

Enemy Swim Lake

Site Description

Location

Water designation number (WDN)	22-0006-00
Legal description	T123N-R53W-Sec.10-16
County (ies)	Day
Location from nearest town	1 ½ miles east and 6 ½ miles north of Waubay

Survey Dates and Sampling Information

Dates of current survey	June 24, 2008 (EF-LMB) July 8-10, 2008 (FN,GN) September 3, 2008 (EF-WAE, SMB)
Date of most recent survey	July 10-12, 2007 (FN,GN) September 14, 2007 (EF-WAE, SMB)
Gill net sets (n)	6
Frame net sets (n)	24
Spring electrofishing (min)	64
Fall electrofishing (min)	61

Morphometry (Figure 1)

Watershed area (acres)	22,310
Surface area (acres)	2,146
Maximum depth (ft)	26
Mean depth (ft)	16

Ownership and Public Access

Enemy Swim Lake is a meandered lake managed by the SDGFP. Two public access sites are located on Enemy Swim Lake (southwest and south shore) and each is maintained by the SDGFP (Figure 1; Figure 2). Lands adjacent to Enemy Swim Lake are owned by the State of South Dakota, Bureau of Indian Affairs, and private individuals.

Watershed and Land Use

Land use within the Enemy Swim Lake watershed is primarily agricultural with much of the landscape being grassland (hay, pasture, CRP; Stueven and Bren 2000). However, many CRP contracts may have expired or will expire in upcoming years which will likely result in a higher percentage of cropland within the watershed.

Water Level Observations

The Water Management Board established Ordinary High Water Mark is 1854.4 fmsl, and the outlet elevation of Enemy Swim Lake is 1853.6 fmsl. On May 7, 2008, the elevation of Enemy Swim Lake was 0.9 ft. higher than fall 2007 and near the Ordinary High Water Mark with an elevation of 1854.5 fmsl. By October 21, 2008 water levels on Enemy Swim Lake had declined to an elevation of 1853.6 fmsl.

Aquatic Vegetation and Exotics

Cattails and bulrush are common along the much of the shoreline and occurs in large beds in Church Bay and East Lake. Submersed vegetation, primarily coontail and pondweeds, is extensive in protected areas of East Lake and Church Bay; scattered areas also exist throughout much of the main lake. Common carp has been the only exotic species reported in Enemy Swim Lake.

Fish Management Information

Primary species	black crappie, bluegill, largemouth bass, smallmouth bass, walleye, yellow perch
Other species	black bullhead, fathead minnow, common carp, Johnny darter, logperch, northern pike, orangespotted sunfish, pumpkinseed, rock bass, spottail shiner, white bass, white sucker
Lake-specific regulations	NE Panfish Management Area: 10 daily; 50 possession. Bluegill/sunfish: High-grading prohibited. Smallmouth/Largemouth bass daily limit of 3. Only those <12", or 18" and longer may be taken. Of those no more than one may be 18" or longer. Walleye/Saugeye: minimum length 14".
Management classification	warm-water permanent
Fish Consumption Advisories	none

South Dakota Game, Fish, and Parks
 SDSU Wildlife and Fisheries Sciences




Enemy Swim Lake - Day county
 Map Creation: November, 2002 Sonar Survey: August, 2002
 Shoreline: Landsat 7, August, 2000

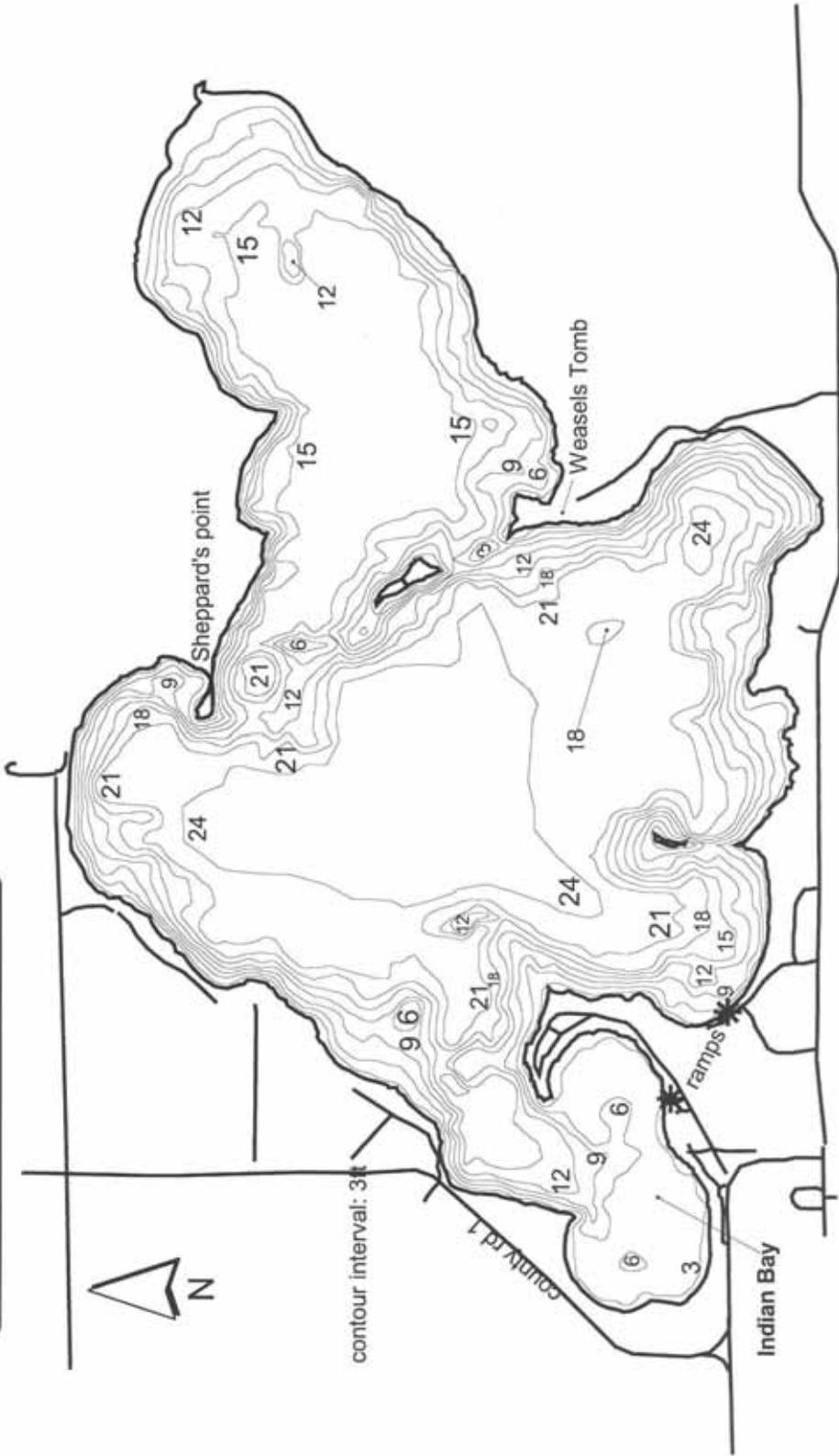


Figure 1. Enemy Swim Lake contour map.

