Waubay Lake

Site Description

Location

Water designation number (WDN)	22-0031-00
Legal description	T122N-R54 W-Sec. 4-6; T122N-R55W-Sec. 1-5, 7-10, 15-19 T123N-R53W-Sec. 17,20; T123N-R54W-Sec. 7, 18-20, 29-32 T123N-R55W-Sec. 12-14, 23-28, 31-36
County (ies)	Day
Location from nearest town	Southeast of Grenville, SD.

Survey Dates and Sampling Information

Survey dates	May 28, 2013 (EF-SMB) August 13-16, 2013 (FN, GN) September 10, 2013 (EF-WAE)
Spring electrofishing-SMB (min)	30
Frame net sets (n)	31
Gill net sets (n)	8
Fall electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	186,967
Surface area (acres)	≈15,540
Maximum depth (ft)	≈31
Mean depth (ft)	13

Ownership and Public Access

Waubay Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. Eight public access sites are present on Waubay Lake (Figure 1). Two (Kanago and Grenville) are maintained by the SDGFP, and six (Buster's, West Bay Ranch, Breske's Bay, Vic's Landing, Wika's Access, and Buckshot) are privately maintained and require a fee or donation for access (Figure 1; Figure 2). Lands adjacent to Waubay Lake are under mixed ownership by the State of South Dakota, private parties, and the U.S. Fish and Wildlife Service (i.e., Waubay National Wildlife Refuge).

Watershed and Land Use

Land use within the Waubay Lake watershed is primarily agricultural including cropland, pasture or grassland, and small wooded areas (e.g., shelterbelts).

Water Level Observations

The South Dakota Water Management Board established OHWM on Waubay Lake of 1787.0 fmsl is below the current water elevation. On May 21, 2013 the elevation was 1803.1 fmsl; 0.5 ft above the fall 2012 elevation of 1802.6 fmsl. By October 8, 2013 the water level had declined to an elevation of 1802.5 fmsl.

Fish Management Information

Primary species	Smallmouth Bass, Walleye, Yellow Perch
Other species	Black Bullhead, Black Crappie, Bluegill, Common Carp, Lake Herring, Northern Pike, Rock Bass, Spottail Shiner, White Bass, White Sucker
Lake-specific regulations	Smallmouth/Largemouth bass daily limit of 5. Only those less than 14", or 18" and longer may be taken. Of those no more than one may be 18" or longer.
Management classification	warmwater semi-permanent

Fish consumption advisories	none

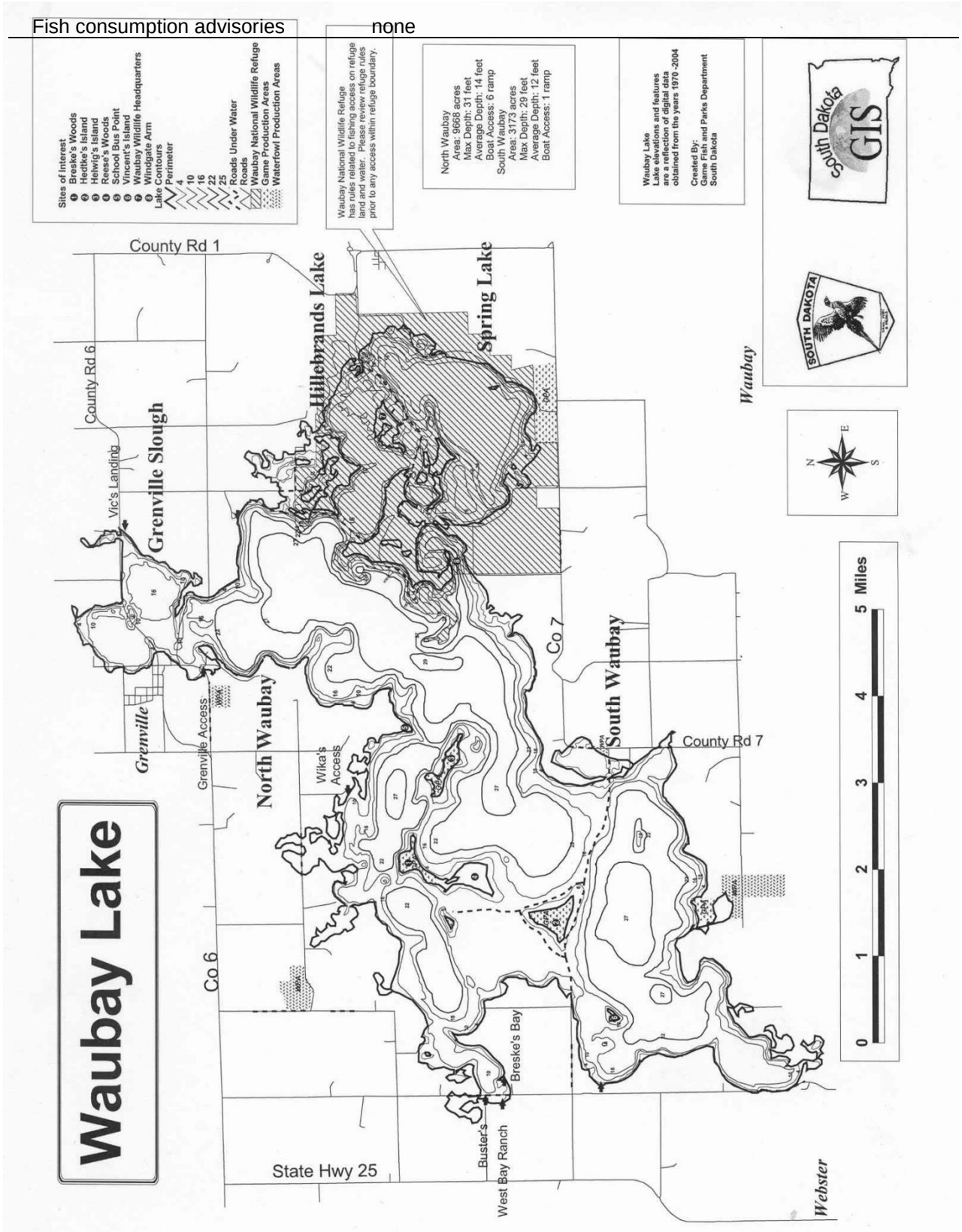

Figure 1. Map depicting access locations and depth contours for Waubay Lake, Day County, South Dakota.

