

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

Name: Murdo Lake

County: Jones

Legal Description: T1S-R28E-Sec. 36

GPS: 43°54'57.63"N 100°42'46.10"W

Location from nearest town: 2 miles north of Murdo

Date of present survey: July 21-23, 2009 (netting), October 2, 2009 (electrofishing)

Date of last survey: July 24-26, 2006 (netting), October 2, 2006 (electrofishing)

Most recent lake management plan: F-21-R-38 (January 1, 2006 to December 31, 2010)

Management classification: Warmwater Permanent

Primary Game Species	Secondary and Other Species
Largemouth Bass	Yellow Perch
Black Crappie	Walleye
Black Bullhead	

PHYSICAL DATA

Surface Area: 41 acres

Watershed: 4,420 acres

Maximum Depth: 28 feet

Mean Depth: 8.9 feet

Lake elevation at time of survey (field observations): 6 feet low

Contour map: Yes

Date: 1992

Ownership of lake and adjacent lakeshore properties:

Murdo Lake, also known as Murdo Dam and Murdo North Dam, is a 41-acre artificial impoundment located two miles north of the City of Murdo in central Jones County. The lake was created in 1938 when the Works Project Administration (WPA) constructed an earthen dam on a tributary to the upper portion of White Clay Creek. The lake was constructed to provide a primary water source for the city. The City of Murdo owns 640 acres of land containing the dam grade and the lake. The Wildlife Division of the South Dakota Department of Game, Fish and Parks completes fisheries management activities at Murdo Lake.

Watershed condition with percentages of land use types:

The watershed for Murdo Lake is approximately 6.9 square miles or 4,420 acres, which is nearly entirely privately owned agricultural and grassland. Land use in the watershed is 67% native grasses used for livestock grazing, hay production and Conservation Reserve acres. The remaining 33% is cultivated cropland. The immediate shoreline is 100% non-grazed native grasses.

Fishing access:

Heavy amounts of submergent and emergent vegetation surround the entire shoreline and restrict shore fishing in open water periods. There is a good plank boat ramp for water access via boat. There is ample opportunity for ice fishing.

Condition of all structures (i.e. spillway, boat ramps, level regulators, etc.):

The City of Murdo constructed a new boat ramp on the northwest corner of the lake. The spillway, dam grade, and old boat ramp are all in good condition. There is no boat dock. There is a poor outdoor toilet and a partial picnic shelter.

Field observations of aquatic vegetation condition:

Heavy amounts of submergent vegetation are found throughout the lake to a depth of around 5 feet. The main species of submergent vegetation is common milfoil and sago pondweed. Emergent vegetation is found along 90% of the shoreline with cattails and rushes being the main species.

CHEMICAL DATA**Field observations of water quality and pollution problems:**

No pollution problems were apparent at the time of the survey. The water clarity was good with a secchi disc reading of 4.5 feet. The conductivity at the time of survey was 3,820 μ S/cm and at the time of electrofishing it was 4,180 μ S/cm. Other water quality characteristics were measured in the field on July 22, 2009, using a HACH water quality kit, an Oyster meter, and a YSI 55 meter. Results are found in Table 1.

Presence of a thermocline and depth from surface: No

Station for water chemistry located on attached map: Yes

Table 1. Water chemistry results from Murdo Lake, Jones County, July 22, 2009.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/l)	Hardness (mg/l)	pH	Secchi disc (ft)
A	Surface	72.9	10.02	37.6	150	--	8.04	4.5
A	21	72.0	4.47	33.6	158	--	7.83	

BIOLOGICAL DATA

Methods:

Murdo Lake was sampled on July 22-24, 2009, with ten overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. No overnight gill net sets were done during this survey period. On October 2, 2009, Murdo Lake was electrofished for 60 minutes (6-ten minute transects) with pulse DC to sample the largemouth bass population. Conductivity was 4,180µS/cm with a water temperature of 42.0°F. Fish indices and statistics were completed using Winfin.

Results and Discussion:

Trap Net Catch

Table 2. Total catch of ten, overnight ¾-inch frame nets at Murdo Lake, Jones County, July 22-24, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	828	84.9	82.8	± 58.4	61.1	1	0	89
Black Crappie	144	14.8	14.4	± 8.6	18.6	64	0	99
Largemouth Bass	2	0.2	0.2	± 0.2	0.1	--	--	112
Golden Shiner	1	0.1	0.1	± 0.1	0.7	--	--	103

* Ten year mean (1974, 1977, 1981, 1987, 1994, 1998, 2001, 2002, 2003, 2006)

Electrofishing Catch

Table 3. Total catch from six ten minute transects of fall nighttime electrofishing at Murdo Lake, Jones County, October 2, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	33	100	33.0	± 17.1	97.2	53	0	110

* One year mean (2006)

Black Crappie

The black crappie population in Murdo Lake continues to improve. The CPUE of 82.8 is actually lower than the 120.2 from the 2006 survey but still above the 61.1 ten year mean (Table 2). The higher density was due to a very young population just getting going, so it is expected to start to decline a little. Condition is good with a mean Wr of 99. Growth starts out fine but starts to lag around age 3 to 4 according to statewide, regional and SLI means (Table 4). Size structure is on the small side yet but is getting close to the size anglers would target. Figures 1-6 show the size progression over the past six surveys of this population.

