

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-47

Name: Herrick Lake

County: Gregory

Legal Description: T96N-R71W-Sec. 26

GPS: 43°05'48.97"N 99°12'02.62"W

Location from nearest town: 1 mile southwest of Herrick

Date of present survey: June 23-25, 2014 (netting); October 7, 2014 (electrofishing)

Date of last survey: June 6-8, 2011 (netting); September 26, 2011 (electrofishing)

Most recent lake management plan: F-21-R-46 (January 1, 2014 to December 31, 2018)

Management classification: Warmwater Marginal

Primary Game Species	Secondary and Other Species
Bluegill	Northern Pike
Largemouth Bass	Black Bullhead
Black Crappie	Yellow Perch
	Green Sunfish

PHYSICAL DATA

Surface Area: 12 acres

Watershed: 800 acres

Maximum Depth: 14 feet

Mean Depth: 6.0 feet

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

Contour map: No

Date: NA

Ownership of lake and adjacent lakeshore properties:

Herrick Lake is a 12-acre impoundment located one mile southwest of the town of Herrick in southern Gregory County. The artificial lake was created in 1935 when the Works Progress Administration (WPA) constructed an earthen dam on the upper end of an unnamed tributary of Ponco Creek. Herrick Lake lies within 160 acres of land owned by the South Dakota Department of Game, Fish and Parks. The land is designated as a Game Production Area.

Watershed condition with percentages of land use types:

The watershed for Herrick Lake is small at approximately 800 acres or 1 1/4 square miles and is made up of privately owned agricultural land and land managed as a Game Production Area. Most of the water in the lake is derived from live springs that flow throughout the year. Land use in the watershed is 20% cultivated farmland, 40% pasture and hayland, and 40% native grasses.

Fishing access:

There is a boat ramp on the southeast corner of the lake for boat access. There is also access to the entire shoreline for shore fishing due the lake being on public land. Fishing in general is usually severely restricted by the amounts of submergent vegetation.

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

The dam and spillway are in good condition. The dam is overgrown with brush and large trees. Beaver dams repeatedly obstruct the spillway. The boat ramp is an old plank boat ramp with the access road only being a dirt trail the may become impassible during wet periods.

Field observations of aquatic vegetation condition:

Submergent vegetation fills 100% of the upper 1/8 of the lake. In the rest of the lake, it grows to depths of around 5 feet and consists of a mixture of several species. The vegetation historically reaches nuisance levels by early summer. Emergent vegetation consists of mainly cattails and surrounds about 97% of the shoreline except for the dam grade. The interesting find this survey was the presence of an aquatic invasive species in curlyleaf pondweed. The presence of curlyleaf will have some management implications for boaters.

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

No pollution problems were evident at the time of the survey but the presence of curlyleaf pondweed was found at the time of survey. The only location of the findings was a small patch at the boat ramp area. Water clarity was good with a secchi disc reading of 6.5 feet. Other water quality characteristics were measured in the field on June 23, 2014, 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 Herrick Lake, Gregory County, June 23, 2014.

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	77.2	5.30	58.8	138	102	8.57	213	106	0.10	-110.7	6.5
A	13.5	66.5	2.30	111.8	163	150	7.65	303	151	0.14	-145.5	

BIOLOGICAL DATA

Methods:

Herrick Lake was sampled on June 23-25, 2014, with ten overnight trap net sets. The trap nets have 3ft x 5ft frames, 60ft leads, and ¾ inch knotted mesh. No experimental gill nets were used during this survey period. On the evening of October 7, 2014, Herrick Lake was electrofished for 20 minutes (2-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 12 amps to electrofish the lake that had a conductivity of 290 µS/cm with a water temperature of 55.0°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 Herrick Lake, Gregory County, June 23-25, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Bluegill	394	75.3	39.4	± 13.7	40.9	48	0	86
Black Crappie	104	19.8	10.4	± 3.1	22.3	69	1	84
Green Sunfish	13	2.5	1.3	± 0.7	0.6	92	0	115
Yellow Perch	6	1.1	0.6	± 0.5	1.6	100	50	89
Black Bullhead	6	1.1	0.6	± 0.4	1.1	100	83	92
Largemouth Bass	1	0.2	0.1	± 0.1	0.3	--	--	106

* Twelve year mean (1978, 1981, 1984, 1988, 1991, 1994, 1996, 1999, 2002, 2005, 2008, 2011)

