

Update on Fox River Fishery and Review of Dam Removal Projects in Northeastern Illinois: Benefits to Fish and River Ecosystems

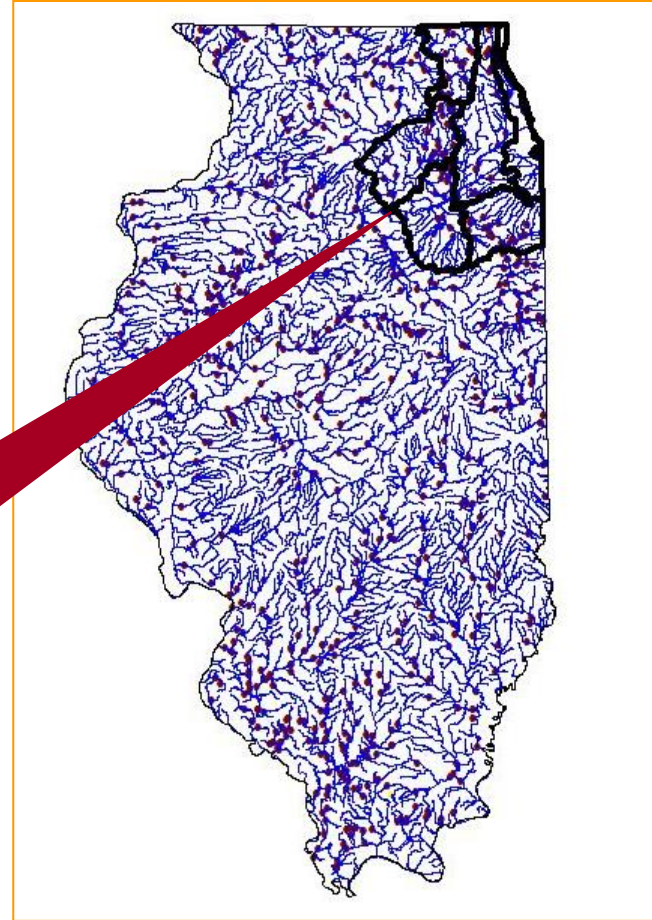


Tristan Widloe and Stephen Pescitelli
Illinois Department of Natural Resources
Region II Streams Program





IDNR REGION 2 Division of Fisheries Streams Program

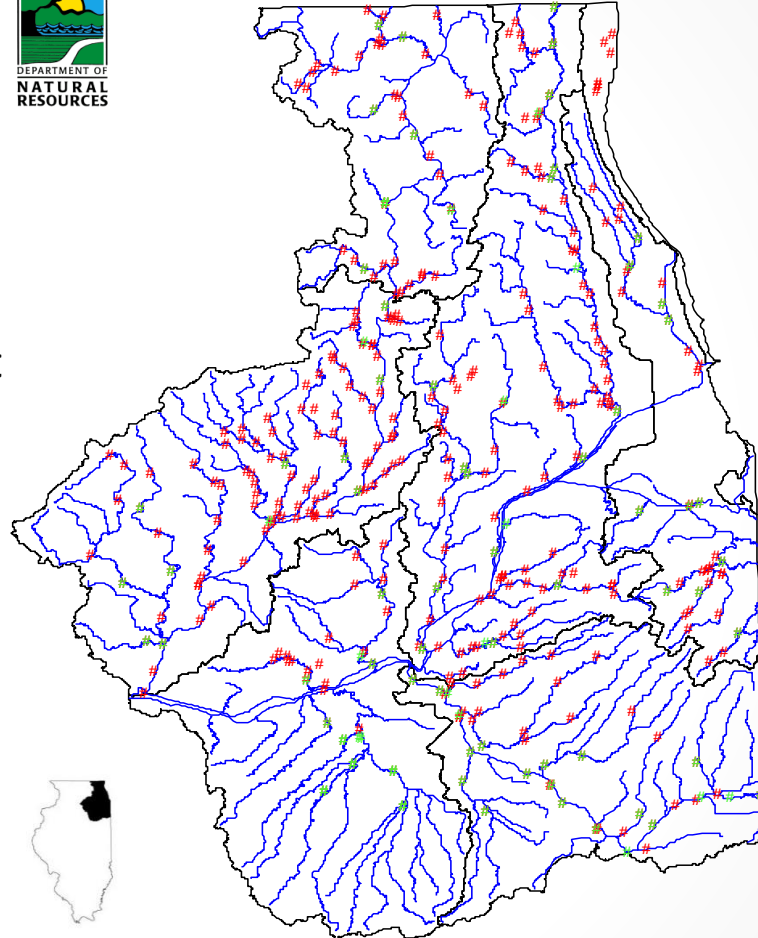


Fox
Des Plaines
-DuPage
Lake Michigan
Kankakee
Mazon
Aux Sable

IDNR Stream Sampling Program

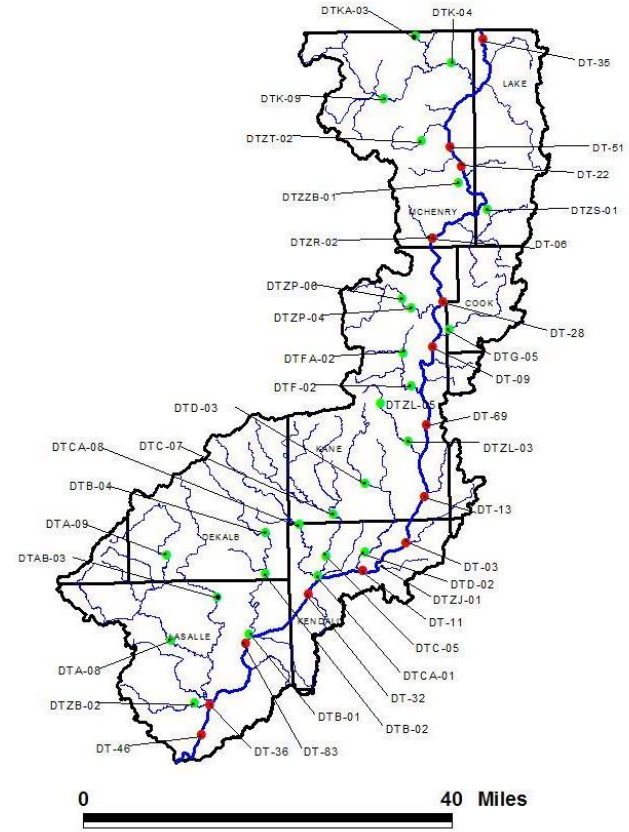
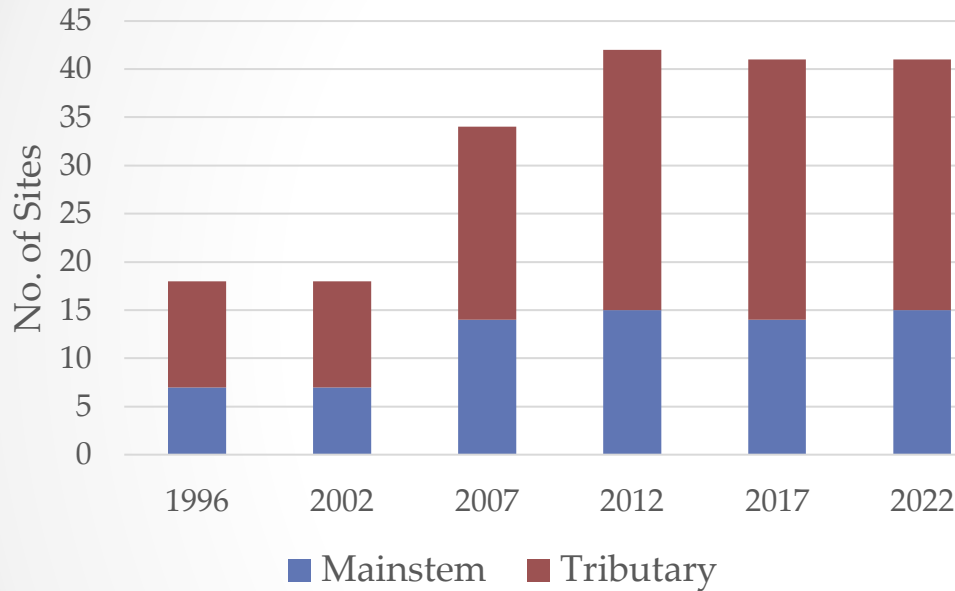


- **Basin Survey sites**
 - large scale
 - five-year rotation
 - IEPA – WQ, macroinverts, habitat
- **Region 2 Sub-basin sites**
 - local scale
 - priority watersheds
 - active watershed groups/projects
 - permitting

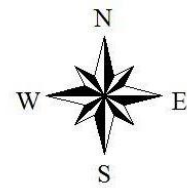




Fox River Basin Survey Sites



- Mainstem Stations
- Tributary Stations
- Fox River
- Tributary Streams
- County Boundaries





2022 Fox River Basin Survey

	No. Stations	Total Fish	No. Species
Mainstem	15	17,094	65
Tributaries	26	24,239	62
Total	41	41,333	79

Fox River Basin Survey



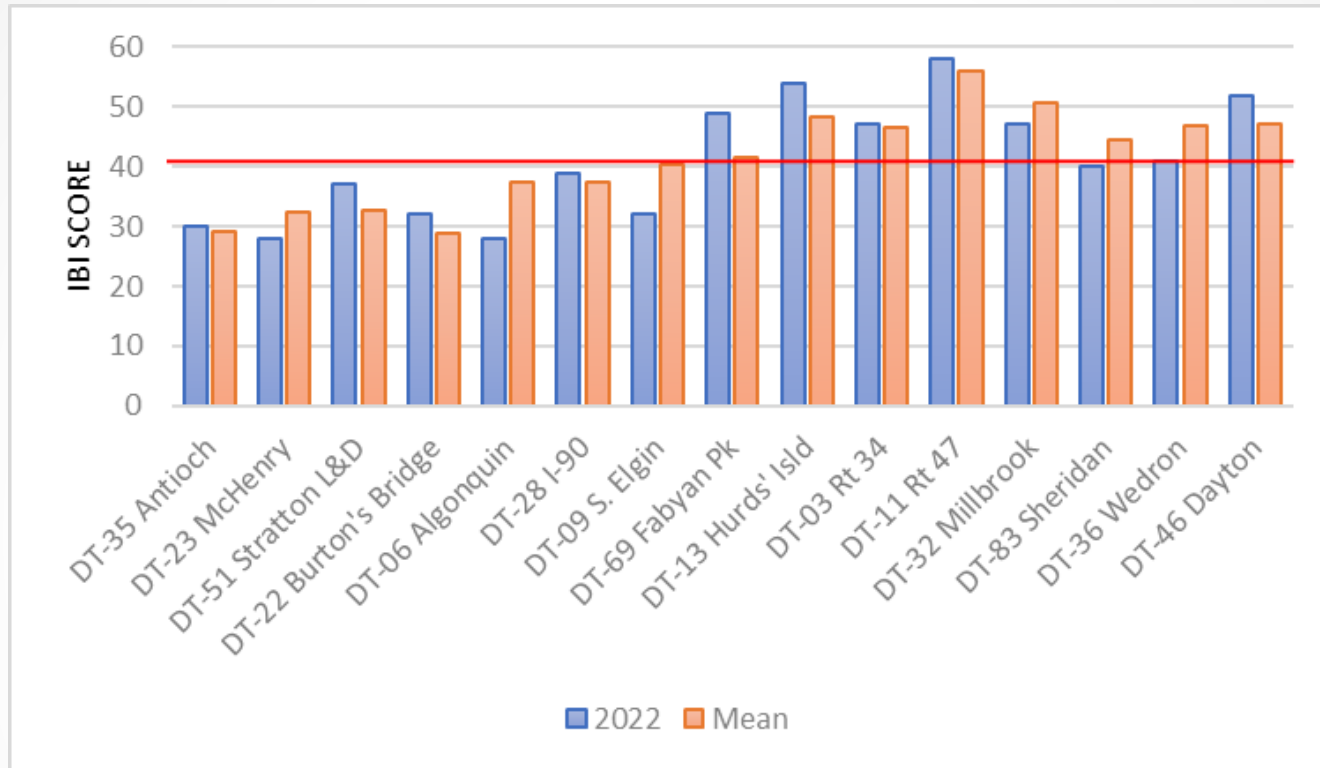


Index of Biotic Integrity – IBI

METRIC	SCORE
No. native fish species	0-6
No. sucker species	0-6
No. sunfish species	0-6
No. intolerant species	0-6
No. minnow species	0-6
No. benthic invertivore species	0-6
Prop. specialist benthic invertivores	0-6
Prop. generalist feeders	0-6
Prop. coarse mineral spawners	0-6
Prop. tolerant species	0-6
total	0-60

Difference of IBI >10 = biologically meaningful change (Smogor 2005)

Fox River Mainstem – IBI Scores

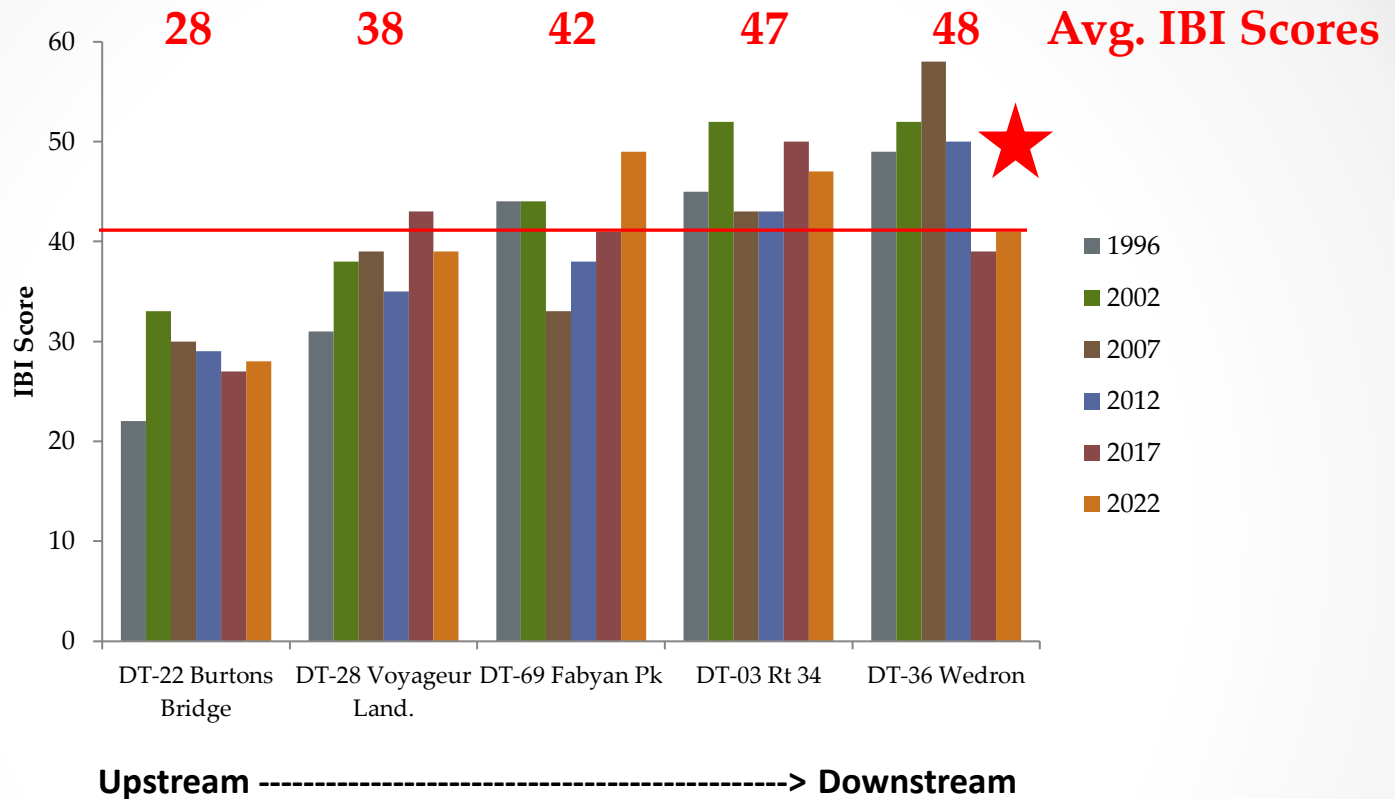


Upstream -----> Downstream



- **IBI \geq 41 “full supporting aquatic life use” – IEPA**
- Upstream of Algonquin: low gradient, dammed, lake-like
- Mid Fox: many dams, highly urbanized
- Lower Fox: less urbanized, free flowing until Dayton Dam

Fox River Mainstem – IBI Scores 1996 to 2022



- **Stations sampled in all Fox Basin surveys since 1996**
- IBI scores variable, though urban gradient is evident
- Overall higher IBI scores in lower Fox – less urban, fewer dams

Fish factors: Habitat / Connectivity

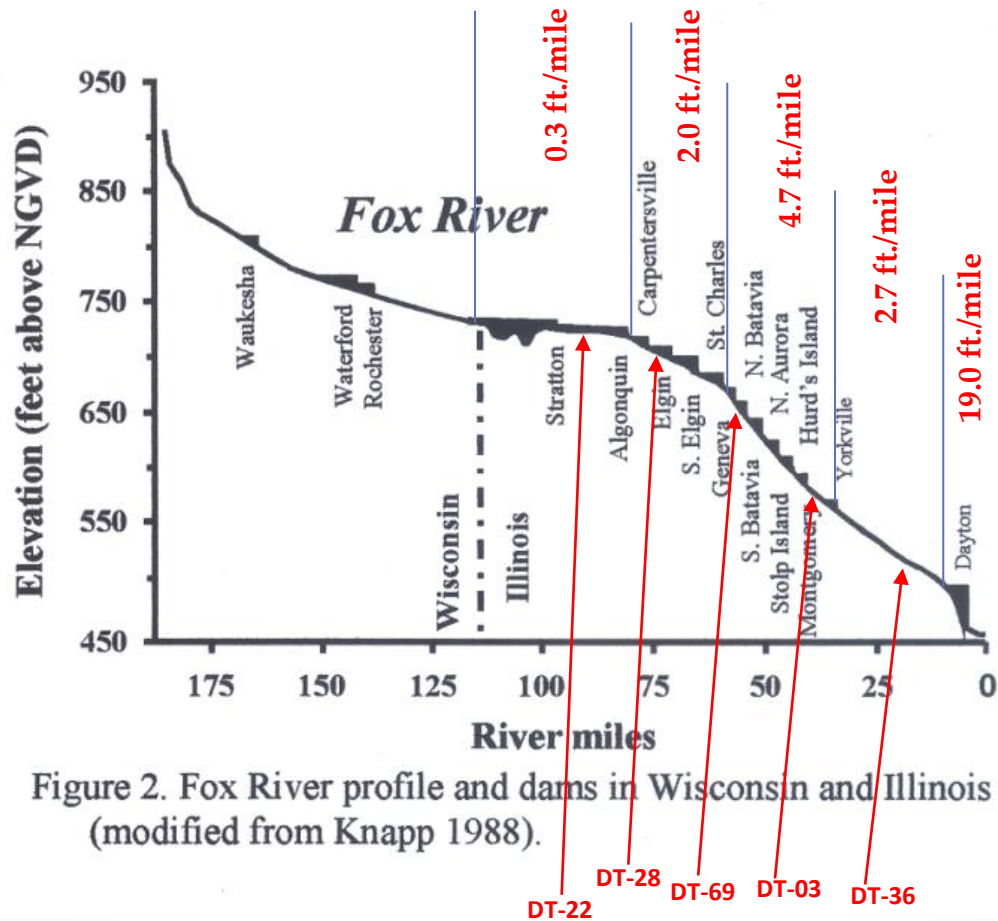
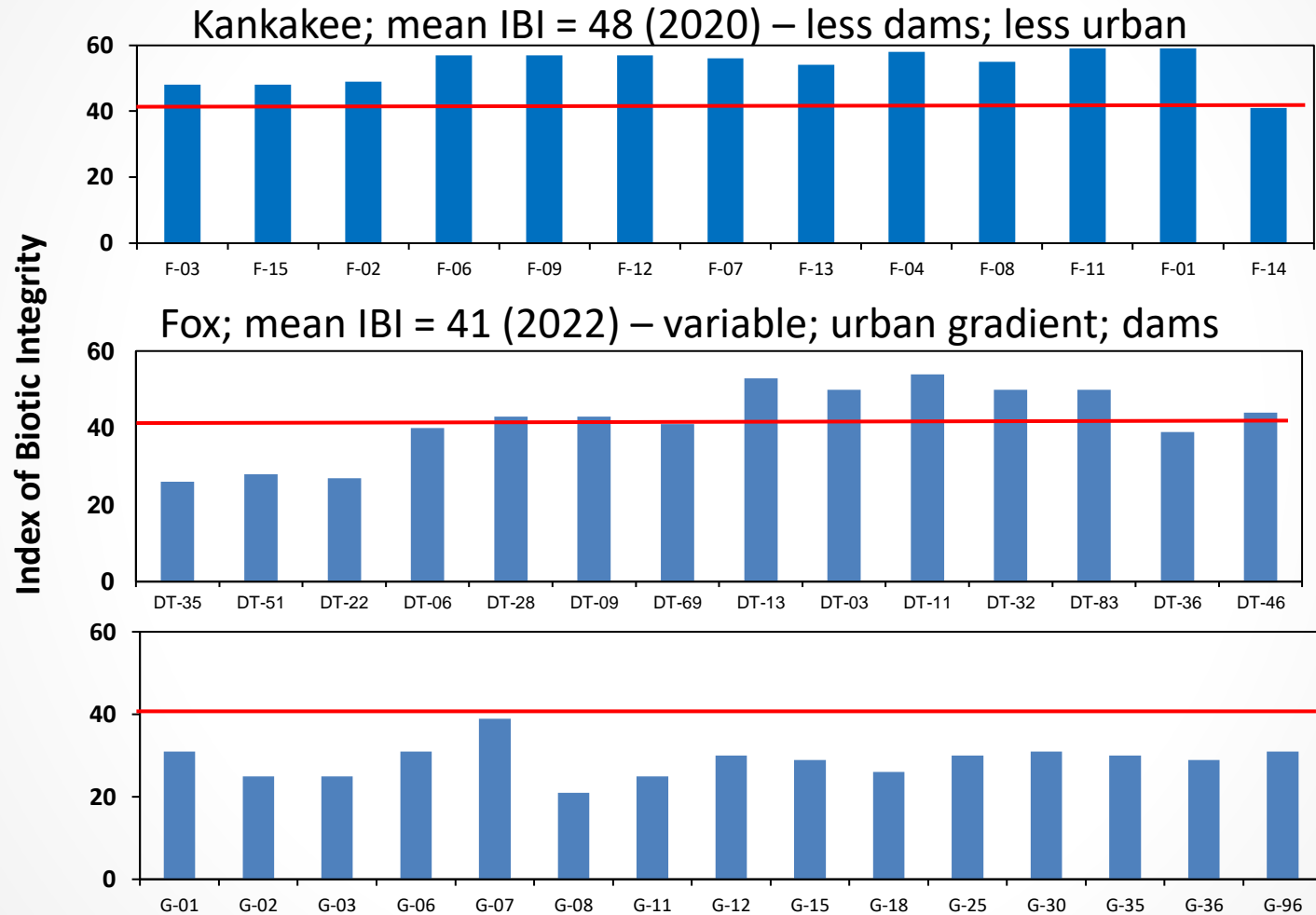
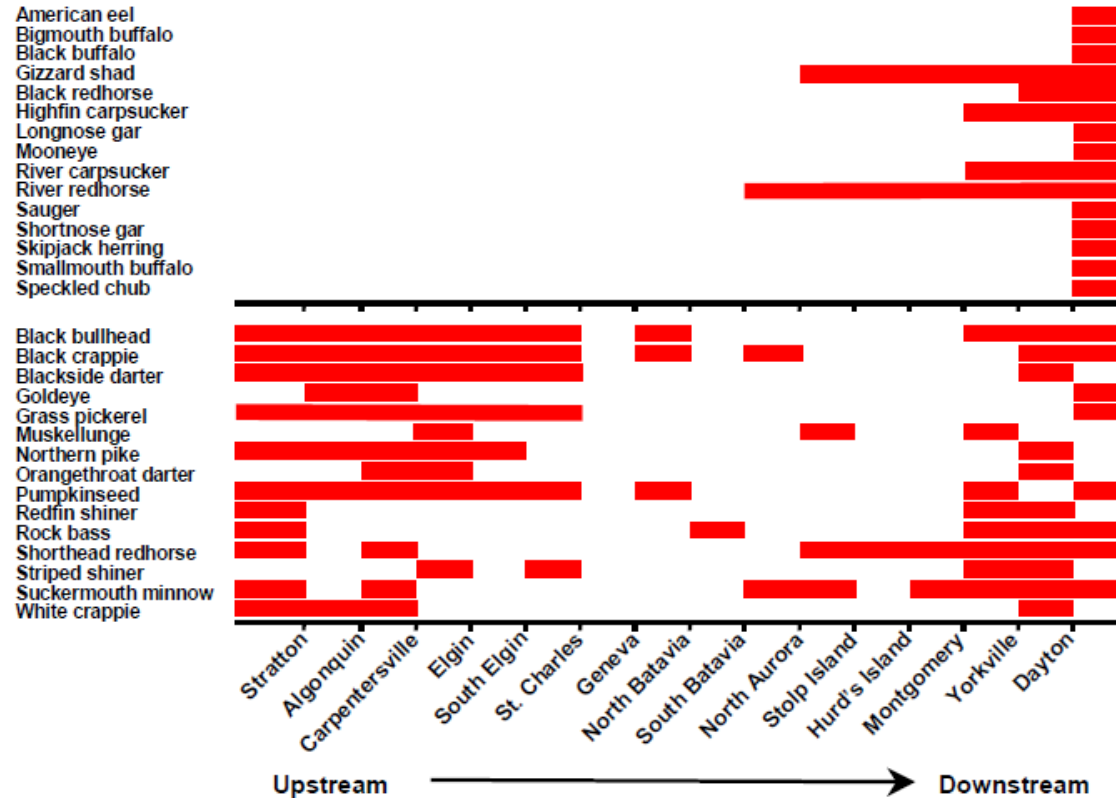


