

HOLT RESERVOIR SPRING MANAGEMENT REPORT FY 2008

Prepared by

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Introduction

Holt Reservoir was previously sampled in 1987, 1989, 1991, 1996, 2002, and 2007 (Haffner et al. 2007). Catch rates of largemouth and spotted bass in 2007 were about half the lake averages and the CPH of largemouth bass was the second lowest catch rate ever observed at Holt Reservoir. The largemouth and spotted bass collection was dominated by larger, older individuals. The decline in the bass fishery coincides with unprecedented drought conditions in west-Alabama. Sampling in 2008 was performed to identify additional weak year-classes and to determine if the poor catch rates in 2007 were temporary artifacts of highly variable recruitment, drought, or other conditions.

Methods

Largemouth bass were collected from 4 backwater sites and spotted bass were collected from a total of 7 backwater and riverine sites from March 26 to April 16, 2008, according to the guidelines of the Alabama Reservoir Management Manual (1999). Largemouth and spotted bass were not aged. Information from bass tournaments was collected through the Bass Angling Information Team (BAIT) and pertinent data was incorporated into this report (Abernethy 2008). All tables and figures appear in Appendix A.

Results and Discussion

Largemouth Bass

Largemouth bass were captured at a rate of 69.6 fish/hour; over twice the rate of the previous year and a rate just slightly below the lake average (Table 2). Catch rates improved for all incremental RSD categories. The CPH of S-Q, Q-P and P-M fish in the 2008 collection exceeded the statewide averages and the CPH of Q-P and P-M fish exceeded the lake averages (Figure 3). Catch rates of largemouth bass < 300 mm increased 3.7-fold between 2007 and 2008. In 2008, the PSD for largemouth bass was 57 and the RSD-P was 28. Both values were very similar to the lake averages. Haffner et al. (2007) noted that historically, largemouth bass < 300 mm made up just over half the fish in Holt Reservoir spring electrofishing surveys. In 2007, largemouth bass < 300 mm made up only 27.1% of the collection. In 2008, CPH of largemouth bass < 300 mm bounced back to 48.6% of the entire collection.

In the 2008 collection, all incremental RSD values were similar to the lake average. While the incremental RSD value of S-Q fish jumped to near the lake and statewide averages, the RSD values of Q-P and P-M fish slipped. However, the incremental RSD value of P-M fish was at the upper 75th percentile of P-M values statewide and exceeded the lake average (Figure 7). Mean Wr values for each incremental RSD size category ranged from 98 to 112 and exceeded the lake averages.

Spotted Bass

Spotted bass (N=151) were captured at a rate of 42.1 fish/hour, the highest CPH ever recorded at Holt and nearly 4-times greater than the year before (Table 3). The PSD was 72 and the RSD-P slid from 45 in 2007 to 15 in 2008. The Holt average for RSD-P was 23. No substock fish and very few M-T fish were present in the 2008 collection. The CPH of S-Q and Q-P fish rose 7-fold in 2008, compared to 2007, and the CPH of P-M fish doubled (Figure 6). The CPH of S-Q, Q-P and P-M fish exceeded the lake average and the CPH of Q-P and P-M fish were higher than the upper 75th percentile of CPH values, statewide (Figure 6).

The incremental RSD values of S-Q and Q-P fish rose in 2008, consequently, the incremental RSD values of P-M and M-T fish fell. Only the incremental RSD value of Q-P fish in 2008 exceeded the lake and statewide averages (Figure 7). Mean Wr values for each incremental RSD size category ranged from 102 to 110 and were generally above the lake average.

BAIT data was reported from just 69 anglers that fished in only 5 bass tournaments at Holt Reservoir in 2007. None of Holt's 5 quality indicators in 2007 were above the statewide averages and no bass \geq 5 pounds was weighed-in. Only bass average weight and the pounds of bass weighed-in/angler-day rose slightly in 2007, compared to 2006.

