SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-47

Name: Isabel **County(ies):** Dewey
Legal Description: T17N-R22W-Sec. 16 **GPS:** 45°26'07.90"N 101°25'03.22"W
Location from nearest town: 2 miles north of Isabel

Date of present survey: June 9-11, 2014 (netting); September 24, 2014 (electrofishing)
Date of last survey: June 20-22, 2011 (netting); September 22, 2011 (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	Walleye
Black Crappie	Northern Pike
Bluegill	Yellow Perch

PHYSICAL DATA

Surface Area: 130 acres **Watershed:** 8,320 acres
Maximum Depth: 25 feet **Mean Depth:** 8.5 feet
Lake elevation at time of survey (field observations): Full
Contour map: Yes **Date:** 1973

Ownership of lake and adjacent lakeshore properties:

Lake Isabel is an 81-acre impoundment 2.5 miles north of Isabel in northwest Dewey County. Lake Isabel has been utilized as a water source for the City since shortly after construction. Lake Isabel was created in 1934 when the Works Progress Administration (WPA) completed construction of an earthen dam on a tributary of Firesteel Creek. The dam grade and entire lake lies within a 640-acre Game Production Area owned and managed by the South Dakota Department of Game, Fish and Parks.

Watershed condition with percentages of land use types:

The watershed of Lake Isabel is 8,320 acres or approximately 13 square miles. The land use in the watershed is 90% native grasses that are utilized as hayland and livestock grazing, 5% cultivated cropland, and 5% roads, tree belts, residences and the City of Isabel. The immediate shoreline is 100% native grasses within the Game Production Area.

Fishing access:

There are ample fishing opportunities around the entire lake as well as boat access on the north side of the lake. Some fishing may be hindered during the summer due to high vegetation levels.

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

The boat ramp is in fair condition and no boat should have a problem launching. There is a picnic area with fair outhouses. There is even a small beach for swimming.

Field observations of aquatic vegetation condition:

The submergent vegetation is a mixture of many different species and is found around the entire shoreline to varying depths. The emergents consist of mainly cattails and rushes around over 80% of the shoreline, especially in the upper ends of the lake.

CHEMICAL DATA

Field observations of water quality and pollution problems:

No pollution problems were evident at the time of the survey. Water clarity is fair with a secchi disc reading of 2.5 feet. Other water quality characteristics were measured in the field on June 9, 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 Lake Isabel, Dewey County, June 9, 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	67.1	5.00	17.2	157	96	8.50	254	127	0.12	-163.3	2.5
A	23.5	62.7	2.00	39.2	165	105	8.07	276	138	0.13	-179.2	

BIOLOGICAL DATA

Methods:

Lake Isabel was sampled on June 9-11, 2014, 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 24, 2014, Lake Isabel was electrofished for 60 minutes (6-ten minute transects) to sample the largemouth bass and walleye populations. The boat was set up with 120 pulses per second DC current at 340 volts with around 12 amps to electrofish that lake that had a conductivity of 198µS/cm with a water temperature of 66.77°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 Isabel, Dewey County, June 9-11, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	12	31.6	6.0	± 6.2	3.5	90	50	92
Yellow Perch	11	28.9	5.5	± 4.6	18.8	55	0	92
Northern Pike	6	15.8	3.0	± 0.0	2.6	100	83	85
Black Crappie	5	13.2	2.5	± 4.6	4.5	100	40	92
Black Bullhead	4	10.5	2.0	± 3.1	2.5	100	100	106

* Fifteen year mean (1983, 1986, 1993-2001, 2003, 2006, 2009, 2011)

Trap Net Catch

Table 3. Total catch of ten, overnight ¾-inch frame nets at Lake Isabel, Dewey County, June 9-11, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	81	53.3	8.1	± 4.0	21.4	85	20	99
Black Bullhead	48	31.6	4.8	± 2.9	9.9	100	94	92
Bluegill	10	6.6	1.0	± 0.7	10.7	80	40	105
Yellow Perch	7	4.6	0.7	± 0.7	4.0	43	29	87
Northern Pike	5	3.3	0.5	± 0.3	1.4	100	40	89
Walleye	1	0.6	0.1	± 0.1	0.5	--	--	80

* Nineteen year mean (1975, 1978, 1983, 1986, 1990, 1992-2001, 2003, 2006, 2009, 2011)

Electrofishing Catch

Table 4. Total catch from six ten-minute runs of fall nighttime electrofishing on Lake Isabel, Dewey County, September 24, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	15	55.6	15.0	± 5.5	42.0	100	69	105
Walleye	9	33.3	9.0	± 3.0	7.2	56	11	85
Smallmouth Bass	3	11.1	3.0	± 4.4	2.1**	--	--	73

* Seven year mean (1999, 2000, 2001, 2003, 2006, 2009, 2011)

** One year mean (1999)

Largemouth Bass

The largemouth bass population in Lake Isabel has declined for the third straight survey. One explanation for the decline this year could have to do with the extremely high water levels and lots of vegetation was flooded that the bass could have been in and we could not sample them. The fall electrofishing CPUE of 15.0 is below the 31.0 from the 2011 survey (Table 11) as well as the seven year mean of 42.0 (Table 4). Size structure has remained relatively the same as can be seen by comparing Figures 1 and 2. Figures 1 through 5 illustrate the length frequency histograms for the last five surveys. Condition is good with a mean Wr of 105. Growth is good with means right around statewide, regional and SLI means (Table 5). A good sign with this survey was the presence of a few young fish.

Table 5. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Lake Isabel, Dewey County, 2014.

