Lake Cochrane
Site Description

Location

Water designation number (WDN)	23-0005-00
Legal description	T114N-R47W-Sec.4-5,8
County (ies)	Deuel
Location from nearest town	5 1/2 miles south and 2 miles west of Gary, SD

Survey Dates and Sampling Information

Dates of current survey	June 8-10, 2010 (FN, GN) June 9, 2010 (EF-LMB)
Gill net sets (n)	4
Frame net sets (n)	18
Electrofishing-LMB (min)	60

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 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). 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 (55%), pasture or grassland (23%), municipal (16%), woodland (5%), and other uses (1%). 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 Ordinary High Water Mark is 1684.3 fmsl, and the outlet elevation of Lake Cochrane is 1682.8 fmsl. On April 21, 2010, the elevation of Lake Cochrane was 1683.1 fmsl. By October 13, 2010 the water level of Lake Cochrane had declined to 1682.8 fmsl, slightly above the outlet elevation.

Aquatic Nuisance Species Monitoring

Plant Survey

Emergent vegetation is sparse along the shoreline of Lake Cochrane. Dense mats of chara (a macro algae) were common and often covered the entire lake bottom in areas <5 ft. Bladderwort was also sampled in 2010. 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, 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	NE Panfish Management Area: 10 daily; 50 possession. Smallmouth/Largemouth 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

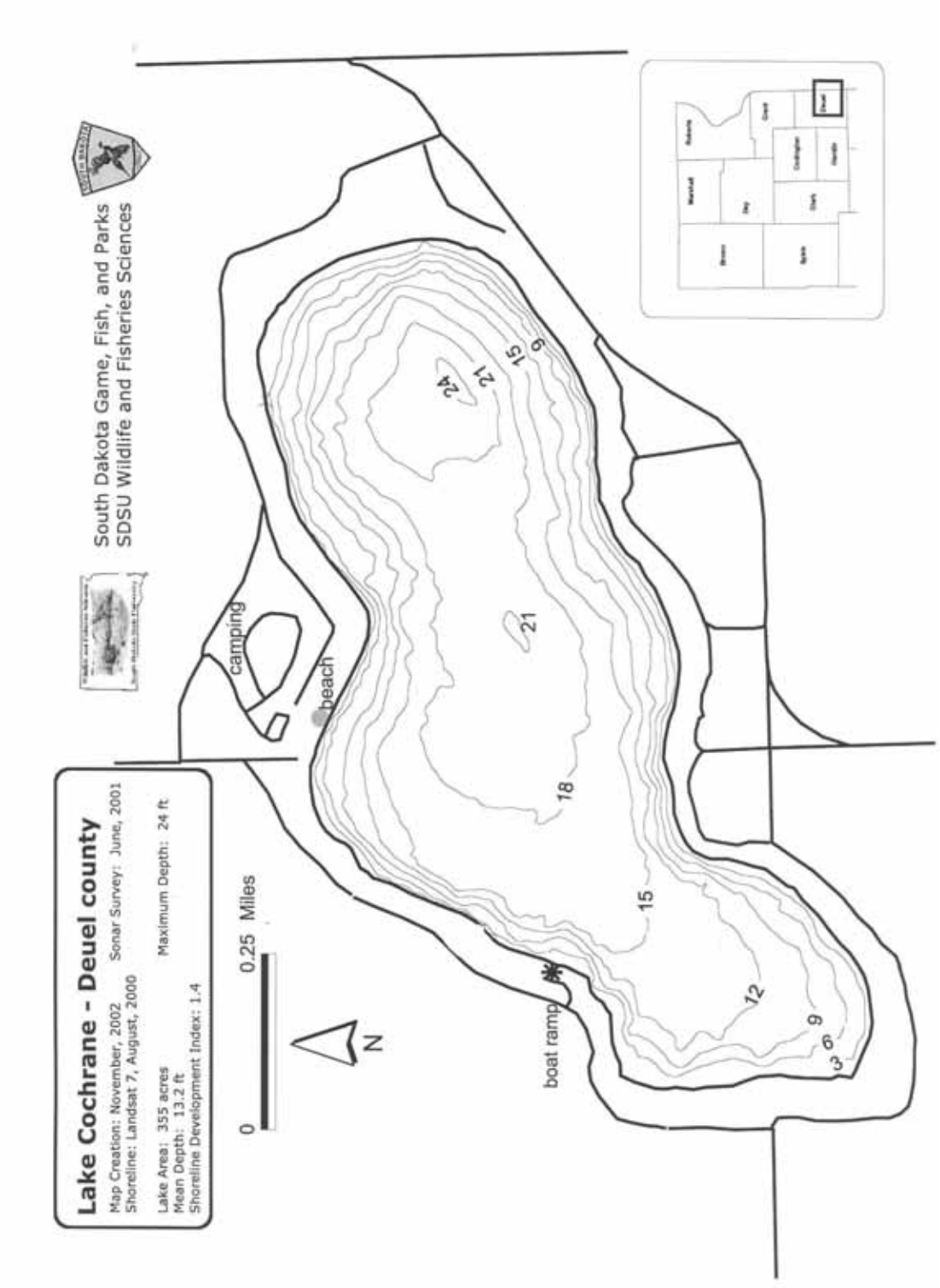

Figure 1. Contour map of Lake Cochrane, Deuel County, South Dakota.

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. CHFN= frame net; CHGN= gill net

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 spring night electrofishing CPUE of stock-length largemouth bass ≥ 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.) ≥ 25, a PSD of 30-60, and a PSD-P of 5-10.

