

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

Survey dates	May 19, 2010 (EF-LMB, SMB) July 7-9, 2010 (FN, GN) August 31, 2010 (EF-WAE)
Electrofishing-LMB (min)	51
Electrofishing-SMB (min)	60
Gill net sets (n)	6
Frame net sets (n)	24
Electrofishing-WAE (min)	60

Morphometry

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 a mix of pasture or grassland, cropland, and woodland.

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 5, 2010, the elevation of Enemy Swim Lake was 1.0 ft. higher than fall 2009 and slightly above the Ordinary High Water Mark with an elevation of 1854.5 fmsl. By October 6, 2010 water levels on Enemy Swim Lake had declined to an elevation of 1853.8 fmsl.

Aquatic Nuisance Species Monitoring

Plant Survey

Areas of emergent vegetation are common along much of the shoreline and occur in large beds in Church Bay and East Lake. Submersed vegetation is extensive in protected areas of East Lake and Church Bay; scattered areas also exist throughout much of the main lake. Aquatic vegetation species identified during the 2010 survey include: bulrush, cattail, clasping-leaf pondweed, coontail, floating-leaf pondweed, Illinois pondweed, long-leaf pondweed, water crowfoot, and water stargrass. Chara (a macro algae) was also sampled. No aquatic nuisance plant species were identified.

Macro-Invertebrate/Mussel Survey

No aquatic nuisance macro-invertebrate or mussel species were identified in 2010.

Fish Community Survey

Common carp were the only aquatic nuisance fish species captured during the 2010 survey (Table 1).

Fish Management Information

Primary species	black crappie, bluegill, largemouth bass, smallmouth bass, walleye, yellow perch
Other species	black bullhead, common carp, 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: Only those <14", or 18" and longer may be taken. Of those no more than one may be 18" or longer. Walleye: minimum length 15".
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

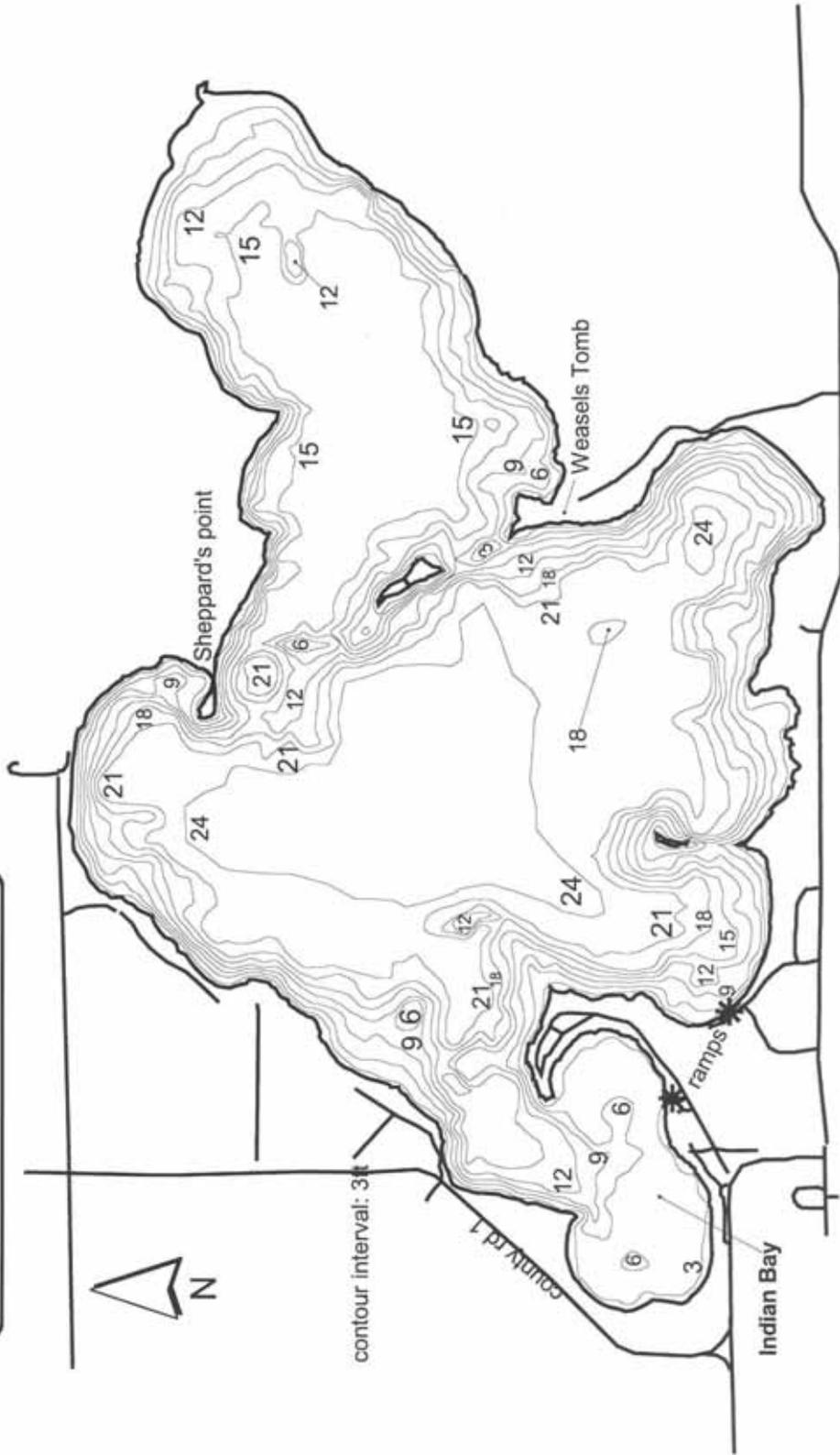


Figure 1. Contour map of Enemy Swim Lake, Day County, South Dakota.

