

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

Name: Cottonwood Lake **County(ies):** Sully

Legal Description: T119N-R75W-Sec. 19, 20, 29, 30

GPS: 44°49'51.39"N 99°55'04.07"W

Location from nearest town: 8.5 miles east of Agar

Date of present survey: June 14-16, 2010 (netting)

Date of last survey: July 16-18, 2007 (netting)

Most recent lake management plan: F-21-R-41 (January 1, 2009 to December 31, 2013)

Management classification: Warmwater Semi-permanent

Primary Game Species	Secondary and Other Species
Walleye	Largemouth Bass
Yellow Perch	Black Bullhead
Northern Pike	Common Carp
Black Crappie	Bluegill
	Fathead Minnow

PHYSICAL DATA

Surface Area: 454 acres

Watershed: 46,720 acres

Maximum Depth: 18 feet

Mean Depth: 9 feet

Lake elevation at time of survey (field observations): Full

Contour map: Yes

Date: 1973

Ownership of lake and adjacent lakeshore properties:

Cottonwood Lake is one of a few natural bodies of water that provide a fishery in north central South Dakota. The 454-acre lake is located eight and one half miles east of the town of Agar in northeastern Sully County. The State of South Dakota, Department of Game, Fish and Parks owns 160 acres on the northwest corner of the lake that is managed as a Game Production Area.

Watershed condition with percentages of land use types:

The Cottonwood Lake watershed consists of approximately 47,000 acres or seventy-three and one half square miles and is located primarily north and east of the lake. Okobojo Creek comprises sixty percent of the watershed and the remaining forty percent is composed of small unnamed tributaries. The immediate shoreline at Cottonwood Lake is native grasses, a road grade, a narrow row of trees with cultivated agricultural land, and marsh areas. The remainder of the watershed is composed of approximately 60% cultivated cropland, 38% native grasses utilized as pasture and hayland, and 2% tree belts and wintering areas for cattle.

Fishing access:

There is good access to the water via a new boat ramp. There is also ample shoreline access for shore anglers. Vegetation is usually not a problem on Cottonwood Lake.

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

The boat ramp was just replaced in 2006. The dock is in good condition. There is also a unisex toilet located at the boat ramp site, which is in good condition.

Field observations of aquatic vegetation condition:

There was very little submergent vegetation found in the lake. It was confined to the marshy areas on the east and west ends of the lake. The marshy areas are also the main location for the emergent vegetation around the shoreline. The emergents are mainly composed of cattails and bulrushes.

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

No pollution problems were evident at the time of the survey, although bluegreen algae frequently invades the lake during the summer months. Water clarity is good with a secchi disc reading of 5.5 feet. Other water quality characteristics were measured in the field on June 14, 2010, 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 Cottonwood Lake, Sully County, June 14, 2010.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/L)	HRD (mg/L)	pH	Cond (µS/cm)	TDS (ppm)	Sal.	ORP	Secchi (ft)
A	Surface	67.23	4.00	69.2	289	744	8.48	2820	1404	1.46	58.0	5.5
A	16.9	67.00	3.72	74.8	251	753	8.46	2815	1408	1.47	61.2	

BIOLOGICAL DATA**Methods:**

Cottonwood Lake was sampled on June 14-16, 2010, with twelve overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. Four experimental gill nets were also set. The gill nets are 150ft x 6ft with 25ft panels of ½, ¾, 1, 1-1/4, 1-1/2, and 2 inch monofilament mesh. No electrofishing was completed this survey. Fish indices and statistics were completed using Winfin.

Results and Discussion:

Gill net catch

Table 2. Total catch of four, 150ft experimental gill nets at Cottonwood Lake, Sully County, June 14-16, 2010.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	72	46.8	18.0	± 1.8	8.1	0	0	98
Common Carp	43	27.9	10.8	± 5.8	3.7	0	0	100
Yellow Perch	39	25.3	9.8	± 4.7	11.1	9	0	112

* Seventeen year mean (1980, 1983, 1985, 1991-2001, 2003, 2004, 2007)

Trap Net Catch

Table 3. Total catch of twelve, overnight ¾-inch frame nets at Cottonwood Lake, Sully County, June 14-16, 2010.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Common Carp	473	49.9	39.4	± 10.9	3.9	0	0	101
Black Bullhead	377	39.8	31.4	± 11.7	146.5	5	0	97
Walleye	68	7.2	5.7	± 2.8	3.4	100	0	90
Yellow Perch	26	2.7	2.2	± 1.5	12.3	8	0	104
Black Crappie	4	0.4	0.3	± 0.2	34.3	--	--	111