Figure 2. Fox River profile and dams in Wisconsin and Illinois (modified from Knapp 1988).

Comparing the Fox River IBI to other NE IL rivers



Discontinuous Distributions



Dams have restricted distributions of 30% of Fox River fishes.

Santucci and Gephard, 2003, Fox River Fish Passage Feasibility Study, Max McGraw Wildlife Foundation



Discontinuous Distributions Fox River 2022

Segment	Location	Length (mi.)	Channel			No. Dams	No. Sampling Stations
			Gradient (ft./mi.)	Urban Landcover			
UPPER	State Line to Algonquin Dam	39.8	0.3	Moderate	2	4	
MID UPPER	Algonquin Dam to Yorkville Dam	46.1	4.7	High	10	6	
MID LOWER	Yorkville Dam to Dayton Dam	30.8	2.7	Low	1	4	
LOWER	Dayton Dam to Illinois River	5.7	2.5	Low	0	1	

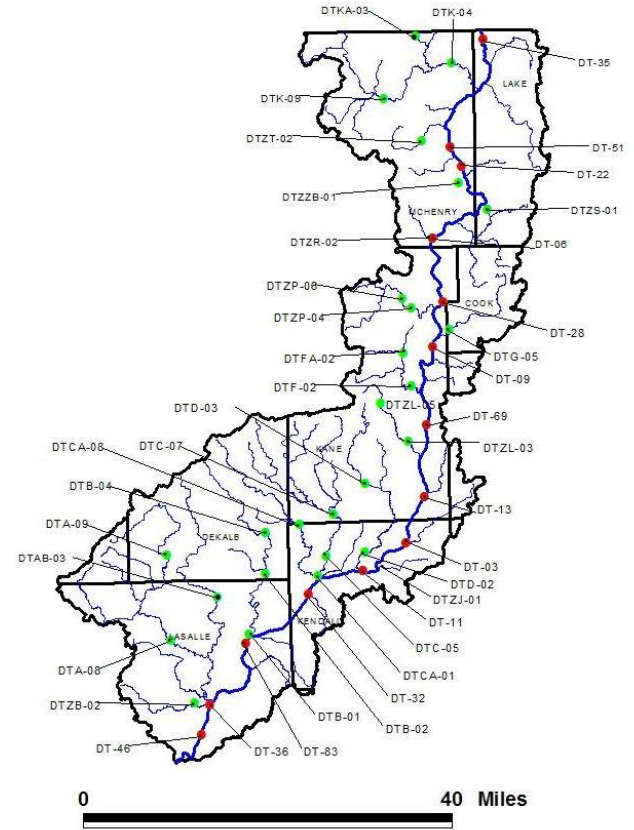
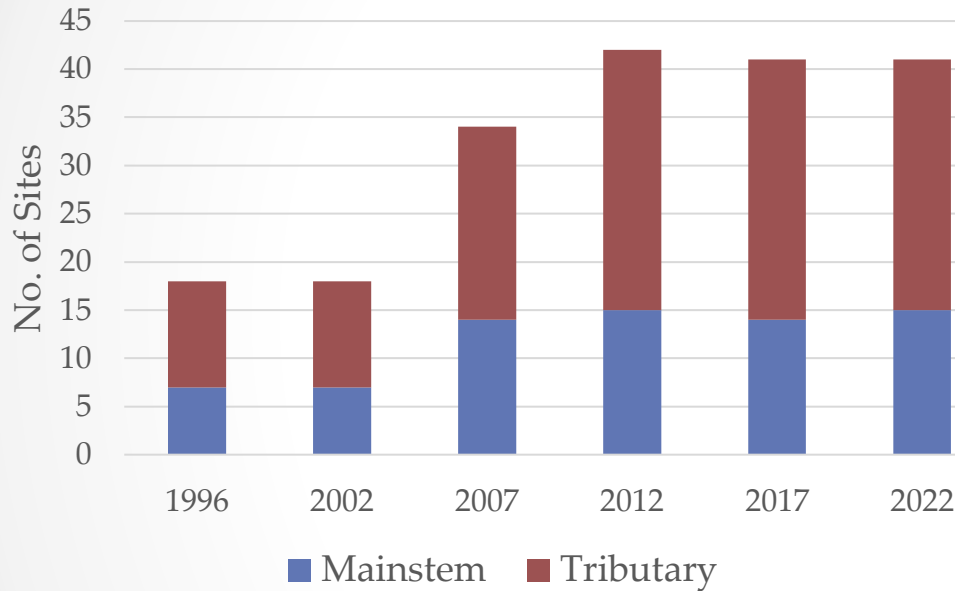
45% ($N = 29$) had discontinuous distribution
 29% ($N = 19$) collected in only one segment
 25% ($N = 16$) collected in all four segments



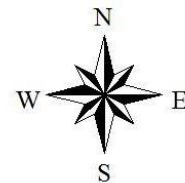
Common name	MID			
	UPPER	UPPER	LOWER	LOWER
Shortnose Gar	0.0	0.0	0.0	5.1
Longnose Gar	0.0	0.0	0.3	10.2
Bowfin	0.3	0.0	0.0	0.0
Gizzard Shad	192.5	0.6	1.0	7.1
Grass Pickerel	1.0	0.0	0.0	0.0
Northern Pike	0.5	0.2	0.0	0.0
Muskellunge	0.0	0.2	0.3	0.0
Silver Carp	0.0	0.0	0.0	50.8
Common Carp	13.5	7.0	9.6	9.2
Golden Shiner	2.8	2.5	0.0	0.0
Southern Redbelly Dace	0.0	0.0	0.3	0.0
Creek Chub	0.0	0.9	0.3	0.0
Hornyhead Chub	0.0	0.0	1.0	0.0
Central Stoneroller	0.0	0.2	0.0	0.0
Suckermouth Minnow	0.0	0.4	1.3	2.0
Blacknose Dace	0.0	0.0	0.3	0.0
Common Shiner	0.0	0.0	1.0	0.0
Spottin Shiner	285.3	183.6	375.4	54.9
Pugnose Minnow	0.5	0.0	0.0	0.0
Fathead Minnow	2.3	0.0	0.0	0.0
Bluntnose Minnow	12.0	27.9	111.2	21.4
Bulhead Minnow	0.0	0.6	33.5	1.0
Emerald Shiner	35.3	2.6	0.0	0.0
Rosyface Shiner	0.0	0.0	11.3	16.3
Bigmouth Shiner	0.5	0.0	0.0	0.0
Blackchin Shiner	0.3	0.0	0.0	0.0
Sand Shiner	2.0	482.6	503.9	6.1
Mimic Shiner	0.5	0.4	0.5	0.0
Spottail Shiner	34.0	80.4	1.8	1.0
Smallmouth Buffalo	0.5	0.0	0.0	35.6
Quillback	107.3	70.6	17.4	3.1
River Carpsucker	0.0	0.0	1.8	13.2
Highfin Carpsucker	0.0	0.0	1.0	4.1
White Sucker	0.5	473.4	6.6	0.0
Northern Hog Sucker	0.0	16.2	16.1	3.1
Shorthead Redhorse	0.3	35.5	44.8	15.3
Black Redhorse	0.0	0.0	4.0	2.0
Golden Redhorse	2.0	9.4	26.0	11.2
Silver Redhorse	0.0	2.6	3.3	1.0
Channel Catfish	7.8	24.5	33.3	15.3
Yellow Bullhead	0.0	0.2	0.0	0.0
Flathead Catfish	1.8	4.7	5.3	4.1
Blackstripe Topminnow	0.3	1.3	14.4	0.0
Brook Silverside	1.8	0.4	0.0	0.0
White Bass	3.3	1.9	0.0	1.0
Yellow Bass	2.3	0.2	0.0	0.0
Black Crappie	1.3	0.4	0.8	0.0
White Crappie	0.3	0.0	0.0	0.0
Rock Bass	2.5	0.0	0.0	0.0
Largemouth Bass	26.0	4.2	0.5	0.0
Smallmouth Bass	6.8	89.1	32.5	34.6
Green Sunfish	1.3	1.1	1.3	2.0
Bluegill	41.3	23.0	4.8	12.2
Pumpkinseed	1.0	0.0	0.0	0.0
Orangespotted Sunfish	0.3	0.4	0.0	0.0
Walleye	1.5	3.8	6.8	0.0
Sauger	0.0	0.0	0.0	1.0
Yellow Perch	2.8	3.0	0.0	0.0
Slenderhead Darter	0.0	0.9	1.5	1.0
Logperch	0.8	4.0	0.3	2.0
Johnny Darter	0.3	2.1	4.5	0.0
Banded Darter	0.3	2.3	9.1	0.0
Rainbow Darter	0.0	0.0	0.3	0.0
Freshwater Drum	20.0	7.0	0.5	40.7
No. species	42	41	41	31



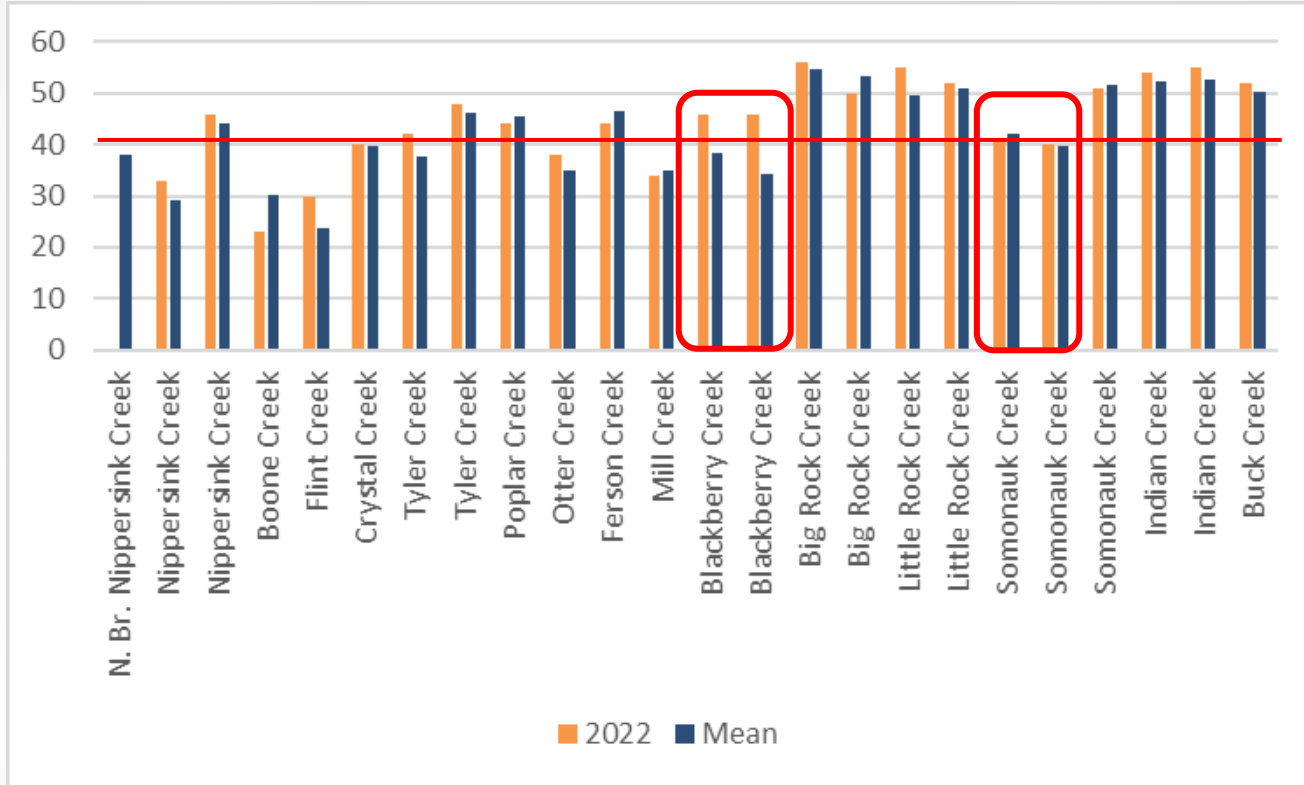
Fox River Basin Survey Sites



- Mainstem Stations
- Tributary Stations
- Fox River
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- County Boundaries



Fox River Tributaries – IBI Scores



Upper WS-----> Lower WS



- IBI scores variable, similar to mainstem, gradient is evident
- Overall higher IBI scores in lower Fox watershed


NE Illinois Dam Projects



Dam Evaluations

Watershed Condition

Legend

 Dams Studied

YWCA (Brewster)
Urban LC: **Moderate**
DS IBI: **37- 49**

Creek Bend (Ferson)
Urban LC: **Moderate**
DS IBI: **45-48**

River Road (Blackberry)
Urban LC: **Low**
DS IBI: **56-59**

Seavey Creek
Urban LC: **High**
DS IBI: **31-39**

Hofmann
Urban LC: **High**
DS IBI: **26-36**

IBI Range = 0 to 60

20 mi



Dam Details

Dam	Stream	Watershed Area (mi. ²)	Year compl.	Hgt (ft.)	Wth (ft.)	Dam Condit.	Cost
YWCA (2)	Brewster Creek	18	2006	8	50	poor	\$400,000
Golf Course	Seavey Creek	11	2009	4	45	poor	\$60,000
Creek Bend	Ferson Creek	54	2010	4	60	fair	\$85,000
Hofmann	Des Plaines River	480	2012	12	259	good	\$2,500,000
River Road	Blackberry Creek	73	2013	12	75	fair	\$900,000



Brewster Creek



YWCA Dam - 2004



DeSanto's Dam - 2006

Brewster Creek

2004 – New channel in former lake bed 4 months post removal



2008 – New channel in former lake bed



Hofmann Dam Removal



Blackberry Creek Dam Removal



Dam Removal Evaluation

PRE-PROJECT

Sampling Sites: ○

POST-PROJECT

“System-wide” effects

- Species distribution
- Habitat reconnection
 - Spawning runs
 - Seasonal migrations

“Localized” effects

- Dam pool

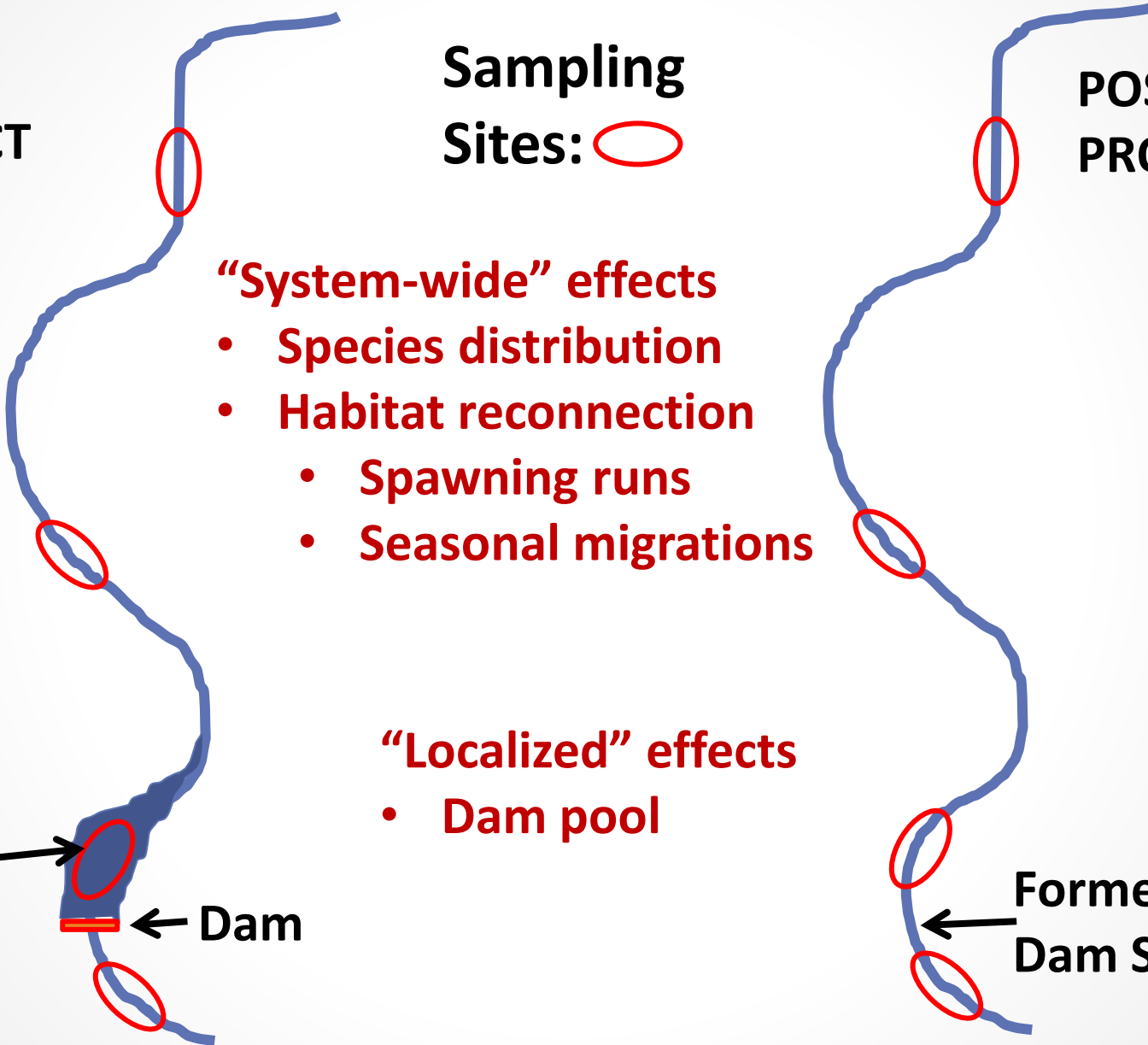
Dam Pool



Dam



Former Dam Site



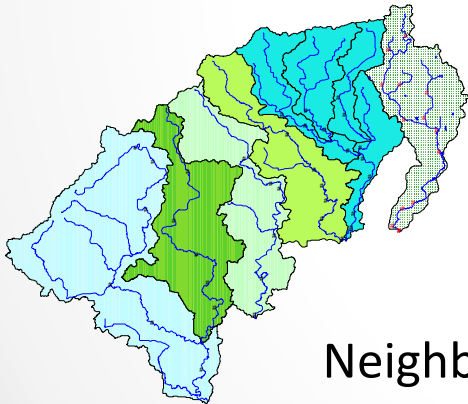
Dam Removal Evaluation

Assessment metrics:

- Species richness
- Catch Per Unit Effort (CPUE)
- Index of Biotic Integrity (IBI)

Analysis:

- T-test
- ANOVA w/ Tukey's HSD



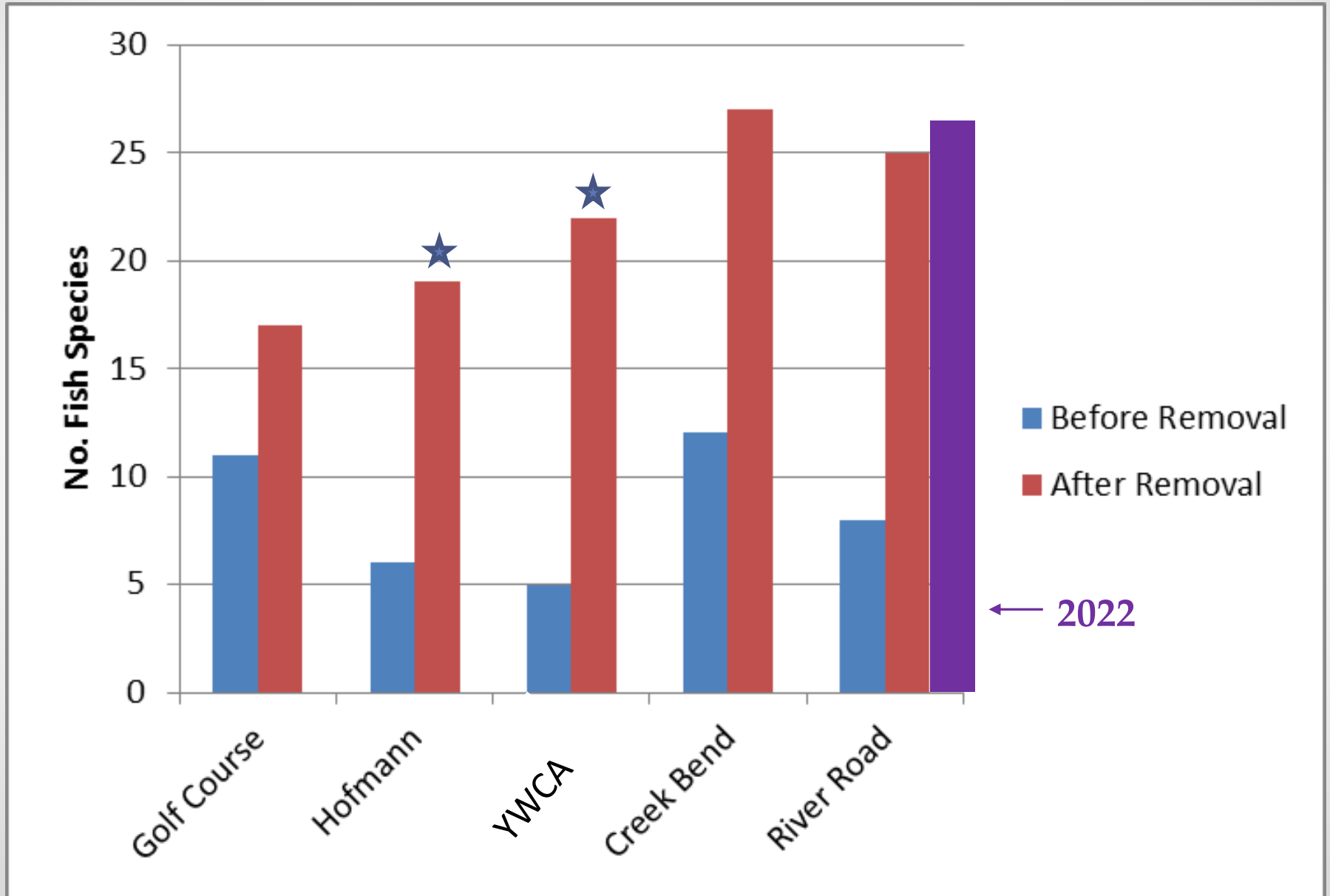
Neighboring
Watersheds



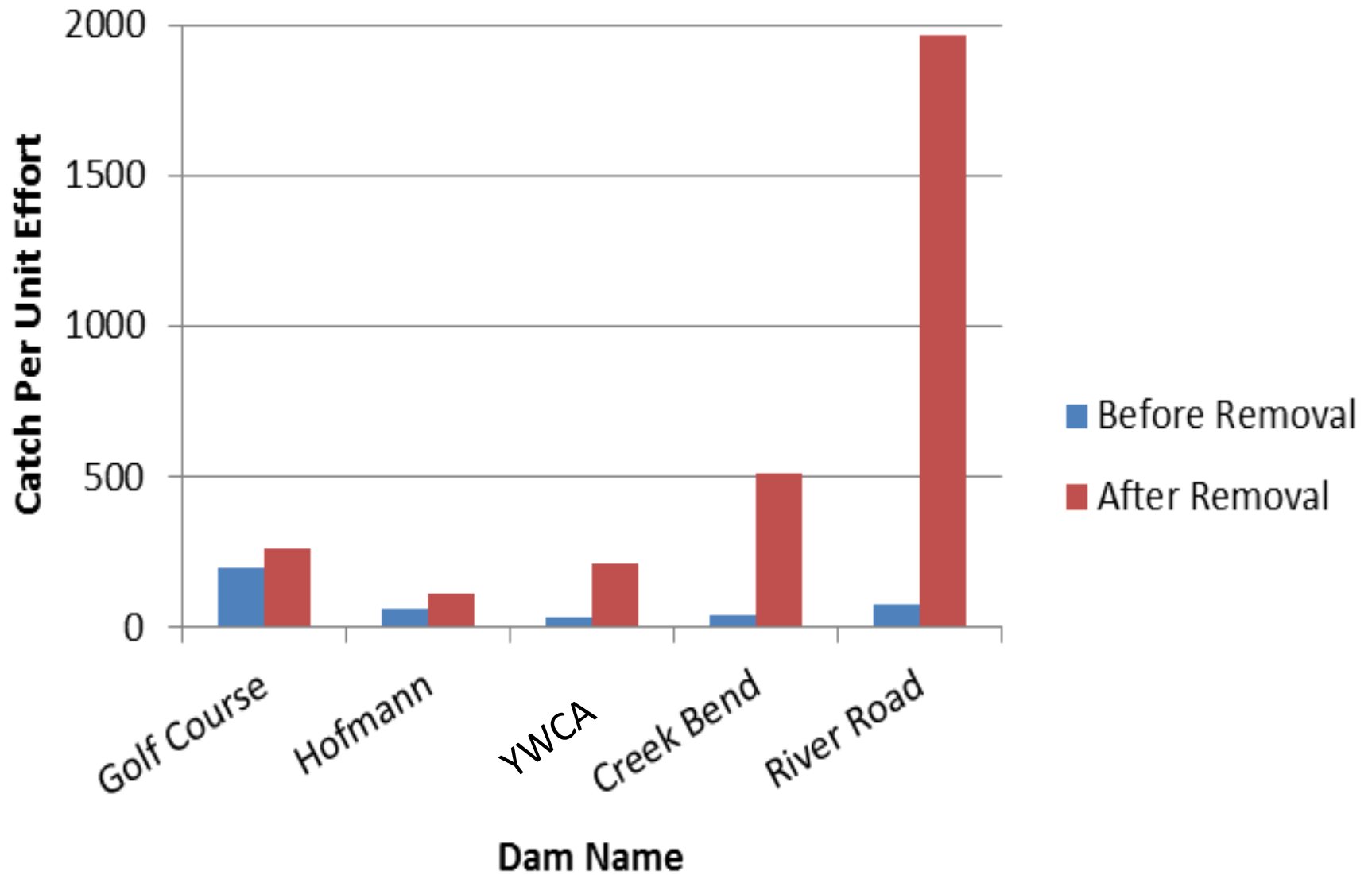
Dam Fish Sampling

Dam	Stream	Year remvd	No. years in study	Pre Samples	Post Samples
YWCA	Brewster Creek	2006	7	2	5
Golf Course	Seavey Creek	2009	1	1	1
Creek Bend	Ferson Creek	2010	4	1	2
Hofmann	Des Plaines River	2012	14	6	3
River Road	Blackberry Creek	2013	3	1	3

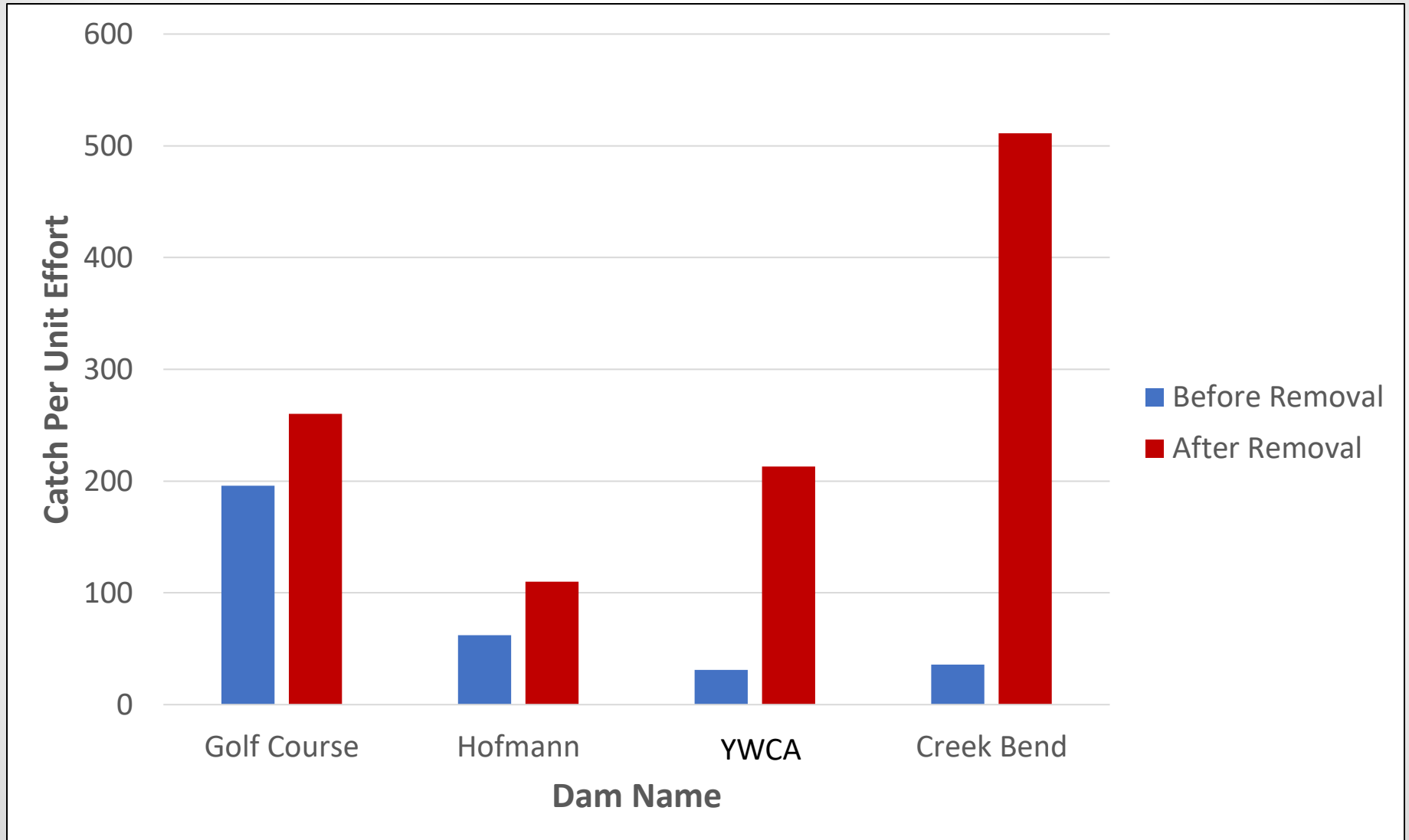
Species Richness in Dam Pool Area Before and After Removal



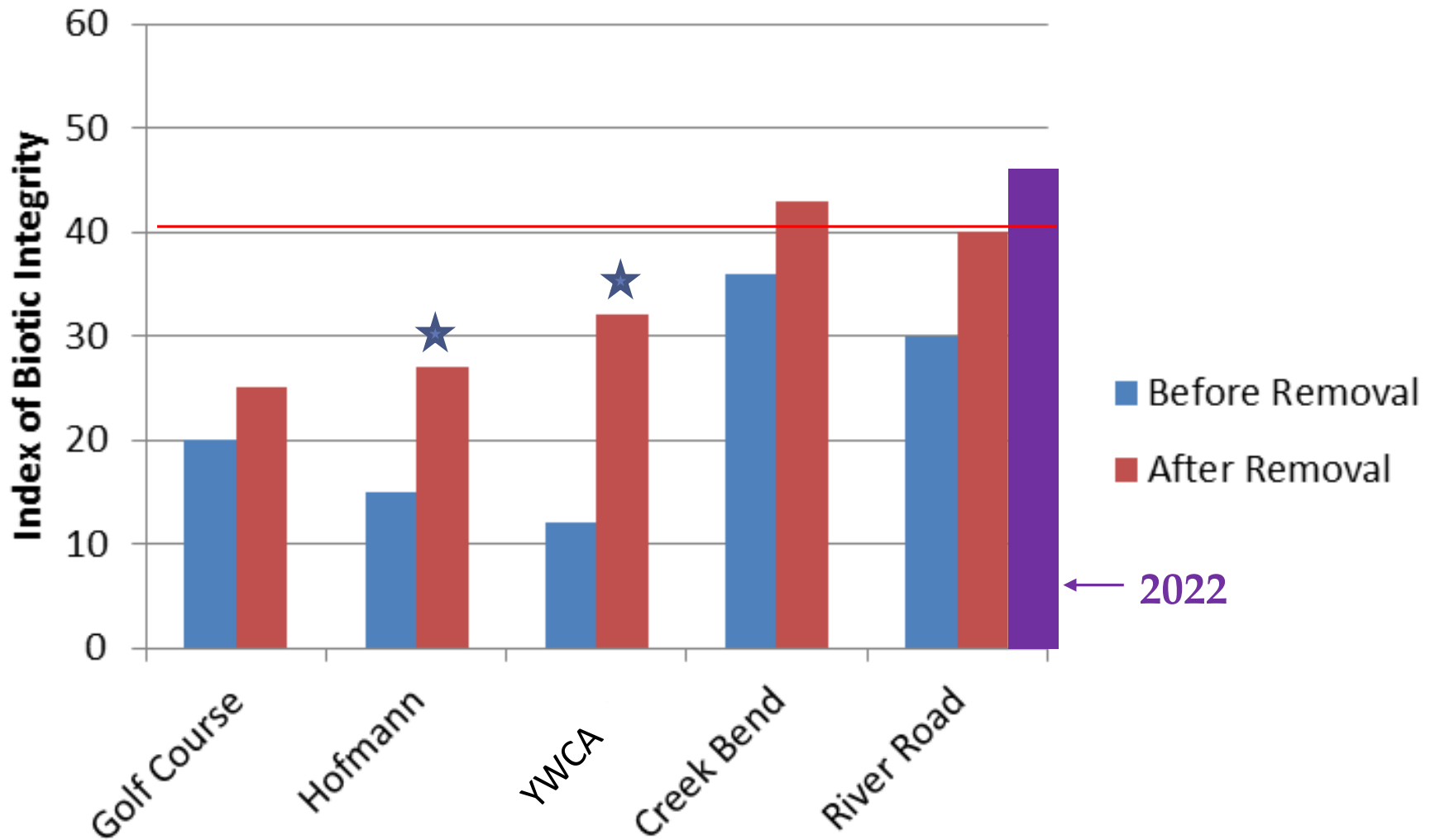
Catch Per Unit Effort in Dam Pool Area Before and After Removal



Catch Per Unit Effort in Dam Pool Area Before and After Removal



IBI in Dam Pool Area Before and After Removal



Results for all dams

	Species Richness		CPUE		IBI	
Dam	Before	After	Before	After	Before	After
Golf Course	11	17	196	260	20	25
Hofmann	6	19	62	110	15	27
YWCA	5	22	31	213	12	32
Creek Bend	12	27	36	511	36	43
River Road	8	25	74	1967	30	40
mean	8.4	22.0	79.8	612.2	22.6	33.4
T-test	p=0.000175		p=0.100		p=0.0484	

● **Difference of IBI >10 = biologically meaningful change (Smogor 2005)** ●



**Riverine species in
Brewster Creek after removal**

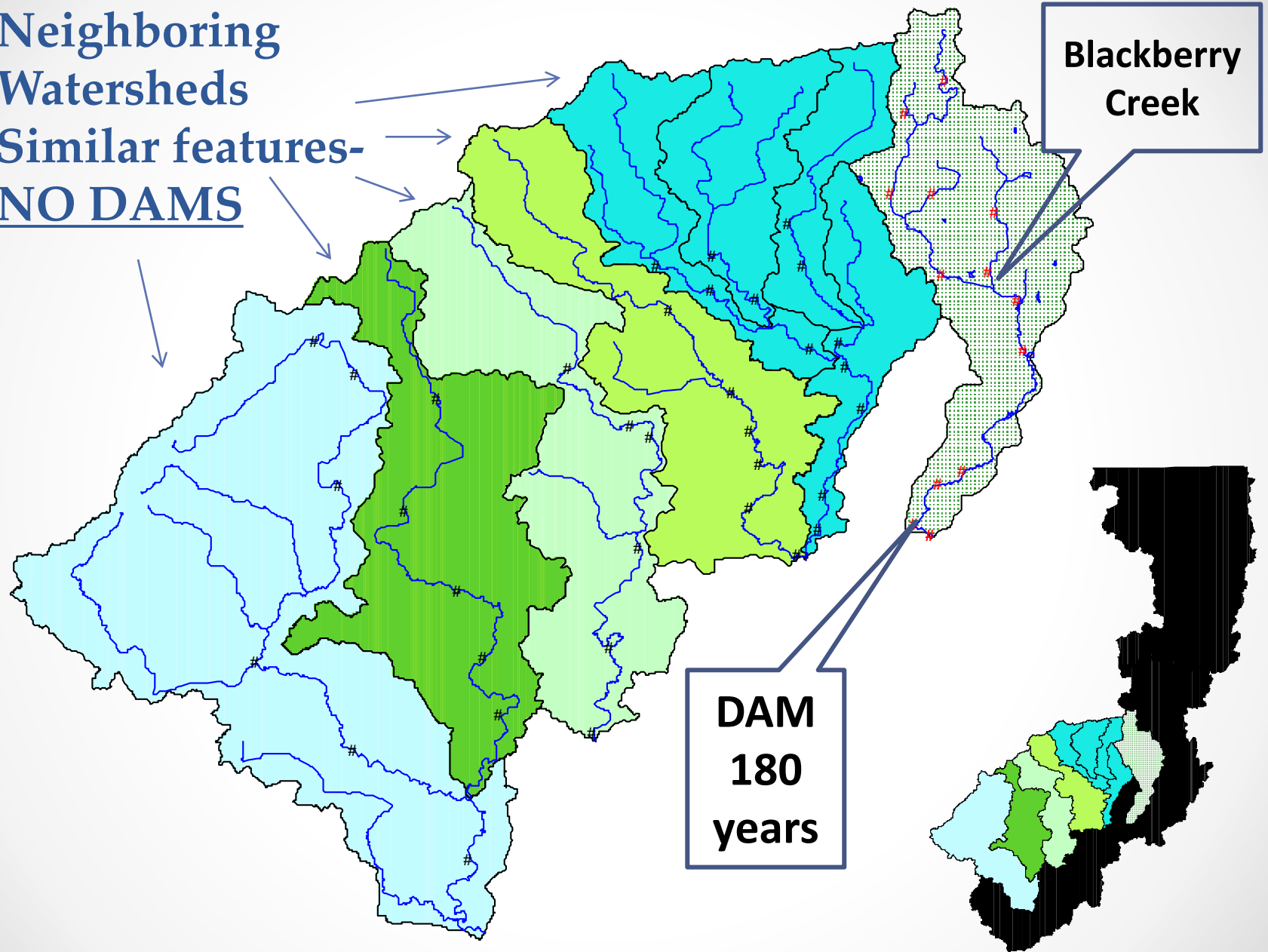
**River Road (Blackberry Creek)
Spring 2013 – 2 weeks post removal
Shorthead Redhorse and Quillback spawning runs
First spawning runs in 180 years**





**Shorthead Redhorse
Spawning Nests
Observed in
Blackberry Creek**

Neighboring
Watersheds
Similar features-
NO DAMS



**PRE – PROJECT : Fish species absent from
Blackberry Creek compared to neighboring,
un-dammed tributaries**

Species	Blackberry	Big Rock	Somonauk	Indian	Little Indian	Little Rock
Rosyface Shiner	0	X	X	X	X	X
Southern Redbelly Dace	0	X	X	X	X	X
Largescale Stoneroller	0	X	X	X	X	X
Shorthead Redhorse	0	X	X	X	X	X
Black Redhorse	0	X	X	X	X	0
Quillback	0	X	X	X	X	X
Banded Darter	0	X	X	X	X	X
Rainbow Darter	0	X	X	X	X	X
Orangethroat Darter	0	X	X	X	X	X
Channel Catfish*	3	10	27	10	5	1
Smallmouth Bass*	4	336	151	18	13	71

*collected only in 1996

POST PROJECT - Blackberry Creek fish species compared to neighboring, un-dammed tributaries

Species	Blackberry	Big Rock	Somonauk	Indian	Little Indian	Little Rock
Rosyface Shiner	√	X	X	X	X	X
Southern Redbelly Dace	0	X	X	X	X	X
Largescale Stoneroller	√	X	X	X	X	X
Shorthead Redhorse	√	X	X	X	X	X
Black Redhorse	0	X	X	X	X	0
Quillback	√	X	X	X	X	X
Banded Darter	√	X	X	X	X	X
Rainbow Darter	√	X	X	X	X	X
Orangethroat Darter	√	X	X	X	X	X
Channel Catfish*	9 (3)	10	27	10	5	1
Smallmouth Bass*	44 (4)	336	151	18	13	71

*Y-O-Y present four miles upstream

“System-wide” Results: New Species Upstream



Fish
Passage
Projects:

fish use them,
BUT more costly
and require
maintenance



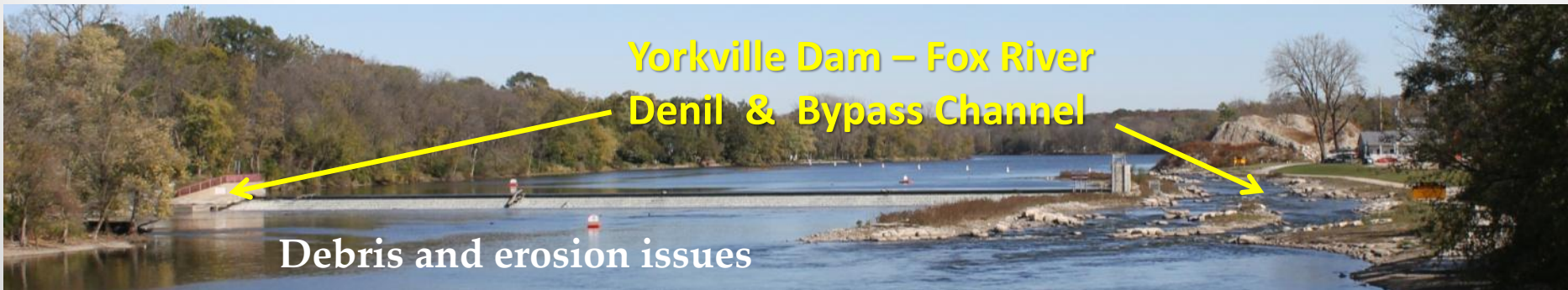
Big Rock Creek Ramp

Repaired
2006



Big Rock Creek Bypass

Repaired
2007



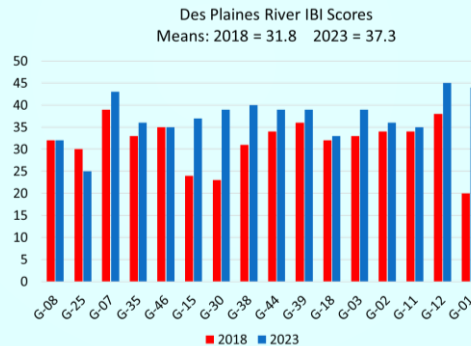
**Yorkville Dam – Fox River
Denil & Bypass Channel**

