

Kentucky Lake Bass Assessment 2016

Kentucky Lake is a Tennessee Valley Authority (TVA) mainstem reservoir on the Tennessee River in western Kentucky and western Tennessee. Kentucky Lake is a 160,234 acre reservoir created by the completion of Kentucky Lake Dam at Tennessee River mile 22.4 in 1944. Approximately 51,300 acres of Kentucky Lake lies in Kentucky. The Kentucky portion of Kentucky Lake is classified as a eutrophic lake.

Water levels at Kentucky Lake fluctuate annually approximately 5 feet between summer and winter pool levels. Winter pool level is 354 feet above sea level (fasl) and is obtained by the first of December. Water levels begin to rise on April 1 to reach summer pool level of 359 fasl by May 1. The water level is slowly drawn down from summer pool beginning July 5th to reach winter pool by December. Kentucky Lake has a mean retention time of 30.3 ± 1.2 days. Kentucky Lake will often thermally stratify during mid to late summer.

Fish habitat in the form of natural woody structure and aquatic vegetation are limited in Kentucky Lake. The woody structure in the lake consists of stumps left along creek channels prior to impoundment, trees that have fallen along the shoreline and buttonball bushes that grow in the shallow littoral zone. Over time some stumps have deteriorated or been removed. The fallen trees deteriorate within a few years or wash away. Buttonball bushes often die due to high water levels which inundate the bushes for longer than they can tolerate. This has caused the shoreline bushes to recede toward dryer land. Aquatic vegetation (Eurasian water milfoil, Naiad, Coontail, and Pondweed) increases dramatically when water clarity increases due to drought conditions. In the mid to late 1980's drought conditions lasted about three years. During this period approximately 7,112 acres of submersed aquatic vegetation was growing in the Kentucky portion of Kentucky Lake. Declines in the acreage of aquatic vegetation occurred during the 1990's with a return to normal rainfall patterns and decreased water clarity. In 2000, TVA estimated that aquatic vegetation covered about 400 acres. Another drought period occurred around 2008, and aquatic vegetation had increased to almost 5,000 acres. After this period, the acreage of aquatic vegetation declined, only to increase again in 2012 when drought conditions returned. During these periods of dense aquatic vegetation in the lake the black bass population has done well. The weed beds provide a nursery area for small fish, and a good feeding ground for larger bass. Redear sunfish and black crappie, two species that thrive better in clear water and around the aquatic vegetation, have also increased in numbers. The Fisheries Division of the Kentucky Department of Fish and Wildlife Resources and local anglers have added stake beds, brush piles, and planted cypress and willow tree saplings throughout the lake to replace lost habitat in the littoral zone.

The following graphs show trends and rankings for each of the five population parameters used in the largemouth bass assessment.

Please see the [Sportfish Assessments](#) page for an explanation of how the assessment works and for a list of other lakes with largemouth bass assessments.

