

Elkhart River Dam Removal

City of Elkhart



2020 Fish Community Monitoring
October, 2020

Introduction

In the winter and early spring of 2020, the U.S. Army Corps of Engineers, working with the City of Elkhart, removed the Elkhart River Dam in downtown Elkhart. This lowhead dam, located approximately 0.5 miles upstream of the Elkhart River confluence with the St. Joseph River was a major barrier to fish migration, preventing numerous lost species from recolonizing the Elkhart River. Removal of the Elkhart River Dam has resulted in opening up another 20 miles of the Elkhart River, not including tributaries.

Numerous pre-removal fish community surveys were conducted directly above and below the dam between 2000 and 2019 with major surveys in 2009, 2018 and 2019. These surveys revealed a significant disparity in species below versus above the dam (species lists are included in Attachement 1). Surveys conducted in 2018 and 2019 have been designated as pre-implementation surveys, while surveys conducted from 2020 to 2022 will provide post-implementation results.

Fish Monitoring 2020

Electrofishing surveys were completed immediately below (Elkhart Avenue) and immediately above (Prairie Street) the former Elkhart River Dam in 2020. Additional surveys were completed at 3 different stations on the Elkhart River (American Park, Studebaker Park, CR 18) that are part of a long-term monitoring network designed by the City of Elkhart. All sites were surveyed twice during the summer of 2020 to account for seasonal variability in their respective fish communities. Two additional sampling events were completed at Oxbow Park and Shanklin Park upstream of Elkhart, where new species were documented as a result of the dam removal.

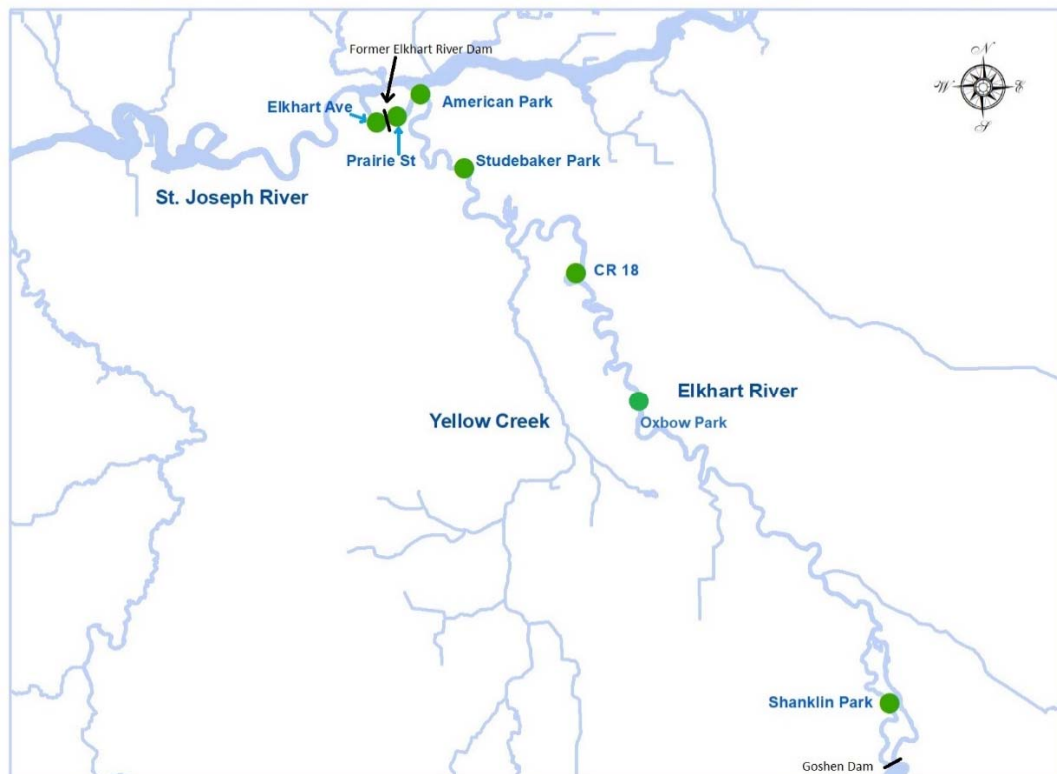


Figure 1: Elkhart River Monitoring sites 2020

Species Records

Based on a review of the pre-removal monitoring data, numerous species were absent from the Elkhart River, but abundant below the dam or in the St. Joseph River. Those species include:

- Channel Catfish (*Ictalurus punctatus*)
- Greenside Darter (*Etheostoma blennioides*)
- Logperch (*Percina caprodes*)
- Longnose Gar (*Lepisosteus osseus*)
- Spotted Gar (*Lepisosteus oculatus*)
- Shorthead Redhorse (*Moxostoma macrolepidotum*)
- Silver Redhorse (*Moxostoma anisurum*)
- Black Redhorse (*Moxostoma duquesnei*)
- Quillback Carpsucker (*Capriodes cyprinus*)



A Longnose Gar collected upstream of the former dam site in 2020

Other species with very sparse records for the Elkhart River, but with relatively high abundance downstream of the former dam include:

- Muskellunge (*Esox Masquinongy*)
- River Redhorse (*Moxostoma carinatum*)
- Brown Bullhead (*Ameiurus nebulosus*)
- Black Bullhead (*Ameiurus melas*)
- Brook Silverside (*Labidesthes sicculus*)
- Bowfin (*Amia calva*)
- Mimic Shiner (*Notropis volcellus*)



A Logperch collected at Shanklin Park in 2020, 18 miles upstream

Of the 16 species listed above, 8 species were collected upstream of the former dam during 2020 surveys:

Species	Prairie St.	American Park	Studebaker Park	CR 18	Oxbow Park	Shanklin Park
Distance Upstream (miles)	0.3	0.7	2.9	6.8	10.3	17.5
Channel Catfish	X			X		
Greenside Darter	X					
Logperch	X	X	X	X		X
Longnose Gar	X				X	
River Redhorse	X	X	X	X		
Shorthead Redhorse	X	X	X	X		X
Silver Redhorse	X	X	X	X		
Mimic Shiner	X	X	X	X		X

Channel catfish were found approximately 7 miles upstream in early July of 2020. This species was also collected at Prairie Street which is immediately upstream of the former dam site, in July of 2020. Greenside darter was also found at Prairie Street in July of 2020. Logperch, shorthead redhorse, and mimic shiner expanded rapidly upstream with all 3 species being found approximately 18 miles upstream by early August, 2020. Silver Redhorse, also expanded rapidly and were found approximately 7 miles upstream. Finally, longnose gar was found approximately 10 miles upstream in June of 2020. It is anticipated that additional species will be documented during follow up surveys in 2021 and 2022.



A Channel Catfish from CR 18 in 2020



A Silver Redhorse from American Park in 2020

In addition to the species listed above, removal of the dam will benefit approximately 50 additional species through population reconnection. Some noteworthy reconnections include:

- Greater Redhorse (*Moxostoma valenciennesi*) – State endangered species with numerous records above and below the former dam site.
- Northern Brook Lamprey (*Ichthyomyzon fossor*) – State species of special concern with sparse records above and below the dam site. Suspected Northern Brook Lamprey ammocoetes (larval lamprey) were collected at the Prairie Street site in 2020, although the ammocoete form of this species cannot be distinguished from Silver Lamprey.



A Greater Redhorse collected from Shanklin Park in 2020

- Longnose Dace (*Rhinichthys cataractae*) – State species of special concern with sparse records above the former dam site and 1 record approximately 0.25 miles downstream by the Indiana State Nongame Aquatic Biologist prior to the dam removal. This species is a riffle specialist and was found on the newly formed riffle upstream of the former dam in November 2020.

Recreational fisheries should also benefit from the removal of the dam. Smallmouth Bass (*Micropterus dolomieu*), Walleye (*Sander vitreus*), and Northern Pike (*Esox Lucius*) are all important game species in the Elkhart and St. Joseph Rivers whose populations have been isolated by the presence of the former dam. Our studies with age and growth of Smallmouth Bass indicate slow growth on the Elkhart but normal growth on the St. Joseph. Interactions between these formerly isolated populations will inevitably benefit genetic exchange. Monitoring in 2020 suggests that Smallmouth Bass are migrating into the Elkhart from the St. Joseph. A tagged Smallmouth Bass was recaptured upstream of the former dam at American Park in late May 2020. This fish was tagged in 2019 approximately 4 miles downstream on the St. Joseph.

Other species that are listed in Attachment 1, that may appear to be new species but are not considered priority species for this project, include Gizzard Shad (*Dorosoma cepedianum*), Brown Trout (*Salmo Trutta*), Silverjaw Minnow (*Ericymba buccata*), Central Stoneroller (*Camptostoma anomalum*), and Warmouth (*Lepomis gulosus*). Gizzard shad and brown trout are both non-native species that were found upstream following the dam removal. Prior to the dam removal, Silverjaw Minnow and Central Stoneroller were collected sparsely upstream of the dam, but they were documented in abundance in the upstream tributaries. Warmouth have been found throughout the St. Joseph River Watershed, upstream and downstream of the former dam site.

