

Kentucky Lake Bass Assessment 2022

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 eutrophic. It is connected to Lake Barkley by an open canal near the dams of each 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 embayments will rarely 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. Submerged aquatic vegetation reached a peak in 2015 at over 9,000 acres but declined to less than 1,000 acres the following year. The sudden decline coincided with a large natural spawn of invasive Grass Carp, which likely consumed the submerged vegetation and continue to limit its growth and expansion.

During these periods of dense aquatic vegetation in the lake the black bass population has done well; however, there is no observed correlation between the amount of grass and the success or failure of bass year classes at Kentucky Lake. The best known predictors of the success or failure of the year classes are rainfall, and spring time water temps. Generally speaking, low rainfall and warm, mild springtime temperatures have led to better year classes.

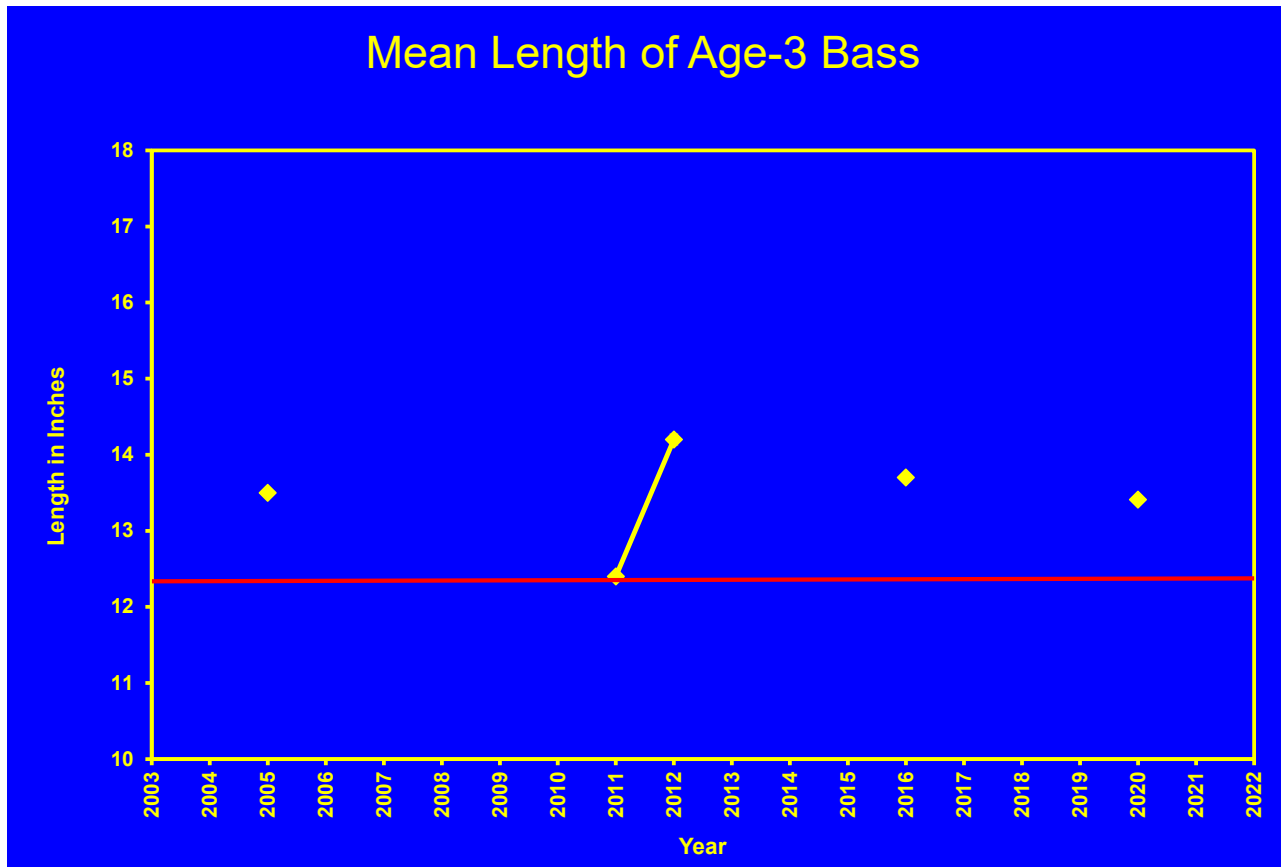
The Fisheries Division of the Kentucky Department of Fish and Wildlife Resources and local anglers have added stake beds, brush piles, and planted cypress and willow tree saplings throughout the lake to replace lost habitat in the littoral zone. Additionally, beginning in 2019 the Fisheries Division began placing laydowns elevated on concrete blocks as well as artificial spawning beds made from concrete into the littoral zone of Kentucky Lake. The hope is that these new spawning structures will increase the number of available spawning sites as well as making them available to bass earlier in the spring.

