

LAKE ADGER LARGEMOUTH BASS SURVEY, 2016



Federal Aid in Sport Fish Restoration
Project F-108
Report Type: Survey



Author
Amanda M. Bushon
and
A. Powell Wheeler

North Carolina Wildlife Resources Commission
Division of Inland Fisheries
Raleigh

2018

Keywords: Largemouth Bass, electrofishing, Lake Adger

This project was funded under the Federal Aid in Sport Fish Restoration Program utilizing state fishing license money and federal grant funds derived from federal excise taxes on fishing tackle and other fishing related expenditures. Funds from the Sport Fish Restoration Program are used for fisheries management and research, aquatic education, and boating access facilities. The program is administered cooperatively by the N.C. Wildlife Resources Commission and the U.S. Fish and Wildlife Service.

Abstract.—Largemouth Bass *Micropterus salmoides* were sampled on April 18, 2016 using boat-mounted electrofishing gear at six 300-m sites on Lake Adger. All fish were weighed, measured and aged. A total of 88 Largemouth Bass were collected with a mean catch rate of 52 fish per hour (SD = 18.2). Largemouth Bass ranged from 100 to 602 mm TL. Stock index values for PSD and PSD-P were 67 and 26, respectively. Condition was moderate with a mean relative weight of 85 (SD = 7.7). Growth was also moderate with Largemouth Bass reaching 356 mm TL around age 6.

Lake Adger is a small (177 ha) impoundment on the Green River in Polk County, NC. Lake Adger is currently managed by the North Carolina Wildlife Resources Commission for Muskellunge *Esox masquinongy* fishing and stocked with 250 advanced fingerling diploid Muskellunge annually. The reservoir also contains a Largemouth Bass *Micropterus salmoides* fishery; however, very little data exists on the Largemouth Bass population in Lake Adger. The discoveries of Blueback Herring *Alosa aestivalis* in Lake Adger in March 2015 and Spotted Bass *Micropterus punctulatus* upstream in Lake Summit in August 2015 revealed the need for a formal Largemouth Bass survey to establish baseline population data. The goal of this survey is to perform a stock assessment of the Largemouth Bass population in Lake Adger.

Methods

Field Collections.—Boat-mounted electrofishing gear was used to collect Largemouth Bass from six sites on Lake Adger on April 18, 2016. Electrofishing gear included a 5.5 m jon boat, 7,500 W generator, and a Smith-Root 7.5 GPP that produced 2.4-3.5 A of pulsed DC current. One net person collected stunned fish. All sites were approximately 300 m in length and distributed throughout the lake (Figure 1). All Largemouth Bass collected were measured for total length (TL; mm), weighed (g) and sexed. Sagittal otoliths were removed for age determination.

Abundance, size structure and condition.—Relative abundance was indexed by catch-per-unit-effort (CPUE) of electrofishing time and expressed as the number of fish per hour. Length frequency histograms were constructed and proportional size distributions were calculated for quality (PSD), preferred (PSD-P) and memorable (PSD-M) sized fish (Gabelhouse 1984, Guy et al. 2007) to assess size structure. Condition was evaluated by calculating relative weight (W_r) values for all Largemouth Bass >150 mm TL using the equation proposed by Wege and Anderson (1978).

Age and growth.—All otoliths were immersed in water and read under a 10X dissecting microscope with a fiber optic light. Otoliths greater than age-1 were broken perpendicular to the long axis and sanded with 400-600 grit sandpaper before counting annuli. Otoliths were read independently by two readers and annuli discrepancies were resolved by reading the otolith in concert. A final annuli count was then recorded for each fish. Fish were assigned an age equal to the number of annuli plus one because they were in the process of laying down a new annulus. Mean length at age was calculated for all Largemouth Bass and a von Bertalanffy growth curve was constructed using Fisheries Analysis and Modeling Simulator software (Slipke and Maceina 2014) to estimate growth rates.

