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 4-6, 2009 (FN, GN) August 27, 2009 (EF-WAE)
Gill net sets (n)	6
Frame net sets (n)	18
Fall electrofishing (min)	61

Morphometry (Figure 1)

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 southwest (spillway access) shorelines and are maintained by the SDGFP. 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. Visual observation indicated that Richmond Lake was at full pool with water flowing over the spillway in late-fall 2009 (Mary Clawson, SDGFP, pers. comm.)

Aquatic Nuisance Species Monitoring

Plant Survey

Areas of emergent vegetation, primarily bulrush and cattail, are limited to the upper portions of the impoundement. Sago pondweed was found in scattered beds near shore and was the only submersed vegetation species identified during the 2009 survey. No aquatic nuisance plant species were encountered in 2009.

Macro-Invertebrate/Mussel Survey

No aquatic nuisance macro-invertebrate or mussel species were identified in 2009.

Fish Community Survey

Common carp was the only aquatic nuisance fish species captured in 2009.

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/Saugeye: minimum length 14”
Management classification	warm-water permanent impoundment
Fish Consumption Advisories	none

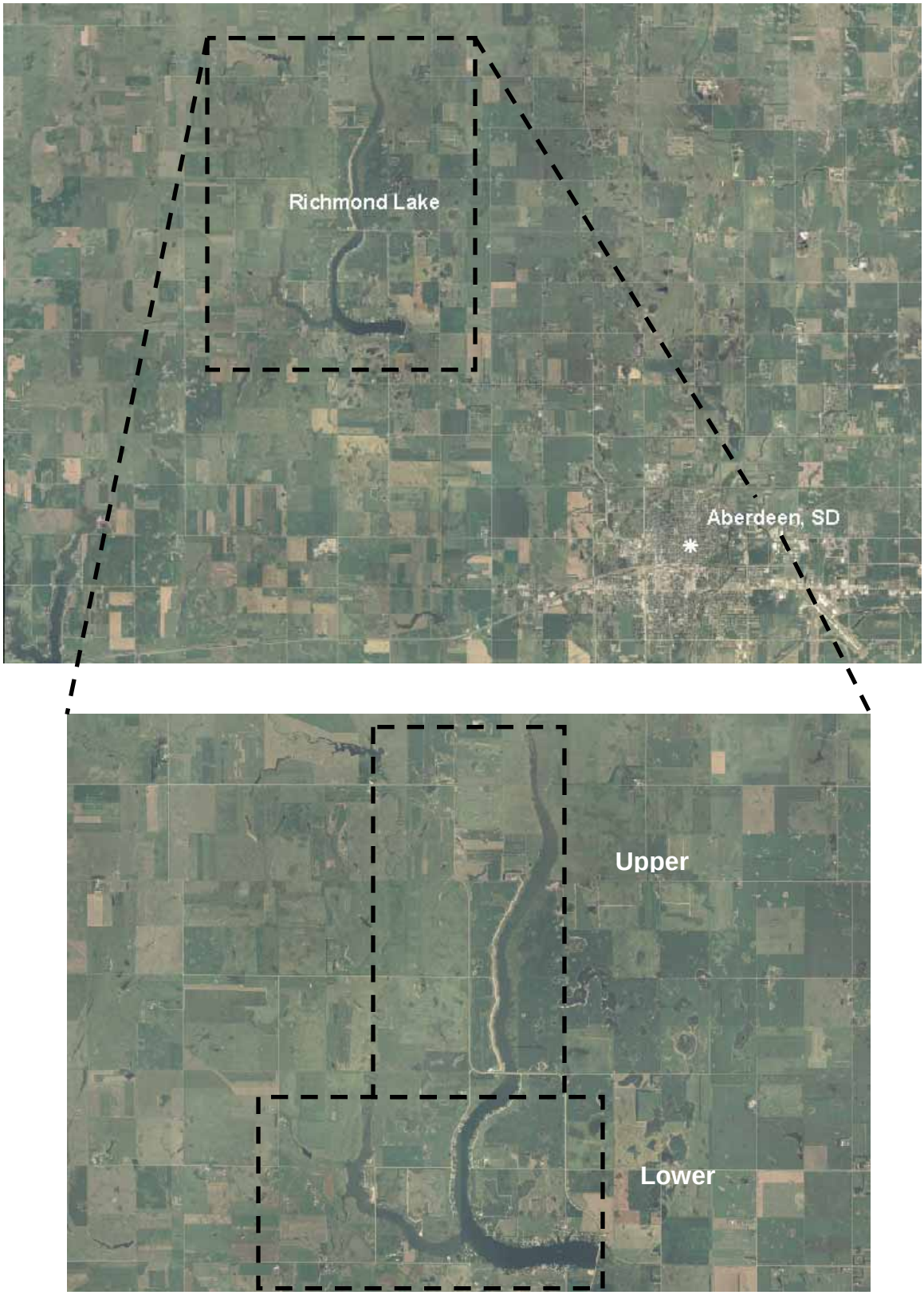

Figure 1. Map depicting location of Richmond Lake from Aberdeen, Brown County, South Dakota and upper and lower divisions.

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 mid 1930's by the Works Progress Administration (McLaury 2006). Foot Creek (west arm) and an unnamed tributary (north arm) are the major surface water inlets to Richmond Lake (Figure 1). Water exits Richmond Lake through an outlet on the eastern side of the lake flowing into Foot Creek and eventually draining into the James River (Figure 1; McLaury 2006).

Currently, Richmond Lake is primarily managed as a bluegill, black crappie, largemouth bass, and walleye fishery. Overall, as many as 17 species of fish have been collected from Richmond Lake.

Primary Species

Black crappie: Relative abundance of black crappie in Richmond Lake appeared high in 2009. The frame net mean CPUE of stock-length black crappie was 58.0 (Table 1) and well above the minimum objective (≥10 stock-length black crappie/net; Table 3). Since 2002, abundance of black crappie, as indexed by frame net mean CPUE has fluctuated from a low of 10.5 (2004) to high of 127.2 (2007; Table 2).

Black crappie captured in frame nets during 2009 ranged in total length from 10 to 24 cm (3.9 to 9.4 in; Figure 3). Five year-classes were present in the frame net sample indicating consistent recruitment from 2004-2008 (Table 4). Length-frequency analysis and age structure information for black crappie in the 2009 frame net catch indicated the presence of a relatively-strong 2005 year-class (Tables 2, 4; Figure 3).

