



## **South Holston Reservoir 2017 Fisheries Management Report**

South Holston Reservoir is a Tennessee Valley Authority (TVA) impoundment located in Washington County, Virginia and Sullivan County, Tennessee. Dam construction was completed in 1950 to provide power production and flood control. At the full pool elevation of 1,729 feet, the reservoir covers 7,580 surface acres in Tennessee and Virginia. Periodic water releases result in annual water level fluctuations of about 30 vertical feet. The reservoir stretches 23.2 river miles with 182 miles of shoreline. At full pool elevation, the maximum depth of the reservoir is 245 feet.

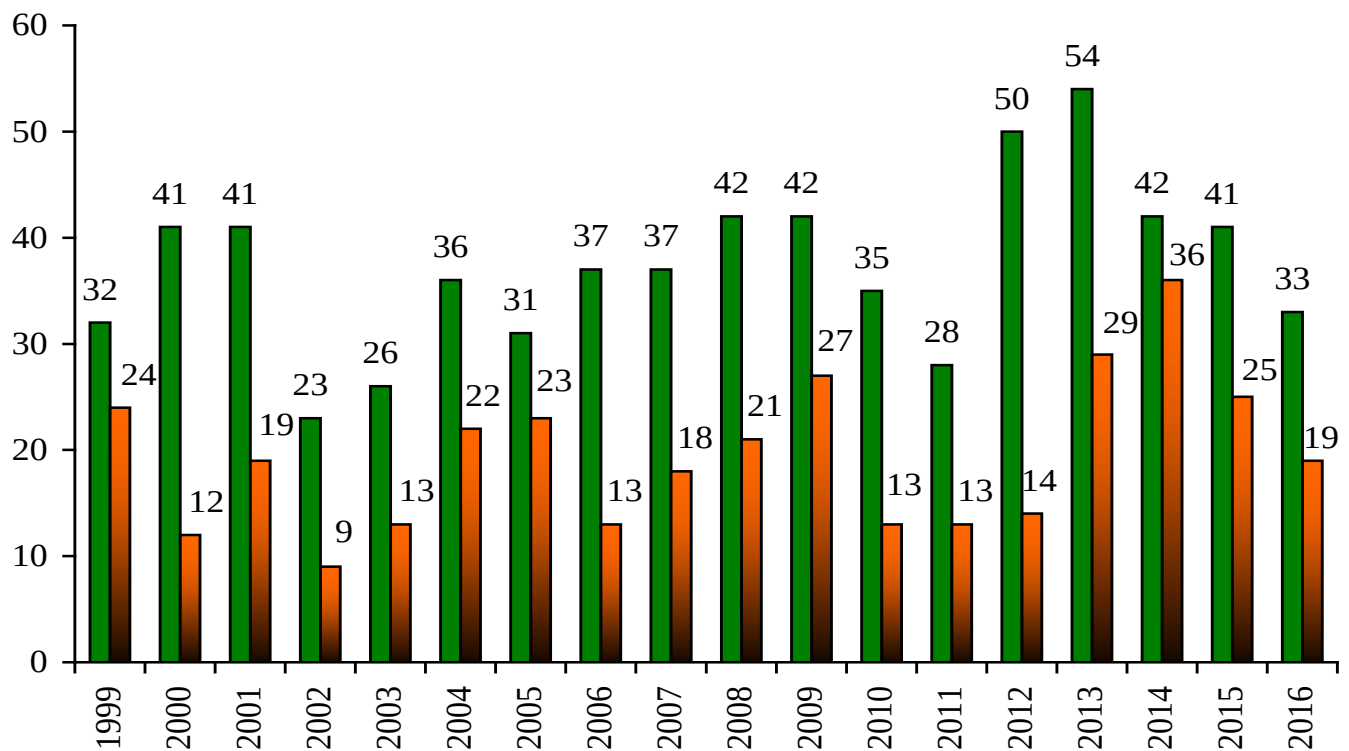
Fisheries resources are managed cooperatively by the Virginia Department of Game and Inland Fisheries (VDGIF) and the Tennessee Wildlife Resources Agency (TWRA). A cooperative agreement was established between the two agencies in June 2010. A "South Holston Lake License" was also established that, when purchased by Virginia or Tennessee residents, will allow the angler to fish the entire reservoir. The agreement also specified some unique regulations, which are detailed in the 2017 Freshwater Fishing Regulation booklet. The reservoir supports a variety of sport fish and forage fish species. Historically, the most popular sport fishes have been smallmouth bass, largemouth bass, crappie, white bass, walleye, trout and various species of sunfish. Channel catfish, flathead catfish, common carp, muskellunge, quillbacks and redhorse suckers also provide angling opportunities. The primary forage fishes include gizzard shad, threadfin shad, and alewives. Most of these species have self-sustaining populations; however, annual stockings maintain walleye and trout populations. Under the terms of the cooperative agreement, walleyes are stocked by VDGIF and trout are stocked by both agencies. Virginia stocks brown trout and Tennessee stocks rainbow and lake trout. Both agencies monitor the status of fish populations by routine sampling, and enhance fish habitat by constructing fish attractors in the reservoir.

