Richmond Lake
Site Description

Location

Water designation number (WDN)	03-0008-00
Legal description	T124N-R64W-Sec.1,12,13,14,25,36; T125N-R65W-Sec.19,22,23,24,25
County (ies)	Brown
Location from nearest town	5 miles north and 4 miles west of Aberdeen

Survey Dates and Netting Information

Survey dates	August 10-12, 2010 (FN, GN) September 27, 2010 (EF-WAE)
Gill net sets (n)	6
Frame net sets (n)	18
Electrofishing-WAE (min)	58

Morphometry

Watershed area (acres)	103,128
Surface area (acres)	829
Maximum depth (ft)	29
Mean depth (ft)	15

Ownership and Public Access

Richmond Lake is an impoundment managed by the SDGFP. Two main public access sites are present on Richmond Lake; these are located on the south (recreation area) and southeast (spillway access) shorelines and are maintained by the SDGFP (Figure 2). Richmond Lake is managed by the State of South Dakota and lands adjacent to the lake are under state and private ownership.

Watershed and Land Use

The Richmond Lake watershed is a sub-watershed within the Moccasin Creek watershed and is predominately comprised of agricultural lands with a small municipality (Leola) being located in the northwestern portion of the watershed. Much of the shoreline of Richmond Lake is rimmed with homes and cabins which are connected to a central sewer collection system (McLaury 2006).

Water Level Observations

Water levels on Richmond Lake are not monitored by SDDENR; however, water levels appeared to be at or slightly below full pool in late-Summer 2010 (Megan Thul, SDSU, pers. comm.).

Aquatic Nuisance Species Monitoring

Plant Survey

Areas of emergent vegetation, primarily bulrush and cattail, are limited to the upper arms and protected bays of the impoundement. Scattered beds of sago pondweed intermingled with chara (a macro algae) were identified, but submersed vegetation was sparse in 2010. No aquatic nuisance plant species were encountered during the 2010 aquatic plant survey.

Macro-Invertebrate/Mussel Survey

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

Fish Community Survey

Common carp was the only aquatic nuisance fish species captured in 2010.

Fish Management Information

Primary species	black crappie, bluegill, walleye
Other species	black bullhead, channel catfish, common carp, green sunfish, largemouth bass, northern pike, rock bass, smallmouth bass, spottail shiner, white bass, white sucker, yellow perch
Lake-Specific regulations	NE Panfish Management Area: 10 daily; 50 possession Largemouth/Smallmouth Bass: minimum length 15” Walleye: minimum length 15”
Management classification	warm-water permanent impoundment
Fish Consumption Advisories	none

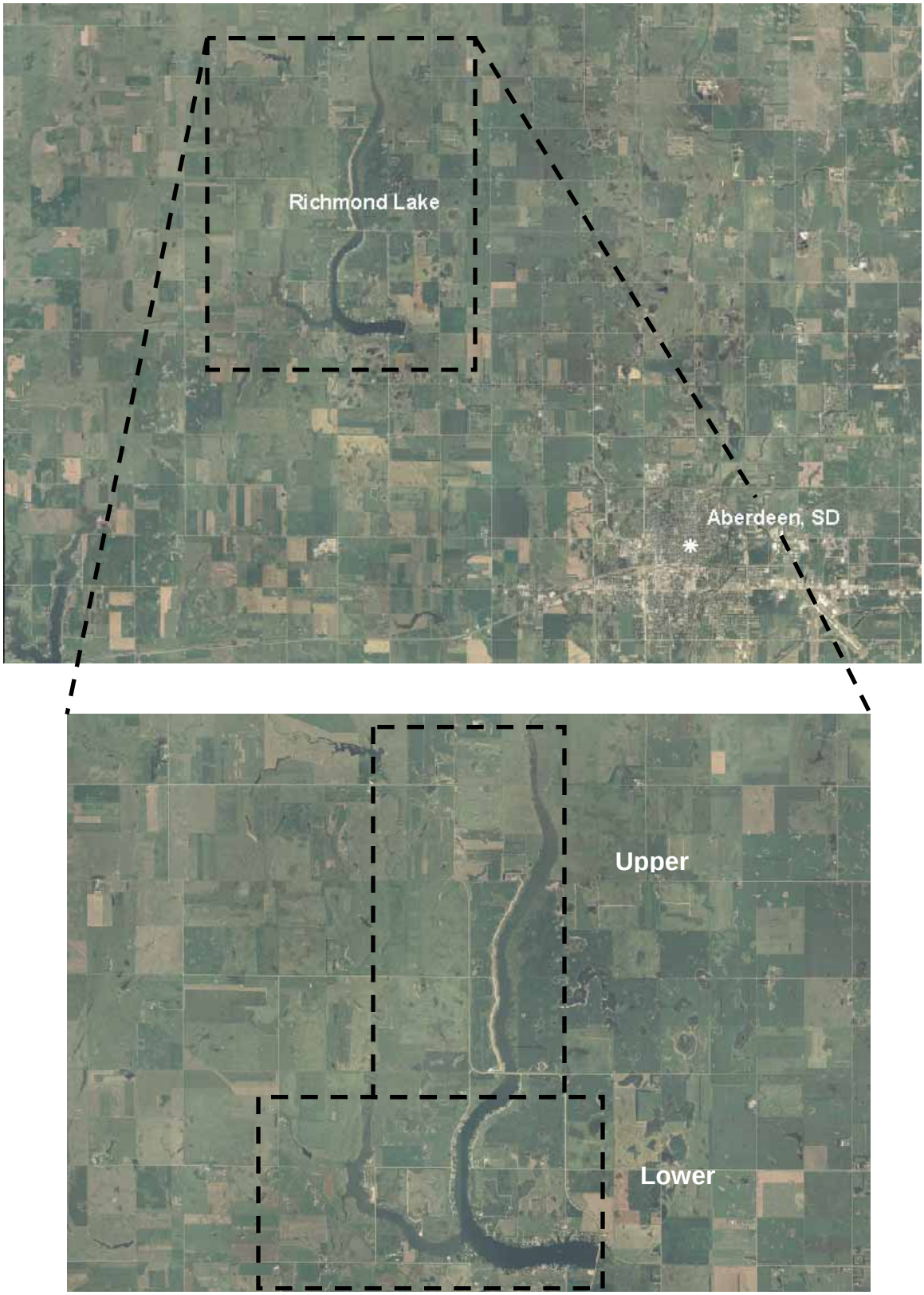

Figure 1. Map depicting location of Richmond Lake from Aberdeen, Brown County, South Dakota, and upper and lower divisions.

