

Status of fish and mussels in Little Rock Creek

Division of Fisheries – Region II Streams Program

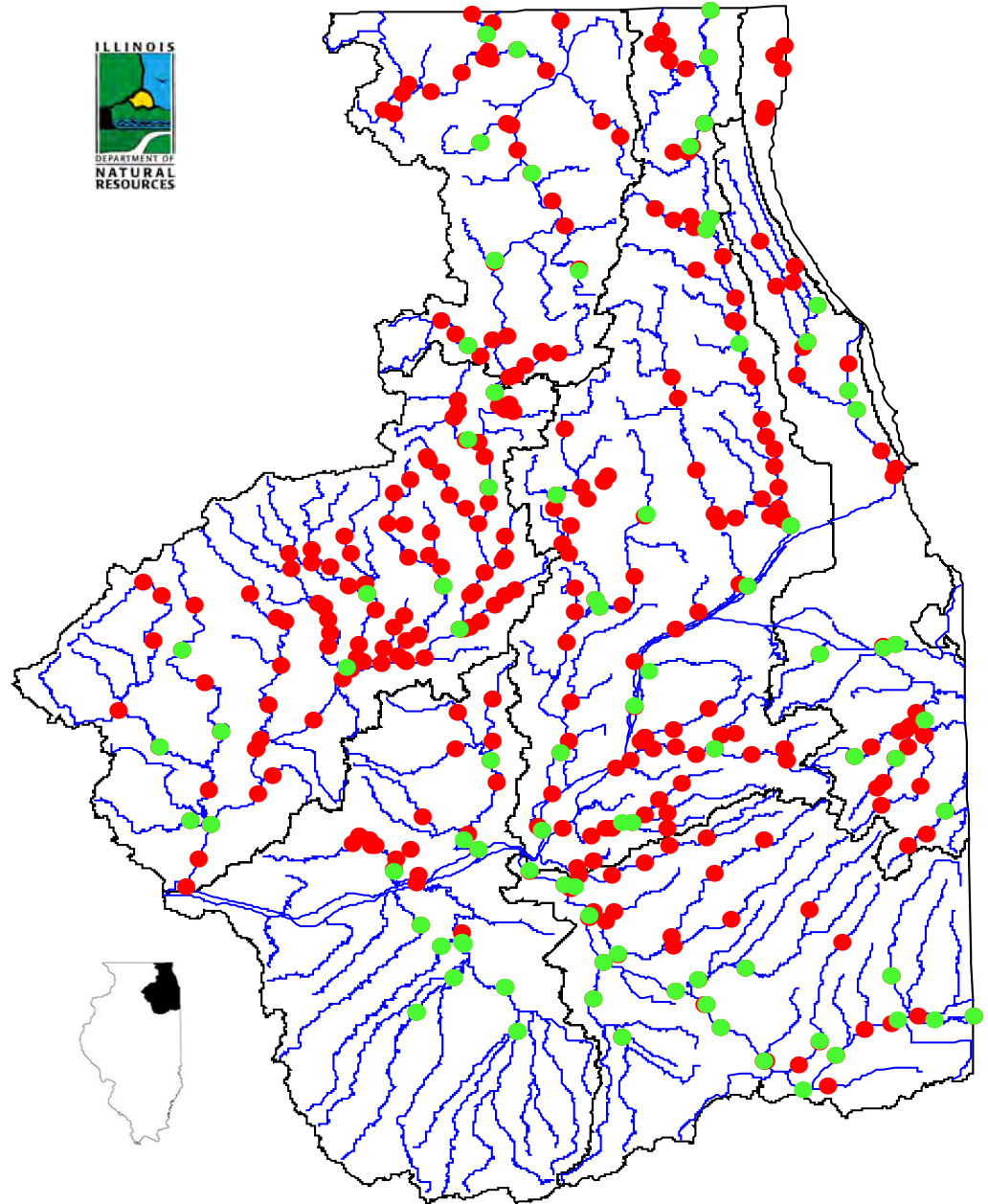
Stephen Pescitelli and Tristan Widloe



IDNR Fish Sampling Program



- Statewide Basin Survey sites
 - large scale
 - five-year rotation
 - IEPA coop.
 - Required by CWA
- Region II Sub-basin sites
 - local scale
 - priority watersheds
 - active watershed groups/projects



FISH SAMPLING



DATA APPLICATIONS

- Stream Ratings
- Fishery Management
- Watershed Planning
- Project Evaluation
- Permit Review
- Fish species distribution and status

