Bad River Watershed Association

Connecting People, Land, and Water

Lake Superior Collaborative Meeting **June 9, 2015**

Tony Janisch

BAD RIVER WATERSHED ASSOCIATION

The mission of the Bad River Watershed Association (BRWA) is to promote a healthy relationship between the people and natural communities of the Bad River watershed by involving all citizens in assessing, maintaining and improving watershed integrity for future generations.

501(c)3 not-for-profit – est. 2002

Our Purpose:

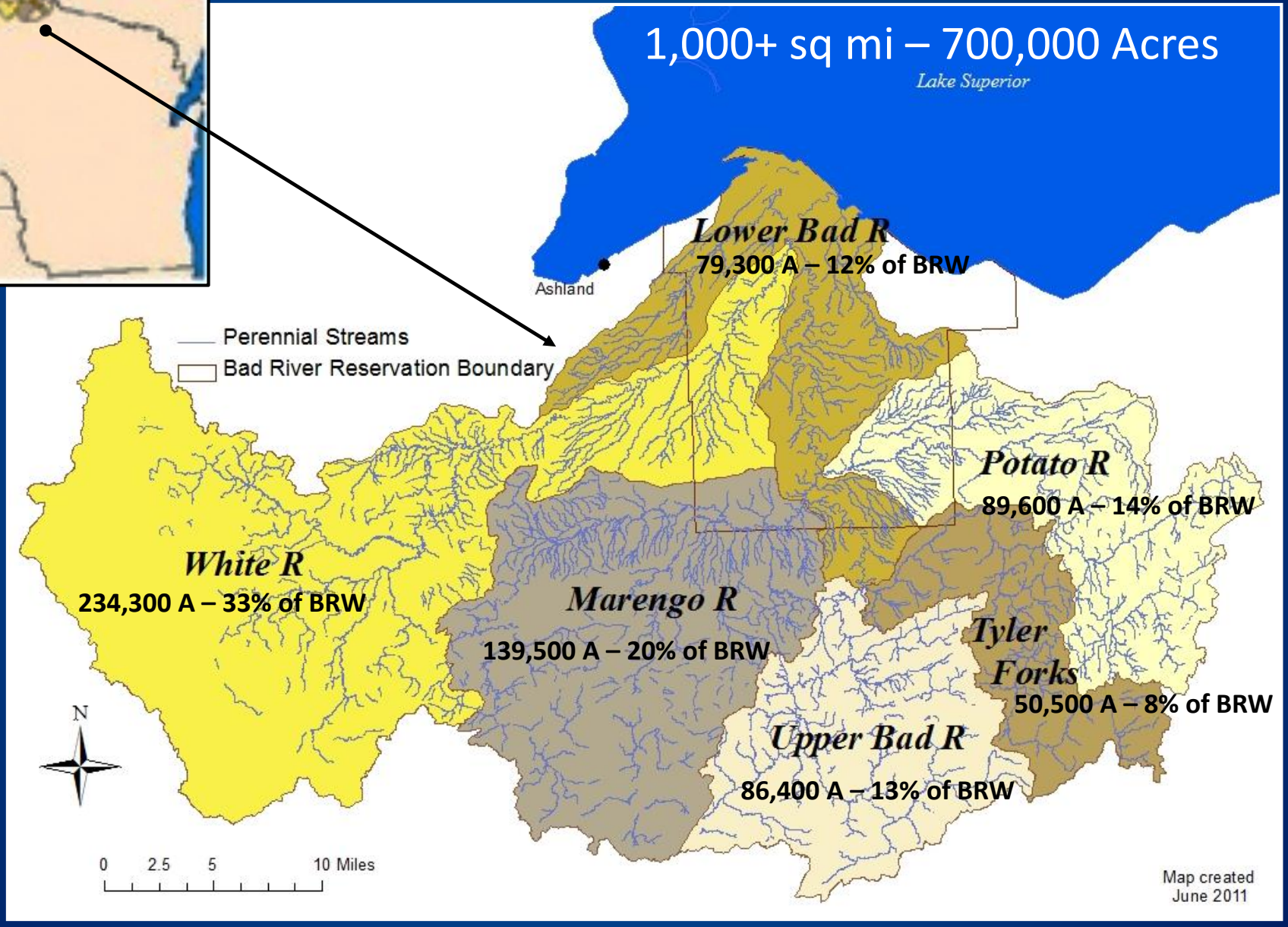
protect the high quality of the natural resources of the watershed;

promote community wide responsible management and use of the public and private lands and waters;

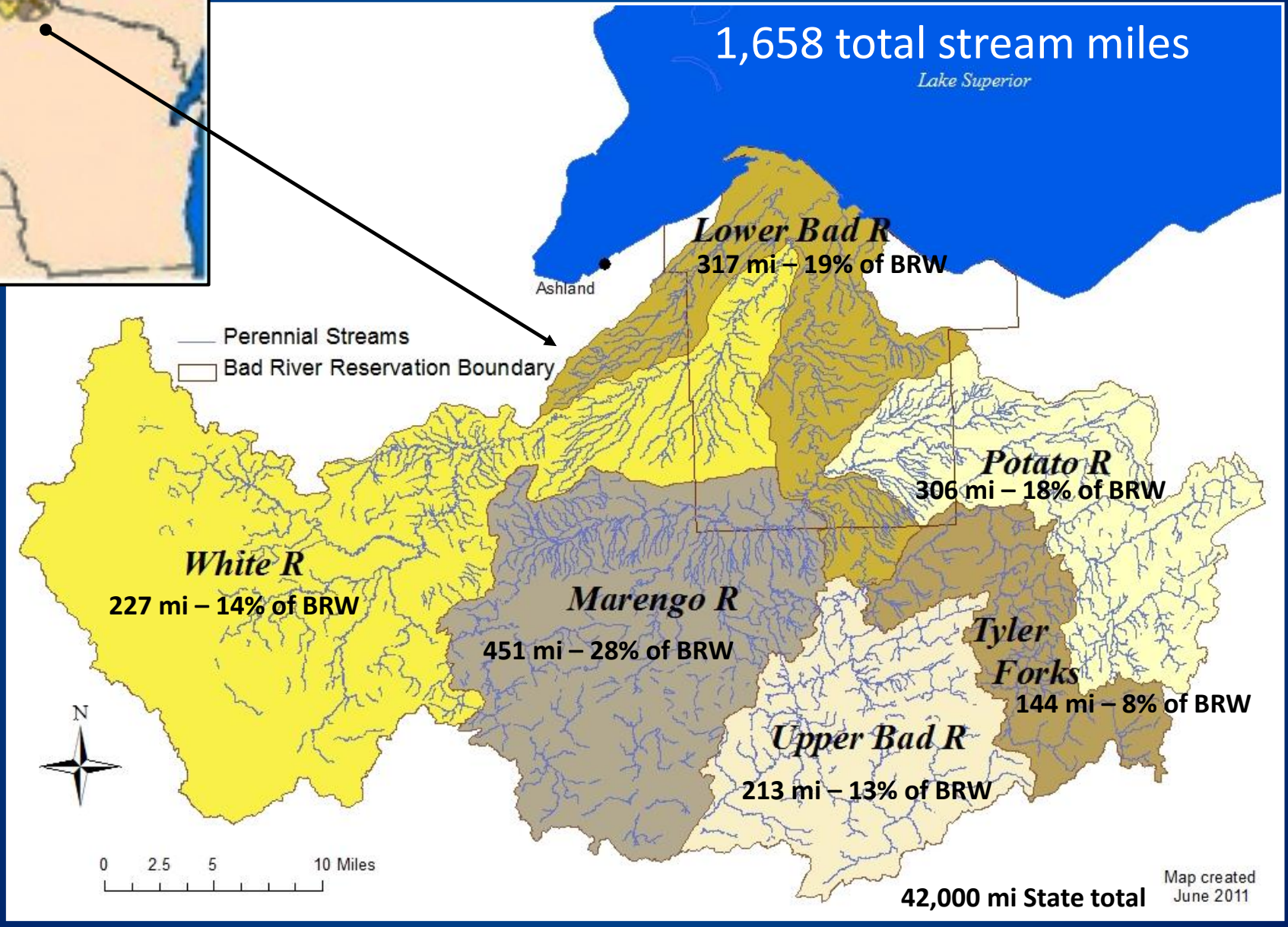
develop a knowledge base for deeper understanding of the ecosystem and the effects of human activity;

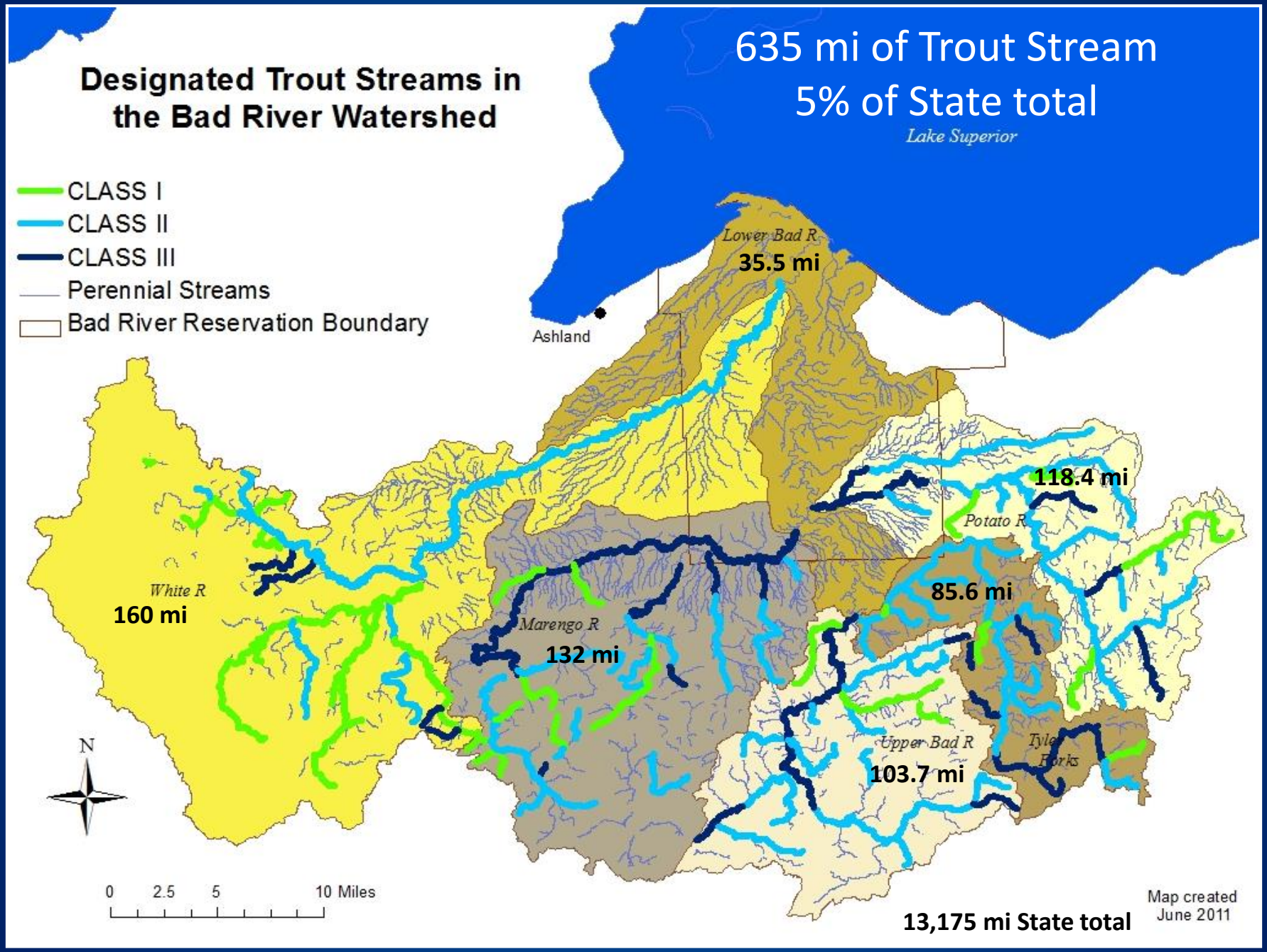
serve as a pro-active forum for education, coordination, and decision making affecting the resources of the watershed.

