

Lake Poinsett

Site Description

Location

Water designation number (WDN)	32-0001-00
Legal description	T112N-R52W-Sec.3-6; T113N-R52W-Sec.14-16,20-23,26-34
County (ies)	Hamlin/Brookings
Location from nearest town	7 miles west of Estelline

Survey Dates and Sampling Information

Survey dates	July 19-20, 2011 (GN) August 30, 2011 (EF-WAE)
Gill net sets (n)	6
Fall electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	292,197
Surface area (acres)	7,903
Maximum depth (ft)	22
Mean depth (ft)	17

Ownership and Public Access

Lake Poinsett is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. The SDGFP maintains four public access sites on Lake Poinsett including one in a State Recreation Area (Figure 1). Ownership of the Lake Poinsett shoreline includes the State of South Dakota and private ownership. The shoreline of Lake Poinsett is highly developed and supports many cabins and homes.

Watershed and Land Use

Land use within the Lake Poinsett watershed is primarily agricultural including a mix of cropland, pasture or grassland, and wooded shelterbelts.

Water Level Observations

The OHWM elevation for Lake Poinsett is 1651.5 fmsl and the outlet elevation is 1650.5 fmsl. Lake Poinsett experienced a "spring rise" of 1.9 ft during the spring of 2011. On May 11 and September 27, 2011 the elevations of Lake Poinsett were 1656.4 and 1653.0 fmsl, respectively.

Aquatic Nuisance Species Monitoring

Plant Survey

Lake Poinsett is a windswept basin and traditionally little emergent or submersed aquatic vegetation has been present. However, in recent years Lake Poinsett has become more vegetated. Sago pondweed has become common and often forms a dense ring around much of the shoreline. In 2010, sago pondweed was the only aquatic plant species identified. No aquatic plant survey was conducted in 2011. To date, no aquatic nuisance plant species have been encountered.

Shoreline Survey

No shoreline survey was conducted in 2011.

Fish Community Survey

Common carp was the only aquatic nuisance fish species captured during the 2011 survey.

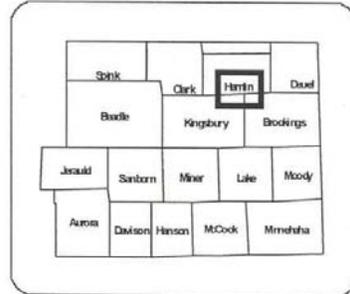
Fish Management Information

Primary species	smallmouth bass, walleye, yellow perch
Other species	bigmouth buffalo, black bullhead, black crappie, bluegill, channel catfish, common carp, emerald shiner, green sunfish, northern pike, orangespotted sunfish, shorthead redhorse, spottail shiner, white bass, white crappie, white sucker, yellow bullhead
Lake-specific regulations	Walleye: minimum length 15"
Management classification	warm-water semi permanent
Fish Consumption Advisories	none

Lake Poinsett - Hamlin County

Map creation: October, 2002 Sonar Survey: June, 2001
Shoreline: Landsat7, August, 2000

Lake Area: 7,903 acres Maximum Depth: 22 ft.
Mean Depth: 16.5 ft. Shoreline Development Index: 1.3



