UPPER MOBILE DELTA MANAGEMENT REPORT

FALL 2007

Prepared by

David L. Armstrong, Jr.
District V Fisheries Supervisor

Benjamin R. Ricks, Jr.
District V Fisheries Biologist

And

Jason B. Thomas
District V Fisheries Aide

Alabama Department of Conservation and Natural Resources
Division of Wildlife & Freshwater Fisheries
Fisheries Section

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Introduction

The Mobile Delta consists of approximately 20,323 acres of water. It is formed by the northern confluence of the Alabama and Tombigbee Rivers in Mobile and Baldwin Counties and is a major North American river delta (Table 1). Sportfish populations of the Mobile Delta have been sampled since 1988 (Tucker and Johnson 1991) and a summary of all historical data can be found in this report and in Armstrong et al. (2006). Samples are collected to monitor trends in fish abundance, growth, recruitment, mortality, and to identify any problems with sport fisheries of the Mobile Delta. Management activities have included standardized sampling, evaluation of the need for length or creel limits, stocking of striped bass, hybrid striped bass, Florida largemouth bass, bluegill sunfish, and black crappie (Table 2).

Methods

From October 25 to November 1, 2007, largemouth bass sampling in the Upper Mobile Delta was conducted using electrofishing gear. Only age-0 largemouth bass were targeted and collections came from 30-minute samples taken from ten random sites; seven from backwater lakes and creeks, and three from mainstem rivers.

From December 10 to 18, 2007, sampling in the Upper Mobile Delta was conducted using trapnets. Black crappie and white crappie were targeted at 14 backwater lake sites with 44 net-nights of effort.

Total length (mm) was recorded for all largemouth bass and crappie collected and weight (g) was also recorded for all stock-size fish. Age determination was done using whole otoliths taken from a subsample of substock and all stock fish collected. Selective sampling of otoliths was done using a length-frequency table based on previous fall standardized collections (unpublished data 2000-2005). Otoliths were examined by two readers under a dissecting microscope. Any

discrepancies in age of the otoliths were reconciled during a third read in concert between two readers (Maceina 1988). Data analysis was prepared using the program ADWFF Data Analysis and Report Utilities (Slipke 2004).

Results and Discussion

Largemouth bass

Substock largemouth bass (N=148) were collected to determine young of year abundance and a catch rate (CPE) of 29.6 bass/hr was similar to 2006 (Table 3, Figure 3). Consequently, age-0 CPE (28.8 bass/hr) was also similar to collections during Fall, 2006 (Table 4). Fall sampling of substock and age-0 bass is a continuation of data collection to determine year class strength. There is high variability in age-0 bass abundance between years (Figure 4).

Black crappie and White crappie

In the Upper Delta, black crappie (N=61) and white crappie (N=58) were captured for a combined catch rate (CPE) of 2.7 fish per net-night (Table 3). Total CPE (species combined) was lower than during all previous years since 1993. However, white crappie total CPE was higher than previous collections during 2003 and 2005 (Armstrong et al. 2004, 2006).

Interquartile values developed for Upper Delta black crappie RSD's were within or above acceptable ranges for all size groups, though stock-size fish were not well represented (Figure 2). Six age classes of black crappie were present in the sample and dominated by age-2 fish (41%; Table 5, Figure 3). Age-0 abundance exhibited a weak (0.4 crappie/net-night) 2007 year class compared to 2003 (2.1 crappie/net-night) and 2005 (1.63 crappie/net-night) samples. Relative weight (Wr) values exceeded the Upper Delta average for all Relative Stock Density (RSD) groups (range 80-108). Catch-curve analysis of age-2 to age-5 black crappie suggested a high total annual mortality; although, this relation was not significant ($r^2 = 0.69$, $\underline{P} = 0.17$; Figure 5).

Interquartile values developed for Upper Delta white crappie RSD's were within or above acceptable ranges for substock and stock-size fish, while quality and preferred-size fish were below average (Figure 2). Only two age classes of white crappie were present in the sample and dominated by age-0 fish (94%; Table 6, Figure 3). The 2007 year class appears to be above average with respect to both CPE and substock ratio compared to previous years (Table 3). Wr values of white crappie were also above average for all RSD groups (range 90-121). Catch-curve analysis of white crappie data was not possible due to absence of older fish.

