Lake Kampeska

Site Description

Location

Water designation number (WDN)	05-0002-00
Legal description	T117N-R53W-Sec.15-22, 27-30, 32
County (ies)	Codington
Location from nearest town	entirely within Watertown city limits

Survey Dates and Sampling Information

Survey dates	July 14-15, 2015 (GN) September 9, 2015 (EF-WAE)
Gill net sets (n)	6
Electrofishing-WAE (min)	60

Morphometry (Figure 1)

Watershed area (acres)	20,433
Surface area (acres)	5,250
Maximum depth (ft)	16
Mean depth (ft)	7

Ownership and Public Access

Lake Kampeska is a meandered lake and the fishery is managed by the SDGFP. Many public access sites are present on Lake Kampeska (Figure 1) with four being maintained by the SDGFP. Lands adjacent to the lake have mixed ownership including the State of South Dakota, Codington County, the city of Watertown, and private individuals.

Watershed and Land Use

The 20,433 acre Lake Kampeska sub-watershed (HUC-12) is located within the larger Lake Kampeska (HUC-10) watershed. Land use within the watershed is comprised of a mix of cropland, pasture or grassland, scattered shelterbelts, housing, and municipal.

Water Level Observations

The South Dakota Water Management Board established OHWM on Lake Kampeska is 1718.3 fmsl and the board set outlet elevation is 1717.8 fmsl. On April 19, 2015 the elevation was 1716.1 fmsl; 0.9 ft lower than the fall 2014 elevation of 1717.0 fmsl. On October 5, 2015 the water elevation was 1715.7 fmsl.

Fish Management Information

Primary species	smallmouth bass, walleye
Other species	bigmouth buffalo, black bullhead, black crappie, bluegill, channel catfish, common carp, green sunfish, largemouth bass, northern pike, orangespotted sunfish, pumpkinseed, rock bass, shorthead redhorse, spottail shiner, stonecat, white bass, white crappie, white sucker, yellow bullhead, yellow perch
Lake-specific regulations	none
Management classification	domestic water supply; warm-water permanent
Fish consumption advisories	none