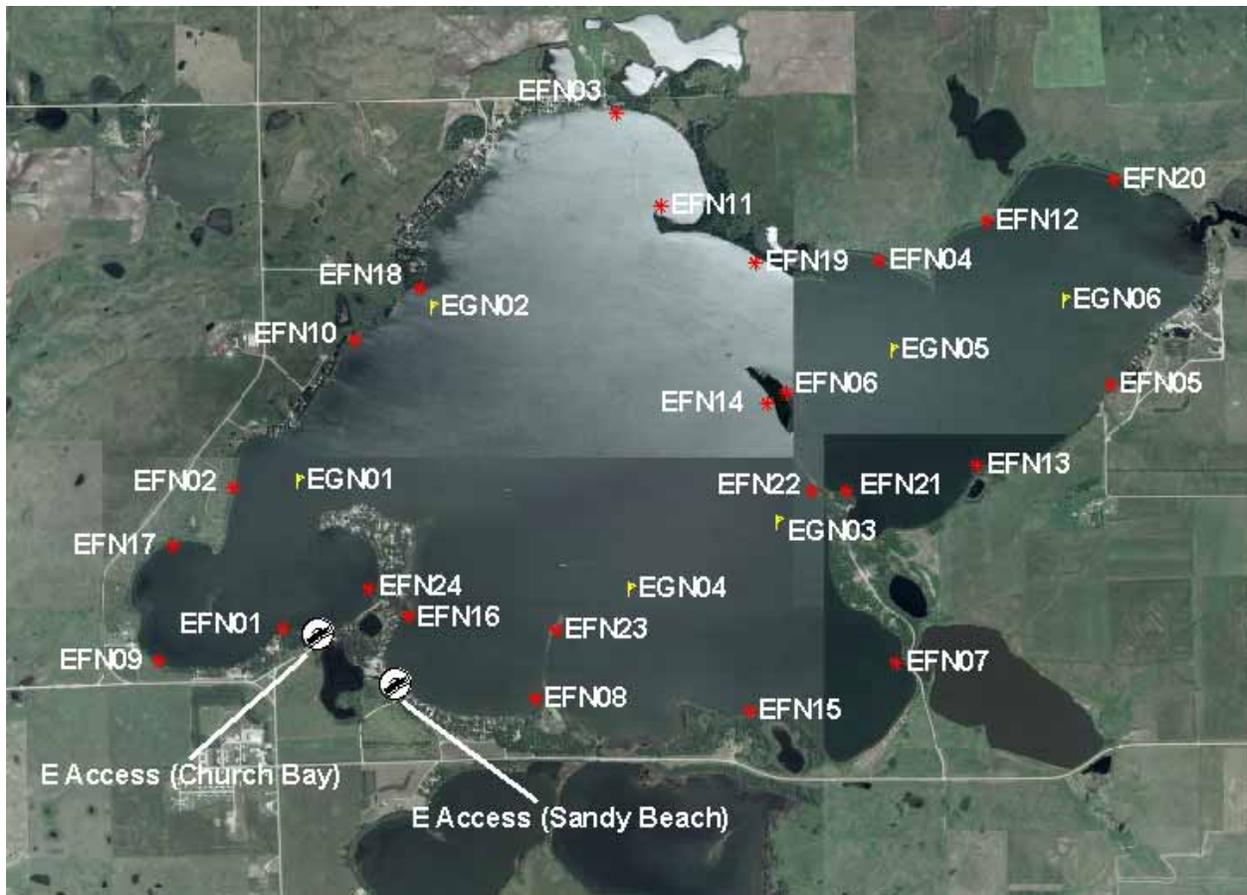


Figure 2. Map depicting public access locations and standardized net locations for Enemy Swim Lake, Day County, South Dakota. EFN=frame nets, EGN=gill nets

Management Objectives

- 1) Maintain a frame net mean CPUE of stock-length black crappie ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a frame net mean CPUE of stock-length bluegill ≥ 25 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a mean spring night electrofishing CPUE of stock-length largemouth bass ≥ 30 , a PSD of 40-70, and a PSD-P of 10-20.
- 4) Maintain a moderate density smallmouth bass population with a PSD of 40-70 and a PSD-P of 10-20.
- 5) Maintain a gill net mean CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and an PSD-P of 5-10.
- 6) Maintain a gill net mean CPUE of stock-length yellow perch ≥ 25 , a PSD of 30-60, and a PSD-P of 5-10.

Results and Discussion

Enemy Swim Lake is a permanent-natural lake with a moderately-sized watershed. Major surface water inlets to Enemy Swim Lake include Lewandowski Creek at the northeast and Burns Slough at the southeast. Water exiting Enemy Swim Lake drains into Campbell Slough from there it flows into Blue Dog Lake and then into a series of connected lakes (Rush Lake, Minnewasta Lake, Waubay Lake and Bitter Lake).

Portions of the Enemy Swim Lake shoreline are highly developed (i.e., south, west and northeast corner of East Lake); while other areas remain relatively undeveloped. Currently, Enemy Swim Lake is primarily managed as a panfish (i.e., black crappie, bluegill, and yellow perch), black bass (largemouth and smallmouth), and walleye fishery. Overall, Enemy Swim Lake supports one of the most diverse fish assemblages in northeast South Dakota with as many as 18 fish species present in the lake.

Primary Species

Black crappie: No stock-length black crappies were captured in the 2008 frame net catch from Enemy Swim Lake. Since 2001, frame net mean CPUE values have fluctuated from a high of 5.9 (2003) to a low of 0.0 (2008) with the 2001-2008 average being 2.3 (Table 2). Based on frame net mean CPUE values (2001-2008) relative abundance of black crappie in Enemy Swim Lake appears to be low; however, sampling takes place in mid-July, likely leading to reduced catch rates in near-shore areas. Guy

and Willis (1991) found that CPUE values for frame net captured black crappies peaked during spring (April) and fall (September) in Lake Madison.

Guy and Willis (1995) found that black crappie populations in South Dakota natural lakes tend to exhibit unstable recruitment, fast growth rates, and high condition, but densities are often too low for the species to contribute to the sport fishery. During periods of increased relative abundance anglers target black crappies in Enemy Swim Lake. Blackwell (2005) reported an increase in the importance of the black crappie fishery in Enemy Swim Lake in creel surveys conducted from December 1997-August 2004 with the percent of anglers targeting black crappies being highest from 2001-2004, likely related to increased relative abundance of black crappies (Table 2; Hubers 2002).

Bluegill: The frame net mean CPUE of stock-length bluegill during 2008 was 65.3 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net) for Enemy Swim Lake (Table 3). Since 2001, the frame net mean CPUE of stock-length bluegill has remained relatively stable with CPUE values ranging from 39.7 (2004) to 85.7 (2002; Table 2). Based on the 2008 frame net mean CPUE, relative abundance of bluegill in Enemy Swim Lake is high (>24 stock-length bluegill/net).

The bluegill population in Enemy Swim Lake has exhibited consistent recruitment of varying magnitude in recent years. Year-classes produced in 2004, 2005 and 2006 comprised the majority of bluegills captured in the 2008 frame net catch with the 2006 year-class being the most represented (Table 5).

The total length of bluegill captured in frame nets during 2008 ranged from 8 to 26 cm (3.1 to 10.2 in) and the sample had a PSD of 29 and a PSD-P of 3 (Figure 3). Both the PSD and PSD-P values were below management objectives of 30-60 and 5-10, respectively (Table 3). The number of preferred-length bluegill in the frame net catch declined each year from 2005-2007, but slightly increased in 2008. Fewer preferred-length bluegills in the frame net catch in recent years has likely resulted from high mortality, either natural or by angling (Table 3; Figure 3). Coble (1988) indicated, if angling mortality is sufficient to increase total annual mortality then a shift in length-frequency distribution of bluegill to smaller sizes may occur as anglers tend to select for larger individuals. This may be the case on Enemy Swim Lake as an estimated 29,400 bluegill have been harvested during the summer months (May-August) from 2005-2008 (Brian Blackwell, SDGFP, unpubl. data.). Although, estimated harvest has declined in recent years anglers continue to select for larger bluegill as the size of bluegill harvested has remained stable with the mean total length of harvested bluegill ranging from 192 to 204 mm from 2005-2008.

Bluegills in Enemy Swim Lake typically attain quality-length (15 cm; 6 in) between age 4 and age 6 (Table 4). Weighted mean total length at capture values for age-3 bluegills in Enemy Swim Lake have ranged from 87 to 135 mm since 2004 (Table 4). In 2008, weighted mean total length at capture values for age-3 and age-4 bluegills of 135 mm and 169 mm, respectively, were higher than in previous years (Table 4). Mean W_r values for bluegill in the 2008 frame net catch ranged from 104 to 116 for all length categories sampled with the mean W_r of stock-length bluegill being 106 (Table 1). Seasonal influences (i.e., spawning behavior) may have influenced W_r values for bluegill in Enemy Swim Lake.

