Fisheries Research Summary

Division of Inland Fisheries N.C. Wildlife Resources Commission

Status of Largemouth Bass and Pumpkinseed Populations in Lake Phelps

Lake Phelps is a 6,480-hectare pocosin located in Washington and Tyrrell counties in North Carolina. This lake is the second largest natural lake in North Carolina. The majority of the lake is shallow, open water with a sand and mud bottom fringed by aquatic plants.

Lake Phelps provides excellent recreational fisheries for largemouth bass and pumpkinseed. The Lake Phelps largemouth bass population has been managed under trophy bass regulations and monitored annually since 2002, except during low water levels in 2009.

Current regulations for largemouth bass include a five fish daily creel limit, minimum size limit of 14 inches and a protective slot limit between 16 and 20 inches. An aggregate of 30 sunfish, including pumpkinseed, can be harvested daily from Lake Phelps.

In late May 2010, staff with the N.C. Wildlife Resources Commission collected largemouth bass and pumpkinseed with boat-mounted electrofishing gear. The objective of the survey was to describe population characteristics of these sportfish in the lake.

Largemouth bass

Duane Raver/USFWS

Pumpkinseed

Duane Raver/USFWS

Ben Ricks, a fisheries biologist in the Coastal Region, holds a largemouth bass in excellent condition.

Upon collection, they measured and weighed the fish. A few largemouth bass from each inch-class were sacrificed to collect otoliths for age and growth analysis. Otoliths are bones extracted from the heads of fish and exhibit annual rings that can be counted to determine the age of the fish.

Staff also calculated catch rates or catch-per-unit-effort (CPUE) of largemouth bass as the number of fish greater than 8 inches collected per hour spent electrofishing.

Examination of CPUE allows the Commission to evaluate changes in largemouth bass and pumpkinseed abundance over time. They evaluated size structure of the largemouth bass population and assessed condition (plumpness) as well.

Status of Largemouth Bass and Pumpkinseed in Lake Phelps

Lake Phelps continues to support an abundance of largemouth bass for anglers to catch; however, there has been a slight decline in CPUE over the last several years (Figure 1). Abundance is currently not outside the normal range in abundance for Lake Phelps, but if this trend continues it could be problematic.

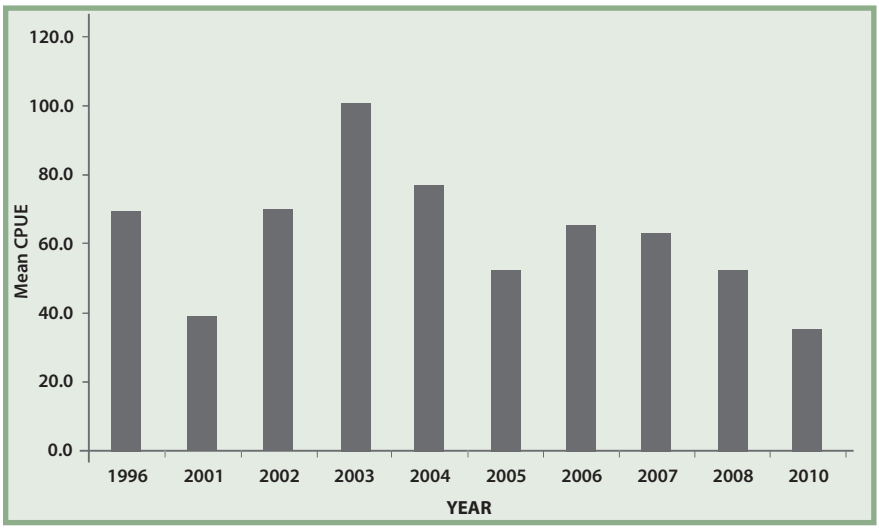

Figure 1. —Abundance of largemouth bass collected with electrofishing gear in Lake Phelps 1996-2010. Abundance is defined as the number of bass caught per hour spent electrofishing

The Lake Phelps largemouth bass population is dominated by fish within the protective slot, which is 16 to 19 inches.

At present, the largemouth bass population is dominated by fish within the protective slot (16–19 inches). Smaller fish and fish larger than 20 inches were uncommon (Figure 2). The low number of young largemouth bass can be attributed to unsuccessful reproduction and low juvenile survival during the drought years of 2007, 2008 and 2009. During the drought years, lake levels were low (below 10.5 feet), habitat was limited and predation on juvenile largemouth bass was likely high. When this situation occurs for several years in a row, declining trends in bass abundance can be seen in the data set. As long as water levels are not always low, this is not a problem. Occasional recruitment failures can actually be beneficial in a stable population, as the decreased number of fish can lead to increased growth rates and size by reducing competition for food. However, the minimum length limit established to protect young fish continues to be necessary at Lake Phelps.