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

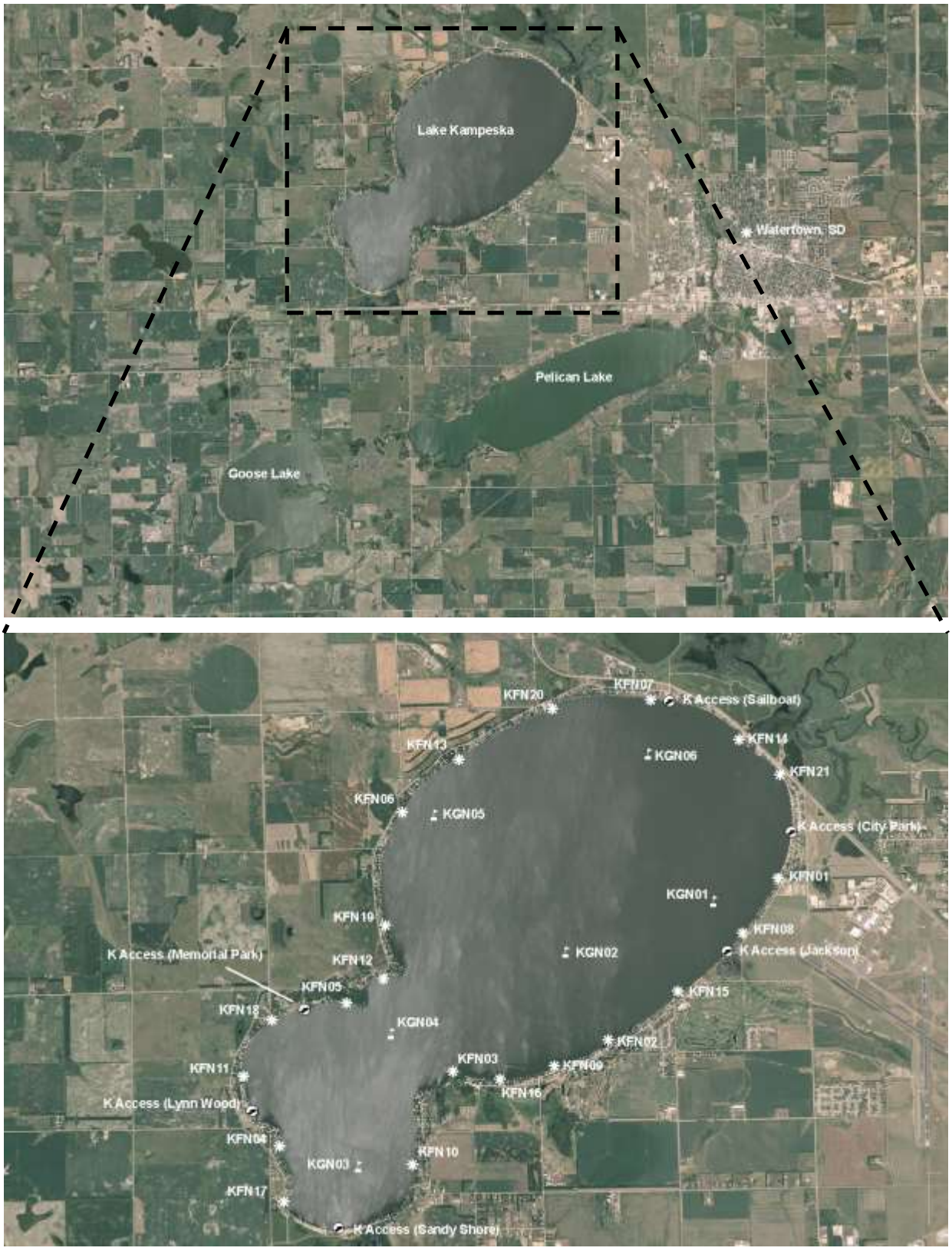

Figure 2. Map depicting geographic location of Lake Kampeska, Goose, and Pelican Lakes from Watertown, South Dakota (top). Also noted are public access points and standardized net locations for Lake Kampeska. KFN= frame nets, KGN= gill nets

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.

Results and Discussion

Lake Kampeska is a natural lake covering approximately 5,250 surface acres, within the city limits of Watertown, South Dakota. Lake Kampeska is connected to the Big Sioux River through a single inlet-outlet channel located on the northeast side. A weir structure installed on the inlet-outlet channel of Lake Kampeska is intended to slow the input of sediments to the lake basin. When the Big Sioux River is high, water enters Lake Kampeska. Conversely, when the water level in Lake Kampeska is higher than the Big Sioux River and above the weir structure water exits Lake Kampeska through the v-notch.

The lake is a popular site for recreational activities including fishing, boating, swimming, waterskiing, camping, and picnicking. Public access is exceptional with access locations on the north, east, south (State Recreation Area), and west shores of the lake. Lake Kampeska is primarily managed as a smallmouth bass and walleye fishery; however, crappie (black and white), bluegill, channel catfish, northern pike, and white bass are important components of the fishery.

Primary Species

Smallmouth Bass: No targeted sampling occurred for smallmouth bass in 2015. Spring night electrofishing to monitor smallmouth bass population parameters is conducted biennially during even years (e.g., 2014, 2016, 2018…).

Walleye: The mean gill net CPUE of stock-length walleye was 11.5 (Table 1) and above the minimum objective (≥ 10 stock-length walleye/net night; Table 3). Since 2006, the mean gill net CPUE has ranged from a low of 6.5 (2007) to a high of 24.3 (2011; Table 2). The 2015 gill net CPUE was higher than the 2014 CPUE of 9.3 (Table 2) and indicated high relative abundance.

Gill net captured walleye ranged in TL from 18 to 55 cm (7.1 to 21.7 in), had a PSD of 12 and a PSD-P of 1 (Table 1; Figure 3). The PSD and PSD-P were both below the objective ranges of 30-60 and 5-10 (Table 3).

Both natural reproduction and stocking contribute to the walleye population in Lake Kampeska. Based on age estimates from otoliths, eight year classes (2006-2011 and 2013-2014) were present in the 2015 gill net catch (Table 4). The 2011 year class comprised 33% of the walleye captured in gill nets and was naturally produced (Table 4; Table 6). The 2013 and 2014 year-classes coincided with fry stocking and comprised

40% and 19% of the 2015 gill net catch, respectively. In 2015, the mean fall night electrofishing CPUE of 7.0 (Table 1) suggested that a weak natural year class was produced.