The overall management goal for South Holston Reservoir is to provide quality angling opportunities for a diversity of fish species. In order to provide quality fishing opportunities, fish populations need to offer both abundance and a desirable size structure. Fish abundance is measured in terms of how many fish are collected per hour of electrofishing or per net night of sampling. Size structure is measured by looking at the proportion of adult fish in the sample that are larger than a given size. For example, we consider the proportion of adult largemouth bass larger than 15 inches, or the proportion of adult black crappie that are over 10 inches. Catch rates and size structure data provide a standardized means of comparing this year's fish sample to previous years' catch, as well as to the samples collected at other lakes. Catch rates do not represent the number of fish you might catch while fishing, because you may be more or less effective than the sampling gear. Size structure measures give information about the sizes of fish available in the population. Again, this may not match what you see while fishing, since you might be using gear or techniques that target a particular size range, while sampling gear tends to collect small and average-sized fish. It is likely that you will catch fish larger than

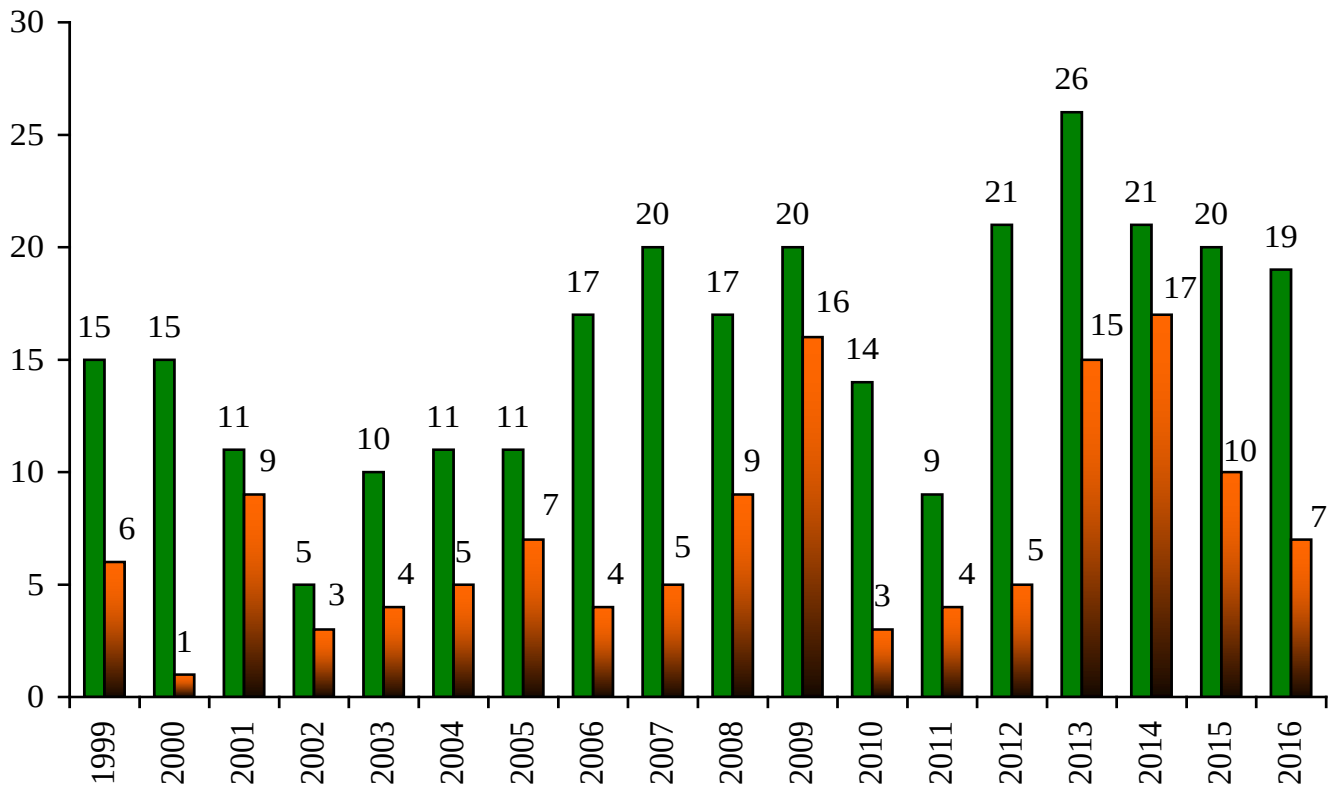
those collected by sampling. The data we collect are best used to track overall trends in fish populations through time.

