

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

Survey Dates and Sampling Information

Survey dates	July 3-6, 2012 (GN)
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 parties.

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 primarily agricultural including a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

The Water Management Board established OHWM is 1710.2 fmsl and the established outlet elevation is 1709.7 fmsl. On April 25, 2012, the elevation of Pelican Lake was 1709.6, which indicated a slight decrease from the fall 2011 elevation of 1710.1 fmsl. The water level had declined slightly to an elevation of 1708.8 fmsl on September 25, 2012

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

South Dakota Department of Game Fish and Parks

Pelican Lake

Codington County

1992

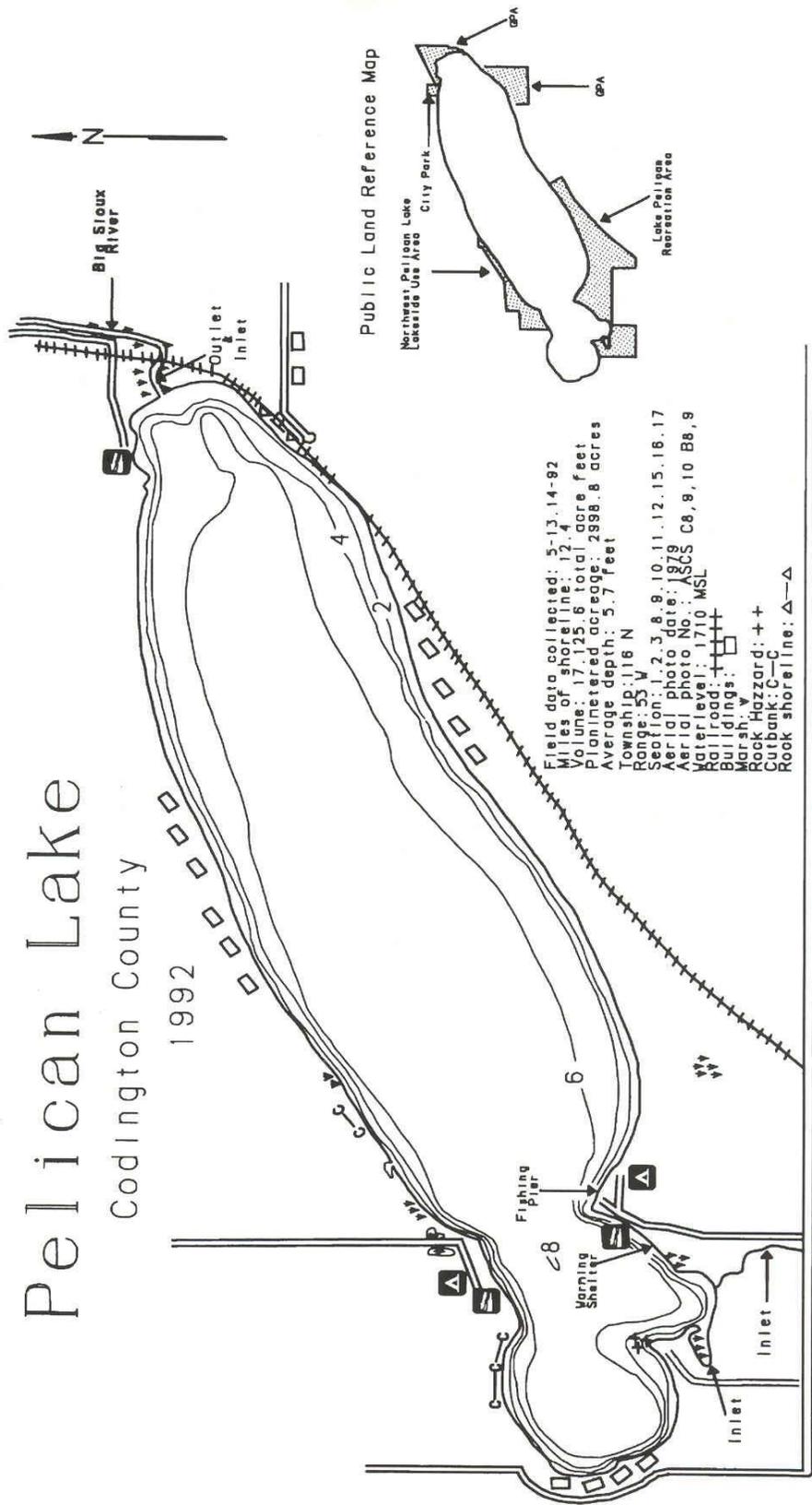


Figure 1. Contour Map of Pelican Lake, Codington County, South Dakota.



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 the City of 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).

Due to its shallow nature and eutrophication, Pelican Lake has a history of frequent winterkill and summerkill events the latest of which occurred during the winter of 2007-08. The 2007-08 winterkill severely limited Walleye and Yellow Perch populations. Gill nets set just after ice-out during 2008 captured low numbers of adult Northern Pike and sub-stock (< 13 cm; 5 in) Yellow Perch. Since the 2007-08 winterkill, both Walleye and Yellow Perch have been restocked (Table 6). Pelican Lake is primarily managed as a Walleye and Yellow Perch fishery; however, other species such as Black Crappie, Northern Pike, and White Bass may also contribute to the fishery. Overall, as many as 14 species of fish have been collected from Pelican Lake.

In 2012, frame nets were not utilized as part of the fish community survey on Pelican Lake. Therefore, the following results and discussion will focus on those fish species (e.g., Northern Pike, Walleye, and Yellow Perch) typically assessed using gill net data and noteworthy catches of other fish species.

Primary Species

