



Wisconsin Conservation Congress  
 Mississippi River Advisory Committee  
 Meeting Minutes

**WCC Meeting Minutes**  
 Form 8300-026 (R 11/17) Page 1 of 4

<b>ORDER OF BUSINESS</b>	09/27/2022	6:30pm	Zoom
--------------------------	------------	--------	------

**I. ORGANIZATIONAL MATTERS**

**A. CALL TO ORDER**

Meeting called to order by	Michael Britton	at	6:32PM
----------------------------	-----------------	----	--------

**B. ROLL CALL**

ATTENDEES	Mike Britton, Marc Schultz, Ed Peters, Charles Gauger, Robert Budworth, Larry Dobbe, Mark Noll, Travis Burce, Wes Domine, Rick Wayne, Daniel Heidel, Kevin Smaby, Maurice Amundson, Jeff Johnson, Nathan Budack, Wayne Steitz, Andrew Novak, Robert Ziel, Barbara Dahlgren, Jason Brazzale, Reed Kabelowsky
EXCUSED	Ted Engelein, Hugh Hatch, David Zielke, Steve Wickman, Ted Engeliem (computer issues)
UNEXCUSED	Maurice Amundson, Jeff Johnson, Andrew Novak, Lester Ryder
GUESTS	Bob Jumbeck (DNR LE) Jordan Weeks (DNR FISH) Shawn Giblin (DNR MRWQ) Public: Valerie Gibbons, John Calabrese, Jerome Donohoe

**C. AGENDA APPROVAL/REPAIR**

DISCUSSION	
ACTION	Motion by Mark Noll and 2nd by Kevin Smaby to approve the agenda as presented - carried.

**D. REVIEW COMMITTEE MISSION STATEMENT**

DISCUSSION	Within and to the support of Wisconsin Conservation Congress process; it is the mission of the Mississippi River Committee (MRC) to advise the Wisconsin NRB and Department of Natural Resources on issues, rules, or policies which affect the river and/or other associated natural resources. The MRC strives to stay acquainted with current river resource management; the science in support or opposition to that management; and with public opinion thereof. The MRC encourages river management agencies to seek public participation in management decisions or policy. Influence stemming from the MRC shall be generated with greatest intentions toward long term benefits to all fish and wildlife resources; and with an emphasis toward preserving public access and harvest of game resources, (i.e., preserving outdoor heritage activities of hunting, fishing, and trapping). Reed read the mission statement aloud.
ACTION	Motion by Wes Domine and 2nd by Robert Ziel to approve the mission statement as printed - carried.

**E. PUBLIC COMMENTS**

DISCUSSION	There were no notices by the public to present at the meeting. There were some citizen visitors to meeting link tonight and they are included in "Guests" section.
ACTION	

**II. INFORMATION & ACTION ITEMS**

**A. Department information items & updates.**

[PRESENTER]

DISCUSSION	Jordan Weeks (in place of retired David Heath). David Heath is now retired after 38 years of service. Two fisheries folks were hired in the area. David's position is in flux as he has some "off" time remaining - hoping to fill this soon with department cooperation. Invasive carp removal and monitoring - working hard at this. Had 8 invasive carp in targets but they evaded traps yesterday. Will be trying again today. There are not many present at this time on Wisconsin side. Looking to place implants into some to use as "Judas" fish to aid in search and destruction. Questions: Marc Schultz - Who will do Dave's sampling - much of it will not get done, they will do some. Ed Peters - The invasive carp - silver or bighead? Mostly silvers. Marc Schultz - Have you seen US Geological report - No he has had chance to read report.  Bob Jumbeck - LE liaison for department. Down 19 positions in the area at this time. Looking to hire 10 this year - so will be 9 short. 1 retirement coming up. They are using several recruits over the area at this time in training. Questions: Dan Heidel - Any closer to reciprocity on use of Go Wild at this time? Hasn't heard anything further on this front. Not sure if state of Minn wants to take this on - it cost Wisconsin \$30,000 just for Android. Current rule = must have paper license on person to fish as rules are different for other states. Reed Kabelowsk - Not needed for trapping and hunting. Not as important as people can only hunt/trap Wisconsin waters - recommended for all
------------	---

	activities on shared waters - USFWS also does enforcement.	
	Shawn Giblin (Mississippi River Water Quality) - Shawn had a great recorded slide presentation. Questions: Ed Peters - Thanked Shawn for wonderful and informative presentation. Asked about Greenfire Wisconsin and his knowledge of their work? Not real familiar. Nitrogen issues on Trempeleau Lake - this is a ground water issue that is quite detrimental. Presentation will be attached.	
<b>ACTION</b>		
<b>PERSON(S) RESPONSIBLE</b>	<b>DEADLINE</b>	
Jordan Weeks, Bob Jumbeck, Shawn Giblin		

**B. USFWS – Tim Miller** [PRESENTER]

<b>DISCUSSION</b>	Tim did not make the meeting. Unsure what happened - may have been short notice on final meeting date.	
<b>ACTION</b>		
<b>PERSON(S) RESPONSIBLE</b>	<b>DEADLINE</b>	

**C. UMRR – (Upper Mississippi River Restoration) – Natalie Lenzen/Andrew Stephenson, US Corps of Engineers.** [PRESENTER]

<b>DISCUSSION</b>	Did not make the meeting. Unsure what happened - may have been short notice on final meeting date.	
<b>ACTION</b>		
<b>PERSON(S) RESPONSIBLE</b>	<b>DEADLINE</b>	

**D. Public Access Launch in Trempeleau, WI downstream of Lock and Dam No 6.** Mike Britton

<b>DISCUSSION</b>	Mike Britton informed committee of correspondence directly with Secretary Cole on this subject. April Ammon (aide) responded promptly to Mike and informed him of the current, narrow scope, work being done at landing to maintain some usability. Mike has received many photos of the issues at this landing. Questions: Reed inquired about Ray from the Corp that was at last meeting. Out of LaCrescent - still on the scene - not much he can do. Jordan Weeks responded: No work can currently be done outside the 9' channel rule. Army Corp probably not going to do anything at this point. DNR is having some sand removal around the areas where ramps are in place - only immediate vicinity of landing ramps. 2 slips are very usable for boats under about 20'. Issue - landing DNR but parking lot is Army Corp. Physical barrier is probably only long term solution - probably doesn't interest the Corp. An actual "dredging" permit is much bigger process and will take much longer. A meeting is set of several DNR venues to discuss issue later this fall. Questions: Mark Noll - The land is not in navigation channel, but is very close - he feels may entire access point could be moved - best solution. Larry Dobbe - Can Congress help? Weeks - maybe as large voice at the right time. Marc Schultz pointed out that this is currently the only access point for Pool 7. Weeks says he will stay on this as it is a big issue. Wes Domine - brought similar matter - Merrick State Park - landing currently has small pier with poor service to the access. What happened to larger pier that was first used?	
<b>ACTION</b>	Jordan Weeks will stay on this issue.	
<b>PERSON(S) RESPONSIBLE</b>	<b>DEADLINE</b>	
Jordan Weeks		

**E. Restore public right to cross RR right-of-way.** [PRESENTER]

<b>DISCUSSION</b>	Mike Britton - where are we currently at? Wes Domine - hasn't heard much about recent updates. Political folks currently in charge don't want anything to do with hearing this bill in committee - being kept off agenda. There was attempt to move bill from Safety Committee to a Resource Committee - this also failed or was blocked. Marc Schultz thought it may go to committee but was blocked by one senator. Pressure needs to be dialed up by citizenry. Not	
-------------------	--	--

	<p>sure we can do much at this time.</p> <p>Reed Kabelowsky suggested issuing a resolution from the committee regarding reversal of current rule limiting access across railroad right-of- ways. Kari issued a recommendation that it was in the pervue of the committee to take action as it was an approved agenda item. After below motion was offered - more discussion. Travis Burce pointed out that the enforcement person in his area responsible for this has not been on the scene for some time. He feels we should leave it alone instead of stirring things up that are now quiet. Several people disagreed with this and want it off the books - reverse the law.</p> <p>Reed has volunteered to draft resolution with help from Marc and Wes. They will get notes together and forward to Reed for drafting. This will be a group effort. Mike cautioned to make sure this resolution is polished to meet WCC guidelines.</p>
<b>ACTION</b>	Motion by Mark Schultz and 2nd by Reed Kabelowsky to draft a resolution from the committee to seek a reversal of the present rule limiting access to railroad right-of-ways - carried (no dissents).
<b>PERSON(S) RESPONSIBLE</b>	
Reed Kabelowsky, Marc Schultz, Wes Domine	
<b>DEADLINE</b>	
Spring meeting	

- F. Allowed limited personal use limited bait harvest on VHS suspect waters (to be [PRESENTER]  
DNR question for 2023 spring hearing).

<b>DISCUSSION</b>	<p>Wes Domine is author - he feels this is a long time in coming. He is concerned about the verbage of final draft as this resolution will be coming from the fisheries folks in DNR. There was good discussion between committee and Jordan Weeks who gave some indication on what could be in and could influence final draft. Said that resolution will probably include verbage to continue requiring disposal of any bait used on the river. VHS is big factor in this issue.</p>
<b>ACTION</b>	
<b>PERSON(S) RESPONSIBLE</b>	
DNR Fisheries	
<b>DEADLINE</b>	
Spring hearing	

- G. Studies and possible added protections for native Buffalo species. Jordan Weeks

<b>DISCUSSION</b>	<p>Jordan Weeks - not known in distant past how long the life cycles of these fish are. Spawning season is much longer and later than once thought. Bow harvest is big issue on these fish.</p> <p>Question: Mike Britton - is anything currently going on with this topic?</p> <p>Jordan Weeks - Thanked group for bring this issue to a resolution - it is an important issue. Finally, as with all chronic issues - it is a political issue. Commercial harvest of these fish is a big issue. Weeks would like to see our native species protected outside of carp. No money coming in due to fact they are not game fish and license money not applicable. Hoping to work with Minnesota on this issue in the future - they are currently considering it a bit more closely.</p>
<b>ACTION</b>	None currently
<b>PERSON(S) RESPONSIBLE</b>	
<b>DEADLINE</b>	

- H. Sale of Xcel Energy parcels within Lower Chippewa River and adjoining Tiffany Wildlife Area (JFC withhold of Knowles Nelson funding). Wess Domine and Marc Schultz

<b>DISCUSSION</b>	<p>Joint Finance Committee is still currently withholding the money to complete the sale of this land. Wes Domine reports that there is still some active interest in moving this purchase forward. Wes thanked Excel folks for staying actively interested in wanting to sell this land to the people of Wisconsin.</p>
<b>ACTION</b>	None currently.
<b>PERSON(S) RESPONSIBLE</b>	
<b>DEADLINE</b>	

**III. MEMBERS MATTERS**

<b>DISCUSSION</b>	<p>Marc Schultz - Ecology Statistics and Trends of Mississippi and Illinois Rivers - would like group to look at this informaiton.</p> <p>Reed Kabelowsky - Gave a brief recap of Congress and YCC involvement in the recent Waterfowl Hunter's Expo.</p>
-------------------	---

	<p>Praised the Congress delegate involvement in final product and is encouraging future engagement by Congress body.                  E-mail to Rob Bohmann just today.                  Ed Peters - Thanked the committee for sound thinking and engagement on the issues presented.                  Barbara Dahlgren - Thanked the committee for their sincere interest in water ecology and pollution issues as presented tonight. Believes that pollution is a huge issue one that currently effects the Milwaukee Area dramatically. Likes the constant reminder of this topic.                  Charles Gauger - Great meeting - really like Shawn Giblin's detailed report. Enjoys being on this committee.                  Robert Budworth - Enjoys the committee.                  Lary Dobbe - also enjoys committee.                  Mark Noll - nothing to report.                  Travis Burce - nothing to report.                  Wes Domine - Reiterated his information regarding watching for final draft of bait resolution.                  Jason Brazzale - Good meeting.                  Daniel Heidel - Gold Wild Card discussion - wants to see push to have other agencies sign on. Asked about status of in person spring hearings? Kari - will come up at DLC meeting. Kevin agreed to follow through with getting this on agenda. Kari suggested e-mail to Rob Bohmann.                  Kevin Smaby - Reiterated Reed's excitement about he Waterfowl Hunter's Expo - would like to see greater involvement by Congress body - some nice perks involved.                  Nathan Budack - Talked briefly about some LE postions.                  Wayne Stietz - Talked about Bob Howe and his standing in the NR and Congress venues. Mentioned seeing so much fry on river this year - too small for ID - many feel good hatch of gizzard shad. Probably multi-species. Bill Howes service was well attended - the man had many connections and friends.                  Mike Britton - Reiterated Bill Howes tenure and imprint on congress and NR. Thanked committee, DNR folks, and Kari for involvement with meeting. Spoke to importance of committee and the River Resource. Thanked Weeks for his involvement in boat landing issue. A tour of river was brought up - been some years - Jordan Weeks said he'd be happy to help set this up in future.                  Reed Kabelowsky brought up a fishing outing after next meeting. Will send out some e-mails to gauge interest when venue is established.</p>
<b>ACTION</b>	

**IV. ADJOURNMENT**

<b>MEETING ADJOURNED</b>	<b>8:32PM Motion by Kevin Smaby and 2nd my Bob Ziel to adjourn - carried.</b>
<b>SUBMITTED BY</b>	<b>Reed Kabelowsky</b>
<b>DATE</b>	<b>09/28/2022</b>

# How Water Quality Shapes the Ecology of the Mississippi River: Where We've Been, Where We Are, and Where We Need To Be

Shawn Giblin

Mississippi River Water Quality Specialist  
Wisconsin Department of Natural Resources





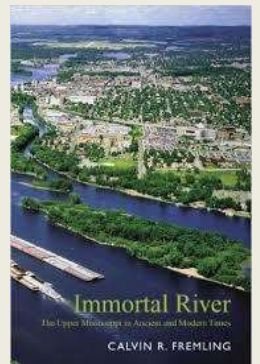
**Sewage Mats on the Mississippi: June 1933**



**Sewage Mats on the Mississippi: May 1933**

“The fetid, festering accumulation of raw sewage led the U.S. Bureau of Fisheries to report that during August of 1927, forty-five miles of the river below St. Paul lacked sufficient oxygen to sustain fish life of any kind.”

