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	7.0 miles west of Estelline, SD

Survey Dates and Sampling Information

Survey dates	July 21-22, 2015 (GN) September 8, 2015 (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; Figure 2). 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

The 30,834 acre Lake Poinsett sub-watershed (HUC-12) is located within the larger Lake Poinsett (HUC-10) watershed. Land use within the watershed is primarily agricultural including a mix of cropland, pasture or grassland, and shelterbelts. Additionally, several smaller communities (e.g., Badger, Hayti) are located within the watershed.

Water Level Observations

The OHWM elevation for Lake Poinsett is 1651.5 fmsl and the outlet elevation is 1650.5 fmsl. The elevation of Lake Poinsett on April 19, 2015 was 1650.9 fmsl; 0.2 ft higher than the fall 2014 elevation of 1650.7 fmsl. On October 8, 2015 the elevation was 1651.3 fmsl.

Fish Management Information

Primary species	smallmouth bass, walleye, yellow perch
Other species	bigmouth buffalo, black bullhead, black crappie, bluegill, channel catfish, common carp, green sunfish, northern pike, orangespotted sunfish, river carpsucker, 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

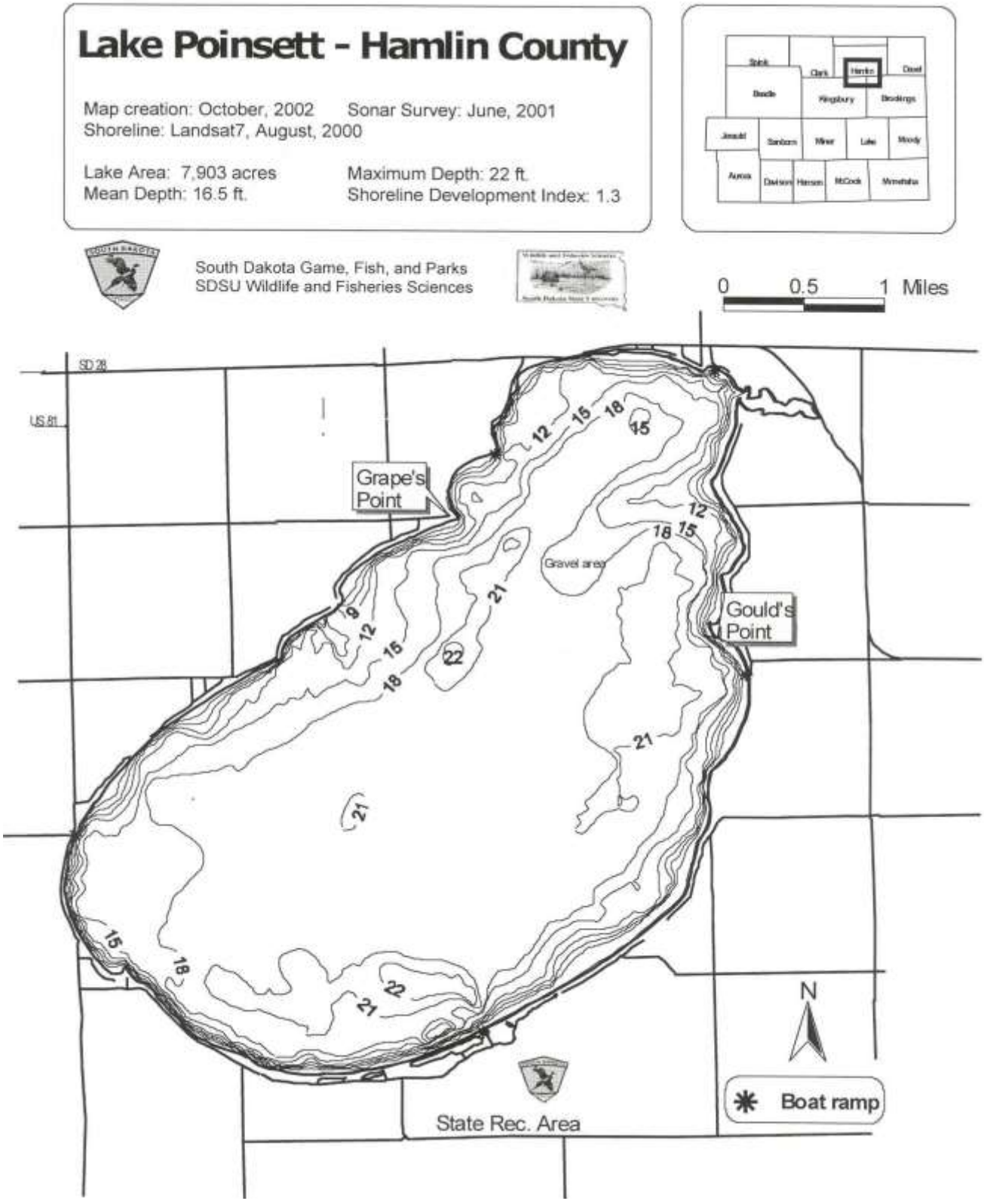

Figure 1. Map depicting access points and depth contours of Lake Poinsett, Hamlin County, South Dakota.