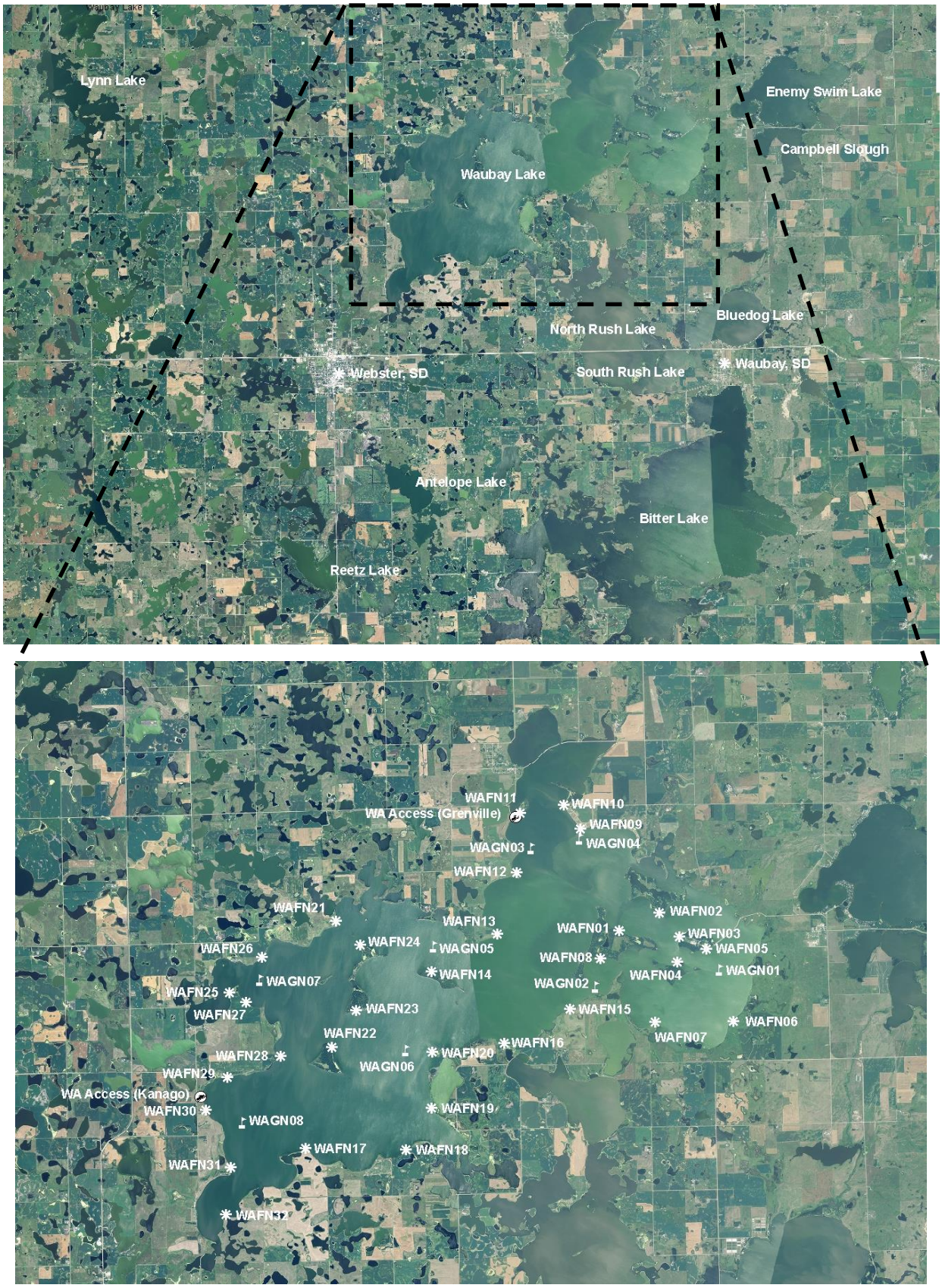

Figure 2. Map depicting geographic location of several Day County, South Dakota lakes including Waubay Lake (top). Also noted are state-owned public access locations and standardized net locations for Waubay Lake (bottom). WAFN= frame nets; WAGN= gill nets

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

Waubay Lake is a meandered lake located in Day County, South Dakota, and is comprised of four previously distinct water bodies (North Waubay, South Waubay, Spring Lake, and Hillebrands). High water conditions since the mid-1990s have connected these four lakes and formed a single waterbody (Waubay Lake). Currently, the surface area of Waubay Lake exceeds 15,000 acres and has a maximum depth of >31 ft. A portion of Waubay Lake is located within the boundaries of the Waubay National Wildlife Refuge (Figure 1). Neither boating nor fishing is allowed within the refuge boundaries during open-water periods; however, fishing is allowed during the winter months.

Currently, Waubay Lake is primarily managed as a Smallmouth Bass, Walleye, and Yellow Perch fishery; however, Northern Pike and White Bass are important components of the fishery. Overall, as many as 13 fish species have been collected from Waubay Lake (Table 2).

Primary Species

Smallmouth Bass: The spring night electrofishing CPUE of stock-length Smallmouth Bass was 98.0 (Table 1). The 2013 spring night electrofishing CPUE represented a substantial increase from the 2009 CPUE of 40.4 (Table 2). Sampled Smallmouth Bass ranged in TL from 19 to 45 cm (7.5 to 17.7 in.; Figure 3), had a PSD of 53 and PSD-P of 18 (Table 1). Both the PSD and PSD-P were within the management objective ranges of 40-70 and 10-40, respectively (Table 3).

