

# **DEMOPOLIS RESERVOIR SPRING MANAGEMENT REPORT FY 2008**

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August 25, 2008

## **Introduction**

Demopolis Reservoir has been sampled every year since 1998, and in 1995, 1993, 1989, 1987, and 1985 (Haffner et al. 2007). A 14-inch (356 mm) minimum-length limit was implemented on all black bass in 1995. The goal of the length limit was to increase the abundance of preferred-size bass (fish  $\geq 380$  mm, 15 inches) and increase anglers catch rates for bass of all sizes. In 2007, the catch rates of bass  $\geq 300$  mm (12 inches), bass  $\geq 356$  mm (14 inches), and bass  $\geq 380$  mm (15 inches) were the highest or nearly the highest ever recorded at Demopolis Reservoir. Older fish grew slowly. In addition, Demopolis suffered from unusually poor recruitment during 2 of the past 3 years.

## **Methods**

Largemouth bass were collected at 8 sites by electrofishing on March 18, 19, and 27, 2008, according to the guidelines of the Alabama Reservoir Management Manual (1999). For the first time in a decade, largemouth bass were not aged. In an effort to establish some preliminary information on the abundance, habitat preferences, and size and age structure of spotted bass, nighttime electrofishing was conducted on April 23 and May 1, 2008. Many habitat types were sampled; most spotted bass were collected off of gravel bars associated with limestone bluff banks of the Black Warrior River. Information from bass tournaments was collected through the Bass Angling Information Team (BAIT) and pertinent data was incorporated into this report.

## **Results and Discussion**

### **Largemouth Bass**

The catch per hour (CPH) of largemouth bass (N=462) was 111.9; slightly above the lake average (Table 2). Haffner et al. (2007) previously identified two weak year-classes (2003 and 2005) and predictably, those two weak year-classes created a gaping hole in the adult largemouth bass population in 2008. Two moderately strong year-classes (2006 and 2007) buoyed the abundance of largemouth bass  $\leq 300$  mm. The CPH of largemouth bass  $\geq 300$  mm,  $\geq 356$  mm, and  $\geq 380$  mm fell in 2008, however, they were still well above the average of four pre-length limit collections (Figures 5-7). The CPH of substock fish was below average (Table 2). By virtue of the strong 2006 year-class, the CPH of S-Q fish in the 2008 collection was well above the

lake average (Figure 3). The CPH of Q-P fish fell sharply, compared to the 2007 collection, and was slightly below the lake average (Table 2). The CPH of P-M fish slipped as well, but remained above the lake average. The CPH of M-T fish rose in 2008 but remained below the lake average (Table 2).

Incremental relative stock density (RSD) values changed substantially between the 2008 and 2007 collections for S-Q and Q-P fish, as a function of variable year-class strength. The 2006 year-class was strong and as a result, the incremental RSD value of S-Q fish jumped and was well above the lake average. Conversely, the incremental RSD value of Q-P fish tumbled. Generally, 3 to 5-year old fish compose a majority of the Q-P fish in the Demopolis collection. Unfortunately, 3 and 5-year old fish represent two of the weakest year classes on record. As a result, the incremental RSD value of Q-P fish fell sharply in 2008 and was well below the lake average. The proportional stock density (PSD) slipped to 45 and the RSD-P fell slightly to 14. Mean relative weight (Wr) values for all incremental RSD size categories ranged from 91 to 94 and were similar to the lake averages.

Based on the CPH of substock fish in the 2008 collection and the length-frequency histogram, it appears that a moderately strong year-class was produced in 2007. Since 2000, 2 of 9 year-classes have been extraordinarily strong (1999 and 2000), 2 quite weak (2003 and 2005), and 5 year-classes have been moderately strong.

### **Spotted Bass**

The catch per hour (CPH) of spotted bass (N=123) was 46.1 (Table 3). The population was dominated by the 2007 year-class (Table 4). The increment RSD of S-Q fish was 71 and exceeded the upper 75<sup>th</sup> percentile of S-Q values, statewide (Figure 11) and the CPH of S-Q fish was more than twice the statewide average (Figure 10). The CPH of Q-P and M-T fish were at the statewide averages and the CPH of P-M fish was slightly below the statewide average (Figure 10). One trophy-size spotted bass was collected. The PSD was 29 and the RSD-P was 11 (Table 3).

The spotted bass collection included five age classes (ages 1-4 and 7) (Table 4). Males made up 61.0% of the collection; 25.2% and 13.8% of the collection were females and immature fish, respectively. Since female spotted bass made up such a small fraction of the collection, age-growth data was combined for all sexes. In 2008,

growth of 1 to 4-year old spotted bass was faster than other west-Alabama reservoirs (Figure 12).

Mortality was not calculated for legal-size spotted bass due to the small sample size (N=11) and the few number of age classes (N=3) represented. Mean relative weight values for all incremental RSD size categories ranged from 98 to 117.

Demopolis Reservoir ranked sixteenth overall in the 2007 BAIT report, out of twenty-two reservoirs reporting five or more tournaments (Abernethy 2008). Three of five quality indicators improved in 2007. The two most important quality indicators, numbers and pounds of fish weighed-in/angler-day, improved substantially (Figure 8). On average, the bags of fish tournament anglers weighed-in in 2007 were 12.9% heavier than they were prior to the implementation of the 14-inch minimum-length limit with 14.3% fewer fish. However, only one quality indicator (average weight) was above the statewide average.

### **Summary**

The largemouth bass population exhibited satisfactory size structure. However, poor recruitment resulted in lower catch rates of adult largemouth bass in 2008. Spotted bass were easily collected near limestone bluff banks on the main river channel. Yearlings dominated the sample. Growth of spotted bass from the Black Warrior River was rapid. The bass fishery at Demopolis Reservoir will continue to be monitored and managed to maximize benefits to anglers. If and when it is appropriate, the minimum length limit may be modified.

### **Conclusions**

1. Resample Demopolis Reservoir in 2011.
2. Maintain the 14-inch minimum-length limit regulation on all black bass.
3. Encourage the USACE to maintain an aggressive aquatic plant management program directed at preventing the spread of Cuban bulrush, water hyacinths, hydrilla and other non-native species.
4. Encourage more local bass clubs to participate in the BAIT Program.
5. Encourage the USACE to perform periodic, maintenance dredging of the mouths of major tributaries, in order to keep them open and accessible to anglers and boaters.

## Literature Cited

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- 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.
- Haffner, J. B., J. M. Moss, and J. M. Piper. 2007. Demopolis Reservoir 2007 management report. Alabama Department of Conservation and Natural Resources, Montgomery, AL.
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- Welch, P. S. 1948. Limnological Methods. McGraw-Hill. pp 93-94.

# Appendix 1

## Tables and Figures

Table 1. Morphometric, physical, and chemical characteristics of Demopolis Reservoir.

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Surface area	10,000 acres
Drainage area	15,400 sq. mi.
Full pool elevation	75 feet-msl
Mean annual fluxuation	2 feet
Shoreline distance	500 miles
Shoreline development index	35.4 (Welch 1948)
Mean depth	12 feet
Maximum depth	56 feet
Outlet depth	Surface
Thermocline depth	None
Total dissolved solids	82 mg/l
Morphoedaphic index	6.8 TDS/mean depth(ft) (Ryder 1965)
Growing season	250 frost free days (Jenkins 1967)
Year of impoundment	1952

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Table 2. Incremental relative stock density (RSD) catch per hour (CPH) and relative weight (Wr) of largemouth bass from spring electrofishing surveys at Demopolis Reservoir. The lake average and the pre and post 14-inch minimum length limit (MLL) averages have been calculated.