Results and Discussion

Abundance, size structure and condition.—A total of 88 Largemouth Bass were collected in 1.7 h of electrofishing time. CPUE at each site ranged from 27 to 78 fish/h with a mean of 52 fish/h (SD = 18.2). CPUE of Largemouth Bass from western North Carolina mountain reservoirs are typically quite variable and have ranged from 25–74 fish/h with an average of 42 fish/h (Davies 1981, Loftis and Goudreau 2000, Loftis and Yow 2004, Wood 2014). Thus, the abundance of Largemouth Bass in Lake Adger is likely similar to the abundance of Largemouth Bass in other North Carolina mountain reservoirs. Other species noted during electrofishing but not collected include *Ameiurus* sp., Blueback Herring, Catostomidae spp., Common Carp *Cyprinus carpio*, Gizzard Shad *Dorosoma cepedianum*, Redear Sunfish *Lepomis microlophus*, and White Crappie *Pomoxis annularis*.

Largemouth Bass ranged in size from 100 to 602 mm TL (Figure 2). PSD, PSD-P and PSD-M values were 67, 26 and 11%, respectively. These values are within the desired range for a balanced Largemouth Bass population (Willis et al. 1993).

Relative weight values for Lake Adger Largemouth Bass ranged from 69–112 with a mean of 85 (SD = 7.7; Figure 3). Low W_r values could be indicative of less than favorable reservoir conditions such as productivity, habitat or forage. The recent occurrence of Blueback Herring, a suitable forage item, into Lake Adger in 2015 may improve Largemouth Bass condition in future samples.

Age and growth.—Age distribution of Lake Adger Largemouth Bass was typical, with a higher frequency of age-1 individuals than other age classes (Figure 4). Largemouth Bass up to age-17 were collected but 60% of the fish were \leq age-3. Largemouth Bass growth rates were relatively slow; it took an estimated five to six years for Largemouth Bass to reach 356 mm TL. (Figure 5).

Management Recommendations

1. Continue to manage the Lake Adger Largemouth Bass population under the current statewide regulation (356 mm minimum, except 2 may be less than 356 mm).
2. Sample the Largemouth Bass population during the spring of 2019 to evaluate any changes caused by introduced species.

References

- Davies, J. H. 1981. Santeetlah Reservoir Survey. North Carolina Wildlife Resources Commission, Federal Aid in Sportfish Restoration, F-24-S, Final Report, Raleigh.
- Gabelhouse, D. W., Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4:273–285.
- Guy, C. S, R. M. Neumann, D. W. Willis and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32:348.
- Loftis, C. S. and C. Goudreau. 2000. Queens Creek Reservoir electrofishing survey, 10 May 1999. North Carolina Wildlife Resources Commission, Federal Aid in Sportfish Restoration, F-24, Final Report, Raleigh.
- Loftis, C. S. and D. L. Yow. 2004. Shoreline electrofishing survey of Santeetlah Reservoir, 1997-1999. North Carolina Wildlife Resources Commission, Federal Aid in Sportfish Restoration, F-24-S, Final Report, Raleigh.
- Slipke, J. W., and M. J. Maceina. 2014. Fishery analysis and modeling simulator (FAMS). Version 1.64. American Fisheries Society, Bethesda, Maryland.
- Wege, G. J. and R. O. Anderson. 1978. Relative weight (W_r): a new index of condition for Largemouth Bass. Pages 79-91 in G.D. Novinger and J.G. Dillard, editors. 1978. New Approaches to the management of small impoundments. American Fisheries Society, North Central Division, Special Publication 5, Bethesda, Maryland.

- Willis, D. W., B. R. Murphy, and C. S. Guy. 1993. Stock density indices: development, use and limitations. *Reviews in Fisheries Science* 1:203–222.
- Wood, C. 2014. Lake James Largemouth Bass survey, 2010-2011. North Carolina Wildlife Resources Commission, Federal Aid in Sportfish Restoration, F-108, Final Report, Raleigh.

