# AN EVALUATION OF THE PENNSYLVANIA LAKE ERIE WATERSHED FISH COMMUNITY: 2011

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## 1.0 ABSTRACT

The Pennsylvania portion of the Lake Erie watershed drains an area of 1,316 square kilometers (508 square miles), including all or portions of 33 municipalities in Erie and Crawford counties. There are 52 streams totaling a length of 1,806 kilometers (1,122 miles) within the watershed, many of which support a healthy sport fishery. It has been well documented that alterations to stream systems as a result of urbanization and agricultural can impact fish communities. From June - September 2011, a fish community assessment was conducted at 119 sites along 27 streams within the Pennsylvania Lake Erie watershed. Species richness, diversity, and a multi-metric index of biological integrity (IBI) were used to evaluate the fish community. The Pennsylvania Lake Erie watershed supports a rich fish community, 54 species representing 13 families were observed. Conneaut Creek had the highest species richness (44 species) and McDannel Run had the lowest species richness, with only western blacknose dace being observed. The functional groups of species collected in the streams may be more important than the species richness; 21 intolerant species were collected compared to 13 tolerant species. However, tolerant species comprised 71.2% of the total catch while intolerant species comprised 19.5% of the total catch. The mean IBI score for the streams was 36.0, indicating the watershed as a whole is in fair-to-poor condition. The warmwater habitat (WWH) criteria was met in only eight of the 27 streams and none of the streams met the exceptional warmwater habitat (EWH) criteria. Despite 70.4% of streams not meeting the WWH or EWH criteria, 50 sites (42.0%) met the WWH criteria and 10 sites (8.4%) sites met the EWH criteria. No fish were found at three sites (2.5%) and 56 sites (47.1%) were classified as non-attaining. In general, streams to the west of Presque Isle Bay had a richer and healthier fish community compared to eastern streams. Streams to the west of Presque Isle Bay had a mean species richness of 11.2 and mean IBI of 40.0, and eastern streams had a mean species richness of 5.2 and mean IBI of 31.2. These results suggest that western streams meet the WWH criteria and are in fair condition, and eastern streams are non-attaining and are in poor condition. The fish community data are being used to prioritize restoration and protection needs for the Pennsylvania Lake Erie watershed.

## 2.0 INTRODUCTION

The Pennsylvania portion of the Lake Erie watershed drains an area of 1,316 square kilometers (508 square miles), including all or portions of 33 municipalities in Erie and Crawford counties. There are 52 streams totaling a length of 1,806 kilometers (1,122 miles) within the watershed (**Map 1**). Many of these streams provide habitat essential for a successful sport fishery, particularly steelhead. Murray and Shields (2004) estimated that the steelhead fishery generated $5.71 million in new value-added activity in Erie County, Pennsylvania in 2003, supporting 219 jobs in the economy through direct and indirect effects. However, alterations to stream systems as a result of urbanization can negatively impact fish community and cause declines in the diversity of fishes (Wang *et al.* 2001). Klauda *et al.* (1998) observed decreased fish index of biotic integrity (IBI) scores in streams with greater than 50% urban land uses, and Wang *et al.* (2000) observed decreased species richness and IBI scores in watersheds with greater than 10% impervious cover. In addition, increased sedimentation to streams as a result of agricultural practices can negatively impact the fishery. Walser and Bart (1999) found percent agricultural land use to be a negative predictor of fish diversity in five sub-watersheds of the Chattahoochee River. The Pennsylvania Lake Erie watershed has 15.65% high intensity land uses (roads, residential, commercial, industrial, and mining), 33.06% agricultural land use (**Map 2**), and 10.78% impervious cover (**Map 3**).

Karr (1981) first introduced the concept of using the IBI to assess the ecological integrity of small warmwater streams, citing several advantages of using fish as indicator organisms. Karr *et al.* (1986) suggest that "biotic integrity is possessed by aquatic ecosystems in which composition, structure, and function

have not been adversely impacted by human activities, and when looked at as a whole, chemical, physical, and biotic integrity can be equated with ecological integrity." The IBI uses the characteristics of fish assemblages to evaluate the biological integrity and includes scoring 12 metrics related to species composition, trophic composition, and fish abundance and condition. The sum of the 12 metrics yields an overall site score that characterizes the biotic integrity of the site. Since its development, the IBI has been modified and applied to various regions of the United States (Barbour *et al.* 1999). Andraso *et al.* (2009) developed a modified IBI to assess the fish community of streams within the Pennsylvania Lake Erie watershed.

In 2010, Pennsylvania Sea Grant completed the *Presque Isle Bay watershed restoration, protection, and monitoring plan* (http://pib.psu.edu). The plan summarizes a comprehensive GIS-based data collection, assessment, and analysis effort; and serves as a living document that provides the framework to drive coordinated restoration, protection, and monitoring projects within the Presque Isle Bay watershed. A major component of the plan was the development of GIS-based restoration and protection prioritization models. The models assist in identifying and ranking subareas within the Presque Isle Bay watershed most in need of restoration and protection efforts. Chemical, physical, and biological data collected as part of initial watershed monitoring efforts by Campbell *et al.* 2002 were used to develop the models. Based upon the success of the plan, additional funding was obtained to apply the plan's framework to the Pennsylvania portion of the Lake Erie watershed in the development of a *Pennsylvania Lake Erie watershed integrated water resource management plan*. As part of initial integrated planning efforts, data gaps for the Lake Erie watershed were identified. Specifically, watershed-wide chemical, physical, and biological data were found to be lacking. In summer 2011, to address gaps in the biological data, a Pennsylvania Lake Erie watershed-wide stream fish community assessment was conducted. The purpose of this assessment was to determine the status of fish assemblages in Pennsylvania Lake Erie streams using a modified IBI developed by Andraso *et al.* (2009). The IBI data will be used to prioritize restoration and protection efforts within the Pennsylvania Lake Erie watershed.

## 3.0 METHODOLOGY

From June - September 2011, a fish community assessment was conducted at 119 sites along 27 streams within the Pennsylvania Lake Erie watershed (**Map 4**; **Table 1**). At each site, a 100-meter stream section was sampled using a Smith Root Model 15-D backpack electrofisher equipped with a Honda generator. The electrofisher was set to mode I5, which represents a standard pulsed direct current wavelength of 60Hz at 6ms. The output voltage ranged from 100 to 300 volts. Electrofishing consisted of a one-pass electrofishing effort, working in a side-to-side pattern between the left and right banks. Electrofishing was conducted in an upstream direction and all habitat types were sampled (e.g. riffle, runs, and pools). When possible, natural barriers such as riffles and waterfalls were used as starting and ending points. The electrofishing start and end time was recorded in order to calculate effort (i.e. catch per hour). Field crews consisted of three to five crew members. A minimum of two crew members were CPR and First Aid certified and at least one crew member was a taxonomical specialist. For crews of three, one crew member operated the electrofisher while the other two crew members netted fish and transferred fish to five gallon buckets. For crews of four, one crew member operated the electrofisher, two crew members netted fish, and one crew member transferred fish to five gallon buckets. For crews of five, one crew member operated the electrofisher, three crew members netted fish, and one crew member transferred fish to five gallon buckets.

Immediately following the sampling, fish were transferred to 66.2 liter (17.5 gallon) holding tanks with ice. Fish were identified and enumerated in the field, and all fish data were recorded on the *2011 Pennsylvania Lake Erie Stream Fish Sampling Data Sheet* (**Appendix A**). All species identified in the field

were released. Species not identifiable in the field were anesthetized and transferred to 10% buffered formalin. The preserved species were transported to the Natural History Museum at the Tom Ridge Environmental Center for identification. Prior to identification, fish were fixed in 10% buffered formalin for five to 14 days (duration of fixation was dependent on the size, shape, and number of fish). The fish were then transferred to de-ionized water for two days, then 20% un-denatured ethyl alcohol for two days, then 40% un-denatured ethyl alcohol for two days, and finally the samples were preserved in 70% un-denatured ethyl alcohol. Following fixation, fish were identified according to Trautman (1981), Werner (2004), and Page and Brooks (2011). All preserved specimens were archived in the Natural History Museum at the Tom Ridge Environmental Center. Species unidentifiable at the Museum were shipped to Dr. Jay Stauffer, Distinguished Professor of Ichthyology at Penn State University, for identification.

Species richness, diversity, and biotic integrity were used to assess the fish community. The Shannon index of diversity (H') was used to assess the diversity of the streams. H' accounts for species richness and evenness, and typically ranges from 0 (only one species present) to 3.5 (species relatively evenly distributed), and rarely exceeds 4.5. A modified, multi-metric fish IBI was used to assess the biotic integrity of the streams (Andraso *et al.* 2009). A total of 12 metrics, representing three classes of biological attributes (species richness and composition, fish condition and abundance, and trophic composition), were evaluated (**Table 2**). Each metric was scored against criteria based on expectations developed from reference sites. Metric values approximating, deviating slightly from, or deviating greatly from values occurring at the reference sites were scored as 5, 3, and 1, respectively. The scores of the 12 metrics were then summed for each site to produce an IBI score, ranging from a maximum of 60 (excellent) to a minimum of 12 (very poor). Sites were then classified according to Karr (1981) as excellent, excellent-good, good, good-fair, fair, fair-poor, poor, poor-very poor, or very poor (**Table 3**). In addition, sites were classified according to Yoder (1995) as meeting warmwater habitat (WWH) (IBI $\geq$ 38) and exceptional warmwater habitat (EWH) (IBI $\geq$ 50) use designation criteria for wading streams in the Erie/ Ontario Lake Plain ecoregion (Omnerik 1987 and Ohio EPA 1987) (**Table 4**).

Water quality and site characteristic data were also recorded at each site. The latitude and longitude of the downstream limit were recorded at each site using a Garmin GPSMAP® 60CSX handheld GPS unit. Dissolved oxygen, temperature, pH, and conductivity were measured at each site using a Quanta® Hydrolab. The channel width was determined by averaging five measured wetted channel widths (measured every 20 meters) using a graduated measuring tape. The stream depth was determined by averaging five depth measurements taken from a cross-section of the stream.

## 4.0 RESULTS

### *4.1 Species richness and diversity*

A total of 24,162 individual fish representing 54 species from 13 families were collected within the Pennsylvania Lake Erie watershed (**Table 5**). Included among the 54 species were one Pennsylvania listed endangered species: *Lythrurus umbratilis* (redfin shiner); one threatened species: *Phoxinus erythrogaster* (southern redbelly dace); four candidate species: *Lampetra appendix* (American brook lamprey), *Culaea inconstans* (brook stickleback), *Umbra limi* (central mudminnow), and *Nocomis biguttatus* (hornyhead chub); and two invasive species: *Neogobius melanostomus* (round goby) and *Petromyzon marinus* (sea lamprey). The mean number of species and individual fish per site were 8.7 and 203, respectively. Cyprinidae (minnows) was the dominant family in the watershed, comprising 78.02% of the total catch. Gasterosteidae (sticklebacks) was the least dominant family, comprising 0.0041% of the total catch. *Rhinichthys obtusus* (western blacknose dace) and *Campostoma anomalum* (central stoneroller) were the most dominant species in the watershed, comprising 24.2% and 21.7% of the total catch respectively. *Semotilus atromaculatus* (creek chub) was the most commonly observed

species, being observed at 103 sites. Sites COC-28, 5M-3, and 8M-11 had the lowest species richness, with no fish being observed (Table 6). Site CRC-1 had the highest species richness; 26 species of fish were observed. Site EC-23 had the highest total number of fish and catch per unit effort (CPUE), reported as catch per hour; 1,927 and 2,569 respectively. Site COC-45 had the highest diversity index (H' = 2.51) and sites T83-1, T76-1, MR-3, MDR-1, 16M-7, and 16M-13 had the lowest diversity index (H' = 0.00). All site-specific species data are reported in Appendix D.

Combining the site data for each stream revealed Conneaut Creek had the highest species richness; 44 species were observed (Table 7). Tributary 62483, Tributary 62476, and McDannel Run had the lowest species richness; one species was observed in each stream. Crooked Creek and Elk Creek had the most families; 11 families were observed in each stream. Tributary 62483, Tributary 62476, McDannel Run, Fivemile Creek, and Orchard Beach Run had the fewest families; one family was observed in each stream. Sixmile Creek had the highest mean number of fish and mean CPUE; 554.2 and 765.5 respectively. Tributary 62483 had the fewest mean number of fish and mean CPUE; 4.0 and 24.0 respectively. Raccoon Creek had the highest mean diversity index; H' = 2.20. Tributary 62483, Tributary 62476, and McDannel Run had the lowest diversity index; H' = 0.00.

### *4.2 Index of Biotic Integrity (IBI)*

The IBI scores ranged from a low of 22.0 at sites MDR-1, 7M-11, 7M-12, 8M-10, and PR-3 to a high of 54.0 at sites COC-18, COC-53, and COC-58 (Table 8). Sites COC-28, 5M-3, and 8M-11 had no fish; therefore, an IBI could not be calculated. The average IBI score for the watershed as a whole was 36.0, indicating the watershed is in fair-to-poor condition. Classifying the sites according to Karr (1981) revealed that three sites were excellent-good, nine sites were good, seven sites were good-fair, 29 sites were fair, 20 sites were fair-poor, 21 sites were poor, 22 sites were poor-very poor, and five sites were very poor. Classifying the sites according to Yoder (1995) revealed that 50 sites met the WWH use-designation, 10 sites met the EWH use-designation, and 59 sites were non-attaining. Of the 54 species assessed, 21 were classified as intolerant, 20 were classified as intermediate, and 13 were classified as tolerant (Table 9). However, intolerant species and intermediate species only comprised 19.4% and 9.5% of the total catch, respectively, while tolerant species comprised 71.1% of the total catch. Combining the IBI data within each stream revealed Twentymile Creek had the highest IBI score (IBI = 46.0) and McDannel Run had the lowest IBI score (IBI = 22.0) (Table 10).

### *4.3 Water Quality and Site Data*

Temperatures ranged from a low of 13.81°C (56.84°F) at site 7M-1 to a high of 27.41°C (81.34°F) at site EC-1 (Table 11). Specific conductance ranged from a low of 104 µS $cm^{-1}$ at site COC-9 to a high of 1,073 µS $cm^{-1}$ at site MR-3. Dissolved oxygen concentrations ranged from a low of 3.76 mg $L^{-1}$ at site EC-28 to a high of 11.66 mg $L^{-1}$ at site EC-43. The pH ranged from 7.42 at site COC-28 to 9.05 at site 4M-9. Stream widths ranged from 1.0 foot (0.3 meters) at site EC-GC-1 to 93.4 feet (28.47 meters) at site EC-6. Stream depths ranged from 0.5 inches (1.27 centimeters) at site EC-GC-1 to 20 inches (18.29 centimeters) at site 20M-1.

### *4.4 Historical Fish Community Data*

In summer 1972, O'Kelly (1972) evaluated five sites on Walnut Creek; two of the five sites were assessed in 2011 (Table 12; Map 5). O'Kelly (1972) observed 2,088 fish representing 22 species from six families (Table 13). Brindle madtom (*Noturus miurus*), a Pennsylvania threatened species, were observed by O'Kelly (1972) but were not observed in 2011. Sand shiner, striped shiner, yellow bullhead, mottled sculpin, bluegill, pumpkinseed, and round goby were observed in 2011 but were not observed by

O'Kelly (1972).

In August and September 1975, Masteller *et al.* (1976) evaluated the mouths, mid-sections, and headwaters of 12 Pennsylvania Lake Erie streams; all 12 streams were assessed in 2011. Masteller *et al.* (1976) observed 4,024 fish representing 38 species from nine families (**Table 14**). Black bullhead (*Ameiurus melas*), a Pennsylvania endangered species, was observed by Masteller *et al.* (1976) but was not observed in 2011. Longnose gar, grass pickerel, central mudminnow, golden shiner, southern redbelly dace, spotfin shiner, striped shiner, golden redhorse, yellow bullhead, yellow perch, and round goby were observed in 2011 but were not observed by Masteller *et al.* (1976).

Between December 1973 and November 1974, USACE (1979) evaluated the mouth of Elk Creek above the first riffle; a more upstream site below Route 5 was assessed in July 2011. In July 1974, USACE (1979) observed 213 fish representing 23 species from 6 families (**Table 15**). Quillback (*Carpiodes cyprinus*) were observed by USACE (1979) but were not observed in 2011. Longnose gar, striped shiner, and round goby were observed in 2011 but were not observed by USACE (1979).

In May 1991, DER (1991) evaluated five sites on Conneaut Creek; two of the five sites were assessed in 2011 (**Table 16**; **Map 6**). DER (1991) observed 27 species representing six families (**Table 17**). The banded darter (*Etheostoma zonale*) was observed in 1991 but was not observed in 2011. Grass pickerel, bigeye chub, mimic shiner, sand shiner, spotfin shiner, striped shiner, bluegill, and pumpkinseed were observed in 2011 but were not observed by DER (1991).

Between June 1994 and July 1997, Billingsley and Johns (1996; 1997a-g; 1998a-b) evaluated 14 sites on six Pennsylvania Lake Erie streams; six of the 14 sites were assessed in 2011 (**Table 18**; **Map 7**). Billingsley and Johns observed 26 species representing seven families (**Table 19**). Central mudminnow, common carp, fathead minnow, redside dace, silverjaw minnow, striped shiner, black crappie, largemouth bass, smallmouth bass, and round goby were observed in 2011 but were not observed by Billingsley and Johns.

In summers 2003 and 2004, Phillips and Andraso (2005) evaluated 25 sites on 13 Pennsylvania Lake Erie streams; 17 of the 25 sites were assessed in 2011 (**Table 20**; **Map 8**). Phillips and Andraso (2005) observed 2,528 fish representing 34 species from 10 families (**Table 21**). IBI scores ranged from a high of 52.0 at site crc3 to a low of 20.0 at sites 16mc2, 7mc2, mr1, and mr2. In 2011, IBI scores were higher at nine sites, remained unchanged at three sites, and were lower at five sites. Phillips and Andraso (2005) observed two species that were not observed in 2011: muskellunge (*Esox masquinongy*) and brook trout (*Salvelinus fontinalis*). Longnose gar, common carp, common shiner, golden shiner, mimic shiner, rosyface shiner, spottail shiner, golden redhorse, brown bullhead, stonecat, blackside darter, logperch, and round goby were observed in 2011 but were not observed by Phillips and Andraso (2005).

In June and July 2006, DEP (2007) evaluated 19 sites on Walnut Creek; three of the 19 sites were assessed in 2011 (**Table 22**; **Map 9**). DEP (2007) observed 23 species representing eight families (**Table 23**). Bluntnose minnow, sand shiner, spottail shiner, and striped shiner were observed in 2011 but were not observed by DEP (2007).

In summer 2007, Andraso *et al.* (2009) evaluated 12 sites on Fourmile Creek; six of the 12 sites were assessed in 2011 (**Table 24**; **Map 10**). Andraso *et al.* (2009) observed 1,478 fish representing eight species from three families (**Table 25**). IBI scores ranged from a low of 22.0 at site 4M-9 to a high of 36.0 at site 4M-1. The mean IBI for Fourmile Creek was 30.1, indicating that the stream is in poor condition. In 2011, IBI scores were higher at two sites, lower at three sites, and remained unchanged at one site. Common shiner, golden shiner, spotfin shiner, bluegill, pumpkinseed, and round goby were observed in 2011 but were not observed by Andraso *et al.* (2009).

## 5.0 DISCUSSION

The Pennsylvania Lake Erie watershed supports a rich fish community. In 2011, 54 species representing 13 families were observed. Combining the site data among the 27 streams assessed revealed Conneaut Creek had the highest species richness, 44 species were observed, and McDannel Run had the lowest species richness, only western blacknose dace were observed. Phillips and Andraso (2005) observed similar results, Conneaut Creek had the highest species richness among the 10 Pennsylvania tributary streams of Lake Erie assessed, 28 species were observed, and McDannel Run had the lowest species richness, only western blacknose dace were present. Conneaut Creek has a predominately forested watershed, whereas, McDannel Run's watershed is dominated by urban land uses. Lenat and Crawford (1994) observed a similar reduction in species richness in urban streams compared to forested streams in the North Carolina Piedmont. Helms *et al.* (2005) observed negative impacts to fish assemblages in the Chattahoochee River and attributed the impacts to urbanization and the reduction of forest cover. The functional groups of species collected in the Pennsylvania Lake Erie tributary streams may be more important than the species richness. In 2011, 21 intolerant species were collected compared to 13 tolerant species. However, tolerant species comprised 71.2% of the total catch while intolerant species comprised 19.5% of the total catch. The tolerant species western blacknose dace and central stoneroller each comprised more of the total catch than all intolerant species combined; 24.2% and 21.7%, respectively. Phillips and Andraso (2005) collected 13 tolerant species compared to 9 intolerant species. Tolerant species comprised 62.5% of the total catch while intolerant species comprised 27.0% of the total catch.

Included among the 54 species observed in the streams were the endangered redfin shiner, threatened southern redbelly dace, and candidate species American brook lamprey, brook stickleback, central mudminnow, and hornyhead chub. American brook lamprey, brook stickleback, and hornyhead chub were observed by Masteller *et al.* (1976), and the central mudminnow was observed by Phillips and Andraso (2005); however, none of the historical records considered indicate the presence of redfin shiner or southern redbelly dace. Steiner (2010) acknowledges the occurrence of the southern redbelly dace in the Ohio River and Potomac River watersheds of Pennsylvania; however, makes no reference to its presence in the Lake Erie watershed. It has been suggested that the southern redbelly dace may have migrated to Elk Creek from Shenango Creek (Ohio River watershed) through a series of wetlands that connects the two streams (P. Woods, pers. comm.). Eisenhour and Eisenhour (2007) suggest the redfin shiner occurs throughout the Mississippi River basin and the southern Great Lakes drainages, and is common to abundant in its preferred habitat of pools and raceways of small, warm, moderate-gradient streams. In 2011, only one individual redfin shiner was observed at one location along a small tributary to Conneaut Creek. Between 1996 and 2003, Matson *et al.* (2004) found redfin shiner abundance to vary from rare to abundant at multiple sites on Conneaut Creek in Ohio, including one site near the Ohio-Pennsylvania border. DER (1991) and Phillips and Andraso (2005) did not observe redfin shiner in Conneaut Creek.

In 2011, two aquatic invasive species were observed in the streams: round goby and sea lamprey. Round goby, native to the Caspian and Black Seas, including their tributaries, were first found in North America in 1990 in the St. Clair River. In October 1996, the round goby was first reported in the Pennsylvania waters of Lake Erie, off of Walnut Creek. In 2000 and 2001, Phillips *et al.* (2003) observed round goby in the mouths of four Pennsylvania Lake Erie tributary streams, including Elk Creek, Walnut Creek, Sixteenmile Creek, and Twentymile Creek. In 2006, DEP (2007) observed round goby at the mouth of Walnut Creek. In 2011, round goby comprised 0.25% of the total catch and were found in the mouths of Crooked Creek, Elk Creek, Walnut Creek, Fourmile Creek, Sixmile Creek, Twelvemile Creek, Sixteenmile Creek, and Twentymile Creek. Phillips *et al.* (2003) and Phillips and Andraso (2005) sampled the mouth of Twelvemile Creek but did not observe round goby. Phillips and Andraso (2005) and Andraso *et al.* (2009) sampled the mouth of Fourmile Creek but did not observe round goby. The results suggest round goby invaded Fourmile Creek sometime after 2007 and Twelvemile Creek sometime after 2004.

Round goby were not found at any sites upstream of the mouths in the current or historical studies. Poos *et al.* (2010) suggest the risks associated with the spread of round goby to tributaries of the Great Lakes are not well understood; however, round goby are known to out-compete benthic fish such as logperch and mottled sculpin and the potential exists for goby to outcompete other benthic species.

The sea lamprey, native to the Atlantic coast of North America, was first reported in Lake Erie in 1921 (reviewed by Emery 1985). The sea lamprey's introduction to the Great Lakes and its abundance, combined with water pollution and overfishing, resulted in the decline of several native species, including ciscoes (*Coregonus spp.*), lake trout (*Salvelinus namaycush*), and walleye (*Sander vitreus*) (Fuller *et al.* 2012). However, Hartman (1973) and Lawrie (1970) suggest that sea lamprey were not particularly damaging to the Lake Erie fishery as they never became abundant due to a lack of suitable spawning habitat. During spring and early summer, adult sea lamprey migrate into tributary streams with gravel substrate to spawn. The fertilized eggs hatch into small larvae known as ammocoetes, which burrow into the sand and silt stream bottoms. After three to six years, the ammocoetes transform into the parasitic adult, which migrate back to Lake Erie and feed for 12 to 20 months before spawning. Conneaut Creek, Crooked Creek, and Raccoon Creek, in Pennsylvania, are three of eight Lake Erie tributaries that are treated with the lampricide TFM (3-trifluoromethyl-4-nitrophenol) by the United States Fish and Wildlife Service to control lamprey populations (C. Murray, pers. comm.). Despite the treatments, sea lamprey ammocoetes continue to persist in the Pennsylvania tributary streams of Lake Erie. In 2011, two sea lamprey ammocoetes were observed at one location on Conneaut Creek. However, sea lamprey ammocoetes were not observed in Crooked Creek or Raccoon Creek. Phillips and Andraso (2005) observed a total of three sea lamprey at two locations on Crooked Creek. In 2011, the candidate species American brook lamprey were more prevalent than the invasive sea lamprey. A total of 94 American brook lamprey ammocoetes were collected from eight sites on Conneaut Creek, Raccoon Creek, Crooked Creek, and Trout Run. Of the historical studies considered, only Masteller *et al*. (1976) reports the occurrence of American brook lamprey; they observed one American brook lamprey in Walnut Creek.

In 2011, the mean IBI score for the streams was 36.0, which was slightly lower than the mean IBI (IBI = 37.6) calculated by Phillips and Andraso (2005) in 2003-2004. However, when comparing mean IBI scores among the 17 sites assessed in both 2011 and 2003-2004, the mean IBI in 2011 (IBI = 38.2) was higher than the mean IBI calculated in 2003 and 2004 (IBI = 36.2). In both sampling events, the mean IBI indicates that the Pennsylvania Lake Erie watershed fails to meet WWH criteria described by Yoder (1995) and is in fair-to-poor condition. Furthermore, in 2011, the WWH criteria was met in only eight of the 27 streams and none of the streams met the EWH criteria. The eight streams meeting the WWH criteria are Conneaut Creek, Turkey Creek, Raccon Creek, Crooked Creek, Elk Creek, Walnut Creek, Sixmile Creek, and Twentymile Creek. Despite 70.4% of streams not meeting the WWH or EWH criteria, 50 sites (42.0%) met the WWH criteria and 10 sites (8.4%) of the sites met the EWH criteria. No fish were found at three sites (2.5%) and 56 sites (47.1%) were non-attaining. These results suggest 42.0% of sites, in their current condition, are capable of supporting and maintaining a balanced, integrated, and adaptive community of warmwater organisms; and 8.4% of sites are capable of supporting and maintaining an exception or unusual community of warmwater aquatic organisms. Streams to the west of Presque Isle Bay have a richer and healthier fish community compared to the streams east of Presque Isle Bay. Streams to the west of Presque Isle Bay had a mean species richness of 11.2 and mean IBI of 40.0. Stream to the east of Presque Isle Bay had a mean species richness of 5.2 and mean IBI of 31.2. These results suggest that western streams meet the WWH criteria and are in fair condition, and eastern streams are non-attaining and are in poor condition.

