

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-48

Name: Gardner Lake

County: Harding

Legal description: Sec 10,15,22, T 19N, R 4E

Location from nearest town: 3 miles west and 1 mile north of Buffalo, SD

Dates of present survey: June 24-26, September 30, 2015

Date last surveyed: July 17-19, 2013

Management classification: Warmwater permanent

Primary Species: (game and forage)

1. Walleye
2. Black crappie
3. Yellow perch
4. Channel catfish
5. Largemouth bass
6. _____
7. _____

Secondary and other species:

1. Black bullhead
2. Common carp
3. White sucker
4. River carpsucker
5. Spottail shiner
6. Fathead minnow
7. Northern pike

PHYSICAL CHARACTERISTICS

Surface Area: 203 acres

Watershed: 13,340 acres

Maximum depth: 10 feet

Mean depth: 7 feet

Lake elevation at survey (from known benchmark): -1 feet

Ownership of lake and adjacent lakeshore property:

South Dakota Department of Game, Fish and Parks owns most of the land adjacent to Gardner Lake; however, three small lakeside portions are privately owned. Game, Fish and Parks has easements, including public access, on this land.

Fishing Access

Access to Gardner Lake is by a 1½ mile gravel road running north from Highway 20. The gravel road splits and leads to a concrete plank boat ramp on the west side of the lake or runs along the east side of the lake and stops on the south side of the dam. Two track trails also provide limited vehicle access along each side of the lake. A new boat ramp was recently installed and boat docks furnished by local businesses are available for lake users when launching boats.

Observations of Water Quality and Aquatic Vegetation:

Vegetation was observed in water under three feet of water in Gardner but is not extremely dense compared to most lakes probably due to more turbid water. No pollution problems were identified by departmental personnel during the 2015 survey.

Observations on condition of structures (i.e. spillway, boat ramps and docks, roads, etc)

In 1987-1988 extensive reconstruction of the dam and spillway occurred. Since the rebuild, problems with the spillway have been identified and are currently under consideration for repair.

BIOLOGICAL DATA

Sampling Effort and Catch

Trap nets and experimental gill nets were used on June 24-26, 2015 to sample adult fish populations in the lake (Figure 1). The net sampling consisted of ten trap net nights and two gill net nights and catch data is displayed in Tables 1 and 2. Largemouth bass were sampled on September 30th with 50 minutes of daytime electrofishing. Results are displayed in Table 3. Discussion on selected fish species follows and completes this report.

Table 1. Catch data from all species collected in ten trap nets in Gardner Lake, Harding County, June 24-26, 2015. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	<i>Wr</i> ≥ S
Black crappie	263	26.3 (8.8)	24.4 (8.3)	66 (5)	7 (3)	101.0 (2.0)
Common carp	4	0.4 (0.3)	0.1 (0.1)	--	--	89.4 (--)
Northern pike	5	0.5 (0.4)	0.3 (0.2)	--	--	--
Walleye	11	1.1 (0.4)	1.1 (0.4)	64 (28)	9 (17)	79.3 (2.2)
Yellow perch	3	0.3 (0.3)	0.3 (0.3)	--	--	97.6 (16.2)

Table 2. Catch data from all species collected in two gill nets in Gardner Lake, Harding County, June 24-26, 2015. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	<i>Wr</i> ≥ S
Black crappie	16	8.0 (9.2)	7.0 (6.2)	21 (21)	0	106.9 (4.0)
Common carp	9	4.5 (7.7)	4.0 (9.2)	88 (24)	0	91.0 (8.2)
Northern pike	10	5.0 (3.1)	4.0 (3.1)	13 (23)	0	86.2 (6.9)
Spottail shiner	6	3.0 (9.2)	--	--	--	--
Walleye	4	2.0 (--)	2.0 (--)	--	--	76.4 (5.0)
Yellow perch	19	9.5 (7.7)	9.5 (7.7)	32 (19)	0	105.4 (2.7)

Table 3. Catch data for largemouth bass collected from 50.0 minutes of daytime electrofishing at Gardner Lake, Harding County, September 30, 2015. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	<i>Wr</i> ≥ S
Largemouth bass	71	85.2 (22.6)	61.2 (24.7)	12 (8)	6 (6)	121.2 (0.7)

