WABASH RIVER 1999 FISH COMMUNITY, AQUATIC HABITAT, AND PUBLIC ACCESS SURVEY

1999 Fish Management Report

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2008

EXECUTIVE SUMMARY

- Forty-eight approximate 1 mile reaches of the Wabash River, spanning 447 miles, were sampled from downstream of the Ohio State line to upstream of the Ohio River during July 1999. Fish and habitat data were collected at each sampling reach.

- Sampling yielded 8,450 fish weighing 9,035.5 lbs, representing 15 families, 82 species, and two hybrids. On average, 176 fish, 188.21 pounds of fish, and 20 species/hybrids were collected per site.

- The ten most abundant species by number were gizzard shad, common carp, steelcolor shiner, freshwater drum, flathead catfish, channel catfish, shortnose gar, quillback, golden redhorse, and longear sunfish.

- The ten most abundant species by weight were common carp, channel catfish, flathead catfish, freshwater drum, golden redhorse, gizzard shad, shortnose gar, quillback, blue sucker, and river carpsucker.

- Gizzard shad and common carp were the most widely distributed species as they were the only ones caught at all 48 collection sites. The next most widely distributed species were freshwater drum, channel catfish, flathead catfish, shortnose gar, steelcolor shiner, white bass, longnose gar, river carpsucker, and bluegill.

- Some species were not collected while the abundance level of others was not adequately assessed as direct current daytime electrofishing was the only collection gear used. Alternating current electrofishing, seines, hoop nets, and gill nets need to be used to properly assess some species while season and/or water level specific collections or nighttime collections must be used to adequately assess other species.

- Huntington Dam impacted fish species distribution as 13 abundant species were collected downstream but not upstream of the dam.

- Results from other comprehensive Wabash River fish surveys combined with this survey's results increase the river's fish species total to at least 117 species and two hybrids. Two exotic fish species, the bighead and silver carp have moved into the river from the Ohio River since 1999.

- The most significant data relationship was between gradient and species diversity. The relatively high gradient area from Huntington downstream to Williamsport generally had 5 to 10 more species that up and downstream lower gradient sites.

- Further information regarding detailed work conducted on catfish and shovelnose sturgeon can be found in Colombo 2005, Donabauer 2007a, and Donabauer 2007b.

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INTRODUCTION

The Wabash River can be described as Indiana's river. Although the Wabash actually starts in northwest Ohio, about 466 of the Wabash's approximately 491 miles lie within or borders Indiana (Figure 1). The Wabash is Indiana's second largest river following the Ohio and was named Indiana's official state river in 1996. It comprises approximately 20,913 acres and provides about 39% of fishing opportunities on Indiana rivers excluding Indiana's portion of the Ohio River.

Dr. James Gammon 1998 publication, "The Wabash River Ecosystem" is an excellent work that provides insightful information on the rivers' history, and chemical and physical attributes. Gammon (1998) also contains a comprehensive list of citations for those interested in further information on the Wabash plus results of the authors thirty plus years of fisheries work on the river which he initiated in 1967. Dr. Gammon's work has been limited to the middle reach of the Wabash, river miles 160 to 313.

This report covers the Indiana Division of Fish and Wildlife's (IDFW) July 1999 survey of the fish community, aquatic habitat, and public access of Indiana's entire 466 mile length of the Wabash River. The aquatic community of major portions of the Wabash had never been assessed. The need was recognized to evaluate the fish community, aquatic habitat, and public access of Indiana's entire length of the Wabash during a discrete, narrow time span to develop a "snapshot" of current conditions. This comprehensive information would then allow IDFW to begin development of a river wide management plan which can then be used to meet strategic objectives of increasing angler days and user satisfaction. Future evaluations using the same methodologies will allow IDFW to evaluate system changes over time. This was the first time that this entire length of river has been surveyed as a single, comprehensive unit.

This project was developed during 1997 and assigned work plan number 98774. The estimated cost using 1997 cost figures was $60,561. Actual costs through 8/18/00 were approximately $77,305. The project's stated objectives were to: 1) help insure that the Wabash River provides about 720,000 sport fishing opportunities by gaining enough fish population, habitat, and access information to begin developing management strategies, and 2) help insure the continued presence of native fish species in the Wabash River.

METHODS

Introduction

Forty-eight, approximate ½ to 1 mile long Wabash River reaches were sampled July 2nd to 13th, 1999 (Figure 1). July was selected as the survey period due to the availability of college interns (which comprised over 1/3 of the field personnel) and historic low river flow conditions which are conducive to optimum fish collection. The stations were to be located approximately ten miles apart depending upon boat access to the river. Station location was also determined by the

presence of historic sampling locations.

In 1975, the Wabash's length in Indiana was 465.6 miles according to Drainage Areas of Indiana Streams (Hoggatt 1975). Since that time, the river has cut new channels, especially in its lower 100 miles so the rivers' length in Indiana is actually less than 465.6 miles as of 1999. River mile (RM) 0 is located in the southwest corner of the state, where the Wabash River enters the Ohio River. River mile 465.5 is located south of Ft. Wayne, near the northeast corner of the state, where the river enters Indiana from the State of Ohio.

Fish collection

The fish sampling was conducted by ten, three person DC boat or barge electrofishing crews. Each crew was assigned a 40 to 50 mile length of the river. One hour of DC electrofishing was conducted at each reach. Boat electrofishing was conducted in a downstream direction along both banks. Barge electrofishing was conducted in an upstream direction. An attempt was made to collect all fish stunned. The length and weight of each individual game fish collected was recorded. All individual special concern, threatened, endangered, exotic, and unusual fish species were also measured and weighed. For all other species, the length range, total number, and total weight was determined. Five scale samples per one-half inch group per reach were taken from scaled game fish. Left pectoral spines were removed from blue, channel, and flathead catfish.

Notes were taken on fish with external anomalies. Fish that were difficult to identify in the field were preserved in 10% formalin and later identified at the office. Crew leaders summarized station results on standardized electronic spreadsheets and provided their data to the project leader.

Aquatic habitat and water chemistry

Aquatic habitat was evaluated at each reach using the "Qualitative Habitat Evaluation Index" (QHEI), a subjective scoring system developed by the Ohio EPA. Most crew leaders attended a QHEI use training session prior to the field work. GPS coordinates were recorded for the upper and lower end of each reach electrofished. Length of the reach electrofished and five channel widths were determined using a GPS unit, a range finder, or a hip chain. River depth at 1/4, mid point, and 3/4 distances along the width transects were measured using depth finders. Air and water temperature, Secchi disk, conductivity, alkalinity, turbidity, and dissolved oxygen levels were measured at each reach per standard procedure.

Information and education

The work plan directed each crew leader to oversee information and education activities in their collection area. However, the project leader and IDFW's Public Affairs Unit supervisor developed an overall project information and education program during spring 1999 which was then overseen by the Public Affairs Unit.

Public access

Each crew leader was to document the presence of public and private boat access sites and shoreline fishing areas within their assigned work area. Crew leaders made recommendations on new access site construction needs including proposed locations.

RESULTS

Forty-eight, one hour electrofishing collections were conducted at 48 sites between RM 0 and RM 465.6. Specific station results are located in Appendix 3.

Station location and physical description

The location of each collection station in regards to county and nearest town is contained in Table 1. The drainage area of the stations varied from 32,850 square miles at RM 7.0 to 284 square miles at RM 454.0 (Table 1). Gradient (the change in elevation) varied from 0.47 feet/mile at RM's 53.0, 63.5, 265.3, and 275.0 to 4.2 feet/mile at RM 341.5. Length of station ranged from 811 feet at RM 419.3 to 8,396 feet at RM 155.0. Average width of the river channel also decreased from downriver to upriver with the maximum of 1,183 feet measured at RM 13.0 while the minimum of 62 feet was found at RM 441.0. Average and maximum depths also followed the same trend. Average depth ranged from 204 inches at RM 63.5 to 11 inches at RM 436.0. Maximum depth varied from 432 inches at RM 63.5 to 22 inches at RM 436.0.

Fisheries

The 8,450 fish collected weighed 9,035.50 pounds and were from 15 families representing 82 species and two hybrids (Tables 2 and 3). On average, 176 fish, 188.24 pounds of fish, and 20 species/hybrids were collected per site. The most fish collected was 362 at RM 74.0 and RM 436.0 (Appendix 1). The fewest fish collected was 63 at RM 42.0. The most fish poundage collected was 537.62 pounds at RM 454.0 while the least was 42.05 pounds, collected at RM 63.5 (Appendix 2). The most fish species/hybrids collected was 38 at RM 341.5 while the fewest was 10 at RM 155.0.

The ten most abundant species by number were gizzard shad (20.0%), common carp (12.4%), steelcolor shiner (7.4%), freshwater drum (5.9%), flathead catfish (4.6%), channel catfish (4.0%), shortnose gar (3.8%), quillback (3.2%), golden redhorse (2.8%), and longear sunfish (2.4%). These ten species comprised 66.5% of the total number of fish collected. Less than 10 individuals were collected of 30 species or hybrids.

The ten most abundant species by weight were common carp (43.6%), channel catfish (6.0%), flathead catfish (5.2%), freshwater drum (4.8%), golden redhorse (4.5%), gizzard shad (4.5%), shortnose gar (3.6%), quillback (3.5%), blue sucker (2.8%), and river carpsucker (2.6%). These ten species comprised 81.1% of the total weight of fish collected.

Gizzard shad and common carp were the most widely distributed species in the river as they were the only two species caught at all 48 collection sites. The next most widely distributed species were freshwater drum (46 stations), channel catfish (43 stations), flathead catfish (39 stations), shortnose gar (35 stations), steelcolor shiner (33 stations), white bass (32 stations), longnose gar (32 stations), river carpsucker (29 stations), and bluegill (29 stations).

Carp and minnow family (Cyprinidae)

This was the most abundant family of the survey by number and weight (Table 3). Cyprinidae was also the most diverse family with 24 species collected. Common carp was the most abundant family member by number and weight. Other family members collected that are not native to North America were goldfish and a single grass carp. Twenty-one species of chubs, minnows, shiners, and stonerollers were collected.

Herring family (Clupeidae)

The herring family was represented by three species, gizzard shad, skipjack herring, and threadfin shad. Gizzard shad dominated the family catch and is the most important forage fish species in the Wabash River.

Sucker family (Catostomidae)

This was the third most abundant family by number (15.7%) and second most abundant family by weight (23.9%). Fifteen family members were collected. Quillback was most abundant by number while golden redhorse was most abundant by weight. The redhorse and sucker (except for blue sucker) species were restricted in distribution to the upstream portion of the river. Buffalo and carpsucker species were generally found river wide.

Bullhead catfish family (Ictaluridae)

The bullhead catfish family was represented by nine species. The flathead catch was 388 individuals from 39 sites which collectively weighed 470.26 pounds. They ranged in length from 4.2 to 38.0 inches with 58.0% being less than 10 inches in length, 25.0% between 10 and 15 inches, 8.8% between 15 and 20 inches, and 8.2% 20 inches and longer. During this survey, flathead catfish were not collected at the 6 sites upstream of Huntington Dam which is located at RM 411.4. However, they have been collected upstream of the dam in the past (Braun, 1997). Sites with the most flathead catfish were RM 115.2 (16 collected), RM 155.0 (54), RM 165.0 (30), RM 174.5 (24), RM 185.0 (24), RM 191.0 (38), RM 205.0 (16), and RM 225.0 (58). Seven of these eight sites were located from RM 155.0 to RM 225.0 which may be an indication that flathead catfish are most abundant in this area. All other sites had flathead collections consisting of fewer than 10 fish.

The channel catfish catch was 341 individuals from 43 sites which weighed 537.77 pounds.

They ranged in length from 1.5 to 29.5 inches with 10.9% being less than 10 inches in length, 34.6% between 10 and 15 inches, 34.9% between 15 and 20 inches, and 19.6% 20 inches and longer. The channel catfish catch was highest at RM 393.5 through RM 450.0.

Six blue catfish measuring 7.0 to 31.1 inches were collected. Blue catfish were only found in the lower river from RM 7.0 to RM 145.6. The only white catfish collected was found at RM 322.2. White catfish were introduced into Indiana from the east coast and maintain small populations in various portions of the state. One bullhead and four madtom species were also collected.

Sunfish Family (Centrarchidae)

This was the fifth most abundant family by number and ninth by weight. Longear sunfish was the most abundant family member with 202 individuals collected that ranged from 1.4 to 5.7 inches in length.

The 151 bluegill collected ranged from 1.0 to 7.2 inches in length. A total of 74 white crappie were collected. They ranged from 4.0 to 9.3 inches in length. Bluegill and white crappie were found in low numbers throughout the length of the river.

A few spotted bass were netted throughout the river except for at the six upstream most sites. The 71 spotted bass collected ranged from 1.5 to 13.1 inches in length. Average spotted bass length at annulus formation was 3.5, 6.8, 9.2, and 11.0 inches at ages 1 through 4 (Appendix 3). Smallmouth bass were not collected downstream of RM 248. The 37 collected smallmouth ranged in length from 2.1 to 17.1 inches. Average smallmouth length at annulus formation was 3.2, 5.9, and 9.7 inches at ages 1 through 3. Largemouth bass were collected throughout the Wabash's length. Only 29 were collected and they ranged in length from 1.9 to 10.7 inches. Average largemouth length at annulus formation was 3.3 and 6.4 inches at ages 1 and 2.

Green sunfish black crappie, orangespotted sunfish, and rock bass are the other family members of which a few individuals were collected.

Drum Family (Sciaenidae)

The freshwater drum catch consisted of 496 individuals from 46 sites which weighed 435.59 pounds. They ranged in length from 5.4 to 22.6 inches. The freshwater drum catch was generally higher from RM 275.0 upstream. Freshwater drum is the only member of this family found in Indiana.

Gar family (Lepisosteidae)

All three of Indiana's gar species were collected. Shortnose gar was most abundant while spotted gar was the least abundant. A 54.0 inch longnose gar was the longest fish collected during the survey.

Perch family (Percidae)

Ten members of this family were collected. Logperch was the most abundant with 82 individuals found that ranged from 2.1 to 6.7 inches long. They were found throughout the river. Other darter species collected were the slenderhead, greenside, blackside, Johnny, rainbow, and river darter.

The 41 sauger collected ranged from 10.8 to 19.9 inches. Sauger was not collected from the six upstream most stations. Average sauger length at annulus formation was 8.4, 13.3, 16.3, and 18.5 inches at ages 1 through 4. Twenty -five walleye were collected which ranged from 3.6 to 29.3 inches in length. Walleye were only found from RM 205.0 to RM 419.3. Average walleye length at annulus formation was 9.0, 13.6, and 18.8 inches at ages 1 through 3. Two hybrid walleye were collected that were 17.6 and 19.3 inches long. They were collected at RM 380.6 and RM 406.8.

