

Roy Lake

Site Description

Location

Water designation number (WDN)	48-0033-00
Legal description	T126N-R55W-Sec.20,21,22,27,28,29,31,32,33,34
County (ies)	Marshall
Location from nearest town	2 miles south and 1 mile west of Lake City, SD

Survey Dates and Sampling Information

Survey dates	May 14, 2012 (EF-LMB, SMB) July 10-12, 2012 (FN, GN) September 24, 2012 (EF-WAE)
Spring electrofishing-LMB (min)	60
Spring electrofishing-SMB (min)	60
Frame net sets (n)	24
Gill net sets (n)	6
Electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	9,614
Surface area (acres)	2,054
Maximum depth (ft)	21
Mean depth (ft)	10

Ownership and Public Access

Roy Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. Three public access sites are present; two are located within the Roy Lake State Park-West Unit (northwest portion of lake) and the other is on the northeastern shore within the Roy Lake State Park-East Unit (Figure 1); all are maintained by the SDGFP. Lands adjacent to the lake are generally under state and private ownership.

Watershed and Land Use

Major land use in the Roy Lake watershed is agricultural, primarily pasture and rangeland (SDDENR 2007).

Water Level Observations

The South Dakota Water Management Board established OHWM is 1795.7 fmsl, and the outlet elevation of Roy Lake is 1795.2 fmsl. On May 16, 2012 the elevation of Roy Lake was above the OHWM with an elevation of 1796.2 fmsl. The water level had declined to an elevation of 1794.0 fmsl on September 27, 2012.

Fish Management Information

Primary species	Largemouth Bass, Northern Pike, Smallmouth Bass, Walleye, Yellow Perch
Other species	Black Bullhead, Black Crappie, Bluegill, Channel Catfish, Common Carp, Green Sunfish, White Sucker
Lake-specific regulations	Largemouth/Smallmouth Bass: Only those less than 14", or 18" and longer may be taken. Of those no more than one may be 18" or longer. Walleye: minimum length 15".
Management classification	warm-water permanent
Fish consumption advisories	none

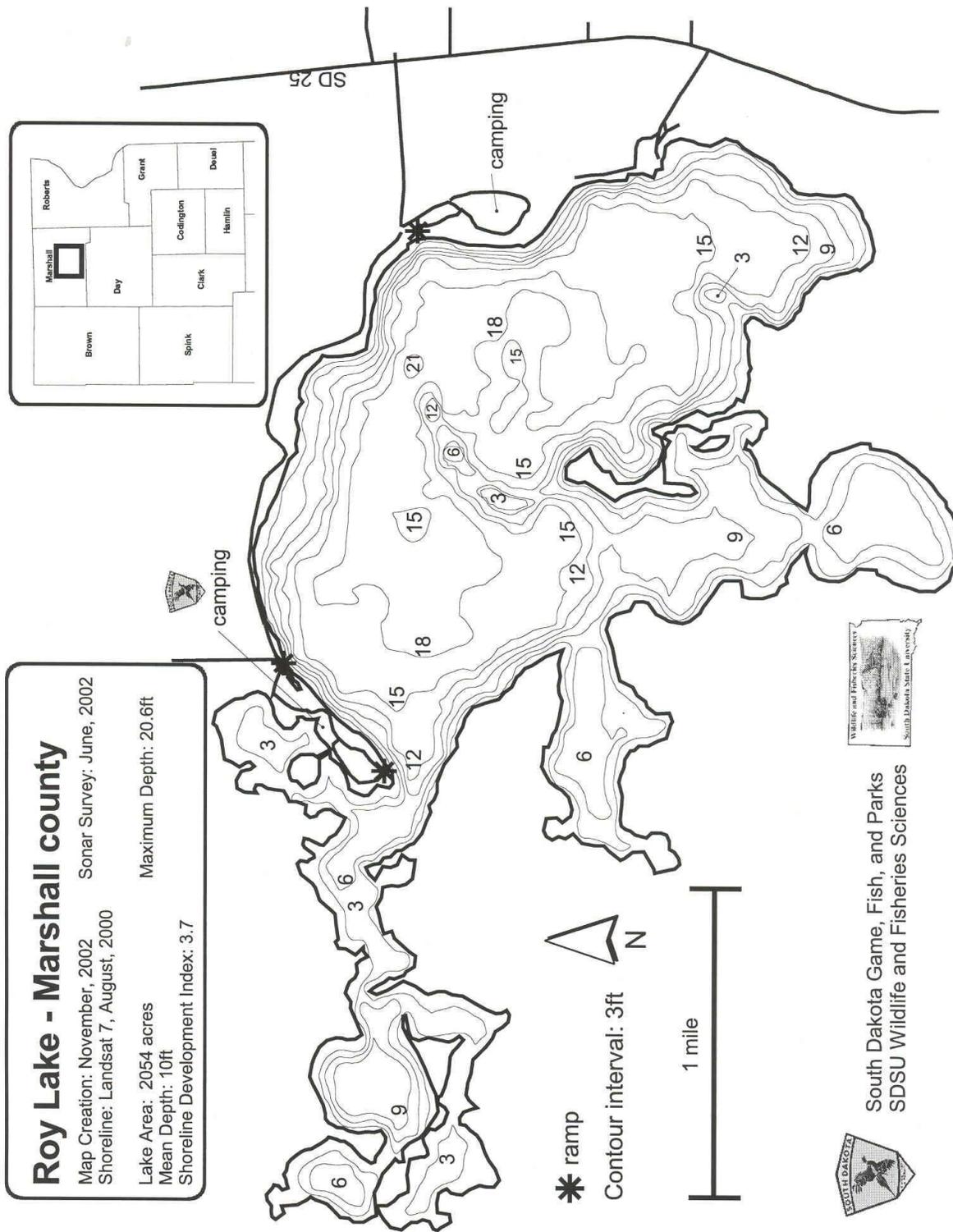


Figure 1. Contour map depicting access locations and depth contours of Roy Lake, Marshall County, South Dakota.