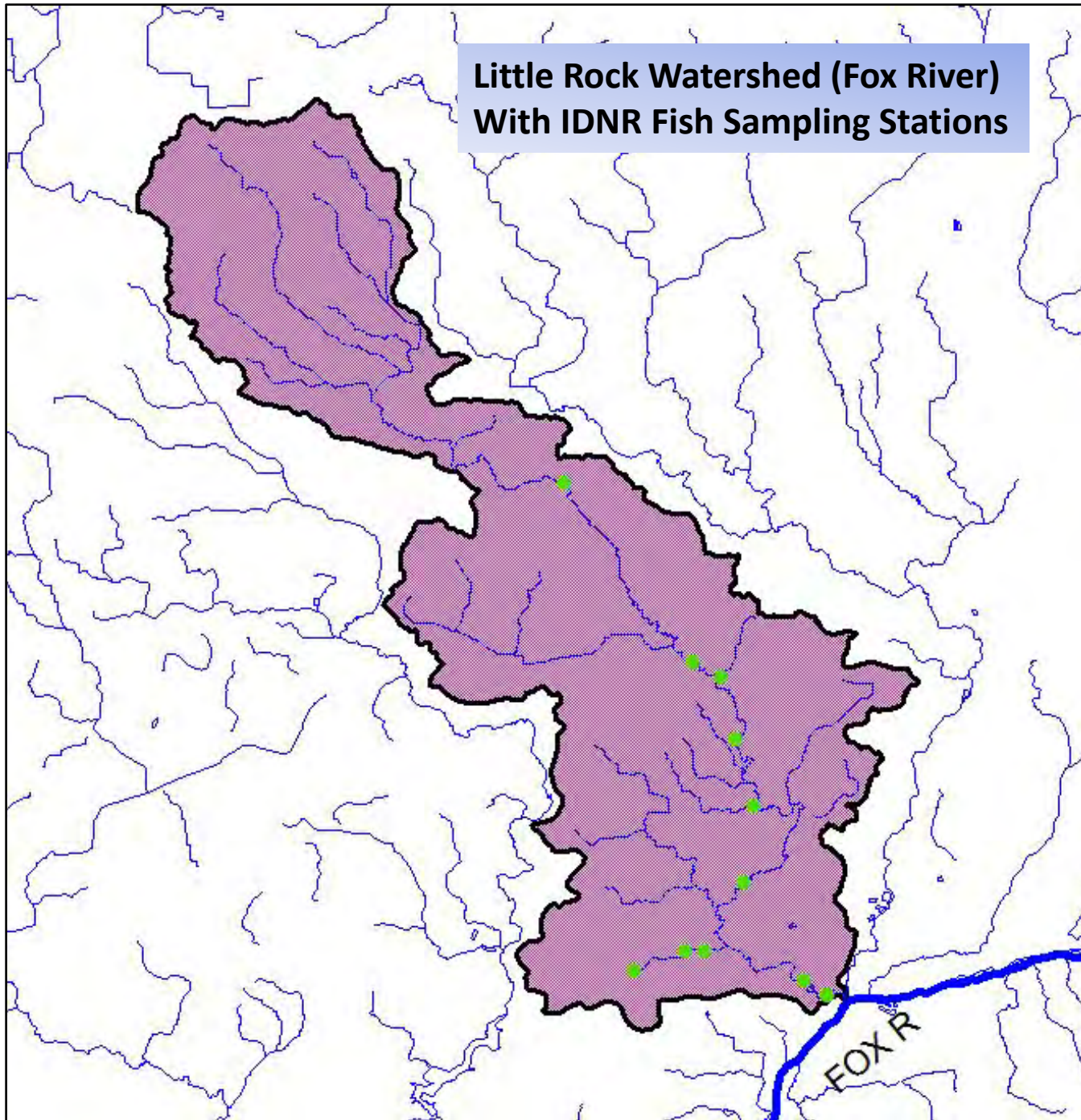


Fish as Biological Monitors

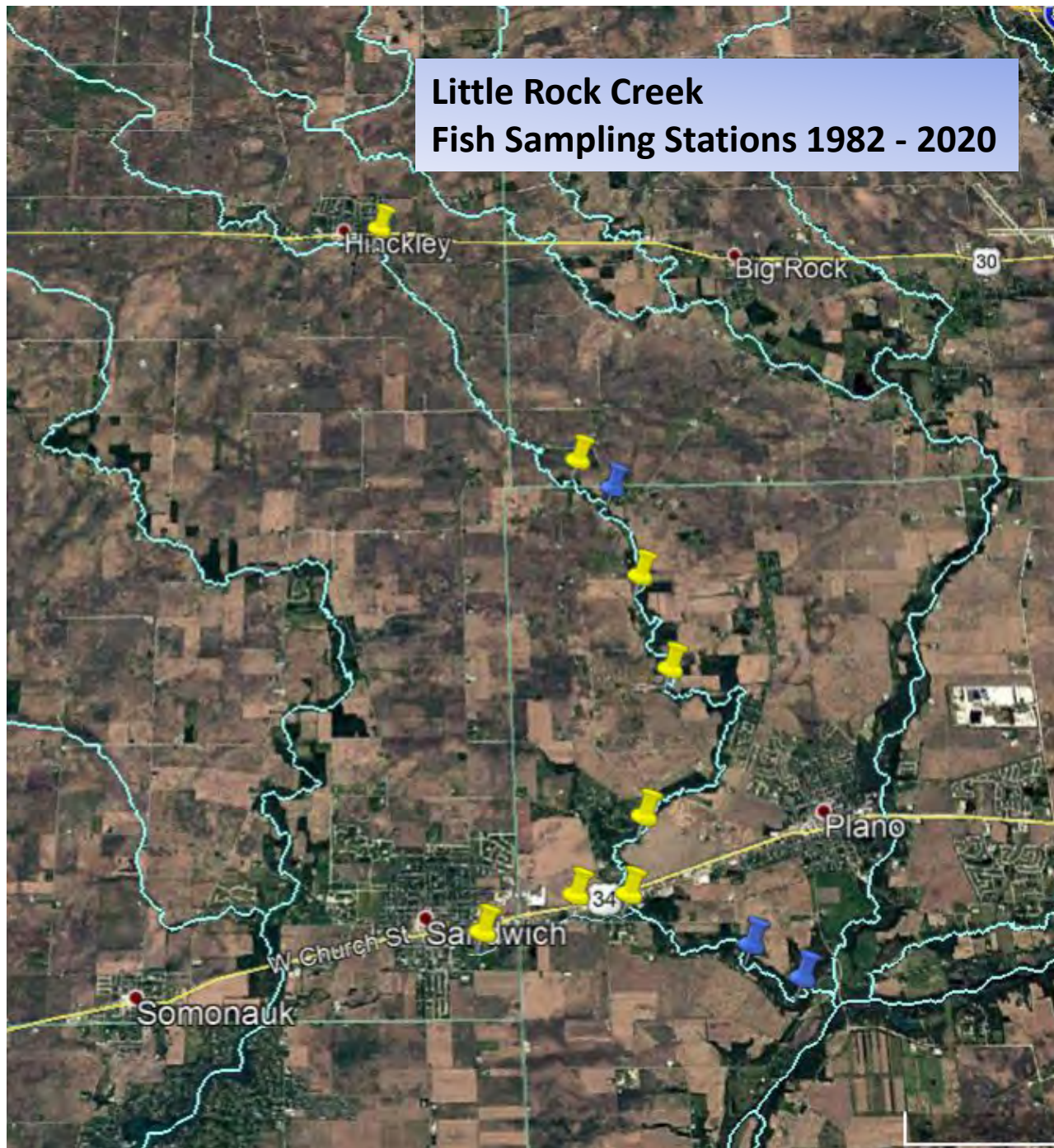
- Fish are everywhere, all habitat types
- Many trophic levels
- Large home ranges
- Long lived (recruitment/growth)
- Macro-environment effects
- Comparatively “easy” to ID
- Life history information available
- Relates to “fishable / swimmable” mandate
- Fish don’t lie



**Little Rock Watershed (Fox River)
With IDNR Fish Sampling Stations**



Little Rock Creek Fish Sampling Stations 1982 - 2020



IDNR Fish collections 1982 to 2020 (14)
 LITTLE ROCK CREEK FISH SPECIES: 8 families; 42 species

Minnows (17)	Carp	54		Black redhorse	4	
	Southern redbelly dace	4		Golden redhorse	115	
	Creek chub	406		Catfish (5)	Channel catfish	2
	Hornyhead chub	1812			Yellow bullhead	69
	Central stoneroller	1987			Stonecat	56
	Largescale stoneroller	175			Freckled madtom	1
	Suckermouth minnow	43			Slender madtom	14
	Blacknose dace	326		Topminnows (1)	Blackstripe topminnow	4
	Striped shiner	960		Sticklebacks (1)	Brook stickleback	11
	Common shiner	1708		Sculpins (1)	Mottled sculpin	264
	Redfin shiner	205		Sunfishes (6)	Black crappie	2
	Spotfin shiner	489			Rock bass	39
	Fathead minnow	2			Largemouth bass	16
	Bluntnose minnow	8084			Smallmouth bass	208
	Rosyface shiner	344			Green sunfish	83
	Bigmouth shiner	1201			Bluegill	63
	Sand shiner	2924		Perch (6)	Johnny darter	361
Suckers (6)	Quillback	22	Banded darter		539	
	White sucker	654	Rainbow darter		4	
	Northern hog sucker	243	Orangethroat darter		203	
	Shorthead redhorse	17	Fantail darter		14	



