SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-48

Name: Lake Louise
County (ies): Hand
Legal Description: T113N-R69W-Sec. 4, 5
GPS: 44°37'24.22"N 99°07'55.87"W
Location from nearest town: 6 miles north and 7 miles west of Miller

Date of present survey: June 29-July 1, 2015 (netting); September 30, 2015 (electrofishing)
Date of last survey: July 8-10, 20113 (netting); October 1, 2013 (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
Bluegill	Walleye
	Black Bullhead
	Northern Pike

PHYSICAL DATA

Surface Area: 165 acres
Watershed: 87,040 acres
Maximum Depth: 20 feet
Mean Depth: 8 feet
Lake elevation at time of survey (field observations): Full
Contour map: Yes
Date: 1974

Ownership of lake and adjacent lakeshore properties:

Lake Louise is a 165-acre impoundment northwest of Miller in central Hand County. The artificial lake was created in 1935 by the Works Progress Administration (WPA) with the construction of an earthen dam and concrete spillway forming a barrier on Wolff Creek impounding water and creating the lake. The dam grade along with the majority of the lake lies on State owned land that is managed by the South Dakota Department of Game, Fish and Parks, Division of Parks and Recreation as a State Recreation Area. Fisheries management activities at Lake Louise are completed by the Wildlife Division of Game, Fish and Parks.

Watershed condition with percentages of land use types:

The watershed for Lake Louise is approximately 87,040 acres or 136 square miles mainly located to the south and west of the lake and is comprised primarily of privately owned agricultural and grassland. Land use in the watershed is 65% cultivated farmland consisting mainly of row crops, 30% pasture and hay land, and 5% roads, shelterbelts and residences. The immediate shoreline is native grasses, wooded areas and a State Recreation Area.

Fishing access:

Lake Louise has ample fishing opportunities. There is a great boat ramp for water access of all different types and sizes of boats. There is also ample shoreline for shore fishing and even a handicap accessible fishing pier.

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

All structures are in excellent condition.

Field observations of aquatic vegetation condition:

Emergent vegetation, consisting of mainly bulrushes and cattails, is found around the majority of the shoreline except for the dam grade and swimming beach. Submergent vegetation grows to a depth of about 6 feet and covers about 30% of the lake. The submergent vegetation consists of a mixture of pondweed species and forms very dense mats. The aquatic nuisance species purple flowering rush was found at Lake Louise across from the boat ramp and in a couple other locations around the main lake area.

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 6.5 feet. Other water quality characteristics were measured in the field on June 29, 2015, 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 Lake Louise, Hand County, June 29, 2015.

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	76.7	6.44	22.6	163	--	8.31	553	277	0.27	-174.5	6.5
A	23.5	73.8	2.99	27.2	224	--	7.94	667	334	0.32	-186.7	

BIOLOGICAL DATA

Methods:

Lake Louise was sampled on June 29-July 1, 2015, 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, 1-1/4, 1-1/2, and 2 inch monofilament mesh. On the evening of September 30, 2015, Lake Louise was nighttime electrofished for 60 minutes (6-ten minute transects) to sample the largemouth bass population. The boat was set at 120 pulses per second of DC current at 340 volts with around 11 amps to electrofish the lake that had a conductivity of 458µS/cm with a water temperature of 64.8°F. Fish indices and statistics were completed using Winfin.

Results and Discussion:

Gill net catch

Table 2. Total catch of two, 150ft experimental gill nets at Lake Louise, Hand County, June 29-July 1, 2015.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	61	67.0	30.5	± 50.8	9.2	93	0	111
Yellow Perch	29	31.9	14.5	± 26.2	46.5	0	0	110
Northern Pike	1	1.1	0.5	± 1.5	0.9	--	--	92

* Thirteen year mean (1997-2001, 2003, 2004, 2006, 2007, 2009, 2010, 2011, 2013)

Trap Net Catch

Table 3. Total catch of ten, overnight ¾-inch frame nets at Lake Louise, Hand County, June 29-July 1, 2015.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	73	90.1	7.3	± 4.9	34.8	94	0	101
Bluegill	3	3.7	0.3	± 0.4	24.8	--	--	119
Common Carp	3	3.7	0.3	± 0.3	0.0**	--	--	122
Yellow Perch	2	2.5	0.2	± 0.3	7.4	--	--	129

* Twenty-two year mean (1970, 1974, 1984, 1989, 1992-2001, 2003, 2004, 2006, 2007, 2009, 2010, 2011, 2013)
** First recorded sample in 2015

Electrofishing Catch

Table 4. Total catch from six, ten-minute runs of fall nighttime electrofishing on Lake Louise, Hand County, September 30, 2015.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	259	95.6	259.0	± 85.7	94.8	7	7	120
Walleye	12	4.4	12.0	± 8.9	3.8	18	0	92

* Fourteen year mean (1993-94, 1997-2001, 2003, 2007, 2009, 2010, 2011, 2012, 2013)

Bluegill

Lake Louise contains a bluegill population that is better than this survey revealed. The trap net CPUE of 0.3 is below the 1.5 from the 2013 survey (Table 9) as well as the 24.8 twenty-two year mean (Table 3). Figures 1 through 4 illustrate the length frequency histograms from the fish sampled since the lake filled after the drought. Not many inferences can be made from this survey due to the lack of fish sampled. The summer sampling this year was severely hindered by the amount of rain and water that was going through the system during the sampling event. Water levels where much higher than normal and nets were not fishing efficiently as they normally do. But during the fall electrofishing event, large numbers of several sizes of bluegills were observed throughout the sampling event. So the next survey should show a much improved picture of what is going on in the lake.

