Illinois NLRS Nutrient Monitoring Council

Illinois Department of Agriculture

Illinois Environmental Protection Agency

Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Virtual Meeting

September 14, 2023

9:00 – 11:30 AM

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Welcome

Trevor Sample, Illinois Environmental Protection Agency

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Roles

Welcome: *Trevor Sample, IEPA*

Moderator: *Joan Cox, Illinois Extension*

Technology Assistance: *Layne Knoche, Illinois Extension*

Meeting minutes: *Amanda Christenson, Illinois Extension*

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Attendance

Please type your name and affiliation into the chat box.

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Agenda

9:00 (10 min.)	Welcome *Trevor Sample, Illinois Environmental Protection Agency*
9:10 (30 min.)	USGS nutrient load update *Kelly Warner, United States Geological Survey* Q & A
9:40 (30 min.)	Which Experiments, Measurements and Analyses Should be Done to Quantify Causes of Total Phosphorus Load Increases in Illinois Rivers? *Greg McIsaac, University of Illinois* Q & A
10:10 (5 min.)	Break
10:15 (30 min.)	Illinois EPA Harmful Algal Bloom Program Update *Alex Terlep, Illinois Environmental Protection Agency* Q & A
10:45 (20 min.)	Illinois River Biological Station Monitoring on the Illinois Waterway *Sara Sawicki, Illinois Natural History Survey* Q & A
11:05 (25 min.)	NMC Member Updates
11:30	Adjourn

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

USGS
science for a changing world

U.S. Geological Survey Local and National Update for Illinois Nutrient Monitoring Council

Kelly Warner

Deputy Director

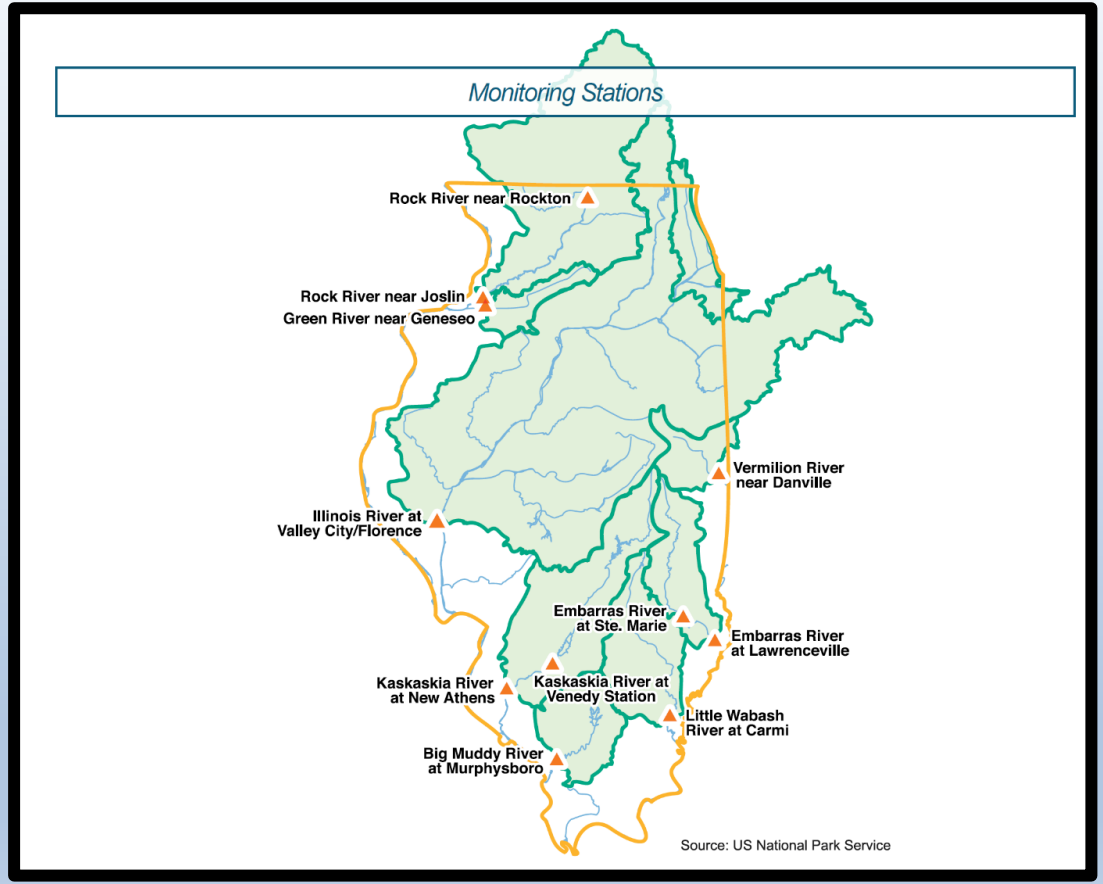
USGS Central Midwest Water Science Center

U.S. Department of the Interior
U.S. Geological Survey

Monitoring Change

Monitor changes in nutrient loads from Illinois' eight largest rivers relative to the 1980-96 baseline

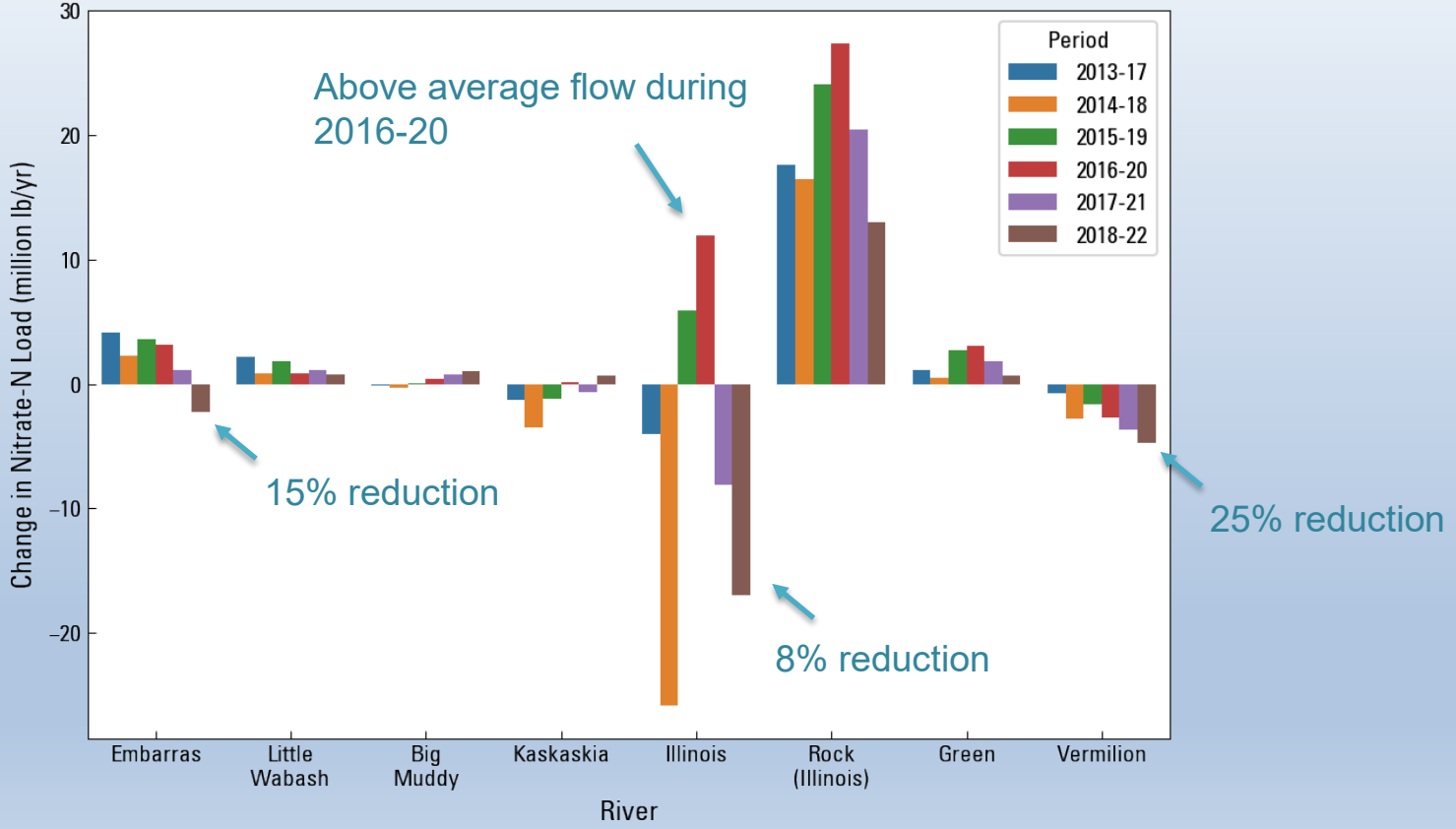
- ***baseline***: water years 1980–1996 estimated by periodic sampling
- ***super gage***: continuous water-quality monitoring sites used to estimate loads since 2019.
- ***INLRS:*** *Since 2017, progress assessed based on the 5-year average loading.*



USGS

Courtesy of Tim Hodson

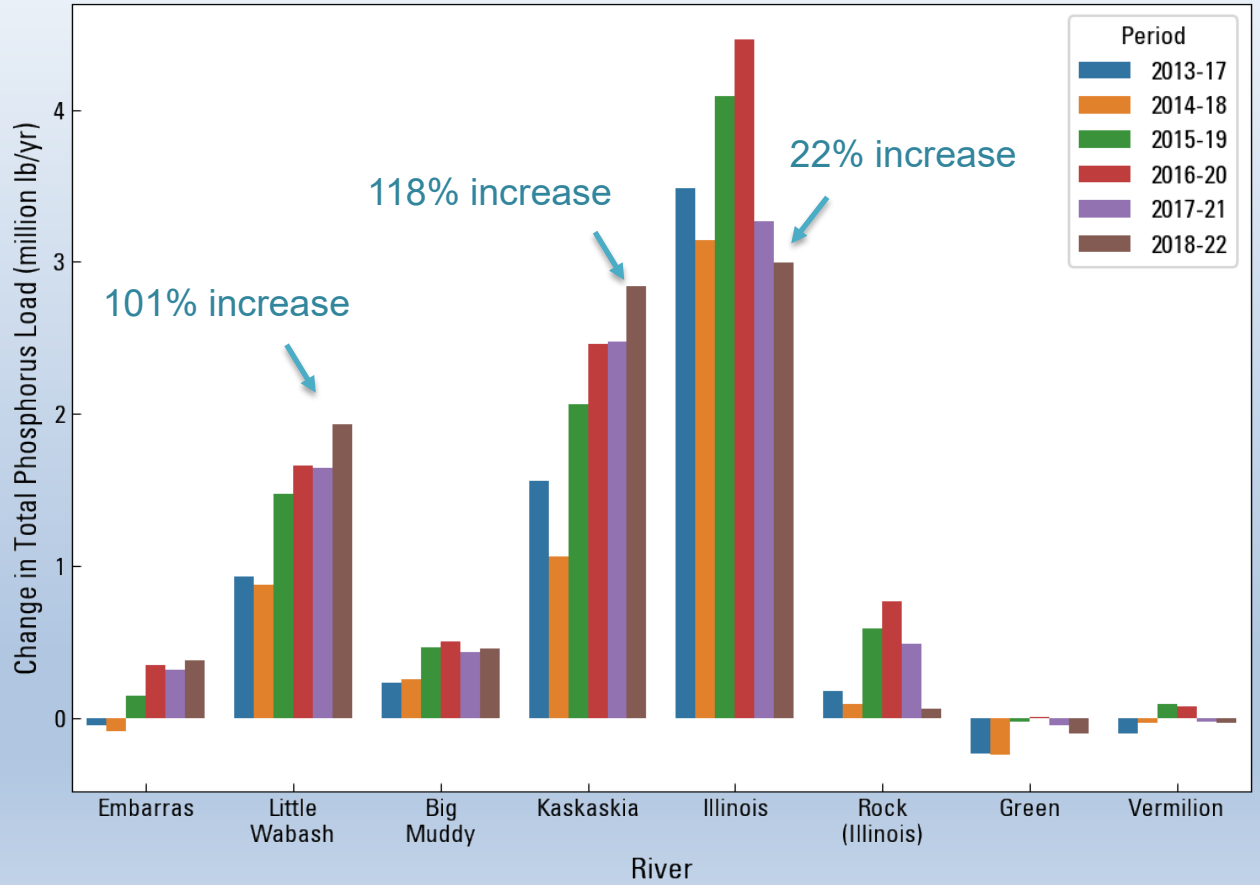
Change in nitrate relative to baseline



USGS

Courtesy of Tim Hodson

Change in phosphorus relative to baseline

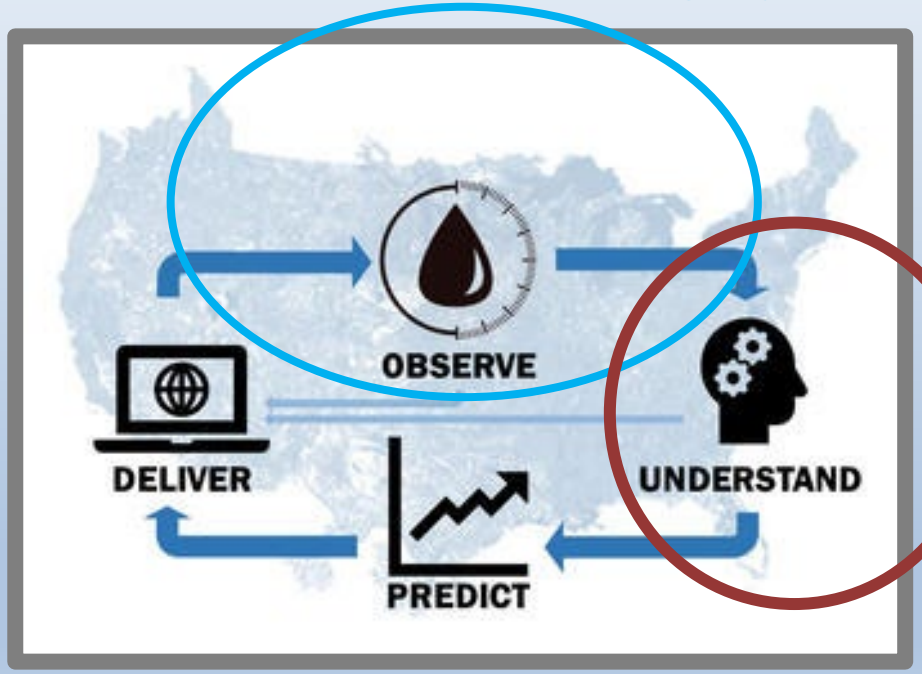


USGS

Courtesy of Tim Hodson

USGS Integrated Water Science (IWS) Basins

Next Generation Water Observing Systems (NGWOS)



Integrated Water Availability Assessments (IWAAs)

USGS

Courtesy of Jim Duncker

USGS Integrated Water Science (IWS) Basins

Next Generation Water Observing Systems (NGWOS)

Focus topics

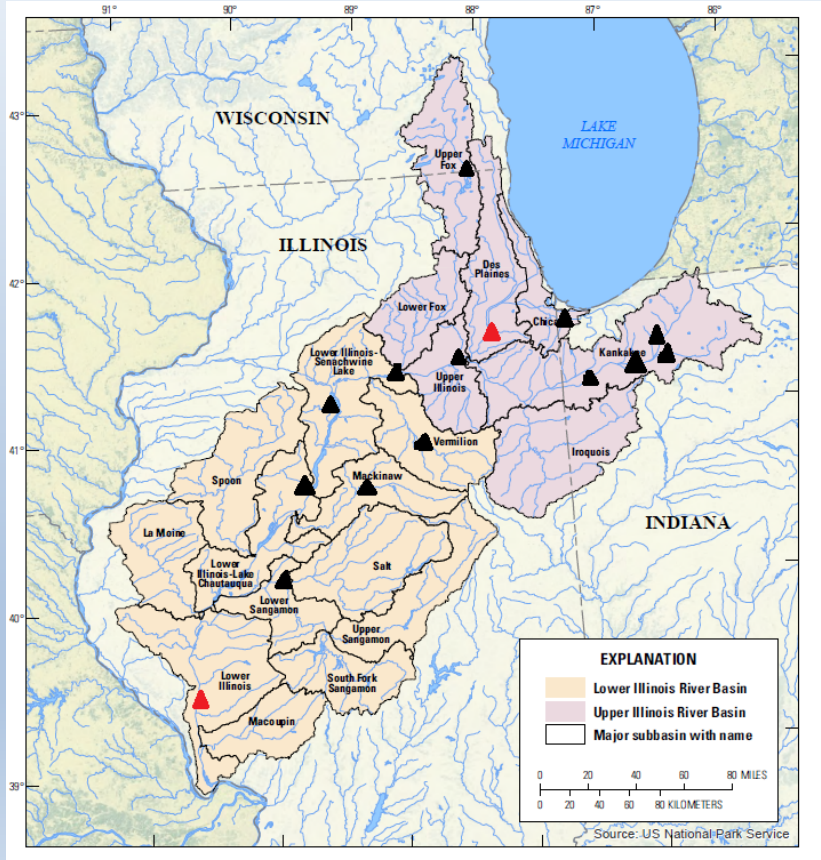
Integrated Water Availability Assessments (IWAAs)

USGS

Courtesy of Jim Duncker

USGS Next Generation Observing Systems (NGWOS)

Super gage network-super gages provide continuous water quality measurements at fixed locations on the mainstem Illinois River (ILR) and major tributaries within the Illinois River Basin (ILRB). NGWOS expanded the network of super gages from 2 to 15 in the ILRB.



USGS

Courtesy of Jim Duncker

Illinois River at Starved Rock Testbed

HABs-discrete sampling and Next Generation sensors MicaSense redband camera, Phytofind, AlgaeTracker among instruments being tested

USGS

Courtesy of Jim Duncker

Improve understanding of conditions driving/triggering CyanoHABs and cyanotoxin production

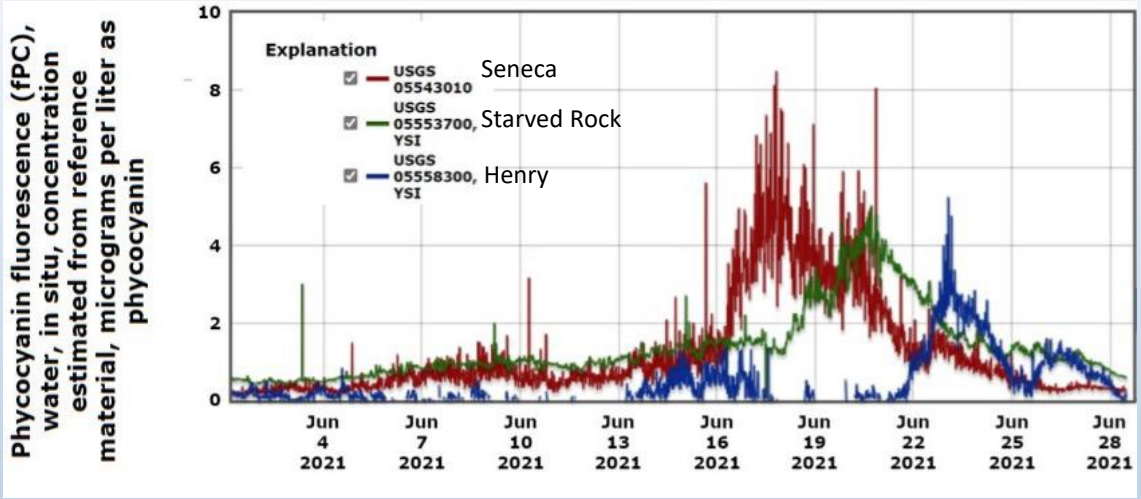
- **NGWOS ILRB sample plan**
  - Nutrients, suspended sediment, selected metals
  - Phytoplankton and periphyton community structure
  - Chlorophyll *a*, pheophytin *a*, and ash-free dry mass
  - Cyanotoxins
  - Taste and odor compounds
  - DNA-based toxin gene assays

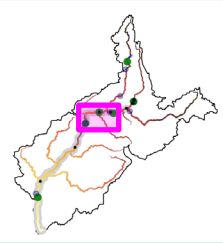
Photographs by Heather Krempa, U.S. Geological Survey

USGS

Courtesy of Heather Krempa

2022 HAB Preliminary Data Review





https://waterdata.usgs.gov/nwis

- Phycocyanin concentrations peaked at the upstream location near Seneca, IL then downstream near Starved Rock and later further downstream near Henry, IL.
- 2-Methylisoborneal (MIB) and Geosmin taste and odor compounds were elevated during HAB
- Cyanobacteria were dominant during visible HAB and Diatoms generally dominant during non-HAB

USGS

Courtesy of Heather Krempa

Photographs by Katie Summers, U.S. Geological Survey

Testbed-Nutrient Diffusing Substrates

- Determine which nutrient(s) are limiting algal growth, toxin production, and species composition
- When a HAB occurs the communities shift thus altering these gross primary productivity rates—the balance between photosynthesis and respiration.

USGS

Courtesy of Katie Summers

Nutrient (N and P) sensor evaluation testbed

- Continuous N and P sensors from various manufacturers are currently being evaluated in Urbana. The basin focus topics and CMWSC expertise make the ILRB an ideal location for these evaluations.

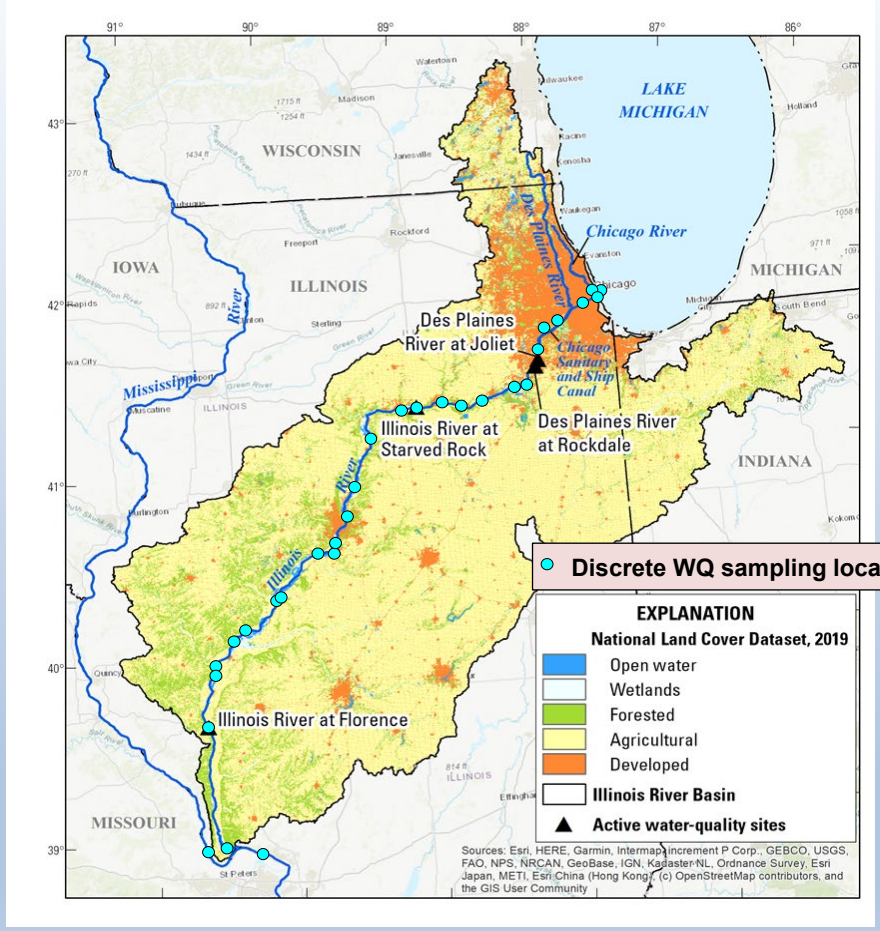
Photographs by the U.S. Geological Survey

USGS

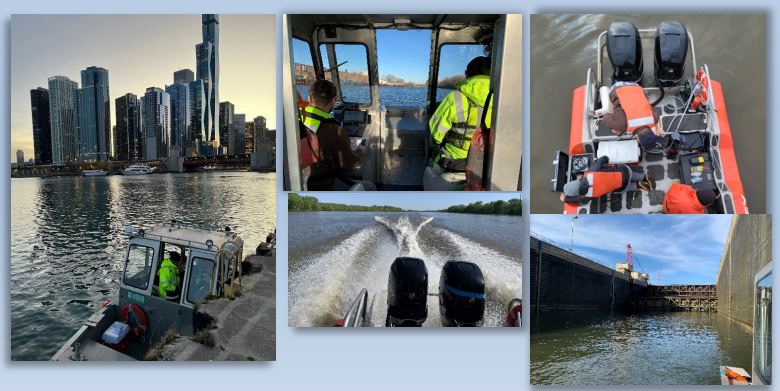
Courtesy of Colin Peake

FLAMe Water Quality Sampling Campaigns

- Lake Michigan to Mississippi River (~335 miles)
- Nutrients (N, P, C), major ions, dissolved CO_2 & CH_4, C isotopes, dissolved organic matter chemical characterization, PFAS, pharmaceuticals, algal communities (select sites)



Map courtesy of J. Sharpe, U.S. Geological Survey



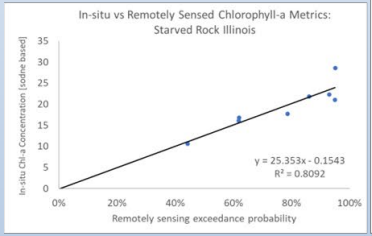
USGS

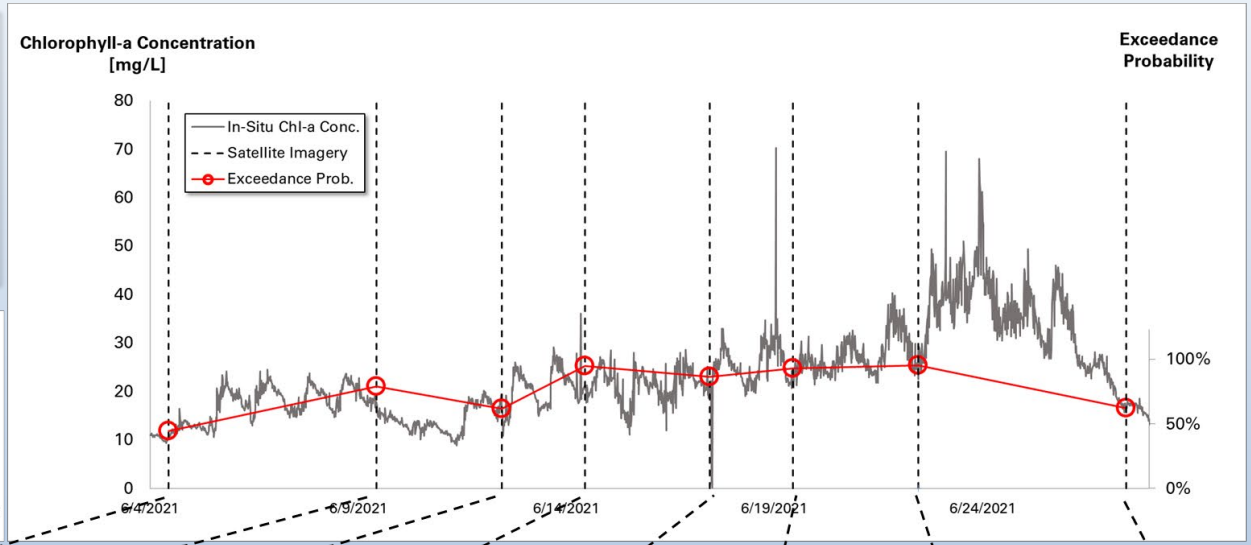
Courtesy of Jim Duncker

Illinois River Basin: Chlorophyll for HABs monitoring

Imagery for Starved Rock, Illinois (USGS 05553700).

Exceedance probability: the estimated probability that a given pixel has a chlorophyll-a concentration greater than 10 ug/L.



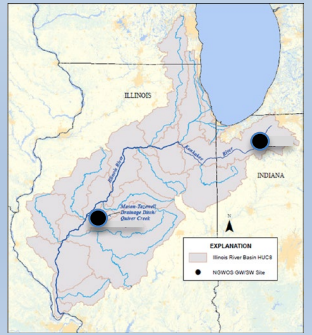


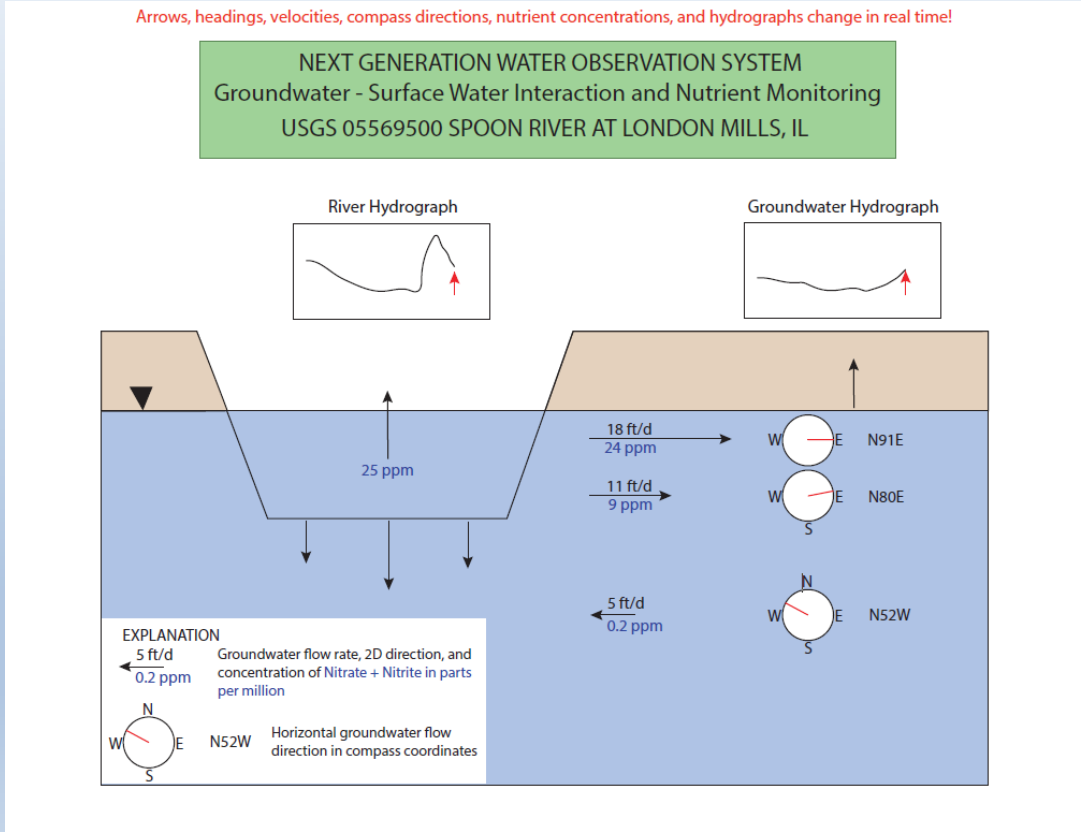
USGS

Courtesy of Tyler King

Groundwater-surface water (GW-SW) interaction

- GW-SW interaction with emphasis on nutrient contribution to stream from shallow groundwater at two locations:
  - Kankakee River at Davis, Indiana
  - Quiver Creek near Havana, Illinois





USGS

Courtesy of Dave Lampe

USGS Integrated Water Science (IWS) Basins

Next Generation Water Observing Systems (NGWOS)

Focus topics

&

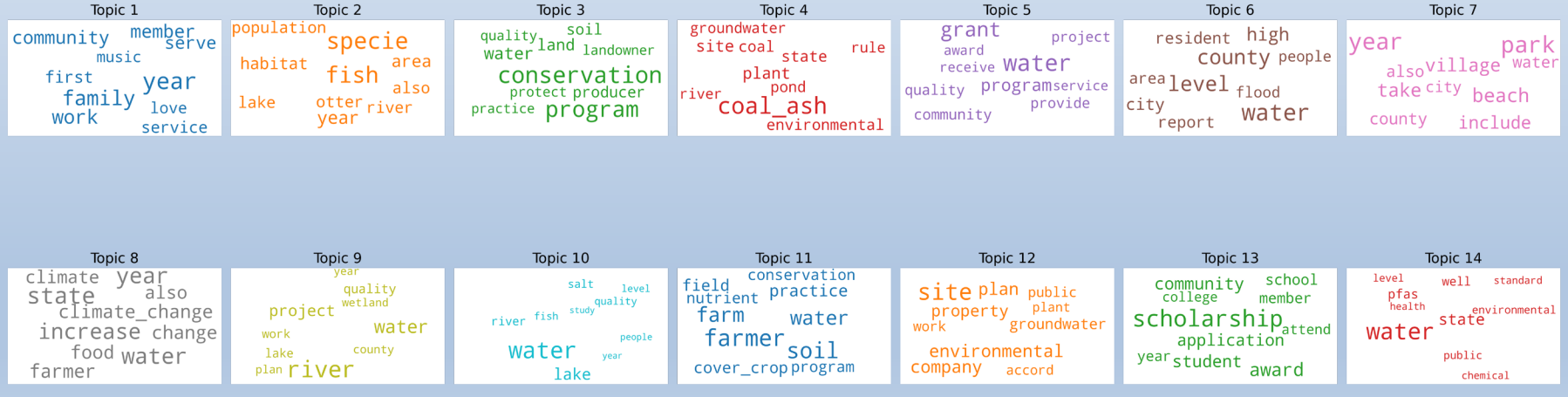
Integrated Water Availability Assessments (IWAAs)

USGS

Courtesy of Jim Duncker

Advancing the State of the Science

- **HABs history in the ILRB**
  - (1) Regional trend analysis with diverse set of data
  - (2) Natural language processing of water quality related newspaper articles

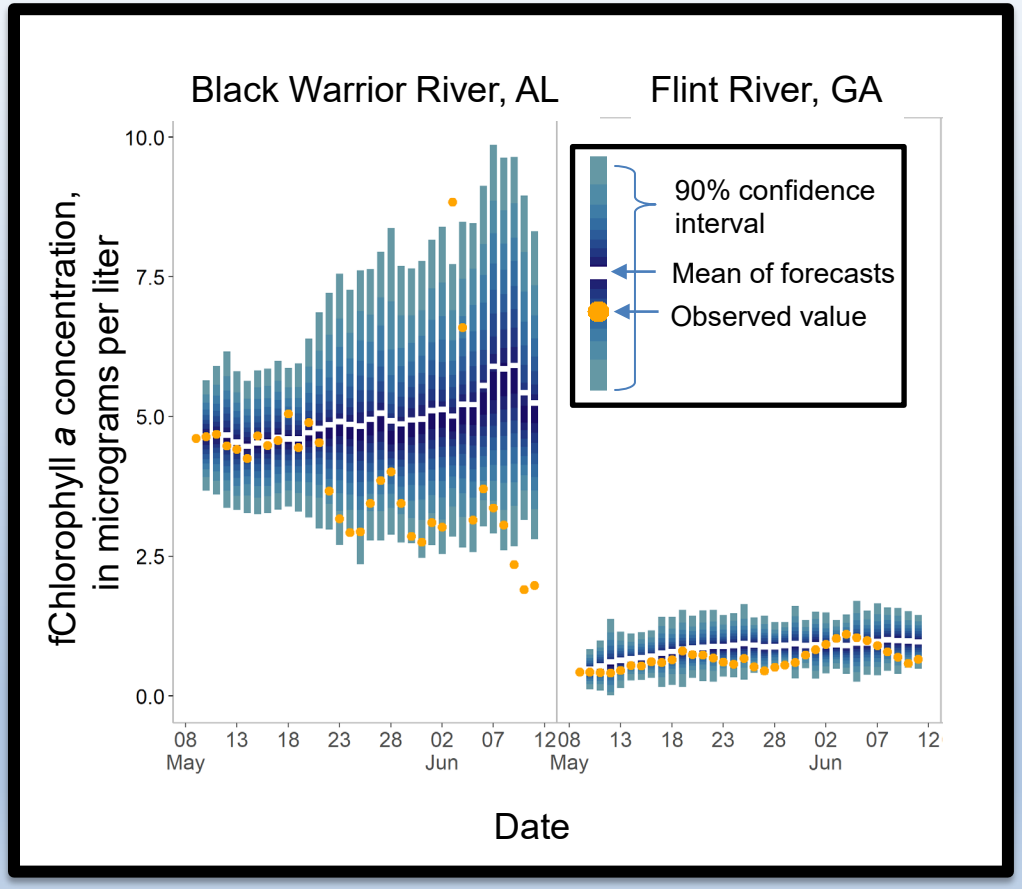


USGS

Courtesy of Jenny Murphy

Predicting/forecasting HABs in nutrient-rich river systems

- River HABs modeling literature review
- Expand ongoing 30-day chlorophyll fluorescence (fChl) forecasting work



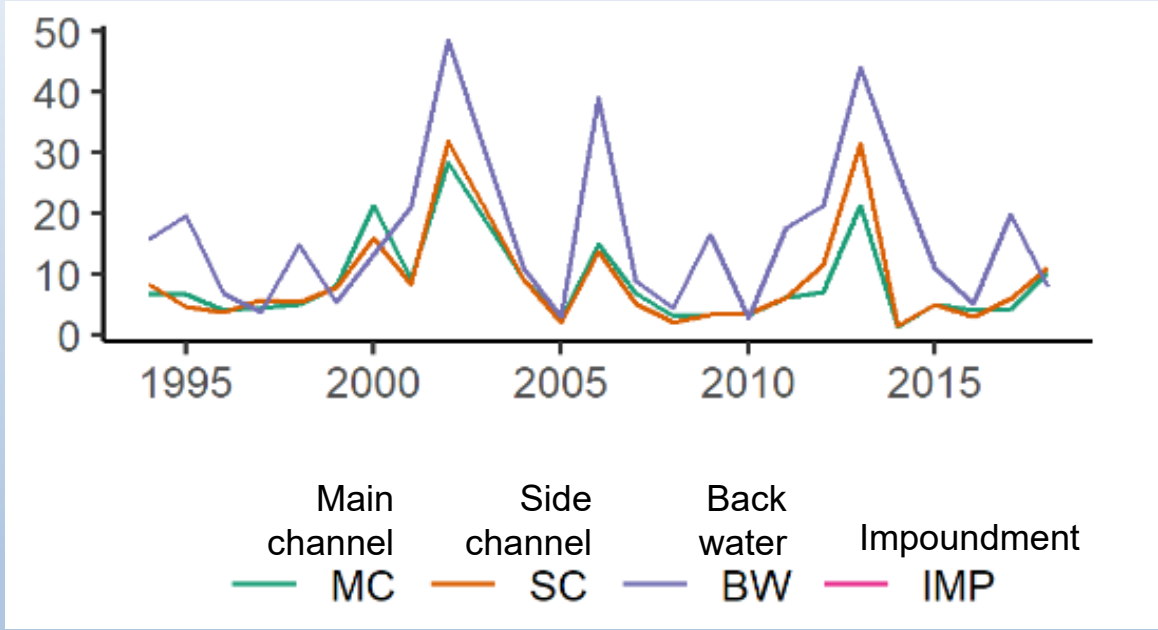
USGS

Courtesy of Jenny Murphy

Understanding the history

For example,
Lower Illinois River
chlorophyll trends
(Jankowski, et al., 2021)

Annual average winter CHL



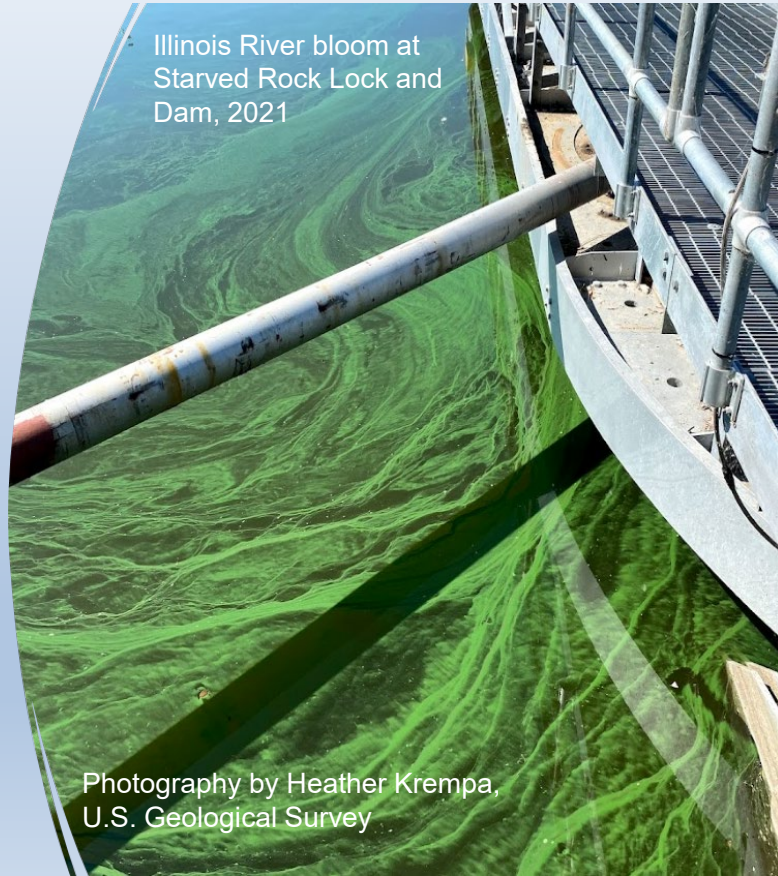
USGS

Courtesy of Jenny Murphy

What is overlooked or noticed when a particular metric is used to identify the occurrence of a river HAB?

