SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

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 8-10, 2009 (netting); November 2, 2009 (electrofishing)
Date of last survey: July 5-7, 2006 (netting); October 16, 2006 (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 nice picnic area with good 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 good with a secchi disc reading of 3.5 feet. Other water quality characteristics were measured in the field on June 8, 2009, using a HACH water quality kit, an Oyster meter and a YSI 55 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 8, 2009.

Station	Depth (ft)	Temp (F)	DO (ppm)	CO2 (ppm)	ALK (mg/l)	Hardness (mg/l)	pH	Secchi disc (ft)
A	Surface	58.3	9.27	53.6	142	106	7.63	3.5
A	21	58.1	10.30	44.2	88	71	7.43	

BIOLOGICAL DATA

Methods:

Lake Isabel was sampled on June 8-10, 2009, 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 November 2, 2009, Lake Isabel was electrofished for 60 minutes (6-ten minute transects) with 340 volts of 120 pulses per second of DC 8 amp current to sample the largemouth bass and walleye populations. Conductivity was 240 µS/cm with a water temperature of 41.4°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 8-10, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	32	45.7	16.0	± 3.1	4.0	3	0	120
Black Bullhead	20	28.7	10.0	± 18.5	0.3	0	0	106
Northern Pike	9	12.9	4.5	± 4.6	2.6	--	--	99
Walleye	4	5.7	2.0	± 3.1	3.9	--	--	100
Yellow Perch	3	4.3	1.5	± 1.5	21.5	--	--	91
Bluegill	2	2.9	1.0	± 3.1	0.7	--	--	131

* Thirteen year mean (1983, 1986, 1993-2001, 2003, 2006)

Trap Net Catch

Table 3. Total catch of ten, overnight ¾-inch frame nets at Lake Isabel, Dewey County, June 8-10, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	205	80.4	20.5	± 8.4	9.6	4	0	99
Black Crappie	43	16.8	4.3	± 2.0	23.1	9	2	108
Bluegill	5	2.0	0.5	± 0.6	11.9	--	--	116
Northern Pike	2	0.8	0.2	± 0.3	1.6	--	--	99

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

Electrofishing Catch

Table 4. Total catch from five ten-minute runs of fall nighttime electrofishing on Lake Isabel, Dewey County, November 2, 2009.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	60	100	60	± 31.0	40.7	5	3	108

* Five year mean (1999, 2000, 2001, 2003, 2006)

Largemouth Bass

Lake Isabel contains a population of largemouth bass that is in a rebuilding stage. This population was negatively affected by the drought, but enough adults survived to reestablish the population. The CPUE for fall electrofishing was 60 fish per hour which is above the 14.4 from 2006 (Table 8) and above the 40.7 five year mean (Table 4). Size structure is comprised of small fish as can be seen in Figure 1. Figures 1-3 illustrate the change in this population from pre drought to now the rebuilding of post drought. Condition is good with a mean Wr of 108. Growth is also good with means right around statewide, regional and SLI means (Table 5).

Table 5. Average back-calculated lengths (mm) for each age class of largemouth bass sampled from Lake Isabel, Dewey County, 2009.

			Back-calculated Age						
Year Class	Age	N	1	2	3	4	5	6	7
2008	1	1	99						
2007	2	53	90	152					
2002	7	1	70	187	237	280	311	349	385
All Classes		**55**	**86**	**169**	**237**	**280**	**311**	**349**	**385**
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, 2009.

