GANTT RESERVOIR
CRAPPIE MANAGEMENT REPORT

FALL 2006

Prepared by

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Introduction

Gantt Reservoir (Table 1, Figure 1) is a 2,747 acre impoundment located on the Conecuh River in Covington County, Alabama. The dam is approximately six miles north of Andalusia, and is located upstream from Point A Reservoir. Gantt Dam is operated by the Alabama Electric Cooperative for hydropower generation. Alabama reservoirs are sampled based on priority, size, quality of fishing, or concerns associated with the fishery. Crappie have never been sampled in Gantt Reservoir using trap nets. The Fall 2006 sample will serve as the baseline data set for future crappie sampling efforts at Gantt Reservoir, and the recent sample was compared to statewide averages to evaluate the current fishery. Newman et al. (1987) includes a detailed description of Gantt Reservoir and fish species present.

Methods

Crappie were sampled (40 net nights) from December 29, 2006 to January 19, 2007 at Gantt Reservoir according to guidelines set forth in the Alabama Reservoir Management Manual (Cook 1999). To maximize gear effectiveness, nets that yielded no crappie were reset in habitats similar to those where crappie were collected after the first net night. 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 only two black crappie were collected, these fish were removed from the data set and only white crappie were used in the population analysis.

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 Bertalannfy equation, and time to reach stock, quality, preferred, and memorable size was calculated by inverting the equation and solving for the time needed to reach each stock length. Total annual mortality was calculated using weighted catch-curve regression where the natural logarithm of the number-at-age was regressed against age.

Results and Discussion

White crappie (N=86) were collected at a rate of 2.2 fish per trap-net night. The statewide mean CPE for white crappie is 8.8 per trap-net night, which is about 3-fold higher than CPE observed at Gantt Reservoir. White crappie ranged in length from 65 to 360 mm TL (Figure 2), and 8 year classes were represented (i.e. 0 + to 7 +; Table 3; Figure 2). The 2003 (age-3+), 2004 (age-2+) and 2005 (age-1+) year-classes represented 77% of the population, and these fish ranged from 144 to 337 mm TL (Table 3; Figure 2). The 2004 year-class was most numerous, representing almost 30% of the population.

Relative stock density indices for stock (RSD-S) and quality (RSD-Q) size crappie were below the statewide mean (Figure 3). RSD-S did not fall within the statewide interquartile range, and fell just below the lower 25th percentile. RSD-Q fell within the statewide interquartile range, but was only slightly higher than the lower 25th percentile (Figure 3). Preferred (RSD-P) and memorable (RSD-M) relative stock density indices were higher than the statewide upper 75th percentile for white crappie (Figure 3). Additionally, proportional stock density (PSD) was very high at 81%, indicating that

large fish (≥ 200 mm TL) made up a high percentage of the population. Also, harvestable size fish (229 mm TL; 9 inches) made up about 64% of the sample (Figure 2). Relative weight was lower than the statewide average for quality, preferred and memorable size fish, but was similar to the statewide average for stock size fish (Table 2).

Inversion of the von Bertalannfy equation predicted that white crappie reach harvestable size (229 mm TL; 9 inches) in approximately 3 years (Figure 4). Time to reach stock , quality, preferred and memorable size was 1.5, 2.3, 3.1 and 4.6 years, respectively (Figure 4). Based on the von Bertalannfy equation, white crappie are not likely to reach trophy size (380 mm TL) in Gantt Reservoir. Growth estimates from Gantt Reservoir are very similar to Point A Reservoir located directly downstream (Holley et al. 2007).

Total annual mortality from catch-curve analysis was 44% for white crappie in Gantt Reservoir, which indicates that survival is likely about 56% (Figure 5). The regression was significant ($F = 13.33$; Adj $r^2 = 0.71$; $P = 0.02$), and age accounted for 77% ($r^2 = 0.77$) of the variation in number-at-age. Adjusted coefficient of determination (Adj $r^2 = 0.71$) did not meet the requirements for catch-curve regressions stipulated in Cook (1999). Recruitment has been fairly constant during the last 7 years, as catch-curve residuals have not deviated far from the predicted number-at-age (Figure 5). Regression diagnostics did not reveal any strong year-classes, but 2000 could be considered a weak year-class (Cook D = 0.6). A cautionary note must be advised that the 95% confidence intervals associated with our estimates of annual mortality were large, ranging from 13 to 64%, and is likely a function of low sample size rather than variable recruitment (Allen 1997).

