NORTH BRANCH CHICAGO RIVER WATERSHED WORKGROUP GENERAL MEMBERSHIP MEETING MINUTES

Lake Forest Municipal Services Building Training Room,
800 N Field Drive, Lake Forest, IL 60045
Wednesday, February 08, 2023 * 1:00pm – 3:00pm

NBWW GENERAL MEMBERSHIP MEETING MINUTES

1. **Introductions**
   Brandon Janes, President of the North Branch Chicago River Watershed Workgroup (NBWW), welcomed attendees at 1:14 pm to the February 08, 2023 NBWW General Membership Meeting. The meeting was held in a hybrid format with presenters attending via Zoom and voting members attending in-person. Jacob Jozefowski, NBWW Coordinator for this meeting, performed roll call. A total of 19 voting members (tallying 70 votes) were in attendance, so an NBWW meeting quorum was present (see the voting quorum and meeting participants list below).

   Voting Quorum: Darren Olson, Christopher Burke, Byron Kutz, City of Lake Forest; Larry Bridges, East Skokie Drainage District; Jacob Jozefowski, Lake County Stormwater Management Commission; Susan Lenz, Lake Forest Open Lands; Chuck Bodden, North Shore Water Reclamation District (NSWRD); Justin Vick, Metropolitan Water Reclamation District of Greater Chicago (MWRD); Brandon Janes, Village of Deerfield; Jonathan Happ, Libertyville Township; Mary Mathews, Illinois Sierra Club; Karolina Cho, Gewalt Hamilton Associates for the Villages of Bannockburn, Northfield and Riverwoods; Ben Metzler, Village of Green Oaks; Kate McDonnell, Village of Wilmette; Jack Bielak, Village of Northbrook, Matt Ueltzen, Lake County Forest Preserve District (LCFPD); Susan Grinnell, Union One West Fork Drainage District.

2. **Public Comment** – None

3. **Guest Speakers**

   a. Biological & Water Quality Assessment of the North Branch Chicago River Report: 2020-2021
   Chris Yoder, Research Director, Midwest Biodiversity Institute (MBI)
   Chris Yoder gave an overview of MBI's methodology for collection of bioassessment data for the North Branch Chicago River watershed biological assemblages, water and sediment chemistry data, habitat data and physical data (including flow, land use and GIS data). Yoder gave a summary of the 2020-2021 North Branch Watershed Bioassessment report which includes a full analysis of NBWW 2020-2021 monitoring data, aquatic life use attainments (causes and sources), "combined" assessment for nutrient enrichment, and restorability factors. The Integrated Prioritization System (IPS) model is operated through a Power BI platform, and it gives the users an opportunity to examine assessed data such as use attainment status and associated cause and sources of impairments and restorability factors of impaired sites.

   Some of the summarized highlights of the 2020-2021 data included chlorides exceedances throughout the watershed. Some of the monitoring results were affected by the flow hydrograph and in 2021 ionic strength variable exceedances were more severe. Although point sources do influence nitrogen and phosphorus, the dominant influence is nonpoint source pollution. The West Fork tributary had the most "poor" and "very poor" exceedances across 10 parameters, most (not all) emanating from the upstream sites. There were 65 total Continuous Dissolved Oxygen (DO) exceedances from the 2020-2021 data; the likely causes of excess DO are due to nonpoint source inputs coupled with low flows and increased retention time. Yoder's conclusion was a combination of urbanization coupled with legacy channelization, hydrological alternations and low gradient, the latter precluding a more complete natural recovery absent direct intervention. The 2020-2021 North Branch Chicago River Bioassessment report will be made available to the NBWW Monitoring Committee for review next week and released to the watershed stakeholders once the report is finalized.

Questions/Answers:

1. Concern was expressed over the disconnect between the Illinois EPA and the IPS model differences in impairments. Any thoughts?
   This is something Chris has seen with other workgroups as well. Not sure what the path/answer would be to change this, but this is a national problem; states primarily address the 303(d) & (b) impairments and their requirements. The issue is that tackling those impairments does not penetrate other programs (permitting and other Clean Water Act programs).
2. Has the U.S. EPA reviewed the IPS Model?
   Some of the EPA, but the question needs to be more specific. An appropriate contact for this question may be Stephen McCracken, DuPage River Salt Creek Workgroup (DRSCW), with more information on what coordination has occurred between the EPA and the IPS Model.
3. Are there important actionable items from this report that municipalities can use to implement?
   Yes, but that is dependent on individuals learning how to use the IPS Model to find those actions.

b. PFAS and the impacts on NPDES permitting Presentation
Antonio (Tony) Garcia, Physical Scientist, U.S EPA Region 5
Tony Garcia gave an educational presentation on Per- and Polyfluoralkyl (PFAS) substances, which consists of a large class of synthetic chemicals created by humans. PFAS sources (since the 1940s) include pesticides, paints, firefighting foams, fast food packaging, etc… Due to the widespread use, PFAS has been identified in water, soil and air samples throughout the United States and around the world. Garcia gave an overview of the EPA's PFAS Strategic Roadmap, which sets timelines for concrete actions from 2021-2024 to protect public health and environment from PFAS.

Reducing discharges (restrict) to the environment and to publicly owned treatment works is a cornerstone of EPA's strategy to restrict PFAS, which includes effluent limitations guidelines that were released January 2023. In December 2022, EPA released an NPDES PFAS guidance how states can monitor PFAS discharges and take steps to reduce where they are detected. The Plan 15 (current effluent guidelines program plan) is targeted at industrial categories (including POTWs) that are at higher risk of PFAS discharges. The December 5, 2022 memorandum includes recommendations for EPA and States to address PFAS through NPDES permits (including best management practices), pretreatment activities and monitoring programs. The EPA is currently compiling a PFAS Analytical Tool to evaluate what is known about PFAS and the extent of PFAS monitoring. In summary, EPA is taking a comprehensive approach (research, restrict and remediate) to addressing PFAs in the environment and encourages close collaboration with State counterparts to implement strategies.

Questions/Answers:

1. What will these PFAS restrictions apply to all of the NPDES regulations or just navigable waters of the U.S?
The Illinois EPA will be making that determination. The Illinois EPA can bring these PFAS regulations to the entire NPDES permit if they want to.

2. PFAS as a pollutant of concern for over 40 years, why is the EPA just getting around to regulating it? What is the status of the EPA ORD effort to develop an aquatic life criteria?
The EPA's decision on how and when to regulate is not something the presenters can answer at this time.

3. NBWW Business

a. Approve NBWW August 10, 2022 General Membership Meeting Summary. Larry Bridges, East Skokie Drainage District, made a motion was made to ratify the FY2023 membership seconded by Chuck Bodden, NSWRD. The motion passed with unanimous consensus vote.

b. Financials

i. Jacob Jozefowski presented the FY2022 revenue and expenditures for review. There were no comments or questions.

ii. Janes presented the NBWW FY2023 proposed membership dues for general membership approval. A question was asked about potential for the annual NARP expenses to be higher than expected. Valleskey answered that Geosyntec is confident in the data that was collected and the costs moving forward. Although there is still additional data to be collected within the Skokie Lagoons, Geosyntec does not expect a large change to the costs provided in the agreement with NBWW. Brandon Janes, Village of Deerfield, made a motion to approve the FY2023 proposed membership dues seconded by Jack Bielak, Village of Northbrook. Motion passed with a 14-1-3 roll call vote (see attached roll call vote spreadsheet).

iii. Jozefowski presented the NBWW FY2023 proposed budget for general membership approval. Jack Bielak, Village of Northbrook, made a motion was made to approve the FY2023 proposed budget seconded by Brandon Janes, Village of Deerfield. Motion passed with a 15-1-3 roll call vote (see attached roll call vote spreadsheet).

c. Old Business:

i. Monitoring Committee Update – Rob Flood, NBWW Monitoring & Water Quality Impairment Abatement Committee Chair gave a Monitoring Committee Update. The Monitoring Committee has been focusing on the NARP and the initial findings. This year the Monitoring Committee will be focusing on some additional monitoring in the Skokie Lagoons based on the monitoring results from 2022. NSWRD will continue monitoring at all twenty-five NBWW for water column chemistry parameters through 5 sampling events, per the recently approved agreement between NSWRD and NBWW. The NBWW will be preparing the annual NPDES NBWW monitoring data submittal later this month that meets POTW and MS4 monitoring requirements.

ii. NBWW NARP Update
Brian Valleskey, Geosyntec Consultants, presented an update on the NBWW NARP. Valleskey reminded the workgroup of the NARP objectives, which are to address phosphorous causing excessive algae, dissolved oxygen problems, and pH problems, as well as other contributing factor such as hydraulic modifications, lack of riparian shading, excessive streambank erosion, and loss of groundwater replenishment. The two POTWs have submitted an email to the Illinois EPA for an extension for the NBWW NARP completion from December 31, 2024 to December 31, 2025. In 2021, Geosyntec completed a NARP Workplan for the workgroup and in 2022 Geosyntec completed field data collection and analysis for the NBWW NARP services. From the 2022 data, the results were field data supported nutrient related impairments likely in the West Fork and Skokie River, but the North Branch Chicago River segment does not show signs of nutrient related impairments. In 2023, Geosyntec will begin the watershed (hydrologic and water quality) model development along with additional Skokie Lagoons sampling analysis. The SWMM watershed model development will be a collection of additional data (watershed boundaries, catchment sizes, land use, etc…).

Questions/Answers

1. Is there a document or web reference for the IEPA risk of eutrophication methodology?
   Yes, that can be provided as a link after the meeting for the workgroup members.

d. New Business: None

4. Watershed Project Updates

a. Open Discussion: Watershed Updates

i. Robyn Flakne shared that the Village of Glenview is in the design phase of a streambank stabilization project.

ii. Larry Bridges shared that East Skokie Drainage District has moved into Phase II of the Lake Forest Streambank Stabilization Project and the project should be completed in Spring/Summer 2023.

iii. North Shore is undergoing about a $4M project for Chemical Phosphorus Removal systems to supplement the biological Phosphorus process at two of its plants including the Clavey Road facility. Construction is expected to be completed in the next few months.

iv. Ashley Strelcheck, NBWW Coordinator, gave an update on the North Branch Chicago River Watershed-Based Plan. SMC will be hosting a Public Information Meeting and plans to open a public comment period in March (2023) pending The Lake County Stormwater Management Commission's approval March 2, 2023.

b. Member Remarks: None.

c. Next NBWW General Membership Meeting: August 09, 2023

5. Adjournment – 3:00 pm

Larry Bridges, East Skokie Drainage District, made a motion to adjourn seconded by Matt Ueltzen, LCFPD. The motion passed with unanimous consensus vote.

North Branch Chicago River Watershed Workgroup Meeting Attendees

Name	Organization
Adrienne Nemura	Geosyntec Consultants
Alana Bartolai	Lake County Health Department
Andrea Schaller	U.S. Environmental Protection Agency, Region 6
Ashley Strelcheck	Lake County Stormwater Management Commission
Ben Metzler	Clark Dietz for Village of Greek Oaks
Brandon Janes	Village of Deerfield
Brian Valleskey	Geosyntec Consultants
Byron Kutz	City of Lake Forest
Chris Yoder	Midwest Biodiversity Institute (MBI)
Chuck Bodden	North Shore Water Reclamation District
Cole Neder	Chicago Metropolitan Agency for Planning (CMAP)
Dudley Onderdonk	Village of Glencoe
Ed Rankin	Midwest Biodiversity Institute (MBI)
Jack Bielak	Village of Northbrook
Jacob Jozefowski	Lake County Stormwater Management Commission
Janice Aull	Aull Nature Preserve
Jim Anderson	James Anderson Company
Jim Jabcon	Chicago Botanic Garden
Jonathan Happ	Libertyville Township
Josephine Meincke	North Shore Water Reclamation District
Justin Vick	Metropolitan Water Reclamation District of Greater Chicago
Karolina Cho	Gewalt Hamilton Associates
Kate McDonnell	Village of Wilmette
Katie Piotrowska	Chicago Metropolitan Agency for Planning (CMAP)
Larry Bridges	East Skokie Drainage District
Marion Cartwright	Lake Forest Open Lands Association
Mary Mathews	Sierra Club
Matt Ueltzen	Lake County Forest Preserve District
Melanie Rummel	City of Lake Forest Environmental Sustainability Chair
Michele Mrachek	East Skokie Drainage District
Mike Prusila	Lake County Stormwater Management Commission
Patty Werner	Resident & East Skokie Drainage District Representative

Name	Organization
Peter Nagle	Chicago Botanic Garden
Reagan Walsh	City of Lake Forest
Rob Flood	North Shore Water Reclamation District
Robyn Flakne	Village of Glenview
Susan Lenz	Lake Forest Open Lands
Tony Garcia	U.S. Environmental Protection Agency, Region 5

PDHs are self-reporting. *If attendees want to apply NBWW meetings towards their professional license, keep the certificate, agenda, and minutes with sign-in sheets. Acceptance of these materials for credit is at the discretion of the licensing authority.*

MS4 Program BMP fulfillment. *If attendees want to apply NBWW meetings and education towards their MS4 Program BMP Measurable Goals, keep the certificate, agenda and minutes with sign-in sheets. Acceptance of these materials for MS4 program credit is at the discretion of the Illinois EPA.*

Organization	Voting Member	Number of Votes	Present? (Y)	Total Vote Count	Roll Call FY2023 Membership Dues	Yay Tallies for FY2023 Membership Dues	Roll Call FY2023 Budget	Yay Tallies for FY2023 Budget
Christopher Burke	Darren Olson	2	Y	2	Absent during roll call	0	Absent during roll call	0
City of Lake Forest	Brian Joyce	7	Y	7	Y	7	Y	7
East Skokie Drainage District	Larry Bridges	3	Y	3	Y	3	Y	3
Gewalt Hamilton	Karolina Cho	2	Y	2	Y	2	Y	2
Lake County SMC	Jacob Jozefowski	2	Y	2	Y	2	Y	2
Lake Forest Open Lands	Susan Lenz	2	Y	2	Y	2	Y	2
LCFPD - Unincorporated	Matt Ueltzen	2	Y	2	Y	2	Y	2
Libertyville Township	Damon Cederberg	3	Y	3	Y	3	Y	3
MWRDGC (Metropolitan Water Reclamation District of Greater Chicago)	Justin Vick	2	Y	2	Y	2	Y	2
NSWRD Clavey Road WRF	Chuck Bodden	9	Y	9	Y	9	Y	9
Illinois Sierra Club	Mary Mathews	2	Y	2	A	0	A	0
Union One West Fork Drainage District	Susan Grinnell	3	Y	3	Y	3	Y	3
Village of Bannockburn	Karolina Cho	3	Y	3	N	0	N	0
Village of Deerfield	Brandon Janes	9	Y	9	Y	9	Y	9
Village of Glencoe	Dudley Onderdonk	3	Y	3	A	0	A	0
Village of Northbrook	Jack Bielak	7	Y	7	Y	7	Y	7
Village of Northfield	Karolina Cho	3	Y	3	A	0	A	0
Village of Riverwoods	Karolina Cho	3	Y	3	Y	3	Y	3
Village of Wilmette	Kate McDonnell	3	Y	3	Y	3	Y	3
Village of Glenview	Robyn Flakne	9	Absent during roll call	0	Absent during roll call	0	Y	9
TOTALS		**164**	**19**	**70**	**14**	**57**	**15**	**66**

SIGN-IN SHEET

NORTH BRANCH CHICAGO RIVER WATERSHED WORKGROUP GENERAL MEMBERSHIP MEETING

February 08, 2023 * 1:00 PM – 3:00 PM * Lake Forest Municipal Services Building

NAME	ORGANIZATION	E-MAIL	ARE YOU AN NBWW MEMBER? (Y/N)	IF YES, ARE YOU VOTING TODAY FOR YOUR AGENCY? (Y/N)
Josephine Meincke	NSWRD	JOmeincke@northshorecurd.org	Y	N
Janice Hall	Avil Nature Preserve	AvilNaturePreserve@gmail.com	N	
Michele Mrachek	LBOLA / ESDD	michelemrachek1@gmail		
Dudley Onderdonk	Village of Glencoe	donderdonk@comcast.net	Y	N
Cole Neder	CMAP	cneder@cmapillinois.gov	N	N
Ben Metzler	Clark Dietz / Green Oaks	ben.metzler@clarkdietz.com	Y (Green Oaks)	N
Jim Anderson	Jos. Anderson Co	jganderson@jacobsengineers.com	Y	N
Jim Jabcon	Chicago Botanic Garden	jjabcon@chicagobotanic.org	Y / almost	N
Justin Vick	MWRD GC	Vick-@MWRD.ORG	Y	X
Jonathan Happ	Libertyville Township	jhappe libertyvilletownship.us	Y	Y
Byron Kutz	Lake Forest	kutzb@cityoflakeforest.com	Y	Y
Reagan Walsh	Lake Forest	walshr@cityoflakeforest.com	Y	N

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Brandon Janes	Deerfield	BJANES@DEERFIELD.IL.US	Y	Y
Chuck Bodden	NSWRD	chbodden@northshorewrd.org	Y	Y
Susan Lenz	Lake Forest Open Lands	slenz@lfola.org	Y	Y
Kate McDonnell	Wilmette	mcdonnellk@wilmette.com	Y	Y
Rob Flood	NSWRD	roflood@northshorewrd.org	Y	Y
Larry Bridges	ESDD	Larryb61@comcast.net	Y	Y
Karolina Cho	Gewalt Hamilton Ass. Village of Riverwoods City of Northfield Village of Bannockburn	kcho@gha-engineers.com	Y	Y
Peter Nagle	Chicago Botanic Garden	pnagle@chicagobotanic.org	Almost	
Alana Bartolai	LCHD	ABARTOLAI2@lakecountyil.gov		
Marion Carturight	resident (LFOLA)	marioncarturight3@gmail.com		

Melanie Rummel — City of Lake Forest Environmental Sustainability Chair — Rummellaw@aol.com

OVER →

MARY MATHEWS	SIERRA CLUB	TIMMARY747@AOL.COM	YES	YES
Patty Werner			NO	NO
Katie Piotrowska	Chicago Metropolitan Agency for Planning		NO	No

Biological and Water Quality Assessment of the North Fork Chicago River Watershed

Years 3 and 4 Rotation

West Fork Downstream Willow Rd. (WF23)

Skokie River Downstream I-94 (SR18)

North Branch Watershed Workgroup
February 8, 2023

Chris O. Yoder
Midwest Biodiversity Institute
Columbus, OH

Skokie River Upstream Half Day Rd. (SR4)

Middle Fork Upstream E. Lake Rd. (MF16)

The Development of a Biological Assessment Plan for the DuPage and Salt Creek Watersheds

Similar approach for the NBWW bioassessments in 2018-21

Chris O. Yoder
Center for Applied Bioassessment and Biocriteria
Midwest Biodiversity Institute
Columbus, OH

What is a Bioassessment?

- **Bioassessment – a systematic assessment of the aquatic resource using biological indicators AND chemical/physical indicators in a *supporting role.***
- **Biocriteria – numerical benchmarks for determining attainment of a goal expressed in the definition of an aquatic life designated use in the state WQS.**
- **Paired habitat and chemical/physical data at all sites – supports broader data analysis and indicator development objectives - Integrated Prioritization System or "IPS".**

Aquatic Life Uses

Definition:

A designation (classification) assigned to a waterbody based on the ***potential*** aquatic assemblage that can realistically be sustained given the regional reference condition and the level of protection afforded by the applicable criteria.

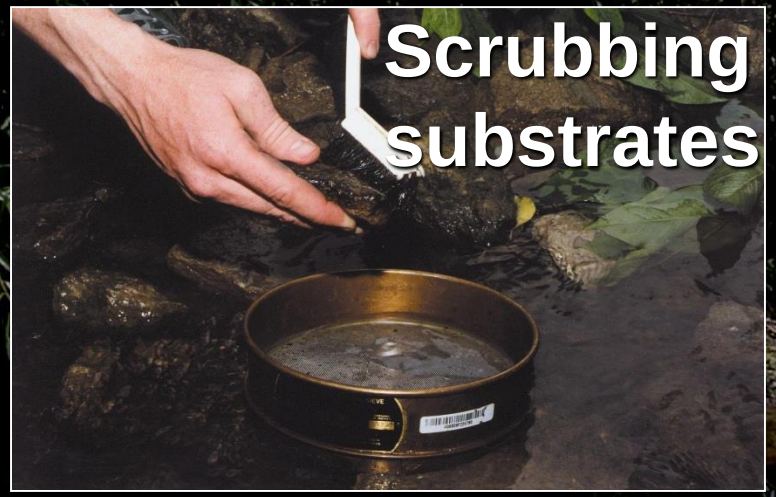
Aquatic Life Uses

ALUs inherently "drive" the determination of status & management responses, thus they are a critical determinant of overall program effectiveness.

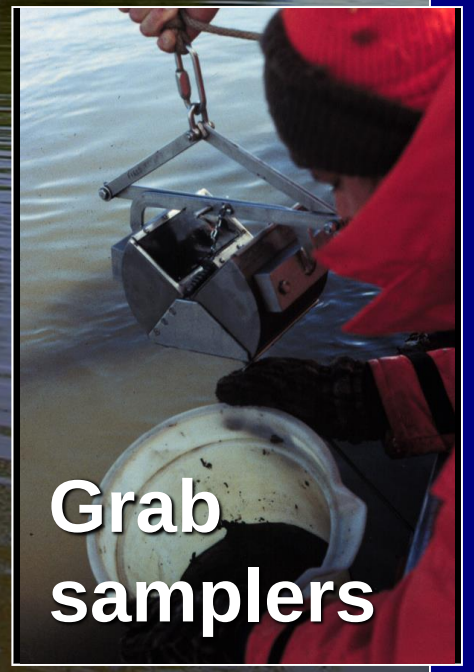
This underscores the critical importance and "reach" of aquatic life uses – they influence every aspect of water quality management.

Benthic Macroinvertebrates

Active Sampling Methods Examples

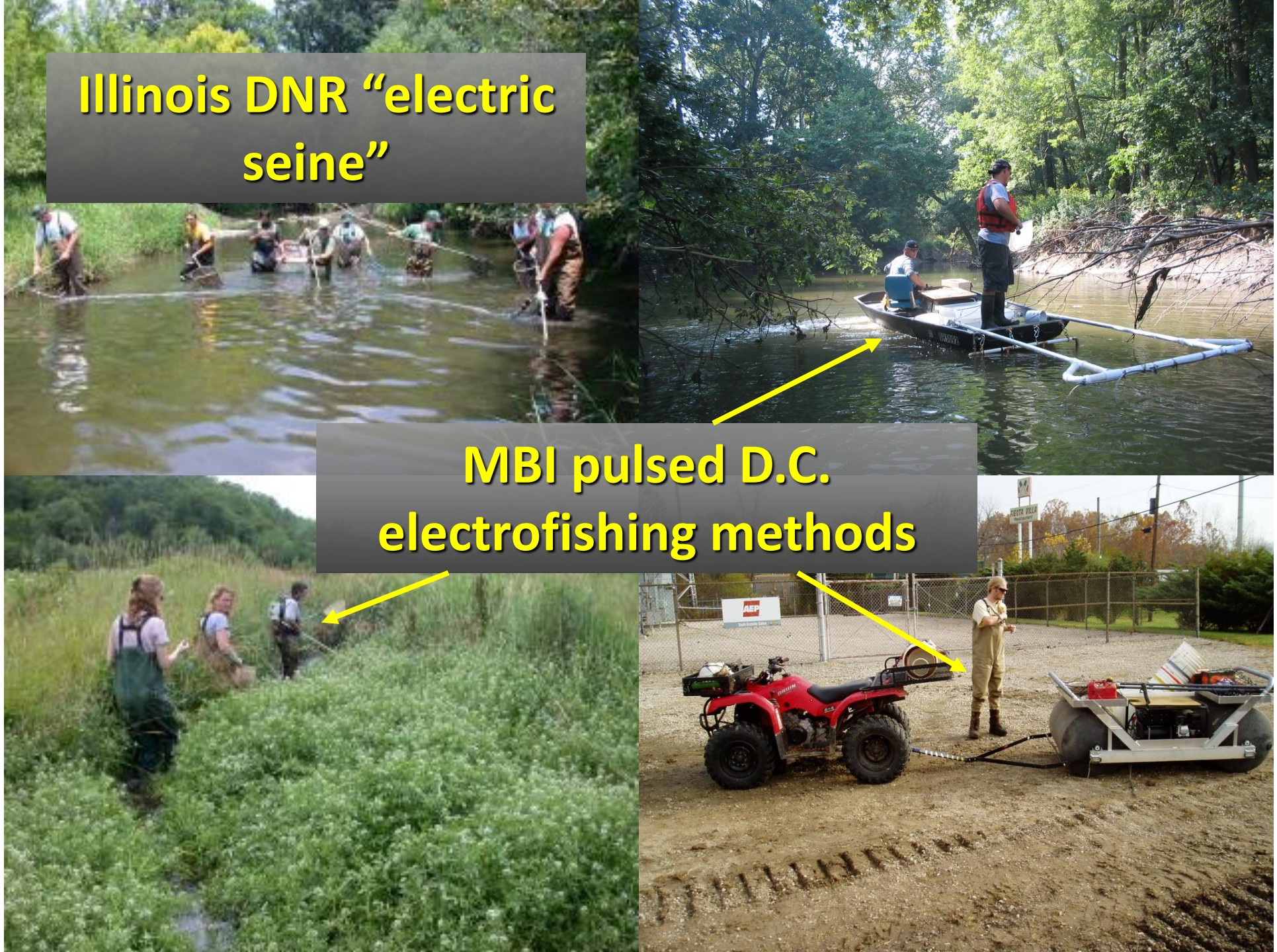


Net-based methods (including kicks, dips, jabs, sweeps, & picks)



IEPA methods for field collections & lab processing

Fish are a widely identifiable component of aquatic systems and are valued for their recreational uses. Most species, however, are more obscure, and comprise the second most endangered group.


