Indiana Impoundments Status and Trends Summary 2016-2023

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EXECUTIVE SUMMARY

- Indiana's impoundments status and trends program was created to collect fish community, water quality and submerged aquatic vegetation data that can be tracked overtime and compared across waterbodies.

- A total of 88 impoundments were sampled from 2016-2023 following impoundments status and trends protocol.

- A total of 62,085 fish across 73 species were collected during impoundments status and trends surveys.

- Based on the Trophic State Index values for Secchi depth, 13% of impoundments are classified as hypereutrophic, 66% eutrophic, 19% mesotrophic and 2% oligotrophic.

- Submerged aquatic vegetation surveys were completed on 85 impoundments with 29 species being identified.

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INTRODUCTION

Indiana contains many man-made impoundments, which are valuable in a multitude of ways, including, flood control, water supply, endless recreational opportunities, and habitat for a wide variety of species. Recreational angling is one form of recreation on impoundments, from the 2021-2022 licensed angler survey, it was estimated around 189,000 anglers fished impoundments for 9.7 million fishing days in the state of Indiana (Indiana Department of Natural Resources 2022). Indiana currently has around 88 impoundments greater than 15 acres that are managed for fisheries with public boat access. Historically Indiana Department of Natural Resources (DNR) fisheries management efforts on these impoundments have mainly focused on popular impoundments and sportfish populations, presenting the need for a standardized community fish sampling rotation for all impoundments. By using a standardized fish sampling protocol, trends in fish populations and comparisons among waterbodies can be assessed overtime (Bonar and Hubert 2002; Hayes et al. 2003; Bonvechio et al. 2008). The goal of the DNR status and trends impoundments program is to provide information about the current condition of Indiana impoundments and track changes overtime. This program consists of fish community, water quality and submerged aquatic vegetation monitoring. This report covers the first rotation of the program from 2016-2023.

METHODS

Only impoundments greater than 15 acres with public boat access that are managed for fisheries were selected for this study.

Fish Community

Fish sampling took place between May 1 and June 15 and consisted of nighttime electrofishing, trap netting and gill netting surveys. Night-time boat-mounted pulsed-DC electrofishing was conducted in shallow water with two dip netters, which commenced no earlier than one half hour after local sunset. Electrofishing output goals should be based off conductivity and water temperature (Miranda 2009). Trap nets were set overnight and consisted of 0.5-in bar mesh and 3-ft by 6-ft frames with two funnels, a 50-ft lead anchored to shore and a DNR float attached to the frame. Experimental gill nets (250-ft x 6-ft) comprised of five 50-ft panel sections of 0.75-in, 1-in, 1.25-in, 1.5-in and 2-in square mesh sizes were set overnight in water containing at least 3 ppm oxygen and labeled on each end with DNR floats. Field crews were advised to sample a variety of habitats and to use their best professional judgment to maximize the catch of fish that most effectively provided a representative sample of the fish community. Fish sampling effort varied based on impoundment size; two gill nets, two trap nets and two 15-minute electrofishing stations

were used for impoundments less than 1,000 acres in size, four gill nets, four trap nets and four 15-minute electrofishing stations were used for impoundments greater than 1,000 acres but less than 5,000 acres and for impoundments greater than 5,000 acres four gill nets, four trap nets and eight 15-minute electrofishing stations were used. These three fish sampling methods were chosen since they tend to capture a variety of species covering the entire fish community and are the gears recommended for sampling North American freshwater fishes in small and large waters (Bonar et al. 2009). Nighttime electrofishing tends to capture black basses and a variety of other species, trap nets tend to capture sunfish and crappie species and gill nets tend to capture Walleye, Gizzard Shad and catfish species. All fish captured were identified, measured to the nearest tenth of an inch and weighted to the hundredth of a pound before being released back into the impoundment.

Impoundments were also ranked in four different categories based on fish sampling results: Action Fishing, Big Bass, Big Sunfish and Bowfishing. Action Fishing rankings are based on an impoundment's relative abundance of Bluegill and Redear Sunfish (≥ 6 in), Largemouth Bass and Smallmouth Bass (≥ 8 in), Channel Catfish (≥ 12 in) and Black Crappie and White Crappie (≥ 7 in). Big Bass rankings are based on relative abundance of Largemouth Bass and Smallmouth Bass ≥ 18 in, Big Sunfish rankings are based on relative abundance of Bluegill and Redear Sunfish ≥ 8in and Bowfishing rankings are based on the relative abundance of Common Carp, gar species and buffalo species. Percentile ranks were used to score impoundments and assign one of four ratings, poor (0-24%), fair (25-49%), good (50-74%) and excellent (75-100%). For the Action Fishing rankings, impoundments were given point values for each rating (poor-0, fair-1, good-2, excellent-3) and points were totaled to determine the final rankings with a maximum score of 12.

Water Quality

Water quality sampling took place prior to fish sampling between May 1 and June 15. Water quality sampling took place in the deepest area of each impoundment or section of impoundment. For impoundments less than 5,000 acres one complete sample was taken and for impoundments greater than 5,000 acres two complete samples were taken. Sampling consisted of a temperature/dissolved oxygen profile and conductivity, pH, alkalinity and Secchi disk readings.

Secchi depth measurements were the only water quality metric analyzed in this report and were used to classify impoundments' trophic state using the Secchi depth Trophic State Index (TSI) from Carlson (1997). Impoundment were classified as hypereutrophic for TSI values ≥70, eutrophic for values of 50-69, mesotrophic for values of 40-49 and oligotrophic for values <40 (Carlson 1977).