### Bass

Bass populations in South Holston Reservoir offer decent numbers of good-sized fish. Relative abundance, the number of fish collected per hour of sampling, varies from year to year (Figure 1). The 2016 catch rates were 33 largemouth bass and 19 smallmouth bass per hour of sampling. Catch rates for largemouth bass and smallmouth bass were above average. Water temperature, lake level, recent weather fronts and water clarity can affect sample catch rates. Biologists strive to be consistent with sample dates and sampling effort in order to minimize these confounding effects and obtain data that accurately represent the true abundance of fish in the population each year.



**Figure 1.** Electrofishing catch rates, fish per hour, for largemouth bass (green columns) and smallmouth bass (orange columns) in South Holston Reservoir 1999-2016.

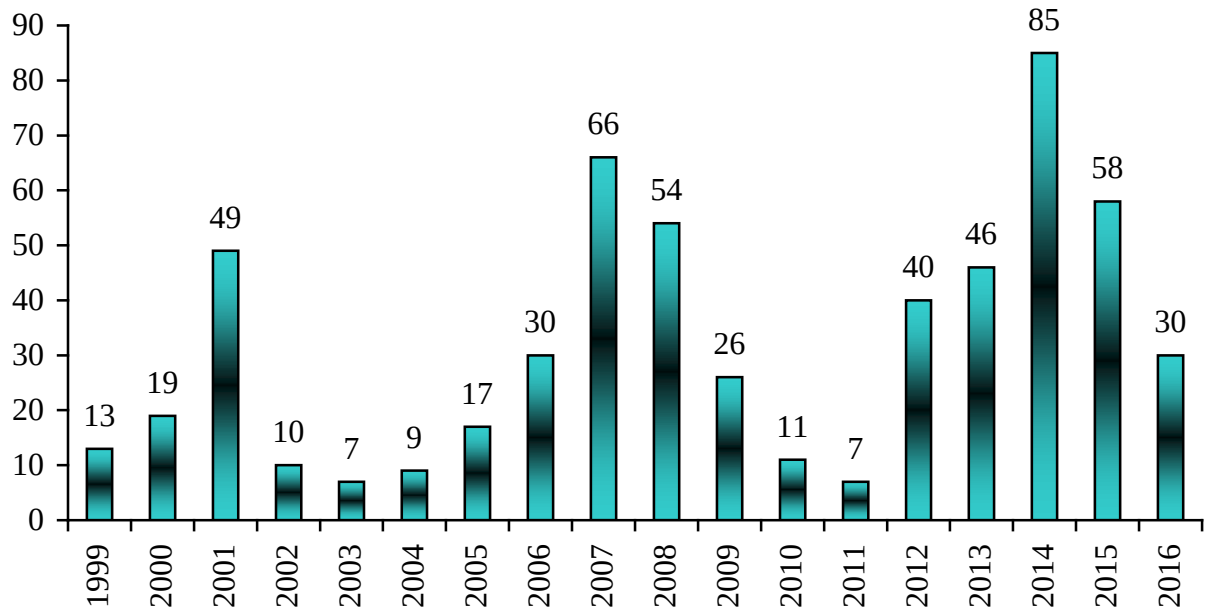


**Figure 2.** Number of preferred size largemouth bass (green columns) and smallmouth bass (orange columns) collected per hour of electrofishing at South Holston Reservoir 1999-2016. Preferred size is 15 inches for largemouth bass and 14 inches for smallmouth bass.