Electrofishing Catch

Table 3. Total catch from two, ten-minute transects of fall nighttime electrofishing on Herrick Lake, Gregory County, September 26, 2011.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	30	100	90.0	± 18.5	131.9	65	31	107

* Four year mean (1994, 2005, 2008, 2011)

Largemouth Bass

Herrick Lake continues to contain an outstanding largemouth bass population. The CPUE of 90.0 fish per hour of electrofishing is well below the 195.0 from the 2011 survey (Table 8) as well as the 131.9 four year mean (Table 3). Figures 1 through 4 illustrate the length frequency histograms for the fish sampled over the last four surveys. They all show how well balanced a population that Herrick has. The PSD of 65 with an RSD-P of 31 shows a balanced population as well. Growth continues to be on the slow side with means below statewide, regional and SLI means (Table 4). Condition is good with a mean Wr of 107.

Table 4. Average back-calculated lengths (mm) for each age class of largemouth bass sampled in Herrick Lake, Gregory County, 2014.

Year Class	Age	N	Back-calculated Age															
			1	2	3	4	5	6	7	8	9	10	11	12	13			
2013	1	4	99															
2012	2	9	109	213														
2011	3	4	89	186	273													
2010	4	2	86	182	252	295												
2009	5	2	84	138	221	283	326											
2007	7	1	99	160	197	232	253	283	312									
2006	8	1	80	156	195	249	271	306	346	384								
2005	9	2	99	147	206	259	298	338	375	388	397							
2004	10	3	86	145	193	253	293	317	346	363	384	412						
2001	13	2	70	140	198	264	294	313	335	371	386	409	431	449	476			
All Classes		30	90	163	217	262	289	311	343	376	389	410	431	449	476			
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 Herrick Lake, Gregory County, 2014.

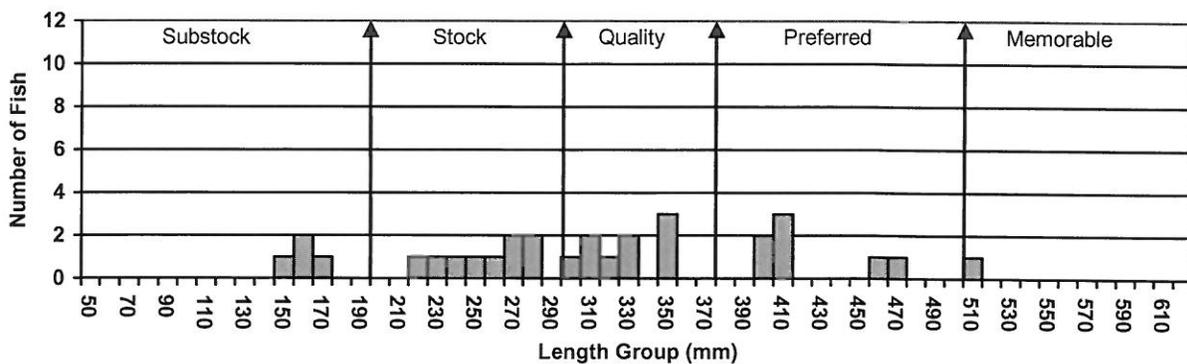


Figure 2. Length frequency histogram for largemouth bass sampled from Herrick Lake, Gregory County, 2011.

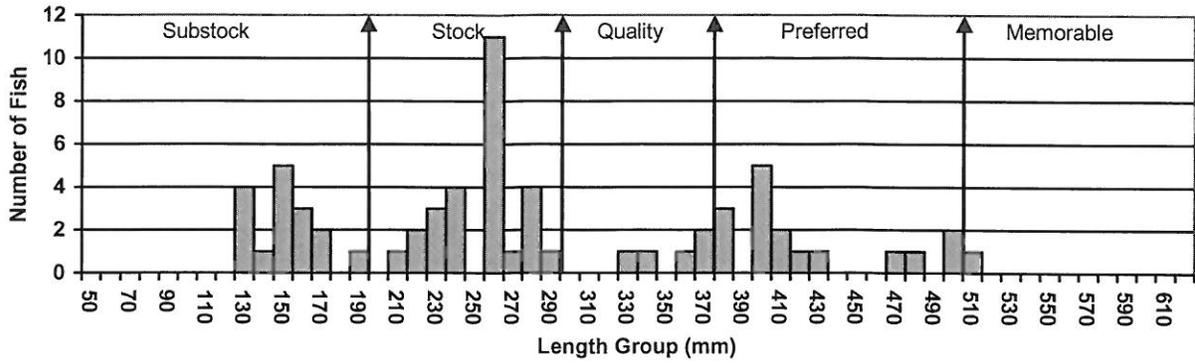


Figure 3. Length frequency histogram for largemouth bass sampled from Herrick Lake, Gregory County, 2008.