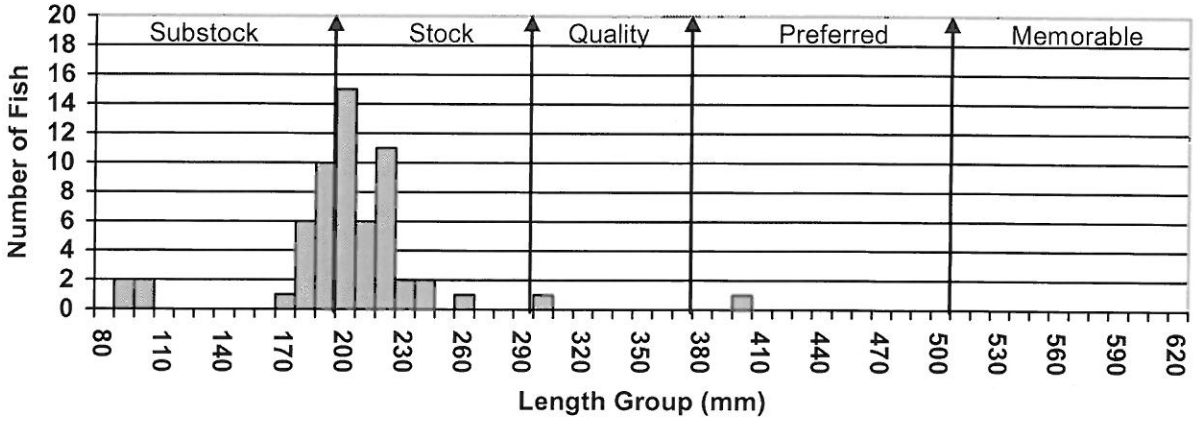


Figure 2. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2006.

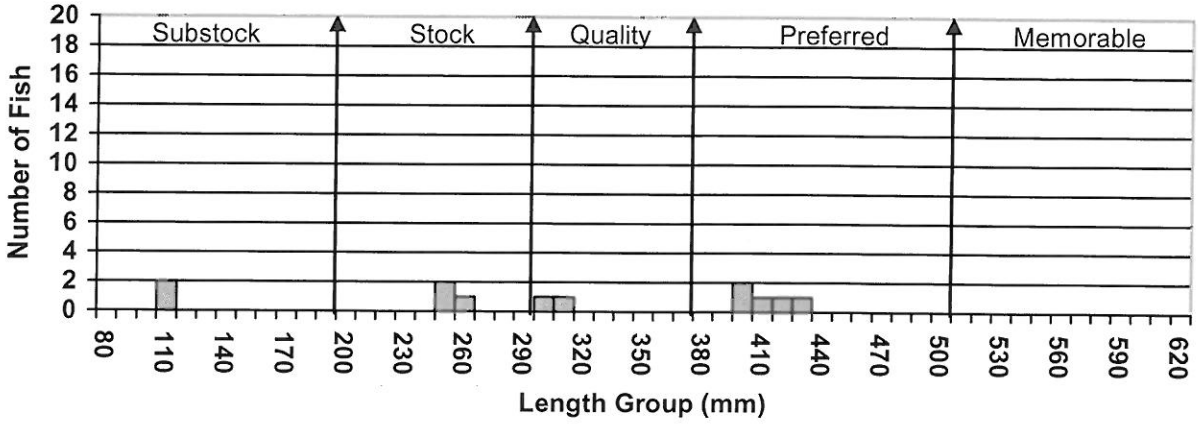
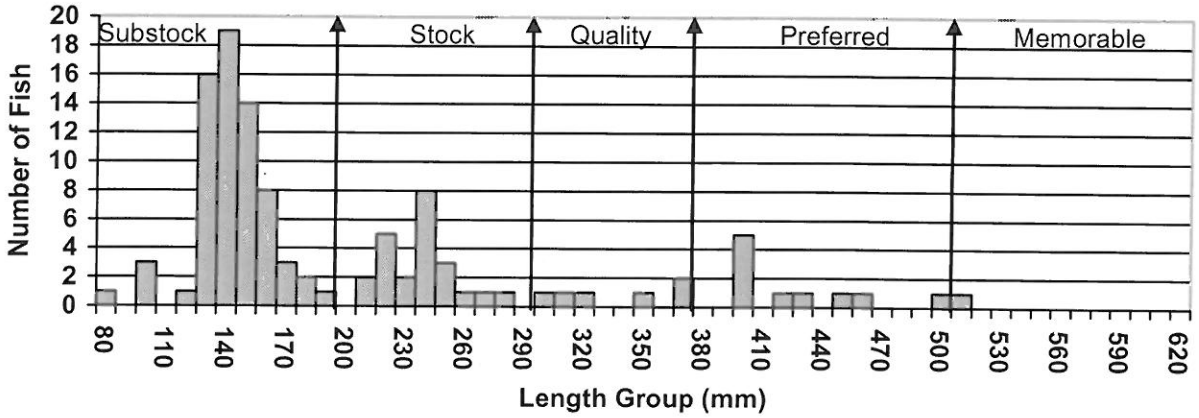


