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	5.0 miles north and 4.0 miles west of Aberdeen

Survey Dates and Netting Information

Survey dates	August 4-6, 2015 (FN, GN) September 28, 2015 (EF-WAE)
Frame net sets (n)	18
Gill net sets (n)	5
Electrofishing-WAE (min)	60

Morphometry

Watershed area (acres)	103,128
Surface area (acres)	823
Maximum depth (ft)	23
Mean depth (ft)	8

Ownership and Public Access

Three public access sites are present on Richmond Lake; these are located on the east (bass club), south (recreation area), and southeast (spillway access) shorelines and are maintained by the SDGFP (Figure 1). 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) located in the northwestern portion of the watershed. Much of the shoreline is rimmed with homes and cabins that are connected to a central sewer collection system (McLaury 2006).

Water Level Observations

Water levels on Richmond Lake are not monitored by SDDENR.

Fish Management Information

Primary species	black crappie, bluegill, walleye
Other species	black bullhead, channel catfish, common carp, green sunfish, largemouth bass, northern pike, pumpkinseed, rock bass, smallmouth bass, spottail shiner, white bass, white sucker, yellow perch
Lake-specific regulations	largemouth/smallmouth bass: minimum length 15” walleye: minimum length 15”
Management classification	warm-water permanent impoundment
Fish consumption advisories	none

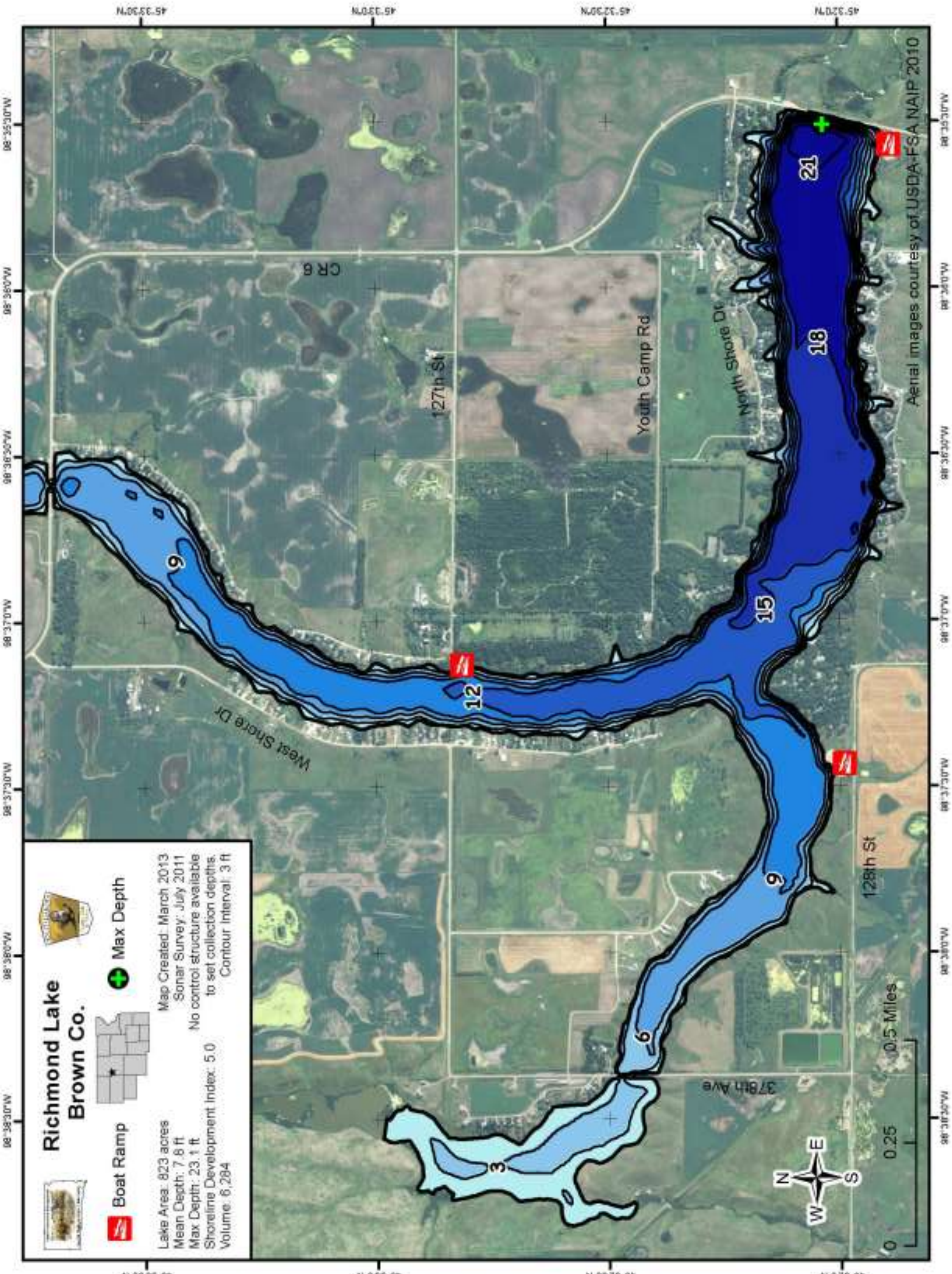

Figure 1. Map depicting access points and depth contours of Richmond Lake, Brown County, South Dakota.

Figure 2. Map depicting 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 black bullhead ≤ 100.

Results and Discussion

Richmond Lake is an impoundment located 5 miles north and 4 miles west of Aberdeen, South Dakota. 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 the lake. Water exits through an outlet on the east side of the lake flowing into Foot Creek and eventually draining into the James River (McLaury 2006).

Overall, as many as 16 species of fish have been collected from the lake. Currently, Richmond Lake is managed as a bluegill, black crappie, and walleye fishery. A high-density (i.e., mean gill net CPUE ≥ 20 stock-length walleye/net night) walleye population should be maintained to effectively impact black crappie and bluegill population size structures through predation.