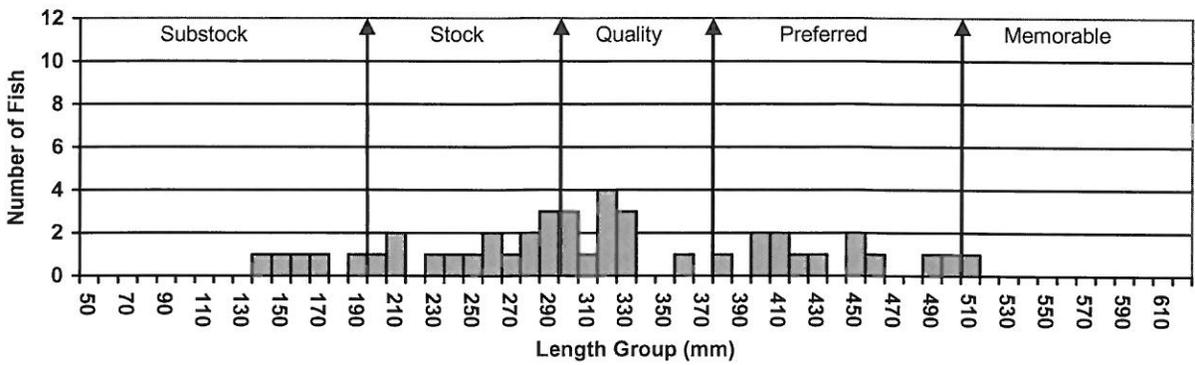
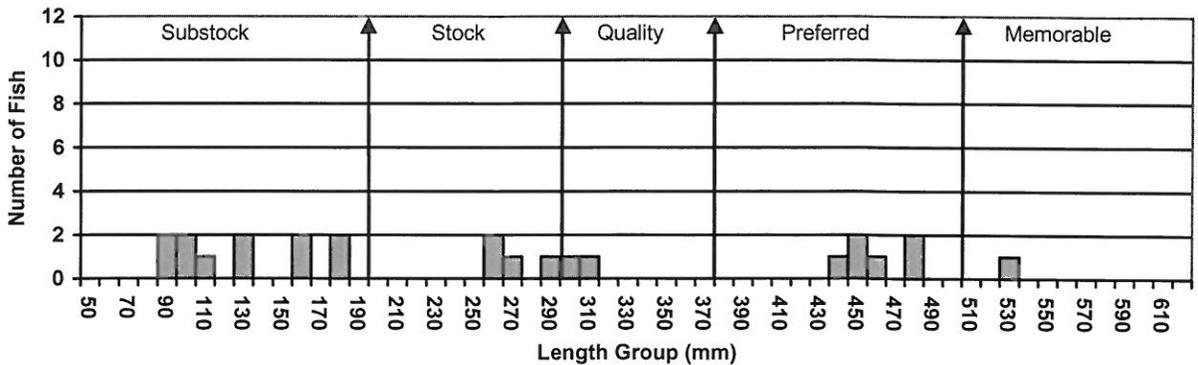


Figure 4. Length frequency histogram for largemouth bass sampled from Herrick Lake, Gregory County, 2005.



Black Crappie

Black crappie numbers have seen an increase this survey. The CPUE of 10.4 is above the 7.3 from the 2011 survey (Table 8) but is still below the 22.3 twelve year mean (Table 2). Figures 5 through 10 illustrate the length frequency histograms for the fish sampled over the last six surveys. The size structure has remained relatively the same with only slight bumps or declines. Growth is again on the slow side with means below statewide, regional and SLI means (Table 5). Condition is fine with a mean W_r of 84.

Table 5. Average back-calculated lengths (mm) for each age class of black crappie sampled in Herrick Lake, Gregory County, 2014.

