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 17-19, 2014 (FN, GN) September 17, 2014 (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 6, 2014 the elevation was 1793.6 fmsl; 0.5 ft above the fall 2013 elevation of 1793.1 fmsl. No fall 2014 measurement was available.

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.

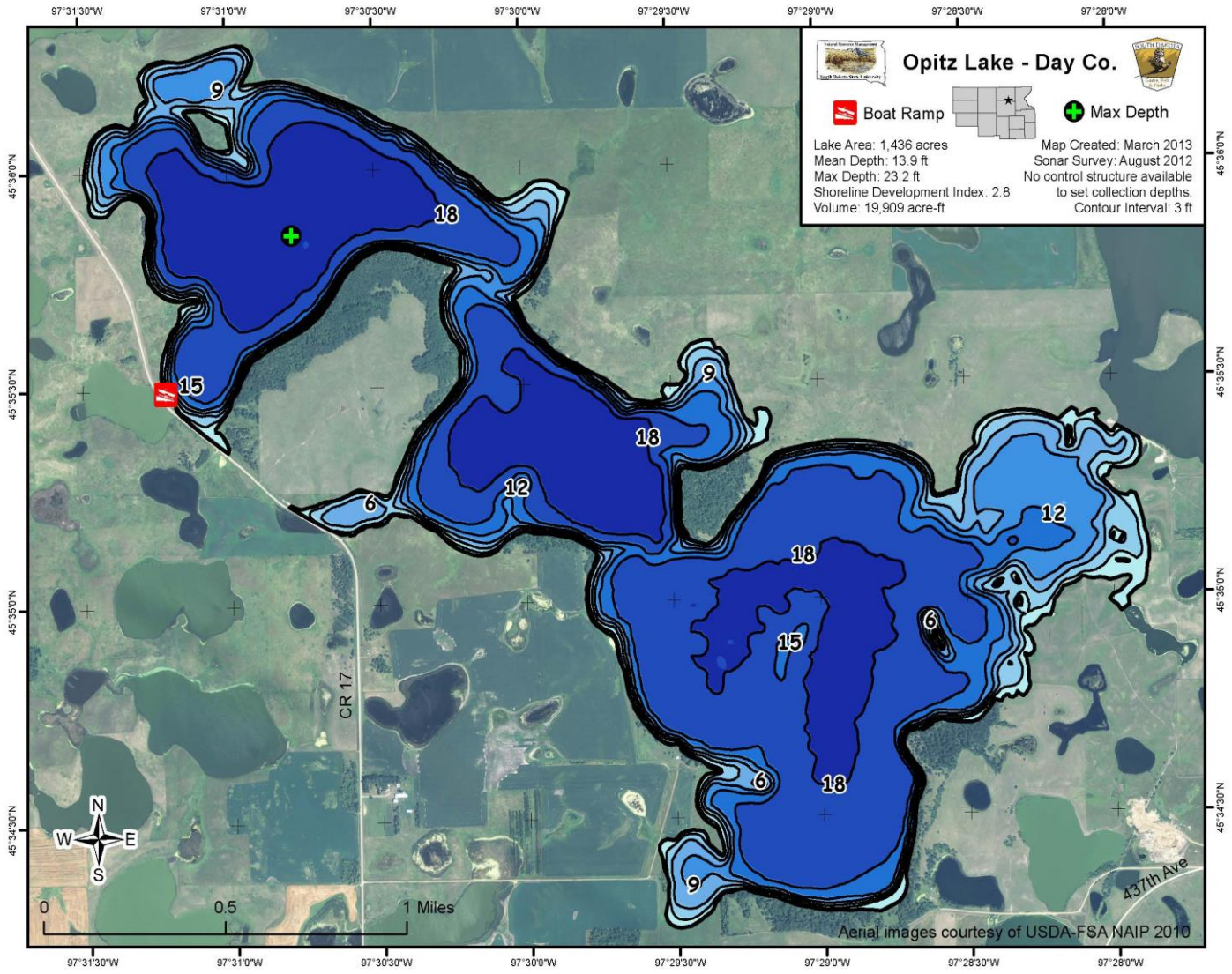

Figure 1. Map depicting access location and depth contours of Opitz Lake, Day and Marshall Counties, South Dakota.

