

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

**2102-F-21-R-45**

**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:** June 28-20, 2012 (netting), October 2, 2012 (electrofishing)

**Date of last survey:** July 21-23, 2009 (netting), October 2, 2009 (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):** Full

**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, boat dock and old boat ramp are all in good condition. There is an outdoor toilet and a 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 3.5 feet. The conductivity at the time of survey was 1,326 $\mu$ S/cm and at the time of electrofishing it was 1,474 $\mu$ S/cm. Other water quality characteristics were measured in the field on June 18, 2012, using a HACH water quality kit and a Hanna multiparameter 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, June 18, 2012.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/L)	HRD (mg/L)	pH	Cond. ( $\mu$ S/cm)	TDS (ppm)	Sal.	ORP	Secchi (ft)
A	Surface	79.3	10.23	36.4	169	452	9.24	1326	670	--	-17.9	3.5
A	23	73.7	5.73	40.2	182	485	8.98	--	662	--	-30.9	

## BIOLOGICAL DATA

### **Methods:**

Murdo Lake was sampled on June 18-20, 2012, 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 the evening of October 2, 2012, Murdo Lake was electrofished for 60 minutes (6-ten minute transects) to sample the largemouth bass population. The boat was set up with 120 pulses per second of DC current at 340 volts with around 15 amps to electrofish the lake that had a conductivity of 1,474µS/cm with a water temperature of 59.1°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, June 18-20, 2012.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	128	56.4	12.8	± 3.2	18.2	82	18	96
Black Bullhead	52	22.9	5.2	± 1.9	63.1	94	27	101
Bluegill	28	12.3	2.8	± 1.7	5.5	41	15	111
Largemouth Bass	14	6.2	1.4	± 1.0	0.1	0	0	114
Yellow Perch	4	1.8	0.4	± 0.4	5.0	100	100	103
Golden Shiner	1	0.4	0.1	± 0.1	0.6	--	--	93

\* Eleven year mean (1974, 1977, 1981, 1987, 1994, 1998, 2001, 2002, 2003, 2006, 2009)

#### **Electrofishing Catch**

**Table 3.** Total catch from six ten minute transects of fall nighttime electrofishing at Murdo Lake, Jones County, October 2, 2012.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	469	100	469	± 61.2	65.1	42	22	110

\* Two year mean (2006, 2009)

## **Black Crappie**

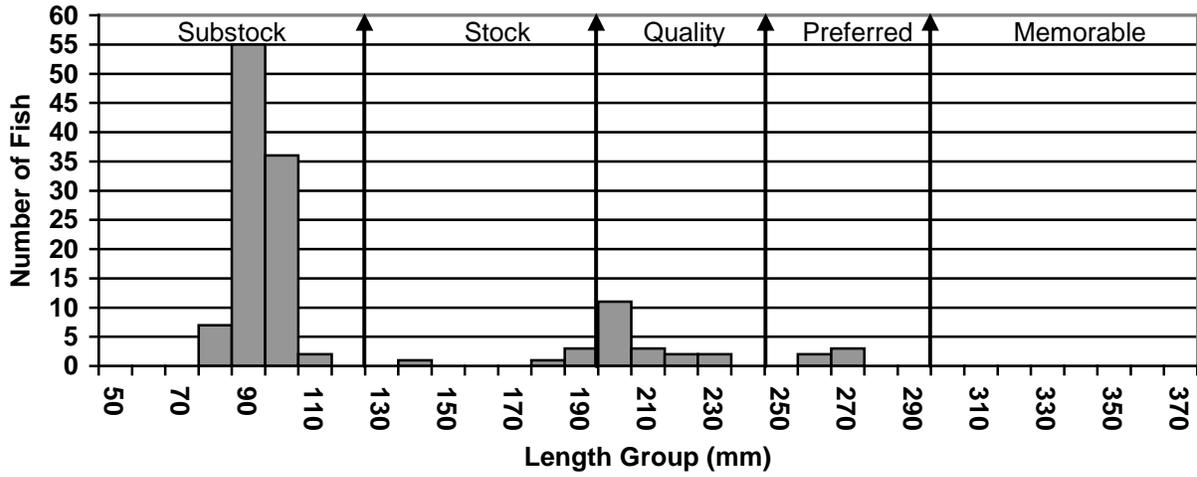
Black crappies continue to be the dominant panfish species sampled in Murdo Lake. The CPUE of 12.8 is slightly lower than the 14.4 from the 2009 survey (Table 8) as well as the 18.2 eleven year mean (Table 2). Condition is good with a mean Wr of 96. Growth is fine with mean right around or slightly lower than statewide, regional and SLI means (Table 4). Figure 1 illustrates the length frequency histogram from this survey. The population is dominated by young fish with a few adults mixed in. This is better than past surveys that have typically been dominated by adult fish with not much if any recruitment noticed (Figures 2-7). Hopefully with waters levels up for a few consecutive years, this population will continue to increase and growth will reach a desired size for anglers.

