

## Lake Wilhelm Mercer County

### Spring 2018 Walleye, Muskellunge, Panfish Trap Net Survey and Largemouth Bass Night Boat Electrofishing Survey



*Fisheries Management Area 2 Fisheries Biologist Brian Ensign with our largest Walleye at 30 inches*

Lake Wilhelm is a 1,724-acre impoundment located in [Maurice K Goddard State Park](#), Mercer County. The lake contains a wide variety of fish species that offer diverse year-round angling opportunities. The Pennsylvania Fish and Boat Commission (PFBC) manages Lake Wilhelm's warm/coolwater fishery under [Statewide Regulations for Commonwealth Inland Waters](#) and stocks it

with Walleye fingerlings, Muskellunge yearlings and, new for 2019, Channel Catfish yearlings. Additionally, Lake Wilhelm was recently added to the Muskellunge Brood Stock Lakes Program (2017) and on occasion it provides a source of broodfish utilized by our state hatchery system. Waters within the Brood Stock program require immediate release of all Muskellunge caught by anglers from April 1 through May 31. Anglers are encouraged to consult the PFBC summary book for further details regarding the [Brood Stock Lakes Program](#).

Biologists from Fisheries Management Areas 2 and 9 set and retrieved Pennsylvania-style trap nets in early and late April and conducted a night-time boat electrofishing survey in May. The purposes of these surveys were to evaluate the status of the lake's Walleye, Muskellunge, panfish and black bass populations. Specifically, we wanted to assess the status of the Walleye and Muskellunge stocking programs to determine if catch rates and population levels were meeting respective (e.g. Walleye and Muskellunge) minimum management plan abundance benchmarks. All captured fish were measured for total length and a sub-sample (10 fish from each 1-inch size grouping) were weighed to the nearest gram with all fish promptly released after processing. Additionally, pelvic fin rays from Muskellunge and scale samples from all other game and panfish were collected in order to determine age and compute growth statistics. Relative abundance, or catch rate, of fish collected, were expressed as catch-per-unit of effort (CPUE); or number of targeted-fish collected per unit of time gear was deployed or "fishing".

Overall results of the 2018 survey were impressive as 16,576 individuals representing 18 different species were captured in our trap nets. Like the 2010 trap net survey, Gizzard Shad were again the most abundant species captured, comprising 41% (6,851) of the total catch.

**Table 1. Number and size range of fish collected during trap net sampling at Lake Wilhelm during the weeks of April 2<sup>nd</sup> and April 30<sup>th</sup>, 2018 (MSL=minimum size limit).**

