

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	1.5 miles east and 6.5 miles north of Waubay, SD

Survey Dates and Sampling Information

Survey dates	May 21, 2014 (EF-SMB) May 28, 2014 (EF-LMB) July 22-24, 2014 (FN, GN) September 2, 2014 (EF-WAE)
Electrofishing-SMB (min)	60
Electrofishing-LMB (min)	60
Frame net sets (n)	24
Gill net sets (n)	6
Electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	30,782
Surface area (acres)	2,146
Maximum depth (ft)	26
Mean depth (ft)	16

Ownership and Public Access

Enemy Swim Lake is a meandered lake owned by the State of South Dakota and the fishery is 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

The 30,782 acre Enemy Swim Lake sub-watershed (HUC-12) is located within the larger Waubay Lakes (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

The South Dakota Water Management Board established OHWM is 1854.4 fmsl, and the outlet elevation of Enemy Swim Lake is 1853.6 fmsl. On May 6, 2014 the elevation was 1854.2 fmsl; 1.1 ft higher than fall 2013 elevation of 1853.1 fmsl. Water levels had declined to an elevation of 1853.1 fmsl by October 29, 2014.

Fish Management Information

Primary species	black crappie, bluegill, largemouth bass, smallmouth bass, walleye, yellow perch
Other species	black bullhead, common carp, northern pike, pumpkinseed, rock bass, spottail shiner, white bass, white sucker
Lake-specific regulations	smallmouth/largemouth bass: only those less than 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

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

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



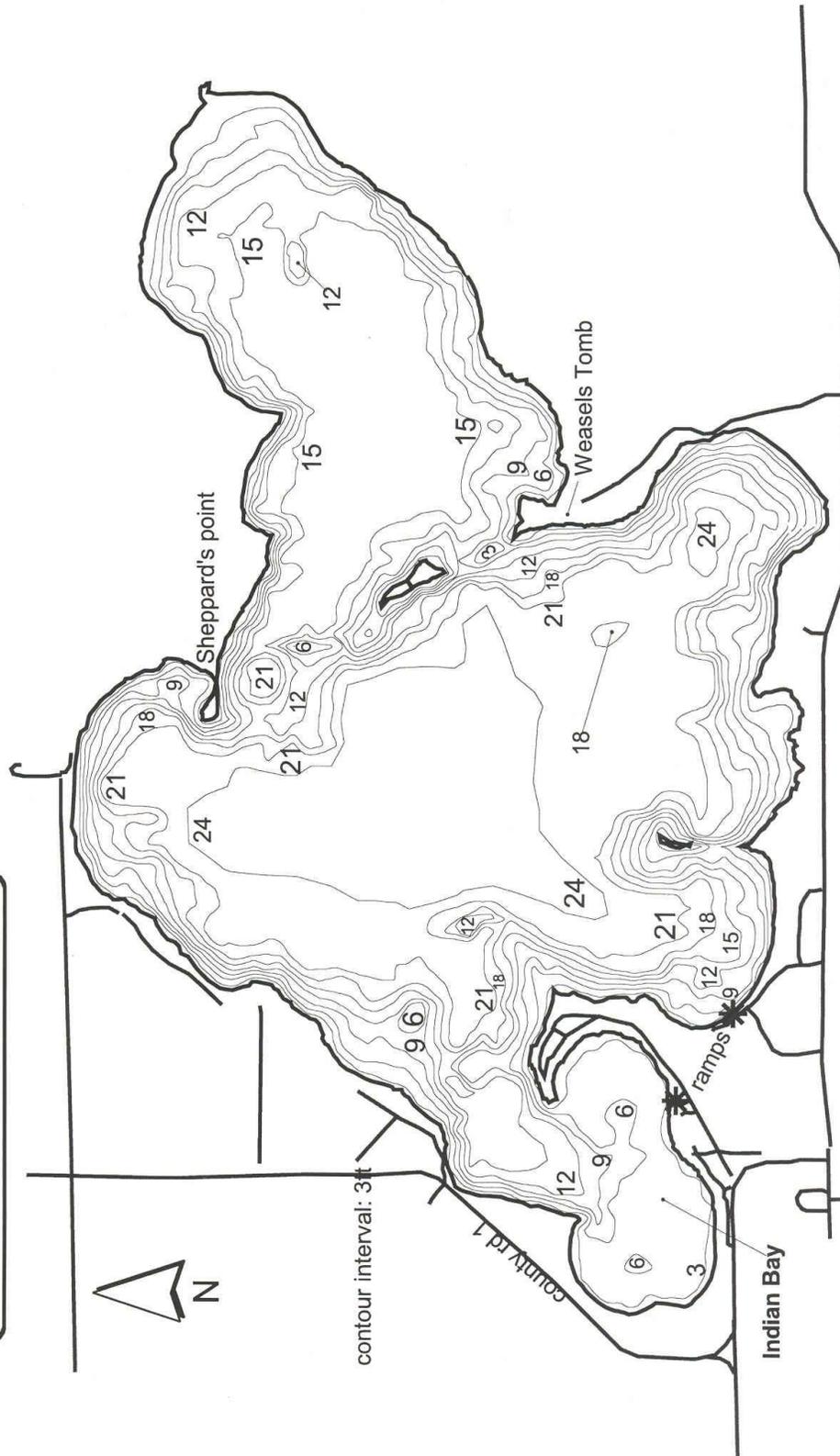


Figure 1. Map depicting access locations and depth contours for Enemy Swim Lake, Day County, South Dakota.

