Pelican Lake

Site Description

Location

Water designation number (WDN)	05-0003-00
Legal description	T116N-R53W-Sec. 1,2,3,8,9,10,11,12,15,16,17
County (ies)	Codington
Location from nearest town	southwestern city limits of Watertown, SD

Survey Dates and Sampling Information

Survey dates	July 1-3, 2014 (FN,GN)
Frame net sets (n)	16
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	16,749
Surface area (acres)	2,796
Maximum depth (ft)	8
Mean depth (ft)	5

Ownership and Public Access

Pelican Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. Three public access sites exist on Pelican Lake, two are maintained by SDGFP (Northwest Lakeside Use Area and Pelican Lake Recreation Area), and the other is maintained by the City of Watertown (East-Side Access; Figure 1). The Pelican Lake shoreline has mixed ownership including the State of South Dakota, Codington County, the City of Watertown, and private individuals.

Watershed and Land Use

The 16,749 acre Pelican Lake sub-watershed (HUC-12) is located within the larger City of Watertown-Big Sioux River (HUC-10) watershed. Land use within the watershed is varied including both municipal and agricultural (e.g., pasture or grassland, cropland, etc.) uses.

Water Level Observations

The Water Management Board established OHWM is 1710.2 fmsl and the established outlet elevation is 1709.7 fmsl. On May 12, 2014 the elevation of Pelican Lake was 1710.6; 1.0 ft higher than the Fall 2013 elevation of 1709.6. The water level on October 15, 2014 was 1710.0 fmsl.

Fish Management Information

Primary species	walleye, yellow perch
Other species	bigmouth buffalo, black bullhead, black crappie, common carp, green sunfish, northern pike, orangespotted sunfish, spottail shiner, tadpole madtom, white bass, white sucker, yellow bullhead
Lake-specific regulations	none
Management classification	warm-water semi-permanent
Fish consumption advisories	none