Walleye growth tends to be highly variable (Table 5). Since 2006, the weighted mean TL at capture for age-4 fish has ranged from 319 to 415 mm (12.6 to 16.3 in; Table 5). In 2015, weighted mean TL at capture for age- 4 walleye was 334 mm (13.1 in; Table 5). Condition of gill net captured walleye was fair, with mean Wr values that ranged from 74 to 89 for all 10-mm length categories represented. A slight decreasing trend in condition was apparent as TL increased.

Other Species

Crappie: The crappie community in Lake Kampeska is comprised of both black and white crappies and both species contribute to the fishery. Black crappie populations are typically assessed using frame nets and no black crappies were captured in the 2015 gill net survey. White crappies appear to be sampled more effectively in gill nets rather than frame nets during annual fish community surveys on Lake Kampeska. Since 2006, white crappie mean frame net CPUE values have remained low (i.e., < 2.0); while mean gill net CPUE values have fluctuated from a low of 0.2 (2009) to a high of 8.2 (2006; Table 2). The 2015 mean gill net CPUE of white crappie was 0.3 (Table 1).

No age or growth information was collected. Few inferences can be made concerning size structure or condition for either species, due to low sample sizes.

Channel Catfish: Channel catfish are occasionally sampled in Lake Kampeska. However, relative abundance appears to be low as mean gill net and frame net CPUE values have been < 1.0 from 2005-2015 (Table 2). In 2015, one channel catfish was captured in the gill nets. Although abundance is low, the opportunity exists for anglers to catch an occasional channel catfish in Lake Kampeska.

Northern Pike: Northern pike typically are not sampled effectively during mid-summer fish community surveys. As a result, mean gill net CPUE values are often low. In 2015, gill nets captured six northern pike ranging in TL from 44 to 54 cm (17.3 to 21.3 in). The mean gill net CPUE of stock-length northern pike was 1.0 (Table 1). Since 2006, mean gill net CPUE values have ranged from a low of 0.2 (2007, 2010, 2014) to a high of 2.5 (2012, 2013; Table 2). Currently, relative abundance is considered moderate.

No age or growth information was collected. Few inferences can be made concerning size structure or condition due to the low sample size.

White Bass: The mean CPUE of stock-length white bass was 4.7 for gill nets (Table 1). Since 2006, mean gill net CPUE values ranged from a low of 3.8 (2014) to a high of 79.5 (2006; Table 2). The PSD was 96 and the PSD-P was 93 (Table 1). Nearly all (26 of 28) white bass in the sample were in the preferred-memorable length category, which had a mean Wr of 84.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 13.0 (Table 1). Since 2006, the mean gill net CPUE values have fluctuated from a low of 0.3 (2008) to a high of 13.0 (2015; Table 2). Lake Kampeska has historically supported a low-density population of yellow perch. The windswept nature of the lake basin, lack of suitable spawning habitat and escape cover, and predation likely combine to limit yellow perch recruitment and abundance. However periodic increases in abundance, similar to that observed in 2015, can provide opportunities for anglers.

The PSD and PSD-P were 65 and 41, respectively, indicating high size structure (Table 1). Captured yellow perch ranged in TL from 17 to 29 cm (6.7 to 11.4 in; Figure 4). Otoliths were collected from a subsample of gill net captured yellow perch. Six year-classes (2008-2013) were present with the most abundant year-classes being 2011 and 2013, comprising 42% and 28% of yellow perch in the gill net sample, respectively (Table 7).

Growth has varied since 2011 with weighted mean TL at capture for age-3 yellow perch ranging from 196 to 242 mm (Table 8). The weighted mean TL at capture for age-3 yellow perch in 2015 was 242 mm (9.5 in; Table 8). Condition is good with mean Wr values for each length category (i.e., stock to quality) >105; the mean Wr of stock-length individuals was 109 (Table 1).

Other: Lake Kampeska supports a highly diverse fish community, as a result of its connection to the Big Sioux River. Black bullhead, common carp, yellow bullhead, shorthead redhorse, smallmouth bass and white sucker were other fish species captured during the 2015 survey (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys using gill nets annually; frame nets will be added to the survey on an every third year basis (scheduled for 2017) 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) Conduct spring night electrofishing on a biennial basis (even years) to monitor smallmouth bass population parameters.

