

## Florida Largemouth Bass Stocking

The TWRA plans to expand the Florida largemouth bass stocking program into more waters across the state. After the hugely successful and popular Florida largemouth bass stocking into Chickamauga Reservoir, plans are now to ramp up the program to include Nickajack, Watts Bar, Fort Loudoun, and Kentucky Reservoirs.



## Florida Largemouth Bass History in Tennessee

In the mid-1980s, TWRA contracted with Tennessee Technological University (TTU) to conduct a statewide evaluation of reservoirs in an effort to determine Florida largemouth bass influence in Tennessee waters. TTU found that there was a slight presence of the Florida gene in many reservoirs. This may have been attributed to escapement from private ponds that may have been stocked with Florida bass in the past. Another theory is that some reservoirs in Tennessee are in a natural intergrade zone where there is overlap between northern and Florida largemouth bass genes.



A 16-pound 15 ounce Florida largemouth bass that was collected by electrofishing (and released alive) in Brown's Creek lake in October 2009

In 1998, TWRA began stocking Florida largemouth bass into some smaller, Agency-owned lakes in the middle and western part of the state (Brown's Creek Lake, Lake Graham, Shellcracker Lake, and Gibson County Lake). However, the TWRA also wanted to consider stocking Florida largemouth bass into at least one larger reservoir. The original goal was to (1) increase the Florida largemouth bass gene to at least 15% and (2) grow bigger bass.

Since the TWRA was new to the Florida largemouth bass stocking scene, they consulted with other states for advice. Oklahoma, which has relatively the same latitude and climate, has stocked Florida largemouth bass since the 1970s and originally determined stocking locations based on aquatic habitat, forage, and heating degree day (HDD) zone. Oklahoma determined that Florida largemouth bass from water bodies in areas with less than 3,400 heating degree days fared better than those with more than 3,400 heating degree days.

When TWRA plotted the same heating degree day parameter to Tennessee, a zone from near Dyersburg to north of Chattanooga was established (Figure 2).

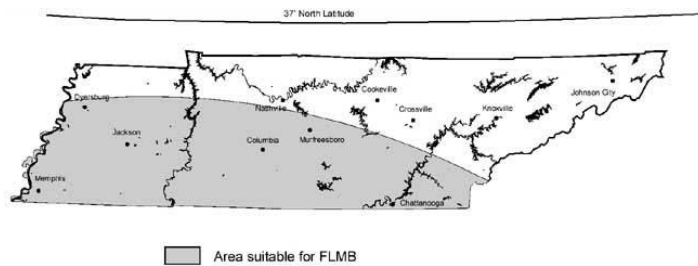


Figure 2. Portion of Tennessee deemed suitable for Florida largemouth bass (FLMB) stocking based on latitude and heating degree days.

**\*Heating Degree Day (HDD)**-When the outside temperature falls below 65 degrees F, heat will be required to maintain the temperature within a house. The average outside temperature is estimated by adding the high and low temperatures for a given day and dividing by 2. Degree days are defined as the difference between the average temperature and the 65 degree F base temperature. Therefore if the average temperature was 31 degrees F for example, then 65 degrees F minus 31 degrees F equals 34 degree days.

In 2000, TWRA decided to stock Chickamauga Reservoir with Florida largemouth bass as a test case. Chickamauga was selected because it was very productive (fertile), it had a good abundance of aquatic vegetation, it lay within the natural zone of integration between the

northern (native Tennessee) largemouth bass and Florida largemouth bass, it was located within the heating degree day zone, it had productive shad populations, and it had public acceptance of trophy bass management. A five-year Florida largemouth bass stocking program began in 2000 with fish obtained from a variety of sources. These fingerlings were stocked throughout the lake at a rate of five fish per acre and were approximately the same size as the native largemouth fingerlings that naturally spawned in the lake.

