



**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 2018

Fish community collections focused on the tributaries to the Great Lakes Basin as well as various targeted watersheds including: Blue-Sinking, Middle Ohio-Laughery, Patoka, Whitewater, Lower East Fork White River (HUC 10), and five sub-watersheds (HUC 12). A total of 111 fish community samples were collected from 98 sites resulting in the capture of 20,312 individuals representing 111 different species.

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

Project	Basin	HUC(s)
Probabilistic Monitoring	Great Lakes (Lake Michigan and Lake Erie drainages)	04060200
		04040001
		04100003
		04100005
		04100007
Reference Site Monitoring	Great Miami	04100004
	Ohio River	05080003
	White River	05140104 05090203
Performance Monitoring	Great Lakes (Lake Erie drainage)	05120209
		041000030401
		041000030604
		041000030702
		041000030705
Watershed Characterization	White River	041000030707
		0512020815

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 44 samples at 38 sites on waterbodies in the Great Lakes Basin. A total of 69 different species were captured and 4,926 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. Great Lakes interesting species captured

Common Name	Species	Waterbody	County
Brook Stickleback	<i>Culaea inconstans</i>	Pigeon Creek	Steuben

Longnose Dace	<i>Rhinichthys cataractae</i>	Elkhart River	Elkhart
Brown Trout	<i>Salmo trutta</i>	East Arm Little Calumet	Porter
Rainbow Trout	<i>Oncorhynchus mykiss</i>	East Arm Little Calumet	Porter
		Juday Creek	St. Joseph



Pictured above: Brown Trout (Salmo trutta).



Pictured above: Longnose Dace (Rhinichthys cataractae)—currently listed Special Concern Species.

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 4th year of monitoring, the WAPB collected 33 samples at 29 sites on waterbodies in the Great Miami Basin, Ohio River Basin, and Patoka River Watershed (05120209). A total of 78 different species were captured and 9,409 individual fish were identified across 11 counties for this project.

Great Miami Basin

Nine sites were sampled for fish community in the Great Miami Basin; 11/33 samples in the counties of Wayne, Dearborn, Fayette, Franklin, and Union A total of 59 species and 4,476 individuals were identified. IBI scores in the Great Miami Basin had a range of 46-58. The highest IBI score of 58 occurred at a site on Whitewater River near SR 1 in Franklin County. Additionally, seven out of nine sites scored

50 or above on the IBI. The lowest IBI score of 46 occurred on Little Salt Creek near Stipps Hill Rd in Franklin County.

Table 3. Great Miami Basin interesting species captured

Common Name	Species	Waterbody	County(s)
Redside Dace ¹	<i>Clinostomus elongatus</i>	Elkhorn Creek	Wayne
Smallmouth Redhorse	<i>Moxostoma breviceps</i>	Whitewater River	Dearborn
Gravel Chub	<i>Erimystax x-punctatus</i>	Whitewater River	Franklin
Variagate Darter*	<i>Etheostoma variatum</i>	Whitewater River (3 sites)	Franklin, Dearborn
Stonecat*	<i>Noturus flavus</i>	Whitewater River (4 sites)	Franklin, Dearborn, Fayette
Banded Darter*	<i>Etheostoma zonale</i>	4 waterbodies (7sites)	Franklin, Dearborn, Fayette, Wayne, Union

¹Identified for the first time in Elkhorn Creek; new distribution expansion

*Species co-occurred at multiple sites

Ohio River Basin

Seventeen sites were sampled in the Ohio River Basin; 18/33 samples in the counties of Dearborn, Ripley, Harrison, Crawford, Washington, and Perry. A total of 58 species and 4,568 individuals were identified. IBI scores had a range of 26-52. There were three sites that received an IBI score of 52:

- Blue River near E Daughtery Rd in Harrison County
- Blue River near SR 62 in Crawford County
- Little Blue River near Beechwood Rd in Crawford County.

Additionally, there were five other sites that scored 50. The lowest IBI score of 26 was at a site on Trigger Branch near Gerald Rd in Perry County.

Table 4. Ohio River Basin interesting species captured

Common Name	Species	Waterbody	County(s)
Bluebreast Darter	<i>Etheostoma camurum</i>	Blue River	Crawford
Spotted Darter	<i>Etheostoma maculatum</i>	Blue River (2 sites)	Crawford, Harrison
Channel Shiner	<i>Notropis wickliffi</i>	Little Blue River	Crawford
Stonecat	<i>Noturus flavus</i>	Blue River	Crawford
		Hayes Branch	Dearborn
Banded Sculpin	<i>Cottus carolinae</i>	5 waterbodies (7 sites)	Crawford, Harrison, Washington
Scarlet Shiner	<i>Lythrurus fasciolaris</i>	9 waterbodies (10 sites)	Crawford, Harrison, Washington, Ripley Perry



Pictured above: Scarlet Shiner (Lythrurus fasciolaris)—Mosquito Creek in Harrison County.

