

# Lake Cochrane

## Site Description

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### **Location**

Water designation number (WDN)	23-0005-00
Legal description	T114N-R47W-Sec.4-5,8
County (ies)	Deuel
Location from nearest town	5.5 miles south and 2 miles west of Gary, SD

### **Survey Dates and Sampling Information**

Dates of current survey	June 9, 2014 (EF-LMB) June 10-11, 2014 (FN, GN)
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Electrofishing-LMB (min)	62
Frame net sets (n)	12
Gill net sets (n)	3

### **Morphometry (Figure 1)**

Watershed area (acres)	833
Surface area (acres)	355
Maximum depth (ft)	24
Mean depth (ft)	13

### **Ownership and Public Access**

Lake Cochrane is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. A single public boat access site is present on the western shore of Lake Cochrane and is maintained by the SDGFP (Figure 1; Figure 2). The property surrounding Lake Cochrane is owned by the State of South Dakota and private parties.

### **Watershed and Land Use**

The Lake Cochrane watershed is comprised of a mix of cropland, pasture or grassland, municipal, woodland, and other uses. The Lake Cochrane shoreline is highly developed with lake homes and/or cabins present around nearly the entire shoreline.

### **Water Level Observations**

The South Dakota Water Management Board established OHWM is 1684.3 fmsl, and the outlet elevation of Lake Cochrane is 1682.8 fmsl. On May 5, 2014 the elevation of Lake Cochrane was 1681.9 fmsl; 0.6 ft higher than the 1681.3 fmsl observed on October 7, 2013. The water level of Lake Cochrane had increased in elevation to 1682.3 fmsl by October 27, 2014.

### **Fish Management Information**

Primary species	black crappie, sunfish (bluegill, green sunfish, bluegill X green sunfish hybrids), largemouth bass, walleye
Other species	black bullhead, common carp, northern pike, shorthead redhorse, white sucker, yellow perch
Lake-specific regulations	largemouth/smallmouth bass: only those <14", or 18" and longer may be taken; of those no more than one may be 18" or longer.
Management classification	warm-water permanent
Fish consumption advisories	none

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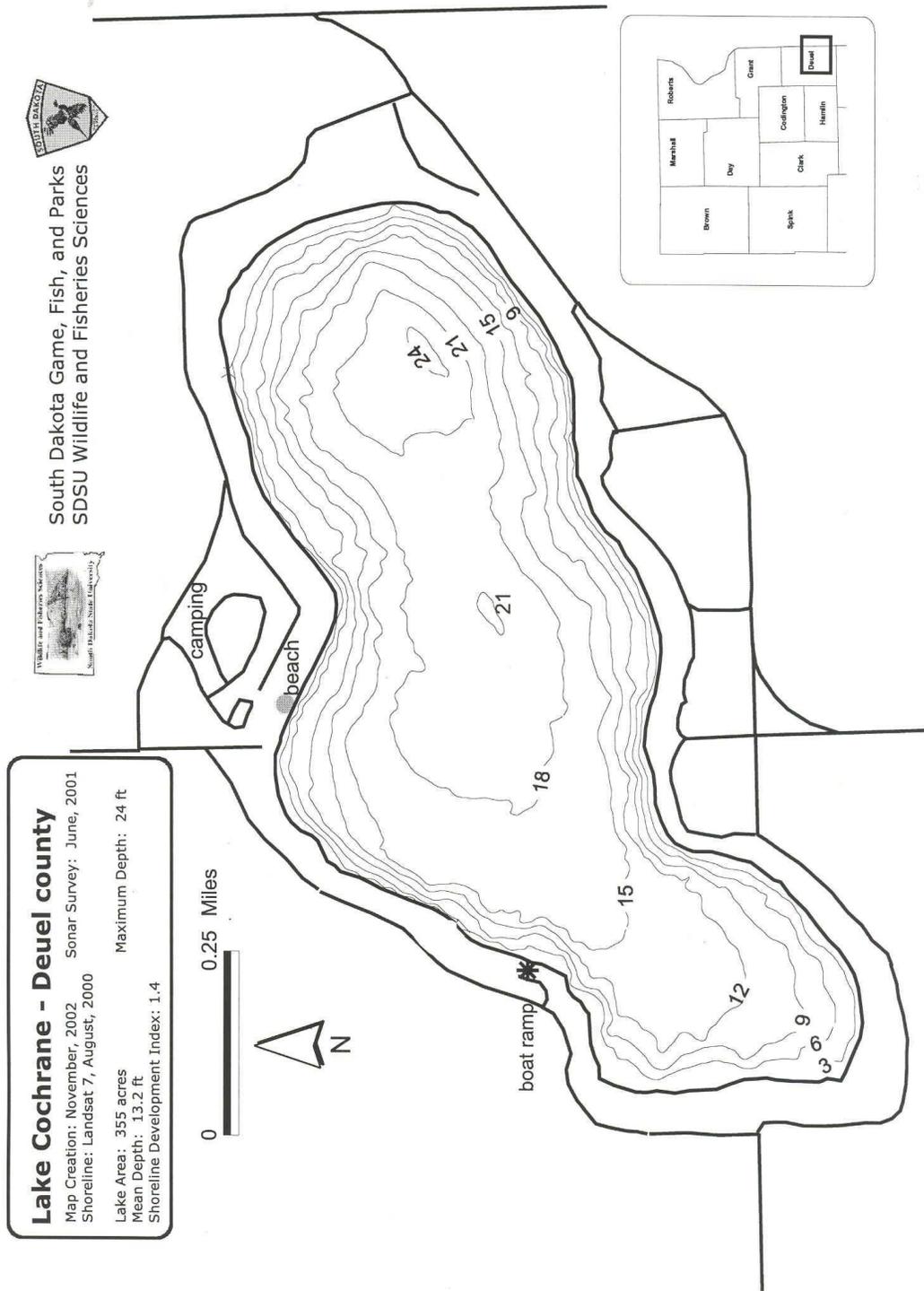


Figure 1. Contour map of Lake Cochrane, Deuel County, South Dakota.

