Clear Lake

Site Description

Location

Water designation number (WDN)	32-0005-00
Legal description	T115N-R53W-Sec.11, 14, 15, 16, 22
County (ies)	Hamlin
Location from nearest town	7 miles north and 1 mile east of Haiyti, SD

Survey Dates and Netting Information

Dates of current survey	June 12-13, 2008 (FN,GN)
Date of most recent survey	June 22-23, 1972 (last on file)
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	unknown
Surface area (acres)	≈750
Maximum depth (ft)	≈13
Mean depth (ft)	unknown

Ownership and Public Access

Clear Lake is a meandered lake owned by the State of South Dakota and the fish community is managed by SDGFP. SDGFP leases land for a public access site which includes a boat ramp and landing dock on the northwest corner of Clear Lake. Lands adjacent to Clear Lake are under private ownership.

Watershed and Land Use

Land use within the Clear Lake watershed is agricultural with much of the immediate shoreline comprised of pasturelands. Homes and cabins have recently been constructed on the northwest corner of the Clear Lake.

Water Level Observations

No Ordinary High Water Mark has been established by the South Dakota Water Management Board for Clear Lake. The elevation of Clear Lake increased during heavy run-off periods during the mid-1990's. The elevation of Clear Lake peaked at 1706.6 fmsl in the Spring of 1997 and has since declined; however, the elevation remains above those reported in the late 1980's (1699-1702 fmsl). On May 29, 2008, the elevation of Clear Lake was 1705.3 fmsl, but by October 15, 2008 the elevation of had declined to 1704.6 fmsl.

Aquatic Vegetation and Exotics

No aquatic vegetation surveys have been completed on Clear Lake. Common carp was the only exotic species sampled during our surveys.

Fish Management Information

Primary species	walleye, yellow perch
Other species	black bullhead, common carp, white crappie, white sucker
Lake-Specific Regulations	NE Panfish Management Area: 10 daily; 50 possession
Management classification	warm-water marginal
Fish Consumption Advisories	none

Figure 1. Map depicting location of Clear Lake from Hayti, South Dakota and the public access point which includes metal boat ramp and landing dock. CHH Access= access point

Management Objectives

1) Maintain a mean gill net CPUE of stock-length walleye ≥ 10, a PSD of 30-60, and a PSD-P of 5-10.

2) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 25, a PSD of 30-60, and a PSD-P of 5-10.

Results and Discussion

Clear Lake is a shallow-natural lake located within the Big Sioux River drainage near the town of Thomas in Hamlin County, South Dakota. Fish community surveys conducted in the 1960-70's indicated that Clear Lake was susceptible to winterkill and the fish community was often dominated by black bullhead, northern pike, and yellow perch.

Above normal precipitation during the mid to late 1990's resulted in an increase in the water depth of Clear Lake lessening the probability of winterkill. In 1997, walleye were introduced into Clear Lake and subsequently a popular sport fishery has developed. Currently, Clear Lake is managed as a walleye and yellow perch fishery.

Primary Species

Walleye: Walleye relative abundance, as indexed by mean gill net CPUE, has remained moderate to moderately-high from 2005-2008 with mean CPUE values ranging from 14 to 17 (Table 2; Table 3; Figure 2). The mean gill net CPUE in 2008 was 14.8 which is above the minimum management objective (≥10 stock-length walleye/ net night; Table 3). Walleye fry were stocked in 2004 and 2007. The 2004 cohort represented the largest year-class sampled by gill nets in 2008 and the 2007 cohort was captured in moderate numbers. In addition, moderate numbers of walleye were captured from the 2001, 2002, and 2006 year-classes which coincide with non-stocking years.

Walleye captured in gill nets in 2008 ranged from 15 to 61 cm TL (5.9 to 24.0 inches; Figure 2). The PSD and PSD-P were 100 and 20, respectively, and both were above the management objective ranges (30-60 and 5-10, respectively). High PSD and PSD-P indicate relatively low mortality of large fish and only moderate recruitment of stock length fish into the population.

Walleye growth in Clear Lake appears to be good. In 2008, the weighted mean total length at capture of age-3 walleye was 444 mm (17.4 inches; Table 4). During 2008, walleye of most age classes experienced equivalent or better growth when compared to surveys conducted in the past five years. The most notable exceptions are the age-1 walleyes which experienced the poorest growth of the past five years. It is unclear as to why growth was slower for age-1 walleye in 2008. Condition of gill net captured walleyes in 2008 was good with mean Wr values for stock-length fish ranging from 88 to 110. No length related trends in Wr were observed in 2008.