4) Collect otoliths from walleye and yellow perch; scales from smallmouth bass to assess age structure and growth rates of each population.

5) 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).

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 experimental gill nets and electrofishing in Lake Kampeska, 2015. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= black bullhead; CCF= channel catfish; NOP= northern pike; SHR=Shorthead Redhorse; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHC= white crappie; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Gear/Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Gill nets								
BLB	2.3	1.8	93	13	43	24	89	4
CCF	0.2	0.2	100	---	100	100	102	---
NOP	1.0	0.5	17	34	0	---	83	5
SHR	0.3	0.5	100	0	100	0	123	0
SMB	1.2	0.7	71	36	14	28	89	4
WAE	11.5	3.3	12	6	1	2	82	1
WHB	4.7	0.7	96	6	93	8	84	1
WHC	0.3	0.3	100	0	50	50	94	26
WHS	2.2	0.9	100	0	100	0	105	3
YEB	0.8	0.8	100	0	100	0	111	5
YEP	13.0	4.3	65	9	41	9	109	1
Electrofishing								
WAE[1]	7.0	---	---	---	---	---	---	---

[1] Fall night electrofishing-WAE; catch rate (CPUE) represents age-0 Walleye not stock-length

Table 2. Historic mean catch rate (CPUE; gill/frame nets= catch/net night, electrofishing= catch/hour) of stock-length fish for various fish species captured in experimental gill nets, frame nets, and electrofishing in Lake Kampeska, 2006-2015. BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; NOP= northern pike; ROB= rock bass; SHR= shorthead redhorse; SMB= smallmouth bass; STC= stonecat; WAE= walleye; WHB= white bass; WHC= white crappie; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

	CPUE									
Gear/Species	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013	2014	2015
Frame nets										
BIB	1.7	1.3	1.6	0.2	1.7	0.3	0.2	0.2	0.4	---
BLB	2.9	0.4	0.4	2.4	<0.1	0.1	18.2	22.7	15.5	---
BLC	2.5	5.2	2.8	0.4	1.2	0.5	1.2	0.6	0.5	---
BLG	3.6	4.2	4.0	1.3	3.2	1.5	1.2	1.6	1.4	---
CCF	0.0	0.0	<0.1	0.0	0.0	0.2	0.1	0.2	0.0	---
COC	0.2	0.4	0.3	0.2	<0.1	0.1	0.0	0.1	0.1	---
NOP	0.2	0.6	0.3	0.5	1.0	0.5	1.3	0.4	0.2	---
ROB	0.2	<0.1	<0.1	0.2	0.1	0.2	0.1	<0.1	0.0	---
SHR	0.0	0.2	0.0	0.0	<0.1	0.1	0.1	0.0	0.0	---
SMB	5.6	7.1	2.7	0.6	2.6	1.6	4.0	1.1	0.5	---
STC[2]	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	---
WAE	0.8	1.6	2.2	1.1	3.4	0.5	0.5	1.0	0.6	---
WHB	1.8	1.3	4.3	10.2	7.9	3.0	8.5	7.2	3.0	---
WHC	0.9	0.7	0.2	0.1	0.2	1.5	0.3	0.2	0.7	---
WHS	0.5	1.3	1.3	1.2	1.6	1.0	0.8	0.5	0.5	---
YEB	0.9	1.3	1.4	0.2	5.2	2.7	21.6	15.4	3.9	---
YEP	0.1	0.0	0.0	0.0	0.4	0.1	2.9	0.0	0.1	---
Gill nets										
BIB	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BLB	0.5	0.3	0.2	0.0	0.2	0.0	3.2	8.0	1.8	2.3
BLG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CCF	0.7	0.8	0.3	0.0	0.2	0.2	0.0	0.2	0.7	0.2
COC	0.3	1.0	0.5	0.5	0.2	0.0	0.2	0.2	0.3	0.0
NOP	0.5	0.2	0.5	1.0	0.2	1.3	2.5	2.5	0.2	1.0
ROB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SHR	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.0	0.0	0.3
SMB	0.3	0.8	0.2	0.0	0.0	0.7	0.2	0.5	0.0	1.2
WAE	11.7	6.5	14.3	17.0	20.7	24.3	12.2	7.5	9.3	11.5
WHB	79.5	20.2	15.5	7.2	5.5	4.5	4.8	4.3	3.8	4.7
WHC	8.2	2.5	0.5	0.2	1.0	3.2	3.2	2.5	1.3	0.3
WHS	0.7	1.5	0.3	1.7	1.8	5.5	3.8	1.5	1.8	2.2
YEB	0.8	0.2	0.2	0.0	0.7	0.8	6.7	2.2	1.5	0.8
YEP	4.3	1.3	0.3	2.2	6.0	2.7	3.5	5.7	2.7	13.0
Electrofishing										
SMB[3]	---	---	---	---	142.0	---	203.0	---	171.0	---
WAE[4]	0.0	10.7	20.6	0.0	0.0	342.0	0.9	110.0	179.0	7.0