Primary Species

Black crappie: In 2010, a die-off of black crappie, the cause of which is unknown, occurred in Richmond Lake. As a result, relative abundance was substantially reduced (Table 2). Since 2010, relative abundance has increased; the 2015 mean frame net CPUE of stock-length black crappie was 9.4 (Table1; Table 2) and slightly below the minimum objective (≥ 10 stock-length crappie/net night; Table 3). Currently, relative abundance is considered moderate.

Frame net captured black crappie ranged in TL from 12 to 25 cm (4.7 to 9.8 in; Figure 3). The PSD was 96 and above the management objective of 30-60, and PSD-P was 5 and within the management objective range of 5-10 (Table 1; Table 3; Figure 3).

Otoliths collected from a sub-sample of frame net captured black crappie showed that five year classes (2010-2014) were present (Table 4). The 2011 year class comprised 68% of black crappie in the frame net catch; while the 2010 and 2012 cohorts accounted for 15% and 11%, respectively (Table 4).

The weighted mean TL at capture of age-4 and age-5 individuals was 231 and 245 mm (9.1 and 9.6 in), respectively (Table 5). A decreasing trend in black crappie condition was apparent as TL increased; however, mean Wr values exceeded 95 for all 10-mm length groups represented.

Bluegill: The mean frame net CPUE of stock-length bluegill was 17.9 (Table 1) and below the minimum objective (≥ 25 stock-length bluegill/net night; Table 3). Since 2006, the mean frame net CPUE has fluctuated from a low of 17.9 (2015) to a high of 60.7 (2011; Table 2). Currently, relative abundance appears to be moderate.

Bluegill captured in frame nets ranged in TL from 8 to 25 cm (3.1 to 9.8 in), had a PSD of 96 and a PSD-P of 65 (Table 1; Figure 4). Both the PSD and PSD-P were above the objective ranges of 30-60 and 5-10 (Table 3), indicating a population skewed towards larger individuals (Figure 4).

Otoliths collected from a sub-sample of frame net captured bluegill suggested the presence of seven year classes (2008-2014; Table 6). The 2011 year class was the most abundant comprising approximately 50% of bluegill in the frame net catch (Table 6).

Bluegills in Richmond Lake typically surpass quality-length (15 cm; 6 in) by age 3 (Table 7). Since 2007, the weighted mean TL at capture of age-3 bluegill has ranged from 169 to 194 mm (6.7 to 7.6 in; Table 7). In 2015, the weighted mean TL at capture of age-3 bluegill was 181 mm (7.1 in; Table 7). Frame net captured bluegill had mean Wr values that were > 110 for all length categories (i.e., stock to quality) sampled; the mean Wr of stock-length bluegill was 113 (Table 1).

Walleye: The mean gill net CPUE of stock-length walleye was 7.2 (Table 1) and below the minimum objective (≥ 20 stock-length walleye/net night; Table 3). Since 2006, gill net mean CPUE values have ranged from a low of 1.5 (2008) to a high of 18.0 (2006; Table 2). The 2015 gill net CPUE is the highest observed since 2008, indicating an increase from low to moderate relative abundance.

Walleye captured in the gill net catch ranged in TL from 19 to 48 cm (7.5 to 18.9 in; Figure 5). The PSD of 17 was below the management objective of 30-60 and no preferred-length individuals were captured (Table 1; Table 3; Figure 5). In 2015, only 12% of gill net captured walleye exceeded the 38-cm (15-in) minimum length restriction (Figure 5).

The Richmond Lake walleye population has relied on large fingerling stockings to establish year-classes (Table 8; Table 10). Unfortunately, recruitment of large fingerling stocked walleye has declined in recent years when compared to year classes produced in the late-1990s and early-2000s (i.e., 1997, 2000, 2001, and 2004; Table 8; Kaufman et al. 2008). In 2015, otoliths were collected from a sub-sample of walleye in the gill net catch; six year classes (2008, 2010-2014) were present (Table 8). Walleye from the 2014 and 2013 year-classes comprised 41% and 27% of walleye in the gill net catch, respectively. No age-0 walleye were captured during fall night electrofishing (Table 1), indicating a failed or weak naturally-produced year class in 2015. However, large numbers of age-1 and age-2 walleye were observed during fall night electrofishing. No large fingerlings were stocked during the fall of 2015 due to the observed increased recruitment of the 2013 and 2014 year-classes.

Growth rates can be influenced by the size at which large fingerlings are stocked into Richmond Lake, as the mean TL of stocked fish can vary from year to year. Walleyes typically achieve quality length and the minimum length limit (i.e., 38 cm; 15 in) during their fifth growing season at age-4 (Table 9). Since 2006, age-4 weighted mean TL at capture values have ranged from 347 to 522 mm (13.7 to 20.6 in; Table 9). However, due to low sample sizes weighted mean TL at capture values may at times represent few individuals (Table 9). In 2015, age-3 and age-4 walleye had a weighted mean TL at capture of 335 mm and 347 mm (13.2 and 13.7 in;Table 9); respectively. Gill net captured walleye were in acceptable condition with mean Wr values that exceeding 85 for all length categories (i.e., stock to quality) sampled; the mean Wr of stock-length walleye was 93 (Table 1).

Other Species

Black bullhead: Black bullhead was the most abundant fish species in the frame net catch (Table 1). The mean frame net CPUE of stock-length black bullhead was 65.2 (Table 1) and within the management objective ($\leq$ 100 stock-length bullhead/net night; Table 3). Black bullhead mean frame net CPUE has decreased since 2012, but still suggests high relative abundance (Table 2).

Frame net captured black bullhead ranged in TL from 10 to 27 cm (3.9 to 10.6 in; Figure 6). The PSD was 91 and the PSD-P was 0 (Table 1; Table 3; Figure 6). No age and growth information was collected in 2015. All stock-length black bullhead sampled were in the stock-quality or quality-preferred length categories and had mean Wr values of 95 and 90.