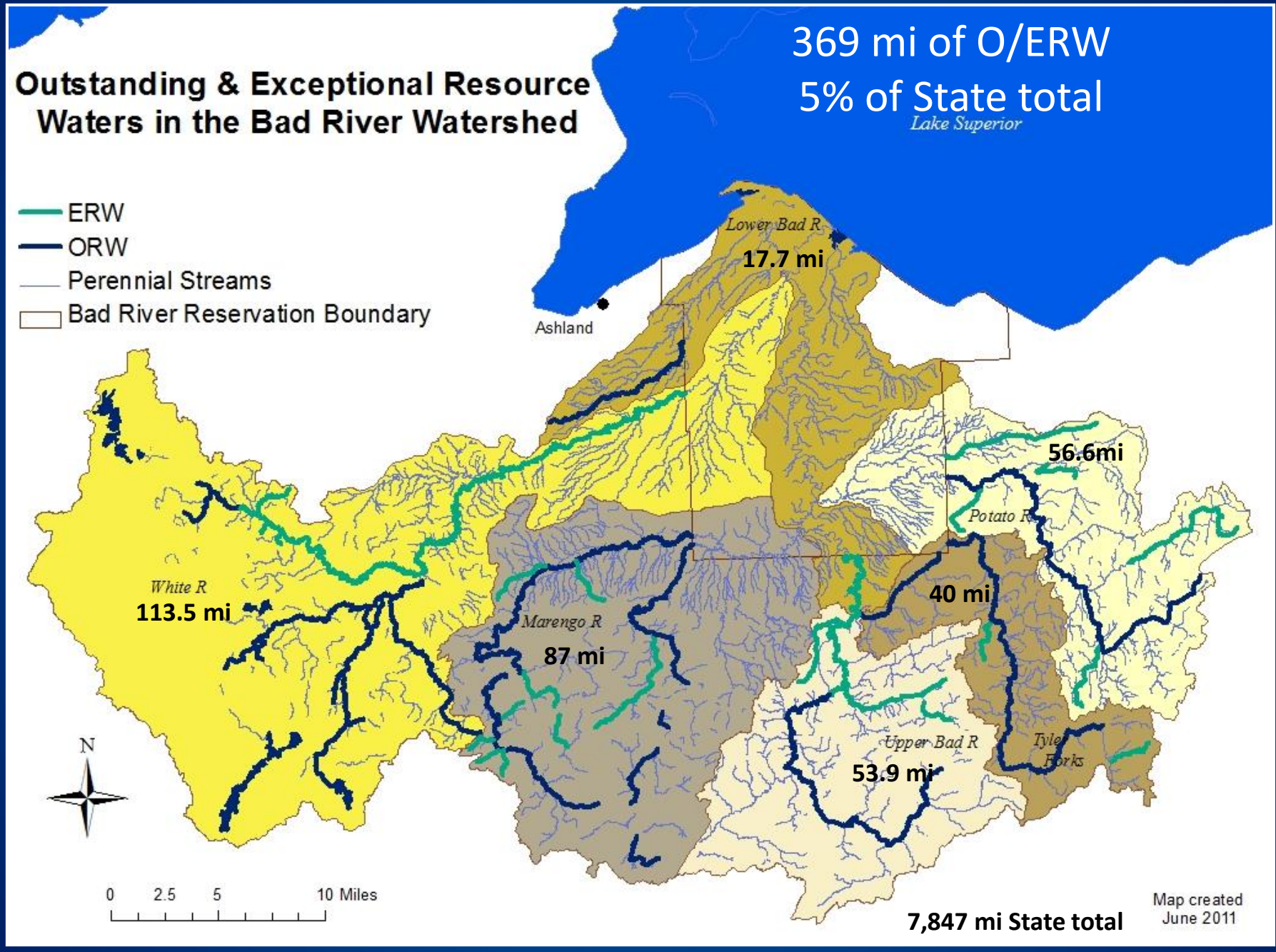
The Bad River Watershed



The Bad River Watershed




Designated Trout Streams in the Bad River Watershed
635 mi of Trout Stream
5% of State total
Lake Superior
CLASS I
CLASS II
CLASS III
Perennial Streams
Bad River Reservation Boundary
Ashland
Lower Bad R
35.5 mi
118.4 mi
Potato R
85.6 mi
White R
160 mi
Marengo R
132 mi
Upper Bad R
103.7 mi
Tyler Forks
N
0 2.5 5 10 Miles
13,175 mi State total
Map created June 2011


Outstanding & Exceptional Resource Waters in the Bad River Watershed
369 mi of O/ERW
5% of State total
Lake Superior
ERW
ORW
Perennial Streams
Bad River Reservation Boundary
Ashland
Lower Bad R
17.7 mi
56.6mi
Potato R
White R
113.5 mi
Marengo R
87 mi
40 mi
Upper Bad R
53.9 mi
Tyler Forks
N
0 2.5 5 10 Miles
7,847 mi State total
Map created June 2011

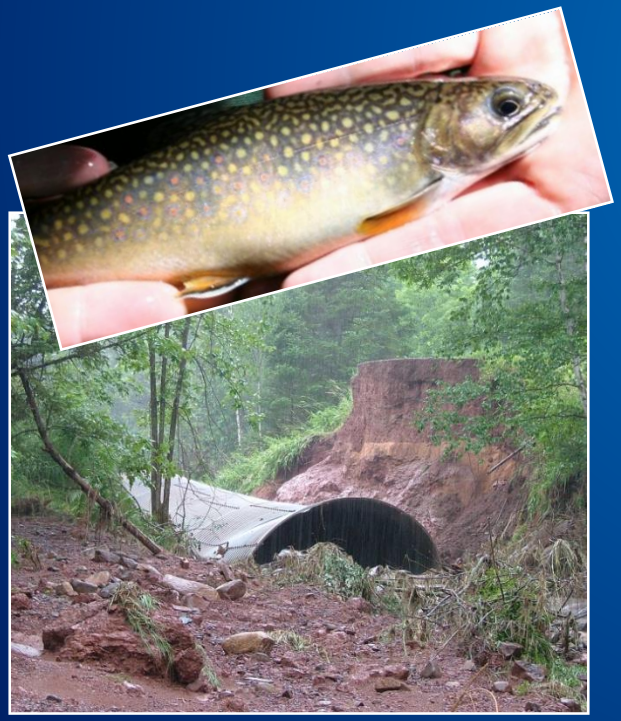
A Special Place

- Home to species such as sturgeon, native brook trout, walleye, piping plover, pine marten, wood turtle...
- Cultural importance – wild rice Bad River Tribe
- Sediment and “flashy streams”
- Working Landscape

BRWA Programs

Fish Passage Restoration

(culvert replacement)



Water Quality Monitoring

Watershed Action

Approach to Programs

- Collaborative – Partnership based
- Meaningful experience for volunteers
- Technically sound

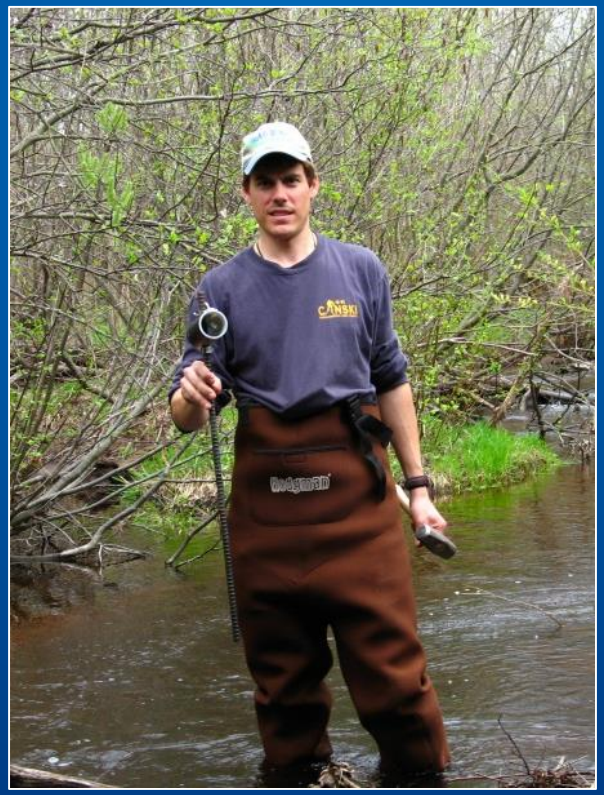
Program Intent

- Educate and empower local people
- Gather data on the watershed health
- If problems are found, work with appropriate agencies for solutions
- Non-regulatory but of value for our community