The size structure of the bass populations in South Holston Reservoir is excellent. The 2016 catch rate for preferred-size largemouth bass (15 inches or greater) was similar to what has been documented over the last few years (Figure 2). Sixty-three percent of the largemouth bass collected were 15 inches or longer. The number of preferred-size smallmouth bass collected per hour of sampling in 2016 decreased to 7 per hour. About 38 percent of the smallmouth bass collected in the 2016 sample were longer than 14 inches.

### Crappie

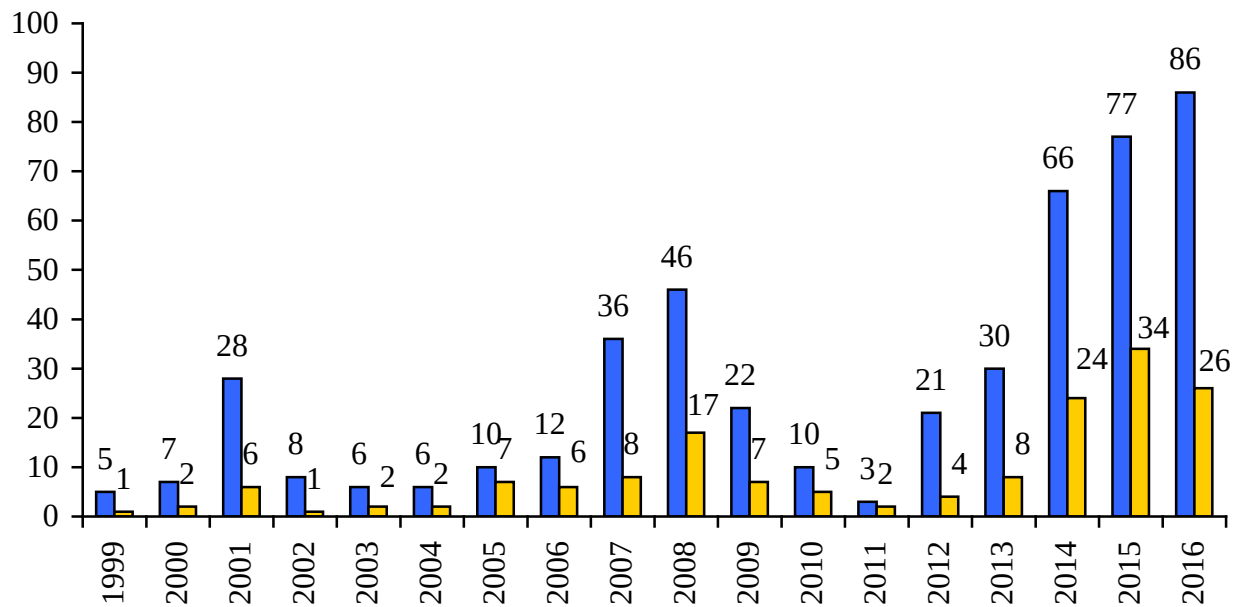
The black crappie electrofishing catch rate in 2016 was about average (Figure 3). Crappie population abundance fluctuates over time, and the highs and lows in abundance are usually the result of spawning success. This cycle of highs and lows is evident in the electrofishing catch rate data presented in Figure 3. Strong year classes from good spawns rapidly increase the population and create excellent fishing opportunities. Missing year classes have the opposite effect.



