

JORDAN RESERVOIR
MANAGEMENT REPORT

SPRING 2009

Prepared by

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Introduction

Jordan Reservoir is a 6,800-acre impoundment on the Coosa River immediately downstream from Mitchell Reservoir. Research has been conducted according to the management program guidelines (Alabama Reservoir Management Manual 1999). Jordan Reservoir was previously sampled in 1987, 1990, 1992, 1999, 2002, and 2005. Largemouth and spotted bass populations typically exhibit relatively low recruitment in Lake Jordan. Consequently, past collections have determined the growth and condition of both species to be excellent. Crappie abundance in Lake Jordan is usually highly variable from year to year, characteristic of other Coosa River impoundments. Hybrid striped bass are stocked each year to provide an additional fishery. A nine-inch minimum length limit is in place for crappie. There is no minimum size limit for black bass in Jordan Reservoir.

“An Angler’s Guide to Interpreting Alabama Wildlife and Freshwater Fisheries Reservoir Reports” provides a detailed description of fisheries terms used in this report.

This guide is available on the Department’s website at:

<http://www.outdooralabama.com/fishing/freshwater/where/reservoirs/guide.pdf>.

Methods

Jordan Reservoir was sampled during spring 2009 by electrofishing to assess largemouth bass, spotted bass, and crappie populations. Ten new sites with preferred bass habitat were systematically chosen such that the bass sample would represent the entire reservoir (Figures 1,2). These sites were sampled for 30 minutes each on April 8-9. Crappie were collected in a non-standardized manner at 11 specific locations within

Sofkahatchee Creek on April 3 and April 9. Total length (mm) and weight (g) were recorded for each fish collected and otoliths were extracted for ageing purposes. The presence of non-target species were documented during fish collection. It should be noted that the water quality data gathered by ADEM in August 2009 did not reveal any distinct stratification with regard to temperature and dissolved oxygen. This may largely be due to the excessive flows experienced during the spring and summer.

A spring creel survey was conducted during 2009 to provide additional information on the bass and crappie fisheries. This survey consisted of sampling one weekend day each week from March 22 through April 25 (6 survey days). Surveys were conducted from Rotary and Bonners access areas. Catch and harvest information was obtained by interviewing anglers upon trip completion. Largemouth bass and spotted bass total lengths were recorded by 25 mm length groups. Black crappie total lengths were recorded by 10 mm length groups.

Bass tournament information was collected through the Bass Anglers Information Team (BAIT). The results of the program were reviewed with regard to Jordan Reservoir and appropriate comments are included in this report.

Results and Discussion

The spring 2009 bass sample from Jordan Reservoir included 216 largemouth bass representing 9 year-classes (Table 4) and 136 spotted bass representing 5 year-classes (Table 5). The catch rate of largemouth bass was 59 percent higher than spotted bass, 43.2/hour compared to 27.2/hour (Table 3). These catch rates were similar to those of largemouth bass and spotted bass from upstream Mitchell Reservoir the previous year,

44.2/hour and 34.6/hour, respectively (Lovell et al. 2008). Catch rates of largemouth bass have typically been similar or slightly higher than spotted bass over the last 15 to 20 years in both Jordan and Mitchell Reservoirs. The catch rate of both species combined was 70.4/hour in 2009, similar to the eight year lake average since 1987 of 77.6/hour (Table 3). When comparing catch rates between species or between years, it should be considered that the sample sites in 2009 were chosen with regard to habitat preference which would likely inflate these indices.

Abernethy et al. (2005) reported exceptional growth of both largemouth bass and spotted bass in Jordan Reservoir compared to other reservoirs statewide. Analysis of the 2009 sample suggested that growth of both species were still well above the statewide average (Figures 7 and 8). Both populations have noticeably become skewed toward larger fish since 2002 (Figures 5 and 6). A large portion of the spotted bass collected were within the preferred (50%) and memorable (28%) size categories (Table 3), despite the determination that spotted bass over 305 mm are often underrepresented in an electrofishing sample (McHugh et al. 1993). Lovell et al. 2008 documented that both species were skewed toward larger size groups in Lake Mitchell during the 2008 collection. The predator and prey fish populations within these two reservoirs tend to behave similarly. With the exception of the memorable size category of largemouth bass, the condition index (W_r) for each size category of bass in 2009 were slightly higher than those collected in 2005 and were well above the lake average (Table 3).

An annual mortality rate for largemouth bass was calculated to be 41% between the ages of 2 and 9 years (Figure 10). The 2009 sample suggested a weak 2007 year-class of spotted bass where few age-2 fish were collected (Table 5). The variability in

catch rates among year-classes prevented an accurate estimation of spotted bass annual mortality. The oldest largemouth bass collected in this sample was 9 years and the oldest spotted bass was 6 years (Tables 4 and 5).

Based on overall quality of bass fishing, Jordan Reservoir ranked 6th of 20 reservoirs that had 5 or more tournament reports in the 2008 BAIT program (Abernethy 2009). Among these 20 reservoirs, Jordan ranked 2nd for average pounds of bass caught per angler per day. This high ranking is largely due to the high catch rate of bass which has increased since 2005 (Figure 11). Jordan also ranked 4th for average weight of bass caught.

It has been suggested that bass populations in Jordan Reservoir may benefit from a minimum length limit to protect young fish after a poor recruitment year. However, Abernethy et al. (2005) reported that angler harvest was far too low for any benefit to be gained from a minimum length limit. Furthermore, angler catch rates of bass have been stable for the last 20 years with no size limit at all (Figure 11).

A total of 89 black crappie were collected using electrofishing in spring 2009. The 2005 year-class of crappie comprised nearly 47% of the entire sample and averaged 319 mm in length (Table 6). Year-class production has historically fluctuated greatly in Lake Jordan, and during specific years is remarkably similar to the other Coosa River impoundments. This variable year-class strength would not allow a valid mortality estimate for crappie to be computed. A von Bertalanffy curve describing the 2009 sample suggested that crappie growth was excellent between the ages of 2 and 6, far exceeding the statewide average (Figure 9). Young crappie are typically not as vulnerable to electrofishing equipment and were not adequately represented in the 2009

sample. Therefore, it was not possible to accurately determine the average time to recruit to the fishery (9 inches). However, all of the age-2 fish collected were well above this minimum length (Table 6). The crappie sampling was not standardized, thus an index of relative abundance was not applicable.

Jordan Reservoir has historically supported a popular white bass fishery, especially during spawning runs below Mitchell Dam and in the upper end of Chestnut Creek. White bass in Mitchell and Jordan Reservoirs were found to exhibit variable recruitment similar to crappie, where high discharge rates during pre-spawn typically stimulate a strong year-class (Lovell and Maceina, 2002). This study also determined that a 12-inch minimum length limit placed on white bass in the lower Coosa impoundments could potentially increase yield in weight if exploitation was over 30 percent. Future sampling consideration should be given to white bass collections in order to monitor population status. Efforts should also be made to determine angler demand for a white bass fishery and to estimate exploitation rates.

The spring creel survey included interviews of 89 anglers who fished for 964.1 hours (Table 8). The anglers surveyed were fishing for bass (47%), crappie (28%), catfish (4%), white or hybrid striped bass (2%), or no particular species (18%). The anglers caught 247 total black bass and 213 crappie. Of the bass caught, 84% were greater than 12 inches and less than 7% were harvested. Eighty-two percent of the crappie caught were over 9 inches and 70% of these fish were harvested. Bass fishing is still the main attraction for Jordan Reservoir anglers. This attraction is mostly driven by tournaments and recreational anglers that practice catch-and-release, as is the case in

most reservoirs today. The number of crappie anglers is likely to vary with the abundance of harvestable-size crappie.

