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	five miles west and one mile south of Eden, SD

Survey Dates and Sampling Information

Dates of current survey	June 26-28, 2007
Date of most recent survey	June 10-12, 2003 June 3-4, 2004 June 1-3, 2005
Gill net sets (n)	6
Frame net sets (n)	18

Morphometry (Figure 1)

Watershed area (acres)	unknown
Surface area (acres)	1,564
Maximum depth (ft)	16
Mean depth (ft)	unknown

Ownership and Public Access

Opitz Lake is a meandered lake managed by the SDGFP (Figure 1). There are two access points located on Opitz Lake; a private boat ramp (fee charged) located on the east side of the lake, and a public access site located on the west side of the lake (Figure 1). The public access site located on the west shore has no boat ramp, and is not useable from March 1- July 31, as a boating restriction is in place on the northwestern portion of Opitz Lake during that time (Figure 1). Although, no boat ramp exists anglers are able to launch boats. Opitz Lake is owned by the State of South Dakota and lands adjacent to the lake are generally under state and private ownership.

Watershed and Land Use

The Opitz Lake watershed is comprised of a mix of pasture or grassland or pasture, cropland, and small shelterbelts.

Water Level Observations

Spring run-off, coupled with heavy rains resulted in increased water levels in Opitz Lake during the spring of 2007.

Aquatic Vegetation and Exotics

Emergent and submergent vegetation are present in Opitz Lake; however, the type and extent has not been documented. Common carp were the only exotic species reported during this survey.

Fish Management Information

Primary species	northern pike, walleye, yellow perch
Other species	black bullhead, black crappie, common carp, fathead minnow, rock bass, white sucker
Management classification	warm-water semi-permanent
Fish Consumption Advisories	none

