River & Streams Technical Committee
State of Indiana Report – 2018
North Central Division American Fisheries Society

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The following accounts have been solicited from the Indiana American Fisheries Society membership and summarize some of the major lotic ecological research, restoration projects, management strategies, monitoring appointments, and conservation efforts ongoing across the state of Indiana.

Indiana Department of Environmental Management (IDEM) / Office of Water Quality / Watershed Assessment and Planning Branch

Compiled by Kayla Werbianskyj

Fish Community monitoring and results from 2019

Fish community collections focused on the tributaries to the Ohio River Basin as well as various targeted watersheds including: Driftwood, Flatrock-Haw, Lower East Muscatatuck, Patoka, St. Joseph, Upper White, and Wildcat. A total of 122 fish community samples were collected from 115 sites resulting in the capture of 33,320 individuals representing 104 different species.

Table 1. Indiana HUC and Basin Location of IDEM monitoring projects

Project	Basin	HUC(s)
Probabilistic Monitoring	Ohio River Basin Tributaries	05090203 05140101 05140104 05140201 05140202
Reference Site Monitoring	White River Basin	05120205 05120204 05120201 05120202 05120208
Performance Monitoring	Ohio River Basin Tributaries	050902030403 050902030402
	White River Basin	051202070101 051202070102 051202070104
	Patoka River Basin	051202090501 051202090502 051202090503
	Wabash River Basin	051201070302 051201070303 051201050503
Watershed Characterization	Ohio River Basin Tributaries	0509020305

Probabilistic Monitoring Efforts

The main objective of IDEM's Probabilistic Monitoring Program is to provide a comprehensive, unbiased assessment of the ability of rivers and streams in a river basin to support aquatic life and recreational uses. Sites are randomly generated each year for the selected basin from the U.S. EPA laboratory in Corvallis, Oregon. This project is on a watershed rotation schedule to cover the whole state in 9 years (West Fork White River, Patoka River, East Fork White River, Great Miami, Upper Wabash, Lower Wabash, Kankakee River, Great Lakes, Ohio River).

The Watershed Assessment and Planning Branch (WAPB) collected 43 samples at 38 sites on waterbodies in the Ohio River Tributaries basin. A total of 63 different species were captured and 8,449 individual fish were identified. Macroinvertebrate community, water chemistry, algae (diatoms and chlorophyll) and *E. coli* were also collected at the same 38 sites. Additionally, HOBOs for continuous

monitoring of temperature and dissolved oxygen were deployed at a sub-set of 14 probabilistic monitoring sites.

Results are currently under review to determine whether the stream segments these sites fall on are considered "supporting" for aquatic life use.

Table 2. Ohio Tributaries interesting species captured

Common Name	Species	Waterbody	County
Spottail Darter	*Etheostoma squamiceps*	Tributary of Coles Creek	Warrick
		Caney Creek	
		Otter Creek	

Spottail Darter from Tributary of Coles Creek

Reference Site Monitoring

In 2015, IDEM started a 10 year project to sample 250 sites across Indiana with the intention of finding sites with the best water quality in the state. Currently in the 5th year of monitoring, the WAPB collected 33 samples at 30 sites on waterbodies in the White River Basin. A total of 65 different species were captured and 8,162 individual fish were identified across 8 counties for this project.

IBI scores in the White River Basin had a range of 30-58. Twelve out of 30 sites scored 50 or above on the IBI. The lowest IBI score of 30 occurred on Tributary of Richland Creek near W Hendricks Road. Two sites received an IBI of 58:

- Brandywine Creek near SR 9 (Bridge) in Shelby County
- Raccoon Creek near Heddings Road in Owen County

Table 3. White River Basin interesting species captured

Common Name	Species	Waterbody	County(s)
Harlequin Darter	*Etheostoma histrio*	Big Blue River	Shelby
Streamline Chub	*Erimystax dissimilis*		

Harlequin Darter from Big Blue River

Performance Measures Monitoring Efforts

Performance monitoring is initiated to show improvements in water quality when waterbodies cited in Categories 4A and/or 5A of Indiana's 303(D) List of Impaired Waters have received documented nonpoint source (NPS) control or watershed planning and restoration efforts. This type of monitoring provides chemical, physical, biological, and/or bacteriological data, depending on the parameter(s) for which the watershed is impaired, that can be reported to U.S. Environmental Protection Agency (U.S. EPA) Region 5's NPS Program showing improvements in watersheds previously listed as impaired.

