

# Opitz Lake

## Site Description

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### **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 16-17, 2014 (GN) September 17, 2014 (EF-WAE)
Gill net sets (n)	6
Electrofishing-WAE (min)	40

### **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 5, 2014 the elevation was 1793.6 fmsl. No measurements were available for fall of 2014 or during 2015.

### **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: <a href="http://doh.sd.gov/food/Fish-Advisories.aspx">http://doh.sd.gov/food/Fish-Advisories.aspx</a> for more information.

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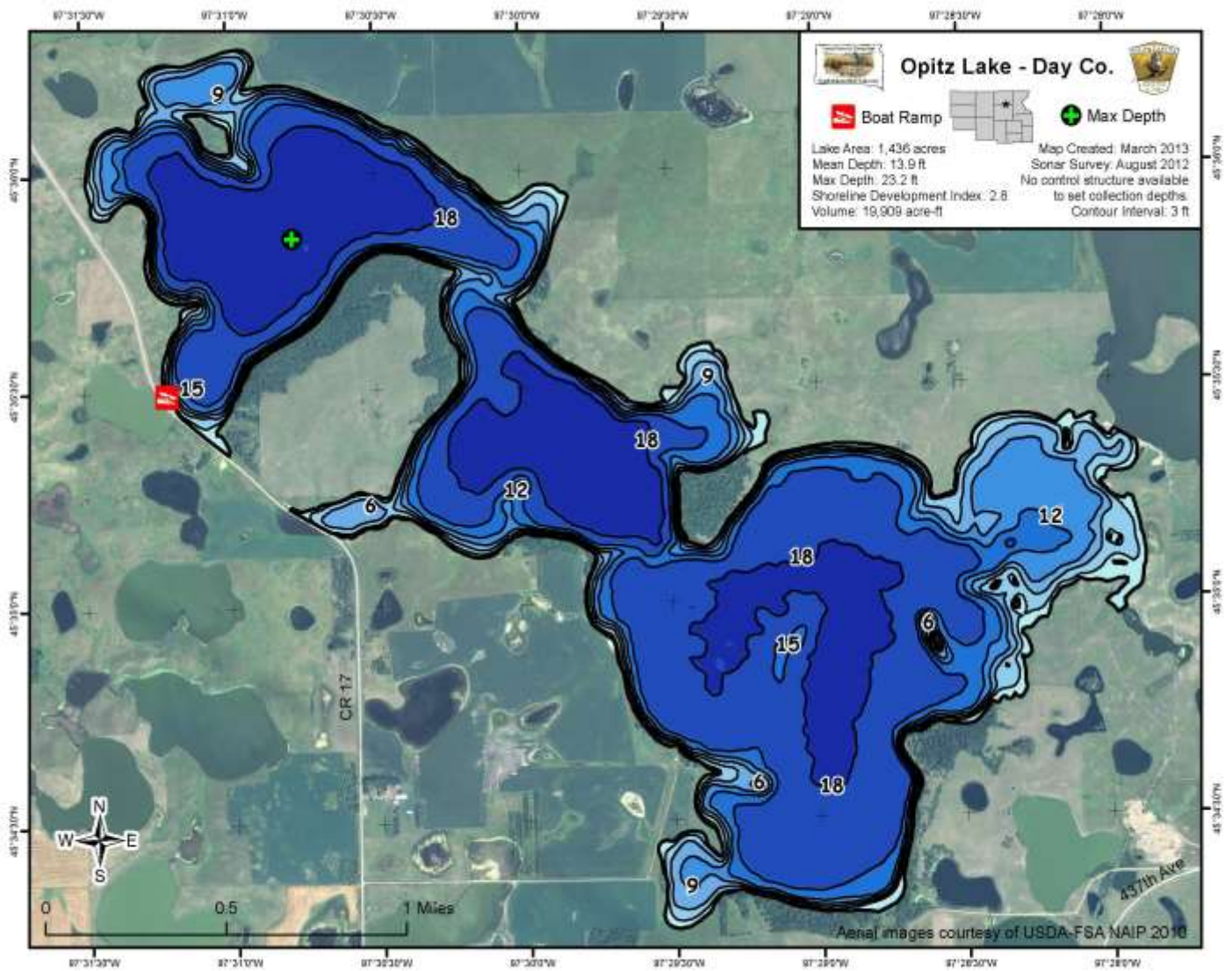


Figure 1. Map depicting access location and depth contours of Opitz Lake, Day and Marshall Counties, South Dakota.