Scales were collected from a sub-sample of spring electrofished Smallmouth Bass. Age structure information suggested consistent recruitment, with seven consecutive year classes (2005-2011) represented (Table 4). Cohorts produced in 2009 and 2010 were the most abundant and collectively comprised 70% of Smallmouth Bass in the electrofishing catch (Table 4).

The mean back-calculated length of age-3 and age-4 Smallmouth Bass was 289 and 345 mm (11.4 and 13.6 in.); compared to the region IV mean of means of 249 and

316 mm (9.8 and 12.4 in; Willis et al. 2001; Table 4). An increasing trend in Smallmouth Bass condition was apparent as TL increased. Mean Wr values ranged from 84 to 102 for all length categories (e.g., stock to quality) sampled, with the mean Wr of stock-length Smallmouth Bass being 89 (Table 1).

Walleye: The mean gill net CPUE of stock-length Walleye was 11.8 (Table 1) and slightly above the minimum objective (≥ 10 stock-length Walleye/net night; Table 3). Since 2004, the mean gill net CPUE has ranged from a low of 11.1 (2012) to a high of 34.4 (2007; Table 2). Based on the 2013 gill net CPUE, relative abundance is considered high.

Gill net captured Walleye ranged in TL from 17 to 72 cm (6.7 to 28.3 in), had a PSD of 28 and a PSD-P of 2; Table 1; Figure 4). Both the PSD and PSD-P were below the management objective ranges of 30-60 and 5-10 indicating a population skewed towards smaller individuals (Table 3; Figure 4). The reduction in PSD from 2012 to 2013 can be attributed to growth of individuals from strong 2011 cohort above stock-length (25 cm; 10 in; Table 5; Figure 4).

Since 2005, otoliths have been collected from a sub-sample of gill net captured walleye. Age structure information suggested that natural recruitment has contributed to the Walleye population (e.g., 2008 and 2010); however, the strongest year classes tend to coincide with fry stockings (Table 5; Table 7). In 2013, eight year classes (2004-2006 and 2008-2012) were present in the gill net catch (Table 5). Year classes produced in 2005, 2009, and 2011, which coincided with fry stockings, were the most abundant and comprised 10%, 25% and 54%, respectively, of Walleye in the gill net catch (Table 5; Table 7). Despite the stocking of 8 million fry in 2012, few age-1 Walleye were captured indicating limited recruitment of the 2012 cohort (Table 5). The capture of no age-0 Walleye in gill nets and only a single individual in the fall night electrofishing catch (i.e., mean CPUE of 1.0) point towards natural production of a weak year class in 2013 (Table 1; Table 5). Walleye fry stocked in 2009 and 2011 were marked with Oxytetracycline (OTC) so that the contribution of stocked fish could be evaluated. The estimated stocking contribution for the 2009 year class was 90%; while the 2011 cohort had an estimated stocking contribution of 14%; however, few age-0 Walleye were captured in 2011 and results should be interpreted with caution (Table 5).

Walleye growth in Waubay Lake tends to be highly variable (Table 6). For example, The 2005 year class had a weighted mean TL at capture of 314 mm (12.4 in) at age 3; while year class produced in 2008 and 2009 had weighted mean TL at capture values of 366 and 367 mm (14.4 in) at age 3 (Table 6). Increased growth of the 2008 and 2009 year classes can likely be attributed to reduced Walleye abundance coupled with improved prey conditions provided by strong natural reproduction of white bass in 2010. Since 2005, the weighted mean TL at capture of age-3 walleye has ranged from 314 to 367 mm (12.4 to 14.4 in); while the weighted mean TL at capture for age-4 fish ranged from 344 to 402 mm (13.5 to 15.8 in; Table 6). In 2013, few age-3 Walleye were captured. The weighted mean TL at capture of age-4 fish was 374 mm (14.7 in; Table 6). A decreasing trend in Walleye condition was apparent as TL increased. Gill net captured Walleye in the stock-quality length category had a mean Wr of 83; while those in quality-preferred length category had a mean Wr of 78.

Yellow Perch: The mean gill net CPUE of stock-length Yellow Perch was 21.9 (Table 1) and below the minimum objective (≥ 30 stock-length perch/net night; Table 3). Since 2004, the gill net CPUE of stock-length Yellow Perch has fluctuated from a low of 13.8 (2009) to a high of 58.3 (2004; Table 2). The 2013 gill net CPUE represented a decrease from the 2012 CPUE of 28.1 (Table 2), but still indicated moderate relative abundance.

Gill net captured Yellow Perch ranged in TL from 12 to 32 cm (4.7 to 12.6 in), with a high proportion being ≥ quality-length (20 cm; 8 in; Figure 5). The PSD was 79 and the PSD-P was 36; both exceeded management objectives of 30-60 and 5-10 (Table 3).

Otoliths collected from a sub-sample of gill net captured Yellow Perch suggested the presence of eight year classes (2004, 2005, and 2007-2012; Table 8). Year classes produced in 2009 and 2011 were the most abundant and comprised 35% and 29% of Yellow Perch in the gill net catch (Table 8).

Yellow perch in Waubay Lake display moderate growth and typically approach or surpass quality-length (20 cm; 8 in) by age 2 (Table 9). Since 2009, weighted mean TL at capture values for age-2 Yellow Perch have ranged from 198 to 216 mm (7.8 to 8.5 in); while the weighted mean TL at capture for age-3 fish has ranged from 237 to 249 mm (9.3 to 9.8 in), when both males and females were combined (Table 9). As with most populations, males tend to be smaller at a given age than females, particularly at older ages (Table 9). Condition of gill net captured Yellow Perch was high with mean Wr values ≥ 99 for all length categories (e.g., stock to quality) sampled.