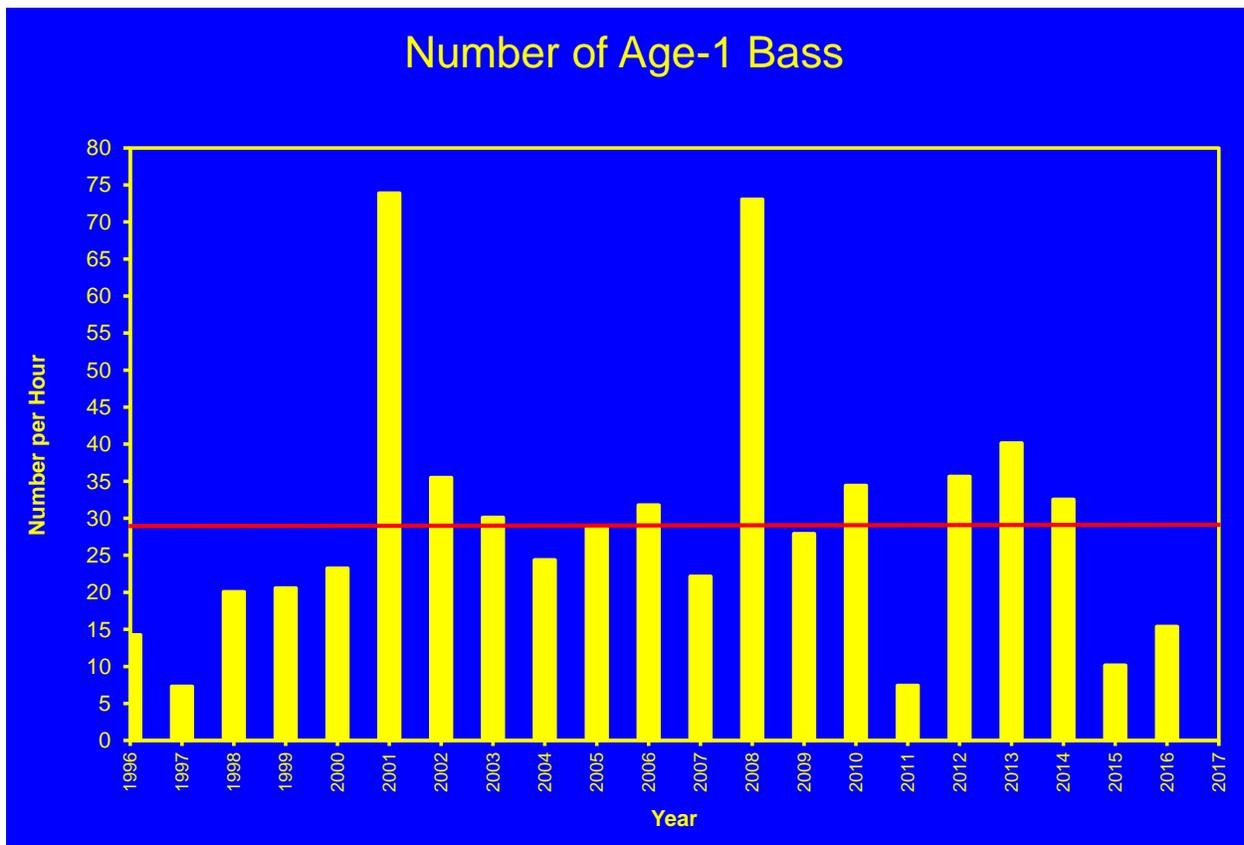
Parameter 1 – Length at age-3 (growth rate)

Largemouth bass at Kentucky Lake are aged about every 4 to 5 years. Age of bass is determined by counting rings on a small bone (otolith) which is removed from the fish. Counting rings on this bone is similar to rings of a tree. At Kentucky Lake since 1986, the length of an age-3 largemouth bass has averaged 12.8 inches (represented by the red line). This is considered to be good growth for largemouth bass when compared to other large lakes in Kentucky. If catch rates of larger-sized bass increase, growth is expected to decline slightly, and vice-versa. Historical flooding hampered sampling in 2011, a year when age calculations were to be made, therefore resulting in a poor sample of bass. Aging was repeated in 2012 and growth appeared to be similar to that in years prior to 2011, suggesting the decline in growth rate in 2011 is most likely inaccurate.