Figure 1. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2013.

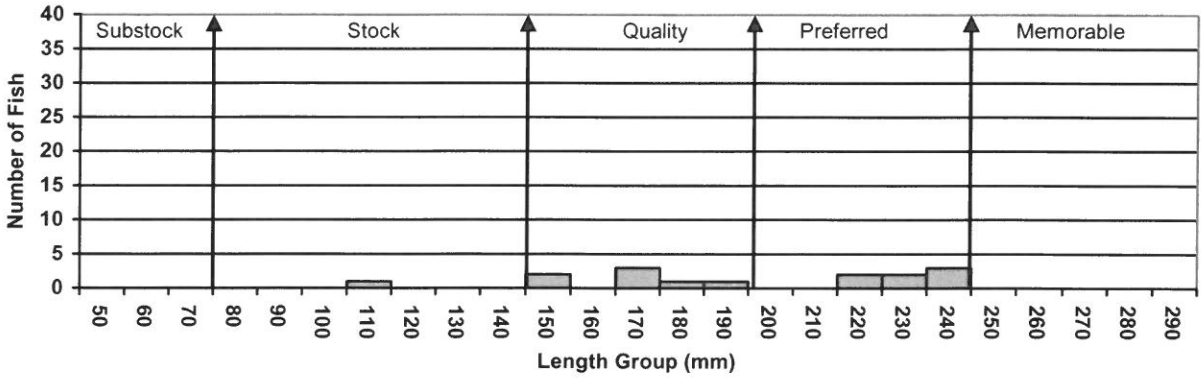


Figure 2. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2011.

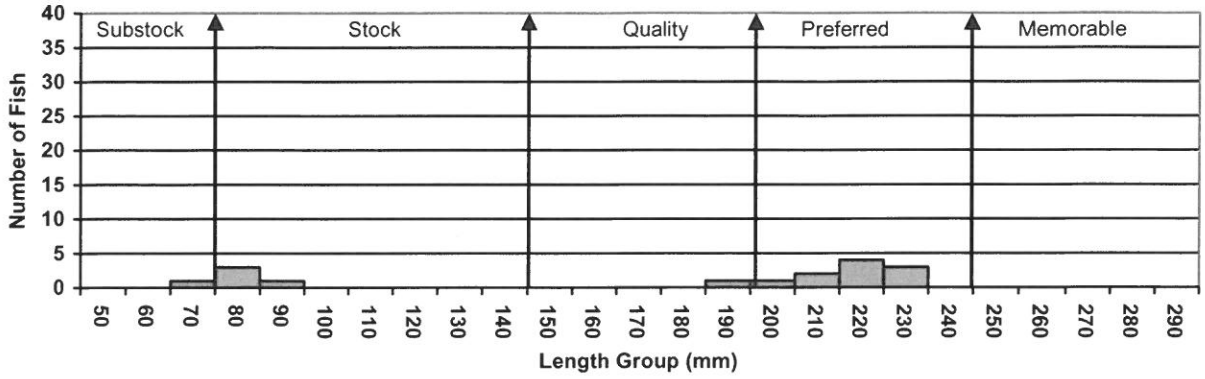


Figure 3. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2010.

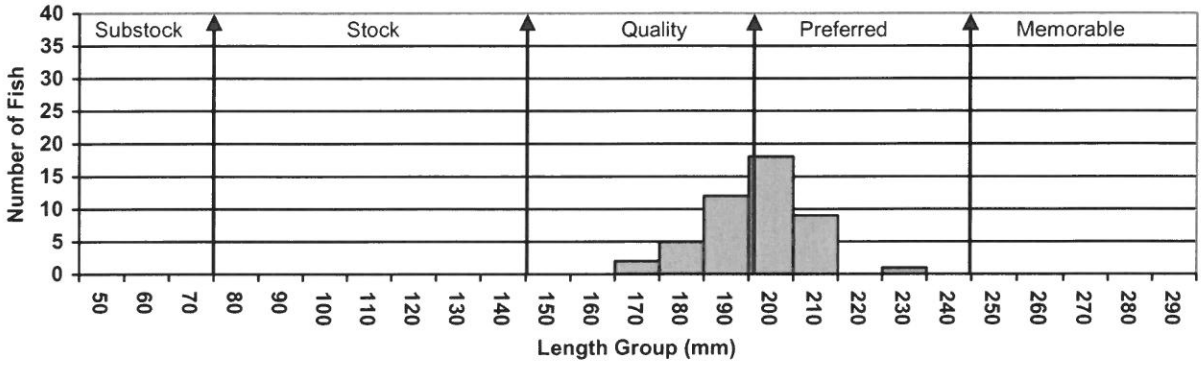
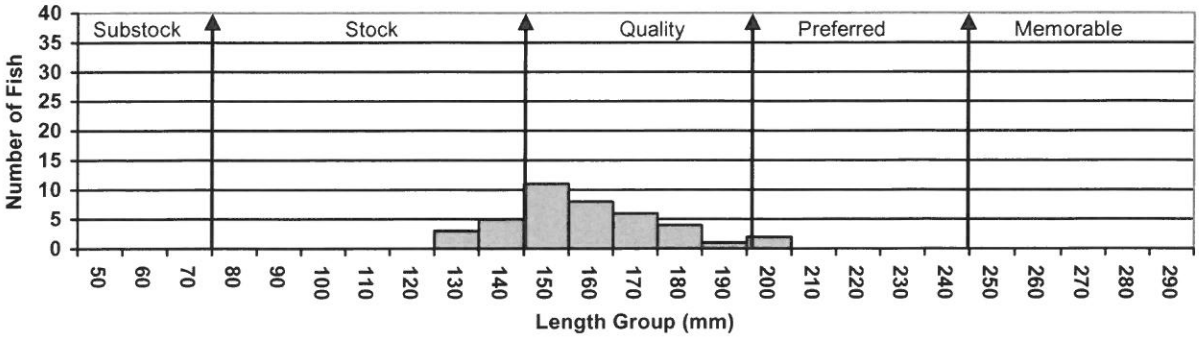