[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; day/night samples combined (2014)
[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) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and relative weight (Wr) for selected species captured in experimental gill nets and electrofishing in Lake Kampeska, 2006-2015. WAE= walleye

Species	2006[1]	2007[1]	2008	2009	2010	2011	2012	2013	2014	2015	Objective
Gill nets											
WAE											
CPUE	12	7	14	17	21	24	12	8	9	12	≥ 10
PSD	73	41	5	4	2	31	53	51	25	12	30-60
PSD-P	1	3	0	1	1	0	0	0	0	1	5-10
Wr	80	85	80	83	86	84	80	88	77	82	---

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

Table 4. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (# stocked x 1000) from Lake Kampeska, 2010-2015.

	Year Class												
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2015		17	35		29	2	1	2	1	1			
2014	---		5	1	39	4	2	7	3		1		
2013[1]	---	---			24	11	13	4	4		1		1
2012[1]	---	---	---		2	11	12	25	12	2	8		1
2011[1]	---	---	---	---		11	28	50	13	1	43	1	
2010[1]	---	---	---	---	---		7	55	37	3	28		
# stocked													
fry		2500	2400				2500[2]	2500			2300		
sm. fingerling													
lg. fingerling													

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

[2] Stocked Walleye were OTC marked; 7 of 15 otoliths collected from spring electrofished age-1 walleye exhibited marks for an estimated stocking contribution of 47%

Table 5. Weighted mean TL (mm) at capture for walleye age-1 through age-10 sampled in experimental gill nets (expanded sample size) from Lake Kampeska, 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	198(17)	264(35)	---	334(29)	352(2)	555(1)	430(2)	422(1)	418(1)	---
2014	193(5)	223(1)	306(39)	352(4)	382(2)	418(7)	426(3)	---	458(1)	---
2013[1]	---	248(24)	369(11)	401(13)	410(4)	446(4)	---	420(1)	---	376(1)
2012[1]	205(2)	317(11)	368(12)	393(25)	388(12)	397(2)	406(8)	---	474(1)	---
2011	250(11)	325(28)	359(50)	383(13)	425(1)	392(43)	432(1)	---	---	498(1)
2010[1]	209(7)	281(55)	313(37)	319(3)	354(28)	---	---	---	345(2)	---
2009	195(35)	275(34)	304(1)	328(64)	404(1)	456(1)	---	519(2)	---	---
2008	192(8)	262(11)	286(70)	---	---	---	406(4)	412(1)	---	---
2007[1]	208(1)	248(75)	---	415(6)	---	411(6)	---	473(3)	---	---
2006[1]	203(74)	334(1)	384(19)	375(2)	397(41)	439(1)	453(2)	---	---	---

[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 Kampeska, 2003-2015. WAE=Walleye

Year	Species	Size	Number
2005	WAE	fry	2,300,000
2008	WAE	fry	2,500,000
2009	WAE	fry	2,500,000
2013	WAE	fry	2,400,000
2014	WAE	fry	2,500,000

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

	Year Class												
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2015			33	7	22	7	9	1					
2014	---		5	2	7	1	6	1					
2013	---	---		1	13	11	8		1				
2012	---	---	---			2	11	6	1	1			
2011	---	---	---	---		11	9	5	2				