Largemouth bass: The spring night electrofishing mean CPUE of stock-length largemouth bass was 102.2 (Table 1) and above the minimum objective (≥ 30 stock-length largemouth bass/hour; Table 3). Since 2002, the mean CPUE has fluctuated from a low of 84.4 (2005) to a high of 202.0 (2006) with the 2002-2008 average being 144.4 (Table 2). Based on the 2008 electrofishing catch, relative abundance appears to be high in suitable habitat.

Length-frequency analysis and age-structure information from largemouth bass in the 2008 spring electrofishing catch suggest consistent recruitment resulting in the high relative abundance. Seven consecutive year classes (ages 3-9) were represented in the 2008 spring electrofishing catch (Table 6; Figure 4).

Largemouth bass captured during spring night electrofishing during 2008 ranged in total length from 21 to 43 cm (8.3 to 16.9 in) and the sample had a PSD of 81 and a PSD-P of 29 (Figure 4). Both the 2008 PSD and PSD-P were above the objective ranges of 40-70 and 10-20, respectively (Table 3), indicating a population skewed toward larger largemouth bass (Figure 4). In 2008, no largemouth bass were collected that exceeded the 300- to 460-mm (12- to 18-inch) protected slot, and approximately 80% were within the protected slot.

Growth of largemouth bass in Enemy Swim Lake was slightly slower than the region IV and statewide means reported by Willis et al. (2001). Mean back-calculated length at age-3 was 219 mm compared to the region IV and statewide means of 266 mm and 250 mm, respectively (Table 6). Largemouth bass in Enemy Swim Lake typically attain quality-length between age-4 and age-5 (Table 6). Largemouth bass in the 2008 spring electrofishing catch had mean W_r values that ranged from 103 to 112 with the mean W_r of stock-length largemouth bass being 104 (Table 1). No length related trends in W_r values were apparent. W_r values reported may have been influenced by spawning behavior.

Smallmouth bass: Currently, fall night electrofishing is used to assess smallmouth bass populations in NE South Dakota. However, concerns regarding the effectiveness of fall night electrofishing at sampling larger bass have resulted in a Master of Science project being designed to evaluate the most effective approach to sample smallmouth bass. Preliminary results from Roy and Enemy Swim Lakes suggest that spring night electrofishing over suitable habitat (i.e., rocky substrate) may provide a better index to smallmouth bass populations in NE South Dakota glacial lakes (Thomas Bacula, South Dakota State University, pers. comm.).

The 2008 fall electrofishing mean CPUE of smallmouth bass was 83.9 (Table 1) indicating high relative abundance. Since 2001, the fall electrofishing mean CPUE has fluctuated from a low of 10.0 (2001) to a high of 158.0 (2006) with the 2001-2008 average being 97.6 (Table 2). Smallmouth bass in Enemy Swim Lake exhibit consistent-strong recruitment as age-1 and age-2 smallmouth bass are routinely sampled in high numbers during fall electrofishing (Table 7; Figure 5).

Smallmouth bass captured during fall electrofishing during 2008 ranged in total length from 18 to 45 cm (7.1 to 17.7 in; Figure 5). The PSD was 9 and the PSD-P was 6 (Table 1; Table 3; Figure 5). Low PSD and PSD-P values generally indicate a population comprised primarily of smallmouth bass less than quality-length; however,

the low PSD and PSD-P at Enemy Swim Lake is likely the result of larger bass not being effectively sampled during fall electrofishing.

Smallmouth bass in Enemy Swim Lake typically obtain quality-length between age 4 and age 5 (Table 7). Smallmouth bass growth in Enemy Swim Lake has been slightly slower than the regional and statewide average reported by Willis et al. (2001). The mean back-calculated length at age-3 for smallmouth bass was 199 mm compared to the region IV and statewide means of 249 mm to 242 mm, respectively (Table 7). Smallmouth bass captured in the 2008 fall electrofishing catch had mean W_r values that ranged from 92 to 104 with the mean W_r of stock-length smallmouth bass being 103 (Table 1).

Walleye: The 2008 gill net mean CPUE of stock-length walleye was 3.0 (Table 1) and the lowest reported since 2001. The 2008 walleye gill net CPUE was below the minimum objective (≥ 10 stock-length walleye/net; Table 3) and indicative of low relative abundance (defined as < 4 stock-length walleye/net). Since 2001, the gill net mean CPUE of stock-length walleye has ranged from a low of 3.0 (2008) to a high of 18.2 (2005) with the 2001-2008 average being 12.5 (Table 2).

Walleye in Enemy Swim Lake have exhibited relatively consistent recruitment of varying magnitude. Eleven consecutive year classes (1996-2006) were represented in the 2007 gill net catch (Table 10). Although the mean gill net CPUE declined in 2008, eight walleye year classes were represented (Table 10). In 2001, a strong walleye year-class was naturally produced; however since 2001, natural recruitment appears to be limited as the strongest walleye year-classes produced (2002 and 2005) have coincided with large fingerling stockings (Table 9; Table 10). Fall electrofishing indicated that relatively strong year-classes (defined as > 20 age-0 walleye/hour; Ermer et al. 2005) have been naturally produced annually since 2006 with the 2008 fall electrofishing CPUE for age-0 walleye of 52.6 being the highest ever recorded on Enemy Swim Lake. However, recruitment of walleye from the 2006 year-class appears to be limited as few walleye from this year class were captured in the 2007 or 2008 gill net catch (Table 10). Walleye from the 2007 and 2008 year-classes were likely too small to be captured in 2008 and their recruitment will be assessed in future surveys.

Walleye captured in the 2008 gill net catch ranged in total length from 17 to 63 cm (6.7 to 24.8 in; Figure 6). The PSD of walleye captured in gill nets during 2008 was 61 and the PSD-P was 17 (Table 1; Figure 6). The 2008 PSD was near the desired objective range of 30-60 while the PSD-P was above the objective range of 5-10 (Table 3). In 2008, approximately 55% of walleye in the gill net catch were above the 356-mm (14-inch) minimum length restriction and available for angler harvest from Enemy Swim Lake (Figure 6).

Walleye in Enemy Swim typically attain 356 mm (14 inches) between age-3 and age-4 (Table 8). In 2008, the weighted mean total length at capture of age-3 walleye was 356 mm and approximately 25 mm (1 inch) longer than in 2006 and 2007 (Table 8). Condition of walleye in Enemy Swim Lake is similar to other permanent lakes in NE South Dakota with mean W_r values typically in the mid to upper 80's. The mean W_r of stock-length walleye was 88 (Table 1) and no length related trends were apparent.

Yellow Perch: The 2008 gill net mean CPUE of stock-length yellow perch was 4.5 (Table 1) and below the minimum objective (≥ 25 stock-length yellow perch/net) for Enemy Swim Lake (Table 3). Since 2001, the gill net mean CPUE has ranged from a high of 61.2 (2001) to a low of 4.5 (2008) with the 2001-2008 average being 24.5 (Table 2). In 2008, yellow perch relative abundance based on the gill net CPUE appeared to be low.

Yellow perch captured in the 2008 gill net catch ranged in total length from 9 to 25 cm (3.5 to 9.8 in) with no missing 1-cm length groups from 9 to 18 cm indicating consistent recruitment in recent years; however, magnitude of year-class strength appears to be low (Figure 7). The majority of yellow perch in the 2008 gill net catch were small (i.e., less than 20 cm; 8 in) resulting in the low PSD and PSD-P of 4 (Table 1; Figure 7). Both the 2008 PSD and PSD-P values for yellow perch were below the desired objective range of 30-60 and 5-10, respectively (Table 3).