Figure 4. Length frequency histogram for bluegill sampled from Lake Louise, Hand County, 2009.



Yellow Perch

Yellow perch numbers in Lake Louise are on the rise. The gill net CPUE of 14.5 is above the 7.0 from the 2013 survey (Table 9) but below the 46.5 thirteen year mean (Table 2). The population is dominated by young fish as can be seen in Table 5 that has the age and growth data. Growth is good with means at statewide, regional and SLI means (Table 5). Figures 5 through10 illustrate the length frequency histograms for the fish sampled over the past six surveys. Condition is good with a mean Wr of 110.

Table 5. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Lake Louise, Hand County, 2015.

			Back-calculated Age	
Year Class	Age	N	1	2
2014	1	27	114	
2013	2	7	95	152
All Classes		**31**	**105**	**152**
Statewide Mean			86	145
Region II Mean			91	152
SLI* Mean			87	142

* Small Lakes and Impoundments

Figure 5. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2015.

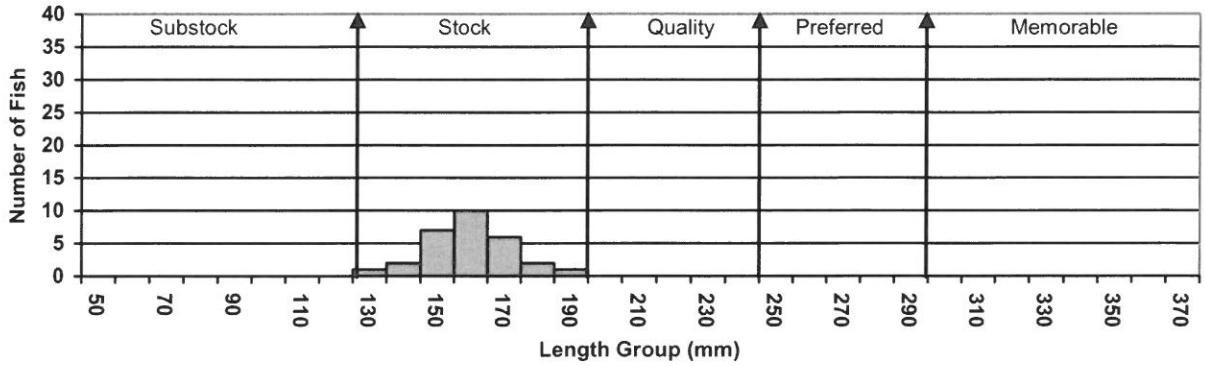


Figure 6. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2013.

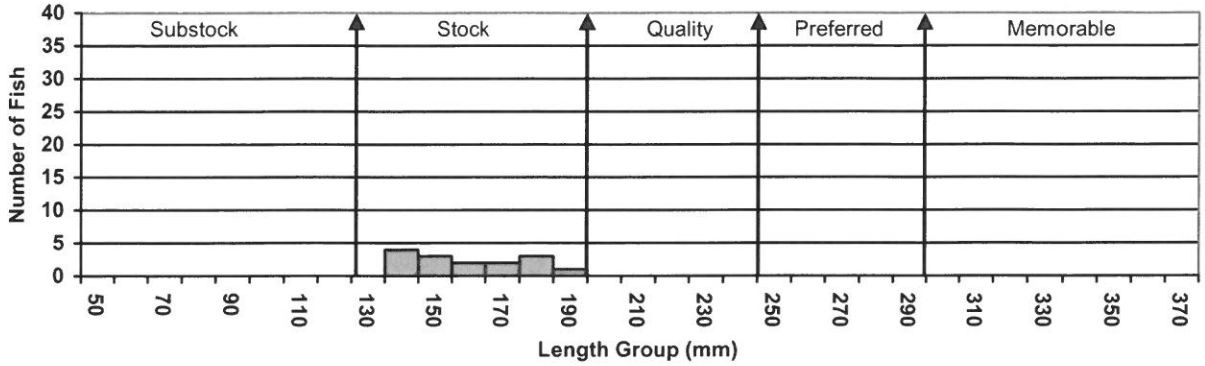


Figure 7. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2011.