**Figure 3.** Number of black crappie collected per hour of electrofishing at South Holston Reservoir 1999-2016.

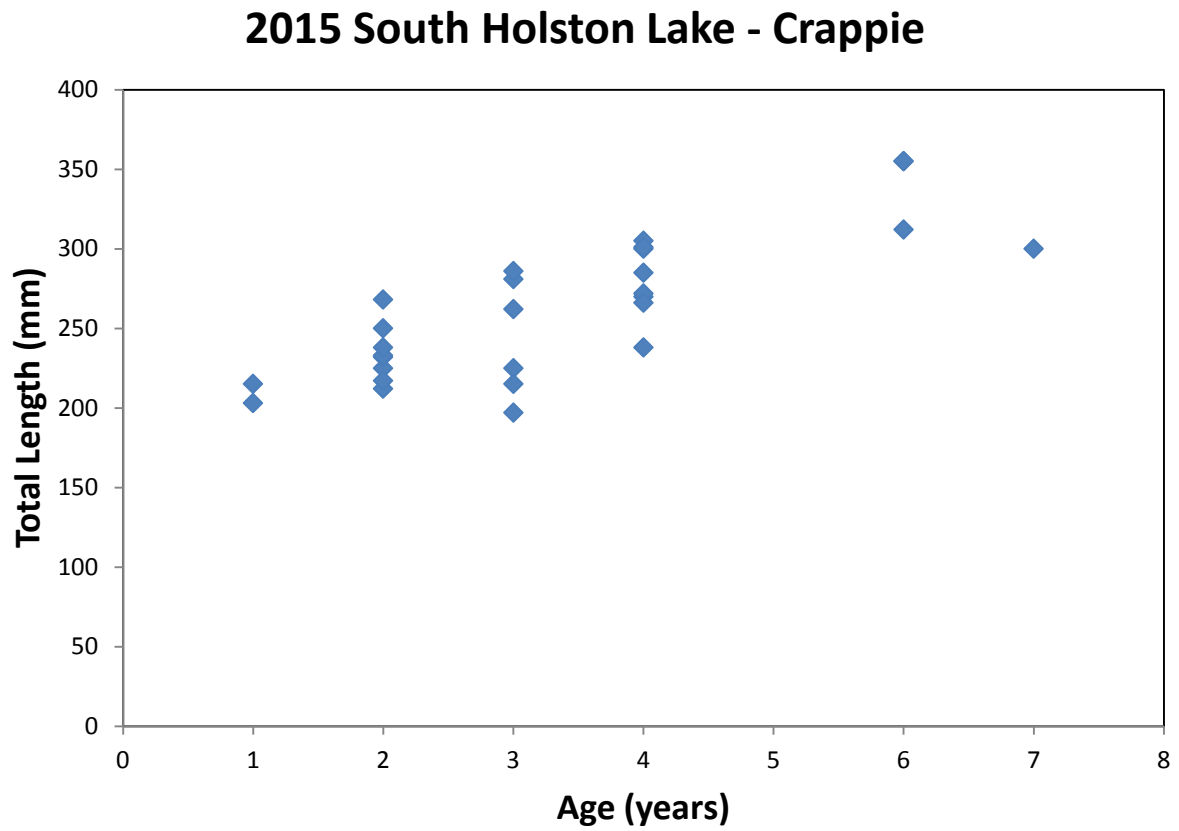
Data collected from 2007 to 2011 indicate a sharp decline in the crappie population abundance at South Holston. The 2012-2014 data shows an increase from strong year classes that have started the rebuilding process and TWRA began a stocking program introducing black-nose black crappie in the lake. The 10-inch minimum size limit should help keep spawning adults in the population and minimize the effects of recruitment failure. In 2014, VDGIF biologists collected one black-nose crappie in the Virginia portion of South Holston Lake.

The size structure of the crappie population was excellent in the 2016 sample. The number of preferred size crappie (10 inches or greater) increased dramatically during 2007 and 2008, but declined sharply in 2009 (Figure 4). The population has been rebuilding since 2012 and is at record levels. Eighty-six percent of black crappie collected in 2015 measured 10 inches in length or larger. These fish should provide good fishing for years to come, and hopefully with suitable spawning conditions and recruitment will continue to be good.



**Figure 4.** Number of preferred and memorable size black crappie collected per hour of electrofishing in South Holston Reservoir 1999-2016. Preferred size (blue columns) is 10 inches for black crappie. Memorable size (gold columns) is 12 inches for black crappie.