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

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

Results and Discussion

Lake Cochrane is a relatively-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 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: Black crappie relative abundance is currently low. Only one stock-length black crappie was captured in the 2010 frame net catch resulting in a mean CPUE of 0.1 (Table 1) which is below the minimum objective (≥10 stock-length black crappie/net night; Table 3). In biennial surveys conducted from 2002-2010, the mean frame net CPUE of stock-length black crappie in Lake Cochrane has fluctuated from a low of 0.1 (2010) to high of 8.2 (2004) with the 2002-2010 average being 3.4 (Table 2).

Small sample size precludes inferences on population size structure, growth or condition.

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 all the variants will be collectively referred to as sunfish during completion of this report.

The 2010 mean frame net CPUE of stock-length sunfish was 35.1 (Table 1) and above the minimum objective (≥ 25 stock-length sunfish/net) for Lake Cochrane (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 in Lake Cochrane has ranged from a low of 35.1 (2010) to a high of 132.7 (2004) with the 2002-2010 average being 62.3 (Table 2).

The total length of sunfish captured in the 2010 frame net catch ranged from 8 to 23 cm (3.1 to 9.1 in) and the sample had a PSD of 53 and a PSD-P of 4 (Figure 5). The 2010 PSD was within the objective range of 30-60 while the PSD-P was slightly below the objective range of 5-10 (Table 3) indicating a relatively balanced population. Predation from abundant largemouth bass likely 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 were captured in the 2008 and 2010 frame net catch. The decrease in preferred-length sunfish is likely the result of increased mortality of larger sunfish either natural or by angling (Figure 5).

Otoliths were collected from a sub-sample of sunfish in Lake Cochrane during 2010. Eight consecutive year-classes (2000-2007) were present in the survey indicating consistent recruitment (Table 5).

Wilson et al. (2000) reported slow growth of bluegill with fish reaching quality-length (150 mm) at age-7. Growth rates observed in 2010 were faster with a weighted mean total length at capture for age-5 sunfish of 159 mm (6.3 in; Table 6). Decreased relative abundance in 2008 and 2010 has likely contributed to increased growth rates. Sunfish in the 2010 frame net catch from Lake Cochrane had mean Wr values that ranged from 105-108 for all length categories sampled, with the mean Wr of stock-length sunfish being 107 (Table 1). Seasonal influences (i.e., spawning behavior) may have impacted mean Wr values for sunfish in Lake Cochrane. No length-related trends in Wr were observed in 2010.

Largemouth bass: In 2010, the mean spring night electrofishing CPUE of stock-length largemouth bass was 123.0 (Table 1) and above the minimum objective (≥ 50 stock-length largemouth bass/hr). Spring night electrofishing mean CPUE of stock-length largemouth bass has fluctuated from a low of 100.0 (2008) to a high of 148.0 (2006) with the 2002-2010 average being 124.9 (Table 2). McKibbin (2002) estimated that there was 3,818 largemouth bass in Lake Cochrane at a CPUE of 109 stock-length largemouth bass/hour in 2000. Largemouth bass relative abundance is considered high.

Largemouth bass captured during spring night electrofishing during 2010 ranged in total length from 26 to 44 cm (10.2 to 17.3 in), had a PSD of 24 and a PSD-P of 5 (Table 1; Figure 4). The 2010 PSD and PSD-P were within the objective ranges (20-40,

0-10). 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 in Lake Cochrane. 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 2010, approximately 15% of the largemouth bass captured during spring night electrofishing were within the 356 to 457 mm (14 to 18 in) protected-slot length, and no largemouth bass were captured that exceeded the 457-mm (18-inch) upper slot length.

Scales were collected from a sub-sample of largemouth bass from the 2010 spring night electrofishing survey. Ten consecutive year-classes (1999-2008) were present in the 2010 survey indicating consistent recruitment (Table 4).

The high density of largemouth bass in Lake Cochrane has resulted in slow growth. In 2010, age-4 and age-5 largemouth bass had mean back calculated lengths at age of 244 and 281 mm (9.3 to 11.1 in), which was well below the regional averages of 325 and 356 mm (12.8 and 14.0 in) reported in Willis et al. (2001; Table 4). Mean Wr values of largemouth bass captured during spring night electrofishing in 2010 ranged from 95 to 98 for all length groups sampled with the mean Wr of stock-length largemouth bass being 96 (Table 1). No length-related trends in Wr were observed.

Walleye: The mean gill net CPUE of stock-length walleye during 2010 was 7.3 (Table 1) and below the objective range (≥ 10 stock length walleye/net) for Lake Cochrane. Since 2002, walleye relative abundance in Lake Cochrane based on gill net CPUE has ranged from 4.3 (2008) to 8.0 (2004) stock-length walleye/net with the 2002-2010 average being 6.2 (Table 2). The gill net CPUE of stock-length walleye during 2010 indicated moderate relative abundance.

Walleye captured in the 2010 gill net catch from Lake Cochrane ranged in total length from 25 to 60 cm (9.8 to 23.6 in), had a PSD of 45 and a PSD-P of 3 (Table 1; Figure 6). The PSD was within the management objective (30-60) and PSD-P was below the management objective (5-10; Table 3).

Otoliths were collected from a sub-sample of gill net captured walleye in 2010. Three walleye year-classes (2001, 2005 and 2008) were present with the 2005 and 2008 year classes being the most represented (Table 7). The 2005 and 2008 year classes coincide with large fingerling stockings; while the 2001 year class was naturally produced (Table 7).

Growth rates can be influenced by the length at which large fingerlings are stocked into Lake Cochrane, as the size of stocked fish can vary greatly from year to year. The 2010 weighted mean total length at capture for age-5 walleye was 405 mm (15.9 in.; Table 8). Mean Wr values of walleye captured in gill nets during 2010 ranged from 89-94 for all length categories sampled with the mean Wr of stock-length walleye being 90 (Table 1). An increasing trend in Wr was observed as total length increased.