Water Quality Monitoring

Water Chemistry

Temperature



Macro Invertebrate

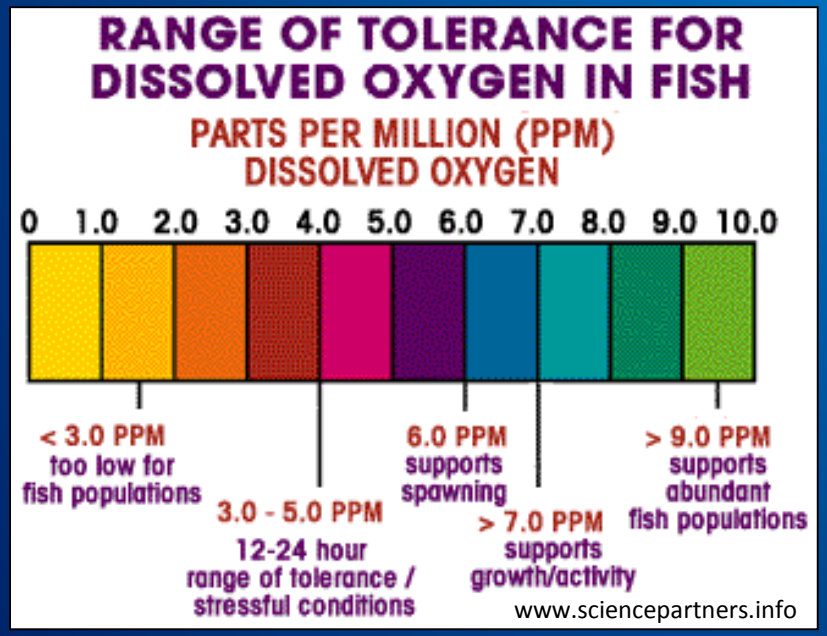
Water Chemistry Monitoring

Nitrate, Phosphate, Dissolved Oxygen,

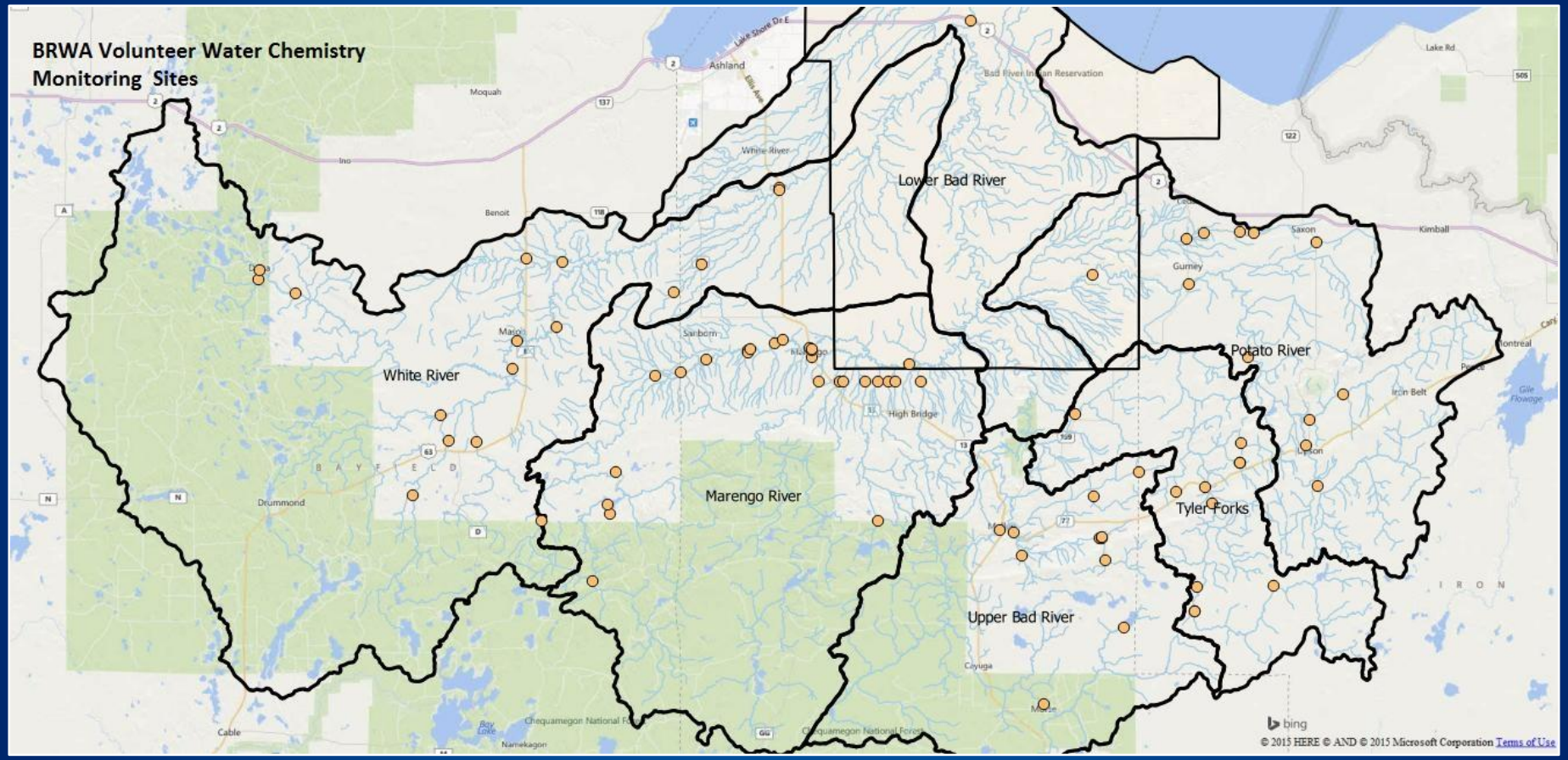
Chloride, Turbidity, pH

Why Monitor Chemistry?

- Can determinant in what lives in water.
- Assist in determining base-line quality and health.
- Determine trends over time.
- Aid in identifying point & non-point sources of pollution.



Water Chemistry Sites



77 locations

14 years (2002-2015)

E.coli Monitoring

41 site locations

6 years (2006-2011)

Temperature Monitoring

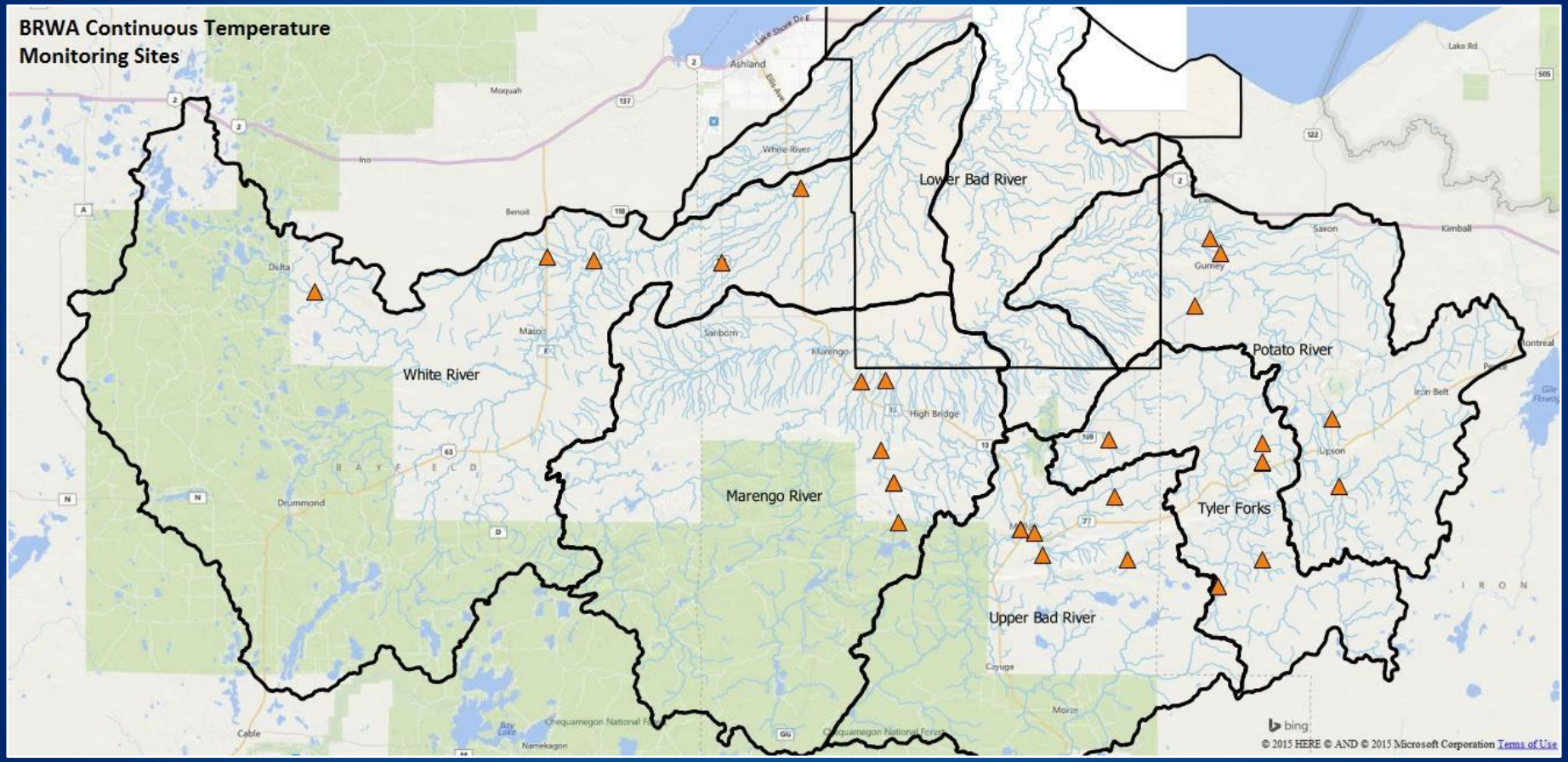
- HOBO TidbiT v2 thermistors (accuracy ±0.2°C)
- 1-hour logging interval
- Accuracy check before & after deployment
- Field check & data download ~monthly
- Deployed from May to mid Sept/early Oct

Why Monitor Temperature?

- Temperature major determinant in what lives where (another is flow)
- Determine or re-evaluate a stream's temperature category for management purposes.
- Determine trends in stream temperature over time.
- Aid in identifying groundwater-influenced streams.

Fish Species	Ideal Temperature Range (source WDNR)
Brook Trout	12-14 C (53-57 F)
Brown Trout	18-24 C (65-75 F)

Temperature Sites



25 locations

10 years (2006-2015)

Macro-invertebrate Monitoring


Dragonfly nymph


Emerging


Dragonfly adult

Insects that spend part of life cycle in water

Why Monitor Macro-invertebrates?

- Macro-invertebrates are thought to be ***good indicators of*** multiple ***environmental stressors*** over time.
- Macros vary in tolerance to disturbance, several established tolerance values are available.
- Changes within a community structure can be utilized to measure ecological changes.


Hellgrammite

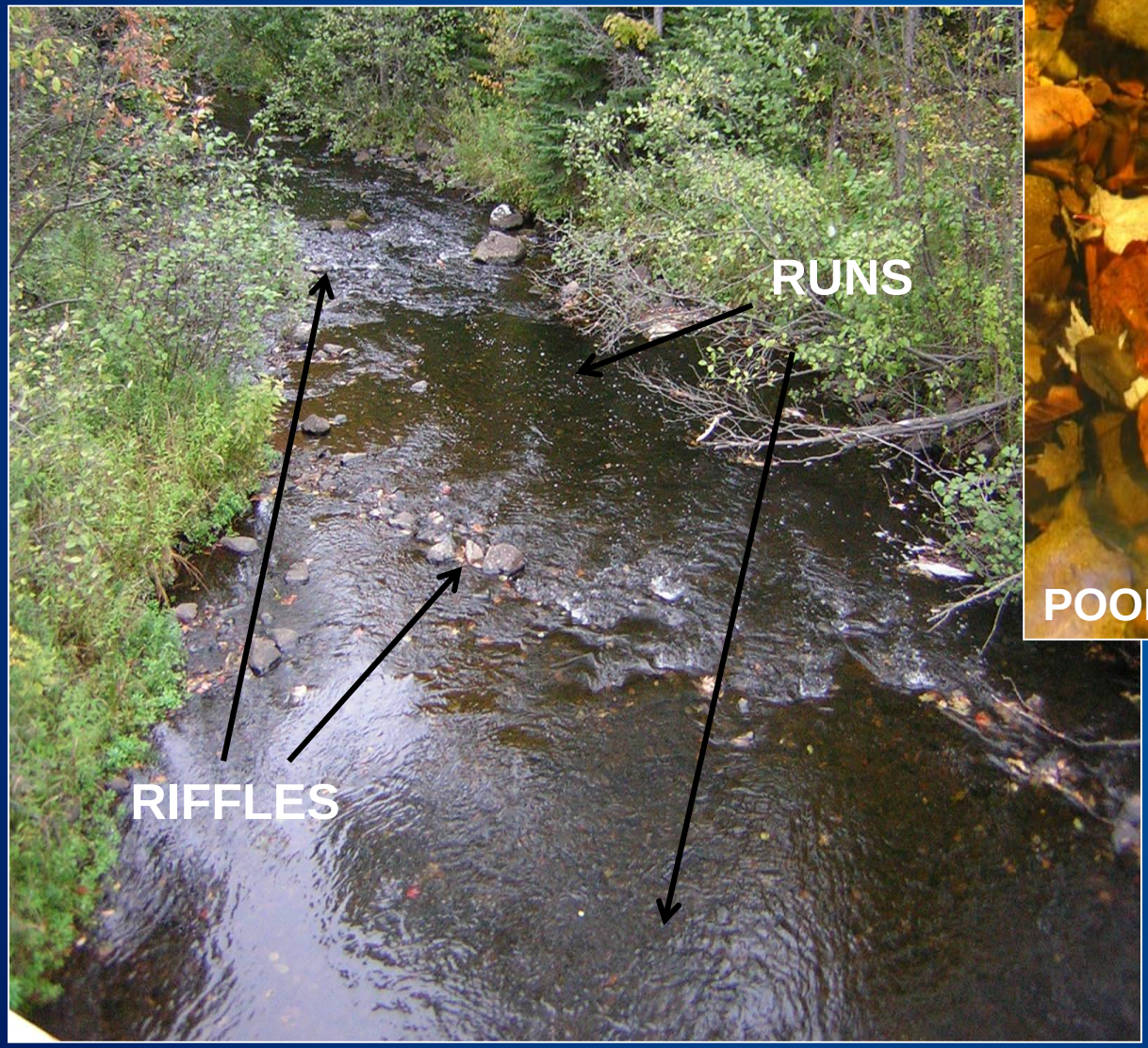

Caddisfly


Stonefly

Macro-invertebrate Field Methods

- 10 “jabs” divided between relative proportion of the following habitats:
  - Hard Bottom
  - Aquatic Plants
  - Undercut Banks
  - Snags
  - Leaf Packs
- Transfer entire sample to plastic container and preserved with 80% ethyl alcohol