Year Class	Age	N	Back-calculated Age								
			1	2	3	4	5	6	7	8	
2012	2	10	66	116							
2011	3	5	78	150	178						
2010	4	26	76	123	161	190					
2009	5	23	73	110	155	189	205				
2008	6	16	74	127	158	188	201	211			
2007	7	11	78	123	153	174	190	202	211		
2006	8	6	101	148	166	176	184	192	201	208	
All Classes		97	78	128	162	183	195	201	206	208	
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 5. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 2014.

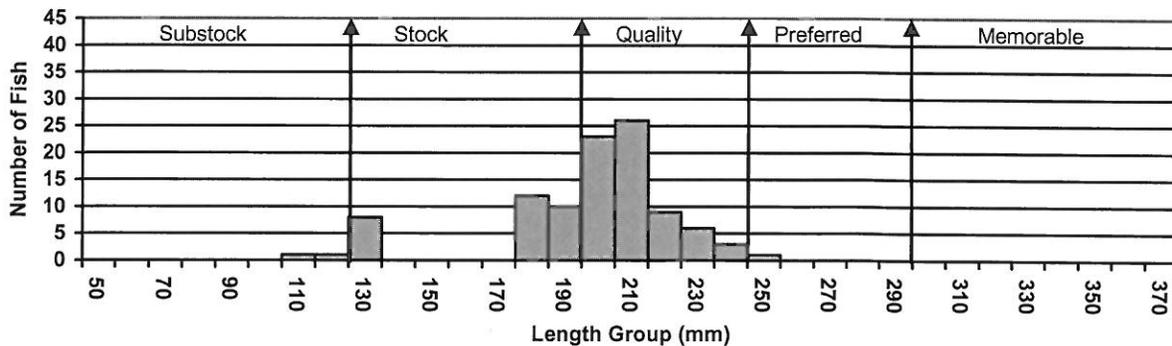


Figure 6. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 2011.

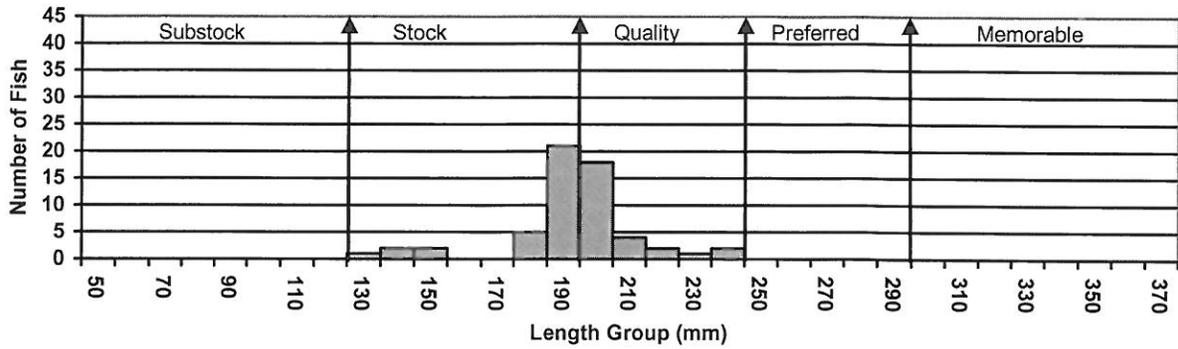


Figure 7. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 2008.

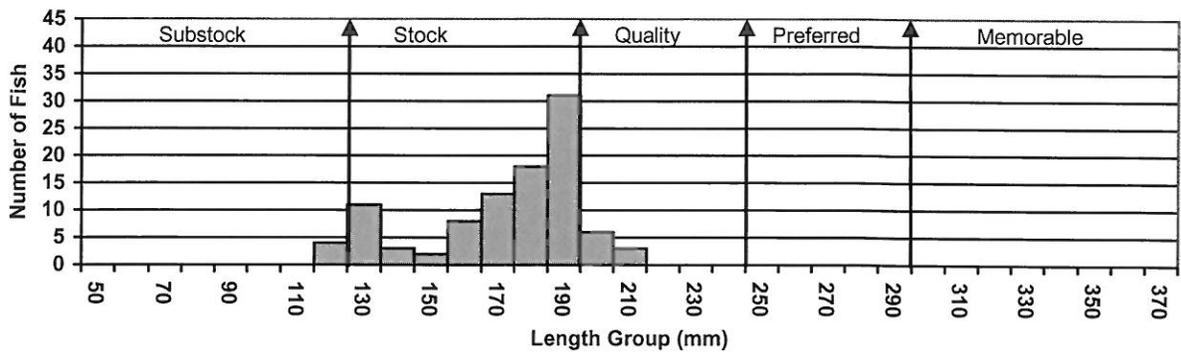


Figure 8. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 2005.