The WAPB collected fish and macroinvertebrate communities at thirteen sites across eleven sub-watersheds (Allen Branch-south Hogan Creek, Headwaters South Hogan Creek, Headwaters Big Creek, Marble Creek-Big Creek, Camp Creek-Big Creek, Shanty Creek-Kilmore Creek, Stump Ditch-Kilmore Creek, Little Deer Creek, Little Flat Creek-Flat Creek, Bone Creek-Flat Creek, Headwaters Flat Creek) as part of performance measures' monitoring to determine if there are improvements in the biological integrity. Site locations and Index of Biotic Integrity scores are summarized below in Table 5. A score of lower than 36 (out of 60) on the IBI or macroinvertebrate IBI indicates impairment for both communities.

Table 5. Performance Measures Monitoring waterbodies, HUCs, counties, fish IBI scores

Project Site Number	Waterbody	HUC	County	fIBI[1]	mIBI[2]
19W001	South Hogan Creek	050902030403	Dearborn	50	42
19W002	South Hogan Creek	050902030402	Ripley	38	40
19W003	Tributary to Big Creek	051202070101	Ripley	36	NA
19W004	Big Creek	051202070101	Ripley	36	NA
19W005	Big Creek	051202070102	Jefferson	50	NA
19W006	Big Creek	051202070104	Jefferson	48	NA
19W007	Kilmore Creek	051201070302	Clinton	42	NA
19W009	Stump Ditch	051201070303	Clinton	36	NA
19W010	Little Deer Creek	051201050503	Carroll	46	40
19W011	Flat Creek	051202090503	Dubois	38	38
19W012	Flat Creek	051202090502	Pike	38	32
19W013	Flat Creek	051202090502	Pike	40	38

19W014	Flat Creek	051202090501	Pike	36	36

[1] Index of Biotic Integrity Score for fish community
[2] Index of Biotic Integrity Score for macroinvertebrate community

Performance Measures Monitoring results are currently under review to determine whether the stream segments these sites fall on are considered "supporting" for aquatic life use and if any segment improvements can be reported as Success Stories.

Fish Tissue Contaminants Monitoring Program

In 2019, contaminant monitoring in fish tissue was conducted in the Lower Wabash and Kankakee River Basins, in addition to the Indiana waters of Lake Michigan. All data has been returned from the laboratory and is used to support Indiana's Integrated Report, the 303(d) List of Impaired Waters, and the Indiana State Department of Health's Indiana Fish Consumption Advisory. The Indiana Fish Consumption Advisory can be used by anglers to help them maximize the health benefits from eating fish, while minimizing the risks (https://www.in.gov/isdh/23650.htm).

For the last several decades all advisories have been based on mercury or polychlorinated biphenyls (PCBs) concentrations in fish. In 2017, IDEM began analyzing per- and polyfluoroalkyl substances (PFAS) in fish tissue. PFAS is found in 100 percent of fish samples and in 2019 the first PFAS-based fish consumption advisory was issued in Indiana. For more information on IDEM's contaminants monitoring program or to inquire about fish tissue contaminants data, contact IDEM Watershed Assessment and Planning Branch staff members Ali Meils, at ameils@idem.IN.gov or (317) 308-3204.

IDEM staff Ross Carlson with King Salmon from East Branch Trail Creek

Muncie Bureau of Water Quality – Drew Holloway

In 2019, the Bureau of Water Quality (BWQ) sampled 50 sites from the West Fork White River (WFWR) and its surrounding tributaries. These sampling events yielded 7,223 fish representing 51 species.

In addition to our yearly sampling events, each of the fish interns created a research project that was presented to the office at the end of field season. Emily Reverman from Purdue University looked at the presence of Black-spot disease on all fish sampled throughout the season to determine which species were more prone to the disease and also which streams had the most individuals with Black-spot. Brooklyn Boatright (Ball State University) and Ryan Freeby (Bowling Green State University) worked together on a WFWR substrate investigation. They collected substrate samples at each of our sites on White River and used a Ro-Tap sieve to separate the substrate types using the Wentworth classification method. They then looked at the species totals for each of these sites to determine if the substrate matched the fish community.

This biggest news out of Muncie and the WFWR was the removal of 2 lowhead dams. Once removed, I did sample a newly established riffle (roughly 2 weeks after removal) and found Rainbow Darters, Orangethroat Darters, Greenside Darters and Logperch had already moved into neighborhood. We are looking forward to sampling these "new" stretches of the river next spring!