Figure 2. Map depicting access points and standardized net locations for Richmond Lake, Brown County, South Dakota. RMFN= frame nets, RMGN= 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 gill net mean CPUE of stock-length walleye ≥ 20, a PSD of 10-40, and a PSD-P of <5.

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

Results and Discussion

Richmond Lake is an impoundment located 5 miles north and 4 miles west of Aberdeen, SD. Richmond Lake was constructed by the damming of Foot Creek in the 1930's by the Works Progress Administration. Foot Creek (west arm) and an unnamed tributary (north arm) are the major surface water inlets to Richmond Lake. Water exits Richmond Lake through an outlet on the east side of the lake flowing into Foot Creek and eventually draining into the James River (McLaury 2006).

Currently, Richmond Lake is primarily managed as a bluegill, black crappie, and walleye fishery. Overall, as many as 15 species of fish have been collected from Richmond Lake.

Primary Species

Black crappie: Relative abundance of black crappie in Richmond Lake appeared low in 2010. The frame net mean CPUE of stock-length black crappie was 0.7 (Table 1) and well below the minimum objective (≥10 stock-length black crappie/net; Table 3). Relative abundance decreased substantially from the mean frame net CPUE of 58.0 observed in 2009 (Table 2). The decrease in relative abundance is a result of a substantial die-off observed during the summer of 2010. The cause of the die-off is unknown. Since 2002, abundance of black crappie, as indexed by frame net mean CPUE has fluctuated from a low of 0.7 (2010) to high of 127.2 (2007; Table 2).

Due to low sample size few inferences can be made concerning size structure, growth and condition of black crappie in Richmond Lake in 2010.

Bluegill: The 2010 frame net mean CPUE of stock-length bluegill was 60.2 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net; Table 3). Since 2003, bluegill relative abundance in Richmond Lake has fluctuated from a low of 23.8 (2005) to a high of 60.2 (2010) stock-length bluegill/net (Table 2). Based on the 2010 frame net mean CPUE relative abundance appears to be high.

Bluegill captured in the 2010 frame net catch ranged in total length from 11 to 22 cm (4.3 to 8.7 in), had a PSD of 91 and a PSD-P of 5 (Figure 4). The 2010 PSD was above the objective range of 30-60; while the PSD-P was within the objective range of 5-10 (Table 3).

Otoliths were collected from a sub-sample of bluegill in the 2010 frame net catch. Age structure information indicated the presence of the 2005, 2007 and 2008 year classes (Table 6). Bluegill from the 2005 year-class had a weighted mean length at capture of 200 mm at age-4 and 215 mm at age-5 (Table 7). Bluegill from the 2007 year-class had a weighted mean length at capture of 160 mm at age-2 and 189 mm at age-3 (Table 7).

Mean Wr values of bluegill captured in the 2010 frame net catch ranged from 105-118 for all length categories sampled. The majority of bluegills in the 2010 frame net catch were in the quality- to preferred-length category which had a mean Wr value of 118. No length-related trend in Wr was observed for bluegill in Richmond Lake in 2010.

Walleye: In 2010, the gill net mean CPUE of stock-length walleye was 5.2 (Table 1). Since 2003, gill net mean CPUE values have ranged from a low of 1.5 (2008) to a high of 33.0 (2002) stock-length walleye/net (Table 2). Based on the 2010 gill net catch, relative abundance of walleye appears to be moderate.

The Richmond Lake walleye population has relied on large fingerling stockings to establish year-classes. Kaufman et al. (2008) reported that large fingerling stockings made in 2000, 2001, and 2004 were well represented in the 2006 gill net catch (Tables 8, 10; Figure 5). However, it appears that mortality since 2006 was high as few walleye from these year-classes were sampled in the 2007-2010 gill net surveys. Walleye large fingerling stocks were made in 2006-2008 (Table 10); however, age structure analysis in 2009 and 2010 indicated recruitment of the 2006-2008 year-classes appeared to be low as few walleye from these year-classes were captured (Table 8). However, the 2006-2008 year-classes were the only year-classes represented in the 2009 and 2010 gill net sample (Table 8).

Walleye captured in gill nets during 2010 ranged in total length from 27 to 41 cm (10.6 to 16.1 in), had a PSD of 10 and a PSD-P of 0 (Figure 5). In 2010, both the PSD and PSD-P values were below the management objectives of 30-60 and 5-10, respectively (Table 3). Only 10% of walleye in the 2010 gill net catch exceeded the 381-mm (15-inch) minimum length restriction on Richmond Lake (Figure 5).

Growth rates can be influenced by the length at which large fingerlings are stocked into Richmond Lake as the size of stocked fish can vary greatly from year to year. Walleyes typically achieve 381-mm (15-inch) during their fifth growing season at age-4+ (Table 9). In 2010, the weighted mean total length at capture of age-3 walleye was 338 mm (13.3 in., Table 9). Mean Wr values of walleye captured in gill nets during 2010 ranged from 84-90 for all length categories sampled. The mean Wr value of stock-length walleye in the 2010 gill net catch was 89 (Table 1). No length-related trends in Wr were observed in 2010.

Other Species

Black bullhead: The frame net mean CPUE of stock-length black bullhead during 2010 was 76.5 (Table 1). In 2009 and 2010, mean frame net CPUE values were substantially higher than those observed from 2003-2008 (Table 2).

Frame net captured black bullheads during 2010 ranged in total length from 12 to 30 cm (4.7 to 11.8 in), had a PSD of 55 and an PSD-P of 1 (Figure 6). No growth information was collected in 2010. Black bullheads in the 2010 frame net catch had a mean Wr value of 84 (Table 1).

Channel catfish: In 2010, mean CPUE of stock-length channel catfish was 2.1 and 1.3 for frame nets and gill nets, respectively (Table 1). Channel catfish in the 2010 frame net catch ranged in total length from 24 to 67 cm (9.4 to 26.4 in; Figure 7). Since 2003, the frame net mean CPUE has ranged from a low of 0.5 (2004) to a high of 4.2 (2007; Table 2).

No growth information was available in 2010. The mean Wr value of frame net captured channel catfish was 86 (Table 1). No length-related trends in Wr were observed.

White bass: From 1991-1999 no white bass were sampled during annual fish population assessments. From 2000-2005, white bass abundance was low, with frame net mean CPUE values of stock-length fish $\leq$ 6 fish/net night (Table 2). In 2006, the frame net mean CPUE of stock-length white bass increased to 59.7, as a relatively-strong cohort ranging in total length from 18 to 24 cm (7.1 to 9.4 in) successfully recruited to the population (Figure 8). Since 2006, mean frame net CPUE values have declined (Table 2) which may be due to high mortality coupled with limited recruitment, sampling variability, or a combination of these factors. The mean frame net CPUE in 2010 was 6.1 (Table 1).

