



## 2015 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, biologists began a project to improve the water chemistry of the lake. One hundred tons of powered 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

The relative abundance (number collected per hour of sampling) of largemouth bass during the 2014 sample was 83 fish/h (Figure 1). This was down from the abundances observed in 2012 and 2013, although the difference was not statistically significant. The decline in overall abundance in 2014 can be largely attributed to a decrease in the number of juvenile ( $\leq 8$  inch) largemouth bass from the two preceding years. The catch rate of juvenile largemouth bass in 2014 was 22 fish/h compared to 109 fish/h in 2012 and 58 fish/h in 2013. Largemouth bass observed in the 2014 sample ranged in length from 3 – 18 inches with an average length of 9.5 inches (Figure 2). Catch rates for preferred ( $\geq 15$  inch) and memorable ( $\geq 20$  inch) largemouth bass have increased substantially since liming and fertilization was initiated on Keokee Lake (Figure 3). This would suggest some improvement in the growth rate of largemouth bass resulting from the liming/fertilization efforts. Despite this increase, however, fish  $\geq 15$  inches in length accounted for just 7% of the adult bass population in the current sample and no memorable-sized largemouth bass were observed.

The predominance of small largemouth bass in Keokee Lake suggests that, although slightly improved, the growth for this species may still be slow. The length distribution of largemouth bass (Figure 2) might also suggest high harvest mortality once fish reach 10 inches in length. Although there is no minimum length limit currently in place for this species on Keokee Lake, the significant decline in fish above 10 inches may suggest this as the minimum length acceptable to anglers for harvest.

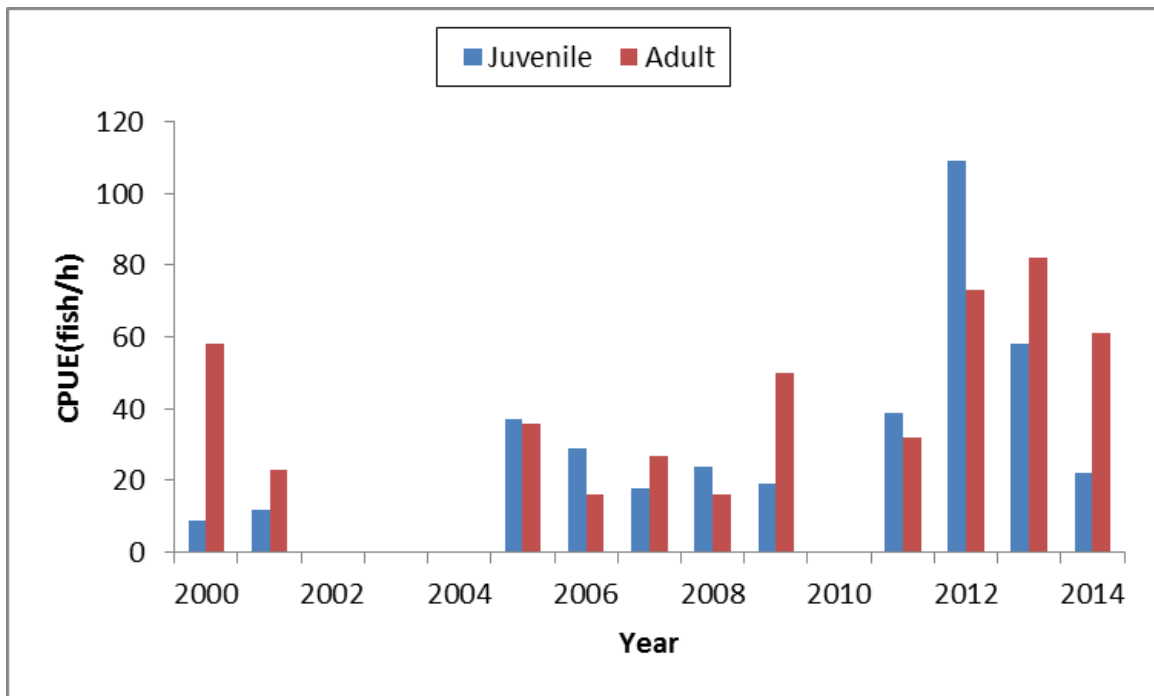


Figure 1. Number of largemouth bass collected per hour of sampling in Keokee Lake 2000-2014. The lake was not sampled from 2002 – 2004 or in 2010.

