SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-44

Name: Silver Lake **County**: Hutchinson
Legal Description: T105-R52 Sec. 16-17, 20-21
Location from nearest town: 7 miles north of Freeman, SD

Dates of present survey: August 8-9, 2011
Dates of last survey August 13-14, 2008

Primary Game and Forage Species	Secondary and Other Species
Northern Pike	Black Bullhead
Yellow Perch	White Sucker
Walleye	Common Carp
	Bigmouth Buffalo
	Green Sunfish
	Shortnose Gar
	Channel Catfish

PHYSICAL DATA

Surface Area: 393 acres **Watershed**: 16,701 acres
Maximum depth: 7 feet **Mean depth**: 3.5 feet
Volume: 1,375.5 acre-feet **Shoreline Length**: 3.85 miles
Contour map available: Yes **Date mapped:** 2003
OHWM elevation: 1,435.7 **Date set:** October, 1985
Outlet elevation: 1,435.3 **Date set:** October, 1985
Lake elevation observed during the survey: Full
Beneficial use classifications: (6) warmwater marginal fish life propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Ownership of Lake and Adjacent Lakeshore Properties

Silver Lake got its name from early settlers who thought it resembled a pool of silver. It is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the fishery is managed by the South Dakota Department of Game, Fish and Parks (GFP).

Fishing Access:

Silver Lake has shore fishing access and a boat ramp on the east side of the lake and part of the west shore is accessible from the highway rest area. The remainder of the shoreline is privately owned.

Field Observations of Water Quality and Aquatic Vegetation:

Common cattail (*Typha spp.*), sago pondweed (*Potamageton pectinatus*), and bulrush (*Scirpus spp.*) were abundant throughout the lake.

BIOLOGICAL DATA

Methods:

Silver Lake was sampled on August 8-9, 2011, with three overnight gill-net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (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 (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting.

Results and Discussion:

Gill Net Catch

Black bullheads were the most abundant fish species sampled in the gill nets this year (Table 1). Only three other species were also sampled.

Table 1. Total catch from three overnight gill net sets at Silver Lake, Hutchinson County, August 8-9, 2011.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	310	87.8	103.3	±15.5	108.0	41	0	85
Shortnose Gar	27	7.6	9.0	±0.7	0.0	--	--	--
Common Carp	11	3.1	3.7	±1.1	4.3	64	0	91
Bigmouth Buffalo	5	1.4	1.7	±0.9	0.0	--	--	--

*One year (2008)

Trap Net Catch

Black bullheads made up 87.8% of the trap net sample (Table 2). Seven other species were also sampled. None of the species sampled were stocked except for northern pike. Silver Lake connects to the Vermillion River which is the source of many non-game species.

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

Table 2. Total catch from five overnight trap net sets at Silver Lake, Hutchinson County, August 8-9, 2011.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	2,291	89.1	458.2	±253.6	544.2	72	5	69
Shortnose Gar	210	8.2	42.0	±32.0	0.6	--	--	--
Common Carp	42	1.6	8.4	±4.0	7.6	66	8	92
White Sucker	12	0.5	2.4	±1.4	23.0	100	58	94
Largemouth Bass	9	0.3	1.8	±1.7	0.0	--	--	--
Green Sunfish	5	0.2	1.0	±0.8	7.2	--	--	--
Northern Pike	2	0.1	0.4	±0.5	0.2	--	--	--
River Carpsucker	1	0.0	0.2	±0.3	0.0	--	--	--

*One year (2008)

Black Bullhead

Black bullheads sampled in 2011 ranged in length from 120 to 320 mm (4.7- 12.6 in.) with a mean length of 245 mm (9.6 in) (Figure 1). Nearly 70% of the catch measured over 23 cm (9 in), the minimum size typically harvested by anglers. Rarely do bullhead populations contain high abundance and large size.