Approach

- Compile State-level HAB guidelines
- Explore use of routine and novel metrics for HAB identification
- Explore early warning indicators
- Apply at seven sites in the Illinois River Basin to demonstrate application in rivers



USGS

Courtesy of Sarah Stackpoole

	Indicator	Number of States	Lowest threshold	Highest threshold
Recreational				
Qualitative	Visual	45		
	Olfactory	26		
Quantitative	Microcystin (micrograms per liter, ug/L)	31	Detection	20
	Cylindrospermopsin (ug/L)	21	Detection	15
	Anatoxin *a* (ug/L)	15	Detection	80
	Saxitoxin (ug/L)	10	Detection	75
	Chlorophyll *a* (ug/L)	2	7.1	30
	Cyanobacteria (ug/L)	19	Detection	100,000
	Secchi Disk Depth (meters, m)	2	1	1.5
Drinking Water				
Quantitative	Microcystin (ug/L)	15	0.16	1
	Cylindrospermopsin (ug/L)	14	0.5	0.7
	Anatoxin *a* (ug/L)	3	0.3	0.7
	Saxitoxin (ug/L)	2	0.3	0.3

USGS

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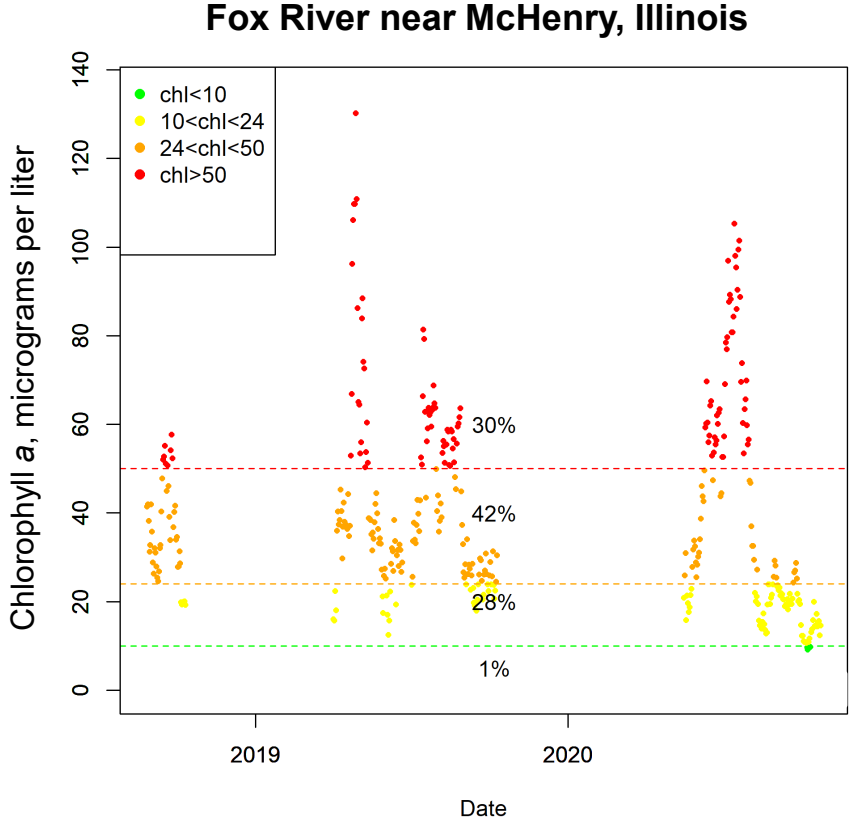
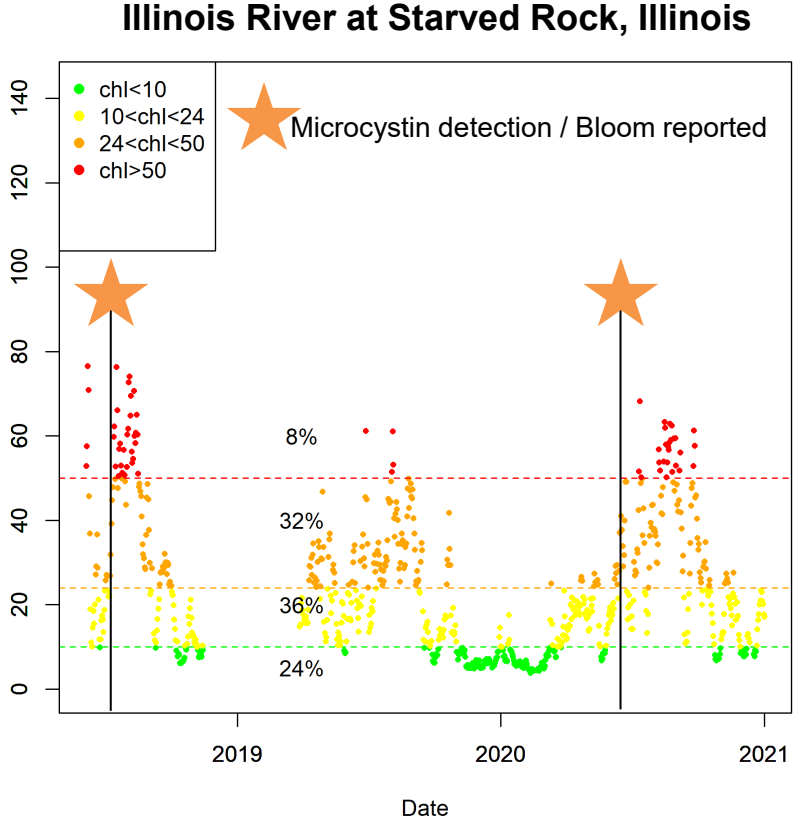




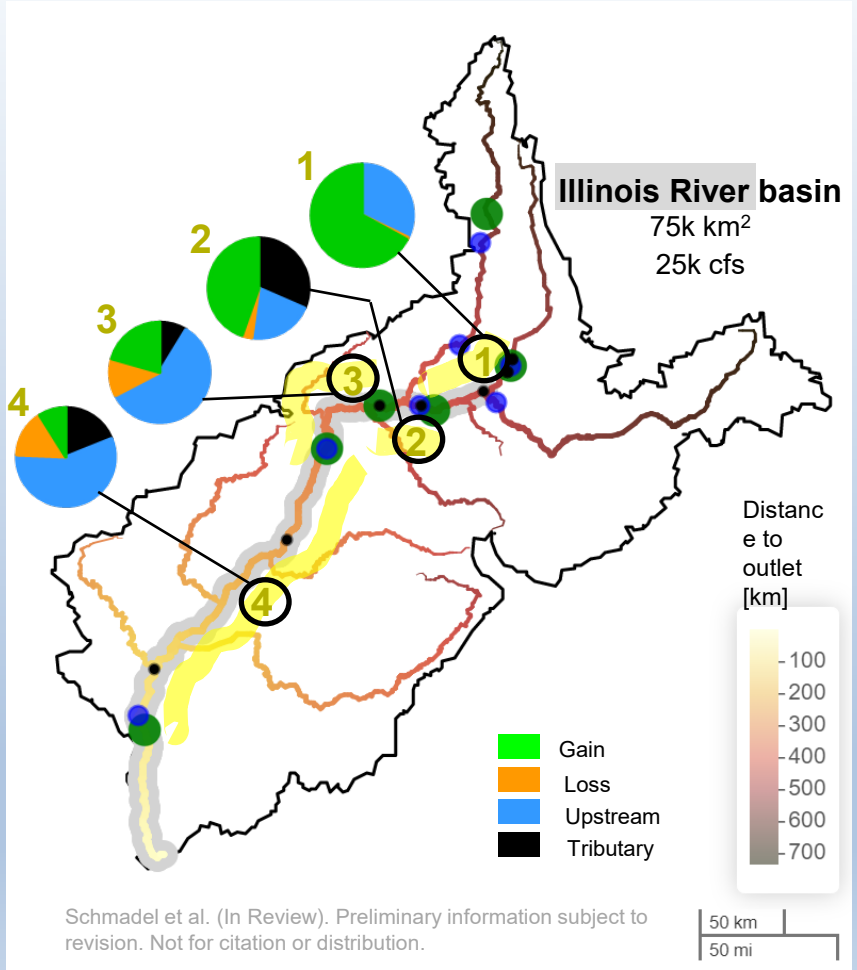
USGS

Courtesy of Sarah Stackpoole

How does transport obscure algal biomass growth?

Approach

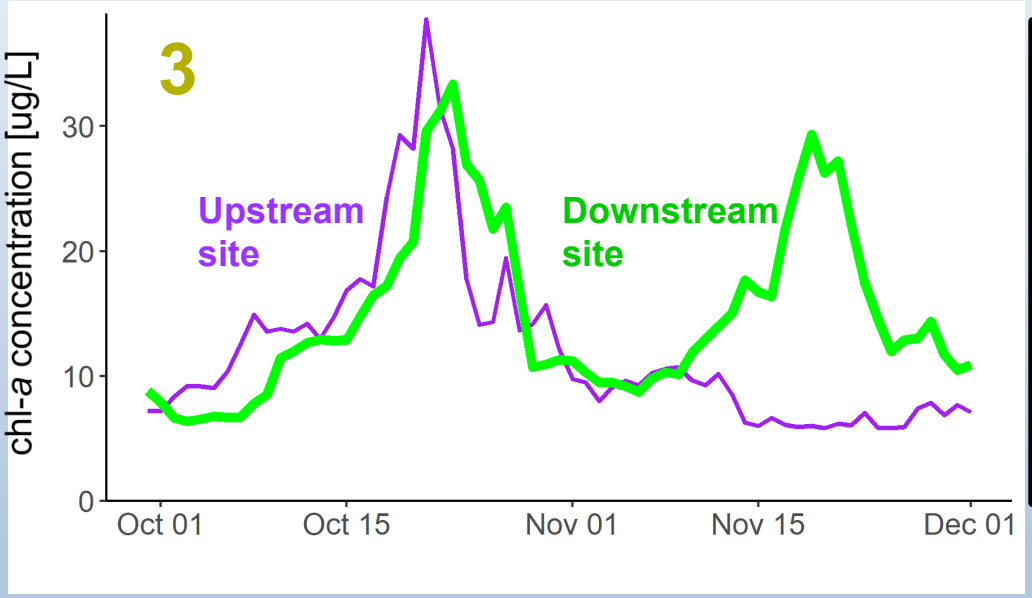
- Quantify advected chlorophyll *a* concentration and tributary dilution between five sites on the Illinois River mainstem (red dots)
- Transport model for *both* unsteady and nonuniform conditions
- Mass and water balances

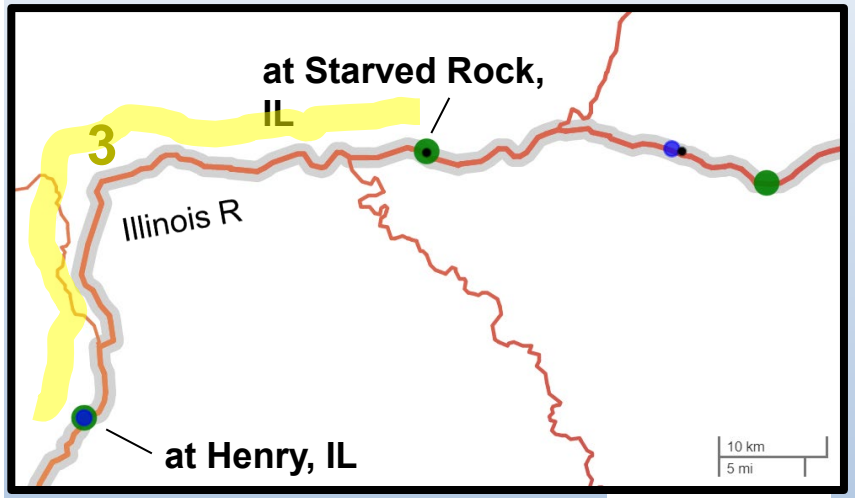


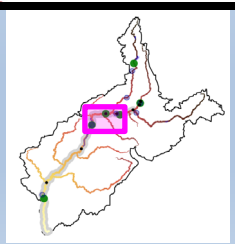
USGS

Courtesy of Jenny Murphy

Quantify advected mass and tributary inputs: When and where is growth occurring?







USGS

Courtesy of Noah Schmadel

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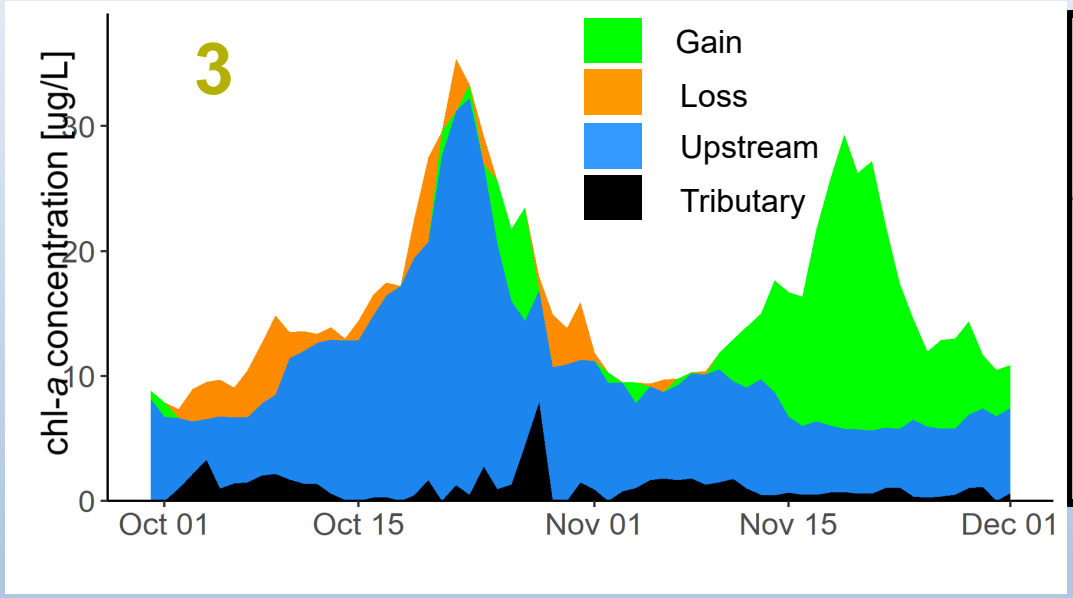
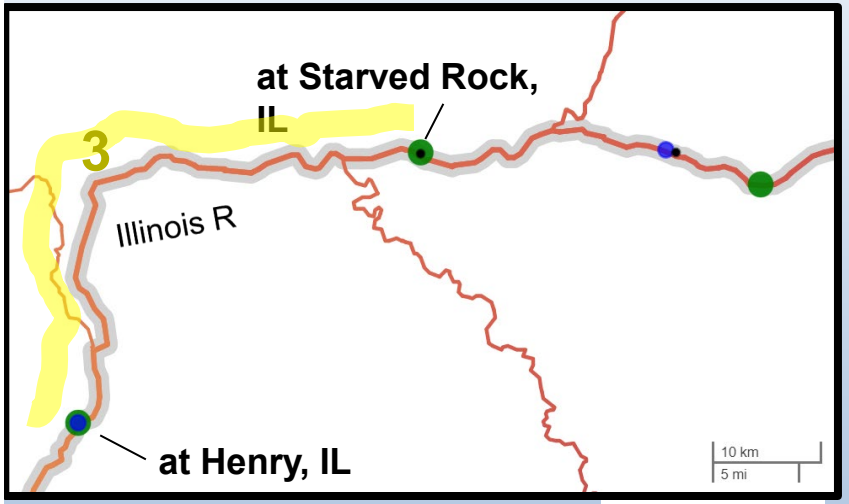
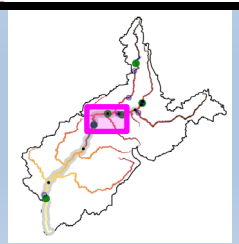
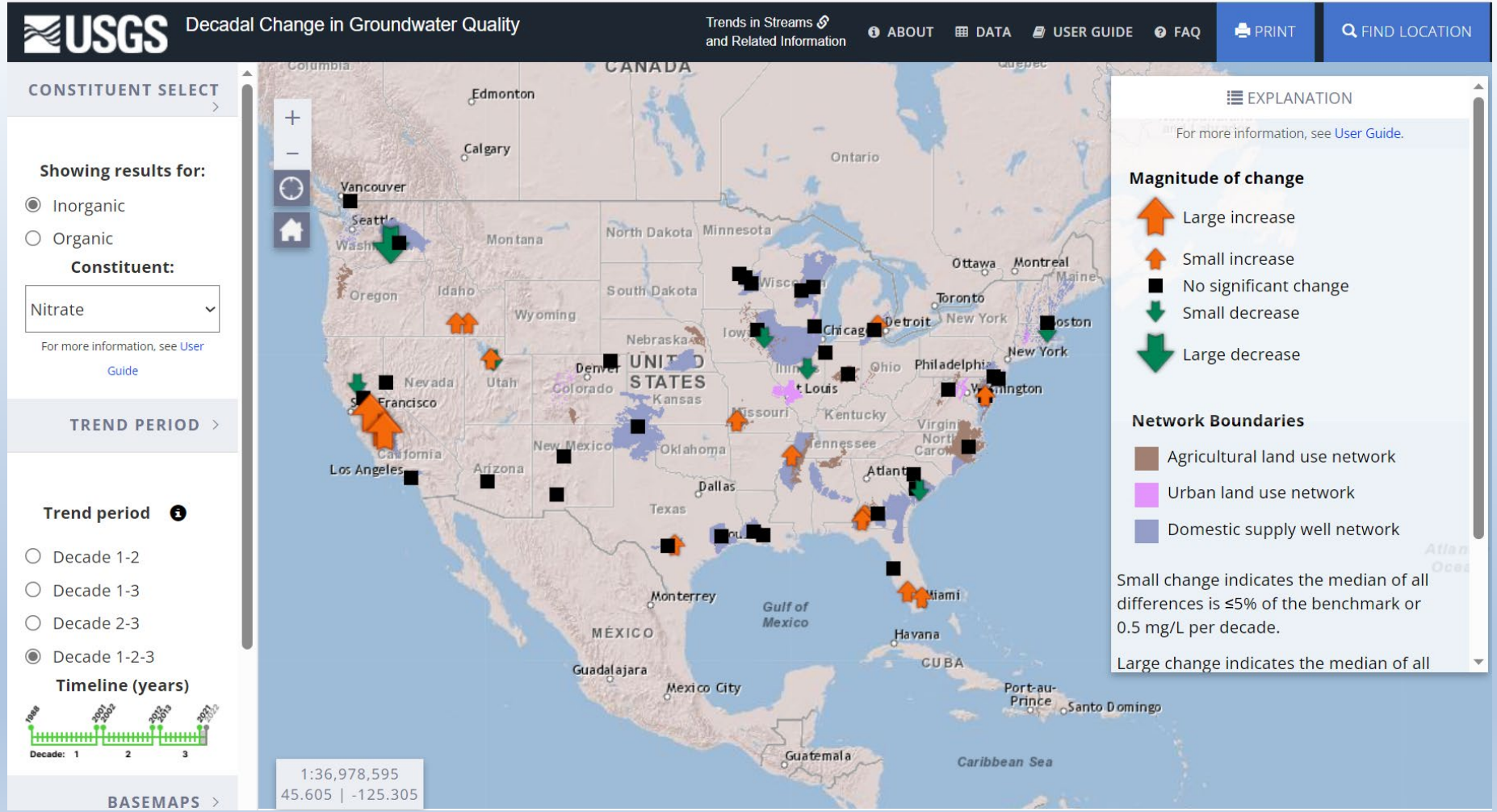






USGS

Courtesy of Noah Schmadel



Courtesy of Bruce Lindsey

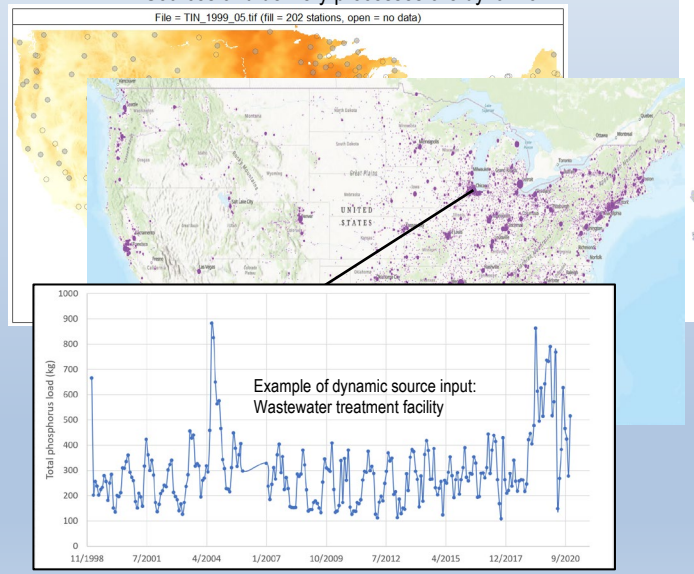
https://nawqatrends.wim.usgs.gov/swtrends/

National dynamic SPARROW modeling of surface water total nitrogen and phosphorus

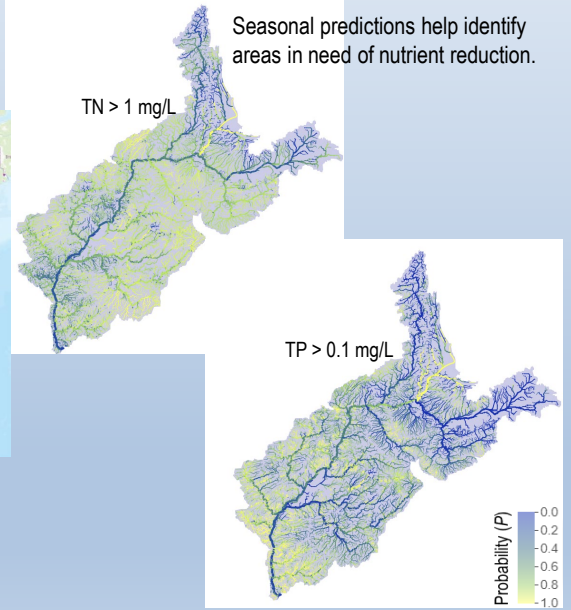
Simulate reach-by-reach seasonal stream water quality across continental scale and evaluate water availability relative to established criteria.

Approach: **(1) Build CONUS datasets** **(2) Develop and test models in smaller basin** **(3) Scale up models to CONUS**

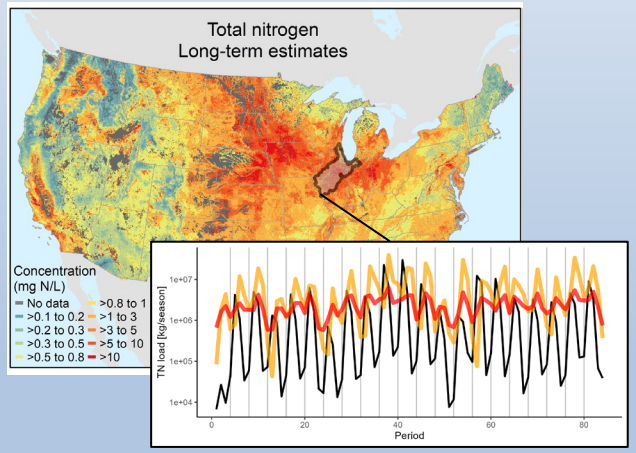
Sources and delivery processes are dynamic.



Seasonal predictions help identify areas in need of nutrient reduction.



Models will provide a new quantification of contributors and how they change over both space and time.



Red = urban sources, orange = agriculture sources, black = storage lag

USGS

Courtesy of Olivia Miller and Noah Schmadel

Questions?

It is not the answer that enlightens, but the question.

– Eugene Ionesco

What Experiments, Measurements and Analyses Should Be Done to Quantify Causes of TP Load Increases in Illinois Rivers?

Who will do it? Who will pay for it?

Outline:

Review Changes in TP loads in The Illinois River Basin

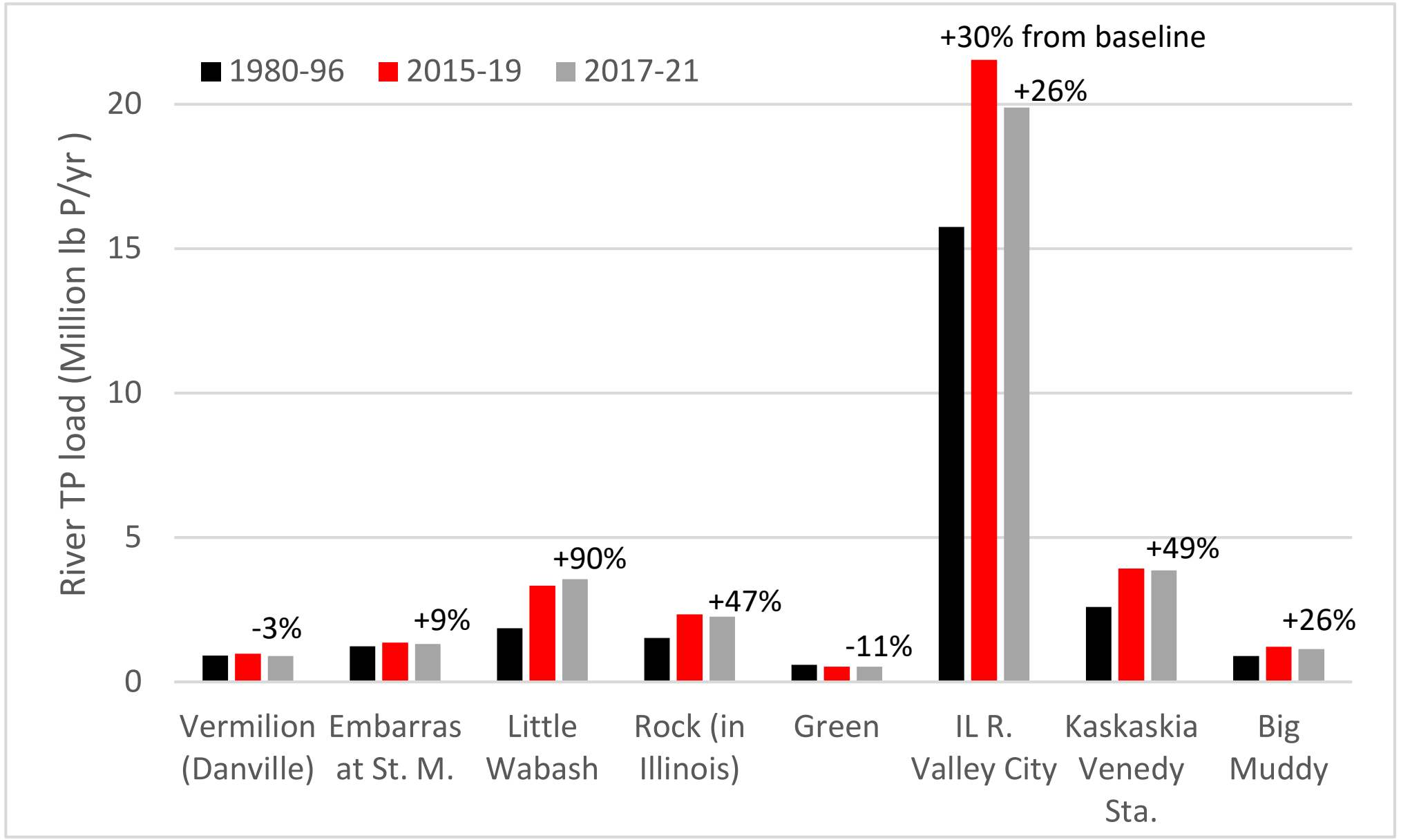
What about other IL rivers (Little Wabash and Kaskaskia)?

Possible causes and how to quantify their impacts on River P loads

Gregory McIsaac
University of Illinois Urbana Champaign
gmcisaac@illinois.edu

TP Load Estimates for Major Rivers draining Illinois

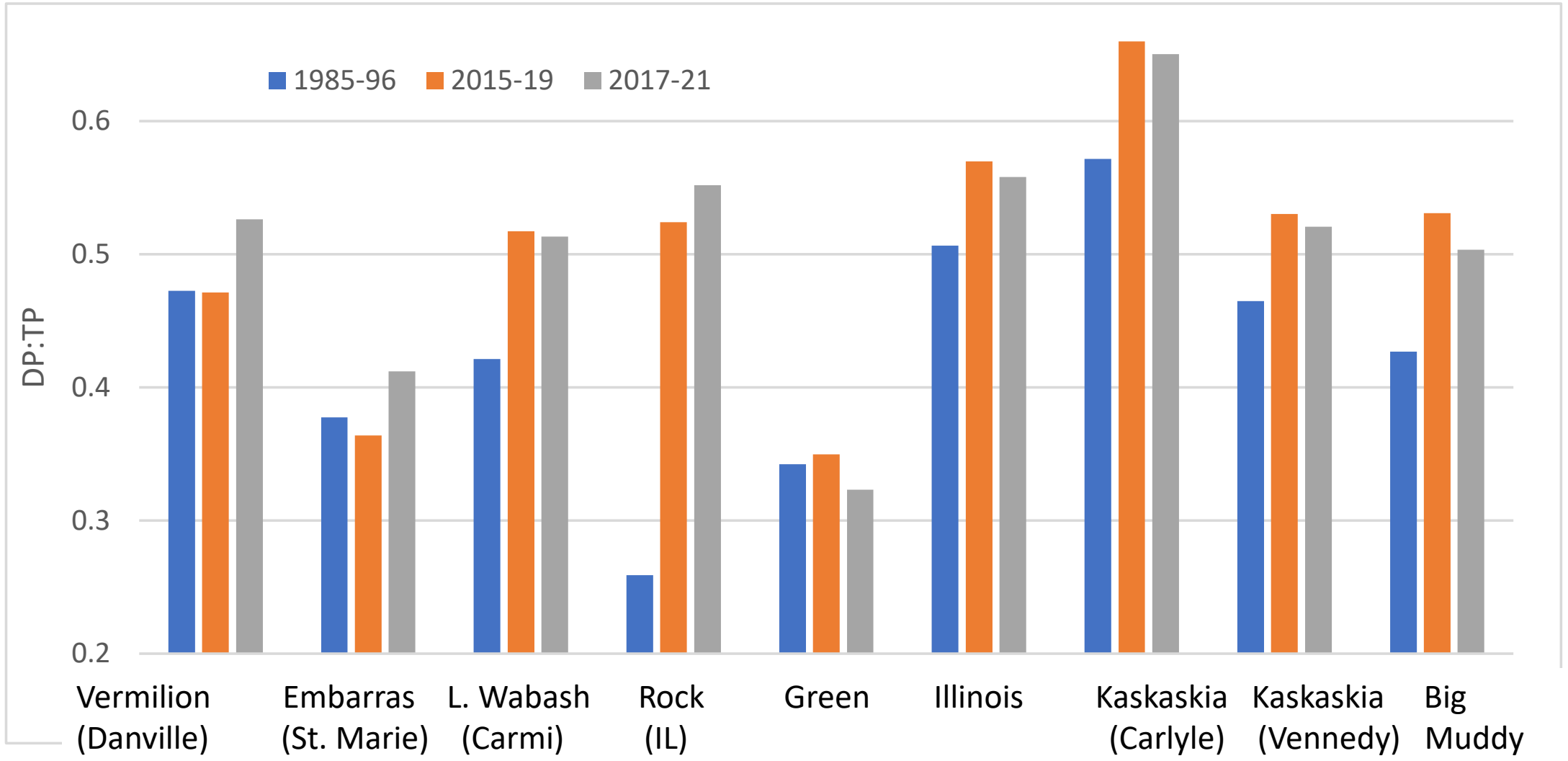
1980-96 baseline, 2015-19 and 2017-2021



estimates from Hodson, 2023 USGS

https://www.usgs.gov/data/annual-nutrient-loads-illinois-epa-ambient-water-quality-monitoring-network-sites-water-years

DP:TP in major rivers increased except for the Green River



Why has DP increased?

Conservation till?

Tile drainage?

CAFOs?

Other?