Table 4. Average back-calculated lengths (mm) for each age class of black crappie in Murdo Lake, Jones County, 2009.

Year Class	Age	N	Back-calculated Age				
			1	2	3	4	5
2008	1	1	74				
2007	2	23	88	142			
2006	3	23	84	137	173		
2005	4	44	97	136	173	189	
2004	5	8	68	112	147	177	191
All Classes		99	82	132	164	183	191
Statewide Mean			83	147	195	229	249
Region II Mean			75	132	177	209	235
SLI* Mean			78	134	180	209	226

* Small Lakes and Impoundments

Figure 1. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2009.

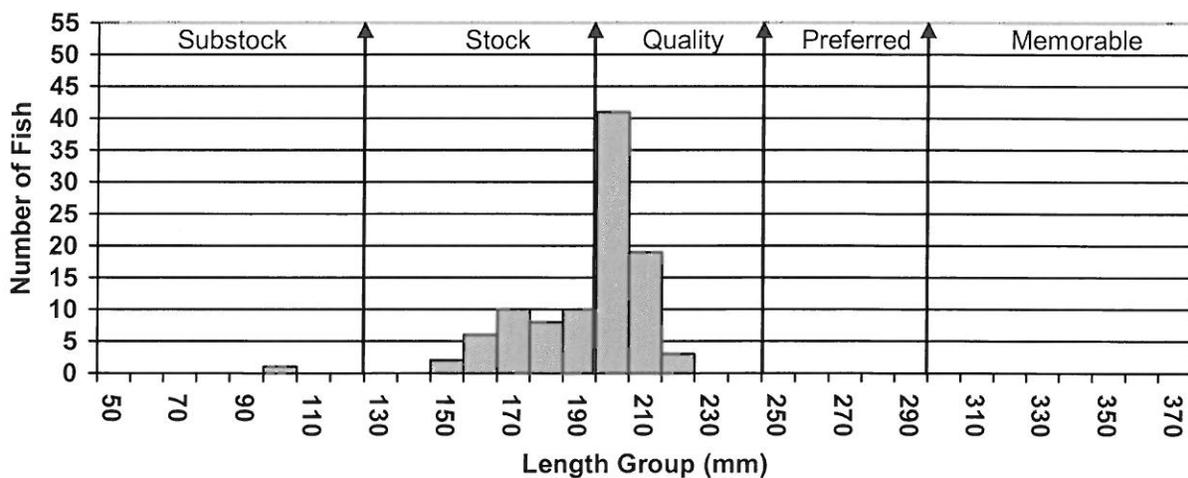


Figure 2. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2006.

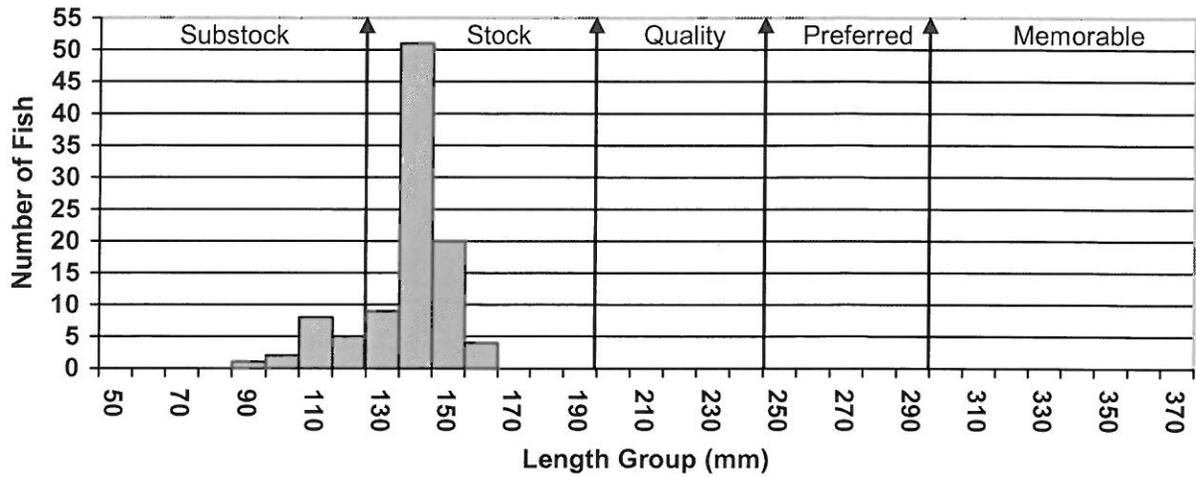


Figure 3. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2003.