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 2010 mean gill net CPUE of stock-length yellow perch was 54.3 (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 130.3 (2002) with the 2002-2010 average being 65.4 (Table 2). Yellow perch relative abundance is high.

Yellow perch in the 2010 gill net catch from Lake Cochrane ranged in total length from 9 to 25 cm (3.5 to 9.8 in), had a PSD of 38 and a PSD-P of 0 (Table 1; Figure 7). The PSD was within the management objective (30-60) and PSD-P was below the management objective (5-10; Table 3).

Otoliths were collected from a sub-sample of yellow perch caught in gill nets in 2010. Eight year-classes (2001, 2003-2009) were present indicating consistent recruitment.

Yellow perch in Lake Cochrane tend to be long-lived with relatively slow growth (Kaufman et al. 2008). The weighted mean total length at capture of age-3 and age-4 male yellow perch was 164 and 187 mm (6.5 and 7.4 in.; Table 11). The weighted mean total length at capture of age-3 and age-4 female yellow perch was 184 and 204 mm (7.2 and 8.0 in.; Table 11). Mean Wr values for yellow perch in the 2010 gill net catch ranged from 78-96 for all length categories sampled with the mean Wr of stock-length yellow perch being 93 (Table 1). A decreasing trend in Wr was observed as total length increased.

Other Species

Black bullhead: The mean frame net CPUE of stock-length black bullhead during 2010 was 3.5 (Table 1) and within the objective (≤ 100 stock-length black bullhead/net) for Lake Cochrane (Table 3). Apparent low recruitment in recent years has resulted in a declining black bullhead population in Lake Cochrane. Black bullhead relative abundance has declined in each survey conducted from 2002-2010 (Table 2).

Black bullhead captured in the 2010 frame net catch ranged in total length from 29 to 36 cm (11.4 to 14.2 in), had a PSD of 100 and a PSD-P of 97 (Table 1; Figure 8). No growth information was collected from black bullheads in Lake Cochrane in 2010. Mean Wr values for black bullhead in the 2010 frame net catch ranged from 96 to 121 with the mean Wr of stock-length black bullhead being 97 (Table 1).

Northern Pike: Northern pike typically are not sampled consistently using standard lake survey methods; however, northern pike abundance is believed to be low. In 2010, three northern pike ranging in total length from 61 to 77 cm (24.0 to 30.3 in) were captured in the 2010 gill net catch resulting in a mean gill net CPUE of 0.8 (Table 1). Ermer et al. (2005) suggested that northern pike exhibited poor recruitment likely due to relatively consistent water levels (i.e., no spring rise) limiting available spawning habitat in Lake Cochrane.

Others: Common carp was the only other species sampled in 2010 and relative abundance appears to be low (Table 1).

Management Recommendations

1) Conduct fish population assessment surveys on a biennial basis (next survey scheduled in summer 2012) 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 (≈25 large fingerlings/acre) on a biennial basis to establish additional year-classes.

5) 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.

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, 2010. Confidence intervals include 80 percent (± CI-80) or 90 percent (± 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

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Frame nets								
BLB	3.5	1.2	100	0	97	4	97	1
BLC	0.1	<0.1	0	---	0	---	102	---
LMB	0.1	<0.1	0	---	0	---	98	---
NOP	0.1	<0.1	100	---	0	---	86	---
SUN	35.1	8.6	53	3	4	1	107	1
WAE	0.2	0.2	50	50	0	---	91	6
YEP	2.2	1.2	33	13	0	---	91	2
Gill nets								
BLB	0.8	0.7	100	0	100	0	104	3
BLC	1.0	0.7	25	59	0	---	108	6
COC	0.3	0.4	100	---	0	---	120	---
LMB	0.8	0.7	33	67	0	---	98	2
NOP	0.8	0.4	100	0	33	67	102	23
SUN	3.5	2.8	93	13	0	---	104	<1
WAE	7.3	3.1	45	16	3	6	90	1
YEP	54.3	9.8	38	5	0	---	93	<1
Electrofishing								
LMB [1]	123.0	31.2	24	6	5	3	96	1

[1] 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, 2000-2010. BLB= black bullhead; BLC= black crappie; 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

	CPUE					
Species	2002	2004	2006[1]	2008	2010	Mean
Frame nets						
BLB	51.5	30.1	13.8	6.4	3.5	21.1
BLC	3.9	8.2	3.6	1.3	0.1	3.4
LMB	0.0	0.3	0.2	0.1	0.1	0.1
NOP	0.0	0.1	0.0	0.1	0.1	0.1
SUN	49.8	132.7	55.1	38.8	35.1	62.3
WAE	0.3	0.7	0.2	0.2	0.2	0.3
YEP	4.9	4.9	9.7	12.5	2.2	6.8
Gill nets						
BLB	8.3	2.8	2.0	0.8	0.8	2.9
BLC	0.5	2.5	0.3	0.3	1.0	0.9
COC	0.0	0.0	0.0	0.0	0.3	0.1
LMB	0.0	3.3	1.2	0.8	0.8	1.2
NOP	0.7	0.2	0.8	0.8	0.8	0.7
SHR	0.0	0.2	0.0	0.0	0.0	0.0
SUN	3.6	3.5	4.8	1.0	3.5	3.3
WAE	4.7	8.0	6.7	4.3	7.3	6.2
WHS	0.0	0.0	0.2	0.0	0.0	0.0
YEP	130.3	67.2	69.7	5.3	54.3	65.4
Electrofishing						
LMB [2]	---	128.4	148.0	100.0	123.0	124.9