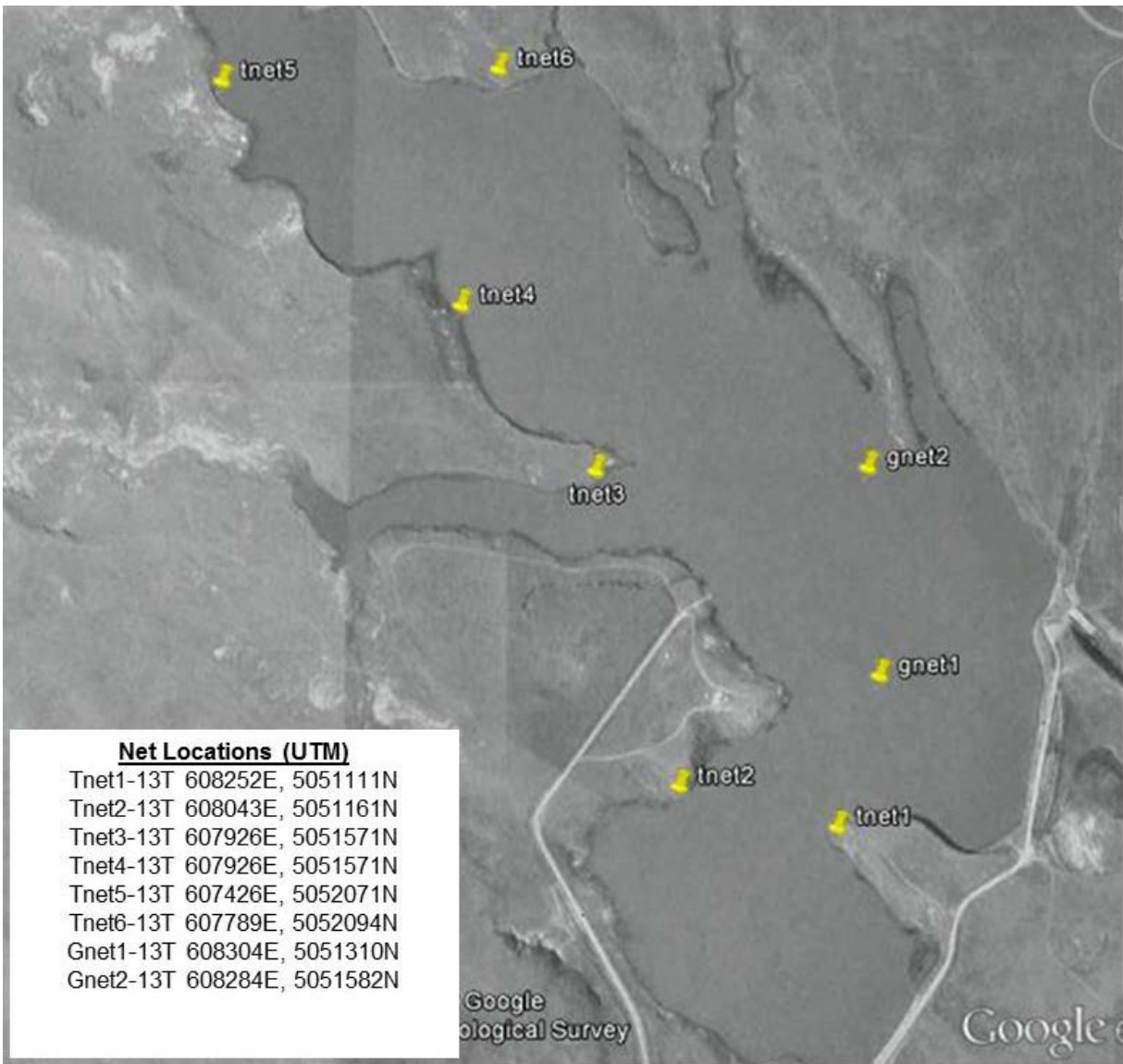


Figure 1. Locations, including GPS points, of experimental gill nets (gnets) and trap nets (tnets) during the annual fishery survey of Gardner Lake, Harding County, 2015.

Black Crappie

Current black crappie management objectives are for trap net CPUE between 10 and 50, and maintain PSD between 50 and 80. Densities were within the objective with a CPUE of 26.3 (Tables 4). Size structure was also within the objective range with a PSD of 66. The length frequency histogram indicates at least two year classes present in the system (Figure 2). Growth was above the regional average (Table 5).

Table 4. Composite listing of data for black crappie collected by trap nets in Gardner Lake, Harding County, 2003-2015. CPUE's with 80% confidence intervals in parentheses. PSD and PSD-P with 90% confidence intervals in parentheses.