IN DNR Big Rivers Unit – Craig Jansen

The big rivers unit started the sampling season netting for Paddlefish at Hovey Lake, JT Myers lock and dam, and Newburgh lock and dam in March and April. Of 128 total Paddlefish collected, the longest eye-to-fork length measured 42 inches. We then assisted Kentucky in a targeted Asian carp monitoring survey using gill-nets and electrofishing capture methods. In May, we collected 663 Shovelnose Sturgeon along the Wabash River to further progress our 14-year monitoring program. From this sample, only 4% were females. The months of June and July primarily consisted of our inland catfish survey along the East Fork, West Fork, and main stem White River. Both hoop-nets and electro-fishing were used to attain a better representation of the natural population. In addition, we assisted the KDFWR in a collaborative Asian carp removal effort in Clover Creek, Kentucky, an embayment of the Ohio River.

Throughout the summer, we also conducted work on the Ohio River as part of the Asian carp early life stages project. Previous years of sampling indicates most Asian carp recruitment is coming from JT Myers Pool and farther downstream, with limited recruitment in Newburgh Pool with Cannelton Pool being densely populated with carp. Despite a concentrated effort using surface trawls and electrofishing in Cannelton Pool this year, no YOY Asian carp were captured. However, after a brief trip down to Hovey Lake located in the JT Myers pool, we confirmed this location remains a seasonal nursery for Asian carp. Larval fish tows were also deployed during spring river pulses at various tributaries of the Ohio River to begin to identify potential Asian carp spawning location within the Ohio River basin; these results are still being processed.

Towards the end of July and into August, we assisted Kentucky with an annual targeted catfish survey via trotlines on the Ohio River. We again conducted our annual fall community sampling in the Ohio River to evaluate long-term impacts of Asian carp on native species. We also still plan to conduct a Sauger survey on the Ohio River by the end of the year.

Elkhart-South Bend Aquatic Community Monitoring Program – Daragh Deegan

The Elkhart-South Bend Aquatic Community Monitoring Program continued to monitor fish and macroinvertebrate communities in the St. Joseph River (Lake Michigan Drainage) in 2019. In 2019, we completed 60 fish community surveys resulting in 25,428 total fish and 73 species in Elkhart and St. Joseph Counties. We also collected macroinvertebrates at 22 sites.

Stonecat collected from Christiana Creek in Elkhart

In 2019, we completed the second year of fish community surveys above and below the Elkhart River Dam in downtown Elkhart. The dam is scheduled to be modified for fish passage in January 2020. The dam is on the Elkhart River (the largest tributary of the St. Joseph River) approximately ½ mile upstream of the confluence with the St. Joseph River. Modification of this structure will restore fish passage and population connectivity for numerous fish species. Post modification surveys will occur during the summer of 2020.

Hornyhead Chub from the Elkhart River

We also collected Longear Sunfish and Northern Sunfish samples during the summer of 2018 and 2019 for genetic analysis. Both species are found in the St. Joseph River Basin and in the same streams. Separating the two species has proven to be difficult.

Healthy Rivers Initiative – Ben Miller

The Healthy Rivers Initiative, led by the IDNR, is the largest conservation initiative to be undertaken in Indiana. The initiative includes a partnership of resource agencies and organizations who are working with willing landowners to permanently protect 43,000 acres located in the floodplain of the Wabash River and Sugar Creek in west-central Indiana and another 26,000 acres of the Muscatatuck River bottomlands in southeast Indiana. HRI partners include the IDNR, U.S. Fish & Wildlife Service, NRCS, and The Nature Conservancy of Indiana. These projects involve the protection, restoration and enhancement of riparian and aquatic habitats and the species that use them, including migratory birds and waterfowl and threatened and endangered species. This initiative will also be beneficial to the public and surrounding communities by providing flood protection, increasing public access to recreational opportunities, and leaving a legacy for future generations by providing a major conservation destination for tourists.

To date, the two major mechanisms for permanently protecting priority lands have been IDNR land acquisition (with partner match contributions) from willing landowners and NRCS Wetland Reserve Easements (previously Wetland Reserve Program). Landowners uninterested in permanent protection are also provided technical assistance in enrolling in temporary conservation programs. These temporary agreements with landowners have often developed into permanent protection opportunities.