Debris and erosion issues

Evaluation of Dam Removals - Summary

- Fish assemblages improved at all dams across a ranges of dam sizes and watershed characteristics
- Repopulation of former dam pool rapid; reliant on downstream recruitment source – avg. species richness increased >2X
- Avg. IBI increased in former dam pool – statistically and “biologically” significant (>10 points)
- Catch per unit effort increase variable; avg. increase >7X in former dam pool area
- Tributary spawning runs re-established rapidly, also benefiting mainstem populations
- “Missing” fish species repopulate upstream segments
- Fish passage structures used by variety of species; connection partial; often more costly and require rebuild and/or maintenance

Dam Removals and Expansion of Tunnel and Reservoir Plan Yields Restoration Milestones for Des Plaines River Fishery

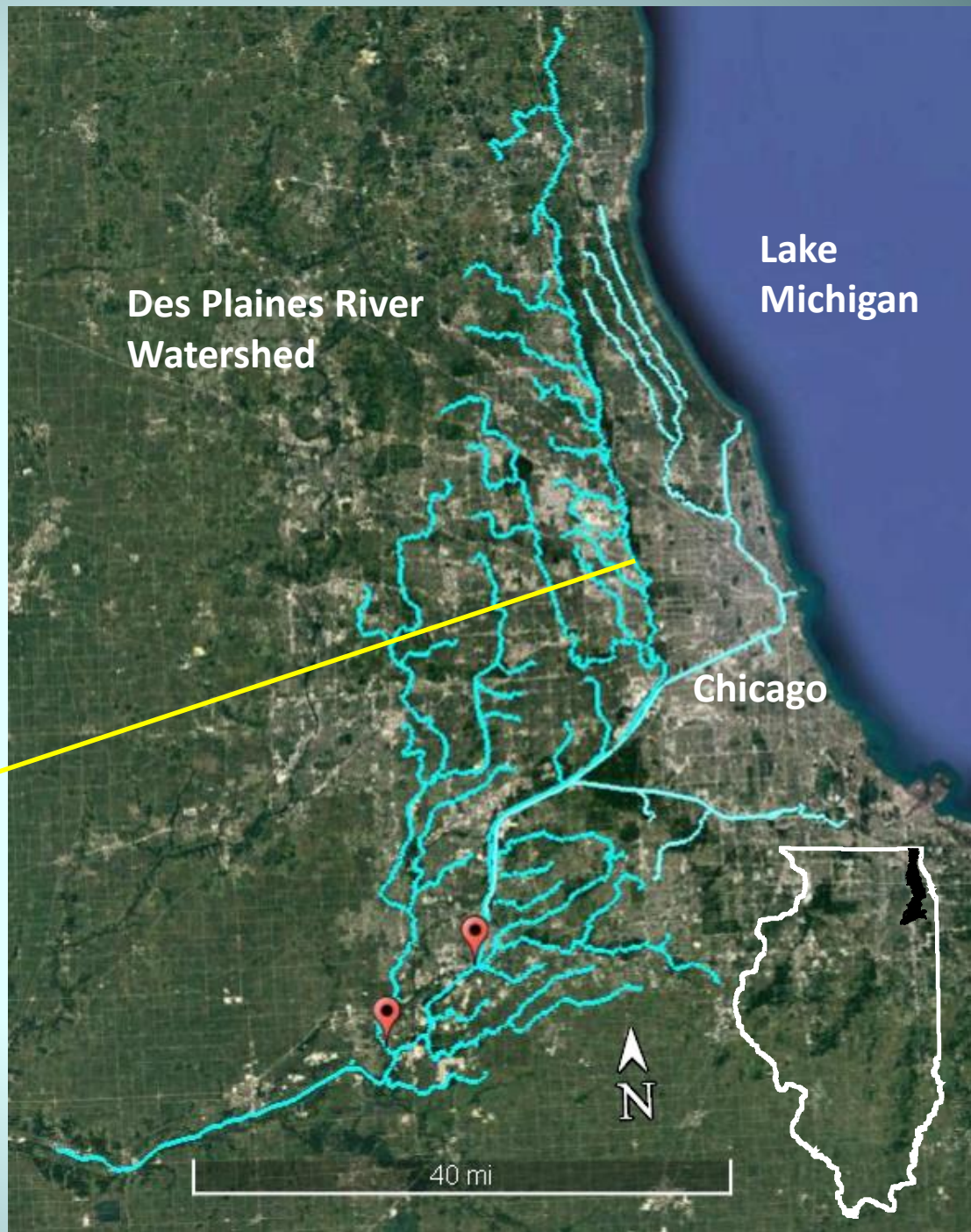


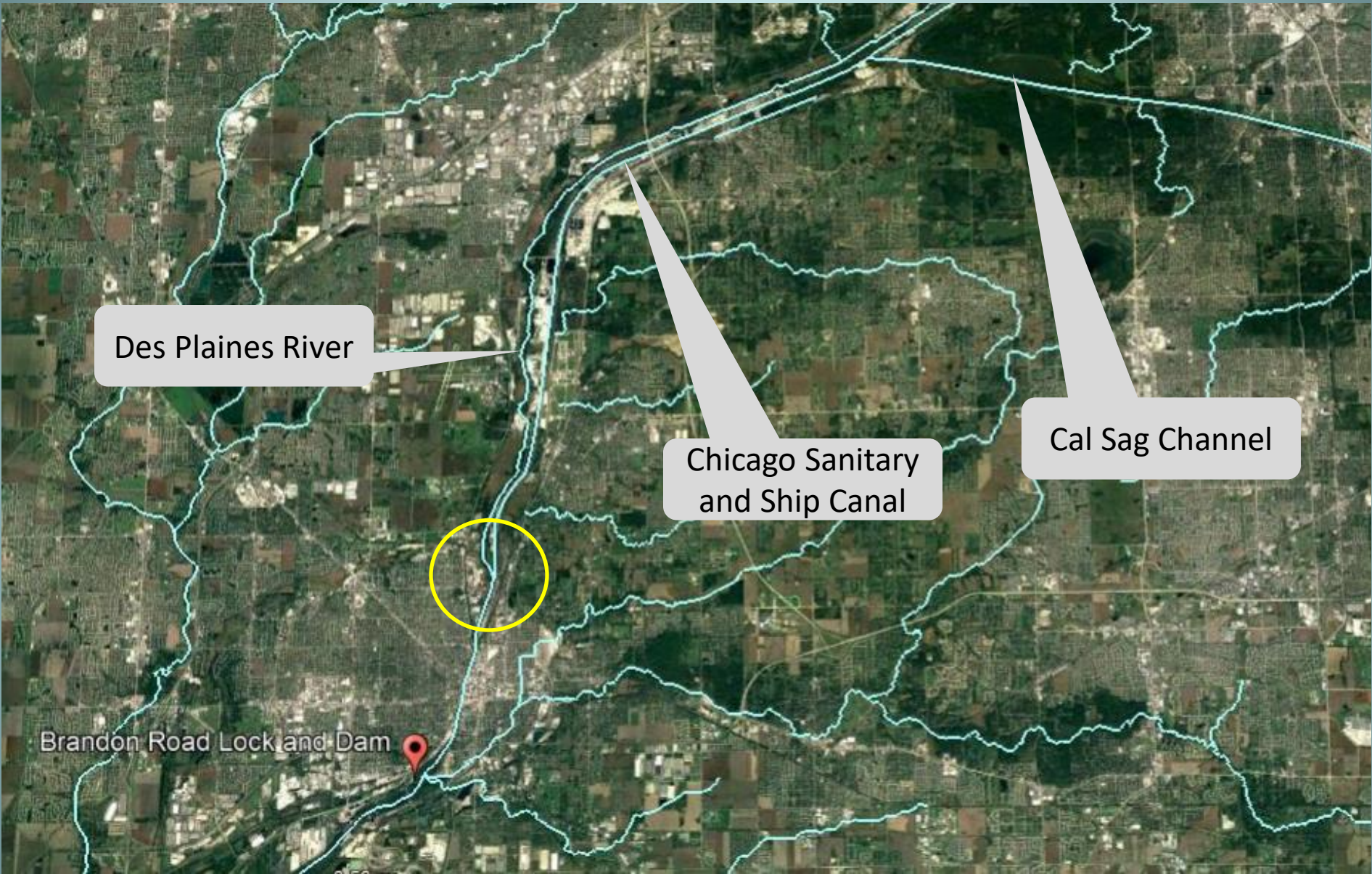
Tristan Widloe and Stephen Pescitelli
Region II Streams Program

**Des Plaines River
2,110 sq. mi.**

Mainstem

**Mean slope:
1.2 ft/mi**





Des Plaines River

Chicago Sanitary
and Ship Canal

Cal Sag Channel

Brandon Road Lock and Dam

Stickney WWT Plant



Stickney Water Reclamation Plant

Ball Court

Baseball Field
Memorial Park

Park

Weolia Municipal Water

Ostara USA

Stickney-Chicago, IL Water Tower

1000 ft



ComEd Electric Substation

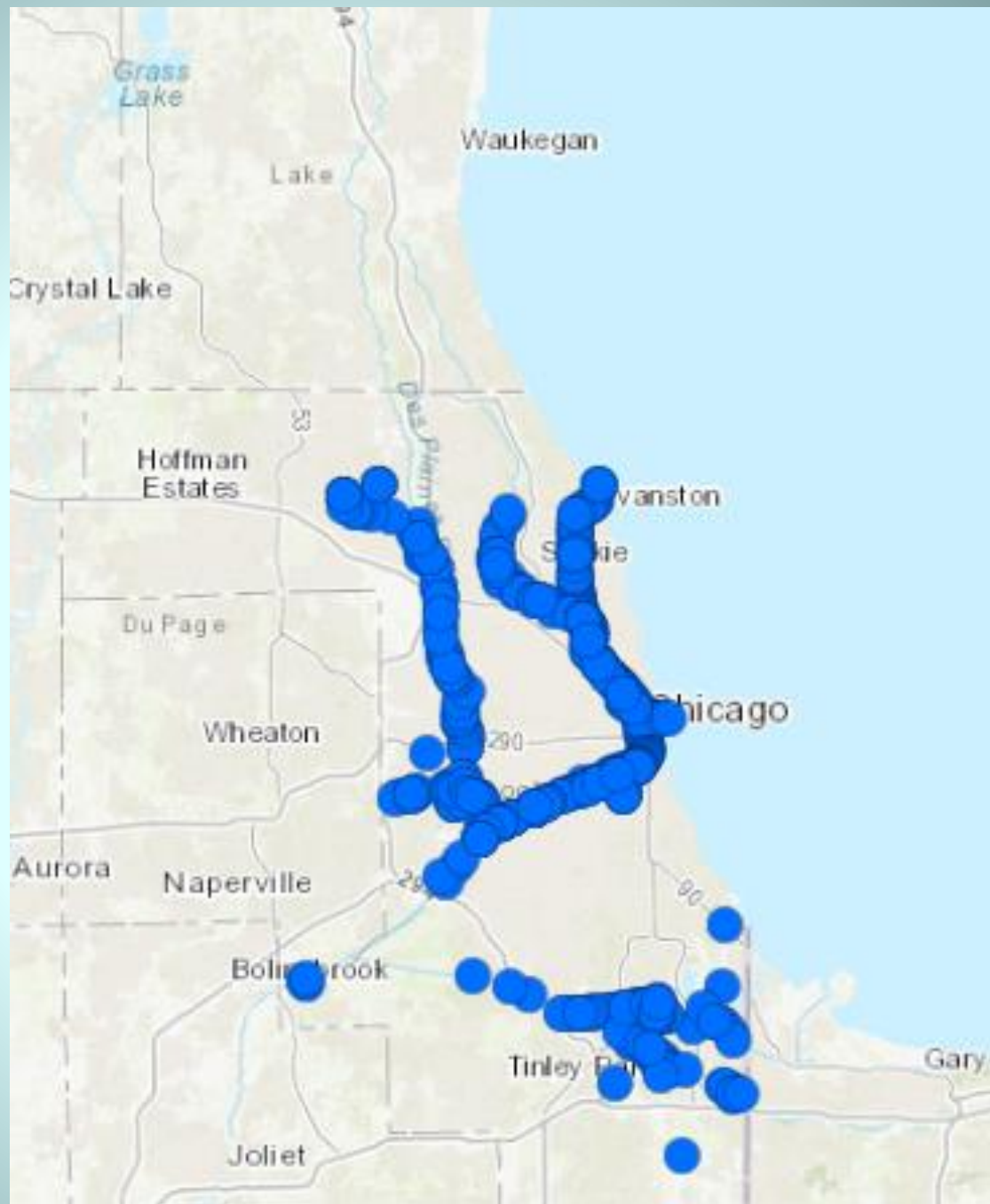
USGS Chicago Sanitary and Ship Canal Data

Forest View Marina

Combined Sewer Overflow (CSO) Locations:

CAWS and

Des Plaines River



TARP a.k.a. Deep Tunnel

Phase I - Tunnels

Started: 1976

Initial service: 1985

Des Plaines completed: 1999

All Completed: 2006

TARP SYSTEM	TUNNEL LENGTH	TUNNEL VOLUME	TUNNEL DIAMETER
Mainstream	40.5 mi.	1,200 MG	8 to 33 ft.
Calumet	36.7 mi.	630 MG	9 to 30 ft.
O'Hare (UDP)	6.6 mi.	70 MG	9 to 20 ft.
Des Plaines	25.6 mi.	405 MG	10 to 33 ft.
TOTALS	109.4 mi.	2,305 MG	8 to 33 ft.