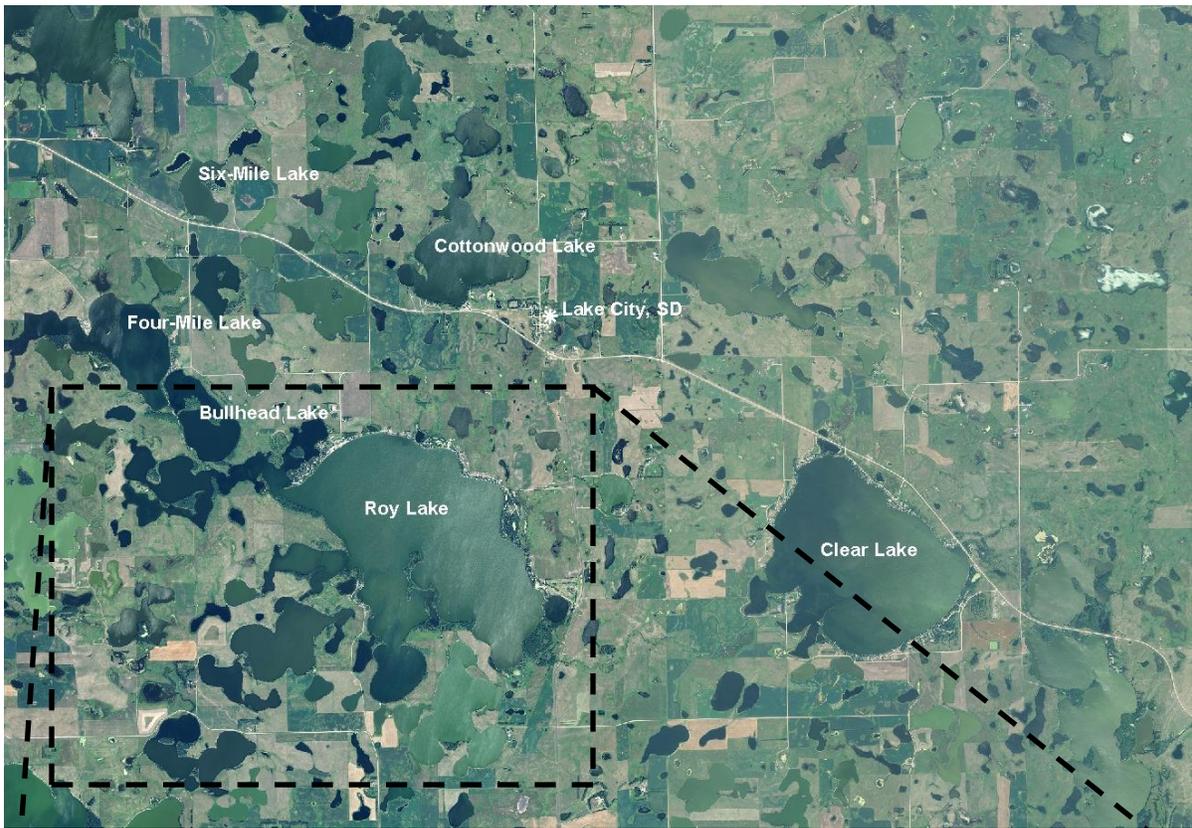


Figure 2. Map depicting geographic locations of Bullhead, Clear, Cottonwood, Four-Mile, Six-Mile, and Roy Lakes from Lake City, Marshall County, South Dakota (top). Also noted are public access and standardized net locations for Roy Lake (bottom). RYFN= frame net; RYGN= gill net

Management Objectives

- 1) Maintain a mean spring night electrofishing CPUE of stock-length Largemouth Bass \geq 10, a PSD of 40-70, and a PSD-P of 10-40.
- 2) Maintain a mean gill net CPUE of stock-length Northern Pike \geq 3, a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a moderate density Smallmouth Bass population with a PSD of 40-70, and a PSD-P of 10-40.
- 4) Maintain a mean gill net CPUE of stock-length Walleye \geq 10, a PSD of 30-60, and a PSD-P of 5-10.
- 5) Maintain a mean gill net CPUE of stock-length Yellow Perch \geq 30, a PSD of 30-60, and a PSD-P of 5-10.
- 6) Maintain a mean frame net CPUE of stock-length Black Bullhead \leq 100.

Results and Discussion

Roy Lake is a permanent, natural lake situated in the Coteau des Prairies. Major surface water inlets flow into Roy Lake from Clear Lake on the east, Cottonwood Lake to the north and Four Mile/Bullhead Lakes to the northwest. Discharge from the surface outlet in the southwest portion of Roy Lake enters Lost Lake before draining into Cattail/Kettle Lakes (SDDENR 2007).

Roy Lake is a popular destination for aquatic recreation primarily boating, swimming, and fishing (SDDENR 2007). A resort, state park, and approximately 140 homes and cabins are located on the northern shoreline of Roy Lake; while the southern shore remains relatively undeveloped. Currently, Roy Lake is managed as a black bass (Largemouth and Smallmouth), Northern Pike, Walleye, and Yellow Perch fishery.

Primary Species

Largemouth Bass: The spring night electrofishing mean CPUE of stock-length Largemouth Bass was 36.6 (Table 1) and above the minimum objective (\geq 30 stock-length Largemouth Bass/hour; Table 3). The 2012 spring night electrofishing CPUE represented an increase from the 2010 CPUE of 26.3 (Table 2).

Largemouth Bass sampled by spring night electrofishing ranged in TL from 21 to 49 cm (8.3 to 19.3 in), had a PSD of 84, and an PSD-P of 65 (Table 1; Table 3; Figure 3). The PSD and PSD-P values exceeded management objective ranges of 40-70 and

10-20, respectively, indicating a population skewed towards larger individuals (Figure 3).

Scales were collected from a sub-sample of Largemouth Bass captured during spring night electrofishing. Age structure information indicated consistent recruitment, with nine year classes (2001-2002, 2004-2010) present (Table 4). However, the magnitude of individual year classes was low (Table 4). The 2005 cohort was the most represented and comprised 28% of Largemouth Bass in the electrofishing catch (Table 4).

Largemouth Bass in Roy Lake tend to exhibit relatively-fast growth. In 2012, the mean back-calculated length at age-3 was 317 mm (12.5 in) compared to the region IV and statewide mean of means of 266 mm and 250 mm (10.5 and 9.8 in; Willis et al. 2001; Table 4). Condition of Largemouth Bass, as indexed using W_r values may have been influenced by spawning activity during 2012, as spring night electrofishing was conducted during mid-May. The majority of sampled Largemouth Bass were in the preferred-memorable length category, which had a mean W_r of 125.

Northern Pike: Northern Pike relative abundance in Roy Lake has generally been considered moderate to high with mean gill net CPUE values that ranged from 1.5 to 7.8 from 2003-2011 (Table 2). In 2012, the mean gill net CPUE of stock-length Northern Pike was 10.3 (Table 1) and above the minimum objective (≥ 3 stock-length Northern Pike/net night). Currently, relative abundance is considered high.

Gill net captured Northern Pike ranged in TL from 35 to 74 cm (13.8 to 29.1 in), had a PSD of 65 and PSD-P of 5 (Table 1; Table 3; Figure 4). The PSD was slightly above the management objective of 30-60; while the PSD-P was within the management objective of 5-10; Table 3).

No Northern Pike age or growth information was collected. The condition of gill net captured Northern Pike was similar to that of Northern Pike captured from other northeast South Dakota glacial lakes (e.g., Cattail/Kettle and Clear Lakes) with mean W_r values that ranged from 88 to 91 for all length categories (e.g., stock to quality) sampled. Stock-length Northern Pike had a mean W_r of 90 (Table 1) and no length-related trends in condition were apparent.

Smallmouth Bass: Prior to 2009, fall night electrofishing was used to assess Smallmouth Bass populations in NE South Dakota. However, recent research has indicated that Smallmouth Bass population dynamics should be monitored utilizing standardized spring (May and June) night electrofishing over suitable habitat (i.e., rocky substrate) in northeastern South Dakota glacial lakes (Bacula 2009).

The mean spring night electrofishing CPUE of stock-length Smallmouth Bass was 110.8 (Table 1) and represented a substantial increase from the 2010 CPUE of 42.4 (Table 2). Smallmouth Bass collected in the spring electrofishing catch ranged in TL from 18 to 48 cm (7.1 to 18.9 in.), had a PSD of 25 and PSD-P of 11 (Table 1; Table 3; Figure 5). The PSD was below the management objective of 40-70; while the PSD-P was within the objective range of 10-20 (Table 3; Figure 4).

