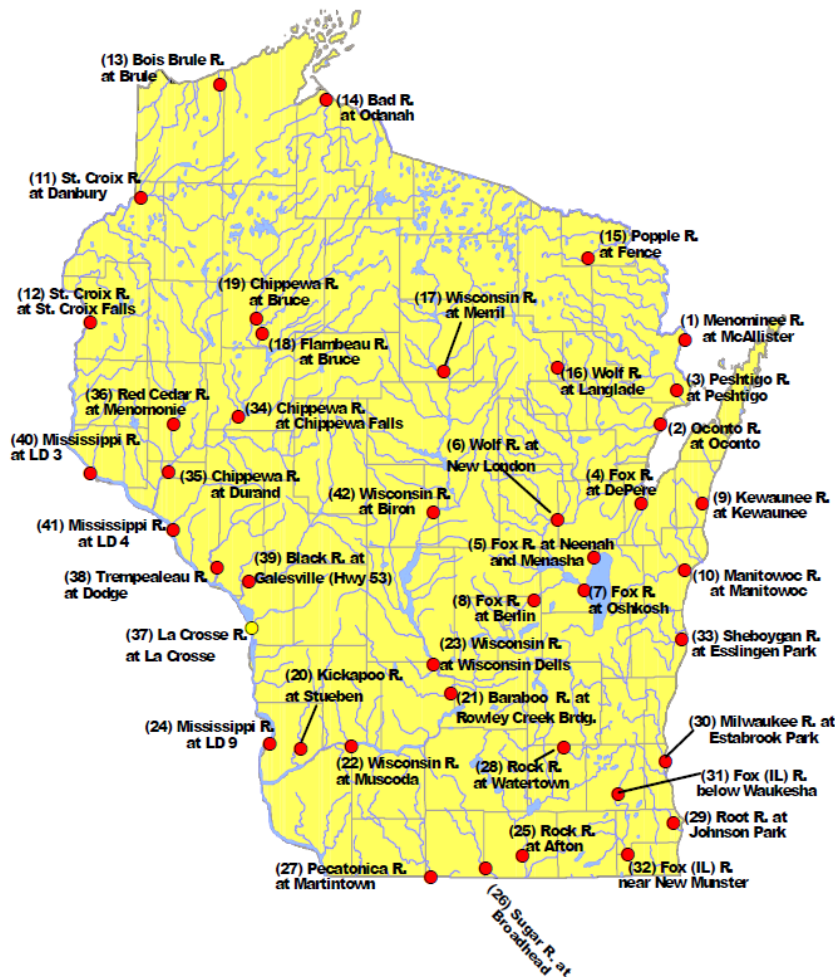
Statewide Baseline Monitoring

- Qualitative habitat
- Water Quality: T, pH, DO, nutrients at some sites
- Fisheries
- Macroinvertebrates



Wisconsin's Monitoring Strategy

Is water quality changing over time?



Long term trend rivers

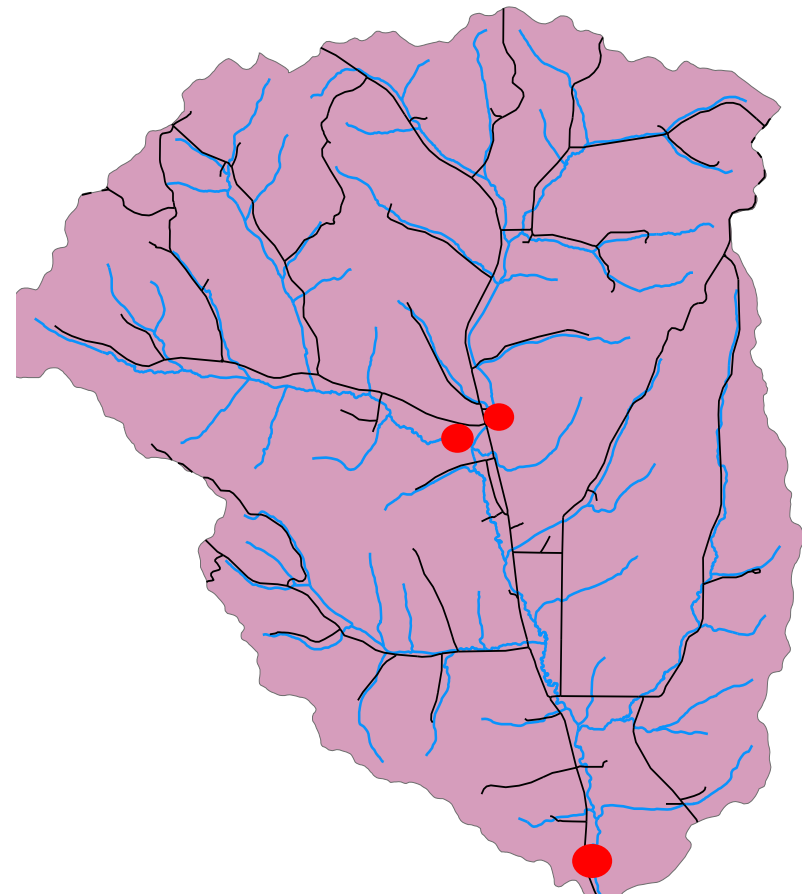
Quarterly sampling

Nutrients

Basic WQ

Wisconsin's Monitoring Strategy

What are the problem areas needing restoration/protection?



Review baseline water quality data *WDNR and Partner

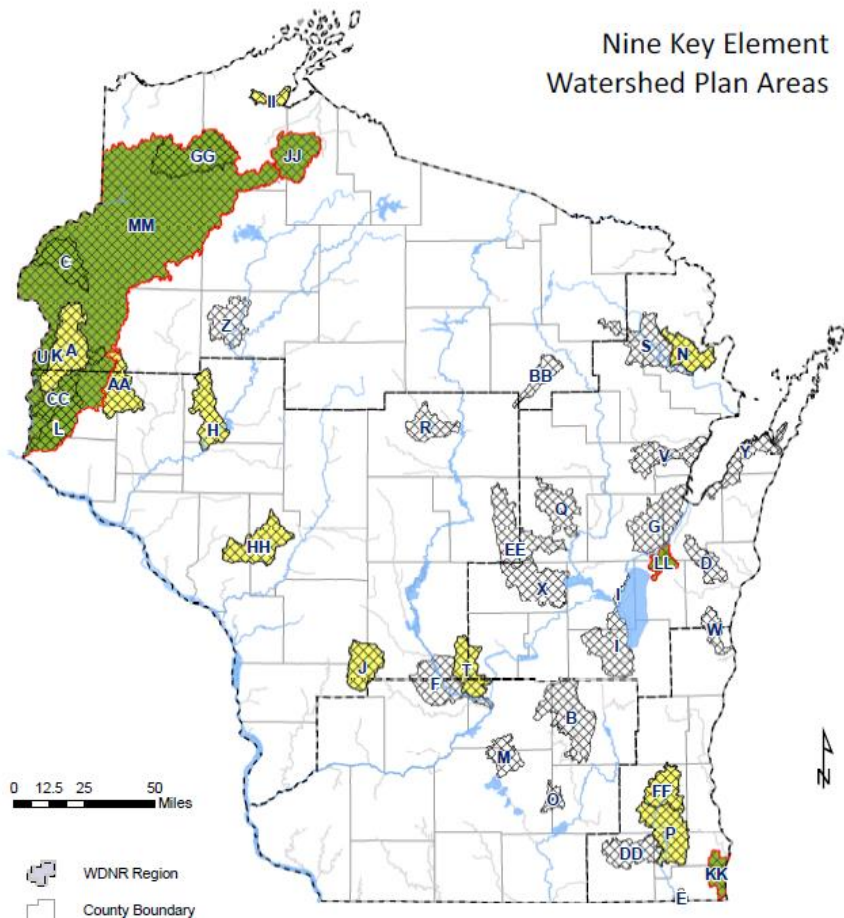
Local needs monitored at recommendation of biologist

One targeted watershed assessment per biologist

Wisconsin's Monitoring Strategy

How effective are CWA projects/programs?