White bass sampled in the 2010 frame net catch ranged in total length from 21 to 32 cm (8.3 to 12.6 in), had a PSD of 90 and a PSD-P of 58 (Figure 8). Age structure analysis in 2010 indicated six year-classes from 2005-2010 (Table 11). Frame net sampled white bass had a weighted mean total length at capture of 312 mm for age-3 and 318 mm for age-4 fish (Table 12). Stock-length white bass from the frame nets in 2010 had a mean Wr of 89 (Table 1).

Yellow perch: The gill net mean CPUE of stock-length yellow perch in 2010 was 10.7 (Table 1) and indicative of moderate relative abundance. Since 2003, the gill net CPUE of stock-length yellow perch has fluctuated from a low of 0.6 (2006) to a high of 10.7 (2010; Table 2). Hubers (2002) suggested that low abundance since the inception of annual surveys indicates that the yellow perch population abundance may be limited by habitat characteristics in Richmond Lake. Yellow perch sampled in gill nets in 2010 ranged in total length from 13 to 26 cm (5.1 to 10.2 in.), had PSD of 23 and PSD-P of 9 (Figure 9). A decline in PSD in 2010 from the 100 observed in 2009 and an increase in mean gill net CPUE from the 3.5 observed in 2009 indicates the recruitment of a new year-class to the sampling gear (Table 2).

No growth information was available in 2010. Stock-length yellow perch had a mean Wr of 95 (Table 1).

Other: Common carp, largemouth bass, northern pike, smallmouth bass, and white sucker were also 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 structure, fish growth, and stocking success.

2) Collect otoliths from black crappie, bluegill, walleye, white bass, and yellow perch; scales from largemouth bass to assess the age structure and growth rates of each population.

3) Stock large fingerling walleyes (≈25 walleye/acre) if gill netting results warrant (i.e., low gill net CPUE of < 250 mm (10 inch) walleye). The walleye population in Richmond Lake should be maintained at a high-density (i.e., a gill net mean CPUE of approximately 20 stock-length walleye/net-night) to effectively impact black crappie and bluegill size structures through predation.

4) 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).

5) Maintain the 381-mm (15 in) minimum length limit on largemouth and smallmouth bass to benefit population and comply with tool box options (Blackwell and Lucchesi 2009).

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 experimental gill nets, frame nets, and electrofishing in Richmond Lake, 2010. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; LMB= largemouth bass; NOP= northern pike; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; 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	76.5	46.8	55	2	1	0	84	1
BLC	0.7	0.2	67	25	8	15	104	3
BLG	60.2	23.7	91	1	5	1	117	1
CCF	2.1	0.8	97	3	5	7	86	2
COC	0.4	0.4	75	25	75	25	93	1
LMB	0.1	0.1	50	50	0	---	121	---
NOP	0.7	0.3	23	22	8	13	85	3
SMB	1.0	0.8	56	21	22	18	97	5
WAE	1.5	0.4	4	6	4	6	85	1
WHB	6.1	2.6	90	5	58	8	91	<1
WHS	0.1	0	100	---	100	---	82	---
YEP	0.2	0.2	100	0	75	25	85	6
Gill nets								
BLB	12.5	9.4	21	8	1	3	91	1
BLC	0.2	0.2	100	---	0	---	104	---
BLG	1.5	0.5	100	0	22	28	121	7
CCF	1.3	0.9	100	0	13	23	91	4
COC	0.3	0.5	100	0	50	50	88	---
NOP	3.7	2.5	14	13	5	7	88	3
WAE	5.2	2.4	10	0	0	---	89	2
WHB	1.3	1.4	88	12	50	36	89	2
WHS	0.2	0.2	100	---	100	---	99	---
YEP	10.7	10	23	9	9	6	95	1
Electrofishing								
WAE [1,2] (age-0)	0.0	---	---	---	---	---	---	---

[1] Fall night electrofishing.
[2] Catch rate (CPUE) represents age-0 walleye/hour

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 experimental gill nets, frame nets, and electrofishing in Richmond Lake, 2003-2010. BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; LMB= largemouth bass; NOP= northern pike; ROB= rock bass; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

	CPUE								
Species	2003	2004	2005	2006[2]	2007[2]	2008	2009	2010	Mean
Frame nets									
BLB	21.2	22.3	2.1	2.8	19.2	1.5	55.8	76.5	25.2
BLC	24.1	10.5	40.3	64.3	127.2	101.7	58.0	0.7	53.4
BLG	41.3	55.4	23.8	46.9	43.9	35.2	29.7	60.2	42.1
CCF	1.9	0.5	0.9	2.1	4.2	1.9	2.2	2.1	2.0
COC	0.4	0.5	3.3	0.9	1.3	1.9	0.4	0.4	1.1
LMB	0.1	0.1	0.0	0.2	0.0	0.3	0.0	0.1	0.1
NOP	0.6	0.1	0.3	0.3	0.2	0.3	0.1	0.7	0.3
ROB	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1
SMB	0.7	0.5	1.4	1.4	0.6	0.8	0.5	1.0	0.9
WAE	8.6	13.4	2.6	13.5	1.5	0.7	1.1	1.5	5.4
WHB	5.8	5.5	2.7	59.7	28.1	14.1	8.1	6.1	16.3
WHS	0.9	1.1	0.5	1.4	0.8	0.2	0.2	0.1	0.7
YEP	0.7	0.1	0.3	0.0	0.2	0.4	0.6	0.2	0.3
Gill nets									
BLB	18.7	2.0	1.3	4.0	6.3	3.5	11.0	12.5	7.4
BLC	1.3	0.8	4.7	18.4	27.2	61.3	13.0	0.2	15.9
BLG	1.5	1.0	0.7	1.0	0.2	0.3	0.3	1.5	0.8
CCF	0.3	0.5	0.7	1.6	2.7	2.5	2.2	1.3	1.5
COC	0.2	1.8	0.8	7.6	5.5	2.0	0.5	0.3	2.3
NOP	0.5	0.0	0.0	0.0	0.0	0.3	0.2	3.7	0.6
WAE	26.2	25.8	10.8	18.0	2.7	1.5	2.3	5.2	11.6
WHB	2.3	1.5	4.0	29.0	10.2	10.5	2.8	1.3	7.7
WHS	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.1
YEP	7.5	3.8	4.5	0.6	0.8	4.8	3.5	10.7	4.5
Electrofishing									
WAE [1]	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.4