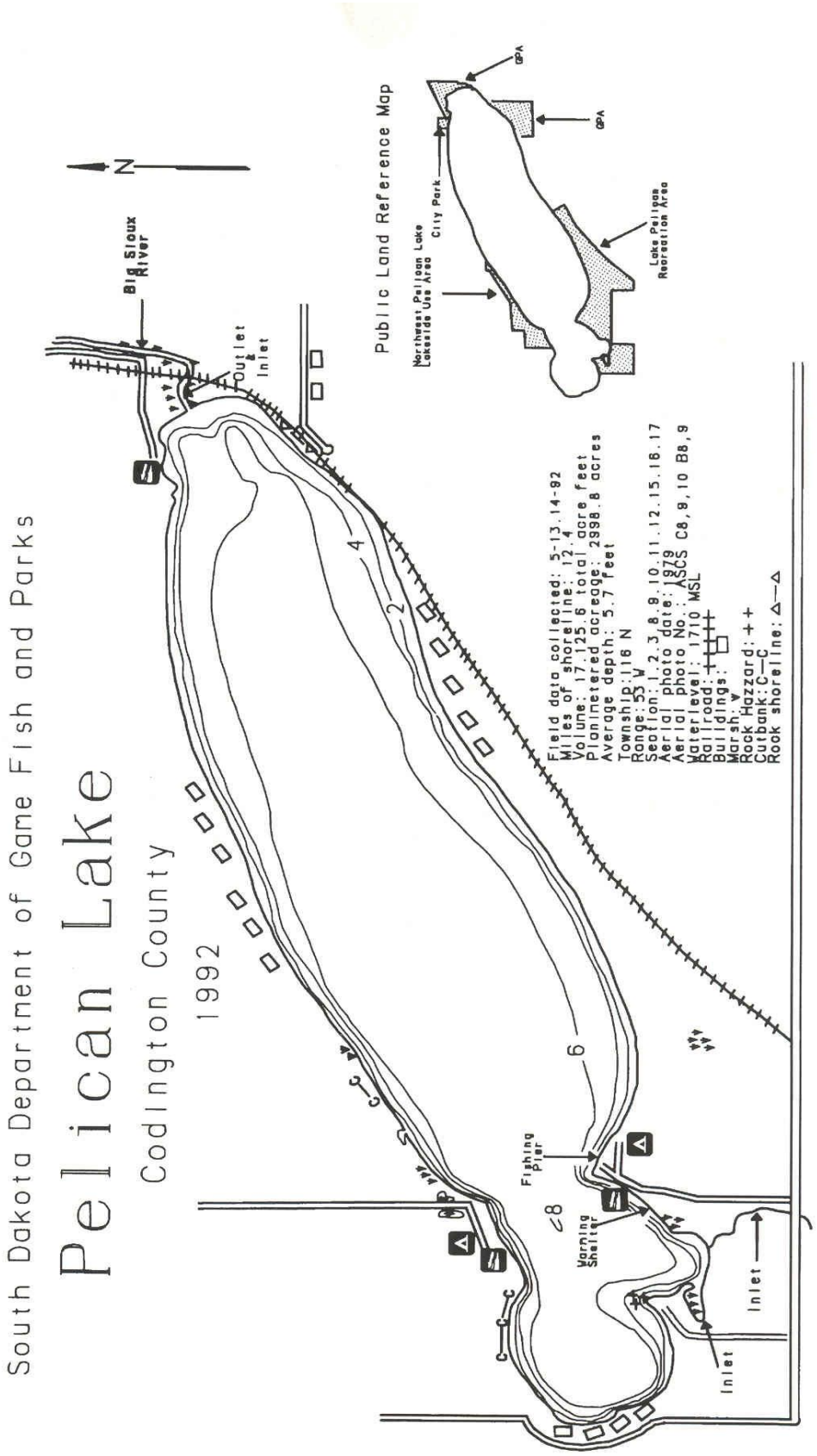

Figure 1. Contour Map of Pelican Lake, Codington County, South Dakota.

