2016 Lake Keokee Fisheries Management Report

Lake Keokee is a 92-acre Department-owned impoundment located in Lee County, Virginia and lies within the Clinch Ranger District of the Jefferson National Forest. 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 through powdered lime and fertilizer applications. The project goal is to improve water quality and increase primary production in the lake and increase fish population abundance. Lake liming is performed every other year and fertilizer is generally applied every few weeks from May through October as needed.

Regulations

As of spring 2015 the fish populations in Lake Keokee were managed under statewide regulations as follows:

Species	Length Limit	Creel Limit
Largemouth bass	none	5 per day
Bream (all species combined)	none	50 per day
Channel catfish	none	20 per day
Crappie	none	25 per day

However, an 18-inch minimum length limit and 5 fish per day creel limit will likely be in implemented for channel catfish in Lake Keokee in spring/summer 2016. The purpose of this regulation change is to improve the size structure of the channel catfish population and distribute the harvest of stocked channel catfish more evenly among anglers.

Stocking

Approximately 1,380 catchable-size channel catfish (average length = 11 inches) were stocked into Lake Keokee in October 2015.

Habitat Work

Twenty catfish spawning boxes were placed in Lake Keokee in June 2015 to provide additional spawning habitat. Periodic examinations did not reveal any spawning activity in the boxes, but the boxes had been deployed later than planned and fish may have already located spawning sites. Also, the abundance of stumps and timber in the lake may already provide sufficient spawning habitat for catfish.

Approximately 88 tons of powdered lime were applied to Lake Keokee in October in 2015 as part of the continuing liming and fertilization project. The annual fertilizing program began in June 2015, but after only two applications the lake experienced a significant algal bloom. Due to concerns over water quality, no additional fertilizer was applied in 2015.

Five hinged tree structures were placed in Lake Keokee in October 2015 to provide additional fish habitat. This work was done in cooperation with U.S. Forest Service personnel from the Clinch Ranger District Office. Although the large number of stobs in the lake may challenge the need for additional woody structure. However, hinged trees provide a different type of habitat than that provided by the stobs and may be more preferred by species such as crappie.

Population Sampling

Fish populations at Lake Keokee 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 2015 sample was 50 fish/h (Figure 1). This represents a significant decline from the abundances observed during 2012 - 2014. The decline in overall abundance in 2015 can be largely attributed to a decrease in the number of adult (≥ 8 inch) largemouth bass from the preceding year. The catch rate of adult largemouth bass in 2015 was 35 fish/h compared to 61 fish/h in 2014 representing a 43% decline. The catch rate of juvenile (≤ 8 inch) bass was also slightly lower in 2015.

Largemouth bass observed in the 2015 sample ranged in length from 3 – 19 inches with an average length of 9.3 inches (Figure 2). Although the overall catch rate for largemouth bass was down in the current sample, the proportion of adult largemouth bass that were ≥ 15 inch increased in 2015 and was the highest observed since 2000 (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 ≥ 15 inches in length accounted for just 10% of the adult bass population in the current sample and no memorable-sized (≥ 20 in) largemouth bass were observed. The predominance of small largemouth bass in Lake Keokee 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

Lake Keokee, the significant decline in fish above 10 inches may suggest this at the minimum length acceptable to anglers for harvest.

