

Lynn Lake

Site Description

Location

Water designation number (WDN)	22-0010-00
Legal description	T123N-R57W-Sec. 15, 16, 21, 22, 23, 26, 27, 34, 35
County (ies)	Day
Location from nearest town	6.0 miles west, 5.0 miles north, 1.0 mile west, and 2.0 miles north of Webster, SD

Survey Dates and Sampling Information

Survey dates	September 1-2, 2015 (GN) October 6, 2015 (FE-WAE)
Gill net sets (n)	6
Electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	37,978
Surface area (acres)	1,555
Maximum depth (ft)	26
Mean depth (ft)	12

Ownership and Public Access

Lynn Lake is a non-meandered lake and the fishery is managed by the SDGFP. Two public access sites are located on the lake: a private fee ramp located on the west shore that includes a metal boat ramp and landing dock; the other located on state-owned lands in the northeast corner of the lake is a primitive boat ramp (i.e., constructed using over-sized rock and gravel; Figure 1; Figure 2). Shore fishing access is available via foot traffic across state-owned lands or from flooded road rights of way on the north, south, and east side of the lake. Lands adjacent to Lynn Lake are under state and private ownership.

Watershed and Land Use

The 37,978 acre Lynn Lake sub-watershed (HUC-12) is located within the larger Pierpont Lake (HUC-10) watershed. Land use within the watershed is primarily agricultural with a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

Water levels on Lynn Lake are not monitored by SDDENR.

Fish Management Information

Primary species	black crappie, bluegill, muskellunge, walleye, yellow perch
Other species	black bullhead, northern pike, rock bass, smallmouth bass, white bass, white sucker
Lake-specific regulations	walleye: 2 daily; minimum length 15"
Management classification	none
Fish consumption advisories	Mercury: walleye (> 18"). See the South Dakota Fishing Handbook for more details on meal and portion size recommendations. Also see Department of Health website: http://doh.sd.gov/food/Fish-Advisories.aspx for more information.

