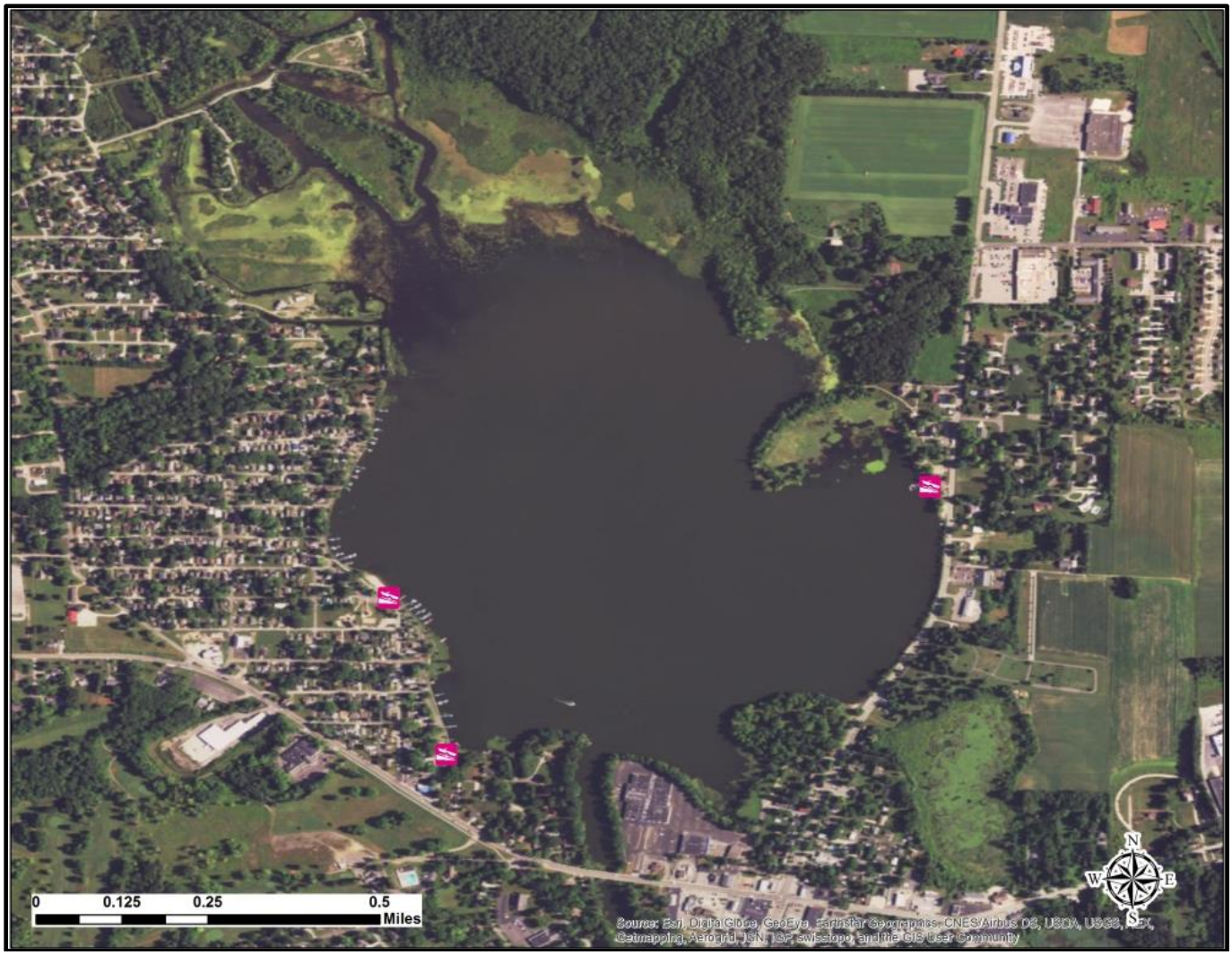
Pennsylvania Fish & Boat Commission Biologist Report

Edinboro Lake

Erie County

Spring 2016 Muskellunge Trap Net, General Trap Net and Night Bass Electrofishing Surveys



Aerial photo of Edinboro Lake.