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

## 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 1,400 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 22.5 (Table 1) and above the minimum objective ( $\geq 10$  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 2015 gill net CPUE indicated high relative abundance.

Gill net captured walleye ranged in TL from 18 to 40 cm (7.1 to 15.7 in; Figure 3). The PSD was 5 and below the management objective (30-60); while no preferred-length walleye were captured (Table 1; Table 3; Figure 3). Growth of individuals from cohorts produced in 2011 and 2012 into the stock-quality length category, coupled with a reduction of individuals from the strong 2009 cohort in the sample has resulted in decreased PSD values (Table 3; Table 4; Figure 3). Approximately 4% of walleye in the gill net catch were above the 38-cm (15-in) minimum length restriction (Figure 3).

Otoliths were collected from a sub-sample of gill net captured walleye. Five consecutive year classes (2010-2014) were present (Table 4). The 2011 cohort, which coincided with a fry stocking, was the most represented and comprised 61% of walleye in the gill net catch (Table 4; Table 6). 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 2015, no age-0 walleye were captured during fall night electrofishing indicating a weak or absent year class (Table 1).

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 324 to 414 mm (12.8 to 16.3 in; Table 5). In 2015, the weighted mean TL at capture of age-2 and age-3 walleye was the lowest observed at 276 mm and 324 mm, respectively (10.9 and 12.8 in; Table 5). Gill net captured walleye had mean  $W_r$  values that ranged from 80 to 88 for all length categories (e.g., stock to quality) sampled. For stock-length walleye, the mean  $W_r$  was 80 (Table 1) and a decreasing trend in  $W_r$  was observed as TL increased.

Yellow Perch: From 2007-2013, relative abundance of yellow perch remained low to moderate, with mean gill net CPUE values that ranged from 0.5 (2010) to 18.2 (2013; Table 2). The mean gill net CPUE for stock-length yellow perch has increased in recent years with values of 34.2 and 33.8 in 2014 and 2015, respectively (Table 1; Table 2). The 2015 mean gill net CPUE was above the minimum objective ( $\geq 30$  stock-length yellow perch/net night) indicating high relative abundance.

Gill net captured yellow perch ranged in TL from 18 to 32 cm (7.1 to 12.6 in), had a PSD of 96 and PSD-P of 74 (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, five consecutive year classes (2010-2013) were represented in the gill net catch (Table 7). The 2011 cohort was the most abundant and comprised 73% of yellow perch in the gill net catch (Table 7).

In 2015, the weighted mean TL at capture for age-3 and age-4 yellow perch was 230 and 274 mm (9.1 and 10.8 in; Table 8). Based on the 2015 sample, it appears that yellow perch growth is moderate to fast in Opitz Lake. Condition of gill net captured yellow perch was high with mean  $W_r$  values  $> 102$  for all length categories (e.g., stock to quality) sampled.

### *Other Species*

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 have remained  $\leq 1.5$  in surveys conducted from 2007-2015 (Table 2). In 2015, three stock-length individuals ranging in TL from 66 to 79 cm (26.0 to 34.1 in) were captured. Currently, relative abundance appears to be low.

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

Other: Black bullhead, common carp and rock bass were captured in low numbers during the 2015 survey (Table 1).

## Management Recommendations

- 1) Conduct fish community assessment surveys using gill nets annually; frame nets will be added to the survey on an every third year basis (scheduled for 2017) 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 ( $\approx 500$  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) Re-evaluate the 381-mm (15-in) minimum length limit and reduced daily limit 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 experimental gill nets and electrofishing from Opitz Lake, 2015. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). BLB= black bullhead; 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>Gill nets</i>								
BLB	0.7	0.7	75	59	25	59	92	10
COC	0.5	0.3	100	0	100	0	101	11
NOP	0.5	0.3	100	0	67	67	81	17
ROB	0.8	0.8	100	0	0	---	107	6
WAE	22.5	4.9	5	3	0	---	80	<1
YEP	33.8	3.2	96	3	74	5	108	<1
<i>Electrofishing</i>								
WAE <sup>1</sup>	0.0	---	---	---	---	---	---	---