In conclusion, the Pennsylvania tributary streams of Lake Erie support a rich and diverse fish community. Despite the rich fish community, the watershed as a whole is in fair-to-poor condition based on calculated IBI scores, and the majority of streams fail to meet the WWH criteria. While many of the

streams as a whole fail to meet the WWH criteria, several individual sites across the watershed do meet the WWH and EWH criteria. In general, streams to the west of Presque Isle Bay have a richer and healthier fish community compared to the streams east of Presque Isle Bay. The fish community data reported herein will be used to prioritize watershed restoration and protection needs for the Pennsylvania Lake Erie watershed as part of the development of the *Pennsylvania Lake Erie Watershed Integrated Water Resources Management Plan*.

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# APPENDIX A: DATA FORMS

## Appendix A: 2011 Pennsylvania Lake Erie Stream Fish Sampling Data Sheet

**Stream/Watershed:**_____ **Site Name:**_____

**Researcher Name(s):**_____ **Date:**_____

**Latitude:** _____ **Longitude:**_____

**Start Time:**_____ **End Time:**_____ **Weather:**_____

**Stream Depth:**_____ **Stream Width:**_____

**Stream Temp:**_____ **D.O.**_____ **Conductivity:** _____ **pH:**_____

| | |
|---|---|
| Alewife | |
| American Brook Lamprey | |
| Banded Killifish | |
| Bigeye Chub | |
| Black Crappie | |
| Black Redhorse | |
| Blackside Darter | |
| Bluegill | |
| Bluntnose Minnow | |
| Bowfin | |
| Brindled Madtom | |
| Brook Silverside | |
| Brook Stickleback | |
| Brook Trout | |
| Brown Bullhead | |
| Brown Trout | |
| Central Mudminnow | |
| Central Stoneroller | |
| Channel Catfish | |
| Channel Darter | |
| Chinook Salmon | |
| Coho Salmon | |
| Common Carp | |
| Common Shiner | |
| Creek Chub | |
| Eastern Sand Darter | |
| Emerald Shiner | |
| Fantail Darter | |
| Fathead Minnow | |
| Flathead Catfish | |
| Freshwater Drum | |
| Gizzard Shad | |
| Golden Rainbow Trout | |
| Golden Redhorse | |
| Golden Shiner | |
| Goldfish | |
| Grass Carp | |
| Grass Pickerel | |
| Greenside Darter | |
| Hornyhead Chub | |
| Iowa Darter | |
| Johnny Darter | |
| Lake Chubsucker | |
| Largemouth Bass | |

## Appendix A: 2011 Pennsylvania Lake Erie Stream Fish Sampling Data Sheet

| | |
|---|---|
| Logperch | |
| Longnose Dace | |
| Longnose Gar | |
| Longnose Sucker | |
| Mimic Shiner | |
| Mottled Sculpin | |
| Muskellunge | |
| Northern Brook Lamprey | |
| Northern Hogsucker | |
| Northern Pike | |
| Pearl Dace | |
| Pink Salmon | |
| Pumpkinseed | |
| Rainbow Darter | |
| Rainbow Smelt | |
| Rainbow Trout | |
| Redfin Shiner | |
| Redside Dace | |
| River Chub | |
| Rock Bass | |
| Rosyface Shiner | |
| Round Goby | |
| Rudd | |
| Sand Shiner | |
| Sea Lamprey | |
| Shorthead Redhorse | |
| Silver Chub | |
| Silver Lamprey | |
| Silver Redhorse | |
| Silver Shiner | |
| Silverjaw Minnow | |
| Smallmouth Bass | |
| Spotfin Shiner | |
| Spottail Shiner | |
| Spotted Gar | |
| Spotted Sucker | |
| Stonecat | |
| Striped Shiner | |
| Tadpole Madtom | |
| Tiger Muskellunge | |
| Walleye | |
| Warmouth | |
| Western Blacknose Dace | |
| White Bass | |
| White Crappie | |
| White Perch | |
| White Sucker | |
| Yellow Bullhead | |
| Yellow Perch | |
| | |
| | |
| | |
| DELTS | |

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# APPENDIX B: TABLES

Table 1. 2011 Pennsylvania Lake Erie stream fish sampling locations

| Stream | Site | Date | Road | Latitude | Longitude |
|---|---|---|---|---|---|
| Conneaut Creek | COC 9 | 11-Aug-2011 | Ashley Rd. and Griffey Rd. | 41.86127 | -80.47666 |
| Conneaut Creek | COC 10 | 11-Aug-2011 | Ashley Rd. and Griffey Rd. | 41.86417 | -80.4743 |
| Conneaut Creek | COC 12 | 11-Aug-2011 | Beaver Rd. and Joiner Rd. | 41.84444 | -80.46988 |
| Conneaut Creek | COC 18 | 8-Aug-2011 | Griffey Rd. | 41.91779 | -80.46921 |
| Conneaut Creek | COC 25 | 10-Aug-2011 | Shadeland Rd. | 41.81643 | -80.38774 |
| Conneaut Creek | COC 26 | 18-Aug-2011 | Agnew Rd. | 41.68505 | -80.34059 |
| Conneaut Creek | COC 28 | 12-Sep-2011 | Shermansville Rd. | 41.66551 | -80.37206 |
| Conneaut Creek | COC 34 | 18-Aug-2011 | Canal St. | 41.72937 | -80.35564 |
| Conneaut Creek | COC 35 | 19-Aug-2011 | Center St. | 41.75639 | -80.37097 |
| Conneaut Creek | COC 37 | 12-Sep-2011 | Atroskin Rd. | 41.75928 | -80.3905 |
| Conneaut Creek | COC 39 | 11-Aug-2011 | Beaver St. | 41.80055 | -80.37817 |
| Conneaut Creek | COC 43 | 19-Aug-2011 | Jerusalem Rd. | 41.83635 | -80.4265 |
| Conneaut Creek | COC 44 | 19-Aug-2011 | Spring Rd. | 41.84091 | -80.41846 |
| Conneaut Creek | COC 45 | 11-Aug-2011 | Jerusalem Rd. | 41.83871 | -80.40295 |
| Conneaut Creek | COC 52 | 8-Aug-2011 | Beckman Ave. | 41.90063 | -80.34906 |
| Conneaut Creek | COC 53 | 4-Aug-2011 | Bessemer Rd. | 41.89825 | -80.36228 |
| Conneaut Creek | COC 57 | 4-Aug-2011 | Whittaker Rd. and Rt. 18 | 41.86003 | -80.36989 |
| Conneaut Creek | COC 58 | 8-Aug-2011 | Carter Rd. | 41.86971 | -80.40182 |
| Turkey Creek | TC1 | 15-Jul-2011 | Stateline Rd. | 41.96156 | -80.5193 |
| Raccoon Creek | RC 1 | 19-Jul-2011 | Old Lake Rd. | 41.98904 | -80.48048 |
| Raccoon Creek | RC 2 | 19-Jul-2011 | Elmwood Rd. | 41.96545 | -80.45984 |
| Raccoon Creek | RC 6 | 19-Jul-2011 | Rt. 20 | 41.95557 | -80.45946 |
| Crooked Creek | CRC 1 | 5-Aug-2011 | Holliday Rd. | 42.00466 | -80.43736 |
| Crooked Creek | CRC 2 | 5-Aug-2011 | Holliday Rd. | 42.00253 | -80.4314 |
| Crooked Creek | CRC 3 | 5-Aug-2011 | Abels Rd. | 42.00343 | -80.43089 |
| Crooked Creek | CRC 4 | 5-Aug-2011 | Lucas Rd. | 41.98601 | -80.40634 |
| Crooked Creek | CRC 9 | 5-Aug-2011 | Gloskey Rd. | 41.94478 | -80.36808 |
| Crooked Creek | CRC 19 | 5-Aug-2011 | Lexington Rd. | 41.95862 | -80.3641 |
| Duck Run | DR 1 | 21-Jul-2011 | Rt. 5 | 42.00546 | -80.39335 |
| Elk Creek | EC 1 | 22-Jul-2011 | Elk Park Rd. | 42.00693 | -80.35394 |
| Elk Creek | EC-GC 1 | 26-Jul-2011 | Overlake Golf Course | 41.98508 | -80.35269 |
| Elk Creek | EC-GC 2 | 26-Jul-2011 | Overlake Golf Course | 41.98792 | -80.35281 |
| Elk Creek | EC 2 | 26-Jul-2011 | Rt. 20 | 41.99101 | -80.35331 |
| Elk Creek | EC 3 | 12-Sep-2011 | South Creek Rd. | 41.98079 | -80.31052 |
| Elk Creek | EC 5 | 22-Jul-2011 | North Creek Rd. | 42.00812 | -80.3607 |
| Elk Creek | EC 6 | 26-Jul-2011 | South Creek Rd. | 41.99118 | -80.31995 |
| Elk Creek | EC 7 | 26-Jul-2011 | South Creek Rd. | 41.99073 | -80.32033 |
| Elk Creek | EC 8 | 22-Jul-2011 | Tannery Rd. | 41.99227 | -80.29108 |
| Elk Creek | EC 10 | 26-Jul-2011 | Rt. 5 | 42.01979 | -80.36402 |
| Elk Creek | EC 15 | 25-Jul-2011 | Francis Rd. | 41.96069 | -80.28338 |
| Elk Creek | EC 21 | 1-Aug-2011 | Rt. 98 | 41.94354 | -80.22503 |
| Elk Creek | EC 22 | 27-Jul-2011 | Platz Rd. | 41.99407 | -80.21672 |
| Elk Creek | EC 23 | 1-Aug-2011 | West Rd. | 42.00389 | -80.20238 |
| Elk Creek | EC 25 | 27-Jul-2011 | Eureka Rd. | 41.97996 | -80.20544 |

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Table 1. 2011 Pennsylvania Lake Erie stream fish sampling locations (*continued)*

| Stream | Site | Date | Road | Latitude | Longitude |
|---|---|---|---|---|---|
| Elk Creek | EC 26 | 27-Jul-2011 | West Stancliff Rd. | 41.95883 | -80.2077 |
| Elk Creek | EC 28 | 25-Jul-2011 | Silverthorn Rd. | 41.94432 | -80.18549 |
| Elk Creek | EC 30 | 27-Jul-2011 | West Rd. | 42.0027 | -80.17439 |
| Elk Creek | EC 43 | 1-Aug-2011 | Greenlee Rd. | 41.98902 | -80.11768 |
| Elk Creek | EC 51 | 3-Aug-2011 | Oliver Rd. | 42.0079 | -80.10315 |
| Elk Creek | EC 52 | 3-Aug-2011 | Elk Creek Rd. | 41.99886 | -80.06199 |
| Tributary 62490 | T490 1 | 14-Jul-2011 | Campground Rd. | 42.02889 | -80.35632 |
| Godfrey Run | GFR 6 | 15-Jul-2011 | Godfrey Rd. | 42.04008 | -80.31309 |
| Godfrey Run | GFR 8 | 15-Jul-2011 | Nursery Rd. | 42.02177 | -80.32169 |
| Tributary 62483 | T83 1 | 14-Jul-2011 | Lindbergh Dr. | 42.04957 | -80.28661 |
| Trout Run | TR 1 | 14-Jul-2011 | Wilson Dr. | 42.05691 | -80.27164 |
| Trout Run | TR 3 | 14-Jul-2011 | Lohrer Rd. | 42.04208 | -80.27197 |
| Trout Run | TR 5 | 14-Jul-2011 | Rt. 20 | 42.02891 | -80.25912 |
| Tributary 62476 | T76 1 | 14-Jul-2011 | Lord R. | 42.0593 | -80.26114 |
| Walnut Creek | WC 1 | 16-Aug-2011 | Manchester Rd. | 42.07426 | -80.23569 |
| Walnut Creek | WC 2 | 17-Aug-2011 | Rt. 20 | 42.04845 | -80.22083 |
| Walnut Creek | WC 3 | 16-Aug-2011 | Sterrettania Rd. | 42.04921 | -80.16599 |
| Walnut Creek | WC 4 | 16-Aug-2011 | Sterrettania Rd. | 42.04729 | -80.16479 |
| Walnut Creek | WC 12 | 17-Aug-2011 | Zimmerly Rd. (Cassidy Park) | 42.05577 | -80.14319 |
| Walnut Creek | WC 16 | 17-Aug-2011 | Zimmerly Rd. | 42.06638 | -80.10948 |
| Walnut Creek | WC 19 | 17-Aug-2011 | Robinson Rd. | 42.06141 | -80.02655 |
| Tributary 62436 | T36 1 | 18-Jul-2011 | Wedge Wood Dr. | 42.07216 | -80.2188 |
| Tributary 62436 | T36 2 | 18-Jul-2011 | East Ravine Dr. | 42.0763 | -80.21955 |
| Wilkins Run | WR 1 | 15-Jul-2011 | Wolf Rd. | 42.08197 | -80.2031 |
| Marshall Run | MR 1 | 21-Jul-2011 | Marshall Dr. | 42.10652 | -80.16521 |
| Marshall Run | MR 3 | 21-Jul-2011 | Oregon Ave. | 42.10038 | -80.15625 |
| McDannel Run | MDR 1 | 30-Jun-2011 | Chattaqua Blvd. | 42.15332 | -80.04104 |
| Fourmile Creek | 4M 1 | 11-Jul-2011 | Fourmile Creek Rd. | 42.15887 | -80.02851 |
| Fourmile Creek | 4M 5 | 11-Jul-2011 | Station Rd. | 42.13379 | -80.00484 |
| Fourmile Creek | 4M 6 | 11-Jul-2011 | Cooper Rd. | 42.12491 | -79.99874 |
| Fourmile Creek | 4M 9 | 15-Jun-2011 | Penn State Behrend | 42.12049 | -79.99168 |
| Fourmile Creek | 4M 12 | 11-Jul-2011 | Kane Hill Rd. | 42.0997 | -79.98833 |
| Fourmile Creek | 4M 13 | 11-Jul-2011 | Shwab Dr. | 42.07422 | -79.96783 |
| Fivemile Creek | 5M 0 | 5-Jul-2011 | Wlaterwards Dr. | 42.16497 | -80.01302 |
| Fivemile Creek | 5M 1 | 30-Jun-2011 | Rt. 5 | 42.16234 | -80.01201 |
| Fivemile Creek | 5M 3 | 30-Jun-2011 | Rt. 20 | 42.14757 | -79.99852 |
| Sixmile Creek | 6M 0 | 8-Jul-2011 | Boyer Rd. | 42.17942 | -79.98449 |
| Sixmile Creek | 6M 1 | 5-Jul-2011 | Iroquois Ave. (Whiteford Park) | 42.15917 | -79.97997 |
| Sixmile Creek | 6M 4 | 5-Jul-2011 | Rockland Ave. | 42.17207 | -79.9866 |
| Sixmile Creek | 6M 7 | 8-Jul-2011 | Clark Rd. | 42.15398 | -79.97807 |
| Sixmile Creek | 6M 18 | 8-Jul-2011 | Filley Rd. | 42.10324 | -79.91075 |
| Sevenmile Creek | 7M 1 | 15-Jun-2011 | Kraus Dr. | 42.18249 | -79.97707 |
| Sevenmile Creek | 7M 2 | 27-Jun-2011 | Iroquois Ave. | 42.16552 | -79.96062 |
| Sevenmile Creek | 7M 3 | 27-Jun-2011 | Bartlett Rd. | 42.17996 | -79.95562 |

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Table 1. 2011 Pennsylvania Lake Erie stream fish sampling locations (*continued)*

| Stream | Site | Date | Road | Latitude | Longitude |
|---|---|---|---|---|---|
| Sevenmile Creek | 7M 6 | 27-Jun-2011 | Iroquois Ave. | 42.1693 | -79.94926 |
| Sevenmile Creek | 7M 11 | 27-Jun-2011 | McGill Rd. | 42.15165 | -79.93997 |
| Sevenmile Creek | 7M 12 | 27-Jun-2011 | Prindle Rd. | 42.13897 | -79.91997 |
| Eightmile Creek | 8M 1 | 28-Jun-2011 | Shades Beach Rd. | 42.19113 | -79.96185 |
| Eightmile Creek | 8M 2 | 28-Jun-2011 | Lewis Rd. | 42.19549 | -79.93132 |
| Eightmile Creek | 8M 3 | 28-Jun-2011 | Dutton Rd. | 42.18734 | -79.9317 |
| Eightmile Creek | 8M 4 | 28-Jun-2011 | King Rd. | 42.18039 | -79.91937 |
| Eightmile Creek | 8M 10 | 28-Jun-2011 | Sidehill Rd. | 42.16609 | -79.89516 |
| Eightmile Creek | 8M 11 | 27-Jun-2011 | Palmer Rd. | 42.15125 | -79.89651 |
| Twelvemile Creek | 12M 1 | 29-Jun-2011 | Shorewood Dr. | 42.2104 | -79.9146 |
| Twelvemile Creek | 12M 2 | 29-Jun-2011 | Sawmill Rd. | 42.19711 | -79.90993 |
| Twelvemile Creek | 12M 3 | 29-Jun-2011 | Law Rd. | 42.17947 | -79.89527 |
| Twelvemile Creek | 12M 4 | 30-Jun-2011 | Williams Rd. | 42.18843 | -79.87302 |
| Twelvemile Creek | 12M 5 | 30-Jun-2011 | South Rd. | 42.15131 | -79.84208 |
| Twelvemile Creek | 12M 8 | 29-Jun-2011 | Sidehill Rd. | 42.17767 | -79.86585 |
| Twelvemile Creek | 12M 12 | 29-Jun-2011 | Townline Rd. | 42.15503 | -79.87057 |
| Sixteenmile Creek | 16M 1 | 17-Jun-2011 | Freeport Rd. | 42.24144 | -79.83205 |
| Sixteenmile Creek | 16M 2 | 17-Jun-2011 | North Mill St. | 42.2335 | -79.83546 |
| Sixteenmile Creek | 16M 5 | 20-Jun-2011 | South Washington Street | 42.21443 | -79.82834 |
| Sixteenmile Creek | 16M 7 | 20-Jun-2011 | Ginny Ln. | 42.1965 | -79.84769 |
| Sixteenmile Creek | 16M 9 | 20-Jun-2011 | Oxbow Rd. | 42.19077 | -79.79639 |
| Sixteenmile Creek | 16M 10 | 20-Jun-2011 | Black Rd. | 42.18115 | -79.78468 |
| Sixteenmile Creek | 16M 12 | 20-Jun-2011 | South Lake Street | 42.20745 | -79.83788 |
| Sixteenmile Creek | 16M 13 | 20-Jun-2011 | Townline Rd. | 42.15517 | -79.79917 |
| Orchard Beach Run | OBR 5 | 23-Jun-2011 | Main St. | 42.21464 | -79.81624 |
| Woodmere Beach Run | WBR 1 | 23-Jun-2011 | Archer Rd. | 42.21484 | -79.79303 |
| Woodmere Beach Run | WBR 3 | 23-Jun-2011 | Middle Rd. | 42.23639 | -79.80779 |
| Peck Run | PR 1 | 21-Jun-2011 | Middle Rd. | 42.24122 | -79.79476 |
| Peck Run | PR 3 | 21-Jun-2011 | Archer Rd. | 42.22171 | -79.77436 |
| Peck Run | PR 5 | 21-Jun-2011 | Gulf Rd. | 42.22431 | -79.77147 |
| Twentymile Creek | 20M 1 | 15-Jun-2011 | Rt. 20 | 42.26083 | -79.78167 |

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Table 2. IBI scoring criteria (Andraso *et al.2009)*

| Category | Metric | Scoring Criteria | | |
|---|---|---|---|---|
| | | 1 | 3 | 5 |
| Species Richness and Composition | 1. Total number of species | < 5 | 5 to 19 | > 19 |
| | 2. Number of darter and sculpin | 0 | 1 to 3 | > 3 |
| | 3. Number of sunfish species | 0 | 1 to 4 | > 4 |
| | 4. Number of minnow species | 0 to 2 | 3 to 5 | > 5 |
| | 5. Number of intolerant species | 0 to 1 | 2 to 5 | > 5 |
| Trophic Composition | 6. % Dace species | ≥ 57% | 11 to 56% | < 11% |
| | 7. % Omnivores | ≥ 51% | 11 to 50% | < 11% |
| | 8. % Insectivores | < 20% | 21 to 59% | > 59% |
| | 9. % Top carnivores | | 0 to 25% | > 25% |
| Fish Abundance and Condition | 10. Catch per hour | < 236 | 236 to 724 | > 724 |
| | 11. % Simple lithophils | < 0.1% | 0.1 to 22.2% | > 22.2% |
| | 12. % Diseased individuals | > 1.3% | 0.1 to 1.3% | < 0.1% |

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Table 3. IBI classifications (Karr *et al.1986)*

| IBI Score | Class | Attributes |
|---|---|---|
| 58 - 60 | Excellent (E) | Comparable to the best situations without human disturbance; all regionally expected species for the habitat and stream size, including the most tolerant forms are present with a full array of age classes; balanced trophic structure |
| 53 - 57 | E-G | |
| 48 - 52 | Good (G) | Species richness somewhat below expectations, especially due to the loss of the most intolerant forms; some species are present with less than optimal abundances or size distributions; trophic structure shows some signs of stress. |
| 45 - 47 | G-F | |
| 40 - 44 | Fair (F) | Signs of additional deterioration include loss of intolerant forms, fewer species, highly skewed trophic structure; older age classes of top predators may be rare. |
| 35 - 39 | F-P | |
| 28 - 34 | Poor (P) | Dominated by omnivores, tolerant forms, and habitat generalists; few top carnivores; growth rates and condition factors commonly depressed; diseased fish often present. |
| 23 - 27 | P-VP | |
| 12 - 22 | Very Poor (VP) | Few fish present, mostly introduced or tolerant forms; disease, parasites, fin damage, and anomalies regular. |
| | No Fish | Sampling finds no fish |

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Table 4. IBI classification for wadeable streams (Yoder 1995)

| Use Designation | IBI Score | Description |
|---|---|---|
| Warmwater Habitat | ≥ 38 | Waters capable of supporting and maintaining a balanced, integrated, adaptive community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the twenty-fifth percentile of the identified reference sites. |
| Exceptional Warmwater Habitat | ≥ 50 | Waters capable of supporting and maintaining an exceptional or unusual community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the seventy-fifth percentile of the identified reference sites. |

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Table 5. 2011 Pennsylvania Lake Erie watershed fish community

| Species | | Total Fish | Sites Found | Percent of Total Catch | Family Rank | Species Rank |
|---|---|---|---|---|---|---|
| **Family *Petromyzontidae (Lampreys)*** | | | | **0.3973** | **7** | |
| American Brook Lamprey | *Lampetra appendix* | 94 | 8 | 0.3890 | | 24 |
| Sea Lamprey | *Petromyzon marinus* | 2 | 1 | 0.0083 | | 47 |
| **Family *Lepisosteidae (Gars)*** | | | | **0.0207** | **12** | |
| Longnose Gar | *Lepisosteus osseus* | 5 | 4 | 0.0207 | | 44 |
| **Family *Esocidae (Pikes)*** | | | | **0.1366** | **10** | |
| Grass Pickerel | *Esox americanus vermiculatus* | 33 | 5 | 0.1366 | | 31 |
| **Family *Umbridae (Mudminnows)*** | | | | **0.0455** | **11** | |
| Central Mudminnow | *Umbra limi* | 11 | 6 | 0.0455 | | 40 |
| **Family *Cyprinidae (Minnows)*** | | | | **78.0233** | **1** | |
| Bigeye Chub | *Hybopsis amblops* | 306 | 11 | 1.2665 | | 13 |
| Blacknose Dace | *Rhinichthys obtusus* | 5857 | 100 | 24.2405 | | 1 |
| Bluntnose Minnow | *Pimephales notatus* | 910 | 35 | 3.7662 | | 7 |
| Central Stoneroller | *Campostoma anomalum* | 5244 | 64 | 21.7035 | | 2 |
| Common Carp | *Cyprinus carpio* | 8 | 4 | 0.0331 | | 41 |
| Common Shiner | *Luxilus cornutus* | 371 | 27 | 1.5355 | | 10 |
| Creek Chub | *Semotilus atromaculatus* | 4001 | 103 | 16.5591 | | 3 |
| Emerald Shiner | *Notropis atherinoides* | 1 | 1 | 0.0041 | | 49 |
| Fathead Minnow | *Pimephales promelas* | 13 | 9 | 0.0538 | | 38 |
| Golden Shiner | *Notemigonus crysoleucas* | 35 | 13 | 0.1449 | | 30 |
| Hornyhead Chub | *Nocomis biguttatus* | 1 | 1 | 0.0041 | | 49 |
| Longnose Dace | *Rhinichthys cataractae* | 1473 | 39 | 6.0963 | | 4 |
| Mimic Shiner | *Notropis volucellus* | 33 | 7 | 0.1366 | | 31 |
| Redfin Shiner | *Lythrurus umbratilis* | 1 | 1 | 0.0041 | | 49 |
| Redside Dace | *Clinostomus elongatus* | 151 | 14 | 0.6249 | | 19 |
| River Chub | *Nocomis micropogon* | 88 | 11 | 0.3642 | | 25 |
| Rosyface Shiner | *Notropis rubellus* | 83 | 6 | 0.3435 | | 26 |
| Sand Shiner | *Notropis stramineus* | 6 | 3 | 0.0248 | | 43 |
| Silverjaw Minnow | *Notropis buccatus* | 142 | 20 | 0.5877 | | 20 |
| Southern Redbelly Dace | *Phoxinus erythrogaster* | 24 | 1 | 0.0993 | | 37 |
| Spotfin Shiner | *Cyprinella spiloptera* | 5 | 3 | 0.0207 | | 44 |

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Table 5. 2011 Pennsylvania Lake Erie watershed fish community (*continued*)

| Species | | Total Fish | Sites Found | Percent of Total Catch | Family Rank | Species Rank |
|---|---|---|---|---|---|---|
| Spottail Shiner | *Notropis hudsonius* | 4 | 3 | 0.0166 | | 46 |
| Striped Shiner | *Luxilus chrysocephalus* | 95 | 22 | 0.3932 | | 23 |
| **Family *Catostomidae (Suckers)*** | | | | **6.0301** | **3** | |
| Golden Redhorse | *Moxostoma erythrurum* | 48 | 9 | 0.1987 | | 29 |
| Northern Hogsucker | *Hypentelium nigricans* | 405 | 37 | 1.6762 | | 8 |
| White Sucker | *Catostomus commersoni* | 1004 | 58 | 4.1553 | | 5 |
| **Family Ictaluridae (Catfishes)** | | | | **0.2607** | **8** | |
| Brown Bullhead | *Ameiurus nebulosus* | 28 | 11 | 0.1159 | | 34 |
| Stonecat | *Noturus flavus* | 27 | 12 | 0.1117 | | 36 |
| Yellow Bullhead | *Ameiurus natalis* | 8 | 7 | 0.0331 | | 41 |
| **Family *Salmonidae (Trout and Salmon)*** | | | | **1.2954** | **6** | |
| Brown Trout | *Salmo trutta* | 28 | 9 | 0.1159 | | 34 |
| Golden Rainbow Trout | *Oncorhynchus mykiss* | 1 | 1 | 0.0041 | | 49 |
| Rainbow Trout | *Oncorhynchus mykiss* | 284 | 30 | 1.1754 | | 15 |
| **Family *Gasterosteidae (Sticklebacks)*** | | | | **0.0041** | **13** | |
| Brook Stickleback | *Culaea inconstans* | 1 | 1 | 0.0041 | | 49 |
| **Family *Cottidae (Sculpins)*** | | | | **1.4527** | **5** | |
| Mottled Sculpin | *Cottus bairdi* | 351 | 40 | 1.4527 | | 12 |
| **Family *Centrarchidae (Sunfishes)*** | | | | **3.2696** | **4** | |
| Black Crappie | *Promoxis nigromaculatus* | 1 | 1 | 0.0041 | | 49 |
| Bluegill | *Lepomis macrochirus* | 292 | 47 | 1.2085 | | 14 |
| Green Sunfish | *Lepomis cyanellus* | 12 | 6 | 0.0497 | | 39 |
| Largemouth Bass | *Micropterus salmoides* | 66 | 17 | 0.2732 | | 27 |
| Pumpkinseed | *Lepomis gibbosus* | 125 | 33 | 0.5173 | | 22 |
| Rock Bass | *Ambloplites rupestris* | 132 | 19 | 0.5463 | | 21 |
| Smallmouth Bass | *Micropterus dolomieu* | 162 | 20 | 0.6705 | | 18 |
| **Family *Percidae (Perches)*** | | | | **8.8114** | **2** | |
| Blackside Darter | *Percina maculata* | 32 | 9 | 0.1324 | | 33 |
| Fantail Darter | *Etheostoma flabellare* | 193 | 32 | 0.7988 | | 16 |
| Greenside Darter | *Etheostoma blennioides* | 185 | 8 | 0.7657 | | 17 |
| Johnny Darter | *Etheostoma nigrum* | 368 | 38 | 1.5231 | | 11 |