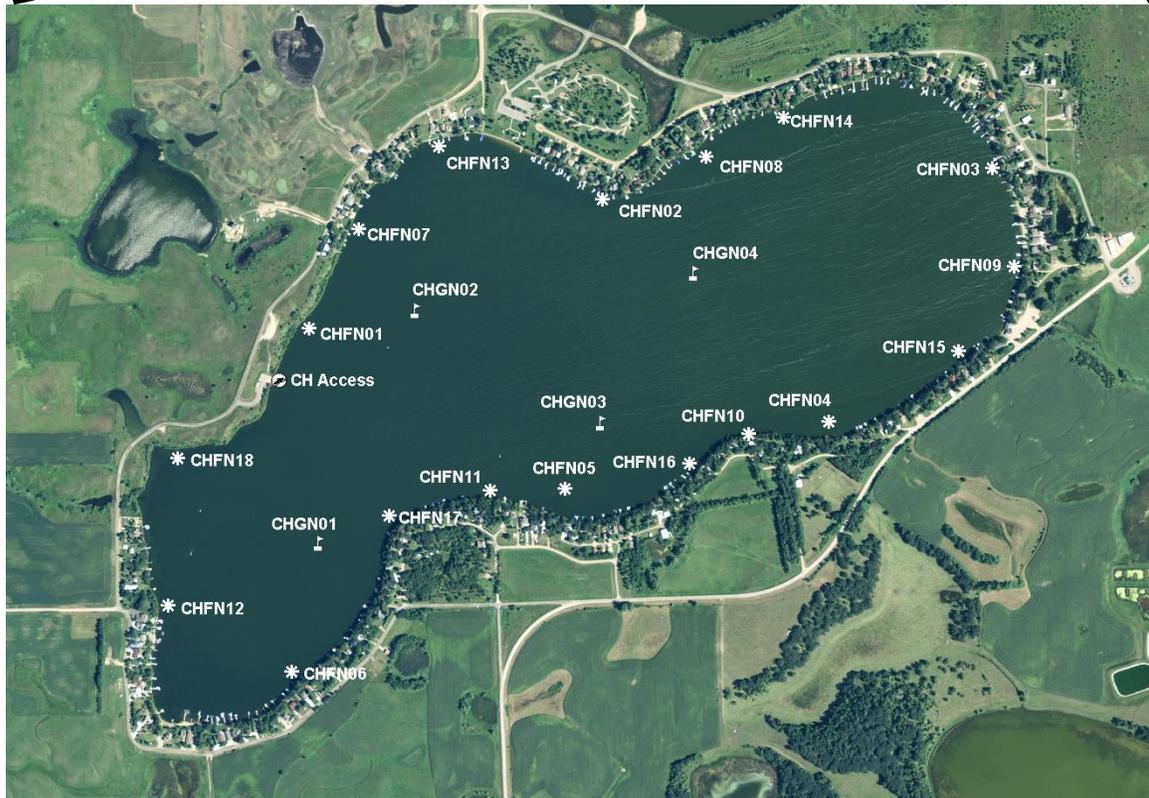


Figure 2. Map depicting geographic location of Lake Cochrane (Deuel County) from Gary, South Dakota (top). Also noted is the public access area and standardized net locations (bottom) for Lake Cochrane. CHF= frame net; CHGN= gill net

## Management Objectives

- 1) Maintain a mean frame net CPUE of stock-length black crappie  $\geq 10$ , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a mean spring night electrofishing CPUE of stock-length largemouth bass  $\geq 50$ , a PSD of 20-40, and a PSD-P of 0-10.
- 3) Maintain a mean frame net CPUE of stock-length sunfish (*Lepomis* spp.)  $\geq 25$ , a PSD of 30-60, and a PSD-P of 5-10.
- 4) Maintain a mean gill net CPUE of stock-length walleye  $\geq 10$ , a PSD of 30-60, and a PSD-P of 5-10.
- 5) Maintain a mean gill net CPUE of stock-length yellow perch  $\geq 30$ , a PSD of 30-60, and a PSD-P of 5-10.
- 6) Maintain a mean frame net CPUE of stock-length black bullhead  $\leq 100$ .

## Results and Discussion

Lake Cochrane is a small natural lake located in the eastern reaches of the Coteau des Prairie. The lake is a popular destination for various recreational activities and has one of the more developed shorelines in northeast South Dakota. Nearly the entire shoreline is surrounded by cabins and homes with the exception of state-owned lands within the state park and lake access area.

Currently, Lake Cochrane is primarily managed as a panfish [i.e., black crappie, sunfish (bluegill, green sunfish, and sunfish hybrids), and yellow perch], largemouth bass and walleye fishery.

### *Primary Species*

**Black Crappie:** In 2014, frame nets captured 13 black crappies that ranged in TL from 19 to 26 cm (7.5 to 10.2 in). The mean frame net CPUE of stock-length black crappie was 1.1 (Table 1) and below the management objective ( $\geq 10$  stock-length black crappie/net). Since 2002, mean frame net CPUE values ranged from a low of 0.1 (2010) to a high of 8.2 (2004). Based on the 2014 frame net CPUE, relative abundance is considered low.

Given the low sample size, few inferences can be made concerning size structure or condition.

Largemouth Bass: In 2014, the mean spring night electrofishing CPUE of stock-length largemouth bass was 82.3 (Table 1) and above the minimum objective ( $\geq 50$  stock-length largemouth bass/hr). The 2014 mean spring night electrofishing CPUE represented a decrease from the 2012 CPUE of 177.0 and was the lowest recorded since 2004 (Table 2).

Largemouth bass captured during spring night electrofishing during 2014 ranged in TL from 24 to 45 cm (9.4 to 17.7 in), had a PSD of 60 and a PSD-P of 21 (Table 1; Figure 4). Both the PSD and PSD-P were above the management objective ranges of 20-40 and 0-10 (Table 3); largemouth bass PSD and PSD-P objectives ranges are lower for Lake Cochrane than other waters managed for largemouth bass in region IV. The objective is to maintain a high-density largemouth bass population that will provide positive impacts to the size structure of panfish. It may be necessary to sacrifice some quality (e.g., decreased size structure) in the largemouth bass population to improve the sunfish population through predation. In 2014, approximately 28% of the largemouth bass captured during spring night electrofishing were within the 356 to 457 mm (14 to 18 in) protected-slot length.

Scales were collected from a sub-sample of largemouth bass from the 2014 spring night electrofishing survey. Ten consecutive year-classes (2002-2011) were present indicating consistent recruitment (Table 4). The high density of largemouth bass in Lake Cochrane has resulted in slow growth. In 2014, age-4 and age-5 largemouth bass (collected during spring electrofishing) had mean TL at capture values of 266 and 291 mm (10.5 to 11.5 in; Table 5), which was well below regional averages of 325 and 356 mm (12.8 and 14.0 in; Willis et al. 2001). Mean  $W_r$  values of largemouth bass captured during spring night electrofishing ranged from 86 to 115 for all 10-mm length groups sampled; a slight decreasing trend in condition was apparent as TL increased.

Sunfish: The sunfish population in Lake Cochrane is comprised of bluegill, green sunfish, and bluegill x green sunfish hybrids. Accurate identification of these sunfish is difficult. Therefore all bluegill, green sunfish and bluegill x green sunfish hybrids were pooled for analysis and will be collectively referred to as sunfish throughout this report.