Data from Hodson, 2023
https://www.usgs.gov/data/annual-nutrient-loads-illinois-epa-ambient-water-quality-monitoring-network-sites-water-years

Illinois River Basin Study

Identify locations and quantify factors contributing to increased phosphorus loads in the Illinois River at Valley City

Funding from Illinois Nutrient Research and Education Council and USGS

JAWRA
JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION

AMERICAN WATER RESOURCES ASSOCIATION

Research Article | Open Access

Spatial and Temporal Variations in Phosphorus Loads in the Illinois River Basin, Illinois USA

Gregory F. McIsaac, Timothy O. Hodson, Momcilo Markus, Rabin Bhattarai, Daniel Chulgi Kim

First published: 27 August 2022 | https://doi.org/10.1111/1752-1688.13054

The past: 1989-96

Incremental Total Phosphorus (TP) yields

TP load per unit area for each watershed segment
1 kg P/ha = 0.89 lb P/ac

TP Yield (kg P/ha-yr)

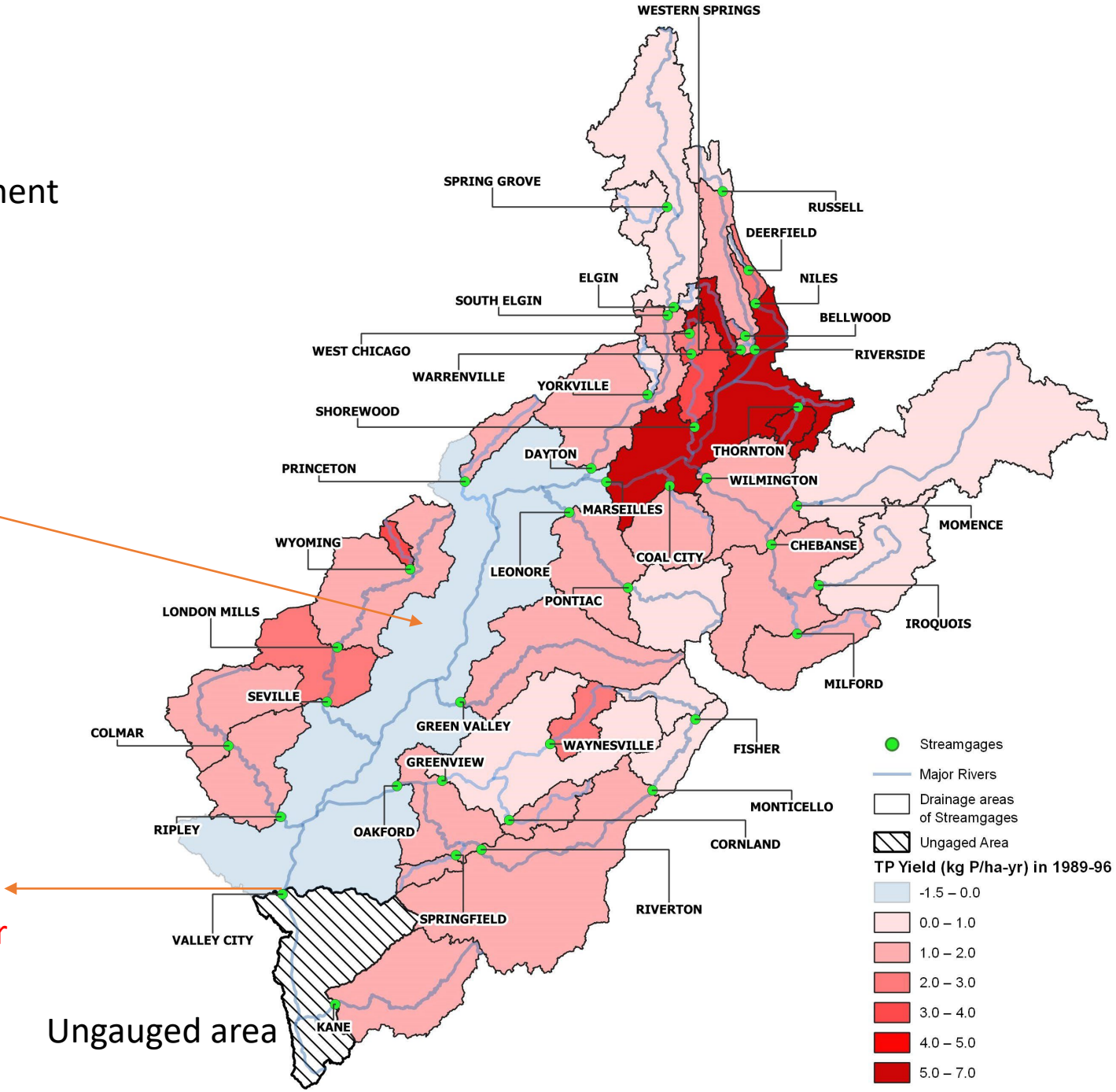
- -1.5 – 0.0
- 0.0 – 1.0
- 1.0 – 2.0
- 2.0 – 3.0
- 3.0 – 4.0
- 4.0 – 5.0
- 5.0 – 7.0

Lower Mainstem Subwatershed

Valley City annual TP load:
15.2 Million lb P/yr
Water yield:
13.8 in/yr

Ungauged area

(McIsaac et al. 2023)



2015-19

Incremental Total Phosphorus (TP) yields

TP load per area for each watershed segment

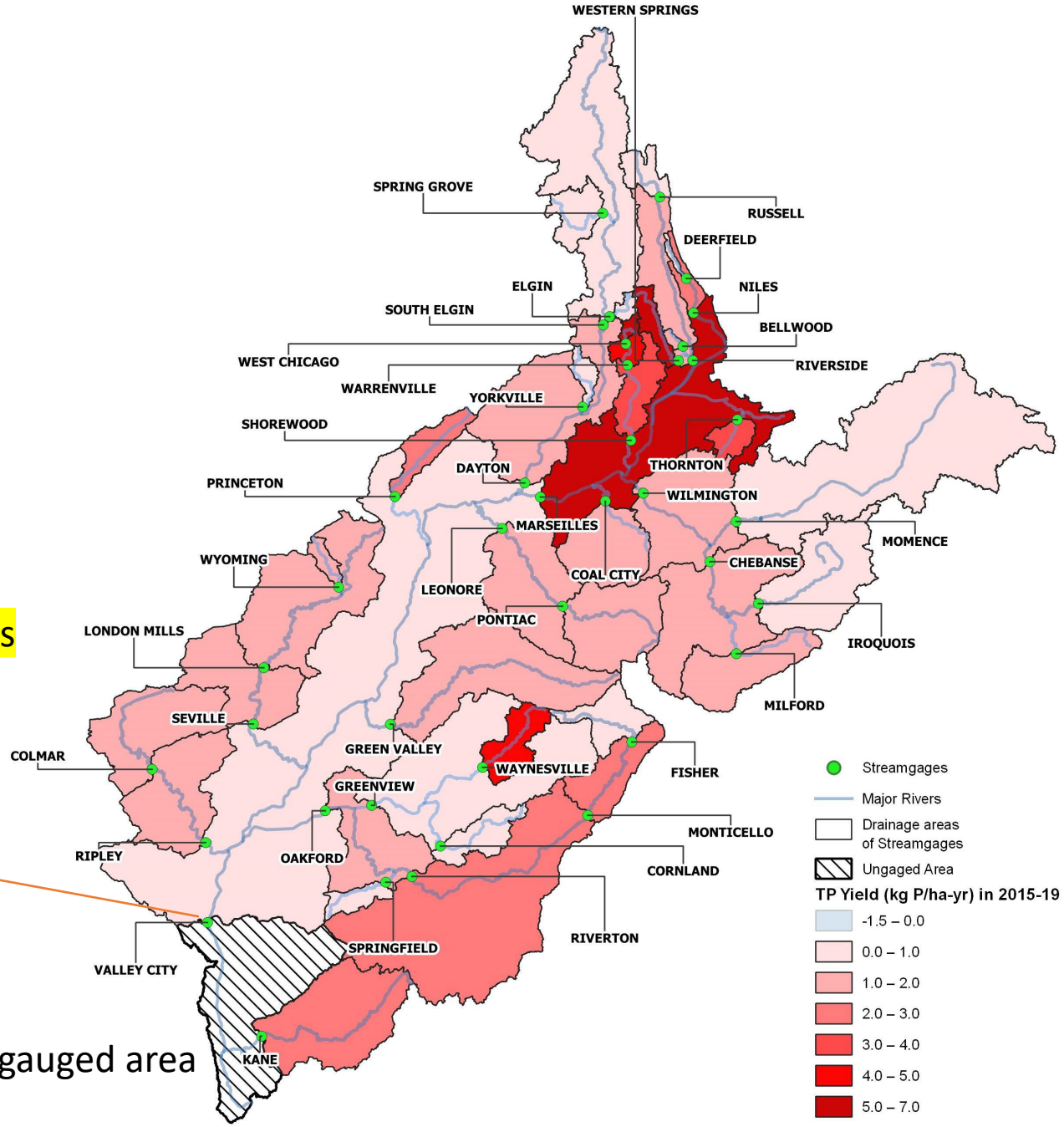
TP Yield (kg P/ha-yr)

- -1.5 – 0.0
- 0.0 – 1.0
- 1.0 – 2.0
- 2.0 – 3.0
- 3.0 – 4.0
- 4.0 – 5.0
- 5.0 – 7.0

Generally:
Increased dissolved P
Reduced particulate P
Reduced Suspended Solids
Increased [Cl^-] some locations

Valley City annual TP load:
21.2 Million lb P/yr
(39% increase from 1989-96)
Water yield:
15.9 in/yr

Ungauged area



(McIsaac et al. 2023)

Change from 1989-96 to 2015-19
Incremental Total Phosphorus (TP) yields

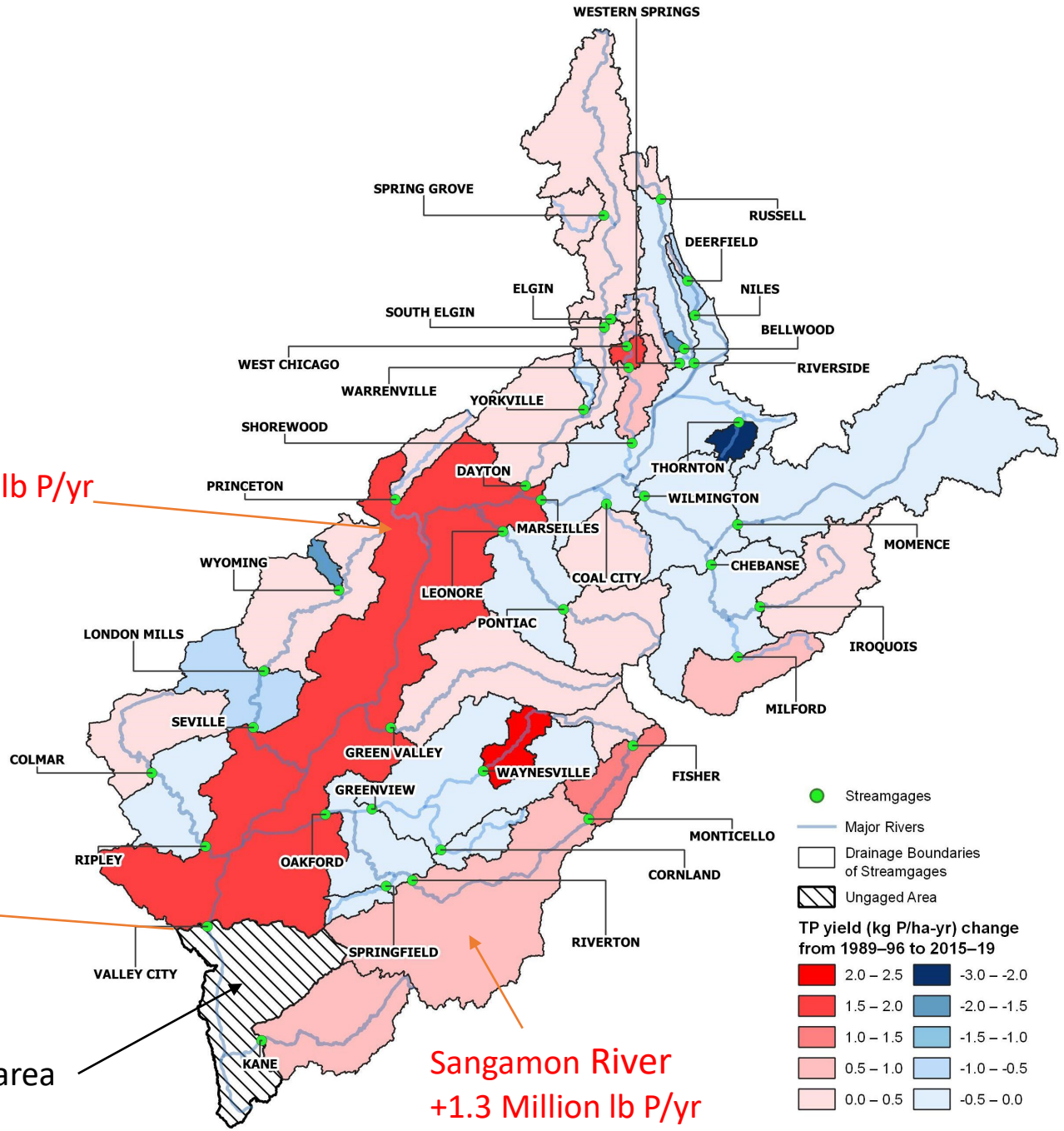
TP load per unit area for each watershed segment
kg P/ha-yr

Blue indicates decrease
Red indicates increase

TP yield (kg P/ha-yr) change from 1989–96 to 2015–19

2.0 – 2.5	-3.0 – -2.0
1.5 – 2.0	-2.0 – -1.5
1.0 – 1.5	-1.5 – -1.0
0.5 – 1.0	-1.0 – -0.5
0.0 – 0.5	-0.5 – 0.0

(McIsaac et al. 2023)



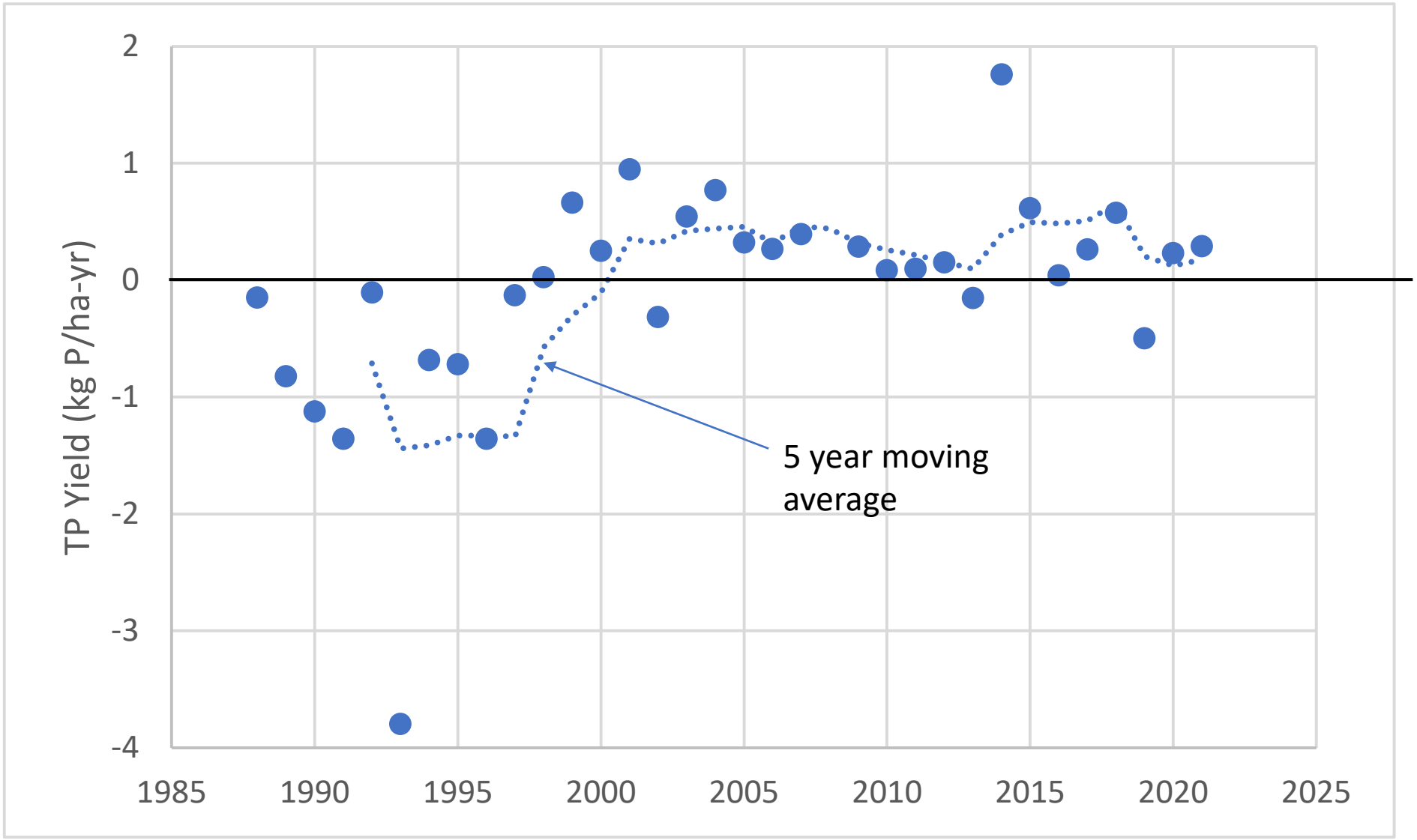
+4.6 Millon lb P/yr

Change in load at Valley City:
+6 Million lb P/yr
(+39% from 1989-96)

Ungauged area

Sangamon River
+1.3 Million lb P/yr

Illinois River Lower Mainstem subwatershed incremental TP yield



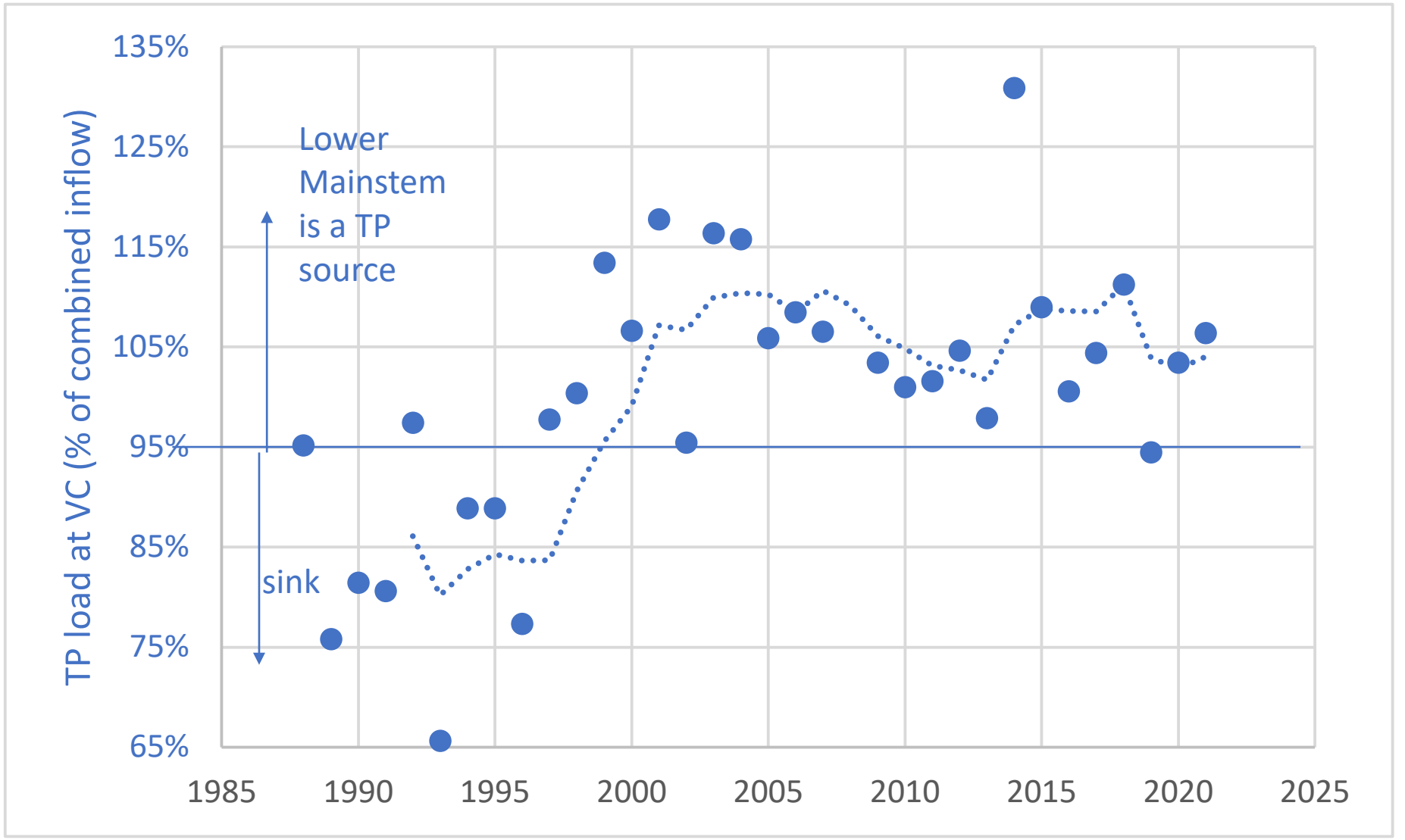
Why the shift from sink to source?

<u>Correlations and Possible causes</u>

Increased DP
Reduced NO3
Increased Chloride
CAFOs
Zebra Mussels
Carp

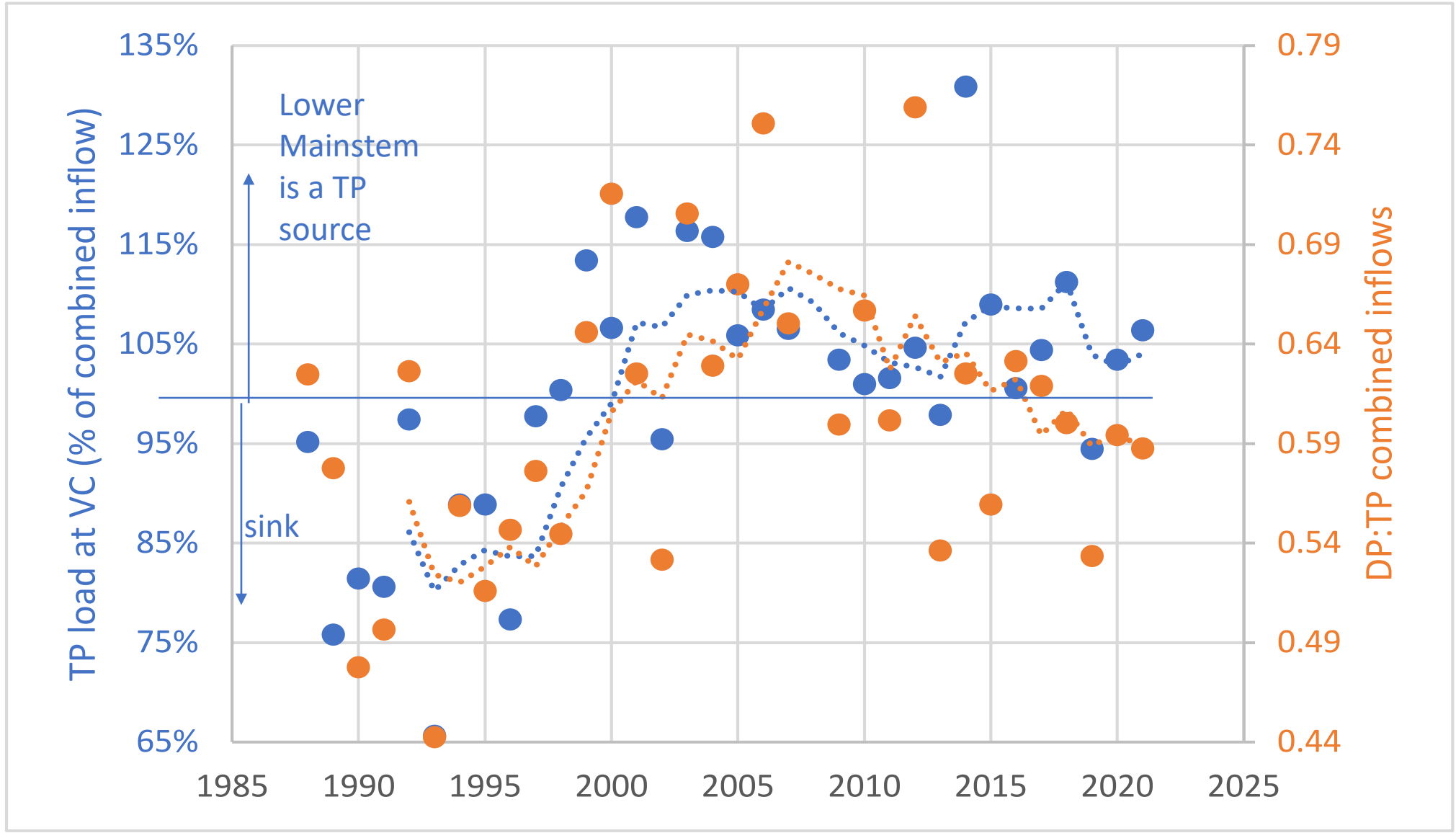
Data: Hodson 2023

Valley City TP load as a % of upstream loads (Marseilles + lower tributaries)



Data: Hodson 2023

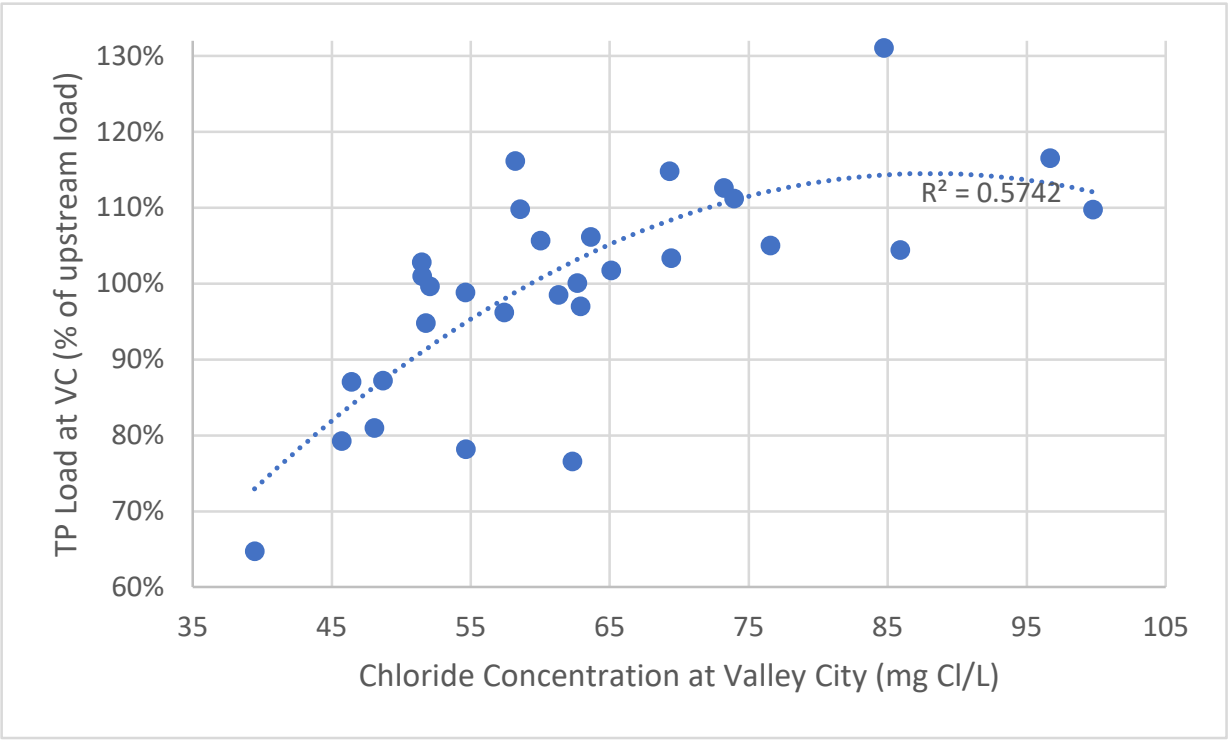
Valley City TP load as a % of upstream loads (Marseilles + lower tributaries) and ratio of dissolved to total P (DP:TP) for Marseilles + lower tributaries

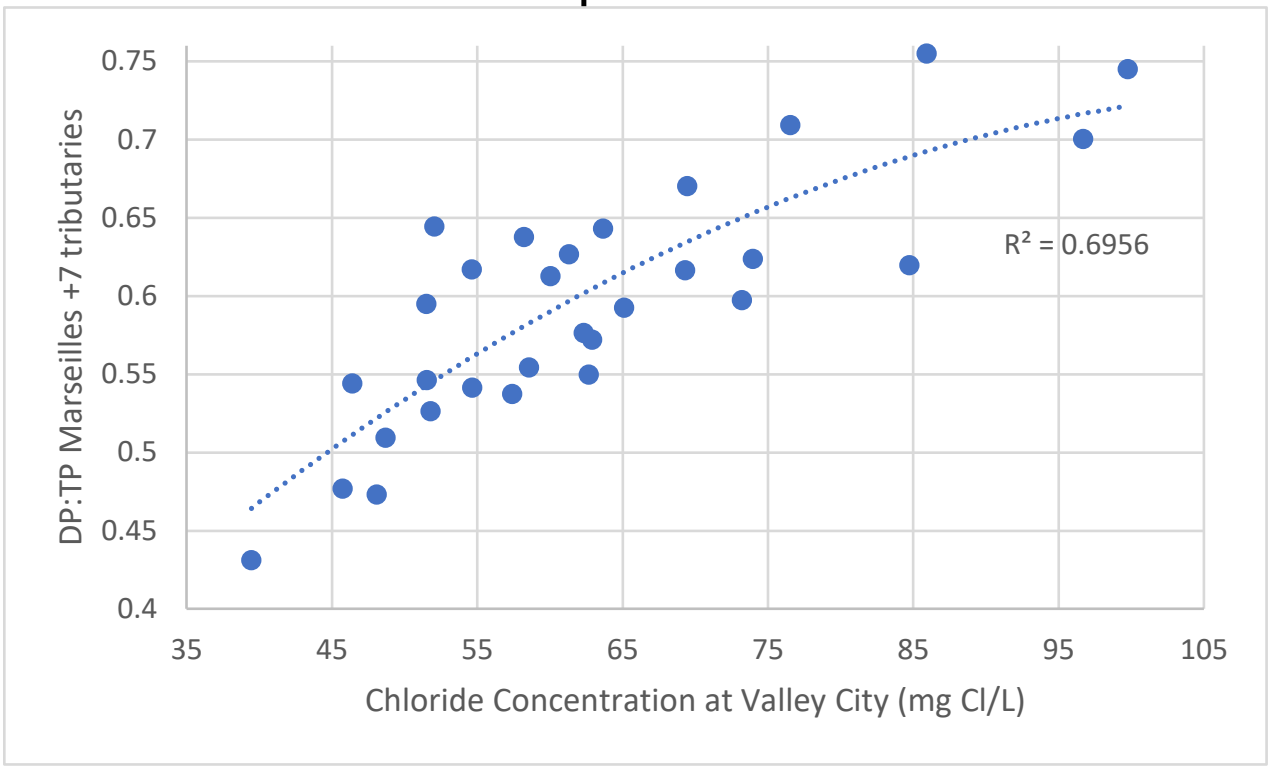


Correlation (0.66) does not prove a cause and effect relationship

Data: Hodson 2023

Several Confounding Correlations:
TP load at Valley City vs Chloride Concentration vs Upstream DP:TP





77% of the chloride increase came from above Marseilles + Fox R, while these contributed 16% of the increased DP load at Valley City

Because these two factors are highly correlated, we were unable to determine how much causation to assign to each.

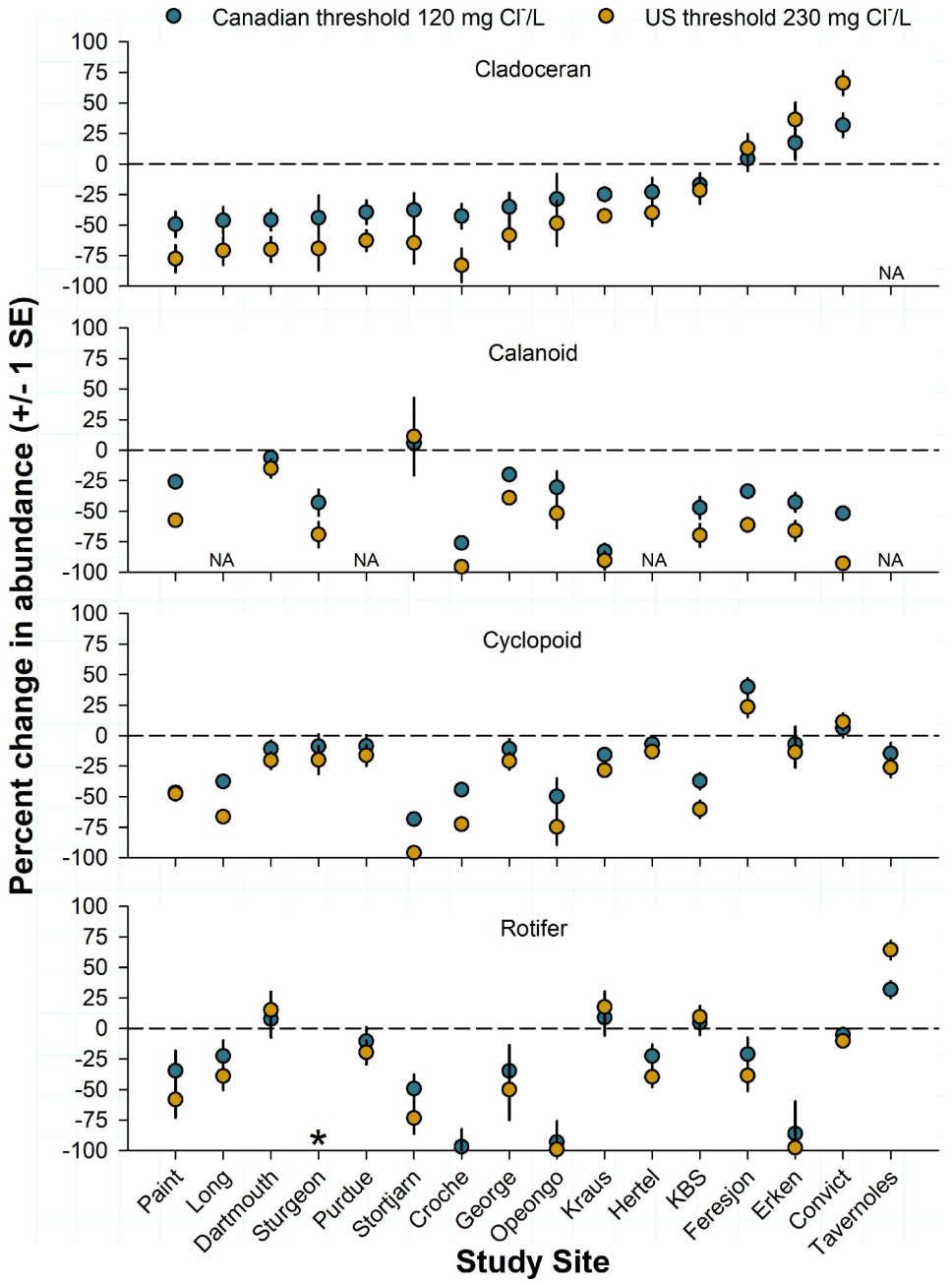
Nitrate and sulfate concentrations were also correlated to these and can affect redox and P desorption.

Data: Hodson 2023

Chloride reduced zooplankton abundances in mesocosm experiments.
(Hintz et al. 2022, PNAS)

Has this been observed in the Illinois River?
Does this also result in higher algae density and periodic lower DO?

Release of P from sediments?

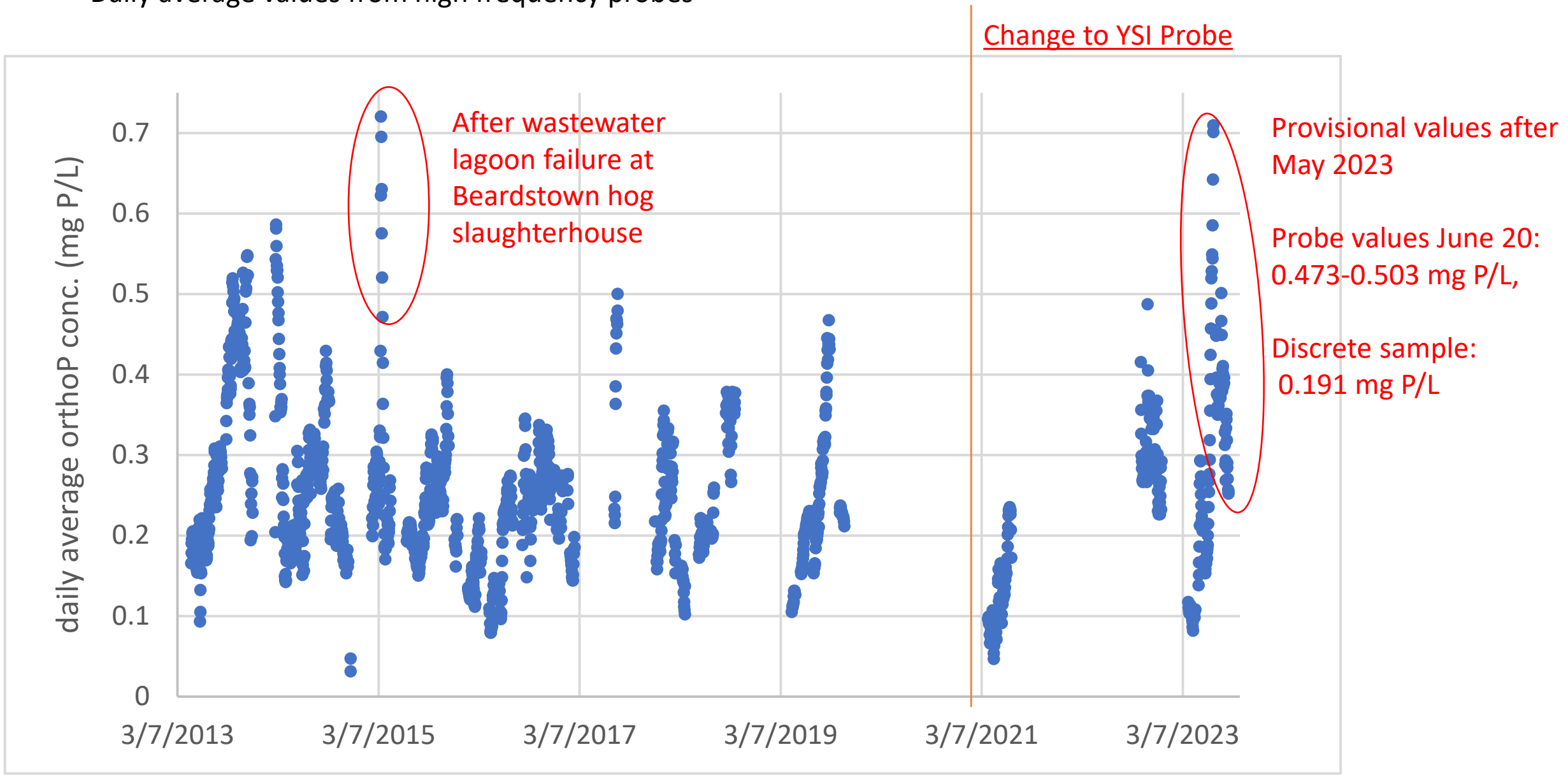


Mean (±1 SE) of the estimated percent change in zooplankton abundances for each taxa at the Canadian (120 mg Cl^-/L) and US (230 mg Cl^-/L) chronic threshold for Cl^-.

Percent changes were estimated using GAM models to compare the predicted abundances at each threshold to the predicted abundance in control conditions.

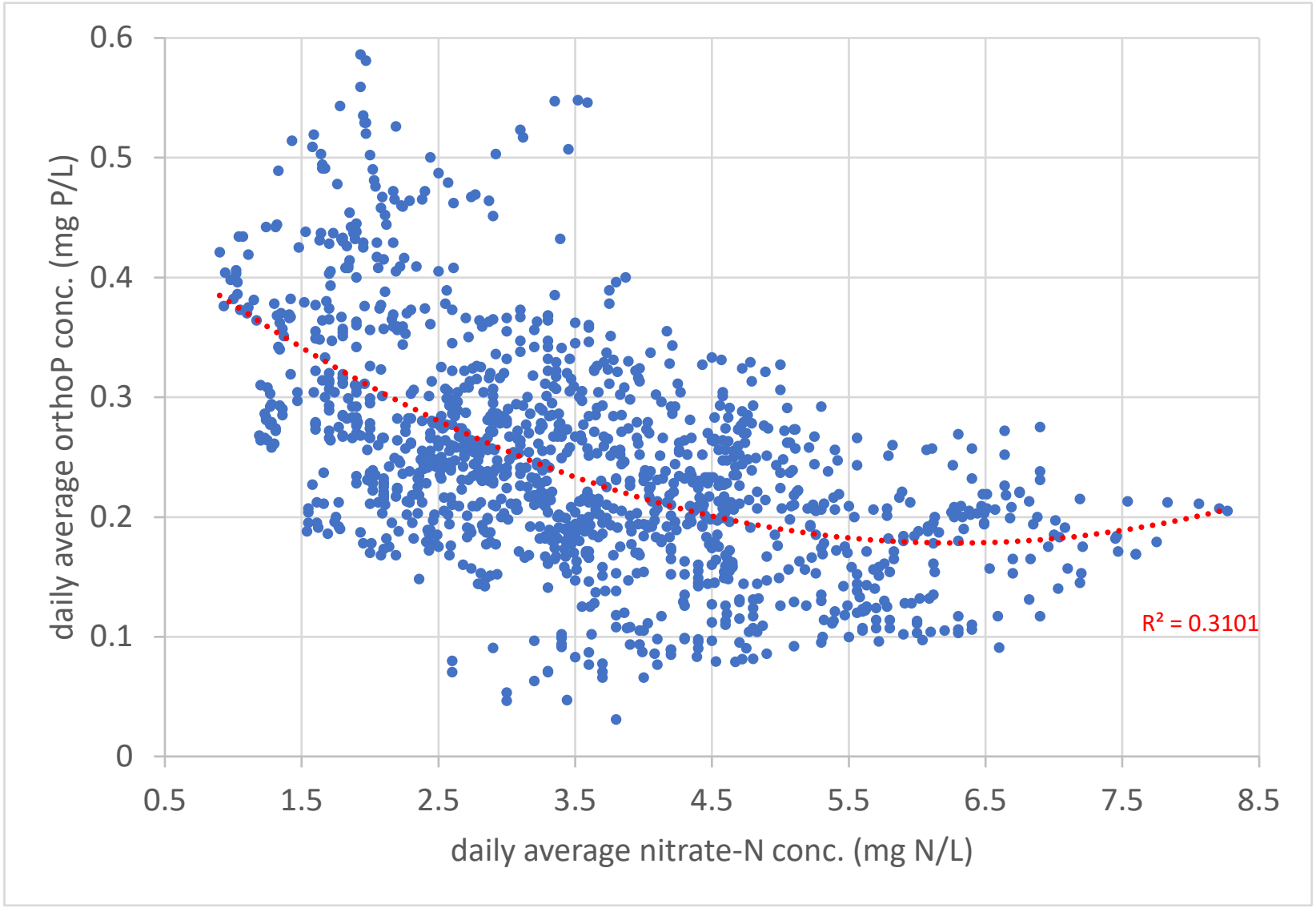
Hintz et al. 2022 https://doi.org/10.1073/pnas.2115033119

Ortho-P concentrations at Florence
Daily average values from high frequency probes



Data: USGS

Ortho-P concentrations plotted against nitrate-N concentrations at Florence daily average concentrations from continuous probe measurements 2012-2023 excluding values following the March 2015 lagoon failure and 2023 provisional values



Similar conditions contribute to denitrification and P release from sediments:

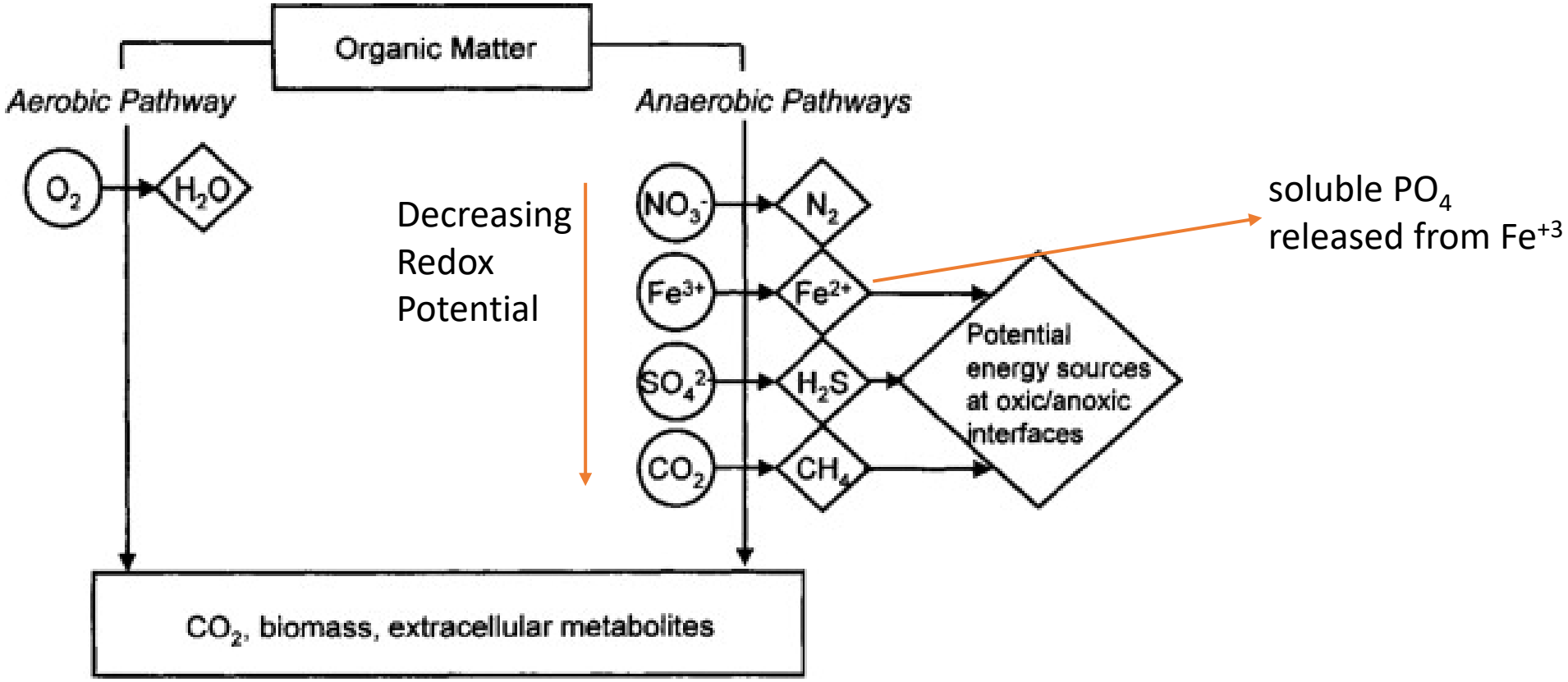
Low DO in sediment
High temperatures
Low flow
Low nitrate in bottom waters and sediment.