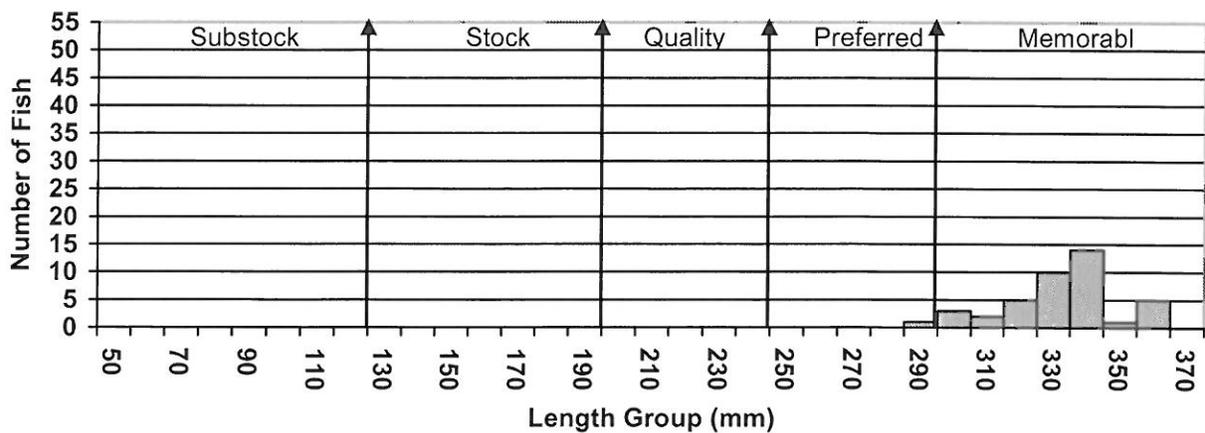


Figure 4. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2002.

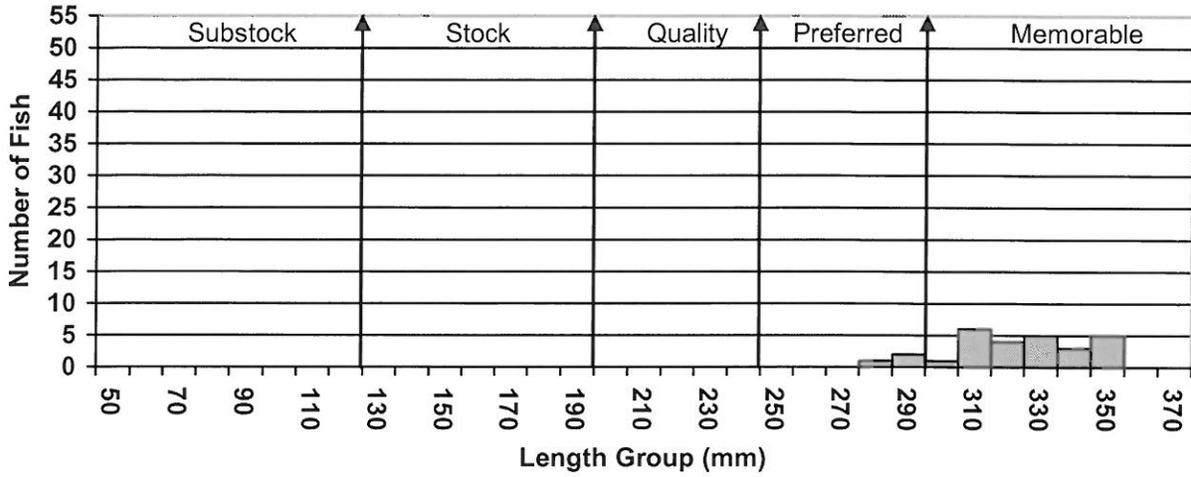


Figure 5. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2001.