The 2014 mean frame net CPUE of stock-length sunfish was 44.5 (Table 1) and above the minimum objective ( $\geq 25$  stock-length sunfish/net night; Table 3). Sunfish in Lake Cochrane tend to exhibit consistent recruitment resulting in a population with high relative abundance. Since 2002, the mean frame net CPUE of stock-length sunfish has ranged from a low of 35.1 (2010) to a high of 132.7 (2004; Table 2).

Frame net captured sunfish ranged in TL from 4 to 22 cm (1.6 to 8.7 in); most were in the quality-preferred length category, which resulted in a PSD of 69 and PSD-P of 4 (Table 1; Figure 5). The 2014 PSD was above the objective range of 30-60; while the PSD-P was slightly below the objective range of 5-10 (Table 3). Predation from abundant largemouth bass plays an important role in the size structure of the sunfish population in Lake Cochrane. Wilson et al. (2000) reported that slight improvements in bluegill size structure from 1994 to 1999 may be a result of increased predation by an increased density of largemouth bass in Lake Cochrane. Kaufman et al. (2008) reported that the high density largemouth bass population in Lake Cochrane appeared to be improving the sunfish size structure as PSD-P values increased between 2002

and 2006 and exceeded the management objective in 2006 (Table 3; Figure 5). However, fewer preferred-length sunfish have been captured in the frame net catch in recent surveys (Table 3; Figure 5).

Otoliths were collected from a sub-sample of sunfish in Lake Cochrane during 2014; 10 consecutive year classes (2005-2013) were present (Table 6). Cohorts produced from 2007-2009 were the most abundant and collectively comprised 73% of sunfish in the frame net catch (Table 6).

Wilson et al. (2000) reported slow growth of bluegill with fish reaching quality-length (15 cm; 6 in) at age-7. Since 2010, weighted mean TL at capture values have ranged from 157 to 167 mm (6.2 to 6.6 in) at age 5 (Table 7). In 2014, the weighted mean TL at capture of age-5 sunfish was 157 mm (6.2 in; Table 7). Mean Wr values exceeded 100 for all length categories (e.g., stock to quality) sampled. The mean Wr of stock-length sunfish was 106 (Table 1) and no length-related trends in Wr were apparent during 2014. Seasonal influences (i.e., spawning behavior) may have influenced mean Wr values for sunfish in Lake Cochrane.

Walleye: In 2014, gill nets captured nine walleye that ranged in TL from 35 to 47 cm (13.8 to 18.5 in) and represented four year classes (2008-2010, and 2012; Table 8; Figure 6). The mean gill net CPUE of stock-length walleye was 3.0 (Table 1) and below the objective range ( $\geq 10$  stock length walleye/net night; Table 3). Since 2002, mean gill net CPUE values have fluctuated from a low of 1.8 (2012) to a high of 8.0 (2004; Table 2). Despite relatively-frequent large fingerling stockings, walleye relative abundance remains low (Table 2; Table 10).

Few inferences can be made concerning size structure, growth, or condition due to the low sample size.

Yellow Perch: Yellow perch in Lake Cochrane have a long history of slow growth, poor size structure, and relatively high abundance of sub-quality length fish (Ermer et al. 2006). The 2014 mean gill net CPUE of stock-length yellow perch was 170.0 (Table 1). Since 2002, the mean gill net CPUE of stock-length yellow perch has fluctuated with a low of 5.3 (2008) and a high of 170.0 (2014; Table 2). Currently, relative abundance is high.

Gill net captured yellow perch ranged in TL from 8 to 27 cm (3.1 to 10.6 in), had a PSD of 34 and a PSD-P of 5 (Table 1; Figure 7). Both the PSD and PSD-P were within management objectives of 30-60 and 5-10, respectively (Table 3).

Otoliths were collected from a sub-sample of gill net captured yellow perch; eight consecutive year-classes (2006-2013) were present indicating consistent recruitment (Table 11). The 2012 cohort was the most represented and comprised 55% of yellow perch in the sample (Table 11).

Yellow perch in Lake Cochrane tend to be long-lived with relatively slow growth. The weighted mean TL at capture of age-4 and age-5 male yellow perch was 194 and 210 mm (7.6 and 8.3 in.; Table 12). The weighted mean TL at capture of age-4 and age-5 female yellow perch was 208 and 240 mm (8.2 and 9.4 in.; Table 12). Mean Wr values exceeded 90 all length categories (e.g., stock to quality) sampled. The mean Wr of stock-length yellow perch was 97 (Table 1) and no length-related trends in condition were observed.

## *Other Species*

**Black Bullhead:** No black bullheads were captured in the 2014 frame net catch and only a single individual was captured by gill nets (Table 1). Black bullhead relative abundance has declined in each survey conducted from 2002-2014 (Table 2; Figure 8). Apparent low recruitment in recent years has resulted in a declining black bullhead population in Lake Cochrane.

**Northern Pike:** Northern pike typically are not sampled consistently using standard lake survey methods; however, northern pike abundance is believed to be moderate. In 2014, nine northern pike ranging in TL from 58 to 82 cm ( 22.8 to 32.3 in) were sampled; the mean gill net CPUE of stock-length northern pike was 3.0 (Table 1) and the highest observed since 2002 (Table 2).

Given the low sample size, few inferences can be made concerning size structure or condition.

## **Management Recommendations**

- 1) Conduct fish population assessment surveys utilizing frame nets and gill nets on a biennial basis (next survey scheduled in summer 2016) to monitor fish relative abundance, fish population size structure, fish growth and stocking success.
- 2) Conduct spring night electrofishing on a biennial basis (in conjunction with netting survey) to monitor largemouth bass population parameters.
- 3) Collect otoliths from sunfish (bluegill, green sunfish, and bluegill x green sunfish hybrids), walleye and yellow perch; scales from largemouth bass to assess age structure and growth rates of each population.
- 4) Stock walleye at ( $\approx$ 25 large fingerlings/acre) on a biennial basis to establish additional year-classes.
- 5) Consider re-implementation of the 381-mm (15-in) minimum length limit on largemouth bass to better align with management objectives for Lake Cochrane. The regulation is designed to maintain a high density population of largemouth bass < 381 mm (15 in) to promote predation on small panfish and/or rough fish (Blackwell and Lucchesi 2009).
- 6) 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; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish for various fish species captured in frame nets, experimental gill nets, and spring night electrofishing in Lake Cochrane, 2014. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). BLB= black bullhead; BLC= black crappie; LMB= largemouth bass; NOP= northern pike; SUN= sunfish (bluegill, green sunfish, bluegill X green sunfish hybrids); WAE= walleye; 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>								
BLC	1.1	0.9	85	19	38	25	93	2
SUN	44.5	12.0	69	4	4	2	106	1
YEP	2.9	1.5	49	15	6	6	84	1
<i>Gill nets</i>								
BLB	0.3	0.6	100	---	100	---	82	<1
BLC	0.3	0.6	100	---	100	---	99	<1
NOP	3.0	1.9	100	---	78	28	92	5
SUN	0.3	0.6	100	---	0	---	105	<1
WAE	3.0	1.9	56	33	0	---	90	4
YEP	170.0	45.1	34	4	5	2	97	<1
<i>Electrofishing</i>								
LMB <sup>1</sup>	82.3	17.3	60	9	21	8	102	1

<sup>1</sup> Spring night electrofishing-LMB.

