

Turning Citizen Science Data into Decisions

Lessons Learned From Our RRC – Yahara WINS Citizen Based Stream Monitoring Project

*Nancy Sheehan, Program Coordinator
Volunteer Stream Monitoring Program*

Talking Points

- 1. The Rock River Coalition (RRC) and Our Volunteer Stream Monitoring Program**
- 2. Our long-term water quality monitoring project in the Yahara River Watershed**
- 3. The Challenge**
- 4. Lessons Learned**

Rock River Coalition (RRC)

- Basin-wide organization
 - 10 counties
 - 3,750 sq. miles of land
 - 2,932 stream miles
 - 150 lakes & storm water impoundments



Rock River Coalition (RRC)

- Chapters – fostering local resource groups (501c3)
- Events: *Paddle and Probe, SYLDR*
- Quarterly newsletters
- Volunteer Stream
- Monitoring Program



RRC – *The Stream Monitoring Program*

**Working together
to protect and restore stream and river health
by collecting stream water quality data necessary for
science-based, natural-resource management decisions.**



RRC – *The Stream Monitoring Program*

- **Our Strengths:
Partnerships and
Volunteers**
- **~ 200 volunteers**
- **~ 100 monitoring
stations**

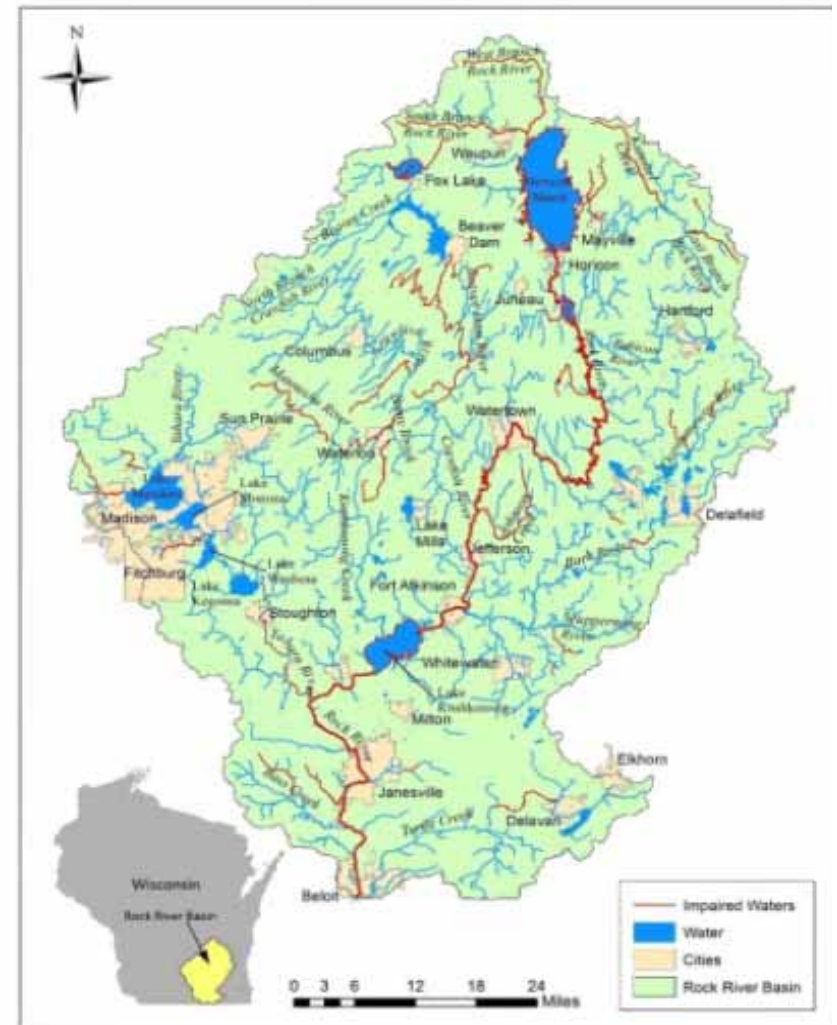


RRC – *The Stream Monitoring Program*

Our current efforts: to increase volunteer participation in nutrient sampling

- **65% stream miles listed as “impaired” by WDNR due primarily to:**
 - **phosphorus**
 - **total suspended solids & sediment**

