

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 Netting Information

Dates of current survey	June 19-21, 2007
Date of most recent survey	June 24-26, 2003
	June 22-24, 2004
	June 21-23, 2005
Gill net sets (n)	6
Frame net sets (n)	18

Morphometry (Figure 1)

Watershed area (acres)	15,686
Surface area (acres)	2,796
Maximum depth (ft)	8
Mean depth (ft)	5

Ownership and Public Access

Pelican Lake is a meandered lake 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 city of Watertown (Outlet/Inlet Area; Figure 1). 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 Pelican Lake watershed is comprised of a mix of cropland (70%), pasture/grassland (17%), housing (7%), and 6% other (wetlands, treebelts, and roads).

Water Level Observations

The Water Management Board established Ordinary High Water Mark is 1710.2 fmsl (feet above mean sea level), and the established outlet elevation of Pelican Lake is 1709.7 fmsl. On May 8, 2007, Pelican Lake was slightly above the Ordinary High Water Mark at an elevation of 1710.8 fmsl. On October 23, 2007 Pelican lake was near full with an elevation of 1709.6 fmsl. Trophic state of Pelican Lake varies between eutrophic and hypereutrophic.

Aquatic Vegetation and Exotics

Stueven and Stewart (1996) reported that emergent vegetation covers <5% of the shoreline. Emergent vegetation in the form of cattail and bulrush is present on the west and east ends of the lake; while submergent vegetation is sparse (Ermer et al. 2006). Common carp were the only exotic species reported during this survey.

Fish Management Information

Primary species	walleye, yellow perch
Other species	black crappie, bigmouth buffalo, black bullhead, channel catfish, common carp, emerald shiner, fathead minnow, green sunfish, Johnny darter, logperch, northern pike, orangespotted sunfish, rock bass, spottail shiner, white bass, white sucker
Management classification	warm-water permanent
Fish Consumption Advisories	none

