

# **WHEELER RESERVOIR CRAPPIE MANAGEMENT REPORT**

**2007**

**Prepared By**

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## **Introduction**

The reservoir management objective for Wheeler Reservoir is to collect baseline biological data on the important sport fishes. From this data, length-at-age frequencies, growth, relative abundance and relative weight or condition will be obtained. This information will be analyzed and used to formulate management recommendations.

Wheeler Reservoir has been sampled routinely since 1994. Attempts at sampling crappie populations with standardized methods have produced limited results. Due to the limited catch efficiency of trap nets on Wheeler Reservoir, we decided to sample crappie in the fall of 2007 by electrofishing.

## **Methods**

Wheeler Reservoir was sampled on October 24 and 26 adjacent to the causeways, second creek and Elk River embayments. Samples were collected from Limestone Creek and Flint Creek embayments on October 29 and 30, respectively. All crappie collected were sexed, weighed and measured. Otoliths were removed from all crappie greater than 100mm total length (TL) for aging. Data analysis was conducted using Alabama Division of Wildlife and Freshwater Fisheries (ADWFF) Data Analysis and Report Utilities (Slipke, 2004). White crappie and black crappie were analyzed separately.

## **Results**

A total of 110 white crappie was collected in the fall. All fish were associated with woody debris structure in depths ranging from 2 to 10 feet. Also, at the time of collection, crappie were being caught by anglers along open water structure, including creek channels and drop-offs (personal observation) at depths ranging from 5-15 ft. deep. Many of the angler caught

fish were suspended at various depths in the open water. This spatial distribution has been observed in other reservoirs where trap nets are ineffective at collecting crappie but angler catch rates are high (personal observation).

Relative Stock Density (RSD) calculations revealed that the preferred and memorable categories were above the statewide 75<sup>th</sup> percentile for trap nets and dominated the sample. The stock and quality size categories were below statewide means for trap nets and at or below the 25<sup>th</sup> percentile. This is probably to be expected due to the size selectivity that can occur with electrofishing gear. Growth of white crappie is very rapid with the majority of one year olds exceeding nine inches.

Age distribution was acceptable with seven year classes (0-6) represented (Table 3). Age 0 and age 1 dominated the sample comprising 72% of the fish collected. From catch curve regression, calculated annual mortality (A) was 56% and year class strength was fairly uniform with no weak or exceptionally strong year classes present (Figure 3).

Calculations on conditional (cm) and instantaneous (M) mortality from FAST modeling program (Slipke and Maciena, 2006) ranged from 0.56-0.3 for cm and 0.82-0.35 for M. Average cm value is 0.44 and average M value of 0.59. Estimated exploitation rate for white crappie is 16%, with a natural mortality rate of 40%.

Thirty-four black crappie, representing four year classes were collected during fall electrofishing. Age distribution was similar to white crappie in that the majority of the sample were age 1 and age 2 (Table 4). Incremental RSD values were 45% for quality, 42% for preferred and 6% for the memorable RSD categories. These values were all above the statewide averages for black crappie collected using trap nets. The RSD stock value of 6 was well below the statewide mean. These high values are probably a result of electrofishing bias for larger size

groups. Growth was slightly slower than observed for white crappie, but the mean length-at-age was higher than statewide means (Damon Abernethy, personal communication). Black crappie from Wheeler Reservoir exhibit above average growth rates.

### **Summary**

The white crappie and black crappie population on Wheeler Reservoir shows excellent size distribution and age structure. Currently we do not have an explanation for the rapid growth rates. Other reservoirs in North Alabama show rapid growth rates of crappie, e.g. Smith and Pickwick. The low estimated exploitation rate, satisfactory age and size distribution and fast growth rates would indicate that no change in management strategies are warranted at this time.

### **Literature Cited**

- Jenkins, R. M. 1967. The influence of some environmental factors on the standing crop and harvest of fishes in U. S. reservoirs. pp. 291-298 in Reservoir Fisheries Resource Symposium. Southern Division American Fisheries Society, Bethesda, Maryland, U.S.A.
- Ryder, R. A. 1965. A method for estimating the potential fish production of North-American temperate lakes. Transaction of the American Fisheries Society. 94:214-218.
- Slipke, J.W. and M.J. Maceina. 2006. Fisheries analysis and simulation tools (FAST). Auburn University, Auburn, Alabama.
- Slipke, J.W. 2004. ADWFF data analysis and report utilities. Version 2.2. Auburn University, Auburn, Alabama.
- Welch, P. S. 1948. Limnological methods. McGraw-Hill. pp. 93-94.