Illinois DNR “electric seine”
MBI pulsed D.C. electrofishing methods

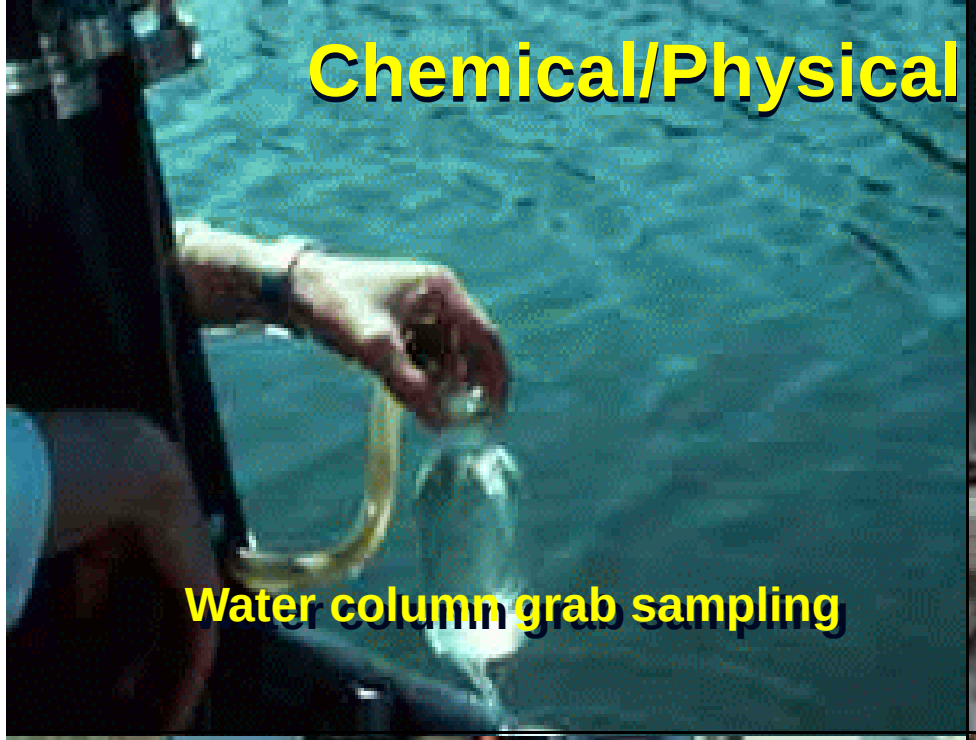
The Qualitative Habitat Evaluation Index (QHEI)

QHEI Includes Six Major Categories of Macrohabitat

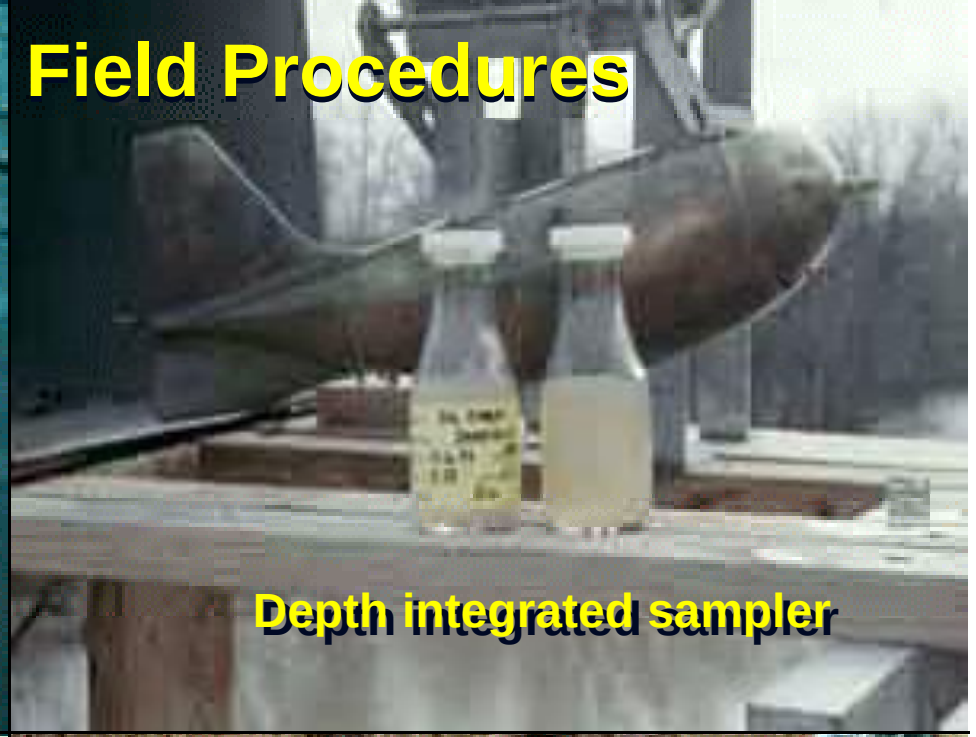
- Substrate - types, origin, quality, embeddedness
- Instream Cover – types and quantity
- Channel Quality – sinuosity, development, stability
- Riparian – width, quality, bank stability & quality
- Pool/Run/Riffle – depth, current types, embeddedness, morphology
- Gradient – local gradient (fall per unit distance)

Source: The Qualitative Habitat Evaluation Index (Rankin 1989)

Chemical/Physical Field Procedures



Water column grab sampling



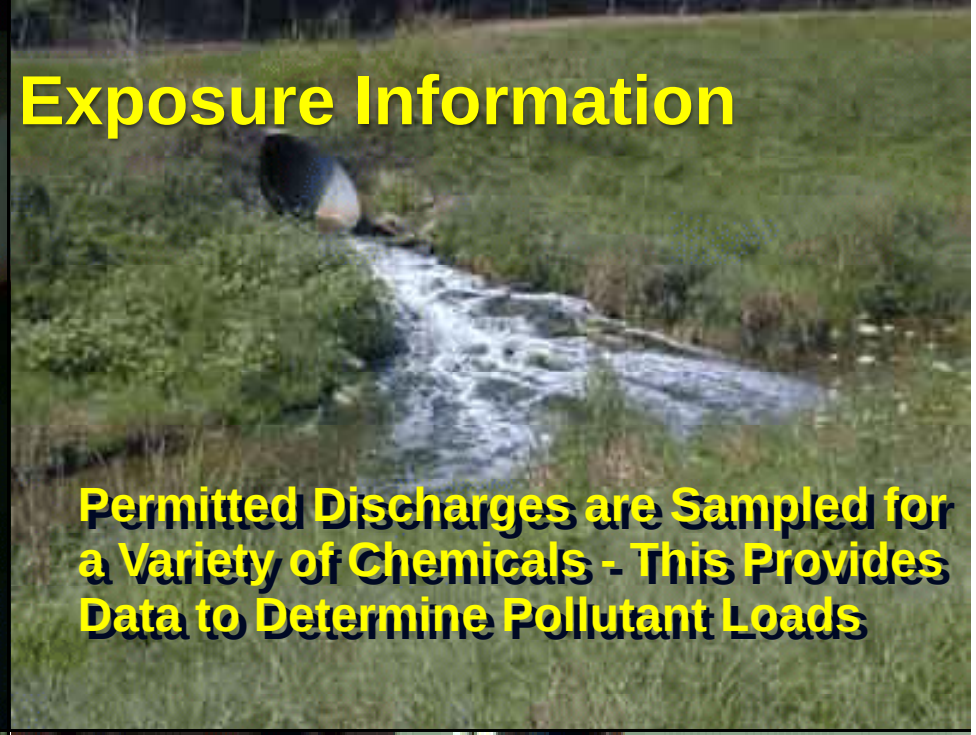
Depth integrated sampler

Automatic composite samplers

Time-of-travel dye injection

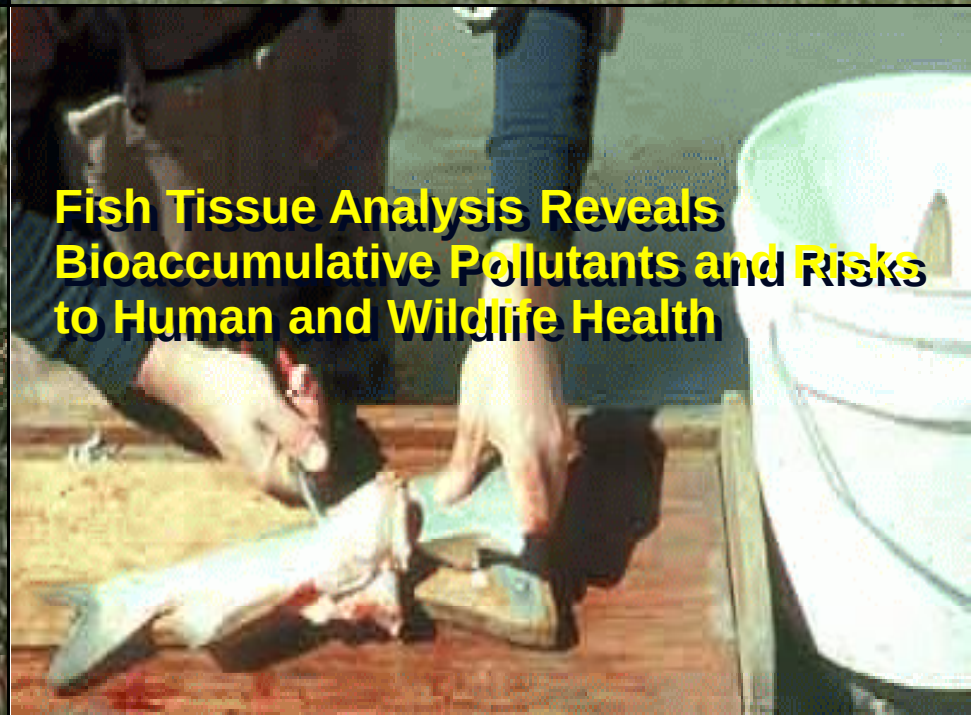
Chemical Effluent & Exposure Information

Whole Effluent Toxicity (WET) Testing is Performed Primarily on Effluents



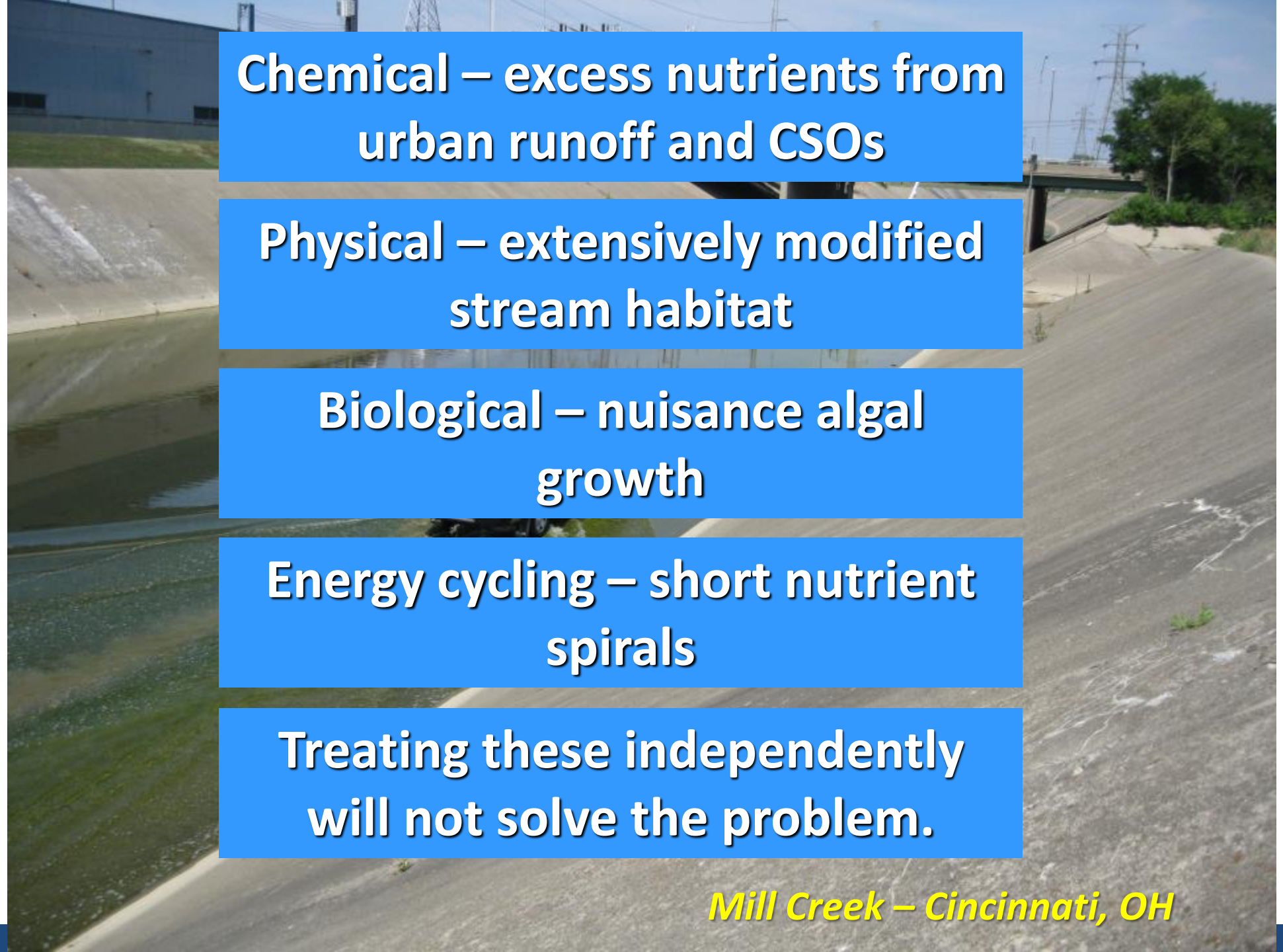
Permitted Discharges are Sampled for a Variety of Chemicals - This Provides Data to Determine Pollutant Loads

Biochemical Markers (Biomarkers) are Useful for Discerning Problem Pollutants



Fish Tissue Analysis Reveals Bioaccumulative Pollutants and Risks to Human and Wildlife Health


Mill Creek – Cincinnati, OH



Chemical – excess nutrients from urban runoff and CSOs

Physical – extensively modified stream habitat

Biological – nuisance algal growth

Energy cycling – short nutrient spirals

Treating these independently will not solve the problem.

Mill Creek – Cincinnati, OH

A Data Driven Framework

Ambient M&A and other data that includes:

- **Biological Assemblages** (*at least two*)
  - Evaluate aquatic life status (IL General Use)
  - Evidence of response to stressor types
- **Water and Sediment Chemistry Data**
  - Compare to biocriteria based thresholds
  - Compare to regional reference benchmarks
  - Evaluate efficacy of current water quality criteria
  - Effluent loadings to gauge impact of point sources
- **Habitat Data**
  - Key limiting factor to biota – can eclipse other factors
  - Key determinant of use attainability
- **GIS and Flow Data**
  - Expressions of land use for potential impacts and limitations on the biota
  - Effects of hydrological modifications - proxy indicators (Hydro QHEI)

Completing the Cycle of WQ Management: Managing for Environmental Results

Indicator Levels

1: Management actions

2: Response to management

Administrative Indicators *[permits, plans, grants, enforcement]*

3: Stressor abatement

Stressor Indicators *[pollutant loads, land practices]*

4: Ambient conditions

5: Assimilation and uptake

Exposure Indicators *[pollutant conc., habitat, ecosystem process, fate & transport]*

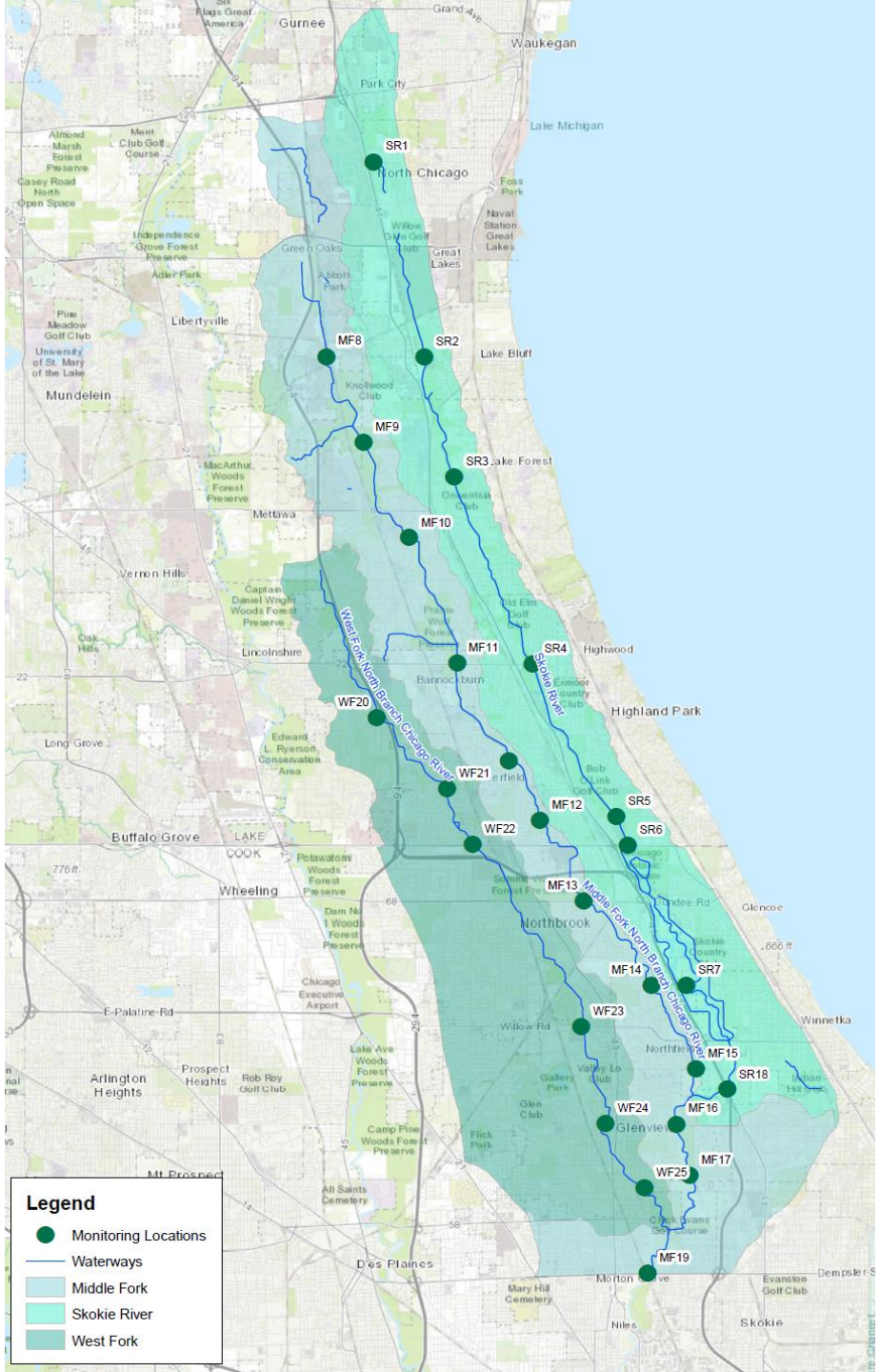
6: Biological response

Response Indicators *[biological assemblage indices, other attributes]*

"Ecological Health" The Endpoint of Concern

North Branch Watershed Bioassessment Report

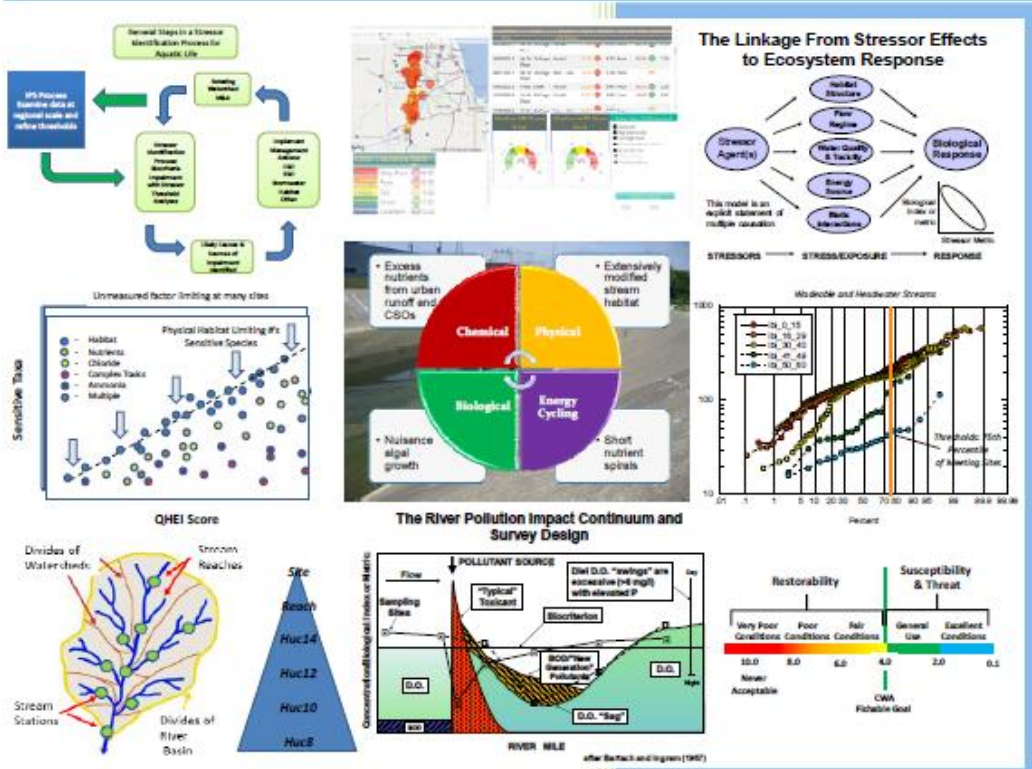
- Full analysis of all 2020-21 data.
- Aquatic life use attainment including causes and sources enhanced by IPS model thresholds and tool updates.
- “Combined” assessment for nutrient enrichment – modified SNAP procedure updated.
- Restorability factors calculated per NE Illinois IPS model and all data added to Power BI platform.
- Expect a draft for review by February 13, 2023.



North Branch Watershed Bioassessment

- Two year cycle: 25 sites total - 11 sites 2018; 14 sites 2019; repeated in 2020-21.
- Each site assigned a consistent site code (e.g., SR18).
- Each sampled for fish, macroinvertebrates, and habitat by MBI.
- Continuous parameters (D.O., pH, temperature, conductivity) and benthic chlorophyll a by MBI at 20 sites.
- Water chemistry sampling and analysis by NBWW at all sites annually.
- Employ 3 crews over a June-October seasonal index period.
- Followed IEPA methods to ensure data consistency and usefulness of results.
- 2020-21 draft for review next week.

Integrated Prioritization System (IPS) for Northeastern Illinois: Technical Documentation



Peter A. Precario, MBI Executive Director
James Lane, MBI Board President

Report citation:

Midwest Biodiversity Institute (MBI). 2022. Integrated Prioritization System (IPS) for Northeastern Illinois: Technical Documentation and Atlas of Stressor Relationships. Technical Report MBI/2020-5-10. Project Number 10180900. Columbus, OH 43221-0561. 157 pp. + appendices.

