



Overview of Lake Mattamuskeet Largemouth Bass Surveys

July 2020



Lake Mattamuskeet

Lake Mattamuskeet is a 40,000-acre lake connected to the Pamlico Sound by four large drainage canals (Outfall, Lake Landing, Waupoppin and Rose Bay) located in Hyde County, NC. Each canal is equipped with tide gates designed to let excess water flow out of the lake. The lake is encompassed by the Mattamuskeet National Wildlife Refuge and is primarily managed for waterfowl and migratory bird habitat; however, the lake's fisheries resources have been recognized for their ecological, recreational, economic and cultural importance.

In 2016, the lake was listed on the state 303(d) list for impaired waters. Water quality and habitat degradation have become evident as suspended sediments and nutrients have increased in the lake. U.S. Fish and Wildlife Service (USFWS) surveys revealed declines in submerged aquatic vegetation (SAV) since 2014 with a complete loss of SAV by 2017. Common Carp have been identified as a nuisance species at Lake Mattamuskeet because they manipulate habitat through grazing activity that actively resuspends

sediment contributing to increasing turbidity and as a result, loss of SAV. North Carolina State University researchers have estimated carp biomass at Lake Mattamuskeet at 4.4 million pounds, equivalent to 110 pounds of carp per acre. For ecosystem balance, scientific research suggests a carp biomass of 45 pounds per acre.

Loss of SAV, eutrophication, increased turbidity and sedimentation all have the potential to impact reproductive success and recruitment of Largemouth Bass in the lake. The N.C. Wildlife Resources Commission (NCWRC) has conducted routine fall electrofishing surveys at Lake Mattamuskeet since 2013, to monitor the status of the Largemouth Bass population. Long-term trend data allow NCWRC biologists to ensure size and creel limits for sport fish are effective for accomplishing management objectives. Since August 2017, the Largemouth Bass fishery at Lake Mattamuskeet has been managed by a minimum length limit of 16 inches and a daily creel limit of five bass, of which only one can be greater than 20 inches.

Project Objectives:

- Monitor long-term changes in relative abundance, size structure, and condition of Largemouth Bass at Lake Mattamuskeet (2013–2019).
- Determine current status of the Largemouth Bass population and evaluate current efficacy of regulation changes.

Methods:

- Largemouth Bass were collected with boat-mounted electrofishing gear 2013–2019 in the fall season. Sampling was conducted at shoreline transects in the main lake and canal habitats (Figure 1). All sport fish were measured for total length (TL mm) and weighed (g). Catch, length, and weight data was used to compare relative abundance (fish captured per hour of electrofishing), size composition and body condition.

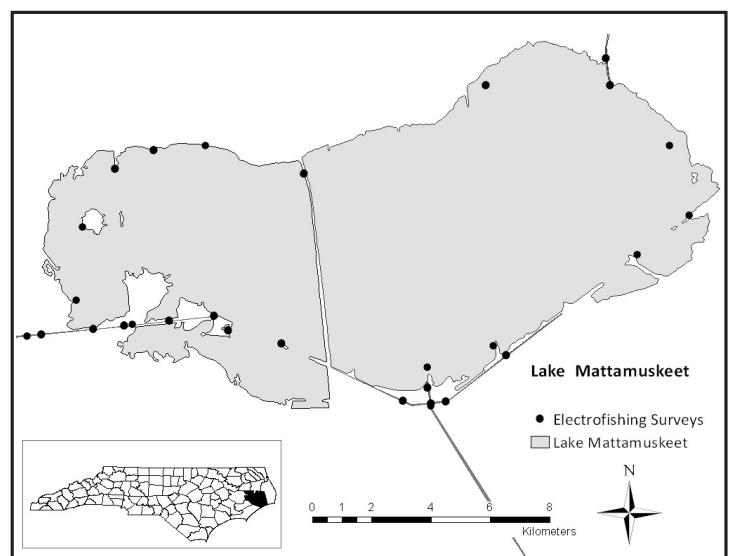


Figure 1: Shoreline electrofishing sites in Lake Mattamuskeet and associated canals (Jarvis Canal, Main Canal, and Rose Bay Canal), of which at least a subset have been surveyed in the fall from 2013-2019.



