Sugar Lake

Crawford County

Spring 2017 Trap Net and Night Bass Electrofishing Survey

Aerial photo of Sugar Lake.

Sugar Lake is a 90-acre open-system (no dam), natural glaciated lake located approximately seven miles northeast of Cochranton, in Crawford County. The lake is accessible from PA Route 27 and PA Route 173. The lake's outlet forms Lake Creek, a tributary to Sugar Creek, which flows through the Erie National Wildlife Refuge' s Southern Sugar Lake Division. There is one Pennsylvania Fish and Boat Commission (PFBC) owned boat launch with limited parking for about 10 vehicles with trailers located on the western shore. Shoreline fishing opportunities on Sugar Lake are restricted primarily due to the number of private residences and surrounding wetlands (Erie National Wildlife Refuge). For that reason, Sugar Lake's fishing opportunities are best enjoyed by boat. Bass are managed under Big Bass Program regulations while the lake's other lake warmwater fish populations are managed under Statewide Regulations for Commonwealth Inland Waters. The PFBC, up until recently (2016), had been stocking the lake with annual plantings of Muskellunge fingerlings, but with the new stocking

recommendations as referenced in the 2017 Update to Pennsylvania's Muskellunge Management Plan, it will now will receive alternate year stockings of spring yearlings. Additionally, Sugar Lake is part of the Muskellunge Brood Stock Lakes Program and has been historically utilized by our state hatchery system in collecting pre-spawn adults for production of Muskellunge and tiger muskellunge.

Biologists from the Fisheries Management Area 2 and 9 offices set and retrieved Pennsylvania-style trap nets in April and conducted a night-time boat electrofishing (NTBEF) survey in May. The purpose of these surveys was to evaluate the status of the lake's Muskellunge, panfish and black bass populations. Specifically, we wanted to evaluate the status of the Muskellunge stocking program to determine if it was meeting the minimum criteria for producing a high quality fishery based on the criteria in the Muskellunge Management Plan.

Pennsylvania-style trap nets were used to assess the lake's Muskellunge and other sportfish populations. Twenty overnight trap nets (24 hour period intervals) were set during the week of April 10th encompassing 471.47 hours of effort that yielded a total of 2,924 fish representing 19 different species (Table 1). 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. Additionally, pelvic fin rays from adult Muskellunge and scale samples (all other game and panfish) were collected to determine age and compute growth statistics. 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. Species, abundance and size range of fish collected during trap net sampling at Sugar Lake during the week of April 10th, 2017.

Species	Number	Size Range (inches)
Muskellunge	8	32 - 39
Northern Pike	6	22 – 39
Chain Pickerel	9	17 - 21
Black Crappie	1,011	3 - 12
Bluegill	836	3 – 8
Yellow Perch	204	3 – 12
Pumpkinseed	1	7
Rock Bass	1	4
Largemouth Bass	6	13 - 18
Walleye	2	18
Brown Bullhead	312	8 - 16
Yellow Bullhead	46	5 - 15
Bowfin	26	14 - 29

Common Carp	9	23 - 30
White Sucker	24	6 - 19
Black Redhorse	1	20
Quillback	1	23
Golden Shiner	223	4 – 9
Gizzard Shad	192	N/A
Total	**2,924**	

As mentioned previously, Sugar Lake was primarily assessed to determine the status of the Muskellunge population. Upon drafting the 2017 Updated Musky Management Plan staff identified this lake as being a “last chance water”, requiring a Muskellunge assessment prior to it’s approval for continued muskellunge stocking. For all lakes, and notably for last chance lakes to be eligible for continued Muskellunge stockings, each must meet statewide objectives based on minimum catch rates as referenced in the plan. Results of the 2017 survey yielded the capture of eight adults that ranged in size from 32 to 39 inches in length. The calculated trap net catch rate was 0.017 fish/hr and was above the minimum statewide objective of 0.01 fish/hr, required for continued stocking. As a result, the lake will remain on the stocking list and will receive alternate year plantings of 12 to 14 inch summer yearlings beginning in 2018. As referenced in the 2017 Update to Pennsylvania’s Muskellunge Management Plan, results of our recent tagging studies have demonstrated that by stocking these larger yearlings we expect better survival rates compared to traditional fall fingerlings stockings. Future musky surveys will be scheduled once these yearlings have been given sufficient time to grow, mature, and reach an appropriate size that would be vulnerable to our trap net gear. Based on historical catch data Muskellunge first become venerable to trap nets when fish are between 2 to 4 years of age and ranging in size from 26 to 32 inches in length.