South Dakota Game, Fish, and Parks
SDSU Wildlife and Fisheries Sciences



0 0.5 1 Miles

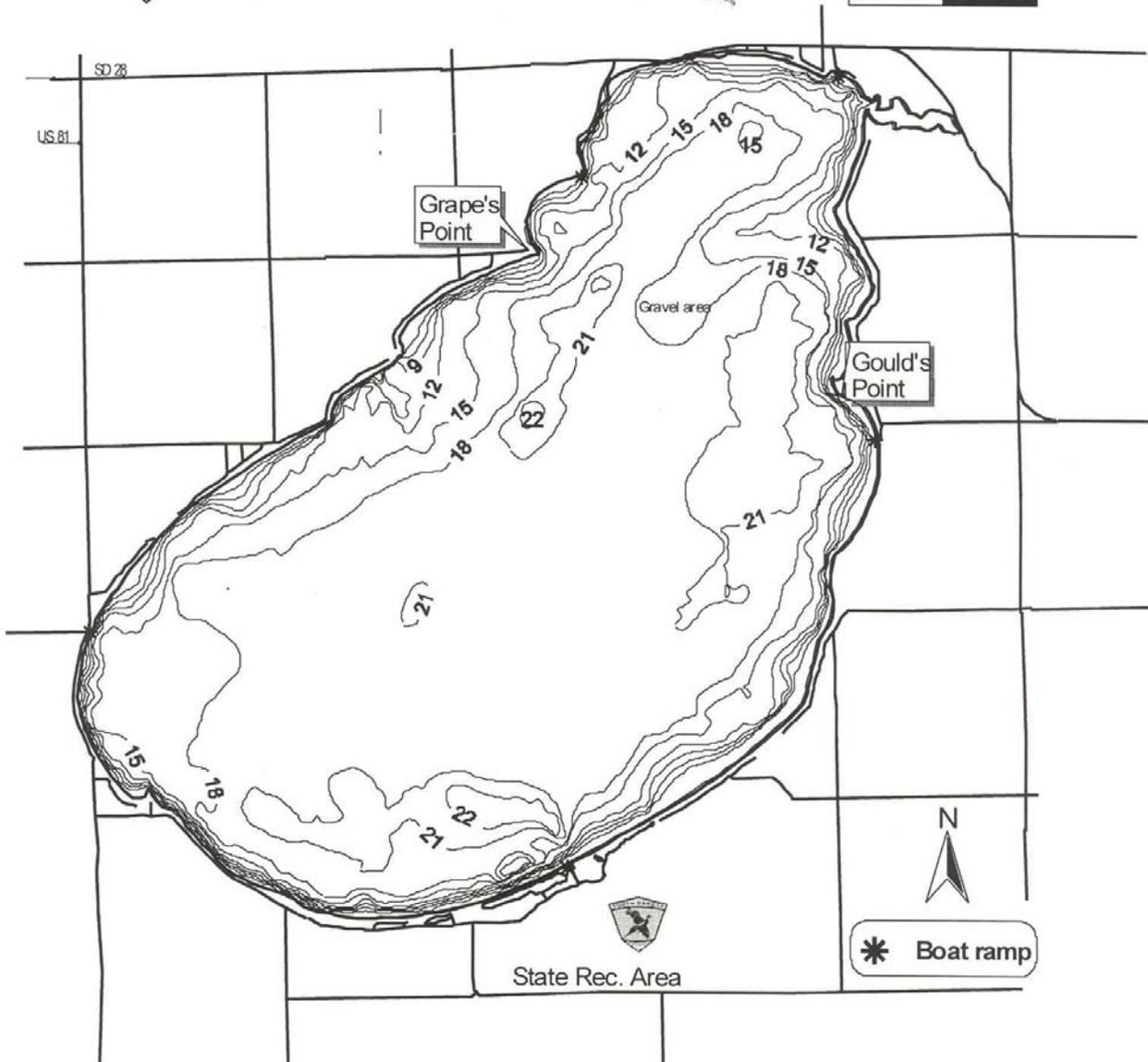


Figure 1. Map depicting depth contours of Lake Poinsett, Hamlin County, South Dakota.



Figure 2. Map depicting access sites and standardized net locations for Lake Poinsett, Hamlin County, South Dakota. POFN= frame nets, POGN= gill nets

Management Objectives

- 1) Maintain a moderate density smallmouth bass population with a PSD of 40-70, and a PSD-P of 10-40.
- 2) Maintain a mean gill net CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and a PSD-P of 5-10.
- 3) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 30 , a PSD of 30-60, and a PSD-P of 5-10.
- 4) Maintain a mean frame net CPUE of stock-length bullhead ≤ 100 .

Results and Discussion

Lake Poinsett is one of South Dakota's largest natural lakes with a surface area of nearly 8,000 acres. Lake Poinsett receives water from Lake Albert and Dry Lake. Historically, Lake Poinsett has been a popular destination for recreational activities including fishing, boating, swimming, water-skiing, and camping. Public access to Lake Poinsett is exceptional with access locations on the north, east, south (State Recreation Area), and west shores of the lake. Currently, Lake Poinsett is primarily managed as a smallmouth bass, walleye and yellow perch fishery.

In 2011, frame nets were not utilized as part of the fish community survey on Lake Poinsett. Therefore, the following results and discussion will focus on those fish species typically assessed using gill net (e.g., northern pike, walleye, and yellow perch) and fall night electrofishing (i.e., age-0 walleye) data.

Primary Species

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).

Spring night electrofishing to monitor smallmouth bass population parameters in Lake Poinsett is scheduled to be conducted biennially during even years (e.g., 2012, 2014, 2016...).