Summary

Catch rates of largemouth and spotted bass at Holt Reservoir rebounded dramatically in 2008. The CPH of largemouth bass was very close to the lake average and the CPH of spotted bass was the highest ever recorded. The size structure of largemouth and spotted bass in the 2008 collection was much more similar to previous collections, than the 2007 collection. Catch rates of largemouth bass < 300 mm were

much higher in 2008. Catch rates of S-Q and Q-P spotted bass were much higher in 2008. No substock spotted bass were collected. Unfortunately, fish from the 2008 collection were not aged, so it's unclear whether age-1 spotted bass were present in the population. However, based on length-frequency histograms of the 2007 and 2008 collections, it appears the 2007 spotted bass year-class failed (Figure 5).

The lack of suitable spawning areas in creeks and backwaters, due to habitat degradation, as well as some water quality issues remain a concern at Holt Reservoir. It now appears the very poor catch rates of both largemouth and spotted bass in the 2007 collection were an aberration, and a product of sampling variability, and not indicative of a substantial, long-term decline in the bass population.

Conclusions

1. Resample Holt Reservoir in 2011.
2. Encourage an aggressive USACOE maintenance control program for nuisance and exotic aquatic plants.
3. Encourage more local bass clubs to participate in the BAIT Program.

Literature Cited

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Alabama reservoir management program 1999. Alabama Department of Conservation and Natural Resources. Montgomery, AL.

Haffner, J. B., J. L. Moss, and J. M. Piper. 2007. Holt Reservoir 2007 management report. Alabama Department of Conservation and Natural Resources, Montgomery, AL.

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.

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Appendix A

Table and Figures

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

Surface area	3,296 acres
Drainage area	4,232 sq. mi.
Full pool elevation	187 feet-msl
Mean annual fluxuation	1 - 2 feet
Shoreline distance	65 miles
Shoreline development index	10.5
Mean depth	36 feet
Maximum depth	85 feet
Outlet depth	55 feet
Thermocline depth	None
Stratification index	19.4 (cfs*365)/dsf
Total dissolved solids	188 mg/l
Chlorophyll a	14.2 mg/m**3
Morphoedaphic index	5.2 TDS/mean depth(ft) (Ryder 1965)
Growing season	235 frost free days (Jenkins 1967)
Year impounded	1969

Table 2. Incremental relative stock density (RSD) catch per effort (CPE) and relative weight (Wr) of largemouth bass captured during spring electrofishing surveys at Holt Reservoir.

Year	1	2		RSD S - Q				RSD Q - P				RSD P - M				RSD M - T				Total		
	Total effort	Substock		No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	
		No.	SSR																			
1987	0.68	19	27.9	23	75	110.3	93	2	2.9	2		3	4.4	4		1	1.5	1		100	147.1	
1989	1.21	12	9.9	12	37	30.6	37	45	37.2	45		16	13.2	16		2	1.7	2		112	92.6	
1991	4.27	4	0.9	4	50	11.7	45	22	5.2	20		32	7.5	29		6	1.4	5		114	26.7	
1996	1.41	32	22.7	32	36	25.5	36	80	45	31.9	45	82	15	10.6	15	88	4	2.8	4	96	132	93.6
2002	2.55	37	14.5	34	32	12.5	29	87	35	13.7	32	93	41	16.1	37	91	2	0.8	2	103	147	57.6
2007	2.51	4	1.6	5	19	7.6	23	95	33	13.1	41	94	27	10.7	33	94	2	0.8	2	95	85	33.8
2008	2.07	15	7.3	12	55	26.6	43	98	38	18.4	29	102	34	16.4	26	101	2	1.0	2	112	144	69.6
LAKE AVERAGE		12.1	17		32.1	44	90		17.5	31	93		11.3	23	94		1.4	3	102		74.4	

1
Effort in hours

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

Table 3. Incremental relative stock density (RSD) catch per effort (CPE) and relative weight (Wr) of spotted bass captured during spring electrofishing surveys at Holt Reservoir.

