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 21-23, 2009 (FN, GN) September 15, 2009 (EF-WAE)
Gill net sets (n)	6
Frame net sets (n)	18
Fall electrofishing (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 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

The Lake Poinsett watershed is comprised of a mix of cropland (70%), pasture or grassland (25%), and wooded shelterbelts (5%).

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 2.7 ft during the spring of 2009. On April 5 and October 7, 2009 the elevations of Lake Poinsett were 1650.3 and 1651.4 fmsl, respectively.

Aquatic Nuisance Species Monitoring

Plant Survey

Lake Poinsett is a windswept basin and traditionally little submergent and emergent vegetation has been present. However, in recent years Lake Poinsett has become heavily vegetated. In 2009, a dense ring of sago pondweed was present around nearly the entire shoreline. Chara (a macro algae) was also sampled. No aquatic nuisance plant species were encountered.

Macro-Invertebrate/Mussel Survey

No aquatic nuisance macro-invertebrate or mussel species were sampled in 2009.

Fish Community Survey

Common carp was the only aquatic nuisance fish species captured during the 2009 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, northern pike, shorthead redhorse, spottail shiner, white bass, white sucker
Lake-specific regulations	NE Panfish Management Area: 10 daily; 50 possession Walleye/Saugeye: minimum length 14"
Management classification	warm-water semi permanent
Fish Consumption Advisories	none

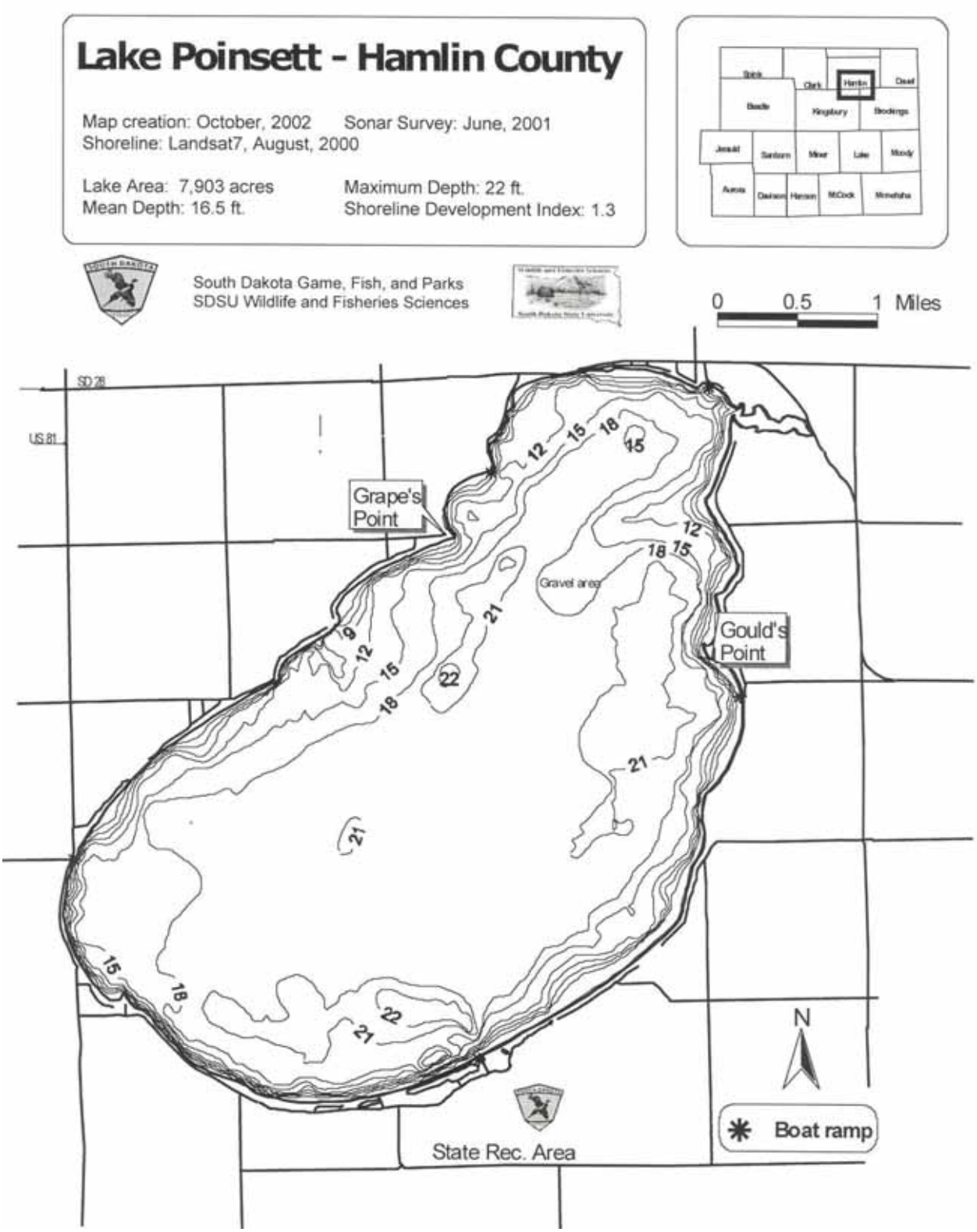

Figure 1. Lake Poinsett contour map.

