

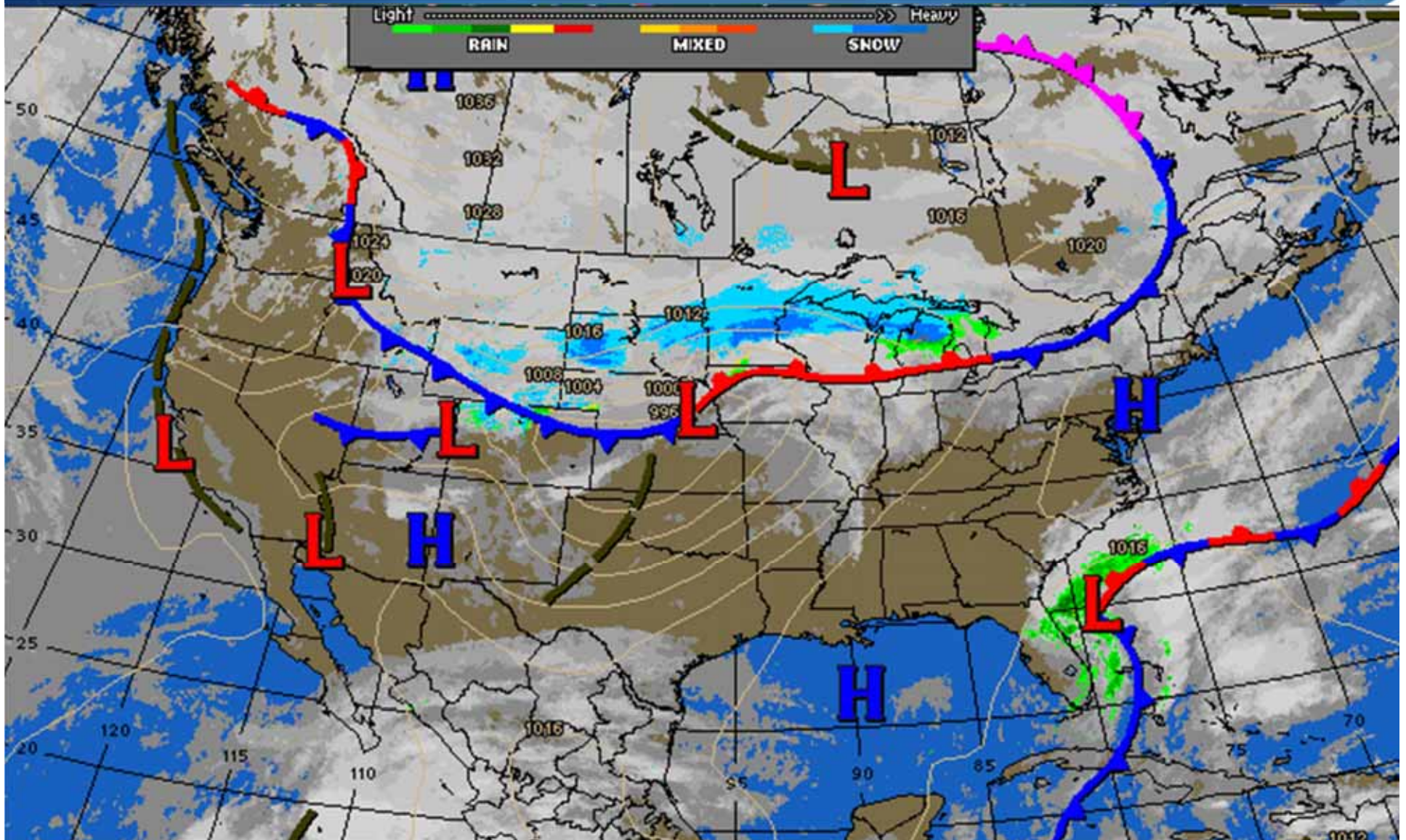
Using Citizen Monitoring and Crowdsourcing to Track and Forecast Near-shore Lake Conditions



Paul Dearlove- Watershed Program Manager
Katie Van Gheem- Watershed Coordinator



Reporting and Awareness



Reporting and Awareness

Air Quality Forecast Guidance - Upper Mississippi Valley

Print Key Help



Daily View

Loops

Point Data

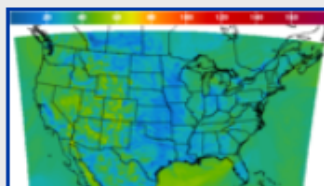
[Page Help](#)

Mouse over or click on the table below to change the guidance image.

Today	+12Hrs														
Valid Hour (EDT):	-- AM --							-- PM --							
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10
1Hr Average Ozone Concentration	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■
Daily 1Hr Ozone Max	■														
8Hr Average Ozone Concentration	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■
Daily 8Hr Ozone Max	■														
1Hr Average Surface Smoke	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■
1Hr Average Vertical Smoke Integration	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■
Surface Dust Concentration	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■
Column Dust Concentration	—	—	■	■	■	■	■	■	■	■	■	■	■	■	■

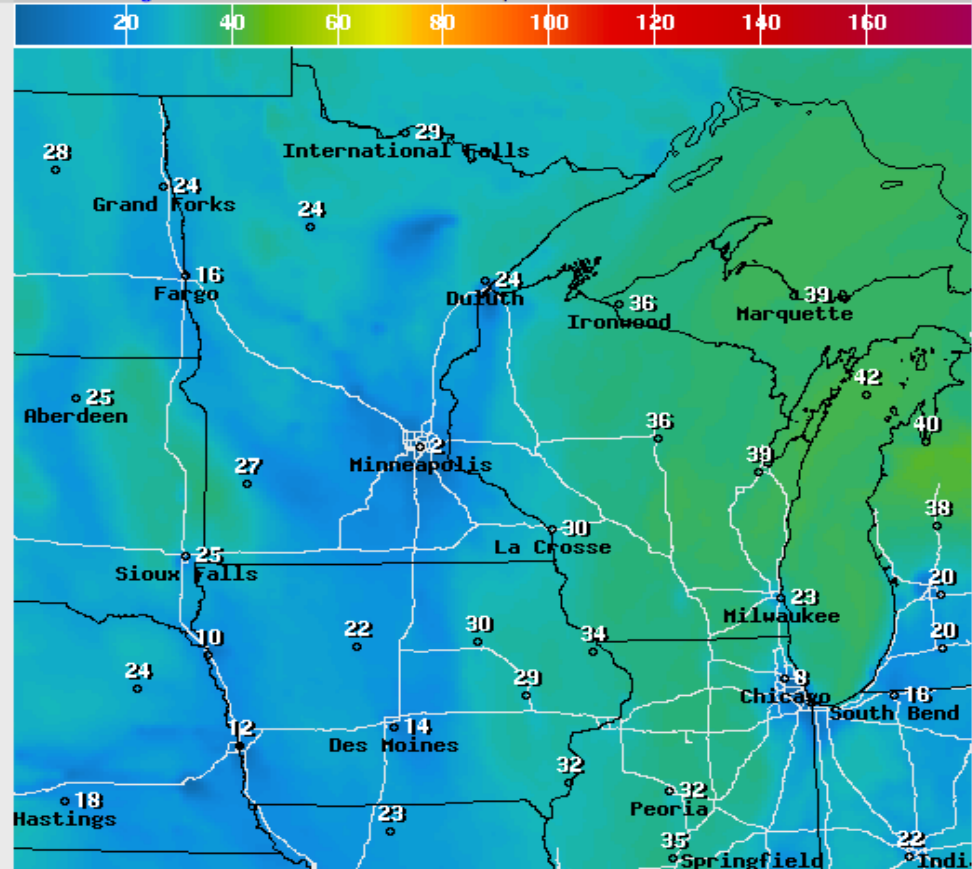
Table MouseOver Effect On

Overview



Go to Region

Click On Map To Zoom In



1Hr Avg Ozone Concentration(PPB) Ending Wed Oct 15 2014 10AM EDT
(Wed Oct 15 2014 14Z)