Cal Fremling, *Immortal River*



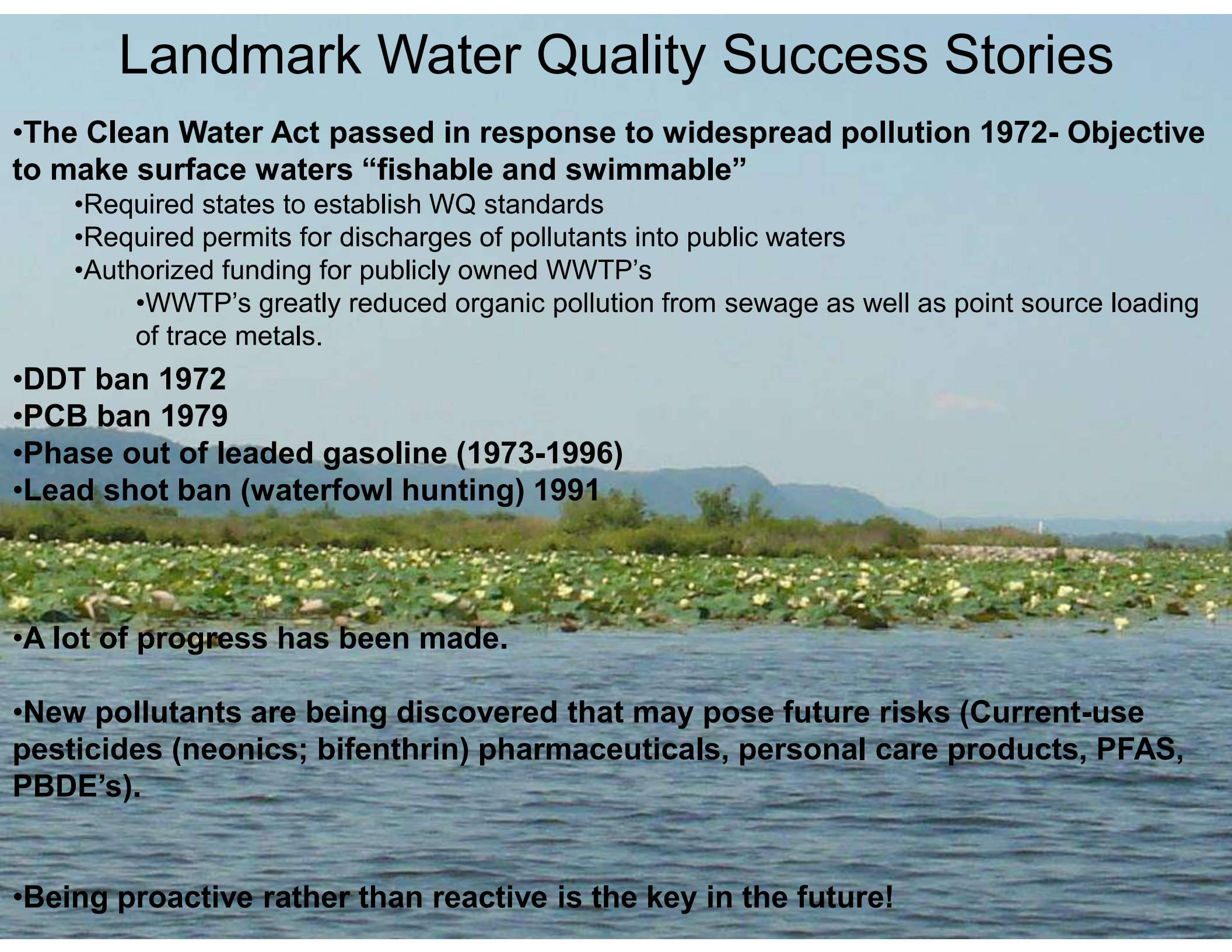




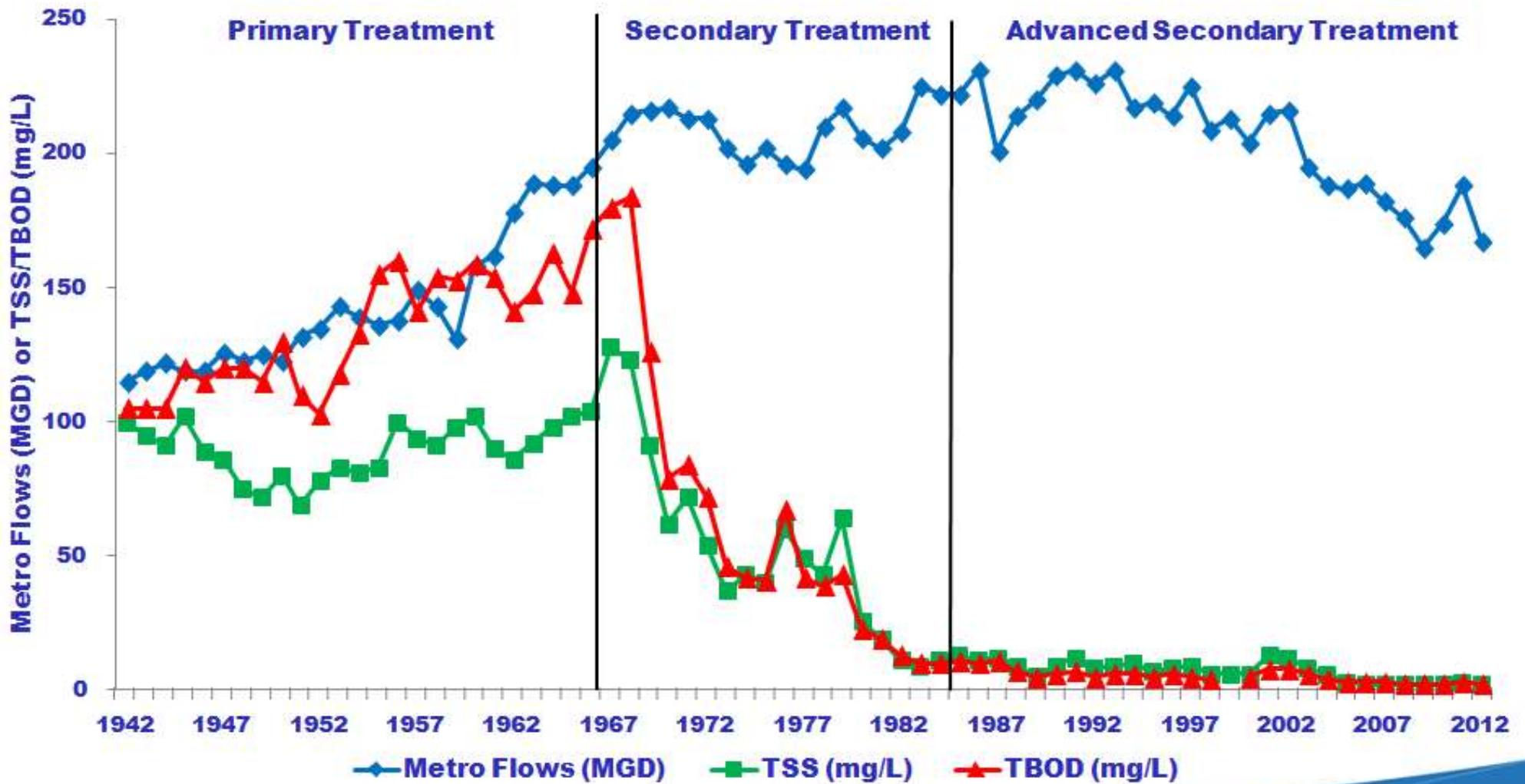
James Thomas  
Cleveland State University Library

## Cuyahoga River Fire 1952

# Landmark Water Quality Success Stories

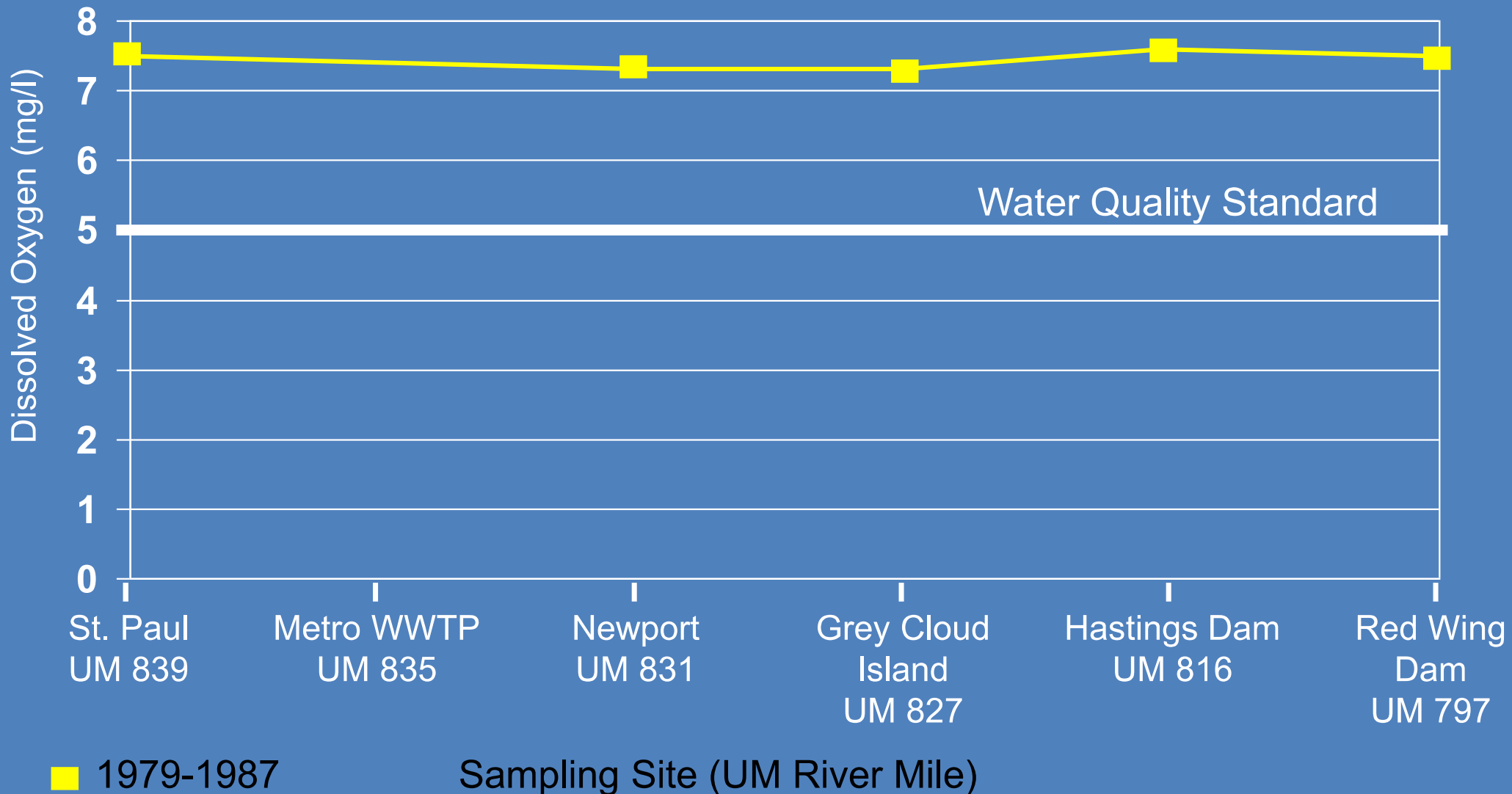
- **The Clean Water Act passed in response to widespread pollution 1972- Objective to make surface waters “fishable and swimmable”**
    - Required states to establish WQ standards
    - Required permits for discharges of pollutants into public waters
    - Authorized funding for publicly owned WWTP's
      - WWTP's greatly reduced organic pollution from sewage as well as point source loading of trace metals.
  - **DDT ban 1972**
  - **PCB ban 1979**
  - **Phase out of leaded gasoline (1973-1996)**
  - **Lead shot ban (waterfowl hunting) 1991**
  - **A lot of progress has been made.**
  - **New pollutants are being discovered that may pose future risks (Current-use pesticides (neonics; bifenthrin) pharmaceuticals, personal care products, PFAS, PBDE's).**
  - **Being proactive rather than reactive is the key in the future!**
- 

# Metro Plant Performance: 1942-2012



# Mississippi River

## Mean August Dissolved Oxygen Concentration\*



\*Mean of all August observations for the time period



Staff Photo by David Brewster

Officer Mike McKenzie examined the slippery mayfly mess Tuesday night on the Interstate Hwy. 494 bridge in South St. Paul.

## Some shiver, others rejoice at mayfly blizzard

By Ellen Foley  
Staff Writer

The state dusted off its snowplows and dispatched them to an Interstate Hwy. 494 bridge in South St. Paul Tuesday night, where a slippery mess had piled up on the road, causing two accidents and forcing the State Patrol to close the highway for a short time.

Millions of mayflies attracted by the lights swarmed above the bridge over the Mississippi River about 11:30 p.m., then died after their frantic annual mating ritual.

Their bodies formed up to a foot of slippery goo on the highway, which had to be plowed and then sanded before it was reopened.