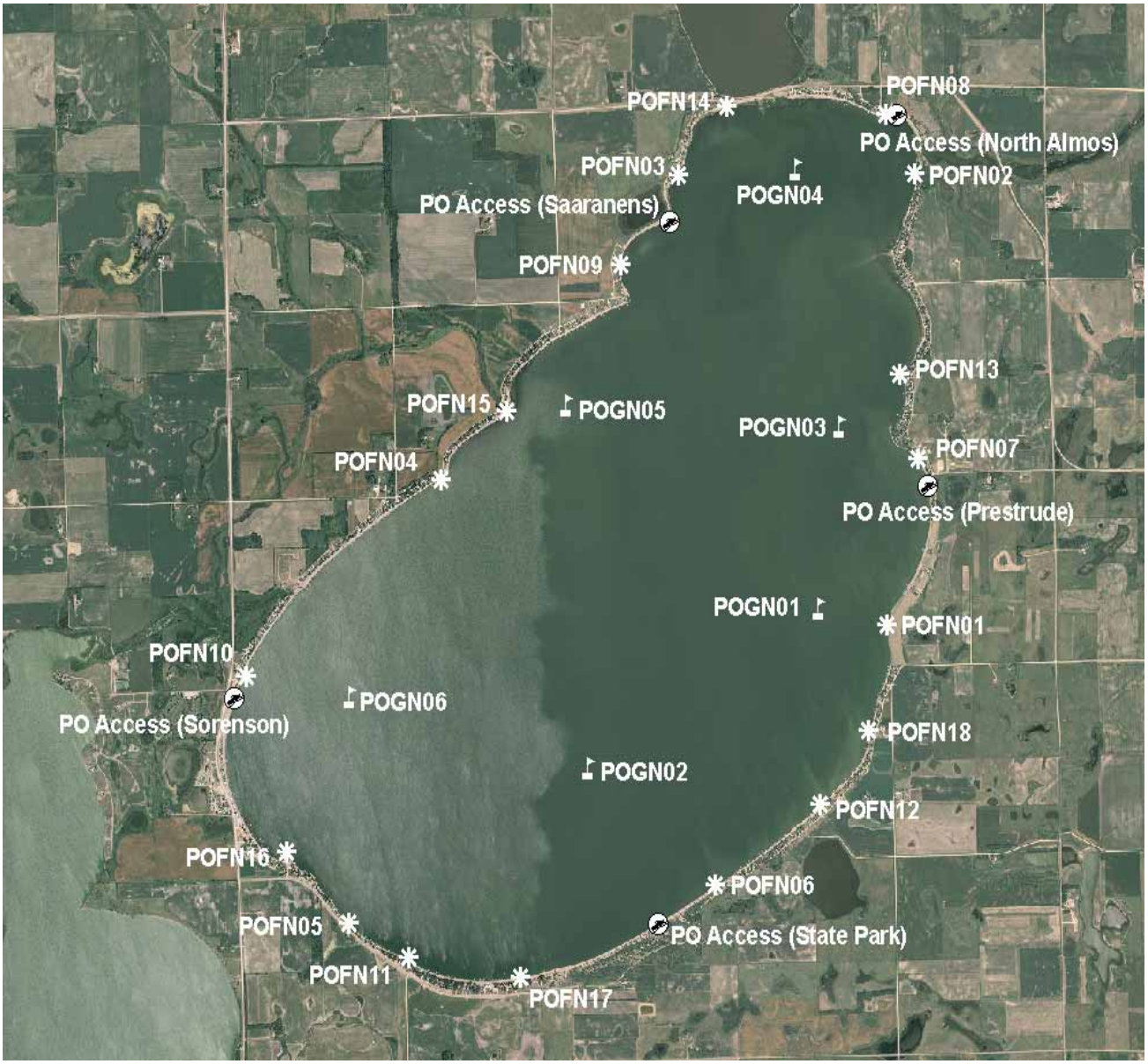

Figure 2. Map depicting access sites and standardized net locations for Lake Poinsett, Hamlin County, South Dakota. POFN= frame nets, POGN= gill nets

Management Objectives

1) Maintain a moderate density smallmouth bass population with a PSD of 40-70, and a PSD-P of 10-20.

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.