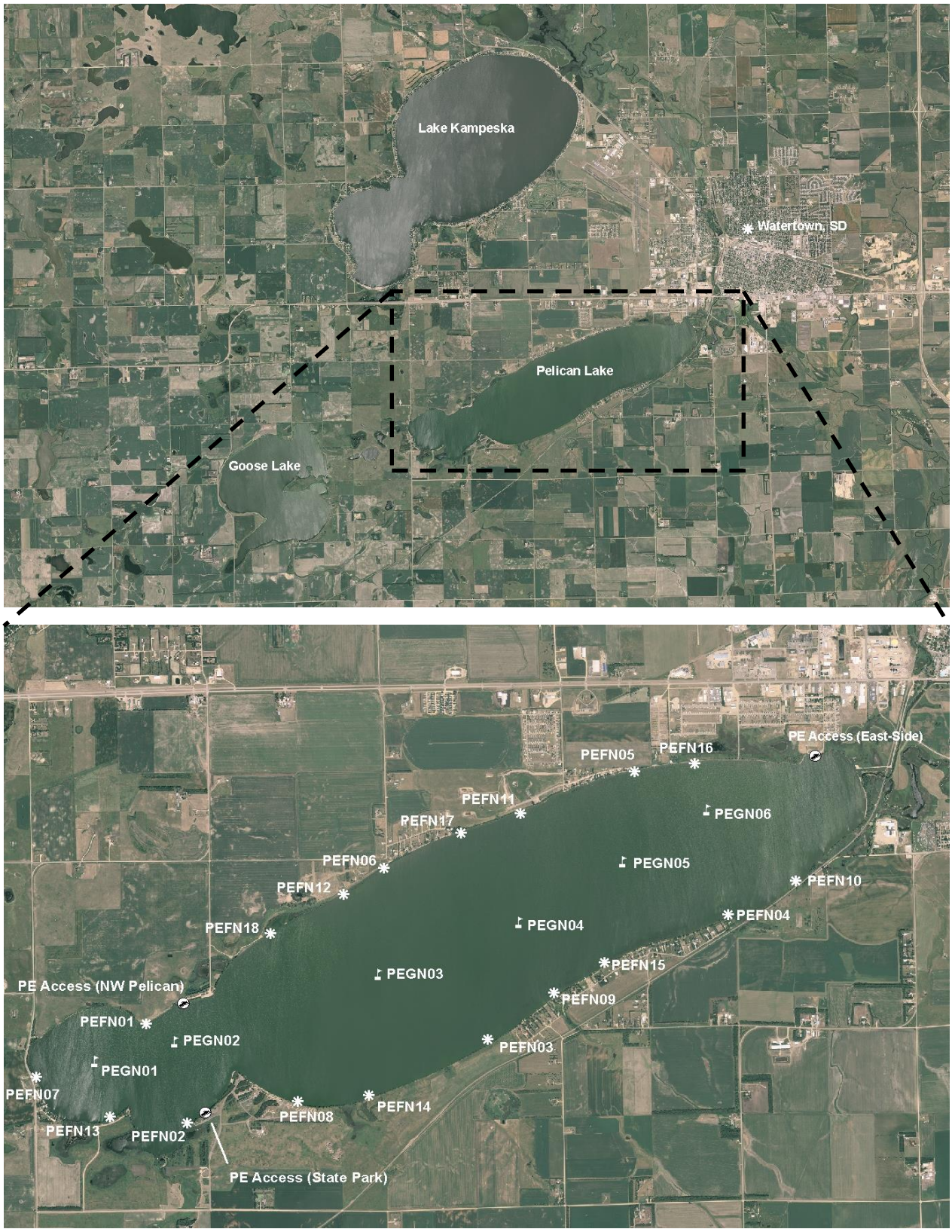

Figure 2. Map depicting location of Pelican Lake from Watertown, South Dakota (top). Also noted are public access points and standardized net locations for Pelican Lake. PEFN= frame nets; PEGN= gill nets

Management Objectives

1) Maintain a mean gill net CPUE of stock-length walleye ≥ 10, a PSD of 30-60, and a PSD-P of 5-10.

2) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 30, a PSD of 30-60, and a PSD-P of 5-10.

3) Maintain a mean frame net CPUE of stock-length black bullhead ≤ 100.

Results and Discussion

Pelican Lake is a relatively-shallow (i.e., maximum depth of ≈8 ft) natural lake located near Watertown, South Dakota. A diversion channel, with weir structure, connects the lake to the Big Sioux River and serves as both the inlet and outlet. The close proximity of Pelican Lake to the city of Watertown makes it a popular recreational destination. Public access is available on the northwest, east, and south (State Park) shores of the lake (Figure 1; Figure 2).

Pelican Lake is primarily managed as a walleye and yellow perch fishery; however, a variety of other fish species including but not limited to black crappie, channel catfish, northern pike, and white bass may also contribute to the fishery. Due to its shallow nature and eutrophication, Pelican Lake has a history of frequent winter and summerkill events. In 2007-08 winterkill severely reduced walleye and yellow perch populations. Gill nets set just after ice-out during 2008 captured only low numbers of adult northern pike and sub-stock (< 13 cm; 5 in) yellow perch. Following restocking, walleye and yellow perch populations began to rebound and the 2012 mean gill net CPUE values were 9.0 and 79.7, respectively (Table 2). Unfortunately, with the severe temperatures endured during the 2013-14 winter another partial winterkill occurred and it appears that again sport fish populations (e.g., northern pike, walleye, and yellow perch) populations may have been reduced.

Primary Species

Walleye: The mean gill net CPUE of stock-length walleye was 1.3 (Table 1) and below the minimum objective (≥ 10 stock-length walleye/net night; Table 3). The 2014 gill net CPUE represented a substantial decrease from the 2012 CPUE of 9.0 (Table 2) and indicated low relative abundance.

Gill net captured walleye ranged in TL from 23 to 56 cm (9.1 to 22.0 in), with the majority being ≥ quality-length (Table 1; Figure 3). Age estimates made using otoliths from gill net captured walleye suggested that 67% were from the 2010 year class (Table 4; Table 6; Figure 3). Given the low sample size, few inferences can be made concerning size structure, growth, or condition.