**Appendix A**  
**Tables and Figures**

TABLE 1. Wheeler Reservoir morphometric, physical and chemical characteristics.

Surface area	67,070 acres
Drainage area	29,590 sq. mi.
Full pool elevation	556 feet-msl
Mean annual fluxuation	6 feet
Shoreline distance	899 miles
Shoreline development index	24.8 (Welch 1948)
Mean depth	15.7 feet
Maximum depth	57 feet
Outlet depth	52 feet
Total dissolved solids	92.6 mg/l
Morphoedaphic index	5.9 TDS/mean depth(ft) (Ryder 1965)
Growing season	214 frost free days (Jenkins 1967)
Date of impoundment	1939

Table 2. Total number, cpe, percent of sample and Wr for white and black crappie from Wheeler Reservoir, fall 2007.

Species	Gear	Year	Number Samples	SUBSTOCK			RSD-S			RSD-Q			RSD-P			RSD-M			RSD-T			TOTAL						
				no.	cpe	ratio	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe				
White Crappie	Electro	2007	5/6.5 hr	3	0.5	3	24	3.7	22	87	15	2.3	14	95	44	6.8	41	102	23	3.5	21	103	1	0.2	1	106	110	16.9
Black Crappie	Electro	2007	5/6.5 hr	3	0.5	10	2	0.3	6	99	14	2.2	45	99	13	2.0	42	101	2	0.3	6	96				34	5.2	

TABLE 3. Age composition and mean length of white crappie from Wheeler Reservoir, fall 2007.

Age	Year Class	Number	Percent	CPE	Mean TL	SE	Length Range
0	2008	30	27.3	4.6	165.1	5.6	83-229
1	2007	49	44.5	7.6	266.4	3.2	201-303
2	2006	16	14.5	2.5	296.2	5.3	230-324
3	2005	9	8.2	1.4	327.0	6.1	307-361
4	2004	4	3.6	0.6	331.0	5.1	318-343
5	2003	1	0.9	0.2	349.0		
6	2002	1	0.9	0.2	383.0		
Total		110	100.0	17.0			

TABLE 4. Age composition and mean length of black crappie from Wheeler Reservoir,  
fall 2007.

Age	Year Class	Number	Percent	CPE	Mean TL	SE	Length Range
0	2008	3	8.8	0.5	90.3	1.2	88-92
1	2007	16	47.1	2.4	229.5	6.9	187-287
2	2006	12	35.3	1.8	266.0	6.0	222-299
3	2005	3	8.8	0.5	306.7	15.1	279-331
Total		34	100.0	5.2			

