

FRANK JACKSON RESERVOIR  
CRAPPIE MANAGEMENT REPORT

FALL 2007

Prepared by

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## **Introduction**

Lake Frank Jackson (Figure 1) is a 1,037-acre impoundment on Lightwood Knot Creek, located in Covington County, Alabama. This lake was impounded in 1986 as part of Frank Jackson State Park. Pertinent characteristics of the lake are listed in Table 1, and a more in-depth description of the reservoir and the species of fish found in Frank Jackson Lake can be found in Newman et al 1988. Fish species stocked into Lake Frank Jackson are listed in Table 2. Lake Frank Jackson was chosen for standardized sampling during FY 2008 according to the procedures specified in the Alabama reservoir management manual (Cook 1999). Creel limits are posted by the state park boat ramp, and the only size restriction is the statewide 9 inch crappie minimum length limit.

## **Methods**

Crappie were sampled (48 net nights) from November 6, 2006 through November 21, 2007, at Lake Frank Jackson according to guidelines set forth in the Alabama Reservoir Management Manual (Cook 1999). Trap-net sampling locations are depicted in Figure 1.

Total length of all crappie was measured to the nearest millimeter, and weight was recorded to the nearest gram. Sagittal otoliths were removed from crappie and read whole view by District VI personnel for age and growth analysis. Since this was the first crappie sample from Lake Frank Jackson, crappie 125 mm TL and less were aged to verify the cutoff length between young-of-year (YOY) and age-1 crappie.

Catch per effort (CPE) was computed as the number of crappie collected per trap-net night. Stock density indices and relative weight were calculated according to Anderson and Nuemann (1996). Growth was described using the von Bertalanffy equation, and time to reach stock, quality, and preferred size was calculated by inverting the equation and solving for the

time needed to reach each stock length. Total annual mortality was calculated using catch-curve regression where the natural logarithm of the number-at-age was regressed against age.

### **Results and Discussion**

White crappie (N = 41), black crappie (N = 32), and hybrids of the two (N=2) were captured at a rate of 1.6 fish per net night. Catch rate (1.6 per trap-net/night) for crappie was less than the statewide average of 5.2 crappie per net-night (Table 3). Black crappie lengths ranged from 52 to 377 mm TL, with a mode at 170 mm (Figure 2). White crappie ranged in length from 57 to 373 mm TL , with a mode at 270 mm (Figure 3). When subspecies were pooled, over 77 % of the fish were age 1 or 2, and were mostly between 170 mm (6.7 inches) and 280 mm (11 inches) (Table 4, Figure 4).

Relative stock density indices were within the statewide upper and lower 25<sup>th</sup> percentiles for all RSD categories, and were very close to statewide means (Figure 5). Relative weight was lower than the state averages for all size groups of crappie, with mean Wr's for RSD-S through RSD-Q fish ranging from 72 to 74 (Table 3).

The von Bertalannfy equation predicted that it took about 2 years for crappie to reach 229 mm TL (9 inches), which is the statewide minimum length limit for crappie (Figure 6). Predicted time to reach stock, quality, preferred and memorable size was 0.6, 1.2, 2.0 and 3.9 years, respectively (Figure 6). This growth seems very high in a fairly oligotrophic reservoir, but may be due to the low sample size. The smallest age-1 white crappie was 137 mm TL, and the largest age-0 white crappie was 104 mm TL. Total annual mortality was 34% for crappie using catch-curve regression (Figure 7), although the variation was too great ( $r^2 = 0.461$ ) to provide a reliable estimate of mortality as directed in the Alabama Reservoir Management Manual.