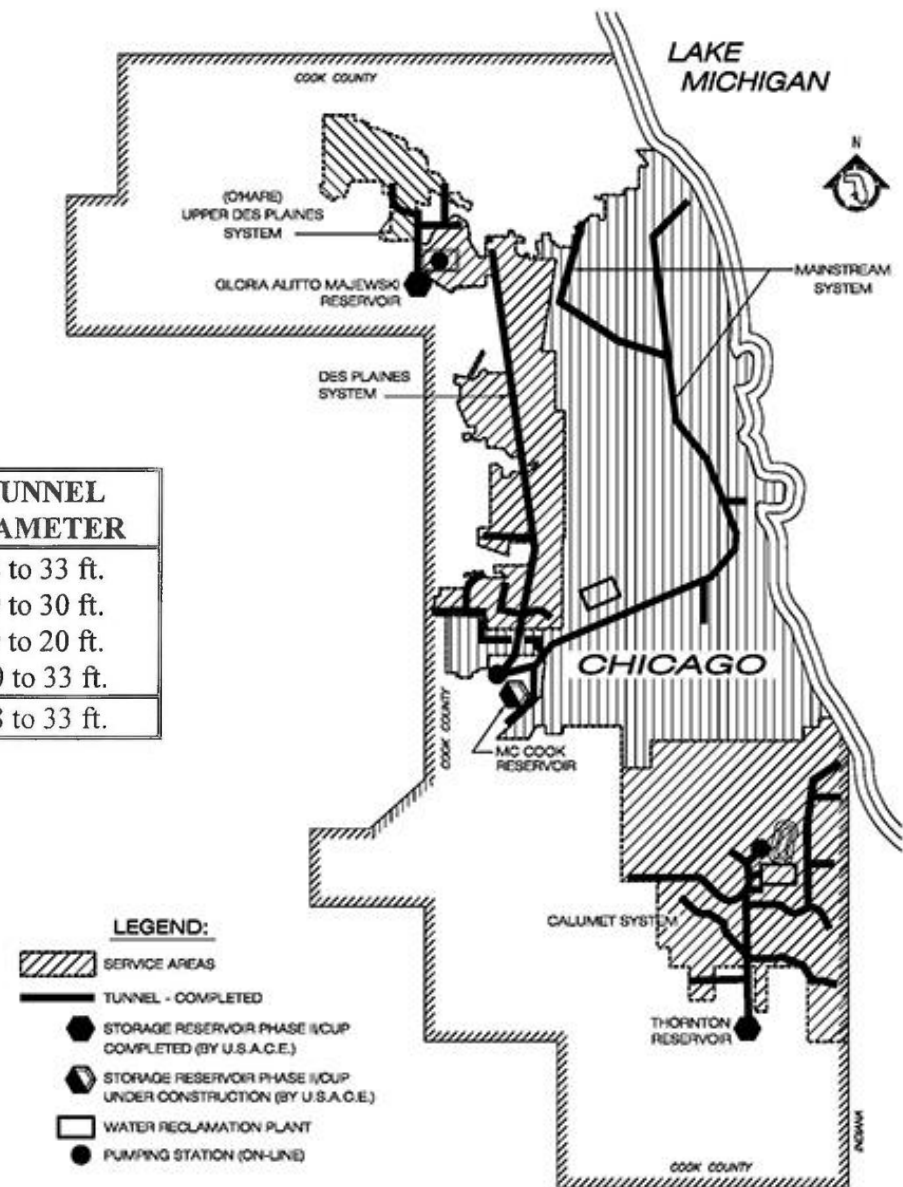
Phase II – Reservoirs

Majewski: 1998 – 0.07 BG

Thornton: 2015 - 4.8 BG

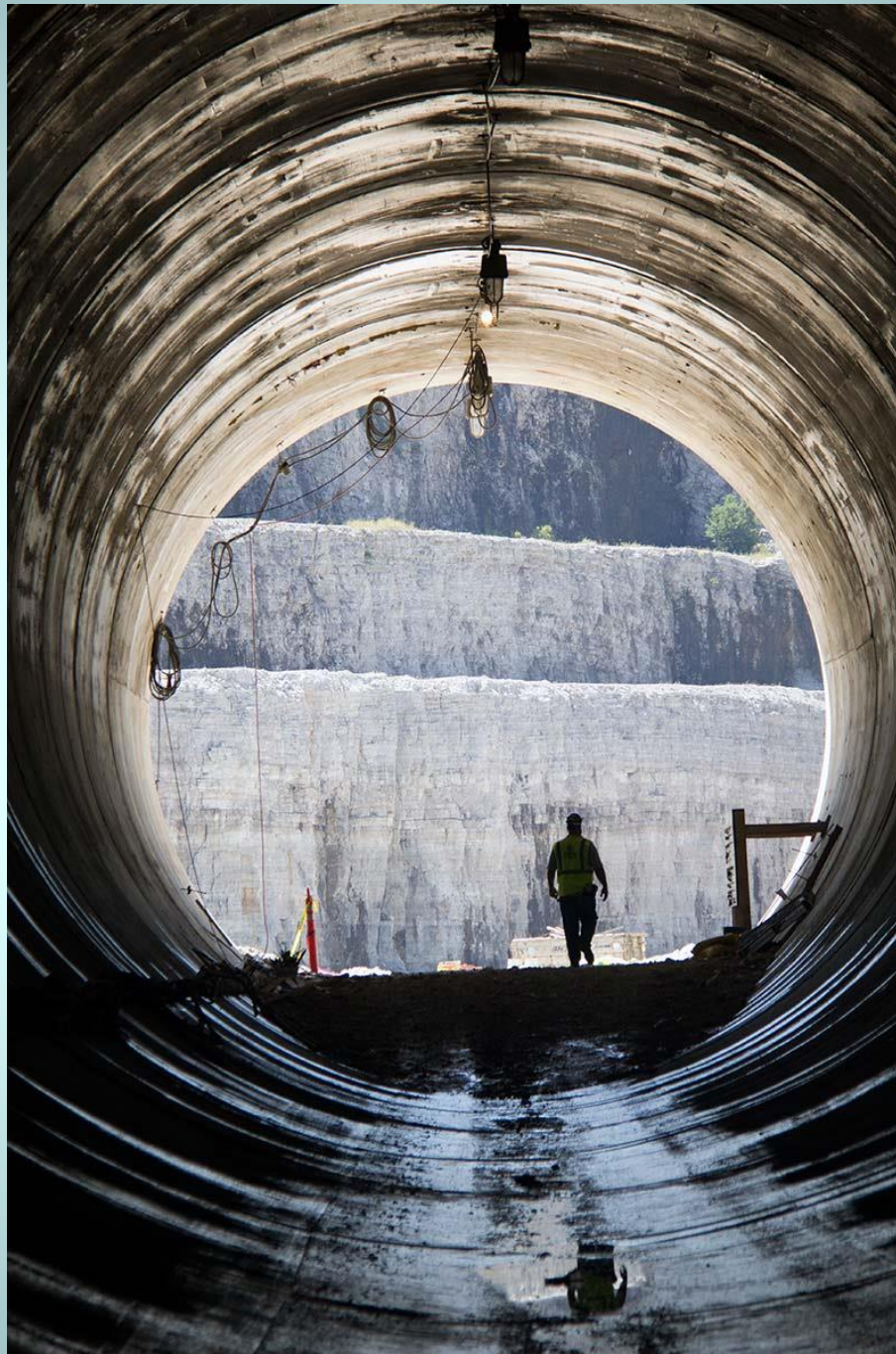
McCook: Phase I; 2017 – 3.5 BG

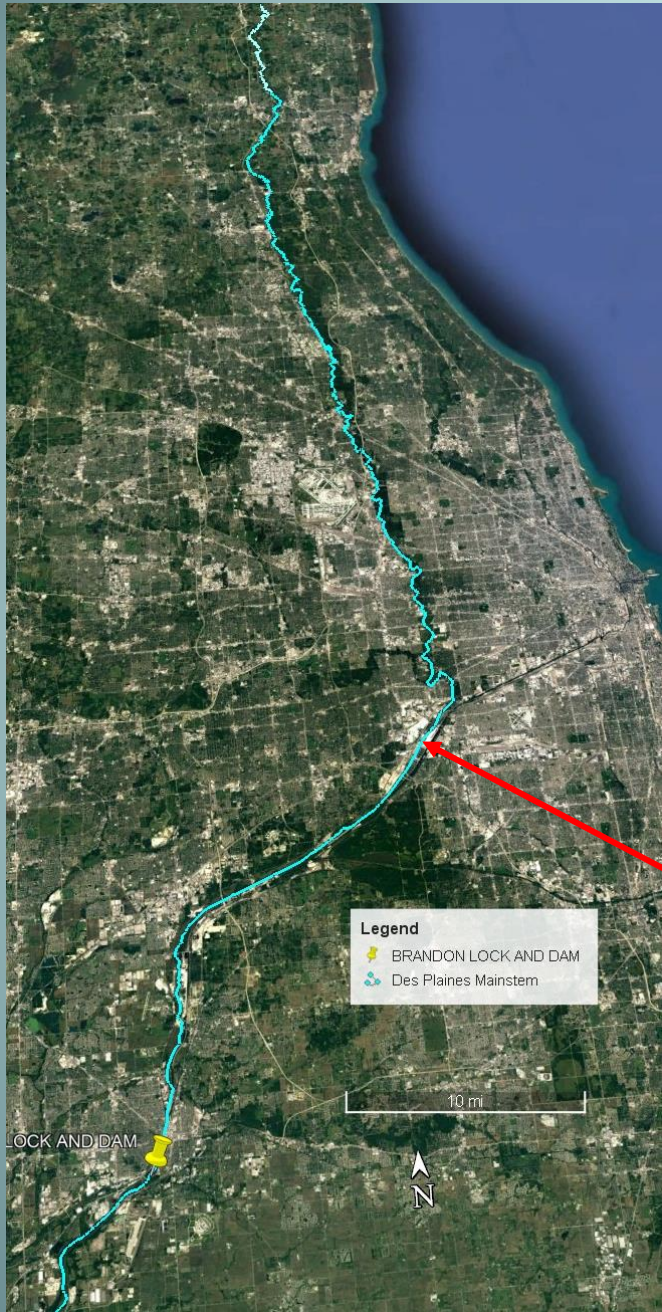
Phase II; 2029 – 6.9 BG



Tunnel and Reservoir Plan Project Status

Deep Tunnel



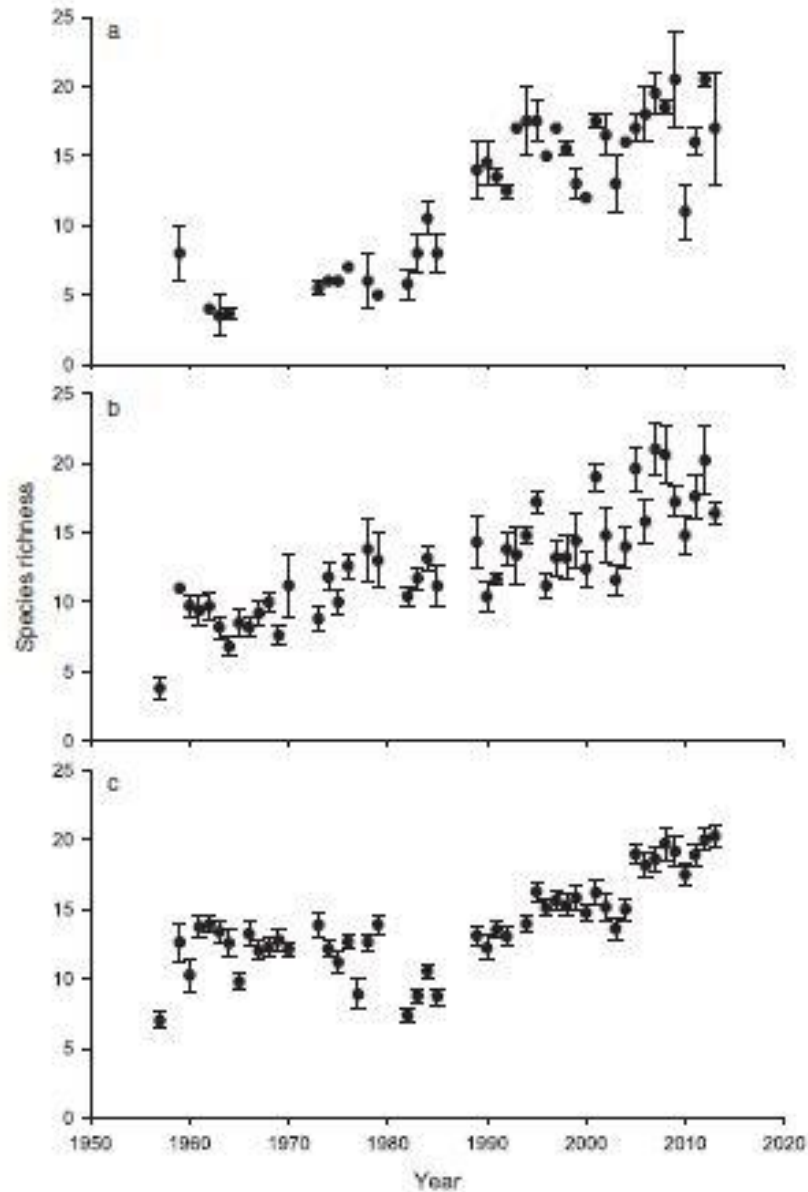


McCook Reservoir 3.5 BG
Opened 2017

Species richness trends downstream of Brandon Road Dam in the Illinois River Waterway System

1957-2013

Gibson-Reinemer et al. 2017



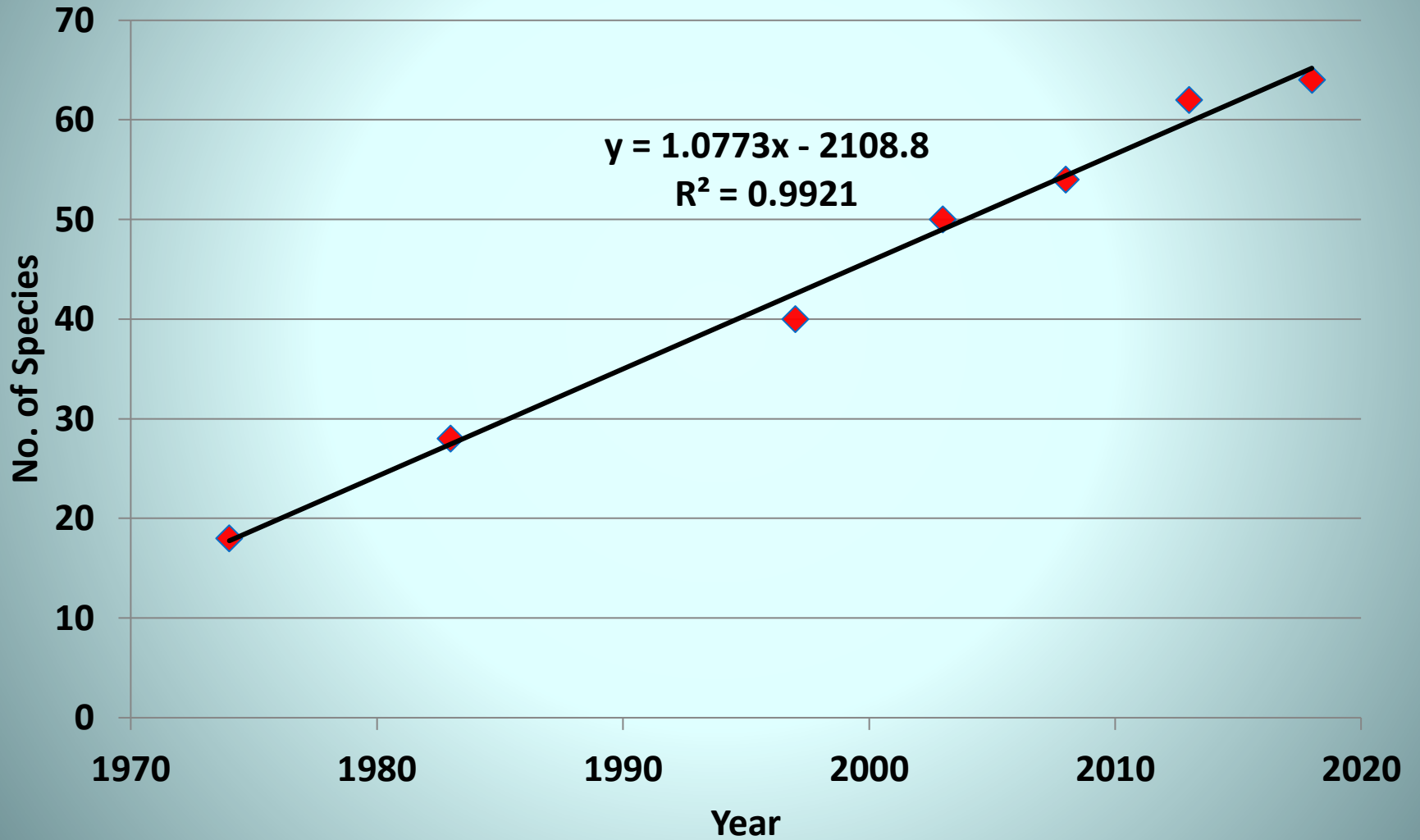
Lower
Des Plaines

Upper Illinois

Lower Illinois

Figure 7. Species richness in the Des Plaines River (a), the upper Illinois River (b), and the lower Illinois River (c) of the Illinois Waterway from 1957 to 2013. The y-axis in (a) is on a different scale from those in (b) and (c). The error bars represent standard error.

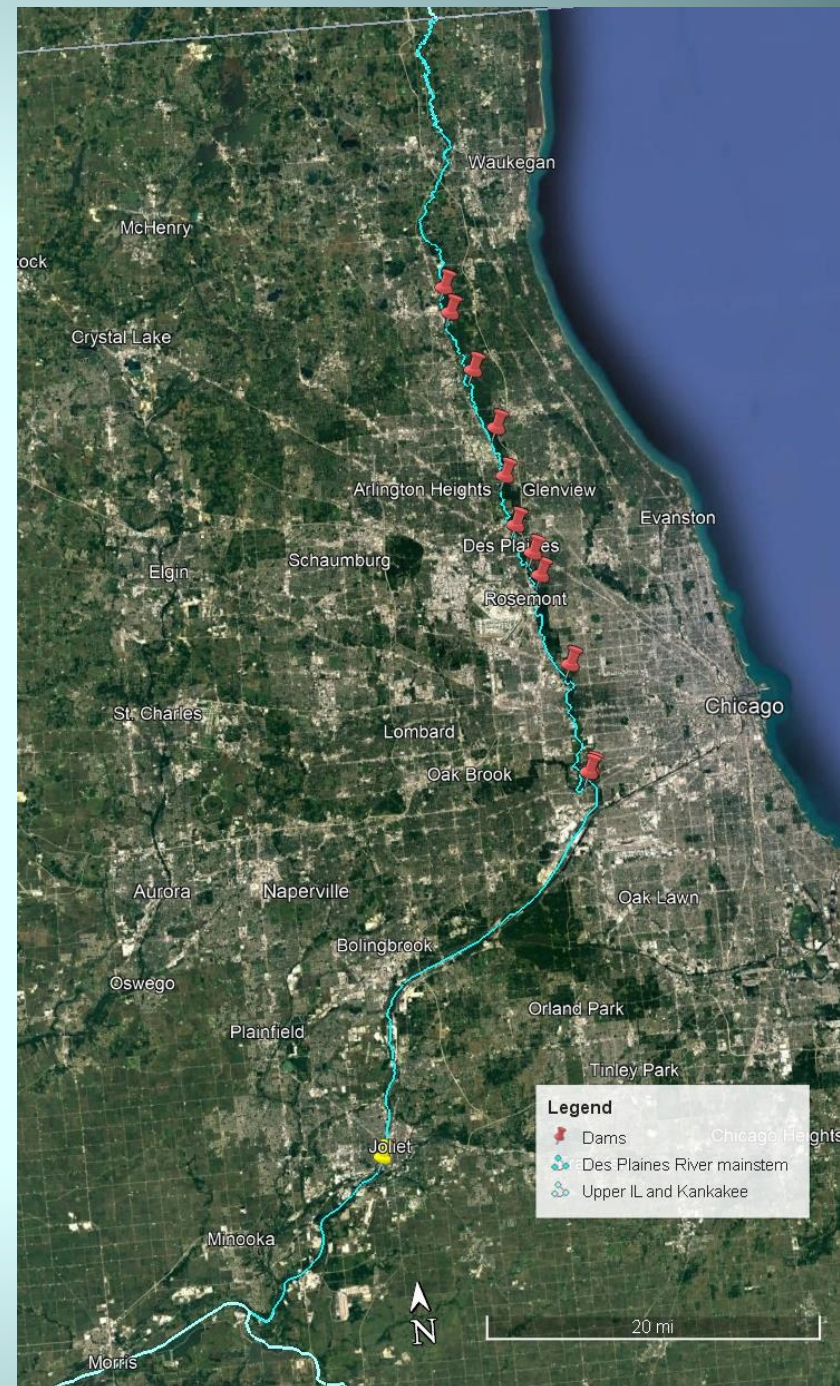
Des Plaines River species richness Upstream of Brandon Lock and Dam 1973 to 2018



11 Former Mainstem Dams

<u>Purpose</u>	<u>Ownership</u>	<u>Effects</u>
Recreation	Lake Co. FP	Fragmentation
Fords	Cook County FP	WQ degradation
Water retention		Paddling

DAM NAME	River Mile	Height (ft)	Width (ft)
MacArther Woods	86	1.0	103
Wright Woods	84	1.3	121
Ryerson Dam	82	1.6	140
Dam No. 1	73	4.6	127
Dam No. 2	69	3.0	151
Dempster Street	65	5.6	107
Touhy Ave. Dam	62	5.6	112
Devon Ave. Dam	61	5.6	112
Armitage Dam	54	4.9	116
Hoffman Dam	44	12.5	258
Fairbanks Dam	44	2.0	158



Des Plaines River Dams



Ryerson
2011



MacArthur
Woods
2016



Devon
Avenue
2021



Hofmann Dam 2012 (initiated 1997)

Largest Dam – “Spawned” dam removal initiative

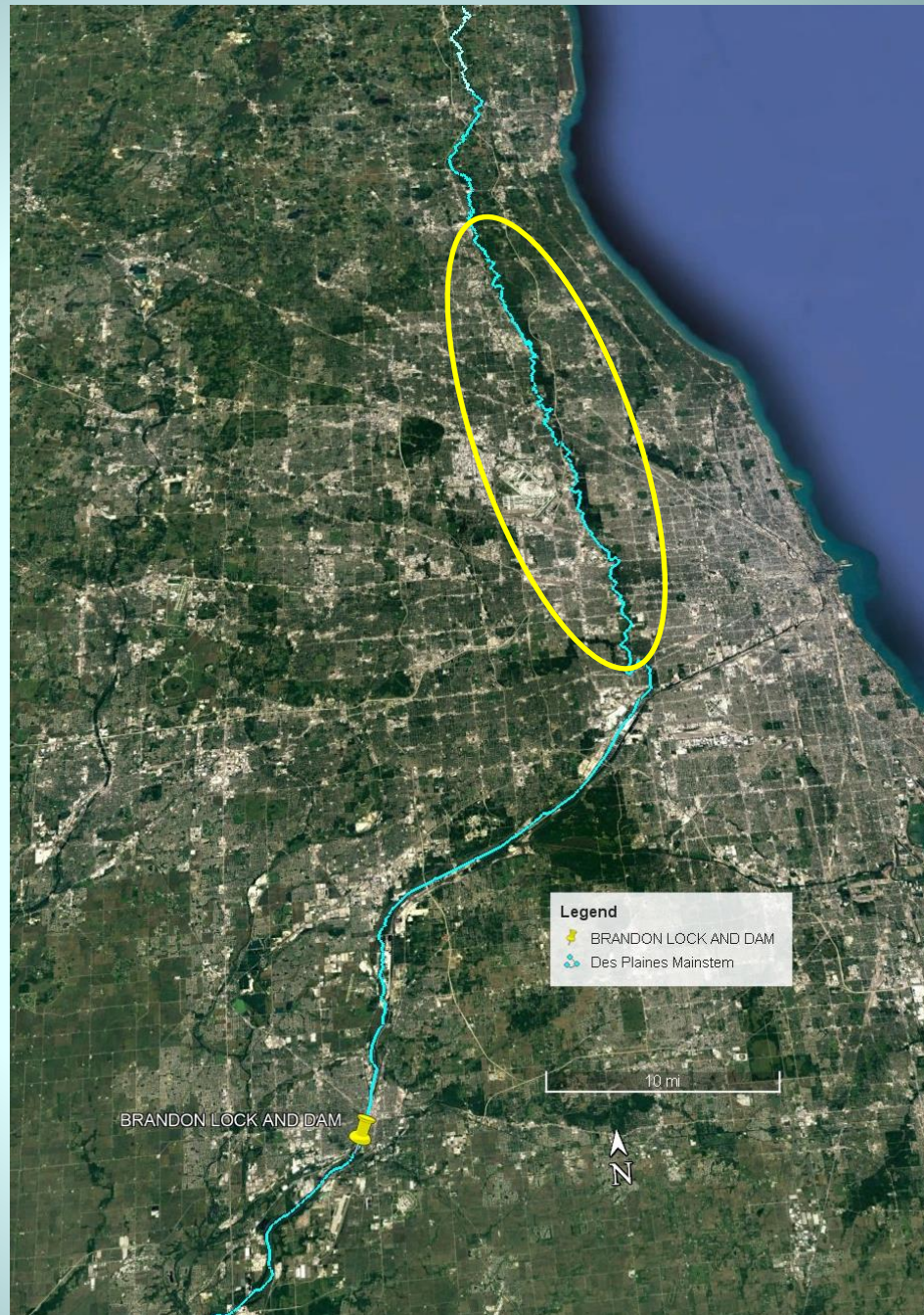


2021 Dams. Be. Gone.

Free Flowing
Stream miles restored:

98 miles - above Brandon

44 miles - 1st to last



Des Plaines River Basin Survey

Fish Sampling Sites

- 16 total
- 14 upstream Brandon
- DC boat EF / seine

SURVEY YEARS

1983

1997

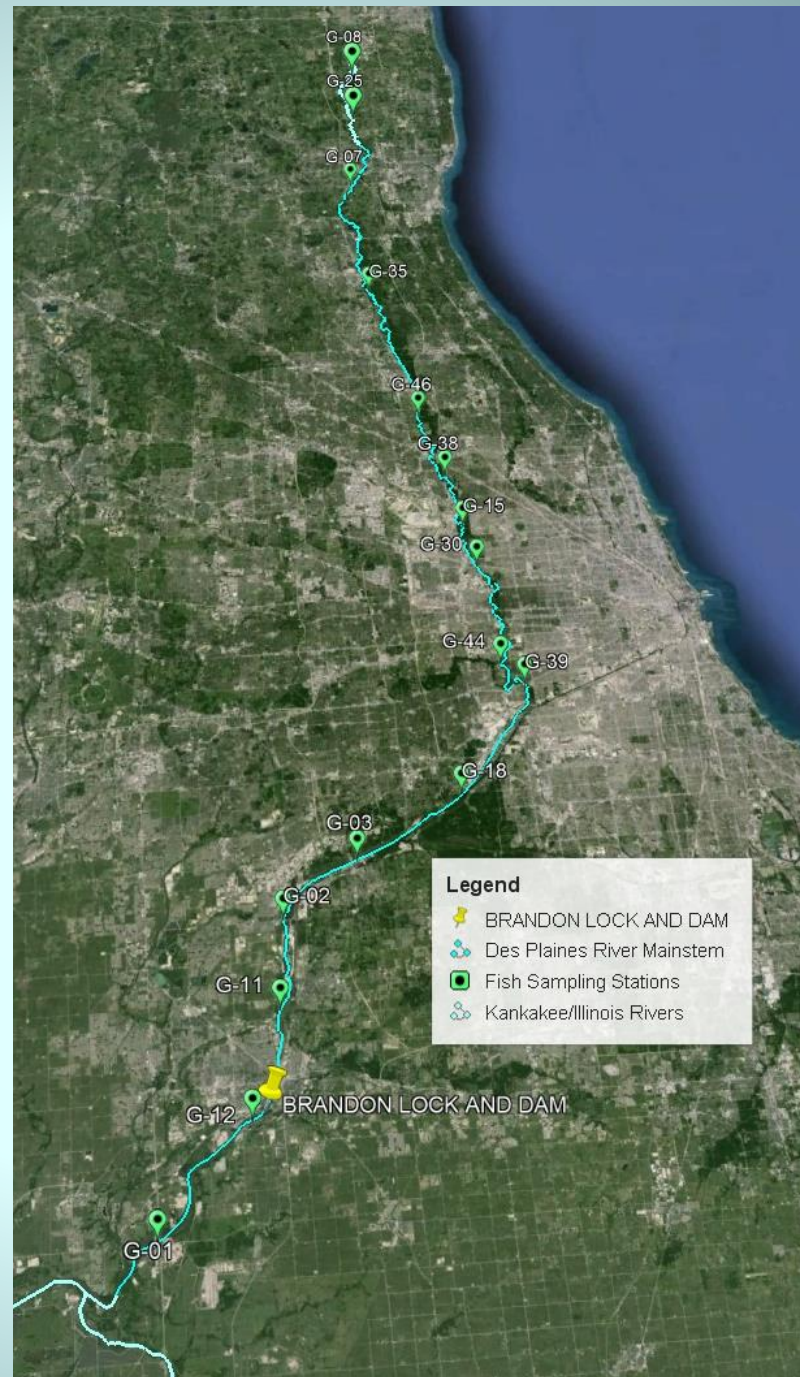
2003

2008

2013

2018

2023



Des Plaines River Restoration

– Sportfish abundance and distribution

- Smallmouth Bass
- Sauger

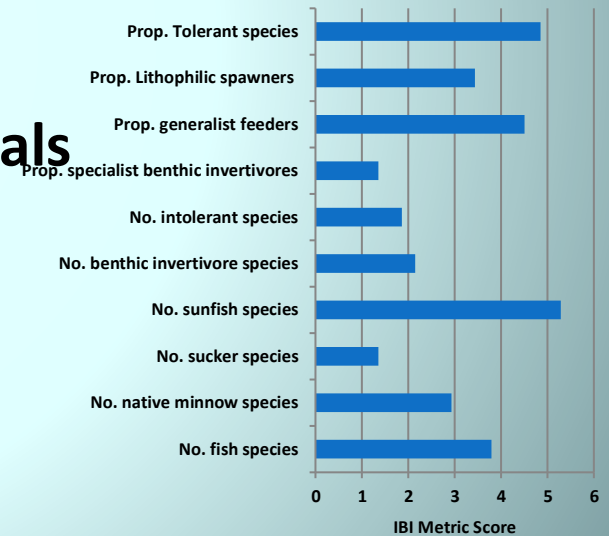


– Stream Quality / IBI

- Trends
- Response to WQ and dam removals

– What's next

- McCook Phase II
- Brandon Road fish barrier



Des Plaines River Restoration

– Sportfish abundance and distribution

- Smallmouth Bass
- Sauger

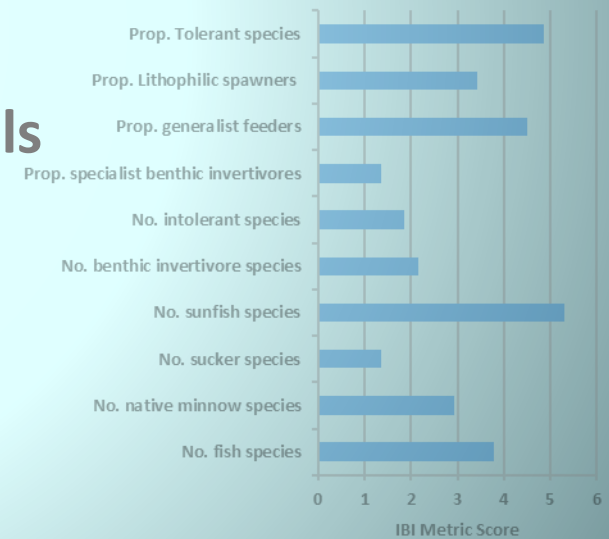


– Stream Quality / IBI

- Trends
- Response to WQ and dam removals

– What's next

- McCook Phase II
- Brandon Road fish barrier



2008

-Before
TARP
expansion
-11 dams

Legend

- BRANDON LOCK AND DAM
- Dams
- Des Plaines River Mainstem
- Fish Sampling Stations
- Kankakee/Illinois Rivers



CPUE

1

2

3

5

15

3

10

Avg.