No relationship with daily average water column DO, but there are few observations with DO <4 ppm

Low nitrate concentrations may be a proxy for lower DO in sediment. Water column DO was significant in multivariate regression.

Data: USGS

Anaerobic respiration/decomposition of organic matter



Baker et al. 2000 https://doi.org/10.1016/B978-012389845-6/50012-0

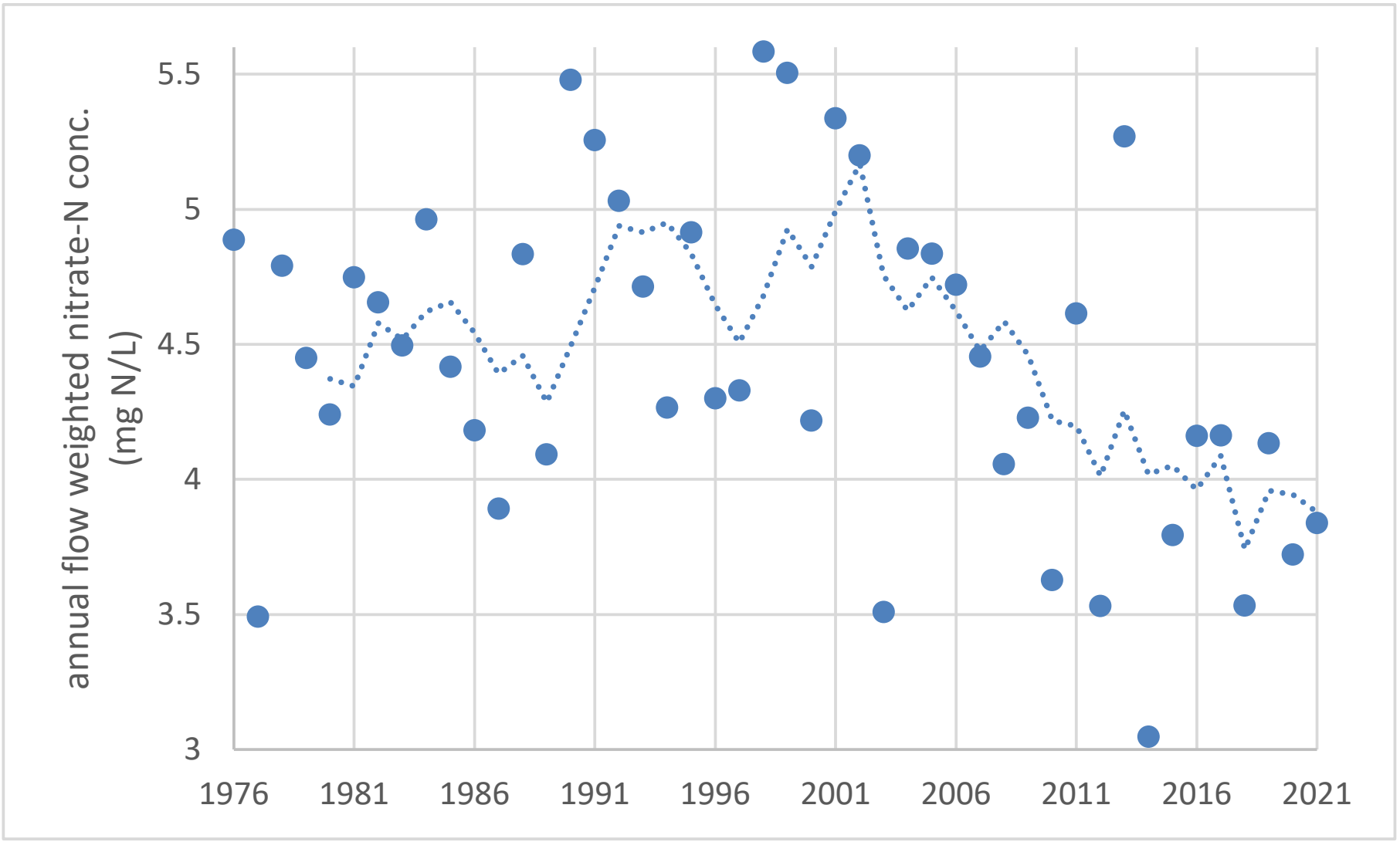
Past studies have shown that nitrate additions can reduce PO_4 release from sediment

- Hemond and Lin (2010) Massachusetts https://doi.org/10.1016/j.watres.2010.04.018
- Hansen et al. (2003) Denmark https://doi.org/10.1023/A:1024826131327
- Ma et al. (2021) China https://doi.org/10.1016/j.watres.2021.116894
  - Mixed result, when nitrate addition promoted phytoplankton growth, it promoted P release from sediment

A thorough literature review may indicate whether similar experiments in Illinois River are warranted

Laboratory incubations or mesocosm experiments with different additions of nitrate, chloride and/or sulfate may be informative.

Illinois River at Valley City & Florence
Annual Flow-Weighted Nitrate-N Concentrations

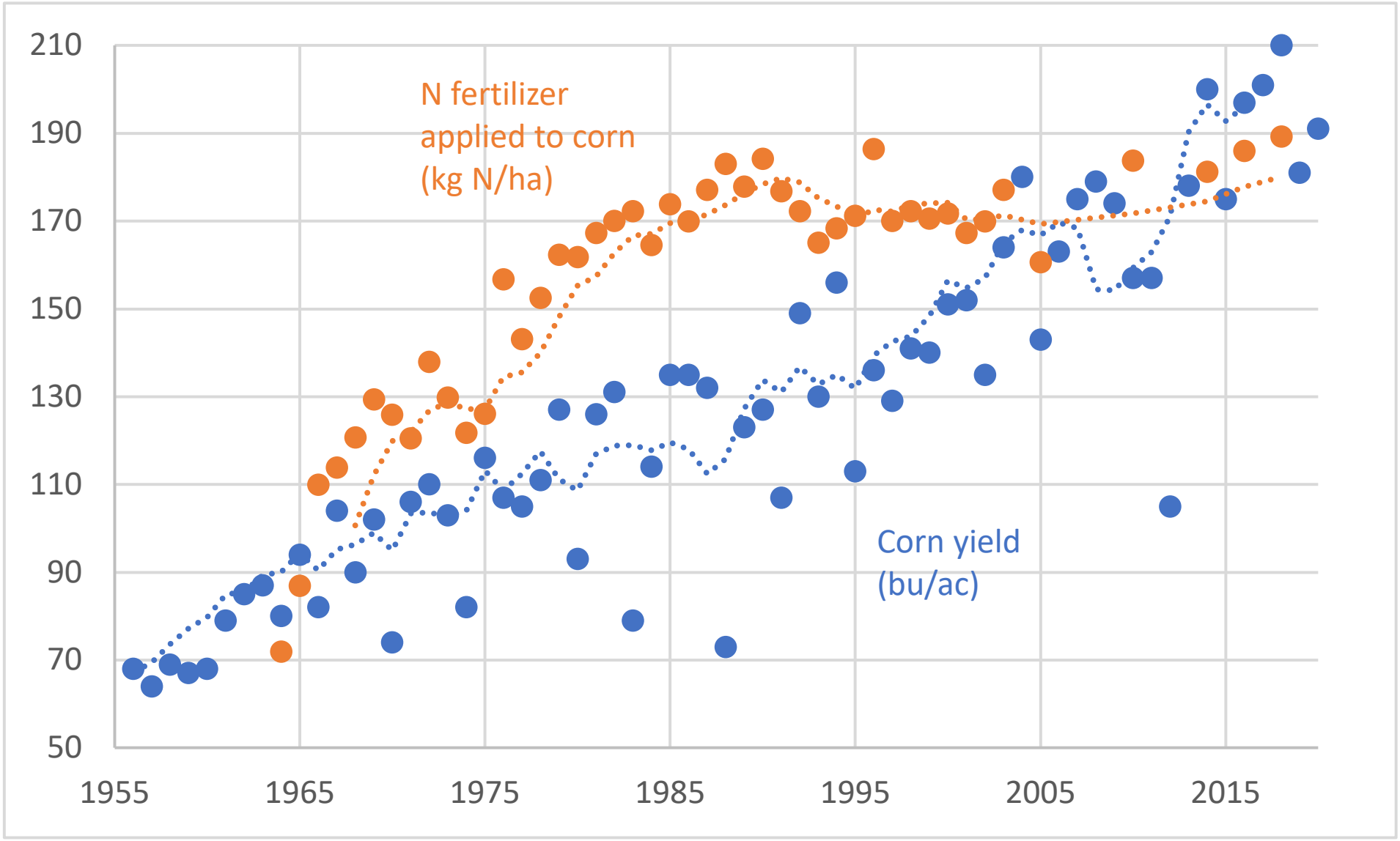


(Data: Hodson 2023)

Reduced loads from tributaries and increased flow providing dilution;

Possibly increased denitrification in the Lower Mainstem.

Illinois average corn yields and N fertilizer applied to corn



(Data: USDA Surveys)

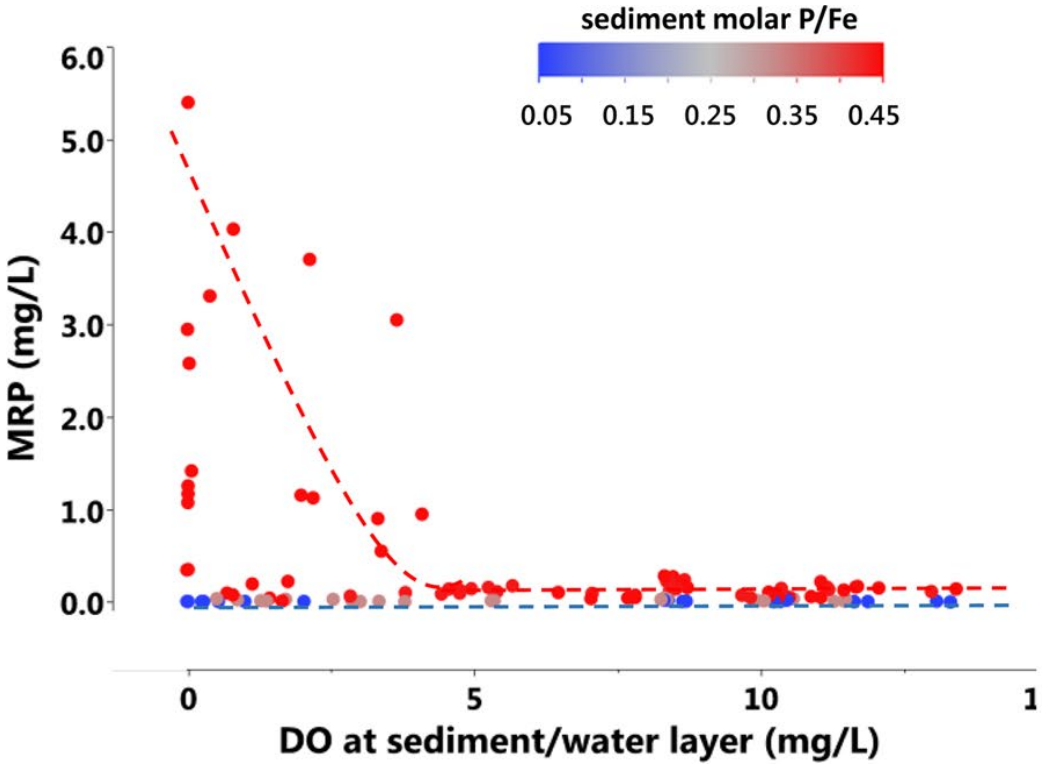
12 Subwatersheds with highest NO3-N yields in Illinois 1989-95

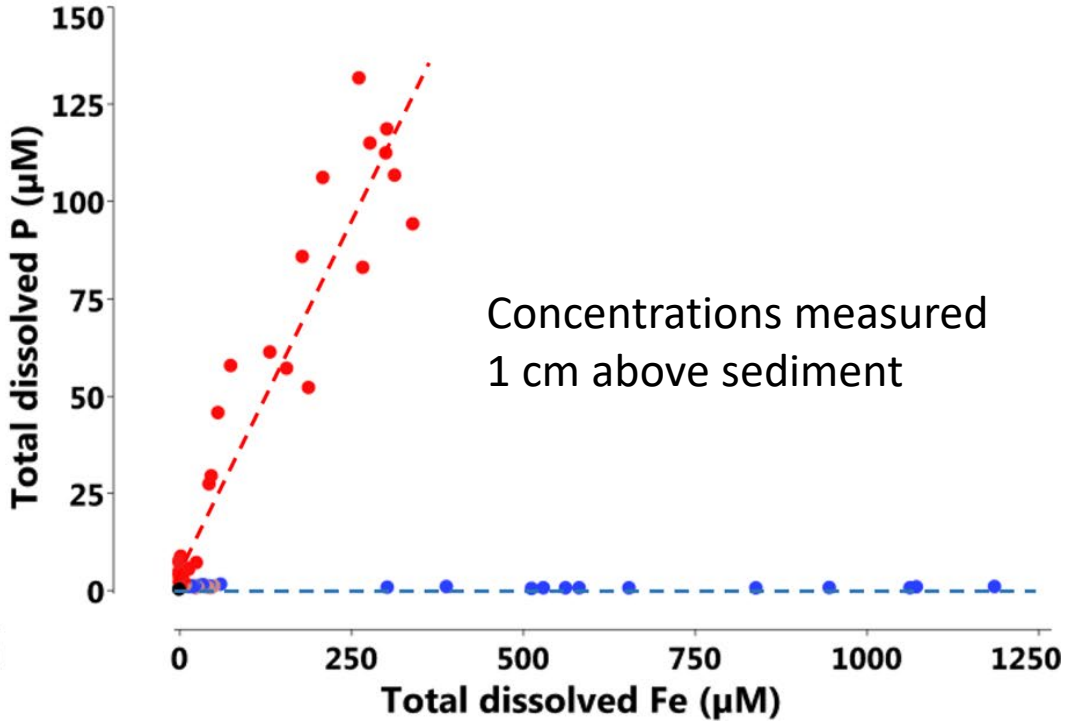
(Data: Hodson 2023)

Incremental subwatershed	Drainage area (sq. mi)		Annual Average Nitrate-N yields (kg N/ha-yr)			Water Yield
			1989-95	2015-19	% Change	% Change
Kankakee R. between Wilmington, Momence and Iroquois	765	Mixed	42.3	33.3	-21%	-30%
Mazon R. @Coal City	455	Ag	41.3	35.4	-14%	+12%
Vermilion R. @Pontiac	579	Ag	38.7	31.1	-20%	+12%
Big Bureau Cr. @Princeton	196	Ag	37.6	31.3	-17%	+18%
Vermilion R. between Leonore and Pontiac	672	Ag	35.8	28.7	-20%	-3%
Indian Cr. @Wyoming	62.7	Ag	34.6	29.3	-15%	-1%
Sangamon R. @Fisher	240	Ag	34.3	39.1	+14%	+8%
Embarras R. @Camargo	186	Ag	33.6	31.1	-7%	-12%
Kaskaskia R. @Cooks Mills	473	Ag	33.5	27.4	-18%	-8%
Iroquois R. @Chebanse	959	Ag	33.5	21.5	-36%	-6%
Mackinaw R. @Green Valley	1073	Ag	33.3	23.0	-31%	+9%
Sangamon R. between Monticello and Fisher	310	Mixed	32.1	12.5	-61%	-26%

Iron (Fe)

Lab incubations in Belgium: P release from sediments influenced by DO and P:Fe in sediment

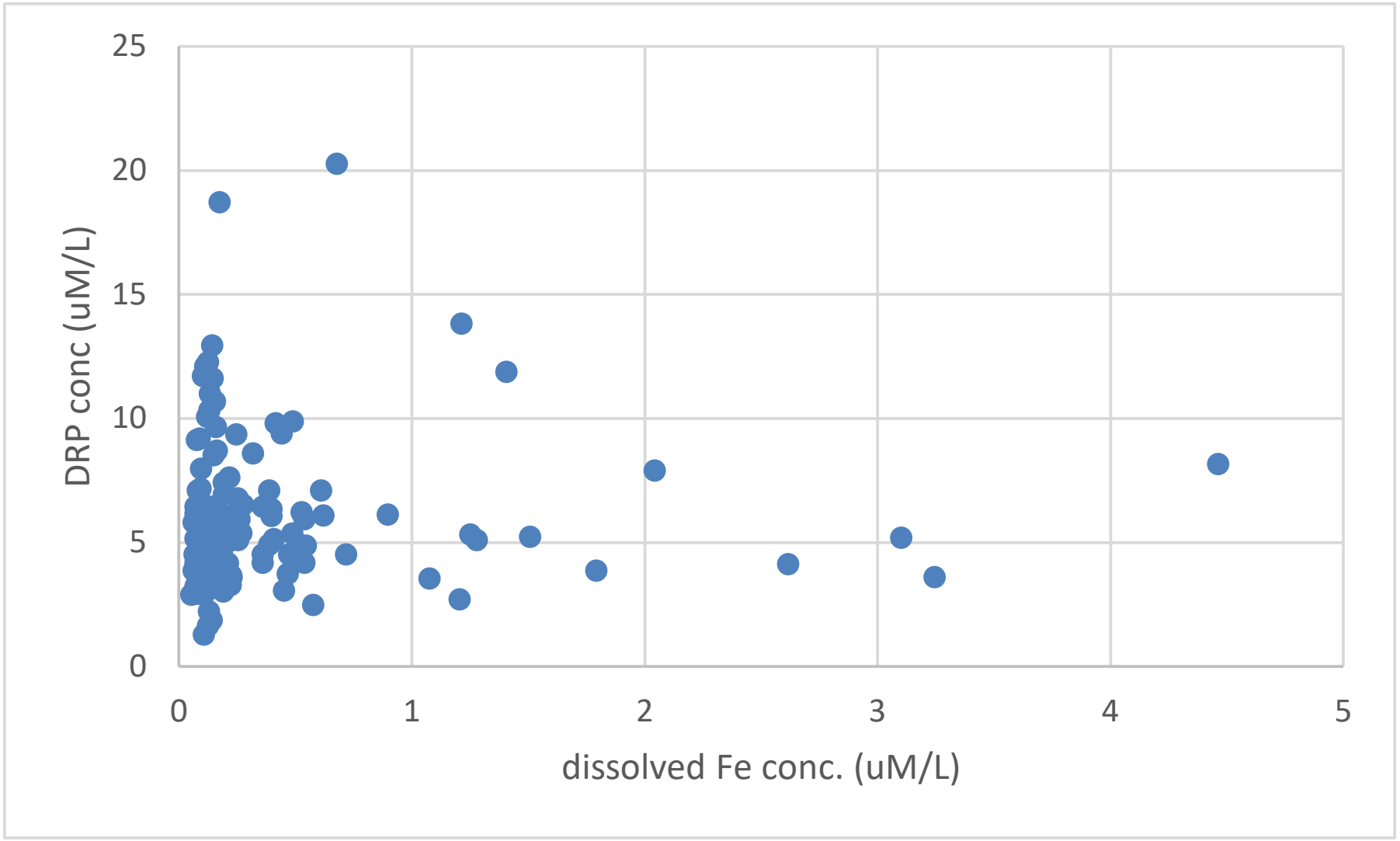




Concentrations measured
1 cm above sediment

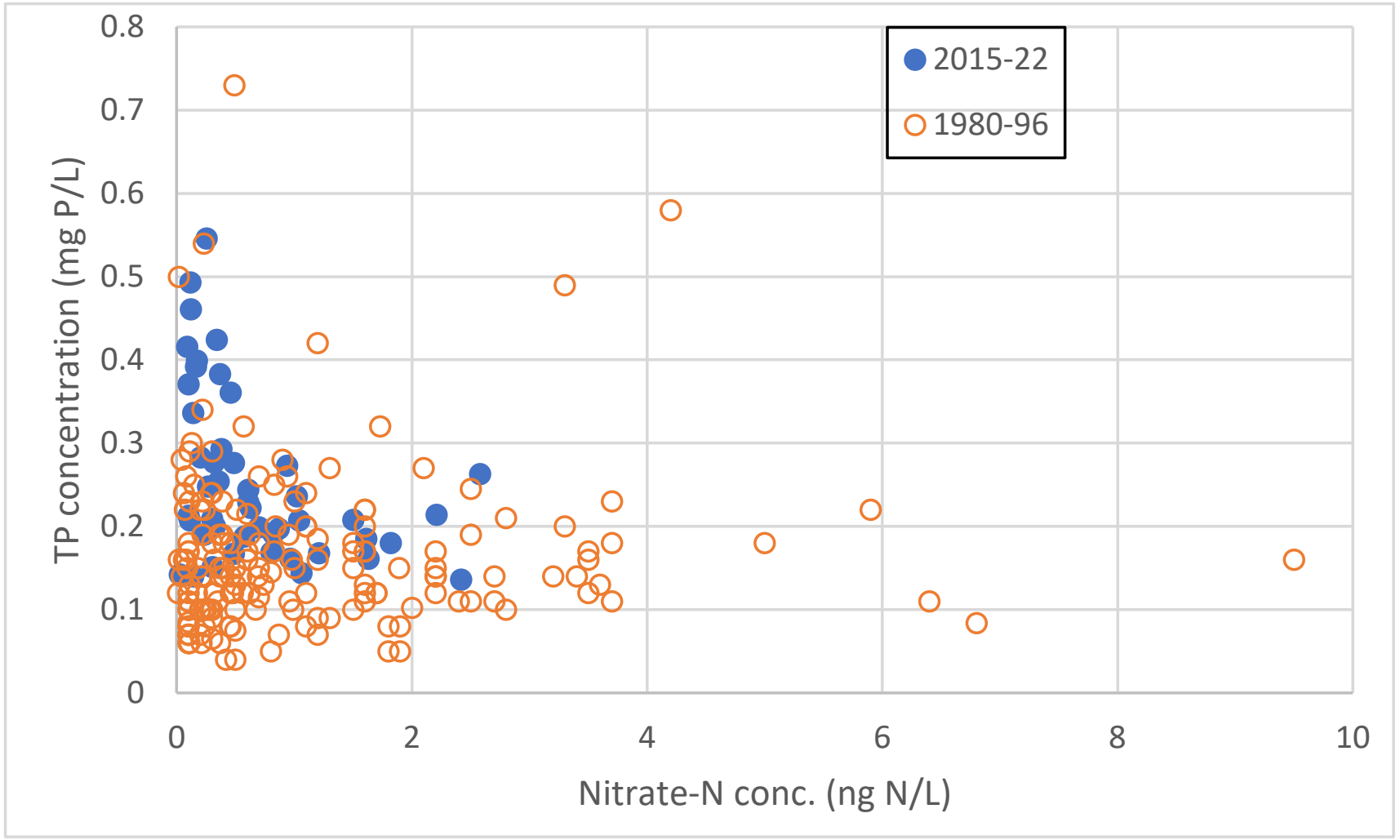
Smolders et al. (2017) DOI: 10.1021/acs.est.6b04337

Illinois River at Valley City Ortho P concentrations vs Dissolved Fe Concentration (USGS data)



Data:USGS & IEPA

Kaskaskia River at Carlyle
TP conc. plotted against nitrate-N conc.

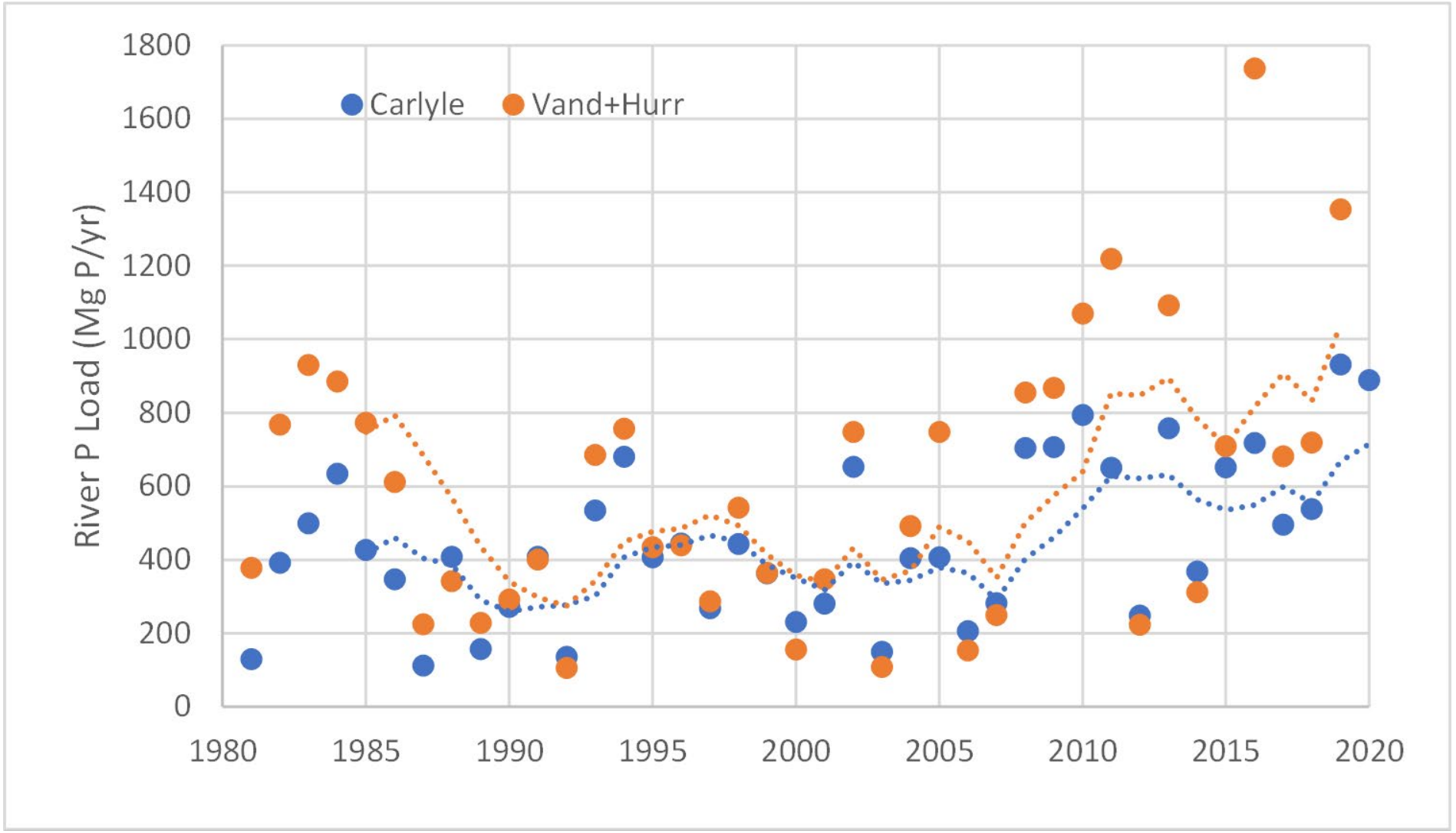


High TP concentrations sometimes occur at low nitrate concentrations, usually during warm months and low flow.

Nitrate concentrations and loads at Carlyle have decreased

Data: IEPA and USGS

Kaskaskia River TP loads at Carlyle and upstream at Vandalia and Hurricane Creek

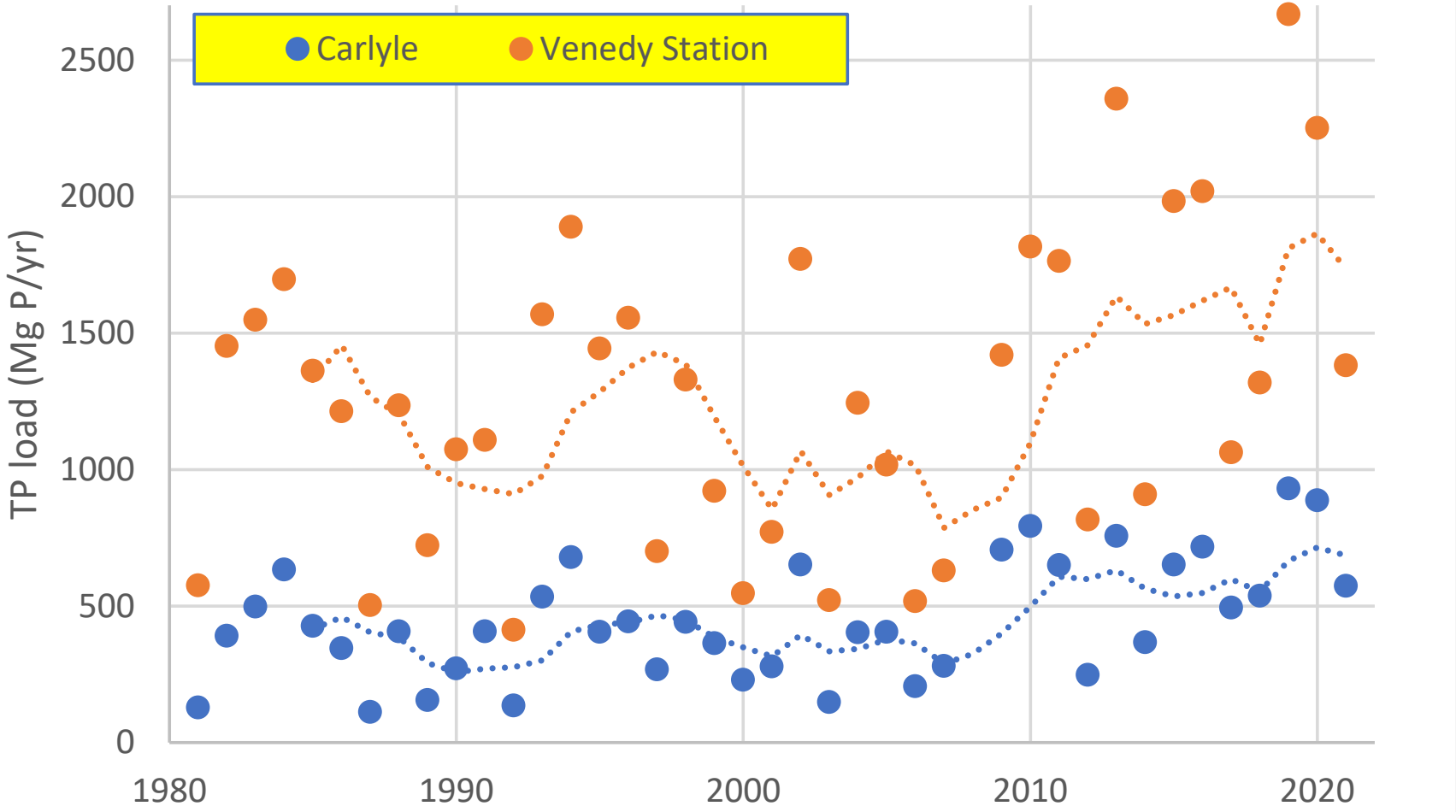


TP loads are higher upstream of Carlyle even without considering TP load from 627 sq miles of drainage area that is not monitored.

P is accumulating in Lake Carlyle. Estimating the amount depends on TP load estimates from the unmonitored 627 sq miles.

Data: Hodson, 2023

Kaskaskia River TP loads at Carlyle (2,719 mi^2) and Venedy Station (4,393 mi^2)



Most of the load at Venedy Station comes from below Carlyle (lower 38% of the watershed)

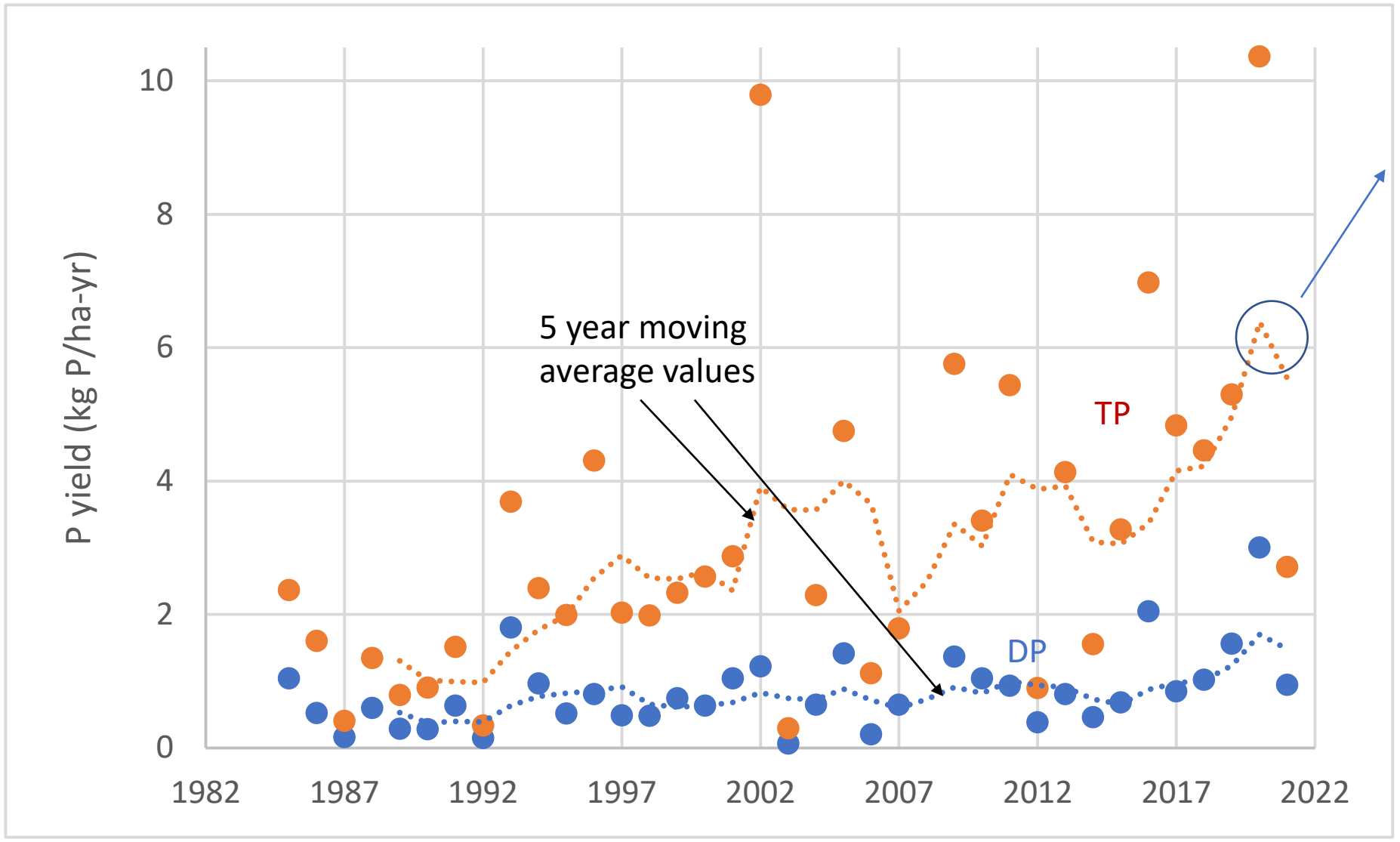
TP yield 2015-19	
Carlyle	0.95 kg P/ha-yr
Ven. Sta. – Carlyle	2.6 kg P/ya-yr

DP:TP 2015-19	
Carlyle	0.66
Ven. Sta. – Carlyle	0.46

Load estimates from Tim Hodson (2023), USGS

Little Wabash River at Effingham TP and DP Yields

240 mi^2



2016-20 average is among the highest TP yields in the state, similar in magnitude to rivers draining Cook County and Chicago suburbs, which have high wastewater inputs.

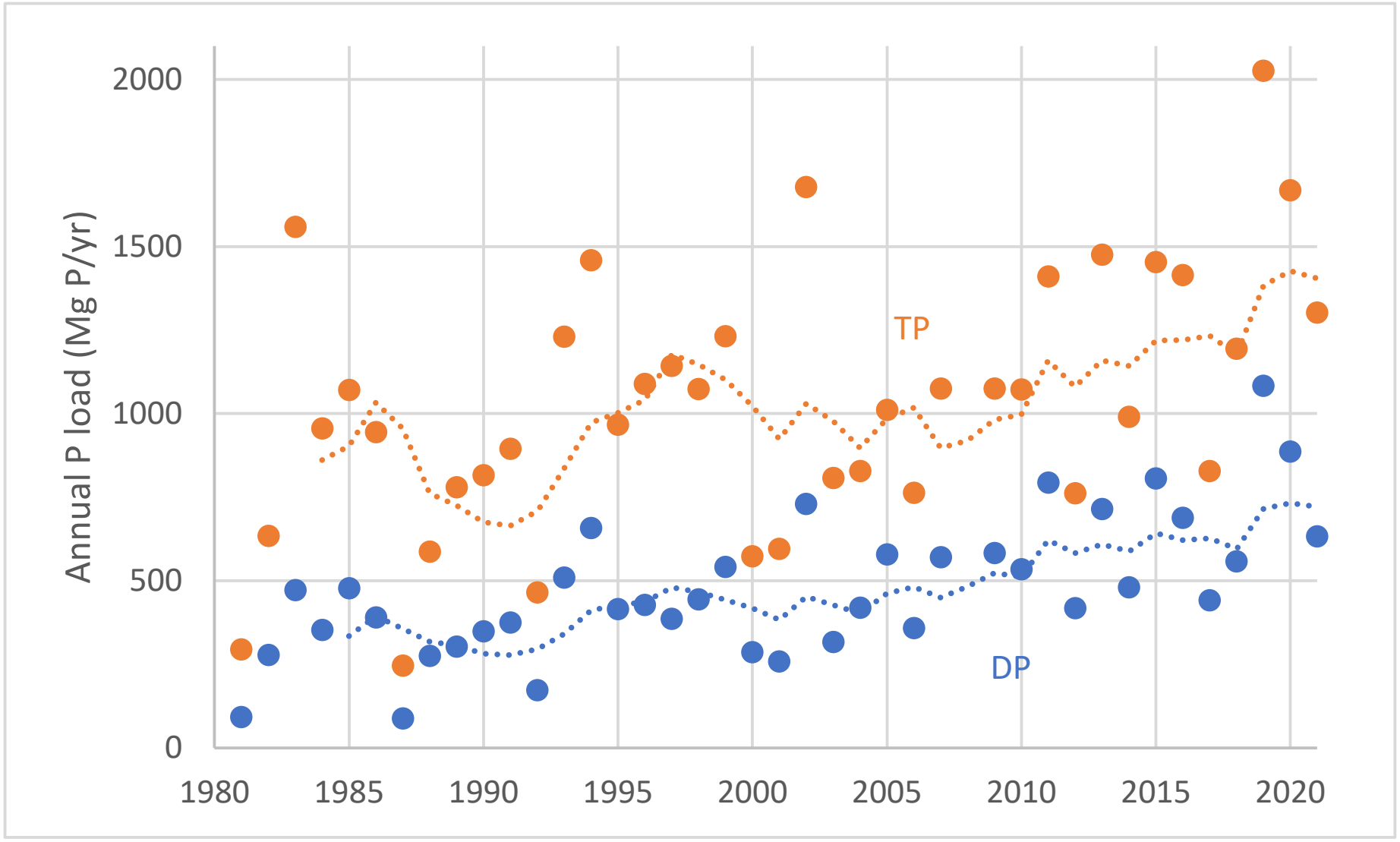
Increase is mostly particulate P (+180 Mg P/yr), associated with increased peak flows.