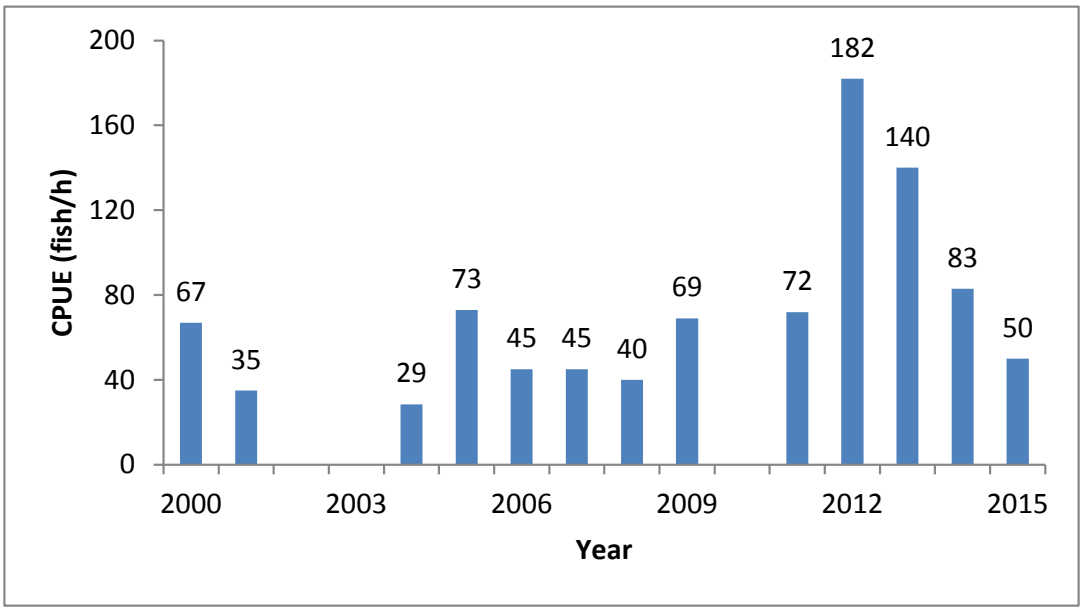

Figure 1. Number of largemouth bass collected per hour of sampling in Lake Keokee 2000-2015. The lake was not sampled from 2002, 2003, or in 2010.

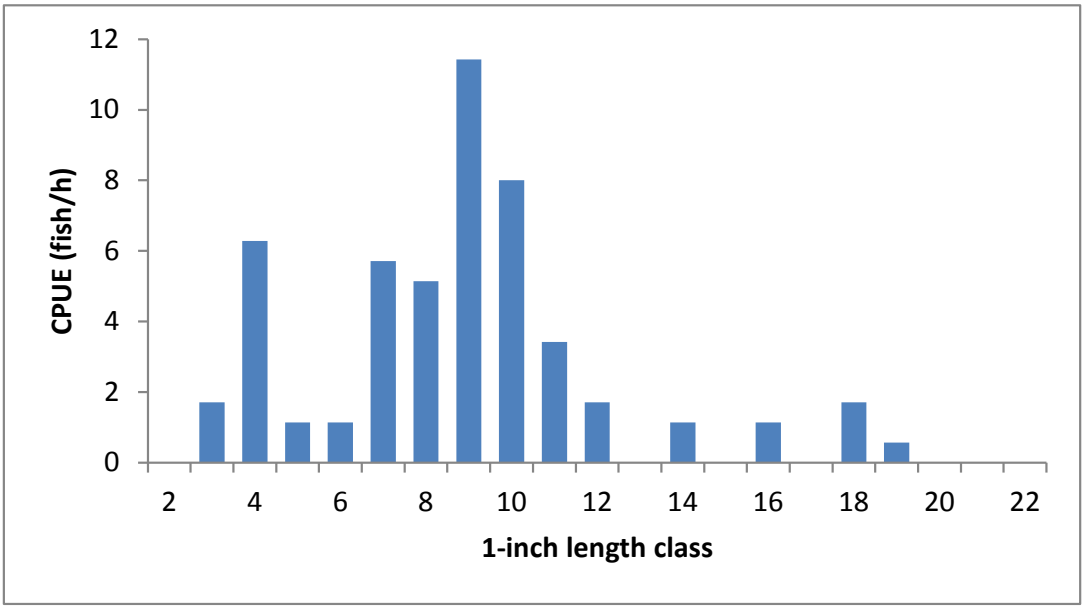

Figure 2. Length frequency distribution of largemouth bass collected during Lake Keokee electrofishing samples in spring 2015.