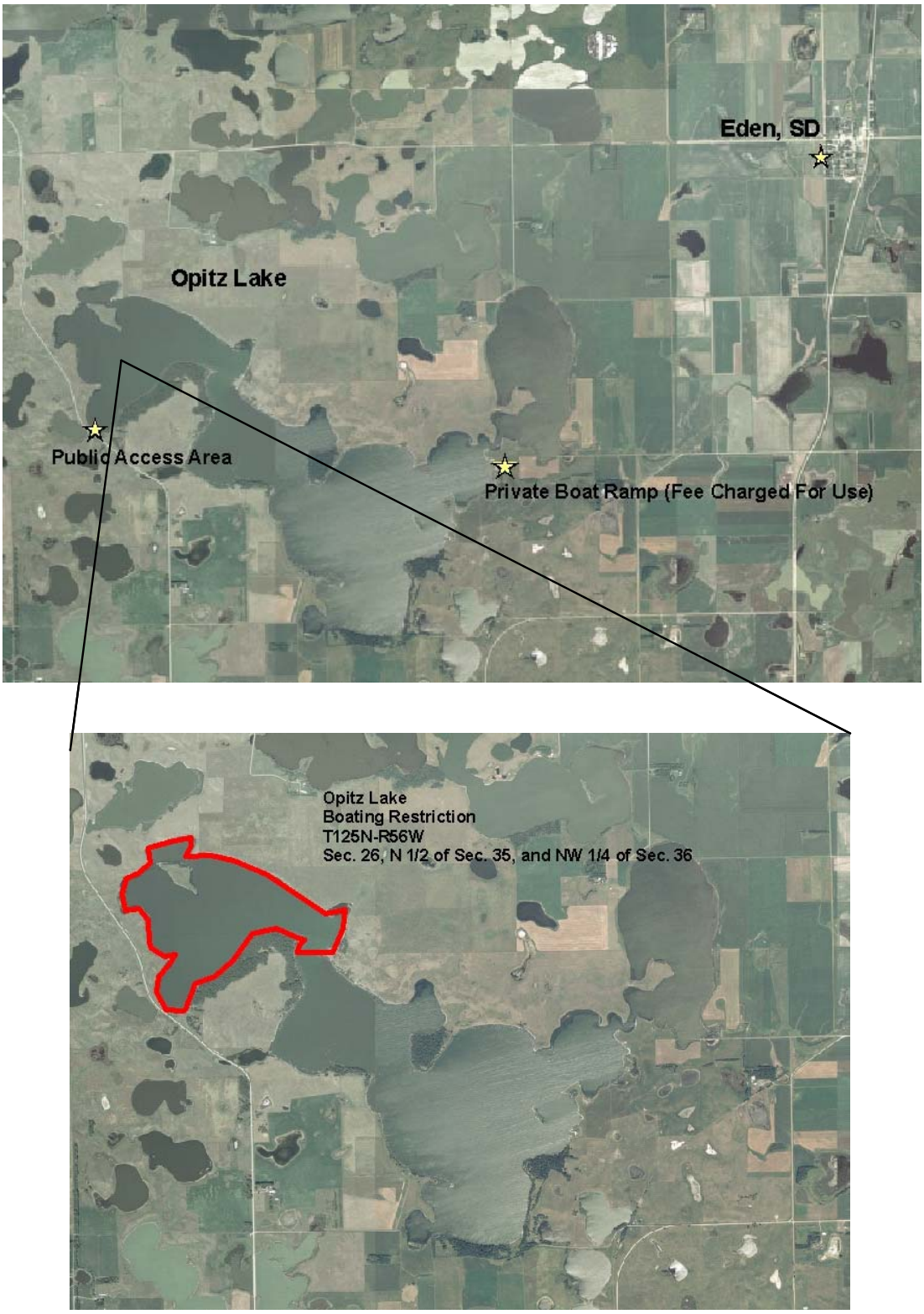

Figure 1. Map depicting location of Opitz Lake from Eden, SD; including access sites, and map of boating closure area.

Management Objectives

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

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

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

4) Maintain a mean frame net CPUE of stock-length bullhead ≤ 100.

Results and Discussion

Prior to heavy precipitation during the 1990's, the lake that is now called Opitz Lake consisted of four shallow cattail sloughs. Heavy precipitation and resulting run-off resulted in increased water levels capable of sustaining fish life. During periods of heavy run-off, fish likely entered Opitz Lake, from the Cattail/Kettle complex to the north. Beginning in 2000, SDGFP began stocking Optiz Lake with walleye and black crappie to further enhance the fishery (Table 5). In 2003, a reduced daily limit of 2-walleye with a 406-mm (16-inch) minimum-length restriction and one walleye over 508-mm (20-inch) regulation was placed on the Opitz Lake walleye population, in an attempt to maintain predator abundance, and provide a measure of sustainability to the walleye fishery.

Primary Species

Northern Pike: High water events during the late 1990's, 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 (Ermer et al. 2005). However, northern pike relative abundance has declined steadily since 2002 (Ermer et al 2006). In 2007, the mean gill net CPUE was 0.7, and below the minimum objective (≥ 3 stock-length fish/net-night; Table 1; Table 3). The decline in relative abundance can likely be attributed to the lack of a substantial spring rise in water levels limiting recruitment. Northern pike depend heavily on flooded vegetation for spawning and recruitment, and tend to have improved recruitment during springs that have rising water levels in northeastern South Dakota lakes.

Four northern pike were captured in gill nets during 2007, and all exceeded preferred-length (710-mm; Figure 2). The condition of sampled northern pike during 2007 was acceptable, with the mean Wr of stock-length fish being 76 and 83 for frame nets and gill nets, respectively (Table 1). Northern pike condition generally is lowest during spring and summer, rises in the fall and peaks during late-winter (Neumann and Willis 1995).

Walleye: The mean gill net CPUE of stock-length walleye during 2007 was 31.7, and indicative of relatively high abundance (Table 1). The 2007 CPUE was a substantial increase from previous years and above the minimum objective (≥ 10 stock-length walleye/net night; Table 2; Table 3). The increase in relative abundance during 2007 is the result of successful recruitment of the 2004-2006 year-classes (Table 6). Both the 2004 and 2006 year-classes appear to be relatively strong and coincide with walleye stockings; while the weaker 2005 year-class was naturally produced (Table 5; Table 6; Figure 3).