## Summary

Lake Frank Jackson is fairly deep for a coastal plain reservoir (mean depth = 8 feet) and only has a 45 to 1 watershed drainage ratio, as compared with Point A Reservoir with a mean depth of 3.3 feet and a watershed ratio of 1,434 to 1. Chlorophyll-a data was not available at the time of submission for this report. Crappie year class strength appears to fluctuate as observed in most Alabama reservoirs, with an absence of Age 3 (2005) fish. Angling pressure seems to be fairly high, with many anglers from the campground fishing while we were sampling in November. Park personnel stated that a lot of people fish for crappie in the upper end of the reservoir in the spring, but there were always anglers drift fishing near the dam in the fall and winter. The annual mortality estimate of 34% is probably lower than the actual mortality rate, based on the fact that the sample size was low and the anglers we talked with indicated they kept all of the crappie they caught that were large enough to eat. The anglers using this fishery are mainly locals or people staying at the state park campground. It is surprising that the older crappie exhibited fairly fast growth rates but low condition factors. This may be tied into their diets, which would presumably be mostly sunfish, shiners, and topminnows. Threadfin and gizzard shad are found in this drainage, but their numbers are so low they have not been collected in previous electrofishing collections. The 9-inch minimum length limit appears to be the most practical regulation for crappie at this time. This fishery would provide an excellent opportunity to evaluate supplemental crappie stocking during years of low natural reproduction.

## **Conclusions**

1. Crappie are not abundant in Lake Frank Jackson but the current population consists of many harvestable size individuals which exhibit fairly high growth rates.
2. The majority of the crappie population consists of younger fish, mainly due to substantial angling pressure.
3. Year class strength appears highly variable, with missing year classes evident.
4. This lake could provide a test facility for stocking supplemental crappie during years of poor natural reproduction.
5. Changes in the size or creel limit for crappie are not warranted at this time.

## **References**

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**APPENDIX A**

**TABLES AND FIGURES**

**FRANK JACKSON RESERVOIR FALL 2007**

Table 1. Lake Frank Jackson morphometric, physical, and chemical characteristics for 2007.

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Surface area	1,037 acres
Drainage area	74 sq. mi.
Full pool elevation	238 feet-msl
Mean annual fluxuation	3 feet
Shoreline distance	13 miles
Shoreline development index	2.9 (Welch 1948)
Mean depth	8 feet
Maximum depth	23 feet
Outlet depth	6 feet
Growing season	249 frost free days (Jenkins 1967)
Date of impoundment	1986
Drainage	Yellow River Basin

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Table 2. Fish stockings in Lake Frank Jackson, 1987-2007.

Species	Year	No/Ac	Size (in)	Total
Florida Largemouth Bass	1987	27.2	3	28,200
Bluegill Sunfish	1992	16.7	1 - 3	17,360
Hybrid Striped Bass	1999	9.9	1	10,245
Hybrid Striped Bass	2005	9.9	1	10,400
Channel Catfish	2003	4.8	3-9	5,000
Channel Catfish	2007	1.0	9-16	1,000

Table 3. Relative stock density, catch per effort, and relative weight of crappie collected during fall trapnetting in Lake Frank Jackson, 2007.

Species	Gear	Year	Number Samples	Effort (Net-Nights)	SUBSTOCK			RSD-S			RSD-Q			RSD-P			RSD-M			TOTAL					
					no.	cpe	ratio	no.	cpe	pct. Wr	no.	cpe	pct. Wr	no.	cpe	pct. Wr	no.	cpe	pct. Wr	no.	cpe				
Crappie*	Trapnet	2008	4	48	10	0.2	15	23	0.5	35	74	20	0.4	31	72	16	0.3	25	75	6	0.1	9	94	75	1.6
State-wide Average					3.6	74	2.2	36	75	1.5	33	86	1.1	24	93	0.3	7	96	5.2						

\* Sample consisted of 41 White Crappie, 32 Black Crappie, and 2 Hybrid Crappie.

Table 4. Mean lengths-at-age and catch rates for crappie collected from Frank Jackson Reservoir, fall 2007.

