

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-44

Name: South Island Lake **County (ies):** Minnehaha, McCook
Legal Description: T104-R 52-Sec. 30; T 104-R 53-Sec 25
Location from nearest town: 10 miles west of Colton, SD

Dates of present survey: July 13-14, 2011

Dates of last survey: July 8-9, 2009

Managed Species	Other Species
Walleye	Northern Pike
Yellow Perch	Black Crappie
Channel Catfish	Green Sunfish
	Black Bullhead

PHYSICAL DATA

Surface Area: 91 acres

Watershed area: No data

Maximum depth: 16 ft.

Mean depth: No data

Lake elevation at time of survey (from field observations): 2 feet low

Date the latest contour map was prepared: 1997

Beneficial use classifications: (5) Warmwater semi-permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation and stock watering.

Ownership of Lake and Adjacent Lakeshore Properties

Island Lake is divided by a county highway into North and South Island lakes. South Island Lake is not listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. Approximately half the lake and western shoreline is owned by the South Dakota Department of Game, Fish and Parks (GFP). The remainder of the lake and shoreline is privately owned.

Fishing Access

Shore fishermen frequently park along the county road to fish. Boat access is limited to a muddy beach on the north shore.

Field Observations of Water Quality and Aquatic Vegetation

The Secchi depth in South Island Lake was 1.9 m (75 in). There were scattered beds of sago pondweed (*Potamogeton pectinatus*), clasping leaf pondweed (*Potamogeton richardsoni*) cattail (*Typhus spp.*) and bulrush (*Scirpus spp.*) along some of the shore.

BIOLOGICAL DATA

Methods:

South Island Lake was sampled on July 13-14, 2011 with three overnight gill-net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh ($\frac{3}{4}$ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting.

Results and Discussion:

Gill Net Catch

Black bullhead, yellow perch, walleye and northern pike were the only species sampled in the gill nets (Table 1).

Table 1. Total catch from three overnight gill net sets at South Island, July 13-14, 2011.

Species	Number	Percent	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	440	73.8	146.7	<u>+12.6</u>	20.0	25	0	95
Yellow Perch	128	21.5	42.7	<u>+10.7</u>	21.7	67	1	105
Walleye	25	4.2	8.3	<u>+3.6</u>	8.3	100	15	89
Northern Pike	3	0.5	1.0	<u>+0.7</u>	0.3	--	--	--

* One year (2009)

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in South Island Lake, July 13-14, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	31.3	115.3	86.7	28.7	--	146.7	<u>+12.6</u>
Yellow Perch	1.0	41.7	13.7	27.7	0.3	42.7	<u>+10.7</u>
Walleye	1.7	6.7	--	5.7	1.0	8.3	<u>+3.6</u>
Northern Pike	--	1.0	0.7	0.3	--	1.0	<u>+0.7</u>

¹ See Appendix A for definitions of CPUE, PSD, RSD-P, mean Wr and length categories.

Trap Net Catch

Black bullheads comprised almost the entire trap net catch (Table 3). Yellow perch, black crappie, and walleye were also sampled.

Table 3. Total catch from five overnight trap net sets at South Island Lake, Minnehaha County, July 13-14, 2011.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	974	99.1	194.8	<u>+132.4</u>	349.9	22	0	78
Yellow Perch	5	0.5	1.0	<u>+0.0</u>	7.6	--	--	--
Black Crappie	3	0.3	0.6	<u>+0.8</u>	5.2	--	--	--
Walleye	1	0.1	0.2	<u>+0.3</u>	1.0	--	--	--

*3 years (2005, 2007, 2009)

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in South Island Lake, July 13-14, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	52.8	142.0	110.6	31.4	--	194.8	<u>+132.4</u>
Yellow Perch	--	1.0	--	1.0	--	1.0	<u>+0.0</u>
Black Crappie	--	0.6	0.4	--	0.2	0.6	<u>+0.8</u>
Walleye	--	0.2	--	0.2	--	0.2	<u>+0.3</u>

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 15.

Walleye CPUE remained unchanged in 2011 at 8.3 (Table 5), about half of the management objective. Sampled fish ranged in length from 20 to 54 cm (7.9 – 21.3 in) (Figure 1) and condition declined to 89.

Table 5. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for South Island Lake, Minnehaha County, 2003-2011.

	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE							8.3		8.3
PSD							96		100
RSD-P							24		15
Mean Wr							97		89

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 50.

South Island has a good yellow perch population and anglers had some success in 2011. Gill net CPUE increased in 2011 and is approaching the management objective (Table 6). Yellow perch sampled ranged in length from 12 to 27 cm (4.7 – 10.6 in) with a mean length of 201 mm (7.9 in) (Figure 2). A stocking of 75,400 fingerlings was made in June 2011 to help achieve the management objective and another fingerling stocking is planned for 2012.