Scales collected from a sub-sample of Smallmouth Bass captured during spring night electrofishing indicated the presence of six year classes (2002, 2004, 2007-2010;

Table 5). Year class produced in 2009 and 2010 were the most represented and collectively comprised 85% of sampled Smallmouth Bass (Table 5).

Smallmouth Bass in Roy Lake tend to exhibit moderate to fast growth. In 2012, the mean back-calculated length at age-3 was 246 mm (9.7 in) compared to the region IV and statewide mean of means of 249 and 242 mm (9.8 and 9.5 in; Willis et al. 2001; Table 5). Condition of Smallmouth Bass, as indexed using W_r values may have been influenced by spawning activity during 2012, as spring night electrofishing was conducted during mid-May. Smallmouth Bass in the spring electrofishing catch had mean W_r values that ranged from 94 to 111 for all length categories (e.g., stock to quality) sampled. An increasing trend in condition was apparent as TL increased.

Walleye: Since 2003, the relative abundance of stock-length Walleye has remained low to moderate with mean gill net CPUE values that have ranged from 1.8 (2011) to 10.3 (2003; Table 2). In 2012, 17 stock-length Walleye ranging in TL from 17 to 68 cm (6.7 to 26.8 in) were captured in the gill net catch for a mean gill net CPUE of 2.8 (Table 1; Figure 6). The 2012 gill net CPUE was below the minimum objective (≥ 10 stock-length fish/net night) and indicated low relative abundance (Table 3).

Otoliths were collected from gill net captured Walleye and suggested the presence of five year-classes (2000, 2008-2011), with each year-class being represented by few individuals (Table 6). Strong year classes (defined as ≥ 75 age-0 Walleye/hour electrofishing) were naturally produced annually from 2003-2011 (Table 2). However, age-0 Walleye apparently experience high natural mortality as few individuals have recruited to the adult population (Table 2; Table 6). In 2012, the mean fall night electrofishing CPUE was 4.0 and the lowest recorded from 2003-2012 indicating limited age-0 Walleye production (Table 1; Table 2).

Walleye in Roy Lake typically reach quality-length and the minimum length limit 38 cm (15 in) at approximately age-3 (Table 7). Since 2005, the weighted mean TL at capture of age-3 walleye has ranged from 334 to 438 mm (13.1 to 17.2 in); while the weighted mean TL at capture of age-4 walleye has ranged from 408 to 530 mm (16.1 to 20.9 in; Table 7). However, due to low sample sizes weighted mean TL at capture values may at times represent a single walleye (Table 7).

Yellow Perch: The mean gill net CPUE of stock-length Yellow Perch was 99.3 (Table 1) and above the minimum objective (≥ 30 stock-length Yellow Perch/net night; Table 3). Since 2003, mean gill net CPUE values have fluctuated from a low of 14.7 (2009) to a high of 99.8 (2006; Table 2). Based on the 2012 gill net CPUE, relative abundance appears to be high.

Gill net captured Yellow Perch ranged in TL from 9 to 22 cm (3.5 to 8.7 in; Figure 7). The majority of Yellow Perch in the gill net catch were \leq quality-length (20 cm; 8 in) as indicated by the low PSD and PSD-P values of 7 and 0, respectively (Table 1; Table 3; Figure 7). Both the PSD and PSD-P were below management objectives of 30-60 and 5-10 (Table 3).

Otoliths collected from a sub-sample of gill net captured Yellow Perch indicated that four year classes (2008-2011) comprised the entire sample (Table 9). The 2010 year class was the most represented and comprised 64% of Yellow Perch in the gill net catch; while year classes produced in 2008 and 2009 accounted for an additional 12%

and 16%, respectively (Table 9). The weighted mean TL at capture for age-2, age-3, and age-4 male Yellow Perch was 146, 173, and 184 mm (5.7, 6.8, and 7.2 in); while the weighted mean TL at capture for age-2, age-3, and age-4 female Yellow Perch was 153, 191, and 211 mm (6.0, 7.5, and 8.3 in; Table 10). The majority (93%) of Yellow Perch in the gill net catch were within the stock-quality length category, which had a mean W_r of 100.

Other Species

Black Bullhead: The mean frame net CPUE of stock-length Black Bullhead was 8.2 (Table 1) and within the objective (≤ 100 stock-length Black Bullhead/net night; Table 3). Since 2003, the mean frame net CPUE has ranged from a low of 0.5 (2009, 2010) to a high of 233.3 (2003; Table 2). Currently, relative abundance is considered low to moderate in Roy Lake and their impact on the sport fishery is likely minimal.

Black Crappie: Black Crappie relative abundance was low from 2001-2005, but increased in 2006, as Black Crappie from year classes produced in 2004 and 2005 recruited to our gear (Table 2). However, relative abundance quickly declined and has remained low from 2007-2012 (Table 2). The 2012 mean frame net CPUE was 0.6 (Table 1). Sampled Black Crappie ranged in TL from 18 to 23 cm (7.1 to 9.1 in). Few inferences can be made concerning size structure or condition due to low sample size.

Bluegill: The mean frame net CPUE of stock-length Bluegill was 12.9 (Table 1). Since 2003, the frame net mean CPUE has ranged from a low of 0.5 (2004) to a high of 63.0 (2006; Table 2). Based on the 2012 frame net CPUE, relative abundance appears to be moderate.

Frame net captured Bluegill ranged in TL from 7 to 23 cm (2.8 to 9.1 in), had a PSD of 17 and a PSD-P of 4 (Table 1; Figure 8). Otoliths were collected from a sub-sample of frame net captured Bluegill and suggested the presence of seven consecutive year classes (2005-2011; Table 11). The 2010 cohort was the most represented and comprised 84% of Bluegill in the frame net catch (Table 11).

Bluegills in Roy Lake typically reach quality-length (15 cm; 6 in) at age-3 (Table 12). Since 2007, the weighted mean TL at capture of age-3 Bluegill has ranged from 146 to 189 mm (5.7 to 7.4 in; Table 12). The condition of sampled Bluegill was high, with W_r values that were ≥ 115 for all length categories (e.g., stock to quality) sampled. The mean W_r of stock-length Bluegill was 118 (Table 1) and no length-related trends in condition were apparent. Seasonal influences (i.e., spawning behavior) may have influenced W_r values.