[1]Monofilament gill net mesh size change (0.75”, 1.00”, 1.25”, 1.50”, 2.00” and 2.50”)
[2] 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, 2000-2010. 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[1]	2008	2010	Average	Objective
Frame nets							
BLB							
CPUE	52	30	14	6	4	21	≤ 100
PSD	100	100	97	99	100	99	---
PSD-P	28	54	96	75	97	70	---
Wr	88	89	100	99	97	95	---
BLC							
CPUE	4	8	4	1	<1	3	≥ 10
PSD	77	45	51	43	0	43	30-60
PSD-P	10	14	11	9	0	9	5-10
Wr	88	95	97	95	102	95	---
SUN							
CPUE	50	133	55	39	35	62	≥ 25
PSD	86	91	77	79	53	77	30-60
PSD-P	1	3	11	2	4	4	5-10
Wr	---	---	108	108	107	108	
Gill nets							
WAE							
CPUE	5	8	7	4	7	6	≥ 10
PSD	64	13	15	18	45	31	30-60
PSD-P	54	10	5	6	3	16	5-10
Wr	87	78	89	87	90	86	---
YEP							
CPUE	130	67	70	5	54	65	≥ 30
PSD	31	51	59	29	38	42	30-60
PSD-P	0	0	3	0	0	1	5-10
Wr	92	89	98	90	93	92	---
Electrofishing							
LMB [2]							
CPUE	---	128	148	100	123	125	≥ 50
PSD	---	26	17	48	24	29	20-40
PSD-P	---	1	1	5	5	3	0-10
Wr	---	85	98	99	96	95	---

[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.

Table 4. Mean back-calculated length (mm) at age and standard error (SE) for largemouth bass captured during spring night electrofishing from Lake Cochrane, 2010.

			Age										
Year	Age	N	1	2	3	4	5	6	7	8	9	10	11
2008	2	1	97	139									
2007	3	11	92	171	219								
2006	4	20	91	151	207	244							
2005	5	51	89	141	177	221	255						
2004	6	6	80	158	221	256	284	309					
2003	7	12	95	156	198	249	276	302	319				
2002	8	11	88	146	193	236	278	298	315	330			
2001	9	3	86	173	201	251	284	304	327	341	359		
2000	10	4	86	161	204	262	302	327	350	370	390	400	
1999	11	1	60	140	204	236	288	307	320	331	348	362	370
Mean		120	86	154	203	244	281	308	326	343	366	381	370
SE			3	4	4	5	5	4	6	9	12	19	0
Mean Comparison [1]													
Small lakes/impoundments			99	183	246	299	332	---	---	---	---	---	---
Large lakes/impoundments			89	178	256	316	359	---	---	---	---	---	---
Region IV			80	180	266	325	356	---	---	---	---	---	---
Statewide			96	182	250	305	342	---	---	---	---	---	---

[1] Willis et al. 2001.

Table 5. 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.

	Year Class										
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
2010				44	117	345	71	27	2	1	2

Table 6. Weighted mean total length (mm) at capture for sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid) age-3 through age-10 sampled in frame nets (expanded sample size) from Lake Cochrane, 2010.

	Age							
Year	3	4	5	6	7	8	9	10
2010	110(44)	130(117)	159(345)	182(71)	199(27)	211(2)	238(1)	212(2)

Table 7. 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 Lake Cochrane, 2006-2010.

	Year Class													
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
2010			10			16				3				
2008	---	---				13	1	1	3	1				
2006[1,2]	---	---	---	---		1		1	29	8	1			
# stocked														
fry														
sm. fingerling														
lg. fingerling	3		7			16			5		4			9

[1] Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")
[2] Older walleye were sampled, but are not reported in this table

Table 8. Weighted mean total length at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Cochrane, 2006-2010. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

	Age									
Year	1	2	3	4	5	6	7	8	9	10
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 9. Stocking history including size and number for fishes stocked into Lake Cochrane, 1997-2010.

Year	Species	Size	Number
1997	WAE	large fingerling	9,250
2000	WAE	large fingerling	4,110
2002	WAE	large fingerling	4,509
2005	WAE	large fingerling	16,000
2008	WAE	large fingerling	7,068
2010	WAE	large fingerling	3,176

Table 10. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Lake Cochrane, 2010.

	Year Class									
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2010		13	74	71	11	65	8	2		2

Table 11. Weighted mean total length (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Lake Cochrane, 2010.

	Age								
Year	1	2	3	4	5	6	7	8	9
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)