Edinboro Lake is a 240-acre water body located near the town of Edinboro in Erie County. The outlet forms the headwaters of Conneautee Creek which eventually enters French Creek approximately seven miles downstream. The Pennsylvania Fish and Boat Commission (PFBC) manages Edinboro Lake as a warmwater fishery under Statewide Regulations for Commonwealth Inland Waters and stocks it annually with Walleye fingerlings and Muskellunge fingerlings and yearlings. Additionally, Edinboro Lake is part of the Muskellunge Brood Stock Lakes Program utilized by our state hatchery system. Anglers are encouraged to consult the PFBC summary book for further details regarding the Brood Stock Lakes Program.

The Pennsylvania Fish and Boat Commission (PFBC) conducted a Muskellunge and fish population survey at Edinboro Lake during the week of April 18th, 2016. Objectives of the survey were to: 1) evaluate the overall abundance and size structure of the Muskellunge population; 2) determine if Edinboro Lake is meeting the minimum criteria for producing a high-quality Muskellunge fishery as outlined in the PFBC's *Muskellunge Management Plan;* and 3) assess the overall success of our Muskellunge fingerling and yearling stocking program. A routine re-inventory of other game and panfish species was also conducted in conjunction with this survey. Pennsylvania-style trap nets were used to sample the lake's Muskellunge, Walleye and panfish populations. We returned in June to conduct a night-time boat electrofishing survey to sample the black bass population.

Muskellunge Survey

The PFBC makes a significant investment to raise and stock fingerling Muskellunge. In northwestern Pennsylvania and elsewhere, many Muskellunge populations are dependent upon hatchery plantings to sustain a high quality fishery. Increasing demands for producing a larger and heavier stockable size fingerling/yearling make identification of the most cost effective stocking strategy critical. This evaluation of Edinboro Lake's Muskellunge stocking program will contribute to that management goal.

Survival of two life stages of Muskellunge (fall fingerlings and spring yearlings) stocked into Edinboro Lake is being evaluated. This 2016 survey is part of a larger statewide study that began in 2010 and is outlined in the Plan for Management of Muskellunge in Pennsylvania. Beginning in 2010, to concisely evaluate relative survival of each life stage, fisheries biologists from the Linesville and Tionesta offices have been inserting **C**oded **W**ire **T**ags (CWT), into juvenile Muskellunge just prior to being stocked. Recaptured Muskellunge from this study are providing valuable information by allowing us to compute the relative survival of each age group of fish (fall fingerlings vs. spring yearlings) and to determine how our stocking programs may accommodate the most cost effective method that produces the best fishing experience. Lake Canadohta and Tionesta Lake are two additional lakes that are also stocked with uniquely tagged (CWT) fingerlings and yearlings. The initial five-year annual tagging of stocked fingerlings/yearlings as part of this study was completed in 2015. Now, as described below, Area biologists will sample Edinboro Lake for several years, using methods that target large and catchable size Muskellunge to identify those age classes (fingerling/yearling) that yield greatest survival per unit cost. Tags can be rapidly detected with a scanning wand, stocked age group determined, and the fish promptly released.

In this 2016 survey, Fisheries Biologists from the Fisheries Management Area 2 and Area 9 offices set five Pennsylvania-style trap nets, which were deployed and retrieved throughout the week of April 18th, 2016. Our sampling effort consisted of 20 overnight sets (24 hour period intervals) encompassing a total of 469.12 hours. Total catch was 3,413 fish representing 15 different species (Table 1). Overall fish populations appeared to be stable with catch rates or relative abundance numbers for most species yielding values similar to surveys of years past. Captured fish were measured for total length and a sub-sample (10 fish from each 1 inch size grouping) was weighed to the nearest gram. Relative abundance, or catch rate, of fish collected, was expressed as catch-per-unit-effort (CPUE); or number of targeted fish collected per unit of time gear was deployed or "fishing".

Table 1. Abundance and size range of fish collected in trap nets at Edinboro Lake during the week of April 18, 2016.