Walleye: The mean gill net CPUE of stock-length walleye was 27.7 (Table 1) and above the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2003, the mean gill net CPUE has ranged from a low of 3.0 (2004) to a high of 27.7 (2011; Table 2). The 2011 gill net CPUE represented an increase from the 10.0 observed in 2010 (Table 2) and indicated high relative abundance.

Walleye captured in the 2011 gill net catch ranged in total length from 30 to 55 cm (11.8 to 21.7 inches), had a PSD of 16 and a PSD-P of 5 (Table 1; Figure 3). The PSD was below the objective range of 30-60; while the PSD-P was within the objective range of 5-10 (Table 3). As walleye from the large 2009 year class, the majority of which ranged in total length from 30 to 39 cm (11.8 to 15.4 in) at the time of sampling, attain quality-length PSD values are expected to increase substantially (Table 4; Figure 3). Approximately 16% of walleye captured in gill nets were above the 38 cm (15 in) minimum-length restriction on Lake Poinsett (Figure 3).

Since 2005, otoliths have been collected from a sub-sample of gill net captured walleye. Six walleye year-classes (2003 and 2005-2009) were present in the 2011 gill net catch, with the 2009 year class being the most represented (Table 4). The 2009 year class coincided with a fry stocking and comprised 87% of walleye in the gill net catch (Table 4). In recent years, strong walleye year classes have been produced in both stocked (e.g., 2009) and non-stocked (e.g., 2007 and 2008) years in Lake Poinsett (Table 4). The contribution of stocked or naturally-produced walleye to year classes produced during stocked years is unknown, as stocked walleye were unmarked making it difficult to differentiate stocked from naturally-produced walleye.

Walleye in Lake Poinsett currently exhibit fast growth and typically attain quality-length (38 cm; 15 in) by age 3 (Table 5). Since 2005, the weighted mean length at capture for age-2 walleye has ranged from 346 to 385 mm (13.6 to 15.2 in); while the weighted mean length at capture for age-3 walleye has ranged from 433 to 480 mm (17.0 to 18.9 in; Table 5). In 2011, the weighted mean length at capture of age-2 and age-3 walleye was 346 and 440 mm (13.6 and 17.3 in), respectively (Table 5). Gill net captured walleye had mean W_r values that ranged from 84 to 85 for all length categories (e.g., stock to quality) sampled, with the mean W_r of stock-length walleye being 85 (Table 1). No length-related trends in condition were apparent.

Few age-0 walleye were captured during fall night electrofishing, potentially indicating poor survival of naturally-produced and stocked walleye in 2011 (Table 1; Table 6). Recruitment of the 2011 year class will be assessed in future surveys.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 22.0 (Table 1) and below the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Since 2003, the gill net CPUE of stock-length yellow perch has fluctuated between 0.8 (2005) and 137.2 (2010; Table 2). Based in on the 2011 gill net CPUE, relative abundance is considered moderate.

Gill net captured yellow perch ranged in total length from 13 to 26 cm (5.1 to 10.2 in), with the majority being in the quality-preferred length category (Figure 4). The PSD was 93 and well above the management objective range (30-60); while the PSD of 5 was within the objective range of 5-10 (Table 1; Table 3).

Otoliths were collected from a sub-sample of gill net captured yellow. In 2011, two year classes (2009 and 2010) comprised the entire sample (Table 7). The 2009 year class was the most represented and comprised 95% of yellow perch in the gill net catch (Table 7). Male yellow perch from the 2009 cohort had a weighted mean total length at capture of 212 mm (8.3 in) at age 2; while their female counterparts had a weighted mean total length at capture of 232 mm (9.1 in; Table 8). Gill net captured age-2 (2009 year class) yellow perch had a mean W_r of 108.

Other Species

Black bullhead: Black bullhead abundance has been typically assessed using frame nets in Lake Poinsett; however, no frame nets were utilized during the 2011 fish community survey. However, black bullhead relative abundance has remained low from 2004-2011 (Table 2). No black bullheads were sampled by gill nets in 2011 (Table 2).

Channel catfish: Channel catfish in Lake Poinsett have generally been considered to be present at a low density with mean gill net CPUE values that have ranged from a low of 0.0 (2010) to a high of 3.2 (2003; Table 2). In 2011, five channel catfish that ranged in total length from 43 to 65 cm (16.9 to 25.6 in) were captured by gill nets, which resulted in a mean gill net CPUE of 0.8 (Table 1). Although abundance is low the potential exists for anglers to catch trophy channel catfish in Lake Poinsett.