Walleye captured in gill nets during 2007 ranged in total length from 180 to 590 mm (Figure 3). The PSD of walleye captured in gill nets during 2007 was 58 and the RSD-P was 2 (Table 1; Table 3; Figure 3). The PSD was within the objective range of 30-60; while the RSD-P was slightly below the desired range of 5-10. In 2007, approximately 6% of all walleye sampled in gill nets exceeded the 406-mm (16-inch) minimum length restriction and were available for angler harvest (Figure 3).

Opitz Lake was sampled approximately one-month later in 2007 than in previous years. Therefore, growth comparisons to past years could not be made. In 2007, the weighted mean length at capture of age-3 walleyes was 391-mm, and indicative of relatively fast growth (Table 4). Currently, walleye are reaching the 406-mm (16-inch) minimum length restriction beginning at age-3 (Table 4; Figure 3). Condition of gill net captured walleye in 2007 ranged from the upper-70's to the upper-80's. Sub-stock (< 250-mm) walleyes had the highest condition, with a mean Wr of 89; while larger length-groups had lower condition, with mean Wr values of 83 and 79 for the stock-quality and quality-preferred length walleyes, respectively. Lower Wr values for larger walleye may be the result of recent spawning activity and/or limited prey availability; however, at this time growth rates appear to be good.

Yellow Perch: The mean gill net CPUE of stock-length (130 mm) yellow perch in 2007 was 4.0, and below the minimum objective (≥ 25 fish/net night) for perch in Opitz Lake (Tables 1 – 3). Since 2002, relative abundance of yellow perch in Opitz Lake has remained low, with mean gill net CPUE values ranging from 1.0 to 8.3 (Table 2). Length-frequency analysis of gill net captured yellow perch in 2007 indicates relatively consistent recruitment, but generally of low magnitude (Figure 4). Yellow perch relative abundance in Opitz Lake appears to be low.

During 2007, yellow perch ranged in total length from 170 to 340 mm (Figure 4), had a PSD of 88, and an RSD-P of 63 (Tables 1 – 3; Figure 4). The high PSD and RSD-P values indicate a population dominated by larger individuals, the result of limited recruitment.

No growth information was available in 2007. The condition of yellow perch in Opitz Lake was good, with the mean Wr of stock-length yellow perch being 113. No length related trends in Wr were apparent during 2007.

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Other Species

Black bullhead: The mean frame net CPUE of stock-length black bullhead during 2007 was 0.8, and within the objective (≤ 100) for black bullhead in Opitz Lake (Tables 1-3). Since fish population assessment surveys were initiated in Opitz Lake (2002) black bullhead abundance has remained low, with mean frame net CPUE values never exceeding 16 fish/net night (Table 2).

Black bullhead captured in frame nets during 2007 ranged in total length from 330 to 420 mm, had PSD and RSD-P values of 100 (Table 1; Table 3; Figure 5). The high PSD and RSD-P values indicate a population comprised entirely of large black bullheads, the result of poor recruitment in recent years. Poor recruitment of black bullheads in many northeastern South Dakota lakes has been common in recent years, limiting their abundance. High predator abundance should aid in limiting future recruitment of black bullheads in Opitz Lake. The majority of black bullheads sampled in Opitz Lake during 2007 exceeded memorable-length (380-mm).

No growth information has been collected on the Opitz Lake black bullhead population. The condition of sampled black bullheads was good with the mean Wr of stock-length fish being 92 (Table 1).

Black Crappie: Black crappies were stocked into Opitz Lake in 2001. However, relative abundance has remained low, in surveys conducted from 2002-2005 and in 2007, the mean frame net CPUE has never exceeded 2 fish/net night (Table 2). Poor recruitment has resulted in the low abundance; however, adult black crappie are present, and the potential exists for the population to expand.

Other: Common carp, rock bass, and white sucker were other fish species captured during the 2007 survey; however, the relative abundance of these species appears to be low, and their impact on the fishery is likely minimal at this time.

Management Recommendations

1) Conduct fish community assessment surveys utilizing gill nets and frame nets on a biennial basis 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 at (≈1,000 fry/acre) to establish additional year classes if gill netting results warrant (i.e., low gill net CPUE of < 250-mm (10-inch) walleye).