In 2017, volunteers collected samples at 64 stations across Rock River Basin



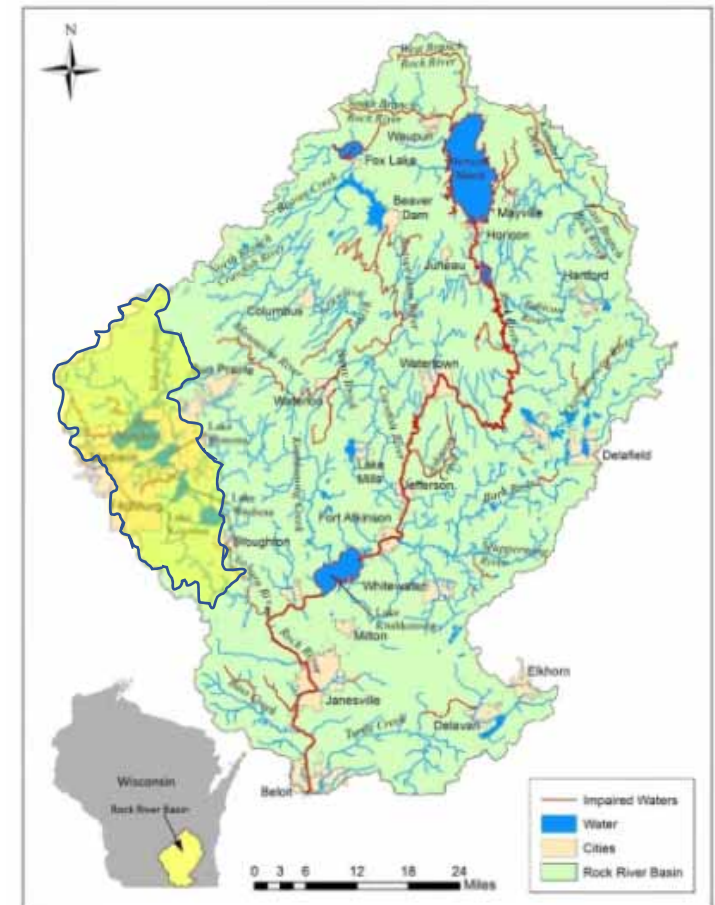
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RRC Long-Term Water Quality Monitoring Project

Yahara Watershed Improvement Network (Yahara WINs)

adaptive management project
spearheaded by the Madison
Metropolitan Sewerage District



RRC Long-Term Water Quality Monitoring Project

“Compliance through Collaboration”

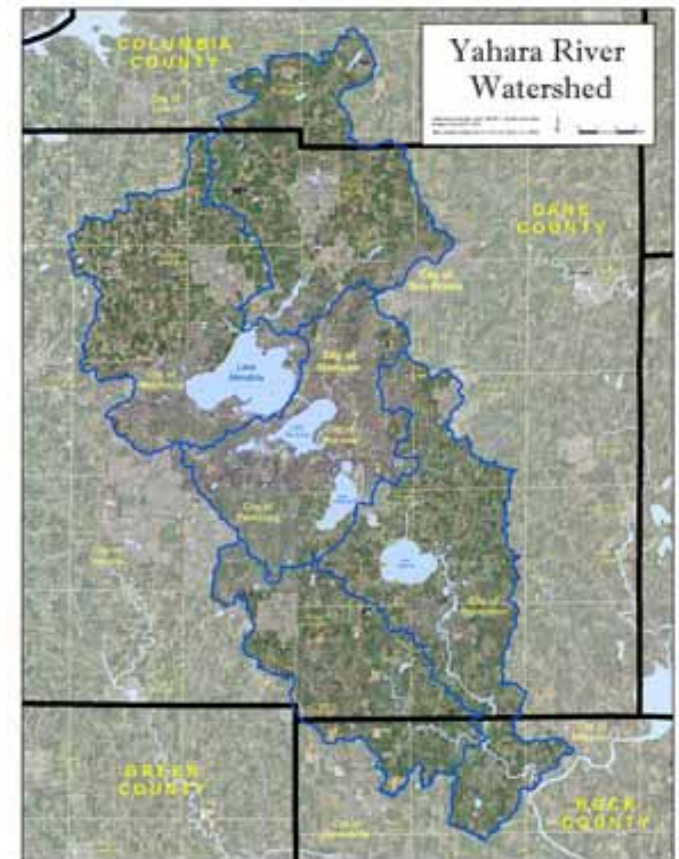
**Network of 30+ partners
working together
to reduce phosphorus
runoff by implementing
best management
practices
in urban and
rural areas**