Experts forecast that the snowplows will have to stand ready because another enormous batch of adult flies is expected to emerge during the week of July 5 for their day of life.

While the mess might send shivers down some people's spines, biologists and federal officials said people in the Twin Cities should

rejoice that the mayflies are back.

Their return in the past two years after a 10-year hiatus signals that the Mississippi River is getting healthier — slowly being transformed from an open sewer back into a natural wonder, experts said.

Mayflies continued on page 10A

## Mayflies Return to the Mississippi River: June 1987

LD3- Near Diamond Bluff, WI



# Declines in an abundant aquatic insect, the burrowing mayfly, across major North American waterways

Phillip M. Stepanian<sup>1,2,3,4</sup>, Sally A. Entrikin<sup>5</sup>, Charlotta E. Walnwright<sup>6</sup>, Djordje Mirkovic<sup>7</sup>, Jennifer L. Tank<sup>8</sup>, and Jeffrey F. Kelly<sup>1,2,3,4</sup>

<sup>1</sup>Department of Biology, University of Oklahoma, Norman, OK 73019; <sup>2</sup>Cori Cori Institute, University of Oklahoma, Norman, OK 73019; <sup>3</sup>Department of Civil and Environmental Engineering and Earth Sciences, University of Notre Dame, Notre Dame, IN 46556; <sup>4</sup>Department of Entomology, Virginia Tech, Blacksburg, VA 24060; <sup>5</sup>Cooperative Institute for Mesoscale Meteorological Studies, University of Oklahoma, Norman, OK 73072; and <sup>6</sup>Department of Biological Sciences, University of Notre Dame, Notre Dame, IN 46556

Edited by David W. Schindler, University of Alberta, Edmonton, Canada, and approved December 12, 2019 (received for review August 6, 2019)

Seasonal animal movement among disparate habitats is a fundamental mechanism by which energy, nutrients, and biomass are transported across ecotones. A dramatic example of such exchange is the annual emergence of mayfly swarms from freshwater benthic habitats, but their characterization at macroscales has remained impossible. We analyzed radar observations of mayfly emergence flights to quantify long-term changes in annual biomass transport along the Upper Mississippi River and Western Lake Erie Basin. A single emergence event can produce 87.9 billion mayflies, releasing 3,678.5 tons of biomass into the airspace over several hours, but in recent years, production across both waterways has declined by over 50%. As a primary prey source in aquatic and terrestrial ecosystems, these declines will impact higher trophic levels and environmental nutrient cycling.

bioRxiv | ecology | emergence | 5-phenomena | radar entomology

We have limited understanding of the critical link between ecosystem function and the phenology and magnitude of spatial flows of nutrients, energy, and organisms (1, 2), yet these flows are increasingly disrupted by anthropogenic environmental change with dynamic cascading effects on ecology and biogeochemistry (3). Modern remote-sensing techniques have enabled landscape-scale budgeting of plant and soil biomass, but the flow of organisms has been particularly difficult to quantify (3). Seasonal movements of animals drive community structure, ecosystem function, and connectivity through the transport and cycling of biomass and nutrients across space and time (4–7). Recent technological advances in animal monitoring have enabled some of the first quantitative descriptions of journeys undertaken by billions of individuals within aquatic, terrestrial, and aerial habitats, and these extremes in both number and spatial scale highlight the importance of animal movement in foundational environmental and ecological processes (5–11). Despite these advances, quantifying the magnitude of seasonal movements across aquatic, aerial, and terrestrial habitat interfaces in an ecosystem context remains problematic. Spanning the aquatic–terrestrial ecotone, the lifecycle of burrowing mayflies (*Hexagenia* spp.) is an extreme example of massive ecosystem fluxes with impacts on fundamental ecology, biogeochemical cycling, and human society.

Through the middle of the 20th century, enormous summertime swarms of *Hexagenia* mayflies were a common sight across many of North America's largest waterways. The immense scale of mayfly emergences made them a natural spectacle, and reports of the aquatic insects blanketing waterfront cities regularly filled newspaper headlines (12). Deep dirts of mayflies rendered streets impassable until snowplows could clear mud and grit roadways, and the dense swarms reduced visibility and inhibited water navigation, temporarily halting river transportation (13). These large *Hexagenia* populations were vital for supporting the commercial fishing industry and recreational anglers (13)

while also serving as a perennial annoyance for waterside residents; most of all, these mayfly emergences were a conspicuous sign of a productive, functional aquatic ecosystem (14–17). However, by 1970, these mass emergences had largely disappeared. The combination of increasing eutrophication from agricultural runoff, chronic hypoxia, hydrologic engineering, and environmental toxicity resulted in the disappearance of *Hexagenia* from many prominent midwestern waterways, with complete extirpation from the Western Lake Erie Basin and large segments of the Illinois, Ohio, and Mississippi Rivers (12–15, 17, 18). After two decades of absence, targeted efforts in conservation and environmental protection led to the eventual recovery of *Hexagenia* populations and recolonization of major habitats in the early 1990s (17, 18). Although the annual cycle of mayfly emergence has once more become commonplace in much of North America (Fig. 1), quantifying the ecological significance of these events at macroscales has remained impossible. Moreover, historical precedent shows that these large freshwater ecosystems are especially vulnerable to environmental change, making *Hexagenia* emergence an effective indicator of ecological “health” of waterways and motivating development of large-scale monitoring capabilities (14, 16).

We used weather surveillance radar to conduct nightly surveys of *Hexagenia* abundance over the Western Lake Erie Basin

### Significance

The annual appearance of massive mayfly swarms is a source of public fascination and spectacular natural phenomenon that plays a key role in regional food webs. Alarming reports of insect declines motivate efforts to uncover long-term and large-scale invertebrate population trends. Monitoring aquatic insect abundance across ecosystems continues to be logistically infeasible, leaving the vulnerability of these communities to intensifying anthropogenic impacts unknown. We apply radar remote sensing to quantify aquatic insect abundance at scales that have been previously impossible, revealing persistent declines in biomass flux from aquatic to terrestrial habitats. As ecological indicators, these losses may signal deterioration in water quality and, if current population trends continue, could cascade to widespread disappearance from some of North America's largest waterways.

**Author contributions:** P.M.S. and C.S.W. designed research; P.M.S. performed research; D.M. contributed new reagents/analytic tools; P.M.S. analyzed data; and P.M.S., S.A.E., C.S.W., J.L.T., and J.F.K. wrote the paper.

The authors declare no competing interest.

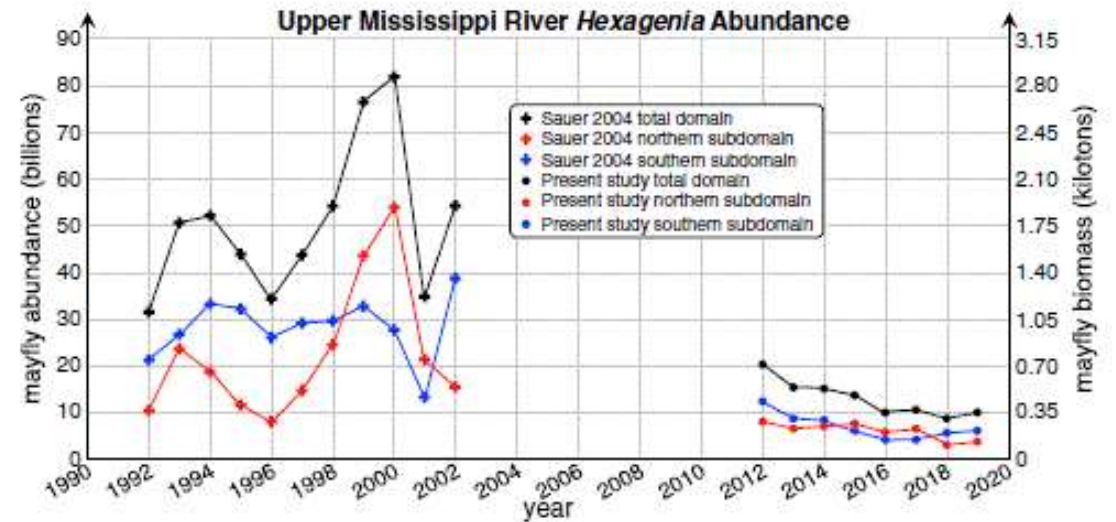
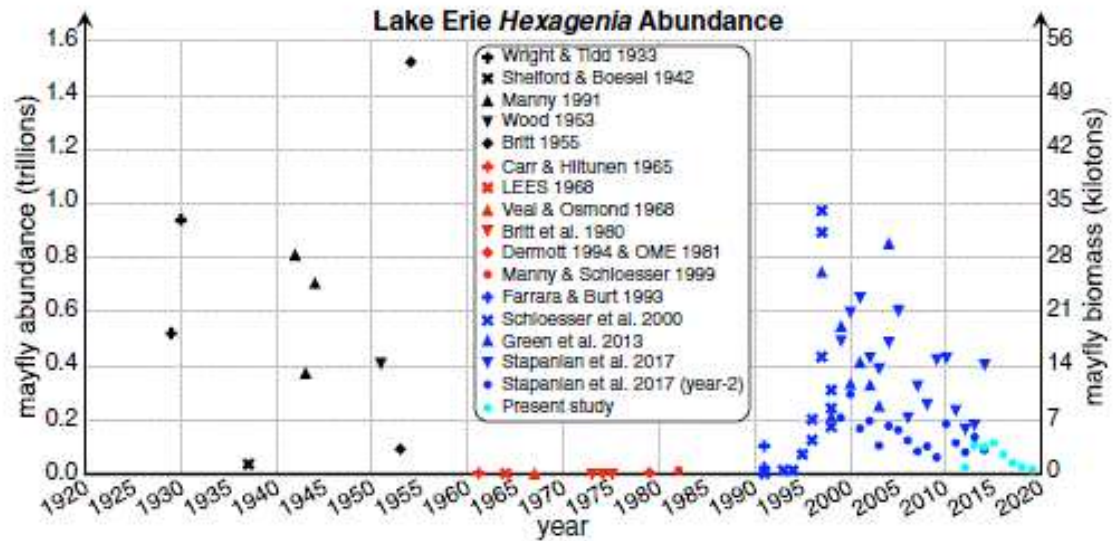
This article is a PNAS Direct Submission.

Published under the PNAS license.

<sup>1</sup>To whom correspondence may be addressed. Email: pstepan@nd.edu.

This article contains supporting information online at <https://www.pnas.org/lookup/suppl/doi:10.1073/pnas.1911268117/-/DCSupplemental>.

First published January 21, 2020.

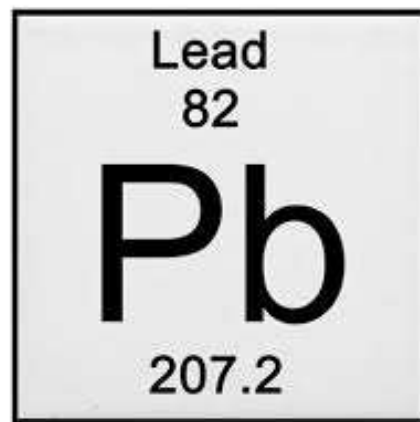


# Is History Repeating Itself?

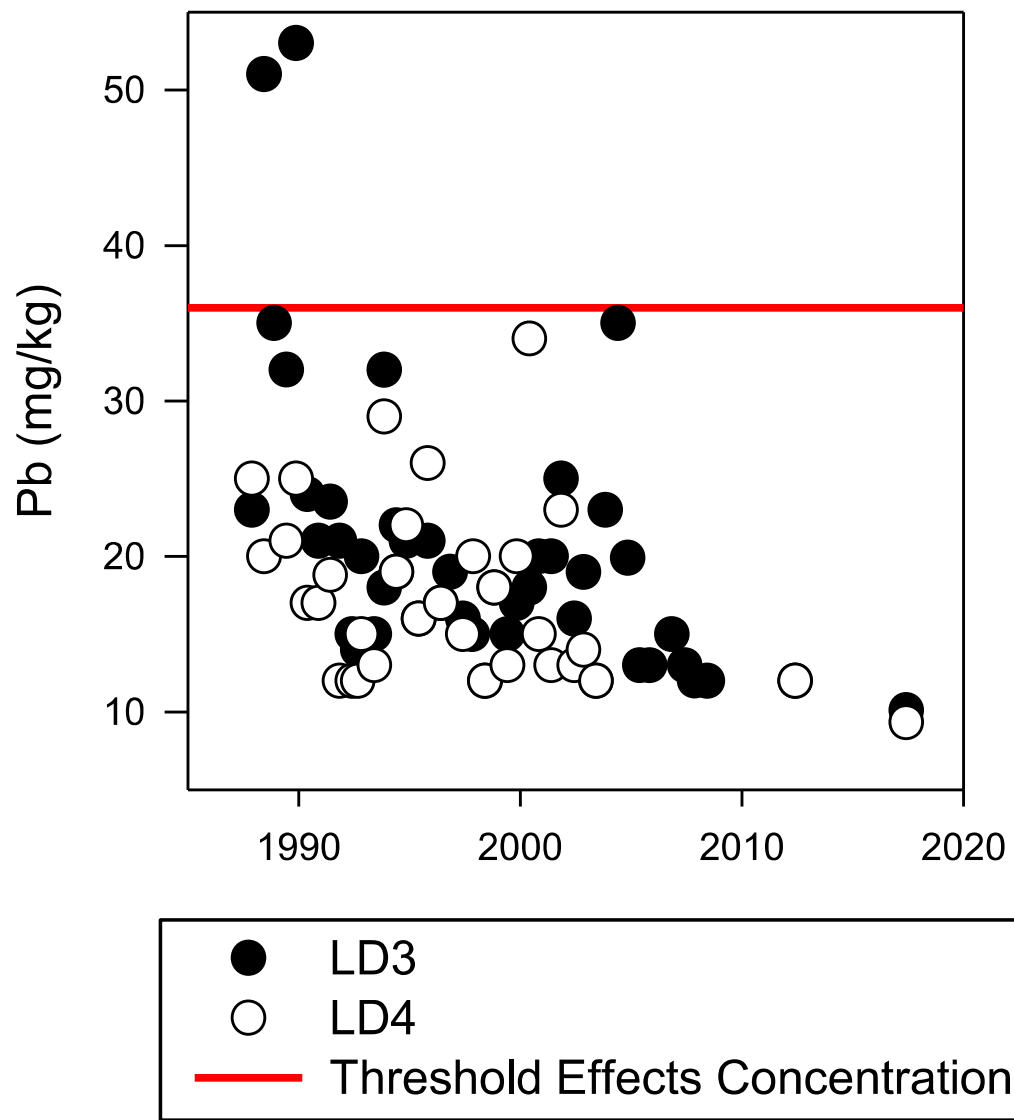
# EPA Takes Final Step in Phaseout of Leaded Gasoline

"The elimination of lead from gas is one of the great environmental achievements of all time. Thousands of tons of lead have been removed from the air, and blood levels of lead in our children are down 70 percent. This means that millions of children will be spared the painful consequences of lead poisoning, such as permanent nerve damage, anemia or mental retardation."