Temperate bass family (Percichthyidae)

White bass and hybrid striped bass were the only two members of this family collected. The 135 collected white bass ranged in length from 6.2 to 16.1 inches in length. They were found throughout the river but were not collected in three discrete areas, RM 248 to 265.3, RM 331 to 369.8, and RM 430.4 to 454.0. Average white bass length at annulus formation was 6.0, 10.1, 12.6, and 13.7 inches at ages 1 through 4. Only one hybrid striped bass was collected. It was 18.5 inches long and was found at RM 174.5.

Sturgeon family (Acipenseridae)

Shovelnose sturgeon was the only family member collected. Fifty-six individuals were collected that ranged from 21.5 to 34.2 inches. Shovelnose was only netted from RM 306.9 to 387.8.

Mooneye family (Hiodontidae)

This family contains only two members. They are both native to Indiana and found in the Wabash. Seventeen goldeneye were collected which ranged from 10.3 to 17.1 inches in length. They were widely distributed from RM 7.0 to RM 369.8. Eight mooneye were collected which ranged from 8.9 to 10.8 inches. Mooneye were netted from RM 255.4 to RM 306.9.

Livebearer family (Poeciliidae)

The western mosquitofish was the only family member collected during the survey and is the only livebearer species found in Indiana waters. This is an exotic species that was introduced into the state for mosquito control. The 11 collected mosquitofish measured 0.8 to 1.5 inches in length and were collected at only three sites (RM 13.0, RM 85.0, and 134.7).

Paddlefish family (Polyodontidae)

Seven paddlefish ranging in length from 15.7 to 37.2 inches were collected from four sites from RM 7.0 to RM 313.2. Paddlefish is the only family member native to North America.

Bowfin family (Amiidae)

Three, 18.8 to 25.5 inch bowfin were collected at RM 185.0 and RM 298.8. Bowfin is the only living species of this family.

Killifish family (Fundulidae)

The blackstripe topminnow is the only family member collected during the survey. They measured 1.0 to 1.3 inches in length and were both collected at RM 53.0.

Water quality and aquatic habitat

Secchi disk readings varied from 7 inches at RM 419.3, 436.0, and 441.0 to 24 inches at RM 380.6 and RM 393.5 (Table 4). Secchi disk measurements increased substantially immediately below Huntington Reservoir which indicates that the reservoir acts as a sediment trap.

Water temperature ranged from 74 degrees F at RM 313.2 to 90 degrees at RM 205.0. Dissolved oxygen was adequate for aquatic life at all sites and ranged from 6 ppm at RM 454.0 to 21 ppm at RM 275.0. Station QHEI (qualitative habitat evaluation index) scores ranged from 43.5 at RM 74.0 and 454.0 to 85.25 at RM 406.8 (Table 5). The average score for the 48 sites was 62.1.

Information and education

IDFW's Public Affairs Unit developed a project web site prior to commencement of field work. Crews were provided with mobile phones and required to report their progress and any unique collections each evening to a central clearing house. This provided the information for the morning web site update. The web site was undated from 7/6 to 7/12/99.

The Public Affairs Unit organized project media events that were held at the Wabash River communities of Bluffton, Lafayette, Terre Haute, Vincennes, and New Harmony on 7/7/99. Numerous advance news releases and media alerts were developed and distributed on 7/6 and 7/7/99 regarding the project and more specifically regarding the 7/7 media events. Press packets were prepared for the media which included fact sheets and specific river and project information. The five field crews whose assigned sampling areas contained media event locations were assigned to work those events.

All activities initiated by the Public Affairs Unit were extremely successful. The media events were well attended with 11 television stations taping and broadcasting project activities, 8 radio stations airing project stories, and dozens of newspaper articles on the project being published

statewide. Indianapolis AP bureau articles were published by newspapers throughout the Midwest.

The Division of Conservation Law Enforcement was contacted during spring 1999 regarding project assistance. Conservation Officers assisted with electrofishing collections, kept field crews under observation regarding emergency situations, and were assigned to provide boats to transport media representatives for photo, interview, and observation opportunities during the media events.

Public access

Actual locations where crews launched are listed in Appendix 4. Following are locations where crew leaders specified that public access sites to the Wabash River are needed:

RM 9.5: Posey County - Acquire site and construct ramp at Oak Grove/Bone Bank Area.

RM 12.0: Posey County - Construct ramp at Hovey Lake State Fish and Wildlife Area.

RM 76.0: Gibson County - Acquire site and construct ramp at Schuh Bend Area.

RM 85.0: Gibson County - Acquire private IN ramp and upgrade site at Crawleyville located at RM 84.5.

RM 105.3: Knox County - Acquire site and construct ramp near Little Rock (East Mount Carmel, IN-IL quad, R11W, T1N, section 30).

RM 155.0: Sullivan County - Acquire site and construct ramp at Riverton IN (RM 155.0 or RM 159.0).

RM 185.0: Sullivan County - Pursue use agreement with Sullivan County and upgrade Sullivan County access site at Riverview.

RM 190.2: Vigo County - Pursue use agreement with private ferry operation and upgrade site on IN bank at Darwin IL.

RM 204.0: Vigo County - Acquire site and construct ramp on gravel company property or just upstream.

RM 207.0: Vigo County - Acquire site and construct ramp on southwest corner of federal penitentiary property.

RM 230.0: Parke County - Determine ownership of Clinton site located on Highway 163 (city or Clinton Boat Club), pursue use agreement with owner, and upgrade site (pave or chip and seal the parking area).

RM 256.0: Vermillion County - Continue effort to acquire and develop Hwy 234 (Cayuga) site.

RM 264.3: Vermillion County - Resurrect effort to acquire and develop Perrysville public easement site.

RM 331.0: Carroll County - Acquire private ramp and develop site at RM 331.0 near Pittsburg, located on west side of Wabash River 0.2 miles downstream of U.S. 421 bridge.

RM 362.4: Cass County - Acquire and develop IN Transportation Department property at new US 24 bridge.

RM 370.5: Miami County - Acquire and develop private site under US 31 bridge which is accessed from K-Mart parking lot north of bridge.

RM 393.3: Wabash County - Acquire and develop private Celotex Corporation site on north side of river.

RM 405: Huntington County - Pursue use agreement with City of Huntington for site development at Historic Forks of the Wabash City Park.

Public boat access to the Wabash River upstream of Huntington Reservoir (RM 411.4) is adequate.

DISCUSSION

Indiana's 466 mile length of the Wabash River contains an amazing diversity and abundance of fish species. The Wabash River's sport and commercial fisheries are also quite diverse and abundant. However, one most realize that the Wabash is not a lake but a river, and not expect to encounter an abundance of traditional lake species such as largemouth bass, bluegill, or crappie.

The important key point in the presence and abundance of any fish species is habitat. Smallmouth bass are abundant in the beautiful riffle/pool sequence, high gradient area centered on Lafayette but flathead catfish, blue catfish, and buffalo are not abundant in this area as it does not contain their habitat. Conversely, smallmouth bass are not abundant in the deep, slow current, silt bottom portion of the river at New Harmony while flathead catfish, blue catfish and buffalo are as this area contains the habitat that these species require to flourish.

The best river length sport fishing opportunities are for channel catfish and freshwater drum. Flathead catfish can be found anywhere downstream of Huntington Dam but the population increases downriver of Williamsport. The blue catfish population was under-assessed during this survey. Fair numbers of blue catfish can be found downriver from Terre Haute with even higher numbers present downriver from Mt. Carmel, IL.

Pockets of white bass can be present anywhere throughout the river's length though they are probably more abundant downriver from Mt. Carmel, IL. Hybrid striped bass are most abundant in the Lafayette area, downstream from the confluence of the Tippecanoe River as these hybrids are stocked in the Tippecanoe River reservoirs. Striped bass can be abundant in the lower 50 miles of the river downstream of New Harmony as they move up the Wabash River from stockings in the Ohio River.

Spotted bass can be caught throughout the river's length but they tend to be more abundant downriver. Smallmouth bass are most abundant in the high gradient area from Huntington (Huntington County) to Williamsport (Warren/Fountain Counties). A few largemouth bass migrants from ponds or lakes are liable to be found anywhere. Isolated concentrations of white crappie may be found anywhere but are more likely downriver.

Sauger concentrations can be found in the right habitat but are most abundant downriver. The

sauger population is likely much larger than documented in this survey downriver from Mt. Carmel, IL as daytime summer electrofishing is not effective at assessing this nocturnal species. Walleye are most abundant downstream of Huntington Dam to Williamsport due to stockings in lakes in reservoirs in the upper watershed.

Collection limitations

All fish collection methods have limitations in that they work to varying degrees in terms of collecting different sizes and species of fish. Direct current electrofishing is generally most effective in shallower water (less than 6 feet in depth), in water with a conductivity between 300 and 600 microsiemens, in clearer versus turbid water, and in water with no or minimal current. Direct current electrofishing is also more effective in stunning topwater versus bottom dwelling fish species, larger versus smaller fish, and is also more effective in stunning some specific species due to their specific physiology (flathead catfish are more effectively stunned than channel catfish due to their physiological differences).

Therefore, it is not surprising that low numbers of smaller size fish and smaller size fish species (such as darters, minnows and shiners) were collected overall and specifically at certain stations. It is also not surprising that some catch rates (number of species or catch of particular species) were lower down river as the river became deeper and wider.

It was recognized as this project was being developed that the addition of a second collection method, seining, was necessary in order to develop a more complete species list for the collection sites. Seining can be very effective in collecting darter, minnow, and shiner species. However, it was also recognized that the addition of a second collection technique would increase the field collection personnel hours in excess of 25-50%, would double the amount of data, and more than double the time required for data analysis and report writing. It was therefore decided not to include seining as a collection technique as this was already a rather ambitious project and having a more comprehensive species list was not a major project objective.

A comprehensive assessment of all Wabash River fish species would also require the use of hoop and gill nets to more accurately document population levels of deep and/or open water species such as paddlefish, buffalo species, and catfish species in the lower river. Other different collection methods would also need to be conducted to accurately assess population levels of some other species; fall night electrofishing for sauger and walleye, spring electrofishing for shovelnose sturgeon, alternating current electrofishing for channel catfish, and summer night electrofishing for smallmouth bass.

Fish species distribution

A major feature that impacts fish species distribution is Huntington Dam. The Dam is located at RM 411.4. Forty-two of the collection sites were located downstream of the dam while

six were located upstream of the dam. Thirteen species which were collected at more than ten sites were not collected upstream of Huntington Dam (Table 6). Six species were missing from a significant downstream portion of the river.

Except for the impact of Huntington Dam, most of these distribution patterns can be explained by the biology of the specific fish species in regard to it's' habitat preference. Species such as river carpsucker, smallmouth buffalo, and blue sucker are not generally found in the extreme upriver portion of the Wabash River as the habitat they prefer is downriver habitat (lower gradient, lower current velocity, soft bottom substrates). Conversely, golden redhorse, shorthead redhorse, silver redhorse, northern hog sucker, and smallmouth bass are generally not found in the extreme downriver portion of the Wabash River as the habitat they prefer is upriver habitat (higher gradient, higher current velocity, hard bottom substrates). Walleye is an exception of sorts since its upriver occurrence is due primarily to it being stocked in the upper Wabash and Tippecanoe River reservoirs.

Comparisons to other collections

Other recent fish collections on the Wabash River that covered major portions of the river are Gammon (1998) and Simon (1998). Gammon (1998)'s collection started in 1967 and continued to 1997, was conducted from RM 160 to RM 330, and resulted in a catch of 105 fish species and one hybrid. Simon (1998)'s collection was made during 1993, was conducted from RM 1 to RM 292, and resulted in a catch of 79 species and 1 hybrid. This project resulted in the catch of 82 species and 2 hybrids.

Fifty-nine of the species and one hybrid were similar between the three collections in that each of the collections resulted in the catch of each of those 59 species and one hybrid (Table 7). Five species and one hybrid were only found during this project and not in the other two collections. Fifteen species were only collected exclusively by Gammon (1998) and 5 species were only exclusively collected by Simon (1998). Thirty one-species were caught during two out of three of the collections. Results of these three collections brought the total fish species list for the Wabash River to 115 species and two hybrids. Additional species undoubtedly occur in the Wabash as the vast number of historic collections were not consulted.

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Data relationships

Correlation coefficient's (Pearson's r) were determined for twenty-nine separate variables (Table 8). The variables were placed into four categories: river physical attribute, water chemistry, QHEI, and fisheries. A total of 406 correlation coefficients were determined of which 53 were significant at $P<0.05$ and 73 were significant at $P<0.01$.

Drainage area had the most significant correlations at 15 (Table 9). Canopy, average width, average depth, maximum depth, and river mile each had 14 significant correlations while flow had

13. All of these physical variables significantly correlated with each other since the river gets bigger, deeper, wider, and has less canopy cover with movement downstream. Gradient exhibited significant negative correlations with most river size variables which indicated that gradient decreased with downriver movement. River mile showed a significant negative correlation with the river size variables and a significant positive correlation with the canopy variable.

Sample distance, habitat type percent's (pool, run, riffle), the two ratings (subjective and aesthetic) and the water chemistry variables showed few significant correlations.

The substrate QHEI score showed significant negative correlations with the river size variables (drainage area, flow, average width, average and maximum depth) which indicates that the abundance of hard bottom substrate (gravel, cobble, boulder) decreases with movement downstream. The riparian score showed significant positive correlations with the river size variables which indicate that the quality and quantity or riparian habitat improves with movement downriver. The remaining QHEI variables showed few significant correlations.

The number of fish species/hybrids collected had 11 significant correlations. Fish species/hybrids showed significant positive correlations with gradient, river mile, Secchi disk, the QHEI gradient score, and number of fish collected. Significant negative correlations were with most of the river size variables (drainage area, flow, width, and maximum depth), sample distance, and water temperature. Major findings were that species diversity increased as the gradient increased while species diversity decreased with movement downriver as the river became larger. The species diversity/river size relationship is due in at least a large part to the decrease in electrofishing efficiency as a river gets larger and deeper.

The species diversity/gradient relationship is illustrated in Figure 2. Fish species diversity increased dramatically from 18 species at RM 284.9 to 27 species at RM 298.8 while gradient increased substantially from 0.47 feet/mile at RM 275.0 to 2.4 feet/mile at RM 284.9. The river reach from RM 298.8 to RM 419.3 generally had the most species and highest gradients. This appears to be a particularly unique portion of the Wabash River. This may also be a transitional zone between the small stream fish species community found upriver and the big river fish species community found downstream. If so, the overlap of these two different fish species assemblages would result in an increase in diversity in the transitional area.