Area 2 Fisheries Biologist Brian Ensign with the largest adult Muskellunge caught in our trap nets.

Sugar Lake continues to maintain a quality panfish population for its size. Black Crappie and Bluegill were the predominant panfish species captured in our nets. Of the 1,011 Black Crappie captured 74% were at least 9 inches in length with many fish in the 9 to 11 inch range. The lakes Bluegill population at 636 total fish is also providing good numbers and size structure with 90% of these being 7 inches in length. Good numbers of Yellow Perch up to 12 inches were present and thus are providing harvestable size fish for anglers to target. Other species of interest to anglers include: Chain Pickerel, Brown Bullhead, Yellow Bullhead, Rock Bass, Walleye and Bowfin. Chain Pickerel were captured in higher abundance during the previous 2007 survey and it is reassuring to know that their overall numbers appear to have stabilized in recent years as only nine adults ranging in size from 17 to 21 inches were captured in 2017. Brown Bullhead outnumbered Yellow Bullhead by a wide margin with a majority of these fish ranging in length between 10 and 14 inches. Sugar Lake contains an abundant Bowfin population and often these fish can provide a spirited fight when hooked. Nearly all the Bowfin captured in our trap nets and those observed during our night electrofishing survey were of nice size (≥ 15 inches). The largest Bowfin, captured by trap nets, measured 29 inches. Other non-game species such as Black Redhorse, Quillback, White Sucker and Golden Shiner were present and are an important component to the overall fish community in that offspring from these adults provide an abundant forage base for the larger predators that inhabit the lake.

A quality sized Black Crappie caught in our trap nets at Sugar Lake.

A post-spawn female Yellow Perch caught in our trap nets at Sugar Lake.

Area 2 Fisheries Biologist Brian Ensign with a 37-inch Northern Pike captured at Sugar Lake.

The timing of our survey occurred when water temperatures were warming, between 55 - 60°F, which was ideal for capture of spawning Muskellunge but not necessarily ideal for other game species such as Northern Pike. This naturally reproducing population continues to be sampled in moderate numbers with each successive survey. Despite these warmer water conditions, we captured six adults that ranged in size from 22 to 39 inches with 83% being of legal size (≥ 24 inches).

Tionesta Hatchery Fish Cultrualist Andy Severns with two trophy-sized Largemouth Bass.

During the evening of May 11, 2017 PFBC staff returned to Sugar Lake to assess the status of the black bass population via night-time boat electrofishing. The entire lake's shoreline was electrofished in three total runs that encompassed 2.0 hours of effort. A total of 172 Largemouth Bass were netted and ranged in size from 3 to 21 inches in length (Figure 1) with a total catch rate of 87 fish/hr. Of the 172 bass netted, 74% were over 12 inches and 22% were over 15 inches. Fisheries Management guidelines for Big Bass Regulations were exceeded at Sugar Lake with bass over 12 inches collected at a rate of 64 per hour (state guideline 7 per hour) and bass over 15 inches collected at a rate of 19 per hour (state guideline 2 per hour.) Total catch, CPUE over 12 inches and 15 inches captured in 2017 were all record highs compared to previous surveys in 1998 and 2007 (Figure 2). Furthermore, most (62%) of the Largemouth Bass captured were 12 to 17 inches in length, thus providing quality bass fishing opportunities currently with such opportunities anticipated to remain good for the foreseeable future.