Patoka River Watershed

Three sites were sampled within the Patoka River Watershed; 4/33 samples in Orange County. A total of 22 species and 365 individuals were identified. Some interesting regional species included: Ribbon Shiner (Patoka River), Banded Sculpin (Patoka River, Youngs Creek), Warmouth (Patoka River), and Southern Redbelly Dace (Patoka River). The IBI scores ranged from 28-40. The highest IBI score of 40 was on the Patoka River near CR175 W/Fargo Rd in Orange County. Youngs Creek near CR 650 S in Orange County received the lowest IBI score of 28.



Southern Redbelly Dace (Chrosomus erythrogaster).

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 nine sites across five sub-watersheds (West Branch Fish Creek, Smith Ditch-Cedar Creek, Peckhart Ditch-John Diehl Ditch, King Lake-Little Cedar Creek, and Dosch Ditch-Cedar 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.

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

Project Site Number	Waterbody	HUC Code	County	fIBI ¹	mIBI ²
18W001	West Branch Fish Creek	041000030401	Steuben	N/A	N/A
18W002	West Branch Fish Creek	041000030401	Steuben	44	40
18W003	West Smith Ditch	041000030604	Dekalb	16	30
18W004; 18W004.5*	Peckhart Ditch	041000030702	Dekalb	16;18*	30
18W005	Little Cedar Creek	041000030705	Dekalb	48	38
18W006; plus macro dup**	Little Cedar Creek	041000030705	Allen	50	40;40**
18W007	Cedar Creek	041000030707	Allen	48	32
18W008	Cedar Creek	041000030707	Allen	54	32
18W009	Cedar Creek	041000030707	Allen	52	34

¹ Index of Biotic Integrity Score for fish community

² Index of Biotic Integrity Score for macroinvertebrate community

*Site revisit for fish community in same year as part of QA/QC procedures

**Site duplicate for macroinvertebrate community as part of QA/QC procedures

A score of lower than 36 (out of 60) on the IBI or macroinvertebrate IBI indicates impairment for both communities. Site 18W001 on West Branch Fish Creek was identified as not a stream but a wetland, therefore it will not be assessed for improvement. 18W002, 18W005, and 18W006 displayed improvement in both biological communities. 18W003 and 18W004 (including fish revisit score) did not show improvement in either biotic community. Sites 18W007, 18W008, and 18W009 located on Cedar Creek displayed very good to excellent fish community scores, but poor macroinvertebrate community scores. There were, however, 7-9 Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa (pollutant sensitive macroinvertebrate taxa which include mayflies, stoneflies, and caddisflies) reported at each site on Cedar Creek.

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.

2019 Monitoring Projects

Site reconnaissance and evaluation was conducted from January-March for all 2019 field projects.

- Probabilistic Monitoring: Sampling will be focused on waterbodies in the Ohio River Basin in Southern Indiana. The goal is to sample 38 sites in the basin. Data to be collected at these randomly

generated sites include water chemistry, bacteriological, algal, macroinvertebrate communities, fish communities and habitat quality assessments.

- **Reference Site Monitoring:** Sampling will occur at 15 sites in HUCs 05120202 and/or 05120208 (counties of: Owen, Monroe, Greene, and Lawrence); and 15 sites in HUCs 05120201, 05120204, and/or 05120205 (counties of: Henry, Madison, Shelby, Johnson, and Morgan). Sites are still in the process of becoming finalized.
- **Watershed Characterization:** Sampling will occur at 24 targeted sites in the Laughery Creek Watershed (HUC 0509020305) in the Ohio River Basin) as part of the baseline monitoring and Total Maximum Daily Load project.
- **Performance Measures' Monitoring:** The WAPB staff will revisit 14 sites across 12 sub-watersheds as part of performance measures' monitoring to determine if there are water quality improvements. The 2019 sites will be sampled due to a historical impairment for one or more of the following parameters: biological communities, dissolved oxygen, or nutrients. Counties where sampling will occur include: Carroll, Clinton, Dearborn, Ripley, Jefferson, Pike, and Dubois. The objective of monitoring these sites is to document water quality improvements following implementation of a watershed management plan.

Fish Tissue Contaminants Monitoring Program

Fish tissue contaminant samples from our 2018 sampling efforts (Upper Wabash Basin) were sent to the analytical laboratory in November. Data results are anticipated to be received by the end of April 2019, at which time results will be, incorporated into Indiana's Integrated Report, the 303(d) List of Impaired Waters, and the Indiana State Department of Health's Indiana Fish Consumption Advisory. Plans are underway for 2019 fish tissue sampling in the Lower Wabash and Kankakee River basins. The fish consumption advisory workgroup, comprised of members from DNR, ISDH and IDEM, has worked diligently to incorporate the data from this program in the Indiana Fish Consumption Advisory (<https://www.in.gov/isdh/23650.htm>) which has a new interactive map format. 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 or James Stahl, at jstahl@idem.IN.gov or (317) 308-3187.