YEAR	NO.OF SITES	TOTAL EFFORT	SUBSTOCK			RSD S - Q				RSD Q - P				RSD P - M				RSD M - T				TOTAL	
			NO.	CPE	SSR	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE
1987	3	0.77	17	22.1	20	44	57.1	53	83	28	36.4	34	95	8	10.4	10	96	3	3.9	4	101	100	129.9
1989	4	1.52	28	18.4	27	62	40.8	60	89	30	19.7	29	91	11	7.2	11	97	0	0.0	0		131	86.2
1993	6	3.00	117	39.0	64	104	34.7	57	93	51	17.0	28	98	24	8.0	13	102	4	1.3	2	113	300	100.0
1995	3	1.15	26	22.6	20	83	72.2	65	88	25	21.7	20	89	15	13.0	12	93	4	3.5	3	96	153	133.0
1998	4	2.09	28	13.4	19	68	32.6	46	92	49	23.5	33	92	25	12.0	17	93	6	2.9	4	95	176	84.3
1999	7	3.58	42	11.7	15	131	36.6	47	89	108	30.2	39	91	32	8.9	12	98	5	1.4	2	100	318	88.9
2000	4	1.98	28	14.2	12	111	56.1	47	92	99	50.1	42	93	26	13.1	11	92	0	0.0	0		264	133.5
2001	7	2.95	62	21.0	16	200	67.7	51	94	158	53.5	40	92	34	11.5	9	96	2	0.7	1	100	456	154.3
2002	7	3.54	59	16.6	19	159	44.9	50	101	106	29.9	33	102	48	13.5	15	96	5	1.4	2	100	377	106.4
2003	6	3.00	35	11.7	13	94	31.3	36	98	121	40.3	46	96	44	14.7	17	97	5	1.7	2	96	299	99.7
2004	6	3.02	26	8.6	10	88	29.2	34	94	121	40.1	46	92	53	17.6	20	96	0	0.0	0		288	95.4
2005	8	4.13	52	12.6	15	170	41.1	48	96	131	31.7	37	93	44	10.6	13	94	7	1.7	2	93	404	97.7
2006	8	4.17	18	4.3	6	114	27.4	37	97	147	35.3	47	96	46	11.0	15	96	4	1.0	1	98	329	79.0
2007	5	2.51	37	14.8	13	115	45.9	39	101	137	54.6	46	100	42	16.8	14	101	2	0.8	1	112	333	132.8
2008	8	4.13	49	11.9	12	227	55.0	55	91	130	31.5	31	92	52	12.6	13	94	4	1.0	1	92	462	111.9
<b>LAKE AVERAGE</b>			16.2	19		44.8	48	93		34.4	37	94		12.1	13	96		1.4	2	100		108.9	
<b>LAKE AVERAGE PRE-MLL</b>			25.5	33		51.2	59	88		23.7	28	93		9.7	11	97		2.2	2	103		112.3	
<b>LAKE AVERAGE POST-MLL</b>			12.8	13		42.5	44	95		38.2	40	94		12.9	14	96		1.1	1	98		107.6	
<b>LOWER 25th PCT. LAKE AVG.</b>			11.8	12		33.6	42	90		26.7	32	92		10.5	11	94		0.7	1	96		92.2	
<b>UPPER 75th PCT. LAKE AVG.</b>			19.7	20		55.6	54	97		40.2	44	96		13.3	15	97		1.7	2	100		131.3	

Table 3. Incremental relative stock density (RSD) catch per hour (CPH) and relative weight (Wr) of spotted bass from the spring 2008 electrofishing survey at Demopolis Reservoir.

YEAR	NO.OF SITES	TOTAL EFFORT <sup>1</sup>	SUBSTOCK			RSD S - Q				RSD Q - P				RSD P - M				RSD M - T				TOTAL	
			NO.	CPE	SSR <sup>2</sup>	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE	PCT.	Wr	NO.	CPE
2008	4	2.67	6	2.2	5	83	31.1	71	98	22	8.2	19	101	8	3.0	7	107	4	1.5	3	117	123	46.1

1 Effort in hours

2 SSR denotes substock ratio; the number of substock fish per 100 stock-size fish.

Table 4. Age composition and mean total length (mm) of spotted bass at Demopolis Reservoir, spring 2008.

Age	Year Class	Number	Percent	CPE	Mean TL	SE	Range
1	2007	92	74.8	34.4	234	3	126 - 301
2	2006	19	15.4	7.1	306	3	290 - 325
3	2005	7	5.7	2.6	384	11	352 - 440
4	2004	4	3.3	1.5	428	18	390 - 460
5	2003	0	0.0	0.0			
6	2002	0	0.0	0.0			
7	2001	1	0.8	0.4	510		
Total		123	100.0	46.1			