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.

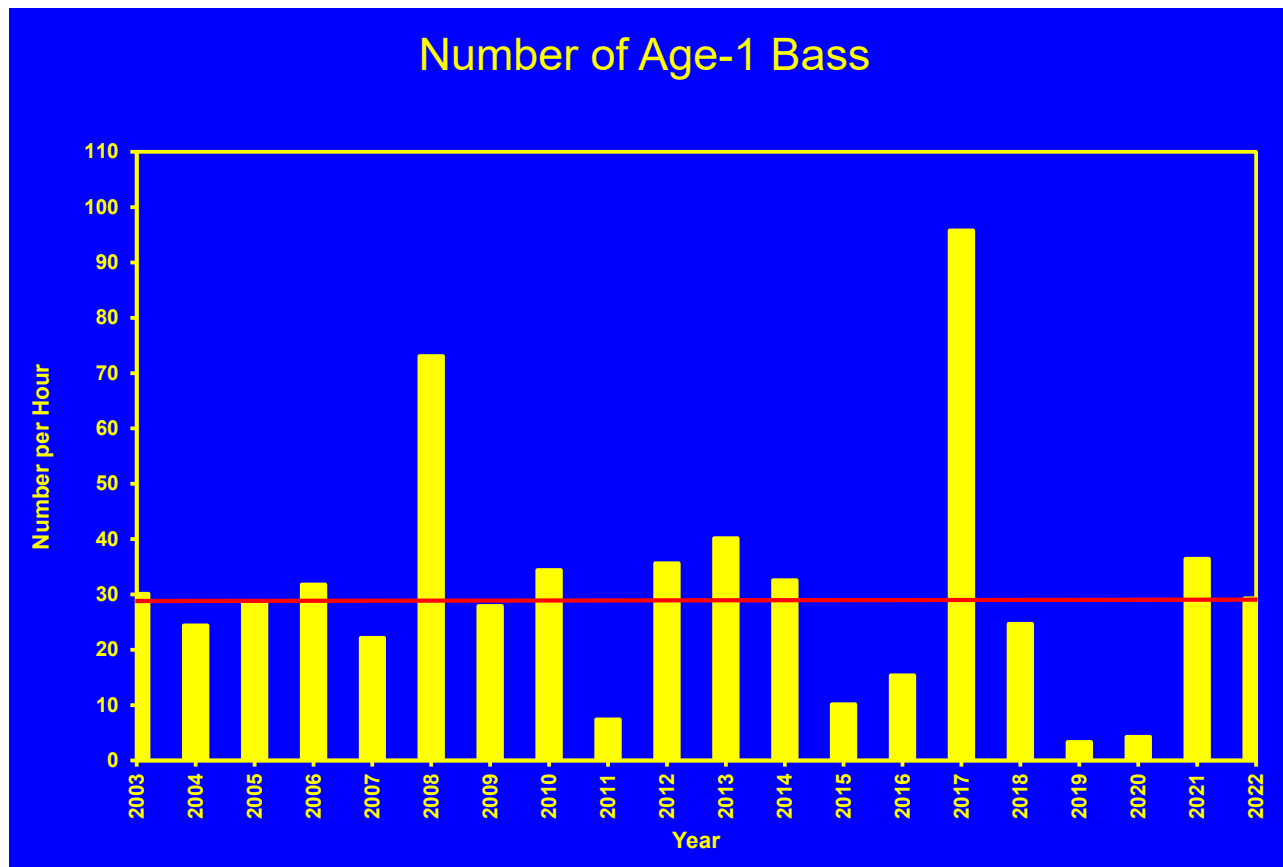
Parameter 1 – Length at Age-3 (growth rate)

Largemouth bass at Kentucky Lake are aged about every 4 to 5 years. The age of a 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 counting the rings of a tree. At Kentucky Lake since 1986, the length of an age-3 Largemouth Bass has averaged 12.3 inches (represented by the red line). This is considered to be on the upper end of fair growth for largemouth bass when compared to other large lakes in Kentucky. Starting in 1997, the length at age-3 has increased and has averaged 13.5 inches since that time. 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. Thus far, invasive carp seem to have had no measurable effect on Largemouth Bass growth.



