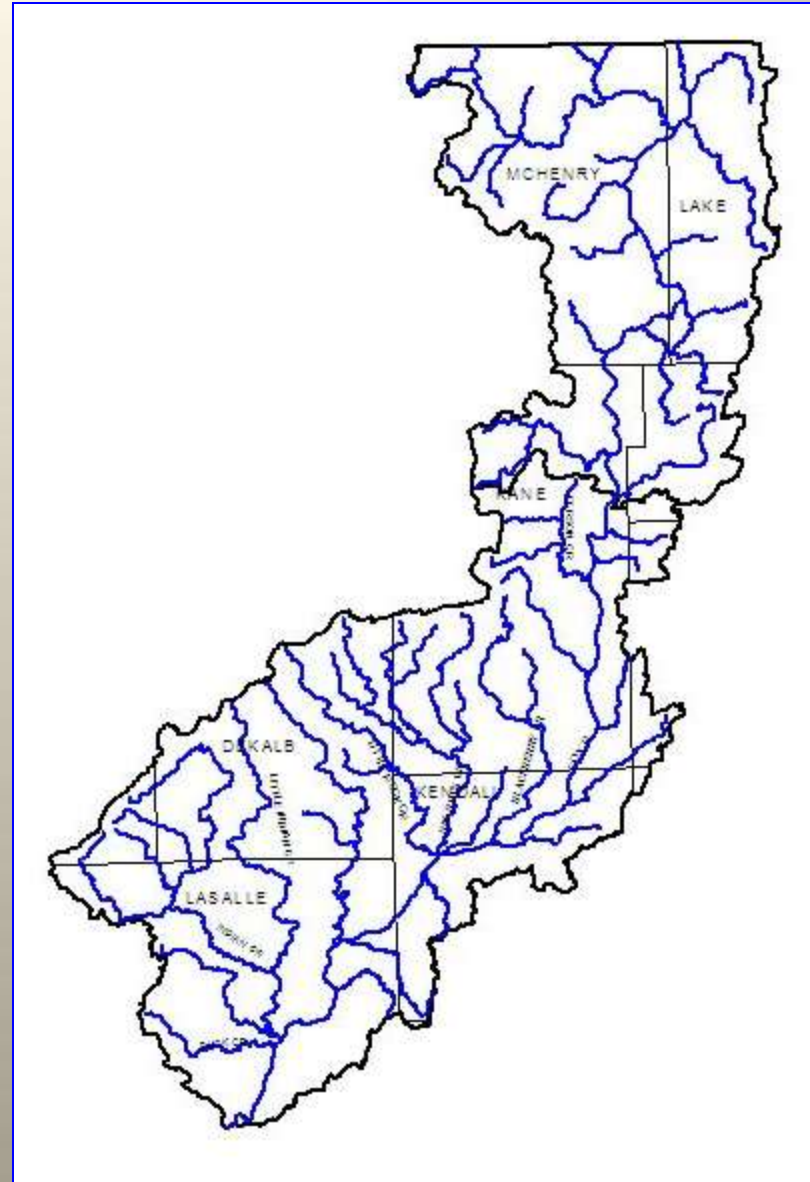




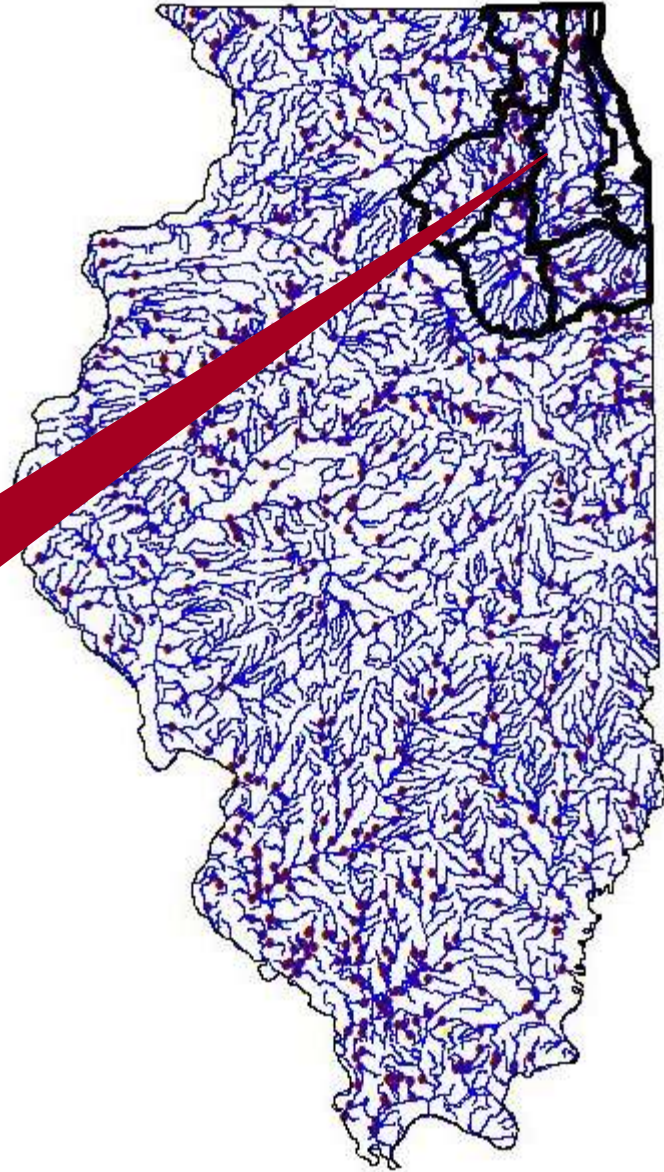
# Fox River

In Illinois:  
Status of fish and  
stream quality



# IDNR Area A Division of Fisheries

Fox  
Des Plaines  
Chicago  
Kankakee  
Mazon  
Aux Sable





## DATA APPLICATIONS

- Stream Health
- Fishery Management
- Watershed Planning
- Project Evaluation
- Permit Review



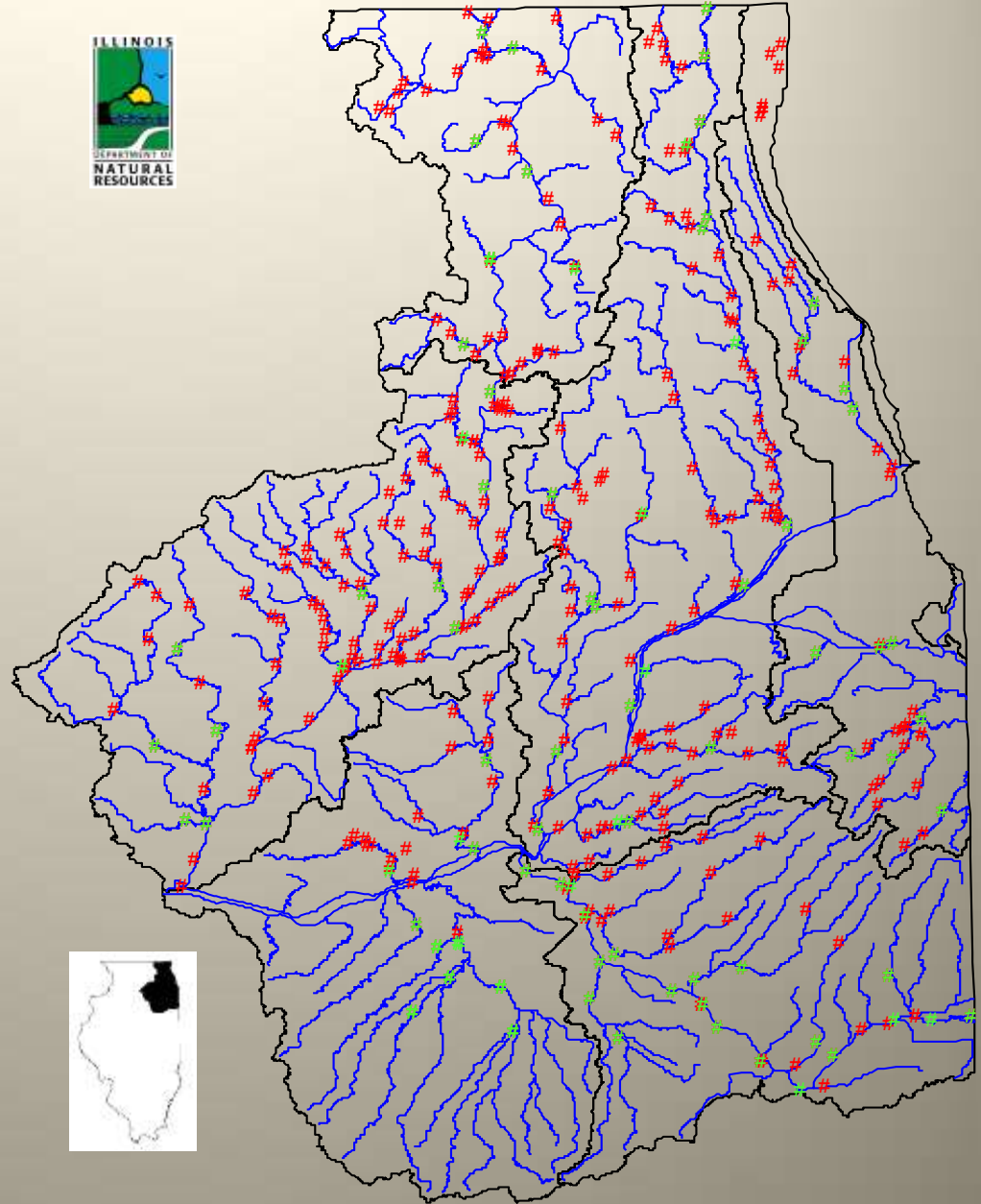
## **Boat Electrofishing Rivers**



# IDNR Fish Sampling Program



- Statewide Basin Survey sites
  - large scale
  - five-year rotation
  - IEPA coop.
- Area A Sub-basin sites
  - local scale
  - priority watersheds
  - active watershed groups/projects



# Fox River Basin Survey Sites

## 2012

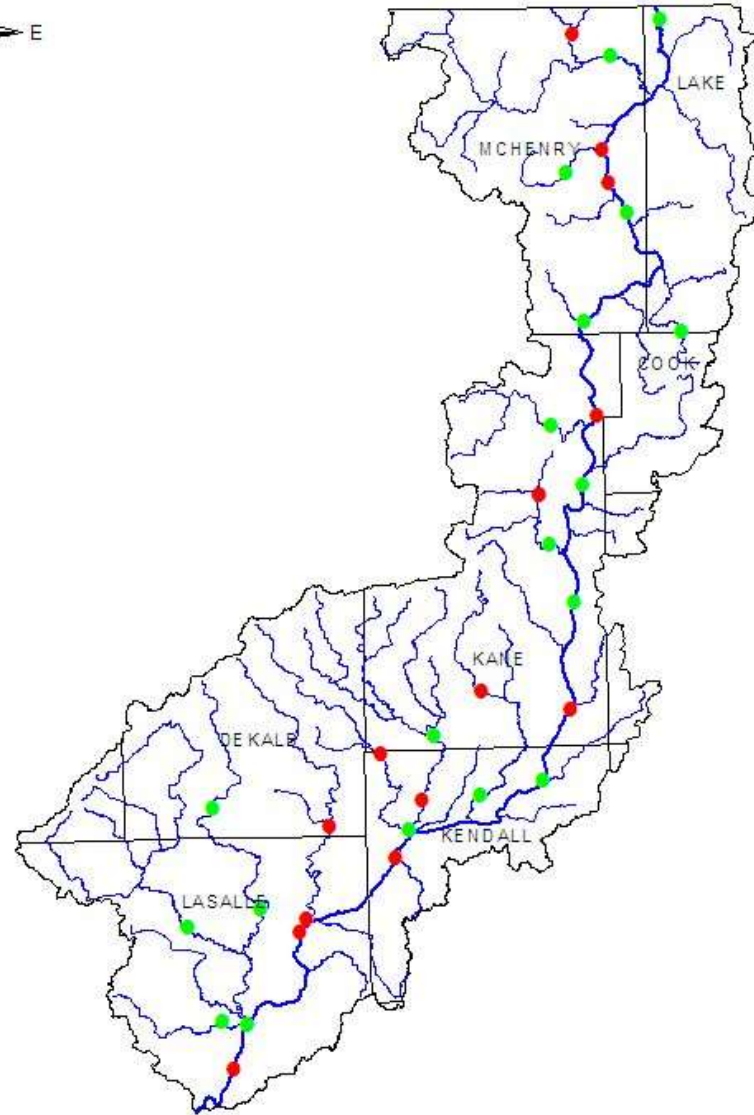
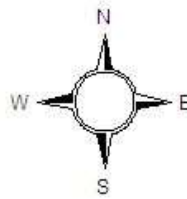
42 Stations:  
15 mainstem  
27 tributary