Year	N	CPUE	PSD	PSD-P
2003	67	8.4 (1.6)	77 (10)	8 (6)
2004	50	6.3 (3.2)	88 (8)	28 (11)
2006	2	0.3 (0.3)	--	--
2007	0	0	--	--
2009	91	13.0 (7.6)	90 (9)	30 (14)
2011	527	86.8 (44.7)	0	0
2013	999	166.5 (24.1)	88 (2)	0
2015	263	26.3 (8.8)	66 (5)	7 (3)

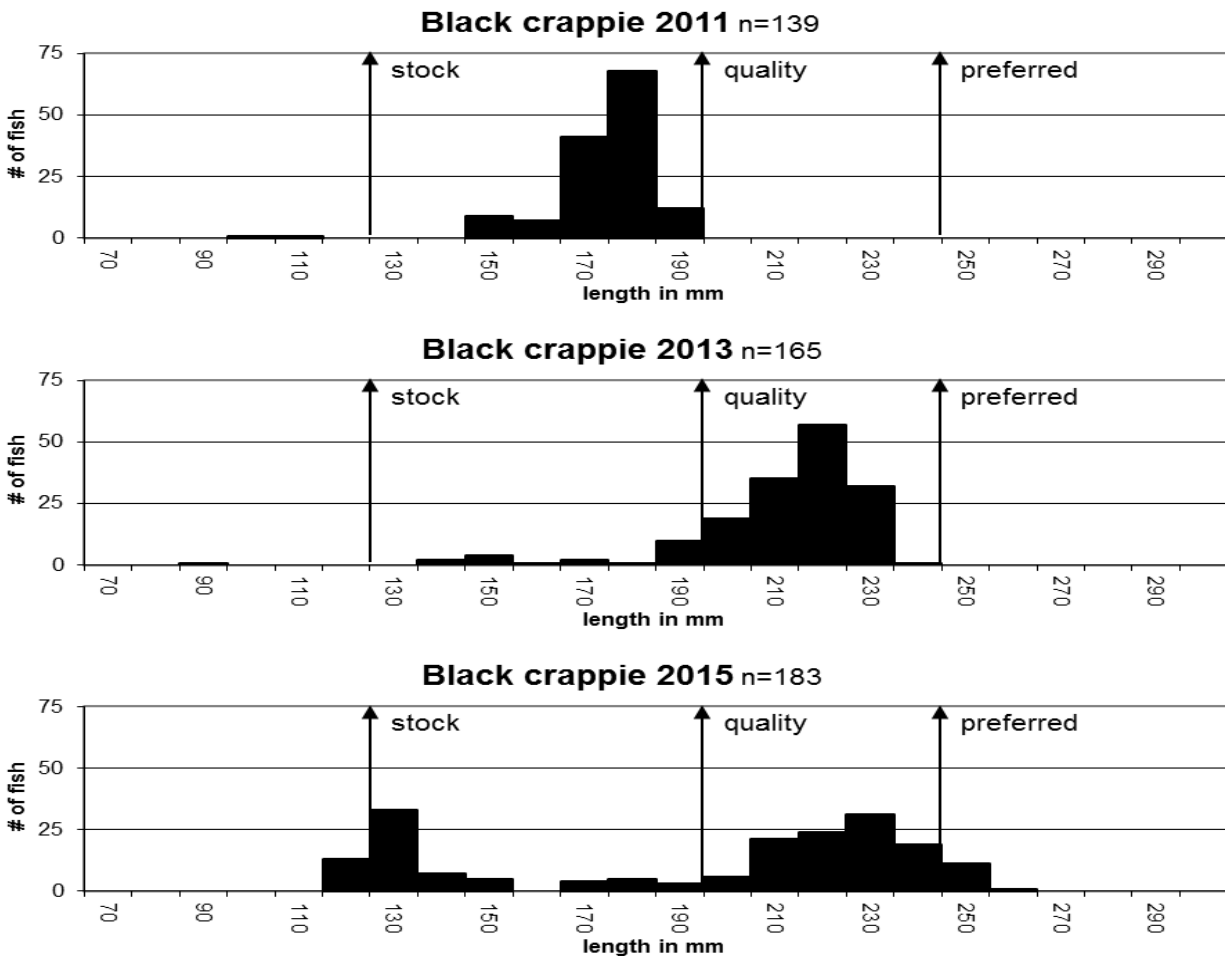


Figure 2. Length frequency histograms of black crappie from trap nets in Gardner Lake, Harding County, 2011, 2013, 2015.