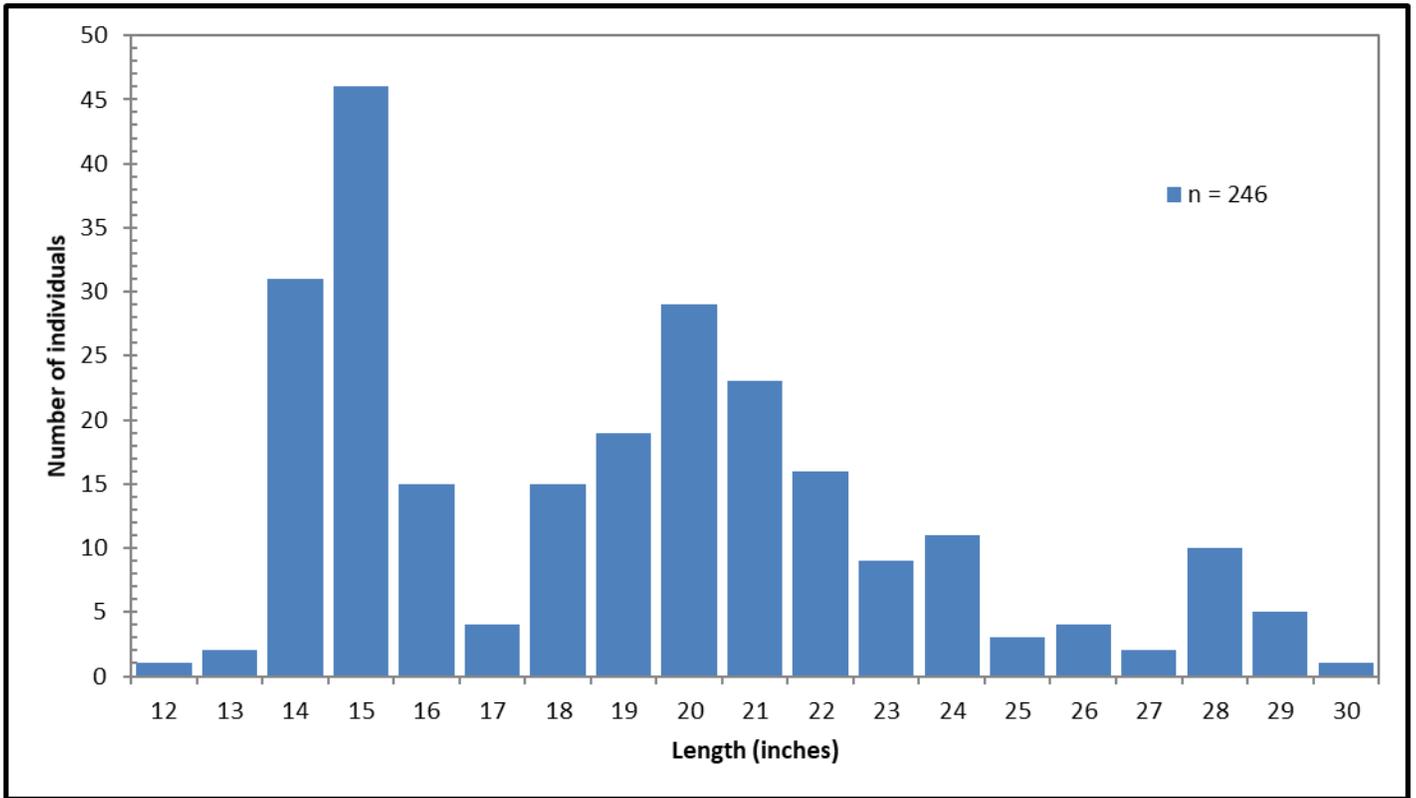
Species	Number	Size Range (inches)	Comments
Walleye	246	12 - 30	86% ≥ 15 inches - MSL
Muskellunge	47	21 - 43	11% ≥ 40 inches - MSL
Bluegill	1,582	4 - 8	69% ≥ 7 inches
Black Crappie	3,272	4 - 16	17% ≥ 9 inches
White Crappie	2,262	4 - 16	61% ≥ 9 inches
Pumpkinseed	370	4 - 8	22% ≥ 7 inches
Green Sunfish	4	4 - 6	
Yellow Perch	507	5 - 11	74% ≥ 7 inches
Largemouth Bass	5	10 - 21	60% ≥ 12 inches
Channel Catfish	3	9 - 33	67% ≥ 15 inches

<b>Flathead Catfish</b>	1	39	
<b>Brown Bullhead</b>	715	9 - 19	75% ≥ 12 inches
<b>Yellow Bullhead</b>	362	5 - 16	23% ≥ 12 inches
<b>White Sucker</b>	220	4 - 23	
<b>Bowfin</b>	1	30	
<b>Golden Shiner</b>	92	5 - 11	
<b>Common Carp</b>	36	Counted only	
<b>*Gizzard Shad</b>	6,851	Counted Only	
<b>Total</b>	<b>16,576</b>		

