Minnewasta Lake

Site Description

Location

Water designation number (WDN)	22-0004-00
Legal description	T122N-R54-55W-Sec. 1-2, 7, 11-13, 18
County (ies)	Day
Location from nearest town	2.0 miles west and 4.0 miles north of Waubay

Survey Dates and Sampling Information

Survey dates	June 2-3, 2015 (GN)
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	11,969
Surface area (acres)	600
Maximum depth (ft)	14
Mean depth (ft)	10

Ownership and Public Access

Minnewasta Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. A single public boat ramp maintained by SDGFP is located on the southeast shore (Figure 1; Figure 2). The majority of lakeshore is undeveloped, but several cabins are present in the southeast corner of the lake.

Watershed and Land Use

The 11,969 acre Rush Lake sub-watershed (HUC-12) encompasses Minnewasta Lake and is located within the larger (186,967 acres) Waubay Lakes watershed. Land use within the Waubay Lakes watershed is primarily agricultural with a mix of pasture or grassland, cropland, and woodland.

Water Level Observations

No OHWM has been established by the South Dakota Water Management Board on Minnewasta Lake. The elevation of Minnewasta Lake on April 21, 2015 was 1802.5 fmsl and similar to the fall 2014 elevation of 1802.4 fmsl. The water level had declined to an elevation of 1801.8 fmsl on October 20, 2015.

Fish Management Information

Primary species	northern pike, walleye, yellow perch
Other species	black bullhead, black crappie, common carp, rock bass, smallmouth bass, white bass, white sucker
Lake-specific regulations	none
Management classification	warm-water semi-permanent
Fish consumption advisories	Mercury: walleye >18". See the South Dakota Fishing Handbook for more details on meal and portion size recommendations. Also see Department of Health website: http://doh.sd.gov/food/fish-advisories.aspx for more information.