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in frame nets, experimental gill nets, and spring night electrofishing in Lake Cochrane, 2002-2014. BLB= black bullhead; BLC= black crappie; COC= common carp; LMB= largemouth bass; NOP= northern pike; SHR= shorthead redhorse; SUN= sunfish (bluegill, green sunfish, bluegill X green sunfish hybrids); WAE= walleye; WHS= white sucker; YEP= yellow perch

Species	CPUE						
	2002	2004	2006 <sup>1</sup>	2008	2010	2012	2014
<i>Frame nets</i>							
BLB	51.5	30.1	13.8	6.4	3.5	0.2	0.0
BLC	3.9	8.2	3.6	1.3	0.1	1.3	1.1
LMB	0.0	0.3	0.2	0.1	0.1	0.0	0.0
NOP	0.0	0.1	0.0	0.1	0.1	0.1	0.0
SUN	49.8	132.7	55.1	38.8	35.1	67.8	44.5
WAE	0.3	0.7	0.2	0.2	0.2	0.3	0.0
YEP	4.9	4.9	9.7	12.5	2.2	0.9	2.9
<i>Gill nets</i>							
BLB	8.3	2.8	2.0	0.8	0.8	0.3	0.3
BLC	0.5	2.5	0.3	0.3	1.0	19.0	0.3
COC	0.0	0.0	0.0	0.0	0.3	0.0	0.0
LMB	0.0	3.3	1.2	0.8	0.8	0.8	0.0
NOP	0.7	0.2	0.8	0.8	0.8	2.5	3.0
SHR	0.0	0.2	0.0	0.0	0.0	0.0	0.0
SUN	3.6	3.5	4.8	1.0	3.5	4.8	0.3
WAE	4.7	8.0	6.7	4.3	7.3	1.8	3.0
WHS	0.0	0.0	0.2	0.0	0.0	0.0	0.0
YEP	130.3	67.2	69.7	5.3	54.3	38.5	170.0
<i>Electrofishing</i>							
LMB <sup>2</sup>	---	128.4	148.0	100.0	123.0	177.0	82.3

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

<sup>2</sup> Spring night electrofishing.

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in frame nets, experimental gill nets, and electrofishing in Lake Cochrane, 2002-2014. BLB= black bullhead; BLC= black crappie; LMB= largemouth bass; SUN= sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid); WAE= walleye; YEP= yellow perch

Species	2002	2004	2006 <sup>1</sup>	2008	2010	2012	2014	Objective
<i>Frame nets</i>								
BLB								
CPUE	52	30	14	6	4	<1	0	≤ 100
PSD	100	100	97	99	100	100	---	---
PSD-P	28	54	96	75	97	100	---	---
Wr	88	89	100	99	97	95	---	---
BLC								
CPUE	4	8	4	1	<1	1	1	≥ 10
PSD	77	45	51	43	0	100	85	30-60
PSD-P	10	14	11	9	0	0	38	5-10
Wr	88	95	97	95	102	95	93	---
SUN								
CPUE	50	133	55	39	35	68	45	≥ 25
PSD	86	91	77	79	53	94	69	30-60
PSD-P	1	3	11	2	4	1	4	5-10
Wr	---	---	108	108	107	105	106	---
<i>Gill nets</i>								
WAE								
CPUE	5	8	7	4	7	2	3	≥ 10
PSD	64	13	15	18	45	43	56	30-60
PSD-P	54	10	5	6	3	0	0	5-10
Wr	87	78	89	87	90	90	90	---
YEP								
CPUE	130	67	70	5	54	39	170	≥ 30
PSD	31	51	59	29	38	26	34	30-60
PSD-P	0	0	3	0	0	0	5	5-10
Wr	92	89	98	90	93	101	97	---
<i>Electrofishing</i>								
LMB <sup>2</sup>								
CPUE	---	128	148	100	123	177	82	≥ 50
PSD	---	26	17	48	24	43	60	20-40
PSD-P	---	1	1	5	5	14	21	0-10
Wr	---	85	98	99	96	97	102	---

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

<sup>2</sup> Spring night electrofishing-LMB.

Table 4. Year class distribution based on the expanded age/length summary for largemouth bass sampled in gill nets and associated stocking history (# stocked x 1,000) from Lake Cochrane, 2008-2014.

Survey Year	Year Class												
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
2014				5	2	14	28	12	8	5	5	3	1
2012 <sup>1</sup>	---	---				3	70	16	22	30	21	12	3
2010 <sup>1</sup>	---	---	---	---			1	11	20	51	6	12	11
2008 <sup>1</sup>	---	---	---	---	---	---				79	37	20	21

<sup>1</sup>Older largemouth bass were captured, but are not included in the table.

Table 5. Weighted mean TL at capture (mm) for largemouth bass age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Cochrane, 2006-2014. 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 <sup>1</sup>	---	---	263(5)	266(2)	291(14)	306(28)	337(12)	359(8)	414(5)	436(5)
2012 <sup>1</sup>	---	---	211(3)	214(70)	279(16)	299(22)	336(30)	358(21)	413(12)	459(3)
2010 <sup>1</sup>	---	147(1)	223(11)	248(20)	256(51)	310(6)	320(12)	330(11)	360(3)	400(4)
2008	---	---	186(79)	222(37)	242(20)	302(21)	330(23)	348(7)	377(8)	---
2006	121(4)	192(25)	244(12)	263(56)	274(63)	336(11)	389(2)	---	---	---
2005	---	214(11)	216(71)	260(40)	311(11)	326(1)	---	---	---	---

<sup>1</sup>Older largemouth bass were captured, but are not included in the table.

Table 6. Year class distribution based on the expanded age/length summary for sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid) sampled in frame nets from Lake Cochrane, 2010-2014.

Survey Year	Year Class												
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
2014		1	11	54	54	142	110	142	21	1	1		
2012	---	---			9	6	193	460	140		4		2
2010 <sup>1</sup>	---	---	---	---				44	117	345	71	27	2

<sup>1</sup>Older sunfish were captured, but are not included in the table.