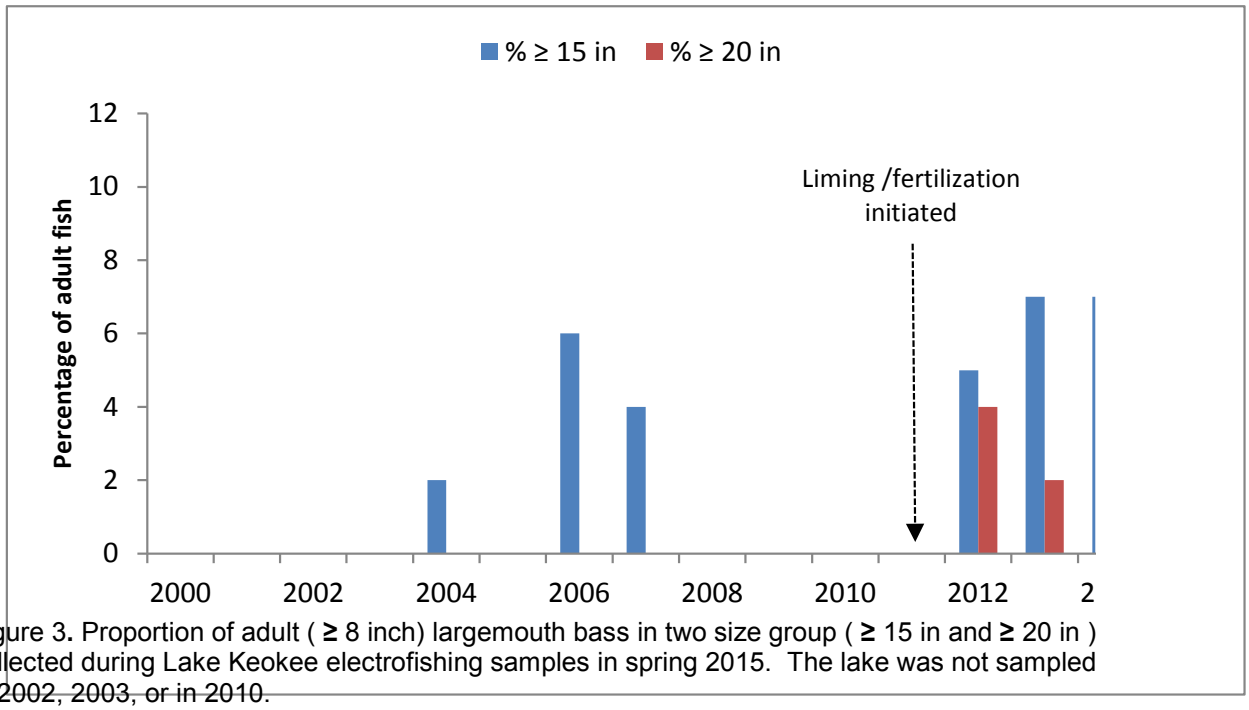

Figure 3. Proportion of adult (≥ 8 inch) largemouth bass in two size group (≥ 15 in and ≥ 20 in) collected during Lake Keokee electrofishing samples in spring 2015. The lake was not sampled in 2002, 2003, or in 2010.

Sunfish - Similar to the pattern observed in largemouth bass, the relative abundance of bluegill has continued to decline since 2012 (Figure 4). The catch rate of bluegill in the 2015 sample (55 fish/h) is the second lowest observed since 2000. Despite the decline in overall abundance, the proportions of quality (≥ 6 inch) and preferred (≥ 8 inch) bluegill were higher than that those observed in recent years at 81% and 15%, respectively. The abundance of redear sunfish in the current sample (9 fish/h) was down just slightly from 2014 (14%). Ninety four percent of the redears sampled in 2015 were ≥ 7 inches and 62% were ≥ 9 inches. Anglers frequently report catching large bluegill and redear.