Species	Number Collected	Size Range (inches)	Comment
Walleye	7	16 - 24	100% ≥ 15 inches
Muskellunge	40	15 – 44	13% ≥40 inches
Bluegill	1260	2 - 9	65% ≥ 7 inches
Black crappie	859	2 -13	62% ≥ 9 inches
Pumpkinseed	97	4 -7	91% ≥ 7 inches
Rock Bass	1	8	
Yellow Perch	49	3 – 9	47% ≥ 7 inches
Smallmouth Bass	5	13 – 14	100% ≥ 12 inches
Largemouth Bass	2	12 – 13	100% ≥ 12 inches
Brown Bullhead	65	8 – 15	99% ≥ 9 inches
Yellow bullhead	121	6 – 14	96% ≥ 9 inches
White Sucker	2	18 – 20	
Quillback	2	21	
Bowfin	2	23 – 27	
Golden Shiner	902		Not measured
Total	**3,413**		

FM Area 2 Fisheries Biologist Brian Ensign with a quality size adult Muskellunge.

The catch of Muskellunge was very impressive and populations were at an all-time high in 2016. A total of 40 Muskellunge were captured. Muskellunge ranged from 15 to 44 inches total length and weighed from 0.7 to 28 lbs. The majority were between 32 and 35 inches (Tables 1 & 2). The largest Muskellunge measured 44 inches and weighed 27.8 pounds. The Muskellunge catch rate was 0.08 fish/hr or eight Muskellunge caught in every four trap net sets. This catch rate was eight times higher than the statewide standard established for Pennsylvania lakes (0.01 fish/hr or one Muskellunge in every four trap nets), providing evidence that Edinboro Lake continues to support an exceptional Muskellunge population.

We were able to scan 39 of the 40 Muskellunge to determine age class stocked. One jumped out of the processing tub before we could scan it. Thirty-four of the 39 scanned fish (87%) contained a tag. Of the 34 fish with CWTs, 26 were tagged along the dorsal fin, eight were tagged in the cheek and one was a recapture that contained a tag along the dorsal fin. Fish tagged in the dorsal fin originated from spring yearling stockings and those tagged in the cheek originated from fall fingerling stockings. At this point it appears that spring yearlings exhibit higher survival than fall fingerlings. However, the sampling phase of the study is just beginning so sampling will continue to confirm results as fish attain legal length (40 inches) and larger.

Table 2. Lengths and weights of Muskellunge captured by Fisheries Management biologists in trap nets at Edinboro Lake during the week of April 18th, 2016 (multi-page table).

Size (inches)	Weight (pounds)	Sex
15.3	0.7	JV
18.9*	1.2	M
19.2*	1.3	M
22.7**	2.8	M
23.7*	2.7	M
26.2*	3.7	M
26.4*	3.7	M
26.8*	4.2	M
26.9*	4.4	M
27.8*	4.6	M
29.0*	6.5	M
30.8*	7.3	M
31.3*	12.5	M
31.7*	14.0	M
32.2*	14.5	M
32.3*	8.5	M
32.3*	14.3	M
32.6*	14.0	M
32.7*	10.0	M
32.7*	8.5	M
33.0*	8.8	M
33.0*	15.0	F
33.1*	8.8	M

Size (inches)	Weight (pounds)	Sex
33.2*	4.5	M
33.2*	9.3	M
33.7*	16.3	F
34.3*	10.8	M
34.8*	11.3	M
35.1*	11.0	M
35.7*	12.3	F
35.7*	17.0	M
35.7*	11.8	M
36.2*	12.3	F
37.3*	16.0	F
40.6	24.5	F
41.8*	17.5	F
42.9	22.8	F
43.1*	15.0	F
44.1	27.8	F

Note: * Coded Wire Tagged adult
** Adult Muskellunge escaped overboard prior to being scanned for a CWT.

As mentioned earlier, Edinboro Lake is managed as a Broodstock Lake and is utilized by our hatchery system for the collection of adults to produce Tiger Muskellunge and purebred Muskellunge fingerlings and yearlings that are stocked statewide. A representative sample of ripe adults (ready to spawn), both males and females, was transported by Union City State Fish Hatchery personnel to be spawned. All adults that were used for spawning purposes were promptly returned back to the lake.