Table 7. Weighted mean TL (mm) at capture for sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid) age-1 through age-10 sampled in frame nets (expanded sample size) from Lake Cochrane, 2010-14.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2014	47(1)	82(11)	105(54)	133(54)	157(142)	175(110)	181(142)	198(21)	210(1)	212(1)
2012	---	86(9)	98(6)	164(193)	167(460)	178(140)	---	204(4)	---	204(2)
2010	---	---	110(44)	130(117)	159(345)	182(71)	199(27)	211(2)	238(1)	212(2)

Table 8. 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 Lake Cochrane, 2008-2014.

Survey Year	Year Class											
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2014			3		4	1	1					
2012	---	---			3		6					
2010 <sup>1</sup>	---	---	---	---			10			16		
2008 <sup>1</sup>	---	---	---	---	---	---				13	1	1
# stocked												
fry												
sm. fingerling												
lg. fingerling		11	4		3		7			16		

<sup>1</sup>Older walleye were captured, but not included in the table.

Table 9. Weighted mean TL at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Cochrane, 2006-2014.

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	---	356(3)	---	404(4)	421(1)	472(1)	---	---	---	---
2012	---	226(3)	---	390(6)	---	---	---	---	---	---
2010	---	274(10)	---	---	405(16)	---	---	---	526(3)	---
2008	---	---	284(13)	304(1)	255(1)	443(3)	400(1)	---	---	---
2006	245(1)	---	314(1)	348(29)	351(8)	432(1)	---	---	---	579(1)

Table 10. Stocking history including size and number for fishes stocked into Lake Cochrane, 2001-2014. WAE=walleye

Year	Species	Size	Number
2002	WAE	large fingerling	4,509
2005	WAE	large fingerling	16,000
2008	WAE	large fingerling	7,068
2010	WAE	large fingerling	3,176
2012	WAE	large fingerling	3,725
2013	WAE	large fingerling	11,132

Table 11. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Lake Cochrane, 2010-2014.

Survey Year	Year Class											
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2014		26	298	32	39	85	48	12	2			
2012	---	---				56	65	24	7	4		
2010 <sup>1</sup>	---	---	---	---		13	74	71	11	65	8	2

<sup>1</sup>Older yellow perch were captured, but are not included in the table.

Table 12. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Lake Cochrane, 2010-2014.

Year	Age								
	1	2	3	4	5	6	7	8	9
2014									
Male	97(10)	155(105)	184(13)	194(21)	210(25)	222(6)	217(3)	222(2)	---
Female	100(15)	164(203)	204(12)	208(13)	240(66)	240(44)	229(3)	---	---
Combined	98(26)	160(298)	191(32)	196(39)	232(85)	238(48)	227(12)	222(2)	---
2012									
Male	---	---	159(19)	183(17)	188(10)	203(3)	---	---	---
Female	---	---	159(35)	198(53)	200(9)	233(2)	202(5)	---	---
Combined	---	---	161(56)	193(65)	192(24)	212(7)	205(4)	---	---
2010									
Male	101(7)	142(35)	164(33)	187(4)	215(24)	225(4)	---	---	223(2)
Female	95(7)	157(39)	184(38)	204(6)	226(44)	---	242(2)	---	---
Combined	98(13)	149(74)	173(71)	197(11)	221(65)	228(8)	242(2)	---	223(2)

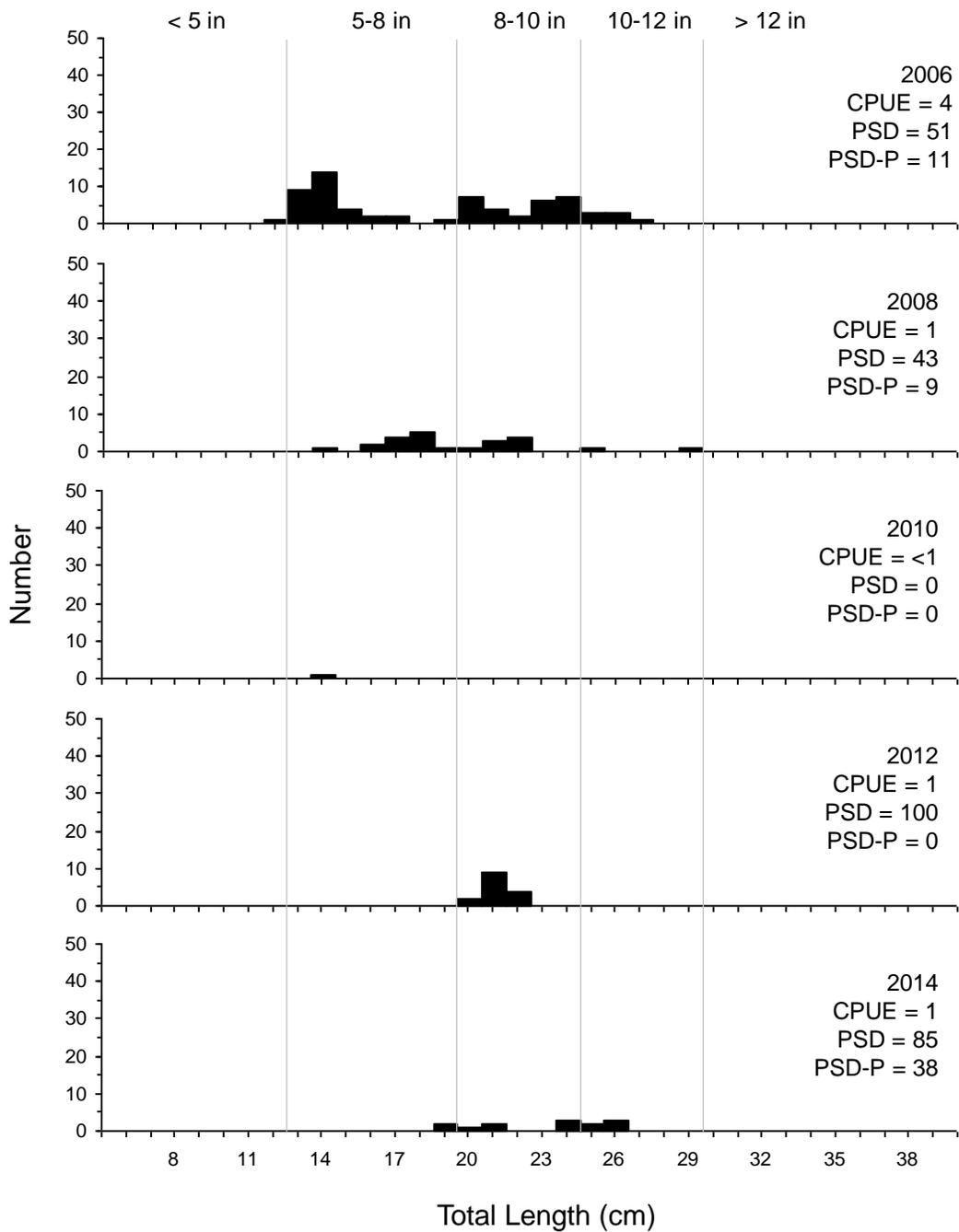


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish black crappie captured using frame nets in Lake Cochrane, 2002-2014.