Nongame Fishes and Freshwater Mussel Update

Brant Fisher, Nongame Aquatic Biologist, IDNR

Banded Killifish (*Fundulus diaphanous*)

Surveys specific for Banded Killifish (*Fundulus diaphanous*) were conducted with Illinois Natural History personnel at several locations across northern Indiana from Wolf Lake (Lake County), which straddles the Illinois-Indiana border, to Clear Lake (Steuben County) in the northeast corner of Indiana. The Banded Killifish is a listed species in Illinois that has seen a significant increase in its distribution recently. This may potentially be the result of bait bucket released individuals of the eastern subspecies – *F. d. diaphanous*, rather than the native western subspecies *F. d. menona* simply expanding its range on its own. There could also potentially now be hybrids between the two. In Indiana we have also seen an increase in the distribution and abundance of Banded Killifish along the Lake Michigan coastline and in the St. Joseph River (Elkhart and St Joseph counties). The specimens collected from several of our natural lakes should act as good reference for native *F. d. menona* to which other suspect populations can be compared.

State Endangered Greater Redhorse (*Moxostoma valenciennesi*) and River Redhorse in the Lake Erie drainage

The St. Joseph River (downstream of the dam at Johnny Appleseed Park in Fort Wayne) and St. Marys River (the lowest section), Allen County, were sampled with Fisheries Section personnel in search of the State Endangered Greater Redhorse (*Moxostoma valenciennesi*). While no Greater Redhorse were collected, it did provide more evidence for what their distribution looks in the Lake Erie drainage of Indiana. They only seem to be in the St. Joseph River upstream of Cedarville Reservoir, while River Redhorse (*Moxostoma carinatum*) inhabit sections below. Neither have been found to date in the St. Marys River or the Maumee River. Both species potentially inhabit certain sections of the Maumee River. Hopefully, future sampling in the lowest section near the Indiana-Ohio state line will provide more insight.

Trout-perch (*Percopsis omiscomaycus*)

A site on Pipe Creek in Franklin County was sampled extensively for Trout-perch (*Percopsis omiscomaycus*), a state species of Special Concern. A single Trout-perch was collected from the location in 1997 during a routine Fisheries Section survey of the watershed. Twenty-nine species were collected, but unfortunately did not include a Trout-perch.

Redside Dace (*Clinostomus elongates*)

IDEM personnel had collected a single, State Endangered, Redside Dace (*Clinostomus elongates*) from Elkhorn Creek in Wayne County during the 2018 field season. This was the first ever known collection of Redside Dace from the Elkhorn Creek Watershed. Elkhorn Creek originates in Ohio and eventually flows into the East Fork Whitewater River south of Richmond. The Redside Dace is strictly a headwater species. The single individual collected in Elkhorn Creek was found in a larger, more downstream section of the stream, so it was speculated if the core population could actually occur in the Ohio portion of the watershed. On an unusually warm couple of days near the beginning of January 2019, efforts were coordinated with some colleagues from Ohio State to sample on the same day both in Ohio and Indiana to get a better understanding of its distribution.

Interestingly, no Redside Dace were found in the upper portion of the Elkhorn Creek watershed in Ohio as suspected, or the first stretches of the stream in Indiana. So efforts continued downstream, targeting the location where IDEM had made their initial collection. After much effort, a single Redside Dace was again collected. However, an interesting find was uncovered while sampling—'Elkhorn Falls'. A rather large, natural waterfall that would block any upstream fish migration was found just upstream of the location of the Redside Dace collection. Efforts then re-focused on smaller tributaries along the lower part of Elkhorn Creek, and sure enough, several Redside Dace were collected from a small, unnamed tributary. While Redside Dace may have historically inhabited upper portions of the Elkhorn Creek watershed, they now look to be extirpated from these areas and have no natural means for re-colonization.



Unnamed tributary in the lower portion of Elkhorn Creek watershed in Wayne County.



Redside Dace collected from the Unnamed tributary in the lower portion of Elkhorn Creek watershed.



Elkhorn Falls on Elkhorn Creek in Wayne County.

Freshwater mussel surveys in the White River drainage and Patoka River Basin

Lick Creek, a tributary of Fall Creek in Madison County, had never been surveyed previously and resulted in some nice finds with a robust population of Spike (*Elliptio dilatata*) - nearly 200 live individuals in 120 minutes of sampling at one site. Two species of Special Concern, Wavyrayed Lampmussel and Kidneyshell as well as Rainbow (*Villosa iris*), another relatively rare species in the state, were also all found live within the drainage. A single live Kidneyshell (the only mussel species collected live) was also found at a site on Fall Creek, Madison County. These live Kidneyshell represent the first ones seen anywhere in the upper West Fork White River drainage in recent times.