Graphic by Grabhorn Studios

RRC Long-Term Water Quality Monitoring Project

In 2013, RRC received a grant from Yahara WINS to design and establish citizen based stream monitoring program



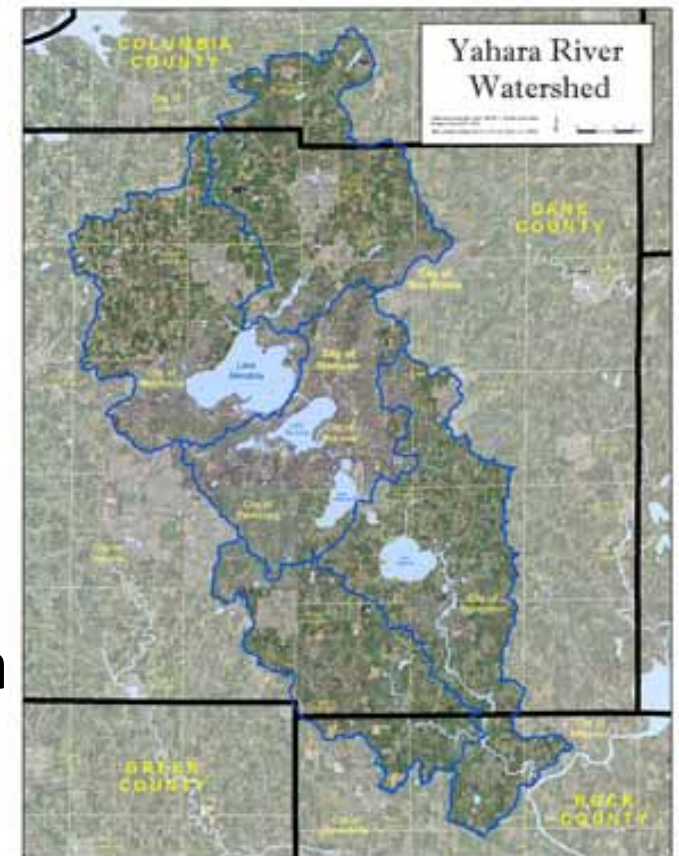
RRC Long-Term Water Quality Monitoring Project

Purpose:

- Assess impact of adaptive management project

Objective:

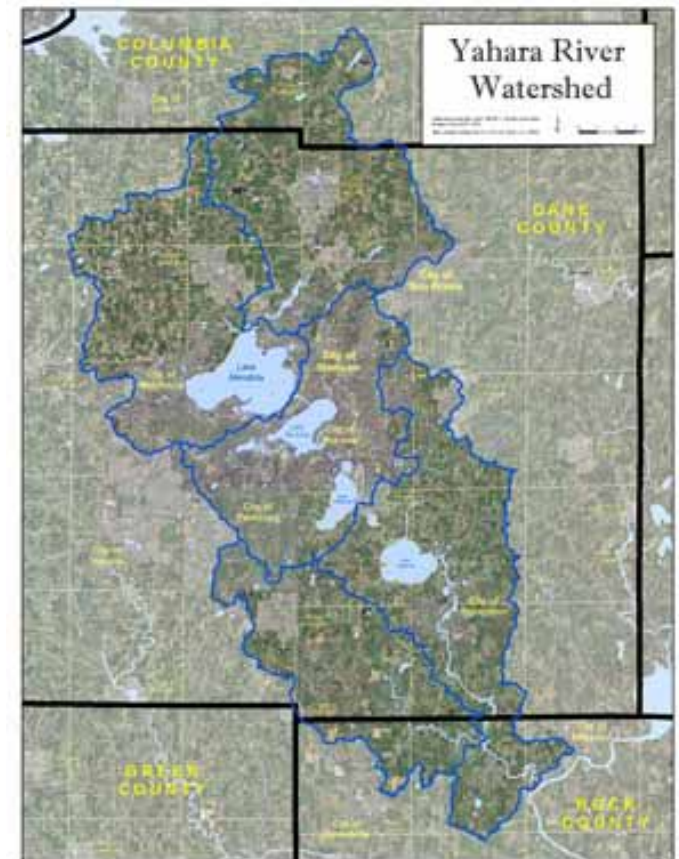
- Baseflow monitoring of smaller tributaries at regular monthly intervals
- Enhance public awareness of Yahara WINS and pollution sources



RRC Long-Term Water Quality Monitoring Project

WQ parameters

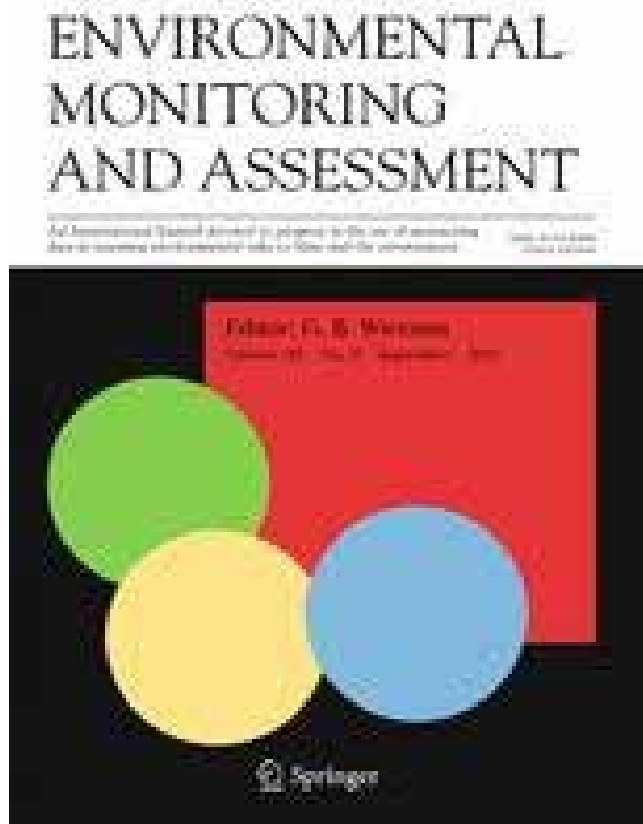
- ✓ Dissolved Oxygen
- ✓ Monthly Stream Temperature
- ✓ Continuous Stream Temperature
- ✓ Clarity
- ✓ Biotic Index
- ✓ Flow
- ✓ Total Phosphorus
- ✓ Total Suspended Solids
- ✓ Ortho-Phosphorus
- ✓ Ammonia
- ✓ Nitrate+Nitrite
- ✓ Total Kjeldahl Nitrogen



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The Challenge



“One of the greatest challenges for [Citizen Based Monitoring Projects] ... data is not used in the decision-making process ...”

(Cathy C. Conrad · Krista G. Hilchey, 2011)

Lessons Learned



According to the Skeptics...