Rosyface Shiner



Southern Redbelly Dace



Northern Hogsucker



Shorthead Redhorse





Orangethroat Darter



Banded Darter



Mottled Sculpin

Fish Survey Results – No. of species at each location

	DTA-01	DTA-05	DTA-06	DTAB-01	DTB-01	DTB-02	DTC-02	DTC-03	DTCA-01	DTD-02	DTD-03	DTE-01	DTF-02	DTG-01	DTK-04	DTK-06	DTKA-04	DTZB-02	DTZL-01	DTZL-02	DTZP-02	DTZS-01	DTZT-02
	Indian Creek	Indian Creek	Indian Creek	Little Indian Creek	Somonauk Creek	Somonauk Creek	Big Rock Creek	Big Rock Creek	Little Rock Creek	Blackberry Creek	Blackberry Creek	Wauboune e Creek	Ferson Creek	Poplar Creek	Nippersink Creek	Nippersink Creek	N. Br. Nippersink Creek	Buck Creek	Mill Creek	Mill Creek	Tyler Creek	Flint Creek	Boone Creek
American eel	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gizzard shad	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central mudminnow	3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0
Grass pickerel	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Carp	102	9	17	4	0	5	0	29	1	10	7	3	4	0	0	5	0	1	6	0	0	0	1
Golden shiner	4	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern redbelly dace	88	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	0
Creek chub	200	8	2	15	37	8	0	1	0	1	0	2	1	6	3	0	17	1	67	11	4	7	0
Hornychub chub	187	0	0	1	3	0	1	0	10	0	1	2	13	14	0	8	0	13	32	48	30	8	0
Unidentified Stoneroller	224	80	9	20	20	0	2	4	0	9	0	0	0	0	1	7	0	31	0	41	0	0	0
Central stoneroller	149	0	0	0	9	5	0	0	4	0	0	0	0	0	0	38	0	0	11	82	0	0	0
Largescale stoneroller	18	0	0	0	0	0	3	1	0	0	0	12	2	0	0	0	0	0	0	0	0	0	0
Suckermouth minnow	14	1	0	0	1	1	5	0	1	2	0	0	0	0	0	0	0	0	3	0	0	0	0
Blacknose dace	35	0	0	0	4	0	1	0	0	0	0	0	0	1	0	10	0	0	0	19	0	0	0
Striped shiner	14	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common shiner	412	10	10	13	58	3	38	7	61	10	0	1	13	30	1	1	5	18	100	8	20	0	5
Redfin shiner	45	1	1	31	1	4	0	0	0	0	3	4	0	0	0	0	0	7	0	22	0	0	0
Spotfin shiner	365	36	10	32	0	47	54	46	18	2	35	1	25	0	0	30	0	7	0	22	0	0	0
Fathead minnow	40	35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0
Bluntnose minnow	445	67	20	17	4	12	52	39	65	1	4	6	6	24	8	1	5	3	53	26	20	0	12
Emerald shiner	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
Rosyface shiner	80	6	0	6	0	1	20	14	31	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Bigmouth shiner	195	32	0	3	32	1	7	8	8	6	0	0	0	0	0	1	3	4	5	0	20	0	64
Sand shiner	292	94	6	24	0	32	11	48	23	15	10	8	0	1	0	7	0	2	1	10	0	0	0
Spottail shiner	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Quillback	57	14	15	1	0	0	0	21	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0
River carpsucker	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Highfin carpsucker	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
White sucker	238	1	3	17	9	1	4	40	10	3	8	17	3	24	8	19	6	10	17	1	9	2	26
Northern hog sucker	111	5	13	3	1	1	5	1	24	13	8	4	0	20	6	0	0	3	2	0	2	0	0
Shorthead redbhorse	27	1	6	0	0	4	0	1	1	3	0	0	2	0	0	2	0	7	0	0	0	0	0
Black redbhorse	41	7	11	0	0	0	0	22	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Golden redbhorse	114	9	41	6	2	2	0	12	3	0	17	3	0	0	0	2	0	17	0	0	0	0	0
Channel catfish	49	3	1	0	0	0	34	0	0	0	0	0	0	0	7	0	0	2	0	0	0	2	0
Yellow bullhead	13	0	0	1	0	1	0	0	0	0	0	6	0	0	0	1	0	3	1	0	0	0	0
Black bullhead	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Stoneyhead	23	0	0	0	0	1	0	0	0	2	0	3	2	8	0	0	0	0	7	0	0	0	0
Tadpole madtom	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Slender madtom	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0
Blackstripe topminnow	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Brook silverside	22	0	3	16	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
Mottled sculpin	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
Rock bass	32	3	1	0	0	0	0	3	4	1	0	0	0	0	0	1	0	1	18	0	0	0	0
Largemouth bass	50	1	3	6	0	0	18	3	1	0	1	0	2	1	0	3	0	0	2	5	0	4	0
Smallmouth bass	29	0	0	0	0	0	5	3	0	0	0	4	0	5	1	0	0	3	7	0	1	0	0
Green sunfish	210	1	18	3	3	1	0	1	0	5	1	9	57	9	14	1	1	5	13	44	0	1	23
Bluegill x Green sunfish hybrid	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluegill	31	0	1	1	0	2	17	0	0	0	1	1	4	3	1	0	0	0	0	0	0	0	0
Pumpkinseed	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
Unidentified Sunfish hybrid	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow perch	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Johnny darter	12	0	3	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7
Orangethroat darter	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Fantail darter	140	0	0	0	18	0	0	0	0	0	0	2	5	0	0	41	0	17	0	53	4	0	0
Total fish	4182	426	197	224	239	142	270	322	269	87	94	64	157	148	51	107	134	71	403	204	354	25	37
Total species	51	24	24	21	15	20	16	20	18	16	11	15	17	13	11	25	10	15	21	16	11	7	10