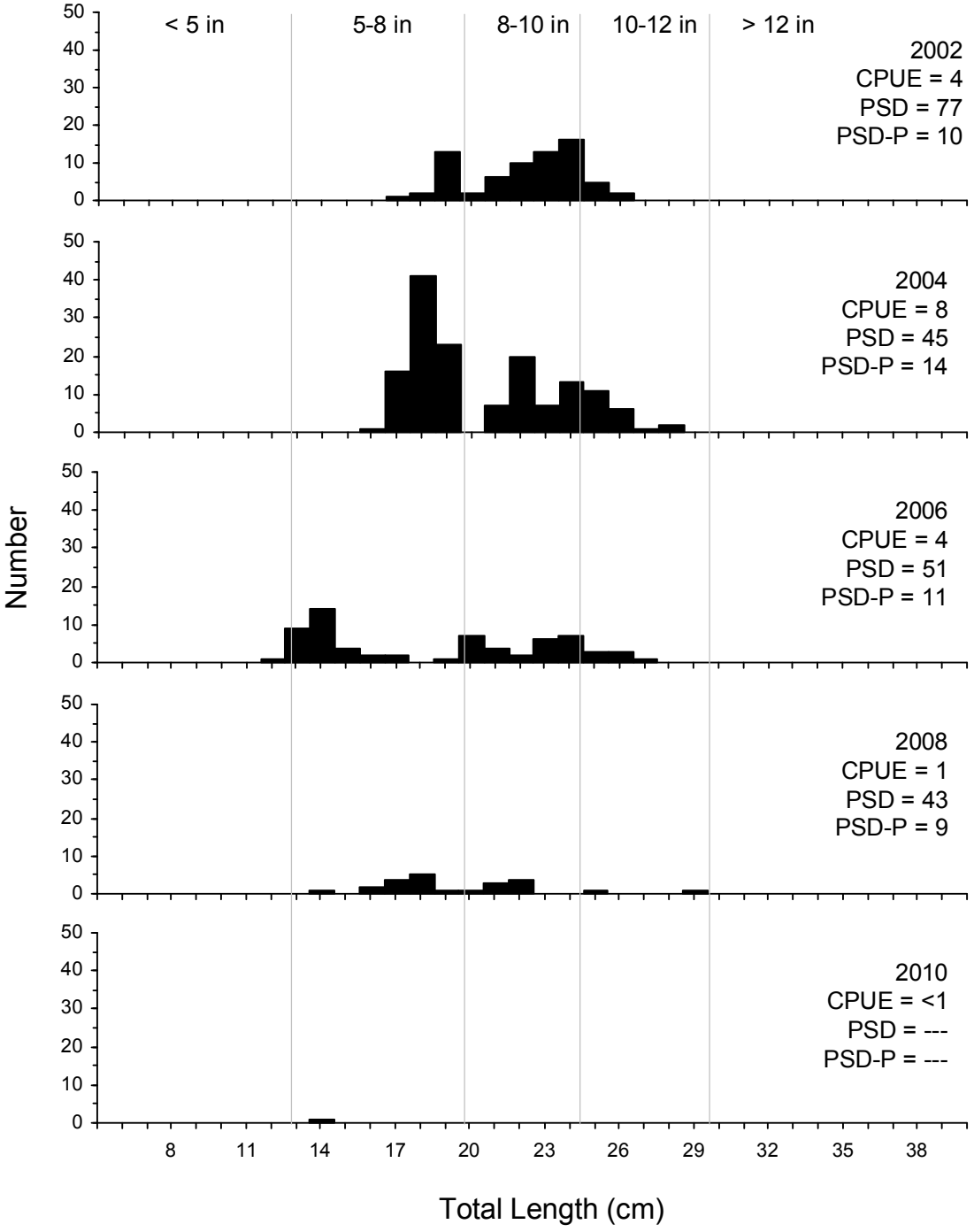

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish black crappie captured using frame nets in Lake Cochrane, 2002-2010.