Hard Bottom Habitat



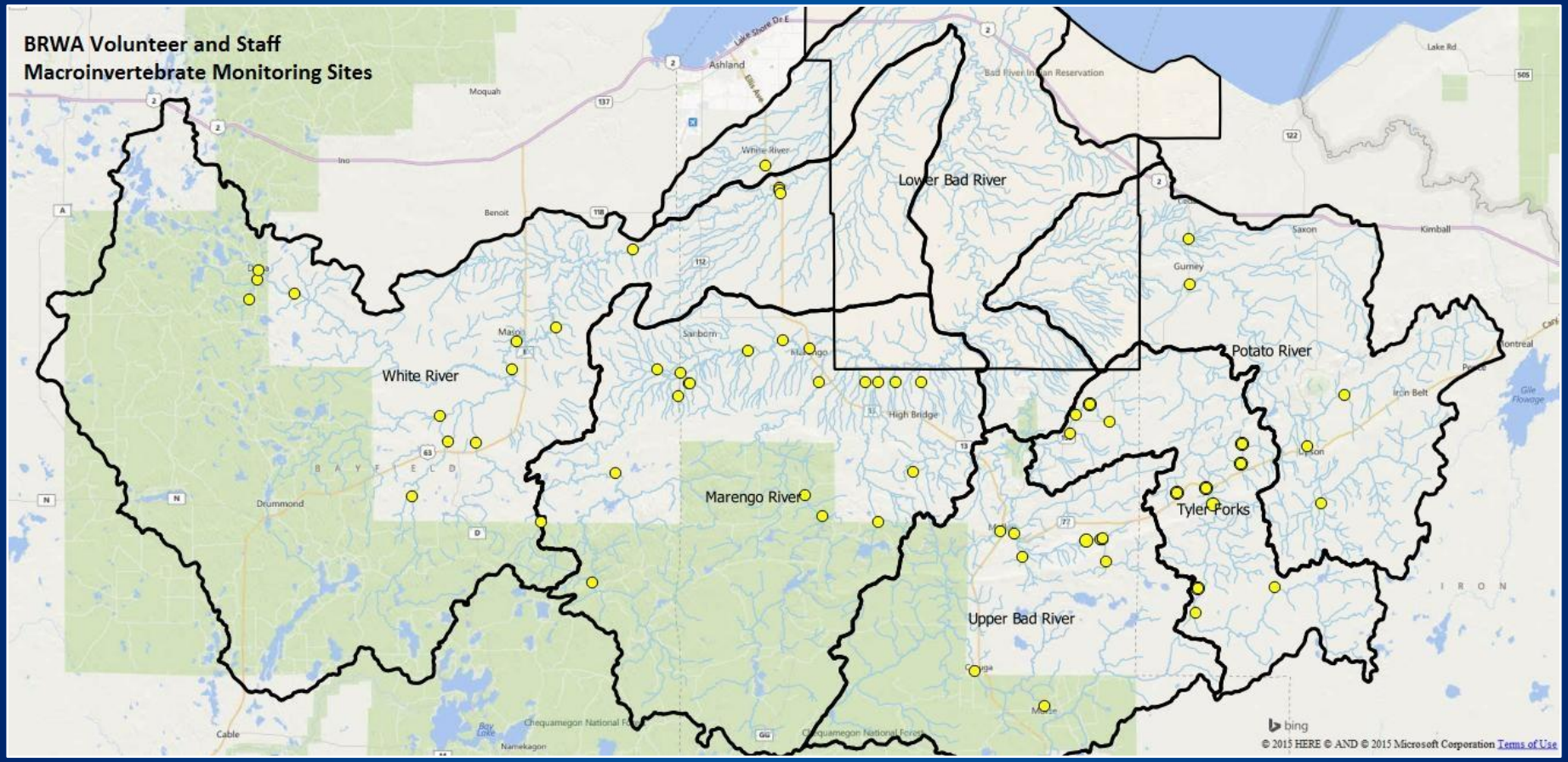
AQUATIC PLANTS

LEAF PACKS

Macro-invertebrate Lab Methods

- Samples sorted and analyzed.
- Random picking of 150 macros.
- Identification to lowest taxonomic level possible generally Family
- Taxonomic data submitted to WDNR - SWIMS

Macro-invertebrate Sites



69 locations

13 years (2003-2015)

BRWA Water Quality Program

160+ volunteers involved in monitoring

WDNR used data to designate O/ERW

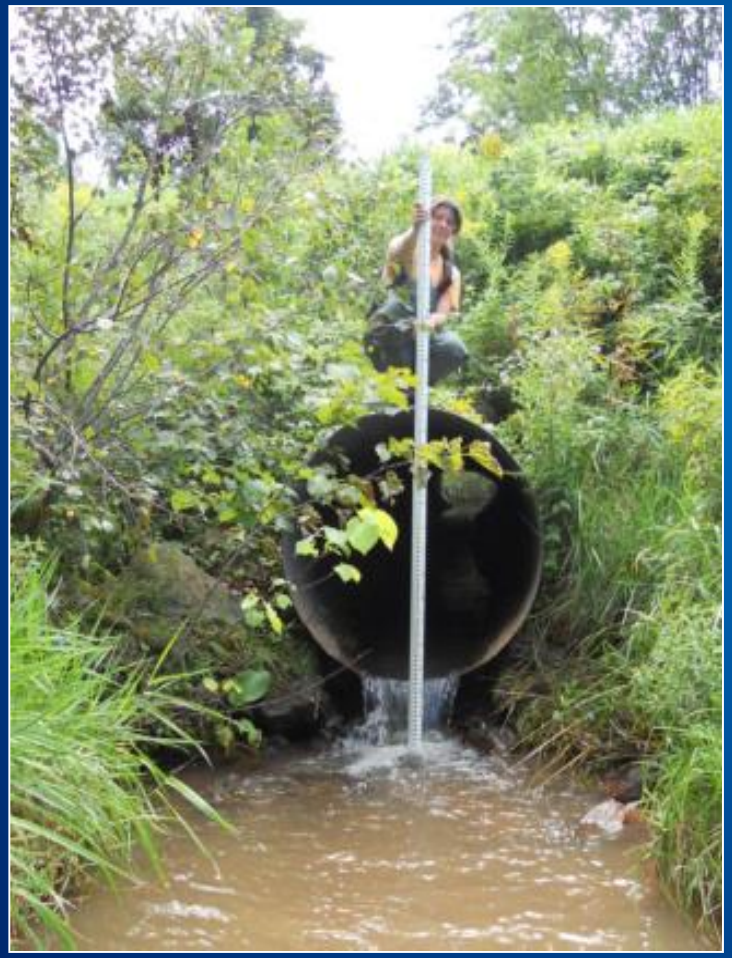
Lake Superior Binational Forum, Environmental Stewardship Award 2008