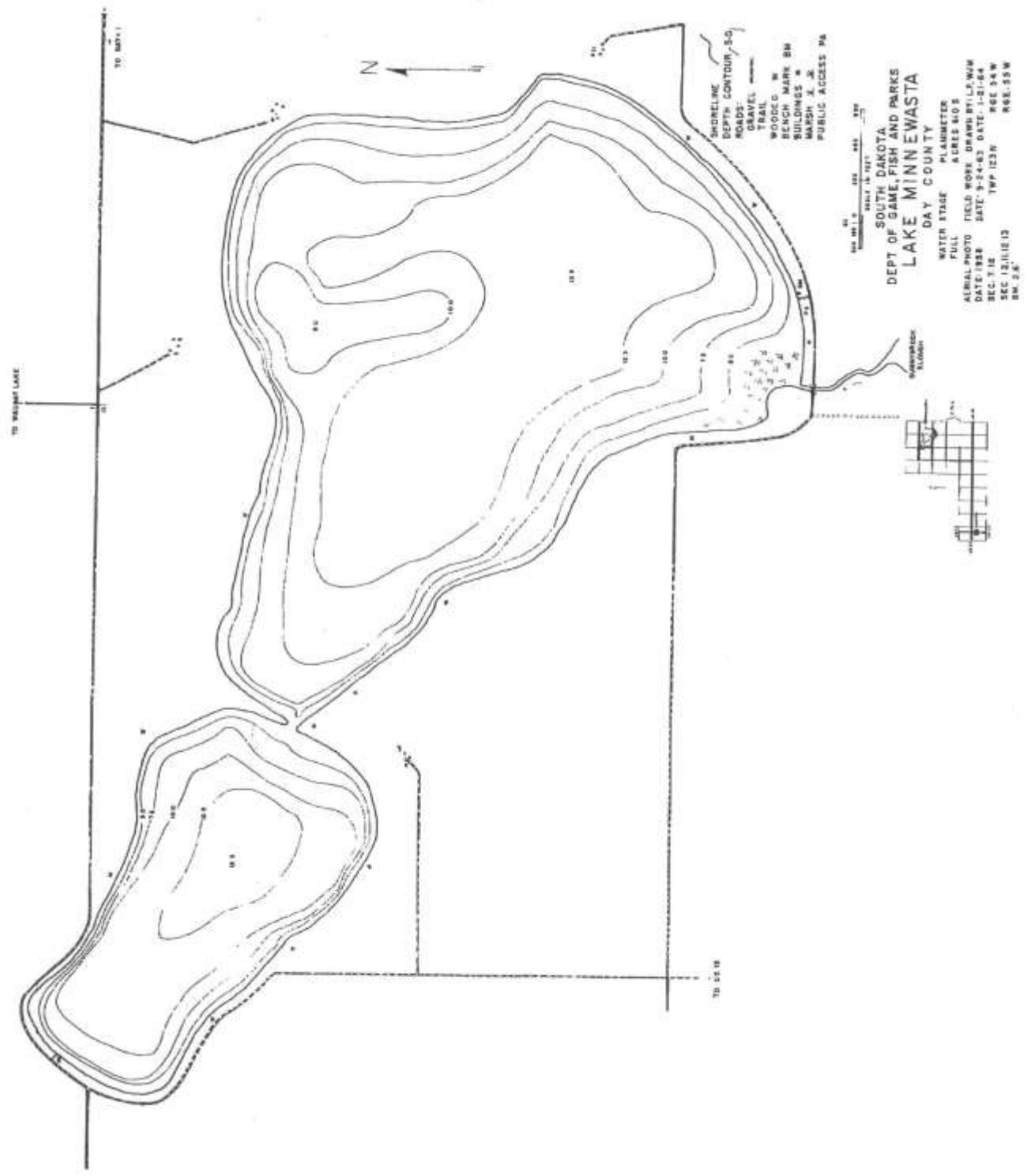

Figure 1. Map depicting surface area and depth contours of Minnewasta Lake, Day County, South Dakota.

Figure 2. Map depicting geographic location of several Day County, South Dakota, lakes including Minnewasta (top). Also noted is the access location and standardized net locations for Minnewasta Lake (bottom). MIGN = gill nets

Management Objectives

1) Maintain a gill net mean CPUE of stock-length northern pike ≥ 3, a PSD of 30-60, and a PSD-P of 5-10.

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

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

Results and Discussion

Minnewasta Lake is a natural lake located between Waubay and North Rush Lakes in Day County, South Dakota (Figure 2). Prior to the 1990's, Minnewasta Lake was shallow and susceptible to periodic winter- and summer-kill events. However, above normal precipitation and the resulting runoff during the mid to late 1990's increased the depth and diminished the risk of winterkill allowing a mature fish community to develop. Currently, Minnewasta Lake is managed as a northern pike, walleye, and yellow perch fishery.

Note: During the 2015 fish community survey, gill net catches were reduced due to a heavy accumulation of algae and likely were not representative of the at-large population for several fish species commonly assessed using gill net data (i.e., northern pike, walleye, and yellow perch). Therefore, no discussion of individual fish species is presented in this report; summarized data from the most recent (2001-2015) fish community surveys are provided in the following tables and figures.

Management Recommendations

1) Conduct fish population assessment surveys on an every third year basis (next survey scheduled in summer 2018) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.

2) Stock walleye fry on a biennial basis (≈500 fry/acre) to establish additional year classes.

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

4) Monitor winter and summer kill events. In cases of substantial winter or summer kill the need to re-establish a walleye fishery in Minnewasta Lake should be evaluated. If water levels are sufficient, northern pike, walleye and yellow perch should be stocked to re-establish a fish community.

Table 1. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P), and mean relative weight (Wr) of stock-length fish for various fish species captured in experimental gill nets from Minnewasta Lake, 2015. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= black bullhead; NOP= northern pike; WAE= walleye; WHS= white sucker; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Gill Nets[1]								
BLB	1.7	0.9	90	18	90	18	103	7
NOP	0.2	0.2	0	---	0	---	71	---
WAE	0.8	1.2	40	52	0	---	82	4
WHS	1.2	0.6	100	0	100	0	108	6
YEP	1.7	1.2	100	0	80	24	103	4

[1] Gill net catches were reduced due to heavy algal build-up and are likely not representative of the at-large population.