White bass: White bass were first sampled in Richmond Lake during 2000 and the population is now well established (Table 2). Since 2006, mean frame net CPUE values have ranged from a low of 2.7 (2005, 2014) to a high of 59.7 (2006; Table 2). In 2015, the mean frame net CPUE of stock-length white bass was 3.7 (Table 1).

Frame net captured white bass ranged in TL from 11 to 37 cm (4.3 to 14.6 in), had a PSD of 100 and a PSD-P of 95 (Table 1; Figure 7). Limited recruitment in recent years contributes to the high size structure. No age and growth information was available in 2015. A slight decreasing trend in white bass condition was noted as TL increased. White bass in the preferred-memorable length category, which comprised a high proportion (95%) of the sample, had a mean Wr of 89.

Yellow perch: In 2015 yellow perch were the second most abundant fish species in the gill net catch with a mean CPUE of 8.8 (Table 1). Yellow perch in the gill net catch ranged in TL from 17 to 27 cm (6.7 to 10.6 in), had a PSD of 93 and PSD-P of 30 (Table 1; Figure 8).

Yellow perch populations are likely limited by habitat characteristics in Richmond Lake. However, a relatively-strong year class produced in 2011 has resulted in moderate relative abundance (Table 11). In 2015, the weighted mean TL at capture at age-4 was 240 mm (9.4 in; Table 12). Yellow perch in the gill net catch had mean Wr values > 100 for all length categories (e.g., stock to quality) sampled; stock-length individuals had a mean Wr of 111 (Table 1).

Other: Channel catfish, common carp, green sunfish, northern pike, and white sucker were other fish species captured in low numbers during the 2015 survey (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys on an annual basis (next survey scheduled in summer 2016) to monitor fish relative abundance, fish population size structure, fish growth, and stocking success.

2) Collect otoliths from black crappie, bluegill, and walleye/saugeye to assess the age structure and growth rates of each population.

3) Consider stocking saugeye, as walleye recruitment has been poor in recent years. Stock saugeye (≈25 large fingerlings/acre) to establish additional year-classes if gill netting and/or fall night electrofishing CPUE of age-0 saugeye/walleye results warrant [i.e., low gill net CPUE of sub-stock (< 25 cm; 10 in) walleye/saugeye and/or fall night electrofishing CPUE of < 75 age-0 fish/hour].

4) Maintain the 381-mm (15 in) minimum length limit on saugeye/walleye. The regulation is designed to protect smaller fish from harvest and increase average fish size (Lucchesi and Blackwell 2009).

5) Maintain the 381-mm (15-in) minimum length limit on largemouth and smallmouth bass. The regulation is designed to improve population density and/or size structure (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, 2015. 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; GRS= green sunfish; NOP= northern pike; 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	65.2	23.9	91	1	0	---	91	1
BLC	9.4	2.1	96	3	5	3	100	1
BLG	17.9	5.2	96	2	65	4	113	1
CCF	0.7	0.4	69	24	0	---	95	2
COC	0.6	0.2	73	26	55	29	91	5
GRS	0.1	0.1	0	---	0	---	---	---
NOP	0.7	0.3	58	27	33	26	87	4
WAE	3.3	1.4	5	5	0	---	90	2
WHB	3.7	0.9	100	0	95	4	89	0
WHS	0.2	0.1	67	67	67	67	86	11
YEP	0.9	0.4	100	0	41	21	99	2
Gill nets								
BLB	51.6	15.6	76	4	0	1	91	0
BLC	1.0	0.7	60	52	40	52	121	26
CCF	0.2	0.3	100	---	100	---	97	---
COC	1.4	1.4	57	39	29	36	89	4
NOP	0.4	0.4	50	50	0	---	88	48
WAE	7.2	5.9	17	11	0	---	93	2
WHB	0.2	0.3	100	---	100	---	94	---
WHS	0.2	0.3	100	---	100	---	92	---
YEP	8.8	4.3	93	6	30	12	111	1
Electrofishing								
WAE [1]	0.0	---	---	---	---	---	---	---

[1] Fall night electrofishing-WAE; 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, 2006-2015. BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; GRS= green sunfish; LMB= largemouth bass; NOP= northern pike; PUS= pumpkinseed; ROB= rock bass; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

	CPUE									
Species	2006[2]	2007[2]	2008	2009	2010	2011	2012	2013	2014	2015
Frame nets										
BLB	2.8	19.2	1.5	55.8	76.5	39.1	236.3	229.2	99.2	65.2
BLC	64.3	127.2	101.7	58.0	0.7	5.9	8.8	8.1	14.3	9.4
BLG	46.9	43.9	35.2	29.7	60.2	60.7	51.3	19.5	33.6	17.9
CCF	2.1	4.2	1.9	2.2	2.1	0.9	0.1	0.3	0.4	0.7
COC	0.9	1.3	1.9	0.4	0.4	0.1	0.4	0.2	0.8	0.6
GRS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
LMB	0.2	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0
NOP	0.3	0.2	0.3	0.1	0.7	0.6	0.4	0.1	0.2	0.7
PUS	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
ROB	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
SMB	1.4	0.6	0.8	0.5	1.0	0.1	0.0	0.0	0.0	0.0
WAE	13.5	1.5	0.7	1.1	1.5	2.2	0.8	1.0	2.2	3.3
WHB	59.7	28.1	14.1	8.1	6.1	17.6	5.2	4.0	2.7	3.7
WHS	1.4	0.8	0.2	0.2	0.1	0.1	0.2	0.2	0.0	0.2
YEP	0.0	0.2	0.4	0.6	0.2	0.9	1.2	0.3	1.9	0.9
Gill nets										
BLB	4.0	6.3	3.5	11.0	12.5	24.7	108.5	109.0	90.7	51.6
BLC	18.4	27.2	61.3	13.0	0.2	0.2	1.0	2.1	0.7	1.0
BLG	1.0	0.2	0.3	0.3	1.5	0.5	1.3	1.0	0.2	0.0
CCF	1.6	2.7	2.5	2.2	1.3	2.2	2.2	1.5	0.2	0.2
COC	7.6	5.5	2.0	0.5	0.3	0.2	1.7	1.5	0.8	1.4
NOP	0.0	0.0	0.3	0.2	3.7	0.7	0.7	1.0	0.5	0.4
WAE	18.0	2.7	1.5	2.3	5.2	8.3	5.8	4.0	1.8	7.2
WHB	29.0	10.2	10.5	2.8	1.3	1.2	2.0	1.5	0.2	0.2
WHS	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2	0.3	0.2
YEP	0.6	0.8	4.8	3.5	10.7	5.3	11.8	8.3	11.3	8.8
Electrofishing										
WAE [1]	0.0	0.0	2.9	0.0	0.0	34.0	0.0	0.0	0.0	0.0