			Back-calculated Age								
Year Class	Age	N	1	2	3	4	5	6	7	8	9
2014	0	1									
2013	1	1	65								
2009	5	5	97	176	264	316	356				
2008	6	2	94	152	208	274	316	365			
2007	7	5	88	162	220	276	316	360	387		
2005	9	1	95	154	220	271	333	376	430	463	505
All Classes		**15**	**88**	**161**	**228**	**284**	**330**	**367**	**409**	**463**	**505**
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 Lake Isabel, Dewey County, 2014.

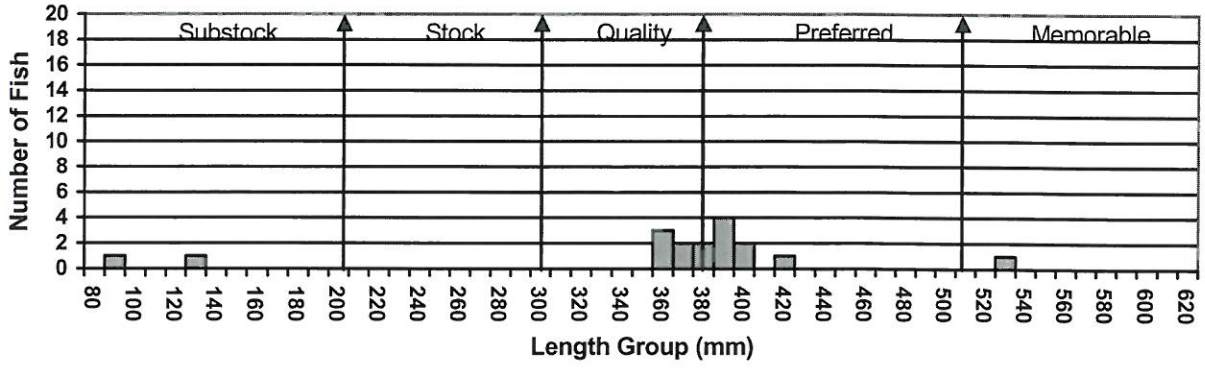


Figure 2. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2011.

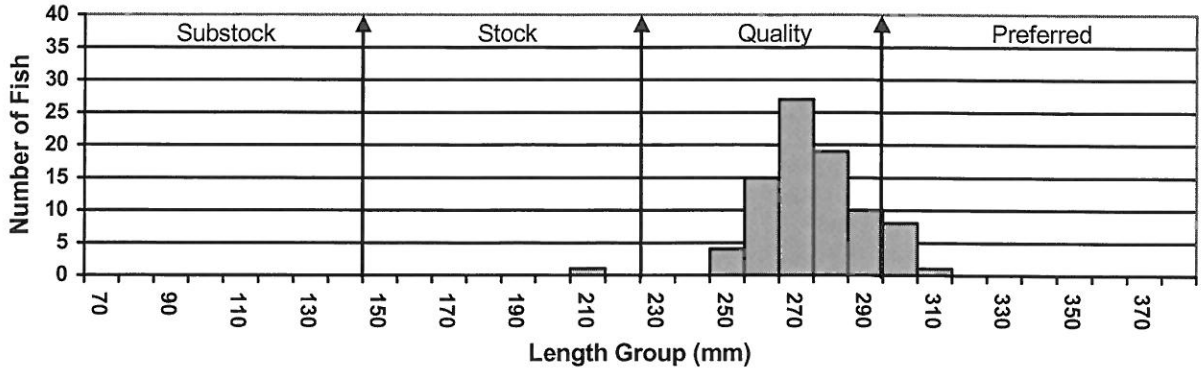


Figure 3. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2009.

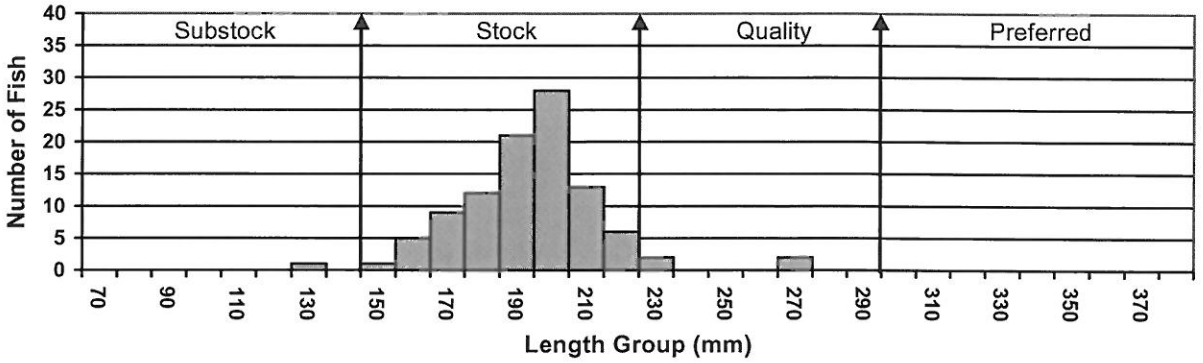


Figure 4. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2006.