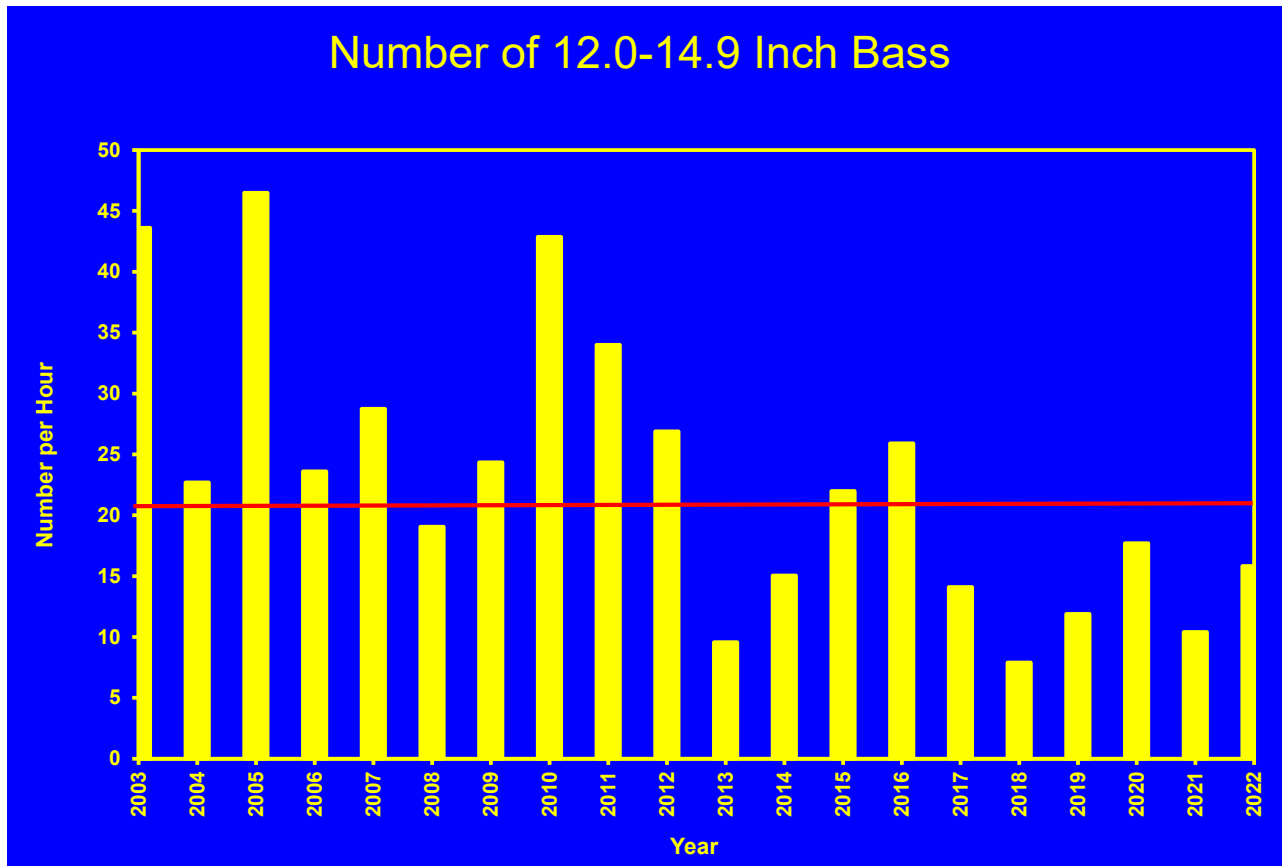
Parameter 2 – Number of Age-1 Bass (how good the spawn was)

KDFWR looks at the electrofishing catch rates of age-1 largemouth bass to assess recruitment, or in other words 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 29.1 fish per hour of electrofishing. When compared to other lakes across the state, this is considered to be a good age-1 catch rate. Low rainfall, stable water levels, (minimum fluctuations), and above average temperatures during March of 2007 and 2016 may help explain those corresponding excellent year classes as indicated by the high catch rates in the following year. 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. Temperatures in those springs remained low during march and jumped very quickly from the 50's to the 70's, likely leading to a shortened bass spawning window. Recent year classes in 2020 and 2021 have been above average and should lead to even better fishing as those fish grow and enter the fishery.