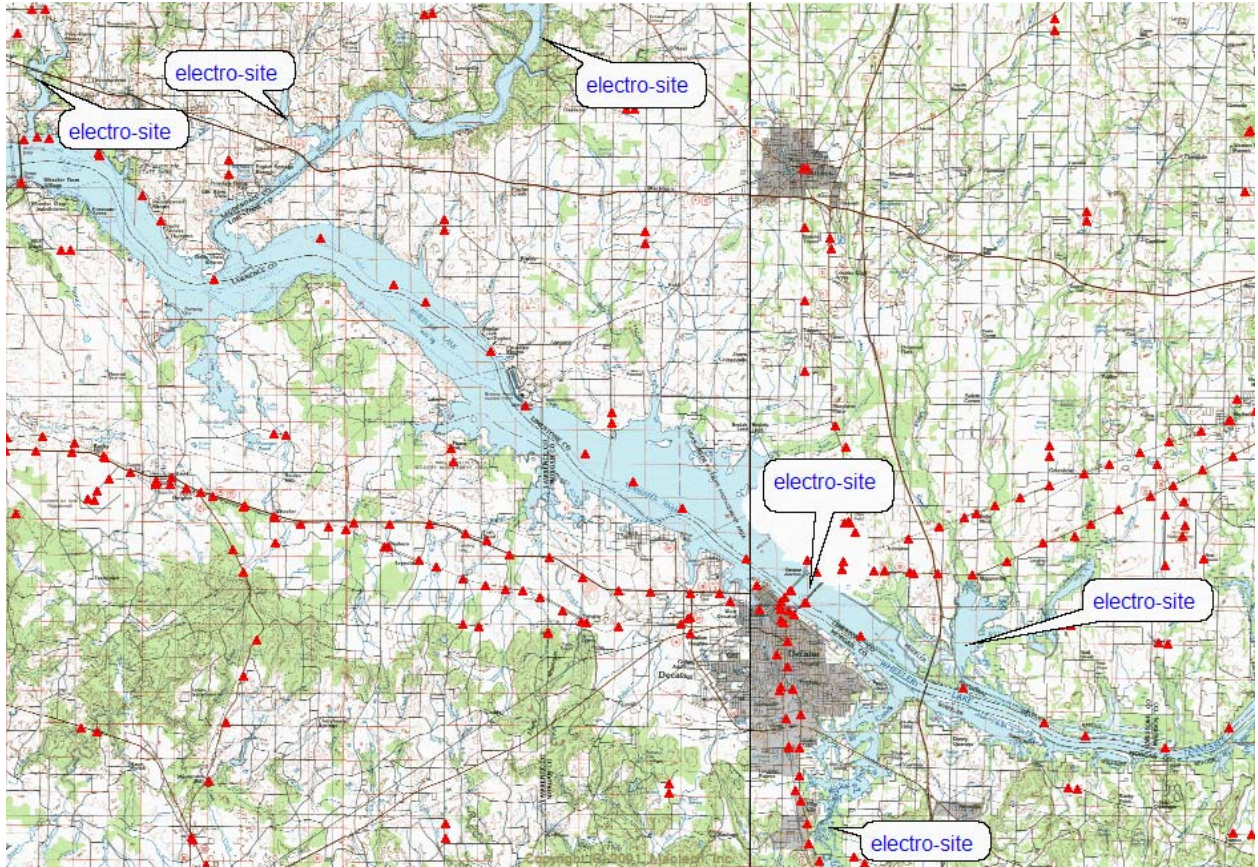


Figure 1. Electrofishing sites, fall 2007.