Higher gradient areas up to 10 or greater feet/mile generally contain more fish species as this results in a variety of high quality fish habitat such as large rock, un-embedded riffles and deep pools. This relationship is well documented by Hynes (1970). Hynes also discusses Huet's slope (gradient) rule of fish distribution where the distribution of a riverine fish species is primarily determined by gradient. River areas with gradients lower than 2 feet/mile are predominated by deep pool and soft bottom run habitat. River areas with gradients higher than 10 to 20 feet/mile are generally mountainous and are predominated by fast current and large rock riffles.

The number of fish collected had 11 significant correlations. Fish numbers showed significant

positive correlations with river mile, number of species/hybrids, and pounds of fish collected. Significant negative correlations were with most of the river size variables (drainage area, flow, width, average and maximum depth), canopy, water temperature, and the QHEI pool score. Again, the number of fish collected per site decreased with movement downriver, and was inversely related to river size.

The pounds of fish collected had ten significant correlations. Fish poundage showed significant positive correlations with gradient, river mile, and number of fish collected. Significant negative correlations were with most of the river size variables (drainage area, flow, width, average and maximum depth), canopy, and water temperature. The poundage of fish collected was negatively related to river size.

June 2007 Update

Since this survey was conducted during July 1999, IDFW funded a four year study (2001-2004) on the rivers catfish populations. The final report (Colombo at. el. 2005) contains a detailed analysis of the channel catfish population and discusses management implications. IDFW Big Rivers fisheries personnel launched a comprehensive project during spring 2005 to resolve Wabash River data gaps and more adequately assess the blue and flathead catfish populations (Donabauer 2007a). A comprehensive shovelnose sturgeon project was also started during spring 2005 (Donabauer 2007b).

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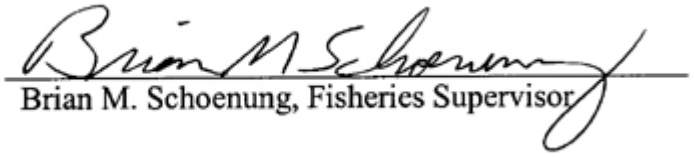
Submitted by: Thomas C. Stefanavage, Big Rivers Fisheries Biologist
Date: June 16, 2007

Approved by: 
Brian M. Schoenung, Fisheries Supervisor

Date: August 3, 2007

Table 1. Station location, drainage area, flow, gradient, sample distance, average width, average and maximum depth, Wabash River, July 1999.

River Mile	County	Nearest Town	Drainage Area (sq.mile)	Flow CFS (cubic feet per second)	Gradient (feet/mile)	Sample Distance (feet)	Average Width (feet)	Average Depth (inches)	Maximum Depth (inches)
7.0	Posey	Oak Grove	32850	15400	1.00	3696	1133	106	156
13.0	Posey	New Haven, IL	32837	15400	1.00	3379	1183	118	192
26.0	Posey	Rising Sun, IL	29604	18220	1.00	4171	945	124	204
31.0	Posey	Maunie, IL	29585	18220	0.70	4276	1180	101	324
42.0	Posey	New Harmony	29234	16500	0.70	4329	961	84	168
53.0	Posey	New Harmony	29222	16500	0.47	5576	935	171	324
63.5	Posey/Gibson	Grayville, IL	29097	18200	0.47	4111	804	204	432
74.0	Gibson	Grayville, IL	28793	18200	0.49	4592	951	110	216
85.0	Gibson	Crawleyville	28706	15400	0.49	2788	1050	106	144
95.3	Gibson	Mt. Carmel, IL	27773	15400	0.82	2952	1181	76	144
108.8	Knox	Decker	16364		0.98	2800	661	99	192
115.2	Knox	St. Francisville, IL	16217		0.65	2975	570	74	108
127.8	Knox	Vincennes	13732		0.65	3000	549	81	144
134.7	Knox	Emison	13684	4830	0.60	2600	468	93	168
145.6	Knox	Oaktown	13265		0.60	3200	374	89	216
155.0	Sullivan	Riverton	13501	5510	0.50	8396	491	67	144
165.0	Sullivan	Merom	13121	5240	0.50	7051	447	89	204
174.5	Sullivan	Hudsonville, IL	12986	5240	0.50	7454	570	95	360
185.0	Sullivan	Fairbanks	12731	4830	0.50	7554	550	74	288
191.0	Vigo	Darwin, IL	12731	3830	0.50	5461	603	78	108
205.0	Vigo	Terre Haute	12425	4060	0.50	4177	393	94	240
214.5	Vigo	Terre Haute	12265	3830	0.50	3800	539	62	96
225.0	Vigo	Shepardsville	12068	3560	0.60	4611	368	82	240
235.0	Vermillion/Parke	Summit Grove	11674	3690	0.60	4730	465	59	156
248.0	Vermillion/Parke	Newport	10287	3690	0.49	2746	397	82	174
255.4	Vermillion/Parke	Lodi	9738	4140	0.49	2851	411	52	110
265.3	Vermillion/Fountain	Perrysville	8268	2720	0.47	3590	411	46	118
275.0	Warren/Fountain	Covington	8200	2500	0.47	2746	483	36	72
284.9	Warren/Fountain	Williamsport	8024	2930	2.40	3907	497	36	73
298.8	Tippecanoe	Westpoint	7489	2660	2.10	2640	400	61	100
306.9	Tippecanoe	West Lafayette	7443	2660	2.10	2640	351	64	106
313.2	Tippecanoe	Lafayette	7267	2660	0.88	2640	476	48	78
322.2	Tippecanoe	Battleground	6350	2870	1.37	2640	376	45	78
331.0	Carroll	Pittsburg	4072	632	1.70	2640	315	30	67
341.5	Carroll	Lockport	4003	657	4.20	2640	397	28	74
349.7	Cass	Clymers	3779	657	1.30	2640	452	20	65
364.0	Cass	Lewisburg	2711	304	1.64	3696	222	25	72
369.8	Miami	Peru	2678	304	2.28	2640	248	28	102
380.6	Miami/Wabash	Richvalley	1787	191	1.00	3696	178	23	40
387.8	Wabash	Wabash	1777	191	1.78	4145	131	26	40
393.5	Wabash	Largo	1711	249	2.40	3041	131	18	36
406.8	Huntington	Huntington	1121		2.25	1100	97	26	44
419.3	Huntington	Markle	564		2.95	811	86	13	26
430.4	Wells	Murray	535	62	1.20	2062	100	16	30
436.0	Wells	Bluffton	466	42	1.45	2192	87.2	11	22
441.0	Wells/Adams	Vera Cruz	437	40	1.42	5630	62	12	27
450.0	Adams	Linn Grove	420	40	1.39	5138	98	24	120
454.0	Adams	Geneva	284	42	1.31	5175	66	22	57

Table 2. Name, number, percentage, size, weight, and occurrence index of fishes collected, Wabash River, July 1999.

Common Name	Scientific Name***	Total Number	Percent By No.	Length (in.) Min.	Length (in.) Max.	Total Weight (Pounds)	Percent By Weight	Occurrence Index
Gizzard shad	*Dorosoma cepedianum*	1,689	20.0	1.0	16.2	404.07	4.5	48
Common carp	*Cyprinus carpio*	1,051	12.4	6.1	32.0	3,935.98	43.6	48
Steelcolor shiner	*Cyprinella whipplei*	624	7.4	0.6	5.5	4.51	*	33
Freshwater drum	*Aplodinotus grunniens*	496	5.9	5.4	22.6	435.59	4.8	46
Flathead catfish	*Pylodictis olivaris*	388	4.6	4.2	38.0	470.26	5.2	39
Channel catfish	*Ictalurus punctatus*	341	4.0	1.5	29.5	537.77	6.0	43
Shortnose gar	*Lepisosteus platostomus*	317	3.8	13.1	30.1	329.59	3.6	35
Quillback	*Carpiodes cyprinus*	274	3.2	1.5	18.0	312.17	3.5	20
Golden redhorse	*Moxostoma erythrurum*	240	2.8	1.6	19.3	405.86	4.5	23
Longear sunfish	*Lepomis megalotis*	202	2.4	1.4	5.7	15.38	0.2	20
River carpsucker	*Carpiodes carpio*	195	2.3	4.7	18.5	231.61	2.6	29
Mississippi silvery minnow	*Hybognathus nuchalis*	194	2.3	1.2	3.2	1.01	*	10
Spotfin shiner	*Cyprinella spiloptera*	185	2.2	1.4	5.5	1.68	*	24
White sucker	*Catostomus commersonii*	174	2.1	4.1	15.7	43.53	0.5	7
Bluegill	*Lepomis macrochirus*	151	1.8	1.0	7.2	9.39	0.1	29
Emerald shiner	*Notropis atherinoides*	143	1.7	1.0	4.1	1.08	*	22
White bass	*Morone chrysops*	135	1.6	6.2	16.1	80.18	0.9	32
Shorthead redhorse	*Moxostoma macrolepidotum*	129	1.5	4.7	19.1	197.68	2.2	17
Longnose gar	*Lepisosteus osseus*	112	1.3	3.2	54.0	169.53	1.9	32
Goldfish	*Carassius auratus*	97	1.1	4.6	10.8	20.70	0.2	4
Logperch	*Percina caprodes*	82	1.0	2.1	6.7	3.26	*	18
White crappie	*Pomoxis annularis*	74	0.9	4.0	9.3	13.48	0.1	17
Silver redhorse	*Moxostoma anisurum*	71	0.8	6.0	23.4	205.20	2.3	15
Spotted bass	*Micropterus punctulatus*	71	0.8	1.5	13.1	17.98	0.2	26
River shiner	*Notropis blennius*	66	0.8	1.6	3.6	0.46	*	8
Blue sucker	*Cycleptus elongatus*	60	0.7	17.2	30.1	255.89	2.8	15
Sand shiner	*Notropis ludibundus*	59	0.7	1.7	2.8	0.19	*	6
Green sunfish	*Lepomis cyanellus*	56	0.7	1.5	5.7	2.10	*	15
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	56	0.7	21.5	34.2	146.57	1.6	9
Northern hogsucker	*Hypentelium nigricans*	50	0.6	1.6	16.8	26.27	0.3	14
Silver chub	*Macrhybopsis storeriana*	50	0.6	3.2	6.8	2.12	*	10
Smallmouth buffalo	*Ictiobus bubalus*	46	0.5	6.0	26.3	148.01	1.6	19
Slenderhead darter	*Percina phoxocephala*	44	0.5	2.6	3.8	0.39	*	8
Sauger	*Sander canadense*	41	0.5	10.8	19.9	61.05	0.7	19
Smallmouth bass	*Micropterus dolomieu*	37	0.4	2.1	17.1	12.33	0.1	13
Central stoneroller	*Campostoma pullum*	36	0.4	1.2	2.4	0.08	*	3
Common shiner	*Luxilus cornutus*	31	0.4	1.6	2.8	0.18	*	3
Largemouth bass	*Micropterus salmoides*	29	0.3	1.9	10.7	4.93	0.1	18
Bluntnose minnow	*Pimephales notatus*	28	0.3	2.0	3.3	0.15	*	9
Walleye	*Sander vitreus*	25	0.3	3.6	29.3	58.98	0.7	13
Suckermouth minnow	*Phenacobius mirabilis*	23	0.3	1.5	4.3	0.36	*	7
River redhorse	*Moxostoma carinatum*	20	0.2	21.7	27.4	141.48	1.6	6
Bigmouth buffalo	*Ictiobus cyprinellus*	18	0.2	8.3	26.1	96.70	1.1	12
Black crappie	*Pomoxis nigromaculatus*	17	0.2	0.8	9.6	3.11	*	7
Goldeye	*Hiodon alosoides*	17	0.2	10.3	17.1	15.38	0.2	12
Spotted sucker	*Minytrema melanops*	15	0.2	12.8	17.2	17.93	0.2	5
Yellow bullhead	*Ameiurus natalis*	15	0.2	6.4	10.9	4.31	*	4
Green sunfish	*Etheostoma blennioides*	14	0.2	1.2	3.6	0.13	*	5
Black buffalo	*Ictiobus niger*	13	0.2	13.3	29.8	58.23	0.6	9
Skipjack herring	*Alosa chrysochloris*	13	0.2	1.9	13.1	2.51	*	8
Stonecat	*Noturus flavus*	12	0.1	1.5	8.2	0.75	*	7

Striped shiner	*Luxilus chrysocephalus*	12	0.1	1.1	1.7	0.01	*	3
Highfin carpsucker	*Carpiodes velifer*	11	0.1	6.5	12.6	7.61	0.1	8
Western mosquitofish	*Gambusia affinis*	11	0.1	0.8	1.5	0.01	*	3
Bullhead minnow	*Pimephales vigilax*	9	0.1	2.2	3.1	0.07	*	6
Mooneye	*Hiodon tergisus*	8	0.1	8.9	10.8	2.73	*	4
Black redhorse	*Moxostoma duquesnei*	7	0.1	9.3	17.3	8.74	0.1	3
Paddlefish	*Polyodon spathula*	7	0.1	15.7	37.2	34.17	0.4	4
Blue catfish	*Ictalurus furcatus*	6	0.1	7.0	31.1	35.36	0.4	4
Silverjaw minnow	*Notropis buccatus*	6	0.1	1.2	2.3	0.02	*	1
Threadfin shiner	*Dorosoma petenense*	6	0.1	2.7	5.6	0.28	*	5
Orangespotted sunfish	*Lepomis humilis*	5	0.1	0.5	2.5	0.02	*	3
Rock bass	*Ambloplites rupestris*	4	*	4.1	5.5	0.38	*	4
Blackside darter	*Percina maculata*	3	*	2.1	4.0	0.03	*	3
Bowfin	*Amia calva*	3	*	18.8	25.5	11.80	0.1	2
Blackstripe topminnow	*Fundulus notatus*	2	*	1.0	1.3	**	*	1
Hybrid walleye	*Sander vitreus x S. canadensis*	2	*	17.6	19.3	4.58	0.1	2
Johnny darter	*Etheostoma nigrum*	2	*	1.2	1.4	**	*	1
Rainbow darter	*Etheostoma caeruleum*	2	*	1.2	2.1	**	*	2
Rosyface shiner	*Notropis rubellus*	2	*	2.0	2.2	**	*	2
Spottail shiner	*Notropis hudsonius*	2	*	2.0	2.8	0.01	*	1
Spotted gar	*Lepisosteus oculatus*	2	*	13.4	28.6	3.22	*	2
Brindled madtom	*Noturus miurus*	1	*	2.4	2.4	0.01	*	1
Fathead minnow	*Pimephales promelas*	1	*	2.5	2.5	**	*	1
Freckled madtom	*Noturus nocturnus*	1	*	2.9	2.9	0.03	*	1
Grass carp	*Ctenopharyngodon idella*	1	*	30.8	30.8	12.44	0.1	1
Hornyhead chub	*Nacomis asper*	1	*	1.6	1.6	0.01	*	1
Hybrid striped bass	*Morone saxatilis x M. chrysops*	1	*	18.5	18.5	2.34	*	1
Mimic shiner	*Notropis volucellus*	1	*	2.3	2.3	**	*	1
Mountain madtom	*Noturus eleutherus*	1	*	2.6	2.6	0.01	*	1
River chub	*Nocomis micropogon*	1	*	2.4	2.4	0.01	*	1
River darter	*Percina shumardi*	1	*	3.0	3.0	0.01	*	1
Streamline chub	*Erimystax dissimilis*	1	*	1.7	1.7	**	*	1
White catfish	*Ameiurus catus*	1	*	21.6	21.6	3.52	*	1
TOTALS		8,450				9,035.50		

82 SPECIES & 2 HYBRIDS

*Less than 0.1%.
**Less than 0.01 pound.
***Common names recognized by the American Fisheries Society Special Publication.