[1] Fall night electrofishing-WAE; 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, 2006-2015. BLB= black bullhead; BLC= black crappie; BLG= bluegill; WAE= walleye

Species	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013	2014	2015	Objective
Frame nets											
BLB											
CPUE	3	19	2	56	77	39	236	229	99	65	≤ 100
PSD	61	23	93	18	55	81	7	15	72	91	---
PSD-P	41	1	0	0	1	0	0	0	0	0	---
Wr	86	78	89	84	84	84	88	93	93	91	---
BLC											
CPUE	64	127	102	58	1	6	9	8	14	9	≥ 10
PSD	11	13	88	93	67	23	66	64	85	96	30-60
PSD-P	2	2	2	0	8	2	0	0	0	5	5-10
Wr	110	95	106	102	104	99	108	106	98	100	
BLG											
CPUE	47	44	35	30	60	61	51	20	34	18	≥ 25
PSD	82	90	94	82	91	89	78	98	99	96	30-60
PSD-P	22	2	2	19	5	6	17	29	35	65	5-10
Wr	106	102	119	113	117	110	113	112	110	113	---
Gill nets											
WAE											
CPUE	18	3	2	2	5	8	6	4	2	7	≥ 20
PSD	34	81	67	7	10	30	54	21	27	17	10-40
PSD-P	3	44	11	0	0	2	6	8	0	0	< 5
Wr	83	78	83	88	89	90	84	83	83	93	---

[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, 2013-2015.

	Year Class							
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008
2015		4	5	19	114	26		
2014	---			1	1	151	80	24
2013	---	---			51	95		

Table 5. Weighted mean TL (mm) at capture for black crappie sampled in frame nets (expanded sample size) from Richmond Lake, 2013-2015.

	Age					
Year	1	2	3	4	5	6
2015	136(4)	199(5)	234(19)	231(114)	245(26)	---
2014	---	143(1)	188(1)	206(151)	223(80)	220(24)
2013	---	191(51)	217(95)	---	---	---

Table 6. Year class distribution based on the expanded age/length summary for bluegill sampled in frame nets from Richmond Lake, 2010-2015.

	Year Class											
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2015		8	56	14	160	24	20	41				
2014	---		1	8	170	271	115	40			1	
2013	---	---		1	113	114	121	8	2	2		
2012	---	---	---		193	390	56	240	40		4	
2011	---	---	---	---		70	246	656	73	25	20	
2010	---	---	---	---	---			928	109		47	

Table 7. Weighted mean TL (mm) at capture for bluegill sampled in frame nets (expanded sample size) from Richmond Lake, 2007-2015.

	Age							
Year	1	2	3	4	5	6	7	8
2015	98(8)	163(56)	181(14)	206(160)	220(24)	221(20)	217(41)	---
2014[1]	95(1)	150(8)	181(170)	196(271)	202(115)	221(40)	---	---
2013	122(1)	116(113)	185(114)	205(121)	193(8)	225(2)	227(2)	---
2012	119(193)	172(390)	189(56)	200(240)	207(40)	---	220(4)	---
2011	118(70)	158(246)	182(656)	198(73)	213(25)	215(20)	---	---
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)

[1] Older bluegill were sampled, but not reported in this table.

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 Richmond Lake, 2010-2015.

	Year Class													
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
2015		21	14	6	6	3		1						
2014	---		4	1	8	1	1	1						
2013	---	---		4	20	9	2	1	2					
2012	---	---	---		2	13		16	5					1
2011	---	---	---	---	2	8		37	7	2				
2010	---	---	---	---	---			17	11	3				
# stocked														
fry														
sm. fingerling														
lg. fingerling		18	27	10	15	12		4	12	24		33		

Table 9. Weighted mean TL (mm) at capture for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Richmond Lake, 2006-2015. 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
2015	234(21)	300(14)	335(6)	347(6)	410(3)	---	489(1)	---	---	---
2014	211(4)	254(1)	304(8)	396(1)	366(1)	406(1)	---	---	---	---
2013	218(4)	248(20)	311(9)	468(2)	493(1)	547(2)	---	---	---	---
2012	220(2)	309(13)	---	411(16)	454(5)	---	---	---	---	640(1)
2011[1]	249(8)	---	361(37)	381(7)	424(2)	---	---	---	---	---
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[1]	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)	---	---

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

Table 10. Stocking history including size and number for fishes stocked into Richmond Lake, 2002-2015. CCF= channel catfish; WAE= walleye

Year	Species	Size	Number
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
2011	WAE	large fingerling	15,240
2012	WAE	large fingerling	10,173
2013	WAE	large fingerling	27,344
2014	WAE	large fingerling	18,420

Table 11. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Richmond Lake, 2011-2015.

	Year Class											
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2015			8	6	27	1	2					
2014	---		4		45	11	8					
2013	---	---			22	18	10					
2012	---	---	---		11	20	38					
2011	---	---	---	---		3	26	2				1

Table 12. Weighted mean TL (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Richmond Lake, 2011-2015.