After five years, bass were collected and analyzed to determine if the Florida bass gene had integrated into the population. It had not. Genetic tests revealed that the percentage of Florida largemouth bass was less than 5% across the lake. TWRA decided to try a new strategy by maintaining the same stocking rate but reducing the number of stocking locations to three embayments (Grasshopper, Muddy, and Richland Creeks). These embayments were selected based on quality habitat that afforded the stocked fingerlings a better chance of survival. TWRA also decided to try and stock larger fingerlings. These larger fingerlings would be able to compete with other fish species and have a better survival rate since they would not be competing directly with largemouth bass from the native spawn. To accomplish this goal, the Florida largemouth bass fry had to be obtained earlier in the spring from more southern states. The TWRA was able to get fry (1/2 inch) from Florida, Arkansas, and Texas in mid-April, which was at least 2 to 3 weeks before the native bass spawned. These fry were then placed in Tennessee hatchery ponds and raised until they were 2 to 3 inch long fingerlings to increase chances of survival after being stocked.



After five years (2010) the results were remarkably different. Genetic tests revealed that the Florida largemouth bass gene had increased to an average of over 33% across the lake. The goal of increasing the Florida gene to at least 15% was met. Although the next goal was yet to be determined, bass anglers began reporting astounding catches in 2011. Tournament anglers were weighing five bass over 30 pounds to win tournaments. In 2012, Chickamauga made the bass fishing news when a limit of five bass weighed in a tournament almost exceeded 45 pounds. That was an average of nearly 9 pounds each!



So the next question was, were these big fish Florida largemouth bass?

To answer that question, biologists needed to get the genetic information from bigger bass. In the spring of 2013, biologists obtained fin clips (for genetic material) from 48 tournament-caught bass that were 8 pounds or larger.

The results indicated that all 48 bass had some degree of Florida largemouth bass genes - 63% were the F-1 hybrids (1<sup>st</sup> generation cross between the Florida and the northern largemouth bass) and 37% were Fx (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, etc.

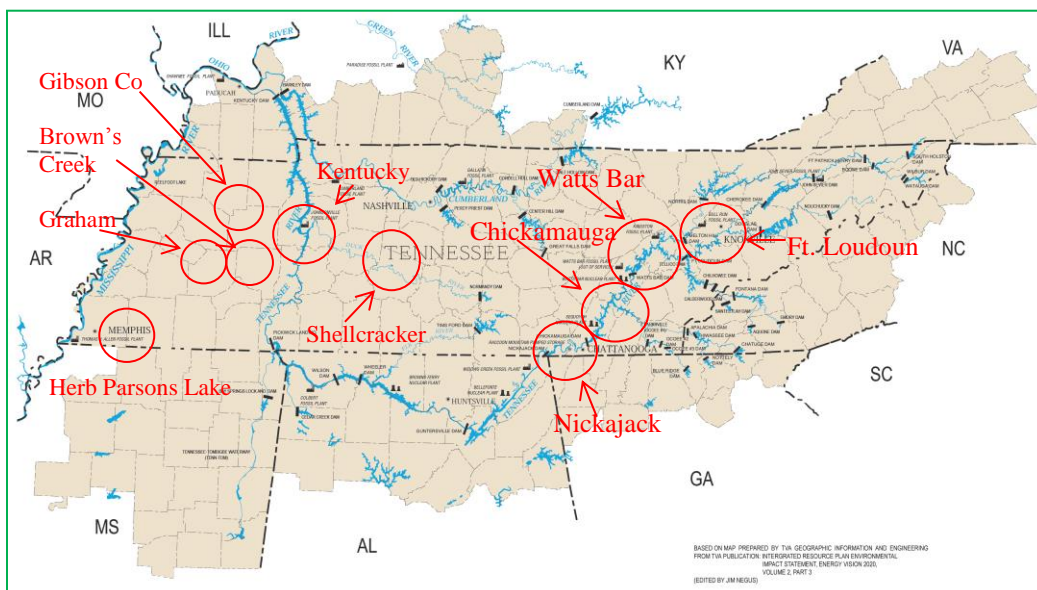
generation crosses). We refer to these as backcrosses. Interestingly, out of the 48 bass, none were pure Florida largemouth bass or pure northern largemouth bass.

Success, right? Well maybe, but there were still some concerns by TWRA biologists over the backcrosses (Fx's). The main concern was whether the backcrosses might be an inferior fish. What if some of the backcrosses exhibited the worst characteristics of both sub species (smaller and less aggressive)? What if their growth was slower? Were they harder to catch or poorly adapted to more northern waters? These were some of the questions that needed to be answered.