CPUE: 0.6

2

Total: 8

31

2013

-Before
TARP
expansion
-7 dams

Legend

- BRANDON LOCK AND DAM
- Dams
- Des Plaines River Mainstem
- Fish Sampling Stations
- Kankakee/Illinois Rivers

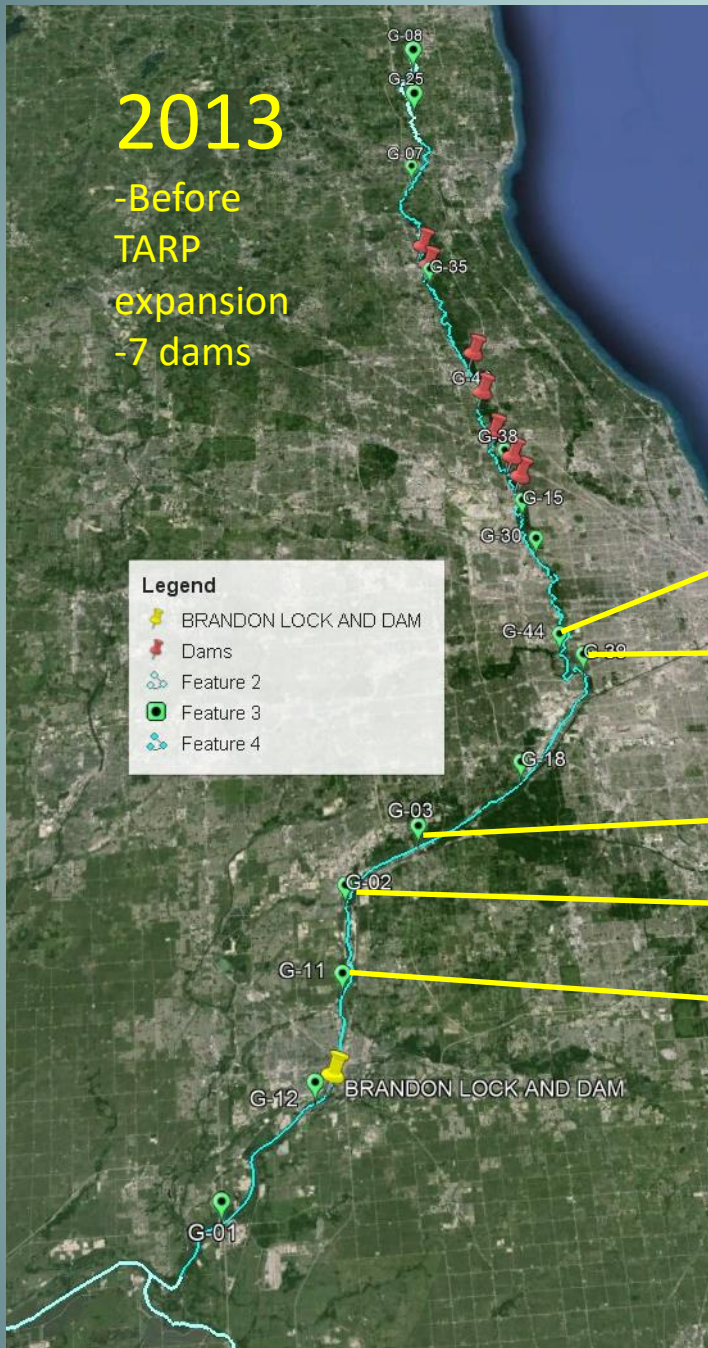


2013

-Before
TARP
expansion
-7 dams

Legend

- BRANDON LOCK AND DAM
- Dams
- Feature 2
- Feature 3
- Feature 4



CPUE

1	3
2	10
3	19
15	68
10	83

Avg.

CPUE: 2

13

Total: 31

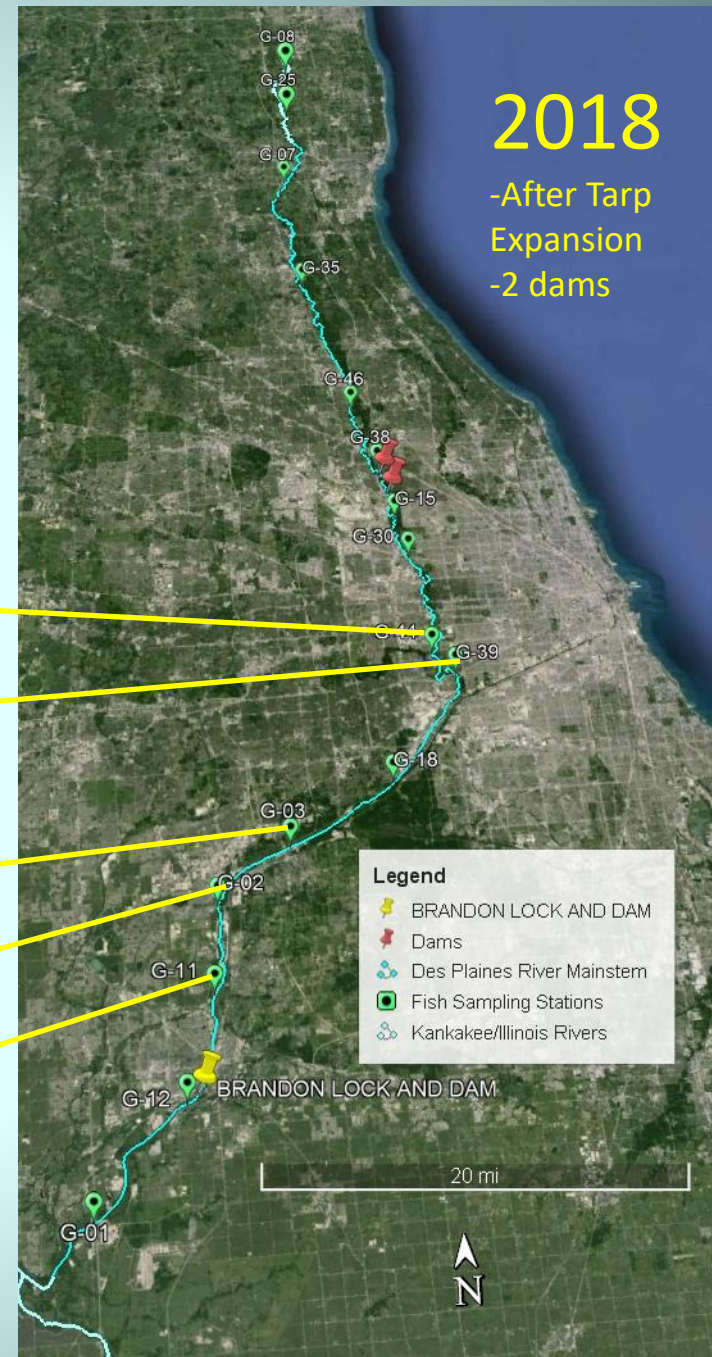
187

2018

-After Tarp
Expansion
-2 dams

Legend

- BRANDON LOCK AND DAM
- Dams
- Des Plaines River Mainstem
- Fish Sampling Stations
- Kankakee/Illinois Rivers



2018

-After Tarp Expansion
-2 dams

Legend

- BRANDON LOCK AND DAM
- Dams
- Des Plaines River Mainstem
- Fish Sampling Stations
- Kankakee/Illinois Rivers



CPUE

2023

-After TARP expansion
-No dams

23

14

35

10

33

16

3

45

10

79

13

19

310

68

175

83

84

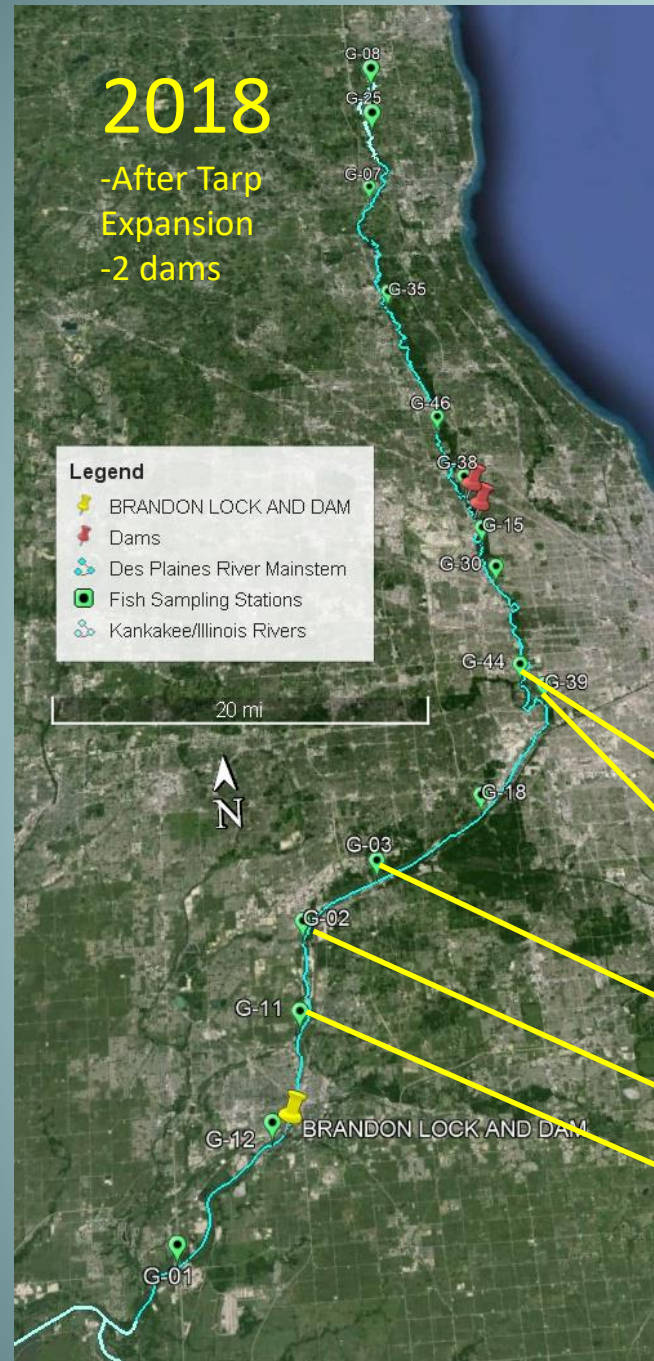
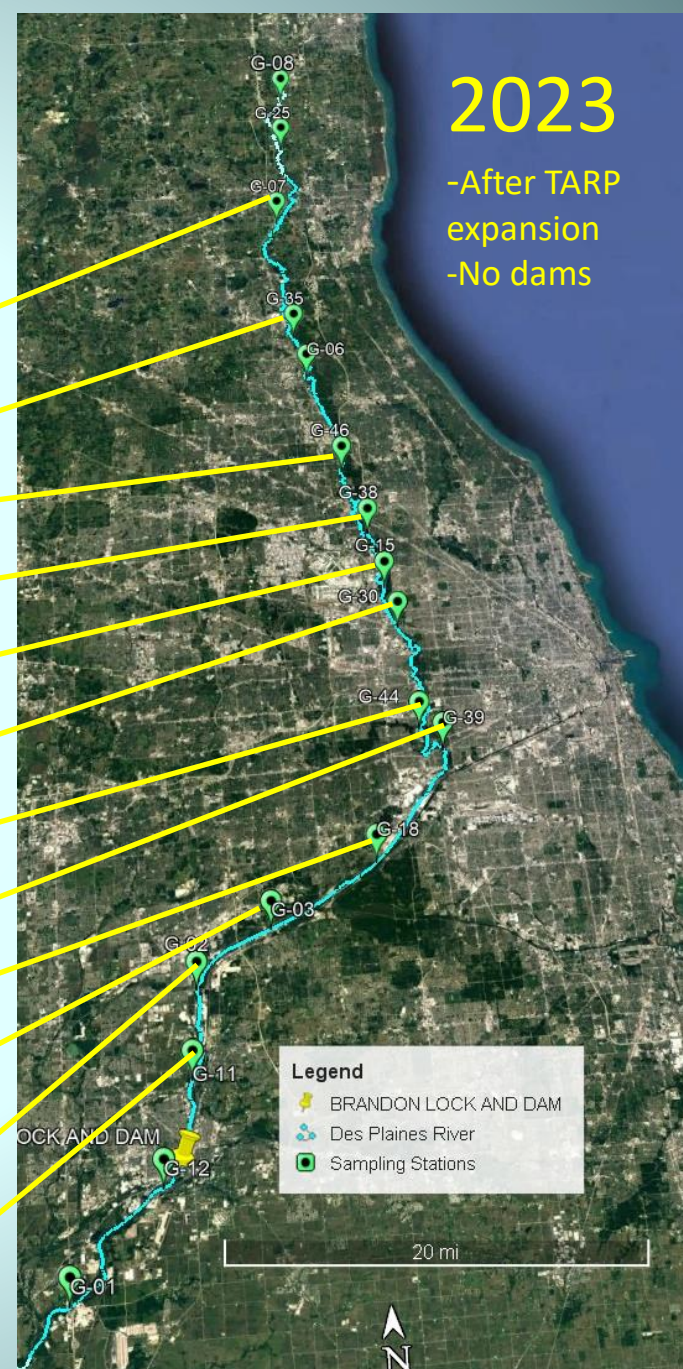
Avg.

CPUE: 13

60

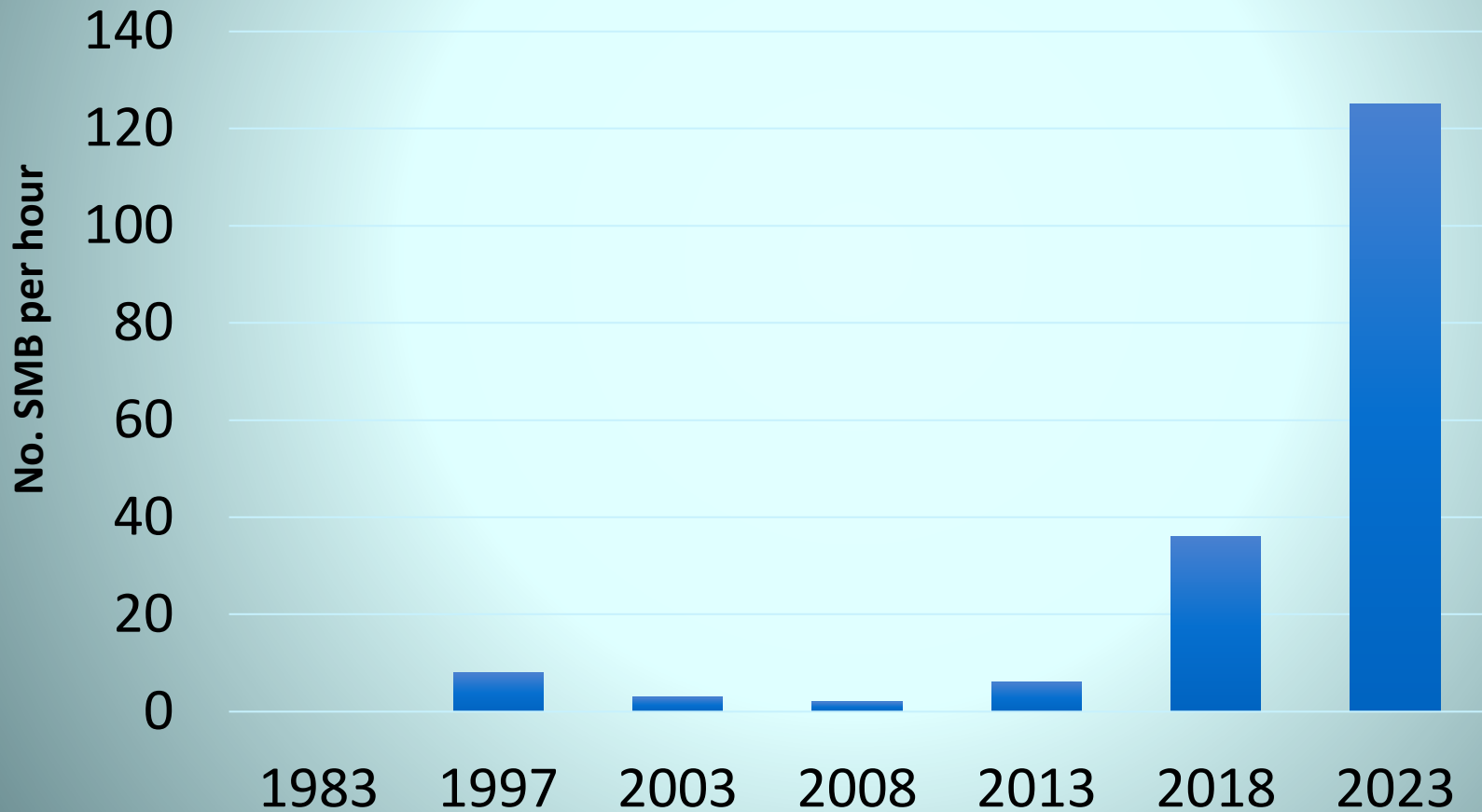
Total: 187

691



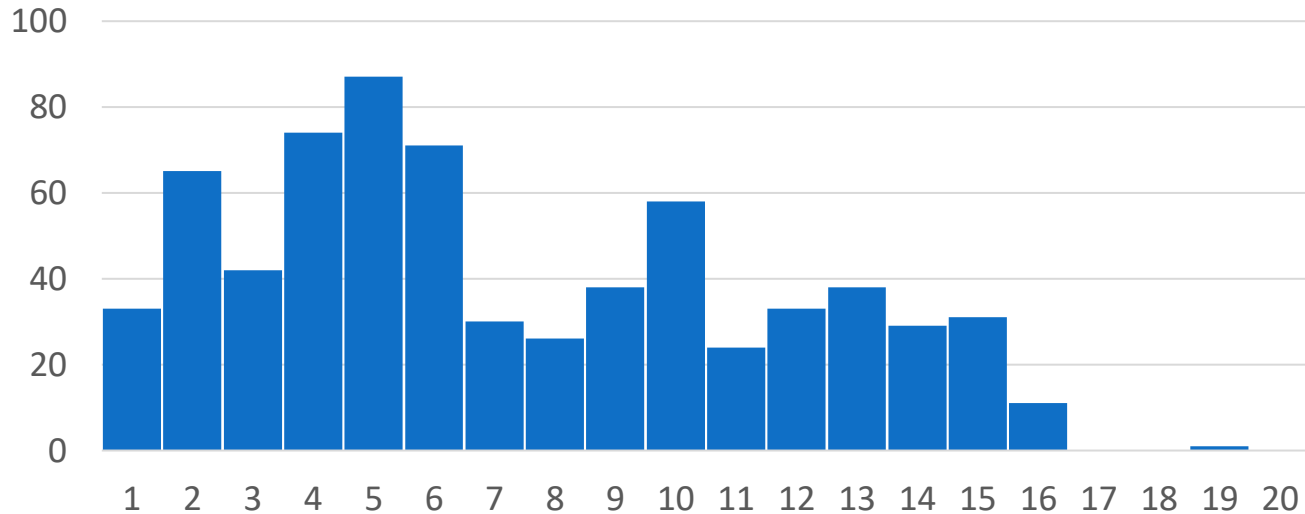
Des Plaines River Smallmouth Bass mean CPUE