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Table 5. 2011 Pennsylvanai Lake Erie watershed fish community (*continued)*

| Species | | Total Fish | Sites Found | Percent of Total Catch | Family Rank | Species Rank |
|---|---|---|---|---|---|---|
| Logperch | *Percina caprodes* | 391 | 10 | 1.6182 | | 9 |
| Rainbow Darter | *Etheostoma caeruleum* | 958 | 51 | 3.9649 | | 6 |
| Yellow Perch | *Perca flavescens* | 2 | 2 | 0.0083 | | 47 |
| **Family *Gobiidae (Gobies)*** | | | | **0.2525** | **9** | |
| Round Goby | *Neogobius melanostomus* | 61 | 8 | 0.2525 | | 28 |

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Table 6. 2011 Pennsylvania Lake Erie watershed fish community by site

| Stream | Site | Number of Species | Number of Individuals | Catch per Hour | Shannon Diversity Index (H') |
|---|---|---|---|---|---|
| Conneaut Creek | COC 9 | 14 | 153 | 364 | 1.56 |
| Conneaut Creek | COC 10 | 15 | 216 | 655 | 1.61 |
| Conneaut Creek | COC 12 | 11 | 274 | 548 | 1.46 |
| Conneaut Creek | COC 18 | 25 | 702 | 936 | 2.40 |
| Conneaut Creek | COC 25 | 18 | 263 | 526 | 2.39 |
| Conneaut Creek | COC 26 | 19 | 507 | 1014 | 2.33 |
| Conneaut Creek | COC 28 | 0 | 0 | 0 | No Fish |
| Conneaut Creek | COC 34 | 16 | 163 | 388 | 2.22 |
| Conneaut Creek | COC 35 | 16 | 111 | 264 | 2.07 |
| Conneaut Creek | COC 37 | 6 | 143 | 511 | 1.34 |
| Conneaut Creek | COC 39 | 20 | 363 | 626 | 2.47 |
| Conneaut Creek | COC 43 | 6 | 123 | 492 | 1.21 |
| Conneaut Creek | COC 44 | 12 | 164 | 381 | 1.56 |
| Conneaut Creek | COC 45 | 21 | 314 | 469 | 2.51 |
| Conneaut Creek | COC 52 | 19 | 319 | 638 | 2.14 |
| Conneaut Creek | COC 53 | 21 | 533 | 761 | 2.29 |
| Conneaut Creek | COC 57 | 5 | 244 | 976 | 0.81 |
| Conneaut Creek | COC 58 | 20 | 171 | 342 | 2.39 |
| Turkey Creek | TC1 | 10 | 69 | 138 | 1.82 |
| Raccoon Creek | RC 1 | 17 | 189 | 228 | 2.25 |
| Raccoon Creek | RC 2 | 21 | 288 | 347 | 2.40 |
| Raccoon Creek | RC 6 | 14 | 154 | 367 | 1.96 |
| Crooked Creek | CRC 1 | 26 | 169 | 338 | 2.45 |
| Crooked Creek | CRC 2 | 16 | 67 | 268 | 2.03 |
| Crooked Creek | CRC 3 | 18 | 140 | 560 | 2.19 |
| Crooked Creek | CRC 4 | 15 | 73 | 174 | 2.31 |
| Crooked Creek | CRC 9 | 13 | 242 | 484 | 2.11 |
| Crooked Creek | CRC 19 | 13 | 128 | 305 | 2.06 |
| Duck Run | DR 1 | 6 | 139 | 421 | 1.16 |
| Elk Creek | EC 1 | 16 | 213 | 296 | 1.98 |
| Elk Creek | EC-GC 1 | 7 | 58 | 341 | 1.23 |
| Elk Creek | EC-GC 2 | 5 | 79 | 316 | 1.23 |
| Elk Creek | EC 2 | 7 | 158 | 632 | 1.15 |
| Elk Creek | EC 3 | 14 | 534 | 890 | 2.05 |
| Elk Creek | EC 5 | 17 | 198 | 396 | 1.89 |
| Elk Creek | EC 6 | 9 | 29 | 69 | 1.63 |
| Elk Creek | EC 7 | 8 | 44 | 176 | 1.42 |
| Elk Creek | EC 8 | 5 | 33 | 150 | 1.27 |
| Elk Creek | EC 10 | 12 | 83 | 111 | 1.49 |
| Elk Creek | EC 15 | 11 | 155 | 310 | 1.93 |
| Elk Creek | EC 21 | 8 | 601 | 1202 | 1.54 |
| Elk Creek | EC 22 | 15 | 186 | 388 | 1.69 |
| Elk Creek | EC 23 | 16 | 1927 | 2569 | 1.04 |

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Table 6. 2011 Pennsylvania Lake Erie watershed fish community by site (*continued)*

| Stream | Site | Number of Species | Number of Individuals | Catch per Hour | Shannon Diversity Index (H') |
|---|---|---|---|---|---|
| Elk Creek | EC 25 | 5 | 88 | 440 | 1.00 |
| Elk Creek | EC 26 | 2 | 97 | 746 | 0.39 |
| Elk Creek | EC 28 | 3 | 55 | 220 | 0.99 |
| Elk Creek | EC 30 | 17 | 240 | 1143 | 1.90 |
| Elk Creek | EC 43 | 4 | 342 | 1036 | 0.85 |
| Elk Creek | EC 51 | 19 | 429 | 517 | 2.23 |
| Elk Creek | EC 52 | 9 | 147 | 294 | 1.70 |
| Tributary 62490 | T490 1 | 4 | 8 | 24 | 1.21 |
| Godfrey Run | GFR 6 | 2 | 10 | 40 | 0.67 |
| Godfrey Run | GFR 8 | 3 | 369 | 1118 | 0.64 |
| Tributary 62483 | T83 1 | 1 | 4 | 24 | 0.00 |
| Trout Run | TR 1 | 2 | 48 | 96 | 0.64 |
| Trout Run | TR 3 | 5 | 111 | 264 | 1.43 |
| Trout Run | TR 5 | 10 | 376 | 501 | 2.16 |
| Tributary 62476 | T76 1 | 1 | 70 | 280 | 0.00 |
| Walnut Creek | WC 1 | 20 | 282 | 564 | 2.19 |
| Walnut Creek | WC 2 | 8 | 409 | 1239 | 0.96 |
| Walnut Creek | WC 3 | 14 | 422 | 1005 | 2.05 |
| Walnut Creek | WC 4 | 15 | 183 | 555 | 2.17 |
| Walnut Creek | WC 12 | 11 | 219 | 664 | 2.01 |
| Walnut Creek | WC 16 | 11 | 216 | 372 | 1.81 |
| Walnut Creek | WC 19 | 12 | 259 | 617 | 1.95 |
| Tributary 62436 | T36 1 | 2 | 2 | 12 | 0.69 |
| Tributary 62436 | T36 2 | 3 | 60 | 182 | 0.33 |
| Wilkins Run | WR 1 | 5 | 12 | 36 | 1.47 |
| Marshall Run | MR 1 | 11 | 90 | 273 | 2.09 |
| Marshall Run | MR 3 | 1 | 23 | 92 | 0.00 |
| McDannel Run | MDR 1 | 1 | 42 | 120 | 0.00 |
| Fourmile Creek | 4M 1 | 12 | 37 | 112 | 2.16 |
| Fourmile Creek | 4M 5 | 4 | 65 | 155 | 1.12 |
| Fourmile Creek | 4M 6 | 4 | 207 | 414 | 0.87 |
| Fourmile Creek | 4M 9 | 4 | 63 | 109 | 0.58 |
| Fourmile Creek | 4M 12 | 3 | 49 | 196 | 0.46 |
| Fourmile Creek | 4M 13 | 3 | 87 | 348 | 0.69 |
| Fivemile Creek | 5M 0 | 3 | 156 | 473 | 0.81 |
| Fivemile Creek | 5M 1 | 3 | 64 | 278 | 0.69 |
| Fivemile Creek | 5M 3 | 0 | 0 | 0 | No Fish |
| Sixmile Creek | 6M 0 | 18 | 907 | 907 | 1.67 |
| Sixmile Creek | 6M 1 | 9 | 268 | 400 | 1.34 |
| Sixmile Creek | 6M 4 | 11 | 933 | 1244 | 1.41 |
| Sixmile Creek | 6M 7 | 11 | 484 | 968 | 1.55 |
| Sixmile Creek | 6M 18 | 8 | 179 | 309 | 1.87 |
| Sevenmile Creek | 7M 1 | 7 | 54 | 93 | 1.64 |

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Table 6. 2011 Pennsylvania Lake Erie watershed fish community by site (*continued)*

| Stream | Site | Number of Species | Number of Individuals | Catch per Hour | Shannon Diversity Index (H') |
|---|---|---|---|---|---|
| Sevenmile Creek | 7M 2 | 3 | 19 | 76 | 0.41 |
| Sevenmile Creek | 7M 3 | 9 | 288 | 505 | 1.51 |
| Sevenmile Creek | 7M 6 | 5 | 100 | 286 | 1.19 |
| Sevenmile Creek | 7M 11 | 2 | 57 | 178 | 0.46 |
| Sevenmile Creek | 7M 12 | 2 | 44 | 119 | 0.18 |
| Eightmile Creek | 8M 1 | 7 | 85 | 340 | 1.03 |
| Eightmile Creek | 8M 2 | 7 | 195 | 591 | 1.08 |
| Eightmile Creek | 8M 3 | 8 | 689 | 1300 | 1.34 |
| Eightmile Creek | 8M 4 | 3 | 441 | 882 | 1.09 |
| Eightmile Creek | 8M 10 | 2 | 11 | 44 | 0.30 |
| Eightmile Creek | 8M 11 | 0 | 0 | 0 | No Fish |
| Twelvemile Creek | 12M 1 | 20 | 431 | 440 | 2.06 |
| Twelvemile Creek | 12M 2 | 5 | 115 | 274 | 1.16 |
| Twelvemile Creek | 12M 3 | 2 | 174 | 527 | 0.42 |
| Twelvemile Creek | 12M 4 | 3 | 59 | 155 | 0.33 |
| Twelvemile Creek | 12M 5 | 3 | 114 | 300 | 0.71 |
| Twelvemile Creek | 12M 8 | 4 | 142 | 284 | 0.22 |
| Twelvemile Creek | 12M 12 | 2 | 25 | 192 | 0.63 |
| Sixteenmile Creek | 16M 1 | 16 | 353 | 425 | 1.86 |
| Sixteenmile Creek | 16M 2 | 12 | 341 | 455 | 1.65 |
| Sixteenmile Creek | 16M 5 | 3 | 313 | 467 | 0.94 |
| Sixteenmile Creek | 16M 7 | 1 | 4 | 24 | 0.00 |
| Sixteenmile Creek | 16M 9 | 3 | 133 | 266 | 1.05 |
| Sixteenmile Creek | 16M 10 | 3 | 109 | 260 | 0.97 |
| Sixteenmile Creek | 16M 12 | 3 | 106 | 212 | 0.83 |
| Sixteenmile Creek | 16M 13 | 1 | 2 | 12 | 0.00 |
| Orchard Beach Run | OBR 5 | 2 | 209 | 653 | 0.33 |
| Woodmere Beach Run | WBR 1 | 3 | 93 | 233 | 0.81 |
| Woodmere Beach Run | WBR 3 | 2 | 228 | 691 | 0.34 |
| Peck Run | PR 1 | 2 | 59 | 111 | 0.67 |
| Peck Run | PR 3 | 2 | 44 | 133 | 0.11 |
| Peck Run | PR 5 | 4 | 119 | 361 | 0.18 |
| Twentymile Creek | 20M 1 | 10 | 175 | 261 | 1.45 |

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Table 7. 2011 Pennsylvania Lake Erie watershed fish community by stream

| Stream | Metrics | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Sites | Number of Families | Mean Families per Site | Rank (Families) | Number of Species | Mean Species per Site | Rank (Species) | Mean Fish per Site | Mean CPUE per Site | Rank (CPUE per site) | Mean Diversity Index (H') | Rank (H') |
| Conneaut Creek | 18 | 10 | 4.7 | 3 | 44 | 14.7 | 1 | 264.6 | 549.5 | 6 | 1.93 | 3 |
| Turkey Creek | 1 | 8 | 8.0 | 4 | 10 | 10.0 | 14 | 69.0 | 138.0 | 22 | 1.82 | 5 |
| Raccoon Creek | 3 | 8 | 7.0 | 4 | 25 | 17.3 | 4 | 210.3 | 313.8 | 11 | 2.20 | 1 |
| Crooked Creek | 6 | 11 | 6.5 | 1 | 35 | 16.8 | 2 | 136.5 | 355.0 | 10 | 2.19 | 2 |
| Duck Run | 1 | 2 | 2.0 | 18 | 6 | 6.0 | 16 | 139.0 | 421.0 | 9 | 1.16 | 12 |
| Elk Creek | 21 | 11 | 4.2 | 1 | 35 | 10.0 | 2 | 271.2 | 582.9 | 4 | 1.46 | 8 |
| Tributary 62490 | 1 | 3 | 3.0 | 16 | 4 | 4.0 | 19 | 8.0 | 24.0 | 26 | 1.21 | 11 |
| Godfrey Run | 2 | 2 | 2.0 | 18 | 3 | 2.5 | 21 | 190.0 | 579.0 | 5 | 0.66 | 20 |
| Tributary 62483 | 1 | 1 | 1.0 | 23 | 1 | 1.0 | 25 | 4.0 | 24.0 | 27 | 0.00 | 25 |
| Trout Run | 3 | 5 | 3.3 | 12 | 11 | 5.7 | 11 | 178.0 | 287.0 | 13 | 1.41 | 10 |
| Tributary 62476 | 1 | 1 | 1.0 | 23 | 1 | 1.0 | 25 | 70.0 | 280.0 | 14 | 0.00 | 25 |
| Walnut Creek | 7 | 8 | 5.3 | 4 | 25 | 13.0 | 4 | 284.0 | 716.0 | 2 | 1.88 | 4 |
| Tributary 62436 | 2 | 2 | 2.0 | 18 | 4 | 2.5 | 19 | 31.0 | 97.0 | 24 | 0.51 | 22 |
| Wilkins Run | 1 | 2 | 2.0 | 18 | 5 | 5.0 | 17 | 12.0 | 36.0 | 25 | 1.47 | 7 |
| Marshall Run | 2 | 4 | 2.5 | 14 | 11 | 6.0 | 11 | 56.5 | 182.5 | 21 | 1.05 | 13 |
| McDannel Run | 1 | 1 | 1.0 | 23 | 1 | 1.0 | 25 | 43.0 | 123.0 | 23 | 0.00 | 25 |
| Fourmile Creek | 6 | 5 | 2.5 | 12 | 12 | 5.0 | 8 | 84.7 | 222.3 | 18 | 0.98 | 14 |
| Fivemile Creek | 3 | 1 | 0.7 | 23 | 3 | 2.0 | 21 | 73.3 | 250.3 | 17 | 0.75 | 19 |
| Sixmile Creek | 5 | 8 | 5.6 | 4 | 20 | 11.4 | 6 | 554.2 | 765.5 | 1 | 1.57 | 6 |
| Sevenmile Creek | 6 | 6 | 2.3 | 11 | 12 | 4.7 | 8 | 93.7 | 209.5 | 19 | 0.90 | 17 |
| Eightmile Creek | 6 | 4 | 1.8 | 14 | 11 | 4.5 | 11 | 236.8 | 526.2 | 7 | 0.97 | 15 |
| Twelvemile Creek | 7 | 8 | 2.7 | 4 | 20 | 5.6 | 6 | 151.0 | 310.0 | 12 | 0.79 | 18 |
| Sixteenmile Creek | 8 | 8 | 2.6 | 4 | 19 | 5.3 | 8 | 170.0 | 265.0 | 15 | 0.91 | 16 |
| Orchard Beach Run | 1 | 1 | 1.0 | 23 | 2 | 2.0 | 24 | 209.0 | 653.0 | 3 | 0.33 | 23 |
| Woodmere Beach Run | 2 | 2 | 1.5 | 18 | 3 | 2.5 | 21 | 160.5 | 461.7 | 8 | 0.58 | 21 |
| Peck Run | 3 | 3 | 1.7 | 16 | 5 | 2.7 | 17 | 74.0 | 201.8 | 20 | 0.32 | 24 |
| Twentymile Creek | 1 | 7 | 7.0 | 10 | 10 | 10.0 | 14 | 175.0 | 261.0 | 16 | 1.45 | 9 |



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Table 8. 2011 Pennsylvania Lake Erie watershed fish IBI scores by site

| Stream | Site | IBI | Class (Karr 1981)* | Class (Yoder 1995)** |
|---|---|---|---|---|
| Conneaut Creek | COC 9 | 42 | F | WWH |
| Conneaut Creek | COC 10 | 40 | F | WWH |
| Conneaut Creek | COC 12 | 40 | F | WWH |
| Conneaut Creek | COC 18 | 54 | E-G | EWH |
| Conneaut Creek | COC 25 | 48 | G | WWH |
| Conneaut Creek | COC 26 | 44 | F | WWH |
| Conneaut Creek | COC 28 | No Fish | No Fish | No Fish |
| Conneaut Creek | COC 34 | 50 | G | EWH |
| Conneaut Creek | COC 35 | 42 | F | WWH |
| Conneaut Creek | COC 37 | 36 | F-P | WWH |
| Conneaut Creek | COC 39 | 52 | G | EWH |
| Conneaut Creek | COC 43 | 36 | F-P | NA |
| Conneaut Creek | COC 44 | 36 | F-P | NA |
| Conneaut Creek | COC 45 | 52 | G | EWH |
| Conneaut Creek | COC 52 | 44 | F | WWH |
| Conneaut Creek | COC 53 | 54 | E-G | EWH |
| Conneaut Creek | COC 57 | 36 | F-P | NA |
| Conneaut Creek | COC 58 | 54 | E-G | EWH |
| Turkey Creek | TC1 | 38 | F-P | WWH |
| Raccoon Creek | RC 1 | 44 | F | WWH |
| Raccoon Creek | RC 2 | 52 | G | EWH |
| Raccoon Creek | RC 6 | 40 | F | WWH |
| Crooked Creek | CRC 1 | 52 | G | EWH |
| Crooked Creek | CRC 2 | 44 | F | WWH |
| Crooked Creek | CRC 3 | 44 | F | WWH |
| Crooked Creek | CRC 4 | 40 | F | WWH |
| Crooked Creek | CRC 9 | 40 | F | WWH |
| Crooked Creek | CRC 19 | 42 | F | WWH |
| Duck Run | DR 1 | 28 | P | NA |
| Elk Creek | EC 1 | 48 | G | WWH |
| Elk Creek | EC-GC 1 | 38 | F-P | WWH |
| Elk Creek | EC-GC 2 | 34 | P | NA |
| Elk Creek | EC 2 | 34 | P | NA |
| Elk Creek | EC 3 | 42 | F | WWH |
| Elk Creek | EC 5 | 42 | F | WWH |
| Elk Creek | EC 6 | 42 | F | WWH |
| Elk Creek | EC 7 | 38 | F-P | WWH |
| Elk Creek | EC 8 | 34 | P | NA |
| Elk Creek | EC 10 | 44 | F | WWH |
| Elk Creek | EC 15 | 38 | F-P | WWH |
| Elk Creek | EC 21 | 38 | F-P | WWH |
| Elk Creek | EC 22 | 46 | G-F | WWH |
| Elk Creek | EC 23 | 46 | G-F | WWH |
| Elk Creek | EC 25 | 38 | F-P | WWH |

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Table 8. 2011 Pennsylvania Lake Erie fish watershed IBI scores by site (*continued)*

| Stream | Site | IBI | Class (Karr 1981)* | Class (Yoder 1995)** |
|---|---|---|---|---|
| Elk Creek | EC 26 | 26 | P-VP | NA |
| Elk Creek | EC 28 | 26 | P-VP | NA |
| Elk Creek | EC 30 | 50 | G | EWH |
| Elk Creek | EC 43 | 30 | P | NA |
| Elk Creek | EC 51 | 50 | G | EWH |
| Elk Creek | EC 52 | 40 | F | WWH |
| Tributary 62490 | T490 1 | 32 | P | NA |
| Godfrey Run | GFR 6 | 26 | P-VP | NA |
| Godfrey Run | GFR 8 | 28 | P | NA |
| Tributary 62483 | T83 1 | 26 | P-VP | NA |
| Trout Run | TR 1 | 30 | P | NA |
| Trout Run | TR 3 | 36 | F-P | NA |
| Trout Run | TR 5 | 38 | F-P | WWH |
| Tributary 62476 | T76 1 | 24 | P-VP | NA |
| Walnut Creek | WC 1 | 46 | G-F | WWH |
| Walnut Creek | WC 2 | 40 | F | WWH |
| Walnut Creek | WC 3 | 42 | F | WWH |
| Walnut Creek | WC 4 | 44 | F | WWH |
| Walnut Creek | WC 12 | 40 | F | WWH |
| Walnut Creek | WC 16 | 36 | F-P | NA |
| Walnut Creek | WC 19 | 42 | F | WWH |
| Tributary 62436 | T36 1 | 36 | F-P | NA |
| Tributary 62436 | T36 2 | 24 | P-VP | NA |
| Wilkins Run | WR 1 | 36 | F-P | NA |
| Marshall Run | MR 1 | 44 | F | WWH |
| Marshall Run | MR 3 | 26 | P-VP | NA |
| McDannel Run | MDR 1 | 22 | VP | NA |
| Fourmile Creek | 4M 1 | 40 | F | WWH |
| Fourmile Creek | 4M 5 | 30 | P | NA |
| Fourmile Creek | 4M 6 | 32 | P | NA |
| Fourmile Creek | 4M 9 | 32 | P | NA |
| Fourmile Creek | 4M 12 | 26 | P-VP | NA |
| Fourmile Creek | 4M 13 | 26 | P-VP | NA |
| Fivemile Creek | 5M 0 | 30 | P | NA |
| Fivemile Creek | 5M 1 | 26 | P-VP | NA |
| Fivemile Creek | 5M 3 | No Fish | No Fish | No Fish |
| Sixmile Creek | 6M 0 | 46 | G-F | WWH |
| Sixmile Creek | 6M 1 | 38 | F-P | WWH |
| Sixmile Creek | 6M 4 | 40 | F | WWH |
| Sixmile Creek | 6M 7 | 40 | F | WWH |
| Sixmile Creek | 6M 18 | 40 | F | WWH |
| Sevenmile Creek | 7M 1 | 38 | F-P | WWH |
| Sevenmile Creek | 7M 2 | 24 | P-VP | NA |
| Sevenmile Creek | 7M 3 | 38 | F-P | WWH |

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Table 8. 2011 Pennsylvania Lake Erie watershed fish IBI scores by site (*continued)*

| Stream | Site | IBI | Class (Karr 1981)* | Class (Yoder 1995)** |
|---|---|---|---|---|
| Sevenmile Creek | 7M 6 | 34 | P | NA |
| Sevenmile Creek | 7M 11 | 22 | VP | NA |
| Sevenmile Creek | 7M 12 | 22 | VP | NA |
| Eightmile Creek | 8M 1 | 30 | P | NA |
| Eightmile Creek | 8M 2 | 36 | F-P | NA |
| Eightmile Creek | 8M 3 | 38 | F-P | WWH |
| Eightmile Creek | 8M 4 | 32 | P | NA |
| Eightmile Creek | 8M 10 | 22 | VP | NA |
| Eightmile Creek | 8M 11 | No Fish | No Fish | No Fish |
| Twelvemile Creek | 12M 1 | 46 | G-F | WWH |
| Twelvemile Creek | 12M 2 | 32 | P | NA |
| Twelvemile Creek | 12M 3 | 24 | P-VP | NA |
| Twelvemile Creek | 12M 4 | 24 | P-VP | NA |
| Twelvemile Creek | 12M 5 | 26 | P-VP | NA |
| Twelvemile Creek | 12M 8 | 26 | P-VP | NA |
| Twelvemile Creek | 12M 12 | 26 | P-VP | NA |
| Sixteenmile Creek | 16M 1 | 46 | G-F | WWH |
| Sixteenmile Creek | 16M 2 | 42 | F | WWH |
| Sixteenmile Creek | 16M 5 | 26 | P-VP | NA |
| Sixteenmile Creek | 16M 7 | 26 | P-VP | NA |
| Sixteenmile Creek | 16M 9 | 34 | P | NA |
| Sixteenmile Creek | 16M 10 | 30 | P | NA |
| Sixteenmile Creek | 16M 12 | 30 | P | NA |
| Sixteenmile Creek | 16M 13 | 26 | P-VP | NA |
| Orchard Beach Run | OBR 5 | 24 | P-VP | NA |
| Woodmere Beach Run | WBR 1 | 28 | P | NA |
| Woodmere Beach Run | WBR 3 | 24 | P-VP | NA |
| Peck Run | PR 1 | 26 | P-VP | NA |
| Peck Run | PR 3 | 22 | VP | NA |
| Peck Run | PR 5 | 28 | P | NA |
| Twentymile Creek | 20M 1 | 46 | G-F | WWH |

* Excellend-Good (E-G); Good (G); Good-Fair (G-F); Fair (F); Fair-Poor (F-P); Poor (P); Poor-Very Poor (P-VP); Very-Poor (VP)