Other Species

Black Bullhead: The mean frame net CPUE for Black Bullhead was 3.5 (Table 1) and within the management objective (≤100 stock-length Black Bullhead/net night; Table 3). Predator densities, coupled with the cyclic nature of black bullhead populations have likely aided in limiting Black Bullhead recruitment. Currently, the black bullhead population in Waubay Lake likely has minimal effect on the overall fishery.

Black crappie: Lack of recruitment since 1998 has resulted in low relative abundance of black crappie (Table 2). In 2013, the mean frame net CPUE of stock-length black crappie was 1.5 (Table 1). Until a substantial year-class of Black Crappie recruit to the population, their impact on the fishery will be minimal.

Lake Herring: Lake Herring were first captured from Waubay Lake during 2002, and have been sampled in low numbers annually from 2004-2013 (Table 2). In 2013, the mean gill net CPUE of stock-length Lake Herring was 0.4 (Table 1). Gill nets captured three individuals that ranged in TL from 40 to 44 cm (15.7 to 17.3 in). The Lake Herring population in Waubay Lake likely originated from Lake Herring that were hatched at Blue Dog Lake State Fish Hatchery and entered Blue Dog Lake (Blackwell and Hubers 2003).

White bass: White bass were first sampled in Waubay Lake during 2001 and have become an important component of the fishery. Typically, White bass have not been well represented in the gill net catch, but have been one of the more abundant species in the frame net catch (Table 2). In 2013, the mean CPUE values for stock-length White Bass were 3.8 and 17.6 for frame nets and gill nets, respectively (Table 1).

Comparison of length-frequency histograms revealed that cm-length groups represented were similar between frame nets and gill nets. However, gill nets captured considerably higher numbers of 31 to 34 cm (12.2 to 13.4 in) White Bass. Frame net captured White Bass ranged in TL from 28 to 42 cm (11.0 to 16.5 in), had a PSD of 100 and a PSD-P of 97 (Table 1; Figure 6). Limited recruitment and relatively fast growth to quality- and preferred-lengths contribute to the high size structure. No age and growth information was available in 2013. White Bass in the frame net catch had mean Wr values that ranged from 87-95 for all length categories (e.g., stock to quality) sampled, with the mean Wr of stock-length fish being 87 (Table 1).

Other: Bluegill, Common Carp, Northern Pike, Rock Bass, and White Sucker were other fish species captured in low numbers during the 2013 survey (Table 1).

Management Recommendations

1) Conduct fish population assessment surveys utilizing frame nets and gill nets on an annual basis (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structures, 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) 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].

4) Collect otoliths from Walleye and Yellow Perch, and scales from Smallmouth Bass to assess age structure and growth rates of each population.

5) Conduct spring night electrofishing on a biennial basis (odd years) to monitor Smallmouth Bass population parameters.

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).

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 Waubay Lake, 2013. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; COC= Common Carp; LAH= Lake Herring; NOP= Northern Pike; ROB= Rock Bass; SMB= Smallmouth Bass; 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								
BLB	3.5	2.9	73	7	37	8	86	1
BLC	1.5	1.1	100	0	44	13	104	1
BLG	0.4	0.4	100	0	83	20	134	2
COC	0.3	0.2	100	0	38	35	93	6
NOP	0.3	0.2	70	28	30	28	77	6
ROB	2.6	1.0	65	9	15	7	103	1
SMB	6.2	2.0	40	6	17	5	91	<1
WAE	2.5	1.0	48	10	9	6	78	1
WHB	3.8	1.5	100	0	97	3	87	<1
WHS	0.1	0.2	100	0	100	0	94	5
YEP	<0.1	0.1	100	---	0	---	126	---
Gill nets								
BLB	4.1	4.7	58	15	12	10	105	1
LAH	0.4	0.3	100	0	100	0	124	12
NOP	0.5	0.4	100	0	25	59	79	6
ROB	1.3	0.9	80	24	0	---	104	2
SMB	0.3	0.5	50	50	50	50	88	<1
WAE	11.8	4.1	28	8	2	3	81	1
WHB	17.6	6.1	100	0	99	2	93	1
WHS	0.3	0.3	100	0	100	0	109	8
YEP	21.9	10.1	79	5	36	6	115	<1
Electrofishing								
SMB[1]	98.0	80.3	53	12	18	10	89	2
WAE[2]	1.0	1.5	---	---	---	---	---	---

[1] Spring night electrofishing-SMB

[2] 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 Waubay Lake, 2004-2013. BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; COC= Common Carp; LAH= Lake Herring; NOP= Northern Pike; ROB= Rock Bass; SMB= Smallmouth Bass; SPS= Spottail Shiner; WAE= Walleye; WHB= White Bass; WHS= White Sucker; YEP= Yellow Perch