Black crappie from the 2005 year-class comprised approximately 89% of black crappie sampled in the 2009 frame net catch and most exceeded quality-length (20 cm; 8 in) resulting in a PSD of 93 but no preferred-length fish were collected (Tables 1, 4; Figure 3).

Black crappie from the 2005 year-class had a weighted mean length at capture of 209 mm at age-3 and 220 mm at age-4 (Table 5). Mean Wr values of black crappies captured in frame nets ranged from 101-114 for all length categories sampled. The majority of black crappies captured in the 2009 frame net catch were in the quality- to preferred-length category which had a mean Wr value of 101. A slight decreasing trend in Wr was observed as total length increased.

Bluegill: The 2009 frame net mean CPUE of stock-length bluegill was 29.7 (Table 1) and above the minimum objective (≥ 25 stock-length bluegill/net; Table 3). Since 2002, bluegill relative abundance in Richmond Lake has fluctuated from a low of 23.8 (2005) to a high of 55.4 (2004) stock-length bluegill/net (Table 2). Based on the 2009 frame net mean CPUE relative abundance appears to be high.

Length-frequency analysis and age structure information for bluegill in the 2009 frame net catch indicated the presence of five year-classes with relatively-strong year-classes from 2005 and 2007 (Table 6). The presence of four consecutive year-classes from 2005-2008 indicate consistent recruitment (Table 6). Bluegill from the 2005 year-class had a weighted mean length at capture of 179 mm at age-3 and 200 mm at age-4 (Table 7). Bluegill from the 2007 year-class had a weighted mean length at capture of 100 mm at age-1 and 160 mm at age-2 (Table 7).

Bluegill captured in the 2009 frame net catch ranged in total length from 8 to 21 cm (3.1 to 8.3 in), had a PSD of 82 and a PSD-P of 19 (Figure 4). The 2009 PSD and PSD-P were above the objective ranges (30-60 and 5-10, respectively) as bluegill from the strong 2005 and 2007 year-classes exceeded quality- and preferred-length (Figure 4).

Mean Wr values of bluegill captured in the 2009 frame net catch ranged from 104-117 for all length categories sampled. The majority of bluegills captured in the 2009 frame net catch were in the quality- to preferred-length category which had a mean Wr value of 114. A slight decreasing trend in Wr was observed as total length increased.

Walleye: In 2009, the gill net mean CPUE of stock-length walleye was 2.3 (Table 1). Since 2002, 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 2009 gill net catch, relative abundance of walleye appears to be low.

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 2007-2009 gill net surveys. Walleye large fingerling stocks were made in 2006-2008 (Table 10); however, age structure analysis in 2009 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 gill net sample (Table 8).

Walleye captured in gill nets during 2009 ranged in total length from 18 to 41 cm (7.1 to 16.1 in), had a PSD of 7 and a PSD-P of 0 (Figure 5). In 2009, both the PSD and PSD-P values were below the management objectives of 30-60 and 5-10, respectively (Table 3). Only 4% of walleye in the 2009 gill net catch exceeded the 356-mm (14-inch) minimum length restriction enforced 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 2009, the weighted mean total length at capture of age-3 walleye was 318 mm (12.5 in., Table 9). Mean Wr values of walleye captured in gill nets during 2009 ranged from 88-93 for all length categories sampled. The mean Wr value of stock-length walleye in the 2009 gill net catch was 88 (Table 1). No length-related trends in Wr were observed in 2009.

Other Species

Black bullhead: The frame net mean CPUE of stock-length black bullhead during 2009 was 55.8 (Table 1). The 2009 frame net mean CPUE was substantially higher than the 1.5 observed in 2008 and the highest observed since 2002 (Table 2).

Frame net captured black bullheads during 2009 ranged in total length from 13 to 29 cm (5.1 to 11.4 in), had a PSD of 18 and an PSD-P of 0 (Figure 6). No growth information was collected in 2009. The majority of black bullheads in the 2009 frame net catch were in the stock- to quality-length category which had a mean Wr value of 84.

Channel catfish: In 2009, mean CPUE of stock-length channel catfish was 2.2 for both frame nets and gill nets. The majority of channel catfish in the 2009 frame net catch ranged in total length from 37 to 48 cm (14.6 to 18.9 in) and appeared to be a single year class (Figure 7). Since 2002, the frame net mean CPUE has ranged from a low of 0.3 (2002) to a high of 4.2 (2007; Table 2).

No growth information was available in 2009. Mean Wr values of frame net captured channel catfish ranged from 88-101 for all length categories sampled. A slight increasing trend in Wr was observed as total length increased.

Smallmouth bass: Smallmouth bass populations are typically sampled using fall night electrofishing in northeast South Dakota. However, in recent years fall night electrofishing has been conducted on Richmond Lake in areas generally not considered optimal smallmouth bass habitat (i.e., rocky substrate). Anglers fishing near the Dam face and along the north road where rip-rap is present have impeded electrofishing efforts; therefore, fall night electrofishing sites have been adjusted over time. As a result, frame net mean CPUE of smallmouth bass may be a better indicator of smallmouth bass abundance in Richmond Lake.

Hubers (2002) suggested that abundance was likely high in areas of suitable habitat. Since 2002, the frame net mean CPUE of stock-length smallmouth bass has not exceeded 2.0, indicating a low density population (Table 2). However, areas that contain suitable habitat (i.e., rip-rap along the dam face and north road) are not conducive to frame netting as they drop-off sharply. In 2009, the frame net mean CPUE of stock-length fish was 0.5 (Table 1). Nine smallmouth bass ranging in total length from 21 to 30 cm (8.3 to 11.8 in) were captured in frame nets during 2009. Stock-length smallmouth bass in the 2009 frame net catch had a mean Wr value of 100 (Table 1).

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). However, frame net mean CPUE values have declined since 2006 likely due to mortality and poor recruitment. The frame net mean CPUE in 2009 was 8.1 (Table 1).