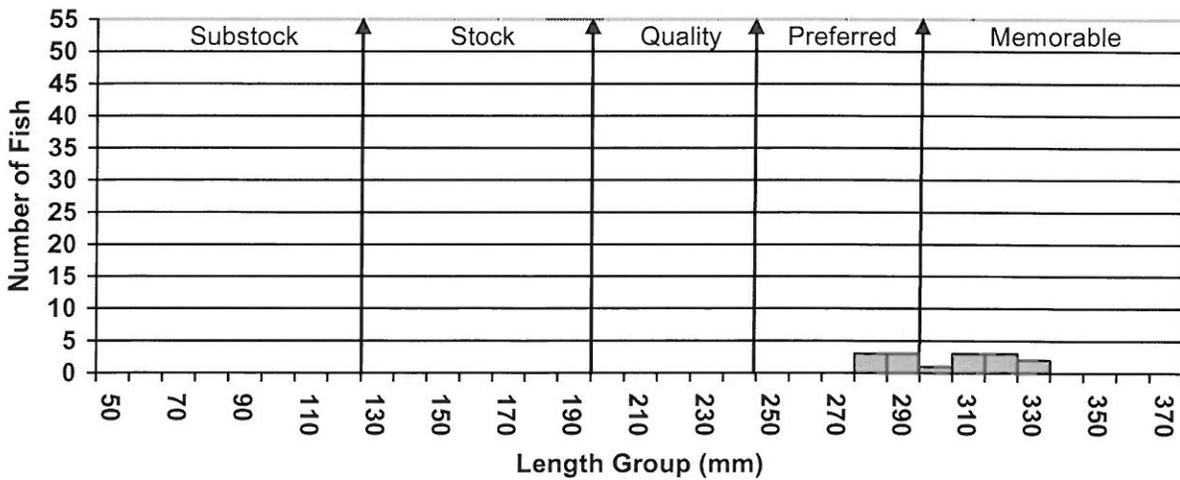
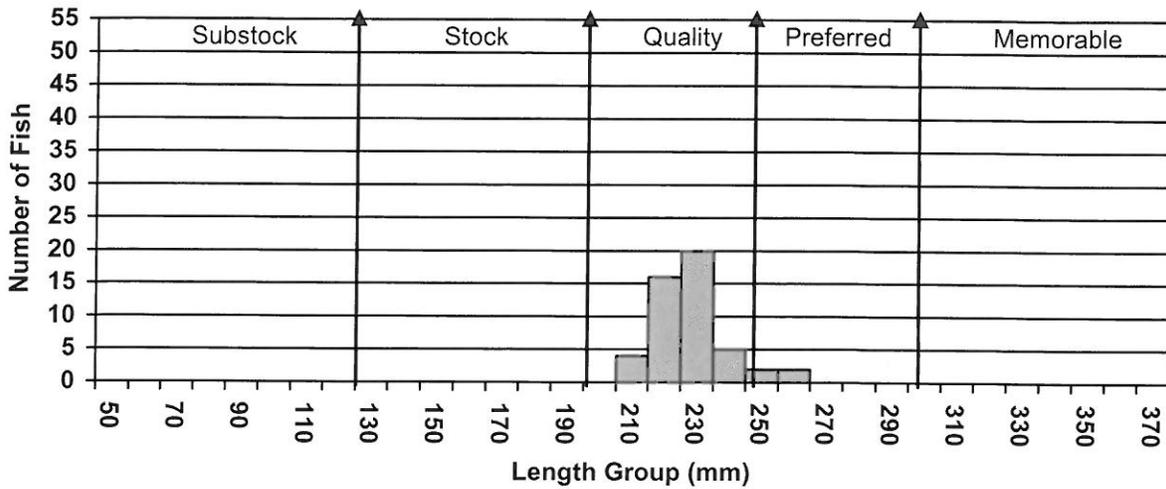


Figure 6. Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 1998.



Largemouth Bass

Murdo Lake continues to have a hard time establishing a largemouth bass population. The CPUE of 33.0 is below the one year mean and only other electrofishing data of 97.2 from 2006. Numerous stocking attempts have been made with little success (Table 6). Fish have even been stocked from other impoundments within a couple miles of the lake. The population is dominated by young fish. Growth is good with means right around statewide, regional and SLI means (Table 5). Condition is also good with a mean Wr of 110. Figures 7 and 8 illustrate what the sizes of fish are in the population over the past two surveys.

Table 5. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Murdo Lake, Jones County, 2009.

Year Class	Age	N	Back-calculated Age		
			1	2	3
2008	1	1	104		
2007	2	13	98	195	
2006	3	1	92	202	277
All Classes		15	98	198	277
Statewide Mean			96	182	250
Region II Mean			105	183	246
SLI* Mean			99	183	246

* Small Lakes and Impoundments

Figure 7. Length frequency histogram for largemouth bass sampled from Murdo Lake, Jones County, 2009.