Conclusions

- Jordan reservoir should be sampled again in 3 to 4 years according to the Reservoir Management Program.
- Collecting white bass during standard spring sampling should be considered to monitor their population status. Continued study is needed to determine angler demand for white bass and an estimate of exploitation.
- Hybrid striped bass stocking should continue at the rate of 6 per acre annually.

Literature Cited

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TABLE 1. Jordan Reservoir morphometric, physical, and chemical characteristics.

Surface area	6,800 surface acres
Drainage area	10,200 square miles
Full pool elevation	252 feet-msl
Mean annual fluxuation	2 to 4 feet
Shoreline distance	188 miles
Shoreline development index	16.2
Mean depth	39 feet
Maximum depth	115 feet
Outlet depth	100 feet
Total dissolved solids	72.14 mg/L (ADEM unpublished)
Chlorophyll-a	14.92 µg/L (ADEM unpublished)
Morphoedaphic index	1.84 TDS/mean depth (ft.) (Ryder 1965)
Growing season	240 frost free days (Jenkins 1967)
Date of Impoundment	1928

TABLE 2. Non-target species observed during routine sampling of Jordan Reservoir, spring 2009.

Species
Bluegill
Blacktail Redhorse
Blacktail Shiner
Bowfin
Channel Catfish
Freshwater Drum
Gizzard Shad
Green Sunfish
Longnose Gar
Mobile Logperch
Redear Sunfish
Spotted Gar
Spotted Sucker
Threadfin Shad
Warmouth

TABLE 3. Relative stock density (RSD), catch per hour (CPE), substock ratio (SSR), and relative weight (Wr) of target species collected with electrofishing gear from Jordan Reservoir, 1987-2009.

LARGEMOUTH BASS																											
Year	No. of Samples	PSD	Substock			RSD S-Q				RSD Q-P				RSD P-M				RSD M-T				RSD T				Total	
			No.	CPH	SSR	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH
1987	7	78.3	13	3.7	14	20	5.7	22	96	26	7.4	28	96	40	11.4	43	99	5	1.4	5	99	1	0.3	1	100	105	30.0
1990	7	87.3	7	2.0	7	13	3.7	13	98	22	6.3	22	103	60	17.1	59	104	7	2.0	7	102					109	31.1
1992	9	77.9	27	6.0	20	30	6.7	22	97	70	15.6	51	98	34	7.6	25	97	2	0.4	1	91					163	36.2
1995	6	87.2	2	0.7	2	14	4.7	13	94	58	19.3	53	99	32	10.7	29	99	5	1.7	5	95					111	37.0
1999	5	62.3	8	3.2	8	40	16.0	38	92	27	10.8	25	95	36	14.4	34	98	3	1.2	3	100					114	45.6
2002	5	77.5	6	2.4	6	23	9.2	23	91	29	11.6	28	95	38	15.2	37	95	12	4.8	12	93					108	43.2
2005	10	79.5	28	5.6	14	42	8.4	20	92	62	12.4	30	97	92	18.4	45	95	9	1.8	4	92					233	46.6
2009	10	79.6	10	2.0	5	42	8.4	20	100	62	12.4	30	101	97	19.4	47	100	5	1.0	2	91					216	43.2
LAKE AVERAGE		79		3.4	9		7.6	21	95		12.1	34	98		14.5	40	98		1.6	5	95		0.0	0	100		39.1
SPOTTED BASS																											
Year	No. of Samples	PSD	Substock			RSD S-Q				RSD Q-P				RSD P-M				RSD M-T				RSD T				Total	
			No.	CPH	SSR	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH	Pct.	Wr	No.	CPH
1987	6	53.2	17	5.7	15	52	17.3	47	101	20	6.7	18	104	34	11.3	31	105	5	1.7	5	97					128	42.7
1990	8	79.6	9	2.3	9	21	5.3	20	104	33	8.3	32	111	34	8.5	33	109	14	3.5	14	106	1	0.3	1	104	112	28.0
1992	9	58.0	25	5.6	10	103	22.9	42	107	66	14.7	27	108	57	12.7	23	106	18	4.0	7	108	1	0.2	0	111	270	60.0
1995	6	79.8	3	1.0	3	20	6.7	20	99	43	14.3	43	100	26	8.7	26	100	7	2.3	7	105	3	1.0	3	100	102	34.0
1999	6	79.8	12	4.0	11	22	7.3	20	98	24	8.0	22	101	38	12.7	35	104	25	8.3	23	103					121	40.3
2002	5	80.9	5	2.0	5	21	8.4	19	102	35	14.0	32	102	40	16.0	36	107	14	5.6	13	105					115	46.0
2005	10	87.1	17	3.4	13	17	3.4	13	97	13	2.6	10	101	57	11.4	43	108	43	8.6	33	109	2	0.4	2	102	149	29.8
2009	10	93.4				9	1.8	7	112	20	4.0	15	114	68	13.6	50	114	38	7.6	28	113	1	0.2	1	109	136	27.2
LAKE AVERAGE		76		2.9	9		8.8	24	103		8.5	25	105		11.8	35	107		5.5	16	106		0.3	1	105		38.5
BLACK CRAPPIE																											
Year	No. of Samples	Gear	Substock			RSD S-Q				RSD Q-P				RSD P-M				RSD M-T				RSD T				Total	
			No.	CPE	SSR	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE	Pct.	Wr	No.	CPE
1990	20	TN								3	0.3	25		7	0.7	58		2	0.2	17						12	0.6
1992	80	TN								32	0.8	34	93	44	1.1	47	100	15	0.4	16	104	2	0.1	2	83	93	1.2
1994	50	TN	9	0.4	7	14	0.6	10		57	2.3	42	89	47	1.9	35	93	18	0.7	13	95					145	2.9
1998	40	TN	6	0.3	4	24	1.2	16	79	87	4.4	58	89	17	0.9	11	92	21	1.1	14	98					155	3.9
2001	43	TN	2	0.1	2	2	0.1	2	80	24	1.1	19	92	61	2.8	49	93	38	1.8	30	94					127	3.0
2005	60	TN				11	0.4	8	75	43	1.4	30	89	63	2.1	43	90	28	0.9	19	91	2	0.1	1		145	2.4
2009*		EF								8				8		9	105	79		89	104	1		1	96	89	
LAKE AVERAGE				0.1	2		0.2	5	78		0.9	30	90		0.8	36	95		0.4	28	98		0.0	0	90		2.3

*No CPE was calculated because fish were not collected in standardized manner.

TABLE 4. Age composition and mean length of largemouth bass collected from Jordan Reservoir, spring 2009.

Annulus	Year Class	Number	Percent	CPE	Mean Length	Standard Error	Length Range
1	2008	26	12.0	5.2	214.0	9.4	82-275
2	2007	66	30.6	13.2	313.7	4.3	216-390
3	2006	41	19.0	8.2	379.7	5.0	296-458
4	2005	29	13.4	5.8	427.7	5.6	374-477
5	2004	31	14.4	6.2	438.5	5.5	363-502
6	2003	10	4.6	2.0	448.0	14.5	398-553
7	2002	9	4.2	1.8	483.9	15.3	420-556
8	2001	2	0.9	0.4	435.5	26.5	409-462
9	2000	2	0.9	0.4	488.5	25.5	463-514
Total		216	100.0	43.2			

TABLE 5. Age composition and mean length of spotted bass collected from Jordan Reservoir, spring 2009.