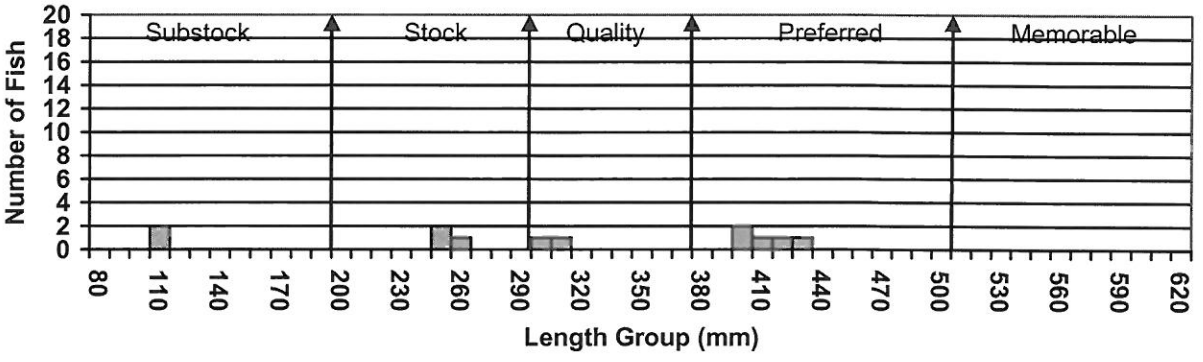
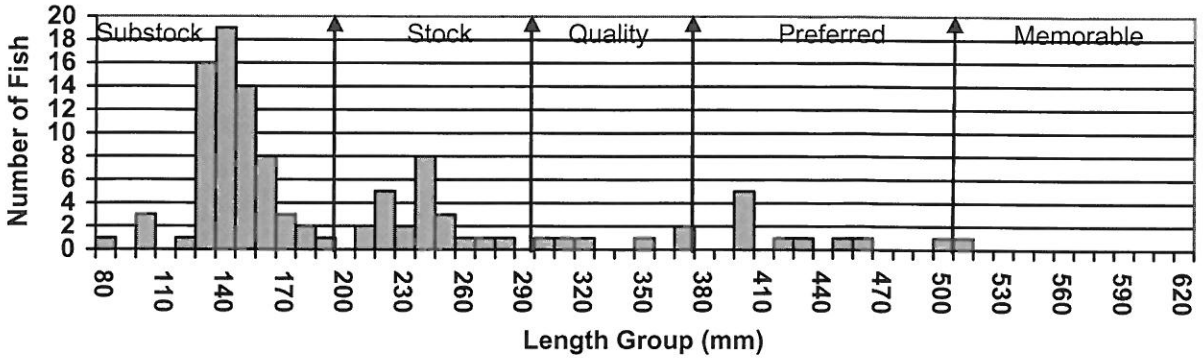


Figure 5. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2003.



Black Crappie

Black crappies continue to be the dominant panfish species sampled in Lake Isabel. The trap net CPUE of 8.1 is slightly below the 9.4 from the 2011 survey (Table 11) but well below the 21.4 nineteen year mean (Table 3). The gill net CPUE of 2.5 is above the 0.0 from the 2011 survey (Table 11) but still slightly below the 4.5 fifteen year mean (Table 2). Figures 6 through 10 illustrate the length frequency histograms for the fish sampled over the last five surveys. A couple changes have occurred over these surveys, but the last three have pretty much been just showing the fish grow in size. The concerning aspect is the lack of young fish recruiting to the population. Growth is good with means right around statewide, regional and SLI means (Table 6). Condition is also good with a mean Wr of 99.

Table 6. Average back-calculated lengths (mm) for each age class of black crappie sampled from Lake Isabel, Dewey County, 2014.

			Back-calculated Age							
Year Class	Age	N	1	2	3	4	5	6	7	8
2012	2	3	66	127						
2011	3	11	78	137	186					
2010	4	36	73	128	181	213				
2009	5	19	82	141	187	223	241			
2008	6	5	93	161	196	214	239	251		
2007	7	6	98	176	206	221	236	250	260	
2006	8	1	100	183	212	225	232	240	252	259
All Classes		**81**	**84**	**150**	**195**	**219**	**237**	**247**	**256**	**259**
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 6. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2014.

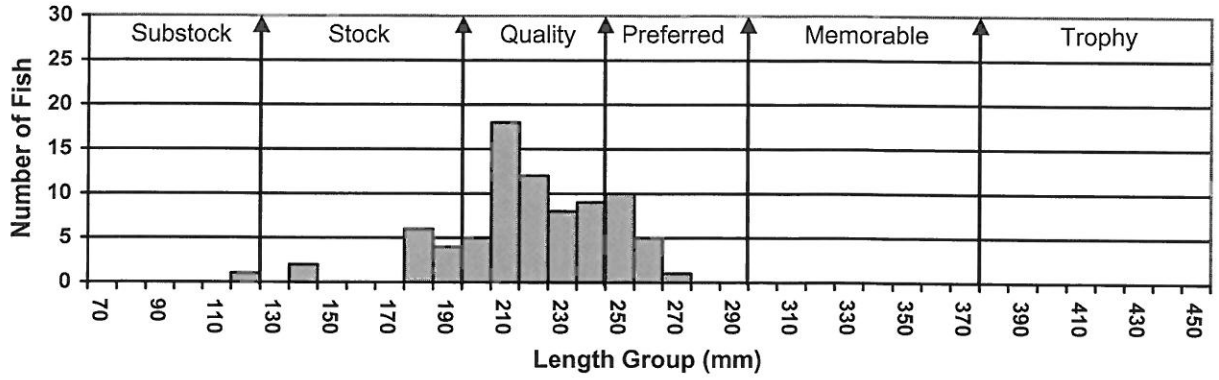


Figure 7. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2011.