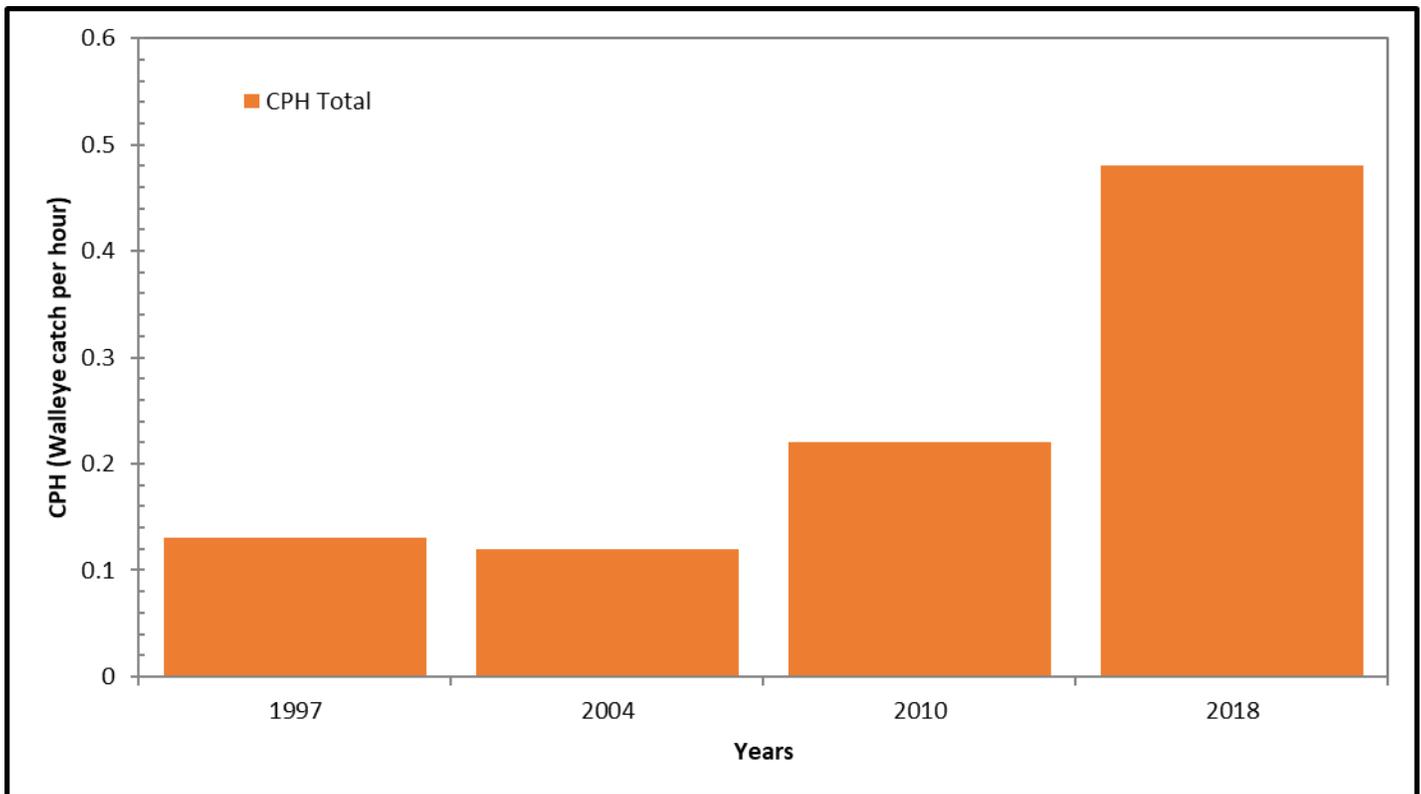
\*Documented invasive species since 2004.

### **Walleye Trap Net Assessment:**

Our first survey specifically targeted spawning Walleye, spawning occurs in early spring, shortly after ice-out, when water temperatures reach approximately 40 degrees. As such, our timing of the survey was spot on as captured Walleye were engaged in movement associated with spawning activity. A total of sixteen overnight trap nets (24-hour period intervals) were set and retrieved in water depths ranging from 4-8 feet during the week of April 2<sup>nd</sup> encompassing 376.58 hours of effort. Results of our survey were noteworthy with the capture of 177 total Walleye that yielded a catch rate of 0.48 fish per hour, a substantial increase over the previous surveys, both of which both were new record highs. Captured Walleye ranged in size from 13 - 30 inches with 157 (89%) of legal size (≥ 15 inches). Two distinct size groups, one between 14 to 16 and the other between 18 to 24 inches (87) were noted, a very encouraging sign for anglers, as the lakes Walleye population is providing good numbers of harvestable size fish presently with such opportunities anticipated to remain good for the foreseeable future. As stated in the [Walleye Management Plan \(see page 68\)](#), a minimum catch rate of 0.15 fish per hour applies to larger sized lakes as a benchmark for producing a quality Walleye fishery. Based on our results with multiple year classes represented and an overall catch rate at approximately twice the minimum required rate, it is evident that our stocking program is performing well, and that Lake Wilhelm continues to produce a quality Walleye fishery.



