

LOGAN MARTIN RESERVOIR MANAGEMENT REPORT

FY 2007

FALL 2006

Prepared by

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Introduction

The objective of the Logan Martin Reservoir management plan is to collect quantitative biological data to assist district biologists in developing management strategies to enhance the fishery. The reservoir is sampled periodically to follow trends in growth, recruitment, and mortality, of its major sport fish species. Logan Martin Reservoir has previously been sampled in 1986, 1988, 1994, 1999, 2002, 2004, and 2005 by District II Fisheries personnel.

Detailed characteristics of Logan Martin Reservoir can be found in the 1986-management report (Catchings and Cook 1987). A summary of morphometric, physical, and chemical characteristics is listed in Table 1 of this report.

Methods

Logan Martin Reservoir was sampled in the fall of 2006 according to guidelines of the Fisheries Section's Reservoir Management Manual (Cook 1999). Trap netting for crappie was conducted October 30, 2006 through November 1, 2006. Gear description and deployment methods can be found in the 2000 management report (Catchings and Smith 2000). Sample sites are shown in Figure 1.

Results

Fall 2006 trap netting resulted in the capture of 61 black crappie. Catch-per-effort of stock-size and larger black crappie (1.5) was below the lake average (2.9) and between the 25th percentile (1.0) and mean (2.4) for upland reservoirs, (Table 2, Jim McHugh, unpublished data). CPE of stock-size fish (0.1) was at the 25th percentile for upland reservoirs and below the lake average (0.2), CPE of quality-size fish (1.0) exceeded the upland mean (0.8) but fell below the lake average (1.5), CPE of preferred-size fish (0.4) was consistent with the 2005 sample, exceeding the upland 25th percentile but remained below the lake average (1.0), and memorable-size CPE (0.1) equaled the 25th percentile, which is slightly below the lake average, 0.2 fish/net night (Table 2, Jim McHugh, unpublished data).

Relative stock density (RSD) of stock-size fish (3.4%) was well below the lake average (6.5%) and the upland reservoir 25th percentile, 11.0% (Table 2, Figure 3, Jim McHugh, unpublished data). Quality-size black crappie (67.2%) were dominant (Table 2, Figure 3) as RSD-Q surpassed the upland reservoir 75th percentile for the fourth consecutive sample. Preferred-size crappie RSD (25.9%) increased from 2005 to a level approximating the mean for upland reservoirs in Alabama (Table 2, Figure 3, Jim McHugh, unpublished data). Concurrently, memorable-size crappie RSD (3.4%) approximated the 25th percentile for upland reservoirs (Table 2, Figure 3, Jim McHugh, unpublished data).

With the exception of the 2004 year class, black crappie growth rates were difficult to determine due to low CPE for the year classes represented in the sample (Table 3). Growth, expressed as mean length-at-age, for age 2+ black crappie (N=46) decreased from a mean length of 243.5 mm in 2005 to 239.5 mm in 2006 (Table 3, Catchings and Andress 2006). Despite the decline, age 2+ growth was comparable to growth from the upper Coosa Reservoirs (Catchings and Andress 2004). Mean lengths for black crappie ages 1-4 are reported in Table 3. The 2001 and 2000 year classes were represented by one fish each (300 mm and 266 mm, respectively).

Wr values exceeded the 75th percentile for stock-size and quality-size black crappie (Table 2, Jim McHugh, unpublished data). Preferred-size black crappie Wr values surpassed the state mean; while memorable-size values approximated the state mean (Table 2, Jim McHugh, unpublished data). Mortality could not be determined as outlined in the Reservoir Manual.

The current crappie fishery is sustained by the 2004 year class, as the majority of these fish are harvestable (>228 mm) (Table 3, Figure 2). The 2003 year-class was moderately strong (Catchings and Andress 2006), but only accounted for approximately 10% of the 2006 fall sample (Table 3). No young-of-year (YOY) crappie from the 2006 year class were sampled, and only one YOY was sampled fall 2005. However, 44,615

(14,550 in December 2005 and 30,065 in February of 2007) crappie fingerlings, ranging in size from 2 to 6 inches, have been stocked by the Department of Conservation, Fisheries Section, equating to approximately 3 crappie/acre.

Conclusions

Crappie fishing should continue to be good during 2007 as the 2004 year-class continues to grow. The 2008 crappie fishery will be dependent upon the survival, growth and recruitment of the crappie stocked in December 2005 and February 2007 in conjunction with crappie from the natural spawn during the relatively poor 2005 and 2006 year-classes. Growth should be phenomenal due to limited competition. District II personnel do not recommend any management changes at this time. Crappie will be sampled again in the fall of 2007.

There are currently no new issues concerning public relations, accessibility, or aquatic weed nuisances pertaining to Logan Martin Reservoir. However, it is worth mentioning that a no consumption advisory for striped bass and a limited consumption advisory for catfish over 1 pound from Logan Martin Reservoir are in effect as of August 2006. For the latest consumption advisory information, check the department of public health website: www.adph.org.

Literature Cited

- Catchings, E. D. and R.O. Andress, 2006. Logan Martin fall 2005 reservoir management report. Division of Wildlife and Freshwater Fisheries, Montgomery.
- Catchings, E. D. and R.O. Andress, 2004. Logan Martin 2003 reservoir management report. Division of Wildlife and Freshwater Fisheries, Montgomery.
- Catchings, E. D. and J. D. Cook, 1987. Logan Martin reservoir management report. Alabama Game and Fish Division, Montgomery.
- Catchings, E. D. and S. M. Smith 2000. Logan Martin reservoir management report. Division of Wildlife and Freshwater Fisheries, Montgomery.
- Cook, S. F. 1999. Reservoir management manual. Alabama Game and Fish Division, Montgomery.
- Ryder, R. A. 1965. A method for estimating the potential fish production of North American temperate lakes. Transactions of the American Fisheries Society. 94:214-218.
- Jenkins, R. M. 1967. The influence of some environmental factors on the standing crop and harvest of fishes in U.S. reservoirs. Pages 298-321 in Reservoir Fishery Resources Symposium. Southern Division American Fisheries Society, Bethesda, Maryland, USA.

Appendix A

Tables and Figures

Table 1. Logan Martin Reservoir morphometric, physical, and chemical characteristics.

| | |
|------------------------------|---|
| Surface area | 15,263 acres |
| Drainage area | 7,700 sq. mi. |
| Full pool elevation | 465 feet-msl |
| Mean annual fluctuation | 5 feet |
| Shoreline distance | 275 miles |
| Shoreline development index | 15.9 |
| Mean depth | 18 feet |
| Maximum depth | 69 feet |
| Outlet depth | 450 feet (upper) 401 feet (lower) |
| Total dissolved solids (TDS) | 109 mg/l |
| Morphoedaphic index | 6.06 TDS/mean depth(ft) (Ryder 1965) |
| Growing season | 210 frost free days (Jenkins 1967) |
| Year of impoundment | 1964 |

Table 2. Relative stock density, catch per effort, and relative weight of black crappie in Logan Martin Reservoir from 1994, 1999, 2002, 2004, 2005 and 2006 fall samples.

| Species | Gear | Year | No. of samples | SUBSTOCK | | | RSD-S | | | RSD-Q | | | RSD-P | | | RSD-M | | | RSD-T | | | TOTAL | | |
|---------------------|---------|------|----------------|----------|-----|-------|-------|-----|------|-------|-----|------|-------|----|-----|-------|------|----|-------|-----|------|-------|-----|-----|
| | | | | No. | CPE | Pct.* | No. | CPE | Pct. | Wr | No. | CPE | Pct. | Wr | No. | CPE | Pct. | Wr | No. | CPE | Pct. | Wr | No. | CPE |
| Black Crappie | Trapnet | 1994 | 40 | 1 | 0.0 | 0.9 | 13 | 0.3 | 11.3 | 64 | 34 | 0.9 | 29.6 | 84 | 59 | 1.5 | 51.3 | 92 | 9 | 0.2 | 7.8 | 96 | 116 | 2.9 |
| | Trapnet | 1999 | 30 | 8 | 0.3 | 6.0 | 9 | 0.3 | 6.8 | 68 | 44 | 1.5 | 33.1 | 85 | 77 | 2.6 | 57.9 | 92 | 3 | 0.1 | 2.3 | 90 | 141 | 4.7 |
| | Trapnet | 2002 | 44 | 4 | 0.1 | 2.9 | 6 | 0.1 | 4.3 | 90 | 89 | 2.0 | 63.6 | 98 | 18 | 0.4 | 12.9 | 96 | 27 | 0.6 | 19.3 | 95 | 144 | 3.3 |
| | Trapnet | 2004 | 40 | 1 | 0.0 | 0.9 | | | | | 76 | 1.9 | 67.9 | 92 | 33 | 0.8 | 29.5 | 94 | 3 | 0.1 | 2.7 | 96 | 113 | 2.8 |
| | Trapnet | 2005 | 40 | 2 | 0.1 | 2.2 | 12 | 0.3 | 13.3 | 77 | 56 | 1.4 | 62.2 | 90 | 17 | 0.4 | 18.9 | 92 | 5 | 0.1 | 5.6 | 94 | 92 | 2.3 |
| | Trapnet | 2006 | 40 | 3 | 0.1 | 5.2 | 2 | 0.1 | 3.4 | 82 | 39 | 1.0 | 67.2 | 94 | 15 | 0.4 | 25.9 | 95 | 2 | 0.1 | 3.4 | 97 | 61 | 1.5 |
| LAKE AVERAGE | | | | 0.1 | 3.0 | | 0.2 | 6.5 | 76 | | 1.5 | 53.9 | 91 | | 1.0 | 32.7 | 94 | | 0.2 | 6.9 | 95 | | 2.9 | |

*Substock Pct. is substock ratio: number of substock size fish collected for every 100 fish of stock size and larger.

Table 3. Age composition and mean length of black crappie collected from Logan Martin Reservoir, October 30, 2006 - November 1, 2006 trap net sampling.

| Annulus | Year | Number | Percent | CPE | Mean | | Length Range (mm) |
|---------|-------|--------|---------|-----|--------|------|-------------------|
| | Class | | | | Length | (SE) | |
| 1 | 2005 | 4 | 6.6 | 0.1 | 120.5 | 10.1 | 104- 149 |
| 2 | 2004 | 46 | 75.4 | 1.2 | 239.5 | 2.7 | 197- 298 |
| 3 | 2003 | 6 | 9.8 | 0.2 | 276.5 | 10.0 | 243- 311 |
| 4 | 2002 | 3 | 4.9 | 0.1 | 268.0 | 17.8 | 235- 296 |
| 5 | 2001 | 1 | 1.6 | 0.0 | | | |
| 6 | 2000 | 1 | 1.6 | 0.0 | | | |
| Total | | 61 | 100.0 | 1.6 | | | |

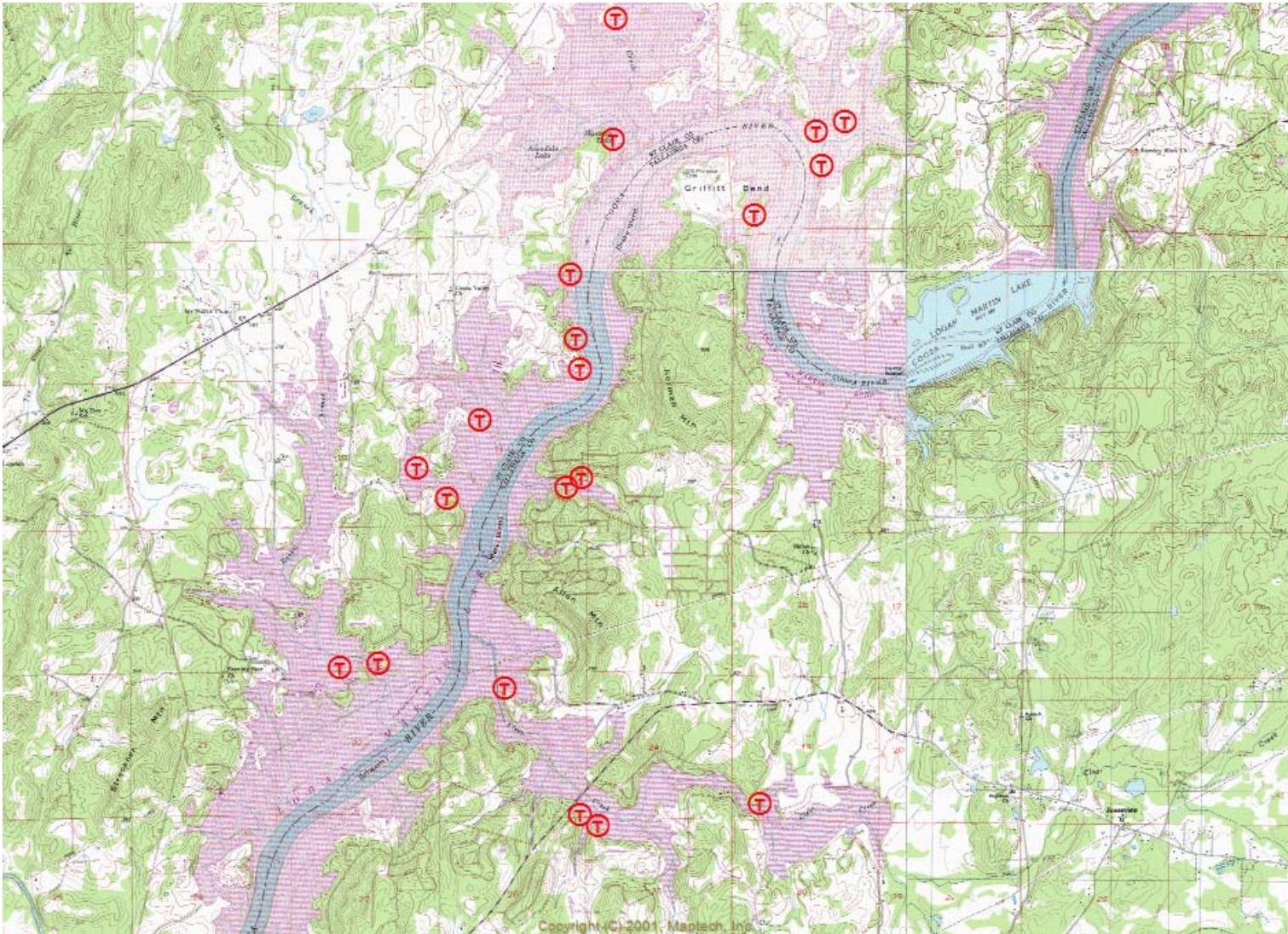


Figure 1. Logan Martin Reservoir Fall 2006 Trap Netting Sites = **T**

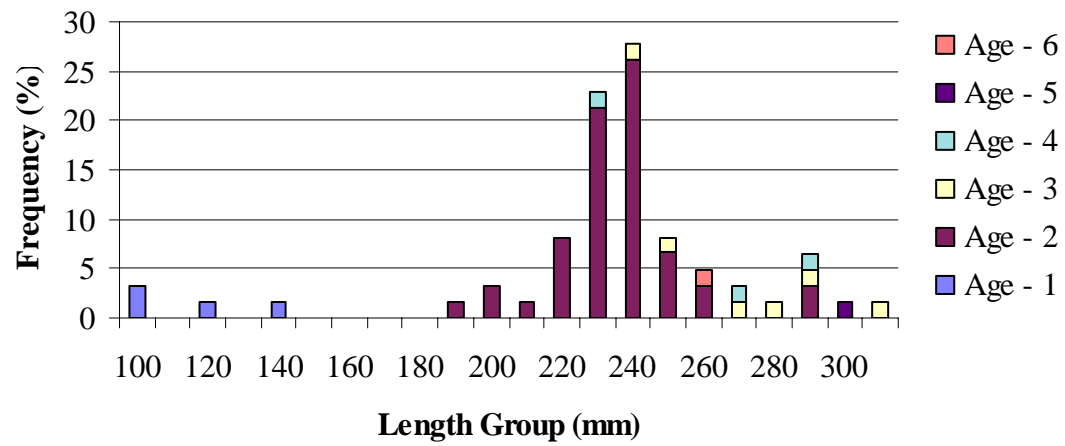


Figure 2. Length at age frequency for Black Crappie (N=61) from Logan Martin Reservoir, October 30, 2006-November 1, 2006.

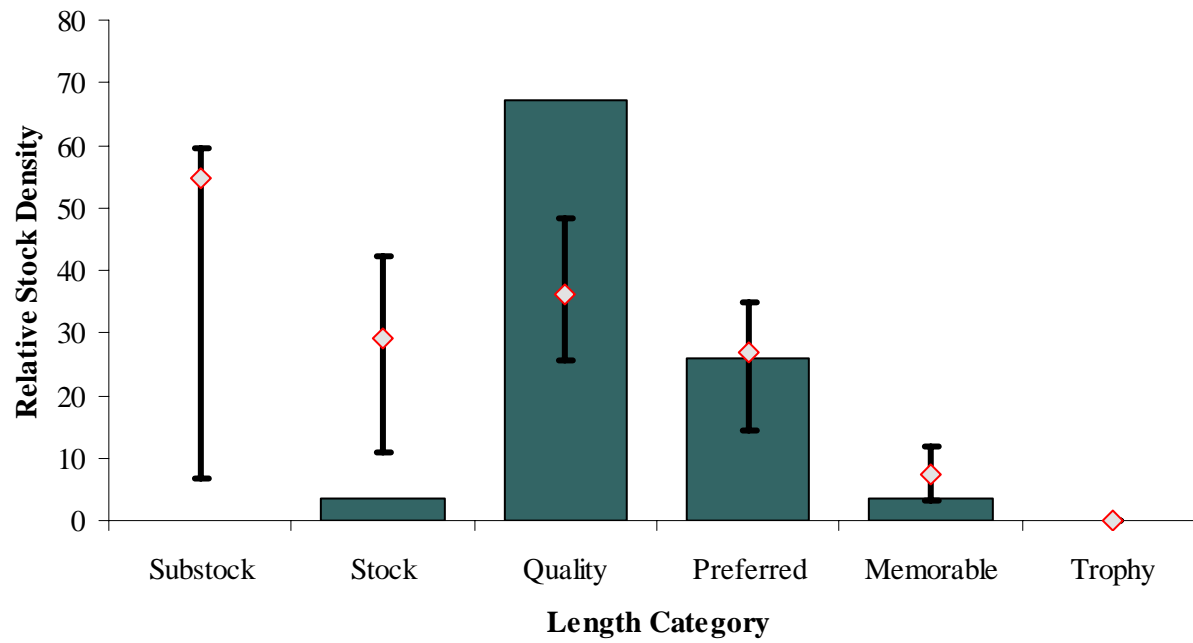


Figure 3. Relative stock density (RSD) of black crappie from Logan Martin Reservoir, fall 2006, with upland reservoir means for each size group. I-beams denote the 25th and 75th percentiles for RSD values in upland reservoirs for black crappie.