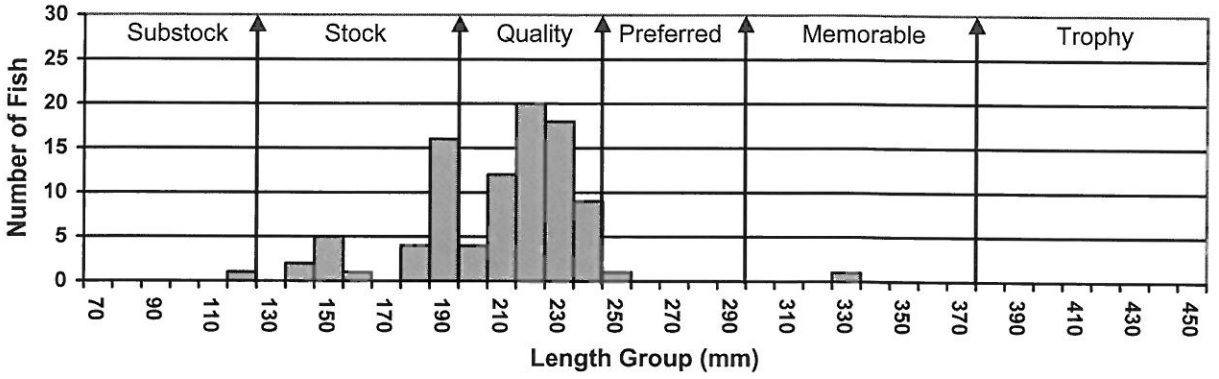


Figure 8. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2009.

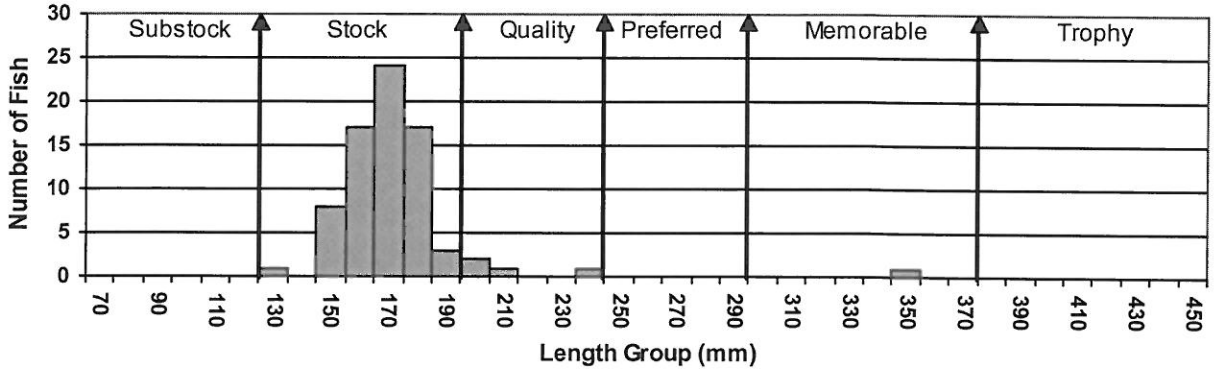


Figure 9. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2006.

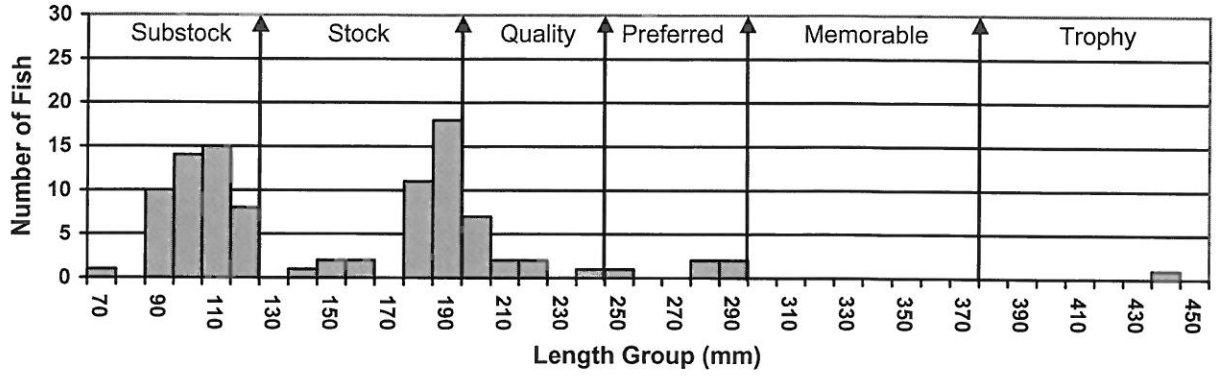
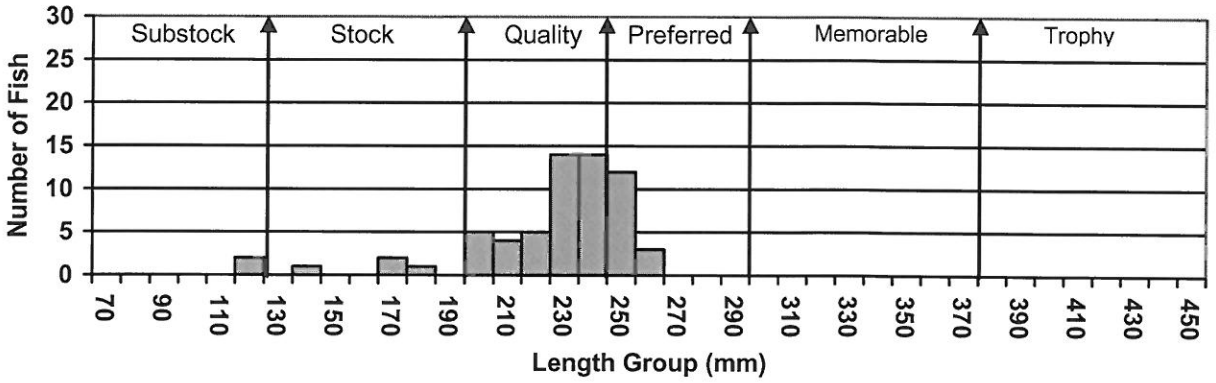


Figure 10. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2003.



