

# Fisheries Research Summary

Division of Inland Fisheries

N.C. Wildlife Resources Commission



## Lake Norman Fisheries Sampling and Assessment

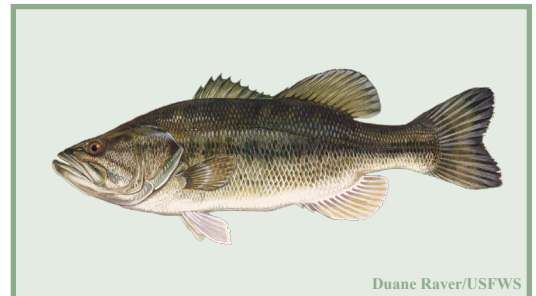
Lake Norman was created in 1963 by Duke Power as part of the construction of the Cowans Ford Dam. With a surface area of more than 32,500 acres and 520 miles of shoreline, it is the largest manmade freshwater lake in North Carolina, extending across four counties — Mecklenburg, Iredell, Lincoln and Catawba.

Lake Norman is fed by the Catawba River and measures 33.6 miles in length and 9 miles at its widest point. Full pond elevation is 760 feet.

The N.C. Wildlife Resources Commission manages Lake Norman as a multi-species fishery for a variety of popular game fish species, including largemouth bass, striped bass, catfish, black crappie and spotted bass.

Commission biologists in cooperation with biologists from Duke Power conduct annual fish samplings on Lake Norman to monitor trends in fish populations. Along with creel surveys and public input, these sampling data help Commission biologists make management decisions such as if and when to stock fish and whether new harvest or size limits should be implemented.

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Duane Raver/USFWS



Biologists electrofish on Lake Norman to collect fish samples.

### Largemouth bass sampling

Since 1993, largemouth bass have been collected from Lake Norman to evaluate the population's abundance, size, condition and growth.

Biologists electrofished along the shoreline during the spring of each year once the water reached approximately 65 F. They sampled nearly two miles of shoreline in three lake areas (upper, middle and lower lake). They measured the length and weight of all largemouth bass collected and, in 2003, 2004 and 2005 they removed otoliths (ear bones) from a subsample of fish for aging.





## Sampling results

From 1993 to 2000, the number of largemouth bass greater than 8 inches collected annually varied from 201 fish to a high of 369 fish (Figure 1). From 2001 to 2005, the number of largemouth bass declined — 2003 was the only year that biologists collected more than 200 fish. The total weight of largemouth bass greater than 8 inches collected from 1993 to 2000 was directly related to the number of fish collected (Figure 1). However, when the number of largemouth bass collected began to decline in 2001, the total weight of fish did not, instead remaining within the same range as in previous years.

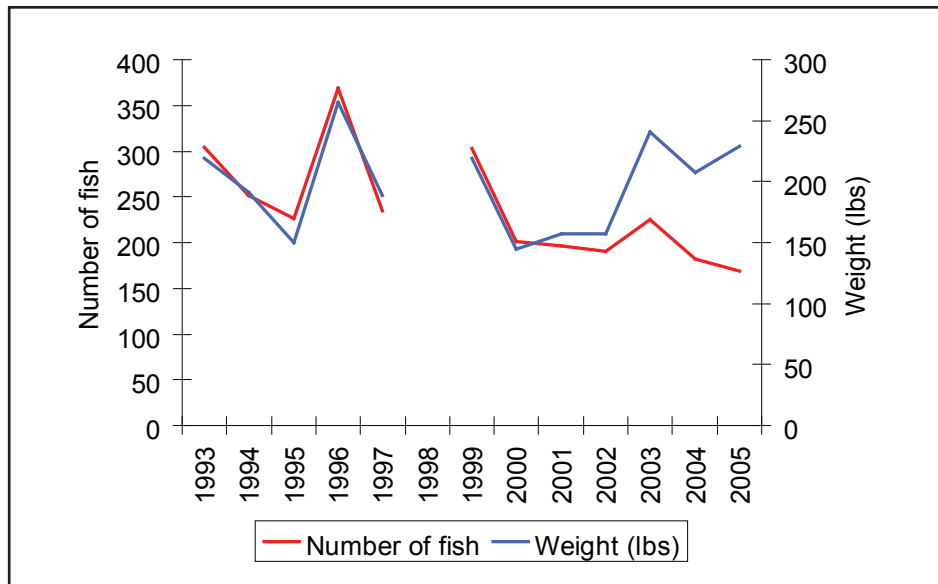


Figure 1. Total number and weight of largemouth bass greater than 8 inches collected by shoreline electrofishing from 1993 to 2005 at Lake Norman.

The decline in smaller fish is directly related to an increase in larger fish. While the number of largemouth bass between 8 and 12 inches has steadily declined since 2002, the number of largemouth bass between 15 and 20 inches has increased (Figure 2). The number of bass between 12 and 15 inches has remained consistent.