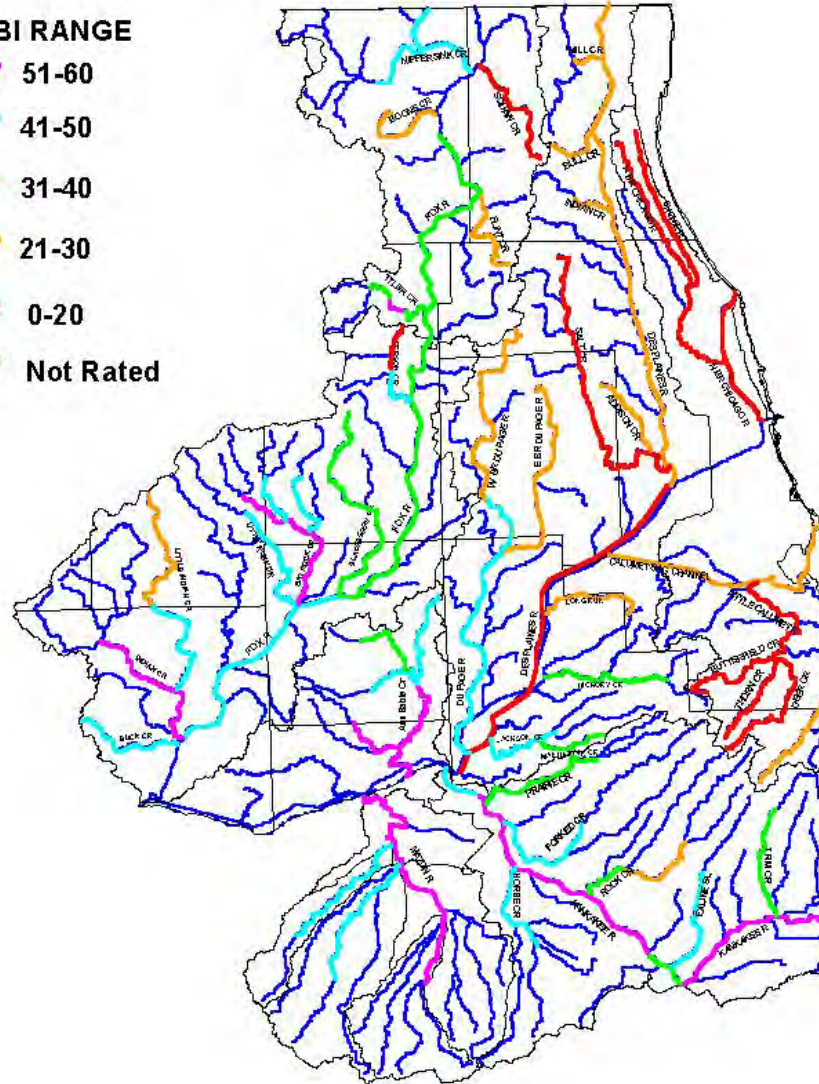
Index of Biotic Integrity - IBI

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 >10 = biologically meaningful change



REGION 2 IBI RATINGS 1994 to 2004



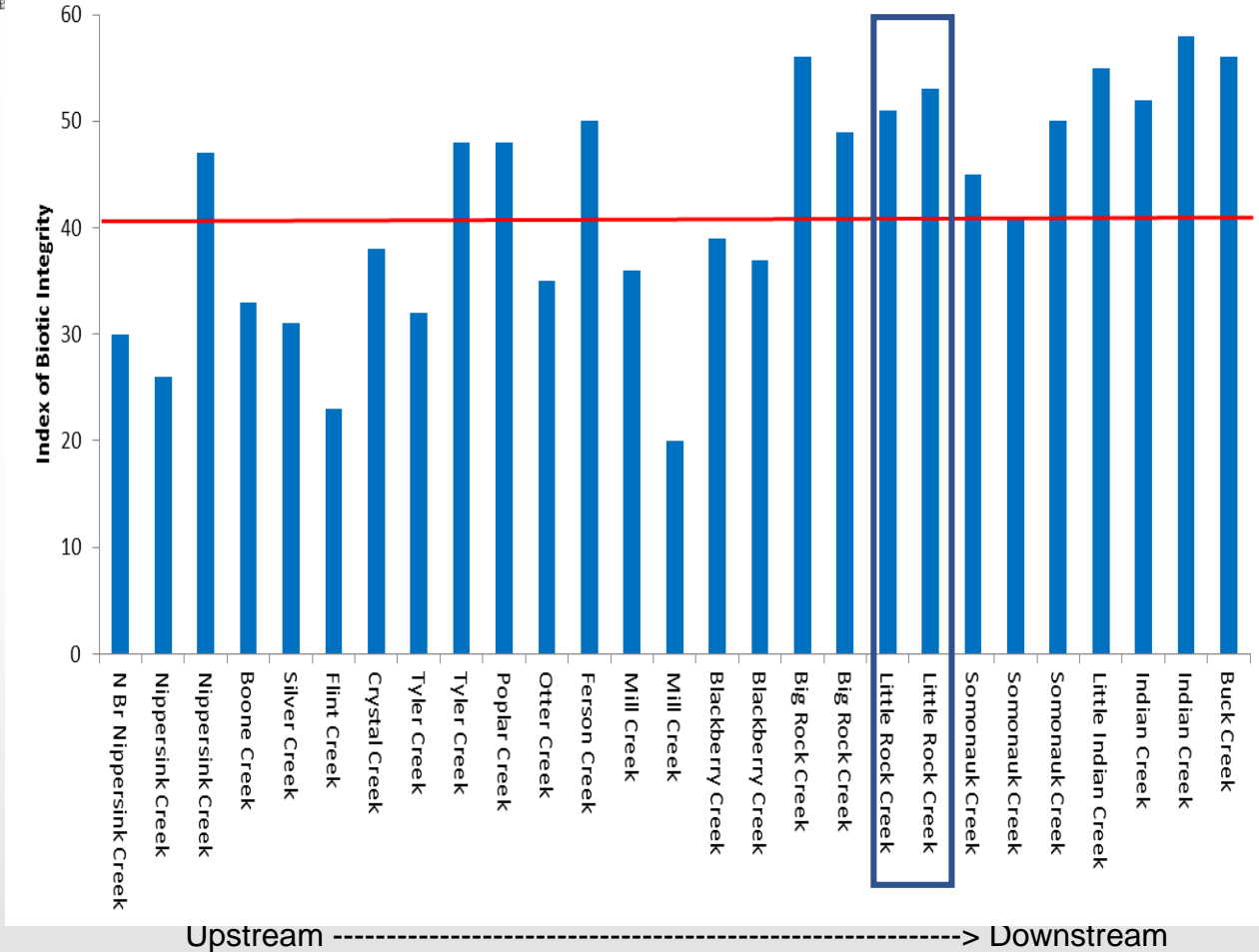
Illinois Integrated Water Quality Report and Section 303d List – 2010
IEPA 2008

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

	No Impairment	Moderate Impairment	Severe Impairment
Biological Indicator	Fully Supporting <u>Aquatic Life</u> Use (Good Resource Quality)	Not Supporting <u>Aquatic Life</u> Use (Fair Resource Quality)	Not Supporting <u>Aquatic Life</u> Use (Poor Resource Quality)
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 ¹ (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.