Primary Species

Smallmouth bass: Fall night-time electrofishing for age-0 walleye and smallmouth bass has been conducted on Lake Poinsett annually. However, recent research in NE South Dakota found that spring night electrofishing over suitable habitat (i.e., rocky substrate) provides a better index to smallmouth bass populations in NE South Dakota glacial lakes (Bacula, 2009). Spring night electrofishing will be conducted during future surveys. However, since no spring night electrofishing was conducted in 2009, all comparisons will utilize frame net and fall night electrofishing data.

The mean frame net CPUE in Lake Poinsett in 2009 was 0.3, which is a substantial decrease from the 4.3 observed in 2008 (Tables 1-2). Due to the low water level frame nets were not utilized from 2006-2007. The mean fall electrofishing CPUE was 4.0 (Table 1). Few inferences can made concerning the size structure, growth, and condition due to low sample size.

Anecdotal reports from anglers indicate smallmouth bass provide an important sport fishery within Lake Poinsett.

Walleye: The mean gill net CPUE of stock-length walleye in 2009 was 16.0 and is above the minimum objective (≥10 stock-length fish/net night) for walleye in Lake Poinsett. The 2009 gill net CPUE was substantially higher than the 5.7 observed in 2008 and above the average of 6.6 from 2002-2009 (Table 2). Relative abundance is considered to be high. Walleye captured in gill nets during 2009 ranged in total length from 23 to 58 cm (9.1 to 22.8 inches), had a PSD of 17, and a PSD-P of 2 (Table 1; Figure 3). The PSD and PSD-P were both below the objective ranges (30-60 and 5-10, respectively) indicating a population dominated by stock- to quality-length walleye. In 2009, approximately 16% of walleye captured in gill nets were above the 381 mm (15 inch) minimum-length restriction enforced on Lake Poinsett (Figure 3).

During the mid to late 1990's, the walleye population in Lake Poinsett was considered to be largely self-sustaining, exhibiting relatively consistent recruitment and high relative abundance (Ermer et al. 2005). However, limited recruitment in 2000-2002 resulted in decreased relative abundance. Relative abundance of walleye remained at moderate-low levels from 2002-2008 (Tables 2-3). Recent recruitment of two year-classes resulted in an increase in gill net CPUE and decrease of PSD and PSD-P. The 2007-2008 year classes comprised 92% of all walleyes captured in the 2009 gill net survey (Table 7). Natural reproduction appears to have improved since 2002 with 93% off all walleye sampled in the 2009 gill nets coinciding with non-stocked years (Table 7).

Fall night electrofishing in 2009 for young of the year walleye resulted in CPUE of 257.2 indicating a strong year-class was present that coincides with a fry stocking in 2009 (Table 1). Fall night electrofishing since 2003 has indicated moderate to strong year classes (> 75 age-0 walleye/hour) in five of the seven years sampled (Table 2).

Walleye growth rates remained similar in Lake Poinsett from 2005-2009 (Table 5). The weighted mean length at capture for gill net captured age-2 and age-3 walleye in 2009 was 358 and 468 mm (14.1 and 18.4 inches), respectively (Table 5). Given current growth rates, walleyes reach the 381-mm (15-inch) minimum length beginning at age-3. Mean Wr values ranged from 89 to 91 for all length categories with a mean Wr for all lengths being 90 (Table 1). No length related trends in Wr were observed in 2009.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch in 2009 was 13.2 and below the minimum objective (≥ 25 fish/net night; Table 1). Since 2002, the gill net CPUE of stock-length yellow perch has fluctuated between 0.8 (2005) and 21.3 (2002; Table 2). Yellow perch relative abundance has declined from moderate to low levels in recent years, likely due to declining water levels limiting recruitment. However, an increase in mean gill net CPUE from 6.2 in 2007 to 16.0 in 2008 and13.2 in 2009 may indicate improved recruitment potentially related to an increase in the water level from 2007-2009 (Table 2). Relative abundance in 2009 is considered to be moderate (8-30 stock-length yellow perch/net).

Sampled yellow perch ranged in total length from 11 to 32 cm (4.3 to 12.6 inches), had a PSD of 27, and a PSD-P of 15 (Table 1; Figure 4). The PSD for yellow perch in Lake Poinsett in 2009 was slightly below the management objective while the PSD-P was slightly above the management objective indicating a slightly lower proportion of quality- to preferred-length fish in the population.

Otoliths were collected from a sub-sample of gill net captured yellow perch in 2009. Growth was good with weighted mean total length at capture of age-1 male and female perch being 144 and 147 mm (5.7 and 5.8 in), respectively (Table 8). Gill net sampled yellow perch had mean Wr values that ranged from 102 to 108 for all length categories sampled and had a mean Wr for all lengths of 106 (Table 1). No length-related trends in mean Wr values were apparent during the 2009 survey.