Nine Key Element
Watershed Plan Areas



Delisting Waterbodies
Showing watershed wide
improvements

Comparing WQ Data to standards

Wisconsin 2014 Consolidated Assessment and Listing Methodology (WisCALM)

Identifies how we look at data to determine if a waterbody is listed

- Number of samples
- Data collection
- Data analysis
- Listing determinations

Dissolved oxygen

Critical for aquatic organisms

Amount DO needed depends on:

- Species
- Life stage
- Temperature
- Pollutant



DO criteria depends on waterbody



All waters $\geq 5\text{mg/L}$

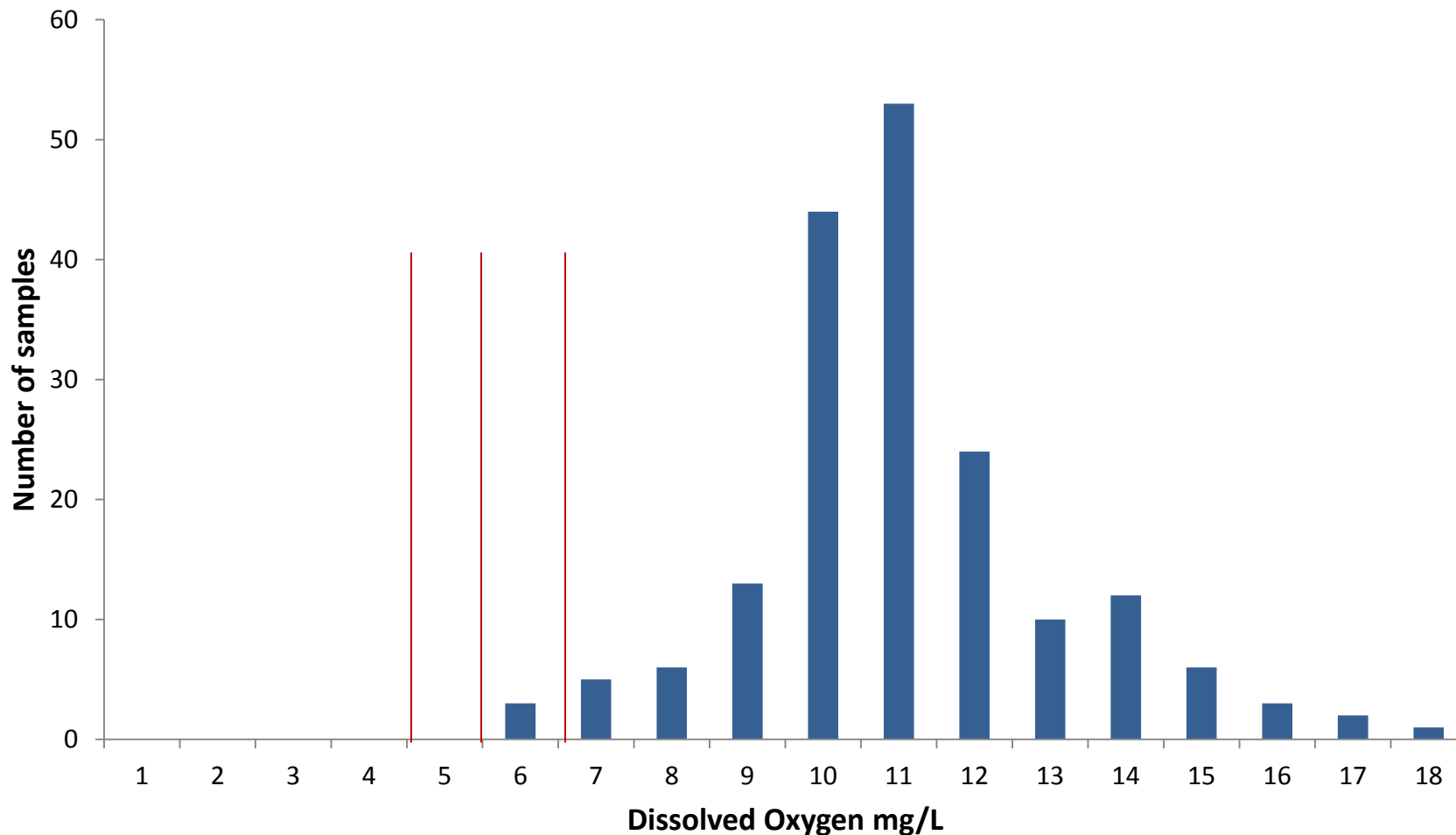
Trout water

$\geq 6\text{ mg/L}$

$\geq 7\text{ mg/L}$ during
spawning

Dissolved oxygen

Dissolved Oxygen Readings in Bayfield County Streams, 2003 - 2014



Phosphorous

Effects of excess phosphorous

- Excess algal growth
- Lower DO
- Poor fish and aquatic habitat
- Beach closures
- Toxic algal blooms