Habitat

Submerged aquatic vegetation surveys and lake mapping took place between July 15 and

August 31. Mapping was done based on fisheries biologist discretion and vegetation surveys followed Tier II sampling guidelines (Indiana Division of Fish and Wildlife 2018).

RESULTS

A total of 88 impoundments were sampled from 2016-2023, no sampling took place during 2020 due to COVID-19 guidelines (Table 1). Additional sampling effort was done on Cagle's Mill, Hardy, Province and Summit (Table 1). J.C Murphey Lake was not sampled during this rotation due to an full lake renovation.

Fish Community

Overall, a total of 62,085 fish were collected across 73 species, with Bluegill being the most abundant (19,727) and in the most impoundments (87) (Table 2). Of the 73 fish species sampled, three are considered invasive: Common Carp (46 impoundments), Goldfish (three impoundments) and Round Goby (one impoundment). Two undesirable species, Gizzard Shad and Yellow Bass were also collected in 50 and 19 impoundments, respectively. Species richness varied from five (Schlamm) to 28 (Freeman) and averaged 12.9 species (sd = 5.8, N = 88) (Table 3). Electrofishing surveys collected 37,835 fish across 69 species, trap nets collected 12,216 fish across 39 species and gill nets captured 12,031 fish across 52 species (Table 4).

Geist was the top ranked impoundment for Action Fishing rankings with a score of 11, followed by Bischoff, Griffy and Westwood Run with scores of 10 (Table 5). Pisgah, Brush Creek and Green Valley were the top three for Big Bass rankings, for Big Sunfish rankings Indian, Palestine and Tipsaw were the top three impoundments and Huntington (Roush), Cypress and Salinda were the top three for Bowfishing rankings (Table 6).

Water Quality

Secchi depths ranged from 0.4 – 16.5 ft and averaged 4.9 ft (sd = 3.4, N = 87). No Secchi depth was recorded for Salinda. Out of the 87 impoundments, 11 were classified as hypereutrophic, 57 eutrophic, 17 mesotrophic and two oligotrophic based Secchi depth TSI values (Table 7).

Habitat

Submersed aquatic vegetation surveys were completed on 85 impoundments. No surveys were completed on Decatur Co Park, Patoka, and Troxel. Coverage of submersed aquatic vegetation ranged from 0-100% and averaged 43.5% (sd = 34.3, N = 85) (Table 8). Number of species per survey ranged from 0-16 with an average of 4 (sd = 3.0, N = 85) (Table 8). A total of 29 submerged aquatic plant species were identified throughout all surveys with Coontail (56

impoundments), Eurasian watermilfoil (36 impoundments), Chara (30 impoundments), and Southern naiad (30 impoundments) being the most common (Table 9). Three invasive plant species were detected: Brittle naiad (30 impoundments), Curly-leaf pondweed (15 impoundments) and Eurasian watermilfoil (36 impoundments impoundments) (Table 9). Additionally, a total of 51 impoundments were mapped and the bathymetric maps can be seen online on Indiana's where to fish interactive map (https://www.in.gov/dnr/fish-and-wildlife/fishing/where-to-fish-interactive-map/).

DISCUSSION

Bluegill and Largemouth Bass were two of the most abundant species sampled and the top two for presence in impoundments. This isn't surprising since Bluegill and Largemouth Bass are common throughout the state and are found in most waterbodies. As expected, different sampling gears tended to collect different species. Electrofishing tended to capture Bluegill, Gizzard Shad and Largemouth Bass, gill nets tended to capture Gizzard Shad, Channel Catfish and Yellow Bass and trap nets mainly captured sunfish species and crappie species. The use of multiple gears is also important for collecting stocked gamefish species such as Walleye, Saugeye, Striped Bass and Hybrid Striped Bass.

Eleven status and trends impoundments are stocked with Walleye (Brookville, Cagle's Mill, Eagle Creek, Kokomo, Freeman, Shafer, Mississinewa, Monroe, Patoka, Prairie Creek, Summit) and Freeman and Monroe were the only impoundments they were not detected in. Walleye were detected in Harden and Hardy, two impoundment that were stocked historically, meaning remnant populations with low natural recruitment may be found in these two impoundments. Interestingly, one Walleye was collected in Westwood Run, an impoundment that has never been stocked with Walleye. Walleye were also sampled in Hurshtown, where Walleye were previously stocked and are thought to have a naturally reproducing population. Saugeye were detected in both impoundments that they were stocked in, Sullivan and Huntingburg City. Striped Bass were only collected in Patoka, but are also stocked in Brookville, Harden and Hardy. Hybrid Striped Bass were sampled in six out seven impoundments (Freeman, Hardy, Monroe, Patoka, Shadyside, Shafer, Worster) they are stocked in, with Patoka being the only one they were not sampled in. Overall, detecting stocked species is another valuable bonus of the impoundment's status and trends program and can help managers make decisions on if additional surveys need to be done.

Three invasive fish species were detected throughout the impoundments sampled, these species were Common Carp, Goldfish and Round Goby. These species are a concern because their ability to modify habitats and negatively affect aquatic communities (Bajer and Sorensen 2015; Brooking et al. 2022). Gizzard Shad and Yellow Bass were also collected, two species which may

be undesirable in certain waterbodies due to becoming overpopulated and causing cascading negative effects to the fishery (Aday et al. 2003; Meerbeek 2022). Future surveys will be able to monitor the distribution and abundance of these invasive and undesirable fishes and help determine if management actions are needed.

Species richness was highest in Lake Freeman and Lake Shafer, two run of the river impoundments on the Tippecanoe River. The presence of riverine species in these two impoundments likely lead to the high species richness, similar to what is seen for Indiana glacial lakes (Linn 2022). Larger impoundments generally had higher species richness as well. Impoundments with low species richness were likely killed off when constructed and restocked with only certain species.

