

Opitz Lake

Site Description

Location

Water designation number (WDN)	22-0050-00
Legal description	T124N-R54W-Sec.6,7;T125N-R56W-Sec.35-36
County (ies)	Day; Marshall
Location from nearest town	5.0 miles west and 1.0 mile south of Eden, SD

Survey Dates and Sampling Information

Survey dates	June 18-20, 2013 (FN, GN) October 9, 2013 (EF-WAE)
Gill net sets (n)	6
Frame net sets (n)	18
Electrofishing-WAE (min)	60

Morphometry

Watershed area (acres)	38,077
Surface area (acres)	1,436
Maximum depth (ft)	23
Mean depth (ft)	14

Ownership and Public Access

Opitz Lake is a meandered lake and the fishery is managed by the SDGFP. High water conditions have limited public access to a single access site that includes a primitive boat launch with landing dock (Figure 1; Figure 2). Lands adjacent to the lake are generally under state and private ownership.

Watershed and Land Use

The 38,077 acre Opitz Lake sub-watershed (HUC-12) is located within the larger Northern Coteau Lakes-Upper James River (HUC-10) watershed. Land use within the watershed is primarily agricultural with a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

No OHWM has been established by the South Dakota Water Management Board on Opitz Lake. On May 22, 2013 the elevation was 1793.6 fmsl; 1.5 ft above the fall 2012 elevation of 1792.1 fmsl. The water level had declined to an elevation of 1793.1 fmsl on October 8, 2013.

Fish Management Information

Primary species	Walleye, Yellow Perch
Other species	Black Bullhead, Black Crappie, Common Carp, Northern Pike, Orangespotted Sunfish, Rock Bass, White Sucker
Lake-specific regulations	Walleye: 2 daily; minimum length 15"
Management classification	none
Fish consumption advisories	Mercury: Northern Pike (> 26"). 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/Fish/Default.aspx for more information.