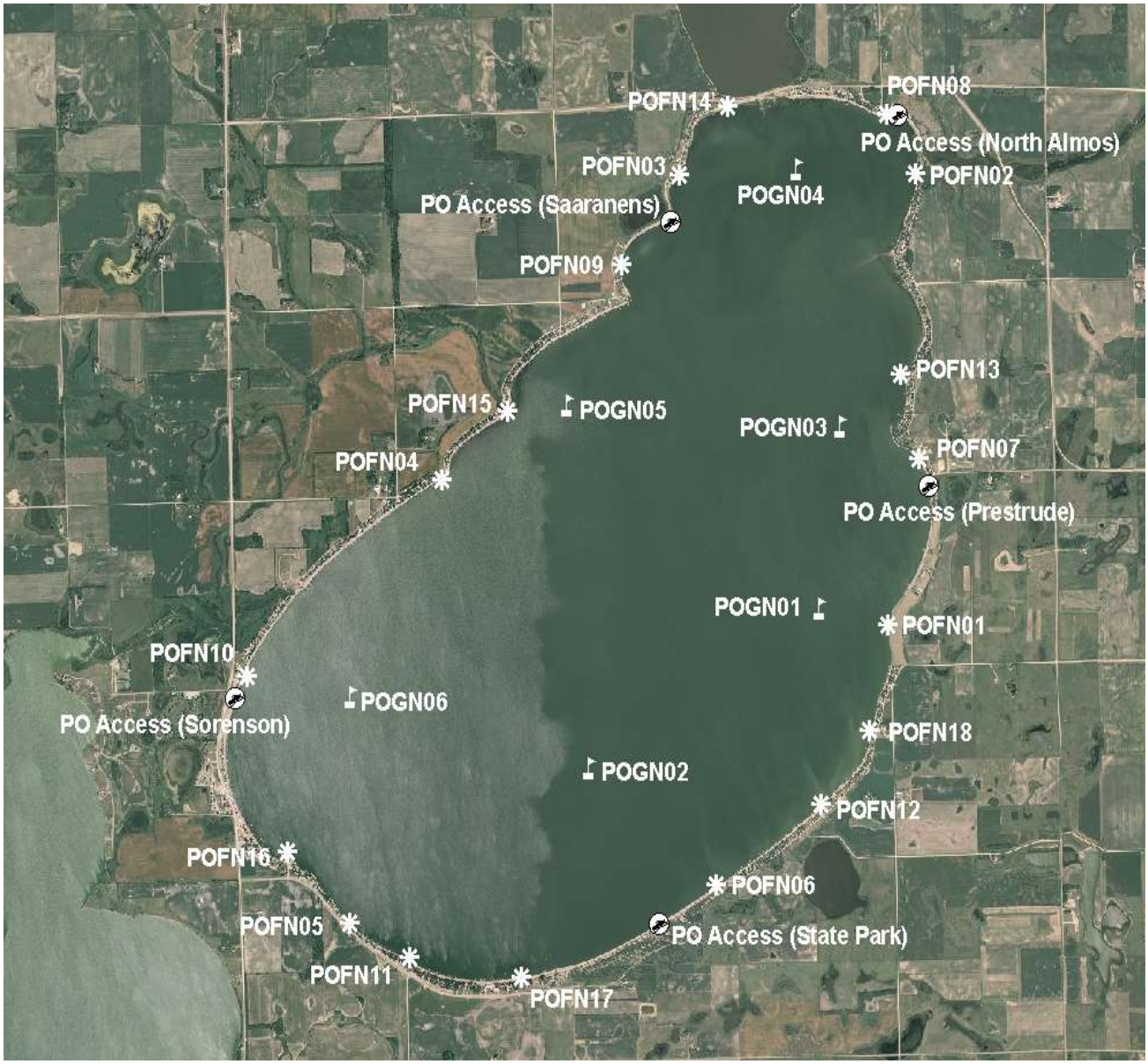

Figure 2. Map depicting access sites and standardized net locations for Lake Poinsett, Hamlin County, South Dakota. POFN= frame nets, POGN= gill nets

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 black 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.

Primary Species

Smallmouth bass: Research has recommended that smallmouth bass population dynamics 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 Poinsett Lake is scheduled to be conducted biennially during even years (i.e., 2016, 2018, 2020…).

Walleye: The mean gill net CPUE of stock-length walleye was 15.3 (Table 1) and above the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2006, mean gill net CPUE's have ranged from a low of 5.0 (2006) to a high of 27.7 (2011; Table 2). The 2015 mean gill net CPUE represented an increase from the 2014 CPUE of 11.7 (Table 2) and suggested high relative abundance.

Walleye captured in the gill net catch ranged in TL from 10 to 54 cm (3.9 to 21.3 in), had a PSD of 30 and a PSD-P of 1 (Table 1; Figure 3). The PSD was within the objective range 30-60; while, the PSD-P was below the objective range of 5-10 (Table 3). In 2015, approximately 21% of walleye captured in gill nets were above the 38-cm (15-in) minimum-length restriction and available for harvest on Lake Poinsett (Figure 3).

Relatively-strong walleye year classes have been produced in both stocked (e.g., 2009) and non-stocked (e.g., 2007 and 2008) years at Lake Poinsett (Table 4; Table 6;

Kaufman et. al 2013). In 2015, otoliths collected from a sub-sample of gill net captured walleye suggested the presence of six year-classes (2005, 2009, 2011-2012 and 2014-2015; Table 4). All year classes captured in the 2015 gill net survey coincide with fry stocking events (Table 4). The 2014 year class was the most abundant cohort in the gill net sample comprising 77% of walleye captured (Table 4).

In 2015 the mean fall night electrofishing CPUE of age-0 walleye was 1,722.0 (Table 1). The 2014 mean fall night electrofishing CPUE of age-0 walleye was 992.2 (Table 1) and indicated production of back-to-back strong year classes (Table 1; Table 2). The 2015 year class is naturally produced while the 2014 year class coincides with a fry stocking (Table 6). Stocked fry in 2014 were marked with Oxytetracycline (OTC) so that the contribution of stocked fish could be evaluated; the estimated stocking contribution was 26% (Table 4). While a combination of fry stocking and natural reproduction contributed to the large 2014 and 2015 year classes, recruitment is unknown and will be assessed in future surveys.