Action Fishing rankings are great way for managers to inform anglers about impoundments with a high density of catchable fish which is great for families and beginner anglers. Big Bass, Big Sunfish and Bowfishing rankings are useful for anglers targeting specific species or looking for quality sizes.

Based on TSI (Secchi Depth) values, 78% of impoundments included in this study were classified as either eutrophic or hypereutrophic. However, those values may be an overestimate since sediment runoff is common in Indiana impoundments and Secchi Depth readings are influenced by non-algae turbidity (Laney et al. 2019). Never less, TSI (Secchi Depth) values are a useful way to measure changes in the trophic state of Indiana impoundments overtime.

For impoundments, the most common native plant species was Coontail and the most common invasive plant species was Eurasian watermilfoil, which is the same as what was found for Indiana glacial lakes (Linn 2020). Impoundments tended to have less submersed aquatic plant species and coverage when compared to Indiana glacial lakes. This isn’t surprising since impoundments often have fluctuations in water levels and low water clarity, two things that can limit aquatic plant growth. Future surveys will help determine changes in submerged aquatic vegetation coverage and species distribution.

It is recommended that Bass Pond (Kosciusko County) be removed from the impoundment status and trends rotation due to shallow depth, few desirable fish species present and being primarily managed as a waterfowl pond. It is also recommended that effort for Hardy Lake (Scott), Huntington Lake (Huntington) and Summit Lake (Henry) increase to four electrofishing stations, four gill net sets and four trap net sets. The increase in effort for these four impoundments is based off preliminary results of electrofishing resampling analysis (Koch et al. 2014) (estimated amount of effort to reach 100 individuals of certain species) indicating possible under sampling for impoundments around 700 to 1,000 acres. Complete resampling analysis results should be

constructed following the next round of status and trends rotation when analyses aren't based off one rotation.

Overall, this first rotation of status and trends impoundments will be used as baseline data and be compared to future status and trends surveys.

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Table 1. List of waterbodies sampled during impoundments status and trends. Sampling effort is shown for electrofishing (EF; number of 15-minute stations), gill netting (GN; number of gill net lifts) and trap netting (TN; number of trap net lifts).

Waterbody	County	Acres	EF	GN	TN	Year
Bass Pond	Kosciusko	17	2	2	2	2016
Beaver Dam	Dubois	178	2	2	2	2017
Bischoff	Ripley	181	2	2	2	2022
Brookville	Franklin	5,260	8	4	4	2022
Brush Creek	Jennings	167	2	2	2	2018
Buffalo Trace	Harrison	29	2	2	2	2018
Cagle's Mill	Owen	1,400	8	8	8	2021
Cedarville	Allen	245	2	2	2	2017
Celina	Perry	140	2	2	2	2017
Chrisney	Spencer	18	2	2	2	2018
Cypress	Jackson	37	2	2	2	2019
Deam	Clark	184	2	2	2	2016
Decatur Co Park	Decatur	15	2	2	2	2016
Delaney Park	Washington	76	2	2	2	2016
Dogwood	Daviess	1,237	4	4	4	2016
Eagle Creek	Marion	1,350	4	4	4	2019
Elk Creek	Washington	43	2	2	2	2016
Ferdinand City Old	Dubois	16	2	2	2	2018
Ferdinand State Forest	Dubois	38	2	2	2	2021
Freeman	Carroll	1,547	4	4	4	2021
Geist	Hamilton	1,890	4	4	4	2017
George (Hobart)	Lake	270	2	2	2	2019
Glenn Flint	Putnam	330	2	2	2	2018
Goldeneye	Kosciusko	26	2	2	2	2019
Green Valley	Vigo	51	2	2	2	2016
Griffy	Monroe	109	2	2	2	2019
Grouse Ridge	Bartholomew	25	2	2	2	2023
Harden	Parke	2,060	4	4	4	2017
Hardy	Scott	749	4	2	4	2022
Huntingburg City	Dubois	151	2	2	2	2021
Huntington (Roush)	Huntington	900	2	2	2	2018
Hurshtown	Allen	260	2	2	2	2018
Indian	Perry	131	2	2	2	2018
John Hay	Washington	205	2	2	2	2021
Kickapoo	Sullivan	253	2	2	2	2017
Kokomo	Howard	484	2	2	2	2019
Lemon	Monroe	1,650	4	4	4	2021
Lenape	Sullivan	58	2	2	2	2017
Lincoln	Spencer	57	2	2	2	2016
Middlefork	Wayne	189	2	2	2	2018
Mississinewa	Miami	3,180	4	4	4	2016
Mollenkramer	Ripley	33	2	2	2	2022
Monroe	Monroe	10,603	8	4	4	2022
Montgomery City	Vigo	25	2	2	2	2017

Table 1. Continued.