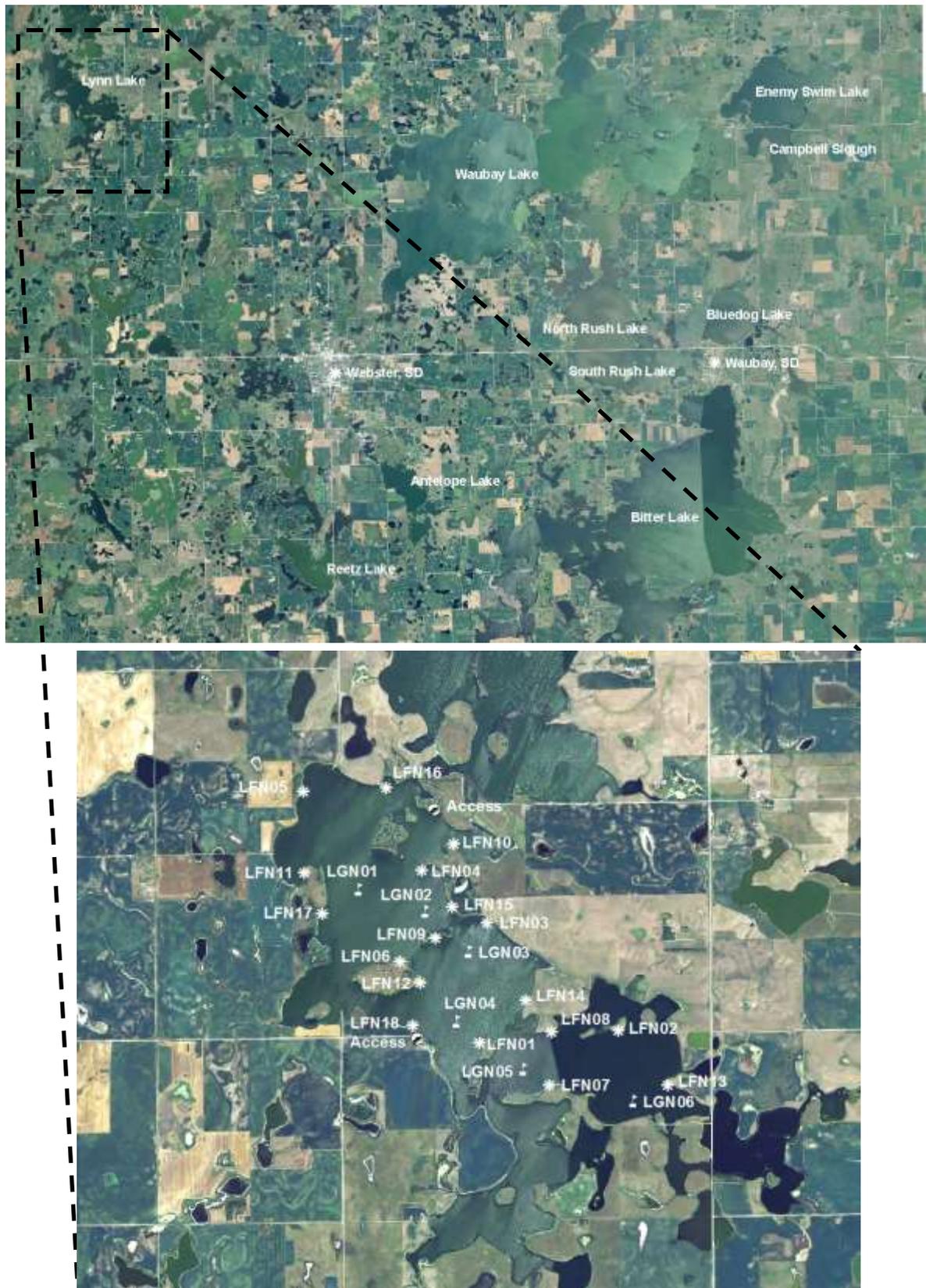


Figure 2. Map depicting geographic location of several Day County, South Dakota Lakes including Lynn (top). Also noted are public access and standardized net locations for Lynn Lake. LFN= frame nets; LGN= gill nets

Management Objectives

- 1) Maintain a mean frame net CPUE of stock-length black crappie ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a frame net mean CPUE of stock-length bluegill ≥ 25 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a low density muskellunge population (i.e., one 30-in fish/5 acres) to provide a unique angling opportunity in northeastern South Dakota.
- 4) Maintain a mean gill net CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 5) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 30 , a PSD of 30-60, and a PSD-P of 5-10.

Results and Discussion

Prior to above normal precipitation during the 1990's, Lynn Lake was a shallow cattail slough. Abundant precipitation and the resulting run-off increased water depth to levels capable of sustaining sport fish. The first SDGFP stocking of fish into Lynn Lake occurred in 1998 when saugeye and black crappie were stocked. Currently, Lynn Lake is managed as a panfish (i.e., black crappie, bluegill, and yellow perch), muskellunge, and walleye fishery.

Primary Species

Black Crappie: Black crappie are assessed with frame nets and no frame nets were used in 2015. Frame nets will be utilized on even years with the next survey in 2016.

Bluegill: Bluegill are assessed with frame nets and no frame nets were used in 2015. Frame nets will be utilized on even years with the next survey in 2016.

Muskellunge: Lynn Lake is one of two lakes in northeast South Dakota managed for muskellunge. Muskellunge were introduced into Lynn Lake in 2001 and subsequently stocked in 2003, 2004, 2006, 2010, 2012 and 2014 (Table 10). Muskellunge stockings are scheduled to take place on a biennial basis, but the frequency of stockings depends upon availability. The goal is to maintain a low-density muskellunge population (one 30-inch fish/5 acres) to provide anglers a diverse and unique opportunity.

Lynn Lake has been used as an egg source for walleye spawning operations in recent years; both large and small frame nets were used to collect walleye broodstock and muskellunge for an extended period of time following ice out during 2013-2015. In 2015, 86 muskellunge that ranged in TL from 81 to 118 cm (31.9 to 45.6 in) were sampled, most in large frame nets (Figure 3). Approximately 16% of the sampled muskellunge exceeded the 1,016-mm (40-in) minimum length restriction.