Walleye

The walleye population in Lake Isabel appears to be on the increase. The gill net CPUE of 6.0 is above the 0.5 from the 2011 survey (Table 11) as well as the 3.5 fifteen year mean (Table 2). The trap net CPUE of 0.1 is also above the 0.0 from 2011 (Table 11) but slightly below the 0.5 nineteen year mean (Table 3). The fall electrofishing CPUE of 9.0 is below the 23.0 from 2011 (Table 11) but above the 7.2 seven year mean (Table 4). Figures 11 and 12 illustrate the length frequency histograms for the last two surveys. It appears the fish from the last three stockings are present in the population, this can also be seen by the growth table. Growth is good with means right around statewide, regional and SLI means (Table 7). Condition is good with a mean Wr of 86.

Table 7. Average back-calculated lengths (mm) for each age class of walleye sampled from Lake Isabel, Dewey County, 2014.

			Back-calculated Age					
Year Class	Age	N	1	2	3	4	5	6
2013	1	7	216					
2010	4	7	175	253	343	401		
2008	6	8	181	265	359	428	493	534
All Classes		**22**	**191**	**259**	**351**	**415**	**493**	**534**
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 11. Length frequency histogram for walleye sampled from Lake Isabel, Dewey County, 2014.

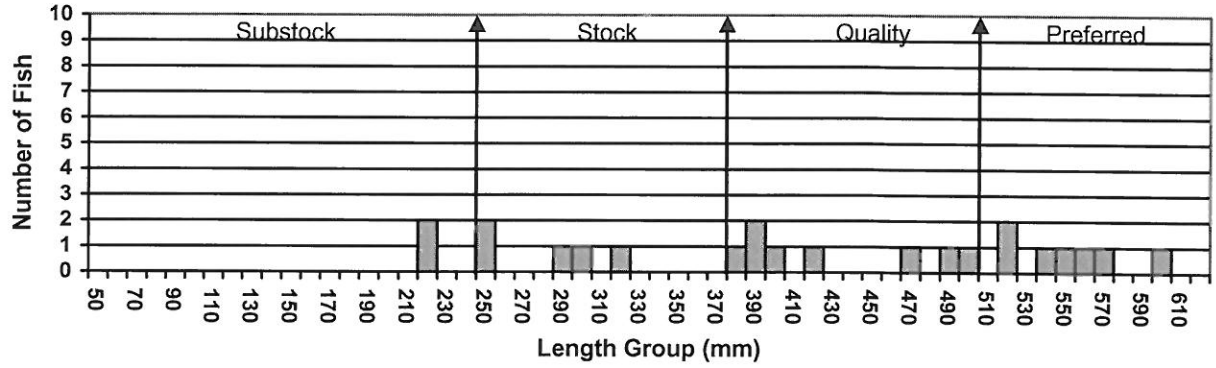
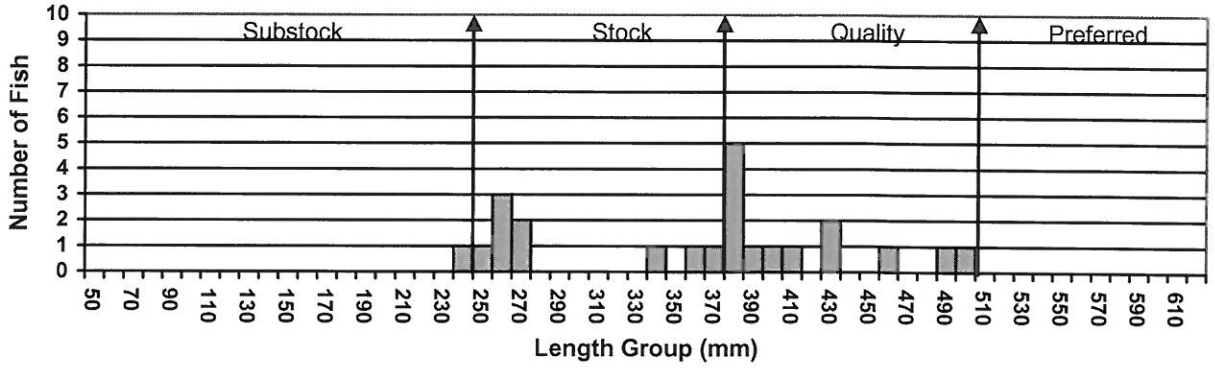


Figure 12. Length frequency histogram for walleye sampled from Lake Isabel, Dewey County, 2011.



Bluegill

Lake Isabel continues to contain a low density bluegill population. The trap net CPUE of 1.0 is slightly below the 1.6 from the 2011 survey (Table 11) but well below the 10.7 nineteen year mean (Table 3). Growth is good with means right around statewide, regional and SLI means (Table 8). Condition is good with a mean Wr of 105. Figures 13 and 14 illustrate the length frequency histograms for the fish sampled from the last two surveys.

Table 8. Average back-calculated lengths (mm) for each age class of bluegill sampled from Lake Isabel, Dewey County, 2014.