Table 8. Weighted mean TL (mm) at capture for yellow perch age-1 through age-8 sampled in experimental gill nets (expanded sample size) from Lake Kampeska, 2011-2015. 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
2015	---	191(33)	242(7)	253(22)	263(7)	269(9)	295(1)	---
2014	119(5)	162(2)	220(7)	230(1)	255(6)	235(1)	---	---
2013	123(1)	182(13)	230(11)	246(8)	---	255(1)	---	---
2012	---	178(2)	211(11)	243(6)	250(1)	273(1)	---	---
2011	107(11)	182(9)	196(5)	254(2)	---	---	---	---

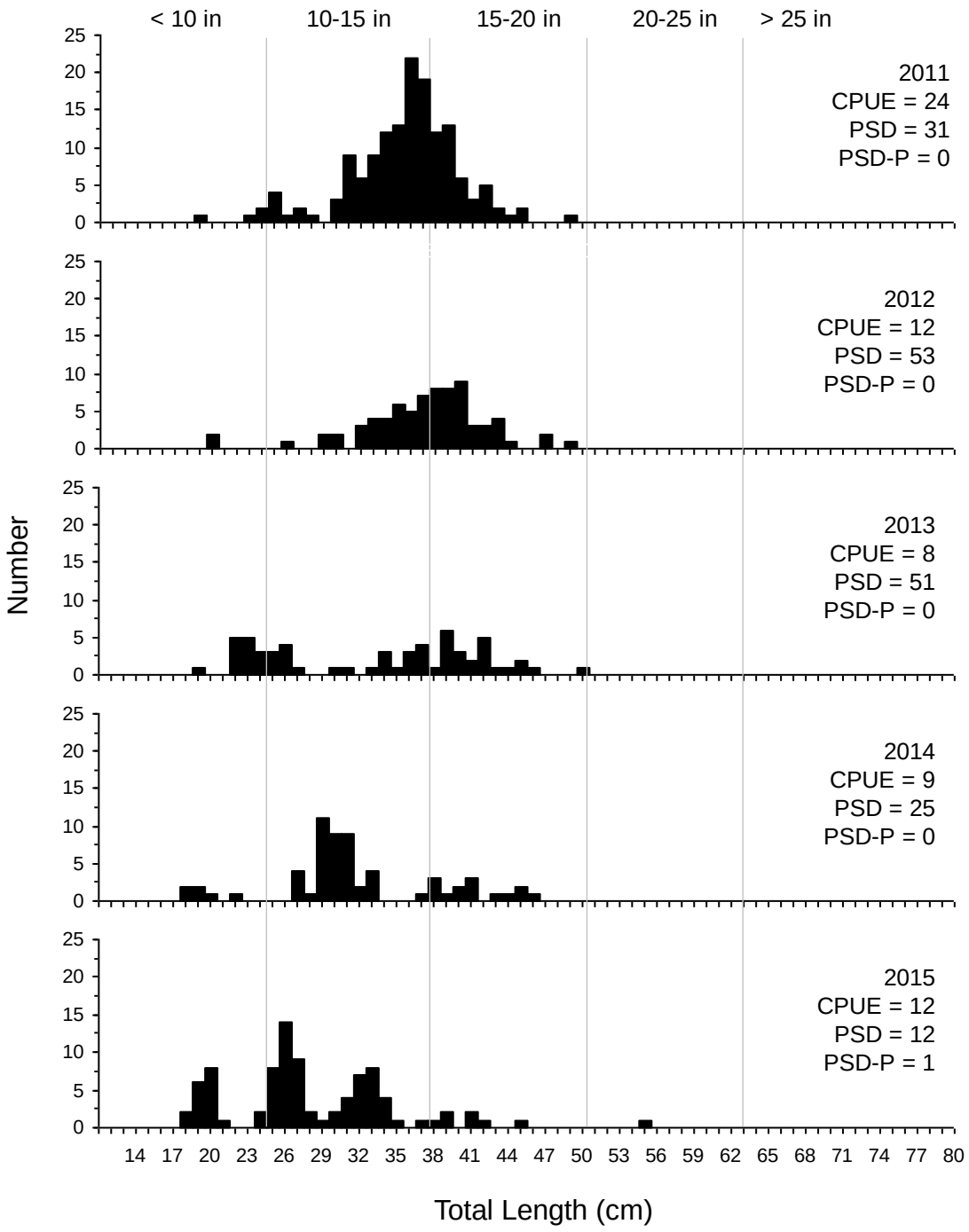

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Lake Kampeska, 2011-2015.