Annulus	Year Class	Number	Percent	CPE	Mean Length	Standard Error	Length Range
2	2007	24	17.6	4.8	291.9	5.8	246-343
3	2006	35	25.7	7.0	371.4	3.6	321-417
4	2005	41	30.1	8.2	415.5	3.2	346-448
5	2004	25	18.4	5.0	444.8	4.1	411-495
6	2003	11	8.1	2.2	473.9	5.1	453-513
Total		136	100.0	27.2			

TABLE 6. Age composition and mean length of black crappie collected from Jordan Reservoir, spring 2009.

Annulus	Year Class	Number	Percent	CPE*	Mean Length	Standard Error	Length Range
2	2007	5	5.6	—	268.4	6.4	256-293
3	2006	7	7.9	—	305.0	3.1	293-318
4	2005	42	47.2	—	319.0	1.7	299-343
5	2004	10	11.2	—	338.1	4.7	315-356
6	2003	10	11.2	—	340.2	4.0	323-356
7	2002	3	3.4	—	362.0	10.7	348-383
8	2001	10	11.2	—	347.8	5.2	323-376
9	2000	2	2.2	—	368.5	18.5	350-387
Total		89	100.0	0.0			

*No CPE was calculated because fish were not collected in standardized manner.

Table 7. Length-at-age for largemouth bass and spotted bass collected from Jordan Reservoir, 1987-2009.

	<u>Largemouth Bass</u>							
	1987	1990	1992	1995	1999	2002	2005	2009
Age-1	168	208	169	176	214	199	150	214
Age-2	296	302	302	316	292	312	295	314
Age-3	373	381	372	352	367	366	380	380
Age-4	409	432	396	406	419	414	434	428
Age-5	442	469	456	447	452	432	463	439
Ages 1-5	338	358	339	339	349	345	344	355
	<u>Spotted Bass</u>							
	1987	1990	1992	1995	1999	2002	2005	2009
Age-1	110	110	131	95	154	148	136	
Age-2	192	249	267	283	284	304	282	292
Age-3	250	350	368	349	365	378	377	371
Age-4	299	421	402	404	420	421	427	416
Age-5	349	438	450	469	443	464	464	445
Ages 1-5	240	314	324	320	333	343	337	381

TABLE 8. Fishery statistics for the access area creel survey conducted on Jordan Reservoir, spring 2009.

		No. anglers	Hours
Fishing for:	Bass ¹	42	417.5
	Crappie	25	324.4
	Catfish	4	27.0
	Striped & white bass	2	26.5
	Anything	16	168.8
	TOTAL	89	964.1
		<u>No. of Fish</u>	
Harvested:	Largemouth bass		5
	Spotted bass		12
	Black crappie		122
	White crappie		0
Released:	Bass >12 inches		190
	Bass <12 inches		40
	Crappie >9 inches		52
	Crappie <9 inches		39
		CPH	HPH
Catch and harvest:	Bass ²	0.59	0.04
	Bass ³	0.50	0.03
	Crappie ⁴	0.66	0.38
		No. parties	
County origin:	Elmore		39
	Montgomery		14
	Autauga		22
	Coosa		5
	Three others		5
	Two other states		4
		No. parties	
Comments:	Nice lake with good fishing		1
	Fish are not biting yet		3

¹No tournament anglers were interviewed.

²Includes only bass anglers and fish of all sizes.

³Includes only bass anglers and fish 12 inches and larger.

⁴Includes only crappie anglers and fish of all sizes.



FIGURE 1. Jordan Reservoir electrofishing sites, spring 2009 (north end).

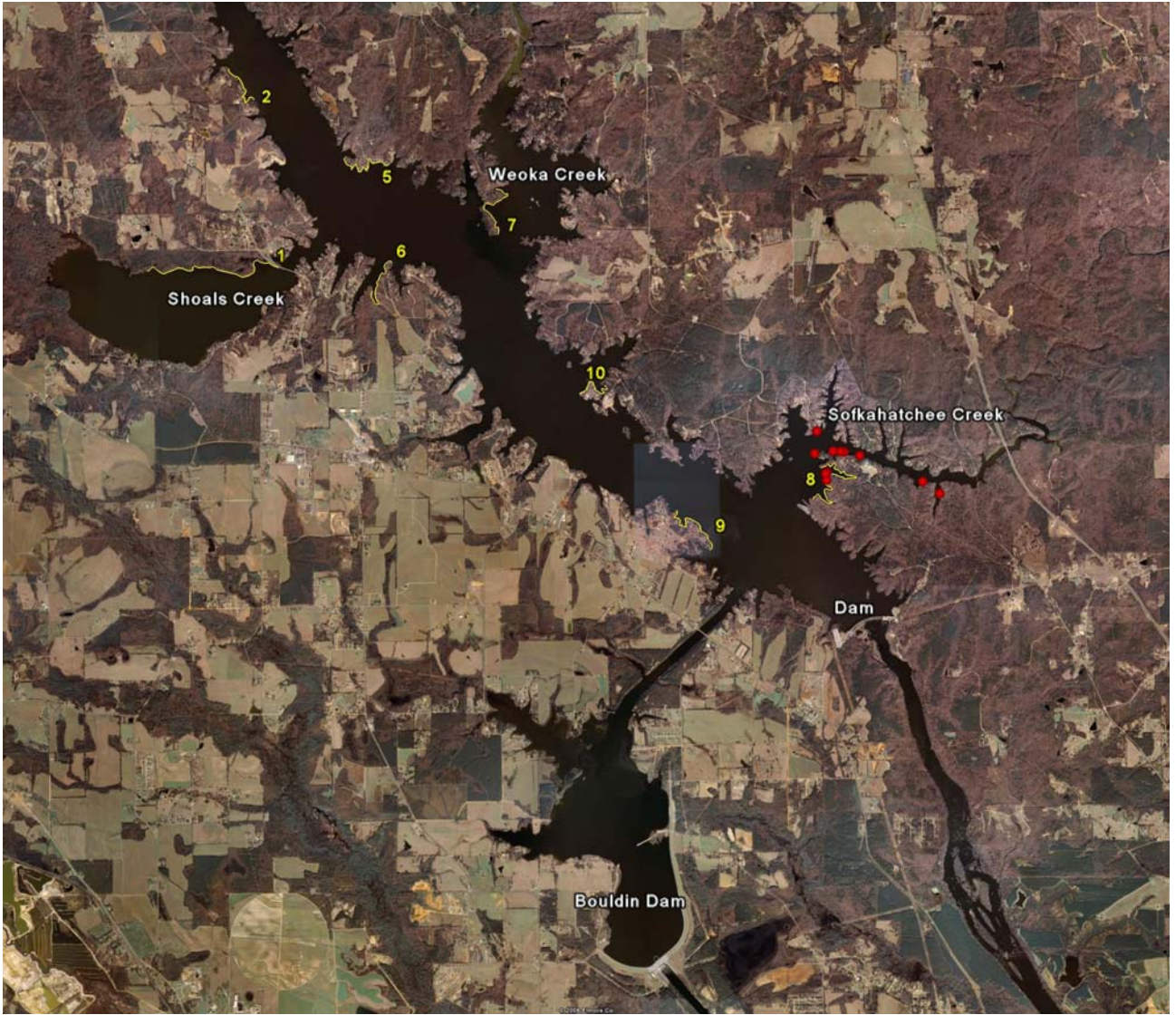


FIGURE 2. Jordan Reservoir electrofishing sites, spring 2009 (south end). Red dots represent locations where crappie were collected.