South Dakota Department of Game Fish and Parks

Pelican Lake

Codington County

1992

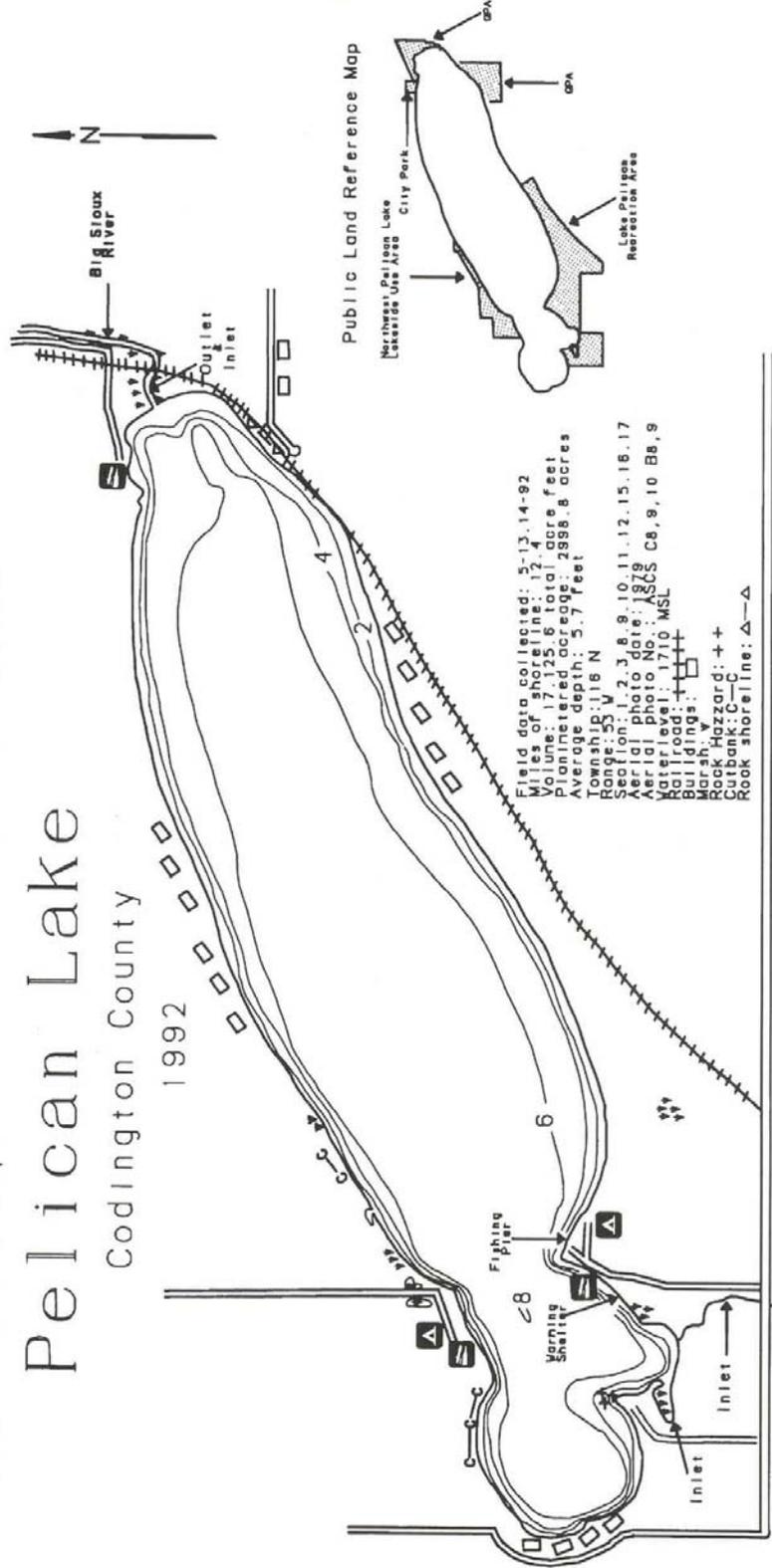


Figure 1. Pelican Lake contour map.

Management Objectives

- 1) Maintain a mean gill net CPUE of stock-length walleye ≥ 10 , a PSD of 30-60, and an RSD-P of 5-10.
- 2) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 25 , a PSD of 30-60, and an RSD-P of 5-10.
- 3) Maintain a mean frame net CPUE of stock-length bullhead ≤ 100 .

Results and Discussion

Pelican Lake is a large, permanent, natural lake located on the southwest edge of Watertown, Codington County, South Dakota. Pelican Lake is a relatively-shallow lake with a maximum depth near eight feet. A diversion channel, with Weir structure, connects Pelican Lake to the Big Sioux River and serves as both the inlet and outlet. Although not well documented Pelican Lake has sustained relatively-frequent winterkill and summer kill events (1945, 1959, 1969, 1982, 1986, 1987, 1988, and 1996) of varying magnitudes. The close proximity to the city of Watertown make Pelican Lake a popular recreational destination. Public access to Pelican Lake is available on the northwest, east, south (State Park), and west shores of the lake (Figure 1).

Currently Pelican Lake is primarily managed as a walleye and yellow perch fishery. Overall, as many as 18 species of fish may contribute to the fishery in Pelican Lake.

Primary Species

Walleye: The mean gill net CPUE of stock-length walleye during 2007 was 3.3, and indicative of low relative abundance (Table 1). The 2007 CPUE was the lowest reported since 2001, and below the minimum objective (≥ 10 stock-length walleye/net night; Table 2; Table 3). Relatively-poor recruitment of stocked and naturally-produced walleye in 2002, 2003, and 2005 has resulted in the low relative abundance during 2007 (Table 6). Year-classes produced in 2004 and 2006, although not highly abundant, comprised the majority of the gill net catch and coincide with fry stockings (Table 5; Table 6). However, walleye from the 2006 year-class were sub-stock and may not have been fully recruited to our gear at the time of the 2007 sample.

Walleye captured in gill nets during 2007 ranged in total length from 160 to 670 mm (Figure 3). The PSD of walleye captured in gill nets during 2007 was 95 and the RSD-P was 25 (Table 1; Table 3; Figure 3). PSD and RSD-P values were above the objective ranges of 30-60 and 5-10, respectively, and indicative of a population comprised mainly of quality- and preferred-length walleye. However, as walleye from the 2006 year-class obtain stock-length the PSD is expected to decline.

In 2005, the primary aging structure was switched from scales to otoliths. Since 2005, walleye growth in Pelican Lake has remained similar, with walleye surpassing 356 mm (14 inches) beginning at age-2 (Table 4). In 2007, the mean length at capture for

age-3 and age-4 walleye was 417 mm and 476 mm (Table 4). The condition of walleye in Pelican Lake ranged from the mid 80's to low 90's for all length groups sampled. No length-related trends in W_r were apparent in 2007, and the mean W_r of stock-length walleye was 89 (Table 1).