Yellow Perch: In 2014, relative abundance of yellow perch in the gill net catch declined substantially (Table 1). The mean gill net CPUE of stock-length yellow perch was 0.2 (Table 1) and well below the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Given the low sample size, few inferences can be made concerning size structure, growth, or condition.

Other Species

Northern Pike: The mean gill net CPUE of stock-length northern pike was 2.5 (Table 1) and indicated moderate relative abundance. Gill net captured northern pike ranged in TL from 60 to 83 cm (23.6 to 32.7 in), had a PSD of 100 and a PSD-P of 53 (Table 1; Figure 5). No age and growth information was available in 2014. Gill net captured northern pike had a mean Wr of 80 for all length categories (e.g., stock to quality) sampled.

Other: Bigmouth buffalo, black bullhead and common carp were other fish species captured in moderate numbers during the 2014 survey. The mean gill net CPUE of stock-length fish was 20.7, 18.8 and 5.3 for bigmouth buffalo, black bullhead and common carp, respectively (Table 1). In addition, spottail shiner and yellow bullhead were captured in low numbers (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys on a biennial basis (next survey scheduled in summer 2016) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.

2) Stock walleye (≈500 fry/acre) on a biennial basis (even years) to establish additional year classes.

3) Collect otoliths from walleye and yellow perch to assess age structure and growth rates of each population.

4) Monitor water levels and winterkill events. In cases of substantial winterkill stock with walleye and yellow perch to re-establish the fish community.

Table 1. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P), and mean relative weight (Wr) of stock-length fish for various fish species captured in frame nets and experimental gill nets from Pelican Lake, 2014. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; COC= common carp; NOP= northern pike; SPS= spottail shiner; WAE= walleye; 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
Frame Nets								
BIB	20.4	12.9	4	2	2	1	94	1
BLB	83.8	28.4	95	1	3	1	80	1
BLC	2.8	0.8	91	7	4	5	103	<1
COC	0.3	0.2	100	0	100	0	99	---
NOP	3.7	0.9	76	9	47	11	68	1
WAE	1.2	0.4	82	17	41	21	75	4
WHS	6.4	1.4	100	0	100	0	79	<1
YEB	1.1	0.4	100	0	72	19	90	3
YEP	0.1	0.2	50	50	0	---	104	15
Gill Nets								
BIB	20.7	3.7	1	1	1	1	93	<1
BLB	18.8	4.7	90	5	4	3	84	1
BLC	0.3	0.3	100	0	0	---	106	<1
COC	5.3	1.4	100	0	3	5	96	1
NOP	2.5	1.0	100	0	53	23	80	6
SPS[1]	0.2	0.2	---	---	---	---	---	---
WAE	1.3	1.1	88	24	13	24	74	4
WHS	0.2	0.2	100	---	100	---	79	---
YEP	0.2	0.2	100	---	0	---	79	---

[1] All fish sizes

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured in frame nets and experimental gill nets from Pelican Lake, 2009-2014. BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; COC= common carp; GSF= green sunfish; NOP= northern pike; OSF= orangespotted sunfish; SPS= spottail shiner; WAE= walleye; WHB= white bass; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

	CPUE		
Species	2009	2012	2014
Frame Nets			
BIB	12.1	---	20.4
BLB	7.9	---	83.8
COC	0.1	---	0.3
NOP	1.3	---	3.7
WAE	0.1	---	1.2
WHS	1.4	---	6.4
YEB	0.1	---	1.1
YEP	0.1	---	0.1
Gill Nets			
BIB	0.3	0.0	20.7
BLB	0.3	21.7	18.8
BLC	0.0	18.0	0.3
COC	0.0	15.5	5.3
GSF	0.0	0.2	0.0
NOP	0.0	14.8	2.5
OSF[1]	0.8	0.2	0.0
SPS[1]	0.2	2.8	0.2
WAE	0.0	9.0	1.3
WHB	4.3	14.7	0.0
WHS	0.0	6.7	0.2
YEB	0.0	0.7	0.0
YEP	0.5	79.7	0.2

