



## **2013 Keokee Lake Fisheries Management Report**

Keokee Lake is a 92-acre Department-owned impoundment located in Lee County, Virginia. At normal pool elevation the reservoir has a maximum depth of 35 feet and a mean depth of 17 feet. The lake is surrounded by forested land, and provides a beautiful setting for a fishing trip.

When the lake was constructed in 1975, much of the timber within the lake basin was left standing for fish habitat. Over time the trees deteriorated and toppled into the lake. Although trees and brush can provide good fish habitat, the accumulation of fallen timber prevented boats from safely accessing many areas of the lake. The problem was compounded by the fact that water and ice support the submerged portion of a standing tree, so that the break often occurred at, or just below, the water's surface. The remaining stump or stob was a navigational hazard. It is difficult for anglers and boaters to avoid bumping into these stobs, and a boat can easily get lodged on top of one that is hidden just beneath the lake's surface.

In 2002, a project was initiated to draw down the lake and remove much of the fallen timber to improve boat access and increase public safety. The project was a cooperative effort of the Department and the U. S. Forest Service, Clinch Ranger District. The improved access allows more thorough fish population sampling, as well as increased management options. For instance, improved access allows biologists to fertilize the lake to increase productivity. During the time that the lake was drawn down, the exposed soil was aerated and re-vegetated naturally. All of the water was not released from the lake during the draw down process. A conservation pool was maintained so that fish in the lake would remain there until the lake refilled. However, biologists stocked fingerling largemouth, bluegills, redear sunfish and channel catfish after the lake refilled to compensate for any recruitment losses incurred during the drawdown.

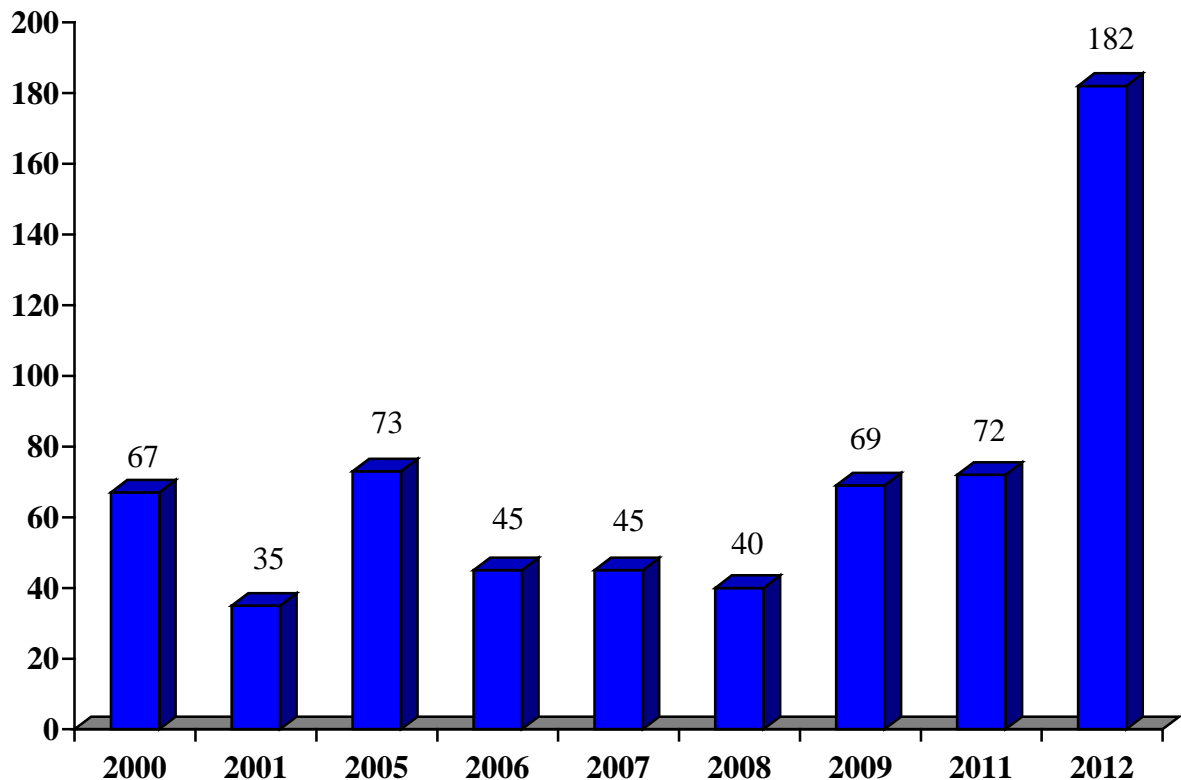
In 2011, biologist began a project to improve the water chemistry of the lake. One hundred tons of powdered limestone was spread throughout the lake and fertilization treatments started on a weekly to monthly basis. The project goal is to improve water quality and increase primary production in the lake and increase fish population abundance. Fisheries management objectives for Keokee Lake are to increase abundance and size of largemouth bass, and to increase the size and abundance of bluegills and redear sunfish. In order to achieve these objectives biologists stock fish as needed, enhance fish habitat, and monitor the fish populations by routine sampling.