MANAGEMENT RECOMMENDATIONS

1. Manage Silver Lake as a northern pike, yellow perch, black bullhead and walleye trap and transfer fishery whenever the lake is full enough to reduce the chances of winterkill. The game fish populations will be maintained by stocking and fish may be transferred to other lakes as needed.

Table 3. Stocking record for Silver Lake, Hutchinson County, 1997-2011.

Year	Number	Species	Size
1997	1,800	Yellow Perch	Adult
1998	46,000	Walleye	Fingerling
	4,338	Yellow Perch	Adult
1999	43,000	Walleye	Fingerling
2001	431,000	Northern Pike	Fry
2003	108,206	Walleye	Fingerling
2004	58,508	Walleye	Fingerling
2005	86,600	Walleye	Fingerling
2006	215,000	Walleye	Fingerling
2007	2,200,000	Walleye	Fry
2010	413,292	Walleye	Fry
	39,375	Yellow Perch	Lrg. Fingerling
2011	422,000	Northern Pike	Fry
	2,000,000	Walleye	Fry

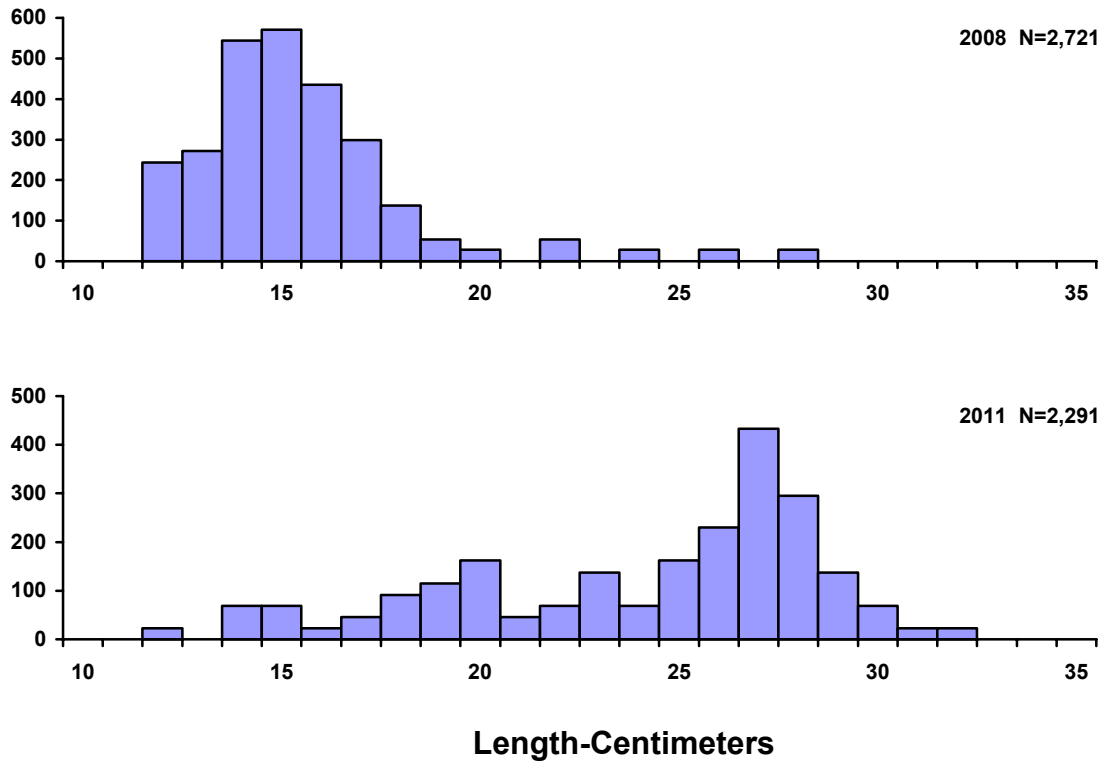

Figure 1. Length frequency histograms for black bullheads sampled with trap nets in Silver Lake, Hutchinson County, 2008 and 2011.

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:

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

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

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

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.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

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.