Some of these answers may not be known for a long time, if ever. However in 2014, biologists collected over 200 bass of all sizes from all parts of Chickamauga Reservoir during a 6-week period in late spring. The results showed that the backcrosses grew the same if not better than the northern bass. At least it wasn't the other way around.

In the fall of 2014, TWRA fisheries biologists met to decide where to expand the program. They decided on a strategy to work in the Tennessee River between Ft. Loudoun and Kentucky Lake and small isolated impoundments in Middle and West Tennessee. There were discussions regarding the Cumberland River system but there is still uncertainty of sustainable success and these reservoirs have largemouth bass populations with predominantly northern largemouth bass genetics. It was decided that we would not include them in this expansion. Thus the Agency proposed to continue stocking Chickamauga Reservoir (and the smaller lakes like Graham, Brown's Creek, Shellcracker, and Gibson County) and to initiate stocking into Nickajack, Watts Bar, Fort Loudoun, and Kentucky Reservoirs. Also, stocking was recommended for Herb Parsons Lake, another Agency-owned lake near Memphis.

These new stockings are experimental and it will take time to evaluate whether they will be successful (8–10 years). The Agency will develop guidelines, goals, and objectives which will determine the success of a stocking and will adjust stocked areas depending upon objectives met. Once the experimental stocking period is over, the TWRA will have a better idea of what types of habitat/waters are suitable to the survival of Florida largemouth bass.



Water bodies for the proposed Florida largemouth bass stockings

## Frequently Asked Questions

### 1. Why stock Florida largemouth bass?

The increased interest and demand for larger bass (trophy bass) from the fishing public as well as support due to the success in other states has captured the attention of the TWRA. The TWRA feels that Florida largemouth bass stocking could enhance bass fishing quality in Tennessee due to faster growth and greater maximum size of fish containing the Florida largemouth bass gene.

### 2 Why not stock lakes in middle Tennessee?

Lakes in middle Tennessee are not being considered at this time for a number of reasons. The lack of desirable aquatic habitat and the fact that these reservoirs are located outside the heating degree day (HDD) zone were the first considerations. The genetics work we conducted in 2014 indicated that, in the Cumberland River System, largemouth bass populations were predominately the northern strain. Why is this important? Even though we have seen positive results over a 10-year period in Chickamauga, it is not certain that these results are sustainable and there is still the potential for negative impacts that may be revealed later on. If the positive results are not sustained, we will need to have sources of the northern strain bass to use for management. It is important to keep in mind that managing genetics is a one way road of sorts. As far as genetics of fish go, 10 years is a short time frame and having populations of northern largemouth bass will hedge our bets against a negative outcome.

### 3 Why not stock the upper east Tennessee reservoirs?

These lakes are not being considered at this time for many of the same reasons that were mentioned above: lack of desirable aquatic habitat, outside the HDD zone, lower overall productivity. Also, studies in Alabama and Oklahoma show that Florida largemouth bass do not do well in reservoirs with extreme winter drawdowns. Many of the reservoirs in upper east Tennessee experience drastic drawdowns in preparation for spring rains.

### 4 What about stocking F-1 (hybrids) into other large lakes?

The F-1 Florida largemouth bass have been shown to fare better in cooler waters than the pure Florida largemouth bass. They grow as big as a Florida largemouth and they are more aggressive. That has been found in Chickamauga Reservoir. By stocking pure Florida largemouth we are creating the F-1's in the wild. We are not stocking them to be caught, we are stocking the pure Florida largemouth bass to influence the genetic structure of the population. This is what has worked at Chickamauga. In fact, the strategy behind stocking pure Florida largemouth bass into the aforementioned reservoirs is that they will mate with the northern largemouth bass to produce many times more F-1 offspring than could feasibly be stocked. A better bang for the buck so to speak. The current stocking rate for Florida largemouth bass is five fingerlings per acre of water. The stocking rate for F-1's would have to be 200 or more per acre to make a difference, thus costing the Agency much more money.