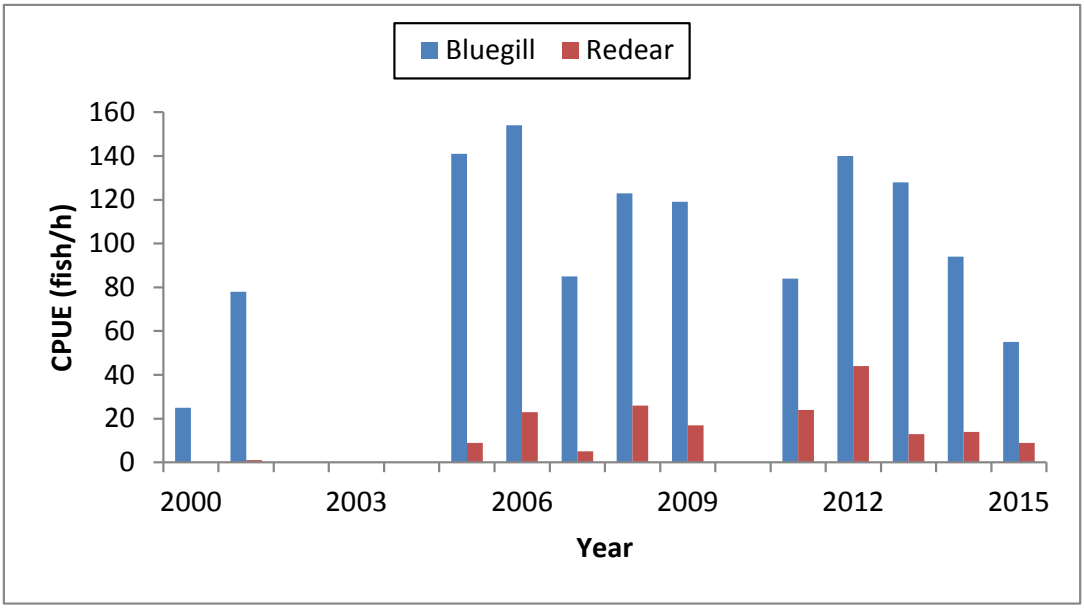

Figure 4. Number of bluegill and redear sunfish collected per hour of electrofishing at Lake Keokee from 2000 through 2015. The lake was not sampled in 2002, 2003, or in 2010.

Crappie - Black crappie were first collected at Lake Keokee 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 2015 sample produced a total of 7 fish representing a decrease in relative abundance (4 fish/h) compared to the two previous years (Figure 5).

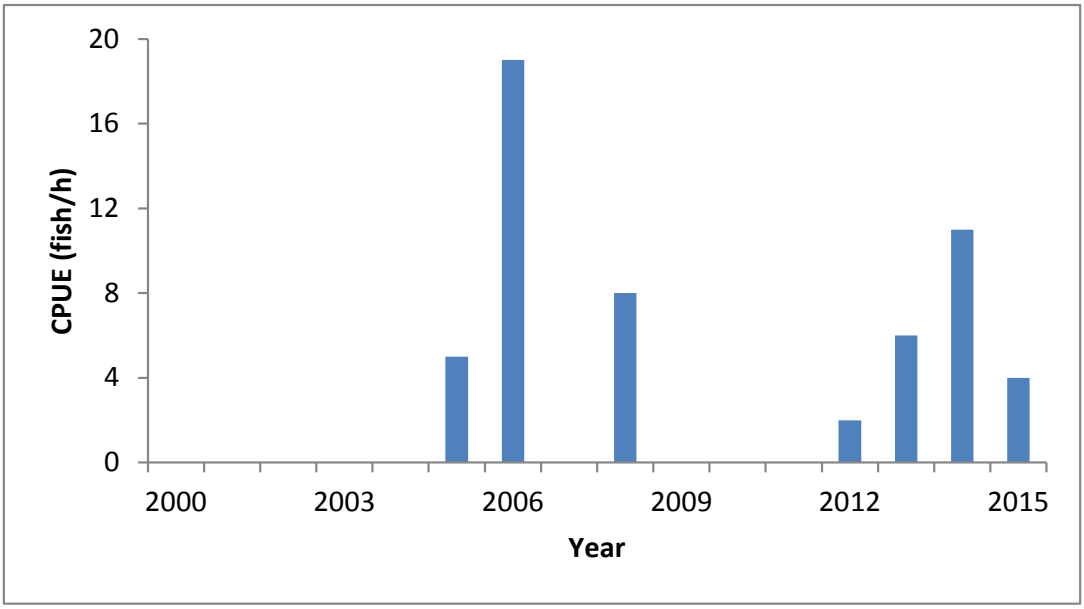

Figure 5 . Number of black crappie collected per hour of sampling in Lake Keokee 2000-2015. The lake was not sampled in 2002, 2003, or in 2010

In summary, Lake Keokee 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 Lake Keokee 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 long term.

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