Differences in CPE and size structure among largemouth bass, black crappie, and white crappie suggest that these populations are dynamic and function independently. Age-0 largemouth bass CPE was above average considering long-term drought conditions in southwest Alabama. Black crappie and white crappie samples exhibited substantial differences in size and age structure, though larger individuals of both species exhibited good body condition. However, both species appear to suffer high mortality at or above age-2.

Conclusions & Management Recommendations

1. Largemouth bass, black crappie, and white crappie management should remain under current regulations.
2. Largemouth bass from the 2007 year class should provide an adequate number of recruits to stock-size in 2008. Recruitment to age 1 will be assessed during Spring, 2008.
3. Current samples exhibit black crappie and white crappie populations with below average abundance and poor age and size structure. Angler success may be affected with modest improvement in catch during 2009. During Spring, 2008, additional sampling is planned to determine if trapnet sampling alone adequately describes crappie populations.

Literature Cited

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APPENDIX A

Tables & Figures

Table 1. Morphometric, physical, and chemical characteristics of the Mobile Delta.

Surface area	20, 323 acres (Crance 1971)
Drainage area	43, 683 sq. mi. (Mettee et al. 1996)
Elevation	0 - 5 feet-msl
Average Discharge	58, 636 cfs
Thermocline depth	none
Salinity	0 - 5 ppt
Growing season	270 frost free days (Jenkins 1967)

Table 2. Fish stocking in the Mobile Delta, 1999-2007.

Species	Year	No/Ac	Size (in)	Total
Black crappie	2005	0.5	3 - 6	10,016
Bluegill sunfish	2004	16.8	1 - 3	340,532
	2005	7.9	1 - 3	160,000
Largemouth bass (Florida)	1999 *	10.0	1 - 3	4,000
	2000 *	10.0	1 - 3	4,000
Hybrid striped bass	1999	4.6	1 - 3	93,456
	2000	6.6	1 - 3	134,581
	2001	6.5	1 - 3	133,000
	2002	10.5	1 - 3	213,900
	2003	11.9	1 - 3	240,919
	2004	5.6	1 - 2	114,460
Striped bass (Atlantic)	1999	4.1	1 - 3	84,200
	2001	4.9	1 - 3	99,964
	2003	7.7	1 - 3	155,720
Striped bass (Gulf)	1999	2.0	1 - 3	40,068
	2002	3.4	1 - 3	68,306
	2004	5.8	2	117,060
	2005	9.7	1 - 2	196,795
	2006	3.3	1 - 2	67,360
	2007	3.5	1 - 3	70,720

* Concentrated localized stocking in Dead Lake

TABLE 3. Relative stock density (pct), catch-per-effort (cpe), number (no), and relative weight (Wr) of target sportfish species in the Upper Mobile Delta, Fall 1993 - 2007. Trophy fish category is not shown here since none have ever been collected in this area.