## 2007

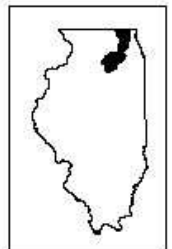
34 Stations:  
14 mainstem  
20 tributary

## 2002 / 1996

18 Stations:  
7 mainstem  
11 tributary



0 9 Miles



## 2012 Fox River Basin Survey

	No. Stations	Total Fish	No. Species
Total	41	38,829	84
Mainstem	15	9,453	66
Tributaries	27	29,376	65



Blacknose dace



Largescale stoneroller



Mottled sculpin



Rainbow darter



Tadpole madtom



Starhead topminnow



# Sucker Family



Highfin carpsucker



Quillback carpsucker





# American brook lamprey



ammocoete



adult



Common name	Scientific name	Total	C-O-L	Dnstrm	Burton's	Dnstrm	S. Elgin			Fabyan Pk.	Aurora	Oswego	Yorkville	Millbrook	Sheridan	Wedron	Dayton
			St Prk Rt. 173	McHenry Rt. 120	McHenry Dam DT-51	Burton's Bridge Rt. 176	Algonquin Dam DT-22	Elgin I-90 DT-69	State Street DT-09	Batavia DT-69	Hurds' Isle DT-13	DT-03	Rt. 47 DT-11	DT-32	DT-83	DT-36	DT-46
Lepistosteus platostomus		4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Longnose gar	Lepistosteus osseus	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1
Bowfin	Amia calva	5	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0
Gizzard shad	Dorosoma cepedianum	302	9	58	5	17	17	5	12	31	4	28	33	14	11	14	44
Mooneye	Hiodon tergisus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grass pickerel	Esox americanus	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Northern pike	Esox lucius	3	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
Grass carp	Ctenopharyngodon idella	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Silver carp	Hypophthalmichthys molitrix	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Goldfish	Carassius auratus	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Carp	Cyprinus carpio	228	6	17	10	22	22	32	17	8	2	34	34	14	6	0	4
Golden shiner	Notemigonus crysoleucas	21	0	7	4	0	1	0	1	3	4	0	1	0	0	0	0
Creek chub	Semotilus atromaculatus	21	0	0	0	0	12	0	0	0	0	0	0	0	0	9	0
Central stoneroller	Camptostoma anomalum	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Blacknose dace	Rhinichthys atratulus	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Striped shiner	Luxilus chrysocephalus	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Common shiner	Luxilus cornutus	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Spotfin shiner	Cyprinella spiloptera	2653	96	28	570	20	326	7	18	15	66	128	98	235	433	154	459
Pugnose minnow	Opsopoeodus emiliae	8	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0
Fathead minnow	Pimephales promelas	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
Bluntnose minnow	Pimephales notatus	874	489	0	0	0	25	1	18	31	35	35	42	67	87	19	25
Bullhead minnow	Pimephales vigilax	76	10	8	2	5	2	1	0	6	9	0	5	8	16	4	0
Emerald shiner	Notropis atherinoides	92	38	2	24	6	0	0	2	11	6	0	0	1	0	2	0
Rosyface shiner	Notropis rubellus	5	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0
Bigmouth shiner	Notropis dorsalis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Sand shiner	Notropis ludibundus	417	3	0	9	3	0	0	10	0	7	14	19	14	143	136	59
Mimic shiner	Notropis volucellus	34	0	0	29	3	1	0	0	0	1	0	0	0	0	0	0
Spottail shiner	Notropis hudsonius	224	0	0	1	0	212	0	5	3	0	0	0	0	0	0	3
Smallmouth buffalo	Ictiobus bubalus	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
Black buffalo	Ictiobus niger	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Quillback	Cariodes cyprinus	621	3	0	277	3	200	12	51	13	4	5	31	3	5	5	9
River carpsucker	Cariodes carpio	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Highfin carpsucker	Cariodes velifer	67	0	0	0	0	0	0	0	0	0	0	11	5	5	41	5
White sucker	Catostomus commersoni	469	0	0	0	0	444	0	6	1	2	3	1	2	2	8	0
Northern hog sucker	Hypentelium nigricans	27	0	0	0	0	0	0	5	0	0	0	2	4	6	7	3
Shorthead redhorse	Moxostoma macrolepidotum	253	0	0	0	0	0	0	0	0	19	39	69	51	34	17	24
Black redhorse	Moxostoma duquesnei	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Golden redhorse	Moxostoma erythrurum	64	0	3	0	0	0	0	2	5	2	3	13	11	19	6	6
Silver redhorse	Moxostoma anisurum	53	0	0	0	0	7	3	1	5	4	0	9	2	4	15	3
Channel catfish	Ictalurus punctatus	270	3	8	21	5	25	3	68	19	8	51	15	7	7	16	14
Yellow bullhead	Ameiurus natalis	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Black bullhead	Ameiurus melas	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Flathead catfish	Pylodictis olivaris	33	1	0	0	0	1	2	6	1	2	3	5	8	1	1	2
Blackstripe topminnow	Fundulus notatus	126	5	0	0	0	0	10	66	0	33	3	0	5	1	3	0
Brook silverside	Labidesthes sicculus	34	0	12	6	8	3	3	0	0	0	0	0	0	0	2	0
White bass	Morone chrysops	14	2	4	0	0	2	1	3	0	0	1	0	0	0	0	1
Striped bass x White bass hybrid	Morone saxatilis x M. chrysops	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Yellow bass	Morone mississippiensis	8	0	0	1	4	0	0	0	2	0	1	0	0	0	0	0
Black crappie	Pomoxis nigromaculatus	8	1	0	1	1	1	0	1	0	0	0	3	0	0	0	0
White crappie	Pomoxis annularis	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Rock bass	Ambloplites rupestris	5	0	0	0	0	0	0	0	0	0	1	0	3	1	0	0
Largemouth bass	Micropterus salmoides	245	64	17	66	16	2	26	4	15	20	2	2	2	3	2	4
Smallmouth bass	Micropterus dolomieu	568	12	0	1	0	154	15	77	95	51	36	28	32	38	25	4
Warmouth	Lepomis gulosus	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Green sunfish	Lepomis cyanellus	89	3	3	15	3	0	8	5	2	11	4	9	21	4	1	0
Bluegill x Green sunfish hybrid	Lepomis macrochirus x L. cyanellus	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Bluegill	Lepomis macrochirus	809	84	60	177	100	37	70	87	59	63	18	18	20	8	2	6
Pumpkinseed	Lepomis gibbosus	11	0	1	9	0	0	0	1	0	0	0	0	0	0	0	0
Orangespotted sunfish	Lepomis humilis	59	1	0	8	0	0	0	20	8	20	0	0	2	0	0	0
Walleye	Stizostedion vitreum	56	0	8	3	0	0	0	24	0	0	6	2	0	7	0	2
Sauger	Stizostedion canadense	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Yellow perch	Perca flavescens	12	0	0	0	7	4	1	0	0	0	0	0	0	0	0	0
Blackside darter	Percina maculata	3	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Slenderhead darter	Percina phoxocephala	4	0	0	0	0	1	0	2	0	0	0	1	0	0	0	0
Logperch	Percina caprodes	21	0	0	5	1	12	0	3	0	0	0	0	0	0	0	0
Johnny darter	Etheostoma nigrum	47	1	0	0	0	24	7	1	0	0	3	1	3	1	6	0
Banded darter	Etheostoma zonale	100	0	0	0	1	80	0	11	0	1	4	2	1	0	0	0
Freshwater drum	Aplodinotus grunniens	293	12	26	26	158	21	4	2	1	0	4	2	1	0	0	36
Total fish		9453	847	266	1280	384	1644	221	533	331	377	425	449	542	836	511	807
Total species		66	23	18	28	20	31	22	31	21	23	23	29	28	25	26	31

## 10 most numerous species -2012 Fox River Basin Survey

### MAINSTEM

Spotfin shiner  
Bluntnose minnow  
Bluegill  
Quillback  
Smallmouth bass  
White sucker  
Sand shiner  
Gizzard shad  
Freshwater drum  
Channel catfish

### TRIBUTARIES

Bluntnose minnow  
Sand shiner  
Spotfin shiner  
Banded darter  
Central stoneroller  
White sucker  
Hornyhead chub  
Striped shiner  
Bluegill  
Smallmouth bass

## Index of Biotic Integrity - IBI

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

**Difference of >10 = biologically meaningful change**

# Illinois Integrated Water Quality Report and Section 303d List – 2008 IEPA 2008

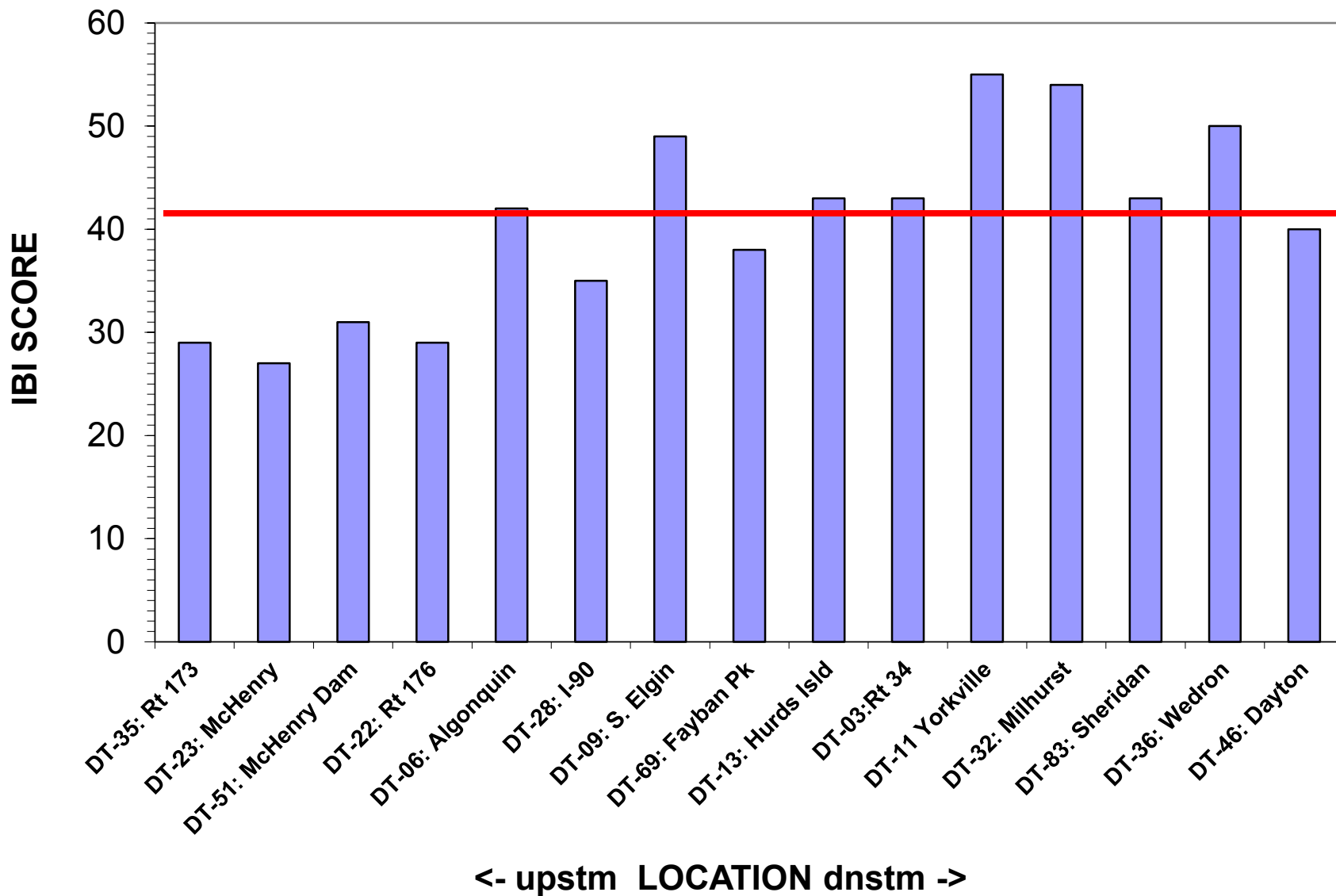
**Table C-2. Guidelines for Using Biological Information in Table C-1 to Assess Aquatic Life Use Attainment in Streams.**