White bass sampled in the 2009 frame net catch ranged in total length from 26 to 31 cm (10.2 to 12.2 in), had a PSD of 100 and a PSD-P of 29 (Figure 8). Age structure analysis in 2009 indicated four year-classes from 2004-2007 (Table 11). Frame net sampled white bass had a weighted mean total length at capture of 290 mm for age-3 and 291 mm for age-4 fish (Table 12). Stock-length white bass from the frame nets in 2009 had a mean Wr of 90 (Table 1).

Yellow Perch: The gill net mean CPUE of stock-length yellow perch in 2009 was 3.5 (Table 1) and indicative of low relative abundance. Since 2002, the gill net CPUE of stock-length yellow perch has fluctuated from a low of 0.6 (2006) to a high of 7.5 (2003; 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 2009 ranged in total length from 20 to 26 cm (7.9 to 10.2 in.), had PSD of 100 and PSD-P of 19 (Figure 9).

Age structure analysis was conducted on yellow perch in Richmond in 2009. The weighted mean total length at capture of male yellow perch was 219 mm at age-2 and 243 mm at age-4 (Table 13). The weighted mean total length at capture of female yellow perch was 227 mm at age-2 and 263 mm at age-4 (Table 13). Stock-length yellow perch had a mean Wr of 101 (Table 1).

Other: Common carp, largemouth bass, northern pike, rock bass and white sucker were also captured in low numbers during the 2009 survey (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2010) to monitor fish relative abundance, fish population size structure, fish growth, and stocking success.

2) Conduct fall night electrofishing on an annual basis to monitor walleye young-of-the-year abundance and to assess the largemouth bass population.

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

4) Stock channel catfish fingerlings (≈50 fingerlings/acre) every third year (when available) in an attempt to bolster the channel catfish fishery in Richmond Lake.

5) Stock large fingerling walleyes (≈25 walleye/acre) if fall night electrofishing CPUE of young-of-the-year walleye and gill netting results warrant (i.e., low gill net CPUE of < 250 mm (10 inch) walleye and/or fall night electrofishing CPUE of age-0 walleye < 75 fish/hour). 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.

6) Establish the 15” minimum length limit on walleye and maintain largemouth/smallmouth bass based on Tool Box recommendations.

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, 2009. 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; NOP= northern pike; ROB= rock bass; 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	55.8	32.6	18	2	0	---	84	2
BLC	58.0	13.4	93	1	0	---	102	1
BLG	29.7	10.3	82	3	19	3	113	1
CCF	2.2	1.0	58	13	5	6	90	1
COC	0.4	0.2	71	29	29	35	96	3
NOP	0.1	0.1	50	50	0	---	84	9
ROB	0.1	<0.1	100	---	0	---	119	---
SMB	0.5	0.3	11	21	0	---	100	4
WAE	1.1	0.7	21	17	5	9	84	1
WHB	8.1	4.0	100	0	29	6	90	1
WHS	0.2	0.1	100	0	100	0	96	12
YEP	0.6	0.3	100	0	36	28	87	3
Gill nets								
BLB	11.0	4.3	12	7	0	---	97	1
BLC	13.0	9.2	96	4	0	---	107	1
BLG	0.3	0.3	0	---	0	---	126	<1
CCF	2.2	1.6	46	26	15	19	99	2
COC	0.5	0.5	100	0	100	0	97	1
NOP	0.2	0.2	100	---	0	---	78	---
WAE	2.3	2.0	7	13	0	---	88	1
WHB	2.8	2.5	100	0	18	16	92	2
YEP	3.5	1.6	100	0	19	15	101	1
Electrofishing								
LMB[1]	2.0	3.0	0	---	0	---	125	23
WAE [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, 2002-2009. BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; GSF= green sunfish; 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	2002	2003	2004	2005	2006[2]	2007[2]	2008	2009	Mean
Frame nets									
BLB	45.9	21.2	22.3	2.1	2.8	19.2	1.5	55.8	21.4
BLC	65.2	24.1	10.5	40.3	64.3	127.2	101.7	58.0	61.4
BLG	33.4	41.3	55.4	23.8	46.9	43.9	35.2	29.7	38.7
CCF	0.3	1.9	0.5	0.9	2.1	4.2	1.9	2.2	1.8
COC	0.4	0.4	0.5	3.3	0.9	1.3	1.9	0.4	1.1
GSF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LMB	0.1	0.1	0.1	0.0	0.2	0.0	0.3	0.0	0.1
NOP	0.8	0.6	0.1	0.3	0.3	0.2	0.3	0.1	0.3
ROB	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1
SMB	1.2	0.7	0.5	1.4	1.4	0.6	0.8	0.5	0.9
WAE	10.9	8.6	13.4	2.6	13.5	1.5	0.7	1.1	6.5
WHB	1.2	5.8	5.5	2.7	59.7	28.1	14.1	8.1	15.7
WHS	0.7	0.9	1.1	0.5	1.4	0.8	0.2	0.2	0.7
YEP	0.3	0.7	0.1	0.3	0.0	0.2	0.4	0.6	0.3
Gill nets									
BLB	23.5	18.7	2.0	1.3	4.0	6.3	3.5	11.0	8.8
BLC	9.8	1.3	0.8	4.7	18.4	27.2	61.3	13.0	17.1
BLG	1.8	1.5	1.0	0.7	1.0	0.2	0.3	0.3	0.9
CCF	0.2	0.3	0.5	0.7	1.6	2.7	2.5	2.2	1.3
COC	0.3	0.2	1.8	0.8	7.6	5.5	2.0	0.5	2.3
LMB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOP	1.0	0.5	0.0	0.0	0.0	0.0	0.3	0.2	0.3
SMB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WAE	33.0	26.2	25.8	10.8	18.0	2.7	1.5	2.3	15.0
WHB	3.0	2.3	1.5	4.0	29.0	10.2	10.5	2.8	7.9
WHS	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
YEP	5.7	7.5	3.8	4.5	0.6	0.8	4.8	3.5	3.9
Electrofishing									
LMB [1]	30.9	13.7	20.6	8.9	71.7	7.0	---	2.0	22.1
WAE [1,3] (age-0)	2.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.6

[1] Fall night electrofishing.
[2] Monofilament gill net mesh size change (.75”, 1”, 1.25”, 1.5”, 2” and 2.5”)
[3] Catch rate (CPUE) represents age-0 walleye/hour