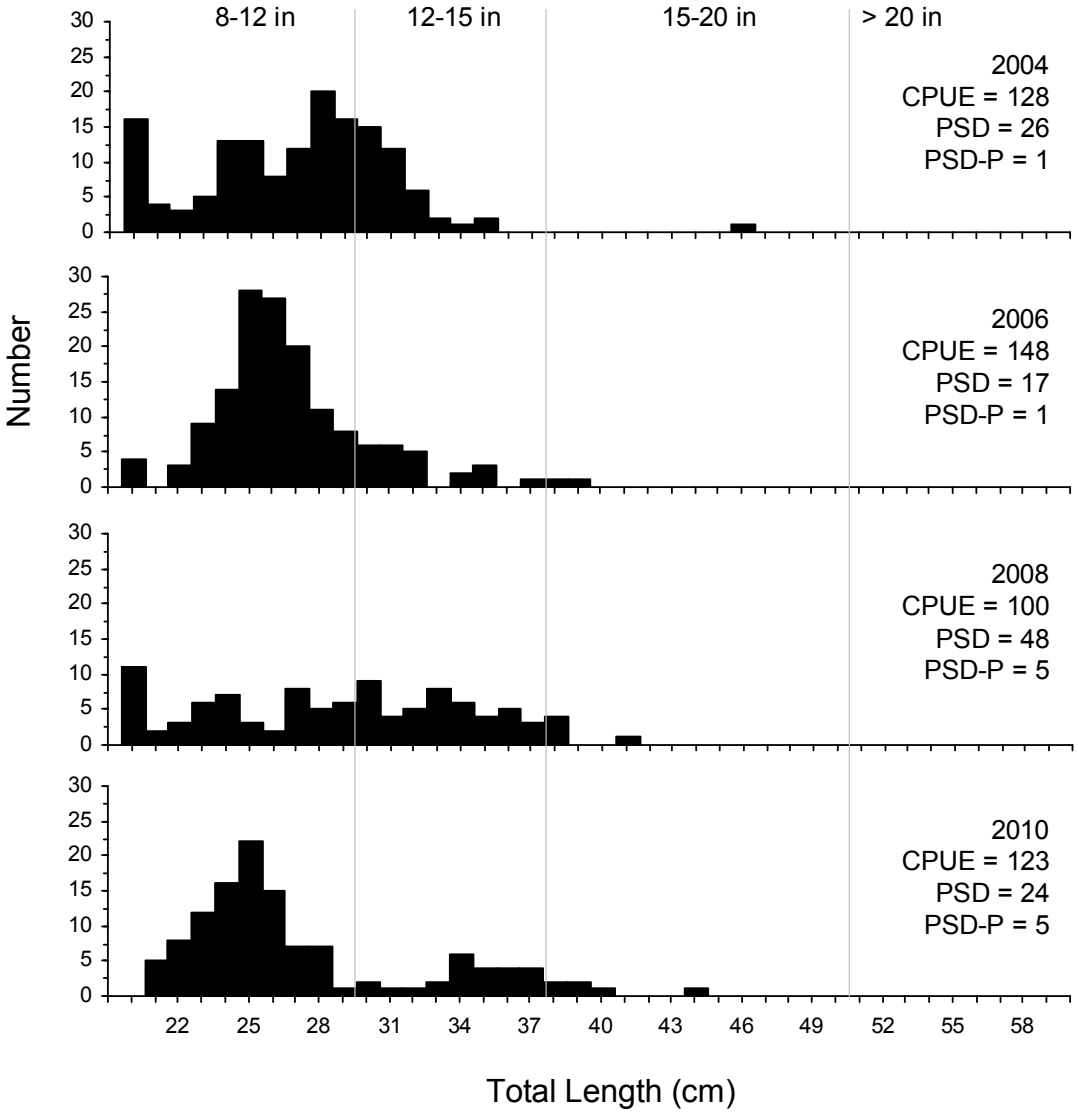

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish largemouth bass captured during spring night electrofishing from Lake Cochrane, 2004-2010.

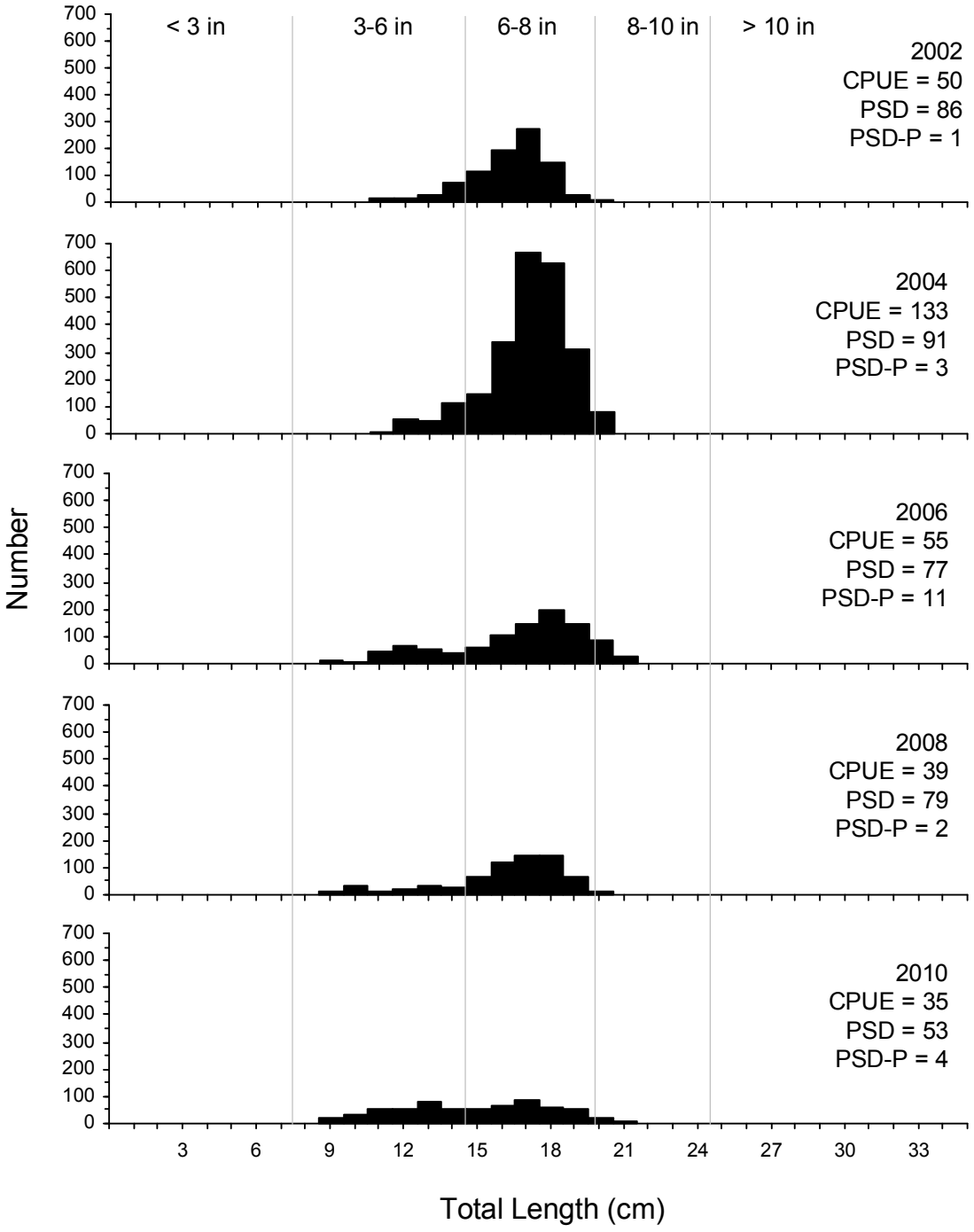

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish sunfish (bluegill, green sunfish, bluegill X green sunfish hybrid) captured using frame nets in Lake Cochrane, 2002-2010.