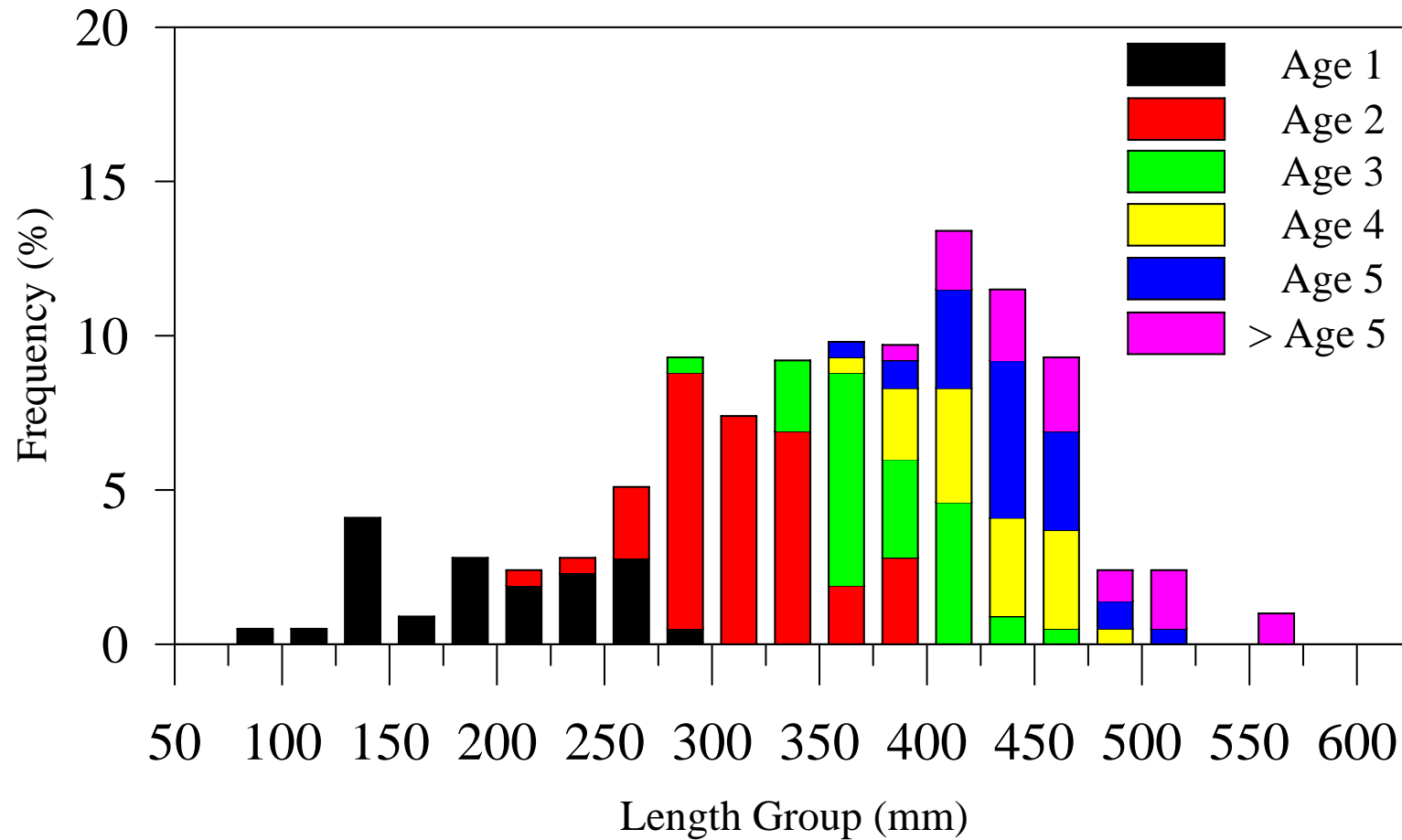


FIGURE 3. Length-at-age frequency of largemouth bass (N=216) collected from Jordan Reservoir, spring 2009.

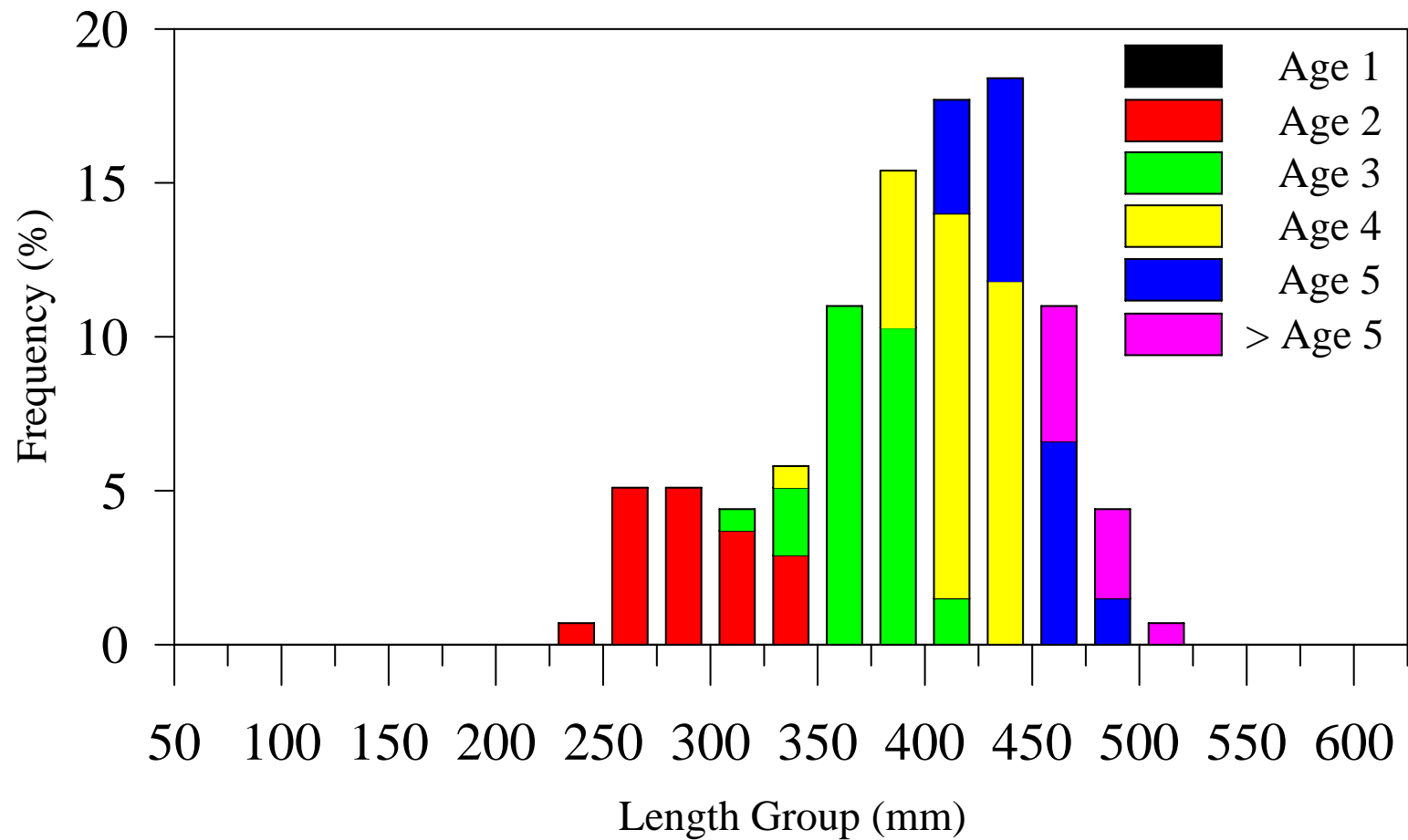


FIGURE 4. Length-at-age frequency of spotted bass (N=136) collected from Jordan Reservoir, spring 2009.