National Digital Guidance Database
06z model run Graphic created-Oct 15 6:13AM EDT



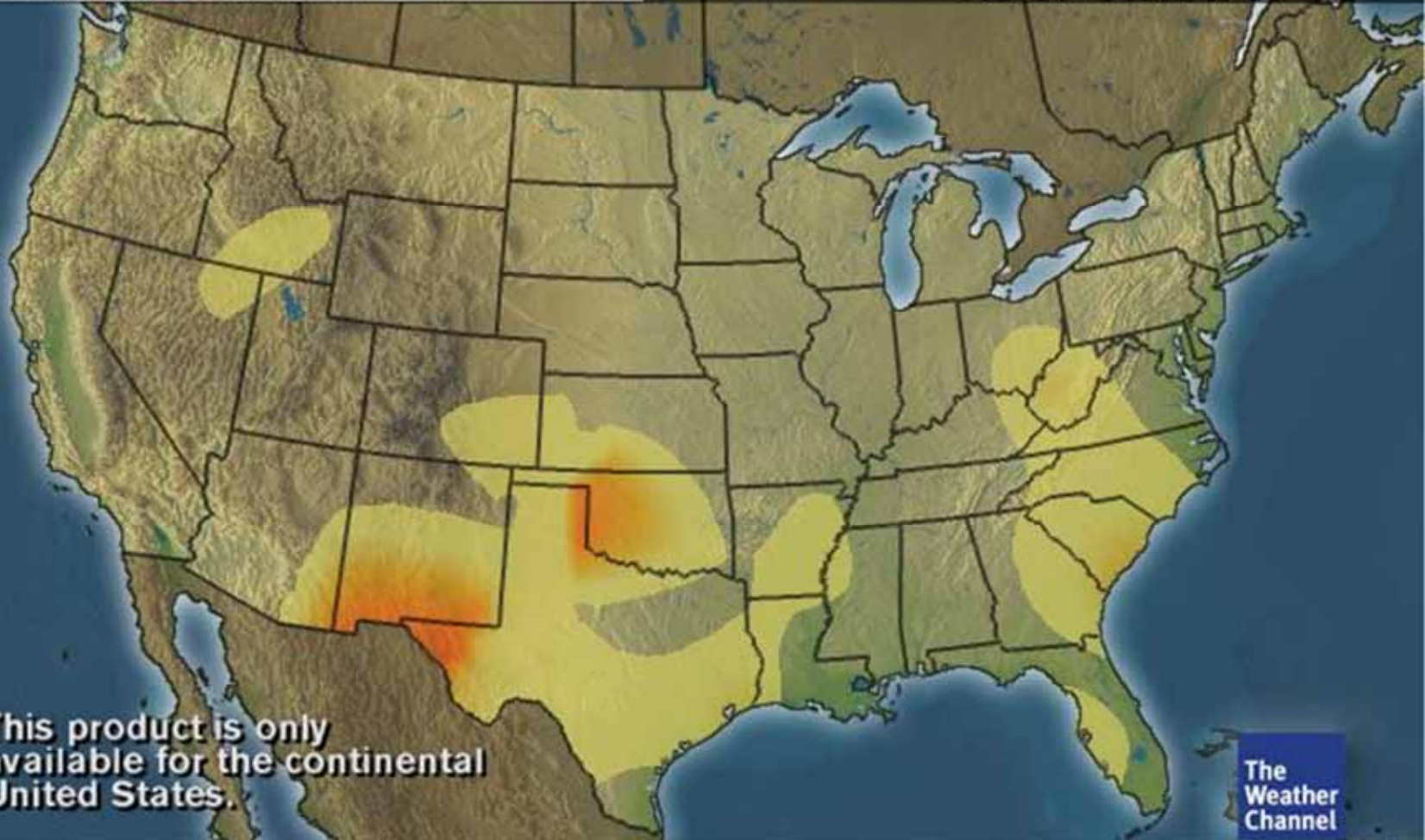
Reporting and Awareness

Grass Pollen

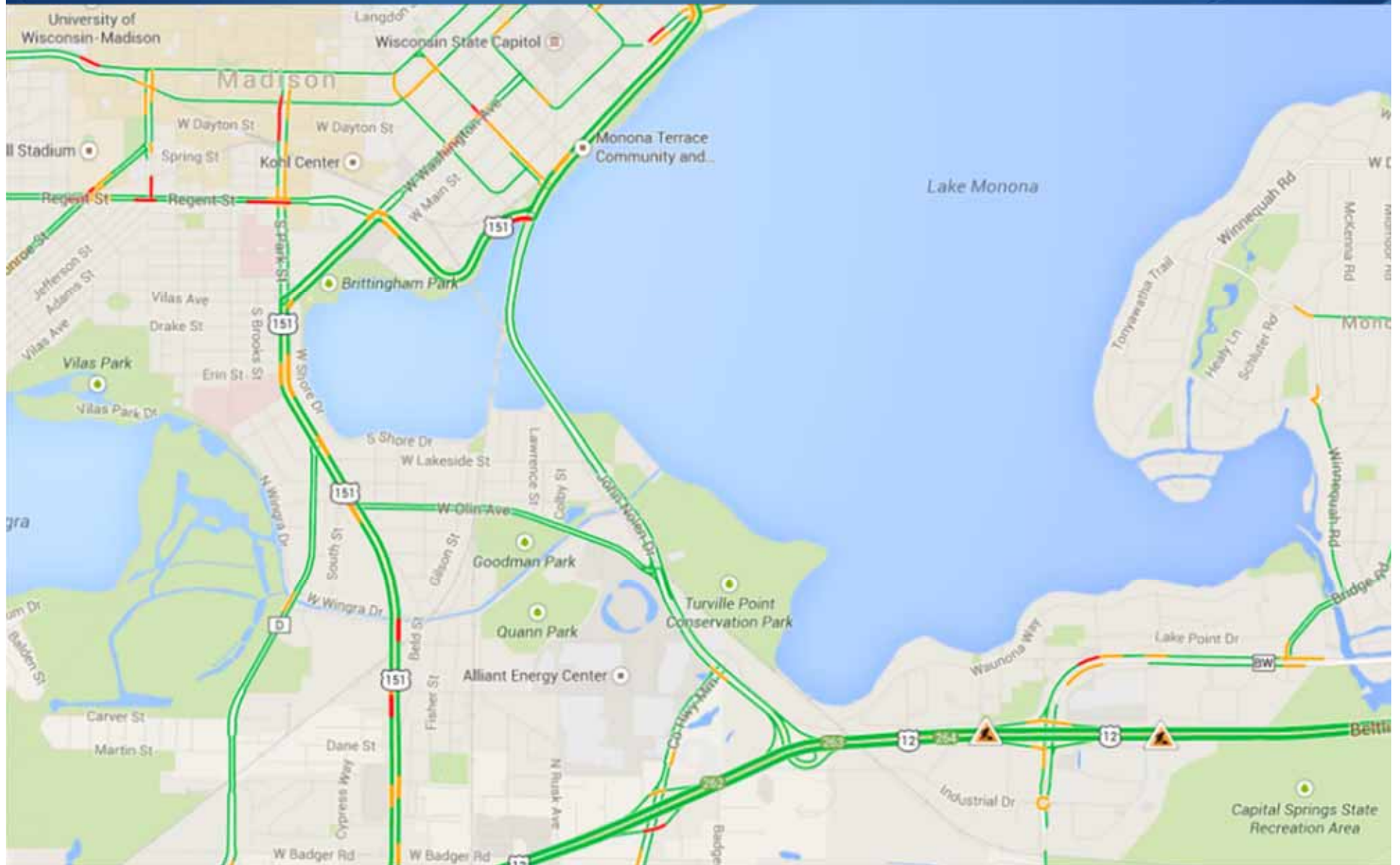
Allergen Report: **Live By It**

LOW  VERY HIGH

AS OF October 10



Reporting and Awareness

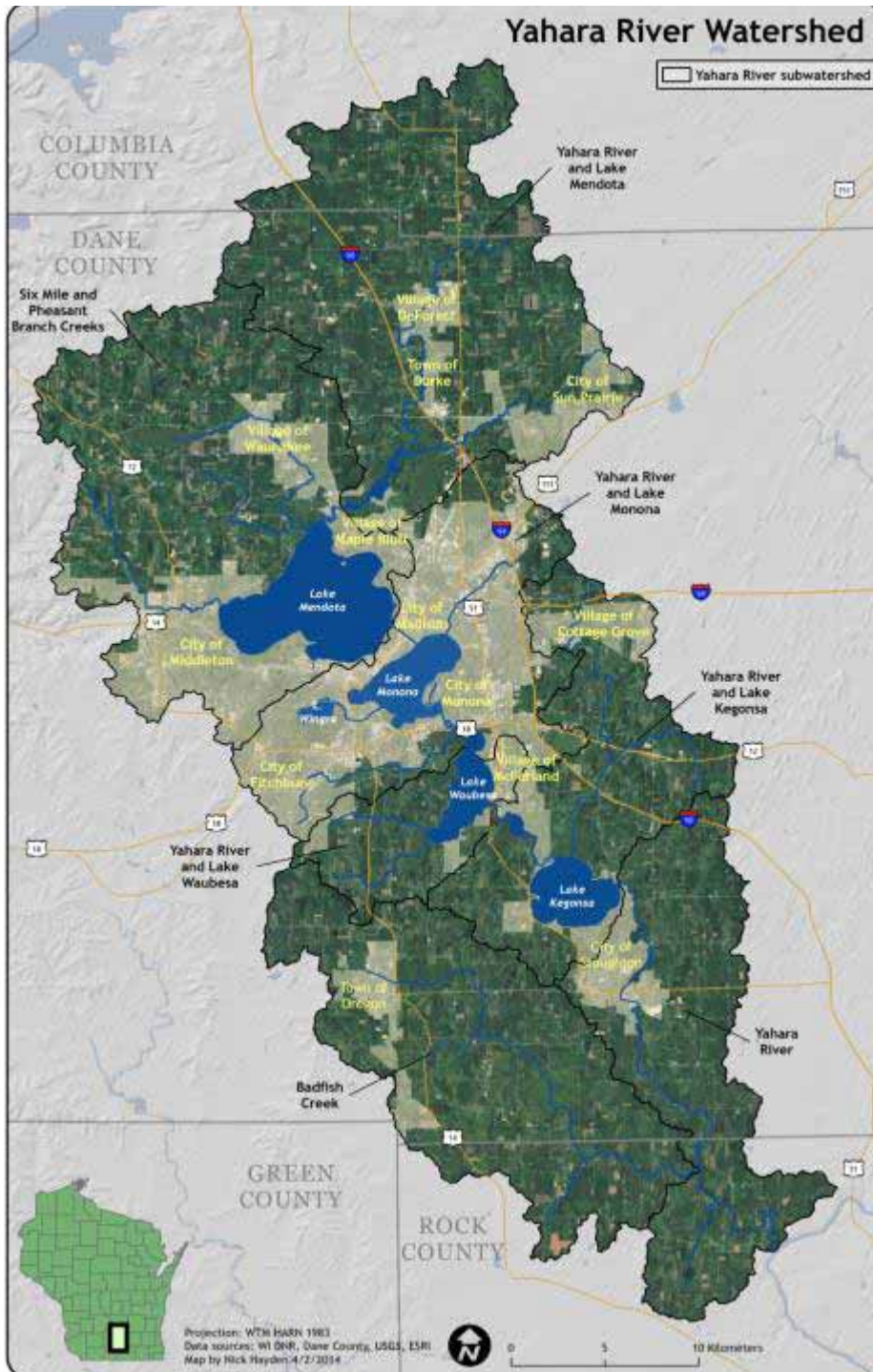


Vision

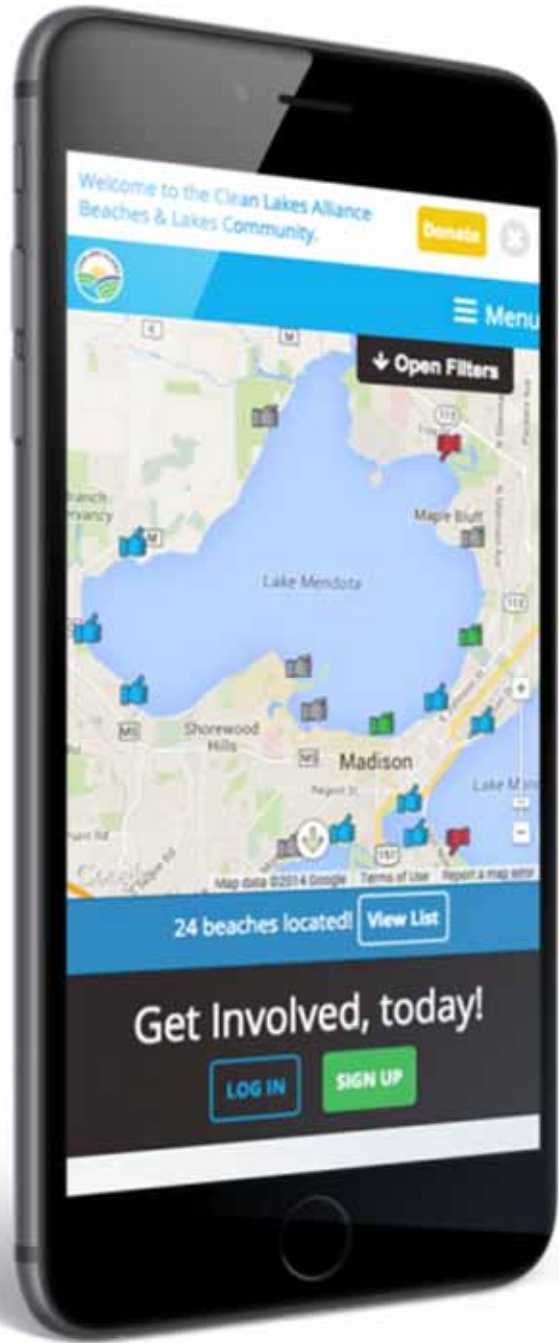
We see a future in which everyone realizes that our lakes are the center of our community.

An aerial photograph showing a city built on a peninsula or island, surrounded by a large body of water. The city features a prominent domed capitol building. In the foreground, a dense forest of trees with autumn foliage borders the water. A small boat is visible on the water in the lower left corner.

Healthy Lakes. Healthy Community.



- 💧 359 mi² watershed
- 💧 28 municipalities
- 💧 370,000 people
- 💧 29 mi² of lake area
- 💧 58 miles of shoreline
- 💧 22 public beaches
- 💧 >3,200 lakefront property owners



Passive
Citizen



Volunteer
Monitor



Informed/
Engaged
Advocate

Lake User Risks

▲ *E. coli* Bacteria

▲ Blue-green Algae (Cyanobacteria)



Perceptions vs. Reality



“ Water quality is the BEST it’s ever been!”