Other: Common Carp, Green Sunfish and White Sucker were other fish species captured in low numbers during the 2012 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys utilizing frame nets and gill nets on an annual basis (next survey scheduled in summer 2013) to monitor fish relative abundance, fish population size structures, and fish growth.
- 2) Conduct spring night electrofishing on a biennial basis (even years) to monitor Largemouth Bass and Smallmouth Bass population parameters.
- 3) Conduct fall night electrofishing on an annual basis to monitor age-0 Walleye relative abundance.
- 4) Collect otoliths from Bluegill, Walleye and Yellow Perch; scales from Largemouth and Smallmouth bass to assess age structure and growth rates of each population.
- 5) Stock Walleye (≈ 25 large fingerlings/acre) to establish additional year classes if the fall night electrofishing CPUE of young-of-the-year Walleye and gill netting results warrant [i.e., low gill net CPUE of sub-stock (< 25 cm; 10 in) Walleye and/or fall night electrofishing CPUE of age-0 Walleye < 75 fish/hour].
- 6) Maintain the 356-457 mm (14-18 in) protected slot length limit on Largemouth and Smallmouth Bass. The regulation is designed to increase the average size of black bass while allowing harvest of small bass to avoid slowing of growth (Blackwell and Lucchesi 2009).
- 7) Maintain the 381-mm (15 in) minimum length limit on Walleye. The regulation is designed to protect smaller fish from harvest and increase average fish size (Lucchesi and Blackwell 2009).
- 8) 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 net = 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 electrofishing in Roy Lake, 2012. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; COC= Common Carp; GSF= Green Sunfish; LMB= Largemouth Bass; NOP= Northern Pike; SMB= Smallmouth Bass; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	8.2	2.8	42	6	8	3	90	<1
BLC	0.6	0.3	79	20	0	---	116	2
BLG	12.9	3.1	17	4	4	2	118	<1
COC	0.1	0.1	100	0	100	0	86	11
GSF	0.7	0.5	0	---	0	---	112	3
NOP	1.5	0.3	53	14	3	5	90	3
SMB	0.3	0.2	38	35	0	---	96	7
WAE	0.5	0.3	36	28	0	---	84	3
WHS	<0.1	0.1	100	---	100	---	96	---
YEP	21.3	7.4	5	2	0	---	95	1
<i>Gill nets</i>								
BLB	4.3	3.5	15	12	0	---	91	1
BLC	0.2	0.2	100	---	100	---	113	---
NOP	10.3	2.6	65	10	5	5	90	1
SMB	0.5	0.3	67	67	67	67	101	10
WAE	2.8	1.8	41	21	41	21	86	2
WHS	6.7	3.4	100	0	80	11	104	2
YEP	99.3	23.3	7	2	0	---	100	<1
<i>Electrofishing</i>								
LMB ¹	36.6	12.9	84	10	65	13	124	2
SMB ²	110.8	49.8	25	7	11	5	97	1
WAE ³	4.0	---	---	---	---	---	---	---

¹ Spring Electrofishing-LMB.

² Spring Electrofishing-SMB.

³ Fall Electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

Table 2. Historic mean catch rate (CPUE; gill/frame net = catch/net night, electrofishing = catch/hour) of stock-length fish for various fish species captured using frame nets, experimental gill nets, and electrofishing in Roy Lake, 2003-2012. BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; HYB= Hybrid Sunfish; COC= Common Carp; GSF= Green Sunfish; LMB= Largemouth Bass; NOP= Northern Pike; SMB= Smallmouth Bass; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

Species	CPUE									
	2003	2004	2005	2006 ⁵	2007 ⁵	2008	2009	2010	2011	2012
<i>Frame nets</i>										
BLB	233.3	39.7	5.0	2.0	3.7	1.5	0.5	0.5	0.6	8.2
BLC	0.3	0.2	0.3	8.9	2.9	0.3	0.0	0.2	0.5	0.6
BLG	2.5	0.5	7.4	63.0	24.2	32.4	16.8	8.2	7.2	12.9
HYB ¹	0.0	0.0	0.0	0.0	0.4	0.0	0.2	<0.1	0.5	0.0
COC	0.1	0.0	0.3	0.1	0.3	0.3	0.0	0.1	<0.1	0.1
GSF	0.0	0.0	0.0	1.3	0.0	0.7	0.7	0.1	0.0	0.7
LMB	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
NOP	1.0	0.4	1.0	1.0	0.6	1.0	0.8	0.5	0.5	1.5
SMB	0.3	0.6	1.0	1.5	0.5	0.5	0.3	0.5	0.8	0.3
WAE	0.6	0.9	0.4	0.5	0.5	1.0	0.5	0.3	0.1	0.5
WHS	0.5	0.5	< 0.1	0.2	0.3	0.2	0.3	<0.1	<0.1	<0.1
YEP	1.3	1.7	5.6	31.6	26.0	5.5	6.8	20.9	19.6	21.3
<i>Gill nets</i>										
BLB	78.8	32.2	0.3	1.3	1.8	0.2	0.0	0.0	0.0	4.3
BLC	0.0	0.3	0.3	2.5	1.7	0.0	0.2	0.2	0.0	0.2
BLG	0.0	0.2	0.0	0.2	0.5	0.0	0.0	0.0	0.0	0.0
COC	0.2	0.7	0.2	0.7	2.0	0.3	0.3	0.7	0.3	0.0
NOP	4.0	1.8	2.0	5.0	1.5	3.7	1.5	2.7	7.8	10.3
SMB	1.3	0.3	1.2	0.8	2.5	0.2	0.3	0.8	0.2	0.5
WAE	10.3	9.7	4.7	6.3	4.0	2.8	3.0	3.3	1.8	2.8
WHS	1.0	1.2	2.5	1.7	2.5	2.2	6.2	4.7	7.2	6.7
YEP	51.2	24.5	91.3	99.8	63.7	15.3	14.7	51.0	80.3	99.3
<i>Electrofishing</i>										
LMB ²	---	---	---	---	---	22.5	18.7	26.3	---	36.6
SMB ³	---	---	---	---	---	---	17.3	42.4	---	110.8
WAE ⁴	1,106.0	420.9	104.5	81.6	275.7	235.0	285.7	153.0	466.5	4.0

¹ All fish sizes

² Spring Electrofishing-LMB

³ Spring Electrofishing-SMB

⁴ Fall Electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye/hour

⁵ Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 3. Mean catch rate (CPUE; gill/frame net = catch/net night, electrofishing = catch/hour) of stock-length fish, 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 Roy Lake, 2003-2012. BLB= Black Bullhead; BLG= Bluegill; LMB= Largemouth Bass; NOP= Northern Pike; SMB= Smallmouth Bass; WAE= Walleye; YEP= Yellow Perch

Species	2003	2004	2005	2006 ³	2007 ³	2008	2009	2010	2011	2012	Objective
<i>Frame nets</i>											
BLB											
CPUE	233	40	5	2	4	2	1	1	1	8	≤ 100
PSD	19	38	99	75	66	91	92	100	67	42	---
PSD-P	0	11	68	48	22	63	85	100	27	8	---
Wr	97	93	96	87	90	91	104	102	91	90	---
BLG											
CPUE	3	1	7	63	24	32	17	8	7	13	---
PSD	7	0	6	12	9	8	7	40	49	17	---
PSD-P	3	0	0	0	0	0	0	0	5	4	---
Wr	117	130	125	109	100	114	109	114	112	118	---
<i>Gill nets</i>											
NOP											
CPUE	4	2	2	5	2	4	2	3	8	10	≥ 3
PSD	88	100	100	77	67	68	100	81	66	65	30-60
PSD-P	4	9	17	3	11	0	11	19	15	5	5-10
Wr	84	85	86	91	91	93	87	93	90	90	---
WAE											
CPUE	10	10	5	6	4	3	3	3	2	3	≥ 10
PSD	47	57	82	68	71	65	83	45	64	41	30-60
PSD-P	29	16	25	50	25	35	39	10	27	41	5-10
Wr	89	91	93	90	90	91	87	87	94	86	---
YEP											
CPUE	51	25	91	100	64	15	15	51	80	99	≥ 30
PSD	14	6	1	6	8	1	1	0	0	7	30-60
PSD-P	0	0	0	0	0	0	0	0	0	0	5-10
Wr	98	116	104	101	100	100	101	99	102	100	---
<i>Electrofishing</i>											
LMB ¹											
CPUE	---	---	---	---	---	23	19	26	---	37	≥ 10
PSD	---	---	---	---	---	83	100	96	---	84	40-70
PSD-P	---	---	---	---	---	26	85	78	---	65	10-40
Wr	---	---	---	---	---	110	110	109	---	124	---
SMB ²											
CPUE	---	---	---	---	---	---	17.3	42	---	111	---
PSD	---	---	---	---	---	---	78	70	---	25	40-70
PSD-P	---	---	---	---	---	---	72	58	---	11	10-40
Wr	---	---	---	---	---	---	89	111	---	97	---

¹ Spring night electrofishing-LMB.

