2006 Electrofishing Survey of Big Ridge State Park Lake

Submitted to

The Tennessee Department of Environment and Conservation

Prepared by

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INTRODUCTION

The Tennessee Wildlife Resources Agency Region IV reservoir data collection unit was asked to sample several Tennessee State Park lakes during the spring of 2006. This work was conducted under an agreement with the Tennessee Department of Environment and Conservation, Division of State Parks to follow a protocol for care of state park lakes. The goal of this management effort is to enhance the quality of fisheries for the enjoyment of park visitors and Tennessee anglers. One of the lakes sampled is contained within Big Ridge State Park located in Union County.

The 1991, 1999, and 2003 fishery survey reports of Big Ridge Lake were used for historical comparison of fish assemblages (Bettoli 1991, Negus 1999, Negus 2003). The sampling methods used by Bettoli were significantly different than those employed during our 1999 - 2006 efforts so only very general inferences can be made.

STUDY AREA

The lake located in Big Ridge State Park is a sub-impoundment of Norris Reservoir (Figure 1). It was created during the late 1930's and contains approximately 16.2 hectares. The maximum depth is approximately 9.8 m and the underwater topography is moderately steep (Bettoli 1991). Visual inspection reveals a water clarity and color similar to Norris leading one to assume the lake has moderately low fertility.

During the early spring of certain high-water years, Norris Reservoir rises above the level of the small dam. Although there is a wire screen to limit movement of fish between the two bodies of water, gaps in the barrier allow some movement of fish. No private boats or gasoline engines are allowed in the lake, but rental boats are available to anglers. A large swimming beach is popular with visitors.

METHODS

Electrofishing is the most efficient method to collect black bass and other game fish. We used standardized electrofishing procedures outlined in our 1998 reservoir fisheries assessment guidelines to sample this lake (TWRA 1998).

A 5.5 m boat electrofisher was used. The boat was equipped with a front-mounted electrode system with two independent pole mounts terminating in cable arrays. The arrays had six droppers of 9.5 mm stainless steel cable spread 45.7 cm apart. Collections were made using pulsed DC current set at 120 pulses per second and 7-8 amps.

Four, 900 second electrofishing runs were performed on May 30, 2006. All bass, walleye, and crappie observed were collected, but sunfish, shad, and rough fish were only netted to determine the species composition in the lake. Fish were measured to the nearest millimeter and weighed to the nearest gram and released.

Analysis of data included calculations of proportional stock density (PSD), relative stock density (RSD), and relative weight (Wr) (Wege and Anderson 1978; Anderson 1980; Alexander and Brown 1987). National standard weights were used in the relative weight analysis.

RESULTS

Fourteen fish species were collected during the 1.0 hours of electrofishing performed on May 30, 2006 (Table 1). Largemouth bass, spotted bass, and bluegill were the most numerous game fish in the sample. The major forage species include spotfin shiner, gizzard and threadfin shad, and bluegill.

Our electrofishing catch rate of largemouth bass (38.0/hr) was lower than the 2003 rate (68.0/hr), but higher than that recorded in 1999 (25.0/hr). Only five largemouth greater than the 355 mm length limit were collected indicating the size structure of the population has deteriorated since 2003.

Relative weight values for largemouth bass were less than ideal (95 - 105) though comparable to that seen in Norris Reservoir (Figure 3). These moderately low Wr values do not necessarily mean there is a problem since they are typical in infertile systems like Norris and Big Ridge Lake.

Thirty-one percent of the bass collected were spotted bass. Unlike largemouth and smallmouth bass, this species rarely reaches quality-size in any East Tennessee impoundment. They also utilize the same habitat and compete with the more desirable smallmouth bass. As a result, anglers are encouraged to keep these fish for the table. There is no size restriction and the limit is 15 spotted bass per day.

Only two of the 15 crappie collected were greater than the 254 mm minimum length limit. Electrofishing is biased towards capturing larger-sized crappie so this sample indicates a rather poorly structured population.

MANAGEMENT RECOMMENDATIONS

Creel limits for Big Ridge are the same as those imposed by the TWRA for Norris Reservoir. Park rangers are encouraged to continue enforcing these limits and promote the catch and release of largemouth bass. Limiting the harvest of largemouth would increase predation on the numerous small sunfish and improve the size structure of largemouth, bluegill, and redear.

The creel limit for spotted bass is 15 per day with no size limit. Spotted bass do not attain quality size in our East Tennessee impoundments and their harvest is encouraged. The increased harvest of this species will help improve the quality of the more desirable largemouth bass.

It is generally accepted that crappie are poorly suited for small impoundments. They tend to over populate and few reach harvestable-size. They are not overly abundant in the lake suggesting anglers are harvesting adequate numbers to keep this species in check.