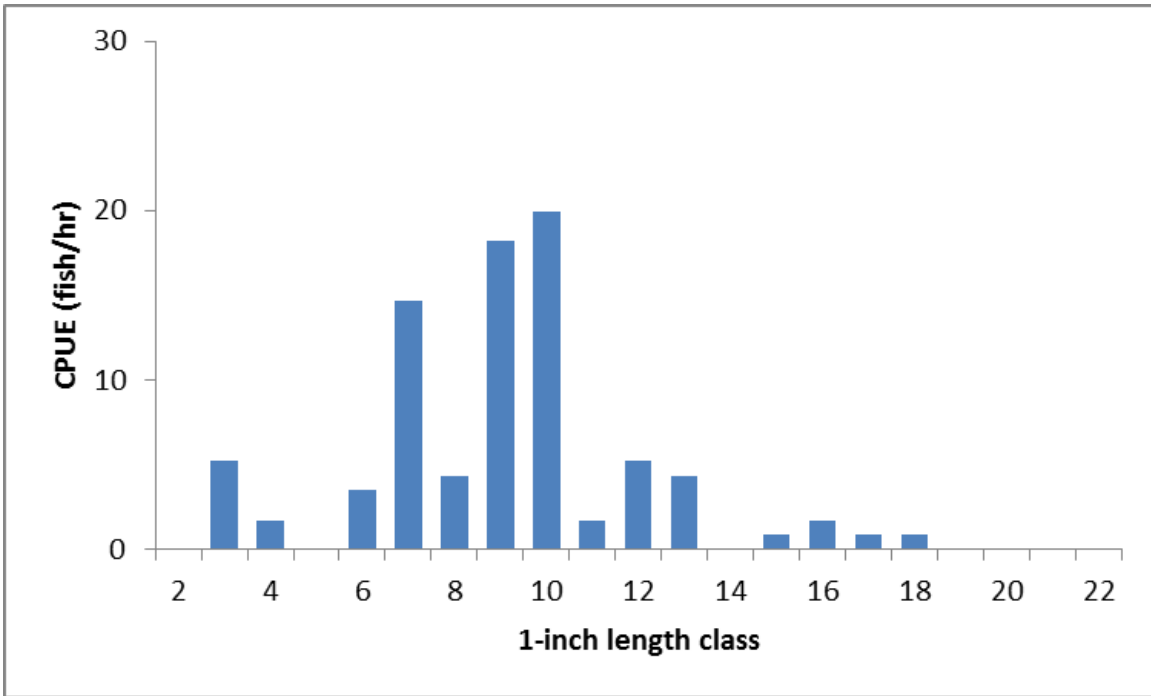


Figure 2. Length frequency distribution of largemouth bass collected during Keokee Lake electrofishing samples in spring 2014.