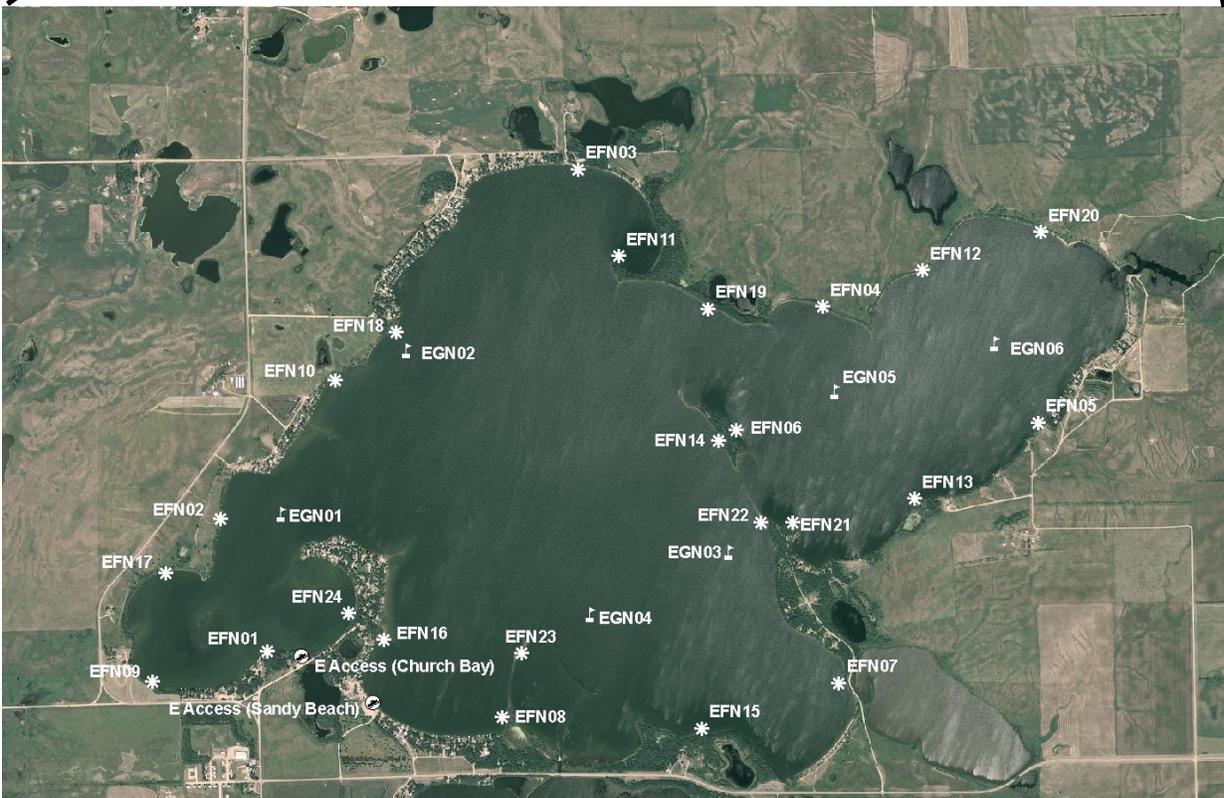
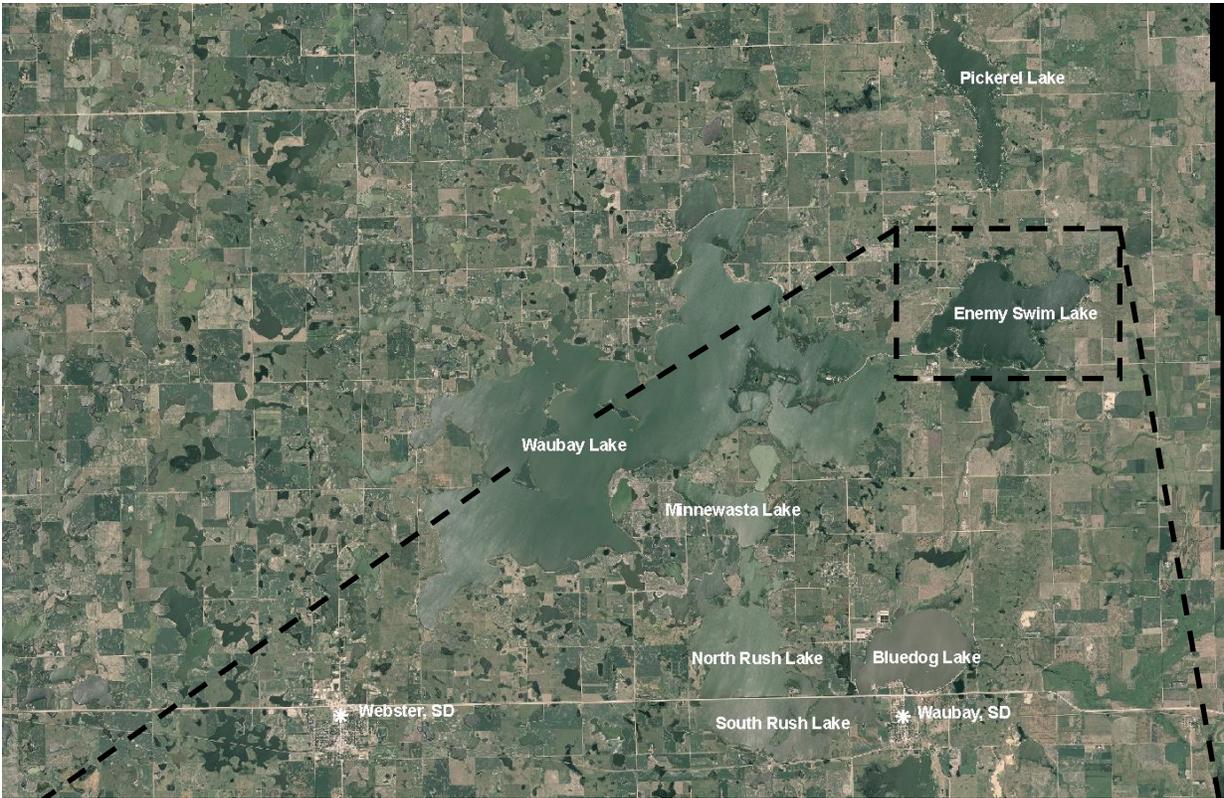


Figure 2. Map depicting the location of several Day County, South Dakota lakes including Enemy Swim (top). Also noted are public access sites and standardized net locations for Enemy Swim Lake. EFN= frame nets; EGN=gill nets

Management Objectives

- 1) Maintain a mean frame net CPUE of stock-length black crappie ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a mean frame net 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 mean gill net CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 6) 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

Enemy Swim Lake is a 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. Enemy Swim Lake supports one of the most diverse fish assemblages in northeast South Dakota. 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.

Primary Species

Black Crappie: The mean frame net CPUE of stock-length black crappie was 1.2 (Table 1) and below the minimum objective (≥ 10 stock-length black crappie/net night; Table 3). The 2014 frame net CPUE represented a decrease from the 2013 CPUE of 5.7 (Table 2). Currently, black crappie relative abundance is considered low.

Black crappies captured in frame nets ranged in TL from 23 to 30 cm (9.1 to 11.8 in), had a PSD of 100 and PSD-P of 93 (Table 1; Figure 3). Both the PSD and PSD-P were above management objective ranges indicating a population dominated by black crappie \geq quality-length (i.e., 20 cm; 8 in; Table 3; Figure 3).

No growth information was collected. A decreasing trend in condition was apparent as TL increased. However, frame net captured black crappie had acceptable condition with mean Wr values that remained ≥ 80 for all cm-length groups represented.

Bluegill: The mean frame net CPUE of stock-length bluegill was 31.5 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net night; Table 3). Since 2005, frame net mean CPUE values of stock-length bluegill have ranged from a low of 31.5 (2014) to a high of 90.2 (2011; Table 2). While relative abundance remained above the minimum objective and is still considered high, the 2014 frame net CPUE was the lowest recorded since 1999 (Table 2; Ermer et al. 2006).

Frame net captured bluegill ranged in TL from 8 to 23 cm (3.1 to 9.1 in), had a PSD of 46, and a PSD-P of 27 (Table 1; Figure 4). The PSD was within the management objective of 30-60; while, the PSD-P exceeded the management objective of 5-10 (Table 3).

Since 2005, otoliths have been collected from a sub-sample of frame net captured bluegill. Age structure analysis suggests that bluegill tend to exhibit consistent recruitment in Enemy Swim Lake (Table 4). In 2014, eight consecutive year classes (2005-2012) were present (Table 4).

Bluegill in Enemy Swim Lake typically approach or surpass quality-length (15 cm; 6 in) by age-5 (Table 5). Since 2005, weighted mean TL at capture values of age-5 bluegill have ranged from 141 to 194 mm (5.6 to 7.6 in; Table 5). In 2014, the weighted mean TL at capture for age-5 individuals was 194 mm (7.6 in; Table 5). Frame net captured bluegill had mean Wr values that ranged from 99 to 105 for all length categories (e.g., stock to quality) sampled. Seasonal influences (i.e., spawning behavior) may have influenced Wr values.

Largemouth Bass: Spring night electrofishing to monitor the largemouth bass population is conducted biennially during even years (e.g., 2014, 2016, 2018...). In 2014, the spring night electrofishing CPUE of stock-length largemouth bass was 224.3 (Table 1) and above the management objective (≥ 30 stock-length largemouth bass/hour; Table 3). Since 2005, spring electrofishing CPUE values have ranged from a low of 67.2 (2012) to a high of 224.3 (2014; Table 2). Currently, relative abundance appears to be high in suitable habitat.

Largemouth Bass ranged in TL from 21 to 46 cm (8.3 to 18.1 in.; Figure 5), had a PSD of 71 and PSD-P of 32 (Table 1). Both PSD and PSD-P were near or within management objective ranges of 40-70 and 10-40, respectively (Table 3).

Age estimates made using scales suggest that largemouth bass have exhibited consistent recruitment of varying magnitude in recent years (Table 6). In 2014, 10 consecutive year classes were represented in the electrofishing catch; the 2010 cohort was the most represented and comprised 43% of largemouth bass sampled (Table 6).

Growth of largemouth bass in Enemy Swim Lake tends to be slower than the regional means reported by Willis et al (2001). Since 2005, weighted mean TL at capture values for age-3 and age-4 fish (collected during spring electrofishing) have ranged from 191 to 250 mm (7.5 to 9.8 in) and 265 to 317 mm (10.4 to 12.5 in), respectively (Table 7); compared to regional mean back-calculated lengths of 266 and 325 mm (10.5 and 12.8 in.) at ages 3 and 4 (Willis et al. 2001). Condition of largemouth bass was high (i.e., ≥ 100 for all length categories sampled) and likely

influenced by spawning activity, as electrofishing was conducted during late-May. The mean W_r of stock-length individuals was 106 (Table 1) and no length-related trends in condition were apparent.