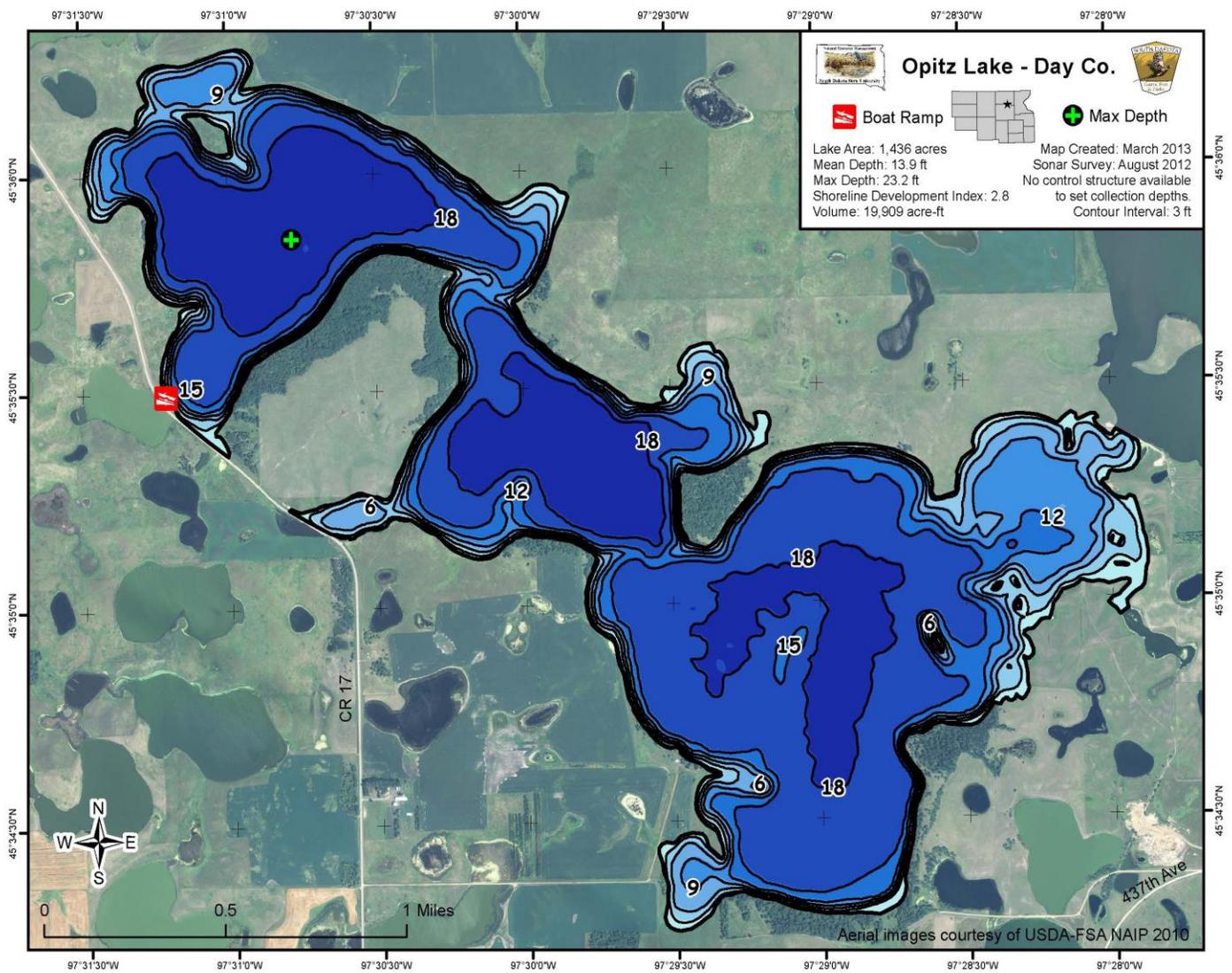


Figure 1. Map depicting access location and depth contours of Opitz Lake, Day and Marshall Counties, South Dakota.