**Table 4.** Average back-calculated lengths (mm) for each age class of black crappie in Murdo Lake, Jones County, 2012.

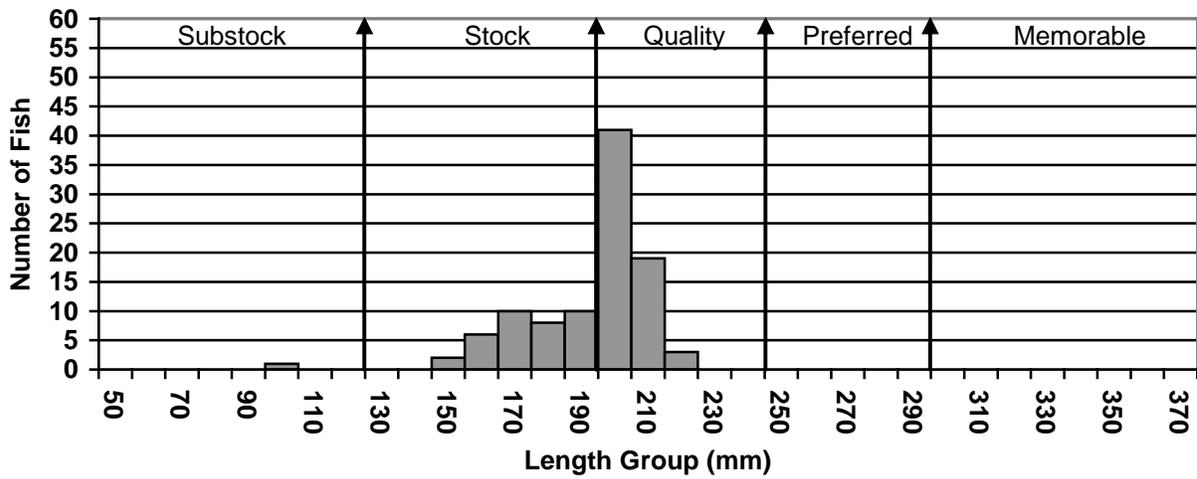
Year Class	Age	N	Back-calculated Age							
			1	2	3	4	5	6	7	8
2011	1	100	83							
2010	2	1	85	134						
2009	3	21	86	153	198					
2008	4	1	64	135	196	231				
2006	6	1	94	133	173	210	243	254		
2005	7	1	91	135	178	194	215	245	260	
2004	8	3	96	128	177	192	213	237	259	270
<b>All Classes</b>		<b>128</b>	<b>86</b>	<b>136</b>	<b>184</b>	<b>207</b>	<b>224</b>	<b>245</b>	<b>259</b>	<b>270</b>
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

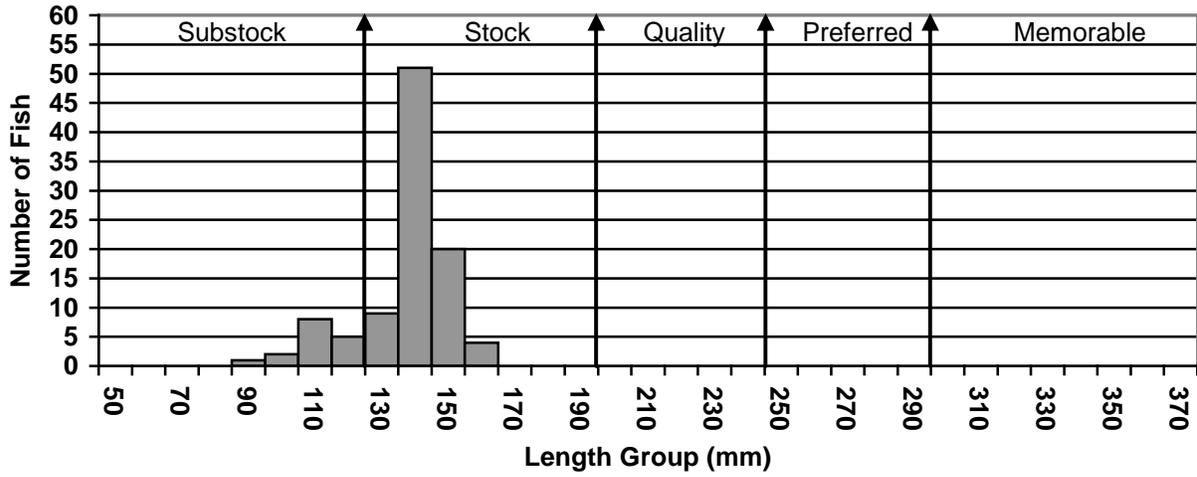
**Figure 1.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2012.



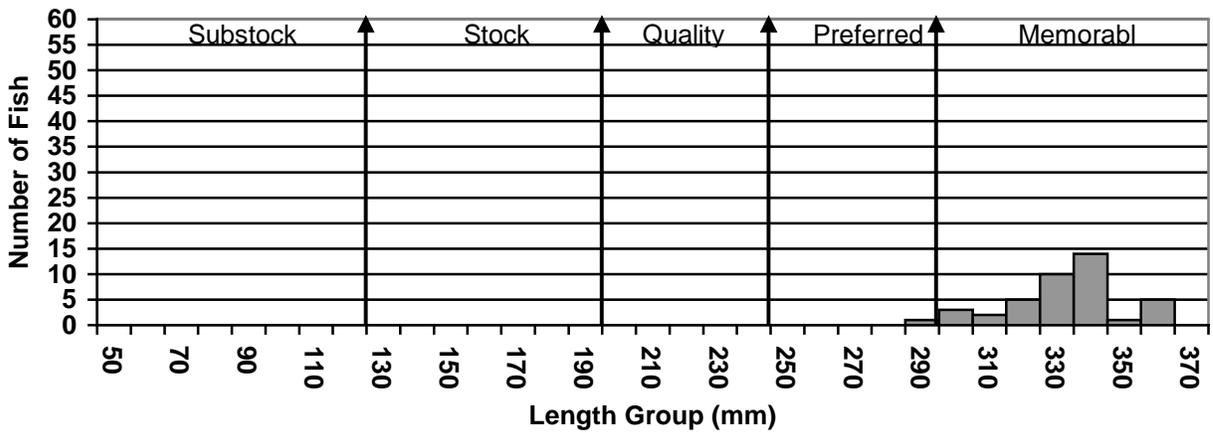
**Figure 2.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2009.