Summary

The crappie population in Gantt Reservoir is not abundant and displays below average condition. However, a large percentage of the fish collected (64%) were harvestable size or larger. Anglers should take advantage of the current fishery that is made up of mostly large individuals. Previous reports have reflected on the infertile nature of Gantt Reservoir (Newman et al. 1987; Weathers et al. 2004; Holley et al. 2006). The infertile nature is reflected by the low abundance of threadfin and gizzard shad, and crappie forage primarily consists of small sunfish and minnows. Additionally, draw downs by the Alabama Electric Cooperative have occurred on occasion, and consist of lake levels dropping 6 to 12 feet to allow maintenance on dams and turbines. In Fall 2006, the reservoir was lowered 6 feet to facilitate turbine repairs, which delayed trap-net sampling. Draw downs can have adverse effects on fish populations by concentrating both prey and predator species (Ploskey 1986; Holley 2007). In infertile reservoirs where prey biomass is low, the production of sportfish is limited. Anglers should be aware that fishing may not be as satisfactory in reservoirs such as Gantt, and their standards may have to be lowered to achieve an enjoyable fishing trip.

Conclusions

1. No change is recommended at this time concerning management of crappie due to the infertile nature of the reservoir and unstable water levels that occur from AEC operations.
2. Communication has improved between AEC and the Alabama Department of Wildlife and Freshwater Fisheries concerning water level manipulation and fishery concerns.

3. Alabama Division of Wildlife and Freshwater Fisheries will perform sampling for flathead catfish to monitor their presence in Summer 2007, since they have been found in Point A reservoir immediately below Gantt.

References

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APPENDIX A

TABLES AND FIGURES

GANTT RESERVOIR 2006

Table 1. Gantt Reservoir morphometric, physical, and chemical characteristics.

Surface Area	2747 acres
Drainage area	647 square miles
Full pool elevation	198 ft-msl
Mean annual fluxuation	1 foot
Shoreline distance	21 miles
Shoreline development index	2.9 (Welch 1948)
Mean depth	5.3 feet
Maximum Depth	40 feet
Outlet depth	27.5 feet
Growing season	233 frost free days (Jenkins 1967)
Thermocline Depth	26 feet
Year of Impoundment	1935

Table 2. Stock density indices, catch per effort, and relative weight of white crappie collected from Point A Reservoir, Fall 2006, compared to statewide averages.

TOTAL NUMBER, CPE, PERCENT OF SAMPLE AND Wr

				SUBSTOCK			RSD-S				RSD-Q				RSD-P				RSD-M				TOTAL	
Species	Gear	Year	Samples	no.	cpe	ratio	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe
White Crappie	Trap	2007	40	7	0.2	9	15	0.4	19	81	20	0.5	25	83	29	0.7	37	81	15	0.4	19	79	86	2.2
Statewide Average					3.6	74		2.2	36	76		1.5	33	89		1.1	24	94		0.3	7	95		8.8

Table 3. Age composition and mean length of white crappie collected from Gantt Reservoir, Fall 2006.