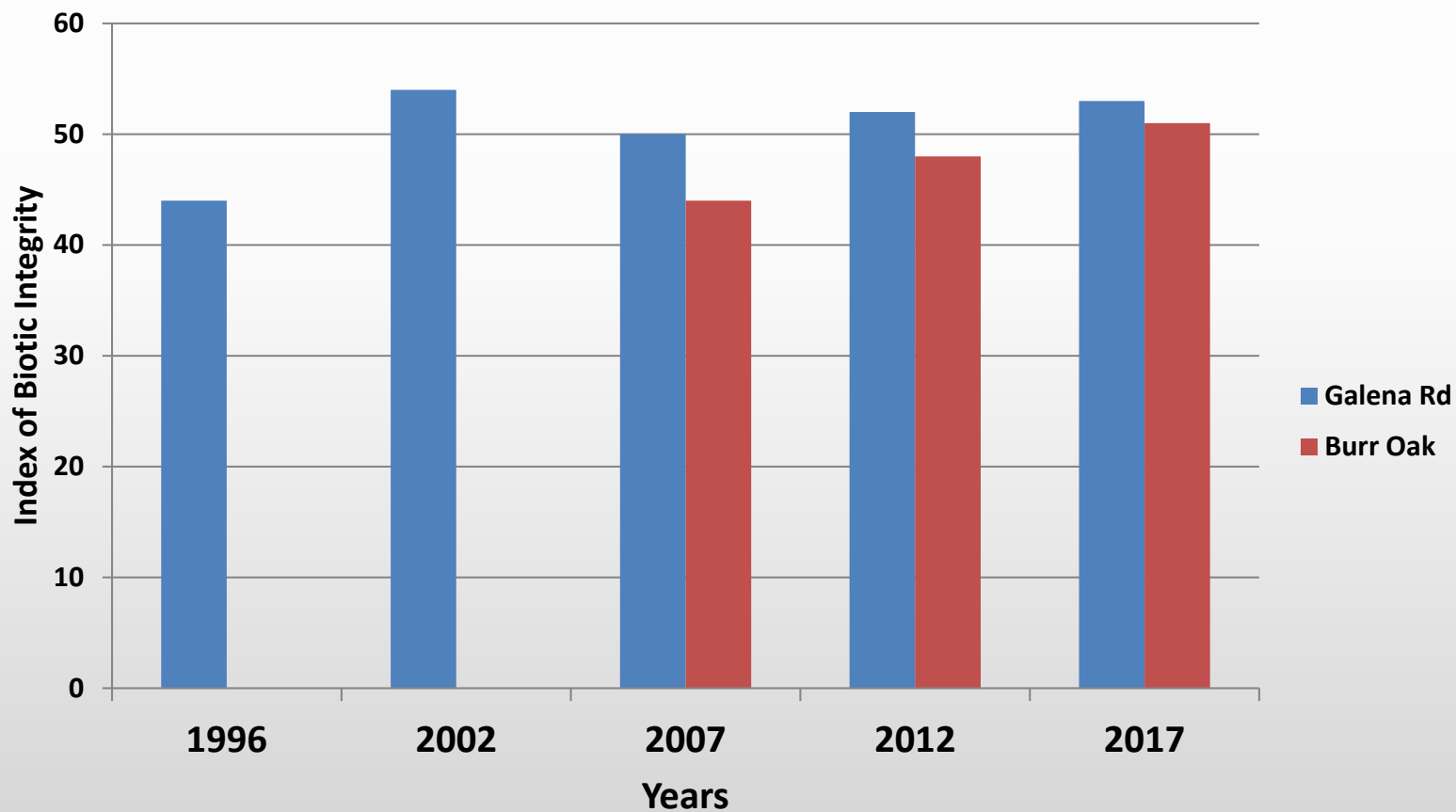
Fox River Tributary IBI Scores - 2017



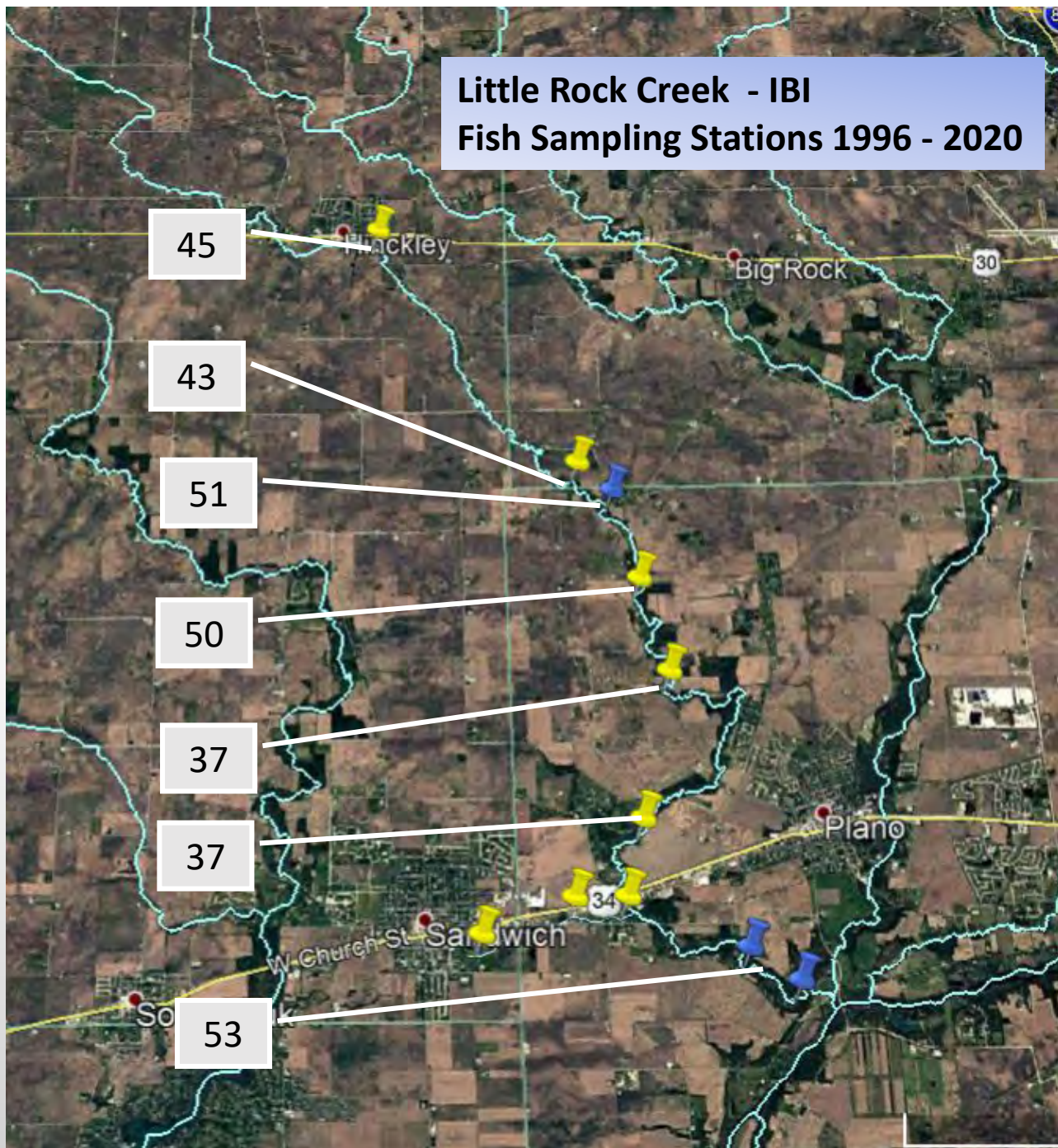
- Similar to mainstem - urban gradient upstream to downstream
- Some streams still impacted by dams and past channelization
- Lower Fox tribs very high quality: Big Rock, Little Rock, Indian, Buck

Little Rock Creek Stream Ratings; Index of Biotic Integrity

		1996	2002	2007	2012	2017
DTCA_01	Burr Oak	44	54	50	52	53
DCA-08	Galena Rd			44	48	51



Little Rock Creek - IBI Fish Sampling Stations 1996 - 2020



Mussel Sample from Little Rock Creek – Dekalb Co. FPD - June 2020



Mussel Sampling Stations
GREEN – Dekalb Co. FPD (2017-2020)
WHITE – IL Natural History Survey (2012)

Mussel Rating - No. Species
10+ = Unique
7-9 = Highly Valued
4-6 = Moderate
1-3 = Limited

5 spp.