Yellow Perch: The mean gill net CPUE of stock-length (130 mm) yellow perch in 2007 was 19.8, and was below the minimum objective (≥ 25 fish/net night; Table 1; Table 3). Yellow perch relative abundance was considered low at the time of the 2007 sample. Since 2001, the gill net CPUE of stock-length yellow perch has fluctuated with year-class strength from a high of 91.0 (2001) to a low of 8.3 (2006; Table 2). Length-frequency analysis of the 2007 gill net catch suggests low recruitment of yellow perch since 2004 resulting in the decreased abundance (Table 2; Table 3; Figure 4). Fisher (1996) characterized the yellow perch population as having low- to moderate-density, fast growth, high size structure, and inconsistent recruitment.

During 2007, yellow perch ranged in total length from 120 to 330 mm, had a PSD of 76 and RSD-P of 66 (Table 3; Figure 4). Both the PSD and RSD-P were above the objective ranges of 30-60 and 5-10, likely the result of yellow perch from the 2004 year-class dominating the population. Ermer et al. (2006) reported the presence of a relatively-strong 2004 year-class during the 2005 survey.

No growth information was collected in 2007. Mean W_r values for yellow perch captured in gill nets during 2007 exceeded 100 for all length groups sampled. No length-related trends in W_r values were observed and the mean W_r of stock-length yellow perch was 116 (Table 1).

Other Species

Black bullhead: The mean frame net CPUE of stock-length black bullhead during 2007 was 4.6 (Table 1) and was the lowest reported since 2001 (Table 2). However, length-frequency analysis of frame net captured black bullheads in 2007 indicated successful recruitment in recent years, as sub-stock (≤ 150 -mm) fish were sampled (Figure 2). Since 2001, black bullhead relative abundance has fluctuated from a high of 134.1 (2002) to a low of 4.6 (2007; Table 2). The frame net CPUE in 2007 was within the objective (≤ 100 stock-length fish/net-night) for black bullhead in Pelican Lake, and indicated low relative abundance (Table 3).

The total length of black bullhead captured in frame nets during 2007 ranged from 120 to 390 mm (Figure 2). The PSD of black bullhead captured in frame nets during 2007 was 66 and the RSD-P was 59 (Table 1; Table 3; Figure 2). The decrease in size structure from 2005 is the result of successful recruitment of what appears to be a single year-class in recent years (Table 3; Figure 2).

No growth information was collected in 2007. Mean W_r values were in the 90's and indicated acceptable condition. No length-related trends in W_r were apparent, and the mean W_r for stock-length fish was 93 (Table 1).

Northern Pike: Northern pike typically are not sampled effectively during mid-summer fish community assessments. In 2007, the gill net CPUE of stock-length northern pike in Pelican Lake was 0.3 (Table 1). Abundance of northern pike in Pelican Lake has generally been considered low, based on the 2001-2007 mean gill net CPUE of stock-length fish of 0.4 (Table 2). Two northern pike were captured by gill nets in 2007 with total lengths of 509 and 697 mm. No growth information was available; however, the condition of both northern pike was good with W_r values of 77 and 84.

Other: Bigmouth buffalo, black crappie, bluegill, channel catfish, common carp, shorthead redhorse, smallmouth bass, white bass, white sucker, and yellow bullhead were other fish species captured during 2007. Relative abundance of these fish species was considered low (Table 1).

Bigmouth buffalo, common carp, and white bass are species commonly harvested from Pelican Lake by commercial fishermen; however, no commercial fishing occurred during the 2006-2007 winter or 2007 summer.

Management Recommendations

- 1) Conduct fish community assessment surveys on a biennial basis (next survey scheduled in summer 2009) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Stock walleye on a biennial basis ($\approx 1,000$ fry/acre) to add additional year-classes to the population.
- 3) 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 Pelican Lake did not necessitate the need for commercial harvest.
- 4) Monitor water levels and winterkill events. In cases of complete winterkill re-stock with northern pike, walleye, and yellow perch to establish a fish community.