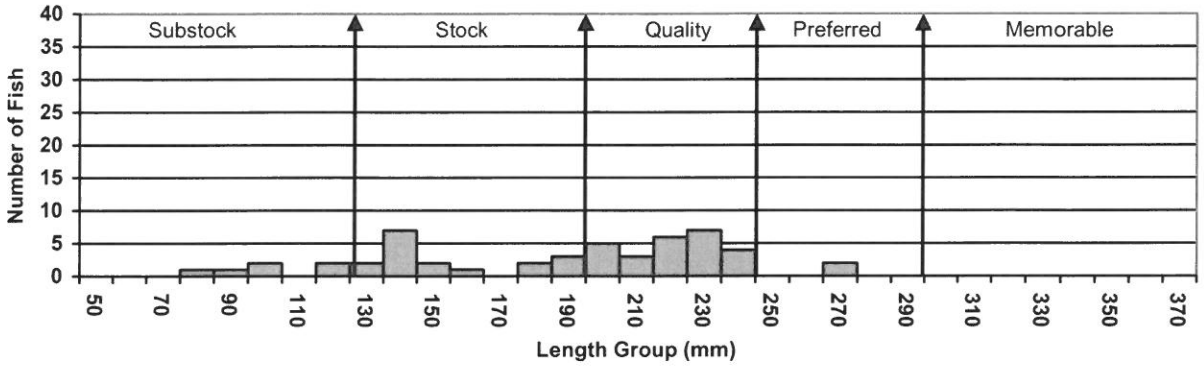


Figure 8. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2010.

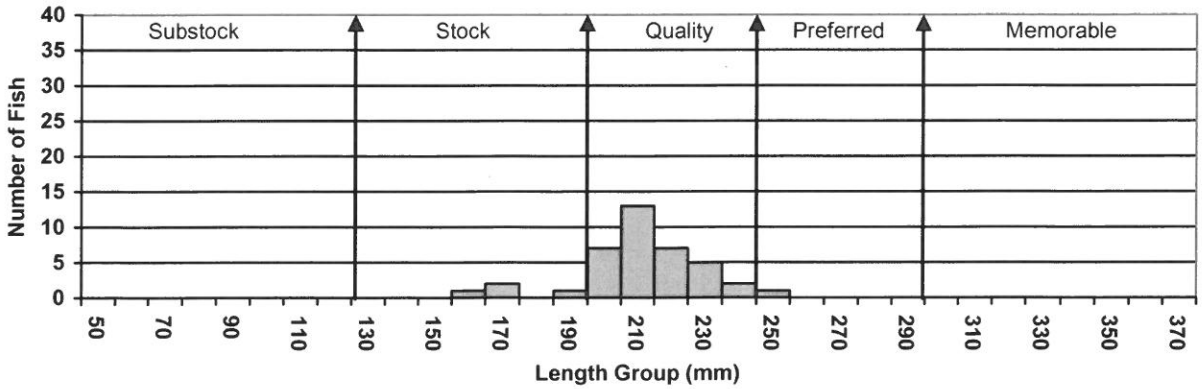


Figure 9. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2009.

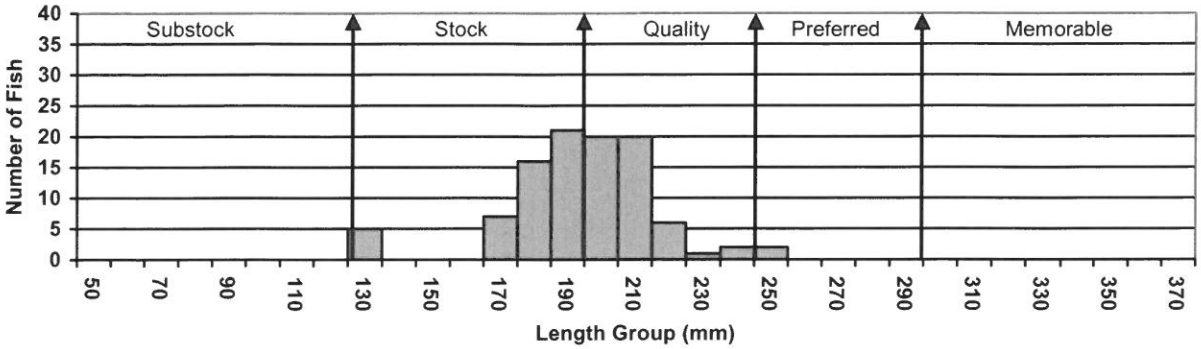
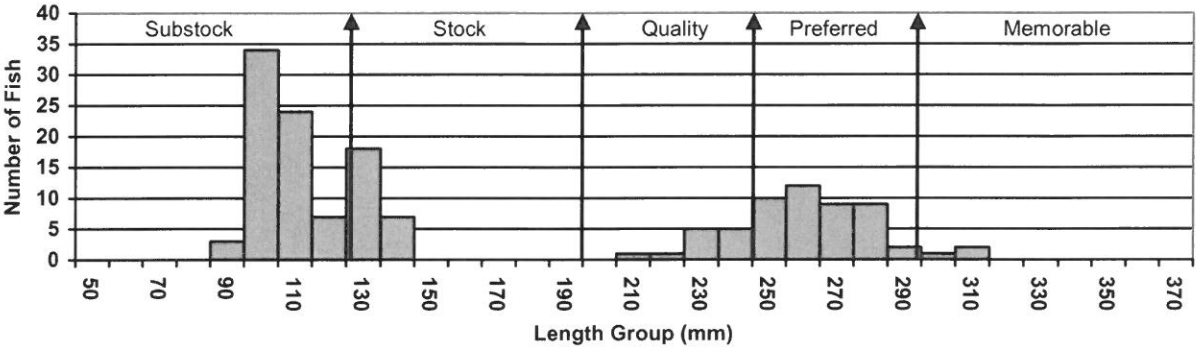


Figure 10. Length frequency histogram for yellow perch sampled from Lake Louise, Hand County, 2007.