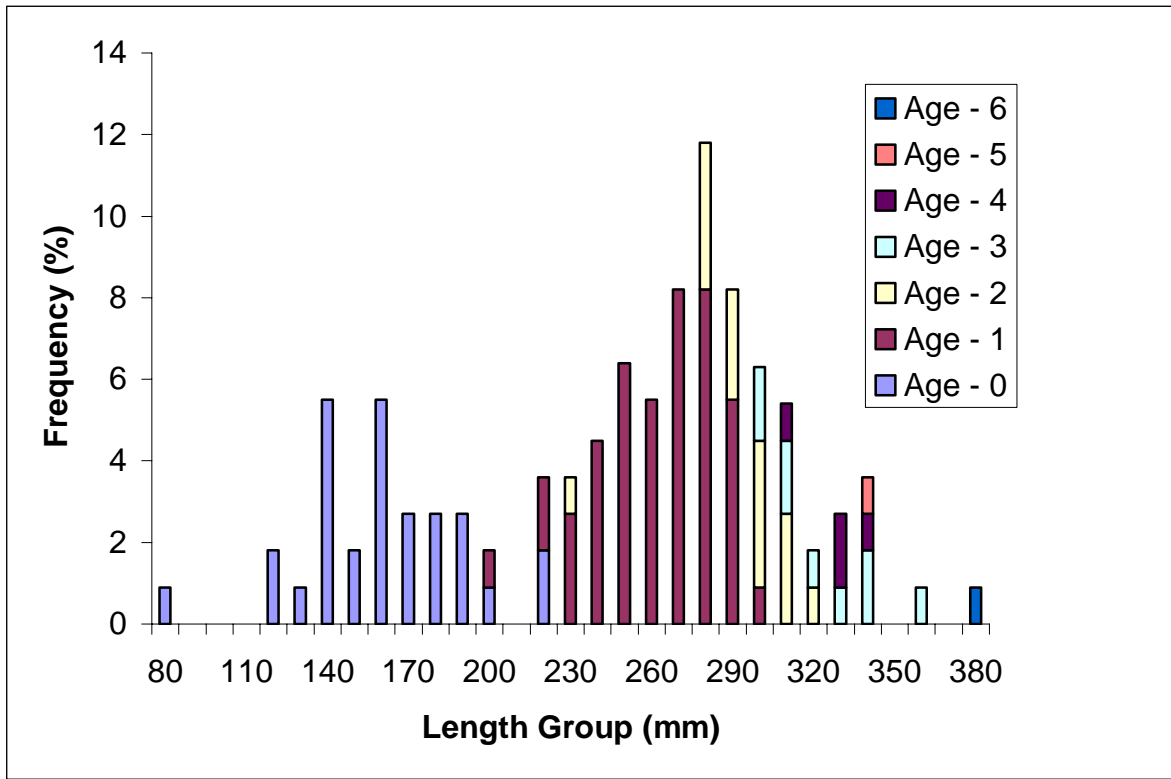


Figure 2. Length-at-age distribution for white crappie (n=110) from Wheeler Reservoir, fall 2007.

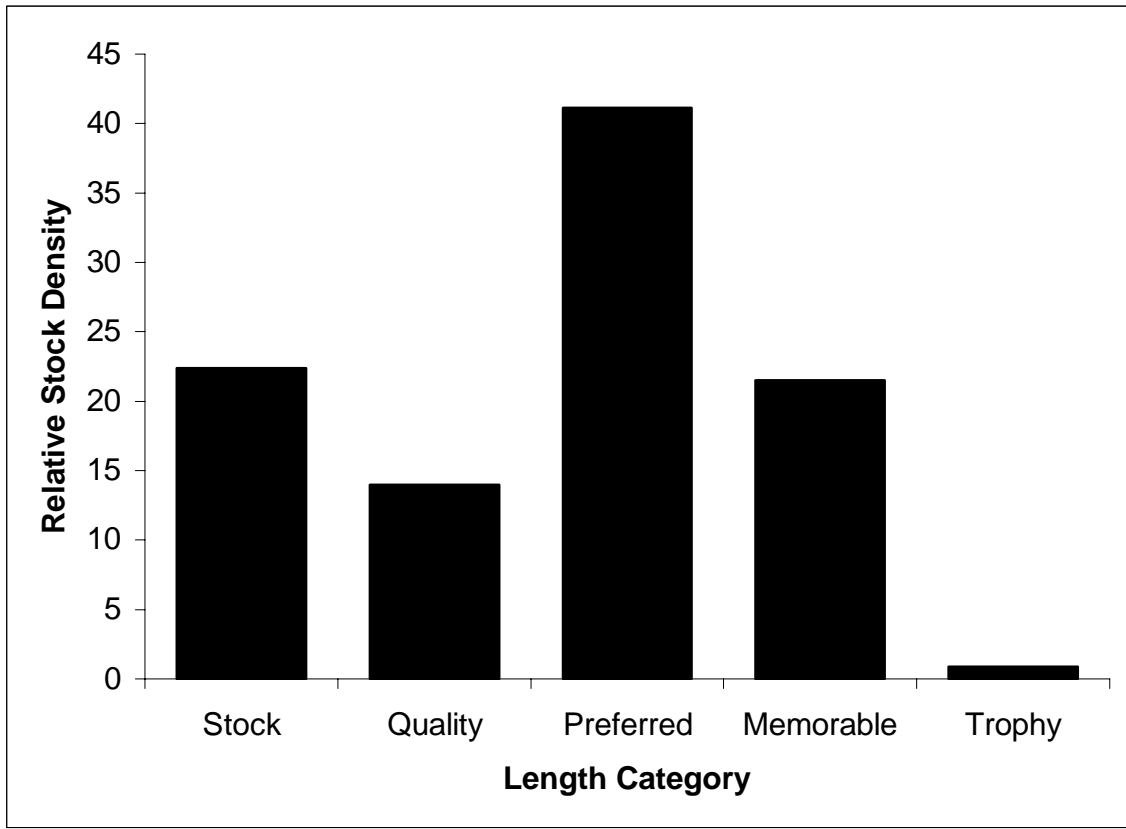


Figure 3. Relative Stock Density distribution for white crappie (n=110) from Wheeler Reservoir, fall 2007.