Smallmouth Bass: Similar to largemouth bass, smallmouth bass population parameters are monitored on a biennial (even years) basis. In 2014, spring electrofishing included a combination of day and night samples; the mean spring electrofishing CPUE of stock-length individuals was 82.0 (Table 1). Sampled smallmouth bass ranged in TL from 20 to 46 cm (7.9 to 18.1 in.; Figure 6), had a PSD of 71 and PSD-P of 12 (Table 1). Both PSD and PSD-P were near or within management objective ranges of 40-70 and 10-40 (Table 3).

Scales collected from a sub-sample of spring electrofished smallmouth bass suggested relatively-consistent recruitment, with seven consecutive year classes (2005-2011) being represented (Table 8). The 2008 cohort was the most abundant and comprised 44% of smallmouth bass in the electrofishing sample; cohorts produced in 2009 and 2010 accounted for an additional 21% and 18%, respectively (Table 8).

Smallmouth bass in Enemy Swim Lake tend to exhibit slow to moderate growth. Since 2009, weighted mean TL at captures values for age-4 individuals (collected during spring electrofishing) have ranged from 241 to 282 mm (9.5 to 11.1 in; Table 9); compared to the Region IV back-calculated mean of means of 316 mm (12.4 in; Willis et al. 2001). Smallmouth bass in the spring electrofishing catch had mean W_r values that ranged from 85 to 91 for all length categories (e.g., stock to quality) sampled. The mean W_r of stock-length fish was stock-length was 86 (Table 1) and no length-related trends in condition were apparent.

Walleye: The mean gill net CPUE of stock-length walleye was 8.5 (Table 1) and below the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2005, the mean gill net CPUE has ranged from a low of 3.0 (2008) to a high of 18.2 (2005; Table 2). The 2014 gill net CPUE was slightly lower than the 2013 CPUE of 8.7 (Table 2) and suggested moderate relative abundance.

Walleye in the gill net catch ranged in TL from 18 to 62 cm (7.1 to 24.4 inches) with the majority being in the stock-quality length category (Figure 7). The PSD was 16 and the PSD-P was 4; both were below management objectives of 30-60 and 5-10, respectively (Table 1; Table 3; Figure 7). Approximately 15% of walleye in the gill net catch were above the 381-mm (15-inch) minimum length restriction (Figure 7).

Otoliths were collected from a sub-sample of gill net captured walleye in 2014; four year classes (2001, 2009, 2011 and 2013) were present (Table 10). The 2009 year class, which coincided with a large fingerling stocking, was the most represented and comprised approximately 83% of walleye in the gill net catch (Table 10; Table 11). With the exception of the 2009 cohort, recruitment has been limited in recent years (Table 10). Fall electrofishing indicated that relatively strong year-classes (defined as > 20 age-0 walleye/hour) were naturally produced in 2006-2008 and 2010; however, few individuals from these year classes have been sampled in later surveys (Table 2; Table 10). Small fingerlings were stocked to supplement the population in 2013; fall night electrofishing in conjunction with oxytetracycline (OTC) marking revealed that a strong year class was produced by the stocking (Table 2; Table 10; Table 12). In 2014, natural reproduction formed what appears to be a weak year class, as few age-0 individuals

were encountered during fall night electrofishing (mean CPUE = 8.0; Table 1). Recruitment of both the 2013 and 2014 cohort is currently unknown and will be assessed in future surveys.

Walleye growth in Enemy Swim Lake tends to be highly variable (Table 11). Since 2005, the weighted mean length at capture for age-3 walleye has ranged from 278 to 411 mm (10.9 to 16.2 in; Table 11). Due to low sample sizes weighted mean TL at capture values may at times represent a single walleye (Table 11). The 2009 cohort had weighted mean TL at capture values of 320 and 334 mm (12.6 and 13.1 in) at age 3 and 4 (Table 11). The majority of gill net captured walleye were in the stock-quality length category, which had a mean W_r of 82.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 1.7 (Table 1) and below the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Since 2005, the mean gill net CPUE has ranged from a low of 1.7 (2014) to a high of 152.2 (2011; Table 2). Mean CPUE values have declined in each of the past three surveys (i.e., 2012-2014; Table 2). Currently, relative abundance is low.

Yellow perch in the gill net catch ranged in TL from 9 to 21 cm (3.5 to 8.3 in), with few being \geq quality-length (20 cm; 8 in; Figure 8). The PSD was 10 and the PSD-P was 0; both were below management objectives (Table 1; Table 3; Figure 8). Size structure indices should be interpreted with caution as sample size was low (i.e., 19 yellow perch).

Otoliths collected from a sub-sample of gill net captured yellow perch revealed the presence of five year classes (2008-2010, 2012-2013); each represented by relatively-few individuals (Table 13). Since 2009, weighted mean TL at capture values for age-3 yellow perch have ranged from 124 to 166 mm (4.9 to 6.5 in); while age-4 fish had weighted mean TL at capture values that ranged from 155 to 222 mm (6.1 to 8.7 in; Table 14). However, due to low sample sizes weighted mean TL at capture values may at times represent few individuals (Table 14). As with most populations, males tend to be smaller at a given age than females, particularly at older ages (Table 14).

Other Species

Black Bullhead: Relative abundance has remained low, with mean frame net CPUE values for stock-length black bullhead of < 3.0 from 2005-2014 (Table 2). In 2014, frame nets captured 18 black bullheads that ranged in TL from 13 to 38 cm (5.1 to 15.0 in). The mean frame net CPUE of stock-length fish was 0.7 (Table 1) and within the management objective (≤ 100 stock-length black bullhead/net night; 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 effectively during mid-summer fish community surveys. As a result, mean gill net CPUE values are often low. In 2014, gill nets captured ten northern pike that ranged in TL from 47 to 71 cm (18.5 to 28 in). The mean gill net CPUE of stock-length northern pike was 1.7 (Table 1). Since

2004, mean gill net CPUE values have ranged from 0.5 (2007) to 3.7 (2012; Table 2). Currently, relative abundance is considered to be moderate.

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

Rock Bass: Rock bass were the second most abundant species in the frame net catch (Table 1). The mean frame net CPUE of stock-length rock bass was 5.3 (Table 1). Since 2004, frame net CPUE values have ranged from a low of 3.8 (2013) to a high of 14.0 (2006; Table 2).

Length-frequency analysis indicated consistent recruitment, as frame net captured rock bass ranged in TL from 8 to 28 cm (3.1 to 11.0 in) with nearly all 1-cm length groups being represented (Figure 9). The PSD was 51 and the PSD-P was 11 (Table 1; Figure 9). No age or growth information was collected. Rock bass in the frame net catch had a mean W_r values that ranged from 98 to 103 for all length categories (e.g., stock to quality) sampled; stock-length individuals had a mean W_r of 101 (Table 1). A slight decreasing trend in condition was apparent as TL increased.

