

Bailey Lake Site Description

Location

Water designation number (WDN)	18-0004-00
Legal description	T118N-R58W Sec.
County (ies)	Clark
Location from nearest town	7 miles north, 1 mile west, and 1 mile north of Clark, SD

Survey Dates and Sampling Information

Survey dates	June 2-3, 2010 (FN, GN)
Frame net sets (n)	12
Gill net sets (n)	6

Morphometry

Watershed area (acres)	3,065
Surface area (acres)	200
Maximum depth (ft)	8
Mean depth (ft)	unknown

Ownership and Public Access

Bailey Lake is a meandered lake owned and managed by the SDGFP. A boat ramp is located on the north shore and is maintained by the SDGFP. In addition, shore fishing access is available from State of South Dakota owned lands on the northwest shore of the lake. Property adjacent the lake is primarily under State of South Dakota and private ownership.

Watershed and Land Use

Land-use within the Bailey Lake watershed is primarily agricultural including grassland (i.e., hay land, rangeland, and CRP) and cropland.

Water Level Observations

No Ordinary High Water Mark has been established by the South Dakota Water Management Board on Bailey Lake. The elevation of Bailey Lake on May 27, 2010 was 1791.4 fmsl and indicated a 1.4 ft increase from the Fall 2009 elevation of 1790.0 fmsl.

Aquatic Nuisance Species Monitoring

Plant Survey

Emergent vegetation is common along the shoreline in Bailey Lake and submersed vegetation was prevalent throughout much of the lake basin. No aquatic nuisance plant species were encountered during the 2010 survey.

Macro-Invertebrate/Mussel Survey

No aquatic nuisance macro-invertebrate or mussel species were sampled in 2010.

Fish Community Survey

No aquatic nuisance fish species were captured during the 2010 survey.

Fish Management Information

Primary species	walleye
Other species	black bullhead, green sunfish
Lake-Specific regulations	NE Panfish Management Area: 10 daily; 50 possession
Management classification	warm-water marginal
Fish consumption advisories	none