Largemouth Bass

The largemouth bass population in Lake Louise has seen another significant jump in the population. The electrofishing CPUE of 259.0 fish per hour is well above the 170.0 from the 2013 survey (Table 9) as well as the 94.8 fourteen year mean (Table 4). One thing about this population is that it is dominated by young fish as can be seen that the majority of fish are age 0 or 1 (Table 6). Growth is good with means at statewide, regional and SLI means (Table 6). Condition is also good with a mean Wr of 120. Figures 11 through 15 illustrate the length frequency histograms for the fish sampled over the past five surveys. It has been somewhat of a struggle to get the bass population on the right track, but with the stable to increasing water levels along with a supplemental stocking that was done in 2012, it appears that things are headed in the right direction.

Table 6. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Lake Louise, Hand County, 2015.

			Back-calculated Age				
Year Class	Age	N	1	2	3	4	5
2015	0	163					
2014	1	57	107				
2010	5	4	138	308	347	386	418
All Classes		**224**	**122**	**308**	**347**	**386**	**418**
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 11. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2015.

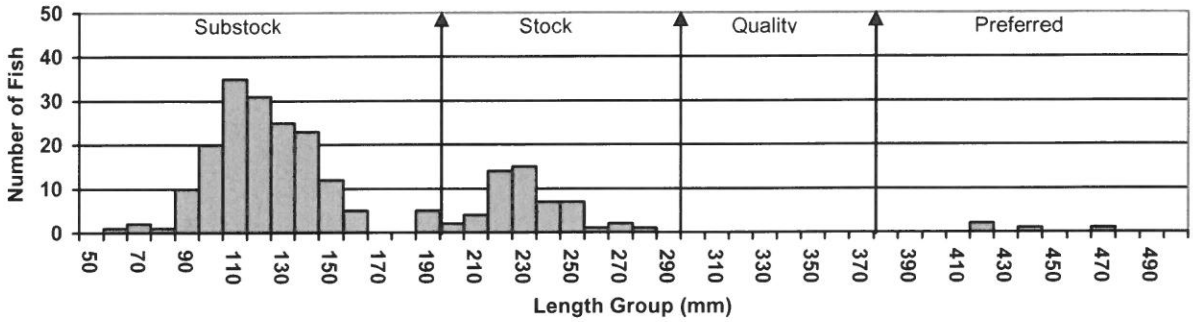


Figure 12. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2013.

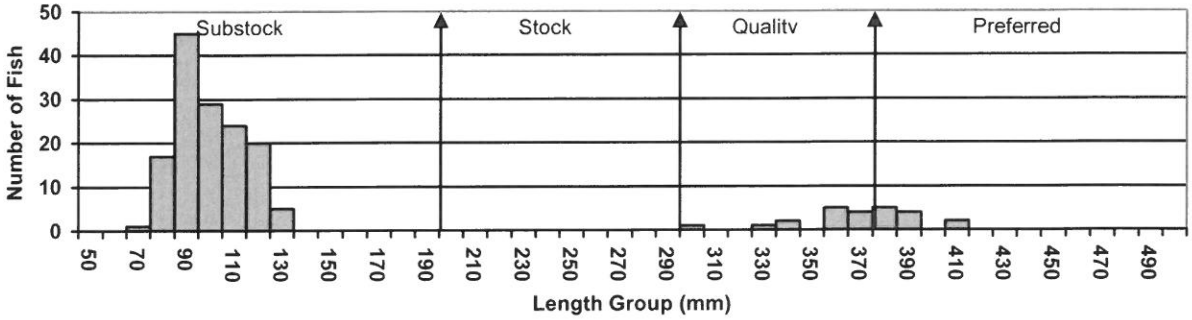


Figure 13. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2011.

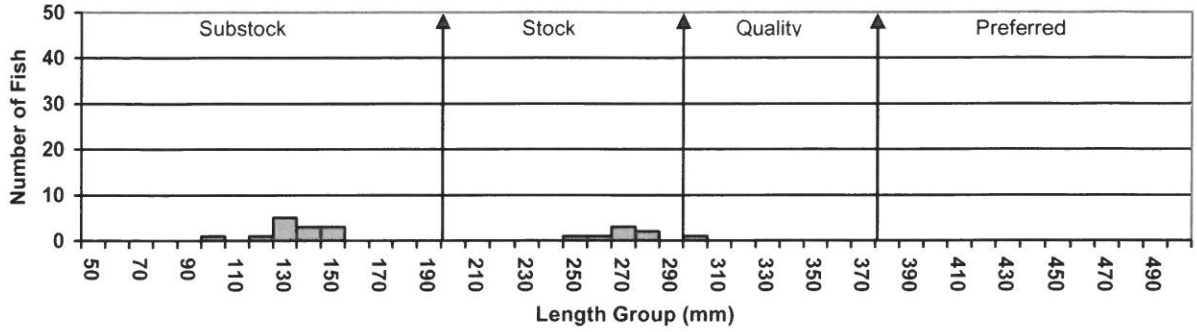


Figure 14. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2010.