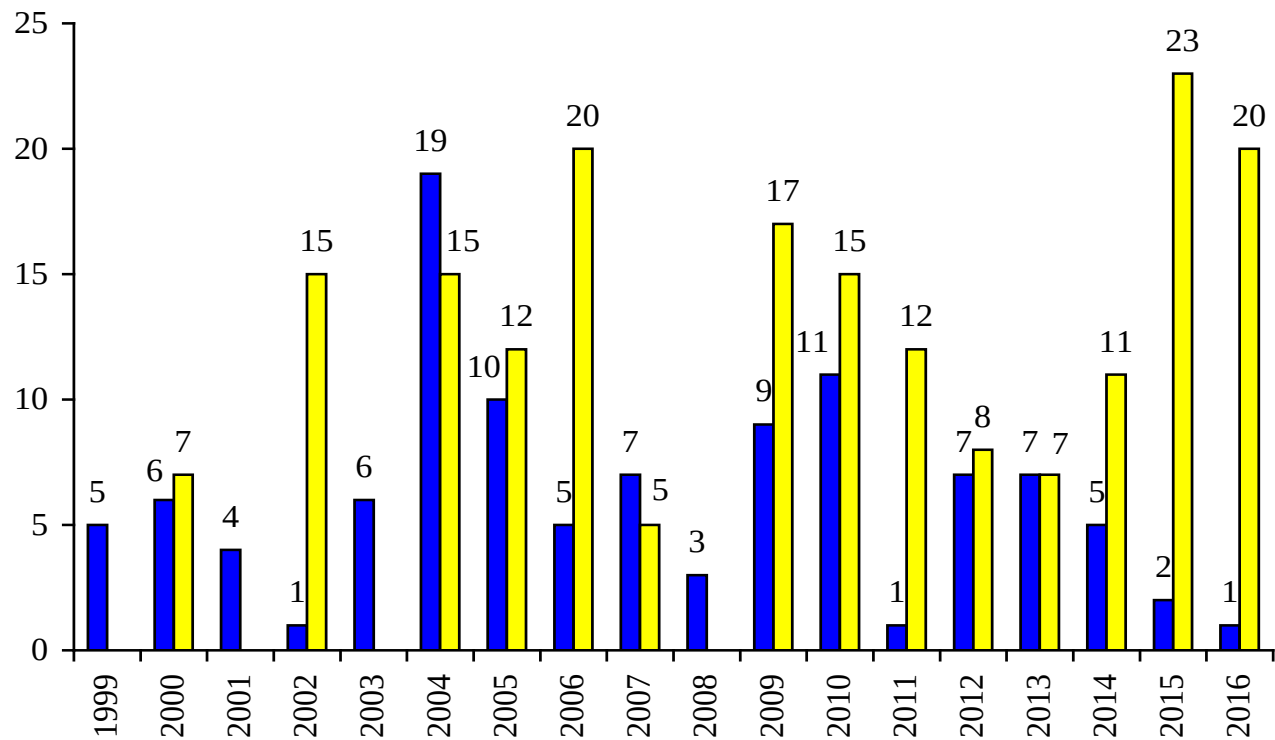
Age and growth data depicts a population that is highly exploited, with the population dominated by individuals less than 5 years of age (Figure 5). South Holston Lake is very productive with abundant forage, which allows for fast growth rates where the majority of the fish reach the legal size of 10 inches (254 mm) by age 3. Angler exploitation is high and fish quickly disappear from the fishery once they reach legal size (Figure 5).



**Figure 5.** Length at age data for black crappie collected from South Holston Reservoir during fall gill net sampling in 2015.

### Walleye

Walleye population abundance in South Holston is measured in two ways. Walleyes are collected during the spring electrofishing sample and with gillnets during the fall. The reason for two sampling methods is that when compared to bass, walleyes are less likely to be associated with shoreline habitat during early April. Because these daytime electrofishing catch rates may not always accurately represent the walleye population, gillnets are also used to collect walleyes. Electrofishing catch rates vary considerably from year to year (Figure 5). Electrofishing catch rates for the April sample were below average (7/hr) at 1 fish per hour in 2016. The 2016 gillnet catch rate of 20 fish per net was almost double the average (12/net night) and is close to the lake record (23/hr).