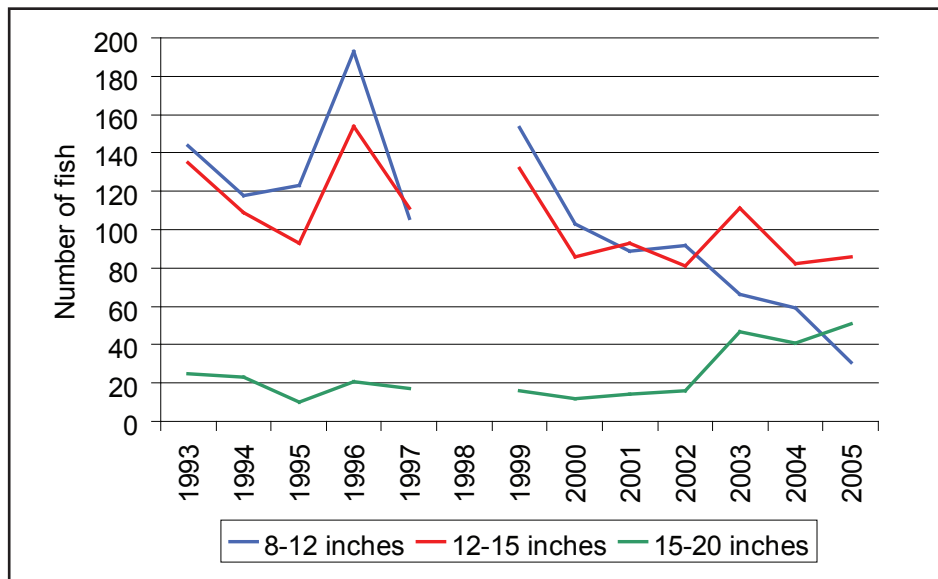


Figure 2. Total number of largemouth bass by length category collected by shoreline electrofishing from 1993 to 2005 at Lake Norman.





## Sampling results (cont.)

Biologist measured largemouth bass body condition by relative weight. Relative weight compares the measured weight to a calculated standard weight based upon a fish's length. An average relative weight near 100 is considered optimum. At Lake Norman, average relative weights changed little from 1993 to 2003, ranging from 78 to 83 (Figure 3). Average relative weight increased slightly to 88 in 2004, and 86 in 2005.

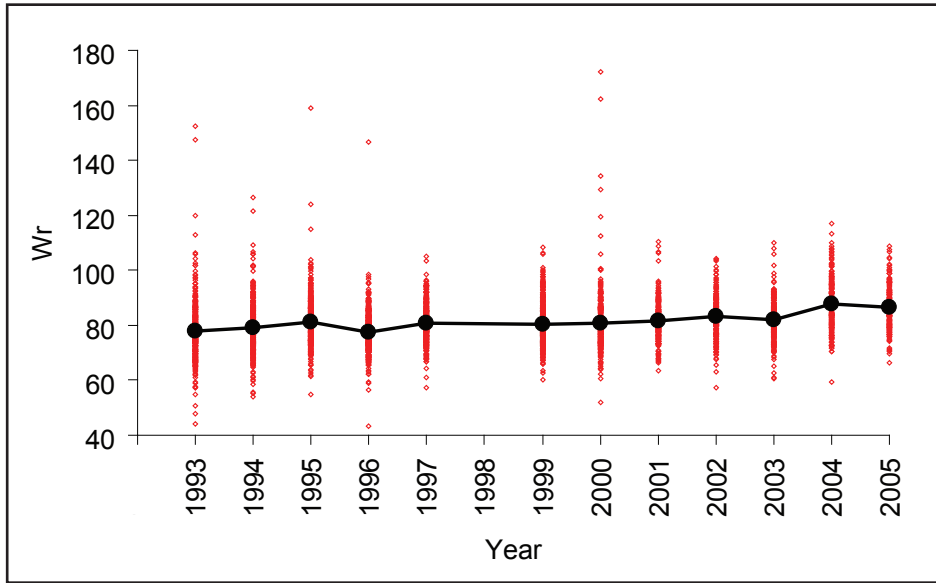


Figure 3. Relative weight ( $W_r$ ) values for largemouth bass greater than 6 inches (red diamonds) and average relative weight values by year (black circles) from 1993 to 2005 at Lake Norman.