	Age						
Year	1	2	3	4	5	6	7
2015	---	204 (8)	215 (6)	240 (27)	272 (1)	273 (2)	---
2014	169 (4)	---	215 (45)	238 (11)	247 (8)	---	---
2013	---	191 (22)	222 (18)	228 (10)	---	---	---
2012	148 (11)	194 (20)	216 (38)	---	---	---	---
2011	149 (3)	194 (26)	233 (2)	---	---	--	297 (1)

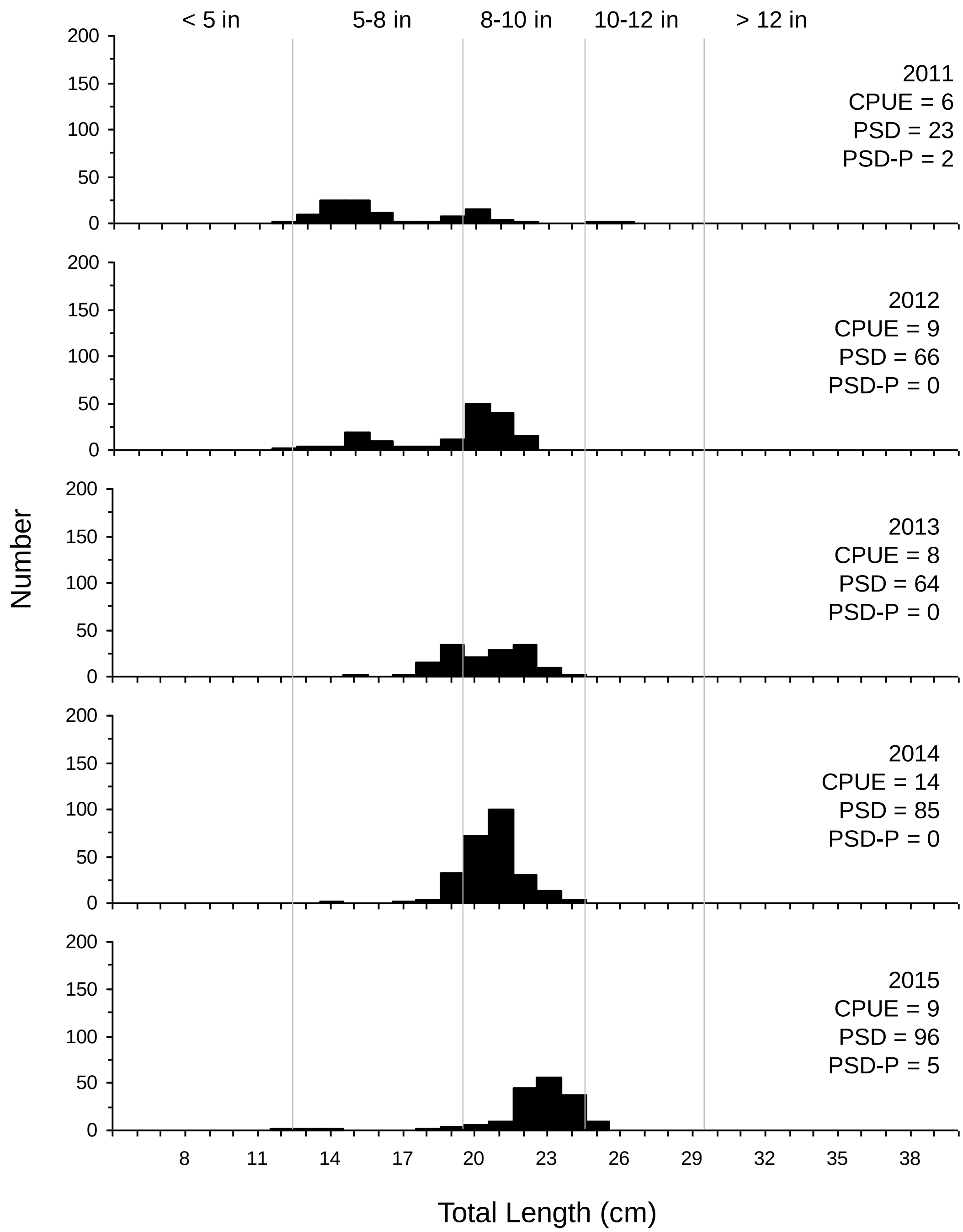

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Richmond Lake, 2011-2015.