Area 2 Fisheries Biologist Brian Ensign and Area 9 Fisheries Biologist Mark Haffley scan the cheek (left) and dorsal area (right) for the presence of a CWT in an Edinboro Lake adult Muskellunge suspended in a specialized sock net to avoid fish injury during processing.

General Trap Net Survey

The panfish population in Edinboro Lake, specifically the catch rates and size distribution of Bluegill and Black Crappie during the 2016 survey, was excellent (Table 1). Panfish encompassed 66% of the total trap net catch. Predominate panfish species captured include: Bluegill (1260), followed by Black Crappie (859), Pumpkinseed (97), and Yellow Perch (49). The catch of Bluegill and Black Crappie were both the second highest on record with 65% of the Bluegill being greater than 7 inches and 62% of the Crappie greater than 9 inches in length. The number of Golden Shiners captured this year showed a substantial increase over the last four historical surveys with a catch of 214 fish. Golden Shiners are an important component of the food chain and provide an abundant forage base for Edinboro Lake's predators. Other species observed during our trap net sampling included Brown and Yellow Bullhead, White Sucker, Quillback and Bowfin. Also captured were two Largemouth Bass and five Smallmouth Bass, all of which were of legal size (12 inches).

A quality size Bluegill caught in our trap nets at Edinboro Lake.

An abundance of Black Crappie were sampled in our trap nets at Edinboro Lake.

Edinboro Lake receives annual plantings of Walleye fingerlings to maintain the lake's Walleye fishery. During our sampling efforts a total of seven adults were captured. This was low but not surprising given the timing of our survey. Water temperatures were generally too warm to effectively sample Walleye

in near shore zones. Captured Walleye ranged from 16 – 24 inches (Figure 1) and all were of legal size (≥ 15 inches). Walleye typically spawn in early spring (March/April) when water temperatures are between 46 – 53° F, just shortly after ice out and are then most vulnerable to near-shore trap net capture.

Fisheries Biologist's Brian Ensign (Area 2) and Mike Hosack (Area 9) with three legal-size Walleye captured during our surveys.

Black Bass Electrofishing Survey

Area 2 Fisheries Management personnel returned to Edinboro Lake on June 6, 2016 to sample the black bass population via night-time boat electrofishing (NTBEF). We captured both Largemouth Bass and Smallmouth Bass, but Largemouth Bass were the most frequently caught black bass species and outnumbered Smallmouth Bass by a 4:1 ratio. A total of 71 Largemouth Bass and 16 Smallmouth Bass were captured. Largemouth Bass ranged from 4 to 15 inches in length with a total catch rate of 47.3 fish/hr (Figure 1). The catch rate of Largemouth Bass ≥ 12 inches was 17.3 fish/hr, which was slightly below the historical mean of 20.9 fish/hr. The catch rate of Largemouth Bass ≥15 inches was the lowest on record with a catch rate of only 0.7 fish/hr. As mentioned, a Smallmouth Bass population is present in the lake but occurs at a much lower density. Captured Smallmouth Bass ranged in size from 3 to 11 inches for a total catch rate 10.6 fish/hr. On the night of our electrofishing survey we

experienced a severe thunderstorm event causing a two hour delay between electrofishing runs which may have adversely affected our overall catch.