Yellow Perch: Yellow perch relative abundance as indexed by mean gill net CPUE, has decreased from a high of 58.8 in 2004 to 5.2 in 2008 (Tables 1-3, Figure 3) . The decrease in abundance over the past four years appears to be a result of mortality coupled with limited natural reproduction.

Collected yellow perch ranged from 9 to 32 cm TL (3.5 to 12.6 inches; Figure 3). The PSD and PSD-P of the yellow perch population sample were 29 and 23, respectively (Tables 1 and 3, Figure 3). The PSD was slightly below the management objective range (30-60) and the PSD-P was above the management objective range (5-10). No growth information is available for yellow perch in Clear Lake. Condition of yellow perch captured in the gill nets was good with Wr values for stock-length fish ranging from 87 to 121. No length related trends in Wr were observed in 2008.

Other Species

Northern Pike: One northern pike was captured in gill nets during the 2008 survey. Abundance appears to be low with a mean gill net CPUE of only 0.2 from 2004-2008 (Table 2). However, northern pike typically are not effectively sampled using standard lake survey methods; therefore reported values may not accurately represent the at-large population.

White Crappie: Two white crappie were captured in the gill nets during the 2008 survey. Gill nets are typically not effective in sampling crappie populations so abundance in considered to be unknown. White crappie have not previously been captured in Clear Lake.

Common Carp: Common carp were captured in low numbers during the 2008 survey (Table 1).

Management Recommendations

1) Conduct fish population assessment surveys every third year (next survey scheduled in 2011) to monitor fish abundance, fish population size structures, fish growth, and stocking success.

2) Stock walleye fry (1,000 fry/acre) biennially to establish additional year-classes and provide a stable sport fishery.

3) Collect otoliths from walleye and yellow perch to assess population age structure and growth rates.

Table 1. Mean catch rate (CPUE; gill nets= catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for various fish species captured in experimental gill nets in Clear Lake, 2008. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). COC= common carp; NOP= northern pike; WAE= walleye; WHC= white crappie; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Gill nets								
COC	1.0	0.7	83	17	83	17	103	7
NOP	0.2	0.2	0	---	0	---	100	---
WAE	14.8	3.3	100	0	20	7	95	1
WHC	0.3	0.3	0	---	0	---	101	35
YEP	5.2	0.4	29	0	23	0	102	2

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night) of stock-length fish for various fish species captured in experimental gill nets in Clear Lake, 2004-2008. BLB= black bullhead; COC= common carp; NOP= northern pike; WAE= walleye; WHC= white crappie; WHS= white sucker; YEP= yellow perch

	CPUE					
Species	2004	2005	2006[1]	2007[1]	2008	Mean
Gill nets						
BLB	0.3	0.0	0.0	0.0	0.0	0.1
COC	1.0	2.3	0.0	2.7	1.0	1.4
NOP	0.3	0.0	0.3	0.0	0.2	0.2
WAE	25.8	17.3	14.0	16.3	14.8	17.6
WHC	0.0	0.0	0.0	0.0	0.3	0.1
WHS	2.0	1.0	1.0	1.0	0.0	1.0
YEP	58.8	13.0	28.7	18.3	5.2	24.8

[1] Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in experimental gill nets in Clear Lake, 2004-2008. WAE= walleye; YEP= yellow perch

Species	2004	2005	2006[1]	2007[1]	2008	Average	Objective
Gill nets							
WAE							
CPUE	26	17	14	16	15	18	≥ 10
PSD	55	67	36	96	100	71	30 – 60
PSD-P	1	4	5	4	20	7	5 – 10
Wr	95	86	90	96	95	92	---
YEP							
CPUE	59	13	29	18	5	25	≥ 25
PSD	69	56	83	27	29	53	30-60
PSD-P	33	0	7	22	23	17	5-10
Wr	107	110	115	110	102	109	---

[1] Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

Table 4. Weighted-mean length-at-capture (mm) for walleye captured using experimental gill nets in Clear Lake, 2004-2008. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

		Age										
Year	N	0	1	2	3	4	5	6	7	8	9	10
2008	101	---	163	394	444	463	521	501	505	528	---	---
2007	49	---	288	395	426	441	492	498	472	---	---	---
2006	42	---	---	325	413	447	473	---	---	---	646	---
2005	60	---	173	353	402	424	---	---	---	586	---	---
2004	110	---	256	351	401	457	---	491	540	---	---	---

Table 5. Stocking history including size and number for fishes stocked into Clear Lake, 1997-2008.