** Warmwater Habitat (WWH); Exceptional Warmwater Habitat (EWH); Non-attaining (NA)

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Table 9. Fish classifications used for calculating IBI scores

| | | Classification* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | | Darter/Sculpin | Sunfish | Minnow | Intolerant | Dace | Omnivore | Insectivore | Carnivore | Lithophil | Tol |
| American Brook Lamprey | *Lampetra appendix* | | | | x | | | | | | I |
| Sea Lamprey | *Petromyzon marinus* | | | | | | | | | | M |
| Longnose Gar | *Lepisosteus osseus* | | | | | | | | x | | M |
| Grass Pickerel | *Esox americanus vermiculatus* | | | | | | | | x | | M |
| Central Mudminnow | *Umbra limi* | | | | | | | x | | | T |
| Bigeye Chub | *Hybopsis amblops* | | | x | x | | | x | | x | I |
| Blacknose Dace | *Rhinichthys obtusus* | | | x | | x | x | | | x | T |
| Bluntnose Minnow | *Pimephales notatus* | | | x | | | x | | | | T |
| Central Stoneroller | *Campostoma anomalum* | | | x | | | | | | | T |
| Common Carp | *Cyprinus carpio* | | | x | | | x | | | | T |
| Common Shiner | *Luxilus cornutus* | | | x | | | | x | | x | M |
| Creek Chub | *Semotilus atromaculatus* | | | x | | | x | | | | T |
| Emerald Shiner | *Notropis atherinoides* | | | x | | | | x | | x | M |
| Fathead Minnow | *Pimephales promelas* | | | x | | | x | | | | T |
| Golden Shiner | *Notemigonus crysoleucas* | | | x | | | x | | | | T |
| Hornyhead Chub | *Nocomis biguttatus* | | | x | x | | | x | | | I |
| Longnose Dace | *Rhinichthys cataractae* | | | x | x | x | | x | | | I |
| Mimic Shiner | *Notropis volucellus* | | | x | x | | | x | | | I |
| Redfin Shiner | *Lythrurus umbratilis* | | | x | | | | x | | | M |
| Redside Dace | *Clinostomus elongatus* | | | x | x | x | | x | | x | I |
| River Chub | *Nocomis micropogon* | | | x | x | | | x | | | I |
| Rosyface Shiner | *Notropis rubellus* | | | x | x | | | x | | x | I |
| Sand Shiner | *Notropis stramineus* | | | x | | | | x | | | M |
| Silverjaw Minnow | *Notropis buccatus* | | | x | | | | x | | | M |
| Southern Redbelly Dace | *Phoxinus erythrogaster* | | | x | x | x | | | | x | I |
| Spotfin Shiner | *Cyprinella spiloptera* | | | x | | | | x | | | M |
| Spottail Shiner | *Notropis hudsonius* | | | x | x | | | x | | | I |
| Striped Shiner | *Luxilus chrysocephalus* | | | x | | | | x | | x | M |
| Golden Redhorse | *Moxostoma erythrurum* | | | | x | | | x | | x | I |
| Northern Hogsucker | *Hypentelium nigricans* | | | | x | | | x | | x | I |
| White Sucker | *Catostomus commersoni* | | | | | | x | | | x | T |

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Table 9. Fish classifications used for calculating IBI scores (*continued)*

| | | Classification* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Species | Darter/Sculpin | Sunfish | Minnow | Intolerant | Dace | Omnivore | Insectivore | Carnivore | Lithophil | Tol |
| Brown Bullhead | *Ameiurus nebulosus* | | | | | | | x | | | T |
| Stonecat | *Noturus flavus* | | | | x | | | x | | | I |
| Yellow Bullhead | *Ameiurus natalis* | | | | | | | x | | | T |
| Brown Trout | *Salmo trutta* | | | | x | | | | x | | I |
| Golden Rainbow Trout | *Oncorhynchus mykiss* | | | | x | | | | x | | I |
| Rainbow Trout | *Oncorhynchus mykiss* | | | | x | | | | x | | I |
| Brook Stickleback | *Culaea inconstans* | | | | x | | | x | | | I |
| Mottled Sculpin | *Cottus bairdi* | x | | | x | | | x | | | I |
| Black Crappie | *Promoxis nigromaculatus* | | x | | | | | | x | | M |
| Bluegill | *Lepomis macrochirus* | | x | | | | | x | | | M |
| Green Sunfish | *Lepomis cyanellus* | | x | | | | | x | | | T |
| Largemouth Bass | *Micropterus salmoides* | | x | | | | | | x | | M |
| Pumpkinseed | *Lepomis gibbosus* | | x | | | | | x | | | M |
| Rock Bass | *Ambloplites rupestris* | | x | | | | | | x | | M |
| Smallmouth Bass | *Micropterus dolomieu* | | x | | x | | | | x | | I |
| Blackside Darter | *Percina maculata* | x | | | | | | x | | x | M |
| Fantail Darter | *Etheostoma flabellare* | x | | | | | | x | | | M |
| Greenside Darter | *Etheostoma blennioides* | x | | | x | | | x | | x | I |
| Johnny Darter | *Etheostoma nigrum* | x | | | | | | x | | | M |
| Logperch | *Percina caprodes* | x | | | | | | x | | x | M |
| Rainbow Darter | *Etheostoma caeruleum* | x | | | x | | | x | | x | I |
| Yellow Perch | *Perca flavescens* | | | | | | | x | | | M |
| Round Goby | *Neogobius melanostomus* | | | | | | | | | | T |

* Classficiations were dervied from Ohio EPA (1987), Simon (1991), and Barbour *et al. (1999)*

Tol (tolerance): I = intolerant; M = intermediate; T = tolerant



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Table 10. 2011 Pennsylvania Lake Erie watershed fish IBI scores by stream

| | | Metrics | | | |
|---|---|---|---|---|---|
| Stream | Sites | Mean IBI | Mean IBI Rank | Class (Karr 1981)* | Class (Yoder 1995)** |
| Conneaut Creek | 18 | 44.7 | 3 | G-F | WWH |
| Turkey Creek | 1 | 38.0 | 8 | F-P | WWH |
| Raccoon Creek | 3 | 45.3 | 2 | G-F | WWH |
| Crooked Creek | 6 | 43.7 | 4 | F | WWH |
| Duck Run | 1 | 28.0 | 19 | P | NA |
| Elk Creek | 21 | 39.2 | 7 | F | WWH |
| Tributary 62490 | 1 | 32.0 | 13 | P | NA |
| Godfrey Run | 2 | 27.0 | 21 | P-VP | NA |
| Tributary 62483 | 1 | 26.0 | 22 | P-VP | NA |
| Trout Run | 3 | 34.7 | 10 | P | NA |
| Tributary 62476 | 1 | 24.0 | 25 | P-VP | NA |
| Walnut Creek | 7 | 41.4 | 5 | F | WWH |
| Tributary 62436 | 2 | 30.0 | 16 | P | NA |
| Wilkins Run | 1 | 36.0 | 9 | F-P | NA |
| Marshall Run | 2 | 35.0 | 10 | P | NA |
| McDannel Run | 1 | 22.0 | 27 | VP | NA |
| Fourmile Creek | 6 | 31.0 | 15 | P | NA |
| Fivemile Creek | 3 | 28.0 | 19 | P | NA |
| Sixmile Creek | 5 | 40.8 | 6 | F | WWH |
| Sevenmile Creek | 6 | 29.7 | 17 | P | NA |
| Eightmile Creek | 6 | 31.6 | 14 | P | NA |
| Twelvemile Creek | 7 | 29.1 | 18 | P | NA |
| Sixteenmile Creek | 8 | 32.5 | 12 | P | NA |
| Orchard Beach Run | 1 | 24.0 | 25 | P-VP | NA |
| Woodmere Beach Run | 2 | 26.0 | 22 | VP | NA |
| Peck Run | 3 | 25.3 | 24 | P-VP | NA |
| Twentymile Creek | 1 | 46.0 | 1 | G-F | WWH |

* Excellend-Good (E-G); Good (G); Good-Fair (G-F); Fair (F); Fair-Poor (F-P); Poor (P); Poor-Very Poor (P-VP); Very-Poor (VP)

** Warmwater Habitat (WWH); Exceptional Warmwater Habitat (EWH); Non-attaining (NA)

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Table 11. 2011 Pennsylvania Lake Erie watershed water quality

| Site | Temp (° C) | Temp (°F) | Dissolved Oxygen (mg $L^{-1}$) | Specific Conductance (µS $cm^{-1}$) | pH | Stream Width (feet) | Stream Width (meters) | Stream Depth (inches) | Stream Depth (cm) |
|---|---|---|---|---|---|---|---|---|---|
| COC 9 | 17.62 | 63.72 | 8.64 | 104.0 | 8.27 | 13.00 | 3.96 | 2.4 | 6.10 |
| COC 10 | 18.05 | 64.49 | 6.65 | 181.0 | 7.91 | 17.00 | 5.18 | 2.2 | 5.59 |
| COC 12 | 18.69 | 65.64 | 4.47 | 185.0 | 7.91 | 10.00 | 3.05 | 2.0 | 5.08 |
| COC 18 | 25.05 | 77.09 | 6.23 | 362.0 | 7.88 | 90.60 | 27.61 | 6.0 | 15.24 |
| COC 25 | 23.10 | 73.58 | 7.31 | 388.0 | 8.01 | 31.00 | 9.45 | 8.0 | 20.32 |
| COC 26 | 17.13 | 62.83 | 9.74 | 374.0 | 8.15 | 6.00 | 1.83 | 2.0 | 5.08 |
| COC 28 | 17.28 | 63.10 | 7.61 | 336.0 | 7.42 | 3.00 | 0.91 | 1.6 | 4.06 |
| COC 34 | 20.71 | 69.28 | 9.30 | 332.0 | 8.36 | 25.50 | 7.77 | 6.2 | 15.75 |
| COC 35 | 19.44 | 66.99 | 8.66 | 339.0 | 8.04 | 29.00 | 8.84 | 8.2 | 20.83 |
| COC 37 | 17.42 | 63.36 | 7.11 | 407.0 | 7.74 | 4.00 | 1.22 | 2.2 | 5.59 |
| COC 39 | 23.20 | 73.76 | 8.43 | 370.0 | 8.24 | 35.00 | 10.67 | 4.1 | 10.41 |
| COC 43 | 18.85 | 65.93 | 9.84 | 266.0 | 7.99 | 12.00 | 3.66 | 1.6 | 4.06 |
| COC 44 | 18.32 | 64.98 | 9.89 | 221.0 | 8.06 | 20.00 | 6.10 | 3.3 | 8.38 |
| COC 45 | 23.64 | 74.55 | 8.05 | 375.0 | 7.98 | 17.00 | 5.18 | 6.8 | 17.27 |
| COC 52 | 23.63 | 74.53 | 9.27 | 324.0 | 7.79 | 16.90 | 5.15 | 4.2 | 10.67 |
| COC 53 | 23.90 | 75.02 | 7.77 | 378.0 | 7.76 | 21.40 | 6.52 | 5.9 | 14.99 |
| COC 57 | 21.65 | 70.97 | 4.26 | 433.0 | 7.46 | 4.50 | 1.37 | 7.6 | 19.30 |
| COC 58 | 26.15 | 79.07 | 6.50 | 379.0 | 7.86 | 23.50 | 7.16 | 4.0 | 10.16 |
| TC1 | 20.10 | 68.18 | 8.53 | 658.0 | 8.06 | 14.60 | 4.45 | 1.6 | 4.06 |
| RC 1 | 21.87 | 71.37 | 7.63 | 463.0 | 8.14 | 17.50 | 5.33 | 6.0 | 15.24 |
| RC 2 | 21.78 | 71.20 | 8.07 | 456.0 | 8.15 | 7.80 | 2.38 | 3.0 | 7.62 |
| RC 6 | 23.25 | 73.85 | 5.44 | 533.0 | 7.99 | 3.50 | 1.07 | 2.6 | 6.60 |
| CRC 1 | 20.71 | 69.28 | 9.63 | 405.0 | 8.16 | 31.60 | 9.63 | 8.6 | 21.84 |
| CRC 2 | 21.11 | 69.99 | 10.67 | 415.0 | 8.35 | 14.90 | 4.54 | 2.0 | 5.08 |
| CRC 3 | 21.64 | 70.95 | 9.70 | 297.0 | 8.07 | 8.30 | 2.53 | 1.8 | 4.45 |
| CRC 4 | 20.53 | 68.95 | 11.63 | 411.0 | 8.44 | 18.70 | 5.70 | 5.3 | 13.46 |
| CRC 9 | 21.98 | 71.56 | 7.98 | 336.0 | 8.00 | 14.50 | 4.42 | 4.3 | 10.92 |
| CRC 19 | 21.02 | 69.84 | 9.44 | 343.0 | 8.29 | 11.20 | 3.41 | 4.5 | 11.43 |
| DR 1 | 26.48 | 79.66 | 8.64 | 262.0 | 8.30 | 6.00 | 1.83 | 1.0 | 2.54 |
| EC 1 | 27.41 | 81.34 | 7.85 | 510.0 | 8.08 | 18.30 | 5.58 | 6.8 | 17.27 |
| EC-GC 1 | ND | ND | ND | ND | ND | 1.00 | 0.30 | 0.5 | 1.27 |
| EC-GC 2 | ND | ND | ND | ND | ND | 2.00 | 0.61 | 3.2 | 8.13 |
| EC 2 | 20.45 | 68.81 | 10.05 | 446.0 | 8.23 | 5.20 | 1.58 | 4.0 | 10.16 |
| EC 3 | 20.40 | 68.72 | 10.49 | 532.0 | 8.53 | 8.00 | 2.44 | 2.0 | 5.08 |
| EC 5 | 19.92 | 67.86 | 10.18 | 467.0 | 8.35 | 13.00 | 3.96 | 9.0 | 22.86 |
| EC 6 | 25.68 | 78.22 | 8.81 | 388.0 | 8.53 | 93.40 | 28.47 | 6.8 | 17.27 |
| EC 7 | 24.50 | 76.10 | 9.05 | 459.0 | 8.67 | 17.60 | 5.36 | 2.9 | 7.37 |
| EC 8 | 21.29 | 70.32 | 9.87 | 517.0 | 8.40 | 11.10 | 3.38 | 5.8 | 14.73 |
| EC 10 | 23.96 | 75.13 | 11.07 | 494.0 | 8.25 | 44.90 | 13.69 | 5.0 | 12.70 |
| EC 15 | 25.32 | 77.58 | 9.24 | 308.0 | 8.16 | 22.30 | 6.80 | 3.0 | 7.62 |
| EC 21 | 22.79 | 73.02 | 4.22 | 820.0 | 7.68 | 5.00 | 1.52 | 2.0 | 5.08 |
| EC 22 | 18.96 | 66.13 | 8.83 | 390.0 | 8.27 | 51.00 | 15.54 | 2.3 | 5.84 |

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Table 11. 2011 Pennsylvania Lake Erie watershed water quality (*continued)*

| Site | Temp (° C) | Temp (°F) | Dissolved Oxygen (mg $L^{-1}$) | Specific Conductance (µS $cm^{-1}$) | pH | Stream Width (feet) | Stream Width (meters) | Stream Depth (inches) | Stream Depth (cm) |
|---|---|---|---|---|---|---|---|---|---|
| EC 23 | 23.25 | 73.85 | 9.07 | 360.0 | 8.06 | 16.60 | 5.06 | 2.4 | 6.10 |
| EC 25 | 20.29 | 68.52 | 7.27 | 376.0 | 8.11 | 11.70 | 3.57 | 4.7 | 11.94 |
| EC 26 | 20.08 | 68.14 | 7.53 | 292.0 | 8.19 | 10.20 | 3.11 | 2.0 | 5.08 |
| EC 28 | 23.13 | 73.63 | 3.76 | 354.0 | 7.66 | 1.00 | 0.30 | 3.4 | 8.64 |
| EC 30 | 19.29 | 66.72 | 8.38 | 371.0 | 8.53 | 52.60 | 16.03 | 3.5 | 8.89 |
| EC 43 | 26.99 | 80.58 | 11.66 | 266.0 | 8.59 | 3.50 | 1.07 | 2.2 | 5.59 |
| EC 51 | 23.24 | 73.83 | 9.26 | 305.0 | 8.15 | 21.50 | 6.55 | 5.0 | 12.70 |
| EC 52 | 24.52 | 76.14 | 7.72 | 288.0 | 8.23 | 8.00 | 2.44 | 2.2 | 5.59 |
| T490 1 | 18.62 | 65.52 | 10.16 | 625.0 | 8.41 | 12.80 | 3.90 | 2.5 | 6.35 |
| GFR 6 | 14.90 | 58.82 | 11.48 | 460.0 | 8.39 | 13.40 | 4.08 | 2.8 | 7.11 |
| GFR 8 | 14.93 | 58.87 | 10.45 | 956.0 | 8.25 | 6.00 | 1.83 | 2.0 | 5.08 |
| T83 1 | 17.00 | 62.60 | 8.55 | 439.0 | 8.04 | 1.80 | 0.55 | 1.0 | 2.54 |
| TR 1 | 17.53 | 63.55 | 10.88 | 569.0 | 8.28 | 19.20 | 5.85 | 5.8 | 14.73 |
| TR 3 | 15.85 | 60.53 | 11.05 | 681.0 | 8.36 | 15.20 | 4.63 | 3.8 | 9.65 |
| TR 5 | 18.61 | 65.49 | 9.30 | 587.0 | 8.12 | 18.50 | 5.64 | 2.8 | 7.11 |
| T76 1 | 16.13 | 61.03 | 10.89 | 460.0 | 8.26 | 7.40 | 2.26 | 2.6 | 6.60 |
| WC 1 | 19.00 | 66.20 | 10.59 | 455.0 | 8.24 | 36.00 | 10.97 | 5.2 | 13.21 |
| WC 2 | 16.15 | 61.07 | 11.10 | 535.0 | 8.42 | 16.60 | 5.06 | 1.4 | 3.56 |
| WC 3 | 19.02 | 66.24 | 10.83 | 520.0 | 8.30 | 32.00 | 9.75 | 8.0 | 20.32 |
| WC 4 | 18.50 | 65.30 | 10.38 | 467.0 | 8.50 | 18.00 | 5.49 | 1.0 | 2.54 |
| WC 12 | 20.26 | 68.47 | 9.36 | 719.0 | 8.15 | 46.30 | 14.11 | 6.6 | 16.76 |
| WC 16 | 20.40 | 68.72 | 10.17 | 912.0 | 7.95 | 32.50 | 9.91 | 7.6 | 19.30 |
| WC 19 | 20.40 | 68.72 | 8.98 | 510.0 | 8.16 | 12.30 | 3.75 | 2.8 | 7.11 |
| T36 1 | 17.55 | 63.59 | 4.92 | 669.0 | 7.68 | 2.10 | 0.64 | 2.0 | 5.08 |
| T36 2 | 19.09 | 66.36 | 8.09 | 639.0 | 8.06 | 3.00 | 0.91 | 1.4 | 3.56 |
| WR 1 | 15.85 | 60.53 | 10.92 | 924.0 | 8.29 | 13.10 | 3.99 | 2.0 | 5.08 |
| MR 1 | 20.49 | 68.88 | 10.06 | 886.0 | 8.35 | 9.20 | 2.80 | 2.4 | 6.10 |
| MR 3 | 24.15 | 75.47 | 8.05 | 1073.0 | 8.25 | 3.50 | 1.07 | 2.0 | 5.08 |
| MDR 1 | 18.50 | 65.30 | 8.91 | 314.0 | 8.37 | 14.60 | 4.45 | 1.8 | 4.45 |
| 4M 1 | 22.59 | 72.66 | 8.04 | 687.0 | 8.15 | 30.70 | 9.36 | 2.2 | 5.59 |
| 4M 5 | 21.48 | 70.66 | 7.68 | 682.0 | 8.19 | 25.80 | 7.86 | 3.2 | 8.13 |
| 4M 6 | 21.09 | 69.96 | 9.11 | 658.0 | 8.49 | 9.10 | 2.77 | 2.6 | 6.60 |
| 4M 9 | 15.54 | 59.97 | 8.16 | 496.0 | 9.05 | 18.44 | 5.62 | 5.0 | 12.70 |
| 4M 12 | 21.45 | 70.61 | 8.37 | 394.0 | 8.27 | 13.80 | 4.21 | 2.8 | 7.11 |
| 4M 13 | 21.12 | 70.02 | 8.12 | 302.0 | 8.33 | 14.50 | 4.42 | 2.3 | 5.84 |
| 5M 0 | 18.42 | 65.16 | 8.08 | 623.0 | 7.76 | 19.40 | 5.91 | 4.2 | 10.67 |
| 5M 1 | 16.30 | 61.34 | 7.90 | 586.0 | 8.06 | 9.30 | 2.83 | 4.5 | 11.43 |
| 5M 3 | 16.71 | 62.08 | 8.38 | 438.0 | 7.87 | 4.30 | 1.31 | 1.5 | 3.81 |
| 6M 0 | 19.95 | 67.91 | 7.47 | 394.0 | 7.75 | 27.20 | 8.29 | 4.6 | 11.68 |
| 6M 1 | 21.57 | 70.83 | 7.03 | 358.0 | 8.06 | 35.08 | 10.69 | 5.2 | 13.21 |
| 6M 4 | 21.20 | 70.16 | 6.02 | 368.0 | 8.20 | 38.36 | 11.69 | 11.0 | 27.94 |
| 6M 7 | 20.85 | 69.53 | 8.66 | 369.0 | 8.20 | 20.80 | 6.34 | 3.0 | 7.62 |

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Table 11. 2011 Pennsylvania Lake Erie watershed water quality (*continued)*

| Site | Temp (° C) | Temp (°F) | Dissolved Oxygen (mg $L^{-1}$) | Specific Conductance (µS $cm^{-1}$) | pH | Stream Width (feet) | Stream Width (meters) | Stream Depth (inches) | Stream Depth (cm) |
|---|---|---|---|---|---|---|---|---|---|
| 6M 18 | 17.51 | 63.52 | ND | ND | ND | 8.20 | 2.50 | 2.1 | 5.33 |
| 7M 1 | 13.80 | 56.84 | 8.38 | 408.0 | 8.71 | 25.85 | 7.88 | 3.2 | 8.13 |
| 7M 2 | 15.50 | 59.90 | 7.68 | 370.0 | 7.52 | 8.60 | 2.62 | 5.5 | 13.97 |
| 7M 3 | 16.46 | 61.63 | 8.67 | 340.0 | 7.71 | 4.60 | 1.40 | 3.7 | 9.40 |
| 7M 6 | 16.98 | 62.56 | 8.48 | 443.0 | 7.83 | 5.40 | 1.65 | 3.0 | 7.62 |
| 7M 11 | 16.28 | 61.30 | 8.75 | 556.0 | 7.95 | 10.30 | 3.14 | 3.5 | 8.89 |
| 7M 12 | 15.89 | 60.60 | 8.94 | 539.0 | 7.67 | 7.20 | 2.19 | 3.6 | 9.14 |
| 8M 1 | 19.14 | 66.45 | 8.28 | 321.0 | 7.99 | 28.80 | 8.78 | 2.0 | 5.08 |
| 8M 2 | 18.94 | 66.09 | 6.77 | 318.0 | 7.61 | 12.80 | 3.90 | 3.7 | 9.40 |
| 8M 3 | 20.51 | 68.92 | 7.47 | 284.0 | 7.72 | 17.00 | 5.18 | 3.0 | 7.62 |
| 8M 4 | 22.28 | 72.10 | 7.26 | 289.0 | 7.74 | 4.94 | 1.51 | 3.8 | 9.65 |
| 8M 10 | 21.53 | 70.75 | 7.45 | 328.0 | 7.99 | 2.50 | 0.76 | 1.3 | 3.30 |
| 8M 11 | 18.37 | 65.07 | 7.84 | 162.0 | 7.80 | 6.00 | 1.83 | 2.2 | 5.59 |
| 12M 1 | 17.69 | 63.84 | 8.19 | 336.0 | 8.03 | 39.24 | 11.96 | 5.2 | 13.21 |
| 12M 2 | 16.76 | 62.17 | 8.34 | 280.0 | 7.91 | 22.40 | 6.83 | 5.3 | 13.46 |
| 12M 3 | 17.90 | 64.22 | 6.82 | 254.0 | 7.88 | 10.12 | 3.08 | 2.9 | 7.37 |
| 12M 4 | 17.11 | 62.79 | 6.44 | 249.0 | 7.67 | 4.50 | 1.37 | 1.9 | 4.83 |
| 12M 5 | 14.27 | 57.69 | 7.26 | 328.0 | 7.92 | 7.80 | 2.38 | 7.0 | 17.78 |
| 12M 8 | 18.00 | 64.40 | 7.20 | 255.0 | 7.92 | 15.82 | 4.82 | 3.3 | 8.38 |
| 12M 12 | 16.01 | 60.82 | 7.46 | 192.0 | 8.09 | 4.50 | 1.37 | 2.0 | 5.08 |
| 16M 1 | 17.05 | 62.69 | 7.37 | 486.0 | 7.79 | 39.60 | 12.07 | 20.0 | 50.80 |
| 16M 2 | 17.58 | 63.64 | 7.77 | 478.0 | 7.92 | 39.00 | 11.89 | 8.6 | 21.84 |
| 16M 5 | 17.16 | 62.89 | 7.80 | 419.0 | 7.70 | 13.90 | 4.24 | 4.6 | 11.68 |
| 16M 7 | 21.64 | 70.95 | 6.40 | 712.0 | 7.58 | 2.50 | 0.76 | 1.8 | 4.57 |
| 16M 9 | 18.61 | 65.49 | 7.12 | 268.0 | 8.17 | 11.32 | 3.45 | 4.5 | 11.43 |
| 16M 10 | 21.03 | 69.85 | 4.95 | 202.0 | 7.81 | 15.30 | 4.66 | 1.2 | 3.05 |
| 16M 12 | 19.43 | 67.15 | 7.36 | 161.0 | 7.57 | 39.30 | 11.98 | 3.8 | 9.65 |
| 16M 13 | 14.85 | 58.73 | 4.05 | 400.0 | 7.51 | 1.25 | 0.38 | 1.5 | 3.81 |
| OBR 5 | 19.45 | 67.01 | 7.09 | 428.0 | 7.92 | 6.00 | 1.83 | 5.0 | 12.70 |
| WBR 1 | 18.24 | 64.83 | 7.61 | 249.0 | 7.76 | 8.50 | 2.59 | 2.0 | 5.08 |
| WBR 3 | 18.22 | 64.79 | 8.32 | 423.0 | 7.97 | 6.00 | 1.83 | 8.0 | 20.32 |
| PR 1 | ND | ND | ND | ND | ND | 12.30 | 3.75 | 3.8 | 9.65 |
| PR 3 | ND | ND | ND | ND | ND | 2.50 | 0.76 | 1.5 | 3.81 |
| PR 5 | ND | ND | ND | ND | ND | 3.00 | 0.91 | 2.4 | 6.10 |
| 20M 1 | 17.19 | 62.94 | 9.35 | 241.0 | 8.66 | 32.42 | 9.88 | 7.2 | 18.29 |

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Table 12. Walnut Creek fish sampling locations (O'Kelly 1972)

| Stream | Site | 2011 Site | Location | Latitude* | Longitude* |
|---|---|---|---|---|---|
| Walnut Creek | WC (Stat 1) | WC-1 | 1/4 mile above mouth; adjacent to PFBC parking lot | ND | ND |
| Walnut Creek | WC (Stat 2) | | Below Route 20; adjacent to rifle range | ND | ND |
| Walnut Creek | WC (Stat 3) | | 200 yards downstream from Millfair Road bridge | ND | ND |
| Walnut Creek | WC (Stat 4) | | 20 yards downstream from sewage effluent discharge at I-90 bridge | ND | ND |
| Walnut Creek | WC (Stat 5) | WC-19 | 30 yards dowstream from Zwilling Road bridge | ND | ND |

* ND = no data; latitude and longitude was not included in report.