Walleye in Lake Poinsett typically attain quality length and the minimum length limit (38 cm; 15 in) by age 3 (Table 5). Since 2006, the weighted mean TL at capture for age-3 walleye has ranged from 361 to 480 mm (14.2 to 18.9 in; Table 5). Growth of the 2009-2011 year classes has been slower than was observed among year-classes produced from 2004-2008 (Table 5). The cause of decreased walleye growth is unknown but may be linked to increased relative abundance of individual year classes (Table 4) and/or decreased prey availability (e.g., white bass) since 2008. Gill net captured walleye had mean Wr values that ranged from 87 to 90 for all length categories (e.g., stock to quality) sampled, with the mean Wr of stock-length individuals being 88 (Table 1). No discernible length-related trends in condition were apparent.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 124.2 (Table 1) and above the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Since 2006, mean gill net CPUE values have ranged from a low of 5.7 (2006) to a high of 137.2 (2010; Table 2). Based on the 2015 gill net CPUE, relative abundance is considered high.

Gill net captured yellow perch ranged in TL from 14 to 32 cm (5.5 to 12.6 in), with PSD and PSD-P values of 92 and 14 (Table 1; Figure 4). Both the PSD and PSD-P were above management objectives of 30-60 and 5-10 (Table 3), respectively, indicating a population dominated by quality-length and larger yellow perch (>20 cm, 8 in).

Otoliths were collected from a sub-sample of gill net captured yellow perch; four consecutive year classes were present (2011-2014; Table 7). The 2012 and 2013 year classes were the most represented and collectively comprised 97% of yellow perch in the gill net catch (Table 7).

Yellow perch in Lake Poinsett typically surpass quality-length (20 cm; 8 in) by age 2 (Table 8). From 2009-2015, weighted mean TL at capture values for age-2 yellow perch ranged from 181 to 246 mm (7.1 to 9.7 in; Table 8). In 2015, the weighted mean TL at capture at age-2 was 225 mm (8.9 in; Table 8). Gill net captured yellow perch had high condition with mean Wr values that >104 for all length categories (e.g., stock to quality) sampled. The mean Wr of stock-length yellow perch was 110 (Table 1). An increasing trend in Wr was observed as TL increased.

Other Species

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 2.5 (2013; Table 2). In 2015, four channel catfish that ranged in TL from 28 to 76 cm (11.0 to 29.9 in) were captured by gill nets, which resulted in a mean gill net CPUE of 0.7 (Table 1). Although abundance is low the potential exists for anglers to catch 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 has generally been considered low, with mean gill net CPUE values ranging from 0.0 to 1.0 from 2003-2010 (Table 2). The mean gill net CPUE of stock-length northern pike increased substantially in 2011, with a mean gill net CPUE of 7.3 (Table 2). Since 2011, the mean gill net CPUE of stock-length northern pike has declined and no northern pike were captured in the 2015 gill net survey (Table 1). Relative abundance is considered low.

White Bass: In the 2015 gill net survey 13 white bass were captured that ranged in TL from 20 to 44 cm (7.9 to 17.3 in) and resulted in a mean gill net CPUE of 2.2 (Table 1). No age and growth information was available. The mean Wr of stock-length white bass was 102 (Table 1).

Other: Bigmouth buffalo, black bullhead, black crappie, common carp, shorthead redhorse, spottail shiner, white sucker and yellow bullhead were other fish species captured in low numbers during the 2015 survey (Table 1).

Bigmouth buffalo, common carp, and white bass are commonly harvested through a permit by commercial fisherman. No harvest occurred during the winter of 2014-15.

Management Recommendations

1) Conduct fish community assessment surveys utilizing gill nets on an annual basis (next survey scheduled in summer 2016) and utilizing frame nets every fourth year (next survey scheduled in summer 2018) 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) Conduct spring night electrofishing on a biennial basis (even years) to monitor smallmouth bass population parameters, when water conditions allow [i.e., water levels are high enough to inundate in shore habitat rock, rip-rap)].

4) Stock walleye (≈500 fry/acre) 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 sub-stock (< 25 cm (10 in) walleye and/or fall night electrofishing CPUE of age-0 walleye < 75 fish/hour].