			Back-calculated Age								
Year Class	Age	N	1	2	3	4	5	6	7	8	9
2011	3	1	39	64	114						
2010	4	1	43	78	112	120					
2009	5	1	42	80	122	147	168				
2008	6	1	38	71	108	146	162	169			
2007	7	2	42	69	101	136	156	174	182		
2006	8	2	42	88	134	153	166	183	194	200	
2005	9	2	46	96	129	151	165	175	193	202	210
All Classes		**10**	**42**	**78**	**117**	**142**	**163**	**175**	**190**	**201**	**210**
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 13. Length frequency histogram for bluegill sampled from Lake Isabel, Dewey County, 2014.

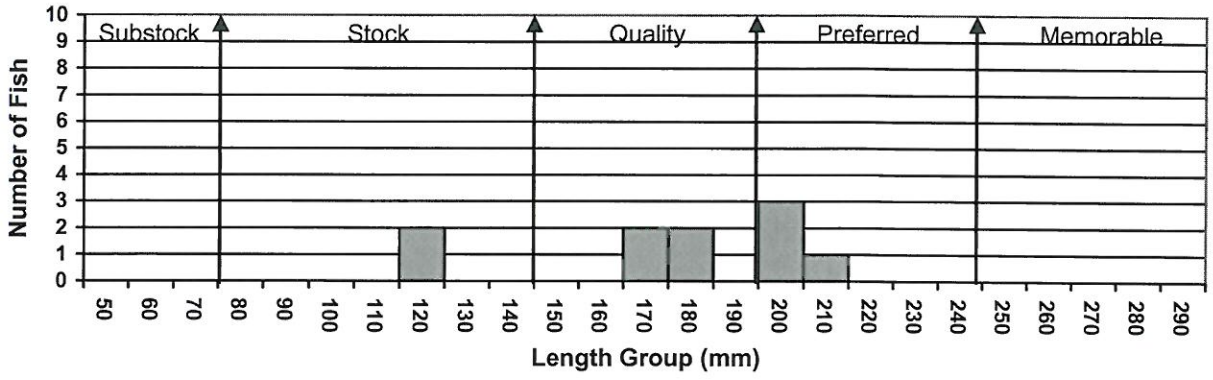
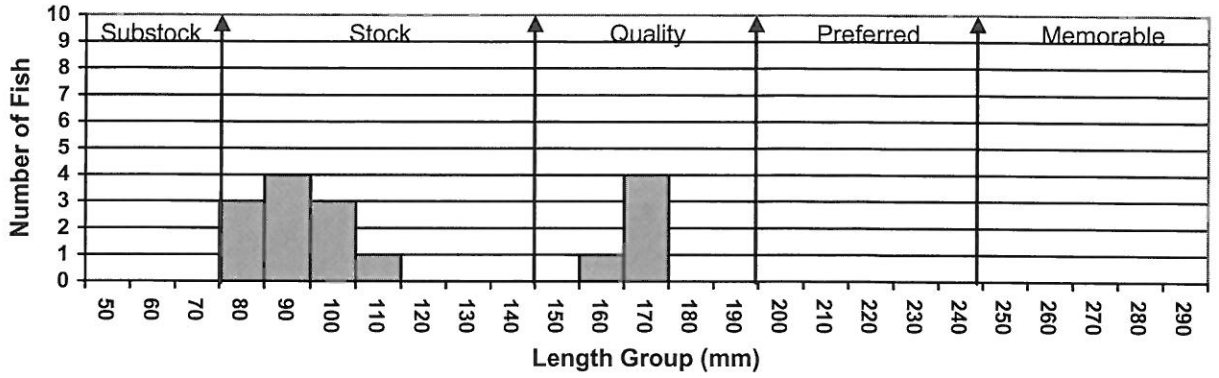


Figure 14. Length frequency histogram for bluegill sampled from Lake Isabel, Dewey County, 2011.



Yellow Perch

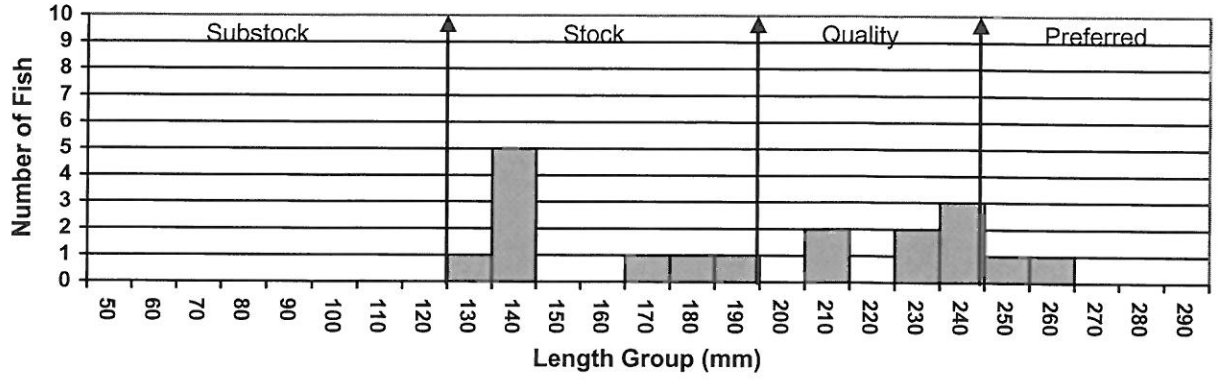
Yellow perch numbers are starting to make a rebound. The gill net CPUE of 5.5 is above the 0.5 from the 2011 survey (Table 11) but still well below the 18.8 fifteen year mean (Table 2). The trap net CPUE of 0.7 is also slightly above the 0.3 from the 2011 survey (Table 11) but below the 4.0 nineteen year mean (Table 3). Figure 15 illustrates the length frequency histogram for the fish sampled from this survey. Growth is fine with means right around statewide, regional and SLI means (Table 9). Condition is good with a mean Wr of 90.