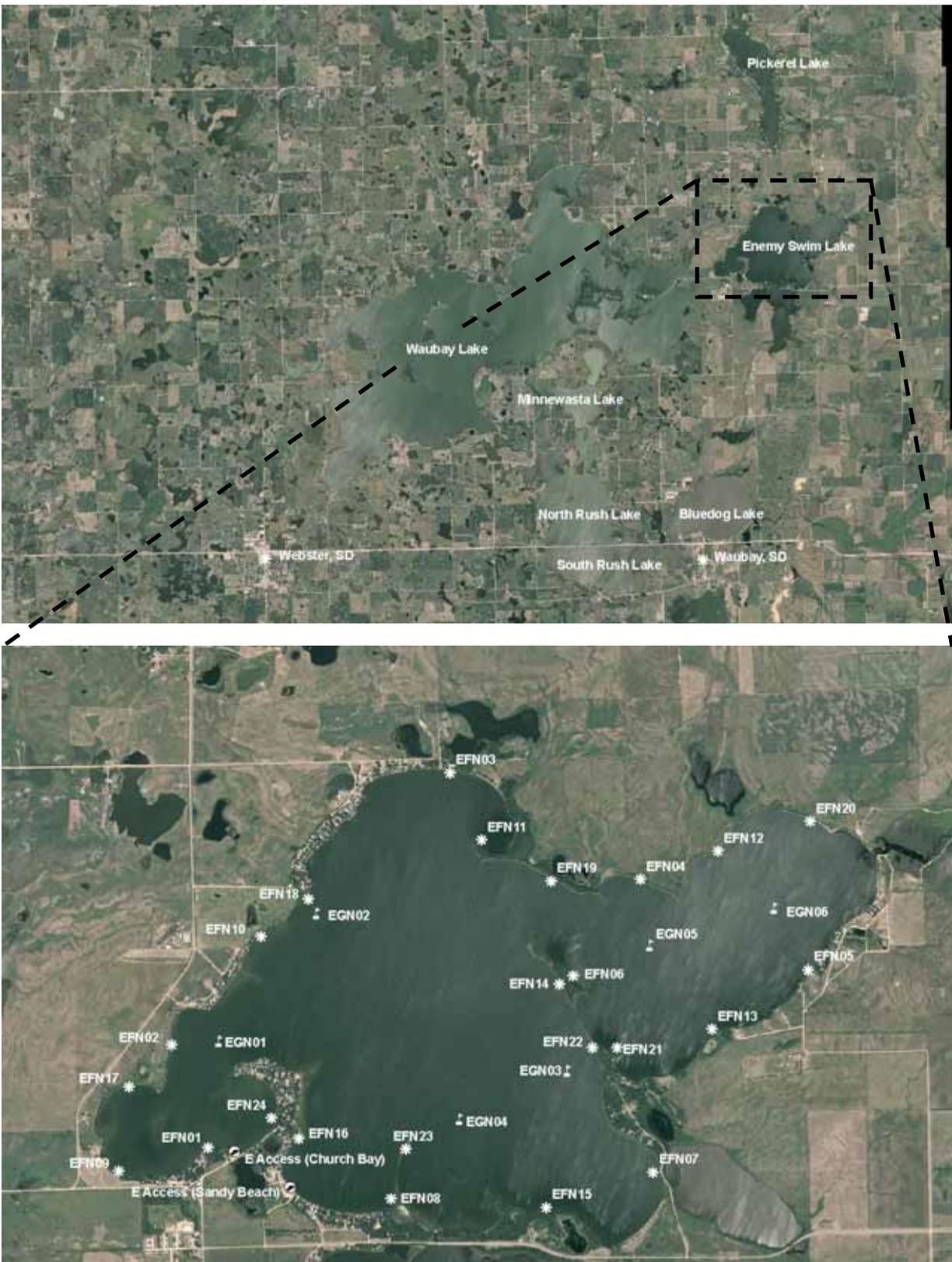


Figure 2. Map depicting location of several Day County, South Dakota Lakes including Enemy Swim (top). Also noted, are public access sites and standardized net locations for Enemy Swim Lake. EFN= frame nets; EGN=gill nets

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 10-40.
- 4) Maintain a moderate density smallmouth bass population with a PSD of 40-70 and a PSD-P of 10-40.
- 5) Maintain a gill net mean CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 6) Maintain a gill net mean CPUE of stock-length yellow perch ≥ 30 , 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: The mean frame net CPUE of stock-length black crappie during 2010 was 1.3 (Table 1) and well below the minimum objective (≥ 10 stock-length black crappie/net night; Table 3). Since 2003, frame net CPUE values have fluctuated from a low of 0.0 (2008) to a high of 5.9 (2003) with the 2003-2010 average being 1.6 (Table 2). Based on frame net mean CPUE values (2003-2010) relative abundance of black crappie in Enemy Swim Lake is considered low.

Black crappies captured in frame nets ranged in total length from 12 to 34 cm (4.7 to 13.4 in) had a PSD of 23 and PSD-P of 16 (Table 1). The PSD was below the management objective of 30-60 while the PSD-P was above the management objective of 5-10 (Table 3).

No age or growth information was collected from black crappies in 2010. Condition was good with mean W_r values ranging from 85 to 105 for all length categories sampled. The mean W_r for all stock-length black crappie was 101 (Table 1). A decreasing trend in W_r was observed as total length increased.

Bluegill: The frame net mean CPUE of stock-length bluegill during 2010 was 57.3 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net night; Table 3). Since 2003, the frame net mean CPUE of stock-length bluegill has remained relatively stable with CPUE values ranging from 39.7 (2004) to 65.3 (2008; Table 2). Based on the 2010 frame net mean CPUE, relative abundance of bluegill in Enemy Swim Lake is considered high.

Bluegill captured in frame nets during 2010 ranged in total length from 8 to 26 cm (3.1 to 10.2 in), had a PSD of 41, and a PSD-P of 7 (Figure 3). Both the PSD and PSD-P values were within management objectives of 30-60 and 5-10 indicating a balanced population (Table 3; Figure 3).

Otoliths were collected from a sub-sample of frame net captured bluegill in 2010. Age structure analysis indicates that bluegills tend to exhibit consistent recruitment with seven year-classes present in the frame net sample (1998, 2003-2008; Tables 4-5). Bluegills in Enemy Swim Lake typically attain quality-length (15 cm; 6 in) at approximately age-5 (Table 5). In 2010 the weighted mean total length at capture values for age-4 and age-5 bluegill was 129 to 153 mm (5.1 to 6.0 in; Table 5). Mean W_r values for bluegill in the 2010 frame net catch ranged from 97 to 105 for all length categories sampled with the mean W_r of stock-length bluegill being 100 (Table 1). Seasonal influences (i.e., spawning behavior) may have influenced W_r values for bluegill in Enemy Swim Lake.

Largemouth bass: The 2010 spring night electrofishing mean CPUE of stock-length largemouth bass was 112.1 (Table 1) and above the minimum objective (≥ 30 stock-length largemouth bass/hour; Table 3). Since 2003, the mean CPUE has fluctuated from a low of 81.7 (2009) to a high of 202.0 (2006) with the 2003-2010 average being 128.0 (Table 2). Based on the 2010 electrofishing catch, relative abundance appears to be high in suitable habitat.

Largemouth bass captured during spring night electrofishing during 2010 ranged in total length from 29 to 43 cm (11.4 to 16.9 in) and the sample had a PSD of 99 and a PSD-P of 55 (Figure 4). Both the 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).

Age and growth information was collected from a sub-sample of stock-length largemouth bass in 2010. Eight year-classes (1998, 2000-2008) were present in the survey indicating consistent recruitment (Table 6). The mean back-calculated length-at-age for age-4 and age-5 largemouth bass was 283 and 319 mm (11.1 and 12.6 in; Table 6). Largemouth bass in the 2010 spring electrofishing catch had mean W_r values that

exceeded 100 for all length categories sampled. The mean W_r of stock-length largemouth bass was 109 (Table 1) and no length-related trends in W_r values were apparent. Seasonal influences (i.e., spawning behavior) may have influenced W_r values for largemouth bass in Enemy Swim Lake.

Smallmouth bass: Prior to 2010, fall night electrofishing was used to assess smallmouth bass populations in NE South Dakota. However, recent research in NE South Dakota found that spring night electrofishing over suitable habitat (i.e., rocky substrate) provides a better index to smallmouth bass populations in NE South Dakota glacial lakes (Bacula 2009). The first spring night electrofishing survey on Enemy Swim Lake for smallmouth bass was conducted in 2009 and will continue biennially starting in 2010.