Year	1		2		RSD S - Q				RSD Q - P				RSD P - M				RSD M - T				Total	
	Total effort	Substock		No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	
		No.	SSR																			
1987	2.74	7	2.6	8	48	17.5	52	33	12.0	35	10	3.6	11	2	0.7	2	100	36.5				
1989	3.01	25	8.3	25	43	14.3	43	44	14.6	44	11	3.7	11	2	0.7	2	125	41.5				
1991	4.50	15	3.3	68	5	1.1	23	8	1.8	36	4	0.9	18	5	1.1	23	37	8.2				
1996	5.03	16	3.2	24	44	8.7	65	88	20	4.0	29	91	4	0.8	6	98	0	0.0	0	84	16.7	
2002	6.10	22	3.6	17	58	9.5	44	92	42	6.9	32	96	26	4.3	20	99	7	1.1	5	101	155	25.4
2007	9.52	26	2.7	31	16	1.7	19	90	31	3.3	36	100	26	2.7	31	106	12	1.3	14	111	111	11.7
2008	3.59	0	0.0	0	43	12.0	28	108	85	23.7	56	110	21	5.8	14	110	2	0.6	1	102	151	42.1
Lake Average		3.4	24		9.3	39	95		9.5	39	99		3.1	16	103		0.8	7	105		26.0	

1
Effort in hours

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



Figure 1. Electrofishing sites at Holt Reservoir, spring 2008. Blue circles designate backwater sites and red circles designate riverine locations.

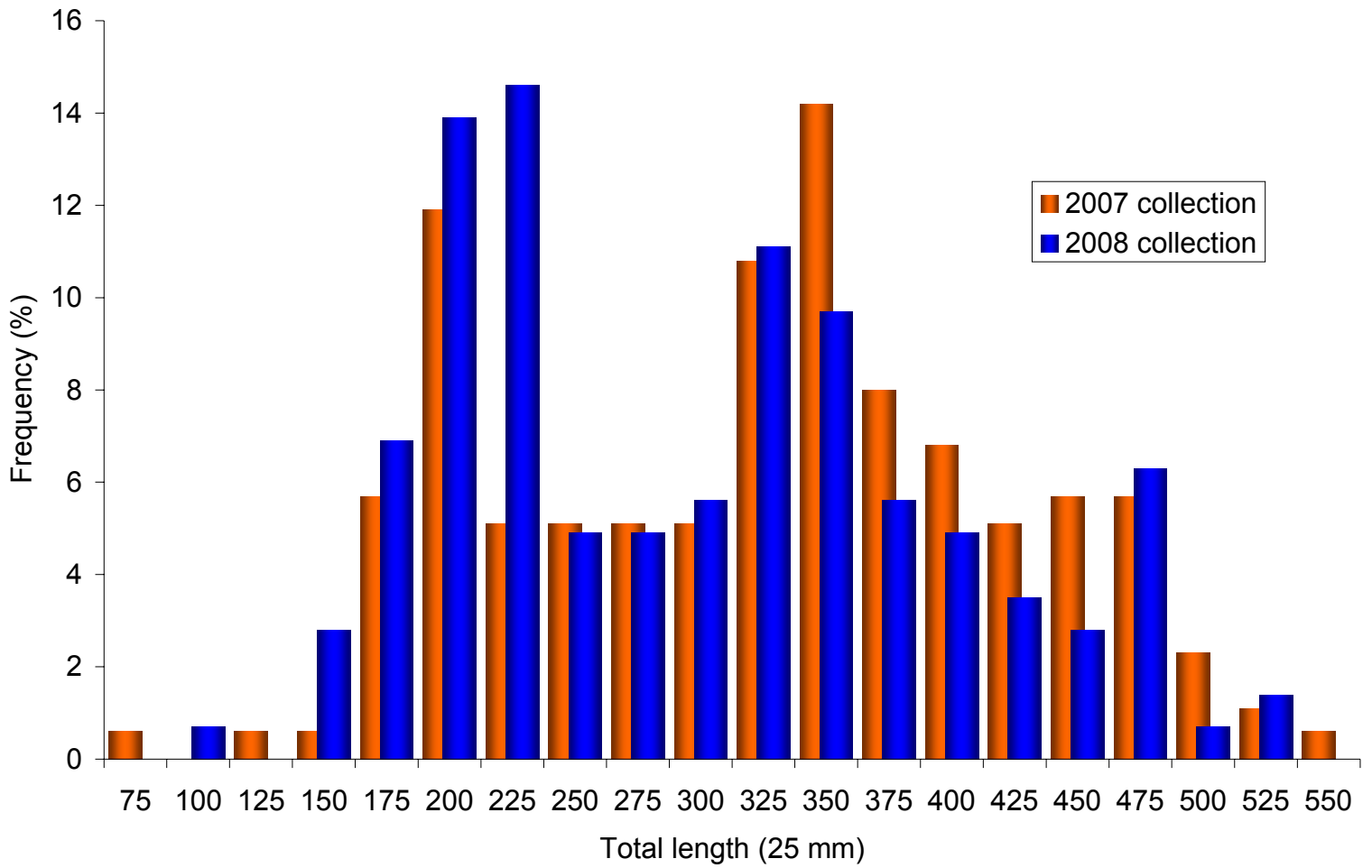


Figure 2. Length frequency histograms of largemouth bass at Holt Reservoir.