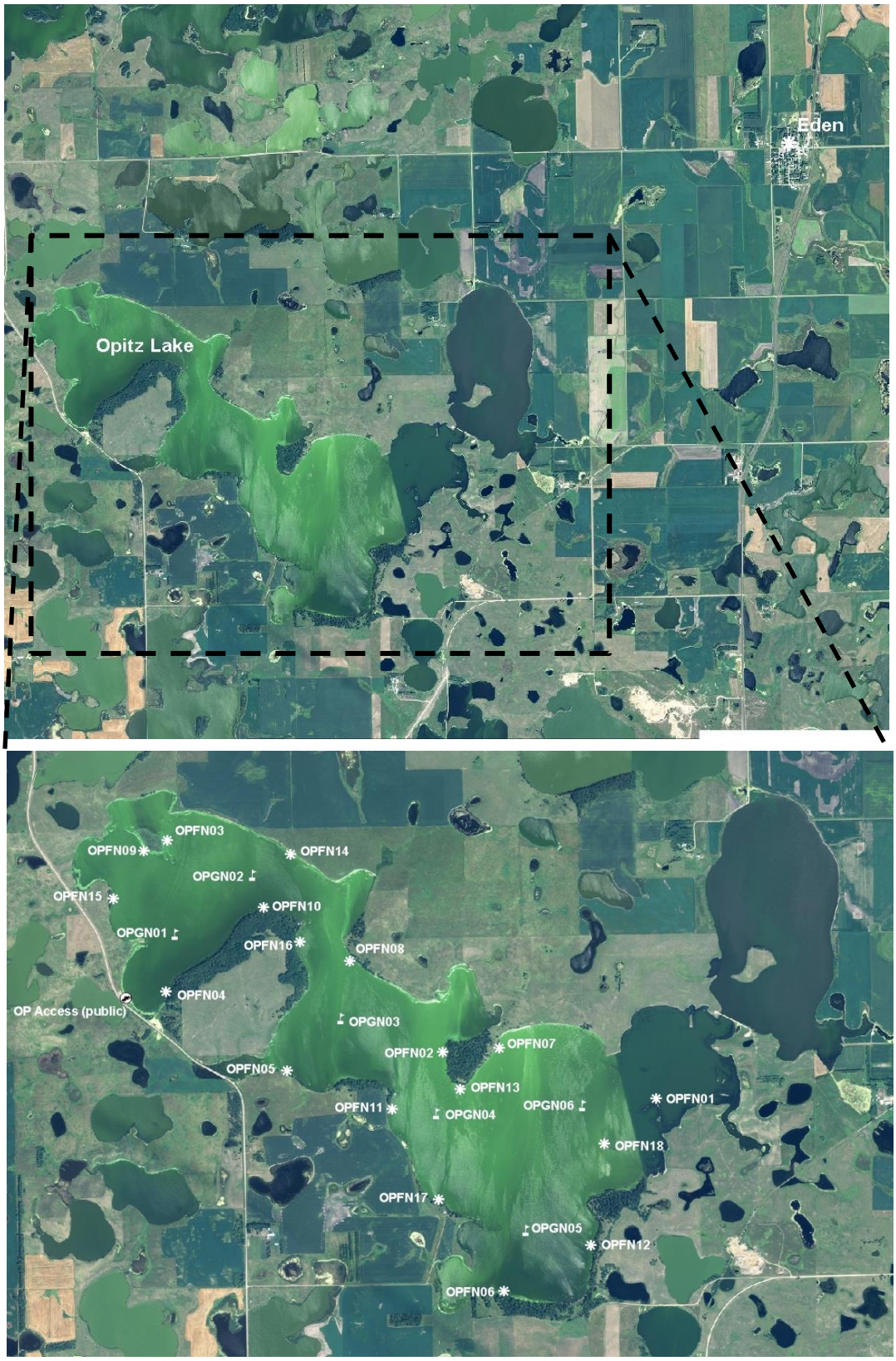

Figure 2. Map depicting geographic location of Opitz Lake (Day; Marshall Counties) from Eden, South Dakota (top). Also noted is the public access and standardized net locations for Opitz Lake (bottom). OPFN= frame net; OPGN= gill net

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.

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 27.7 (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 2014 gill net CPUE represented an increase from the 2013 CPUE of 17.7 (Table 2), and indicated high relative abundance.