<sup>1</sup> 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, 2007-2015. 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 <sup>1</sup>	2008	2010	2011	2012	2013	2014	2015
<i>Frame nets</i>								
BLB	0.8	0.6	0.1	0.0	0.2	4.9	7.0	---
BLC	0.3	0.6	0.6	0.2	0.1	0.9	0.3	---
COC	1.5	0.4	0.3	0.0	0.3	0.1	0.1	---
NOP	0.5	0.2	0.3	0.2	0.1	0.1	0.3	---
OSF <sup>2</sup>	0.0	0.0	0.0	0.0	0.1	0.0	0.0	---
ROB	0.1	0.0	0.6	1.4	2.2	6.9	2.6	---
WAE	10.1	6.8	2.9	3.9	4.0	6.0	5.9	---
WHS	0.1	0.0	0.0	0.0	0.1	0.0	0.0	---
YEP	0.1	0.4	0.0	0.0	0.7	0.1	0.0	---
<i>Gill nets</i>								
BLB	0.0	0.3	0.0	0.0	0.0	0.5	0.3	0.7
COC	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5
NOP	0.7	0.3	0.0	0.0	0.3	1.5	1.5	0.5
ROB	0.0	0.0	0.0	0.0	0.8	1.0	1.3	0.8
WAE	31.7	12.5	10.2	39.7	29.0	17.7	27.7	22.5
YEP	4.0	4.2	0.5	11.7	6.0	18.2	34.2	33.8
<i>Electrofishing</i>								
WAE <sup>3</sup>	---	---	0.0	283.5	167.0	144.0	75.0	0.0

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

<sup>2</sup> All fish sizes

<sup>3</sup> 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, 2007-2015. BLB= black bullhead; WAE= walleye; YEP= yellow perch

Species	2007 <sup>1</sup>	2008	2010	2011	2012	2013	2014	2015	Objective
<i>Frame nets</i>									
BLB									
CPUE	1	1	<1	0	0.2	5	7	---	≤ 100
PSD	100	100	100	---	75	93	68	---	---
PSD-P	100	90	100	---	25	31	40	---	---
Wr	92	104	107	---	109	100	99	---	---
<i>Gill nets</i>									
WAE									
CPUE	32	13	10	40	29	18	28	23	≥ 10
PSD	58	16	52	14	68	28	6	5	30-60
PSD-P	2	0	0	0	0	0	0	0	5-10
Wr	81	86	90	95	84	83	82	80	---
YEP									
CPUE	4	4	1	12	6	18	34	34	≥ 30
PSD	88	100	100	77	97	87	99	96	30-60
PSD-P	63	64	100	16	56	19	62	74	5-10
Wr	113	120	121	115	119	113	108	108	---

<sup>1</sup> 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, 2010-2015.

Survey Year	Year Class											
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2015		7	24	24	87	2						
2014	---		17	23	136		8			1		
2013	---	---		3	74	1	31			2		1
2012	---	---	---		135	8	152	3	1	7		1
2011	---	---	---	---		1	207	2	1	27	2	1
2010	---	---	---	---	---		86	5	9	44		3
# stocked												
fry					900 <sup>1</sup>		750			1,500		
sm. fingerling												258
lg. fingerling												

<sup>1</sup> 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, 2007-2015. 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
2015	201(7)	276(24)	324(24)	355(87)	395(2)	---	---	---	---
2014	212(17)	288(23)	340(136)	---	420(8)	---	---	425(1)	---
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, 2000-2015. 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, 2011-2015.

Survey Year	Year Class										
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
2015	---	---	14	28	149	11	1	---	---	---	---
2014	---	---	---	16	148	---	42	---	---	---	---
2013	---	---	---	---	82	4	22	1	---	---	---
2012	---	---	---	---	1	1	32	1	1	---	---
2011 <sup>1</sup>	---	---	---	---	---	---	51	11	5	---	2

<sup>1</sup> A single yellow perch from the 2001 cohort was sampled, but is not reported.

