SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-45

Name: Mud Lake **County:** Kingsbury
Legal Description: T112-R56-Sec. 28,29
Location from nearest town: 6.5 miles west of Erwin, SD

Dates of present survey: August 14-15, 2012
Date last surveyed: August 12-13, 2003
Management classification: Warmwater Marginal

Game Species	Other Species
Walleye	Black Bullhead
Yellow Perch	Common Carp
Northern Pike	White Sucker

PHYSICAL DATA

Surface Area: 462 acres **Watershed:** Unknown
Maximum depth: 10 feet **Mean depth:** 6 feet
Lake elevation at time of survey (from known benchmark): 2 ft. low
Date the latest contour map was prepared: No map available

Ownership of Lake and Adjacent Lakeshore Properties

Mud Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. Except for a county road right-of-way on the north side of the lake, and a game production area on the west side, the rest of the shoreline is privately owned.

Fishing Access

There are no boat ramps or lake access areas on Mud Lake. Boats can be launched off the county road right-of-way on the north side of the lake, but parking is limited. Shore fishing is also possible from this right-of-way. Most fishing activity occurs during the winter.

Field Observations of Water Quality and Aquatic Vegetation

Sago pondweed was observed during the survey however the water was turbid with a Secchi disk reading of only 27 cm (10.5 in).

BIOLOGICAL DATA

Methods:

Mud Lake was sampled on August 14-15, 2012 with two 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, 1-1/4, 1-1/2, and 2 in) monofilament netting. Gill-net and trap-net sites are displayed in Figure 4.

Results and Discussion:

Gill Net Catch

Walleye and common carp were the most abundant species sampled in the gill nets (Table 1). White sucker, black bullhead, yellow perch, and northern pike were also caught.

Table 1. Total catch from two overnight gill net sets at Mud Lake, Kingsbury County, August 14-15, 2012.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	69	30.8	34.5	+14.7	254.3	11	0	77
Common Carp	49	21.9	24.5	+7.0	75.7	0	0	88
White Sucker	36	16.1	18.0	+9.0	4.3	53	22	84
Black Bullhead	35	15.6	17.5	+5.8	2.7	24	3	75
Yellow Perch	30	13.4	15.0	+6.4	7.7	10	7	89
Northern Pike	5	2.2	2.5	+0.6	0.7	--	--	--

*One year (2011).

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in Mud Lake August 14-15, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Walleye	3.5	31.0	27.5	3.5	--	34.5	+14.7
Common Carp	2.0	22.5	22.5	--	--	24.5	+7.0
White Sucker	--	18.0	8.5	5.5	4.0	18.0	+9.0
Black Bullhead	0.5	17.0	13.0	3.5	0.5	17.5	+5.8
Yellow Perch	--	15.0	13.5	0.5	1.0	15.0	+6.4
Northern Pike	--	2.5	0.5	2.0	--	2.5	+0.6

* Length categories can be found in Appendix A.

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

Trap Net Catch

Black bullhead and walleye were the most abundant species caught in the trap nets (Table 2). The remainder of the trap net sample consisted of common carp, white sucker, northern pike and yellow perch.

Table 3. Total catch from five overnight trap net sets at Mud Lake, Kingsbury County, August 14-15, 2012.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	740	53.0	148.0	+65.8	--	5	4	78
Walleye	491	35.2	98.2	+48.9	--	19	0	77
Common Carp	82	5.9	16.4	+3.7	--	9	4	96
White Sucker	68	4.9	13.6	+2.3	--	93	78	92
Northern Pike	10	0.7	2.0	+0.8	--	70	0	81
Yellow Perch	5	0.4	1.0	+0.7	--	20	0	84

*This is the first survey using trap nets.

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Mud Lake August 14-15, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	43.0	105.0	99.6	1.4	4.0	148.0	+65.8
Walleye	10.8	87.4	70.8	16.6	--	98.2	+48.9
Common Carp	0.6	15.8	14.4	0.8	0.6	16.4	+3.7
White Sucker	--	13.6	1.0	2.0	10.6	13.6	+2.3
Northern Pike	--	2.0	0.6	1.4	--	2.0	+0.8
Yellow Perch	--	1.0	0.8	0.2	--	1.0	+0.7

* Length categories can be found in Appendix A.

Discussion

Shallow water depths in Mud Lake make long term fish management a challenge. Successful stockings in 2010 and 2011(Table 7) have established a good walleye population in the lake (Figure 1).

Table 5. Walleye gill-net CPUE, PSD, and mean Wr for Mud Lake, Kingsbury County, 2004-2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
CPUE								254.3	34.5
PSD								7	11
RSD-P								0	0
Mean Wr								96	77

Table 6. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Mud Lake, Kingsbury County, 2004-2012.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012
COC (GN)								75.7	24.5
COC (TN)									16.4
WHS (GN)								4.3	18.0
WHS (TN)									13.6
BLB (GN)								2.7	17.5
BLB (TN)									148.0
NOP (GN)								0.7	2.5
NOP (TN)									2.0
YEP (GN)								7.7	15.0
YEP (TN)									1.0
WAE (GN)								254.3	34.5
WAE (TN)									98.2

COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), NOP (Northern Pike), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye).

MANAGEMENT RECOMMENDATIONS

1. Stock walleye and yellow perch whenever the lake is deep enough to minimize the risk of fish kills for the primary objective of rearing fish for stocking and the secondary objective of providing fishing opportunity.

Table 7. Stocking record for Mud Lake, Kingsbury County, 2010-2012.

Year	Number	Species	Size
2010	550,000	Walleye	Fry
2011	500,000	Walleye	Fry

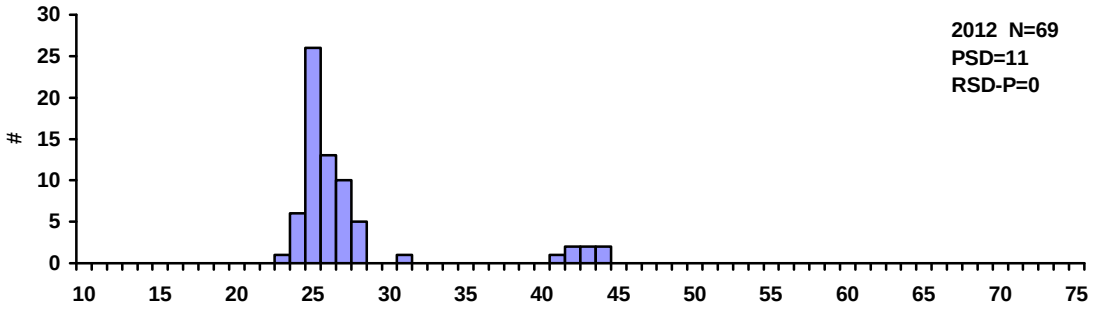

Figure 1. Length frequency histograms for walleyes sampled with gill nets in Mud Lake, Kingsbury County, 2012.

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 (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.