Very little evidence of native freshwater mussels was found in the Lost River and two of its tributaries (Upper Sulphur Creek and Lick Creek) downstream of the Orangeville Rise in Orange County. The only species collected live were two very common species, Giant Floater (*Pyganodon grandis*) and Fatmucket (*Lampsilis siliquoidea*), while fresh dead shell material of Rainbow was found at a couple sites on Lick Creek. The Lost River tended to have hard pan banks with steep drop-offs into relatively deep sandy, mid-channel trenches; Lick Creek habitat varied widely even within the same reach, with stretches of bedrock/cobble/gravel/sand/hard pan and lots of woody debris.

Live Rainbow, Little Spectaclecase (*Villosa lienosa*), a species of Special Concern, and a previously unknown population of Threeridge (*Amblema plicata*) were all found during surveys in the Patoka River, Orange County, upstream of the Patoka Reservoir.

Mussel surveys were completed in the vicinity of three potential dam removals/modifications (West End dam, IN Steel and Wire Dam, and George R. Dale dam) along the West Fork White River through Muncie in Delaware County. A robust mussel population was found in the area directly upstream from the George R. Dale dam, where 16 live species were collected.

The first week of October, the dam on the West Fork White River, just downstream of the 16th Street bridge in Indianapolis sprung a leak, quickly draining 'Lake Indy'. Swift, temporary repairs quickly brought water levels back up until a new leak formed about a week later. This provided a unique opportunity to see the river at pre-impounded conditions and to take a look for stranded freshwater mussels on some of the extensive, exposed mud flats and gravel bars. Ten species were collected live/fresh dead from four locations investigated on October 17th. While all were common species, probably the most interesting find was of a single, live, juvenile Threeridge (*Amblema plicata*). The only other population in the West Fork White River drainage in the area is from nearby Fall Creek.

Freshwater mussel surveys in the Great Lakes Basin

Mussel sampling was completed with National Park Service personnel at several locations in the East Arm Little Calumet River within the Indiana Dunes National Lakeshore. Only one native species, White Heelsplitter (*Lasmigona complanata*), was found live, while nearly 20 other native species were found as weathered shell material. The decimated mussel fauna in this watershed is unrivaled in the state. Mussel conservation efforts at the Park were discussed and will continue going forward.

Systematic freshwater mussel sampling was conducted at three locations on Coffee Creek, Porter County, at the only known location of reproducing Ellipse (*Venustaconcha ellipsiformis*), a state species of Special Concern, in the Lake Michigan portion of northwest Indiana. This effort was part of a larger effort to estimate Ellipse densities across the range of the species in northeastern Illinois and northwest Indiana. The ellipse is a priority species for Chicago Wilderness, a conservation group centered in Chicago - a regional alliance that ventures into northwest Indiana.

Wavyrayed Lampmussel (*Lampsilis fasciola*) and Kidneyshell (*Ptychobranthus fasciolaris*)

Wavyrayed Lampmussel (*Lampsilis fasciola*) and Kidneyshell (*Ptychobranthus fasciolaris*), both state species of Special Concern, were found live at a site on Buck Creek, Marion County. In contrast, and on the other side of Marion County, no live or fresh dead mussels were found in Eagle Creek at three sites sampled in the section downstream of Eagle Creek Reservoir to its confluence with the West Fork White River.

Snuffbox Augmentation in the Tippecanoe River

Another year of successful Snuffbox (*Epioblasma triquetra*) propagation was completed. Cages were prepared and placed in Lake Shafer on April 27th. Six female Snuffbox were secured from the Salamonie River on April 30th. Then on May 1st, 86 Logperch (*Percina caprodes*) were collected from the Tippecanoe River below Norway Dam and transported to the Salamonie River. Glochidia (parasitic larvae) were extracted from the female Snuffbox and used to infect the Logperch. The Logperch, with attached glochidia, were then taken back to Lake Shafer and placed in the previously prepared cages, where they remained until juvenile snuffbox transformed and dropped off into the cage bottoms.

One cage top was pulled on May 23rd to check on the status of the Logperch and attached glochidia. Of the 18 Logperch originally placed in the cage, one did not survive, but all others looked healthy. Inspection of the gills revealed many small, maturing mussels. Logperch were released from their cages on July 11th. Logperch gills were clean indicating that all glochidia had transformed and baby mussels had dropped. These cages will now stay in Lake Shafer until August-September 2019 when hopefully a nice crop of 1+ year old Snuffbox will be harvested for augmentation at a site further upstream on the Tippecanoe River.