5 How much will the proposed program cost?

The cost is minimal compared to what it might cost to purchase the fingerlings. Currently the Agency is spending approximately \$20,000 (which includes the genetic testing costs) per year on this program. However, if it becomes necessary to purchase the fingerlings from private hatcheries or if we have to raise them in our own hatchery systems, it could cost over \$250,000 per year. This estimate also includes the genetic assessments which are vital in determining whether the stockings are successful or not.

6 Were there any other considerations that went into stocking the lakes in the Tennessee River chain?

It is important to remember that the decision to stock the Tennessee River chain of lakes was based on several factors: desirable aquatic habitat, very productive waters, its abundance of forage fish, and its location within the HDD zone and in the natural intergrade zone. Biologists were also seeing Florida largemouth bass in Nickajack and Watts Bar Lakes, either as a result of migration through the locks or from tournament fishermen fishing Chickamauga but weighing in at both lakes. In addition, the State of Alabama has stocked Guntersville and Wheeler in the past and both lakes lie between Nickajack and Kentucky Reservoirs.

7 What is the estimated number of fingerlings that will be stocked?

At this time the total number of fingerlings that will be needed to stock the proposed lakes with a stocking rate of five fish per acre is 750,000 fingerlings.

8 Will other species of fish raised at Tennessee fish hatcheries be reduced in order to make up for the increase in raising Florida bass?

Not at this time. Recent hatchery expansions can support the additional bass production. Also hatchery managers typically double and sometimes triple crop their production ponds (i.e., raise two or three different species in the same pond) in order to meet the demand for stocking Tennessee waters. As an FYI, TWRA stocks approximately 6.5 million warm water fish and over 2 million cold water fish (trout) per year. If all goes well and the weather cooperates there should be no reduction in the number of other species of fish that are raised in TWRA hatcheries.

9 Where will the Florida largemouth bass fry come from?

From Florida of course. Actually, they all originated from Florida but other states such as Alabama, Mississippi, Louisiana, Arkansas, Texas, and Oklahoma produce and stock Florida largemouth bass. Florida largemouth bass are also stocked into lakes in California and Arizona. At this time, we are not set up to spawn all the needed Florida largemouth bass fry. We will be obtaining the fry from state hatcheries in Florida, Louisiana and Texas. This will allow us time to expand the program but, at some point, we will need to raise them in our

hatcheries. In the meantime, if these states are unable to or decide not to supply the TWRA with Florida bass fry, it may become necessary to purchase them from private hatcheries.

- 10 How many years does TWRA plan on stocking Florida largemouth bass into the reservoirs mentioned?

The plan is to stock for 7 to 10 years and then evaluate. It could take that long to fully know if the stockings have been successful and it may take longer if the required numbers of fingerlings are not available to meet the pre-determined stocking rate. If it is determined that the program is not working in a given reservoir, then the stocking may cease.

- 11 Will TWRA consider stocking more waters in the future?

There is always that possibility. Consideration of various factors such as improvements in aquatic habitat, availability of fingerlings, the success or lack of success of the reservoirs proposed to be stocked, and angler catch rates will determine the future of Florida largemouth bass in Tennessee.

- 12 What if you don't get enough fry or fingerlings to stock the proposed reservoirs in a given year?

To date, the TWRA hatcheries have had a lot of success in raising fry obtained from southern states to fingerling size for stocking. However, there are circumstances where influences such as unusually cold weather, diseases, limited supply of fry, and water quality issues have affected the desired numbers. If, for any reason, the desired numbers of fry or fingerlings are not obtained, then the lakes will be stocked on a priority basis. Reservoirs that do not get stocked in a given year will be given first priority for receiving fish the next year.

- 13 What other concerns does TWRA have about stocking Florida largemouth bass?

The Agency does have some concerns about a number of potential issues. There is the "catchability" concern. There is some concern about the long term performance of the backcrosses. There are concerns of die-offs during severe winters. There are concerns about the availability of fry and/or fingerlings for stocking. There is a concern about protecting the genetic integrity of the native largemouth bass in Tennessee. These are some of the things that are unknown and may take a while to get answered.