Northern Pike: Northern pike typically are not sampled effectively during standardized mid-summer fish community surveys. As a result, mean gill net CPUE values are often low. Northern pike relative abundance in Lake Poinsett has generally been considered low, with mean gill net CPUE values that ranged from 0.0 to 1.0 from 2003-2010 (Table 2). In 2011, the mean gill net CPUE of stock-length northern pike was 7.3 (Table 1) and indicated high relative abundance.

Gill net captured northern pike ranged in total length from 44 to 77 cm (17.3 to 30.3 in), had a PSD of 55, and a PSD-P of 5 (Table 1; Figure 5). No northern pike growth information was collected. Gill net captured northern pike in the stock-quality and quality-preferred length categories had a mean W_r of 93.

White bass: In 2011, eight white bass that ranged in total length from 33 to 45 cm (13.0 to 17.7 in) were captured by gill nets, which resulted in a mean gill net CPUE of 1.3 (Table 1). The 2011 gill net CPUE was the lowest CPUE recorded from 2003-2011 (Table 2). Given the low sample size, few inferences can be made concerning the size structure, growth, and condition of white bass in Lake Poinsett.

Other: Common carp and white sucker were other fish species captured in low numbers during the 2011 survey (Table 1).

Bigmouth buffalo, common carp, and white bass are commonly harvested through a permit by commercial fisherman during the ice-covered season. A total of 5,500 lb of bigmouth buffalo, 7,500 lb of common carp, and 500 lb of white bass were reported harvested by commercial fisherman from Lake Poinsett during the 2010-2011 winter.

Management Recommendations

- 1) Conduct fish community assessment surveys utilizing gill nets and frame nets on an annual basis (next survey scheduled in summer 2012) 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 age-0 walleye relative abundance.
- 3) Stock walleye (≈ 500 fry/acre; 50% OTC marked) to establish additional year-classes if gill netting and/or fall night electrofishing CPUE of age-0 walleye 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).
- 4) Maintain the 381-mm (15 in) minimum length limit on walleye to benefit the population and comply with tool box options (Lucchesi and Blackwell 2009).
- 5) Conduct spring night electrofishing on a biennial basis (even years) to monitor smallmouth bass population parameters.
- 6) Monitor commercial harvest of bigmouth buffalo, common carp, and white bass.
- 7) 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 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 using gill nets and electrofishing in Lake Poinsett, 2011. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). CCF= channel catfish; COC= common carp; NOP= northern pike; SMB= smallmouth bass; WAE= walleye; WHB= white bass; 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>Gill nets</i>								
CCF	0.8	0.8	100	0	20	43	109	9
COC	0.3	0.5	100	0	50	50	102	14
NOP	7.3	1.3	55	13	5	5	92	2
SMB	0.3	0.3	50	50	50	50	108	<1
WAE	27.7	11.5	16	5	5	3	85	1
WHB	1.3	0.9	100	0	100	0	100	1
WHS	2.7	0.8	100	0	81	18	105	4
YEP	22.0	7.3	93	4	5	3	107	<1
<i>Electrofishing</i>								
WAE ¹	4.0	---	---	---	---	---	---	---

¹ Fall 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 using gill nets, frame nets, and electrofishing in Lake Poinsett, 2003-2011. BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; NOP= northern pike; OSF= orangespotted sunfish; SHR= shorthead redhorse; SMB= smallmouth bass; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