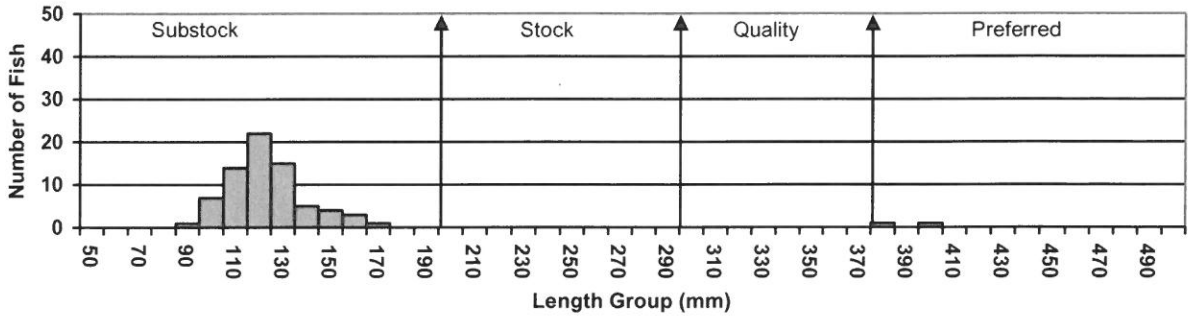
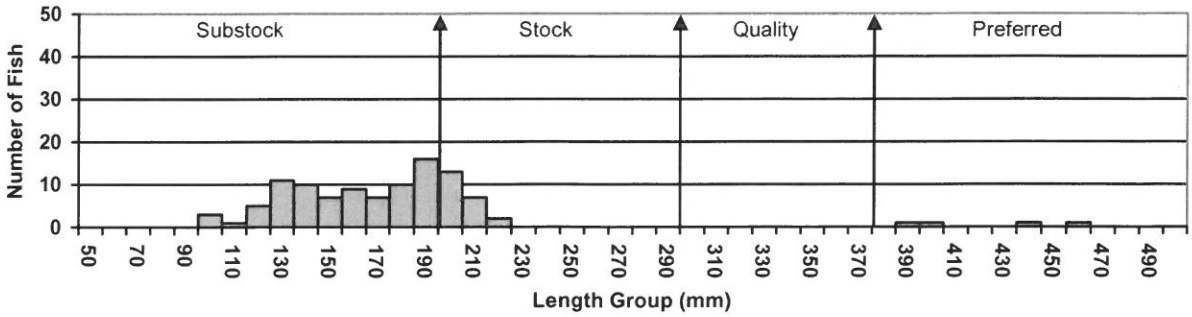


Figure 15. Length frequency histogram for largemouth bass sampled from Lake Louise, Hand County, 2007.



Black Bullhead

Black bullheads have consistently been sampled in Lake Louise, but usually in low numbers. Numbers really changed for the worse after the drought broke and numbers have climbed ever since. Numbers reached their peak in the 2013 survey with a CPUE of 233.6 fish per trap net night. The current CPUE is 7.3 fish per trap net night. The reason for the drastic drop in numbers was that during the summer of 2014, black bullheads suffered a large die off caused by a combination of bacterial infections. The die off appears to have opened that door for the other species to take off and start to reach the numbers they typically exhibit. Figures 16 through 21 illustrate the length frequency histograms for the fish sampled over the past six surveys. Condition is good with a mean Wr of 101.

Figure 16. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2015.

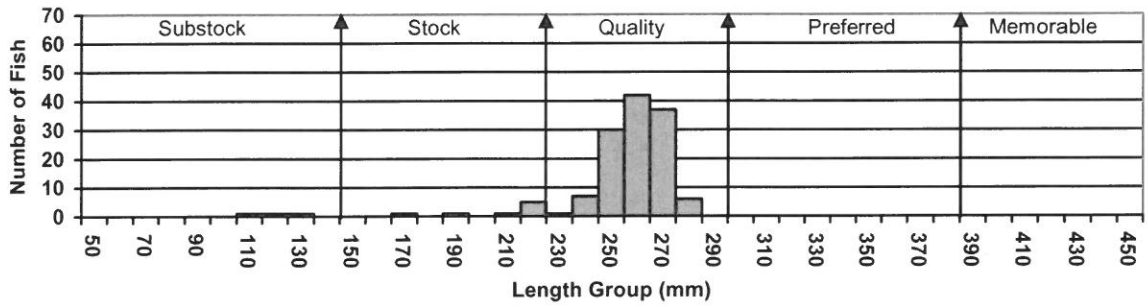


Figure 17. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2013.

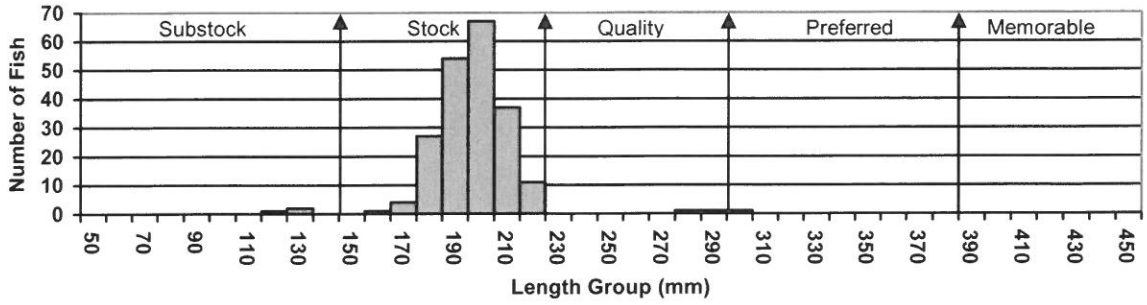


Figure 18. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2011.