² Spring night electrofishing-SMB.

³ Monofilament gill net mesh size (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 4. Mean back-calculated length (mm) at age and standard error (SE) for Largemouth Bass captured during spring night electrofishing in Roy Lake, 2012.

Year	Age	N	Age											
			1	2	3	4	5	6	7	8	9	10	11	
2010	2	6	103	252										
2009	3	4	84	211	331									
2008	4	4	88	209	317	375								
2007	5	2	95	194	292	363	405							
2006	6	2	88	222	308	360	394	416						
2005	7	10	84	205	312	364	399	425	445					
2004	8	6	81	201	312	361	392	414	433	450				
2003	9	0												
2002	10	1	84	197	326	366	399	417	431	448	460	472		
2001	11	1	126	245	335	381	401	420	440	454	474	489	499	
Mean		36	92	215	317	367	398	418	437	451	467	481	499	
SE			5	7	5	3	2	2	3	2	7	9	0	
<i>Mean Comparison</i> ¹														
			99	183	246	299	332	---	---	---	---	---	---	---
			89	178	256	316	359	---	---	---	---	---	---	---
			80	180	266	325	356	---	---	---	---	---	---	---
			96	182	250	305	342	---	---	---	---	---	---	---

¹ Willis et al. 2001.

Table 5. Mean back-calculated length (mm) at age and standard error (SE) for Smallmouth Bass captured during spring night electrofishing in Roy Lake, 2012.

Year	Age	N	Age											
			1	2	3	4	5	6	7	8	9	10		
2010	2	56	94	206										
2009	3	38	81	159	268									
2008	4	7	77	144	244	335								
2007	5	4	85	163	246	317	380							
2006	6	0												
2005	7	0												
2004	8	5	84	165	268	341	383	416	435	447				
2003	9	0												
2002	10	1	79	144	205	294	370	415	439	462	473	481		
Mean		111	83	164	246	322	378	415	437	454	473	481		
SE			2	9	11	11	4	0	2	8	0	0		
<i>Mean Comparison</i> ¹														
			98	180	241	291	---	---	---	---	---	---	---	---
			92	169	237	304	335	---	---	---	---	---	---	---
			96	179	249	316	339	---	---	---	---	---	---	---
			91	171	242	300	333	---	---	---	---	---	---	---

¹ Willis et al. 2001.

Table 6. 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 Roy Lake, 2008-2012.

Survey Year	Year Class													
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
2012 ¹		6	2	8	1									1
2011 ¹	---		4	5	1	2	1		1					
2010	---	---		3	12	1	2	3	2			1		
2009 ¹	---	---	---		4	2	5	2	2	1	1	3		
2008 ¹	---	---	---	---		1	4	1	5	1				1
# stocked														
fry														
sm. fingerling														
lg. fingerling											209			

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

Table 7. Weighted mean TL at capture (mm) for Walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Roy Lake, 2005-2012. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age									
	1	2	3	4	5	6	7	8	9	10
2012 ¹	197(6)	294(2)	351(8)	530(1)	---	---	---	---	---	---
2011 ¹	183(4)	276(5)	398(1)	483(2)	467(1)	---	513(1)	---	---	---
2010	177(3)	294(12)	384(1)	464(2)	522(3)	473(2)	---	---	485(1)	---
2009 ¹	194(4)	301(2)	398(5)	465(2)	502(2)	506(1)	561(1)	570(3)	---	---
2008 ¹	262(1)	324(4)	438(1)	408(5)	557(1)	---	---	---	626(1)	---
2007	210(8)	327(6)	423(7)	466(3)	538(1)	504(1)	---	535(1)	641(1)	---
2006 ¹	168(1)	223(4)	334(11)	445(2)	510(8)	527(3)	558(2)	---	580(3)	---
2005 ¹	183(2)	301(3)	396(5)	447(10)	471(1)	---	524(1)	553(2)	530(1)	---

¹ Older Walleye were sampled, but are not reported in this table.

Table 8. Stocking history including size and number for fishes stocked into Roy Lake, 1999-2012. LMB= Largemouth Bass; WAE= Walleye

Year	Species	Size	Number
2003	LMB	fingerling	4,200
2003	WAE	small fingerling	208,600

Table 9. Year class distribution based on the age/length summary for Yellow Perch sampled in gill nets from Roy Lake, 2009-2012.

Survey Year	Year Class							
	2012	2011	2010	2009	2008	2007	2006	2005
2012		45	412	105	80			
2011	---		764	548	194			
2010	---	---		208	926	44		
2009	---	---	---		138	361	5	2

Table 10. Weighted mean TL (mm) at capture by gender for Yellow Perch captured in experimental gill nets (expanded sample size) from Roy Lake, 2009-2012.

Year	Age			
	1	2	3	4
2012				
Male	105(18)	146(130)	173(27)	184(23)
Female	100(22)	153(270)	191(85)	211(33)
Combined	102(45)	150(412)	184(105)	196(80)
2011				
Male	96(151)	124(80)	155(39)	---
Female	100(288)	135(316)	166(93)	---
Combined	99(764)	128(548)	157(194)	---
2010				
Male	96(66)	114(275)	143(4)	---
Female	96(123)	126(611)	169(29)	---
Combined	96(208)	122(926)	158(44)	---
2009				
Male	90(45)	108(131)	164(1)	---
Female	95(86)	121(218)	179(4)	193 (2)
Combined	93(138)	116(361)	176(5)	193 (2)

Table 11. Year class distribution based on the expanded age/length summary for Bluegill sampled in frame nets from Roy Lake, 2007-2012.

Survey Year	Year Class										
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
2012		32	260	5	4	4	4	1			
2011	---		37	26	66	35	11				
2010	---	---			62	106	29				
2009	---	---	---		19	338	41	7			
2008	---	---	---	---		443	221	104	3		
2007	---	---	---	---	---		6	527	52	1	1

Table 12. Weighted mean TL (mm) at capture for Bluegill sampled in frame nets (expanded sample size) from Roy Lake, 2007-2012.