[1] All fish sizes

Table 3. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) for selected species captured in experimental gill nets from Pelican Lake, 2009-2014. NOP= northern pike; WAE = walleye; YEP = yellow perch

Species	2009	2012	2014	Objective
Gill nets				
NOP				
CPUE	1	15	3	---
PSD	60	39	100	---
PSD-P	0	0	53	---
Wr	100	96	80	---
WAE				
CPUE	0	9	1	≥ 10
PSD	---	94	88	30-60
PSD-P	---	6	13	5-10
Wr	---	91	74	---
YEP				
CPUE	1	80	<1	≥ 30
PSD	67	46	100	30-60
PSD-P	0	7	0	5-10
Wr	104	96	79	---

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 Pelican Lake, 2009-2014.

	Year Class						
Survey Year	2014	2013	2012	2011	2010	2009	2008
2014			2		6		1
2012	---	---			40	12	2
2009	---	---	---	---	---		
# stocked							
fry	1400		1400		2800	1400	2800
sm. fingerling							
lg. fingerling							

Table 5. Weighted mean length at capture (mm) for walleye captured in experimental gill nets (expanded sample size) from Pelican Lake, 2009-2014. 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
2014	---	251 (2)	---	423 (6)	---	568 (1)	---	---
2012	---	400 (40)	490 (12)	584 (2)	---	---	---	---
2009	---	---	---	---	---	---	---	---

Table 6. Stocking history including size and number for fishes stocked into Pelican Lake, 2008-2014. WAE= walleye; YEP= yellow perch

Year	Species	Size	Number
2008	WAE	fry	2,800,000
	YEP	adult	3,200
	YEP	small fingerling	8,880
2009	WAE	fry	1,400,000
2010	WAE	fry	2,800,000
	YEP	small fingerling	148,090
2012	WAE	fry	1,400,000
2014	WAE	fry	1,400,000

Table 7. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Pelican Lake, 2012-2014.

	Year Class					
Survey Year	2014	2013	2012	2011	2010	2009
2014				1		
2012	---	---		233	196	60

Table 8. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Pelican Lake, 2012-2014.

	Age		
Year	1	2	3
2014			
Male	---	---	---
Female	---	---	233 (1)
Combined	---	---	233 (1)
2012			
Male	141 (77)	203 (64)	237 (14)
Female	143 (138)	224 (136)	278 (30)
Combined	142 (233)	215 (196)	256 (60)