Site	Start Latitude	Start Longitude	Stop Latitude	Stop Longitude
1	35.33821	-82.22706	35.34045	-82.22868
2	35.33746	-82.21553	35.33891	-82.2167
3	35.34369	-82.20674	35.34619	-82.20823
4	35.33329	-82.20099	35.33236	-82.19917
5	35.33358	-82.19119	35.33161	-82.19106
6	35.33506	-82.21693	35.33482	-82.21948



FIGURE 1.—Map and GPS coordinates of Lake Adger, Polk County, North Carolina electrofishing sites sampled on 18 April, 2016. Sites on the map are represented with bold black lines along the shore line. Each site was approximately 300 m long.

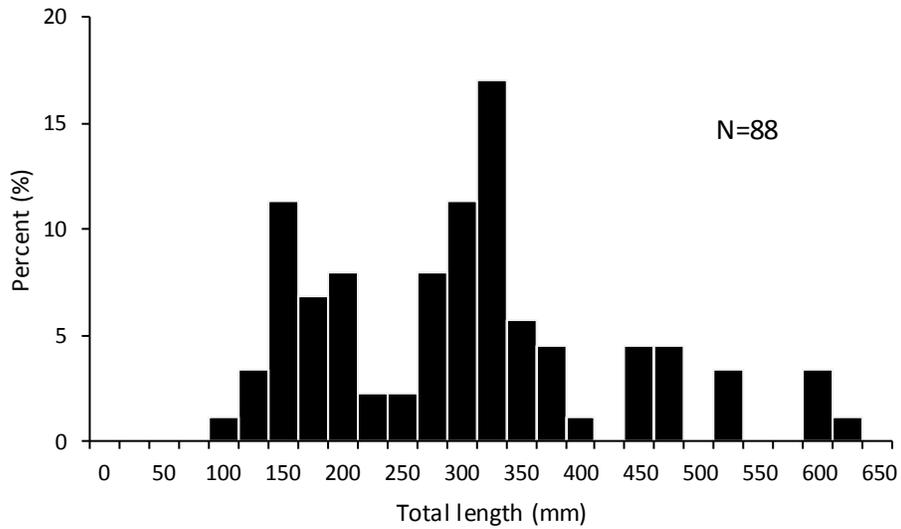


FIGURE 2.—Length frequency distribution of Lake Adger Largemouth Bass collected April 18, 2016.

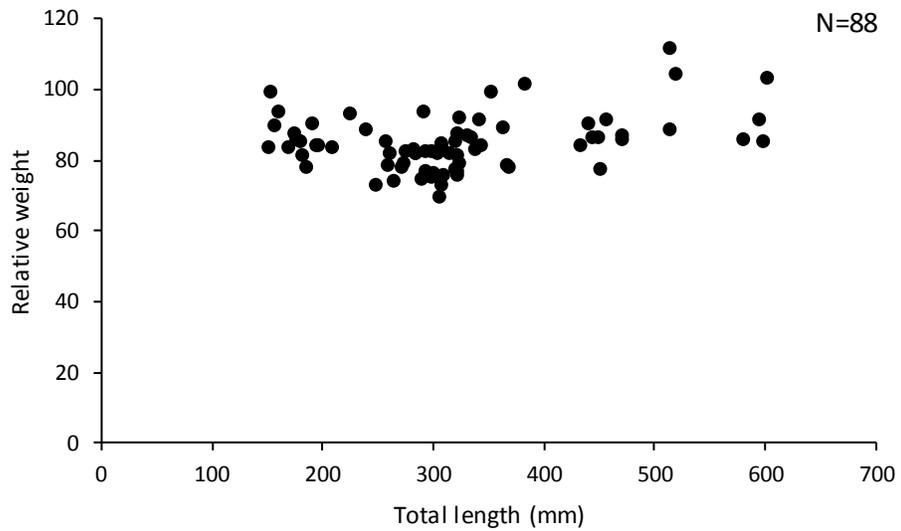


FIGURE 3.—Relative weights of Lake Adger Largemouth Bass collected April 18, 2016.