4 spp.

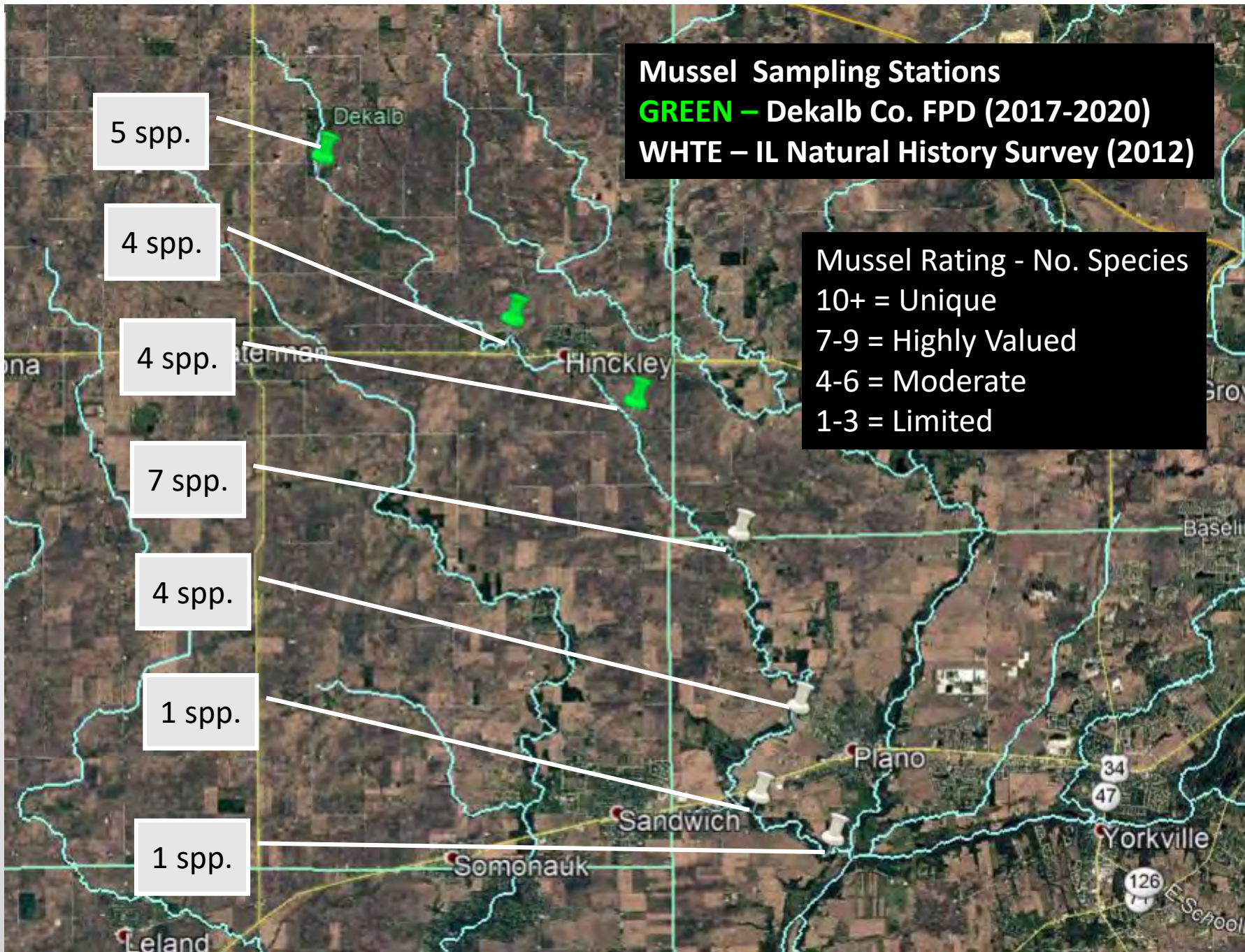
4 spp.

7 spp.

4 spp.

1 spp.

1 spp.



Factors affecting stream ecosystems

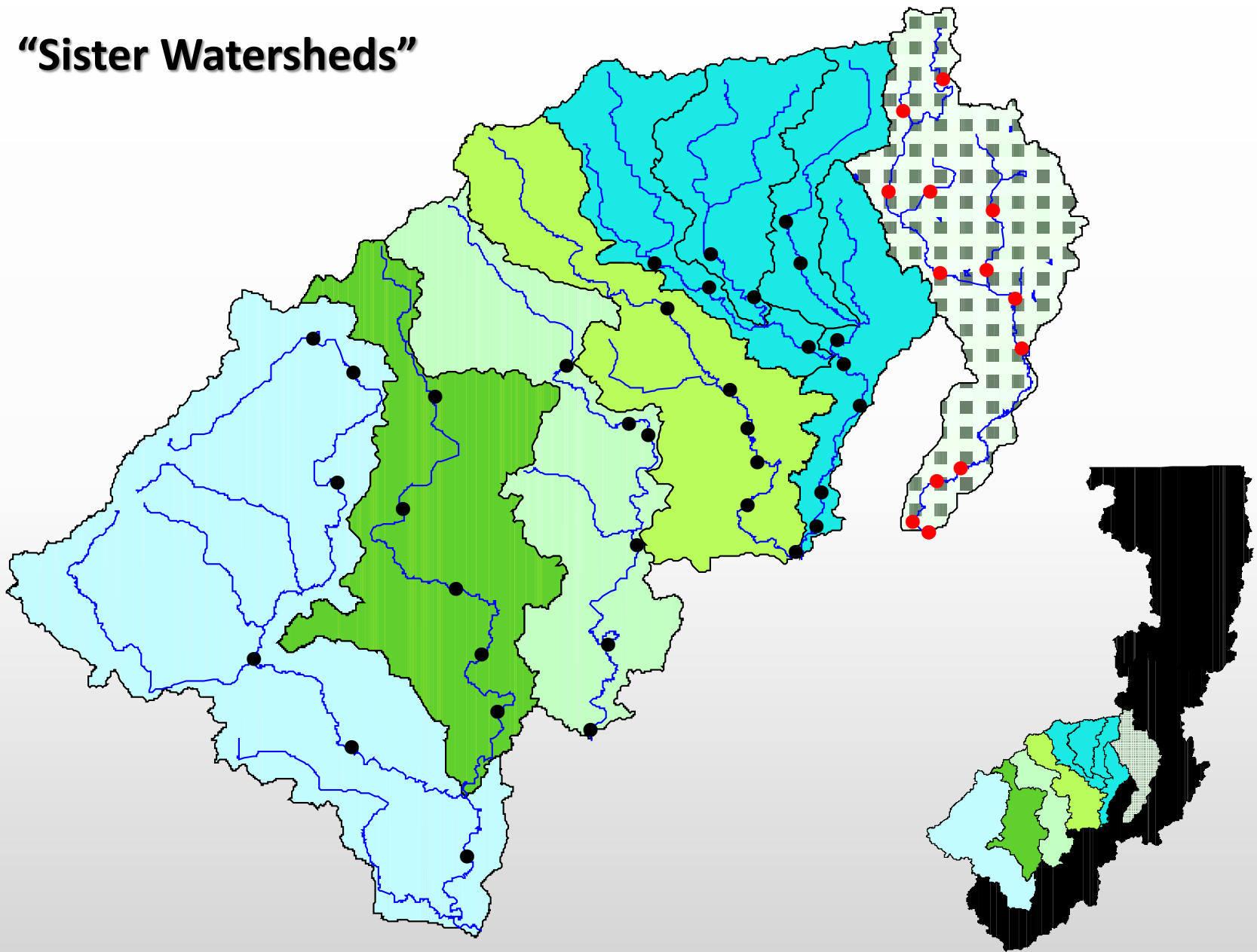
- **Stream Flow**
- **Water Quality**
- **Habitat**
- **Food source**
- **Connectivity**







