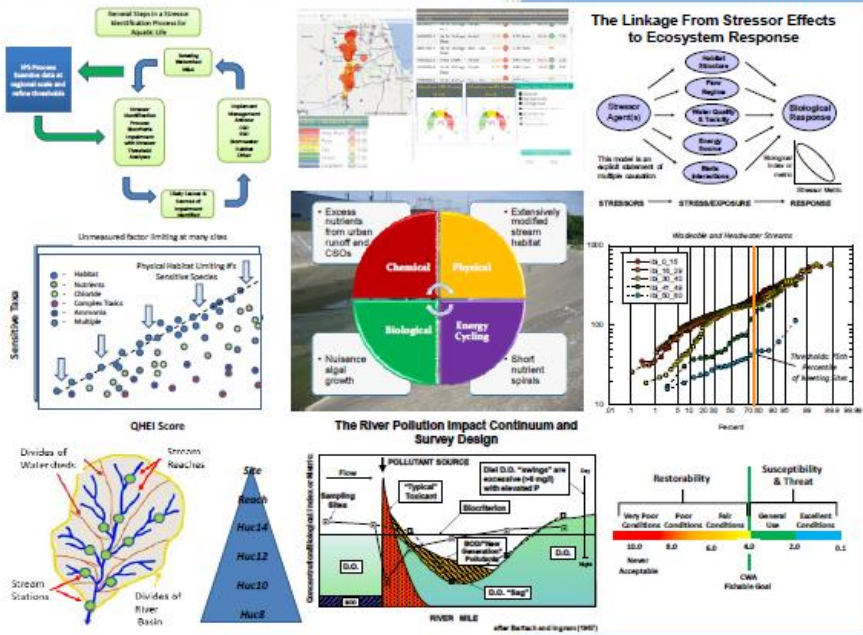


# Integrated Prioritization System (IPS) for Northeastern Illinois: Technical Documentation



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

## Report citation:

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

## Sponsoring Organizations:



# What is the IPS Tool?

- Allows users to *visualize and rank* aquatic life use aspects of CWA water quality issues
  - Identifies designated aquatic life uses (goals) for streams and rivers
  - Identifies aquatic life impaired reaches
  - Identifies probable causes of impairment
  - Standardized approaches to viewing data linked to attainment of aquatic life uses
  - Sites, reaches, and watersheds ranked by Restorability (for impaired waters) and Susceptibility and Threat (for attaining waters)

# What is the IPS Tool?

- Allows users to *visualize and rank* aquatic life use aspects of CWA water quality issues

Identifies sites that are most likely to attain (or not) for

**IPS provides data and analyses to support addressing complex issues at a meaningful scale to local stakeholders**

attainment of aquatic life uses

- Sites, reaches, and watersheds ranked by Restorability (for impaired waters) and Susceptibility and Threat (for attaining waters)

The background image shows a concrete-lined stream or canal. The water is dark and still. In the background, there are power lines and a bridge. The sky is blue with some clouds. The overall scene is an urban or industrial waterway.

**Chemical – excess nutrients from  
urban runoff and CSOs**

**Physical – extensively modified  
stream habitat**

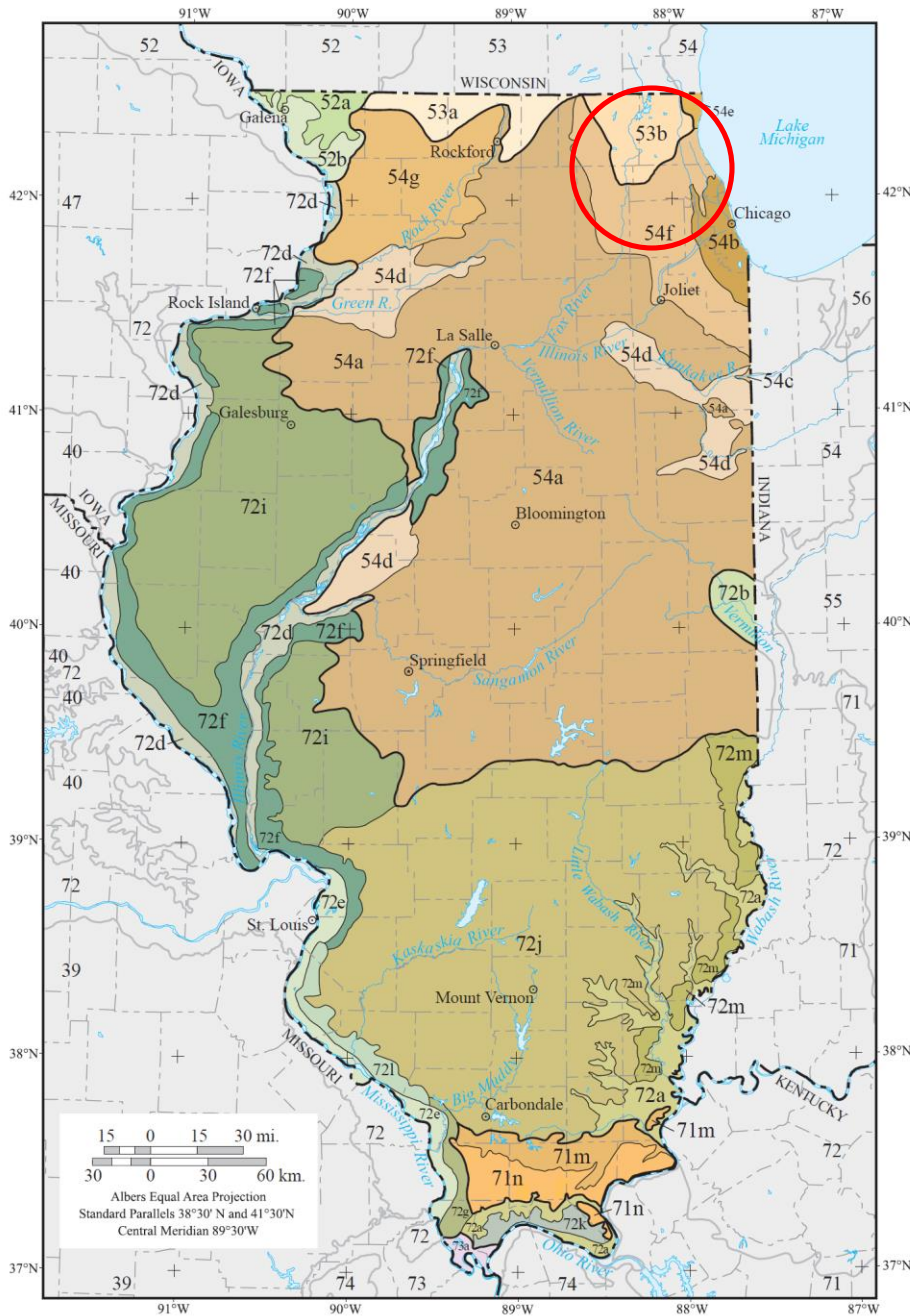
**Biological – nuisance algal  
growth**

**Energy cycling – short nutrient  
spirals**

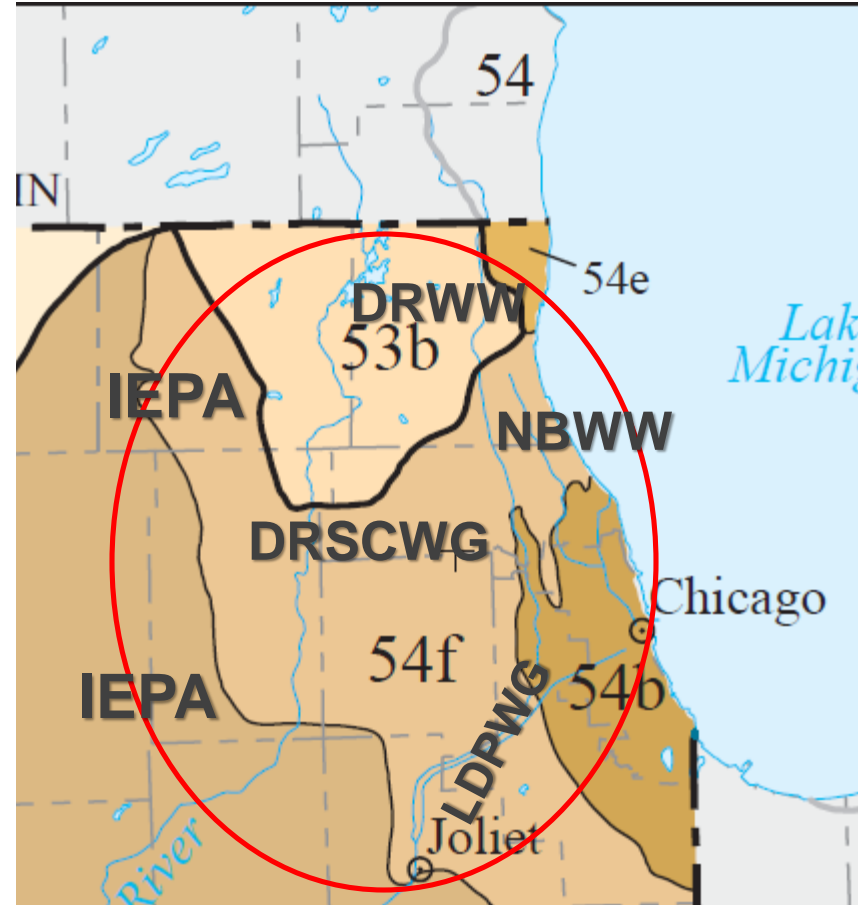
**Treating these independently  
will not solve the problem.**

*Mill Creek – Cincinnati, OH*

# ILLINOIS LEVEL III AND LEVEL IV ECOREGIONS



# NE Illinois IPS Update Data Sources

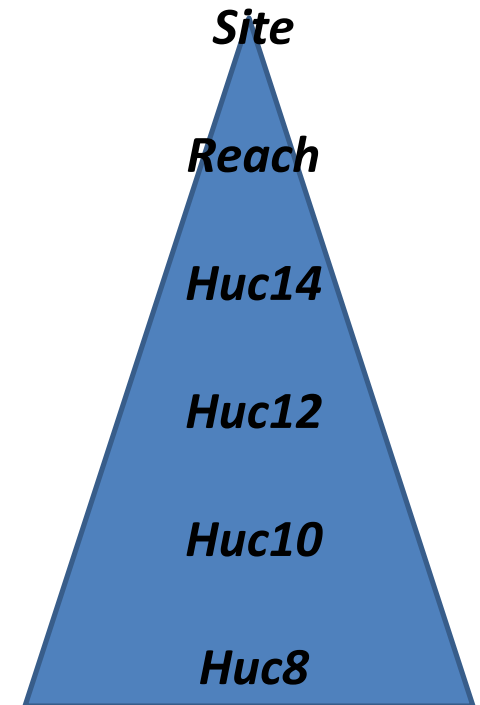
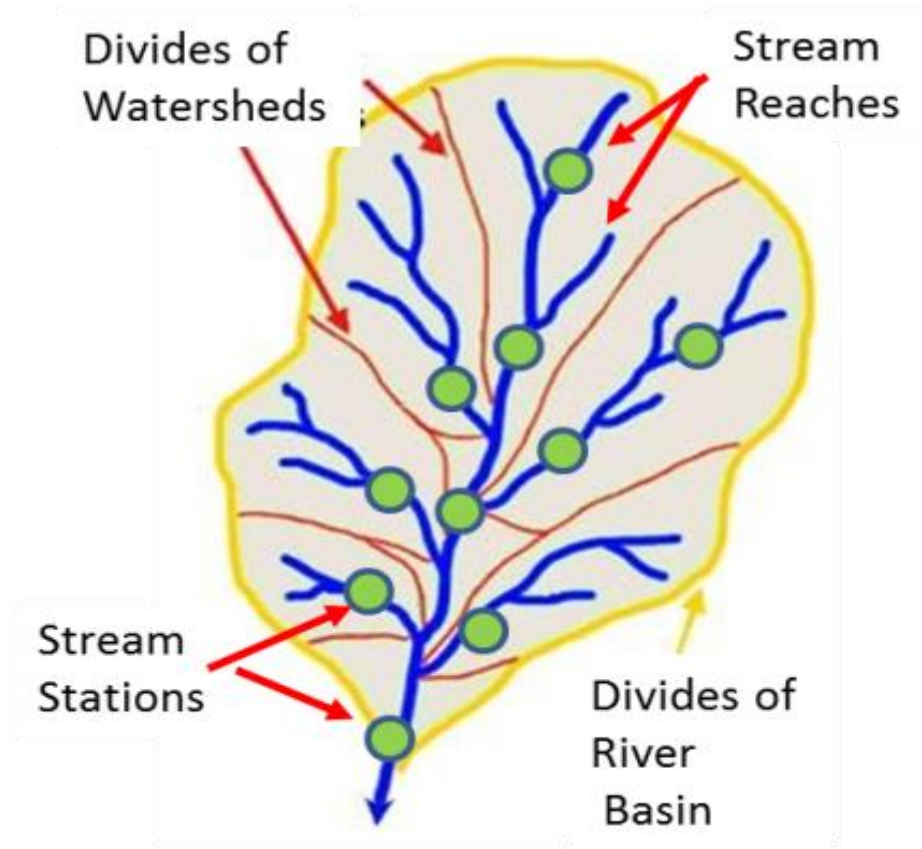