From 2003 to 2005, largemouth bass averaged 1.4 pound at 14 inches (Figure 4). After reaching 14 inches, bass gained approximately 0.5 pound per inch. Subsequent average lengths and weights were:

- 16 inches – 2 pounds
- 18 inches – 3 pounds
- 20 inches – 4 pounds
- 22 inches – 5 pounds

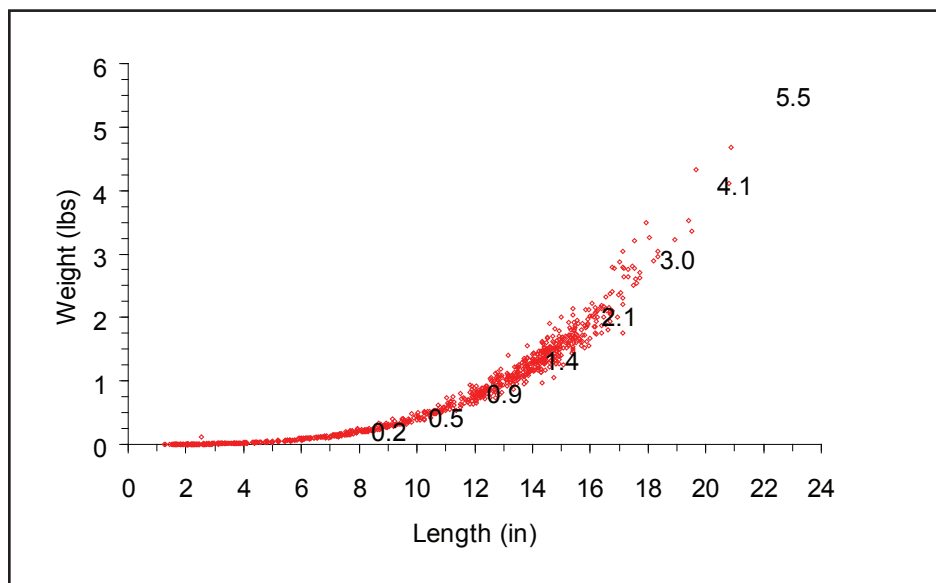


Figure 4. Length-weight relationship for largemouth bass collected from 2003 to 2005 at Lake Norman.



## Sampling results (cont.)

Lake Norman largemouth bass initially grow an average of 6 inches per year, reaching 12 inches by age 2 (Figure 5). By age 3, fish average 14 inches. For ages 5 to 8, average length is 15 to 17 inches, but individual fish can range from 12 inches to greater than 21 inches.

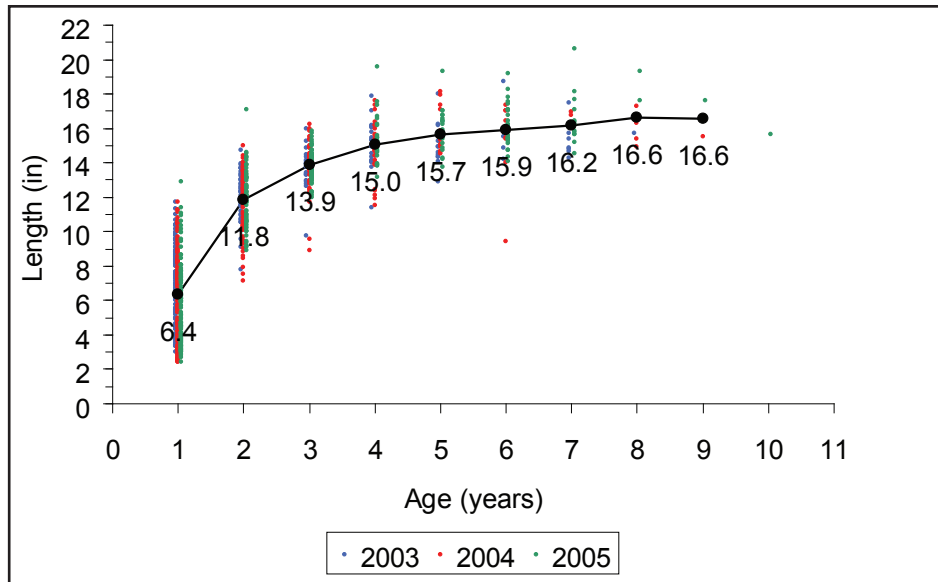


Figure 5. Length at age by year and average length at age across years (black circles) for largemouth collected from 2003 to 2005 at Lake Norman.

## Conclusions

Because fewer largemouth bass less than 12 inches survive, more food and habitat are available for surviving fish, which live longer, are healthier and grow bigger. The increase in the number of largemouth bass that are 15 to 20 inches and the slight increase in relative weight are consistent with fewer largemouth bass competing for the same resources.

Increasing the size and quality of largemouth bass is the management goal for Lake Norman. Biologists believe it is a step in the right direction for the lake's largemouth bass fishery. However, long-term success hinges on the continued production of small bass to sustain the fishery. The decline of 8- to-12-inch largemouth bass and the decline in 12- to 15-inch fish in 2005 are concerns.

## What's Next?

Commission biologists will continue to monitor largemouth bass in Lake Norman annually. They also will study juvenile largemouth bass throughout their first year of life to determine when mortality is occurring and the possible source.