Sponsoring Organizations:

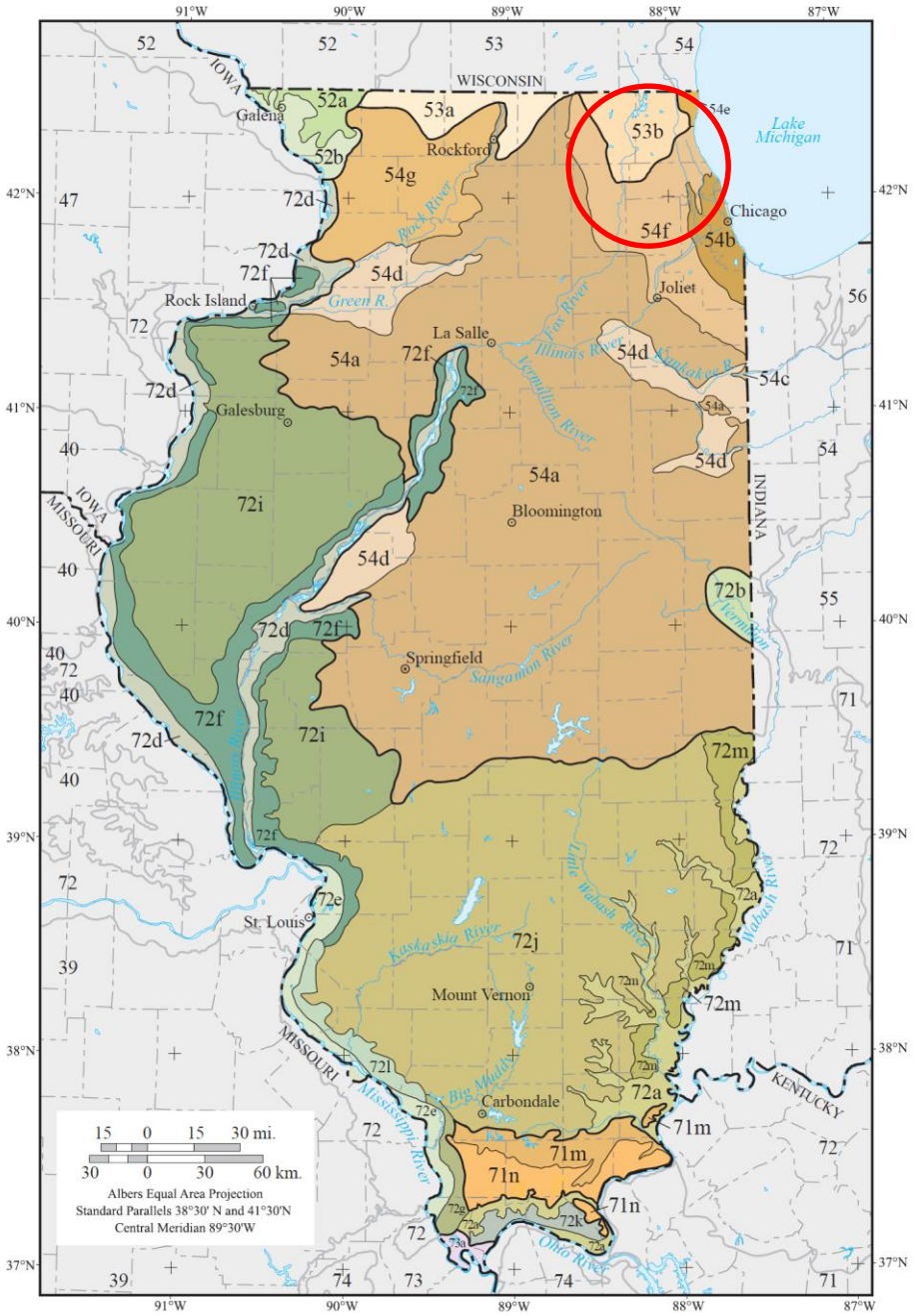
DuPage River Salt Creek Workgroup

Lower DuPage River Watershed Coalition

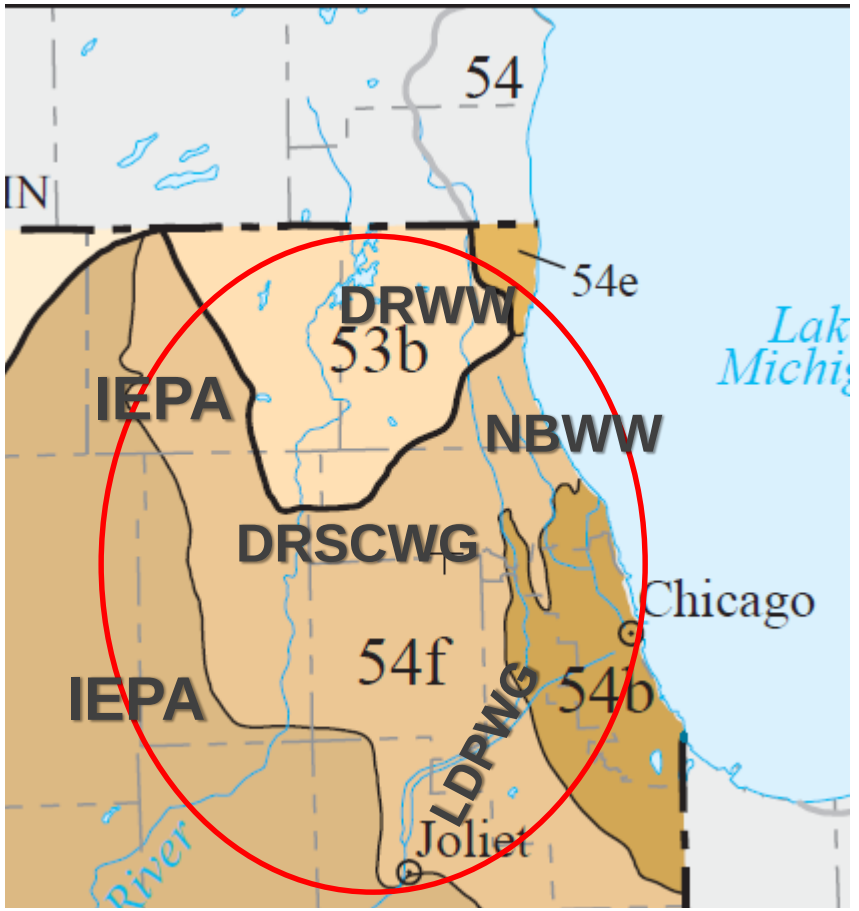
DES PLAINES RIVER WATERSHED WORKGROUP

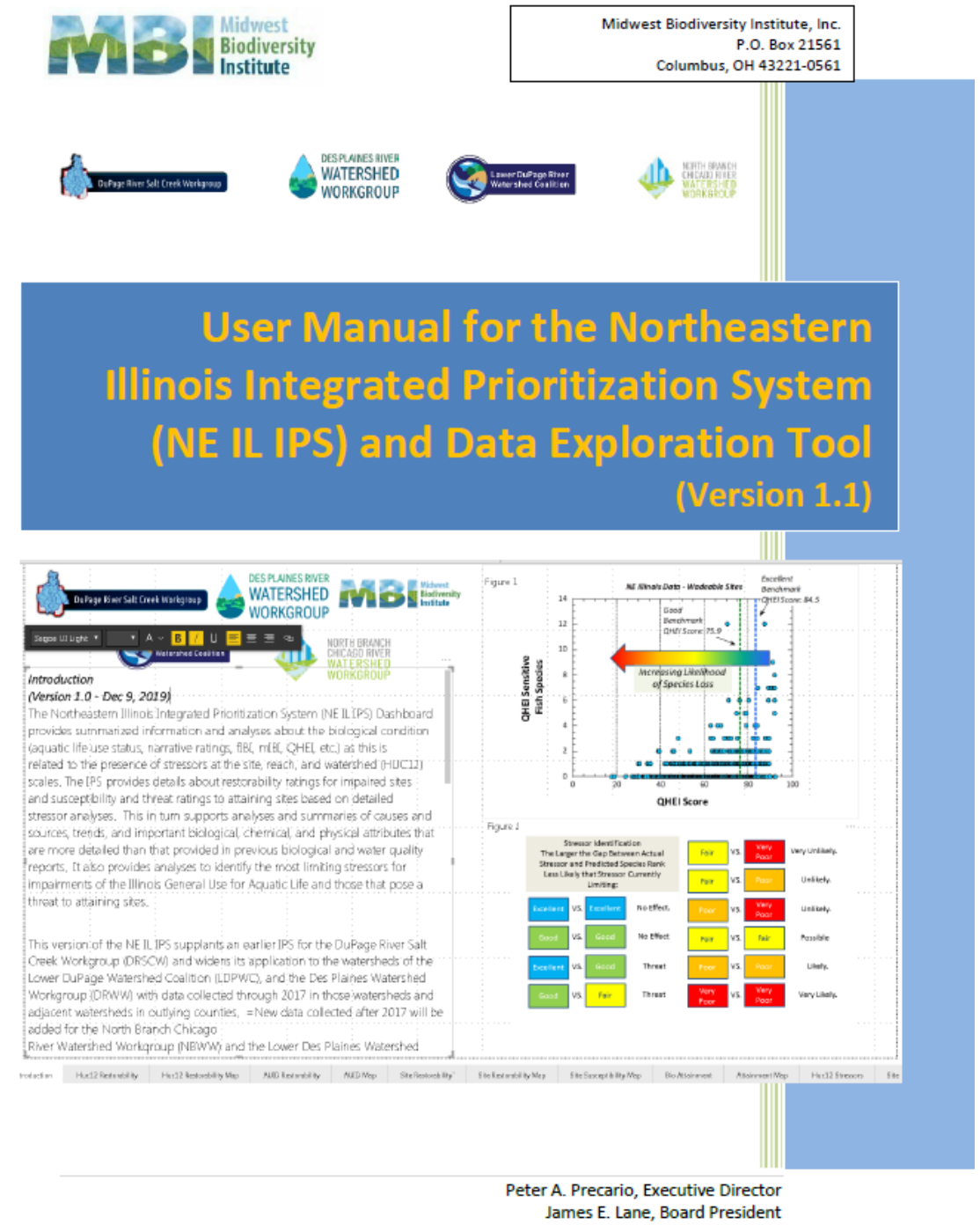
NORTH BRANCH CHICAGO RIVER WATERSHED WORKGROUP

esri Portions of this document were made possible by a generous grant from ESRI. The GIS elements of this report were also made possible by a grant from ESRI.



NE Illinois IPS Update Data Sources





NE Illinois IPS: Power BI Dashboard & User Manual

- All data is housed in a Power BI platform or “dashboard”.
- Allows a user to examine assessed data such as use attainment status and associated causes & sources of impairment.
- Biological effect thresholds for assessing risk of existing and new impacts of use attainment.
- Scaled to five narrative categories.
- Restorability factors for impaired sites.
- Susceptibility and Threat factors for attaining sites.
- Need to schedule hands on training for the collective watershed groups.

<table>
<tr><th colspan="3">Stressor and Response Variables (0-10 Standardized Scale)</th><th colspan="3">Restorability, Susceptibility and Threat Score Ranges (0-100 Range)</th></tr>
<tr><th>Narrative Condition</th><th>Equivalent “Use Class”</th><th>Stressor Ranks</th><th>Restorability</th><th>Susceptibility</th><th>Threatened</th></tr>
<tr><td>Excellent</td><td>Exceptional</td><td>0.1-2.0</td><td rowspan="2">Not assigned to attaining sites</td><td colspan="2">Very Low (0-20)</td></tr>
<tr><td>Good</td><td>General Use</td><td>>2.0-4.0</td><td colspan="2">Low (>20-40)</td></tr>
<tr><td rowspan="2">Fair</td><td rowspan="2">Modified Use</td><td rowspan="2">>4.0-6.0</td><td>V. High (>80)</td><td colspan="2" rowspan="5">Not assigned to impaired sites</td></tr>
<tr><td>High (>60-80)</td></tr>
<tr><td rowspan="2">Poor</td><td rowspan="2">Limited Use</td><td rowspan="2">>6.0-8.0</td><td>Intermediate (>40-60)</td></tr>
<tr><td>Low (>20-40)</td></tr>
<tr><td>Very Poor</td><td>None</td><td>>8.0</td><td>V. Low (<20)</td></tr>
</table>

Evaluating Chemical Results: WQC & Threshold Effects

Parameter	Water Quality Criteria		Effect Thresholds				Non-effect Benchmarks	
	IL Chronic	IL Acute	Ohio EPA	SW Ohio	NOAA SQRT	Other	Regional Reference	IL Non-Standard
Demand Group								
BOD_5	NA	NA	--	2.48 mg/L [HW Streams] 2.96 mg/L [WD Streams] 2.60 mg/L [BT Rivers]	--	--	2.00 mg/L [HW Streams]	--
Dissolved Oxygen (D.O.)	mg/L [7-day rolling avg.]	mg/L [minimum]	7.2 mg/L [HW Streams]	5.32 mg/L [All Streams]	--	--	6.6 mg/L [HW Streams]	--
Suspended Solids (TSS)	NA	NA	16.0 mg/L [HW Streams]	70.8 mg/L [WD Streams] 74.3 mg/L [BT Rivers]	--	--	28.0 mg/L [HW Streams]	--
Nutrients Group								
Ammonia-N (NH_3-N)	1.24 mg/L [pH 8.0/25°C]	8.40 mg/L [pH 8.0/25°C]	0.05 mg/L [HW Streams]	0.31 mg/L [HW Streams]	--	0.15 mg/L [DRSCW IPS]	0.025 mg/L [HW Streams]	--
Total Kjeldahl Nitrogen (TKN)	NA	NA	0.50 mg/L [HW Streams]	0.51 mg/L [HW Streams] 0.58 mg/L [WD	--	1.00 mg/L [DRSCW IPS[11]]	0.70 mg/L	--

These have been updated via the currently ongoing IPS[1] development

[1] Integrated Prioritization System

NE IL IPS Biological Effect Thresholds: Chemical Parameters

Parameter Code	Variable Name	Units	Parameter Group	Limiting Assemblage	FIT Score	Sample N	Thresholds by Narrative Condition Category: Excellent	Good	Fair	Poor	Very Poor	Reference Site Values (Median-2X IQR)	Reference Site N
P665	Total Phosphorus	mg/L	Nutrients	Fish	0.04	1464	≤0.106	>0.106	>0.277	>1.002	>1.726	0.088 (0.062-0.115)	35
P94	Conductivity	µS/cm	Ionic	Fish	0.05	1464	≤739	≥739	>1038	>1208	>1378	922 (705-1158)	40
P70300	Total Dissolved Solids	mg/L	Ionic	Fish	0.10	1464	≤453.8	>453.8	>558.0	>651.2	>744.5	614 (512-664)	28
DO_MIN	Minimum DO	mg/L	Demand	Macros	0.10	985	>8.0	≥6.5	>5.47	<4.44	<3.4	8.6 (6.5-9.6)	29
P625	Total Kjeldahl Nitrogen	mg/L	Demand	Macros	0.14	985	≤1.07	>1.07	>1.12	>1.63	>2.14	0.74 (0.30-0.99)	30
P940	Chloride, Total	mg/L	Ionic	Fish	0.17	1464	≤40.00	>40.00	>120.0	>184.9	>249.8	154 (80.3-171.3)	33
P299	Mean Dissolved Oxygen	mg/L	Demand	Macros	0.21	985	≥9.42	<9.42	<9.25	<6.11	<3.05	8.6 (7.9-9.0)	40
P310	BOD (5-Day)	mg/L	Demand	Macros	0.21	985	≤1.30	>1.30	>2.35	>3.45	>4.54	2 (2.0-2.2)	27
P610	Total Ammonia	mg/L	Nutrients	Macros	0.28	985	≤0.084	>0.084	>0.100	>0.190	>0.280	0.1 (0.10-0.10)	34
P630	Nitrate-N	mg/L	Nutrients	Fish	0.29	1464	≤3.767	>3.767	>5.045	>7.344	>9.643	0.39 (0.29-0.97)	32
P929	Sodium, Total	mg/L	Ionic	Fish	0.29	1464	≤16275	>16275	>45000	>79056	>113112	14200 (10375-22500	21
P530	Total Suspended Solids	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] (5.4-20.3)	33
P615	Nitrite-N	mg/L	Nutrients	Macros	[illegible]	985	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.01 (0.01-0.01)	27
DO_MAX	Maximum DO	mg/L	Demand	Macros	0.94	985	≤10.36	≥10.36	>12.21	>14.24	>16.28	8.74 (8.21-9.45)	29
P82078	Turbidity	NTU	Demand	Macros	2.61	985	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11.0 (4.5-24.5)	7
P549	Volatile Suspended Solids	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6.0 (4.8-7.4)	5
P945	Sulfate, Total	mg/L	Ionic	Macros	6.49	985	≤58.27	>58.27	>73.10	>83.45	>93.81	74.6 (61.8-81.8)	4
P937	Potassium, Total	mg/L	Ionic	Macros	[illegible]	985	≤3158	>3158	>6300	>7718	>9129	2400 (1574-2817)	21
P916	Calcium, Total	mg/L	Ionic	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	>86559	54,000 (80-74,250)	21
Metals and Toxics													
P1092	Zinc, Total	µg/L	Metal_Tox	Fish	0.13	1464	≤7.47	>7.47 [55.5]	>9.78	>11.00	>12.22 [309.7]	2.0 (2.0-7.0)	23
P1027	Cadmium, Total	µg/L	Metal_Tox	Fish	0.93	1464	≤0.937	>0.937 [2.70]	>0.974	>0.983	>0.991 [33.63]	<MDL (0.17)	23
P1042	Copper, Total	µg/L	Metal_Tox	Fish	1.75	1464	--	≤4.480 [CS: 18.65]	>4.480	>4.969	>5.458 [AS: 30.1]	2.00 (1.96-4.15)	22
P1051	Lead, Total	µg/L	Metal_Tox	Macros	2.11	985	≤2.851	>2.851 [CS; 18.0]	>3.335	>3.884	>4.434 [AS: 343]	0.24 (0.20-0.57)	23
P1082	Strontium	µg/L	Metal_Tox	Fish	2.69	1464	≤169.1	>169.1	>190.8	>280.4	>370.1	150 (135-181)	21
P1055	Manganese, Total	µg/L	Metal_Tox	Macros	2.74	985	≤53.71	>53.71 [CS: 3319]	>77.03	>107.1	>137.2 [AS: 7808]	32.0 (24.1-38.2)	23
P1067	Nickel, Total	µg/L	Metal_Tox	Macros	3.26	985	--	≤3.470 [CS: 103.6]	>3.470	>9.585	>15.70 [AS: 932]	5.0 (1.5-21)	14
P1105	Aluminum, Total	µg/L	Metal_Tox	Fish	4.54	1464	≤310.0	>310.0	>393.3	>560.2	>727.0	200 (128-449)	21
P1007	Barium, Total	µg/L	Metal_Tox	Fish	4.77	1464	≤74.1	>74.09	>84.88	>101.8	>118.6	56.3 (44.3-64.7)	21
P720	Cyanide, Total	µg/L	Metal_Tox	Macros	5.17	985	≤8	>8 [CS: 5.2]	>10	>10	>10 [AS: 22]	3 (2-10)	6
P1002	Arsenic	µg/L	Metal_Tox	Macros	9.19	985	--	≤3.616 [CS: 190]	>3.455	>5.029	>6.603 [AS: 360]	Insufficient Data	
P1034	Chromium, Total	µg/L	Metal_Tox	Fish	10.17	1464	≤1.398	>1.398 [CS: 167]	>1.540	>2.682	>3.824 [AS: 3503]	1.73 (1.30-2.00)	6

CS - Illinois WQS chronic standard equated to Good; AS - Illinois WQS acute standard equated to Very Poor.

Thresholds for sediment metals & PAH compounds and habitat & land use variables also developed.

Site ID	River Mile	Drainage Area (sq. mi.)	Tempera-ture (°C)	pH (S.U.)	Conduct-ivity (µS/cm)	D.O. (mg/L)	Ammonia-N (mg/L)	Nitrate-N (mg/L)	TKN (mg/L)	Total Phos-phorus (mg/L)	Chloro-phyll a, Sestonic (ug/L)	Total Suspend-ed Solids (mg/L)	Volatile Suspend-ed Solids (mg/L)	Chloride (mg/L)	Specific Conduct-ance (µS/cm)
Skokie River - 2020															
SR1	21.1	2.7	22.6	7.09	1438	5.6	0.12	0.02	0.86	0.006	7.1	11	1.0	356	1438
SR2	17.4	7.8	21.9	7.48	1390	6.3	0.13	0.14	0.40	0.006	2.7	9	1.0	279	1390
SR3	14.8	11.5	21.8	7.54	1054	7.0	0.12	0.20	0.71	0.006	1.3	11	1.0	203	1054
SR4	11.3	15.0	22.0	7.76	1085	7.7	0.05	0.22	0.59	0.006	0.7	8	1.0	179	1085
SR5	8.0	20.6	22.3	7.65	1006	6.2	0.06	0.45	0.97	0.006	3.1	6	1.0	168	1006
SR6	7.4	21.5	22.9	7.67	983	6.3	0.12	0.49	0.88	0.006	1.5	7	1.0	167	983
SR7	3.0	23.7	25.1	7.85	844	7.5	0.06	0.64	1.46	0.120	25.0	14	4.5	149	844
SR18	0.5	30.9	23.5	7.70	868	7.1	0.06	6.18	1.33	0.320	18.0	14	3.5	140	868
Skokie River - 2021															
SR1	21.1	2.7	20.0	7.23	1030	8.1	0.11	0.19	0.64	0.006	1.0	11	2.0	222	1030
SR2	17.4	7.8	19.7	7.15	1661	8.1	0.06	0.30	0.82	0.006	0.4	8	1.0	452	1661
SR3	14.8	11.5	19.6	7.43	1499	9.0	0.08	0.30	0.76	0.006	0.4	5	1.0	406	1499
SR4	11.3	15.0	19.9	7.37	1505	9.1	0.08	0.29	0.95	0.006	0.2	5	1.0	395	1505
SR5	8.0	20.6	20.6	7.47	1565	8.2	0.15	0.45	1.18	0.093	7.6	6	1.0	386	1565
SR6	7.4	21.5	21.0	7.49	1549	8.0	0.15	0.45	1.55	0.078	0.5	7	1.0	398	1549
SR7	3.0	23.7	24.8	7.64	1294	7.5	0.18	1.03	2.09	0.170	23.0	12	1.0	331	1294
SR18	0.5	30.9	22.4	7.14	1181	8.2	0.13	11.00	1.55	0.620	2.3	19	4.5	254	1181
Middle Fork North Branch Chicago River - 2020															
MF8	21.1	5.8	24.8	7.29	1504	7.0	0.07	0.02	0.62	0.006	4.9	15	4.5	334	1504
MF9	18.9	8.9	24.5	7.28	1328	8.0	0.07	0.02	0.45	0.058	2.2	24	3.0	297	1328
MF10	16.7	11.9	24.3	7.43	1167	7.7	0.06	0.06	0.72	0.006	1.2	10	2.0	228	1167
MF11	14.1	16.1	24.6	7.56	915	9.1	0.05	0.02	0.95	0.006	0.4	23	4.0	165	915
MF12	10.8	19.2	24.7	7.55	905	7.8	0.01	0.02	0.92	0.006	0.6	8	1.0	166	905
MF13	8.6	21.0	24.9	7.42	887	8.0	0.06	0.09	1.46	0.006	0.8	10	3.5	170	887
MF14	6.0	22.5	24.1	7.63	961	8.9	0.01	0.02	1.51	0.006	0.8	8	1.5	182	961
MF15	4.0	24.3	25.0	7.57	909	8.8	0.09	0.02	0.97	0.006	0.3	17	3.0	172	909
MF16	3.0	56.1	22.5	7.49	960	7.2	0.09	5.88	2.15	0.390	3.5	18	2.0	176	960
MF17	1.8	57.3	23.5	7.49	911	6.8	0.18	6.67	1.29	0.325	3.5	15	2.0	151	911
Middle Fork North Branch Chicago River - 2021															
MF8	21.1	5.8	22.1	6.99	2865	5.7	0.08	0.02	1.36	0.110	3.8	11	1.0	773	2865
MF9	18.9	8.9	21.0	7.11	2665	4.7	0.07	0.02	1.32	0.130	5.8	14	1.0	700	2665
MF10	16.7	11.9	23.5	7.20	1969	5.3	0.06	0.02	1.56	0.063	1.6	6	1.0	555	1969
MF11	14.1	16.1	23.0	7.05	1845	5.4	0.06	0.02	1.33	0.073	4.1	13	1.0	505	1845
MF12	10.8	19.2	22.4	7.33	1847	4.4	0.06	0.09	1.06	0.068	2.1	6	1.0	522	1847
MF13	8.6	21.0	22.2	7.18	1912	6.1	0.12	0.16	1.09	0.150	0.9	8	2.0	541	1912
MF14	6.0	22.5	21.2	7.49	1832	7.5	0.07	0.17	1.30	0.115	0.4	5	1.0	518	1832
MF15	4.0	24.3	21.8	7.62	1752	8.3	0.13	0.35	1.01	0.063	1.4	5	1.0	490	1752
MF16	3.0	56.1	24.1	7.07	1290	8.3	0.08	13.85	1.47	0.705	3.2	25	1.0	284	1290
MF17	1.8	57.3	24.1	7.24	1299	8.0	0.19	13.25	1.74	0.760	1.7	19	2.5	287	1299
Condition Category Thresholds		Excellent	25.0		<739	>8.0	<0.084	≤3.77	<1.07	≤ 0.106	<2.5	≤17.5	≤5.00	<40.0	<739
		Good	29.4		<1038	>6.5	<0.100	<5.05	<1.12	<0.277	<5.1	<31.6	<7.76	<120.0	<1038
		Fair	31.7		<1208	>5.6	<0.190	<7.34	<1.63	<1.020	<13.8	<35.2	<9.83	<184.9	<1208
		Poor	32.2		<1378	>4.4	<0.280	<9.64	<2.14	<1.730	<28.9	<38.7	<11.88	<249.8	<1378
		Very Poor	36.0		>1378	<4.4	≥0.280	≥9.64	≥2.14	≥1.730	>28.9	>38.7	>11.88	≥249.8	>1378
Source		IPS	IL/OH WQS		IPS	IPS	IPS	IPS	IPS	IPS	MBI/NSAC	IPS	IPS	IPS	IPS

Chemical Threshold Exceedances

- Based on IPS threshold exceedances.
- Scaled to five narrative categories.
- Arranged upstream/ downstream reveals “pollution profiles”.
- Some results affected by flow hydrograph – 2021 ionic strength variable exceedances more severe in 2021.
- Point source influence for N and P.
- Numerous NPS effects.