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Table 13. Walnut Creek fish community (O'Kelly 1972)

| Species | Study and Site | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1972 WC (Stat 1) | 2011 WC-1 | 1972 WC (Stat 2) | 1972 WC (Stat 3) | 1972 WC (Stat 4) | 1972 WC (Stat 5) | 2011* WC-19 |
| Blacknose Dace | 10 | 74 | 22 | 32 | 40 | 70 | 26 |
| Bluntnose Minnow | | 1 | | | 16 | | 10 |
| Central Stoneroller | 40 | 65 | 102 | 20 | 43 | 30 | 35 |
| Common Shiner | 8 | 19 | 23 | 11 | 29 | 45 | 24 |
| Creek Chub | | 31 | 16 | 10 | 110 | 16 | 94 |
| Emerald Shiner | 1 | | | | | | |
| Fathead Minnow | | | | | 42 | | |
| Longnose Dace | 50 | 31 | 57 | 48 | 73 | 36 | |
| Redside Dace | | | | | 9 | 9 | 10 |
| River Chub | 1 | 9 | 1 | 5 | | | |
| Rosyface Shiner | 20 | | | | | 5 | |
| Sand Shiner | | 1 | | | | | |
| Striped Shiner | | 2 | | | | | |
| Northern Hogsucker | | 17 | 11 | 2 | | 1 | |
| White Sucker | 1 | 9 | 17 | | 11 | 3 | 37 |
| Brindled Madtom | 12 | | | | | | |
| Stonecat | | 2 | | 2 | | | |
| Yellow Bullhead | | | | | | | 1 |
| Rainbow Trout | 1 | 2 | 5 | 1 | | | |
| Mottled Sculpin | | 2 | | | | | 1 |
| Bluegill | | 1 | | | | | |
| Pumpkinseed | | 5 | | | | | |
| Rock Bass | 3 | | | | | | |
| Smallmouth Bass | | 4 | 6 | | | | |
| Fantail Darter | 1 | 1 | 4 | 2 | 3 | 6 | 7 |
| Johnny Darter | 2 | | | | | 1 | 3 |
| Logperch | 874 | | | | | | |
| Rainbow Darter | 10 | 5 | 15 | 27 | 7 | 10 | 11 |
| Round Goby | | 1 | | | | | |
| Number of Species | 15 | 20 | 12 | 11 | 11 | 12 | 12 |
| Number of Individuals | 1034 | 282 | 279 | 160 | 383 | 232 | 259 |

*Site WC-19 is located downstream of site WC (Stat 5) south of Robinson Road

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Table 14. Pennsylvania Lake Erie watershed fish community (Masteller *et al. 1976)*

| Species | Stream, Year, and Sites Assessed | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | RC | | CRC | | EC | | TR | |
| | 1975 n = 3 | 2011 n = 3 | 1975 n = 3 | 2011 n = 6 | 1975 n = 3 | 2011 n = 21 | 1975 n = 3 | 2011 n = 3 |
| American Brook Lamprey | | 3 | | 33 | | | | 14 |
| Longnose Gar | | | | | | 4 | | |
| Grass Pickerel | | | | 7 | | | | |
| Central Mudminnow | | | | 1 | | 1 | | |
| Bigeye Chub | | | 1 | 8 | 11 | 57 | | |
| Blacknose Dace | 5 | 59 | 11 | 80 | 165 | 811 | 8 | 72 |
| Bluntnose Minnow | 4 | 1 | 13 | 14 | 49 | 142 | 3 | 50 |
| Central Stoneroller | 16 | 28 | 44 | 15 | 137 | 2161 | 2 | 35 |
| Common Carp | | 7 | | | | 1 | | |
| Common Shiner | 40 | 11 | 69 | 11 | 115 | 115 | 24 | 41 |
| Creek Chub | 43 | 138 | 19 | 146 | 100 | 1017 | 9 | 116 |
| Emerald Shiner | | | | | | | | |
| Fathead Minnow | 3 | 6 | | 2 | | 1 | 1 | |
| Golden Shiner | | | | 4 | | | | |
| Hornyhead Chub | | | | | | | | |
| Longnose Dace | | 3 | 6 | 32 | 17 | 150 | 3 | |
| Mimic Shiner | | | 1 | 2 | | | | |
| Redside Dace | | | | 26 | 28 | 39 | 3 | 27 |
| River Chub | | | 3 | | 2 | 32 | | |
| Sand Shiner | | | 4 | | 8 | 1 | | |
| Silverjaw Minnow | 14 | 4 | 47 | 4 | 2 | 18 | | |
| Southern Redbelly Dace | | | | | | 24 | | |
| Spotfin Shiner | | | | | | | | |
| Spottail Shiner | | | | 1 | | | | |
| Striped Shiner | | 1 | | 1 | | 33 | | |
| Golden Redhorse | | 1 | | 7 | | 14 | | |
| Northern Hogsucker | 3 | 14 | 6 | 33 | 3 | 76 | 1 | |
| White Sucker | 4 | 70 | 15 | 139 | 65 | 347 | 20 | 68 |
| Black Bullhead | | | | | 1 | | | |
| Brown Bullhead | | 2 | | 3 | | | | |
| Stonecat | | | 1 | | 1 | 8 | | |
| Yellow Bullhead | | | | | | | | |
| Brown Trout | | | | 5 | 5 | 15 | | |
| Rainbow Trout | | 48 | | 29 | | 40 | 18 | 63 |
| Brook Stickleback | | | | | 6 | 1 | | |
| Mottled Sculpin | 7 | 40 | 10 | 4 | 6 | 74 | | |
| Black Crappie | | 1 | | | | | | |
| Bluegill | 2 | 17 | 2 | 81 | 40 | 73 | | |
| Green Sunfish | | | 1 | 2 | 3 | | | |
| Largemouth Bass | | 8 | | 7 | | 21 | | |
| Pumpkinseed | 13 | 13 | | 5 | | 26 | | |
| Rock Bass | 12 | 1 | 2 | 4 | 2 | 8 | | |
| Smallmouth Bass | 1 | | 5 | 20 | 13 | 71 | | |
| Fantail Darter | 1 | 13 | 1 | 5 | | 13 | 1 | 18 |
| Johnny Darter | 4 | 45 | 6 | 54 | 32 | 40 | 3 | 31 |
| Logperch | | | | 1 | 1 | 1 | | |
| Rainbow Darter | 43 | 97 | 6 | 23 | 33 | 257 | 3 | |
| Yellow Perch | | | | | | 1 | | |
| Round Goby | | | | 10 | | 3 | | |

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Table 14. Pennsylvania Lake Erie watershed fish community (Masteller *et al. 1976) (cntd.)*

| Species | Stream, Year, and Sites Assessed | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | WC | | MC | | 4M | | 6M | |
| | 1975 n = 3 | 2011 n = 7 | 1975 n = 3 | 2011 n = 6 | 1975 n = 3 | 2011 n = 6 | 1975 n = 3 | 2011 n = 5 |
| American Brook Lamprey | 1 | | | | | | | |
| Longnose Gar | | | | | | | | |
| Grass Pickerel | | | | | | | | |
| Central Mudminnow | | | | | | | | |
| Bigeye Chub | 7 | | | | | | | |
| Blacknose Dace | 72 | 468 | 42 | 214 | 151 | 227 | 154 | 870 |
| Bluntnose Minnow | 4 | 71 | | | | | | |
| Central Stoneroller | 244 | 272 | 38 | 38 | 1 | 8 | 50 | 1074 |
| Common Carp | | | | | | | | |
| Common Shiner | 109 | 142 | 28 | | 1 | 3 | 10 | 20 |
| Creek Chub | 78 | 193 | 30 | 201 | 4 | 39 | 5 | 133 |
| Emerald Shiner | | | | | 1 | | | |
| Fathead Minnow | 5 | | | 1 | 2 | | | |
| Golden Shiner | | | | | | 1 | | 2 |
| Hornyhead Chub | 2 | | | | | | | |
| Longnose Dace | 22 | 495 | | | 38 | 190 | 11 | 409 |
| Mimic Shiner | | | | | 2 | | | |
| Redside Dace | 57 | 10 | | | | | 8 | |
| River Chub | 58 | 41 | | | | | | |
| Sand Shiner | 7 | 1 | | | | | | |
| Silverjaw Minnow | | | | | | | | |
| Southern Redbelly Dace | | | | | | | | |
| Spotfin Shiner | | | | | | 2 | | |
| Spottail Shiner | 1 | 1 | | | | | | |
| Striped Shiner | | 8 | | | | | | |
| Golden Redhorse | | | | | | | | |
| Northern Hogsucker | | 40 | | | | | | |
| White Sucker | 49 | 73 | 31 | 100 | | | 9 | 16 |
| Black Bullhead | | | | | | | | |
| Brown Bullhead | | | | | | | | 9 |
| Stonecat | | 2 | | | | | | |
| Yellow Bullhead | | 2 | | | | | | 2 |
| Brown Trout | 2 | | | | | | | 5 |
| Rainbow Trout | 1 | 13 | | | | 4 | | |
| Brook Stickleback | | | | | | | | |
| Mottled Sculpin | | 41 | 3 | 23 | | 27 | 1 | 62 |
| Black Crappie | | | | | | | | |
| Bluegill | 4 | 1 | | | | 2 | 1 | 13 |
| Green Sunfish | | | | | | | | |
| Largemouth Bass | 1 | 1 | | | | | | 1 |
| Pumpkinseed | 10 | 8 | | | | 1 | 1 | 26 |
| Rock Bass | | | | | | | | 10 |
| Smallmouth Bass | 5 | 4 | | | | | | 3 |
| Fantail Darter | 5 | 17 | | | | | | 23 |
| Johnny Darter | 8 | 3 | | | | | 1 | |
| Logperch | | | | | | | | 6 |
| Rainbow Darter | 63 | 82 | 4 | 19 | | | 4 | 63 |
| Yellow Perch | | | | | | | | |
| Round Goby | | 1 | | | | 4 | | 24 |

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Table 14. Pennsylvania Lake Erie watershed fish community (Masteller *et al. 1976) (cntd.)*

| Species | Stream, Year, and Sites Assessed | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 7M | | 8M | | 12M | | 16M | |
| | 1975 n = 3 | 2011 n = 6 | 1975 n = 3 | 2011 n = 6 | 1975 n = 3 | 2011 n = 7 | 1975 n = 3 | 2011 n = 8 |
| American Brook Lamprey | | | | | | | | |
| Longnose Gar | | | | | | | | |
| Grass Pickerel | | | | | | | | |
| Central Mudminnow | | | | | | | | |
| Bigeye Chub | | | | | | | | |
| Blacknose Dace | 73 | 223 | 20 | 418 | 204 | 538 | 319 | 403 |
| Bluntnose Minnow | | | | | | 2 | | |
| Central Stoneroller | 27 | 112 | 24 | 481 | | 120 | 9 | 206 |
| Common Carp | | | | | | | 4 | |
| Common Shiner | | | 2 | 7 | | | | |
| Creek Chub | 6 | 143 | 58 | 399 | 37 | 126 | 115 | 348 |
| Emerald Shiner | | | | | | | | |
| Fathead Minnow | | | 1 | 1 | | 1 | 4 | |
| Golden Shiner | | 1 | | | | 7 | | 13 |
| Hornyhead Chub | | | | | | | | |
| Longnose Dace | | 14 | 1 | | 4 | 69 | 74 | 92 |
| Mimic Shiner | | | | | | | | |
| Redside Dace | | | 66 | 22 | | | | |
| River Chub | | | | | | | | 1 |
| Sand Shiner | | | | | | | | |
| Silverjaw Minnow | | | | 1 | | | | |
| Southern Redbelly Dace | | | | | | | | |
| Spotfin Shiner | | | | | | | | |
| Spottail Shiner | | | | | | 2 | | |
| Striped Shiner | | | | | | 1 | | |
| Golden Redhorse | | | | | | | | |
| Northern Hogsucker | | | | | | | | 1 |
| White Sucker | 3 | 4 | 15 | 37 | | 3 | 3 | 4 |
| Black Bullhead | | | | | | | | |
| Brown Bullhead | | | | | 1 | 8 | | 3 |
| Stonecat | | | | | | | | 2 |
| Yellow Bullhead | | | | | | | | 1 |
| Brown Trout | | | | | | 3 | | |
| Rainbow Trout | | 4 | | | | 7 | 1 | 8 |
| Brook Stickleback | | | | | | | | |
| Mottled Sculpin | | 17 | 2 | 1 | | 3 | 1 | 72 |
| Black Crappie | | | | | | | 19 | |
| Bluegill | | | | | | 25 | | 4 |
| Green Sunfish | | | | | | | | |
| Largemouth Bass | | 1 | | | | | | |
| Pumpkinseed | 3 | 13 | | | 8 | | | |
| Rock Bass | | | | | | 2 | | 5 |
| Smallmouth Bass | | | | | | | 11 | 7 |
| Fantail Darter | | 25 | 1 | 51 | | 4 | | |
| Johnny Darter | | | 1 | 3 | | | | |
| Logperch | | | | | | 113 | | 159 |
| Rainbow Darter | 29 | 5 | | | | 21 | | 19 |
| Yellow Perch | | | | | | | | |
| Round Goby | | | | | | 5 | | 13 |

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Table 15. Elk Creek fish community (USACE 1979)

| Species | Study, Site, and Sample Date | |
|---|---|---|
| | USACE (1979) EC (mouth) July 1974 | 2011 EC-10 July 2011 |
| Longnose Gar | | 1 |
| Bigeye Chub | 1 | |
| Blacknose Dace | 3 | |
| Bluntnose Minnow | 21 | |
| Central Stoneroller | 13 | |
| Common Shiner | 15 | 11 |
| Fathead Minnow | 1 | |
| Longnose Dace | 3 | 2 |
| Mimic Shiner | 7 | |
| Spotfin Shiner | 8 | |
| Striped Shiner | | 2 |
| Golden Redhorse | 9 | |
| Northern Hogsucker | 15 | 1 |
| Quillback | 2 | |
| White Sucker | 8 | 1 |
| Brown Bullhead | 1 | |
| Stonecat | 5 | 2 |
| Rainbow Trout | 1 | |
| Bluegill | 10 | 1 |
| Largemouth Bass | 4 | |
| Pumpkinseed | 1 | |
| Rock Bass | 14 | 6 |
| Smallmouth Bass | 24 | 3 |
| Logperch | 44 | |
| Rainbow Darter | 3 | 50 |
| Round Goby | | 3 |
| Number of Species | 23 | 12 |
| Number of Individuals | 213 | 83 |

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Table 16. Conneaut Creek fish sampling locations (DER 1991)

| Site | Date | 2011 Site | Location | Latitude* | Longitude* |
|---|---|---|---|---|---|
| CC01 | May 1991 | | Downstream off Porter Road bridge | ND | ND |
| CC02 | May 1991 | | Bridge Crossing on Dicksonburg Road | ND | ND |
| CC03 | May 1991 | | Tower Road crossing | ND | ND |
| CC04 | May 1991 | COC-58 | Carter Road crossing | ND | ND |
| CC05 | May 1991 | COC-18 | Griffey Road crossing | ND | ND |

* ND = no data; latitude and longitude was not included in report.

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Table 17. Conneaut Creek fish community (DER 1991)

| | Study, Site, and Sample Date * | | | | | | |
|---|---|---|---|---|---|---|---|
| Species | DER CC01 | DER CC02 | DER CC03 | DER CC04 | 2011 COC-58 | DER CC05 | 2011 COC-18 |
| Grass Pickerel | | | | | 3 | | |
| Bigeye Chub | | | | | 4 | | 186 |
| Blacknose Dace | | x | | | 3 | | |
| Bluntnose Minnow | | | x | x | 12 | x | 132 |
| Central Stoneroller | | x | x | x | 33 | x | 105 |
| Common Shiner | x | x | x | x | | x | 1 |
| Creek Chub | x | x | x | | 3 | x | 1 |
| Golden Shiner | | | x | x | 1 | x | 0 |
| Mimic Shiner | | | | | 3 | | 16 |
| Redside Dace | x | x | | | | | |
| River Chub | | | | | | x | 14 |
| Rosyface Shiner | | | x | x | 4 | | 14 |
| Sand Shiner | | | | | | | 4 |
| Silverjaw Minnow | | x | x | x | | | 9 |
| Spotfin Shiner | | | | | | | 2 |
| Spottail Shiner | | | | x | | x | |
| Striped Shiner | | | | | | | 11 |
| Golden Redhorse | | | | x | | x | 9 |
| Northern Hogsucker | | x | x | x | 15 | x | 25 |
| White Sucker | x | x | x | x | 2 | | 24 |
| Stonecat | | x | | | | | 3 |
| Brown Trout | x | | | x | | | |
| Rainbow Trout | x | | | | | | |
| Bluegill | | | | | 3 | | 2 |
| Green Sunfish | | | x | | | | |
| Pumpkinseed | | | | | 3 | | 4 |
| Rock Bass | | | x | x | 6 | x | 26 |
| Smallmouth Bass | | | | x | 2 | x | 25 |
| Banded Darter | | | | x | | x | |
| Blackside Darter | | | x | x | 4 | | 2 |
| Fantail Darter | x | x | | | | | 3 |
| Greenside Darter | | | x | x | 18 | x | 43 |
| Johnny Darter | x | x | | | 6 | x | 23 |
| Logperch | | | x | | 1 | | |
| Rainbow Darter | x | x | x | x | 45 | | 18 |
| Number of Species | 9 | 12 | 15 | 17 | 20 | 14 | 25 |
| Number of Individuals | ND | ND | ND | ND | 171 | ND | 702 |

* indicates species was present

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Table 18. Pennsylvania Fish and Boat Commission fish sampling locations (1996-1998)

| Stream | Site | Sample Date | 2011 Site | Location | Study |
|---|---|---|---|---|---|
| Elk Creek (Brandy Run) | BR-01 | June 1995; June 1997 | EC-8 | Headwaters downstream to Tannery Road | Billingsley and Johns (1996); Billingsley and Johns (1998a) |
| Elk Creek (Brandy Run) | BR-02 | June 1995 | | Tannery Road downstream to confluence with Elk Creek | Billingsley and Johns (1996) |
| Elk Creek (Falk Run) | FR-01 | July 1994 | | Hawthorne Ridge Girl Scout Camp | Billingsley and Johns (1997a) |
| Twelvemile Creek | 12M-01 | June 1994 | | Upstream of Route 5 bridge | Billingsley and Johns (1997b) |
| Elk Creek (Halls Run) | HR-01 | July 1994 | EC-3 | Downstream of South Creek Road | Billingsley and Johns (1997c) |
| Sevenmile Creek | 7M-01 | June 1994 | | Belle Road bridge | Billingsley and Johns (1997d) |
| Sevenmile Creek | 7M-02 | June 1994 | | Route 5 bridge | Billingsley and Johns (1997d) |
| Raccoon Creek | RC-02 | July 1994 | RC-1/RC-2 | Route 5 bridge to mouth | Billingsley and Johns (1997e) |
| Sixmile Creek | 6M-01 | June 1994 | | Depot Road | Billingsley and Johns (1997f) |
| Sixmile Creek | 6M-02 | June 1994 | 6M-7 | Clark Road bridge | Billingsley and Johns (1997f) |
| Sixmile Creek | 6M-03 | June 1994 | | Route 5 bridge | Billingsley and Johns (1997f) |
| Elk Creek (Goodban Run) | GR-01 | July 1994 | | Upstream of confluence with Elk Creek near Route 98 bridge | Billingsley and Johns (1997g) |
| Twentymile Creek | 20M-01 | July 1997 | | New York border to Route 20 | Billingsley and Johns (1998b) |
| Twentymile Creek | 20M-02 | July 1997 | 20M-1 | Route 20 to mouth | Billingsley and Johns (1998b) |



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Table 19. Historical fish community (Billingsley and Johns 1996; 1997a-g; 1998a-b)

| | Study and Site | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | 1997e RC-02 | 2011 RC-1 | 2011 RC-2 | 1997a FR-01 | 1997c HR-01 | 2011 EC-3 | 1996 BR-01 | 1998a BR-01 | 2011 EC-8 | 1996 BR-02 | 1997g GR-01 |
| Central Mudminnow | | | | | | 1 | | | | | |
| Blacknose Dace | | 19 | 23 | x | x | 98 | x | 148 | 9 | x | x |
| Bluntnose Minnow | x | 1 | | | x | 15 | | | | | |
| Central Stoneroller | x | 14 | 14 | x | x | 129 | | | | | x |
| Common Carp | | 5 | 1 | | | | | | | | |
| Common Shiner | x | | 3 | | x | 44 | | | | | |
| Creek Chub | x | 48 | 27 | | x | 105 | x | 20 | 2 | | x |
| Fathead Minnow | | 1 | 5 | | | 1 | | | | | |
| Golden Shiner | x | | | | | | | 1 | | | |
| Longnose Dace | | 1 | 2 | | | | | 13 | | | |
| Redside Dace | | | | | | 32 | | | | | |
| River Chub | | | | | | | | | | | |
| Rosyface Shiner | | | | | x | | | | | | |
| Silverjaw Minnow | | | 4 | | | | | | | | |
| Spottail Shiner | x | | | | x | | | | | | |
| Striped Shiner | | | 1 | | | 1 | | | | | |
| Golden Redhorse | | 1 | | | | | | | | | |
| Northern Hogsucker | | 3 | 9 | | x | 12 | | | | | |
| White Sucker | x | 21 | 29 | | | 60 | x | 92 | | | |
| Brown Bullhead | x | 1 | 1 | | | | | | | | |
| Brown Trout | 4 | | | | | | x | 29 | 5 | 3 | |
| Rainbow Trout | 13 | 32 | 15 | 6 | | | | | 1 | | 17 |
| Mottled Sculpin | x | 11 | 27 | | | | x | 67 | 16 | x | |
| Black Crappie | | | 1 | | | | | | | | |
| Bluegill | x | 9 | 4 | x | | | x | 1 | | | x |
| Largemouth Bass | | 4 | 1 | | | | | | | | |
| Pumpkinseed | x | | 1 | x | | | x | 1 | | | x |
| Rock Bass | x | 1 | | | | | | | | | |
| Smallmouth Bass | 2 | | | | | | | | | | |
| Blackside Darter | | | | | | | | | | | |
| Fantail Darter | | | 13 | | x | 2 | | | | | x |
| Johnny Darter | x | | 30 | | | 12 | | | | | |
| Logperch | x | | | | | | | | | | |
| Rainbow Darter | x | 17 | 77 | | x | 22 | | | | | x |
| Round Goby | | | | | | | | | | | |
| Number of Species | 18 | 17 | 21 | 5 | 10 | 14 | 7 | 9 | 5 | 3 | 8 |
| Number of Individuals | ND | 189 | 288 | ND | ND | 534 | ND | 372 | 33 | ND | ND |

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Table 19. Historical fish community (Billingsley and Johns 1996; 1997a-g; 1998a-b) (*continued)*

| | Study and Site | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Species | 1997f 6M-03 | 1997f 6M-02 | 2011 6M-7 | 1997f 6M-01 | 1997d 7M-01 | 1997d 7M-02 | 1997b 12M-01 | 1998b 20M-01 | 1998b 20M-02 | 2011 20M-1 |
| Central Mudminnow | | | | | | | | | | |
| Blacknose Dace | x | x | 130 | | x | x | x | x | x | 1 |
| Bluntnose Minnow | | | | | | | | | | |
| Central Stoneroller | x | x | 211 | x | | x | | | x | 15 |
| Common Carp | | | | | | | | | | |
| Common Shiner | x | x | 6 | | | | | | | |
| Creek Chub | x | x | 51 | x | x | x | | | x | |
| Fathead Minnow | | | | | | | | | | |
| Golden Shiner | | | | | | | | | | |
| Longnose Dace | | x | 49 | x | | x | x | x | x | 9 |
| Redside Dace | | | | | | | | | | |
| River Chub | | | | | | | | | x | |
| Rosyface Shiner | | | | | | | | | | |
| Silverjaw Minnow | | | | | | | | | | |
| Spottail Shiner | | | | | | | | | | |
| Striped Shiner | | | | | | | | | | |
| Golden Redhorse | | | | | | | | | x | |
| Northern Hogsucker | | | | | | | | | | |
| White Sucker | x | x | 6 | x | | x | | x | x | |
| Brown Bullhead | | | | | | | | | | 1 |
| Brown Trout | | | | | | | | | x | |
| Rainbow Trout | | | | | 1 | 8 | 82 | x | x | 16 |
| Mottled Sculpin | | x | 10 | x | | x | x | | x | 6 |
| Black Crappie | | | | | | | | | | |
| Bluegill | | | 1 | | | | | | | |
| Largemouth Bass | | | | | | | | | | |
| Pumpkinseed | | | 6 | | | | | | x | |
| Rock Bass | x | | | | | | | | x | |
| Smallmouth Bass | | | | | | | | | | 8 |
| Blackside Darter | | | | | | | | | x | |
| Fantail Darter | x | x | 2 | | | | x | | x | |
| Johnny Darter | | | | | | | | | | |
| Logperch | | | | | | | | | | 103 |
| Rainbow Darter | x | x | 12 | x | | x | x | x | x | 15 |
| Round Goby | | | | | | | | | | 1 |
| Number of Species | 8 | 9 | 11 | 6 | 3 | 8 | 6 | 5 | 15 | 10 |
| Number of Individuals | ND | ND | 484 | ND | ND | ND | ND | ND | ND | 175 |

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Table 20. Lake Erie watershed fish sampling locations (Phillips and Andraso 2005)

| Stream | Site | 2011 Site | Location | Latitude | Longitude |
|---|---|---|---|---|---|
| Sixteenmile Creek | 16mc1 | 16M-2 | Mill Street | 42.23243 | -79.83843 |
| Sixteenmile Creek | 16mc2 | 16M-12 | Wellington Road | 42.20543 | -79.8346 |
| Baker Run | bc1 | 16M-5 | Vine and East Street | 42.2153 | -79.83403 |
| Twelvemile Creek | 12mc1 | 12M-1 | Mooreheadville Road | 42.20398 | -79.9128 |
| Sevenmile Creek | 7mc1 | 7M-1 | Glinodo Center | 42.1821 | -79.97685 |
| Sevenmile Creek | 7mc2 | 7M-11 | Depot Road | 42.15395 | -79.94243 |
| Sevenmile Creek | 7mc3 | 7M-12 | Prindle Road | 42.13883 | -79.9197 |
| Sixmile Creek | 6mc1 | 6M-1 | Iroquois Avenue | 42.15915 | -79.97961 |
| Sixmile Creek | 6mc2 | | Clark Road | 42.12395 | -79.929 |
| Fourmile Creek | 4mc1 | 4M-1 | Lawrence Park Golf Club | 42.15888 | -80.02773 |
| McDannel Run | mr1 | MDR-1 | Chautauqua Park | 42.1535 | -80.04125 |
| McDannel Run | mr2 | | Franklin Street | 42.14543 | -80.03603 |
| Elk Creek | ec1 | EC-1 | Elk Park Road | 42.00601 | -80.3526 |
| Elk Creek | ec2 | | Ridge Road | 41.99445 | -80.32641 |
| Elk Creek | ec3 | | Route 98 (Folly's End) | 41.98273 | -80.23656 |
| Elk Creek | ec4 | | I-79 Crossing | 41.99705 | -80.16441 |
| Hall Run | hr1 | | Colespring Road | 41.9695 | -80.31051 |
| Little Elk Creek | lec1 | | Franklin Center Road | 41.94413 | -80.2817 |
| Crooked Creek | crc1 | CRC-2 | Ables Road (Camp Fitch) | 42.00265 | -80.43123 |
| Crooked Creek | crc2 | CRC-4 | Happy Valley Road | 41.98473 | -80.40566 |
| Crooked Creek | crc3 | CRC-19 | Lexington Road | 41.9589 | -80.3636 |
| Raccoon Creek | rc1 | RC-1 | Old Lake Road (Raccoon Park) | 41.98936 | -80.48135 |
| Raccoon Creek | rc2 | RC-2 | Elmwood Road | 41.96626 | -80.4608 |
| Conneaut Creek | coc1 | COC-18 | Griffey Road | 41.91786 | -80.46835 |
| Conneaut Creek | coc2 | | McKee Road | 41.9206 | -80.4294 |