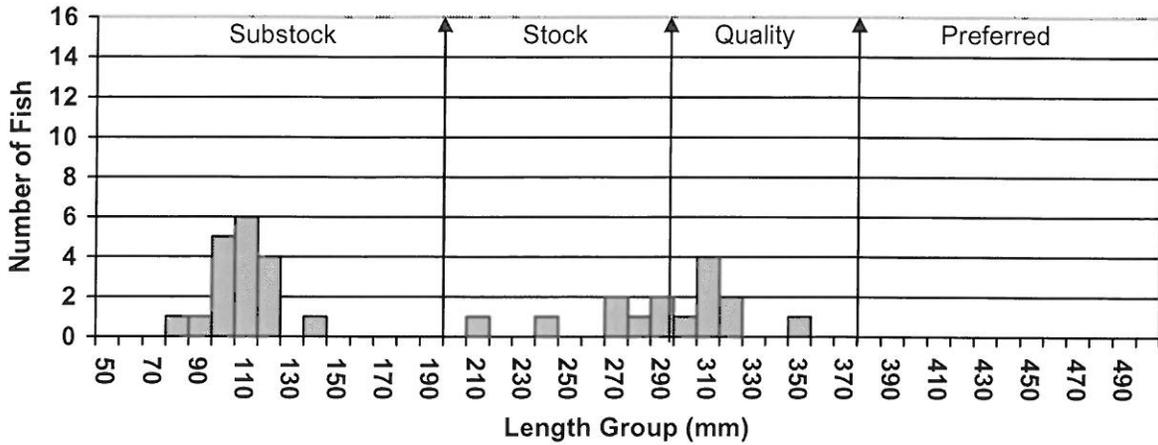
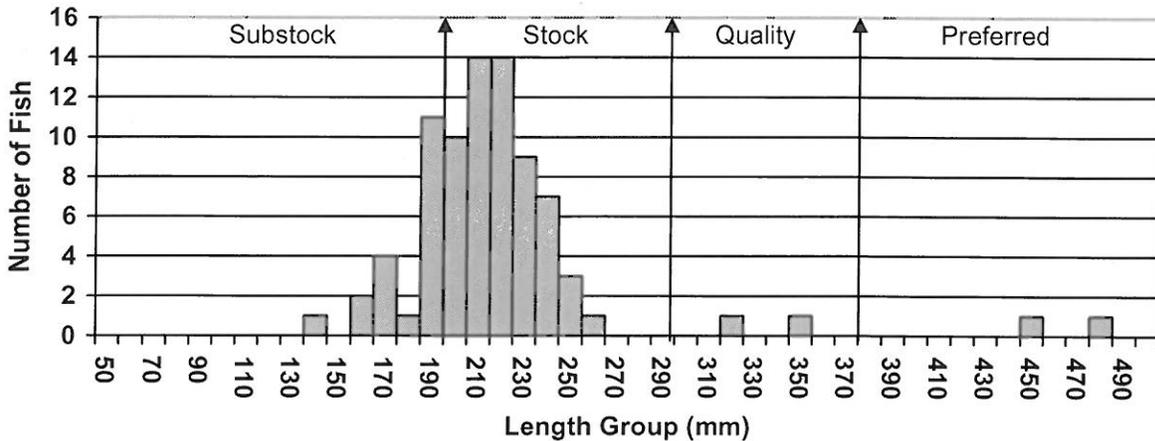


Figure 8. Length frequency histogram for largemouth bass sampled from Murdo Lake, Jones County, 2006.



Black Bullhead

Black bullheads continue to dominate the fish population in Murdo Lake. The CPUE of 82.8 is well below the 497.5 from 2006, which was the highest on record (Table 7), but is above the 61.1 ten year mean (Table 2). The size structure is dominated by small fish as can be seen in Figure 9. Figures 9-14 illustrates how the size structure has changed over the past six surveys. Condition is on the low side with a mean W_r of 89. This population really took off in the drought years when the predator population was lost. Some work lies ahead to get things turned around.

Figure 9. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2009.