Table 3. Species, number, and weight of families collected from the Wabash River, July 1999.

Family		Number	%	Weight	%
Cyprinidae - Carps and Minnows					
Common carp	Suckermouth minnow	2,624	30.9	3,981.07	43.9
Steelcolor shiner	Striped shiner				
Mississippi silvery minnow	Bullhead minnow				
Spotfin shiner	Silverjaw minnow				
Emerald shiner	Rosyface shiner				
Goldfish	Spottail shiner				
River shiner	Fathead minnow				
Sand shiner	Grass carp				
Silver chub	Hornyhead chub				
Central stoneroller	Mimic shiner				
Common shiner	River chub				
Bluntnose minnow	Streamline chub				
Clupeidae - Herrings		1,708	20.2	406.86	4.5
Gizzard shad	Threadfin shad				
Skipjack herring					
Catostomidae - Suckers		1,323	15.7	2,156.91	23.9
Quillback	Smallmouth buffalo				
Golden redhorse	River redhorse				
River carpsucker	Bigmouth buffalo				
White sucker	Spotted sucker				
Shorthead redhorse	Black buffalo				
Silver redhorse	Highfin carpsucker				
Blue sucker	Black redhorse				
Northern hogsucker					
Ictaluridae - Bullhead Catfish		766	9.2	1,052.02	11.5
Flathead catfish	Brindled madtom				
Channel catfish	Freckled madtom				
Yellow bullhead	Mountain madtom				
Stonecat	White catfish				
Blue catfish					
Centrarchidae - Sunfishes		646	7.6	79.10	0.8
Longear sunfish	Smallmouth bass				
Bluegill	Largemouth bass				
White crappie	Black crappie				
Spotted bass	Orangespotted sunfish				
Green sunfish	Rock bass				
Sciaenidae - Drums		496	5.9	435.59	4.8
Freshwater drum					
Lepisosteidae - Gars		431	5.1	502.34	5.5
Shortnose gar	Spotted gar				
Longnose gar					
Percidae - Perches		216	2.4	128.43	1.4
Logperch	Blackside darter				
Slenderhead darter	Hybrid walleye				

Sauger	Johnny darter				
Walleye	Rainbow darter				
Greenside darter	River darter				
Percichthyidae - Temperate Bass		136	1.6	82.52	0.9
White bass	Hybrid striped bass				
Acipenseridae - Sturgeon		56	0.7	146.57	1.6
Shovelnose sturgeon					
Hiodontidae - Mooneyes		25	0.3	18.11	0.2
Goldeye	Mooneye				
Poecillidae - Livebearers		11	0.1	0.01	*
Western mosquitofish					
Polyodontidae - Paddlefish		7	0.1	34.17	0.4
Paddlefish					
Amiidae - Bowfin		3	*	11.80	0.1
Bowfin					
Fundulidae - Killifishes		2	*	**	*
Blackstripe topminnow					
TOTALS	82 SPECIES & 2 HYBRIDS	8,450		9,035.50	

*Less than 0.1%.
**Less than 0.01 pound.

Table 4. Station water chemistry information, Wabash River, July 1999.

River Mile	Secchi Disk (in.)	Air (°F)	Water (°F)	Dissolved Oxygen (ppm)	Conductivity (micromhos)
7.0	13	88	84	8	484
13.0	13	90	84	9	484
26.0	12	94	87	8	443
31.0	12	88	82	8	443
42.0	12	73.8	84	8	500
53.0	11	95	85	8	461
63.5	11	84	86	8	442
74.0	13	82	83	8	453
85.0	13	76	85	8	482
95.3	14	77	87	9	518
108.8	17	93	86	12	410
115.2	14	100	87	10.8	410
127.8	16	81	84	7.8	440
134.7	14	86	85	10	455
145.6	18	90	85	18	470
155.0	15	86	84	11	580
165.0	15	82	86	9	592
174.5	15	90	88	11	584
185.0	15	80	85	8	568
191.0	21	80	86	9	572
205.0	14	95	90	11.2	600
214.5	13	80	89	8.8	1100
225.0	14	88	87	12.2	550
235.0	14	82	84	7.5	500
248.0	16	87	88.2	18.1	580
255.4	15	91	86	15.6	510
265.3	12	91	87.8	19.9	500
275.0	14	85	86.4	21	510
284.9	17	94	87.1	19.7	550
298.8	18	77	77.5	13	505
306.9	14	80	77.5	13	535
313.2	18	65	74	11.5	490
322.2	18	78	77	16	490
331.0	12	85	78	8.6	460
341.5	16	88	82	8.8	468
349.7	23	75	78	8.2	601
364.0	15	80	86	17.5	385
369.8	21	76	82	14.5	430
380.6	24	92	87	18	486
387.8	22	92	85	13	498
393.5	24	98	86	12	500
406.8	18	83	79	7.5	475
419.3	7	88	88	9.5	559
430.4	9	85	78	13	536
436.0	7	85	82	8	707
441.0	7	80	76	7	741
450.0	9	84	81	11	660
454.0	9	85	84	6	729

Table 5. Station Qualitative Habitat Evaluation Index (QHEI) metric component scores, Wabash River, July 1999.

River Mile	Substrate Max. 20	Cover Max. 20	Channel Max. 20	Riparian Max. 10	Pool Max. 12	Riffle Max. 8	Gradient Max. 10	Total 100	Percent Pool	Percent Run	Percent Riffle
7.0	5	6	12	6.5	9	0	8	46.5	0	100	0
13.0	5	6	12	5.5	8	0	8	44.5	0	100	0
26.0	8	7	12	8.5	9	0	8	52.5	0	100	0
31.0	12	9	14	9	7	8	8	67	20	75	5
42.0	15	14	15	6.75	8	7	8	73.75	20	50	30
53.0	8	9	10	5.5	10	0	6	48.5	50	50	0
63.5	9	10	12	10	10	0	6	57	25	75	0
74.0	8	5	10	5.5	9	0	6	43.5	25	75	0
85.0	4	6	10	10	9	0	6	45	5	95	0
95.3	13	7	10	6.5	10	7	8	61.5	80	10	10
108.8	15	7	12	6.5	9	0	8	57.5			0
115.2	15	6	11	6.5	8	0	8	54.5			0
127.8	15	7	12	6.8	10	0	8	58.8			0
134.7	15	7	12	7.3	10	0	8	59.3			0
145.6	15	9	13	7	10	0	8	62			0
155.0	16	7	13	7	10	0	6	59	20	80	0
165.0	14	11	13	7.3	10	0	6	61.3	50	50	0
174.5	16	11	16	5.75	12	6	6	72.75	50	30	20
185.0	14	7	14	5	10	4	6	60	20	50	30
191.0	13	12	11	7.5	10	0	6	59.5	0	100	0
205.0	13	12	14	11	10	5	6	71	35	63	2
214.5	13	7	10	8	8	0	6	52	10	90	0
225.0	15	15	14	9	10	0	8	71	40	60	0
235.0	13	12	14	10	10	0	8	67	30	70	0
248.0	7	8	13	5.5	8	0	6	47.5	10	90	0
255.4	13	9	14	6.5	10	0	6	58.5	30	70	0
265.3	12	5	12	5.5	10	0	6	50.5	20	80	0
275.0	12	7	13	7	9	0	6	54	5	95	0
284.9	12	7	12	6	9	0	10	56	5	95	0
298.8	12.5	8	11	10	9	0	10	61.5	5	95	0
306.9	14	8	11	7.8	10	0	10	61	4	96	0
313.2	13	3	11	6	8	0	8	49	5	95	0
322.2	16	8	10	5	10	4	10	63	8	85	7
331.0	15.5	13	15	12	9	7	10	81.5	20	60	20
341.5	13.5	10	13	10	9	6	10	71.5	5	70	25
349.7	17	11	14	10	9	7	10	78	10	70	20
364.0	15	12	19	7	10	7	10	80	10	80	10
369.8	17	13	15	5.5	9	6	10	75.5	10	80	10
380.6	16	14	15	5.75	10	6	8	74.75	3	94	3
387.8	13	15	17	7	12	5.5	10	79.5	10	60	30
393.5	17	13	17	7.75	8	6	10	78.75	0	95	5
406.8	19.5	14	19	7.75	11	6	8	85.25	20	60	20
419.3	14.5	14	20	10	9	6	8	81.5	10	10	80
430.4	12.5	10	15	6	9	6	6	64.5	0	98	2
436.0	17	7	14	5.5	4	6	6	59.5	30	60	10
441.0	18	6	14	4.5	7	5	4	58.5	80	10	10
450.0	19.5	6	14	4	7	5	6	61.5	60	30	10
454.0	6	9	7	3.5	9	3	6	43.5	90	5	5
Average	13.2	9.1	13.1	7.2	9.2	2.7	7.6	62.1	19.4	62.6	7.6

Table 6. Fish species collected at more than ten sites which had a limited upstream or downstream distribution, Wabash River, July 1999.

LIMITED UPSTREAM DISTRIBUTION	LIMITED DOWNSTREAM DISTRIBUTION
Flathead catfish (missing from upper 6 sites)	Golden redhorse (missing from lower 21 sites)
Shortnose gar (missing from upper 7 sites)	Shorthead redhorse (missing from lower 23 sites)
Longnose gar (missing from upper 7 sites)	Silver redhorse (missing from lower 25 sites)
River carpsucker (missing from upper 12 sites)	Northern hogsucker (missing from lower 29 sites)
Spotted bass (missing from upper 6 sites)	Smallmouth bass (missing from lower 24 sites)
Emerald shiner (missing from upper 7 sites)	Walleye (missing from lower 20 sites)
Smallmouth buffalo (missing from upper 11 sites)	
Sauger (missing from upper 6 sites)	
Shorthead redhorse (missing from upper 6 sites)	
Silver redhorse (missing from upper 6 sites)	
Blue sucker (missing from upper 14 sites)	
Bigmouth buffalo (missing from upper 8 sites)	
Goldeye (missing from upper 10 sites)	

Table 7. Comparison of Wabash River July 1999 fish species collection to other recent collections.

All Three Collections	Stefanavage 1999	Gammon 1998	Simon 1998	2 of 3 Collections
Gizzard shad	Common shiner	American brook lamprey	Pallid shiner	*1-White sucker
Common carp	Hybrid walleye	American eel	Cypress minnow	1-Goldfish
Steelcolor shiner	Spottail shiner	Bighead carp	Bigeye shiner	1-Spotted bass
Freshwater drum	Fathead minnow	Redfin shiner	Silverband shiner	1-Spotted sucker
Flathead catfish	Hornyhead chub	Creek chub	Mud darter	1-Yellow bullhead
Channel catfish	White catfish	Blacknose dace	Total: 5 Species	1-Greenside darter
Shortnose gar	Total: 5 Species	Black bullhead		1-Skipjack herring
Quillback	and 1 Hybrid	Pirate perch		1-Stonecat
Golden redhorse		Burbot		1-Brindled madtom
Longear sunfish		Pumpkinseed		1-Blackstripe topminnow
River carpsucker		Warmouth		1-Johnny darter
Mississippi silvery minnow		Eastern sand darter		1-Rainbow darter
Spotfin shiner		Bluntnose darter		1-Rosyface shiner
Bluegill		Fantail darter		1-Mountain madtom
Emerald shiner		Orangethroat darter		1-River darter
White bass		Total: 15 Species		1-Spotted gar
Shorthead redhorse				1-Streamline chub
Longnose gar				*2-Mimic shiner
Logperch				*3-Chestnut lamprey
White crappie				3-Silver lamprey
Silver redhorse				3-Grass pickerel
River shiner				3-Speckled chub
Blue sucker				3-Bigeye chub
Sand shiner				3-Golden shiner
Shovelnose sturgeon				3-Ghost shiner
Northern hogsucker				3-Channel shiner
Silver chub				3-Brook silverside
Smallmouth buffalo				3-Yellow bass
Slenderhead darter				3-Redear sunfish
Sauger				3-Slough darter
Smallmouth bass				3-Dusky darter
Central stoneroller				Total: 31 Species
Largemouth bass				
Bluntnose minnow				
Walleye				*1-Stefanavage 1999 and Gammon 1998.
Suckermouth minnow				
River redhorse				
Bigmouth buffalo				*2-Stefanavage 1999 and Simon 1998.
Black crappie				
Goldeye				
Green sunfish				*3-Gammon 1998 and Simon 1998.
Black buffalo				
Striped shiner				
Highfin carpsucker				
Western mosquitofish				
Bullhead minnow				
Mooneye				
Black redhorse				
Paddlefish				
Blue catfish				
Silverjaw minnow				
Threadfin shiner				
Orangespotted sunfish				
Rock bass				
Blackside darter				
Bowfin				
Blackside darter	Overall Totals:			
Freckled madtom	Stefanavage 1999 - 82 Species & 2 Hybrids			
Grass carp	Gammon 1998 - 105 Species & 1 Hybrid			
Hybrid striped bass	Simon 1998 - 79 Species & 1 Hybrid			
River chub				
Total: 60 Species & 1 Hybrid	Wabash River Grand Total Number of Species & Hybrids 116 Species & 2 Hybrids			

Table 8. Correlation coefficient (Pearson=s r) matrix calculated for paired physical attributes, water chemistry, QHEI and fisheries variable sets, Wabash River, July 1999. Asterisks indicate significance at P<0.05* or P<0.01**.