Other: Pumpkinseed, white bass, and white sucker were other fish species captured during the 2014 fish community survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys utilizing frame nets and gill nets on an annual basis (next survey scheduled in summer 2015) 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 (≈ 25 large fingerling/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 < 75 age-0 walleye/hour].
- 6) Maintain the 356-457 mm (14-18 in) protected slot length limit on largemouth and smallmouth bass. The regulation is designed to increase the average size of black bass while allowing harvest of small bass to avoid slowing of growth (Blackwell and Lucchesi 2009).
- 7) Maintain the 381-mm (15 in) minimum length limit on walleye. The regulation is designed to protect smaller fish from harvest and increase average fish size (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, 2014. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; 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	0.7	0.5	100	0	100	0	88	3
BLC	1.2	0.4	100	0	93	8	96	2
BLG	31.5	6.3	46	3	27	3	101	1
NOP	<0.1	0.1	50	36	13	23	81	4
PUS	0.4	0.3	80	24	0	---	110	11
ROB	5.3	1.4	51	8	11	5	101	1
SMB	3.3	0.7	41	9	18	7	93	<1
WAE	0.8	0.3	44	21	17	16	82	2
WHB	0.2	0.1	100	0	100	0	88	7
WHS	<0.1	0.1	100	---	100	---	---	---
YEP	0.5	0.3	33	26	0	---	80	2
<i>Gill nets</i>								
BLC	3.5	1.3	100	0	90	11	101	1
BLG	10.3	6.2	97	4	47	11	107	1
COC	0.2	0.2	100	---	100	---	88	---
NOP	1.7	0.5	70	28	10	18	82	4
PUS	0.2	0.2	100	---	0	---	121	---
ROB	2.0	1.9	83	20	8	15	101	3
SMB	5.3	3.2	28	14	19	12	96	2
WAE	8.5	2.4	16	9	4	5	82	1
WHB	1.3	0.8	100	0	100	0	88	2
WHS	4.7	1.6	100	0	100	0	102	1
YEP	1.7	0.8	10	18	0	---	91	2
<i>Electrofishing</i>								
LMB ¹	224.3	54.8	71	5	32	6	106	1
SMB ²	82.0	23.3	71	9	12	6	86	1
WAE ³	8.0	---	---	---	---	---	---	---

¹ Spring night electrofishing-LMB

² Spring night electrofishing-SMB; day/night samples combined

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, 2005-2014. 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	CPUE									
	2005	2006 ¹	2007 ¹	2008	2009	2010	2011	2012	2013	2014
<i>Frame nets</i>										
BLB	2.6	1.0	0.4	0.1	0.1	0.1	0.5	0.3	0.2	0.7
BLC	1.0	2.3	0.8	0.0	0.2	1.3	8.3	2.1	5.7	1.2
BLG	51.3	56.0	42.5	65.3	56.8	57.3	90.2	53.8	54.2	31.5
COC	0.0	0.0	<0.1	0.1	<0.1	0.0	0.1	<0.1	0.0	0.0
LMB	0.0	0.0	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0
NOP	0.4	0.1	0.3	0.3	0.1	0.3	0.3	0.3	0.4	<0.1
PUS	3.1	1.7	<0.1	0.5	0.3	1.7	2.3	0.6	2.1	0.4
ROB	9.6	14.0	8.6	11.5	8.3	5.3	12.7	8.2	3.8	5.3
SMB	2.1	6.3	1.3	2.7	1.8	1.9	14.9	4.6	3.4	3.3
WAE	0.2	0.3	0.3	0.4	0.1	<0.1	0.6	1.2	0.7	0.8
WHB	0.1	0.3	0.5	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.2
WHS	0.1	0.0	0.3	0.1	0.1	0.2	0.1	0.1	0.2	<0.1
YEP	2.3	4.4	3.5	<0.1	1.6	5.1	7.4	0.9	1.1	0.5
<i>Gill nets</i>										
BLB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BLC	4.2	2.8	1.5	0.3	0.0	2.0	2.0	4.0	8.5	3.5
BLG	12.5	8.7	5.8	0.5	2.8	3.8	2.5	54.8	41.8	10.3
COC	0.0	1.2	1.8	0.2	0.5	0.2	0.3	1.2	0.0	0.2
NOP	1.2	1.2	0.5	1.2	2.0	1.3	2.8	3.7	1.0	1.7
PUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2
ROB	1.8	2.3	14.0	2.0	3.3	1.2	0.2	0.7	2.7	2.0
SMB	5.0	1.2	1.8	2.2	4.2	0.7	1.5	2.7	2.3	5.3
WAE	18.2	13.5	14.7	3.0	4.7	5.7	10.8	7.5	8.7	8.5
WHB	0.0	0.7	1.5	2.5	2.7	0.3	1.8	8.0	5.8	1.3
WHS	3.0	4.0	1.7	3.5	4.5	7.7	3.3	1.5	2.2	4.7
YEP	18.0	19.8	14.3	4.5	40.5	112.3	152.2	34.0	9.7	1.7
<i>Electrofishing</i>										
LMB ²	84.4	202.0	---	102.2	81.7	112.1	---	67.2	---	224.3
SMB ³	---	---	---	---	123.7	107.0	---	299.0	---	82.0
WAE ⁴	8.7	21.0	38.5	52.6	8.2	34.7	25.0	3.0	116.0	8.0

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

² Spring night electrofishing-LMB

³ Spring night electrofishing-SMB; day/night samples combined (2014)

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

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, 2005-2014. BLC= black crappie; BLG= bluegill; LMB= largemouth bass; SMB= smallmouth bass; WAE= walleye; YEP= yellow perch

Species	2005	2006 ³	2007 ³	2008	2009	2010	2011	2012	2013	2014	Objective
<i>Frame nets</i>											
BLC											
CPUE	1	2	1	0	<1	1	8	2	6	1	≥ 10
PSD	84	64	56	---	20	23	84	84	99	100	30-60
RSD-P	84	53	39	---	20	16	5	57	46	93	5-10
Wr	110	99	94	---	106	101	104	95	100	96	---
BLG											
CPUE	51	56	43	65	57	57	90	54	54	32	≥ 25
PSD	18	34	15	29	15	41	61	78	68	46	30-60
RSD-P	14	7	1	3	4	7	0	7	32	27	5-10
Wr	116	109	100	106	101	100	102	107	103	101	---
<i>Gill nets</i>											
WAE											
CPUE	18	14	15	3	5	6	11	8	9	9	≥ 10
PSD	12	57	63	61	96	56	14	18	21	16	30-60
RSD-P	6	7	14	17	18	9	5	9	17	4	5-10
Wr	85	87	89	88	91	92	85	81	80	82	---
YEP											
CPUE	18	20	14	5	41	112	152	34	10	2	≥ 30
PSD	35	24	8	4	0	0	1	3	2	10	30-60
RSD-P	12	5	1	4	0	0	0	0	0	0	5-10
Wr	94	96	93	99	97	97	91	93	91	91	---
<i>Electrofishing</i>											
LMB ¹											
CPUE	84	202	---	102	82	112	---	67	---	224	≥ 30
PSD	80	59	---	81	91	99	---	86	---	71	40-70
RSD-P	5	6	---	29	45	55	---	79	---	32	10-40
Wr	106	108	---	104	105	109	---	107	---	106	---
SMB ²											
CPUE	---	---	---	---	124	107	---	299	---	82	---
PSD	---	---	---	---	7	72	---	8	---	71	40-70
RSD-P	---	---	---	---	6	41	---	3	---	12	10-40
Wr	---	---	---	---	87	95	---	83	---	86	---

¹ Spring night electrofishing-LMB.

² Spring night electrofishing-SMB; day/night samples combined (2014)

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, 2010-2014.

Survey Year	Year Class											
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2014			125	209	101	92	154	74	1	1		
2013	---		12	91	327	124	248	431	76	14		
2012	---	---			54	63	357	530	128	112	45	
2011	---	---	---				265	504	669	727		
2010 ¹	---	---	---	---			57	196	307	728	77	6

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

Table 5. Weighted mean TL (mm) at capture for bluegill age-1 through age-9 sampled in frame nets (expanded sample size) from Enemy Swim Lake, 2005-2014.

Year	Age								
	1	2	3	4	5	6	7	8	9
2014	---	94(125)	109(209)	145(101)	194(92)	200(154)	198(74)	230(1)	237(1)
2013	92(12)	84(91)	115(327)	172(124)	190(248)	199(431)	201(76)	215(14)	---
2012	---	93(54)	124(63)	158(357)	176(530)	192(128)	193(112)	199(45)	---
2011	---	---	107(265)	131(504)	172(669)	183(727)	---	---	---
2010 ¹	---	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. Year class distribution based on the expanded age/length summary for largemouth bass sampled during spring night electrofishing from Enemy Swim Lake, 2008-2014.