Species	CPUE									
	2003	2004	2005	2006 ⁴	2007 ⁴	2008	2009	2010	2011	
<i>Frame nets</i>										
BIB	0.4	1.5	0.1	---	---	0.0	1.8	0.4	---	
BLB	170.7	0.7	0.2	---	---	0.6	0.3	0.2	---	
BLC	0.0	0.1	0.0	---	---	0.0	0.0	0.1	---	
BLG	0.0	0.1	0.0	---	---	0.0	0.0	0.0	---	
CCF	0.0	0.0	1.6	---	---	0.7	0.1	0.4	---	
COC	0.1	0.1	0.0	---	---	0.2	1.1	0.6	---	
NOP	1.3	0.2	1.0	---	---	1.3	0.6	0.5	---	
OSF ¹	0.0	0.0	0.1	---	---	0.0	0.0	0.0	---	
SHR	0.0	0.2	0.0	---	---	0.1	0.1	0.0	---	
SMB	1.2	1.1	0.0	---	---	4.3	0.3	1.7	---	
WAE	0.9	0.1	0.1	---	---	1.4	4.1	0.3	---	
WHB	0.7	2.5	0.0	---	---	0.7	0.6	0.1	---	
WHS	1.1	1.9	0.5	---	---	1.4	2.4	0.7	---	
YEB	0.1	0.0	0.0	---	---	0.0	0.0	0.0	---	
YEP	0.0	0.3	4.3	---	---	2.3	0.4	22.4	---	
<i>Gill nets</i>										
BIB	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
BLB	14.8	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	
CCF	3.2	1.0	1.2	2.7	1.0	0.3	0.5	0.0	0.8	
COC	0.0	0.0	0.2	0.8	1.0	0.0	0.0	0.3	0.3	
NOP	0.7	0.3	0.0	0.7	0.8	0.5	0.0	1.0	7.3	
OSF ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	
SHR	0.0	0.0	0.2	0.3	0.3	0.0	0.2	0.2	0.0	
SMB	0.7	0.8	0.8	0.7	1.8	0.2	0.2	0.2	0.3	
SPS ¹	0.2	0.0	0.0	0.0	0.0	0.2	2.0	4.7	0.0	
WAE	3.8	3.0	8.3	5.0	6.3	5.7	16.0	10.0	27.7	
WHB	17.3	25.5	15.0	11.7	10.0	3.2	3.5	3.5	1.3	
WHS	1.8	1.2	2.0	1.5	1.2	0.5	0.2	2.7	2.7	
YEP	8.5	11.5	0.8	5.7	6.2	16.0	13.2	137.2	22.0	
<i>Electrofishing</i>										
SMB ²	---	---	---	---	---	---	---	19.6	---	
WAE ³	706.1	31.1	97.5	117.0	79.8	19.5	257.2	0.0	4.0	

¹ All fish sizes

² Spring electrofishing-SMB

³ Fall electrofishing-WAE; catch rate (CPUE) represents age-0 walleye/hour

⁴ 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 nets= 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 using gill nets, frame nets, and electrofishing in Lake Poinsett, 2003-2011. BLB= black bullhead; NOP= northern pike; SMB= smallmouth bass; WAE= walleye; WHB= white bass; YEP= yellow perch

Species	2003	2004	2005	2006 ¹	2007 ¹	2008	2009	2010	2011	Objective
<i>Frame nets</i>										
BLB										
CPUE	171	1	< 1	---	---	1	<1	<1	---	≤ 100
PSD	99	100	100	---	---	100	33	67	---	---
PSD-P	1	100	100	---	---	100	33	67	---	---
Wr	94	102	101	---	---	90	102	88	---	---
<i>Gill nets</i>										
WAE										
CPUE	4	3	8	5	6	6	16	10	28	≥ 10
PSD	48	72	72	63	42	59	17	32	16	30-60
PSD-P	0	6	10	23	18	12	2	2	5	5-10
Wr	88	99	97	85	89	88	90	94	85	---
YEP										
CPUE	9	12	1	6	6	16	13	137	22	≥ 30
PSD	100	77	60	100	32	17	27	9	93	30-60
PSD-P	92	75	60	38	22	16	15	3	5	5-10
Wr	119	119	105	105	107	105	106	106	107	---
<i>Electrofishing</i>										
SMB ²										
CPUE	---	---	---	---	---	---	---	20	---	---
PSD	---	---	---	---	---	---	---	45	---	40-70
PSD-P	---	---	---	---	---	---	---	30	---	10-40
Wr	---	---	---	---	---	---	---	116	---	---

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

² Spring electrofishing-SMB

Table 4. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (Number stocked x 10,000) from Lake Poinsett, 2007-2011.

Survey Year	Year Class												
	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
2011			145	7	8	3	2		1				
2010	---	---	51	21	8	3		2					
2009	---	---		47	44	2	3	1	1	1			
2008	---	---	---		21	14	4	3	4				1
2007 ^{1,2}	---	---	---	---		9	19	1	6		1		
# stocked													
fry	300		400			805	1170		1052				
sm. fingerling													
lg. fingerling													