Age	Year Class	Number	Percent	CPE	Mean TL	SE
0	2008	10	13.3	0.2	84.3	5.2
1	2007	33	44.0	0.7	184.8	4.2
2	2006	25	33.3	0.5	252.0	3.9
3	2005	0	0.0	0.0	0.0	
4	2004	4	5.3	0.1	368.8	4.3
5	2003	2	2.7	0.0	302.0	24.0
6	2002	1	1.3	0.0	364.0	
Total		75	100.0	1.6		

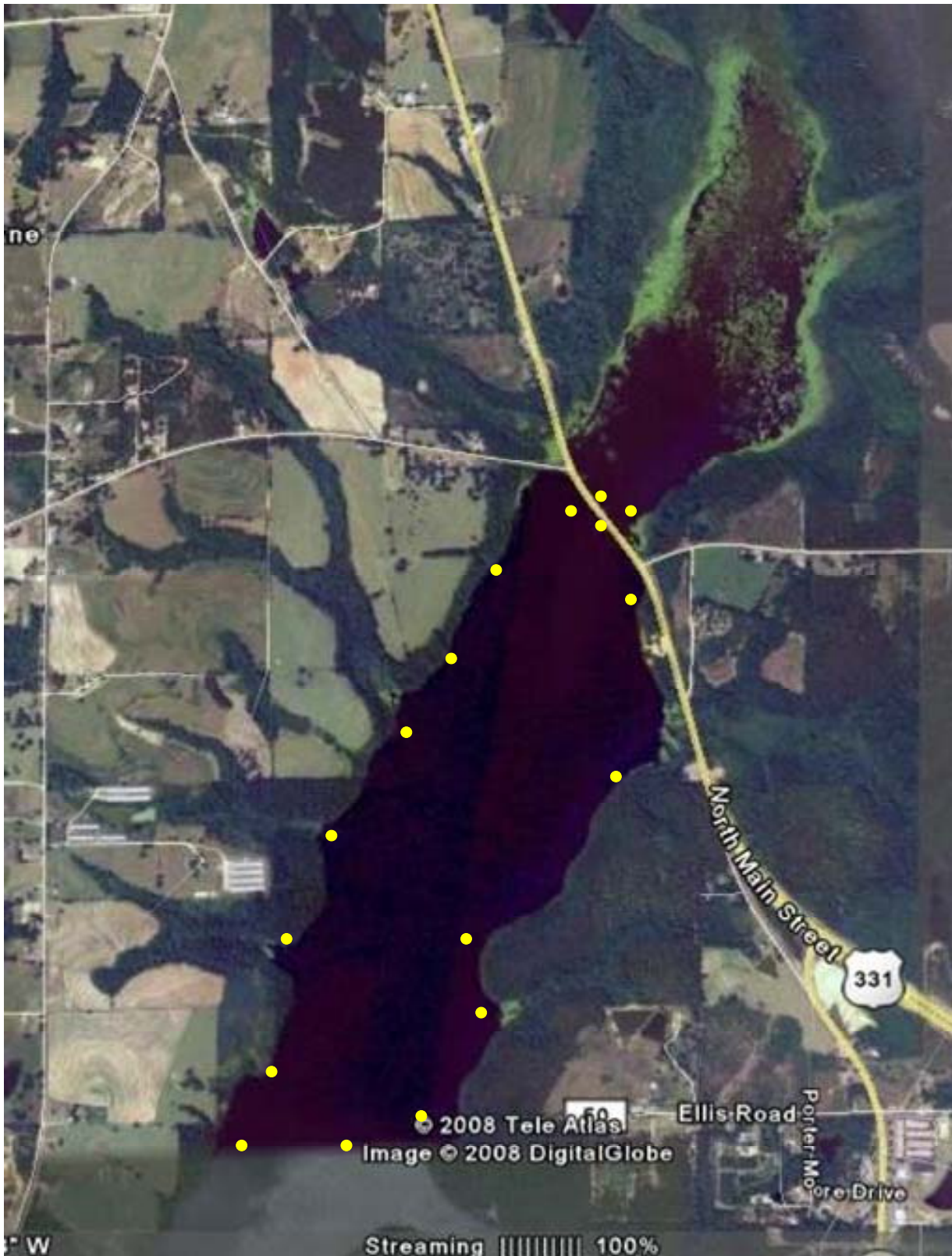


Figure 1. Map of Frank Jackson Reservoir with trap-net sampling locations indicated by yellow circles.