On October 9th, Snuffbox originally propagated on April 20, 2016, and raised in cages in Lake Shafer since, were pulled. These Snuffbox ranged in size from 6-12mm on October 6, 2016 (169 days after infection on Logperch); 10-23mm on August 31, 2017 (498 days); and 34-42mm on 10/9/2018 (902 days). On October 10th, 83 Snuffbox (79 from 2016 propagation and 4 from 2014 propagation work)

were tagged and placed in the Tippecanoe River at an augmentation site that had been previously sampled and prepared on October 2nd. All 83 augmented Snuffbox received a small numbered plastic tag on each valve (via super glue); 30 also had a PIT tag epoxied to one valve so they could be monitored over time for growth, survival, and movement.

Besides pulling the cages with 2016 propagated Snuffbox, cages from 2017 propagation efforts were also pulled and checked on October 9th, and unfortunately yielded no 1+ year old Snuffbox. However, several young of the year Snuffbox from 2018 propagation work were found in the 2017 cages. This is not an uncommon occurrence – Snuffbox mussels falling off Logperch gills, but ending up in other year's cages that are nearby. We have speculated that if they are moving out of some cages into other cages, that they certainly could also be moving out of cages and just ending up on the bottom of Lake Shafer. So some time was spent on October 25th randomly digging up substrate around the area where the cages are kept in Lake Shafer. And sure enough, four live Snuffbox – two 2+ year old and two young of the year were found. Additional Snuffbox may be salvaged this way in the future. The older Snuffbox were tagged and placed at the augmentation site – younger ones were placed back in one of the 2018 production cages.

Snuffbox placed in the Tippecanoe River on October 10th were checked later in the month and seemed to be adapting well to their new location as many were seen buried in the substrate and actively filtering. None of the PIT tagged individuals had moved substantially from the grid location where they had been placed.

Northern Riffleshell Augmentation in the Tippecanoe River and Clubshell Reintroduction in the Eel River

Northern Riffleshell (*Epioblasma rangiana*) and Clubshell (*Pleurobema clava*) were once both widely distributed within the Ohio River and Lake Erie drainages of Indiana. Northern Riffleshell has not been seen live for many years in Indiana but is still considered extant in the Tippecanoe River. Clubshell is still reproducing in the upper section of the Tippecanoe River and is still found live in Fish Creek, although reproduction, if occurring there, is at very low levels. Augmenting and strengthening the Northern Riffleshell population in the Tippecanoe River and re-establishing a Clubshell population in another Indiana drainage (Eel River in the upper Wabash River drainage) would provide a better opportunity for the continued persistence of both species in Indiana.

The salvage of adult Northern Riffleshell and Clubshell (among other species) from the Hunter Station (US 62) bridge replacement project on the Allegheny River in Pennsylvania provided an unprecedented opportunity to augment and reintroduce populations of both species within their historical ranges in Pennsylvania, Illinois, West Virginia, Kentucky, Ohio, and Indiana. In 2015, Indiana received approval from the Pennsylvania Fish & Boat Commission to receive adult mussels of both species.

The first 150 Northern Riffleshell and 150 Clubshell arrived in Indiana via overnight FedEx (packed in a cooler with moist burlap and some ice) in September 2015. All mussels came with a PIT tag already epoxied to one valve and a small numbered plastic tag attached to the other valve. These 'pilot study' mussels were placed at three sites in each receiving river (50 per site) and monitored for survival in October 2015 and June 2016.

In October 2015, all 300 released mussels were relocated, and none had moved outside their original area of placement. Five individuals at each site were dug up and checked – all were still alive and closed tightly upon handling. Many were seen actively filtering at each site and many (especially the Clubshell) were buried deeply into the substrate.

The 300 pilot study mussels were monitored again in June 2016. For Northern Riffleshell in the Tippecanoe River, all 50 PIT tagged mussels were found at two of the three sites; 46 of 50 were found at

the third. At each site, five random mussels were dug up to see if they were still alive. Four out of five were live at two of the sites and three out of five were found live at the third. Overall, 11 out of 15 were found live (73%); this is actually good survival for Northern Riffleshell when compared to other states that have moved Northern Riffleshell from the Hunter Station bridge location. All fifty mussels were re-found at two of the three Eel River sites where Clubshell were reintroduced; 49 of 50 were found at the third site. All 15 mussels dug up to check for survival were live (100%). With these promising results, Indiana was granted more adults of each species for continued augmentation/reintroduction by the Pennsylvania Fish and Boat Commission.

Near the end of July 2016, 3,000 adult Clubshell arrived in Indiana. Similarly to 2015, mussels arrived via overnight FedEx, packed in coolers on ice. Of the 3,000 Clubshell only one died in transit. An additional two Clubshell arrived as mudders (had been dead for a while but were thought to have been alive when pulled from the Allegheny). Ten percent of the Clubshell arrived with a PIT tag attached to one of their valves. The rest were marked with green glitter super glued to their shell to distinguish that they were placed in 2016.