Expanded impervious surfaces likely contribute.

TSS yields (Mg/ha)	
1985-96	2.2
2017-21	7.1

Load estimates from Tim Hodson (2023), USGS

Little Wabash at Carmi (3102 mi^2)



Load estimates from Tim Hodson (2023), USGS

P Load increases from 1981-1996 to 2017-21:
DP: +368 Mg P/yr
PP: +161 Mg P/yr

P Load increases from 1985-1996 to 2017-21:
DP: +350 Mg P/yr
PP: +175 Mg P/yr

Increase in TP load is mostly from DP

PP load increase at Carmi similar to incrase at Effingham +180 Mg P/yr

TSS yield at Carmi Mg/ha

1981-96	0.4
1985-96	0.4
2017-21	0.4

What Experiments, Measurements and Analyses Should Be Done to Quantify Causes of TP Load Increases in Illinois Rivers?

(Who will do it? Who will pay for it?)

Examine statewide landcover/land use relationships to river P loads (livestock, tile drains and other factors)

Examine monthly P loads to evaluate seasonal/temperature impacts

Investigate whether conditions likely to produce low DO in sediment have become more frequent?
(e.g., longer periods of low flow and high water temp?)

Examine trends in zooplankton, algae and DO (past measurements may be available)

Investigate sediment P:Fe ratios (past measurements may be available)

Lab and/or Mesocosm incubations to examine whether NO_3, Cl^-, SO_4 inhibit or enhance P release

Gregory McIsaac
University of Illinois Urbana Champaign
gmcisaac@illinois.edu

Questions and Comments

Gregory McIsaac
University of Illinois Urbana Champaign
gmcisaac@illinois.edu

5-minute break

If you have recently joined, please type your name and affiliation into the chat box.

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

2023 ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S HARMFUL ALGAL BLOOM PROGRAM

Alexandrea Terlep and Erica Becker

PRESENTATION OVERVIEW

MONITORING

Routine and Bloom Event Response monitoring

BLOOM REPORTING

How to report a bloom

BLOOM EVENTS

2023 Illinois bloom events

SAMPLE RESULTS

Cyanotoxin sample collections are analysed by IL EPA Division of Laboratories

PHYCOTECH KITS

Cyanotoxin sample collections are analysed by IL EPA Division of Laboratories

HAB DASHBOARD

How to communicate with public and HAB dashboard

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

The Bureau of Water has been monitoring Illinois surface waters since 1970

2013
Started collecting microcystin

2015
US EPA established Health Advisories for microcystins and cylindrospermopsin

2016
Started routinely collecting microcystin and cylindrospermopsin

2020
US EPA Grant to expand IL EPA HAB Program

2021
Started collecting anatoxin-a and saxitoxin

WHERE DOES CYANOTOXIN MONITORING OCCUR?

ROUTINE MONITORING

- Public water supply intakes in Illinois lakes, streams, and Lake Michigan
- Lake beaches
- Lake Michigan nearshore and harbor areas

EVENT RESPONSE

Investigates potential cyanobacteria blooms in lakes or in streams where blooms may threaten public health.

ROUTINE MONITORING

	MICROCYSTIN	CYLINDROSPERMOPSIN	ANATOXIN	SAXITOXIN
STREAMS	✓	✓	✓	✓
LAKES	✓	✓	✗	✗
BEACHES	✓	✓	✗	✗

PUBLIC WATER SUPPLY

WHERE

Routine samples are collected at select waterbodies used for public water supplies

WHAT

Samples collected at depth from in-lake water intakes and at the raw and finished taps in water treatment plant

FOLLOW-UP?

collected if toxins detected in treated water or at request of Public Water Supply staff

- ✓ MICROCYSTIN
- ✓ CYLINDROSPERMOPSIN
- ✓ ANATOXIN
- ✓ SAXITOXIN

Photo Credit: Bridget Kiernan – Chicago Botanic Garden

BLOOM EVENT RESPONSE

WHERE

Event Response investigates cyanobacteria blooms in publicly owned lakes or in streams where blooms may threaten public health.

ANNUALLY

50-65 bloom event response samples at waterbodies across the state

FOLLOW-UP?

If sample results show the need

- MICROCYSTIN
- CYLINDROSPERMOPSIN
- ANATOXIN
- SAXITOXIN

Algal Bloom

- 2022 Statewide Harmful Algal Bloom Program
- Identifying Cyanobacteria Blooms
- **Reporting a Harmful Algal Bloom**
- USEPA Issues Health Advisories Regarding Algal Tox...
- Harmful Algal Bloom Poster
- Document: Recommended Human Health Recreational Am...
- Links to Other Resources
- Contact

BLOOM REPORT FORM

Click or scan QR Code for IEPA Bloom Report Form

The Bloom Report Form is a fillable online survey located on the Illinois EPA's Reporting a Harmful Algal Bloom Page

Illinois EPA staff will review all submissions

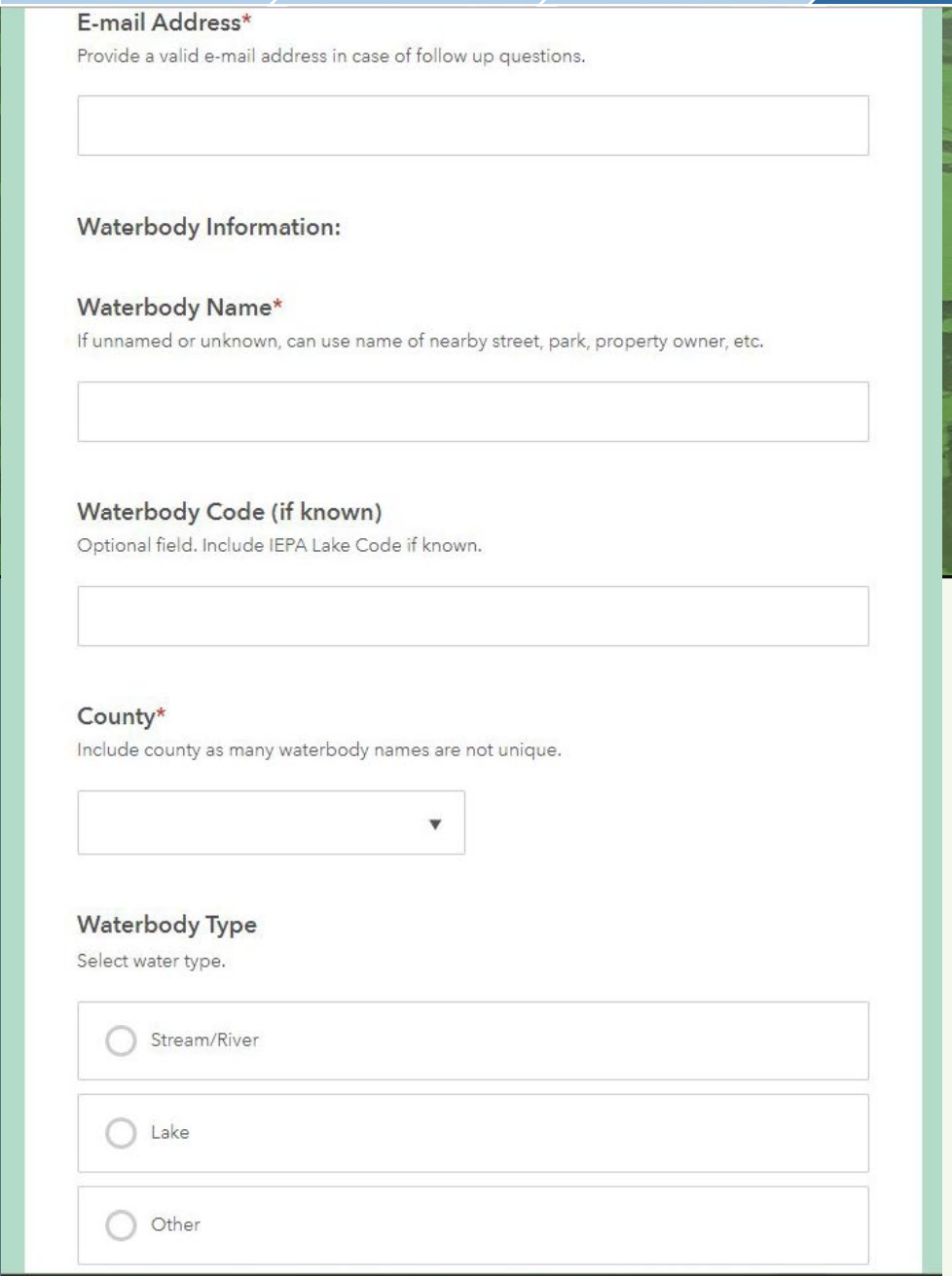
https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

BLOOM REPORT FORM

1. **Contact Information**
2. Waterbody Information
3. GPS
4. Photo(s) of Bloom
5. Bloom Description
6. Human/Animal Illness Report

IEPA Bloom Report Form

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html



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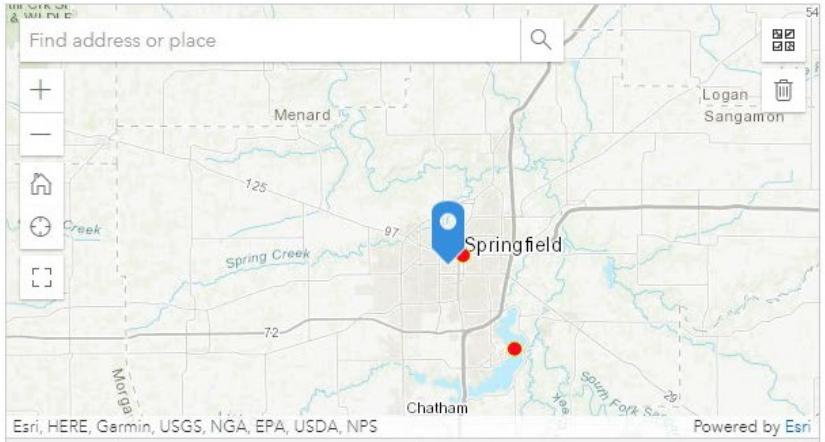
[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

Record GPS Points*

Use location finder (circular icon) or search map to record GPS points. You can also search for an address or landmark and click on the map to drop a pin.



Are You Able To Submit Photos?*

Submit photos if possible as they help our biologists identify blooms.

- ○ Yes
- ○ No

Bloom Description:

When Did You First Observe Bloom?

Record the date on which you first observed the algal bloom.

MM/DD/YYYY

BLOOM REPORT FORM

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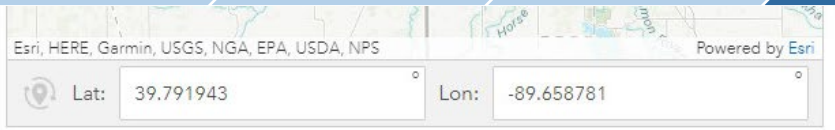

Are You Able To Submit Photos?*

Submit photos if possible as they help our biologists identify blooms.

- (•) Yes
- ( ) No

Take A Close Up Photo of the Algal Bloom*

Focus on capturing color and other details.

Drop image here or select image

Comment On Close Up Photo

Optional description.

Take A Landscape Photo of the Algal Bloom*

Include as much of the bloom as possible.

Drop image here or select image

Comment On Landscape Photo

Optional description.

BLOOM REPORT FORM

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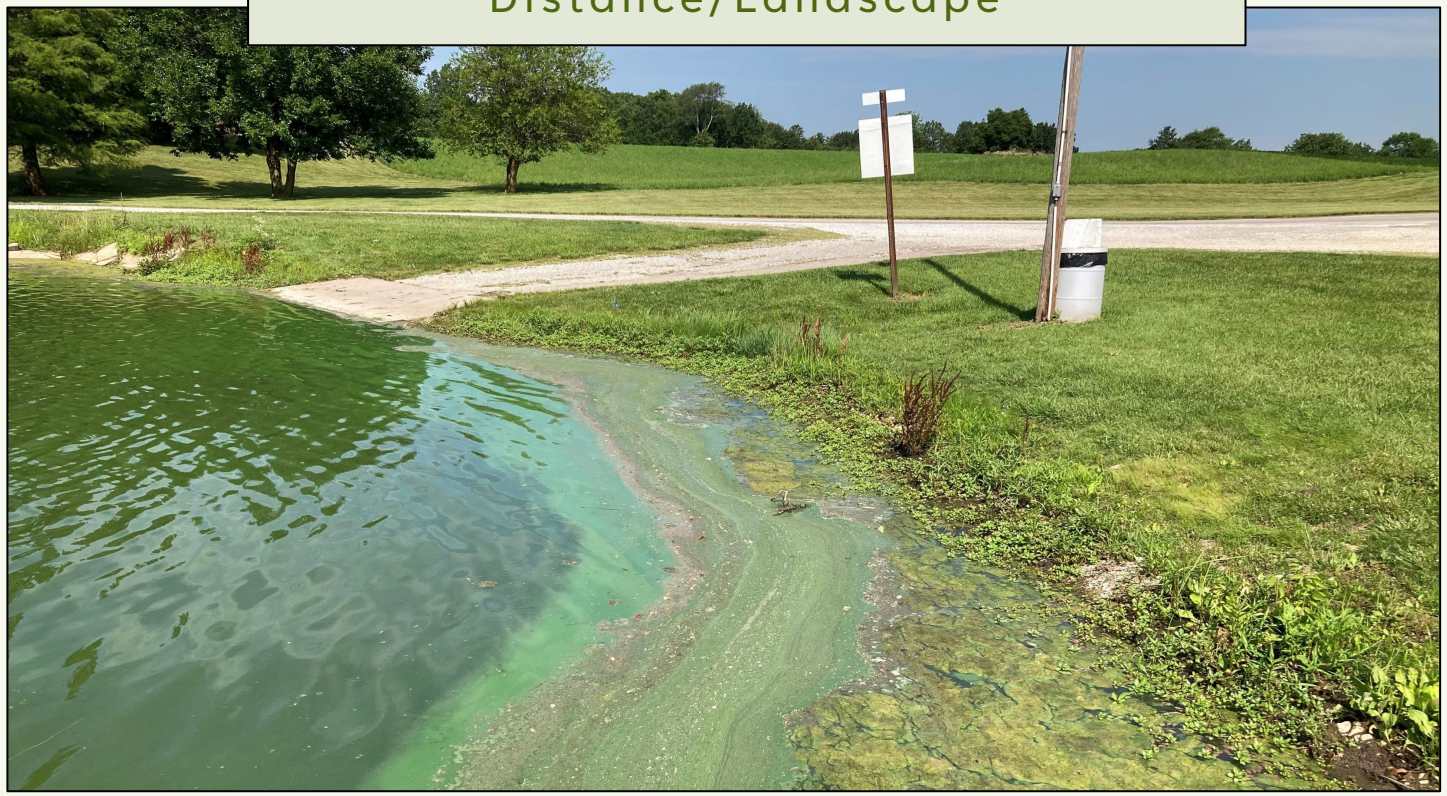
[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

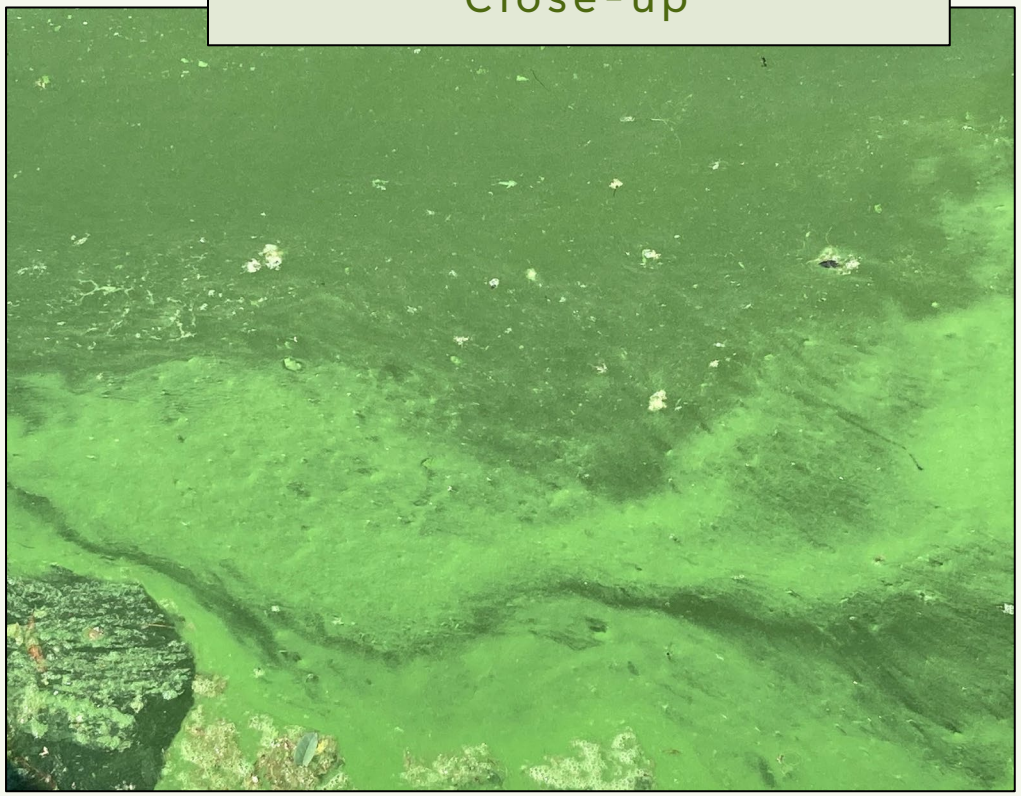
PUBLIC BLOOM REPORT FORM (SURVEY 123)

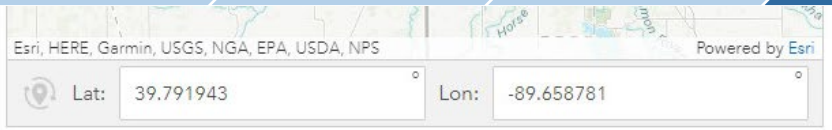
Photos

Distance/Landscape



Close-up





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Optional description.

Take A Landscape Photo of the Algal Bloom*

Include as much of the bloom as possible.

Drop image here or select image

Comment On Landscape Photo

Optional description.

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[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

Bloom Description:

When Did You First Observe Bloom?
Record the date on which you first observed the algal bloom.

MM/DD/YYYY

When Did You Last Observe Bloom?
Record the date on which you last observed the algal bloom.

MM/DD/YYYY

Is The Bloom Present Today?
Indicate if the bloom is visible today.

- Yes
- No
- Uncertain

Estimated Bloom Size
Description of bloom size (ex: size of a car, 30 sq. ft, etc.).

Describe Bloom Location
Center of lake, boat dock, beach , etc.

BLOOM REPORT FORM

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5. **Bloom Description**
6. Human/Animal Illness Report

[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

Describe Bloom Color
Describe any colors you see in bloom.

Describe Bloom Odor
Describe any odors associated with bloom (ex: septic, rotten, fishy, earthy, etc.).

Is There An Accumulation Of Algae At The Surface?

- ○ Yes
- ○ No
- ○ Uncertain

Is The Bloom Near A Public Beach, Boat Ramp, Or Marina?

- ○ Yes
- ○ No
- ○ Unknown

Is The Bloom Near A Public Water Supply Intake?

BLOOM REPORT FORM

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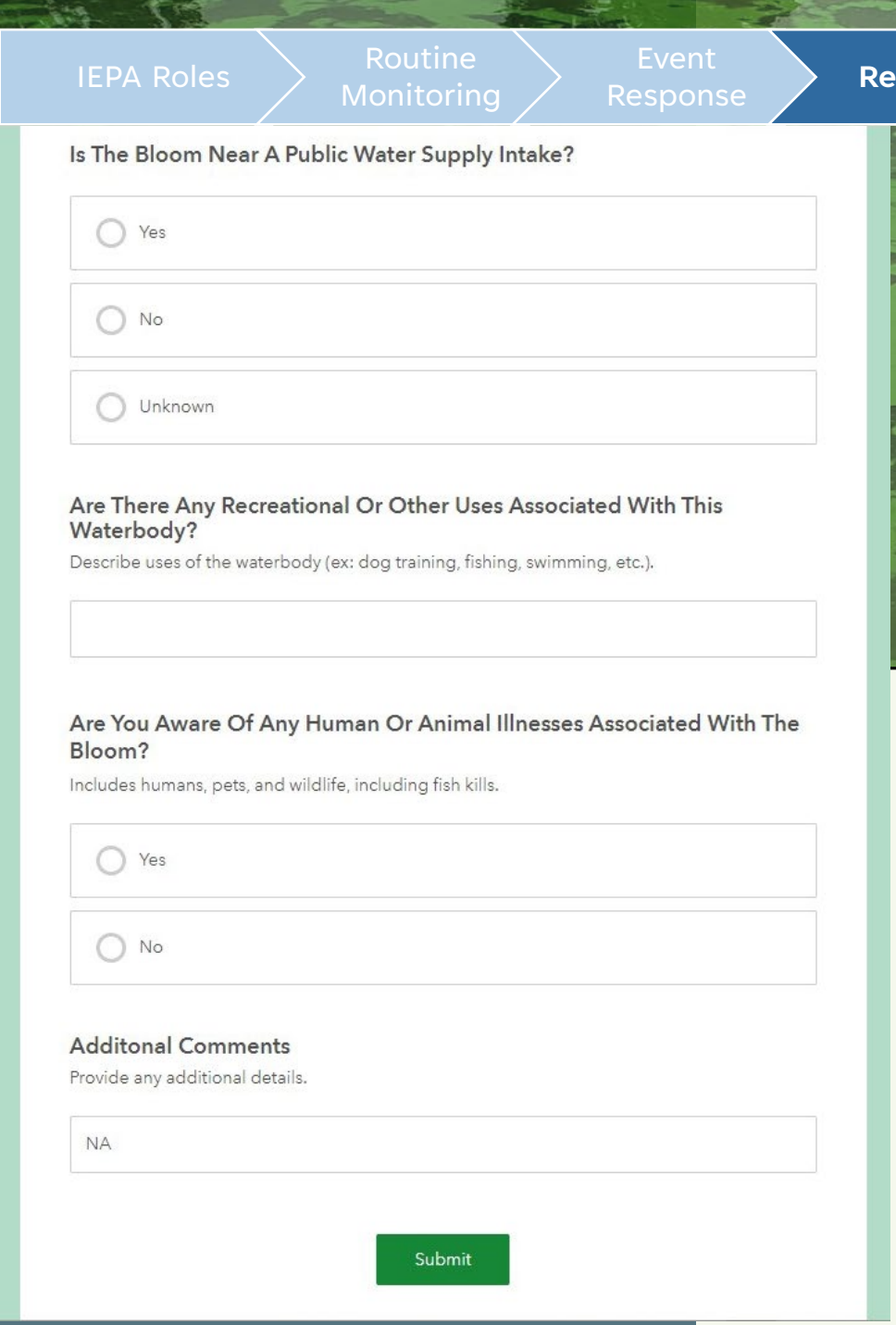
[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html



BLOOM REPORT FORM

1. Contact Information
2. Waterbody Information
3. GPS
4. Photo(s) of Bloom
5. Bloom Description
6. **Human/Animal Illness Report**

[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

BLOOM REPORT FORM

1. Contact Information
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[IEPA Bloom Report Form]

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/reporting.html

Are There Any Recreational Or Other Uses Associated With This Waterbody?

Describe uses of the waterbody (ex: dog training, fishing, swimming, etc.).

Are You Aware Of Any Human Or Animal Illnesses Associated With The Bloom?

Includes humans, pets, and wildlife, including fish kills.

- (●) Yes
- ( ) No

Illness Comments

Provide details on any observed illnesses.

Additonal Comments

Provide any additional details.

NA

Submit

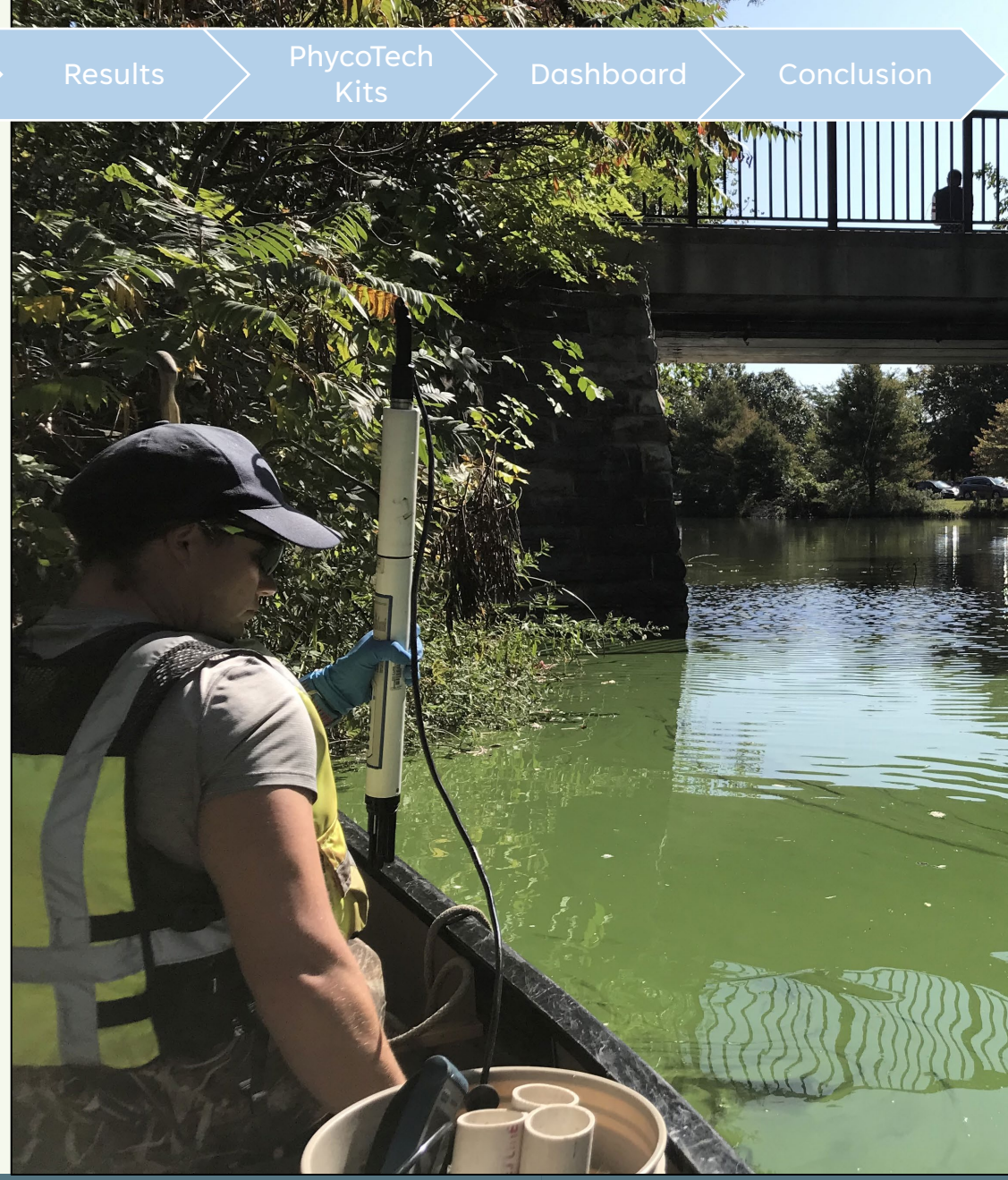
Powered by ArcGIS Survey123

NEXT STEPS

Illinois EPA staff review submitted information and photos

Staff may reach out to request more photos or specific information

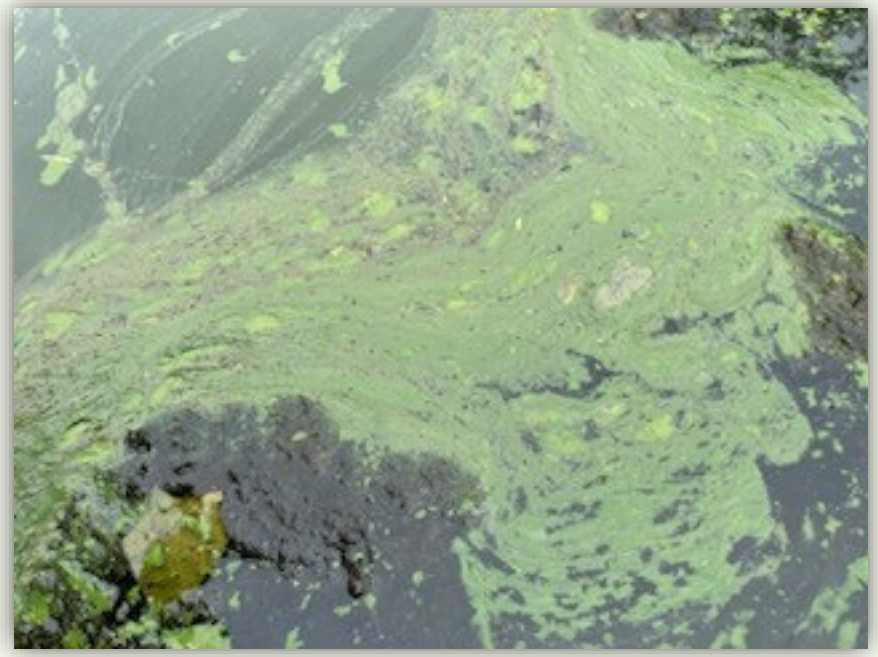
If we suspect that a cyanobacteria bloom is present, we may send staff to collect a toxin sample



2023 BLOOM EVENTS– EAST BRANCH DOG PARK

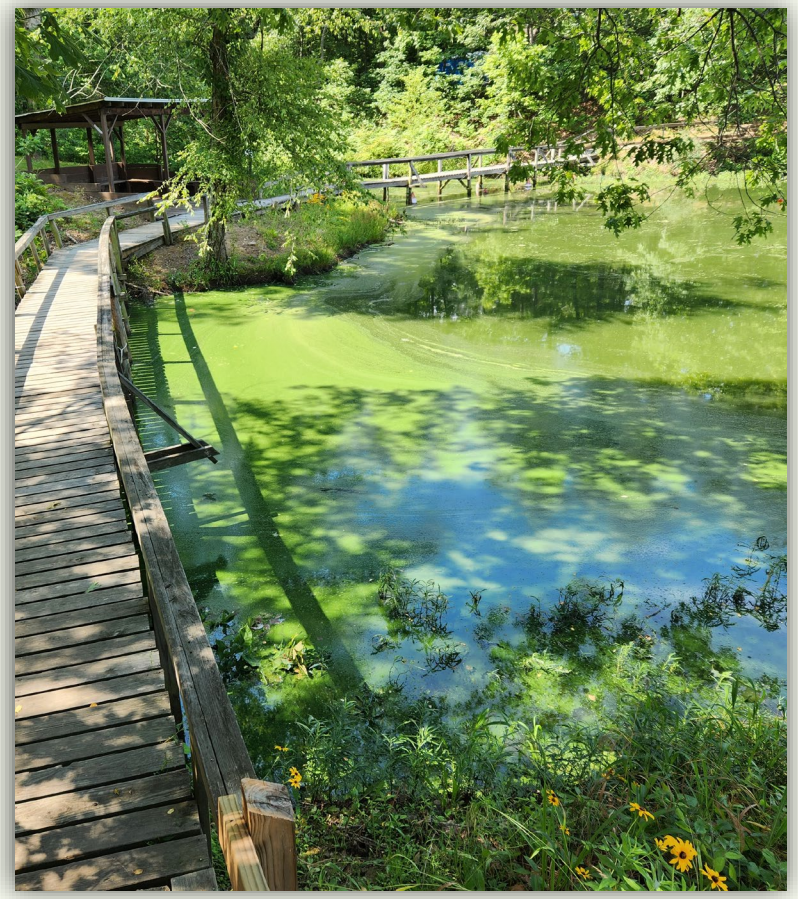
- Reported by Forest Preserve District of DuPage County
- Aware of the bloom and risks
- Strip tests for fast results.
- Posted signs and updated information on website

2023 BLOOM EVENTS– GILLESPIE NEW 7.31.2023

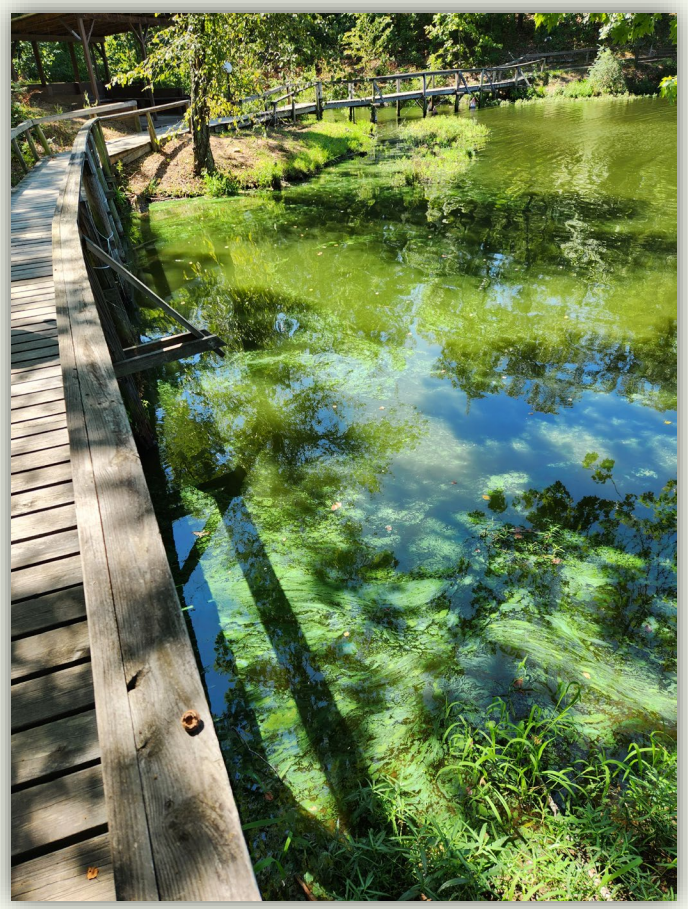


- Discovered during routine sampling
- Collected samples for all four toxins
- Public Water Supply
  - Sample sent for ID and enumeration

2023 BLOOM EVENTS– DUBOIS



06.22.2023



08.30.2023

- Ongoing bloom reported via online bloom report form
- Microcystin and Saxitoxin detected this year
- Swimming beach has been closed most of season
- Bloom persists despite treatment efforts

SAMPLE ANALYSIS

ILLINOIS EPA DOL

All samples are sent to the Illinois EPA Division of Laboratories in Springfield, IL

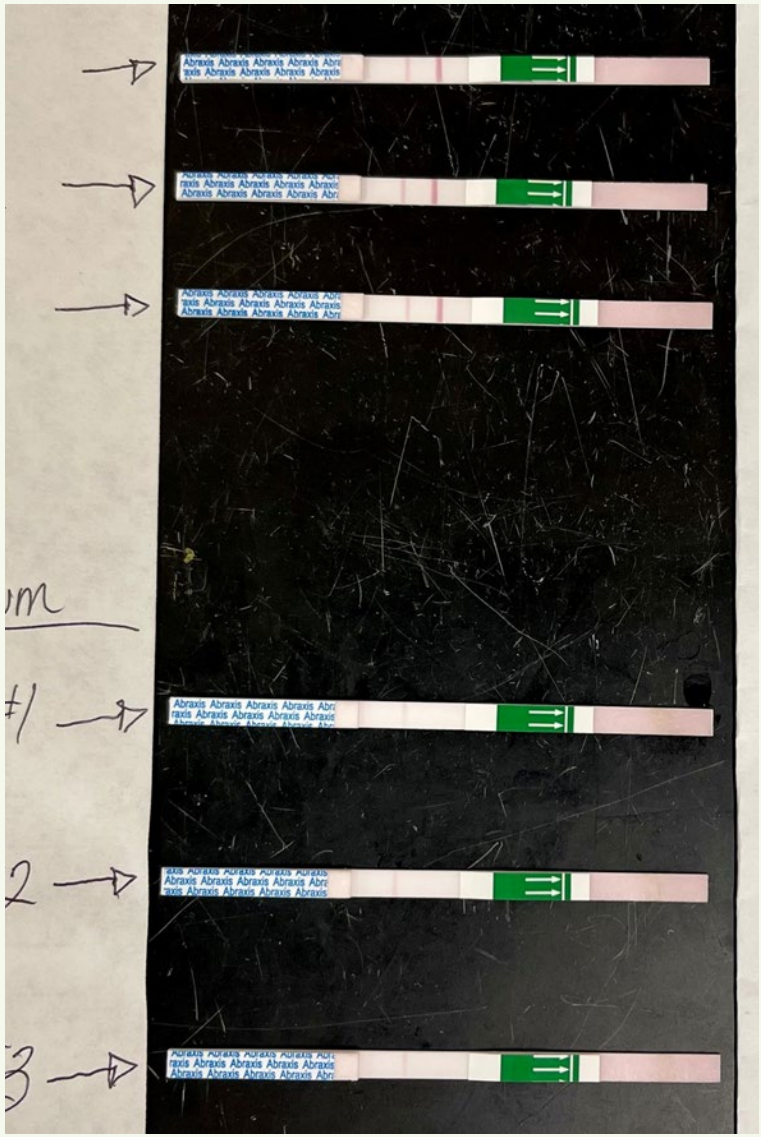
7-14 BUSINESS DAYS

Toxin results within 7-14 business days → Tell us how much, if any toxin is present

RESULTS

Staff at headquarters send results to regional staff who will reach out to waterbody manager/operator

Staff sometimes use strip tests for fast results



UNDERSTANDING SAMPLE RESULTS

Cyanotoxin	Recreational Advisory	Drinking Water Advisory
Microcystin *US EPA	8 ug/L	0.3 ug/L
Cylindrospermopsin*US EPA	15 ug/L	0.7 ug/L
Anatoxin-a *WHO	60 ug/L	6 ug/L
Saxitoxin *WHO	30 ug/L	3 ug/L

If results exceed guidance levels, avoid contact

When in doubt, keep out!