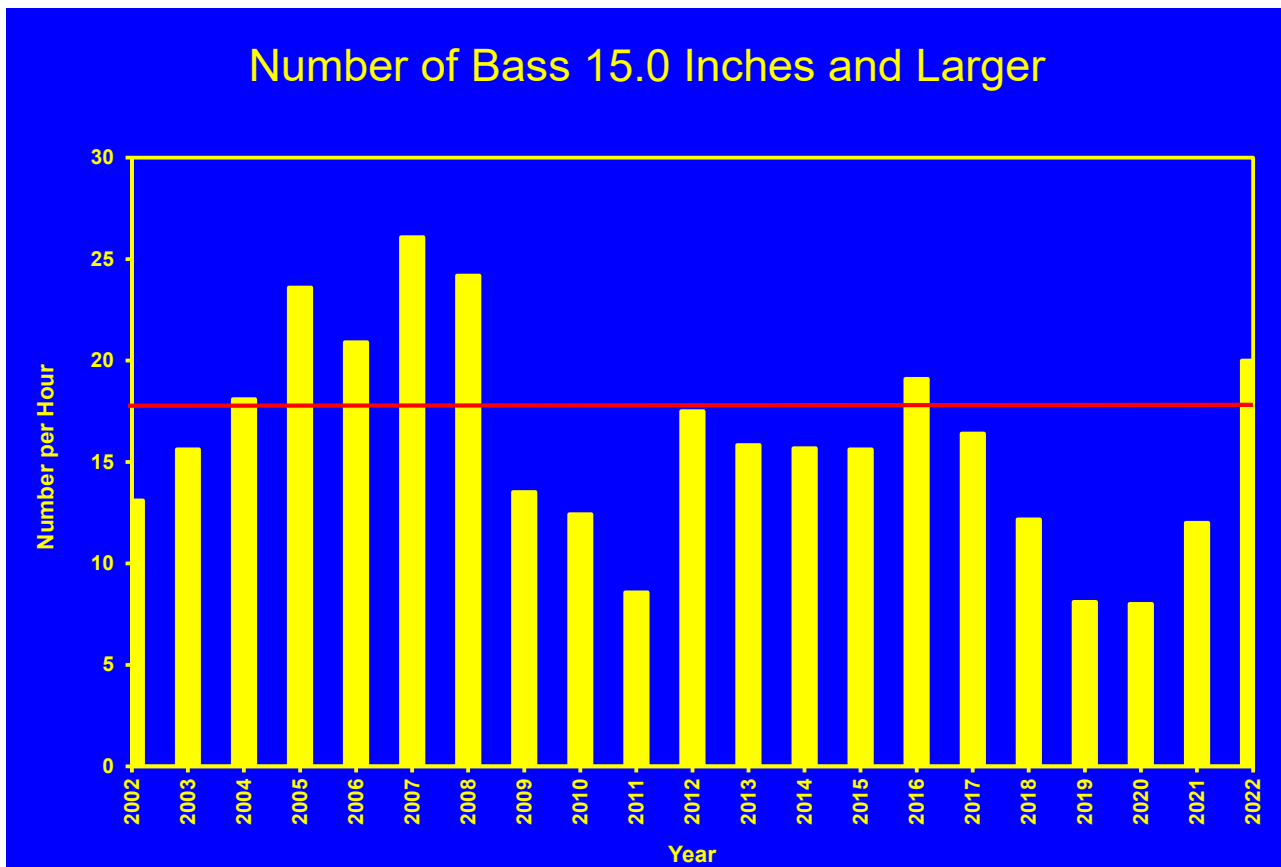
Parameter 3 – Number of 12.0- to 14.9-Inch Bass

The electrofishing catch of 12.0- to 14.9-inch largemouth bass has averaged 20.4 fish/hour since 1986. 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. With poor year classes in 2014 and 2015 we anticipated a decline in the numbers of intermediate size bass. We did see an uptick in 2020 thanks to the 2016 year class and we expect higher catch rates in the future as the 2020 and 2021 year classes enter the fishery.