Other Species

Black bullhead: Black bullhead abundance has been typically assessed using frame nets in Lake Poinsett; however, due to low water levels no frame nets were used in the 2006-2007 fish population assessment. The 2009 mean frame net CPUE for black bullheads was 0.3 (Table1). Black bullhead relative abundance appears to be low and has declined since 2002. Condition of stock-length black bullheads in the 2009 frame net catch was good with a mean Wr value of 102 (Table 1).

Channel catfish: Three channel catfish were caught in 2009 resulting in a mean gill net CPUE of 0.5 (Table 1). Channel catfish in Lake Poinsett have generally been considered to be present at a low density with the 2002-2009 mean gill net CPUE of stock-length fish being 1.5 (Table 2). Channel catfish abundance remains low.

Although abundance is low the potential exists for anglers to catch trophy channel catfish in Lake Poinsett. Channel catfish collected in gill nets from Lake Poinsett ranged in total length from 56 to 89 cm (22.0 to 35.0 inches) had a PSD of 100 and a PSD-P of 67 (Table 1). The high PSD and PSD-P values may indicate a lack of young fish in the population or sampling gear bias. Channel catfish condition was good with the mean Wr value for stock-length fish being 108 (Table 1). No growth information was available.

Northern Pike: Northern pike typically are not sampled effectively during mid-summer fish community assessments. No northern pike were captured in the 2009 gill nets. Abundance of northern pike in Lake Poinsett has generally been considered low, based on the 2002-2009 mean gill net CPUE of stock-length fish of 0.4 (Table 2).

White bass: The mean gill net CPUE of stock-length white bass in Lake Poinsett during 2009 was 3.5 (Table 1). White bass have generally been considered to be present at a moderate-high density with 2002-2009 mean gill net CPUE for stock-length fish being 13.1 (Table 2). However, relative abundance has declined since 2008 likely due to poor recruitment in recent years and poor representation of the strong 2005 cohort in the sampling gear.

White bass collected from Lake Poinsett in 2009 ranged in total length from 37 to 44 cm (14.6 to 17.3 inches; Figure 5). The PSD and PSD-P were 100 for white bass captured in gill nets (Table 1).

White bass captured in gill nets in 2009 were aged using otoliths. Two year-classes, from 2000-2001, were observed. Age-8 and age-9 white bass had a weighted mean length at capture of 399 and 416 mm (15.7 and 16.4 in), respectively. Condition of stock-length white bass was excellent with a mean Wr of 110. No length related trends in Wr were apparent in the 2009 sample.

White bass are commonly harvested on Lake Poinsett by commercial fisherman. Commercial harvest is limited by an annual quota of 30,000 lbs. During the 2008-2009 winter commercial fisherman harvested approximately 600 lb of white bass from Lake Poinsett.

Other: Bigmouth buffalo, common carp, shorthead redhorse, spottail shiner, and white sucker were other fish species captured during the 2009 survey. Abundance of shorthead redhorse and white suckers is believed to be low in Lake Poinsett and their impact on the fishery is likely minimal (Table 1; Table 2). Relative abundance of spottail shiners is unknown because our current sampling methods do not effectively target shiners.

Bigmouth buffalo and common carp are commonly harvested through a permit by commercial fisherman during the ice-covered season. In the winter of 2008-2009 500 lb of bigmouth buffalo and no common carp were reported harvested by commercial fisherman. Bigmouth buffalo and common carp are not effectively sampled using standard lake survey methods; therefore relative abundance is difficult to assess. Both species are commonly sampled in relatively low abundance during the typical fish community survey (Table 1; Table 2).

Management Recommendations

1) Conduct fish community assessment surveys utilizing gill nets and frame nets on an annual basis (next survey scheduled in summer 2010) to monitor fish abundance, fish population size structures, fish growth, and stocking success.

2) Conduct fall night electrofishing on an annual basis to monitor walleye young-of-the-year abundance.

3) Stock walleye (1,000 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 < 250 mm (10 inch) walleye and/or fall night electrofishing CPUE of age-0 walleye < 75 fish/hour).

4) Evaluate black bass and walleye population dynamics and implement regulations to benefit the population and comply with tool box options.

5) Conduct spring night electrofishing on a biennial basis to monitor smallmouth bass abundance, population size structure and fish growth.

6) Encourage commercial harvest of black bullhead to limit abundance if the abundance exceeds the management objective. At the time of this survey, the abundance of black bullhead in Lake Poinsett did not necessitate the need for commercial harvest.

7) Monitor commercial harvest of bigmouth buffalo, common carp, and white bass.