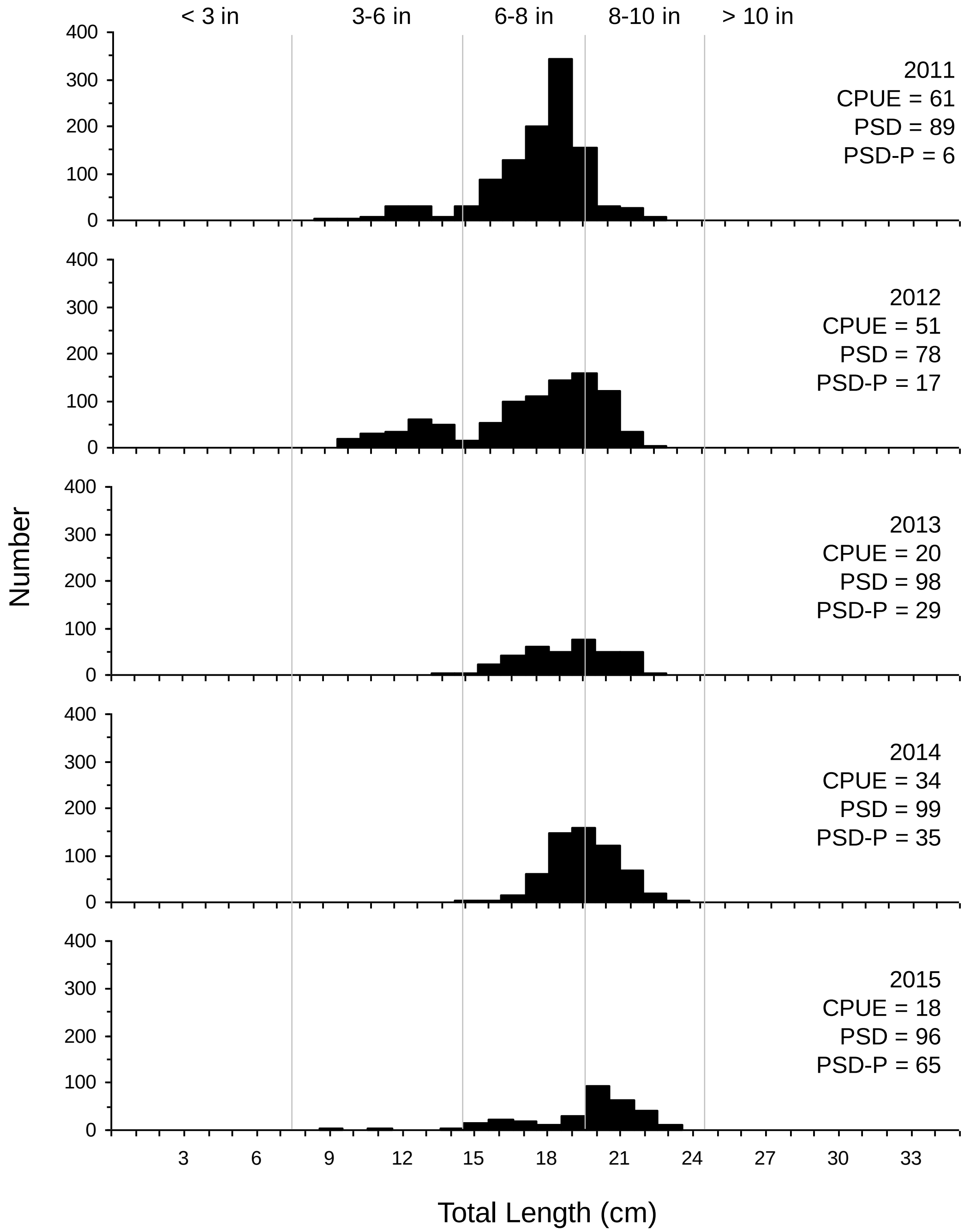

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Richmond Lake, 2011-2015.

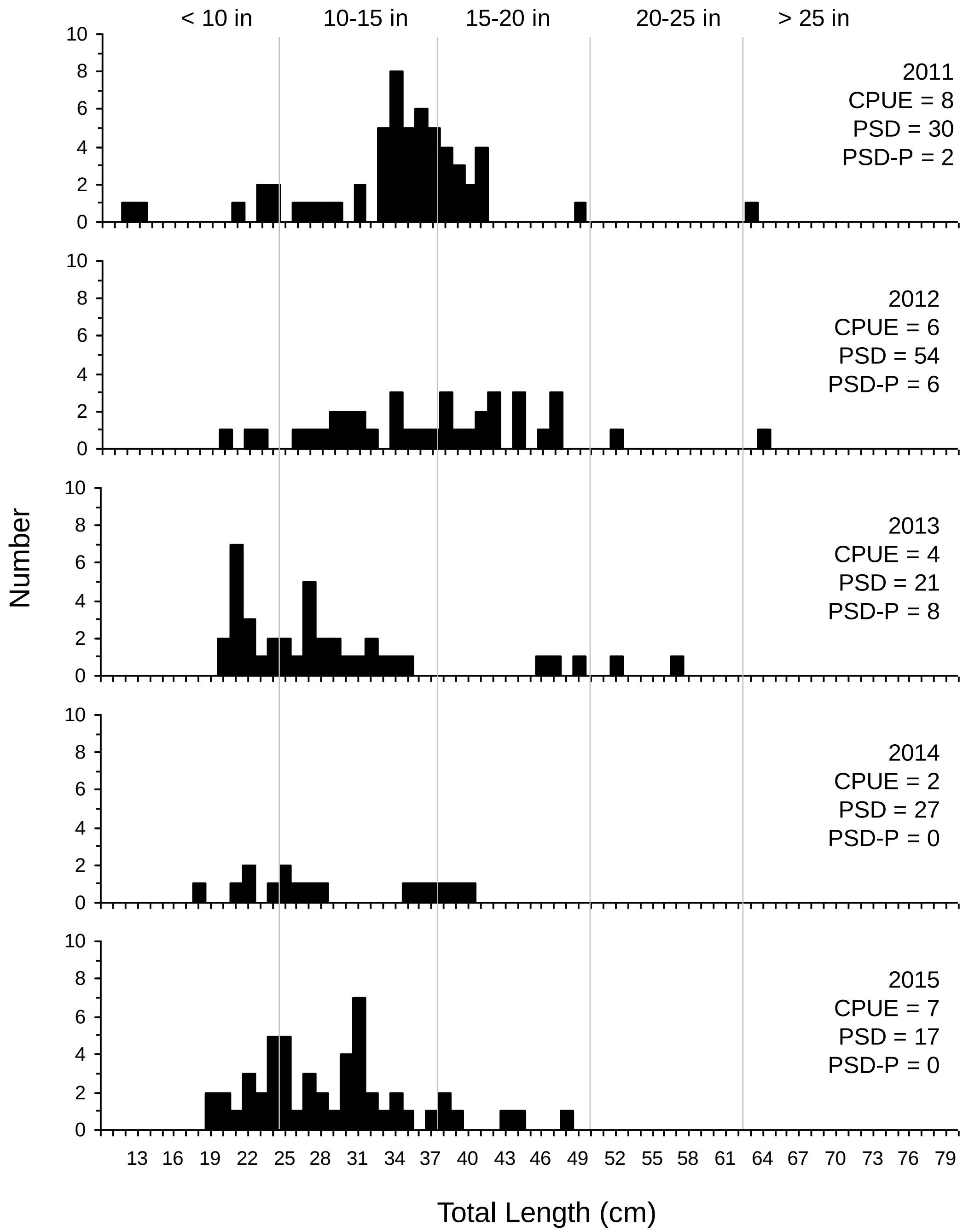

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using gill nets in Richmond Lake, 2011-2015.