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 experimental gill nets, frame nets, and electrofishing in Richmond Lake, 2002-2009. BLB= black bullhead; BLC= black crappie; BLG= bluegill; LMB= largemouth bass; WAE= walleye

Species	2002	2003	2004	2005	2006[2]	2007[2]	2008	2009	Average	Objective
Frame nets										
BLB										
CPUE	46	21	22	2	3	19	2	56	21	≤ 100
PSD	100	100	99	97	61	23	93	18	74	---
PSD-P	18	28	30	79	41	1	0	0	25	---
Wr	90	84	89	84	86	78	89	84	86	---
BLC										
CPUE	65	24	10	40	64	127	102	58	61	≥ 10
PSD	100	100	76	83	11	13	88	93	71	30-60
PSD-P	7	43	66	13	2	2	2	0	17	5-10
Wr	115	106	107	117	110	95	106	102	107	
BLG										
CPUE	33	41	55	24	47	44	35	30	39	≥ 25
PSD	98	99	36	75	82	90	94	82	82	30-60
PSD-P	18	47	24	47	22	2	2	19	23	5-10
Wr	118	117	108	119	106	102	119	113	113	---
Gill nets										
WAE										
CPUE	33	26	26	11	18	3	2	2	15	≥ 20
PSD	19	13	24	32	34	81	67	7	35	30-60
PSD-P	4	1	1	3	3	44	11	0	8	5-10
Wr	90	90	88	90	83	78	83	88	86	---
Electrofishing										
LMB [1]										
CPUE	31	14	21	9	72	7	---	2	22	≥ 10
PSD	94	94	59	78	33	43	---	0	57	30-60
PSD-P	61	65	47	22	17	29	---	0	34	5-10
Wr	121	117	120	126	112	110	---	125	119	---

[1] Fall night electrofishing.
[2] Monofilament gill net mesh size change (.75”, 1”, 1.25”, 1.5”, 2” and 2.5”)

Table 4. Year class distribution based on the expanded age/length summary for black crappie sampled in frame nets from Richmond Lake, 2007-2009.

	Year Class								
Survey Year	2009	2008	2007	2006	2005	2004	2003	2002	2001
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, 2007-2009.

	Age					
Year	1	2	3	4	5	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, 2007-2009.

	Year Class											
Survey Year	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
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, 2007-2009.

	Age							
Year	1	2	3	4	5	6	7	8
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, 2005-2009.

	Year Class												
Survey Year	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
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	
2005	---	---	---	---		47		1	39	4		1	1
# stocked													
fry													
sm. fingerling													
lg. fingerling		4	12	24		33			61	9		6	44

[1] Monofilament gill net mesh size (.75”, 1”, 1.25”, 1.5”, 2” and 2.5”).

Table 9. Weighted mean total length at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Richmond Lake, 2005-2009. 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
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)	---	---
2005	245 (47)	---	300 (1)	375 (39)	434 (4)	---	564 (1)	495 (1)	---	---

Table 10. Stocking history including size and number for fishes stocked into Richmond Lake, 1997-2009. SXW= saugeye; CCF= channel catfish; WAE= walleye

Year	Species	Size	Number
1997	SXW	large fingerling	44,467
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

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

	Year Class								
Survey Year	2009	2008	2007	2006	2005	2004	2003	2002	2001
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.

Year	1	2	3	4	5
2009	---	268 (1)	290 (24)	291 (113)	301 (7)

Table 13. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Richmond Lake, 2009.

	Year Class						
Survey Year	2009	2008	2007	2006	2005	2004	2003
2009			11		9		1

Table 14. Weighted mean total length (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Richmond Lake, 2009.

	Age						
Year	0	1	2	3	4	5	6
2009							
Male	---	---	219 (2)	---	243 (7)	---	251 (1)
Female	---	---	227 (9)	---	263 (2)	---	---
Combined	---	---	225 (11)	---	247 (9)	---	251 (1)