	CPUE									
Species	2004	2005	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013
Frame nets										
BLB	4.6	3.8	3.8	1.7	0.8	0.9	0.8	0.4	1.5	3.5
BLC	1.3	0.4	0.2	0.2	0.3	0.1	0.2	0.3	1.3	1.5
BLG	0.1	0.0	<0.1	0.2	0.1	0.1	0.6	0.7	0.9	0.4
COC	1.3	1.5	0.7	1.1	0.4	0.3	0.5	0.5	0.5	0.3
NOP	0.2	0.7	0.2	0.4	0.8	0.7	0.4	0.1	0.2	0.3
ROB	0.0	0.0	0.0	<0.1	0.3	0.7	0.9	0.6	0.9	2.6
SMB	1.1	1.3	2.1	6.3	1.9	3.4	6.3	6.1	5.1	6.2
WAE	7.8	7.2	9.7	8.3	6.1	5.4	5.5	3.1	2.9	2.5
WHB	0.5	1.8	9.1	6.6	3.2	7.1	3.1	6.5	5.1	3.8
WHS	0.1	0.2	0.7	0.4	0.1	0.2	0.1	0.1	0.1	0.1
YEP	<0.1	0.1	<0.1	<0.1	0.0	0.3	0.2	<0.1	0.1	<0.1
Gill nets										
BLB	0.5	0.1	0.3	0.6	0.0	0.1	0.0	0.5	4.3	4.1
BLG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
COC	0.9	0.1	1.9	1.5	0.6	0.0	0.8	0.1	0.5	0.0
LAH	0.5	1.1	2.3	1.9	0.6	1.5	4.3	1.0	0.1	0.4
NOP	0.3	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.5
ROB	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	1.4	1.3
SMB	0.0	0.0	0.0	0.4	0.9	0.1	0.1	0.1	0.0	0.3
SPS[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
WAE	15.5	18.1	13.5	34.3	28.8	12.4	16.0	15.9	11.1	11.8
WHB	0.0	0.0	0.3	2.0	4.6	0.3	0.9	2.9	1.5	17.6
WHS	0.0	0.4	0.0	0.3	0.1	0.0	0.4	0.0	0.0	0.3
YEP	58.3	30.4	27.6	42.8	32.4	13.8	19.8	27.6	28.1	21.9
Electrofishing										
SMB[3]	---	---	---	---	---	40.4	---	---	---	98.0
WAE[4]	114.3	148.4	2.0	0.0	5.0	88.0	0.0	6.0	5.0	1.0

[1] Monofilament gill net mesh size change (0.75”, 1.00”, 1.25”, 1.50”, 2.00” and 2.50”)
[2] All fish sizes
[3] Spring night electrofishing-SMB
[4] Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye not stock length

Table 3. Mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour), proportional stock density of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in experimental gill nets, frame nets, and electrofishing in Waubay Lake, 2004-2013. BLB= Black Bullhead; SMB= Smallmouth Bass; WAE= Walleye; YEP= Yellow Perch

Species	2004	2005	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013	Objective
Frame nets											
BLB											
CPUE	5	4	4	2	1	1	1	<1	2	4	≤ 100
PSD	100	100	96	98	96	100	83	91	78	73	---
PSD-P	84	89	90	87	96	100	78	45	13	37	---
Wr	87	85	83	86	86	96	92	84	93	86	---
Gill nets											
WAE											
CPUE	16	18	14	34	29	12	16	16	11	12	≥ 10
PSD	29	26	29	7	12	16	25	42	48	28	30-60
PSD-P	6	3	1	0	1	3	0	0	7	2	5-10
Wr	78	86	81	88	85	90	88	83	83	81	---
YEP											
CPUE	58	30	28	43	32	14	20	28	28	22	≥ 30
PSD	97	88	86	79	61	75	59	72	85	79	30-60
PSD-P	47	46	43	32	33	20	22	22	32	36	5-10
Wr	112	113	116	121	114	116	114	114	117	115	---
Electrofishing											
SMB[2]											
CPUE	---	---	---	---	---	40	---	---	---	98	---
PSD	---	---	---	---	---	57	---	---	---	53	40-70
PSD-P	---	---	---	---	---	27	---	---	---	18	10-20
Wr	---	---	---	---	---	102	---	---	---	89	---

[1] Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50").
[2] Spring night electrofishing-SMB

Table 4. Mean back-calculated length (mm) at age and standard error (SE) for Smallmouth Bass captured during spring electrofishing (day/night samples combined) in Waubay Lake, 2013.

			Age							
Year	Age	N	1	2	3	4	5	6	7	8
2011	2	5	113	207						
2010	3	29	105	186	253					
2009	4	15	94	201	273	311				
2008	5	8	98	188	287	342	369			
2007	6	1	84	202	302	356	389	418		
2006	7	4	109	218	320	370	404	426	442	
2005	8	1	99	212	299	347	378	406	426	440
Mean		63	100	202	289	345	385	417	434	440
SE			4	4	10	10	8	6	8	0
Mean Comparison [1]										
Small lakes/impoundments			98	180	241	291	---	---	---	---
Large lakes/impoundments			92	169	237	304	335	---	---	---
Region IV			96	179	249	316	339	---	---	---
Statewide			91	171	242	300	333	---	---	---

[1] Willis et al. 2001.

Table 5. 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 Waubay Lake, 2009-2013.

	Year Class												
Survey Year	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
2013[1]		4	61	2	28	2		3	11	1			
2012[1]	---		131	14	30	7	1	2	30				
2011	---	---	1	5	50	17			54	3	1		
2010	---	---	---	1	47	24			55	3			
2009[1]	---	---	---	---	4	6	6		77	6		2	2
# stocked													
fry		800	800[2]		400[3]				600	870	900	850	
sm. fingerling											49		
lg. fingerling													

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

[2] 56% of stocked Walleye were OTC marked; 1 of 12 otoliths collected from fall electrofished age-0 Walleye exhibited marks. The estimated stocking contribution was 14%, but sample size was low and the results should be interpreted with caution

[3] Stocked Walleye were OTC marked; 45 of 50 otoliths collected from fall electrofished age-0 Walleye exhibited marks for an estimated stocking contribution of 90%

Table 6. Weighted mean TL (mm) at capture for Walleye age-0 through age-10 sampled in experimental gill nets (expanded sample size) from Waubay Lake, 2005-2013. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