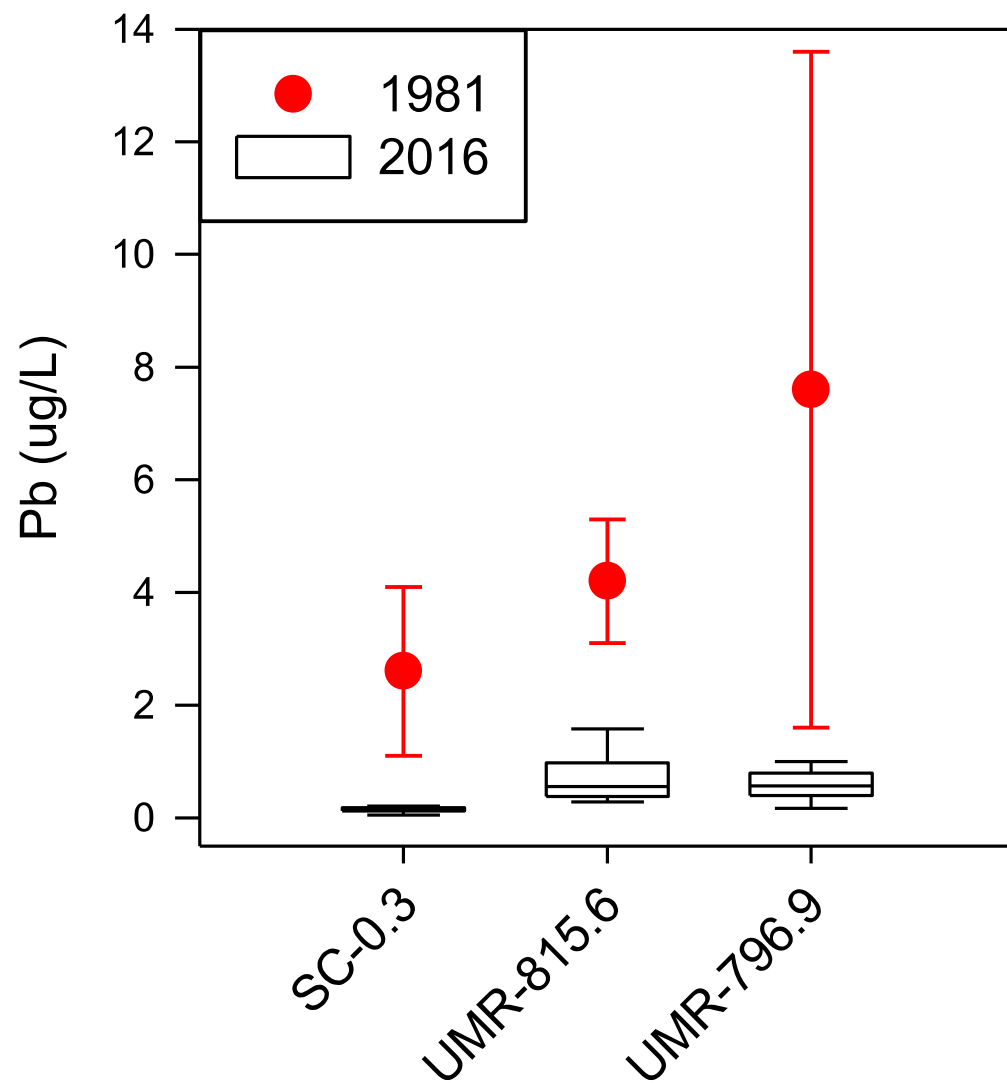
Carol M. Browner, EPA Administrator- January 29, 1996



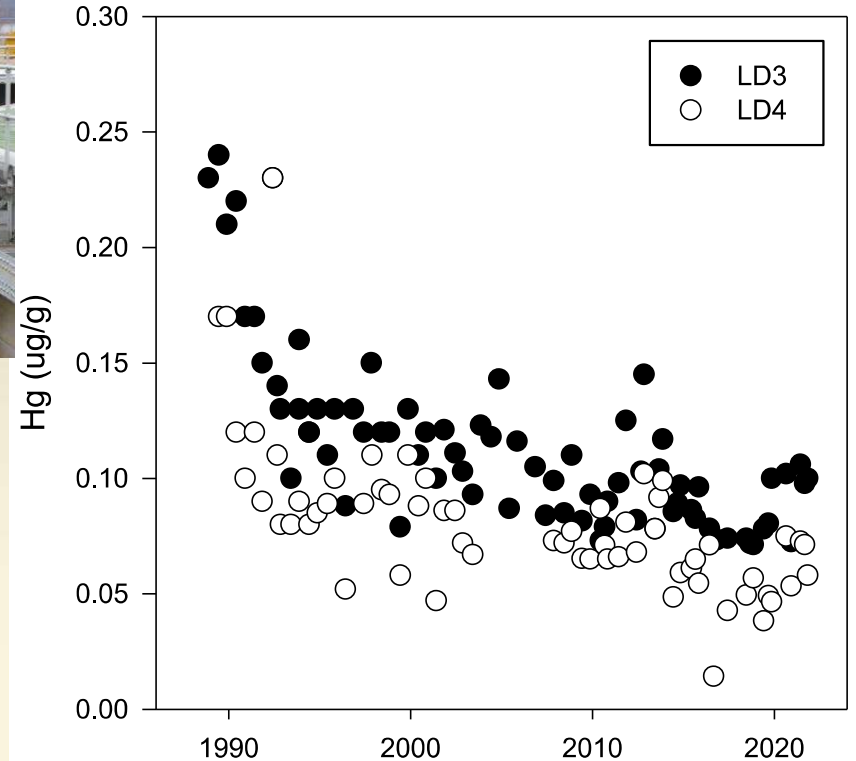
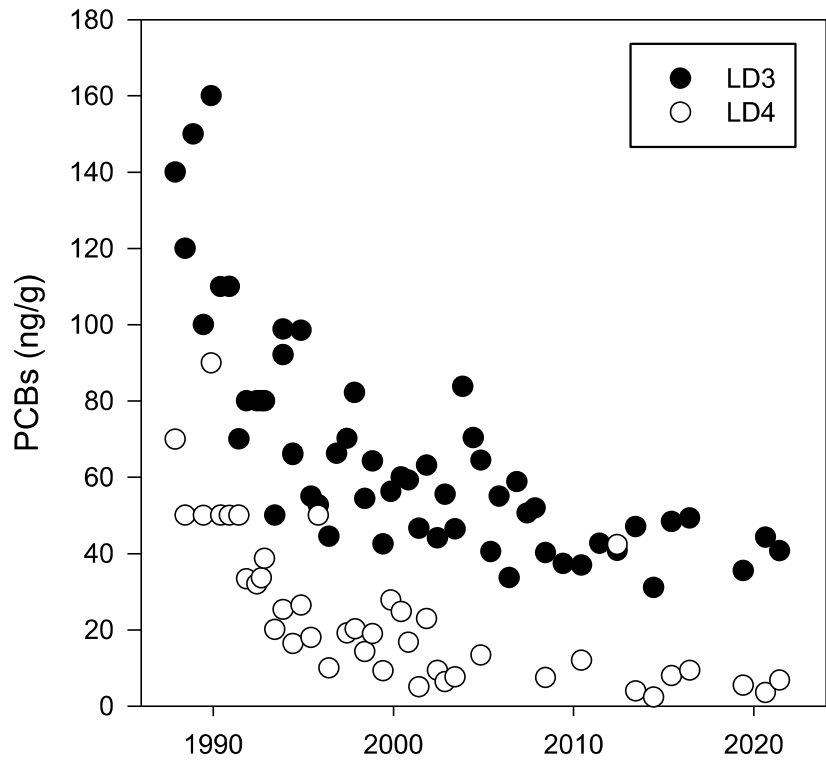




**Sediment Trap Lead Concentration  
1987-2017**



**Water Column Lead Concentration  
1981 vs. 2016  
St. Croix R., LD2, LD3**

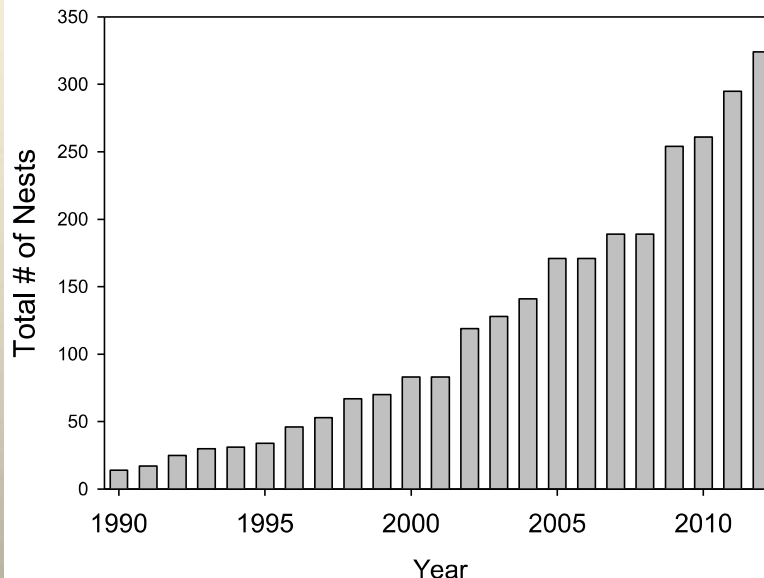


Active Bald Eagle Nests in the Upper Mississippi River: Chippewa River to Lock and Dam 13

In 1972, we were down to one active bald eagle nest in the UMR refuge

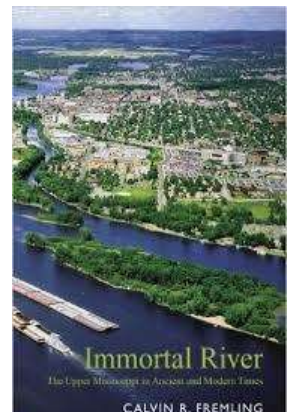
Similar recoveries have been observed for many species of fish eating birds, mink, and other wildlife

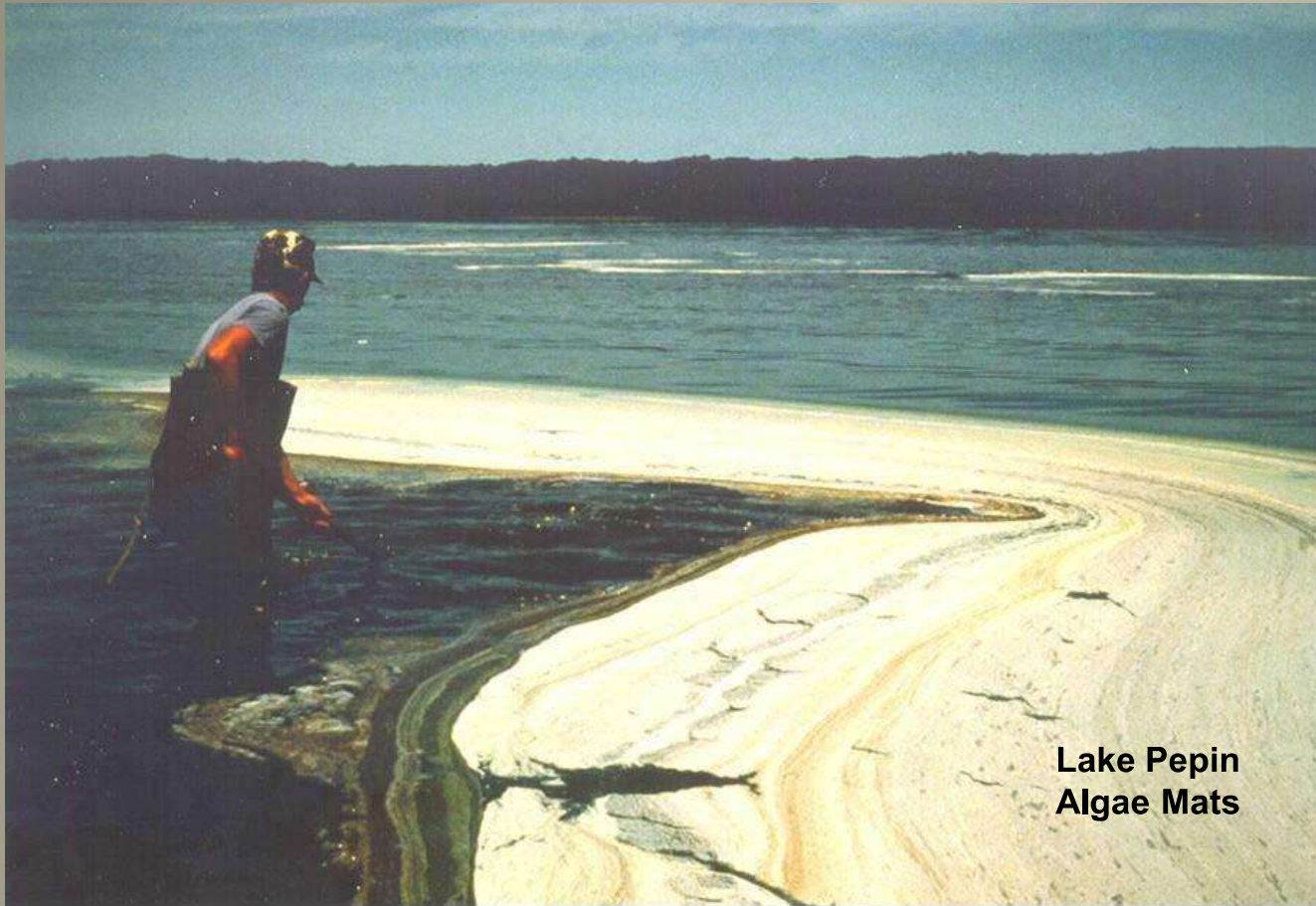
These recoveries are a source of national pride