**Figure 1. Length frequency distribution of total Walleye captured by trap nets in Lake Wilhelm during the weeks of April 2<sup>nd</sup> and April 30<sup>th</sup>, 2018.**



**Figure 2. Historical comparison of trap net catch rates (CPH = Catch Per Hour) for Walleye in Lake Wilhelm for the years of 1997, 2004, 2010 & 2018.**



*Area 9 Fisheries Biologist Mark Haffley with two pre-spawn female Walleye*

### **Muskellunge & Panfish Trap Net Assessment:**

Another highlight of our sampling was the abundant and high-quality Muskellunge population which continues to improve in overall size and age structure with each successive survey. Staff returned to Lake Wilhelm during the week of April 30<sup>st</sup>, when water temperatures were warmer, near 50 degrees, to evaluate the Muskellunge and panfish populations. Twenty Pennsylvania style trap nets (24-hour period intervals) were set and retrieved between dates of April 30<sup>th</sup> to May 4<sup>th</sup>, 2018. We captured a total of 32 adult Muskellunge in 473.68 hours of effort that yielded a catch rate of 0.05 fish/hr. This catch rate far exceeded the Musky Management Plan minimum benchmark of 0.01 fish/hr, a

requirement for continued stocking. Captured Muskellunge ranged in size from 22 to 43 inches in total length and weighed between 0.7 to 28 lbs. Our largest Muskellunge measured 43 inches and weighed 27.8 pounds. Additionally, the total number of Muskellunge captured and the calculated catch rate in 2018 were both record highs. We also captured an additional 15 Muskellunge during the earlier April 2<sup>nd</sup> trap net survey thus bringing our grand total to 47 fish (Table 1).

Future lake stockings of Muskellunge yearlings will be on an every other year basis as referenced in the recently updated [Muskellunge Management Plan \(2017\)](#). In adopting this new stocking strategy, we fully anticipate these 12-14 inch yearlings to yield increased survival rates to adulthood and thus should continue to further enhance the quality Musky population that presently exists in the lake. Table 2 provides historical catch information for musky for 1997, 2004, 2010 and 2018, in which CPH rates exceeded the minimum catch rate criteria (0.01 fish/hr) for all years of sampling.

