

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-46

Name: Brakke Lake **County(ies):** Lyman

Legal Description: R105N-R76W-Sec. 16, 21 & 22

GPS: 43°53'39.10"N 99°57'24.69"W

Location from nearest town: 5 miles east of Presho

Date of present survey: June 10-12, 2013 (netting); October 9, 2013 (electrofishing)

Date of last survey: July 19-21, 2010 (netting); October 13, 2010 (electrofishing)

Most recent lake management plan: F-21-R-40 (January 1, 2008 to December 31, 2012)

Management classification: Warmwater Permanent

Primary Game Species	Secondary and Other Species
Largemouth Bass	Yellow Perch
Walleye	Channel Catfish
Bluegill	Black Bullhead

PHYSICAL DATA

Surface Area: 130 acres

Watershed: 10,240 acres

Maximum Depth: 17 feet

Mean Depth: 5 feet

Lake elevation at time of survey (field observations): 3 feet low

Contour map: Yes

Date: 1968

Ownership of lake and adjacent lakeshore properties:

Brakke Lake is a 135-acre artificial impoundment located 5 miles east of the City of Presho in southcentral Lyman County. The Civilian Conservation Corps (CCC) created the artificial lake in 1935 with the construction of an earthen dam across an unnamed tributary of Medicine Creek. To allow for the construction of the dam grade and creation of the lake, flooding and public use easements were granted to the State of South Dakota and the Department of Game, Fish and Parks for the lake and a strip of land 12 feet above the high water contour. The South Dakota Department of Game, Fish and Parks purchased 160 acres containing the dam grade and lower 1/3 of the lake in 1948.

Watershed condition with percentages of land use types:

The watershed of Brakke Lake contains all or most of 16 square miles or approximately 10,240 acres. Land use in the watershed is estimated at 65% cultivated cropland, 30% native grass land utilized for pasture and hay crops and the remaining 5% treebelts, farmsteads and roadways. During the past 20 years, more land in the watershed has been placed into production as cultivated cropland, including some in the immediate area adjacent to the lake.

Fishing access:

There is a good boat ramp for water access. Shore fishing may be limited during the summer months due to the high amounts of both submergent and emergent vegetation found throughout the lake.

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

The boat ramp is in good condition. The dam grade, spillway, access road, and toilet are all in good condition.

Field observations of aquatic vegetation condition:

Submergent vegetation consists of a mixture of, but not limited to, floating, sago, and clasping leaf pondweeds. They are found around most of the shoreline to a depth of 4 feet. Cattails and rushes make up most of the emergent vegetation. They too are found around most of the shoreline of Brakke Lake.

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

No pollution problems were evident at the time of the survey. Water clarity was good with a secchi disc reading of 5.5 feet. Other water quality characteristics were measured in the field on June 10, 2013, 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 Brakke Lake, Lyman County, June 10, 2013.

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	70.0	7.20	33.8	209	177	9.08	447	223	0.22	-289.5	5.5
A	13.0	70.8	5.40	36.2	185	172	8.92	446	223	0.21	-289.0	

BIOLOGICAL DATA

Methods:

Brakke Lake was sampled on June 10-12, 2013, with ten overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. Two experimental gill nets were also set. The gill nets are 150ft x 6ft with 25ft panels of ½, ¾, 1, 1-¼, 1-½, and 2 inch monofilament mesh. On the evening of October 10, 2013, Brakke Lake was electrofished for 60 minutes (6-ten minute transects) to electrofish the largemouth bass and walleye populations. 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 Brakke Lake, Lyman County, June 10-12, 2013.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Bluegill	135	45.9	13.5	± 5.2	33.9	99	69	105
Black Crappie	132	44.9	13.2	± 5.7	9.1**	65	23	100
Northern Pike	17	5.8	1.7	± 0.8	0.3	94	35	87
Walleye	5	1.7	0.5	± 0.4	2.2	--	--	85
Yellow Perch	3	1.1	0.3	± 0.2	2.6	--	--	80
Largemouth Bass	1	0.3	0.1	± 0.1	1.0	--	--	89
Black Bullhead	1	0.3	0.1	± 0.1	43.7	--	--	91

* Fifteen year mean (1964, 1968, 1971, 1974, 1978, 1980, 1987, 1990, 1992, 1995, 1998, 2001, 2004, 2007, 2010)

** Four year mean (2001, 2004, 2007, 2010)

Gill Net Catch

Table 3. Total catch of two, 150ft experimental gill nets at Brakke Lake, Lyman County, June 10-12, 2013.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Yellow Perch	7	53.8	3.5	± 1.5	17.9	17	0	88
Northern Pike	3	23.1	1.5	± 1.5	0.7	--	--	87
Walleye	2	15.4	1.0	± 3.1	7.2	--	--	85
Black Crappie	1	7.7	0.5	± 1.5	5.0**	--	--	90

* Five year mean (1974, 1978, 1980, 2007, 2010)

** Second year mean (2007, 2010)

Electrofishing Catch

Table 4. Total catch from six ten-minute runs of fall nighttime electrofishing on Brakke Lake, Lyman County, October 9, 2013.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	13	56.5	13.0	± 6.2	16.0**	100	85	95
Largemouth Bass	10	43.5	10.0	± 5.9	77.6	89	67	114

* Four year mean (2001, 2004, 2007, 2010)

** Three year mean (2001, 2007, 2010)

Largemouth Bass

Largemouth bass continue to be a dominant predator species found in Brakke Lake. Fall electrofishing yielded a CPUE of 10 fish per hour, which is significantly lower than the 98 from the 2010 survey (Table 11) as well as the 77.6 four year mean (Table 4). Size structure remains good with a PSD of 89 and an RSD-P of 67 compared to the 42 and 24, respectively, from the 2010 survey. Figures 1 through 4 illustrate the length frequency histograms for the fish sampled the last four surveys. Growth is good with means above statewide, regional and SLI means (Table 5). Condition is good with a mean Wr of 114. The drop in catch may be due to the early winter blizzard that dropped water temperatures faster than normal and changed their patterns to a winter pattern earlier. Will be interesting to see what happens in the next survey.