	Age										
Year	0	1	2	3	4	5	6	7	8	9	10
2013[1]	---	234(4)	259(61)	350(2)	374(28)	429(2)	---	374(3)	447(11)	418(1)	---
2012[1]	---	213(131)	325(14)	367(30)	402(7)	488(1)	360(2)	447(30)	---	---	---
2011	119(1)	248(5)	322(50)	366(17)	---	---	407(54)	392(3)	457(1)	---	---
2010	151(1)	270(47)	347(24)	---	---	380(55)	394(3)	---	---	---	---
2009[1]	120(4)	239(6)	315(6)	---	349(77)	377(6)	---	368(2)	492(2)	---	422(3)
2008	---	214(2)	267(1)	314(188)	377(10)	383(13)	---	407(5)	405(3)	425(11)	---
2007	---	246(5)	280(190)	332(25)	354(34)	---	---	437(1)	412(20)	657(1)	---
2006[1]	---	223(72)	289(26)	332(20)	---	381(4)	---	385(54)	---	---	---
2005	125(15)	229(14)	295(31)	321(4)	344(4)	349(1)	371(98)	---	---	626(3)	697(1)

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

Table 7. Stocking history including size and number for fishes stocked into Waubay Lake, 2001-2013. SMB= Smallmouth Bass; WAE= Walleye

Year	Species	Size	Number
2001	SMB	fingerling	26,900
2002	WAE	fry	8,500,000
2003	WAE	fry	9,000,000
2003	WAE	small fingerling	496,655
2004	WAE	fry	8,700,000
2005	WAE	fry	6,000,000
2009	WAE	fry	4,000,000
2011	WAE	fry	8,000,000
2012	WAE	fry	8,000,000

Table 8. Year class distribution based on the age/length summary for Yellow Perch sampled in gill nets from Waubay Lake, 2009-2013.

	Year Class														
Survey Year	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
2013		5	51	38	61	4	10		1	4					
2012	---		26	63	111	13	7			1	1		1	6	
2011	---	---		23	131	26	31	8							
2010	---	---	---		60	31	61	7		3					
2009[1]	---	---	---	---		2	75	14	2	5	1		4	2	2

[1] Older Yellow Perch were sampled, but are not reported in this table

Table 9. Weighted mean TL (mm) at capture by gender for Yellow Perch age-1 through age-10 captured in experimental gill nets (expanded sample size) from Waubay Lake, 2009-2013.

	Age									
Year	1	2	3	4	5	6	7	8	9	10
2013										
Male	148(1)	189(12)	228(7)	230(8)	224(1)	264(1)	---	---	268(1)	---
Female	151(4)	203(42)	241(29)	254(55)	306(1)	284(8)	---	323(1)	273(2)	---
Combined	150(5)	198(51)	237(38)	249(61)	245(4)	280(10)	---	323(1)	271(4)	---
2012[1]										
Male	142(5)	204(9)	221(16)	---	217(2)	---	---	---	---	---
Female	144(21)	219(58)	251(89)	263(14)	296(4)	---	---	309(1)	335(1)	---
Combined	143(26)	216(63)	245(111)	266(13)	262(7)	---	---	309(1)	335(1)	---
2011										
Male	151(10)	194(34)	234(1)	249(2)	---	---	---	---	---	---
Female	153(13)	209(95)	241(28)	271(28)	281(8)	---	---	---	---	---
Combined	152(23)	206(131)	242(26)	269(31)	281(8)	---	---	---	---	---
2010										
Male	153(17)	191(4)	218(10)	---	---	---	---	---	---	---
Female	151(43)	220(28)	252(48)	251(7)	---	280(3)	---	---	---	---
Combined	151(60)	216(31)	245(61)	251(7)		280(3)	---	---	---	---
2009[1]										
Male	136(1)	198(15)	233(2)	---	239(2)	---	---	268(1)	235(1)	---
Female	157(1)	206(61)	254(11)	261(2)	286(3)	255(1)	---	298(3)	298(1)	299(2)
Combined	147(2)	204(75)	249(14)	261(2)	267(5)	255(1)	---	291(4)	267(2)	299(2)

[1] Older Yellow Perch were sampled, but are not reported in this table

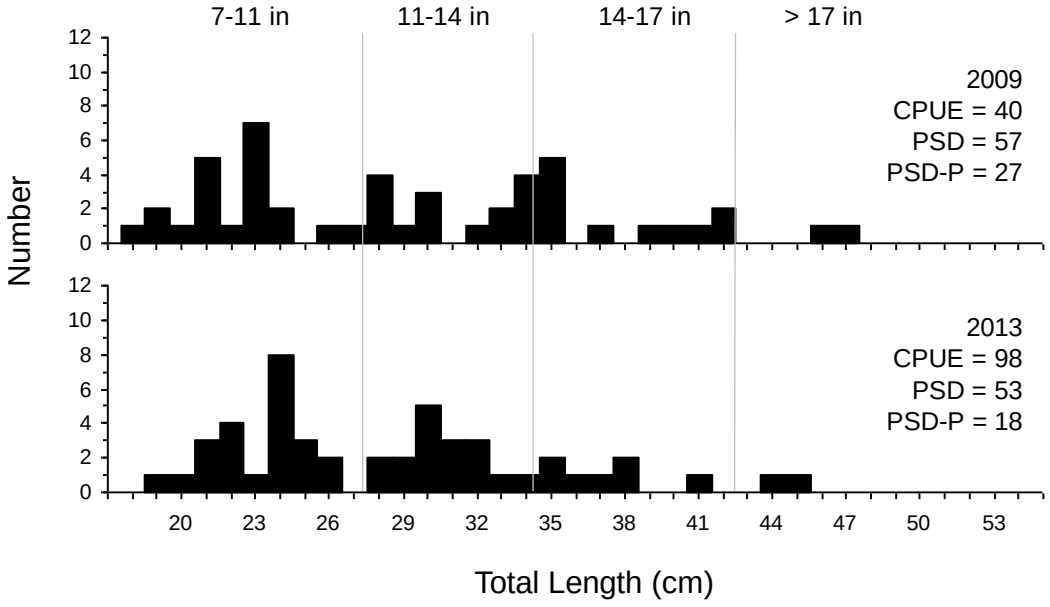

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for smallmouth bass captured during spring night electrofishing in Waubay Lake, 2009-2013.