						Total Number, CPE, Percent of Sample, and Wr																			
				No. samples &		SUBSTOCK			RSD-S				RSD-Q				RSD-P				RSD-M				TOTAL	
Species	Season	Year	Gear		Effort (Hrs)	no.	cpe	pct. [a]	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe	pct.	Wr	no.	cpe
Largemouth bass	Fall	2001	EL	7	3.50	56	16.0	32	77	22.0	44	85	59	16.9	34	88	39	11.1	22	91					231	66.0
Largemouth bass	Fall	2002	EL	8	4.02	111	27.6	84	71	17.7	53	92	42	10.4	32	89	20	5.0	15	91					244	60.7
Largemouth bass	Fall	2003	EL	4	1.52	127	83.6	98	81	53.3	63	93	29	19.1	22	97	18	11.8	14	99	1	0.7	1	93	256	168.5
Largemouth bass	Fall	2004	EL	6	3.00	5	1.7	10	14	4.7	29	89	21	7.0	44	91	12	4.0	25	93	1	0.3	2	93	53	17.6
Largemouth bass	Fall	2005	EL	8	3.88	226	58.2	215	32	8.2	30	95	49	12.6	47	95	24	6.2	23	100					331	85.3
Largemouth bass	Fall	2006	EL	10	4.85	157	32.4	85	90	18.6	49	86	43	8.9	23	85	45	9.3	25	87	6	1.2	3	88	341	70.3
Largemouth bass	**Fall**	**2007**	**EL**	**10**	**5.00**	**148**	**29.6**	[b]	**1**	**0.2**	**100**	[b]													**149**	**29.8**
	LAKE AVERAGE						35.6	87		20.7	45	90		12.5	34	91		7.9	21	93		0.4	1	91		78.1
Black crappie	Fall	1993	TN		20	15	0.8	10	82	4.1	55	82	29	1.5	19	86	36	1.8	24	87	3	0.2	2	84	165	8.3
Black crappie	Fall	1995	TN		15	2	0.1	0	62	4.1	23	86	94	6.3	35	92	85	5.7	31	97	30	2.0	11	97	273	18.2
Black crappie	Fall	2003	TN		26	53	2.0	23	190	7.3	81	76	36	1.4	15	84	7	0.3	3	91	1	0.0	0	80	287	11.0
Black crappie	Fall	2005	TN		54	82	1.5	94	25	0.5	29	75	28	0.5	32	80	23	0.4	26	89	11	0.2	13	91	169	3.1
Black crappie	**Fall**	**2007**	**TN**		**44**	**18**	**0.4**	**42**	**10**	**0.2**	**23**	**80**	**22**	**0.5**	**51**	**97**	**9**	**0.2**	**21**	**107**	**2**	**0.1**	**5**	**108**	**61**	**1.4**
	LAKE AVERAGE						1.0	34		3.2	42	80		2.0	31	88		1.7	21	94		0.5	6	92		8.4
White crappie	Fall	1993	TN		20	3	0.2	8	11	0.6	31	82	14	0.7	39	91	7	0.4	19	88	4	0.2	11	95	39	2.0
White crappie	Fall	1995	TN		15	30	2.0	49	10	0.7	17	77	16	1.1	26	88	30	2.0	49	96	5	0.3	8	99	91	6.1
White crappie	Fall	2003	TN		26	2	0.1	22	5	0.2	56	74	3	0.1	33	74	1	0.0	11	78					11	0.4
White crappie	Fall	2005	TN		54	5	0.1	15	1	0.0	3	65	23	0.4	70	74	9	0.2	27	77					38	0.7
White crappie	**Fall**	**2007**	**TN**		**44**	**44**	**1.0**	**314**	**10**	**0.2**	**71**	**90**	**3**	**0.1**	**21**	**97**	**1**	**0.0**	**7**	**121**					**58**	**1.3**
	LAKE AVERAGE						0.7	82		0.3	36	78		0.5	38	85		0.5	23	92		0.1	4	97		2.1

[a] The substock pct. is known as substock ratio, derived by the number of substock fish per 100 fish of stock-size and larger.

[b] During Fall, 2007, only 0+ bass were targeted and N=1, age-0 bass was a stock-size fish. Therefore, except for CPE of the substock bass RSD group, all summary statistics for remaining bass RSD groups use data from 2001-2006.

Table 4. Age composition and mean length of substock bass from Upper Mobile Delta, sampled Fall, 2007. Age 0+ fish were targeted to determine year-class strength. A small number were age 1.

Age	Year Class	Number	Percent	CPE	Mean TL (mm)	Standard Error (mm)	Length Range (mm)
0	2007	144	96.6	28.8	129.1	2.4	66 - 205
1	2006	5	3.4	1.0	184.0	5.8	170 - 198
		149	100.0	29.8			

Table 5. Age composition and mean length of black crappie sampled from Upper Mobile Delta, Fall, 2007.

Age	Year Class	Number	Percent	CPE	Mean TL (mm)	Standard Error (mm)	Length Range (mm)
0	2007	18	29.5	0.4	85.8	6.2	55 - 156
1	2006	13	21.3	0.3	178.5	10.2	124 - 252
2	2005	25	41.0	0.6	233.5	3.7	205 - 275
3	2004	2	3.3	<0.1	272.5	5.5	267 - 278
4	2003	1	1.6	<0.1	305.0		305
5	2002	2	3.3	<0.1	291.0	41.0	250 - 332
		61	100.0	1.40			

Table 6. Age composition and mean length of white crappie sampled from Upper Mobile Delta, Fall, 2007.