“Sister Watersheds”



Species absent from Blackberry Creek vs.
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

Little Rock Creek

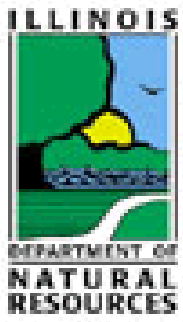
- Diverse fish assemblage
- Intolerant fish species present
- State Threatened species
- Mussels variable, limited HV areas
- Many segments with good habitat
- Minimal channelization
- Forested buffer in many areas

Issues –short list

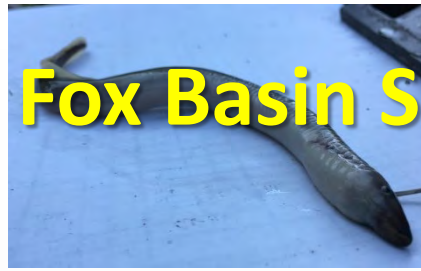
- Stream flow extremes
- Sedimentation
- Nutrients
- Connectivity

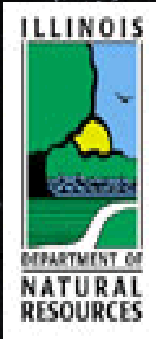






2017 Fox Basin Survey

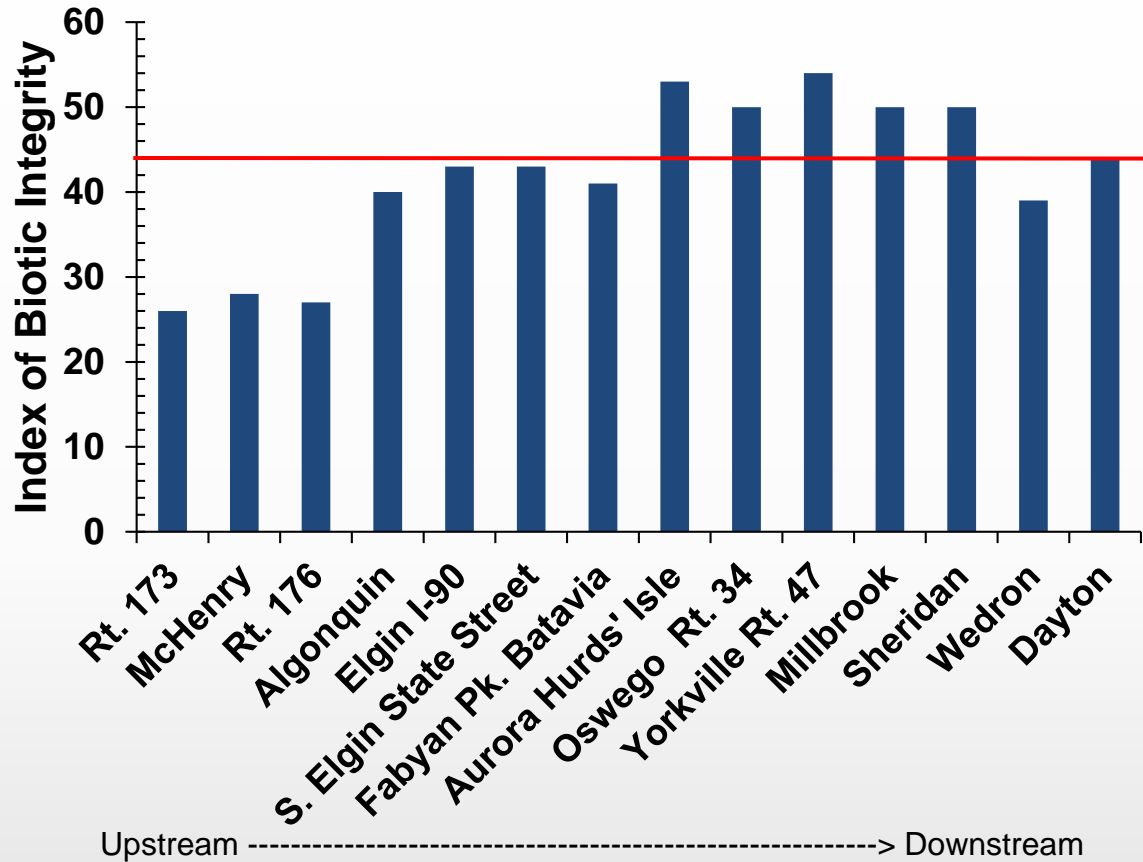




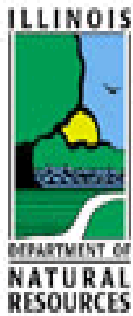
2017 Fox River Basin Survey

	No. Stations	No. Total Fish	No. Species
Mainstem	14	7,014	58
Tributaries	27	18,850	63
Total	41	25,864	77