2023 SURFACE WATER SAMPLE RESULTS

(AS OF 8/30/2023)

MICROCYSTIN

- 248 samples analyzed.
- Microcystin detected in 24% of samples
- Highest detected= **335 ug/L**

CYLINDROSPERMOPSIN

- 248 samples analyzed
- Cylindrospermopsin detected in 3% of samples
- Highest detected = **4.95 ug/L**

ANATOXIN-A

- 175 samples analyzed
- Anatoxin-a detected in 0.6% of samples
- Highest detected = **1.0351 ug/L**

SAXITOXIN

- 175 samples analyzed
- Saxitoxin detected in 16% of samples
- Highest detected = **0.868 ug/L**

2023 SURFACE WATER SAMPLE RESULTS

(AS OF 8/30/2023)

MICROCYSTIN

Microcystin (reporting limit 0.3 ug/L)				
ND	0.3 ug/L < 8 ug/L	8 ug/L < 20 ug/L	20 ug/L <	Total Samples
188	57	0	3	248

CYLINDROSPERMOPSIN

Cylindrospermopsin (reporting limit 0.1 ug/L)		
ND	Detect	Total Samples
240	8	248

ANATOXIN-A

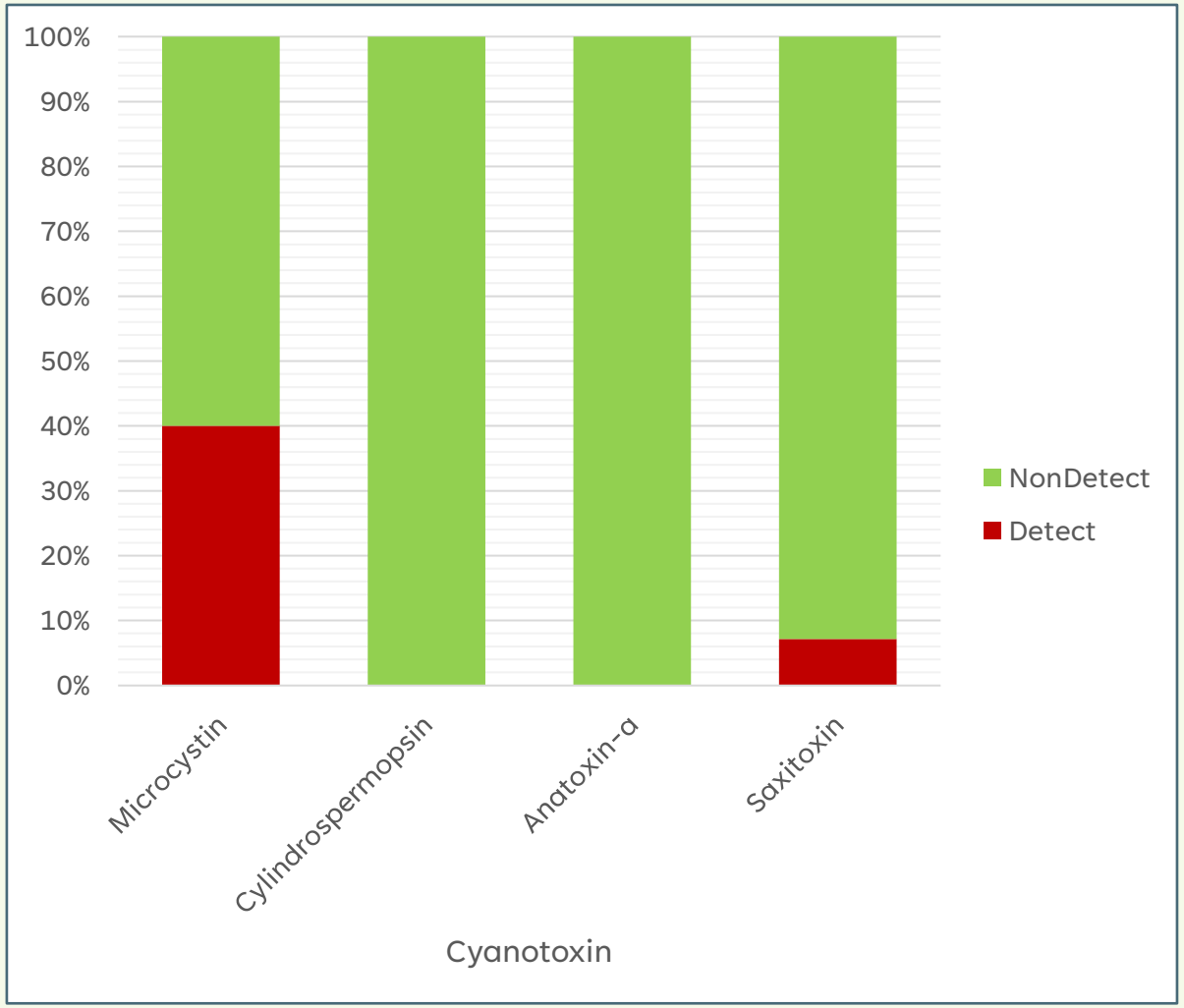
Anatoxin-a (reporting limit 0.44 ug/L)		
ND	Detect	Total Samples
174	1	175

SAXITOXIN

Saxitoxin (reporting limit 0.055 ug/L))		
ND	Detect	Total Samples
151	24	175

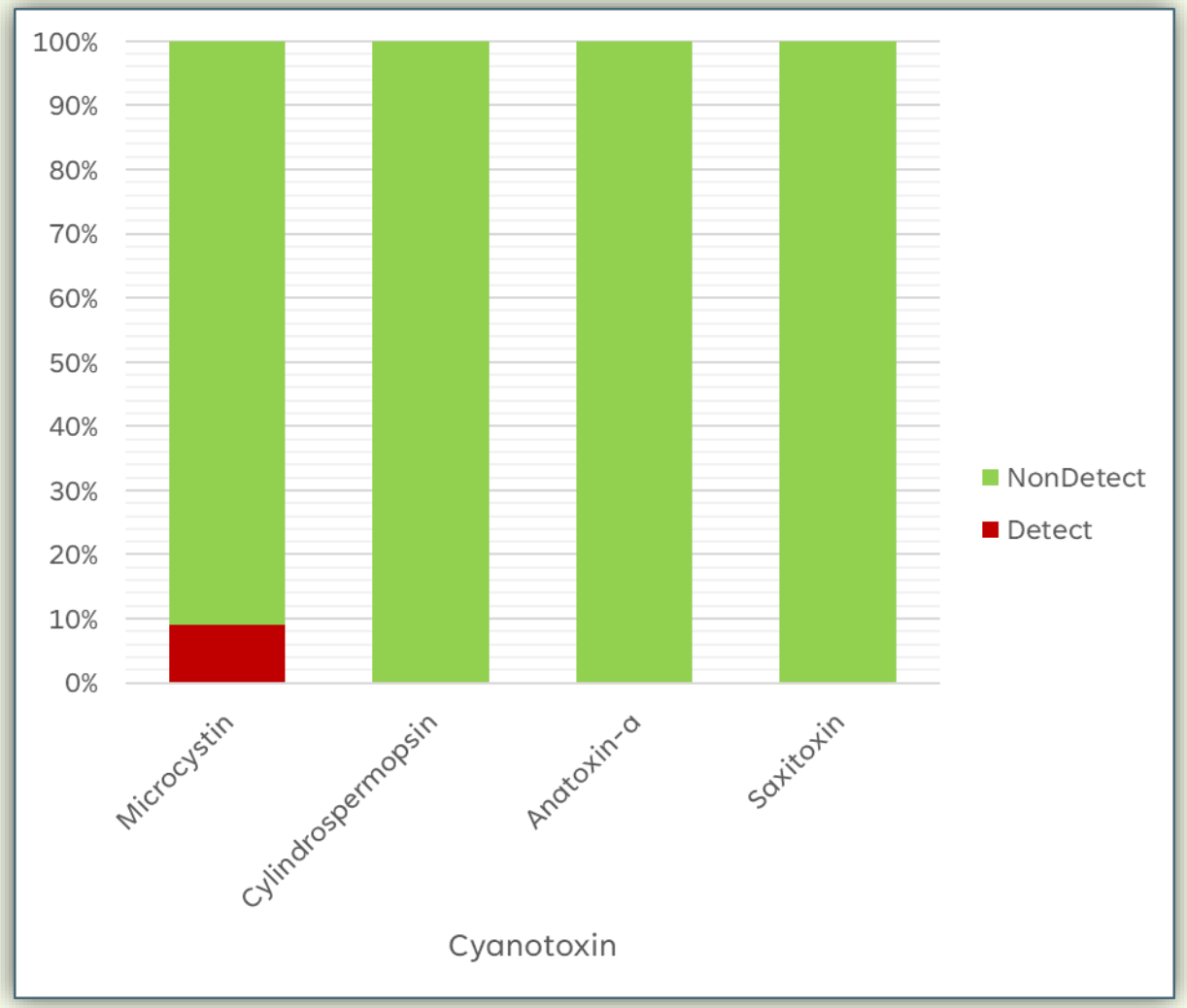
2023 Source Waters (RAW)

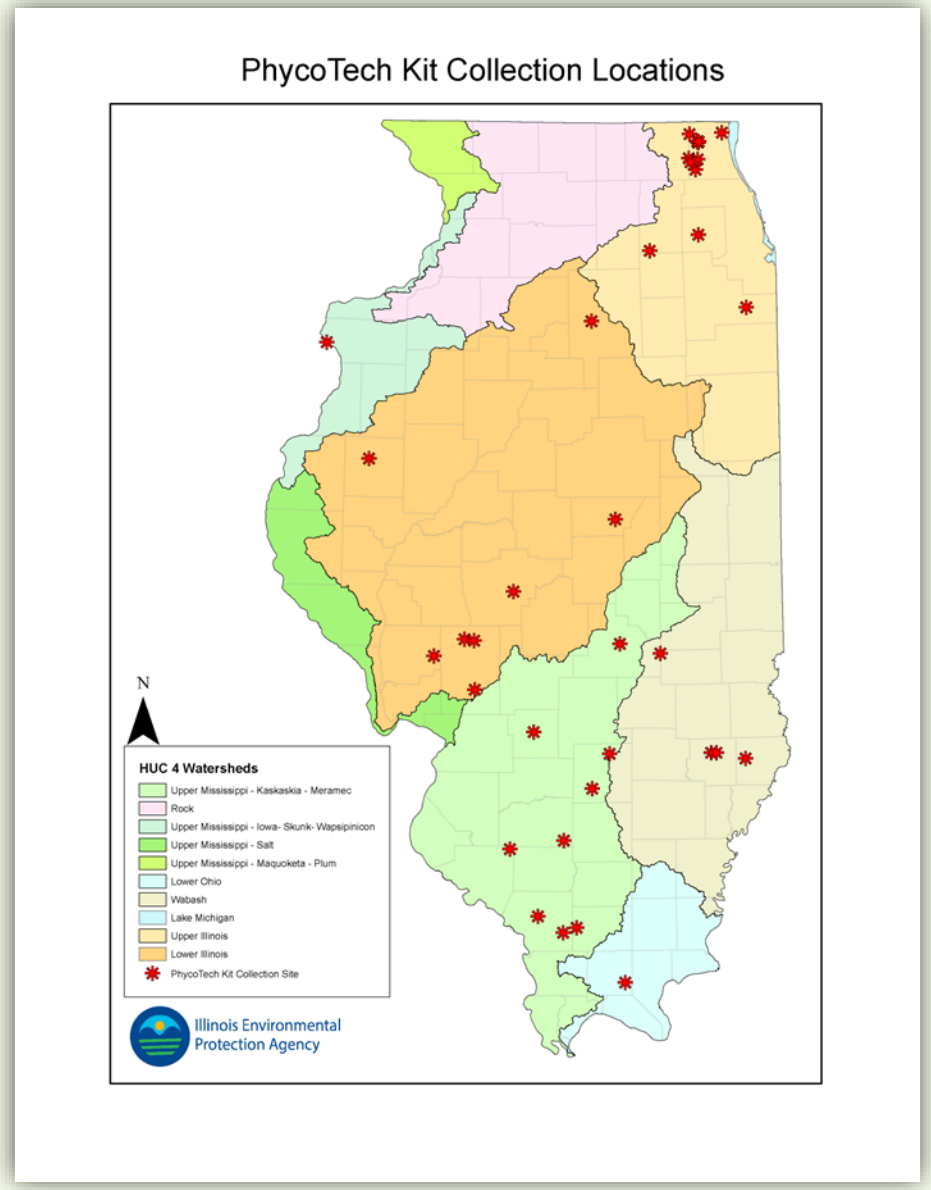
- Total Microcystin samples analyzed: 35
  - Microcystin detected in 14/35 (40%) of samples collected
- Total cylindrospermopsin samples analyzed: 35
  - Cylindrospermopsin detected in 0/35 of samples collected
- Total anatoxin-a samples analyzed: 28
  - Anatoxin-a detected in 0/28 of samples collected
- Total saxitoxin samples analyzed: 28
  - Saxitoxin detected in 2/28 (7%)of samples collected



2023 Source Waters (Finished)

- Total Microcystin samples analyzed: 33
  - Microcystin detected in 3/33 (9%) of samples collected
- Total cylindrospermopsin samples analyzed: 33
  - Cylindrospermopsin not detected
- Total anatoxin-a samples analyzed: 28
  - Anatoxin-a not detected
- Total saxitoxin samples analyzed: 28
  - Saxitoxin not detected





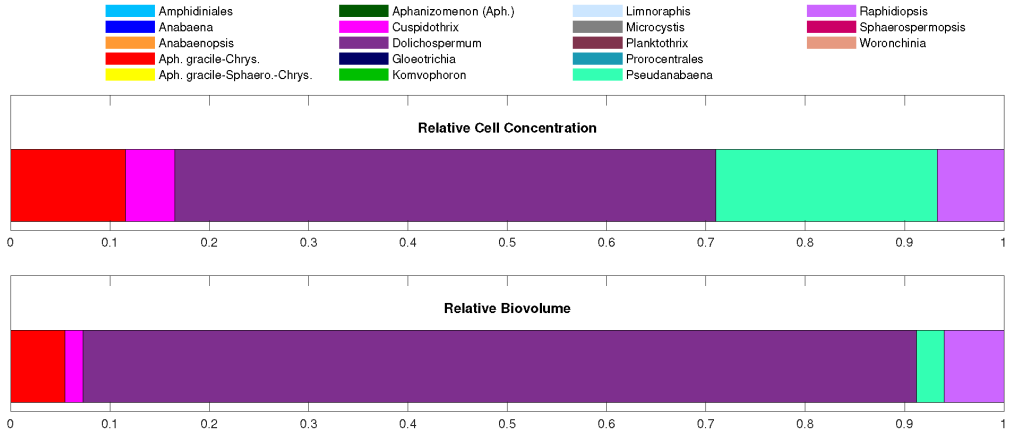
PHYCOTECH KITS

- US EPA Multipurpose Grant
- First Kit collected in 2021
- Originally used just for blooms
- 2023 use kits for blooms and routine monitoring
- Species identification, enumeration, and an estimate of cyanobacteria biovolume
- Also collect samples for toxin analysis

Sample ID: D20230615T143926
Customer ID: 383
Tracking Code: 210045-383
Sample Info: 1345

System: Crab Orchard Lake
Site: RNA-100 Beach
Station: NaN
Level: Epi

Date Sampled: 6/14/2023
Date Received: 6/15/2023
Date Analyzed: 6/15/2023



Total Algal Concentration: 129676 cells/mL
HAB Concentration: 75455 cells/mL
HAB Relative Concentration: 58%

Total Biovolume: 37830365 um^3/mL
HAB Biovolume: 19588224 um^3/mL
HAB Relative Biovolume: 52%

! WARNING !

HAB concentration is high - Toxin testing recommended.
Taste and odor producer concentration is high.

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Site: RNA-100 Beach
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Date Sampled: 6/14/2023
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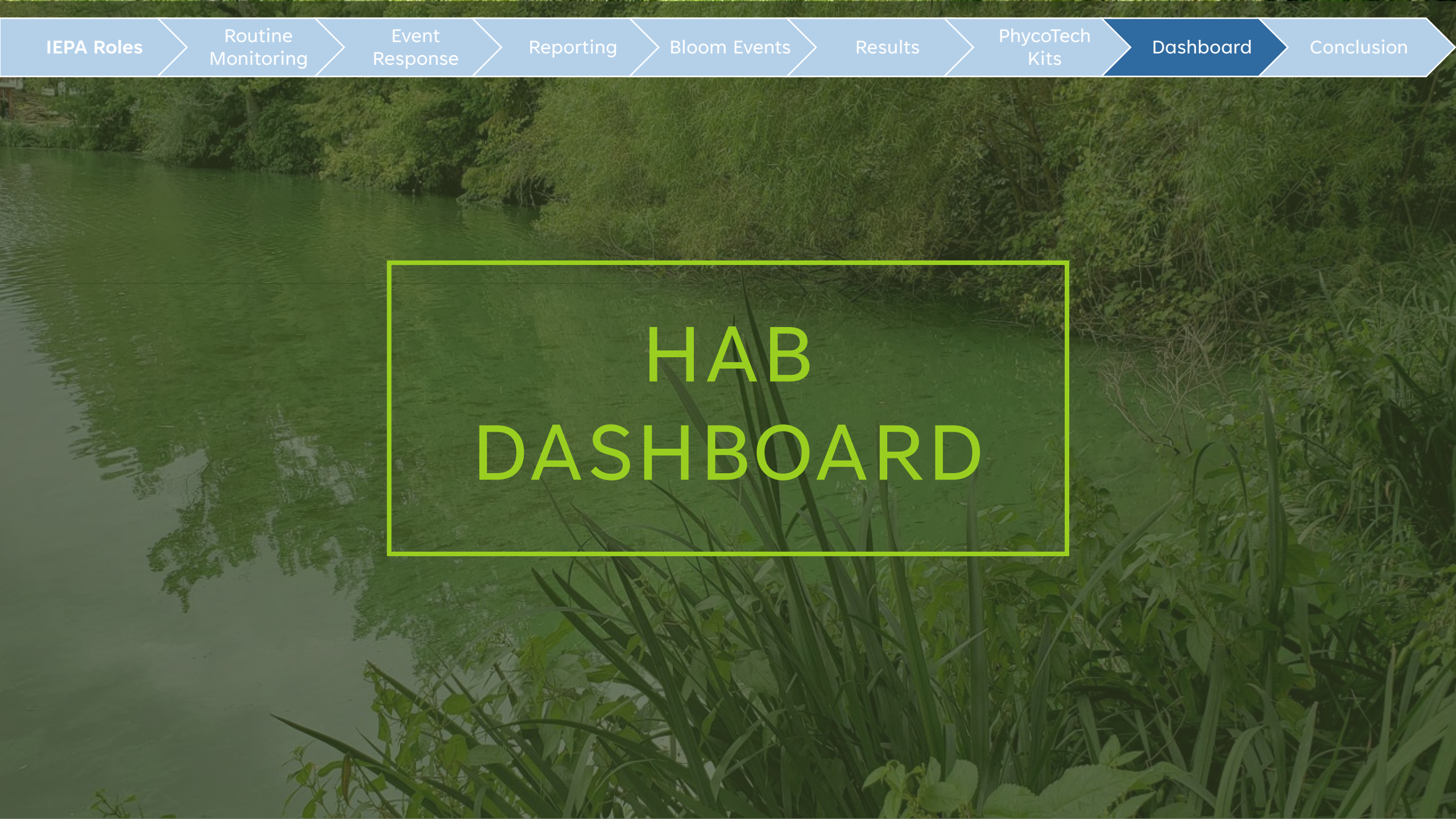
Date Analyzed: 6/15/2023

Taxa	Group	NU/mL	Cells/mL	Biovolume um^3/mL	Relative Biovolume %
Aph. gracile-Chrys.	HAB	1073	11240	1101172	2.91
Cuspidothrix	HAB	244	4804	361505	0.96
Dolichospermum	HAB	7878	52900	16912447	44.71
Raphidiopsis	HAB	1537	6512	1213100	3.21
Taxa below 9um	M	11121	11121	1647187	4.35
Pseudanabaena	TO	2902	21637	560042	1.48
unclassified	U	21462	21462	16034912	42.39



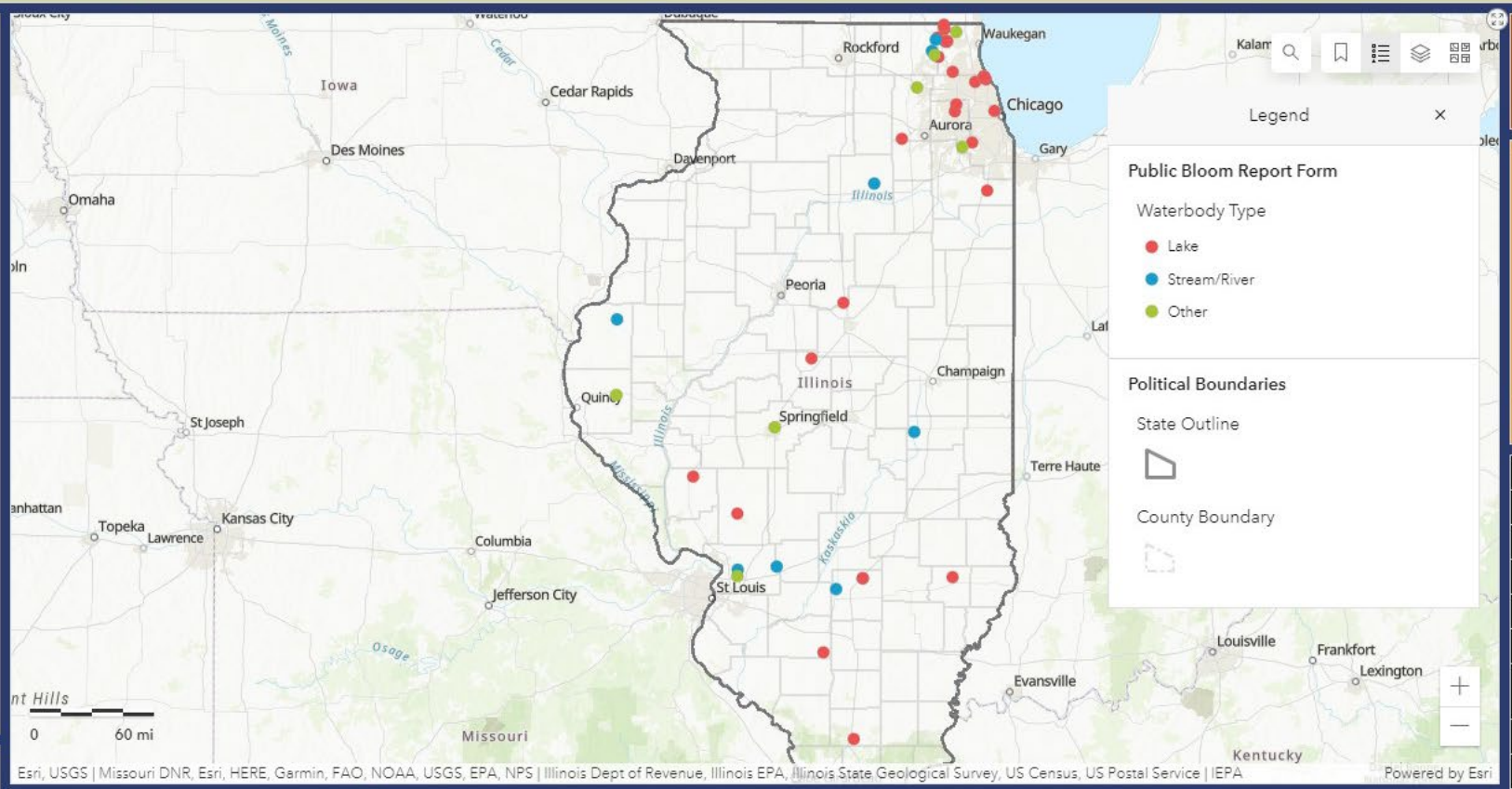
HAB DASHBOARD

Illinois Environmental Protection Agency Harmful Algal Bloom (HAB) Dashboard

Best Experienced with Google Chrome or Microsoft Edge Browsers

Algal Bloom Monitoring and Response Quick Links

- Report Algal Blooms
- Statewide Algal Bloom Program
- Harmful Algal Bloom FAQs
- Identifying Cyanobacterial Blooms
- Health Questions
- Algae Bloom Poster



POISON CONTROL:
1 (800) 222- 1222

Recommended Magnitude for Cyanotoxins in Recreational Water	
Microcystins	8 µg/L [a]
Cylindrospermopsin	15 µg/L [a]

[a] Swimming Advisory: not to be exceeded on any day.

- Big Rock
- Monee
- Borah
- Kinmundy Old
- Marie
- [redacted]
- [redacted]
- Long
- Little Silver Creek
- Evergreen Lake
- Nippersink/Fox Lake/Dunns Lake
- Citation Lake
- Arcadia (Old Marion Country Club Lake)

Algal Blooms Reported in 2022

45

CONTACT IDPH

Illinois Department of Public Health

Report suspected human or animal cases of HAB - related illnesses **Here**

CONTACT LCHD

Lake County Health Department

(847) 377-8030

CONTACT ILLINOIS EPA

Suface Water Section

(217) 782-3362

epa.hab@illinois.gov

More Information on Cyanobacteria Blooms

- Interstate Technology Regulatory Council
- World Health Organization
- US Environmental Protection Agency
- Upper Mississippi River Basin Association

Illinois Environment
Best Experienced with Google Chror

m (HAB) Dashboard

Algal Bloom Monitoring and Response Quick Links

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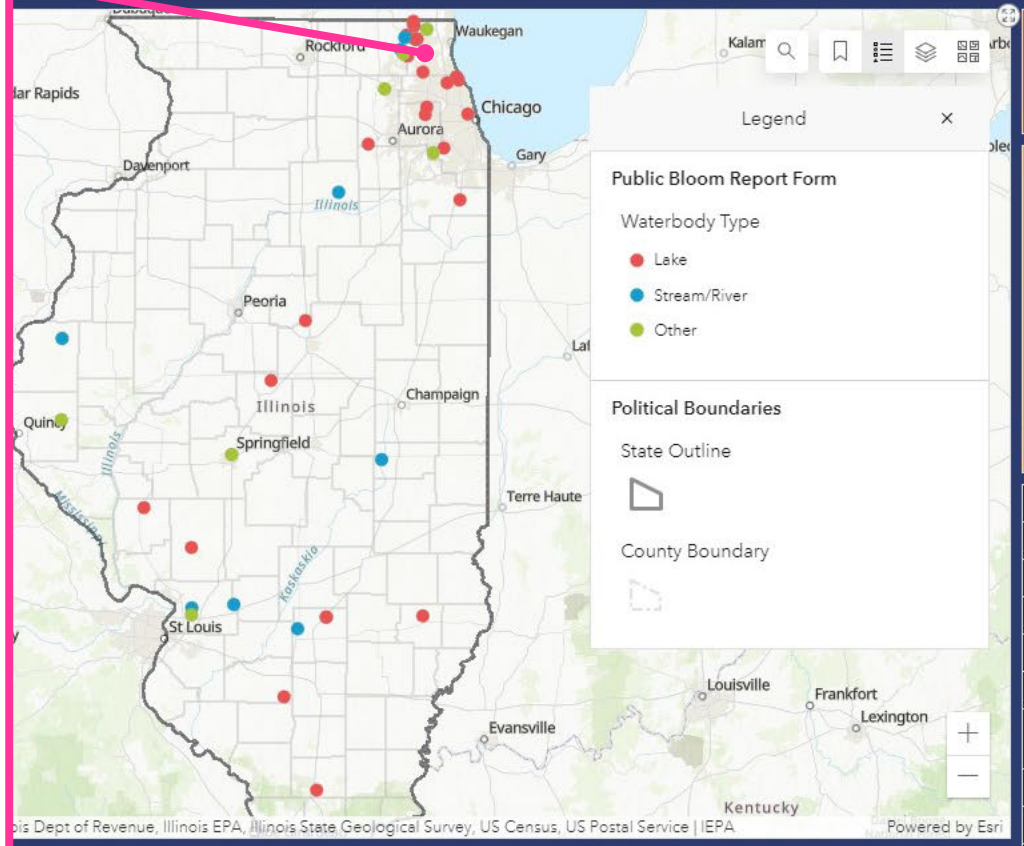
CONTACT IDPH
Illinois Department of Public Health
Report suspected human or animal cases of HAB - related illnesses **Here**

CONTACT LCHD
Lake County Health Department
(847) 377-8030

Waterbody Name: Unnamed-Shelley Dr Lake. /West Branch Spring Creek

County	DuPage
Waterbody Code	
Waterbody Type	Lake
Latitude	41.96
Longitude	-88.04
Collection Date	September 15, 2022

Last edited on 9/15/2022, 10:53 AM.



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More Information on Cyanobacteria Blooms

World Health Organization

US Environmental Protection Agency

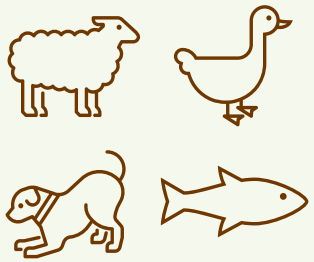
Upper Mississippi River Basin Association

Algal Blooms Reported in 2022
45

REPORTING SUSPECTED ILLNESS

Human HAB-related Illness

https://dph.illinois.gov/content/dam/soi/en/web/idph/files/forms/hab-human-report-form-042616.pdf



Animal HAB-related Illness

https://dph.illinois.gov/content/dam/soi/en/web/idph/files/forms/hab-animal-report-form-042616.pdf

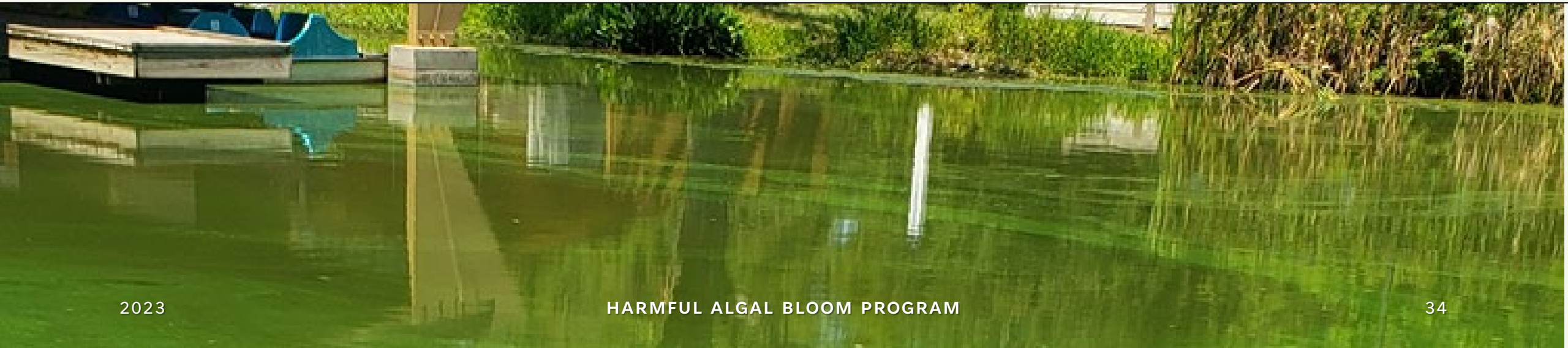
PROTECT YOUR PETS

https://www.avma.org/resources-tools/animal-health-and-welfare/animal-health/harmful-algal-blooms-habs

https://www.cdc.gov/habs/pdf/habsveterinarian_card.pdf

https://www.uvm.edu/seagrant/sites/default/files/uploads/publication/HABs_brochure_2018_05_05.pdf

https://coastalscience.noaa.gov/news/protecting-your-dog-from-harmful-algal-blooms-information-and-resources/



RESOURCES

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

Reporting a Bloom

Examples of Blooms

https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom.html

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

HABs and Health: Human & Animal Illness Report Forms

https://dph.illinois.gov/topics-services/environmental-health-protection/toxicology/harmful-algal-blooms.html

US ENVIRONMENTAL PROTECTION AGENCY

Useful for waterbody managers: Prevention & Control

https://www.epa.gov/cyanohabs

CENTER FOR DISEASE CONTROL AND PREVENTION

Examples of Social media, Signage, and Printable posters

https://www.cdc.gov/habs/index.html

CONTACT INFORMATION

Surface Water Section

Manager
Nicole Vidales | Nicole.Vidales@Illinois.gov

HAB Unit Coordinator
Alexandrea Terlep | Alexandrea.Terlep@Illinois.gov

NMU

Northern Monitoring Unit
Kevin Zidonis | Kevin.Zidonis@Illinois.gov

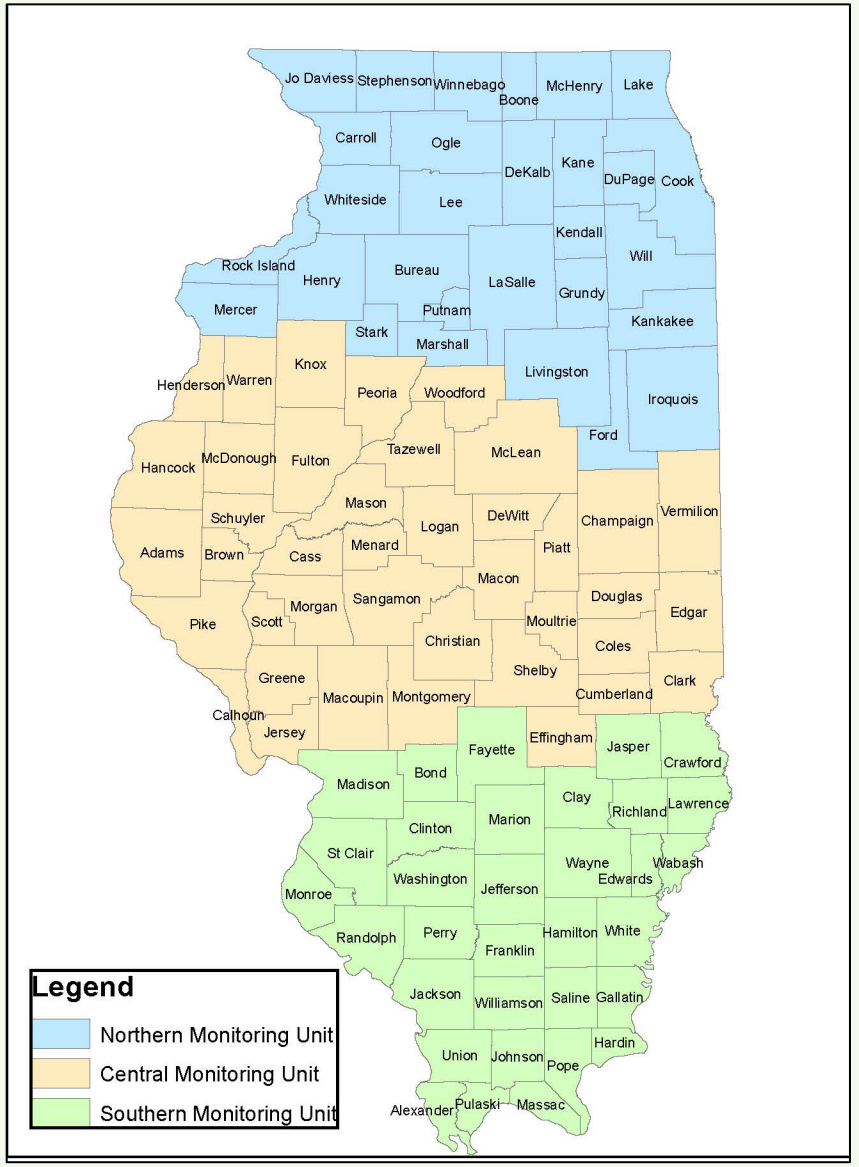
CMU

Central Monitoring Unit
Logan Schippert | Logan.Schippert@Illinois.gov

SMU

Southern Monitoring Unit
Mike Bundren | Mike.Bundren@Illinois.gov

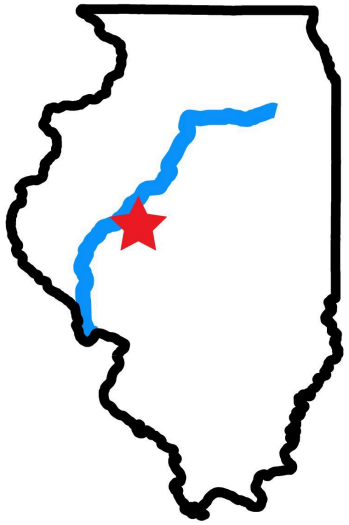
https://epa.illinois.gov/topics/water-quality/monitoring/algal-bloom/contact.html




THANK YOU

ILLINOIS RIVER BIOLOGICAL STATION
Monitoring on the Illinois Waterway

Illinois Natural History Survey – Prairie Research Institute



Illinois River Biological Station

Havana

Long Term River Monitoring

Upper Mississippi River Restoration

Leading · Innovating · Partnering

USGS science for a changing world

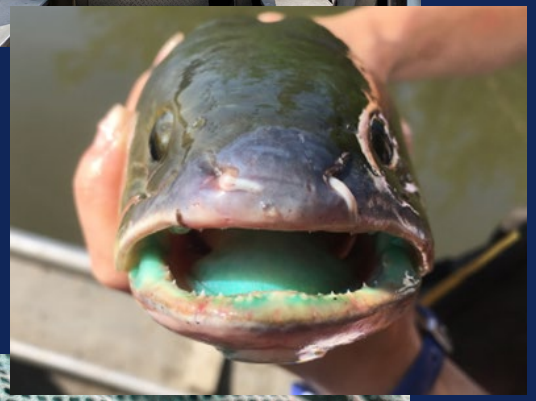
U.S. FISH & WILDLIFE SERVICE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

USDA

Long Term River Monitoring (LTRM)

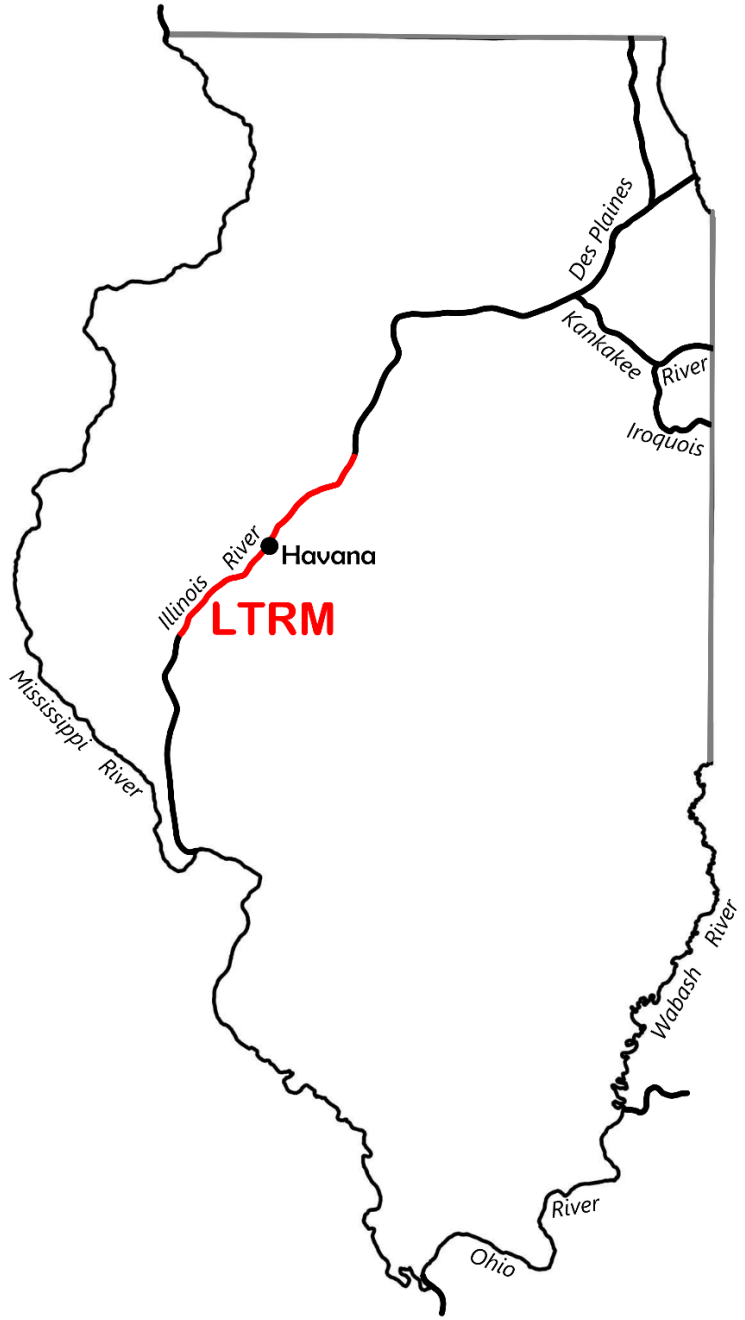
Water Quality



Fish

- ~80 river mile stretch
- Peoria to LaGrange, IL
- Standardized methods 1993-current