Near the beginning of August 2016, 3,000 adult Northern Riffleshell arrived in Indiana. Of the 3,000 Northern Riffleshell around 2% were dead on arrival; interestingly almost all were males. Similarly to the Clubshell, ten percent of the Northern Riffleshell arrived with a PIT tag attached to one of their valves, and the rest were marked with green glitter super glued to their shell.

The 2,997 Clubshell and 2,934 Northern Riffleshell were placed in the Eel River and Tippecanoe River respectively, at the three sites where pilot studies were initiated in 2015. At each location, they were placed at a density of 8/m² within the previously designated 8 x 20 meter grid. This was a monumental effort made much easier by the assistance of Manchester University students/faculty, USFWS, The Nature Conservancy, and Division of Fish and Wildlife Fisheries Section staff.

Northern Riffleshell and Clubshell have been monitored for survival since placement. While survival of Northern Riffleshell has not been as good as Clubshell, it is similar to what has been seen in other states receiving mussels. Only five Clubshell are confirmed dead to date. The survival of these animals has been nothing short of incredible. These two populations will continue to be monitored for survival. Some effort in the next year or two will also be spent looking for juvenile individuals of each species, in order to determine if any successful reproduction is occurring. No additional adult mussels were received in 2017 or 2018, but hopefully there will be other opportunities in the future.

The City of Elkhart

Daragh Deegan, Aquatic Biologist

The City of Elkhart completed its 21st year for fish community sampling in the St. Joseph River Watershed (Lake Michigan Drainage) in 2018. This program conducts sampling in Elkhart and St. Joseph Counties as a collaborative effort between the City of Elkhart and the City of South Bend. A total of 55 fish community surveys were completed, resulting in 66 species and a total of 27,870 fish collected. Our program also completed 30 macroinvertebrate surveys and 4 aquatic plant surveys to complement the fish community efforts. Additionally, 10 samples for fish tissue contaminant monitoring were collected. The aquatic plant surveys are conducted in collaboration with Indiana University-South Bend. In addition to each plant survey, fish and macroinvertebrates are collected in an effort to gauge interactions among the three biological communities. During each survey, aquatic plants are randomly sampled along linear transects within each site and macroinvertebrates are collected in each plant sample. Following plant and macroinvertebrate sampling, we conduct fish sampling using a backpack electrofisher and seine along each transect.



Picture: Juvenile bowfin collected from Pine Creek, Elkhart County in 2018.

A genetic identification project is underway to gain a more accurate understanding of lamprey distributions in the St. Joseph River Watershed. Within the St. Joseph River watershed (Lake Michigan Drainage) there are three species in the genera *Ichthyomyzon*; Silver Lamprey (*I. unicuspis*), Chestnut Lamprey (*I. castaneus*), and Northern Brook Lamprey (*I. fessor*), which have overlapping characteristics—particularly in the ammocoete life stage. Tissue samples from Longear Sunfish (*L. megalotis*) and Northern Sunfish (*L. peltastes*) individuals were collected in 2018 to begin genetic analyses as separating the two species has proven to be difficult. It appears that both species are present in the St. Joseph River, while *L. peltastes* might be the more abundant of the two species in the Elkhart River. Additional samples will be collected in 2019 and work will be conducted with the Indiana State Aquatic Biologist to obtain reference samples from known populations of both species from other watersheds in the state.



Intern Skylie McKinnell with 1 of 4 greater redhorse collected in 2018.

In 2018, fish community surveys were initiated above and below the Elkhart River Dam in downtown Elkhart. It 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. Removal of this structure will restore fish passage and population connectivity for numerous fish species. This dam is scheduled to be removed in late 2019/early 2020; additional pre-removal surveys will occur in 2019.

**Muncie Sanitary District Bureau of Water Quality
Drew Holloway, Aquatic Biologist**

In 2018, the Muncie Sanitary District Bureau Water Quality (BWQ) sampled 61 sites from the West Fork White River (WFWR) and its surrounding tributaries in Delaware County, IN to evaluate the health and integrity of the corresponding fish communities. These sampling events yielded 11,245 fish representing 53 species. Looking at the White River specifically, 48 species were harvested bringing in 7,450 fish. This year was also the inaugural year where seasonal interns each worked on separate projects to present to the office. The work put in from each intern was impressive and they did a great job while presenting, as well. Kaleb Eden, Ball State University, looked at West Fork White River Rock Bass data from 2013 to present. He was able to use this data to look at not only yearly, but site-by-site PSD and RSD results as well as a West Fork White River age-length key for age classes. He presented this information as a poster at the Spring IAFS meeting in Indianapolis, IN. Cameron Yeakle, Taylor University, had to create a project as part of his internship requirement through the university. He came in as a serious bass angler but ended up really enjoying the nongame species observed throughout the White River. His favorite fish was the Logperch and decided to do a historical review using BWQ data. It was interesting to see where these fish turn up and their numbers. Lucas Foertsch, Purdue University, decided to look at Stonecat Madtom data after realizing it was the only catfish species we sampled that he hadn't caught while growing up a catfish angler. His results were also interesting because it was determined "not all riffles are created equally" as he put in his PowerPoint. The Stonecat is very habitat specific and only found in our riffles with large boulders.