The 2010 mean spring night electrofishing CPUE of stock-length smallmouth bass was 107.0 (Table 1). Smallmouth bass in Enemy Swim Lake appear to have consistent recruitment with year classes from 1998-2007 represented in the 2010 survey (Table 7).

Smallmouth bass collected by electrofishing in 2010 ranged in total length from 18 to 46 cm (7.1 to 18.1 in.), had a PSD of 72 and PSD-P of 41 (Table 1). Both the 2010 PSD and PSD-P were above the objective ranges of 40-70 and 10-20, respectively, (Table 3) indicating a sample comprised primarily of larger individuals.

Growth of smallmouth bass was slower than the statewide and regional means reported in Willis et al. (2001) with mean back-calculated lengths of 205 mm (7.8 in) and 260 mm (10.0 in) for age-3 and age-4 bass (Table 7). Mean W_r values ranged from 90 to 100 for all length categories sampled with the mean W_r of stock-length smallmouth bass being 95 (Table 1). No length-related trends in condition were apparent.

Walleye: The mean gill net CPUE of stock-length walleye during 2010 was 5.7 (Table 1) and below the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2003, the mean gill net CPUE has ranged from a low of 3.0 (2008) to a high of 18.2 (2005), with the 2003-2010 average being 10.7 (Table 2). The 2010 gill net CPUE represented a slight increase from the 4.7 observed in 2009 (Table 2) and indicated moderate relative abundance.

Walleye captured in the 2010 gill net catch ranged in total length from 16 to 58 cm (6.3 to 22.8 inches), had a PSD of 56 and a PSD-P of 9 (Figure 6). Both the 2010 PSD and PSD-P were within the management objectives of 30-60 and 5-10 (Table 3) indicating a balanced population. In 2010, approximately 22% of stock-length walleye captured in the gill net catch were above the 381-mm (15-inch) minimum length restriction (Figure 6).

Otoliths were collected from gill net captured walleye in 2010. Nine walleye year classes (1999-2002, 2005-2009) were present in the 2010 gill net catch. The 2009 year-class was the strongest representing 62% of all walleyes sampled in the 2010 gill net catch and corresponds with a large fingerling stocking (Table 8). From 2006-2008 fall electrofishing indicated that relatively strong year-classes (defined as > 20 age-0 walleye/hour; Ermer et al. 2005) were naturally produced (Table 2). However, recruitment of walleye from the 2006 and 2007 year classes appears to be limited as few walleye from these year classes were captured in the 2008-2010 gill net catch (Table 8).

Walleye in Enemy Swim typically attain quality-length (38 cm; 15 in) between age-3 and age-5 (Table 9). Since 2005, the weighted mean length at capture for age-3 walleye has ranged from 313 to 411 mm (12.3 to 16.2 in; Table 9). Condition of stock-length walleye captured in the 2010 gill net catch was good mean Wr values ranging from 88 to 96 for all length categories sampled and with a mean Wr for all stock-length walleye of 92 (Table 1). A slight increasing trend in Wr was observed as total length increased.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch in 2010 was 112.3 (Table 1) and above the minimum objective (≥ 30 stock-length yellow perch/net night). Since 2003, the gill net CPUE of stock-length yellow perch has ranged from 4.5 (2008) to 112.3 (2010) with the 2003-2010 average being 31.2 (Table 2). Based on the 2010 gill net catch the relative abundance of stock-length yellow perch appears to be high.

Yellow perch captured in the 2010 gill net catch ranged in total length from 9 to 19 cm (3.5 to 7.5 in.; Figure 7). No quality- or preferred-length yellow perch were captured resulting in a PSD and PSD-P of 0, which is well below the management objectives of 30-60 and 5-10 (Table 3; Figure 7).

Otoliths were collected from a sub-sample of gill net captured yellow perch. Age structure information indicated that year classes produced in 2006-2009 comprised the entire sample, with the 2007 and 2008 year classes being the most represented (Table 10). The weighted mean total length at capture for age-2 and age-3 male yellow perch was 114 and 152 mm (4.5 and 6.0 in; Table 11) and the weighted mean total length at capture for age-2 and age-3 female yellow perch was 126 and 170 mm (5.0 and 6.7 in; Table 11). Yellow perch in the sub-stock and stock-quality length categories dominated the 2010 gill net catch and had mean Wr values of 97 and 98, respectively. A slight decreasing trend in Wr was observed as total length increased.

Other Species

Black bullhead: Relative abundance of black bullhead in Enemy Swim Lake has remained low with the frame net mean CPUE not exceeding 5.0 stock-length black bullhead/net from 2003-2010 (Table 2). In 2010, three stock-length black bullhead ranging in total length from 35 to 38 cm (13.8 to 15.0 in) were captured resulting in a frame net mean CPUE of 0.1 (Table 1). The 2010 frame net mean CPUE was within the objective (≤ 100 stock-length black bullhead/net night) 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 2003-2010 average gill net CPUE being 1.5 (Table 2).

Eight northern pike ranging in total length from 41 to 73 cm (16.1 to 28.7 in) were captured in the 2010 gill net catch resulting in a gill net mean CPUE of 1.3 (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 2010 frame net catch from Enemy Swim Lake with a frame net mean CPUE of 5.3 (Table 1). Frame net mean CPUE values have ranged from 8.3 (2009) to 17.6 (2003) in surveys conducted from 2003-2010. Rock bass captured in the 2010 frame net catch ranged in total length from 9 to 28 cm (3.5 to 11.0 in) with few missing cm-length groups indicating consistent recruitment (Figure 8). Frame net captured rock bass had a PSD of 55 and a PSD-P of 25 (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 in low numbers during the 2010 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2011) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Conduct spring night electrofishing biennially (even years) to monitor largemouth and smallmouth bass population parameters.
- 3) Conduct fall night electrofishing on an annual basis to monitor age-0 walleye relative 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 walleye at (\approx 100 small fingerling/acre; 50% OTC marked) 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 $<$ 25 cm (10 in) walleye and/or fall night electrofishing CPUE of age-0 walleye $<$ 75 age-0 walleye/hour).
- 6) Maintain length limit on largemouth and smallmouth bass to benefit population and comply with toolbox options (Blackwell and Lucchesi 2009). Largemouth and smallmouth bass must be less than 14" or longer than 18", but only one 18" or longer can be kept in the daily creel.
- 7) Maintain the 381-mm (15 in) minimum length limit on walleye to benefit the population and comply with tool box options (Lucchesi and Blackwell 2009).
- 8) Partner with willing landowners on shoreline restoration projects designed to restore native plant fauna along highly-developed shorelines providing improvements to water quality and littoral habitats within the lake.