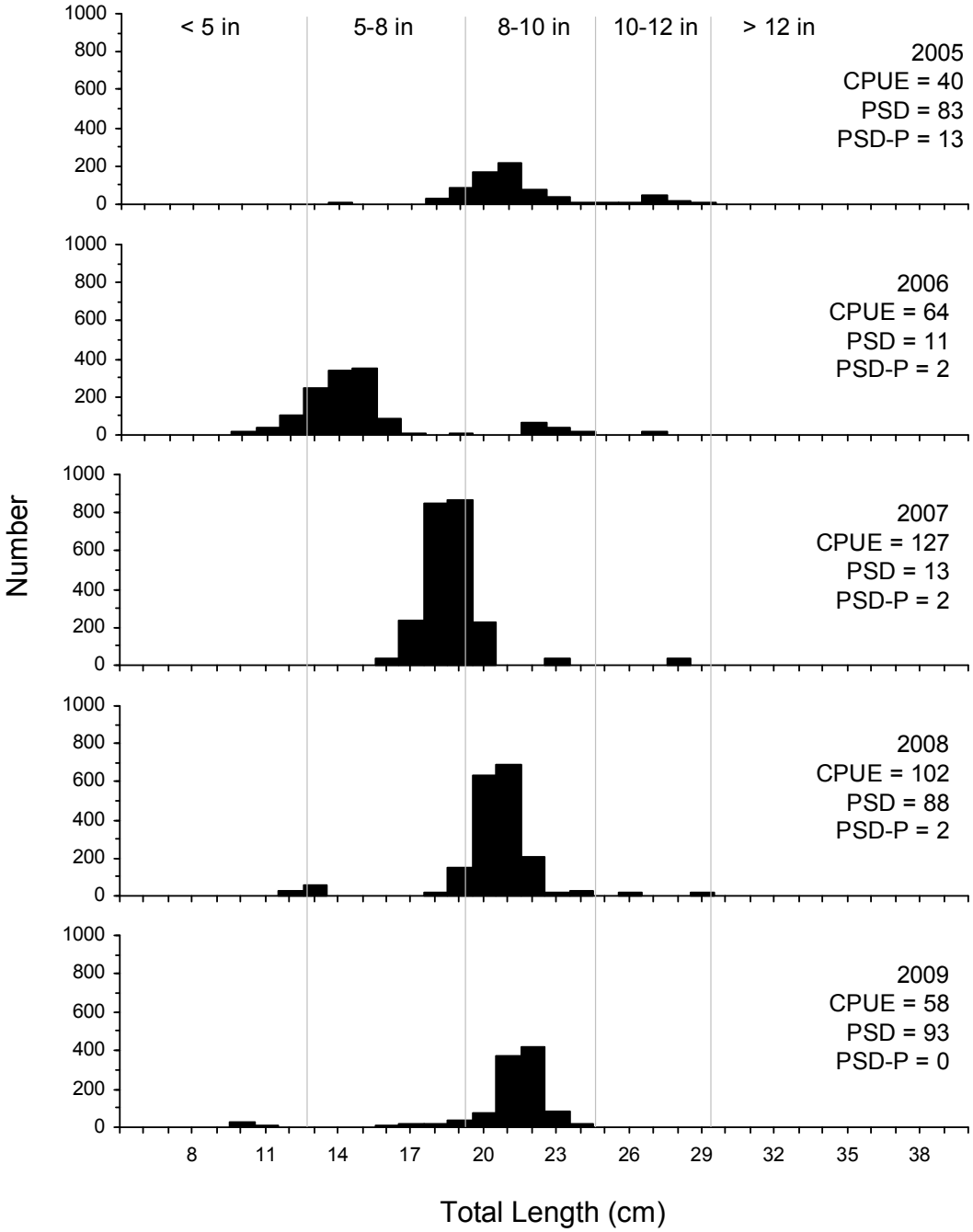

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Richmond Lake, 2005-2009.

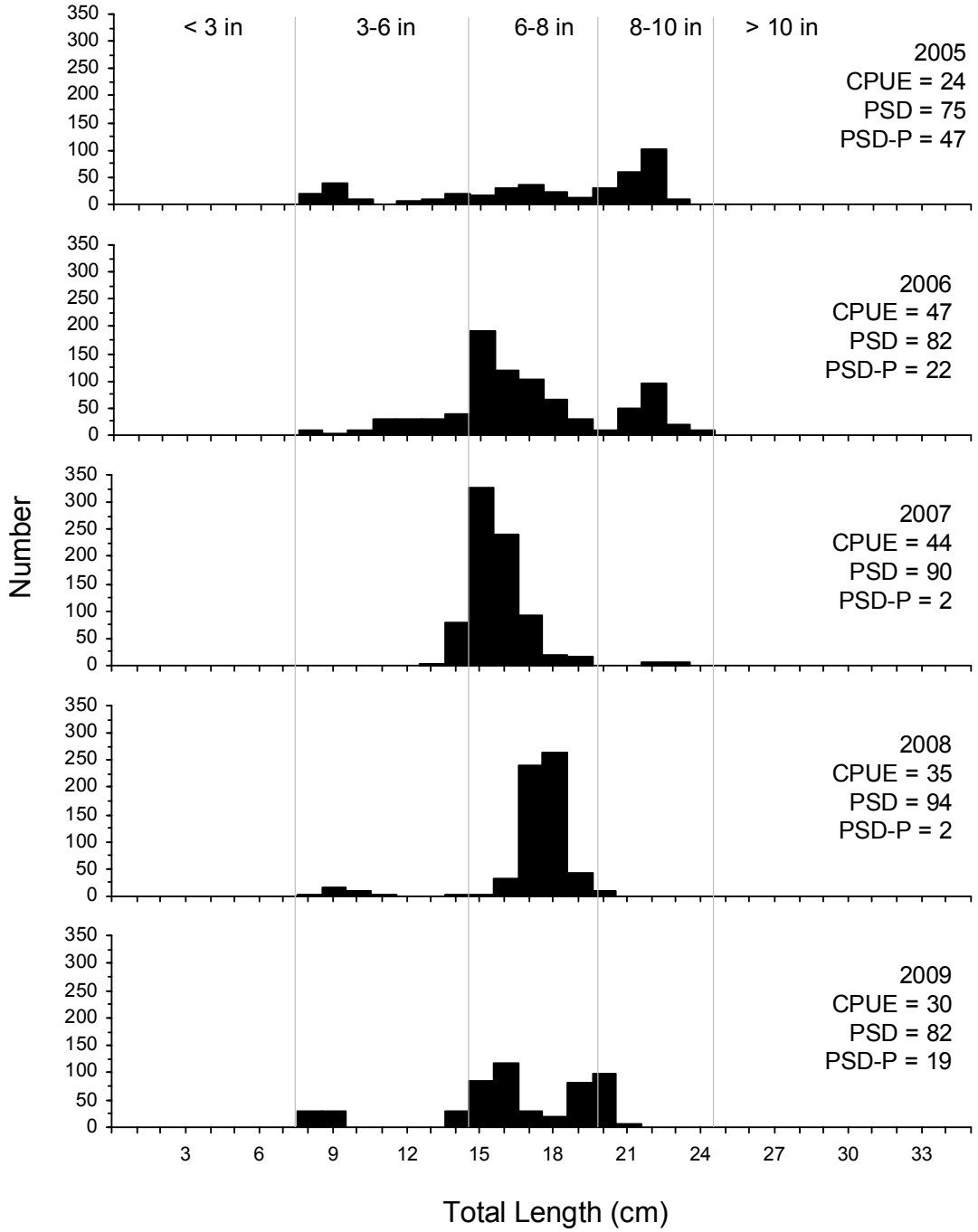

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Richmond Lake, 2005-2009.