Age	Year Class	Number	Percent	CPE	Mean TL	SE	Range
0	2006	7	8.1	0.2	75.7	3.2	65 - 88
1	2005	20	23.3	0.5	185.4	4.7	144 - 219
2	2004	25	29.1	0.6	246.3	3.7	196 - 275
3	2003	21	24.4	0.5	283.3	4.7	248 - 337
4	2002	5	5.8	0.1	302.8	5.5	281 - 311
5	2001	5	5.8	0.1	326.2	13.1	287 - 357
6	2000	0	0.0	0.0	0.0		
7	1999	3	3.5	0.1	347.3	8.2	332 - 360
Total		86	100.0	2.2			

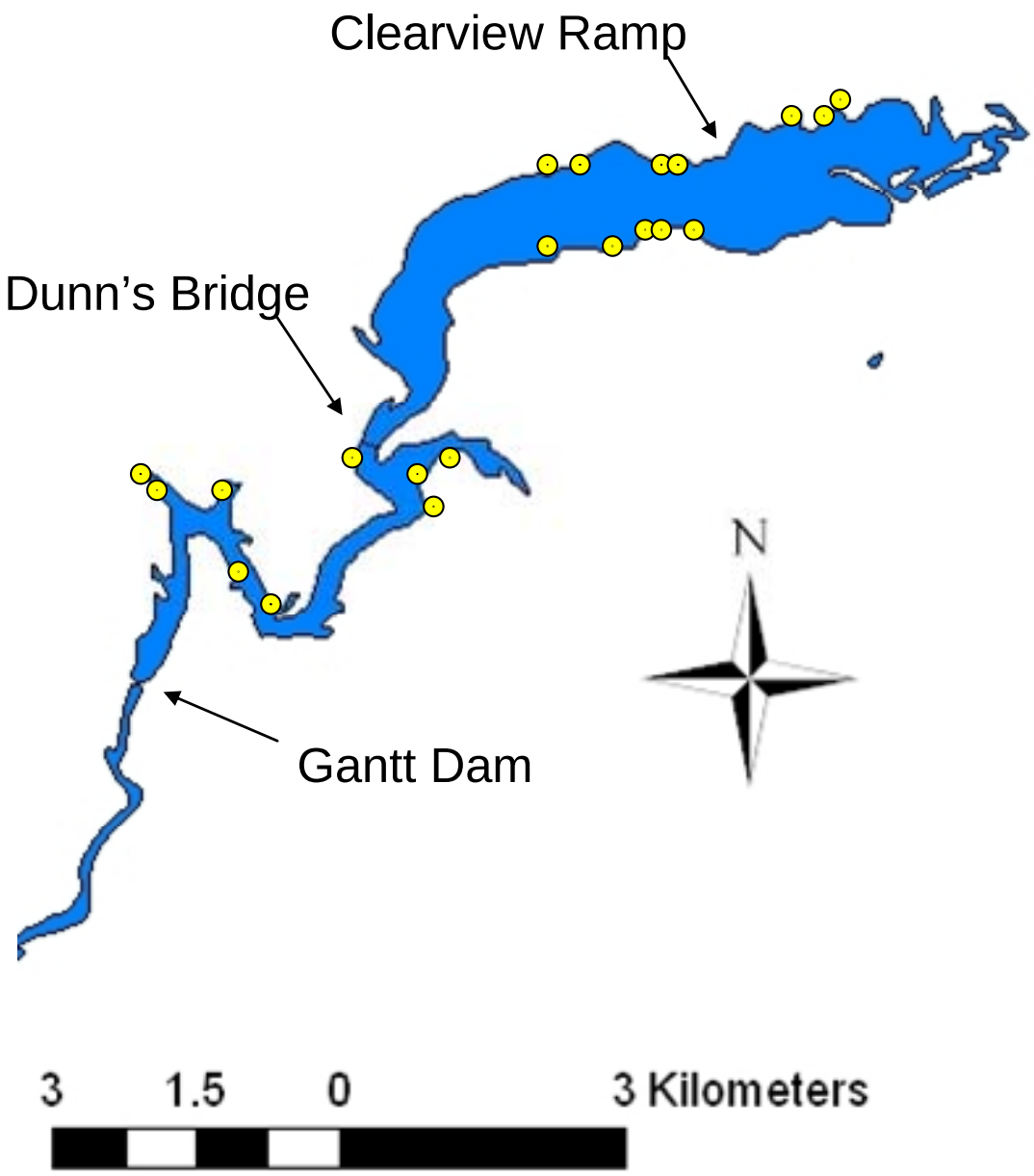

Figure 1. Map of Gantt Reservoir with crappie sampling locations depicted with yellow circles for the Fall 2006 sample.