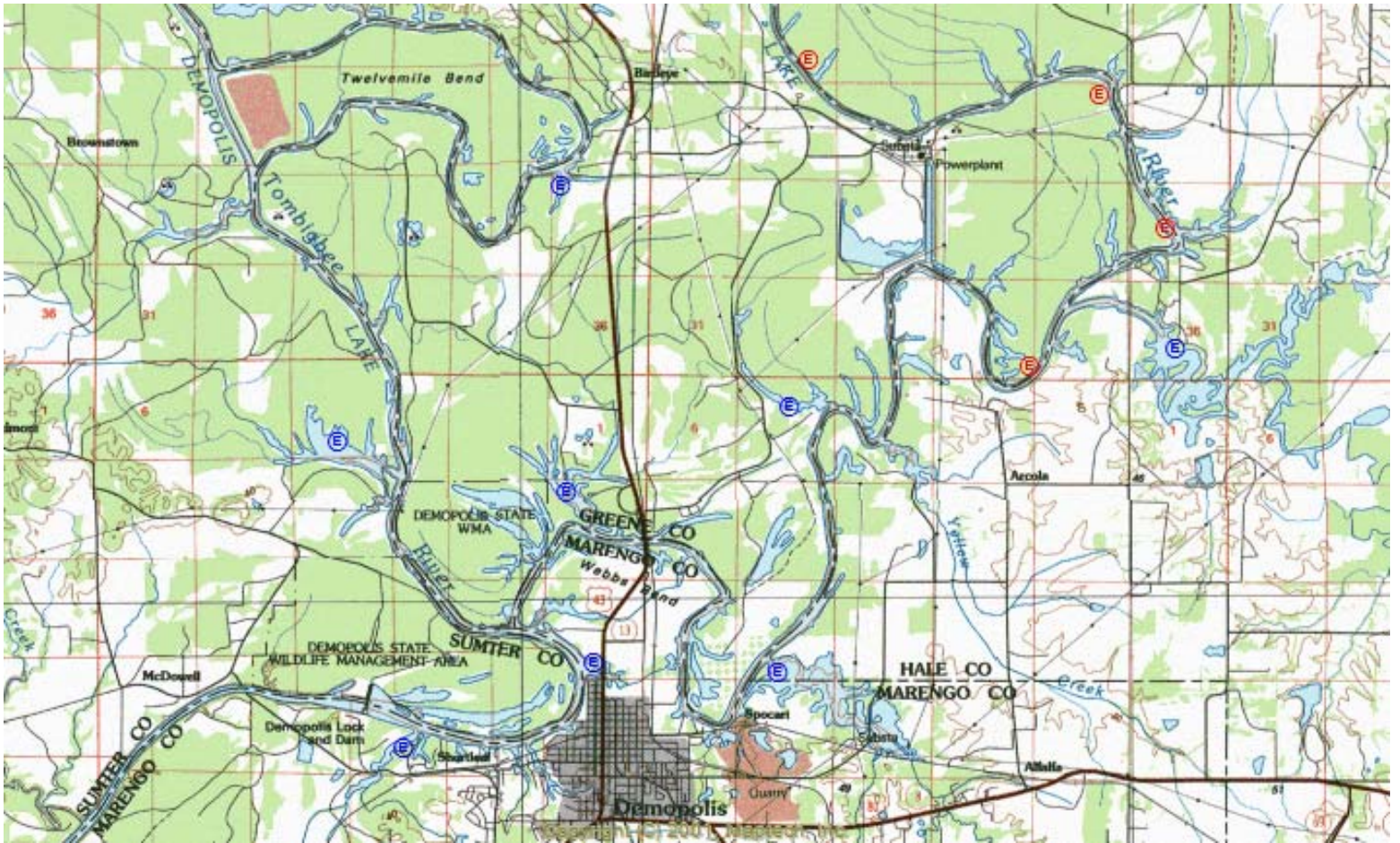


Figure 1. Spring 2008 electrofishing survey sites at Demopolis Reservoir. Backwater sites appear in blue and riverine sites appear in red.

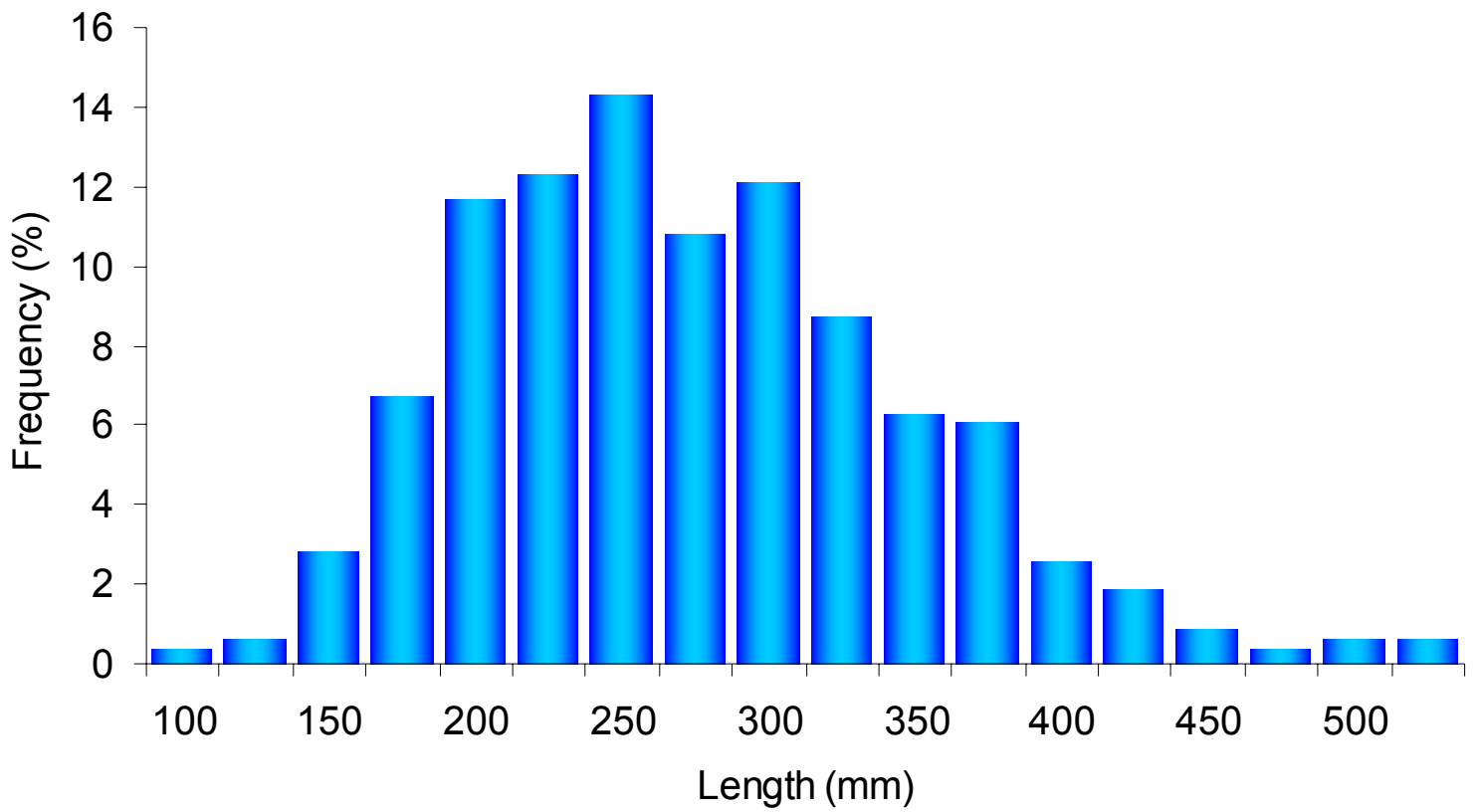


Figure 2. Length-frequency histogram of largemouth bass (N=462) at Demopolis Reservoir, March 2008.