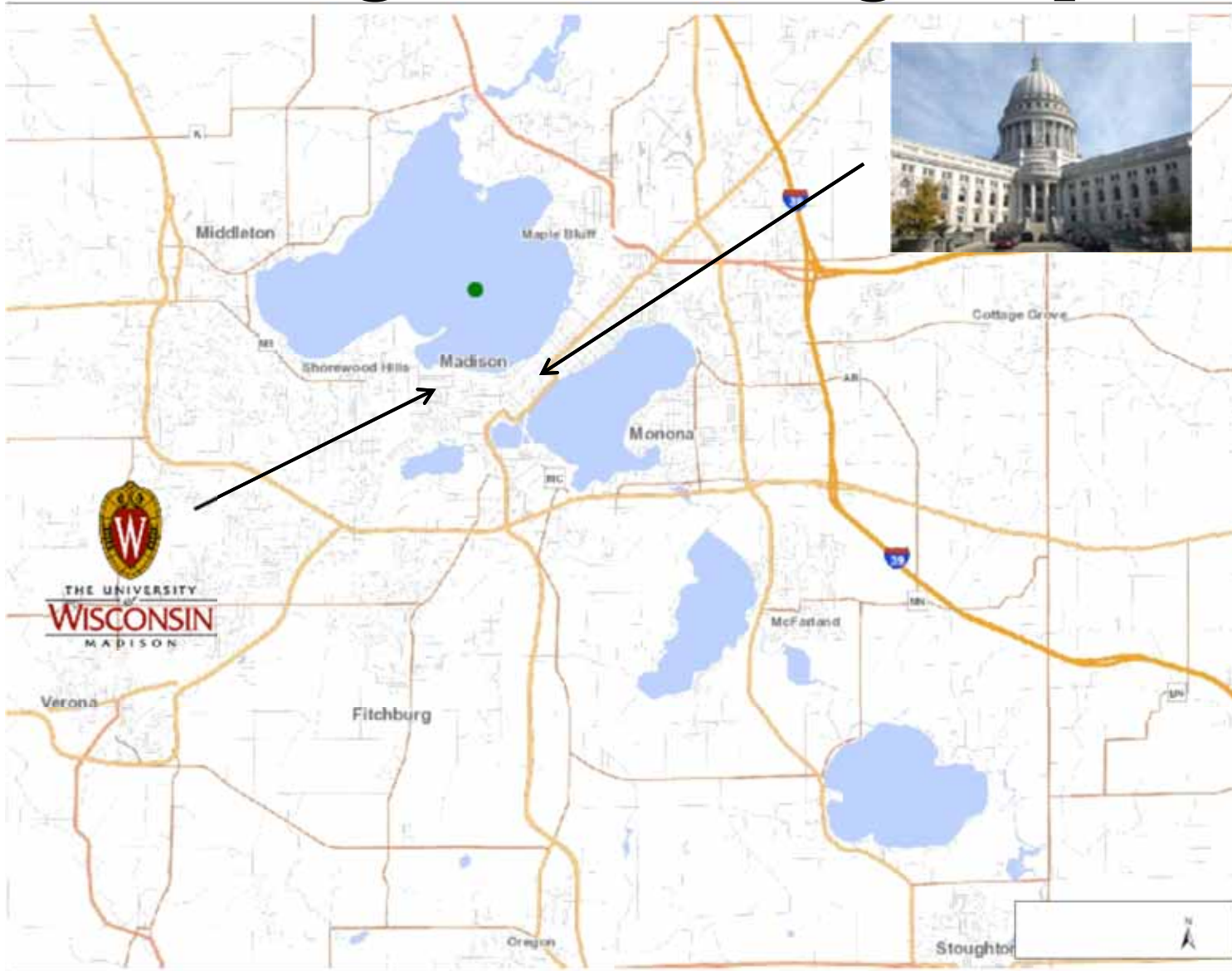


“ Water quality is the WORST it’s ever been!”

Perceptions vs. Reality

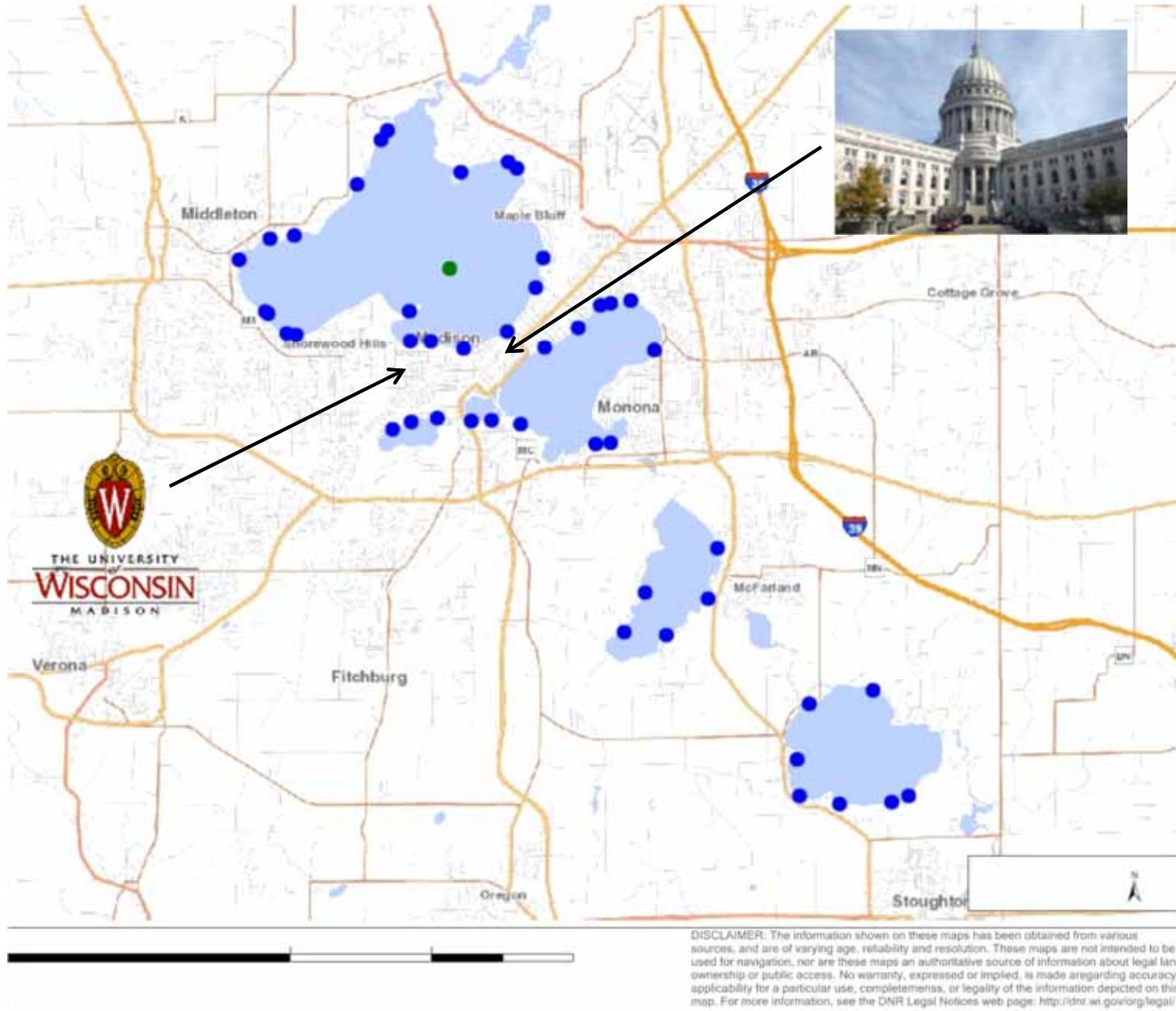


Filling Monitoring Gaps




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Filling Monitoring Gaps

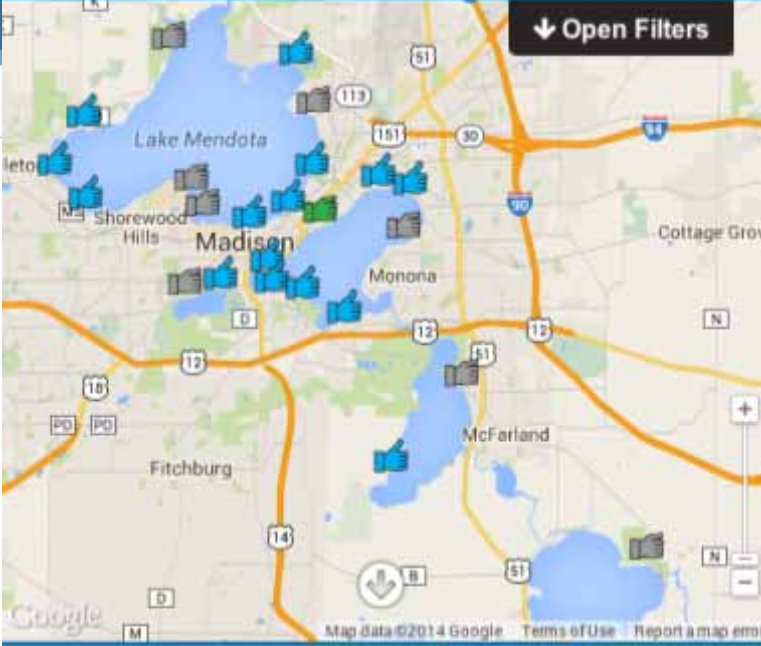


Beaches

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 [Menu](#)

↓ Open Filters



24 beaches located! [View List](#)

Map data ©2014 Google Terms of Use Report a map error

Find the best beach every day!