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, 2010. 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	89	18
BLC	1.3	0.4	23	0	16	0	101	2
BLG	57.3	11.9	41	2	7	1	100	1
NOP	0.3	0.1	71	29	0	---	87	3
PUS	1.7	1.5	3	4	0	---	101	1
ROB	5.3	0.9	55	7	25	7	104	<1
SMB	1.9	0.6	28	11	11	8	98	1
WAE	<0.1	0.1	100	---	100	---	85	---
WHB	<0.1	0.1	100	---	100	---	99	---
WHS	0.2	0.1	100	0	80	20	100	6
YEP	5.1	2.8	2	2	0	---	85	<1
<i>Gill nets</i>								
BLC	2.0	1.3	0	---	0	---	107	1
BLG	3.8	2.8	17	14	0	---	105	1
COC	0.2	0.2	100	---	100	---	88	---
NOP	1.3	1.2	75	25	13	23	91	4
ROB	1.2	1.1	71	29	0	---	109	3
SMB	0.7	0.5	50	50	25	59	94	18
WAE	5.7	2.0	56	14	9	8	92	1
WHB	0.3	0.3	100	0	50	50	102	14
WHS	7.7	4.8	85	9	41	13	101	2
YEP	112.3	27.3	0	---	0	---	97	1
<i>Electrofishing</i>								
LMB ¹	112.1	46.0	99	1	55	9	109	<1
SMB ²	107.0	37.4	72	7	41	8	95	<1
WAE ³	34.7	---	---	---	---	---	---	---

¹ Spring night electrofishing-LMB.

² Spring night electrofishing-SMB.

³ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye/hour

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, 2003-2010. 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								
	2003	2004	2005	2006 ^b	2007 ^b	2008	2009	2010	Mean
<i>Frame nets</i>									
BLB	4.4	2.8	2.6	1.0	0.4	0.1	0.1	0.1	1.4
BLC	5.9	1.5	1.0	2.3	0.8	0.0	0.2	1.3	1.6
BLG	63.1	39.7	51.3	56.0	42.5	65.3	56.8	57.3	54.0
COC	0.0	0.04	0.0	0.0	<0.1	0.1	<0.1	0.0	0.0
LMB	0.0	0.0	0.0	0.0	<0.1	<0.1	0.0	0.0	0.0
NOP	0.4	0.4	0.4	0.1	0.3	0.3	0.1	0.3	0.3
PUS	1.4	0.9	3.1	1.7	<0.1	0.5	0.3	1.7	1.2
ROB	17.6	11.0	9.6	14.0	8.6	11.5	8.3	5.3	10.7
SMB	4.1	1.9	2.1	6.3	1.3	2.7	1.8	1.9	2.8
WAE	0.2	0.4	0.2	0.3	0.3	0.4	0.1	<0.1	0.3
WHB	0.1	0.1	0.1	0.3	0.5	<0.1	<0.1	<0.1	0.2
WHS	0.04	0.1	0.1	0.0	0.3	0.1	0.1	0.2	0.1
YEP	1.4	0.5	2.3	4.4	3.5	<0.1	1.6	5.1	2.4
<i>Gill nets</i>									
BLB	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
BLC	8.5	15.8	4.2	2.8	1.5	0.3	0.0	2.0	4.4
BLG	16.2	19.7	12.5	8.7	5.8	0.5	2.8	3.8	8.8
COC	0.2	0.3	0.0	1.2	1.8	0.2	0.5	0.2	0.6
NOP	2.0	2.8	1.2	1.2	0.5	1.2	2.0	1.3	1.5
PUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROB	23.8	4.5	1.8	2.3	14.0	2.0	3.3	1.2	6.6
SMB	6.0	3.5	5.0	1.2	1.8	2.2	4.2	0.7	3.1
SPS ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WAE	14.5	11.0	18.2	13.5	14.7	3.0	4.7	5.7	10.7
WHB	0.5	0.5	0.0	0.7	1.5	2.5	2.7	0.3	1.1
WHS	3.5	3.7	3.0	4.0	1.7	3.5	4.5	7.7	4.0
YEP	20.7	19.2	18.0	19.8	14.3	4.5	40.5	112.3	31.2
<i>Electrofishing</i>									
LMB ²	181.9	131.5	84.4	202.0	---	102.2	81.7	112.1	128.0
SMB ³	---	---	---	---	---	---	123.7	107.0	115.4
WAE ⁴	24.0	1.0	8.7	21.0	38.5	52.6	8.2	34.7	23.6

¹ All fish sizes.

² Spring night electrofishing-LMB

³ Spring night electrofishing-SMB.

⁴ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye/hour

⁵ Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

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, 2003-2010. BLC= black crappie; BLG= bluegill; LMB= largemouth bass; SMB= smallmouth bass; WAE= walleye; YEP= yellow perch

Species	2003	2004	2005	2006 ³	2007 ³	2008	2009	2010	Average	Objective
<i>Frame nets</i>										
BLC										
CPUE	6	2	1	2	1	0	<1	1	2	≥ 10
PSD	87	97	84	64	56	---	20	23	62	30-60
RSD-P	24	31	84	53	39	---	20	16	38	5-10
Wr	100	107	110	99	94	---	106	101	102	---
BLG										
CPUE	63	40	51	56	43	65	57	57	54	≥ 25
PSD	72	47	18	34	15	29	15	41	34	30-60
RSD-P	13	16	14	7	1	3	4	7	8	5-10
Wr	104	130	116	109	100	106	101	100	108	---
<i>Gill nets</i>										
WAE										
CPUE	15	11	18	14	15	3	5	6	11	≥ 10
PSD	52	27	12	57	63	61	96	56	53	30-60
RSD-P	6	3	6	7	14	17	18	9	10	5-10
Wr	82	84	85	87	89	88	91	92	87	---
YEP										
CPUE	21	19	18	20	14	5	41	112	31	≥ 30
PSD	48	57	35	24	8	4	0	0	22	30-60
RSD-P	3	12	12	5	1	4	0	0	5	5-10
Wr	89	96	94	96	93	99	97	97	95	---
<i>Electrofishing</i>										
LMB ¹										
CPUE	182	131	84	202	---	102	82	112	128	≥ 30
PSD	37	63	80	59	---	81	91	99	73	40-70
RSD-P	3	9	5	6	---	29	45	55	22	10-20
Wr	110	105	106	108	---	104	105	109	107	---
SMB ²										
CPUE	---	---	---	---	---	---	124	107	116	---
PSD	---	---	---	---	---	---	7	72	40	40-70
RSD-P	---	---	---	---	---	---	6	41	24	10-20
Wr	---	---	---	---	---	---	87	95	91	---

¹ Spring night electrofishing-LMB.

² Spring night electrofishing-SMB.

³ 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 bluegill sampled in frame nets from Enemy Swim Lake, 2006-2010

Survey Year	Year Class												
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
2010			57	196	307	728	77	6					3
2008	---	---				811	519	152	34	21	6	20	
2007	---	---	---			285	306	365	88	6		6	
2006 ¹	---	---	---	---			58	232	246	565	161	17	60

¹ Older bluegill were sampled, but are not reported in this table.

Table 5. Weighted mean total length (mm) at capture for bluegill age-2 through age-10 sampled in frame nets (expanded sample size) from Enemy Swim Lake, 2005-2010.