Age	Year Class	Number	Percent	CPE	Mean TL (mm)	Standard Error (mm)	Length Range (mm)
0	2007	53	91.4	1.2	89.2	4.5	57 - 170
1	2006	5	8.6	0.1	226.0	15.6	191 - 276
		58	100.0	1.3			

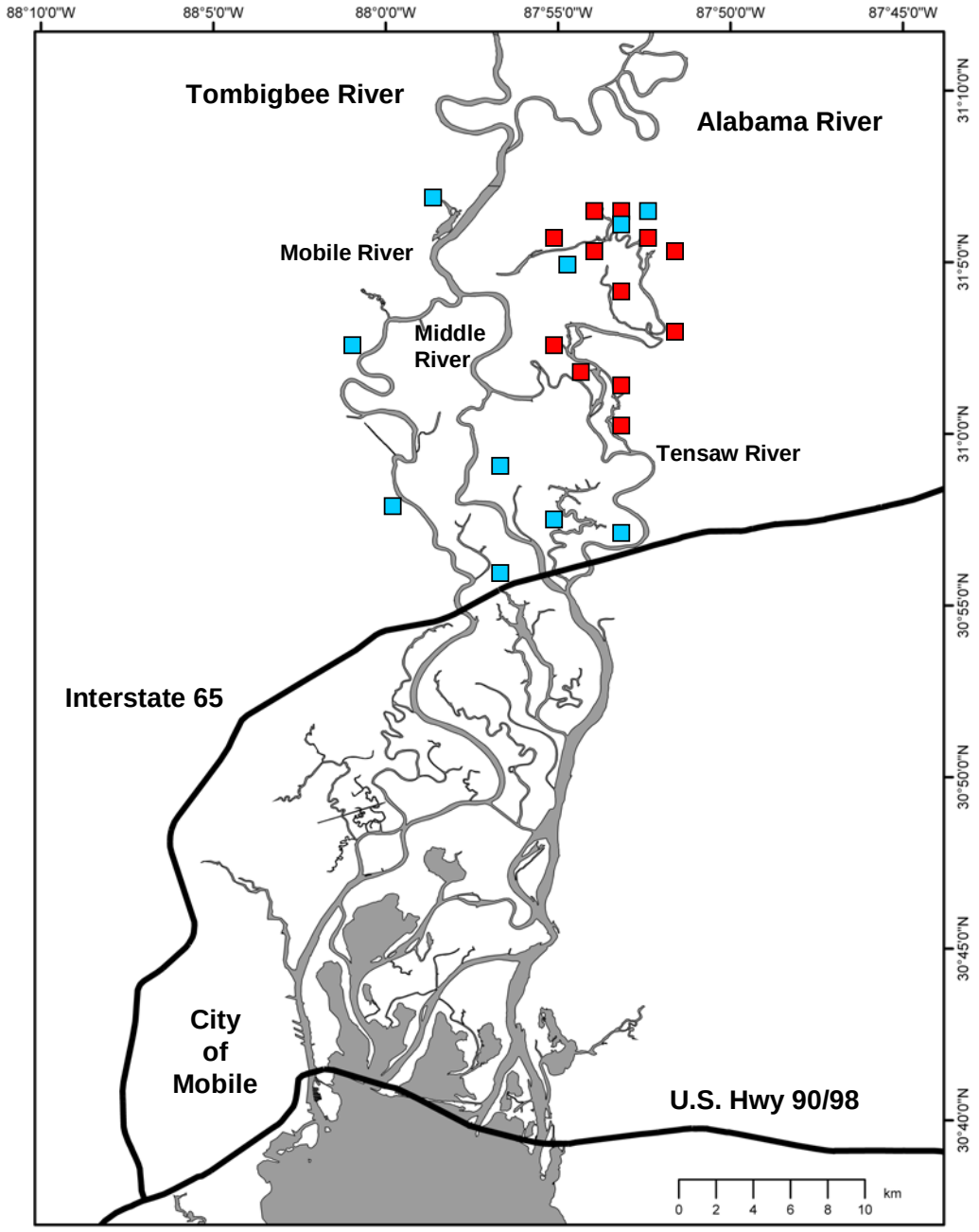

Figure 1. Upper Mobile Delta sample sites during Fall, 2007. The Upper Delta area is bounded by I-65 to the South and by the confluence of the Alabama and Tombigbee Rivers to the North. Trapnet and electrofishing sites are red and blue squares, respectively.