[LOG IN](#)

[SIGN UP](#)

Beaches

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Menu

I'm looking for...

at...

Beaches

All Lakes

With...

Life Guards Boat Landing

Restrooms Drinking Water

Go

Beach Filters

Open Beaches

Good Condition

Closed Beaches

Poor Condition



0

Tweets



0

Shares



44

Snaps

Real Time Beach Data

ARE YOU HERE? CHECK IN!

SIGN UP



Good

water clarity



Open

beach status



No

lifeguards



Empty

beach condition

Get Involved, today!

LOG IN

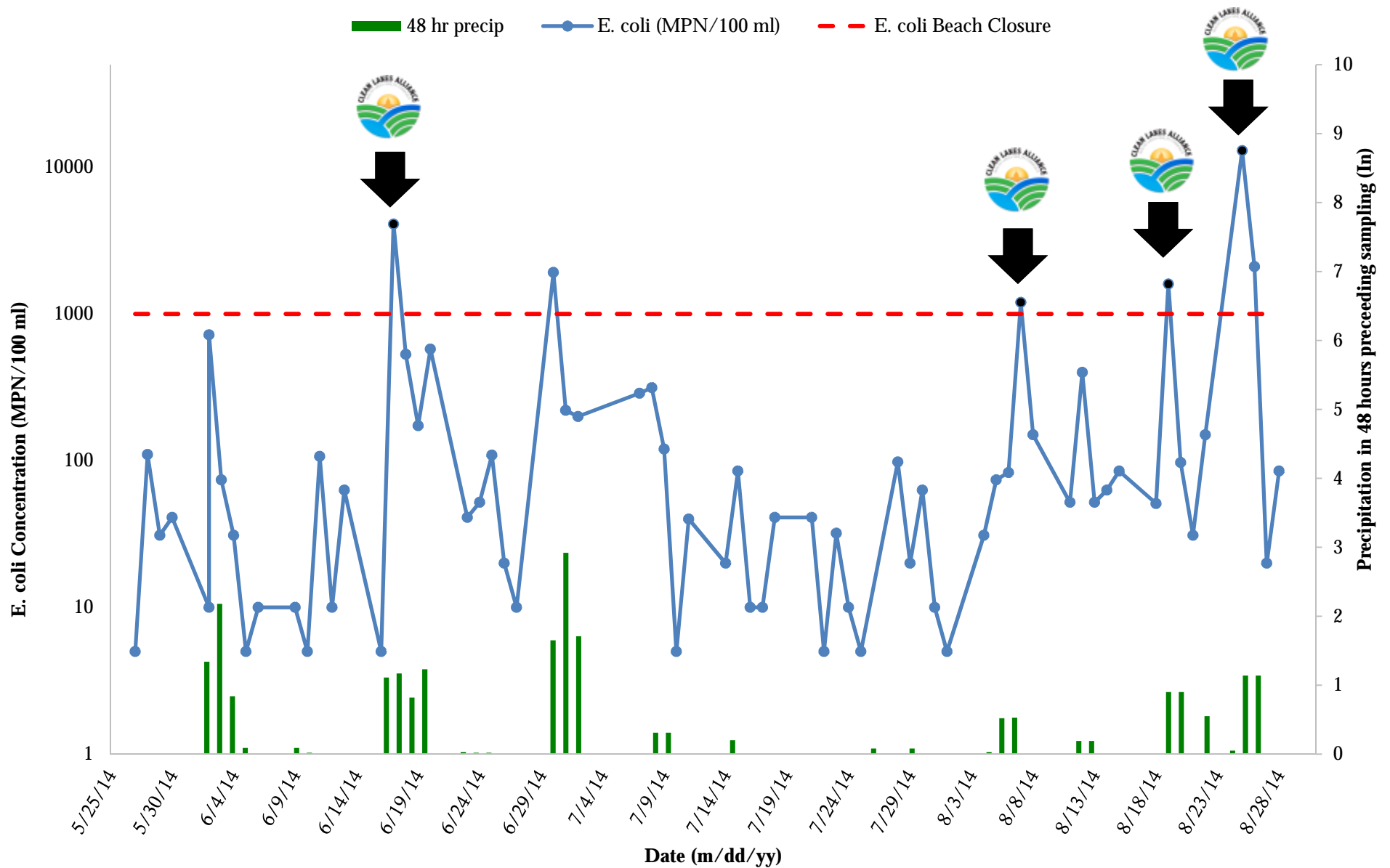
SIGN UP

Beaches

- ◆ Purpose
 - ◆ Increase confidence in beach safety through *E. coli* bacteria monitoring
- ◆ Parameters
 - ◆ Daily (M – F)
 - ◆ *E. coli* concentration
 - ◆ Water and air temperature
 - ◆ Turbidity
 - ◆ Visual observations
 - ◆ Monthly
 - ◆ Total phosphorus




James Madison Beach 2014 *E. coli* Data



End-of-Pier


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I'm looking for... at...

Site Filters
 Fair Good Murky Unknown

[Close Filters](#)





46 sites located! [View List](#)

Get Involved, today!

[LOG IN](#) [SIGN UP](#)

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 [Menu](#)



Open Filters

Spaight St





B.B. Clarke Beach

Monona Beach 11


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Last Sampled: 9/04/14

Real Time Site Data [View List](#)

 Murky <small>Water Quality</small>	 19.6 <small>Temperature</small>	 74.3 <small>Water Level (ft)</small>	 Empty <small>Water Available</small>
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Historical Data

