

Bullhead Lake

Site Description

Location

Water designation number (WDN)	48-0007-00
Legal description	T126N-R55W-Sec. 18,19
County (ies)	Marshall
Location from nearest town	4 miles west and 2 miles south of Lake City, SD

Survey Dates and Sampling Information

Survey dates	June 2-3, 2009 (FN, GN)
Frame net sets (n)	15
Gill net sets (n)	3

Morphometry (Figure 1)

Watershed area (acres)	---
Surface area (acres)	163
Maximum depth (ft)	15
Mean depth (ft)	7

Ownership and Public Access

Bullhead Lake is a meandered lake owned and managed by the SDGFP. Lands adjacent to Bullhead Lake are primarily owned by the State of South Dakota, but a small portion on the north shore is under private ownership. A public access (including boat ramp) is located on the southwest shore of the lake and is maintained by the SDGFP (Figure 2). Much of the shoreline of Bullhead Lake is undeveloped as only a few homes and cabins are present (Figure 2).

Watershed and Land Use

No data was available on land-use within the Bullhead Lake watershed.

Water Level Observations

No Ordinary High Water Mark has been established by the South Dakota Water Management Board on Bullhead Lake. The elevation of Bullhead Lake on April 28, 2009 was 1797.4 fmsl and indicated only a slight decrease from the fall 2008 elevation of 1798.0 fmsl. The water level on September 23, 2009 was at the same elevation as the April observation at 1797.4 fmsl.

Aquatic Nuisance Species Monitoring

Plant Survey

Submerged vegetation was prevalent in the northwest bay of the lake and in scattered beds in protected areas of the main lake. Species identified included native milfoil and coontail. No aquatic nuisance plant species were identified during the 2009 survey.

Macro-Invertebrate/Mussel Survey

No aquatic nuisance macro-invertebrate or mussel species were sampled.

Fish Community Survey

No aquatic nuisance fish species were captured during the 2009 survey; however, common carp were captured during the 1994 survey and common carp were captured in Four-Mile Lake during 2009. Bullhead Lake is connected to Four-Mile Lake during high water periods.

Fish Management Information

Primary species	northern pike, yellow perch
Other species	black bullhead, black crappie, bluegill, common carp, largemouth bass, smallmouth bass, walleye, white sucker
Lake-Specific regulations	NE Panfish Management Area: 10 daily; 50 possession
Management classification	warm-water marginal
Fish consumption advisories	none