Index Scores

Fish communities were evaluated using the Index of Biotic Integrity (IBI) Northern Indiana Till Plain Calibration, at the site above (Prairie Street) and below (Elkhart Avenue) the former dam site. IBI evaluations were also completed at long-term monitoring sites (American Park, Studebaker Park, and CR 18). In addition, habitat evaluations were also completed at these sites using the Qualitative Habitat Evaluation Index (QHEI).

IBI scores were significantly higher at Prairie Street in 2020 than in previous years. The score at Prairie Street was also higher than any score recorded at Elkhart Avenue between 2018 and 2020. A significant increase in the number overall species and the number of darters, suckers, and sensitive species also occurred in 2020 relative to previous years. Furthermore, the percent of simple lithophils (fish that require good coarse substrate for spawning) also increased significantly in 2020 relative to previous years. Most metrics from Prairie Street indicated a superior fish community to Elkhart Avenue in 2020.

Prairie Street	2018	2019	2020		Elkhart Avenue	2018	2019	2020
IBI Score*	45	49	54		IBI Score*	51	50	51
# Species	23	30	43		# Species	42	38	42
# Darters sp.	1	2	5		# Darters sp.	3	4	4
# Suckers sp.	5	5	7		# Suckers sp.	7	6	6
# of Sensitive sp.	9	9	17		# of Sensitive sp.	15	14	14
% Simple Lithophils*	21.5	20	34		% Simple Lithophils*	18.5	18.2	16
QHEI	52	57	79		QHEI	78	83	81

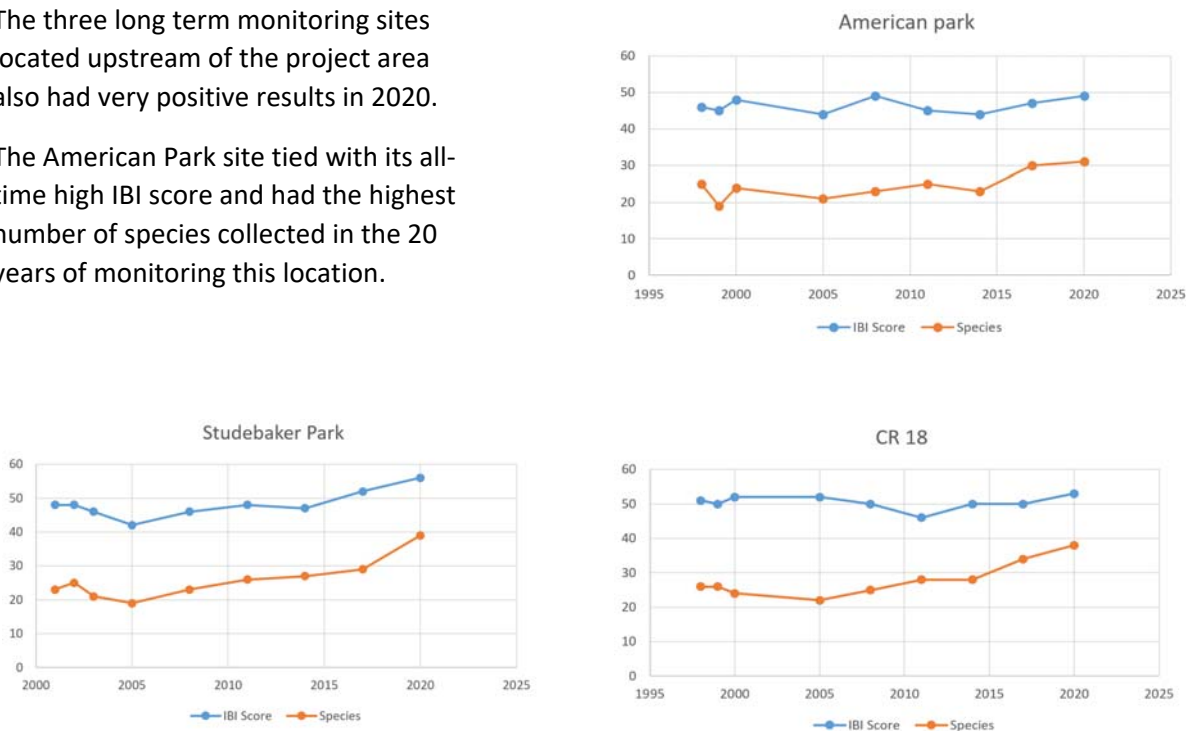
*IBI scores and % Simple Lithophils were averaged from the 2 sampling events. Species data are combined (not averaged) from the 2 sampling events.