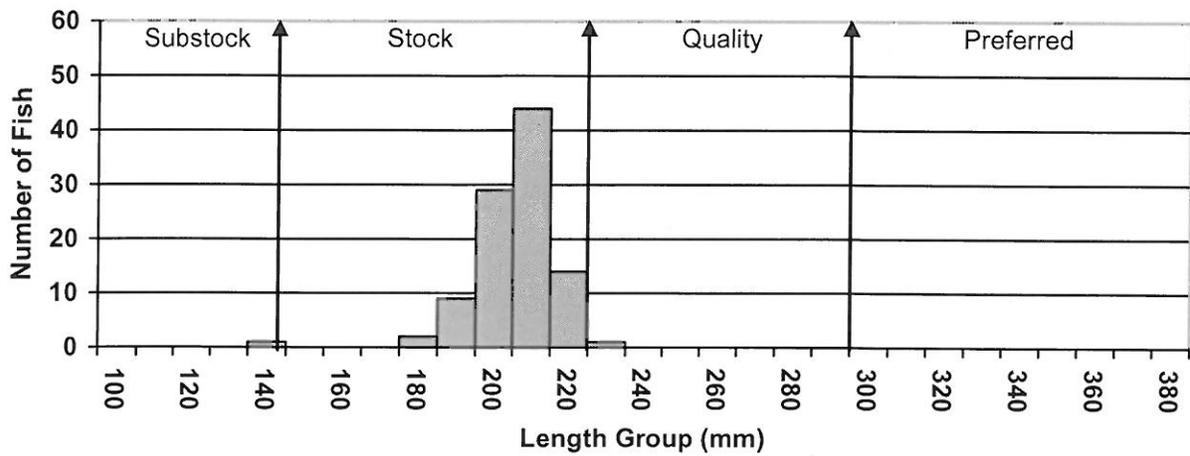


Figure 10. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2006.

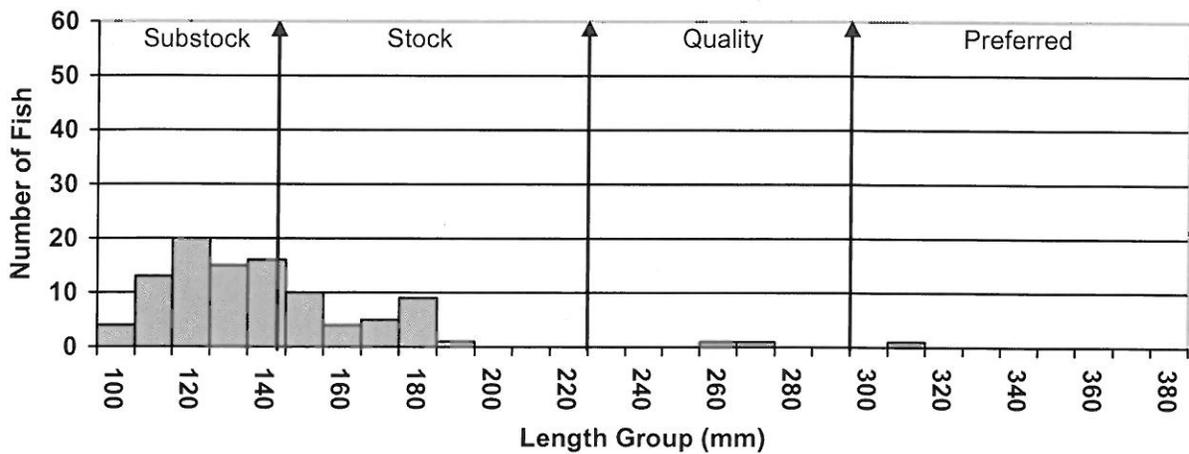


Figure 11. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2003.

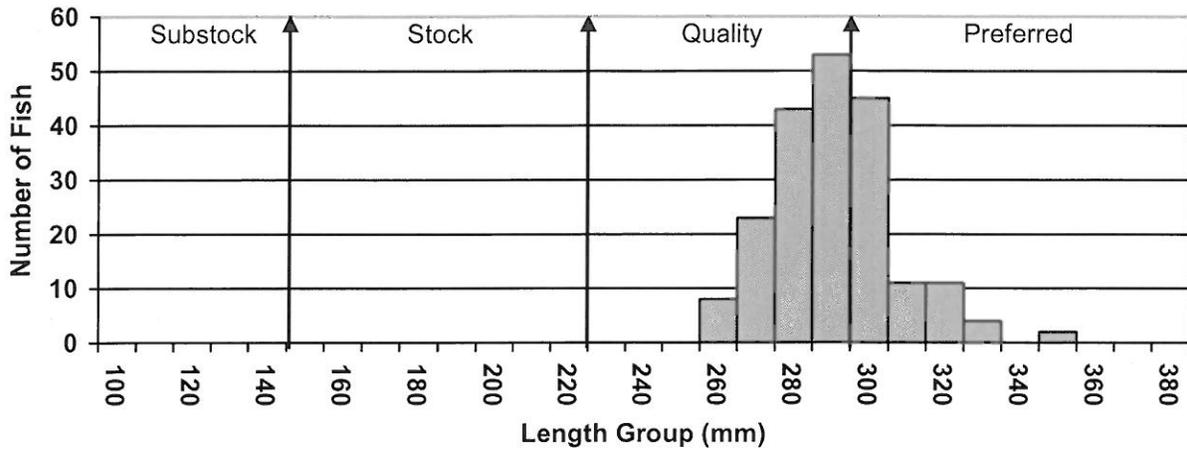


Figure 12. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 2002.