Table 5. Gardner Lake black crappie scale aged year class, age in 2015, sample size (N), mean back-calculated total length-at-age, and the Region 1 (western SD) mean length-at-age, (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5	6
2013	2	75	59	118				
2012	3	53	75	124	173			
2011	4	47	75	133	188	212		
2010	5	51	67	128	186	213	231	
2009	6	34	74	130	186	211	227	239
2015 Pop. mean (SE)		272	70 (3)	126 (3)	183 (3)	212 (1)	229 (2)	239 (0)
Region 1			74 (3)	122 (7)	158 (9)	197 (13)	217 (16)	

Largemouth bass

Largemouth bass fingerlings were stocked in 2006 and haven't been sampled since. Daytime electrofishing on September 30, 2015 showed that the largemouth bass population is doing just fine with a CPUE of 85.2 fish per hour (Table 3). Size structure was fairly low with a PSD of 12 with a PSD-P of 6. Fish condition was excellent with a *Wr* for stock length and larger fish of 121.2. The length frequency shows several strong year classes present (Figure 3). Growth was good, well above the state and regional average (Table 7).

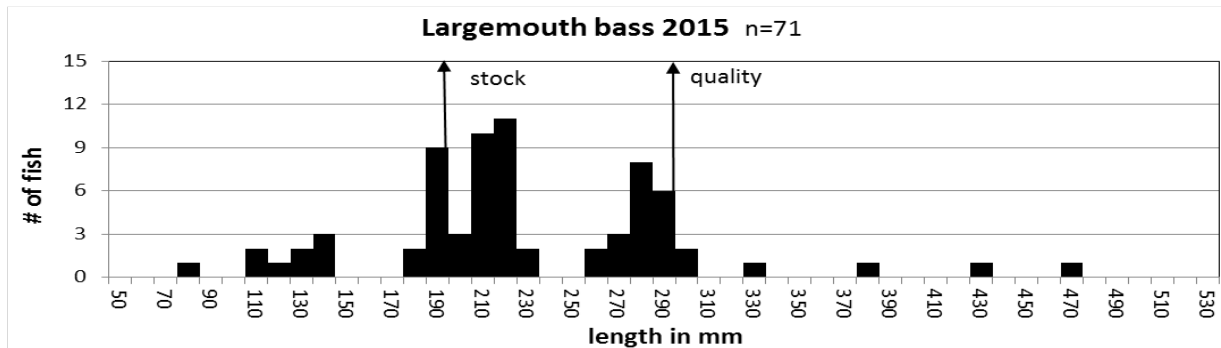


Figure 3. Length frequencies of largemouth bass from day time electrofishing in Gardner Lake, September 30, 2015.

Table 7. Gardner Lake largemouth bass scale aged year class, age in 2015, sample size (N), mean back-calculated total length-at-age, the Region 1 (western SD) mean length-at-age, and the South Dakota state-wide largemouth bass mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5	6
2014	1	36	91					
2013	2	19	77	182				
2012	3	5	88	143	229			
2009	6	2	78	233	288	332	350	380
2015 Pop. mean (SE)		62	84 (3)	186 (26)	258 (29)	332 (0)	350 (0)	380 (0)
Region 1			78 (4)	154 (10)	214 (11)	272 (13)	318 (13)	
South Dakota			96 (3)	182 (6)	250 (7)	305 (8)	342 (8)	

Walleye

The management objective for walleye in Gardner Lake is to maintain a fishery with a minimum gill net CPUE for stock length of 10, a PSD range of 30-60, and PSD-P of 10 or greater. Walleye density remains much lower than objective range with a gill net CPUE of 2.0 (Tables 2 and 6). Fish condition was low with a *Wr* of 76.4. The length frequencies indicate a balanced size structure with fish of various sizes (Figure 4).

Table 6. Composite listing of data for walleye collected in Gardner Lake, Harding County, 2006-2015. CPUE's with 80% confidence intervals in parentheses and *Wr* with 90% confidence intervals.