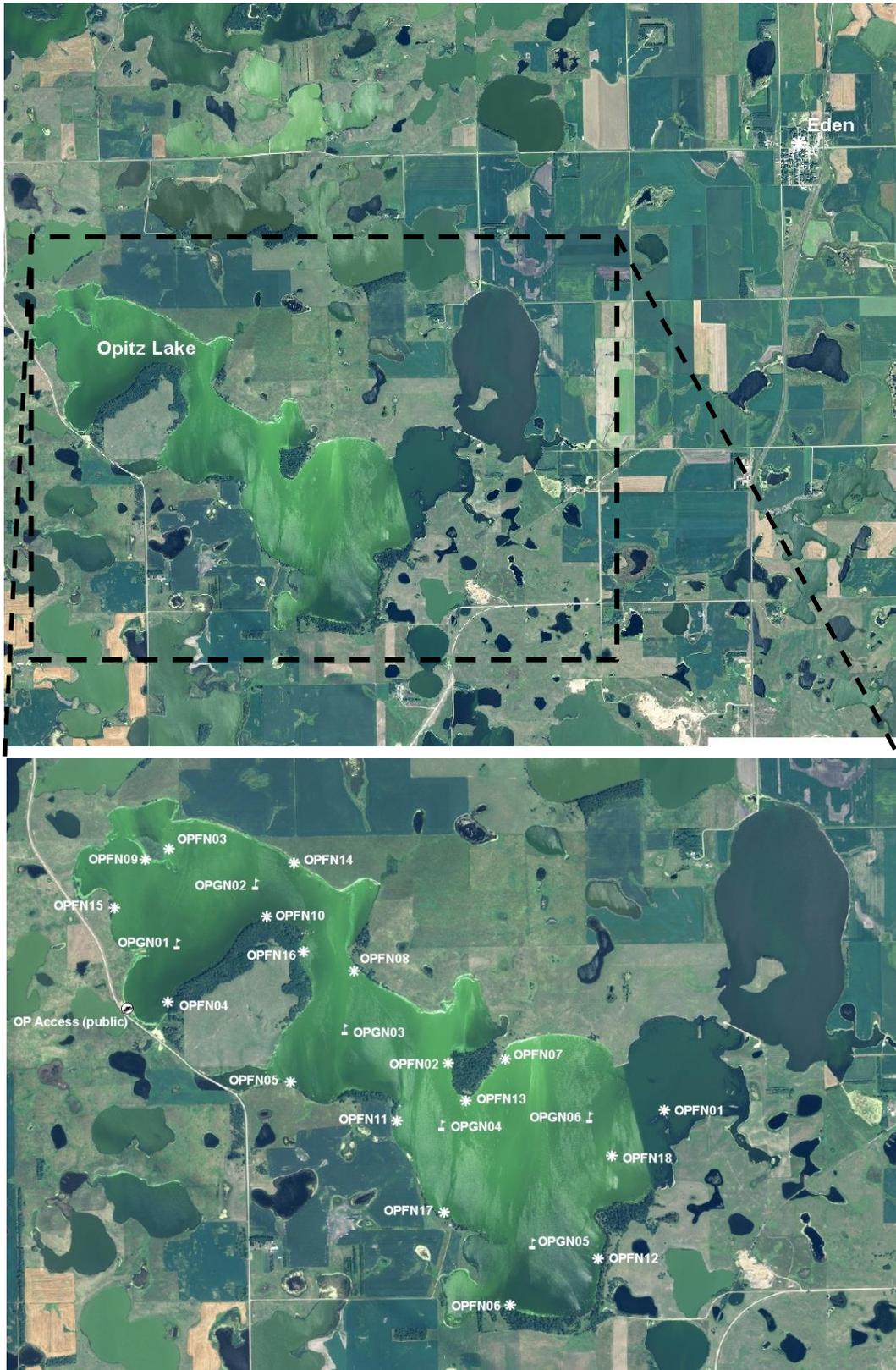


Figure 2. Map depicting geographic location of Opitz Lake (Day; Marshall Counties) from Eden, South Dakota (top). Also noted is the public access and standardized net locations for Opitz Lake (bottom). OPFN= frame net; OPGN= gill net

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 ≥ 30 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a mean frame net CPUE of stock-length Black Bullhead ≤ 100 .

Results and Discussion

Prior to the 1990s, the lake that is now called Opitz Lake consisted of four shallow cattail sloughs. High water conditions since the mid-1990s have increased the water depth and surface area of the lake that now covers in excess of 1,500 acres. In 2000, SDGFP began stocking efforts to supplement the fishery (Table 6). Currently, Opitz Lake is managed as Walleye and Yellow Perch fishery.

Primary Species

Walleye: The mean gill net CPUE of stock-length Walleye was 17.7 (Table 1) and above the minimum objective (≥ 10 stock-length Walleye/net night; Table 3). Since 2007, mean gill net CPUE values have ranged from a low of 10.2 (2010) to a high of 39.7 (2011; Table 2). The 2013 gill net CPUE represented a decrease from the 2012 CPUE of 29.0 (Table 2), but still indicated high relative abundance.

Gill net captured Walleye ranged in TL from 17 to 48 cm (6.7 to 18.9 in; Figure 3). The PSD was 28 and below the management objective (30-60); while no preferred-length Walleye were captured (Table 1; Table 3; Figure 3). Growth of individuals from the 2011 cohort into the stock-quality length category, coupled with the substantial reduction of individuals from the strong 2009 cohort in the sample resulted in the decreased PSD observed in 2013 (Table 3-4; Figure 3). Approximately 27% of gill net captured Walleye were above the 38-cm (15-in) minimum length restriction (Figure 3).

Otoliths were collected from a sub-sample of gill net captured walleye. Six year classes (2004, 2006, and 2009-2012) were present (Table 4). Cohorts produced in 2009 and 2011, which coincided with fry stockings, comprised 94% of Walleye in the gill net catch (Table 4; Table 6). While it appears that the fry stocking in 2009 was successful, the contribution of naturally-produced Walleye to the cohort is unknown as stocked individuals were not marked. Walleye stocked in 2011 were marked with Oxytetracycline (OTC) so that the contribution of stocked fish could be evaluated; the estimated stocking contribution was 36% (Table 4). In 2013, the mean fall night electrofishing CPUE of age-0 Walleye was 144.0 (Table 1). For the second straight year, a strong year class was natural produced in Opitz Lake (Table 2). However,

recruitment of year classes produced in 2012 and 2013 is unknown and their contribution to the population will be assessed in future surveys.

Walleye in Opitz Lake exhibit variable growth and typically approach or surpass quality-length and the minimum length limit (38 cm; 15 in) by age 3 (Table 5). Since 2007, weighted mean TL at capture values for age-2 Walleye have ranged from 276 to 338 (10.9 to 13.3 in); while weighted mean TL at capture values for age-3 Walleye have ranged from 355 to 414 mm (14.0 to 16.3 in; Table 5). In 2013, the weighted mean TL at capture of age-2 Walleye was 283 mm (11.1 in); while few age-3 Walleye were captured (Table 5). Age-4 individuals were relatively abundant and had weighted mean TL at capture of 396 mm (15.6 in; Table 5). A decreasing trend in condition was apparent as TL increased. Walleye in the sub-stock length category had the highest condition (i.e., mean W_r of 92); while Walleye in the quality-preferred length category had the lowest condition (i.e., mean W_r of 77).

Yellow Perch: Since 2007, the relative abundance of Yellow Perch has remained low to moderate, with mean gill net CPUE values that ranged from 0.5 (2010) to 18.2 (2013; Table 2). Although the 2013 mean gill net CPUE of 18.2 was below the minimum objective (≥ 30 stock-length Yellow Perch/net night), it represented a substantial increase from the 2012 CPUE of 6.0 and was the highest recorded from 2007-2013 (Tables 1-3).