Waterbody (Cont.)	County	Acres	EF	GN	TN	Year
Morse	Hamilton	1,500	4	4	4	2019
New Holland	Dubois	15	2	2	2	2019
New Oakland City	Gibson	77	2	2	2	2019
Ogle	Brown	20	2	2	2	2017
Old Holland	Dubois	19	2	2	2	2019
Old Timbers	Ripley	100	2	2	2	2019
Palestine	Kosciusko	290	2	2	2	2021
Patoka	Orange	8,706	8	4	4	2019
Pisgah	Johnson	47	2	2	2	2017
Prairie Creek	Delaware	1,187	4	4	4	2018
Prides Creek	Pike	90	2	2	2	2021
Province	Henry	57	3	2	5	2021
Reservoir 26	Sullivan	42	2	2	2	2018
Robinson Park	Lake	16	2	2	2	2016
Rockville	Parke	104	2	2	2	2019
Rosser Park	Lake	35	2	2	2	2018
Ruble	Vigo	22	2	2	2	2018
Saddle	Perry	37	2	2	2	2017
Salamonie	Huntington	2,860	4	4	4	2021
Salinda	Washington	67	2	2	2	2017
Sandpiper/Plover	Johnson	84	2	2	2	2016
Scales	Warrick	60	2	2	2	2016
Schlamm	Clark	18	2	2	2	2022
Scottsburg	Scott	90	2	2	2	2022
Shadyside	Madison	20	2	2	2	2018
Shafer	White	1,291	4	4	4	2017
Shakamak	Sullivan	52	2	2	2	2016
Spring Mill	Lawrence	26	2	2	2	2021
Springs Valley	Orange	141	2	2	2	2018
Spurgeon Hollow	Washington	26	2	2	2	2021
Starve Hollow	Jackson	131	2	2	2	2021
Stone Arch	Johnson	18	2	2	2	2016
Sullivan	Sullivan	471	2	2	2	2017
Summit	Henry	835	4	4	4	2016
Tipsaw	Perry	131	2	2	2	2017
Troxel	Lagrange	72	2	2	2	2021
Versailles	Ripley	204	2	2	2	2018
Waveland	Montgomery	355	2	2	2	2016
West Boggs	Daviess	620	2	2	2	2019
Westwood Run	Henry	163	2	2	2	2022
Whak-Shin-Gah	Huntington	28	2	2	2	2022
Whitewater	Union	183	2	2	2	2017
Worster (Potato Creek)	St. Joseph	327	2	2	2	2016
Yellowwood	Brown	131	2	2	2	2019

Table 2. Total number of each fish species collected and percentage of impoundments each fish species was collected in. * indicates invasive species.

Species	Total Collected	Percent of Impoundments
Bigmouth Buffalo	20	5%
Black Buffalo	2	2%
Black Bullhead	15	11%
Black Crappie	2,079	89%
Black Redhorse	11	3%
Blackstripe Topminnow	9	5%
Bluegill	19,727	99%
Bluntnose Minnow	17	7%
Brook Silverside	211	18%
Brown Bullhead	429	26%
Bullhead Minnow	40	2%
Central Mudminnow	28	2%
Channel Catfish	1,698	76%
Chestnut Lamprey	6	5%
Common Carp*	706	52%
Common Shiner	3	2%
Emerald Bowfin	9	6%
Emerald Shiner	41	2%
Flathead Catfish	57	19%
Freshwater Drum	203	11%
Ghost Shiner	1	1%
Gizzard Shad	14,946	57%
Golden Redhorse	168	17%
Golden Shiner	641	36%
Goldfish*	34	3%
Green Sunfish	470	42%
Highfin Carpsucker	54	3%
Hybrid Striped Bass	54	7%
Hybrid Sunfish	58	24%
Johnny Darter	1	1%
Lake Chubsucker	290	5%
Largemouth Bass	5,038	98%
Logperch	80	16%
Longear Sunfish	1,070	41%
Longnose Gar	9	3%
Mimic Shiner	2	1%
Muskellunge	3	1%

Species (Cont.)	Total Collected	Percent of Impoundments
Northern Hogsucker	2	2%
Northern Pike	1	1%
Orangespotted Sunfish	58	7%
Pumpkinseed	516	14%
Quillback	324	18%
Rainbow Trout	1	1%
Redear Sunfish	3,540	81%
Redfin Pickerel	55	8%
River Carpsucker	47	5%
River Redhorse	1	1%
Rock Bass	36	6%
Rosyface Shiner	5	1%
Round Goby*	4	1%
Sand Shiner	12	3%
Sauger	6	2%
Saugeye	40	2%
Shortnose Gar	6	2%
Silver Redhorse	4	2%
Slenderhead Darter	1	1%
Smallmouth Bass	203	10%
Smallmouth Buffalo	19	3%
Spotfin Shiner	188	11%
Spotted Bass	46	3%
Spotted Gar	17	3%
Spotted Sucker	256	22%
Spotted Sunfish	2	1%
Steelcolor Shiner	11	2%
Striped Bass	1	1%
Walleye	135	15%
Warmouth	800	63%
White Bass	303	14%
White Crappie	3,283	51%
White Sucker	295	25%
Yellow Bass	2,550	22%
Yellow Bullhead	450	61%
Yellow Perch	635	17%

Table 3. Fish species richness by impoundment.

Waterbody	Species
Freeman	28
Shafer	27
Cypress	26
Eagle Creek	26
Huntington (Roush)	25
Morse	25
Lemon	24
Mississinewa	24
Cagle's Mill	23
Brookville	22
Monroe	22
Patoka	21
Harden	20
Sandpiper/Plover	20
Salamonie	19
Cedarville	18
Geist	18
George (Hobart)	18
Versailles	18
Kokomo	17
Shadyside	17
Worster (Potato Creek)	17
Brush Creek	16
Hardy	16
Prairie Creek	16
Rosser Park	16
Spring Mill	15
Glenn Flint	14
Middlefork	14
Palestine	14
Dogwood	13
Huntingburg City	13
Yellowwood	13
Deam	12
Griffy	12
Hurshtown	12
Robinson Park	12
Sullivan	12
Summit	12
Whitewater	12
Bischoff	11
Delaney Park	11
Mollenkramer	11
Salinda	11

