

## Barkley Lake Bass Assessment 2010

Barkley Lake is a Tennessee Valley Authority (TVA) mainstem reservoir on the Cumberland River in western Kentucky and western Tennessee. Barkley Lake was completed in 1966 to form the 57,920-acre reservoir, of which 41,775 acres lie in Kentucky. The Kentucky portion of Barkley Lake is classified as a eutrophic lake.

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

Fish habitat in the form of aquatic vegetation, tree stumps and standing timber is limited in Barkley Lake. Aquatic vegetation (Eurasian water milfoil, Naiad, Coontail, and Pondweed) increased dramatically when water clarity increased due to drought conditions during 1985 through 1988. In the Kentucky portion of Barkley Lake, there were approximately 7,112 acres of submersed aquatic vegetation in 1987. Declines in the acreage of aquatic vegetation occurred during the 1990's with a return to normal rainfall patterns and decrease in water clarity. In 2000, TVA estimated that aquatic vegetation covered about 400 acres. Between 2001 and 2007, there were periods of dry weather which played a part in increased water clarity and aquatic vegetation in the lake. By 2008, the acreage of aquatic vegetation had increased to almost 5,000. 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. 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. However, over time the some stumps have been removed by mussel brailers, buttonball bushes have died due to high water, and the fallen trees deteriorate within a few years or wash away. 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.

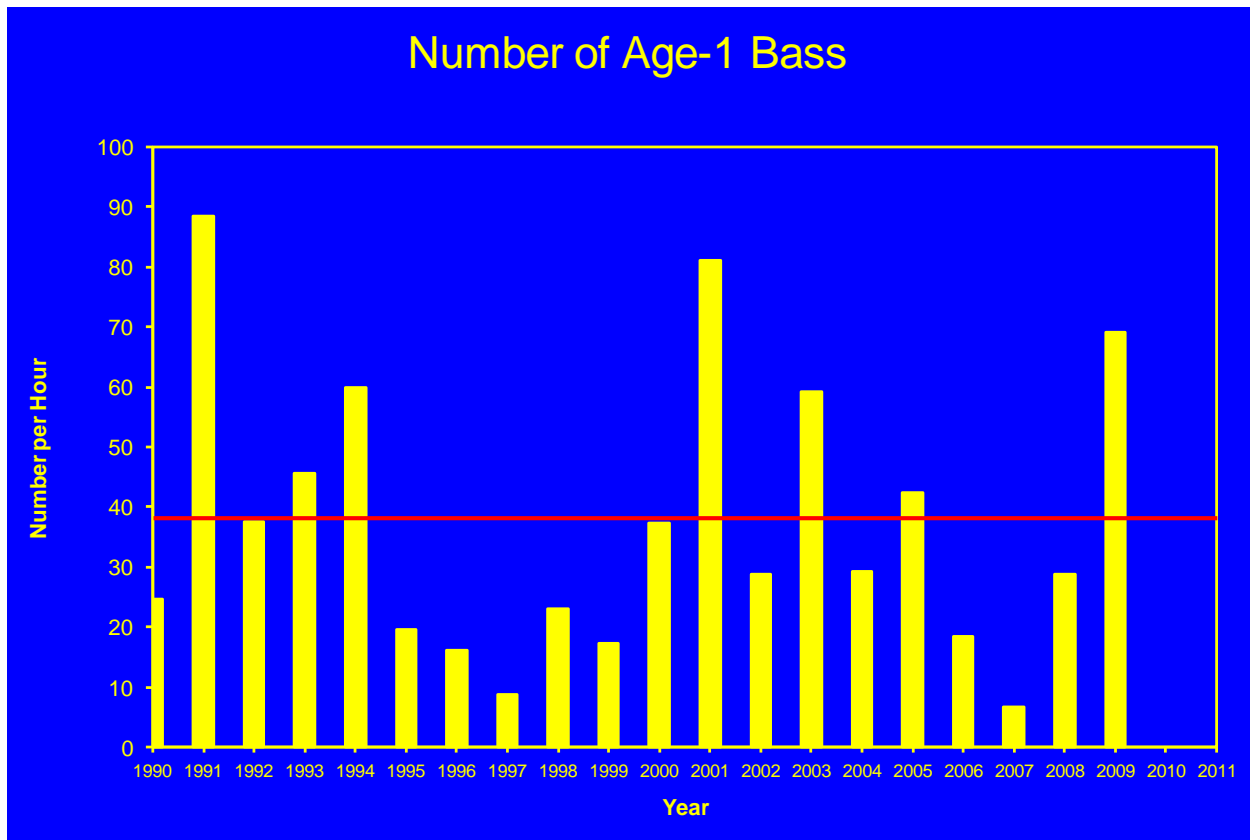
## Parameter 1 – Length at age-3 (growth rate)

Largemouth bass at Barkley 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 Barkley Lake, the length of an age-3 largemouth bass has averaged 12.5 inches at the lake since 1986 (represented by the red line). When compared to other lakes of this size, this is considered to be good growth for largemouth bass. Since 1996, at Barkley Lake the growth rate of largemouth bass has been much better, with an average length by age 3 closer to 14.0 inches. The fast growth rate might be expected to decline slightly as a strong year-class reaches age 3.