Year	Age								
	2	3	4	5	6	7	8	9	
2010	91(57)	105(196)	129(307)	153(728)	212(77)	217(6)	---	---	
2008	---	105(811)	149(519)	161(152)	173(34)	199(21)	227(6)	249(20)	
2007	91(285)	113(306)	133(365)	149(88)	180(6)	---	240(6)	---	
2006 ¹	94(58)	112(232)	110(246)	145(565)	176(161)	220(17)	227(60)	242(3)	
2005	76(5)	87(122)	104(843)	141(71)	193(51)	219(76)	---	237(5)	

¹ Older bluegill were sampled, but are not reported in this table.

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, 2010.

Year	Age	N	Age													
			1	2	3	4	5	6	7	8	9	10	11	12		
2006	4	1	58	154	219	290										
2005	5	4	75	124	206	277	330									
2004	6	2	68	127	194	270	310	347								
2003	7	17	79	166	239	294	322	343	367							
2002	8	44	78	144	211	275	317	346	366	383						
2001	9	22	75	143	202	254	296	331	361	379	392					
2000	10	3	89	158	228	286	317	350	375	400	416	427				
1999	11	0														
1998	12	1	88	193	276	315	343	362	377	395	409	418	426	432		
Mean	---	94	76	151	222	283	319	346	369	389	406	423	426	432		
SE	---		4	8	9	6	6	4	3	5	7	4	0	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 spring night electrofishing in Enemy Swim Lake, 2010.

Year	Age	N	Age														
			1	2	3	4	5	6	7	8	9	10	11	12			
2007	3	21	78	142	208												
2006	4	28	85	143	213	282											
2005	5	11	85	149	204	275	328										
2004	6	17	77	143	209	270	323	357									
2003	7	5	77	153	226	276	318	345	374								
2002	8	8	83	140	185	246	301	342	381	400							
2001	9	6	90	142	187	235	297	333	364	385	402						
2000	10	3	88	148	217	265	309	340	361	386	406	422					
1999	11	5	82	139	198	241	284	311	347	377	402	416	425				
1998	12	4	87	147	201	250	295	331	349	372	394	414	425	432			
Mean	---	108	83	145	205	260	307	337	363	384	401	417	425	432			
SE	---		1	1	4	6	5	5	5	5	2	2	0	0			
<i>Mean Comparison</i> ¹																	
	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. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (Number stocked x 1,000) from Enemy Swim Lake, 2006-2010.

Survey Year	Year Class												
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
2010 ¹		52	13	1	3	4			3	3	3	2	
2009 ¹	---		1	1	1	4		6	8	3	2	1	
2008 ¹	---	---		2	1	8			1	3	1	2	
2007 ^{1,2}	---	---	---		1	26	6	7	16	11	5	7	3
2006 ^{1,2}	---	---	---	---		10	6	12	28	16	2	6	1
# stocked													
fry													
sm. fingerling											439	158	
lg. fingerling		15				58			12				

¹ Older walleye were sampled, but are not reported in this table.

² Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 9. Weighted mean total length at capture (mm) for walleye age-0 through age-10 sampled in experimental gill nets (expanded sample size) from Enemy Swim Lake, 2005-2010. 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	10
2010 ¹	210(52)	311(13)	402(1)	446(3)	445(4)			478(3)	493(3)	542(3)
2009 ¹	198(1)	311(1)	411(1)	426(4)	---	472(6)	484(8)	467(3)	482(2)	625(1)
2008 ¹	176(2)	259(1)	356(8)	---	---	485(1)	465(3)	421(1)	531(2)	---
2007 ¹	180(1)	273(26)	329(6)	407(7)	430(16)	447(11)	500(5)	525(7)	504(3)	560(2)
2006 ¹	198(10)	255(6)	336(12)	378(28)	411(16)	420(2)	466(6)	432(1)	482(1)	502(8)
2005	190(2)	261(9)	313(48)	341(39)	379(7)	452(3)	---	576(3)	564(2)	460(1)

¹ Older walleye were sampled, but are not reported in this table.

Table 10. Stocking history including size and number for fishes stocked into Enemy Swim Lake, 1998-2010. LMB= largemouth bass; WAE= walleye

Year	Species	Size	Number
1999	WAE	small fingerling	158,300
2000	WAE	small fingerling	439,450
2002	WAE	juvenile	2,971
		large fingerling	9,388
		large fingerling	57,791
2005	WAE	large fingerling	116,460
2006	LMB	fingerling	14,949
2009	WAE	large fingerling	

Table 11. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Enemy Swim Lake, 2009-2010.

Survey Year	Year Class					
	2010	2009	2008	2007	2006	2005
2010		25	1517	277	7	
2009	---		241	636	35	1

Table 12. Weighted mean total length (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Enemy Swim Lake, 2009-2010.

Year	Age			
	1	2	3	4
2010				
Male	93(14)	114(569)	152(29)	---
Female	95(7)	126(890)	170(219)	200(7)
Combined	94(25)	120(1517)	166(277)	200(7)
2009				
Male	98(72)	116(97)	103(15)	---
Female	102(87)	127(532)	169(11)	222(1)
Combined	100(241)	126(636)	124(35)	222(1)