[1] Fall night electrofishing; catch rate (CPUE) represents age-0 walleye/hour
[2] 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; gill/frame nets= catch/net night), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in experimental gill nets and frame nets in Richmond Lake, 2003-2010. BLB= black bullhead; BLC= black crappie; BLG= bluegill; WAE= walleye

Species	2003	2004	2005	2006[1]	2007[1]	2008	2009	2010	Average	Objective
Frame nets										
BLB										
CPUE	21	22	2	3	19	2	56	77	25	≤ 100
PSD	100	99	97	61	23	93	18	55	68	---
PSD-P	28	30	79	41	1	0	0	1	23	---
Wr	84	89	84	86	78	89	84	84	85	---
BLC										
CPUE	24	10	40	64	127	102	58	1	53	≥ 10
PSD	100	76	83	11	13	88	93	67	66	30-60
PSD-P	43	66	13	2	2	2	0	8	17	5-10
Wr	106	107	117	110	95	106	102	104	106	
BLG										
CPUE	41	55	24	47	44	35	30	60	42	≥ 25
PSD	99	36	75	82	90	94	82	91	81	30-60
PSD-P	47	24	47	22	2	2	19	5	21	5-10
Wr	117	108	119	106	102	119	113	117	113	---
Gill nets										
WAE										
CPUE	26	26	11	18	3	2	2	5	12	≥ 20
PSD	13	24	32	34	81	67	7	10	34	10-40
PSD-P	1	1	3	3	44	11	0	0	8	< 5
Wr	90	88	90	83	78	83	88	89	86	---

[1] 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 black crappie sampled in frame nets from Richmond Lake, 2007-2010.

	Year Class									
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2010		2	2	1	1	6				
2009	---		40	57	9	965	14			
2008	---	---		20	70	1689	46	17		
2007	---	---	---			2072	142	37	1	38

Table 5. Weighted mean total length (mm) at capture for black crappie sampled in frame nets (expanded sample size) from Richmond Lake, 2007-2010.

	Age					
Year	1	2	3	4	5	6
2010	139 (2)	190 (2)	217 (1)	235 (1)	239 (6)	---
2009	106 (40)	182 (57)	190 (9)	220 (965)	246 (14)	---
2008	136 (20)	128 (70)	209 (1689)	240 (46)	294 (17)	---
2007	---	190 (2072)	182 (142)	231 (37)	227 (1)	281 (38)

Table 6. Year class distribution based on the expanded age/length summary for bluegill sampled in frame nets from Richmond Lake, 2007-2010.

	Year Class											
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
2010			928	109		47						
2009	---		62	258	50	162			2			
2008	---	---		32	3	590	7					
2007	---	---	---			620	95	55	6	3	10	4

Table 7. Weighted mean total length (mm) at capture for bluegill sampled in frame nets (expanded sample size) from Richmond Lake, 2007-2010.

	Age							
Year	1	2	3	4	5	6	7	8
2010	---	161 (928)	189 (109)	---	215 (47)	---	---	---
2009	90 (62)	160 (258)	194 (50)	200 (162)	---	---	227 (2)	---
2008	100 (32)	148 (3)	179 (590)	201 (7)	---	---	---	---
2007	---	157 (620)	169 (95)	181 (55)	194 (6)	214 (3)	226 (10)	234 (4)

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 Richmond Lake, 2006-2010.

	Year Class												
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
2010			17	11	3								
2009	---		14	7	6								
2008	---	---		3	3		3		1	1	1	1	
2007[1]	---	---	---		3	1	5	1		1	4		1
2006[1]	---	---	---	---			60	1	3	17	7	1	1
# stocked													
fry													
sm. fingerling													
lg. fingerling	12		4	12	24		33			61	9		6

[1] 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 (mm) at capture for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Richmond Lake, 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	---	305(17)	338(11)	370(3)	---	---	---	---	---	---
2009	233 (14)	263 (7)	318 (6)	---	---	---	---	---	---	---
2008	203 (3)	247 (3)	---	404 (3)	---	432 (1)	480 (1)	624 (1)	495 (1)	---
2007	205 (3)	455 (1)	380 (5)	522 (1)	---	542 (1)	493 (4)	---	521 (1)	---
2006	---	329 (60)	427 (1)	411 (3)	427 (17)	470 (7)	634 (1)	593 (1)	---	---

Table 10. Stocking history including size and number for fishes stocked into Richmond Lake, 1998-2010. SXW= saugeye; CCF= channel catfish; WAE= walleye

Year	Species	Size	Number
1998	SXW	large fingerling	6,030
2000	CCF	large fingerling	25,000
	WAE	large fingerling	9,285
2001	WAE	large fingerling	60,984
2004	WAE	large fingerling	32,535
2006	WAE	large fingerling	23,828
2007	WAE	large fingerling	11,766
2008	WAE	large fingerling	4,218
2010	WAE	large fingerling	11,788

Table 11. Year class distribution based on the expanded age/length summary for white bass sampled in frame nets from Richmond Lake, 2009-2010.

	Year Class								
Survey Year	2010	2009	2008	2007	2006	2005	2004	2003	2002
2010	4	30	10	15	11	42			
2009	---			1	24	113	7		

Table 12. Weighted mean total length (mm) at capture for white bass sampled in frame nets (expanded sample size) from Richmond Lake, 2009-2010.

	Age					
Year	0	1	2	3	4	5
2010	114 (4)	228 (30)	286 (10)	312 (15)	318 (11)	313 (42)
2009	---	---	268 (1)	290 (24)	291 (113)	301 (7)