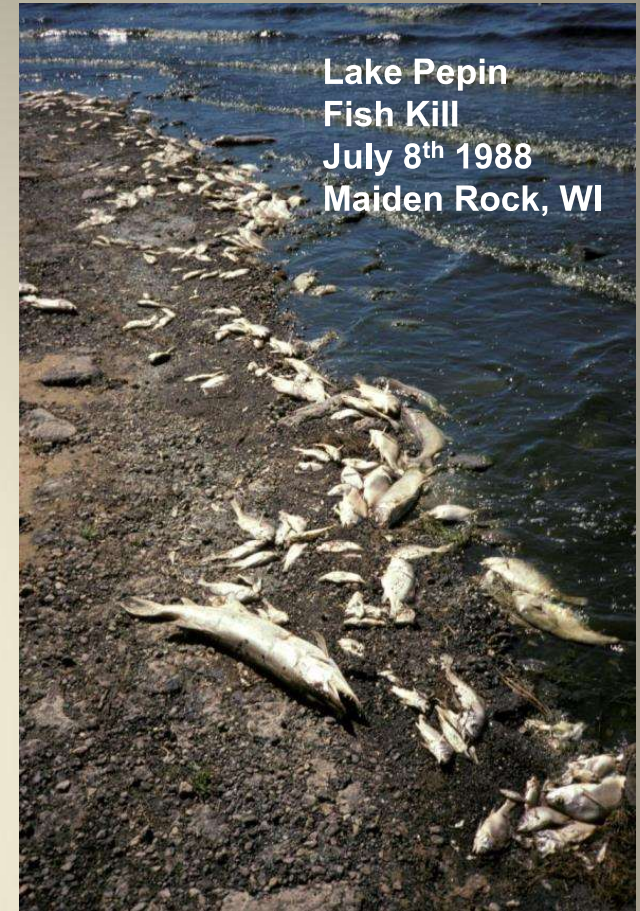
“Several river cities have erected eagle watch facilities that attract hundreds of eagle watchers. Shoppers strolling down the main street of Alma, WI have grown accustomed to seeing eagles flying at treetop height.”

Cal Fremling, *Immortal River*





Lake Pepin  
Algae Mats



Lake Pepin  
Fish Kill  
July 8<sup>th</sup> 1988  
Maiden Rock, WI

**1988 – Summer Drought & Lake Pepin Fish Kill in July**

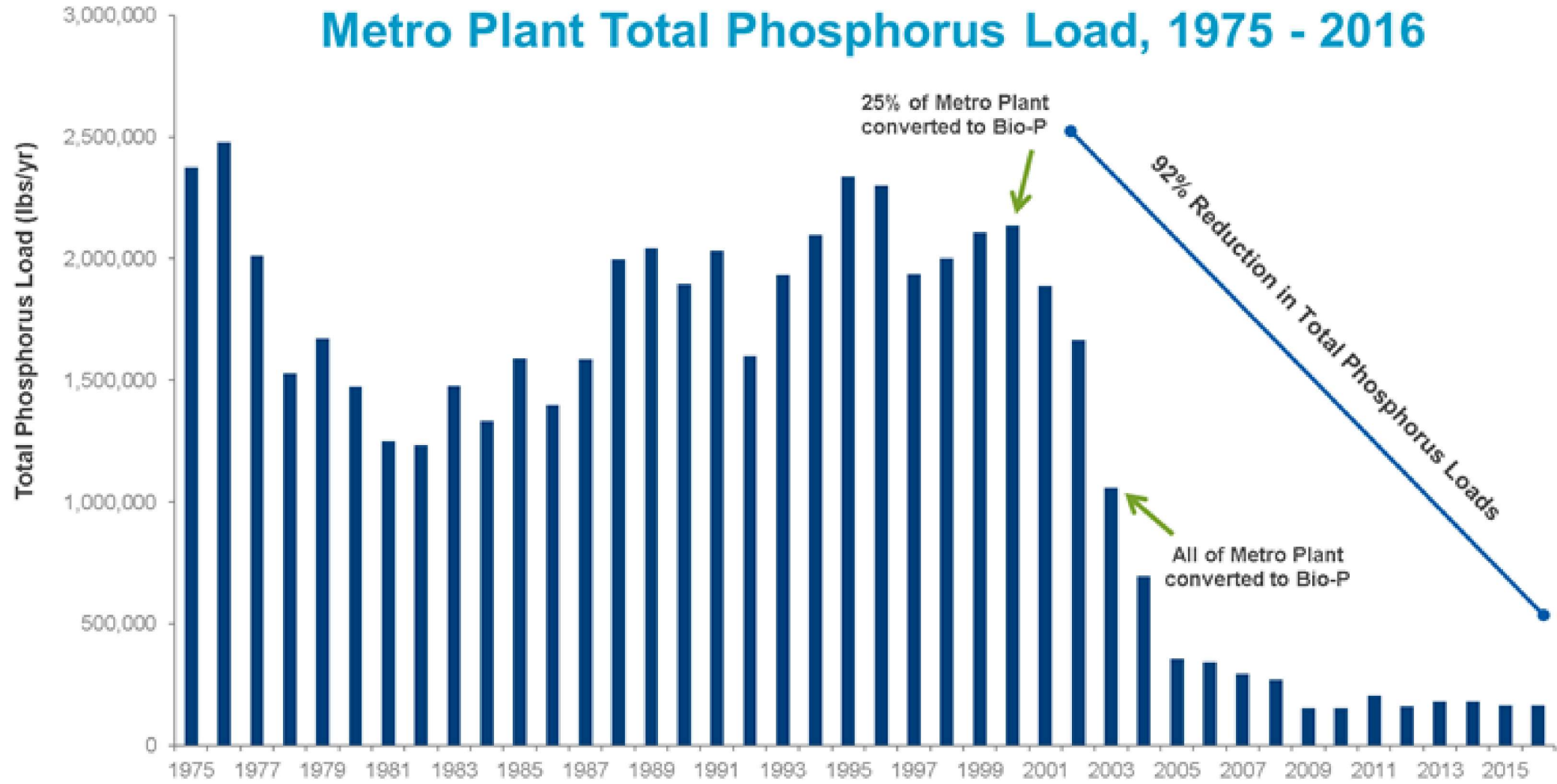
**1989 – Wisconsin challenges Metro Plant Permit**

**1990s - Permit Required Phosphorus Studies**

**1999 – Metro Plant Partial Phosphorus Removal Transition Begins**

**2003 – Metro Plant Phosphorus Removal Program Complete**

# Metro Plant Total Phosphorus Load, 1975 - 2016



# Two Forms of Pollution

## Point



**A lot of progress has been made**

## Non-Point



**More work needs to be done**

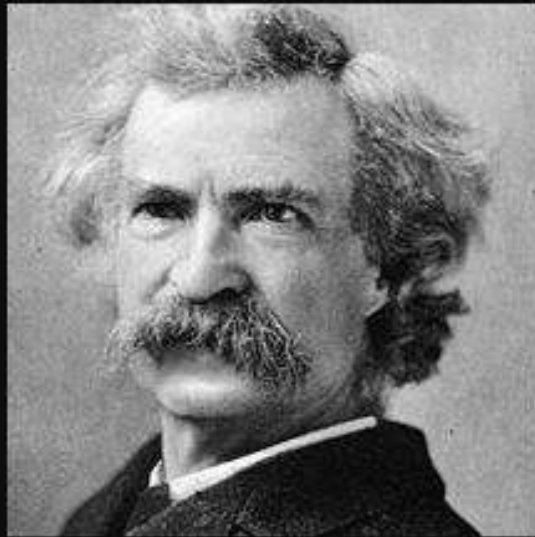
# Non-Point Source Pollution Challenges

The current regulatory framework provided by the Clean Water Act does not adequately address non-point pollution.



“The landscape is leaking sediment, nitrogen and phosphorus”

We need to build on our successes dealing with point source pollution and deal with pollution flowing off the landscape.



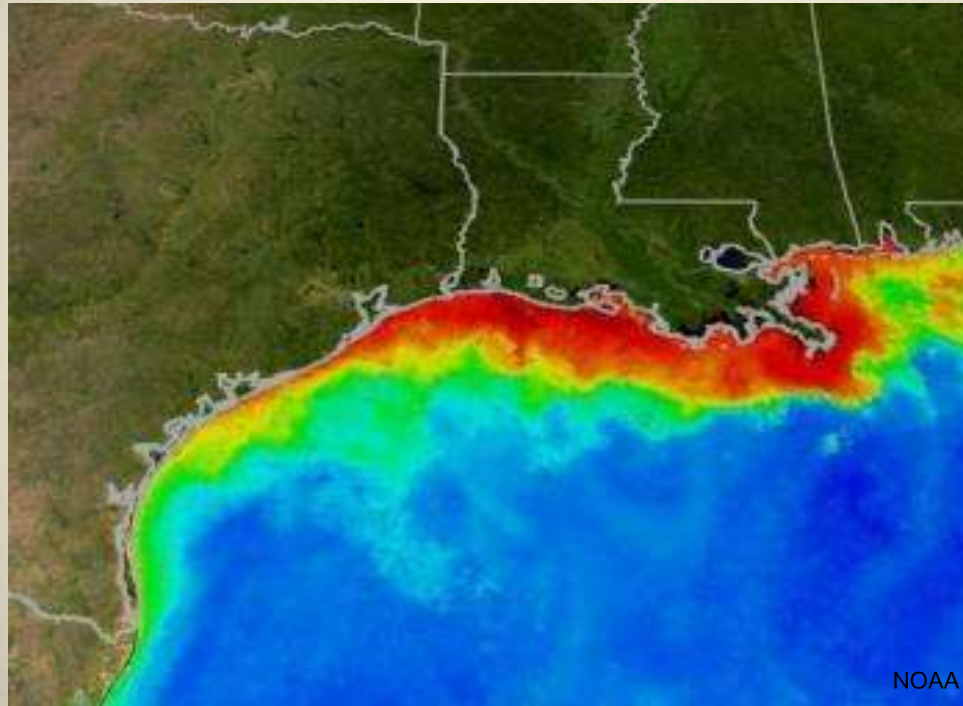
Whiskey is for drinking; water is  
for fighting over.

~ Mark Twain

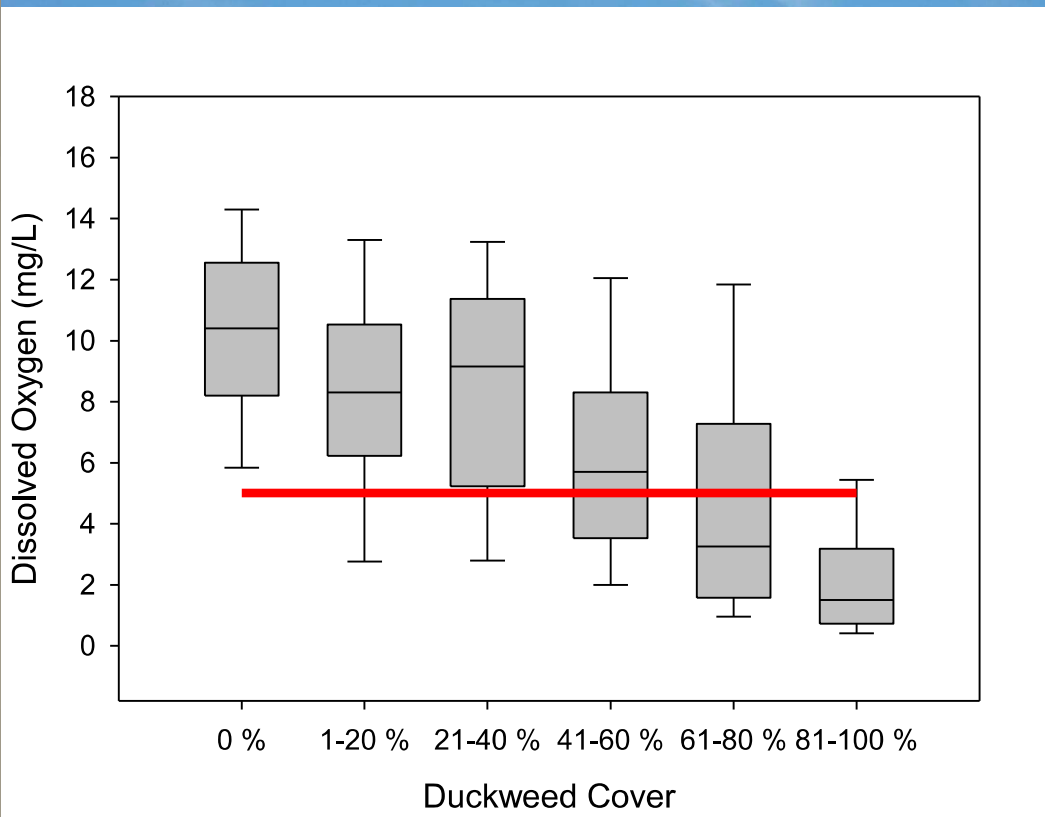


# Dead Zone in the Gulf of Mexico

- Nitrate-N has increased by a factor of 10 over the past 100 years in the Lower Mississippi River
- Up to 8,000 sq. miles unsuitable for life- Roughly the size of New Jersey