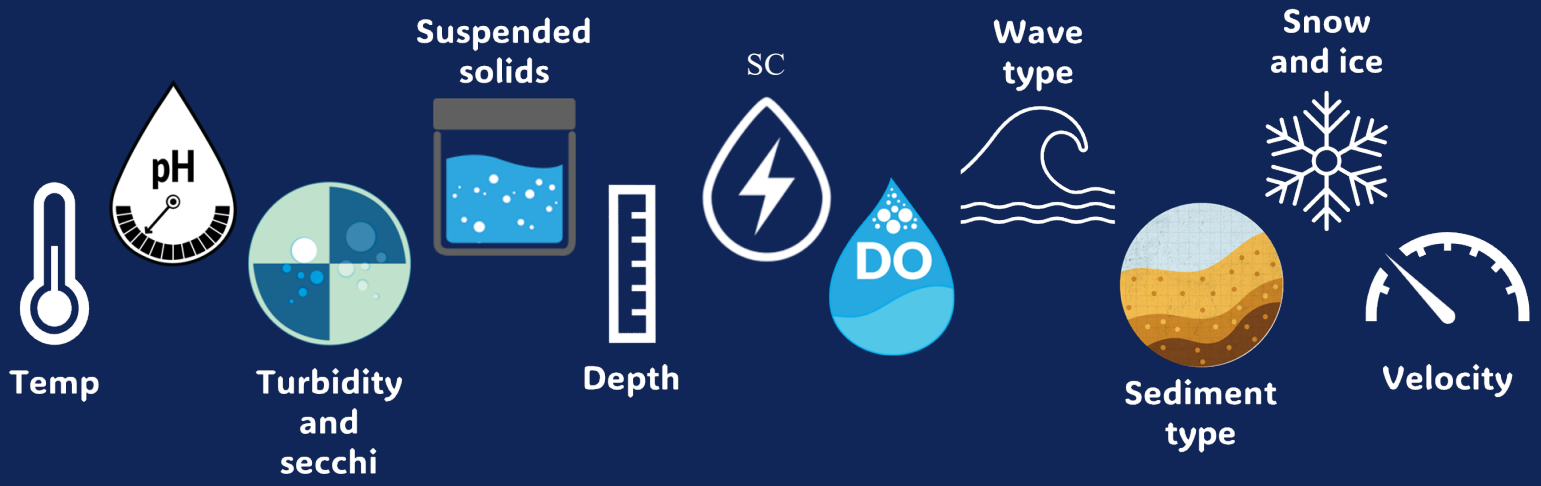
Macroinvertebrates

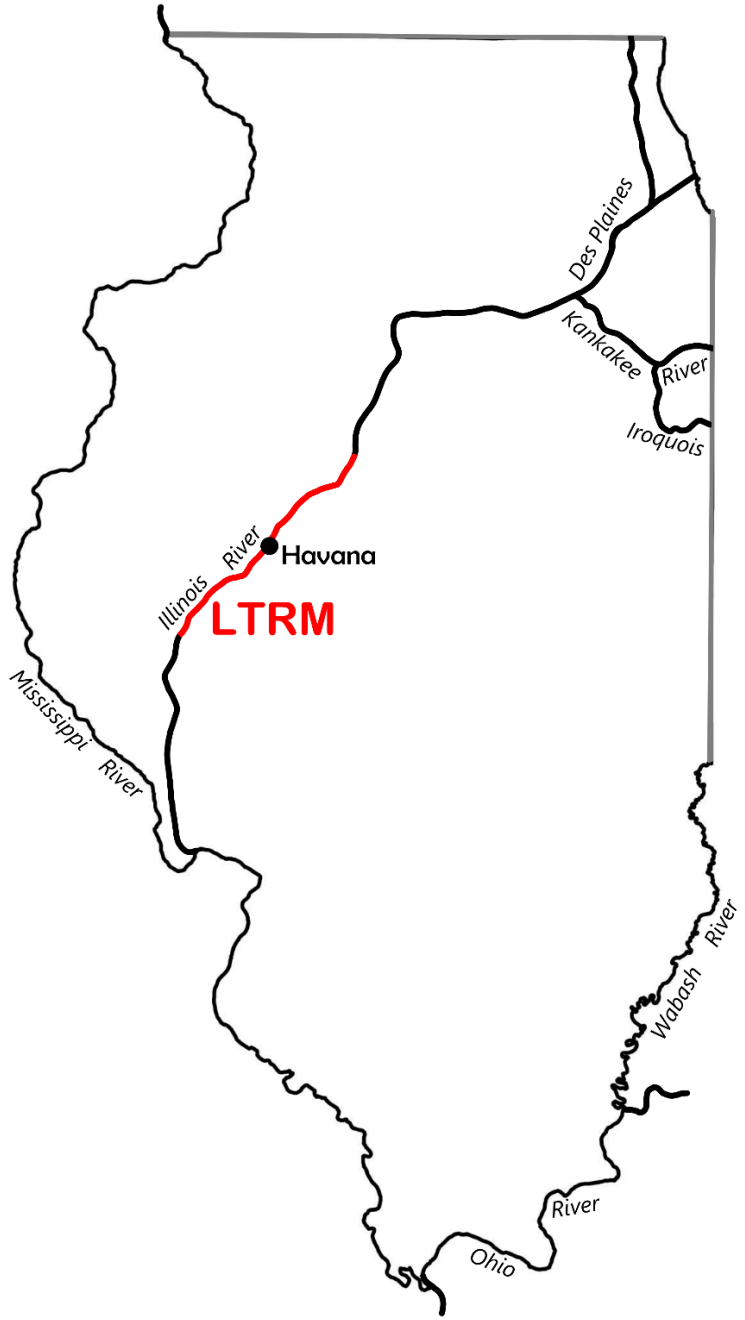


LTRM Water Quality

- Physical, chemical, and biological
- Year round
- Started 1988, standardized 1993
- Over 33,000 records of WQ in the LaGrange Reach
- Fixed and random sites

LTRM Water Quality - Physical

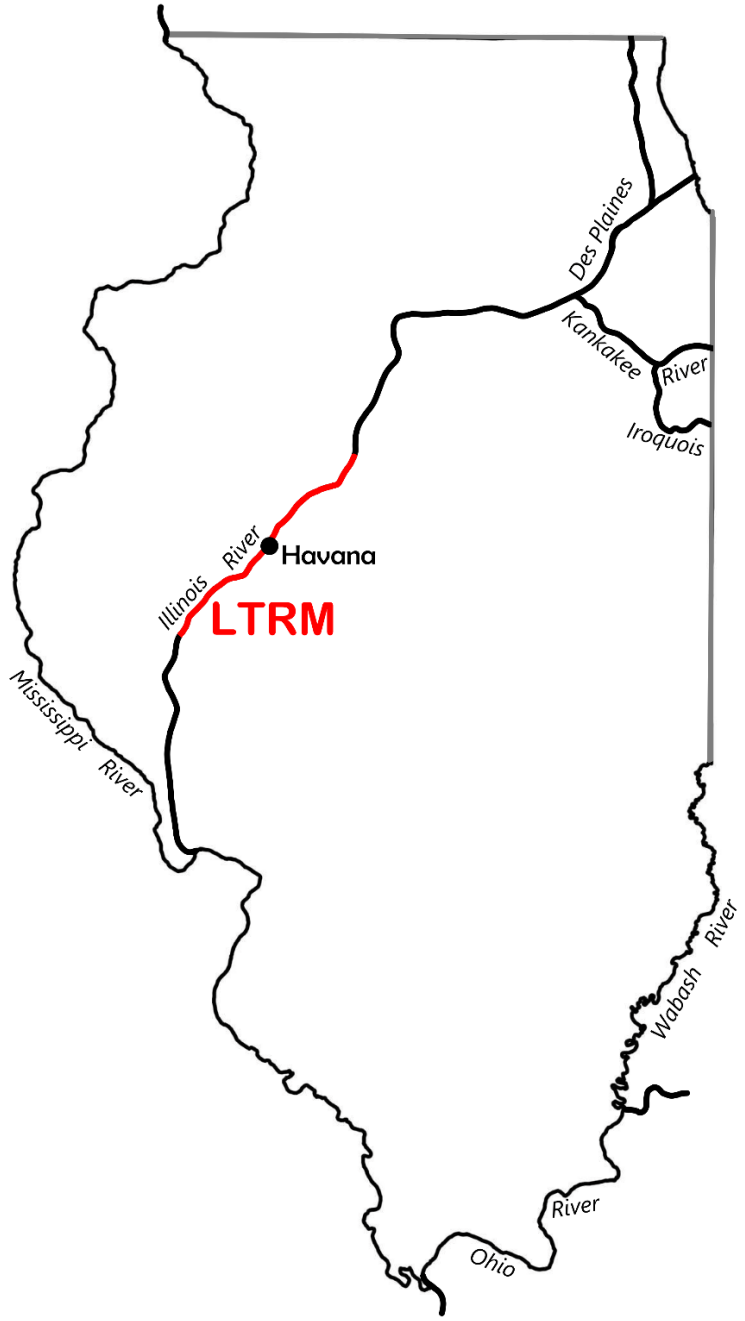




LTRM Water Quality – Chemical

Current

7	15	14	17	7	7
N	P	Si	Cl	N	N
Nitrogen	Phosphorus	Silicon	Chlorine	Nitrogen	Nitrogen
		SiO_2	Cl^-	NH_4^+	NO_3^--NO_2^-



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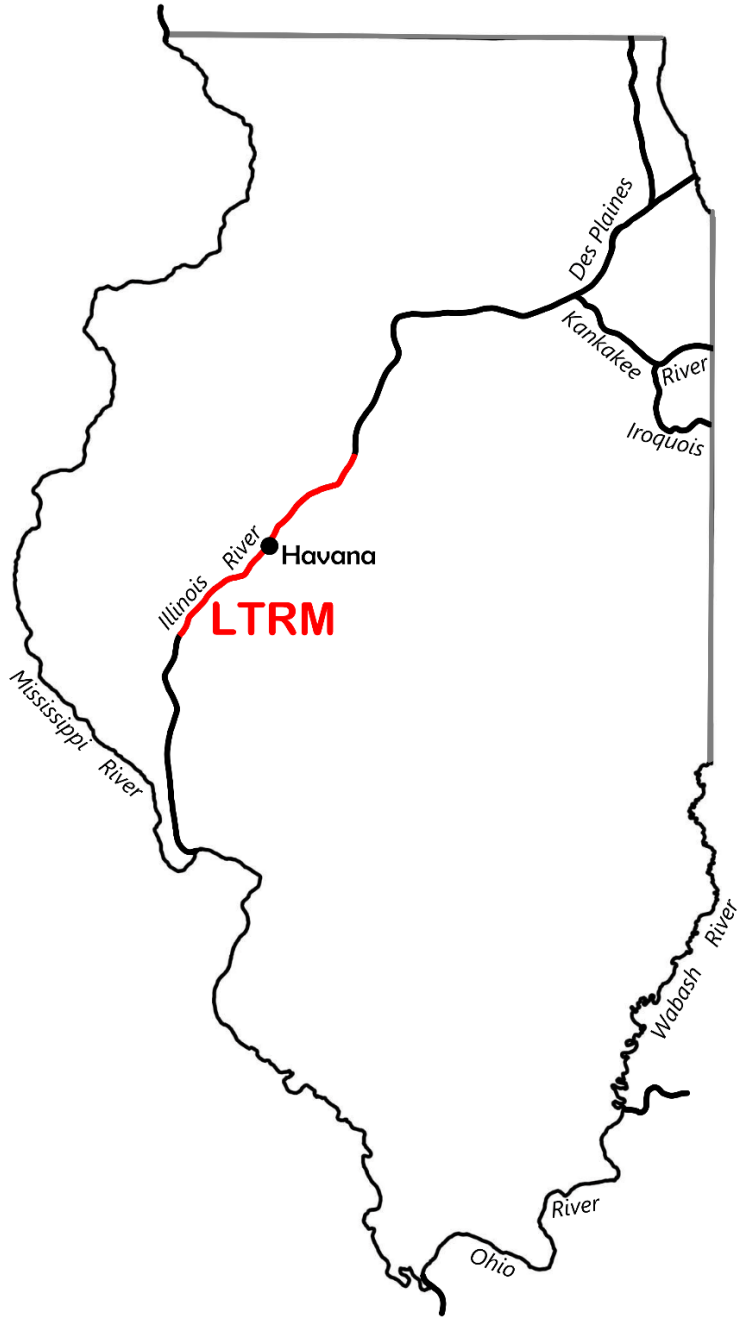
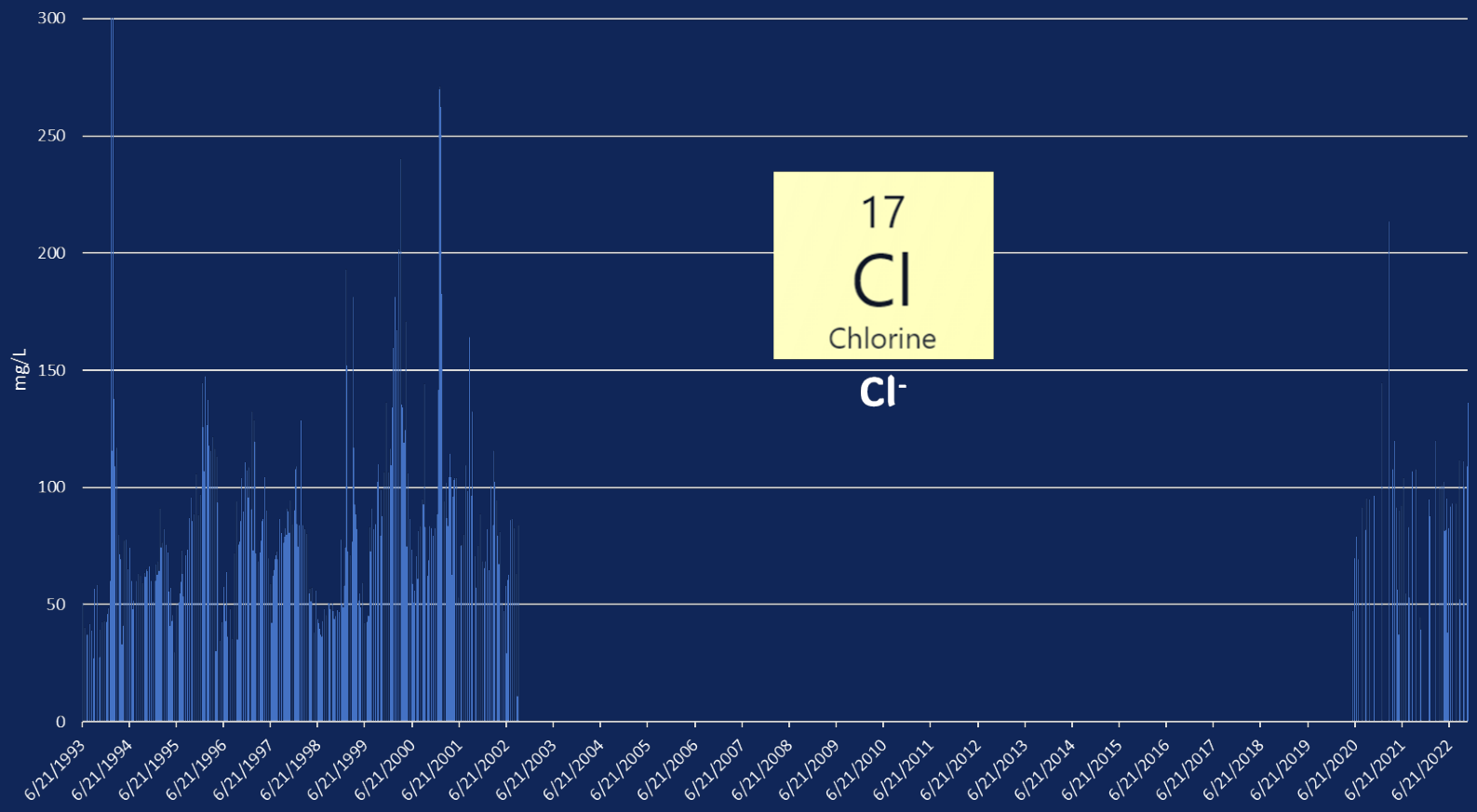
N	P	Si	Cl	N	N
Nitrogen	Phosphorus	Silicon	Chlorine	Nitrogen	Nitrogen
		SiO_2	Cl^-	NH_4^+	NO_3^--NO_2^-

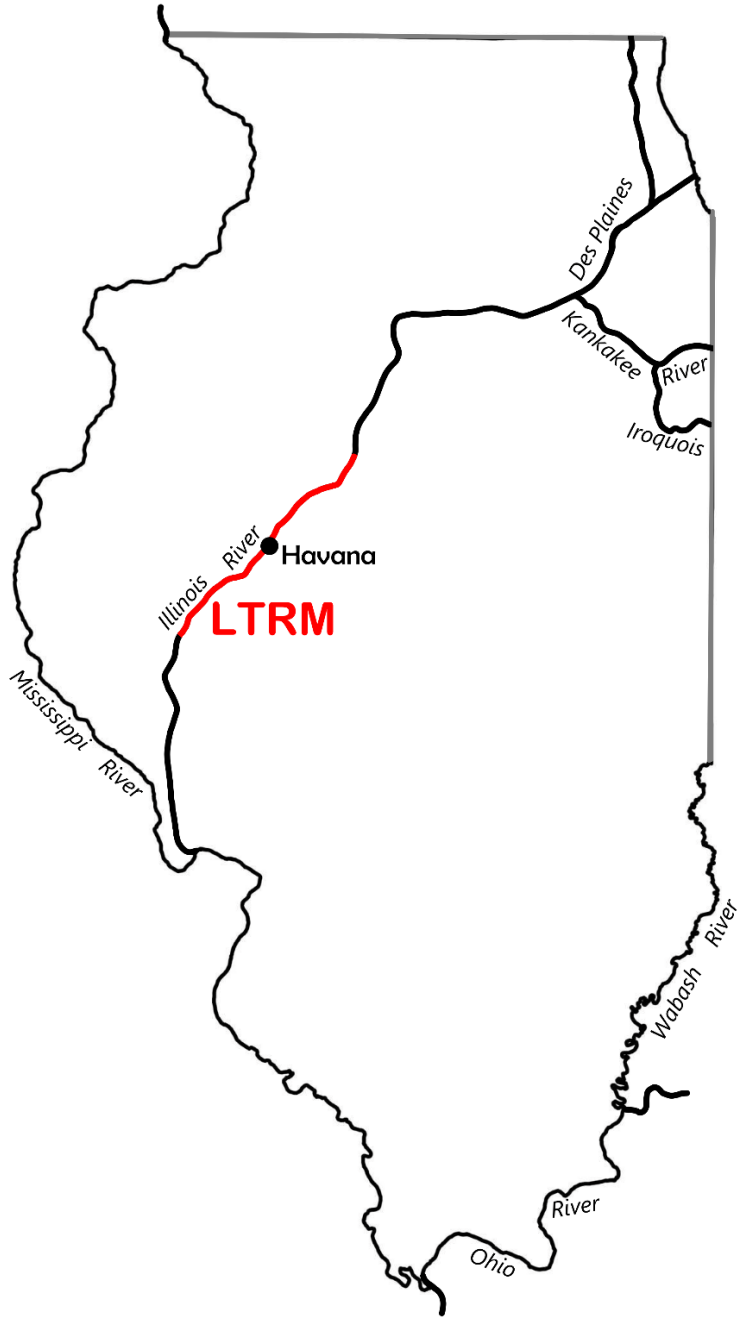
Past up to 2002~

20	26	12	19	11	25	16
Ca	Fe	Mg	K	Na	Mn	S
Calcium	Iron	Magnesium	Potassium	Sodium	Manganese	Sulfur
						SO_4^{2-}



LTRM Water Quality – Chemical

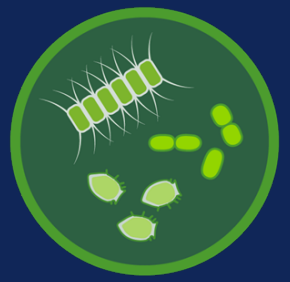


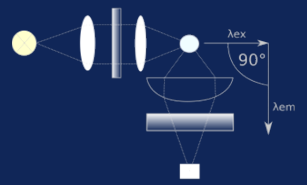


LTRM Water Quality - Biological

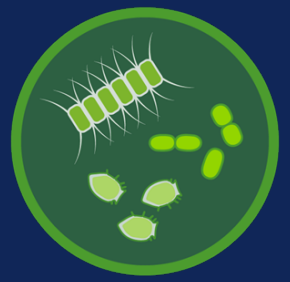
Phytoplankton

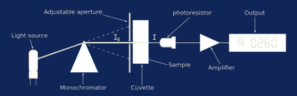
Fluorometric chlorophyll-α

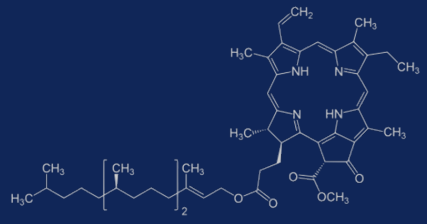




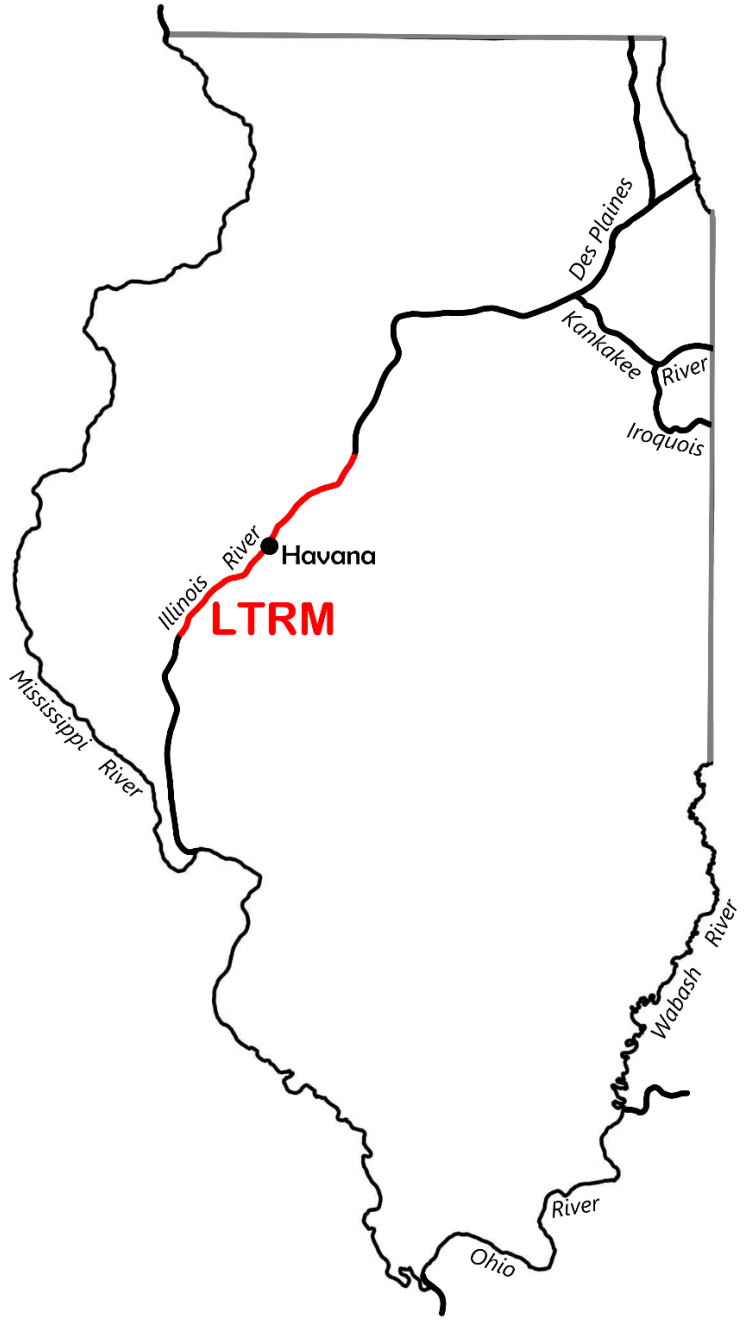
Spectrophotometric chlorophyll-α



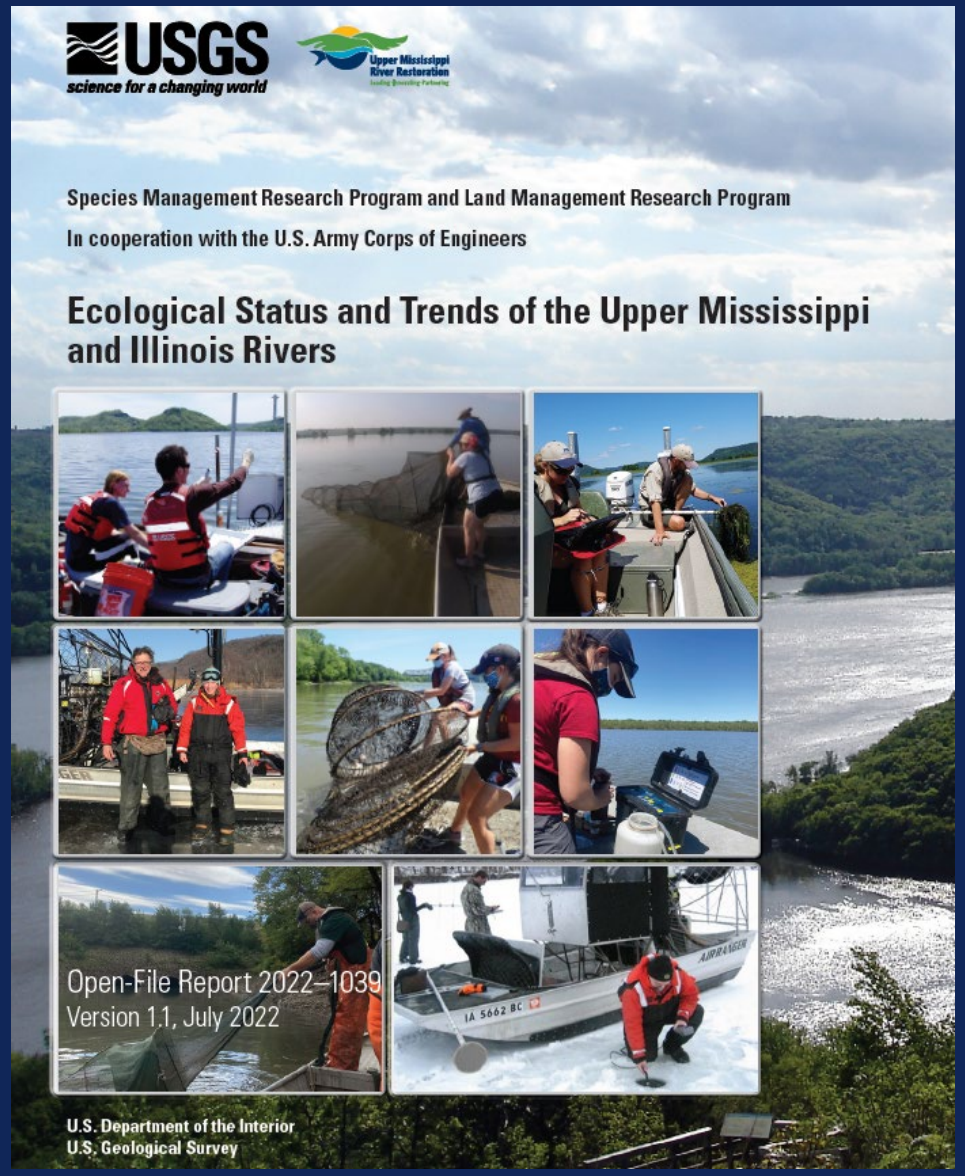


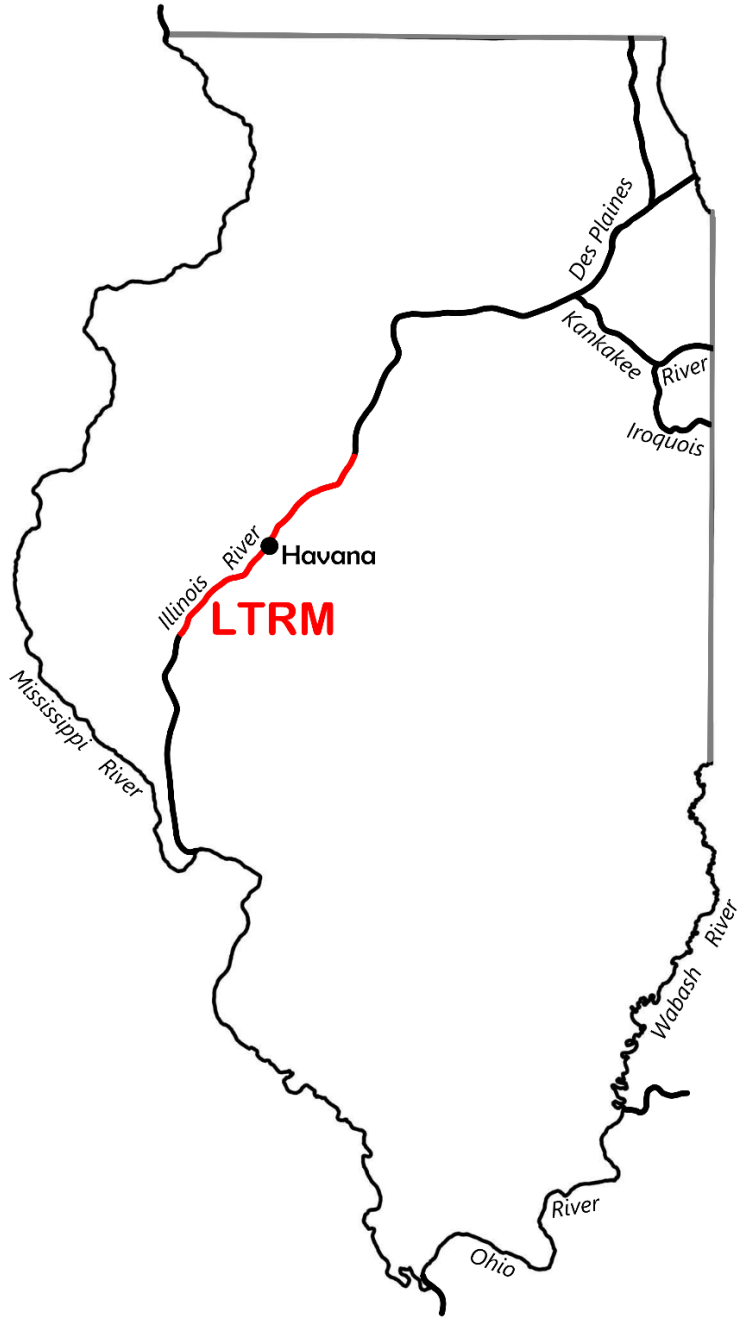


Phaeophytin (past)



LTRM Water Quality



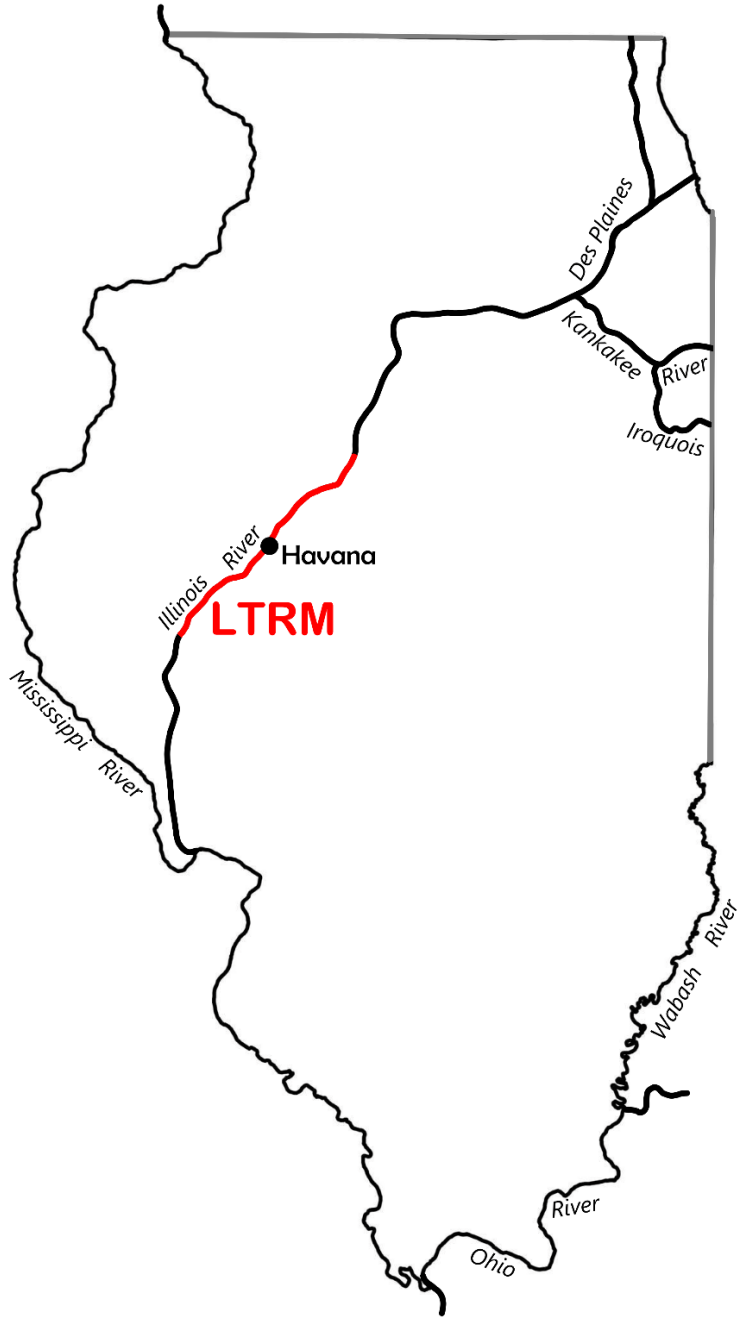


LTRM Water Quality

	Indicator		Upper Mississippi River: Upper Impounded Pool 4	Upper Mississippi River: Upper Impounded Pool 8	Upper Mississippi River: Upper Impounded Pool 13	Upper Mississippi River: Lower Impounded Pool 26	Upper Mississippi River: Unimpounded Open River	Illinois River: La Grange
Water quality	Main channel suspended solids (flow-normalized concentration)		▼	▼	■	▼	▼	▼
	Main channel nutrients (flow-normalized concentration)	Nitrogen	▲	■	▲	■	▲	▼
		Phosphorus	▼	▼	▼	▼	■	▲
	Chlorophyll *a*	Main channel	■	■	■	■	■	~
		Backwater	~	▼	■	■	◆	■
	Backwater hypoxia (dissolved oxygen < 5 miligrams per liter)	Summer	~	~	~	~	◆	~
		Winter	▲	~	~	■	◆	■
Aquatic vegetation	Submersed aquatic vegetation prevalence		▲	▲	~	■	◆	■
	Invasive submersed species		▼	▼	▼	◆	◆	◆
	Aquatic vegetation diversity		~	▲	~	■	◆	■
	Free-floating plant dominance		▼	▼	▼	◆	◆	◆
	Emergent vegetation		▲	▲	■	■	▲	▲
Fisheries	Fish community		■	■	■	■	■	■
	Lentic fishes		▲	▲	■	■	▲	▼
	Lotic fishes		■	■	■	■	■	■
	Nonnative fishes (excluding *cyprinus carpio* [common carp])		■	■	■	▲	■	▲
	Forage fishes		▼	■	■	▼	▼	▼
	Recreationally valued native fishes		■	▲	▲	▼	■	▼
	Commercially valued fishes	Native	■	▲	▲	■	■	▼
		Nonnative	▼	▼	▼	▼	▼	▼

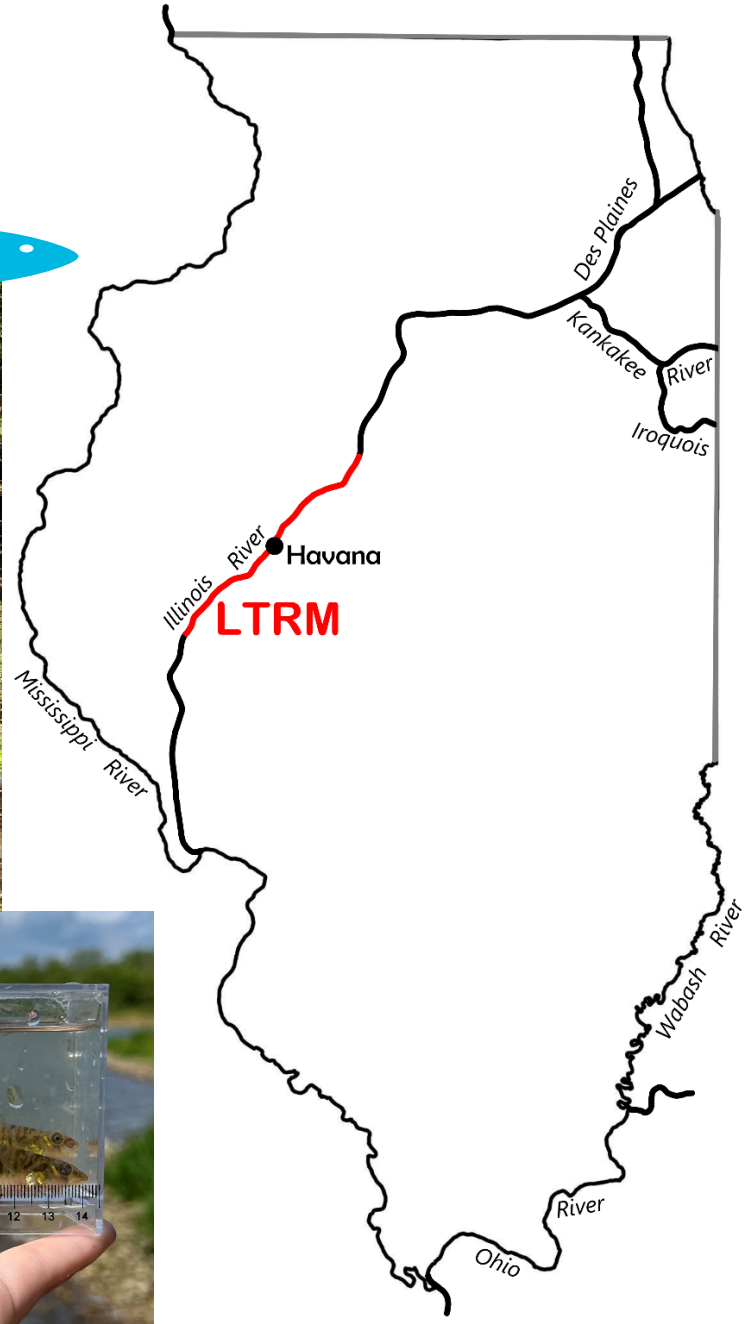
EXPLANATION

▲ Significant long-term increase ▼ Significant long-term decrease ■ No trend ◆ No data available or analyzed ~ Dynamic trend