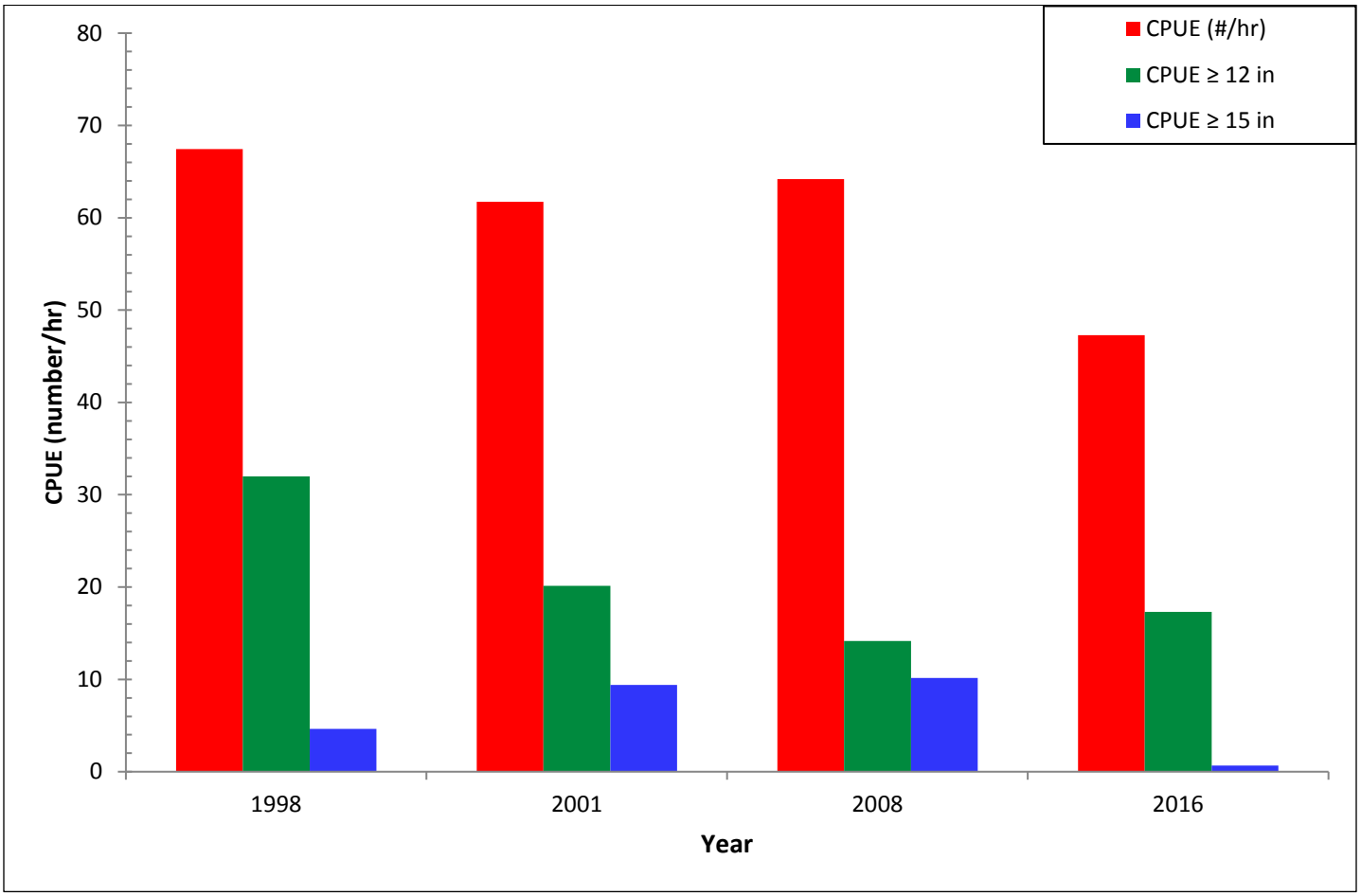


Figure 1. Historical catch rates for Largemouth Bass captured during night-time boat electrofishing surveys in Edinboro Lake for 1998, 2001, 2008 and 2016.

Fisheries Biologist Aide Jessica Tain with two quality-sized Largemouth Bass captured during night-time boat electrofishing at Edinboro Lake.

In conclusion, the future looks bright regarding the lake's gamefish populations. Edinboro Lake continues to offer excellent angling opportunities for Muskellunge and Panfish. The Largemouth Bass population is providing good opportunities for anglers to catch fish with an occasional trophy sized fish. We note that the Brown Bullhead and Yellow Bullhead populations are sustaining a nice size structure and support a sustainable recreational fishery.

Prepared by Brian Ensign, Area 2 Fisheries Biologist