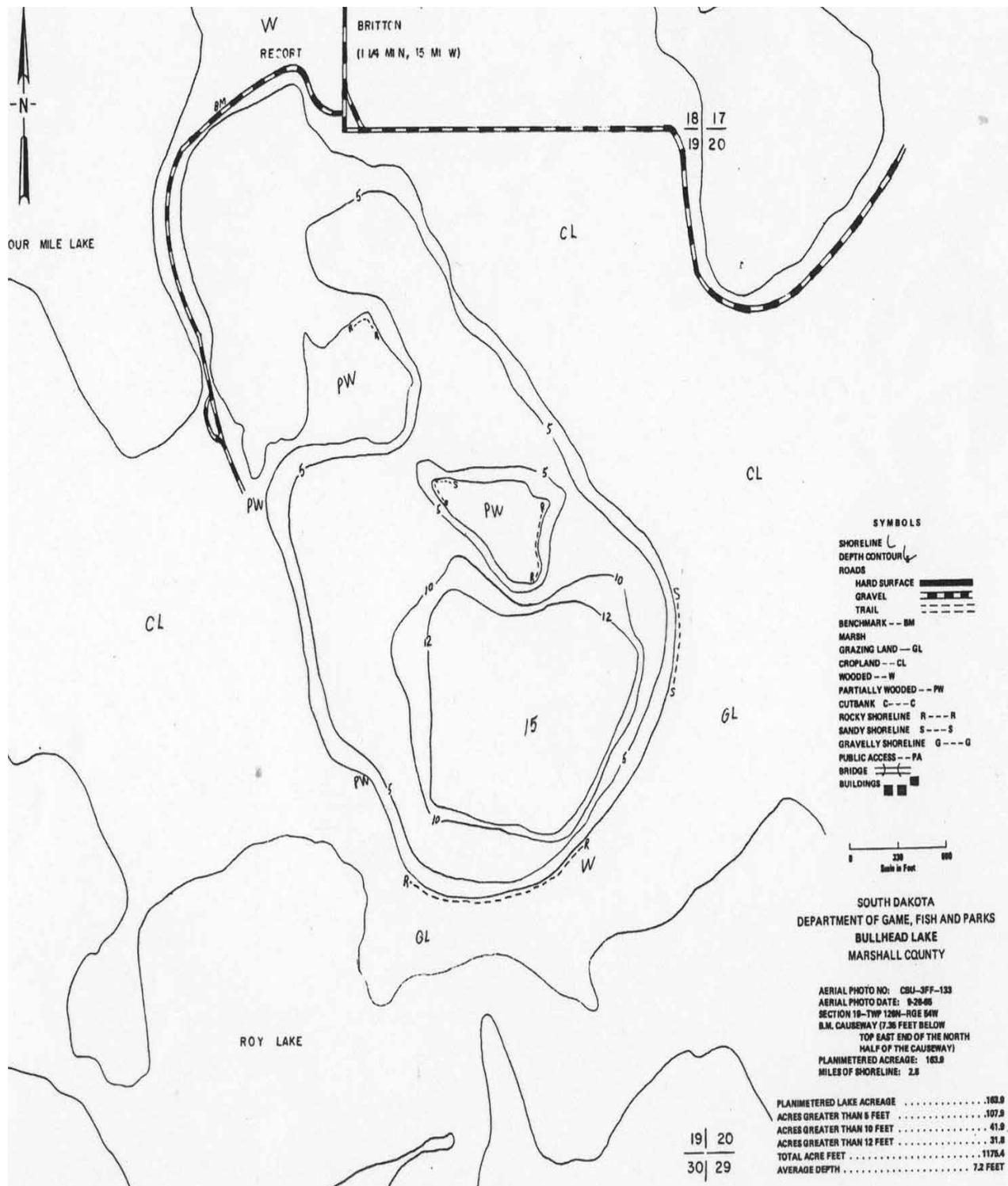


Figure 1. Bullhead Lake contour map.