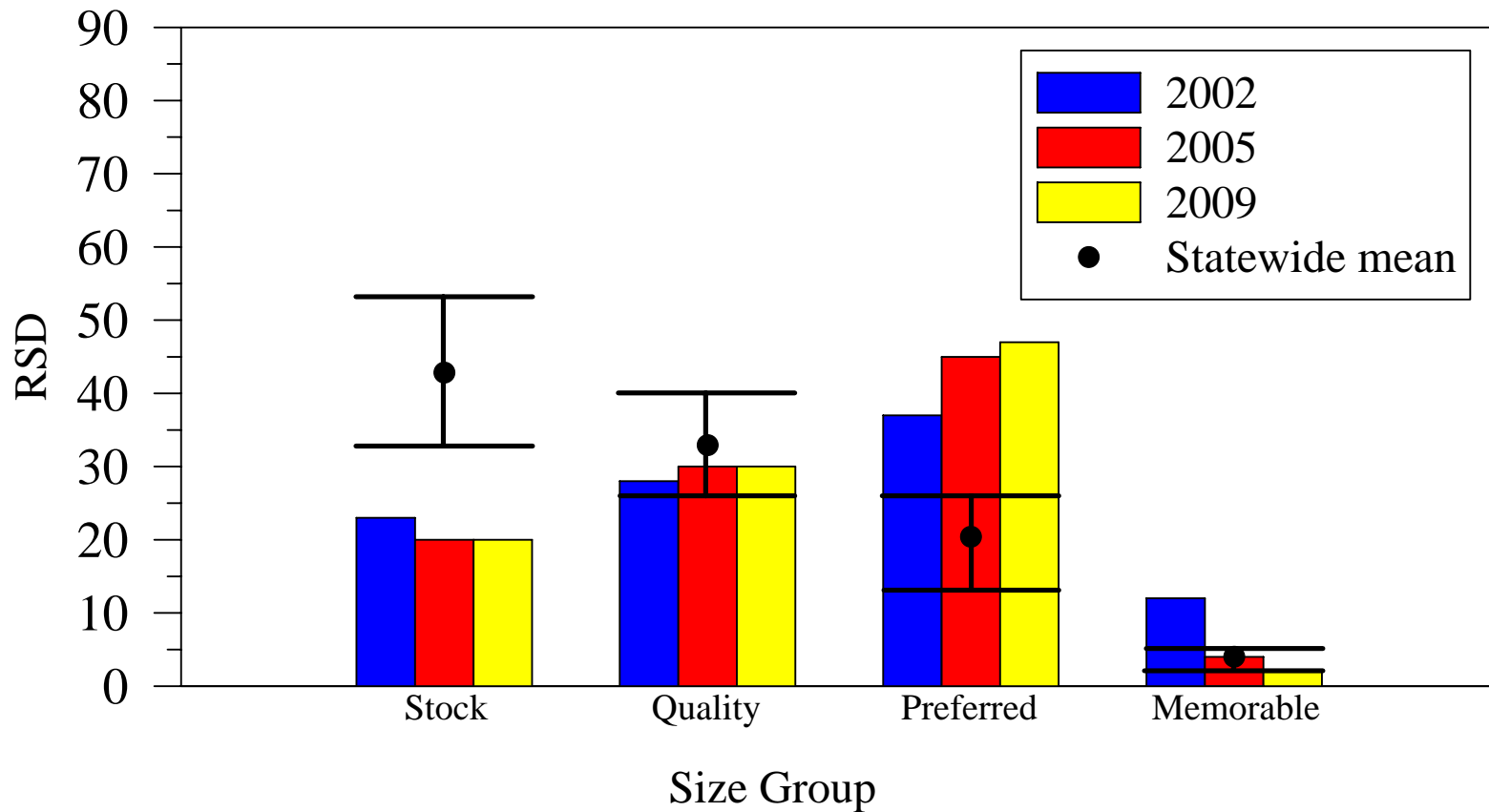


FIGURE 5. Relative stock density (RSD) and statewide means of largemouth bass in Jordan Reservoir, spring 2002, 2005, and 2009. The I-beam denotes the 25th and 75th percentiles of RSD values of largemouth bass, statewide.