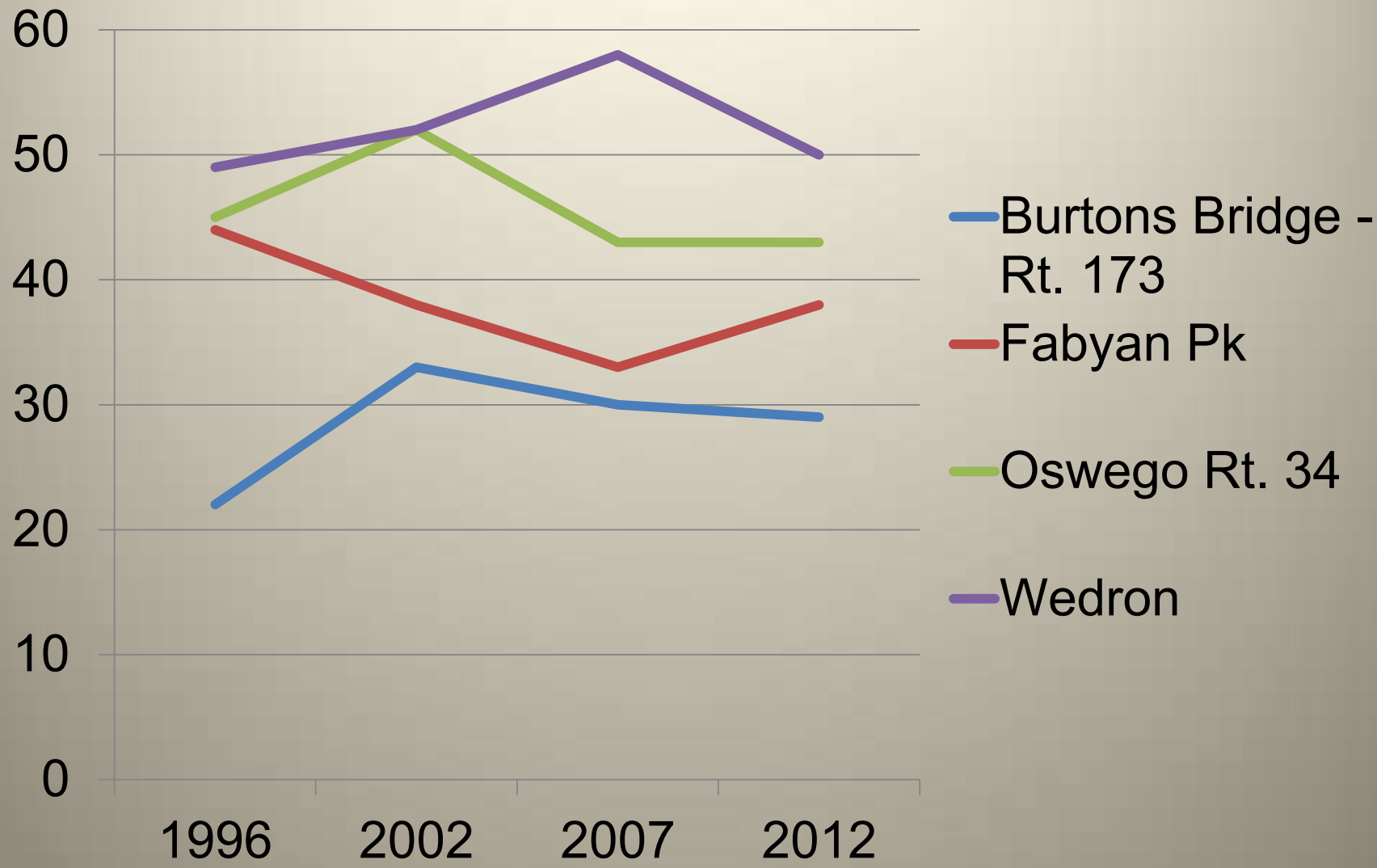
	<b>No Impairment</b>	<b>Moderate Impairment</b>	<b>Severe Impairment</b>
<b>Biological Indicator</b>	<b>Fully Supporting <u>Aquatic Life</u> Use (Good Resource Quality)</b>	<b>Not Supporting <u>Aquatic Life</u> Use (Fair Resource Quality)</b>	<b>Not Supporting <u>Aquatic Life</u> Use (Poor Resource Quality)</b>
Fish Index of Biotic Integrity (fIBI,)	fIBI $\geq$ 41	fIBI < 41 and > 20	fIBI $\leq$ 20
Macroinvertebrate Index of Biotic Integrity (mIBI)	mIBI $\geq$ 41.8	mIBI < 41.8 and > 20.9	mIBI $\leq$ 20.9
Macroinvertebrate Biotic Index <sup>1</sup> (MBI)	MBI $\leq$ 5.9	MBI > 5.9 and $\leq$ 8.9	MBI > 8.9

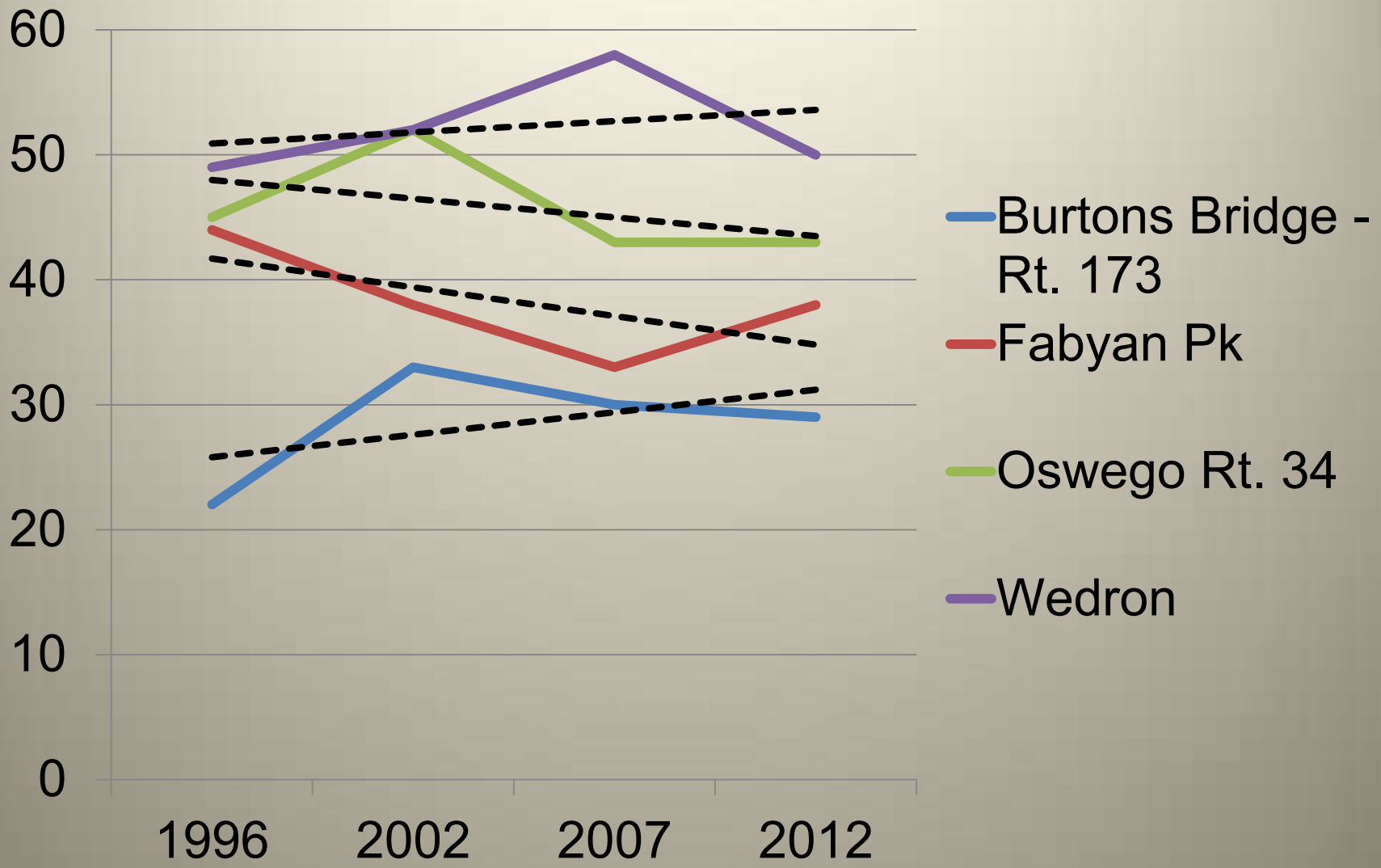
1. When the mIBI is available, the MBI is not used independently to assess attainment of aquatic life use.