No growth information was available in 2008. Mean W_r values ranged from 96 to 102 with the mean W_r of stock-length yellow perch being 99 (Table 1). No length-related trends in yellow perch condition were apparent in 2008.

Other Species

Black bullhead: Relative abundance of black bullhead in Enemy Swim Lake has remained low with the frame net mean CPUE not exceeding 6.0 stock-length black bullhead/net from 2001-2008 (Table 2). In 2008, three stock-length black bullhead ranging in total length from 34 to 37 cm (13.4 to 14.6 in) were captured resulting in a frame net mean CPUE of 0.1 (Table 1). The 2008 frame net mean CPUE was within the objective (≤ 100 stock-length black bullhead/net) and indicative of low relative abundance (Table 3). Relatively high predator abundance provided by several species of predatory fish (i.e., walleye, largemouth and smallmouth bass) likely aids in maintaining the low abundance of black bullhead in Enemy Swim Lake.

Northern Pike: Northern pike typically are not sampled consistently using standard lake survey methods; however, northern pike abundance in Enemy Swim Lake has generally been considered moderate with the 2001-2008 average gill net CPUE being 1.6 (Table 2).

Seven northern pike ranging in total length from 54 to 91 cm (21.3 to 35.8 in) were captured in the 2008 gill net catch resulting in a gill net mean CPUE of 1.2 (Table 1). Low sample size limits the usefulness of size structure and relative weight indices.

Rock Bass: Rock bass were the second most abundant species in the 2008 frame net catch from Enemy Swim Lake with a frame net mean CPUE of 11.5 (Table 1). Frame net mean CPUE values have ranged from 8.6 (2007) to 17.6 (2002, 2003) in surveys conducted from 2001-2008. Rock bass captured in the 2008 frame net catch ranged in total length from 9 to 27 cm (3.5 to 10.6 in) with no missing cm-length groups present indicating consistent recruitment (Figure 8). Frame net captured rock bass had a PSD of 43 and a PSD-P of 10 (Table 1). Despite relatively high abundance and quality size structure, angler interest in rock bass appears low. Blackwell et al. (2007)

reported that rock bass were a minor component to the overall fishery in creel surveys conducted during winter and summer periods from December 2004 through August 2006.

Other: Common carp, pumpkinseed, white bass and white sucker were other fish species captured during the 2008 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2009) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Conduct spring night electrofishing biennially to monitor largemouth bass population parameters.
- 3) Conduct fall night electrofishing on an annual basis to monitor walleye young-of-the-year abundance.
- 4) Collect otoliths from bluegill, walleye, and yellow perch; scales from largemouth and smallmouth bass to assess the age structure and growth rates of each population.
- 5) Stock large fingerling walleyes (≈ 25 walleye/acre) to establish additional year classes if the fall night electrofishing CPUE of young-of-the-year walleye and gill netting results warrant (i.e., low gill net CPUE of < 250 mm (10 inch) walleye and/or fall night electrofishing CPUE of age-0 walleye < 20 fish/hour).
- 6) Evaluate walleye and black bass (largemouth and smallmouth) population dynamics and implement regulations to benefit the population and comply with tool box options.

Table 1. Mean catch rate (CPUE; frame/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 gill nets, frame nets, and electrofishing in Enemy Swim Lake, 2008. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; COC= common carp; LMB= largemouth bass; NOP= northern pike; PUS= pumpkinseed; ROB= rock bass; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; 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	0.1	0.1	100	0	100	0	94	18
BLG	65.3	19.1	29	2	3	1	106	1
COC	0.1	0.1	100	0	100	0	90	<1
LMB	<0.1	0.1	100	---	0	---	94	---
NOP	0.3	0.1	100	0	14	28	79	7
PUS	0.5	0.7	23	22	0	---	107	3
ROB	11.5	4.4	43	4	10	3	104	<1
SMB	2.7	0.7	12	7	9	6	97	1
WAE	0.4	0.2	80	20	20	24	85	3
WHB	<0.1	0.1	100	---	100	---	73	---
WHS	0.1	0.1	100	0	100	0	92	18
YEP	<0.1	0.1	0	---	0	---	74	---
<i>Gill nets</i>								
BLC	0.3	0.5	100	0	100	0	97	<1
BLG	0.5	0.5	0	---	0	---	109	6
COC	0.2	0.2	100	---	100	---	86	---
NOP	1.2	1.2	100	0	43	39	87	4
ROB	2.0	2.4	50	27	17	20	111	3
SMB	2.2	1.3	15	19	15	19	102	4
WAE	3.0	1.3	61	21	17	15	88	1
WHB	2.5	1.2	100	0	0	---	94	1
WHS	3.5	2.6	95	5	71	18	107	2
YEP	4.5	2.6	4	6	4	6	99	2
<i>Electrofishing</i>								
LMB ¹	102.2	13.2	81	6	29	8	104	1
SMB ²	83.9	42.5	9	6	6	4	103	1
WAE ² (age-0)	52.6	---	---	---	---	---	---	---

¹ Spring night electrofishing-LMB.

² Fall night electrofishing-WAE, SMB.

Table 2. Historic mean catch rate (CPUE; frame/gill nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in gill nets, frame nets, and electrofishing in Enemy Swim Lake, 2001-2008. BLB= black bullhead; BLC= black crappie; BLG= bluegill; COC= common carp; LMB= largemouth bass; NOP= northern pike; PUS= pumpkinseed; ROB= rock bass; SMB= smallmouth bass; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

Species	CPUE								Mean
	2001	2002	2003	2004	2005	2006 ⁴	2007 ⁴	2008	
<i>Frame nets</i>									
BLB	5.4	3.5	4.4	2.8	2.6	1.0	0.4	0.1	2.5
BLC	3.4	3.4	5.9	1.5	1.0	2.3	0.8	0.0	2.3
BLG	54.0	85.7	63.1	39.7	51.3	56.0	42.5	65.3	57.2
COC	0.0	0.0	0.0	0.04	0.0	0.0	<0.1	0.1	0.0
LMB	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.0
NOP	0.8	0.7	0.4	0.4	0.4	0.1	0.3	0.3	0.4
PUS	4.0	2.9	1.4	0.9	3.1	1.7	<0.1	0.5	1.8
ROB	15.2	17.6	17.6	11.0	9.6	14.0	8.6	11.5	13.1
SMB	3.7	4.2	4.1	1.9	2.1	6.3	1.3	2.7	3.3
WAE	0.4	0.6	0.2	0.4	0.2	0.3	0.3	0.4	0.4
WHB	0.2	0.1	0.1	0.1	0.1	0.3	0.5	<0.1	0.2
WHS	0.0	0.2	0.04	0.1	0.1	0.0	0.3	0.1	0.1
YEP	3.0	3.1	1.4	0.5	2.3	4.4	3.5	<0.1	2.3
<i>Gill nets</i>									
BLB	1.3	1.3	0.2	0.3	0.0	0.0	0.0	0.0	0.4
BLC	3.8	1.8	8.5	15.8	4.2	2.8	1.5	0.3	4.8
BLG	7.5	5.7	16.2	19.7	12.5	8.7	5.8	0.5	9.6
COC	0.0	0.7	0.2	0.3	0.0	1.2	1.8	0.2	0.6
NOP	1.8	2.2	2.0	2.8	1.2	1.2	0.5	1.2	1.6
PUS	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
ROB	1.5	2.8	23.8	4.5	1.8	2.3	14.0	2.0	6.6
SMB	4.2	2.2	6.0	3.5	5.0	1.2	1.8	2.2	3.3
SPS ¹	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WAE	11.0	14.0	14.5	11.0	18.2	13.5	14.7	3.0	12.5
WHB	0.5	3.7	0.5	0.5	0.0	0.7	1.5	2.5	1.2
WHS	4.7	0.0	3.5	3.7	3.0	4.0	1.7	3.5	3.0
YEP	61.2	38.3	20.7	19.2	18.0	19.8	14.3	4.5	24.5
<i>Electrofishing</i>									
LMB ²	---	164.1	181.9	131.5	84.4	202.0	---	102.2	144.4
SMB ³	10.0	---	152.1	148.5	50.7	158.0	79.9	83.9	97.6
WAE ³ , (age-0)	15.5	---	24.0	1.0	8.7	21.0	38.5	52.6	23.0

¹ All fish sizes.