# Local Effects of Excess Nitrogen and Phosphorus



Mini Dead Zones

18 11:14AM

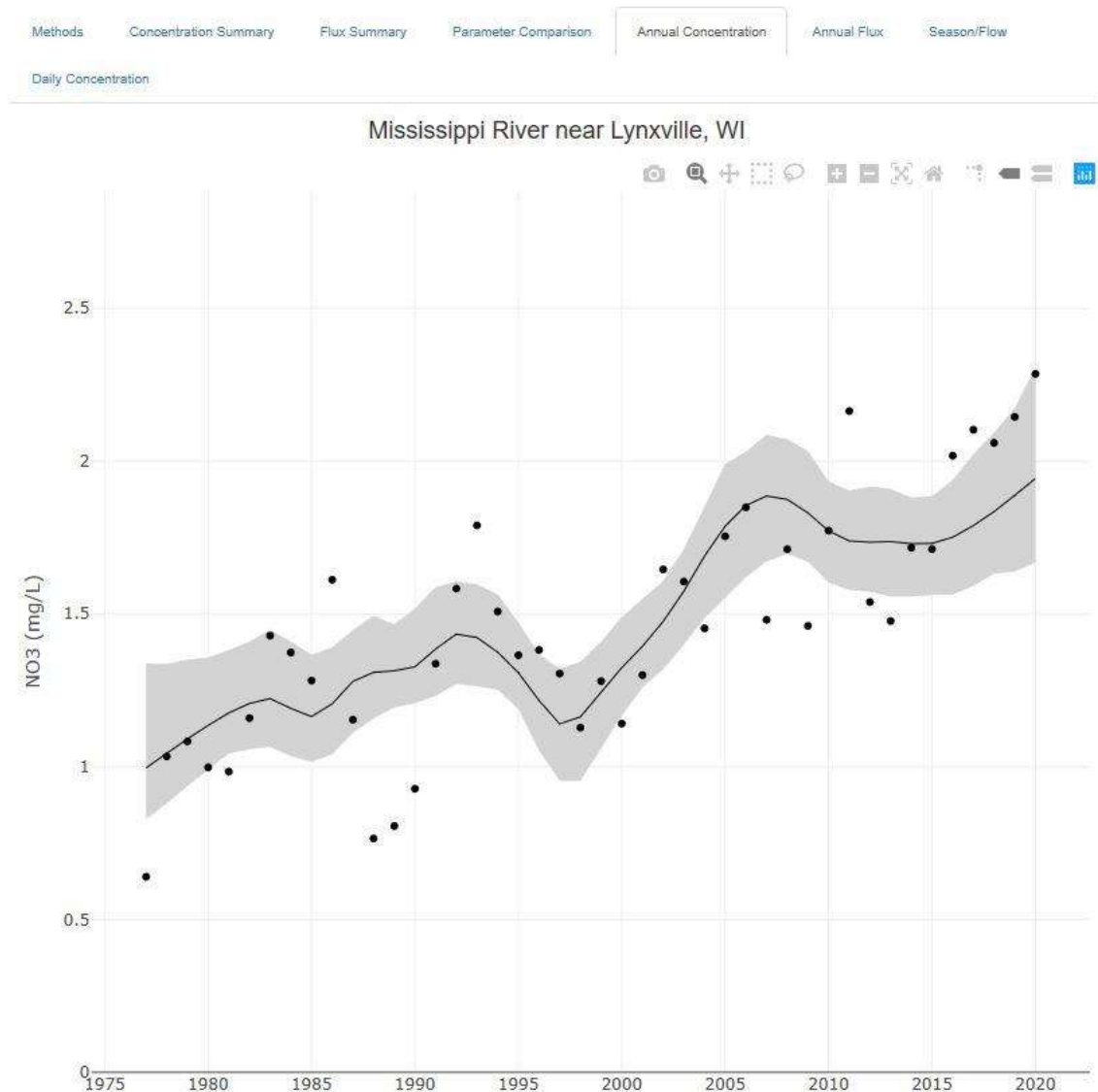
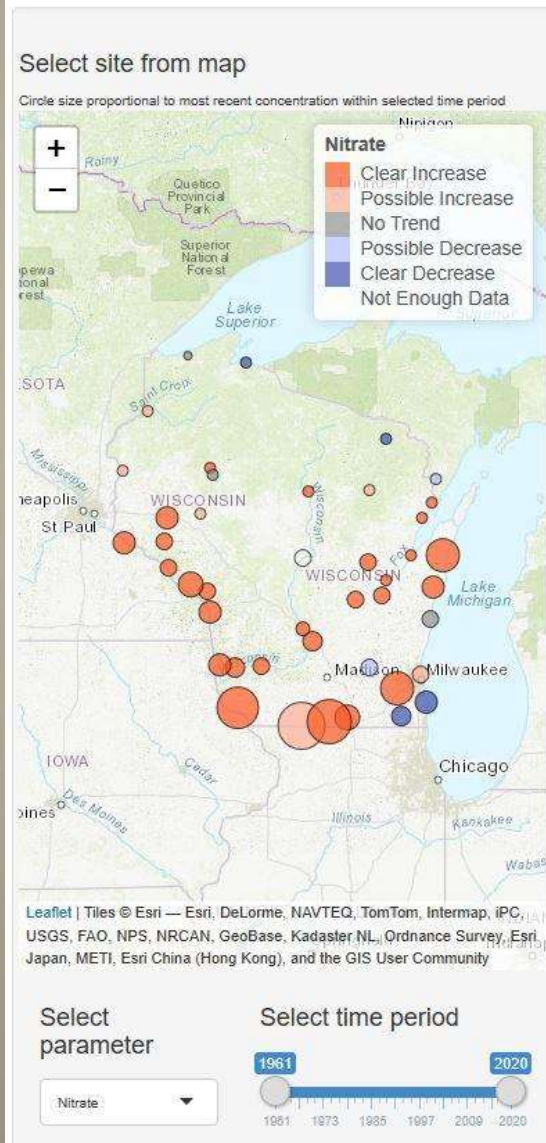


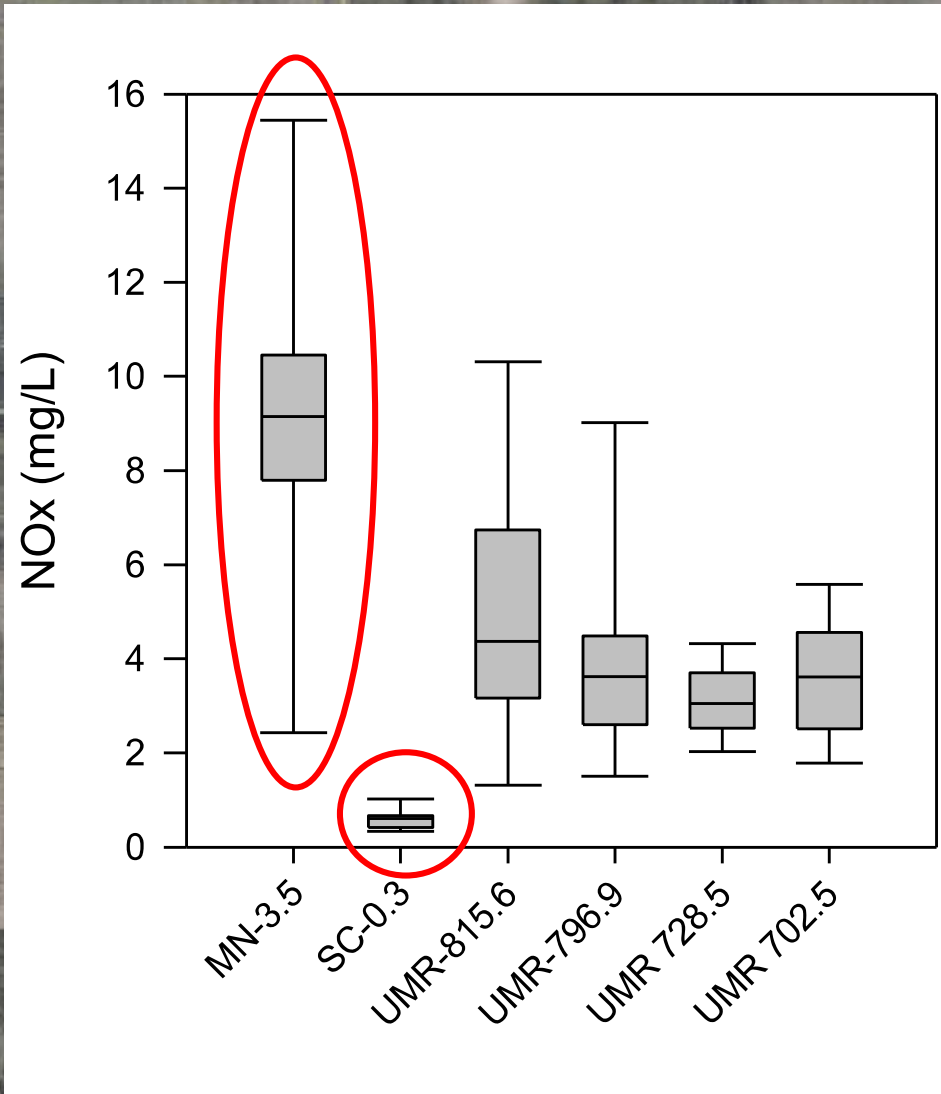
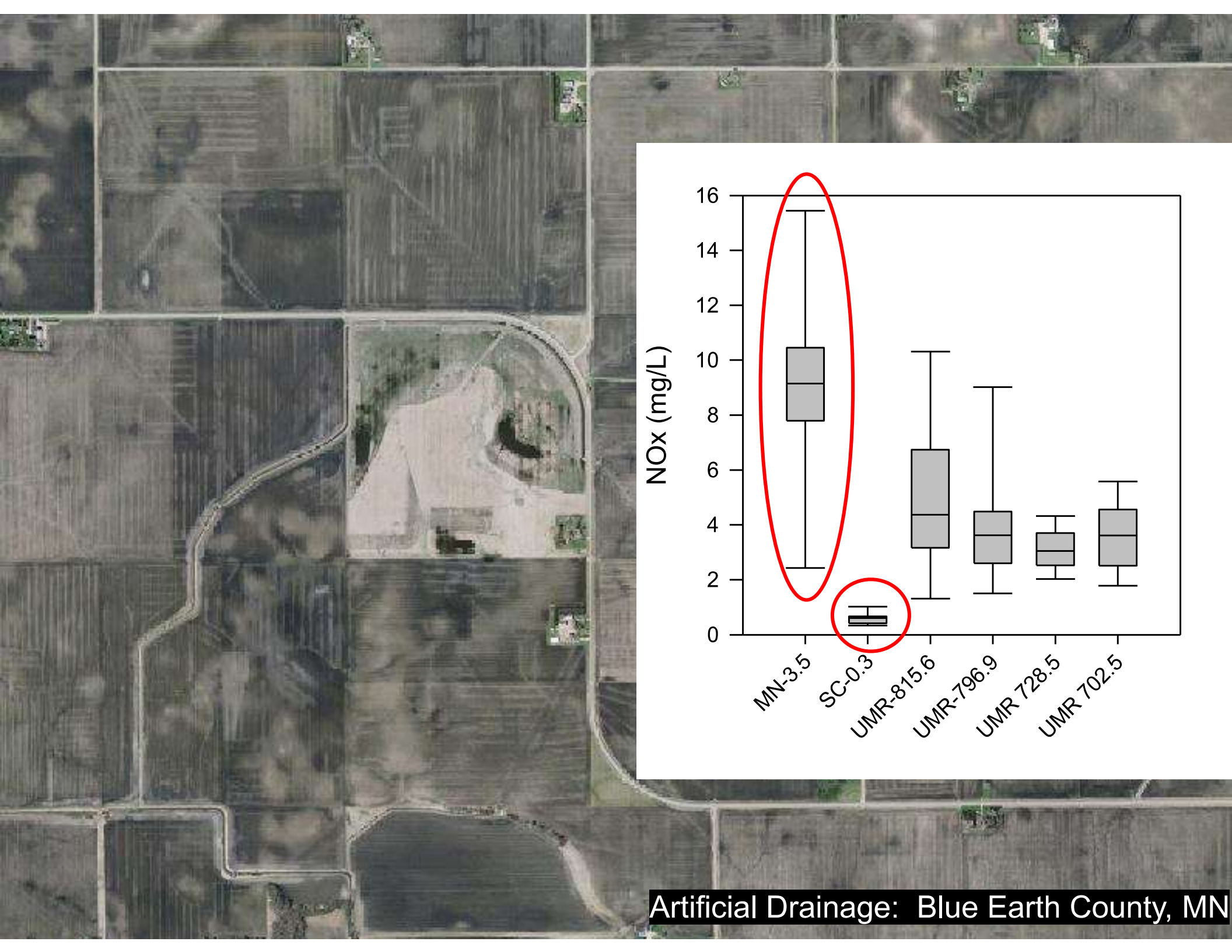