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, 2008. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BIB= bigmouth buffalo; BLB= black bullhead; CCF= channel catfish; COC= common carp; NOP= northern pike; SHR= shorthead redhorse; SMB= smallmouth bass; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Frame nets								
BIB	1.8	0.6	72	13	72	13	90	4
BLB	0.3	0.2	33	43	33	43	102	7
CCF	0.1	0.2	100	0	50	50	135	---
COC	1.1	0.4	95	5	68	19	97	4
NOP	0.6	0.2	100	0	20	24	87	4
SHR	0.1	<0.1	100	---	100	---	106	---
SMB	0.3	0.2	60	40	40	52	117	9
WAE	4.1	1.3	22	8	11	6	89	1
WHB	0.6	0.3	91	9	82	18	105	3
WHS	2.4	1.5	100	0	100	0	101	3
YEP	0.4	0.3	43	39	29	35	107	9
Gill nets								
BLB	0.2	0.2	100	---	0	---	115	---
CCF	0.5	0.3	100	0	67	33	108	10
SHR	0.2	0.2	100	---	100	---	135	---
SMB	0.2	0.2	100	---	100	---	115	---
SPS[1]	2.0	1.3	---	---	---	---	---	---
WAE	16.0	3.5	17	6	2	3	90	1
WHB	3.5	1.9	100	0	100	0	110	2
WHS	0.2	0.2	100	---	100	---	114	---
YEP	13.2	2.5	27	8	15	7	106	1
Electrofishing								
SMB[2]	4.0	2.9	0	---	0	---	121	5
WAE [2] (age-0)	257.2[3]	---	---	---	---	---	---	---

[1] All fish sizes.
[2] Fall electrofishing-WAE.
[3] Catch rate (CPUE) represents age-0 walleye/hour, not stock-length 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, 2002-2009. BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; GSF= green sunfish; NOP= northern pike; OSF= orangespotted sunfish; SHR= shorthead redhorse; SMB= smallmouth bass; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHC= white crappie; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

	CPUE								
Species	2002	2003	2004	2005	2006[3]	2007[3]	2008	2009	Average
Frame nets									
BIB	0.3	0.4	1.5	0.1	---	---	0.0	1.8	0.7
BLB	334.3	170.7	0.7	0.2	---	---	0.6	0.3	84.5
BLC	0.4	0.0	0.1	0.0	---	---	0.0	0.0	0.1
BLG	0.0	0.0	0.1	0.0	---	---	0.0	0.0	0.0
CCF	0.1	0.0	0.0	1.6	---	---	0.7	0.1	0.4
COC	0.2	0.1	0.1	0.0	---	---	0.2	1.1	0.3
GSF [1]	0.0	0.0	0.0	0.0	---	---	0.0	0.0	0.0
NOP	1.6	1.3	0.2	1.0	---	---	1.3	0.6	1.0
OSF [1]	0.0	0.0	0.0	0.1	---	---	0.0	0.0	0.0
SHR	0.1	0.0	0.2	0.0	---	---	0.1	0.1	0.1
SMB	2.1	1.2	1.1	0.0	---	---	4.3	0.3	1.5
WAE	1.8	0.9	0.1	0.1	---	---	1.4	4.1	1.4
WHB	7.7	0.7	2.5	0.0	---	---	0.7	0.6	2.0
WHS	0.9	1.1	1.9	0.5	---	---	1.4	2.4	1.4
YEB	0.1	0.1	0.0	0.0	---	---	0.0	0.0	0.0
YEP	0.1	0.0	0.3	4.3	---	---	2.3	0.4	1.2
Gill nets									
BIB	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.1
BLB	65.2	14.8	0.0	0.2	0.0	0.0	0.0	0.2	10.1
CCF	2.3	3.2	1.0	1.2	2.7	1.0	0.3	0.5	1.5
COC	0.0	0.0	0.0	0.2	0.8	1.0	0.0	0.0	0.3
NOP	0.3	0.7	0.3	0.0	0.7	0.8	0.5	0.0	0.4
SHR	0.0	0.0	0.0	0.2	0.3	0.3	0.0	0.2	0.1
SMB	0.8	0.7	0.8	0.8	0.7	1.8	0.2	0.2	0.8
SPS [1]	0.0	0.2	0.0	0.0	0.0	0.0	0.2	2.0	0.3
WAE	4.3	3.8	3.0	8.3	5.0	6.3	5.7	16.0	6.6
WHB	18.8	17.3	25.5	15.0	11.7	10.0	3.2	3.5	13.1
WHS	2.5	1.8	1.2	2.0	1.5	1.2	0.5	0.2	1.4
YEP	21.3	8.5	11.5	0.8	5.7	6.2	16.0	13.2	10.4
Electrofishing									
WAE [2] (age-0)	---	706.1[4]	31.1[4]	97.5[4]	117.0[4]	79.8[4]	19.5[4]	257.2[4]	186.9[4]

[1] All fish sizes.
[2] Fall electrofishing-WAE.
[3] Monofilament gill net mesh size (.75", 1", 1.25", 1.5", 2" and 2.5").
[4] Catch rate (CPUE) represents age-0 walleye/hour, not stock-length walleye/hour.