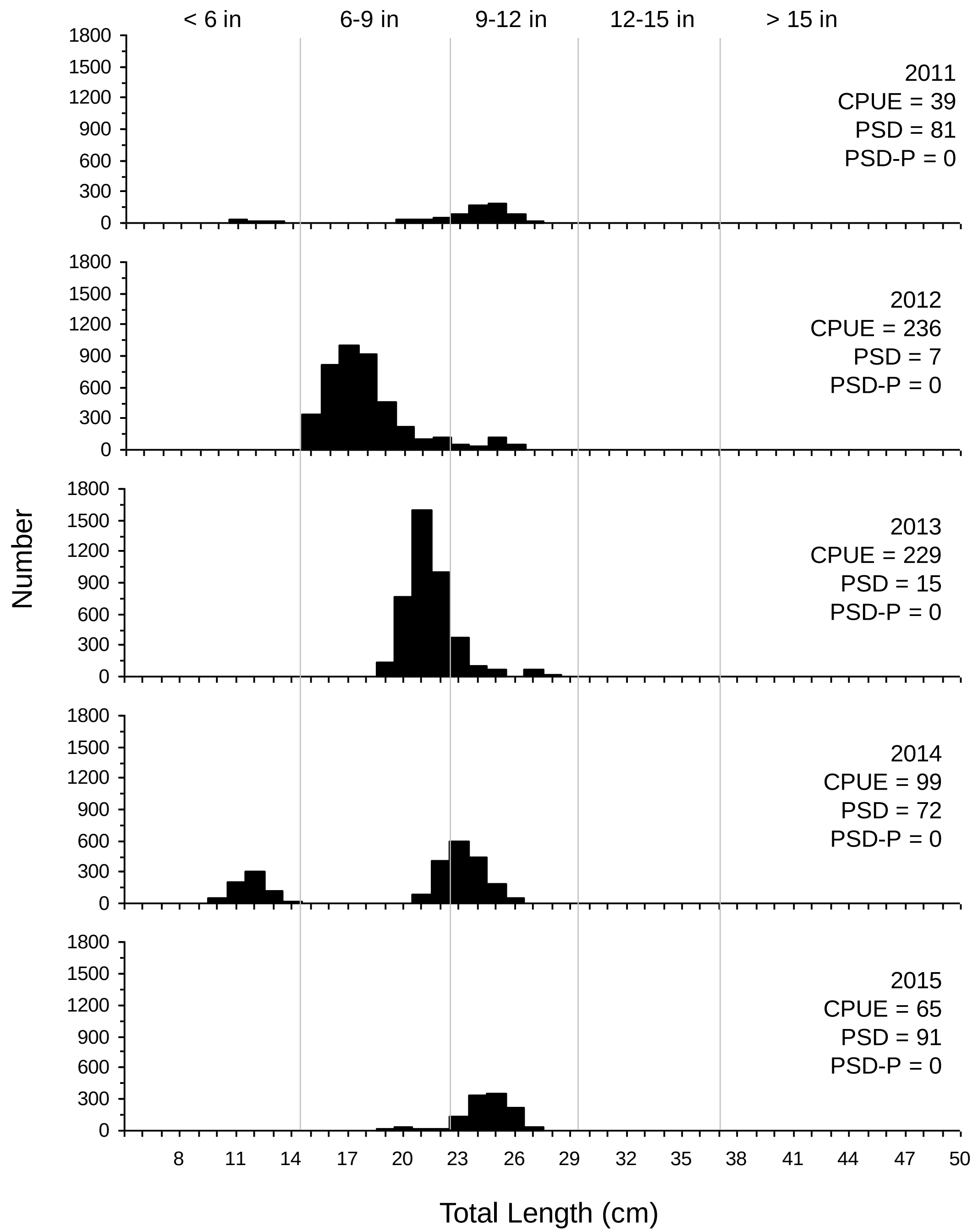

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black bullhead captured using frame nets in Richmond Lake, 2011-2015.