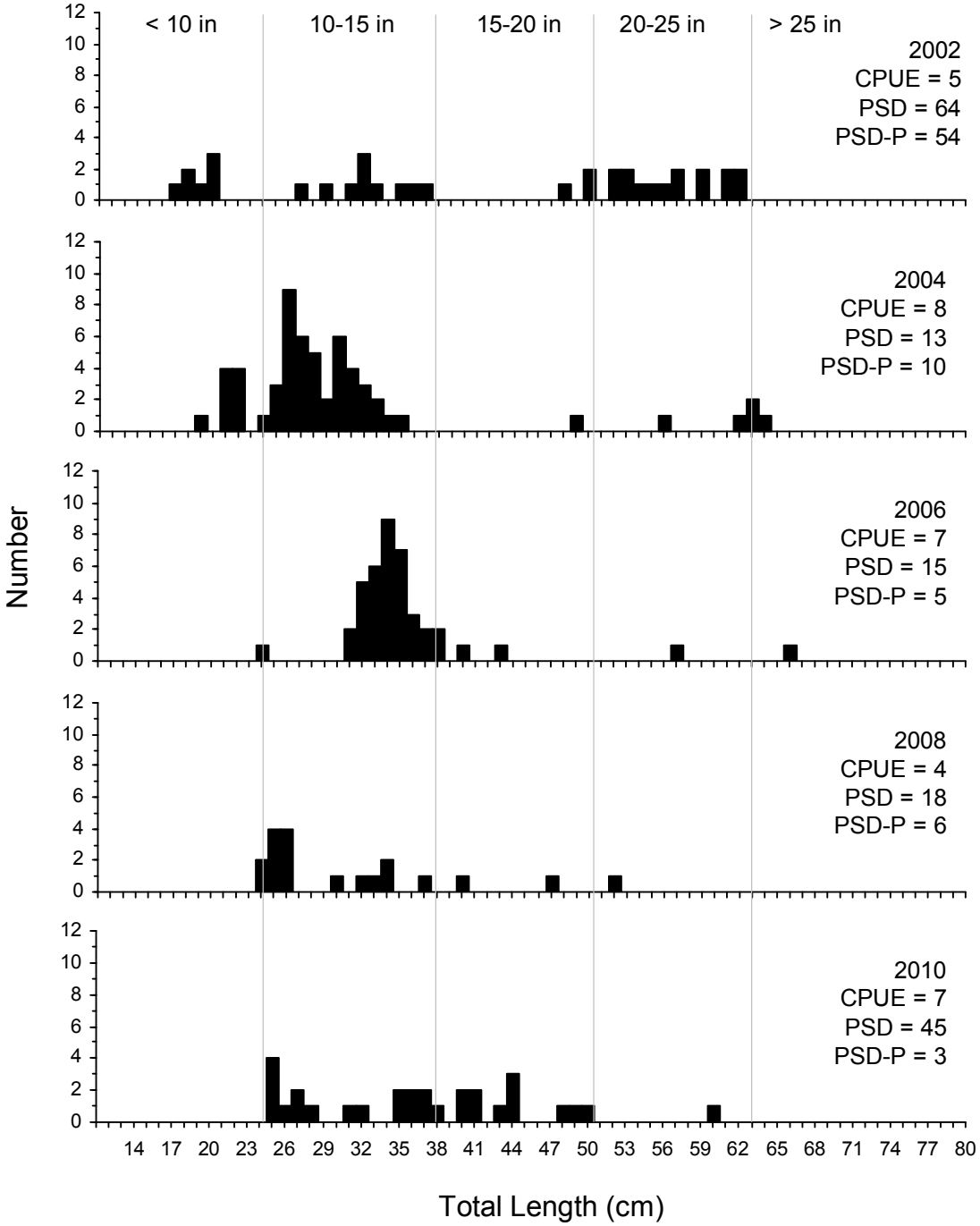

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish walleye captured using gill nets in Lake Cochrane, 2002-2010.