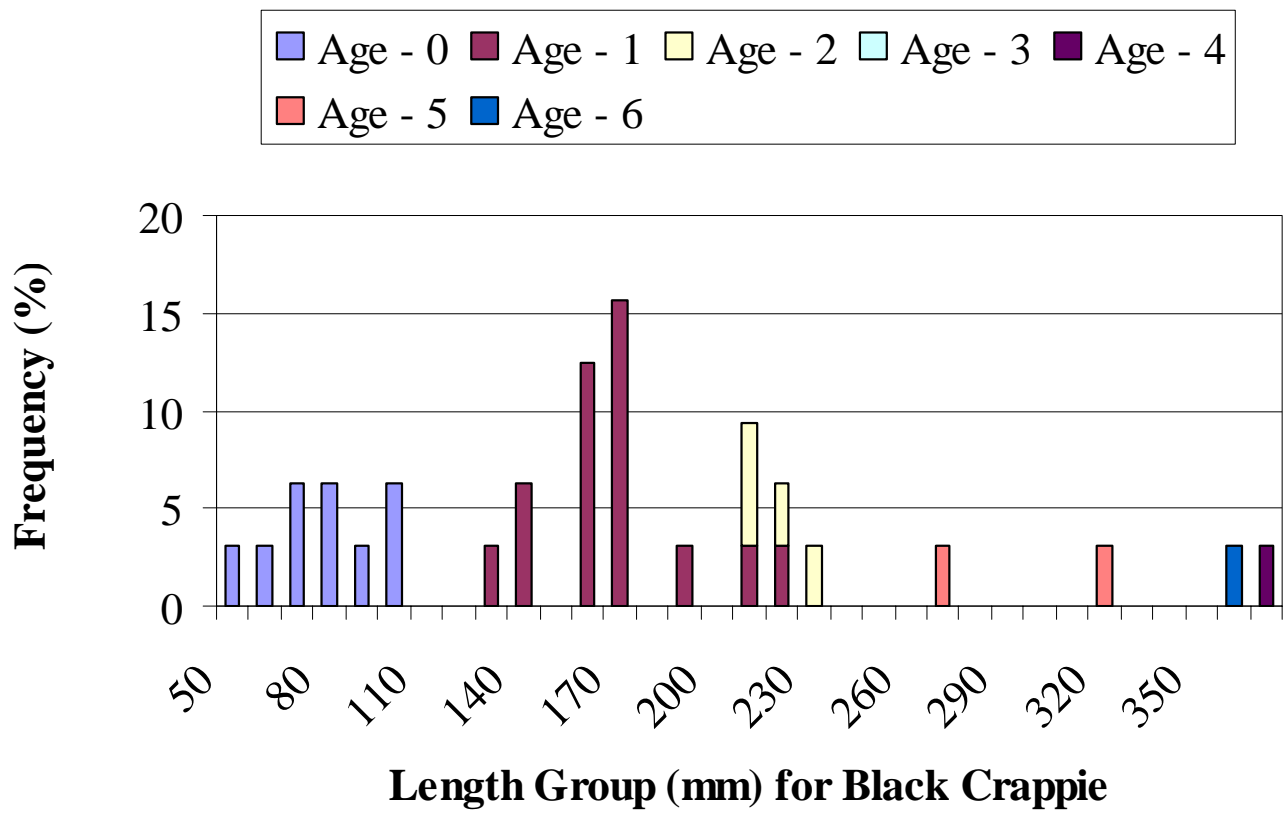


Figure 2. Length at age frequency for 32 black crappie collected from Lake Frank Jackson, fall 2007.