Walleye: The mean gill net CPUE of stock-length Walleye was 9.0 (Table 1) and slightly below the minimum objective (≥ 10 stock-length Walleye/net night; Table 3). The 2012 gill net CPUE represented a substantial increase from the 2009 CPUE of 0.0 (Table 2) and indicated moderate relative abundance.

Gill net captured Walleye ranged in TL from 31 to 59 cm (12.2 to 23.2 in; Figure 3). Age estimates made using otoliths from gill net captured Walleye suggested that restocking efforts were successful as year classes produced in 2008-2010, which coincided with fry stockings, comprised the entire sample (Table 4; Table 6; Figure 3).

The majority of Walleye in the gill net catch were \geq quality-length which resulted in a PSD of 94 and above the management objective of 30-60; while the PSD-P was 6 and within the management objective range of 5-10 (Table 1; Table 3).

The 2009 and 2010 year classes have exhibited fast growth. The 2009 year class had a weighted mean TL at capture of 490 mm (19.3 in) at age 3; while the 2010 year class had a weighted mean TL at capture of 400 mm (15.7 in) at age 2 (Table 5). Mean Wr values of Walleye captured in the gill net catch ranged from 89 to 93 for all length categories (e.g., stock to quality) sampled with the mean Wr of stock-length walleye being 90 (Table 1). No length-related trends in walleye condition were apparent.

Yellow Perch: Yellow Perch were the most abundant species captured in the gill net catch (Table 1). The mean gill net CPUE of stock-length Yellow Perch was 79.7 (Table 1) and above the minimum objective (\geq 30 stock-length Yellow Perch/net night; Table 3). The 2011 gill net CPUE represented a substantial increase from the 2009 CPUE of 0.5 (Table 2) and indicated high relative abundance.

Yellow Perch captured in gill nets ranged in TL from 11 to 30 cm (4.3 to 11.8 in), had a PSD of 46 and a PSD-P of 7 (Table 1; Figure 4). The PSD and PSD-P values were within management objectives and indicated a relatively balanced population (defined as PSD of 30-60 and a PSD-P of 5-10; Table 3). Otoliths were collected from a sub-sample of gill net captured Yellow Perch. Three year classes (2009-2011) were present (Table 7). The 2010 (age 2) and 2011 (age 1) year classes were the most represented and collectively comprised approximately 88% of Yellow Perch in the gill net catch (Table 7).