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured in frame nets and experimental gill nets from Minnewasta Lake, 2001-2015. BLB= black bullhead; BLC= black crappie; COC= common carp; NOP= northern pike; OSF= orangespotted sunfish; ROB= rock bass; SMB= smallmouth bass; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

	CPUE				
Species	2001	2006[1]	2009	2012	2015[2]
Frame nets					
BLB	2.3	1.3	1.3	13.2	---
BLC	0.1	2.4	0.0	3.4	---
COC	0.0	0.1	0.2	0.1	---
NOP	0.1	0.7	0.2	0.5	---
OSF[3]	0.0	0.2	0.1	0.0	---
ROB	0.0	0.0	0.0	0.2	---
SMB	0.0	0.0	0.0	0.1	---
WAE	0.1	1.9	0.3	5.6	---
WHB	0.0	0.2	0.1	2.8	---
WHS	0.1	0.8	0.5	0.5	---
YEP	0.0	0.3	0.1	0.4	---
Gill Nets					
BLB	0.0	0.2	0.2	3.0	1.7
BLC	0.0	0.0	0.0	0.2	0.0
COC	0.0	0.0	0.3	0.2	0.0
NOP	3.7	1.2	0.0	2.8	0.2
OSF[3]	0.0	0.2	0.2	0.0	0.0
SPS[3]	0.0	0.0	0.2	0.0	0.0
WAE	7.8	10.7	3.3	24.0	0.8
WHB	0.0	0.0	0.2	0.0	0.0
WHS	2.7	2.5	0.7	1.7	1.2
YEP	11.0	2.5	3.2	4.8	1.7

[1] Monofilament gill net mesh size (0.75”, 1.00”, 1.25”, 1.50”, 2.00” and 2.50”)

[2] Gill net catches were reduced due to heavy algal accumulation and are likely not representative of the at-large population.

[3] All fish sizes.

Table 3. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) for selected species captured in experimental gill nets from Minnewasta Lake, 2001-2015. NOP= northern pike; WAE = walleye; YEP = yellow perch

Species	2001	2006[1]	2009	2012	2015[2]	Objective
Gill nets						
NOP						
CPUE	4	1	0	3	<1	≥ 3
PSD	95	100	---	88	0	30-60
PSD-P	18	43	---	18	0	5-10
Wr	83	83	---	86	71	---
WAE						
CPUE	8	11	3	24	1	≥ 10
PSD	47	31	45	13	40	30-60
PSD-P	19	5	5	2	0	5-10
Wr	95	98	95	89	82	---
YEP						
CPUE	11	3	3	5	2	≥ 30
PSD	11	80	71	97	100	30-60
PSD-P	3	33	6	76	80	5-10
Wr	96	110	103	112	103	---

[1] Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")
[2] Gill net catches were reduced due to heavy algal accumulation and are likely not representative of the at-large population.

Table 4. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Minnewasta Lake, 2009-2015.

	Year Class											
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2015[1]					3	2						
2012	---	---	---		3	126	3	12	1		2	
2009[2]	---	---	---	---	---	---		2	10	1	7	1
# stocked												
fry	300	300	300		300		350	700			800	1000
sm. fingerling												34
lg. fingerling												

[1] Gill net catches were reduced due to heavy algal accumulation and are likely not representative of the at-large population.
[2] Older Walleye were sampled, but are not reported in this table.

Table 5. Weighted mean length at capture (mm) for walleye captured in experimental gill nets (expanded sample size) from Minnewasta Lake, 2006-2015. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

	Age									
Year	1	2	3	4	5	6	7	8	9	10
2015	---	---	---	317(3)	389(2)	---	---	---	---	---
2012	193(3)	318(126)	443(3)	454(12)	493(1)	---	571(2)	---	---	---
2009	202(2)	318(10)	375(1)	428(7)	442(1)	---	---	---	---	662(1)
2006	196(13)	279(69)	379(13)	442(4)	473(1)	---	619(1)	691(1)	660(1)	---

Table 6. Stocking history including size and number for fishes stocked into Minnewasta Lake, 2004-2015. WAE= walleye, YEP= yellow perch

Year	Species	Size	Number
2004	WAE	fry	1,000,000
2004	WAE	small fingerling	34,000
2005	WAE	fry	800,000
2006	YEP	fingerling	5,440
2008	WAE	fry	700,000
2009	WAE	fry	350,000
2009	YEP	small fingerling	9,690
2011	WAE	fry	300,000
2013	WAE	fry	300,000
2014	WAE	fry	300,000
2015	WAE	fry	300,000

Table 7. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Minnewasta Lake, 2009-2015.