Year	Year Class														
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
2014				25	96	8	22	3	10	32	17	5	4		
2012	---	---			3	5	2	1	2	7	10	14	9	3	
2010 ¹	---	---	---	---					1	4	2	17	44	22	3
2008 ¹	---	---	---	---	---	---				19	3	31	23	17	15

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

Table 7. Weighted mean TL (mm) at capture for largemouth bass age-1 through age-10 sampled during spring night electrofishing (expanded sample size) from Enemy Swim Lake, 2005-2014.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2014 ¹	---	---	245(25)	304(96)	317(8)	338(22)	377(3)	405(10)	424(32)	423(17)
2012 ¹	---	209(3)	250(5)	317(2)	369(1)	376(2)	393(7)	416(10)	420(14)	427(9)
2010 ¹	---	---	---	290(1)	330(4)	347(2)	367(17)	383(44)	392(22)	427(3)
2008	---	---	232(19)	277(3)	340(31)	367(23)	389(17)	389(15)	429(1)	---
2006	120(1)	173(10)	214(53)	265(34)	318(53)	350(67)	386(14)	403(1)	---	---
2005	---	140(3)	191(6)	285(22)	335(44)	356(24)	404(2)	---	---	---

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

Table 8. Year class distribution based on the expanded age/length summary for smallmouth bass sampled during spring electrofishing from Enemy Swim Lake, 2009-2014; includes both day and night samples (2014).

Year	Year Class														
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
2014				2	15	17	36	7	4	1					
2012	---	---			1	59	208	25	1			3	1		
2010 ¹	---	---	---	---				21	28	11	17	5	8	6	3
2009	---	---	---	---	---			4	89	6	3	4	2		

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

Table 9. Weighted mean TL (mm) at capture for smallmouth bass age-2 through age-10 sampled during spring electrofishing (expanded sample size) from Enemy Swim Lake, 2009-2014; includes both day and night samples (2014).

Year	Age								
	2	3	4	5	6	7	8	9	10
2014	---	202(2)	264(15)	294(17)	303(36)	338(7)	403(4)	460(1)	---
2012	182(1)	208(59)	241(208)	307(25)	298(1)	---	---	444(3)	478(1)
2010 ¹	---	208(21)	282(28)	328(11)	357(17)	374(5)	400(8)	402(6)	422(3)
2009	189(4)	221(89)	264(6)	311(3)	360(4)	373(2)	---	---	---

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

Table 10. 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 Enemy Swim Lake, 2010-2014.

Survey Year	Year Class													
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2014		4		4		45								2
2013 ¹	---			6	10	30			1	1	1	1	3	
2012 ¹	---	---		3	1	40				1		1		1
2011 ¹	---	---	---		3	61	1	2		2			2	
2010 ¹	---	---	---	---		52	13	1	3	4			3	3
# stocked														
fry														
sm. fingerling		217 ²		236						58			12	
lg. fingerling				39		15								

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

² 87% of stocked walleye were OTC marked; 43 of 54 otoliths (80%) collected from fall electrofished age-0 walleye exhibited marks. The estimated stocking contribution was 92%.

Table 11. Weighted mean TL at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Enemy Swim Lake, 2005-2014. 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
2014 ¹	187(4)	---	278(4)	---	356(45)	---	---	---	---	---
2013 ¹	---	224(6)	288(10)	334(30)	---	---	559(1)	565(1)	559(1)	602(1)
2012 ¹	167(3)	260(1)	320(40)	---	---	---	552(1)	---	636(1)	---
2011 ¹	209(3)	298(61)	399(1)	480(2)	---	479(2)	---	---	536(2)	---
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 12. Stocking history including size and number for fishes stocked into Enemy Swim Lake, 2001-2014. LMB= Largemouth Bass; WAE= Walleye

Year	Species	Size	Number
2002	WAE	juvenile	2,971
2002	WAE	large fingerling	9,388
2005	WAE	large fingerling	57,791
2006	LMB	fingerling	116,460
2009	WAE	large fingerling	14,949
2011	WAE	small fingerling	235,640
2011	WAE	large fingerling	38,634
2013	WAE	small fingerling	217,450

Table 13. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Enemy Swim Lake, 2010-2014.

Survey Year	Year Class								
	2014	2013	2012	2011	2010	2009	2008	2007	2006
2014		7	2		1	3	6		
2013	---		11	1	2	21	32	4	
2012	---	---		2	7	20	168	18	
2011	---	---	---			682	811	112	
2010	---	---	---	---		25	1517	277	7

Table 14. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Enemy Swim Lake, 2009-2014.

Year	Age					
	1	2	3	4	5	6
2014						
Male	96(2)	116(1)	---	155(1)	---	186(1)
Female	97(4)	106(1)	---	---	184(3)	197(5)
Combined	96(7)	111(2)	---	155(1)	184(3)	195(6)
2013						
Male	98(4)	112(1)	---	155(1)	155(6)	175(1)
Female	97(7)	---	139(2)	157(22)	173(24)	165(2)
Combined	97(11)	112(1)	139(2)	157(21)	168(32)	170(4)
2012						
Male	---	112(2)	132(3)	153(37)	---	---
Female	101(2)	111(5)	146(20)	170(124)	185(22)	---
Combined	101(2)	111(7)	144(20)	165(168)	189(18)	---
2011						
Male	---	107(301)	142(181)	165(14)	---	---
Female	---	110(328)	152(664)	180(60)	---	---
Combined	---	109(682)	149(811)	171(112)	---	---
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)	---	---

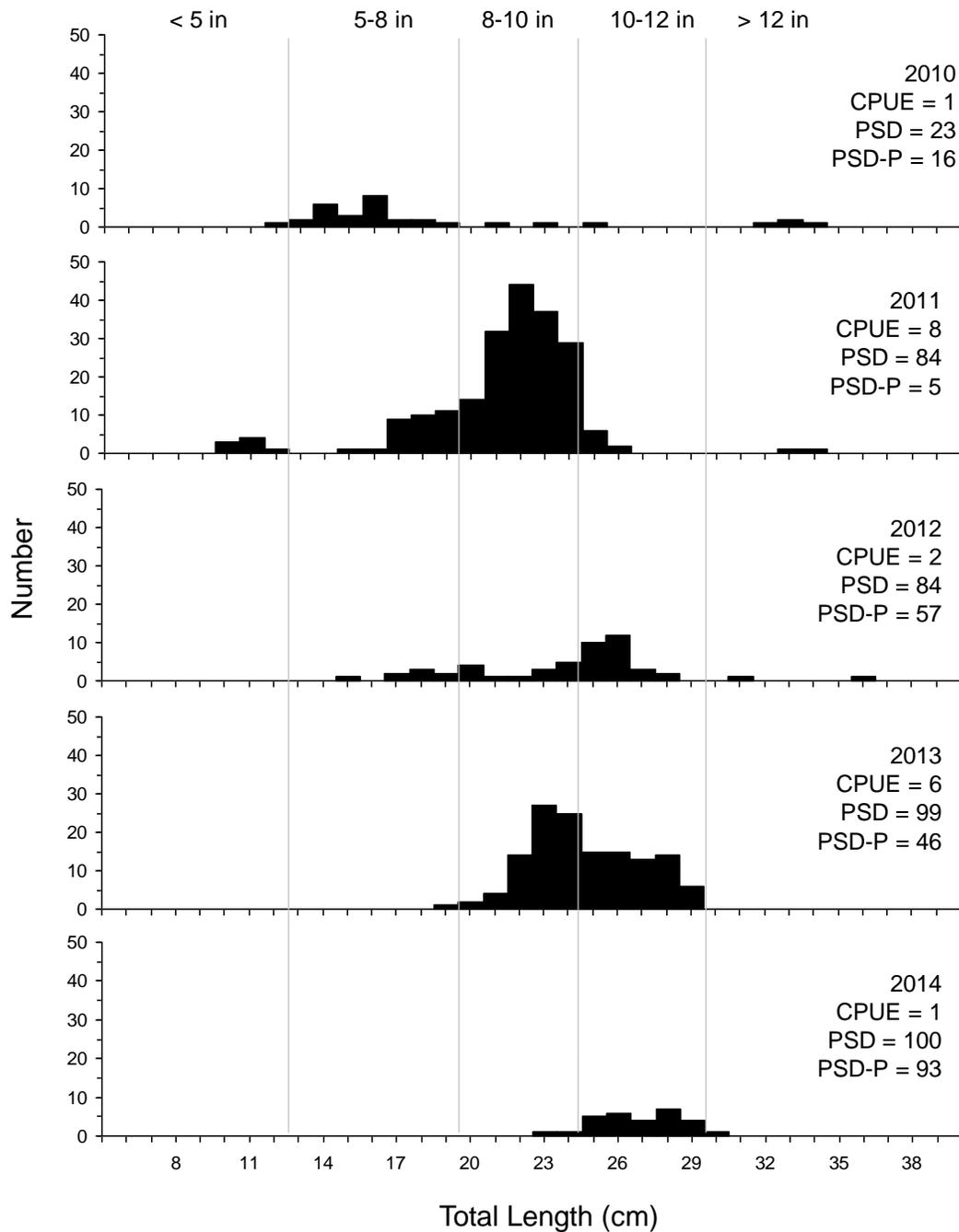


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Enemy Swim Lake, 2010-2014.