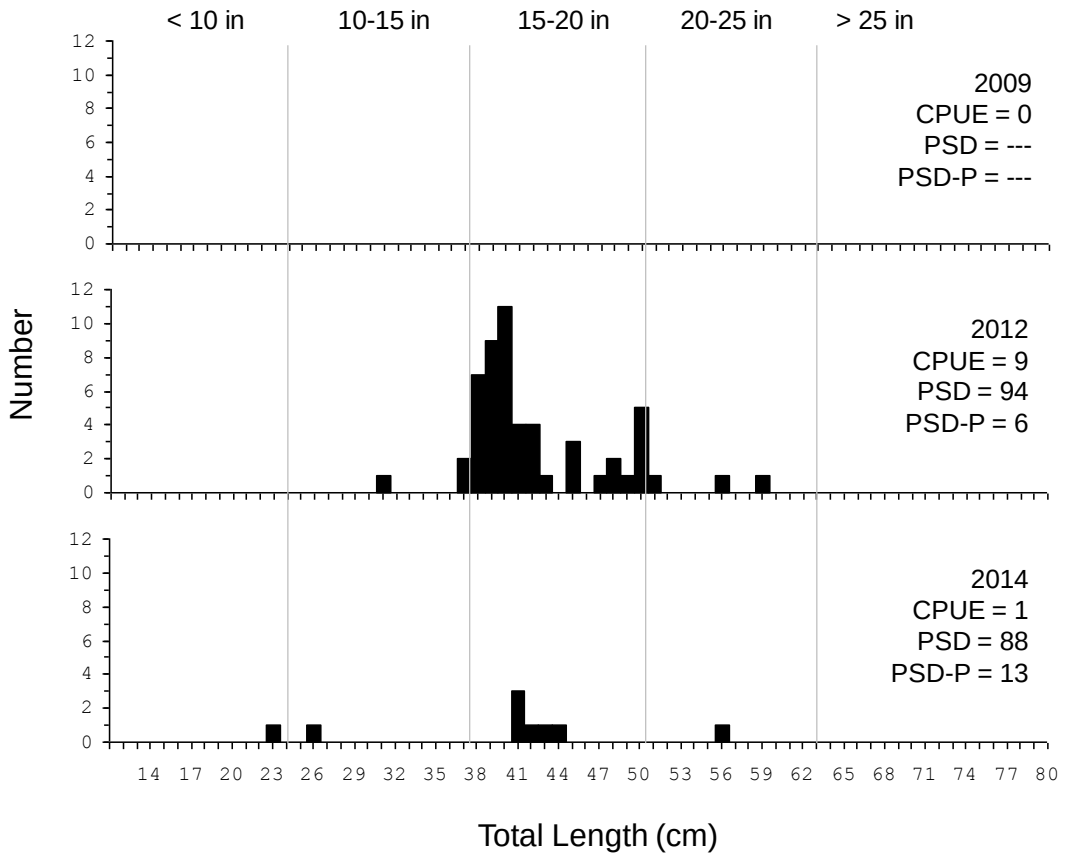

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Pelican Lake, 2009-2014.