Male Yellow Perch had weighted mean TL at capture values of 141, 203, and 237 mm (5.6, 8.0, and 9.3 in) at age-1, age-2 and age-3, respectively; (Table 8). The weighted mean TL at capture for age-1, age-2, and age-3 female yellow perch was 143, 224, and 278 mm (5.6, 8.8, and 10.9 in; Table 8). Sampled yellow perch had mean Wr values that ranged from 80-100 for all length categories (e.g., stock-quality) sampled, with the mean Wr of stock-length yellow perch being 96 (Table 1). No length-related trends in condition were apparent.

Other Species

Northern Pike: Adult northern pike were present in Pelican Lake immediately following the 2007-08 winterkill and appear to have thrived with the high water conditions of recent years. The mean gill net CPUE of stock-length Northern Pike was 14.8 (Table 1) and indicated high relative abundance.

Northern Pike in the gill net catch ranged in TL from 42 to 67 mm (16.5 to 26.4 in), had a PSD of 39 and a PSD-P of 0 (Table 1; Figure 5). No age and growth information was available in 2012. Gill net captured Northern Pike had a mean Wr of 96 for all length categories (e.g., stock to quality) sampled and no length-related trends in condition were apparent.

Other: Black Bullhead, Black Crappie, Common Carp, White Bass and White Sucker were other fish species captured in relatively-high numbers during the 2012 survey. The mean gill net CPUE of stock-length fish was 21.7, 18.0, 15.5, 14.7, and 6.7 for Black Bullhead, Black Crappie, Common Carp, White Bass, and White Sucker, respectively (Table 1). In addition, Green Sunfish, Orangespotted Sunfish, 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 2014) 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 re-stock with Walleye and Yellow Perch to establish a 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 experimental gill nets from Pelican Lake, 2012. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). 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

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Gill Nets</i>								
BLB	21.7	8.9	32	7	0	---	94	<1
BLC	18.0	5.8	0	---	0	---	114	<1
COC	15.5	6.1	0	---	0	---	101	1
GSF	0.2	0.2	0	---	0	---	100	---
NOP	14.8	3.3	39	9	0	---	96	1
OSF ¹	0.2	0.2	---	---	---	---	---	---
SPS ¹	2.8	2.2	---	---	---	---	---	---
WAE	9.0	4.1	94	5	6	5	91	<1
WHB	14.7	7.4	33	8	6	4	94	1
WHS	6.7	4.2	100	0	90	8	101	2
YEB	0.7	0.6	100	0	50	50	119	5
YEP	79.7	20.4	46	4	7	2	96	1

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, 2009-2012. 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

Species	CPUE			
	2009	2010	2011	2012
<i>Frame Nets</i>				
BIB	12.1	---	---	---
BLB	7.9	---	---	---
COC	0.1	---	---	---
NOP	1.3	---	---	---
WAE	0.1	---	---	---
WHS	1.4	---	---	---
YEB	0.1	---	---	---
YEP	0.1	---	---	---
<i>Gill Nets</i>				
BIB	0.3	---	---	0.0
BLB	0.3	---	---	21.7
BLC	0.0	---	---	18.0
COC	0.0	---	---	15.5
GSF	0.0	---	---	0.2
NOP	0.0	---	---	14.8
OSF ¹	0.8	---	---	0.2
SPS ¹	0.2	---	---	2.8
WAE	0.0	---	---	9.0
WHB	4.3	---	---	14.7
WHS	0.0	---	---	6.7
YEB	0.0	---	---	0.7
YEP	0.5	---	---	79.7

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, 2009-2012. NOP= Northern Pike; WAE = Walleye; YEP = Yellow Perch