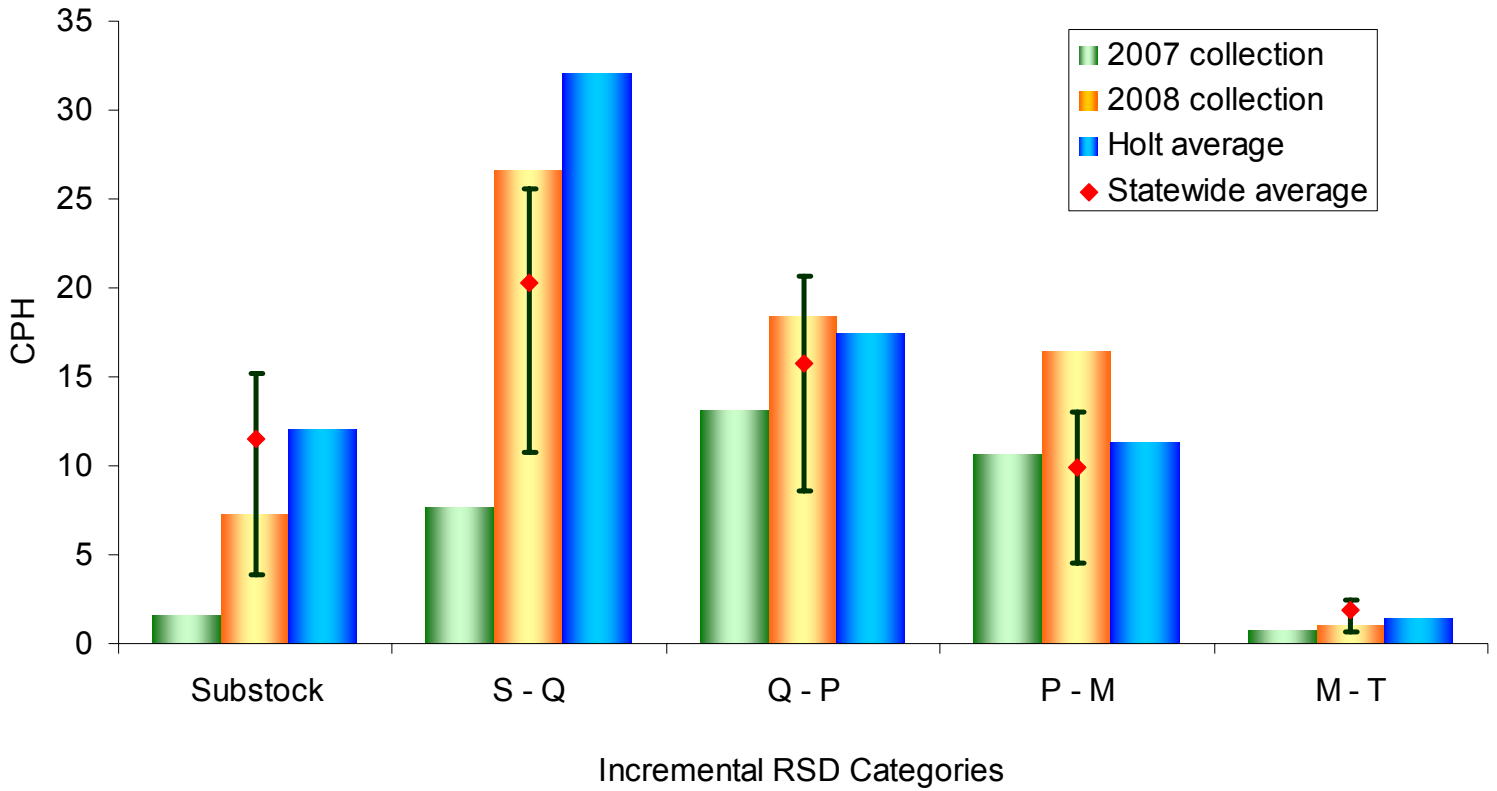


Figure 3. Catch per hour (CPH) of largemouth bass in 2007 and 2008 at Holt Reservoir, and the Holt and statewide averages. Error bars represent the 25th and 75th percentile of CPH values, statewide.