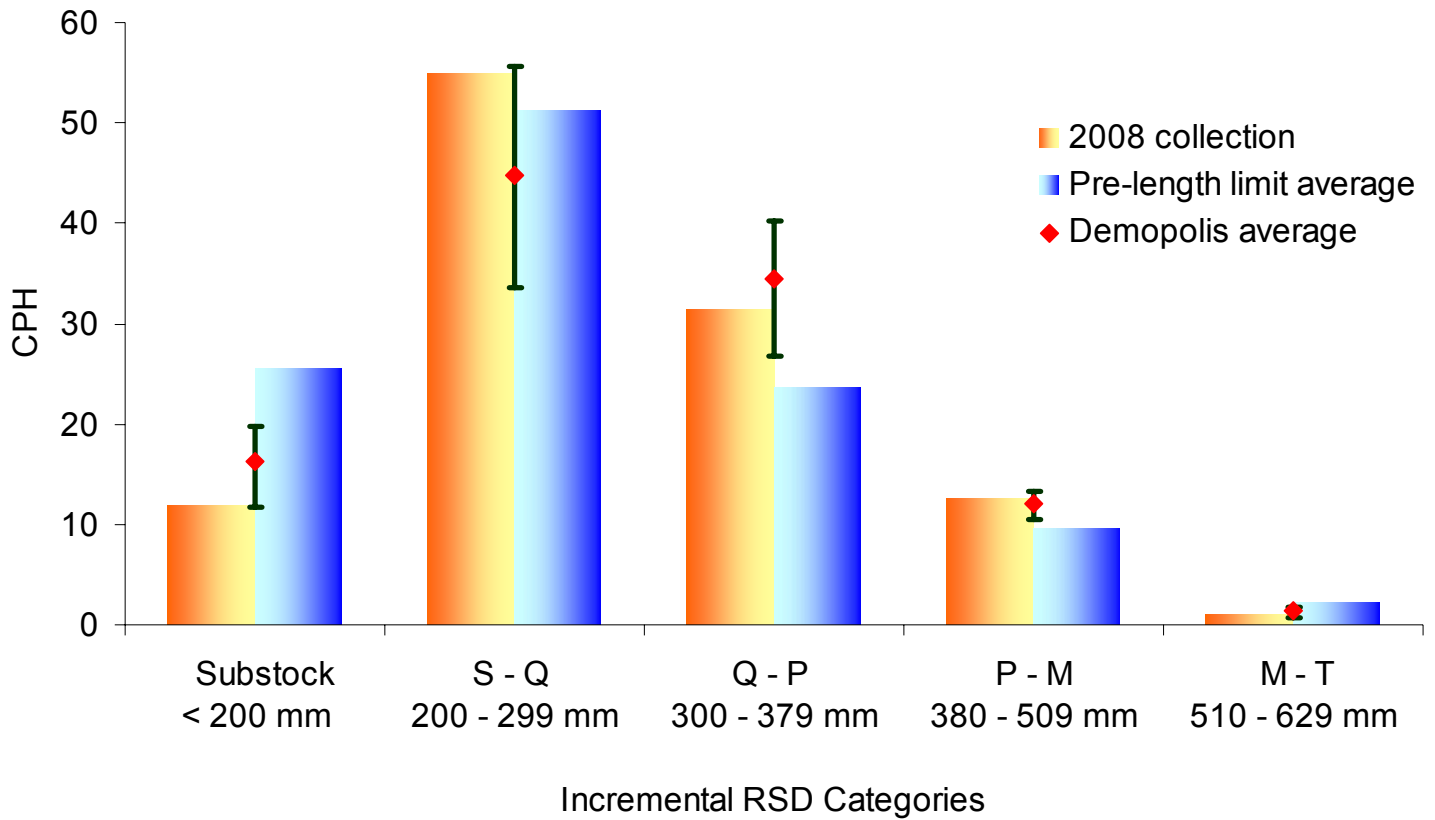


Figure 3. Catch per hour (CPH) of largemouth bass (N=462) at Demopolis Reservoir, March 2008, and the pre-length limit (N=4) and Demopolis average (N=15). Error bars represent the 25th and 75th percentile of CPH values, at Demopolis.

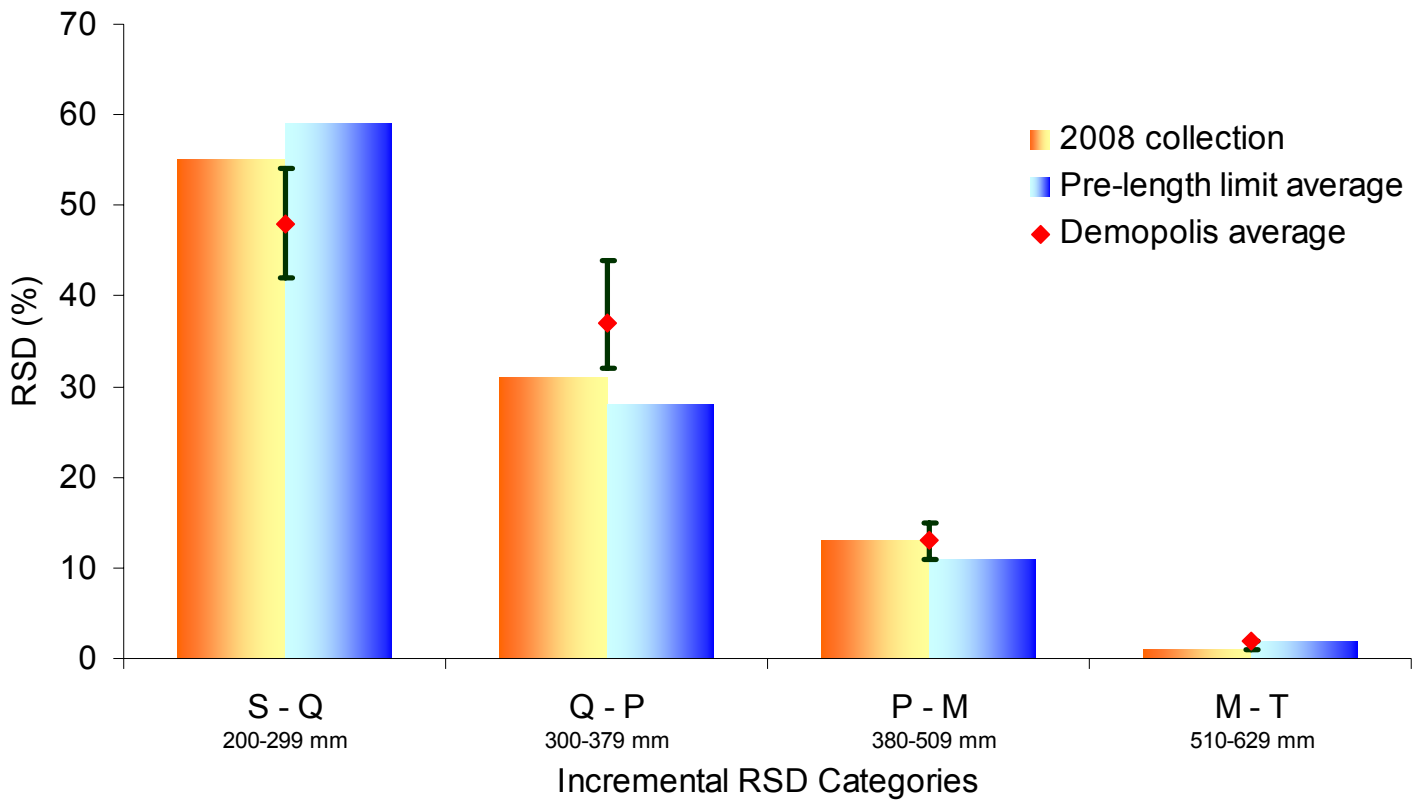


Figure 4. Relative stock density (RSD) of largemouth bass (N=462) at Demopolis Reservoir, March 2008, and the pre-length limit (N=4) and Demopolis average (N=15). Error bars represent the 25th and 75th percentile of RSD values, at Demopolis.

