

# **NEELY HENRY RESERVOIR MANAGEMENT REPORT**

2007

Prepared by

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## **Introduction**

The objective of the Neely Henry Reservoir management plan is to collect quantitative biological data that will assist the Fisheries Section in determining management strategies to enhance the fishery. Fish were collected and data analyzed according to instructions in the Fisheries Section's Reservoir Management Program Manual. Relative stock densities (RSD), relative abundance, growth, mortality, and relative weights were calculated for largemouth and spotted bass. Alabama Wildlife and Freshwater Fisheries Division previously sampled largemouth and spotted bass from Neely Henry Reservoir in 1988, 1994, 1998, 2002, and 2004 (Floyd and Catchings 1989; Catchings and Smith 1994; Catchings et al 1999; Catchings et al 2002; Catchings and Andress 2005). A detailed description of the study area to include climatic and physical characteristics of the reservoir can be found in the 1988 management report (Floyd and Catchings 1988). A summary of morphometric, physical, and chemical characteristics is listed in Table 1 of this report.

## **Methods**

Neely Henry Reservoir was sampled April 9-11, 2007 according to the guidelines of the Reservoir Management Program Manual (Cook 1999) electrofishing target species included largemouth and spotted bass. Length, weight, and otoliths were taken from largemouth and spotted bass. Electrofishing gear consisted of an 18-ft aluminum boat with bow mounted electrodes. A 5,000-watt generator and a Smith Root 5.0 GPP electrofisher were used to provide 300 to 1008-volts of pulsed direct current. Electrofishing consisted of a 30-minute sample at each of 10 randomly selected sites (Figures 1A & 1B). Sampling sites were selected in the following manner:

- (1) The reservoir shoreline was divided into one mile segments from two miles above the mouth of Big Canoe Creek downstream to the dam;
- (2) The one mile shoreline segments were numbered and eight sites were randomly selected for sampling using a random number table;
- (3) Two upriver shoreline sites were randomly selected for sampling to include a one mile shoreline site from river mile 14 to river mile 28 and a one mile shoreline site from river mile 29 to river mile 33;
- (4) Any site, which posed problems with sampling because of physical features such as water depth or abundance of snags, was eliminated.

Target species were collected for either the entire 30-minute sample period or designated times within the 30 minute sample period.

## **Results**

Relative stock density (RSD) indicated that the largemouth bass population was again dominated by stock-size fish, (39%, cpe = 13.4), as it was in 2004 (49%, cpe = 12.8) and exceeded the lake average (Table 2, Figure 3). Quality-size bass represented 34% of the sample, rebounding from 2004 (13%) and exceeding the lake average (30%) and statewide mean (33%). Preferred-size fish abundance, decreased to 23% because of the numbers of smaller largemouth bass present from the strong year classes of 2004 through 2006. However, preferred-size fish still exceeded the statewide mean value (Jim McHugh, AL Game and Fish, unpublished data). CPE of S-T (34.8) approximated the lake average. Memorable-size bass structure (4%) equaled the statewide mean and surpassed the lake average. Relative weight (Wr) values were good for all RSD length groups and exceeded the upper 75<sup>th</sup> percentile values for stock through preferred-size bass, while Wr of the memorable-size fish slightly exceeded the statewide mean.

Largemouth bass growth increased, for age classes 1, 2, and 3 (Table 3, Figure 4), while growth decreased slightly for age classes 4 and 5 (Table 8, Catchings and Andress 2005). Largemouth bass mean length at age 1 increased from below the 25<sup>th</sup> percentile in 2004, to exceeding the upper 75<sup>th</sup> percentile in 2007 (Mike Maceina, Auburn University, unpublished data). Age 2 largemouth bass growth was below the 25<sup>th</sup> percentile in 2004, but increased to slightly more than the statewide average in 2007. Growth at age 3 approximated the state mean value, a slight increase. Age 4 growth declined from approximating the 75<sup>th</sup> percentile in 2004 to slightly more than the statewide median value in 2007. The numbers of older largemouth bass continue to increase slightly in the sampling (Table 3). In 2002 age 5 and older largemouth bass comprised only 8.5% of the sample; however, in 2004 they comprised 16.4% of the sample and in 2007 they represented 17.3% of the sample. Largemouth bass mortality for ages 3-9 (n= 108) was estimated to be 44% ( $P < 0.05$ ,  $r^2 = 0.93$ ; Figure 5).

The Bass Anglers Information Team (B.A.I.T.) report for 2006 (Abernethy 2007) ranked Neely Henry Reservoir 13<sup>th</sup> statewide by quality indicators of fishing success. Among the 20 reservoirs for which five or more tournament reports were received, Neely Henry ranked 3<sup>rd</sup> in percent success, 9<sup>th</sup> in bass per angler-day, 12<sup>th</sup> in pounds per angler-day, 16<sup>th</sup> in average weight of bass caught, and 15<sup>th</sup> in hours to catch a bass > 5 pounds.

Although the CPE (28.6) for spotted bass declined from the record number sampled in 2004, the population appears to be in good shape (Table 2). Preferred-size spotted bass were most abundant (CPE = 9.8) and were the dominant RSD group (37%) exceeding the statewide 75<sup>th</sup> percentile again for the fourth consecutive sample (Table 2, Figure 7). The memorable-size spotted bass RSD value (11%) surpassed the statewide 75<sup>th</sup> percentile for the third consecutive sample. The P-T CPE (12.8) was almost double the statewide 75<sup>th</sup> percentile value. The stock-

size spotted bass RSD value (23%) dropped below the statewide lower 25<sup>th</sup> percentile, while the quality-size spotted bass RSD value (28%) remained the same, slightly below the state mean value.

Growth was faster in 2007 compared to 2004 for age 1 through age 4 spotted bass, while slightly slower for age 5 spotted bass (Table 4 & Figure 8). Age 2 spotted bass growth equaled the state mean value, age 3 and age 4 bass growth exceeded the state mean and age 5 growth was below the state mean value. Growth for ages 2-5 spotted bass was within the 25<sup>th</sup> to 75<sup>th</sup> percentile of statewide growth (Mike Maceina, Auburn University, unpublished data). Mortality was 46% for spotted bass from age 3 to age 9 ( $P < 0.005$ ,  $r^2 = 0.92$ , Figure 9).

Relative weight values improved in all RSD groups of spotted bass from the 2004 sample (Table 2). Spotted bass  $W_r$  values equaled or exceeded the statewide upper 75<sup>th</sup> percentile values in stock, quality, and preferred-size groups, while memorable-size group spots were slightly below the upper 75<sup>th</sup> percentile.

### **Conclusions**

The black bass population in Neely Henry Reservoir continues to be in excellent condition. There is adequate recruitment, generally improved growth rates, and outstanding relative weight values. Spotted bass in the preferred and memorable-size groups continue to exceed the statewide 75<sup>th</sup> percentile values as they have for the last four and three years sampled, respectively. At the present time no additional harvest restriction is warranted.

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# Appendix A

## Tables and Figures

Table 1. Neely Henry Reservoir morphometric, physical and chemical characteristics.

Surface area	11,235	acres
Drainage area	6,600	sq. mi.
Full pool elevation	508	feet-msl
Mean annual fluctuation	4	feet
Shoreline distance	339	miles
Shoreline development index	22.83	
Mean depth	11	feet
Maximum depth	53	feet
Outlet depth	500	feet
Total dissolved solids	110	mg/l
Morphoedaphic index	10.0	TDS/mean depth(ft) (Ryder 1965)
Growing season	200	frost free days (Jenkins 1967)
Year of impoundment	1966	



Table 3. Age composition and mean length of largemouth bass collected from Neely Henry Reservoir, spring 2007.

Annulus	Year		Number	Percent	CPE	Mean		Length Range
	Class					Length	SE	
1	2006		43	21.9	8.6	192.9	6.0	97-247
2	2005		44	22.4	8.8	274.6	4.0	203-322
3	2004		58	29.6	11.6	339.8	6.9	233-398
4	2003		17	8.7	3.4	396.9	8.7	317-482
5	2002		15	7.7	3.0	442.8	10.8	332-494
6	2001		8	4.1	1.6	477.4	12.2	419-523
7	2000		8	4.1	1.6	497.8	9.3	457-534
8	1999		2	1.0	0.4	540.0	2.0	538-542
9	1998		1	0.5	0.2	473.0		
Total			196	100.0	39.2			

Table 4. Age composition and mean length of spotted bass collected from Neely Henry Reservoir, spring 2007.

Annulus	Year		Percent	CPE	Mean		
	Class	Number			Length	SE	Length Range
1	2006	12	8.4	2.4	133.8	7.0	98 -177
2	2005	34	23.8	6.8	255.6	5.2	186 -334
3	2004	44	30.8	8.8	336.0	4.5	262 -398
4	2003	27	18.9	5.4	393.4	4.4	351 -428
5	2002	15	10.5	3.0	423.7	6.6	386 -460
6	2001	5	3.5	1.0	424.8	10.6	398 -450
7	2000	5	3.5	1.0	480.8	7.7	461 -503
8	1999	0	0.0	0.0	0.0	0.0	
9	1998	1	0.7	0.2	417.0		
Total		143	100.0	28.6			

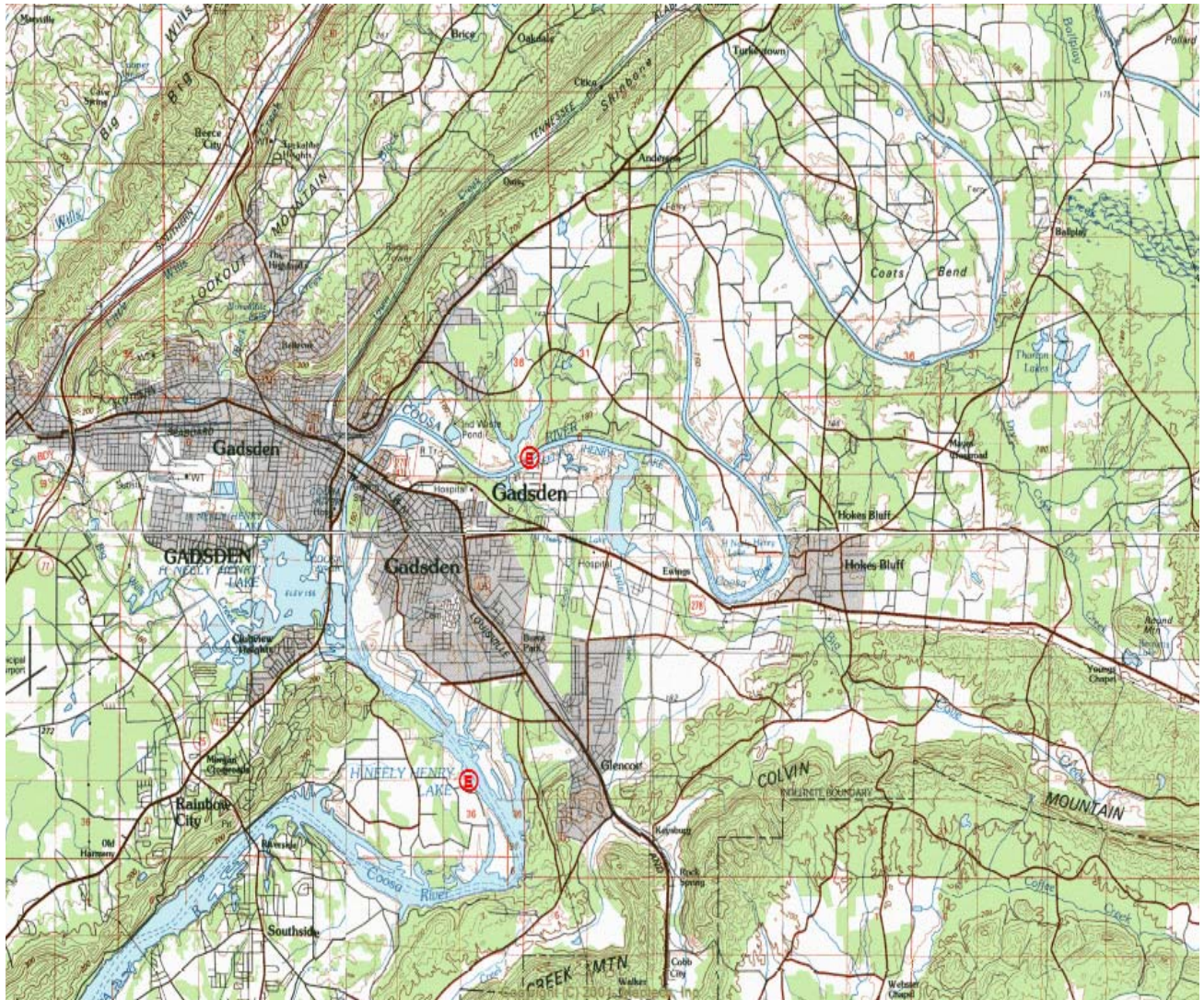


Figure 1A. Upriver electrofishing sample sites on Neely Henry Reservoir.  
Electrofishing sample sites = **E**

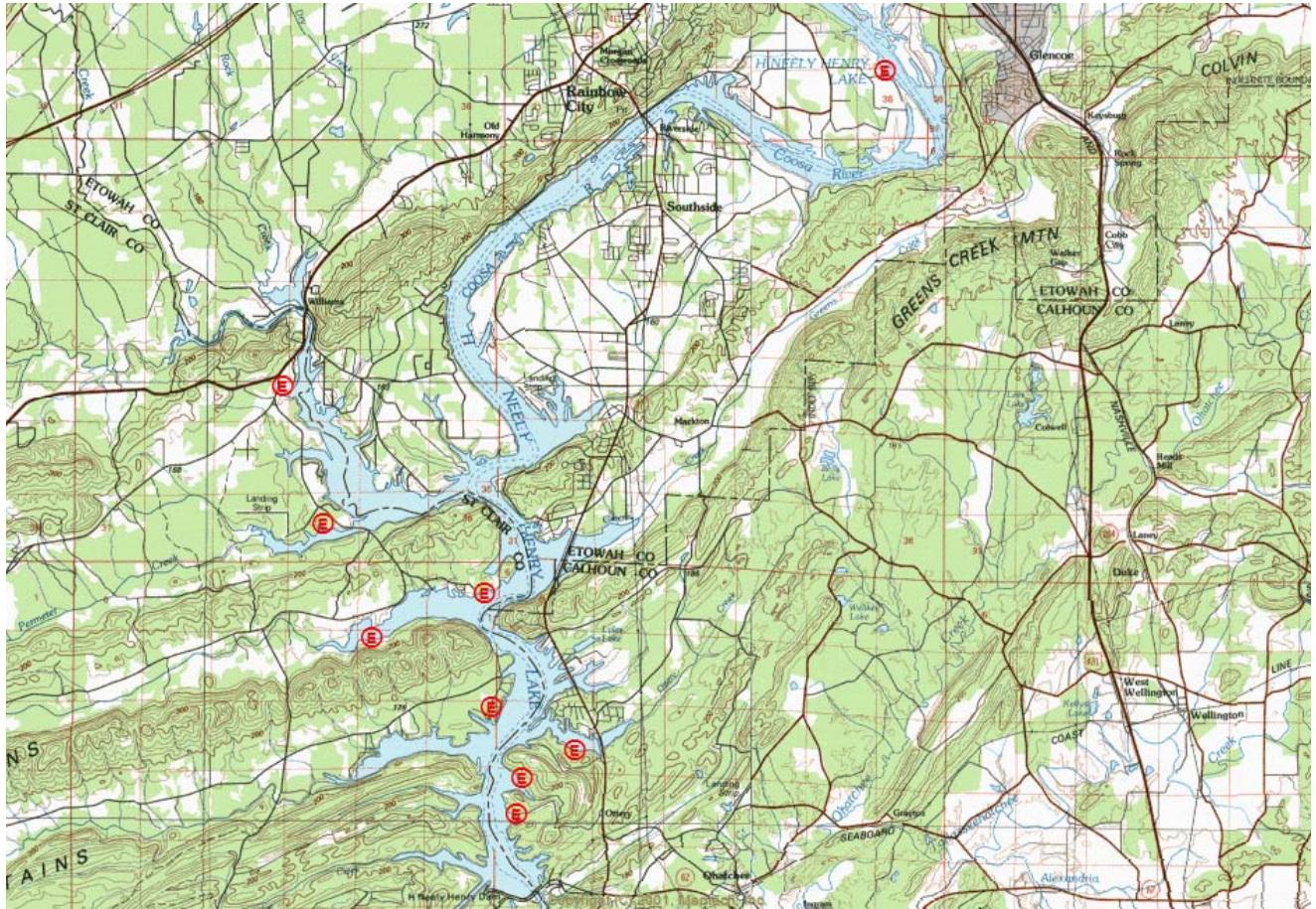
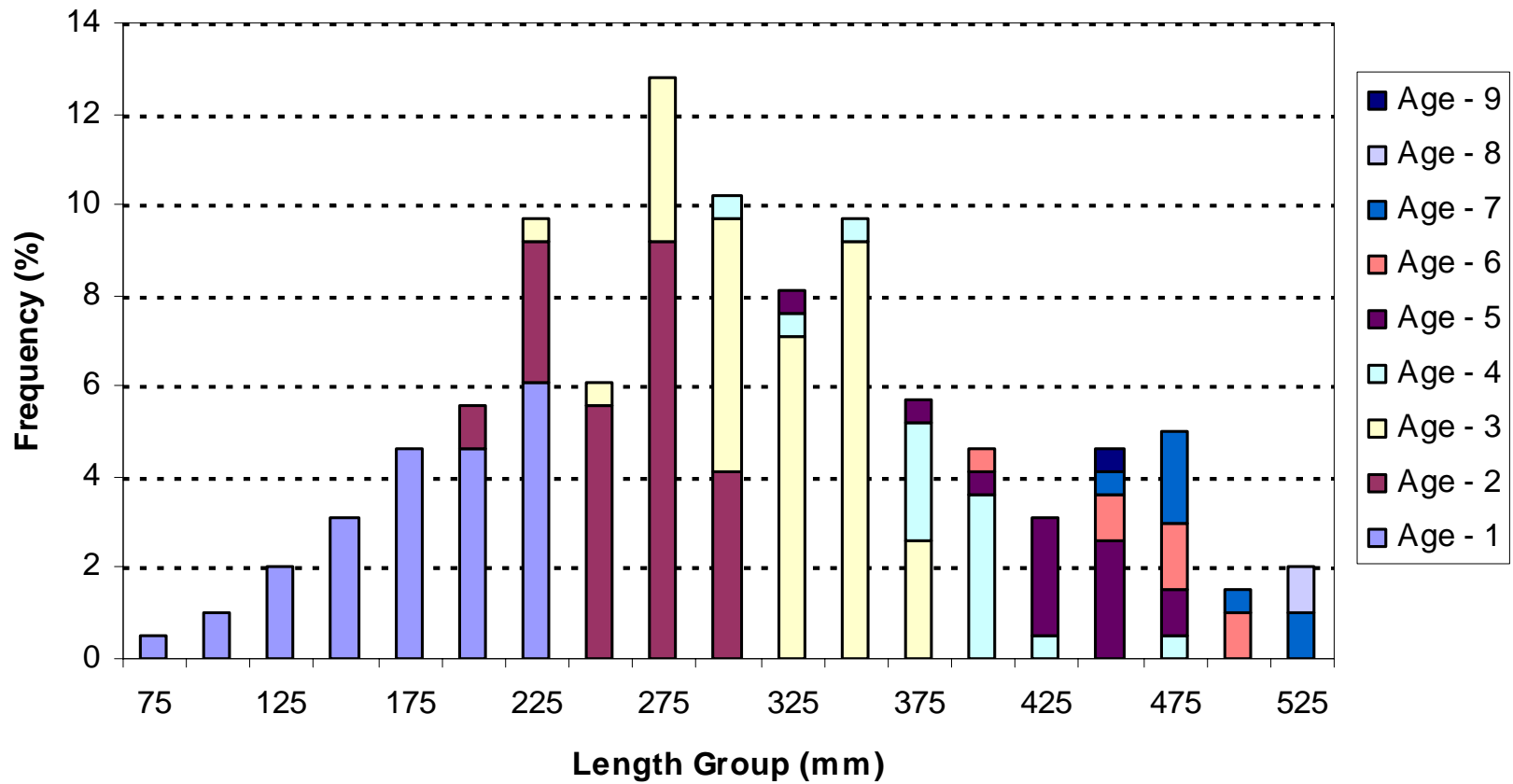
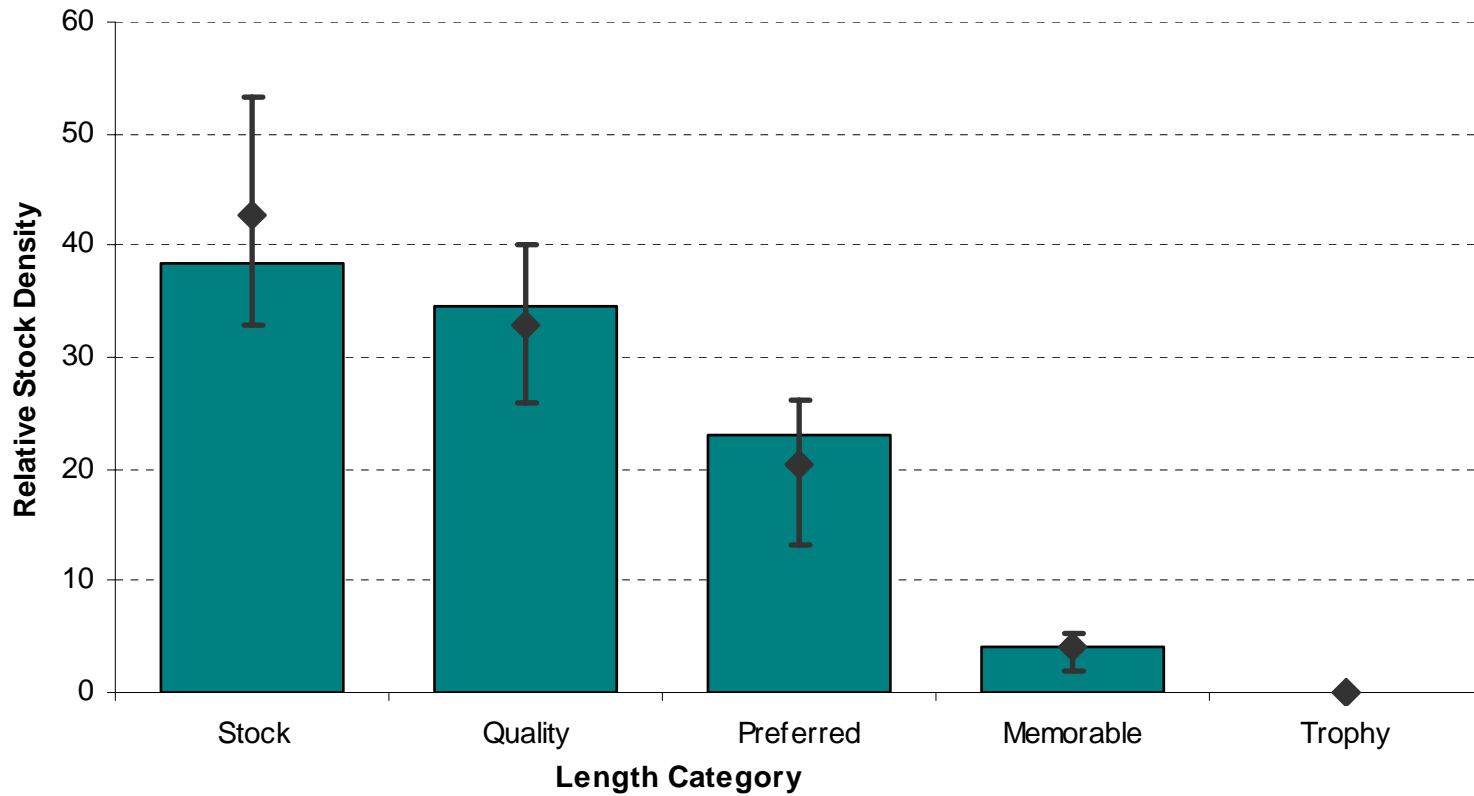


Figure 1B. Downriver electrofishing sample sites on Neely Henry Reservoir.  
Electrofishing sample sites = **E**



**Figure 2. Length at age frequency of largemouth bass (N=196) from Neely Henry Reservoir, April 2007.**



**Figure 3. Relative stock density (RSD) of largemouth bass from Neely Henry Reservoir, spring 2007, and the statewide mean. I-beams denote the 25th and 75th percentiles for RSD values for largemouth bass, statewide.**

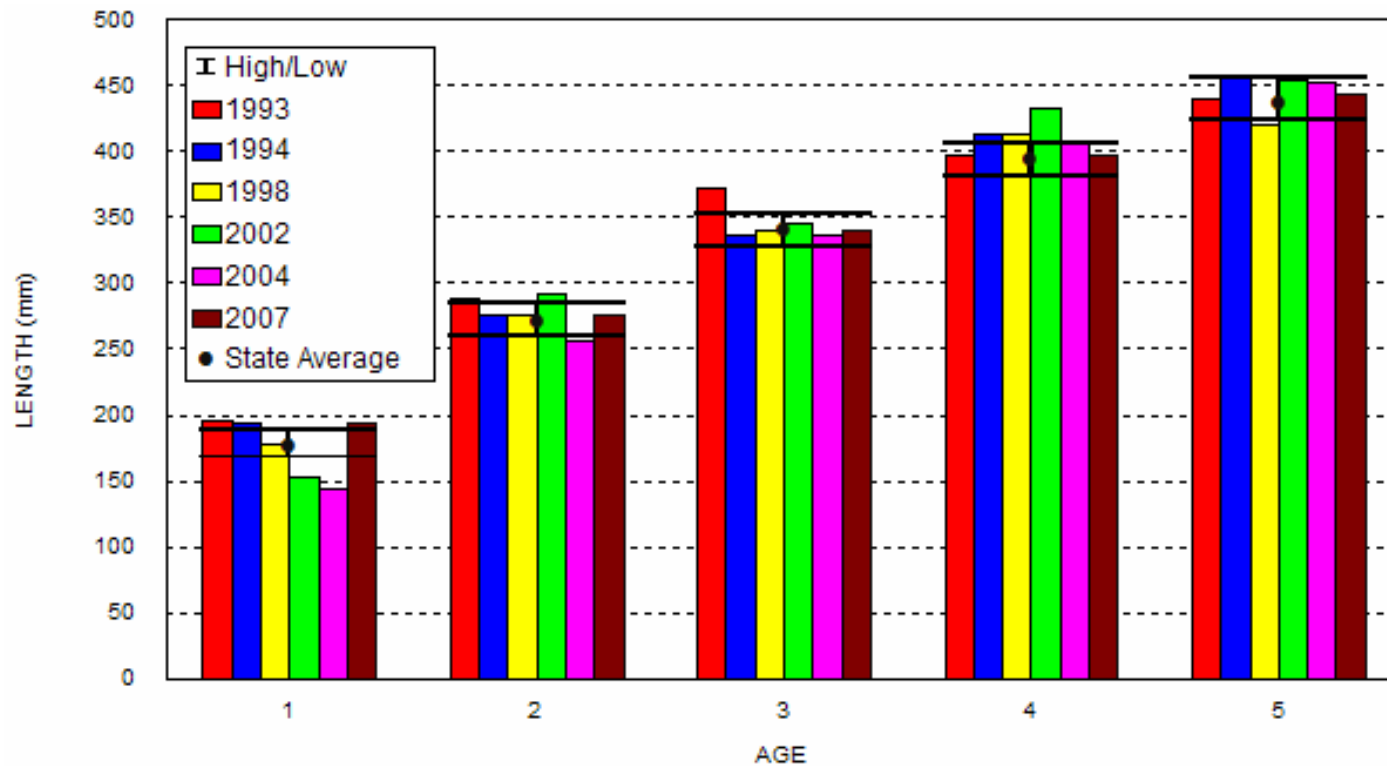


Figure 4. Length-at-age for largemouth bass from spring electrofishing at Neely Henry Reservoir, 1993, 1994, 1998, 2002, 2004 and 2007. The I-beam denotes the 25-75th percentile for largemouth bass statewide.

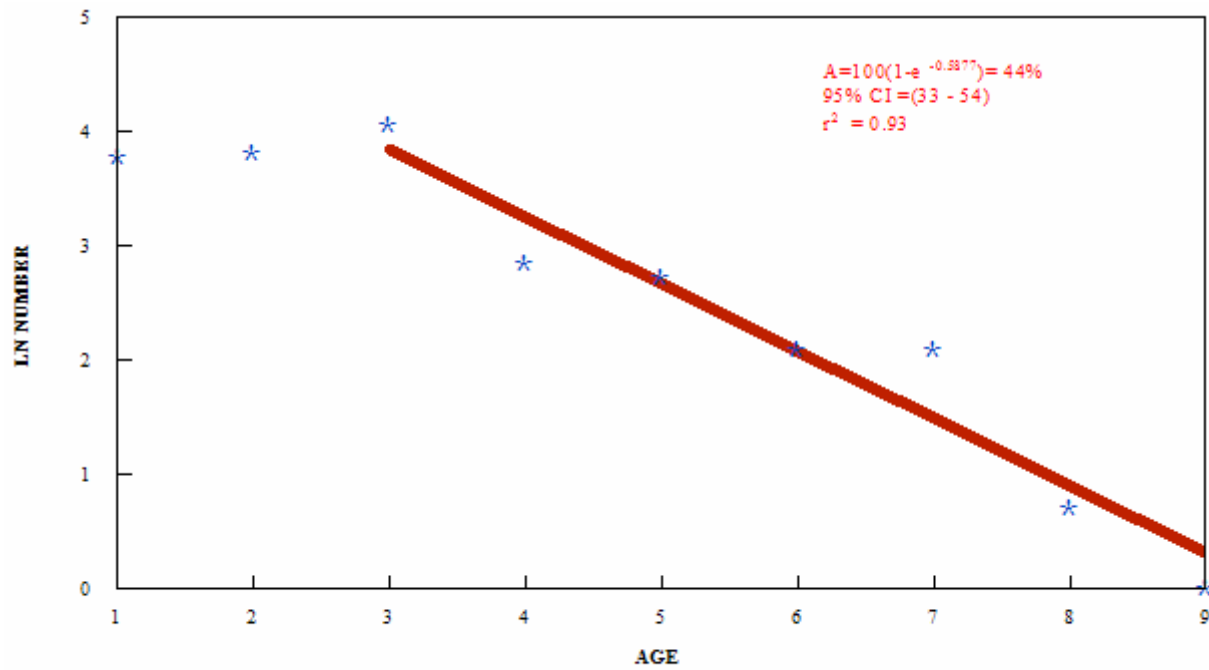
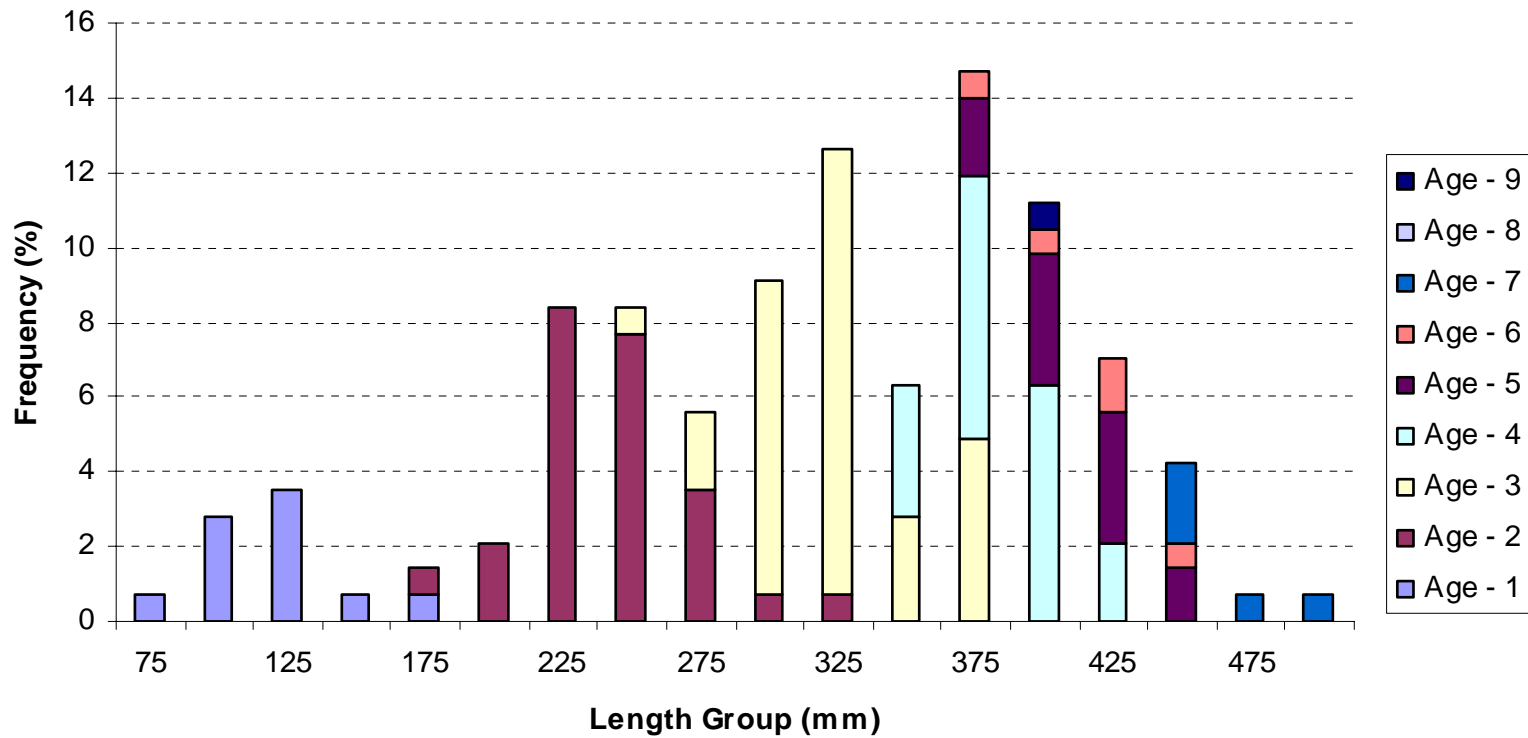
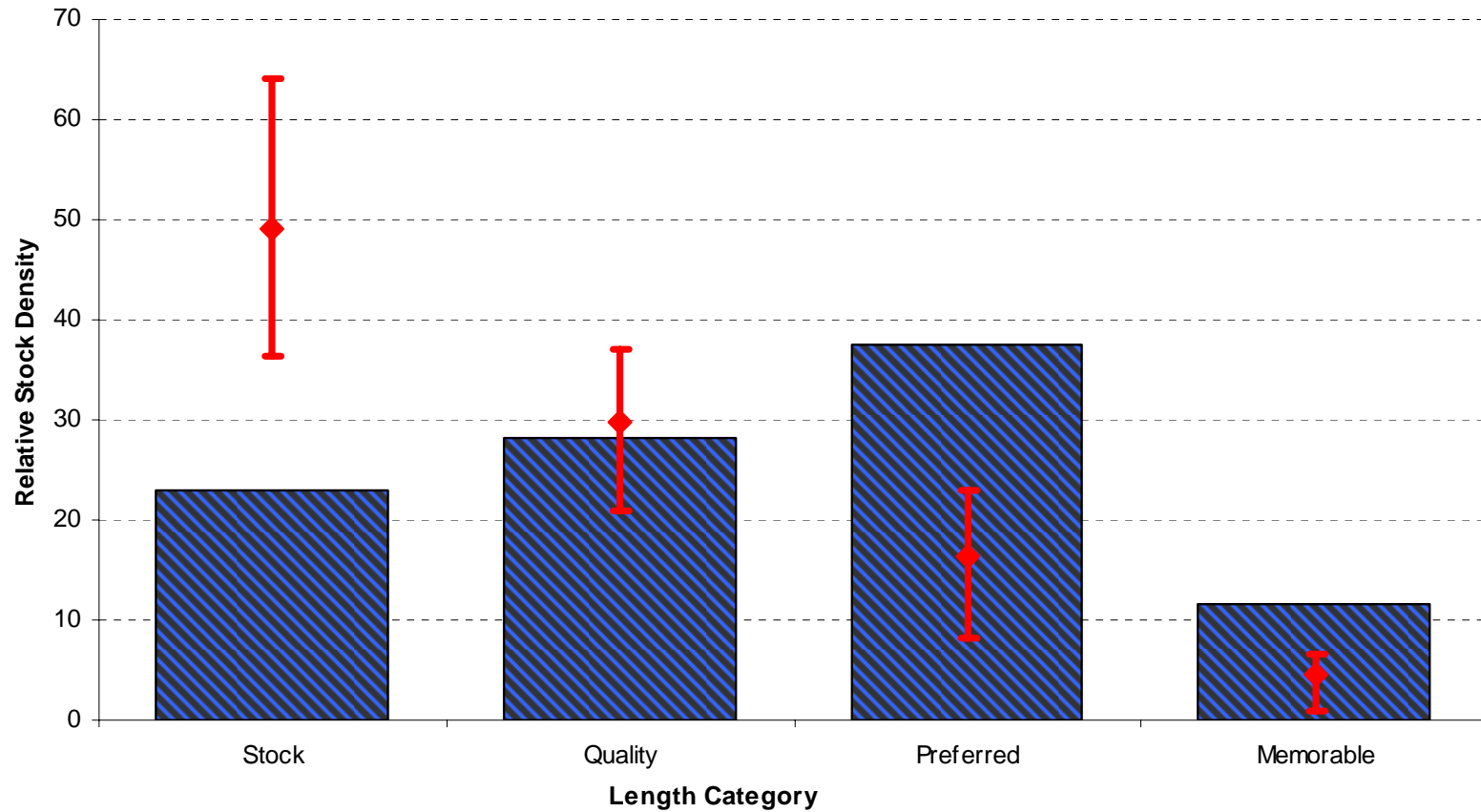


Figure 5. Total annual mortality (A) of largemouth bass (Ages 3-9) from spring electrofishing at Neely Henry Reservoir, spring 2007.



**Figure 6. Length at age frequency of spotted bass (N= 143) from Neely Henry Reservoir, April 2007.**



**Figure 7. Relative stock density (RSD) of spotted bass from Neely Henry Reservoir, spring 2007, and the statewide mean. I-beams denote the 25th and 75th percentiles for RSD values for spotted bass, statewide.**

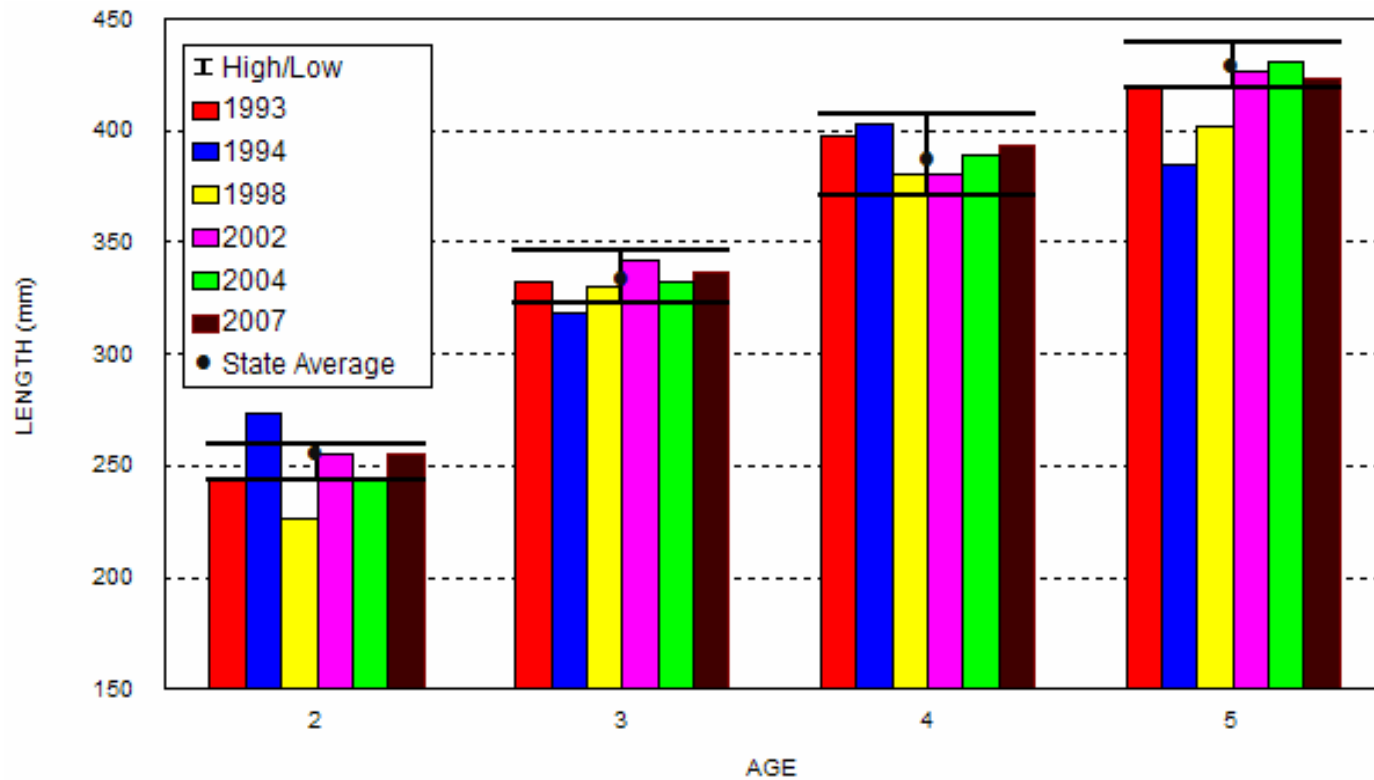


Figure 8. Length-at-age for spotted bass from spring electrofishing at Neely Henry Reservoir, 1993, 1994, 1998, 2004, and 2007. The I-beam denotes the 25-75th percentile for spotted bass statewide.

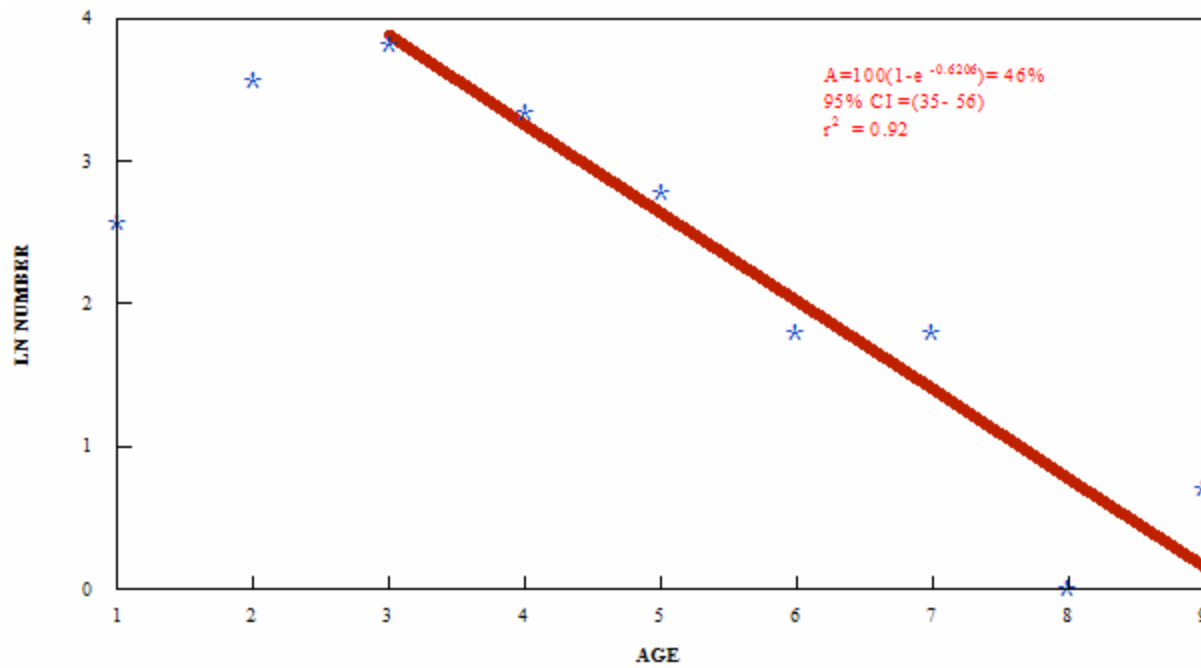


Figure 9. Total annual mortality (A) of spotted bass (Ages 3-9) from spring electrofishing at Neely Henry Reservoir, spring 2007.