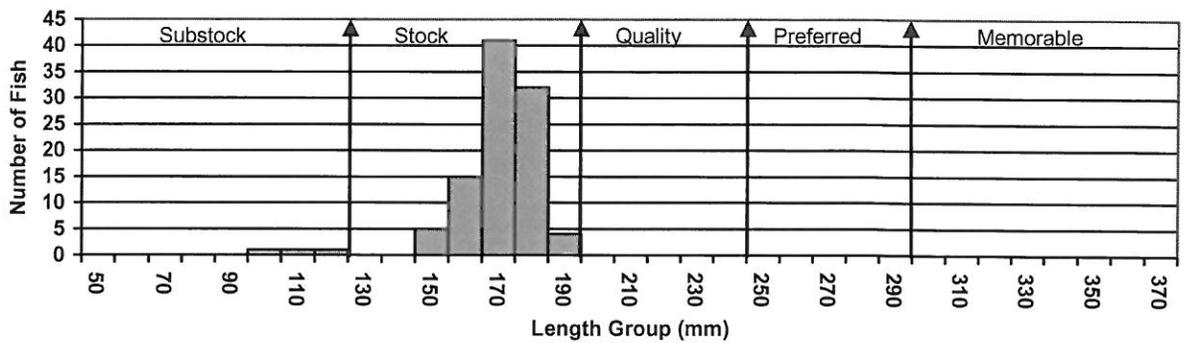


Figure 9. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 2002.

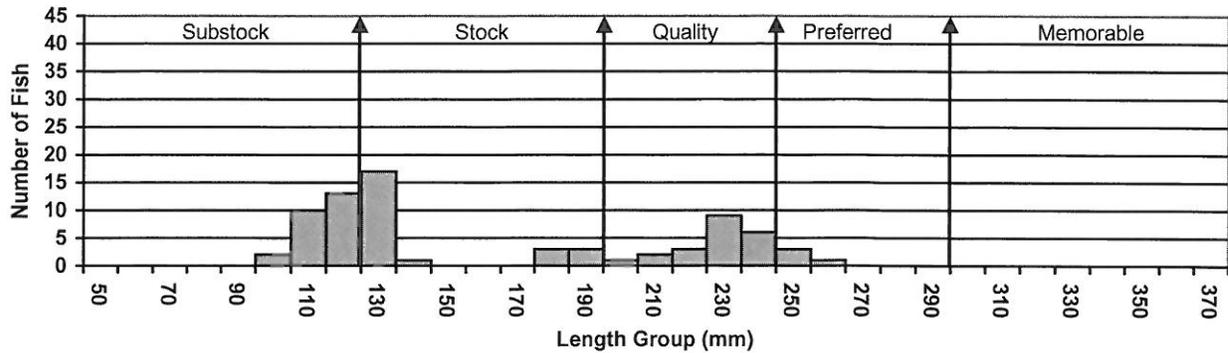
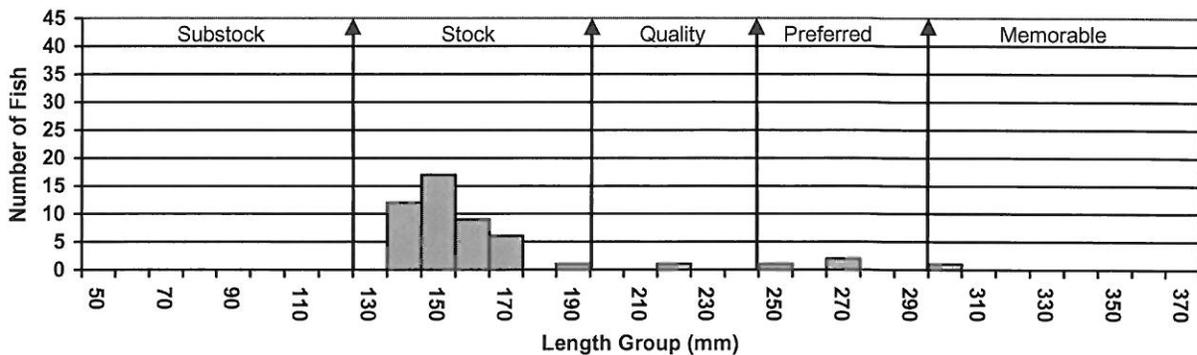


Figure 10. Length frequency histogram for black crappie sampled from Herrick Lake, Gregory County, 1999.