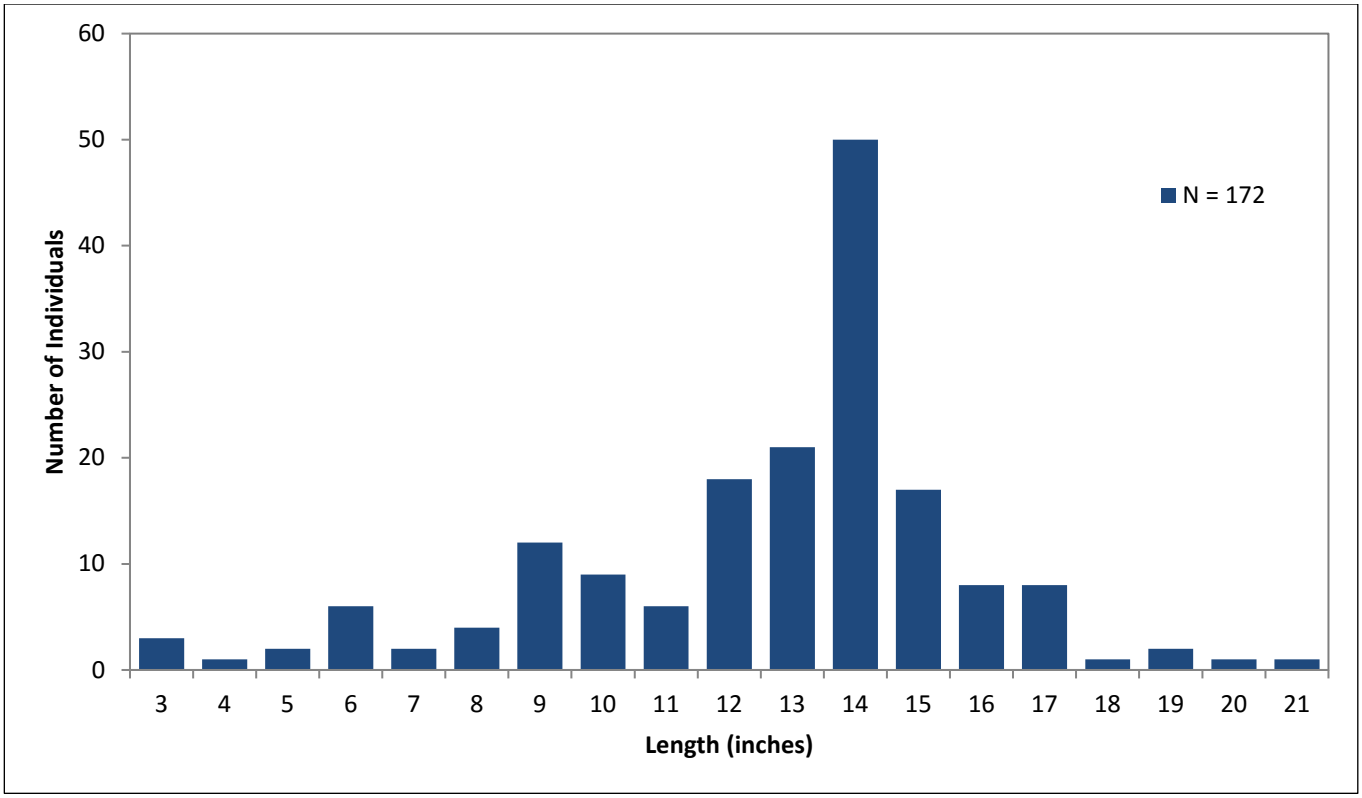

Figure 1. Length frequency distribution for Largemouth Bass captured during night-time boat electrofishing surveys at Sugar Lake.