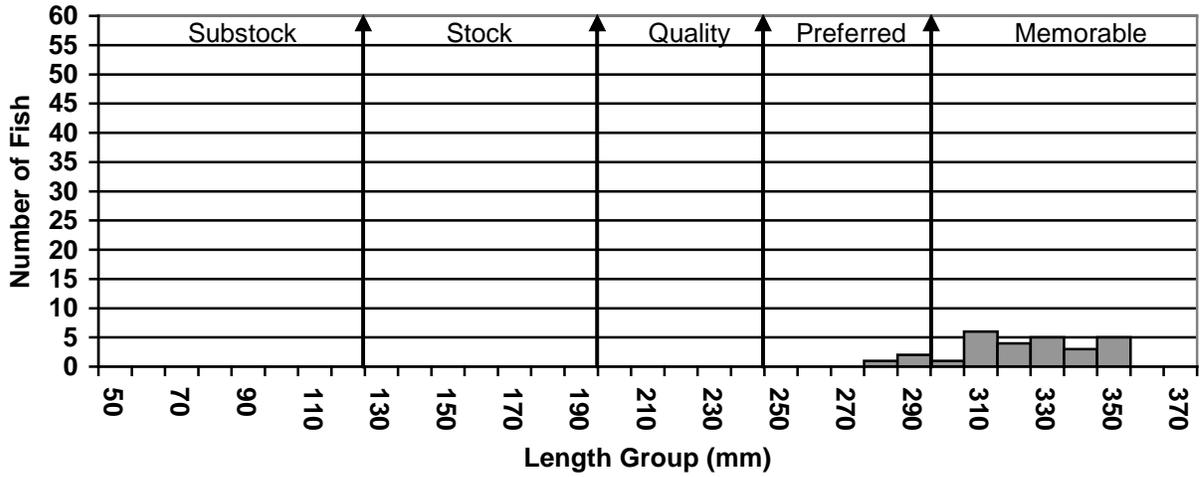
**Figure 3.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2006.



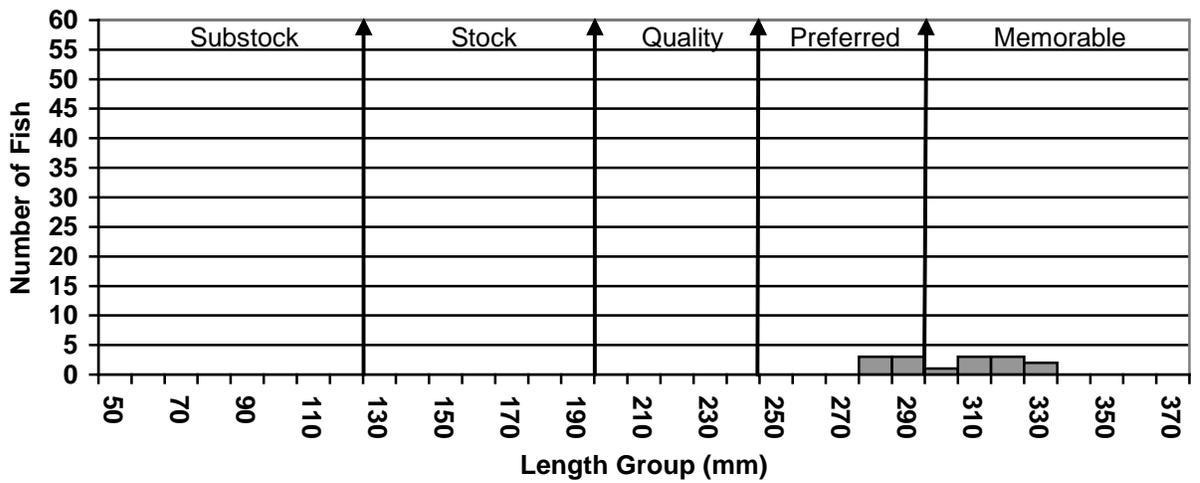
**Figure 4.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2003.