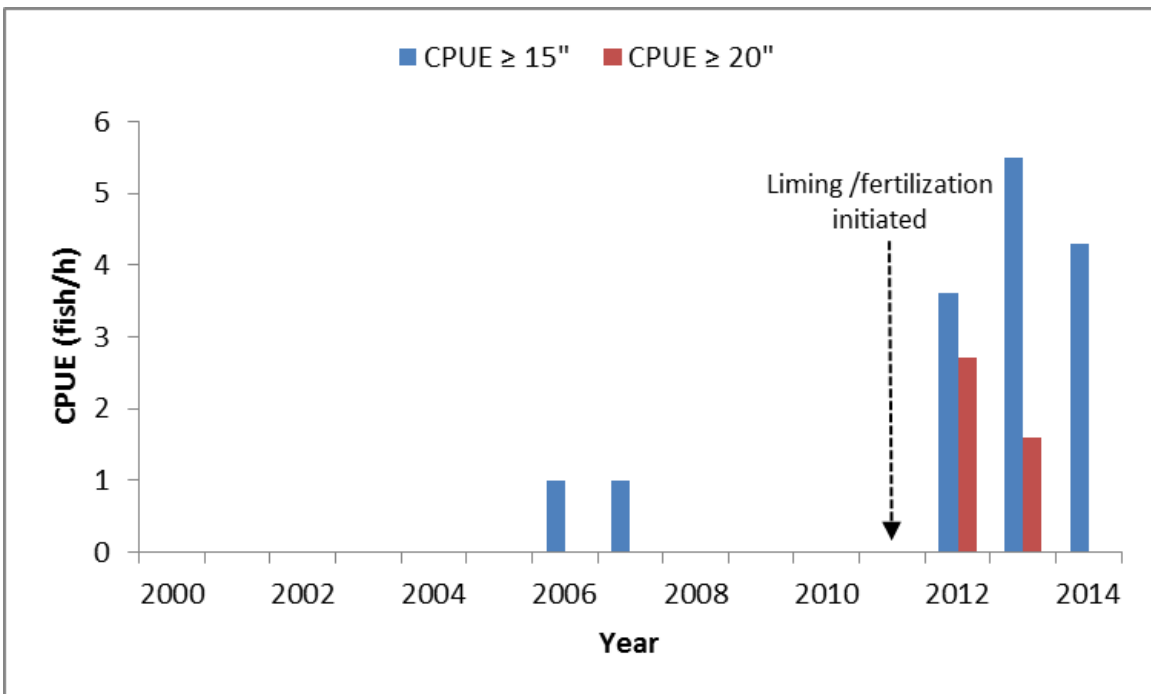


Figure 3. Relative abundance of preferred ( $\geq 15$  inch) and memorable ( $\geq 20$  inch) largemouth bass collected during Keokee Lake electrofishing samples in spring 2014. The lake was not sampled from 2002 – 2004 or in 2010.

### Sunfish

The catch rate of bluegill in the 2014 sample (94 fish/h) was down slightly from that observed in 2013 (Figure 4). Quality ( $\geq 6$  inch) and preferred ( $\geq 8$  inch) fish represented 51% and 5% of the adult bluegill population, respectively. The abundance of redear sunfish in the current sample (14 fish/h) was comparable to that in 2013. Fifty six percent of the redears sampled in 2014 were  $\geq 9$  inches and 6% were  $\geq 11$  inches. 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.