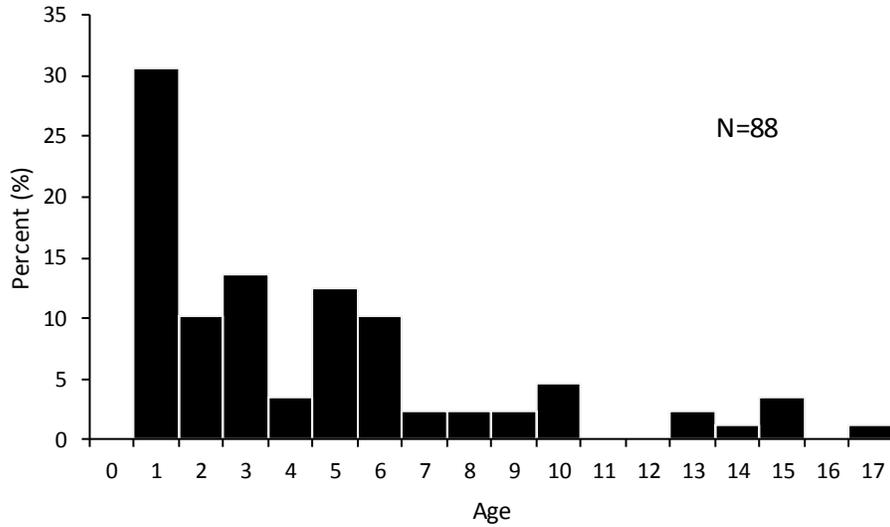


FIGURE 4.—Age frequency distribution of Lake Adger Largemouth Bass collected April 18, 2016.

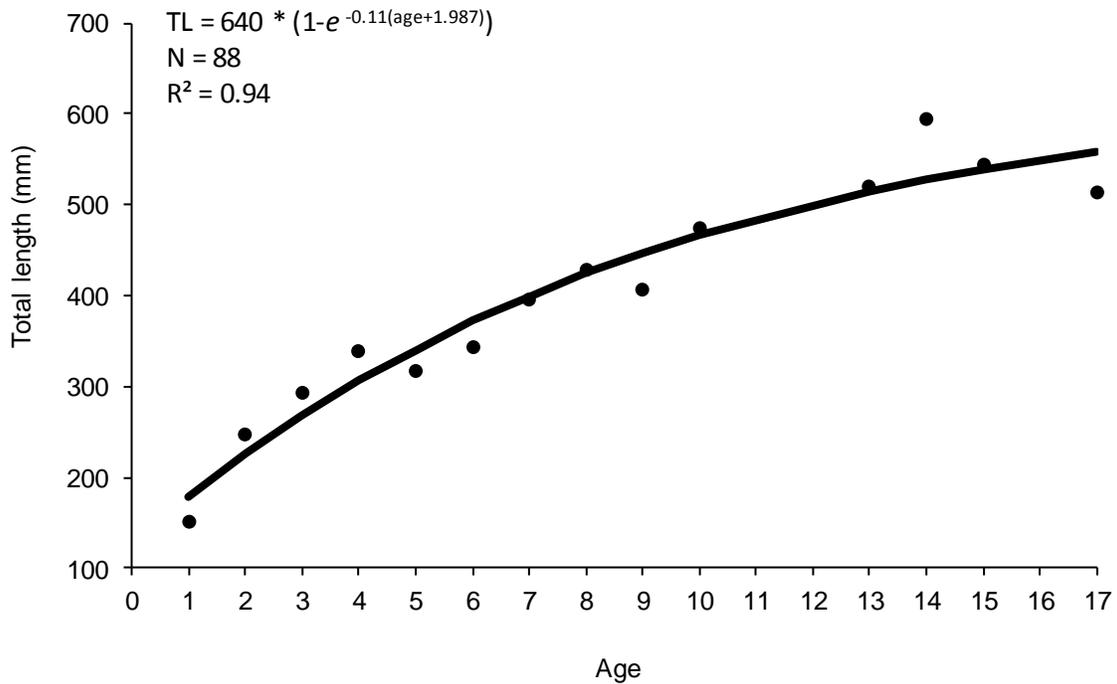


FIGURE 5.—Observed total length (TL; mm) at age (dots) and von Bertalanffy growth curve (solid line) for Lake Adger Largemouth Bass collected April 18, 2016.