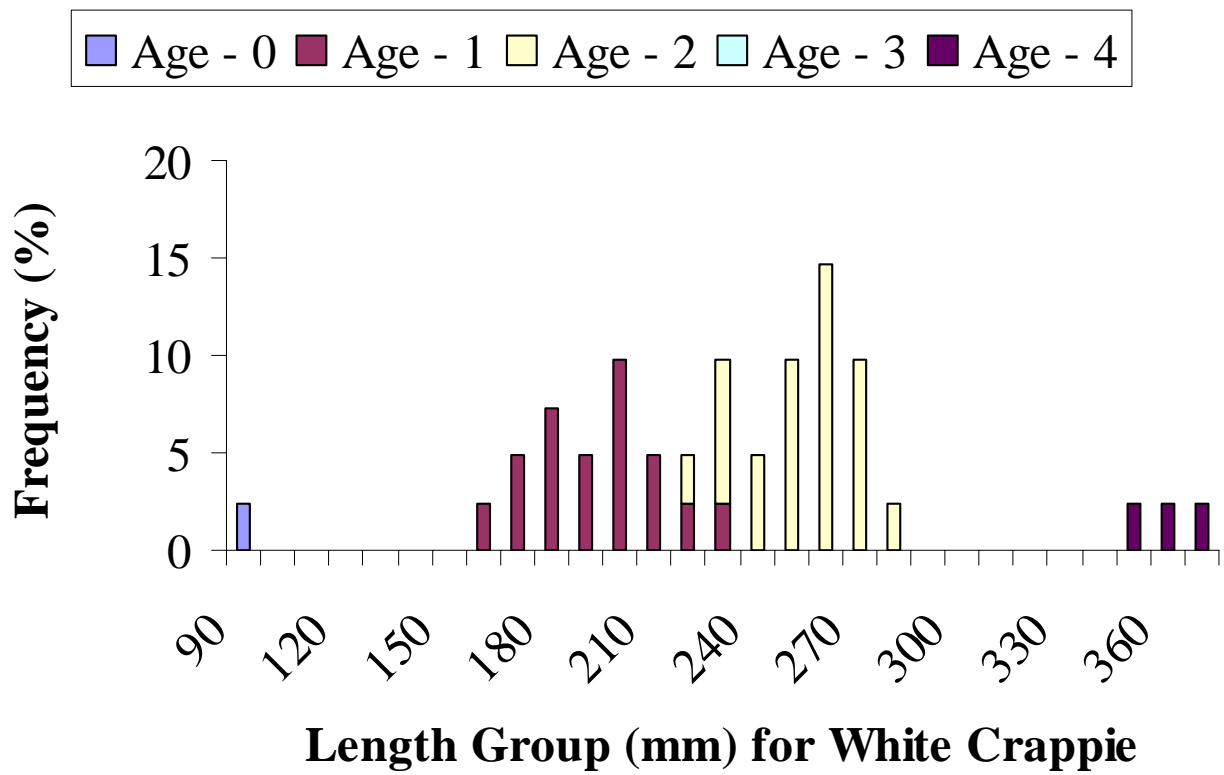


Figure 3. Length at age frequency for 41 white crappie collected from Lake Frank Jackson, fall 2007.