* Twenty-seven year mean (1959, 1962-1963, 1965, 1968, 1970-1971, 1974, 1977, 1980, 1983, 1985, 1988, 1991-2001, 2003, 2004, 2007)

Walleye

The walleye population in Cottonwood Lake is on the rebound. The lake suffered from low water for several years that hindered the walleye and all fish species. Now that the lake is full, walleye fingerlings were stocked in both 2009 and 2010 (Table 6). The survey shows that they are taking hold. The gill net CPUE of 18 is above the 3.5 from the 2007 survey (Table 8) and also above the 8.1 seventeen year mean (Table 2). The trap net CPUE of 5.7 is also above both the 3.6 from 2007 (Table 8) and the 3.4 twenty-seven year mean (Table 3). Figure 1 illustrates the size structure of the current population as being dominated by young fish from the 2009 stocking. Figures 2 through 7 illustrate what the size structure has looked like over the previous six surveys. Growth is good with means right on with statewide, regional and SLI means (Table 4). Table 4 also shows that the population is dominated by fish from the 2009 stocking. Condition is also good with a mean Wr of 94.

Table 4. Average back-calculated lengths (mm) for each age class of walleye sampled from Cottonwood Lake, Sully County, 2010.

Year Class	Age	N	Back-calculated Age		
			1	2	3
2009	1	105	179		
2007	3	2	164	235	392
All Classes		107	172	235	392
Statewide Mean			168	279	360
Region II Mean			169	282	346
SLI* Mean			176	271	384

* Small Lakes and Impoundments

Figure 1. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 2010.

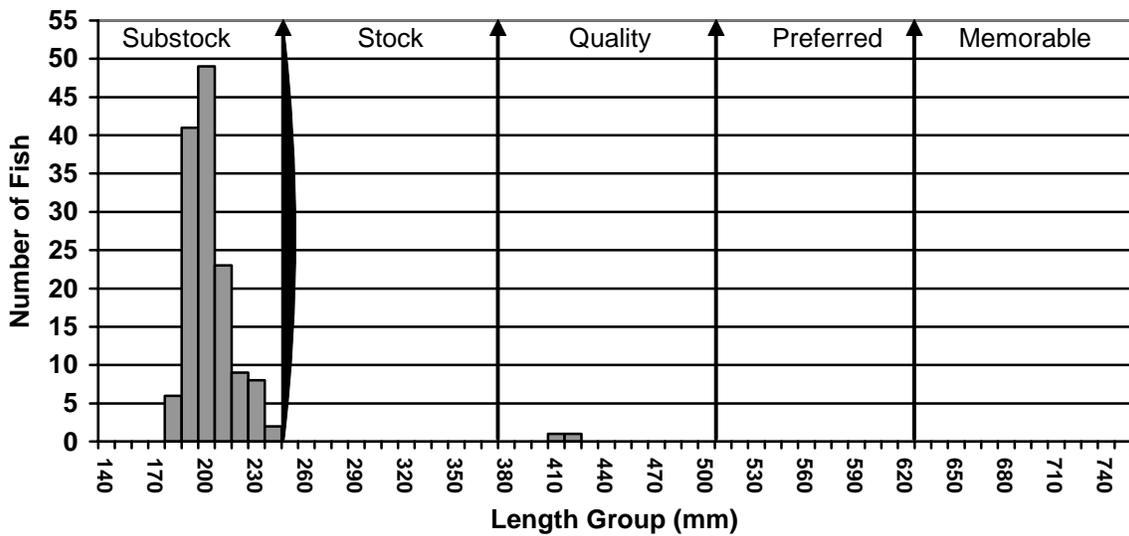


Figure 2. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 2007.