Year	Total #	Gill net CPUE	Trap net CPUE	Gill net <i>Wr</i> >Stock Length
2006	17	0.5 (1.5)	2.7 (1.5)	--
2007	27	12.0 (9.2)	0.4 (0.4)	105.9 (1.8)
2009	31	8.0 (9.2)	2.1 (0.7)	84.9 (0.8)
2011	26	5.5 (4.6)	2.5 (3.1)	78.5 (1.9)
2013	20	4.5 (1.5)	1.8 (1.1)	81.9 (3.1)
2015	15	2.0 (--)	1.1 (0.4)	76.4 (5.0)

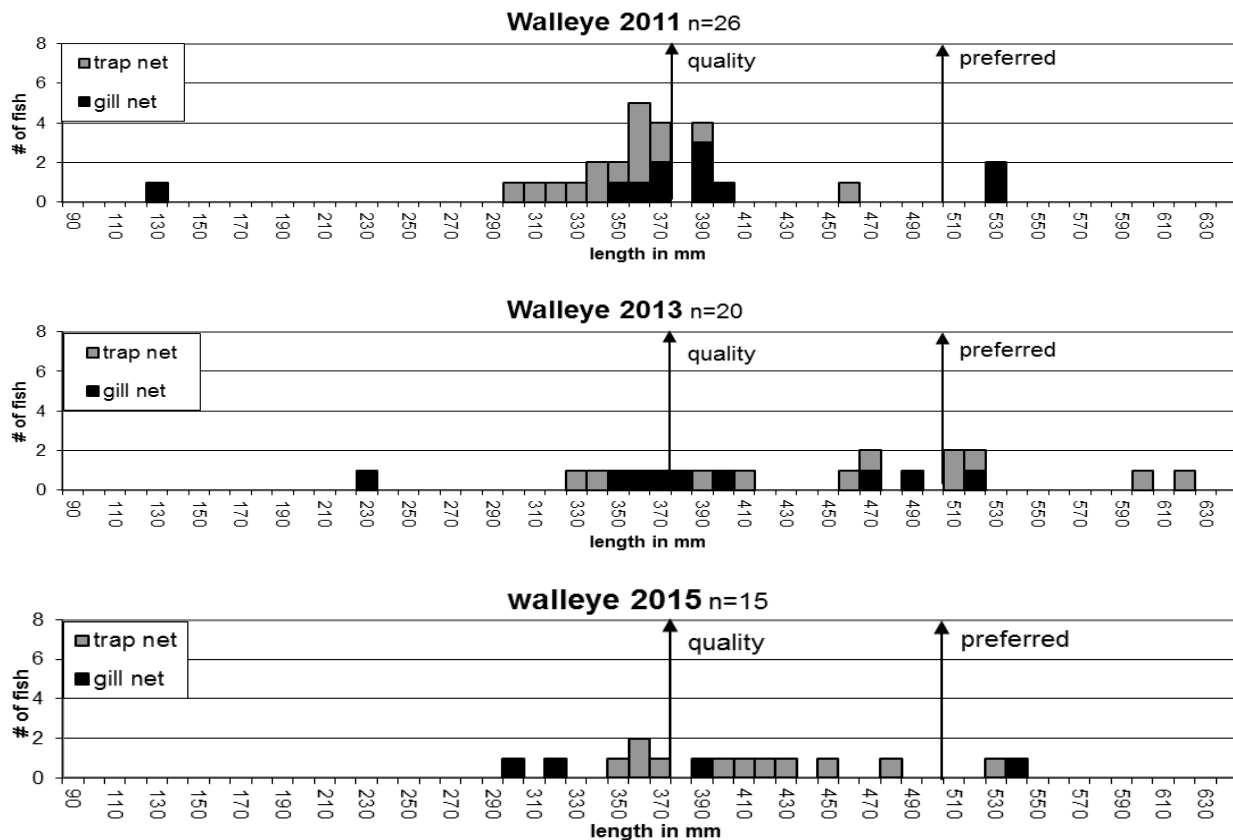


Figure 4. Length frequencies of walleye collected by gill nets and trap nets in Gardner Lake, Harding County, 2011, 2013, 2015.

RECOMMENDATIONS

1. Continue and increase the stocking of walleye fingerlings to improve density. Also look into other forage species (ie. gizzard shad) to improve walleye condition and recruitment.
2. Place Christmas tree structures in the lake, when time allows, to provide spawning habitat and cover for yellow perch and other fish species.

APPENDIX

Appendix A. Stocking record for Gardner Lake, Harding County, 1998-2015

Year	Number	Species	Size
1998	107	Channel catfish	Adult
2003	310	Channel catfish	Adults
2004	5,759 912	Walleye Channel catfish	Large fingerling Adult
2005	368	Yellow perch	Adult
2006	1,000 800	Largemouth bass Walleye	Fingerling Large fingerling
2007	660 50,000	Black crappie Walleye	Adult Fingerling
2009	59,680	Walleye	Fingerling
2010	20,700	Walleye	Fingerling
2011	19,900	Walleye	Fingerling
2014	30,000 800 150	Walleye Yellow perch Channel catfish	Fingerling Adult Adult