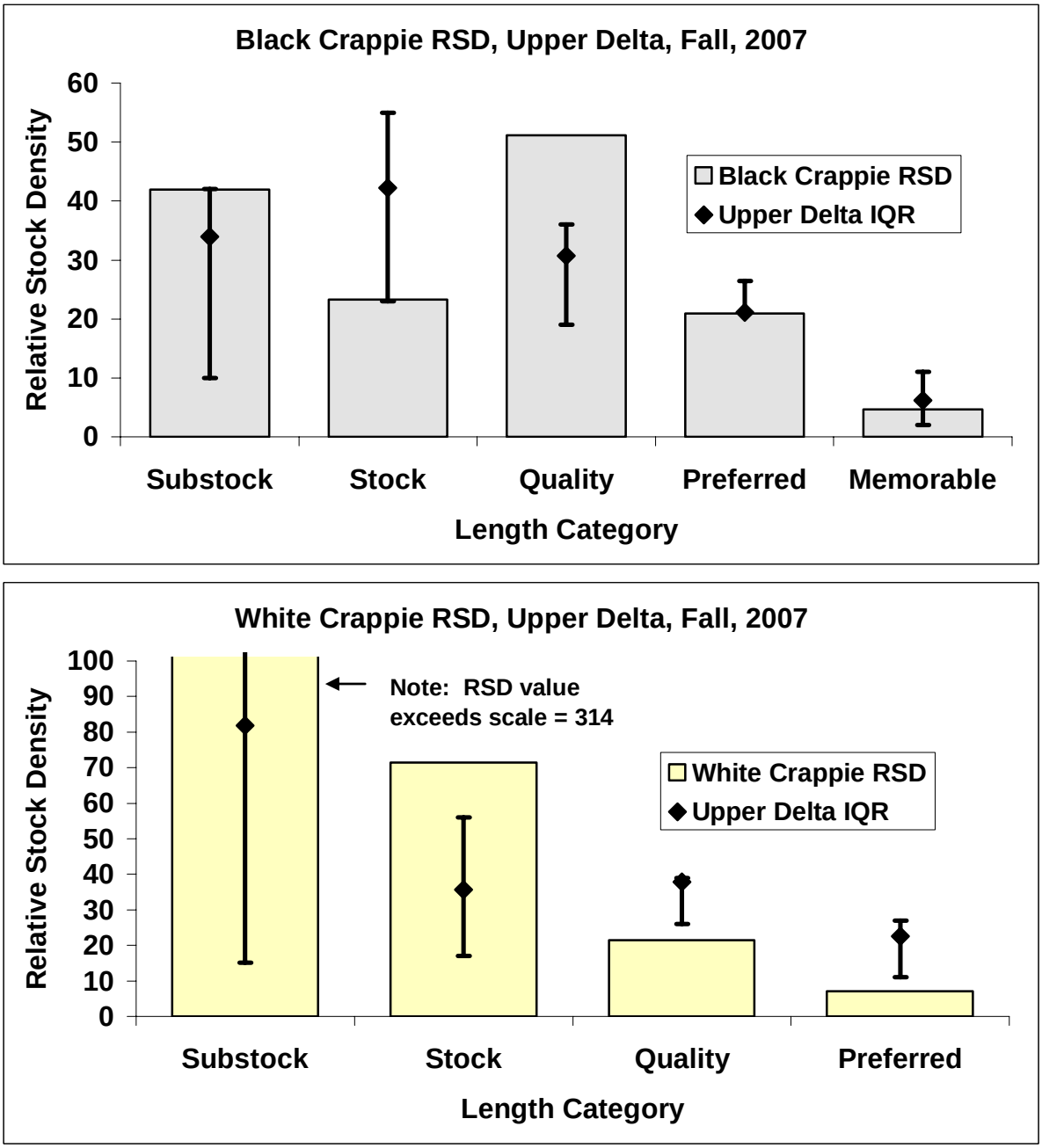

Figure 2. Relative stock density (RSD, percentage) of black crappie (top panel) and white crappie (bottom panel) collected from trapnet samples in the Upper Mobile Delta, Fall, 2007. Diamond and error bars represent mean, 25th, and 75th interquartile ranges (IQR) developed for each species.