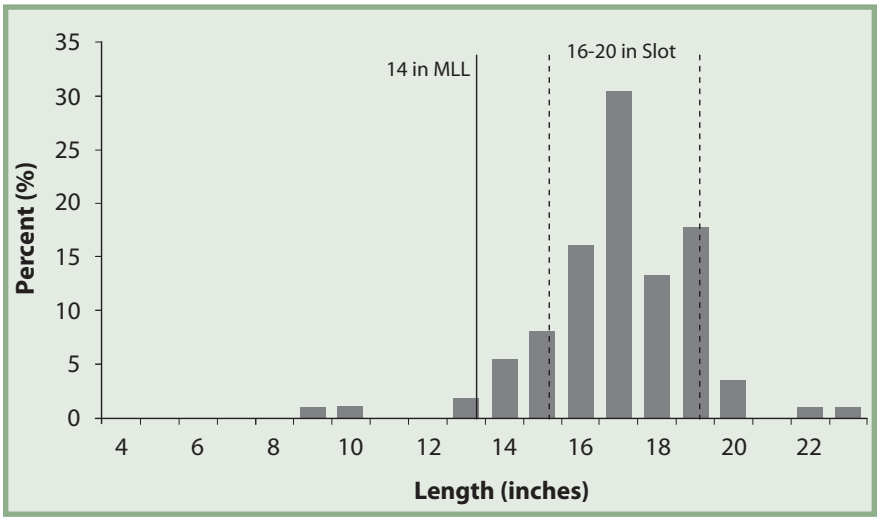

Figure 2. —Length distribution of largemouth bass collected at Lake Phelps in 2010. The solid line displays the 14 inch minimum length limit (MLL) and the dashed line displays the 16 to 20 inch protective slot limit.

Lake Phelps

Although the numbers of bass within the slot limit provide excellent catch-and-release opportunities for anglers, the initial objective of the regulations was to grow fish larger than 20 inches in the lake. Largemouth bass growth was excellent for young fish as they reached 16 inches by age 3. However, growth slows thereafter (Figure 3). Although the condition of largemouth bass at all sizes was acceptable, fish within the protective slot limit (primarily bass ages 5, 6 and 7) had slightly lower condition than fish outside the slot limit. This scenario of decreasing growth rate and lower body condition with increases in fish size is a function of increased competition for available forage.

Numbers of age-5, age-6, and age-7 largemouth bass were similar and relatively high. However, few largemouth bass older than age-7 were collected, suggesting survival is low beyond age-7. The growth model predicts largemouth bass will grow out of the protective slot limit and will be available to harvest by age-8. In the coming years anglers may see the number of 20-inch largemouth bass increase as fish grow out of the protective slot.

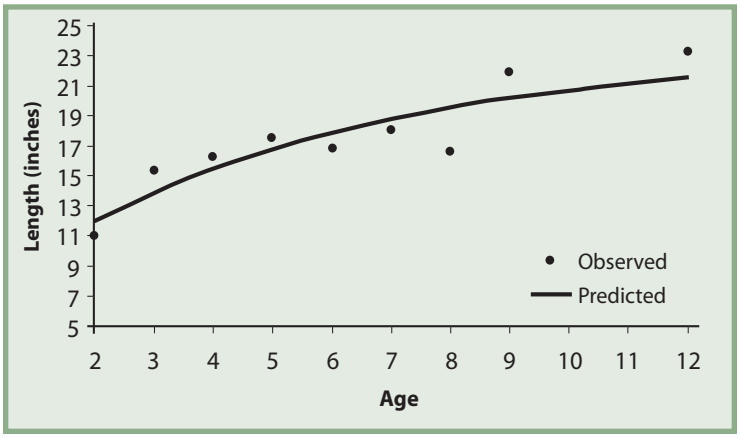

Figure 3.—Number at age and growth curve of largemouth bass in Lake Phelps.

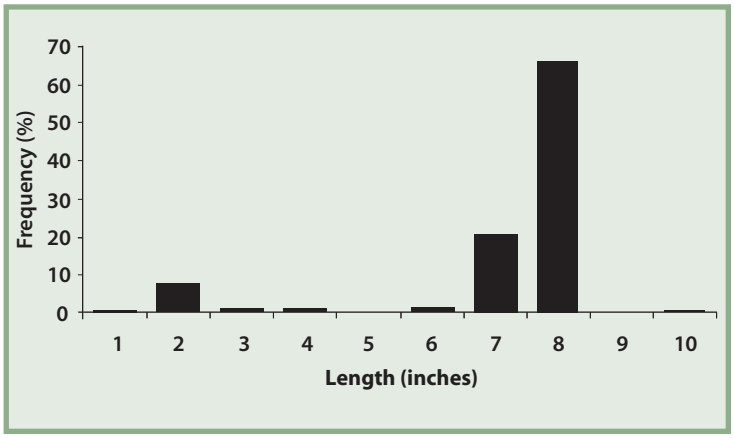

Figure 4.—Length distribution of pumpkinseed collected from Lake Phelps in 2010.

The pumpkinseed fishery in Lake Phelps continues to be excellent. Lake Phelps has a high abundance of pumpkinseed that are 8 inches indicating the population is not overfished and growth rates are excellent (Figure 4). Ten percent of the pumpkinseed sampled were 4 inches or less; an indication of successful spawning and recruitment. Excessive predation from slot-length largemouth bass may be limiting the amount of smaller pumpkinseed in the system, but pumpkinseed that avoid predation are able to grow to a large size.

Large pumpkinseeds are found in good numbers in Lake Phelps.

Lake Phelps continues to be a location where anglers can enjoy quality fishing. Anglers should expect to catch largemouth bass within the slot limit as well as large pumpkinseed in good numbers. Additional data will be collected to determine angler satisfaction with the current regulation framework.