“Volunteers are unreliable and may not follow monitoring standards.”

“Volunteer recruitment will be difficult.”

“Citizen generated water quality data may not be relevant ... accurate ... valid ... representative”



Lessons Learned: Dealing with the Skeptics

Start small, scale up gradually

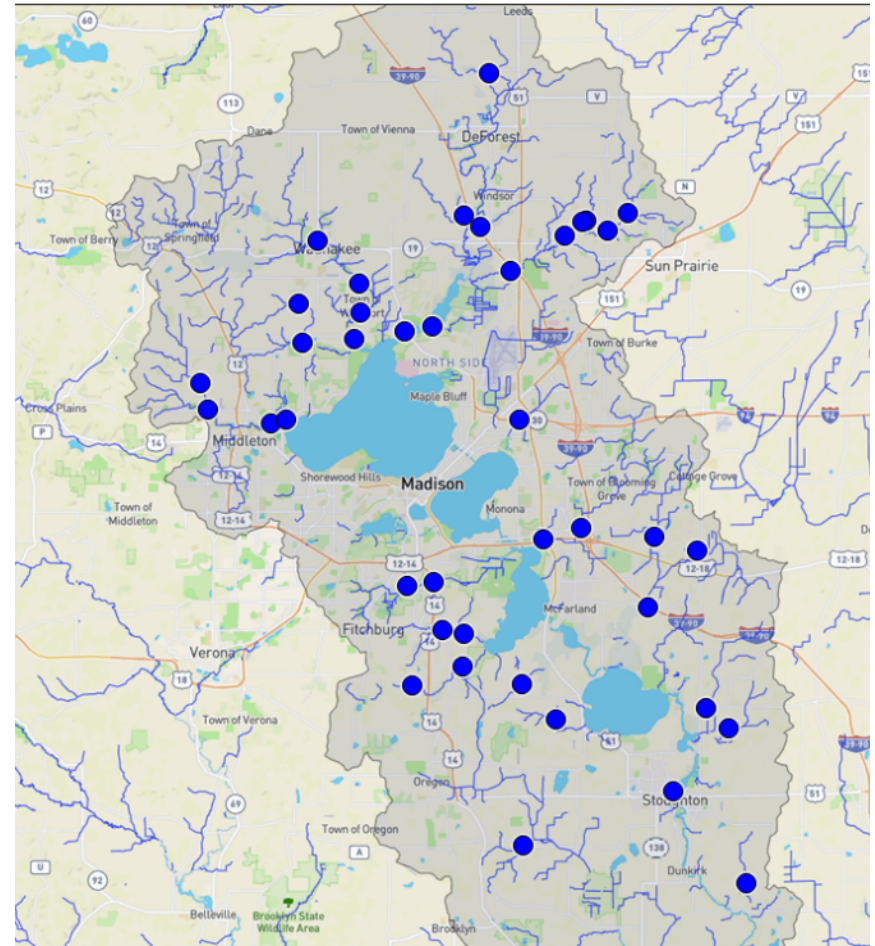
- Located near USGS gages
- QA side-by-side monitoring
- Gradually added more sites with more monitoring tasks