During annual mid-summer fish community surveys, which occur during early-September, muskellunge have proven difficult to sample (Table 2). In 2015, no muskellunge were captured in the gill net catch (Table 1).

Walleye: The mean gill net CPUE of stock-length walleye was 4.8 (Table 1) and below the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2006, the mean gill net CPUE has fluctuated from a low of 4.8 (2015) to a high of 28.3 (2010). The 2015 gill net CPUE represented a decrease from the 2014 CPUE of 8.7 (Table 2). Based on the 2015 gill net CPUE, relative abundance is considered moderate.

Walleye in the gill net catch ranged in TL from 12 to 69 cm (4.7 to 27.2 in; Figure 4). The PSD was 31 and the PSD-P was 14 (Table 1). The PSD was within the management objective of 30-60; the PSD-P was above management objective range of 5-10 (Table 3). Approximately 16% of walleye in the gill net catch were above the 381-mm (15-in) minimum length restriction (Figure 4).

Both natural reproduction and stocking contribute to the walleye population in Lynn Lake. Based on age estimates made using otoliths, eight year classes (1999-2000, 2009-2011 and 2013-2015) were present in the 2015 gill net catch (Table 4). Of year classes considered recruited to the population (i.e., > age-0), the 2013 and 2014 cohorts were the most abundant and collectively comprised 72% of walleye in the gill net catch (Table 4). The 2013 year class coincides with a fry stocking and the 2014 year class was naturally produced (Tables 4, 6). Fry stocked in 2013 were marked with Oxytetracycline (OTC) so that the contribution of stocked fish could be evaluated. The estimated stocking contribution was 42% (Table 8). The capture of seven individuals from the 2015 (age-0; Table 4) cohort in the gill net catch coupled with a mean fall night electrofishing CPUE of 10.0 (Table 1) suggests that a natural year class was produced; however, recruitment is currently unknown and will be assessed in future surveys.

Walleye in Lynn Lake tend to grow fast and attain quality-length (38cm; 15 in) by age 2 or 3 (Table 5). Since 2006, the weighted mean TL at capture for age-2 walleye has ranged from 310 to 425 mm (12.2 to 16.7 in; Table 5). In 2015, the weighted mean TL at capture of age-2 individuals was 310 mm (12.2 in; Table 5). Stock-length walleye in the gill net catch had a mean Wr of 84 (Table 1) and a decreasing trend in Wr was observed as TL increased.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 2.7 (Table 1) and well below the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Since 2006, the mean gill net CPUE has fluctuated from a low of 2.7 (2015) to a high of 95.2 (2011; Table 2). Based on the 2015 gill net CPUE, relative abundance is low.

Gill net captured yellow perch ranged in TL from 18 to 24 cm (7.1 to 9.4 in; Figure 5). Small sample size limits the utility of the size structure, age and growth data in 2015. Two year-classes (2013-2014; Table 7) were present in the gill net catch and mean W_r was 100 (Table 1).

Other Species

Northern Pike: No stock-length northern pike were captured in the 2015 gill net survey (Table 1). Since 2006, mean gill net CPUE of stock-length northern pike has ranged from 0.0 (2007-2008, 2010, 2015) to 2.8 (2012; Table 2). Currently, relative abundance appears to be low.

Other: Rock bass were the only other fish species captured in low numbers during the survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys utilizing gill nets on an annual basis (next survey scheduled in summer 2016) and frame nets on a biennial basis (next scheduled in summer 2016) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Collect otoliths from black crappie, bluegill, walleye, and yellow perch to assess the age structure and growth rates of each population.
- 3) Conduct annual spring trap netting using large frame nets to monitor muskellunge population parameters (e.g., abundance, size structure, etc).
- 4) Stock 1,500 muskellunge fingerlings on a biennial basis, in an effort to maintain a low density population which provides a unique angling opportunity in northeastern South Dakota.
- 5) Maintain statewide 1,016-mm (40-in) minimum length restriction on muskellunge in an effort to develop a unique trophy fishery.
- 6) Conduct fall night electrofishing on an annual basis to monitor age-0 walleye relative abundance.
- 7) Stock walleye at (\approx 500 fry/acre) to establish additional year classes if fall night electrofishing CPUE of young-of-the-year walleye and gill netting results warrant [i.e., low gill net CPUE of sub-stock (i.e., < 25 cm (10 in) walleye and/or fall night electrofishing CPUE of age-0 walleye < 75 fish/hour].
- 8) Maintain the 381-mm (15-in) minimum length limit and daily limit of two on walleye. The regulation is designed to protect smaller fish from harvest, increase average fish size, and provide a more equitable distribution of the walleye harvest (Lucchesi and Blackwell 2009).
- 9) Improve access via enhancements (e.g., installation of landing dock) to the primitive boat launch and parking area.