Table 9. Average back-calculated lengths (mm) for each age class of yellow perch sampled from Lake Isabel, Dewey County, 2014.

			Back-calculated Age						
Year Class	Age	N	1	2	3	4	5	6	7
2012	2	4	73	133					
2011	3	4	75	125	159				
2009	5	6	88	134	161	200	218		
2008	6	2	99	152	179	200	220	244	
2007	7	1	95	152	180	208	239	257	264
All Classes		**17**	**86**	**140**	**170**	**203**	**226**	**251**	**264**
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 Lake Isabel, Dewey County, 2014.



Other species

Black bullhead and northern pike were the only other species sampled this survey. White crappie, white sucker, green sunfish and hybrid sunfish were the species not sampled this survey that have been in surveys past (Table 11).

Lake Isabel continues to contain a black bullhead population. The catches have decreased from the 2011 survey. The gill net CPUE of 2.0 is below the 23.5 from the 2011 survey (Table 11) as well as the 2.5 fifteen year mean (Table 2). The trap net CPUE of 4.8 is slightly above the 3.8 from the 2011 survey (Table 11) but below the 9.9 nineteen year mean (Table 3). Figures 16 through 18 illustrate the length frequency histograms for the last three surveys with the main difference being that fish are getting bigger and older.

Figure 16. Length frequency histogram for black bullhead sampled from Lake Isabel, Dewey County, 2014.

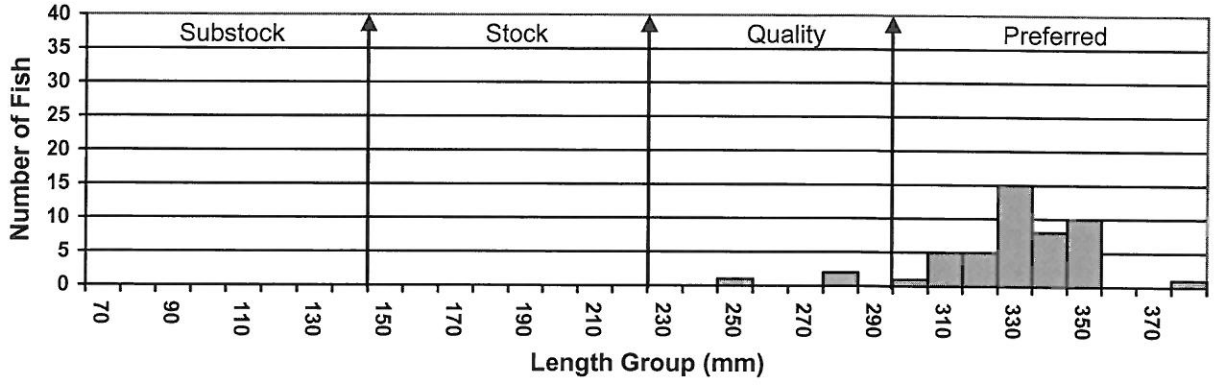


Figure 17. Length frequency histogram for black bullhead sampled from Lake Isabel, Dewey County, 2011.

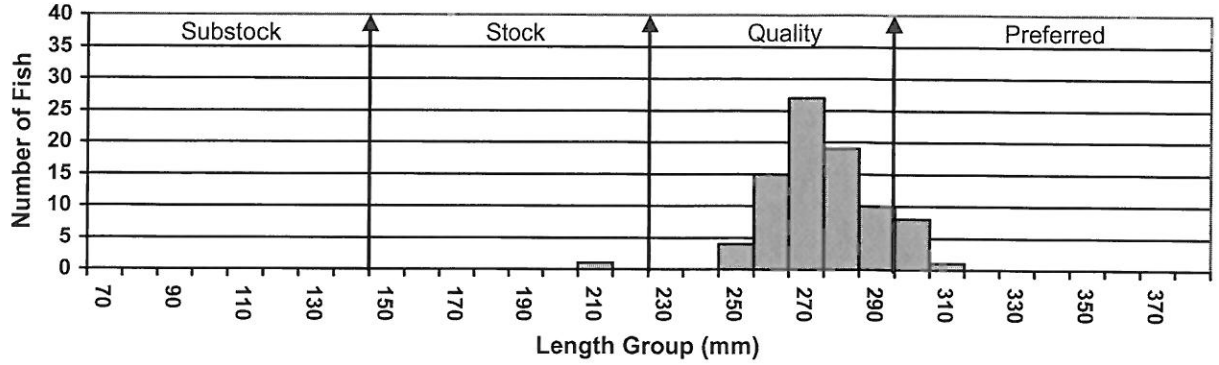


Figure 18. Length frequency histogram for black bullhead sampled from Lake Isabel, Dewey County, 2009.