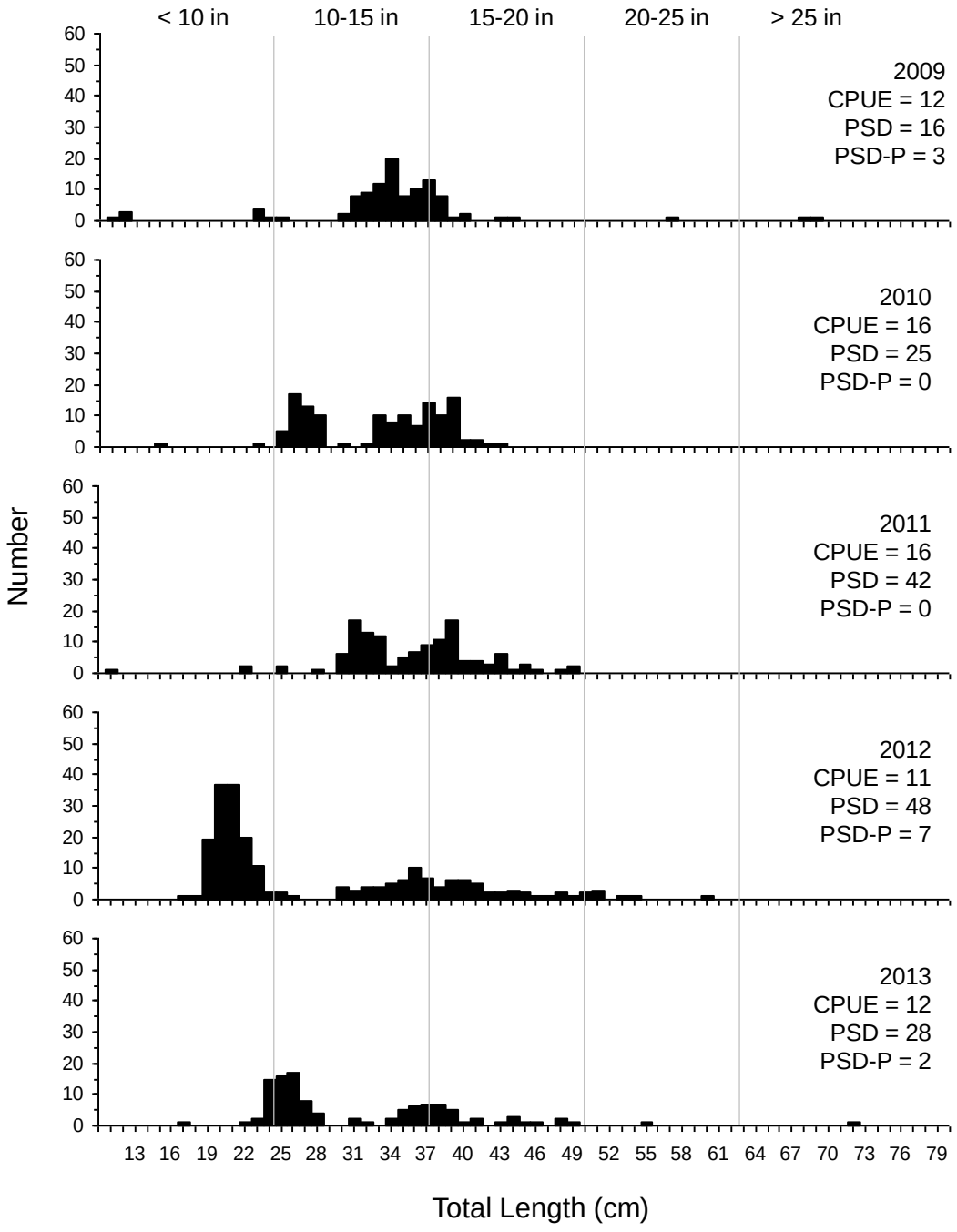

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using experimental gill nets in Waubay Lake, 2009-2013.