Lake Superior Magazine, Achievement Award 2012

Wisconsin Conservation Congress, Local Conservation Org. of the Year 2014

Culvert Program

Open habitat - Replace undersized and failing



Hager Rd, before and after replacement

Culvert Program

Find problem culverts and fix them

Inventory

Monitor

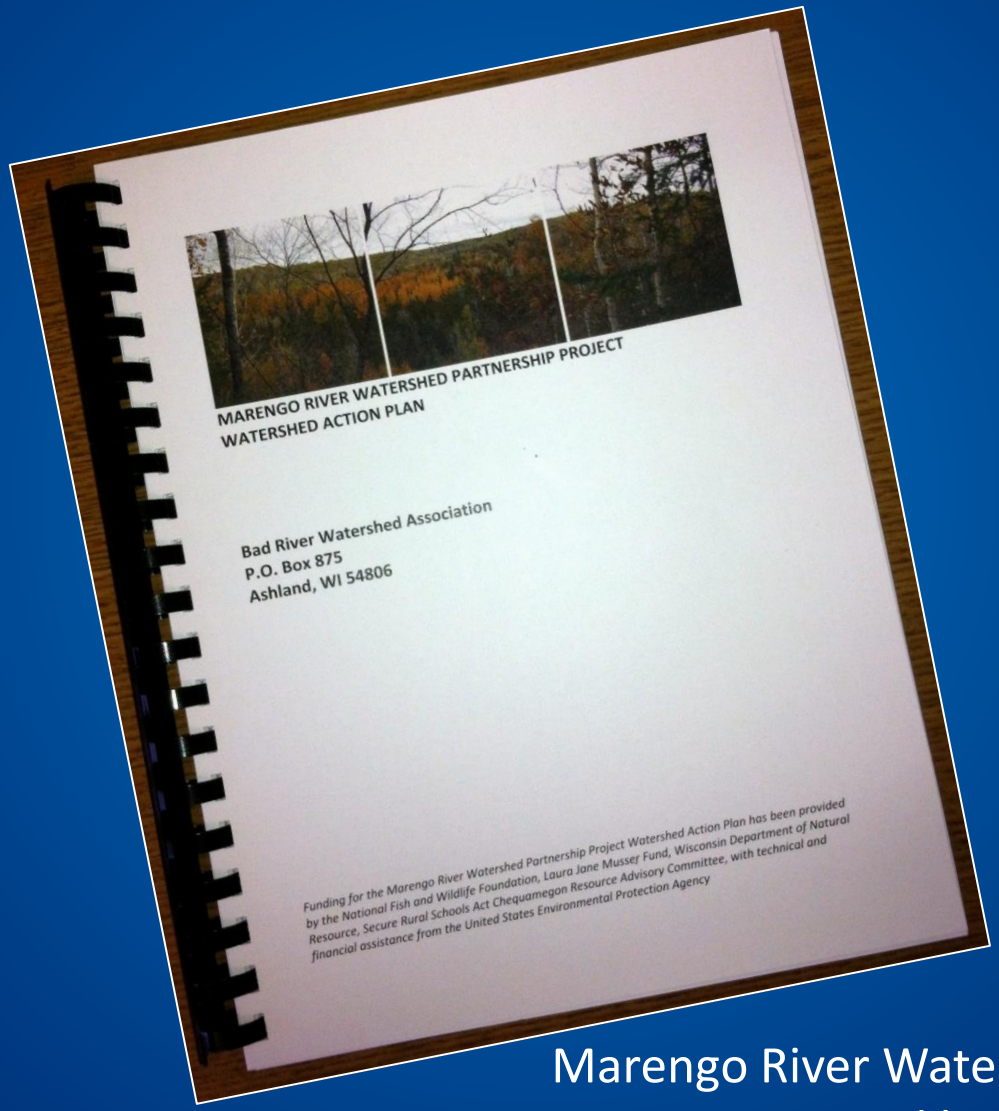
Prioritize

Outreach

Coordinate

Restore

Watershed Action Plan



Marengo River Watershed Action Plan
approved by EPA 2013

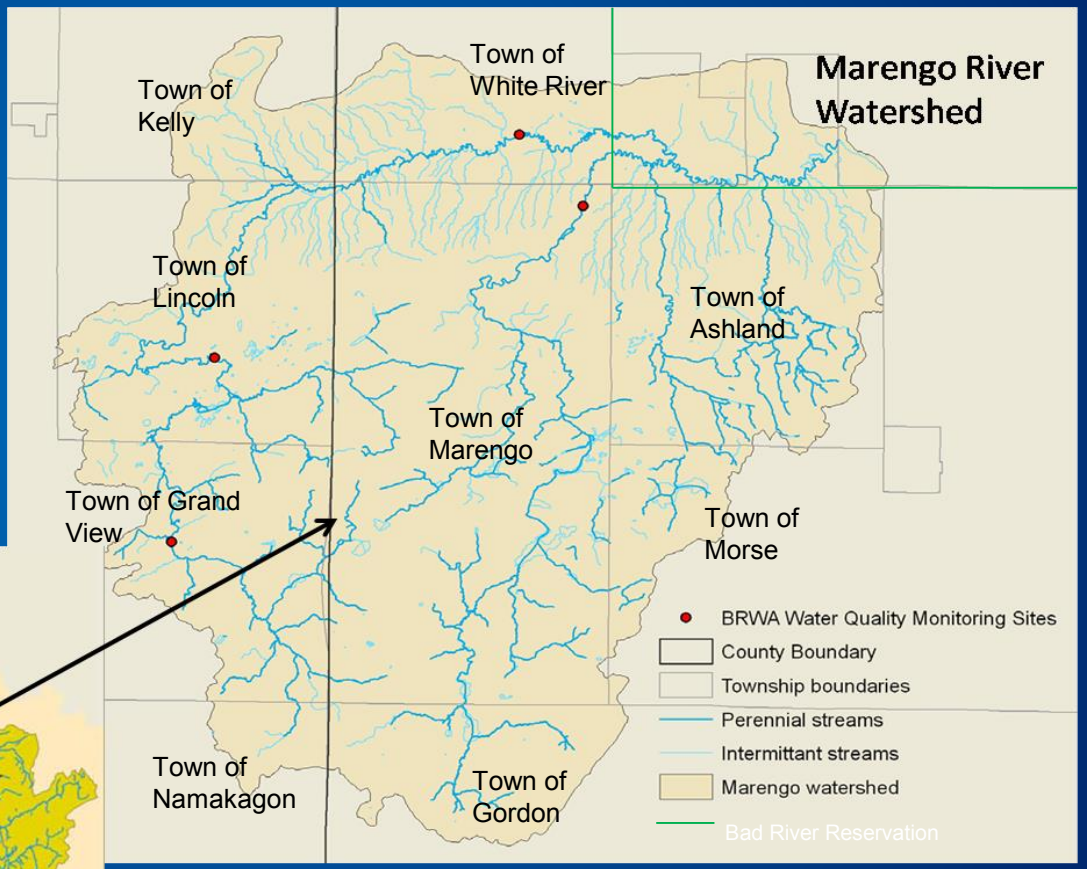
Marengo River Watershed Action Plan

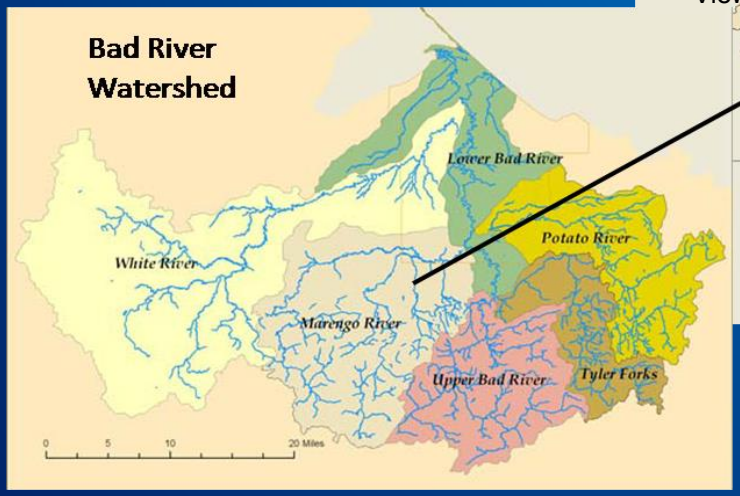
2 Counties

9 Townships

Bad River Reservation

Largest contributor of sediment to the Bad River



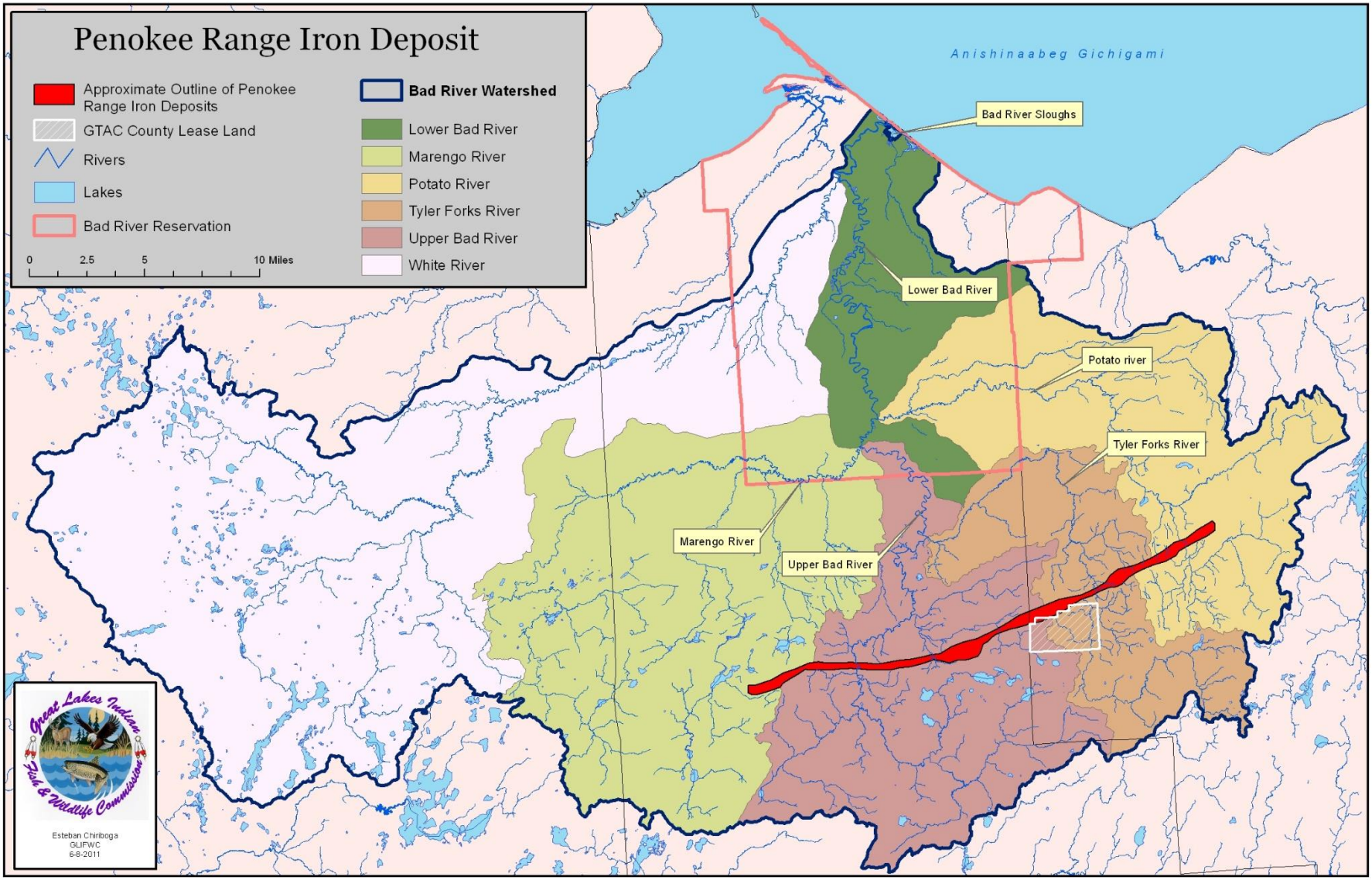


June 2012 Storm Sedimentation

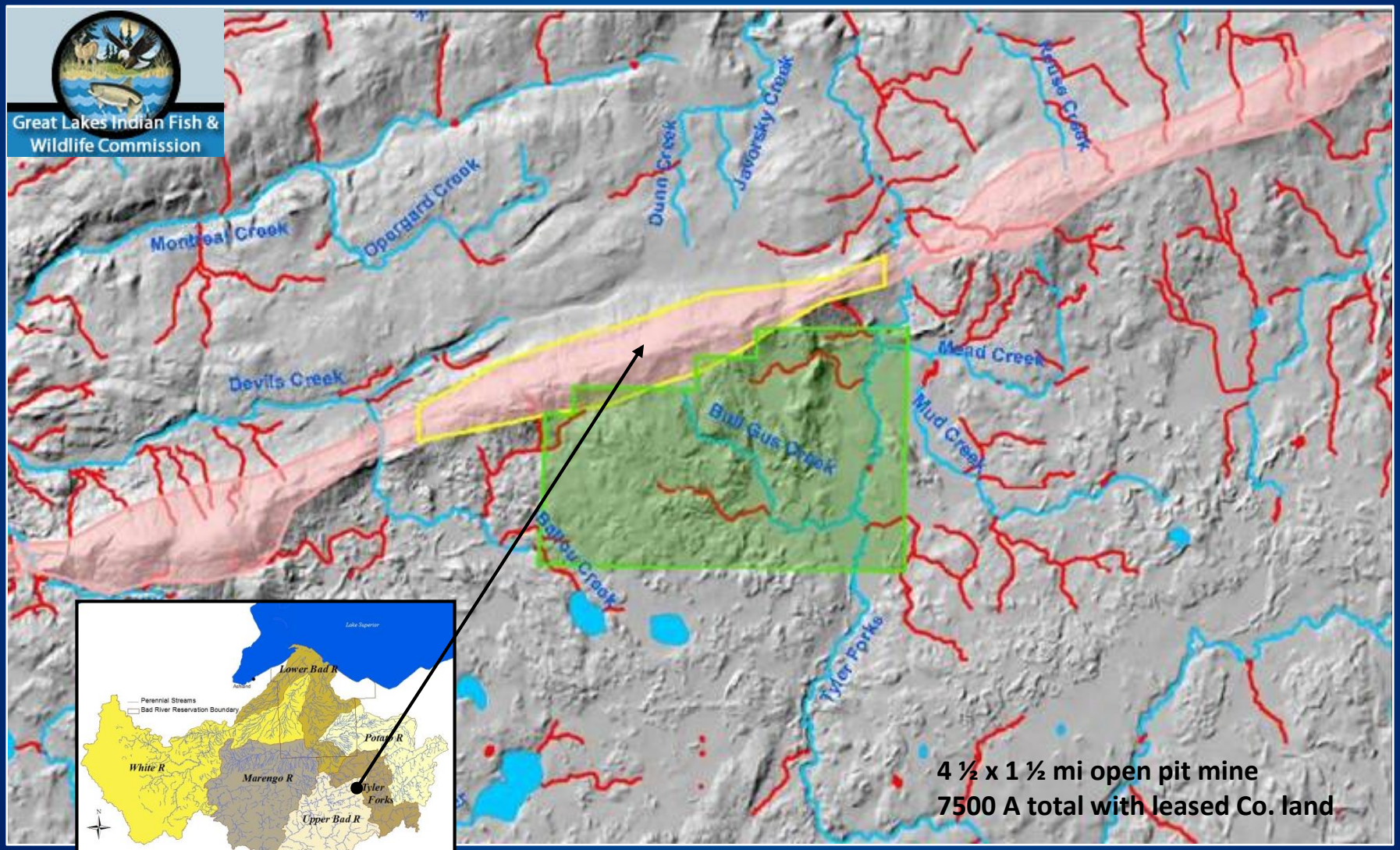
photo credit: NOAA

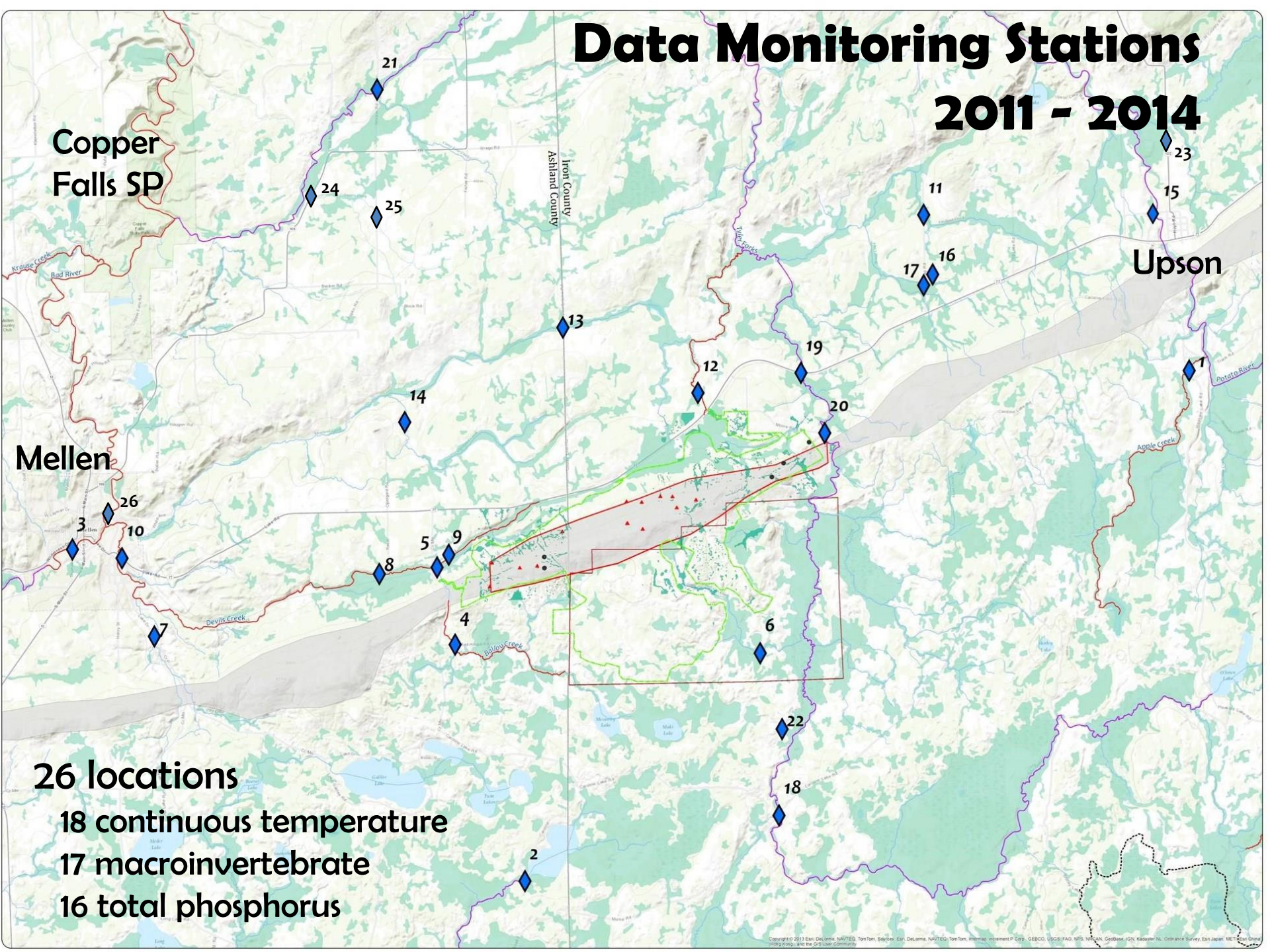
Penokee Baseline Monitoring

Proposed Penokee Mine



Proposed Penokee Mine

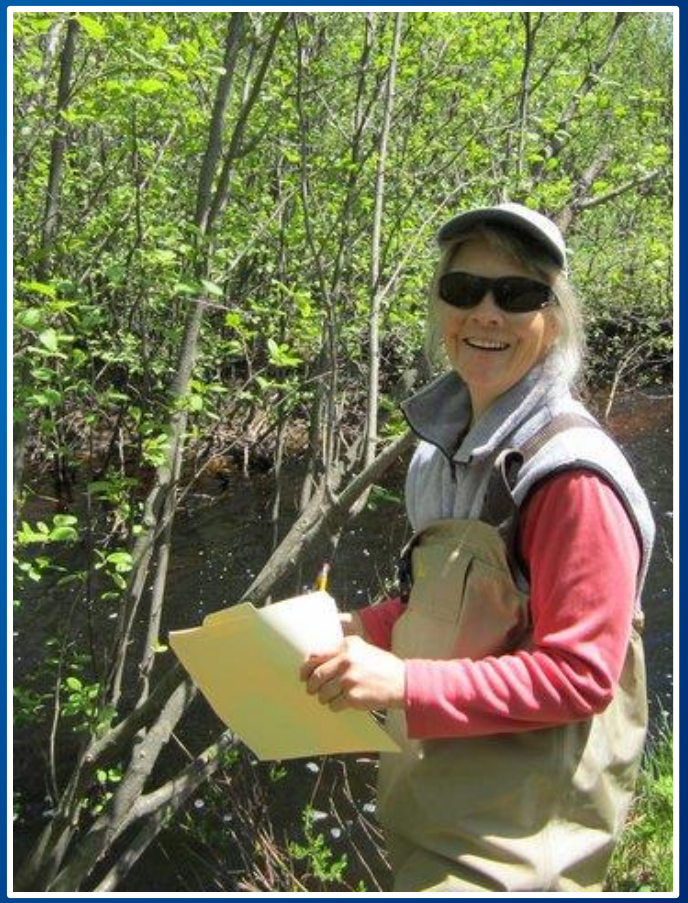


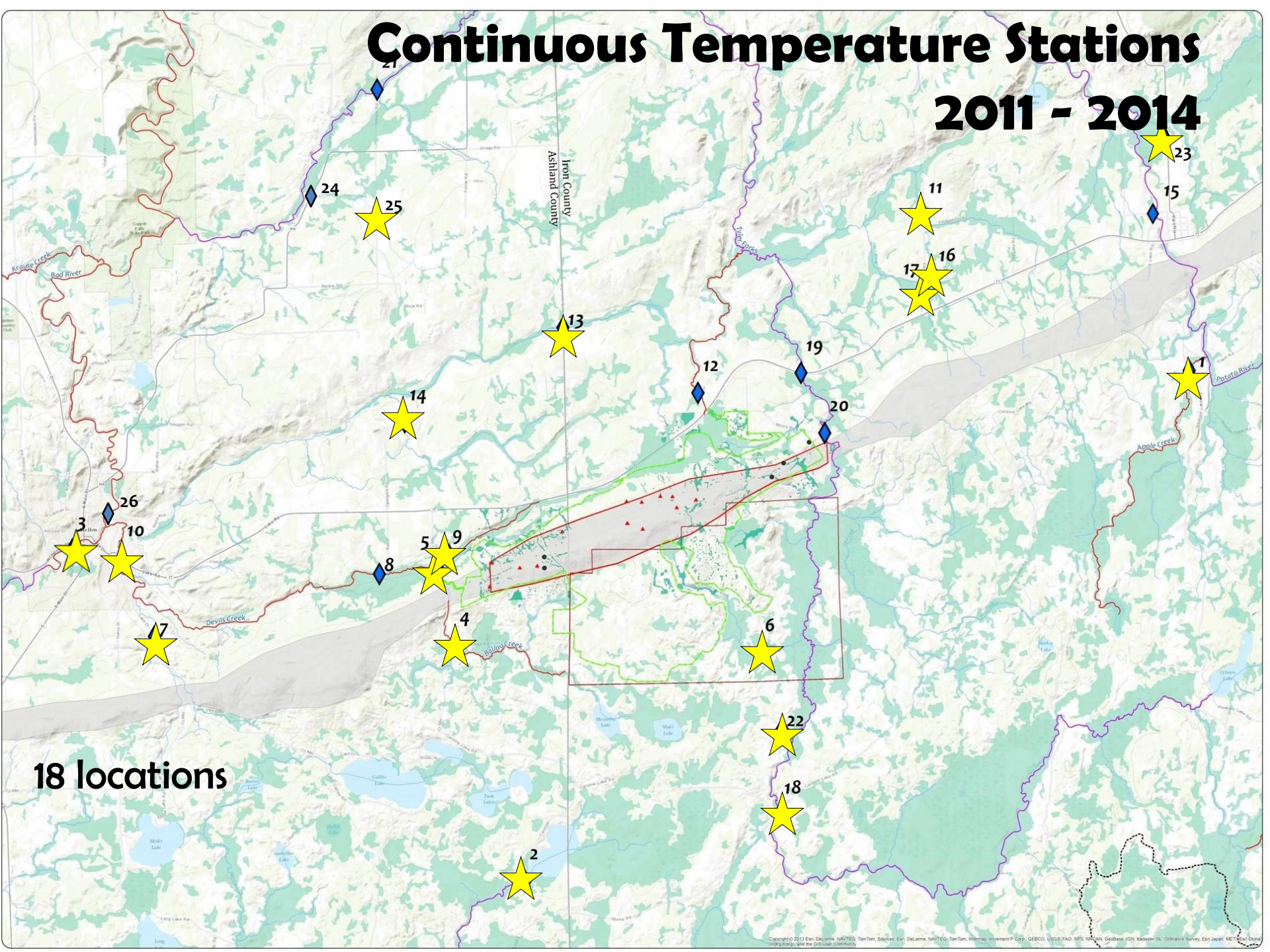

Data Monitoring Stations
2011 - 2014
Copper Falls SP
Mellen
Upson
Iron County
Ashland County
Bad River
Krause Creek
Devils Creek
Bollou Creek
Potato River
Apple Creek
Tyler Forks
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
26 locations
18 continuous temperature
17 macroinvertebrate
16 total phosphorus

Data Monitoring Stations

Site #	Sample Site Location	Temperature				Macroinvertebrates				TP
		2011 (* Temp Logger Lost)	2012	2013	2014	F 2011	S 2012	F 2013	F 2014	2014