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Table 21. Historical fish community (Phillips and Andraso 2005)

| | Study and Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species | 2005 16mc1 | 2011 16M-2 | 2005 16mc2 | 2011 16M-12 | 2005 bc1 | 2011 16M-5 | 2005 12mc1 | 2011 12M-1 |
| Sea Lamprey | | | | | | | | |
| Longnose Gar | | | | | | | | |
| Muskellunge | | | | | | | | |
| Central Mudminnow | | | | | | | | |
| Bigeye Chub | | | | | | | | |
| Blacknose Dace | 37 | 40 | 66 | 51 | 43 | 165 | 14 | 57 |
| Bluntnose Minnow | 4 | | | | | | | 2 |
| Central Stoneroller | 141 | 150 | | | 1 | 33 | 7 | 108 |
| Common Carp | | | | | | | | |
| Common Shiner | | | | | | | | |
| Creek Chub | 23 | 54 | 2 | 51 | 30 | 115 | 2 | 5 |
| Fathead Minnow | | | | | | | | 1 |
| Golden Shiner | | 2 | | | | | | 7 |
| Longnose Dace | 20 | 59 | | | | | 16 | 62 |
| Mimic Shiner | | | | | | | | |
| Redside Dace | | | | | | | | |
| River Chub | | | | | | | | |
| Rosyface Shiner | | | | | | | | |
| Sand Shiner | | | | | | | | |
| Silverjaw Minnow | | | | | | | | |
| Spotfin Shiner | | | | | | | | |
| Spottail Shiner | | | | | | | | 2 |
| Striped Shiner | | | | | | | | 1 |
| Golden Redhorse | | | | | | | | |
| Northern Hogsucker | | 1 | | | | | | |
| White Sucker | 9 | 4 | | | | | | 3 |
| Brown Bullhead | | | | | | | | 6 |
| Stonecat | | | | | | | | |
| Yellow Bullhead | | | | | | | | |
| Brook Trout | | | | | | | | |
| Brown Trout | | | | | | | | 3 |
| Rainbow Trout | | 8 | | | | | 5 | 7 |
| Mottled Sculpin | 1 | 5 | | 4 | | | 3 | 3 |
| Black Crappie | | | | | | | | |
| Bluegill | | | | | | | | 22 |
| Green Sunfish | | | | | | | | |
| Largemouth Bass | | | | | | | | |
| Pumpkinseed | | | | | | | | |
| Rock Bass | | 1 | | | | | | 2 |
| Smallmouth Bass | | 4 | | | | | | |
| Blackside Darter | | | | | | | | |
| Fantail Darter | | | | | | | 6 | 1 |
| Greenside Darter | | | | | | | | |
| Johnny Darter | | | | | | | | |
| Logperch | | | | | | | | 113 |
| Rainbow Darter | | 13 | | | | | 51 | 21 |
| Round Goby | | | | | | | | 5 |
| Number of Species | 7 | 12 | 2 | 3 | 3 | 3 | 8 | 20 |
| Number of Individuals | 235 | 341 | 68 | 106 | 74 | 313 | 104 | 431 |
| IBI | 40 | 42 | 20 | 30 | 28 | 26 | 40 | 46 |

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Table 21. Historical fish community (Phillips and Andraso 2005) (*cntd.)*

| | Study and Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species | 2005 7mc1 | 2011 7M-1 | 2005 7mc2 | 2011 7M-11 | 2005 7mc3 | 2011 7M-12 | 2005 6mc1 | 2011 6M-1 |
| Sea Lamprey | | | | | | | | |
| Longnose Gar | | | | | | | | |
| Muskellunge | | | | | | | | |
| Central Mudminnow | | | | | | | | |
| Bigeye Chub | | | | | | | | |
| Blacknose Dace | 30 | 11 | 30 | 47 | 109 | 42 | 15 | 100 |
| Bluntnose Minnow | 1 | | | | | | | |
| Central Stoneroller | 3 | 7 | | | | | 88 | 121 |
| Common Carp | | | | | | | | |
| Common Shiner | | | | | | | | |
| Creek Chub | 6 | | 18 | 10 | 29 | 2 | 8 | 6 |
| Fathead Minnow | | | | | | | | |
| Golden Shiner | | | | | | | | |
| Longnose Dace | 20 | 14 | | | | | | 12 |
| Mimic Shiner | | | | | | | | |
| Redside Dace | | | | | | | | |
| River Chub | | | | | | | | |
| Rosyface Shiner | | | | | | | | |
| Sand Shiner | | | | | | | | |
| Silverjaw Minnow | | | | | | | | |
| Spotfin Shiner | | | | | | | | |
| Spottail Shiner | | | | | | | | |
| Striped Shiner | | | | | | | 3 | |
| Golden Redhorse | | | | | | | | |
| Northern Hogsucker | | | | | | | | |
| White Sucker | | | | | | | 6 | 2 |
| Brown Bullhead | | | | | | | | |
| Stonecat | | | | | | | | |
| Yellow Bullhead | | | | | | | | |
| Brook Trout | | | | | | | | |
| Brown Trout | | | | | | | | 2 |
| Rainbow Trout | 71 | 4 | | | | | | |
| Mottled Sculpin | 1 | 16 | | | | | 2 | 4 |
| Black Crappie | | | | | | | | |
| Bluegill | | | | | | | | |
| Green Sunfish | | | | | | | | |
| Largemouth Bass | | | | | | | | |
| Pumpkinseed | | | | | | | | 9 |
| Rock Bass | | | | | | | | |
| Smallmouth Bass | | | | | | | | |
| Blackside Darter | | | | | | | | |
| Fantail Darter | 10 | 1 | | | | | 3 | |
| Greenside Darter | | | | | | | | |
| Johnny Darter | | | | | | | | |
| Logperch | | | | | | | | |
| Rainbow Darter | 17 | 1 | | | | | 9 | 12 |
| Round Goby | | | | | | | | |
| Number of Species | 9 | 7 | 2 | 2 | 2 | 2 | 8 | 9 |
| Number of Individuals | 159 | 54 | 48 | 57 | 138 | 44 | 134 | 268 |
| IBI | 42 | 38 | 20 | 22 | 22 | 22 | 38 | 38 |

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Table 21. Historical fish community (Phillips and Andraso 2005) (*cntd.)*

| | Study and Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species | 2005 6mc2 | 2005 4mc1 | 2011 4M-1 | 2005 mr1 | 2011 MDR-1 | 2005 mr2 | 2005 ec1 | 2011 EC-1 |
| Sea Lamprey | | | | | | | | |
| Longnose Gar | | | | | | | | 2 |
| Muskellunge | | | | | | | | |
| Central Mudminnow | | | | | | | | |
| Bigeye Chub | | | | | | | 1 | |
| Blacknose Dace | 71 | 136 | 1 | 45 | 42 | 35 | 10 | |
| Bluntnose Minnow | | | | | | | | 5 |
| Central Stoneroller | 125 | 2 | 8 | | | | 6 | 80 |
| Common Carp | | | | | | | | |
| Common Shiner | | | 3 | | | | | |
| Creek Chub | 12 | 67 | 2 | | | | 9 | 3 |
| Fathead Minnow | | | | | | | | |
| Golden Shiner | | | 1 | | | | | |
| Longnose Dace | 10 | 42 | 9 | | | | | 14 |
| Mimic Shiner | | | | | | | | |
| Redside Dace | 4 | | | | | | | |
| River Chub | | | | | | | | 4 |
| Rosyface Shiner | | | | | | | | |
| Sand Shiner | | | | | | | 1 | |
| Silverjaw Minnow | | | | | | | | |
| Spotfin Shiner | | | 2 | | | | | |
| Spottail Shiner | | | | | | | | |
| Striped Shiner | | | | | | | 2 | 1 |
| Golden Redhorse | | | | | | | | 5 |
| Northern Hogsucker | | | | | | | | 2 |
| White Sucker | 27 | | | | | | 4 | 21 |
| Brown Bullhead | | | | | | | | |
| Stonecat | | | | | | | | 1 |
| Yellow Bullhead | | | | | | | 1 | |
| Brook Trout | | 1 | | | | | | |
| Brown Trout | | | | | | | | |
| Rainbow Trout | | 11 | 4 | | | | | |
| Mottled Sculpin | 2 | 3 | 1 | | | | | 3 |
| Black Crappie | | | | | | | | |
| Bluegill | | | 1 | | | | | 5 |
| Green Sunfish | | | | | | | | |
| Largemouth Bass | | | | | | | | |
| Pumpkinseed | 1 | | 1 | | | | | |
| Rock Bass | | | | | | | 1 | 2 |
| Smallmouth Bass | | | | | | | | 23 |
| Blackside Darter | | | | | | | | |
| Fantail Darter | 6 | | | | | | | |
| Greenside Darter | | | | | | | | |
| Johnny Darter | 1 | | | | | | | |
| Logperch | | | | | | | | |
| Rainbow Darter | 43 | | | | | | 8 | 42 |
| Round Goby | | | 4 | | | | | |
| Number of Species | 11 | 7 | 12 | 1 | 1 | 1 | 10 | 16 |
| Number of Individuals | 302 | 262 | 37 | 45 | 42 | 35 | 43 | 213 |
| IBI | 46 | 32 | 40 | 20 | 22 | 20 | 40 | 48 |

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Table 21. Historical fish community (Phillips and Andraso 2005) (*cntd.)*

| | Study and Site | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Species | 2005 ec2 | 2005 ec3 | 2005 ec4 | 2005 hr1 | 2005 lec1 | 2005 crc1 | 2011 CRC-2 | 2005 crc2 | 2011 CRC-4 |
| Sea Lamprey | | | | | | 2 | | | |
| Longnose Gar | | | | | | | | | |
| Muskellunge | | | | | | | | | |
| Central Mudminnow | | | | | | | | 4 | 1 |
| Bigeye Chub | | | 2 | | | | | | |
| Blacknose Dace | | 1 | 2 | 19 | 39 | | 1 | 29 | 10 |
| Bluntnose Minnow | | | | | | 2 | | 7 | 1 |
| Central Stoneroller | 13 | 4 | 15 | 5 | 5 | 1 | | | |
| Common Carp | | | | | | | | | |
| Common Shiner | | | | | | | | | |
| Creek Chub | 4 | | | 20 | 2 | 1 | 1 | 26 | 18 |
| Fathead Minnow | | | | | 1 | | | | |
| Golden Shiner | | | | | | | | | |
| Longnose Dace | 1 | | | | 5 | 2 | 22 | 2 | 4 |
| Mimic Shiner | | | | | | | | | |
| Redside Dace | | | | 4 | | | | | |
| River Chub | | | | | | | | 4 | |
| Rosyface Shiner | | | | | | | | | |
| Sand Shiner | | | 3 | | | | | | |
| Silverjaw Minnow | | | | | | | 1 | | 1 |
| Spotfin Shiner | | | | | | | | | |
| Spottail Shiner | | | | | | | | | |
| Striped Shiner | 1 | 2 | 3 | 4 | | 4 | | 7 | |
| Golden Redhorse | | | | | | | | | |
| Northern Hogsucker | | 2 | 1 | | | | 4 | 8 | 8 |
| White Sucker | 8 | | | | | 2 | 3 | 1 | 10 |
| Brown Bullhead | | | | | | | 1 | | |
| Stonecat | | | | | | | | | |
| Yellow Bullhead | | | | | 1 | | | | |
| Brook Trout | | | | | | | | | |
| Brown Trout | | | 1 | | | | 1 | | 3 |
| Rainbow Trout | 1 | 2 | 1 | | | 16 | 10 | 11 | 4 |
| Mottled Sculpin | | | 5 | | 2 | 1 | 1 | 4 | 2 |
| Black Crappie | | | | | | | | | |
| Bluegill | 1 | | 2 | | | | 16 | | 1 |
| Green Sunfish | | | | | | | | | 1 |
| Largemouth Bass | | 1 | | | | | | | |
| Pumpkinseed | | | | | 1 | | 2 | | |
| Rock Bass | | | | | | | 1 | | |
| Smallmouth Bass | 6 | | 5 | | | 1 | 1 | | |
| Blackside Darter | | | | | | | | | |
| Fantail Darter | 7 | 4 | 4 | 12 | 13 | 2 | | 2 | |
| Greenside Darter | | | | | | | | | |
| Johnny Darter | 1 | | | | 5 | | 1 | 24 | 6 |
| Logperch | | | | | | | | | |
| Rainbow Darter | 20 | 55 | 41 | 7 | 2 | 1 | 1 | 14 | 3 |
| Round Goby | | | | | | | | | |
| Number of Species | 11 | 8 | 13 | 7 | 11 | 12 | 16 | 14 | 15 |
| Number of Individuals | 63 | 71 | 85 | 71 | 76 | 35 | 67 | 143 | 73 |
| IBI | 46 | 44 | 46 | 40 | 38 | 46 | 44 | 46 | 40 |

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Table 21. Historical fish community (Phillips and Andraso 2005) (*cntd.)*

| | Study and Site | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Species | 2005 crc3 | 2011 CRC-19 | 2005 rc1 | 2011 RC-1 | 2005 rc2 | 2011 RC-2 | 2005 coc1 | 2011 COC-18 | 2005 coc2 |
| Sea Lamprey | 1 | | | | | | | | |
| Longnose Gar | | | | | | | | | |
| Muskellunge | | | | | | | | | 1 |
| Central Mudminnow | | | | | | | 1 | | 1 |
| Bigeye Chub | | 1 | | | | | | 186 | |
| Blacknose Dace | 9 | 16 | | 19 | 4 | 23 | 1 | | |
| Bluntnose Minnow | 3 | | 2 | 1 | 4 | | 5 | 132 | 24 |
| Central Stoneroller | 1 | 8 | 1 | 14 | | 14 | | 105 | 2 |
| Common Carp | | | | 5 | | 1 | | | |
| Common Shiner | | | | | | 3 | | 1 | |
| Creek Chub | 5 | 40 | | 48 | 7 | 27 | | 1 | |
| Fathead Minnow | 2 | | | 1 | | 5 | | | |
| Golden Shiner | | | | | | | | | |
| Longnose Dace | | 2 | | 1 | | 2 | | | |
| Mimic Shiner | | | | | | | | 16 | |
| Redside Dace | 3 | 5 | | | | | | | 1 |
| River Chub | | | | | | | | 14 | |
| Rosyface Shiner | | | | | | | | 14 | |
| Sand Shiner | | | | | | | 5 | 4 | 9 |
| Silverjaw Minnow | 3 | 2 | | | 1 | 4 | | 9 | |
| Spotfin Shiner | | | | | | | | 2 | 3 |
| Spottail Shiner | | | | | | | | | |
| Striped Shiner | 1 | | | | 2 | 1 | | 11 | |
| Golden Redhorse | | | | 1 | | | | 9 | |
| Northern Hogsucker | 7 | 8 | 1 | 3 | 2 | 9 | | 25 | 1 |
| White Sucker | 12 | 17 | 7 | 21 | 2 | 29 | | 24 | |
| Brown Bullhead | | | | 1 | | 1 | | | |
| Stonecat | | | | | | | | 3 | |
| Yellow Bullhead | | | 1 | | | | 1 | | |
| Brook Trout | | | | | | | | | |
| Brown Trout | 4 | | | | | | | | 2 |
| Rainbow Trout | 14 | 2 | 19 | 32 | 5 | 15 | | | 1 |
| Mottled Sculpin | 5 | 1 | 5 | 11 | 10 | 27 | | | |
| Black Crappie | 2 | | | | | 1 | | | |
| Bluegill | 4 | | 12 | 9 | | 4 | | 2 | |
| Green Sunfish | 1 | | | | | | | | |
| Largemouth Bass | 11 | | 1 | 4 | 1 | 1 | | | |
| Pumpkinseed | 2 | | | | | 1 | | 4 | |
| Rock Bass | | | 1 | 1 | | | 19 | 26 | 14 |
| Smallmouth Bass | | | | | | | | 25 | |
| Blackside Darter | | | | | | | | 2 | |
| Fantail Darter | | | | | 3 | 13 | 2 | 3 | 1 |
| Greenside Darter | | | | | | | 9 | 43 | 10 |
| Johnny Darter | 5 | 21 | 14 | | 9 | 30 | | 23 | 1 |
| Logperch | | | | | | | | | |
| Rainbow Darter | | 5 | 4 | 17 | 9 | 77 | 1 | 18 | |
| Round Goby | | | | | | | | | |
| Number of Species | 20 | 13 | 12 | 17 | 13 | 21 | 9 | 25 | 14 |
| Number of Individuals | 95 | 128 | 68 | 189 | 59 | 288 | 44 | 702 | 71 |
| IBI | 52 | 42 | 44 | 44 | 46 | 52 | 40 | 54 | 44 |

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Table 22. Walnut Creek fish sampling sites (DEP 2007)

| Site | 2011 Site | Location | Latitude | Longitude |
|---|---|---|---|---|
| 1 WC | | Downstream of Donation Road bridge | 42.0418 | -80.0125 |
| 2 WC | | Upstream of Zwilling Road bridge | 42.0451 | -80.0206 |
| 7 WC | | Upstream of Cherry Street bridge | 42.0654 | -80.0584 |
| 8 WC | | Glade Drive dead end | 42.061 | -80.0871 |
| 9 UNT | | Unnamed tributary downstream of Peach Street | 42.0612 | -80.09 |
| 11 WC | | Behind Millcreek Mall Cinema | 42.0728 | -80.097 |
| 12 UNT | | Unnamed tributary upstream of Peach Street | 42.0749 | -80.0917 |
| 13 WC | | Upstream of Schermer Road bridge | 42.0614 | -80.1159 |
| 14 UNT | | Unnamed tributary upstream of Garries Road bridge | 42.0565 | -80.1277 |
| 15UNT | | Unnamed tributary downstream of Love Road bridge | 42.0581 | -80.1434 |
| 16 WC | | Upstream of Thomas Run confluence | 42.0469 | -80.1635 |
| 17 TR | | Thomas Run downstream of California Road bridge | 42.0268 | -80.172 |
| 18 TRUNT | | Mouth of unnmaed tributary of Thomas Run | 42.0392 | -80.1604 |
| 19 TR | WC-4 | 1/4 mile upstream of Thomas Run mouth | 42.046 | -80.166 |
| 20 UNT | | Unnamed tributary downstream of Asbury Park bridge | 42.0473 | -80.1719 |
| 21 WC | | Upstream of Bear Run confluence | 42.0491 | -80.2193 |
| 22 BR | WC-2 | Mouth of Bear Run | 42.0482 | -80.2203 |
| 23 WC | | Upstream of Route 5 | 42.063 | -80.2281 |
| 24 WC | WC-1 | Mouth | 42.0748 | -80.2377 |

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Table 23. Walnut Creek fish community (DEP 2007)

| | Study and Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species | DEP 1-WC | DEP 2-WC | DEP 7-WC | DEP 8-WC | DEP 9-UNT | DEP 11-WC | DEP 12-UNT | DEP 13-WC |
| Blacknose Dace | VA | C | A | A | | VA | A | A |
| Bluntnose Minnow | | | | | | | | |
| Central Stoneroller | | P | A | VA | | VA | P | A |
| Common Shiner | | C | P | | | A | | A |
| Creek Chub | VA | C | C | A | | C | A | A |
| Longnose Dace | | | P | | | C | | P |
| Redside Dace | | C | C | | | C | C | |
| River Chub | | | | | | | R | |
| Sand Shiner | | | | | | | | |
| Spottail Shiner | | | | | | | | |
| Striped Shiner | | | | | | | | |
| Northern Hogsucker | | P | P | | | C | | P |
| White Sucker | | P | C | P | | C | P | P |
| Stonecat | | | | | | | | |
| Brown Trout | | | | | | | | |
| Rainbow Trout | | | | R | | R | | C |
| Mottled Sculpin | | P | P | | | R | | C |
| Bluegill | | | | R | | | R | R |
| Largemouth Bass | | | | | | | | |
| Pumpkinseed | | | | | | | | |
| Smallmouth Bass | | | | | | | | |
| Banded Darter | | | | | | | | |
| Fantail Darter | | P | C | P | | P | | R |
| Johnny Darter | | P | R | | | | | |
| Logperch | | | | | | | | |
| Rainbow Darter | R | C | P | | | A | | C |
| Round Goby | | | | | | | | |
| Number of Species | 3 | 11 | 12 | 8 | 0 | 12 | 7 | 12 |
| Number of Individuals | | | | | | | | |

Very Abundant (>100 individuals); Abundant (26-99 individuals); Common (10-25 individuals); Present (3-9 individuals); Rare (<3 individuals)

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Table 23. Walnut Creek fish community (DEP 2007) (*continued)*

Study and Site

| Species | DEP 14-UNT | DEP 15-UNT | DEP 16-WC | DEP 17-TR | DEP 18-TRUNT | DEP 19-TR | 2011 WC-4 | DEP 20-UNT |
|---|---|---|---|---|---|---|---|---|
| Blacknose Dace | C | C | C | A | C | C | 37 | |
| Bluntnose Minnow | | | | | | | 15 | |
| Central Stoneroller | C | C | VA | | A | C | 10 | |
| Common Shiner | P | | C | | P | P | 6 | |
| Creek Chub | P | P | A | C | A | C | 26 | |
| Longnose Dace | P | | | | P | C | 48 | |
| Redside Dace | | | | | | | | |
| River Chub | | | P | | | | 1 | |
| Sand Shiner | | | | | | | | |
| Spottail Shiner | | | | | | | 1 | |
| Striped Shiner | | | | | | | 1 | |
| Northern Hogsucker | | | P | | P | P | 7 | |
| White Sucker | P | | P | | P | P | 9 | |
| Stonecat | | | R | | | | | |
| Brown Trout | | | | | | | | |
| Rainbow Trout | C/C | /R | | | | P/C | 4 | P |
| Mottled Sculpin | P | P | P | C | P | | 4 | |
| Bluegill | P | P | R | | | | | |
| Largemouth Bass | | | | R | P | | | |
| Pumpkinseed | R | R | | | | R | 1 | |
| Smallmouth Bass | | | | | | | | |
| Banded Darter | | | | | | | | |
| Fantail Darter | R | R | | | R | R | | |
| Johnny Darter | | | | | | R | | |
| Logperch | | | | | | | | |
| Rainbow Darter | A | P | VA | | P | C | 13 | |
| Round Goby | | | | | | | | |
| Number of Species | 12 | 9 | 11 | 4 | 11 | 12 | 16 | 1 |
| Number of Individuals | | | | | | | 183 | |

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Table 23. Walnut Creek fish community (DEP 2007) (*continued)*

| Study and Site<br>Species | DEP 21-WC | DEP 22-BR | 2011 WC-2 | DEP 23-WC | DEP 24-WC | 2011 WC-1 |
|---|---|---|---|---|---|---|
| Blacknose Dace | A | C | 120 | C | C | 74 |
| Bluntnose Minnow | | | | | | 1 |
| Central Stoneroller | VA | P | | VA | VA | 65 |
| Common Shiner | A | | 1 | C | P | 19 |
| Creek Chub | A | P | 10 | P | C | 31 |
| Longnose Dace | C | P | 258 | C | P | 31 |
| Redside Dace | | | | | | |
| River Chub | R | | | C | P | 9 |
| Sand Shiner | | | | | | 1 |
| Spottail Shiner | | | | | | |
| Striped Shiner | | | | | | 2 |
| Northern Hogsucker | A | | | C | P | 17 |
| White Sucker | P | | | P | C | 9 |
| Stonecat | | | | C | P | 2 |
| Brown Trout | | /P | | R | P | |
| Rainbow Trout | | P/A | 6 | P/C | P/C | 2 |
| Mottled Sculpin | | C | 11 | R | R | 2 |
| Bluegill | | | 0 | R | P | 1 |
| Largemouth Bass | | | 1 | | R | |
| Pumpkinseed | | | 2 | | P | 5 |
| Smallmouth Bass | | | | | R | 4 |
| Banded Darter | | | | P | | |
| Fantail Darter | P | | | P | P | 1 |
| Johnny Darter | | | | | | |
| Logperch | | | | | P | |
| Rainbow Darter | P | P | | A | A | 5 |
| Round Goby | | | | | C | 1 |
| Number of Species | 10 | 8 | 9 | 16 | 20 | 21 |
| Number of Individuals | | | 409 | | | 282 |

Very Abundant (>100 individuals); Abundant (26-99 individuals); Common (10-25 individuals); Present (3-9 individuals); Rare (<3 individuals)

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Table 24. Fourmile Creek fish sampling locations (Andraso *et al. 2009)*

| Site | Date | 2011 Site | Location | Latitude | Longitude |
|---|---|---|---|---|---|
| 4M 1 | June 2007 | 4M-1 | Dam at Lawrence Park Golf Course | 42.15873 | -80.0272 |
| 4M 2 | June 2007 | | Waterfall at Lawrence Park practice green | 42.15666 | -80.02493 |
| 4M 3 | June 2007 | | Napier Park | 42.1511 | -80.02021 |
| 4M 4 | June 2007 | | Walking bridge north of G.E. railroad tracks | 42.1467 | -80.01526 |
| 4M 5 | June 2007 | 4M-5 | Spring creek low head dam (Station Road) | 42.13368 | -80.00485 |
| 4M 6 | May 2007 | 4M-6 | Cooper Road crossing | 42.12573 | -79.99801 |
| 4M 7 | May 2007 | | Concrete capped waterfall at Penn State Behrend | 42.1212 | -79.99305 |
| 4M 8 | May 2007 | 4M-9 | Confluence of Trout Run and main stem | 42.12083 | -79.99225 |
| 4M 9 | May 2007 | | Lower Trout Run | 42.12085 | -79.9911 |
| 4M 10 | June 2007 | 4M-12 | Kane Hill Road crossing | 42.09973 | -79.98828 |
| 4M 11 | May 2007 | | Hartman Road crossing | 42.08828 | -79.9818 |
| 4M 12 | May 2007 | 4M-13 | Schwab Road crossing off Kuhl Road | 42.0741 | -79.96793 |