# Why IPS? What Does it Additionally Provide For?

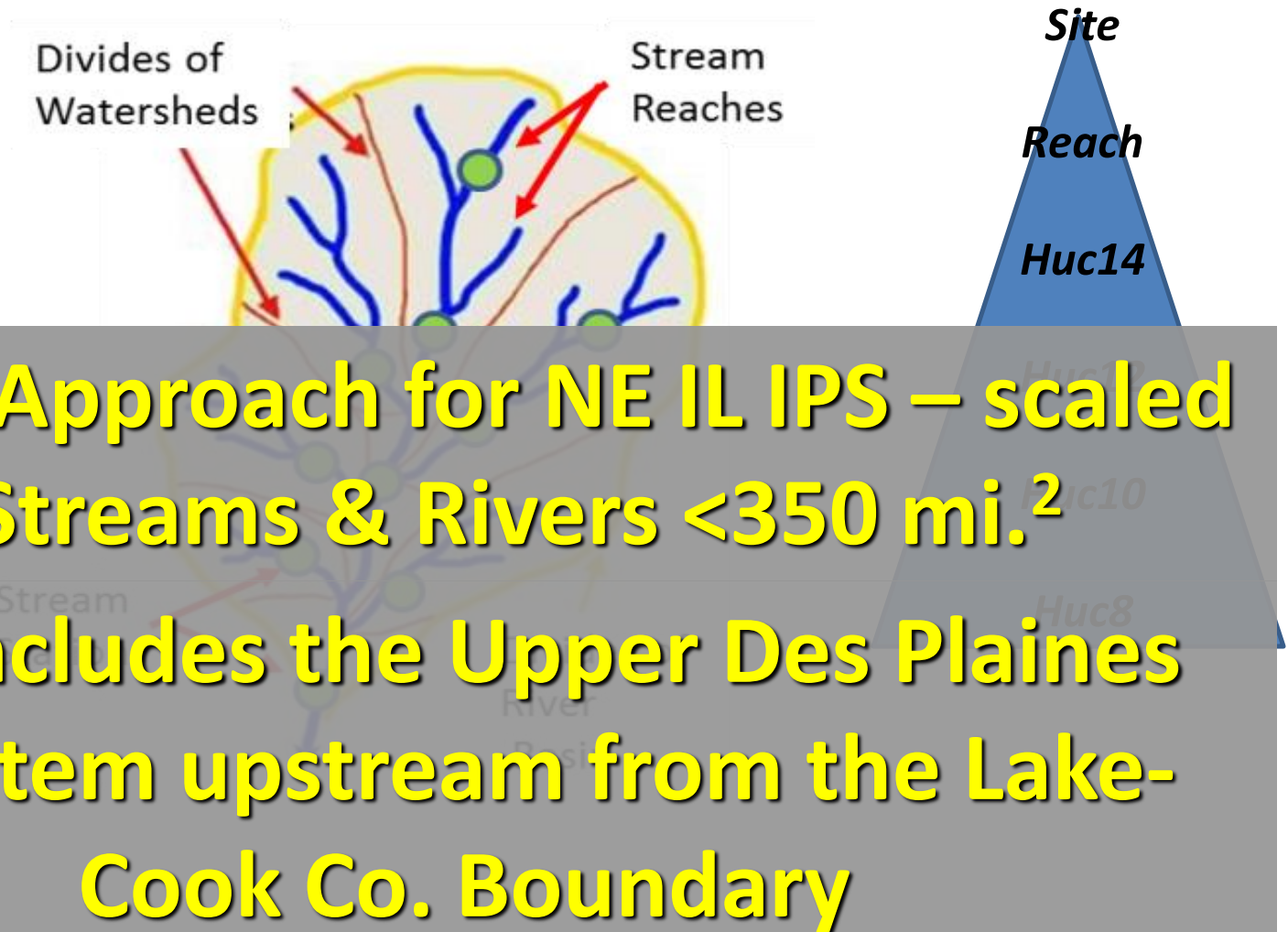
- A direct focus on WQS use attainment end points, e.g., biocriteria.
- Includes a wider array of both pollutants and non-pollutants (~300+ variables) than typical water quality models.
- Regionally developed stressor thresholds.
- Considers needs for both impaired and attaining sites, reaches, and subwatersheds (HUC12 scale).
- Power BI Dashboard allows users to explore and use the IPS data, assessments, and outputs.
- Provides sufficient information to plan ahead and avoid actions that can lead to long term declines.

Physical Habitat	QHEI and metrics, HydroQHEI, watershed scale habitat
Nutrients	TP, nitrate, Max. DO, DO Flux,
Organic Enrichment	DO, BOD, total ammonia, TKN
Dissolved Materials	Chloride, sulfate, conductivity, TDS
Suspended Materials	TSS, VSS, Turbidity
Water Column Toxicants	Metals, organics
Sediment Toxicants	PAHs, metals, PCBs
Catchment Landuse	Impervious surface, Developed land uses, road density
Buffer Landuse	Impervious surface, Developed land uses, road density