1	Apple Creek at Lake O'Brien Rd			X	X					X
2	Bad River at Caroline Lake Outflow		X							X
3	Bad River at Gilman Park		X	X	X		X			X
4	Ballou Creek at Red House Rd		X	X	X	X	X	X		X
5	Ballou Creek upstream from Devil's	X				X				
6	Bull Gus at FR 703			X						X
7	City Creek west of Lake Drive	X	X	X		X	X			X
8	Devil's Creek off Oppergard Rd						X		X	
9	Devil's Creek upstream from Ballou	X				X				
10	Devil's Creek at Hwy 77			X						X
11	Erickson Creek at Casey Sag Rd	X	X	X		X	X	X	X	X
12	Javorsky Creek at Hwy 77					X	X		X	X
13	Montreal Creek at County Line Rd			X						X
14	Opergard Creek at Revai Rd	X	X	X		X	X			X
15	Potato River at Upson		*			X	X			X
16	Rouse Creek at Casey Sag Rd			X	X			X	X	
17	Unnamed Rouse Crk Tributary at Casey Sag	X	X	X				X		X
18	Tyler Forks at Caroline Lake Rd	X	*			X	X			
19	Tyler Forks at Hwy 77					X	X		X	
20	Tyler Forks at Moore Park Rd							X	X	
21	Tyler Forks at Stricker Rd					X	X		X	
22	Unnamed Tyler Forks Tributary at FR703		X	X	X			X	X	X
23	Alder Creek at Hwy 122				X					
24	Gehrman Creek at Hwy 169									X
25	Gehrman Creek at Popko Rd				X					
26	Bad River at E.Tyler Rd (Mellen)									X

Continuous Temperature Monitoring

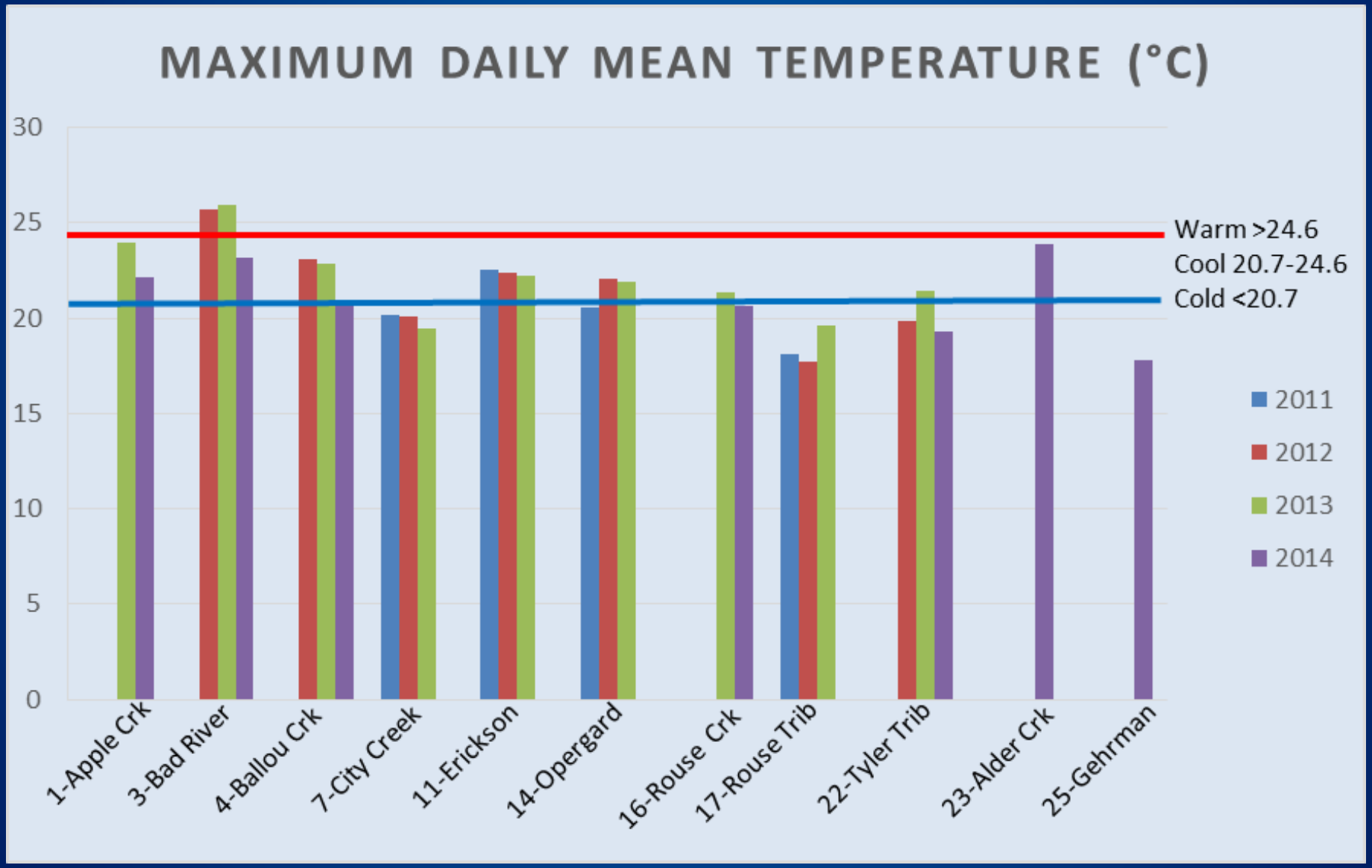



Continuous Temperature Stations
2011 - 2014
18 locations
Iron County
Ashland County
Bad River
Krause Creek
Devils Creek
Bollou Creek
Tyler Forks
Potato River
Apple Creek
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Temperature
2011 - 2014 Classification Results