Site ID	River Mile	Drainage Area (sq. mi.)	Tempera-ture (°C)	pH (S.U.)	Conduct-ivity (µS/cm)	D.O. (mg/L)	Ammonia-N (mg/L)	Nitrate-N (mg/L)	TKN (mg/L)	Total Phos-phorus (mg/L)	Chloro-phyll a, Sestonic (ug/L)	Total Suspend-ed Solids (mg/L)	Volatile Suspend-ed Solids (mg/L)	Chloride (mg/L)	Specific Conduct-ance (µS/cm)
West Fork North Branch Chicago River - 2020															
WF20	12.5	3.9	23.2	7.33	800	8.3	0.14	0.11	1.36	0.173	3.0	12	1.0	147	800
WF21	10.4	7.0	25.7	7.27	872	7.8	0.15	0.07	1.96	0.006	1.3	8	1.0	183	872
WF22	9.2	9.4	25.6	7.51	1047	10.0	0.13	6.70	2.15	1.285	4.1	10	3.0	210	1047
WF23	4.9	17.9	26.1	7.59	1101	9.3	0.13	3.64	1.77	0.665	4.2	20	4.5	221	1101
WF24	2.9	24.5	25.0	7.59	1177	8.1	0.34	2.71	1.72	0.460	2.2	7	3.0	236	1177
WF25	1.3	28.0	26.7	7.64	1172	8.1	0.29	2.53	0.87	0.470	1.0	6	1.0	243	1172
West Fork North Branch Chicago River - 2021															
WF20	12.5	3.9	22.7	6.98	1379	4.8	0.15	0.13	1.72	0.235	10.0	20	3.5	357	1379
WF21	10.4	7.0	22.7	6.92	1566	3.7	0.30	0.37	1.52	0.225	1.2	9	2.5	418	1566
WF22	9.2	9.4	23.0	7.16	1142	5.9	0.35	7.40	2.05	2.065	2.9	17	2.0	232	1142
WF23	4.9	17.9	24.8	8.02	1478	9.7	0.19	3.37	1.69	0.735	24.0	60	5.0	283	1478
WF24	2.9	24.5	23.3	7.46	1699	6.3	0.38	1.92	1.62	0.515	6.7	18	1.0	323	1699
WF25	1.3	28.0	23.7	7.19	1347	6.3	0.28	2.28	1.49	0.435	1.7	15	1.5	312	1347
North Branch Chicago River - 2020															
MF19	18.6	93.4	24.4	7.62	944	7.5	0.14	5.02	1.42	0.305	1.0	13	1.0	166	944
North Branch Chicago River - 2021															
MF19	18.6	93.4	25.8	7.24	1380	8.5	0.14	11.75	2.19	0.600	2.4	15	1.0	349	1380
Condition Category Thresholds		**Excellent**	25.0		<739	>8.0	<0.084	≤3.77	<1.07	≤ 0.106	<2.5	≤17.5	≤5.00	<40.0	<739
		Good	29.4		<1038	>6.5	<0.100	<5.05	<1.12	<0.277	<5.1	<31.6	<7.76	<120.0	<1038
		Fair	31.7		<1208	>5.6	<0.190	<7.34	<1.63	<1.020	<13.8	<35.2	<9.83	<184.9	<1208
		Poor	32.2		<1378	>4.4	<0.280	<9.64	<2.14	<1.730	<28.9	<38.7	<11.88	<249.8	<1378
		Very Poor	36.0		>1378	<4.4	≥0.280	≥9.64	≥2.14	≥1.730	>28.9	>38.7	>11.88	≥249.8	>1378
Source		**IPS**	**IL/OH WQS**		**IPS**	**IPS**	**IPS**	**IPS**	**IPS**	**IPS**	**MBI/NSAC**	**IPS**	**IPS**	**IPS**	**IPS**

The West Fork had the most poor and very poor exceedances across 10 parameters, most (not all) emanating for the upstream sites

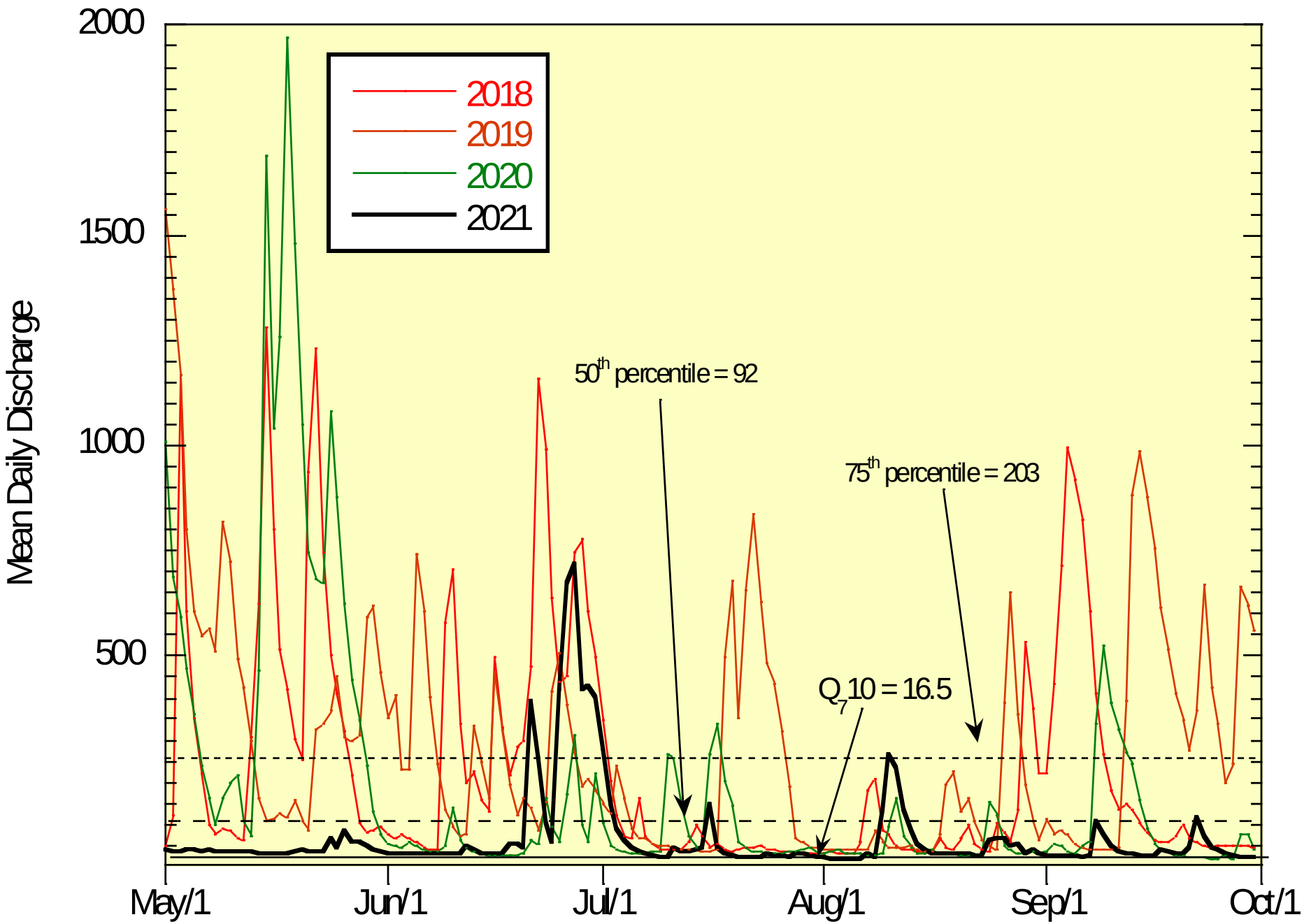
Bacteria *(E. coli)* Results

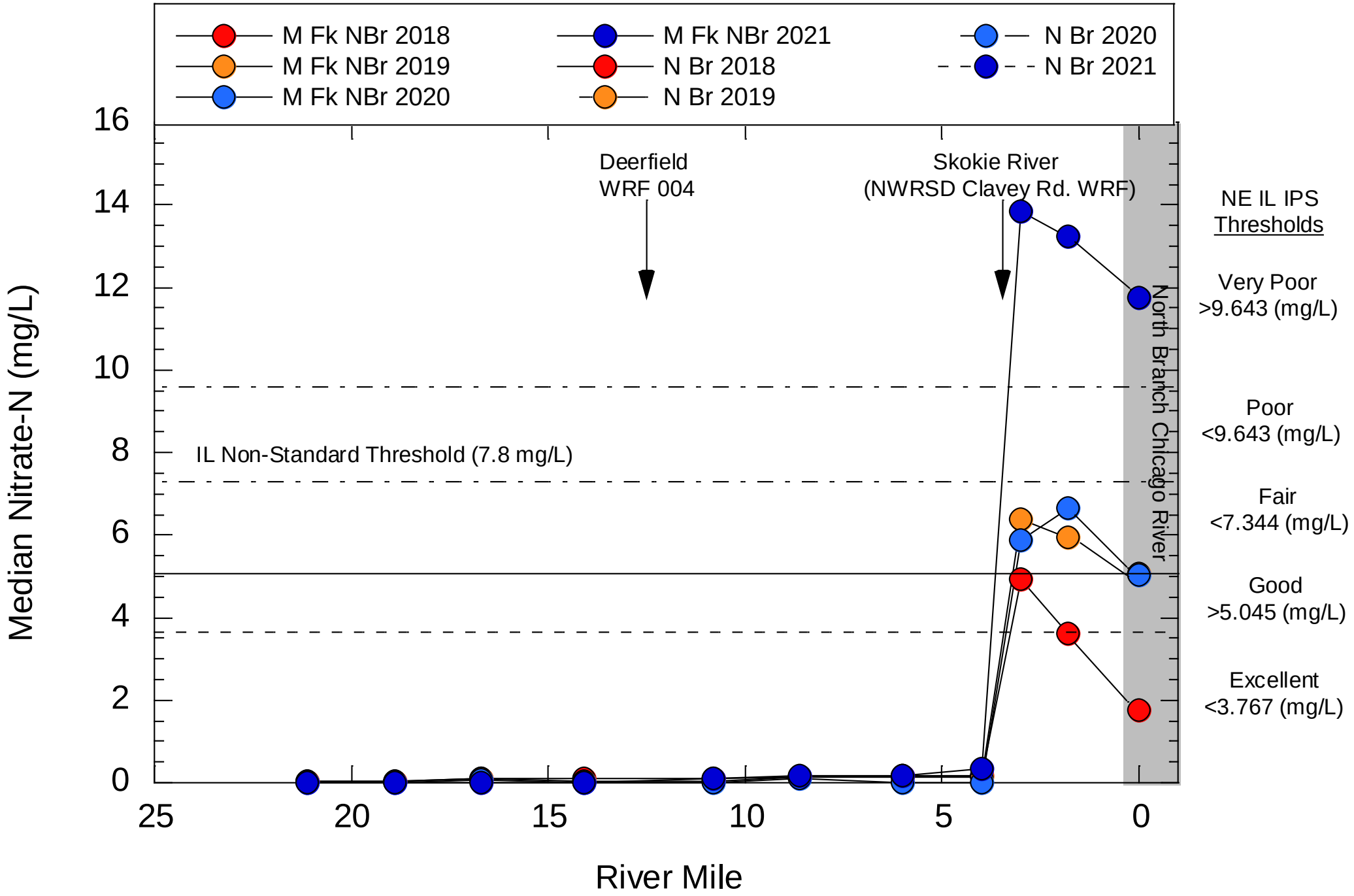
U.S. EPA criteria:

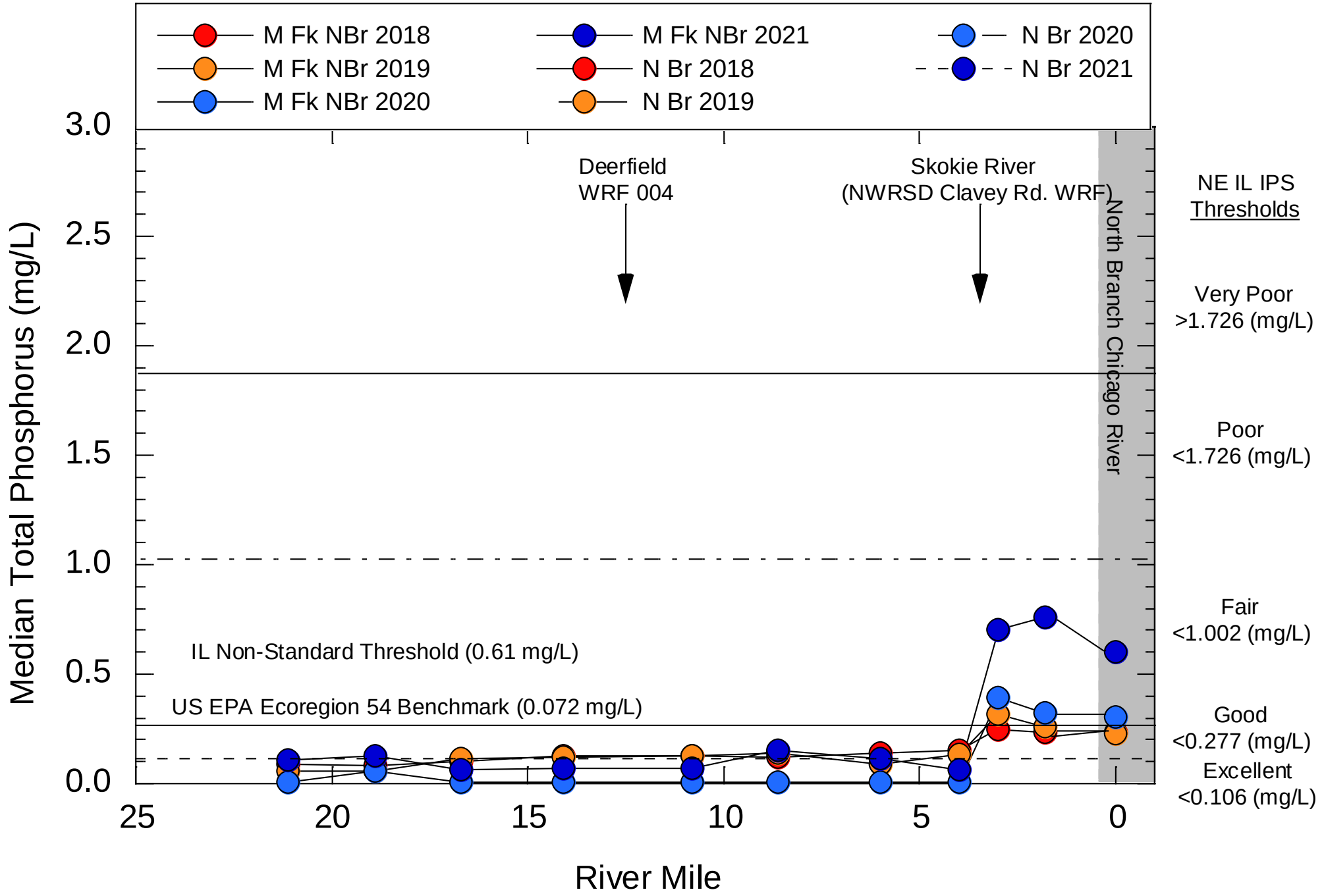
Geometric Mean: 126 cfu/100 mL
Maximum STV: 410 cfu/100 mL

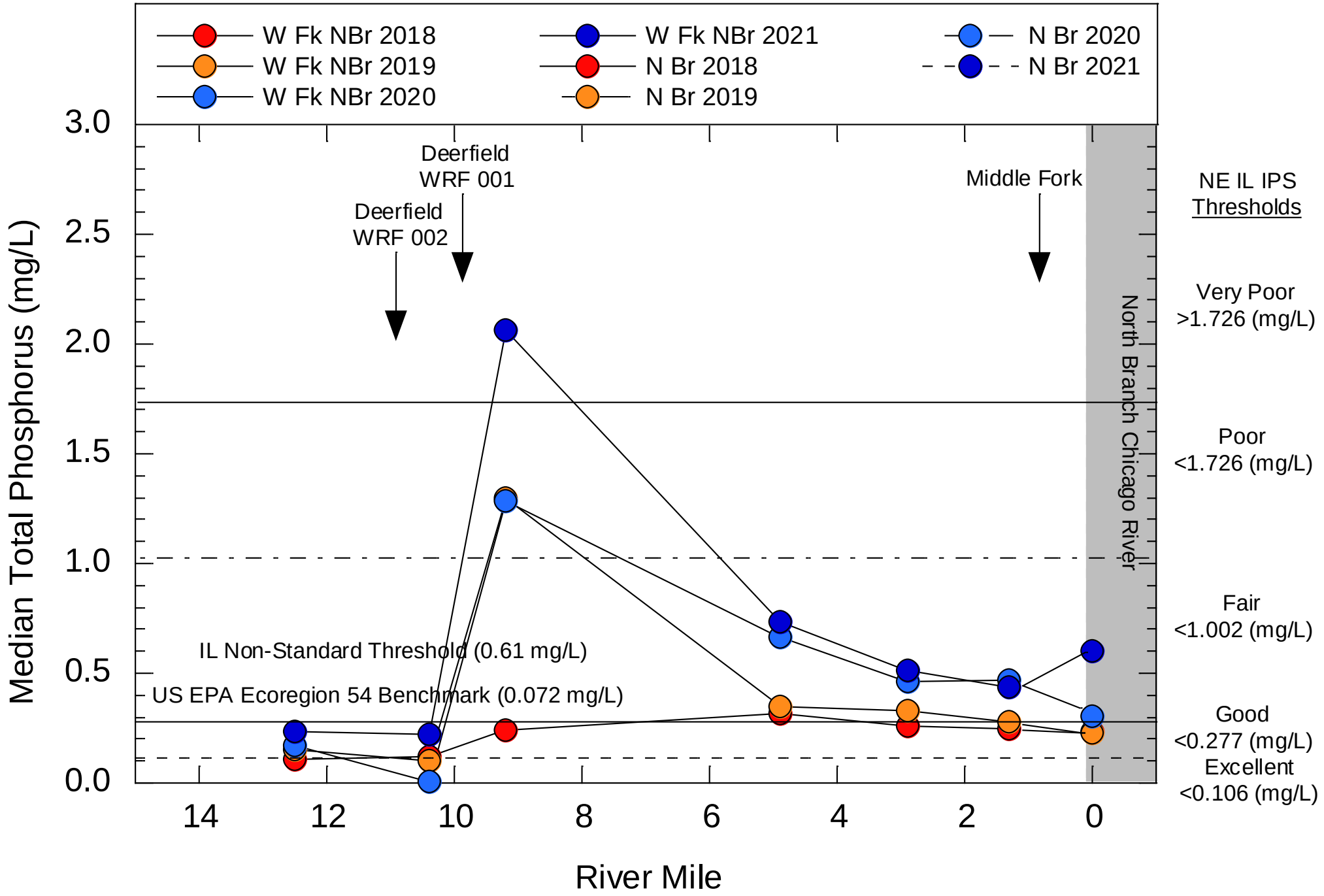
Site ID	River Mile	Drainage Area (sq. mi.)	Samples	Minimum	Geometric Mean	Maximum STV
Skokie River - 2020						
SR1	21.1	2.70	6	9	193	1550
SR2	17.4	7.80	6	59	203	512
SR3	14.8	11.50	6	65	158	361
SR4	11.3	15.00	6	228	591	2420
SR5	8.0	20.60	6	125	297	548
SR6	7.4	21.50	6	150	386	980
SR7	3.0	23.70	6	3	34	210
SR18	0.5	30.90	6	26	301	816
Skokie River - 2021						
SR1	21.1	2.70	4	16	102	649
SR2	17.4	7.80	4	66	265	2420
SR3	14.8	11.50	4	62	133	488
SR4	11.3	15.00	4	91	154	265
SR5	8.0	20.60	4	52	120	613
SR6	7.4	21.50	4	41	153	613
SR7	3.0	23.70	4	13	84	365
SR18	0.5	30.90	4	116	447	1990
Middle Fork North Branch Chicago River - 2020						
MF8	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]
MF9	18.9	8.91	4	33	95	1130
MF10	[illegible]	11.90	4	[illegible]	124	4350
[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]
MF12	10.8	19.23	4	56	265	5480
MF13	8.6	[illegible]	4	49	221	2610
[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	5170
MF15	4.0	24.29	4	308	881	13000
MF16	3.0	56.10	6	62	349	2420
MF17	1.8	57.30	6	88	285	2420

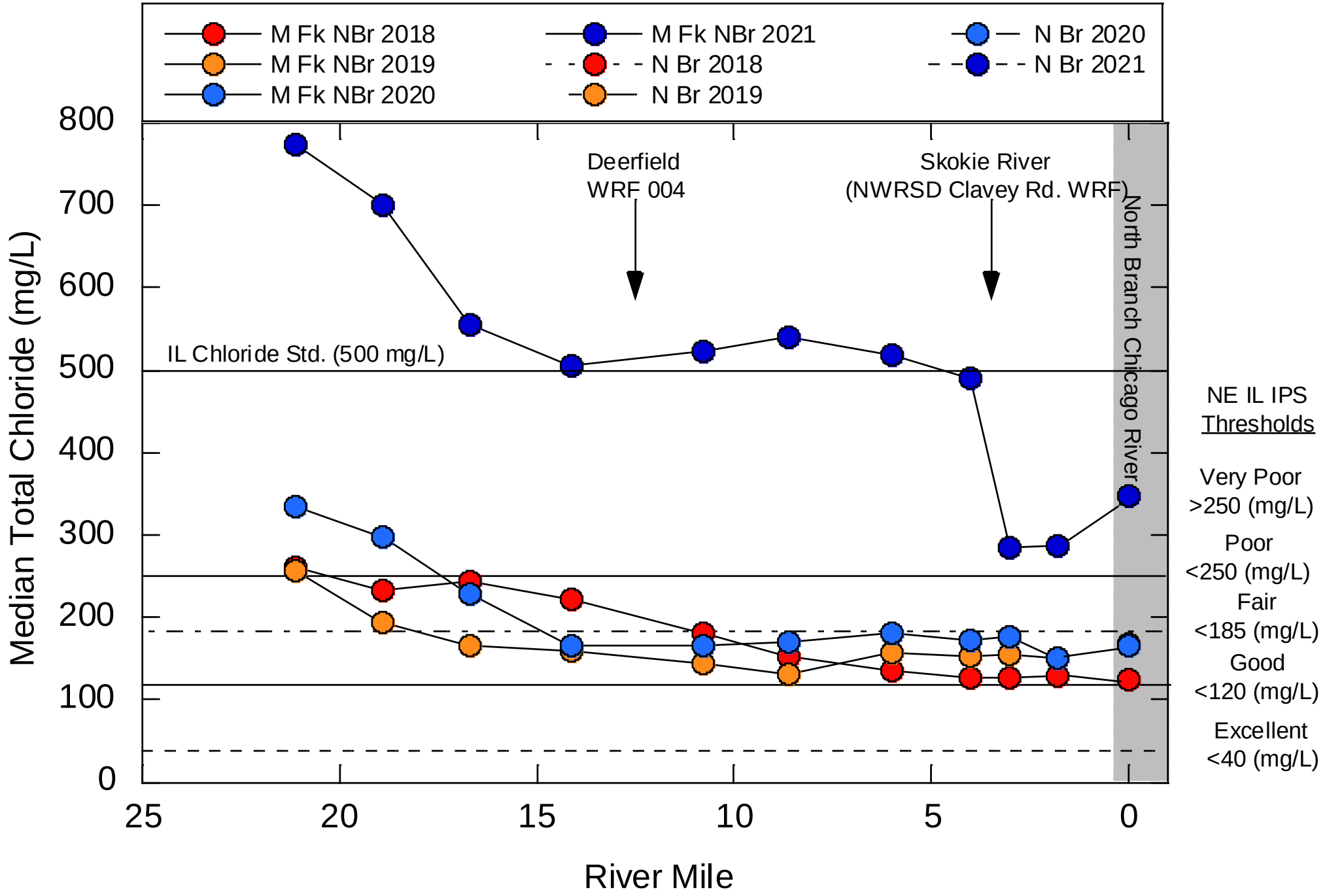
While intended to assess the risk of human body contact it is also useful as an indicator of organic enrichment quite possibly from sewage.