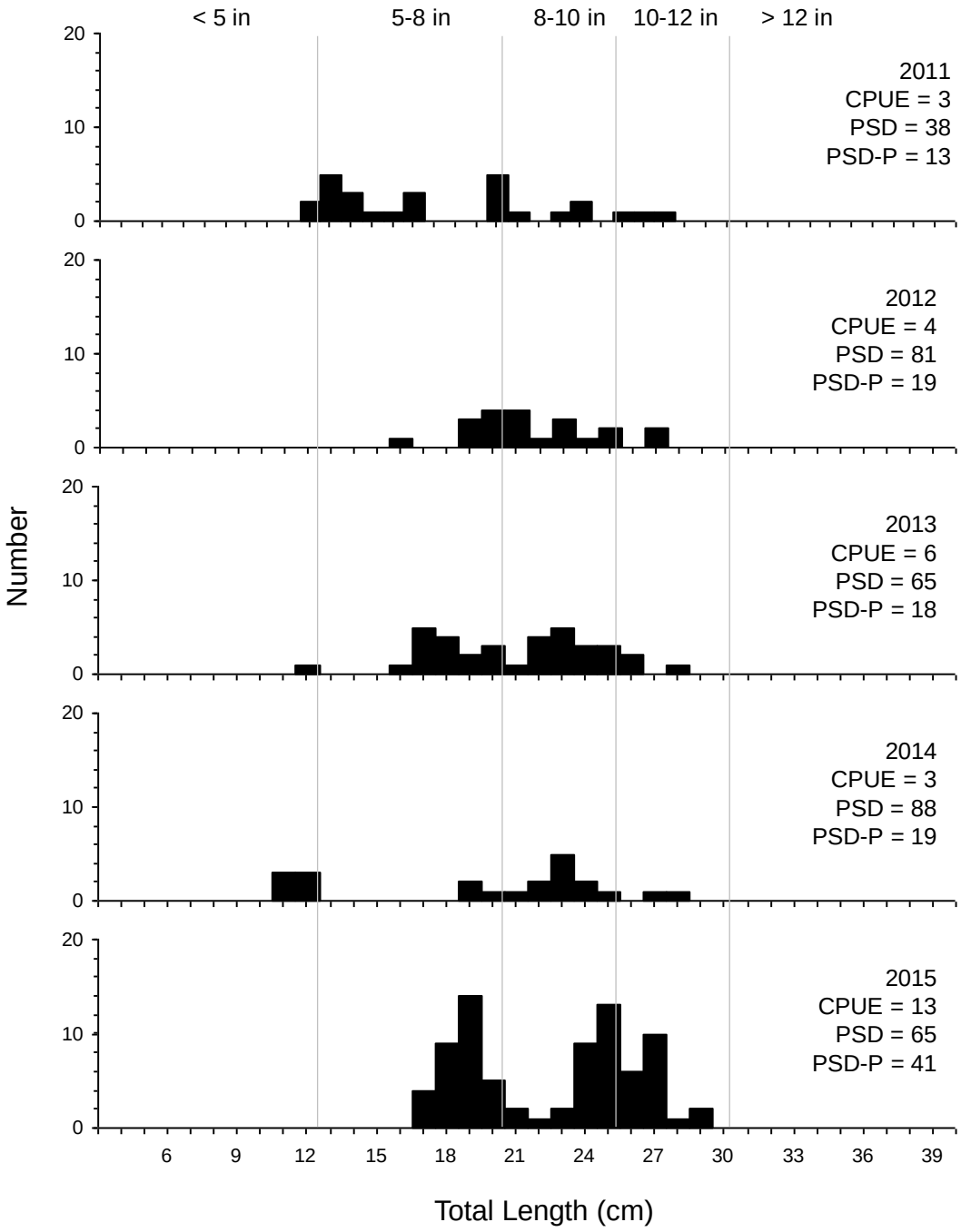

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using gill nets in Lake Kampeska, 2011-2015.