Year	Age						
	1	2	3	4	5	6	7
2012	89(32)	138(260)	189(5)	203(4)	219(4)	228(4)	247(1)
2011	83(37)	119(26)	151(66)	179(35)	202(11)	---	---
2010	---	101(62)	146(106)	165(29)	---	---	---
2009	81(19)	106(338)	150(41)	183(7)	---	---	---
2008	104(443)	115(221)	150(104)	177(3)	---	---	---
2007	83(6)	123(527)	158(52)	218(1)	234(1)	---	---

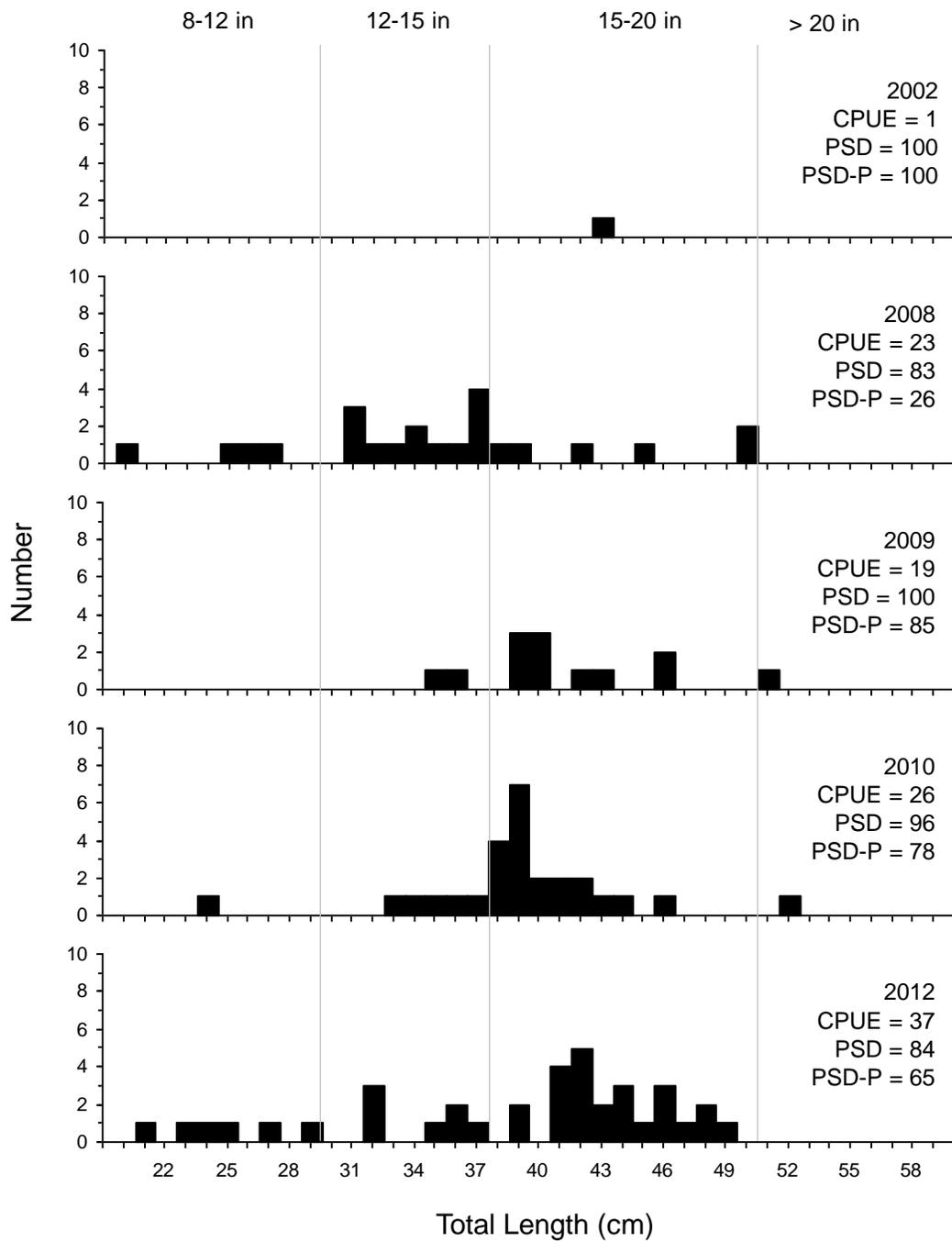


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Largemouth Bass captured during spring electrofishing in Roy Lake, 2002-2012.

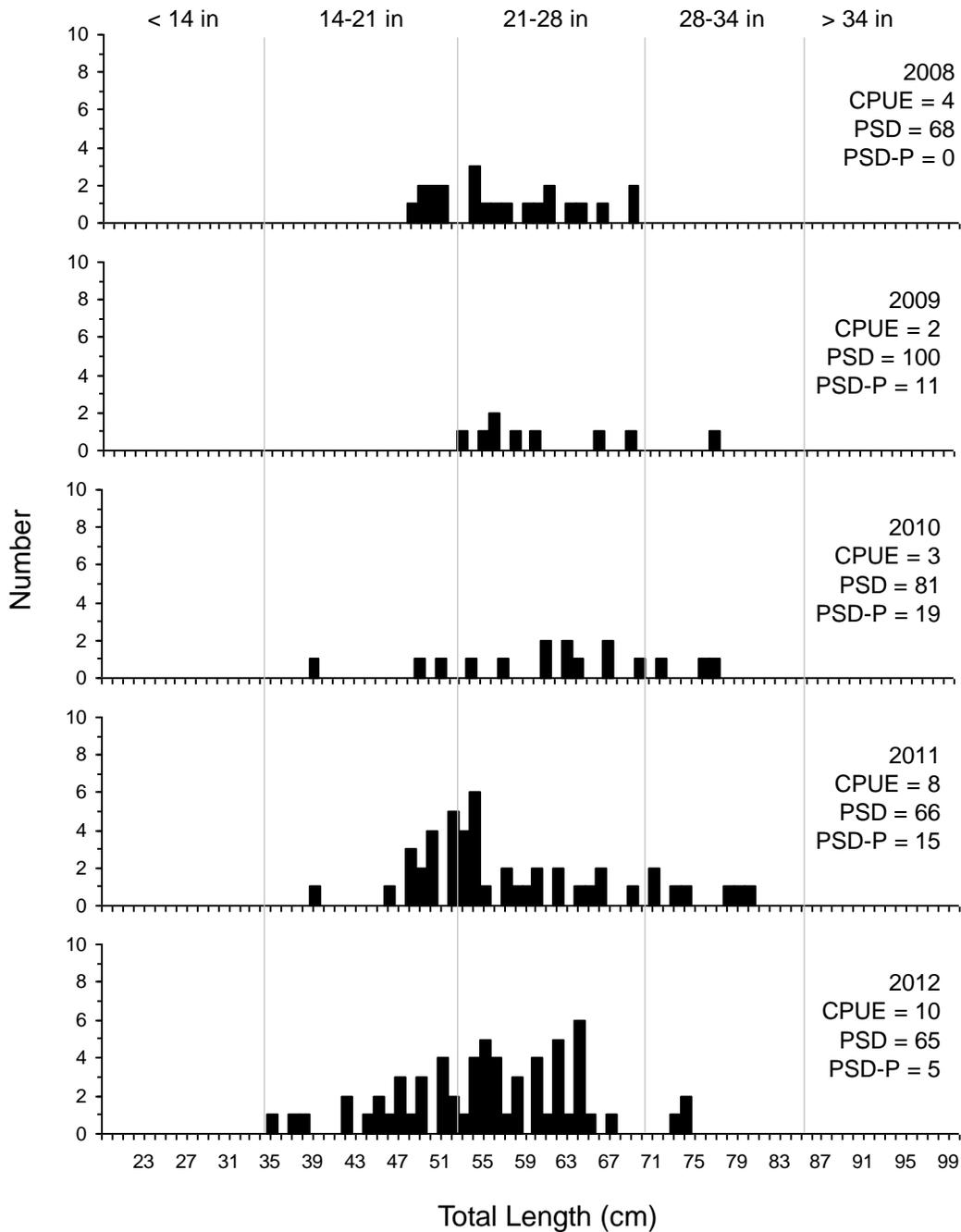


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Northern Pike captured using gill nets in Roy Lake, 2008-2012.