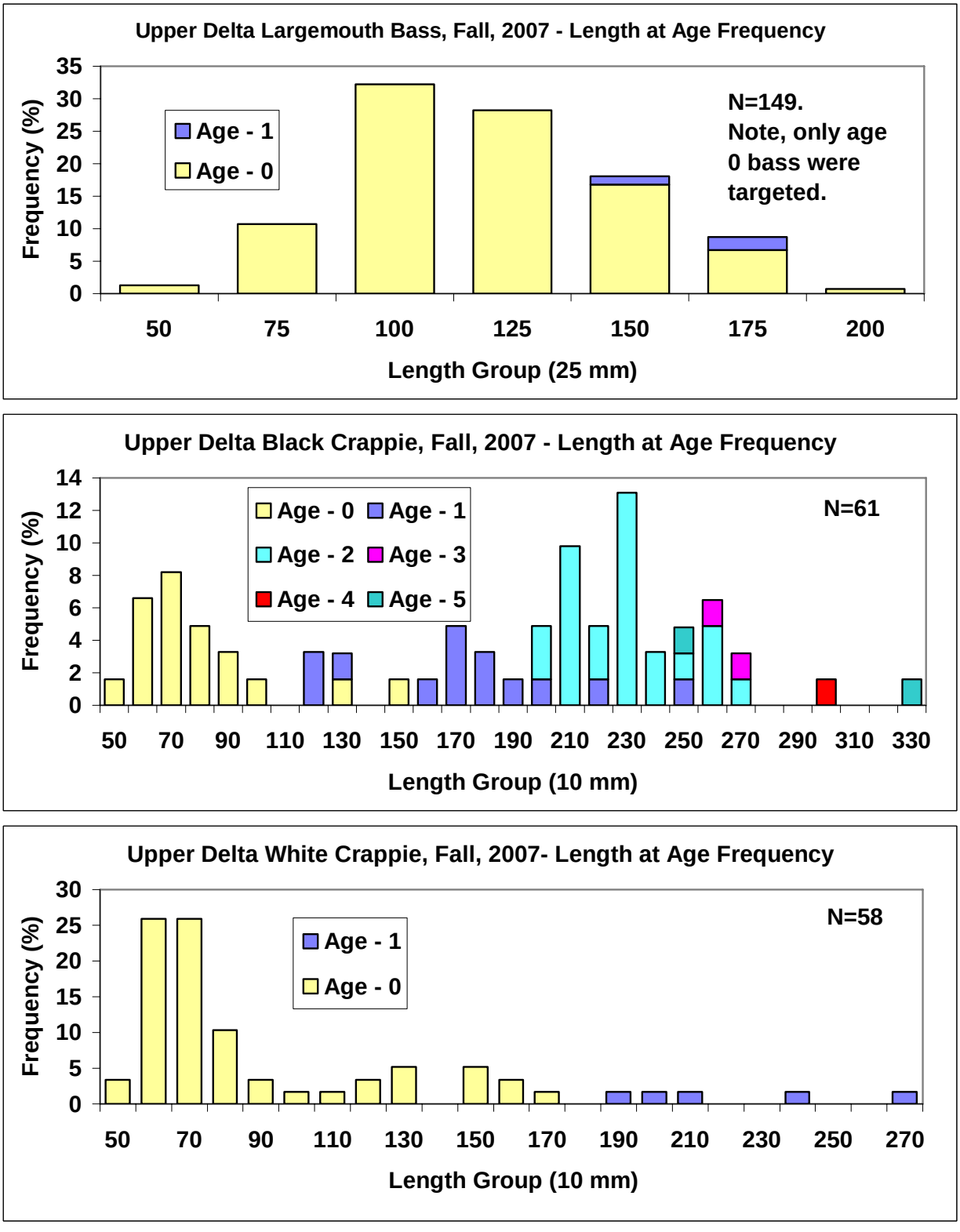

Figure 3. Length at age frequency distribution of largemouth bass (top panel), black crappie (middle panel), and white crappie (bottom panel) sampled in the Upper Mobile Delta, Fall, 2007.