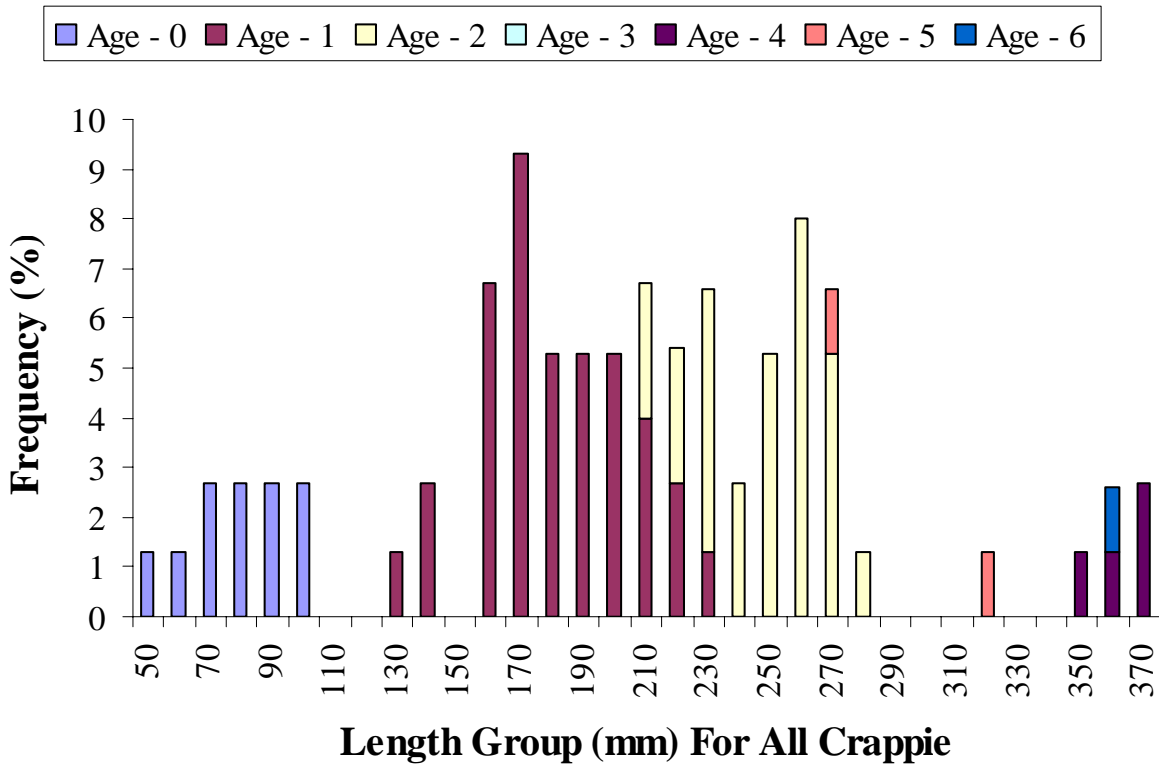


Figure 4. Length at age frequency for all crappie (N = 75) collected from Lake Frank Jackson, Fall 2007.