Waterbody (Cont.)	Species
Scottsburg	11
Troxel	11
Beaver Dam	10
Green Valley	10
Indian	10
Montgomery City	10
Pisgah	10
Ruble	10
Shakamak	10
Starve Hollow	10
Whak-Shin-Gah	10
Decatur Co Park	9
Elk Creek	9
Ferdinand City Old	9
Goldeneye	9
Kickapoo	9
Lincoln	9
Old Timbers	9
Saddle	9
Springs Valley	9
Waveland	9
West Boggs	9
Westwood Run	9
Buffalo Trace	8
New Holland	8
New Oakland City	8
Prides Creek	8
Reservoir 26	8
Rockville	8
Stone Arch	8
Bass Pond	7
Celina	7
Chrisney	7
Ferdinand State Forest	7
Grouse Ridge	7
John Hay	7
Lenape	7
Ogle	7
Old Holland	7
Spurgeon Hollow	7
Tipsaw	7
Province	6
Scales	6
Schlamm	5

Table 4. Number of each species collected by the different gear types. EF = electrofishing. GN = gill net. TN = trap net. * Indicates invasive species.

Species	EF	GN	TN
Bigmouth Buffalo	19	0	0
Black Buffalo	2	0	0
Black Bullhead	2	8	5
Black Crappie	294	682	1,103
Black Redhorse	9	2	0
Blackstripe Topminnow	9	0	0
Bluegill	13,990	585	5,152
Bluntnose Minnow	17	0	0
Brook Silverside	211	0	0
Brown Bullhead	74	98	257
Bullhead Minnow	40	0	0
Central Mudminnow	28	0	0
Channel Catfish	181	1,470	47
Chestnut Lamprey	3	1	2
Common Carp*	368	273	65
Common Shiner	0	0	3
Emerald Bowfin	6	3	0
Emerald Shiner	41	0	0
Flathead Catfish	48	7	2
Freshwater Drum	97	101	5
Ghost Shiner	1	0	0
Gizzard Shad	10,180	4,018	748
Golden Redhorse	120	37	11
Golden Shiner	115	448	78
Goldfish*	34	0	0
Green Sunfish	427	28	15
Highfin Carpsucker	7	47	0
Hybrid Striped Bass	6	48	0
Hybrid Sunfish	21	5	32
Johnny Darter	1	0	0
Lake Chubsucker	181	91	18
Largemouth Bass	4,817	197	24
Logperch	80	0	0
Longear Sunfish	1,030	11	29
Longnose Gar	2	6	1
Mimic Shiner	2	0	0
Muskellunge	2	1	0

Species (Cont.)	EF	GN	TN
Northern Hogsucker	2	0	0
Northern Pike	0	1	0
Orangespotted Sunfish	45	2	11
Pumpkinseed	248	45	223
Quillback	85	224	15
Rainbow Trout	0	1	0
Redear Sunfish	1,557	329	1,654
Redfin Pickerel	33	17	5
River Carpsucker	23	24	0
River Redhorse	1	0	0
Rock Bass	15	3	18
Rosyface Shiner	5	0	0
Round Goby*	4	0	0
Sand Shiner	12	0	0
Sauger	2	4	0
Saugeye	2	38	0
Shortnose Gar	0	6	0
Silver Redhorse	1	3	0
Slenderhead Darter	1	0	0
Smallmouth Bass	198	3	2
Smallmouth Buffalo	11	8	0
Spotfin Shiner	158	0	30
Spotted Bass	38	6	2
Spotted Gar	5	5	7
Spotted Sucker	153	88	15
Spotted Sunfish	2	0	0
Steelcolor Shiner	0	0	9
Striped Bass	0	2	0
Walleye	43	90	2
Warmouth	464	161	175
White Bass	94	206	3
White Crappie	399	764	2,120
White Sucker	38	247	10
Yellow Bass	1,260	1,060	230
Yellow Bullhead	90	304	56
Yellow Perch	380	223	32

Table 5. Action Fishing ranking for impoundments. Sunfish (Bluegill and Redear Sunfish), Bass (Largemouth Bass and Smallmouth Bass), Catfish (Channel Catfish), Crappie (Black Crappie and White Crappie).

Waterbody	Sunfish ≥6in	Bass ≥8in	Catfish ≥12in	Crappie ≥7in	Total Score
Geist	Excellent	Excellent	Excellent	Good	11
Bischoff	Excellent	Good	Good	Excellent	10
Griffy	Good	Excellent	Excellent	Good	10
Westwood Run	Excellent	Excellent	Excellent	Fair	10
Huntingburg City	Fair	Good	Excellent	Excellent	9
Kokomo	Good	Good	Good	Excellent	9
Lemon	Good	Good	Good	Excellent	9
Lincoln	Excellent	Excellent	Excellent	Poor	9
Rockville	Excellent	Excellent	Fair	Good	9
Sullivan	Excellent	Fair	Good	Excellent	9
Waveland	Excellent	Good	Fair	Excellent	9
Yellowwood	Good	Good	Excellent	Good	9
Beaver Dam	Good	Good	Fair	Excellent	8
Brookville	Fair	Fair	Excellent	Excellent	8
Buffalo Trace	Fair	Excellent	Good	Good	8
Cedarville	Fair	Fair	Excellent	Excellent	8
Eagle Creek	Fair	Fair	Excellent	Excellent	8
Ferdinand State Forest	Good	Excellent	Fair	Good	8
Glenn Flint	Fair	Fair	Excellent	Excellent	8
Green Valley	Good	Excellent	Fair	Good	8
Middlefork	Good	Poor	Excellent	Excellent	8
Monroe	Fair	Fair	Excellent	Excellent	8
Morse	Excellent	Poor	Excellent	Good	8
Sandpiper/Plover	Excellent	Fair	Good	Good	8
Starve Hollow	Excellent	Excellent	Poor	Good	8
Whitewater	Excellent	Good	Good	Fair	8
Brush Creek	Good	Good	Poor	Excellent	7
Mollenkramer	Excellent	Poor	Fair	Excellent	7
Pisgah	Fair	Excellent	Good	Fair	7
Prides Creek	Fair	Excellent	Excellent	Poor	7
Salinda	Fair	Fair	Good	Excellent	7
Scottsburg	Good	Excellent	Fair	Fair	7
West Boggs	Fair	Excellent	Good	Fair	7
Cagle's Mill	Poor	Poor	Excellent	Excellent	6
Chrisney	Excellent	Fair	Good	Poor	6
Deam	Good	Good	Good	Poor	6
Decatur Co Park	Excellent	Poor	Fair	Good	6
Dogwood	Good	Excellent	Fair	Poor	6
Elk Creek	Good	Excellent	Fair	Poor	6
Freeman	Fair	Poor	Excellent	Good	6
Hardy	Good	Fair	Good	Fair	6
Huntington (Roush)	Poor	Poor	Excellent	Excellent	6
Kickapoo	Fair	Excellent	Poor	Good	6
Mississinewa	Poor	Poor	Excellent	Excellent	6