Gill net captured yellow perch ranged in TL from 17 to 29 cm (6.7 to 11.4 in), had a PSD of 87 and PSD-P of 19 (Table 1; Figure 4). The PSD and PSD-P values were above management objective ranges of 30-60 and 5-10 and indicated a population comprised of a high proportion of larger (i.e., >20 cm; 8 in) yellow perch (Table 3; Figure 4). Based on age estimates from otoliths, four year classes were represented in the gill net catch (Table 7). The 2009 and 2011 cohorts were the most abundant and comprised 20% and 75%, respectively, of Yellow Perch in the gill net catch (Table 7).

In 2013, the weighted mean TL at capture for age-2 and age-4 Yellow Perch was 211 and 266 mm (8.3 and 10.5 in), when males and females were combined (Table 11). Based on the 2013 sample, it appears that Yellow Perch growth is moderate to fast in Opitz Lake. As with most populations, males tend to be smaller at a given age than females (Table 8). Condition of gill net captured Yellow Perch was high with mean W_r values > 110 for all length categories (e.g., stock to quality) sampled.

Other Species

Black bullhead: In surveys conducted from 2007-2013, black bullhead relative abundance has remained low (Table 2). In 2013, the mean frame net CPUE of stock-length Black Bullhead was 4.9 (Table 1) and within the objective range (≤ 100 stock-length Black Bullhead/net; Table 3). Poor recruitment of Black Bullheads in many northeastern South Dakota lakes has been common in recent years limiting their abundance.

Black Crappie: Black crappie were introduced into Opitz Lake in 2001 (Table 6), but their relative abundance has remained low with mean frame net CPUE values of stock-length black crappie < 1.0 from 2007-2013 (Table 2). Lack of recruitment has limited the population; however, adult black crappies are present and the potential exists for population abundance to increase.

Northern Pike: High water conditions during the late 1990s, allowed northern pike to prosper in Opitz Lake. In 2002, northern pike relative abundance was considered high with a mean gill net CPUE of 8.2. However, relative abundance declined and mean gill net CPUE values of stock-length Northern Pike remained ≤ 0.7 in surveys conducted from 2007-2012 (Table 2). In 2013, the mean gill net CPUE of stock-length Northern Pike increased to 1.5 (Table 1), as nine stock-length individuals that ranged in TL from 51 to 66 cm (20.1 to 26.0 in) were captured. Currently, relative abundance appears to be moderate.

No age or growth information was collected. Few inferences can be made concerning size structure and condition due to the low sample size.

Rock Bass: The mean frame net CPUE of stock-length Rock Bass was 6.9 (Table 1) and has increased in each of the past four surveys (Table 2). Rock Bass captured in the frame net catch ranged in TL from 12 to 24 cm (4.7 to 9.4 in.) with the majority being \geq quality-length (18 cm; 7 in; Figure 5). The PSD was 85 and the PSD-P was 3 (Table 1).

No age or growth information was collected. A decreasing trend in condition was apparent as TL increased; however, mean W_r values were > 100 for all cm-length groups sampled. Sampling was conducted in mid-June; therefore, spawning behavior may have influenced W_r values.

Other: Common Carp was the only other fish species captured during the 2013 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys utilizing gill nets and frame nets annually (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Collect otoliths from Walleye and Yellow Perch to assess the age structure and growth rates of each population.
- 3) Stock walleye (≈ 500 fry/acre) to establish additional year classes if fall night electrofishing CPUE of age-0 walleye and gill netting results warrant [i.e., low gill net CPUE of sub-stock (< 25 cm; 10 in) walleye and/or fall night electrofishing CPUE of age-0 walleye < 75 fish/hour].
- 4) Maintain the 381-mm (15-in) minimum length limit and daily limit of two on Walleye. The regulation is designed to protect smaller fish from harvest, increase average fish size, and provide a more equitable distribution of the Walleye harvest (Lucchesi and Blackwell 2009).
- 5) Improve public access to Opitz Lake via enhancements to the current boat launch and parking areas.

Table 1. Mean catch rate (CPUE; gill nets = catch/net night, electrofishing = catch/hour) 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 frame nets, experimental gill nets and electrofishing in Opitz Lake, 2013. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= Black Bullhead; BLC= Black Crappie; COC= Common Carp; NOP= Northern Pike; ROB= Rock Bass; WAE= Walleye; YEP= Yellow Perch

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	4.9	1.7	93	5	31	9	100	1
BLC	0.9	1.0	59	22	41	22	110	3
COC	0.1	<0.1	100	---	100	---	90	---
NOP	0.1	0.1	50	50	0	---	82	7
ROB	6.9	1.7	85	6	3	3	114	1
WAE	6.0	2.9	59	8	3	3	80	1
YEP	0.1	<0.1	100	---	100	---	102	---
<i>Gill nets</i>								
BLB	0.5	0.3	33	67	0	---	103	21
NOP	1.5	0.8	89	21	0	---	80	4
ROB	1.0	0.5	83	33	0	---	104	2
WAE	17.7	3.1	28	8	0	---	83	1
YEP	18.2	6.2	87	5	19	7	113	<1
<i>Electrofishing</i>								
WAE ¹	144.0	38.9	---	---	---	---	---	---

¹ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye not stock length.