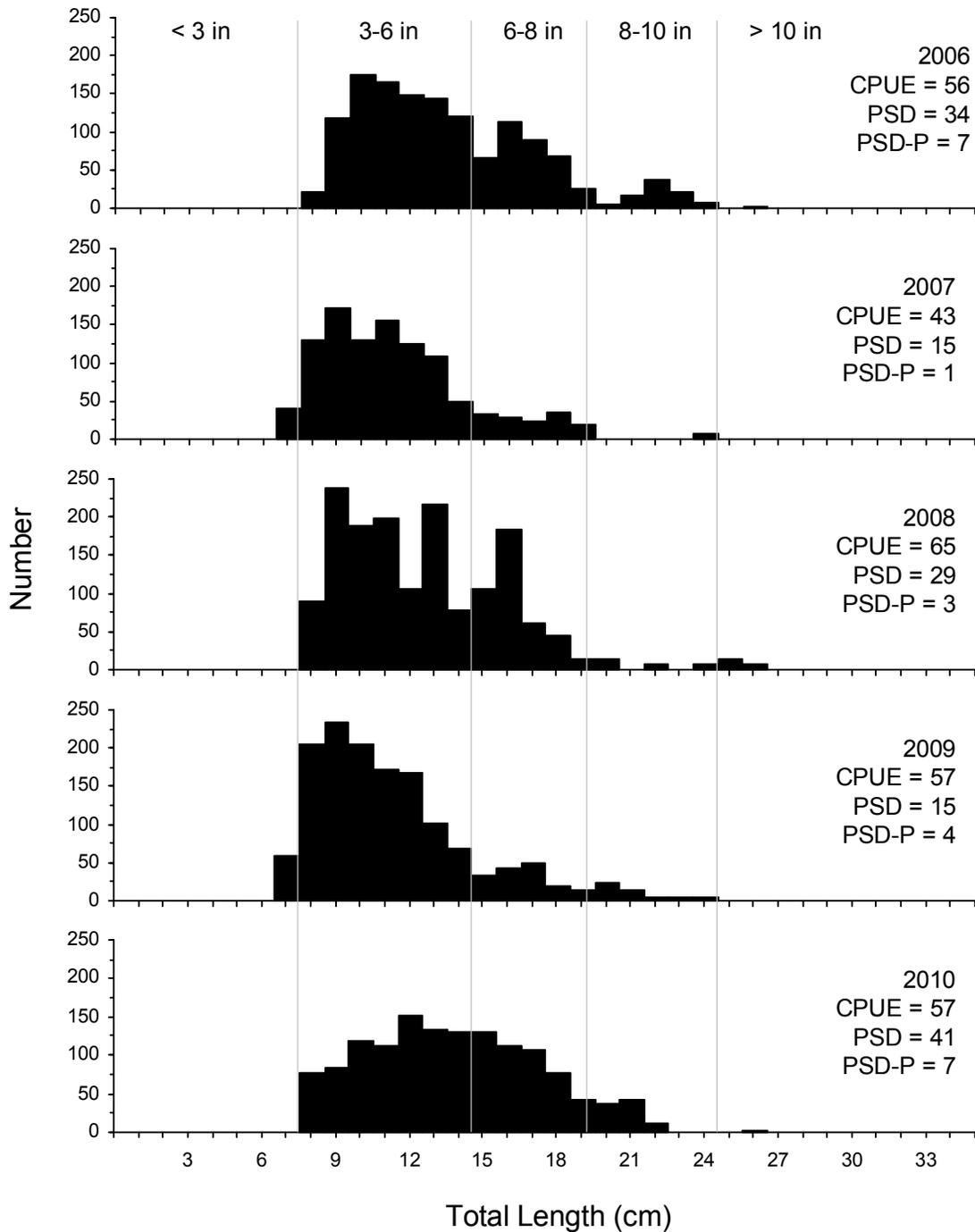


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Enemy Swim Lake, 2006-2010.

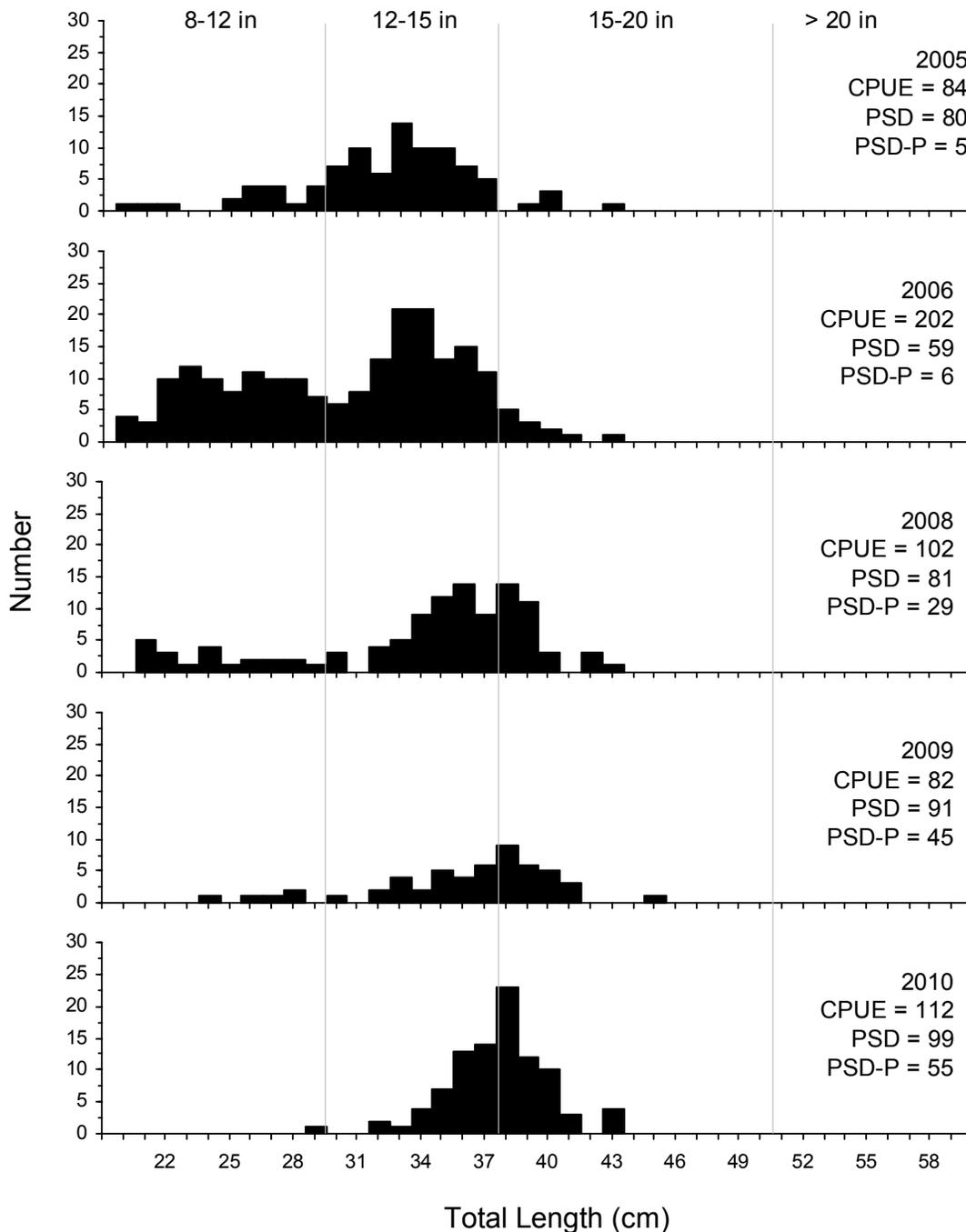


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for largemouth bass captured using spring night electrofishing in Enemy Swim Lake, 2005-2010. Spring electrofishing was not completed in 2007 due to boat malfunction.