Year	Species	Size	Number
1997	WAE	fry	750,000
1998	YEP	adult	268
2000	WAE	fry	750,000
2004	WAE	fry	1,000,000
2007	WAE	fry	600,000

Table 6. Number of walleyes sampled using gill nets (n) by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Clear Lake, 2000-2008.

	Year Class											
Survey Year	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
2008[1]		12	10	5	35	6	14	14	5			
2007[1]	---		2	3	37	1	3	3	1			
2006[1]	---	---			27	4	5	5				1
2005	---	---	---		8	14	13	23				2
2004	---	---	---	---		26	18	63	1		1	1
Number stocked												
fry		600			1,000				750			750
small fingerling												
large fingerling												

[1]Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

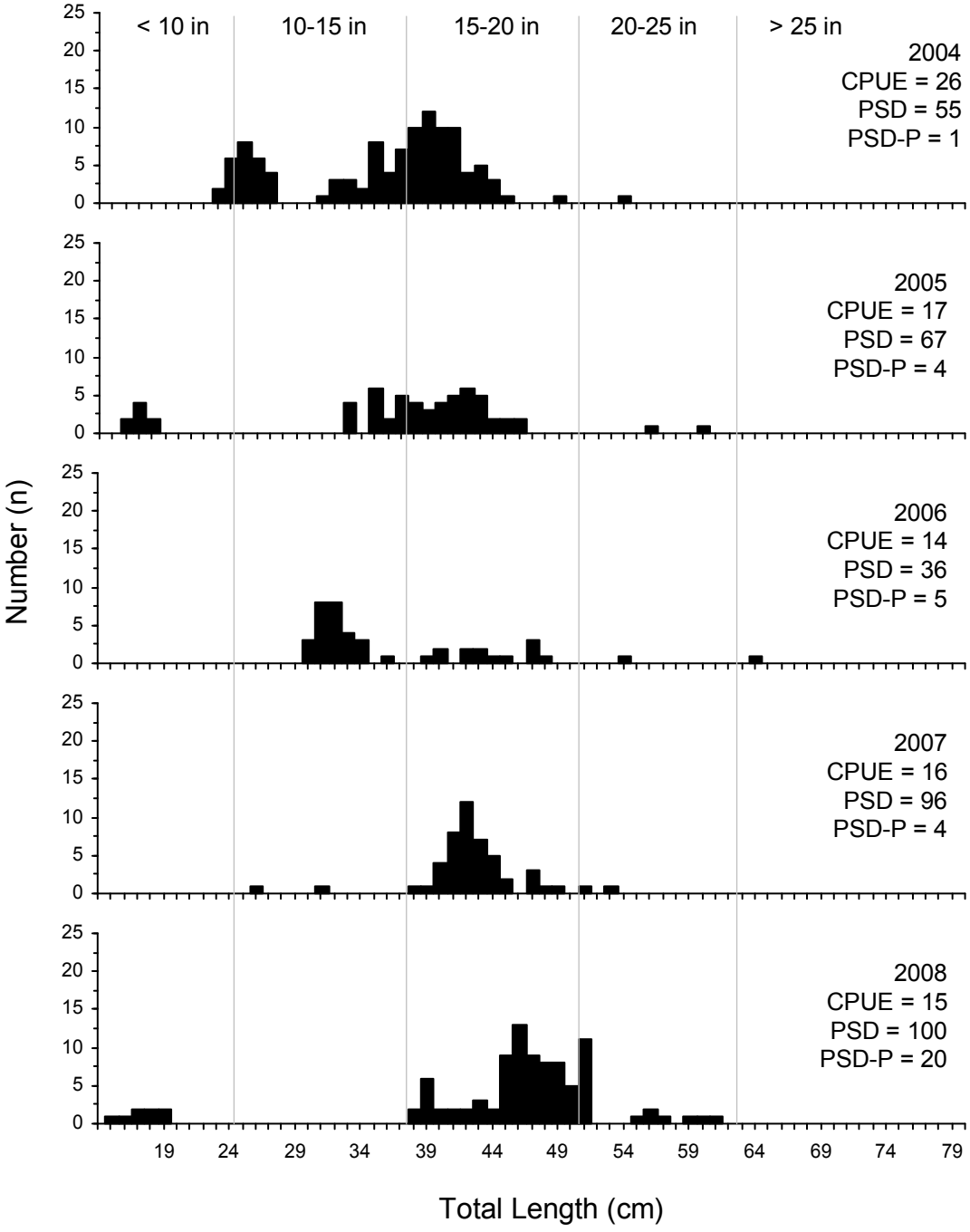

Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Clear Lake, 2004-2008.