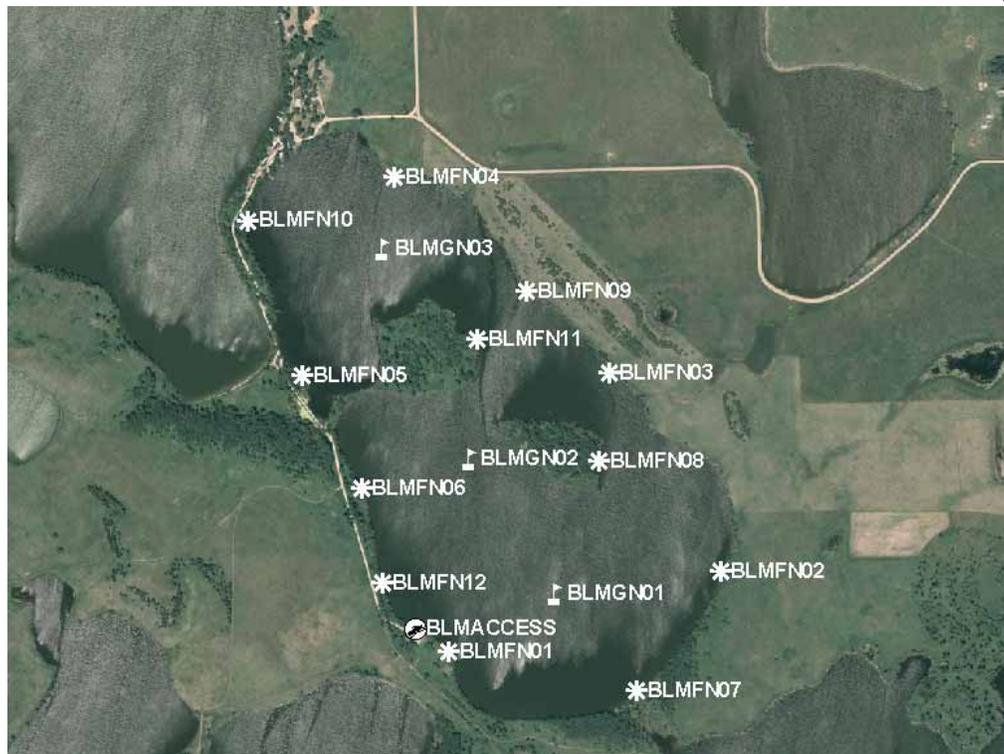
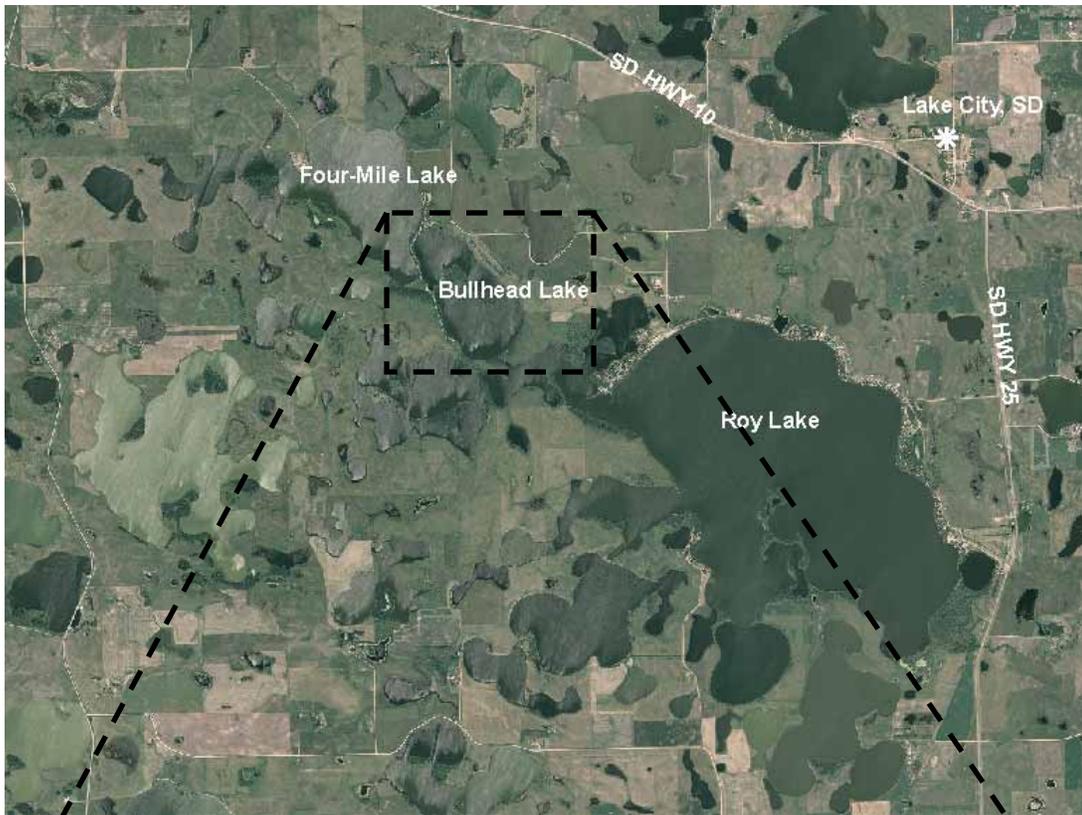


Figure 2. Map depicting geographic location of Bullhead Lake from Lake City, South Dakota (top). Also noted is the boat ramp and standardized net locations for Bullhead Lake (bottom). BLMFN= frame nets, BLMGN= gill nets

Management Objectives

- 1) Maintain a mean gill net CPUE of stock-length northern pike ≥ 3 , 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 bullhead ≤ 100 .

Results and Discussion

Bullhead Lake is a shallow natural lake located southwest of Lake City, South Dakota. The lake receives surface water from the local watershed and Four-Mile Lake to the northwest. During periods of high water, Bullhead Lake flows southeast into Roy Lake.