Table 5. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Brakke Lake, Lyman County, 2013.

Year Class	Age	N	Back-calculated Age					
			1	2	3	4	5	6
2012	1	1	65					
2011	2	1	86	142				
2010	3	3	100	232	308			
2009	4	2	115	222	312	370		
2008	5	1	212	306	387	420	452	
2007	6	2	153	264	315	368	412	438
All Classes		10	122	233	330	386	432	438
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 1. Length frequency histogram for largemouth bass sampled from Brakke Lake, Lyman County, 2013.

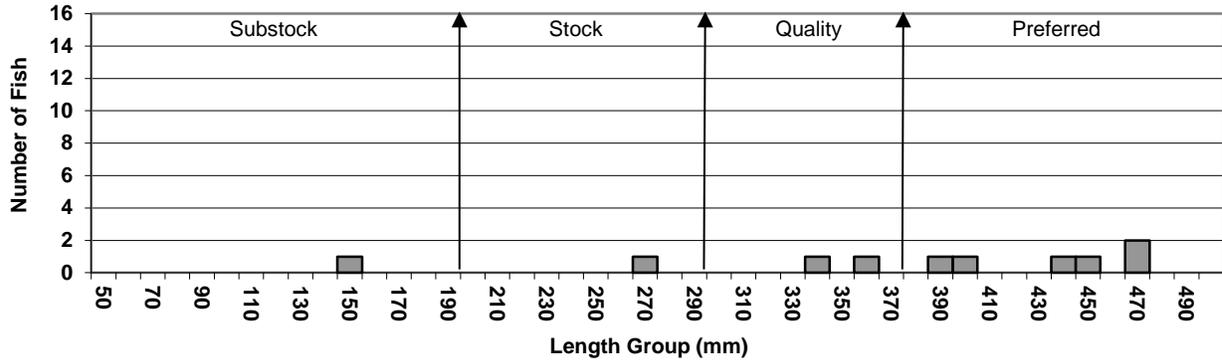


Figure 2. Length frequency histogram for largemouth bass sampled from Brakke Lake, Lyman County, 2010.

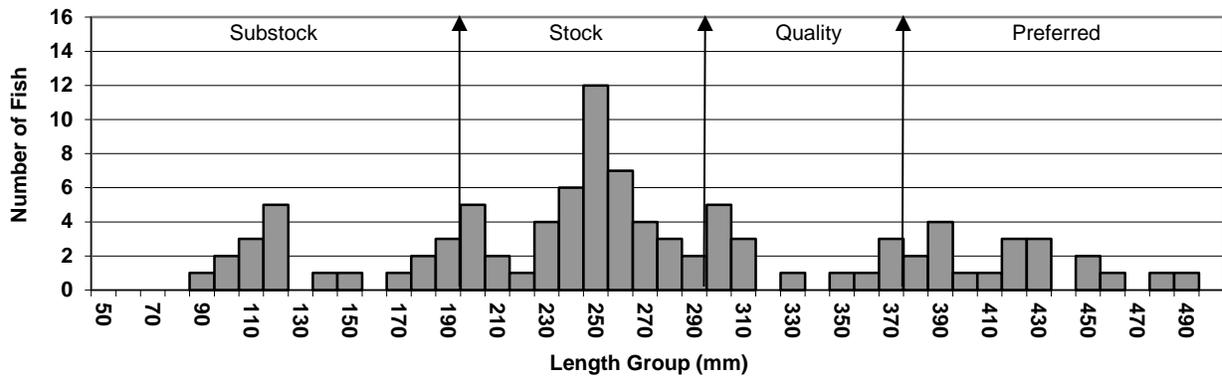


Figure 3. Length frequency histogram for largemouth bass sampled from Brakke Lake, Lyman County, 2007.