In preparation for dam removal on the White River, Aquatic Biologist, Drew Holloway, decided to sample three different types of riffles and runs to help predict the fish community post dam removal. This data will be presented at IAFS this spring and also used for public outreach when discussing the changes associated with dam removal.



Photo from left to right: Interns Cameron Yeakle, Lucas Foertsch and Kaleb Eden visiting the headwaters of White River on the last day of 2018 BWQ sampling.

Big Rivers Update

Craig Jansen, Big Rivers Fisheries Biologist, IDNR

In 2018, the IN DNR big rivers unit conducted annual monitoring of Shovelnose Sturgeon on the Wabash River and annual Paddlefish monitoring on the Ohio River. Catfish were sampled via hoop nets and electrofishing on the Wabash River as part of the Inland catfish monitoring dataset, and catfish were also sampled via trotlines on the Ohio River during a collaborative effort with Kentucky DFWR. The big rivers unit assisted KDFWR and USFWS on multiple Asian carp projects on the Ohio River, in addition to collecting, filleting, and serving Asian carp at the State Fair. General fisheries surveys were completed at Tanners Creek and Hogan Creek (embayments/backwaters of the Ohio River). It was intended to sample Sauger at Newburgh Dam tailwaters on the Ohio River, but high waters this fall/winter interfered with this plan.

IDNR – District 1

Tom Bacula, Fisheries Biologist

A Black Bass survey was conducted from in mid-September and one site in late October on the Tippecanoe River in north central Indiana. A total of 11 sites were surveyed in 22.5 h for 22.2 river miles of boat DC electrofishing. The survey was primarily to collect Black Bass specifically Smallmouth Bass, but other sport fish species were collected. In total, 617 Smallmouth Bass were collected from 2.6 to 19.8 in. Fish ages were estimated using scales from age-0 to -12. Fish catch varied by site from 4.1 to 56.9 fish/h (average 28.7 fish/h) and 4.5 to 54.0 fish/mi (average 28.6 fish/mi). Overall, 67% of bass collected were less than 12 inches, 17% were from 12 to 15 in, 12% were 15 to 18 in, and 4% were larger than 18 in. Only, 46 Largemouth Bass were collected from 2.9 to 18.0 in with ages ranging from 0 to 9

years. This survey was in a follow up to a 2012 river and streams protected Black Bass slot limit from 12-15 inches (only 2 over 15 inches) and at this time data has not been compared with a similar 2014 survey.

As part of the survey protocol, Rock Bass were collected and aged with otoliths. Rock Bass were the most numerous sport fish within the river, collecting 396 individuals from 2.3 to 9.6 in and were assigned ages 0 to 7. This was considerably more Rock Bass collected than the 2014 survey when only 81 Rock Bass were collected. Catfish were also collected with 198 Channel Catfish from 10 to 29.2 inches and nine Flathead Catfish from 3.5 to 20.0 inches. In all the stretches, 10 Sauger up to 22.1 inch, nine Walleyes and one 36.5 inch Muskellunge were collected. Countless individuals in the family *Catostomidae* were observed and likely the most abundant species, but not netted.

IDNR – District 2

Matt Horsley, Assistant Fisheries Biologist

In September and October of 2018, fisheries management staff from District 2 conducted a targeted black bass survey on the St. Joseph River from the Indiana-Michigan state line north of South Bend upstream to Bristol, Indiana. Seven stations were sampled during the survey that ranged in length from 1.0 to 4.6 river miles and covered over 16 miles of the 42 mile stretch of river that flows through Elkhart and St. Joseph counties. A total of 388 Smallmouth Bass and 58 Largemouth Bass were collected during the 11.2 hours of electrofishing conducted for the survey. The catch rate for smallmouth was 35 fish per hour and 5 fish per hour for largemouth. Smallmouth ranged from 3.0 to 20.9 inches with an average length of 8.9 inches. Fifty-two percent of the total catch was ≥ 8 inches, while 28% were ≥ 12 inches. Eleven percent of the catch was ≥ 15 inches with three individuals over 20 inches. Largemouth Bass ranged in length from 3.0 to 16.8 inches and averaged 11.2 inches. Fifty-seven percent of the catch was ≥ 12 inches, while largemouth ≥ 15 inches made up of 16% of the catch. Other game fish observed during the survey included Rock Bass, Coho and Chinook Salmon,



Matt Horsley (left) and Alexander Ingersoll (right) with a few St. Joseph River Smallmouth collected during 2018 fall sampling.