In 2013, 23 total stations
Including 6 nutrient
sampling sites



In 2018, 53 total stations
Including 37 nutrient
sampling sites

Volunteer Nutrient Sampling Sites
All Years: 2013, 2014, 2015 and 2 more



Lessons Learned: Dealing with the Skeptics

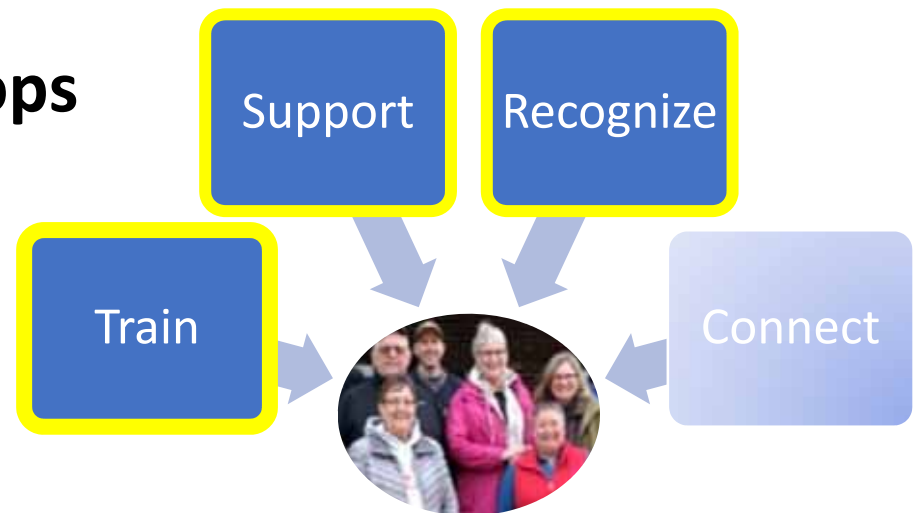
Invest in Volunteer Management



Lessons Learned: Dealing with the Skeptics

Invest in Volunteer Management

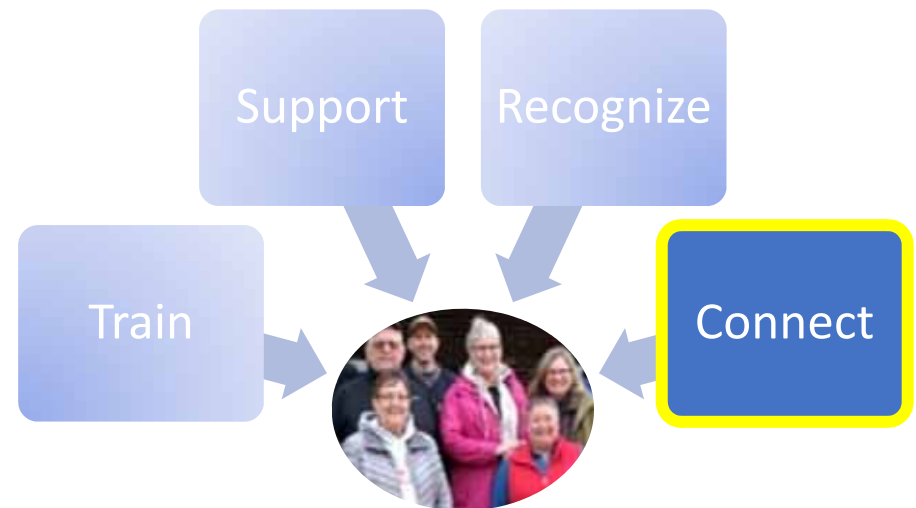
- **Training:** annual training workshops; multiple communication channels
- **Support:** standardized methods and equipment aligned with Wisconsin's Consolidated Assessment and Listing Methodology (WisCALM)
- **Recognize:** annual workshops



Lessons Learned: Dealing with the Skeptics

Investing in Volunteer Management

- Annual workshops; periodic meetings
- Communication with partners—in site selection, training, information sharing,