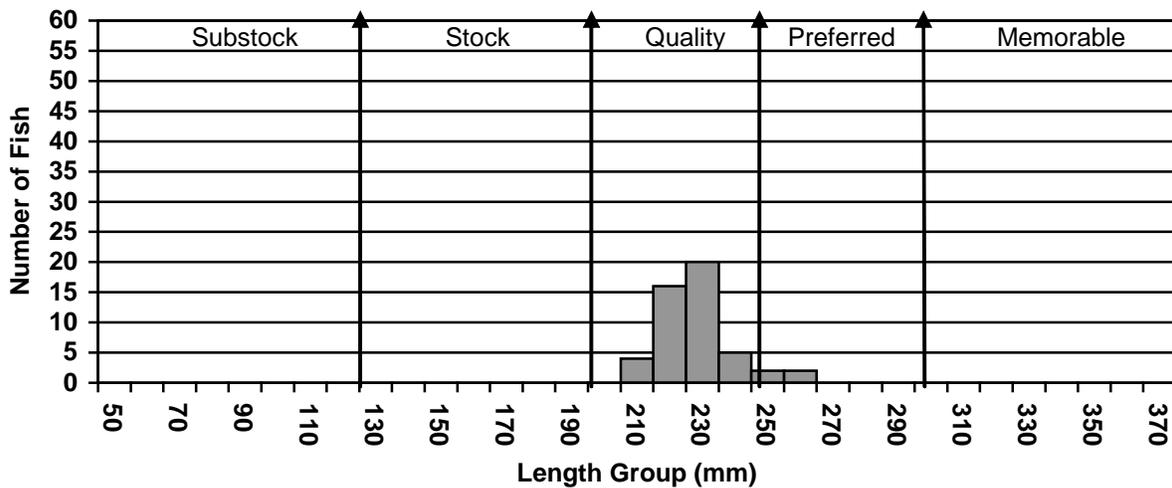
**Figure 5.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2002.



**Figure 6.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 2001.



**Figure 7.** Length frequency histogram for black crappie sampled in Murdo Lake, Jones County, 1998.



**Largemouth Bass**

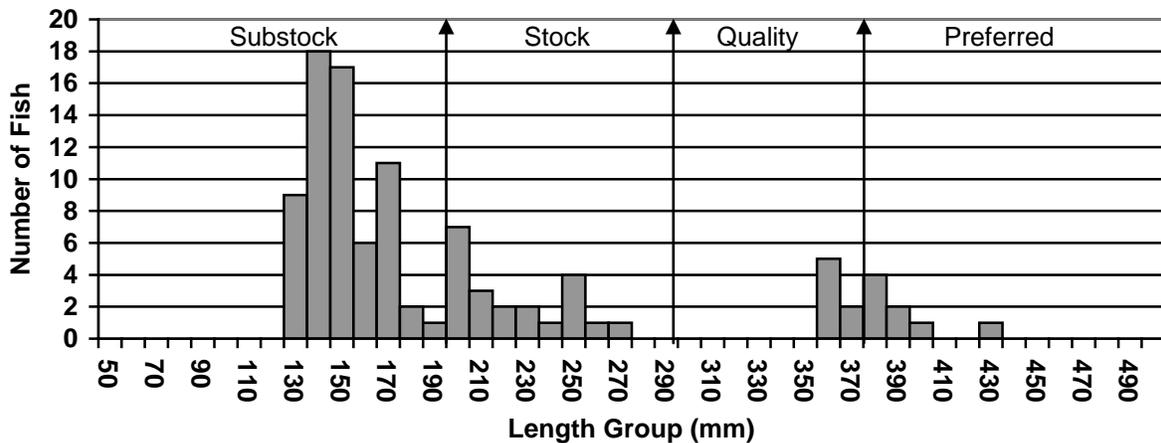
A largemouth bass population appears to finally have developed in Murdo Lake. Years of low water and continued lack of stocking success have finally changed and a huge population of largemouth bass is developing. The electrofishing CPUE of 469 fish per hour is significantly higher than the 33.0 from the 2009 survey (Table 8) as well as the 65.1 two year mean (Table 3). Condition is good with a mean Wr of 110. Growth is good with means right on or slightly above statewide, regional and SLI means (Table 5). The majority of this population is dominated by young fish but they appear to be recruiting to the population. Figure 8 illustrates the length frequency histogram from this survey. Figures 9 and 10 illustrate what the population looked like over the previous two surveys. All surveys show populations dominated by young fish, but this year shows fish moving up in size. Hopefully this trend continues and a high quality largemouth bass population develops.

**Table 5.** Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Murdo Lake, Jones County, 2012.

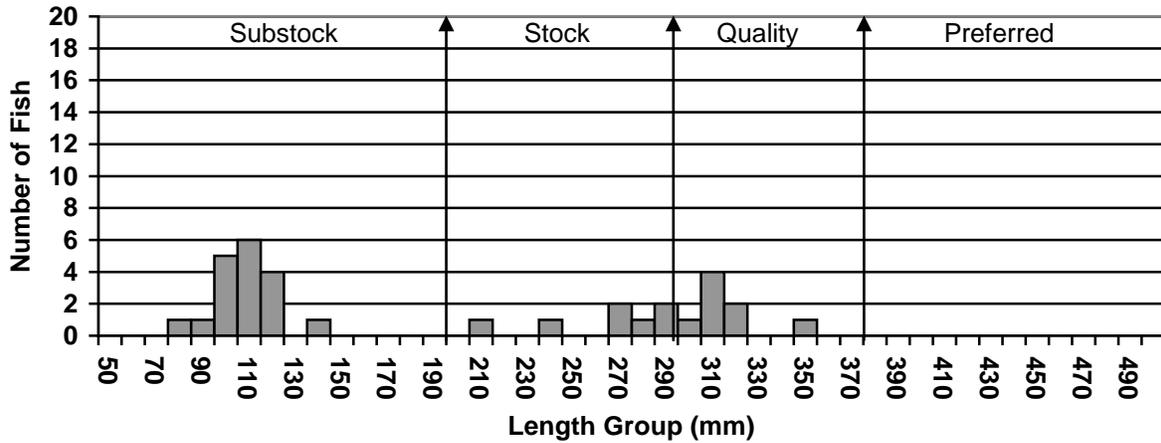
Year Class	Age	N	Back-calculated Age					
			1	2	3	4	5	
2011	1	85	117					
2009	3	12	105	205	321			
2008	4	1	91	190	250	326		
2007	5	1	86	181	284	347	398	
<b>All Classes</b>		<b>99</b>	<b>100</b>	<b>192</b>	<b>285</b>	<b>336</b>	<b>398</b>	
Statewide Mean			96	182	250	305	342	
Region II Mean			105	183	246	296	328	
SLI* Mean			99	183	246	299	332	