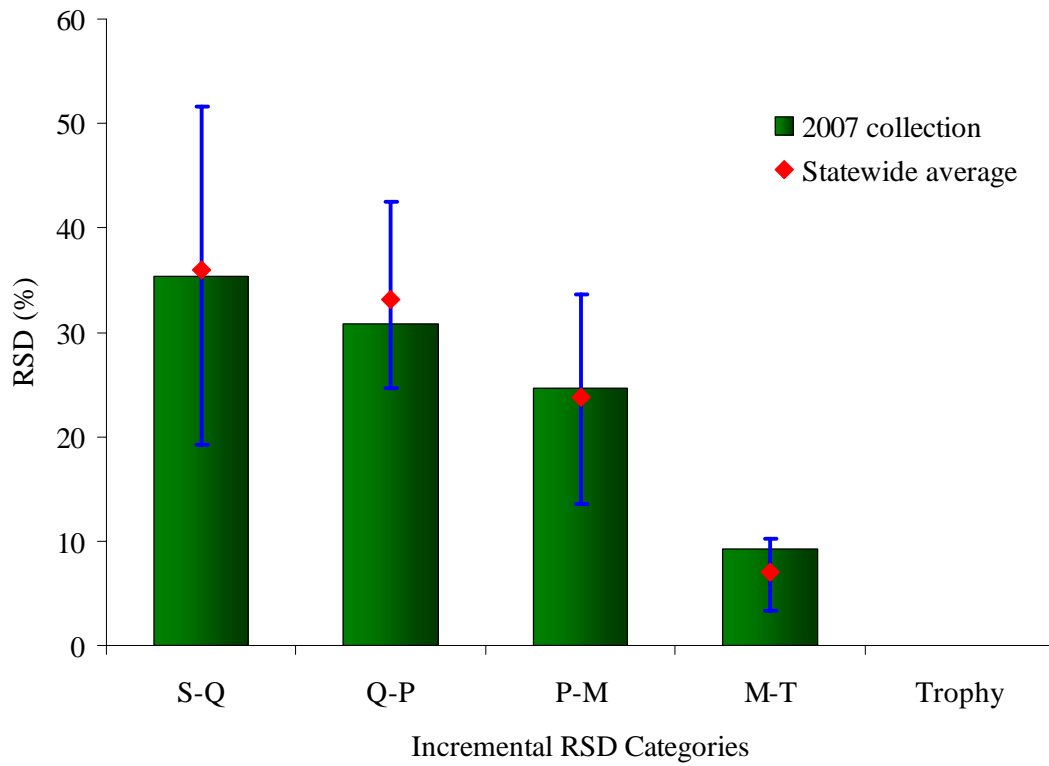


Figure 5. Relative stock density (RSD) of crappie (N=32 black, 41 white, 2 hybrids) at Lake Frank Jackson, fall 2007. I-Beams represent the 25th and 75th percentile of RSD values of crappie statewide.