Bluegill

The bluegill population in Herrick Lake has remained pretty constant over the last several surveys. The CPUE of 39.4 is above the 29.1 from the 2011 survey (Table 8) but right on with the 40.9 twelve year mean (Table 2). Size structure has slightly increased again this survey over the last survey with the current PSD of 48 with an RSD-P of 0. Figures 11 through 16 illustrate the length frequency histograms for the last six surveys. They really show how stable the population has been over time. Growth is also again on the slow side with means below statewide, regional and SLI means (Table 6). Condition is fine with a mean W_r of 86.

Table 6. Average back-calculated lengths (mm) for each age class of bluegill sampled in Herrick Lake, Gregory County, 2014.

Year Class	Age	N	Back-calculated Age						
			1	2	3	4	5	6	7
2012	2	2	45	74					
2011	3	3	44	73	101				
2010	4	30	47	76	105	126			
2009	5	46	47	75	104	129	143		
2008	6	18	41	63	94	121	143	157	
2007	7	1	54	103	120	132	148	155	174
All Classes		100	46	77	105	127	145	156	174
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 11. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 2014.

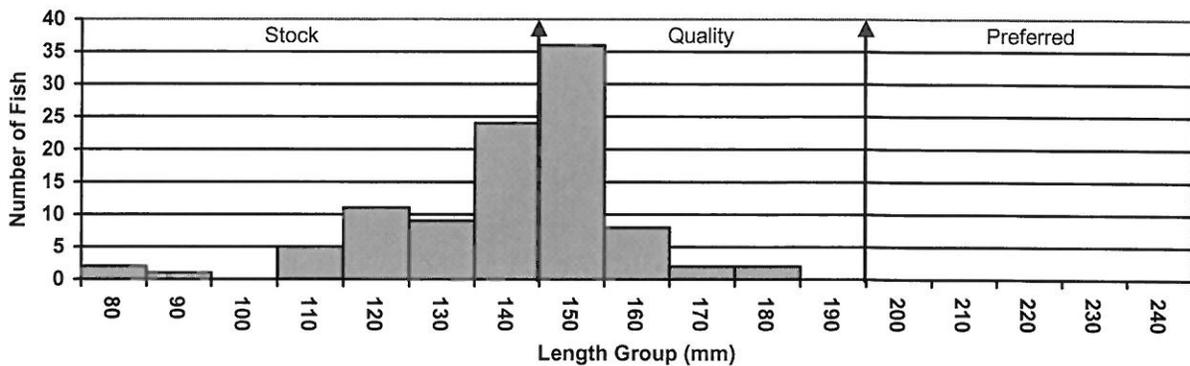


Figure 12. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 2011.

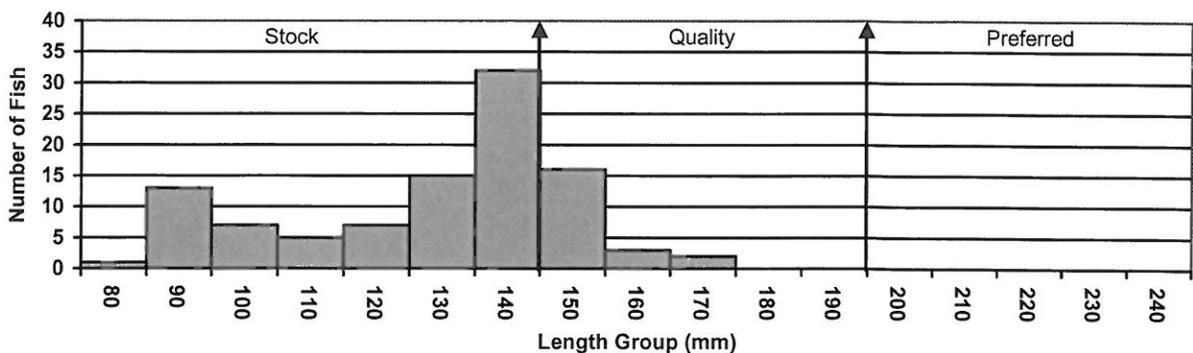


Figure 13. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 2008.