# Geographic Nesting of Data

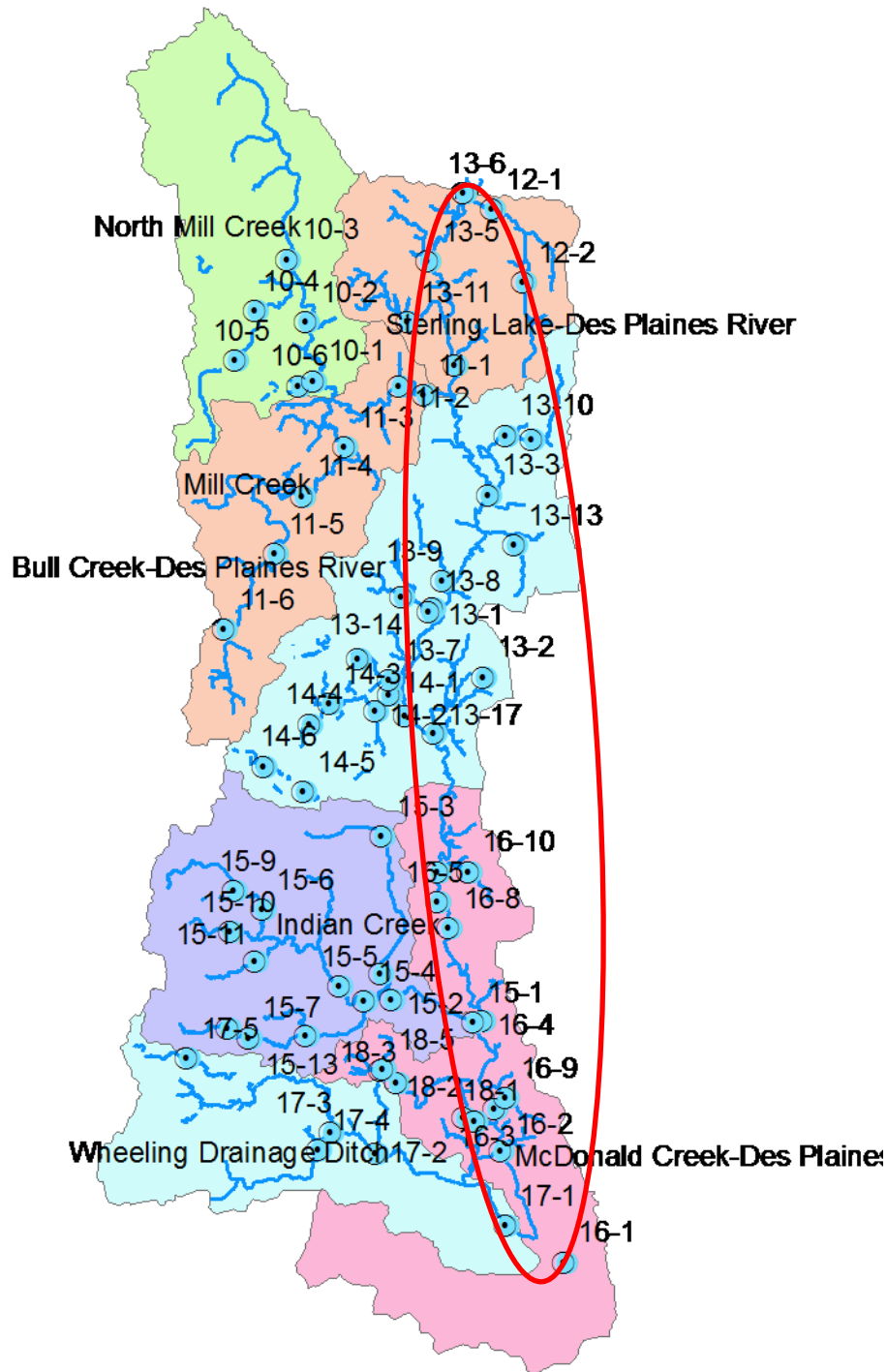


# Geographic Nesting of Data





# Upper Des Plaines Watershed Bioassessment

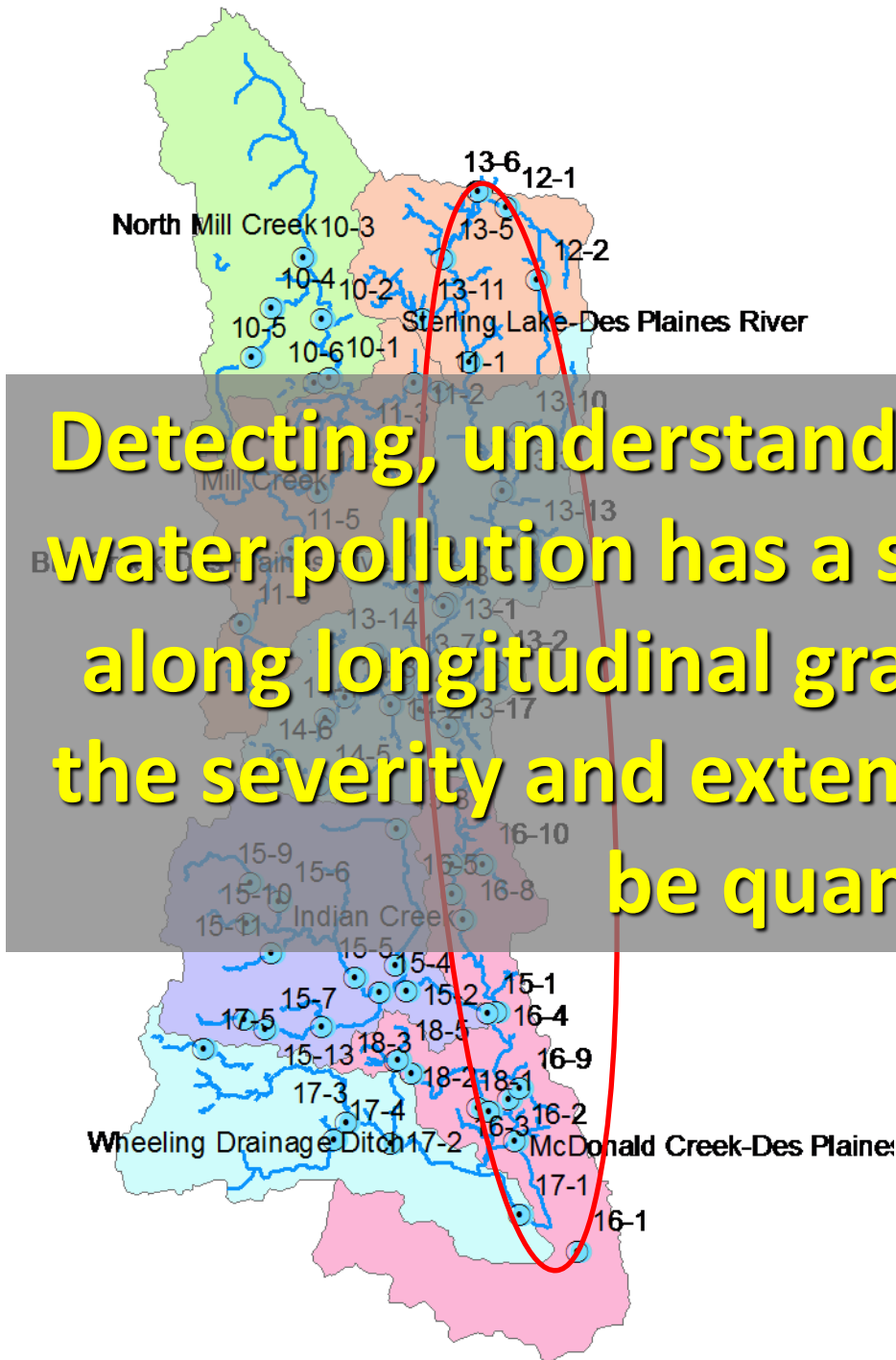


- Pollution survey design – geometric allocation of sampling sites with additional sites positioned in proximity to suspected sources of stress & contamination.
- Each site assigned a consistent site code (e.g., 13-6).
- 70 sites sampled in mainstem & tributary subwatersheds in 2016.
- Each sampled for biological, habitat, & water quality parameters.
- Employed 3 crews over a July-October seasonal index period.
- Followed IEPA methods to ensure data consistency & relevance of results.
- Three year rotation initiated in 2017.
- Des Plaines mainstem in 2018.

# Upper Des Plaines Watershed Bioassessment

- Pollution survey design – geometric allocation of sampling sites with additional sites positioned in proximity to suspected sources of stress & contamination.
- Each site is given a consistent site code (e.g., 13-6).
- Employed 3 crews over a July-October seasonal index period.
- Followed IEPA methods to ensure data consistency & relevance of results.
- Three year rotation initiated in 2017.
- Des Plaines mainstem in 2018.

**Detecting, understanding, and dealing with water pollution has a strong spatial context along longitudinal gradients within which the severity and extent of impairments can be quantified.**



# Biological and Water Quality Assessment of the Upper Des Plaines River



*Des Plaines River at Wright Woods Dam (removed)*



*Indian Creek at Sullivan Woods Preserve*

# Biological and Water Quality Assessment of Upper Des Plaines River Subwatersheds: Year 1 Rotation 2017



*Buffalo Creek*



*Indian Creek*



*Seavey Drainage Ditch*



*Aptakisic Creek*

## Biological and Water Quality Assessment of the Upper Des Plaines River

## Biological and Water Quality Assessment of Upper Des Plaines River Subwatersheds: Year 1 Rotation 2017

**A report detailing the status of aquatic life & recreation with causes/sources of impairment at each site.**

*Des Plaines River at Wright Woods Dam (removed)*

*Indian Creek at Sullivan Woods Preserve*

*Buffalo Creek*

*Indian Creek*

*Seavey Drainage Ditch*

*Aptakisic Creek*

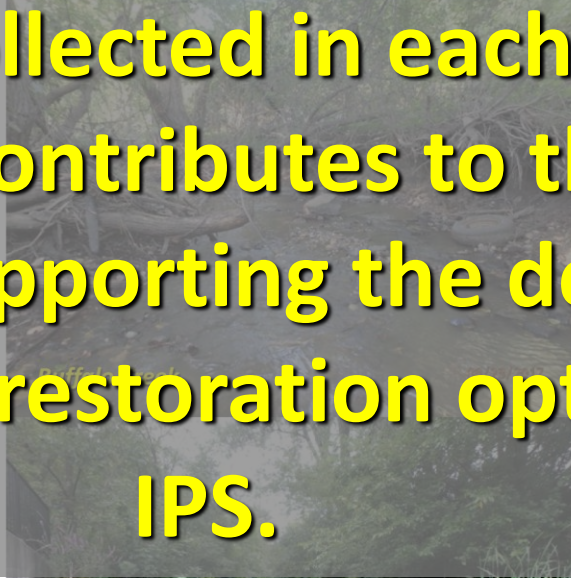
## Biological and Water Quality Assessment of the Upper Des Plaines River

## Biological and Water Quality Assessment of Upper Des Plaines River Subwatersheds: Year 1 Rotation 2017

The data collected in each year of bioassessment contributes to the aggregate database for supporting the development of protection & restoration options via the **IPS.**



Des Plaines River



Buffalo Creek



Indian Creek



Indian Creek at Sullivan Woods Preserve



Seavey Drainage Ditch



Aptakisic Creek

The IPS utilizes watershed data at a regional scale and produces refined thresholds & other IPS factors, thus strengthening the overall assessment and WQ management process.

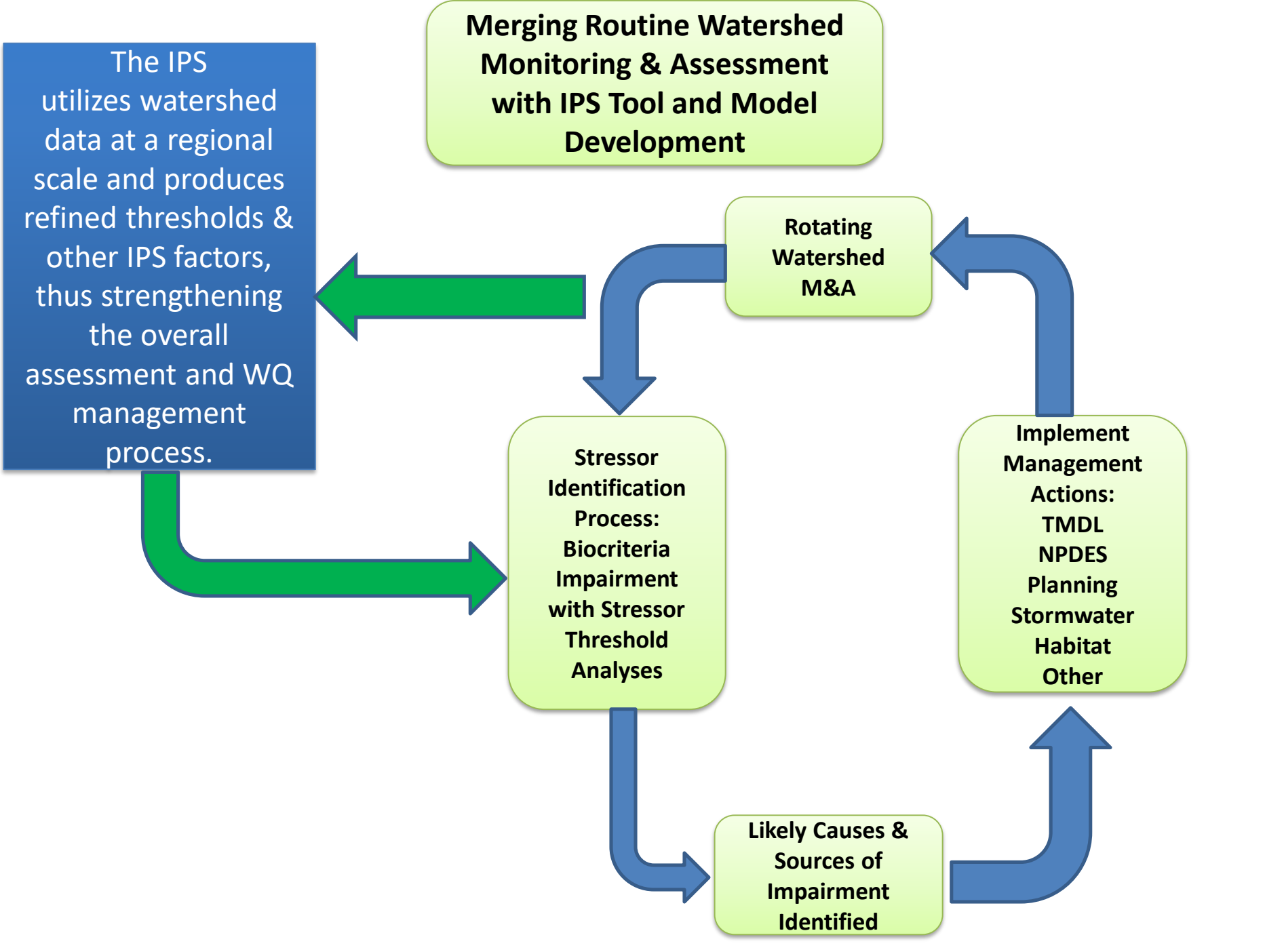
**Merging Routine Watershed Monitoring & Assessment with IPS Tool and Model Development**

**Rotating Watershed M&A**

**Stressor Identification Process:  
Biocriteria Impairment with Stressor Threshold Analyses**

**Implement Management Actions:  
TMDL  
NPDES  
Planning  
Stormwater  
Habitat  
Other**

**Likely Causes & Sources of Impairment Identified**



# 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
<b>Demand Group</b>								
<b>BOD<sub>5</sub></b>	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]	--
<b>Dissolved Oxygen (D.O.)</b>	5.5./6.0 mg/L [7-day rolling avg.]	3.5/5.0 mg/L [minimum]	7.2 mg/L [HW Streams]	5.32 mg/L [All Streams]	--	--	6.6 mg/L [HW Streams]	--
<b>Suspended Solids (TSS)</b>	NA	NA	16.0 mg/L [HW Streams]	65.7 mg/L [HW Streams] 70.8 mg/L [WD Streams] 74.3 mg/L [BT Rivers]	--	--	28.0 mg/L [HW Streams]	--
<b>Nutrients Group</b>								
<b>Ammonia-N (NH<sub>3</sub>-N)</b>	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]	--
<b>Total Kjeldahl Nitrogen (TKN)</b>	NA	NA	0.50 mg/L [HW Streams]	0.51 mg/L [HW Streams] 0.58 mg/L [WD Streams] 1.05 mg/L [BT Rivers]	--	1.00 mg/L [DRSCW IPS <sup>11</sup> ]	0.70 mg/L	--

# 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
<b>Demand Group</b>								
<b>BOD<sub>5</sub></b>	NA	NA	--	2.48 mg/L [HW Streams] 2.96 mg/L [WD Streams]	--	--	2.00 mg/L [HW Streams]	--
<b>Nutrients Group</b>								
<b>Ammonia-N (NH<sub>3</sub>-N)</b>	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]	--
<b>Total Kjeldahl Nitrogen (TKN)</b>	NA	NA	0.50 mg/L [HW Streams]	0.51 mg/L [HW Streams] 0.58 mg/L [WD Streams] 1.05 mg/L [BT Rivers]	--	1.00 mg/L [DRSCW IPS <sup>11</sup> ]	0.70 mg/L	--

These have been updated via the derivation of tiered effect thresholds for the NE Illinois IPS.