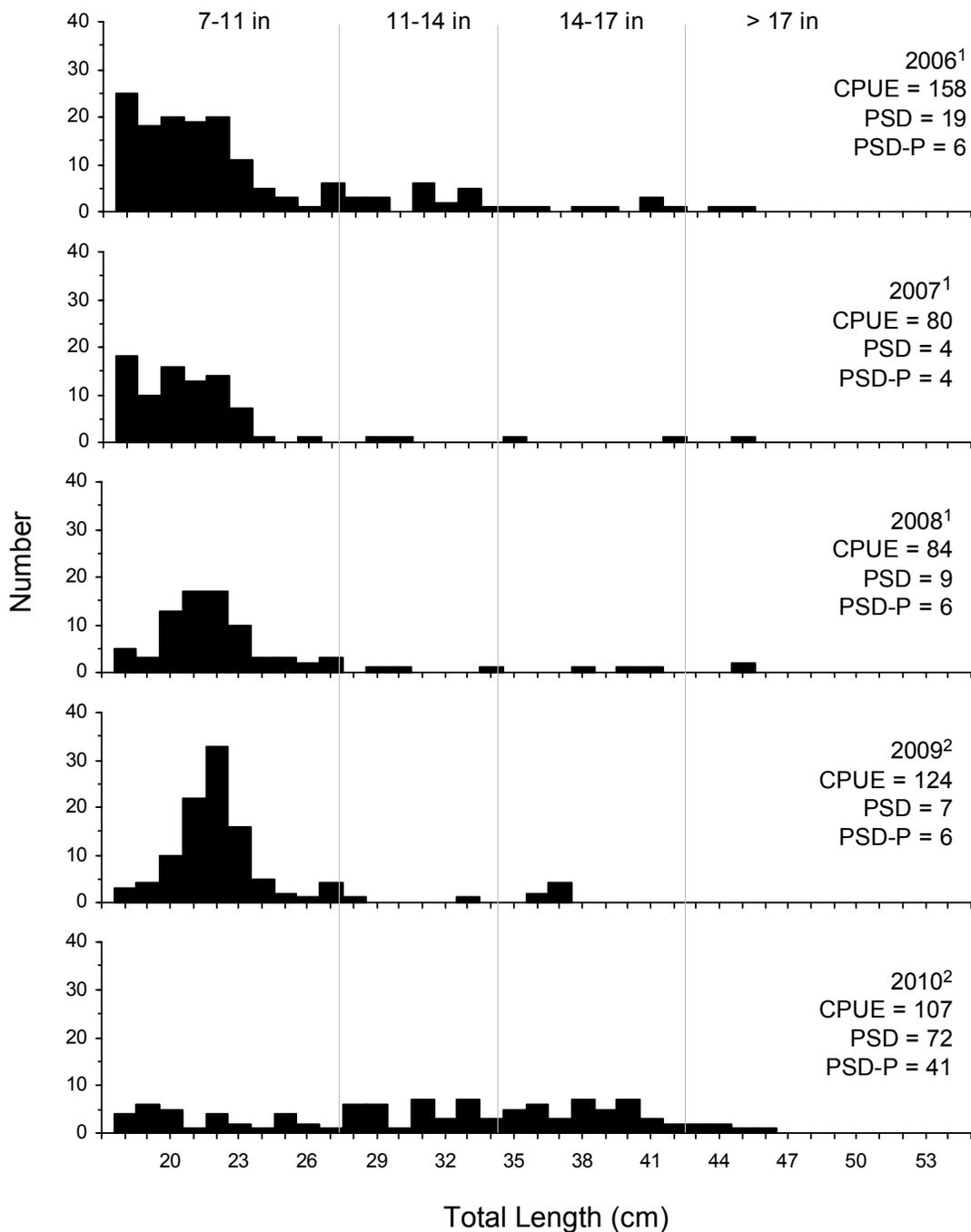


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for smallmouth bass captured using night electrofishing in Enemy Swim Lake, 2006-2010.

1 Fall night electrofishing; 2 Spring night electrofishing

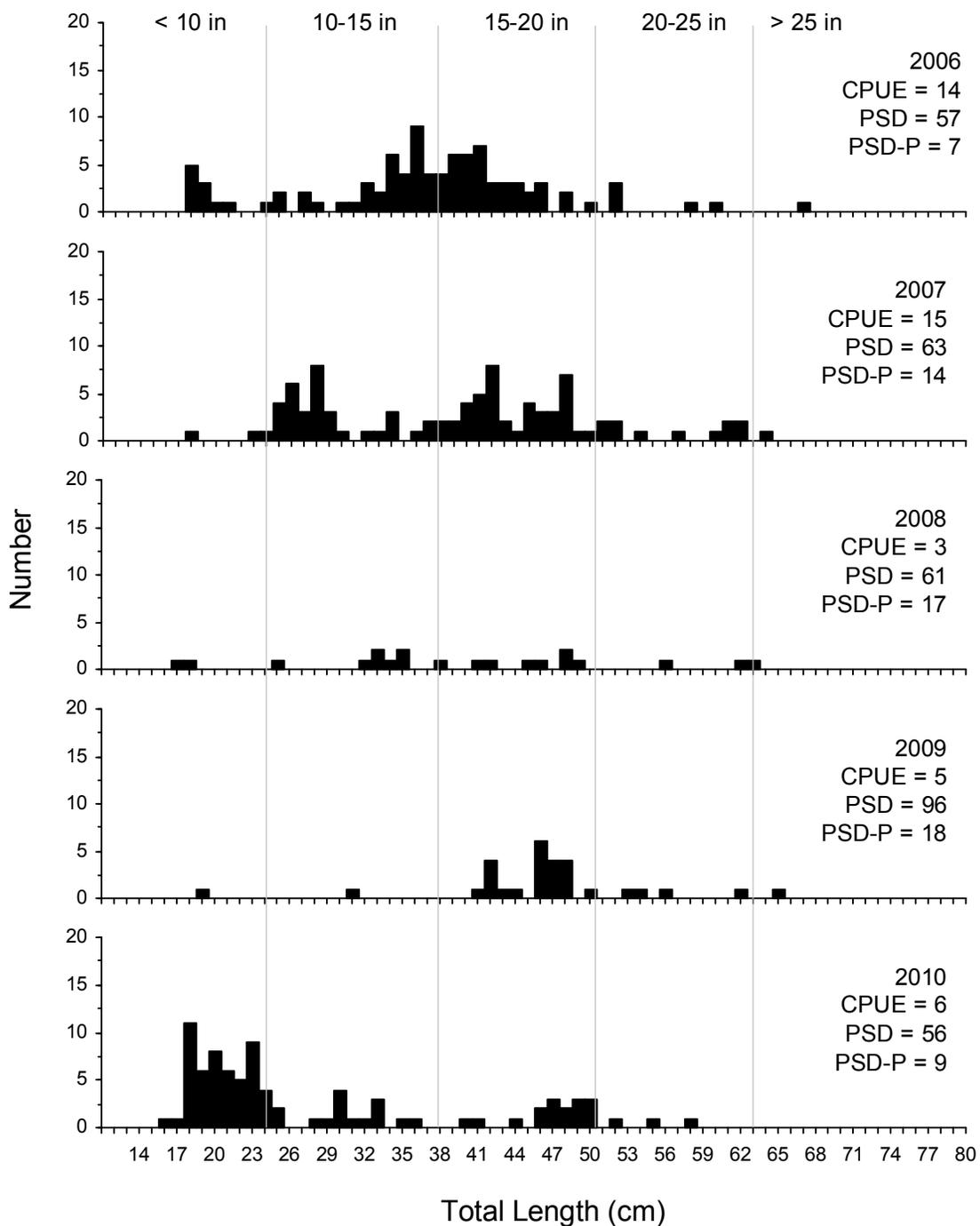


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Enemy Swim Lake, 2006-2010.