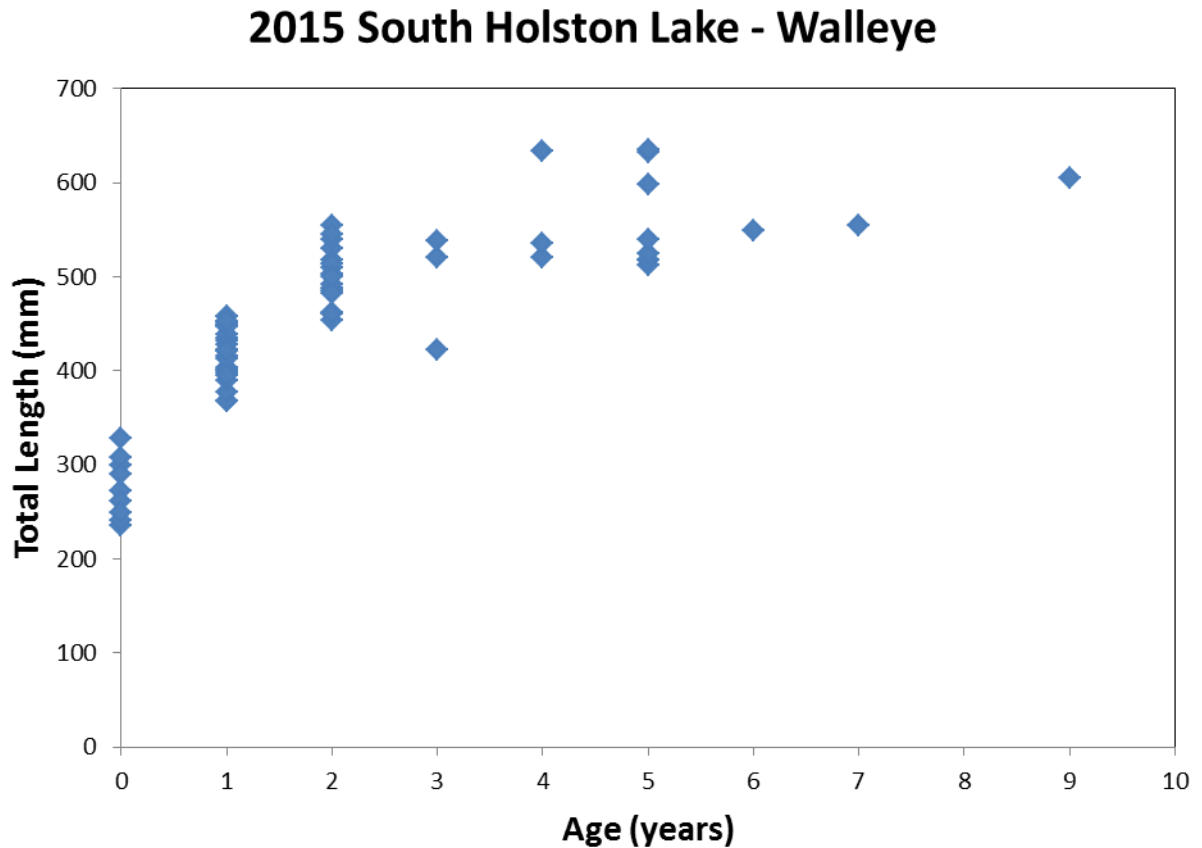


**Figure 5.** Sampling catch rates for walleye in South Holston Reservoir 1999-2016. Blue columns represent spring electrofishing catch rates (fish per hour) and yellow columns represent fall gillnet catch rates (fish per net).

The size structure of the walleye population is good. There are plenty of walleyes longer than the 18-inch minimum length limit. Most of the walleyes collected in fall gillnets were 18 inches or longer.

Growth of stocked walleyes is excellent in South Holston. Most walleyes exceed 10 inches in their first year, measure 15 to 18 inches in their second year, and reach 20 inches by their third year. Walleye growth rates really slow down after age four or five. Male walleyes grow slower than females, and seldom exceed 24 or 25 inches in length. Female walleyes grow faster and may reach lengths of 30 inches or more in South Holston.

Length-at-age data from the fall 2015 gillnet sample shows the range of lengths from ages 1 through 9 (Figure 6). Some of the differences in length at a particular age can be explained by the fact that male walleyes grow slower and have a smaller maximum total length. The differences in growth rates between males and females are most apparent for walleyes over five years old. Female walleyes are four to five inches longer than males of the same age.