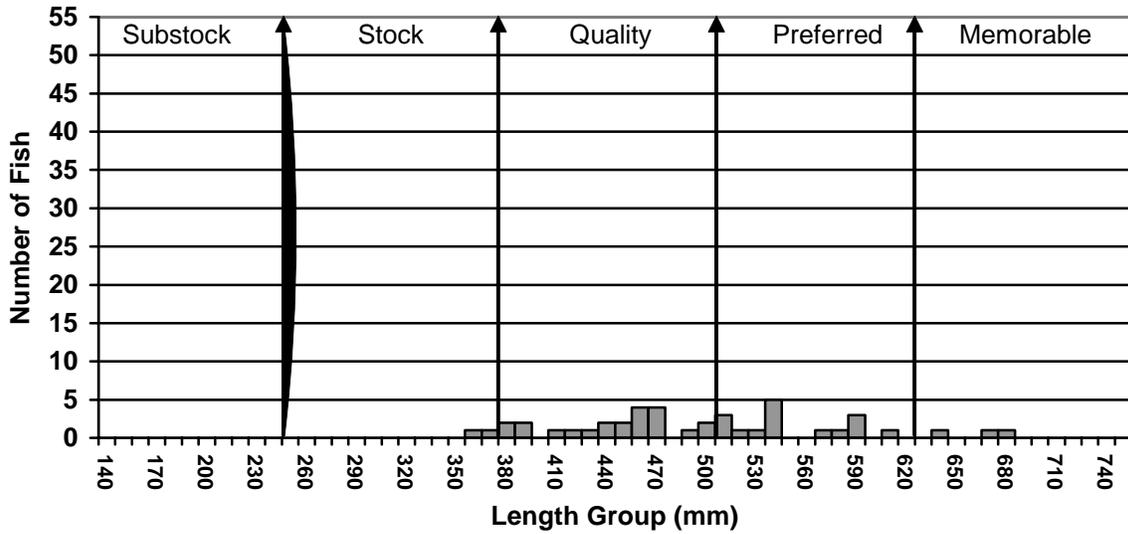


Figure 3. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 2004.

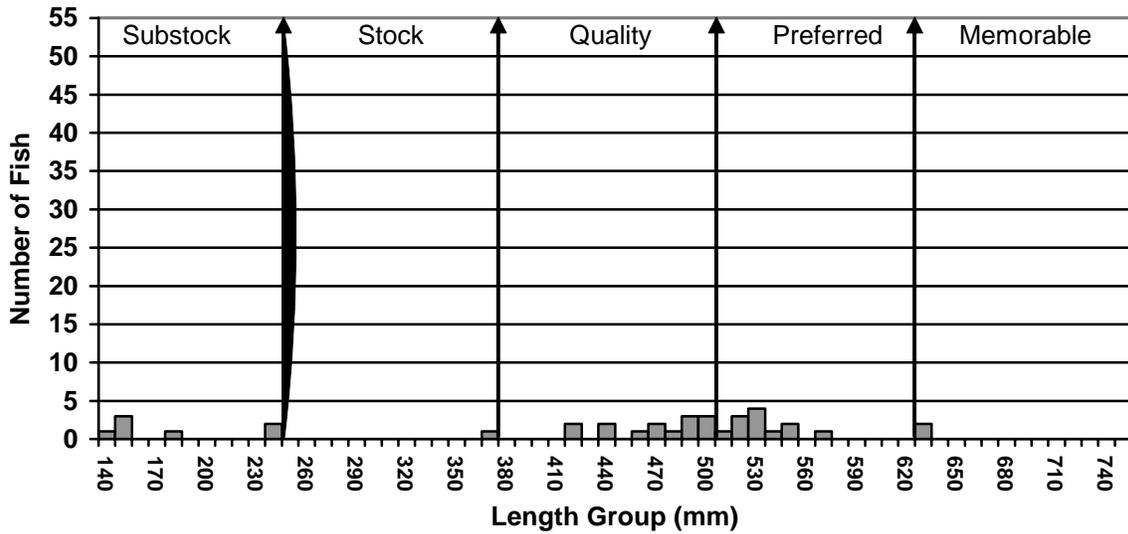


Figure 4. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 2003.