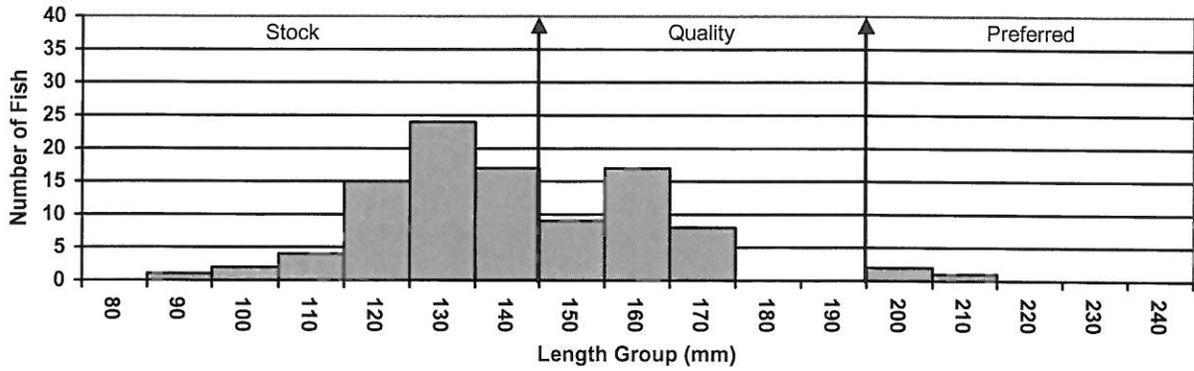


Figure 14. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 2005.

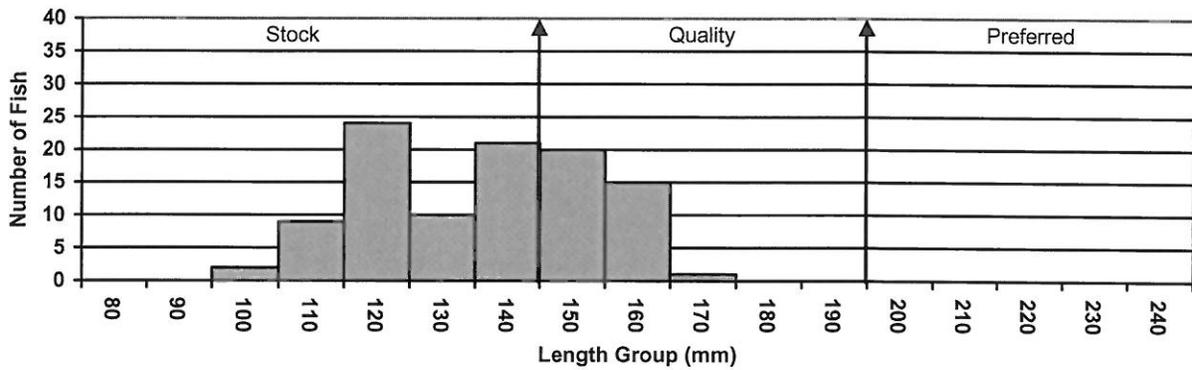


Figure 15. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 2002.