IBI scores and other IBI metrics in 2020 were relatively consistent with previous years at Elkhart Avenue. The number of species did increase in 2020, a result of new species moving from upstream following the dam removal (see species lists in Attachment 1).

Habitat (QHEI) scores increased significantly at Prairie Street in 2020. Following the dam removal, a high gradient riffle with coarse cobble and boulders appeared approximately 0.1 miles upstream of the former dam. Riffle specialists like the Norther Hog Sucker (*Hypentelium Nigricans*) were abundant on this riffle. In addition to Longnose Dace, Blacknose Dace (*Rhinichthys atratulus*), another riffle specialist, was found for this first time at the Prairie Street riffle in 2020. This feature and other natural features that were exposed from the dam removal were the reason for the increased QHEI score.

The three long term monitoring sites located upstream of the project area also had very positive results in 2020.

The American Park site tied with its all-time high IBI score and had the highest number of species collected in the 20 years of monitoring this location.



Figures 2-4: IBI and Species Numbers



All time high IBI scores and species numbers were also recorded at Studebaker Park and CR 18 on the Elkhart River. The Studebaker Park site had particularly impressive numbers in 2020 and a significant increase in new species as a result of the dam removal.

Attachment 1 – Fish Species Lists

Common Name	Downstream Site (Pre-Removal)	Upstream Site (Pre-Removal)	Downstream (Post-Removal)	Upstream (Post-Removal)
American Brook Lamprey		X		X
Banded Killifish			X	
Black Bullhead	X		X	
Black Crappie	X	X		
Black Redhorse			X	
Blacknose Dace				X
Blackside Darter	X	X	X	X
Bluegill	X	X	X	X
Bluntnose Minnow	X	X	X	X
Bowfin	X	X	X	
Brook Silverside	X	X	X	
Brown Bullhead			X	
Brown Trout				X
Central Mudminnow			X	
Channel Catfish	X			X
Chestnut Lamprey	X	X		X
Common Carp	X	X		X
Common Shiner	X	X		
Creek Chub	X			
Gizzard Shad	X		X	X
Golden Redhorse	X	X	X	X
Golden Shiner	X			
Grass Pickerel		X	X	X
Greater Redhorse	X	X		X
Green Sunfish	X	X	X	X
Greenside Darter			X	X
Hornyhead Chub	X	X	X	X
Hybrid Sunfish	X	X		
Johnny Darter	X	X	X	X
Largemouth Bass	X	X	X	X
Logperch	X		X	X
Longear Sunfish	X	X	X	X
Longnose Gar	X		X	X
Longnose Dace	X		X	X
Mimic Shiner	X		X	X
Muskellunge	X			
Northern Brook Lamprey				X

Common Name	Downstream Site (Pre-Removal)	Upstream Site (Pre-Removal)	Downstream (Post-Removal)	Upstream (Post-Removal)
Northern Hog Sucker	X	X	X	X
Northern Pike	X	X	X	X
Pirate Perch		X	X	
Pumpkinseed	X	X	X	X
Quillback	X			
Rainbow Darter	X	X	X	X
Rainbow Trout	X			
Redear Sunfish	X	X	X	
River Redhorse	X	X	X	X
Rock Bass	X	X	X	X
Rosyface Shiner	X	X	X	X
Sand Shiner	X	X	X	X
Shorthead Redhorse	X		X	X
Silver Lamprey	X			
Silver Redhorse	X		X	X
Silverjaw Minnow			X	X
Smallmouth Bass	X	X	X	X
Spotfin Shiner	X	X	X	X
Spotted Gar	X		X	
Spotted Sucker	X	X	X	X
Stoneroller, Central	X			X
Striped Shiner	X	X	X	X
Walleye	X	X	X	X
Warmouth			X	X
White Sucker	X	X	X	X
Yellow Bullhead	X	X	X	X

Attachment 2 – Pictures 2020

	
<p>Oxbow Park – Longnose Gar</p>	<p>Prairie Street - Greenside Darter</p>
	
<p>Prairie Street - Channel Catfish</p>	<p>Prairie Street – Brown Trout</p>
	
<p>Prairie Street – River Redhorse</p>	<p>Prairie Street – Silver Redhorse</p>
	
<p>Prairie Street – Shorthead Redhorse</p>	<p>Studebaker Park – Shorthead Redhorse</p>

	
<p>Studebaker Park – Silver Redhorse</p>	<p>CR 18 – River Redhorse</p>
	
<p>CR 18 – Shorthead Redhorse</p>	<p>CR 18 - Logperch</p>
	
<p>CR 18 – Silver Redhorse</p>	<p>Shanklin Park - Logperch</p>
	
<p>Shanklin Park – Shorthead Redhorse</p>	