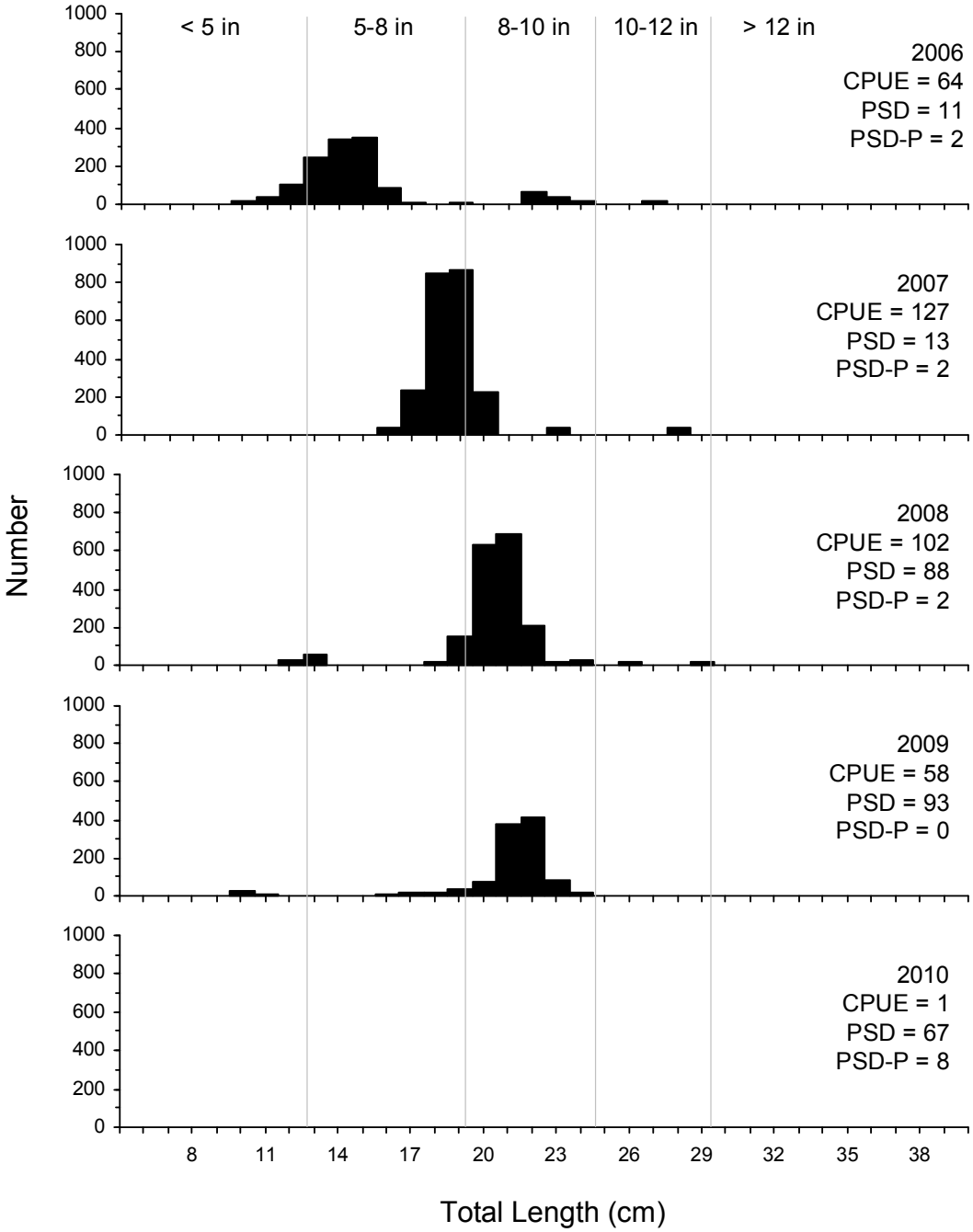

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Richmond Lake, 2006-2010.

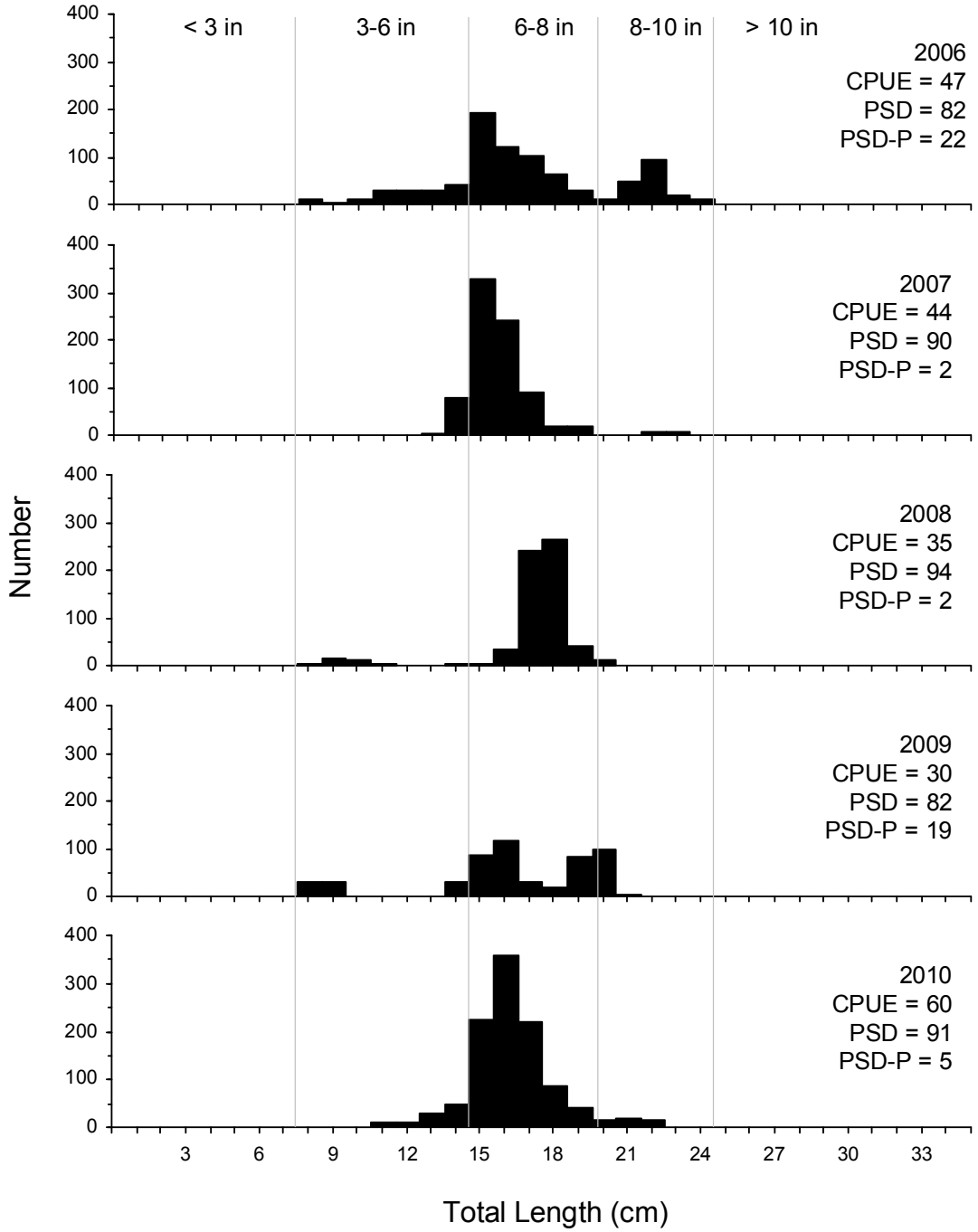

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Richmond Lake, 2006-2010.