² Spring night electrofishing-LMB.

³ Fall night electrofishing-WAE, SMB.

⁴ Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

Table 3. Mean catch rate (CPUE; frame/gill nets= catch/net night, electrofishing= catch/hour), 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, frame nets, and electrofishing in Enemy Swim Lake, 2001-2008. BLB= black bullhead; BLC= black crappie; BLG= bluegill; LMB= largemouth bass; SMB= smallmouth bass; WAE= walleye; YEP= yellow perch

Species	2001	2002	2003	2004	2005	2006 ³	2007 ³	2008	Average	Objective
<i>Frame nets</i>										
BLB										
CPUE	5	4	4	3	3	1	<1	<1	3	≤ 100
PSD	99	99	79	98	98	100	100	100	97	---
RSD-P	88	96	77	97	95	96	100	100	94	---
Wr	91	89	103	91	88	81	88	94	91	---
BLC										
CPUE	3	3	6	2	1	2	1	0	2	≥ 10
PSD	99	89	87	97	84	64	56	---	82	30-60
RSD-P	50	65	24	31	84	53	39	---	49	5-10
Wr	107	99	100	107	110	99	94	---	102	---
BLG										
CPUE	54	86	63	40	51	56	43	65	57	≥ 25
PSD	58	35	72	47	18	34	15	29	39	30-60
RSD-P	26	2	13	16	14	7	1	3	10	5-10
Wr	109	101	104	130	116	109	100	106	109	---
<i>Gill nets</i>										
WAE										
CPUE	11	14	15	11	18	14	15	3	13	≥ 10
PSD	30	36	52	27	12	57	63	61	42	30-60
RSD-P	5	2	6	3	6	7	14	17	8	5-10
Wr	85	84	82	84	85	87	89	88	86	---
YEP										
CPUE	61	38	21	19	18	20	14	5	25	≥ 25
PSD	69	68	48	57	35	24	8	4	39	30-60
RSD-P	1	3	3	12	12	5	1	4	5	5-10
Wr	97	95	89	96	94	96	93	99	95	---
<i>Electrofishing</i>										
LMB ¹										
CPUE	---	164	182	131	84	202	---	102	144	≥ 30
PSD	---	50	37	63	80	59	---	81	62	40-70
RSD-P	---	7	3	9	5	6	---	29	10	10-20
Wr	---	110	110	105	106	108	---	104	107	---
SMB ²										
CPUE	10	---	152	149	51	158	80	84	98	---
PSD	36	---	34	34	33	19	6	9	24	40-70
RSD-P	18	---	9	13	14	6	4	6	10	10-20
Wr	94	---	91	97	100	108	101	103	99	---
WAE ²										
CPUE (age-0)	16	---	24	1	9	21	39	53	23	---

¹ Spring night electrofishing-LMB.

² Fall night electrofishing-WAE, SMB.

³ Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

Table 4. Weighted mean length at capture (mm) for bluegill captured in frame nets in Enemy Swim Lake, 2002-2008. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	N	Age											
		1	2	3	4	5	6	7	8	9	10	11	12
2008	1,562	---	101	135	169	204	227	---	247	---	---	---	250
2007	1,055	---	96	125	150	171	---	---	240	---	---	---	---
2006	1,342	---	94	112	110	145	176	220	227	242	---	---	---
2005	1,173	---	76	87	104	141	193	219	---	237	---	---	---
2004	951	---	---	106	115	170	199	170	261	---	---	---	---

Table 5. Numbers of bluegill sampled using frame nets (n) by year class in Enemy Swim Lake 2003-2007.

Survey Year	Year Class													
	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
2008		682	495	345	14	6		6				14		
2007			533	257	203	56			6					
2006	---			58	232	246	565	161	17	60	3			2
2005	---	---			5	122	843	71	51	76		5		
2004	---	---	---				202	269	238	228	13			1

Table 6. Mean back-calculated length (mm) at age and standard error (SE) for largemouth bass captured during spring night electrofishing in Enemy Swim Lake, 2008.

Year	Age	N	Age										
			1	2	3	4	5	6	7	8	9		
2005	3	19	78	146	231								
2004	4	3	81	141	198	272							
2003	5	31	71	130	205	277	337						
2002	6	23	82	152	218	287	333	365					
2001	7	17	78	148	231	294	335	363	389				
2000	8	15	82	159	221	281	319	349	372	389			
1999	9	1	96	183	228	298	354	390	416	422	429		
Mean	---	109	81	151	219	285	336	367	392	406	429		
SE	---		3	6	5	4	6	9	13	17	0		
<i>Mean Comparison</i> ¹													
			99	183	246	299	332	---	---	---	---		
			89	178	256	316	359	---	---	---	---		
			80	180	266	325	356	---	---	---	---		
			96	182	250	305	342	---	---	---	---		

¹ Willis et al. 2001.

Table 7. Mean back-calculated length (mm) at age and standard error (SE) for smallmouth bass captured during fall night electrofishing in Enemy Swim Lake, 2008.

Year	Age	N	Age											
			1	2	3	4	5	6	7	8	9			
2007	1	5	108											
2006	2	68	87	153										
2005	3	6	76	137	203									
2004	4	1	69	114	178	263								
2003	5	1	72	147	228	274	306							
2002	6	0												
2001	7	3	77	137	191	254	306	352	381					
2000	8	0												
1999	9	2	89	144	195	257	294	327	367	404	431			
Mean	---													
SE	---													
Small lakes/impoundments			98	180	241	291	---	---	---	---	---	---	---	---
Large lakes/impoundments			92	169	237	304	335	---	---	---	---	---	---	---
Region IV			96	179	249	316	339	---	---	---	---	---	---	---
Statewide			91	171	242	300	333	---	---	---	---	---	---	---

¹ Willis et al. 2001.

Table 8. Weighted mean length at capture (mm) for walleye captured in gill nets in Enemy Swim Lake, 2001-2008. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	N	Age												
		1	2	3	4	5	6	7	8	9	10	11	12	13
2008 ¹	20	176	259	356	---	---	485	465	421	531	---	634	---	---
2007 ¹	87	180	273	329	407	430	447	500	525	504	560	438	---	647
2006 ¹	90	198	255	336	378	411	420	466	432	482	502	674	---	---
2005 ¹	114	190	261	313	341	379	452	---	576	564	460	---	---	---
2004	76	154	256	315	359	392	429	506	440	---	---	---	---	---
2003	97	202	271	330	387	413	464	464	---	657	680	---	---	---
2002	91	196	270	337	373	400	416	---	665	---	---	---	---	---
2001	78	192	260	333	364	411	634	644	---	---	---	---	---	---

¹Age assignments made using otoliths; scales used other years.

Table 9. Stocking history including size and number for fishes stocked into Enemy Swim Lake, 1996-2008.

Year	Species	Size	Number
1996	WAE	small fingerling	246,520
1999	WAE	small fingerling	158,300
2000	WAE	small fingerling	439,450
2002	WAE	juvenile	2,971
		large fingerling	9,388
2005	WAE	large fingerling	57,791
2006	LMB	fingerling	116,460

Table 10. Numbers of walleye sampled (n) using gill nets, by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Enemy Swim Lake, 2001-2008.

Survey Year	Year Class												
	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996
2008 ²		2	1	8			1	3	1	2		2	
2007 ^{1,2}	---		1	26	6	7	16	11	5	7	3	2	2
2006 ^{1,2}	---	---		10	6	12	28	16	2	6	1	1	8
2005 ¹	---	---	---		2	9	48	39	7	3		3	2
2004	---	---	---	---		1	20	17	19	8	6	4	1
2003	---	---	---	---	---		10	11	21	31	9	5	8
2002	---	---	---	---	---	---		8	10	33	6	17	16
2001	---	---	---	---	---	---	---		9	16	8	24	18
# stocked													
fry													
sm. fingerling									439	158			247
lg. fingerling				58			12						

¹Age assignments made using otoliths; scales used other years.

² Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5").

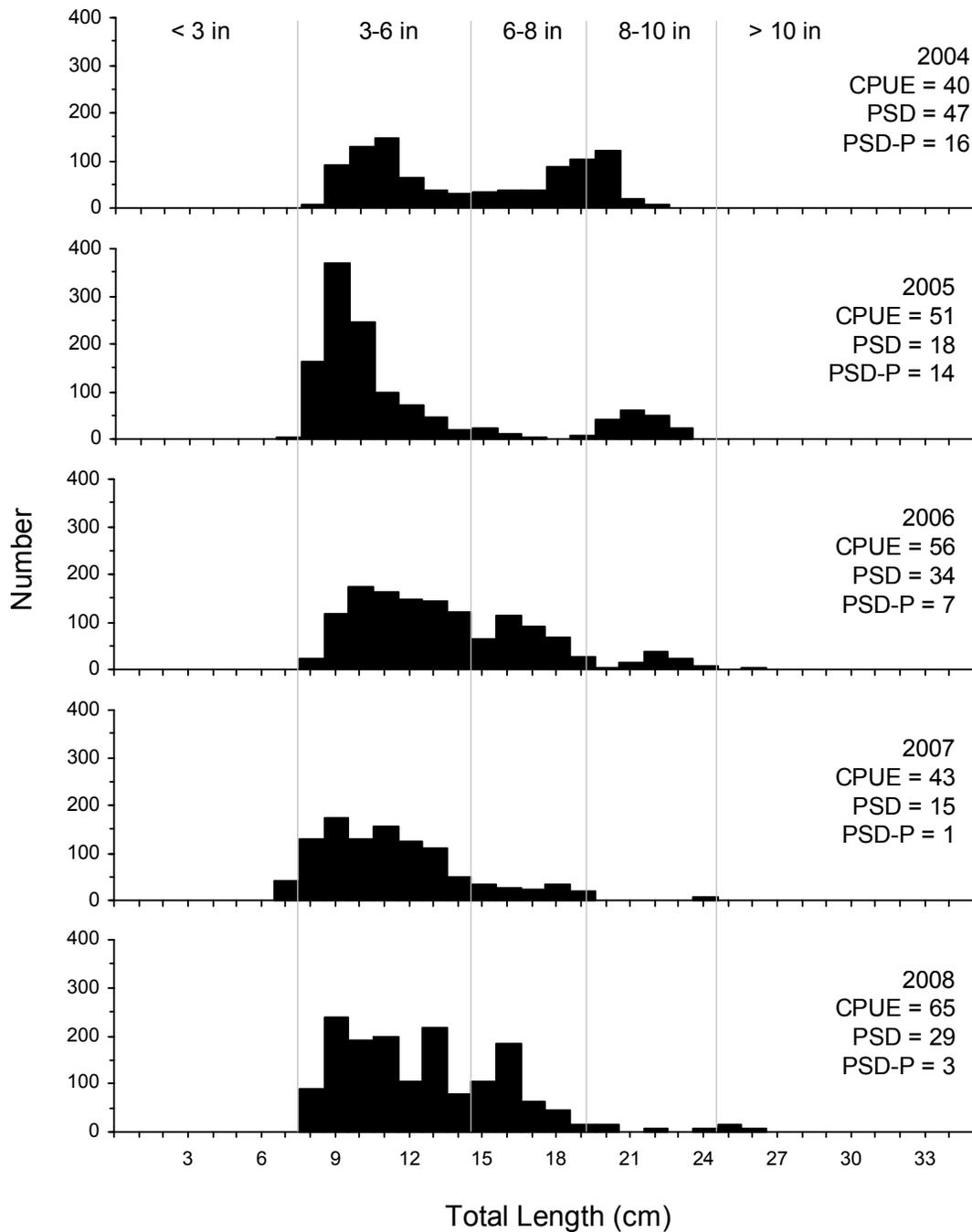


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Enemy Swim Lake, 2004-2008.

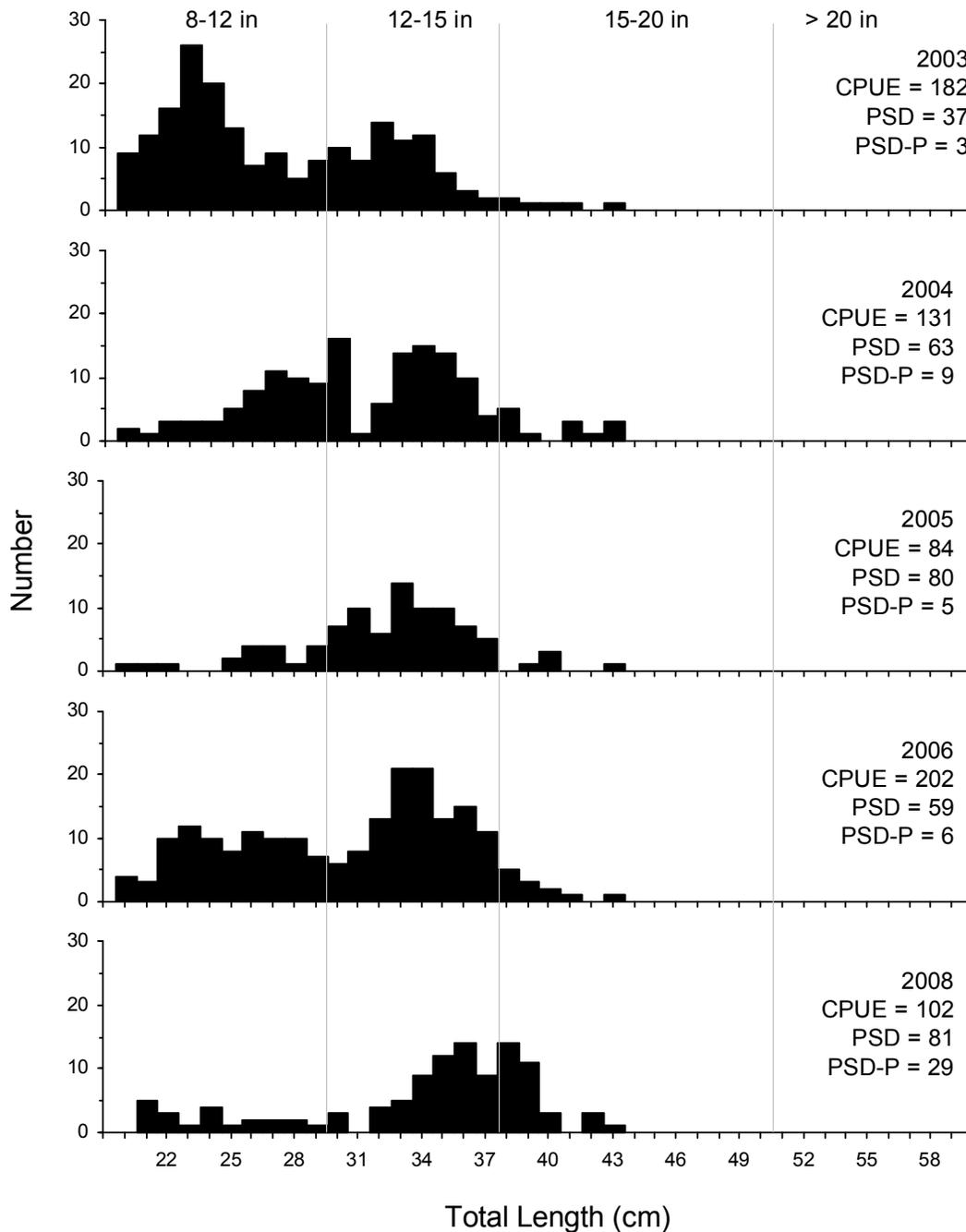


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for largemouth bass captured using spring night electrofishing in Enemy Swim Lake, 2003-2008. Spring electrofishing was not completed in 2007 due to boat malfunction.