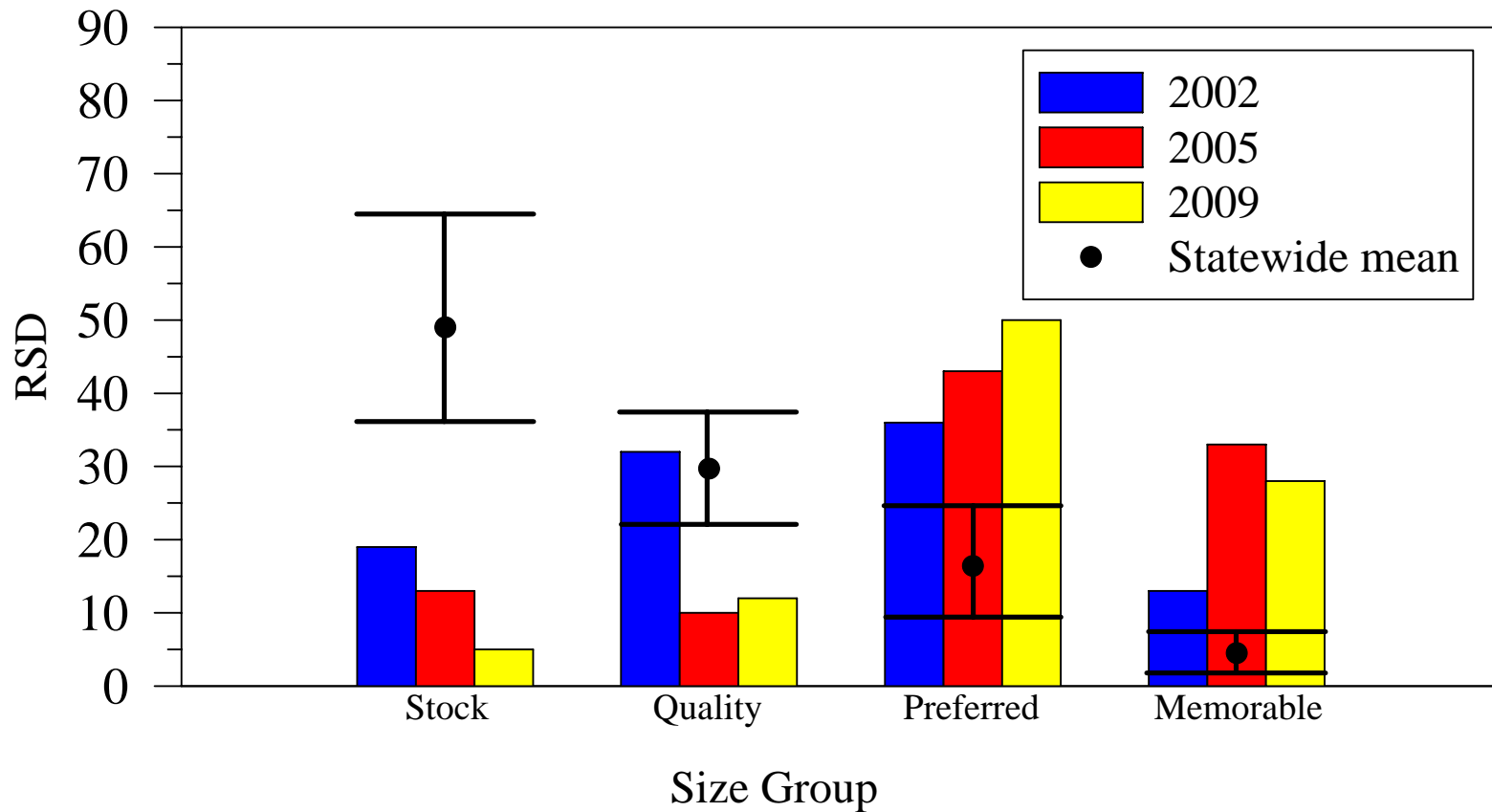


FIGURE 6. Relative stock density (RSD) and statewide means of spotted bass in Jordan Reservoir, spring 2002, 2005, and 2009. The I-beam denotes the 25th and 75th percentiles of RSD values of spotted bass, statewide.

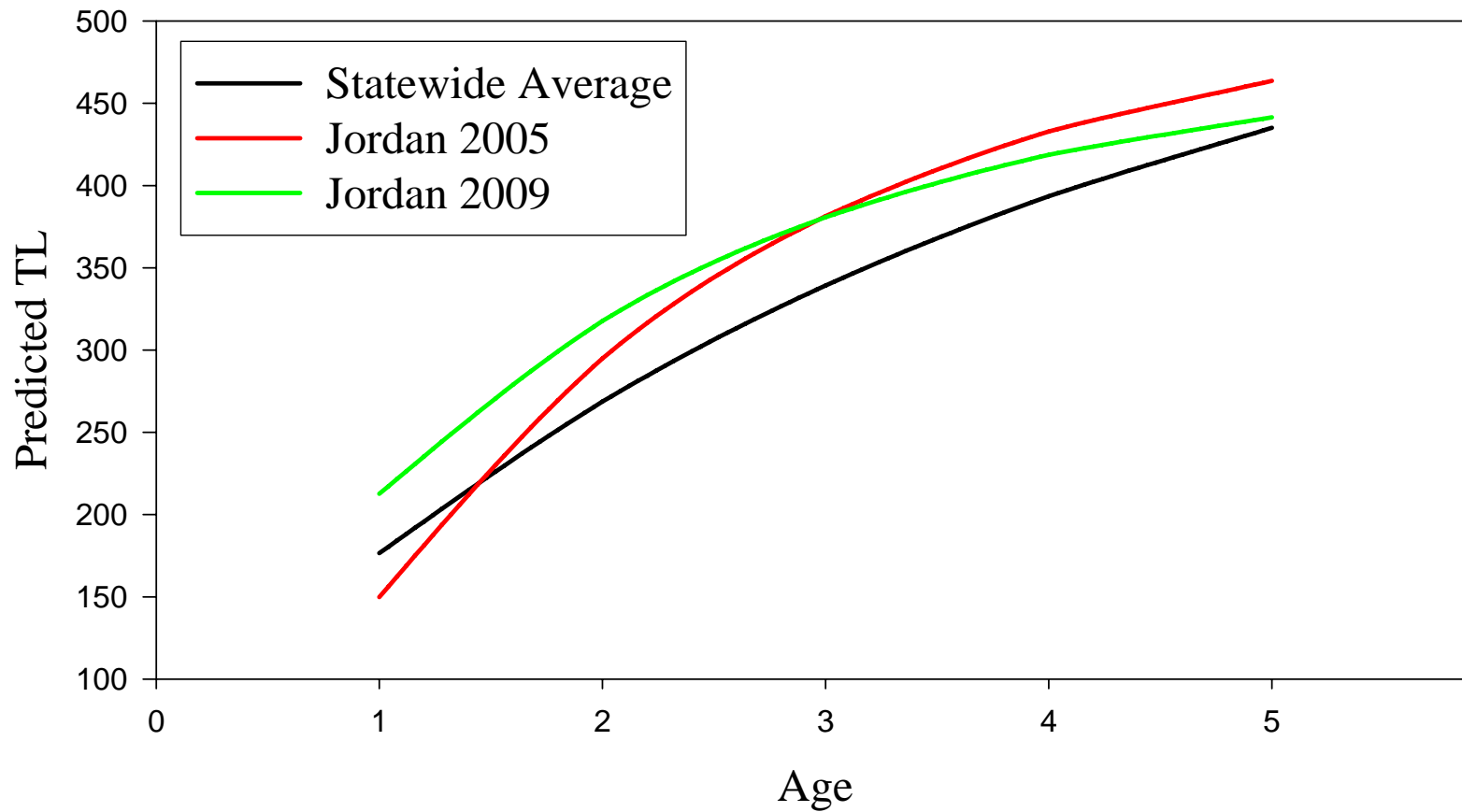


FIGURE 7. Predicted total length-at-age from the von Bertalanffy growth equation for largemouth bass collected in Jordan Reservoir 2005 (N=233), 2009 (N = 216), and the statewide average.