Gill net captured walleye ranged in TL from 19 to 44 cm (7.5 to 17.3 in; Figure 3). The PSD was 6 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 5% 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 year classes (2006, 2009 and 2011-2013) were present (Table 4). The 2011 cohort, which coincided with a fry stocking, was the most represented and comprised 74% 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 2014, the mean fall night electrofishing CPUE of age-0 Walleye was 75.0 (Table 1). For the third straight year, high numbers of age-0 walleye were naturally produced in Opitz Lake. However, recruitment of the 2012 cohort was relatively low; only 23 individuals sampled at age 2 (Table 4). Recruitment of the 2013 and 2014 year classes is currently unknown will be assessed in future surveys.

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 2014, the

weighted mean TL at capture of age-2 and age-3 walleye was 288 mm and 340 mm (11.3 and 13.4 in; Table 5). Gill net captured walleye had mean Wr values that ranged from 82 to 94 for all length categories (e.g., stock to quality) sampled. For stock-length walleye, the mean Wr was 82 (Table 1) and no length-related trends in condition were apparent.

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 2014 mean gill net CPUE for stock-length yellow perch of 34.2 (Table 1) was above the minimum objective (≥ 30 stock-length yellow perch/net night) and the highest recorded from 2007-2014 (Table 2).

Gill net captured yellow perch ranged in TL from 18 to 32 cm (7.1 to 12.6 in), had a PSD of 99 and PSD-P of 62 (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, three year classes (2009, 2011, and 2012) were represented in the gill net catch (Table 7). The 2009 and 2011 cohorts were the most abundant and comprised 20% and 72%, respectively, of yellow perch in the gill net catch (Table 7).

In 2014, the weighted mean TL at capture for age-2 and age-3 yellow perch was 214 and 254 mm (8.4 and 10.0 in; Table 8). Based on the 2014 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 Wr values > 105 for all length categories (e.g., stock to quality) sampled.

Other Species

Black Bullhead: In surveys conducted from 2007-2014, black bullhead relative abundance has remained low (Table 2). In 2014, the mean frame net CPUE of stock-length black bullhead was 7.0 (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 2007-2014 (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 have remained ≤ 1.5 in surveys conducted from 2007-2014 (Table 2). In 2014, nine stock-length

individuals ranging in TL from 61 to 87 cm (24.0 to 34.3 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 1.3 (Table 1). Rock bass captured in the frame net catch ranged in TL from 13 to 23 cm (5.1 to 9.1 in.) with the majority being ≥ quality-length (18 cm; 7 in). The PSD was 74 and the PSD-P was 6 (Table 1).

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

Other: Common carp was the only other fish species captured during the 2014 survey (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys utilizing gill nets and frame nets annually (next survey scheduled in summer 2015) 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) 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 frame nets, experimental gill nets and electrofishing in Opitz Lake, 2014. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= black bullhead; BLC= black crappie; COC= common carp; NOP= northern pike; ROB= rock bass; WAE= walleye; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Frame nets								
BLB	7.0	2.8	68	7	40	8	99	1
BLC	0.3	0.2	100	0	80	43	97	4
COC	0.1	0.1	100	---	100	---	---	---
NOP	0.3	0.2	100	0	0	---	76	5
ROB	2.6	1.3	74	11	6	6	112	1
WAE	5.9	2.2	12	6	1	2	80	<1
Gill nets								
BLB	0.3	0.3	50	50	50	50	93	29
NOP	1.5	0.5	100	0	44	33	81	4
ROB	1.3	1.1	88	24	13	23	109	5
WAE	27.7	8.3	6	3	0	---	82	<1
YEP	34.2	8.7	99	1	62	6	108	<1
Electrofishing								
WAE[1]	75.0	---	---	---	---	---	---	---

[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, 2007-2014. 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

	CPUE						
Species	2007[1]	2008	2010	2011	2012	2013	2014
Frame nets							
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[2]	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
Gill nets							
BLB	0.0	0.3	0.0	0.0	0.0	0.5	0.3
COC	0.3	0.0	0.0	0.0	0.0	0.0	0.0
NOP	0.7	0.3	0.0	0.0	0.3	1.5	1.5
ROB	0.0	0.0	0.0	0.0	0.8	1.0	1.3
WAE	31.7	12.5	10.2	39.7	29.0	17.7	27.7
YEP	4.0	4.2	0.5	11.7	6.0	18.2	34.2
Electrofishing							
WAE[3]	---	---	0.0	283.5	167.0	144.0	75.0

[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 experimental gill nets from Opitz Lake, 2007-2014. BLB= black bullhead; wae= walleye; yep= yellow perch

Species	2007[1]	2008	2010	2011	2012	2013	2014	Objective
Frame nets								
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	---
Gill nets								
WAE								
CPUE	32	13	10	40	29	18	28	≥ 10
PSD	58	16	52	14	68	28	6	30-60
PSD-P	2	0	0	0	0	0	0	5-10
Wr	81	86	90	95	84	83	82	---
YEP								
CPUE	4	4	1	12	6	18	34	≥ 30
PSD	88	100	100	77	97	87	99	30-60
PSD-P	63	64	100	16	56	19	62	5-10
Wr	113	120	121	115	119	113	108	---

[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, 2010-2014.