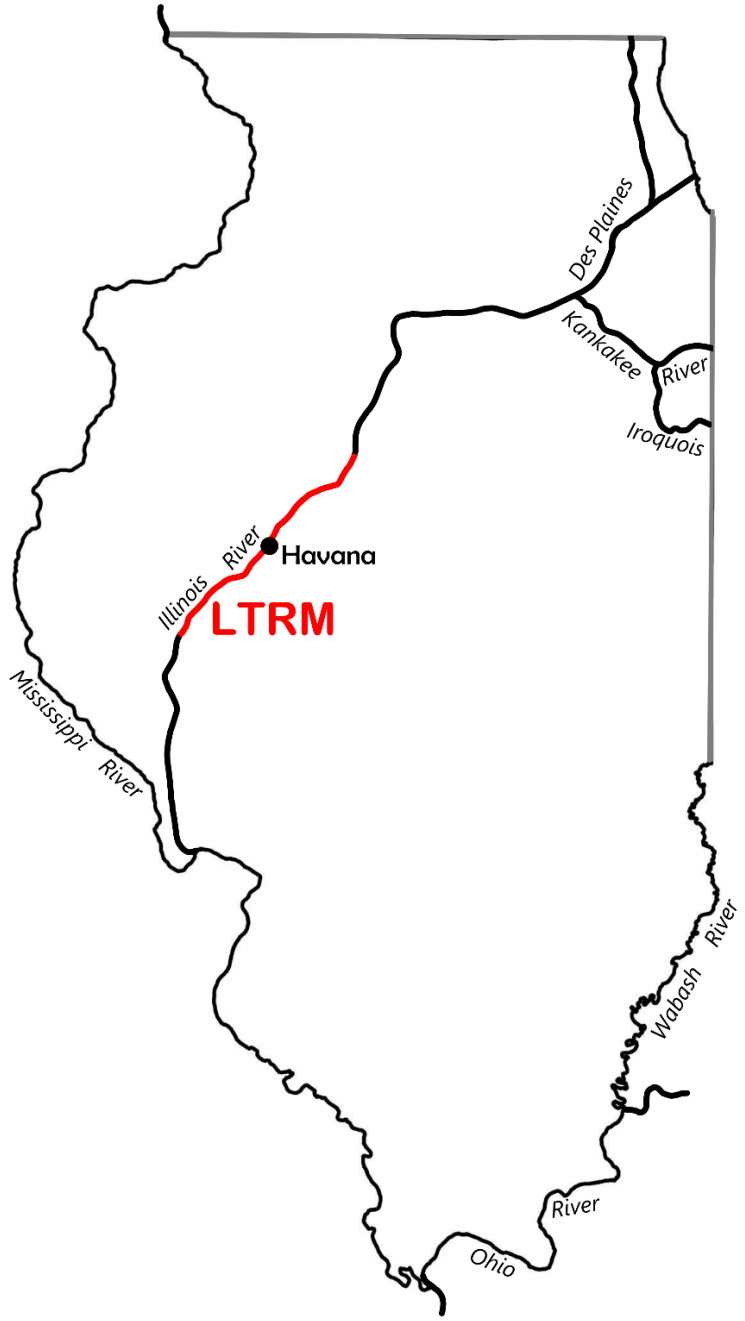
LTRM Fish

- Three periods, June 15-Oct 31
- 1993- current
- 252 random, 54 fixed sites
  - Stratified by habitat use areas (SCB, MCB, BW, IMP)
- Netting and electrofishing
- Goal: Monitor fish populations on the La Grange Reach



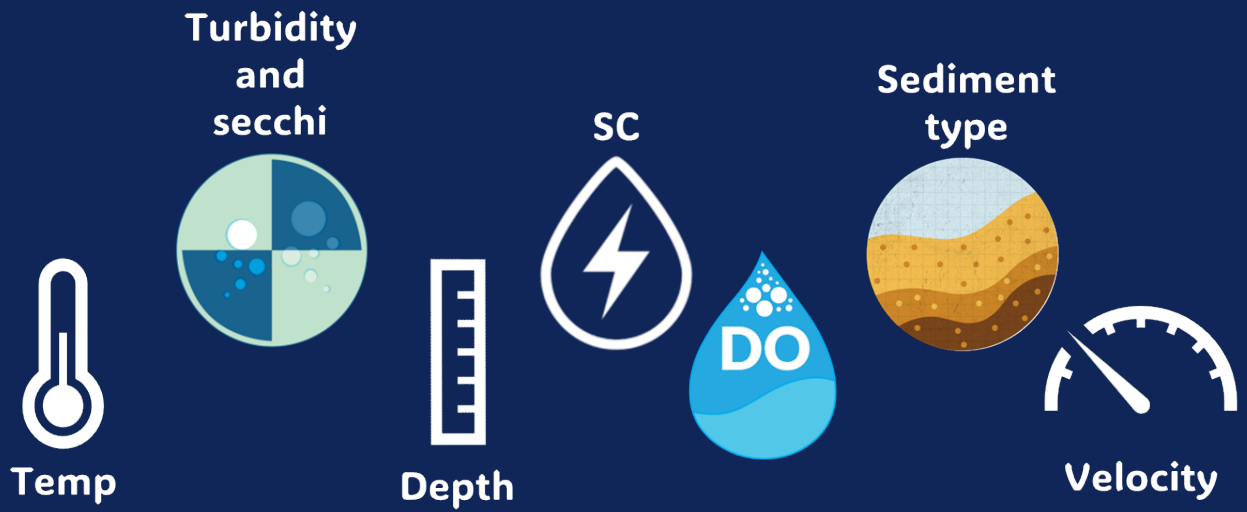
LTRM Fish

- Multi-gear, multi-strata
- Track trends in catch-per-unit-effort



LTRM Fish

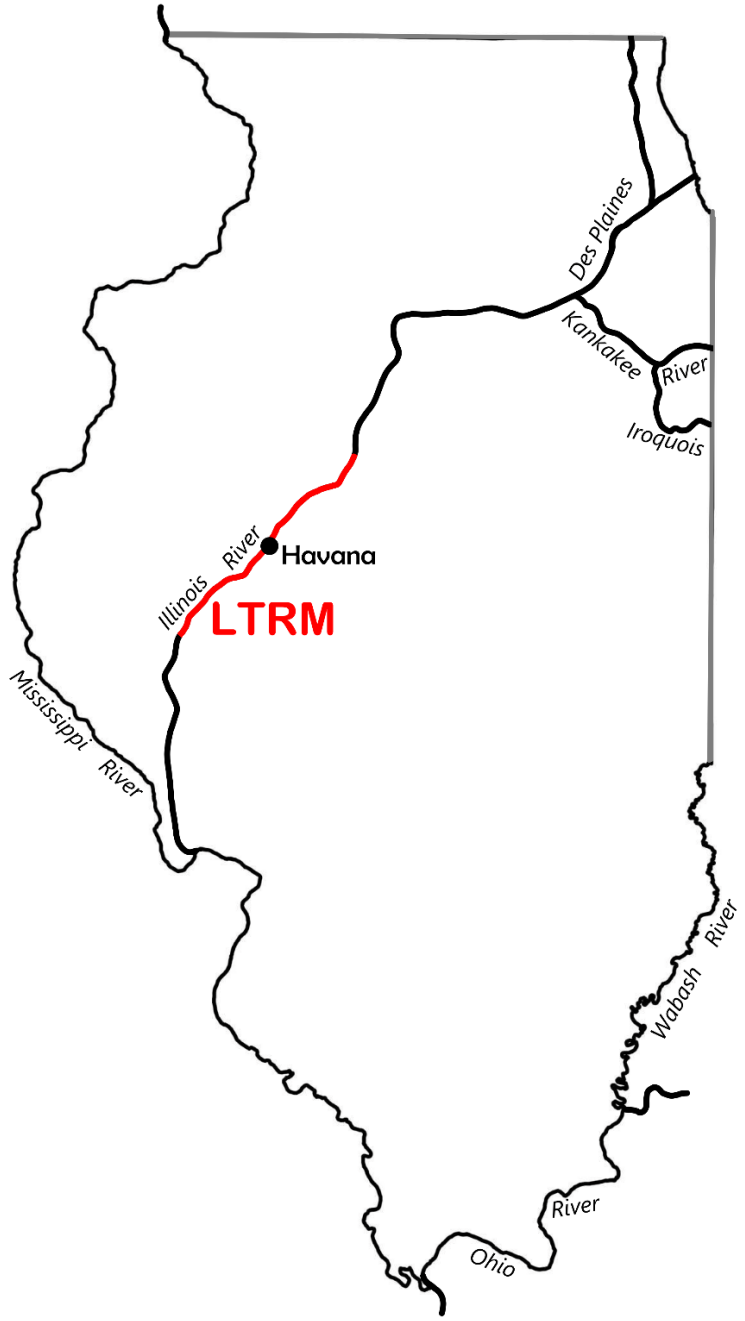
- Water and environment



Veg, woody debris

Dam, riprap, etc.

And more…

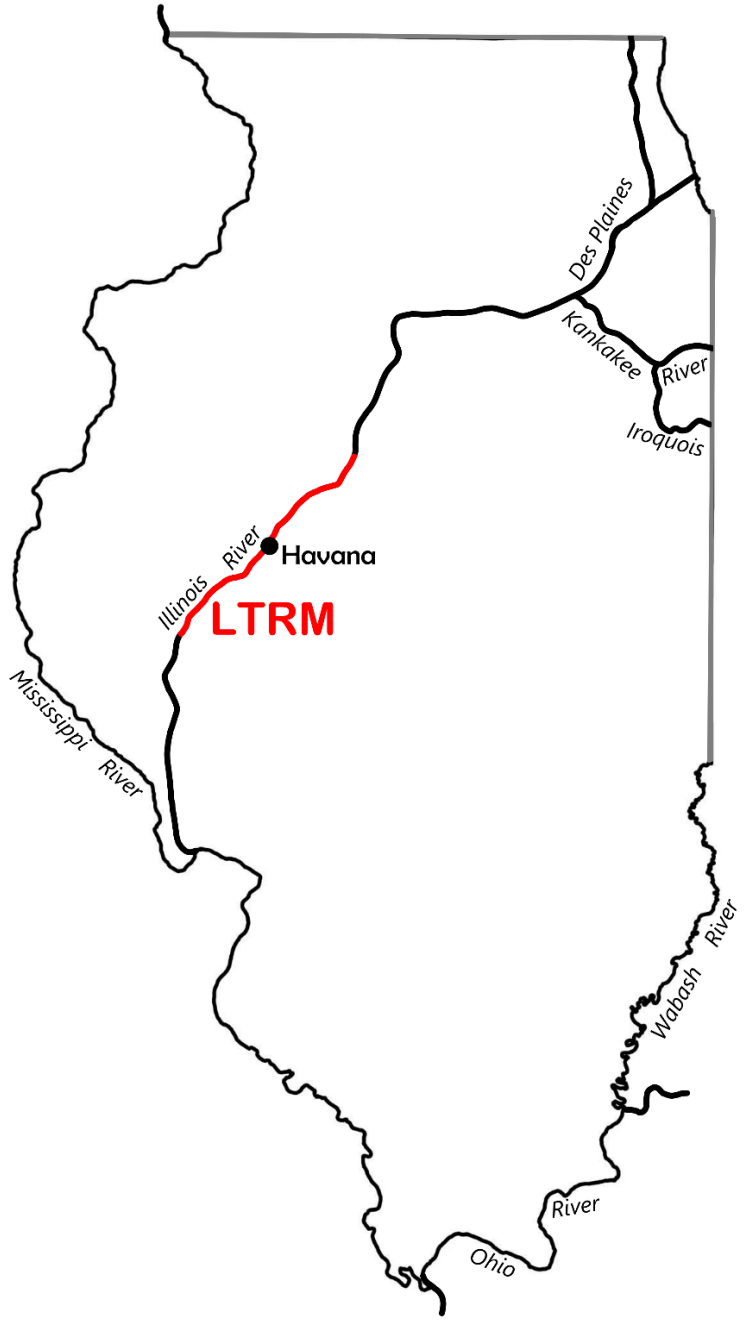


LTRM Macroinvertebrates

- Spring/summer only (May-June)
- Ponar and suction dredge sampling
- Mayflies and contaminants
- Started Spring 2023
- Comparison to historical data (ponar) 1991-2004

Manisha

Hester-Dendy/rock bag



LTRM Macroinvertebrates

- Manages/coordinates all six pools in LTRM

Long Term River Monitoring (LTRM)

https://umesc.usgs.gov/ltrm-home.html

Upper Mississippi River Restoration Program

Long Term Resource Monitoring

Conducting Research and Monitoring on the Upper Mississippi River System since 1986

About LTRM
- Mission and Goals
- Background
- Fact Sheets
- Program Documents

Components
- Fish
- Aquatic Vegetation
- Water Quality
- Macroinvertebrates
- Land Cover
- Bathymetry and Elevation
- GIS Data
- Other Research

Search...

Upper Mississippi River Restoration (UMRR) Celebrates 35 Years of History and Partnership

UMRR LTRM Science Director, U.S. Geological Survey: Jeff Houser
UMRR Regional Program Manager, U.S. Army Corps of Engineers: Marshall Plumley
UMRR LTRM Manager, U.S. Army Corps of Engineers: Karen Hagerty

Quick links
- USGS contacts
- State Field Stations
- Field Station contacts
- ATeam Corner
- Reports and Publications
- Data Visualization
- Sampling Design and Statistics
- Strategic Plan 2010-2014
- Status and Trends Report 2008
- Status and Trends Report 2022

UMRR LTRM Story Map

The LTRM element is one of two components of the federally mandated Upper Mississippi River Restoration Program. A cooperative program between the U.S. Army Corps of Engineers, U.S. Geological Survey-Upper Midwest Environmental Science Center, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Department of Agriculture Natural Resources Conservation Service and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

Multi-Agency Monitoring (MAM)

- Grew out of LTRM after Lock closures
- 2019-current
- Lockport to Alton; LGR uses LTRM data
- Silver and Bighead Carp focus
- Goal: invasive carp detection, fish response, impact of contracted commercial harvest
- ~1,880 sites each year
- Chlorophyll collected once a year

Multi-Agency Monitoring (MAM)

Wave (pressure) sensors

2018, 2020, 2021

Black Carp Detection

- From increased commercial fisherman black carp catches
- June 15-October 31 since 2019
- Focus predominantly on LGR and some work below Melvin Price Lock and Dam + Horseshoe Lake
- Experimental bait in hoop nets
- Same stratified design as LTRM in La Grange Reach

Long-Term Survey and Assessment of Large River Fishes (LTEF)

- Summer only, June 15-Oct 31
- Electrofishing with LTRM methods (since 2016)
- Fixed sites since 1959, random sites added in 2009
- Southwest Chicago to Alton, IL (Lockport-Alton Reaches), and pools 16-22, 25, 26 on the Mississippi River, Wabash and Ohio
- Species ID, weights, lengths, and the occurrences of external lesions, parasites, and deformities (standardized 2015)

Long-Term Survey and Assessment of Large River Fishes (LTEF)

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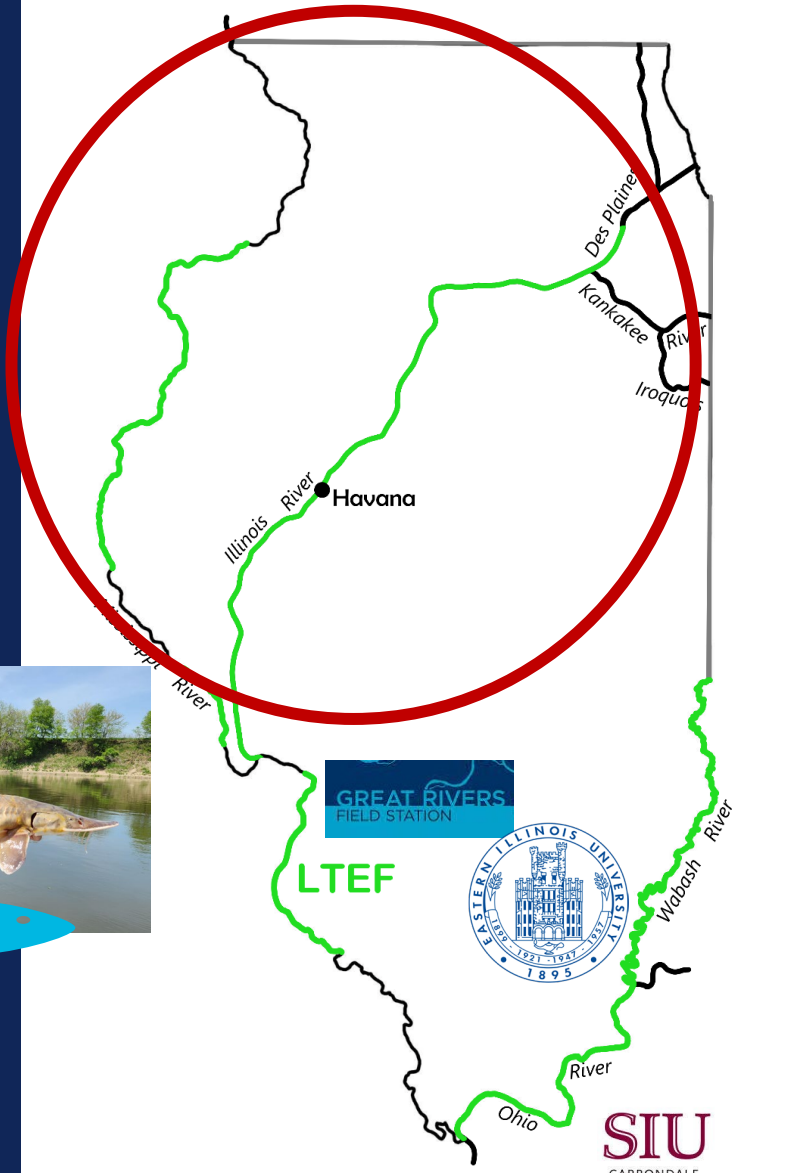
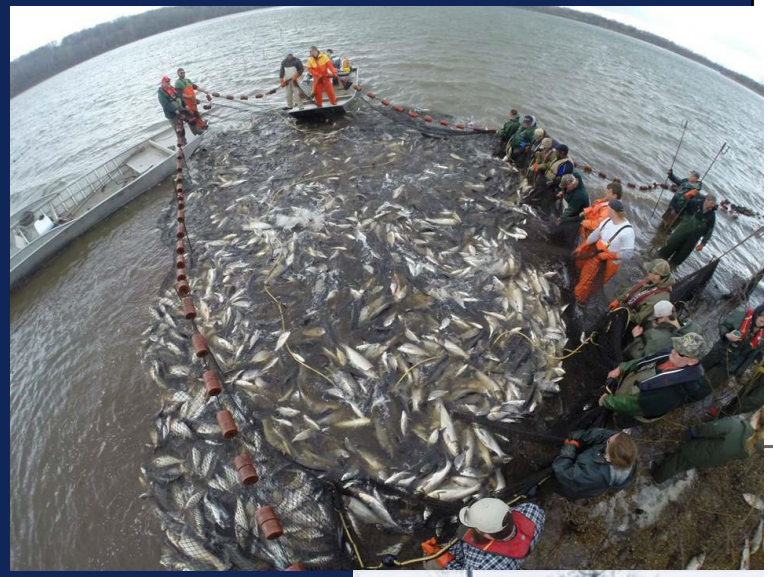
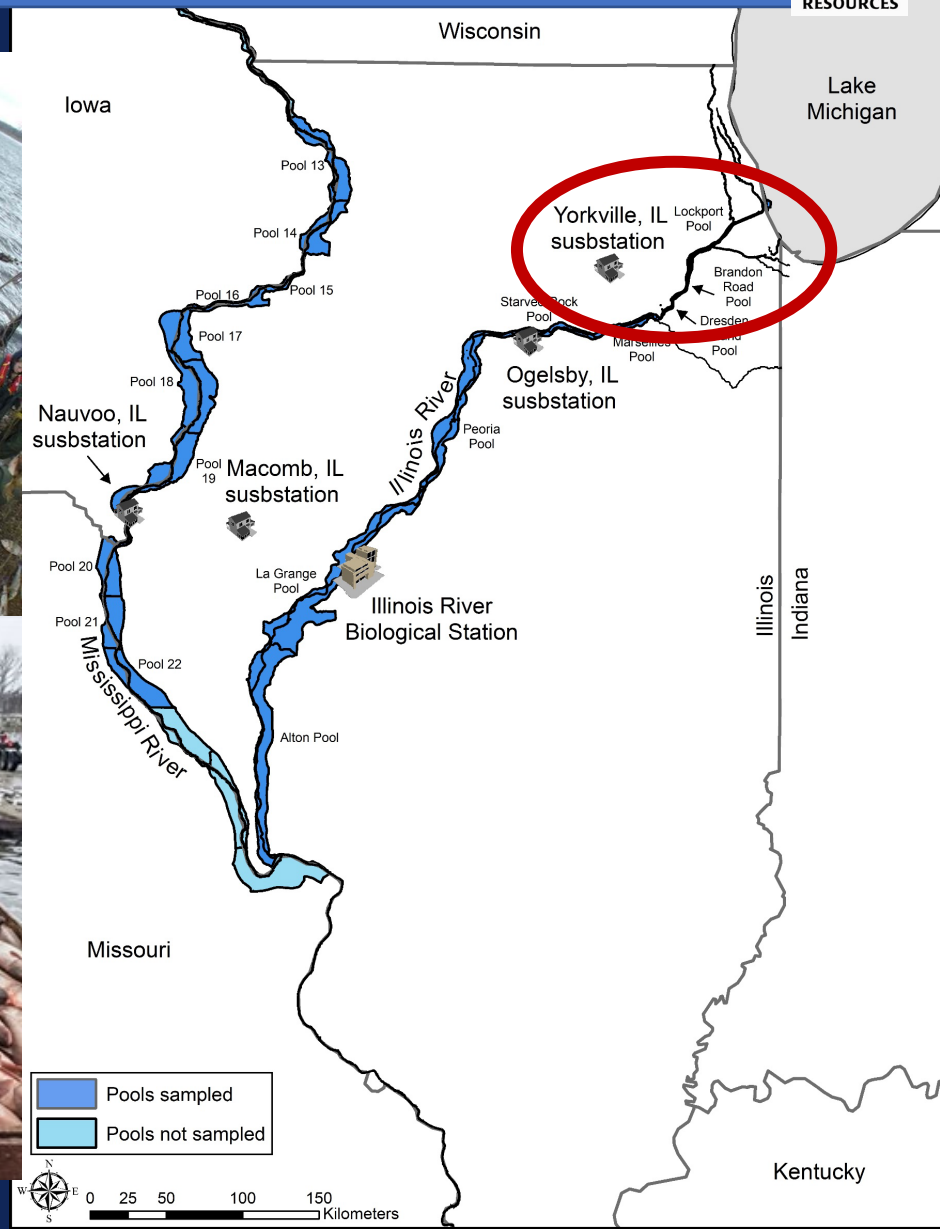
- Species ID, weights, lengths, and the occurrences of external lesions, parasites, and deformities (standardized 2015)
- Jason manages data from SIU, Eastern, and Great Rivers Station



Upper Illinois River Invasive Carp Harvest

- Yorkville, IL
- Uses contracted commercial fishermen to target invasive carp species to reduce invasion pressure at the electric barrier
- Monitor upstream of the electric barrier for invasive carp presence
- 12.7 million pounds of invasive carps harvested since 2010





Allie Lenaerts

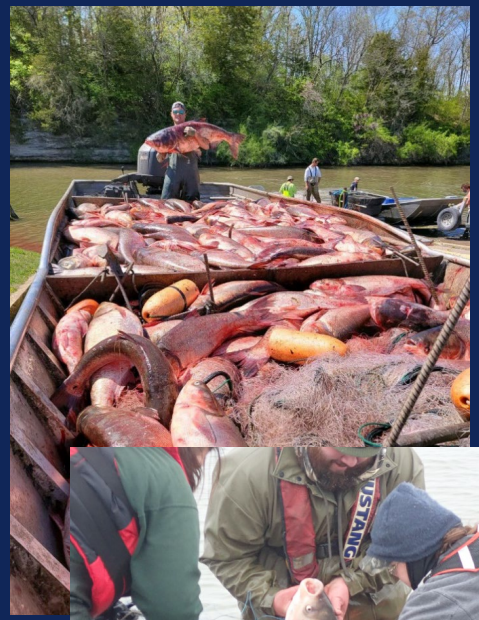
Madison Myers

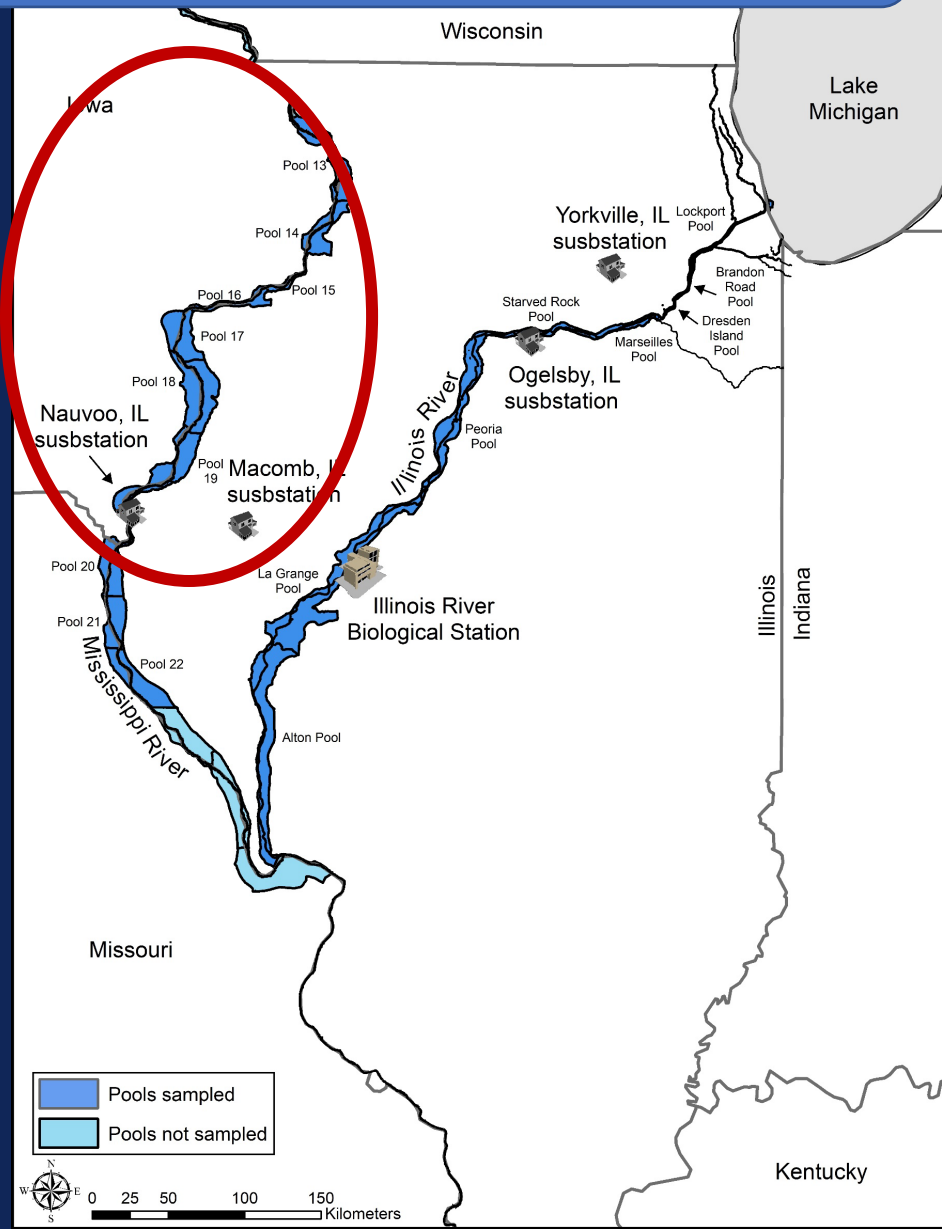
MJ Oubre

Andrew Wieland

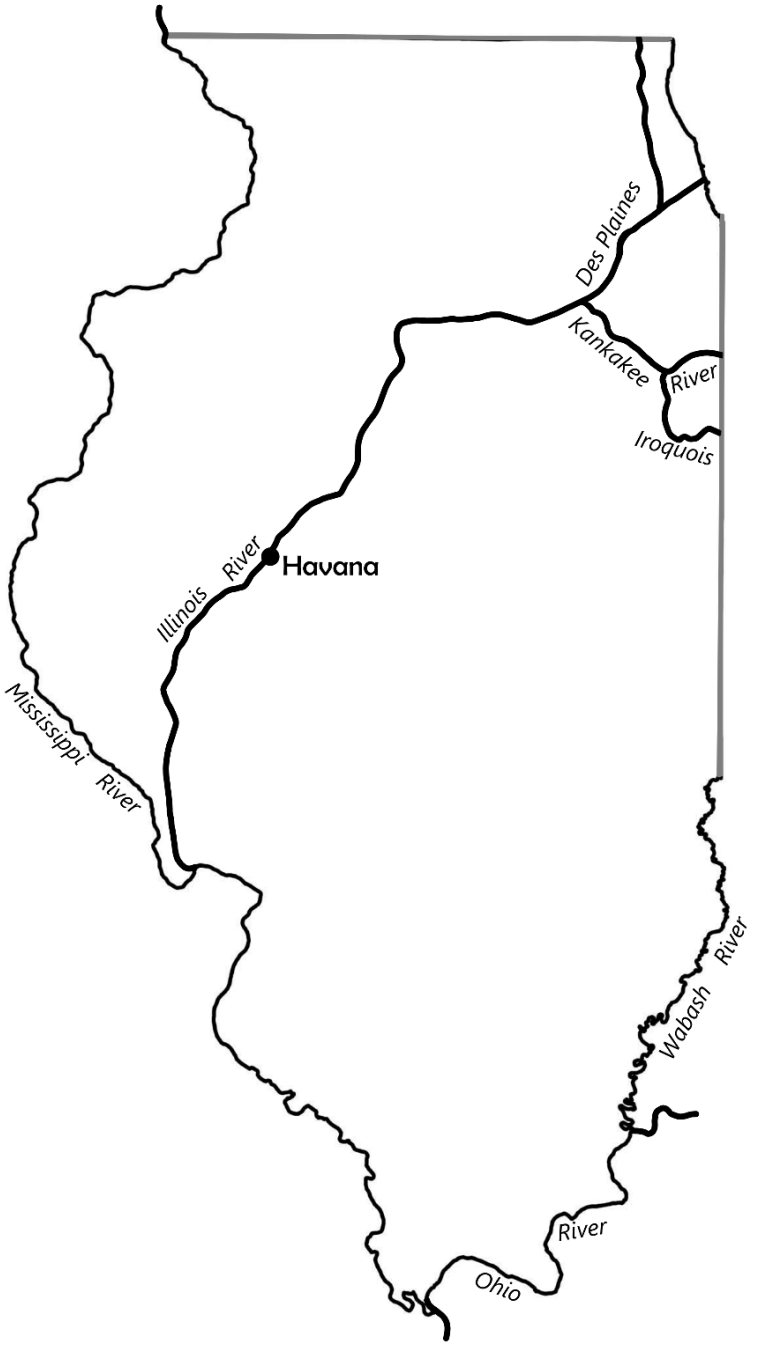
Upper Mississippi River Invasive Carp Harvest

- Macomb/Nauvoo
- contracted commercial fishers intensively target invasive carp species for removal at the established front and invasion front (reaches above pool 16)
- determine population abundance to evaluate effectiveness of harvest
- survey for the presence of invasive carp reproduction using larval light traps (Pool 17, 18, and 19)
- determine the frequency and rate of fish passage at LD14 and LD15 using telemetered fish (Asian carp and native fishes: bigmouth buffalo and paddlefish)
- 1.06 million lbs of invasive carps removed since 2015





The Emiquon Preserve



The Emiquon Preserve projects

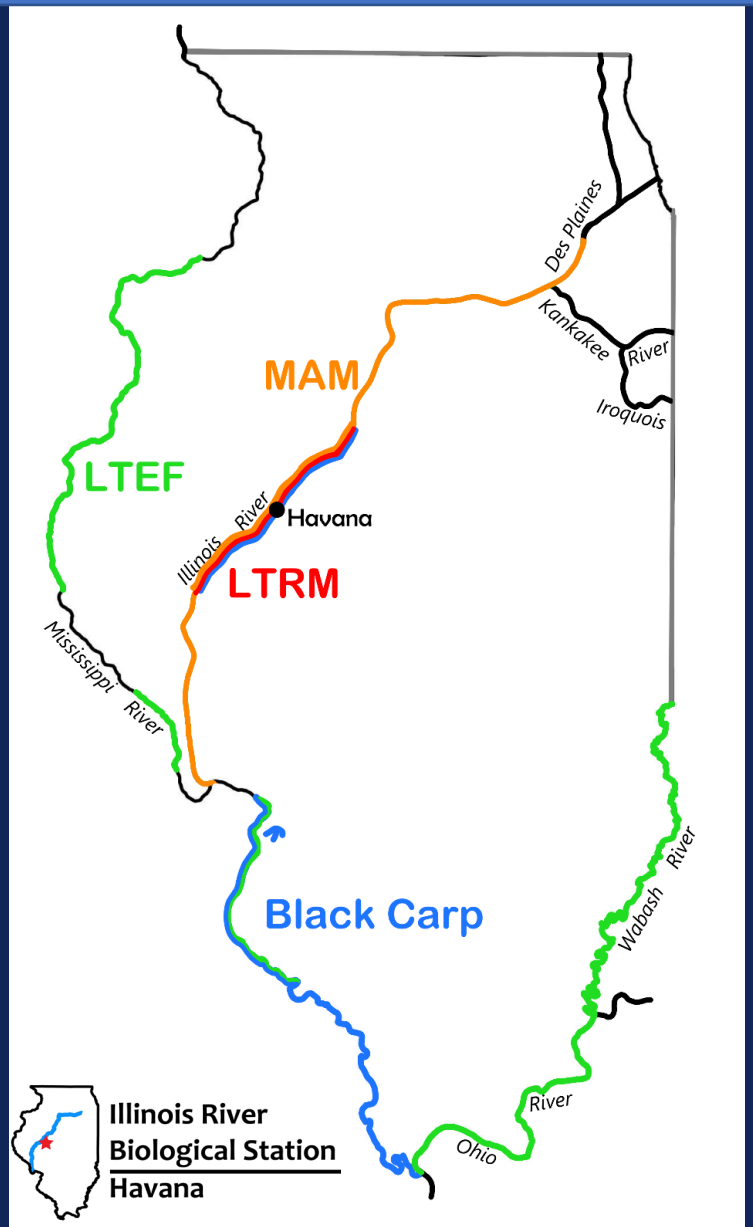
The Nature Conservancy

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

WHOOSHH INNOVATIONS

- Vegetation
- Electrofishing

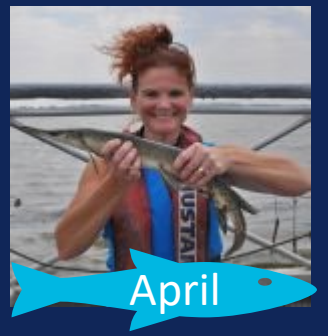
IRBS presence on Illinois Waterways

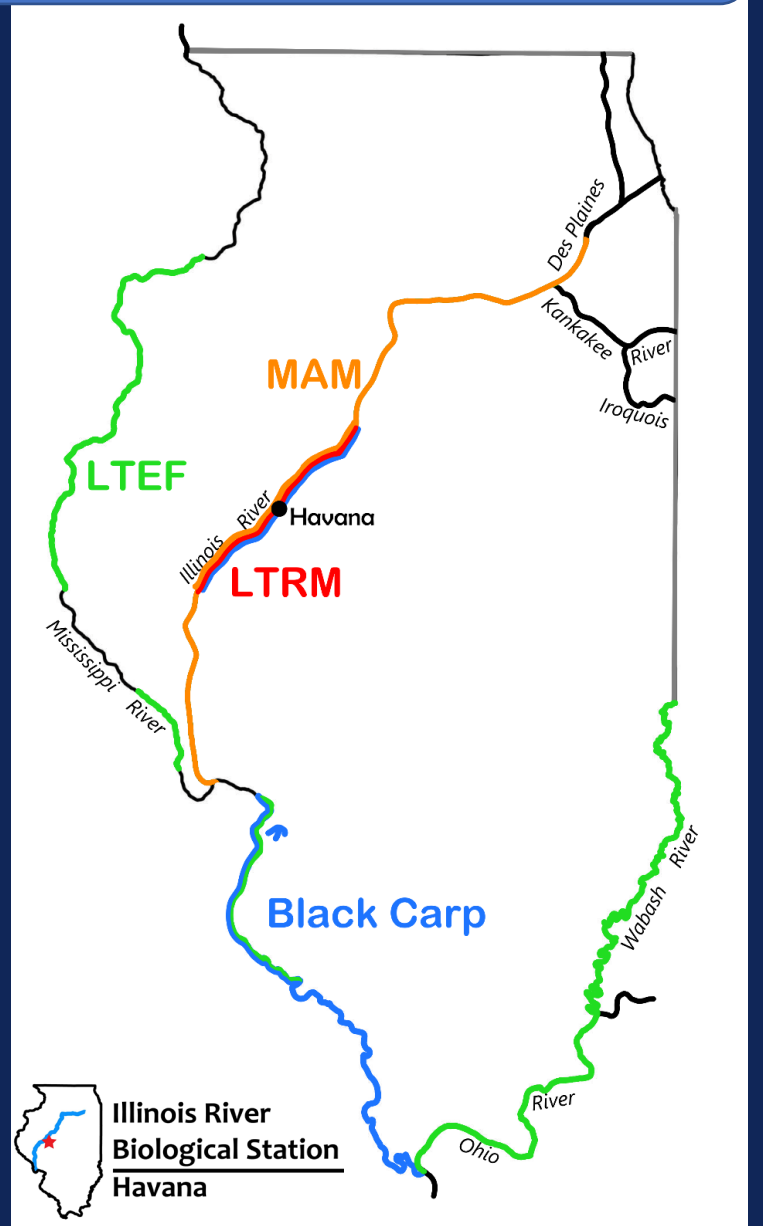


IRBS presence on Illinois Waterways

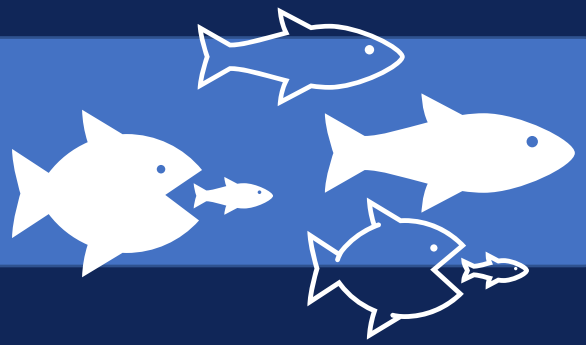
Thank You

- University of IL UC
- IL Natural History Survey
- LTRM UMESC page
- Staff
- IRBS website and FB page
- Captains of the IRBS Ship





Questions?



Nutrient Monitoring Council Member Updates

If you have a member update,
please type "update" in the chat box.

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Announcement: NLRS Conference

Thursday, January 25, 2024

Hybrid Format

Virtual on WebEx and In-person

Illinois Department of Agriculture

John Block Auditorium, Springfield, IL

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Thank you

Contact IllinoisNLRS@gmail.com if you have any questions.

ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY