COFFEEVILLE RESERVOIR
MANAGEMENT REPORT

2006

Prepared by

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Introduction

Coffeeville Reservoir is an 8,500-acre reservoir on the Tombigbee River impounded by the United States Army Corps of Engineers in 1958 (Table 1, Figure 1). Coffeeville has been sampled following the Alabama Division of Wildlife and Freshwater Fisheries Reservoir Management protocol since 1987, and the results of these efforts, including a detailed description of the physical and biological characteristics, are summarized in several management reports (Tucker 1988, Tucker 1991, Tucker and Johnson 1989, Tucker et al. 1996, Armstrong et. al. 2001). This report evaluates data taken from standardized sampling in Spring, 2006. Management activities since 1987 have included standardized sampling, aquatic plant management, general surveillance, and the stocking of Gulf-strain and Atlantic-strain striped bass, hybrid striped bass, and Florida largemouth bass (Table 2).

Coffeeville Reservoir is a river-run reservoir with few creeks and backwater areas, resulting in limited habitat for centrarchids. The backwater areas on this reservoir are important nursery habitat for both game and non-game fish species, as they are in Demopolis Reservoir upstream of Coffeeville (Slipke et. al. 2005).

Methods

Electrofishing of this reservoir was done using standardized sampling procedures. Sampling sites are indicated on the reservoir map (Figure 1). Target species for electrofishing included largemouth bass, bluegill, gizzard shad, and threadfin shad. Species diversity was sampled by devoting a portion of the sampling period to collection of all fish; however, no measurements of diversity were made in this analysis (Table 3). Total length (mm) and weight (g) were recorded for all fish collected. For age determination of largemouth bass, otoliths were removed and preserved. All otoliths were read by two readers under a dissecting microscope. Discrepancies in age of the otolith were reconciled during a third read in concert between the two readers. Any largemouth bass otolith aged older than five years was sectioned and read under a compound microscope using the methods outlined by Maceina (1988). Significant aspects of reservoir sampling are discussed in the narrative portion of this report. The reader is encouraged to take note of the appendices of this report for additional information.

Results and Discussion

Largemouth Bass

A total of 160 (109 ≥ stock-length) largemouth bass were collected by electrofishing (Tables 3, 4). Ten age-classes were present in the sample with the 2005 (Age 1+), 2004 (Age 2+) and 2003 (Age 3+) year-classes comprising the most abundant age groups at 34%, 24%, and 16% (Tables 5, 6). Catch-curve analysis was used to estimate survival and year-class strength ($S = 66\%$, $R^2 = 0.92$) from ages 2 to 10 (Figure 2, Maceina 1997). None of the year-classes from 1996 to 2005 deviated enough from the predicted values to be considered strong or weak year-classes, indicating stable recruitment and low fishing mortality (Table 5). Analysis of the sample indicated that stock- and quality-length fish represented 83% of all largemouth bass sampled at 47% and 36%. Preferred- and memorable-length largemouth bass comprised the remaining 17% of fish in the sample. Relative weights (Wr) for largemouth bass were depressed, ranging from 74 to 87, but not surprising due to turbidity and fertility of this reservoir.

The 2006 sample values for relative stock density (RSD) of largemouth bass were similar to the lake average. However, when compared to the 2001 sample, RSD values were higher for stock- and memorable-length largemouth bass, and lower for quality- and preferred-length fish (Figure 3). RSD values for the 2006 Coffeeville Reservoir sample fell within the statewide inner quartile range (IQR) for all reservoirs in Alabama, with the exception of sub-stock length largemouth bass which was higher than the statewide IQR (Figure 3). Catch-rates were lower in the 2006 sample than in the

2001 sample across all lengths of largemouth bass; however, these values were within the statewide IQR (Figure 4). These comparisons were not tested for statistical significance.

Because of the river-run nature of Coffeeville Reservoir, optimum habitat for centrarchids is limited. The geomorphometry of the lake and periods of excessive turbidity likely limit the overall productivity of the reservoir, resulting in less than optimum conditions for black bass populations. The limited productivity and distance from a major population result in low fishing pressure in Coffeeville Reservoir. Although angler use is low, the largemouth bass fishery in Coffeeville is healthy and stable.

<u>Bluegill</u>

The bluegill sample included 114 fish with lengths ranging from 61 to 218 mm (Table 3, Figure 6). Stock- and quality-size fish were the dominant RSD groups in the sample (Table 4, Figure 7). Bluegill samples were comprised mostly of stock-size fish at 79%, with quality-size fish making up 19%. Preferred-size bluegill comprised 2% of the sample. Mean Wr of bluegill in this sample ranged from 94 to 97 across all length groups indicating a population in good condition.

RSD values were higher in 2006 than in 2001 for stock-length bluegill; however they were lower in 2006 for preferred- and quality-length fish. RSD values across all length groups fell within the statewide IQR for all Alabama reservoirs (Figure 7). Catch-rates for bluegill in 2006 were higher for stock-length fish and similar for preferred- and quality-length fish when compared to the 2001 sample. The 2006 catch-rates were within the statewide IQR for all Alabama reservoirs (Figure 8). These comparisons were not tested for statistical significance. The increased number of stock-length fish should promote good bluegill angling opportunities.

<u>Gizzard and Threadfin Shad</u>

The gizzard shad sample (N=101) ranged in size from 132-293 mm with modal groups occurring at 160 and 220 mm (Figure 9). Relative weights of gizzard shad were 85 and 73 for stock-and quality-size fish (Table 4). Relative weight values in 2006 and 2001 were similar for stock-length gizzard shad. Catch rates of stock-length gizzard shad were equal to the lake average (24.7 fish/hour); however, catch-rates decreased from 2001.

Threadfin shad (N=108) ranged in size from 82 to 155 mm with a single modal group at 100 mm (Figure 10). Threadfin shad catch rates were higher in 2001 (57.2) than in 2006 (45; Table 4). Gizzard shad and threadfin shad populations appear to be stable.

Management Recommendations

There are no management recommendations for any sportfish species at this time.

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APPENDIX A

TABLES AND FIGURES

TABLE 1. MORPHOMETRIC, PHYSICAL, AND CHEMICAL CHARACTERISTICS OF COFFEEVILLE RESERVOIR.

Surface area	8,500	acres
Drainage area	18,600	sq. mi.
Full pool elevation	32.5	feet-msl
Mean annual fluctuation	minimum	feet
Shoreline distance	300	miles
Shoreline development index	23.2	(Welch 1948)
Mean depth	23	feet
Maximum depth	40	feet
Total dissolved solids	203	mg/l
Morphoedaphic index	8.83	TDS/mean depth(ft) (Ryder 1965)
Growing season	230-245	frost-free days (Jenkins 1967)
Reservoir age	48	years

TABLE 2. FISH STOCKING IN COFFEEVILLE RESERVOIR, 1975-2006.

Species	Year	No/Ac	Total
Largemouth Bass	1986	2.0	18000
(Florida-strain)	1987	1.0	8500
	1989	4.0	34000
	1992	1.0	8550
Hybrid Striped Bass	1993	3.0	25500
	1997	2.0	19040
	1998	2.0	19114
	2000	2.0	19020
	2001	5.0	43000
	2002	2.0	20260
	2003	2.0	19000
	2004	2.0	19392
Striped Bass	1975	2.0	17500 A*
	1976	1.5	12665 A
	1977	1.0	12240 A
	1991	1.5	11962 A
	1992	2.0	19000 G
	1993	2.0	19000 G
	1995	2.0	19049 G
	1996	2.5	20685 G
	1997	2.0	19080 G
	1998	2.0	19210 G
	1999	2.5	20202 G
	2001	2.0	19000 A
	2003	2.0	19200 G
	2004	2.0	19200 G
	2005	2.0	19200 G
	2006	2.0	19000 G

***** A denotes Atlantic-strain
G denotes Gulf-strain

TABLE 3. NUMBER OF SPECIES COLLECTED BY ELECTROFISHING IN COFFEEVILLE RESERVOIR, SPRING, 2006.

	Electrofishing Sample		
Species	No.	CPE	Tot E
Largemouth bass	160	35.6	4.5
Bluegill sunfish	114	67.1	1.7
Threadfin shad	108	45.0	2.4
Gizzard shad	101	33.7	3.0
Spotted gar	40	36.4	1.1
Blacktail redhorse	18	16.4	1.1
White crappie	15	13.6	1.1
Bowfin	12	10.9	1.1
Redear sunfish	12	10.9	1.1
Smallmouth buffalo	12	10.9	1.1
Striped mullet	12	10.9	1.1
Notropis sp.	11	10.0	1.1
Spotted sucker	7	6.4	1.1
Black crappie	2	1.8	1.1
Chain pickeral	2	1.8	1.1
Channel catfish	2	1.8	1.1
Flathead catfish	2	1.8	1.1
Freshwater drum	2	1.8	1.1
Longear sunfish	2	1.8	1.1
American eel	1	0.9	1.1
Bayou topminnow	1	0.9	1.1
Fundulus sp.	1	0.9	1.1
Longnose gar	1	0.9	1.1
Silverside	1	0.9	1.1
Spotted sunfish	1	0.9	1.1
Warmouth sunfish	1	0.9	1.1

TABLE 4. NUMBER, RELATIVE STOCK DENSITY, CATCH-PER-EFFORT, AND RELATIVE WEIGHT OF TARGET FISH IN COFFEEVILLE RESERVOIR,1987 - 2006.

					TOTAL NUMBER, CPE, PERCENT OF SAMPLE AND Wr																				
			Sample	Effort	SUBSTOCK			RSD-S				RSD-Q				RSD-P				RSD-M				TOTAL	
Species	Year	Gear	Sites	(Hours)	no.	cpe	pct [b]	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe
Largemouth bass	1987	Elec	10	5.00	6	1.2	15	26	5.2	67	.	8	1.6	21	.	4	0.8	10	.	1	0.2	3	.	45	9.0
Largemouth bass	1988	Elec	6	2.02	31	15.3	31	59	29.0	59	.	30	15.0	30	.	8	4.0	8	.	3	1.5	3	.	130	64.4
Largemouth bass	1989	Elec	4	1.69	18	10.7	18	57	33.7	57	.	24	14.2	24	.	14	8.3	14	.	5	3.0	5	.	118	69.9
Largemouth bass	1995a	Elec	3	1.96	55	28.0	51	55	28.0	51	87	34	17.0	31	89	17	8.7	16	91	2	1.0	1	106	163	83.2
Largemouth bass	2001	Elec	4	1.62	25	15.4	25	42	25.9	42	90	41	25.3	41	88	16	9.9	16	86	1	0.6	1	88	125	77.2
Largemouth bass	2006	Elec	9	4.50	51	11.3	47	51	11.3	47	87	39	8.7	36	86	15	3.3	14	82	4	0.9	4	74	160	35.6
LAKE AVERAGE			**6**	**2.80**	**31**	**13.6**	**31**	**48**	**22.2**	**54**	**88**	**29**	**13.6**	**30**	**88**	**12**	**5.8**	**13**	**86**	**3**	**1.2**	**3**	**89**	**124**	**56.5**
Bluegill	1987	Elec	10	5.00	.	.	.	46	9.2	84	.	9	1.8	16	.	.	.	.	.	.	.	.	.	55	11.0
Bluegill	1988	Elec	6	2.53	.	.	.	91	36.0	91	.	6	2.4	6	.	3	1.2	3	.	.	.	.	.	100	39.5
Bluegill	1989	Elec	5	1.96	.	.	.	89	45.4	92	.	7	3.6	7	.	1	0.5	1	.	.	.	.	.	97	49.5
Bluegill	1995	Elec	3	1.46	100	68.5	108	79	54.0	85	85	14	9.6	15	89	.	.	.	.	.	.	.	.	193	132.2
Bluegill	2001	Elec	6	2.62	.	.	.	79	30.2	68	103	31	11.8	27	102	6	2.3	5	95	0	.	.	.	116	44.3
Bluegill	2006	Elec	4	1.70	3	1.7	3	88	51.2	79	94	21	12.2	19	94	2	1.2	2	98					114	66.3
LAKE AVERAGE			**6**	**2.55**	**52**	**35.1**	**55**	**79**	**37.7**	**83**	**94**	**15**	**6.9**	**15**	**95**	**3**	**1.3**	**3**	**97**	**0**	.	.	.	**113**	**57.1**
Gizzard shad	1987	Elec	.	5.00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11.8
Gizzard shad	1988	Elec	4	2.00	.	.	.	75	37.5	99	.	1	0.5	1	.	.	.	.	.	.	.	.	.	76	38.0
Gizzard shad	1989	Elec	4	1.96	.	.	.	37	18.9	90	.	4	2.0	10	.	.	.	.	.	.	.	.	.	41	21.0
Gizzard shad	1995	Elec	3	1.96	.	.	.	22	11.0	100	.	.	.	.	.	.	.	.	.	.	.	.	.	22	11.0
Gizzard shad	2001	Elec	6	2.79	.	.	.	87	31.2	84	87	16	5.7	16	83	.	.	.	.	.	.	.	.	103	36.9
Gizzard shad	2006	Elec	6	2.40	26	8.7	35	74	24.7	99	85	1	0.3	1	73	.	.	.	.	.	.	.	.	101	33.7
LAKE AVERAGE			**5**	**2.69**	.	.	.	**59**	**24.7**	**94**	**86**	**6**	**2.1**	**7**	**78**	.	.	.	.	.	.	.	.	**69**	**25.4**
Threadfin shad	1987	Elec	.	5.00	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15.8
Threadfin shad	1988	Elec	4	2.00	.	.	.	32	16.0	32	.	68	34.0	68	.	.	.	.	.	.	.	.	.	100	50.0
Threadfin shad	1989	Elec	3	1.96	.	.	.	9	6.3	9	.	91	63.2	91	.	.	.	.	.	.	.	.	.	100	69.4
Threadfin shad	1995	Elec	3	1.96	.	.	.	1	0.7	100	.	.	.	.	.	.	.	.	.	.	.	.	.	1	0.7
Threadfin shad	2001	Elec	6	2.50	.	.	.	1	0.4	1	.	142	56.8	99	.	.	.	.	.	.	.	.	.	143	57.2
Threadfin shad	2006	Elec	6	2.40				108	45.0	100	.	.	.	.	.	.	.	.	.	.	.	.	.	108	45.0
LAKE AVERAGE			**4**	**2.64**	.	.	.	**30**	**13.7**	**48**	.	**100**	**51.3**	**86**	.	.	.	.	.	.	.	.	.	**90**	**39.7**

[a] 1995 sample collected during Fall.

[b] Substock pct is Substock Ratio, the number of substock fish per 100 fish stock-size and larger.

TABLE 5. AGE COMPOSITION AND MEAN LENGTH OF LARGEMOUTH BASS FROM COFFEEVILLE RESERVOIR, SPRING, 2006.

Annulus	Year-Class	Number	Percent	CPE	Mean Length (mm)	Standard Error	Length Range (mm)
1	2005	55	34.4	12.2	149.7	3.9	93 - 215
2	2004	38	23.8	8.4	254.5	4.0	211 - 306
3	2003	25	15.6	5.6	313.5	6.2	233 - 366
4	2002	18	11.3	4.0	332.7	7.7	263 - 380
5	2001	5	3.1	1.1	377.4	17.6	320 - 420
6	2000	6	3.8	1.3	400.8	22.2	330 - 448
7	1999	7	4.4	1.6	438.1	18.4	370 - 515
8	1998	3	1.9	0.7	432.3	53.5	331 - 513
9	1997	2	1.3	0.4	515.5	50.5	465 - 566
10	1996	1	0.6	0.2	582.0	.	582
TOTAL		160	100.0	35.6			

Total effort = 4.5 hrs

TABLE 6. LENGTH AT AGE OF LARGEMOUTH BASS FROM COFFEEVILLE RESERVOIR, SPRING, 2006.

Length (mm)	Age - 1	Age - 2	Age - 3	Age - 4	Age - 5	Age - 6	Age - 7	Age - 8	Age - 9	Age - 10	Total
75	2										2
100	7										7
125	24										24
150	11										11
175	7										7
200	4	4									8
225		11	1								12
250		14	2	1							17
275		7	4	3							14
300		2	8	4	1						15
325			7	4		2		1			14
350			3	4	1		1				9
375				2	1						3
400					2	1	3				6
425						3					3
450							1	1	1		3
475							1				1
500							1	1			2
525											0
550									1		1
575										1	1
Total	55	38	25	18	5	6	7	3	2	1	160

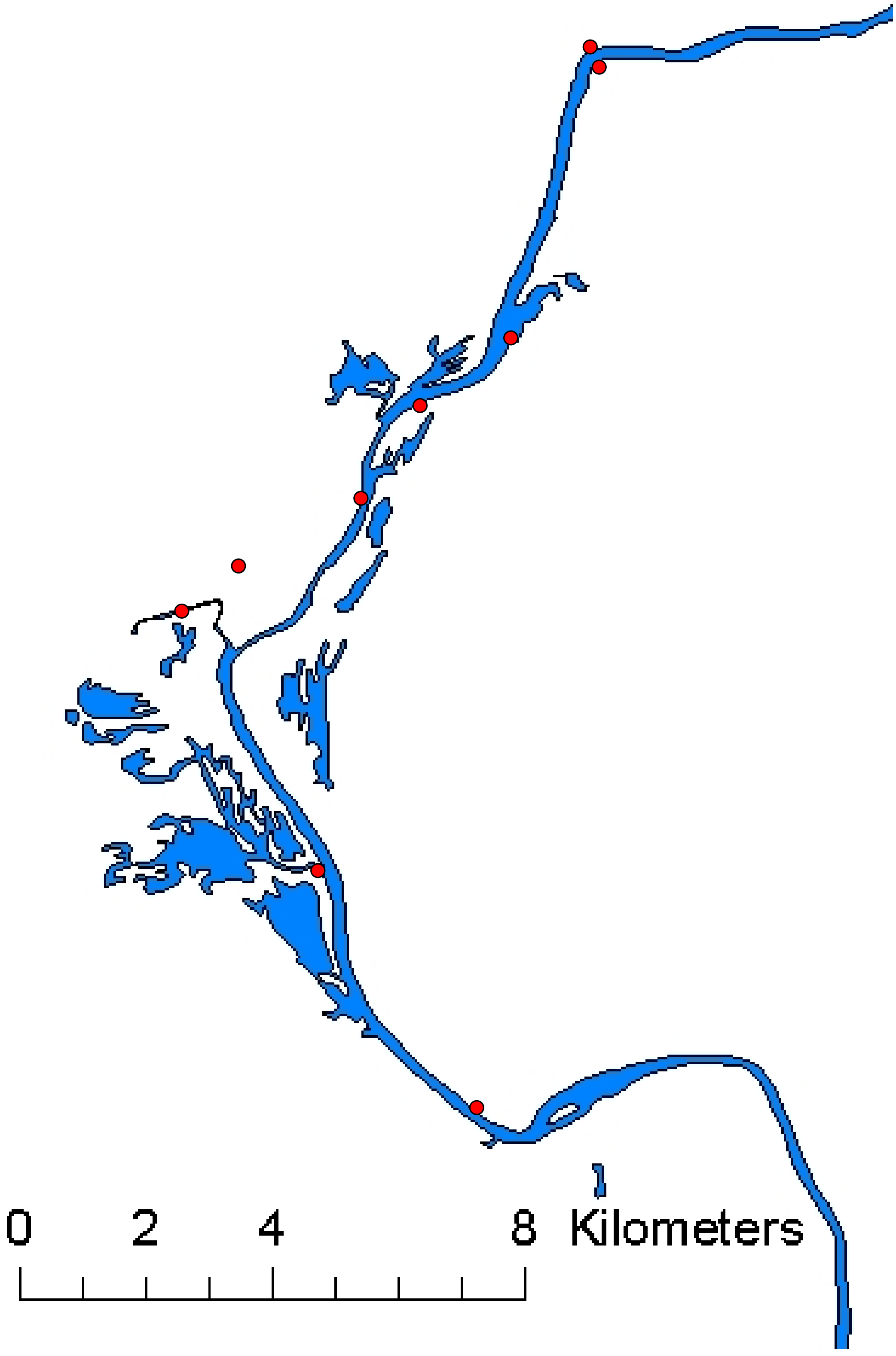

Figure 1. Coffeeville Reservoir Spring, 2006, sampling sites.

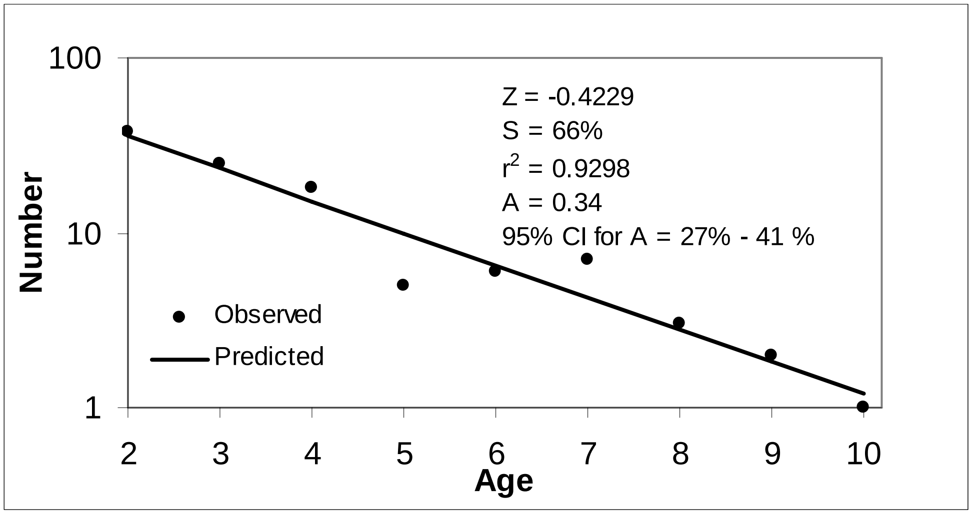

Figure 2. Catch-curve regression for largemouth bass collected from Coffeeville Reservoir Spring, 2006.

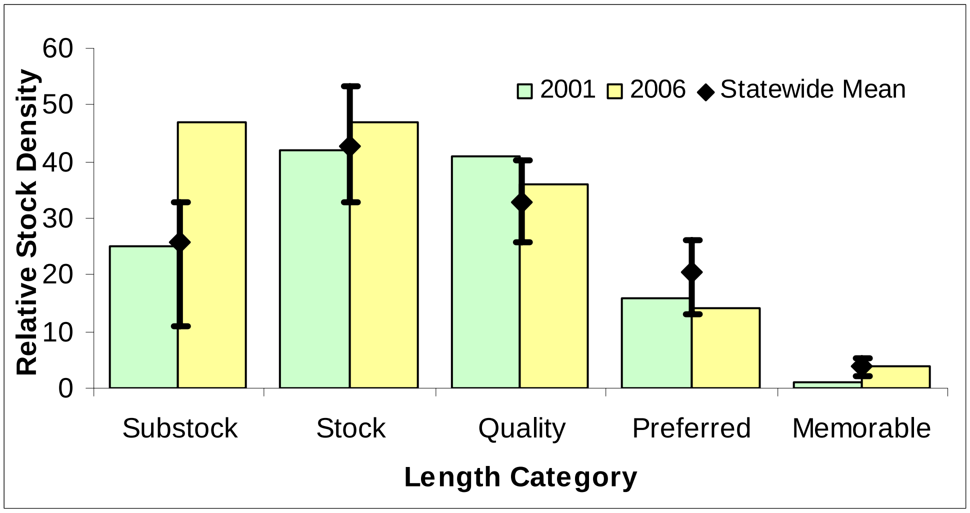

Figure 3. Relative stock density (RSD) of largemouth bass from Coffeeville Reservoir, 2001 and 2006. The I-beam denotes the inner quartile range for all Alabama reservoirs.

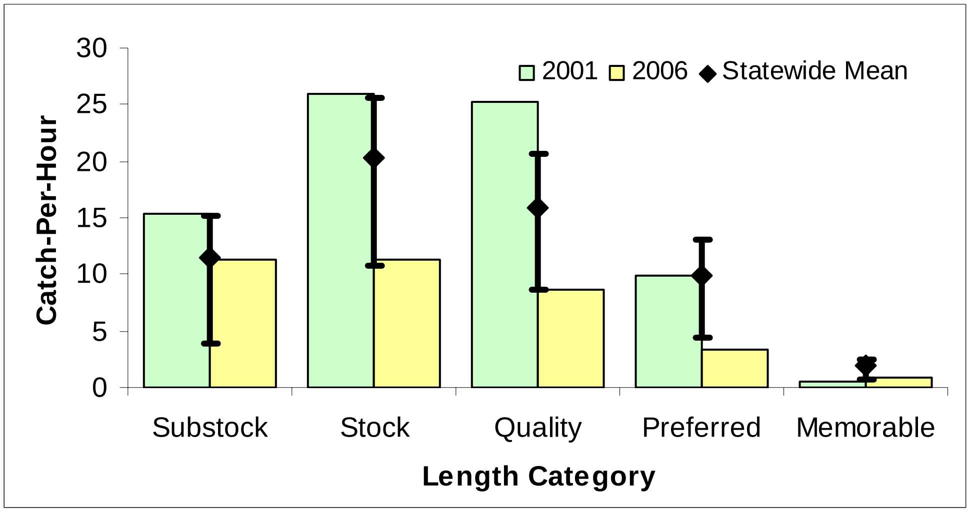

Figure 4. Catch-per-hour for largemouth bass by stock density indices from Coffeeville Reservoir, 2001 and 2006. The I-beam denotes the inner quartile range for all Alabama reservoirs.

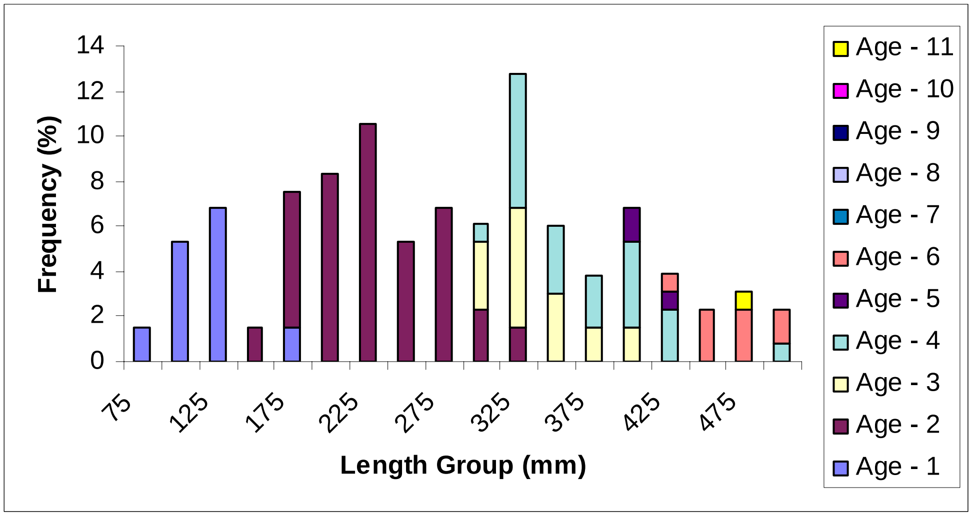

Figure 5. Length-at-age frequency of largemouth bass from Coffeeville Reservoir, Spring, 2006.

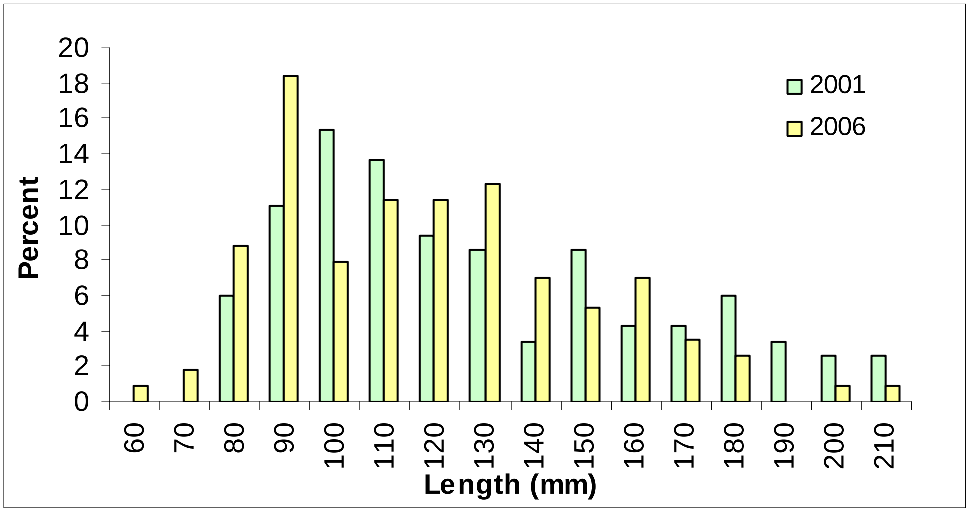

Figure 6. Length frequency of bluegill from Coffeeville Reservoir, Spring, 2001 and 2006.

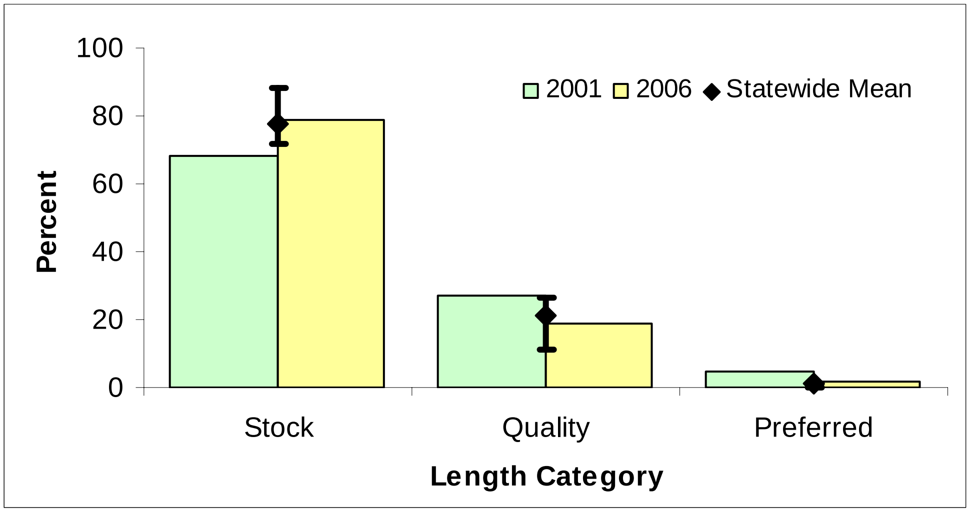

Figure 7. Relative stock density (RSD) of bluegill from Coffeeville Reservoir during Spring, 2001 and 2006. The I-beam denotes the inner quartile range for all Alabama reservoirs.

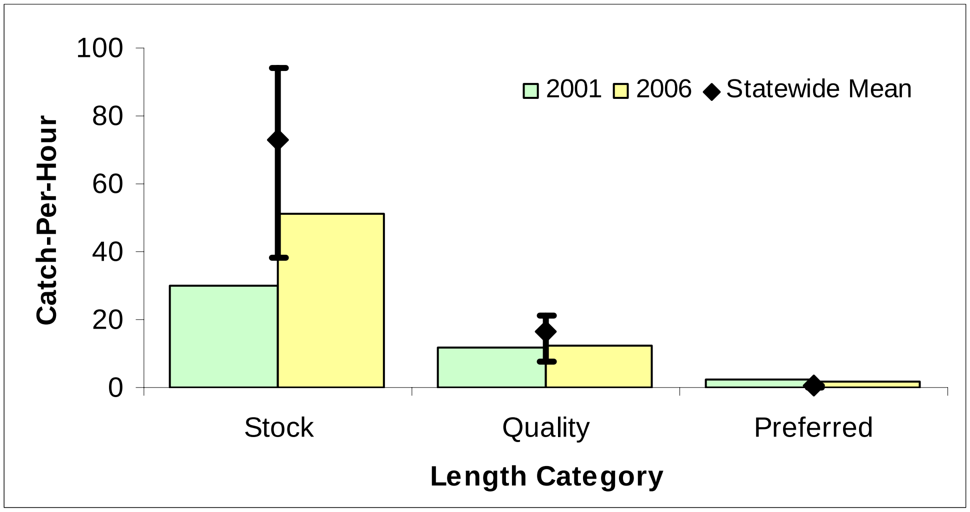

Figure 8. Catch-per-hour for bluegill by stock density indices from Coffeeville Reservoir, 2001 and 2006. The I-beam denotes the inner quartile range for all Alabama reservoirs.

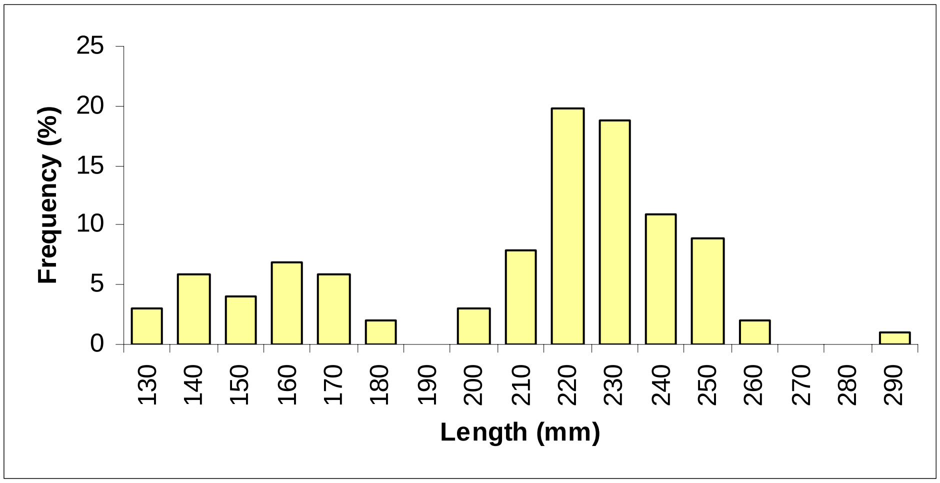

Figure 9. Length frequency of gizzard shad from Coffeeville Reservoir, Spring, 2006.

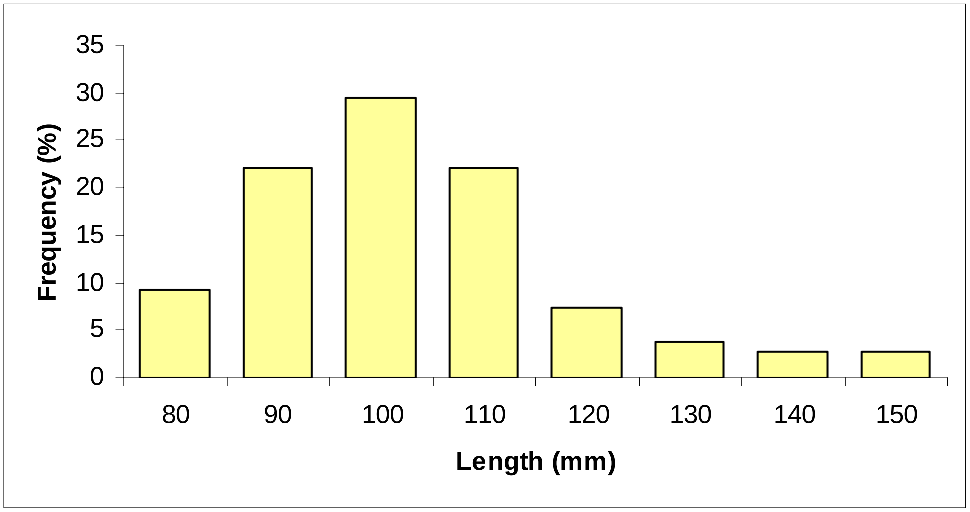

Figure 10. Length frequency of threadfin shad from Coffeeville Reservoir, Spring, 2006.