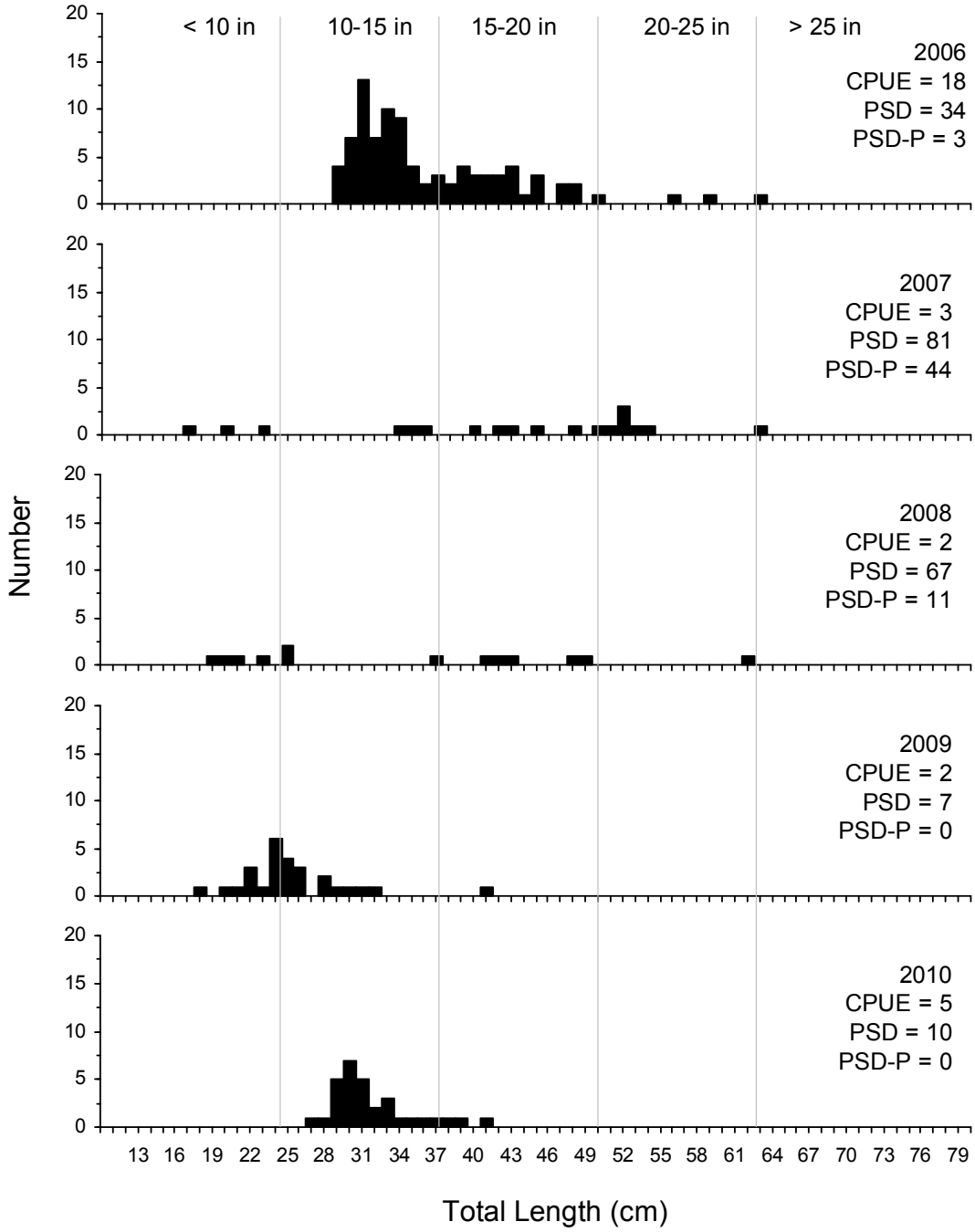

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Richmond Lake, 2006-2010.