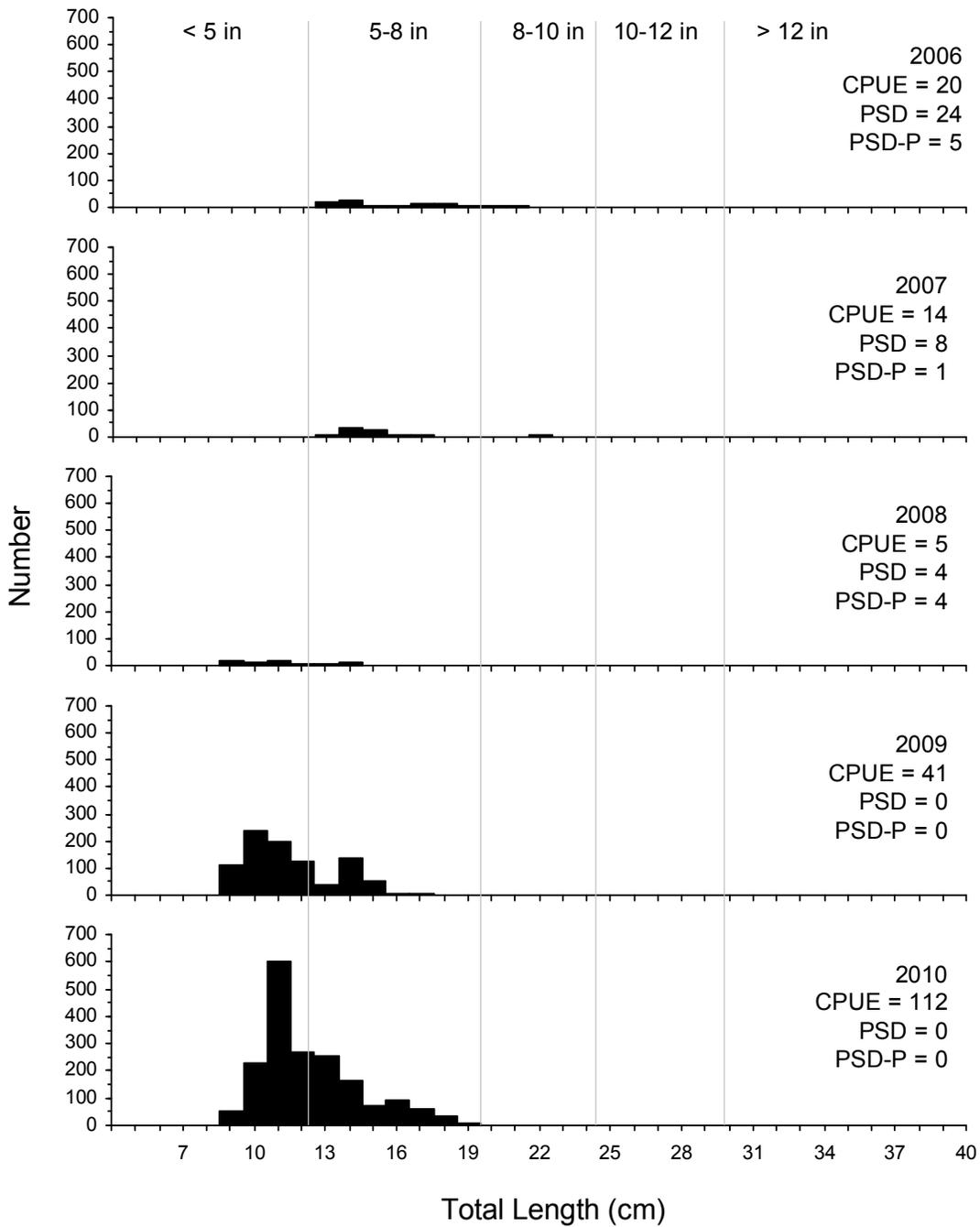


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Enemy Swim Lake, 2006-2010.

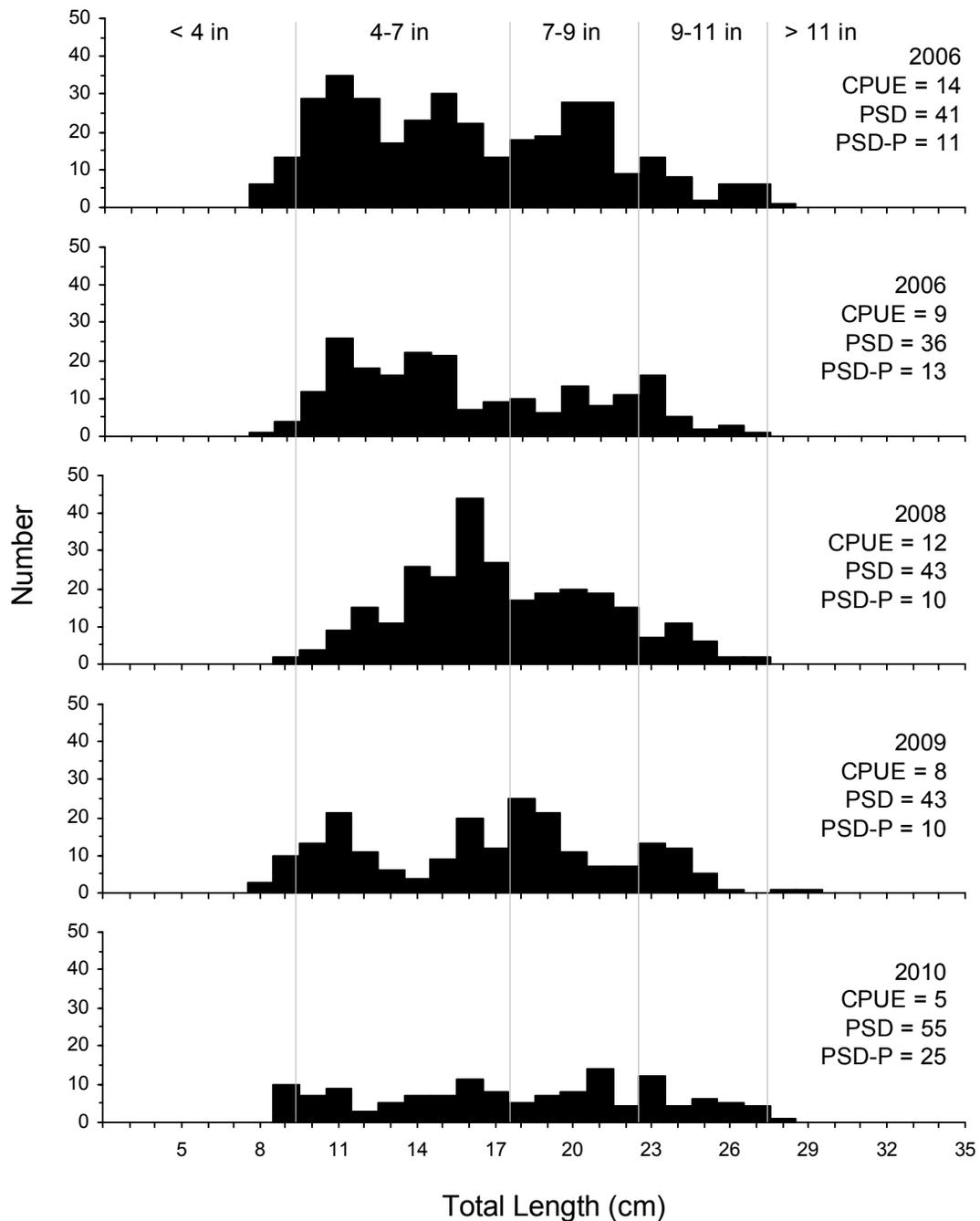


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for rock bass captured using frame nets in Enemy Swim Lake, 2006-2010.