Figure 3. Length frequency histogram for largemouth bass sampled from Lake Isabel, Dewey County, 2003.



Black Crappie

The black crappie population in Lake Isabel continues to be a dominant species sampled. The trap net CPUE of 4.3 is below the 10.9 from 2006 as well as the 23.1 seventeen year mean (Table 3). The gill net CPUE of 16.0 is above the 1.0 from 2006 as well as the 4.0 thirteen year mean (Table 2). Size structure has declined a little from the 2006 survey. This can be seen by looking at Figures 4 and 5. Figures 4-6 illustrate the changes in the size structure over the last three surveys. The population is now dominated by younger fish as the population appears to be on a rebuilding cycle. Condition is good with a population mean Wr of 114. Growth is good with means right around or slightly above statewide, regional and SLI means (Table 6).

Table 6. Average back-calculated lengths (mm) for each age class of black crappie sampled from Lake Isabel, Dewey County, 2009.

			Back-calculated Age							
Year Class	Age	N	1	2	3	4	5	6	7	8
2007	2	42	92	163						
2006	3	4	59	116	191					
2005	4	1	81	182	218	245				
2001	8	1	88	138	207	236	262	316	339	350
All Classes		**48**	**80**	**150**	**198**	**241**	**262**	**316**	**339**	**350**
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 4. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2009.

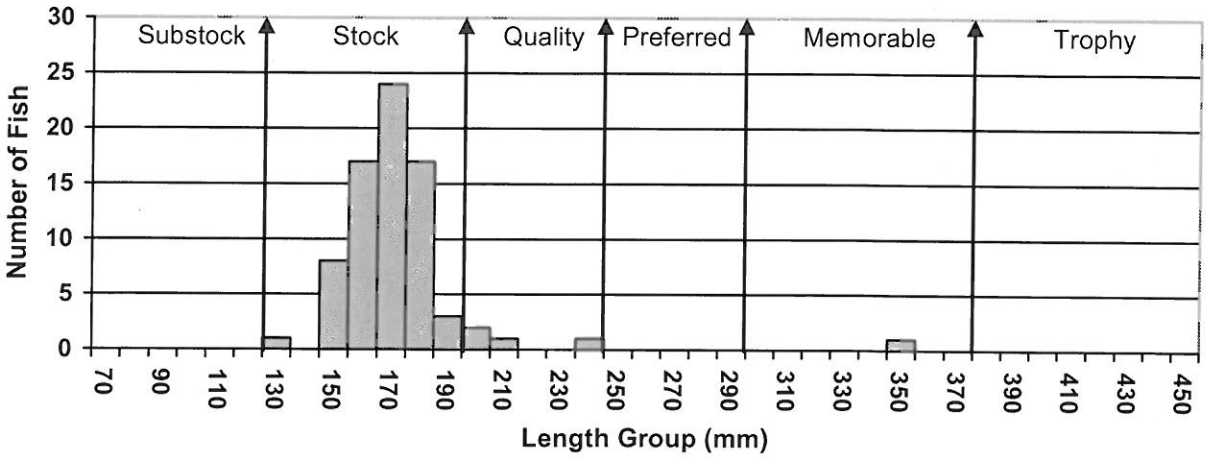


Figure 5. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2006.