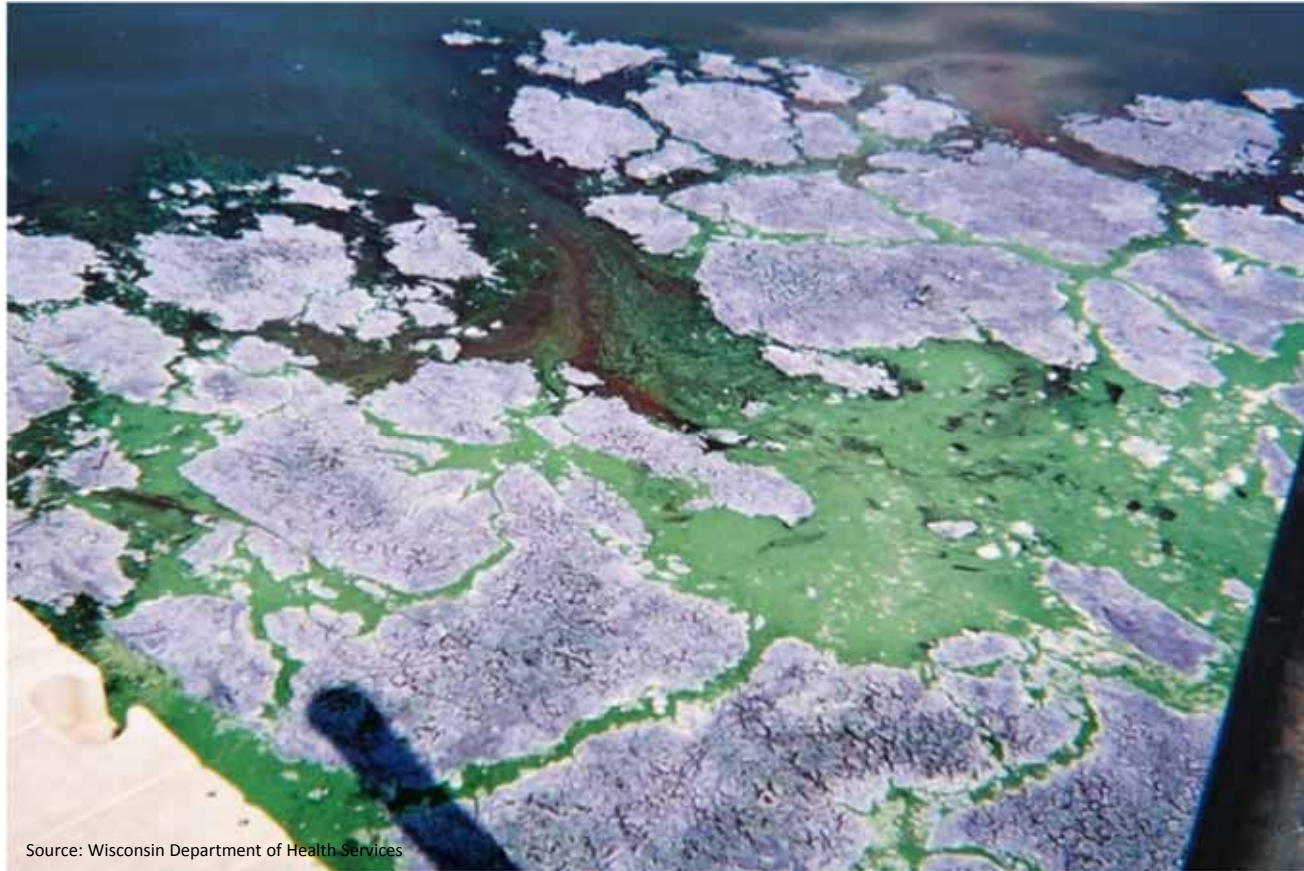


Y-axis: Murky (Scale 0-100)
X-axis: Time (Scale 2012-2014)

End-of-Pier

- 💧 Purpose
 - 💧 Collect data that may be useful in modeling and forecasting blue-green algal blooms
- 💧 Parameters
 - 💧 Weekly
 - 💧 Water and air temperature
 - 💧 Turbidity
 - 💧 Visual observations
 - 💧 Monthly
 - 💧 Total phosphorus





A. Green

B. Blue-Green



Source: New York Department of Environmental Conservation

A. Green

B. Blue-Green



Source: New York Department of Environmental Conservation

A. Green

B. Blue-Green



Source: Sam Oliver

A. Green

B. Blue-Green

Visual Observations

Algal Surface Bloom- the estimated amount of algal growth observed on the surface of a sampling site.

1



None

2



Some clear evidence

3

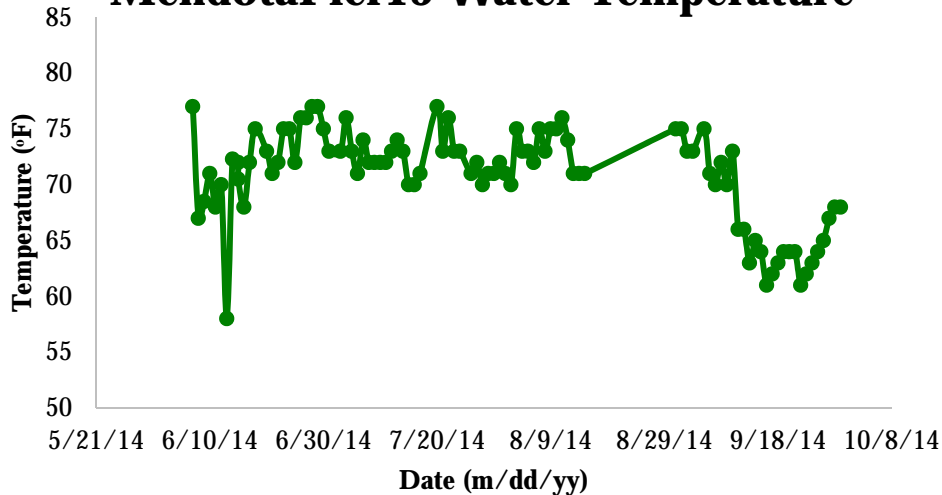


Strong extensive
evidence

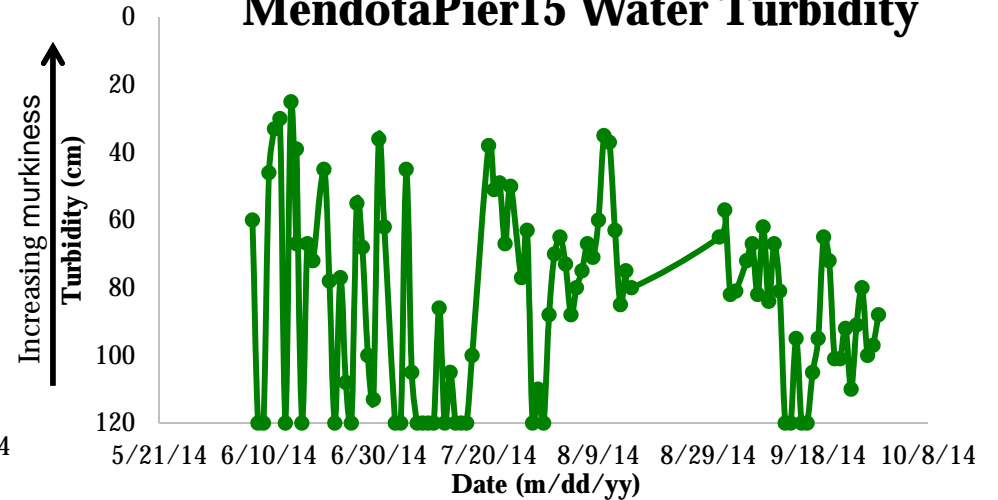
MendotaPier15 Results



MendotaPier15 Water Temperature



MendotaPier15 Water Turbidity



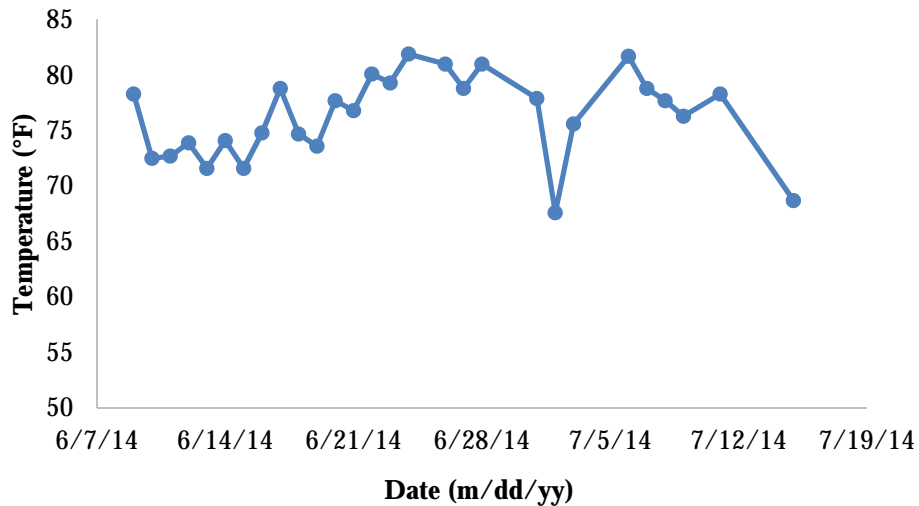
Data Summary	MendotaPier15	Lake Mendota
Number of Observations	95	455
% of Observations When Algae Present	6.3%	13%
Average Water Turbidity	83.9 cm	87 cm
Average Water Temperature	70.8 °F	73.5 °F
Average Total Phosphorus	0.059 mg/L	0.064 mg/L