Opportunities to purchase land and enroll landowners fluctuate slightly year to year based on factors such as flooding, crop prices, and availability of partner match dollars. However, over the past eight years landowner interest in HRI has been fairly consistent, and the Healthy Rivers INitiative's strategy for permanently protecting land has been remarkably successful. Since June 2010, HRI has 37,673 acres of land under permanent protection, more than half of the overall goal of 70,000 protected acres. In the Wabash and Sugar Creek project areas this includes 11,956 acres purchased by IDNR and 4,052 non-IDNR acres enrolled in NRCS Wetlands Reserve Easements (WRE/WRP), both of which complement the existing 12,723 acres of state-owned and protected land in the project area. In the Muscatatuck River Project Area, 4,405 acres were acquired by IDNR and 2,048 non-IDNR acres were enrolled in WRE, complementing 2,489 acres of existing state-owned or otherwise protected land. To date, a total of 13,663 new acres are now open to the public for hunting, fishing, trapping, boating, and birdwatching in the Sugar Creek, Wabash River and Muscatatuck (Austin Bottoms) Conservation Areas.

IN DNR District 5 – David Kittaka

In 2019, we completed a follow up black bass survey on a 15 mile reach of the East Fork White River between Bedford, IN and Williams, IN. In 2012, Indiana instated a statewide stream 12 to 15 inch protected slot size limit with a bag limit of 5 fish and only 2 can be over 15 inches. Data collected on black bass will be used to evaluate the Black bass population under the new size and harvest limits. This is also the location where we conducted an angler creel and recreational use survey. Fish harvested, target species as well as angler opinion on the new catfish and black bass harvest regulations were a few of the questions asked during angler interviews. River Creel surveys are always a gamble with changing river conditions and this year several of the ramps remained inaccessible for parts of the spring and summer due to flooding. Williams Dam is a mainstay for angling activity. Changing water conditions high or low moved different species of fish in and out of this public fishing area. Skipjack Herring was the number one species harvested at the dam. Commonly used as bait fish for catfishing, during the peak of the spring run Skipjacks were harvested by the hundreds for the single use as bait fish. Throughout the season Common Carp were also popular, especially from an Asian community that would regularly make the almost 2 hour drive from Indianapolis, spend up to several days harvesting

common carp. Other species harvested were Channel, Flathead and Blue Catfish, Freshwater Drum, Hybrid Striped Bass and Asian Carp. The Milwaukee Rails to Trail from Bedford runs 10 miles and ends at Williams Dam. This area is a popular turn around and beginning area for this trail.

IN DNR District 6 – Andy Bueltmann

Completed 6 electrofishing sites ranging from river mile 9 to river mile 62.4 on the Blue River from 9/16/19 to 9/24/19 for a Black bass survey. At each site electrofishing runs were conducted until depletion. We measured, weighed, and collected aging structures from all Black Bass species and Rock Bass. A total of 236 Rock Bass, 206 Smallmouth Bass, 12 Spotted Bass, and 2 Largemouth Bass were collected. We have yet to finish analyzing all the data including an abundance estimate, however analysis will be completed by April 15th, 2020

Fish Assemblages in Floodplain Lakes of the lower Wabash, Lower White, and lower West Fork of the White River, Indiana – Mark Pyron and Paul Derolf at Ball State University

We collected fishes at nine floodplain lakes in 2018 and seven lakes in 2019, based on accessibility for a boat electrofisher. Floodplain lakes were located in Daviess, Knox, Gibson, and Posey Counties. We collected 1,116 fishes in 33 species in 2018, and 904 fishes in 38 species in 2019. Species richness of lakes ranged from 8-19 species per lake in 2018, and from 12-24 in 2019. Three lakes resulted in the highest species richness in 2018: Washington Lake, Ribeyre Lake, and Long Pond Knox County. The three lakes with the highest species richness in 2019 were: Ribeyre Lake, Greathouse Lake, and Washington Lake.

Spatiotemporal Variation in the Long-Term Fish Assemblages of Buck Creek, Indiana – Paul Derolf at Ball State University

Buck Creek is a spring-fed, cool-water tributary of the West Fork White River, Indiana. The Muncie Bureau of Water Quality sampled fishes and monitored water temperature in Buck Creek annually from 1986-2018. The watershed is dominated by row crop agriculture and urbanization. We tested for effects of hydrology and water temperature on local fish assemblages using long-term data from the BWQ. We hypothesized that: 1) spatially these communities will shift from habitat/headwater specialists to large river species on the upstream-downstream gradient, and 2) yearly assemblages will shift from pollution tolerant species to more intolerant species. Water temperature and altered stream riparian zones were predicted to result in increased relative abundance of intolerant species. We identified gradual, directional shifts over time, and sample site compositions varied predictably.