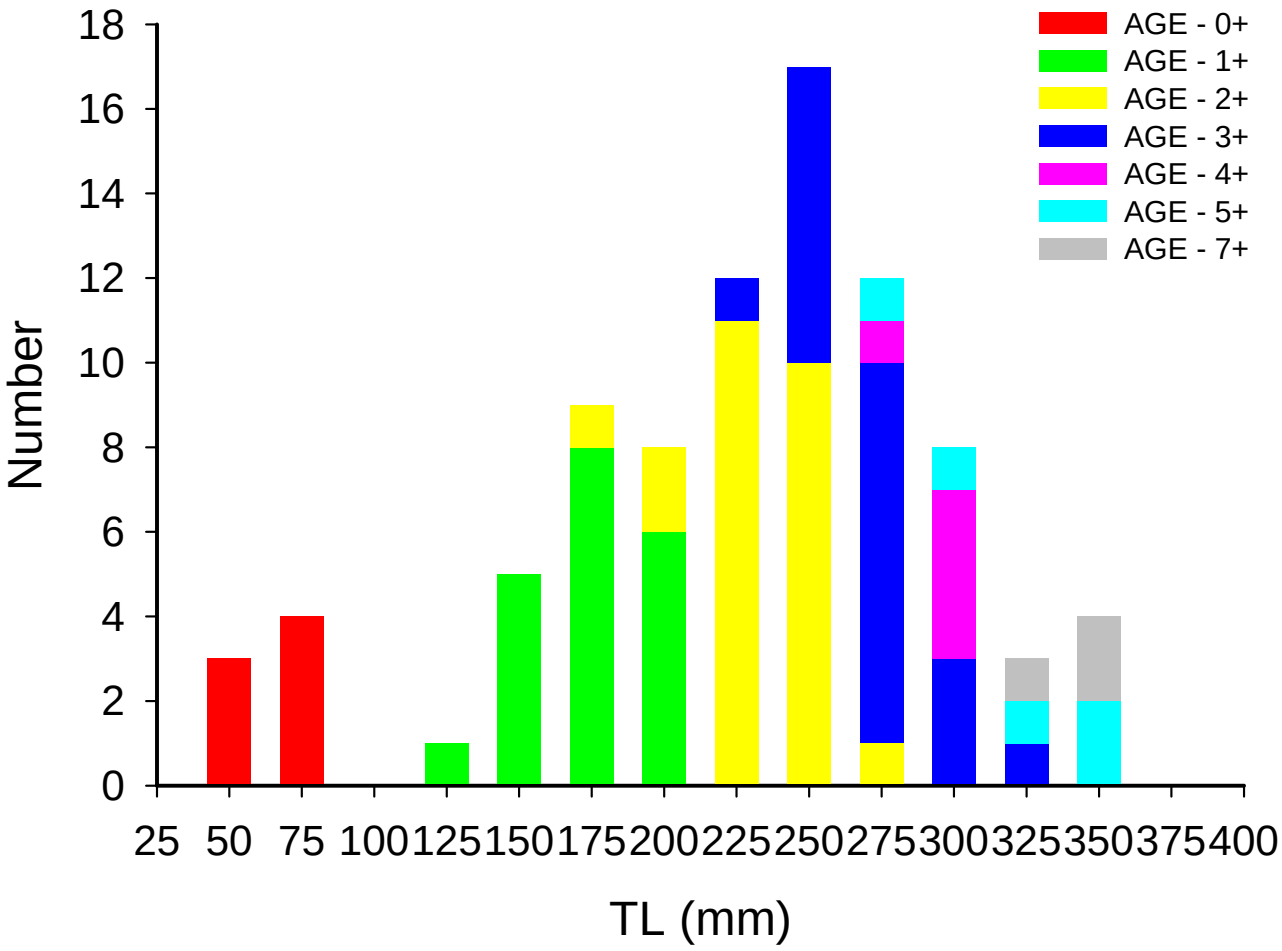

Figure 2. Length-at-age frequency for Gantt Reservoir white crappie, Fall 2006.

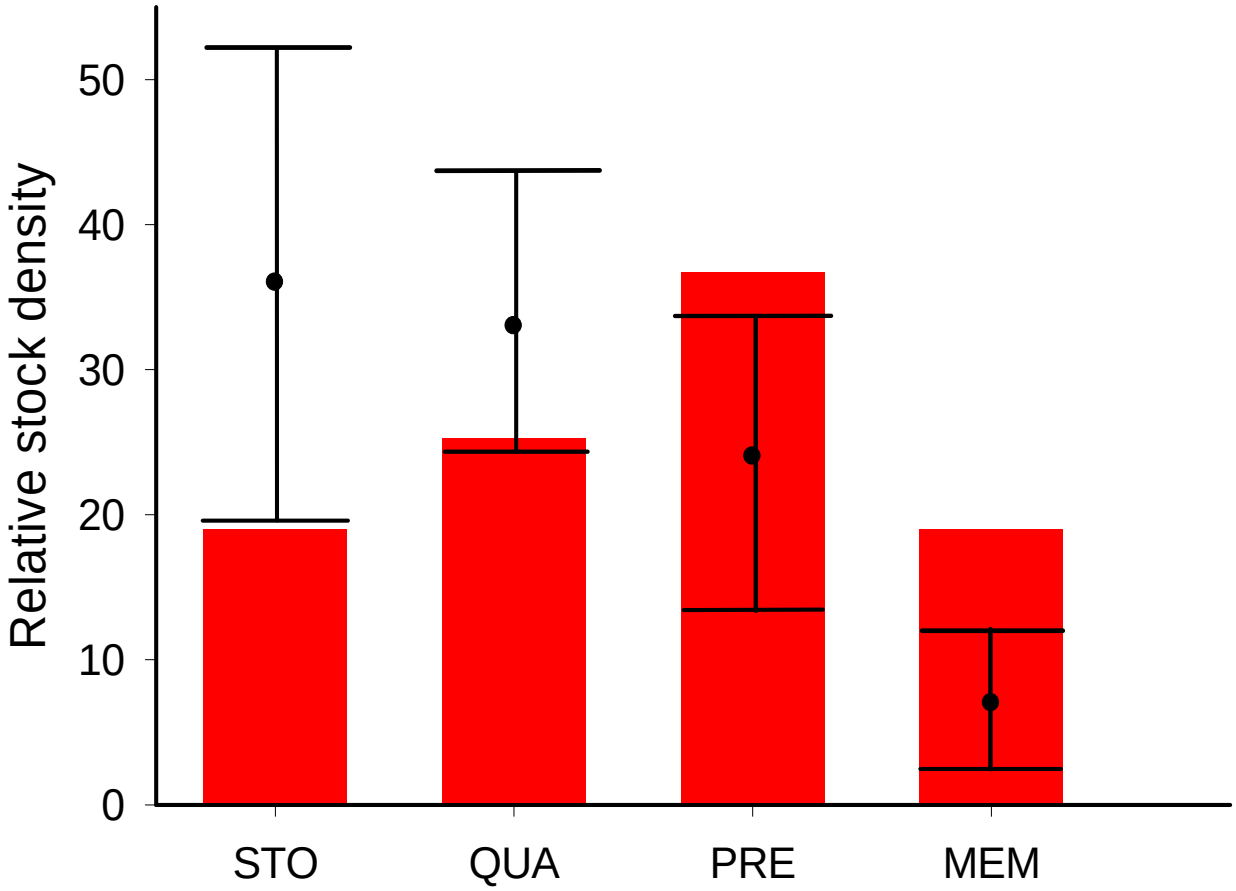

Figure 3. Relative stock densities for white crappie collected from Point A Reservoir, Fall 2006. Circles represent the statewide mean and bars represent the interquartile range for each relative stock density indice.

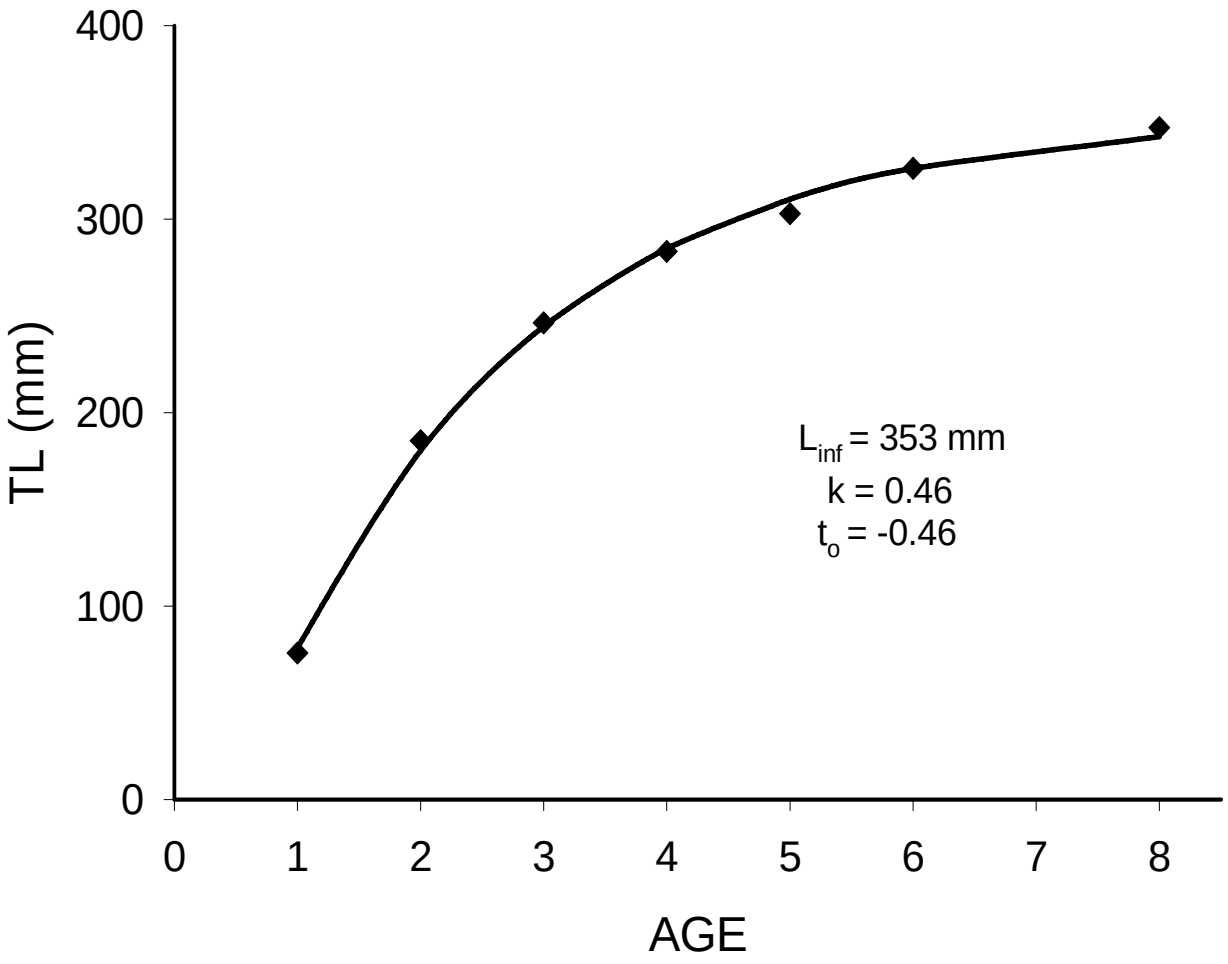

Figure 4. Mean lengths-at-age (diamonds) and the predicted growth curve (line) from the von Bertalannfy growth equation. Note: Age is adjusted to represent the age at capture during Fall 2006 (i.e as of January 1, 2007, fish are deemed 1 instead of 0+).