**Table 2. Comparison of Muskellunge trap net catch rates for Lake Wilhelm for years 1997, 2004, 2010 and 2018.**

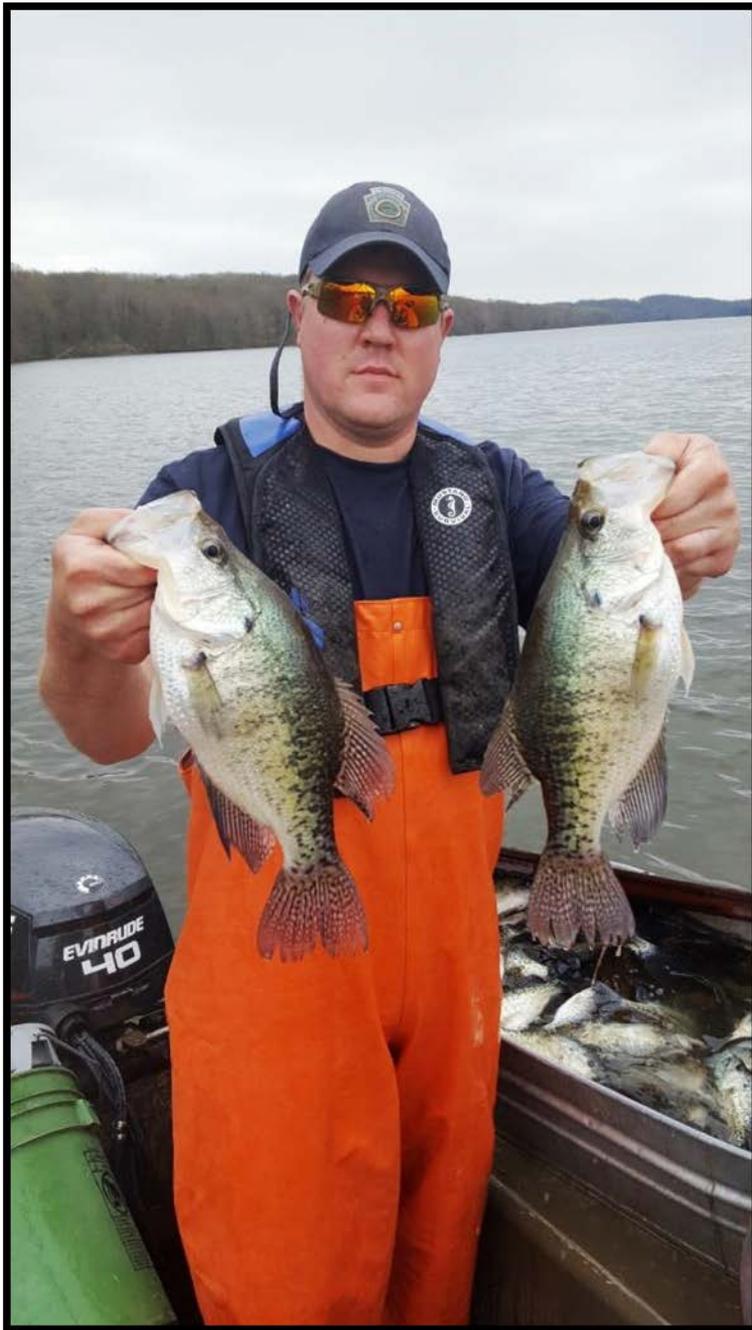
Species	Year	Number Collected	Size Range	Catch per Trap Net Hour (CPH)
MKY	1997	12	37 - 46	0.02
MKY	2004	14	33 - 49	0.05
MKY	2010	23	28 - 50	0.02
MKY	2018	47*	21 - 43	0.05

Note: \*Combined total catch from both weeks of sampling on April 2<sup>nd</sup> and April 30<sup>th</sup>, 2018.



*Fisheries Biologist Brian Ensign with a 43-inch Muskellunge*

The overall abundance and catch rates of panfish were near record highs compared to the previous 2010 survey. Panfish comprised 48% of the total trap net catch, see table 1. The predominate panfish species captured was Black Crappie, followed by White Crappie, Bluegill, Yellow Perch and Pumpkinseed. The catch of Black and White Crappie were both the highest on record with 17% of the Black Crappie and 61% of the White Crappie greater than 9 inches in length. Many of the White Crappie captured were of larger size, within the 11-13-inch range, the largest individual measured 16 inches total length. Bluegill were the third most captured panfish species, with two thirds (69%) of the catch  $\geq 7$  inches in length. Yellow Perch up to 11 inches are present and several quality sized Brown Bullhead and Yellow Bullhead were also captured in our trap nets. The Brown Bullhead and Yellow Bullhead populations continue to provide anglers a nice sustainable recreational fishery.



*Area 9 Fisheries Biologist Mark Haffley with two nice size Lake Wilhelm White Crappie*

Also captured in our trap nets were five Largemouth Bass with the largest measuring 21 inches and weighing 5.7 pounds. Typically, in inland waters, Largemouth Bass are not captured in trap nets in proportion to their abundance, measures of abundance are best assessed with other sampling gears, such as boat electrofishing. Thus, a follow-up night-time boat electrofishing survey was conducted in May to further evaluate their population status, with results detailed below.