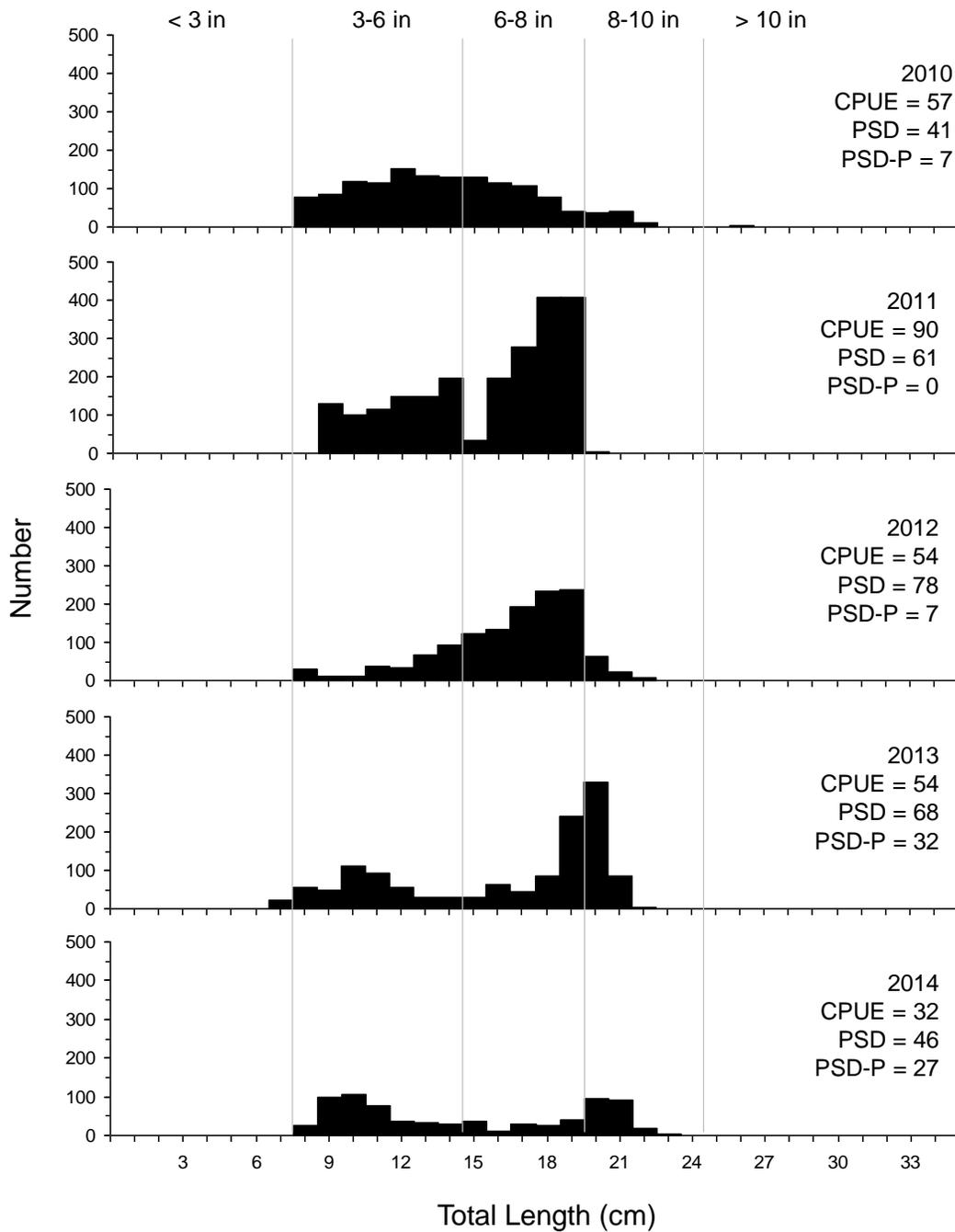


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Enemy Swim Lake, 2010-2014.

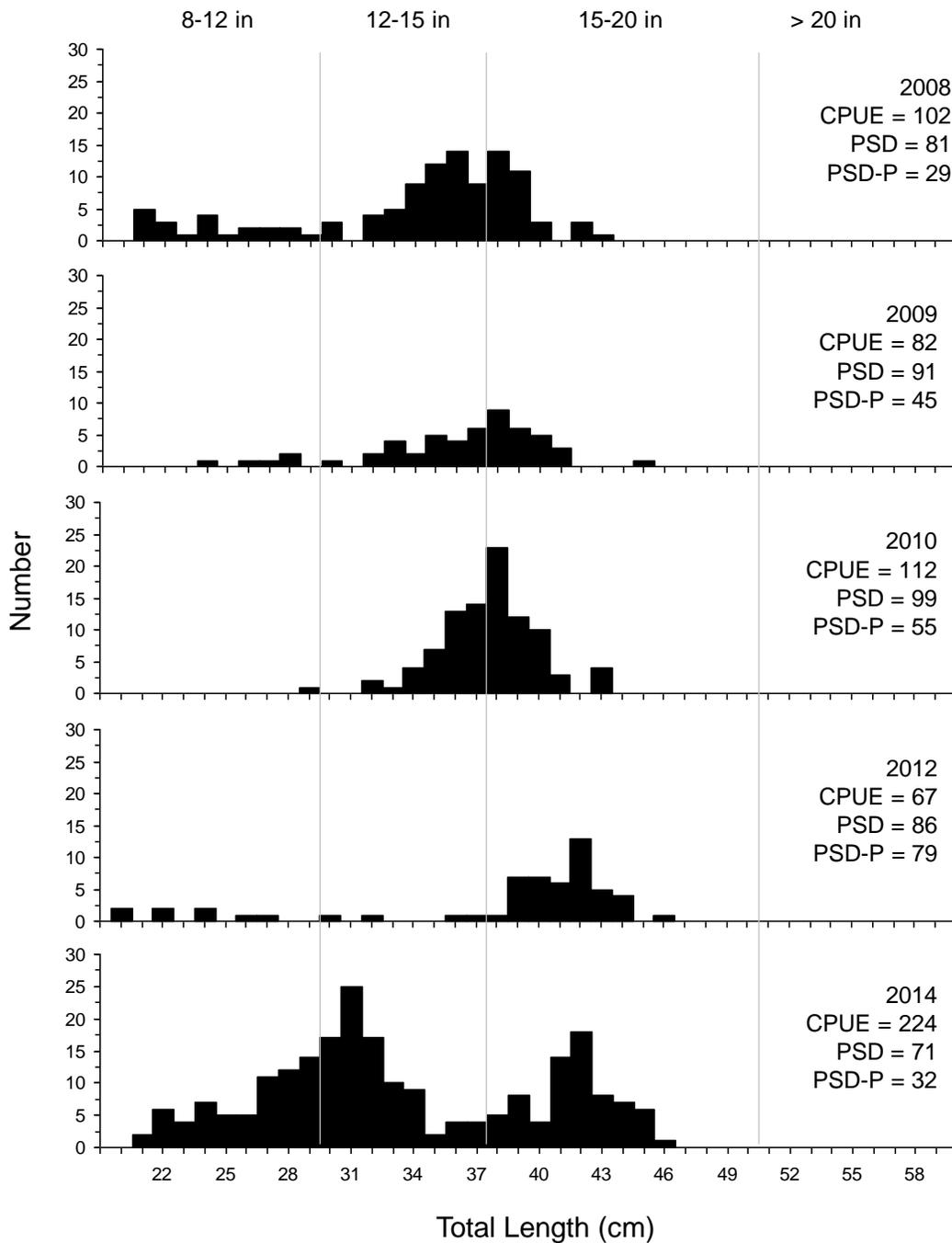


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for largemouth bass captured using spring night electrofishing in Enemy Swim Lake, 2008-2014.