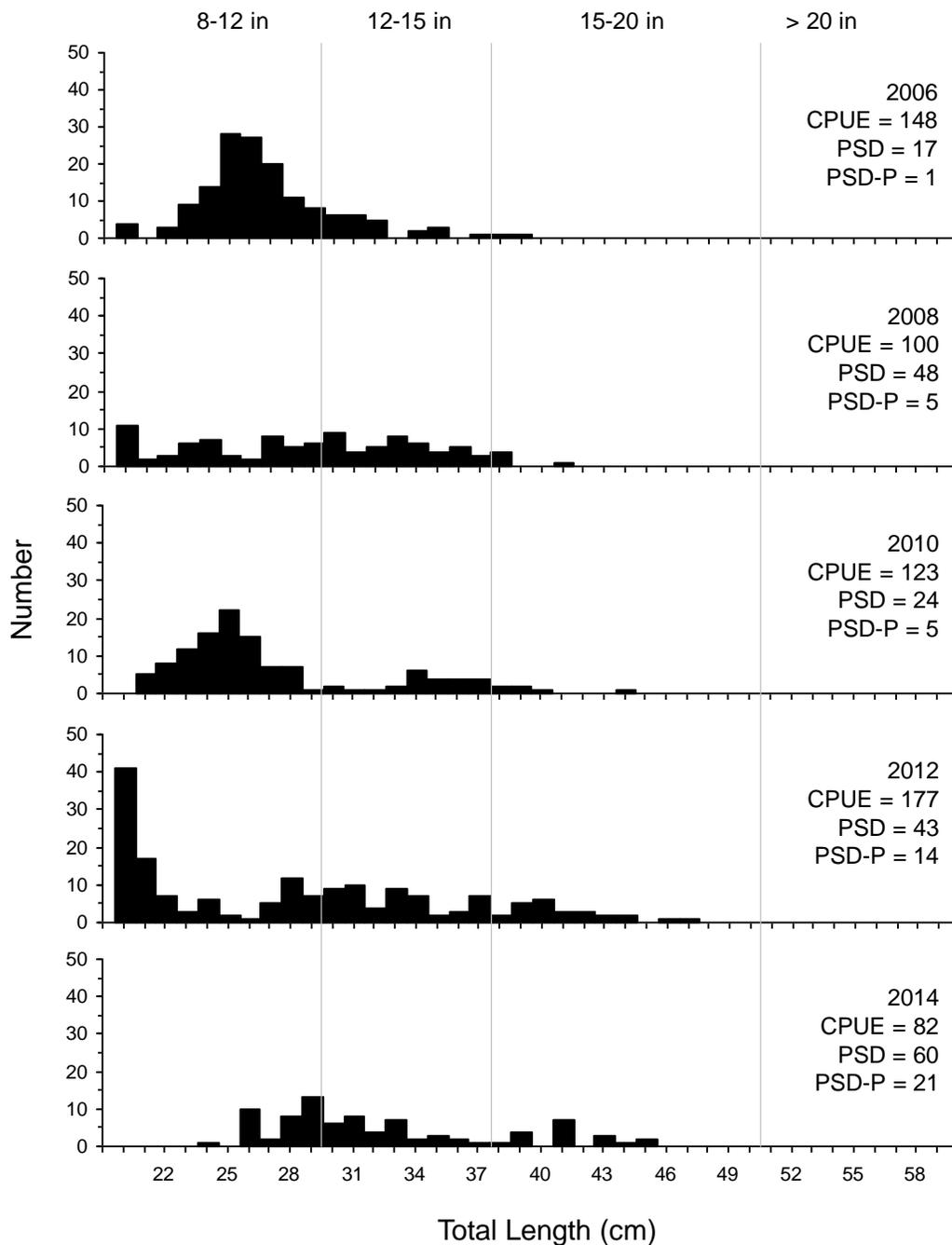


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish largemouth bass captured during spring night electrofishing from Lake Cochrane, 2006-2014.