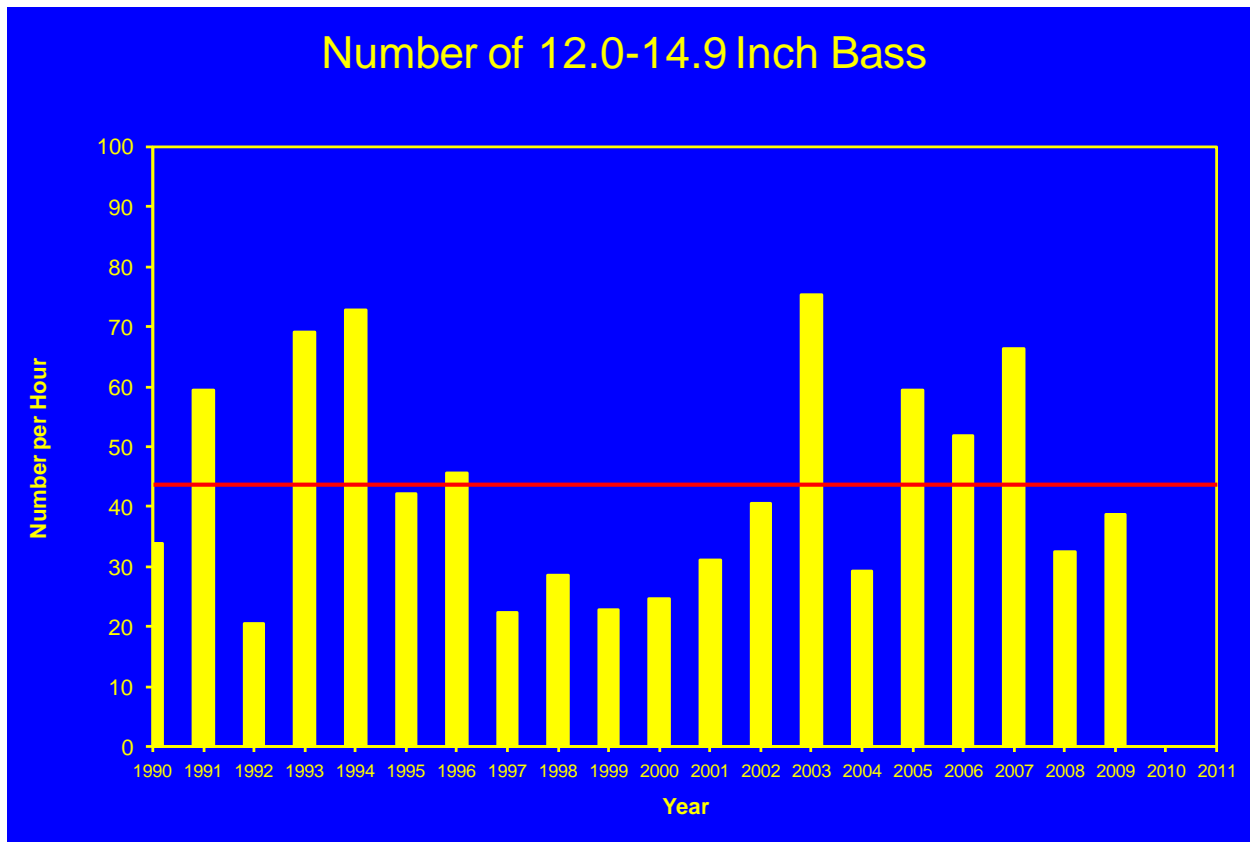
## Parameter 2 – Numbers of age-1 bass (how good the spawn was)

KDFWR looks at the electrofishing catch rates of age-1 largemouth bass to assess the success of the spawn which occurred in the prior year. This is an important parameter because the number of bass produced represents how good the fishing will be once these fish grow large enough for anglers to catch. At Barkley Lake, age-1 largemouth bass catch rates have averaged at 30.0 fish per hour of electrofishing. When compared to other lakes across the state, this is considered to be a good age-1 catch rate. Following a drought in the Barkley Lake drainage around 1990, a period of dense beds of aquatic vegetation, an increase in the number of small largemouth bass population was reported. This era was followed by a decline in the bass population during the mid 1990's in a response to more normal weather patterns and a decline in the vegetation. During the past few years, dryer weather patterns, clearer water and more aquatic vegetation have occurred along with an increase in the number of small bass, which means more keeper size largemouth bass in the next few years.