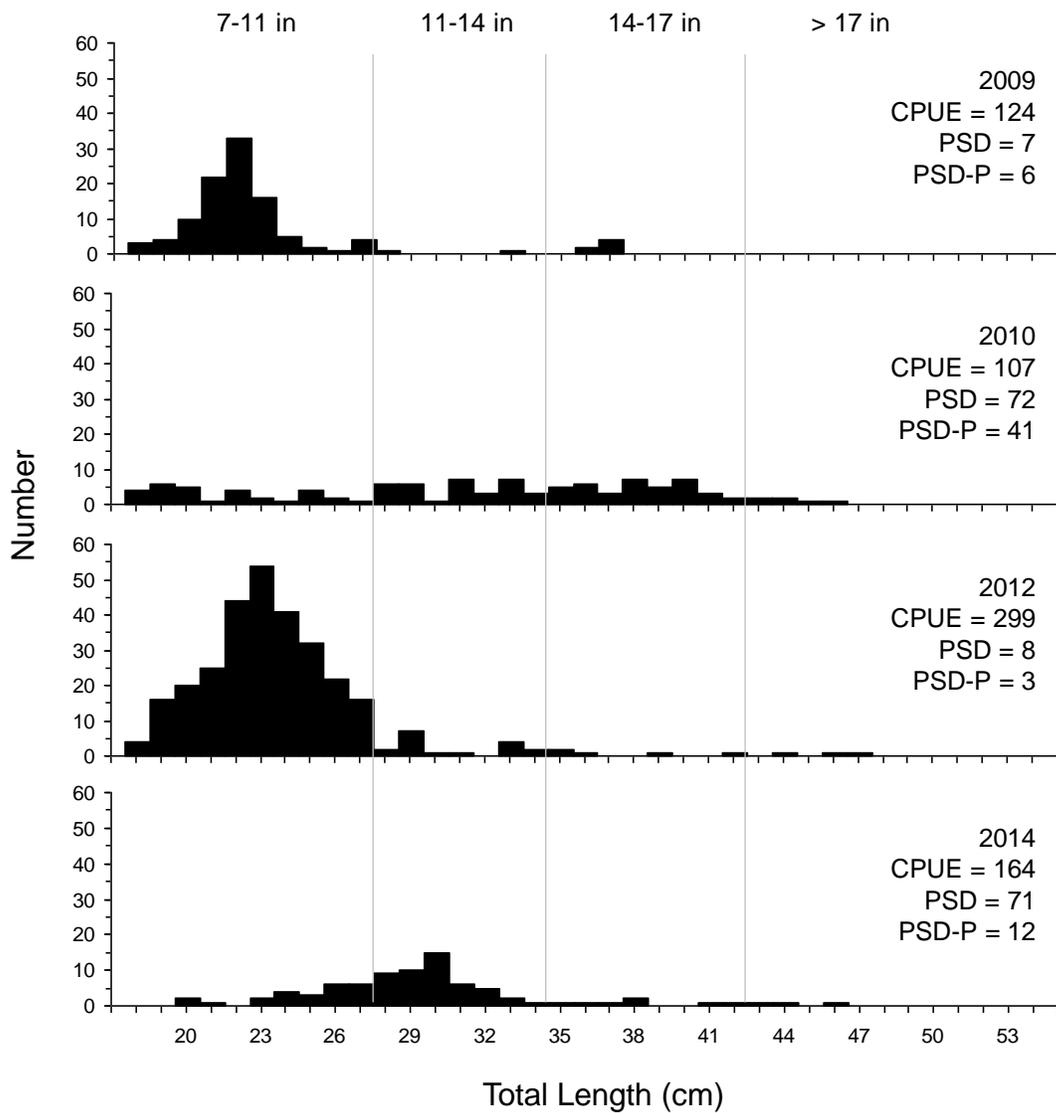


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for smallmouth bass captured using night electrofishing in Enemy Swim Lake, 2009-2014; day/night samples combined (2014).

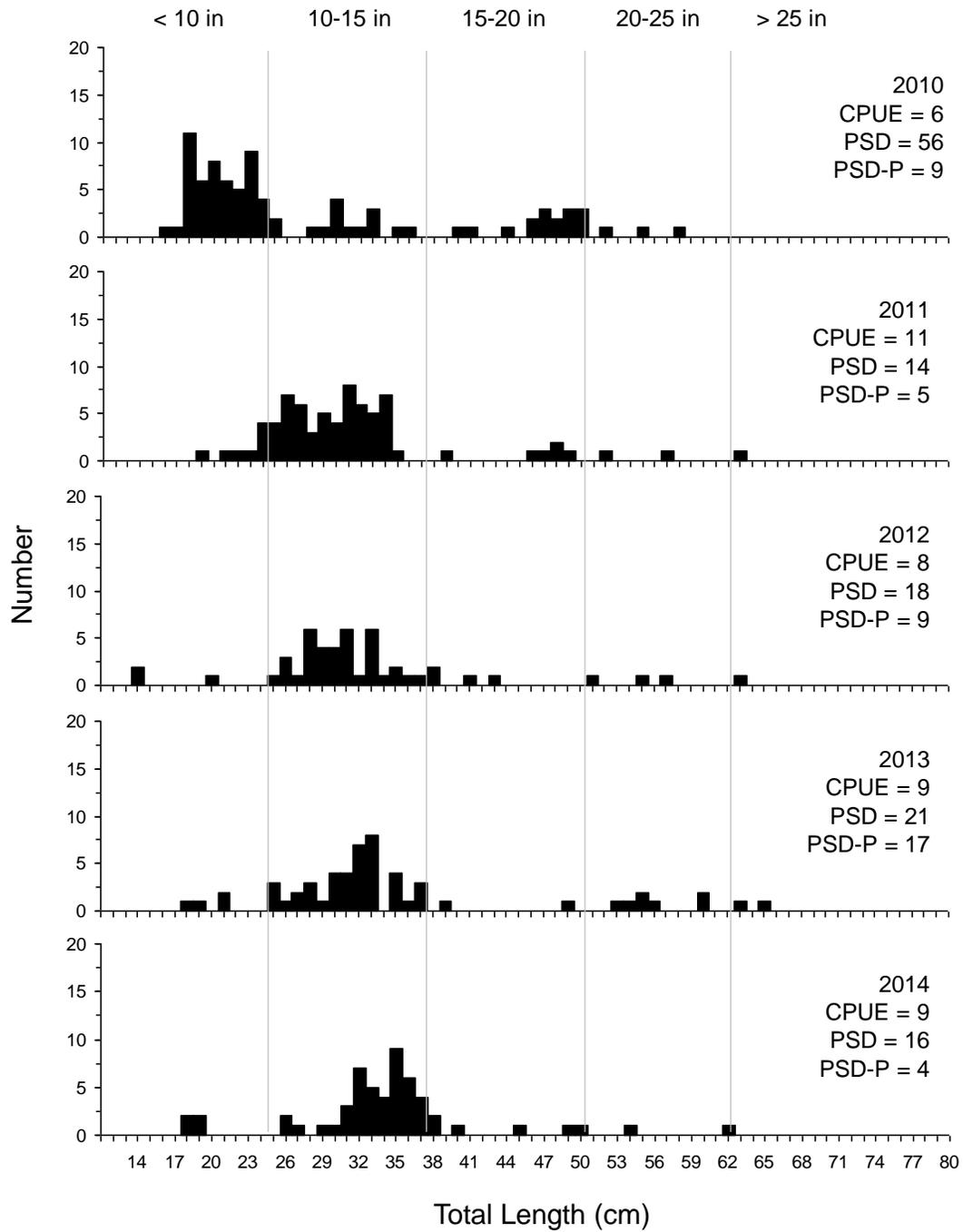


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Enemy Swim Lake, 2010-2014.