# 2012 FOX RIVER MAINSTEM IBI RESULTS







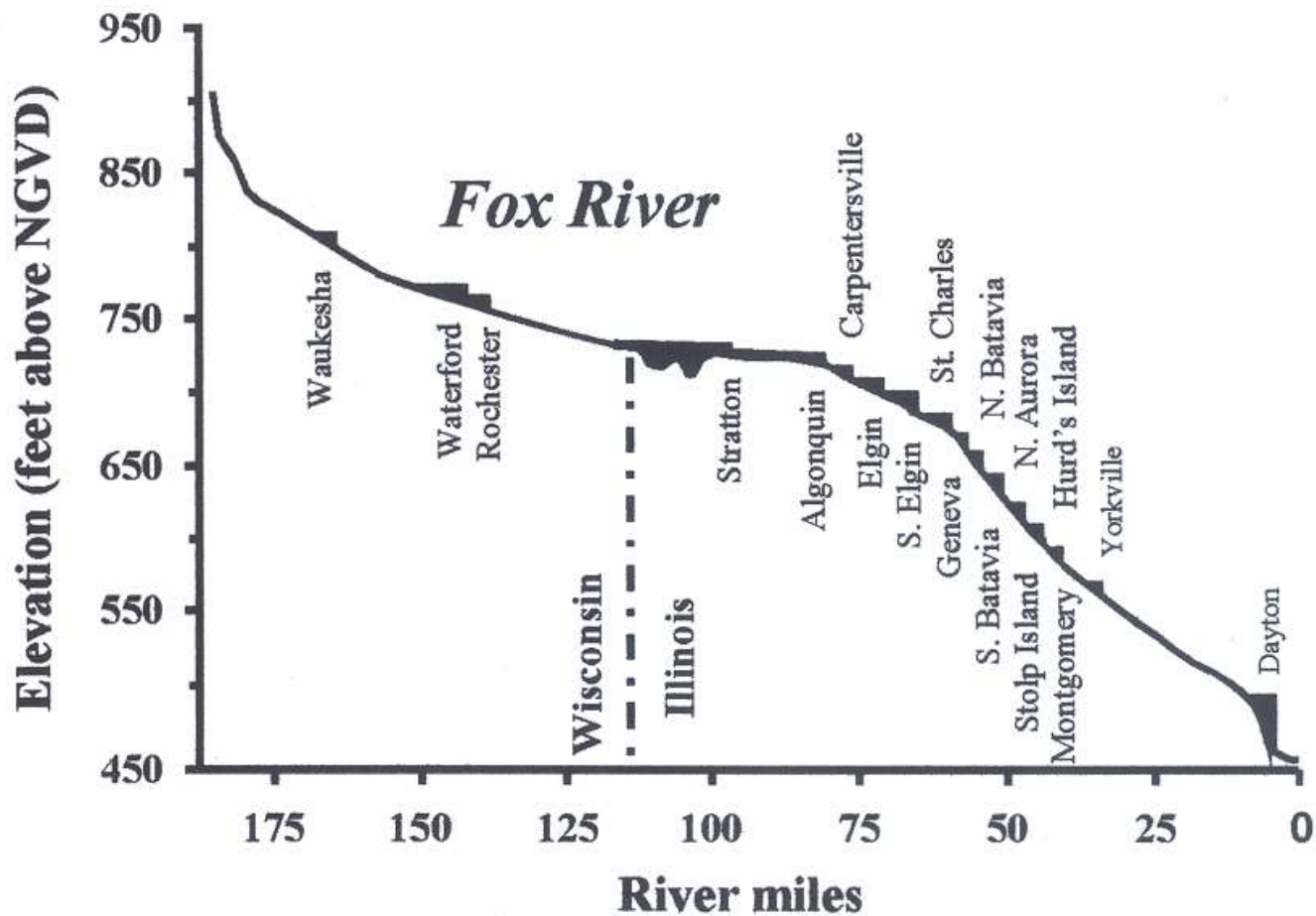
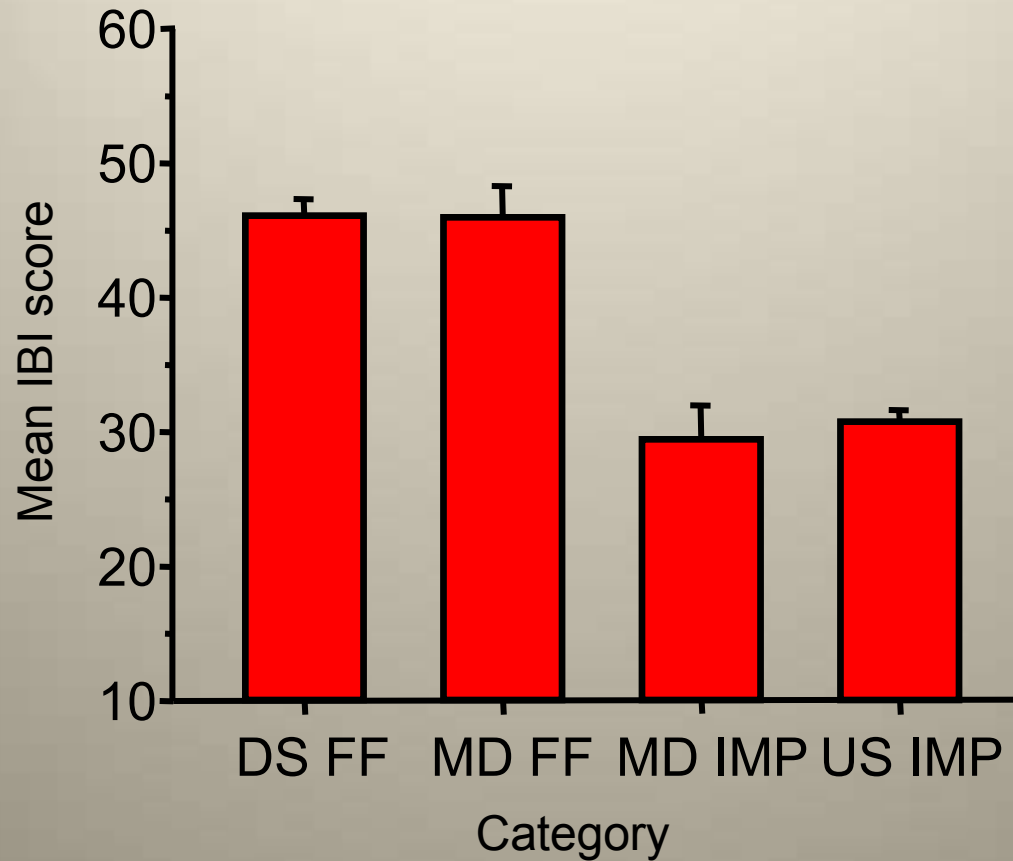


Figure 2. Fox River profile and dams in Wisconsin and Illinois (modified from Knapp 1988).

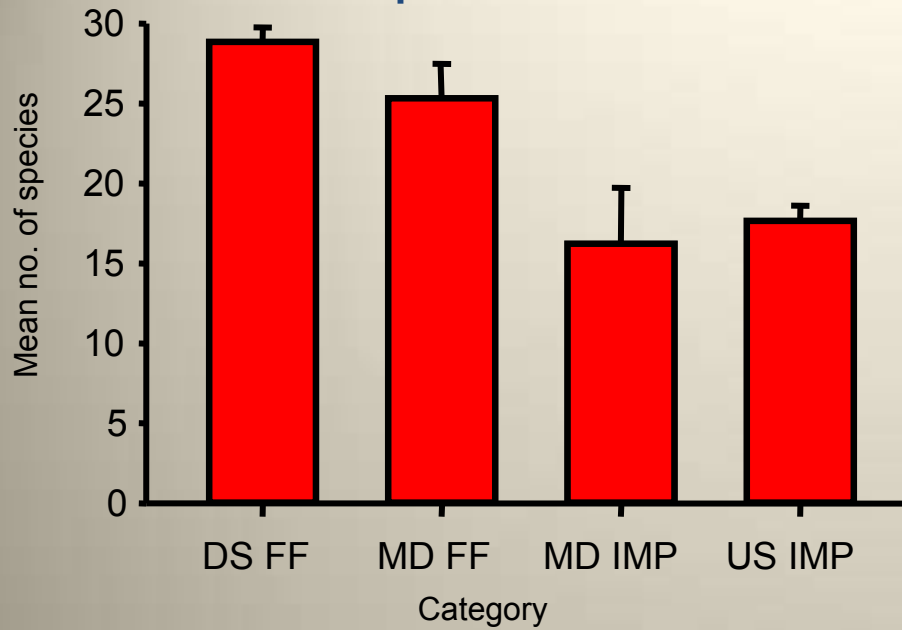
# IEPA 2008 303d list - Causes of Impairment Fox River mainstem

IEPA CODE	LOCATION	Cause						
		Flow Alt. 319	D.O 322	Sus Solids 371	Fecal Coli 400	TSS 403	Phos 462	Algae 479
DT-35	Antioch- Rt. 173	X				X		X
DT-51	McHenry	X						
DT-23	McHenry - Rt. 120	X	X					
DT-22	Burtons Brdg Rt. 176	X	X	X	X	X		X
DT-06	Algonquin	X	X	X	X	X		X
DT-28	Elgin - I-90	X	X	X		X		
DT-09	Elgin Dam	X	X	X	X	X	X	X
DT-69	Fabyan Pk	X	X	X		X	X	X
DT-13	Montgomery	X	X	X	X	X	X	X
DT-03	Oswego	X	X	X		X	X	X
DT-32	Milhurst							
DT-83	Sheridan							
DT-36	Wedron	X		X	X	X		X
DT-46	Dayton	X		X		X		

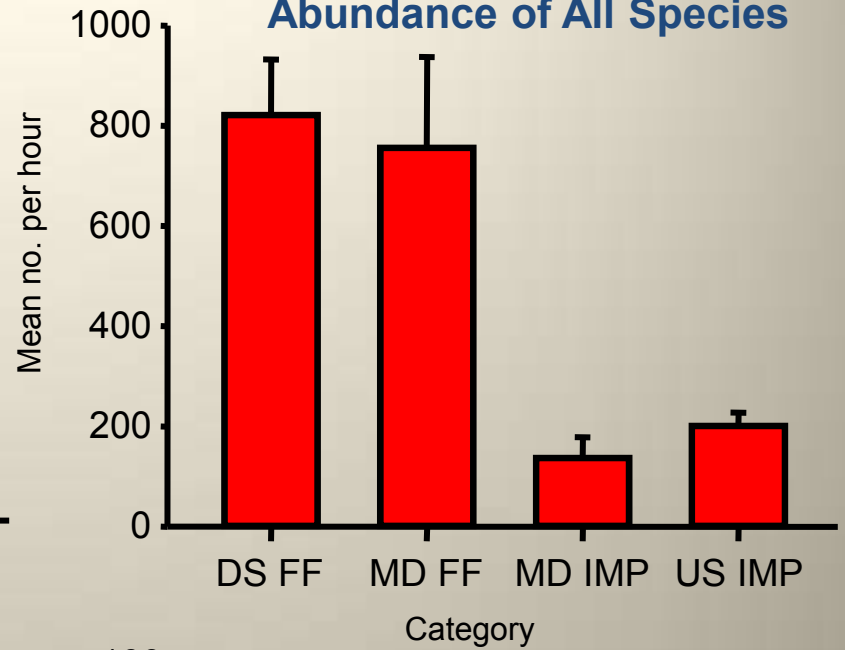
# Effects of dams on the Fox River IBI Scores (Santucci et al. 2005)