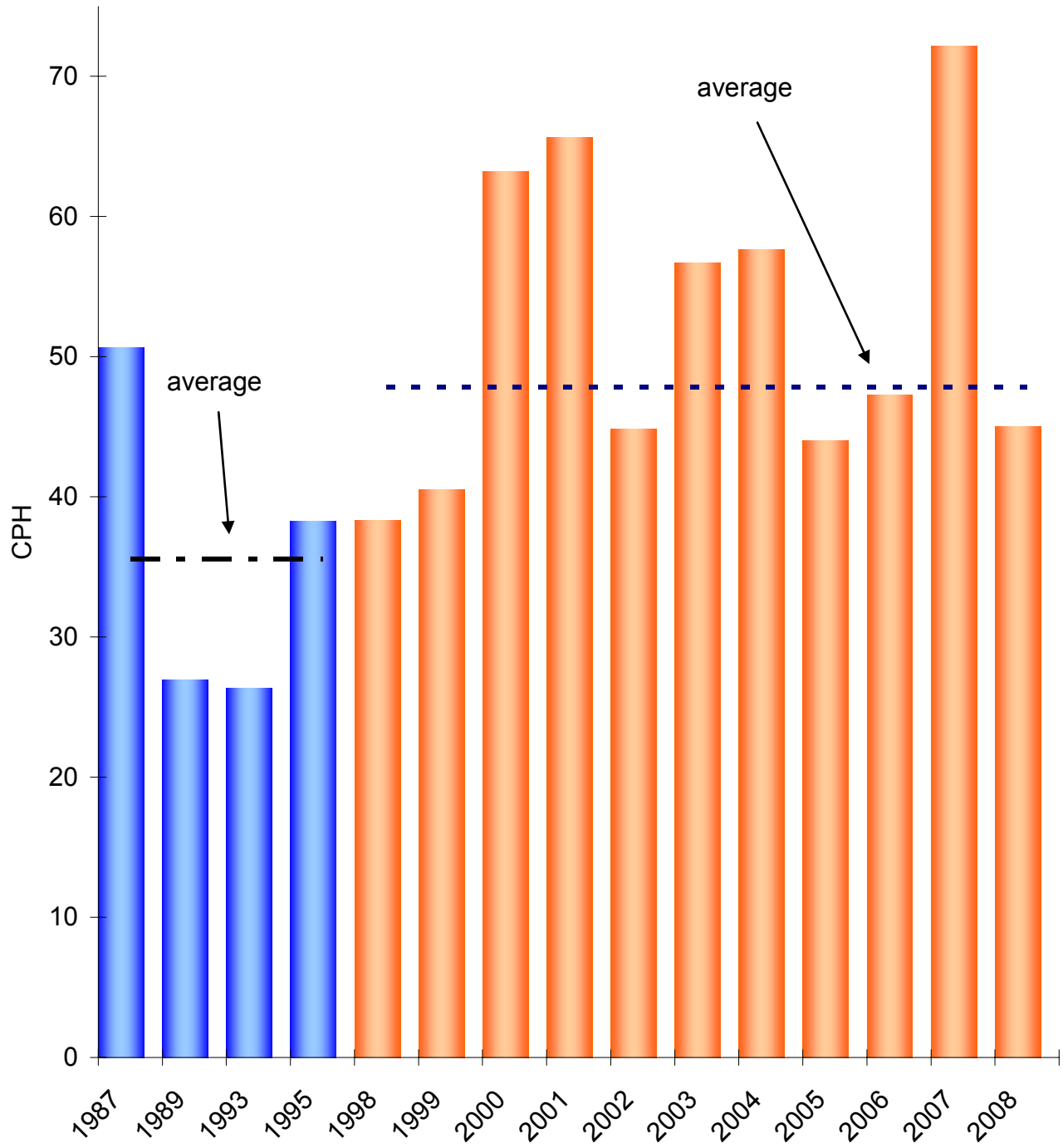


Figure 5. The catch per hour (CPH) of largemouth bass  $\geq 300$  mm at Demopolis Reservoir. The blue bars represent collections made prior to the implementation of the 14-inch minimum-length limit. The orange bars represent collections made since.

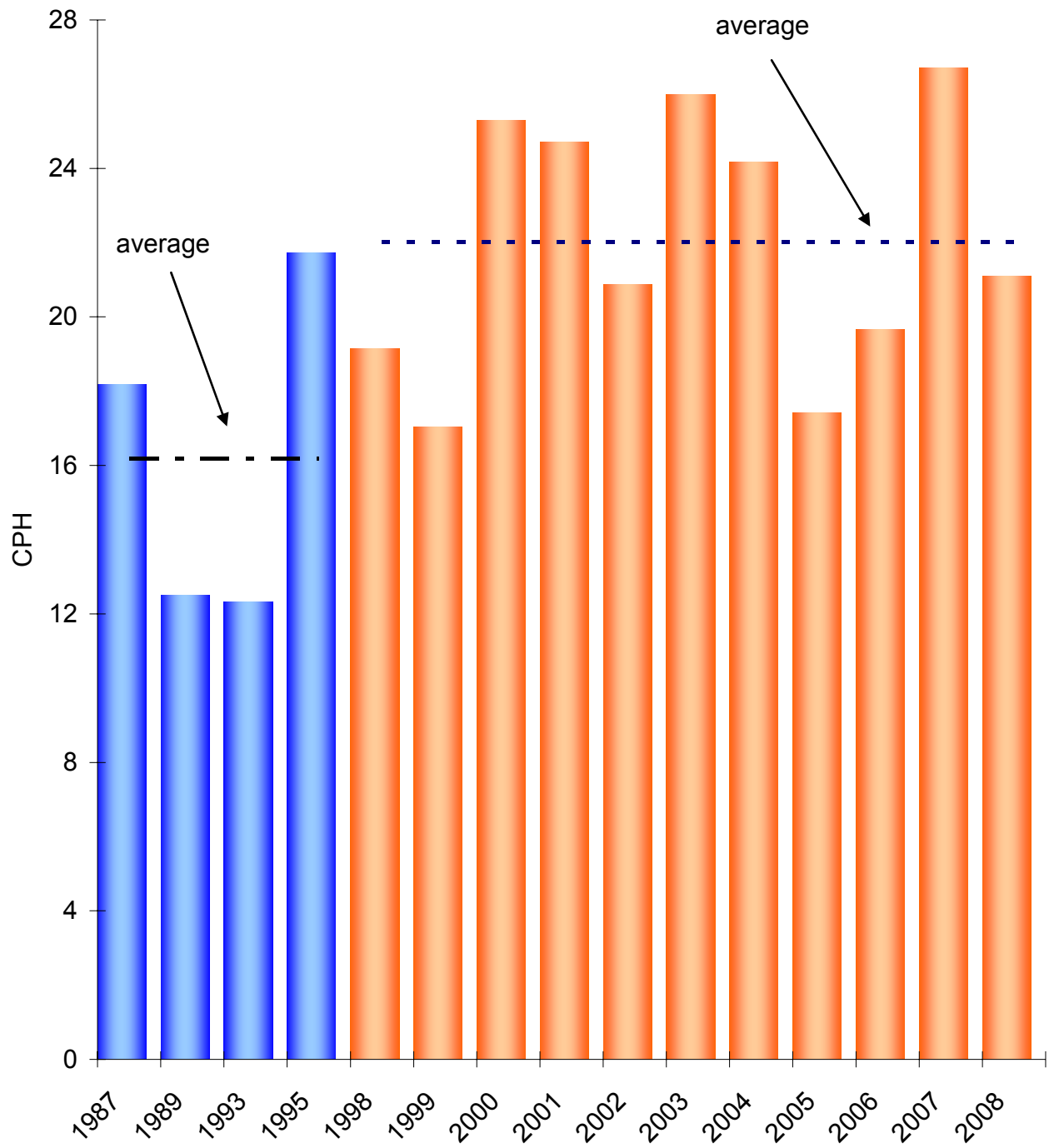


Figure 6. The catch per hour (CPH) of largemouth bass  $\geq$  14 inches at Demopolis Reservoir. The blue bars represent collections made prior to the implementation of the 14-inch minimum-length limit. The orange bars represent collections made since.