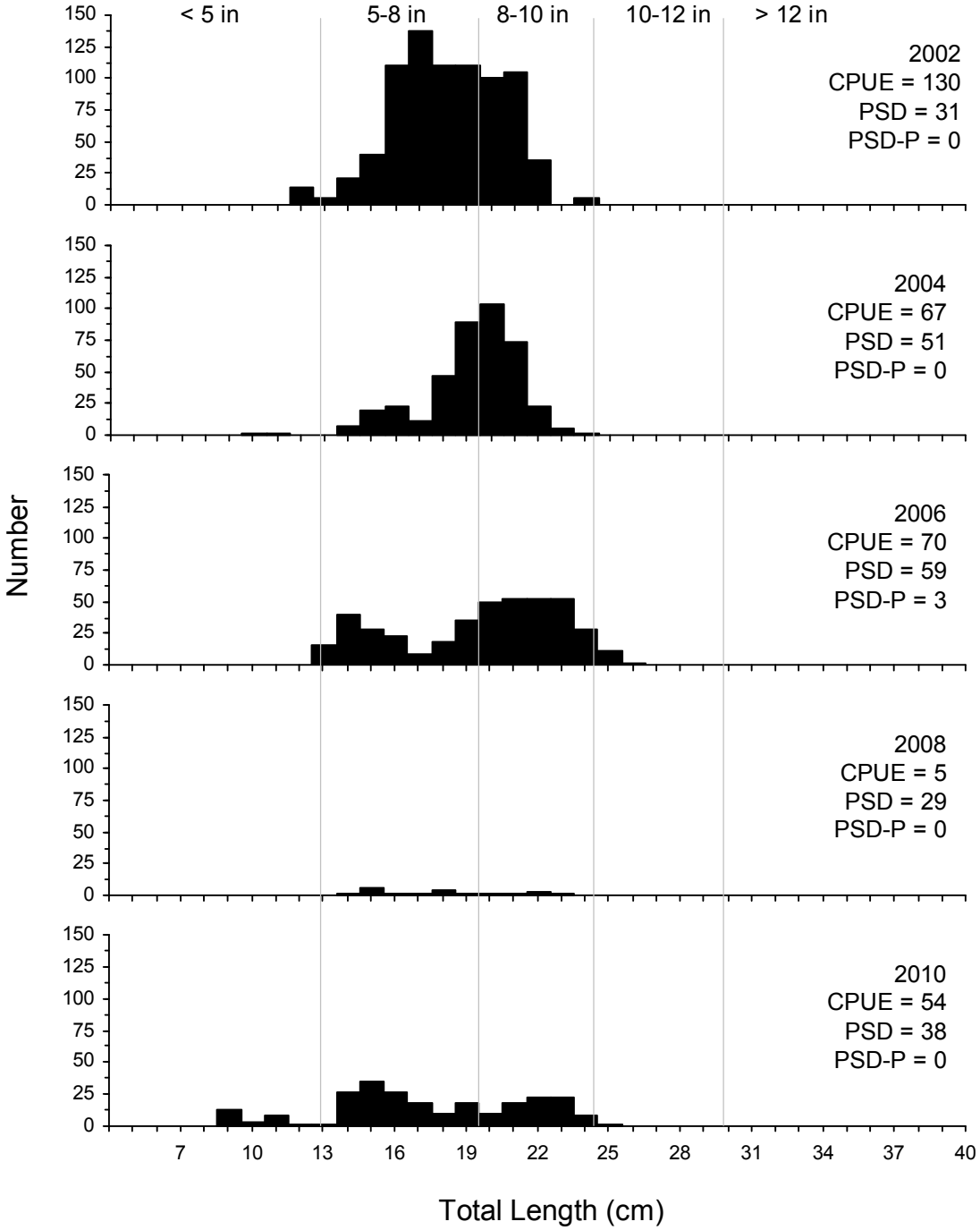

Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish yellow perch captured using gill nets in Lake Cochrane, 2002-2010.

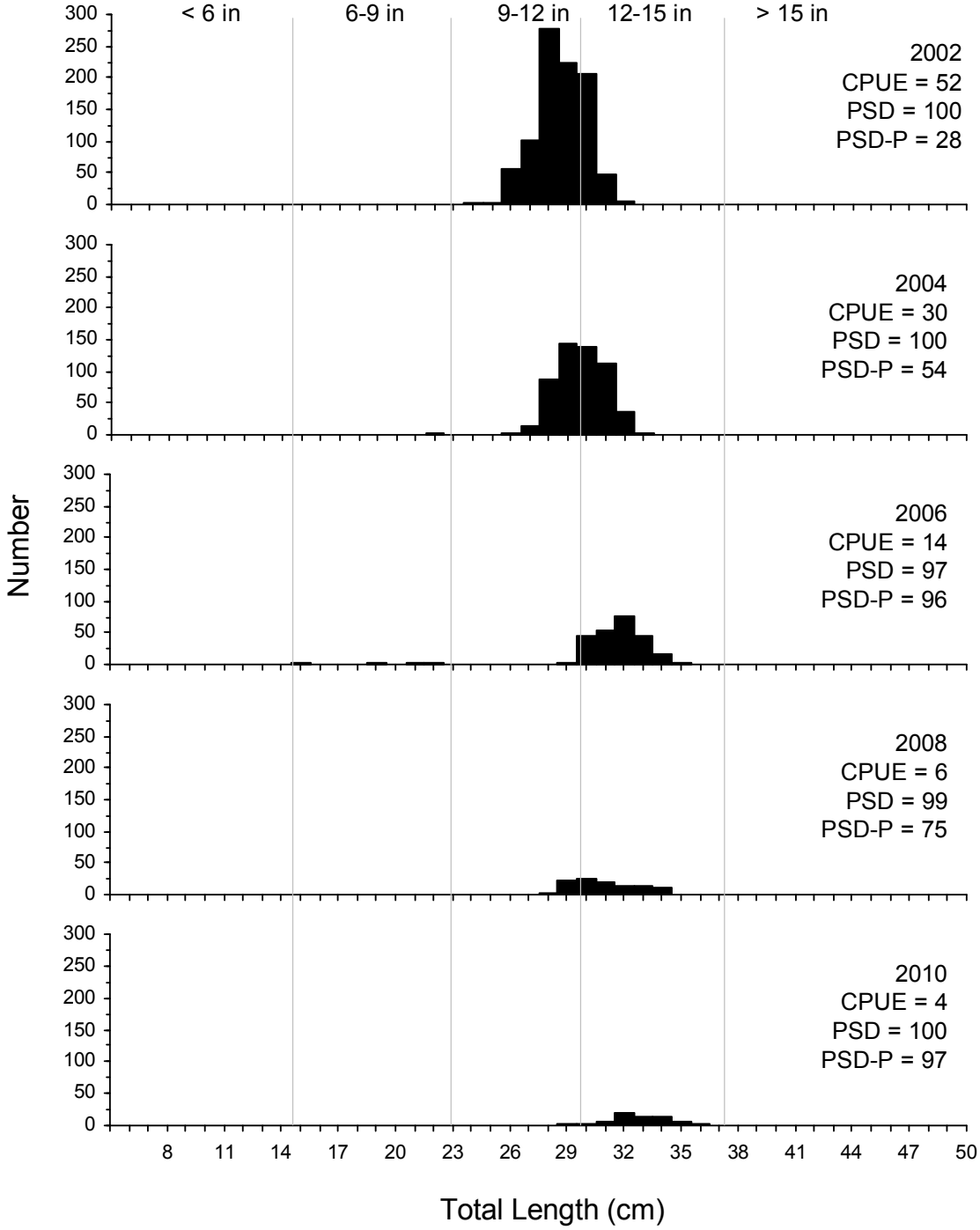

Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish black bullhead captured using frame nets in Lake Cochrane, 2002-2010.