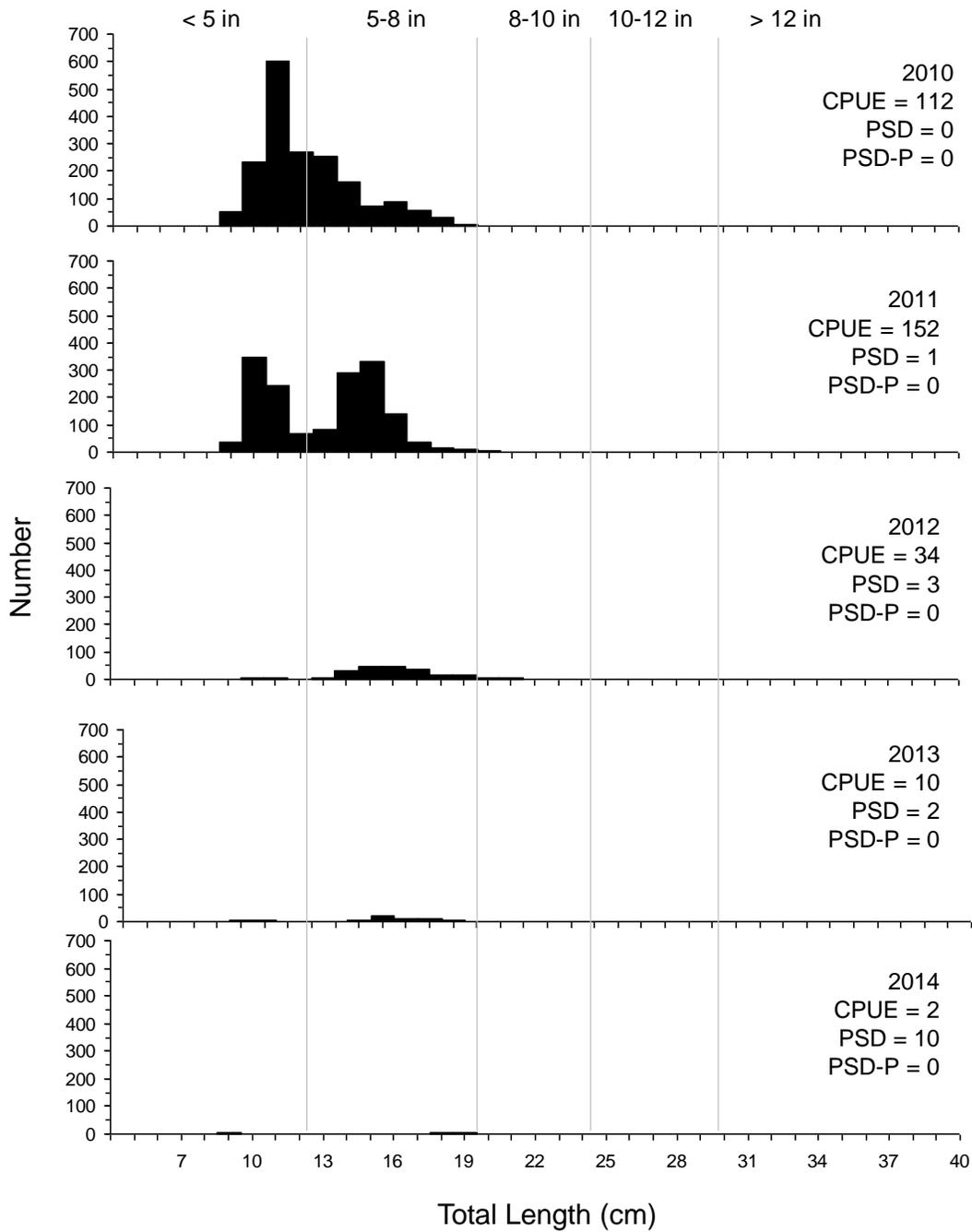


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Enemy Swim Lake, 2010-2014.

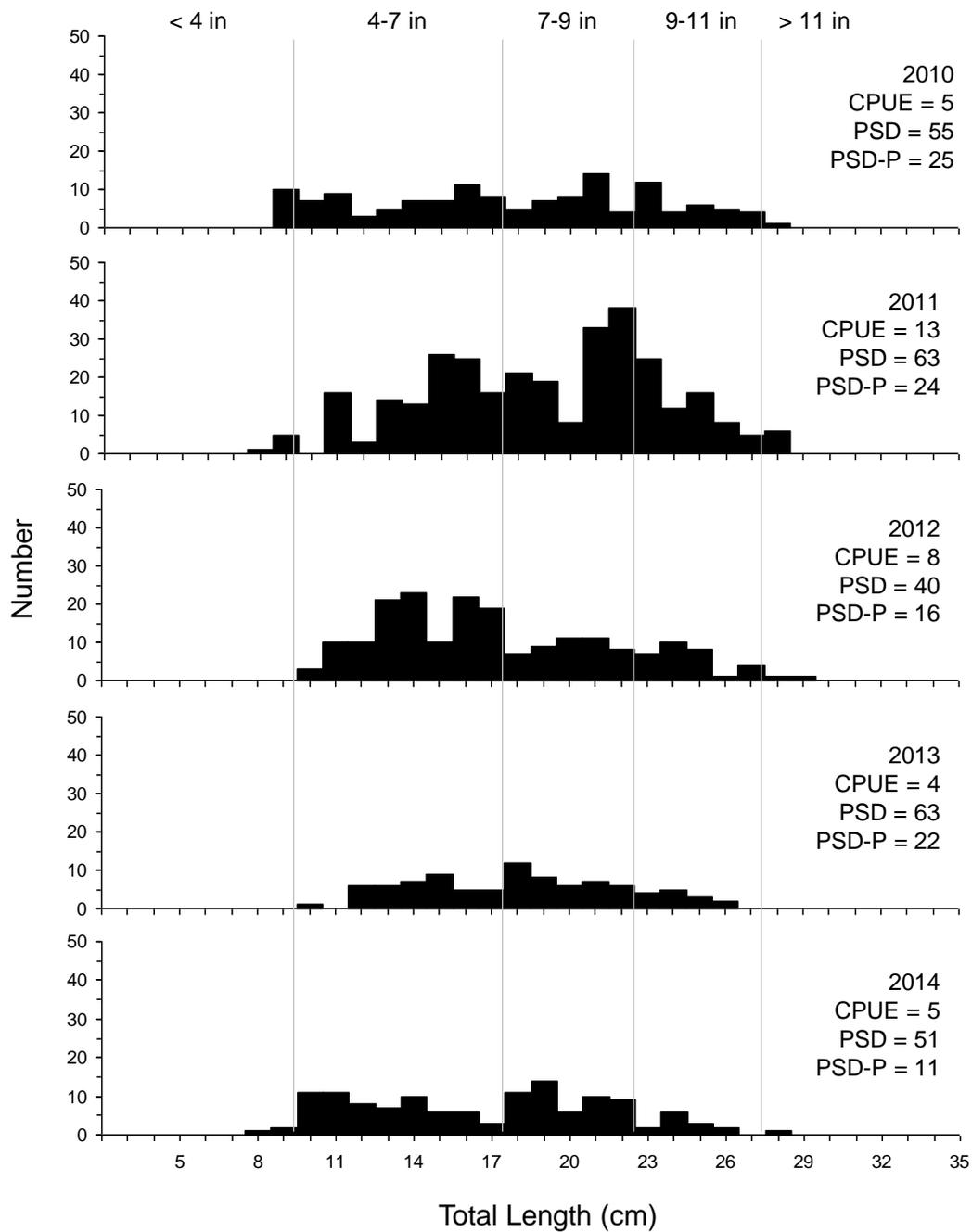


Figure 9. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for rock bass captured using frame nets in Enemy Swim Lake, 2010-2014.