Phosphorous

Criteria set the maximum allowable P concentration

Phosphorous Criteria NR 102.06

Rivers
100 ug/L

Streams
75 ug/L

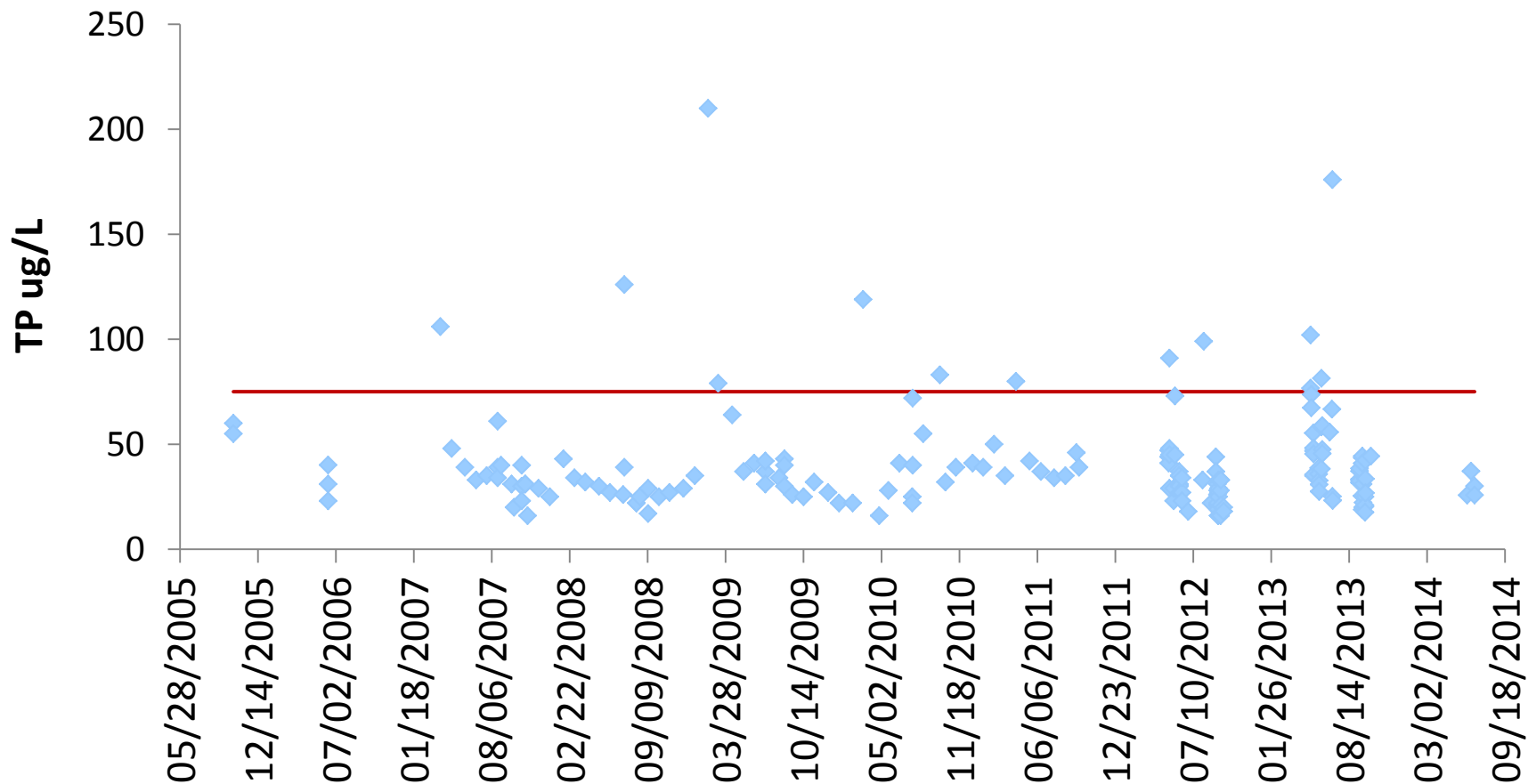
Reservoirs
30-40 ug/L

Lakes
15-40 ug/L

L Superior
5 ug/L

Phosphorous

TP data for Bayfield County L Superior Streams



TP ug/L

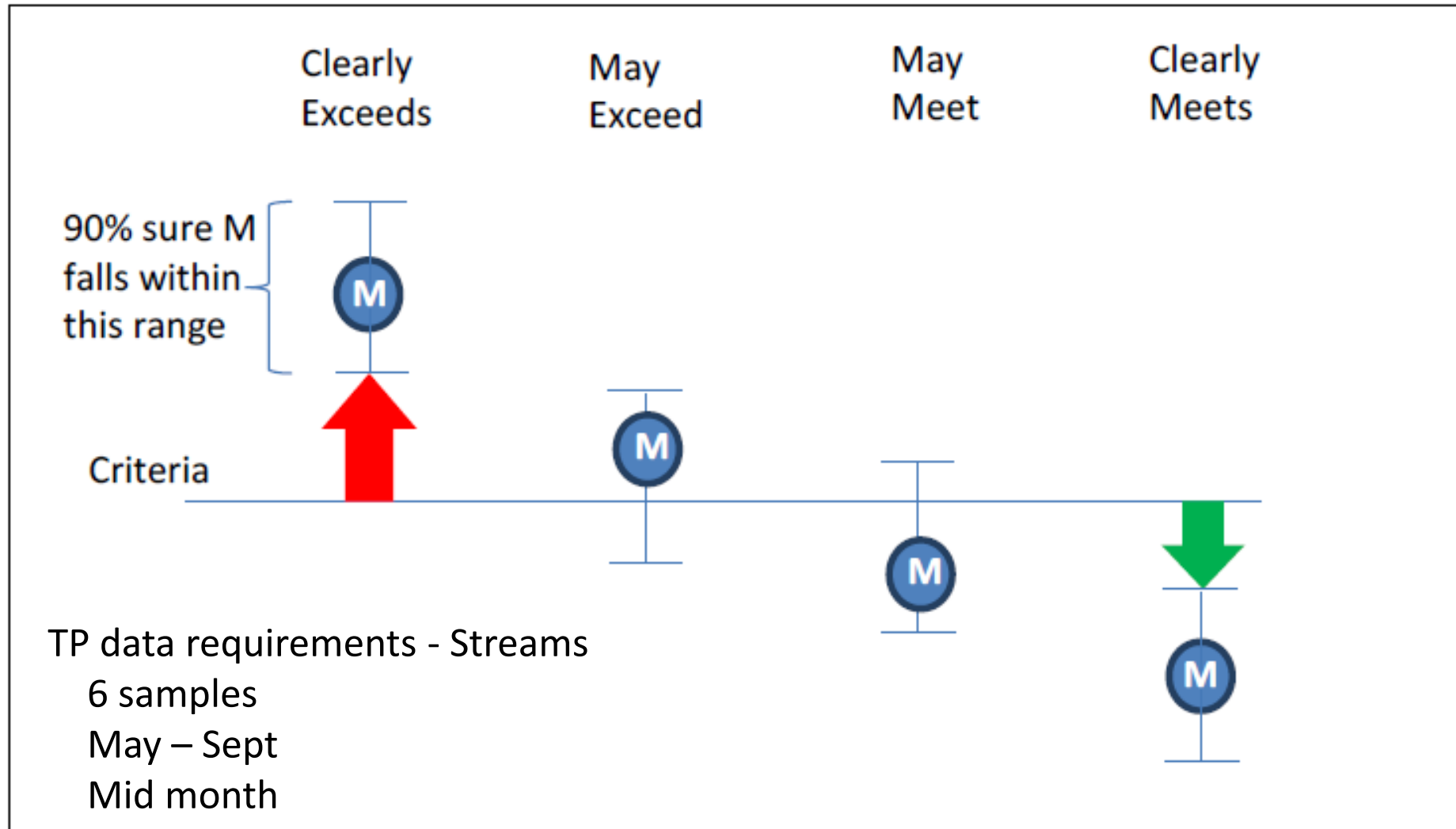
Legend:

- Nfish
- Iron R
- Bark R
- Bark R Up
- Sioux R
- White R
- Criteria

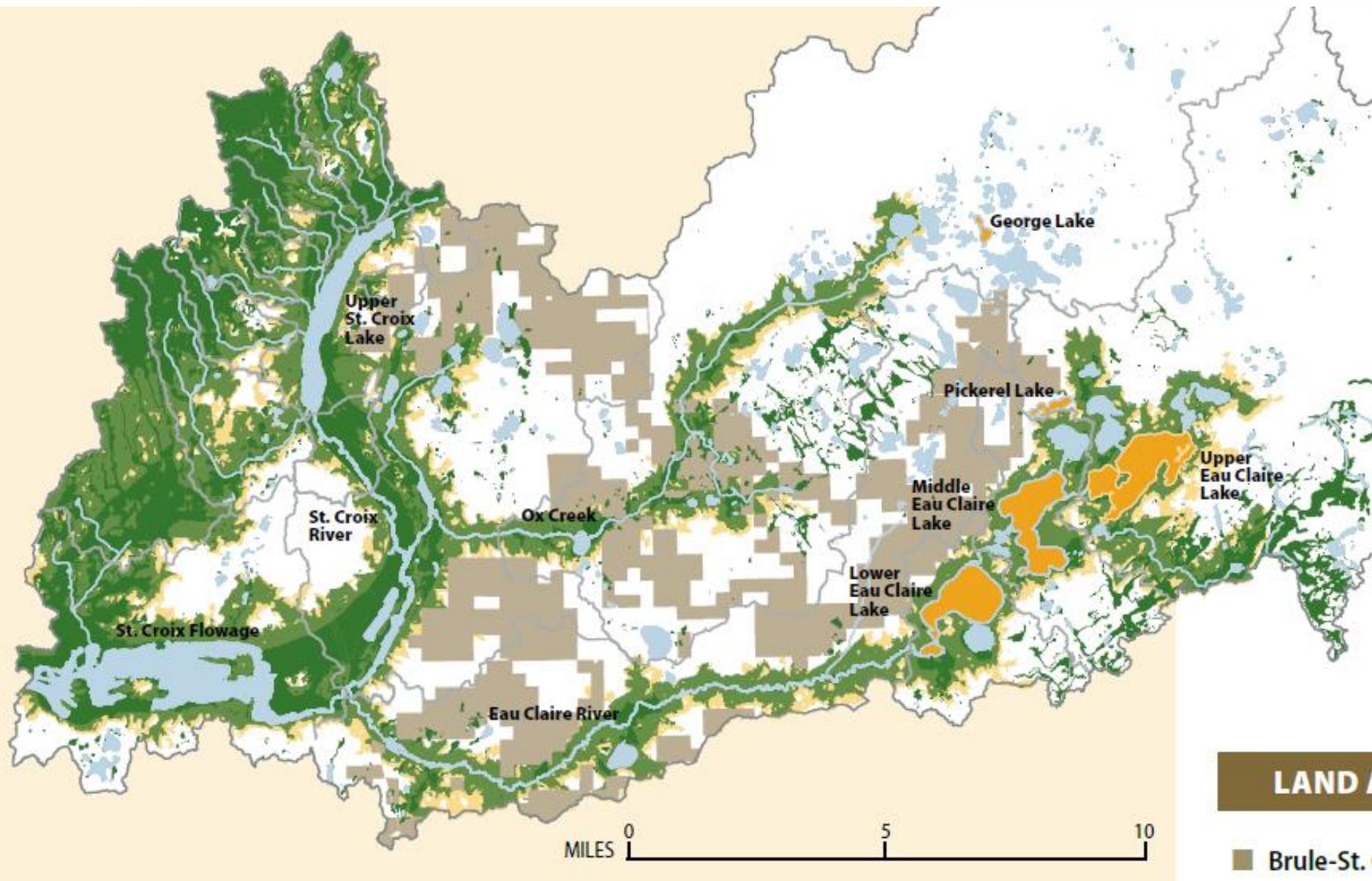
06/12/2006 06/12/2007 06/12/2008 06/12/2009 06/12/2010 06/12/2011 06/12/2012 06/12/2013