Lessons Learned: Dealing with the Skeptics

- **Since 2013, 160+ volunteers**
- **70% Retention Rate**

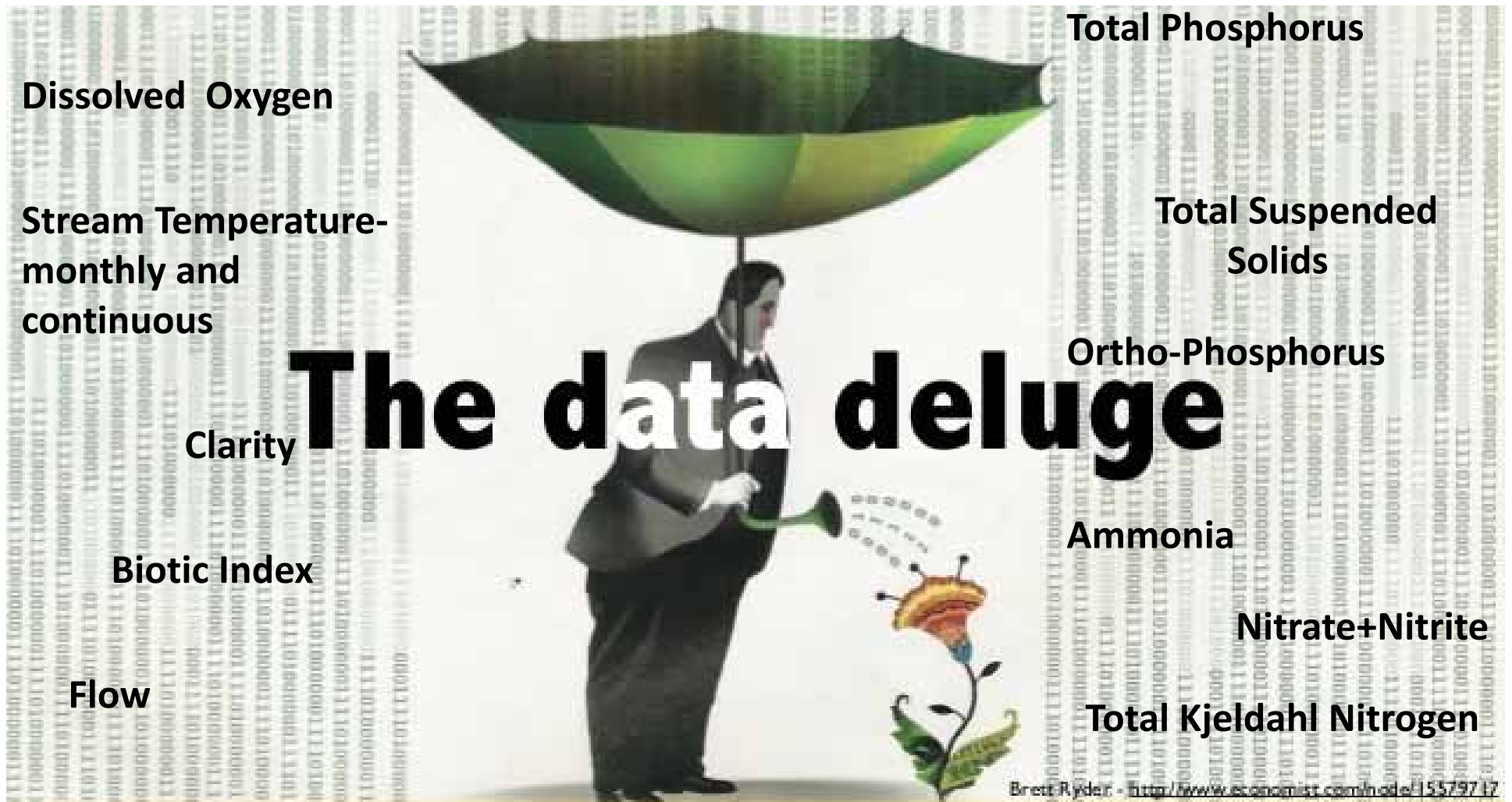


Lessons Learned: Dealing with the Skeptics

Since 2013, volunteers have generated **5454** nutrient sampling results



Lessons Learned: Dealing with Increasing Amounts of Data



Lessons Learned: Dealing with the Deluge...

Invest in data management and visualizations software



Tableau Desktop

The data crunching starts here. Called “the gold standard” in visual analytics, Tableau Desktop upended the business intelligence industry and ushered in a new paradigm of self-service insight.

LEARN MORE →

Lessons Learned: Dealing with the Deluge...

Invest in data management and visualizations software



Creating
dashboards

How much phosphorus is in our streams within the Yahara River Basin?