Fish populations at Keokee Lake are sampled each year in May using boat-mounted electrofishing gear. Fish collected during these population surveys are measured, weighed and released back into the lake. Sampling time is recorded in seconds so that the relative abundance (number of fish collected per hour) can be determined. Biologists get important information about the size structure of the population by looking at the length data. The abundance and size structure data allow biologists to compare the current sample collection to past results, and to the results of samples collected at other lakes.

## Largemouth Bass

Prior to 2012, largemouth bass relative abundance (number collected per hour of sampling) fluctuated between 40 and 70 fish per hour (Figure 1). The 2012 sample yielded 182 bass per hour of electrofishing. This is an above average abundance for largemouth bass in Southwest Virginia lakes and double the previous rates. Catch rates for young bass (less than eight inches) have increased since the lake was drawn down and fertilized. In 2012, the catch rate of young bass was 109 per hour. The number of young bass collected varies from year to year, because spawning success is better in some years than others. Catch rates for bass over 12 inches have also improved since the drawdown, liming and fertilization project. However, very few bass over 15 inches long have been collected, less than 1% of the bass catch in 2012 samples. The largemouth bass fingerlings stocked after the lake refilled were a cross between Florida strain largemouth bass and northern strain largemouth bass. These fingerlings were tagged with a coded wire tag so that they could be identified when collected in routine sampling. After the first growing season, the stocked bass were bigger than bass of the same age that were spawned in Keokee Lake. However, after the second year there were no observed differences in growth. Growth was poor for both stocked bass and bass spawned naturally in the lake.

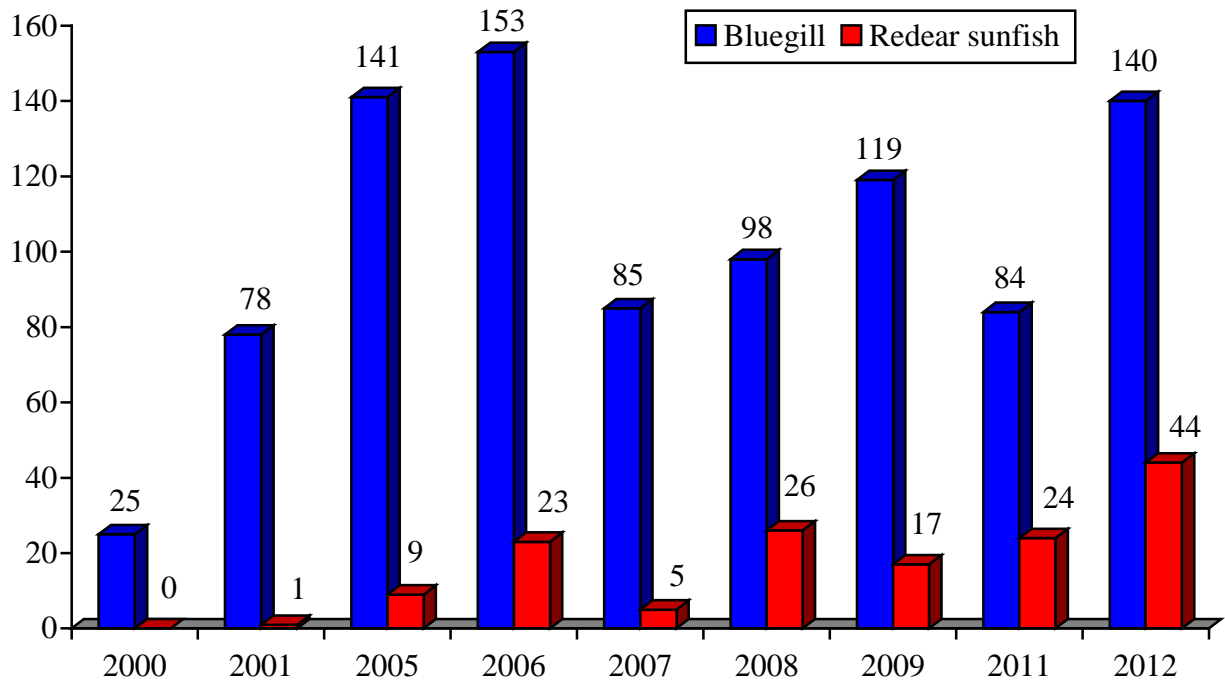
The slow growth of bass in Keokee Lake results in poor size structure for the bass population. The size structure of the bass population improved briefly after the lake refilled, and is still better than it was prior to the drawdown. However, the bass size structure is far from ideal. Growth rates must be improved in order to improve the quality of fish available for anglers. The liming and fertilization work started in 2012 should improve growth rates as the lake increases fertility. This should increase the abundance of plankton and provide more forage for young bass and the bluegills that larger bass need for prey.