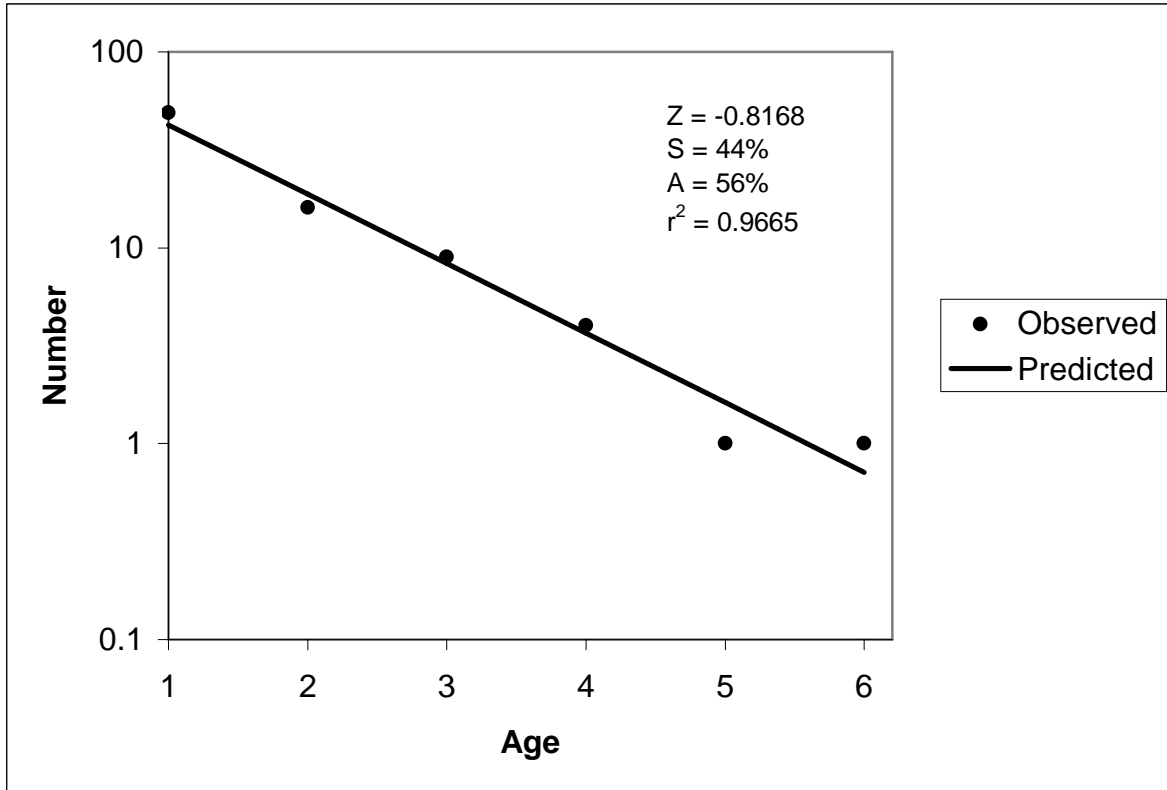


Figure 4. Catch curve regression for white crappie from Wheeler Reservoir, fall 2007.