Var.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Physical Attributes																													
1	1.00																												
2	**-.468****	1.00																											
3	.157	-.357	1.00																										
4	**.978****	**-.433***	.131	1.00																									
5	-.150	-.123	**.404***	-.086	1.00																								
6	.142	.130	**-.455***	.083	**-.963****	1.00																							
7	-.035	-.075	.353	-.024	.291	**-.536****	1.00																						
8	**.540****	-.142	-.053	**.609****	.189	-.232	.243	1.00																					
9	**.421***	-.126	.105	.478	.145	-.140	.043	**.822****	1.00																				
10	**.503****	-.297	.072	**.429***	-.354	**.365***	-.189	.146	.062	1.00																			
11	**.971****	**-.437***	.021	**.933****	-.184	.170	-.028	**.522***	**.406***	**.543****	1.00																		
12	**.843****	**-.502****	.208	**.836****	-.107	.132	-.137	**.467****	.348	**.498****	**.753****	1.00																	
13	**.653****	**-.545****	**.452***	**.661****	.080	-.121	.181	**.461****	.288	**.383***	**.585****	**.856****	1.00																
14	**-.964****	**.541****	-.249	**-.908****	.217	-.196	.019	**-.440***	**-.361***	-.615	**-.948****	**-.849****	**-.705****	1.00															
Water Chemistry																													
15	-.249	.182	-.127	-.290	**-.487****	**.469****	-.138	-.046	-.042	**.542****	.025	-.034	-.081	.163	1.00														
16	.041	.120	.134	.037	-.052	.111	-.233	-.227	-.209	.045	-.012	.111	.164	-.073	-.013	1.00													
17	.296	**-.401***	.282	.231	.044	-.045	.025	-.037	-.062	**.368***	.328	.353	**.391***	**-.381***	.067	**.551****	1.00												
18	**-.415***	.156	**-.371***	**-.461****	**-.370***	**.406***	-..283	**-.471****	**-.457***	.143	-.324	**-.367***	-.329	.319	.345	.289	.124	1.00												
QHEI																													
19	**-.603****	.292	.212	**-.567****	.214	-.312	**.440***	-.065	.080	**-.503****	**-.571****	**-.559****	-.273	**.537****	.097	-.142	-.308	.144	1.00										
20	-.014	.034	.176	-.006	.014	-.098	.307	..250	.252	.180	-.078	.094	.171	-.044	.257	.197	.286	-.131	.226	1.00									
21	-.213	.062	.131	-.216	-.161	.026	**.415***	-.048	-.056	-.255	-.237	-.232	.040	.139	.060	.290	.106	.127	**.558****	**.391***	1.00								
22	**.401***	-.004	-.204	**.407***	**-.469****	**.498****	-.301	**.371***	**.424***	**.420***	**.392***	**.445***	.278	**-.431***	.298	-.069	.096	-.067	-.284	.237	.031	1.00							
23	.191	-.313	.362	.125	-.000	.015	-.052	.019	-.014	**.680****	.203	**.369***	**.395***	-.322	**.367***	.066	.325	.176	-.154	.201	-.213	.139	1.00						
24	-.174	.173	.025	-.095	**.367***	**-.514****	**.681****	.333	.251	**-.421***	-.136	-.352	-.052	.245	-.226	-.062	-.154	-.272	**.529****	.353	**.473****	-.222	-.336	1.00					
25	.059	**-.666****	**-.425***	.045	**-.468****	**.438***	-.089	.084	-.017	.300	.145	-.062	-.175	-.053	**.542****	.002	-.209	.234	.033	.098	-.087	.307	.031	.018	1.00				
26	-.271	.290	.123	-.240	.006	-.150	**.517****	..224	.247	-.133	-.251	-.266	-.004	-205	.272	.030	-.062	.032	**.762***	**.674****	**.700****	.181	.020	.674	..277	1.00			
Fisheries																													
27	**-.416***	**.542****	**-.486****	**-.388***	.358	.359	-.156	-.063	-.185	-.061	**-.375***	-.324	**-.402***	**.444***	**.456***	-.253	**-.629****	.244	.269	-.065	-.014	.024	-.062	.003	**.556****	.203	1.00		
28	**-.486****	.386	-.128	**-.371***	.188	-.145	-.073	.011	.092	**-.629****	**-.572****	**-.373***	**-.392***	**.601****	-.222	-.052	**-.535****	-.151	.359	-.140	.059	-.298	**-.435***	.184	-.153	.044	**.464****	1.00	
29	**-.626****	**.547****	-.183	**-.577****	.299	-.263	-.003	-.203	-.200	**-.385***	**-.625****	**-.671****	**-.657****	**.718****	-.091	-.045	**-.452***	-.119	.217	.009	-.019	-.316	-.355	.295	.027	.082	.357	**.577****	1.00

VARIABLE KEY

Physical Attributes			Water Chemistry	QHEI		Fisheries
1-Drainage area	5-Percent pool	10-Canopy	15-Secchi disk	19-Substrate score	23-Pool score	27-# species/hybrids
2-Gradient	6-Percent run	11-Average width	16-Air temperature	20-Cover score	24-Riffle score	28-# fish collected
3-Sample distance	7-Percent riffle	12-Average depth	17-Water temperature	21-Channel score	25-Gradient score	29-Lbs fish collected
4-Flow	8-Subjective rating	13-Maximum depth	18-Dissolved oxygen		26-Total score	
	9-Aesthetic rating	14-River mile				

Table 9. Breakdown of significant correlation coefficients (Pearson-s r) per physical attribute, water chemistry, QHEI and fisheries variable.

Variable	Number of Variables Significant at P<0.05*	Number of Variables Significant at P<0.01**	Total Number of Variables Significant at P<0.05* and P<0.01**
Physical Attribute			
1-Drainage area	4	11	15
2-Gradient	3	7	10
3-Sample distance	5	1	6
4-Flow	5	8	13
5-Percent pool	3	4	7
6-Percent run	4	5	9
7-Percent riffle	2	3	5
8-Subjective rating	2	6	8
9-Aesthetic rating	5	1	6
10-Canopy	7	7	14
11-Average width	4	10	14
12-Average depth	4	10	14
13-Maximum depth	6	8	14
14-River mile	5	9	14
Water Chemistry			
15-Secchi disk	2	4	6
16-Air temperature	0	1	1
17-Water temperature	5	3	8
18-Dissolved oxygen	6	2	8
QHEI			
19-Substrate score	2	8	10
20-Cover score	1	1	2
21-Channel score	2	3	5
22-Riparian score	8	2	10
23-Pool score	4	1	5
24-Riffle score	2	4	6
25-Gradient score	2	4	6
26-Total score	1	3	4
Fisheries			
27-Number of species/hybrid	6	5	11
28-Number of fish collected	4	7	11
29-Pounds of fish collected	2	8	10
TOTAL NUMBER	106	146	252

Appendix 1. Number of fish per species collected per river mile station, Wabash River, July 1999 (Station 7.0 through 165.0).

	RIVER MILE																
COMMON NAME	7.0	13.0	26.0	31.0	42.0	53.0	63.5	74.0	85.0	95.3	108.8	115.2	127.8	134.7	145.6	155.0	165.0
GIZZARD SHAD	1	1	61	5	16	50	27	49	9	5	47	1	105	38	55	53	55
COMMON CARP	22	10	5	9	3	5	1	6	18	3	18	19	13	11	7	15	20
STEELCOLOR SHINER	16	19	9	2	1	58	62	101	42	7							7
FRESHWATER DRUM	15	1	3	10	1	4	5	19		2	4	4	6	2	1	1	2
FLATHEAD CATFISH	5	8	3	7	1	5	7	3	6		2	16	4	6	5	54	30
CHANNEL CATFISH	13		7	11	6	1		3	3	2	3	9	11				5
SHORTNOSE GAR	8	5	41	21	13	6	3	29	13	1	14	1	7	3	6	9	9
QUILLBACK						13	11	5				7					
GOLDEN REDHORSE																	
LONGEAR SUNFISH											1	1					
RIVER CARPSUCKER			1	1	4	6		22		2	7		4		7	1	
MISSISSIPPI SILVERY MINNOW			17	4	4	5	86	74									
SPOTFIN SHINER											4	3	1	2	2		
WHITE SUCKER																	
BLUEGILL			2				3	3	1		1	1		4			
EMERALD SHINER	11	34									1	5		1		1	2
WHITE BASS	5	7	1		2	15	21	29	8	5	2	1	2	3	4	1	2
SHORTHEAD REDHORSE																	
LONGNOSE GAR	4	4	18	2	9	2	4	1	1	3	2	4	2		4		1
GOLDFISH																	
LOGPERCH			1														
WHITE CRAPPIE								1									
SILVER REDHORSE																	
SPOTTED BASS			2	1		1	8	10	6	1	1	2	3		1		2
RIVER SHINER		1												3			
BLUE SUCKER	1	3	1	4						29							
SAND SHINER																	
GREEN SUNFISH														1			1
SHOVELNOSE STURGEON																	
NORTHERN HOGSUCKER																	
SILVER CHUB										1							
SMALLMOUTH BUFFALO	1	2		4	1	3				4	1	3			4	2	
SLENDERHEAD DARTER																	
SAUGER								2					1				1
SMALLMOUTH BASS																	
CENTRAL STONEROLLER																	
COMMON SHINER																	
LARGEMOUTH BASS							1	2				1			1		
BLUNTNOSE MINNOW			1														
WALLEYE																	
SUCKERMOUTH MINNOW																	
RIVER REDHORSE																	
BIGMOUTH BUFFALO			1			1		1					2		1		
BLACK CRAPPIE								1	2								
GOLDEYE	3				1			1	2			2					
SPOTTED SUCKER																	
YELLOW BULLHEAD																	
GREENSIDE DARTER																	
BLACK BUFFALO			2	1												1	1
SKIPJACK HERRING	2	5				1			1								
STONECAT																	
STRIPED SHINER												1		5			
HIGHFIN CARPSUCKER												1					
WESTERN MOSQUITOFISH		1							3					7			
BULLHEAD MINNOW									1								

MOONEYE																	
BLACK REDHORSE																	
PADDLEFISH	1		4		1												
BLUE CATFISH	3						1								1		1
SILVERJAW MINNOW																	
THREADFIN SHAD	1	2				1				1							1
ORANGESPOTTED SUNFISH							1		1					3			
ROCK BASS																	
BLACKSIDE DARTER																	
BOWFIN																	
BLACKSTRIPE TOPMINNOW						2											
HYBRID WALLEYE																	
JOHNNY DARTER																	
RAINBOW DARTER																	
ROSYFACE SHINER																	
SPOTTAIL SHINER																	
SPOTTED GAR									1								
BRINDLED MADTOM																	
FATHEAD MINNOW																	
FRECKLED MADTOM																	
GRASS CARP																	
HORNYHEAD CHUB																	
HYBRID STRIPED BASS																	
MIMIC SHINER																	
MOUNTAIN MADTOM																	
RIVER CHUB																	
RIVER DARTER																	
STREAMLINE CHUB																	
WHITE CATFISH																	
TOTAL NUMBER COLLECTED	112	103	180	82	63	179	241	362	118	66	108	82	161	89	99	138	140
# OF SPECIES/HYBRIDS	17	15	19	14	14	18	15	20	17	14	15	19	13	14	14	10	16

Appendix 1. Number of fish per species collected per river mile station, Wabash River, July 1999 (Station 174.5 through 331.0). Cont=d.

	RIVER MILE																
COMMON NAME	174.5	185.0	191.0	205.0	214.5	225.0	235.0	248.0	255.4	265.3	275.0	284.9	298.8	306.9	313.2	322.2	331.0
GIZZARD SHAD	32	27	40	28	54	58	19	66	65	62	54	54	48	40	48	101	58
COMMON CARP	12	16	22	11	17	11	15	16	23	6	30	12	23	15	12	14	5
STEELCOLOR SHINER		2	4					1			1		2	6	6	7	3
FRESHWATER DRUM	1	6	2		2	2	7	5	7	6	27	34	12	13	22	15	48
FLATHEAD CATFISH	24	24	38	16	8	58	7	6	3	1	3	4	1	3	2	5	2
CHANNEL CATFISH	1	3	2	2	5	1	2	1	6	3	3	8	3	8	14	10	1
SHORTNOSE GAR	9	28	32	10	2	4	2	4	8	5			8	6	1		1
QUILLBACK		1								1							1
GOLDEN REDHORSE					1	1	1	1	2			3	3	4	1	5	4
LONGEAR SUNFISH									2				2	1	2	2	
RIVER CARPSUCKER	1	3	1	2	6	3	6	5	13	6	7	1	19	19	7	7	14
MISSISSIPPI SILVERY MINNOW		1						1									
SPOTFIN SHINER				2			1	2	2	2		1	6	11	10	19	
WHITE SUCKER																	
BLUEGILL	2		2		1			1			1	1	1		2	1	1
EMERALD SHINER		2	1	1				2		3			1	21	6	8	4
WHITE BASS	2	3	3		1	1	2				1	2		1	1	3	
SHORTHEAD REDHORSE							4	1	1			1	4	1	8	7	7
LONGNOSE GAR	2	2	1			2	2			1		1	8	4	2	7	1
GOLDFISH																	
LOGPERCH						1			2		1		3	1	2	3	
WHITE CRAPPIE		1								2	1			1	2	1	
SILVER REDHORSE									1		1	3	1	5	3	5	7
SPOTTED BASS	1		1				1	3	3		7	2	1	3	2	3	
RIVER SHINER													1	4	15	35	2
BLUE SUCKER	2	1				2	5		3			3		2	1	2	1
SAND SHINER																20	
GREEN SUNFISH			1											1	1	2	
SHOVELNOSE STURGEON														1	26	3	4
NORTHERN HOGSUCKER													2	2		5	3
SILVER CHUB				1											11	9	1
SMALLMOUTH BUFFALO	2		2	2	3	4		1				1					
SLENDERHEAD DARTER																	1
SAUGER	1		1		2		1				2		4	5	5	2	1
SMALLMOUTH BASS								1	1	2	7	1	3	3	1	5	
CENTRAL STONEROLLER																9	
COMMON SHINER																	
LARGEMOUTH BASS							1						2		4	1	
BLUNTNOSE MINNOW															1		
WALLEYE				1	1				3					2	2	1	1
SUCKERMOUTH MINNOW													2	1	1		
RIVER REDHORSE																	1
BIGMOUTH BUFFALO					1	4				1							3
BLACK CRAPPIE																	
GOLDEYE			1	1			1		1						1		
SPOTTED SUCKER															1		
YELLOW BULLHEAD																	
GREENSIDE DARTER																1	
BLACK BUFFALO	1													1	3		
SKIPJACK HERRING			1					1					1			1	
STONECAT																	
STRIPED SHINER																	
HIGHFIN CARPSUCKER															1	4	1
WESTERN MOSQUITOFISH																	
BULLHEAD MINNOW																	1

MOONEYE									1	2	2		3				
BLACK REDHORSE							1					1					
PADDLEFISH															1		
BLUE CATFISH																	
SILVERJAW MINNOW																	
THREADFIN SHAD																	
ORANGESPOTTED SUNFISH																	
ROCK BASS																	
BLACKSIDE DARTER																1	
BOWFIN		2											1				
BLACKSTRIPE TOPMINNOW																	
HYBRID WALLEYE																	
JOHNNY DARTER																	
RAINBOW DARTER																	
ROSYFACE SHINER										1							
SPOTTAIL SHINER																	2
SPOTTED GAR																	
BRINDLED MADTOM																	
FATHEAD MINNOW																	
FRECKLED MADTOM	1																
GRASS CARP													1				
HORNYHEAD CHUB																	
HYBRID STRIPED BASS	1																
MIMIC SHINER																	
MOUNTAIN MADTOM																	
RIVER CHUB																	
RIVER DARTER																	
STREAMLINE CHUB																	
WHITE CATFISH																1	
TOTAL NUMBER COLLECTED	95	122	155	77	104	152	78	118	147	104	148	133	163	188	228	325	179
# OF SPECIES/HYBRIDS	17	16	18	12	14	14	18	18	19	16	16	18	27	30	36	36	28

Appendix 1. Number of fish per species collected per river mile station, Wabash River, July 1999 (Station 341.5 through 454.0). Cont=d.