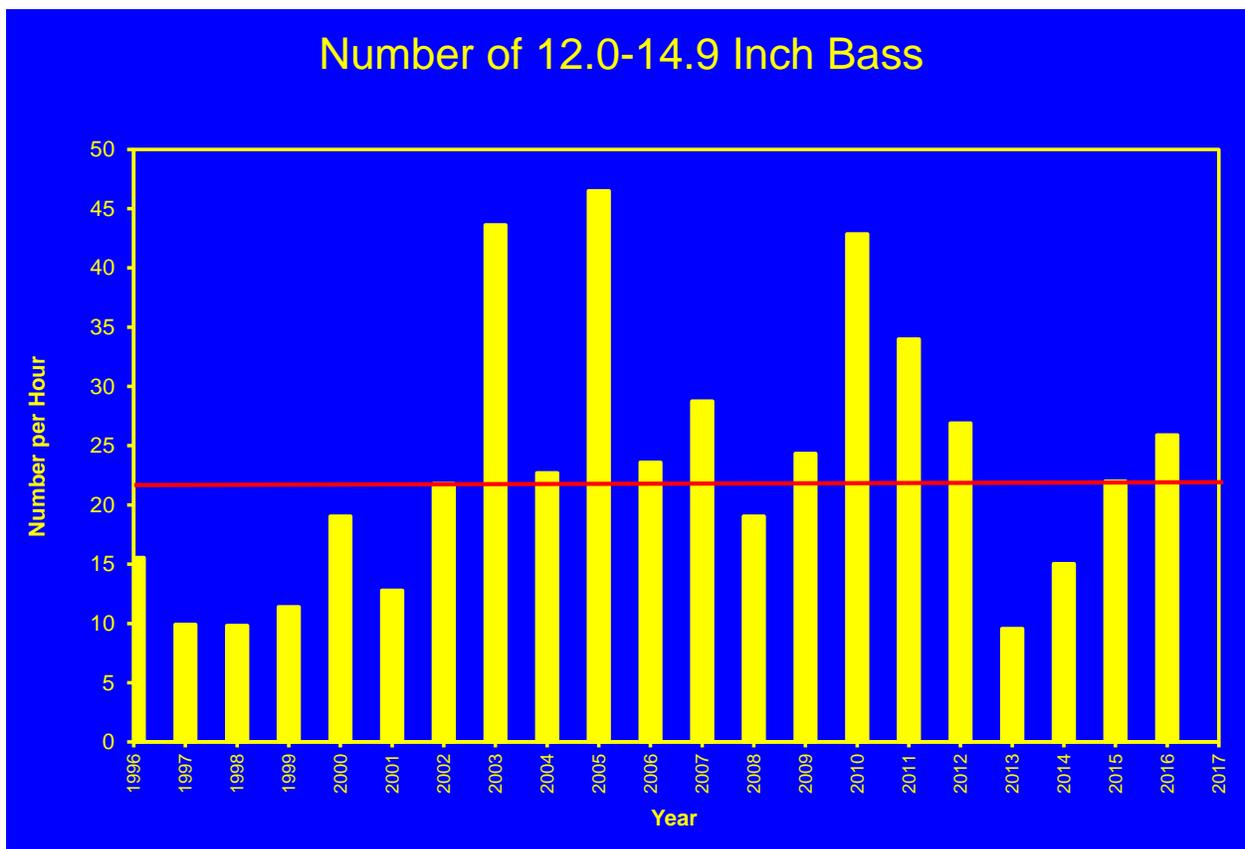
Parameter 2 – Numbers of age-1 bass (how good the spawn was)

KDFWR looks at the electrofishing catch rates of age-1 largemouth bass to assess recruitment, hence the success of the spawn which occurred in the prior year. This is an important parameter because the number of age-1 bass produced represents how the population of harvestable-sized bass will be in about 4 years. At Kentucky Lake, age-1 largemouth bass catch rates have averaged 28.5 fish per hour of electrofishing. When compared to other lakes across the state, this is considered to be a good age-1 catch rate. Stable water levels (minimum fluctuations) during May (primary spawning month) of 2000 and 2007 may help explain those corresponding very good year classes as indicated by the high catch rates in the following years. Historical flooding hampered sampling in 2011, therefore resulting in a poor sample of bass. Water levels were also stable in 2014 and 2015 during May, but the resulting year classes, as measured by low catch rates in 2015 and 2016, suggest that something more than just stable water levels is required for a good spawn. It is well documented that within fish populations, spawning success can be driven by density-dependent factors, such as high densities of adults. When adult numbers are consistently high, resulting poor spawns occur to bring the population back into balance.