# Steps to Deriving “Better” Stressor Thresholds

1. Use weighted means (by stressor) to identify fishes/macro taxa sensitive to each stressor
  - a) Sensitive: upper/lower 20 percent of species or taxa depending on direction of stressor (e.g., high QHEI good, high ammonia bad)
2. Calculate number of stressor sensitive species/taxa at each site in IPS study area
3. Plot each stressor vs. number of stressor sensitive species/taxa in scatter plot and use quantile regression to characterize “goodness of fit” – i.e., strong vs weak

08/02/2018

# Steps to Deriving “Better” Stressor Thresholds

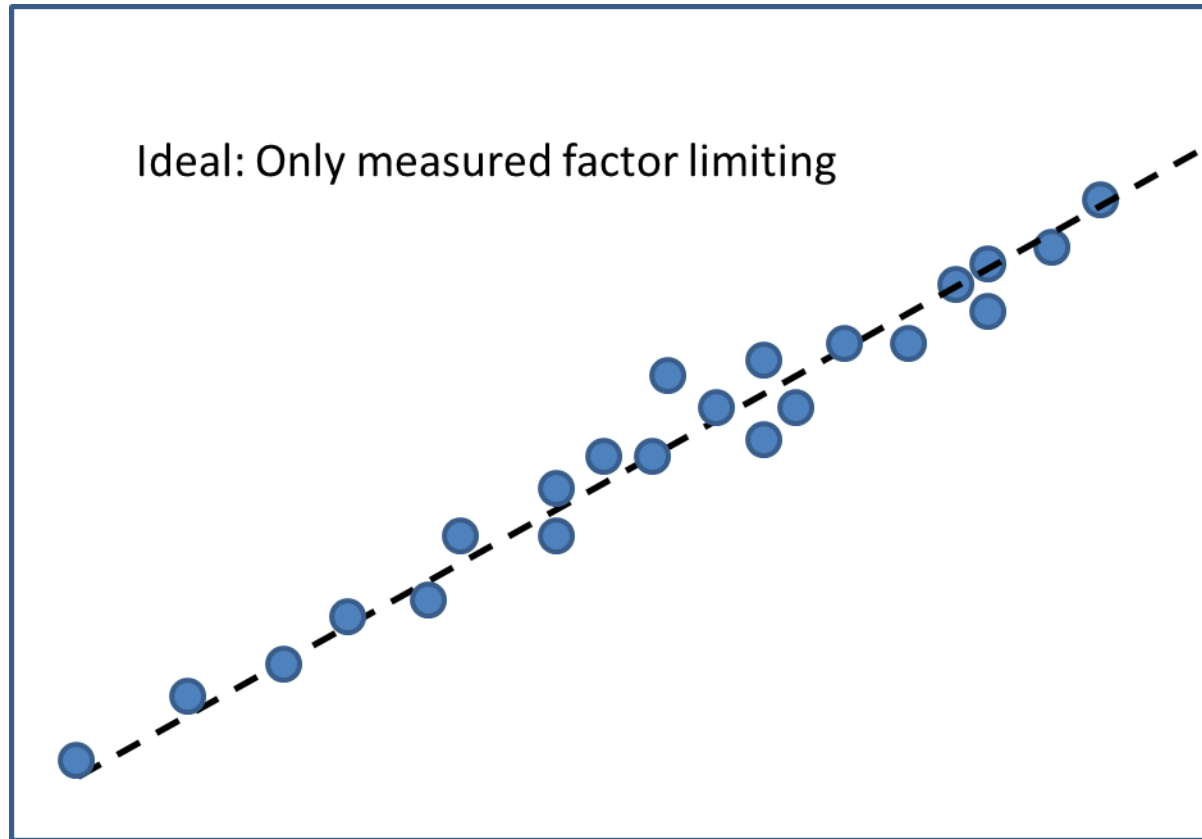
1. Use weighted means (by stressor) to identify fishes/macro taxa sensitive to each stressor
  - a) Sensitive: upper/lower 20 percent of species or taxa

**Regionally derived stressor thresholds are the essential basis of an IPS model**

2. Calculate the number of stressor sensitive species/taxa at each site in IPS study area
3. Plot each stressor vs. number of stressor sensitive species/taxa in scatter plot and use quantile regression to characterize “goodness of fit” – i.e., strong vs weak

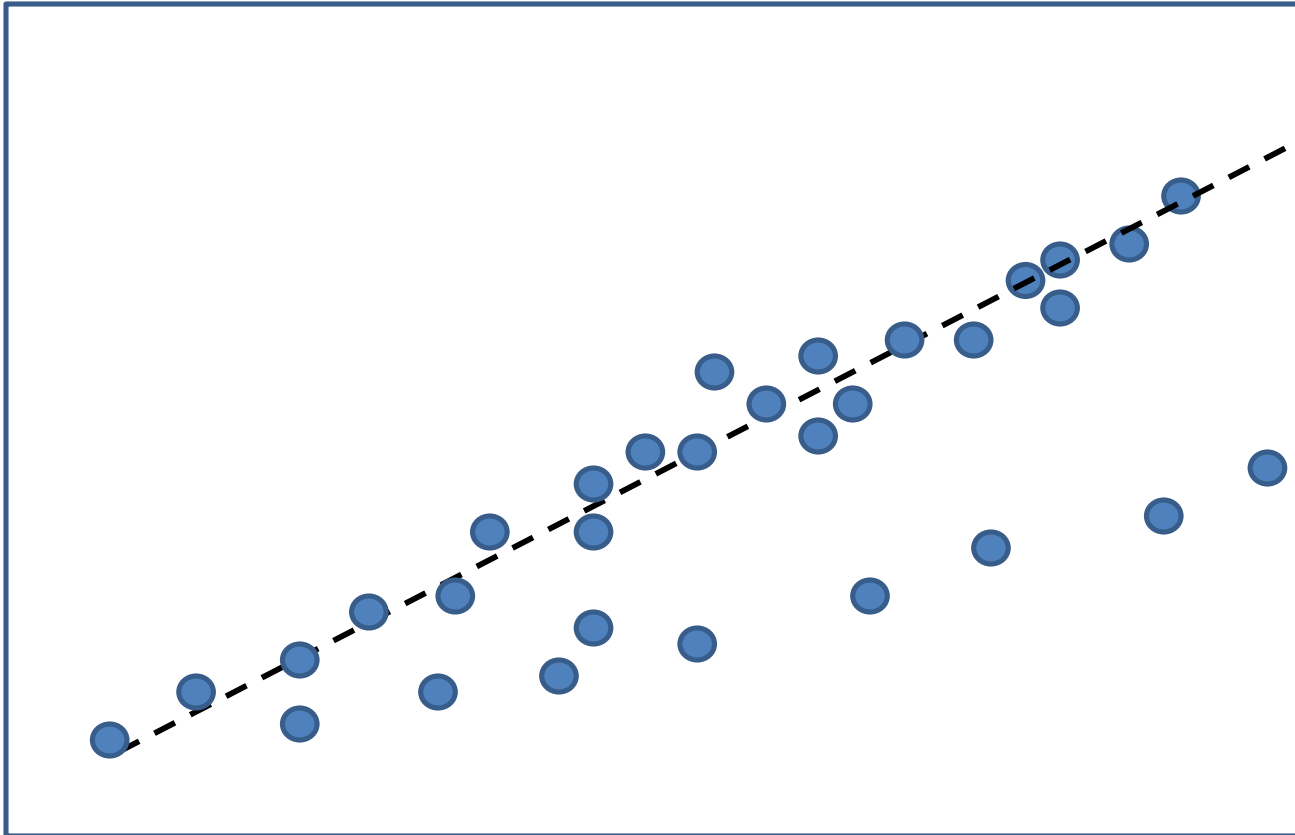
08/02/2018

# Typical Response of Biota to Stressors



# Typical Response of Biota to Stressors

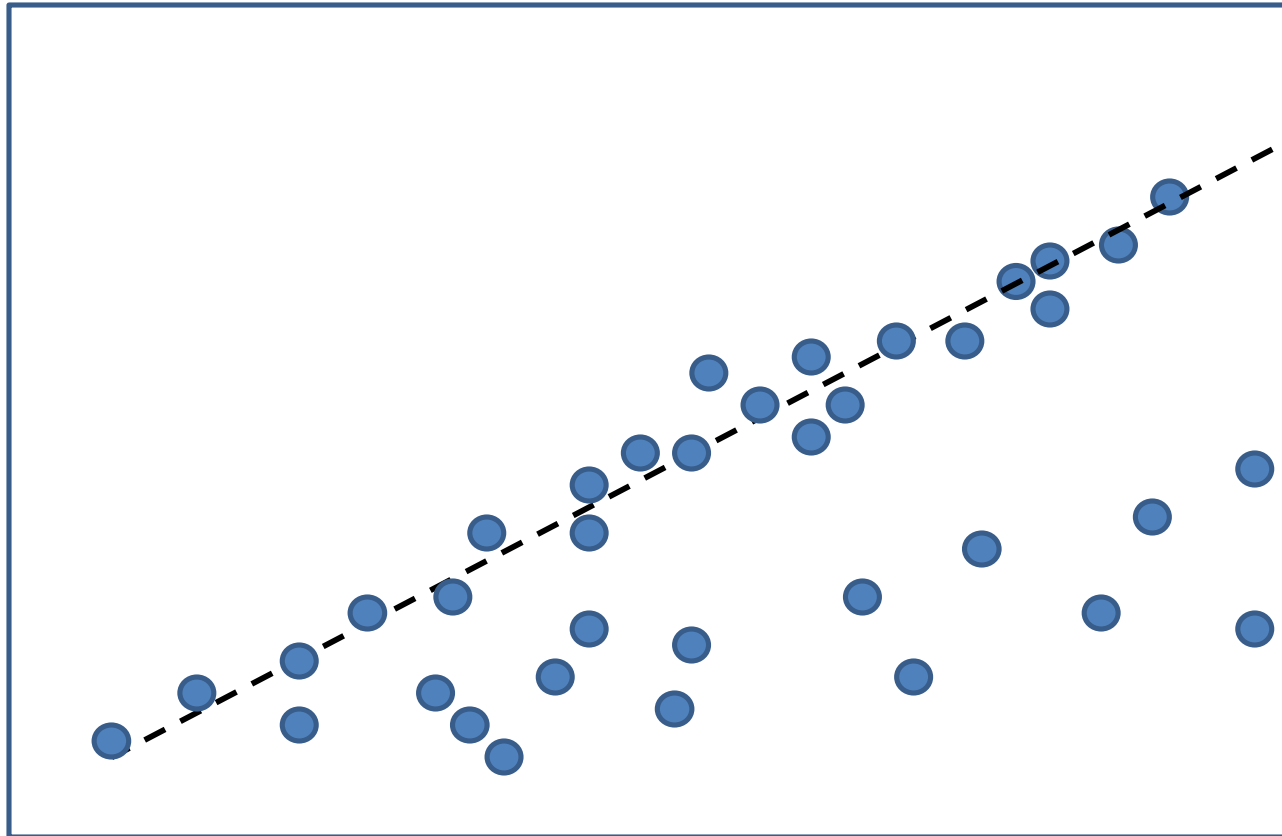
1 Unmeasured factor limiting at some sites