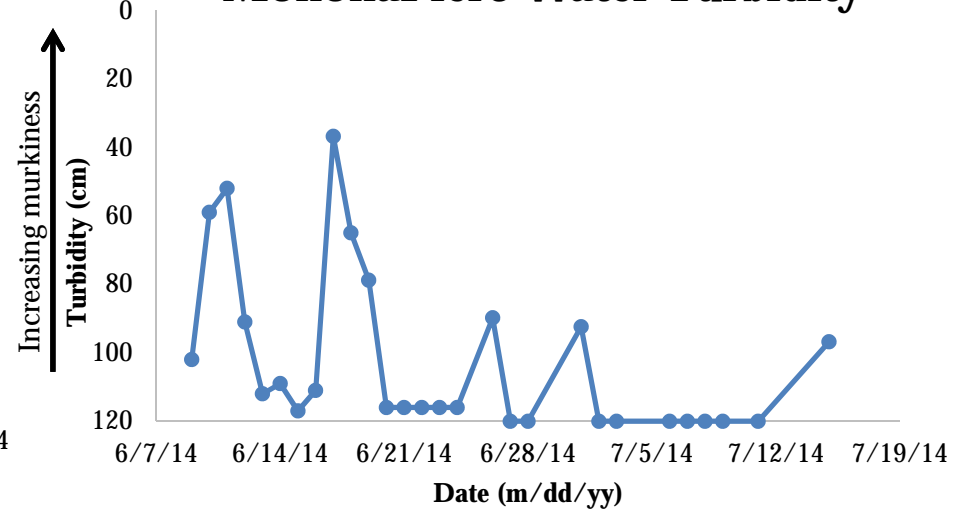
MononaPier6 Results



MononaPier6 Water Temperature



MononaPier6 Water Turbidity



Data Summary	MononaPier6	Lake Monona
Number of Observations	28	189
% of Observations Algae Present	25%	24%
Average Water Turbidity	103 (cm)	85 cm
Average Water Temperature	76.3 °F	71.2 °F
Average Total Phosphorus	0.046 mg/L	0.060 mg/L

Crowdsourcing

- 💧 Purpose
 - 💧 Increase public's understanding of local water quality issues
 - 💧 Increase public lake involvement
 - 💧 Strengthen dataset



Thank You!

We would like to specially thank Jon Standridge and Dr. Richard Lathrop

Monitors

Alan Ausel
Allen & Claire Arntsen
Amy Wencel
Bill Lamm
Carla Schubert
Carol Gillen
Caroline Hoffman
Carolyn Betz
Cathie Taylor
Craig Ostrom
David Schroder
Dea Larsen Converse
Deanna Letts
Debbie & Eli Durcan
Dick Pearson
Eric Christenson
Harmon & Nell Ray
Jacob Stampen
Jacqui Guthrie
Jeff Schraml
Jerry Jendrisak

Jim Cordray
Jim Wilcox
John Reinders
John Tye
Josie & Peter Cyffka
Juliette Schick
Karen Faller
Kirk & Betsy Swenson
Leigh & Maddie Meier
Mel McCartney
Mike Horn
Nick Hayden
Rhonda Arries
Robert Gilbert
Roy Carter
Sarah Balz
Sasha Kerlow
Silke Schmidt & Dan Phaneuf
Tom Smith
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Woody Kneppreth

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Kirsti Sorsa
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Molli MacDonald

Pat Gorski
Shawn Marsh
Steve Carpenter

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City of Monona
Dane County
MIOsoft
Public Health Madison & Dane County
Thermo Fisher Scientific
UW-Madison Center for Limnology
Wisconsin Department of Natural Resources
Wisconsin State Laboratory of Hygiene
100state

This program wouldn't be possible without the help of our interns:

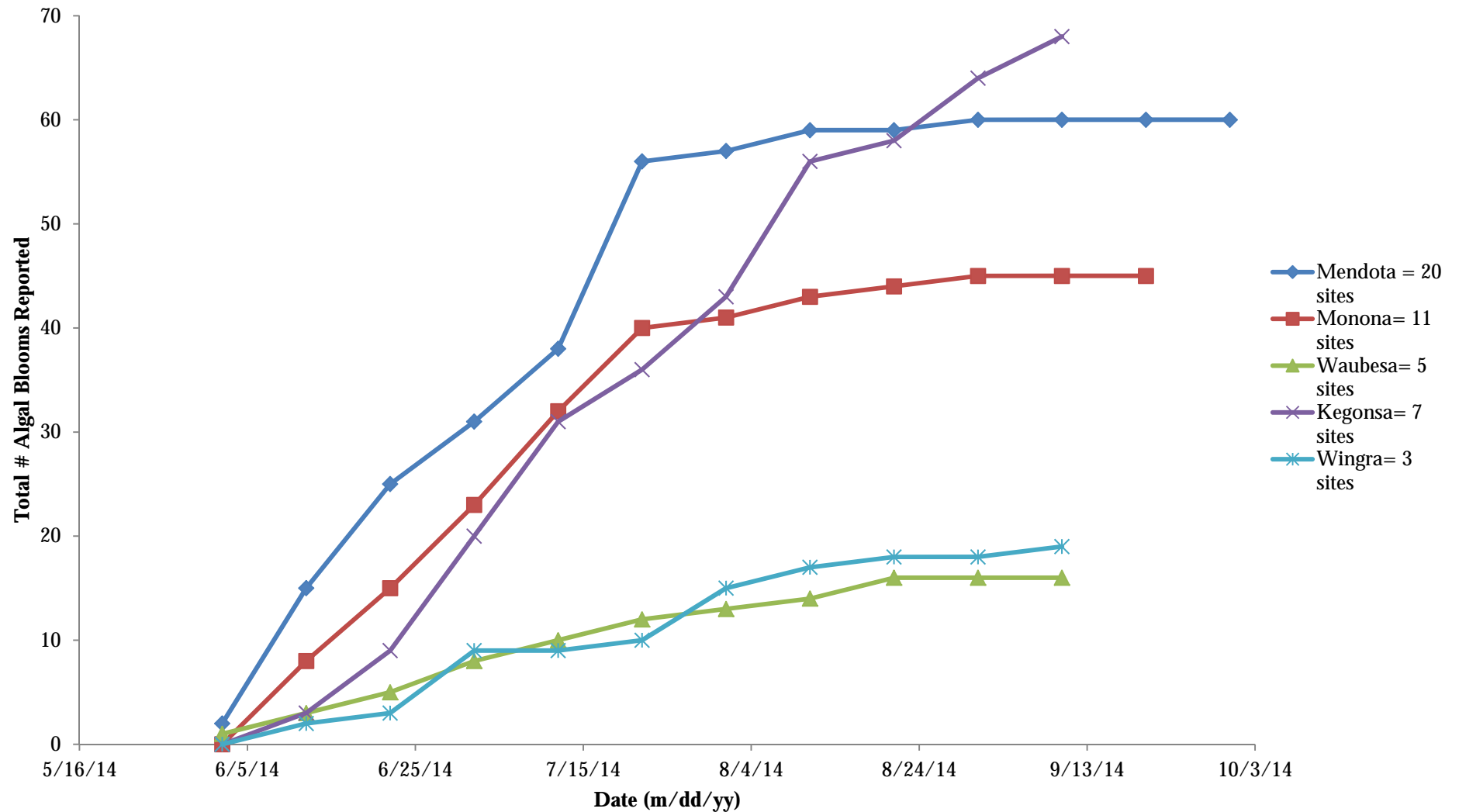
Eric Krejcarek
Justin Chenevert
Paul Webb