	Maximum Daily Mean Stream and Location	Centigrade 2011	2012	2013	2014
1	Apple Creek at Lake O'Brien Rd			23.99	22.13
2	Bad River at Caroline Lake Outflow		27.36		
3	Bad River at Gilman Park		25.72	25.93	23.14
4	Ballou Creek at Red House Rd		23.07	22.87	20.69
5	Ballou Creek upstream from Devil's	22.03			
6	Bull Gus at FR 703			22.09	
7	City Creek west of Lake Drive	20.16	20.07	19.45	
9	Devil's Creek upstream from Ballou	19.79			
10	Devil's Creek at Hwy 77			19.63	
11	Erickson Creek at Casey Sag Rd	22.57	22.37	22.21	
13	Montreal Creek at County Line Rd			22.12	
14	Opergard Creek at Revai Rd	20.55	22.06	21.94	
15	Potato River at Upson		*		
16	Rouse Creek at Casey Sag			21.34	20.67
17	Unnamed Rouse Crk Tributary at Casey Sag	18.1	17.74	19.63	
18	Tyler Forks at Caroline Lake Rd	24.06	*		
22	Unnamed Tyler Forks Tributary at FR703		19.82	21.4	19.29
23	Alder Creek at Hwy 122				23.92
25	Gehrman Creek at Popko Rd				17.81

Temperature
2011 - 2014 Classification Results



Macroinvertebrate Monitoring

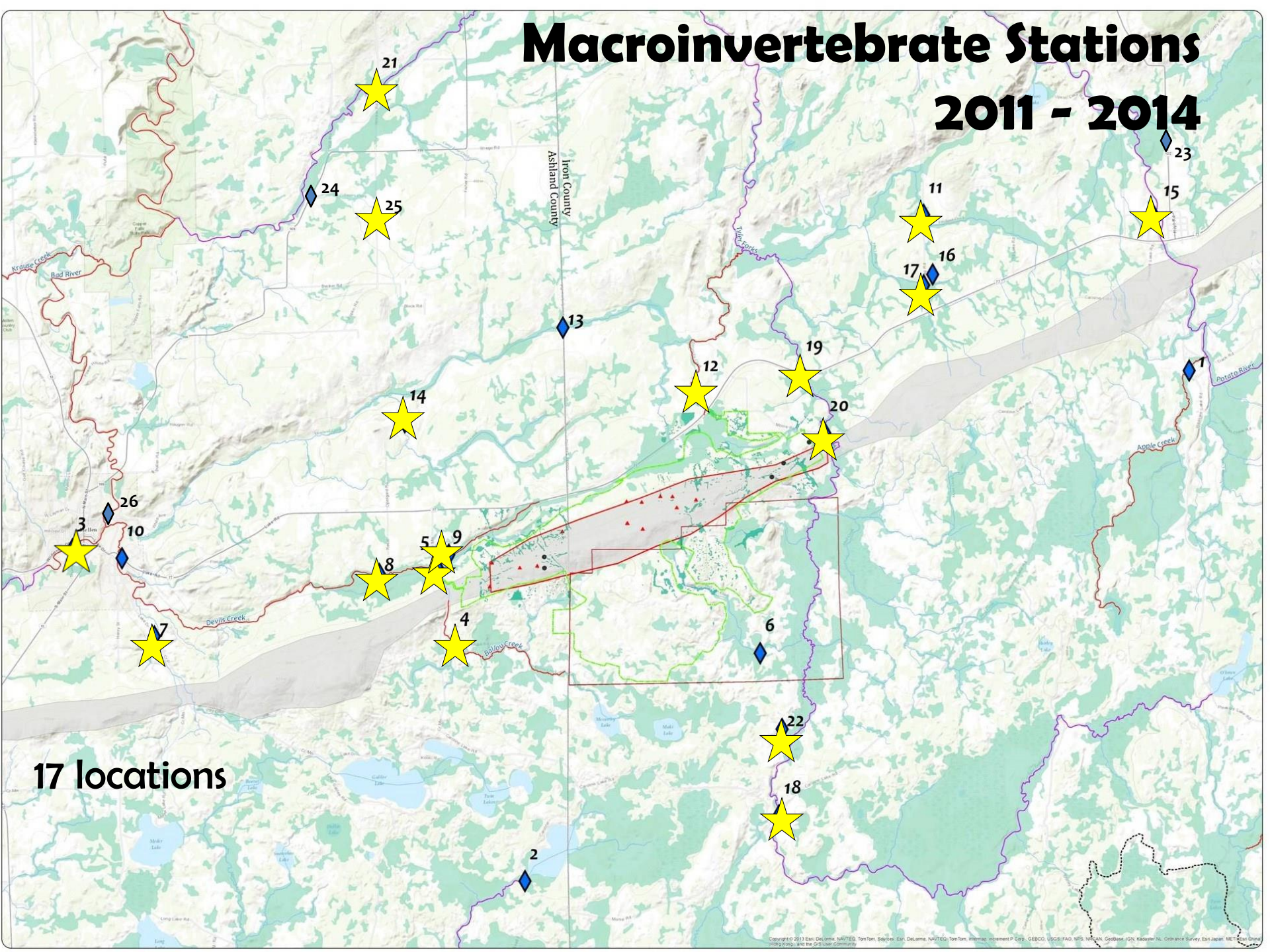
Macro-invertebrate Field Methods

- 20 “jabs” divided between relative proportion of the following habitats:
  - Hard Bottom
  - Aquatic Plants
  - Undercut Banks
  - Snags
  - Leaf Packs
- Transfer entire sample to plastic container and preserved with 80% ethyl alcohol

Macro-invertebrate Lab Methods

- Samples sorted and analyzed at UW-Superior, Lake Superior Research Institute (Dr. Kurt Schmude)
- Random picking of 300 macros, using Canton tray.
- Identification to lowest taxonomic level possible - generally genus or species
- Taxonomic data submitted to WDNR - SWIMS

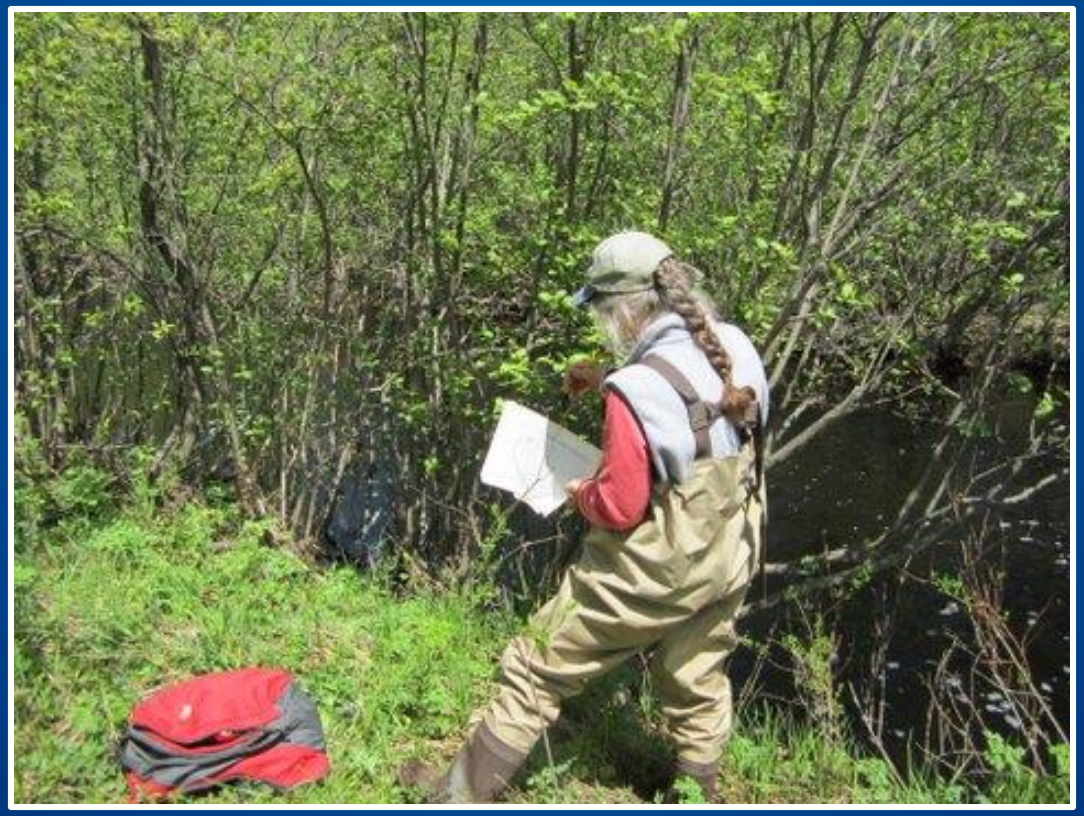
UNIVERSITY of WISCONSIN Superior


Macroinvertebrate Stations
2011 - 2014
17 locations
Iron County
Ashland County
Bad River
Krause Creek
Devils Creek
Baillou Creek
Tyler Forks
Potato River
Apple Creek
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Macroinvertebrate Results Using the Hilsenhoff Biotic Index