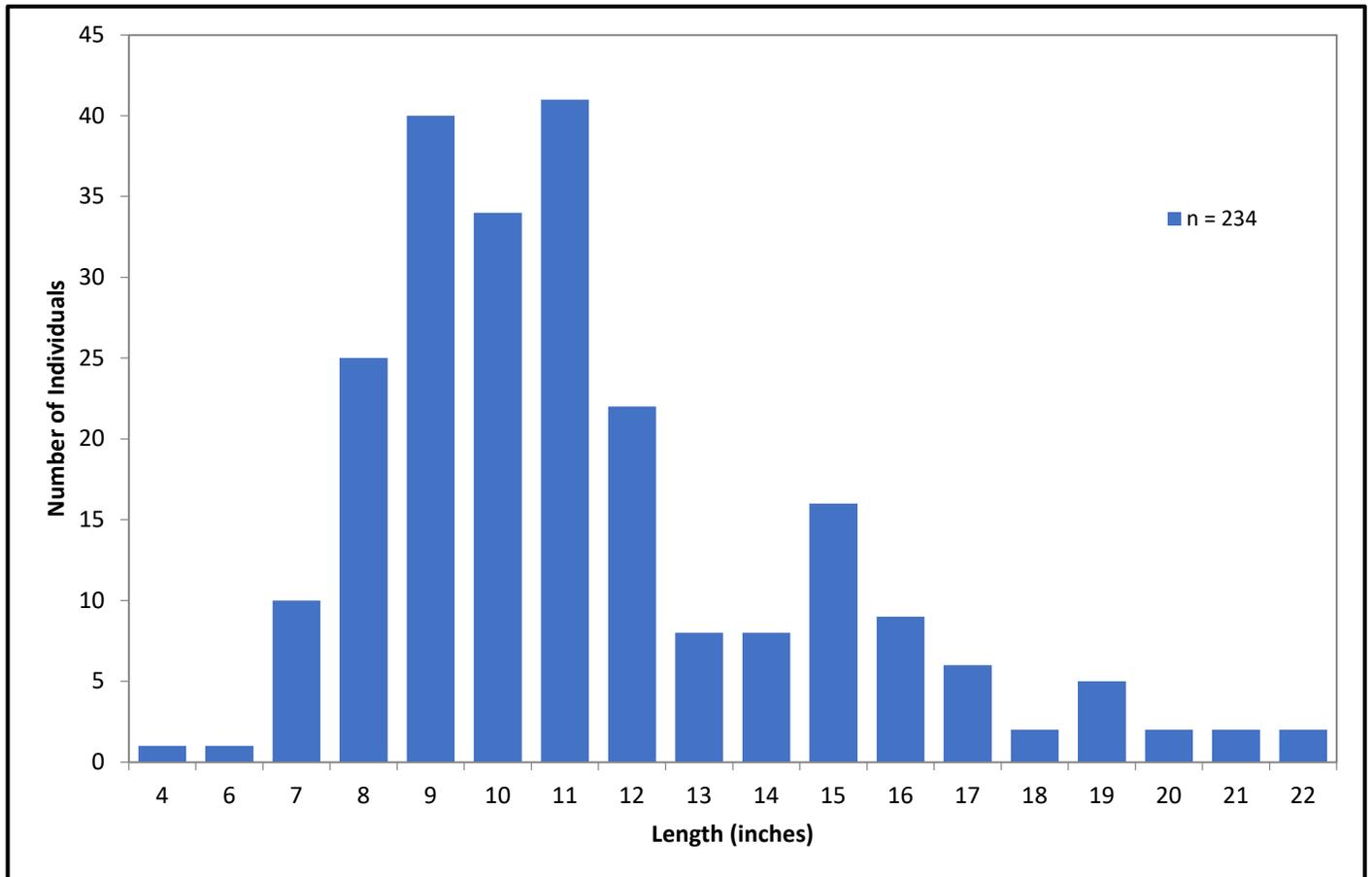
*Representative sizes of Gizzard Shad present in Lake Wilhelm*