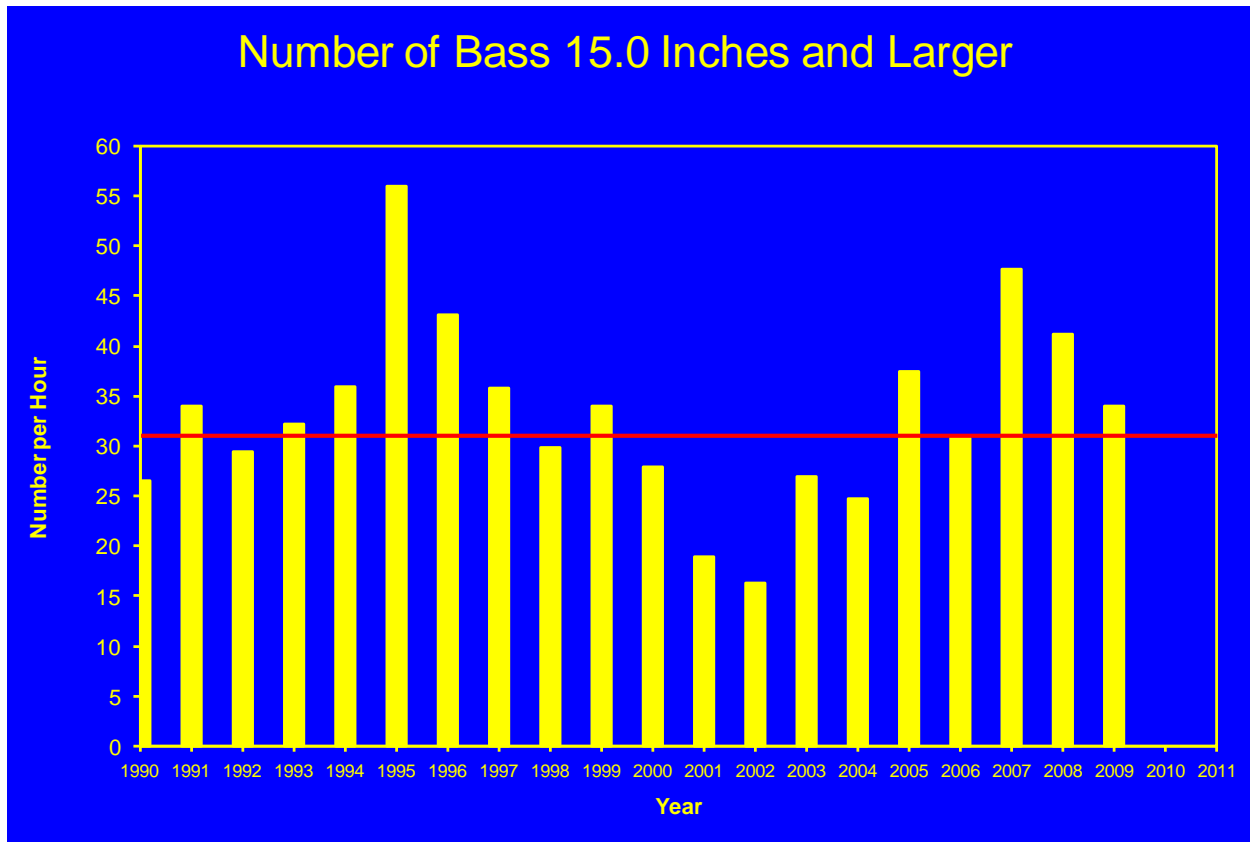
### Parameter 3 – Numbers of 12.0-14.9 inch bass

The electrofishing catch of 12.0-14.9 inch largemouth bass has averaged almost 21.0 fish/hour over the years, which gives Barkley Lake a good rating when compared to other lakes 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. Since a good spawn was measured from 2007, this size group of bass will likely increase in 2010, and stay high for at least the following year.