Modified from Cade and Noon

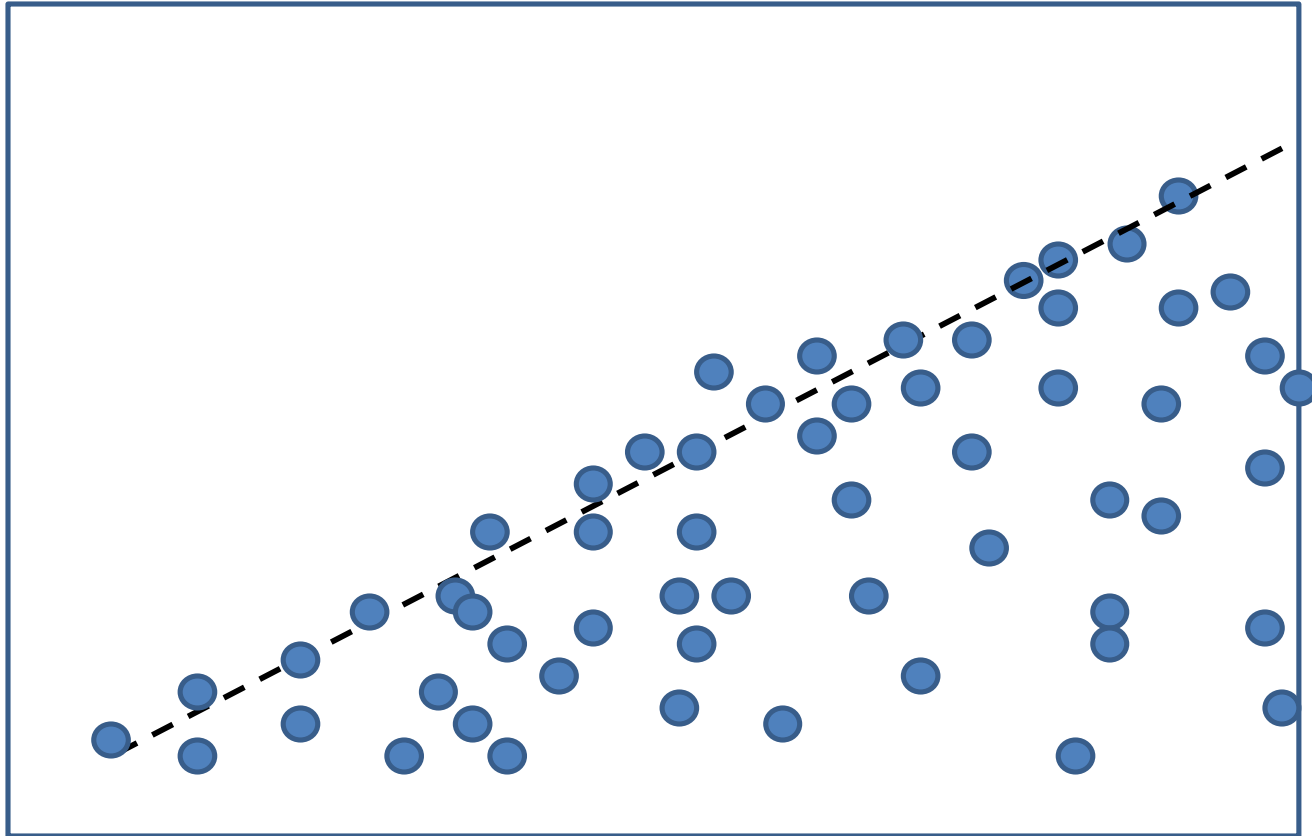
# Typical Response of Biota to Stressors

2 Unmeasured factors limiting at some sites

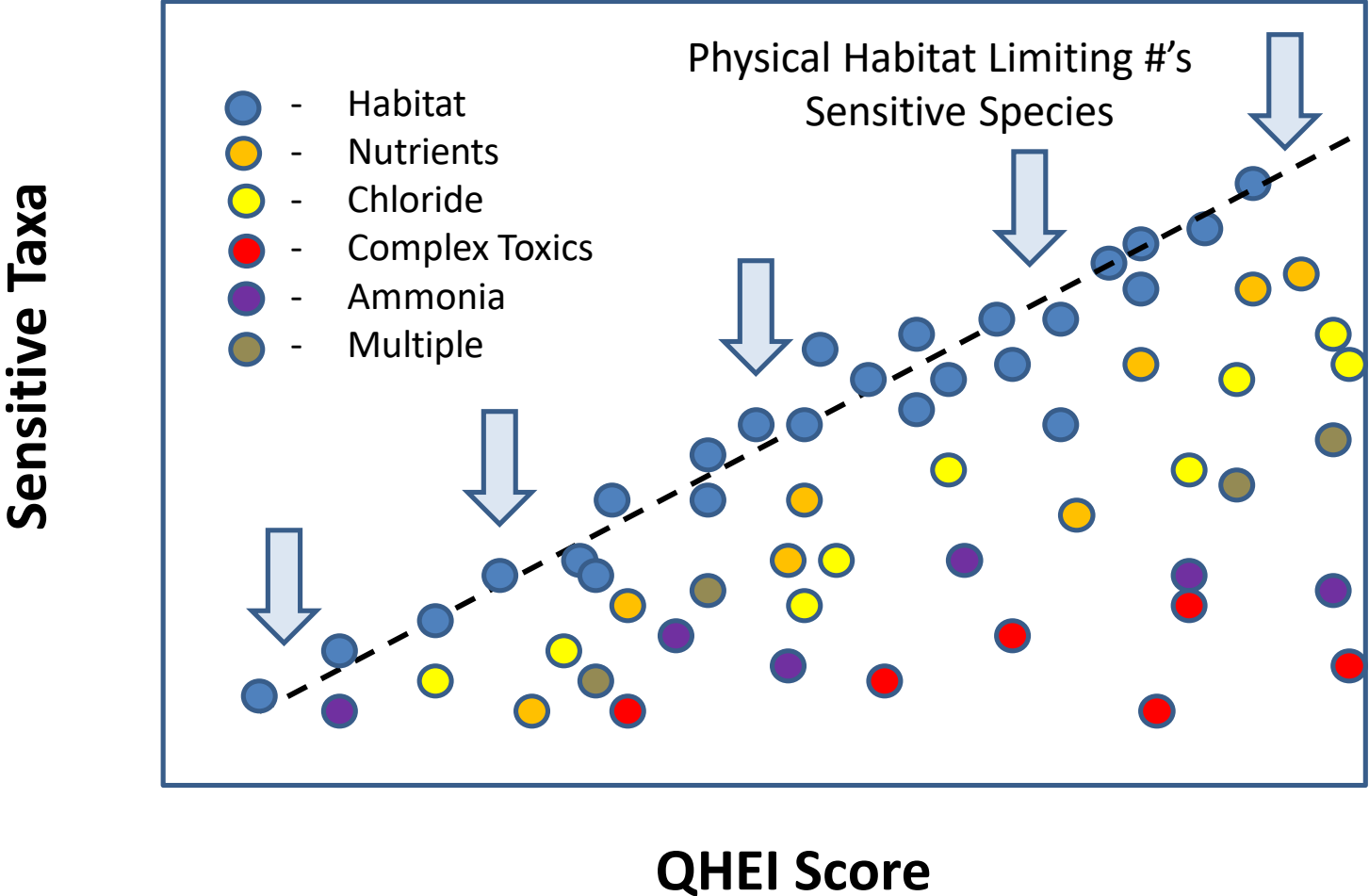


# Typical Response of Biota to Stressors

Unmeasured factor limiting at many sites



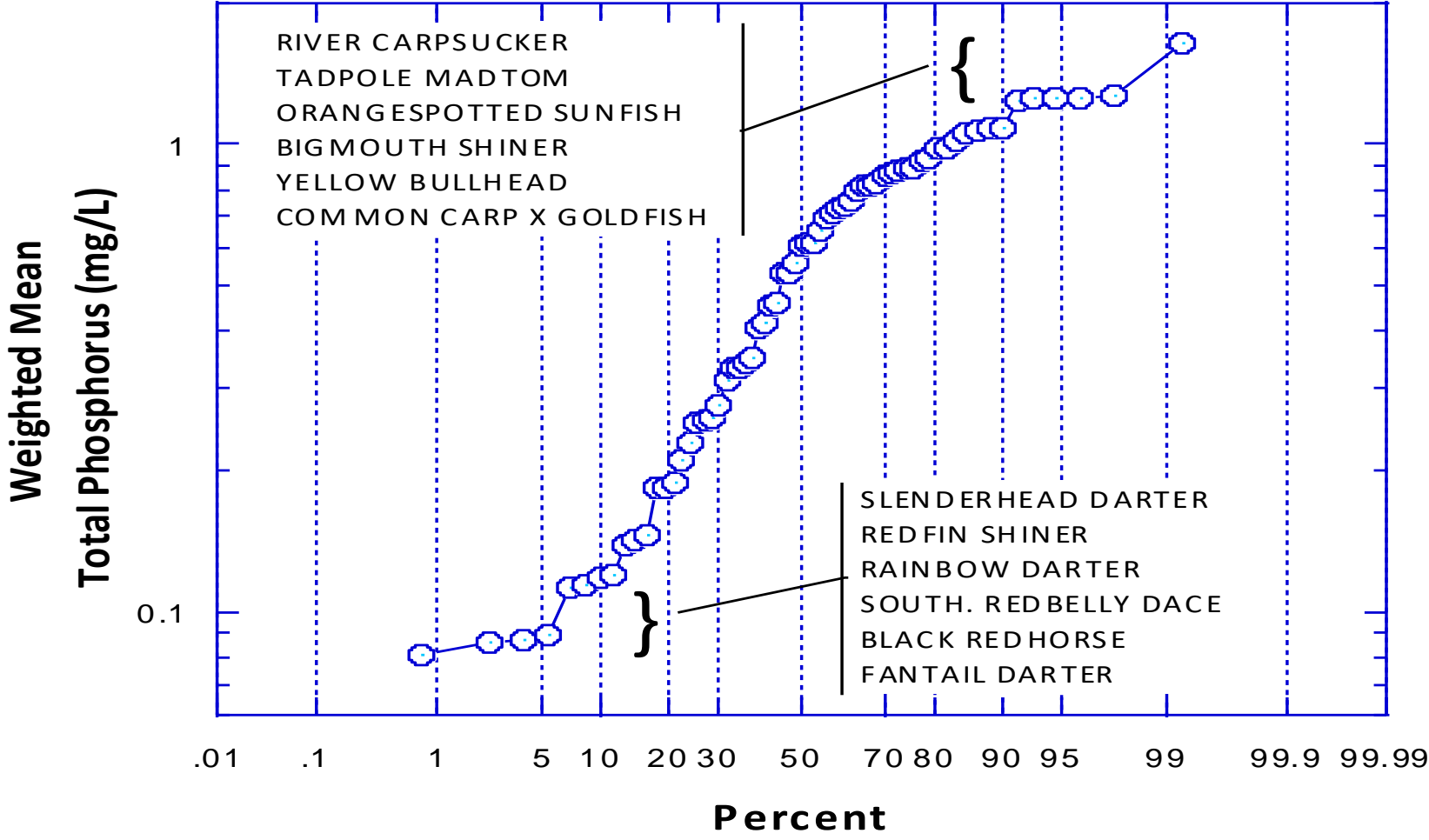
# Typical Response of Biota to Stressors