Phosphorous

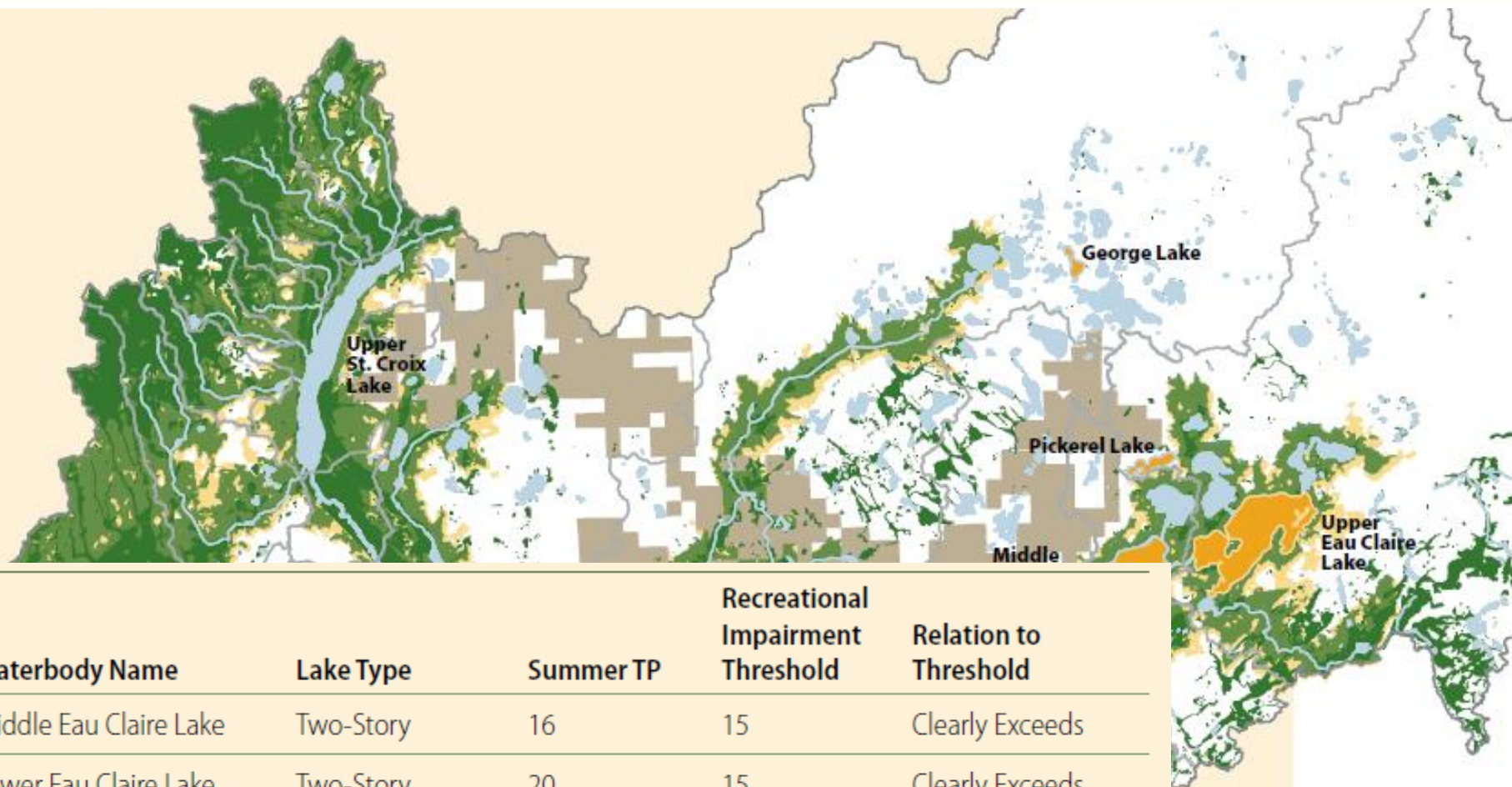
Comparing WQ Data to standards



Phosphorous



Phosphorous



Waterbody Name	Lake Type	Summer TP	Recreational Impairment Threshold	Relation to Threshold
Middle Eau Claire Lake	Two-Story	16	15	Clearly Exceeds
Lower Eau Claire Lake	Two-Story	20	15	Clearly Exceeds
Pickerel Lake	Deep Seepage	18	20	May Exceed
George Lake	Two-Story	14	15	May Exceed
Upper Eau Claire Lake	Two-Story	14.5	15	May Exceed

10

LAND

Brule-St.

Macroinvertebrates

Indicators of stream health

<i>Wadeable Stream M-IBI Thresholds</i>	<i>Condition Category</i>
> 7.5	Excellent
5.0-7.4	Good
2.5-4.9	Fair
< 2.5	Poor



Indicators of stream health

<i>Wadeable Stream M-IBI Thresholds</i>	<i>Condition Category</i>	
> 7.5	Excellent	55%
5.0-7.4	Good	36%
2.5-4.9	Fair	9%
< 2.5	Poor	



Indicators of stream health

<i>Fisheries IBIs</i>	<i>Category</i>	
Cold Water	Poor	10%
Cool Cold Headwaters	Fair	11%
Cool Cold Mainstem	Good	45%
Cool Warm Headwaters	Excellent	31%



WDNR Data online

Surface Water Data Viewer

Search...



Home

Show Layers

Show Legend

Pan

Zoom In

Zoom Out

Previous Extent

Full State

Point Identify

Scale: 1: 204,297

Jump to a map bookmark...

New

Plot

Clear All

Clicked Coordinates

Lat: 44.7513
Lon: -89.7632

Lat/Lon (DD)

Map Layers

Layer Theme: Surface Water (default)

Show Layers

Filter...

Monitoring Sites & Data

SWIMS Monitoring Station Points without...

★ New Station, Pending.

▲ Active, Usable.

▲ Station Points with Recent Data (10...

▲ SWIMS Station Point with Historic Data

Impairments & Assessments

Outstanding and Exceptional Streams

Exceptional

Outstanding

Locational Information (line)

Outstanding and Exceptional Lakes

Locational Information (area)

I want to...

2.5mi
5km

Lat:
Lon:

WI Dept. of Natural Resources, Water Division IV

Which group to sample?