5) 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).

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 in frame nets, gill nets and electrofishing in Lake Poinsett, 2015. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; CCF= channel catfish; COC= common carp; SHR= shorthead redhorse; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Gill nets								
BIB	0.3	0.3	50	50	50	50	100	32
BLB	3.2	3.3	95	9	26	18	93	4
BLC	2.0	1.4	58	27	0	---	113	2
CCF	0.7	0.5	75	59	75	59	110	12
COC	0.5	0.7	100	0	33	67	104	4
SHR	0.2	0.2	100	---	100	---	115	---
SPS[1]	0.7	1.0	0	---	0	---	---	---
WAE	15.3	5.4	30	8	1	2	88	0
WHB	2.2	1.2	62	25	23	22	102	2
WHS	3.0	1.8	94	10	78	18	101	5
YEB	0.3	0.5	100	0	100	0	97	5
YEP	124.2	21.6	92	2	14	2	110	1
Electrofishing								
WAE[2]	1,722.0	---	---	---	---	---	---	---

[1] All fish sizes

[2] 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, 2005-2014. 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

	CPUE									
Species	2006[4]	2007[4]	2008	2009	2010	2011	2012	2013	2014	2015
Frame nets										
BIB	---	---	0.0	1.8	0.4	---	0.0	4.2	0.5	---
BLB	---	---	0.6	0.3	0.2	---	79.7	4.4	10.2	---
BLC	---	---	0.0	0.0	0.1	---	4.5	0.4	1.5	---
BLG	---	---	0.0	0.0	0.0	---	0.1	0.0	0.0	---
CCF	---	---	0.7	0.1	0.4	---	0.8	0.2	0.0	---
COC	---	---	0.2	1.1	0.6	---	0.3	2.7	0.2	---
NOP	---	---	1.3	0.6	0.5	---	5.9	3.6	1.0	---
OSF [1]	---	---	0.0	0.0	0.0	---	0.0	0.0	0.0	---
SHR	---	---	0.1	0.1	0.0	---	0.2	0.1	0.0	---
SMB	---	---	4.3	0.3	1.7	---	2.2	1.2	1.4	---
WAE	---	---	1.4	4.1	0.3	---	4.0	1.4	2.4	---
WHB	---	---	0.7	0.6	0.1	---	3.1	0.4	0.8	---
WHS	---	---	1.4	2.4	0.7	---	1.1	0.2	0.4	---
YEB	---	---	0.0	0.0	0.0	---	19.3	2.7	6.3	---
YEP	---	---	2.3	0.4	22.4	---	0.6	0.1	0.1	---
Gill nets										
BIB	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.5	0.3
BLB	0.0	0.0	0.0	0.2	0.0	0.0	2.5	0.2	0.5	3.2
BLC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0
CCF	2.7	1.0	0.3	0.5	0.0	0.8	2.2	2.5	0.7	0.7
COC	0.8	1.0	0.0	0.0	0.3	0.3	2.8	1.3	0.8	0.5
NOP	0.7	0.8	0.5	0.0	1.0	7.3	2.0	1.3	1.2	0.0
OSF[1]	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
SHR	0.3	0.3	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2
SMB	0.7	1.8	0.2	0.2	0.2	0.3	1.3	1.3	0.7	0.0
SPS[1]	0.0	0.0	0.2	2.0	4.7	0.0	0.0	0.5	8.8	0.7
WAE	5.0	6.3	5.7	16.0	10.0	27.7	12.5	6.7	11.7	15.3
WHB	11.7	10.0	3.2	3.5	3.5	1.3	2.2	0.8	0.8	2.2
WHS	1.5	1.2	0.5	0.2	2.7	2.7	2.3	4.3	3.5	3.0
YEB	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.3	0.0	0.3
YEP	5.7	6.2	16.0	13.2	137.2	22.0	22.0	15.0	40.5	124.2
Electrofishing										
SMB[2]	---	---	---	---	19.6	---	30.6	---	---	---
WAE[3]	117.0	79.8	19.5	257.2	0.0	4.0	305.0	2.0	992.2	1,722.0