N Br Chicago R at Niles, IL
Mean Daily Discharge
2000
1500
1000
500
2018
2019
2020
2021
50th percentile = 92
75th percentile = 203
Q7 10 = 16.5
May/1
Jun/1
Jul/1
Aug/1
Sep/1
Oct/1


M Fk NBr 2018
M Fk NBr 2019
M Fk NBr 2020
M Fk NBr 2021
N Br 2018
N Br 2019
N Br 2020
N Br 2021
Deerfield
WRF 004
Skokie River
(NWRSD Clavey Rd. WRF)
IL Non-Standard Threshold (7.8 mg/L)
North Branch Chicago River
Median Nitrate-N (mg/L)
River Mile
16
14
12
10
8
6
4
2
0
25
20
15
10
5
0
NE IL IPS
Thresholds
Very Poor
>9.643 (mg/L)
Poor
<9.643 (mg/L)
Fair
<7.344 (mg/L)
Good
>5.045 (mg/L)
Excellent
<3.767 (mg/L)


M Fk NBr 2018
M Fk NBr 2019
M Fk NBr 2020
M Fk NBr 2021
N Br 2018
N Br 2019
N Br 2020
N Br 2021
Median Total Phosphorus (mg/L)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
25
20
15
10
5
0
River Mile
Deerfield
WRF 004
Skokie River
(NWRSD Clavey Rd. WRF)
North Branch Chicago River
IL Non-Standard Threshold (0.61 mg/L)
US EPA Ecoregion 54 Benchmark (0.072 mg/L)
NE IL IPS
Thresholds
Very Poor
>1.726 (mg/L)
Poor
<1.726 (mg/L)
Fair
<1.002 (mg/L)
Good
<0.277 (mg/L)
Excellent
<0.106 (mg/L)


W Fk NBr 2018
W Fk NBr 2019
W Fk NBr 2020
W Fk NBr 2021
N Br 2018
N Br 2019
N Br 2020
N Br 2021
Median Total Phosphorus (mg/L)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Deerfield WRF 001
Deerfield WRF 002
Middle Fork
North Branch Chicago River
IL Non-Standard Threshold (0.61 mg/L)
US EPA Ecoregion 54 Benchmark (0.072 mg/L)
14
12
10
8
6
4
2
0
River Mile
NE IL IPS Thresholds
Very Poor >1.726 (mg/L)
Poor <1.726 (mg/L)
Fair <1.002 (mg/L)
Good <0.277 (mg/L)
Excellent <0.106 (mg/L)


M Fk NBr 2018
M Fk NBr 2019
M Fk NBr 2020
M Fk NBr 2021
N Br 2018
N Br 2019
N Br 2020
N Br 2021
Median Total Chloride (mg/L)
800
700
600
500
400
300
200
100
0
25
20
15
10
5
0
River Mile
Deerfield
WRF 004
Skokie River
(NWRSD Clavey Rd. WRF)
North Branch Chicago River
IL Chloride Std. (500 mg/L)
NE IL IPS
Thresholds
Very Poor
>250 (mg/L)
Poor
<250 (mg/L)
Fair
<185 (mg/L)
Good
<120 (mg/L)
Excellent
<40 (mg/L)

Illinois EPA Fish Index of Biotic Integrity

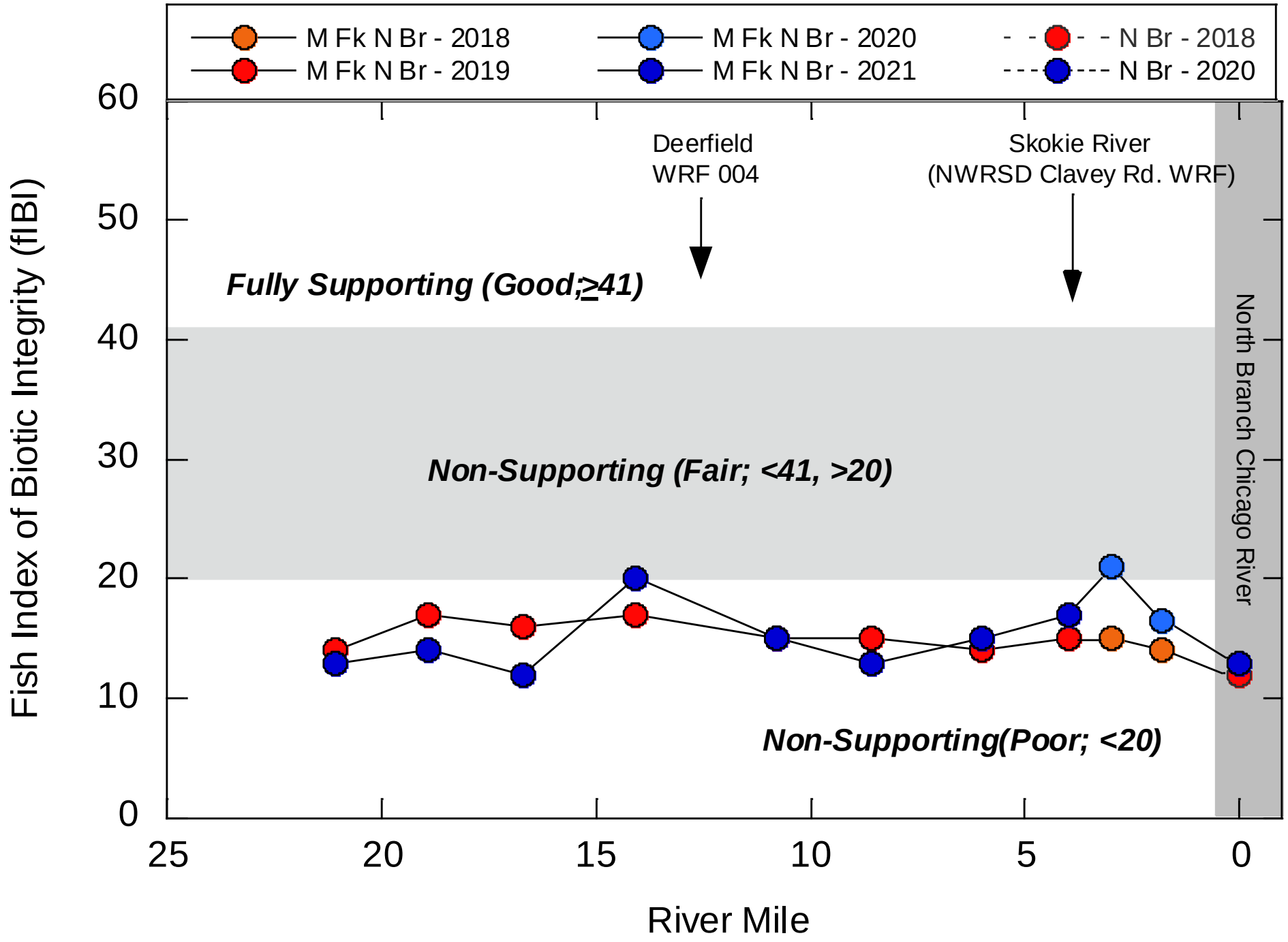
Table 3. Ten metrics selected for inclusion in revised Illinois IBIs. Metrics in **bold type** are new to Illinois IBIs; four others are slight variants of previous metrics.

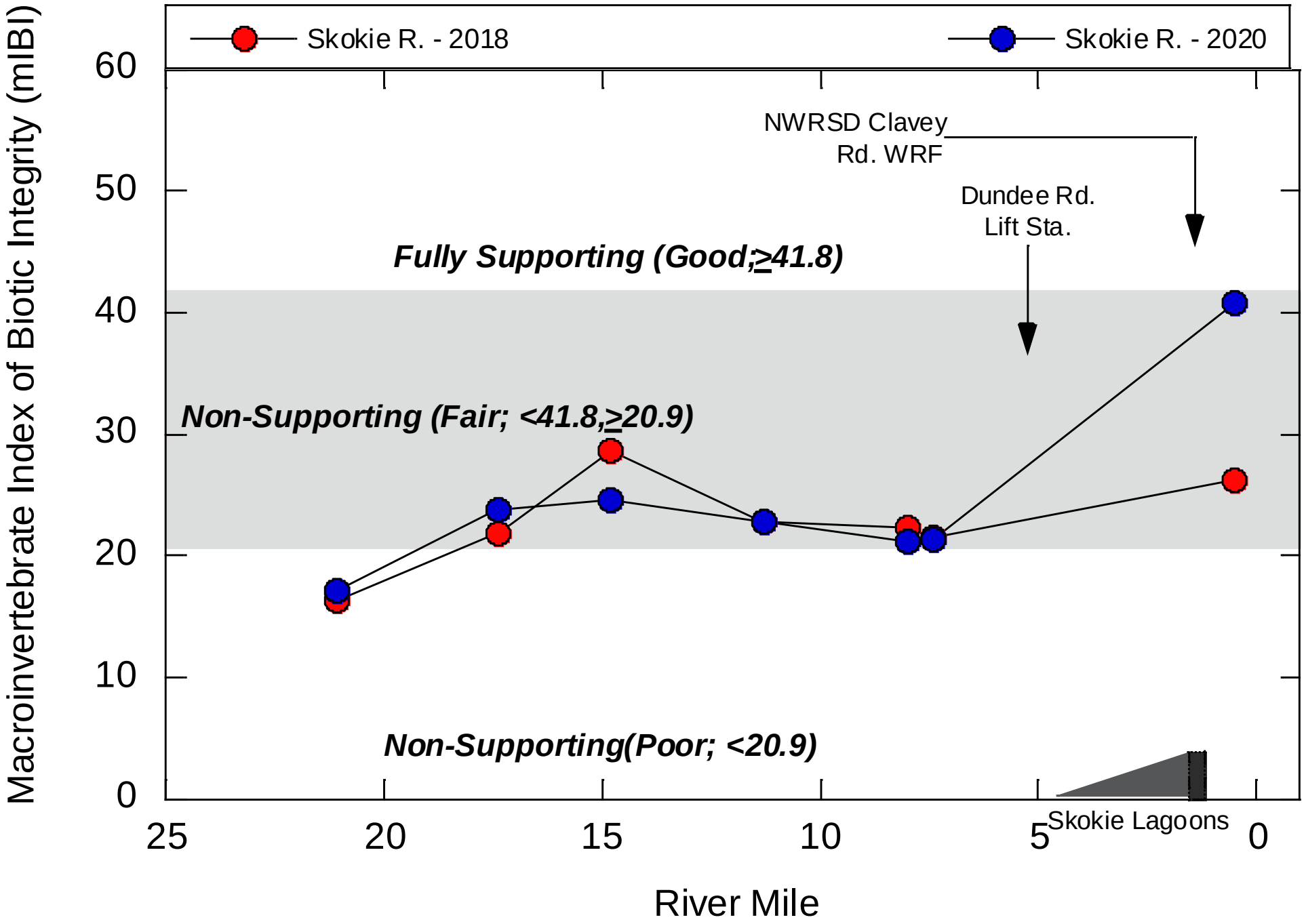
Metric Name	Description
Species-richness metrics	
NFSH	Number of native fish species
NSUC	Number of native sucker species (i.e., in family Catostomidae)
NSUN	Number of native sunfish species (i.e., in family Centrarchidae)
INTOL	Number of native intolerant species
NMIN	**Number of native minnow species (i.e., in family Cyprinidae)**
NBINV	**Number of native benthic invertivore species**
Trophic- or reproductive-structure metrics	
SBI	**Proportion of individuals of species that are specialist benthic invertivores**
GEN	**Proportion of individuals of species that are generalist feeders**
LIT0T	**Proportion of individuals of species that are obligate coarse-mineral-substrate spawners and not "tolerant" (i.e., excludes creek chub and white sucker)**
Tolerance metric	
PRTOL	**Proportion of tolerant species**

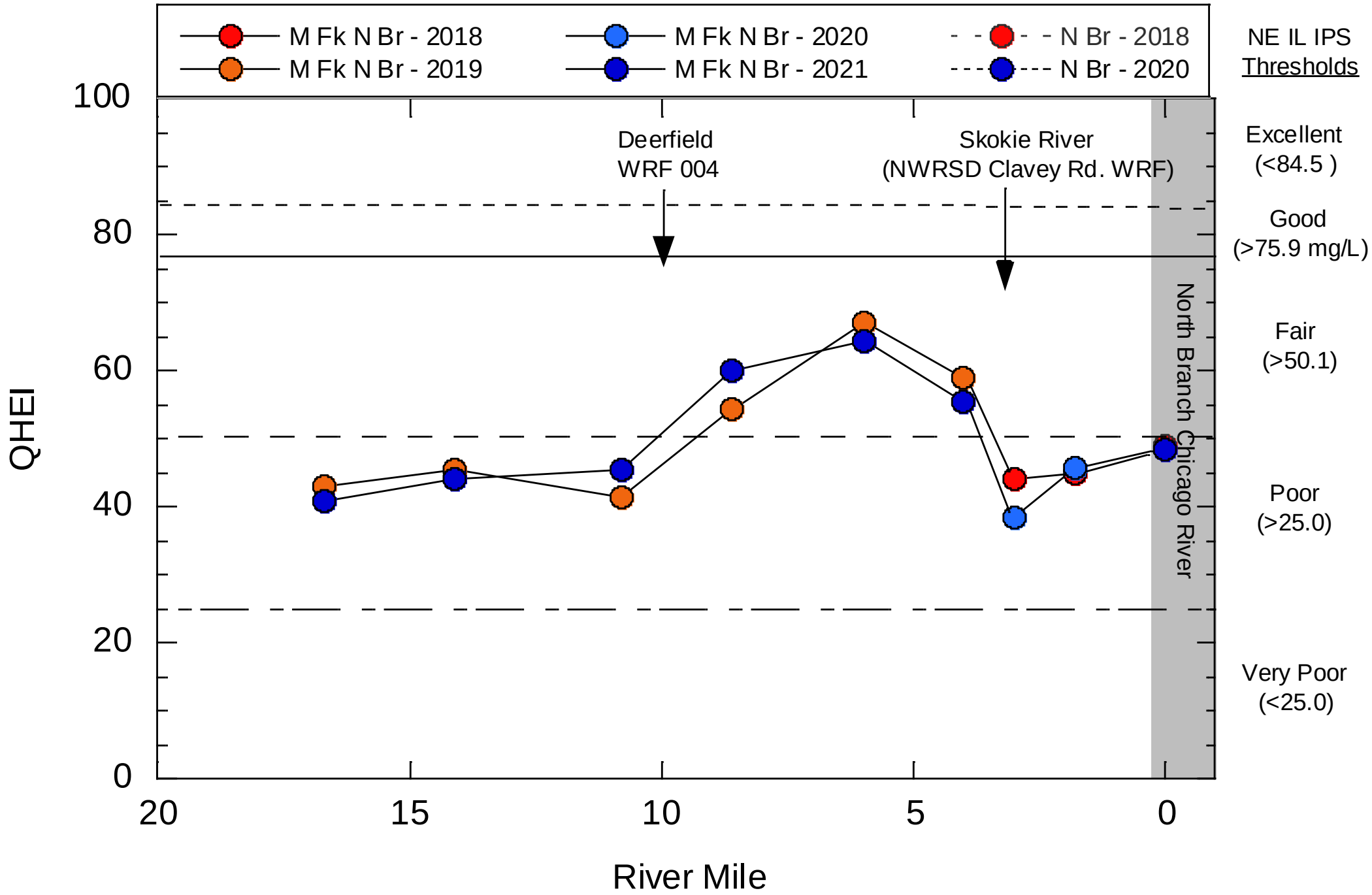
The end goal is biological assemblages that meet the State's aquatic life use "biocriteria"

Aquatic Life Use Status: 2020-21

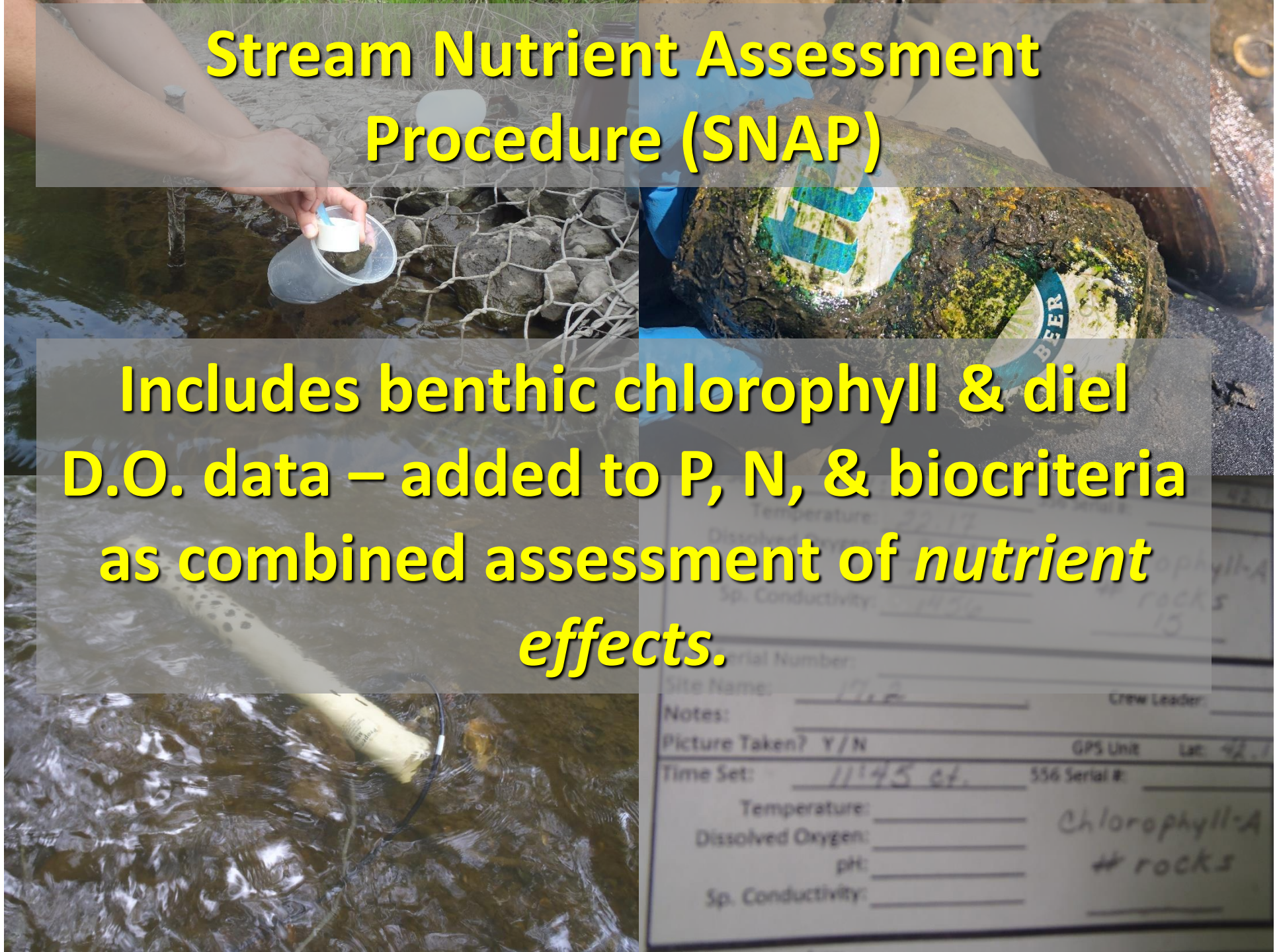
Site ID	Fish RM/ Macro RM	Drain-age Area (sq. mi.)	fIBI	mIBI	QHEI	Aq. Life Status	Very Poor	Poor	Fair	IPS Restora-bility Ranking	IEPA Causes
Skokie River - 2020											
SR1	21.10/21.10	2.78	5.0	17.2	37.0	Non - Poor	Dev-WS; Substr; Chloride;	Low DO; QHEI; Chan; Conduct;	TKN; PAHs;	7.9	Chloride, DO, TP, TSS
SR2	17.40/17.40	7.87	16.5	23.8	38.0	Non - Poor	Dev-WS; Chloride;	QHEI; Substr; Chan;	Low DO; Max DO; Conduct; Turbidity; Sed. Metals;	24.0	
SR3	14.80/14.80	11.56	23.0	24.6	48.0	Non - Fair		Dev-WS; QHEI; Substr; Chloride;	Low DO; Max DO; Chan; Conduct; Turbidity; PAHs; Sed. Metals;	27.2	
SR4	11.30/11.30	15.07	17.5	22.8	52.5	Non - Poor	Dev-WS;	Chloride;	Max DO; QHEI; Substr; Chan; Conduct; PAHs;	35.1	
SR5	8.00/8.00	20.67	23.5	21.2	46.8	Non - Fair	Dev-WS; Substr;	QHEI; Chan;	Low DO; TKN; Max DO; Conduct; Chloride; Turbidity; PAHs; Sed. Metals;	20.1	
SR6	7.40/7.40	21.51	18.0	21.3	39.5	Non - Poor	Dev-WS; Substr;	Low DO; QHEI; Chan;	Imperv-30C; Max DO; Conduct; Chloride; PAHs;	20.4	
SR7	3.00/0.00	23.73	15.0	NA	38.0	Non - Poor	Dev-WS; Substr;	QHEI; Chan;	Low DO; TKN; BOD; Max DO; Chloride; Turbidity; Sed. Metals;	29.2	TSS, Mercury
SR18	0.50/0.50	30.90	34.5	40.8	62.6	Non - Fair	Dev-WS;	Substr;	TP; TKN; Nitrate; Max DO; QHEI; Chan; Chloride; PAHs;	51.4	Algae, Chlordane, CoverLoss, FlowMod, HabAlt, N, Sed/Silt, TP
Middle Fork North Branch Chicago River - 2021											
MF8	21.10/21.10	5.81	13.0	17.5	29.0	Non - Poor	Substr; Conduct; Chloride;	Dev-WS; Low DO; QHEI; Chan;	TKN; PAHs;	19.2	Chloride, DDT, DO, HabAlt, Cause Unknown, Hexachlorobenzene, Sed./Silt, TSS
MF9	18.90/18.90	8.91	14.0	24.0	31.5	Non - Poor	Substr; Conduct; Chloride;	Low DO; QHEI; Chan;	Dev-WS;	12.5	
MF10	16.70/16.70	11.99	12.0	41.1	41.0	Non - Poor	Conduct; Chloride;	Dev-WS; Low DO; QHEI; Substr; Chan;	TKN; Max DO;	19.3	
MF11	14.10/14.10	16.13	20.0	21.5	44.0	Non - Fair	Conduct; Chloride;	Dev-WS; Low DO; QHEI; Substr; Chan;	TKN;	21.8	
MF12	10.80/10.80	19.23	15.0	34.0	45.5	Non - Poor	Chloride;	Dev-WS; Low DO; QHEI; Substr; Chan; Conduct;		23.6	
MF13	8.60/8.60	20.97	13.0	15.7	60.0	Non - Poor	Conduct; Chloride;	Dev-WS; Low DO; Substr;	Max DO; QHEI; Chan;	25.5	
MF14	6.00/6.00	22.48	15.0	39.5	64.5	Non - Poor	Conduct; Chloride;	Dev-WS;	Low DO; TKN; Max DO; QHEI; Substr; Turbidity; Sed. Metals;	38.7	
MF15	4.00/4.00	24.29	17.0	21.4	55.5	Non - Poor	Conduct; Chloride;	Dev-WS; Substr;	Max DO; QHEI; Chan;	34.6	
MF16	3.00/3.00	56.15	21.0	24.7	38.5	Non - Fair	Substr;	Dev-WS; TKN; QHEI;	TP; Low DO; Nitrate; Max DO; Chan; Chloride; Turbidity; PAHs; Sed. Metals;	20.0	Cr, DDT, Endrin, Hexachlorobenzene, Merury, Phosphorus, TSS
MF17	1.80/1.80	57.31	16.5	25.2	45.8	Non - Poor		Dev-WS; QHEI; Substr; Chan;	TP; Low DO; Nitrate; Max DO; Chloride; Turbidity; PAHs; Sed. Metals;	21.9	
West Fork North Branch Chicago River - 2021											
WF20	12.50/12.50	3.90	7.0	10.6	30.5	Non - Poor	Substr; Chloride;	Dev-WS; Low DO; QHEI; Chan; Conduct; TSS;	TP; TKN; BOD;	1.9	Aldrin, Cause Unknown, DDT, Endrin, Hexachlorobenzene, Phosphorus, TSS
WF21	10.40/10.40	7.02	11.0	18.7	42.0	Non - Poor	Chloride;	Dev-WS; Low DO; BOD; QHEI; Chan; Conduct;	TKN; Substr; PAHs;	14.6	
WF22	9.20/9.20	9.41	9.0	15.8	46.5	Non - Poor	Dev-WS;TP; Chloride;	TKN; BOD; QHEI; Substr; Chan; Conduct;	Imperv-30C; Low DO; Nitrate; Turbidity; PAHs; Sed. Metals;	1.4	
WF23	4.90/4.90	17.86	9.0	13.8	41.0	Non - Poor	Dev-WS; Substr; Chloride;	Imperv-30C; BOD; QHEI; Chan; Conduct; TSS;	TP; TKN; Max DO; VSS; PAHs;	7.8	
WF24	2.90/2.90	24.52	10.0	21.0	66.0	Non - Poor	Dev-WS; Chloride;	Low DO; Conduct;	Imperv-30C;TP; TKN; BOD; QHEI; Substr; Chan; PAHs;	18.6	
WF25	1.30/1.30	27.97	12.0	21.9	48.0	Non - Poor	Dev-WS; Chloride;	Low DO; BOD; QHEI; Substr; Conduct;	TP; TKN; Chan; PAHs;	16.6	
North Branch Chicago River - 2020											
MF19	18.60/18.60	93.41	13.0	21.4	48.5	Non - Poor	Dev-WS;	Imperv-30C; QHEI; Substr;	TP;Low DO;TKN;Nitrate;Max DO;Chan;Conduct;Chloride;VSS;Turbid.;PAH; Sed. Metals;	28.3	Aldrin, Cause Unknown, DDT, FlowMod., Hexachlorobenzene, Phosphorus, N, TSS
	Narrative Thresholds	Excellent	≥50	>73	≥84.5	FULL				Very High	**2022 Integrated Report**
		Good	>41-49	41.8-72.9	75.9-84.0	FULL				High	
		Fair	30-<41	30-41.7	50.1-75.0	PARTIAL				Moderate	
		Poor	>15-29	>15-29	25-50	NON-Fair				Low	
		Very Poor	≤15	≤15	<25	NON-Poor				Very Low	
	Source(s)	**IPS**	**IEPA/IPS**	**IEPA/IPS**	**IPS**	**IPS**				**IPS**	