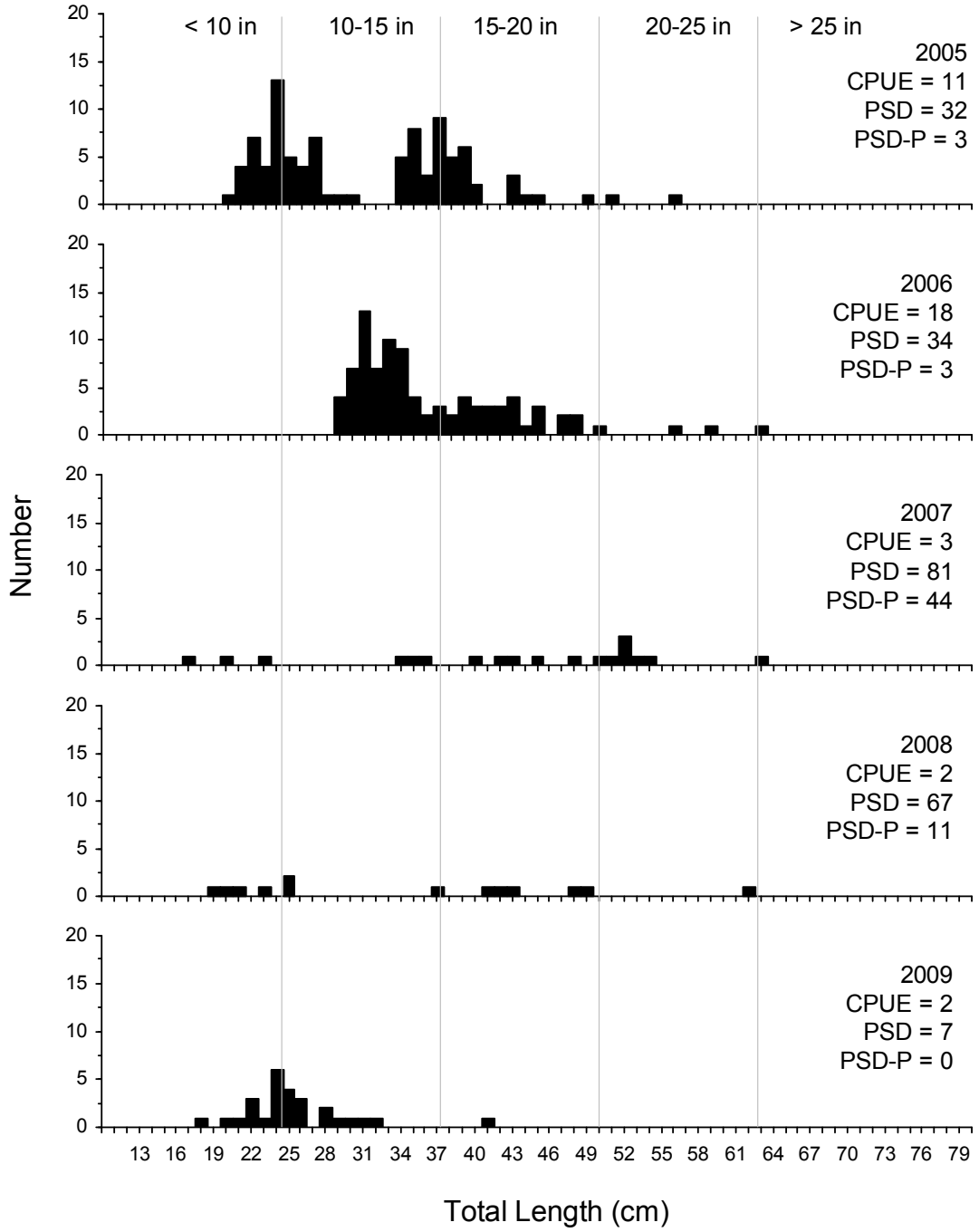

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Richmond Lake, 2005-2009.

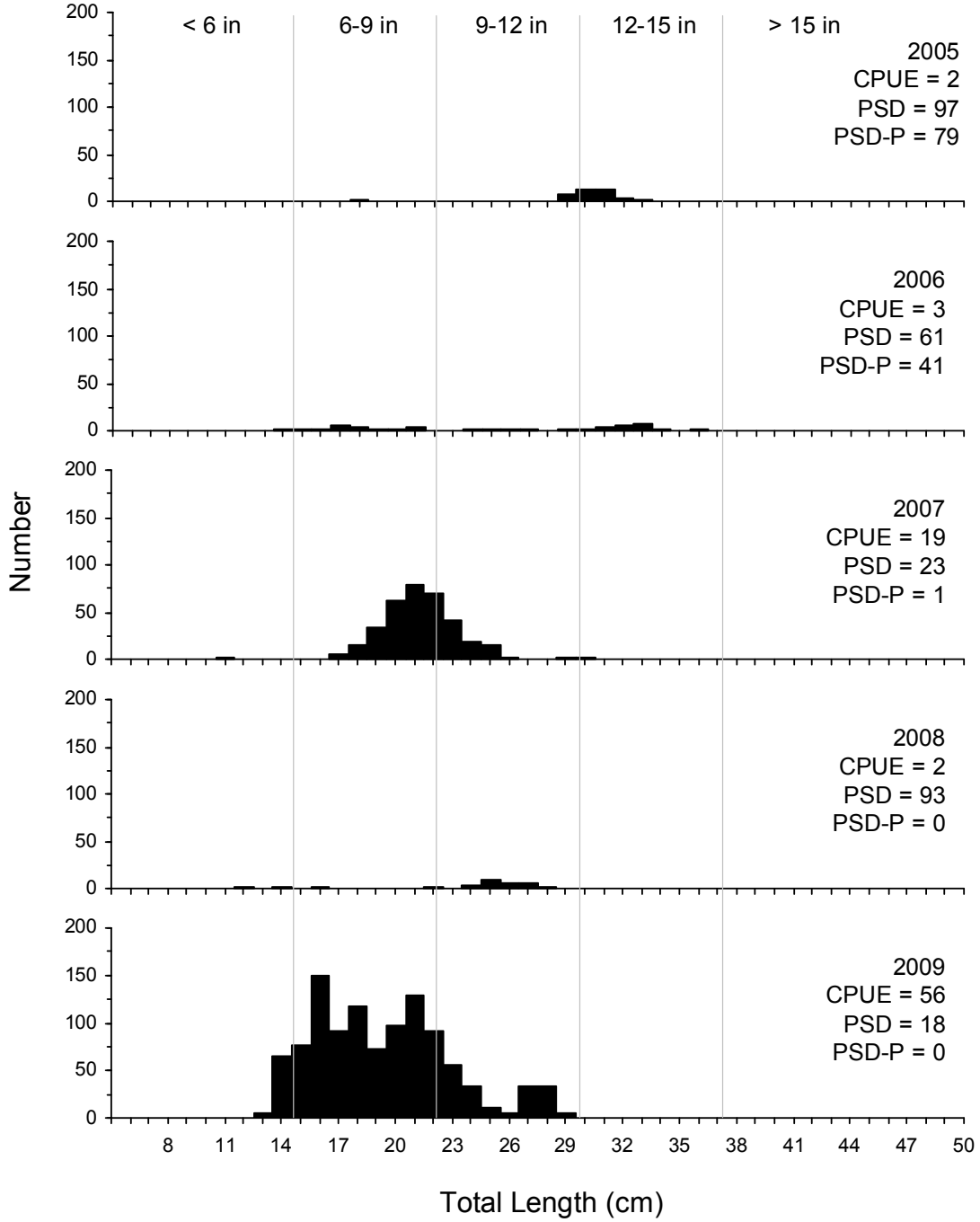

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black bullhead captured using frame nets in Richmond Lake, 2005-2009.