Walleye occasionally enter the lake during high water periods via the damaged screen in the dam. Stocking at a recommended rate of 12.5 per hectare is suggested provided the screen is repaired to prevent escape.

Future sampling might also include shoreline seining. This is an easy method of locating smaller, shoreline oriented species and gives one an estimate of spawning success of game fish.

LITERATURE CITED

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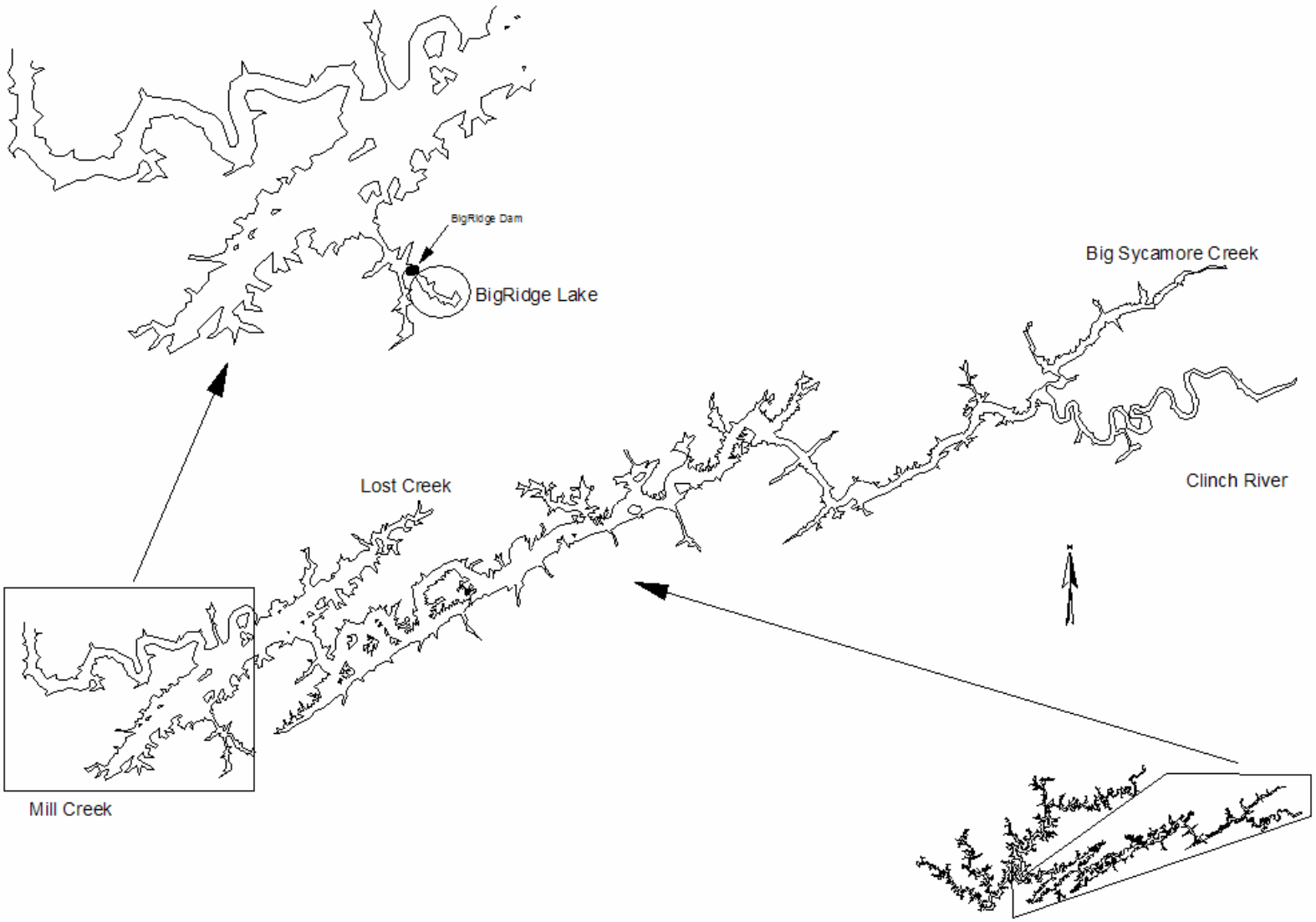

Figure 1. Location of Big Ridge State Park lake, a subimpoundment of Norris Reservoir.