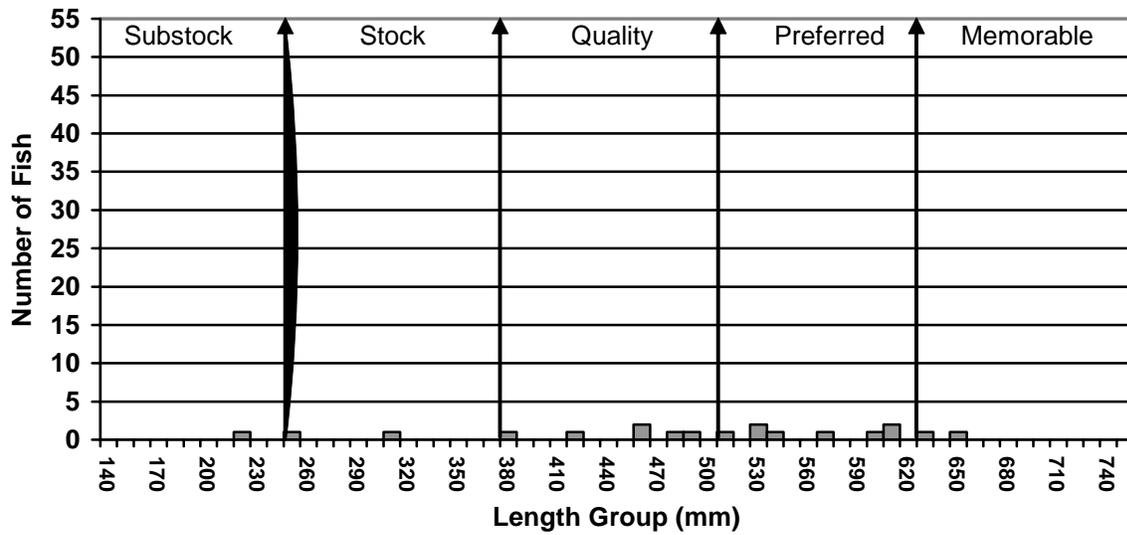


Figure 5. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 2000.

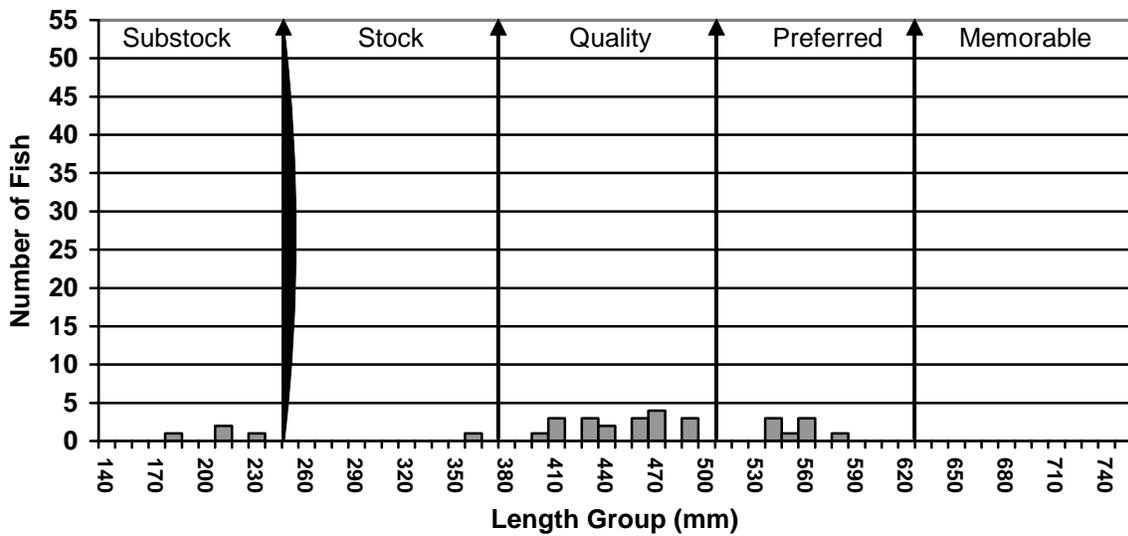


Figure 6. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 1999.