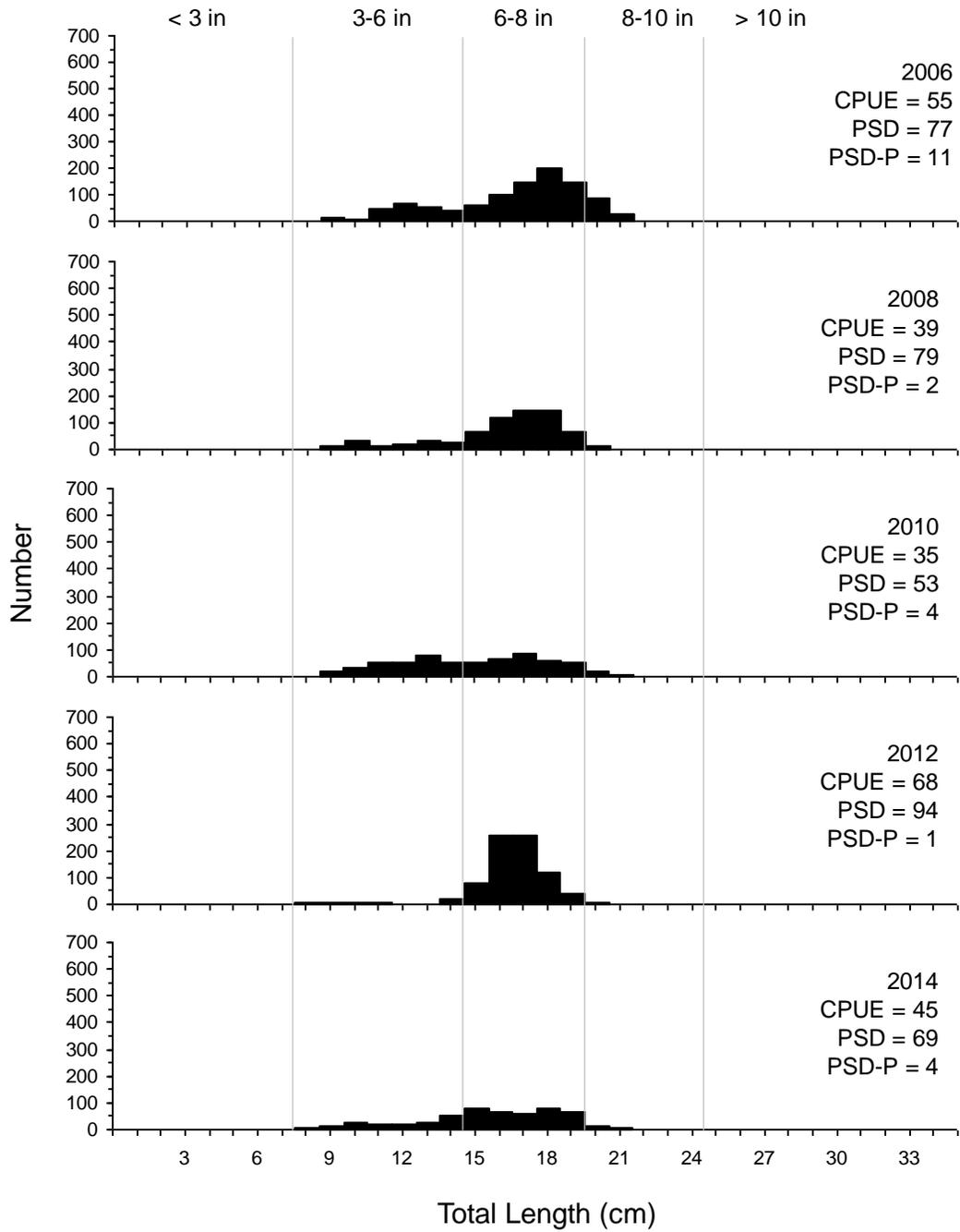


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid) captured using frame nets in Lake Cochrane, 2006-2014.

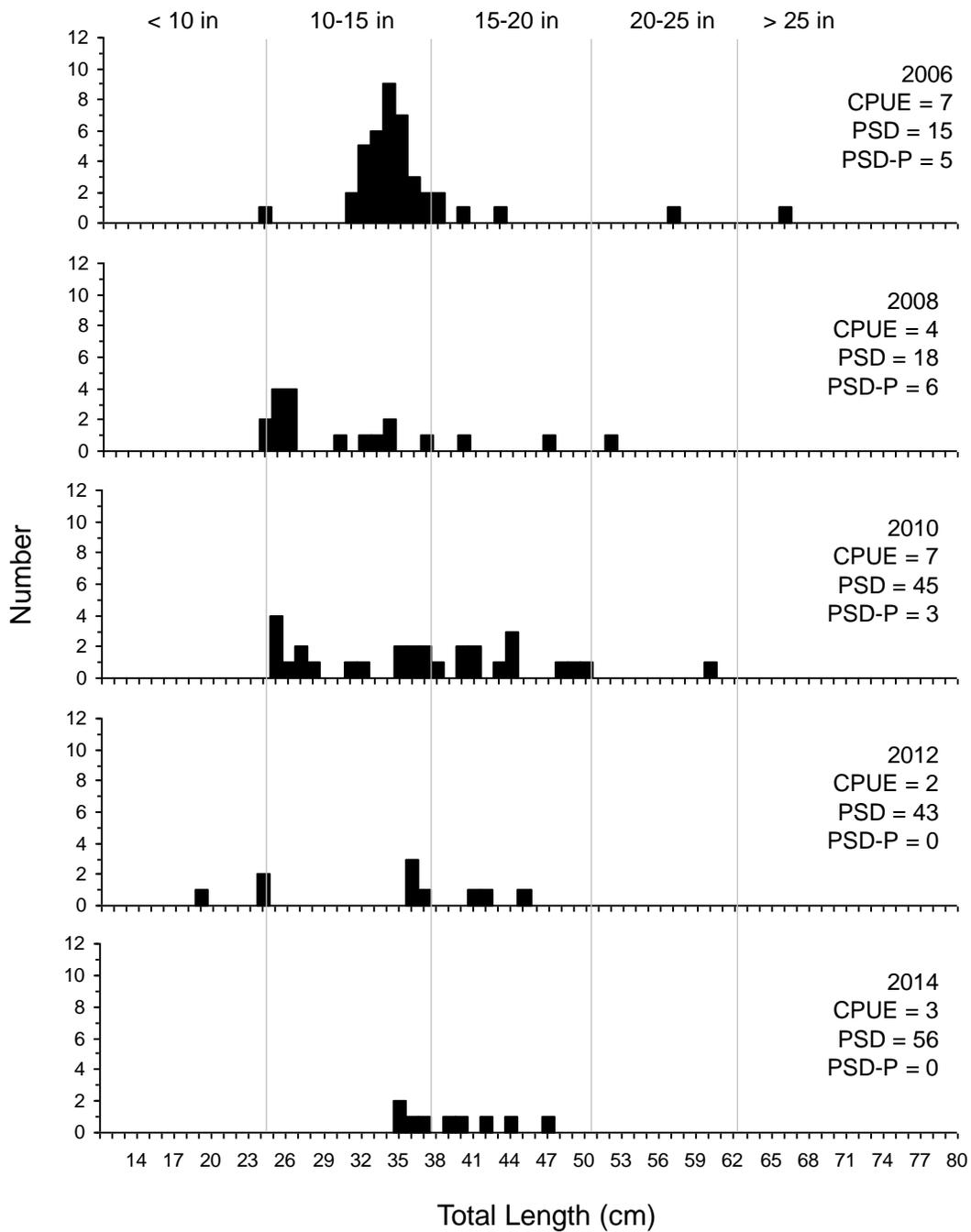


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish walleye captured using gill nets in Lake Cochrane, 2006-2014.