Streams: Fecal coliforms

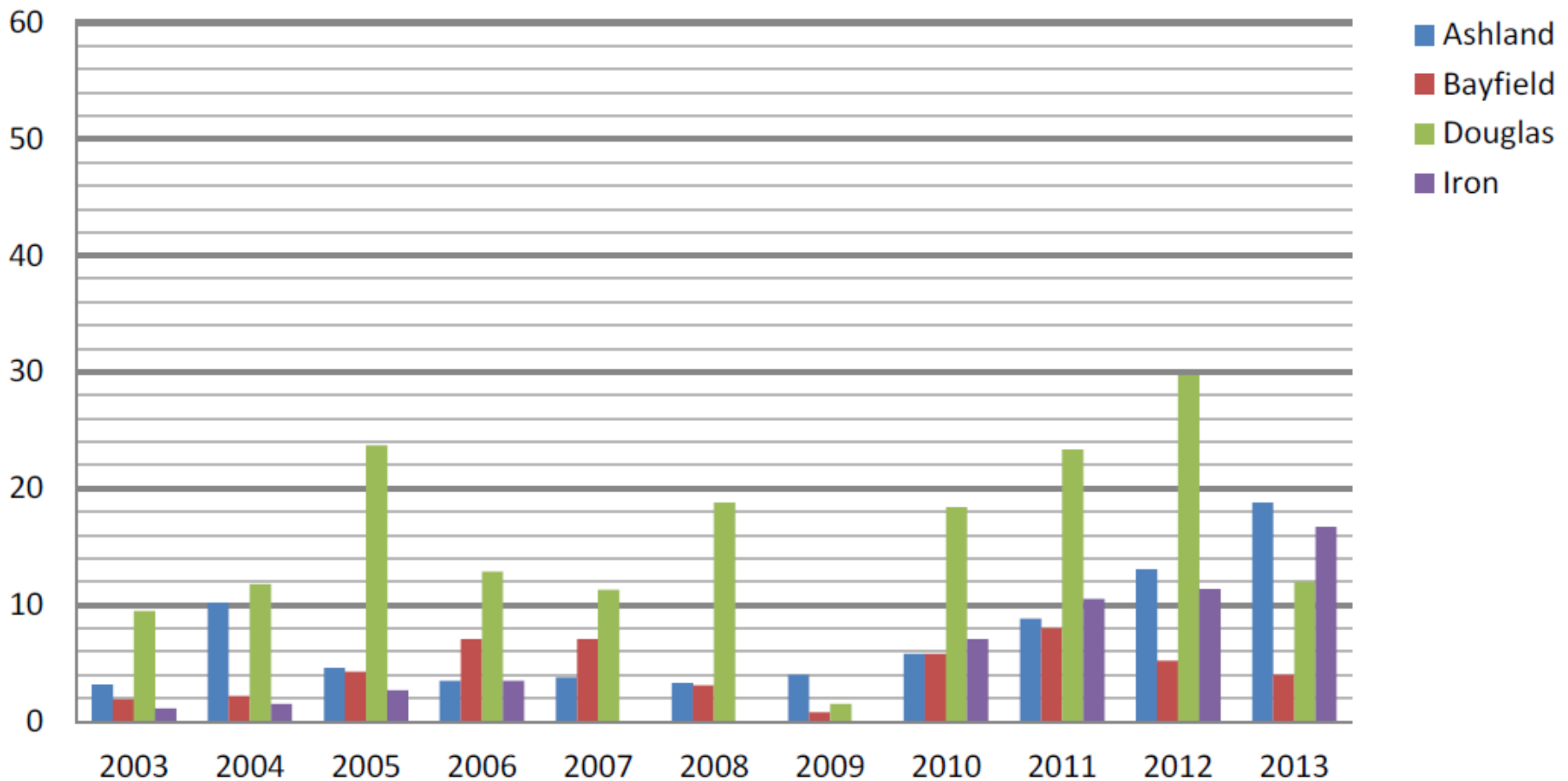
- 200 colonies/100 ml - 5 samples in 30 days
- 400 colonies/100 ml -Single sample

Beaches: E. coli

- 126 colonies/100 ml - 5 samples in 30 days
- 236 colonies/100 ml – Single sample