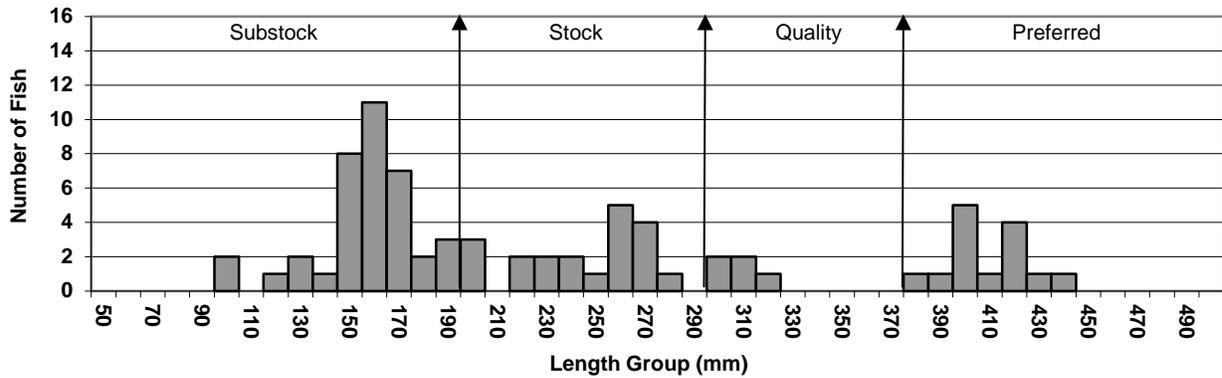
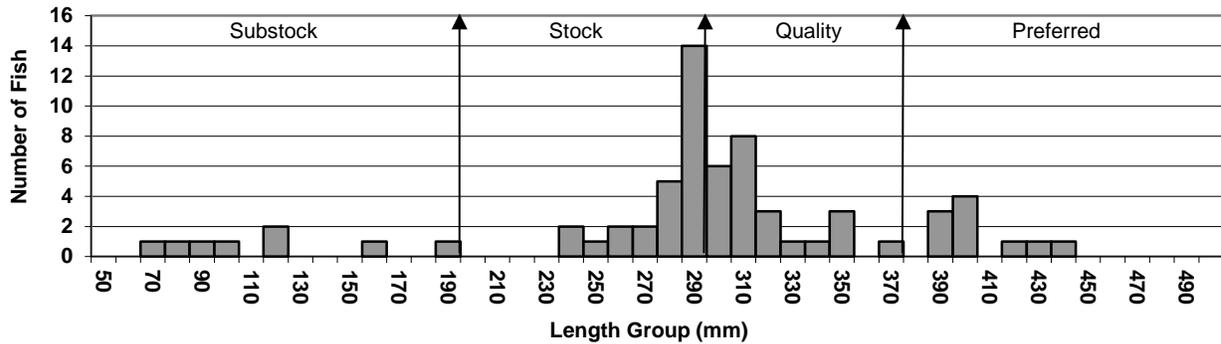


Figure 4. Length frequency histogram for largemouth bass sampled from Brakke Lake, Lyman County, 2004.



Bluegill

Bluegills continue to be the dominant panfish species sampled in Brakke Lake. The CPUE of 13.5 is below the 39.9 from the 2010 survey (Table 11) as well as the 33.9 fifteen year mean (Table 2). Size structure continues to be good with a PSD of 99 with an RSD-P of 69 compared to the 95 and 27, respectively, from the 2010 survey. Figures 5 through 8 illustrate the length frequency histograms for the fish sampled from the last four surveys. Growth is good with means right on with statewide, regional and SLI means (Table 6). Condition is also good with a mean W_r of 105.

Table 6. Average back-calculated lengths (mm) for each age class of bluegill sampled from Brakke Lake, Lyman County, 2013.

Year Class	Age	N	Back-calculated Age								
			1	2	3	4	5	6	7	8	9
2010	3	22	54	119	171						
2009	4	41	51	106	168	201					
2008	5	4	46	83	139	198	211				
2007	6	18	49	96	149	183	209	221			
2006	7	6	48	81	148	180	198	223	232		
2005	8	5	50	102	137	164	183	198	219	228	
2004	9	4	38	76	129	144	179	201	209	215	220
All Classes		100	48	95	149	178	196	211	220	221	220
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 5. Length frequency histogram for bluegill sampled from Brakke Lake, Lyman County, 2013.

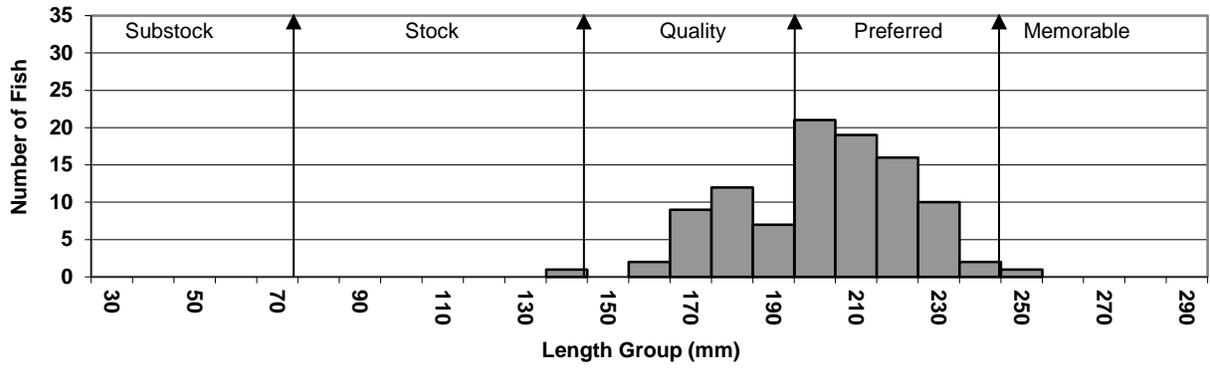


Figure 6. Length frequency histogram for bluegill sampled from Brakke Lake, Lyman County, 2010.

