North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

Mr. Tim Grant, Director
Winston-Salem Recreation and Parks Department
P.O. Box 2511
Winston-Salem, North Carolina 27101

March 3, 2014

Dear Mr. Grant,

As per our cooperative agreement, this is a summary of the fisheries management activities completed by the Division of Inland Fisheries on Salem Lake and Winston Lake during 2013.

Salem Lake

On May 10, Commission personnel conducted an electrofishing survey of the Salem Lake fish community. The overall objective of these surveys has been to monitor largemouth bass population characteristics over time, with the 2013 survey in particular being conducted to evaluate the fishery following a drawdown of the lake that occurred between fall 2010 and summer 2012. During this period the 365 acre lake was reduced to approximately 80 acres.

Six survey sites, each containing approximately 300 m of shoreline, were electrofished. All largemouth bass were collected, measured, and weighed to the nearest gram. The size structure of largemouth bass was assessed with length-frequency histograms and calculations of proportional size distribution for quality (PSD) and preferred-size fish (PSD-P). Catch-per-unit-effort (CPUE) was calculated to assess fish densities and body condition was assessed using relative weight indices. The calculation of these values is explained in Appendix 1.

Lengths of captured largemouth bass ranged from 92 mm (4 in.) to 540 mm (21 in.). Unlike previous years when most captured fish were > 380 mm (15 in.) in length, the majority (64%) of fish collected during the 2013 survey were < 380 mm (Figure 1). PSD was 94 while PSD-P was 63 (Figure 2). These values are considerably higher than the desired ranges of 40-70 for PSD and 10-40 for PSD-P and indicate a high proportion of quality (≥ 300 mm) and preferred-size fish (≥ 380 mm) fish in relation to stock-sized fish (≥ 200 mm).

While these size index values have always been higher than normal due to the fact that our electrofishing gear does not sample bass < 300 mm long in proportion to their true abundance in Salem Lake, the values from the 2013 sample were atypically high, due in large part to the

Mailing Address: N.C. Wildlife Resources Commission • 1701 Mail Service Center • Raleigh NC 27699-1701
Telephone: (919) 707-0010

unusually low number of 200–300 mm fish that were collected. While elevated, PSD-P was within the usual range of values observed in Salem Lake, but the PSD value of 94 was the highest obtained since 1996. While the high values of both size indices were mainly driven by the lack of stock–sized fish collected in this survey, the fact that PSD-P values did not increase proportionally to PSD values indicates that the abundance of preferred-size fish (≥ 380 mm) was also lower than normal. Given the extreme contraction of available habitat that occurred during the drawdown, changes such as these are not unexpected and will hopefully be short-lived as the population recovers.

The lack of 200–300 mm fish collected in 2013 is likely due to poor survival of young bass spawned during the spring of 2011 while the lake was drawn down. While bass may have been able to successfully spawn during the spring of 2011, young bass were confined in a small pool of water with no shoreline habitat to provide refuge from adult largemouth bass and other piscivorous fish species, likely lowering their survival. Conversely, an unusually high number of fish in the 100–200 mm length range was collected in 2013. Fish in this size range would have been spawned in the spring of 2012. Although the lake was still drawn down during the 2012 spawning season, water levels began to return to normal shortly thereafter, providing newly-spawned fish with access to complex cover in the form of trees, shrubs, and grasses that sprouted along the shoreline while the lake was drawn down. Similar to the survival of young fish being reduced when no shoreline cover is available to provide refuge from predators during the growing season, survival of young fish often increases when abundant shoreline cover becomes available, and access to newly inundated cover in the summer of 2012 likely explains the increased survival of the 2012 year class. Additionally, the lack of competition with and predation from the reduced 2011 year class may have also helped the survival of largemouth bass hatched during spring 2012.

Catch rates (47 fish/hour) were the lowest recorded since 1999 despite the tremendous number of 100–200 mm bass that were collected. The decline in CPUE appears to have been driven by the poor survival of the 2011 year class along with the apparent decrease in preferred-size fish. As previously noted, the 2012 spawn appeared to be extremely successful. This strong year class, coupled with the improved water levels and an increase in shoreline habitat, will hopefully allow the densities of largemouth bass to rebound quickly. Future surveys will allow us to evaluate the expected improvement of largemouth bass densities at Salem Lake. Finally, relative weights appeared to be very good, with a mean relative weight of 97 (Figure 4). This is the highest mean relative weight obtained since the 2005 survey and it suggests that ample forage is available.

In addition to the electrofishing survey conducted in April 2013, the Commission also resumed the supplemental stockings of channel catfish (4,000) and hybrid striped bass (3,000) that were temporarily suspended while the lake was drawn down.