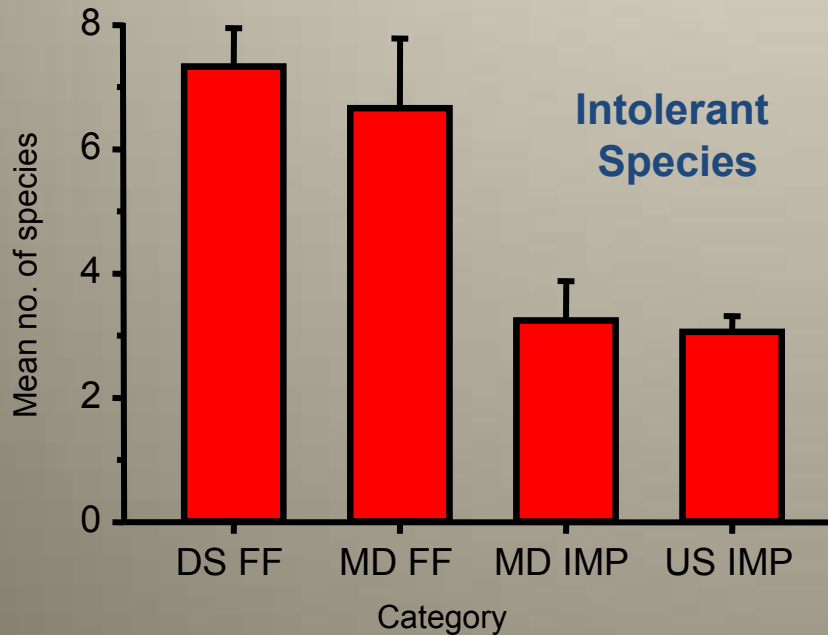
### Species Richness



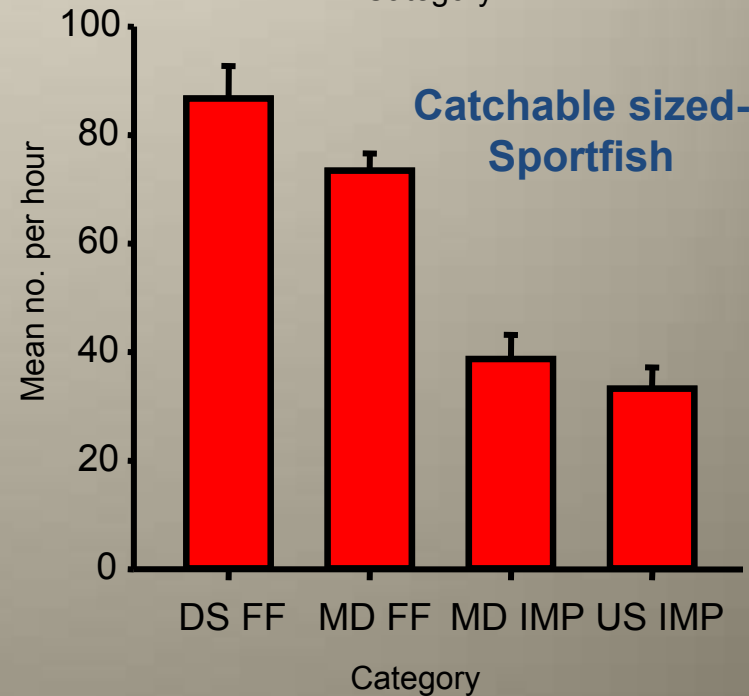
### Abundance of All Species



### Intolerant Species

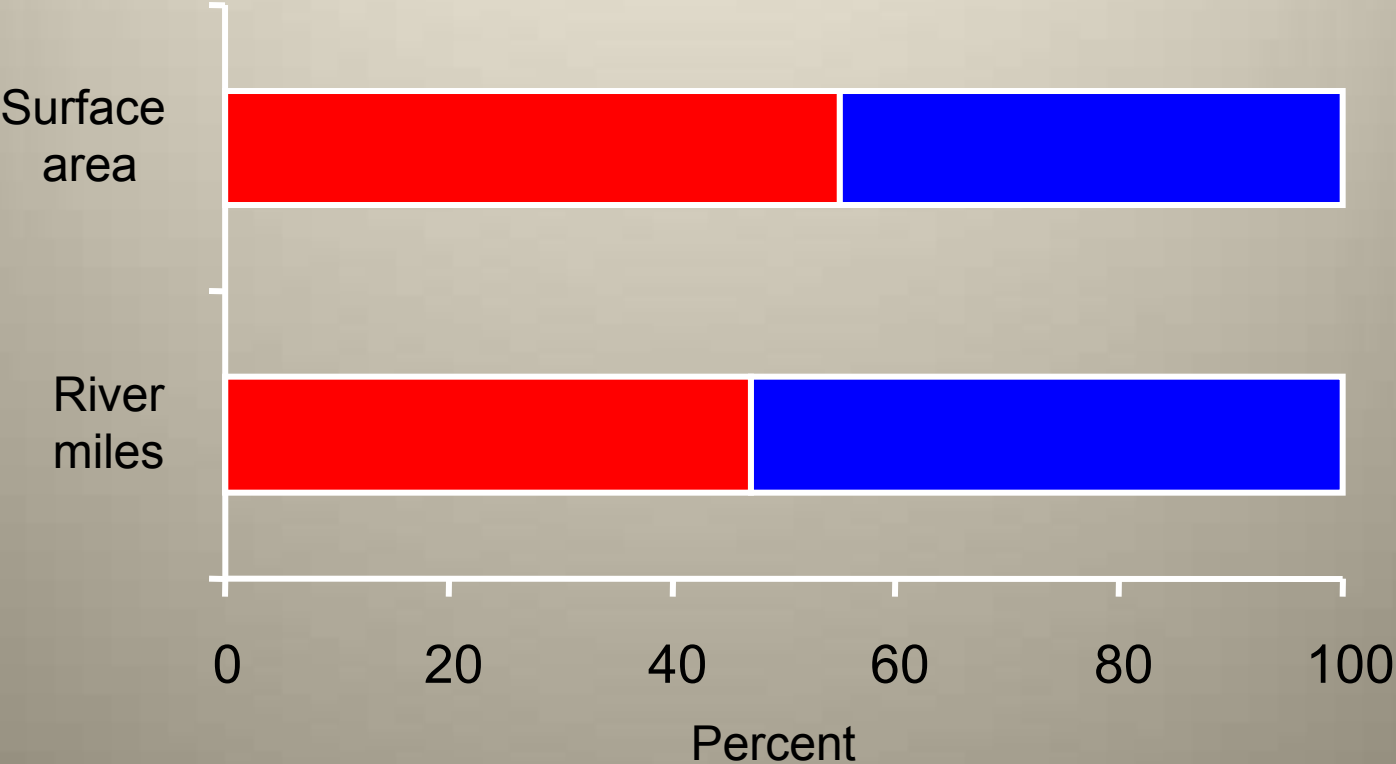


### Catchable sized-Sportfish



# Impounded vs. Free-Flowing Habitat

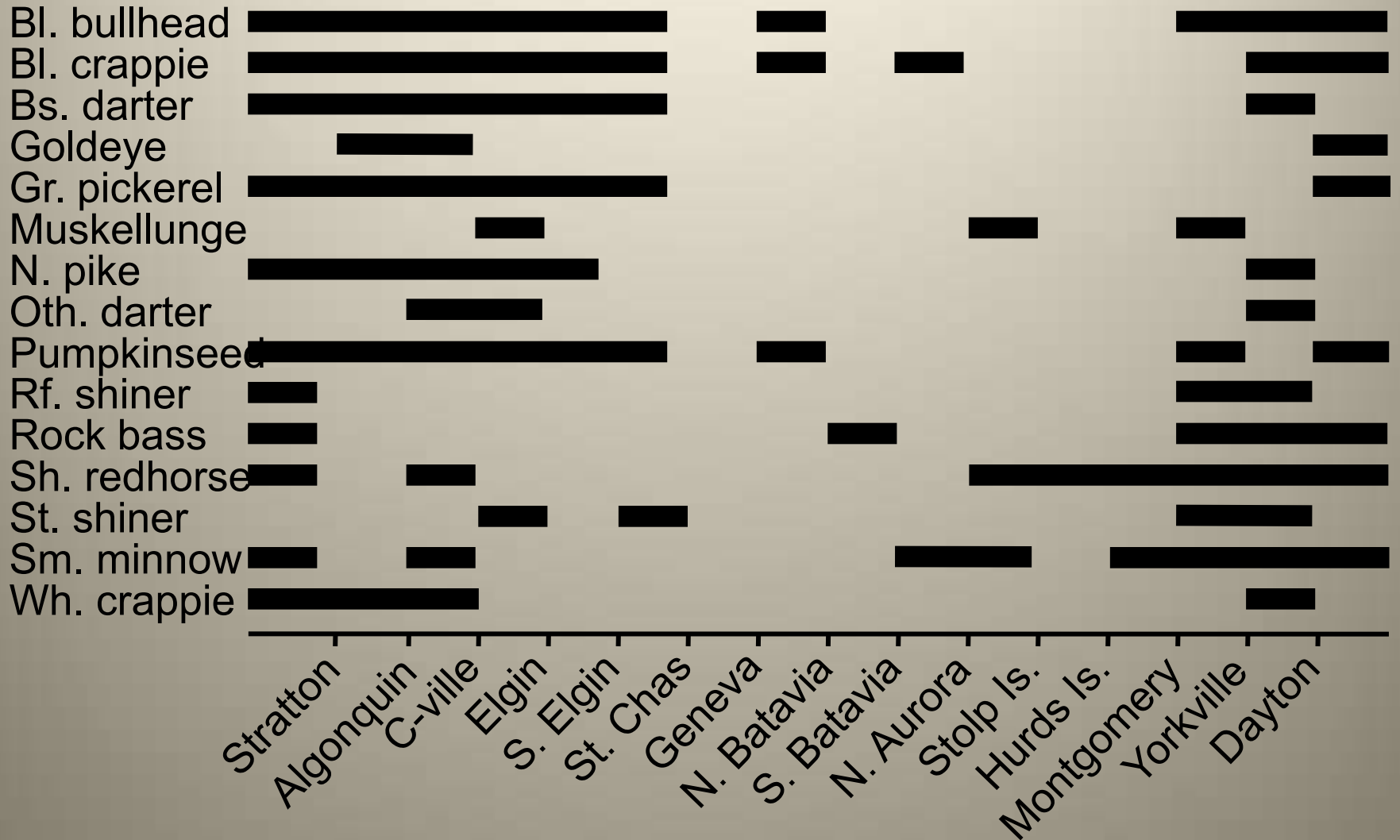
■ Impounded ■ Free-flowing



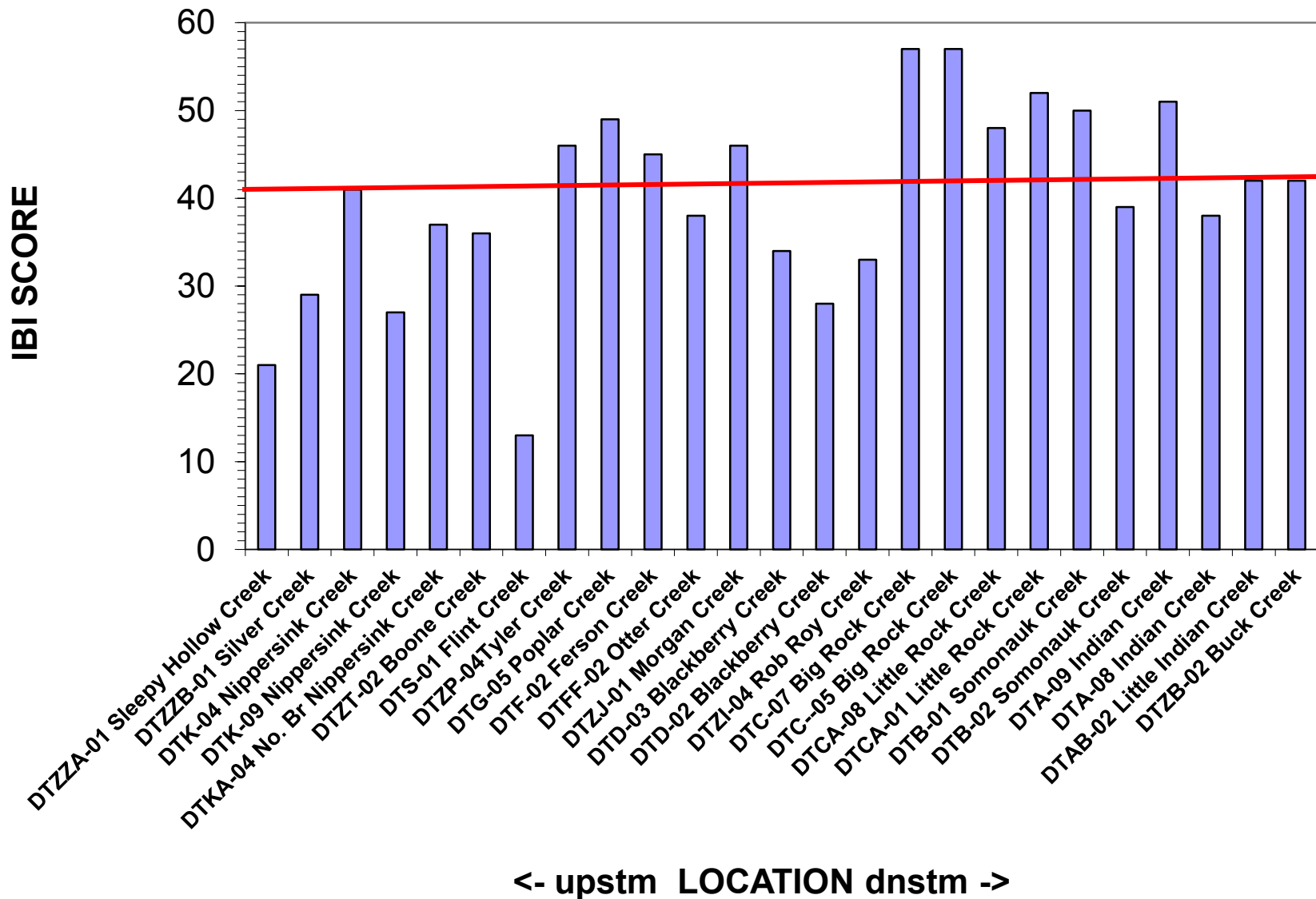




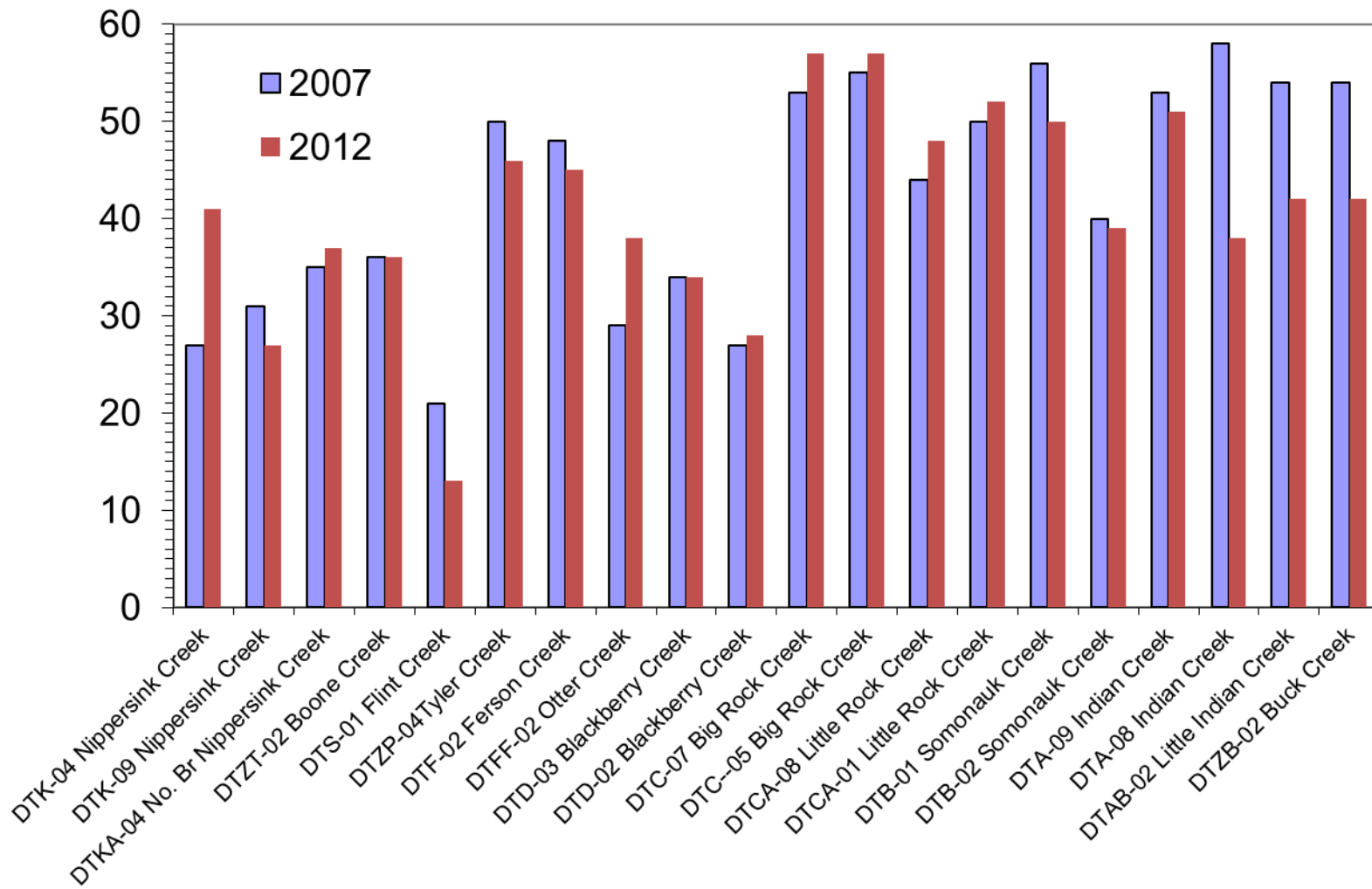
# Discontinuous Distributions



# 2012 Fox Basin Survey IBI Results - tributaries






**IBI SCORE**

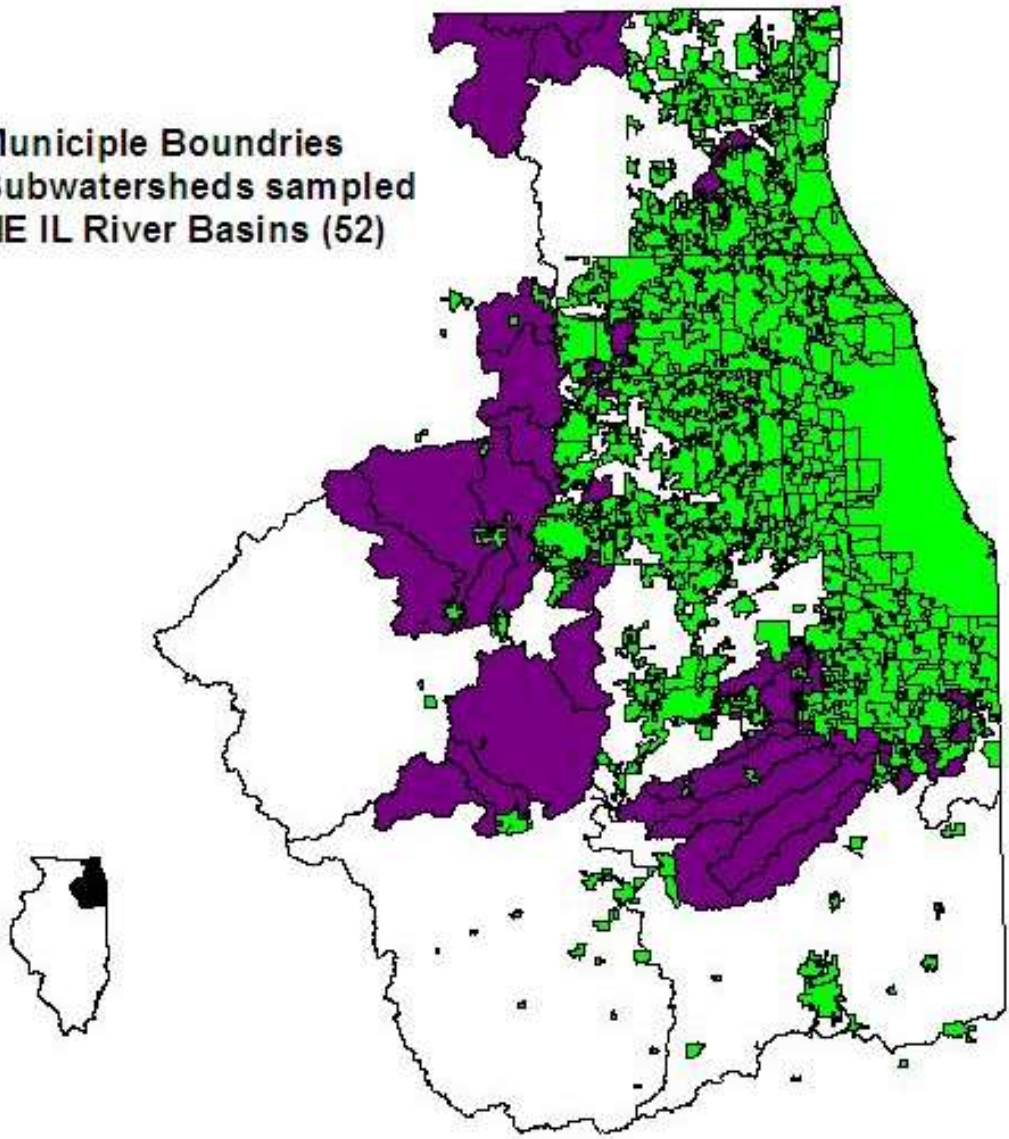


**<- upstm LOCATION dnstm ->**

IDNR Fox River sub-watershed IBI results

Year	Stream	Dwnstrm					Upstrm			
		No. Sites	No. Sites >= 41	1	2	3	4	5	6	7
1995	Tyler	5	2	35	54	53	39	35		
1997	Blackberry	7	0	33	34	34	35	35	33	38
1998	Brewster	4	0	36	18	23	24			
	Ferson/Otter	4	2	50	42	34	12			
	Little Rock	4	1	54	37	33	43			