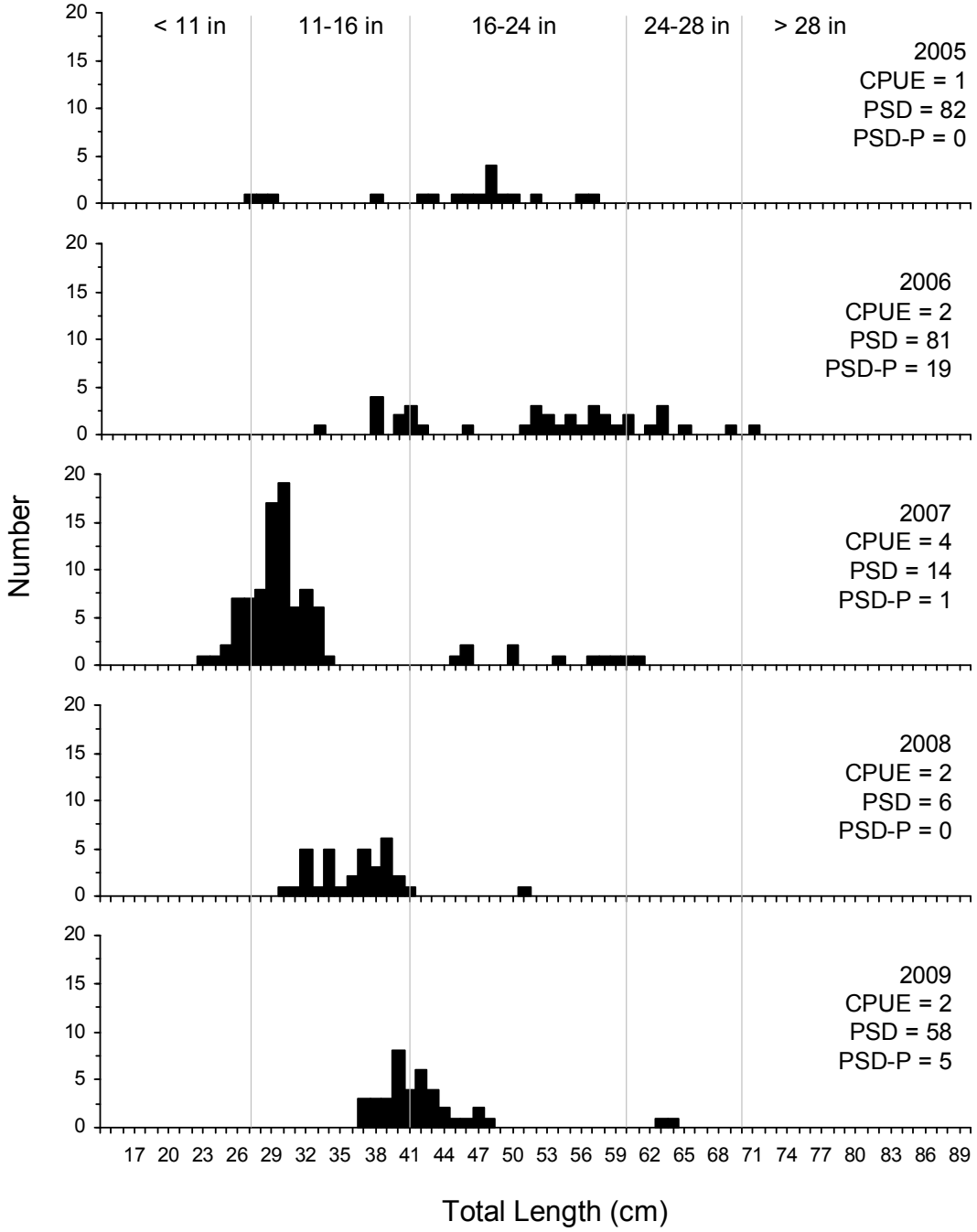

Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for channel catfish captured using frame nets in Richmond Lake, 2005-2009.