\* Small Lakes and Impoundments

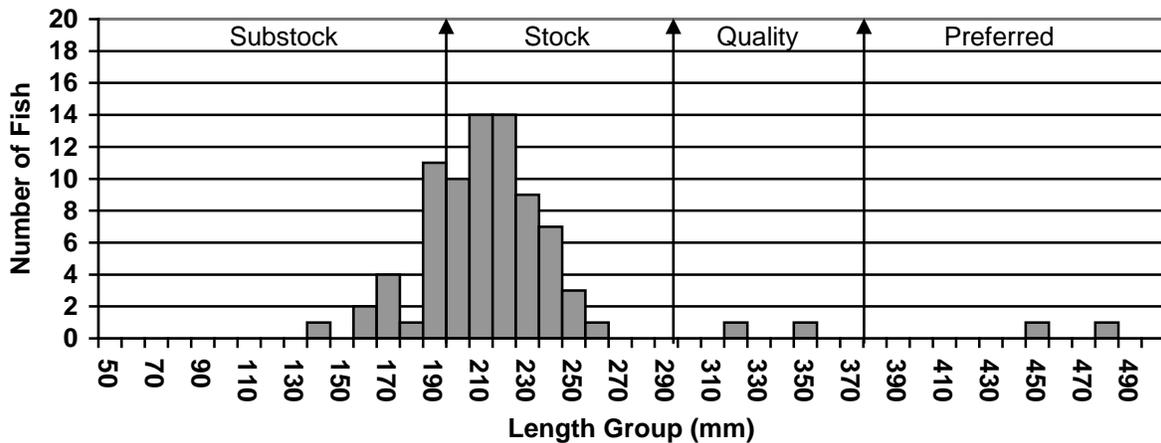
**Figure 8.** Length frequency histogram for largemouth bass sampled from Murdo Lake, Jones County, 2012.



**Figure 9.** Length frequency histogram for largemouth bass sampled from Murdo Lake, Jones County, 2009.



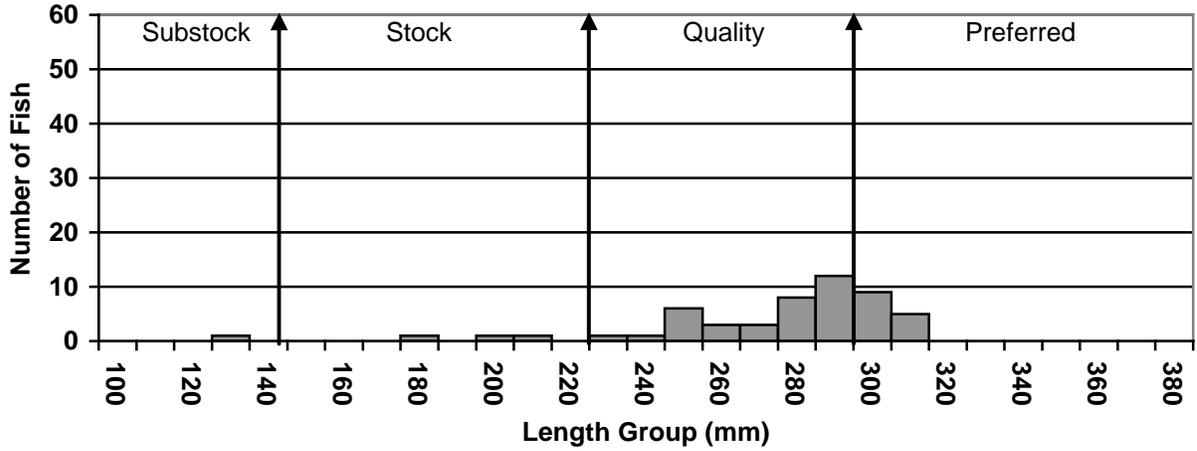
**Figure 10.** Length frequency histogram for largemouth bass sampled from Murdo Lake, Jones County, 2006.