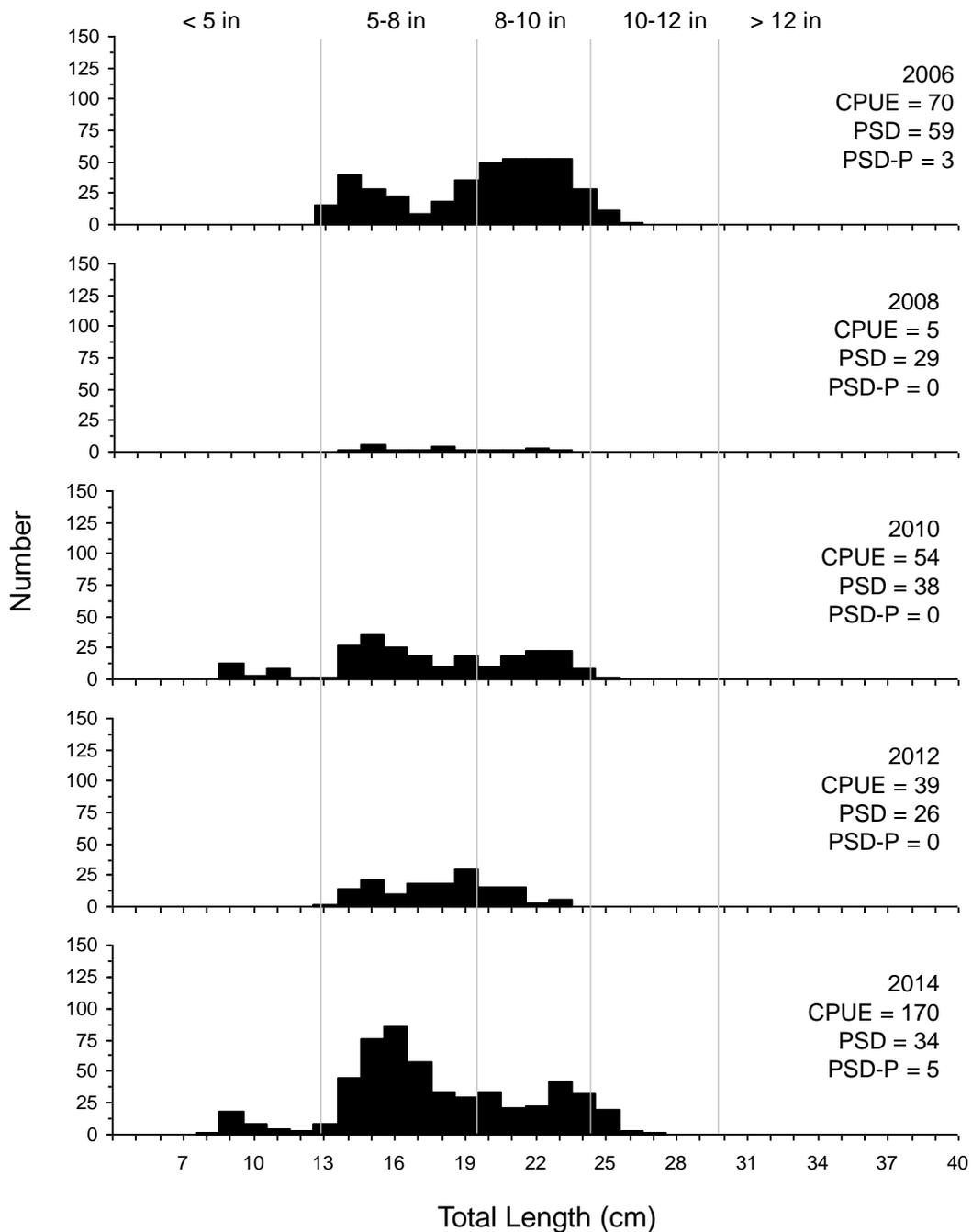


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish yellow perch captured using gill nets in Lake Cochrane, 2006-2014.

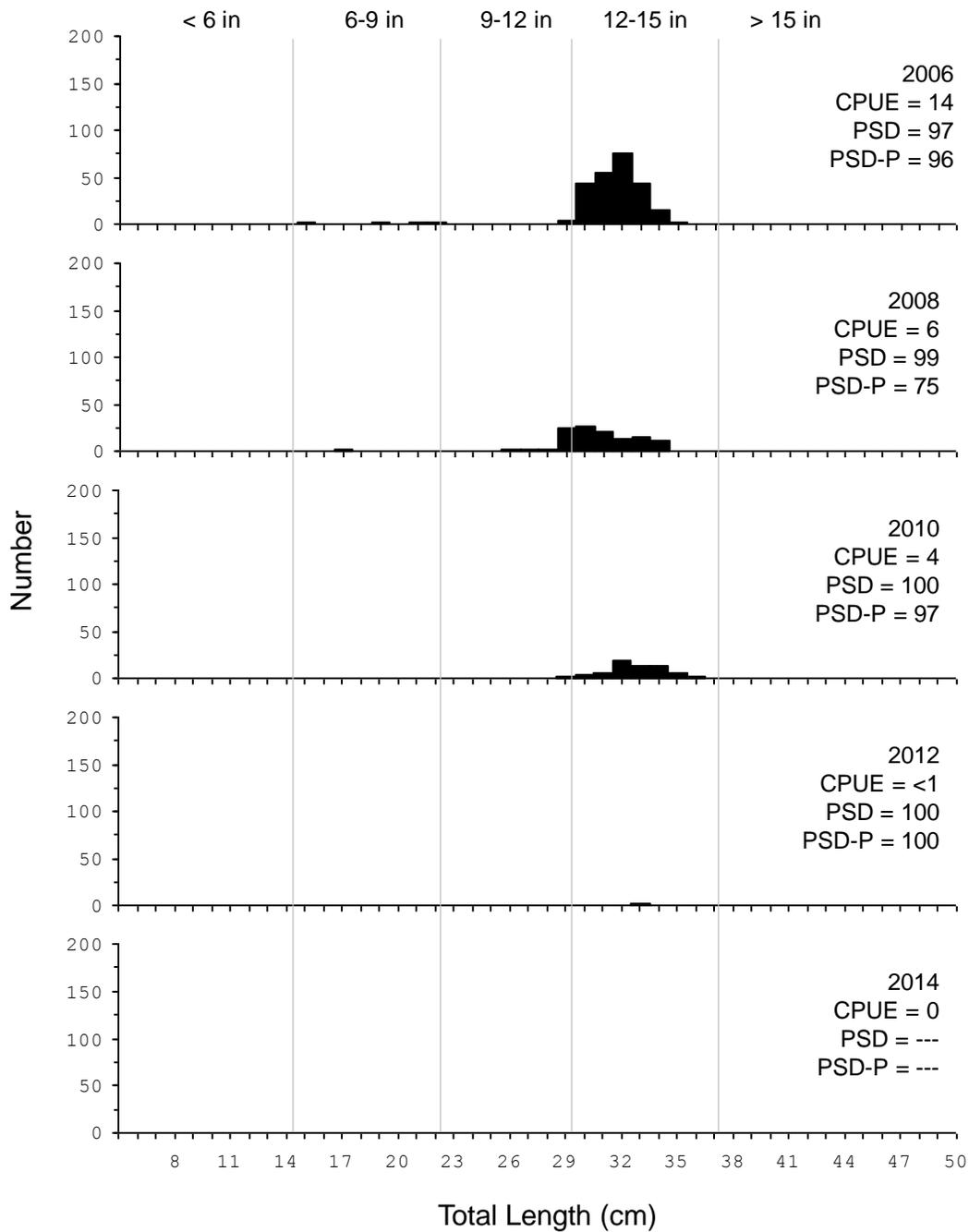


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish black bullhead captured using frame nets in Lake Cochrane, 2006-2014.