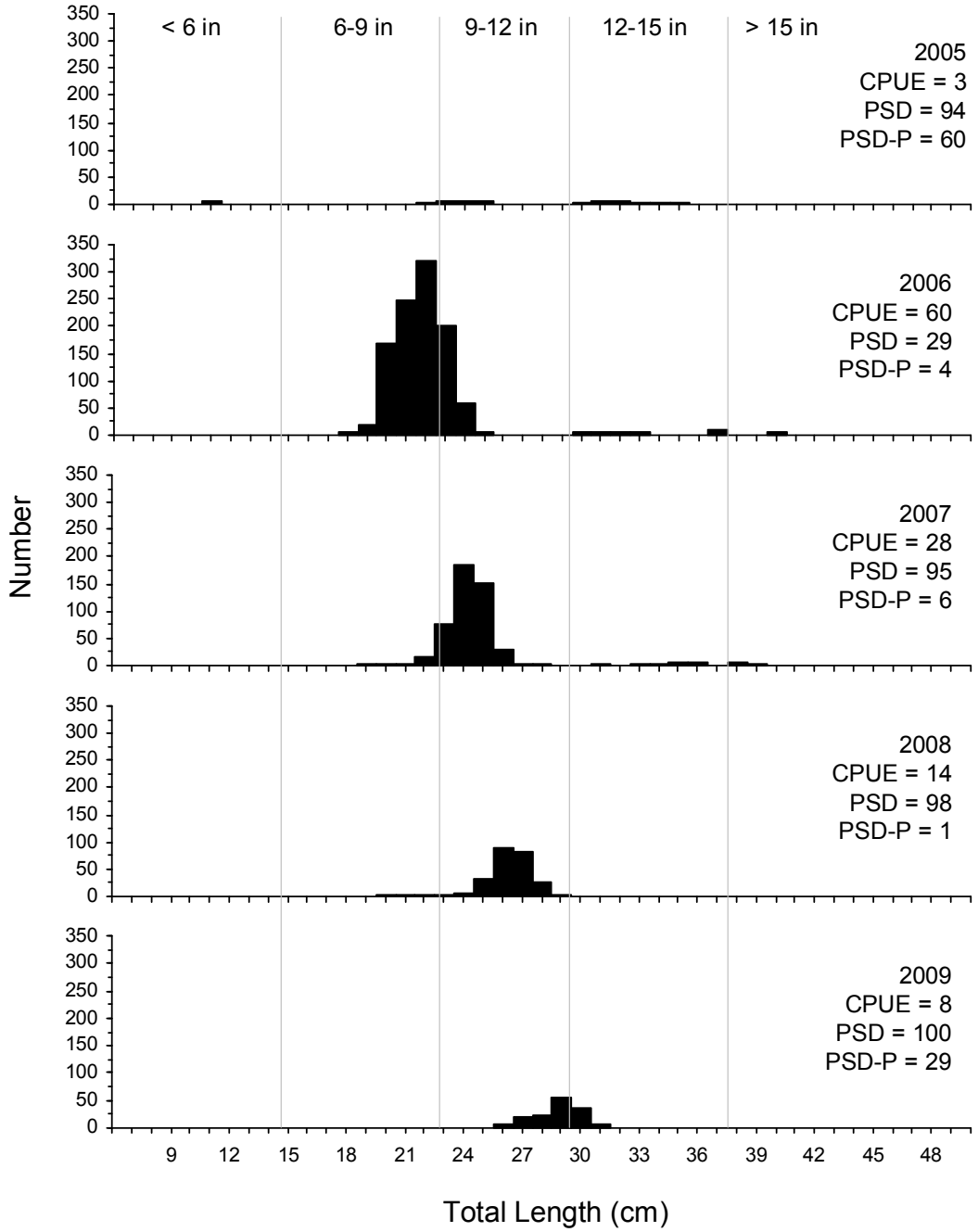

Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for white bass captured using frame nets in Richmond Lake, 2005-2009.

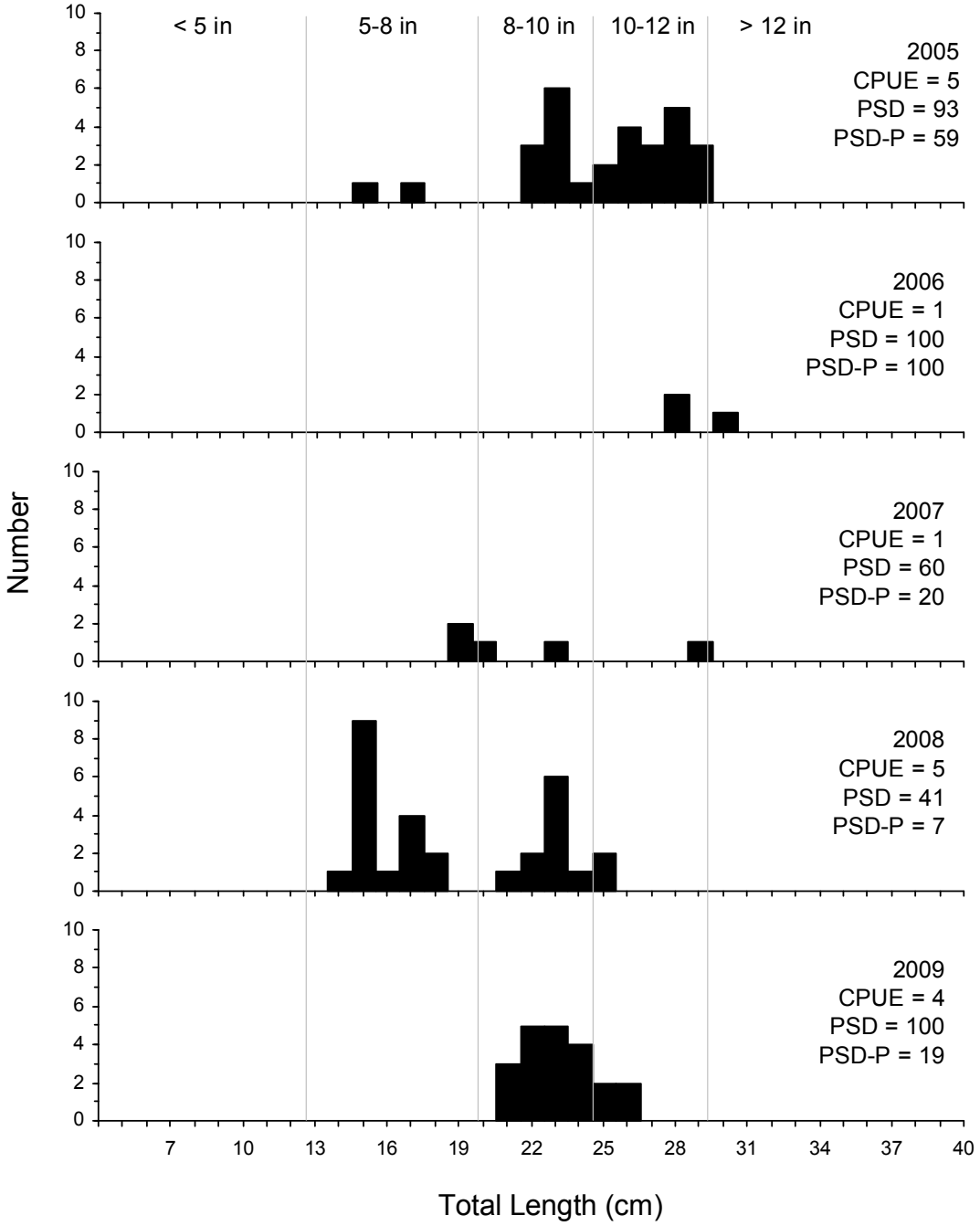

Figure 9. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Richmond Lake, 2005-2009.