Table 2. Historic mean catch rate (CPUE; gill nets = catch/net night, electrofishing = catch/hour) of stock-length fish for various fish species captured in frame nets, experimental gill nets and electrofishing from Opitz Lake, 2007-2013. BLB= Black Bullhead; BLC= Black Crappie; COC= Common Carp; NOP= Northern Pike; OSF= Orangespotted Sunfish; ROB= Rock Bass; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

Species	CPUE					
	2007 ¹	2008	2010	2011	2012	2013
<i>Frame nets</i>						
BLB	0.8	0.6	0.1	0.0	0.2	4.9
BLC	0.3	0.6	0.6	0.2	0.1	0.9
COC	1.5	0.4	0.3	0.0	0.3	0.1
NOP	0.5	0.2	0.3	0.2	0.1	0.1
OSF ²	0.0	0.0	0.0	0.0	0.1	0.0
ROB	0.1	0.0	0.6	1.4	2.2	6.9
WAE	10.1	6.8	2.9	3.9	4.0	6.0
WHS	0.1	0.0	0.0	0.0	0.1	0.0
YEP	0.1	0.4	0.0	0.0	0.7	0.1
<i>Gill nets</i>						
BLB	0.0	0.3	0.0	0.0	0.0	0.5
COC	0.3	0.0	0.0	0.0	0.0	0.0
NOP	0.7	0.3	0.0	0.0	0.3	1.5
ROB	0.0	0.0	0.0	0.0	0.8	1.0
WAE	31.7	12.5	10.2	39.7	29.0	17.7
YEP	4.0	4.2	0.5	11.7	6.0	18.2
<i>Electrofishing</i>						
WAE ³	---	---	0.0	283.5	167.0	144.0

¹ Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

² All fish sizes

³ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye not stock length.

Table 3. Mean catch rate (CPUE; gill/frame nets = catch/net night), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) for selected species captured in frame nets and experimental gill nets from Opitz Lake, 2007-2013. BLB= Black Bullhead; WAE= Walleye; YEP= Yellow Perch

Species	2007 ¹	2008	2010	2011	2012	2013	Objective
<i>Frame nets</i>							
BLB							
CPUE	1	1	<1	0	0.2	5	≤ 100
PSD	100	100	100	---	75	93	---
PSD-P	100	90	100	---	25	31	---
Wr	92	104	107	---	109	100	---
<i>Gill nets</i>							
WAE							
CPUE	32	13	10	40	29	18	≥ 10
PSD	58	16	52	14	68	28	30-60
PSD-P	2	0	0	0	0	0	5-10
Wr	81	86	90	95	84	83	---
YEP							
CPUE	4	4	1	12	6	18	≥ 30
PSD	88	100	100	77	97	87	30-60
PSD-P	63	64	100	16	56	19	5-10
Wr	113	120	121	115	119	113	---

¹ Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

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 Opitz Lake, 2008-2013.

Survey Year	Year Class									
	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2013		3	74	1	31			2		1
2012	---		135	8	152	3	1	7	2	1
2011	---	---		1	207	2	1	27		1
2010	---	---	---		86	5	9	44		3
2008	---	---	---	---	---		1	58	2	16
# stocked										
fry			900 ¹		750			1,500		
sm. fingerling										258
lg. fingerling										

¹ Stocked Walleye were OTC marked; 18 of 50 otoliths collected from fall electrofished age-0 walleye exhibited marks for an estimated stocking contribution of 36%.

Table 5. Weighted mean TL at capture (mm) for walleye sampled in experimental gill nets (expanded sample size) from Opitz Lake, 2007-2013. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age								
	1	2	3	4	5	6	7	8	9
2013	185(3)	283(74)	357(1)	396(31)	---	---	453(2)	----	485(1)
2012	200(135)	320(8)	386(152)	402(3)	462(1)	438(7)	466(2)	455(1)	---
2011	225(1)	330(207)	414(2)	402(1)	441(27)	---	435(1)	---	---
2010	203(86)	328(5)	375(9)	386(44)	---	406(3)	---	---	---
2008	202(1)	276(58)	355(2)	389(16)	---	---	---	---	---
2007	203(160)	338(32)	391(152)	---	---	---	537(3)	---	---

Table 6. Stocking history including size and number for fishes stocked into Opitz Lake, 2000-2012. BLC= black crappie; WAE= walleye;

Year	Species	Size	Number
2000	WAE	fry	1,500,000
2001	BLC	fingerling	175,200
	WAE	fry	1,500,000
2002	WAE	fry	1,500,000
2004	WAE	fingerling	258,000
2006	WAE	fry	1,500,000
2009	WAE	fry	750,000
2011	WAE	fry	900,000

Table 7. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Opitz Lake, 2010-2013.