Table 6. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for South Island Lake, Minnehaha County, 2003-2011.

	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE							21.7		42.7
PSD							62		67
RSD-P							22		1
Mean Wr							90		105

Black Bullhead

Management objective: Maintain a black bullhead population with a trap-net net CPUE of less than 100.

Black bullhead trap net CPUE decreased in 2011 (Table 8) but is still over the management objective. However, the size structure of the population has improved since 2009 (Figure 3).

Table 8. Black bullhead trap-net CPUE, PSD, RSD-P, and mean Wr for South Island Lake, Minnehaha County, 2003-2011.

	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE			358.0		270.2		421.4		194.8
PSD			2		9		0		22
RSD-P			0		0		0		0
Mean Wr			95		100		89		78

All Species

There are a few northern pike and black crappie in South Island that provide some additional opportunity for anglers. Channel catfish were not sampled in 2011. Common carp and bigmouth buffalo have not been found in lake so far.

Table 5. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in South Island Lake, Minnehaha County, 2003-2011.

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011
GOS (GN)									
GOS (TN)							1.0		
WHS (GN)							0.3		
WHS (TN)									
BLB (GN)							20.0		146.7
BLB (TN)			358.0		270.2		421.4		194.8
CCF (GN)							0.7		
CCF (TN)					1.2		0.2		
NOP (GN)							0.3		1.0
NOP (TN)			3.8		1.0				
GSF (GN)									
GSF (TN)			0.2				3.2		
BLG (GN)									
BLG (TN)					0.2		1.2		
BLC (GN)									
BLC (TN)			0.6		13.4		1.6		0.6
YEP (GN)							21.7		42.7
YEP (TN)			0.2		18.2		4.4		1.0
WAE (GN)							8.3		8.3
WAE (TN)			1.2		1.2		0.6		0.2

GOS (Golden Shiner), WHS (White Sucker), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), BLG (Bluegill), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Reduce black bullhead abundance by Department removal projects and predator management.
2. Improve access for launching boats, shore fishing and vehicle parking.
3. Collect yellow perch aging structures to assess contribution of stocked hatchery-reared fingerlings.
4. Stock adult predators when available to provide angling opportunity and control bullhead recruitment.
5. Conduct occasional lake surveys to monitor the fishery.

Table 6. Stocking record for South Island Lake, Minnehaha County, 1991-2011.

Year	Number	Species	Size
2005	532	Northern Pike	Adult
2006	142	Channel Catfish	Adult
2007	365	Walleye	Adult
	452	Walleye	Juvenile
	200	Yellow Perch	Fingerling
2008	106	Walleye	Adult
2009	743	Walleye	Adult
2011	75,400	Yellow Perch	Fingerling
	478	Walleye	Lrg. Fingerling