Table 1. Mean catch rate (CPUE; gill/frame nets = catch/net night) of stock-length fish, mean relative weight (Wr) of stock-length fish, proportional stock density (PSD) and relative stock density of preferred-length fish (RSD-P) of various fish species captured in experimental gill nets and frame nets in Pelican Lake, 2007. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; NOP= northern pike; SHR= shorthead redhorse; SMB= smallmouth bass; WAE= walleye; WHB= white bass; WHS= white sucker; YEB= yellow bullhead YEP= yellow perch

Survey Year Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	RSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BIB	1.6	0.4	100	0	18	12	90	2
BLB	4.6	1.7	66	9	59	9	93	1
BLC	0.8	0.7	50	25	21	21	114	5
BLG	0.4	0.3	57	39	14	28	127	9
CCF	<0.1	---	---	---	---	---	---	---
COC	0.4	0.3	100	0	88	12	82	4
NOP	0.8	0.2	79	20	21	21	77	4
SHR	0.1	0.0	100	---	100	---	121	---
SMB	0.1	0.0	100	---	0	---	109	---
WAE	1.3	0.5	100	0	17	13	87	1
WHB	2.7	1.2	100	0	78	10	93	1
WHS	0.9	0.3	100	0	100	0	100	3
YEB	0.6	0.2	100	0	70	28	108	6
YEP	0.6	0.3	60	30	50	31	106	5
<i>Gill nets</i>								
BIB	0.5	0.5	67	33	33	67	94	20
COC	1.3	0.7	100	0	100	0	86	6
NOP	0.3	0.3	50	50	0	--	81	24
SHR	0.2	0.2	100	---	100	---	105	---
WAE	3.3	1.9	95	5	25	17	89	1
WHB	3.8	1.2	100	0	30	17	97	1
WHS	1.7	0.9	80	20	60	30	104	5
YEP	19.8	9.3	76	6	66	8	116	<1

Table 2. Historic mean catch rate (CPUE; gill/frame nets = catch/net night) of stock-length fish for various fish species captured in experimental gill nets and frame nets in Pelican Lake, 2000 – 2007. BIB= bigmouth buffalo; BLB= black bullhead; BLC= black crappie; BLG= bluegill; CCF= channel catfish; COC= common carp; EMS= emerald shiner; GSF= green sunfish; NOP= northern pike; OSF= Orangespotted sunfish; ROB= rock bass; 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

Species	CPUE								Mean
	2000	2001	2002	2003	2004	2005	2006 ^{1,3}	2007 ¹	
<i>Frame nets</i>									
BIB	---	4.9	0.0	0.5	---	3.1	---	1.6	2.0
BLB	---	19.9	134.1	60.4	---	5.2	---	4.6	44.8
BLC	---	1.2	1.6	0.6	---	0.4	---	0.8	0.9
BLG	---	0.0	0.1	0.5	---	0.0	---	0.4	0.2
CCF	---	0.8	0.6	0.7	---	0.2	---	0.0	0.5
COC	---	0.4	0.0	0.4	---	0.1	---	0.4	0.3
EMS ²	---	0.0	0.0	0.1	---	0.0	---	0.0	0.0
GSF	---	0.0	0.1	0.0	---	0.0	---	0.0	0.0
NOP	---	1.2	0.3	0.5	---	0.1	---	0.8	0.6
ROB	---	0.1	0.0	0.0	---	0.0	---	0.0	0.0
SHR	---	0.1	0.2	0.1	---	0.3	---	0.1	0.2
SMB	---	0.1	0.1	0.0	---	0.1	---	0.1	0.1
WAE	---	1.9	0.5	1.9	---	0.2	---	1.3	1.2
WHB	---	0.2	0.1	0.1	---	0.1	---	2.7	0.6
WHC	---	0.0	0.0	0.1	---	0.0	---	0.0	0.0
WHS	---	4.9	0.3	1.2	---	1.2	---	0.9	1.7
YEB	---	0.1	0.3	7.6	---	0.1	---	0.6	1.7
YEP	---	5.3	8.2	5.6	---	1.3	---	0.6	4.2
<i>Gill nets</i>									
BIB	---	0.0	0.0	1.2	0.2	0.0	0.0	0.5	0.3
BLB	---	3.3	3.2	3.2	1.3	1.2	0.0	0.0	1.7
BLC	---	0.0	0.2	0.3	0.2	0.0	0.0	0.0	0.1
CCF	---	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1
COC	---	0.0	0.0	0.0	0.0	0.2	0.0	1.3	0.2
EMS ²	---	0.0	0.8	6.0	0.2	0.0	0.0	0.0	1.0
NOP	---	0.3	0.7	0.7	1.0	0.0	0.0	0.3	0.4
OSF	---	0.0	0.2	6.0	0.2	0.7	0.0	0.0	1.0
SHR	---	0.7	1.0	0.0	0.5	0.5	0.0	0.2	0.4
SPS ²	---	0.0	0.2	0.3	0.7	2.5	0.0	0.0	0.5
WAE	---	11.5	34.3	41.2	9.8	8.7	9.0	3.3	16.8
WHB	---	0.0	3.5	1.3	0.5	2.8	1.3	3.8	1.9
WHS	---	9.5	4.0	2.5	3.5	4.3	0.7	1.7	3.7
YEP	---	91.0	70.5	41.7	21.2	26.7	8.3	19.8	39.9