	RIVER MILE														TOTAL
COMMON NAME	341.5	349.7	364.0	369.8	380.6	387.8	393.5	406.8	419.3	430.4	436.0	441.0	450.0	454.0	NUMBER
GIZZARD SHAD	30	6	20	23	33	22	29	2	37	4	8	16	7	20	1,689
COMMON CARP	11	1	19	33	8	29	67	29	34	56	49	79	34	157	1,051
STEELCOLOR SHINER		2	15	3	3	27	2	2	81	11	41	66	12	3	624
FRESHWATER DRUM	7	9	15	19	14	10	26	5	19	5	27	11	33	7	496
FLATHEAD CATFISH	1			6	5	1	4	4							388
CHANNEL CATFISH	4	3	8	6	4	7	34	1	37	23	12	28	22	5	341
SHORTNOSE GAR			1	5		1	1								317
QUILLBACK	3	1	52	41	27	39	24	2		1	10	18	13	4	274
GOLDEN REDHORSE	15	2		3	20	3	10	6	1	20	49	75	10		240
LONGEAR SUNFISH	5		4	6	4	3	3	21	19	30	44	19	30	3	202
RIVER CARPSUCKER	3	17													195
MISSISSIPPI SILVERY MINNOW				1			1								194
SPOTFIN SHINER	23	5	15	8	3	26	17	2		18					185
WHITE SUCKER							1		1	28	57	67	17	3	174
BLUEGILL	1			1	4	5	9	30	4	11	8	21	24	5	151
EMERALD SHINER	6		3		14	3	13								143
WHITE BASS					1	1	1	1	3						135
SHORTHEAD REDHORSE	5	34	17	8	2	17	10	2							129
LONGNOSE GAR		2	5	3		4	4								112
GOLDFISH								1		8		33	55		97
LOGPERCH				1	1	7	11	4	10	7	15	3	9		82
WHITE CRAPPIE			1	3	1	4	19	4	3		12		9	9	74
SILVER REDHORSE	2		8	8	6	10	10	1							71
SPOTTED BASS			1			1		4							71
RIVER SHINER	5														66
BLUE SUCKER															60
SAND SHINER	30		2	1		2	4								59
GREEN SUNFISH	1				4		1	20	2	10	4	3	4		56
SHOVELNOSE STURGEON		1	1	9	5	6									56
NORTHERN HOGSUCKER	10		3	1		4	2	1	8	4	3	2			50
SILVER CHUB		4		2	9	2	10								50
SMALLMOUTH BUFFALO		3	3												46
SLENDERHEAD DARTER	3	3		3		7	14	9		4					44
SAUGER	1		1		4	3	2	2							41
SMALLMOUTH BASS	2		1						5		5				37
CENTRAL STONEROLLER	25								2						36
COMMON SHINER											14	12	5		31
LARGEMOUTH BASS	4		1	1	1			1	2	2	2	1		1	29
BLUNTNOSE MINNOW	2			1	1					15	1	4		2	28
WALLEYE			1		2	7	1	2	1						25
SUCKERMOUTH MINNOW	3								9	4			3		23
RIVER REDHORSE	1	1	15	1		1									20
BIGMOUTH BUFFALO				1	1	1									18
BLACK CRAPPIE						1		1		6			4	2	17
GOLDEYE			1	2											17
SPOTTED SUCKER									2	2		7	3		15
YELLOW BULLHEAD									4	4		6		1	15
GREENSIDE DARTER	6		1			4		2							14
BLACK BUFFALO		2		1											13
SKIPJACK HERRING															13
STONECAT	1						1	2	2	4	1		1		12
STRIPED SHINER	6														12
HIGHFIN CARPSUCKER		1	1			1	1								11
WESTERN MOSQUITOFISH															11

BULLHEAD MINNOW			1			1	2	3							9
MOONEYE															8
BLACK REDHORSE	5														7
PADDLEFISH															7
BLUE CATFISH															6
SILVERJAW MINNOW	6														6
THREADFIN SHAD															6
ORANGESPOTTED SUNFISH															5
ROCK BASS	1			1	1					1					4
BLACKSIDE DARTER				1	1										3
BOWFIN															3
BLACKSTRIPE TOPMINNOW															2
HYBRID WALLEYE					1			1							2
JOHNNY DARTER	2														2
RAINBOW DARTER	1					1									2
ROSYFACE SHINER	1														2
SPOTTAIL SHINER															2
SPOTTED GAR			1												2
BRINDLED MADTOM							1								1
FATHEAD MINNOW					1										1
FRECKLED MADTOM															1
GRASS CARP															1
HORNYHEAD CHUB	1														1
HYBRID STRIPED BASS															1
MIMIC SHINER							1								1
MOUNTAIN MADTOM					1										1
RIVER CHUB	1														1
RIVER DARTER				1											1
STREAMLINE CHUB	1														1
WHITE CATFISH															1
TOTAL NUMBER COLLECTED	235	97	217	204	182	261	336	165	286	278	362	471	295	222	8,450
# OF SPECIES/HYBRIDS	38	18	29	32	30	34	33	29	22	24	19	19	19	14	84

Appendix 2. Weight (pounds) of fish species collected per river mile station, Wabash River, July 1999 (Station 7.0 through 145.6).

	RIVER MILE														
COMMON NAME	7.0	13.0	26.0	31.0	42.0	53.0	63.5	74.0	85.0	95.3	108.8	115.2	127.8	134.7	145.6
COMMON CARP	114.00	53.50	19.74	37.50	7.00	21.56	5.20	13.44	64.84	12.33	88.74	67.97	58.95	50.99	35.19
CHANNEL CATFISH	22.65		12.51	16.26	21.85	3.77		6.29	3.42	7.13	3.01	24.95	33.21		
FLATHEAD CATFISH	2.90	3.38	5.80	6.93	0.06	2.74	5.61	3.09	2.09		2.00	12.40	5.88	1.81	2.75
FRESHWATER DRUM	13.00	1.04	1.98	8.98	0.58	1.77	0.41	6.00		1.62	3.58	5.12	10.78	2.11	1.60
GOLDEN REDHORSE															
GIZZARD SHAD	0.16	0.01	7.35	1.39	3.42	13.22	5.40	7.00	1.91	2.00	9.50	0.32	32.44	13.75	16.00
SHORTNOSE GAR	9.74	6.00	42.00	22.00	19.50	5.42	2.97	27.00	11.26	0.90	13.82	1.50	5.16	2.92	5.62
QUILLBACK						0.81	0.87	0.41				1.70			
BLUE SUCKER	9.00	15.00	4.75	19.00						115.20					
RIVER CARPSUCKER			0.08	0.07	3.52	4.40		1.00		2.99	9.00		1.27		1.13
SILVER REDHORSE															
SHORTHEAD REDHORSE															
LONGNOSE GAR	9.24	25.50	35.50	3.15	12.68	5.28	4.85	0.20	0.38	5.50	1.59	1.51	0.49		1.36
SMALLMOUTH BUFFALO	2.00	2.33		22.50	2.20	4.28				15.33	0.15	21.25			2.21
SHOVELNOSE STURGEON															
RIVER REDHORSE															
BIGMOUTH BUFFALO			4.50			0.34		0.53					7.80		4.50
WHITE BASS	6.83	5.04	1.02		2.03	6.18	8.54	14.18	3.81	5.48	1.46	0.32	0.71	1.57	4.40
SAUGER								3.46					1.17		
WALLEYE															
BLACK BUFFALO			5.68	6.00											
WHITE SUCKER															
BLUE CATFISH	25.52						5.00								0.11
PADDLEFISH	2.11		26.40		1.10										
NORTHERN HOGSUCKER															
GOLDFISH															
SPOTTED BASS			0.08	0.10		0.65	1.93	2.07	1.28	0.02	0.82	1.11	0.25		0.23
SPOTTED SUCKER															
GOLDEYE	2.48				0.80			0.35	1.89			1.80			
LONGEAR SUNFISH											0.05	*			
WHITE CRAPPIE								0.16							
GRASS CARP															
SMALLMOUTH BASS															
BOWFIN															
BLUEGILL			0.05				0.64	0.31	0.01		0.04	0.22		0.33	
BLACK REDHORSE															
HIGHFIN CARPSUCKER												0.16			
LARGEMOUTH BASS							0.12	0.78				0.39			0.55
SAUGEYE															
STEELCOLOR SHINER	0.03	0.06	0.03	0.01	0.01	0.04	0.08	0.09	0.03	0.01					
YELLOW BULLHEAD															
WHITE CATFISH															
LOGPERCH			0.01												
SPOTTED GAR									0.28						
BLACK CRAPPIE								0.35	*						
MOONEYE															
SKIPJACK HERRING	0.02	0.02				0.46			0.43						
WIPER															
SILVER CHUB										0.03					
GREEN SUNFISH														0.02	
SPOTFIN SHINER											0.01	0.01	0.00	*	0.02
EMERALD SHINER	0.02	0.06									*	*		*	
MISSISSIPPI SILVERY MINNOW			0.04	0.02	0.02	0.01	0.43	0.45							
STONECAT															
RIVER SHINER		0.01												0.01	
SLENDERHEAD DARTER															
ROCK BASS															

SUCKERMOUTH MINNOW															
THREADFIN SHAD	0.08	0.08				0.05				0.01					
SAND SHINER															
COMMON SHINER															
BLUNTNOSE MINNOW			0.01												
GREENSIDE DARTER															
CENTRAL STONEROLLER															
BULLHEAD MINNOW									0.01						
BLACKSIDE DARTER															
FRECKLED MADTOM															
SILVERJAW MINNOW															
ORANGESPOTTED SUNFISH							*		*					0.02	
BRINDLED MADTOM															
SPOTTAIL SHINER															
RIVER DARTER															
RIVER CHUB															
HORNYHEAD CHUB															
STRIPED SHINER												*		*	
MOUNTAIN MADTOM															
WESTERN MOSQUITOFISH		0.01							*					*	
STREAMLINE CHUB															
JOHNNY DARTER															
ROSYFACE SHINER															
RAINBOW DARTER															
FATHEAD MINNOW															
MIMIC SHINER															
BLACKSTRIPE TOPMINNOW						*									
TOTAL LBS. COLLECTED	219.78	112.04	167.53	143.91	74.77	70.98	42.05	87.16	91.64	168.55	133.77	140.73	158.11	73.53	75.67
# OF SPECIES/HYBRIDS	17	15	19	14	14	18	15	20	17	14	15	19	13	14	14

*Less than 0.01 pound.

Appendix 2. Weight (pounds) of fish species collected per river mile station, Wabash River, July 1999 (Station 155.0 through 298.8). Cont-d.

	RIVER MILE														
COMMON NAME	155.0	165.0	174.5	185.0	191.0	205.0	214.5	225.0	235.0	248.0	255.4	265.3	275.0	284.9	298.8
COMMON CARP	49.50	71.50	28.58	57.00	91.94	42.14	91.13	38.35	82.92	77.00	102.80	26.70	134.60	56.50	134.70
CHANNEL CATFISH		12.96	0.77	11.28	6.82	0.03	26.44	4.18	2.88	1.20	7.69	6.33	3.86	11.20	6.67
FLATHEAD CATFISH	23.43	13.43	6.46	19.40	18.09	5.62	1.33	20.20	37.62	3.14	22.34	0.12	2.44	6.64	0.69
FRESHWATER DRUM	1.24	0.29	0.95	2.72	1.35		0.62	2.20	8.09	9.51	10.10	8.75	28.09	21.41	14.63
GOLDEN REDHORSE							0.28	0.69	2.12	1.17	0.41			0.47	4.06
GIZZARD SHAD	14.25	14.92	10.35	9.75	13.00	7.30	12.63	16.29	7.04	20.69	19.70	10.48	9.00	13.11	9.31
SHORTNOSE GAR	11.15	5.00	6.85	34.50	22.75	10.43	0.89	3.11	2.21	3.71	8.87	6.20			15.69
QUILLBACK				0.28								0.10			
BLUE SUCKER			8.78	4.45				9.14	18.22		11.14			11.55	
RIVER CARPSUCKER	3.02		0.12	2.82	0.08	2.06	13.46	4.99	8.87	6.97	20.10	7.20	11.80	1.17	22.69
SILVER REDHORSE											1.35		2.57	4.05	4.05
SHORTHEAD REDHORSE									2.95	2.26	2.40			0.30	0.35
LONGNOSE GAR		0.24	2.57	0.57	0.26			1.72	2.08			1.29		1.32	9.50
SMALLMOUTH BUFFALO	1.87		5.06		3.34	7.72	4.42	12.48		5.01				2.25	
SHOVELNOSE STURGEON															
RIVER REDHORSE															
BIGMOUTH BUFFALO							8.15	34.35				9.10			
WHITE BASS	0.63	0.56	1.58	2.91	3.65		0.36	0.47	2.09				0.32	0.69	
SAUGER		1.52	0.46		1.46		3.08		1.92				3.28		10.66
WALLEYE						0.89	0.41				7.00				
BLACK BUFFALO	1.44	1.43	5.50												
WHITE SUCKER															
BLUE CATFISH		4.73													
PADDLEFISH															
NORTHERN HOGSUCKER															0.46
GOLDFISH															
SPOTTED BASS		0.21	0.01		0.01				0.07	0.48	1.50		2.36	0.27	0.37
SPOTTED SUCKER															
GOLDEYE					1.46	0.91			1.43		0.70				
LONGEAR SUNFISH											0.08				0.05
WHITE CRAPPIE				0.10								0.44	0.23		
GRASS CARP															12.44
SMALLMOUTH BASS										0.04	0.06	0.20	0.44	0.05	0.46
BOWFIN				9.50											2.30
BLUEGILL			0.30		0.08		0.05			0.24			0.01	0.09	0.02
BLACK REDHORSE									0.31					0.73	
HIGHFIN CARPSUCKER															
LARGEMOUTH BASS									0.13						0.36
SAUGEYE															
STEELCOLOR SHINER		0.06		0.02	0.04					0.01			0.01		0.00
YELLOW BULLHEAD															
WHITE CATFISH															
LOGPERCH								0.03			0.05		0.01		0.13
SPOTTED GAR															
BLACK CRAPPIE															
MOONEYE											0.30	0.57	0.77		
SKIPJACK HERRING					0.34					0.28					0.66
WIPER			2.34												
SILVER CHUB						0.03									
GREEN SUNFISH		0.09			0.04										
SPOTFIN SHINER						0.02			0.02	0.01	0.02	0.02		*	0.07
EMERALD SHINER	0.01	0.03		0.02	0.01	0.02				0.02		0.03			0.01
MISSISSIPPI SILVERY MINNOW				0.01						0.01					
STONECAT															
RIVER SHINER															0.01
SLENDERHEAD DARTER															

ROCK BASS															
SUCKERMOUTH MINNOW															0.03
THREADFIN SHAD		0.06													
SAND SHINER															
COMMON SHINER															
BLUNTNOSE MINNOW															
GREENSIDE DARTER															
CENTRAL STONEROLLER															
BULLHEAD MINNOW															
BLACKSIDE DARTER															
FRECKLED MADTOM			0.03												
SILVERJAW MINNOW															
ORANGESPOTTED SUNFISH															
BRINDLED MADTOM															
SPOTTAIL SHINER															
RIVER DARTER															
RIVER CHUB															
HORNYHEAD CHUB															
STRIPED SHINER															
MOUNTAIN MADTOM															
WESTERN MOSQUITOFISH															
STREAMLINE CHUB															
JOHNNY DARTER															
ROSYFACE SHINER												*			
RAINBOW DARTER															
FATHEAD MINNOW															
MIMIC SHINER															
BLACKSTRIPE TOPMINNOW															
TOTAL LBS. COLLECTED	106.54	127.03	80.71	155.33	164.72	77.17	163.25	148.20	180.97	131.75	216.61	77.53	199.79	131.80	250.37
# OF SPECIES/HYBRIDS	10	16	17	16	18	12	14	14	18	18	19	16	16	18	27

*Less than 0.01 pound.