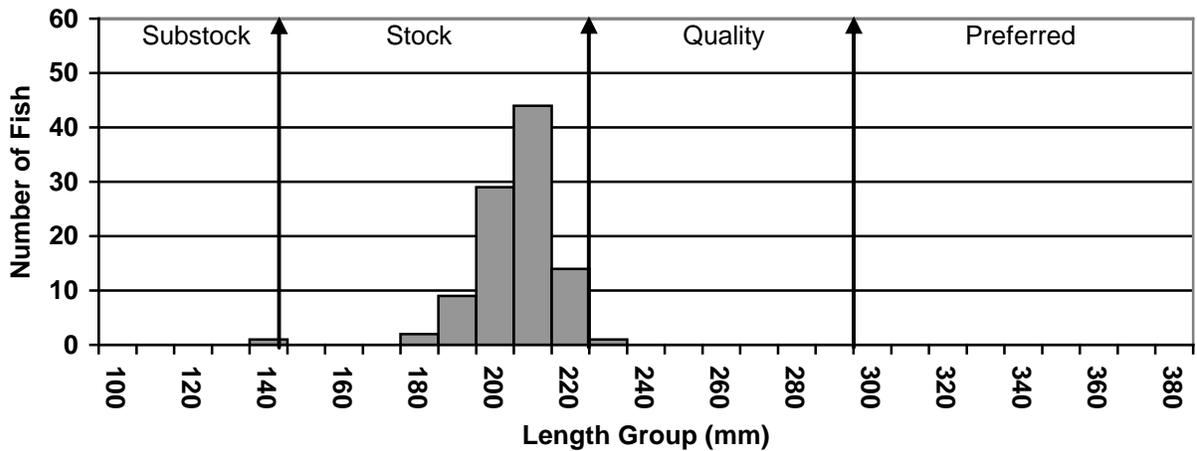
**Black Bullhead**

Black bullheads are no longer the dominant species in Murdo Lake. The CPUE of 5.2 is significantly lower than the 82.8 from the 2009 survey (Table 8) as well as the 63.1 eleven year mean (Table 2). Size structure is no longer dominated by young fish as can be seen in Figure 11. The 2006 survey was the last to be dominated by young fish and it appears that those fish are moving up in size with very little to no new recruitment taking place (Figures 11-13). Figures 14-17 illustrate the size structure of the black bullhead populations from the previous four surveys. With the increased black crappie and largemouth bass populations, the black bullhead population will hopefully remain at a low manageable level.

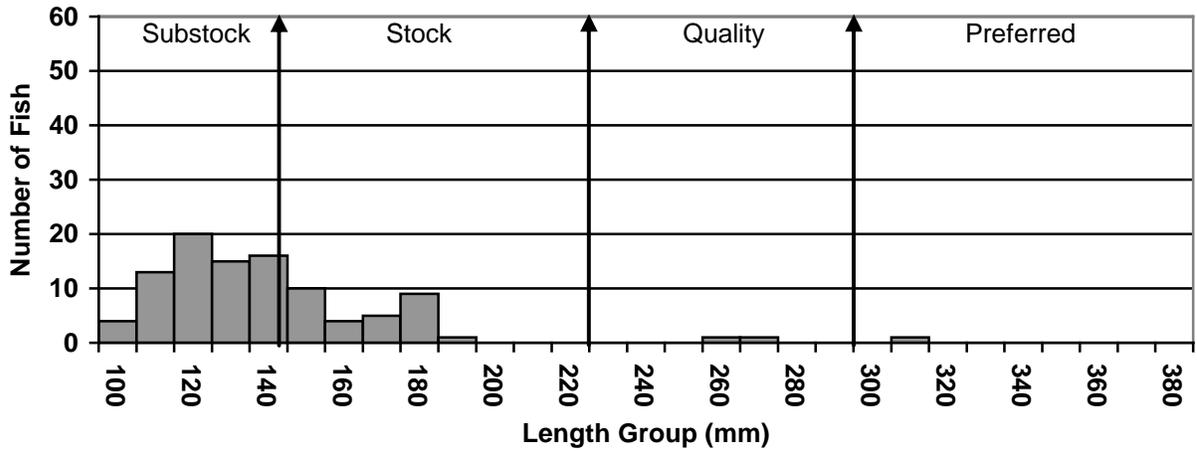
**Figure 11.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2012.



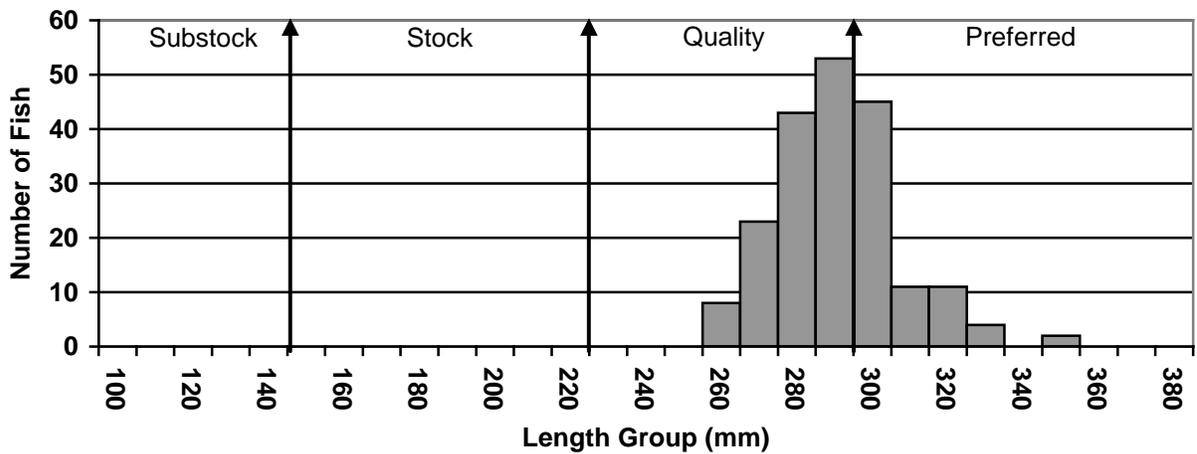
**Figure 12.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2009.