Species	2009	2010	2011	2012	Objective
<i>Gill nets</i>					
NOP					
CPUE	1	---	---	15	---
PSD	60	---	---	39	---
PSD-P	0	---	---	0	---
Wr	100	---	---	96	---
WAE					
CPUE	0	---	---	9	≥ 10
PSD	---	---	---	94	30-60
PSD-P	---	---	---	6	5-10
Wr	---	---	---	91	---
YEP					
CPUE	1	---	---	80	≥ 30
PSD	67	---	---	46	30-60
PSD-P	0	---	---	7	5-10
Wr	104	---	---	96	---

Table 4. Year class distribution based on the expanded age/length summary for Walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Pelican Lake, 2009-2012.

Survey Year	Year Class				
	2012	2011	2010	2009	2008
2012			40	12	2
2009	---	---	---		
# stocked					
fry	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, 2009-2012. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age			
	1	2	3	4
2012	---	400(40)	490(12)	584(2)
2009	---	---	---	---

Table 6. Stocking history including size and number for fishes stocked into Pelican Lake, 2008-2012. 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

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

Survey Year	Year Class			
	2012	2011	2010	2009
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.

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

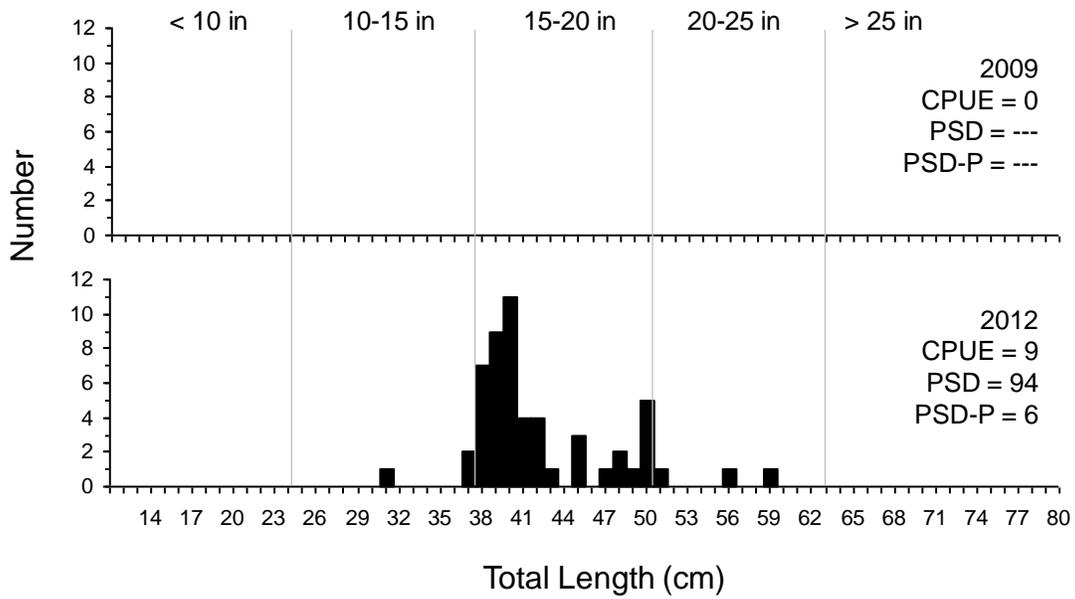


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using experimental gill nets in Pelican Lake, 2009 and 2012.