4) Maintain 406-mm (16-inch) minimum length restriction on walleyes with a daily limit of two in an effort to maintain predator densities, provide larger walleye to the angler, and attempt to add a measure of sustainability to the fishery.

5) Encourage commercial harvest of black bullhead to limit abundance if the abundance exceeds the management objective. At the time of this survey, the abundance of black bullhead in Opitz Lake did not necessitate the need for commercial harvest.

6) Monitor water levels and winter/summerkill events. In cases of complete winter/summerkill the need to re-establish a fishery in Opitz Lake should be evaluated. If so desired, northern pike, walleye, and yellow perch should be stocked to re-establish a fish community.

7) Establish a public boat ramp and parking lot on the west side of Opitz Lake.

Table 1. Mean catch rate (CPUE; gill/frame nets = catch/net night) of stock-length fish, mean relative weight (Wr) of stock-length fish, proportional stock density (PSD) and relative stock density of preferred-length fish (RSD-P) of various fish species captured in experimental gill nets, and frame nets in Opitz Lake, 2007. 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; WHS= white sucker; YEP= yellow perch

Survey Year	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	RSD-P	CI-90	Wr	CI-90
Frame nets								
BLB	0.8	0.4	100	0	100	0	92	2
BLC	0.3	0.2	100	0	80	20	91	---
COC	1.5	0.6	96	4	22	14	110	3
NOP	0.5	0.3	100	0	22	28	76	4
ROB	0.1	0.2	0	---	0	---	118	---
WAE	10.1	4.4	83	4	14	4	80	<1
WHS	0.1	0.1	100	0	100	0	102	---
YEP	0.1	0.0	0	---	0	---	110	---
Gill nets								
COC	0.3	0.5	100	0	0	---	111	<1
NOP	0.7	0.5	100	0	100	0	83	7
WAE	31.7	6.4	58	6	2	1	81	<1
YEP	4.0	2.5	88	11	63	17	113	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 and frame nets in Opitz Lake, 2000 – 2007. BLB= black bullhead; BLC= black crappie; COC= common carp; NOP= northern pike; ROB= rock bass; WAE= walleye; WHS= white sucker; YEP= yellow perch

	CPUE								
Species	2000	2001	2002	2003	2004	2005	2006[1]	2007[1,2]	Mean
Frame nets									
BLB	---	---	15.7	5.6	1.5	4.7	---	0.8	5.7
BLC	---	---	0.0	0.0	0.1	1.2	---	0.3	0.3
COC	---	---	0.0	0.0	0.0	0.2	---	1.5	0.3
NOP	---	---	1.6	0.6	0.8	0.3	---	0.5	0.8
ROB	---	---	0.0	0.1	0.0	0.0	---	0.1	0.0
WAE	---	---	2.3	1.1	0.3	2.5	---	10.1	3.3
WHS	---	---	0.1	0.0	0.9	0.8	---	0.1	0.4
YEP	---	---	0.4	0.0	0.0	0.0	---	0.1	0.1
Gill nets									
BLB	---	---	17.7	1.7	0.3	0.2	---	0.0	4.0
BLC	---	---	0.0	0.0	0.0	0.2	---	0.0	0.0
COC	---	---	0.0	0.0	0.0	0.0	---	0.3	0.1
NOP	---	---	8.2	1.3	1.8	1.0	---	0.7	2.6
ROB	---	---					---	0.0	0.0
WAE	---	---	15.2	10.8	6.8	4.0	---	31.7	13.7
WHS	---	---	0.0	0.3	0.0	0.0	---	0.0	0.1
YEP	---	---	1.0	2.2	8.3	6.2	---	4.0	4.3

[1] Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

[2] Standard survey dates moved from late-May/early-June to late-June.