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, 2002-2009. BLB= black bullhead; WAE= walleye; WHB= white bass; YEP= yellow perch

Species	2002	2003	2004	2005	2006[1]	2007[1]	2008	2009	Average	Objective
Frame nets										
BLB										
CPUE	334	171	1	< 1	---	---	1	<1	85	≤ 100
PSD	9	99	100	100	---	---	100	33	74	---
PSD-P	0	1	100	100	---	---	100	33	56	---
Wr	97	94	102	101	---	---	90	102	98	---
Gill nets										
WAE										
CPUE	4	4	3	8	5	6	6	16	7	≥ 10
PSD	58	48	72	72	63	42	59	17	54	30-60
PSD-P	8	0	6	10	23	18	12	2	10	5-10
Wr	89	88	99	97	85	89	88	90	91	---
WHB										
CPUE	19	17	26	15	12	10	3	4	13	---
PSD	99	100	100	100	91	100	100	100	99	---
PSD-P	99	100	100	100	91	100	100	100	99	---
Wr	94	104	109	109	106	105	102	110	105	---
YEP										
CPUE	21	9	12	1	6	6	16	13	11	≥ 30
PSD	78	100	77	60	100	32	17	27	61	30-60
PSD-P	48	92	75	60	38	22	16	15	46	5-10
Wr	22	119	119	105	105	107	105	106	99	---

[1] 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-0 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Poinsett, 2005-2009. 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
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, 1996 - 2007. 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

Table 7. 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, 2005-2009.

	Year Class												
Survey Year	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
2009		47	44	2	3	1	1	1					
2008	---		21	14	4	3	4			1			
2007[1,2]	---	---		9	19	1	6		1				
2006[1,2]	---	---	---		39	1	12		2		1		1
2005[1]	---	---	---	---	2	3	37	1		2	3	1	
# stocked													
fry	400			805	1,170		1,052						
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 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.

	Age					
Year	0	1	2	3	4	5
2009						
Male	---	144 (14)	220 (1)	---	---	---
Female	---	147 (44)	247 (18)	313 (1)	325 (1)	---
Combined		147 (59)	246 (19)	313 (1)	325 (1)	---

Table 9. Year class distribution based on the age/length summary for yellow perch sampled in gill nets from Lake Poinsett, 2009.