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 Lynn Lake, 2015. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLC= black crappie; BLG= bluegill; ROB= rock bass; WAE= walleye; YEP= yellow perch

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Gill nets</i>								
BLC	0.2	0.2	0	---	0	---	125	---
BLG	0.2	0.2	0	---	0	---	98	---
ROB	0.7	0.5	25	59	0	---	109	9
WAE	4.8	1.6	31	15	14	11	84	1
YEP	2.7	0.8	81	18	0	---	100	2
<i>Electrofishing</i>								
WAE ¹	10.0	11.6	---	---	---	---	---	---

¹ Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye not stock length.

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 Lynn Lake, 2006-2015. BLB= black bullhead; BLC= black crappie; BLG= bluegill; MUE= muskellunge; NOP= northern pike; ROB= rock bass; SMB= smallmouth bass; WAE= walleye; YEP= yellow perch

Species	CPUE									
	2006 ¹	2007 ¹	2008	2009	2010	2011	2012	2013	2014	2015
<i>Frame nets</i>										
BLB	---	---	0.1	0.0	0.1	0.7	2.1	0.9	0.1	---
BLC	---	---	0.4	1.7	1.7	11.9	5.2	1.7	0.3	---
BLG	---	---	3.6	20.6	6.8	22.4	8.7	7.1	2.4	---
NOP	---	---	0.1	0.1	0.1	0.1	0.2	0.6	0.2	---
ROB	---	---	0.0	0.3	0.1	0.4	0.2	1.5	0.2	---
SMB	---	---	0.0	0.1	0.1	0.6	0.2	0.2	0.1	---
WAE	---	---	2.8	1.5	2.2	1.6	0.8	1.2	1.2	---
YEP	---	---	0.4	1.7	2.7	18.7	4.6	3.8	0.2	---
<i>Gill nets</i>										
BLB	1.2	0.7	0.0	0.0	0.0	0.3	0.7	0.2	0.2	0.0
BLC	4.8	0.2	0.2	0.5	0.3	6.5	0.8	0.2	0.0	0.2
BLG	5.3	0.5	0.3	0.2	0.5	0.7	0.8	0.0	0.0	0.2
MUE	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
NOP	0.5	0.0	0.0	0.2	0.0	1.7	2.8	1.5	0.8	0.0
ROB	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.3	0.3	0.7
SMB	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0
WAE	7.7	14.3	12.2	20.5	28.3	7.0	9.5	8.5	8.7	4.8
YEP	42.5	23.2	5.5	8.2	29.5	95.2	93.2	37.0	24.7	2.7
<i>Electrofishing</i>										
WAE ²	708.5	988.5	99.4	127.1	0.0	143.0	4.0	315.0	157.8	10.0

¹ Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

² Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 walleye not stock-length

Table 3. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional stock density 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 Lynn Lake, 2006-2015. BLC= black crappie; BLG= bluegill; WAE= walleye; YEP= yellow perch