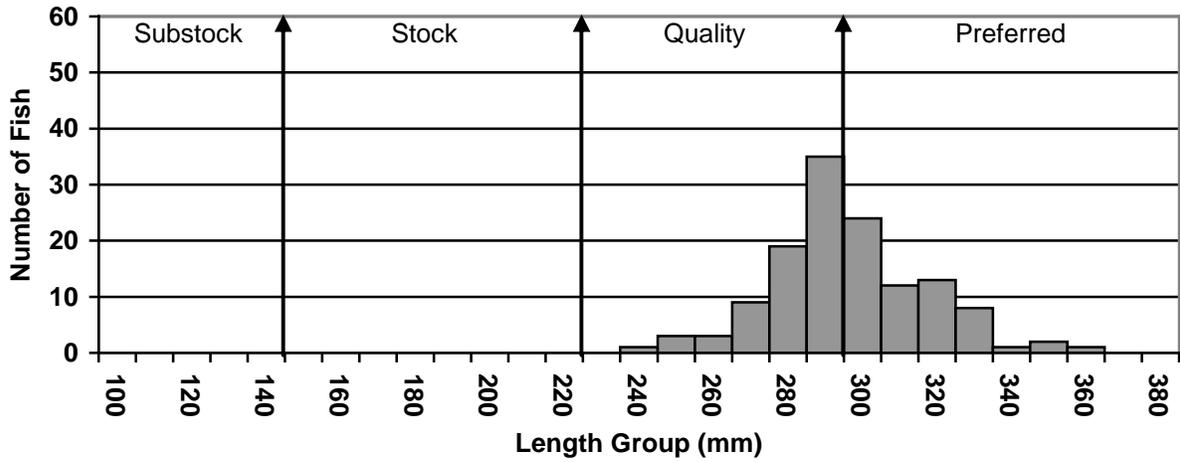
**Figure 13.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2006.



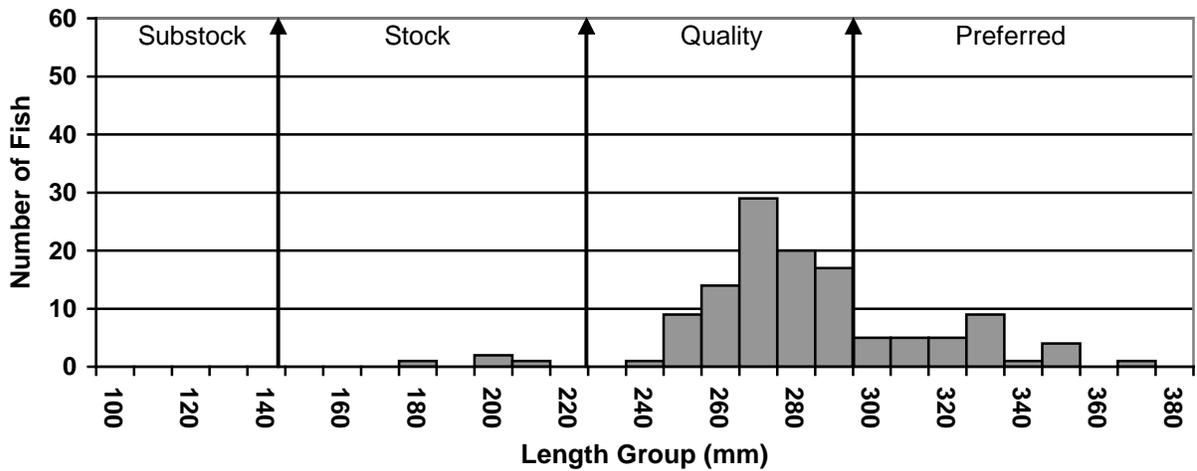
**Figure 14.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones, County, 2003.



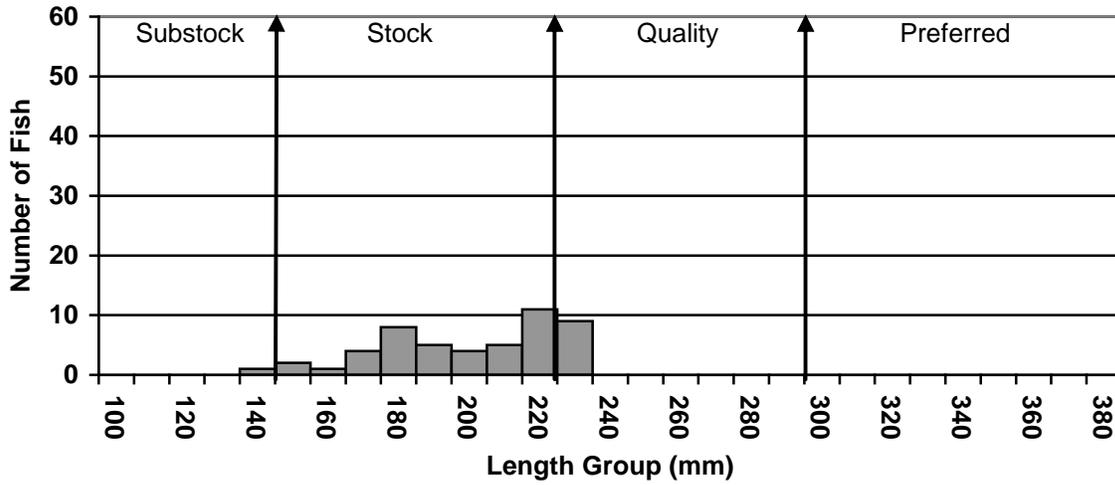
**Figure 15.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 2002.