[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, 2006-2015. BLB= black bullhead; SMB= smallmouth bass; WAE= walleye; YEP= yellow perch

Species	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013	2014	2015	Objective
Gill nets											
WAE											
CPUE	5	6	6	16	10	28	13	7	12	15	≥ 10
PSD	63	42	59	17	32	16	57	48	44	30	30-60
PSD-P	23	18	12	2	2	5	4	8	4	1	5-10
Wr	85	89	88	90	94	85	82	85	90	88	---
YEP											
CPUE	6	6	16	13	137	22	22	15	41	124	≥ 30
PSD	100	32	17	27	9	93	83	81	26	92	30-60
PSD-P	38	22	16	15	3	5	55	23	11	14	5-10
Wr	105	107	105	106	106	107	107	110	114	110	---
Electrofishing											
SMB[2]											
CPUE	---	---	---	---	20	---	31	---	---	---	---
PSD	---	---	---	---	45	---	13	---	---	---	40-70
PSD-P	---	---	---	---	30	---	6	---	---	---	10-40
Wr	---	---	---	---	116	---	99	---	---	---	---

[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 (# stocked x 10,000) from Lake Poinsett, 2011-2015.

	Year Class												
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2015	1	97		12	8		7				1		
2014	---		1	12	32	2	22	1					
2013	---	---			8	12	18	1	1	1			
2012	---	---	---		12	1	68	2	2	1			1
2011	---	---	---	---			145	7	8	3	2		1
# stocked													
fry		400[1]		400	300[2]		400[3]			805	1170		1052
sm. fingerling													
lg. fingerling													

[1] 50% of stocked walleye were OTC marked; 7 of 52 otoliths collected from fall electrofished age-0 walleye exhibited marks for an estimated stocking contribution of 26%.
[2] 50% of stocked walleye were OTC marked; only three age-0 walleye were collected during fall electrofishing. All exhibited marks.
[3] Stocked walleye were OTC marked; 8 of 50 otoliths collected from fall electrofished age-0 walleye exhibited marks for an estimated stocking contribution of 16%. However, it was noted that extensive cracking through the focus of examined otoliths likely influenced mark visibility; therefore, the stocking contribution may have been higher.

Table 5. Weighted mean TL at capture (mm) for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Poinsett, 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	254(97)	---	408(12)	451(8)	---	463(7)	---	---	---	540(1)
2014	264(1)	317(12)	361(32)	421(2)	458(22)	581(1)	---	---	---	---
2013	---	280(8)	370(12)	409(18)	528(1)	556(1)	623(1)	---	---	---
2012	205(12)	307(1)	394(68)	477(2)	508(2)	577(1)	---	---	706(1)	---
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)	---

[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, 2003-2015. 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
2012	WAE	fry	4,000,000
2014	WAE	fry	4,000,000

Table 7. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Lake Poinsett, 2009-2015.

	Year Class										
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
2015		16	570	146	13						
2014	---		140	55	41	2	8				
2013	---	---		8	56	7	19				
2012	---	---	---		23	11	98				
2011	---	---	---	---		6	126				
2010	---	---	---	---	---		761	47	14	2	
2009	---	---	---	---	---	---		59	19	1	1

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

	Age				
Year	1	2	3	4	5
2015	153(16)	225(570)	252(146)	296(13)	---
2014	154(140)	181(55)	245(41)	237(2)	306(8)
2013	147(8)	214(56)	246(7)	277(19)	---
2012	156(23)	226(11)	259(98)	---	---
2011	156(6)	228(126)	---	---	---
2010	167(761)	239(47)	281(14)	328(2)	---
2009	147(59)	246(19)	313(1)	325(1)	---