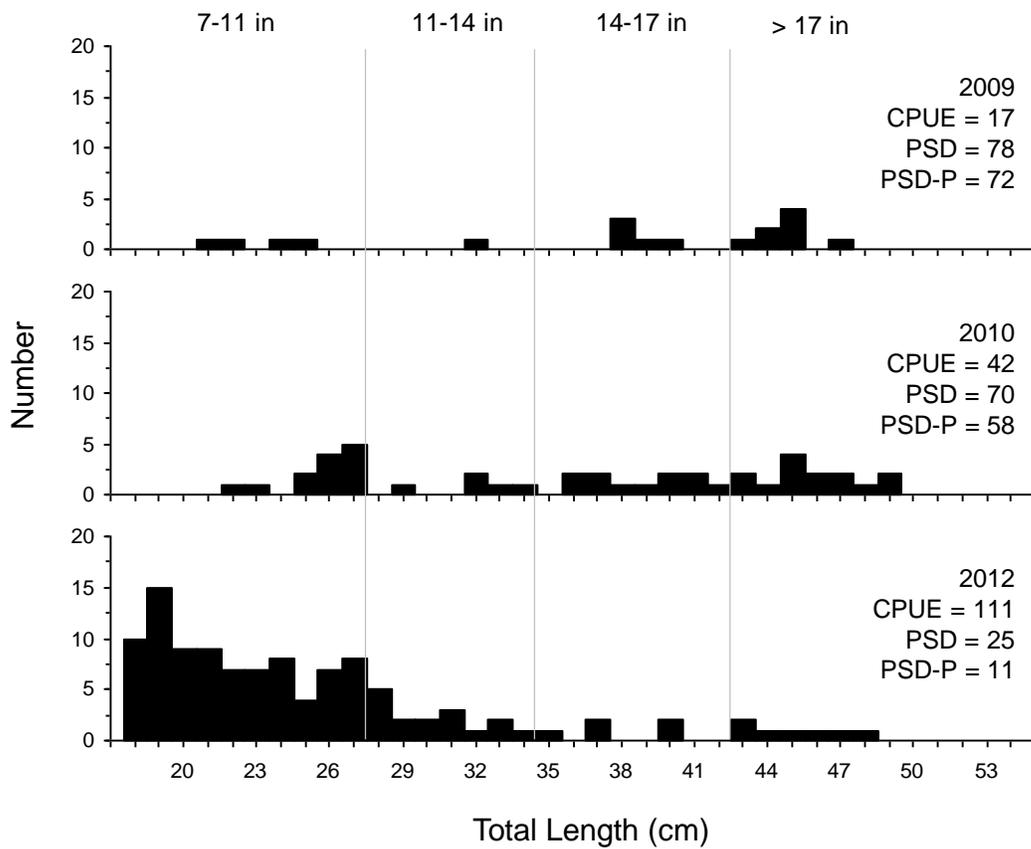


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Smallmouth Bass captured during spring electrofishing in Roy Lake, 2009-2012.

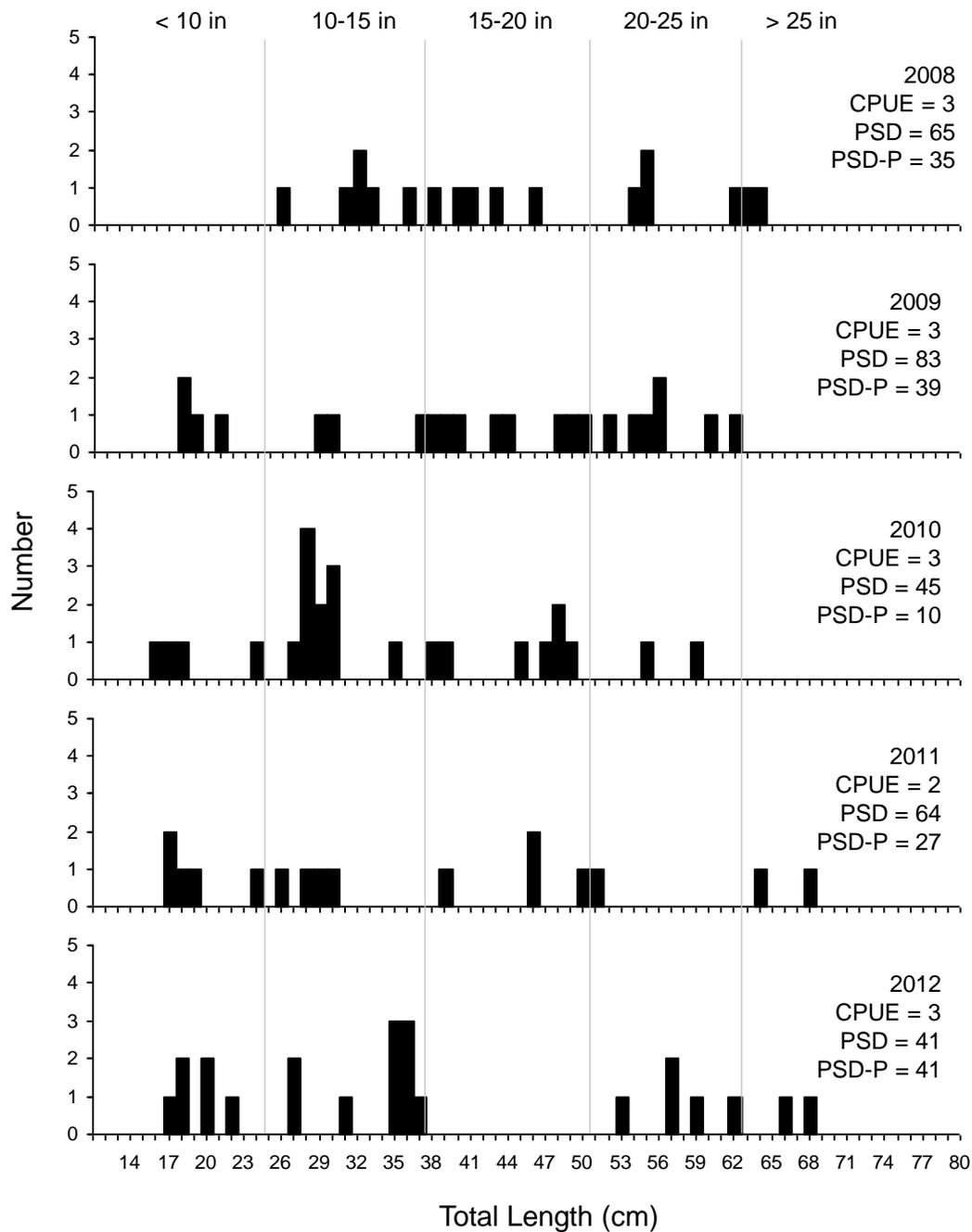


Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using gill nets in Roy Lake, 2008-2012.