Table 5. Continued.

Waterbody (Cont.)	Sunfish ≥6in	Bass ≥8in	Catfish ≥12in	Crappie ≥7in	Total Score
New Oakland City	Good	Excellent	Poor	Fair	6
Old Holland	Excellent	Good	Poor	Fair	6
Palestine	Excellent	Fair	Poor	Good	6
Saddle	Good	Fair	Excellent	Poor	6
Stone Arch	Fair	Good	Fair	Good	6
Troxel	Excellent	Excellent	Poor	Poor	6
Versailles	Poor	Poor	Excellent	Excellent	6
Harden	Poor	Poor	Excellent	Good	5
Hurshtown	Poor	Good	Fair	Good	5
Indian	Excellent	Fair	Poor	Fair	5
John Hay	Good	Excellent	Poor	Poor	5
Lenape	Good	Good	Poor	Fair	5
New Holland	Excellent	Good	Poor	Poor	5
Ogle	Good	Good	Fair	Poor	5
Prairie Creek	Poor	Poor	Good	Excellent	5
Salamonie	Poor	Poor	Good	Excellent	5
Shafer	Poor	Poor	Excellent	Good	5
Tipsaw	Excellent	Good	Poor	Poor	5
Whak-Shin-Gah	Excellent	Poor	Poor	Good	5
Celina	Good	Good	Poor	Poor	4
Delaney Park	Fair	Fair	Fair	Fair	4
George (Hobart)	Fair	Poor	Fair	Good	4
Montgomery City	Poor	Good	Fair	Fair	4
Old Timbers	Fair	Excellent	Poor	Poor	4
Patoka	Poor	Poor	Good	Good	4
Ruble	Poor	Good	Fair	Fair	4
Shakamak	Poor	Excellent	Fair	Poor	4
Springs Valley	Excellent	Poor	Fair	Poor	4
Spurgeon Hollow	Good	Fair	Fair	Poor	4
Cypress	Poor	Poor	Good	Fair	3
Grouse Ridge	Good	Poor	Fair	Poor	3
Province	Fair	Poor	Good	Poor	3
Robinson Park	Poor	Fair	Fair	Fair	3
Scales	Poor	Excellent	Poor	Poor	3
Schlamm	Poor	Poor	Good	Fair	3
Shadyside	Poor	Good	Poor	Fair	3
Spring Mill	Fair	Fair	Fair	Poor	3
Worster (Potato Creek)	Fair	Good	Poor	Poor	3
Bass Pond	Poor	Poor	Poor	Good	2
Ferdinand City Old	Fair	Fair	Poor	Poor	2
Reservoir 26	Fair	Poor	Poor	Fair	2
Rosser Park	Poor	Poor	Fair	Fair	2
Summit	Poor	Fair	Fair	Poor	2
Goldeneye	Poor	Fair	Poor	Poor	1

Table 6. Impoundments rankings for the Big Bass (Largemouth Bass and Smallmouth Bass ≥ 18in), Big Sunfish (Bluegill and Redear Sunfish ≥ 8in) and Bowfishing (Common Carp, Gar species and Buffalo species) categories.

Waterbody	Big Bass	Big Sunfish	Bow-fishing
Bass Pond	Poor	Poor	Poor
Beaver Dam	Excellent	Good	Poor
Bischoff	Poor	Excellent	Poor
Brookville	Good	Fair	Excellent
Brush Creek	Excellent	Fair	Excellent
Buffalo Trace	Poor	Good	Excellent
Cagle's Mill	Fair	Poor	Excellent
Cedarville	Poor	Poor	Excellent
Celina	Poor	Excellent	Poor
Chrisney	Poor	Good	Poor
Cypress	Poor	Poor	Excellent
Deam	Poor	Excellent	Poor
Decatur Co Park	Fair	Good	Good
Delaney Park	Poor	Good	Poor
Dogwood	Good	Excellent	Poor
Eagle Creek	Good	Poor	Excellent
Elk Creek	Good	Excellent	Poor
Ferdinand Old	Fair	Good	Poor
Ferdinand State Forest	Fair	Excellent	Poor
Freeman	Poor	Fair	Good
Geist	Excellent	Good	Good
George (Hobart)	Fair	Poor	Good
Glenn Flint	Good	Poor	Excellent
Goldeneye	Fair	Poor	Poor
Green Valley	Excellent	Good	Poor
Griffy	Good	Fair	Good
Grouse Ridge	Poor	Excellent	Poor
Harden	Good	Poor	Excellent
Hardy	Poor	Good	Fair
Huntingburg City	Good	Fair	Excellent
Huntington (Roush)	Poor	Poor	Excellent
Hurshtown	Poor	Poor	Excellent
Indian	Poor	Excellent	Poor
John Hay	Excellent	Excellent	Fair
Kickapoo	Poor	Good	Poor
Kokomo	Fair	Poor	Excellent
Lemon	Fair	Good	Good
Lenape	Poor	Excellent	Poor
Lincoln	Fair	Good	Poor
Middle Fork	Excellent	Poor	Good
Mississinewa	Poor	Poor	Excellent
Mollenkramer	Good	Excellent	Poor
Monroe	Excellent	Poor	Good
Montgomery City	Poor	Good	Fair