Lower six stations - Riverside to CSSC



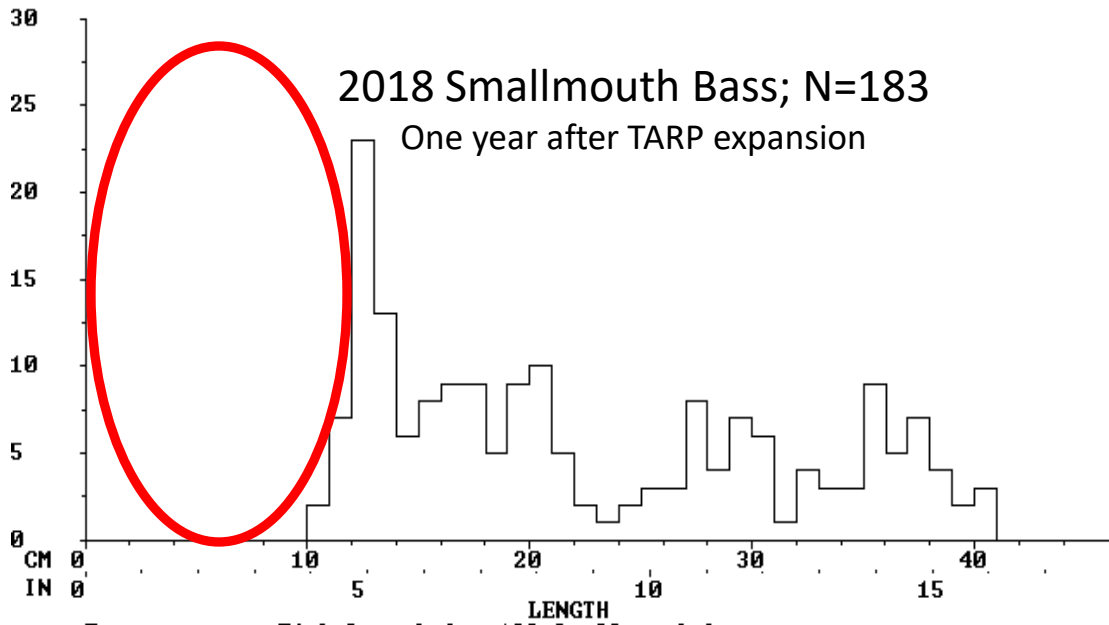
2023 Smallmouth Bass; N=691

Six years after TARP expansion



2018 Smallmouth Bass; N=183

One year after TARP expansion



Frequency vs. Fish Length for 183 Smallmouth bass



CPUE Fox River 2022

20

2

5

0

103

93

164

93

57

63

54

42

25

10

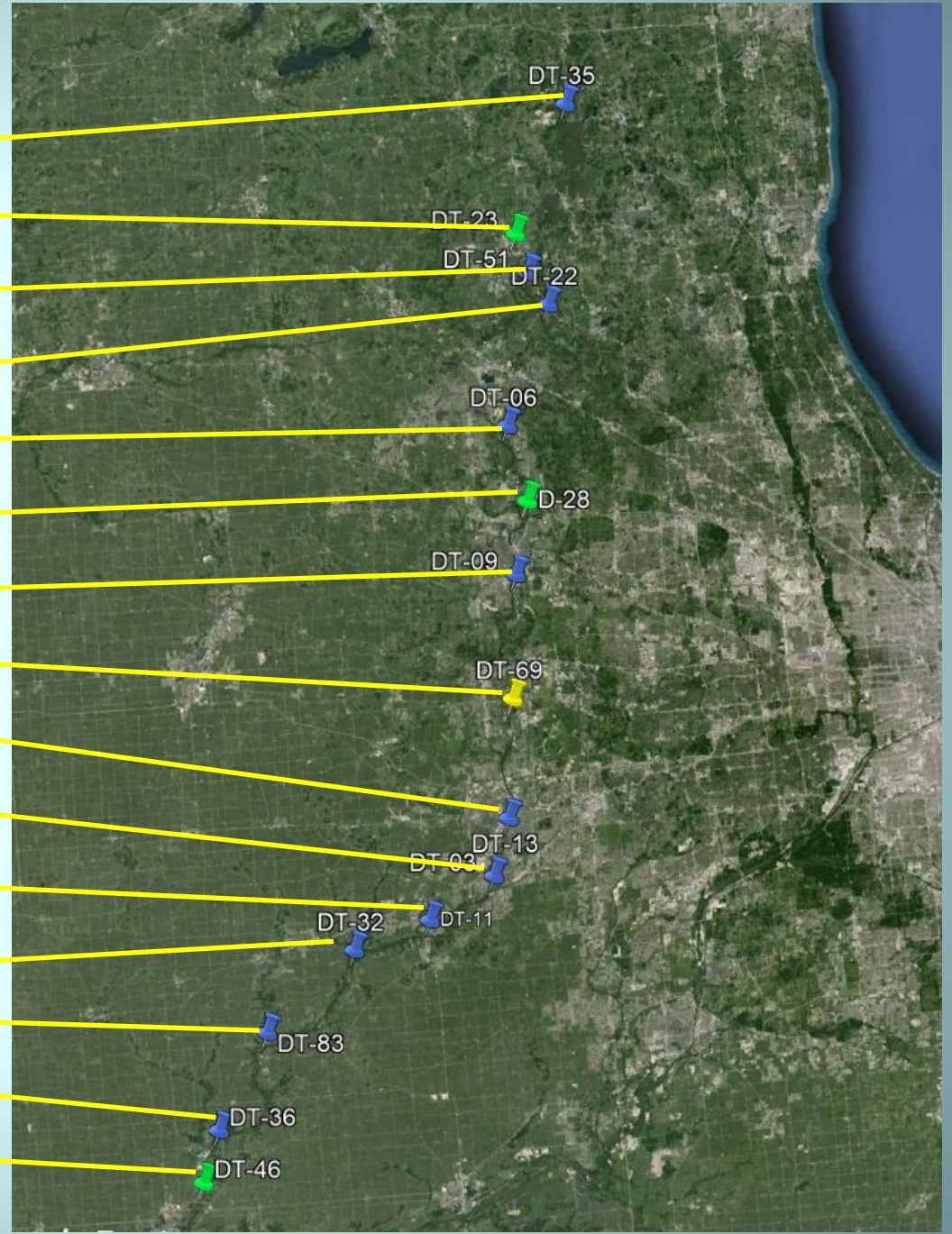
35

51

662

Avg. CPUE:

Total:



Des Plaines River Sauger Stocking Program

2001 – 2023: 17,000 2-in. fingerlings released at 4 - 6 mid river locations

Basin Survey Sauger Abundance - 16 stations

Year	No.	No. Sites Found
2003	19	1
2008	11	2
2013	1	1
2018	14	5
2023	92	9

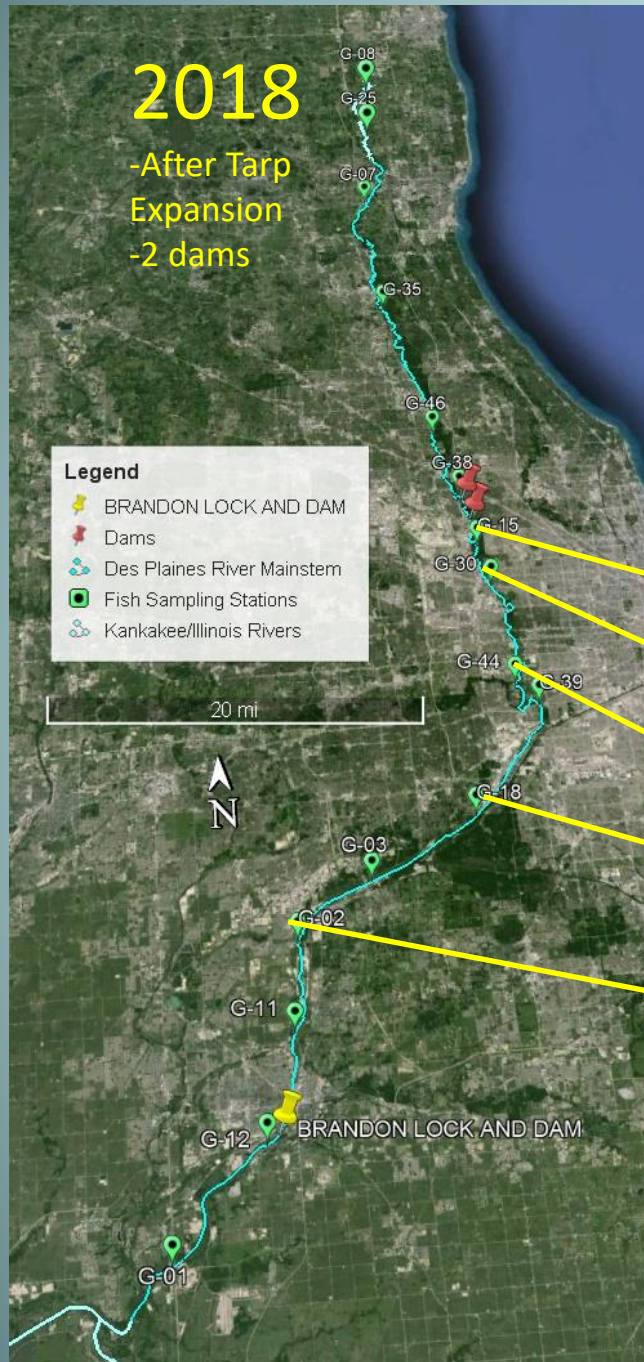


2018

-After Tarp Expansion
-2 dams

- Legend**
- BRANDON LOCK AND DAM
 - Dams
 - Des Plaines River Mainstem
 - Fish Sampling Stations
 - Kankakee/Illinois Rivers

20 mi



Sauger CPUE

4

13

2

9

2

7

2

12

5

24

4

12

30

11

Total: 14

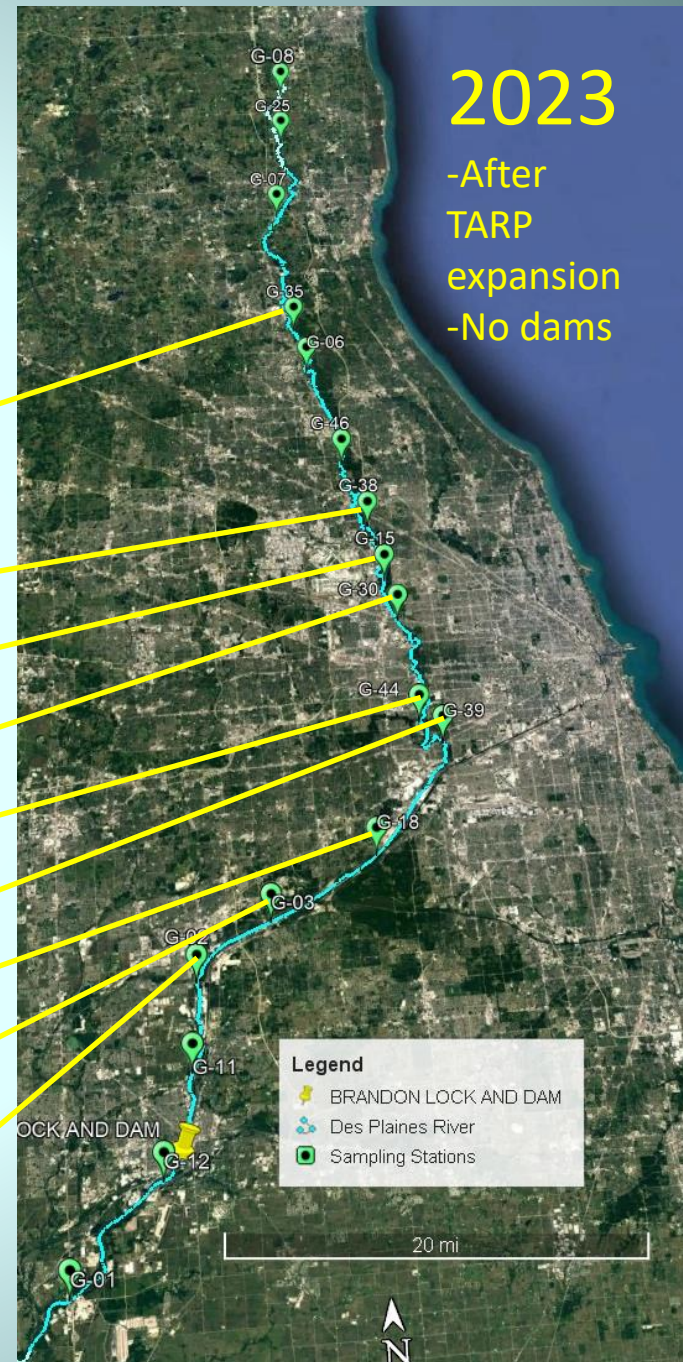
92

2023

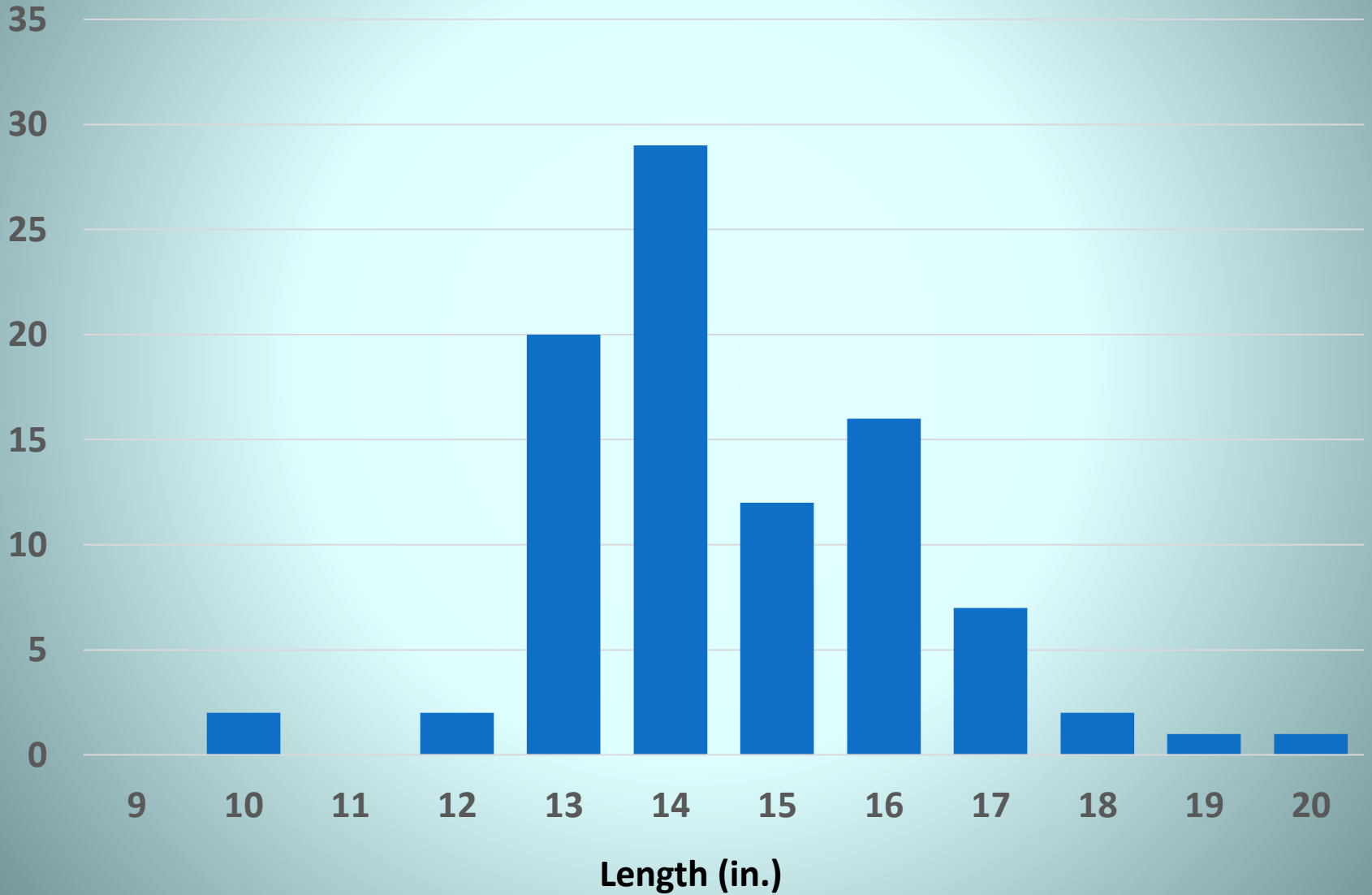
-After TARP expansion
-No dams

- Legend**
- BRANDON LOCK AND DAM
 - Des Plaines River
 - Sampling Stations

20 mi



2023 Sauger; N=92





Des Plaines River Restoration

– Sportfish abundance and distribution

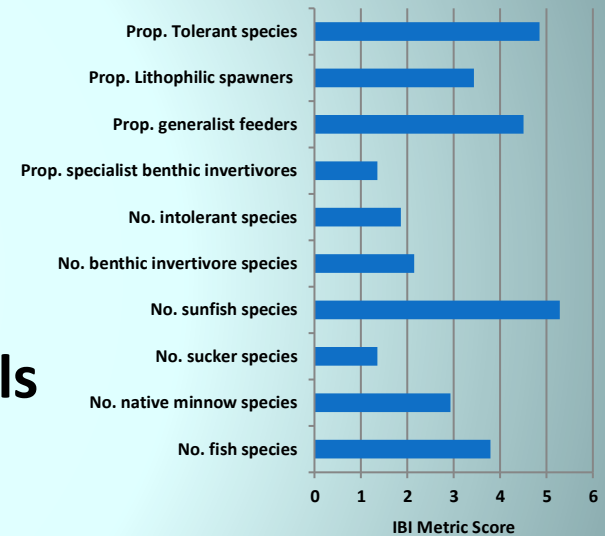
- Smallmouth Bass
- Sauger

– Stream Quality / IBI

- Trends
- Response to WQ and dam removals

– What's next

- McCook Phase II
- Brandon Road fish barrier

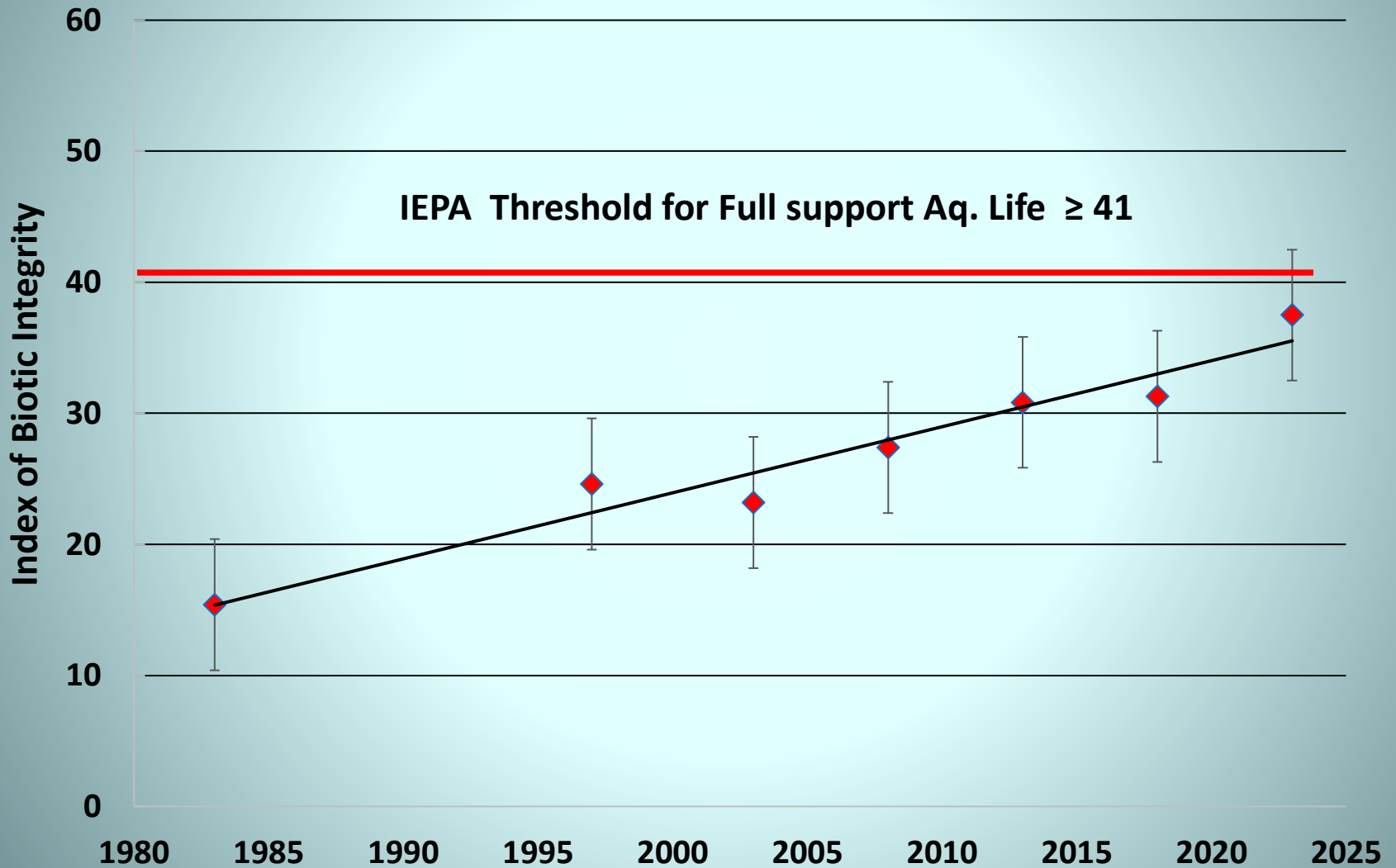


Index of Biotic Integrity – IBI

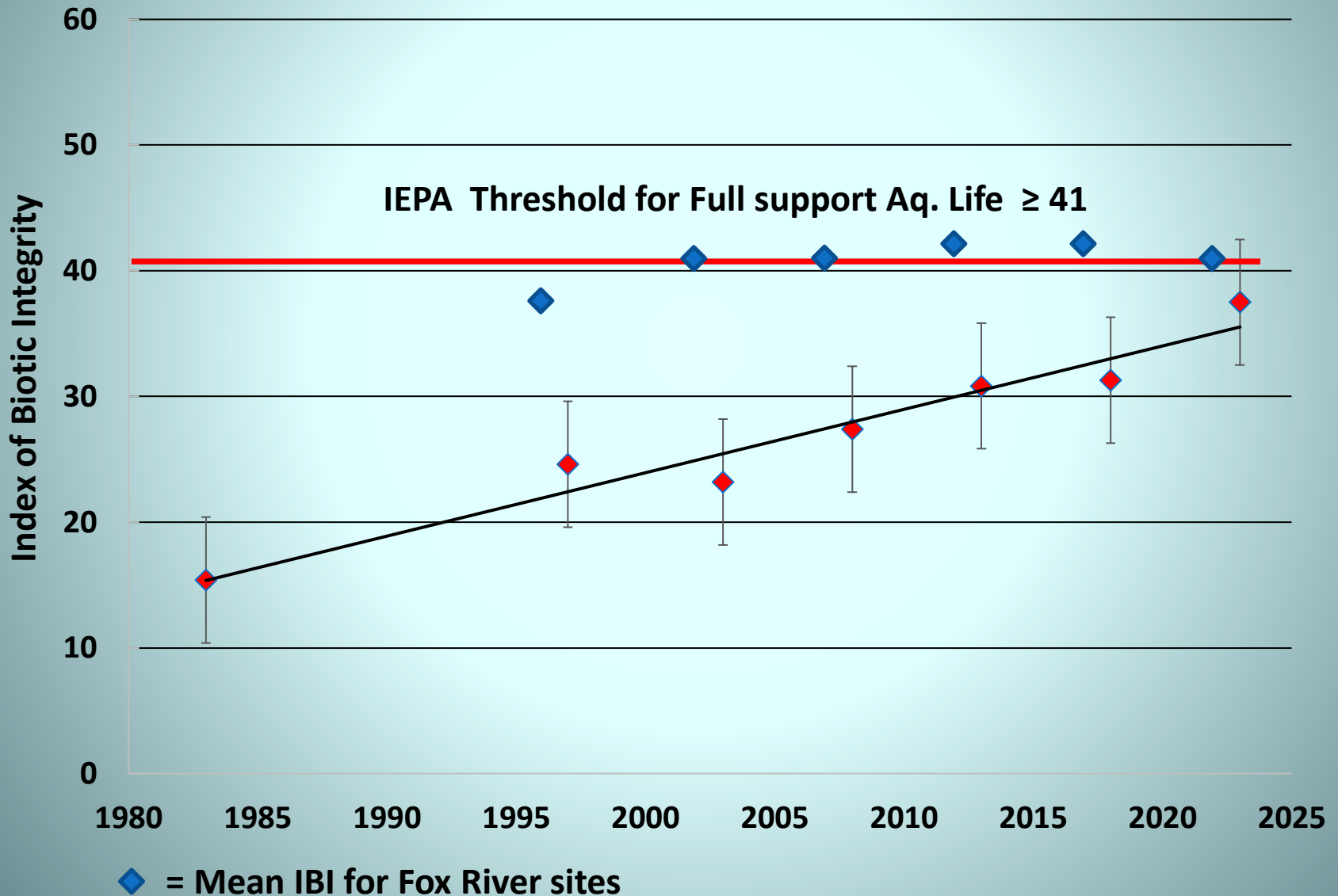
METRIC	SCORE
No. native fish species	0-6
No. sucker species	0-6
No. sunfish species	0-6
No. intolerant species	0-6
No. minnow species	0-6
No. benthic invertivore species	0-6
Prop. specialist benthic invertivores	0-6
Prop. generalist feeders	0-6
Prop. coarse mineral spawners	0-6
Prop. tolerant species	0-6
total	0-60