Winston Lake

Fisheries management activities on Winston Lake included the stocking of 1,000 channel catfish /month from April through September as part of the NCWRC's Community Fishing Program (CFP). No other management activities occurred at Winston Lake during 2013.

If you have any questions concerning this report or other issues regarding fisheries management on Salem Lake or Winston Lake, please do not hesitate to contact either myself (336-877-1087) or Kin Hodges (336-443-9436). We look forward to working with you in the future.

Sincerely,

Kevin Hining
District 7 Fisheries Biologist I

CC: Kin Hodges, District Fisheries Biologist
David Yow, Mountain Region Warmwater Fishery Research Coordinator

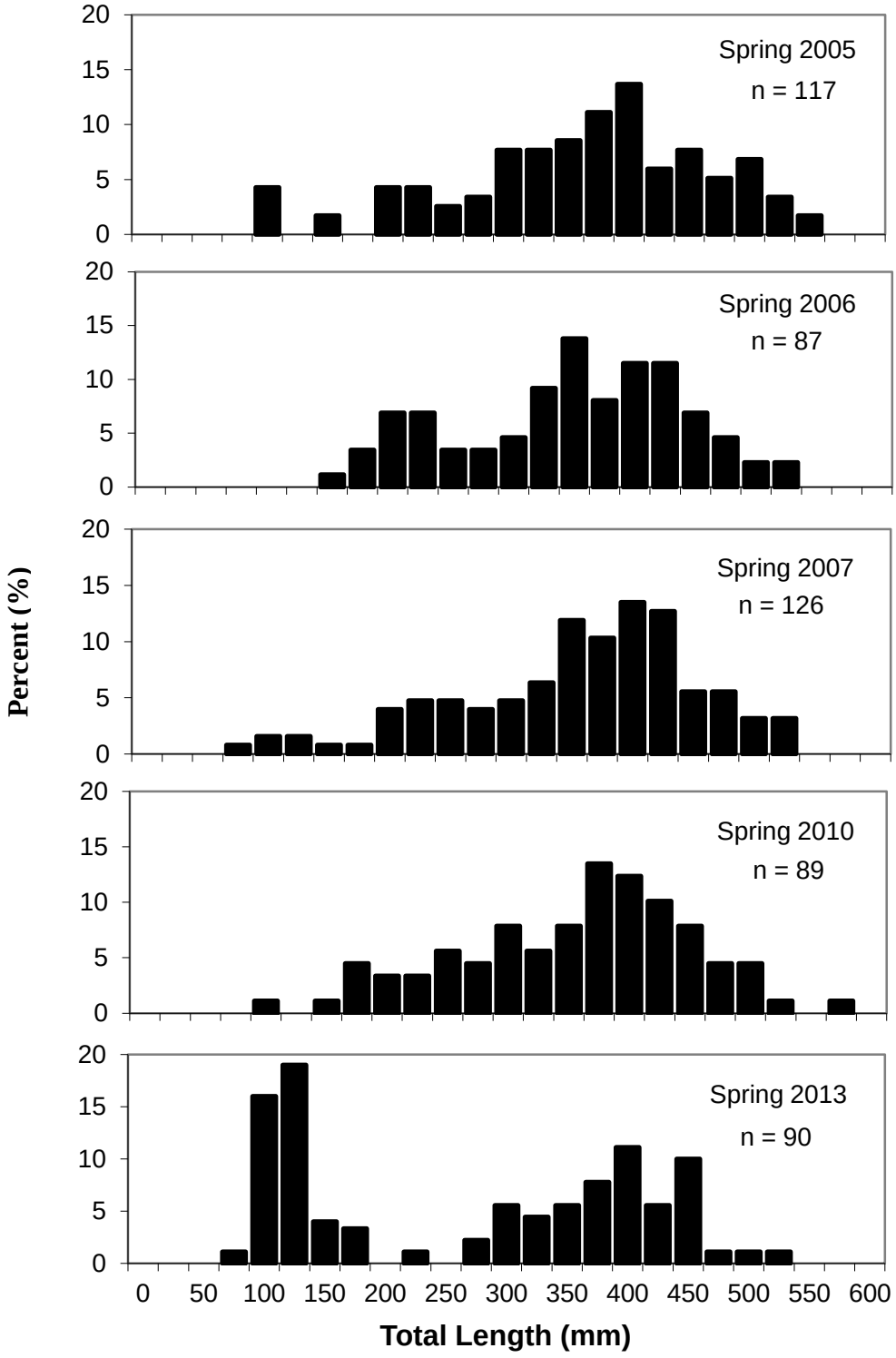

FIGURE 1.—Length-frequency distribution of largemouth bass collected from Salem Lake, 2005–2013.

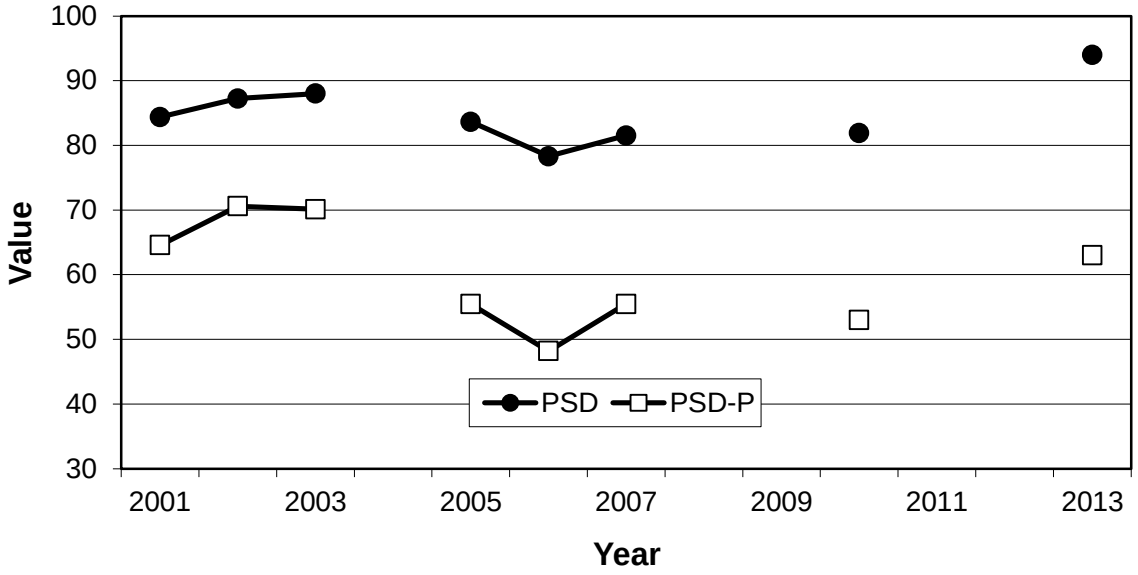

FIGURE 2.—Proportional size distribution for quality (PSD) and preferred-size (PSD-P) largemouth bass from Salem Lake, 2001–2013. Years with no value reported represent years when sampling did not occur.

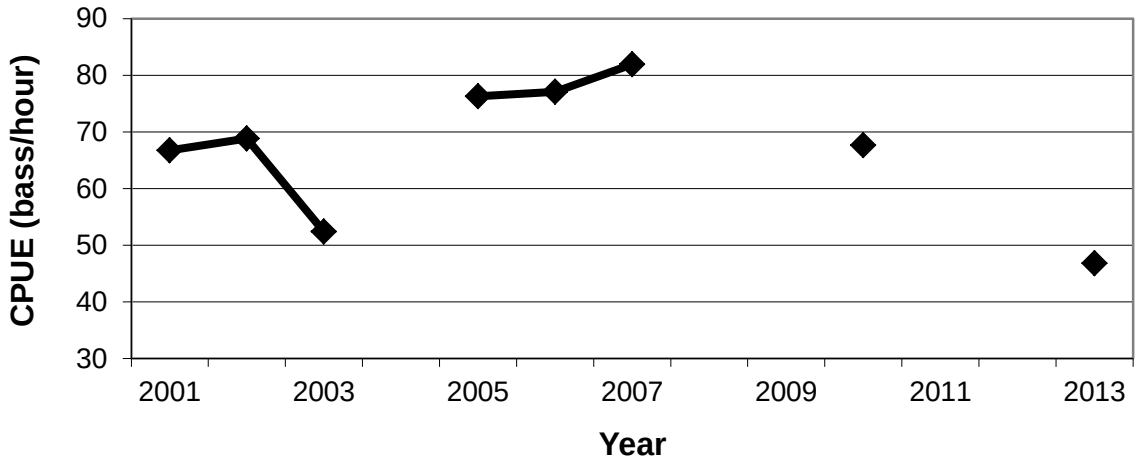

FIGURE 3.—Catch per unit effort (CPUE) of largemouth bass collected from Salem Lake, 2001–2013. Years with no value reported represent years when sampling did not occur.