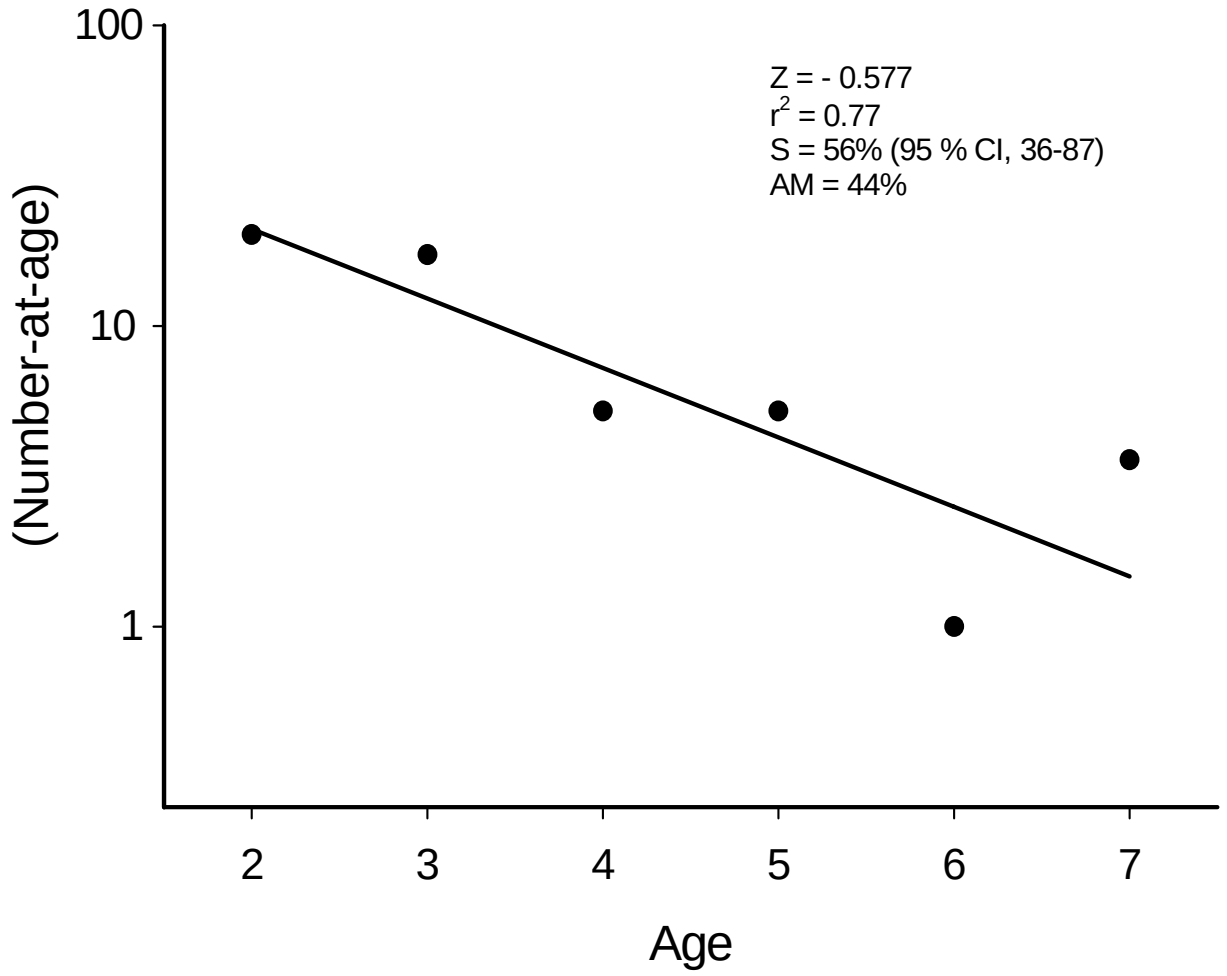

Figure 5. Catch-curve regression for white crappie collected from Gantt Reservoir, Fall 2006. Circles represent the number-at-age, and the line is the predicted slope (Z) from regressing the natural log of the number-at-age against age.