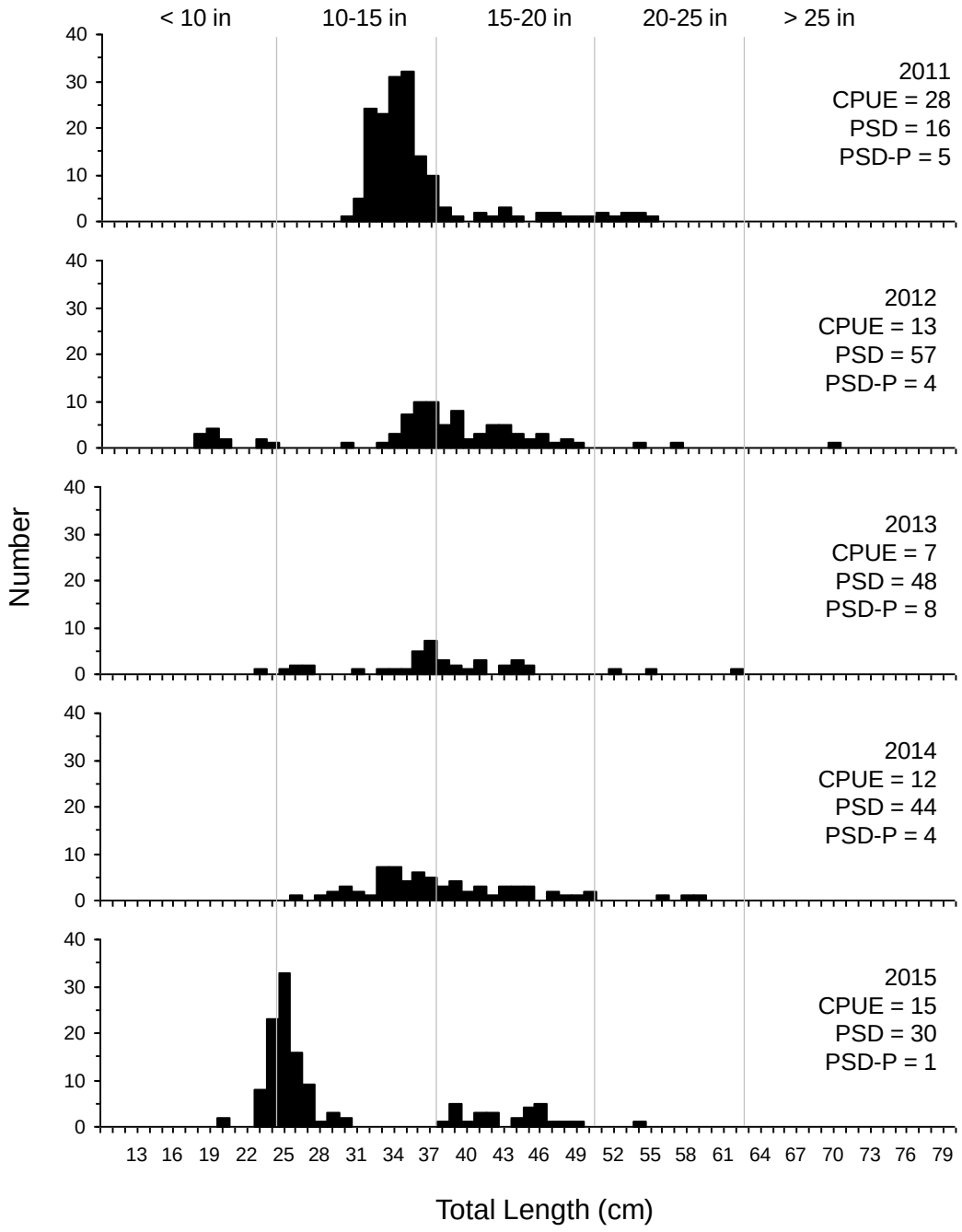

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Lake Poinsett, 2011-2015.