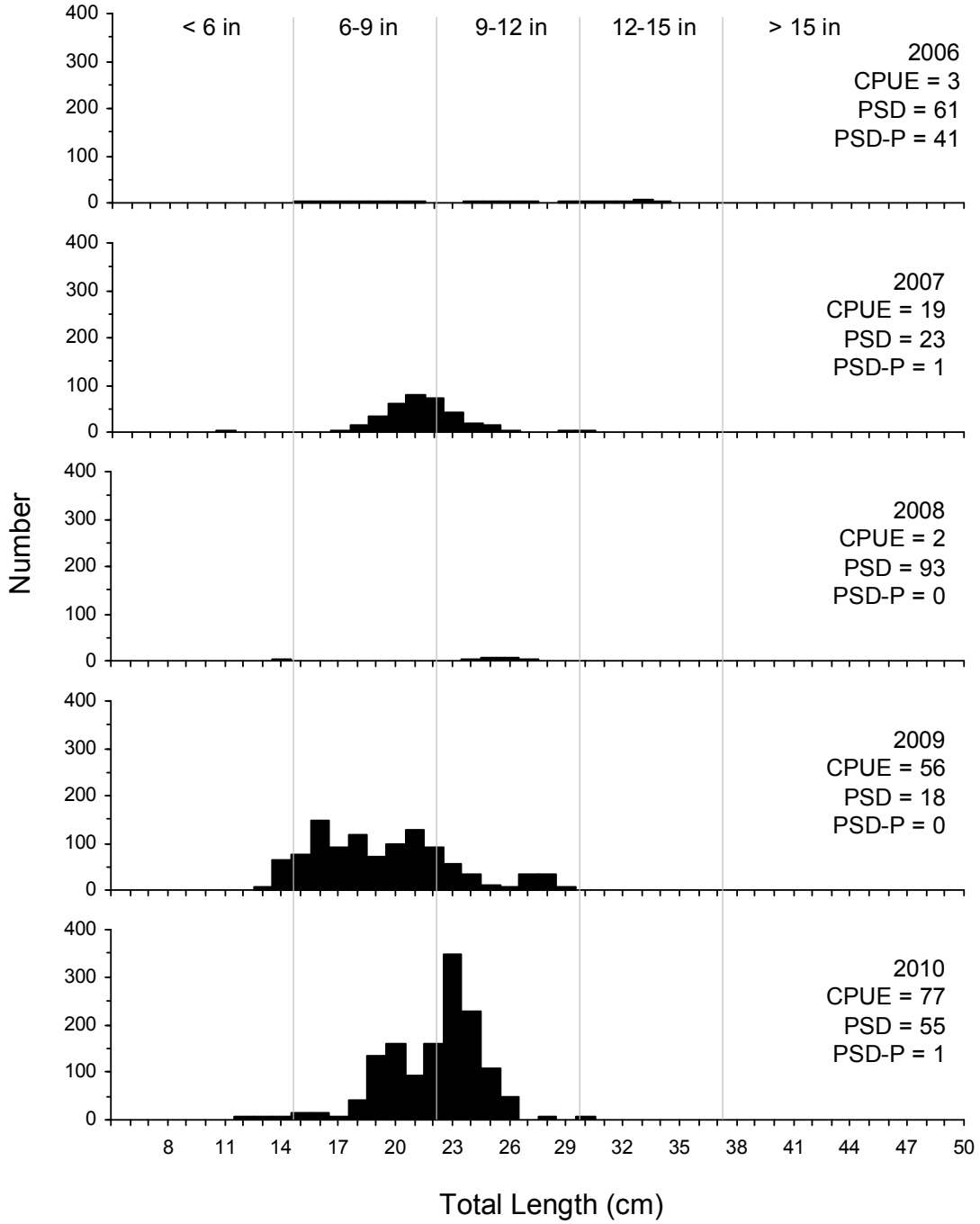

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black bullhead captured using frame nets in Richmond Lake, 2006-2010.

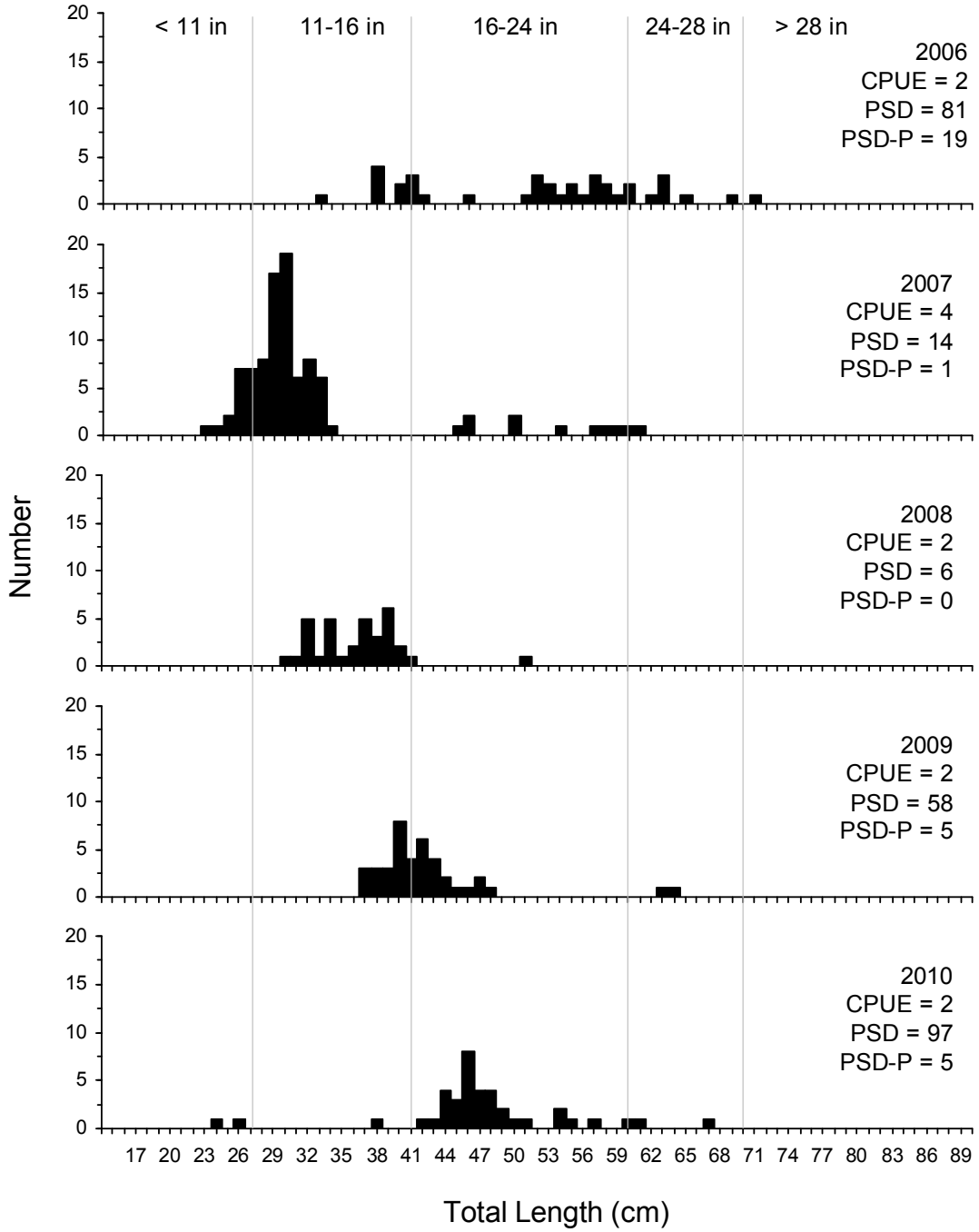

Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for channel catfish captured using frame nets in Richmond Lake, 2006-2010.