	Year Class					
Survey Year	2009	2008	2007	2006	2005	2004
2009		59	19	1	1	

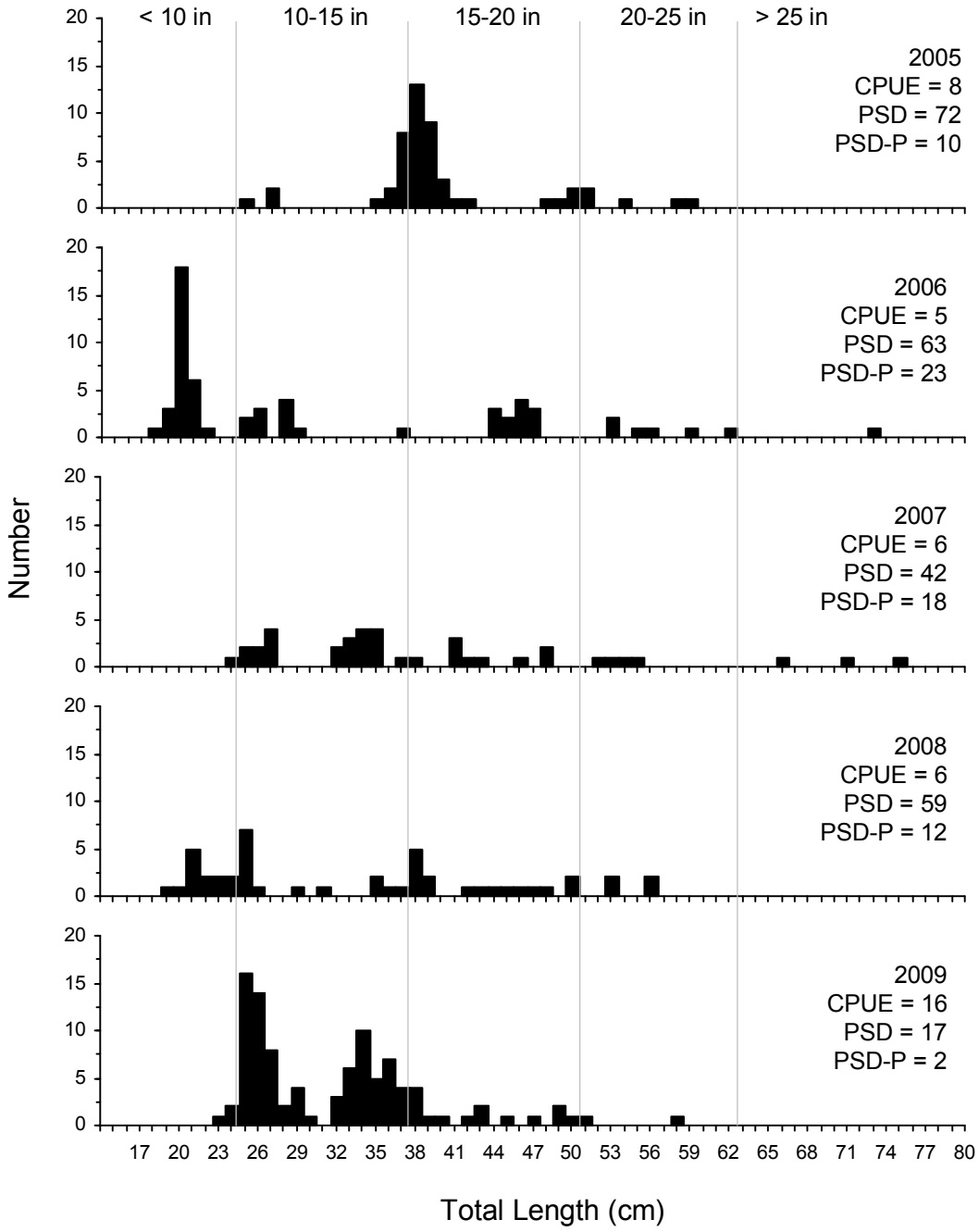

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Lake Poinsett, 2005-2009.