# Annual Nitrate Concentration Lock and Dam 9 (Lynxville, WI) 1977-2020

**~2% annual increase**

Long-Term River Water Quality Trends in Wisconsin

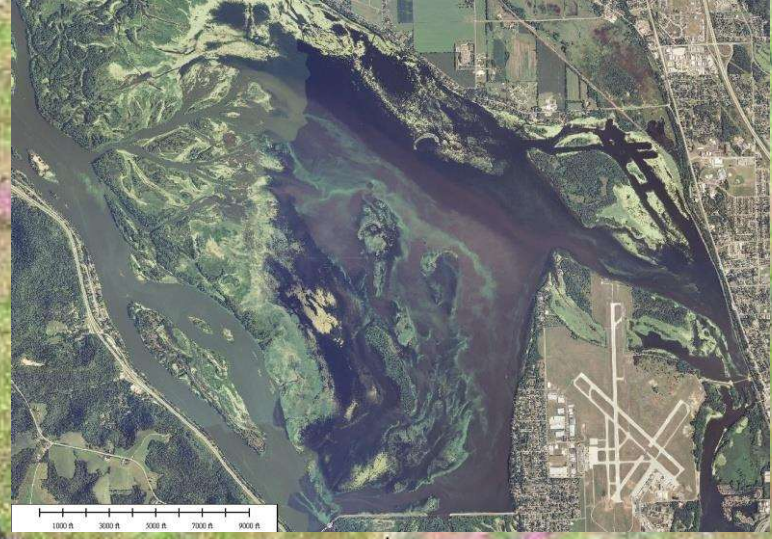




Artificial Drainage: Blue Earth County, MN

# Bluegreen Algae Blooms Phosphorus Driven Events

Lake Pepin



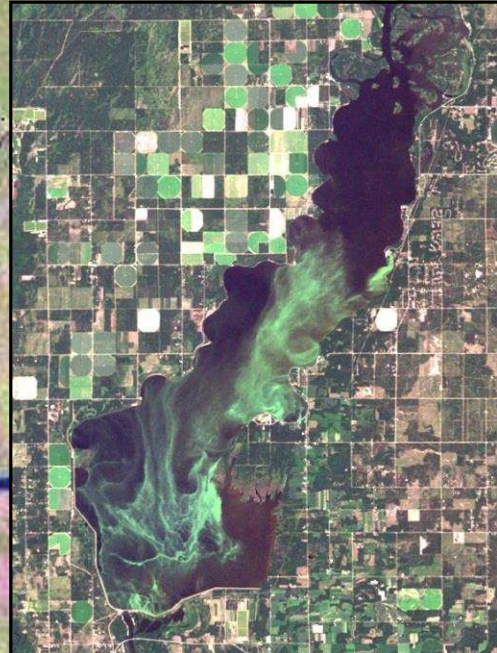
Lake Onalaska

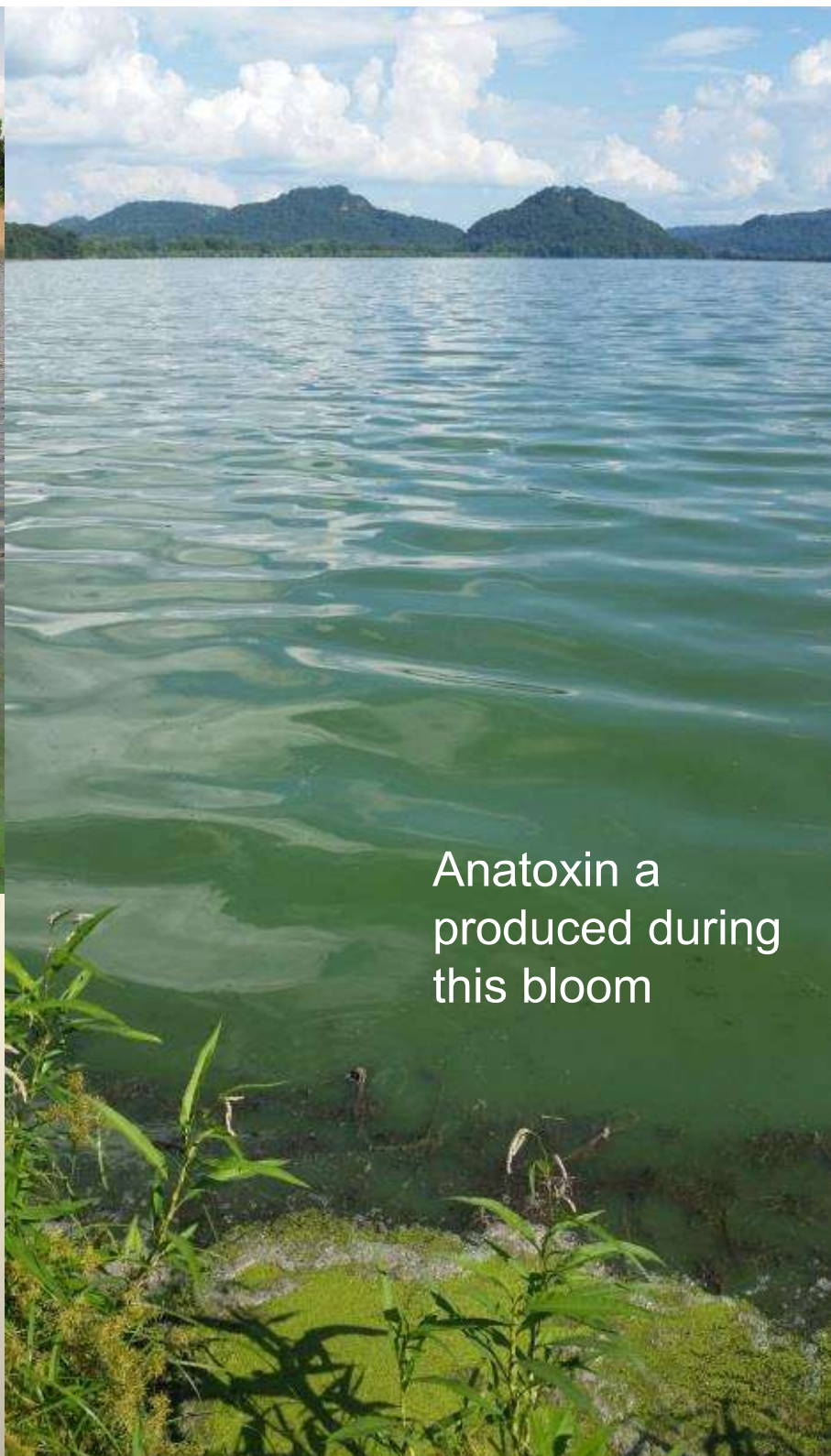


Lake Petenwell



Pool 8 near Genoa



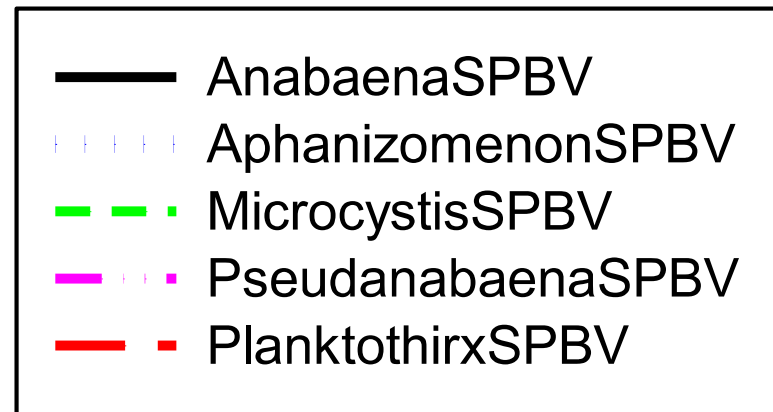
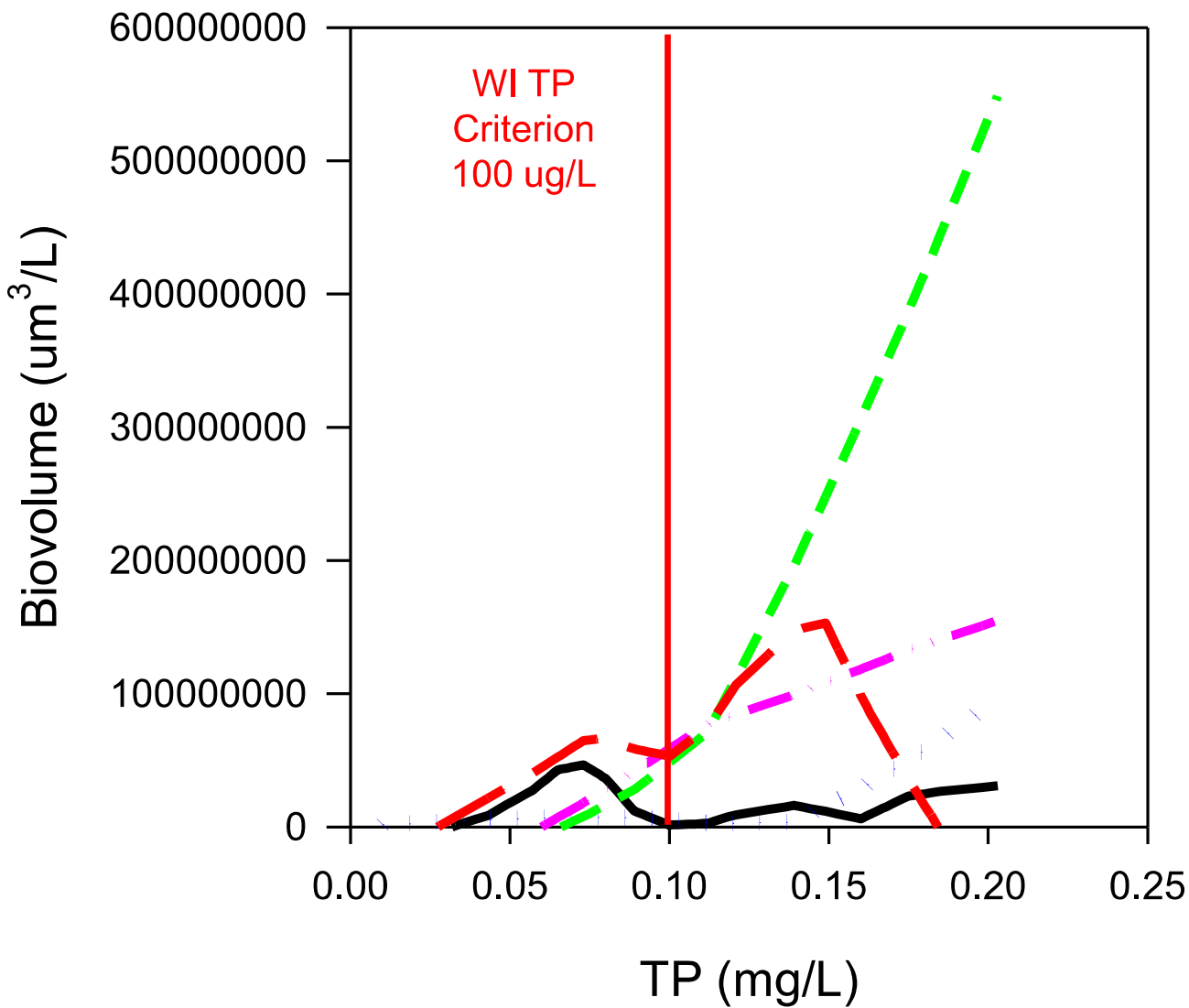


## Emerging Threat Cyanotoxins

**Microcystin 69.8 ug/L- August 2013- Crater Lake near La Crosse- *Microcystis Aeruginosa* bloom**

**Draft EPA Guidance (Swimming Advisory)  
Microcystin 8 ug/L**

Anatoxin a  
produced during  
this bloom



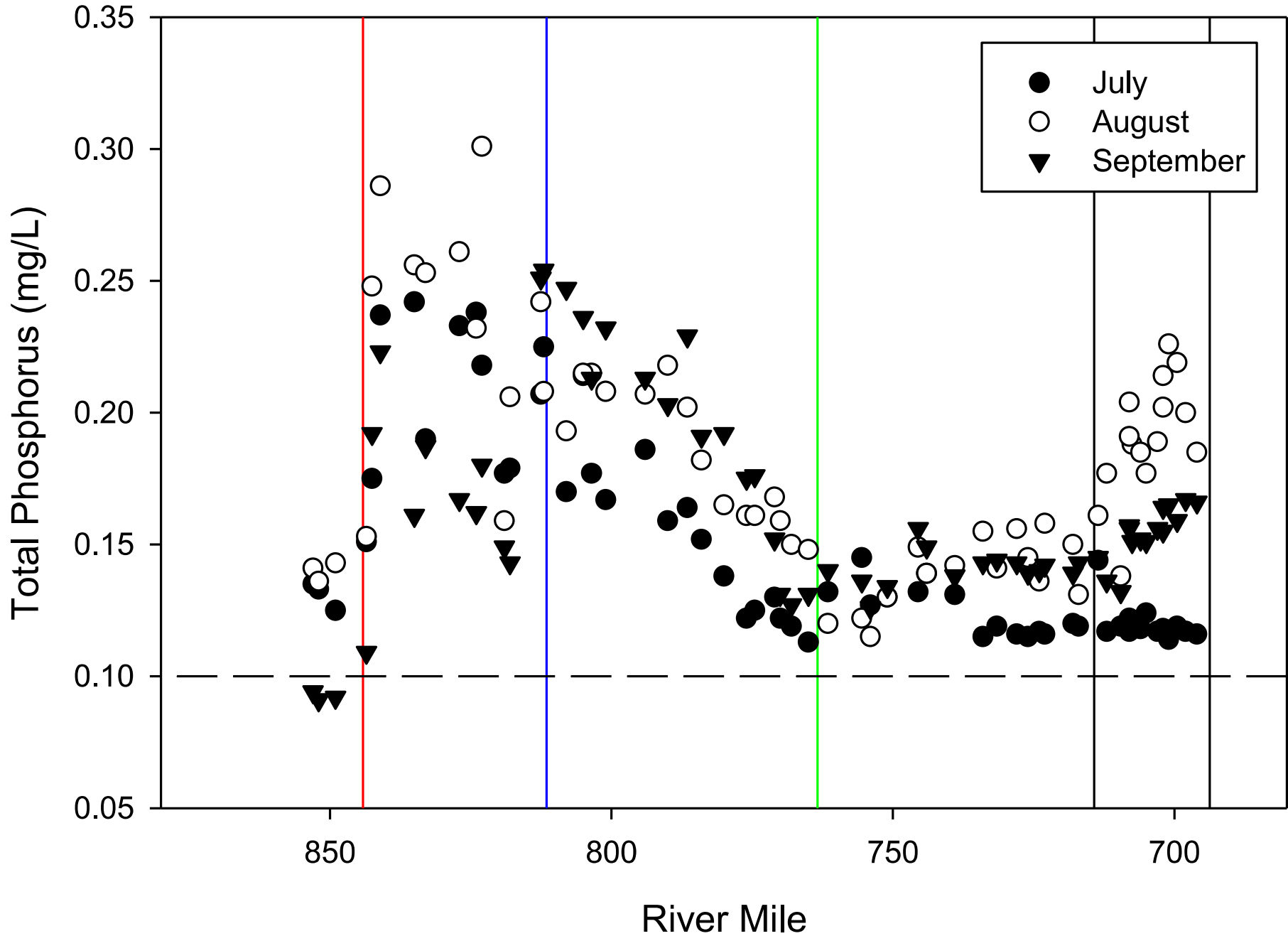


Minnesota R. St. Croix R.