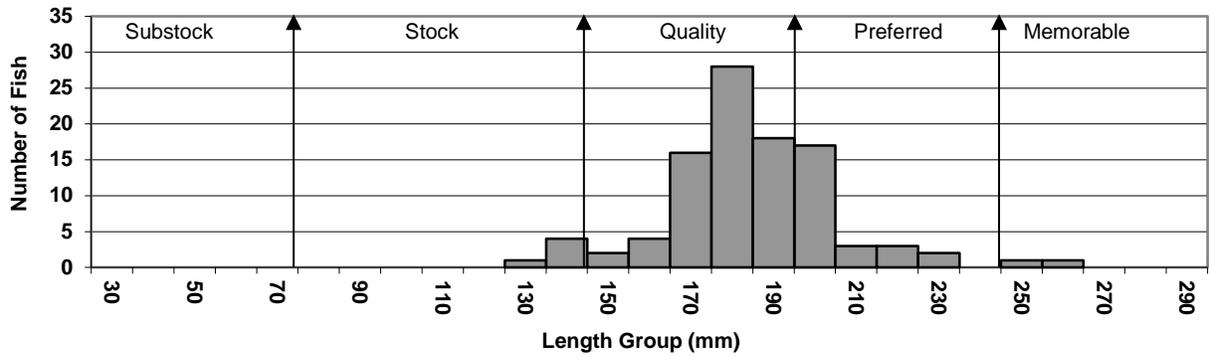


Figure 7. Length frequency histogram for bluegill sampled from Brakke Lake, Lyman County, 2007.

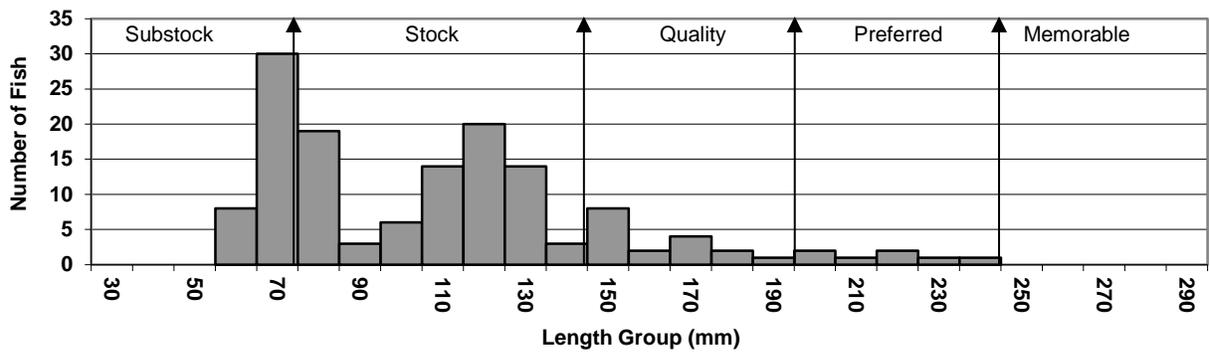
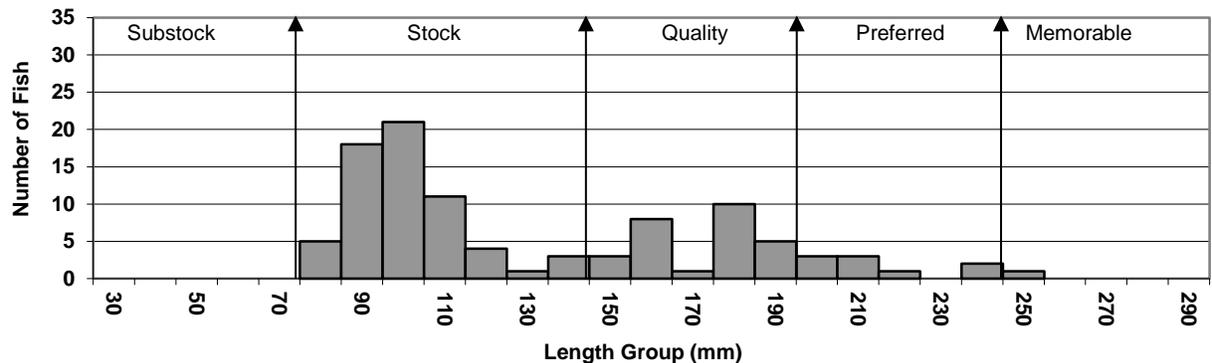


Figure 8. Length frequency histogram for bluegill sampled from Brakke Lake, Lyman County, 2004.



Black Crappie

Black crappies are now a dominant panfish species present in Brakke Lake. The CPUE of 13.2 fish per net night is below the 31.6 from the 2010 survey (Table 11), but is above the 9.1 four year mean (Table 2). Figures 9 through 11 illustrate the length frequency histograms for the last three surveys. Size structure is good and balanced with a PSD of 65 and an RSD-P of 23 compared to the 57 and 20, respectively, from the 2010 survey. Growth is good with means right on with statewide, regional and SLI means (Table 7). Condition is good with a mean Wr of 100.

Table 7. Average back-calculated lengths (mm) for each age class of black crappie sampled from Brakke Lake, Lyman County, 2013.

Year Class	Age	N	Back-calculated Age					
			1	2	3	4	5	6
2011	2	55	79	120				
2010	3	11	84	146	186			
2009	4	22	78	125	186	231		
2008	5	12	89	148	202	242	268	
2007	6	1	78	156	185	236	256	263
All Classes		101	82	139	190	236	262	263
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 9. Length frequency histogram for black crappie sampled from Brakke Lake, Lyman County, 2013.