¹ Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

² All fish sizes

³ Reduced effort, three overnight gill net sets.

Table 3. Mean catch rate (CPUE; gill/frame nets = catch/net night), proportional stock density (PSD), relative stock density of preferred-length fish (RSD-P), and relative weight (Wr) for selected species captured in experimental gill nets and frame nets in Pelican Lake, 2000-2007. BLB= black bullhead; WAE= walleye; YEP= yellow perch

Species	2000	2001	2002	2003	2004	2005	2006 ^{1,2}	2007 ¹	Average	Objective
<i>Frame nets</i>										
BLB										
CPUE	---	20	134	60	---	5	---	5	45	≤ 100
PSD	---	93	43	61	---	99	---	66	72	---
RSD-P	---	85	17	13	---	98	---	59	54	---
Wr	---	98	103	95	---	98	---	93	97	---
<i>Gill nets</i>										
WAE										
CPUE	---	12	34	41	10	9	9	3	17	≥ 10
PSD	---	1	73	86	97	85	11	95	64	30 – 60
RSD-P	---	1	2	2	19	15	0	25	9	5 – 10
Wr	---	94	96	94	87	87	91	89	91	---
YEP										
CPUE	---	91	71	42	21	27	8	20	40	≥ 25
PSD	---	100	95	6	58	41	90	76	67	30-60
RSD-P	---	77	50	1	3	30	23	66	36	5-10
Wr	---	106	98	103	109	105	116	116	108	---

¹ Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

² Reduced effort, three overnight gill net sets.

Table 4. Weighted mean length at capture (mm) for walleye captured in experimental gill nets in Pelican Lake, 2005 and 2007. Note: sampling was conducted at approximately same time of the year to allow for comparisons between years.

Year	N	Age									
		1	2	3	4	5	6	7	8	9	10
2007 ¹	40	202	---	417	476	---	478	---	---	---	531
2006 ¹											
2005 ¹	82	192	373	432	461	---	---	508	513	698	473
2004	60	---	345	428	444	---	483	498	---	---	---
2003	240	---	383	---	---	465	480	---	---	---	---
2002	224	252	---	381	400	559	---	---	---	---	---
2001	70	261	280	293	344	630	---	---	---	---	---

¹ Age assignments made using otoliths; scales were used in previous years.

Table 5. Stocking history including size and number for fishes stocked into Pelican Lake, 1996 - 2007.

Year	Species	Size	Number
1996	WAE	small fingerling	562,800
1997	WAE	fry	2,800,000
	WAE	small fingerling	260,300
1998	WAE	fry	2,795,000
2002	WAE	fry	2,795,000
2004	WAE	fry	2,800,000
2006	WAE	fry	2,800,000

Table 6. Numbers of walleye sampled (n) by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Pelican Lake, 2001-2007.

Survey Year	Year Class											
	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	
2007 ^{1,2}		20		11	1		1					5
2006 ^{1,2,3}	---		1	23	1							2
2005 ¹	---	---		30	8	4	20			3		14
2004	---	---	---			2	14	1		9		34
2003	---	---	---	---			74			133		33
2002	---	---	---	---	---		40		29	151		4
2001	---	---	---	---	---	---		6	37	24		2
Number stocked												
fry		2,800		2,800		2,795				2,798		2,800
small fingerling												260
large fingerling												

¹ Monofilament gill net mesh size change (.75", 1", 1.25", 1.5", 2" and 2.5"), previous years (.5", .75", 1", 1.25", 1.5" and 2").

² Age assignments made using otoliths; scales were used in previous years.

³ Reduced effort, three overnight gill net sets.