Chippewa R.

LD6

Root R.



Summer 2016

# Sediment Issues



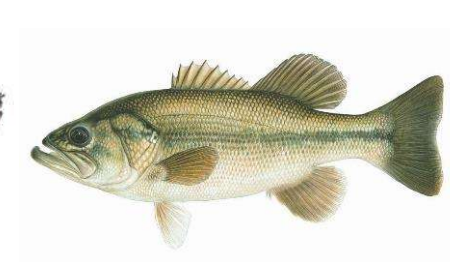
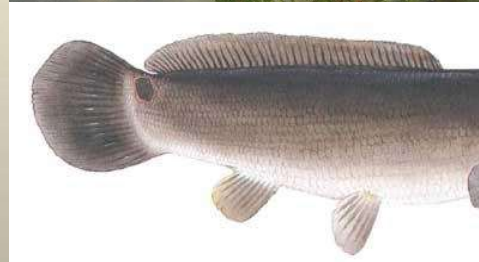
# Mississippi River Downstream of Lake Pepin Last 35 years



Turbid/Unvegetated

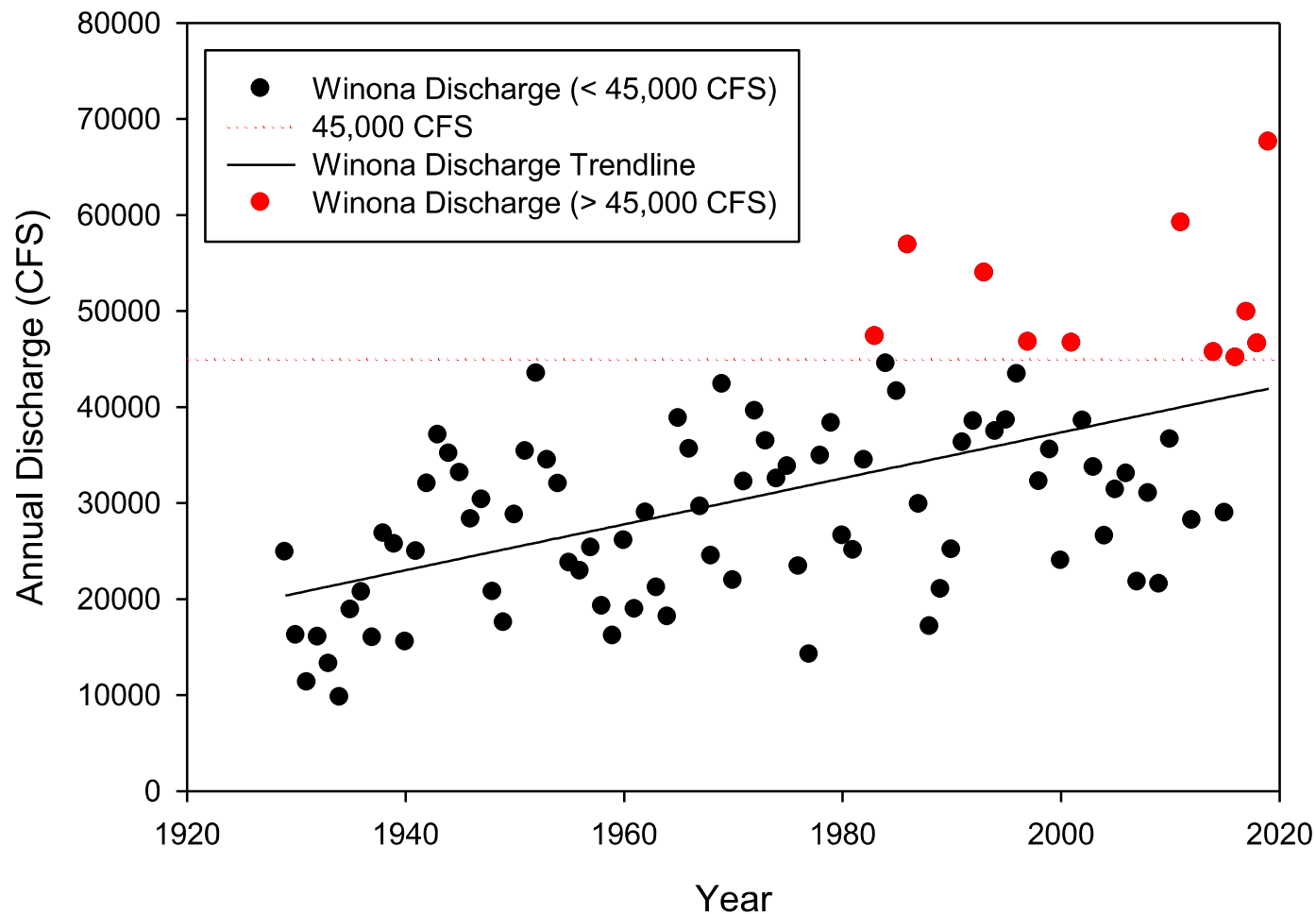


Clear/Vegetated



# WATER QUANTITY CLIMATE CHANGE ISSUES

Mean Annual Discharge at Winona 1929-2019



**Substantial increase in mean annual discharge at Winona past 90 years**

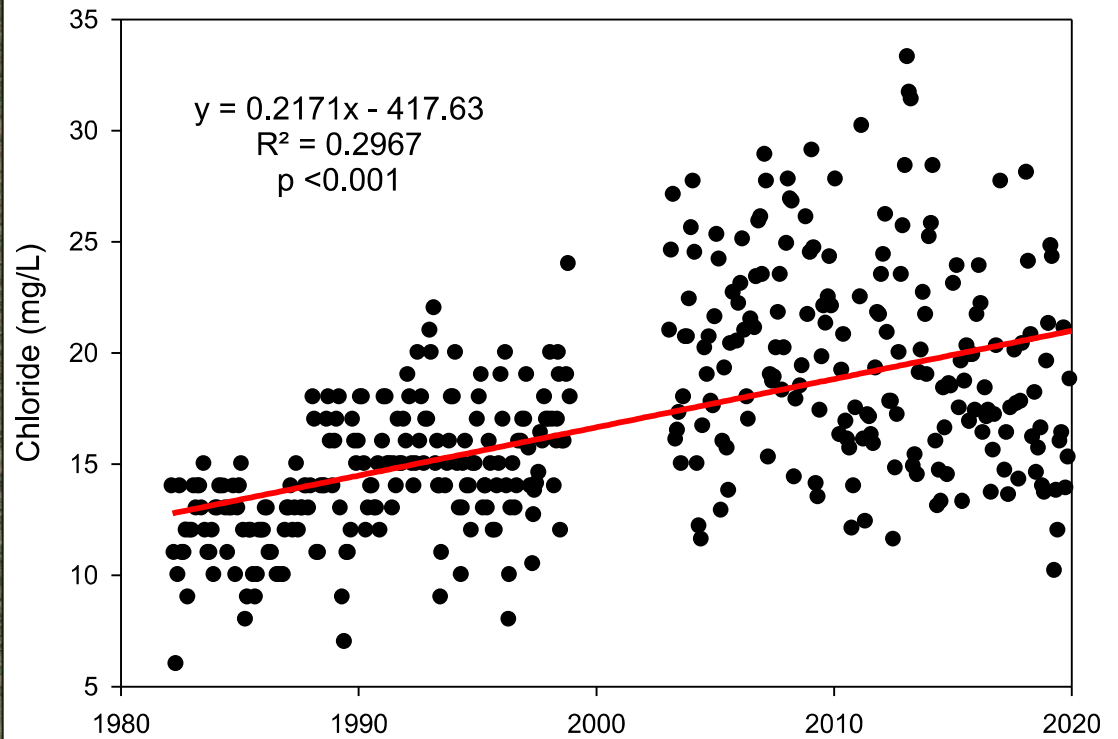
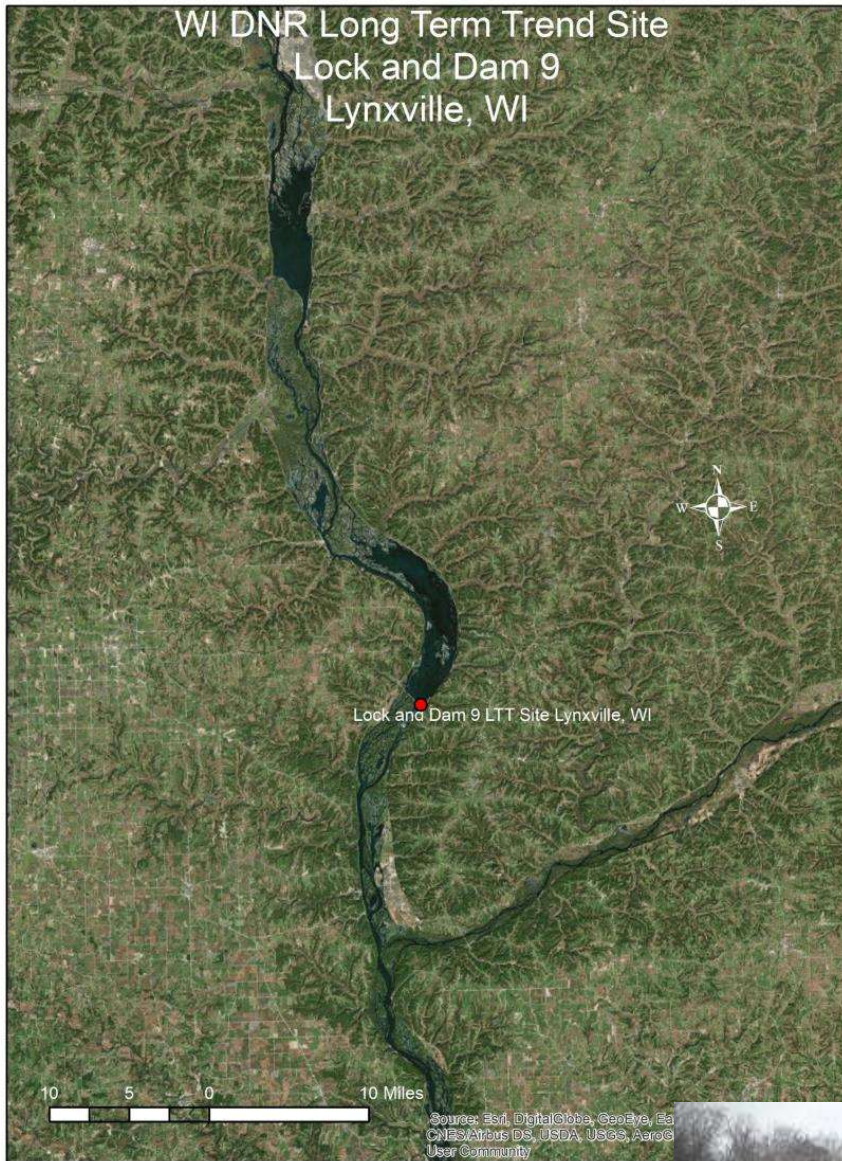
**Zero years of mean annual discharge >45,000 CFS 1929-1980**

- 11x since 1980
- 6x since 2011

**Paying a heavy price in terms of habitat loss (island destruction, island dissection, loss of water depth in backwaters, loss of floodplain forest)**

# Chloride

Lock and Dam 9  
Lynxville, WI  
1982-2020



**66% Increase**



# Conclusions

- Great strides have been made in regard to controlling point-source pollution
- The Clean Water Act does not adequately address non-point source pollution
- Excess nutrients and sediment from non-point sources are affecting the Mississippi River ecosystem both locally and in the Gulf of Mexico
- Emerging threats (nitrogen, chloride, algal toxins, PFAS and increasing discharge) need to be addressed
- We need to invest in conservation and habitat restoration programs and develop new technologies to restore this globally significant ecosystem