Species	2006 ¹	2007 ¹	2008	2009	2010	2011	2012	2013	2014	2015	Objective
<i>Frame nets</i>											
BLC											
CPUE	---	---	<1	2	2	12	5	2	<1	---	≥ 10
PSD	---	---	86	55	62	45	98	97	100	---	30-60
PSD-P	---	---	86	16	21	22	28	90	100	---	5-10
Wr	---	---	110	121	120	114	114	109	111	---	---
BLG											
CPUE	---	---	4	21	7	22	9	7	2	---	≥ 25
PSD	---	---	2	13	37	40	45	12	2	---	30-60
PSD-P	---	---	0	0	7	19	11	6	0	---	5-10
Wr	---	---	115	116	116	120	111	107	112	---	---
<i>Gill nets</i>											
WAE											
CPUE	8	14	12	21	28	7	10	9	9	5	≥ 10
PSD	100	66	55	35	22	95	86	27	69	31	30-60
PSD-P	30	19	30	14	4	7	11	8	29	14	5-10
Wr	86	85	89	90	93	87	89	88	84	84	---
YEP											
CPUE	43	23	6	8	30	95	93	37	25	3	≥ 30
PSD	62	35	18	45	31	69	36	49	1	81	30-60
PSD-P	50	14	3	2	7	9	6	9	0	0	5-10
Wr	105	106	104	108	100	101	98	105	104	100	---

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 walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Lynn Lake, 2011-2015.

Survey Year	Year Class													
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
2015 ¹	7	25	16		3	2	2							
2014 ¹	---	71	24	2	27	2	11	2			2		1	1
2013 ¹	---	---	57	2	38	4	5							
2012 ¹	---	---	---		13	4	36	2	3				1	
2011 ¹	---	---	---	---	12	2	37				1			
# stocked														
fry			750 ²		700					1500				1500
sm. fingerling														
lg. fingerling														

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

² Stocked walleye were OTC marked; 21 of 50 otoliths collected from fall electrofished age-0 walleye exhibited marks for an estimated stocking contribution of 42%.

Table 5. Weighted mean TL at capture (mm) for walleye age-0 through age-10 sampled in experimental gill nets (expanded sample size) from Lynn Lake, 2005-2015. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age										
	0	1	2	3	4	5	6	7	8	9	10
2015 ¹	144(7)	234(25)	310(16)	---	423(3)	479(2)	565(2)	---	---	---	---
2014 ¹	121(71)	218(24)	326(2)	381(27)	461(2)	526(11)	538(2)	---	---	609(2)	---
2013 ¹	127(57)	248(2)	325(38)	466(4)	495(5)	---	---	---	---	---	---
2012 ¹	---	258(13)	422(4)	461(36)	534(2)	486(3)	---	---	---	636(1)	---
2011 ¹	137(12)	346(2)	411(37)	---	---	---	628(1)	---	---	---	---
2010	197(6)	339(131)	425(21)	470(11)	---	571(1)	---	511(2)	511(1)	---	577(3)
2009	174(94)	301(37)	356(48)	422(7)	498(6)	---	484(2)	517(6)	546(2)	516(13)	669(1)
2008	172(11)	260(38)	361(8)	453(4)	---	514(4)	519(8)	485(1)	539(20)	599(1)	---
2007	---	257(41)	406(6)	---	459(11)	500(13)	---	518(27)	---	---	653(1)
2006	---	---	---	447(9)	462(11)	---	512(27)	---	---	---	---
2005	195(3)	---	396(65)	432(63)	435(4)	483(91)	550(1)	---	---	---	---

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

Table 6. Stocking history including size and number for fishes stocked into Lynn Lake, 2002-2015. BLC= black crappie; MUE= muskellunge; WAE= walleye; YEP= yellow perch

Year	Species	Size	Number
2002	WAE	fry	1,500,000
2003	MUE	fingerling	2,000
2004	BLC	fingerling	16,324
	MUE	fingerling	500
2006	WAE	fry	1,500,000
	MUE	fingerling	1,250
2010	MUE	juvenile	770
2011	WAE	fry	700,000
2012	MUE	large fingerling	3,018
2013	WAE	fry	750,000
2014	MUE	large fingerling	1,600

Table 7. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Lynn Lake, 2011-2015.

Survey Year	Year Class									
	2015	2014	2013	2012	2011	2010	2009	2008	2007	
2015		3	13							
2014	---		138	8	1		1			
2013	---	---	647	5	152	52	12			
2012	---	---	---		348	122	90			
2011	---	---	---	---	25	171	382	7	11	

Table 8. Weighted mean TL (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Lynn Lake, 2009-2015.