Waterbody (Cont.)	Big Bass	Big Sunfish	Bow-fishing
Morse	Fair	Poor	Excellent
New Holland	Good	Excellent	Poor
New Oakland City	Poor	Good	Poor
Ogle	Poor	Excellent	Poor
Old Holland	Good	Good	Poor
Old Timbers	Poor	Excellent	Poor
Palestine	Excellent	Excellent	Fair
Patoka	Fair	Poor	Excellent
Pisgah	Excellent	Fair	Poor
Prairie Creek	Fair	Fair	Excellent
Prides Creek	Fair	Good	Good
Province	Good	Fair	Poor
Reservoir 26	Poor	Poor	Poor
Robinson Park	Poor	Fair	Good
Rockville	Good	Excellent	Fair
Rosser	Good	Poor	Good
Ruble	Poor	Fair	Good
Saddle	Poor	Good	Poor
Salamonie	Fair	Poor	Excellent
Salinda	Excellent	Poor	Excellent
Sandpiper/Plover	Fair	Good	Fair
Scales	Excellent	Good	Poor
Schlamm	Poor	Poor	Poor
Scottsburg	Fair	Fair	Good
Shadyside	Fair	Fair	Good
Shafer	Fair	Fair	Good
Shakamak	Fair	Fair	Poor
Spring Mill	Poor	Fair	Good
Springs Valley	Poor	Excellent	Poor
Spurgeon Hollow	Good	Fair	Poor
Starve Hollow	Poor	Excellent	Poor
Stone Arch	Poor	Fair	Poor
Sullivan	Good	Fair	Excellent
Summit	Poor	Fair	Good
Tipsaw	Poor	Excellent	Poor
Troxel	Good	Fair	Poor
Versailles	Good	Poor	Excellent
Waveland	Excellent	Good	Poor
West Boggs	Poor	Good	Good
Westwood Run	Excellent	Fair	Good
Whak-Shin-Gah	Excellent	Fair	Poor
Whitewater	Excellent	Excellent	Excellent
Worster (Potato Creek)	Poor	Fair	Fair
Yellowwood	Good	Good	Fair

Table 7. Secchi depth, TSI (SD) values and trophic classification by waterbody.

Waterbody	Secchi Depth (ft)	TSI (SD)	Trophic Classification
Bass Pond	4.4	56	Eutrophic
Beaver Dam	3.2	60	Eutrophic
Bischooff	1.2	74	Hypereutrophic
Brookville	10	44	Mesotrophic
Brush Creek	2.6	63	Eutrophic
Buffalo Trace	3	61	Eutrophic
Cagle's Mill	4	57	Eutrophic
Cedarville	0.4	90	Hypereutrophic
Celina	6.3	51	Eutrophic
Chrisney	5.8	52	Eutrophic
Cypress	1.3	73	Hypereutrophic
Deam	5.4	53	Eutrophic
Decatur Co Park	1.4	72	Hypereutrophic
Delaney Park	8.8	46	Mesotrophic
Dogwood	8.1	47	Mesotrophic
Eagle Creek	3.1	61	Eutrophic
Elk Creek	11.3	42	Mesotrophic
Ferdinand City Old	6.3	51	Eutrophic
Ferdinand SF	3	61	Eutrophic
Freeman	2.5	64	Eutrophic
Geist	2.4	65	Eutrophic
George (Hobart)	1	77	Hypereutrophic
Glenn Flint	5	54	Eutrophic
Goldeneye	12	41	Mesotrophic
Green Valley	3	61	Eutrophic
Griffy	6	51	Eutrophic
Grouse Ridge	12	41	Mesotrophic
Harden	3.4	59	Eutrophic
Hardy	4.5	55	Eutrophic
Huntinburg City	4	57	Eutrophic
Huntington (Roush)	3	61	Eutrophic
Hurshtown	3	61	Eutrophic
Indian	6.4	50	Eutrophic
John Hay	15	38	Oligotrophic
Kickapoo	5.4	53	Eutrophic
Kokomo	1.5	71	Hypereutrophic
Lemon	3.3	60	Eutrophic
Lenape	6	51	Eutrophic
Lincoln	5.1	54	Eutrophic
Middlefork	2.7	63	Eutrophic
Mississinewa	2	67	Eutrophic
Mollenkramer	1	77	Hypereutrophic
Monroe	4.8	55	Eutrophic
Montgomery City	7.1	49	Mesotrophic