M Fk N Br - 2018
M Fk N Br - 2019
M Fk N Br - 2020
M Fk N Br - 2021
N Br - 2018
N Br - 2020
Deerfield
WRF 004
Skokie River
(NWRSD Clavey Rd. WRF)
Fully Supporting (Good; ≥41)
Non-Supporting (Fair; <41, >20)
Non-Supporting(Poor; <20)
North Branch Chicago River
Fish Index of Biotic Integrity (fIBI)
River Mile
60
50
40
30
20
10
0
25
20
15
10
5
0

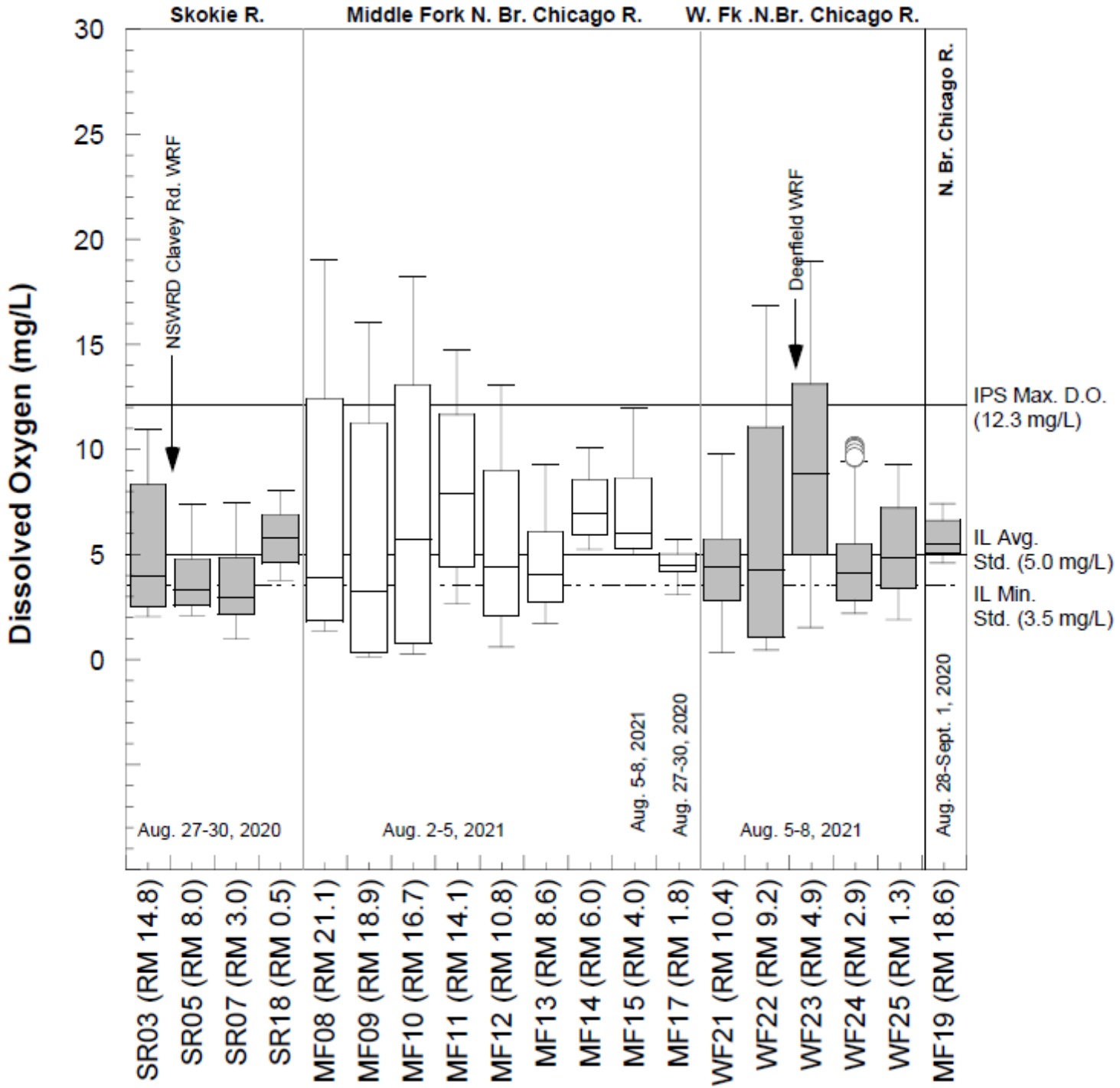

Skokie R. - 2018
Skokie R. - 2020
Macroinvertebrate Index of Biotic Integrity (mIBI)
60
50
40
30
20
10
0
NWRSD Clavey Rd. WRF
Dundee Rd. Lift Sta.
Fully Supporting (Good;≥41.8)
Non-Supporting (Fair; <41.8,≥20.9)
Non-Supporting(Poor; <20.9)
Skokie Lagoons
25
20
15
10
5
0
River Mile


M Fk N Br - 2018
M Fk N Br - 2019
M Fk N Br - 2020
M Fk N Br - 2021
N Br - 2018
N Br - 2020
NE IL IPS Thresholds
Deerfield WRF 004
Skokie River (NWRSD Clavey Rd. WRF)
North Branch Chicago River
Excellent (<84.5)
Good (>75.9 mg/L)
Fair (>50.1)
Poor (>25.0)
Very Poor (<25.0)
QHEI
River Mile
100
80
60
40
20
0
20
15
10
5
0

Stream Nutrient Assessment Procedure (SNAP)



Includes benthic chlorophyll & diel D.O. data – added to P, N, & biocriteria as combined assessment of *nutrient effects.*



Continuous D.O. Exceedances Results

- 65 total exceedances of 3.5 mg/L minimum and 4.0 mg/L 7-day average standard in 2020-21
- Up from 47 in 2018-19.
- Seven sites exceeded IPS maximum D.O.
- 15 of 19 sites had poor or very poor diel swings.
- Likely causes are excess D.O. demand from NOS inputs coupled with low flows and increased retention time.

Modified Stream Nutrient Assessment Procedure (SNAP)

Site ID	River Mile	Drainage Area (mi.^{2})	fIBI	fIBI Score	mIBI	mIBI Score	QHEI	QHEI Score	AQLU Attainment Status	Mean TP (mg/L)	Total P Score	Mean Nitrate-N (mg/L)	NO_3-N Score	Continuous Max. D.O. (mg/L)	Max. D.O. Score	Continuous Min D.O. (mg/L)	Min. D.O. Score	Max. Diel D.O. Swing (mg/L)	Diel Swing Score	Benthic Chloro-phyll a (mg/m^3)	BChl a Score	Seston-ic Chloro-phyll a (µg/L)	Seston-ic Chl a Score	Mean TSS (mg/L)	TSS Score	Mean TKN (mg/L)	TKN Score	Total SNAP Score	Overall Enrichment Status
Skokie River 2020																													
SR3	14.80	11.5	23.0	7.0	24.60	7.0	**48.0**	5.0	NON - Fair	0.006	0.0	0.20	0.0	10.95	1.0	2.05	1.5	8.9	10.0	41.0	1.0	1.22	0.0	12.0	0.0	0.66	0.0	67.5	Enriched
SR5	8.00	20.6	23.5	7.0	21.20	7.0	**46.8**	5.0	NON - Fair	0.006	0.0	0.41	0.0	7.42	0.0	2.10	1.5	5.3	7.0	65.8	1.0	3.00	1.0	13.3	0.0	1.15	1.0	69.5	Enriched
SR7	3.00	23.7	15.0	10.0			**38.0**	5.0	NON - Poor	0.006	0.0	0.91	0.0	7.45	0.0	0.97	2.0	6.5	10.0	45.2	1.0	32.40	10.0	15.8	0.0	1.13	1.0	61.0	Enriched
SR18	0.50	30.9	34.5	3.0	40.80	3.0	**41.5**	5.0	NON - Fair	0.006	0.0	8.53	1.5	8.03	0.0	3.78	1.5	3.8	1.0	94.3	3.0	15.88	7.0	17.5	0.5	1.45	1.0	73.5	Likely Nutrients
Middle Fork North Branch Chicago River 2020																													
MF17	1.80	57.3	16.5	7.0	25.20	7.0	**45.8**	5.0	NON - Poor	0.006	0.0	8.13	1.5	5.69	0.0	3.09	1.5	2.5	1.0	56.4	1.0	3.66	1.0	13.8	0.0	1.12	1.0	74.0	Likely Nutrients
Middle Fork North Branch Chicago River 2021																													
MF8	21.10	5.81	13.0	10.0	17.50	7.0	**29.0**	5.0	NON - Poor	0.107	1.0	0.10	0.0	19.03	6.0	1.35	2.0	17.7	10.0	28.0	0.0	7.94	3.0	17.8	0.5	1.69	1.5	54.0	Highly Enriched
MF9	18.90	8.91	14.0	10.0	24.00	7.0	**31.5**	5.0	NON - Poor	0.120	1.0	0.10	0.0	16.06	5.0	0.14	2.0	15.8	10.0	28.1	0.0	8.48	3.0	23.8	0.5	1.09	0.5	56.0	Highly Enriched
MF10	16.70	11.9	12.0	10.0	41.10	3.0	**41.0**	5.0	NON - Poor	0.079	0.0	0.10	0.0	18.23	6.0	0.28	2.0	17.9	10.0	21.0	0.0	7.72	3.0	5.8	0.0	1.38	1.0	60.0	Enriched
MF11	14.10	16.11	20.0	7.0	21.50	7.0	**44.0**	5.0	NON - Fair	0.093	0.0	0.10	0.0	14.71	5.0	2.65	1.5	12.0	10.0	21.5	0.0	5.32	3.0	16.3	0.0	1.45	1.0	60.5	Enriched
MF12	10.80	19.23	15.0	10.0	34.00	3.0	**45.5**	5.0	NON - Poor	0.074	0.0	0.24	0.0	13.07	2.0	0.61	2.0	12.5	10.0	59.9	1.0	2.16	0.0	5.5	0.0	0.96	0.0	67.0	Enriched
MF13	8.60	20.96	13.0	10.0	15.70	7.0	**60.0**	2.0	NON - Poor	0.136	1.0	0.76	0.0	9.28	0.0	1.72	2.0	7.5	10.0	29.8	0.0	1.24	0.0	7.8	0.0	1.04	0.5	67.5	Enriched
MF14	6.00	22.48	15.0	10.0	39.50	3.0	**64.5**	2.0	NON - Poor	0.095	0.0	0.78	0.0	10.09	0.0	5.25	1.0	4.8	3.0	62.2	1.0	0.52	0.0	5.0	0.0	1.39	1.0	79.0	Likely Nutrients
MF15	4.00	24.29	17.0	7.0	21.40	7.0	**55.5**	2.0	NON - Poor	0.074	0.0	0.87	0.0	11.99	1.0	4.98	1.0	7.0	10.0	49.0	1.0	1.16	0.0	6.5	0.0	0.92	0.0	71.0	Likely Nutrients
West Fork North Branch Chicago River 2021																													
WF21	10.40	7.02	11.0	10.0	18.70	7.0	**42.0**	5.0	NON - Poor	0.224	1.0	0.35	0.0	9.78	0.0	0.33	2.0	5.5	7.0	104.0	3.0	1.20	0.0	11.5	0.0	1.80	1.5	63.5	Enriched
WF22	9.20	9.41	9.0	10.0	15.80	7.0	**46.5**	5.0	NON - Poor	1.953	6.0	6.26	1.0	16.81	6.0	0.46	2.0	15.2	10.0	37.3	1.0	2.76	1.0	25.0	0.5	2.02	1.5	49.0	Highly Enriched
WF23	4.90	17.86	9.0	10.0	13.80	10.0	**41.0**	5.0	NON - Poor	0.712	2.0	3.20	0.0	18.95	6.0	1.52	2.0	9.4	10.0	45.4	1.0	28.48	7.0	50.5	2.0	1.65	1.5	43.5	Highly Enriched
WF24	2.90	24.52	10.0	10.0	21.00	7.0	**66.0**	2.0	NON - Poor	0.472	2.0	2.23	0.0	10.18	0.0	2.21	1.5	7.8	10.0	37.4	1.0	6.44	3.0	19.5	0.5	1.66	1.5	61.5	Enriched
WF25	1.30	27.97	12.0	10.0	21.90	7.0	**48.0**	5.0	NON - Poor	0.408	2.0	2.33	0.0	9.22	0.0	1.89	2.0	5.5	7.0	46.3	1.0	9.24	3.0	15.5	0.0	1.15	1.0	62.0	Enriched
North Branch Chicago River 2020																													
MF19	18.60	93.4	13.0	10.0	21.40	7.0	**48.5**	5.0	NON - Poor	0.006	0.0	5.62	1.0	7.42	0.0	4.61	1.0	2.6	1.0	40.5	1.0	1.92	1.0	16.3	0.0	1.62	1.0	72.0	Likely Nutrients
Condition Category Thresholds	**Excellent**	≥50	0	>73	0	>84.5	0	FULL	≤0.106	0	≤3.77	0	<10.36	0	>6.9	0	<2.0	0	<35	0	<2.5	0	≤17.50	0	<1.07	0	≥94	Not Nutrients
	Good	>41-49	1	≥41.8	1	>75.9	1	FULL	<0.277	1	<5.05	0.5	<12.2	1	>6.0	0.5	<4.0	1	<79	1	<5.1	1	>17.50	0.5	<1.12	0.5	≥82	Not Nutrients
	Fair	30- <41	3	≤41.7	3	<75.9	2	NON-Partial	<1.020	2	<7.34	1	<14.2	2	>4.0	1	<5.0	3	<150	3	<13.8	3	>31.60	1	<1.63	1	≥70	Likely Nutrients
	Poor	>15-29	7	≤29	7	<50.1	5	NON-Fair	<1.726	5	<9.64	1.5	<16.3	5	>2.0	1.5	<6.5	7	<320	7	<28.9	7	>35.15	1.5	<2.14	1.5	≥60	Enriched
	Very Poor	<15	10	<15	10	<25	6	NON-Poor	≥1.726	6	≥9.64	2	≥16.3	6	<2.0	2	≥6.5	10	≥320	10	>28.9	10	>38.69	2	≥2.14	2	<60	Highly Enriched
Source		IPS	IEPA	MBI	IEPA	MBI	IPS	MBI	IPS	IPS	MBI	IPS	MBI	IPS	MBI	IPS	MBI	MBI/SNAP	MBI/SNAP/NSAC			MBI/NSAC	MBI	IPS	MBI	IPS	MBI	MBI/SNAP	

Highly Enriched – 4 sites; Enriched -10 sites; Likely Nutrients – 5 sites

Modified Stream Nutrient Assessment Procedure (SNAP)

Site ID	River Mile	Drainage Area ($mi.^2$)	fIBI	fIBI Score	mIBI	mIBI Score	QHEI	QHEI Score	AQLU Attainment Status	Mean TP (mg/L)	Total P Score	Mean Nitrate-N (mg/L)	NO_3-N Score	Continuous Max. D.O. (mg/L)	Max. D.O. Score	Continuous Min D.O. (mg/L)	Min. D.O. Score	Max. Diel D.O. Swing (mg/L)	Diel Swing Score	Benthic Chloro-phyll a (mg/m^3)	BChl a Score	Seston-ic Chloro-phyll a (µg/L)	Seston-ic Chl a Score	Mean TSS (mg/L)	TSS Score	Mean TKN (mg/L)	TKN Score	Total SNAP Score	Overall Enrichment Status
Skokie River 2020																													
SR3	14.80	11.5	23.0	7.0	24.60	7.0	**48.0**	5.0	NON - Fair	0.006	0.0	0.20	0.0	10.95	1.0	2.05	1.5	8.9	10.0	41.0	1.0	1.22	0.0	12.0	0.0	0.66	0.0	67.5	Enriched
SR5	8.00	20.6	23.5	7.0	21.20	7.0	**46.8**	5.0	NON - Fair	0.006	0.0	0.41	0.0	7.42	0.0	2.10	1.5	5.3	7.0	65.8	1.0	3.00	1.0	13.3	0.0	1.15	1.0	69.5	Enriched
SR7	3.00	23.7	15.0	10.0			**38.0**	5.0	NON - Poor	0.006	0.0	0.91	0.0	7.45	0.0	0.97	2.0	6.5	10.0	45.2	1.0	32.40	10.0	15.8	0.0	1.13	1.0	61.0	Enriched
SR18	0.50	30.9	34.5	3.0	40.80	3.0	**41.5**	5.0	NON - Fair	0.006	0.0	8.53	1.5	8.03	0.0	3.78	1.5	3.8	1.0	94.3	3.0	15.88	7.0	17.5	0.5	1.45	1.0	73.5	Likely Nutrients
Middle Fork North Branch Chicago River 2020																													
MF17	1.80	57.3	16.5	7.0	25.20	7.0	45.8	5.0	NON - Poor	0.006	0.0	8.13	1.5	5.69	0.0	3.09	1.5	2.5	1.0	56.4	1.0	3.66	1.0	13.8	0.0	1.12	1.0	74.0	Likely Nutrients
MF8	18.81																												
MF9	18.90	8.91	14.0	10.0	24.00	7.0	31.5	5.0	NON - Poor	0.120	1.0	0.10	0.0	16.06	5.0	0.14	2.0	15.8	10.0	28.1	0.0	8.48	3.0	23.8	0.5	1.09	0.5	57.5	Highly Enriched
MF10	16.70	11.9	12.0	10.0	41.10	3.0	41.0	5.0	NON - Poor	0.079	0.0	0.10	0.0	18.23	5.0	0.28	2.0	17.9	10.0	21.0	0.0	7.72	3.0	5.8	0.0	1.38	1.0	60.0	Enriched
MF11	14																												
MF12	10																												
MF13	8.60	20.96	14.0	10.0	15.70	7.0	60.0	2.0	NON - Poor	0.136	1.0	0.76	0.0	9.28	0.0	1.72	2.0	7.5	10.0	29.8	0.0	1.24	0.0	7.8	0.0	1.04	0.5	67.5	Enriched
MF14	6.00	22.48	15.0	10.0	39.50	7.0	64.5	2.0	NON - Poor	0.095	0.0	0.78	0.0	10.65	0.0	0.85	1.0	4.8	3.0	62.2	1.0	0.52	0.0	5.0	0.0	1.39	1.0	79.0	Likely Nutrients
MF15	4																												
MF16	2																												
WF21	10.40	7.02	11.0	10.0	18.70	7.0	42.0	5.0	NON - Poor	0.224	1.0	0.35	0.0	9.78	0.0	0.33	2.0	5.5	7.0	104.0	3.0	1.20	0.0	11.5	0.0	1.80	1.5	63.5	Enriched
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Condition Category Thresholds		Excellent	≥50	0	>73	0	>84.5	0	FULL	≤0.106	0	≤3.77	0	<10.36	0	>6.9	0	<2.0	0	<35	0	<2.5	0	≤17.50	0	<1.07	0	≥94	Not Nutrients
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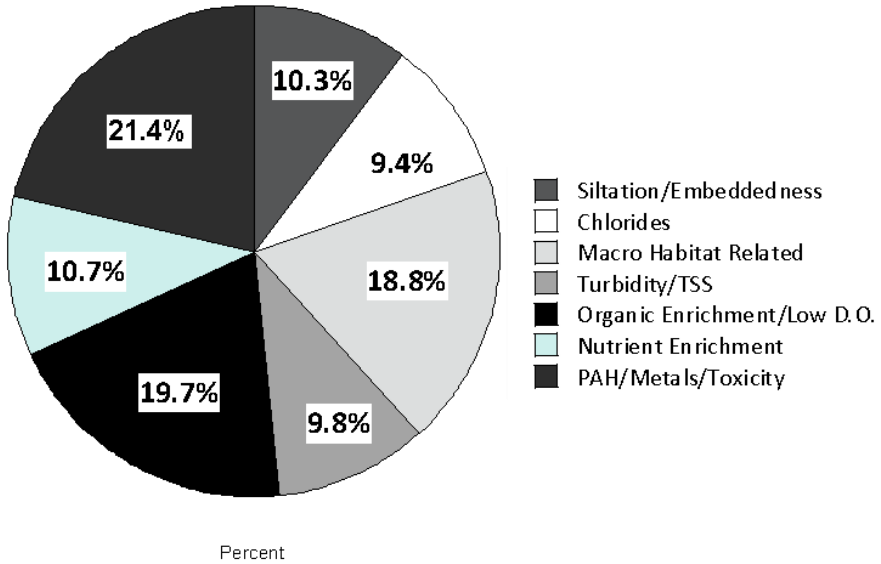
Source			IPS	IEPA	MBI	IEPA	MBI	IPS	MBI	IPS	IPS	MBI	IPS	MBI	IPS	MBI	IPS	MBI	MBI/SNAP	MBI/SNAP/NSAC			MBI/NSAC	MBI	IPS	MBI	IPS	MBI	MBI/SNAP	

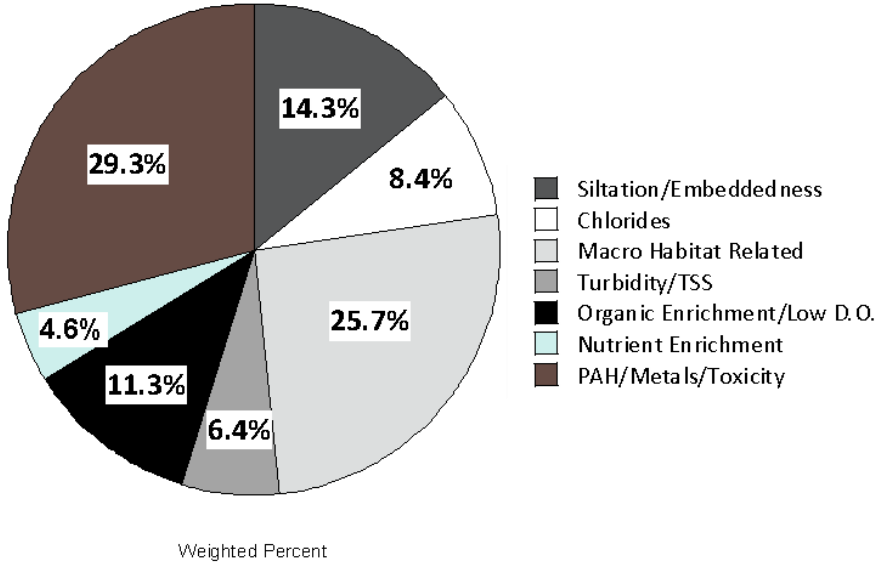
This has been updated to include a weighted scoring of the parameters based on their role as response and direct & indirect exposure indicators resulting in amore consistent assignment of overall enrichment status.