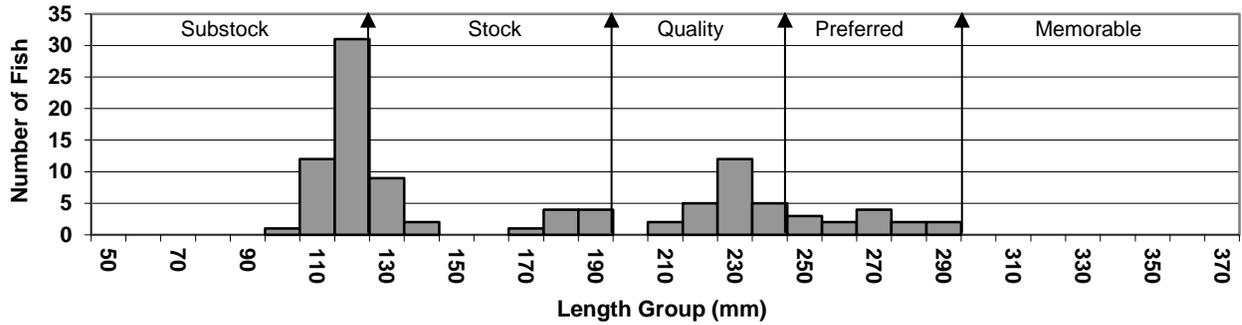


Figure 10. Length frequency histogram for black crappie sampled from Brakke Lake, Lyman County, 2010.

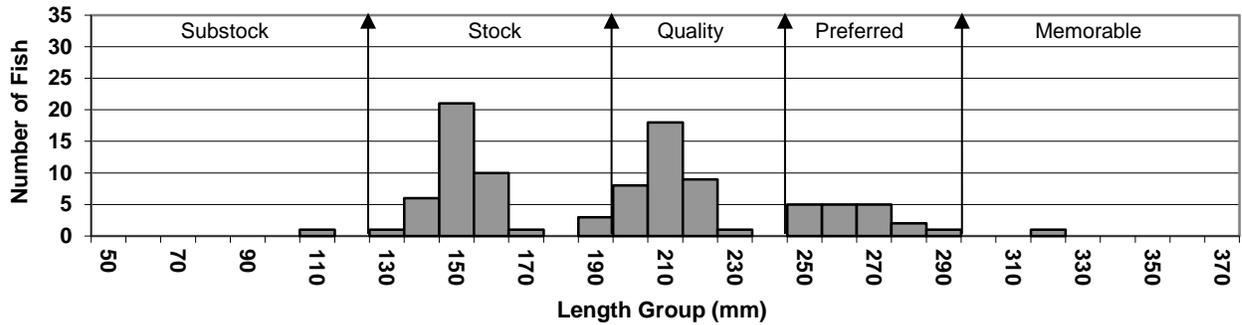
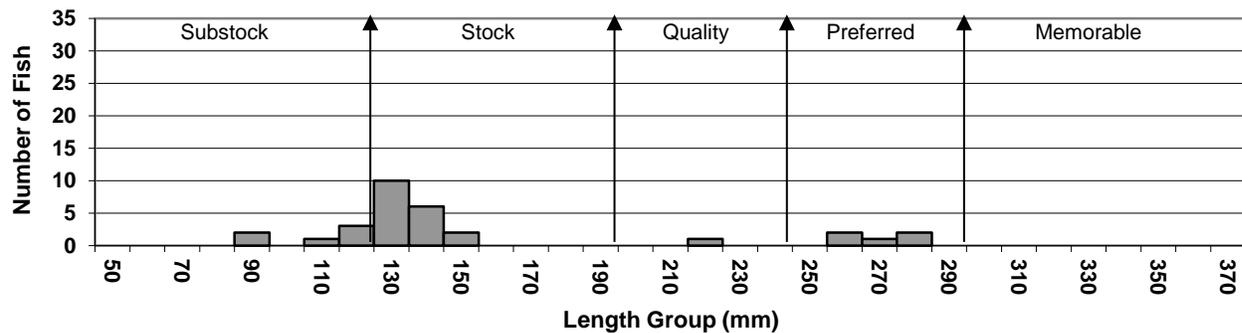


Figure 11. Length frequency histogram for black crappie sampled from Brakke Lake, Lyman County, 2007.



Walleye

Brakke Lake continues to contain a quality walleye population that adds a very good secondary predator to the system. The gill net CPUE of 1.0 is below the 9.0 from the 2010 survey (Table 11) as well as the 7.2 five year mean (Table 3). The trap net CPUE of 0.5 is also below the 3.5 from the 2010 survey (Table 11) as well as the 2.2 fifteen year mean (Table 2). The electrofishing CPUE of 13.0 fish per hour is below the 26.0 from the 2010 survey (Table 11) as well as the 16.0 three year mean (Table 4). Figures 12 through 14 illustrate the length frequency histograms for the fish sampled the last three surveys. Growth is good with means right on with statewide, regional and SLI means (Table 8). Condition is good with a mean Wr of 88.

Table 8. Average back-calculated lengths (mm) for each age class of walleye sampled from Brakke Lake, Lyman County, 2013.

Year Class	Age	N	Back-calculated Age														
			1	2	3	4	5	6	7	8	9	10	11				
2010	3	1	237	311	377												
2008	5	9	178	290	406	481	523										
2006	7	1	184	318	394	436	475	507	540								
2005	8	4	197	331	423	479	520	560	590	613							
2004	9	2	150	277	378	435	470	512	545	573	588						
2003	10	2	175	294	343	387	425	456	501	543	570	592					
2002	11	1	227	346	409	430	487	507	533	561	598	626	645				
All Classes			193	310	390	441	483	508	542	573	585	610	645				
Statewide Mean			168	279	360	425	490										
Region II Mean			169	282	346	408	455										
SLI* Mean			176	271	384	431	483										

* Small Lakes and Impoundments

Figure 12. Length frequency histogram for walleye sampled from Brakke Lake, Lyman County, 2013.