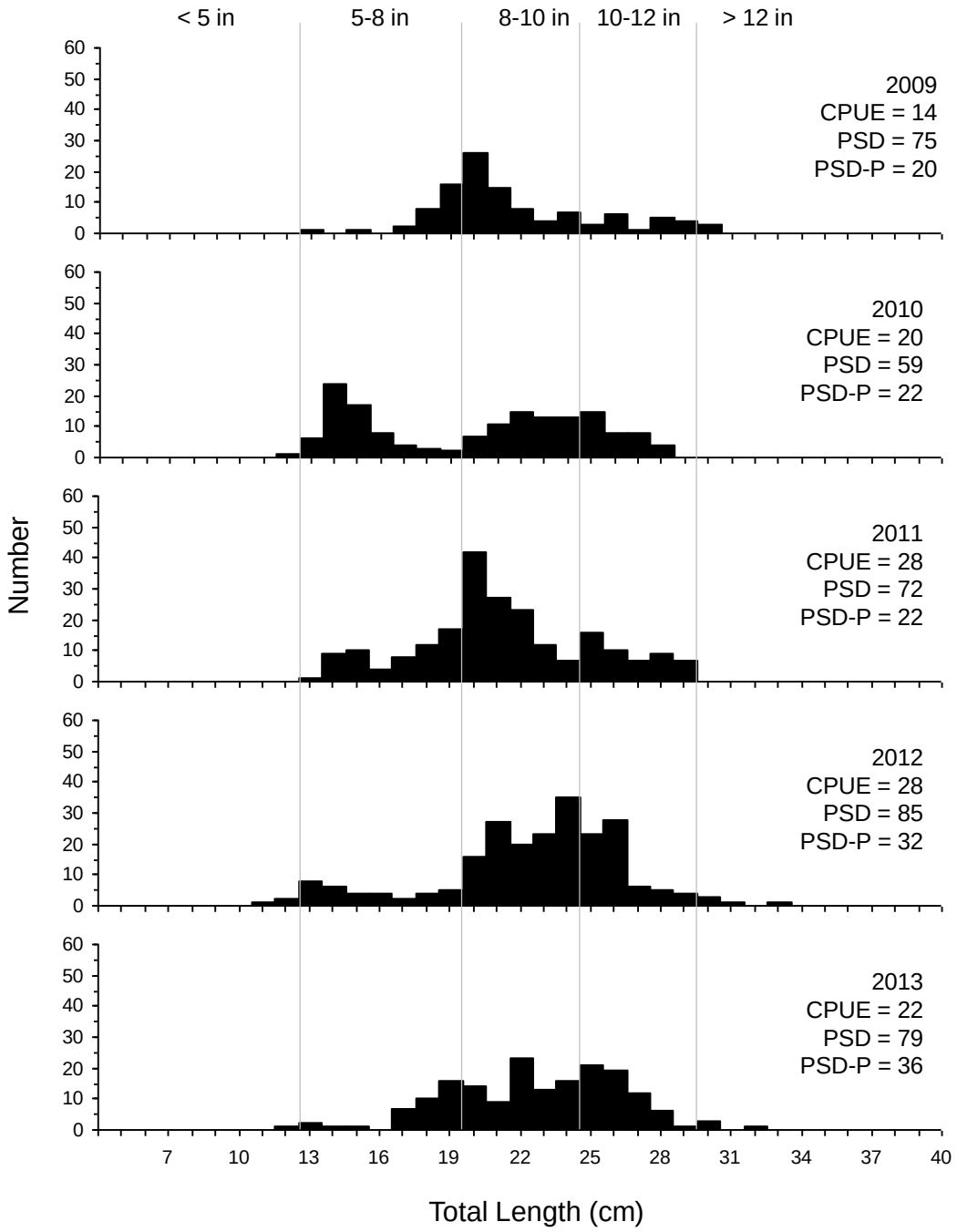

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Waubay Lake, 2009-2013.

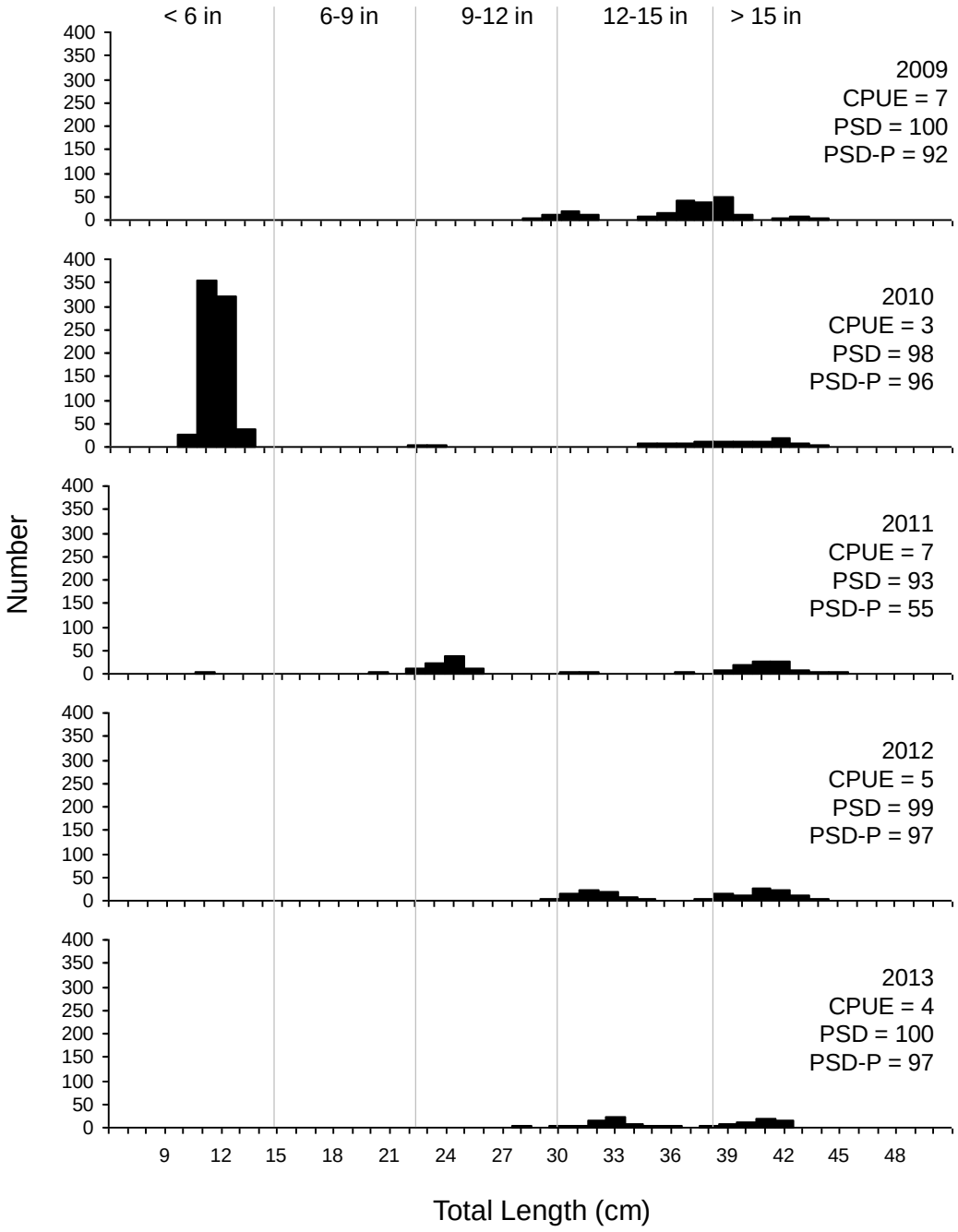

Figure 6. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for White Bass captured using frame nets in Waubay Lake, 2009-2013.