Bullhead Lake has a history of winter and summerkill events (most recently documented in winter of 1992-1993) and the fish community has been primarily comprised of black bullhead, northern pike, and yellow perch (species believed to be more winterkill tolerant). However, anecdotal information suggests that walleye and largemouth bass have provided a sport fishery between winter and summerkill events. The lake habitat is conducive to largemouth bass and bluegill; therefore during intervals when adequate water conditions exist stocking of bluegill and largemouth bass may be considered. Currently, Bullhead Lake is managed as a northern pike and yellow perch fishery.

Primary Species

Northern Pike: The 2009 mean gill net CPUE of stock-length northern pike was 5.7 (Table 1) and above the minimum objective (≥ 3 stock-length fish/net night). Based on the 2009 gill net catch, relative abundance of northern pike in Bullhead Lake appears to be high (>3 stock-length northern pike/net night).

Northern pike sampled in gill nets during 2009 ranged in total length from 48 to 77 cm (18.9 to 30.3 in), had a PSD of 76, and a PSD-P of 12 (Figure 3). Both the PSD of 76 and PSD-P of 12 were above the management objectives of 30-60 and 5-10. Gill net sampled northern pike from Bullhead Lake in 2009 had mean W_r values that ranged from 74 to 98 for all length categories sampled, and a slight decreasing trend in W_r was apparent as length increased. Mean W_r values were likely at a seasonal low, as Neumann and Willis (1995) reported that W_r values were lowest during spring following the spawn and remained low throughout the summer in Lake Thompson, South Dakota. The mean W_r for stock-length northern pike was 91 (Table 1).

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 1.7 (Table 1), and below the minimum objective (≥ 30 stock-length yellow perch/net night). Based on the 2009 gill net catch, the relative abundance of stock-length yellow perch appears to be low (<8 stock-length yellow perch/net night).

Yellow perch captured in the 2009 gill net catch ranged in total length from 8 to 15 cm (3.1 to 5.9 in) with the majority being less than stock-length (Figure 5). No quality- or preferred-length yellow perch were captured resulting in a PSD and PSD-P of 0.

Otoliths were collected from a sub-sample of gill net captured yellow perch in 2009. The majority of the yellow perch sampled (97%) represented the 2007 year-class (Table 3). The weighted mean total length at capture for age-2 male yellow perch was 101 mm (4.0 in) and the weighted mean total length at capture for age-2 female yellow perch was 103 mm (4.1 in; Table 2). Mean W_r values of gill net captured yellow perch in 2009 ranged from 90 to 105 for all length categories sampled.

Other Species

Black Bullhead: The mean frame net CPUE of stock-length black bullhead during 2009 was 0.1 (Table 1) and within the management objective (≤ 100 stock-length fish/net-night). Black bullhead relative abundance was classified as low in Bullhead Lake during 2009. Given the current low relative abundance, the impact of the black bullhead population on the sport fishery in Bullhead Lake is likely minimal.

Bluegill: The mean frame net CPUE of stock-length bluegill during 2009 was 2.8 (Table 1). Bluegill captured ranged in total length from 7 to 17 cm (2.8 to 6.7 in) and had a PSD of 5 and PSD-P of 0 (Table 1). The low CPUE, PSD and PSD-P indicate a population of low relative abundance dominated by stock length or smaller bluegill. Condition of bluegill was good with a mean W_r of 104 (Table 1).

Largemouth Bass: No largemouth bass were sampled in the 2009 survey; however, the sampling gear utilized is unreliable at capturing largemouth bass. Spring electrofishing is the most effective method for capturing largemouth bass. Anecdotal reports from anglers indicate that largemouth bass are present in sufficient numbers to provide a sport fishery.