Gizzard Shad were first documented at Lake Wilhelm in 2004. Since then their numbers have been increasing with each successive survey. Unfortunately, to this point their numbers have yet to stabilize despite our increased stocking efforts of surplus Walleye, Largemouth Bass, Muskellunge fingerlings/yearlings over the past few years. Consequently, Gizzard Shad abundance in 2004 went from 4 adults with a catch rate of 0.01 fish/hr, to 1,937 fish in 2010 for a catch rate of 3.50 fish/hr, and to 6,851 total fish in 2018 for a catch rate of 8.06 fish/hr. While Gizzard Shad can serve as an important diet component for larger predators such as Largemouth Bass, Smallmouth Bass and Channel Catfish, they also have negative ecological consequences with respect to other species, especially panfish and juvenile bass. Young Gizzard Shad may out-compete panfish species for food resources such as zooplankton, which can lead to reduced growth rates especially in Bluegill, crappie and young bass where food preferences overlap. Although Gizzard Shad were most abundant species in our net catches, we have not documented a decrease in size distribution of the lakes panfish populations. We are hopeful that increased predation by game species will reduce the overall abundance of Gizzard Shad over time and that over the long term the lake's panfish populations will not be adversely affected. Experience in other lakes with Gizzard Shad indicate that crappie populations may recover where their abundance is reduced, and large crappies may use young of the year Gizzard Shad as forage.

#### **Largemouth Bass Night-Time Boat Electrofishing Assessment:**

Fisheries Management staff from Areas 2 and 9 returned to Lake Wilhelm on the nights of May 8 & 9, 2018 to evaluate the status of the Largemouth Bass population via night-time boat electrofishing (NTBEF). Six runs at approximately 30 min each totaling 3.65 hours of effort were conducted along the northern and southern ends of the causeway. A total catch of 234 Largemouth Bass were netted

and ranged in size from 4 to 22 inches in length for a catch rate of 64.1 fish/hr (Figures 3 & 4). Additionally, the catch rate of Largemouth Bass  $\geq 12$  inches at 22.5 fish/hr was slightly above the historical mean of 20.9 fish/hr. Conversely, the catch rate of Largemouth Bass  $\geq 15$  inches was the lowest on record with a catch rate of 12.1 fish/hr. One encouraging sign with respect to the lakes current bass population is that a significant portion (69%) of the Largemouth Bass sampled measured between 8 to 12 inches in length, providing good quality bass fishing opportunities, with such opportunities anticipated to remain good for the foreseeable future.