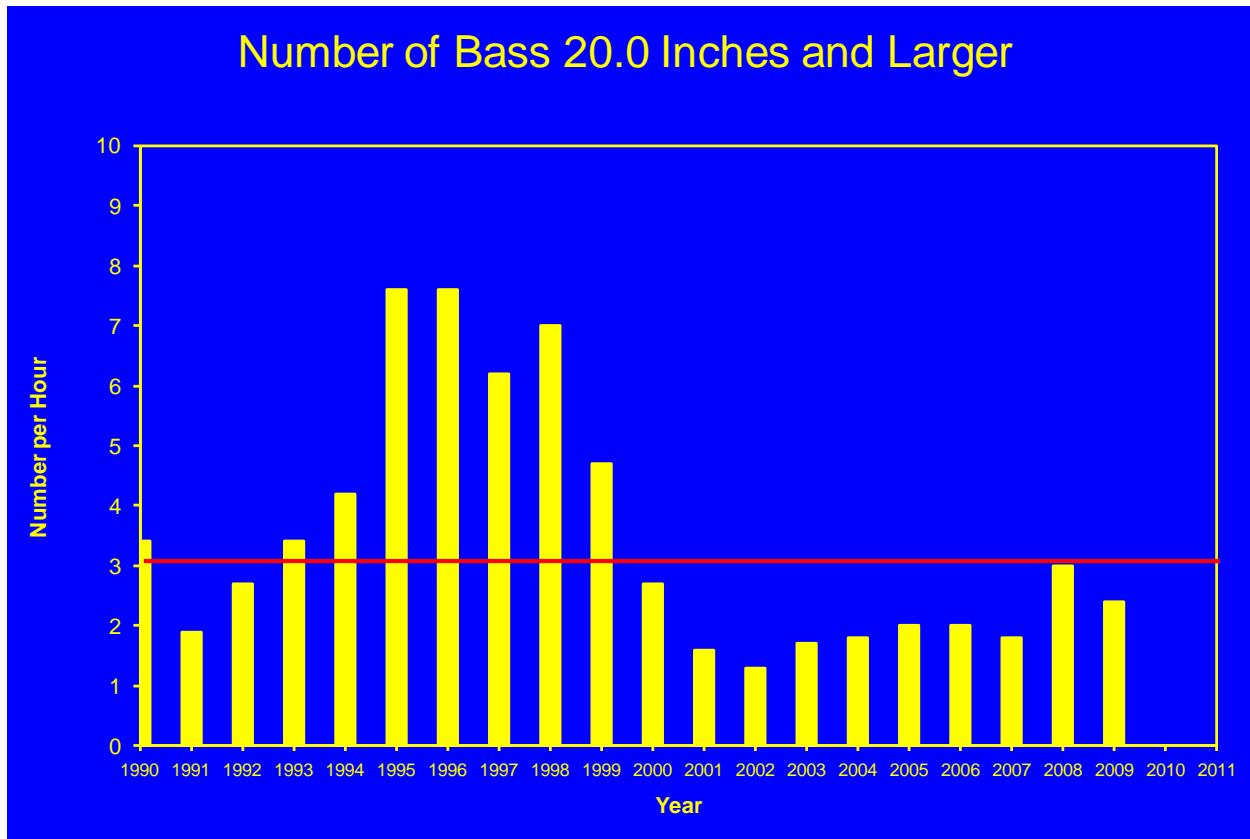
## Parameter 4 – Numbers of 15.0 inch and larger bass

The catch rate of 15.0 inch and larger largemouth bass at Barkley Lake has averaged just over 18.0 fish/hour of electrofishing. Again, 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. In more recent years, the fishery has recovered as indicated by above average catches of larger bass. With a high number of age 1 bass collected in 2008, the numbers of harvestable size bass will likely increase in the next few years.



## Parameter 5 – Numbers of 20.0 inch and larger bass

The electrofishing catch of 20.0 inch and larger largemouth bass has averaged about 2.0 fish/hour for Barkley Lake since 1986. Based on this average value, this parameter of the fishery has rated good. The high catch rates recorded in the mid 1990's were mostly likely associated with the prior drought and an increase in aquatic vegetation throughout the lake. Though the numbers of these larger fish declined in years following the drought, their numbers are likely to increase again within the next 5 years, as clearer water and aquatic vegetation returned to the lake in 2007 and 2008.



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

The largemouth bass fishery for the past nineteen years has rated “good”, with the 2008 rating of “excellent”. This rating was achieved due to an above average spawn in 2007, and the continued good growth rates and the high catch rate of bass larger than 15 inches. As the strong year class of 2007 passes through the fishery, it is expected that this fishery will continue to obtain at least a rating of good and potential keep an excellent level as the number of bass greater than 20 inches increases. The decline in 2009 was mostly affected by a lower catch of age 1 bass, which would have been the 2008 spawn.