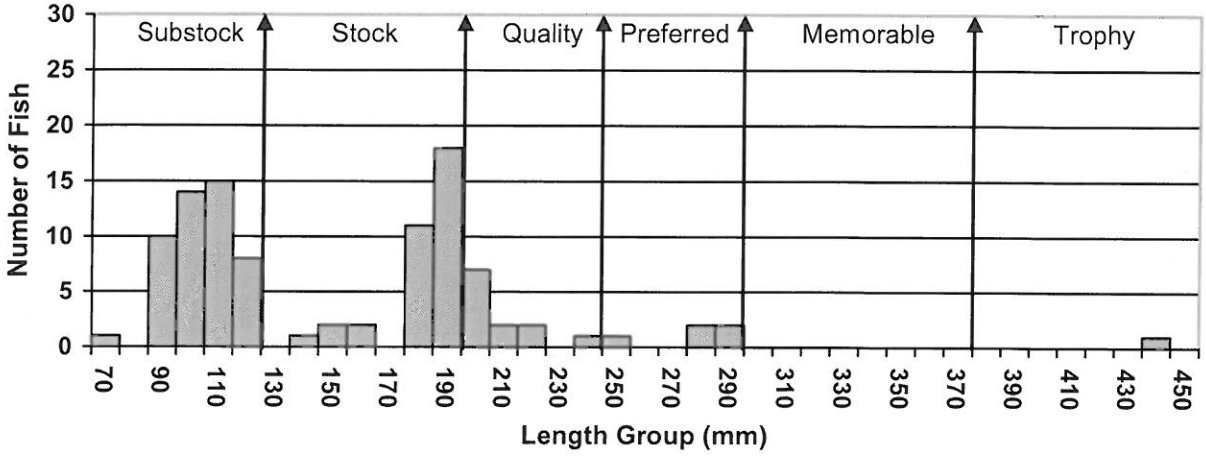
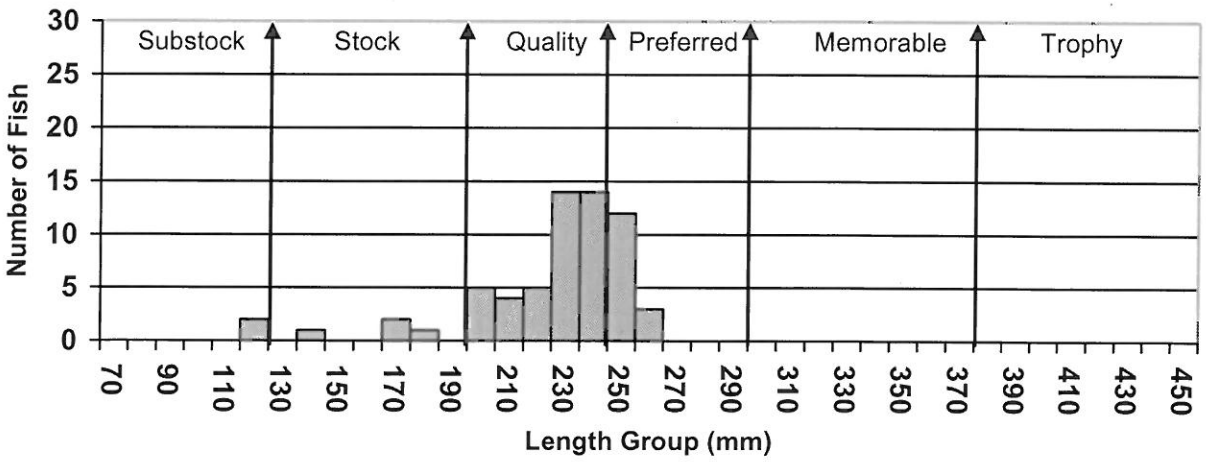


Figure 6. Length frequency histogram for black crappie sampled from Lake Isabel, Dewey County, 2003.