**Figure 1.** Number of largemouth bass collected per hour of sampling in Keokee Lake 2000-2012.

## Sunfish

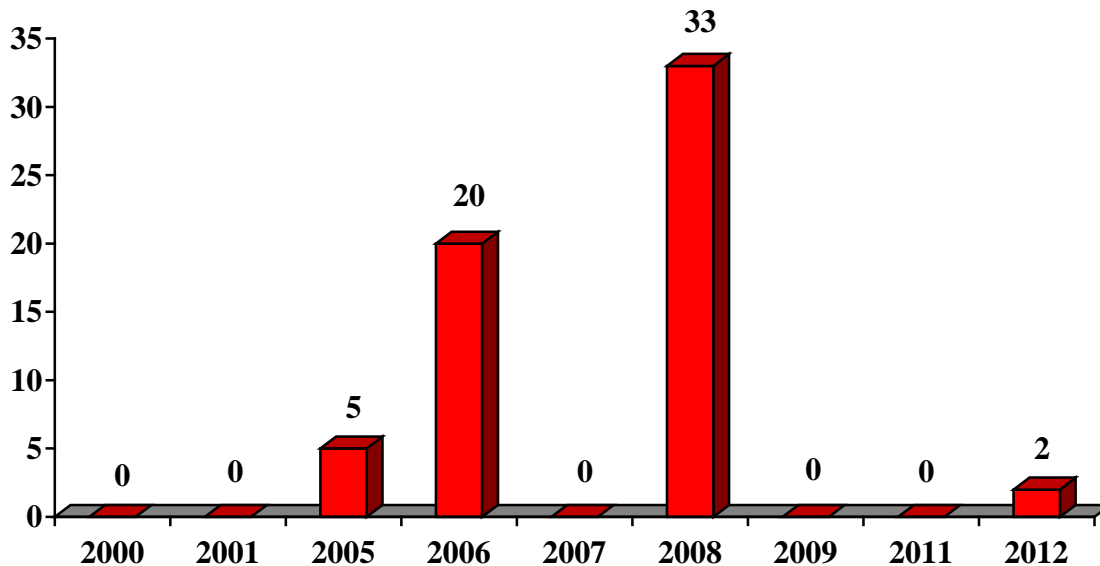
Catch rates for bluegill and redear sunfish improved substantially in 2012 (Figure 2). Some quality and preferred-size sunfish were collected during sampling. Anglers frequently report catching large bluegills and redears. Both bluegills and redear sunfish should be able to reproduce naturally in the lake. Stocking has been discontinued to determine if the populations are self-sustaining.



**Figure 2.** Number of bluegill (blue columns) and number of redear sunfish (red columns) collected per hour of electrofishing at Keokee Lake from 2000 through 2012.

## Crappie

Black crappie were first collected at Keokee Lake in the 2005 electrofishing sample. Crappie may have been present prior to 2005, but undetected by electrofishing because much of the shoreline was inaccessible. Catch rates increased from 2005 to 2008, but have declined since then (Figure 3). No crappie were collected in 2009, 2011, and only 2 were collected in 2012. The data suggest that crappie are not abundant and have sustained low population numbers. Crappie abundance will be monitored as water quality increases.



**Figure 3.** Number of black crappie collected per hour of sampling in Keokee Lake 2000-2012.

In summary, Keokee Lake offers decent fishing for largemouth bass, bluegills and redear sunfish. Most of the fish caught will be small. Some larger individual fish are present, especially bluegills and redear sunfish, and may provide a memorable day for the lucky or skillful angler. Biologists are deeply concerned about the poor quality of the fishery and are determined to find a solution. The partial drawdown, and subsequent removal of standing and fallen trees around the shoreline, improved navigability but did not provide long term improvements to the fishery. In 2011 a new project was launched to begin a liming and fertilization program to improve the basic productivity of the lake. All fish species are benefiting from increased productivity.

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