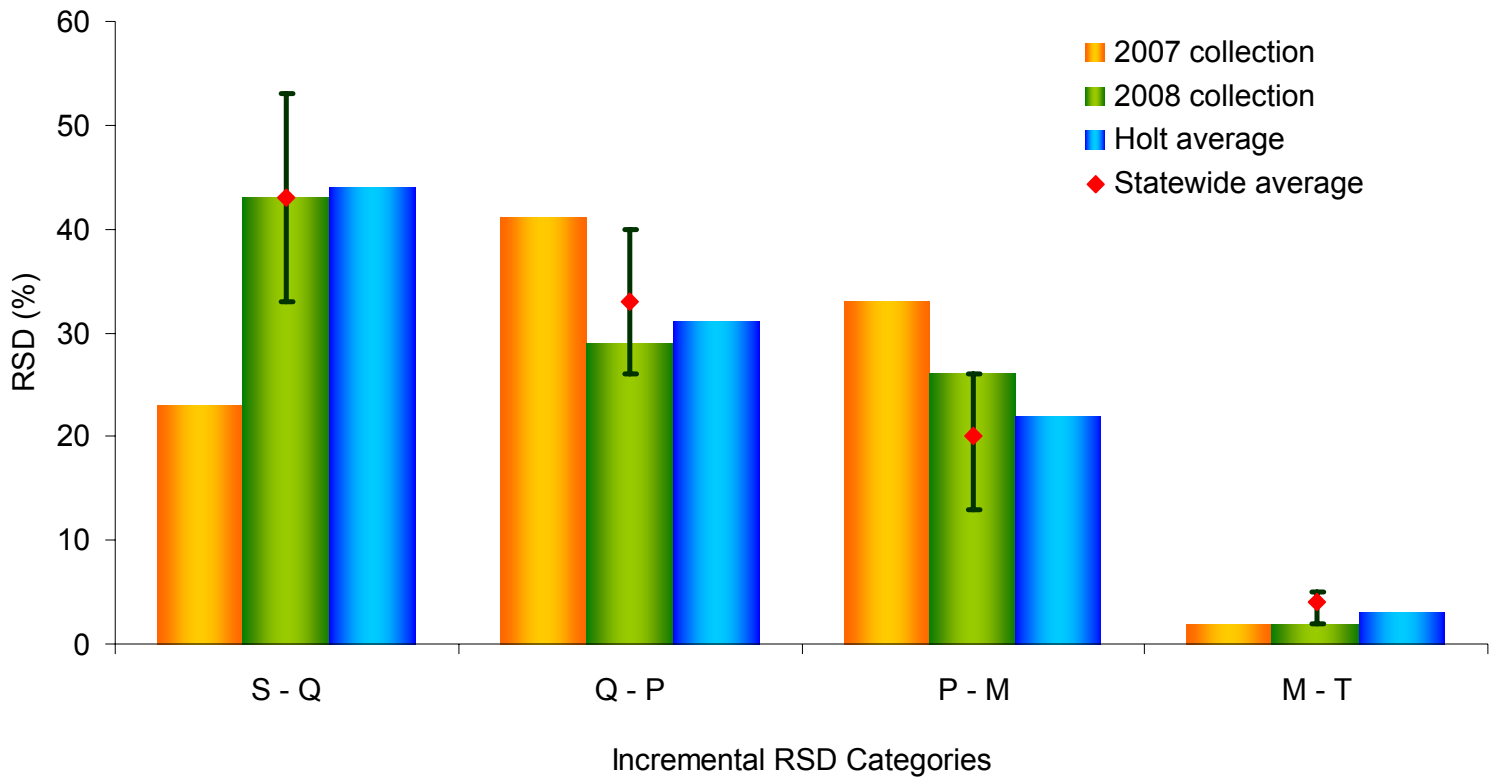


Figure 4. Relative stock density (RSD) of largemouth bass in 2007 and 2008 at Holt Reservoir, and the Holt and statewide averages. Error bars represent the 25th and 75th percentile of RSD values, statewide.