**Figure 16.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 2001.



**Figure 17.** Length frequency histogram for black bullhead sampled in Murdo Lake, Jones County, 1998.



**Bluegill**

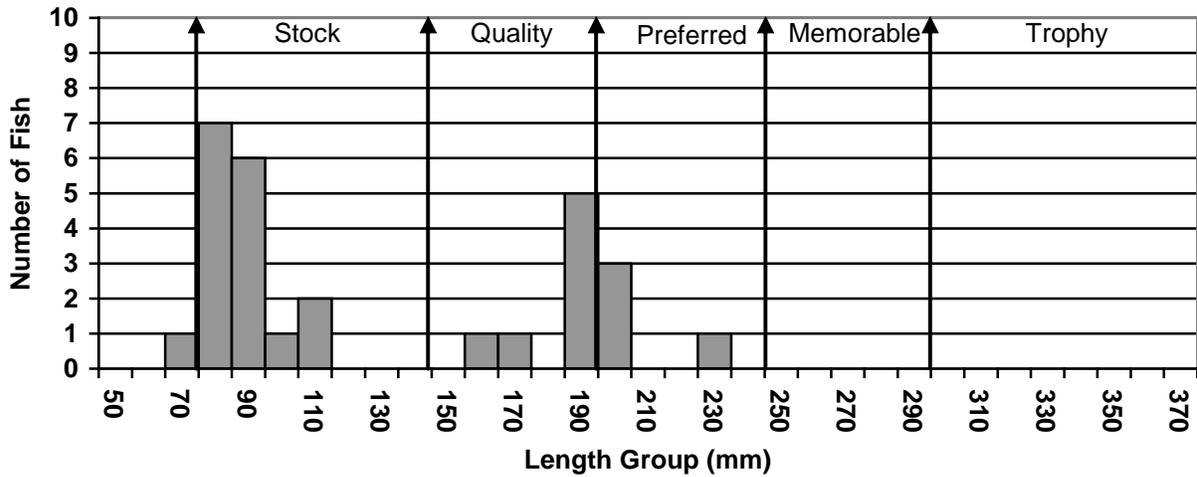
The bluegills sampled during this survey were the first since the 1998 survey (Table 8). The CPUE of 2.8 was the third highest in the trap net portion of the survey. The CPUE was under the prior surveys typical numbers, which is expected of a new population getting started. Growth is good with means right on or slightly above statewide, regional and SLI means (Table 6). Condition is also good with a mean Wr of 111. Figure 18 illustrates the length frequency histogram for this population. It will be interesting to see what happens with this population over the next few years.

**Table 6.** Average back-calculated lengths (mm) for each age class of bluegill sampled from Murdo Lake, Jones County, 2012.

Year Class	Age	N	Back-calculated Age						
			1	2	3	4	5	6	
2011	1	16	58						
2010	2	1	41	140					
2009	3	4	41	91	185				
2008	4	4	43	92	134	176			
2006	6	2	50	122	165	193	207	215	
<b>All Classes</b>		<b>27</b>	<b>47</b>	<b>111</b>	<b>161</b>	<b>184</b>	<b>207</b>	<b>215</b>	
Statewide Mean			55	103	141	166	180		
Region II Mean			52	97	134	164	180		
SLI* Mean			53	101	138	163	180		

\*Small Lakes and Impoundments

**Figure 18.** Length frequency histogram for bluegill sampled in Murdo Lake, Jones County, 2012.



**Other Species**

Golden shiner and yellow perch were the only other species sampled this survey (Table 2). Neither species was sampled in large enough numbers to make any inferences about their populations, although both have been sampled on a fairly regular basis in the history of lake surveys.

Northern pike, walleye, smallmouth bass, green sunfish, and rock bass were the species not sampled this survey that have been in surveys past (Table 8). Smallmouth bass will be the species in this list to watch over the next few years as they have been restocked into the population this year (Table 7).

**Table 7.** 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
2012	100	Smallmouth Bass	Juvenile

## RECOMMENDATIONS

1. Resurvey in 2015 to monitor the fish populations.

**Table 8.** 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	2012
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	5.2
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	12.8
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	--	--	0.4
LMB (EF)	--	--	--	--	--	--	--	--	0.0	97.2	33.0	469.0
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--	--
LMB (TN)	0.3	0.1	0.3	0.3	--	--	--	0.2	--	--	0.2	1.4
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	--	--	--	--	--	2.8
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	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