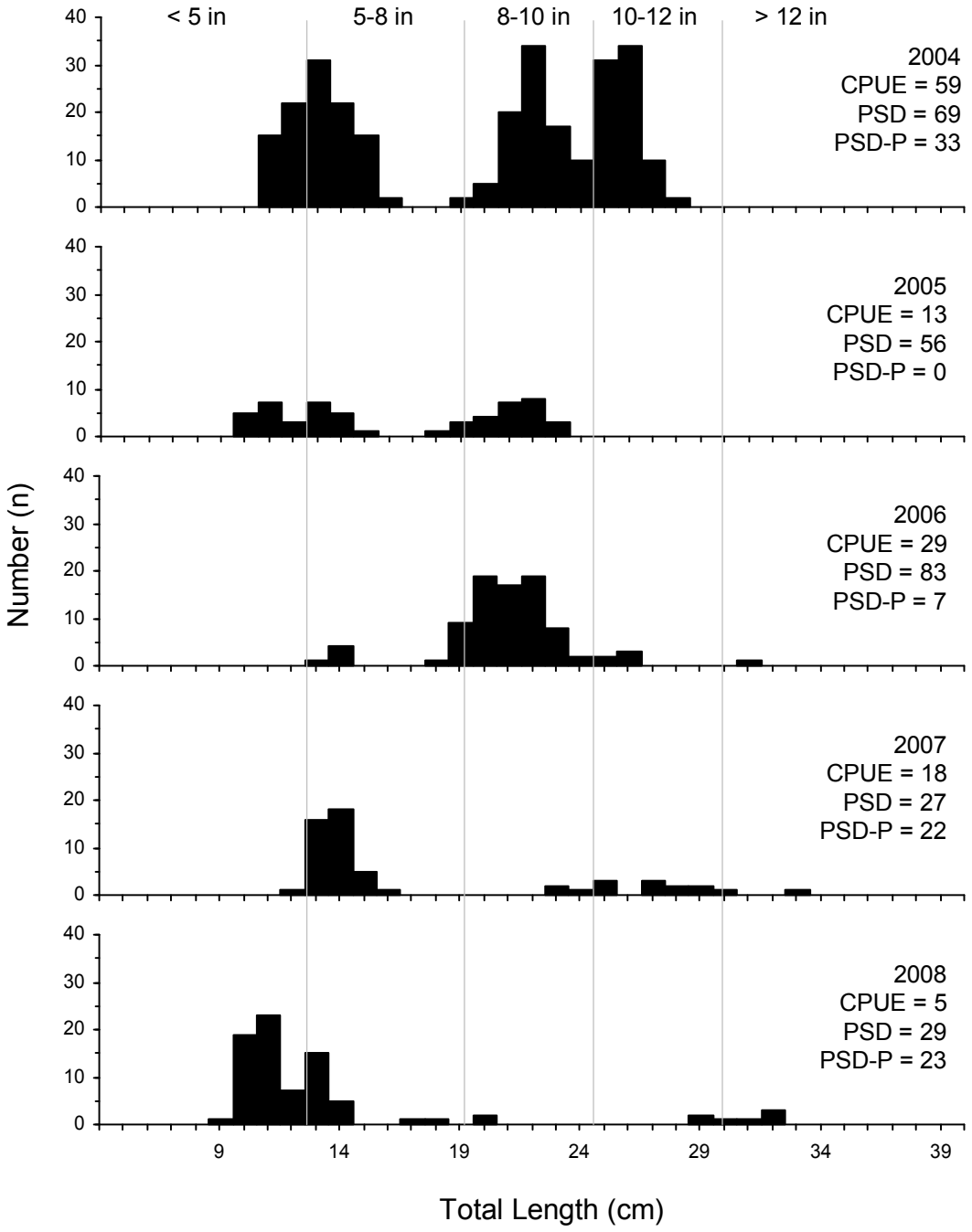

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Clear Lake, 2004-2008.