Appendix 2. Weight (pounds) of fish species collected per river mile station, Wabash River, July 1999 (Station 306.9 through 436.0). Cont=d.

	RIVER MILE														
COMMON NAME	306.9	313.2	322.2	331.0	341.5	349.7	364.0	369.8	380.6	387.8	393.5	406.8	419.3	430.4	436.0
COMMON CARP	83.44	62.42	68.00	29.05	48.10	2.80	70.25	130.25	24.50	94.00	215.50	79.00	117.75	176.50	119.56
CHANNEL CATFISH	16.56	15.83	12.50	0.85	5.12	2.35	11.40	13.01	3.85	7.42	26.96	3.40	65.75	33.23	9.85
FLATHEAD CATFISH	2.46	9.89	12.25	17.05	2.52			40.37	51.96	3.26	38.92	53.19			
FRESHWATER DRUM	14.88	23.65	17.00	60.99	10.20	6.10	13.50	25.00	10.00	10.25	23.50	2.65	9.50	4.98	18.31
GOLDEN REDHORSE	3.11	2.54	7.25	4.28	10.70	0.00		6.75	35.69	4.04	21.94	12.00	2.66	53.00	83.47
GIZZARD SHAD	7.57	6.45	24.40	13.25	8.20	2.60	6.16	5.61	7.01	3.96	4.58	0.68	0.86	0.92	1.89
SHORTNOSE GAR	9.75	0.56		2.80			2.52	4.84		0.96	0.99				
QUILLBACK				0.01	*	*	71.75	58.25	36.44	48.50	22.25	2.73		2.56	17.38
BLUE SUCKER	11.88	3.65	11.68	2.45											
RIVER CARPSUCKER	30.78	10.22	8.08	23.27	4.00	26.45									
SILVER REDHORSE	16.31	12.13	14.31	20.20	6.22		27.75	22.25	14.69	28.50	26.25	4.57			
SHORTHEAD REDHORSE	1.49	10.64	8.30	12.75	7.70	58.25	27.25	14.25	3.63	27.75	15.50	1.91			
LONGNOSE GAR	4.64	1.97	10.80	5.25		2.60	4.59	4.29		3.76	4.85				
SMALLMOUTH BUFFALO						15.25	18.36								
SHOVELNOSE STURGEON	2.47	61.44	9.69	9.25		2.60	3.20	27.60	14.13	16.19					
RIVER REDHORSE				8.25	6.50	6.50	107.25	7.09		5.89					
BIGMOUTH BUFFALO				10.27				4.34	5.13	7.69					
WHITE BASS	0.20	1.04	1.96						0.09	0.10	0.12	0.18	1.66		
SAUGER	6.58	7.50	2.99	2.11	0.34		1.42		4.41	3.79	2.71	2.19			
WALLEYE	4.61	6.54	2.54	1.50			1.66		18.82	10.98	2.76	1.26	0.01		
BLACK BUFFALO	4.15	6.94				10.40		16.69							
WHITE SUCKER											0.35		0.13	13.68	10.21
BLUE CATFISH															
PADDLEFISH		4.56													
NORTHERN HOGSUCKER	1.14		1.22	1.44	0.00		2.21	1.56		0.57	0.21	0.99	7.00	5.08	1.51
GOLDFISH												0.75		1.99	
SPOTTED BASS	0.34	0.27	0.96				0.04			0.95		1.60			
SPOTTED SUCKER		1.96											2.24	1.77	
GOLDEYE		0.80					0.54	2.22							
LONGEAR SUNFISH	0.08	0.11	0.19		0.41		0.19	0.79	0.21	0.25	0.19	1.87	1.49	1.93	3.51
WHITE CRAPPIE	0.20	0.55	0.16				0.21	0.42	0.06	0.62	2.73	0.95	0.69		2.77
GRASS CARP															
SMALLMOUTH BASS	0.49	0.33	1.69		2.21		0.26						3.95		2.15
BOWFIN															
BLUEGILL		0.08	0.03	0.07	0.04			0.01	0.31	0.44	0.40	1.94	0.14	0.41	0.46
BLACK REDHORSE					7.70										
HIGHFIN CARPSUCKER		0.74	2.95	1.00		0.80	0.99			0.83	0.14				
LARGEMOUTH BASS		0.52	0.34		0.43		0.00	0.01	0.05			0.00	0.26	0.26	0.42
SAUGEYE									2.70			1.88			
STEELCOLOR SHINER	0.06	0.11	0.08	0.04		0.03	0.16	0.01	0.03	0.33	0.04	0.08	1.13	0.16	0.57
YELLOW BULLHEAD													1.64	0.75	
WHITE CATFISH			3.52												
LOGPERCH	0.03	0.07	0.10					0.03	0.03	0.32	0.56	0.17	0.35	0.26	0.55
SPOTTED GAR							2.94								
BLACK CRAPPIE										0.11		0.10		1.31	
MOONEYE	1.09														
SKIPJACK HERRING			0.30												
WIPER															
SILVER CHUB		0.43	0.29	0.02		0.18		0.07	0.46	0.10	0.51				
GREEN SUNFISH	0.01	0.01	0.02		0.01				0.15		0.02	0.98	0.09	0.25	0.16
SPOTFIN SHINER	0.10	0.09	0.15		0.10	0.04	0.16	0.08	0.03	0.32	0.20	0.01		0.20	
EMERALD SHINER	0.26	0.07	0.09	0.04	0.05		0.01		0.14	0.04	0.15				
MISSISSIPPI SILVERY MINNOW								0.01			0.01				
STONECAT					*						0.02	0.04	0.21	0.27	0.11
RIVER SHINER	0.01	0.10	0.25	0.02	0.05										
SLENDERHEAD DARTER				*	0.02	0.03		0.02		0.07	0.12	0.08		0.05	

ROCK BASS					0.12			0.12	0.09					0.05	
SUCKERMOUTH MINNOW	*	0.01			0.01								0.16	0.07	
THREADFIN SHAD															
SAND SHINER			0.05		0.09		0.01	*		0.01	0.03				
COMMON SHINER															0.08
BLUNTNOSE MINNOW		*			0.02			0.01	*					0.05	0.01
GREENSIDE DARTER			0.01		0.01		0.02			0.06		0.03			
CENTRAL STONEROLLER			0.02		0.05								0.01		
BULLHEAD MINNOW				0.01			0.01			0.01	*	0.03			
BLACKSIDE DARTER			*					0.02	0.01						
FRECKLED MADTOM															
SILVERJAW MINNOW					0.02										
ORANGESPOTTED SUNFISH															
BRINDLED MADTOM											0.01				
SPOTTAIL SHINER				0.01											
RIVER DARTER								0.01							
RIVER CHUB					0.01										
HORNYHEAD CHUB					0.01										
STRIPED SHINER					0.01										
MOUNTAIN MADTOM									0.01						
WESTERN MOSQUITOFISH															
STREAMLINE CHUB					*										
JOHNNY DARTER					*										
ROSYFACE SHINER					*										
RAINBOW DARTER					*					*					
FATHEAD MINNOW									*						
MIMIC SHINER											*				
BLACKSTRIPE TOPMINNOW															
TOTAL LBS. COLLECTED	224.69	254.22	224.17	226.23	120.97	136.98	374.81	385.98	234.63	282.07	412.52	175.26	217.68	299.73	272.97
# OF SPECIES/HYBRIDS	30	36	36	28	38	18	29	32	30	34	33	29	22	24	19

*Less than 0.01 pound.

Appendix 2. Weight (pounds) of fish species collected per river mile station, Wabash River, July 1999 (Station 441.0 through 454.0). Cont-d.

COMMON NAME	RIVER MILE 441.0	450.0	454.0	TOTAL WEIGHT
COMMON CARP	259.58	105.74	513.23	3,935.98
CHANNEL CATFISH	25.38	15.94	11.01	537.77
FLATHEAD CATFISH				470.26
FRESHWATER DRUM	5.81	8.88	1.87	435.59
GOLDEN REDHORSE	137.13	12.10		405.86
GIZZARD SHAD	0.60	1.99	5.65	404.07
SHORTNOSE GAR				329.59
QUILLBACK	26.14	18.98	3.01	312.17
BLUE SUCKER				255.89
RIVER CARPSUCKER				231.61
SILVER REDHORSE				204.20
SHORTHEAD REDHORSE				197.68
LONGNOSE GAR				169.53
SMALLMOUTH BUFFALO				148.01
SHOVELNOSE STURGEON				146.57
RIVER REDHORSE				141.48
BIGMOUTH BUFFALO				96.70
WHITE BASS				80.18
SAUGER				61.05
WALLEYE				58.98
BLACK BUFFALO				58.23
WHITE SUCKER	16.25	2.27	0.64	43.53
BLUE CATFISH				35.36
PADDLEFISH				34.17
NORTHERN HOGSUCKER	2.88			26.27
GOLDFISH	8.08	9.88		20.70
SPOTTED BASS				17.98
SPOTTED SUCKER	7.88	4.08		17.93
GOLDEYE				15.38
LONGEAR SUNFISH	1.40	2.50	0.08	15.38
WHITE CRAPPIE		1.65	1.54	13.48
GRASS CARP				12.44
SMALLMOUTH BASS				12.33
BOWFIN				11.80
BLUEGILL	1.05	1.42	0.20	9.39
BLACK REDHORSE				8.74
HIGHFIN CARPSUCKER				7.61
LARGEMOUTH BASS	0.26		0.05	4.93
SAUGEYE				4.58
STEELCOLOR SHINER	0.94	0.19	0.02	4.51
YELLOW BULLHEAD	1.82		0.10	4.31
WHITE CATFISH				3.52
LOGPERCH	0.05	0.51		3.26
SPOTTED GAR				3.22
BLACK CRAPPIE		1.03	0.21	3.11
MOONEYE				2.73
SKIPJACK HERRING				2.51
WIPER				2.34
SILVER CHUB				2.12
GREEN SUNFISH	0.13	0.12		2.10
SPOTFIN SHINER				1.68
EMERALD SHINER				1.08
MISSISSIPPI SILVERY MINNOW				1.01
STONECAT		0.10		0.75
RIVER SHINER				0.46

SLENDERHEAD DARTER				0.39
ROCK BASS				0.38
SUCKERMOUTH MINNOW		0.08		0.36
THREADFIN SHAD				0.28
SAND SHINER				0.19
COMMON SHINER	0.06	0.04		0.18
BLUNTNOSE MINNOW	0.04		0.01	0.15
GREENSIDE DARTER				0.13
CENTRAL STONEROLLER				0.08
BULLHEAD MINNOW				0.07
BLACKSIDE DARTER				0.03
FRECKLED MADTOM				0.03
SILVERJAW MINNOW				0.02
ORANGESPOTTED SUNFISH				0.02
BRINDLED MADTOM				0.01
SPOTTAIL SHINER				0.01
RIVER DARTER				0.01
RIVER CHUB				0.01
HORNYHEAD CHUB				0.01
STRIPED SHINER				0.01
MOUNTAIN MADTOM				0.01
WESTERN MOSQUITOFISH				0.01
STREAMLINE CHUB				*
JOHNNY DARTER				*
ROSYFACE SHINER				*
RAINBOW DARTER				*
FATHEAD MINNOW				*
MIMIC SHINER				*
BLACKSTRIPE TOPMINNOW				*
TOTAL LBS. COLLECTED	495.48	187.50	537.62	9,035.50
# OF SPECIES/HYBRIDS	19	19	14	84

*Less than 0.01 pound.

Appendix 3. Back calculated length at annulus formation, Wabash River, July 1999.

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
White bass	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 0.7	1998	29	6.7							
	1997	23	5.2	9.7						
	1996	38	6.3	10.5	12.8					
	1995	4	5.9	10.0	12.4	13.7				
	1994	1	3.2	9.6	11.7	13.1	13.8			
	AVERAGE LENGTH		6.0	10.1	12.6	13.7				
	STD. DEVIATION		0.65	0.41	0.28					
	YR. CLASSES AVG.		4	3	2	1				

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
Spotted bass	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 0.0	1998	21	3.4							
	1997	11	3.3	6.4						
	1996	12	3.6	6.4	8.8					
	1995	8	3.7	7.5	9.5	11.0				
	AVERAGE LENGTH		3.5	6.8	9.2	11.0				
	STD. DEVIATION		0.21	0.60	0.50					
	YR. CLASSES AVG.		4	3	2	1				

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
Smallmouth bass	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 1.4	1998	14	3.5							
	1997	5	3.2	6.4						
	1996	3	2.9	5.4	9.7					
	1995	1	2.8	6.8	10.3	12.7				
	AVERAGE LENGTH		3.2	5.9	9.7					
	STD. DEVIATION		0.33	0.67						
	YR. CLASSES AVG.		3	2	1					

NOTE: Age groups with less than three samples are not included in year class averages or standard deviation.

Appendix 3. Back calculated length at annulus formation, Wabash River, July 1999. Cont-d.