	Year Class										
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
2015[1]				1	7		2				
2012	---	---	---		14	4	8	11	5		1
2009	---	---	---	---	---	---		1	16		

[1] Gill net catches were reduced due to heavy algal build-up and are likely not representative of the at-large population.

Table 8. Weighted mean TL (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Minnewasta Lake, 2009-2015.

	Age						
Year	1	2	3	4	5	6	7
2015	---	---	215(1)	283(7)	---	317(2)	---
2012	101(14)	213(4)	258(8)	300(11)	305(5)	---	339(1)
2009	112(1)	210(16)	---	---	---		

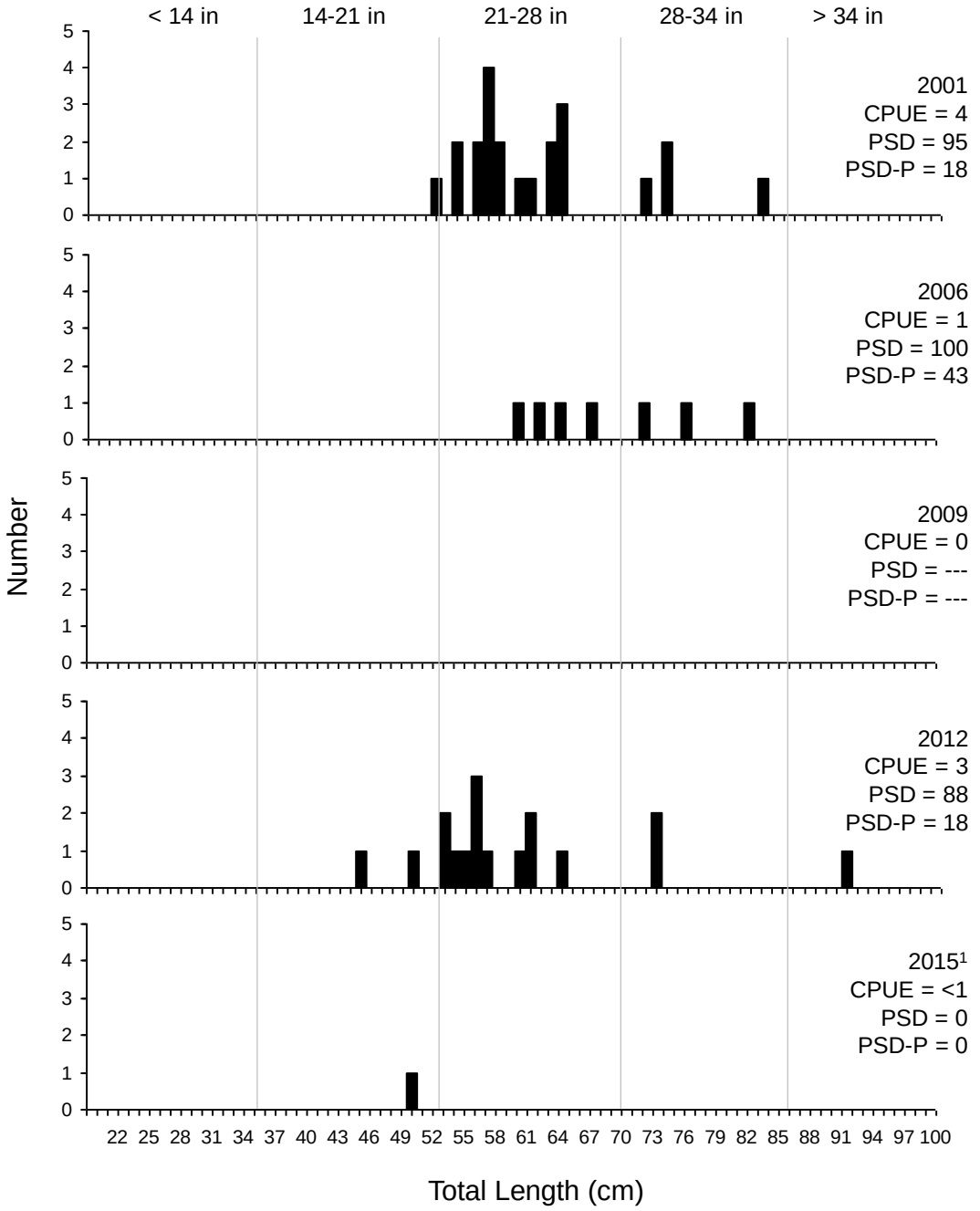

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using gill nets in Minnewasta Lake, 2001-2015.