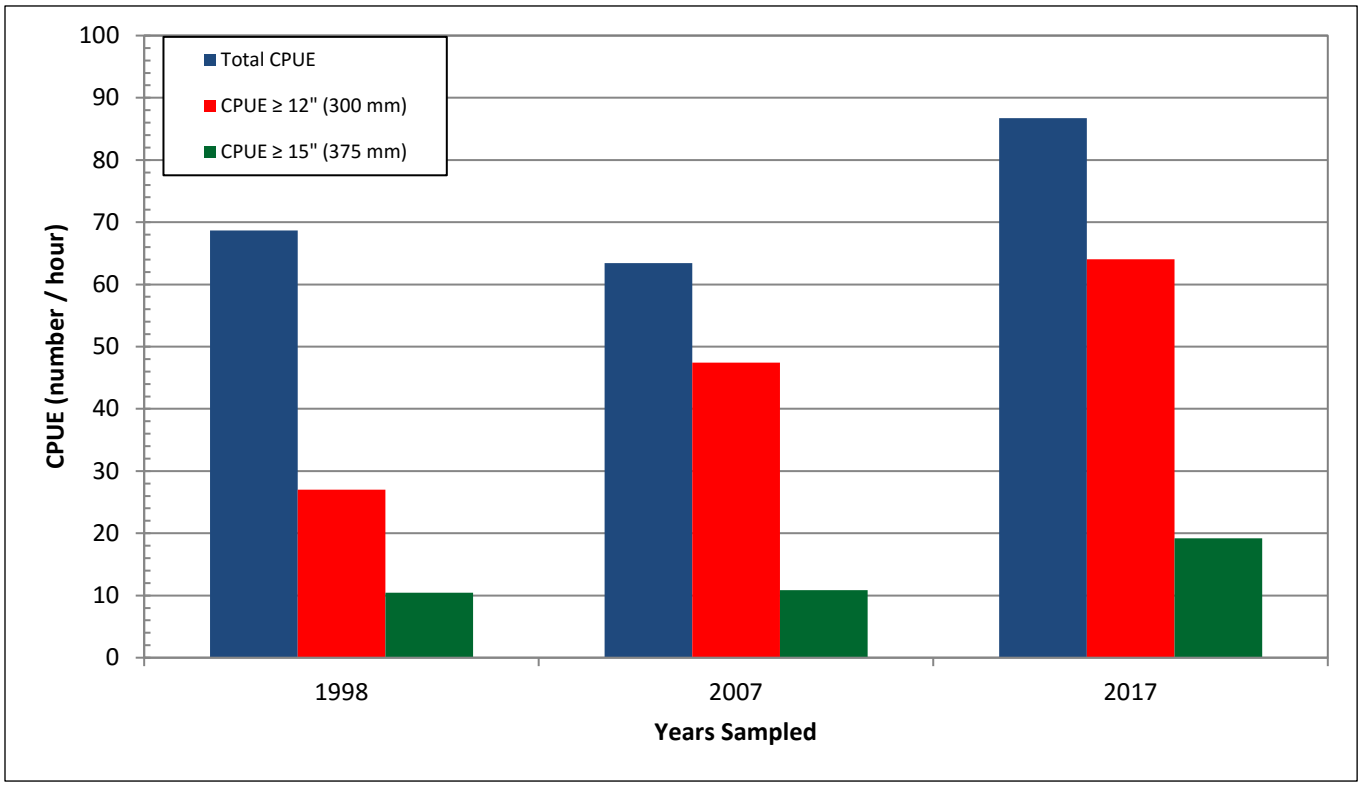

Figure 2. Catch rates (CPUE) for Largemouth Bass captured during night-time boat electrofishing surveys in 1998, 2007 and 2017 at Sugar Lake.

In conclusion, Sugar Lake provides quality angling opportunities for a variety of species. The Muskellunge and Northern Pike populations are providing moderate numbers of quality size individuals for anglers to catch. The Largemouth Bass population continues to be excellent, providing anglers with abundant numbers of bass between 12 to 15 inches including several with a trophy status. The panfish fishery is providing abundant numbers and quality sizes of Black Crappie and Bluegill. Good numbers and sizes of Yellow Perch are also available for anglers to harvest. The Brown Bullhead population is sustaining a nice size structure and supports a sustainable recreational fishery.

Prepared by Brian Ensign, Area 2 Fisheries Biologist