Modified from Cade and Noon

# Field-Derived Species Sensitivity Distribution Step 1: Derive WSVs

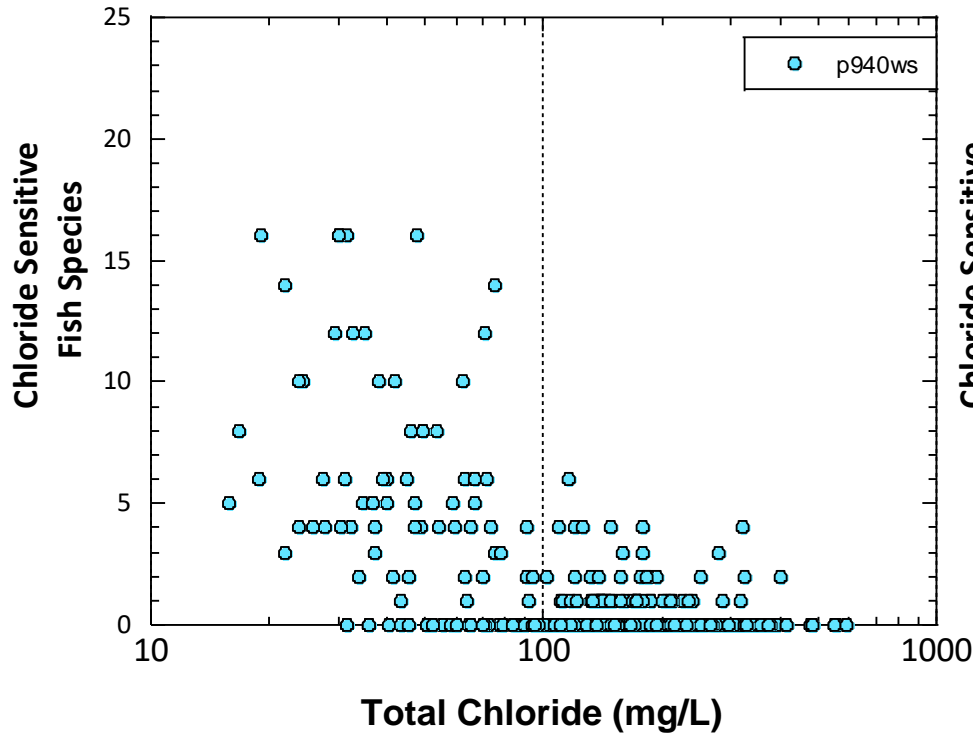
*Fish - Wadeable Streams*



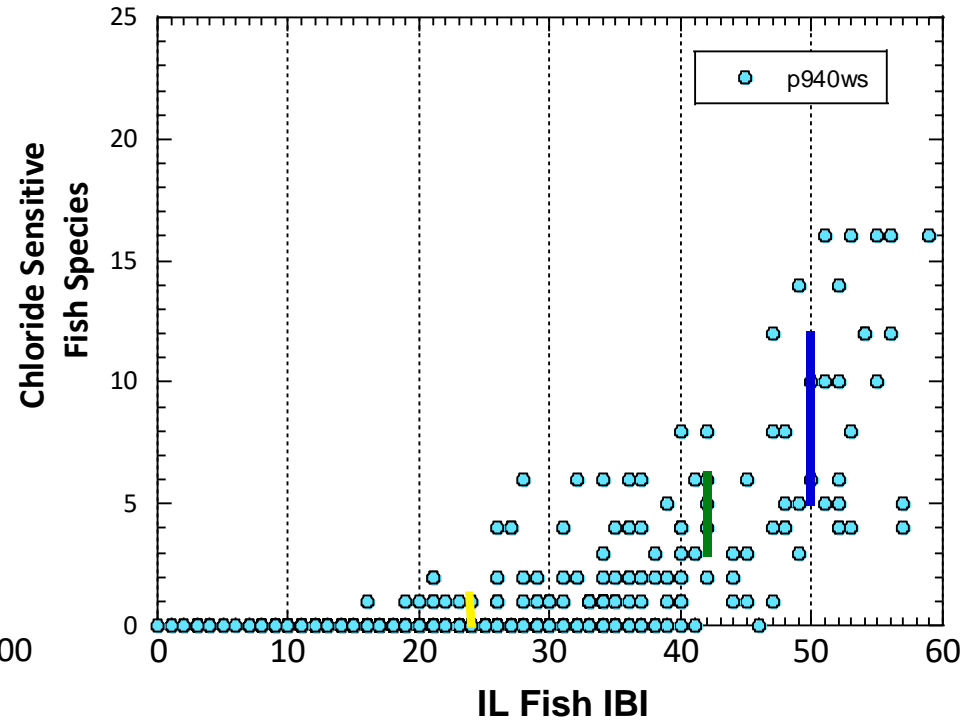


# Step 2 Derive Stress:Response Thresholds: Chlorides

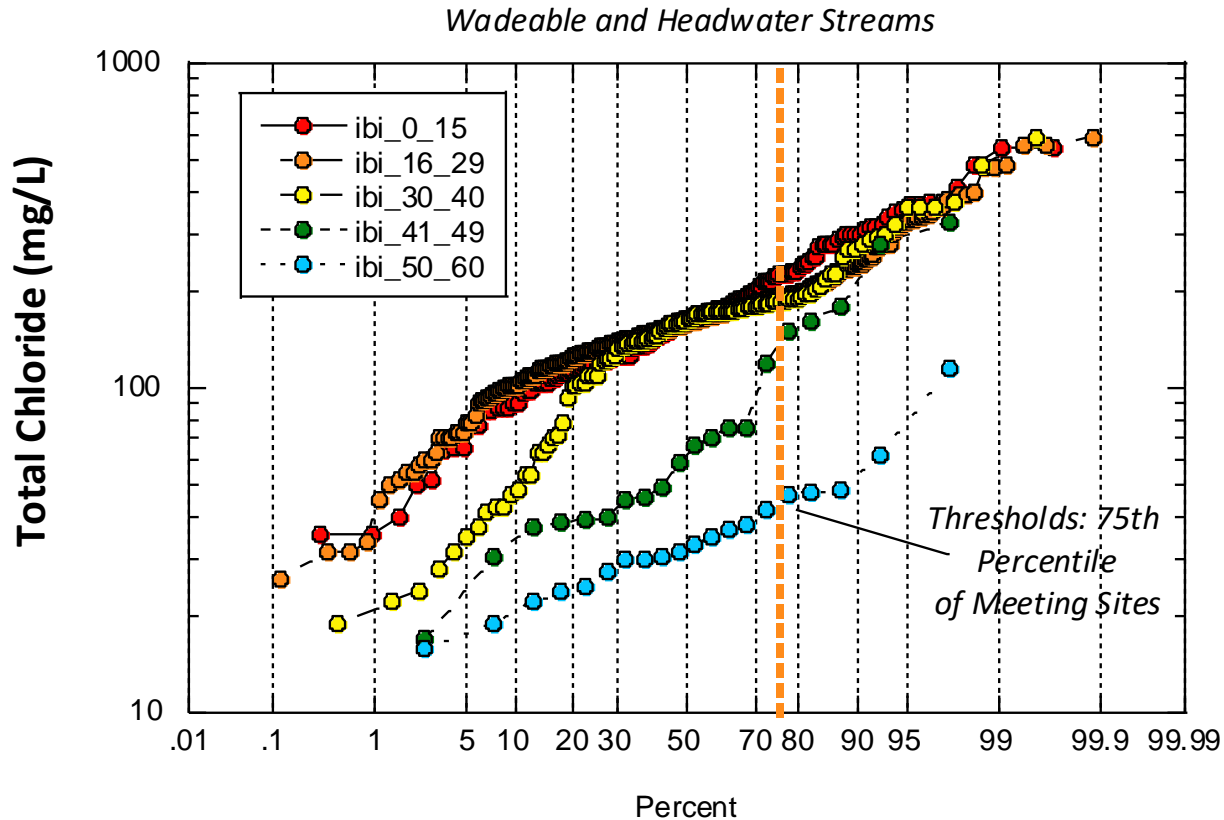
NE Illinois Data - Wadeable Sites



NE Illinois Data - Wadeable Sites



# Step 2 Derive Stress:Response Thresholds: Chlorides



	Narrative Condition Category Thresholds (mg/L)					Reference	
Parameter	Very Poor	Poor	Fair	Good	Excellent	Mean/ Median	IQR
Total Chloride (mg/L)	>295	>169	>120	>40	<40	123.3/ 156.5	49.0- 171.0

# NE IL IPS Biological Effect Thresholds<sup>1</sup>: Selected Ionic Strength Parameters

	Limiting Biological Effects	Narrative	Benchmark	Sites (N)
Chloride (mg/L)	Fish	Excellent	40.0	156 mg/L (49-171) N=34
		Good	120.0	
		Fair/Poor	185.5	
		Poor/V. Poor	251.2	
Total Dissolved Solids (TDS) (mg/L)	Fish	Excellent	453.8	622 (608-670) N=25
		Good	558.0	
		Fair/Poor	652.1	
		Poor/V. Poor	746.4	
Sulfate (mg/L)	Macros	Excellent	58.3	54.1 (15.5-81.8) N=36
		Good	73.1	
		Fair/Poor	83.5	
		Poor/V. Poor		

<sup>1</sup> Excellent and Good meet the General Use

Parameter	Limiting Assemblage	Narrative Range	Benchmark (mg/L)	Reference Sites Median (IQR)
Chloride (mg/L)	Fish	Excellent	40.0	156 mg/L (49-171) N=34
		Good	120.0	
		Fair/Poor	185.5	
		Poor/V. Poor	251.2	
Total Dissolved Solids (TDS) (mg/L)	Fish	Excellent	453.8	622 (608-670) N=25
		Good	558.0	
		Fair/Poor	652.1	
		Poor/V. Poor	746.4	
Sulfate (mg/L)	Macros	Excellent	58.3	54.1 (15.5-81.8) N=36
		Good	73.1	
		Fair/Poor	83.5	
		Poor/V. Poor	94.0	

# NE IL IPS Biological Effect Thresholds: Nutrient & Effect Parameters

Parameter	Limiting	Benchmark	Reference Sites Median (IQR)
Total Phosphorus (mg/L)	Fish	Excellent	0.088 mg/L (0.062-0.115) N=35
		Good	
		Fair/Poor	
		Poor/V. Poor	
Nitrate (mg/L)	Fish	Excellent	0.37 mg/L (0.29-1.09) N=28
		Good	
		Fair/Poor	
		Poor/V. Poor	
Max. Dissolved Oxygen (mg/L)	Fish	Excellent	NA
		Good	
		Fair/Poor	
		Poor/V. Poor	