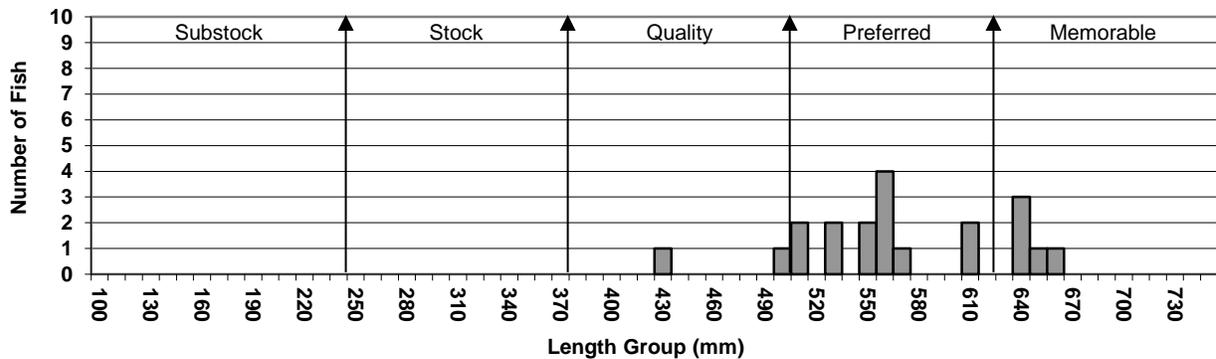


Figure 13. Length frequency histogram for walleye sampled from Brakke Lake, Lyman County, 2010.

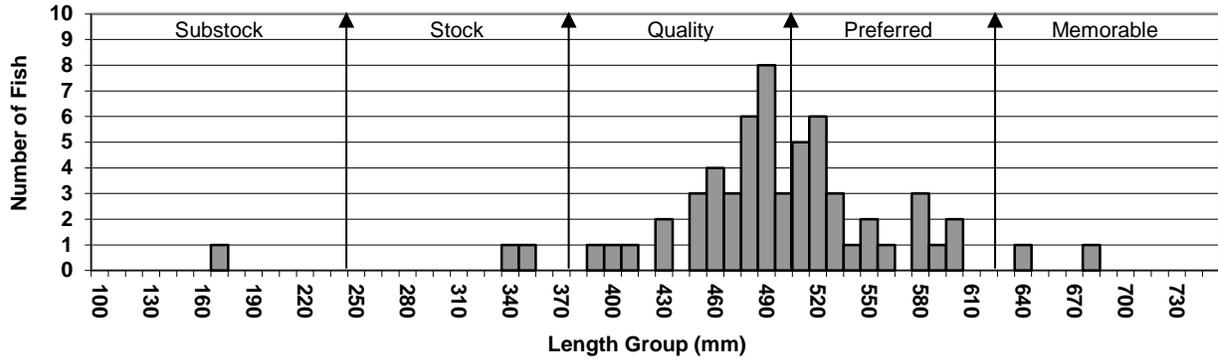
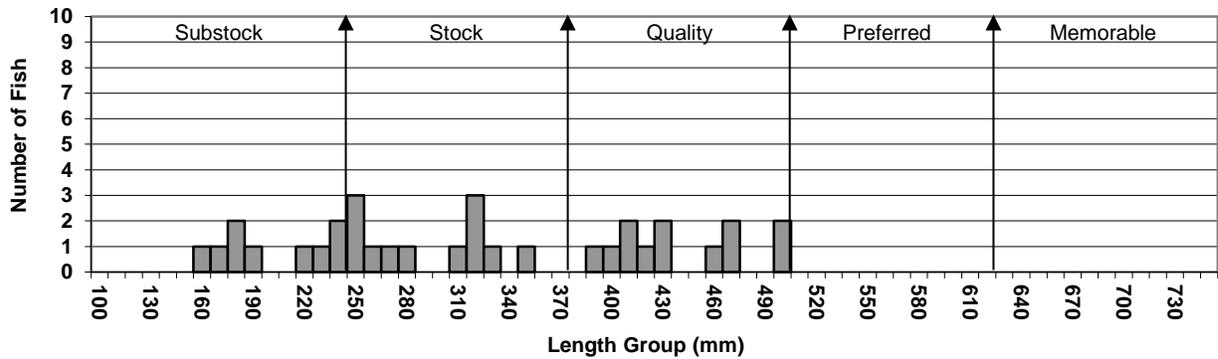


Figure 14. Length frequency histogram for walleye sampled from Brakke Lake, Lyman County, 2007.



Yellow Perch

Brakke Lake also contains a yellow perch population. The gill net CPUE was 3.5 fish per net night, which is well below the 29.5 from the 2010 survey (Table 11) as well as the 17.9 five year mean (Table 3). The trap net CPUE of 0.3 is right on with the 0.5 from the 2010 survey (Table 11) but below the 2.6 fifteen year mean (Table 2). Figures 15 through 17 illustrate the length frequency histograms for the fish sampled the last three surveys. Growth is on the low side with means slightly below statewide, regional and SLI means (Table 9). Condition is fine with a mean W_r of 84.