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Results so Far:

- Survey results indicate that the relative abundance of Largemouth Bass has remained relatively stable over the survey period with slight fluctuations.
- Size structure of Largemouth Bass has shifted toward larger individuals, seen in the percentage of fish greater than 14 and 16 inches and the increasing trend in average total length. (Table 2)
- Low abundance of bass less than 8 inches has been observed since 2013 but has become even more evident during 2017–2019. This is at least partially attributed to poor spawning and rearing habitat as this time frame relates to the loss of SAV from the lake. (Table 1)
- Body condition (or plumpness) of Largemouth Bass between 8–16 inches has increased over the survey period; other length groups have remained relatively stable with minor variations. (Figure 3)

What's Next:

- The focus of NCWRC Inland Fisheries staff will be to support the U.S. Fish and Wildlife Service watershed restoration plan with a focus on revitalizing in-lake habitat, specifically SAV; these actions are intended to improve sportfish habitat, abundance, and overall stock health.
- The Largemouth Bass population will continue to be monitored through NCWRC electrofishing surveys to determine trends in age, growth, and reproductive success.

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Figure 2: Assistant fisheries biologist, Chris Smith, with Largemouth Bass collected from Lake Mattamuskeet in 2019.

	2013	2014	2015	2016	2017	2018	2019
Sample Size	190	216	68	158	169	118	96
Relative Abundance (fish/h)	43	25	13	17	22	59	29
% Less than 8 inches	18	31	28	14	1	3	0
% Greater than 14"	35	30	32	48	69	71	85
% Greater than 16"	17	16	18	18	21	25	38
Largest Fish (inches)	23	23	19	20	21	22	21
Average Total Length (inches)	12	11	11	13	15	15	16
Average Water Temp (°C)	16.3	22.9	21.2	23.4	23.1	15.3	21.2

Table 1: Largemouth Bass survey results from shoreline electrofishing surveys 2013–2019; including: sample size, % by length group, largest fish, and average total length. Relative abundance is described as the number of fish collected per hour of electrofishing, with % by length calculated from total sample size.

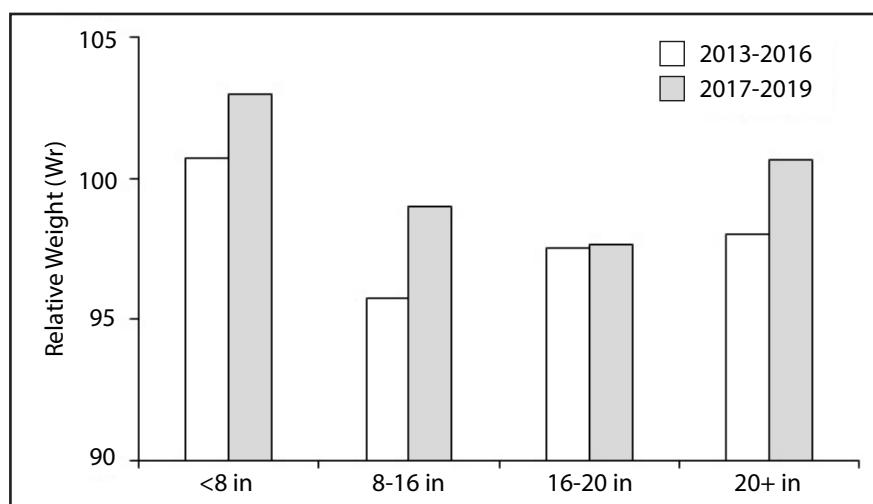


Figure 3: Body condition of Largemouth Bass by length group collected from 2013–2016 and 2017–2019, before and after the regulation change. Body condition (plumpness) is defined by relative weight (Wr).