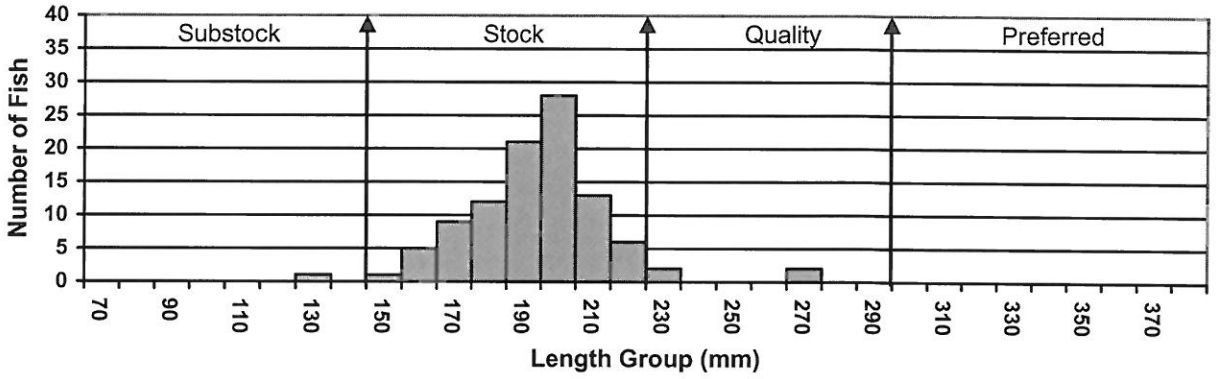


Table 10. Stocking records for the last ten years for Lake Isabel, Dewey County.

Year	Number	Species	Size
2001	1,925	Walleye	Fingerling
2004	2,015	Walleye	Fingerling
2006	2,040	Walleye	Large Fingerling
2008	910	Walleye	Large Fingerling
2010	8,100	Walleye	Small Fingerling
2013	688	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2017 to monitor the fish populations in the lake.

2. Continue to stock large walleye fingerlings every other fall to supplement their population.

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

Species	1975	1978	1983	1986	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2003	2006	2009	2011	2014
BLB (GN)	--	--	2.0	--	--	--	--	--	--	--	--	--	1.0	--	--	--	0.5	10.0	23.5	2.0
BLB (TN)	104.4	21.4	24.3	7.5	0.6	2.0	--	--	1.1	--	--	--	1.1	--	--	--	1.5	20.5	3.8	4.8
BLC (GN)	--	--	1.0	7.0	--	--	1.0	2.0	--	7.0	5.0	--	--	9.0	15.0	4.0	1.0	16.0	--	2.5
BLC (TN)	30.8	--	25.5	107.6	34.0	2.8	21.3	5.1	8.3	41.4	17.9	6.1	37.0	20.0	17.7	6.3	10.9	4.3	9.4	8.1
WHC (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	1.0	--	--	--	--	--
WHC (TN)	--	21.0	--	--	--	--	0.1	--	--	--	--	--	0.4	--	0.1	--	--	--	--	--
YEP (GN)	--	--	28.0	1.0	--	--	73.0	49.0	20.0	13.0	6.0	3.0	12.0	2.0	20.0	35.0	17.5	1.5	0.5	5.5
YEP (TN)	3.0	12.0	--	0.8	3.4	13.8	5.0	14.8	5.8	5.1	1.3	2.0	1.6	0.9	0.5	1.5	4.3	--	0.3	0.7
LMB (EF)	--	--	--	--	--	--	--	--	--	--	--	--	12.9	17.0	51.0	108.0	14.4	60.0	31.0	15.0
LMB (GN)	--	--	--	--	--	--	--	--	--	1.0	--	--	--	--	0.5	0.5	--	--	--	--
LMB (TN)	--	--	0.1	0.1	--	0.1	--	0.3	--	--	--	--	--	--	0.1	0.4	0.5	--	--	--
NOP (GN)	--	--	--	--	--	--	3.0	2.0	--	4.0	3.0	2.0	1.0	3.0	4.5	7.5	4.0	4.5	0.5	3.0
NOP (TN)	1.3	0.1	1.3	--	1.0	1.0	1.0	3.6	3.5	0.6	0.9	0.9	1.1	0.3	1.8	2.3	6.0	0.2	0.3	0.5
WHS (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WHS (TN)	--	--	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	--	9.6	2.0	9.0	7.0	--	--	23.0	9.0
WAE (GN)	--	--	--	--	--	--	1.0	2.0	9.0	16.0	6.0	1.0	1.0	6.0	3.5	2.5	2.5	2.0	0.5	6.0
WAE (TN)	4.5	0.3	--	0.3	--	0.1	0.3	--	--	--	--	--	0.3	0.1	0.8	0.3	2.5	--	--	0.1
BLG (GN)	--	--	--	--	--	--	2.0	--	--	1.0	--	--	--	--	3.5	--	2.0	1.0	--	--
BLG (TN)	0.6	0.9	1.2	0.6	31.1	13.4	4.5	29.6	14.6	2.1	10.4	1.3	11.4	13.4	13.5	26.2	27.0	0.5	1.6	1.0
SMB (EF)	--	--	--	--	--	--	--	--	--	--	--	--	2.1	--	--	--	--	--	--	3.0
SMB (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMB (TN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GSF (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GSF (TN)	4.6	0.9	--	--	--	0.3	--	--	0.1	--	--	--	0.1	--	0.3	--	--	--	--	--
HYB (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HYB (TN)	--	--	--	--	--	--	--	--	--	--	0.3	--	--	1.0	0.4	0.5	0.5	--	--	--

BLB – Black Bullhead, BLC – Black Crappie, WHC – White Crappie, YEP – Yellow Perch, LMB – Largemouth Bass, NOP – Northern Pike, WHS – White Sucker, WAE – Walleye, BLG – Bluegill, SMB – Smallmouth Bass, GSF – Green Sunfish, HYB – Hybrid Sunfish