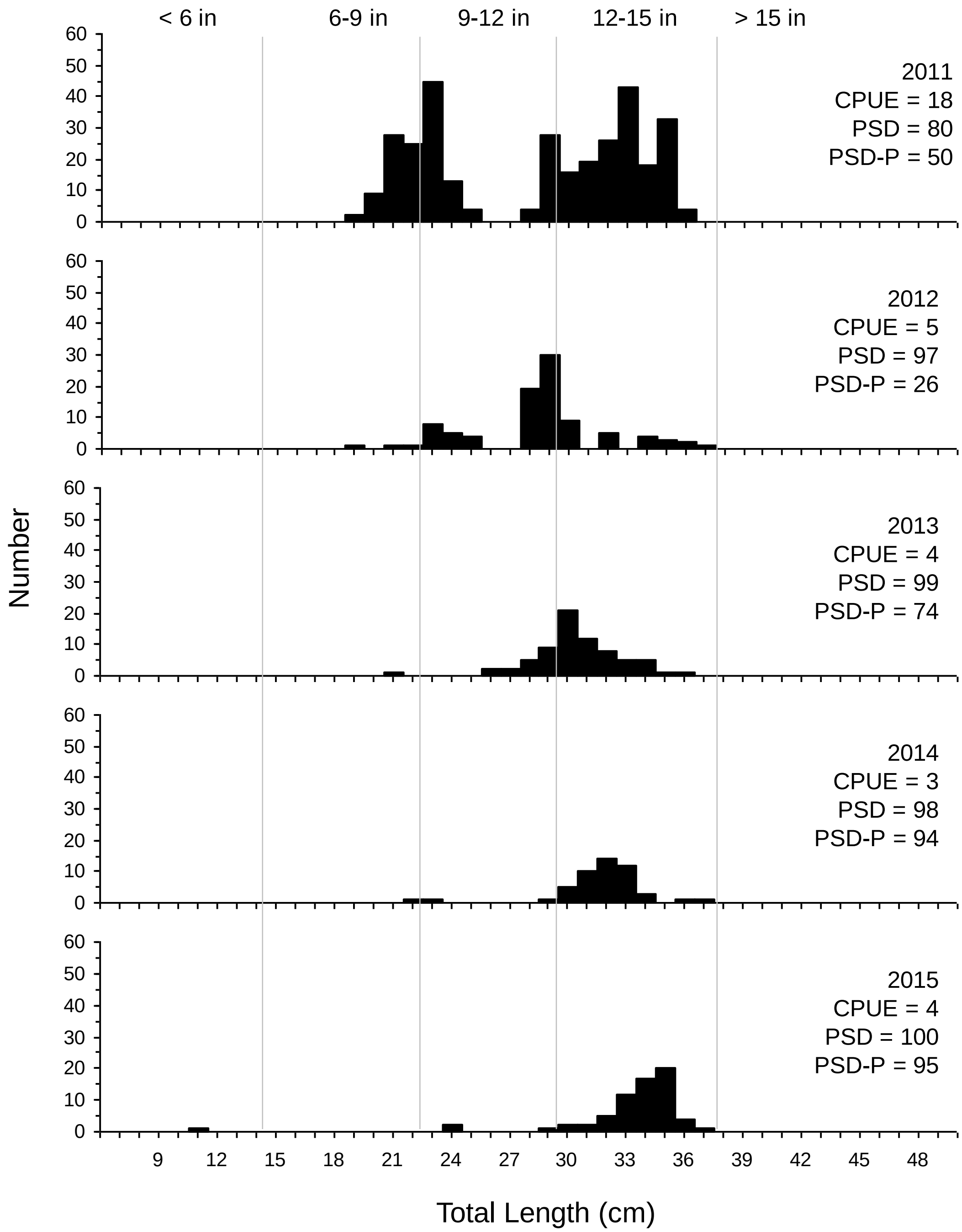

Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for white bass captured using frame nets in Richmond Lake, 2011-2015.

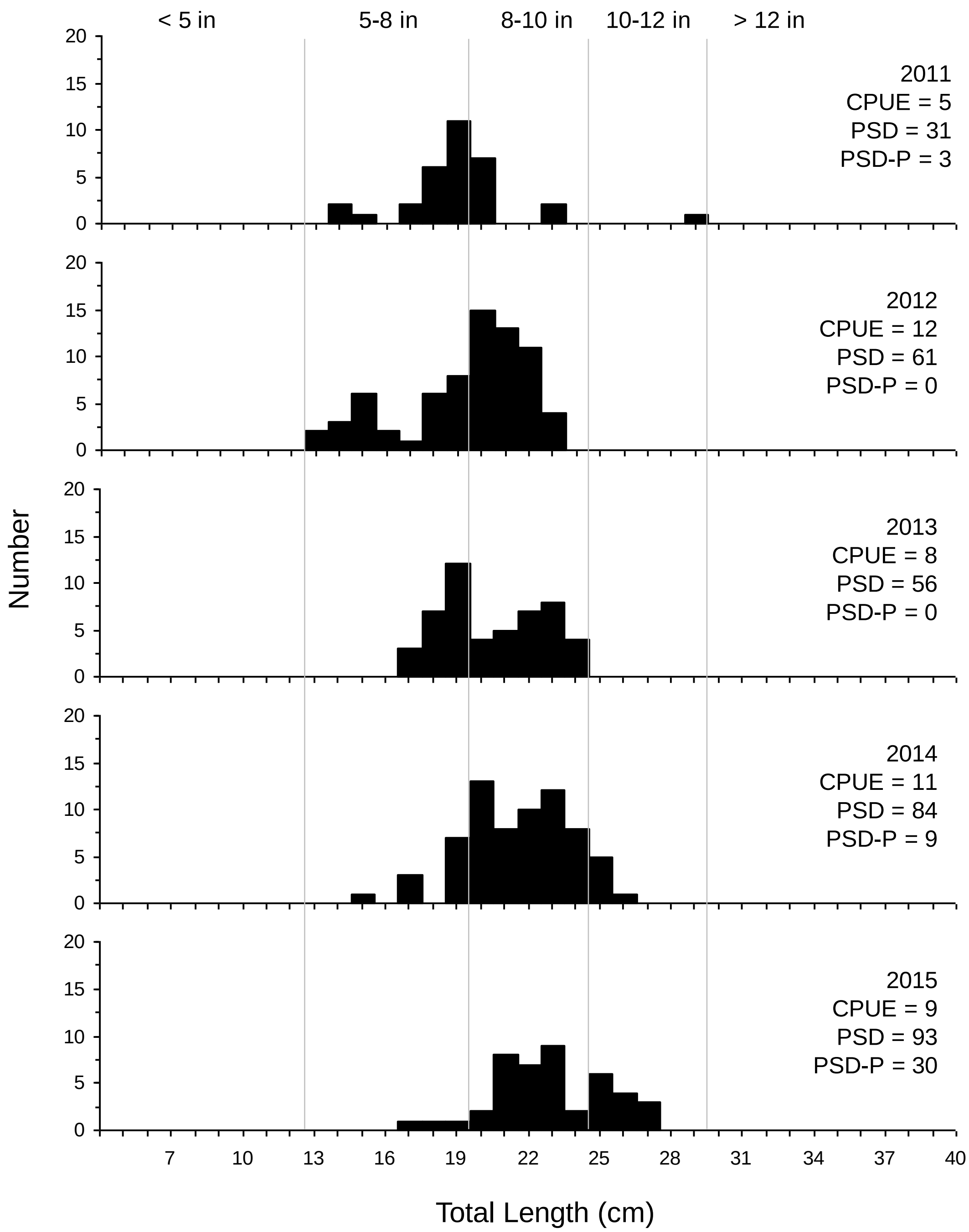

Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Richmond Lake, 2011-2015.