Survey Year	Year Class												
	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2013	---	---	82	4	22	1	---	---	---	---	---	---	---
2012	---	---	1	1	32	1	1	---	---	---	---	---	---
2011	---	---	---	---	51	11	5	---	2	---	---	---	1
2010	---	---	---	---	1	---	2	---	---	---	---	---	1

Table 8. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Opitz Lake, 2010-2013.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2013										
Male	---	202(10)	---	242(3)	254(1)	---	---	---	---	---
Female	---	213(74)	249(4)	274(17)	---	---	---	---	---	---
Combined	---	211(82)	249(4)	266(22)	254(1)	---	---	---	---	---
2012										
Male	150(1)	204(1)	230(10)	---	---	---	---	---	---	---
Female	---	---	258(22)	278(1)	276(1)	---	---	---	---	---
Combined	150(1)	204(1)	249(32)	278(1)	276(1)	---	---	---	---	---
2011										
Male	---	176(6)	229(5)	259(2)	---	274(1)	---	---	---	---
Female	---	208(47)	259(4)	285(3)	---	306(1)	---	---	---	351(1)
Combined	---	204(51)	236(11)	274(5)	---	290(2)	---	---	---	351(1)
2010										
Male	---	---	---	---	---	---	---	---	---	---
Female	92(1)	---	263(2)	---	---	---	---	---	300(1)	---
Combined	92(1)	---	263(2)	---	---	---	---	---	300(1)	---