	Year Class										
Survey Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2014		17	23	136		8			1		
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
# 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, 2007-2014. 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
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, 2000-2014. 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, 2010-2014.

	Year Class													
Survey Year	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2014			16	148		42								
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, 2010-2014.

	Age									
Year	1	2	3	4	5	6	7	8	9	10
2014										
Male	---	200(3)	235(21)	---	266(2)	---	---	---	---	---
Female	---	216(15)	258(136)	---	285(29)	---	---	---	---	---
Combined	---	214(16)	254(148)	---	279(42)	---	---	---	---	---
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)	---

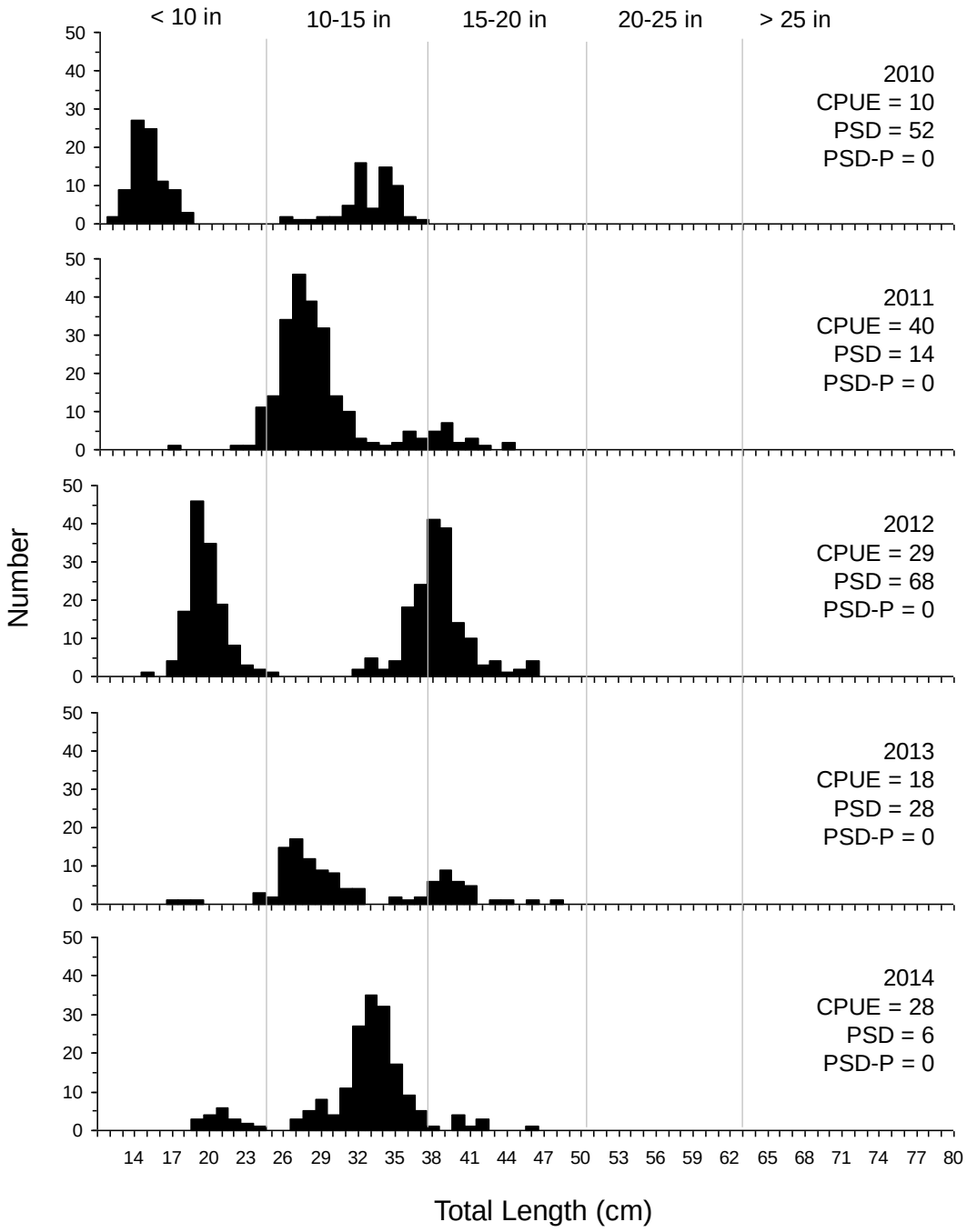

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Opitz Lake, 2010-2014.