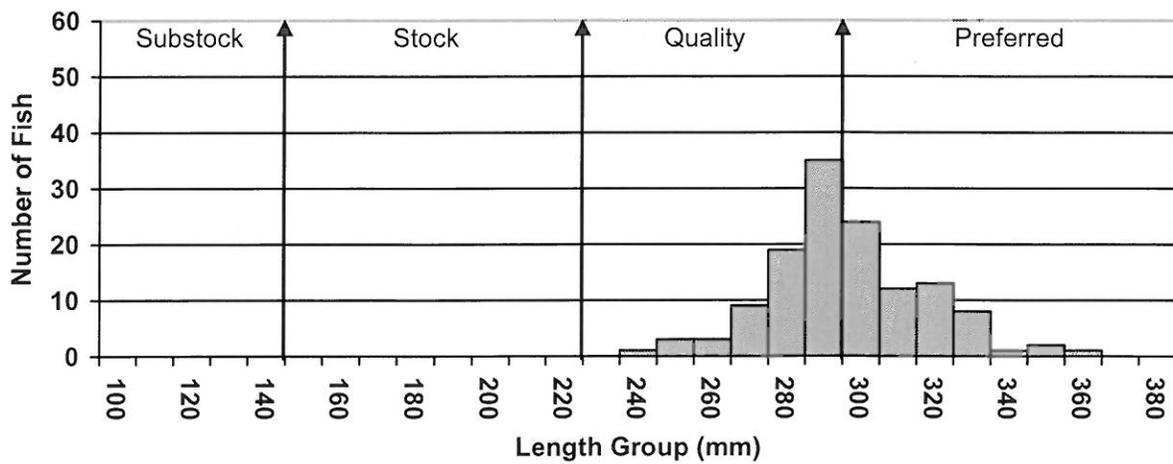


Figure 13. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 2001.

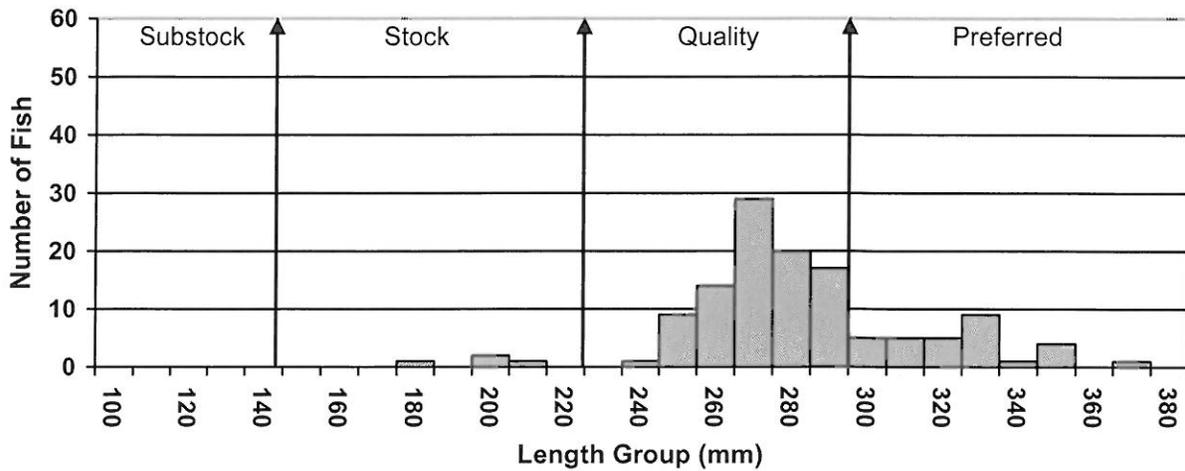
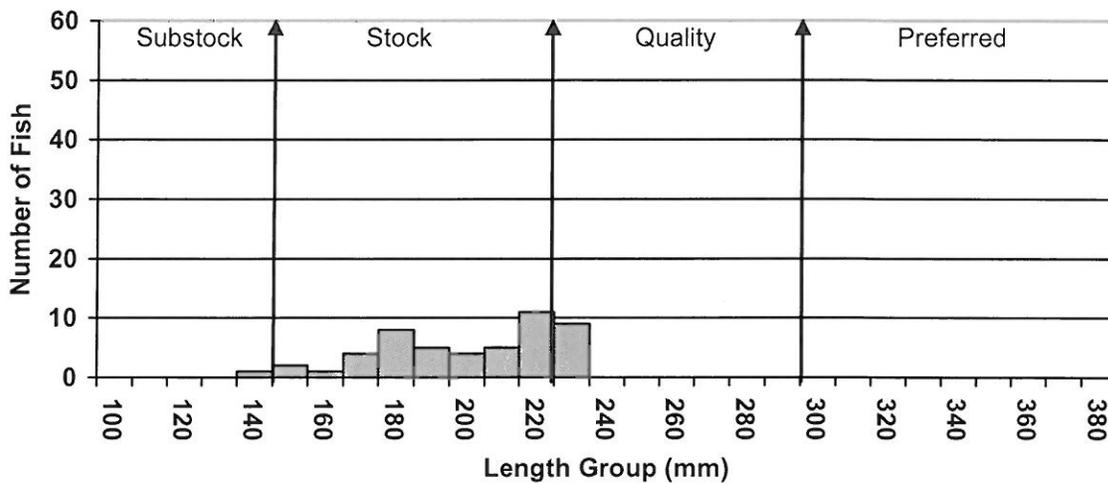