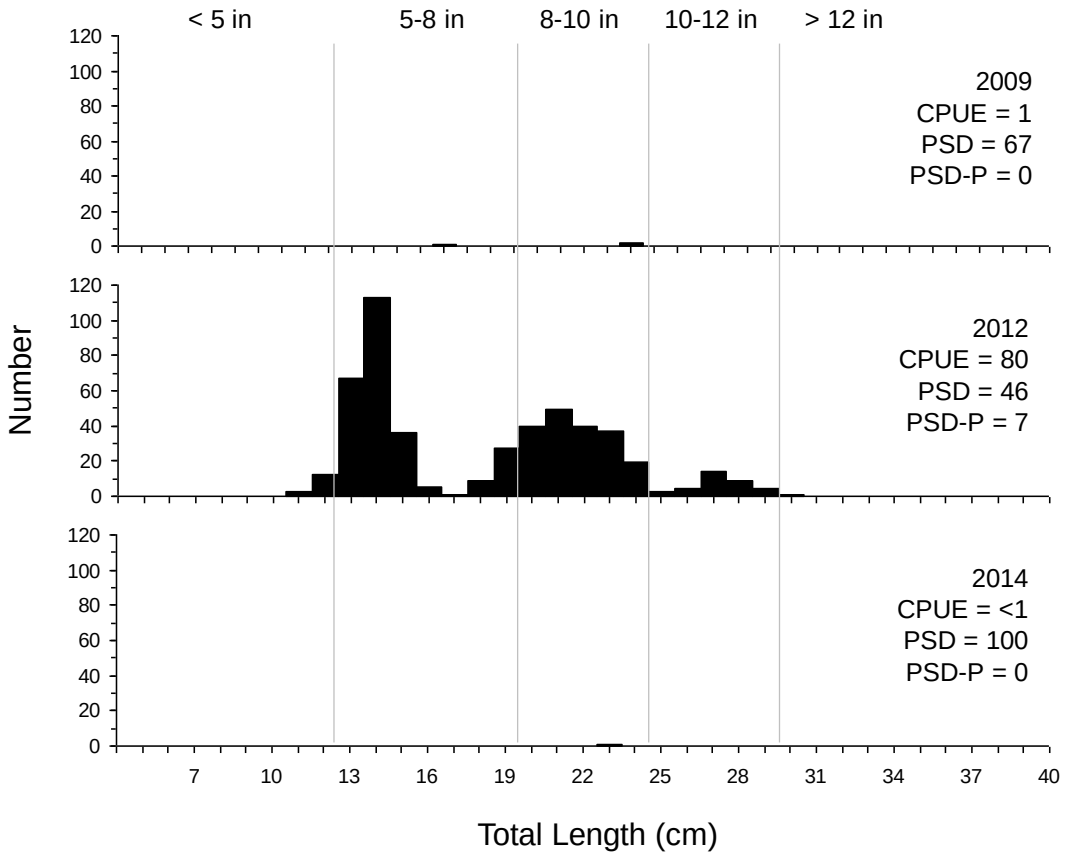

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Pelican Lake, 2009-2014.

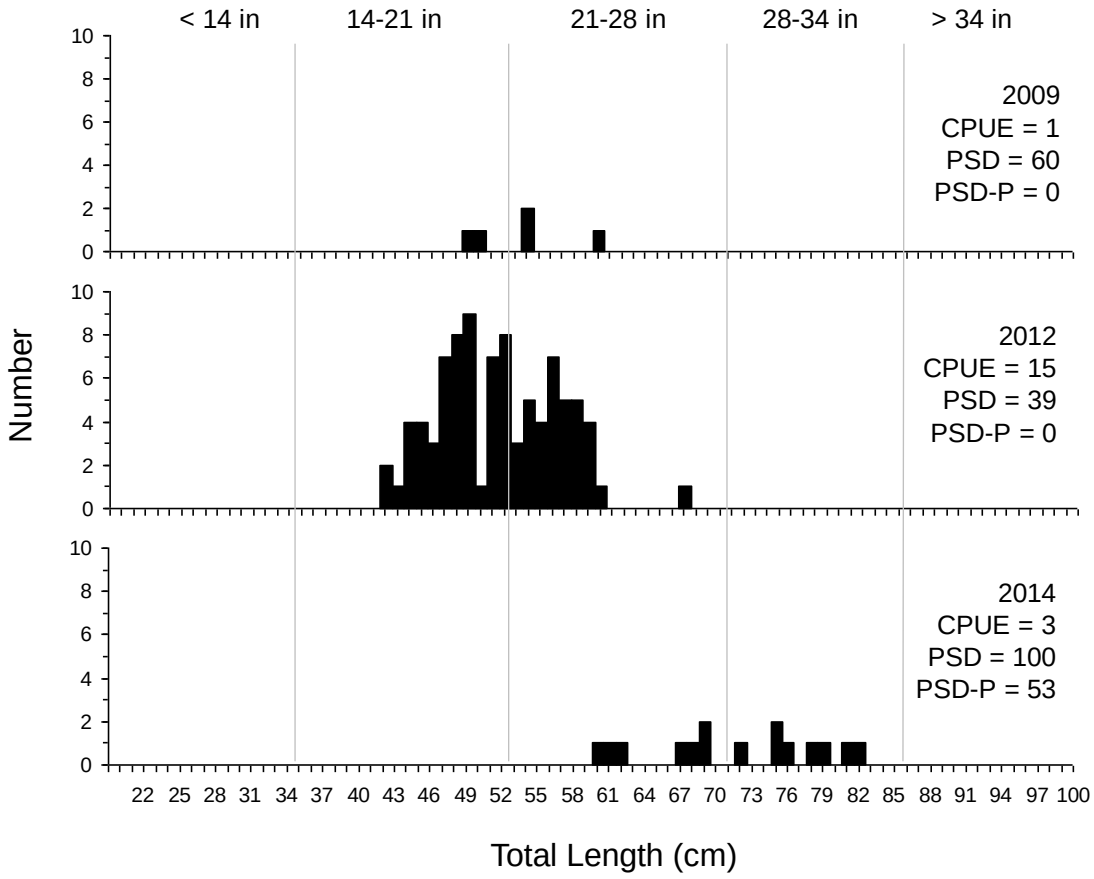

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using experimental gill nets in Pelican Lake, 2009-2014.