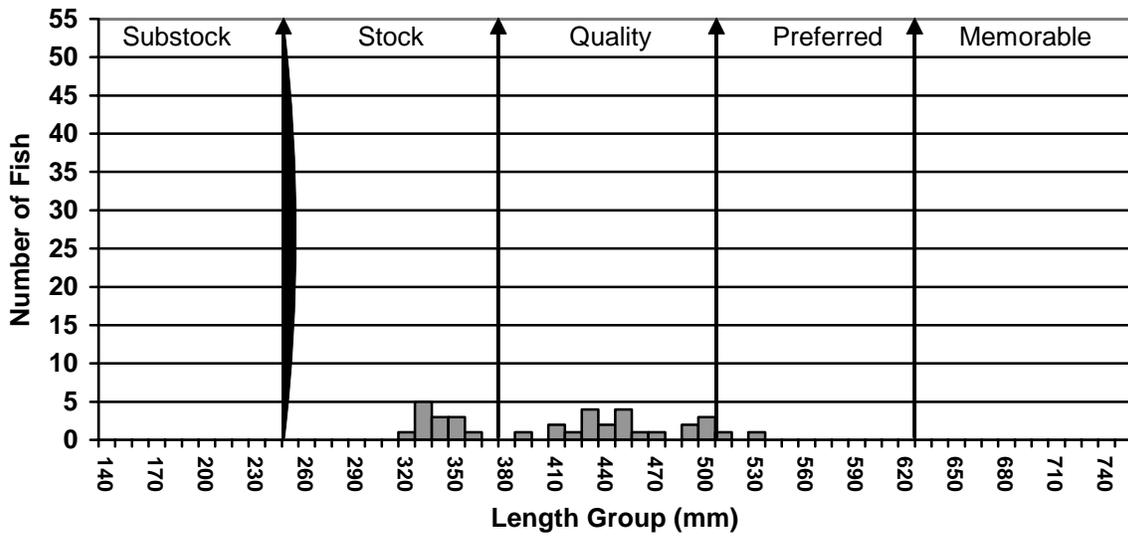
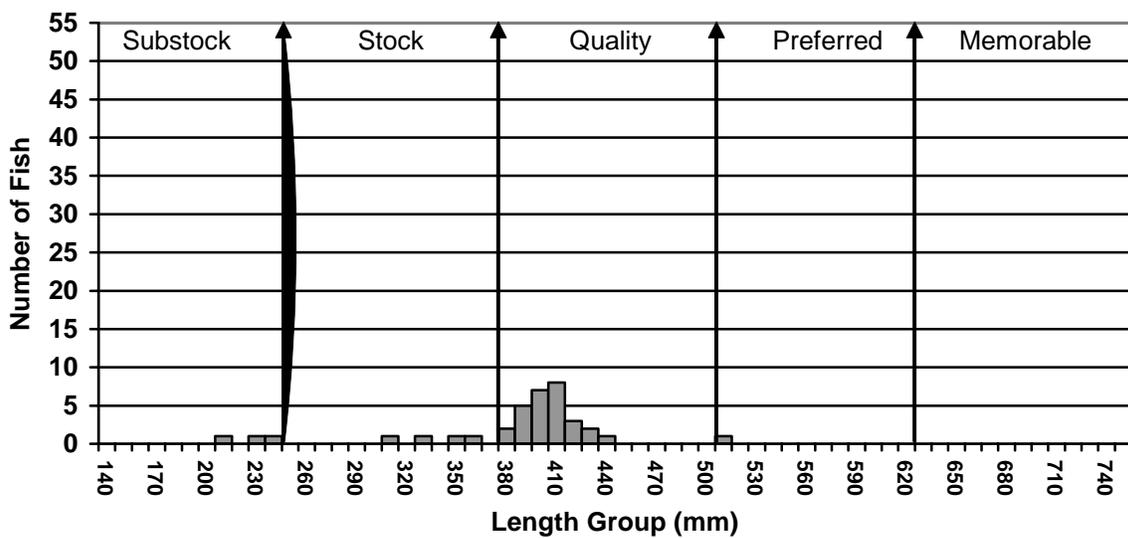


Figure 7. Length frequency histogram for walleye sampled from Cottonwood Lake, Sully County, 1998.



Yellow Perch

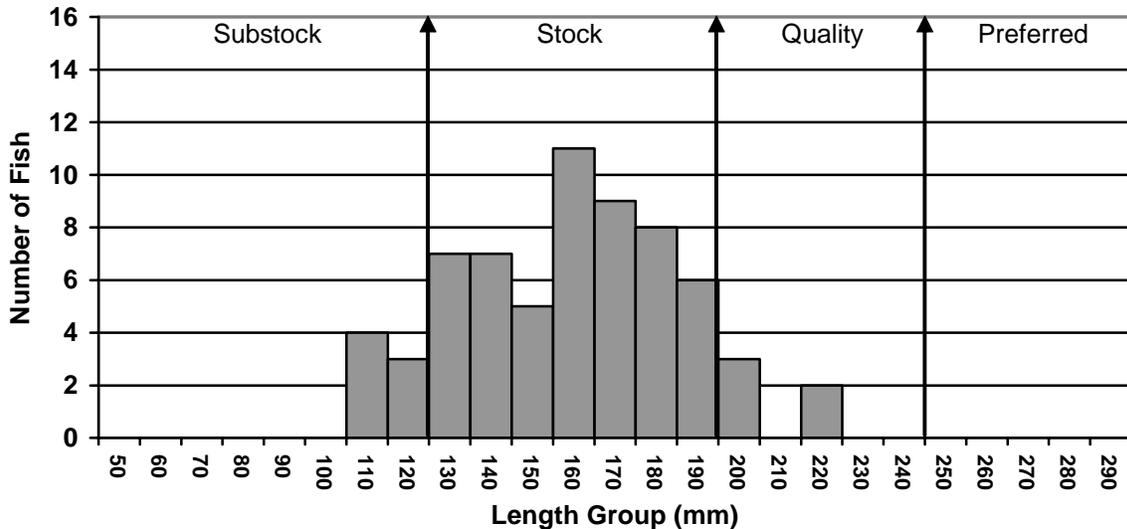
Yellow perch are making a come back in Cottonwood Lake. They were absent from the survey in 2007 (Table 8). The gill net CPUE is 9.8, which is just under the seventeen year mean of 11.1 (Table 2). The trap net CPUE is 2.2, which is well below the twenty-seven year mean of 12.3 (Table 3). Figure 8 illustrates the size structure of this population with a fairly good mix starting. Growth is fine with means only slightly below statewide, regional and SLI means (Table 5). Condition is good with a mean Wr of 108.