**Figure 3: Length frequency distribution of Largemouth Bass collected in Lake Wilhelm on May 8 & 9, 2018.**

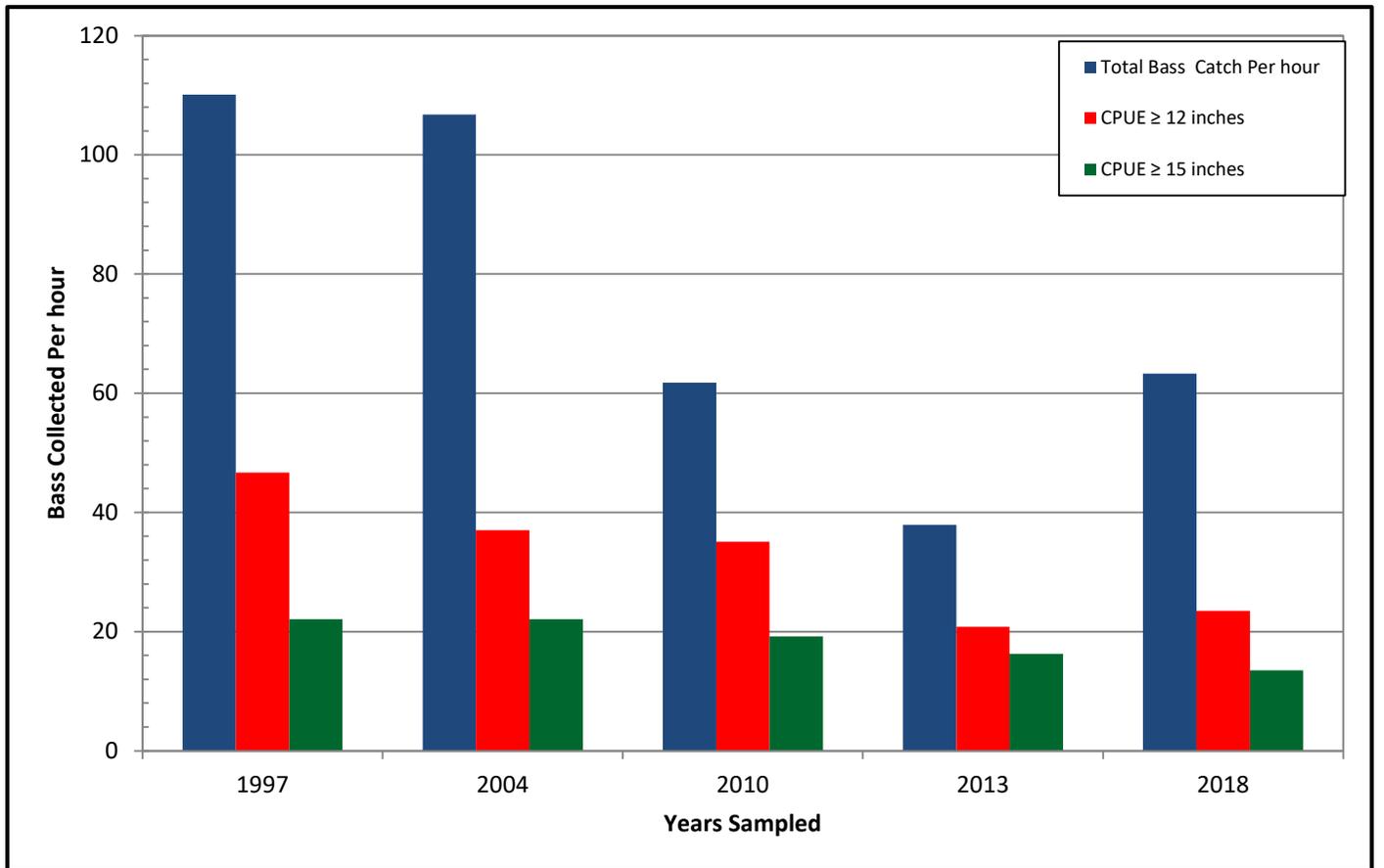


Figure 4: Catch rates of Largemouth Bass collected in Lake Wilhelm on May 8 & 9, 2018, compared to previous years.



*Area 2 Fisheries Biologist Aide Nicholas Nelson with two trophy size Lake Wilhelm Largemouth Bass*

In order to circumvent the anticipated negative impacts of Gizzard Shad specifically on young of the year Largemouth Bass, resulting in low survival rates of very young bass due to competition for food resources, supplemental annual stockings of fingerling bass have been made annually since 2013. Annual surveys are conducted to evaluate overall survival of these stockings and to determine their contribution to the adult population. Preliminary results suggest that these fingerling bass stockings are working as intended with catch rates, especially within the past three years, maintaining between 40 to 80 bass/hr. These catch rates are much improved from the 20 bass/hr post Gizzard Shad introduction, and prior to our initiating of bass fingerling stockings.



*Net full of fingerling Largemouth Bass collected during day boat electrofishing surveys in early fall*

In conclusion, the Walleye, Muskellunge, and panfish populations are performing exceptionally well despite the influence of an expanding Gizzard Shad population. Anglers interested in great fishing opportunities with abundant numbers and quality sizes of all game species should continue to invest their time in fishing Lake Wilhelm. The PFBC would like to extend our thanks to the Goddard State Park staff for their assistance in accommodating the storage of our trap net boat on property grounds during these surveys.

*Brian A. Ensign, Fisheries Biologist Area 2*