Highly Enriched – 4 sites; Enriched -10 sites; Likely Nutrients – 5 sites

Major Causes (%) Associated with Aquatic Life Impairments: NBWW 2018-2019



Major Causes (Weighted %) Associated with Aquatic Life Impairments: NBWW 2018-2019



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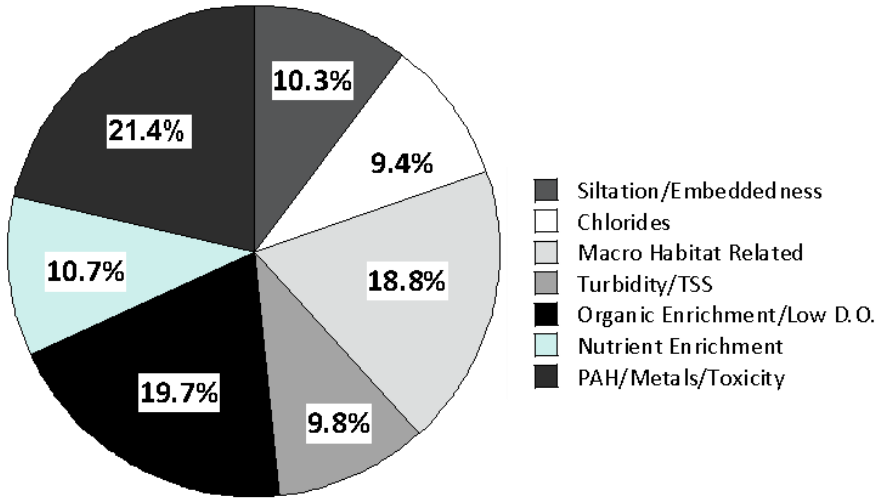
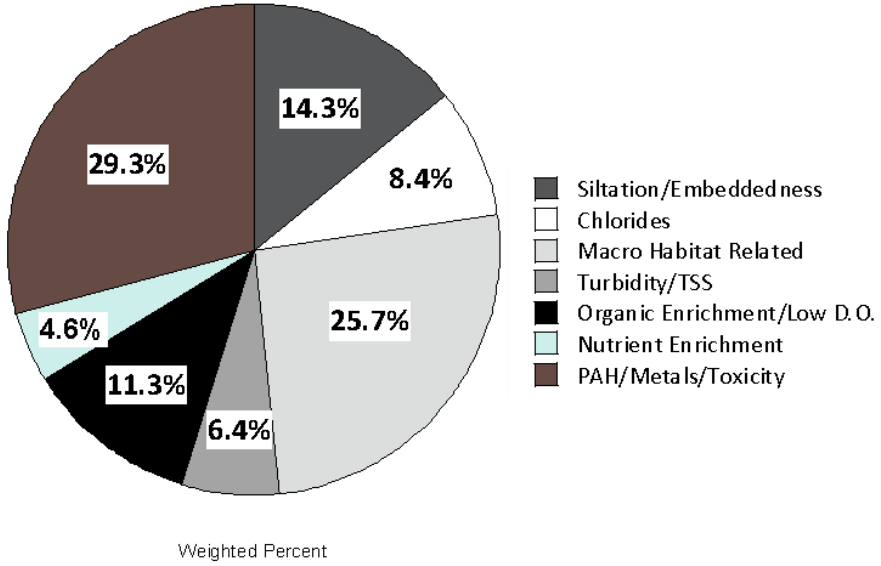
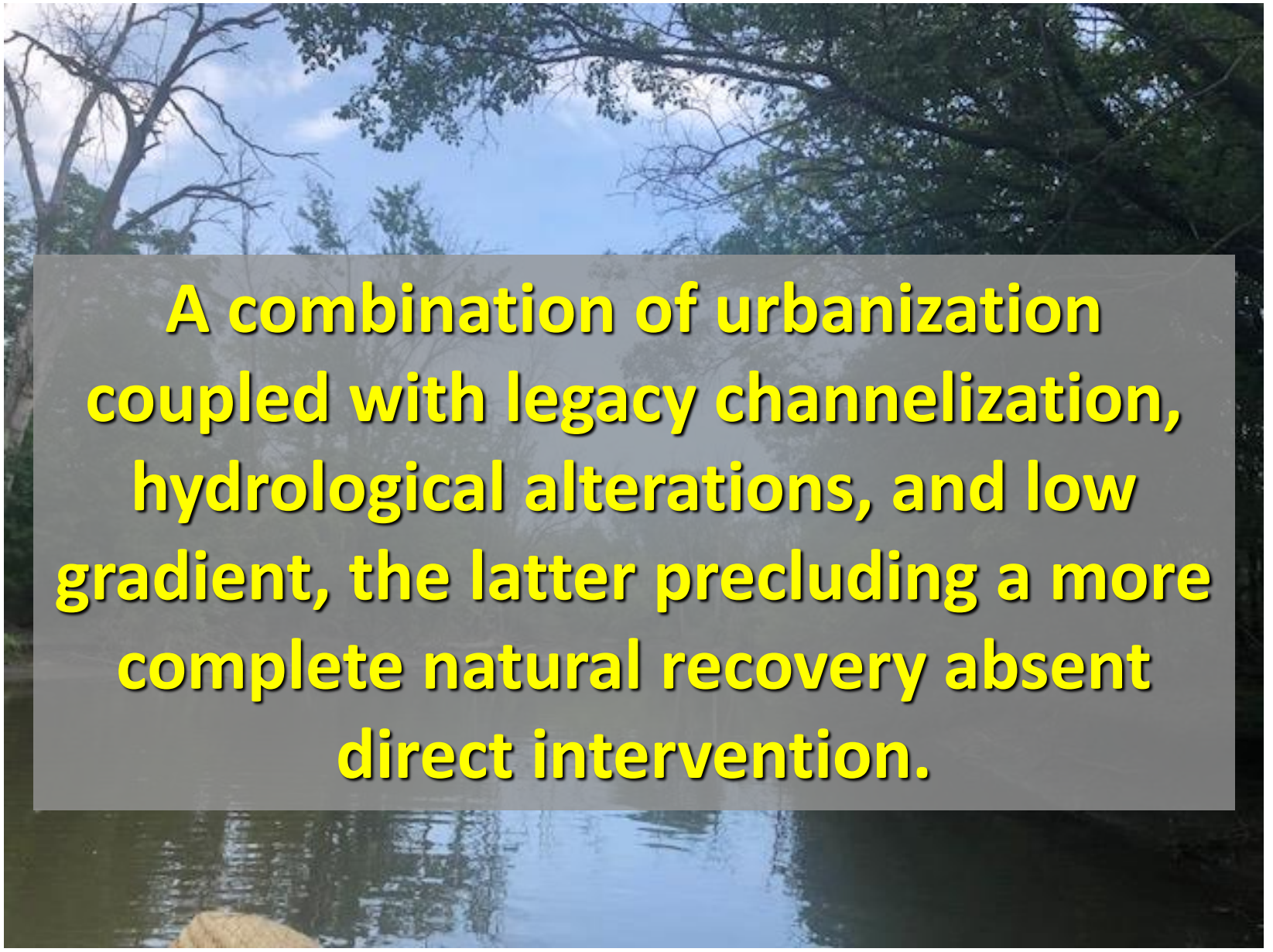


Major Causes (Weighted %) Associated with Aquatic Life Impairments: NBWW 2018-2019





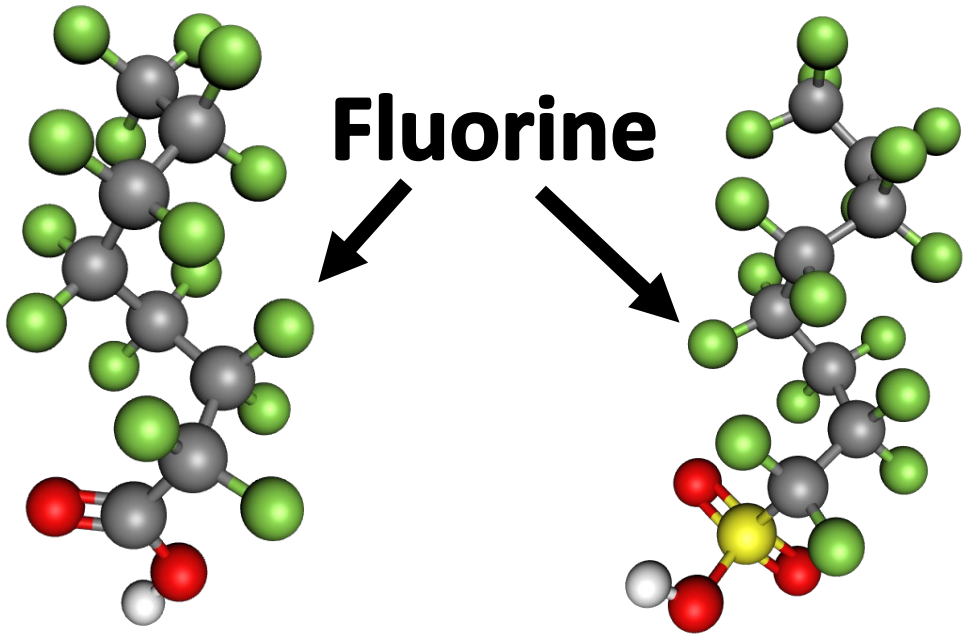
Iowa Darter (IL Threatened) – a doable interim restoration objective?

National Pollutant Discharge Elimination System

Program Considerations to Restrict PFAS Discharges

Water Division - Permits Branch - NPDES Program

Per- and Polyfluoroalkyl Substances (PFAS)



Perfluorooctanoic acid (PFOA)

Perfluorooctanesulfonic acid (PFOS)

Image taken from https://www.seacc.org/water-quailty/pfas/

Agenda

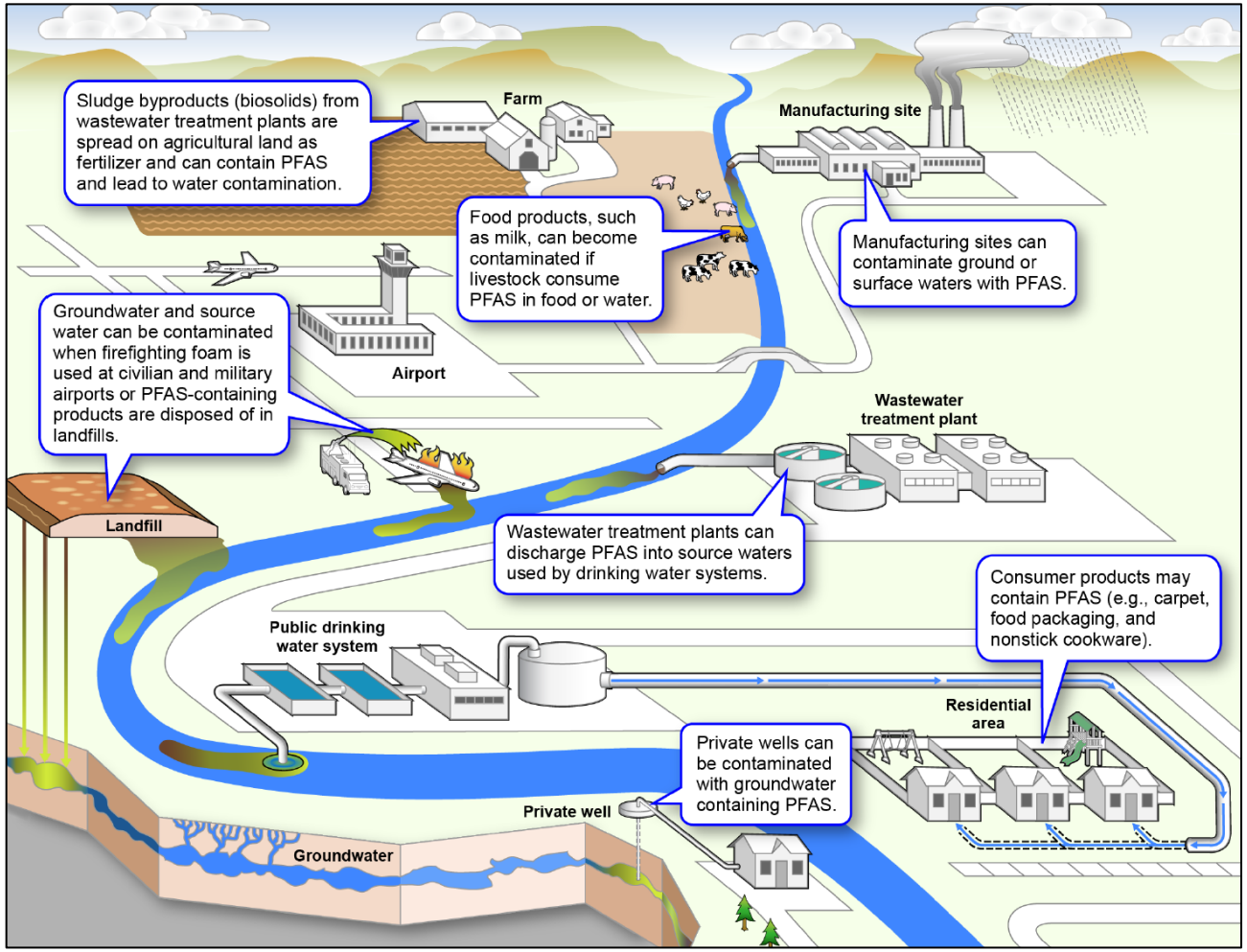
- Overview of EPA's PFAS Strategic Roadmap
- Addressing PFAS Discharges to Waterways
  - Effluent Limitations Guidelines
  - Latest recommendations for NPDES Permits
  - Examples of State PFAS Approaches
  - New Funding Options to consider

EPA's PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024

- A whole-of-EPA strategy to protect public health and the environment from PFAS.
- EPA's Strategic Roadmap:
  - Sets timelines for concrete actions from 2021 to 2024;
  - Fills a critical gap in federal leadership;
  - Supports states' ongoing efforts

Photo of EPA Administrator Michael Regan

PFAS Lifecycle and EPA's Approach



PFAS Strategic Roadmap: EPA's Commitments to Action 2021–2024

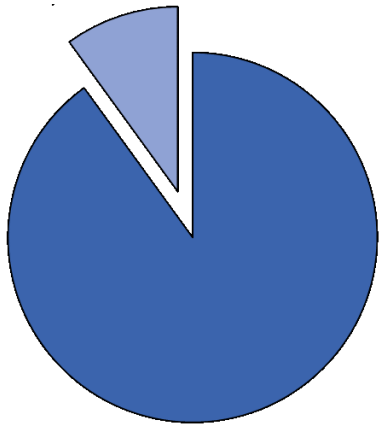
PFAS contamination presents unique challenges. EPA's approach is centered around the following principles:

- Consider the Lifecycle of PFAS.
- Get Upstream of the Problem.
- Hold Polluters Accountable.
- Ensure Science-Based Decision-Making.
- Prioritize Protection of Disadvantaged Communities.

Source: GAO | GAO-21-37

EPA's Goals in the Strategic Roadmap

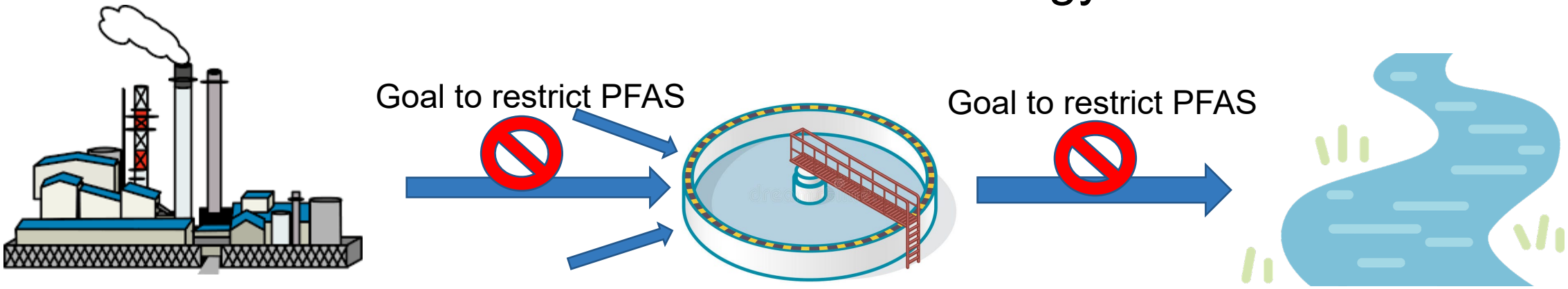
RESEARCH | **RESTRICT** | **REMEDIATE**



Now, a sub-portion of the EPA PFAS Strategy – Addressing PFAS Discharges

Restricting PFAS Discharges

Reducing discharges to the environment and to publicly owned treatment works is a cornerstone of EPA's strategy to restrict PFAS.



Effluent Limitations Guidelines (Plan 15) (New - January 2023)

NPDES PFAS Guidance (New - December 2022)

EPA Region 5 will be working with our State counterparts to incorporate these elements into their NPDES programs.

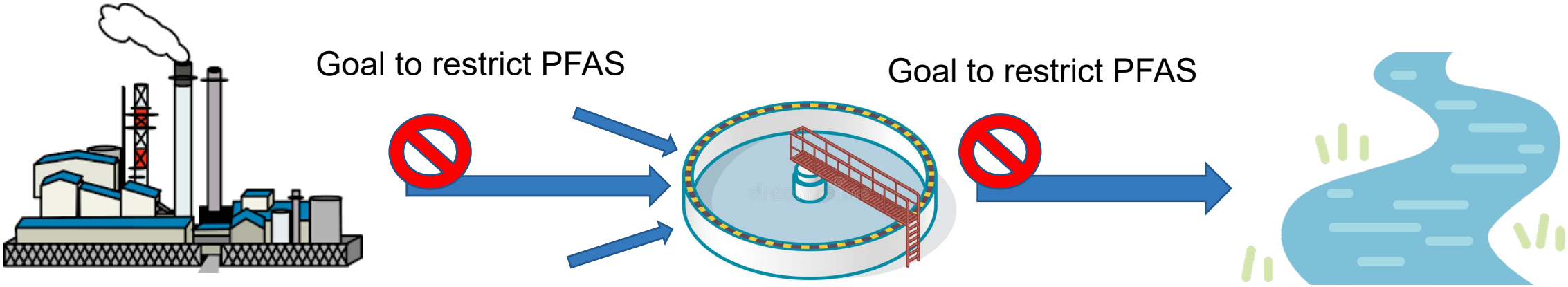
The Current Effluent Guidelines Program Plan 15 (Plan 15) (January 2023)

Industrial categories in the proposed ELG Program Plan 15 related to PFAS.

- Organic Chemicals, Plastics & Synthetic Fibers Category
- Metal Finishing Category
- Electroplating Category
- Landfills Category
- Textile Mills Category
- Publicly Owned Treatment Works
- Pulp, Paper, and Paperboard Category
- Discharges from Airports
- Electrical and Electronic Components (E&EC) Category

For more information on the current status of each industrial category, please visit EPA's Plan 15 website: https://www.epa.gov/eg/current-effluent-guidelines-program-plan

Restricting PFAS Discharges



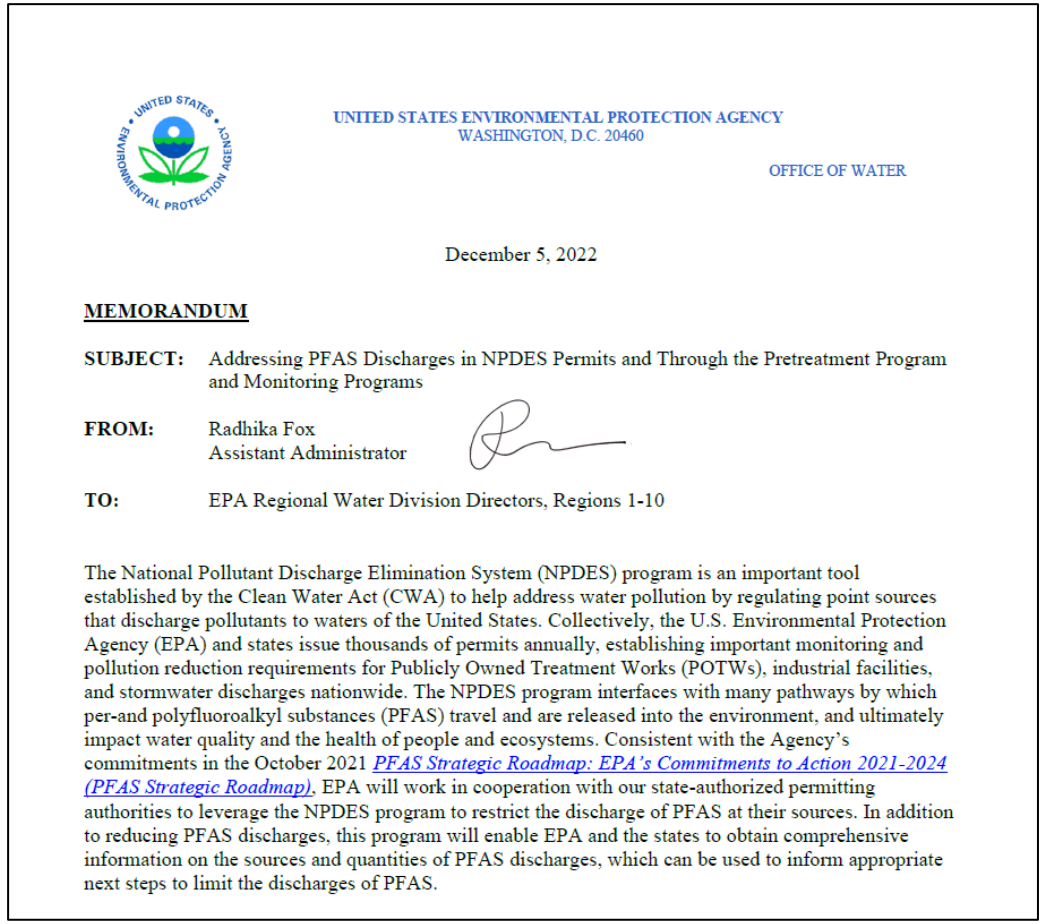
Effluent Limitations Guidelines (Plan 15) (New - January 2023)

NPDES PFAS Guidance (New - December 2022)

EPA's NPDES PFAS Memorandum Released on December 5th, 2022

Included are **recommendations** for EPA and States to address PFAS through NPDES permits and pretreatment activities and monitoring programs.