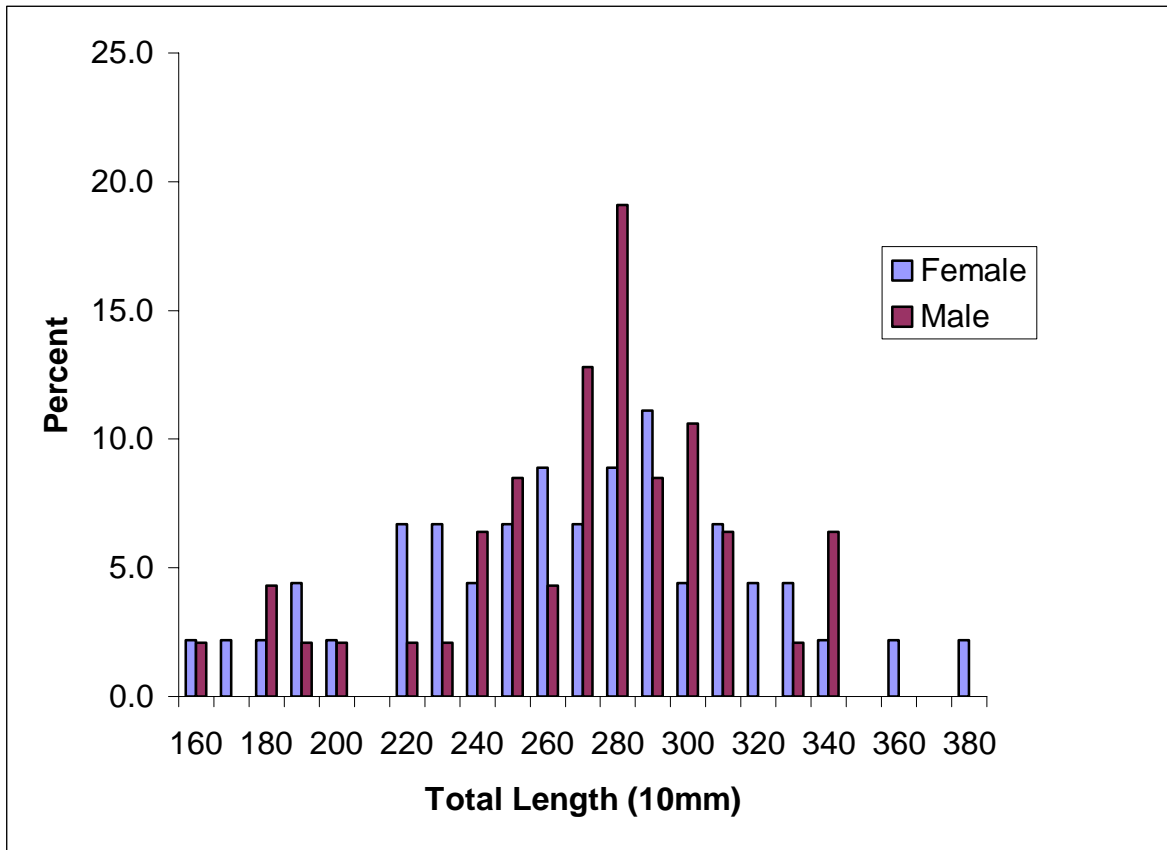


Figure 5. Length frequency distribution of male (n=47) and female (n=45) white crappie from Wheeler Reservoir, fall 2007.