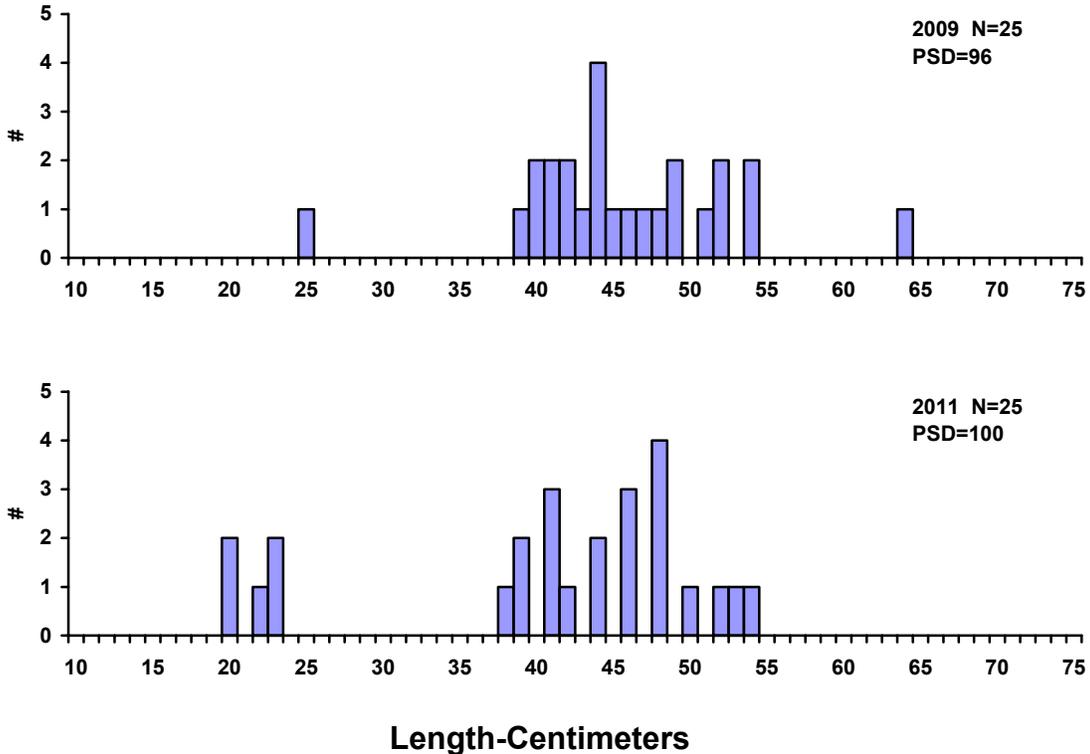


Figure 1. Length frequency histograms for walleye sampled with gill nets in South Island Lake, Minnehaha County, 2009 and 2011.