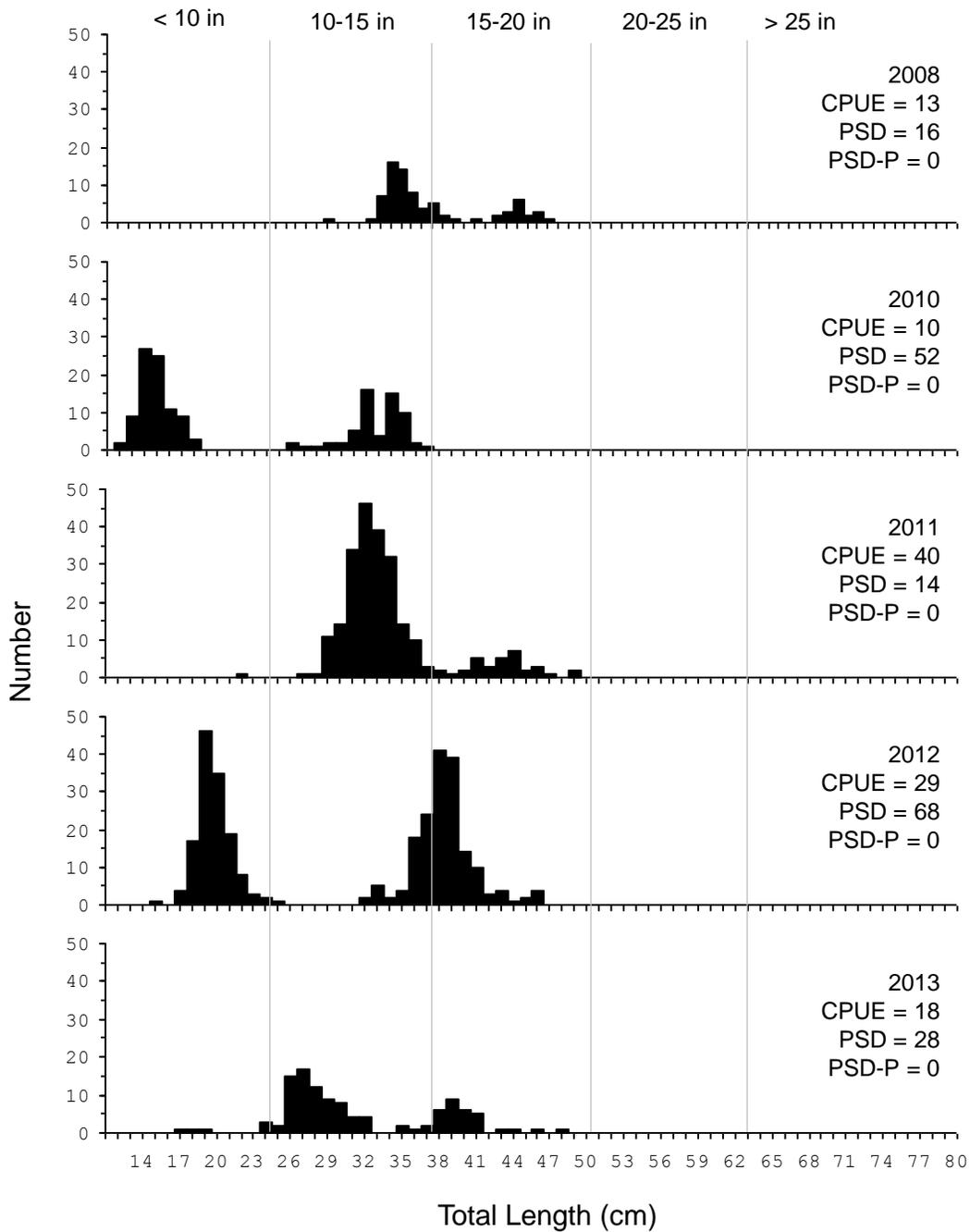


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using experimental gill nets in Opitz Lake, 2008-2013.

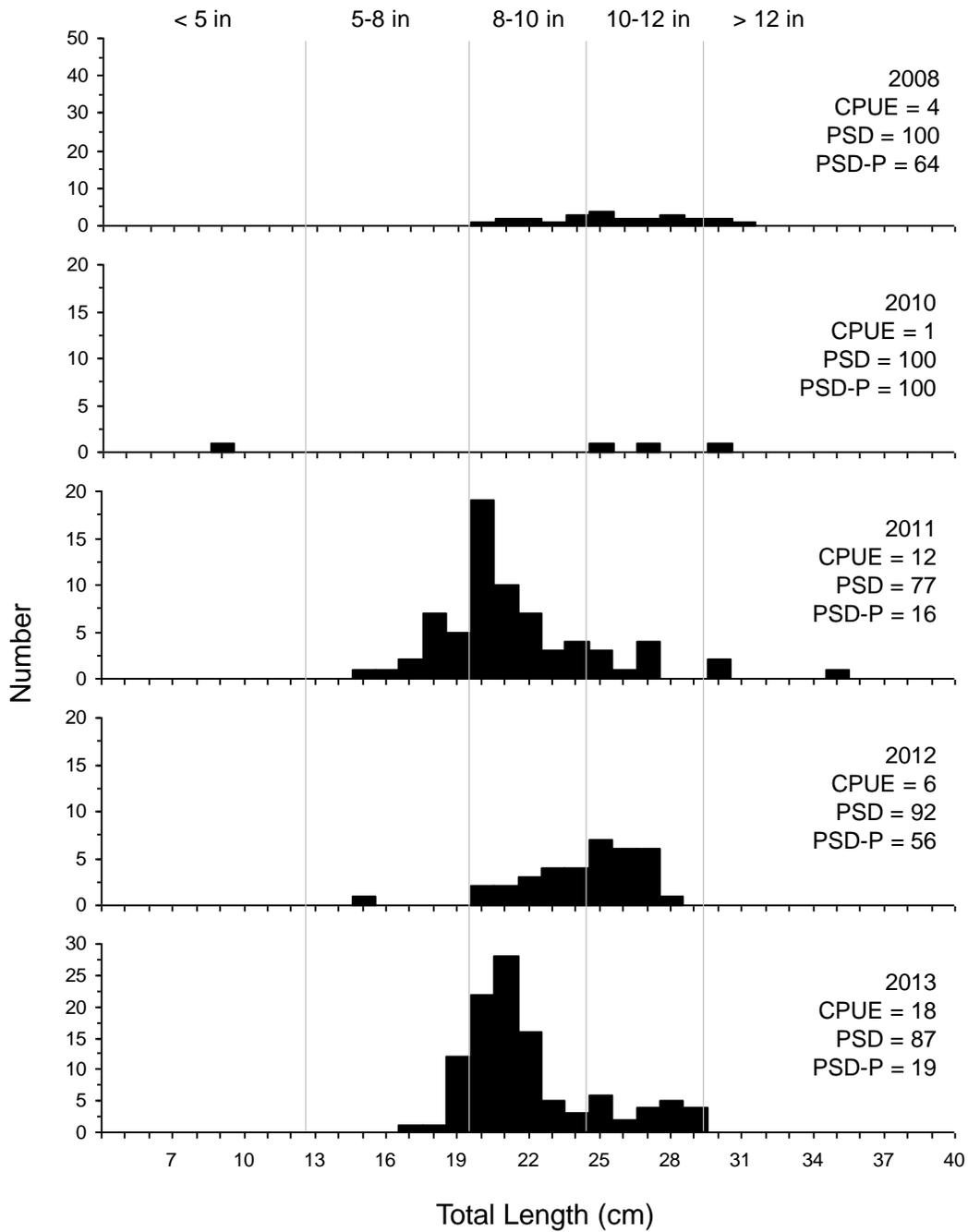


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Opitz Lake, 2008-2013.