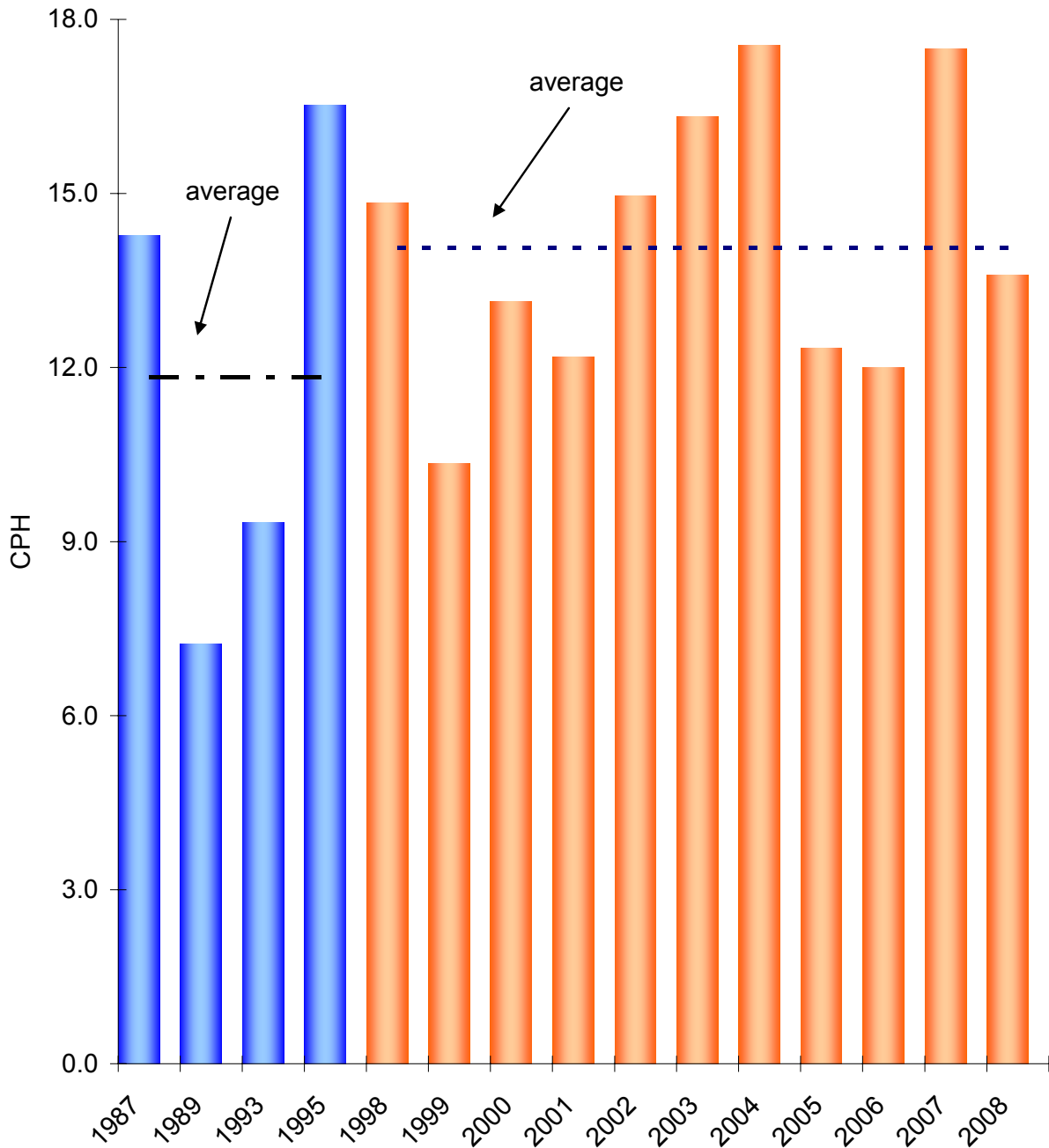


Figure 7. The catch per hour (CPH) of largemouth bass  $\geq 380$  mm at Demopolis Reservoir. The blue bars represent collections made prior to the implementation of the 14-inch minimum-length limit. The orange bars represent collections made since.

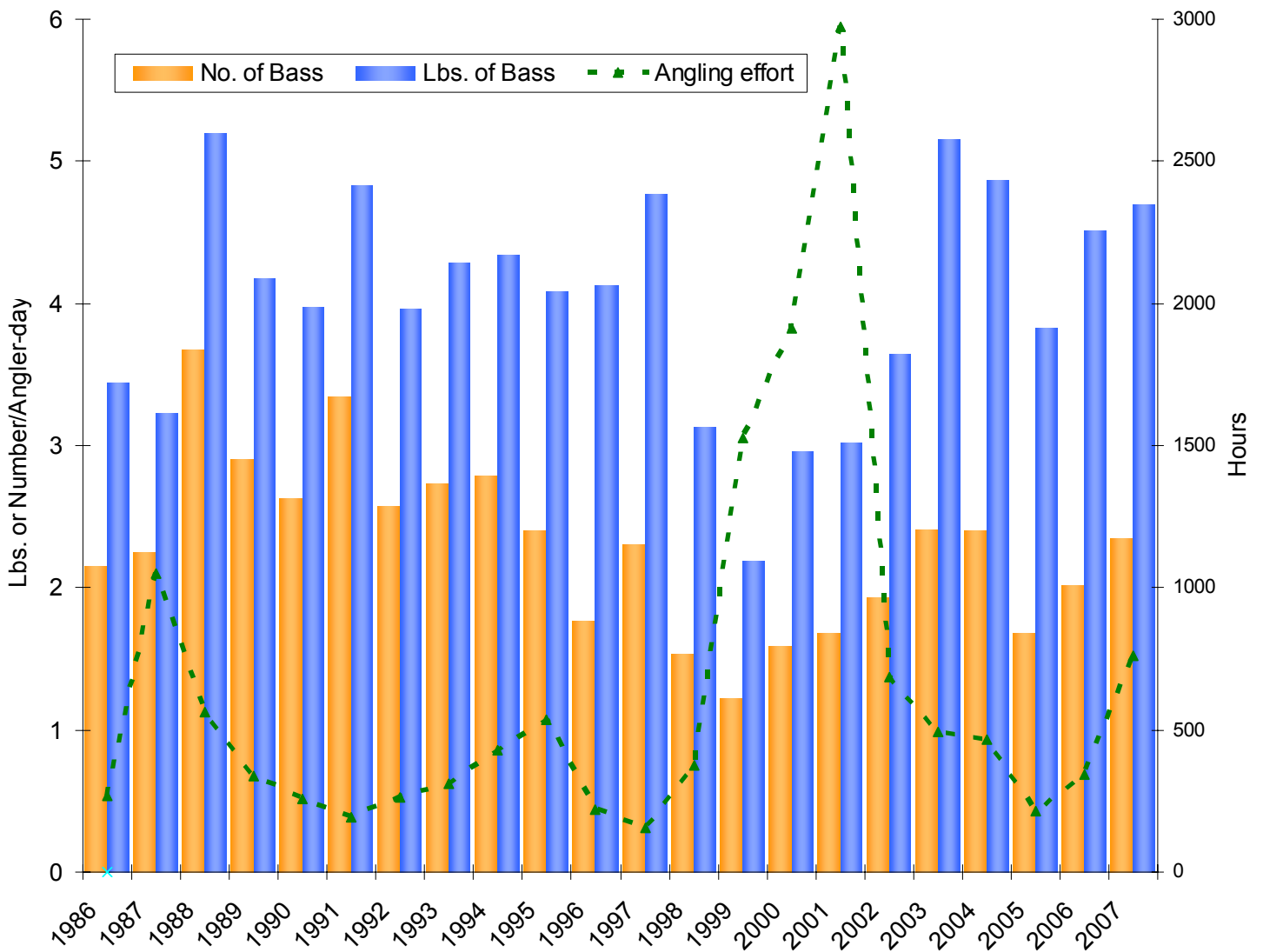


Figure 8. Number or pounds of bass weighed-in/angler-day at Demopolis Reservoir, 1986 - 2007, and the hours of fishing effort/bass  $\geq$  5 lbs. weighed-in.