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

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

Table 5. Weighted mean total length at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Poinsett, 2005-2011. 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
2011		346(145)	440(7)	499(8)	547(3)	444(2)	---	534(1)	---	---
2010	250(51)	369(21)	436(8)	480(3)	---	517(2)	---	---	---	---
2009	265 (47)	358 (44)	468 (2)	478 (3)	496 (1)	514 (1)	580(1)	---	---	---
2008	233 (21)	372 (14)	450 (4)	506 (3)	520 (4)	---	---	568 (1)	---	---
2007 ¹	265 (9)	362 (19)	433 (1)	506 (6)	---	554 (1)	---	---	---	---
2006 ¹	223 (39)	378 (1)	461 (12)	---	563 (2)	---	532 (1)	---	559 (1)	---
2005 ¹	269 (3)	385 (37)	480 (1)	---	511 (2)	519 (3)	491 (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 Lake Poinsett, 1999-2011. WAE= walleye

Year	Species	Size	Number
2003	WAE	fry	10,520,000
2005	WAE	fry	11,700,000
2006	WAE	fry	8,050,000
2009	WAE	fry	4,000,000
2011	WAE	fry	3,000,000

Table 7. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Lake Poinsett, 2009-2011.

Survey Year	Year Class						
	2011	2010	2009	2008	2007	2006	2005
2011		6	126				
2010	---		761	47	14	2	
2009	---	---		59	19	1	1

Table 8. Weighted mean total length (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Lake Poinsett, 2009-2011.

Year	Age			
	1	2	3	4
2011				
Male	156(4)	212(16)	---	---
Female	155(1)	232(99)	---	---
Combined	156(6)	228(126)	---	---
2010				
Male	161(126)	227(9)	258(4)	---
Female	169(484)	242(40)	299(8)	328(2)
Combined	167(761)	239(47)	281(14)	328(2)
2009				
Male	144 (14)	220 (1)	---	---
Female	147 (44)	247 (18)	313 (1)	325 (1)
Combined	147 (59)	246 (19)	313 (1)	325 (1)