Year	Age					
	0	1	2	3	4	5
2015	---	183(3)	227(13)	---	---	---
2014	---	168(138)	180(8)	230(1)	---	244(1)
2013	101(647)	174(5)	195(152)	226(52)	258(12)	---
2012	---	153 (348)	222 (122)	241 (90)	---	---
2011	95(25)	174(171)	227(382)	254(7)	279(11)	---
2010	106(9)	188(157)	239(12)	289(7)	281(1)	---
2009	96(442)	146(35)	232(22)	---	---	---

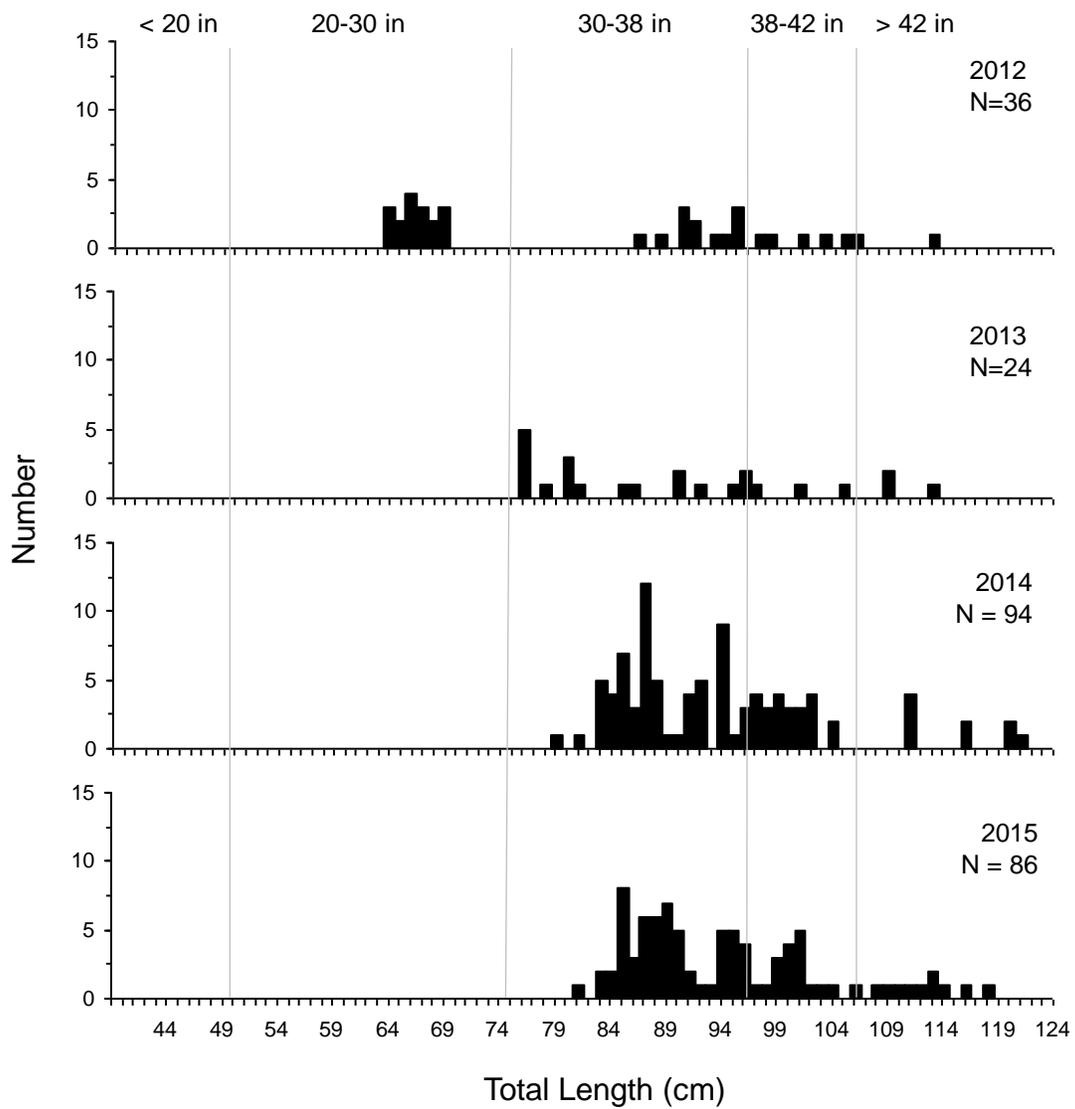


Figure 3. Length-frequency histogram of muskellunge captured using spring frame nets during walleye spawning efforts at Lynn Lake, 2012-2015. Small frame nets were used in 2012 and both large and small frame nets were used in 2013-2015.