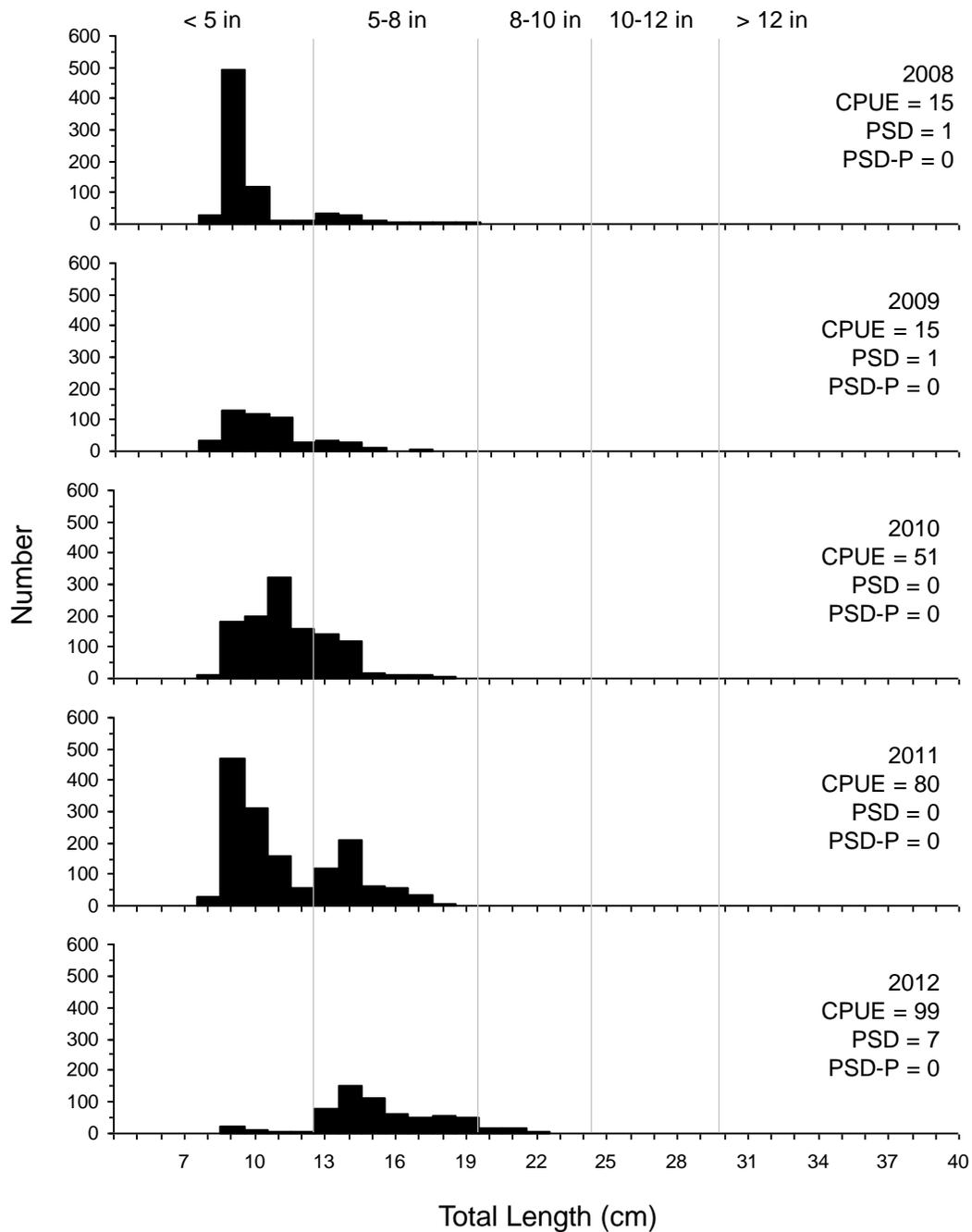


Figure 7. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using gill nets in Roy Lake, 2008-2012.

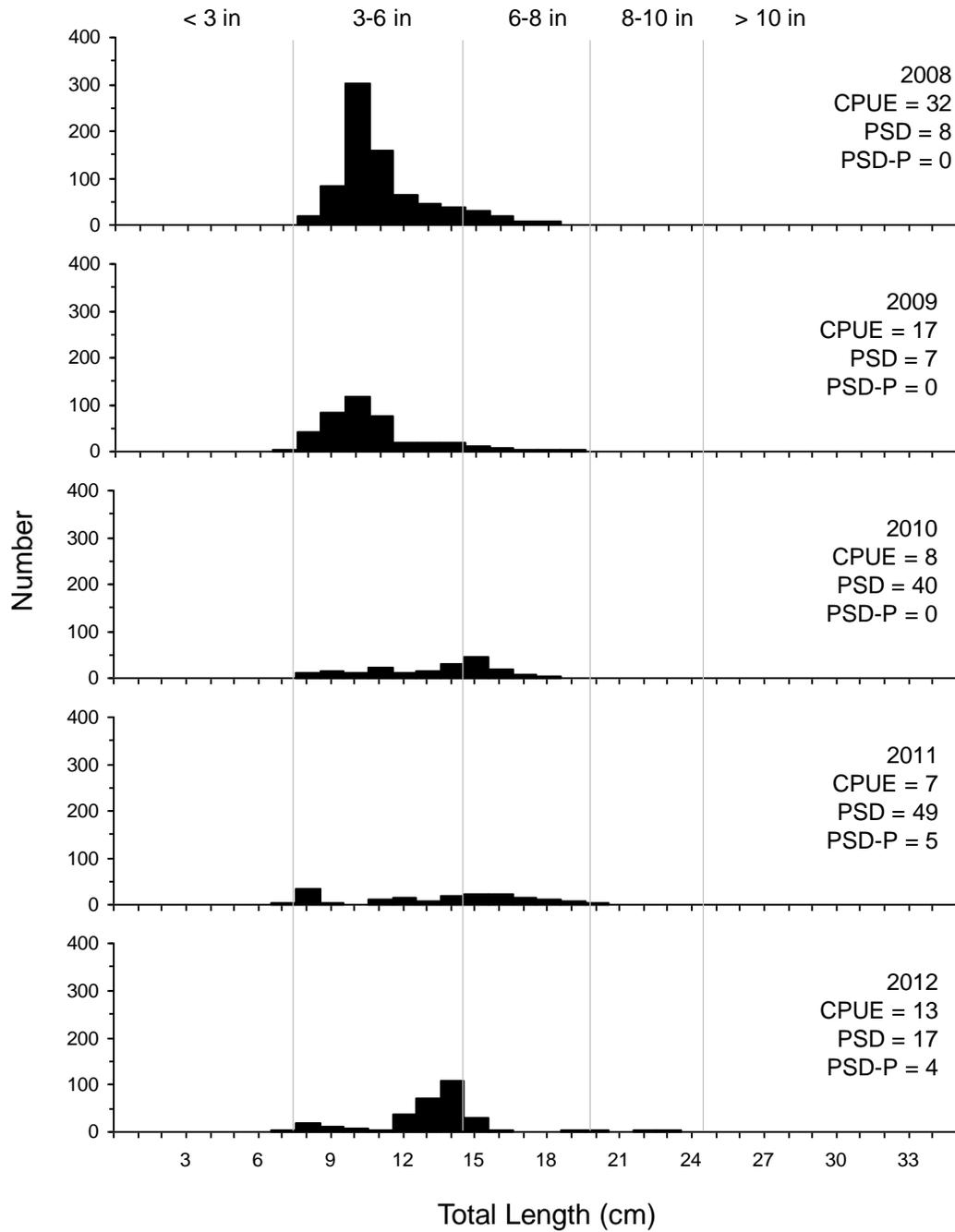


Figure 8. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Bluegill captured using frame nets in Roy Lake, 2008-2012.