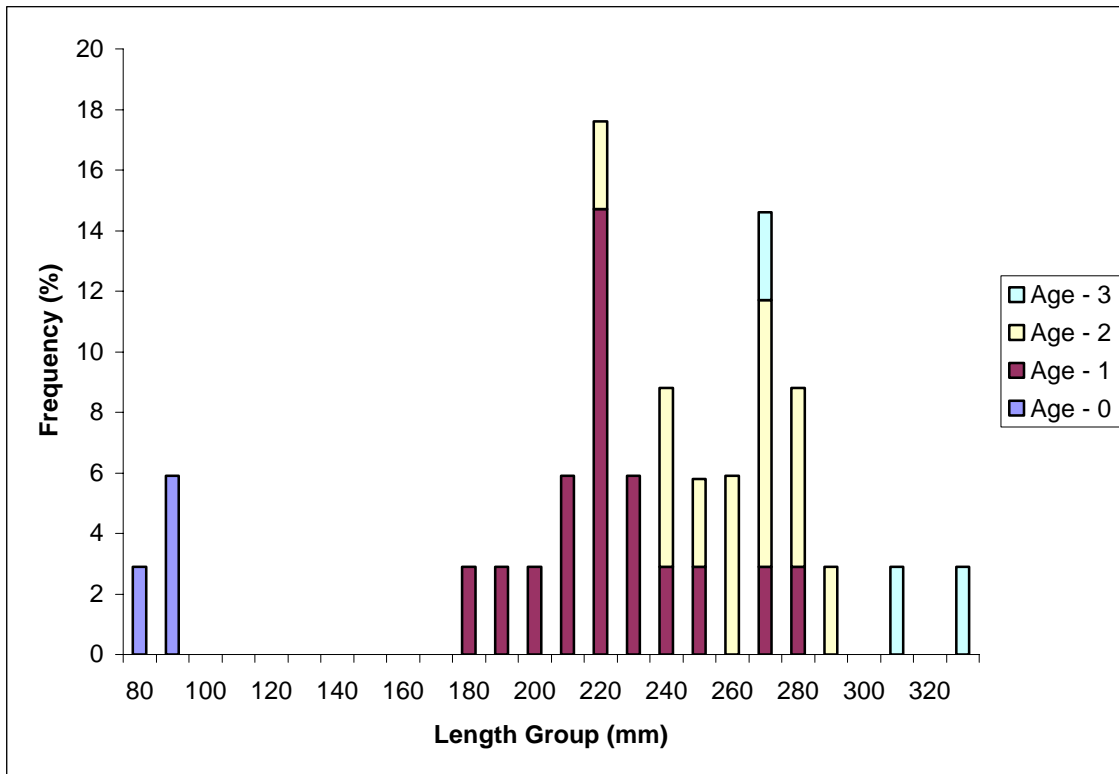


Figure 6. Length-at-age distribution for black crappie (n=34) from Wheeler Reservoir, fall 2007.

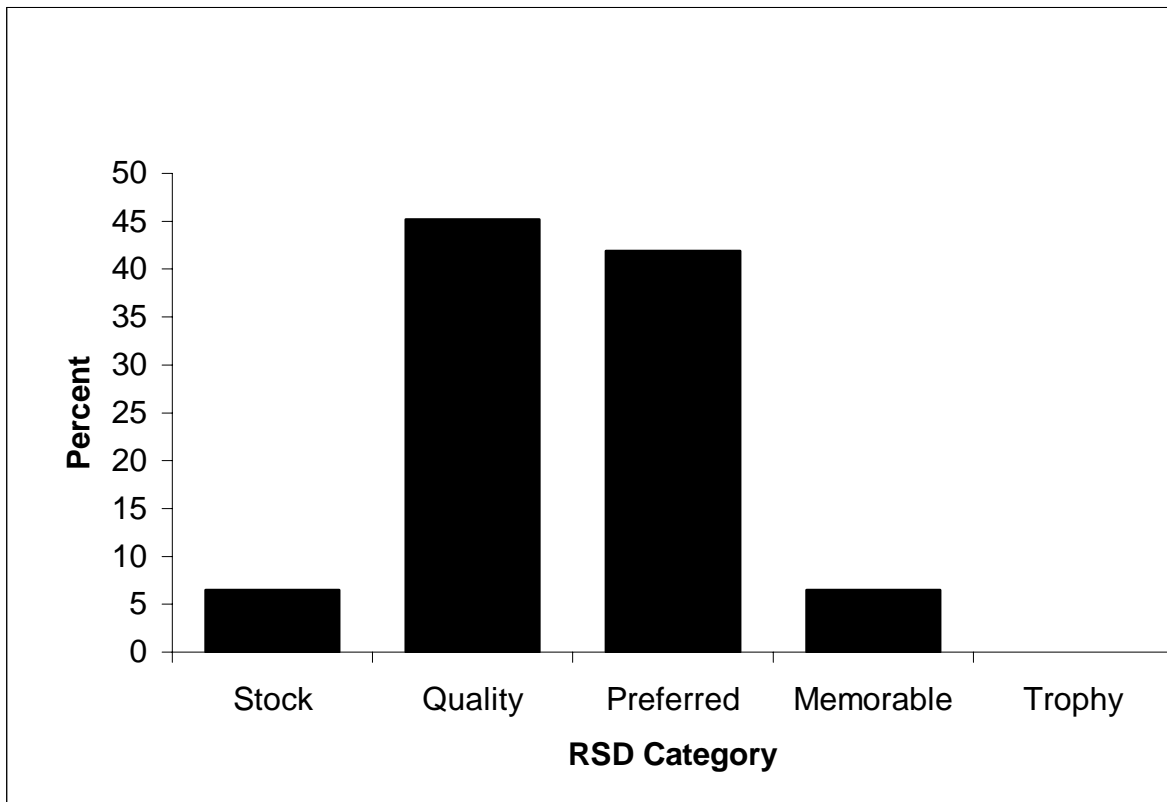


Figure 7. Relative stock density of black crappie (n=34) from Wheeler Reservoir, fall 2007.