2001	Waubonsee	4	1	45	34	34	36	18	20	
2002	Poplar	6	1	23	41	40	30	25	20	
	Big Rock	6	13	52	59	56	58	57	54	45
2004	Mill	14	1	39	25	27	36	42	21	
	Indian (Kane)	6	0	24	17	19				
2005	Nippersink	14	1	30	28	30	37	34	26	36
	Rob Roy	4	1	49	36	32	32			
2007	Somonauk	6	4	56	47	40	33	44	42	
	Tyler	5	2	45	50	35	39	26		
2009	Indian (LaSalle)	7	6	48	53	56	49	40	43	
	Little Indian	5	4	51	49	44	47	35		
	total	101	39							
	% >= 41		39%							

-  Municipality Boundaries
-  Subwatersheds sampled
-  NE IL River Basins (52)



# IDNR Activities on the Fox River

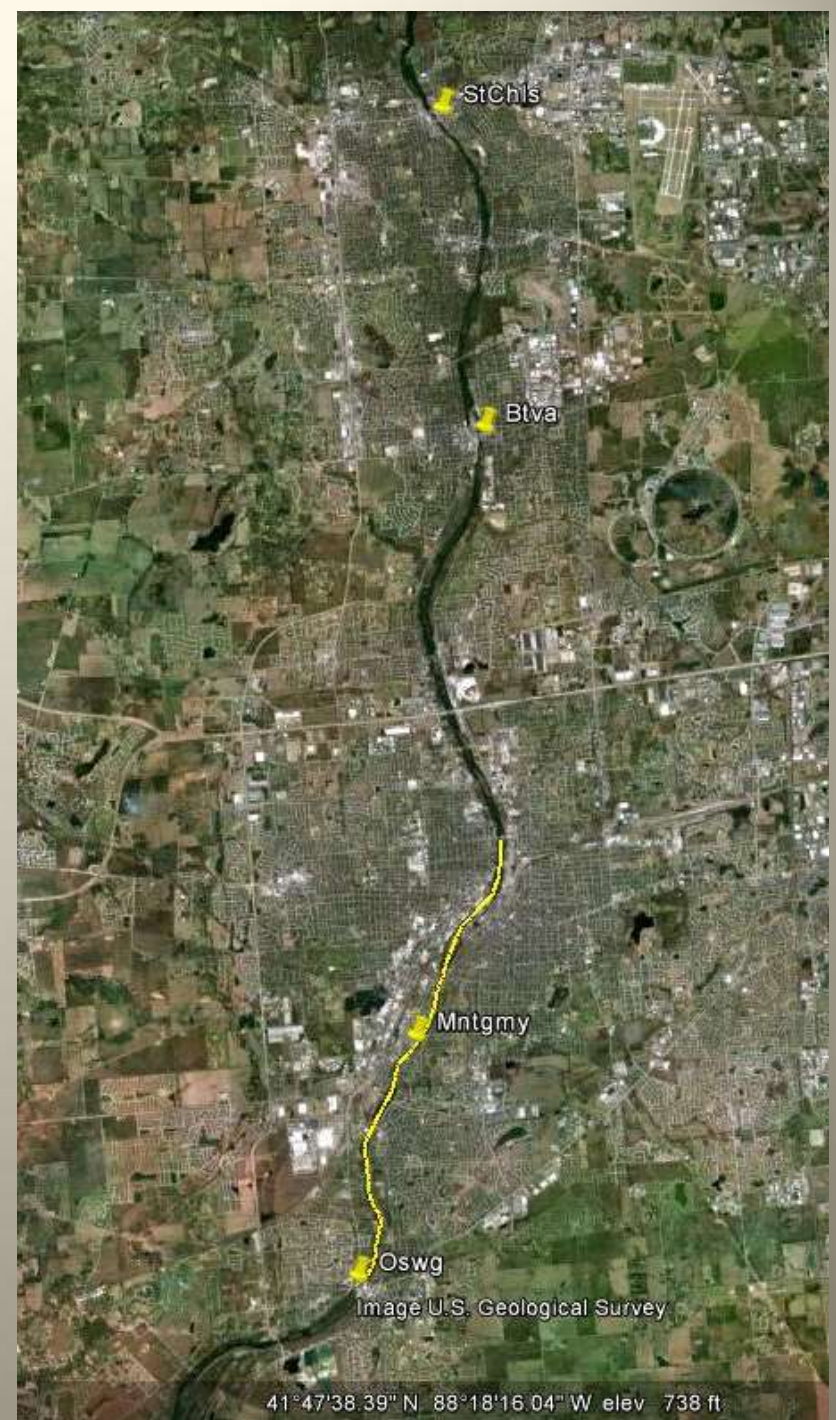
- Monitoring
- Sport fishery management
  - Flathead catfish study
  - Walleye stocking
  - Harvest regulations
- Instream habitat
  - Waterwillow planting
- Fish passage
- Dam removal





## FOX RIVER Emergent Plant Reintroduction

- Water willow (Lizard's tail)
- Initiated in 2001
- Over 49,000 plants
- Volunteer planters