[1] Gill net catches were reduced due to heavy algal accumulation.

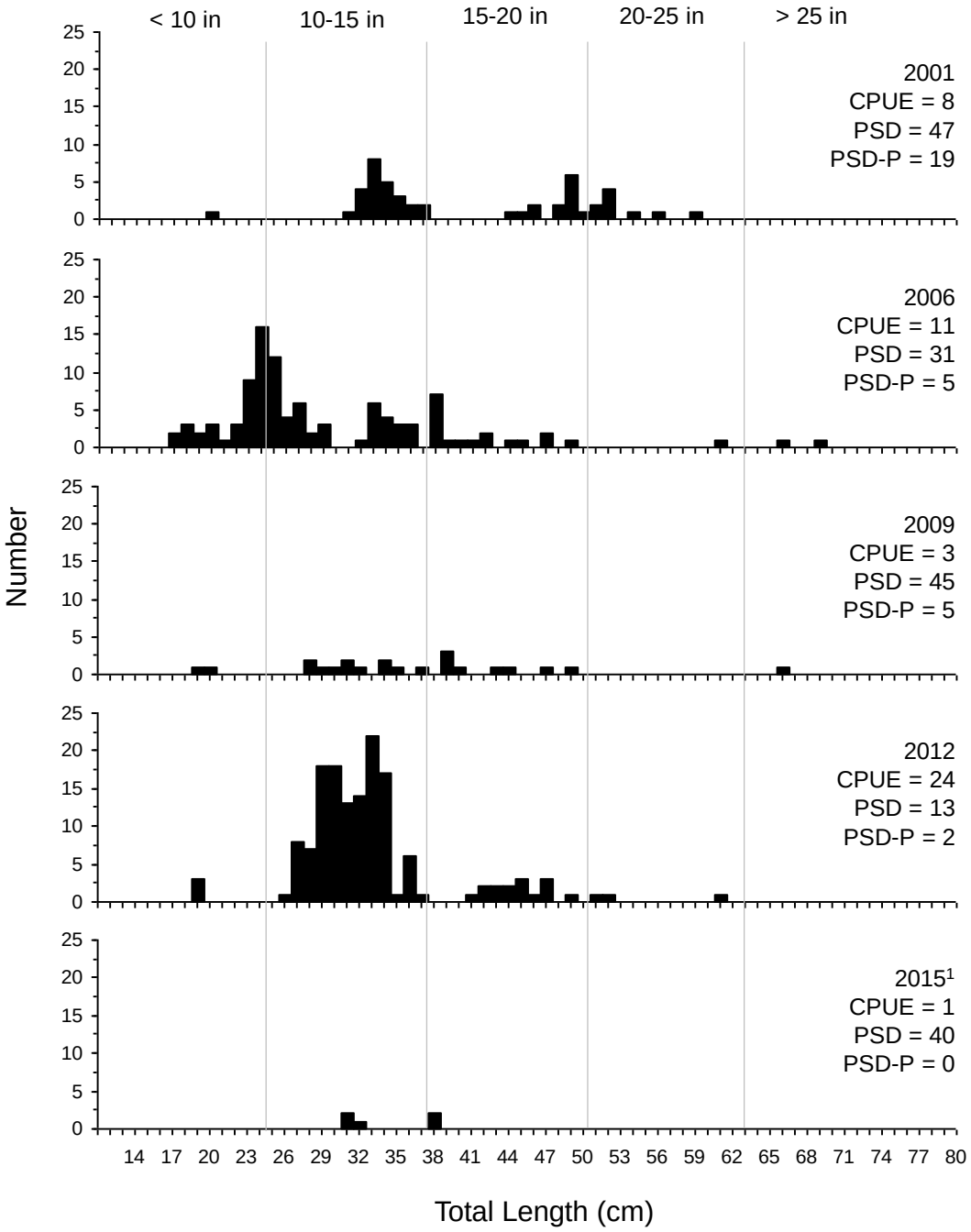

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Minnewasta Lake, 2001-2015.

[1] Gill net catches were reduced due to heavy algal accumulation.

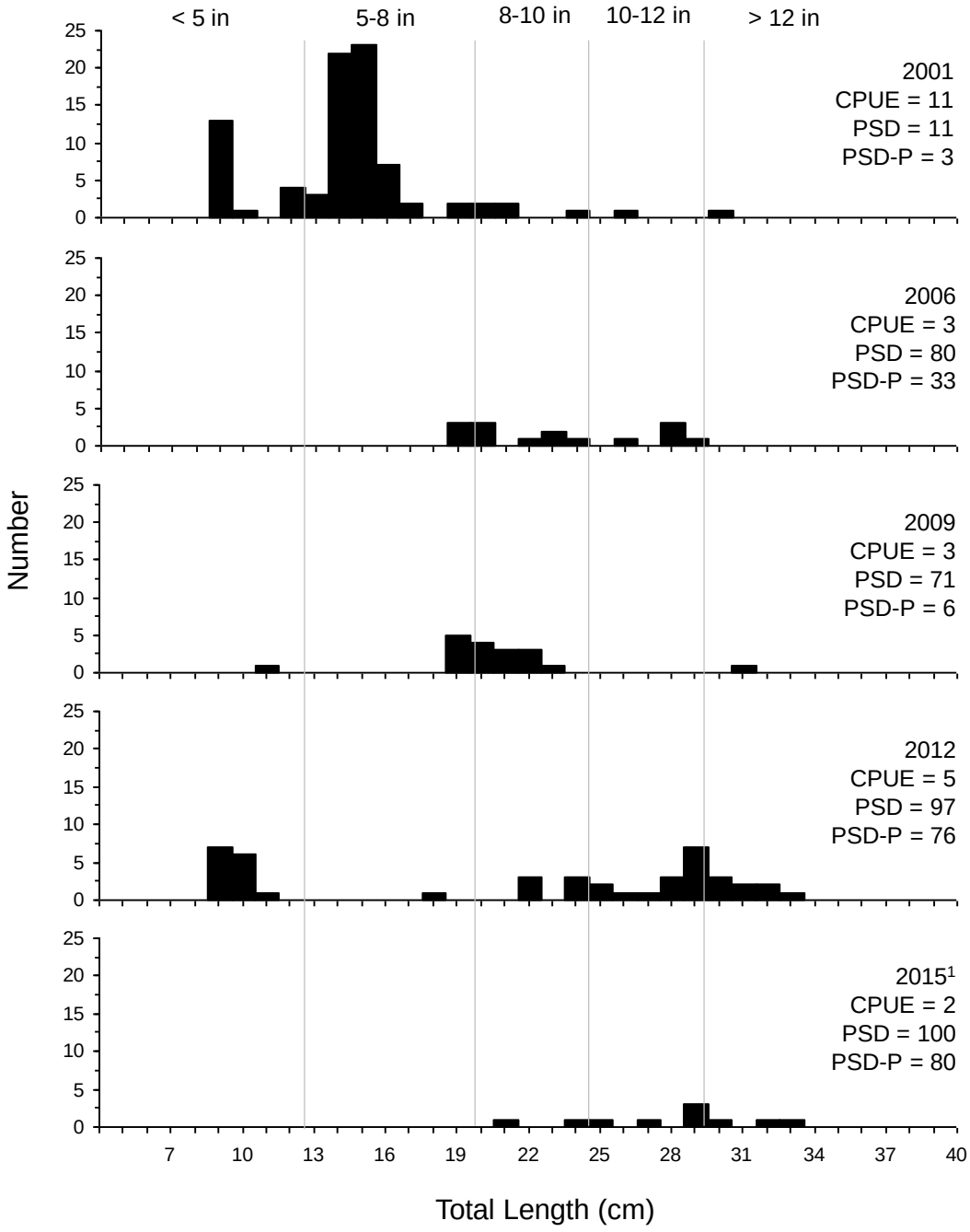

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Minnewasta Lake, 2001-2015.

[1] Gill net catches were reduced due to heavy algal accumulation.