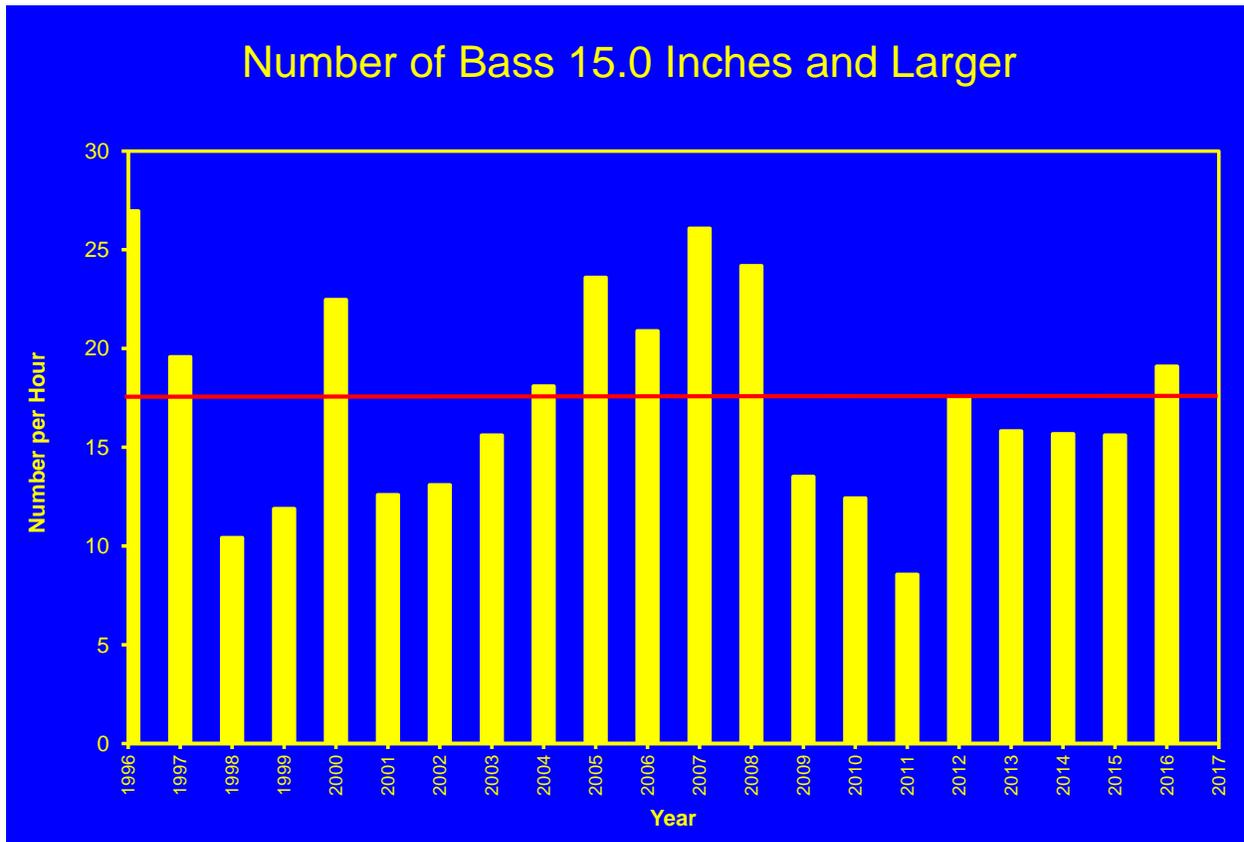
Parameter 3 – Numbers of 12.0-14.9 inch bass

The electrofishing catch of 12.0-14.9 inch largemouth bass has averaged 21.8 fish/hour over the last 31 years. This catch rate of intermediate size bass gives Kentucky Lake a “fair” rating when compared to other lakes of similar size across the state. The low catch rates recorded in the late 1990’s are a response to the poor year classes produced from 1995 to 1997. The increases recorded in 2003 and 2005 are in response to the better year classes produced around 2001 to 2003. With the good spawn reported in 2007, this size group of bass increased in 2010. As the number of age-1 bass returned to more average numbers in recent years, we anticipated the numbers of these intermediate size bass to decline.