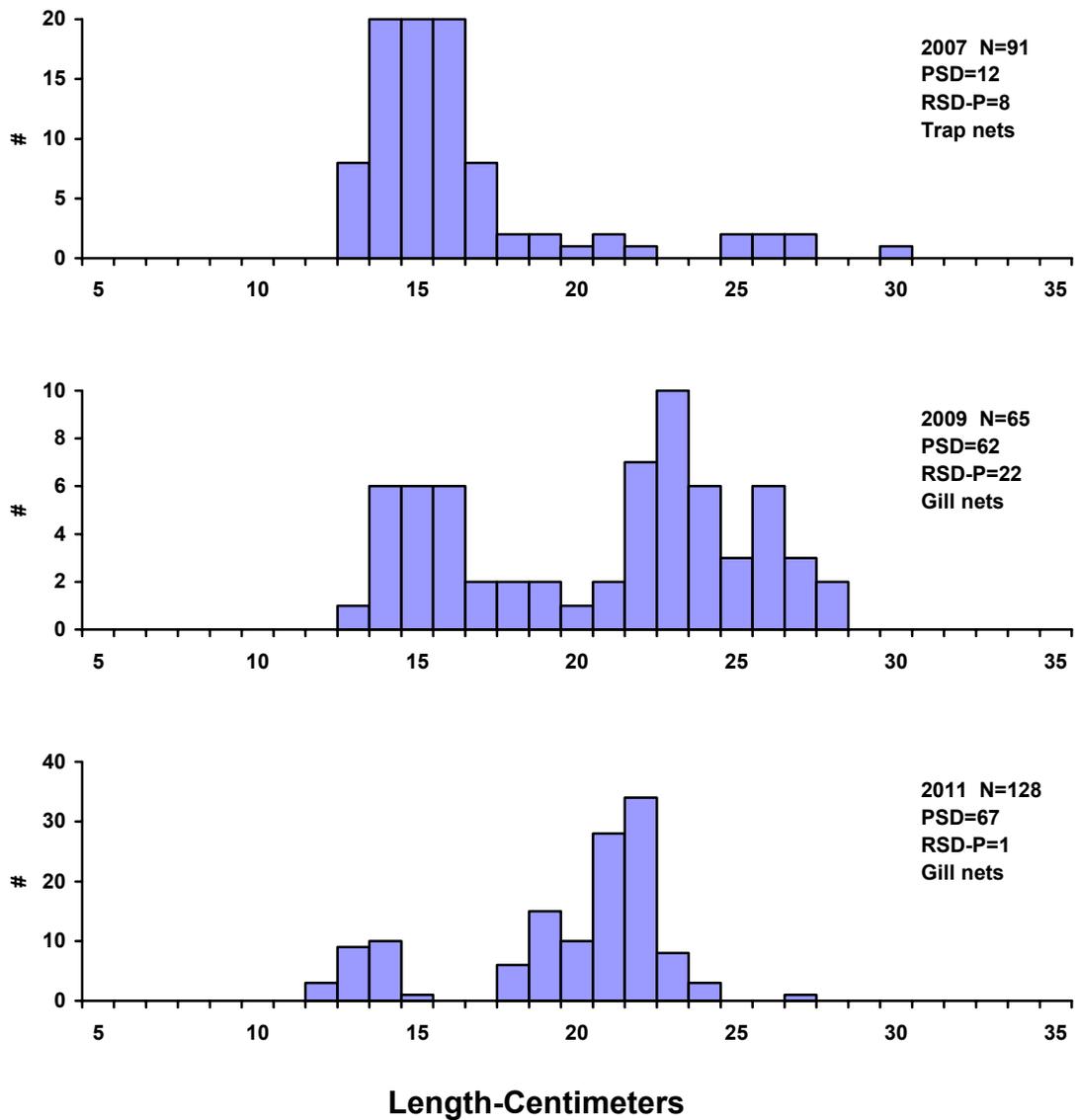
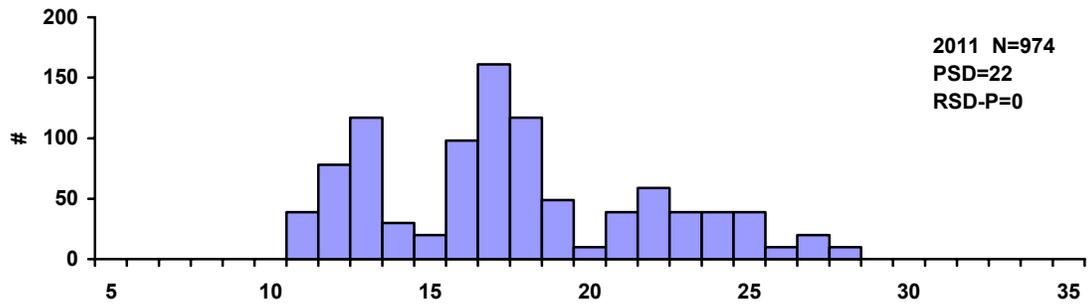
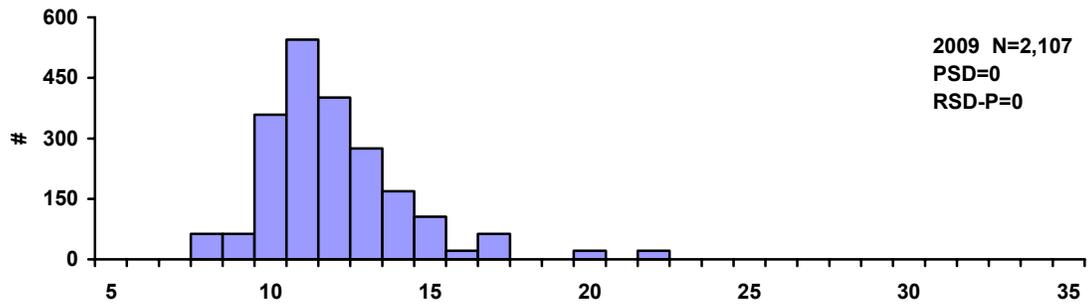
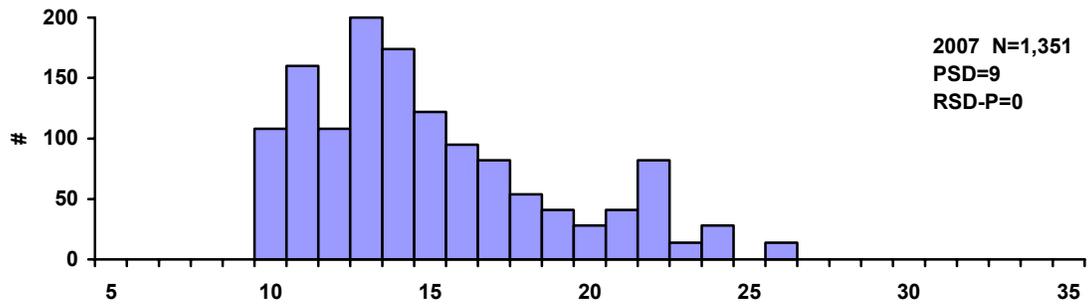
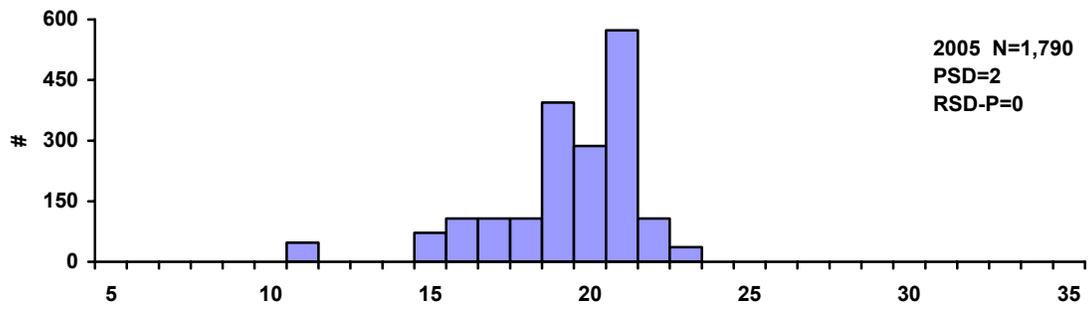


Figure 2. Length frequency histograms for yellow perch sampled with trap nets or gill nets in South Island Lake, Minnehaha County, 2007, 2009 and 2011.



Length-Centimeters

Figure 3. Length frequency histograms for black bullheads sampled with trap nets in South Island Lake, Minnehaha County, 2005, 2007, 2009, and 2011.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters. (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.