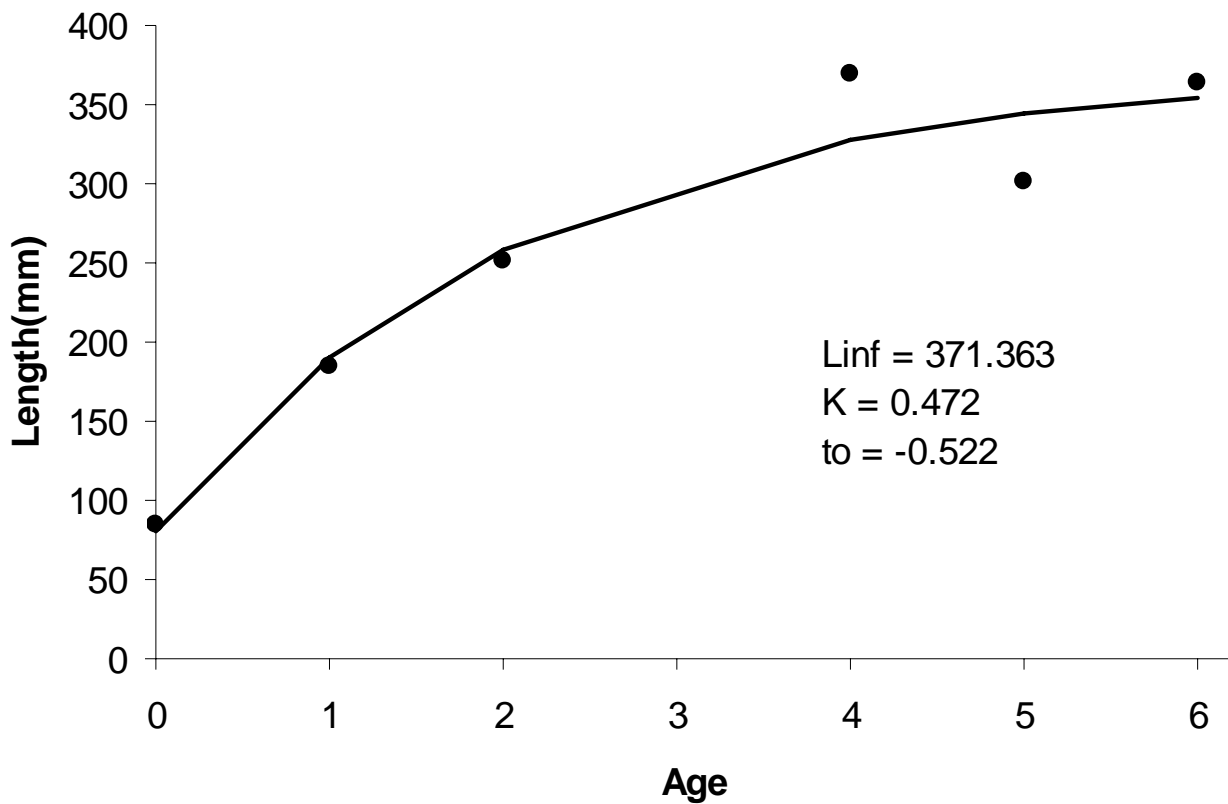


Figure 6. Mean lengths at age (circles) and the predicted growth curve from the von Bertalanffy growth equation. Note: Ages represent the age at capture, i.e. age 0+, 1+, 2+, etc. since the fish were collected during fall sampling and have almost completed the current year growth.

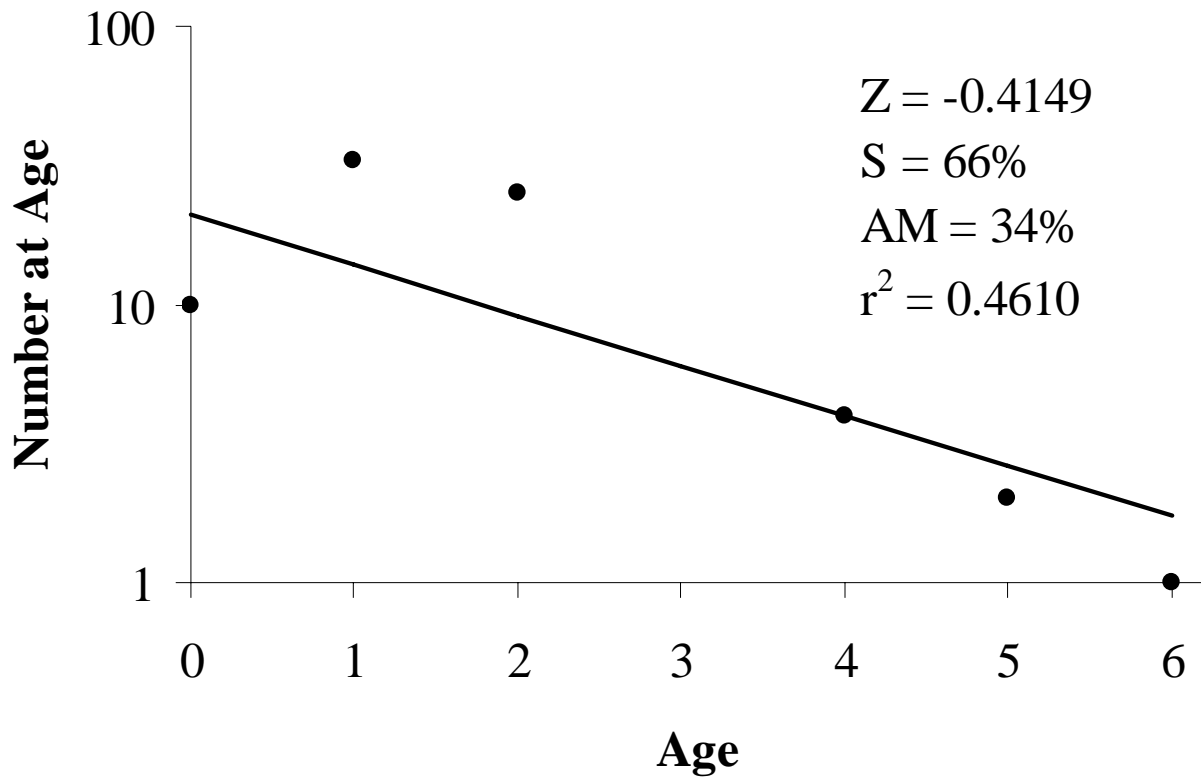


Figure 7. Catch-curve regression for crappie collected from Lake Frank Jackson, fall 2007. Circles represent the number-at-age, and the line is the predicted slope (Z) from regressing the natural log of the number-at-age against age.