Table 3. Mean catch rate (CPUE; gill/frame nets = catch/net night), proportional stock density (PSD), relative stock density of preferred-length fish (RSD-P), and relative weight (Wr) for selected species captured in experimental gill nets and frame nets in Opitz Lake, 2000 – 2007. BLB= black bullhead; NOP= northern pike; WAE= walleye; YEP= yellow perch

Species	2000	2001	2002	2003	2004	2005	2006[1]	2007[1,2]	Average	Objective
Frame nets										
BLB										
CPUE	---	---	16	6	2	5	---	1	6	≤ 100
PSD	---	---	17	99	100	90	---	100	81	---
RSD-P	---	---	15	99	100	89	---	100	81	---
Wr	---	---	82	110	107	111	---	92	100	---
Gill nets										
NOP										
CPUE	---	---	8.2	1.3	1.8	1.0	---	1	3	≥ 3
PSD	---	---	96	100	100	83	---	100	96	30-60
RSD-P	---	---	35	25	86	67	---	100	63	5-10
Wr	---	---	73	77	88	82	---	83	81	---
WAE										
CPUE	---	---	15	11	7	4	---	32	14	≥ 10
PSD	---	---	3	42	81	100	---	58	57	30 – 60
RSD-P	---	---	1	0	0	0	---	2	1	5 – 10
Wr	---	---	85	89	94	96	---	81	89	---
YEP										
CPUE	---	---	1	2	8	6	---	4	4	≥ 25
PSD	---	---	83	8	91	95	---	88	73	30-60
RSD-P	---	---	50	0	21	46	---	63	36	5-10
Wr	---	---	84	116	110	108	---	113	106	---

[1] Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

[2] Standard survey dates moved from late-May/early-June to late-June.

Table 4. Weighted mean length at capture (mm) for walleye captured in experimental gill nets in Opitz Lake, 2002 – 2007. Note: sampling was conducted one-month later in 2007; other years sampling was conducted in late-May/early-June.

		Age						
Year	N	1	2	3	4	5	6	7
2007[1]	347	203	338	391	---	---	---	537
2005[1]	36	185	---	---	408	454	---	---
2004	27	---	---	368	432	---	---	---
2003	65	---	279	377	---	---	---	---
2002	98	186	340	---	---	---	---	---

[1]Age assignments made using otoliths; scales were used in previous years.

Table 5. Stocking history including size and number for fishes stocked into Opitz Lake, 2000 - 2007.

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	small fingerling	258,000
2006	WAE	fry	1,500,000

Table 6. Numbers of walleye sampled using gill nets (n) by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Opitz Lake, 2002 – 2007.

	Year Class									
Survey Year	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
2007[1,2]		160	32	152				3		
2005[1]	---	---		12			10	14		
2004	---	---	---				6	21		
2003	---	---	---	---			8	57		
2002	---	---	---	---	---		7	90		
Number stocked										
fry		1,500				1,500	1,500	1,500		
small fingerling				258						
large fingerling										

[1]Age assignments made using otoliths; scales were used in previous years.
[2] Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