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Table 25. Fourmile Creek fish community (Andraso *et al. 2009)*

| | Study and Site | | | | | | |
|---|---|---|---|---|---|---|---|
| Species | Andraso 4M-1 | 2011 4M-1 | Andraso 4M-2 | Andraso 4M-3 | Andraso 4M-4 | Andraso 4M-5 | 2011 4M-5 |
| Blacknose Dace | 91 | 1 | 18 | 46 | 75 | 40 | 33 |
| Bluntnose Minnow | | | | | | | |
| Central Stoneroller | 25 | 8 | | | | | |
| Common Shiner | | 3 | | | | | |
| Creek Chub | 39 | 2 | 5 | 16 | 7 | 6 | 2 |
| Golden Shiner | | 1 | | | | | |
| Longnose Dace | 23 | 9 | 95 | 9 | 67 | 93 | 17 |
| Spotfin Shiner | | 2 | | | | | |
| Brown Trout | 1 | | | 1 | | | |
| Rainbow Trout | 9 | 4 | 6 | | | | |
| Mottled Sculpin | | 1 | | 4 | 1 | 6 | 13 |
| Bluegill | | 1 | | | | | |
| Pumpkinseed | | 1 | | | | | |
| Round Goby | | 4 | | | | | |
| Number of Species | 6 | 12 | 4 | 5 | 4 | 4 | 4 |
| Number of Individuals | 188 | 37 | 124 | 76 | 150 | 145 | 65 |
| IBI | 36 | 40 | 34 | 28 | 32 | 32 | 30 |

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Table 25. Fourmile Creek fish community (Andraso et al. 2009) (*continued)*

| Species | Study and Site: Andraso 4M-6 | 2011 4M-6 | Andraso 4M-7 | Andraso 4M-8 | 2011 4M-9 | Andraso 4M-9 |
|---|---|---|---|---|---|---|
| Blacknose Dace | 62 | 86 | 16 | 25 | 6 | 12 |
| Bluntnose Minnow | | | | | | |
| Central Stoneroller | | | | | | |
| Common Shiner | | | | | | |
| Creek Chub | 34 | 3 | 22 | 2 | 1 | |
| Golden Shiner | | | | | | |
| Longnose Dace | 66 | 111 | 50 | 28 | 53 | |
| Spotfin Shiner | | | | | | |
| Brown Trout | | | | | | |
| Rainbow Trout | | | | | | |
| Mottled Sculpin | 3 | 7 | 7 | 2 | 3 | 0 |
| Bluegill | | | | | | |
| Pumpkinseed | | | | | | |
| Round Goby | | | | | | |
| Number of Species | 4 | 4 | 4 | 4 | 4 | 1 |
| Number of Individuals | 165 | 207 | 95 | 57 | 63 | 12 |
| IBI | 32 | 32 | 32 | 30 | 32 | 22 |

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Table 25. Fourmile Creek fish community (Andraso *et al. 2009) (continued)*

| Species | Study and Site: Andraso 4M-10 | 2011 4M-12 | Andraso 4M-11 | Andraso 4M-12 | 2011 4M-13 |
|---|---|---|---|---|---|
| Blacknose Dace | 169 | 43 | 140 | 48 | 58 |
| Bluntnose Minnow | | | 2 | | |
| Central Stoneroller | | | | | |
| Common Shiner | | | | | |
| Creek Chub | 4 | 3 | 12 | 17 | 28 |
| Golden Shiner | | | | | |
| Longnose Dace | | | | | |
| Spotfin Shiner | | | | | |
| Brown Trout | | | | | |
| Rainbow Trout | | | | | |
| Mottled Sculpin | 45 | 3 | 28 | 1 | |
| Bluegill | | | | | 1 |
| Pumpkinseed | | | | | |
| Round Goby | | | | | |
| Number of Species | 3 | 3 | 4 | 3 | 3 |
| Number of Individuals | 218 | 49 | 182 | 66 | 87 |
| IBI | 28 | 26 | 30 | 28 | 26 |

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## APPENDIX C: MAPS


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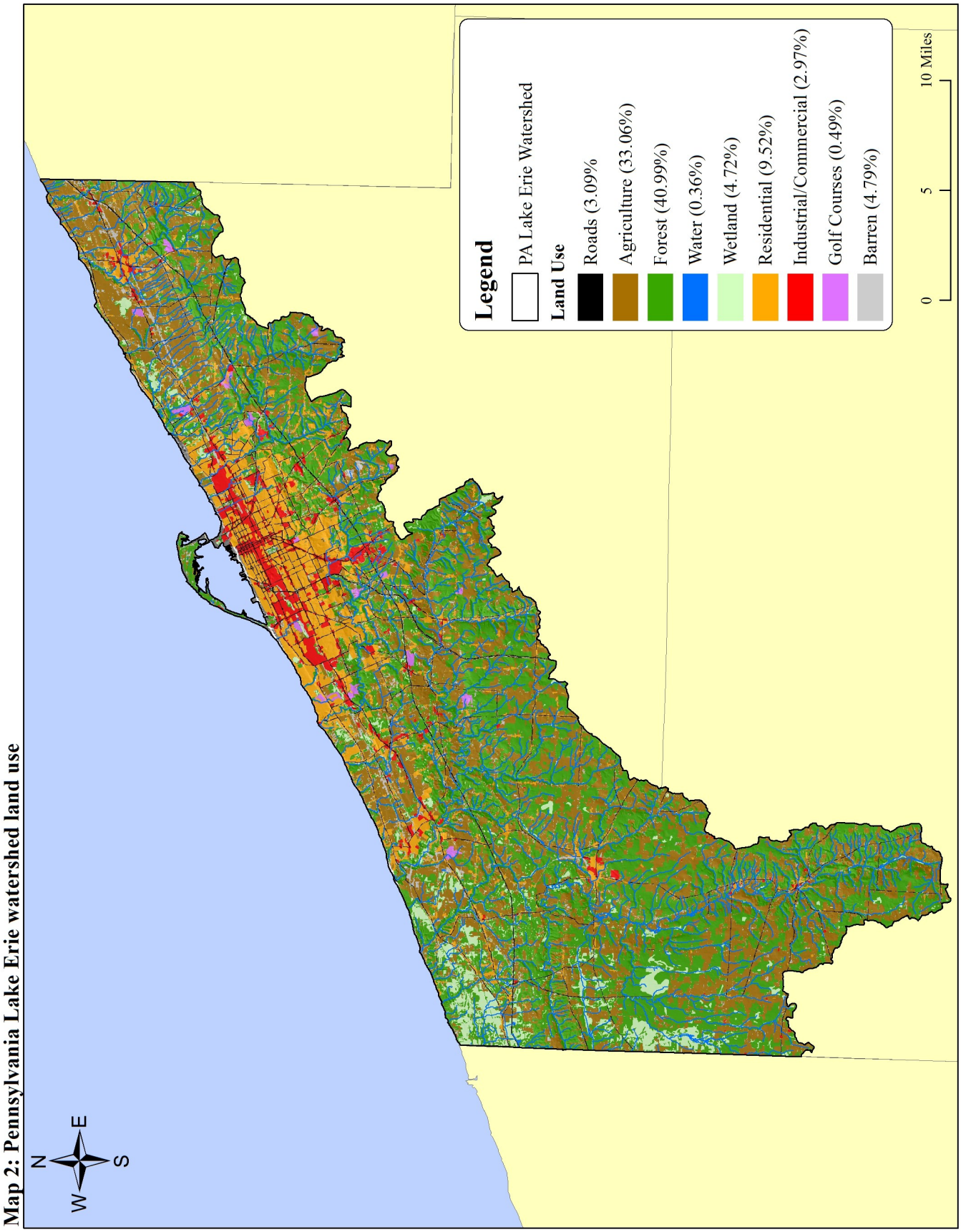


**Map 2: Pennsylvania Lake Erie watershed land use**

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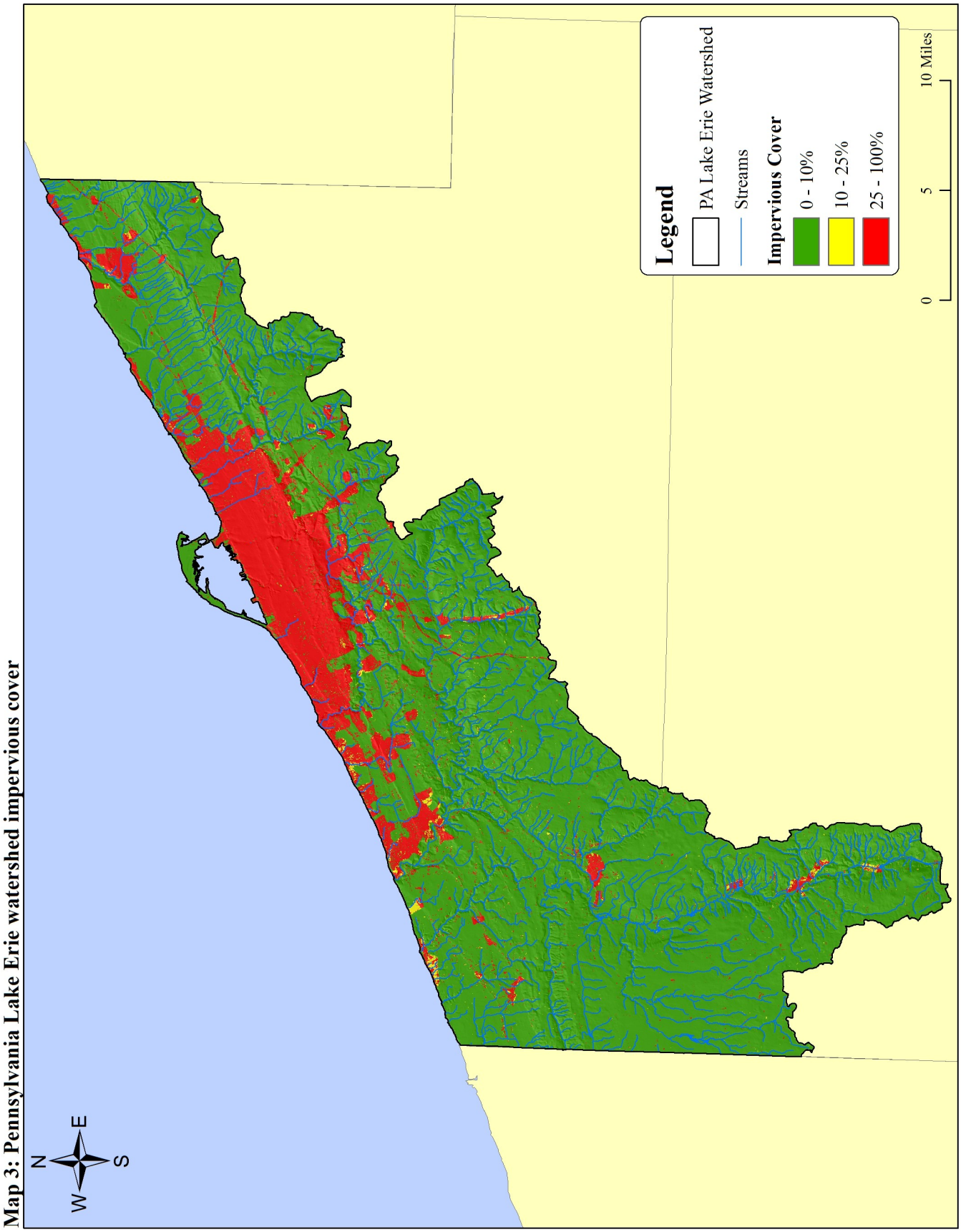


**Map 3: Pennsylvania Lake Erie watershed impervious cover**

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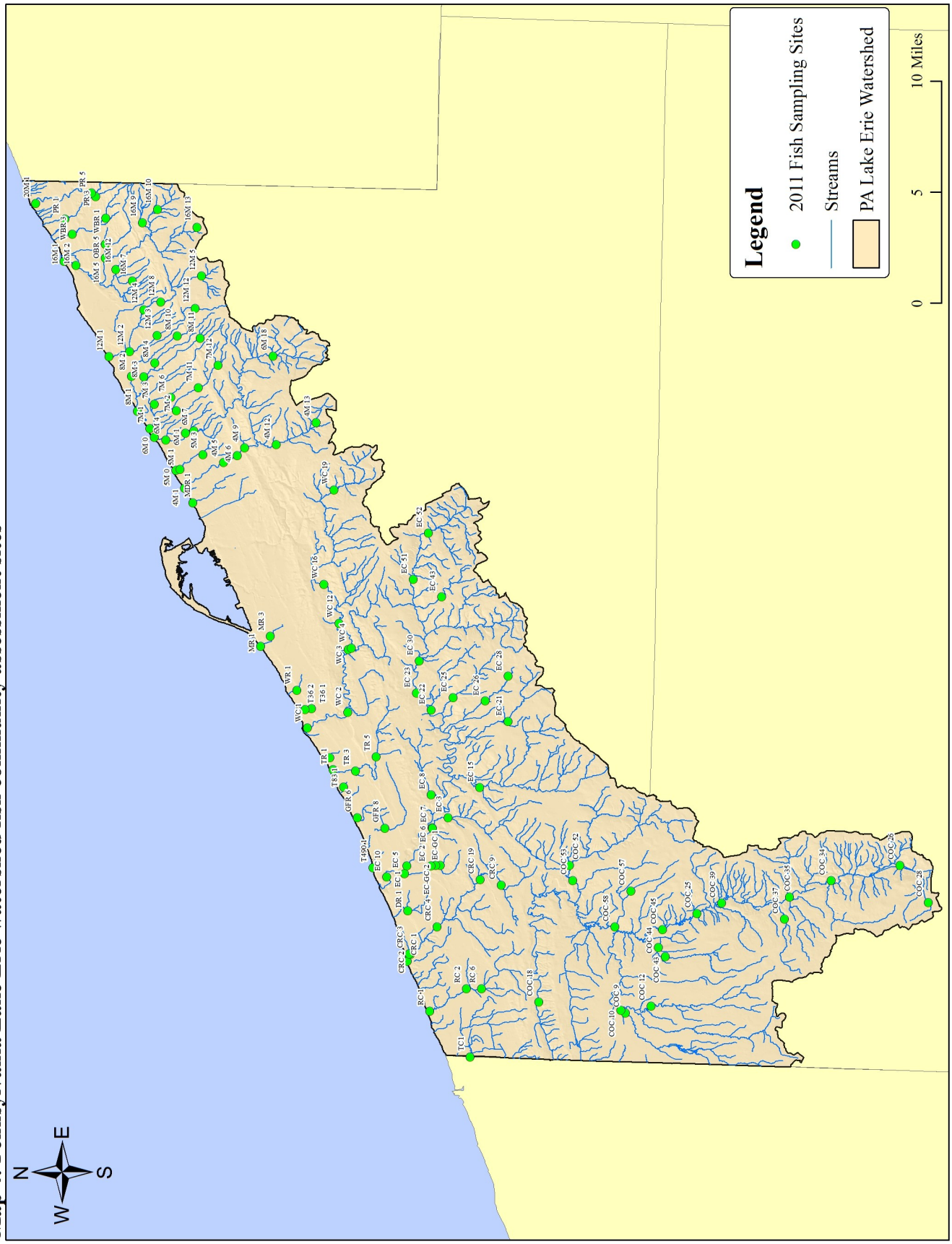
**Map 4: Pennsylvania Lake Erie watershed fish community assessment sites**

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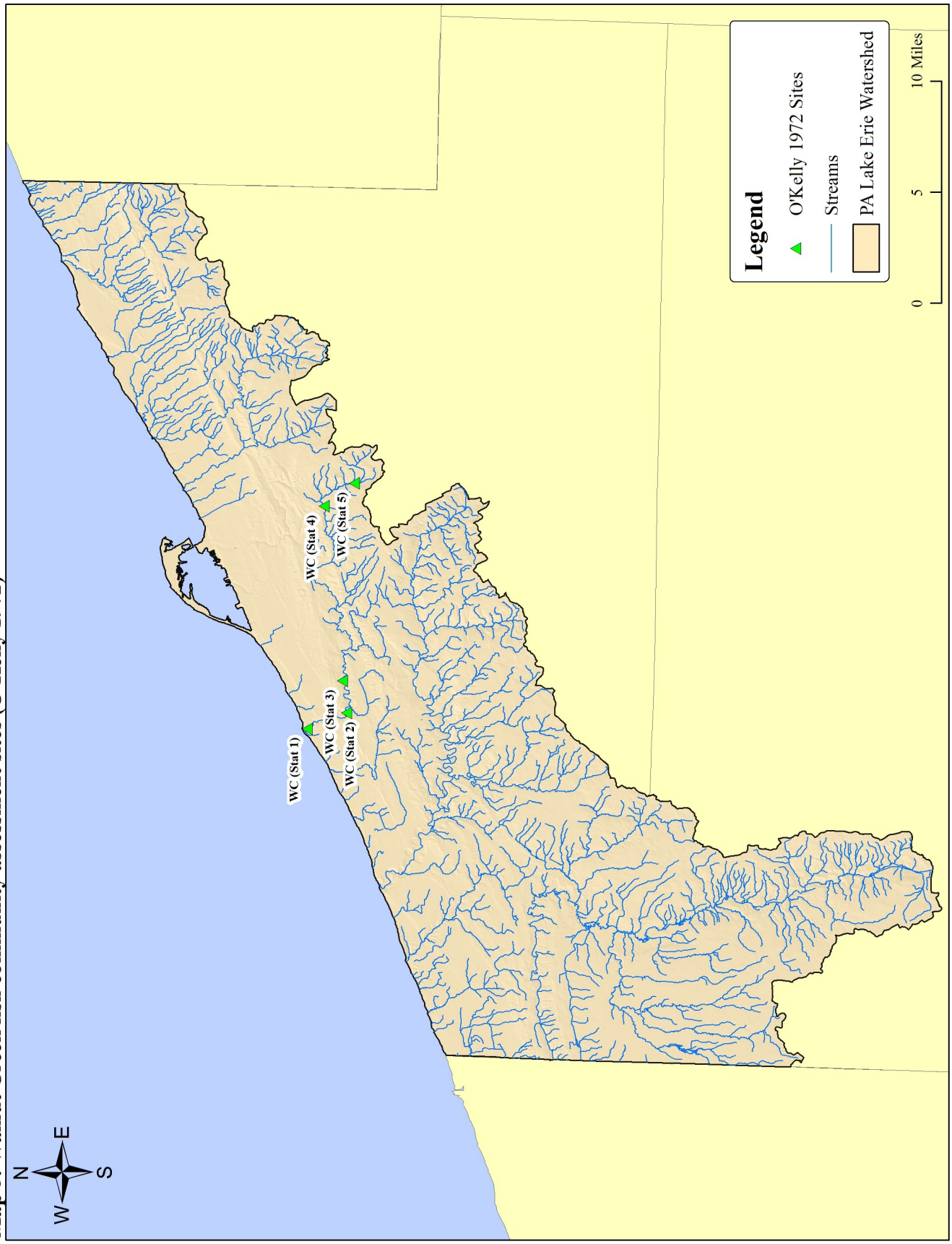


**Map 5: Walnut Creek fish community assessment sites (O'Kelly 1972)**

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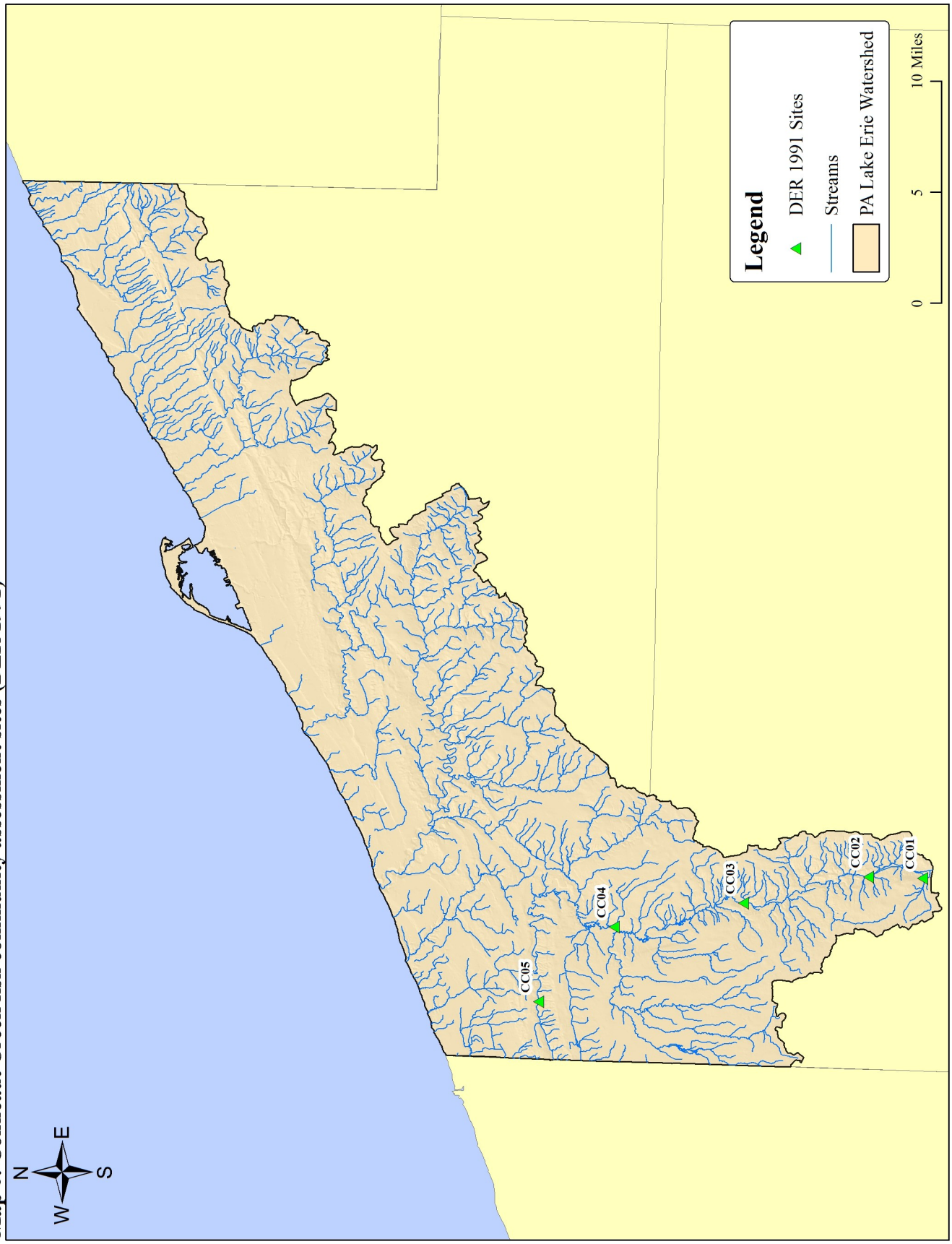


Map 6: Conneaut Creek fish community assessment sites (DER 1991)

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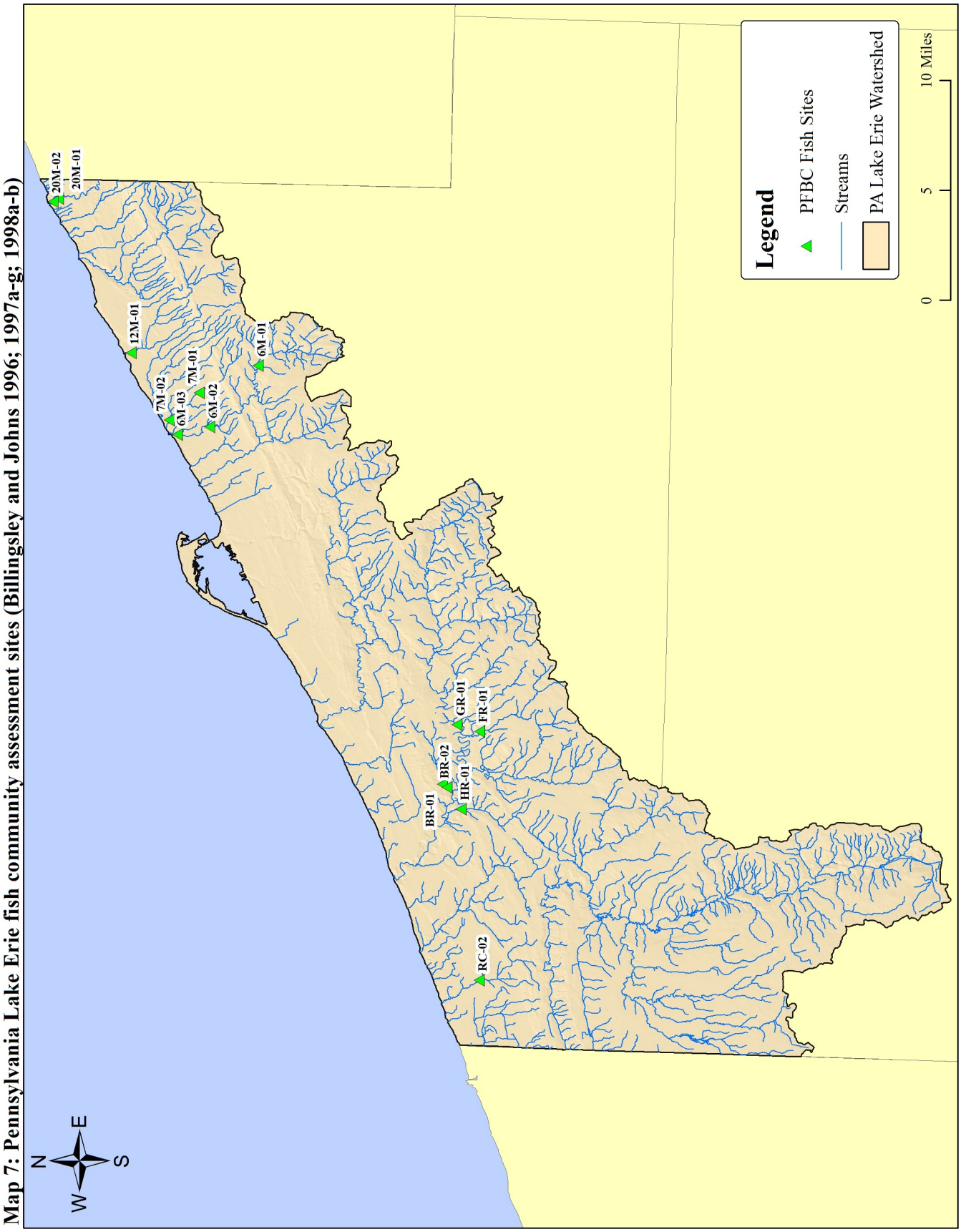


Map 7: Pennsylvania Lake Erie fish community assessment sites (Billingsley and Johns 1996; 1997a-g; 1998a-b)