Walleye: The 2009 mean gill net CPUE for walleye in Bullhead Lake was 4.0 (Table 1). Collected walleye ranged in total length from 17 to 65 cm (6.7 to 25.6 in), had a PSD of 67 and PSD-P of 25 (Table 1; Figure 4). A low CPUE and high PSD and PSD-P indicate a population of low relative abundance that is dominated by quality-length and larger walleye. Walleye from seven year-classes were present in the gill net sample. All year-classes were of weak magnitude and only one, the 2005 cohort, coincided with a stocking. All others were from non-stocked years indicating possible natural reproduction or movement of fish from Four-Mile or Roy Lakes. Two fish (one each from the 1998 and 1995 cohorts) are not represented in Tables 4-5. Growth appears to be fair with a weighted mean total length at capture for age-3 walleye of 369

mm (14.5 in; Table 4); however, inferences concerning growth are limited due to the small sample size. Condition of Bullhead Lake walleyes is adequate with a mean W_r value of 85 (Table 1).

The shallow nature and susceptibility of Bullhead Lake to winterkill exclude walleye from being a primary management species. However, the potential exists for occasional walleye year classes to develop and provide angling opportunities. Therefore, walleye stockings should continue provided water levels are favorable (i.e., lake is full), excess walleye are available, and higher priority stockings have been completed.

Other: Black crappie, smallmouth bass and white sucker were captured in relatively-low numbers during the 2009 fish community survey and likely have a minimal impact on the Bullhead Lake fishery (Table 1).

Management Recommendations

- 1) Conduct fish community surveys utilizing gill nets and frame nets on an every fifth year basis (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Continue to manage as a self-sustaining northern pike and yellow perch fishery.
- 3) Stock walleye periodically when water levels are favorable (i.e., lake is full), extra walleye are available, and other higher priority stockings have been completed.
- 4) Collect otoliths from walleye and yellow perch to assess age structure and growth rates of each population.
- 5) Monitor winter and summerkill events. In cases of substantial winter/summerkill stock with northern pike and yellow perch to re-establish a fish community. If water conditions are acceptable (i.e. depth, oxygen) consider stocking bluegill and largemouth bass.
- 6) Conduct spring electrofishing during survey years (next in 2014) to monitor largemouth bass relative abundance, population size structure, and growth.

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 Bullhead Lake, 2009. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; SMB= smallmouth bass; NOP= northern pike; WAE= walleye; WHS= white sucker; YEP= yellow perch

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	0.1	0.1	100	---	100	---	92	---
BLC	0.1	0.1	100	---	0	---	102	---
BLG	2.8	1.4	5	5	0	---	104	4
NOP	0.3	0.2	100	0	60	40	84	8
SMB	0.1	0.1	100	---	0	---	110	---
WAE	0.4	0.2	83	17	83	17	91	6
YEP	0.9	0.5	0	---	0	---	105	1
<i>Gill nets</i>								
NOP	5.7	2.6	76	19	12	14	91	2
WAE	4.0	1.1	67	25	25	23	85	3
WHS	0.3	0.3	100	---	0	---	101	---
YEP	1.7	0.8	0	---	0	---	97	5

Table 2. Weighted mean total length (mm) at capture by gender and age (sample size) for yellow perch captured in experimental gill nets in Bullhead Lake, 2009.

Year	Age				
	1	2	3	4	5
2009					
Male		101 (27)	143 (1)		
Female		103 (127)	151 (1)		
Combined		103 (154)	147 (2)		

Table 3. Numbers of yellow perch sampled using gill nets by year class in Bullhead Lake, 2009.

Survey Year	Year Class					
	2009	2008	2007	2006	2005	2004
2009			154	2		

Table 4. Weighted mean total length at capture (mm) for walleye age-0 through age-10 sampled in experimental gill nets (expanded sample size) from Bullhead Lake, 2005-2009.

Year	Age										
	0	1	2	3	4	5	6	7	8	9	10
2009	---	194 (3)	352 (2)	369 (3)	420 (3)	---	---	---	650 (1)	---	---

Table 5. Numbers of walleye sampled using gill nets by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Bullhead Lake, 2009.

Survey Year	Year Class										
	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999
2009		3	2	3	3				1		
Number stocked											
fry						160					
small fingerling							20				
large fingerling					2						

Table 6. Stocking history including size and number for fishes stocked into Bullhead Lake, 1999-2009.