- Since 2013, volunteers have monitored baseline water quality at 65 stream stations and collected phosphorus (and other nutrients) samples at 42 stations.
- 41 phosphorus sampling stations are distributed widely throughout the five subwatersheds in the Yahara River Basin.
- Explore how total phosphorus concentrations fluctuate over the course of a year at your stream station of interest.
- Compare monthly total phosphorus concentrations at individual stream stations within your watershed of interest.
- Explore how yearly median TP concentrations compare across stream stations within a watershed.

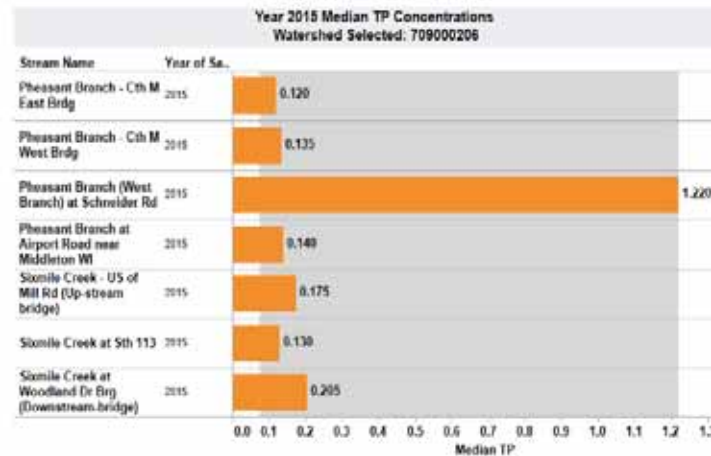
Yearly Median TP Concentrations and Corresponding Heat Map

Step #1: Select your watershed of interest

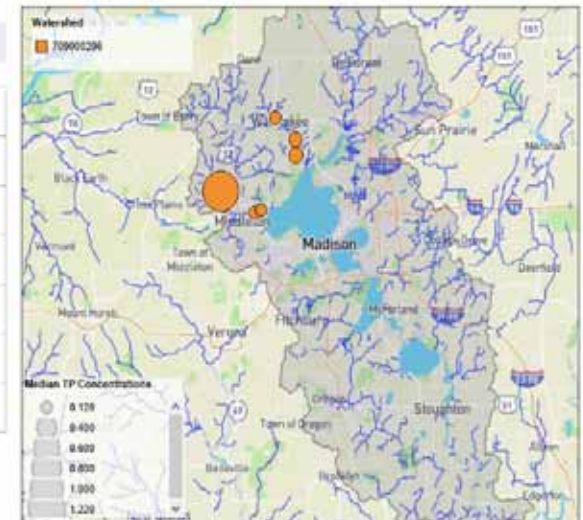
709000206

Step #2: Select your year of interest

2015



Color shows details for selected Watershed: 709000206 and Year: 2015. The shaded sections shows exceedancies to TP state standard of 0.075mg/L.



Dealing with the Deluge...

Invest in data management and visualizations software



Sharing results

“Crowdsourcing analysis”




Tableau Public

Want the sharing and collaboration of Server, but without having to actually manage a server? Then you want Tableau Online. Secure. Scalable. And Look Ma—
No hardware to maintain!

LEARN MORE →

The complex block is a screenshot of a Tableau advertisement. It features a diagram at the top showing three stylized human icons (one blue, one orange, one green) connected by dotted lines, all set against a background of grey clouds. Below the diagram is the text "Tableau Public" in a blue font. Underneath that is a paragraph of text: "Want the sharing and collaboration of Server, but without having to actually manage a server? Then you want Tableau Online. Secure. Scalable. And Look Ma— No hardware to maintain!". At the bottom of the advertisement is a link that says "LEARN MORE" followed by a right-pointing arrow.

Wrap-up

To meet challenge – to turn data into decisions:

- **Establish and manage a program to train and retain volunteers**
- **Establish monitoring network: start small, scale up gradually**
- **Establish a data management and analysis plan from the outset**