# Fox River Flathead Catfish Study



# Fox River flathead catfish collection summary, all locations, all years

---

Year	Sample time (hrs.)	Total number collected	No. Tagged	No. RECAPS
2009	26.9	219	166	9
2010	9.4	97	49	9
2011	6.8	112	48	8
2012	5	33	15	4
2013	5.5	69	56	10
total	53.6	530	334	40

---

Mean catch rate (per hr.) = 9.9

“Tag” return EF = 11.97 %

**Walleye enhancement program  
-50,000 fingerlings per year**





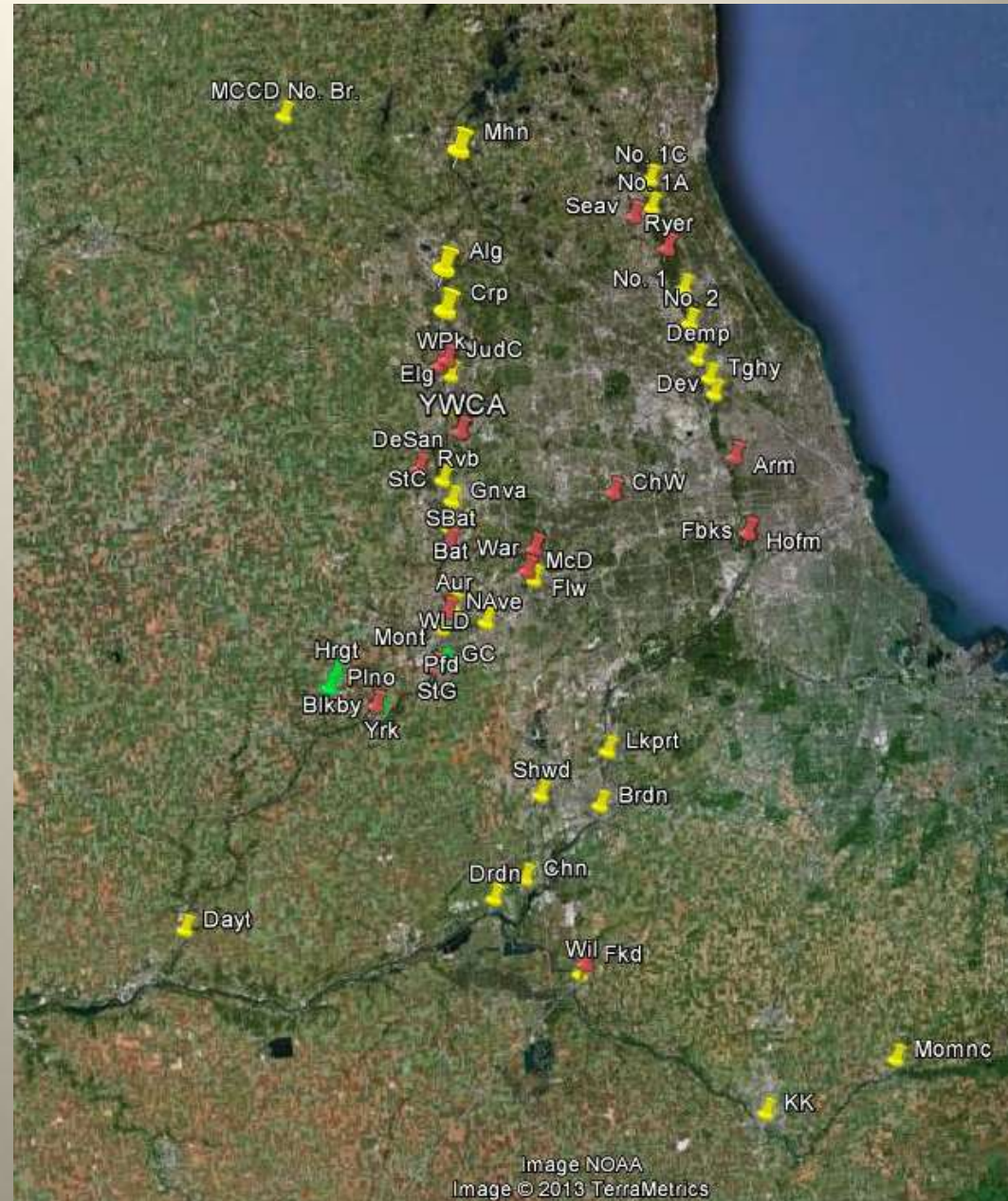
# Dam Projects in Illinois - Update

## ILLINOIS

- 24 projects completed
- 21 removals; 3 fish passage
- 250 Miles re-connected
- 16 additional removals planned in new initiative

## FOX RIVER

- 2 mainstem dams removed
- 8 tributary dams removed
- 3 fish passage project
  - 1 mainstem
  - 2 tributary



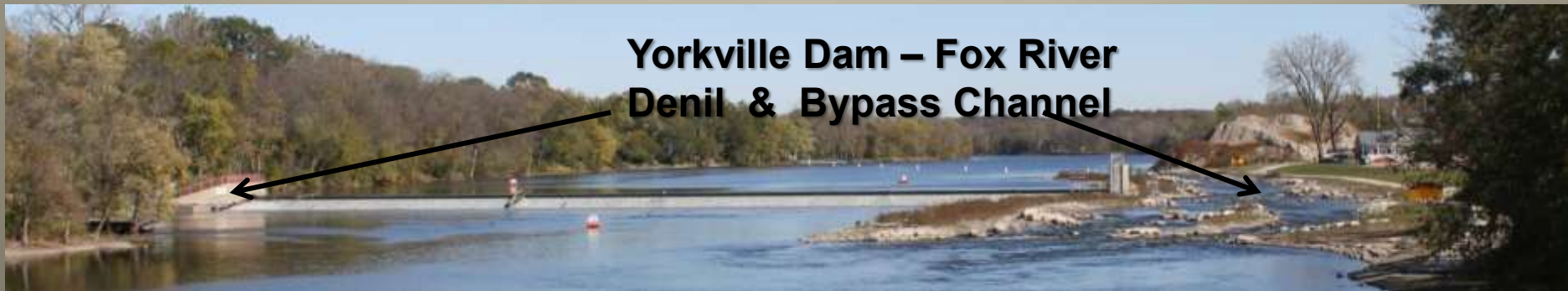
**Fish  
Passage  
Projects**



**Big Rock Creek Ramp**



**Big Rock Creek Bypass**

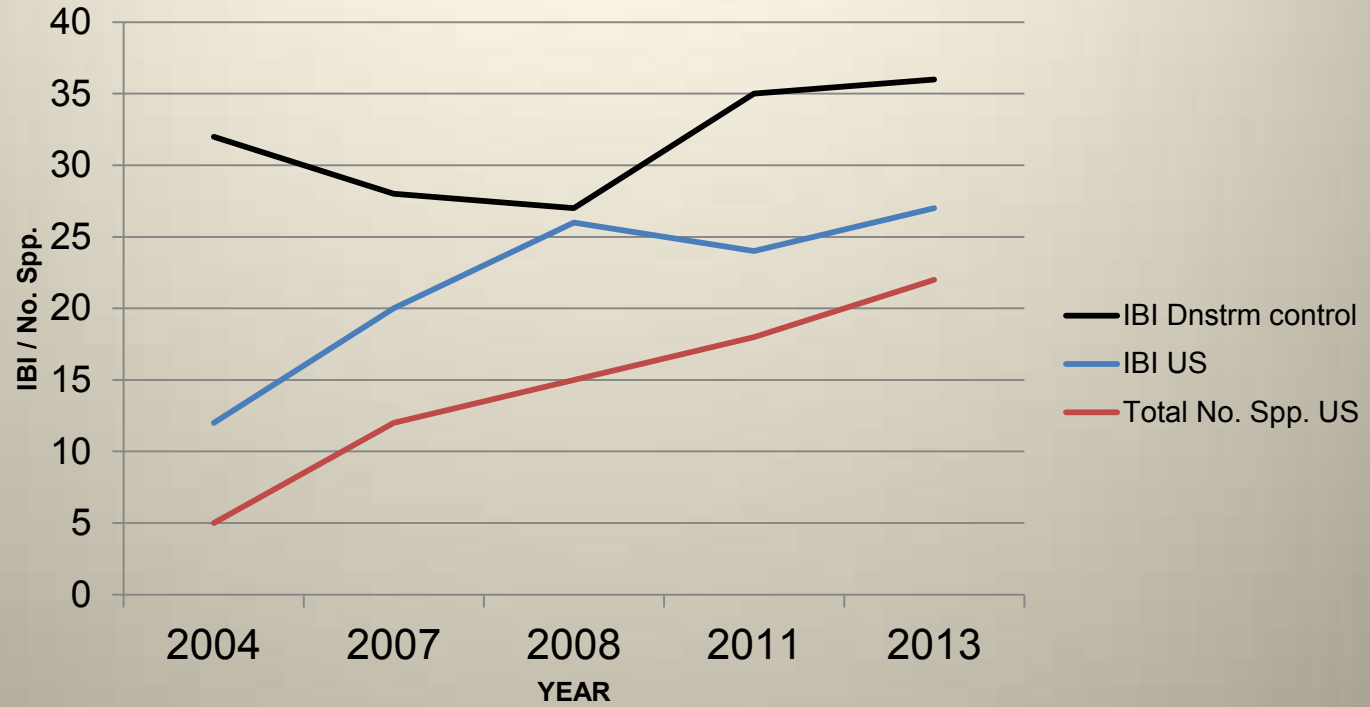


**Yorkville Dam – Fox River  
Denil & Bypass Channel**





## Brewster Creek Dam Removal



Year	IBI Dnstrm control	IBI US	Total No. Spp. US
2004	32	12	5
2007	28	20	12
2008	27	26	15
2011	35	24	18
2013	36	27	22



Riverine species in  
Brewster Creek after removal





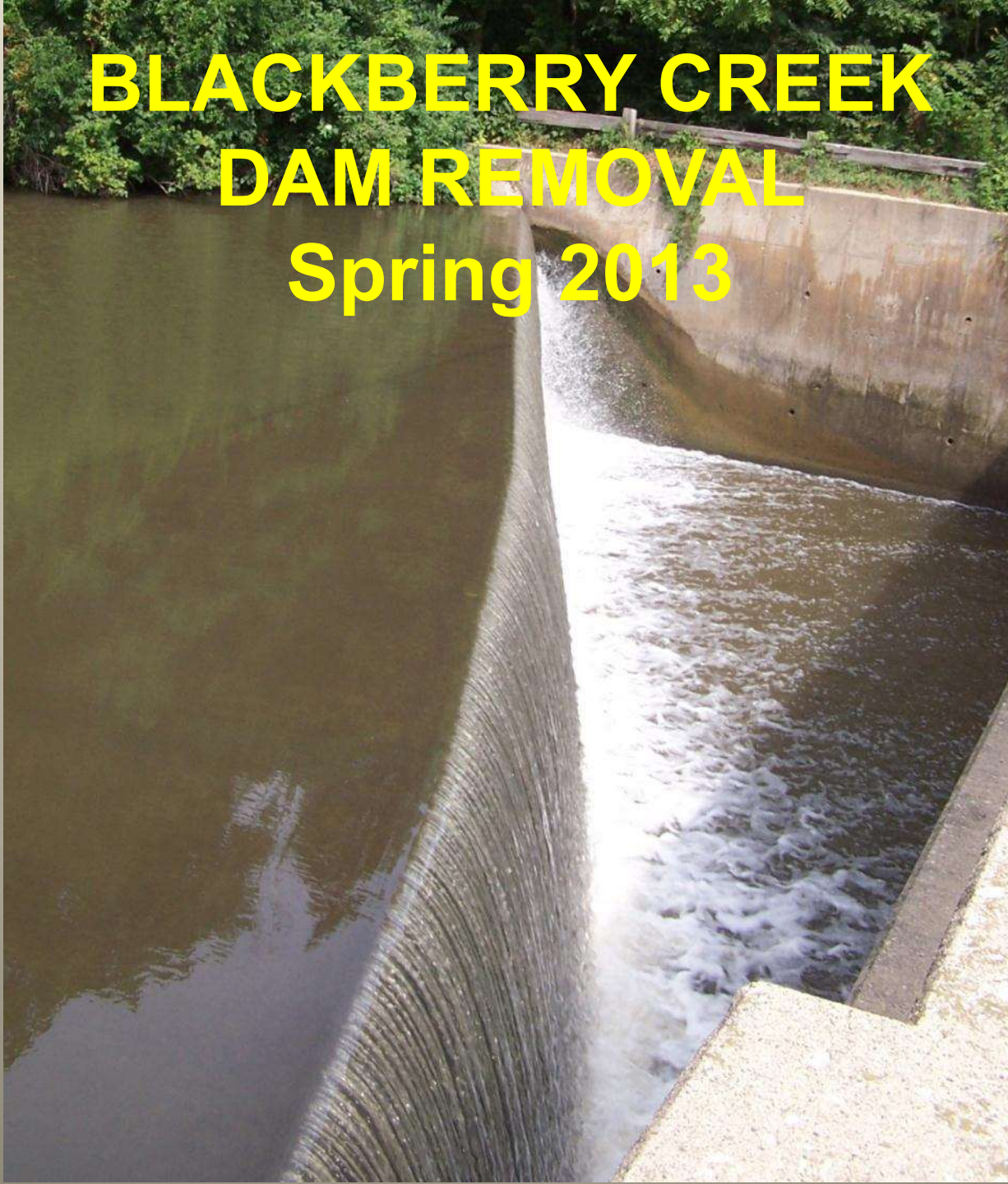
# Ferson Creek Dam Removal



## Evaluation of Ferson Creek Dam Removal

	Downstream			Upstream		
	Pre	Post		Pre	Post	
	2009	2011	2013	2009	2011	2013
Total no. fish	575	165	414	47	386	636
No. Species	24	19	21	12	18	27
IBI	51	44	48	36	39	46