Waterbody (Cont.)	Secchi Depth (ft)	TSI (SD)	Trophic Classification
Morse	3.8	58	Eutrophic
New Holland	3	61	Eutrophic
New Oakland City	11	43	Mesotrophic
Ogle	8.8	46	Mesotrophic
Old Holland	2	67	Eutrophic
Old Timbers	4	57	Eutrophic
Palestine	6.5	50	Eutrophic
Patoka	5.5	53	Eutrophic
Pisgah	3.4	59	Eutrophic
Prairie Creek	12.2	41	Mesotrophic
Prides Creek	3.5	59	Eutrophic
Province	2.5	64	Eutrophic
Reservoir 26	2.1	66	Eutrophic
Robinson Park	2.3	65	Eutrophic
Rockville	4	57	Eutrophic
Rosser Park	4.4	56	Eutrophic
Ruble	5	54	Eutrophic
Saddle	0.4	90	Hypereutrophic
Salamonie	2	67	Eutrophic
Salinda	-	-	-
Sandpiper/Plover	2.5	64	Eutrophic
Scales	7.7	48	Mesotrophic
Schlamm	5.3	53	Eutrophic
Scottsburg	4	57	Eutrophic
Shadyside	4	57	Eutrophic
Shafer	0.6	84	Hypereutrophic
Shakamak	7	49	Mesotrophic
Spring Mill	3.4	59	Eutrophic
Springs Valley	13.3	40	Mesotrophic
Spurgeon Hollow	7	49	Mesotrophic
Starve Hollow	8.2	47	Mesotrophic
Stone Arch	7	49	Mesotrophic
Sullivan	1	77	Hypereutrophic
Summit	16.5	37	Oligotrophic
Tipsaw	4.5	55	Eutrophic
Troxel	6.5	50	Eutrophic
Versailles	1	77	Hypereutrophic
Wahk-Shin-Gah	2.5	64	Eutrophic
Waveland	2	67	Eutrophic
West Boggs	3.4	59	Eutrophic
Westwood Run	8	47	Mesotrophic
Whitewater	4	57	Eutrophic
Worster (Potato Cr)	3.3	60	Eutrophic
Yellowwood	4.2	56	Eutrophic

Table 8. Percent coverage of submersed aquatic vegetation and number of submersed aquatic plant species per impoundment. No submersed aquatic vegetation surveys were completed on Decatur Co Park, Patoka, and Troxel.

Waterbody	Coverage	Species
Bass Pond	100%	5
Beaver Dam	28%	3
Bischoff	30%	3
Brookville	12%	2
Brush Creek	0%	0
Buffalo Trace	97%	4
Cagle's Mill	0%	0
Cedarville	2%	1
Celina	96%	8
Chrisney	70%	7
Cypress	0%	0
Deam	30%	5
Delaney Park	66%	6
Dogwood	98%	7
Eagle Creek	0%	0
Elk Creek	90%	6
Ferdinand City Old	43%	6
Ferdinand State Forest	45%	3
Freeman	2%	2
Geist	47%	7
George (Hobart)	12%	2
Glenn Flint	6%	2
Goldeneye	97%	5
Green Valley	63%	3
Griffy	35%	4
Grouse Ridge	80%	4
Harden	0%	0
Hardy	22%	5
Huntingburg City	16%	2
Huntington (Roush)	0%	0
Hurshtown	10%	3
Indian	52%	5
John Hay	91%	9
Kickapoo	83%	10
Kokomo	1%	1
Lemon	30%	6
Lenape	49%	5
Lincoln	88%	7
Middlefork	4%	2
Mississinewa	1%	1
Mollenkramer	7%	2
Monroe	29%	6
Montgomery City	29%	5

Waterbody (Cont.)	Coverage	Species
Morse	0%	0
New Holland	10%	3
New Oakland City	93%	5
Ogle	40%	5
Old Holland	20%	3
Old Timbers	46%	3
Palestine	55%	2
Pisgah	73%	2
Prairie Creek	30%	8
Prides Creek	48%	4
Province	100%	4
Reservoir 26	47%	4
Robinson Park	100%	7
Rockville	4%	1
Rosser Park	87%	10
Ruble	63%	5
Saddle	40%	3
Salamonie	0%	0
Salinda	0%	0
Sandpiper/Plover	30%	4
Scales	68%	5
Schlamm	40%	2
Scottsburg	85%	2
Shadyside	13%	2
Shafer	8%	3
Shakamak	83%	2
Spring Mill	50%	4
Springs Valley	84%	9
Spurgeon Hollow	0%	0
Starve Hollow	92%	3
Stone Arch	100%	3
Sullivan	16%	4
Summit	91%	16
Tipsaw	72%	7
Versailles	0%	0
Waveland	19%	7
West Boggs	53%	4
Westwood Run	76%	10
Whak-Shin-Gah	57%	4
Whitewater	28%	3
Worster (Potato Creek)	69%	10
Yellowwood	50%	7

Table 9. List of all submerged aquatic plant species collected, and percent of impoundments collected in. * indicates invasive species.

Species	Percent of Impoundments
American Pondweed	1%
Bladderwort	4%
Brittle Naiad*	36%
Chara	37%
Clasping-leaf Pondweed	1%
Coontail	67%
Curly-leaf Pondweed*	18%
Eelgrass	4%
Elodea	14%
Eurasian Watermilfoil*	43%
Flat-stem Pondweed	4%
Floating-leaf Pondweed	5%
Horned Pondweed	1%
Illinois Pondweed	1%
Large Leaf Pondweed	1%
Leafy Pondweed	20%
Long-leaf Pondweed	35%
Naiad spp. (excluding brittle/southern)	4%
Nitella	4%
Sago Pondweed	18%
Slender Naiad	17%
Small Pondweed	17%
Spatterdock	1%
Southern Naiad	36%
Variable Pondweed	2%
White-water Crowfoot	1%
Water Stargrass	13%
Water-thread Pondweed	1%
Water Shield	1%