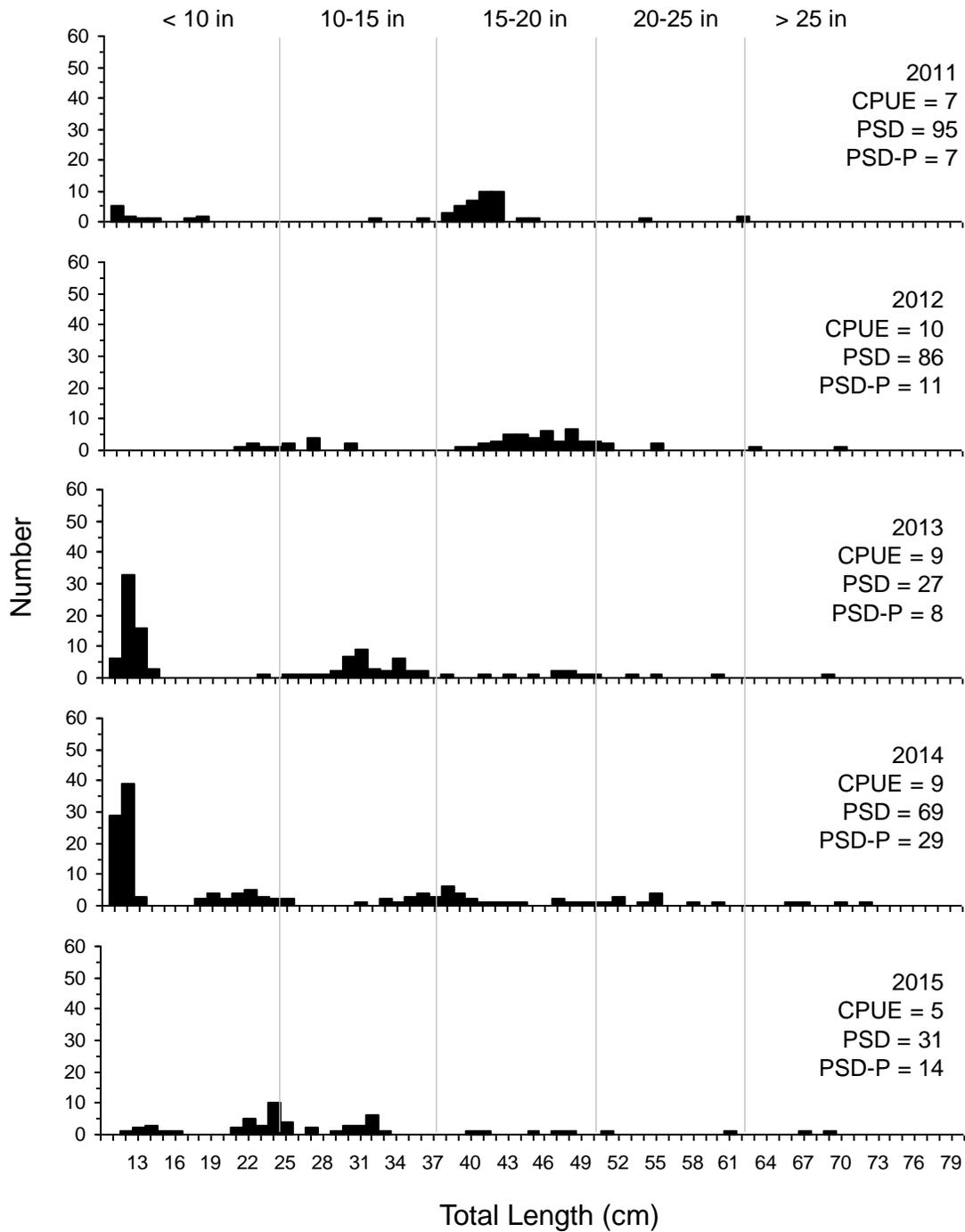


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Lynn Lake, 2011-2015.