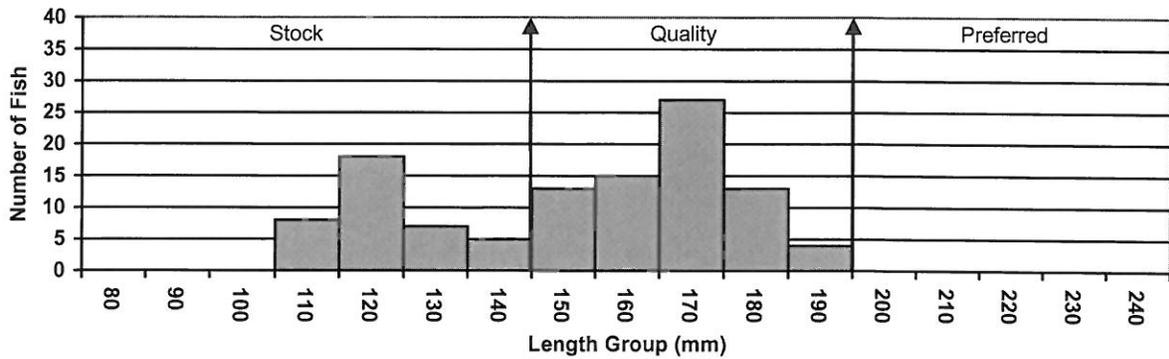
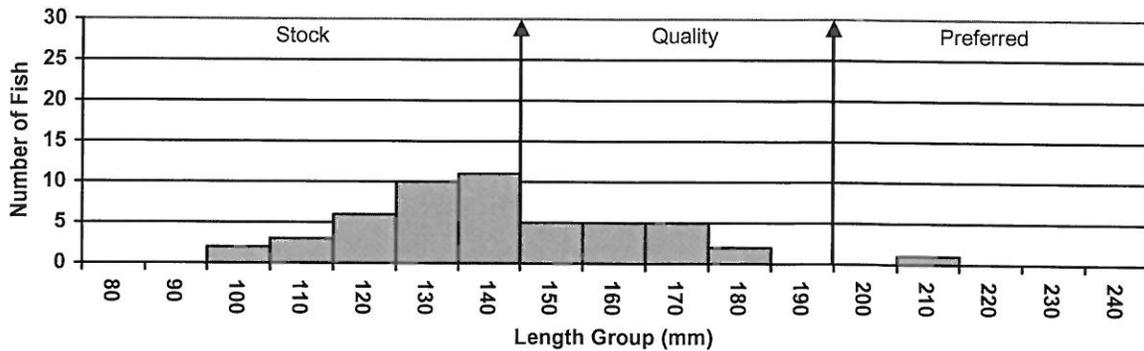


Figure 16. Length frequency histogram for bluegill sampled from Herrick Lake, Gregory County, 1999.



Other Species

Green sunfish, yellow perch, and black bullhead were the only other species sampled this survey (Table 2). None of them were sampled in large enough numbers to make any inferences about their populations.

Northern pike, channel catfish and hybrid sunfish were the only species not sampled this survey that had been in surveys past (Table 8).

Table 7. Stocking records from 1993 to present for Herrick Lake, Gregory County.

Year	Number	Species	Size
1993	1,200	Largemouth Bass	Medium Fingerling
1997	122	Northern Pike	Adult
2000	150	Largemouth Bass	Adult

RECOMMENDATIONS

1. Remove black crappie from the population to keep them from stunting like the bluegills. This would also help benefit other lakes by providing a source of fish.
2. Remove some of the bluegills out of the stunted population. This would help to increase growth to an utilizable size as well as be a source of fish for other lakes.
3. Resurvey in 2017 to monitor the fish populations in the lake.
4. Continue to monitor the presence of the newly found aquatic invasive species in curlyleaf pondweed.

Table 8. Trap net (TN) and electrofishing (EF) CPUE for all fish species sampled in Herrick Lake since survey records started in 1978.

Species	1978	1981	1984	1988	1991	1994	1996	1999	2002	2005	2008	2011	2014
BLB (TN)	0.3	--	1.3	1.0	0.5	--	0.4	1.6	3.4	0.6	2.2	1.4	0.6
BLC (TN)	--	0.8	1.0	1.1	2.0	7.5	22.8	76.1	109.6	26.7	12.3	7.3	10.4
YEP (TN)	--	--	--	0.4	--	1.5	4.8	1.5	4.4	2.7	1.6	0.3	0.6
LMB (EF)	--	--	--	--	--	175.5	--	--	--	69.0	88.0	195.0	90.0
LMB (TN)	0.3	0.6	0.3	--	0.1	--	0.3	0.8	0.8	0.6	--	--	0.1
NOP (TN)	--	0.4	0.1	--	0.6	0.3	0.1	2.4	0.2	0.5	0.3	--	--
CCF (TN)	0.3	1.3	0.1	--	0.1	--	--	--	--	--	--	--	--
BLG (TN)	10.5	71.4	42.1	21.6	17.1	50.8	64.3	63.6	40.8	46.2	33.5	29.1	39.4
GSF (TN)	1.0	2.6	0.6	0.3	--	0.6	0.3	0.4	0.1	--	--	1.6	1.3
HSF (TN)	--	--	5.0	--	--	--	--	--	--	--	--	--	--

BLB-Black Bullhead, BLC-Black Crappie, YEP-Yellow Perch, LMB-Largemouth Bass, NOP-Northern Pike, CCF-Channel Catfish, BLG-Bluegill, GSF-Green Sunfish, HSF-Hybrid Sunfish