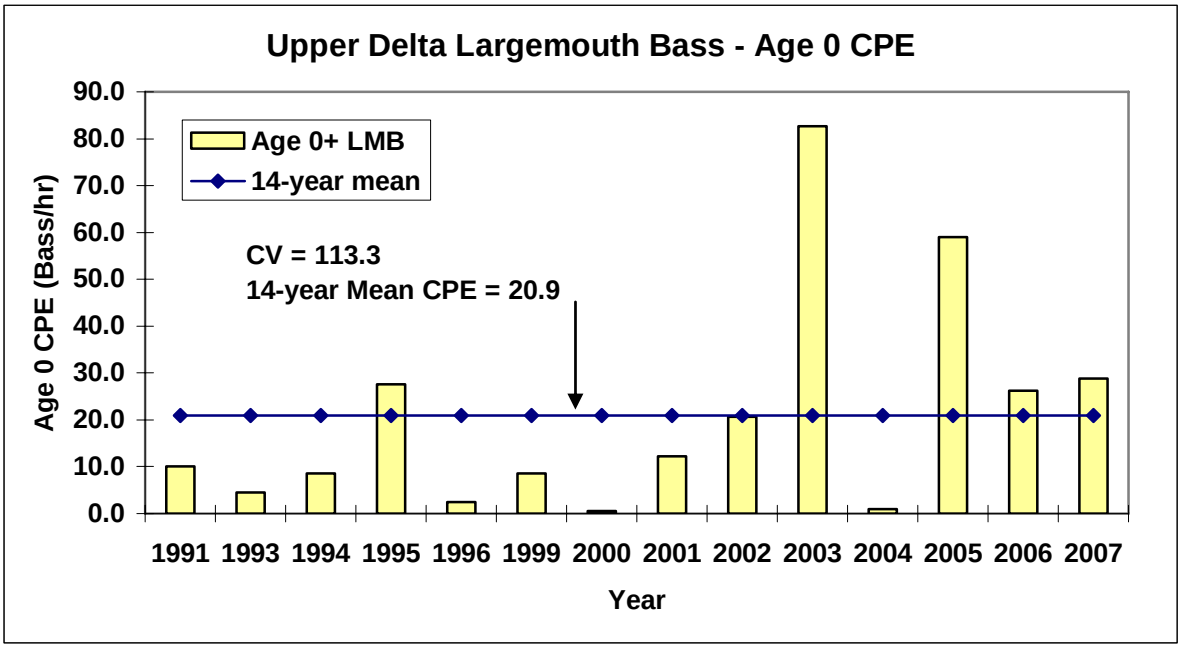

Figure 4. Historical catch (CPE) rates of fall-collected age 0+ largemouth bass from the Upper Mobile Delta. Coefficients of variation (CV) were calculated from CPE rates across years to evaluate sampling variability in young-of-year catch.

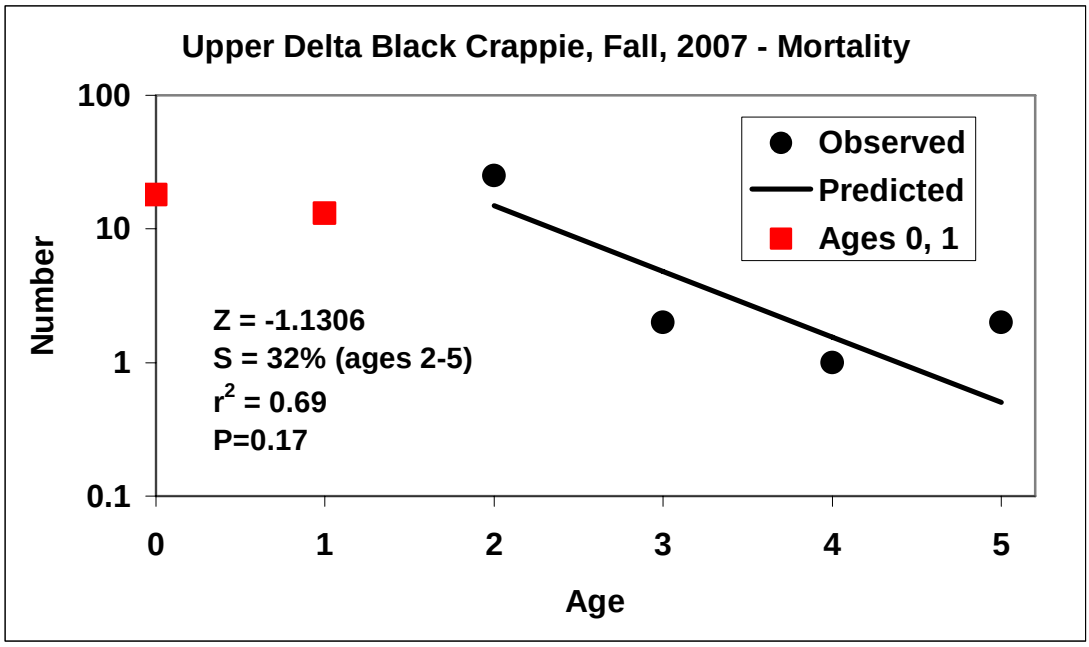

Figure 5. Mortality and survival statistsics of Upper Mobile Delta black crappie, ages 2-5, Fall, 2007. Catch-curve analysis uses weighted data from Table 5.