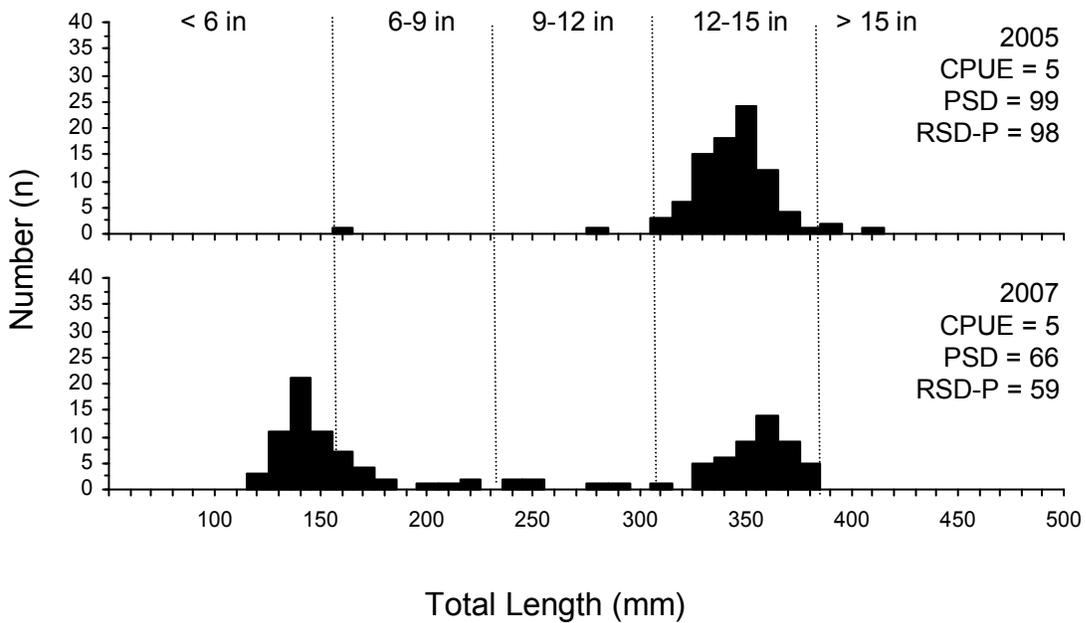


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for black bullhead captured in frame nets in Pelican Lake, 2005 and 2007.