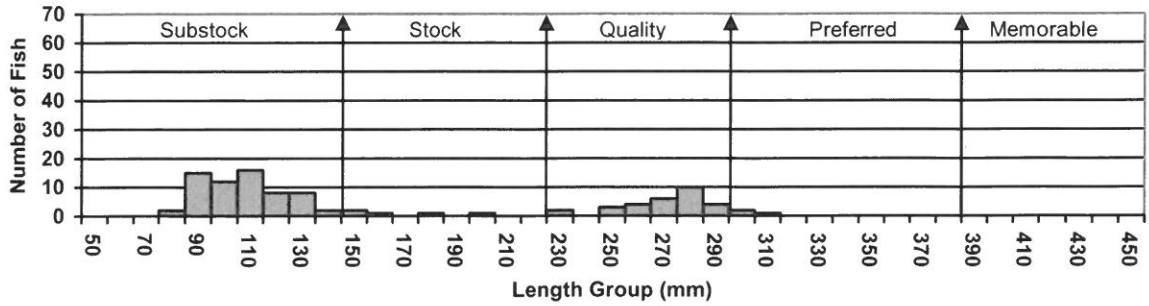


Figure 19. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2010.

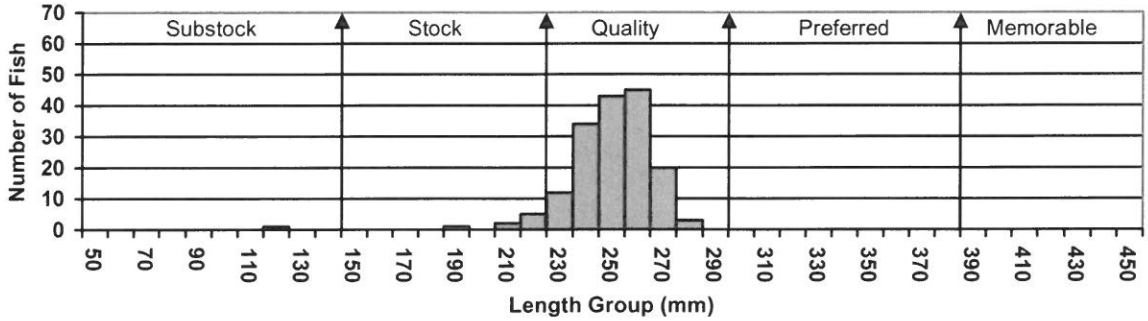


Figure 20. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2009.

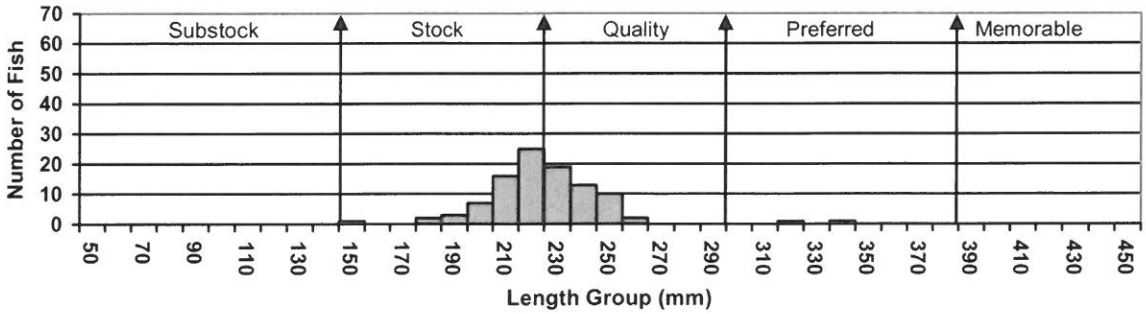
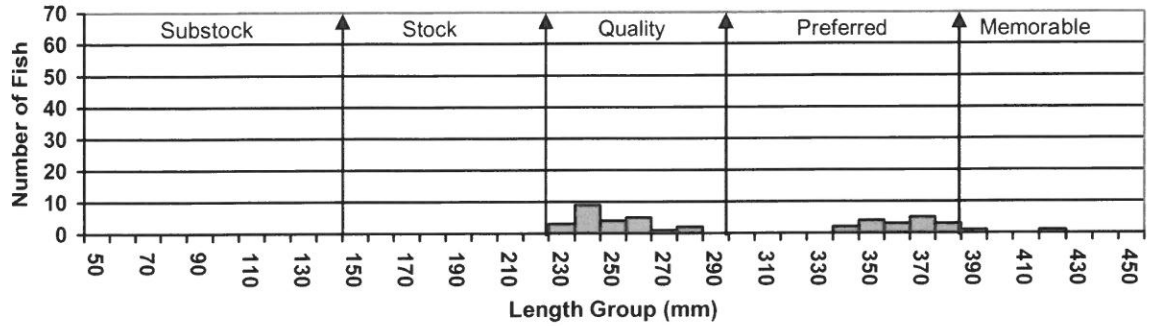


Figure 21. Length frequency histogram for black bullhead sampled from Lake Louise, Hand County, 2007.



Other Species

Northern pike, walleye and common carp were the only other species sampled this survey. Black crappie and channel catfish were the species not sampled this survey that have been in years past (Table 8 & 9). Only one northern pike was sampled this year. There has been a low density pike population found in Louise for the last several surveys, but this is one of the lowest catches.

Three common carp were sampled in the trap nets this year. This was the first recorded sampling of carp in the history of lake surveys (Table 8 & 9). It will be interesting to see what kind of carp population comes about.