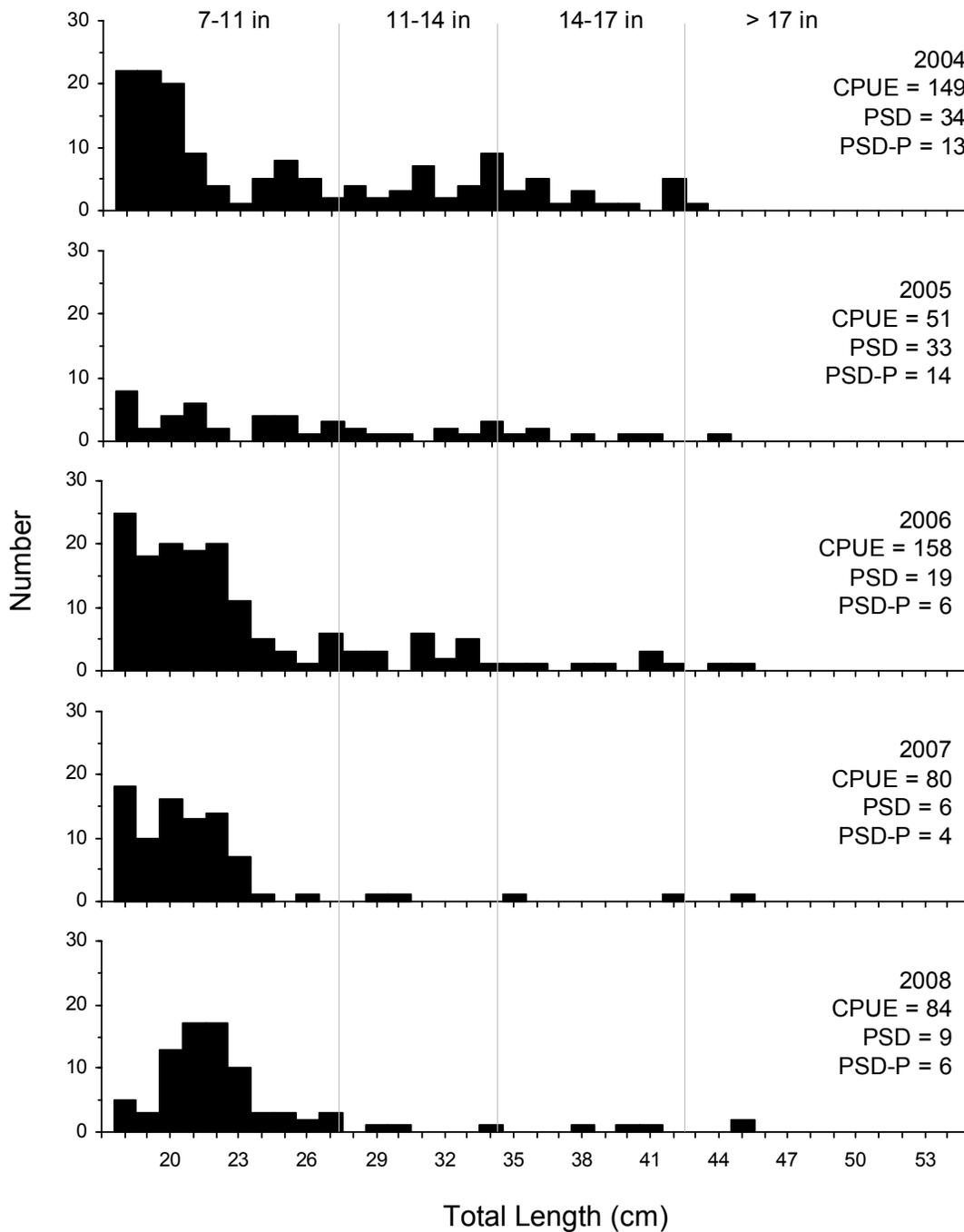


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for smallmouth bass captured using fall night electrofishing in Enemy Swim Lake, 2004-2008.

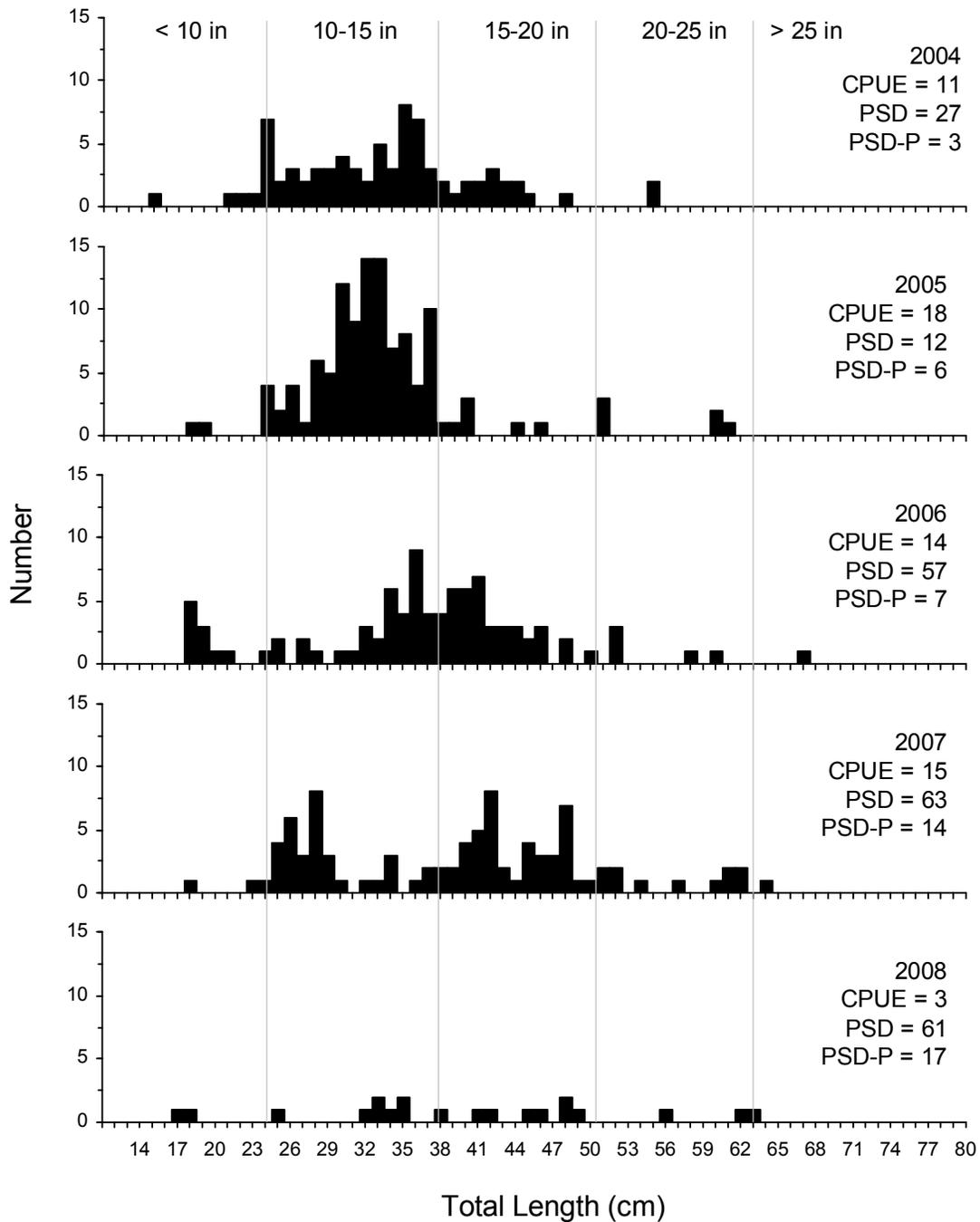


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Enemy Swim Lake, 2004-2008.