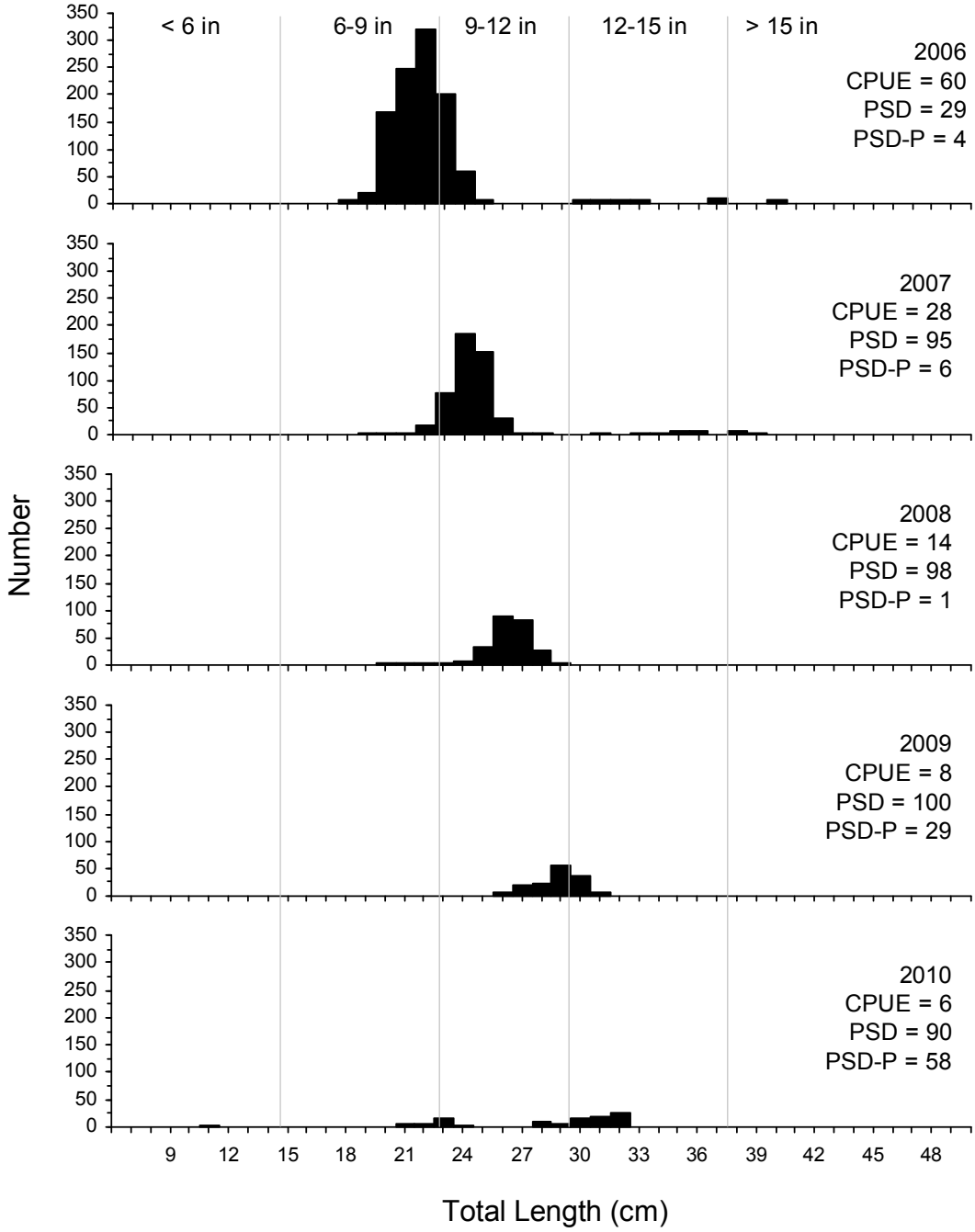

Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for white bass captured using frame nets in Richmond Lake, 2006-2010.

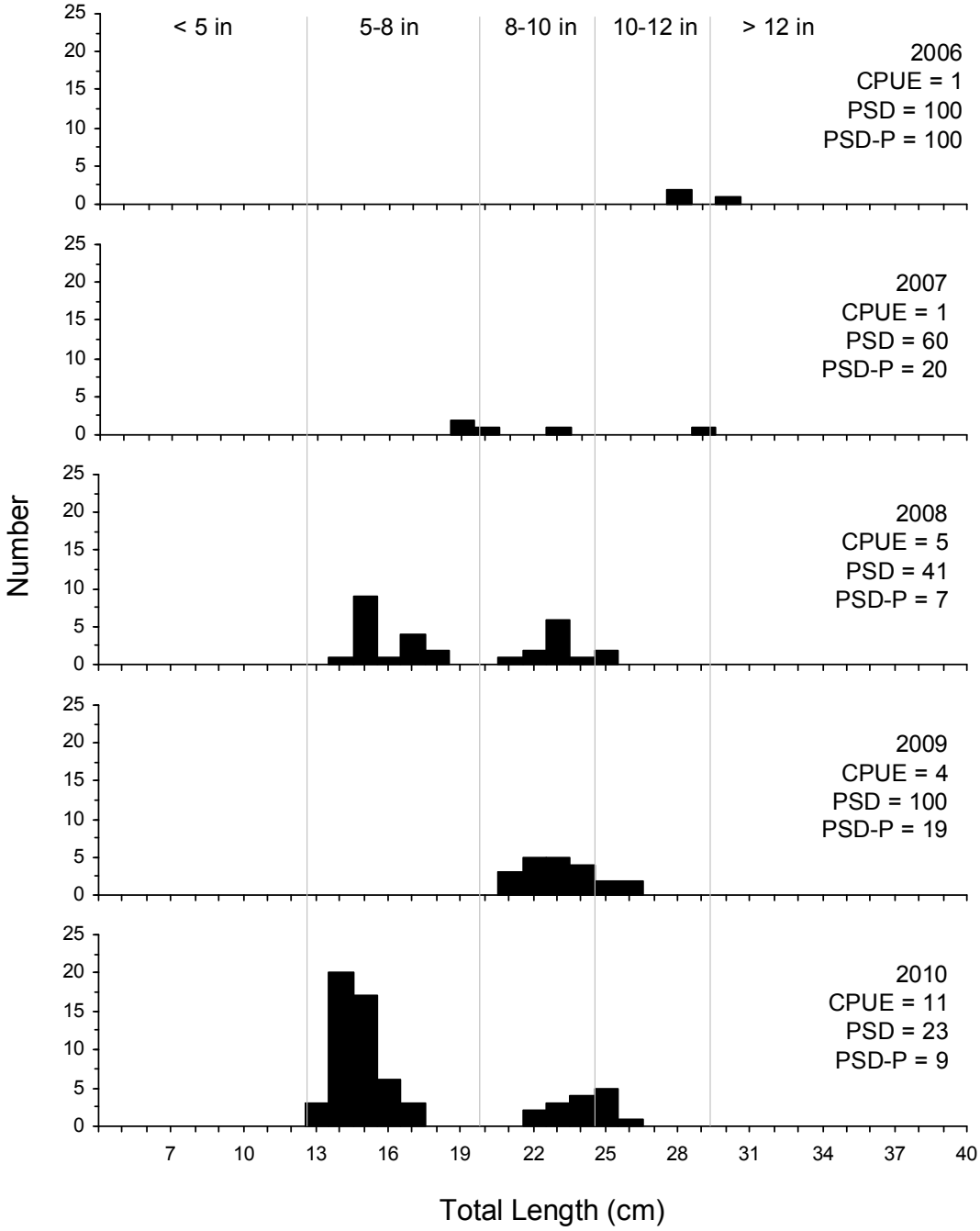

Figure 9. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Richmond Lake, 2006-2010.