Table 9. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Brakke Lake, Lyman County, 2013.

Year Class	Age	N	Back-calculated Age					
			1	2	3	4	5	6
2011	2	5	95	140				
2008	5	3	74	107	139	173	193	
2007	6	1	78	106	155	187	216	232
All Classes		9	82	118	147	180	205	232
Statewide Mean			86	145	190	220	242	
Region II Mean			91	152	196	219	242	
SLI* Mean			87	142	185	205	219	

* Small Lakes and Impoundments

Figure 15. Length frequency histogram for yellow perch sampled from Brakke Lake, Lyman County, 2013.

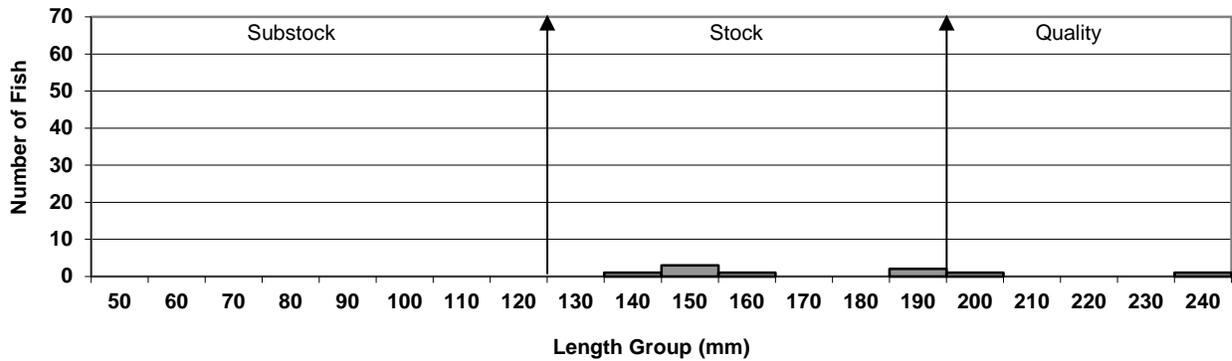


Figure 16. Length frequency histogram for yellow perch sampled from Brakke Lake, Lyman County, 2010.

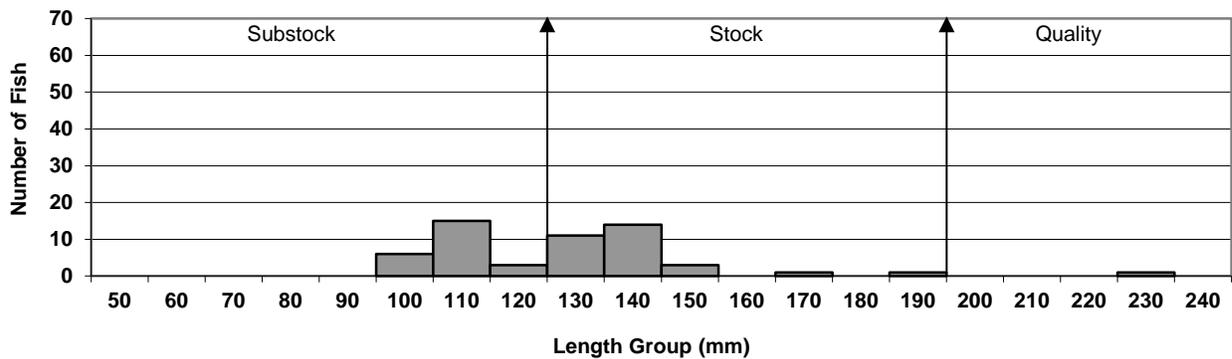
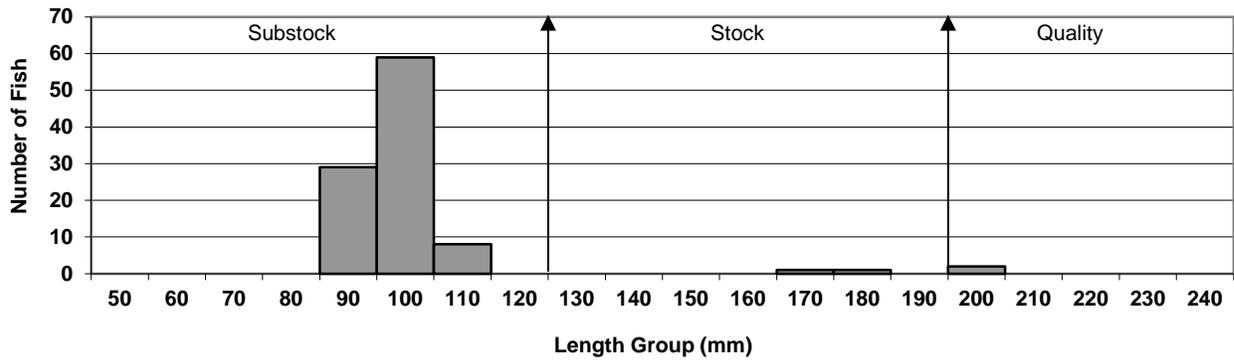


Figure 17. Length frequency histogram for yellow perch sampled from Brakke Lake, Lyman County, 2007.