Walleye were the last species sampled this survey and they were only sampled in the fall electrofishing sample. Twelve fish were sampled for a CPUE of 12.0, which is above the 3.8 fourteen year mean (Table 4). Walleye continue to be a low density fishery in Louise and are stocked as large fingerlings on an every other year basis (Table 7).

Table 7. Stocking records for the last ten years for Lake Louise, Hand County.

Year	Number	Species	Size
2006	4,200	Walleye	Large Fingerling
2010	23,360	Walleye	Small Fingerling
2012	5,640	Largemouth Bass	Fingerling
2012	1,630	Walleye	Large Fingerling
2014	1,613	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2018 to continue to monitor the fish populations.

2. Continue to stock walleye fingerlings every other year to further supplement the population.

Table 8. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Lake Louise since 1970.

Species	1970	1974	1984	1989	1992	1993	1994	1995	1996	1997	1998	1999
BLB (GN)	--	--	--	--	--	--	--	--	--	4.5	1.5	--
BLB (TN)	6.9	38.6	242.5	6.1	7.5	2.1	0.7	3.5	4.4	2.0	1.0	3.3
BLC (GN)	--	--	--	--	--	--	--	--	--	--	--	--
BLC (TN)	28.3	104.6	--	--	--	--	--	--	--	--	--	--
YEP (GN)	--	--	--	--	--	--	--	--	--	203.5	35.5	109.0
YEP (TN)	0.3	--	45.5	2.0	3.3	10.9	11.9	1.6	1.3	2.8	1.3	3.3
LMB (EF)	--	--	--	--	--	70.0	76.0	--	--	40.9	42.9	284.3
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--	1.5
LMB (TN)	0.5	0.1	5.8	--	1.4	2.3	1.3	1.4	0.1	--	--	0.3
NOP (GN)	--	--	--	--	--	--	--	--	--	--	--	--
NOP (TN)	0.6	--	--	--	--	--	--	--	--	--	--	--
CCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--
CCF (TN)	--	--	0.1	--	--	--	--	--	--	--	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	4.8
WAE (GN)	--	--	--	--	--	--	--	--	--	--	2.5	2.0
WAE (TN)	--	--	0.3	0.1	1.0	--	0.3	0.9	2.9	--	--	1.1
COC (GN)	--	--	--	--	--	--	--	--	--	--	--	--
COC (TN)	--	--	--	--	--	--	--	--	--	--	--	--
BLG (EF)	--	--	--	--	--	--	--	--	--	104.1	337.1	--
BLG (GN)	--	--	--	--	--	--	--	--	--	--	--	6.5
BLG (TN)	5.7	34.0	24.5	52.5	34.4	20.5	23.3	32.3	32.1	39.5	27.0	68.8

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, CCF-Channel Catfish, WAE-Walleye, COC-Common Carp, BLG-Bluegill

Table 9. Gill net (GN), trap net (TN), and electrofishing (EF) CPUE for all fish species sampled in Lake Louise since 1970.

Species	2000	2001	2003	2004	2006	2007	2009	2010	2011	2012	2013	2015
BLB (GN)	1.0	--	7.5	7.0	0.5	3.5	4.0	31.5	0.5	--	58.5	30.5
BLB (TN)	5.4	2.8	5.0	4.1	0.5	4.3	57.6	49.5	83.7	--	233.6	7.3
BLC (GN)	--	--	--	--	--	--	--	--	--	--	--	--
BLC (TN)	--	--	--	--	--	--	--	--	--	--	--	--
YEP (GN)	0.5	28.5	59.5	1.5	5.5	127.0	4.5	4.5	18.0	--	7.0	14.5
YEP (TN)	1.8	4.4	3.1	0.5	1.4	5.0	57.0	3.9	1.4	--	0.1	0.2
LMB (EF)	94.8	82.0	116.0	--	--	276.0	3.0	20.0	22.0	29.0	170.0	259.0
LMB (GN)	--	--	--	--	--	--	--	--	--	--	--	--
LMB (TN)	0.3	0.1	0.5	0.2	0.1	0.1	--	--	--	--	--	--
NOP (GN)	--	--	2.0	2.0	--	2.5	--	3.0	0.5	--	1.5	0.5
NOP (TN)	--	--	--	0.1	--	0.5	0.3	0.6	0.7	--	0.8	--
CCF (GN)	--	--	--	--	--	--	--	--	--	--	--	--
CCF (TN)	--	--	--	--	--	--	--	--	--	--	--	--
WAE (EF)	7.2	1.0	6.0	--	--	--	--	29.0	--	5.0	--	12.0
WAE (GN)	0.5	3.0	5.0	8.5	1.0	3.0	--	--	--	--	1.0	--
WAE (TN)	0.6	--	0.1	0.2	0.2	0.2	--	--	--	--	0.1	--
COC (GN)	--	--	--	--	--	--	--	--	--	--	--	--
COC (TN)	--	--	--	--	--	--	--	--	--	--	--	0.3
BLG (EF)	--	--	--	--	--	--	--	--	--	--	--	--
BLG (GN)	0.5	--	2.0	0.5	1.5	--	--	--	--	--	--	--
BLG (TN)	48.6	14.7	39.5	19.1	7.1	9.1	4.0	4.8	1.6	--	1.5	0.3

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, CCF-Channel Catfish, WAE-Walleye, COC-Common Carp, BLG-Bluegill