- Applicable Industrial Direct Dischargers
- Publicly Owned Treatment Works
- Biosolids Assessment
- Public Notice for Draft Permits with PFAS-Specific Conditions



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

December 5, 2022

MEMORANDUM

SUBJECT: Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs

FROM: Radhika Fox
Assistant Administrator

TO: EPA Regional Water Division Directors, Regions 1-10

The National Pollutant Discharge Elimination System (NPDES) program is an important tool established by the Clean Water Act (CWA) to help address water pollution by regulating point sources that discharge pollutants to waters of the United States. Collectively, the U.S. Environmental Protection Agency (EPA) and states issue thousands of permits annually, establishing important monitoring and pollution reduction requirements for Publicly Owned Treatment Works (POTWs), industrial facilities, and stormwater discharges nationwide. The NPDES program interfaces with many pathways by which per-and polyfluoroalkyl substances (PFAS) travel and are released into the environment, and ultimately impact water quality and the health of people and ecosystems. Consistent with the Agency's commitments in the October 2021 *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024 (PFAS Strategic Roadmap)*, EPA will work in cooperation with our state-authorized permitting authorities to leverage the NPDES program to restrict the discharge of PFAS at their sources. In addition to reducing PFAS discharges, this program will enable EPA and the states to obtain comprehensive information on the sources and quantities of PFAS discharges, which can be used to inform appropriate next steps to limit the discharges of PFAS.

https://www.epa.gov/system/files/documents/2022-12/NPDES_PFAS_State%20Memo_December_2022.pdf

Recommendations for *Applicable Industrial Direct Dischargers*

Recommendations for:

- **Monitoring** - Effluent and wastewater residuals
- **Best Management Practices (BMPs)** for discharges of PFAS
  - Conditions based on pollution prevention/source reduction opportunities
  - Includes examples of BMP Permit Special Condition Language
- **Stormwater Permits** - BMPs to address PFAS-containing firefighting foams for stormwater permits
- **Permit Limits**

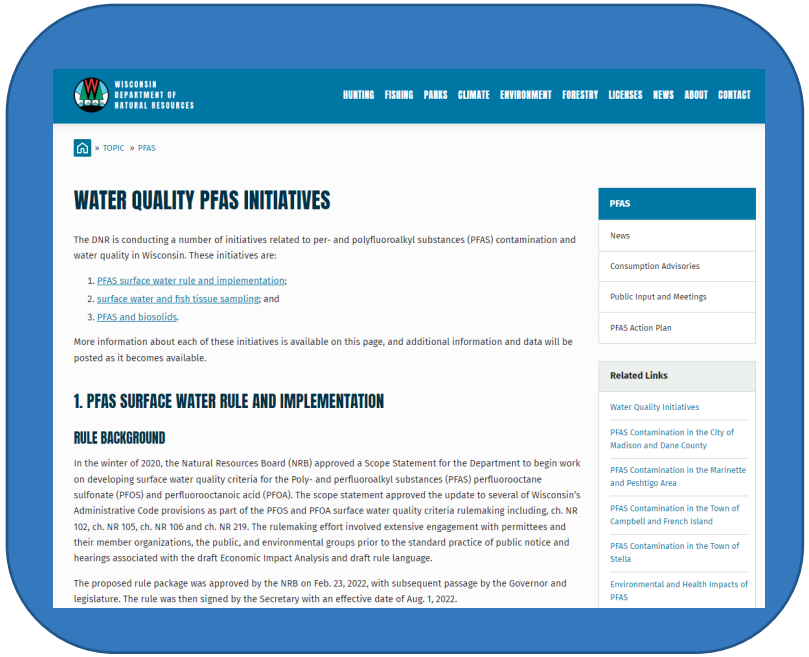
Recommendations for *Publicly Owned Treatment Works (POTWs)*

Recommendations for:

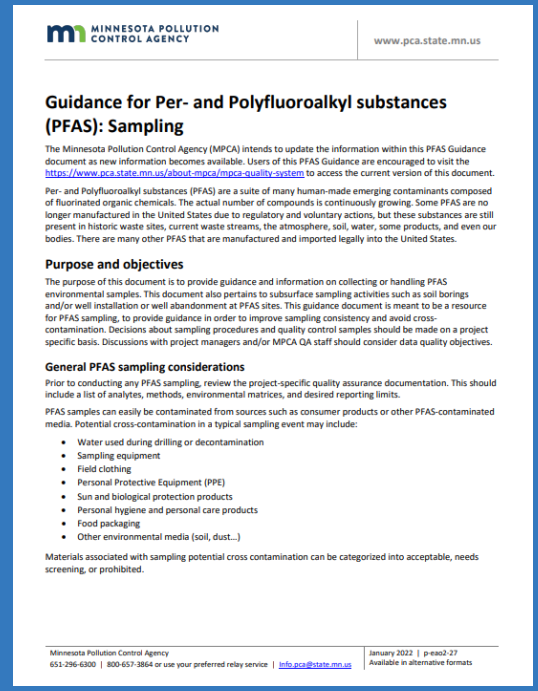
- **Monitoring** - Effluent, Influent, and Biosolids
- **Pretreatment Program Activities**
  - Update Industrial User Inventory
  - Utilize BMPs and pollution prevention to address PFAS discharges to POTWS
  - Establishing Local Limits

Some Examples of PFAS Implementation Practices by States

Michigan
Narrative Translation



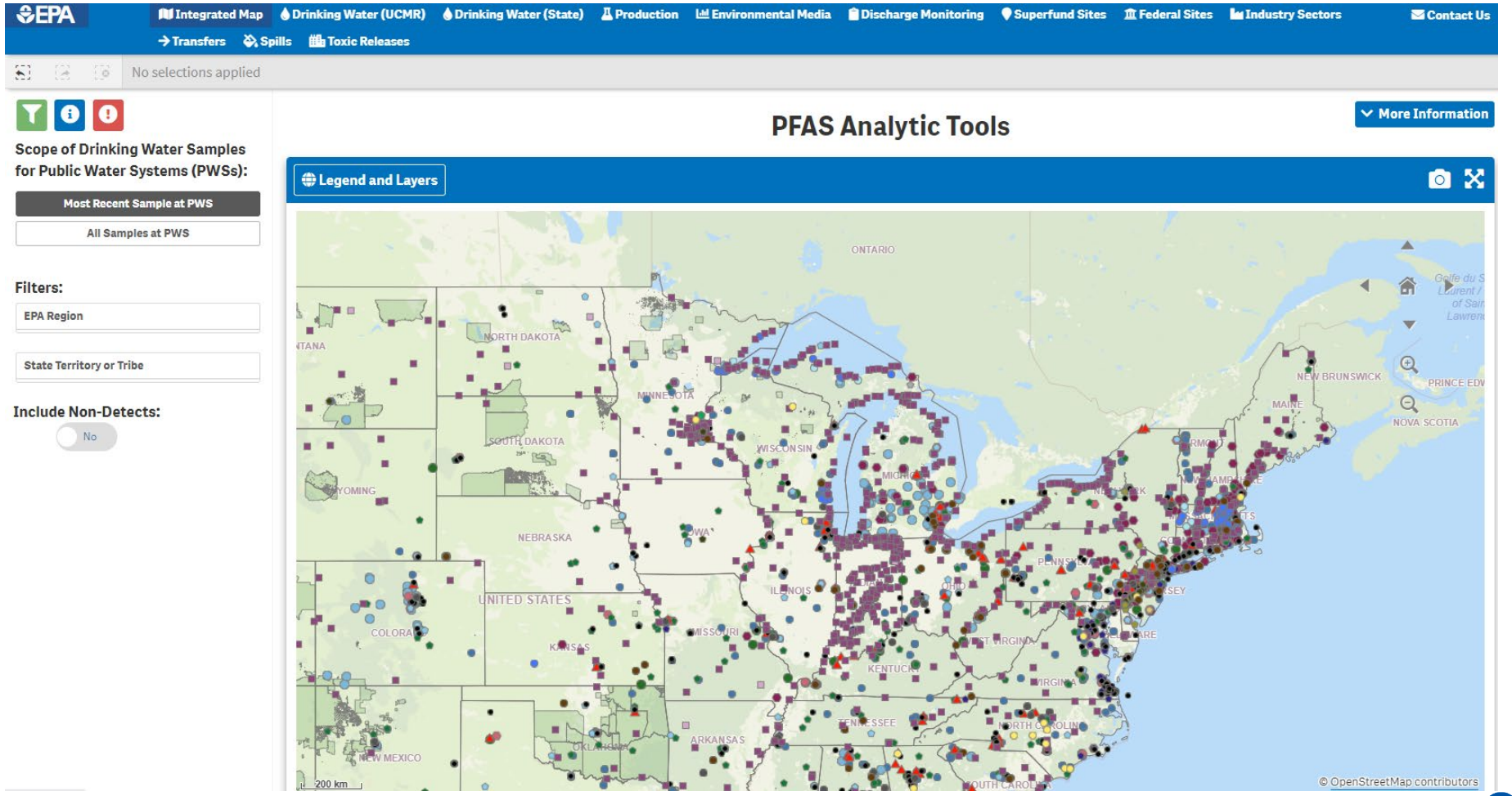
Wisconsin
Numeric Standard



Minnesota –
Robust Sampling

EPA's PFAS Analytical Tool

Interactive Tools to Spatially Assess current extent of PFAS Monitoring



https://echo.epa.gov/trends/pfas-tools

Bipartisan Infrastructure Law and PFAS

The Bipartisan Infrastructure Law makes transformational investments in America's water infrastructure. It provides $10 billion to invest in communities impacted by PFAS and other emerging contaminants, including:

$4 billion	**Drinking Water State Revolving Fund**
$1 billion	**Clean Water State Revolving Fund**
$5 billion	**Small or Disadvantaged Communities Drinking-Water Grants**

Please work with your State on accessing SRF Funding

Recap and Future Considerations

- EPA's is taking a comprehensive approach to addressing PFAS in the environment
- Clean Water Act - Restricting Upstream PFAS Discharges is a focus of the NPDES Program (Recently released ELGs and NPDES PFAS Guidance)
- EPA will be working closely with State counterparts to implement strategies. Including through BIL investments.

Research

Restrict

Remediate

Thank you for your time!

Questions?

Andrea Schaller – Schaller.Andrea@epa.gov
Matthew Gluckman – Gluckman.Matthew@epa.gov

Geosyntec consultants

NORTH BRANCH CHICAGO RIVER WATERSHED WORKGROUP

NBWW NARP Status Update

February 8, 2023

NARP Objective (Review)

- Address phosphorus causing
  - Excessive algae
  - Dissolved oxygen problems
  - pH problems
- Other contributing factors
  - Hydraulic modifications (dams, channelization)
  - Lack of riparian shading
  - Excessive streambank erosion
  - Loss of groundwater replenishment

Lower Des Plaines River. Photo by Cynthia Skrukrud.

NARP work to date

Nutrient Assessment Reduction Plan (NARP)

2021 – Completed NARP Workplan

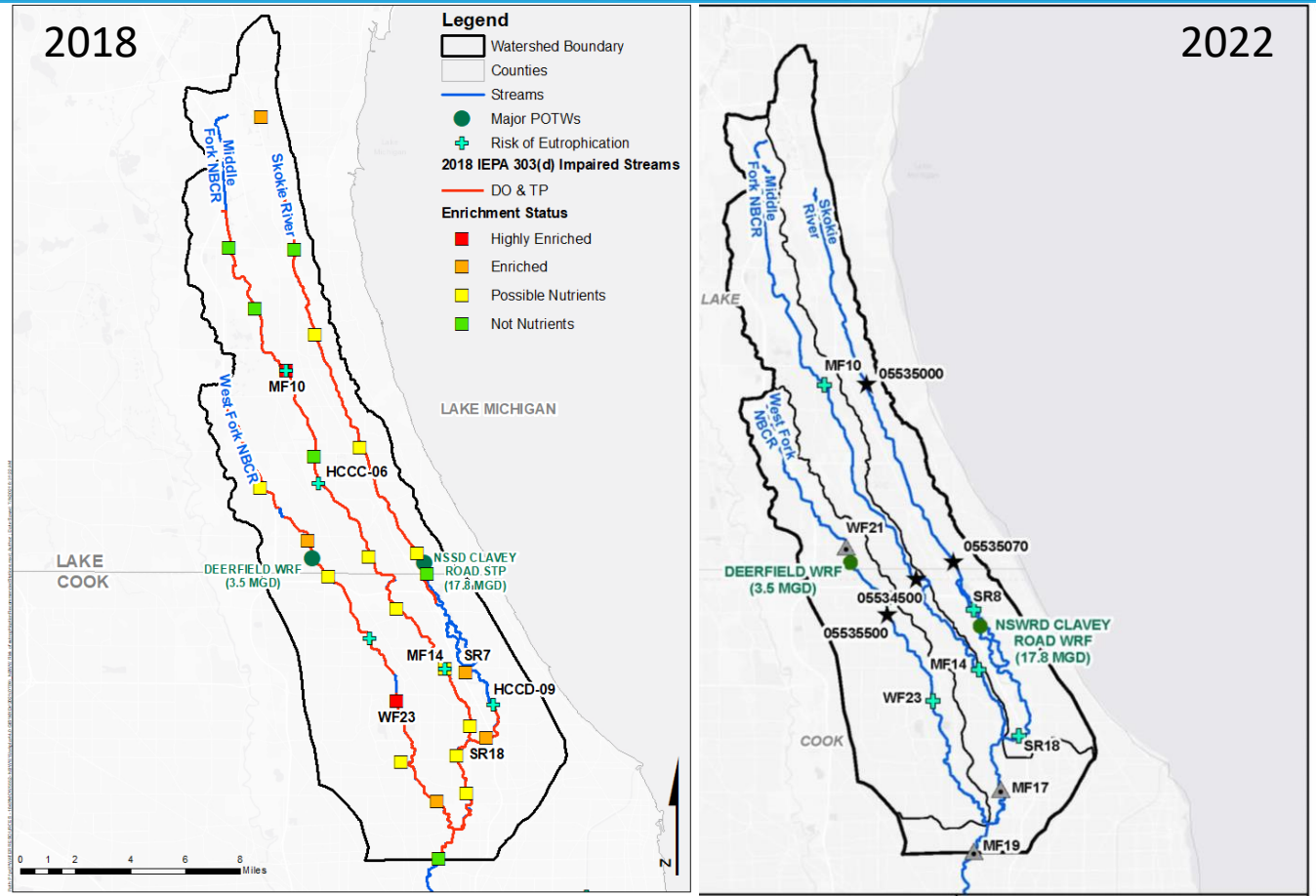
2022 – Completed Field data collection and analysis

- ❑ Field data supported full NARP for entire watershed
- ❑ Additional field data to be collected in association with the Skokie Lagoon
- ❑ NBWW presented data to IEPA seeking guidance on a one-year extension
- ❑ NBWW renewed contract to begin baseline model development

Strategic Data Collection and Analysis (2022)

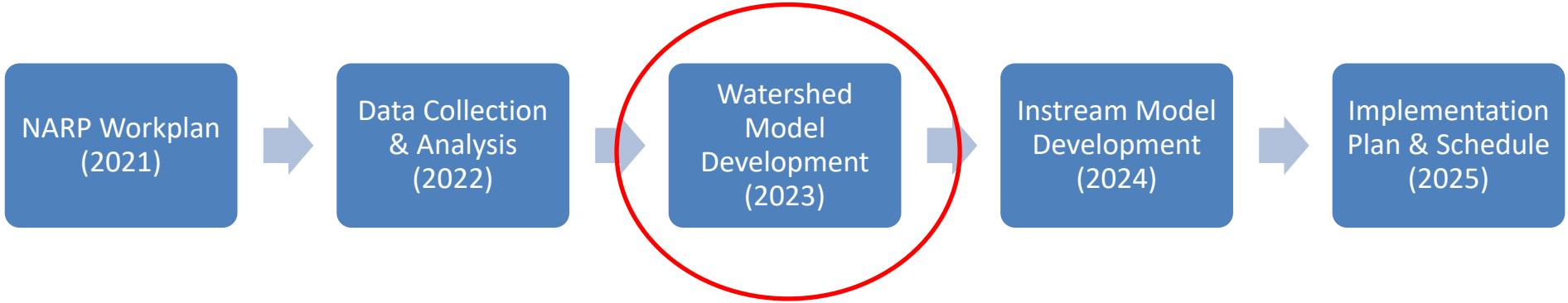
NORTH BRANCH CHICAGO RIVER WATERSHED WORKGROUP

- Nutrient related impairments likely in West Fork and Skokie River
- North Branch Chicago River does not show signs of nutrient-related impairments
  - SNAP methodology had listed the stations in reaches as "Possible Nutrients"
  - Develop a NARP for Skokie and West Fork watersheds

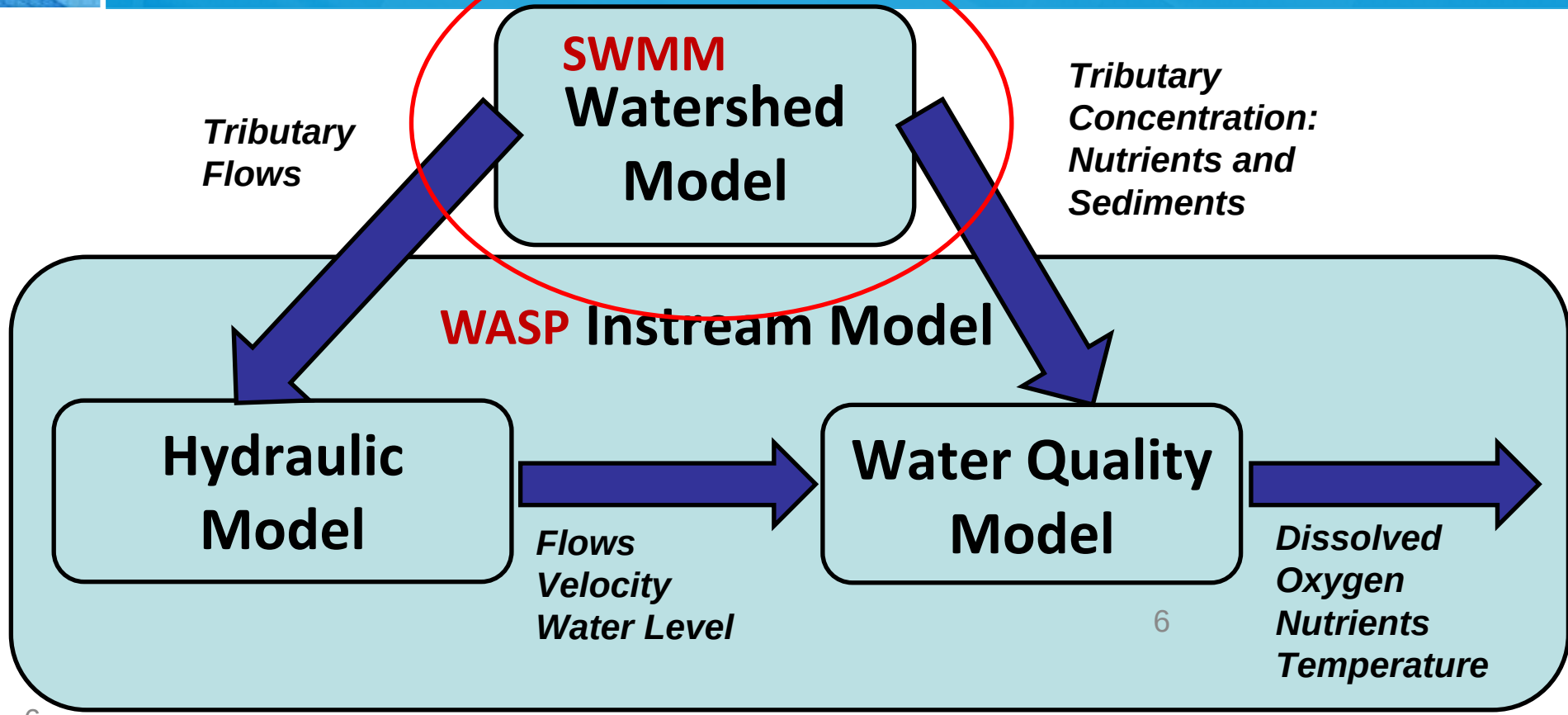


NARP work to date

Nutrient Assessment Reduction Plan (NARP)

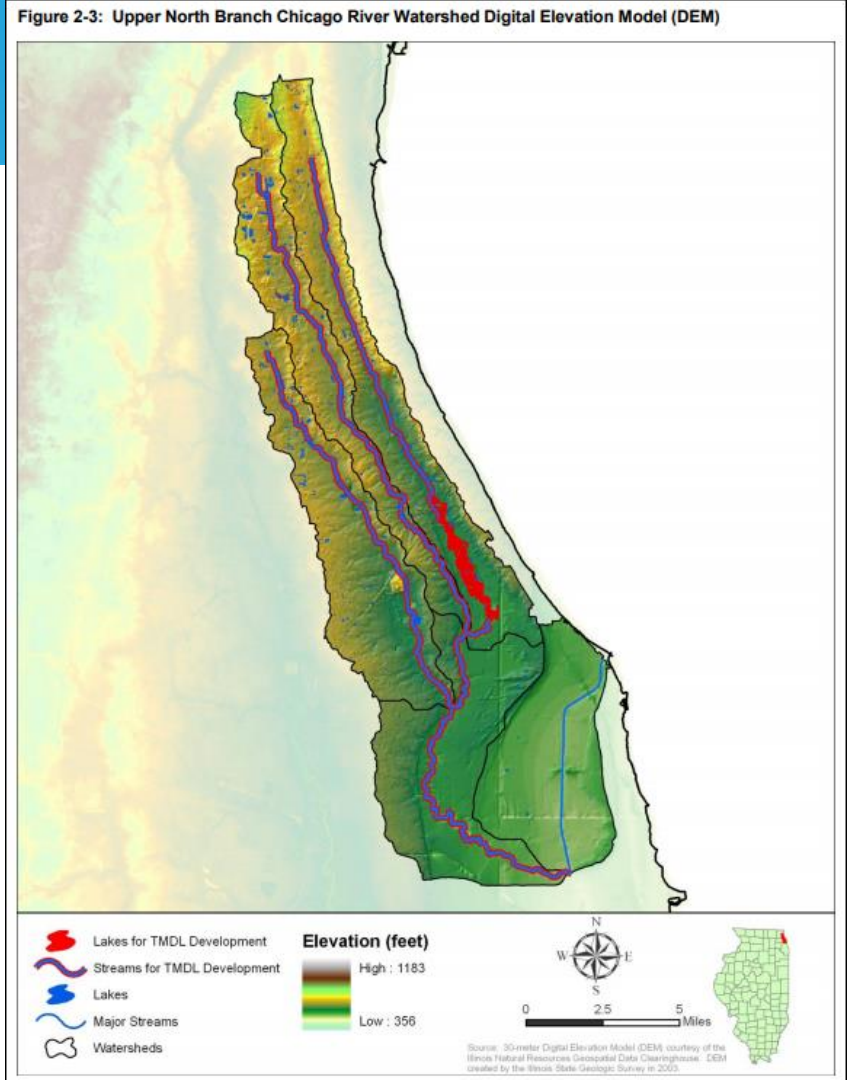


Hydrologic Model Development (2023)



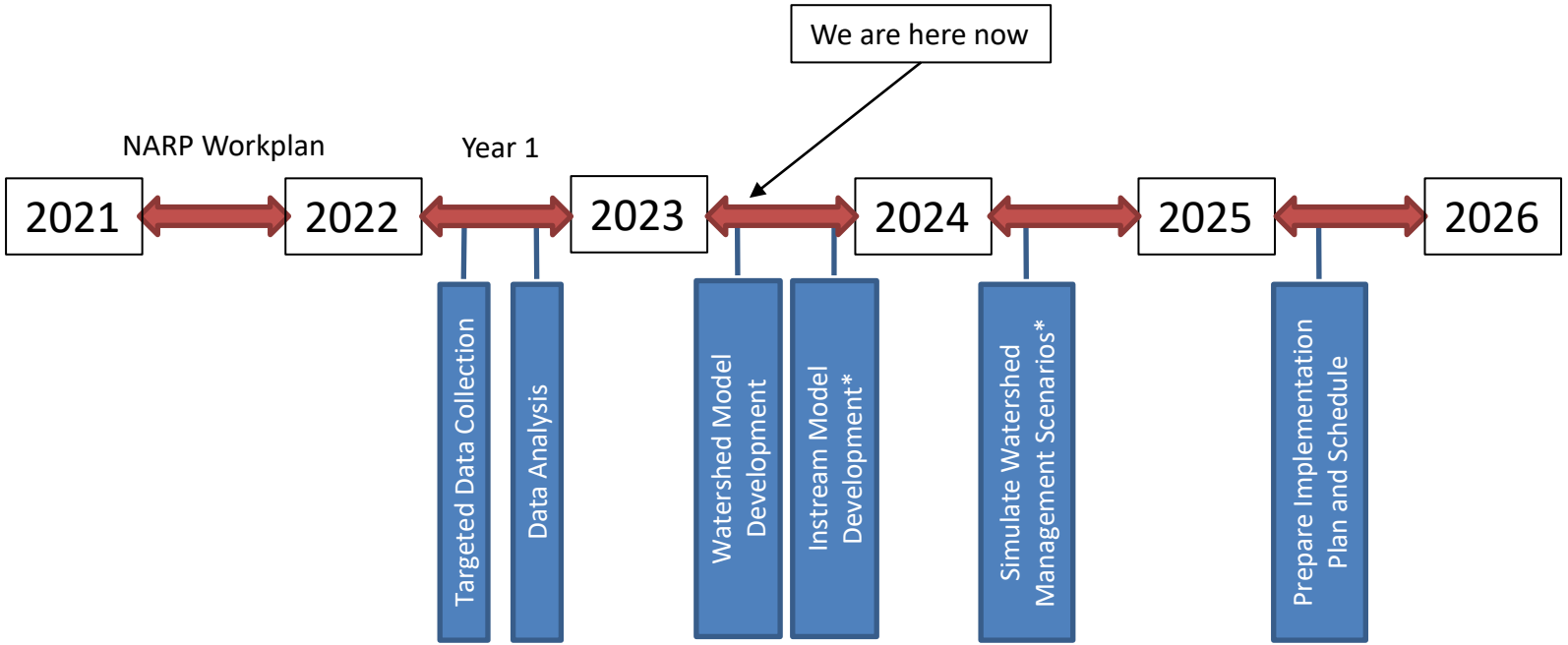
SWMM Model Development

- GIS data acquisition and digital catalogue
- Verify Watershed Boundaries
- Validate Catchment Size
- Review land use data
- Rainfall and gauge data review
- Calibrate hydrology (flow) and pollutant loading



Work Conducted to Date

General Timeline and Schedule



*Indicates task spans more than one fiscal year

QUESTIONS?

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