Table 5. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Cottonwood Lake, Sully County, 2010.

Year Class	Age	N	Back-calculated Age		
			1	2	3
2009	1	20	116		
2008	2	2	98	139	
2007	3	37	97	138	163
All Classes		59	104	139	163
Statewide Mean			86	145	190
Region II Mean			91	152	196
SLI* Mean			87	142	185

* Small Lakes and Impoundments

Figure 8. Length frequency histogram for yellow perch sampled from Cottonwood Lake, Sully County, 2010.



Other Species

Common carp, black bullhead and black crappie were the only other species sampled this survey. Common carp were actually the most dominant species sampled with a gill net CPUE of 10.8 (Table 2) and a trap net CPUE of 39.4 (Table 3). Figure 9 illustrates the size structure of this population. Condition is good with a mean W_r of 100.

The black bullhead population was also much higher than anticipated. They were the second highest species sampled in the trap nets with a CPUE of 31.4 (Table 3), which is still well below the twenty-seven year mean of 146.5. Figure 10 illustrates the size structure of this population and is made up of mostly small fish at this time. Condition is good with a mean W_r of 97. Hopefully with the increasing density of walleyes both the carp and bullhead populations will be brought in line.

Cottonwood used to have a great black crappie population but they are struggling to get reestablished again. Further stockings will be made to help get this population back on track.

Largemouth bass, channel catfish, white sucker, bluegill, green sunfish, orangespotted sunfish, hybrid sunfish and smallmouth bass were the species not sampled that had been in past surveys (Table 7 and 8).

Figure 9. Length frequency histogram for common carp sampled from Cottonwood Lake, Sully County, 2010.

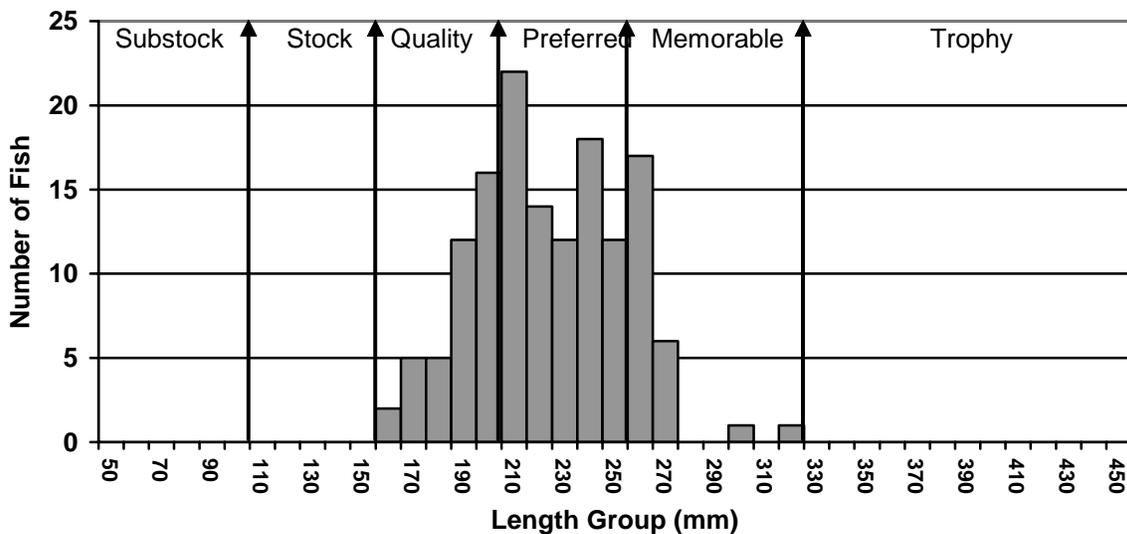


Figure 10. Length frequency histogram for black bullhead sampled from Cottonwood Lake, Sully County, 2010.