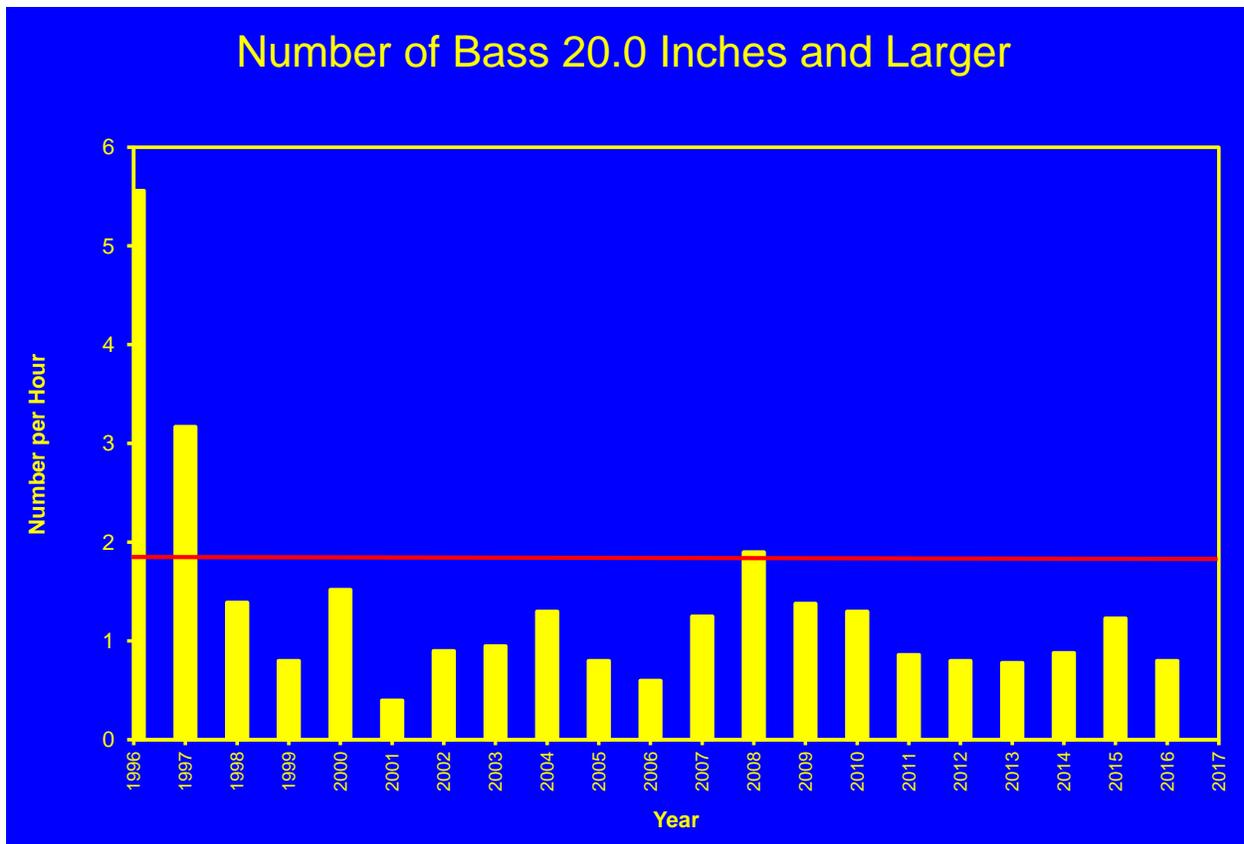
Parameter 4 – Numbers of 15.0 inch and larger bass

The catch rate of 15.0 inch and larger largemouth bass at Kentucky Lake has averaged 17.4 fish/hour of electrofishing. As compared to other lakes, this is a good catch rate for this size group. The numbers of 15.0 inch and larger bass at the lake increased in the mid 1990's due to good year classes produced during the drought period which was associated with more aquatic vegetation in the lake. The decline in numbers of harvestable size bass seen in the late 1990's and early 2000's was a result of poor year classes produced in prior years following the drought. The mid 2000's saw a return of above average catches of these keeper size bass due to good year classes produced in prior drought years. Numbers of keeper size bass declined between 2009 and 2011. This could be due to a decline in the spawns, but could also be related to sampling conditions. Flood years, which hampered sampling, occurred in 2010 and 2011, while 2012 was a drought year. The poorer spawns seen in 2014 and 2015 will likely cause the catch of these harvestable size bass to decline slightly.



Parameter 5 – Numbers of 20.0 inch and larger bass

The electrofishing catch rate of 20.0 inch and larger largemouth bass has averaged about 1.9 fish/hour for Kentucky Lake for the past 31 years of sampling. Based on this average value, this parameter of the fishery has rated “excellent”. The high catch rates recorded in the mid 1990’s were most likely associated with the prior drought and an increase in aquatic vegetation throughout the lake that resulted in strong year classes. The numbers of these larger fish declined in our samples in years following the drought period. Since that period, the average catch rate of these larger bass has been closer to 1.0 fish/hour. The population of these larger bass in recent years appears to maintain a consistent density. Though slight deviations from this mean occur as strong or poor years classes age, and the fish reach this size range.



Overall – Total Assessment Score (All five parameters added together)

In the past few years the largemouth bass fishery has rated “good”. This follows a period where the population rated “excellent”. The “excellent” period kicked off with a good spawn represented by a higher catch of age 1 bass in 2001. Another good age 1 year class appeared in 2002. As these good year classes aged, coupled with excellent growth rates, the population of larger bass increased. An increase was seen in the catch rates of the 12-14 inch bass, and eventually the 15 inch and larger bass. The lower rating in 2011 is likely caused by the poor sample collected during a historical flood event in the Tennessee River Valley which effected Kentucky Lake. A lower catch of age-1 fish in 2015 is the primary cause for the decline that year.