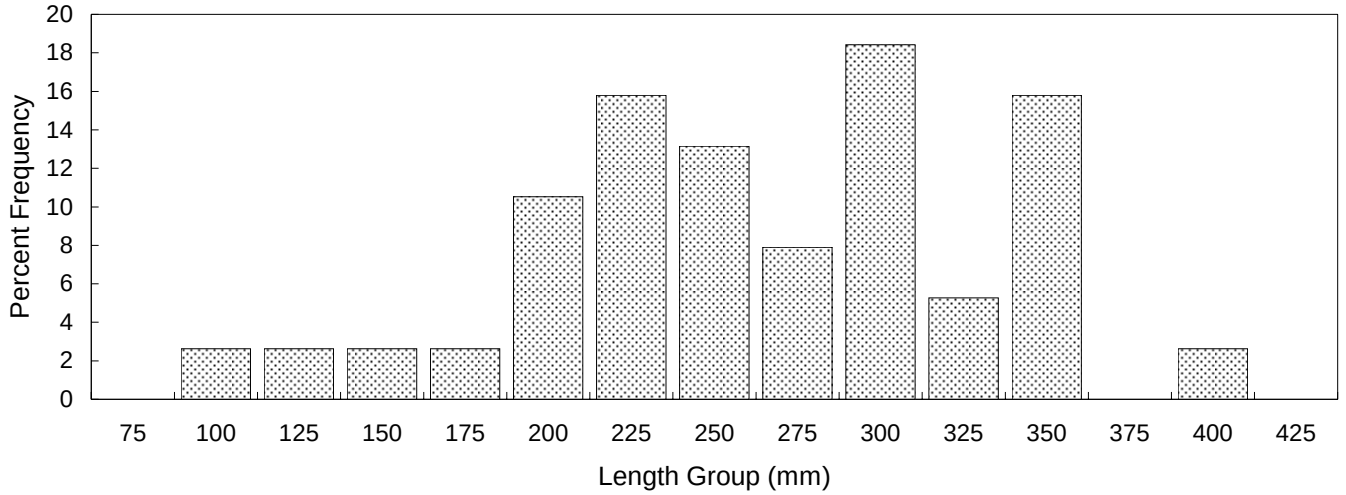

Figure 2. Big Ridge State Park Lake largemouth bass length frequency by percent for TWRA's 2006 electrofishing sample (n=38)

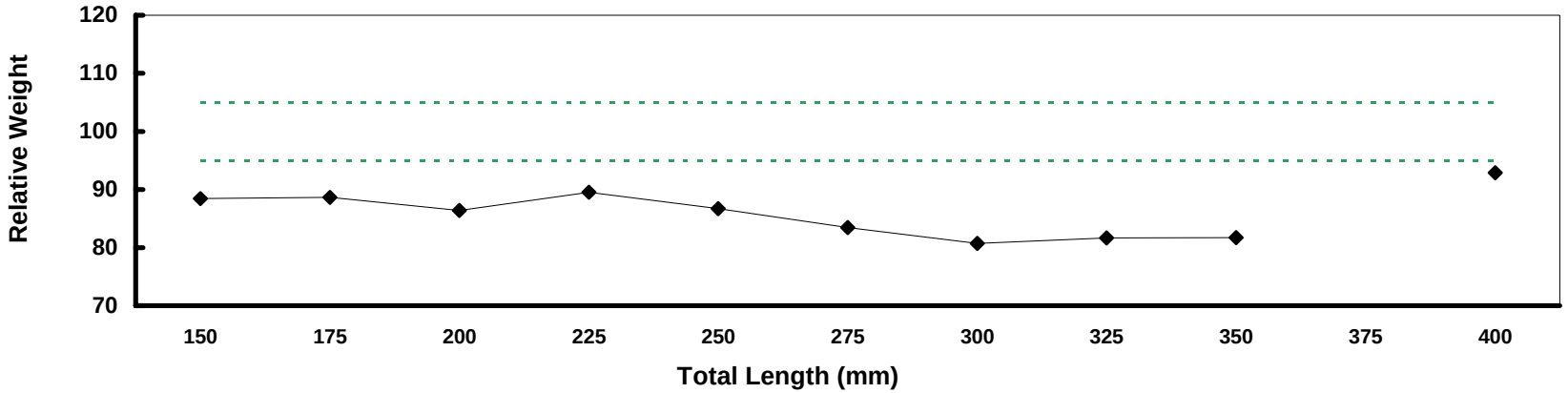

Figure 3. Big Ridge largemouth bass mean relative weight values from the 2006 electrofishing sample (n=36).

Table 1. Species collected in Big Ridge State Park impoundment during the 2006.

Species Collected
Black Crappie
Bluegill
Brook Silverside
Common Carp
Flathead Catfish
Freshwater Drum
Gizzard Shad
Largemouth Bass
Longnose Gar
Redear Sunfish
Spotfin Shiner
Spotted Bass
Threadfin Shad
White Crappie