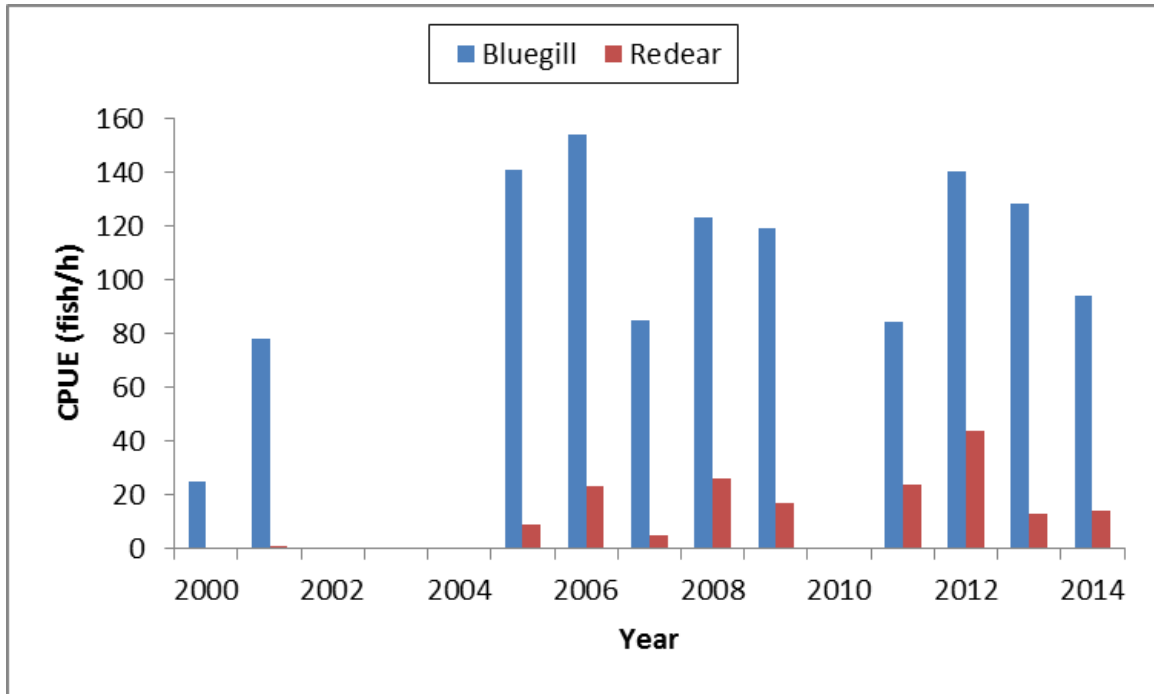


Figure 4. Number of bluegill and redear sunfish collected per hour of electrofishing at Keokee Lake from 2000 through 2014. The lake was not sampled from 2002 – 2004 or in 2010.

### 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. The 2014 sample produced a total of 13 fish representing an increase in relative abundance (11 fish/h) compared to the two previous years (Figure 5). Despite this increase, however, crappie continue to be present in low numbers overall.

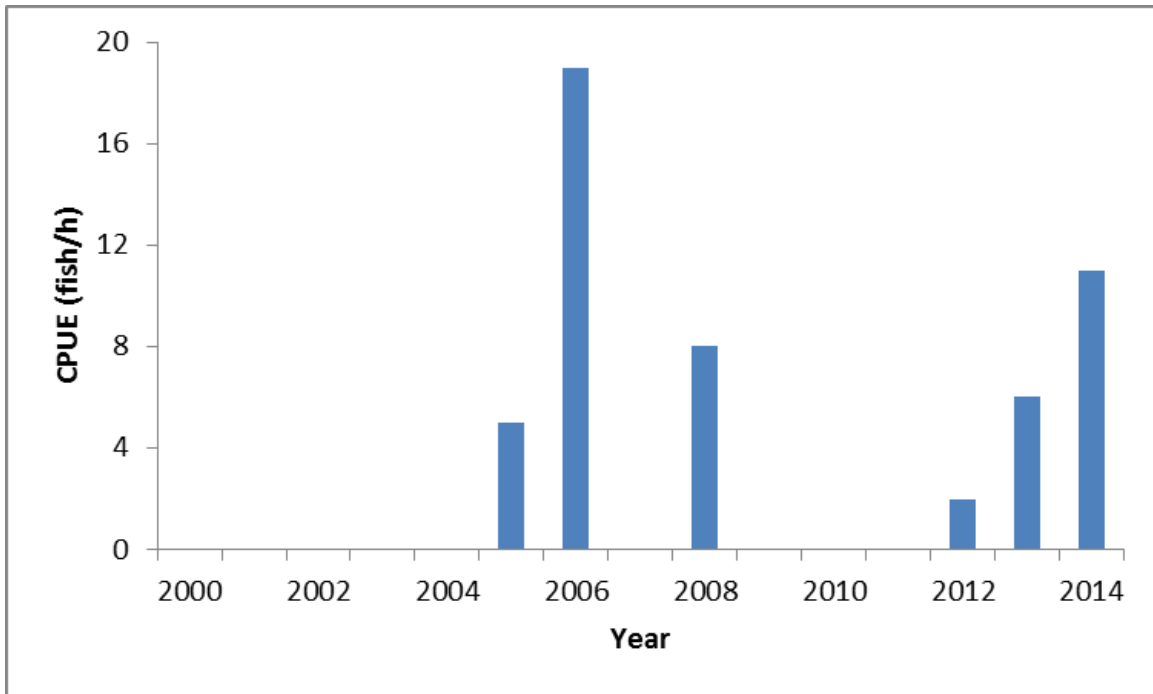


Figure 5 . Number of black crappie collected per hour of sampling in Keokee Lake 2000-2014.

In summary, Keokee Lake offers good fishing for largemouth bass, bluegills and redear sunfish, although 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. VDGIF biologists continue to seek solutions for improving the quality of the fishery. 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. Although the largemouth bass population in Keokee Lake appears to be benefiting from the liming and fertilization efforts, additional years of monitoring data will be needed to determine if improvements are sustained over the longterm.

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