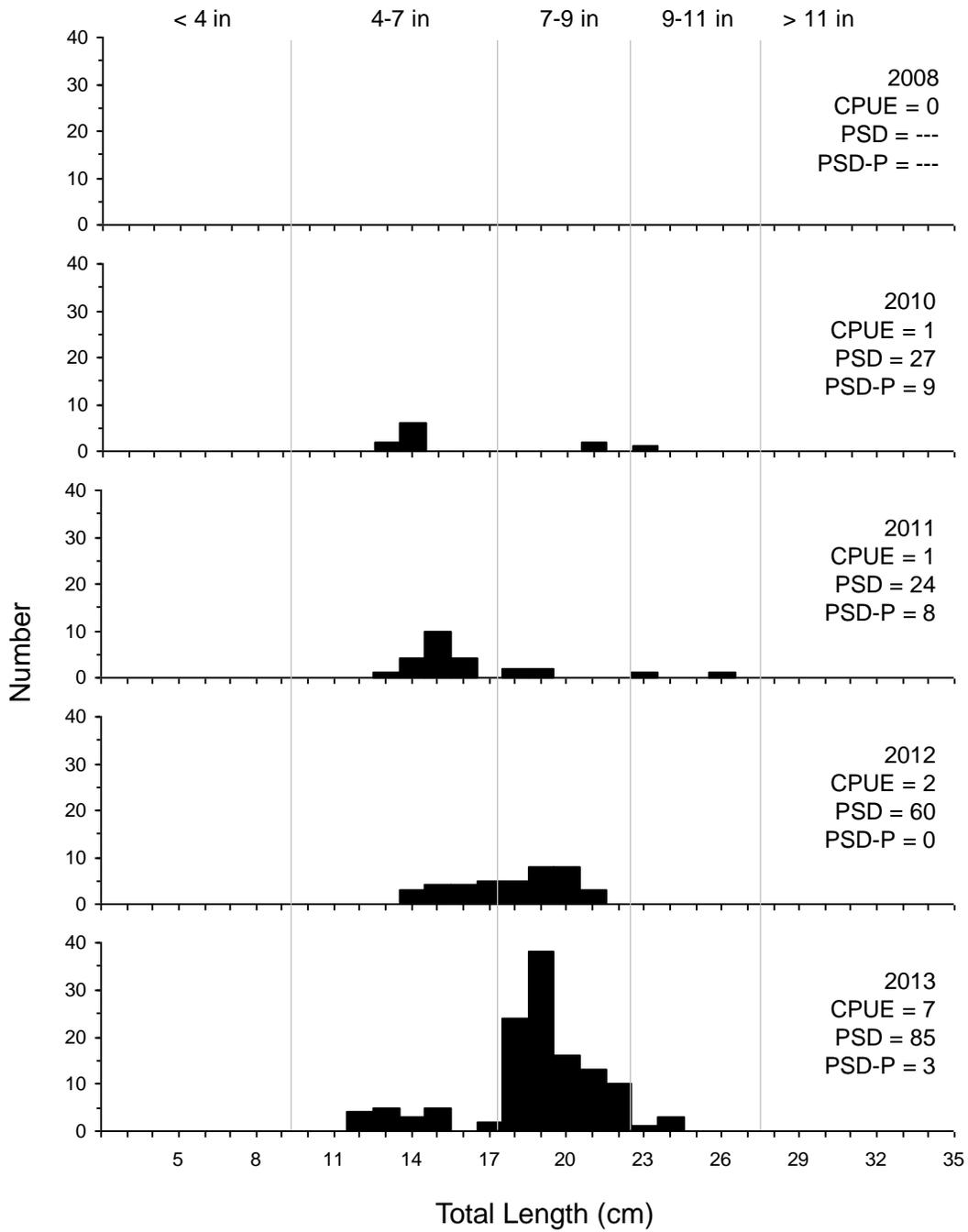


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Rock Bass captured using frame nets in Opitz Lake, 2008-2013.