Parameter	Limiting Assemblage	Narrative Range	Benchmark (mg/L)	Reference Sites Median (IQR)
Total Phosphorus (mg/L)	Fish	Excellent	0.106	0.088 mg/L (0.062-0.115) N=35
		Good	0.277	
		Fair/Poor	1.010	
		Poor/V. Poor	1.740	
Nitrate (mg/L)	Fish	Excellent	3.77	0.37 mg/L (0.29-1.09) N=28
		Good	5.05	
		Fair/Poor	7.36	
		Poor/V. Poor	9.69	
Max. Dissolved Oxygen (mg/L)	Fish	Excellent	10.36	NA
		Good	12.20	
		Fair/Poor	14.26	
		Poor/V. Poor	16.33	

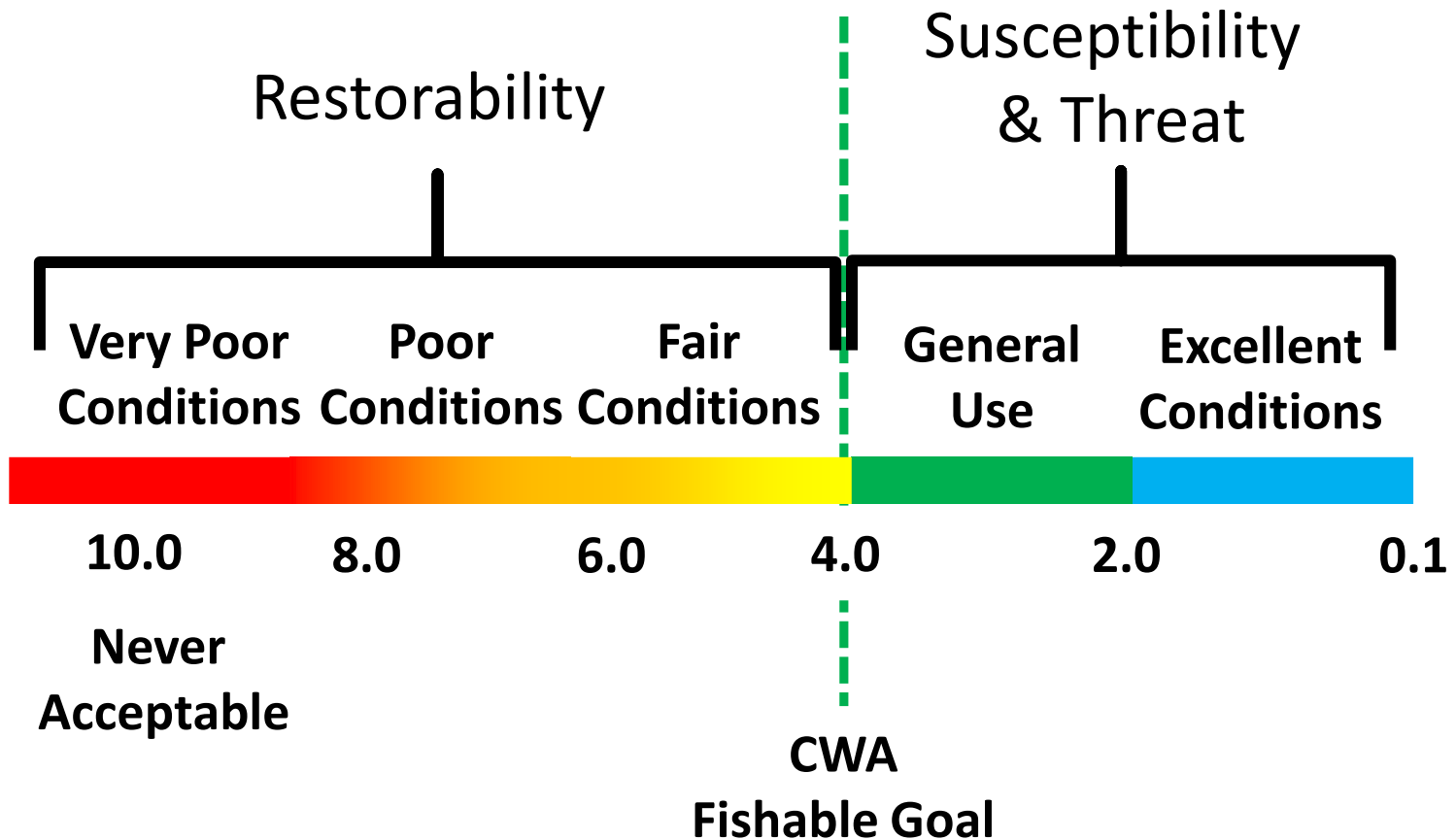
# NE IL IPS Biological Effect Thresholds: Organic Enrichment Parameters

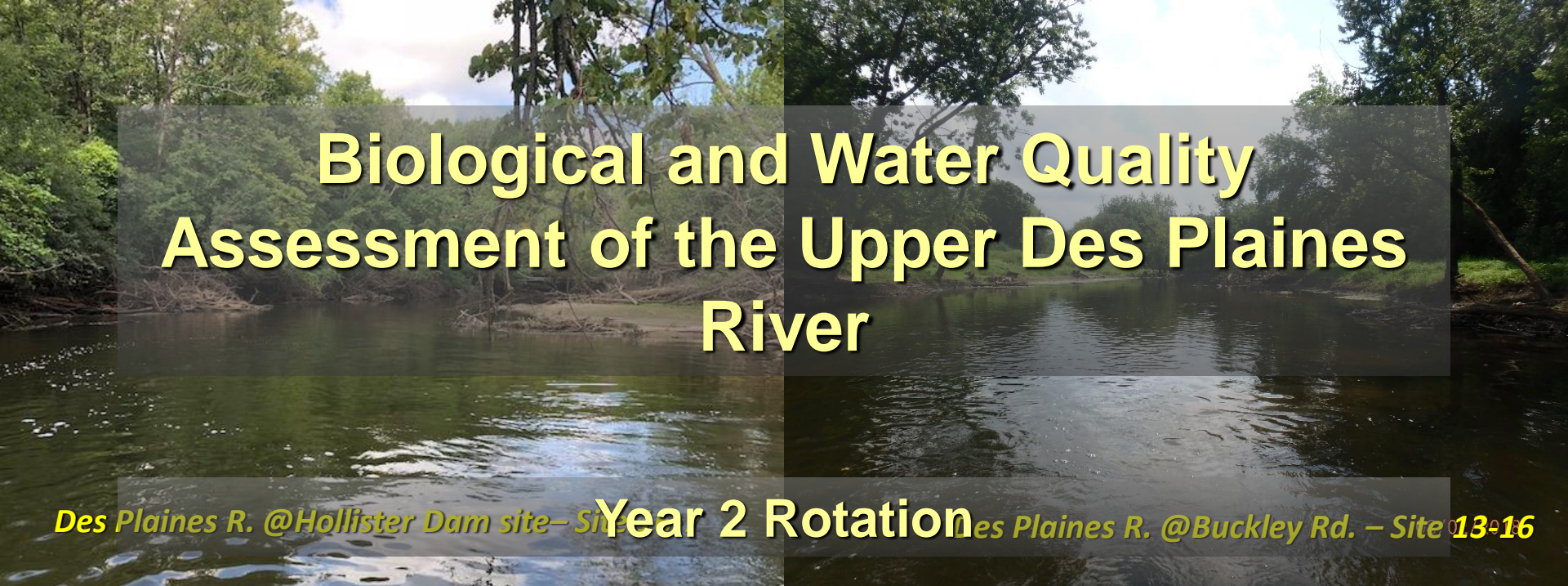
Parameter	Limiting	Benchmark	Reference Sites
<b>BOD<sub>5</sub></b> <b>(mg/L)</b>	Excellent	1.30	2.0 mg/L (2.0-2.25)
	Good	2.35	
	Fair/Poor	3.46	
	Poor/V. Poor	4.56	
<b>Total Ammonia</b> <b>(mg/L)</b>	Excellent	0.084	0.10 mg/L (0.10-0.10)
	Good	0.10	
	Fair/Poor	0.19	39
	Poor/V. Poor	0.28	
<b>Total Kjeldahl</b> <b>Nitrogen (TKN)</b> <b>mg/L</b>	Excellent	1.07	0.78 mg/L (0.34-0.99)
	Good	1.12	
	Fair/Poor	1.63	N=38
	Poor/V. Poor	2.15	

Parameter	Limiting Assemblage	Narrative Range	Benchmark (mg/L)	Reference Sites Median (IQR)
<b>BOD<sub>5</sub> (mg/L)</b>	Macros	Excellent	1.30	2.0 mg/L (2.0-2.25)
		Good	2.35	
		Fair/Poor	3.46	
		Poor/V. Poor	4.56	
<b>Total Ammonia (mg/L)</b>	Macros	Excellent	0.084	0.10 mg/L (0.10-0.10) 39
		Good	0.10	
		Fair/Poor	0.19	
		Poor/V. Poor	0.28	
<b>Total Kjeldahl Nitrogen (TKN) mg/L</b>	Macros	Excellent	1.07	0.78 mg/L (0.34-0.99) N=38
		Good	1.12	
		Fair/Poor	1.63	
		Poor/V. Poor	2.15	




# Standardization of Stressor and Condition Measures





# Biological and Water Quality Assessment of the Upper Des Plaines River

*Des Plaines R. @Hollister Dam site– Site 13-16* **Year 2 Rotation** *Des Plaines R. @Buckley Rd. – Site 13-16*



## Des Plaines River Watershed Workgroup August 15, 2019

Chris O. Yoder  
Midwest Biodiversity Institute  
Columbus, OH

*Des Plaines R. Wright Woods Dam site– Site 16-8*

*Des Plaines R. Ust. IL-WI Line – Site 13-6*

# Aquatic Life Use Status: 2018

Site ID	River Miles	Drainage Area (sq. mi)	fIBI	MIwb	mIBI	QHEI	Attainment Status
<b>Upper Des Plaines River 2018</b>							
13-6	109.30/109.30	123.7	33.5*	8.8	33.0*	58.5	Non - Fair
13-5	106.60/106.60	137.3	29.5*	7.7	20.7*	50.0	Non - Poor
13-4	102.90/102.90	145.6	26.5*	8.7	29.9*	59.0	Non - Fair
13-18	99.72/ -----	213.2	22.5*	8.4	---	47.0	[Non - Fair]
13-19	99.30/99.30	212.9	30.0*	8.9	35.9*	79.0	Non - Fair
13-3	98.70/98.70	220.3	33.5*	9.4	53.7	74.0	Partial
13-2	96.82/96.82	225.4	35.0*	8.7	48.3	84.5	Partial
13-1	94.20/94.20	232.0	42.5	9.4	60.7	78.5	Full
13-16	90.60/90.60	253.8	41.0	8.9	55.2	72.5	Full
16-6	87.10/87.10	261.4	42.0	8.7	54.7	74.0	Full
16-7	84.60/84.60	266.5	41.5	8.4	47.5	80.5	Full
16-5	83.60/83.60	268.0	32.5*	8.5	56.0	67.0	Partial
16-8	82.90/82.90	268.9	33.5*	8.1	41.7*	72.5	Non - Fair
16-4	80.00/80.00	273.2	37.0*	7.7	52.0	70.0	Partial
16-3	76.70/76.70	314.7	38.0*	8.6	54.2	73.0	Partial
16-2	75.40/75.40	324.0	42.0	8.0	55.2	59.8	Full
16-1	71.70/71.70	358.7	40.5*	8.2	35.8*	74.5	Non - Fair