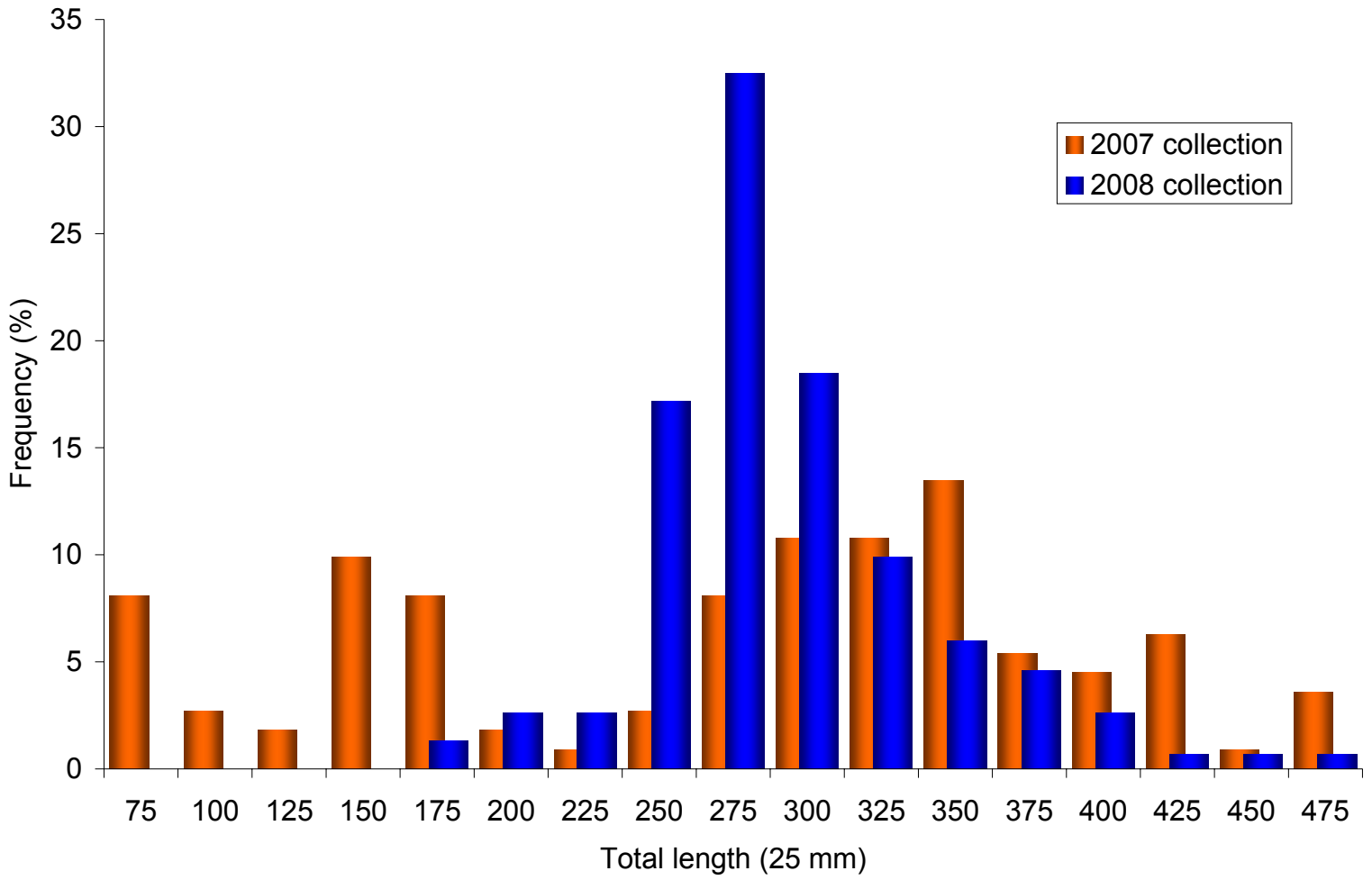


Figure 5. Length frequency histograms of spotted bass at Holt Reservoir.