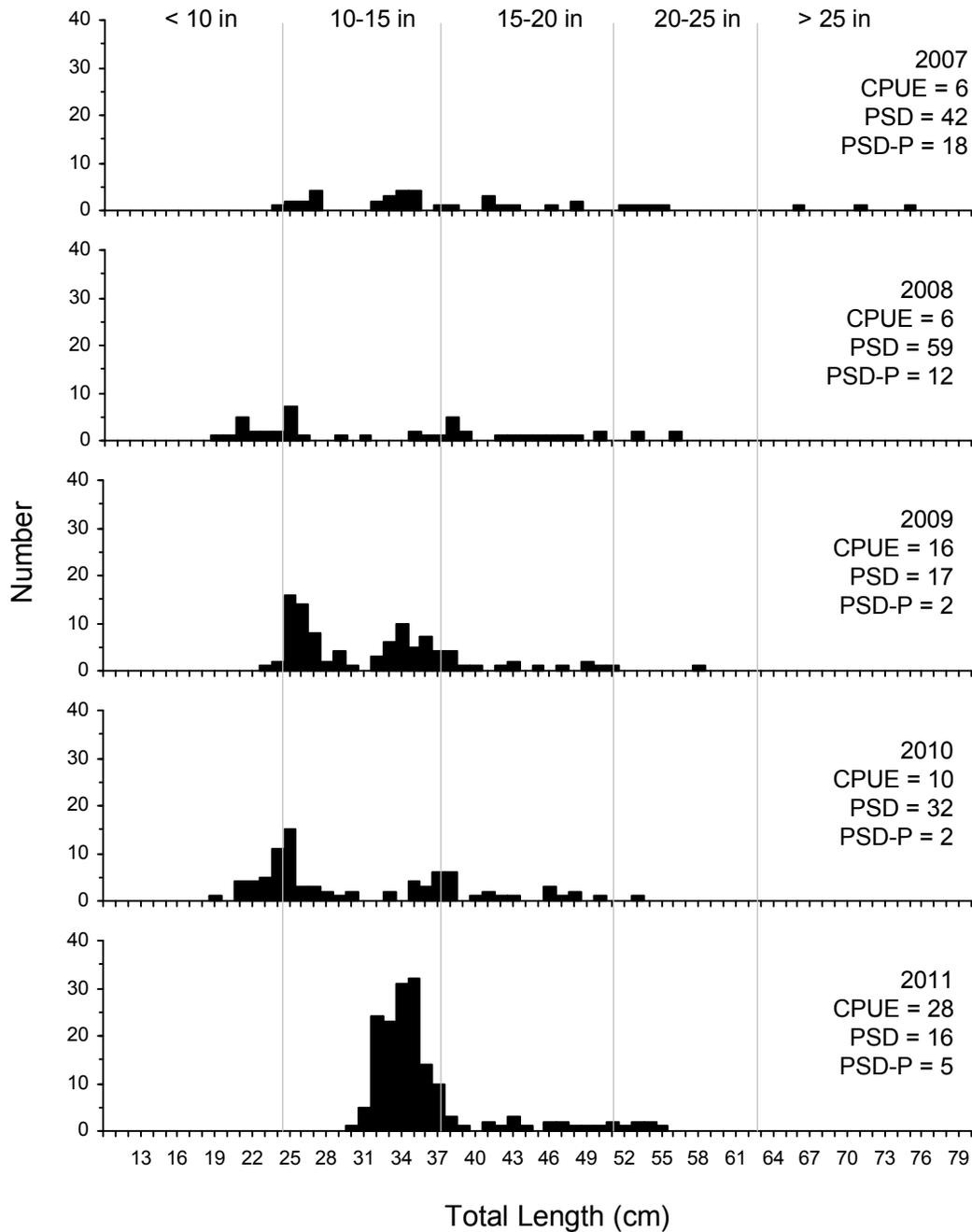


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Lake Poinsett, 2007-2011.

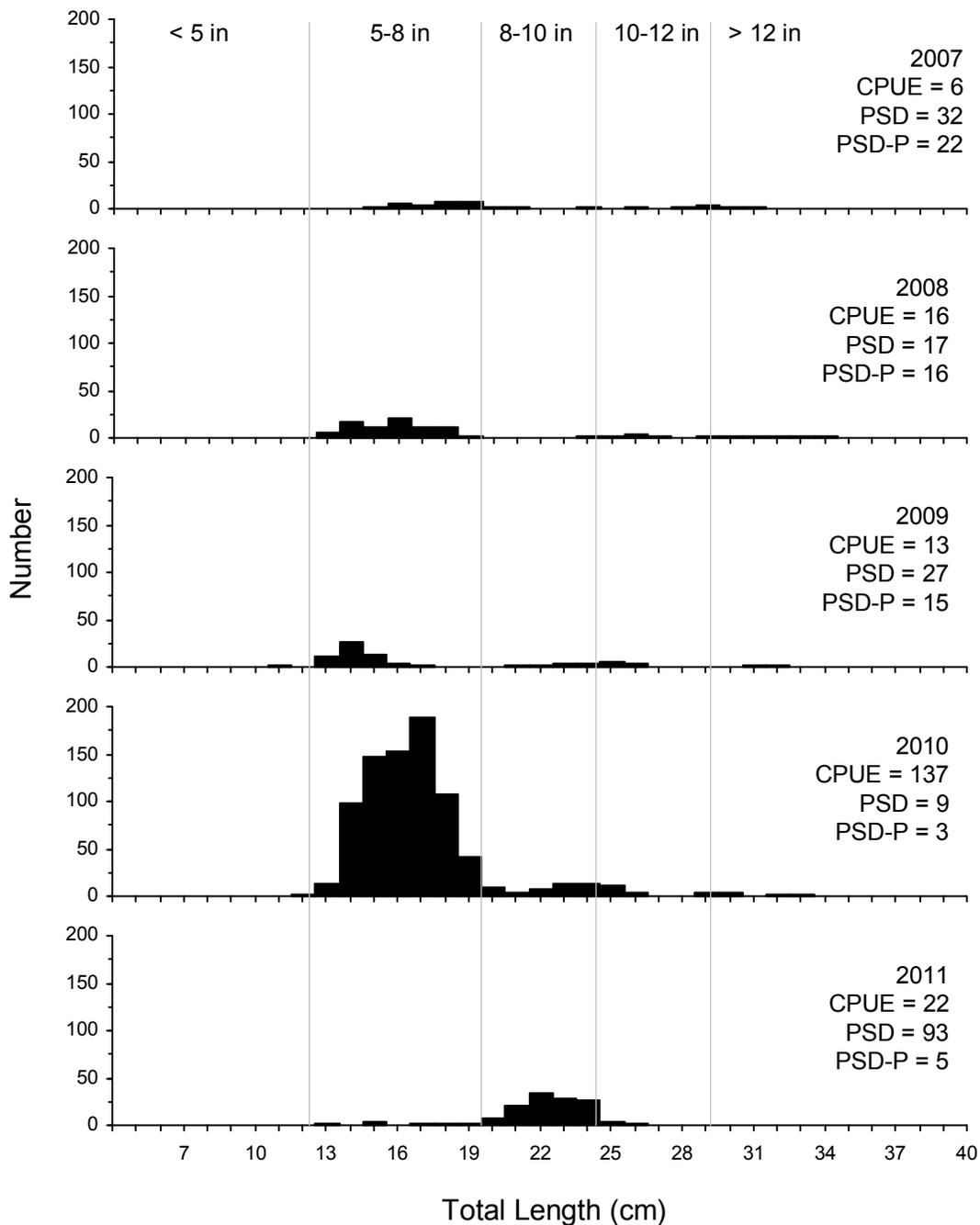


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Lake Poinsett, 2007-2011.