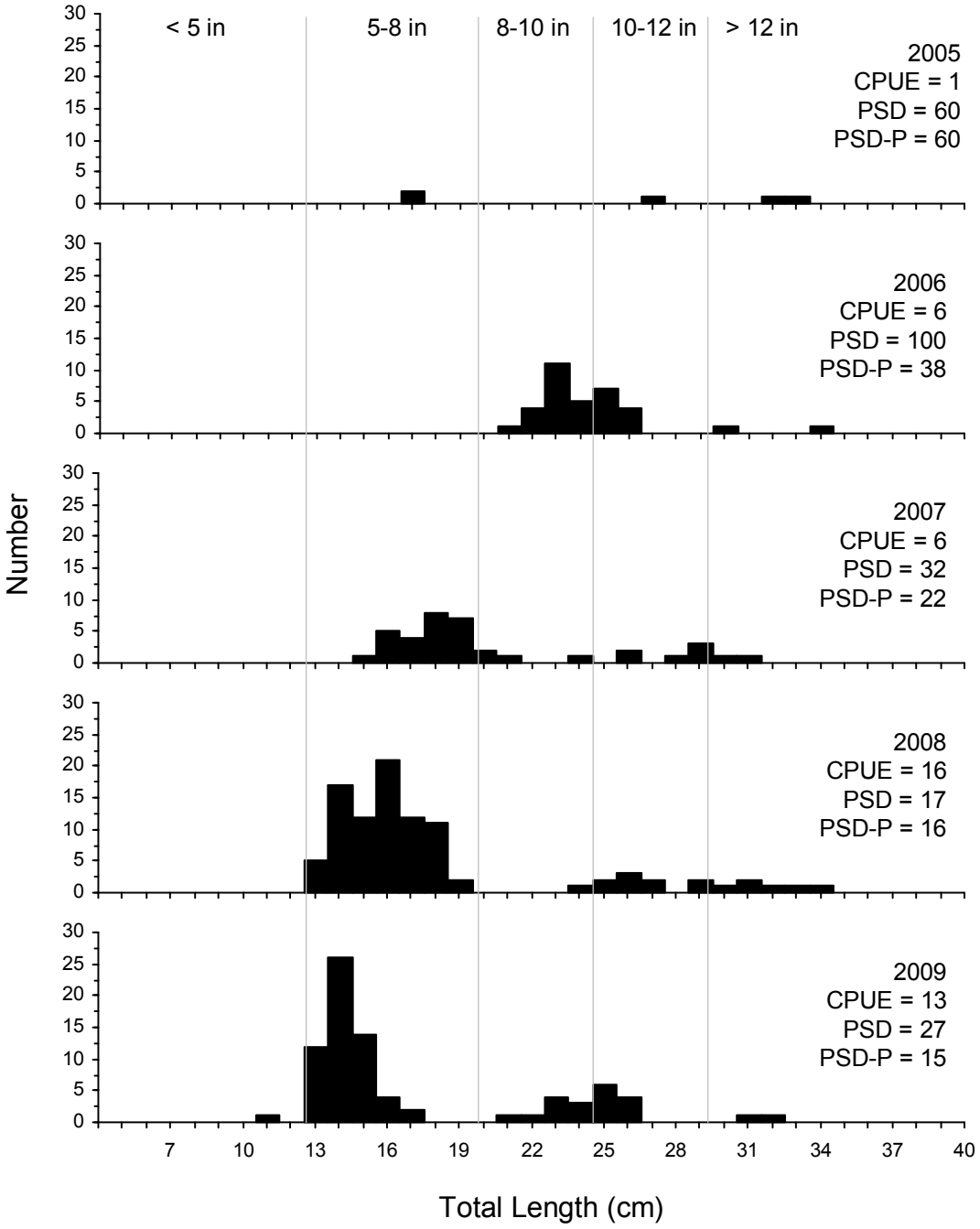

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Lake Poinsett, 2005-2009.

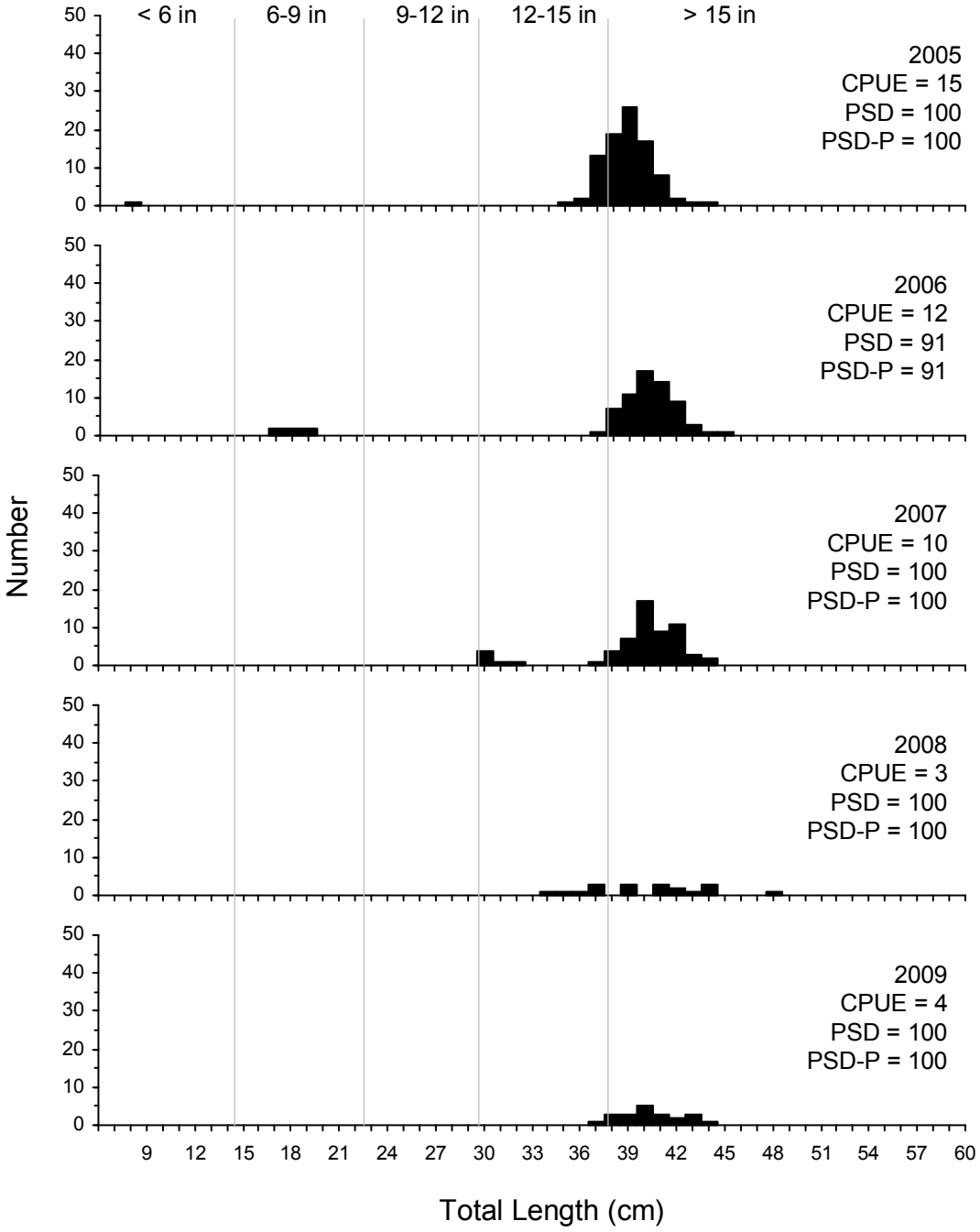

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for white bass captured using experimental gill nets in Lake Poinsett, 2005-2009.