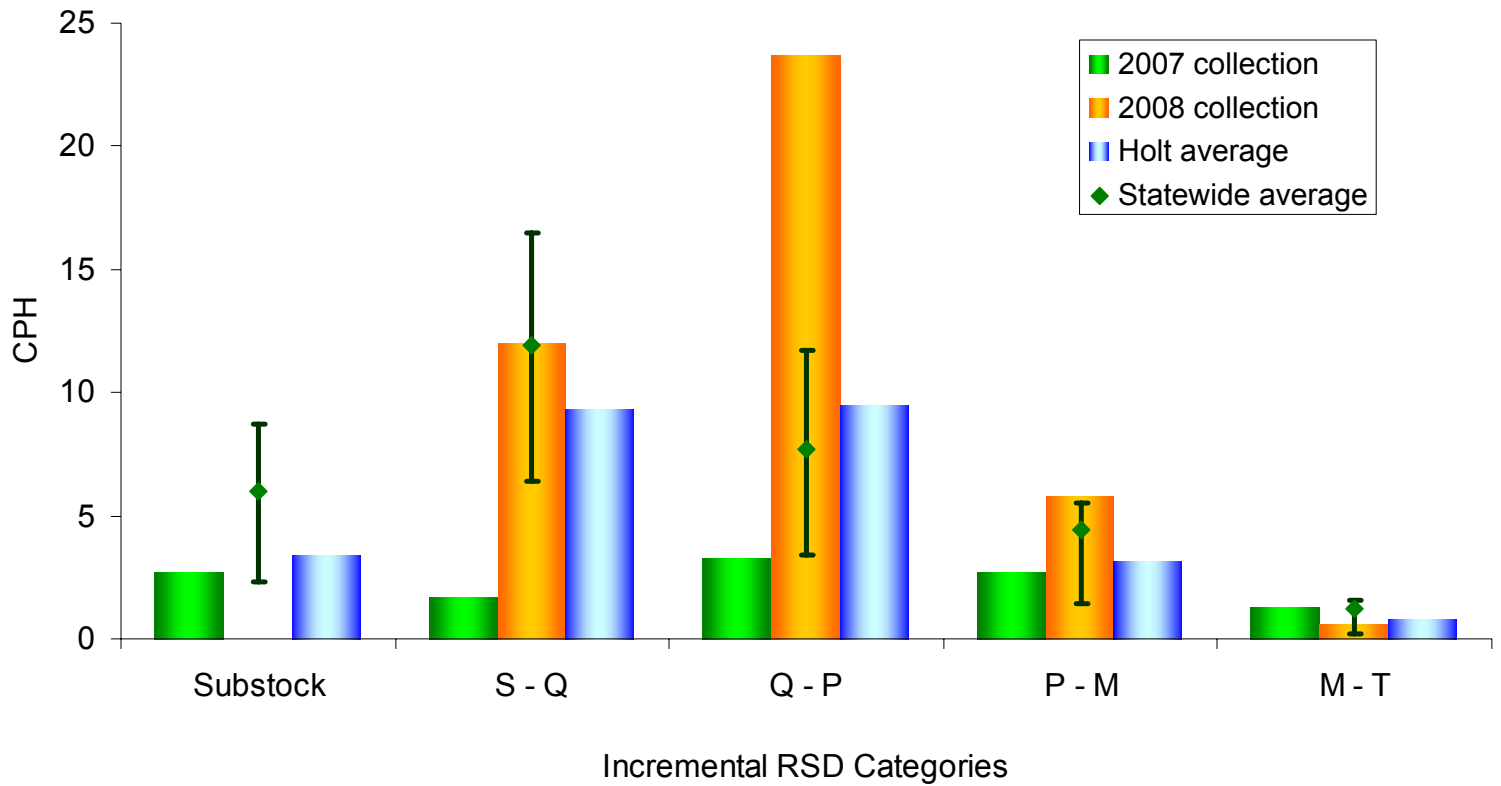


Figure 6. Catch per hour (CPH) of spotted bass in 2007 and 2008 at Holt Reservoir, and the Holt and statewide averages. Error bars represent the 25th and 75th percentile of CPH values, statewide.