IDNR – District 5**Dave Kittaka, Fisheries Biologist**

No rivers and stream sampling to report from 2018. In 2019, an angler creel survey on a 15-mile stretch of the East Fork White River in the cities of Bedford and Williams to evaluate the 2013 Black Bass Slot size-limit and the newly developed trophy catfish regulations.

IDNR – District 6**Andrew Bueltmann, Assistant Fisheries Research Biologist**

No rivers and stream sampling to report from 2018. However, assistance was provided to the IN DNR Big Rivers Unit in Fall 2018 on the Ohio River sampling for Asian Carp. In 2019, a Black Bass Survey will be conducted on the Blue River (tributary to the Ohio River).



Andy Bueltmann with Hybrid Striped Bass collected on the Ohio River.

IDNR – Sport Fishing Education**Clint R. Kowalik, Go FishIN Coordinator**

On Sept 20th and 21st of 2018, the fifth annual “Shoreline Fishing Trip down the White River” was conducted from Muncie, IN to Martinsville, IN. Go FishIN Coordinator Clint Kowalik stopped at 19 public access sites along the way to fish, take photos (posting on the Division of Fish and Wildlife (DFW) Facebook page after each site), and talk about the fish and habitat in each area while promoting public access, river fishing, urban fishing, and partners. Fish were captured at 17 of 19 sites with a total of 8 species identified. The DFW posts reached 55,600 people, getting 4,212 clicks and 641 reactions,

comments and shares—the DFW delivers a big thank you to those who helped spread the word by sharing pictures with your friends.

Duke Energy—Water Resources

Daniel Arndt, Certified Fisheries Professional

Duke Energy has been monitoring aquatic communities at five facilities (Wabash River Station, Cayuga Station, Edwardsport Station, Noblesville Station, and Dresser Station) on the Wabash and White River at various intervals since 1982. These efforts were driven in large part from requirements in the National Pollutant Discharge Elimination System (NPDES) permits at each applicable station. Specifically, Duke Energy has studied the potential effects of thermal effluent on the aquatic communities present in the Wabash and White Rivers in order to demonstrate that a Balanced and Indigenous Community of fish and aquatic macroinvertebrates exist in the vicinity of these stations. Specific objectives of these studies include: document the current species composition and relative abundance of the fish and macroinvertebrate community of the Wabash River and White River in the vicinity of Wabash River Station (WRS), Cayuga Generating Station (CGS), Edwardsport Generating Station (EDW), Noblesville Generating Station (NOB), and Dresser Station (DRS), document the changes in the spatial and temporal distribution of the fish and macroinvertebrate community, compare the results of fisheries and macroinvertebrate data with previous years, and evaluate the potential impact of these station's discharge on the diversity and density of the downstream fish and macroinvertebrate assemblages.

The fisheries sampling techniques implemented to complete the work described above are boat electrofishing, seining, quantitative macroinvertebrate sampling through the use of Hester Dendys, and qualitative macroinvertebrate sampling. Typically, this work is performed between the months of June and October but can vary based on river discharge rates and heights. At WRS and CGS, fish and macroinvertebrate samples are collected at three locations upstream of the station's heated discharge and three locations downstream of the station's heated discharge. Five locations are sampled at EDW, NOB, and DRS that consists of upstream and downstream locations. Currently, each electrofishing sampling location is 500 meters in length (except at NOB where the length is 250 meters) and seining and macroinvertebrate samples are collected within the electrofishing location or in the vicinity. At the end of the sampling season, the resultant data is compiled, verified for quality assurance, analyzed, and expressed in a report.

Fisheries sampling occurred at CGS, EDW, NOB, and DRS in 2018. Fish and macroinvertebrates were sampled at CGS while fish were the only trophic level sampled at EDW, NOB, and DRS. Sampling at EDW and NOB in 2018 provided a unique opportunity to analyze a fish community that was once affected by a thermal discharge but no longer is due to changes in operations at each station. Data collected at these stations will be compared during years of thermal impact and years of non-thermal impact to determine if significant differences exist in the fish community. These results will help researchers, regulators, and utilities better understand the impacts of thermal discharges on fish communities or lack thereof. Sampling is planned for 2019 at these stations in a manner similar to that described above.

Ball State University

Dr. Mark Pyron

Fish Assemblages in Floodplain Lakes of the lower Wabash, lower White, and lower West Fork of the White River, Indiana

Sponsor: The Nature Conservancy

Fishes were collected at nine floodplain lakes, based on accessibility for a boat electrofisher and landowner permission. Water depth profiles were captured using side-scan sonar and converted into images. We collected 1,116 fishes, in 33 species. Species richness of lakes ranged from 8-19 species per lake. Three lakes resulted in the highest species richness: Washington Lake, Ribeyr Lake, and Long Pond.



Depth profile for Mackie Lake Oxbow