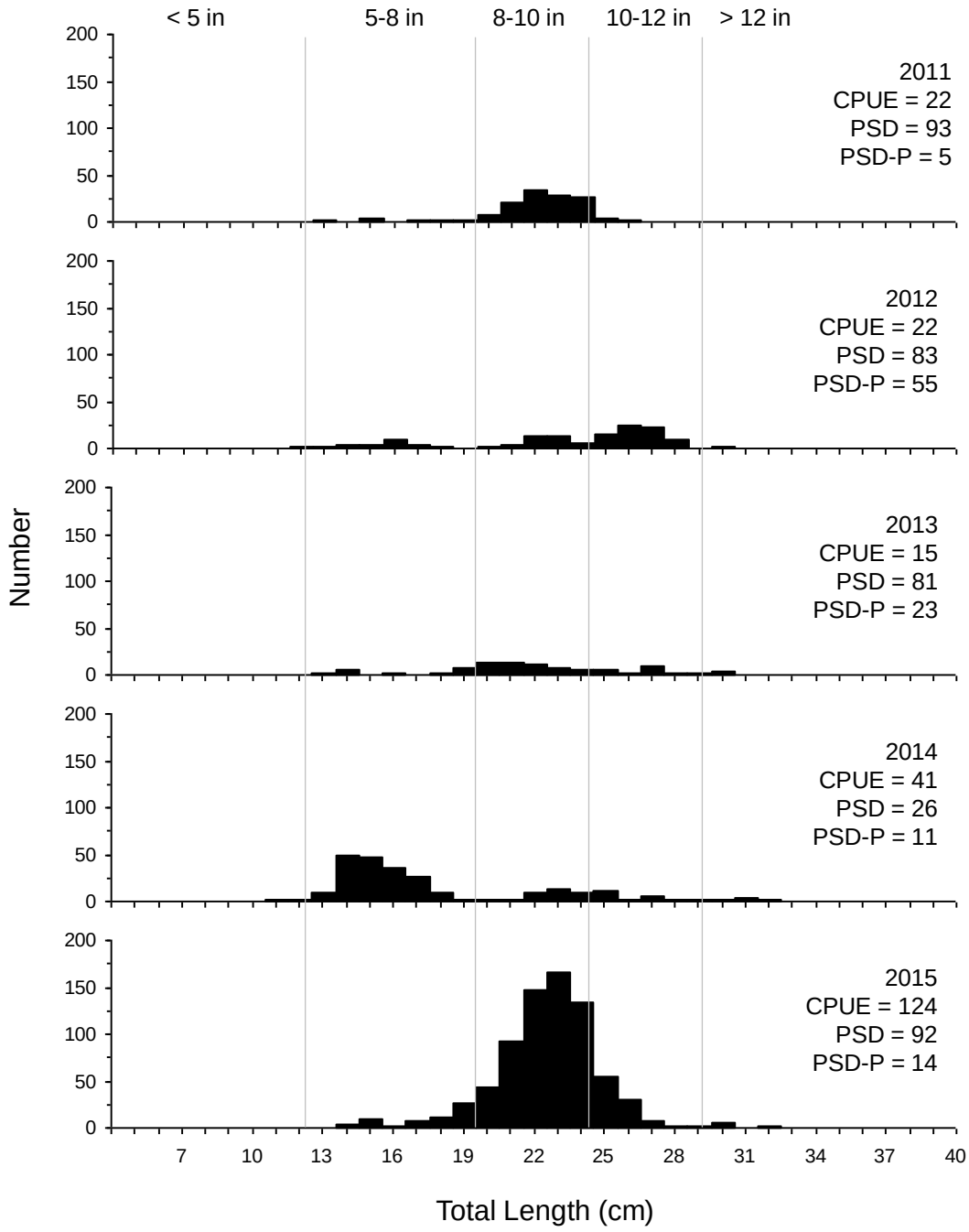

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Lake Poinsett, 2011-2015.