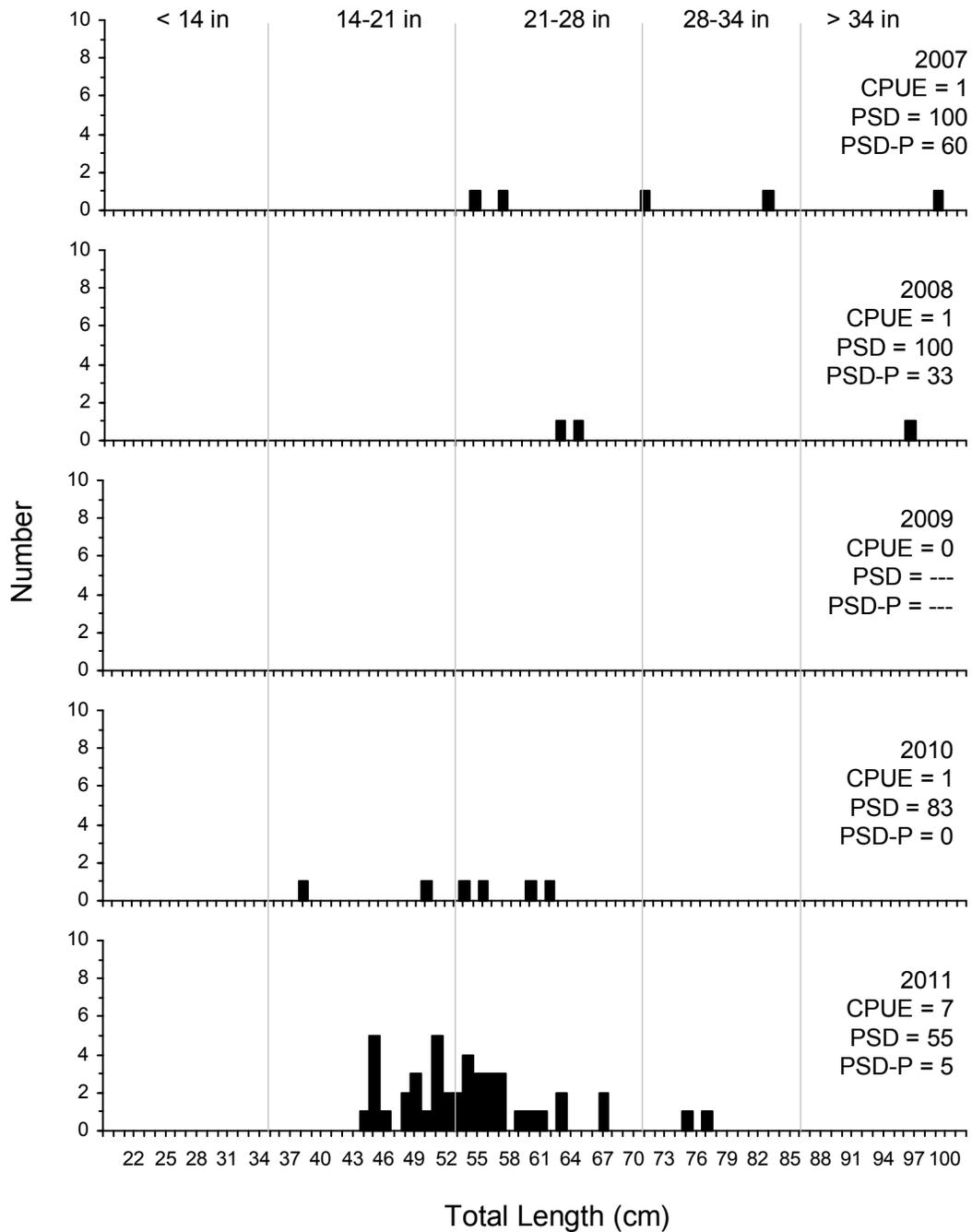


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using experimental gill nets in Lake Pointett, 2007-2011.