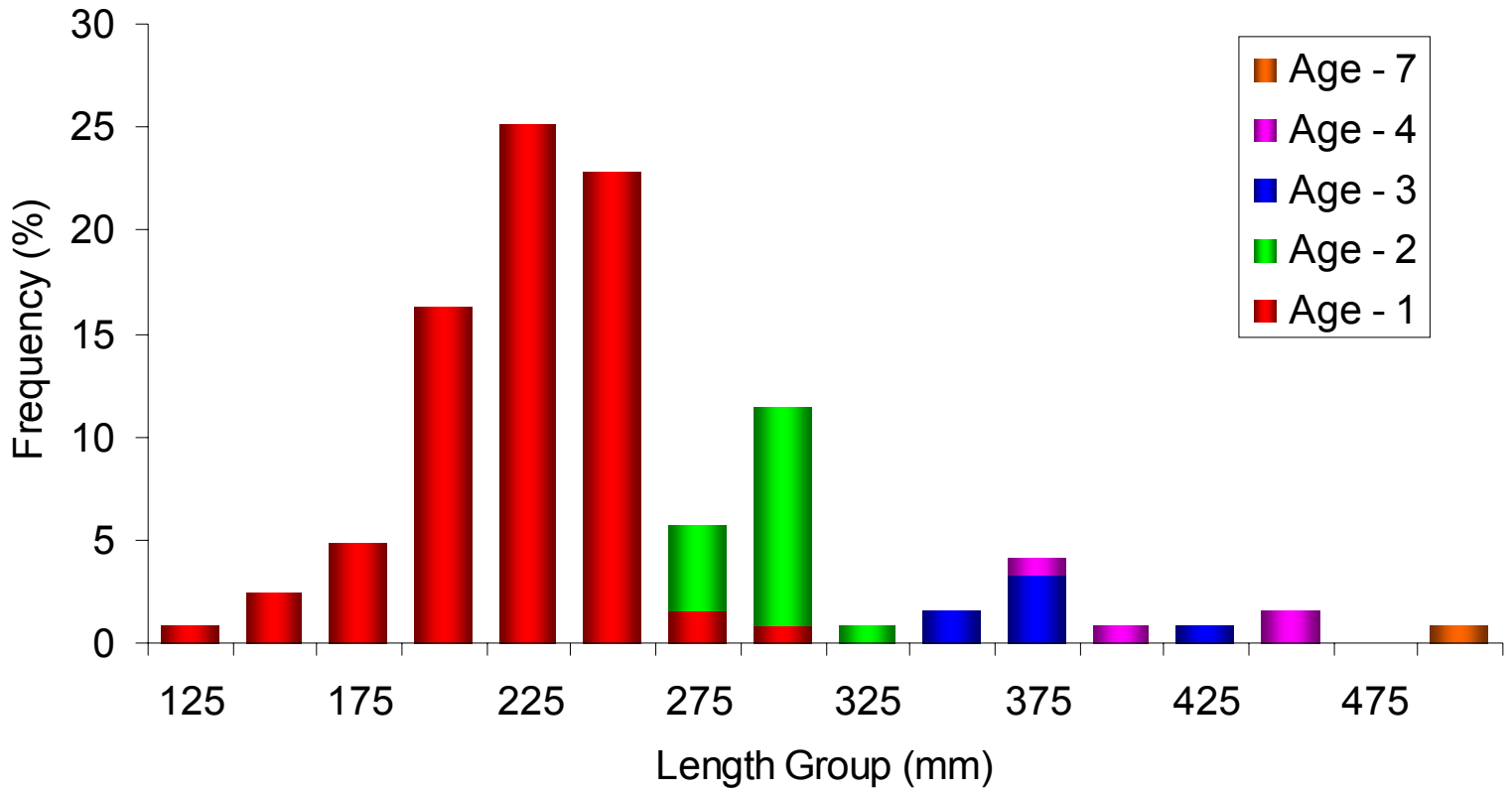


Figure 9. Length at age frequency of spotted bass (N=123) from Demopolis Reservoir, spring 2008.

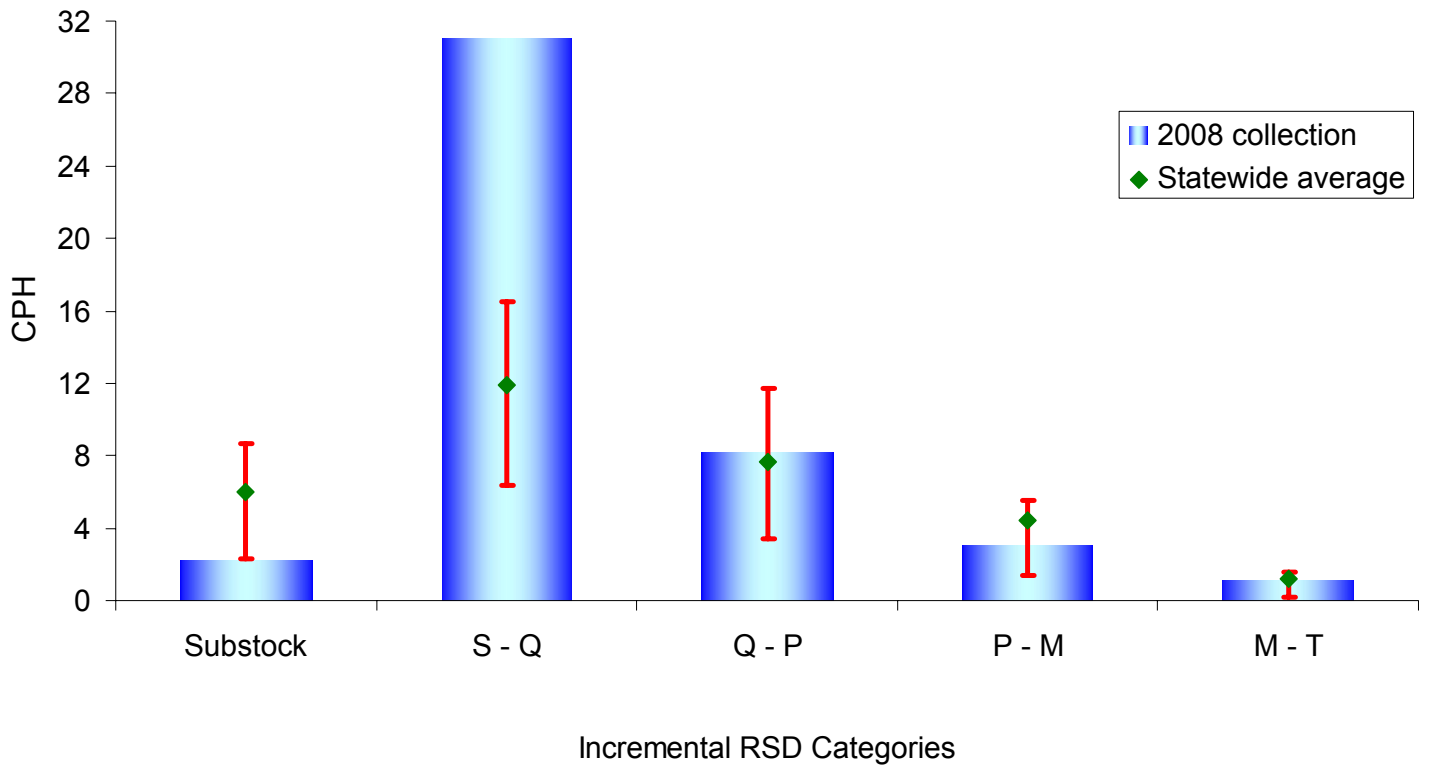


Figure 10. Catch per hour (CPH) of spotted bass (N=123) at Demopolis Reservoir, spring 2008, and the statewide average. Error bars represent the 25th and 75th percentile of CPH values, statewide.