# Applying the IPS Model to the Upper Des Plaines Bioassessment 2018

Site ID	River Mile	AQLU Status	2018 MBI Causes by Stressor Threshold Narrative Category			MBI Sources	IPS Restorability Score (0-100)	IPS Susceptibility Score (0-100)	IPS Threat Score (0-100)		
			Very Poor <sup>4</sup>	Poor <sup>4</sup>	Fair <sup>4</sup>						
<i>Des Plaines River Mainstem</i>											
13-6	109.3	NON - Fair	Low D.O.,Org. Enrich.	Embedded,Turbidity	QHEI Ratio,Siltation,No Sinuosity,Recov. Channel.	Altered Flow; Habitat Modification, NPS	41.2				
13-5	106.6	NON - Poor	Diel D.O.,Org. Enrich.	QHEI Ratio,No Cover,Substr.,Turbidity	Siltation,Embeddness,Recov. Channel	Altered Flow; Habitat Modification, NPS	48.7				
13-4	102.9	NON - Fair	Low D.O.	Org. Enrich.,Substr.,Chan; Turbidity;	Low DP,QHEI,TSS,Sed. Metals;	Altered Flow; Habitat Modification, NPS	48.1				
13-18	99.72	NON - Fair	Impounded,Siltation	QHEI Ratio,Channel Mod.,Metals		Altered Flow; Habitat Modification, NPS	39.8				
13-19	99.3	NON - Fair	None	QHEI Ratio,Metals	Siltation,Embeddness	Habitat Modification, NPS	76.1				
13-3	98.7	Partial	None	None	Low D.O.,Org. Enrich.,QHEI Score,Turbidity,Metals	Upstream Flow & Habitat Modifications, NPS	90.5				
13-2	96.82	Partial	None	Org. Enrich.; PAH	None	Upstream Flow & Habitat Modifications, NPS	93.6				
13-1	94.2	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		56.9	15.38		
13-16	90.6	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		65.2	7.69		
16-6	87.1	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		56.9	11.54		
16-7	84.6	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		62.0	7.69		
16-5	83.6	Partial	None	Org. Enrich.,Metals,PAH	QHEI,Chloride,PAH	Urban NPS, WWTP	85.4				
16-8	82.9	Partial	None	Metals	TP,QHEI,Chloride	Urban NPS, WWTP	88.1				
16-4	80	Partial	None	Org. Enrich.,Metals	TP,Nitrate,QHEI,Chloride	Urban NPS, WWTP	59.1				
16-3	76.7	Partial	None	Metals	TP,Nitrate,QHEI Score,Chloride	Urban NPS, WWTP	93.8				
16-2	75.4	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		38.7	19.2		
16-1	71.7	NON - Fair	None	Diel D.O.,Org. Enrich.,Metals	Chloride	Urban NPS, WWTP	95.7				
<i>Unnamed Tributary to Werhane Lake Drain</i>											
16-10	0.10	ND									
<i>Unnamed Tributary to Des Plaines River</i>											
16-9	0.40	Non-Fair	None	Turbidity	Low D.O.,QHEI Score	Urban NPS	57.2				
<i>Werhane Lake Drain</i>											
16-10B	0.80	Non-Fair	None	None	QHEI Ratio; Siltation,Embedded,Recov. Channel	Urban NPS	35.0				
<b>Narrative Category</b>											
		Excellent	FULL				Very High	Very Low	Very Low		
		Good	FULL				High	Low	Low		
		Fair	Non-Fair				Moderate	Moderate	Moderate		
		Poor	Non-Poor				Low	High	High		
		Very Poor	Non-Poor				Very Low	Very High	Very High		

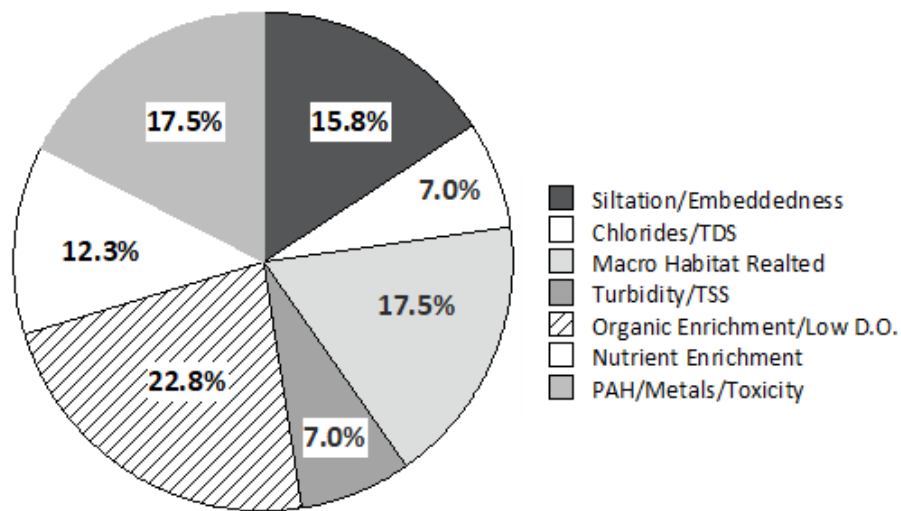
# Applying the IPS Model to the Upper Des Plaines River Assessment 2018

**Legacy channelization & hydrological alteration with lingering effects downstream**

**The benefits of the "dilution" provided by 35+ MGD of treated municipal effluent**

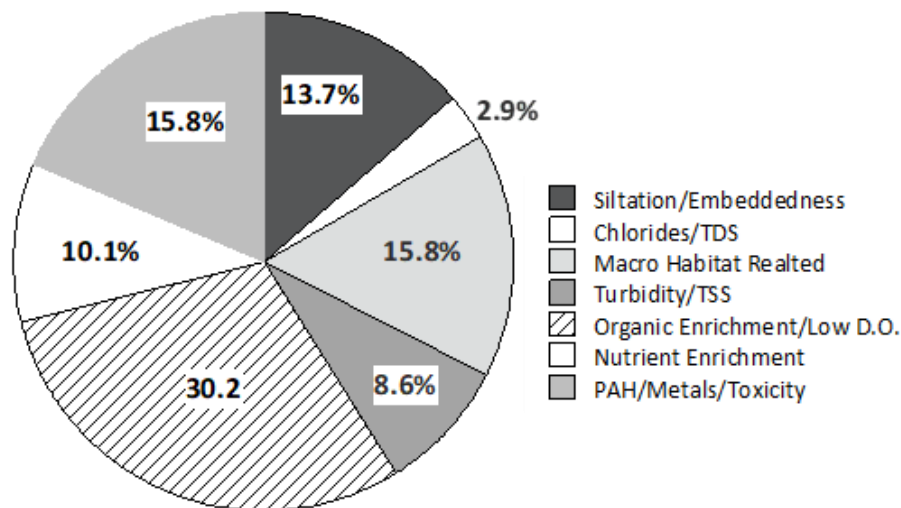
Site ID	River Mile	AQLU Status	Very Poor	Poor	Fair	Good	Excellent	MBI Sources	IPS Restorability Score (0-100)	IPS Susceptibility Score (0-100)	IPS Threat Score (0-100)
13-6	109.3	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Altered Flow; Habitat Modification, NPS	41.2				
13-5	106.6	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Altered Flow; Habitat Modification, NPS	48.7				
13-4	102.9	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Altered Flow; Habitat Modification, NPS	48.1				
13-18	99.72	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Altered Flow; Habitat Modification, NPS	39.8				
13-19	99.3	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Habitat Modification, NPS	76.1				
13-3	98.7	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Upstream Flow & Habitat Modifications, NPS	90.5				
13-2	96.82	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Upstream Flow & Habitat Modifications, NPS	93.6				
13-1	94.2	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		56.9	15.38		
13-16	90.6	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		65.2	7.69		
16-6	87.1	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		56.9	11.54		
16-7	84.6	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		62.0	7.69		
16-5	83.6	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS, WWTP	85.4				
16-8	82.9	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS, WWTP	88.1				
16-4	80	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS, WWTP	59.1				
16-3	76.7	Part-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS, WWTP	93.8				
16-2	75.4	FULL	FULL Attainment - No Causes Assigned			FULL Attainment - No Sources Assigned		38.7	19.2		
16-1	71.7	NON-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS, WWTP	95.7				
16-10	0.10	ND									
16-9	0.40	Non-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS	57.2				
16-10B	0.80	Non-Fair	Low D.O., Org. Enrich	QHEI Ratio, No Cover, Substr., Turbidity	Siltation, Embedness, Flow Cov. Channel	Urban NPS	35.0				
<b>Narrative Category</b>											
	Excellent	FULL						Very High	Very Low	Very Low	
	Good	FULL						High	Low	Low	
	Fair	Non-Fair						Moderate	Moderate	Moderate	
	Poor	Non-Poor						Low	High	High	
	Very Poor	Non-Poor						Very Low	Very High	Very High	

**Major Causes (%) Associated with Aquatic Life Impairments: Year 2 Subwatersheds 2018**



Number of Observations

**Major Causes (Weighted %) Associated with Aquatic Life Impairments: Year 2 Subwatersheds 2018**



Weighted Observations

**Deriving effect thresholds by narrative condition category allows for the weighting of impairment causes in a watershed or river reach context**

# NE Illinois IPS: Power BI Dashboard & User Manual



Midwest Biodiversity Institute, Inc.  
P.O. Box 21561  
Columbus, OH 43221-0561

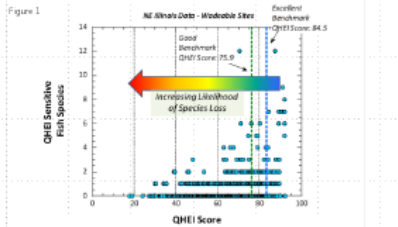


## User Manual for the Northeastern Illinois Integrated Prioritization System (NE IL IPS) and Data Exploration Tool (Version 1.1)

**Introduction (Version 1.0 - Dec 9, 2019)**

The Northeastern Illinois Integrated Prioritization System (NE IL IPS) Dashboard provides summarized information and analyses about the biological condition (aquatic life use status, narrative ratings, IIR, mIR, QHEI, etc.) at this site related to the presence of stressors at the site, reach, and watershed (HUC12) scales. The IPS provides details about restorability ratings for impaired sites and susceptibility and threat ratings to attaining sites based on detailed stressor analyses. This in turn supports analyses and summaries of causes and sources, trends, and important biological, chemical, and physical attributes that are more detailed than that provided in previous biological and water quality reports. It also provides analyses to identify the most limiting stressors for impairments of the Illinois General Use for Aquatic Life and those that pose a threat to attaining sites.

This version of the NE IL IPS supplants an earlier IPS for the DuPage River Salt Creek Workgroup (DRSCW) and widens its application to the watersheds of the Lower DuPage Watershed Coalition (LDPW/C), and the Des Plaines Watershed Workgroup (DPWW) with data collected through 2017 in those watersheds and adjacent watersheds in outlying counties. =New data collected after 2017 will be added for the North Branch Chicago River Watershed Workgroup (NBW/W) and the Lower Des Plaines Watershed




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

- 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.

# IPS Next Steps

- Hands on training for watershed groups – 2 days minimum with pre-training preparation and post-training assignments.
- The watershed groups should begin using Power BI now to “explore” their respective areas.
- Establish links to ongoing and planned projects – are they sufficient to restore, improve, or protect waters?
- Incorporate new tools as they are developed, e.g., the combined nutrient effects assessment in support of the response to NARP.
- Integrate IPS outputs with administrative and/or social well-being measures.





**Matt Sarver, MBI Fish  
Crew Leader**

**Please contact Chris Yoder at  
[cyoder@mwbinst.com](mailto:cyoder@mwbinst.com) or (614)  
403-9592 with any questions or  
comments.**