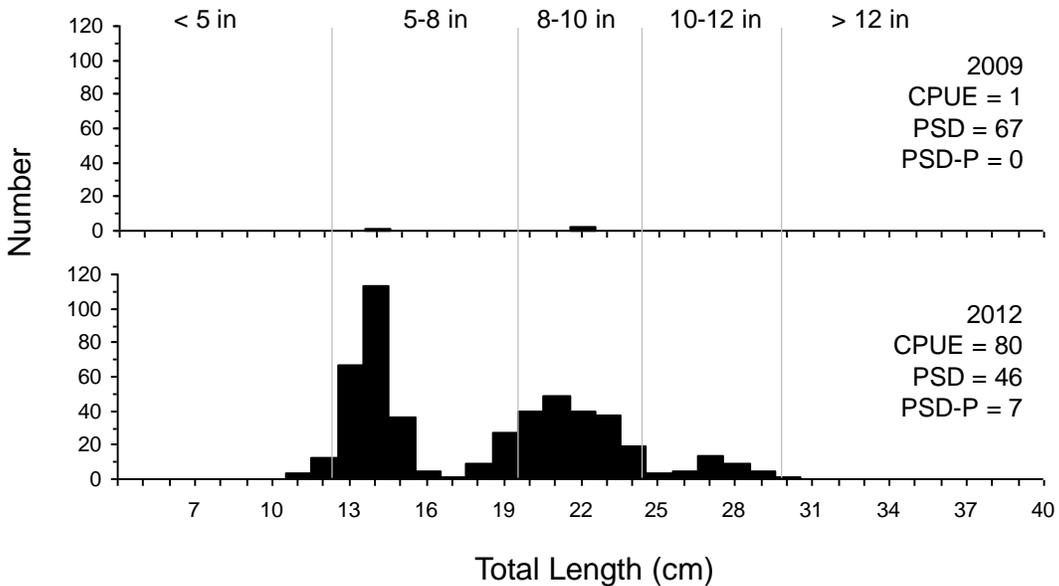


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Pelican Lake, 2009 and 2012.

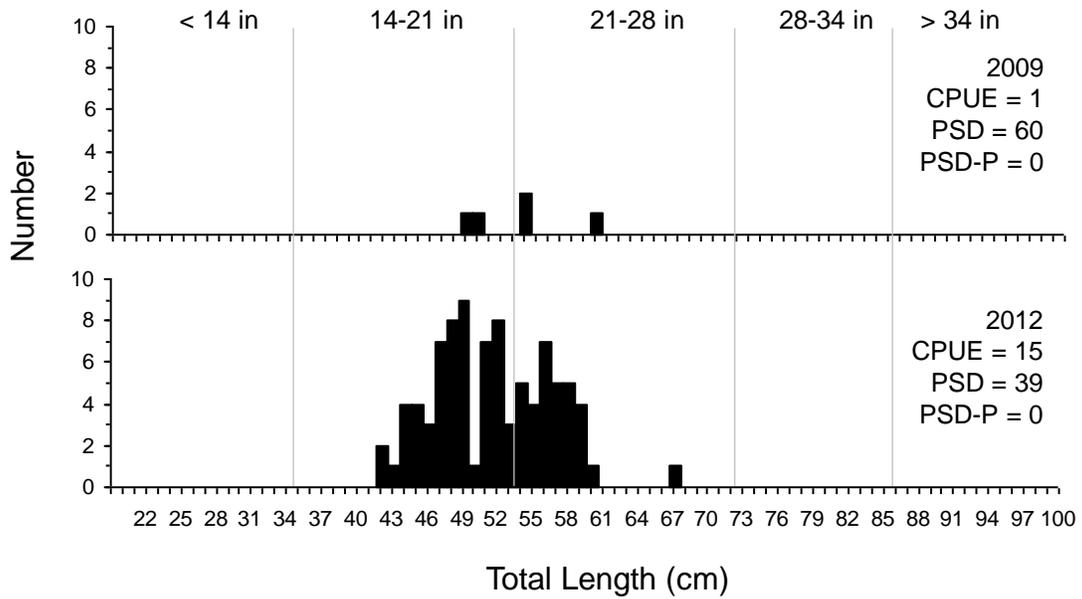


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Northern Pike captured using experimental gill nets in Pelican Lake, 2009 and 2012.