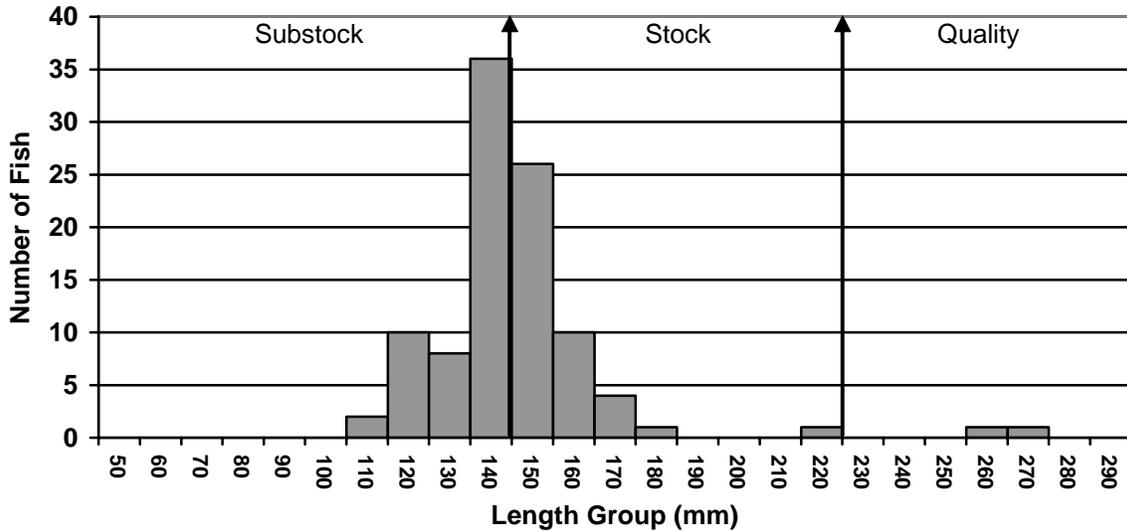


Table 6. Stocking records for the last ten years for Cottonwood Lake, Sully County.

Year	Number	Species	Size
2003	1,346	Black Crappie	Adult
2003	324	Yellow Perch	Juvenile
2003	640	Yellow Perch	Adult
2004	100	Largemouth Bass	Juvenile
2004	45,500	Walleye	Fingerling
2005	1,500	Smallmouth Bass	Fingerling
2005	120	Yellow Perch	Adult
2006	10,349	Yellow Perch	Juvenile
2007	61,600	Walleye	Small Fingerling
2007	20	Smallmouth Bass	Juvenile
2008	75	Yellow Perch	Juvenile
2009	45,750	Walleye	Small Fingerling
2010	45,260	Walleye	Small Fingerling

RECOMMENDATIONS

1. Resurvey with trap nets, gill nets and fall nighttime electrofishing in 2012.
2. Stock walleye to supplement the current population that appears to be controlling the bullhead and carp populations.

Table 7. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Cottonwood Lake, Sully County since surveys began.

Species	1959	1962	1963	1965	1968	1970	1971	1974	1977	1980	1983	1985	1988	1991	1992	1993	1994	1995
BLB (GN)	--	--	--	--	--	--	--	--	--	1.0	6.0	38.0	--	10.0	--	3.0	2.0	2.0
BLB (TN)	394.0	413.7	106.3	113.0	1140.0	94.1	9.3	342.0	12.9	5.1	263.7	138.1	86.1	22.6	291.7	64.2	2.4	7.8
BLC (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BLC (TN)	7.1	122.6	212.7	1.3	2.5	0.1	0.6	--	--	--	--	--	535.5	--	0.08	--	0.1	2.8
YEP (GN)	--	--	--	--	--	--	--	--	--	13.0	22.0	7.0	--	21.0	16.0	7.5	15.5	63.5
YEP (TN)	22.6	199.8	58.5	0.5	5.3	3.7	13.1	1.4	0.8	--	0.3	2.4	12.1	--	2.0	0.5	0.9	3.8
LMB (EF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LMB (TN)	--	--	--	--	--	--	--	--	--	0.07	--	--	0.8	--	--	--	--	--
NOP (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5
NOP (TN)	--	0.1	1.3	--	--	0.4	0.3	0.4	--	0.2	0.4	0.1	0.1	--	0.08	--	--	0.9
CCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CCF (TN)	0.3	--	0.1	--	2.0	0.4	0.07	0.3	--	--	--	0.1	0.1	--	--	0.08	--	0.08
WHS (TN)	0.1	0.1	--	--	--	0.4	0.3	--	0.1	0.07	0.3	0.8	0.1	0.1	0.2	0.3	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WAE (GN)	--	--	--	--	--	--	--	--	--	1.0	2.0	7.0	--	12.5	1.0	0.5	5.0	34.5
WAE (TN)	0.1	1.2	6.5	4.5	1.0	4.6	3.5	2.4	1.4	6.3	1.2	8.8	1.6	--	0.2	0.7	0.4	6.8
COC (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5	--	--	11.5	12.5
COC (TN)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.8	0.8	1.4	6.3	28.8
BLG (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	--	--	--	--
BLG (TN)	1.6	0.4	0.7	--	--	--	--	--	--	2.5	--	0.4	12.5	--	0.08	0.3	--	0.08
GSF (TN)	--	--	--	--	--	--	--	--	--	0.2	--	--	--	--	--	--	--	--
OSF (TN)	--	--	--	--	--	--	2.6	--	--	--	--	--	--	--	--	--	--	--
HYB (TN)	--	--	--	--	--	--	--	--	--	3.3	--	--	--	--	--	--	--	--
SMB (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMB (TN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BLB – Black Bullhead, BLC – Black Crappie, YEP – Yellow Perch, LMB – Largemouth Bass, NOP – Northern Pike, CCF – Channel Catfish, WHS – White Sucker, WAE – Walleye, COC – Common Carp, BLG – Bluegill, GSF – Green Sunfish, OSF – Orangespotted Sunfish, HYB – Hybrid Sunfish, SMB – Smallmouth Bass