Figure 14. Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 1998.



Other Species

Golden shiner was the only other species sampled this survey with only one fish caught. Yellow perch, northern pike, walleye, bluegill, smallmouth bass, green sunfish and rock bass were the species not sampled that have been in surveys past (Table 7).

Table 6. Stockings records from 2001 to present for Murdo Lake, Jones County.

Year	Number	Species	Size
2001	169	Largemouth Bass	Adult
2001	14,100	Largemouth Bass	Fingerling
2001	2,500	Walleye	Fingerling
2001	104	Black Crappie	Adult
2001	51	Largemouth Bass	Adult
2002	80	Largemouth Bass	Adult
2004	161	Largemouth Bass	Juvenile
2004	10,050	Largemouth Bass	Fingerling
2005	750	Smallmouth Bass	Fingerling
2005	8,550	Largemouth Bass	Fingerling
2006	8,480	Largemouth Bass	Fingerling

RECOMMENDATIONS

1. Resurvey in 2010 to monitor the fish populations.

Table 7. Gill net (GN), trap net (TN) and electrofishing (EF) CPUE for all fish species sampled in Murdo Lake, Jones County, since 1974.

Species	1974	1977	1981	1987	1994	1998	2001	2002	2003	2006	2009
BLB (GN)	--	1.0	3.0	37.0	34.0	--	29.0	--	60.5	--	--
BLB (TN)	--	0.1	1.3	3.0	9.0	31.4	6.6	33.4	29.2	497.5	82.8
BLC (GN)	1.5	--	--	--	33.0	--	--	--	0.5	--	--
BLC (TN)	12.5	11.1	2.4	16.6	7.0	7.4	1.5	2.7	4.1	120.2	14.4
YEP (GN)	3.0	205.0	31.0	26.0	102.0	--	--	--	--	--	--
YEP (TN)	1.0	18.5	5.1	18.0	8.0	3.9	0.1	--	0.1	--	--
LMB (EF)	--	--	--	--	--	--	--	--	0.0	97.2	33.0
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--
LMB (TN)	0.3	0.1	0.3	0.3	--	--	--	0.2	--	--	0.2
NOP (GN)	0.5	--	6.0	--	2.0	--	--	--	--	--	--
NOP (TN)	--	0.4	0.1	0.2	--	0.1	--	--	--	--	--
WAE (GN)	0.5	--	--	--	--	--	--	--	--	--	--
WAE (TN)	--	--	--	--	--	--	--	--	--	--	--
BLG (GN)	--	--	1.0	--	--	--	--	--	--	--	--
BLG (TN)	2.5	9.1	21.1	4.0	4.0	7.1	--	--	--	--	--
SMB (EF)	--	--	--	--	--	--	--	--	--	7.2	--
SMB (GN)	--	--	--	--	--	--	--	--	--	--	--
SMB (TN)	--	--	0.1	--	--	--	--	--	--	0.4	--
GSF (GN)	--	--	--	--	--	--	--	--	--	--	--
GSF (TN)	--	--	2.3	0.2	--	--	0.2	--	--	--	--
GOS (GN)	0.5	--	--	--	--	--	--	--	--	--	--
GOS (TN)	--	--	--	--	--	0.7	2.7	0.6	2.3	0.5	0.1
ROB (GN)	--	--	--	--	--	--	--	--	--	--	--
ROB (TN)	--	--	--	--	1.0	--	--	--	--	--	--

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, WAE-Walleye, BLG-Bluegill, SMB-Smallmouth Bass, GSF-Green Sunfish, GOS-Golden Shiner, ROB-Rock Bass