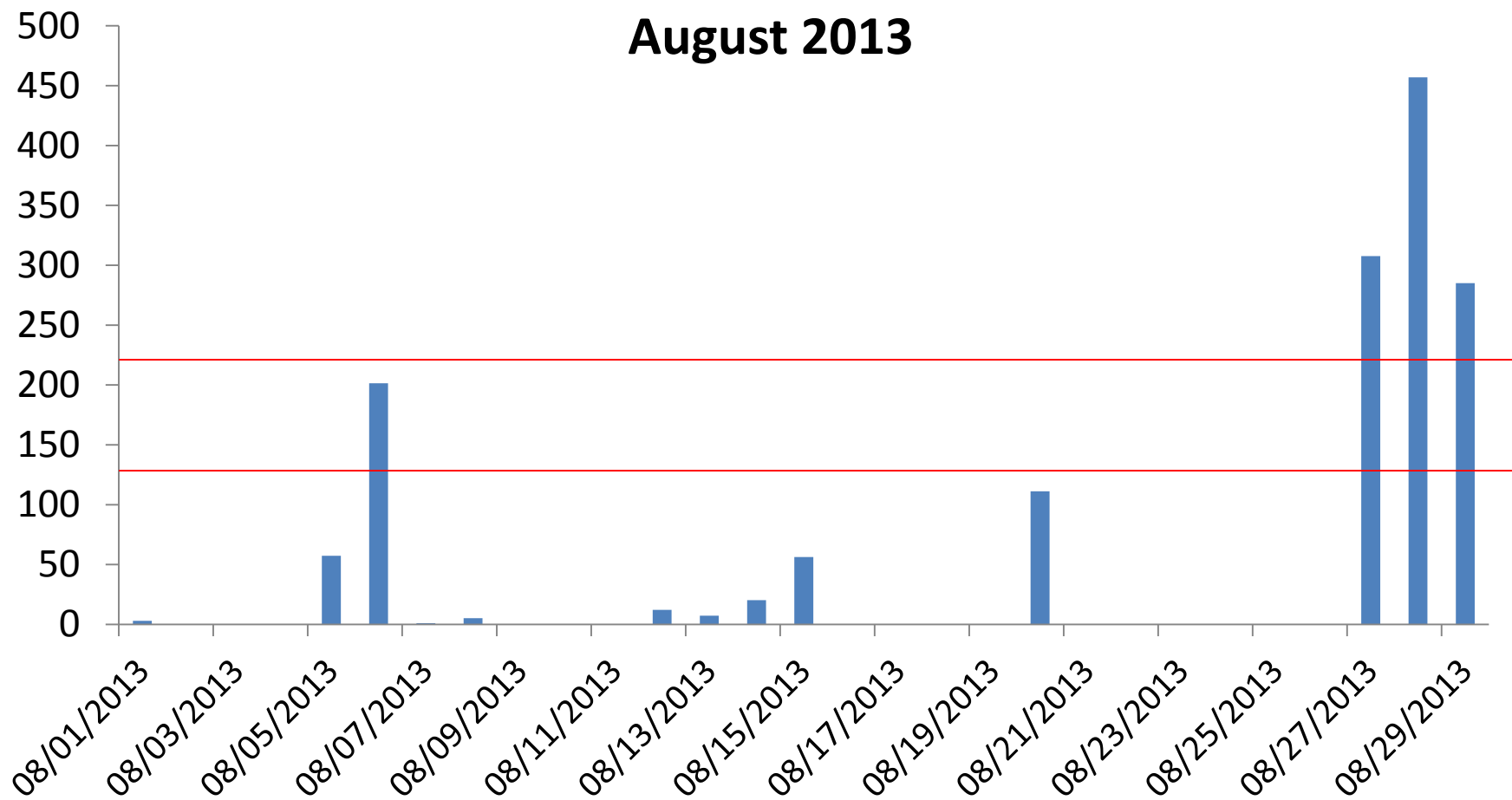
Bacteria

Lake Superior Counties 2003 - 2013 Advisory Rates (%) per Year



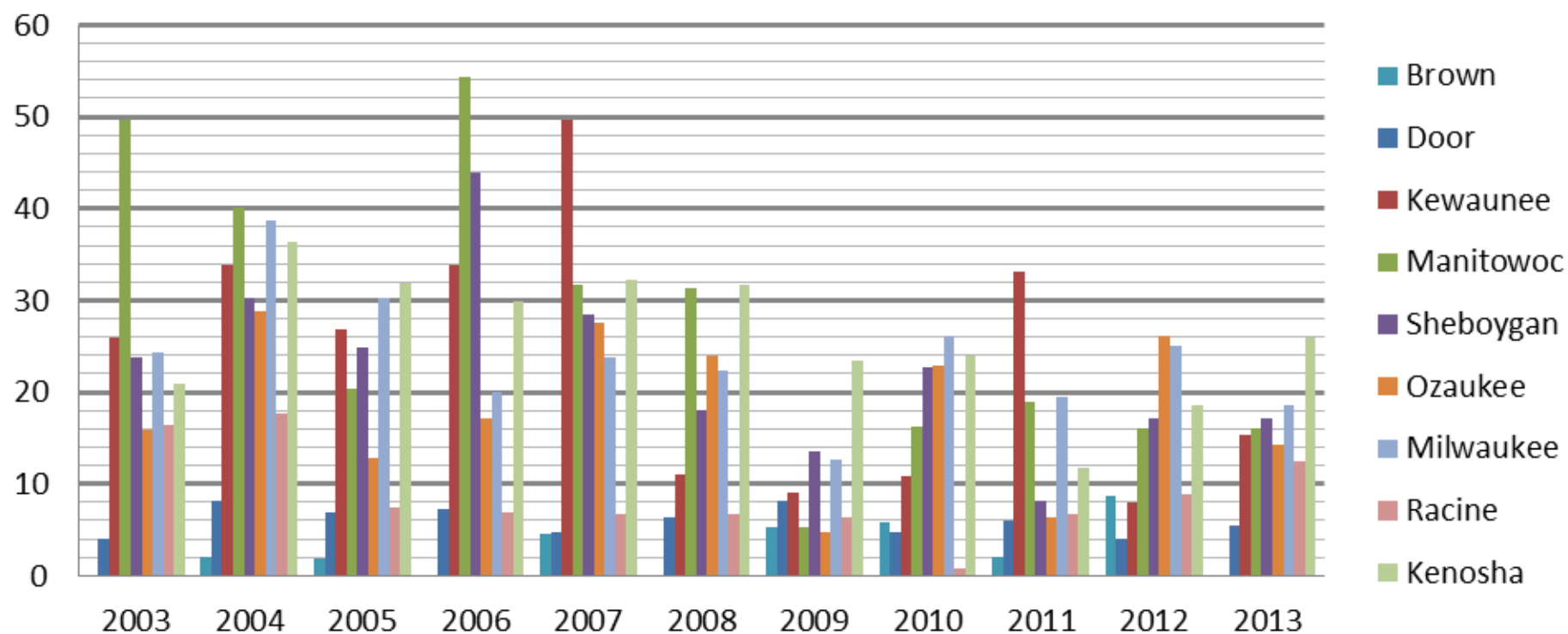
Bacteria

Thompsons West End Park E. coli August 2013



Bacteria

Lake Michigan Counties 2003 - 2013 Advisory Rates (%) per Year



Bacteria

Monthly data
5 years
126 colonies/100 ml





- Wisc Beach Health Home
 - Inland Beach Water Quality
 - Real-Time Data Links: WI Coastwide
 - Beach Advisories 2003-Present
 - Beach Advisory Email Sign Up
 - RSS Feeds of Beach Advisories
 - Water Quality E. coli Monitoring Data 2003-Present
 - Beach Historical Conditions 2003-2008
 - Historical Data 1999-2002
 - City and County Health Department Contacts
 - Questionnaire
 - Reasons for Advisories/Closures
 - Beach Nowcasts
 - News and Events
 - FAQ (Frequently Asked Questions)
 - About Beach Health Website
 - Data Entry (For Beach Managers)
- Check out the great **BEACH POSTERS** from a group of Kenosha students! [Click here for Beach Posters](#)

Water Quality E. coli (Monitoring) Report

Water Quality E. coli (Monitoring) Data on this website for the current beach season have not received final quality testing and approval.

Water Quality E. coli (Monitoring) Data can be retrieved from 2003 to Present. Reports can be downloaded by clicking the "Download to csv File" link at the bottom left of the report.

Note: Contact your local county health department for more information. (See links on the left for websites and phone numbers)

County:

Beach:

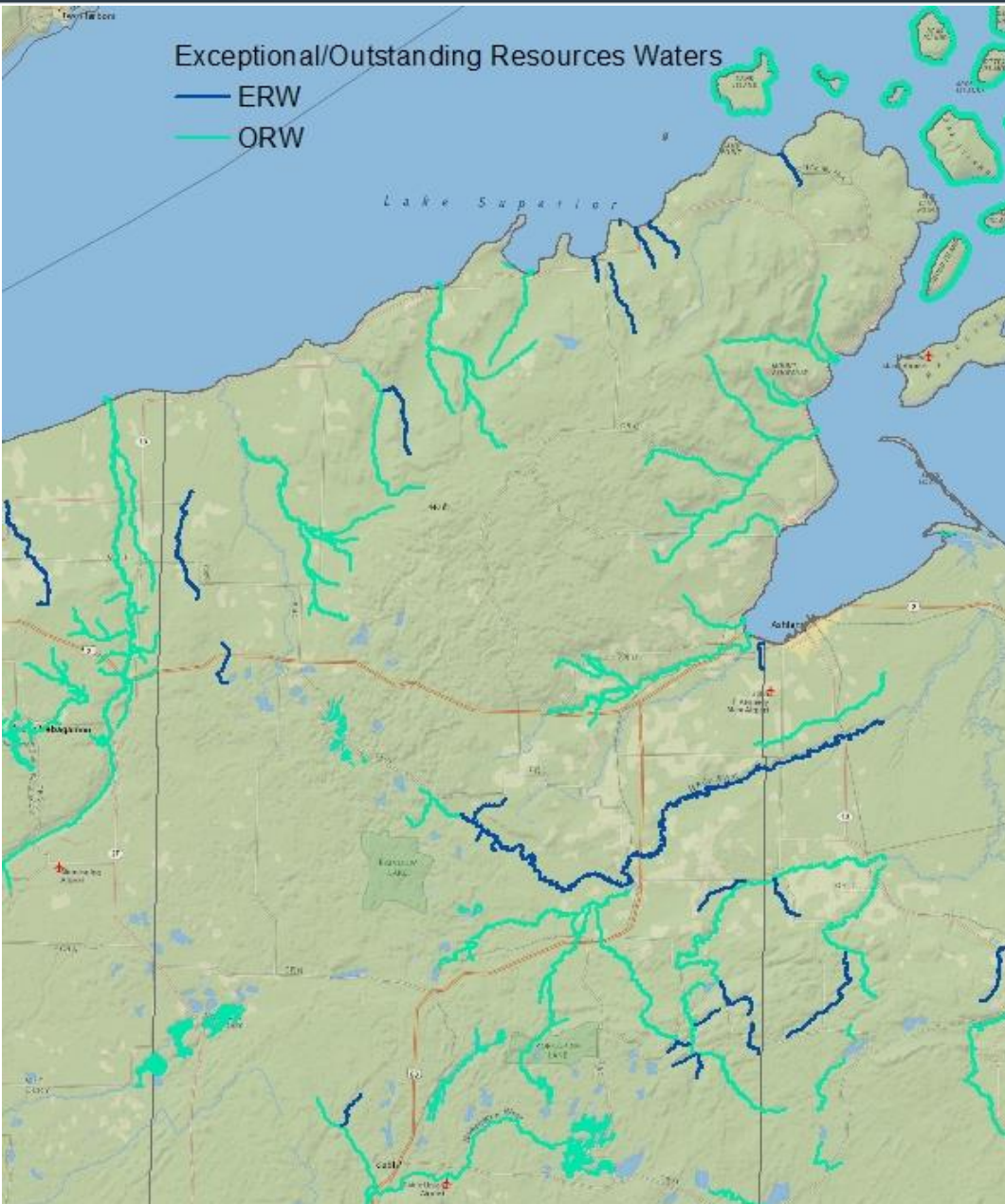
Start Date:

End Date:

County	Beach	Station name	Sample date/time	E. Coli Remark	E. Coli Value	E. Coli Units	Water temp. (F)
Bayfield	Bark Bay Beaches	Center of beach	08/19/2013 10:05		9.8	MPN/100ml	66
Bayfield	Bark Bay Beaches	Center of beach	08/12/2013 11:38	<	1	MPN/100ml	67
Bayfield	Bark Bay Beaches	Center of beach	08/05/2013 11:15	NONE	3.1	MPN/100ml	65
Bayfield	Bark Bay Beaches	Center of beach	07/30/2013 11:11	NONE	4.1	MPN/100ml	61
Bayfield	Bark Bay Beaches	Center of beach	07/22/2013 11:05	<	1	MPN/100ml	48
Bayfield	Bark Bay Beaches	Center of beach	07/15/2013 11:22	NONE	3.1	MPN/100ml	63
Bayfield	Bark Bay Beaches	Center of beach	07/09/2013 11:29	NONE	1	MPN/100ml	53
Bayfield	Bark Bay Beaches	Center of beach	07/01/2013 10:59	NONE	35.5	MPN/100ml	57
Bayfield	Bark Bay Beaches	Center of beach	06/24/2013 10:27	NONE	2	MPN/100ml	46
Bayfield	Bark Bay Beaches	Center of beach	06/17/2013 10:15	NONE	1	MPN/100ml	49
Bayfield	Bark Bay Beaches	Center of beach	06/11/2013 12:39	<	1	MPN/100ml	50
Bayfield	Bark Bay Beaches	Center of beach	08/27/2012 12:52		1	MPN/100ml	68
Bayfield	Bark Bay Beaches	Center of beach	08/21/2012 12:28	<	1	MPN/100ml	68
Bayfield	Bark Bay Beaches	Center of beach	08/14/2012 11:53		1	MPN/100ml	67
Bayfield	Bark Bay Beaches	Center of beach	08/07/2012 14:00	<	1	MPN/100ml	72

[Download to csv](#) row(s) 1 - 15 of 2864 [Next >](#)

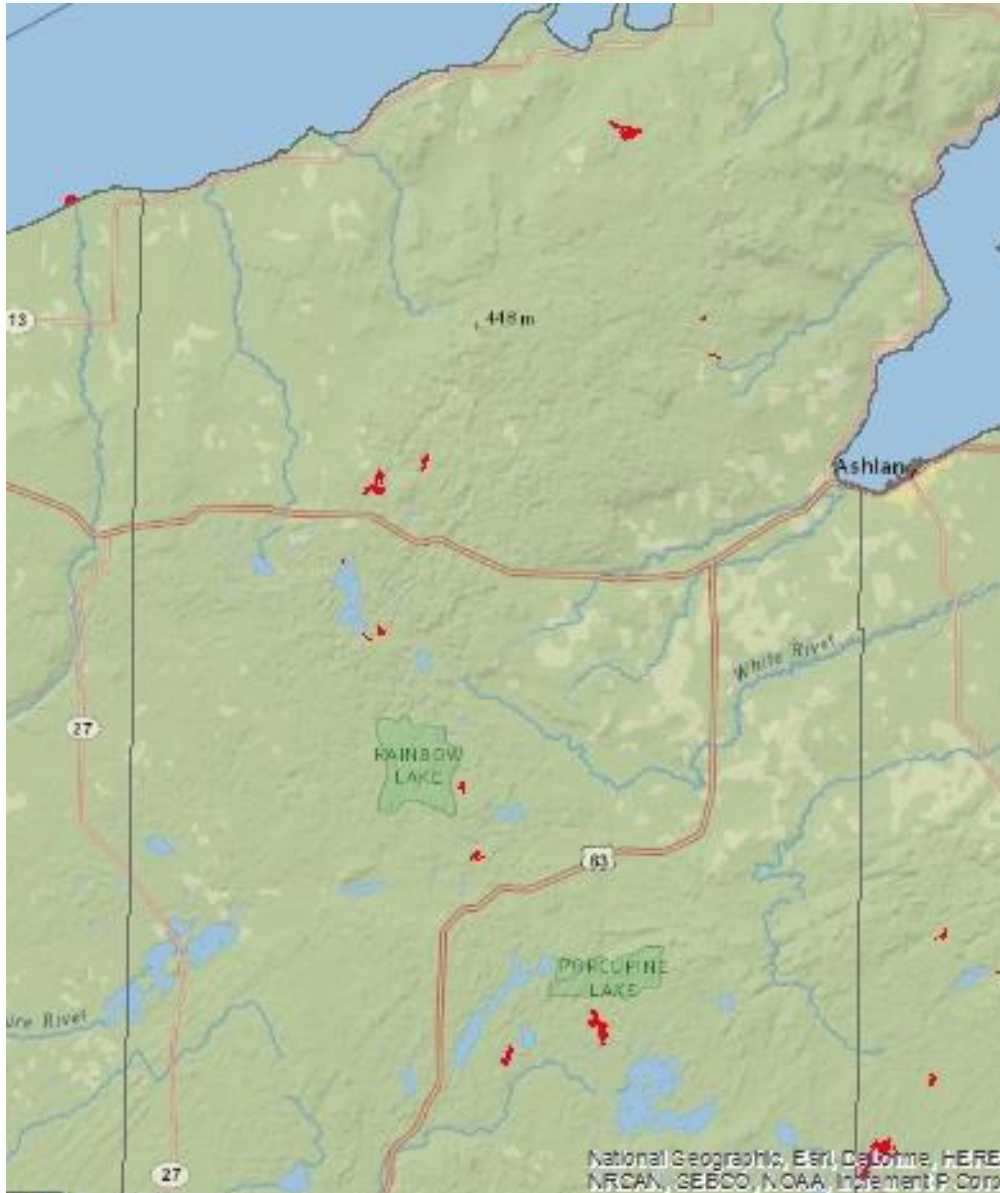
Exceptional/Outstanding RW



In Bayfield Co:

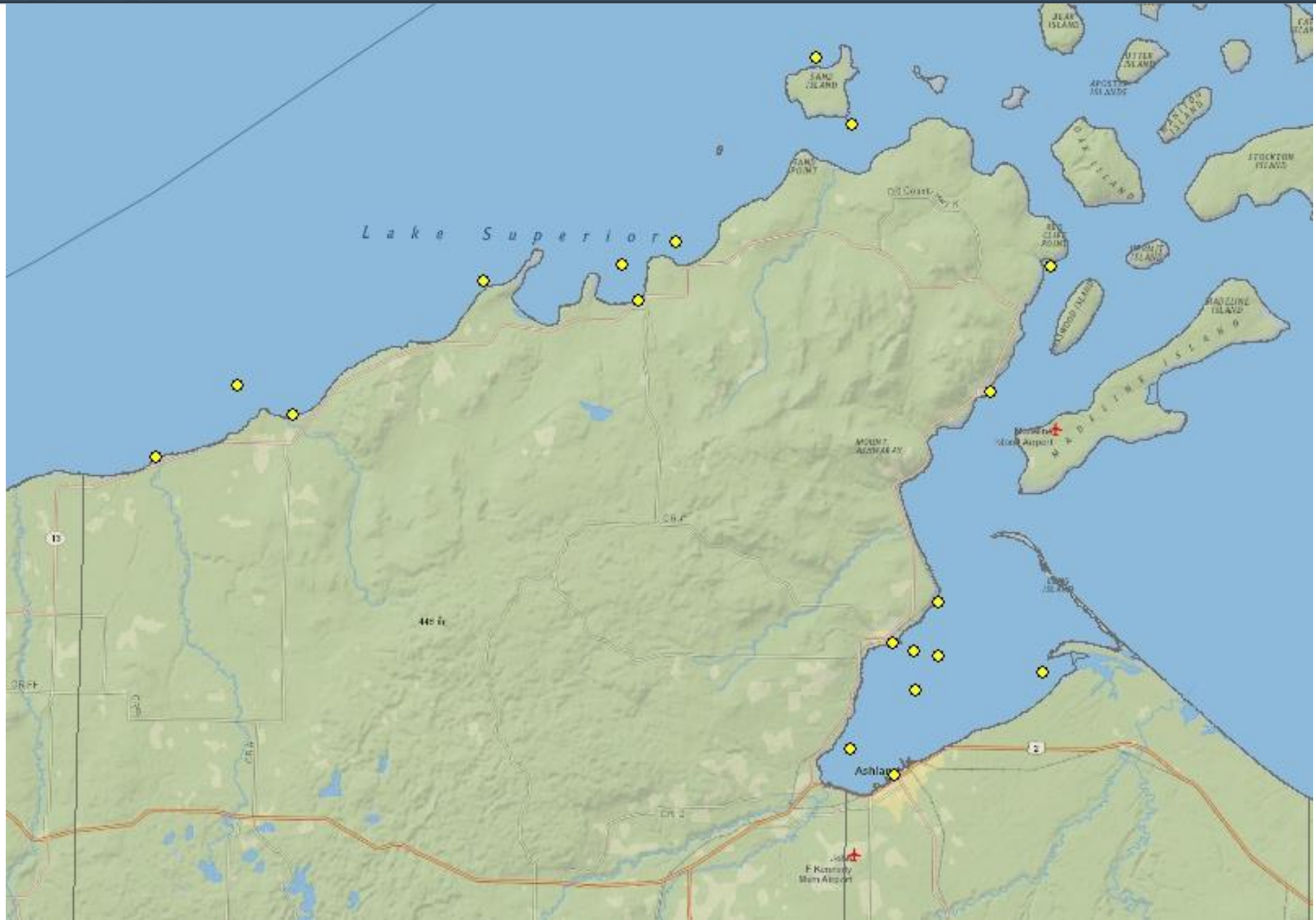
- 414 miles ERW/ORW
- 6% ERW
- 16% ORW

Impaired Waters - Lakes



- Bladder Lake
- Long Lake
- Perch Lake
- Siskiwit Lake
- West Twin Lake
- Tahkodah Lake
- Cisco Lake
- Diamond Lake
- Hildur Lake
- Flynn Lake
- Pike Lake

Lake Superior WQ data



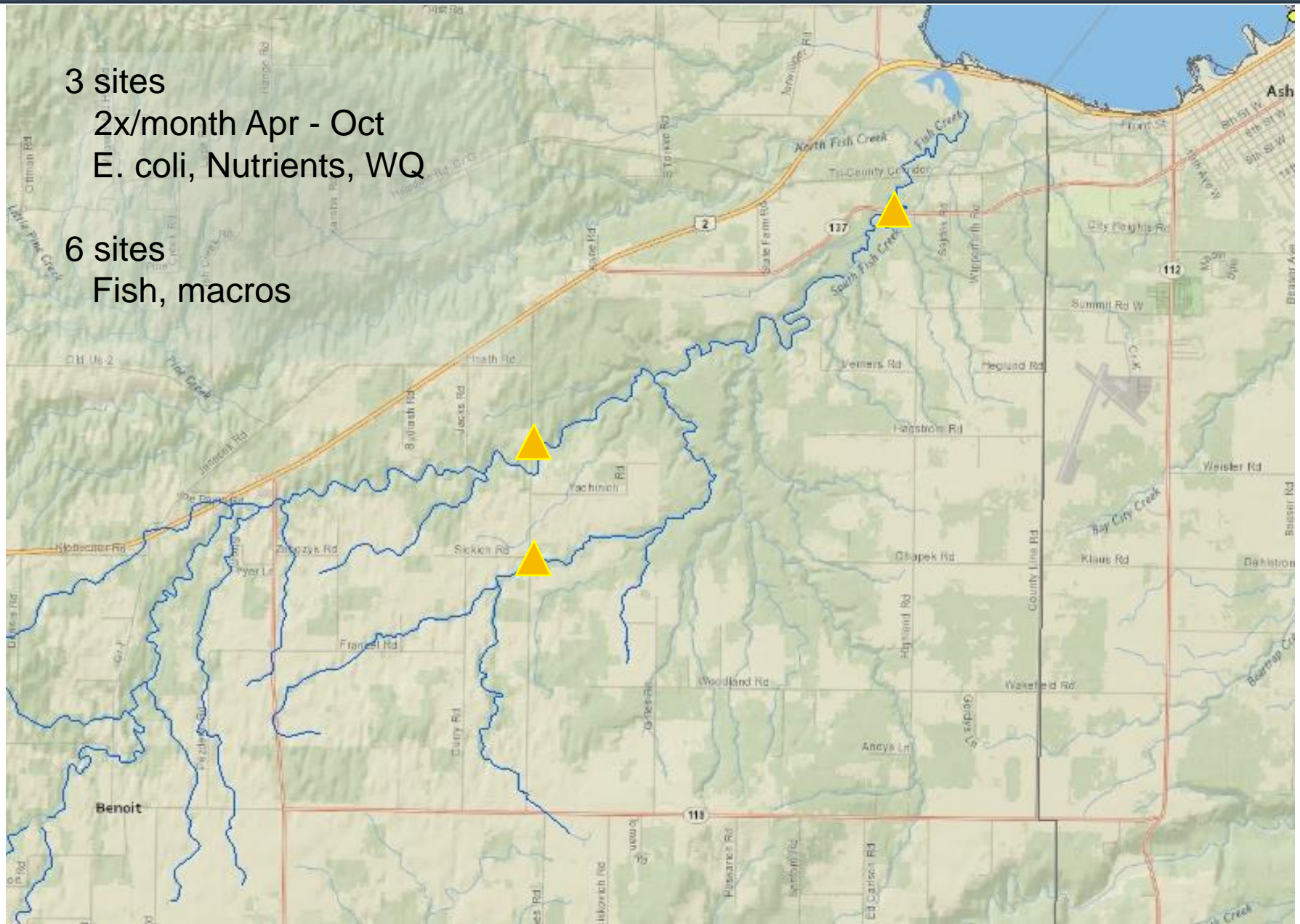
South Fish Monitoring 2015

3 sites

2x/month Apr - Oct
E. coli, Nutrients, WQ

6 sites

Fish, macros



Most surface waters in Bayfield County are high quality and meeting WQS.

Amount of water quality monitoring is limited

Partnering is essential

Questions

Michele Wheeler
michele.wheeler@wisconsin.gov
715-685-2912



Bayfield Co Beach Monitoring

***2015 draft list**

Nearest Town	Beach	Public Use Designation	Min. Frequency
Sand Bay	Little Sand Bay	Beach and adjacent Marina	1/week
Port Wing	Port Wing East	Beach and Boat Launch	1/week
Port Wing	Port Wing West	Beach and natural area	1/week
Bayfield	Washington Ave	Beach	1/week
Bayfield	Broad St	Beach	1/week
Herbster	Herbster	Beach	2/week
Washburn	Sioux River North	Beach	2/week
Washburn	Sioux River South	Beach	2/week
Cornucopia	Siskiwit East	Beach	2/week
Cornucopia	Siskiwit West	Beach	2/week
Washburn	Thompson West End Park	Beach	2/week