Other species

Northern pike, walleye, yellow perch, and bluegill were the other species sampled this survey period. Black bullheads were the highest density sampled out of these species with a trap net CPUE of 20.5 which is well above the 1.5 from the 2006 survey as well as the 9.6 seventeen year mean (Table 3). Figure 7 illustrates what the size structure of the population looks like. White crappie, white sucker, smallmouth bass, green sunfish and hybrid sunfish were the species not sampled this survey that have been in years past (Table 8).

Figure 7. Length frequency histogram for black bullhead sampled from Lake Isabel, Dewey County, 2009.

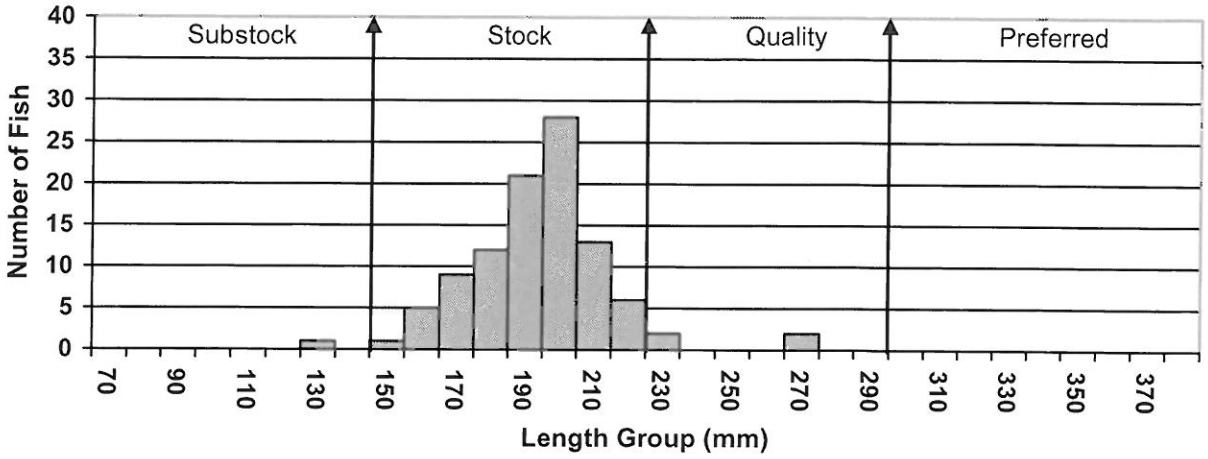


Table 7. Stocking records for the last ten years for Lake Isabel, Dewey County.

Year	Number	Species	Size
1999	3,250	Walleye	Fingerling
2001	1,925	Walleye	Fingerling
2004	2,015	Walleye	Fingerling
2006	2,040	Walleye	Large Fingerling
2008	910	Walleye	Large Fingerling

RECOMMENDATIONS

1. Resurvey in 2011 to monitor the fish populations in the lake, especially due to the lake filling back up after the extended drought.

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

Table 8. 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
BLB (GN)	--	--	2.0	--	--	--	--	--	--	--	--	--	1.0	--	--	--	0.5	10.0
BLB (TN)	104.4	21.4	24.3	7.5	0.6	2.0	--	--	1.1	--	--	--	1.1	--	--	--	1.5	20.5
BLC (GN)	--	--	1.0	7.0	--	--	1.0	2.0	--	7.0	5.0	--	--	9.0	15.0	4.0	1.0	16.0
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
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
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	--
LMB (EF)	--	--	--	--	--	--	--	--	--	--	--	--	12.9	17.0	51.0	108.0	14.4	60.0
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
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
WHS (GN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
WHS (TN)	--	--	--	--	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--
WAE (EF)	--	--	--	--	--	--	--	--	--	--	--	--	9.6	2.0	9.0	7.0	--	--
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
WAE (TN)	4.5	0.3	--	0.3	--	0.1	0.3	--	--	--	--	--	0.3	0.1	0.8	0.3	2.5	--
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
SMB (EF)	--	--	--	--	--	--	--	--	--	--	--	--	2.1	--	--	--	--	--
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