Other species

Brakke Lake contains a good northern pike population as well the also contributes as a good predator species to keep all these panfish species in check. The trap net CPUE of 1.7 was slightly below the 2.2 from the 2010 survey (Table 11) but slightly above the 0.3 fifteen year mean (Table 2). The gill net CPUE of 1.5 was slightly below the 2.0 from the 2010 survey (Table 11) but slightly above the 0.7 fifteen year mean (Table 3). Figure 18 illustrates the length frequency histogram for the fish sampled from this survey. Condition is good with a mean Wr of 87.

One black bullhead was the only other species sampled this survey. Channel catfish, white sucker, common carp, flathead catfish, golden shiner and rainbow trout were the species not sampled this survey that have been in surveys past (Table 11).

Figure 18. Length frequency histogram for northern pike sampled from Brakke Lake, Lyman County, 2013.

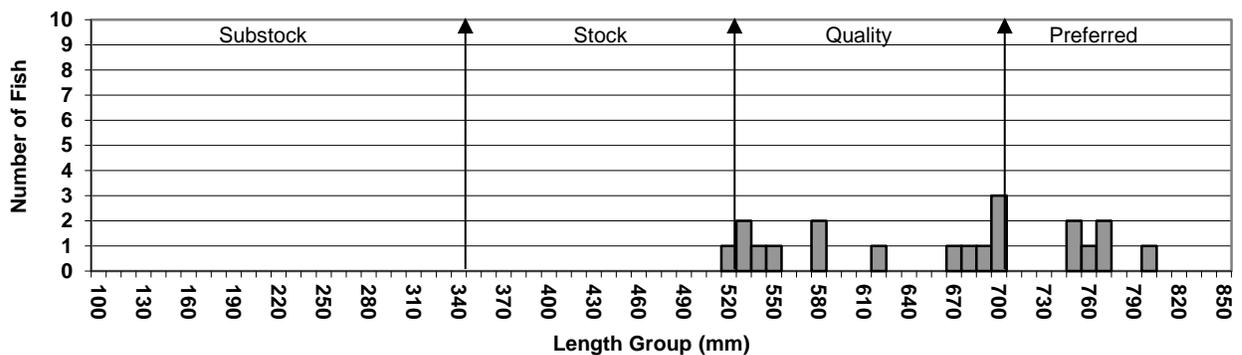


Table 10. Stocking records for the last ten years for Brakke Lake, Lyman County.

Year	Number	Species	Size
2003	3,780	Walleye	Fingerling
2005	2,335	Walleye	Fingerling
2008	1,170	Walleye	Large Fingerling
2010	13,000	Walleye	Small Fingerling
2013	3,089	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2016 to monitor the fish populations.
2. Continue to stock walleye fingerlings every other year to supplement the existing population.

Table 11. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Brakke Lake since survey records started.

Species	1964	1968	1971	1974	1978	1980	1987	1990	1992	1995	1998	2001	2004	2007	2010	2013
BLB (GN)	--	--	--	--	--	1.0	--	--	--	--	--	--	--	--	--	--
BLB (TN)	3.0	10.1	1.9	0.3	--	1.9	26.0	581.3	30.1	--	0.3	0.1	--	--	--	0.1
BLC (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	7.0	0.5
BLC (TN)	--	--	--	--	--	--	--	--	--	--	--	0.6	1.3	3.0	31.6	13.2
YEP (GN)	--	--	--	0.5	--	4.0	--	--	--	--	--	--	--	55.5	29.5	3.5
YEP (TN)	2.9	2.4	0.1	--	0.1	0.2	25.4	--	0.4	1.1	5.6	0.1	0.7	0.2	0.5	0.3
LMB (EF)	--	--	--	--	--	--	--	--	--	--	--	54.0	67.0	91.2	98.0	10.0
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	--	--
LMB (TN)	2.2	1.6	7.5	1.2	--	0.8	--	0.3	0.5	0.1	0.3	--	0.1	0.3	0.6	0.1
NOP (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5	2.0	1.5
NOP (TN)	--	--	--	--	--	--	--	0.1	--	--	0.1	0.3	1.0	1.2	2.2	1.7
CCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	--	--
CCF (TN)	--	--	--	--	--	--	0.3	2.6	1.2	0.5	0.5	--	0.1	0.3	--	--
WHS (GN)	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--	--
WHS (TN)	--	0.1	--	0.5	0.3	0.1	--	--	--	--	--	--	--	--	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	16.0	--	6.0	26.0	13.0
WAE (GN)	--	--	--	14.0	2.5	1.0	--	--	--	--	--	--	--	9.5	9.0	1.0
WAE (TN)	0.3	0.1	1.9	3.5	3.4	1.7	2.4	5.0	1.0	1.1	3.6	2.5	2.0	2.2	3.5	0.5
COC (GN)	--	--	--	--	--	33.0	--	--	--	--	--	--	--	--	--	--
COC (TN)	--	0.7	0.6	0.2	0.9	4.6	--	--	--	--	--	--	--	--	--	--
BLG (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	20.5	1.0	--
BLG (TN)	92.4	41.7	32.6	12.3	6.6	9.5	2.1	12.6	24.1	52.9	121.0	13.3	16.7	30.7	39.9	13.5
FCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FCF (TN)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	--	--
GOS (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GOS (TN)	4.5	1.2	0.9	--	--	0.1	--	--	--	--	--	--	--	--	--	--
RBT (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RBT (TN)	--	--	--	--	--	--	3.8	--	--	--	--	--	--	--	--	--

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, FCF – Flathead Catfish, GOS – Golden Shiner, RBT – Rainbow Trout