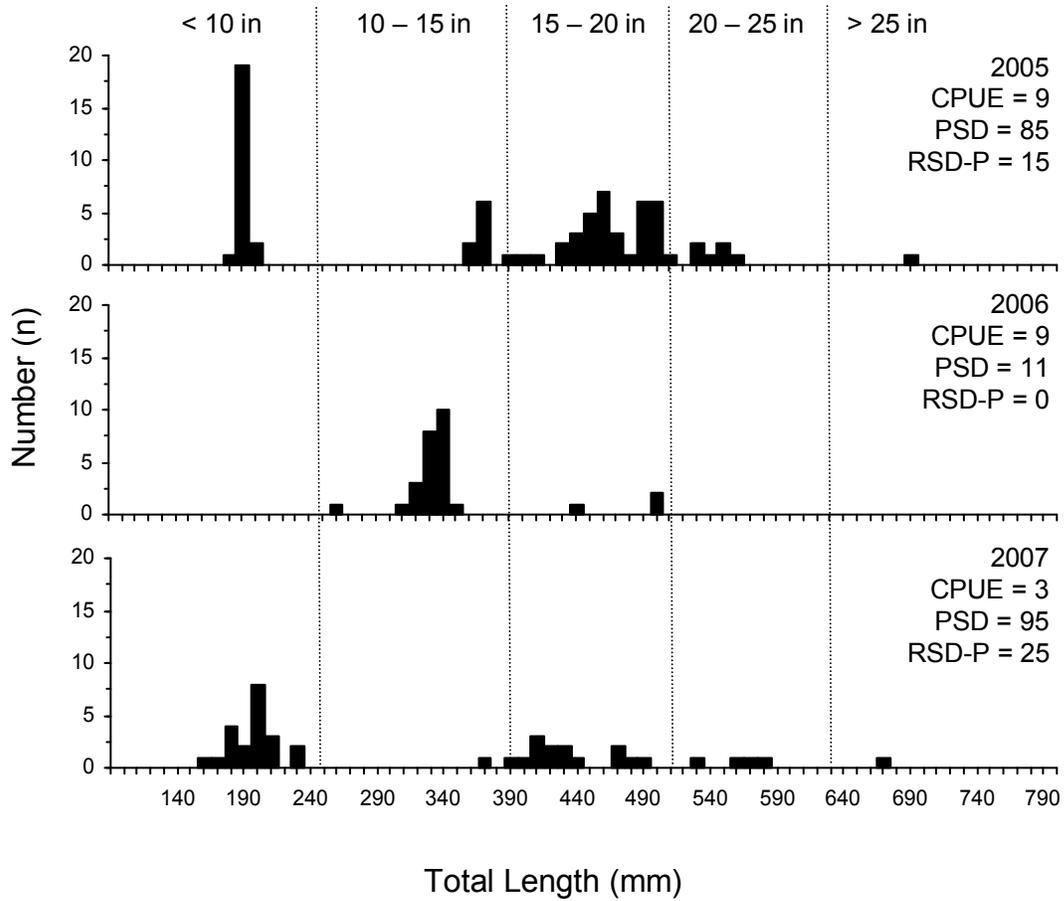


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for walleye captured in gill nets in Pelican Lake, 2005-2007.

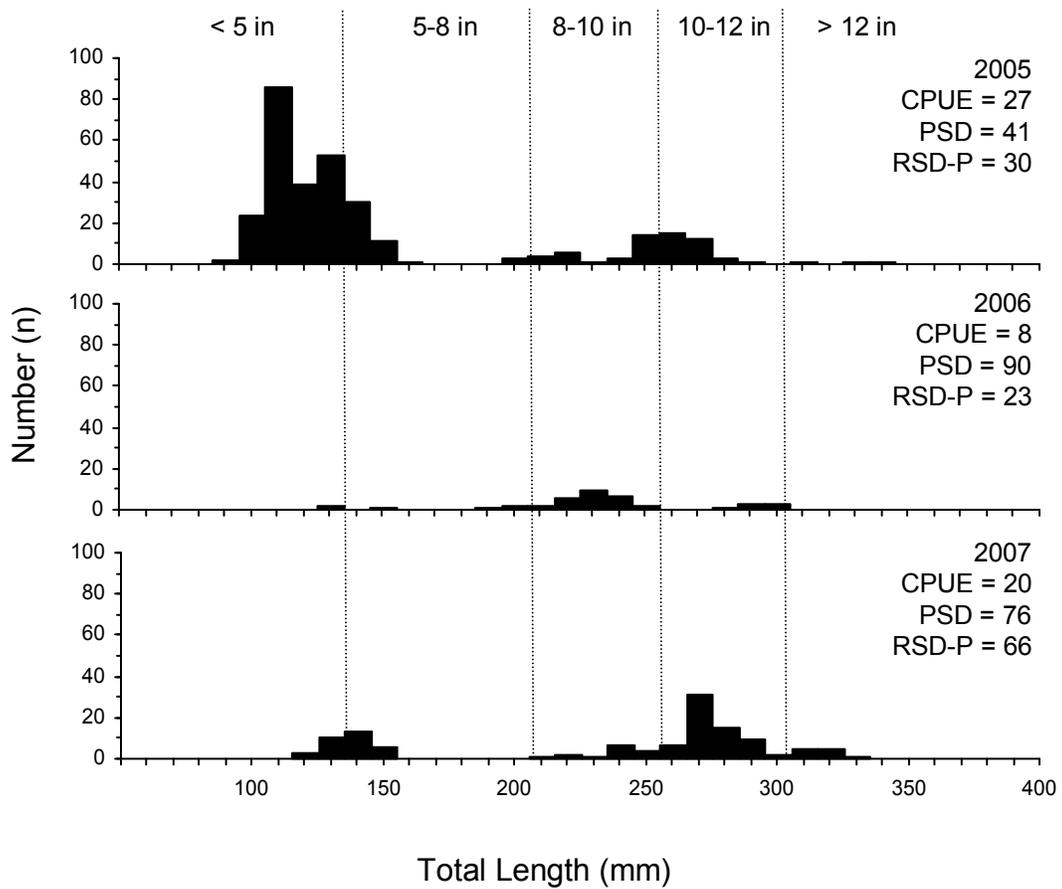


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional stock density (PSD), and relative stock density of preferred-length fish (RSD-P) for yellow perch captured in experimental gill nets in Pelican Lake, 2005-2007.