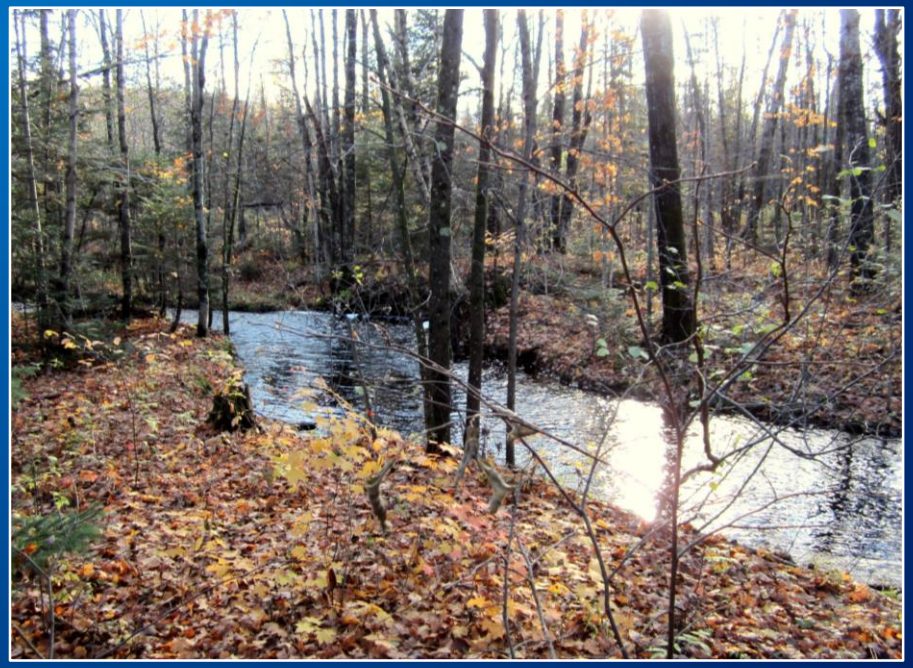
	SITE	Sept/Oct-11		May-12		Oct-13		Oct-14	
	Stream and Location	HBI	Class	HBI	Class	HBI	Class	HBI	Class
3	Bad River at Gilman Park			4.5	Very Good				
4	Ballou Creek at Red House Rd			3.9	Very Good	3.9	Very Good		
5	Ballou Creek upstream from Devil's	2.2	Excellent						
7	City Creek west of Lake Drive	4.2	Very Good	3.4	Excellent				
8	Devil's Creek off Oppergard Rd			4.4	Very Good			2.8	Excellent
9	Devil's Creek upstream from Ballou	3.6	Very Good						
11	Erickson Creek at Casey Sag Rd	3.9	Very Good	3.3	Excellent	4.3	Very Good	4.5	Very Good
12	Javorsky Creek at Hwy 77	3.7	Very Good	3.7	Very Good			5.1	Good
14	Opergard Creek at Revai Rd	3.1	Excellent	2.2	Excellent				
15	Potato River at Upson	3.6	Very Good	3.3	Excellent				
17	Unnamed Rouse Crk Tributary at Casey Sag					4.5	Very Good	5.4	Good
18	Tyler Forks at Caroline Lake Rd	3.4	Excellent	4.1	Very Good				
19	Tyler Forks at Hwy 77	3.3	Excellent	4.2	Very Good			2.5	Excellent
20	Tyler Forks at Moore Park Rd					3.3	Excellent	3.9	Very Good
21	Tyler Forks at Stricker Rd	4.1	Very Good	5.2	Good			4.8	Good
22	Unnamed Tyler Forks Tributary at FR703					4.4	Very Good	5.1	Good

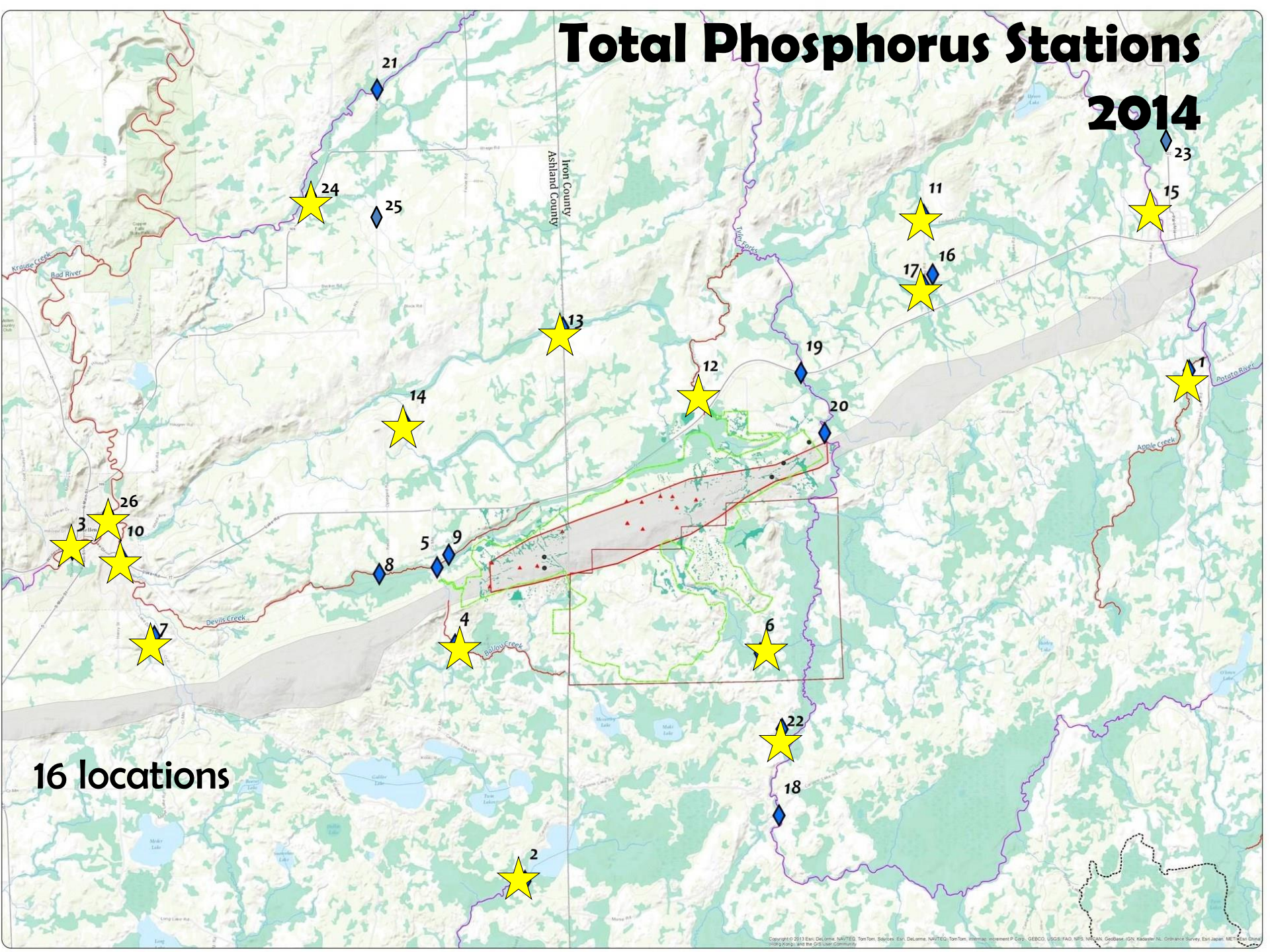
BRWA Phosphorus Monitoring 2014



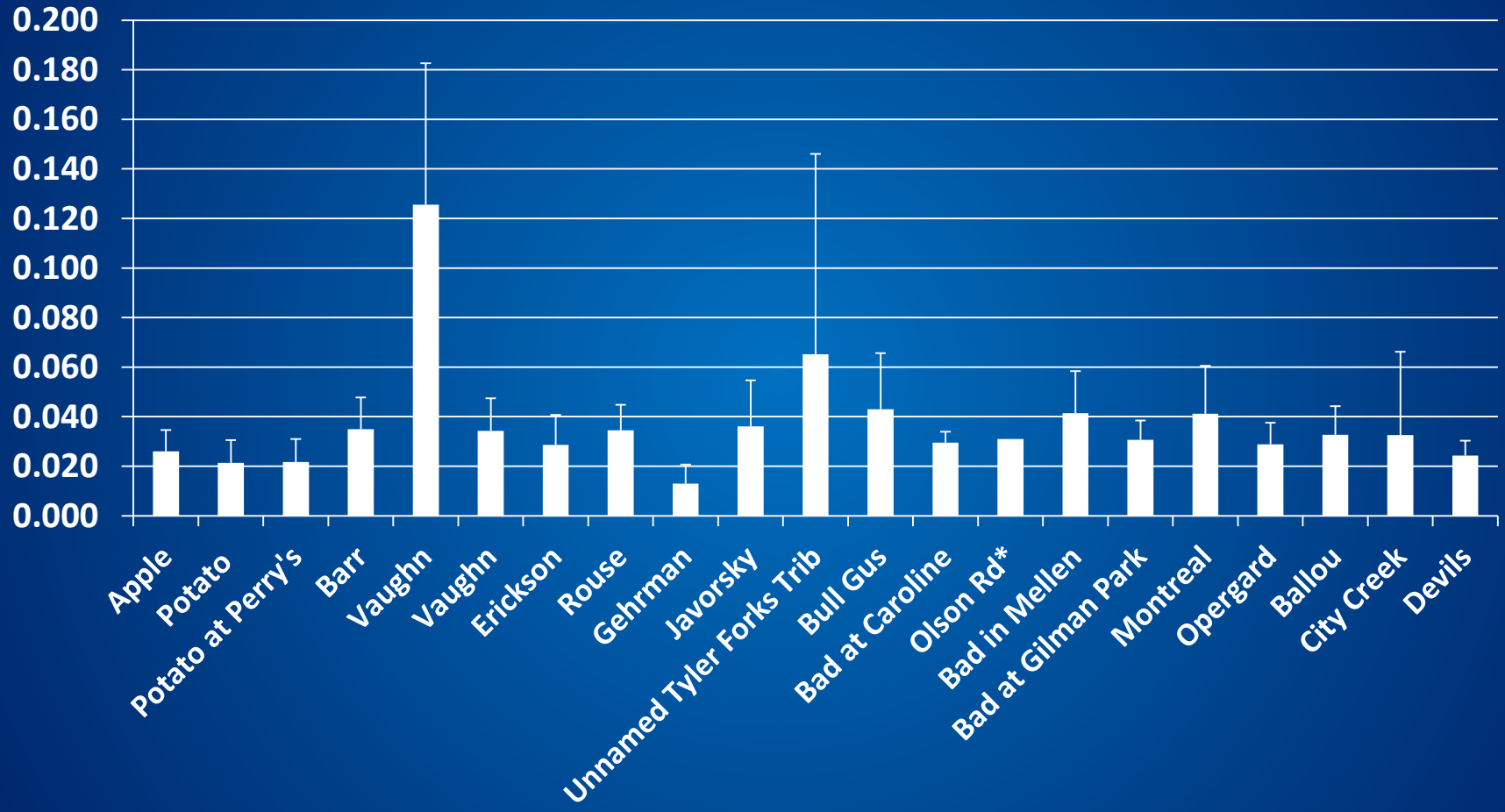
Phosphorus Sampling Design

- 20 Sites: Tyler Forks, Upper Bad, Potato sub-basins
  - 4 sites downstream of potential P inputs
  - 16 sites in vicinity of potential mine
- 6 Sampling events
  - June 3 – October 22
- 1 Rain event at all sites
- 2 Additional rain events at some sites
- Analyzed by Northern Lab Services




Total Phosphorus Stations
2014
16 locations
Iron County
Ashland County
Bad River
Krause Creek
Devils Creek
Bollou Creek
Tyler Forks
Potato River
Apple Creek
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Total Phosphorus (mg/L) & Standard Deviation



Bad River Watershed Association Staff Continuous Temperature Monitoring Standard Operating Procedure

Revision: 1
Date: September 2011

QUALITY ASSURANCE PROJECT PLAN

STAFF BASELINE WATER QUALITY MONITORING NEAR THE POTENTIAL PENOKEE IRON ORE MINE – CONTINUOUS TEMPERATURE, MACROINVERTEBRATE, and CONDUCTI

BAD RIVER WATERSHED ASSOCIATION
P.O. Box 875
Ashland, WI 54806

REVISION: 0
February 2012

	4/13/2012	4/13/2012	4/13/2012	11/27/2012	11/27/2012	11/27/12
Thermistor Number	Accuracy ice bath	Accuracy room temp.	Mean accuracy	Accuracy ice bath	Accuracy room temp.	Mean accuracy
9885848	0.03	0.03	0.03	0.01	0.02	0.02
9885855	0.02	0.04	0.0	.06	0.04	0.05
9885856	0.08	0.10	0.0	.07		0.07
9885860	0.10	0.11	0			
9885864	0.11	0.11	(			1
9922449	0.01	0.02				03
9922451	0.10	0.09				.12
9922452	0.06	0.08				.10

A1. APPROVALS

Donalea Dinsmore: Donalea Dinsmore
Great Lakes Funding and Quality Assurance Coordinator
Wisconsin Department of Natural Resources

Kurt Schmude: Kurt L. Schmude
Lake Superior Research Institute Project Manager
University of Wisconsin-Superior

Matt Hudson
Digitally signed by Matt Hudson
DN: cn=Matt Hudson, o=Bad River Watershed Association, ou, email=mattabad@riverwatershed.org, c=US
Date: 2012.03.05 16:24:55 -06'00'

A2. TABLE OF CONTENTS

Wisconsin Dept. of Natural Resources Surface Water Integrated Monitoring System (SWIMS Database)

Questions ??

Thank You

Connecting People, Land and Water

BAD RIVER WATERSHED ASSOCIATION