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
Largemouth bass	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 0.8	1998	3	3.2							
	1997	12	3.5	6.4						
	1996	1	3.6	7.1	9.3					
	AVERAGE LENGTH		3.3	6.4						
	STD. DEVIATION		0.21							
	YR. CLASSES AVG.		2	1						

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
Sauger	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 0.0	1998	3	9.5							
	1997	6	8.3	13.8						
	1996	23	7.4	12.9	16.1					
	1995	4	8.3	13.4	16.4	18.5				
	1994	1	9.7	15.9	20.4	22.3	23.5			
	AVERAGE LENGTH		8.4	13.3	16.3	18.5				
	STD. DEVIATION		0.86	0.43	0.22					
	YR. CLASSES AVG.		4	3	2	1				

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
Walleye	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 2.2	1998	7	10.0							
	1997	4	9.3	12.6						
	1996	7	8.5	14.4	17.5					
	1995	4	8.1	13.9	20.0	21.4				
	AVERAGE LENGTH		9.0	13.6	18.8	21.4				
	STD. DEVIATION		0.86	0.93	1.76					
	YR. CLASSES AVG.		4	3	2	1				

NOTE: Age groups with less than three samples are not included in year class averages or standard deviation.

Appendix 3. Back calculated length at annulus formation, Wabash River, July 1999. Cont-d.

Species	YEAR	NUMBER OF	BACK CALCULATED LENGTH (inches) AT EACH AGE							
White crappie	CLASS	FISH AGED	I	II	III	IV	V	VI	VII	VIII
Intercept = 1.4	1998	3	3.5							
	1997	15	3.3	5.9						
	1996	11	3.2	5.3	7.1					
	1995	3	3.5	5.6	7.2	8.0				
	AVERAGE LENGTH		3.4	5.6	7.1	8.0				
	STD. DEVIATION		0.17	0.29	0.07					
	YR. CLASSES AVG.		4	3	2	1				

NOTE: Age groups with less than three samples are not included in year class averages or standard deviation.

Appendix 4. Actual locations where boats were launched to sample collection sites, Wabash River, July 1999.

Access Sites

RM 7.0 - IL DNR=s Public Access Site (PAS) in New Haven, IL along the Little Wabash River. The Little Wabash River enters the Wabash located at RM 15.0.

RM 13.0 - IL DNR=s PAS in New Haven, IL along the Little Wabash River. The Little Wabash River enters the Wabash located at RM 15.0.

RM 26.0 - IN DNR=s Dogtown PAS located at RM 27.75.

RM 31.0 - IN DNR=s Dogtown PAS located at RM 27.75.

RM 42.0 - IN DNR=s New Harmony State Park PAS located at RM 40.5.

RM 53.0 - IN DNR=s New Harmony PAS located at RM 51.8.

RM 63.5 - IL DNR=s Grayville PAS located at RM 63.5.

RM 74.0 - IL DNR=s Grayville PAS located at RM 63.5.

RM 85.0 - Private ramp at Crawleyville IN, located at RM 84.5.

RM 95.3 - IN DNR=s Patoka Island PAS located at RM 92.9.

RM 108.8 - IN DNR=s Clarks Landing PAS located at RM 115.2.

RM 115.2 - IN DNR=s Clarks Landing PAS located at RM 115.2..

RM 127.8 - IN DNR=s Kimmell Park (Vincennes) PAS located at RM 129.

RM 134.7 - Private ramp at Russellville IL, located at RM 140.5.

RM 145.6 - Private ramp at Russellville IL, located at RM 140.5.

RM 155.0 - Poor quality private launch site at Riverton IN, located at RM 155.0.

RM 165.0 - IN DNR=s Merom PAS located at RM 164.7

RM 174.5 - IL DNR=s Hutsonville PAS located at RM 170.5.

RM 185.0 - Sullivan County IN partially developed Riverview Access Site located upstream of RM 185.0.

RM 191.0 - Good quality launch site at private ferry landing in Darwin IL located at RM 190.2 on IN bank.

RM 205.0 - IN DNR=s Fairbanks Park (Terre Haute) PAS located at RM 214.0.

RM 214.5 - IN DNR=s Fairbanks Park (Terre Haute) PAS located at RM 214.0.

RM 225.0 - City of Clinton or Clinton Boat Club (ownership uncertain) launch site located on highway 163 in Clinton (RM 230.0)..

RM 235.0 - City of Clinton or Clinton Boat Club (ownership uncertain) launch site located on highway 163 in Clinton (RM 230.0).

*RM 240.0 - IN DNR=s Montezuma PAS.

RM 248.0 - Private fish camp site located at RM 247.5.

RM 255.4 - Private Cayuga Generating Station dirt ramp located at RM 254.0.

RM 265.3 - Public easement ramp in Perrysville located at RM 264.3.

RM 275.0 - IN DNR=s Covington PAS located at RM 271.1.

RM 284.9 - IN DNR=s Attica PAS located at RM 287.2.

*RM 286 - Town of Williamsport (ownership uncertain) ramp.

RM 298.8 - Private ramp near RM 298.2.

*RM 303.0 - Tippecanoe County Granville Bridge ramp.

RM 306.9 - Tippecanoe County Quiatenon Blockhouse Park ramp located approximately at RM 307.2.

RM 313.2 - IN DNR=s Mascouten Park PAS located approximately at RM 313.2.

RM 322.2 - Private canoe livery ramp just upstream from the Tippecanoe River confluence located at RM 322.2.

RM 331.0 - Private ramp located at RM 331 near Pittsburg, on west side of the river 0.2 miles downstream
of the U.S. 421 bridge.

RM 341.5 - IN DNR=s French Post Park PAS located at RM 341.5.

RM 349.7 - IN DNR=s France Park PAS located at RM 349.7.

RM 364.0 - Private launch site just downstream from the old Lewisburg Bridge located at RM 363.5.

RM 369.8 - Private launch site in the Peru K-Mart parking lot located at RM 370.5.

RM 380.6 - IN DNR=s Omer Cole PAS located at RM 380.1.

RM 387.8 - IN DNR=s City of Wabash PAS located at RM 387.0.

RM 393.5 - Private launch site at Celotex Company water intake located at RM 393.3.

RM 406.8 - Public easement on SE corner of SR 9 and SR 37 bridge located at RM 405.9.

RM 419.3 - IN DNR Huntington Reservoir property at mouth of Rock Creek located at RM 419.2.

RM 430.4 - Private launch site off Rose Road, south side of river located at RM 430.5.

RM 436.0 - IN DNR=s White=s Bridge PAS located at RM 436.3.

RM 441.0 - Private launch site downstream side of SR 316 located at RM 440.5.

RM 450.0 - Lynn Grove town park ramp located at RM 445.0.

RM 454.0 - Town of Geneva park property upstream of CR 900S near covered bridge located at RM 451.8.

*** Other ramps along the river that were not used during the project.**

APPENDIX 5

INDIVIDUAL STATION DESCRIPTION INCLUDING PHYSICAL CHARACTERISTICS, QHEI SCORES AND COMPOSITION OF THE FISH COMMUNITY

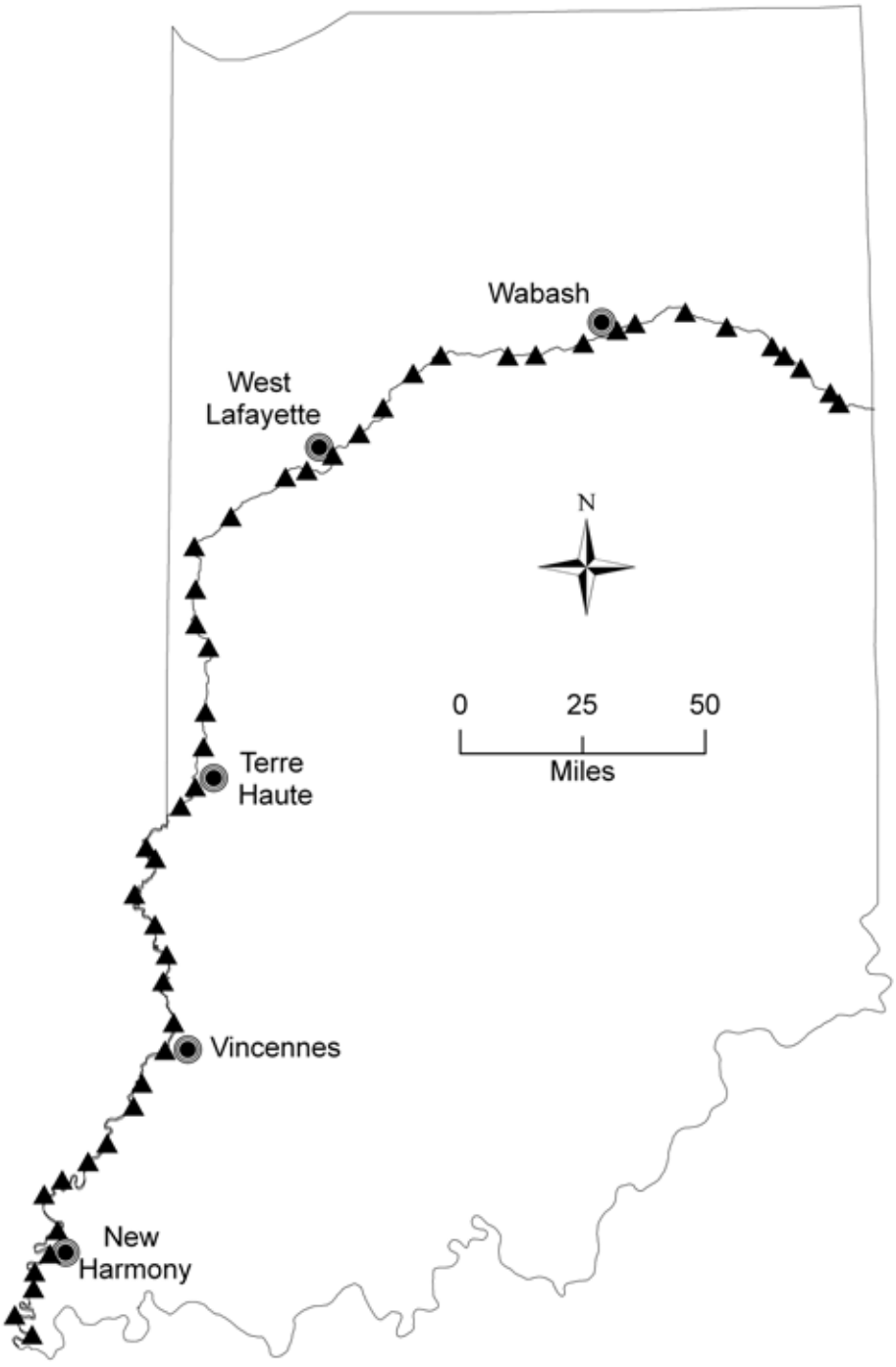


Figure 1. Map of Wabash River with locations of sampling stations.

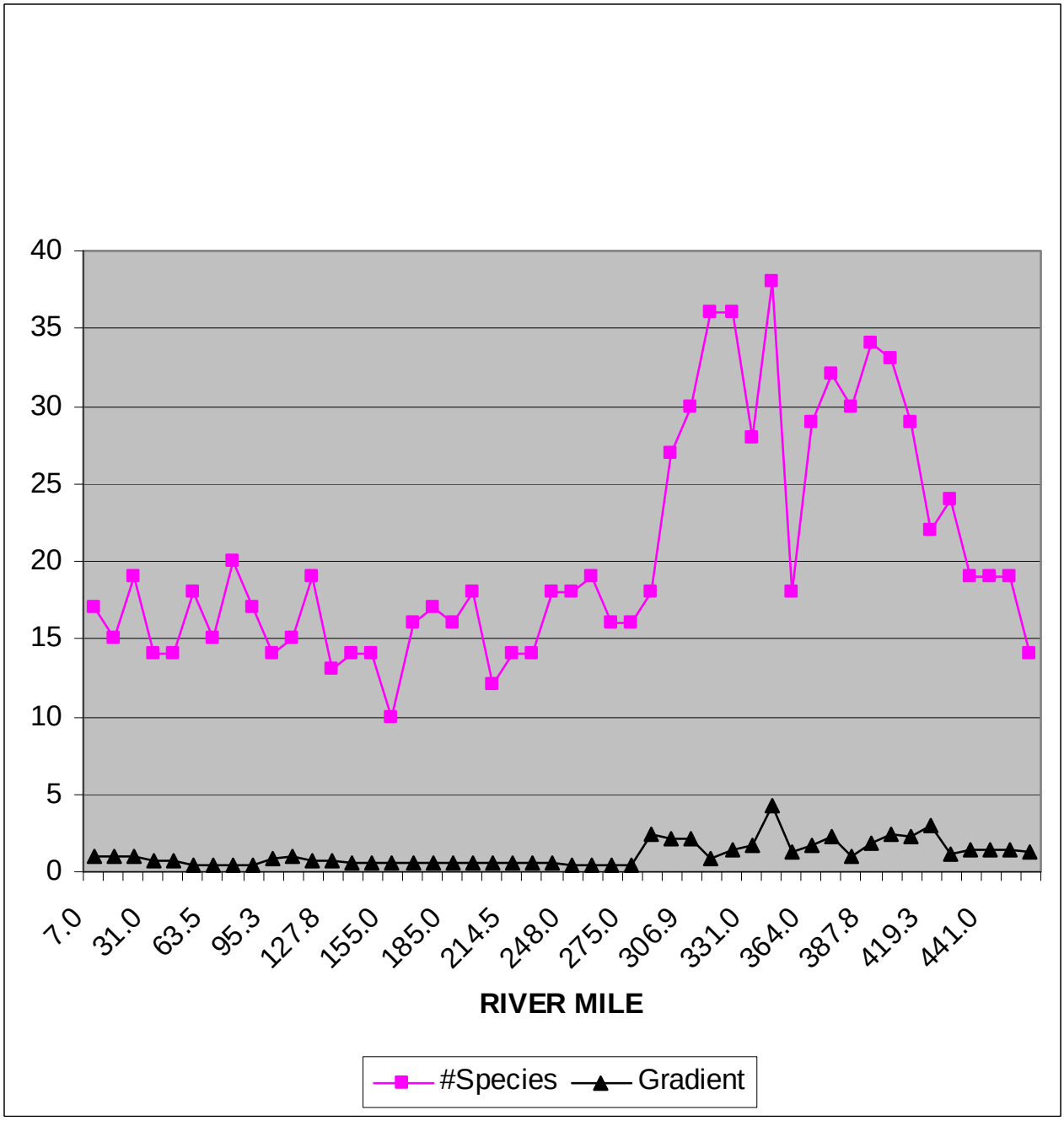


Figure 2. Number of species/hybrids collected and gradient (feet/mile) per collection site, Wabash River, July 1999.