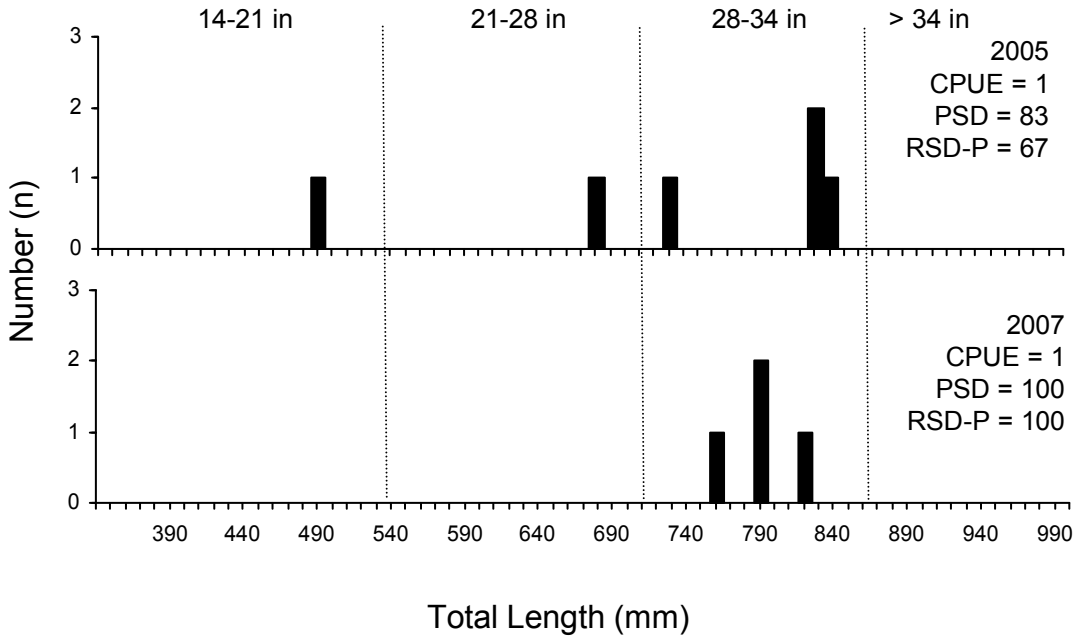

Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for northern pike captured using gill nets in Opitz Lake, 2005 and 2007.

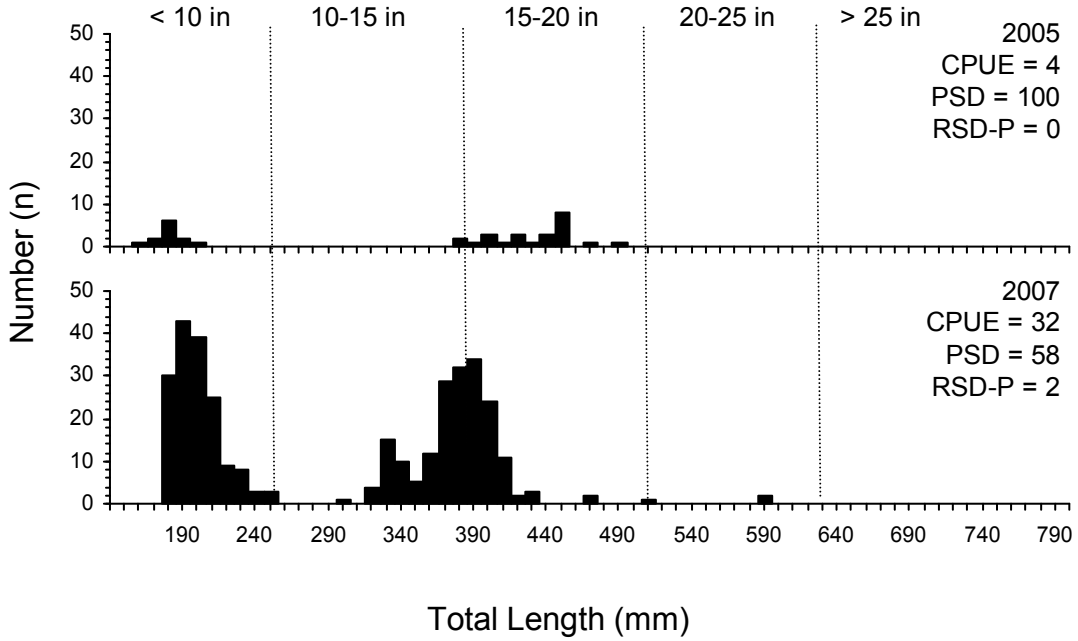

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for walleye captured in gill nets in Opitz Lake, 2005 and 2007.