Difference of IBI >10 = biologically meaningful change (Smogor 2005)

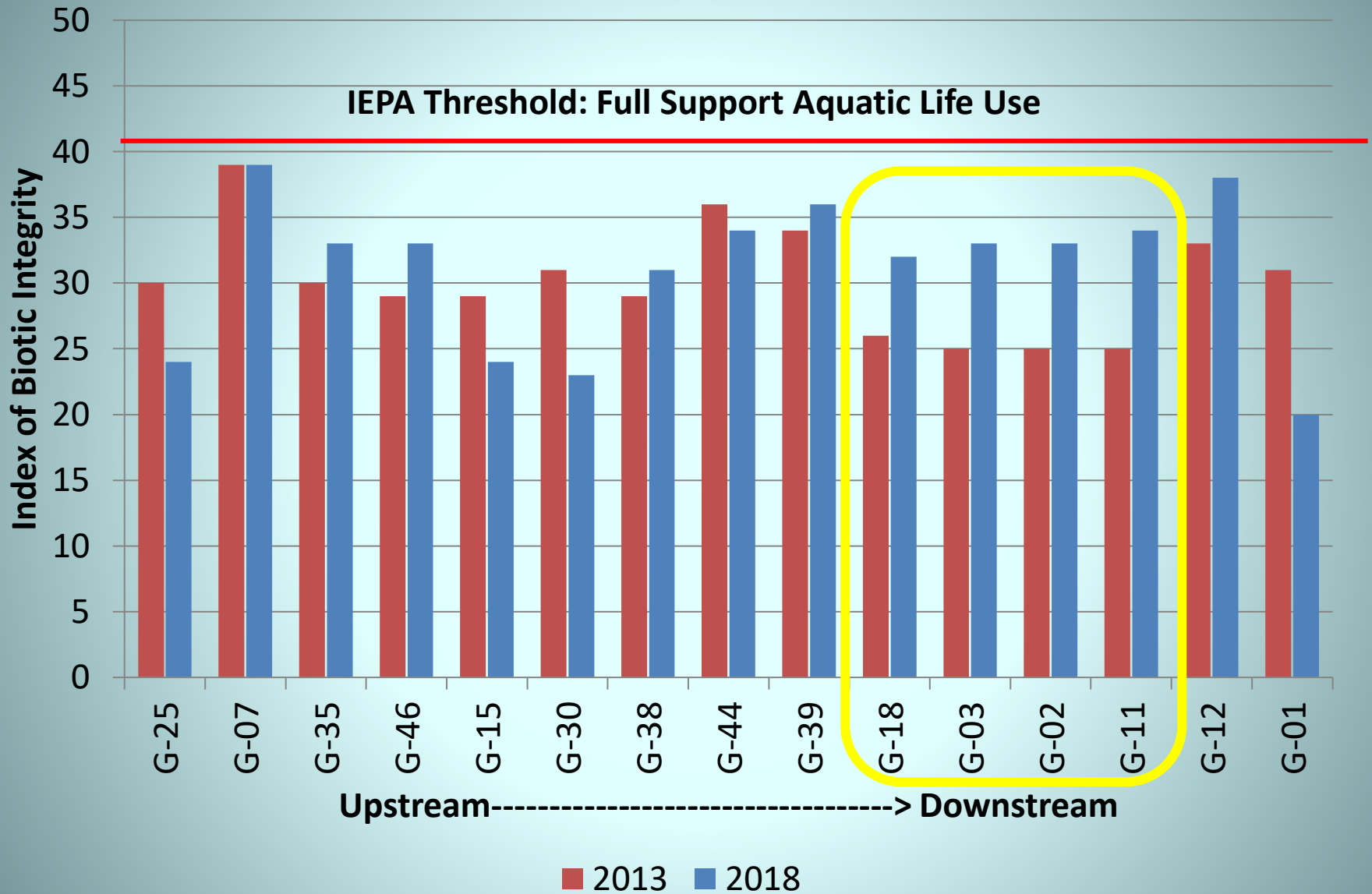
Mean IBI for Des Plaines River survey sites: “biologically meaningful” change (>10 points)



Mean IBI for basin survey sites: “biologically meaningful” change (>10 points)

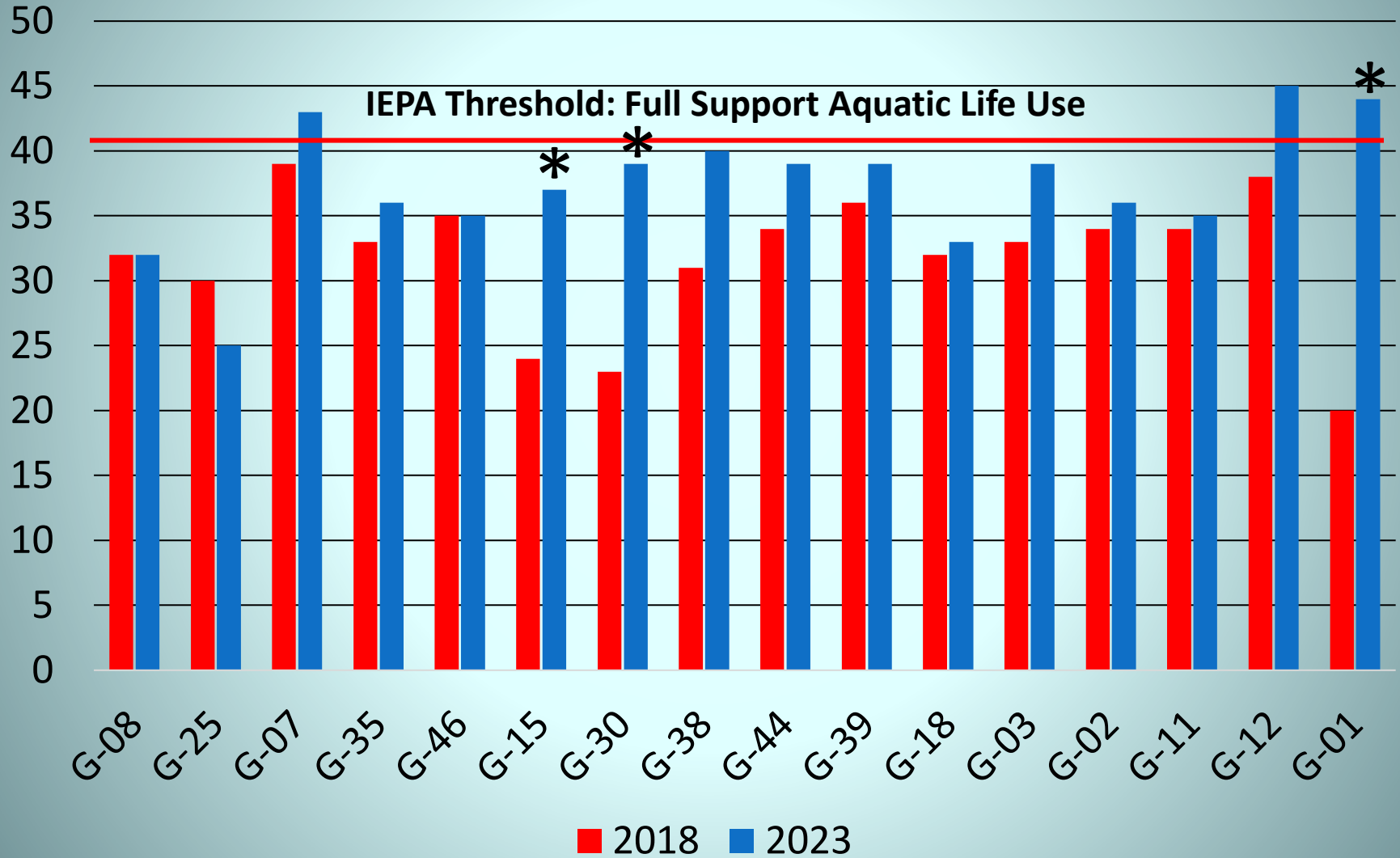


Des Plaines River IBI Scores 2013 vs. 2018



Des Plaines River IBI Scores 2018 vs. 2023

Mean: 2018 = 31.8 2023 = 37.3



* Biologically Significant Change > 10 points

Species composition at sampling station G-15

Species	2018	2023
Gizzard shad	2	0
Northern pike	4	2
Goldfish	1	0
Carp	39	11
Hornyhead chub	4	9
Spotfin shiner	3	32
Bluntnose minnow		74
Rosyface shiner		19
Sand shiner	1	11
Spottail shiner		1
White sucker	19	41
Channel catfish	5	6
Yellow bullhead		1
Black bullhead	2	0
Blackstripe topminnow		1
Black Crappie		1
Rock bass	5	3
Largemouth bass	6	8
Smallmouth bass		33
Green sunfish	5	13
Bluegill	6	24
Sauger	1	9
Blackside darter		1
Logperch	1	10
Johnny darter	1	0
Round goby		19



Rosyface Shiner expansion:

2008 = 0

2013 = 39 (4)

2018 = 21 (3)

2023 = 294 (11)

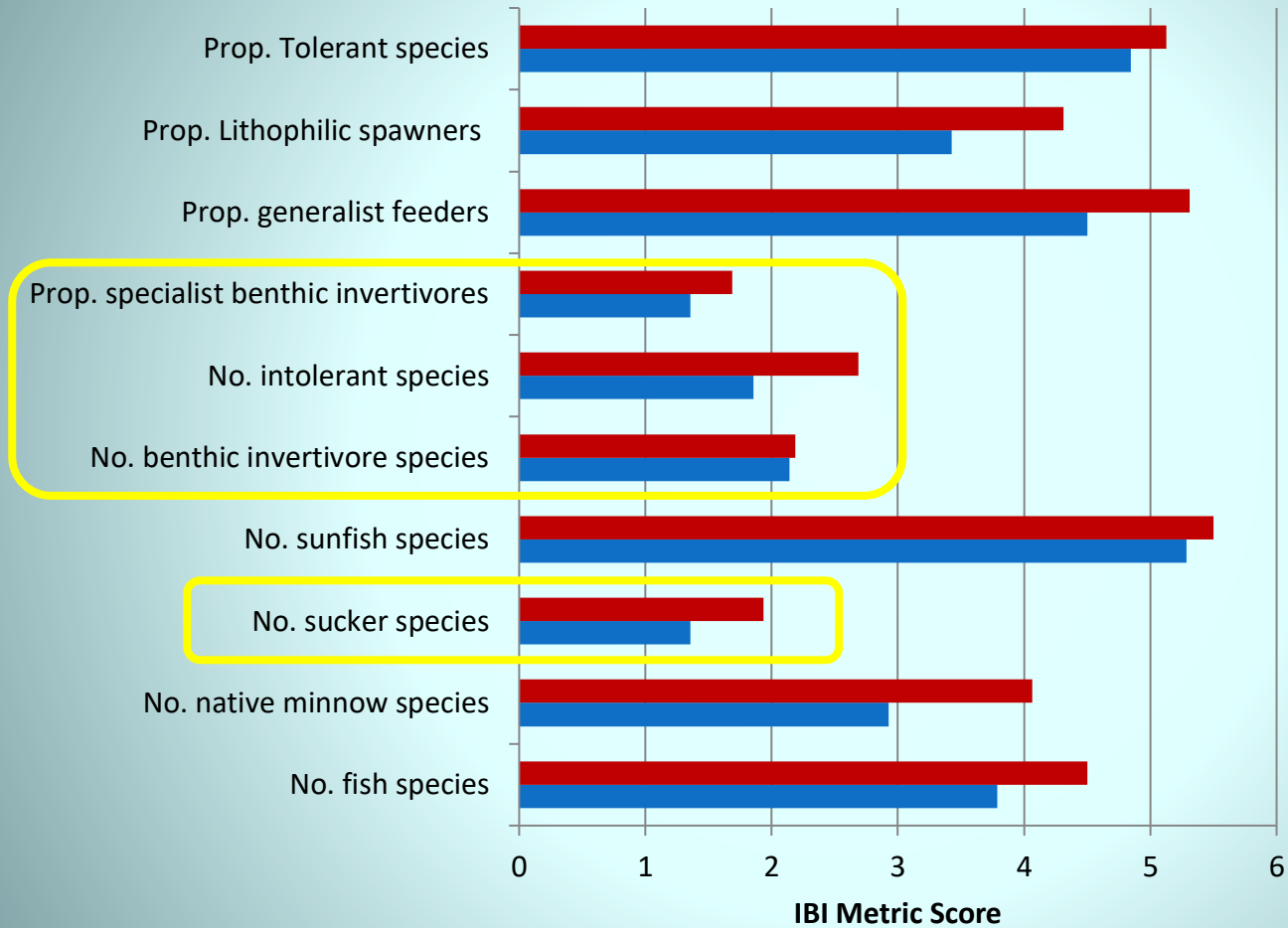
IBI Score:

2018 = 24

2023 = 37

Species moving
Upstream

Mean IBI Metric scores (n=16) for Des Plaines River mainstem stations 2023 (red) vs. 2018 (blue)





Des Plaines River Restoration

- Sportfish abundance and distribution
 - Smallmouth Bass
 - Sauger
- Stream Quality / IBI
 - Trends
 - Response to WQ and dam removals
- **What's next**
 - **McCook Phase II**
 - **Brandon Road fish barrier**

Des Plaines River: future projects - positive



McCook Reservoir 3.5 BG current capacity
Increased to 6.9 BG in 2029

Des Plaines River: future projects - negative

Brandon Road Lock and Dam

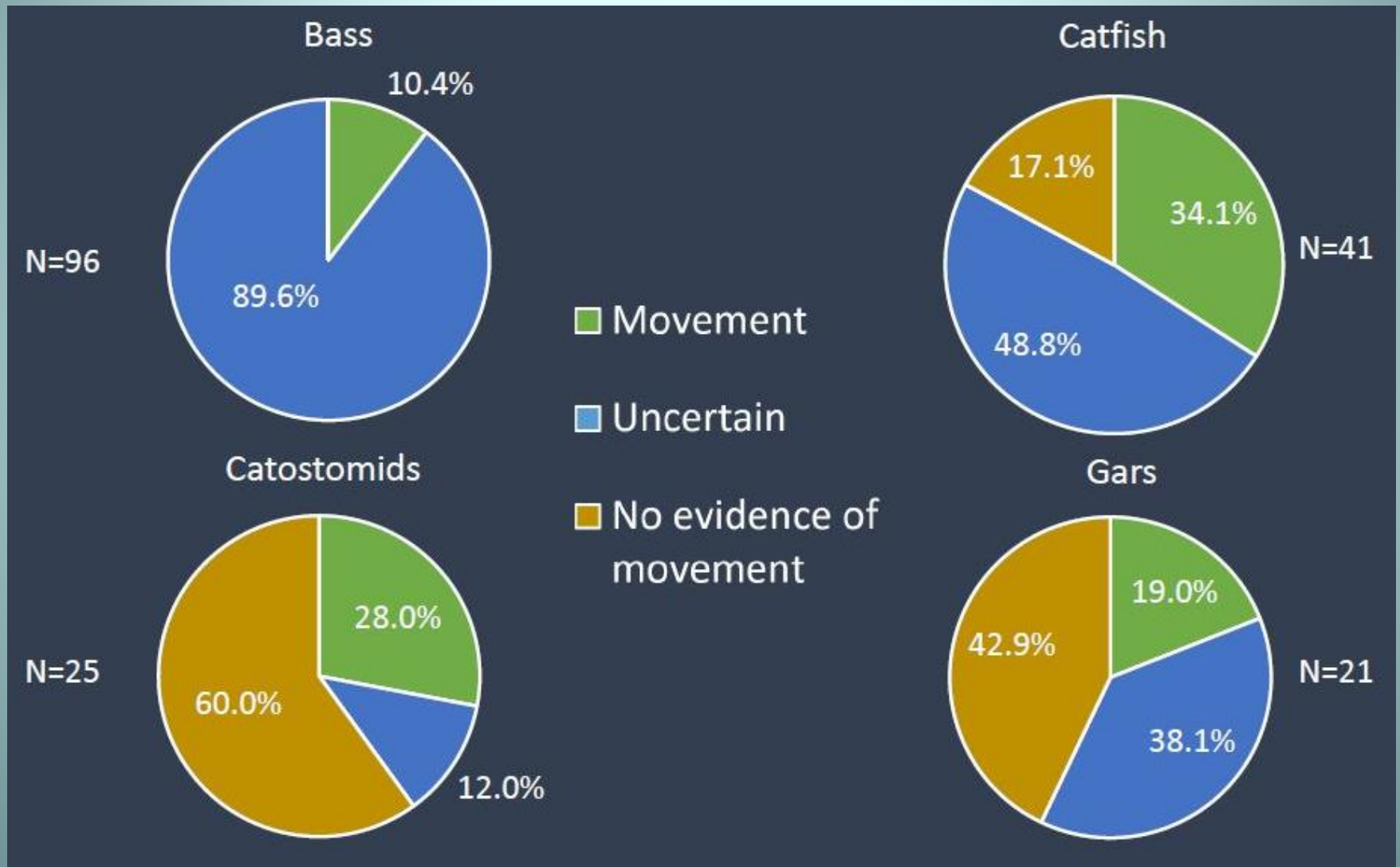
Asian carp
barrier proposed



Native species
blocked

Limits further
recolonization / restoration
of upstream areas

Frequency of upper Des Plaines River captured fish passing through Brandon Rd Lock and Dam based on fin microchemistry (Snyder et al. 2022)

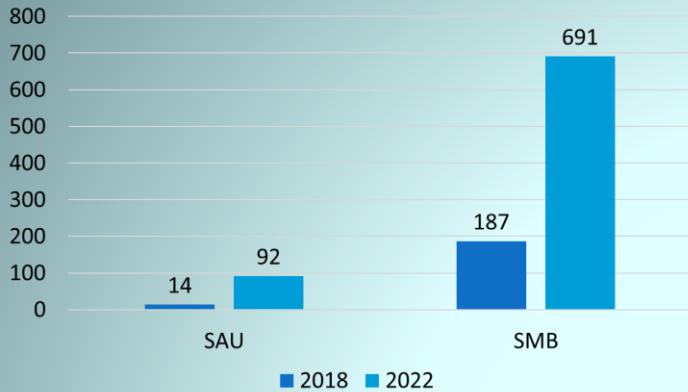


Hofmann Dam Project submitted 1997 – Project completed 2012

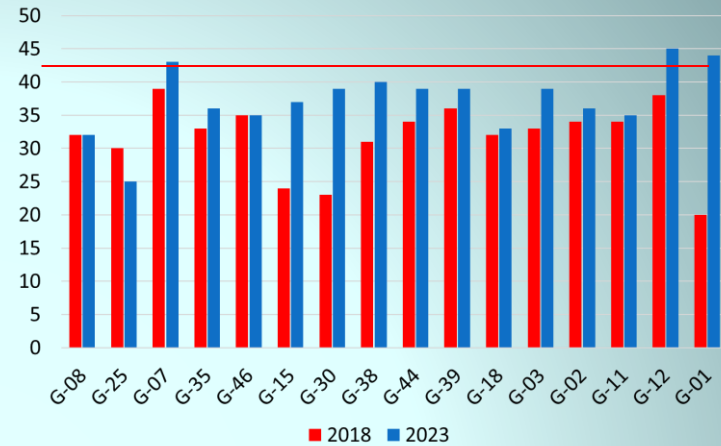
- Four Governors
- Five DNR Directors
- Four Fisheries Chiefs
- Dam “Safety Fund” announced Sept 2012



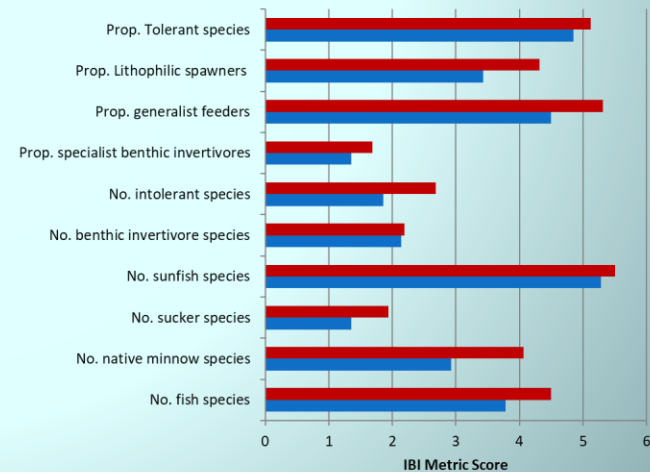
Total No. Sauger and Smallmouth Bass



Des Plaines River IBI Scores
Means: 2018 = 31.8 2023 = 37.3



- CSOs reduced by TARP expansion
- All dams removed US Brandon
- SMB increased by 73%
- SMB expand throughout mainstem
- Sauger increased abundance and range
- IBIs improve in upper mainstem due to dam removals
- Three stations exceed IEPA impairment threshold for first time
- Further expansion of TARP in 2029
- Invasive Carp barrier at Brandon may limit restoration potential



tristan.widloe@illinois.gov