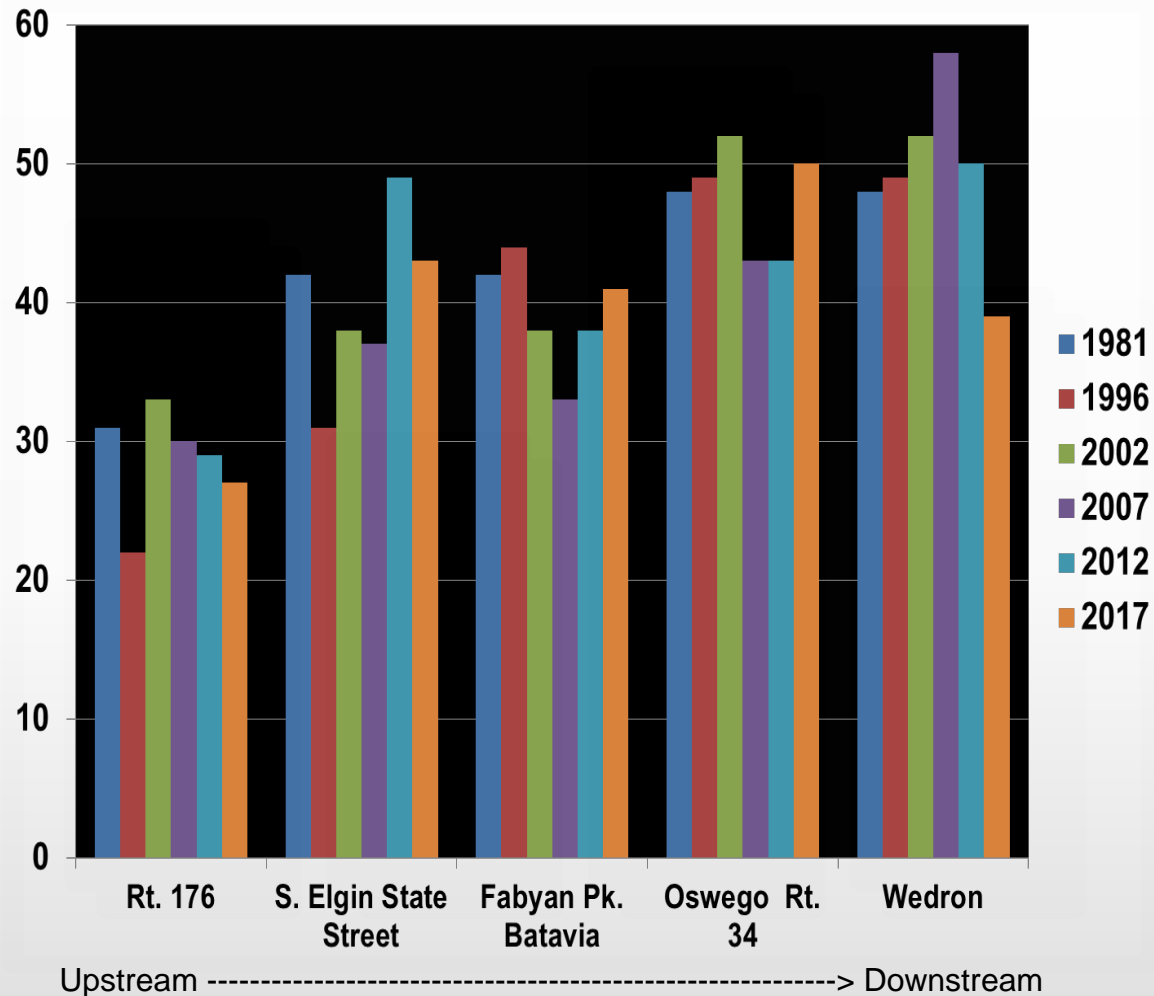
Index of Biotic Integrity (IBI) Fox River Mainstem - 2017



- IBI based on fish assemblages: range 0 to 60; higher score = better quality
- Score of 41: Threshold for IEPA “Full Aquatic Life Use” (red line)
- Upstream of Algonquin: low gradient, dammed, lake-like
- Mid Fox: many dams, highly urbanized
- Lower Fox: less urbanized, free flowing until Dayton Dam
 - Low score at Wedron in 2017- low water levels limited sampling



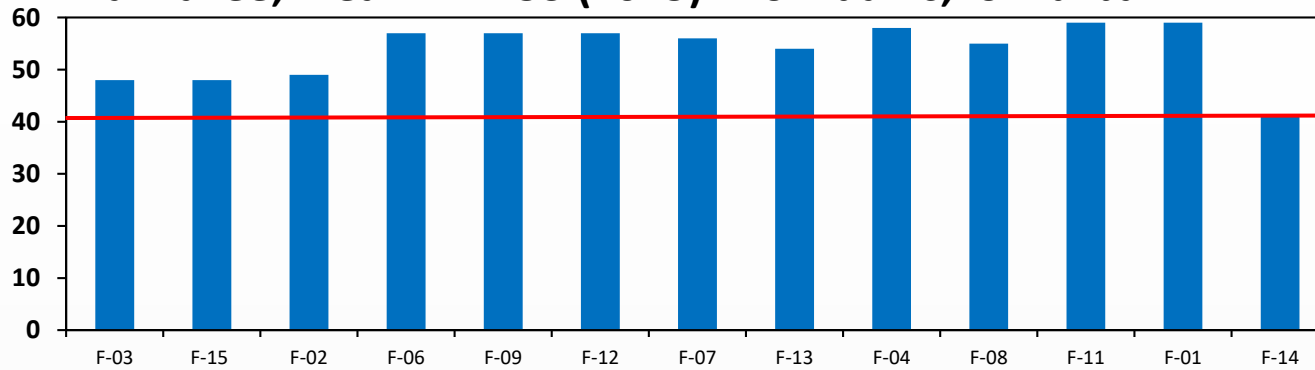
Fox River Mainstem – IBI Scores 1981 to 2017



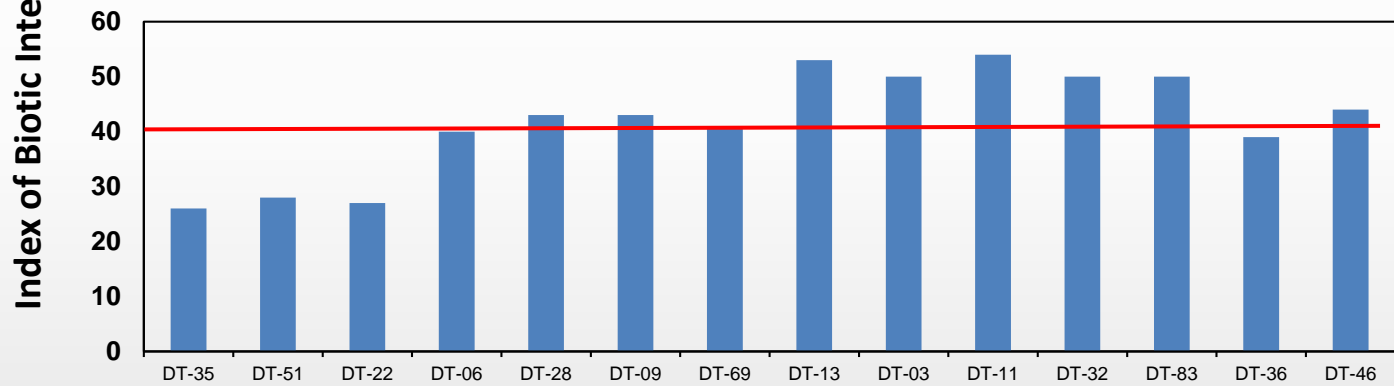
- Stations sampled in all Fox Basin surveys since 1981
- IBI scores variable though urban gradient is evident
- Overall higher IBI scores in Lower Fox – less urban, fewer dams

Comparing the Fox River Mainstem to other NE IL rivers

Kankakee; mean IBI = 53 (2015) – low dams, low urban



Fox; mean IBI = 42 (2017) – variable; urban gradient exists; dams



Des Plaines; mean IBI = 29 (2018) - highly urban; dams almost gone=improving