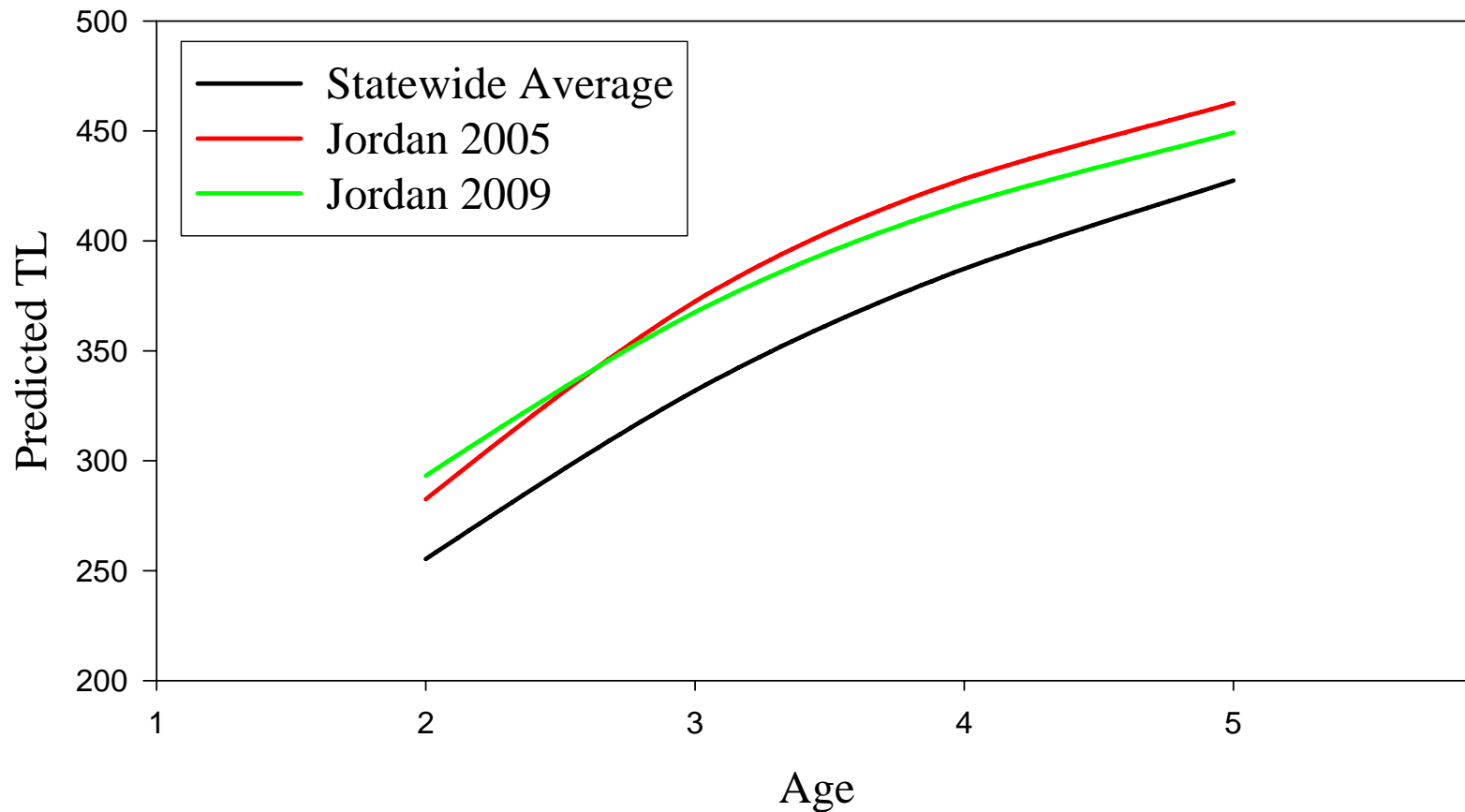


FIGURE 8. Predicted total length-at-age from the von Bertalanffy growth equation for spotted bass collected in Jordan Reservoir 2005 (N=149), 2009 (N = 136), and the statewide average.

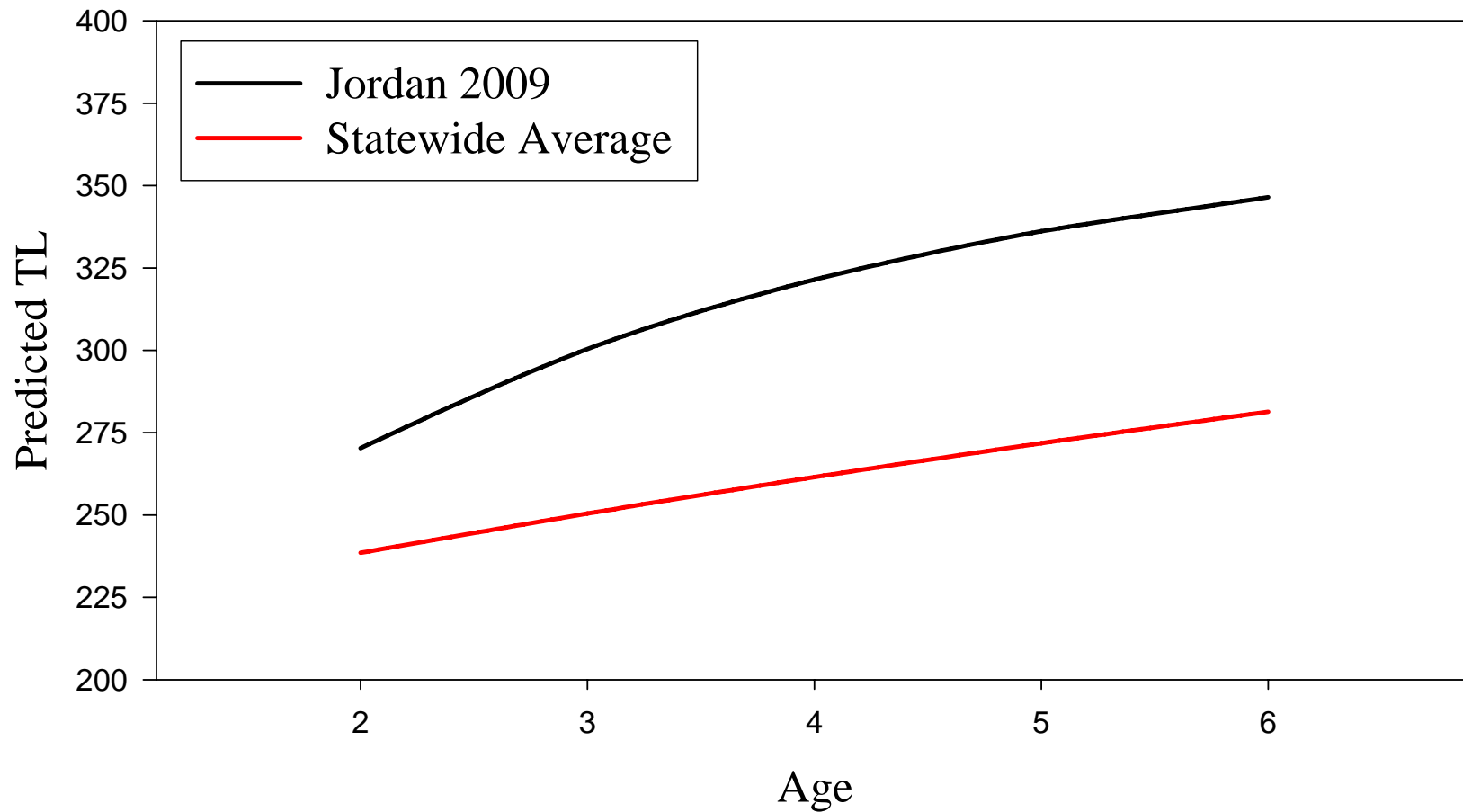


FIGURE 9. Predicted total length-at-age from the von Bertalanffy growth equation for black crappie collected in Jordan Reservoir 2009 (N = 89) versus the statewide average.