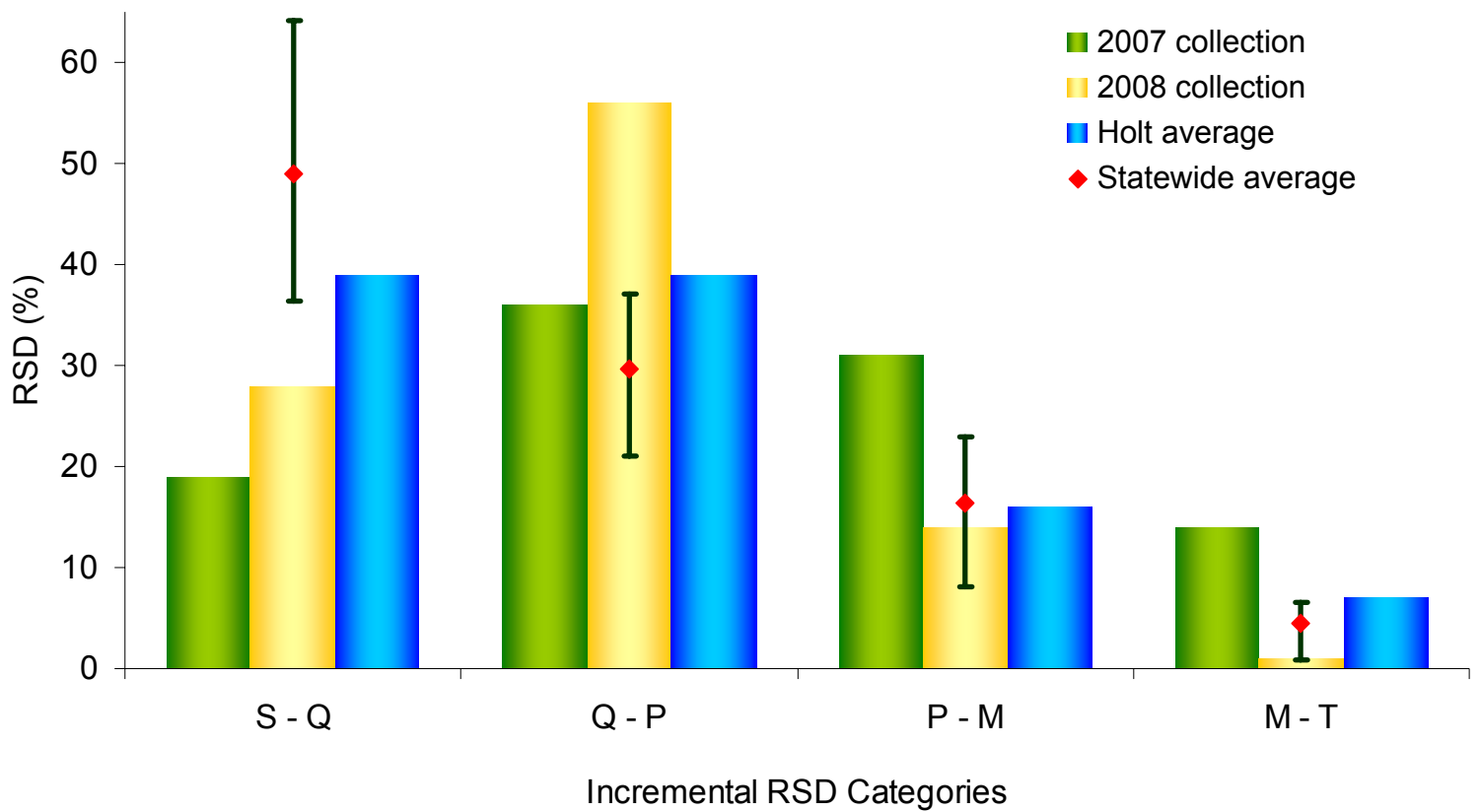


Figure 7. Relative stock density (RSD) of spotted bass in 2007 and 2008 at Holt Reservoir, and the Holt and statewide averages. Error bars represent the 25th and 75th percentile of RSD values, statewide.