**BLACKBERRY CREEK  
DAM REMOVAL  
Spring 2013**



# Blackberry Creek Dam Removal









Spring 2013 – 2 weeks post removal  
Shorthead redhorse and quilback carpsucker spawning run







5/23/2013

W Semonauk St

Gene Farm Rd

West St

W Center St

River Rd

1998

Imagery Date: 5/23/2013 41°38'47.42" N 88°27'08.40" W elev 584 ft

Go

## Blackberry Creek – Former Dam Po



## Blackberry Creek Dam Pool Area

	2011 pre	2013 post	
No. Species	8	26	24
Total No. Fish	74	898	3039
IBI	29	42	37



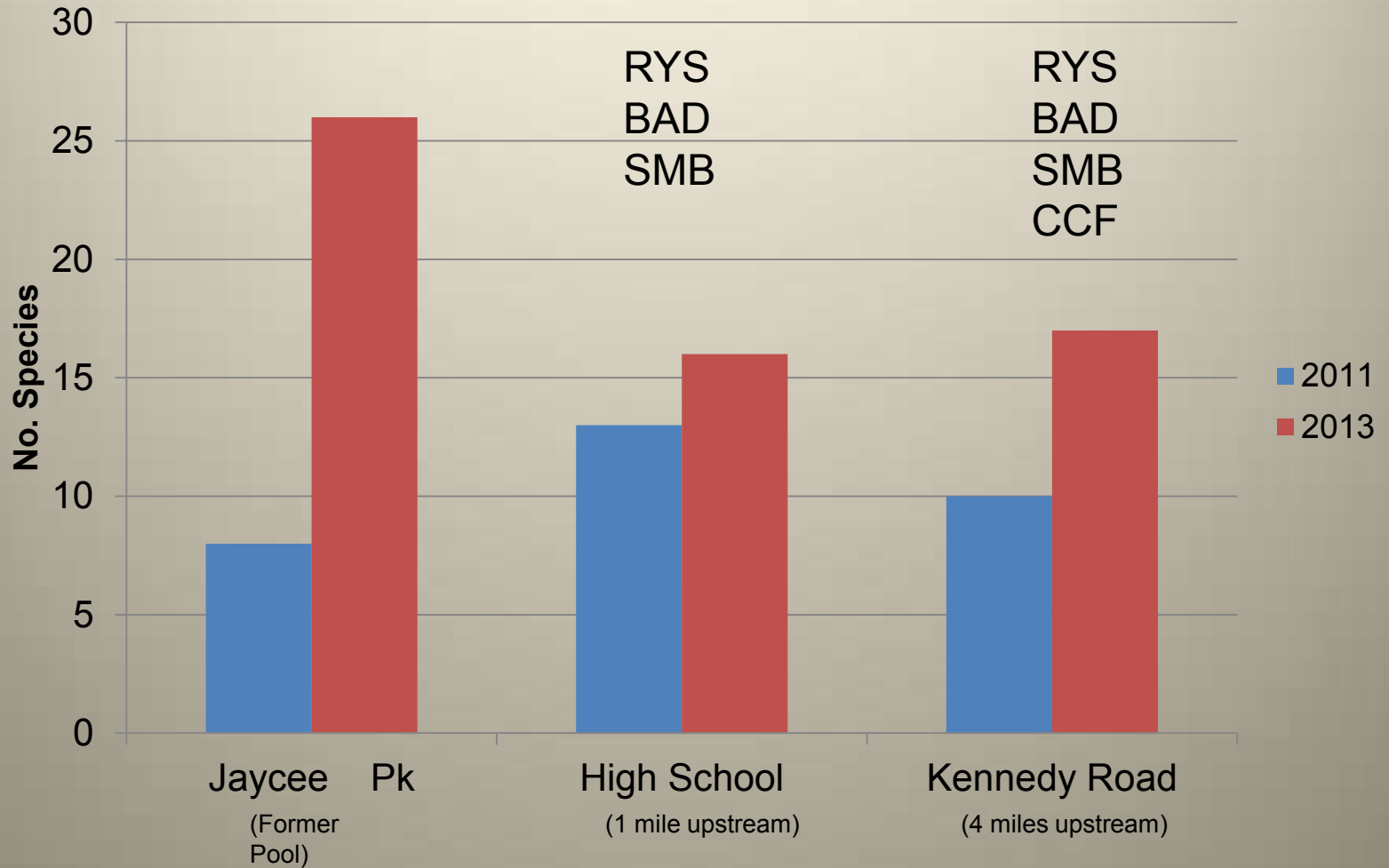
- 25 new species in former dam pool
- 19 species not present in 2011 survey
- 4 species very low abund., no recent record
- 8 species\* never recorded upstream of dam



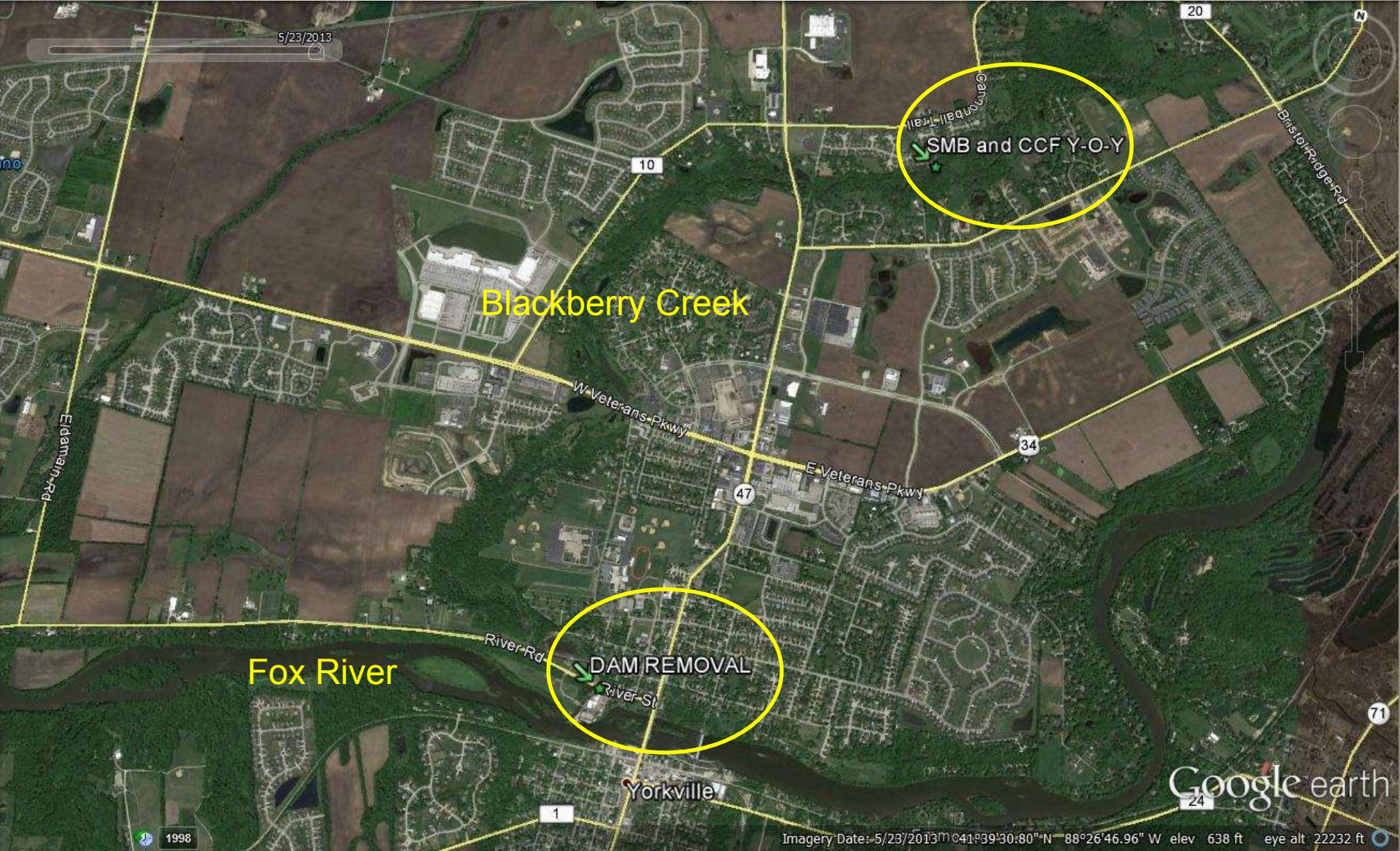
Species	pre		post	
Gizzard shad	1		1	
Hornyhead chub	1		5	10
White sucker	2		1	
Goldfish	4			
Bluegill	7		29	48
Green sunfish	10		18	30
Carp	11		10	
Golden redhorse	38		8	
Creek chub			2	19
Spotfin shiner			246	1674
Bluntnose minnow			78	326
Sand shiner			373	704
Northern hog sucker			1	1
Largemouth bass			14	6
Central stoneroller			7	81
Suckermouth minnow				5
Yellow bullhead			1	3
Stonecat			1	1
Blackstripe topminnow			1	
Black crappie			1	1
Johnny darter			20	22
Rosyface shiner (1982 -1)			33	71
Channel catfish (1997 -3)			2	7
Smallmouth bass (1997 -3)			14	7
Fantail darter (1997 -4)				1
Largescale stoneroller*				5
Quillback*			18	
Highfin carpsucker*			9	
Shorthead redhorse*			4	
Flathead catfish*				12
Mottled sculpin*				1
Banded darter*			1	1
Orangethroat darter*				1

# Blackberry Creek Dam Evaluation

No. species pre (2011) vs. post (2013)



# Smallmouth bass and channel catfish Y-O-Y found 4 miles upstream of former dam





# Fox River Summary

- 41 stations sampled in 2012 – 84 species collected
- Fish distribution / stream quality affected by gradient, dams, tributary access, and urban inputs –
- Only 2 stations on mainstem rated Full Support for biological use – located in free flowing non-urbanized lower Fox.
- Difficult to separate dam and other effects –
- No major trends on mainstem since 1996 –
- Drought had some impact on tribs in 2012
- Dams, channelization, urbanization important factors at tributaries sites
- Subwatershed surveys for Fox tribs found only 39% of stations with IBI  $\geq 41$  (13 in Big Rock watershed)
- Upstream lower gradient areas impacted by ag uses – more vulnerable.
- Urbanization remains major threat for higher gradient, higher quality locations.