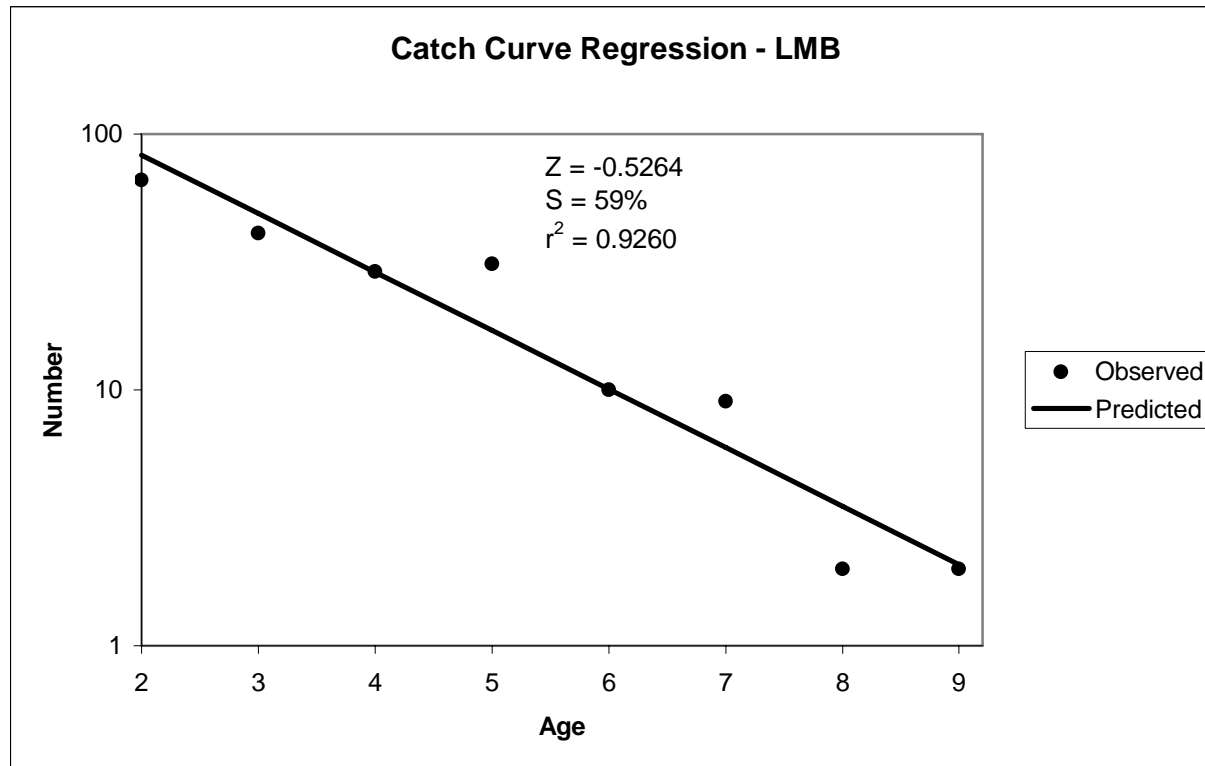


FIGURE 10. Catch-curve analysis of largemouth bass ages 2 through 9 in Jordan Reservoir, spring 2009.

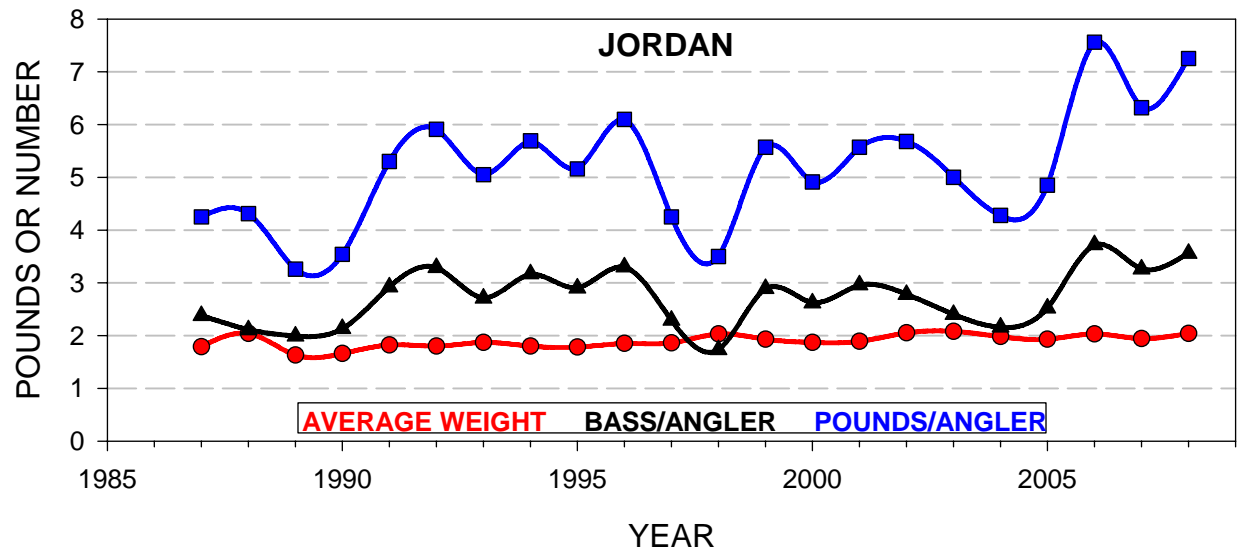


FIGURE 11. Average weight, catch per angler, and pounds per angler of bass caught in BAIT participating tournaments through 2008.

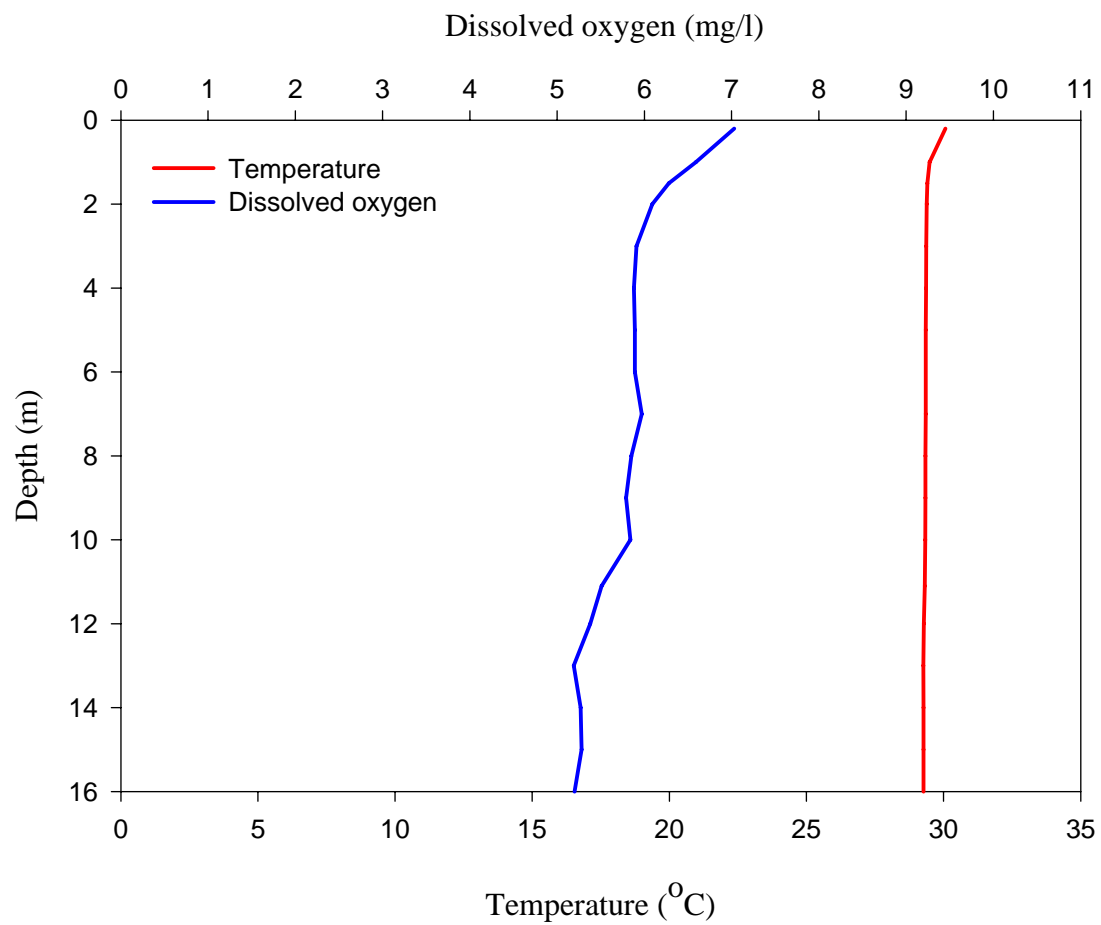


FIGURE 12. Temperature and dissolved oxygen profiles in Jordan Reservoir forebay, August 24, 2009.