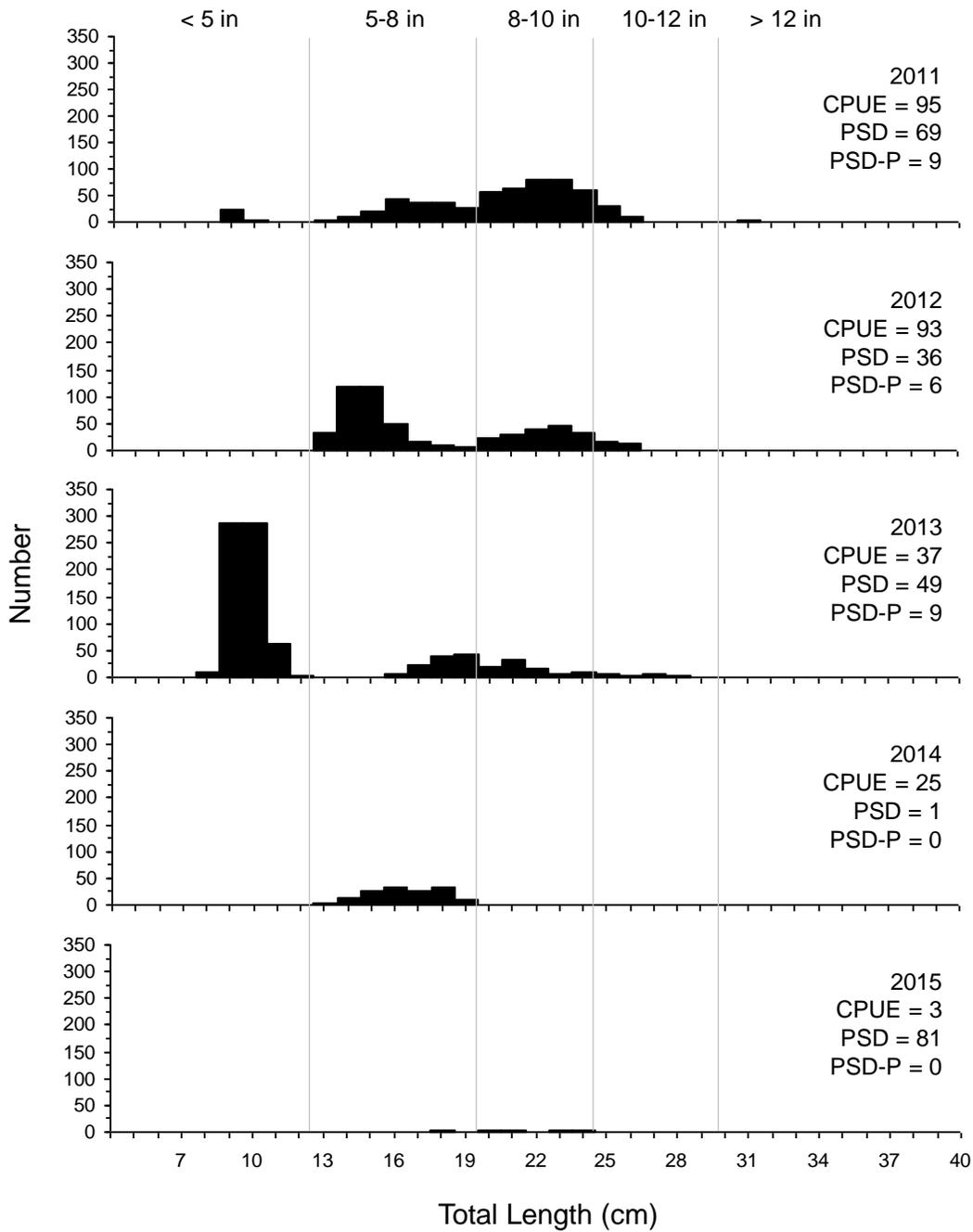


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Lynn Lake, 2011-2015.