Table 8. Weighted mean TL (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Opitz Lake, 2011-2015.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2015	---	197(14)	230(28)	274(149)	276(11)	321(1)	---	---	---	---
2014	---	214(16)	254(148)	---	279(42)	---	---	---	---	---
2013	---	211(82)	249(4)	266(22)	254(1)	---	---	---	---	---
2012	150(1)	204(1)	249(32)	278(1)	276(1)	---	---	---	---	---
2011	---	204(51)	236(11)	274(5)	---	290(2)	---	---	---	351(1)

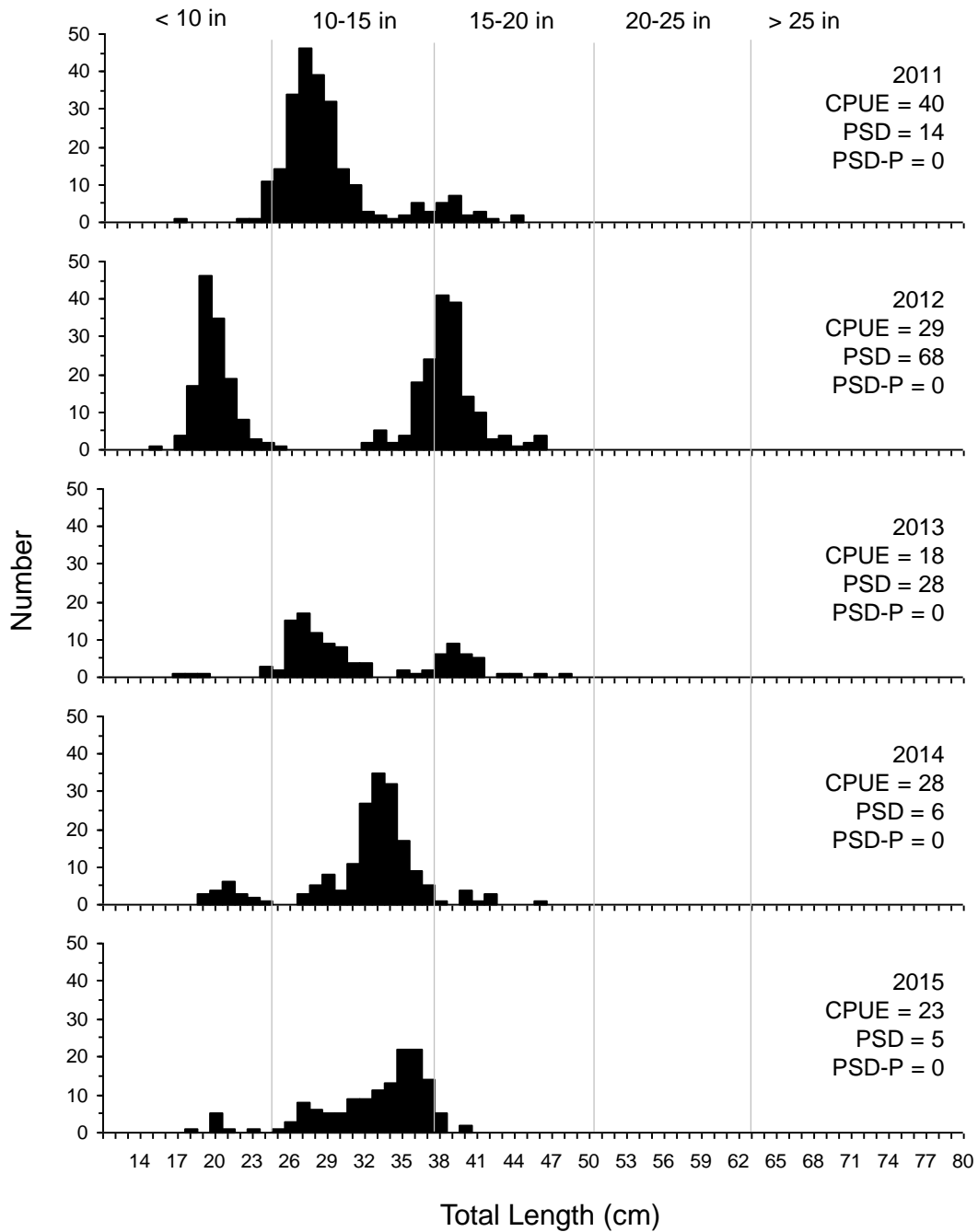


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Opitz Lake, 2011-2015.