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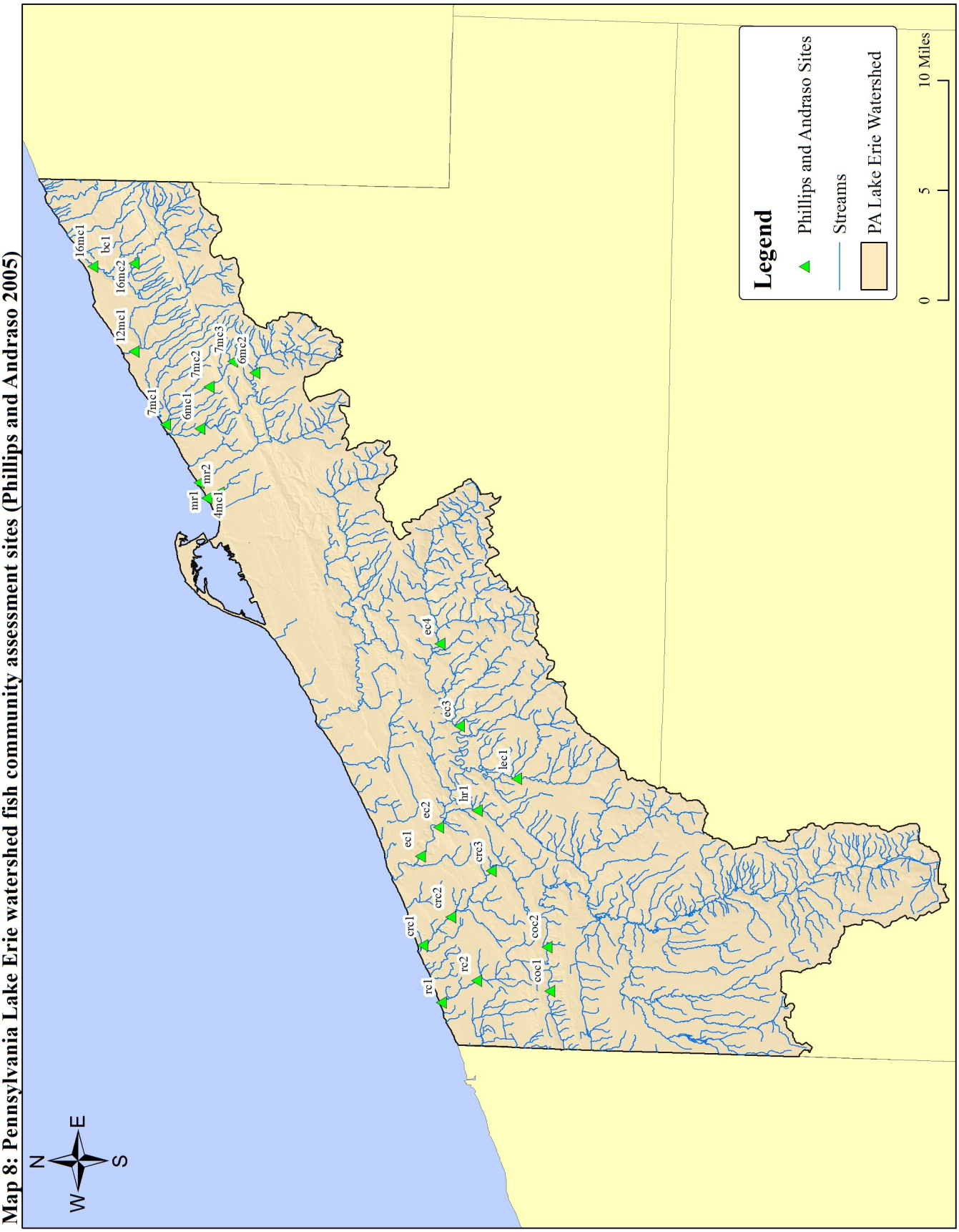


Map 8: Pennsylvania Lake Erie watershed fish community assessment sites (Phillips and Andraso 2005)

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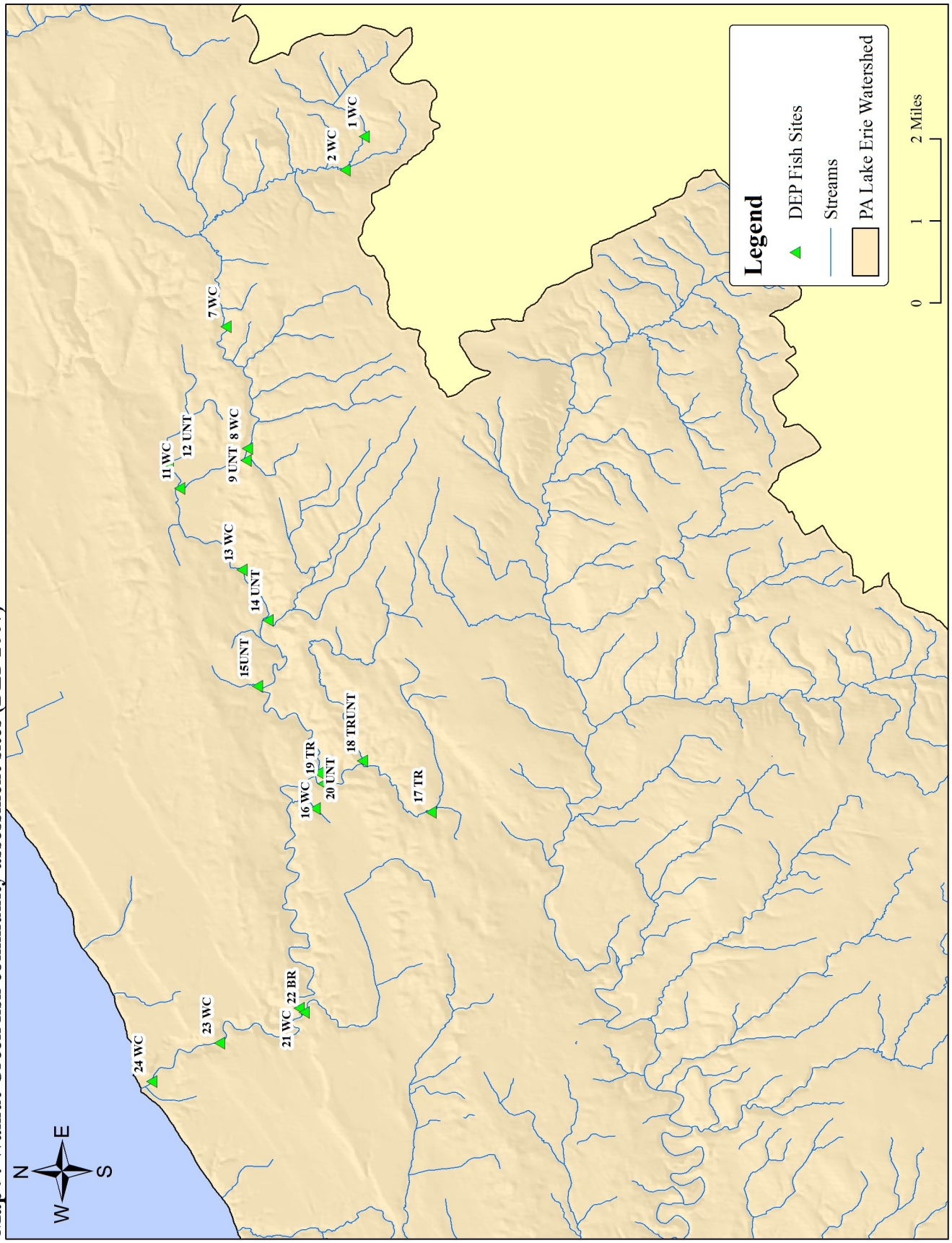


Map 9: Walnut Creek fish community assessment sites (DEP 2007)

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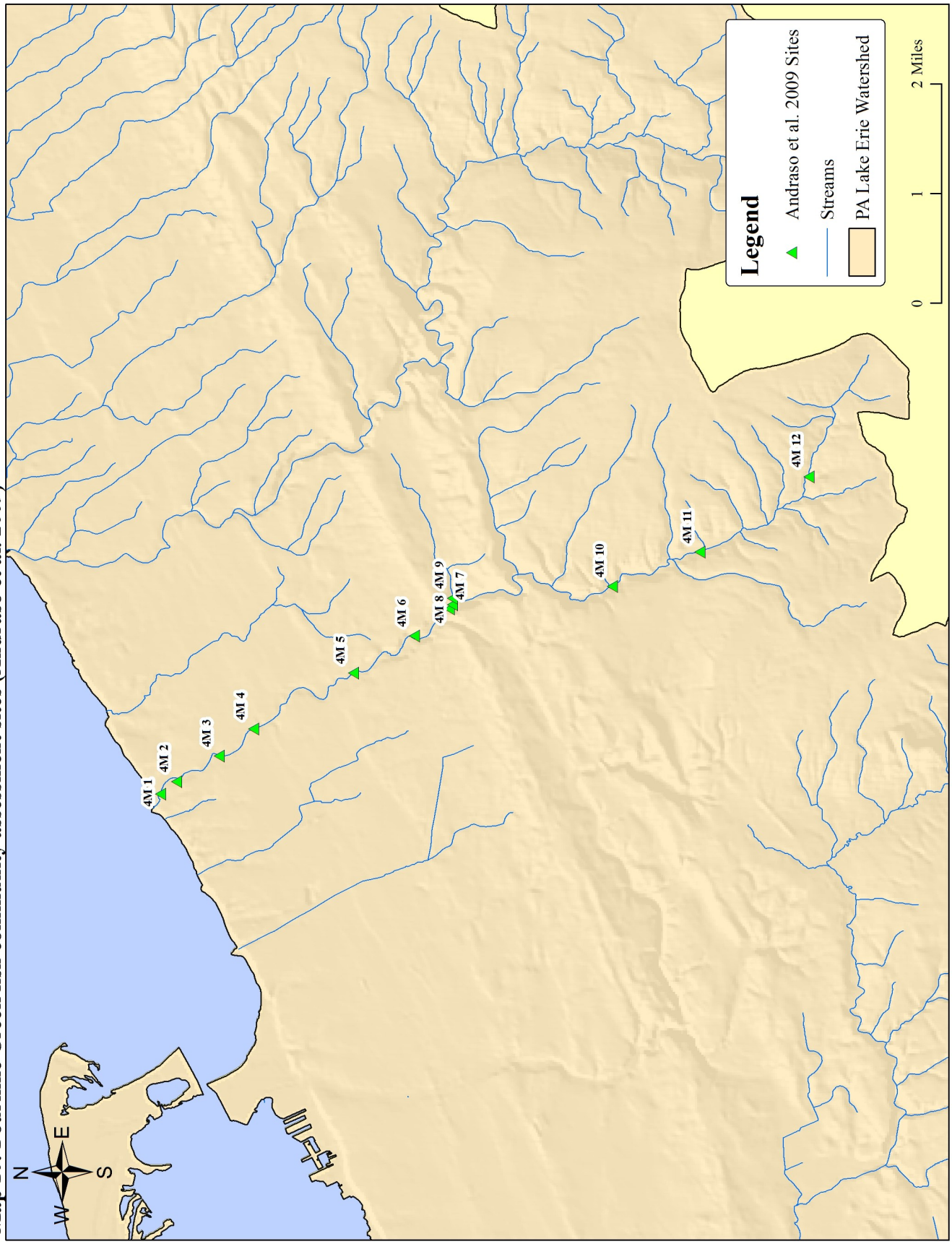


**Map 10: Fourmile Creek fish community assessment sites (Andraso et al. 2009)**

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## APPENDIX D: SITE-SPECIFIC FISH COMMUNITY DATA

Appendix D. 2011 Site-specific fish community data

| Species | COC 9 | COC 10 | COC 12 | COC 18 | COC 25 | COC 26 | COC 28 | COC 34 | COC 35 | COC 37 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 1 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 186 | 23 | 0 | 0 | 6 | 1 | 0 |
| Blacknose Dace | 0 | 0 | 0 | 0 | 0 | 130 | 0 | 3 | 13 | 51 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 5 | 5 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 5 | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| Bluntnose Minnow | 5 | 50 | 17 | 132 | 59 | 68 | 0 | 33 | 4 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 11 | 107 | 0 | 105 | 16 | 30 | 0 | 9 | 18 | 14 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 0 | 0 | 1 | 0 | 12 | 0 | 1 | 0 | 0 |
| Creek Chub | 93 | 22 | 170 | 1 | 13 | 64 | 0 | 7 | 42 | 54 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 5 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 1 | 0 | 9 | 4 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 7 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 43 | 5 | 0 | 0 | 14 | 2 | 0 |
| Green Sunfish | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Johnny Darter | 3 | 0 | 8 | 23 | 19 | 39 | 0 | 6 | 5 | 2 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 3 | 9 | 0 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Longnose Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 1 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northern Hogsucker | 1 | 1 | 0 | 25 | 31 | 7 | 0 | 17 | 6 | 0 |
| Pumpkinseed | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 1 | 0 |
| Rainbow Darter | 7 | 9 | 22 | 18 | 8 | 13 | 0 | 47 | 3 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 |
| Redfin Shiner | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 3 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 4 | 0 | 26 | 8 | 1 | 0 | 0 | 3 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 14 | 10 | 0 | 0 | 0 | 2 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 2 | 6 | 9 | 48 | 8 | 0 | 1 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 25 | 2 | 0 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 0 | 0 | 0 | 11 | 3 | 11 | 0 | 0 | 0 | 0 |
| White Sucker | 11 | 2 | 20 | 24 | 9 | 54 | 0 | 7 | 8 | 21 |
| Yellow Bullhead | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | COC 39 | COC 43 | COC 44 | COC 45 | COC 52 | COC 53 | COC 57 | COC 58 | TC1 | RC 1 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Blacknose Dace | 0 | 61 | 75 | 0 | 45 | 19 | 89 | 3 | 0 | 19 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 1 | 3 | 2 | 3 | 0 | 4 | 0 | 0 |
| Bluegill | 2 | 0 | 15 | 0 | 0 | 14 | 6 | 3 | 6 | 9 |
| Bluntnose Minnow | 95 | 0 | 1 | 38 | 22 | 93 | 0 | 12 | 0 | 1 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 |
| Central Stoneroller | 36 | 18 | 18 | 38 | 112 | 126 | 0 | 33 | 0 | 14 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Common Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Creek Chub | 11 | 37 | 41 | 13 | 20 | 30 | 147 | 3 | 9 | 48 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 2 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 1 |
| Golden Shiner | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 |
| Greenside Darter | 47 | 0 | 0 | 52 | 0 | 4 | 0 | 18 | 0 | 0 |
| Green Sunfish | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 14 | 3 | 3 | 13 | 7 | 40 | 0 | 6 | 1 | 0 |
| Largemouth Bass | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Logperch | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| Longnose Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Longnose Gar | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 7 | 0 | 0 | 2 | 0 | 2 | 0 | 3 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 11 |
| Northern Hogsucker | 25 | 0 | 0 | 9 | 41 | 63 | 0 | 15 | 0 | 3 |
| Pumpkinseed | 0 | 0 | 0 | 2 | 2 | 7 | 1 | 3 | 0 | 0 |
| Rainbow Darter | 18 | 0 | 0 | 46 | 26 | 78 | 0 | 45 | 30 | 17 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 32 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 13 | 0 | 0 | 29 | 3 | 9 | 0 | 6 | 0 | 1 |
| Rosyface Shiner | 31 | 0 | 0 | 22 | 0 | 0 | 0 | 4 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 14 | 0 | 0 | 18 | 3 | 6 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 10 | 0 | 0 | 5 | 0 | 5 | 0 | 2 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 7 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 5 | 0 | 0 | 1 | 7 | 2 | 0 | 0 | 4 | 0 |
| White Sucker | 1 | 1 | 0 | 7 | 15 | 27 | 0 | 2 | 8 | 21 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | RC 2 | RC 6 | CRC 1 | CRC 2 | CRC 3 | CRC 4 | CRC 9 | CRC 19 | DR 1 | EC 1 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 3 | 0 | 0 | 1 | 0 | 32 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Blacknose Dace | 23 | 17 | 1 | 1 | 30 | 10 | 22 | 16 | 27 | 0 |
| Black Crappie | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 4 | 4 | 21 | 16 | 42 | 1 | 1 | 0 | 7 | 5 |
| Bluntnose Minnow | 0 | 0 | 2 | 0 | 1 | 1 | 10 | 0 | 0 | 5 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 14 | 0 | 3 | 0 | 4 | 0 | 0 | 8 | 0 | 80 |
| Common Carp | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 3 | 8 | 1 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |
| Creek Chub | 27 | 63 | 2 | 1 | 16 | 18 | 69 | 40 | 85 | 3 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 13 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 |
| Fathead Minnow | 5 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Golden Shiner | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 30 | 15 | 1 | 1 | 4 | 6 | 21 | 21 | 0 | 0 |
| Largemouth Bass | 1 | 3 | 1 | 0 | 6 | 0 | 0 | 0 | 14 | 0 |
| Logperch | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 2 | 0 | 2 | 22 | 2 | 4 | 0 | 2 | 0 | 14 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Mimic Shiner | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 27 | 2 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 3 |
| Northern Hogsucker | 9 | 2 | 9 | 4 | 4 | 8 | 0 | 8 | 0 | 2 |
| Pumpkinseed | 1 | 12 | 3 | 2 | 0 | 0 | 0 | 0 | 4 | 0 |
| Rainbow Darter | 77 | 3 | 5 | 1 | 1 | 3 | 8 | 5 | 0 | 42 |
| Rainbow Trout | 15 | 1 | 7 | 10 | 6 | 4 | 0 | 2 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 5 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Rock Bass | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 17 | 1 | 2 | 0 | 0 | 0 | 0 | 23 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Striped Shiner | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| White Sucker | 29 | 20 | 57 | 3 | 13 | 10 | 39 | 17 | 0 | 21 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | EC-GC 1 | EC-GC 2 | EC 2 | EC 3 | EC 5 | EC 6 | EC 7 | EC 8 | EC 10 | EC 15 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 2 | 18 | 28 | 98 | 54 | 0 | 3 | 9 | 0 | 26 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 13 | 4 | 4 | 0 | 9 | 4 | 1 | 0 | 1 | 2 |
| Bluntnose Minnow | 1 | 0 | 0 | 15 | 1 | 0 | 0 | 0 | 0 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 1 |
| Central Mudminnow | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 0 | 0 | 0 | 129 | 1 | 0 | 3 | 0 | 0 | 36 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 0 | 0 | 44 | 1 | 0 | 0 | 0 | 11 | 0 |
| Creek Chub | 34 | 38 | 89 | 105 | 72 | 2 | 25 | 2 | 0 | 35 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| Fathead Minnow | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 1 | 1 | 12 | 2 | 0 | 1 | 0 | 0 | 3 |
| Largemouth Bass | 5 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Longnose Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 12 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 16 | 0 | 0 |
| Northern Hogsucker | 0 | 0 | 0 | 12 | 1 | 2 | 3 | 0 | 1 | 0 |
| Pumpkinseed | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Rainbow Darter | 0 | 0 | 0 | 22 | 16 | 2 | 0 | 0 | 50 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 1 | 0 | 26 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 32 | 2 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 |
| Striped Shiner | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| White Sucker | 2 | 18 | 34 | 60 | 11 | 15 | 1 | 0 | 1 | 8 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | EC 21 | EC 22 | EC 23 | EC 25 | EC 26 | EC 28 | EC 30 | EC 43 | EC 51 | EC 52 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 28 | 0 | 0 | 0 | 28 | 0 | 0 | 0 |
| Blacknose Dace | 197 | 1 | 9 | 43 | 84 | 30 | 1 | 150 | 35 | 23 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 16 | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 2 | 1 |
| Bluntnose Minnow | 0 | 0 | 2 | 0 | 0 | 0 | 14 | 0 | 104 | 0 |
| Brook Stickleback | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 71 | 106 | 1490 | 6 | 0 | 0 | 117 | 0 | 111 | 11 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 7 | 40 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Creek Chub | 206 | 0 | 52 | 37 | 13 | 16 | 2 | 179 | 53 | 54 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 2 | 5 | 0 | 0 | 0 | 7 | 0 | 6 | 0 |
| Largemouth Bass | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 0 | 6 | 99 | 0 | 0 | 0 | 8 | 0 | 6 | 3 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 36 |
| Northern Hogsucker | 0 | 8 | 11 | 0 | 0 | 0 | 18 | 0 | 9 | 9 |
| Pumpkinseed | 6 | 6 | 0 | 1 | 0 | 9 | 0 | 0 | 1 | 0 |
| Rainbow Darter | 0 | 19 | 64 | 1 | 0 | 0 | 14 | 0 | 27 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| River Chub | 0 | 5 | 6 | 0 | 0 | 0 | 9 | 0 | 8 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 1 | 7 | 0 | 0 | 0 | 4 | 0 | 5 | 0 |
| Smallmouth Bass | 0 | 10 | 33 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Southern Redbelly Dace | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Striped Shiner | 0 | 8 | 10 | 0 | 0 | 0 | 2 | 0 | 9 | 0 |
| White Sucker | 80 | 0 | 70 | 0 | 0 | 0 | 3 | 0 | 15 | 8 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | T490 1 | GFR 6 | GFR 8 | T83 1 | TR 1 | TR 3 | TR 5 | T76 1 | WC 1 | WC 2 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 1 | 6 | 262 | 0 | 16 | 35 | 21 | 70 | 74 | 120 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 1 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 65 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 19 | 1 |
| Creek Chub | 0 | 0 | 104 | 4 | 0 | 27 | 89 | 0 | 31 | 10 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 1 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 0 | 0 | 0 | 3 | 28 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 258 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 11 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 |
| Pumpkinseed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 |
| Rainbow Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Rainbow Trout | 4 | 4 | 3 | 0 | 32 | 31 | 0 | 0 | 2 | 6 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| White Sucker | 0 | 0 | 0 | 0 | 0 | 15 | 53 | 0 | 9 | 0 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | WC 3 | WC 4 | WC 12 | WC 16 | WC 19 | T36 1 | T36 2 | WR 1 | MR 1 | MR 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 59 | 37 | 58 | 94 | 26 | 0 | 55 | 1 | 5 | 0 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 |
| Bluntnose Minnow | 23 | 15 | 20 | 2 | 10 | 0 | 0 | 0 | 1 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 98 | 10 | 36 | 28 | 35 | 0 | 0 | 3 | 16 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 81 | 6 | 11 | 0 | 24 | 0 | 0 | 0 | 7 | 0 |
| Creek Chub | 10 | 26 | 9 | 13 | 94 | 0 | 0 | 1 | 5 | 23 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Fantail Darter | 2 | 0 | 2 | 5 | 7 | 0 | 0 | 0 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 84 | 48 | 48 | 26 | 0 | 0 | 0 | 4 | 4 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 5 | 4 | 6 | 12 | 1 | 0 | 0 | 3 | 0 | 0 |
| Northern Hogsucker | 11 | 7 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpkinseed | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Rainbow Darter | 21 | 13 | 17 | 15 | 11 | 0 | 0 | 0 | 6 | 0 |
| Rainbow Trout | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 11 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 21 | 1 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| White Sucker | 1 | 9 | 0 | 17 | 37 | 0 | 0 | 0 | 26 | 0 |
| Yellow Bullhead | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | MDR 1 | 4M 1 | 4M 5 | 4M 6 | 4M 9 | 4M 12 | 4M 13 | 5M 0 | 5M 1 | 5M 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 42 | 1 | 33 | 86 | 6 | 43 | 58 | 73 | 46 | 0 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Creek Chub | 0 | 2 | 2 | 3 | 1 | 3 | 28 | 78 | 16 | 0 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 0 | 9 | 17 | 111 | 53 | 0 | 0 | 0 | 0 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 1 | 13 | 7 | 3 | 3 | 0 | 0 | 0 | 0 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpkinseed | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rainbow Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rainbow Trout | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| White Sucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | 6M 0 | 6M 1 | 6M 4 | 6M 7 | 6M 18 | 7M 1 | 7M 2 | 7M 3 | 7M 6 | 7M 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 287 | 100 | 322 | 130 | 31 | 11 | 17 | 87 | 19 | 47 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 340 | 121 | 367 | 211 | 35 | 7 | 1 | 85 | 19 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 7 | 0 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Creek Chub | 26 | 6 | 26 | 51 | 24 | 0 | 1 | 75 | 55 | 10 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 2 | 0 | 8 | 2 | 11 | 1 | 0 | 24 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Logperch | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 143 | 12 | 164 | 49 | 41 | 14 | 0 | 0 | 0 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 13 | 4 | 9 | 10 | 26 | 16 | 0 | 1 | 0 | 0 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpkinseed | 6 | 9 | 5 | 6 | 0 | 0 | 0 | 10 | 3 | 0 |
| Rainbow Darter | 13 | 12 | 16 | 12 | 10 | 1 | 0 | 4 | 0 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| White Sucker | 2 | 2 | 6 | 6 | 0 | 0 | 0 | 0 | 4 | 0 |
| Yellow Bullhead | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | 7M 12 | 8M 1 | 8M 2 | 8M 3 | 8M 4 | 8M 10 | 8M 11 | 12M 1 | 12M 2 | 12M 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 42 | 56 | 12 | 220 | 120 | 10 | 0 | 57 | 66 | 148 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 0 | 8 | 1 | 298 | 173 | 1 | 0 | 108 | 12 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Creek Chub | 2 | 17 | 132 | 102 | 148 | 0 | 0 | 5 | 27 | 26 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 4 | 47 | 0 | 0 | 0 | 1 | 3 | 0 |
| Fathead Minnow | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 0 | 0 |
| Longnose Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 7 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpkinseed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rainbow Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 14 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| White Sucker | 0 | 1 | 29 | 7 | 0 | 0 | 0 | 3 | 0 | 0 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | 12M 4 | 12M 5 | 12M 8 | 12M 12 | 16M 1 | 16M 2 | 16M 5 | 16M 7 | 16M 9 | 16M 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blacknose Dace | 54 | 69 | 136 | 8 | 61 | 40 | 165 | 0 | 30 | 56 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bluegill | 1 | 1 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brown Bullhead | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Stoneroller | 0 | 0 | 0 | 0 | 23 | 150 | 33 | 0 | 0 | 0 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Common Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Creek Chub | 4 | 44 | 3 | 17 | 20 | 54 | 115 | 4 | 63 | 39 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fantail Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golden Shiner | 0 | 0 | 0 | 0 | 11 | 2 | 0 | 0 | 0 | 0 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Johnny Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Logperch | 0 | 0 | 0 | 0 | 159 | 0 | 0 | 0 | 0 | 0 |
| Longnose Dace | 0 | 0 | 0 | 0 | 33 | 59 | 0 | 0 | 0 | 0 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mottled Sculpin | 0 | 0 | 0 | 0 | 9 | 5 | 0 | 0 | 40 | 14 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Pumpkinseed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rainbow Darter | 0 | 0 | 0 | 0 | 6 | 13 | 0 | 0 | 0 | 0 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| River Chub | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Rock Bass | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Round Goby | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Stonecat | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| White Sucker | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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Appendix D. 2011 Site-specific fish community data (*continued)*

| Species | 16M 12 | 16M 13 | OBR 5 | WBR 1 | WBR 3 | PR 1 | PR 3 | PR 5 | 20M 1 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| American Brook Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 |
| Bigeye Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 306 |
| Blacknose Dace | 51 | 0 | 188 | 24 | 204 | 36 | 43 | 115 | 1 | 5857 |
| Black Crappie | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Blackside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| Bluegill | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 292 |
| Bluntnose Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 910 |
| Brook Stickleback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Brown Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 28 |
| Brown Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| Central Mudminnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Central Stoneroller | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 5244 |
| Common Carp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Common Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 371 |
| Creek Chub | 51 | 2 | 21 | 62 | 24 | 0 | 1 | 2 | 0 | 4001 |
| Emerald Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Fantail Darter | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 193 |
| Fathead Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 |
| Golden Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Golden Redhorse | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| Golden Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| Grass Pickeral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| Greenside Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 185 |
| Green Sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Hornyhead Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Johnny Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 368 |
| Largemouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 |
| Logperch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103 | 391 |
| Longnose Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1473 |
| Longnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Mimic Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| Mottled Sculpin | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 351 |
| Northern Hogsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 405 |
| Pumpkinseed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| Rainbow Darter | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 958 |
| Rainbow Trout | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 16 | 284 |
| Redfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Redside Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 151 |
| River Chub | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| Rock Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| Rosyface Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 83 |
| Round Goby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 61 |
| Sand Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Sea Lamprey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Silverjaw Minnow | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 142 |
| Smallmouth Bass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 162 |
| Southern Redbelly Dace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Spotfin Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Spottail Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Stonecat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| Striped Shiner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 |
| White Sucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1004 |
| Yellow Bullhead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| Yellow Perch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |

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