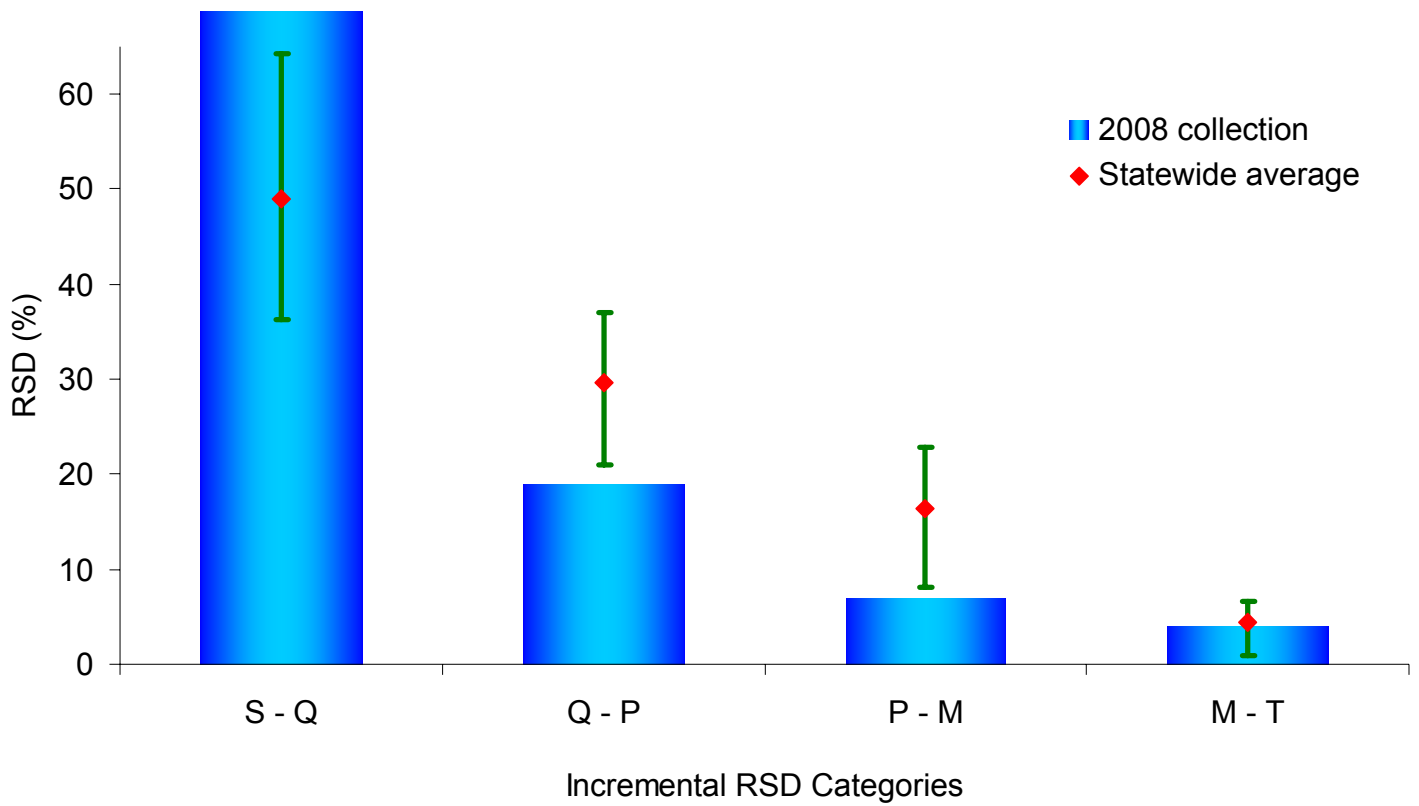


Figure 11. Relative stock density (RSD) of spotted bass (N=123) at Demopolis Reservoir, spring 2008, and the statewide average. Error bars represent the 25th and 75th percentile of RSD values, statewide.

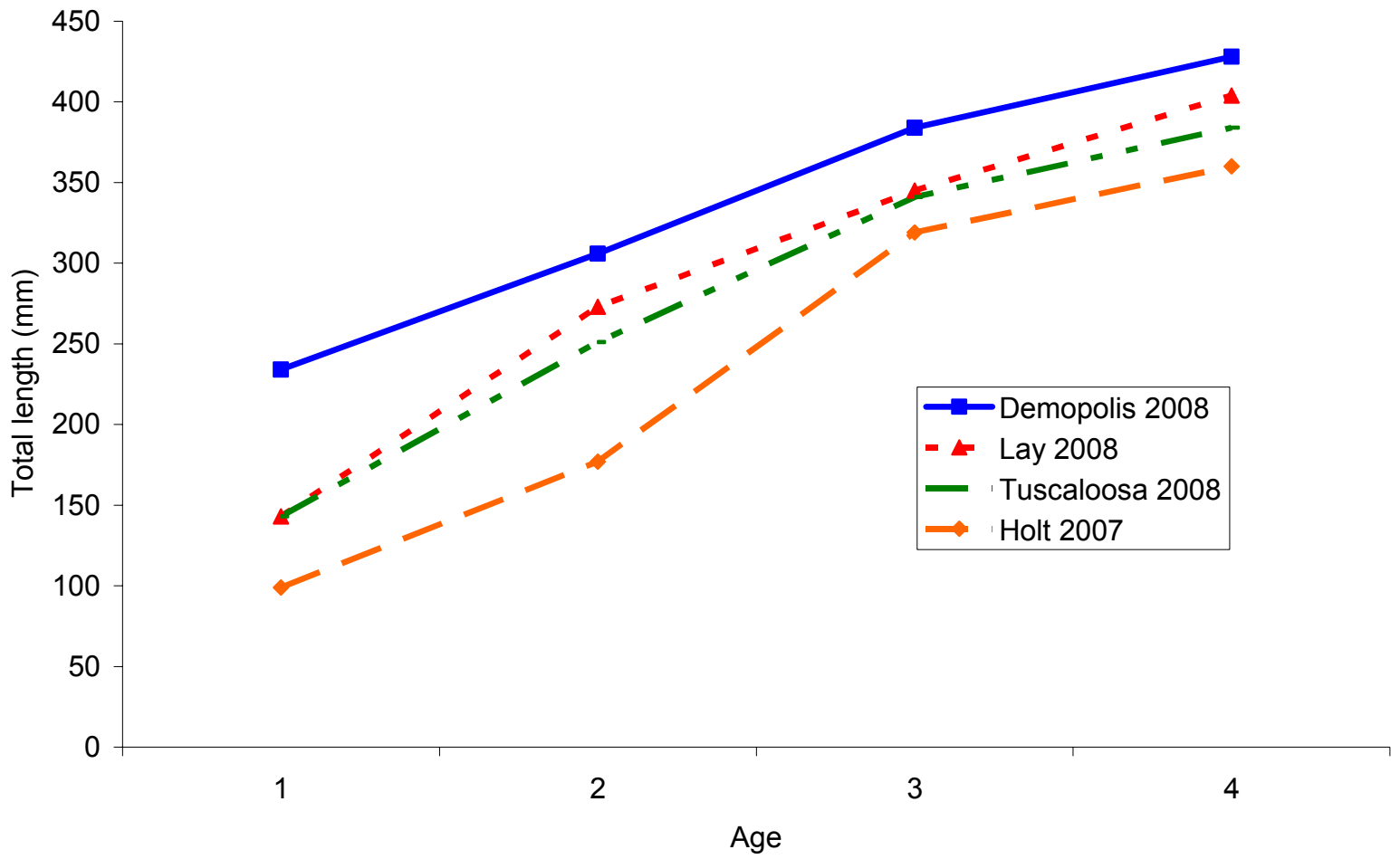


Figure 12. Growth of spotted bass from recent reservoir collections in west-Alabama.