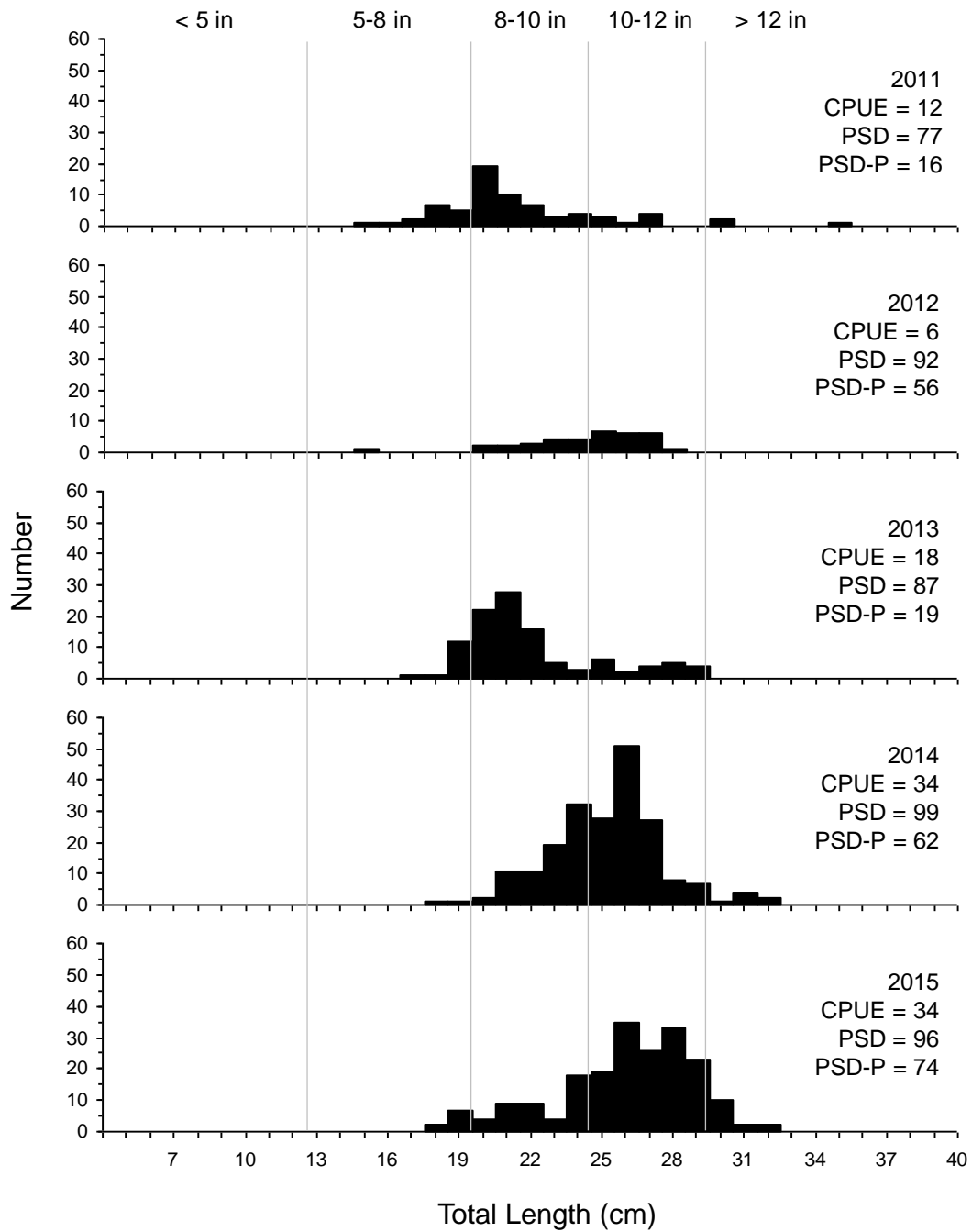


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Opitz Lake, 2011-2015.