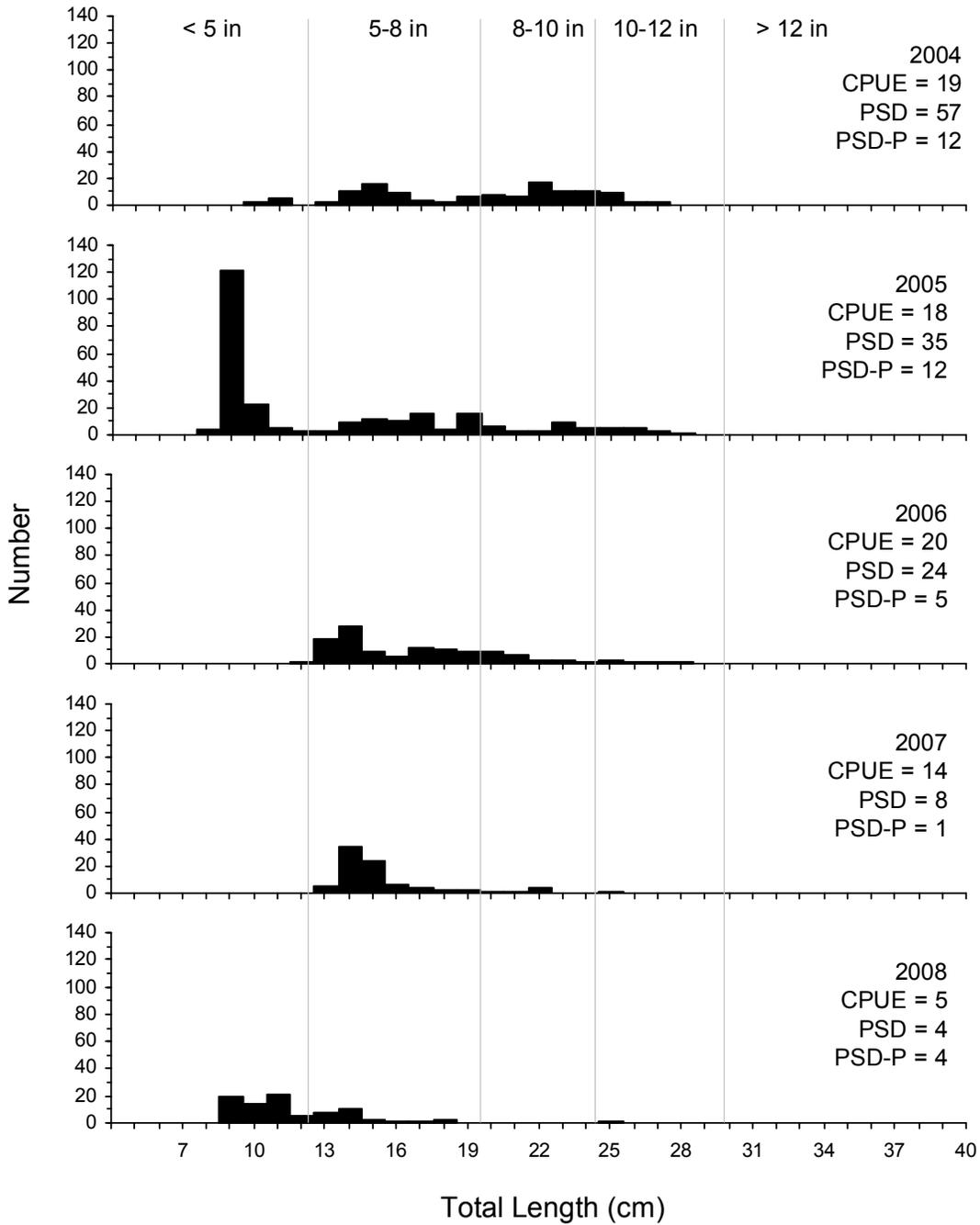


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Enemy Swim Lake, 2004-2008.

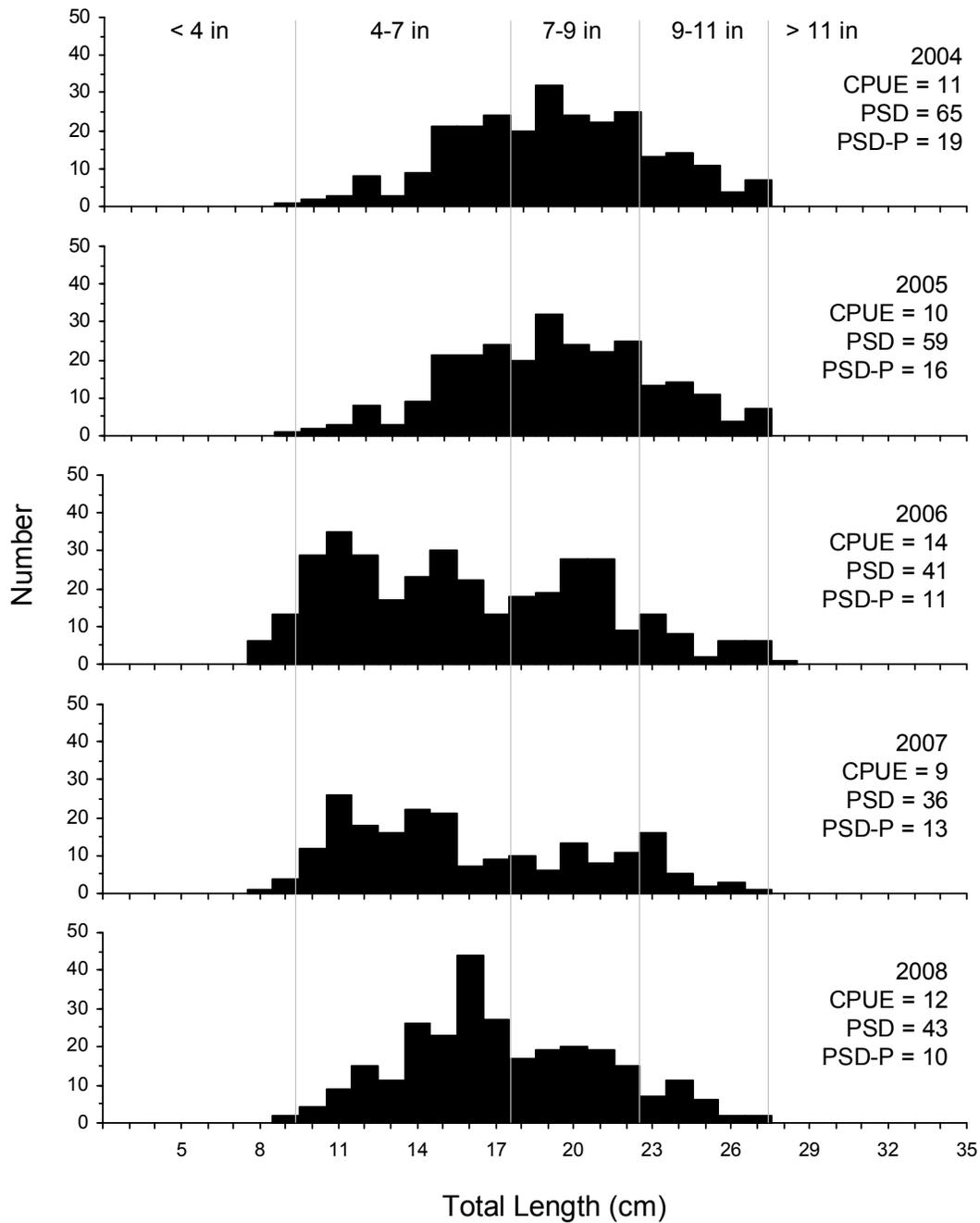


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for rock bass captured using frame nets in Enemy Swim Lake, 2004-2008.