Year	Species	Size	Number
2003	WAE	small fingerling	19,580
2004	WAE	fry	160,000
2005	WAE	large fingerling	1,515

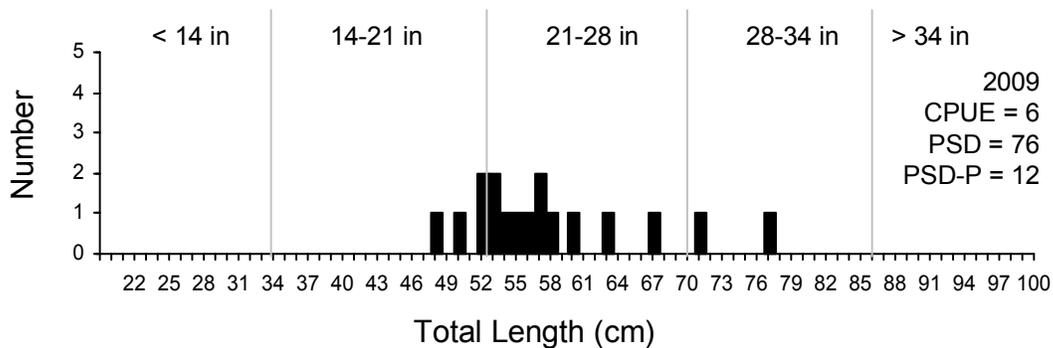


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for northern pike captured using gill nets in Bullhead Lake, 2009.

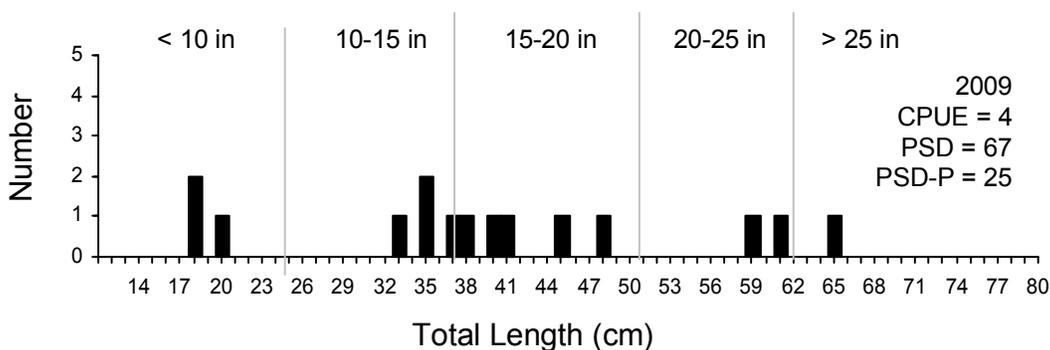


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for walleye captured using gill nets in Bullhead Lake, 2009.

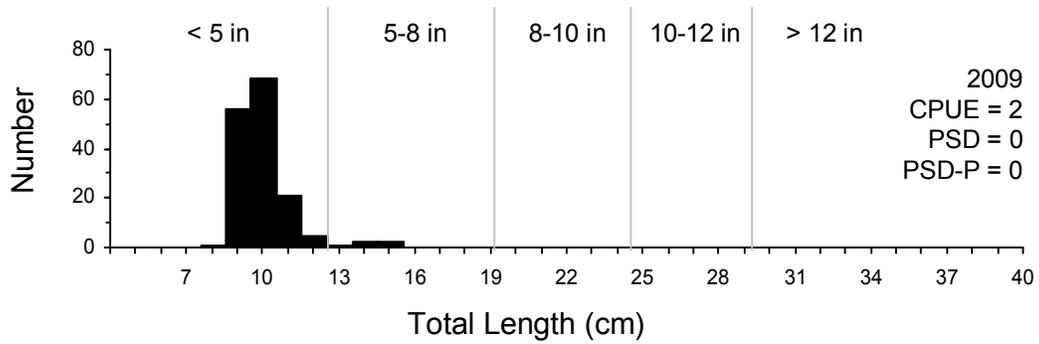


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for yellow perch captured using gill nets in Bullhead Lake, 2009.