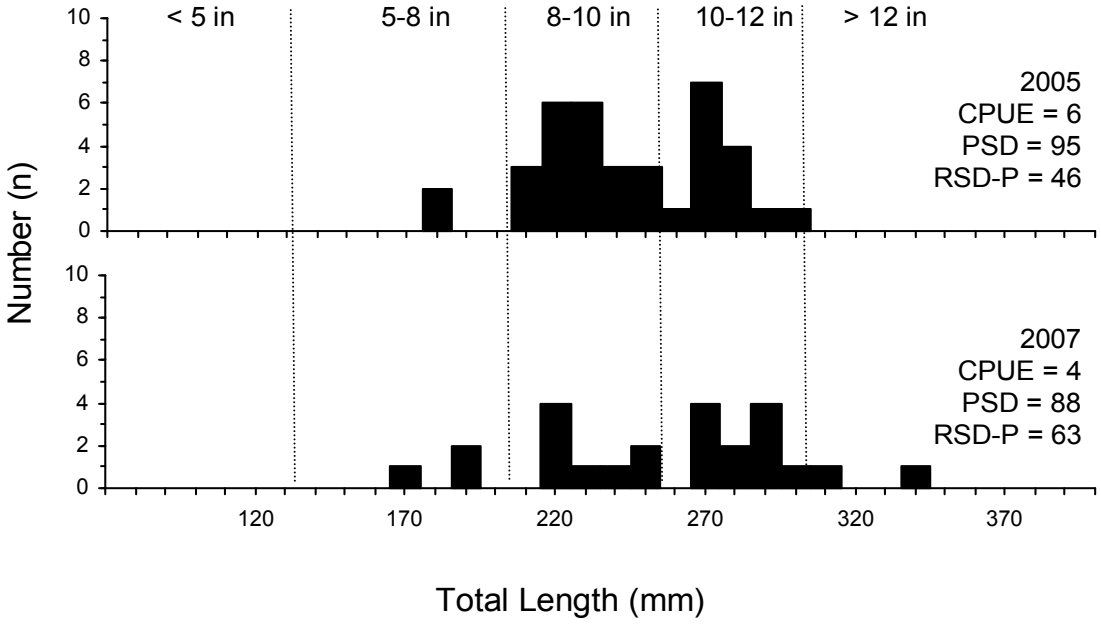

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for yellow perch captured in gill nets in Opitz Lake, 2005 and 2007.

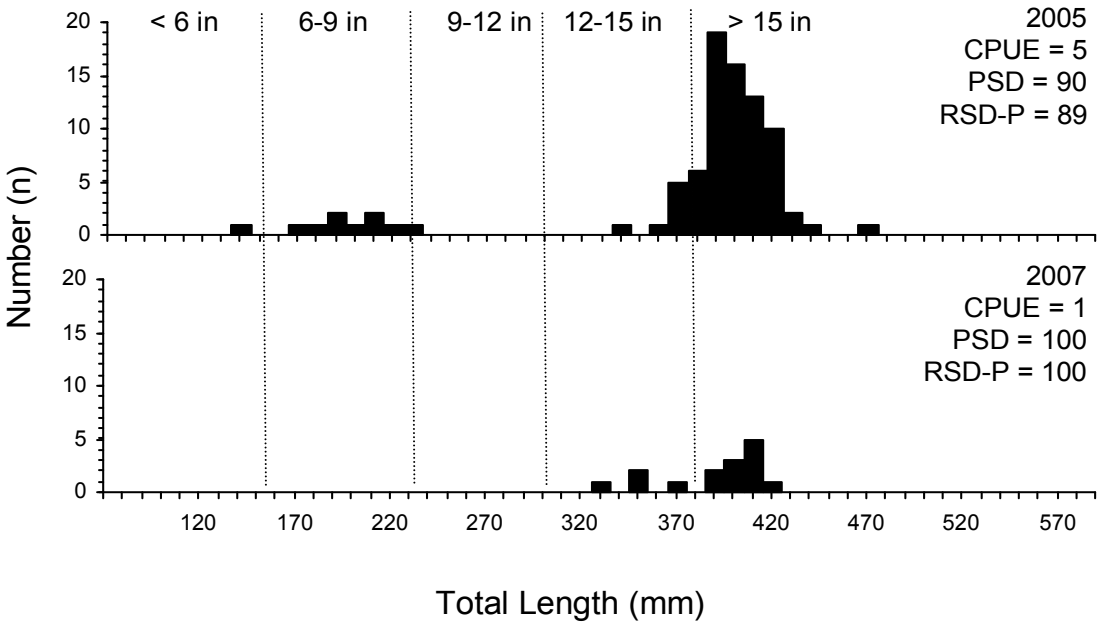

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for black bullhead captured using frame nets in Opitz Lake, 2005 and 2007.