**Figure 6.** A summary of length at age data for walleyes in South Holston Reservoir, based on fall gillnet data from 2015. Each diamond represents an individual walleye. For example, at age 2 some walleyes are only 17 inches long and others are more than 21 inches long. Walleye are legally harvestable at 457mm (18 inches).

The walleye population is maintained by annual stocking. Walleye fingerlings are about one inch long at the time of stocking. Walleyes have been actively stocked into South Holston Reservoir since 1986, but stocking rates and frequency greatly increased in 2000 (Table 1).

**Table 1.** Walleye stocking history for South Holston Reservoir 1986-2016. Walleye fingerlings are stocked by the Virginia Department of Game and Inland Fisheries (VDGIF) and the Tennessee Wildlife Resources Agency (TWRA).

| Year | Number Stocked | Stocked by: |
|------|----------------|-------------|
| 1986 | 35,000         | VDGIF       |
| 1987 | 25,457         | VDGIF       |
| 1988 | 52,752         | VDGIF       |
| 1989 | 28,930         | VDGIF       |



|      |                   |               |
|------|-------------------|---------------|
| 1990 | 29,656            | VDGIF         |
| 1991 | 27,300            | VDGIF         |
| 1993 | 30,000            | VDGIF         |
| 1995 | 31,900            | VDGIF         |
| 1997 | 40,400<br>37,900  | VDGIF<br>TWRA |
| 1998 | 39,250            | VDGIF         |
| 1999 | 39,508            | TWRA          |
| 2000 | 146,000           | VDGIF         |
| 2001 | 149,700           | VDGIF         |
| 2002 | 47,533<br>51,411  | VDGIF<br>TWRA |
| 2003 | 179,033<br>17,047 | VDGIF<br>TWRA |
| 2004 | 7,000<br>46,725   | VDGIF<br>TWRA |
| 2005 | 150,000<br>41,199 | VDGIF<br>TWRA |
| 2006 | 180,200<br>26,640 | VDGIF<br>TWRA |
| 2007 | 171,239<br>38,623 | VDGIF<br>TWRA |
| 2008 | 188,514<br>40,921 | VDGIF<br>TWRA |
| 2009 | 190,112<br>24,920 | VDGIF<br>TWRA |
| 2010 | 183,429           | VDGIF         |
| 2011 | 192,842           | VDGIF         |
| 2012 | 142,688           | VDGIF         |
| 2013 | 375,221           | VDGIF         |
| 2014 | 183,953           | VDGIF         |
| 2015 | 199,134           | VDGIF         |
| 2016 | 42,640            | VDGIF         |

### **White bass**

The white bass population has virtually disappeared in recent years. The last good spring run into the headwaters was in 1998. We had not collected a single white bass in population monitoring since 2001 until 2012 when we collected two. Most of the white bass caught by anglers in recent years were very large adults. There are many theories as to why the white bass are gone. Low spring flows and low lake levels during drought years may have affected the reproductive success of the white bass during the 1990's and early 2000's. Since that time, favorable spawning conditions have existed, but it is possible that the adult population was already reduced to the point that a successful spawn was not possible. White bass do not live as long as some other fish species and can be more easily impacted by missing age classes.

A cooperative effort with TWRA was launched in 2010 to restore the white bass fishery. Biologists and hatchery personnel from both agencies are working together to obtain broodstock and produce fry or fingerlings for stocking. In 2010, TWRA provided white bass broodstock that were transported to a Virginia hatchery for spawning. These adult white bass produced 200,000 fry. Both the fry and the adult white bass were stocked into South Holston Reservoir. In 2011-2015, TWRA provided white bass broodstock to Virginia. These adult white bass produced approximately 850,000 fry, and both the fry and the adult white bass were stocked into South Holston Reservoir.

As part of the lake license agreement, catch-and-release regulations have been established to protect white bass in South Holston Reservoir. All white bass caught by anglers must be released unharmed. Hopefully the white bass population will recover as a result of the catch-and-release regulation and continued efforts of TWRA and VDGIF to produce fry and fingerlings for stocking.

**Prepared by: Steve Owens, Fisheries Biologist with the Virginia Department of Game and Inland Fisheries: (276) 783-4860; [Steve.Owens@dgif.virginia.gov](mailto:Steve.Owens@dgif.virginia.gov)**