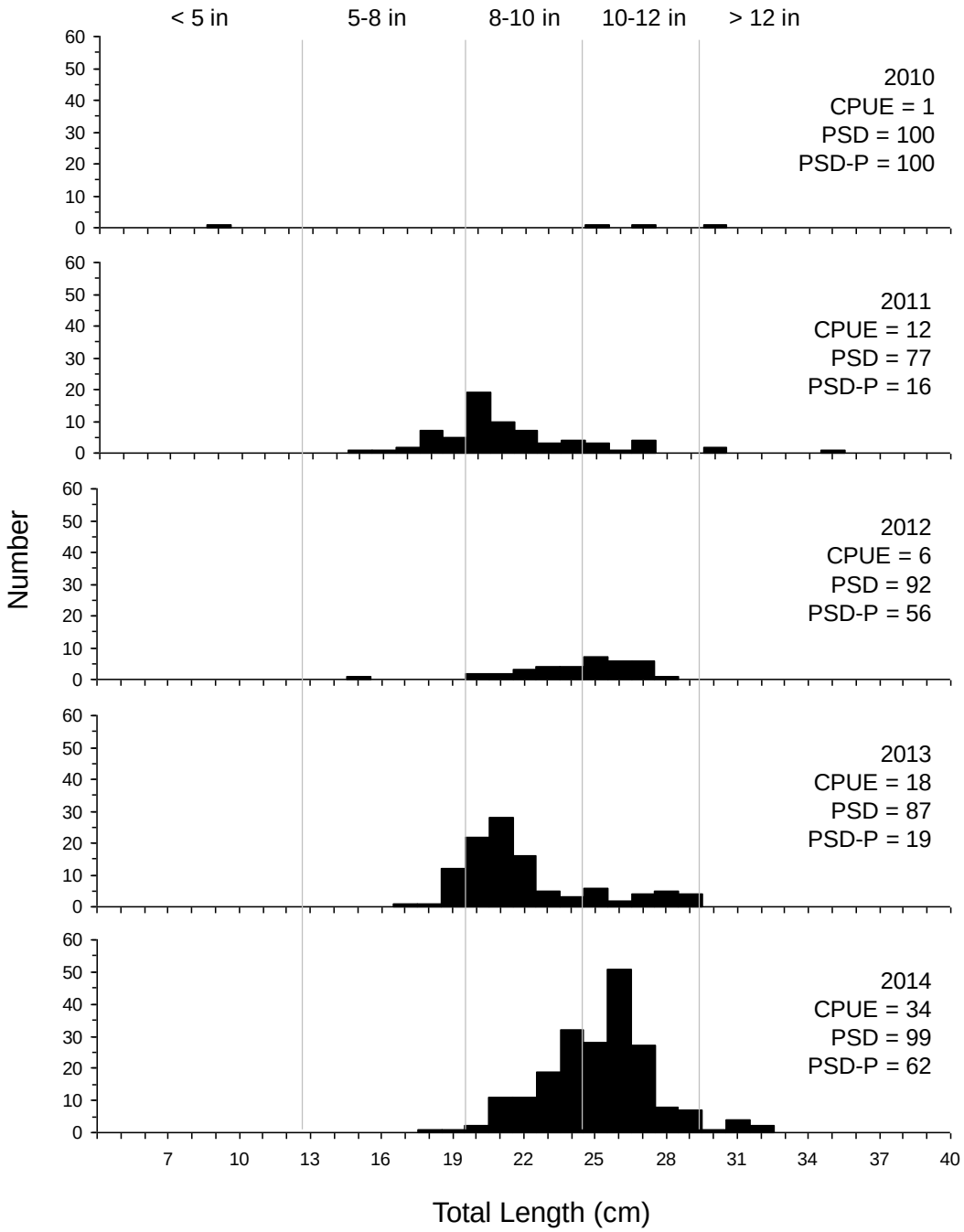

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Opitz Lake, 2010-2014.