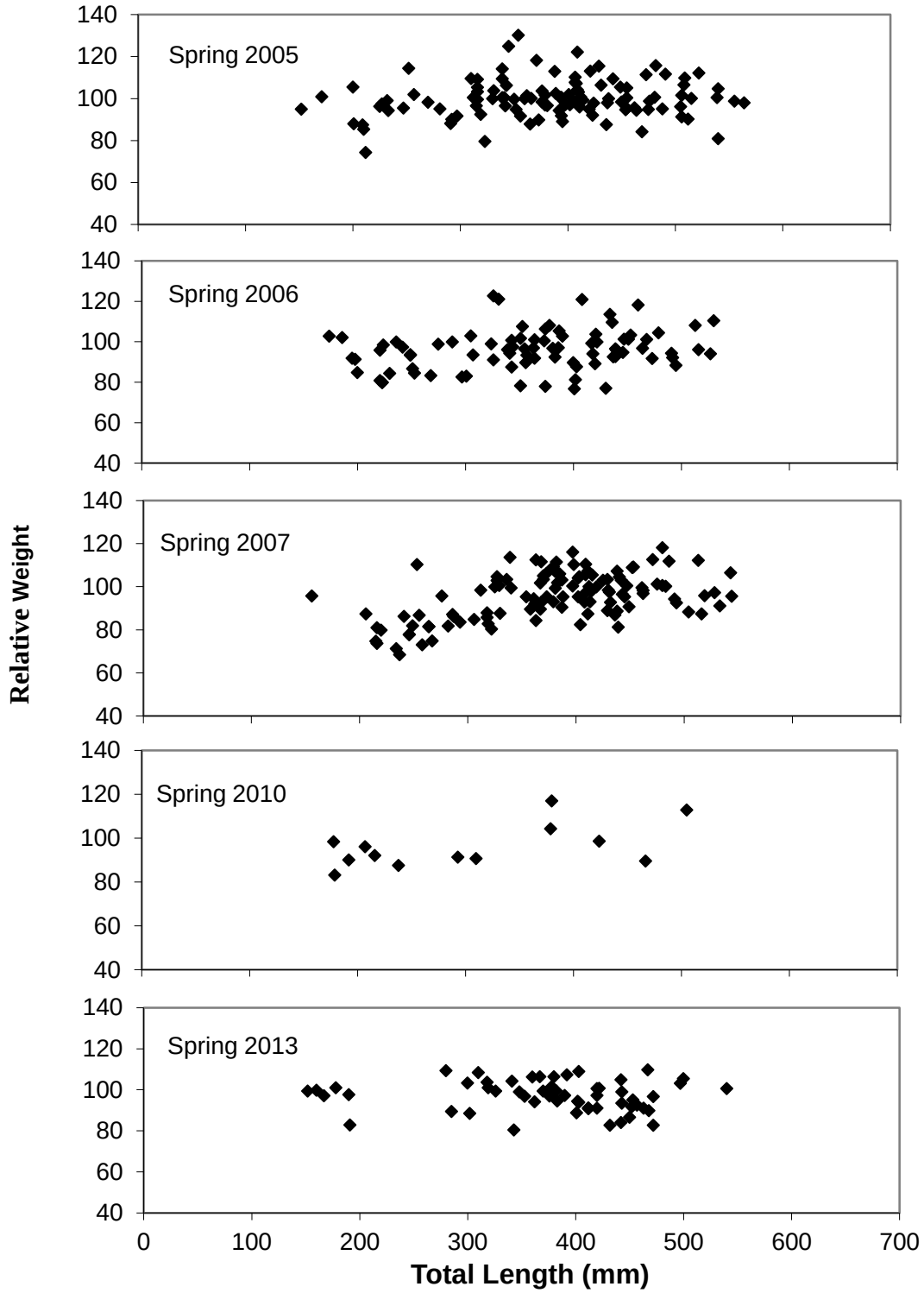

FIGURE 4.—Relative weights of largemouth bass from Salem Lake, 2005–2013.

Appendix 1

Proportional Size Distribution (PSD) is expressed as the percentage of the stock that is of quality size:

$$PSD\ (\%) = \frac{\text{number} \geq \text{quality size} \times 100}{\text{number} \geq \text{stock size}}$$

where for largemouth bass quality size is defined as 300 mm (12 in.) and stock size is defined as 200 mm (8 in.). Balanced largemouth bass - bluegill populations generally exhibit PSD values between 40 and 70%; PSD values in excess of 70 % are indicative of a largemouth bass population with low annual recruitment.

Proportional Size Distribution-Preferred (PSD-P) is expressed as the percentage of the stock that is of preferred size:

$$PSD\text{-}P\ (\%) = \frac{\text{number} \geq \text{preferred size} \times 100}{\text{number} \geq \text{stock size}}$$

where for largemouth bass preferred size is defined as 380 mm (15 in.). PSD-P values ranging from 10 to 25 % are common in balanced bass-bluegill populations; PSD-P values in excess of 40 % are indicative of a largemouth bass population with low annual recruitment and low mortality of large individuals.

Relative Weight (Wr) is expressed as a ratio of an individual's weight (W) relative to a standard weight (Ws) for a given species:

$$Wr = \frac{W}{Ws} \times 100$$

where for largemouth bass $Ws = 10^{-5.316 + 3.191 \log TL}$ The average Wr for largemouth bass of a balanced population usually falls within the range of 100 ± 5.