Table 8. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Cottonwood Lake, Sully County since surveys began.

Species	1996	1997	1998	1999	2000	2001	2003	2004	2007	2010
BLB (GN)	23.0	2.5	18.5	64.5	52.5	1.0	--	--	--	--
BLB (TN)	56.5	3.2	73.7	158.2	154.1	2.9	0.3	0.3	0.1	31.4
BLC (GN)	--	--	2.5	--	1.0	--	--	1.5	0.5	--
BLC (TN)	1.0	1.5	0.6	2.8	23.4	2.8	5.7	1.8	2.1	0.3
YEP (GN)	7.0	1.5	10.5	--	1.0	0.5	1.0	0.5	1.0	9.8
YEP (TN)	0.9	0.4	1.4	--	0.4	0.3	--	1.0	--	2.2
LMB (EF)	5.5	11.7	16.4	0.9	19.2	19.0	25.0	3.0	--	--
LMB (TN)	--	0.1	--	--	--	--	--	0.08	--	--
NOP (GN)	1.5	0.5	4.0	2.0	0.5	1.0	2.0	1.8	0.5	--
NOP (TN)	2.4	0.5	0.6	1.3	1.1	1.4	0.5	0.1	1.3	--
CCF (GN)	--	--	--	--	--	0.5	--	--	2.0	--
CCF (TN)	--	--	--	--	--	0.1	0.3	--	1.3	--
WHS (TN)	--	0.3	--	0.8	0.5	1.3	--	0.8	2.6	--
WAE (EF)	197.8	1.7	10.9	37.8	116.4	37.0	4.0	6.0	--	--
WAE (GN)	37.0	10.0	5.0	3.5	5.0	2.0	2.5	6.3	3.5	18.0
WAE (TN)	23.3	5.4	2.4	2.4	1.8	0.8	0.6	0.1	3.6	5.7
COC (GN)	8.5	0.5	1.5	6.0	10.0	0.5	2.0	3.5	5.0	10.8
COC (TN)	34.1	3.9	3.9	4.5	15.8	3.4	0.9	0.1	0.4	39.4
BLG (GN)	--	--	--	--	--	--	0.3	--	--	--
BLG (TN)	0.2	--	0.3	0.1	0.2	0.8	0.4	0.08	--	--
GSF (TN)	--	--	--	--	--	--	--	--	--	--
OSF (TN)	--	--	--	--	--	--	--	--	--	--
HYB (TN)	--	--	--	--	--	--	--	--	--	--
SMB (GN)	--	--	--	--	--	--	--	--	--	--
SMB (TN)	--	--	--	--	--	--	--	--	0.7	--

BLB – Black Bullhead, BLC – Black Crappie, YEP – Yellow Perch, LMB – Largemouth Bass, NOP – Northern Pike, CCF – Channel Catfish, WHS – White Sucker, WAE – Walleye, COC – Common Carp, BLG – Bluegill, GSF – Green Sunfish, OSF – Orangespotted Sunfish, HYB – Hybrid Sunfish, SMB – Smallmouth Bass