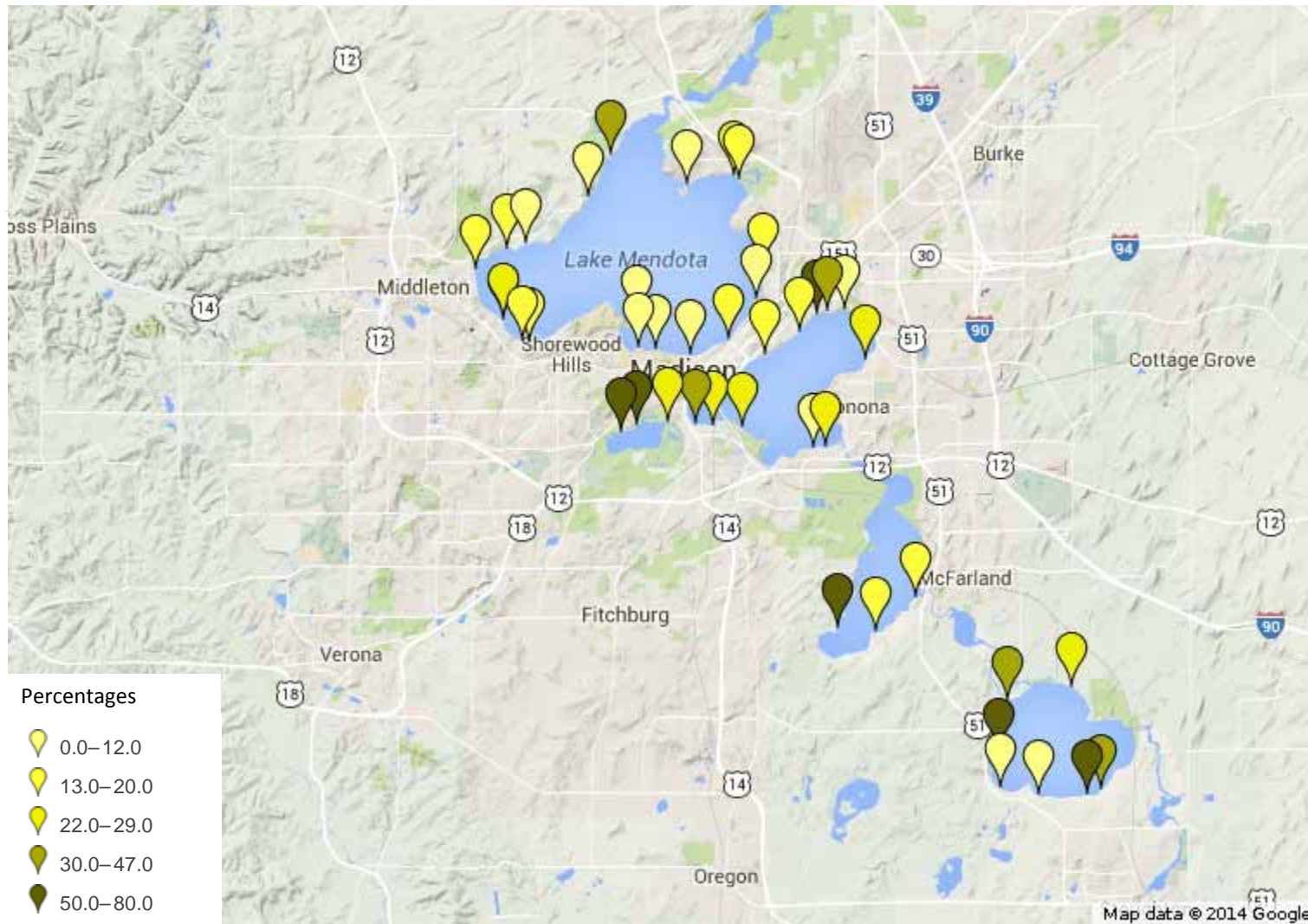
Center for Limnology
University of Wisconsin-Madison

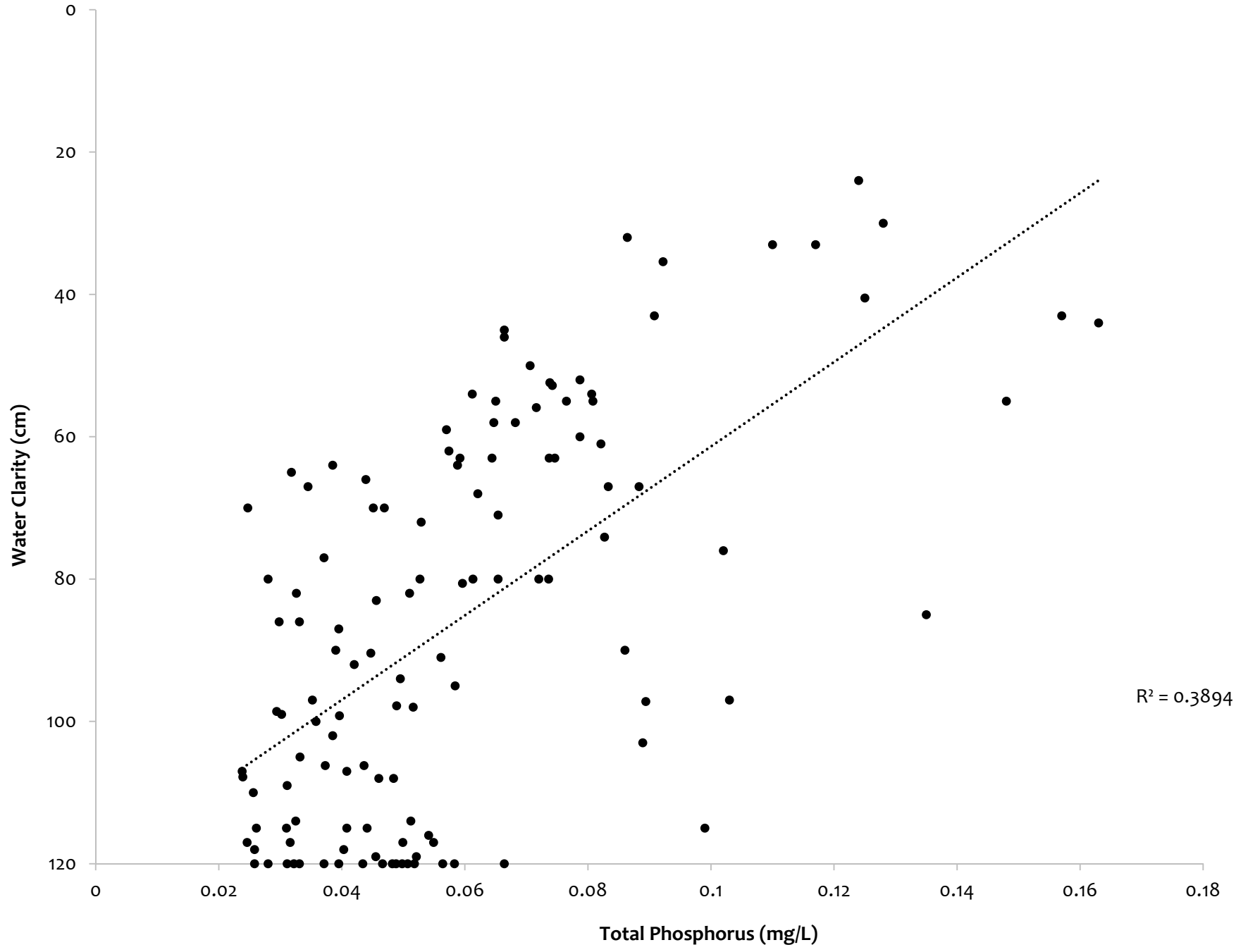


Algal Blooms Reported By Lake in 2014 (May 27 – September 30)



% Algal Bloom Presence Results for Summer 2014 (May 27 – September 30)





Future Plans

- ◆ Increase number of end-of-pier and beach monitors
- ◆ Use data for research
 - ◆ Modeling
 - ◆ Reporting and awareness
- ◆ Incorporate crowdsourcing

2014 → 2015 → 2016