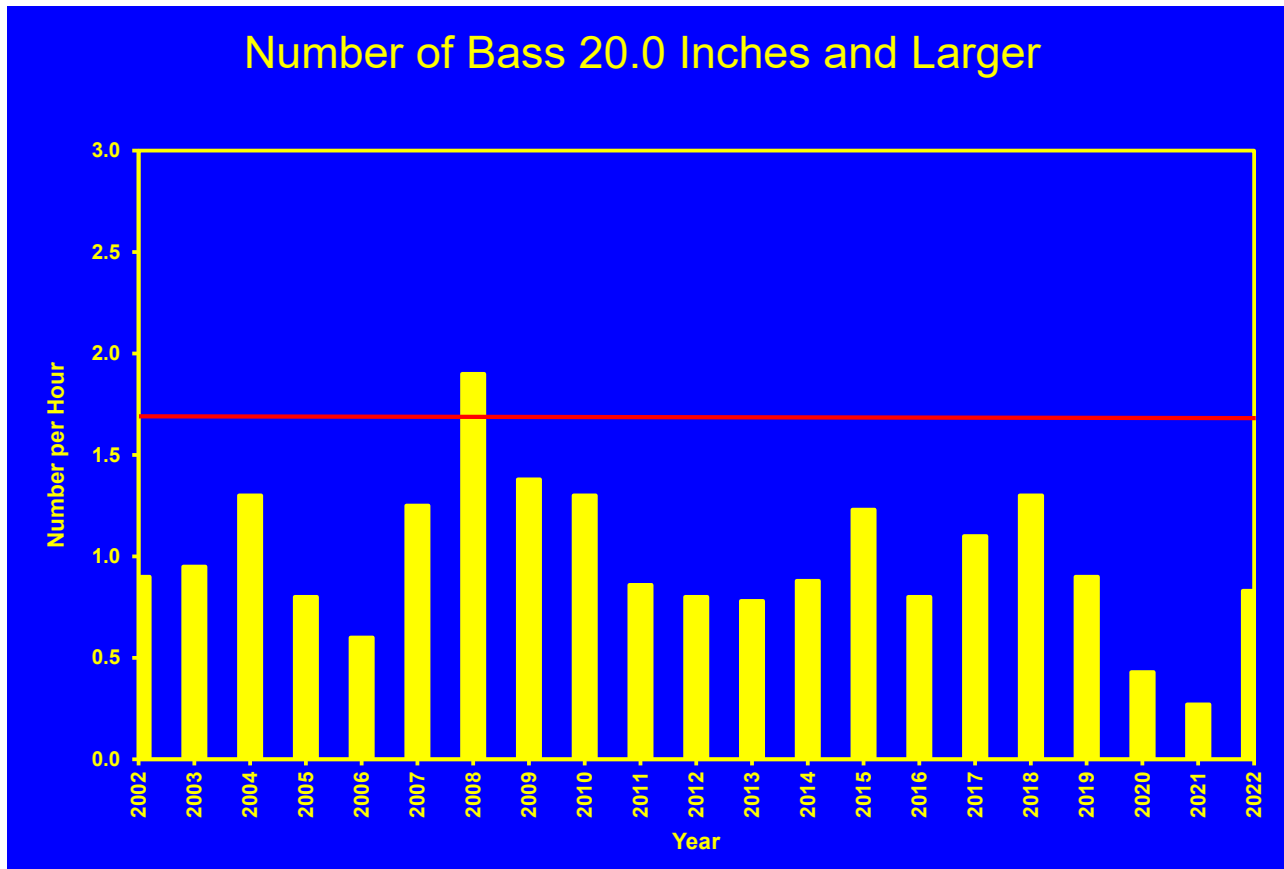
Parameter 4 – Number of Bass 15.0 Inches and Larger

The catch rate of 15.0-inch and larger largemouth bass at Kentucky Lake has averaged 16.6 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 some good year classes in the late 80's. 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 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 year classes seen in 2014 and 2015 contributed to the recent decline observed from 2018-2021. However, the catch rates of keeper size bass increased to above average levels once again in 2022 thanks to an excellent year class in 2016.



Parameter 5 – Number of 20.0-Inch and Larger Bass

The electrofishing catch rate of 20.0 inch and larger largemouth bass has averaged about 1.7 fish/hour for Kentucky Lake since 1986. Based on this average value, this parameter of the fishery has rated “excellent”. The high catch rates observed over this period are the result of good year classes and excellent growth rates. It typically takes 8 years to reach 20.0 inches, so we typically observe a rise in catch rates 8 years after a strong year class. Recently we have seen declines in response to poor year classes. However, the catch rates did improve in 2022 and are now more consistent with what we have observed over the last 20 years.



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

In the past few years, the largemouth bass fishery saw a major downturn compared to its relative high point earlier in the century. The “good” 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- to 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. Poor year classes in 2014, 2015, 2018, and 2019 have all contributed to the lower scores over the last several years. Thankfully, strong year classes in 2016, 2020, and 2021 have raised our assessment back in line with historical trends in 2022.