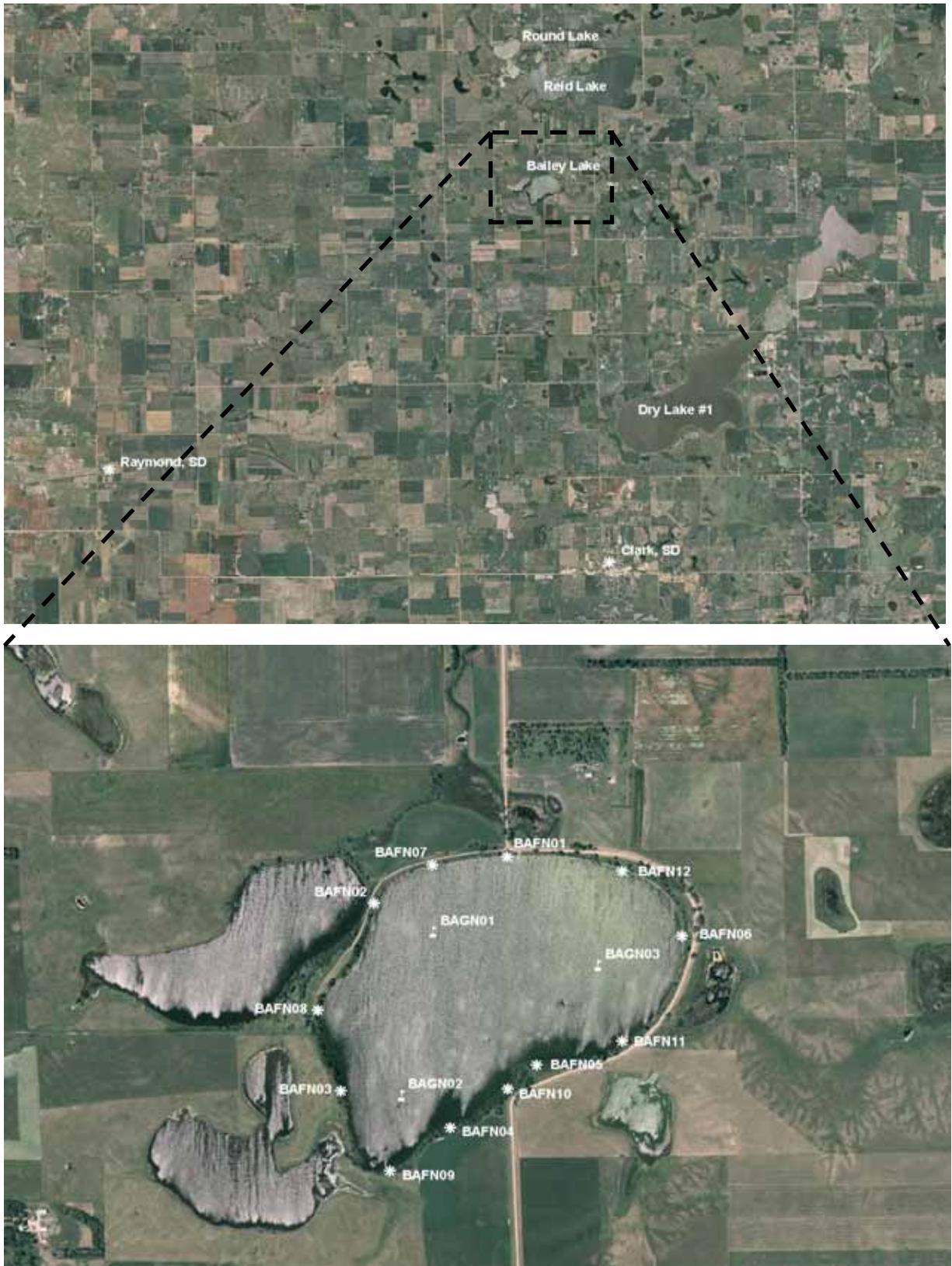


Figure 1. Map depicting location of Bailey Lake, Dry Lake #1, Reid Lake, and Round Lake from Clark, SD (top). Also noted are standardized net locations for Bailey Lake (bottom). BAFN= frame nets; BAGN= gill nets

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 frame net CPUE of stock-length black bullhead ≤ 100 .

Results and Discussion

Bailey Lake is a shallow natural lake located north of Clark, SD. The lake has good public access, but is susceptible to partial and complete winterkill events that affect the quality of the fishery. The most recent winterkill event occurred during the 2006-07 winter. Test netting shortly after ice-out in 2007 captured only two black bullheads. Subsequently, Bailey Lake was utilized as a natural walleye rearing pond (i.e., walleye fry are stocked in the spring and allowed to grow, then harvested as large fingerlings in the fall and stocked into more permanent waters) in 2007. At times, Bailey Lake provides quality angling opportunities for walleye and is currently managed as a walleye fishery.

Primary Species

Walleye: Bailey Lake experienced a winterkill in 2006 and walleye fry were stocked in 2007 and 2009 to reestablish the fishery. The 2010 mean gill net CPUE for stock-length walleye was 33.0 (Table 1) and well above the minimum objective (≥ 10 stock-length walleye/net night). Relative abundance is high.

Walleye captured in gill nets during 2010 ranged in total length from 21 to 48 cm (8.3 to 18.9 in), had a PSD of 62 and a PSD-P of 0 (Figure 2). The 2010 PSD was slightly above the objective range (30-60) and PSD-P was below the objective range (5-10).

Otoliths were collected from a sub-sample of gill net captured walleye in 2010. Two walleye year classes were present correlating with the 2007 and 2009 fry stockings (Table 2).

Walleye growth appears to be fast, as age-1 and age-3 walleye had mean weighted length at capture values of 243 and 428 mm (9.6 and 16.9 in), respectively in 2010 (Table 3). The mean W_r of stock-length walleye in the 2010 gill net catch was 96 and a slight decreasing trend in W_r was observed as total length increased.

Black Bullheads: The 2010 mean frame net CPUE of black bullheads in Bailey Lake was 20.8 (Table 1) and within the management objective range (≤ 100 stock-length black bullhead/net night). Relative abundance is moderate.

Black bullheads in the 2010 frame net survey ranged in total length from 9 to 33 cm (3.5 to 13.0 in.) had a PSD of 6 and PSD-P of 2 indicating a population dominated by fish under quality-length. The mean W_r of stock-length black bullheads in the 2010 frame net catch was 91 (Table 1). An increasing trend in W_r was observed as total length increased.

Other Species

Other: Green sunfish were the only other species sampled in the 2010 survey (Table 1).

Management Recommendations

- 1) Conduct fish community surveys utilizing gill nets on an every fifth year basis (next survey scheduled in summer 2015) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Collect otoliths from walleye to assess age structure and growth rate of the population.
- 3) Stock walleye on a biennial basis (≈ 500 fry/acre) to establish additional year classes.
- 4) Monitor winter and summerkill events. In cases of substantial winter/summerkill stock with walleye to re-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 frame nets and experimental gill nets from Bailey Lake, 2010. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= black bullhead; GSF= green sunfish; WAE= walleye

Species	Abundance		Stock Density Indices				Condition	
	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
<i>Frame nets</i>								
BLB	20.8	8.4	6	3	2	1	91	1
GSF	4.1	1.6	8	7	0	---	112	1
WAE	5.6	3.0	13	7	0	---	101	1
<i>Gill nets</i>								
BLB	8.7	1.6	0	---	0	---	104	2
WAE	33.0	22.5	62	4	0	---	96	1

Table 2. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (Number stocked x 1,000) from Bailey Lake, 2010.

Survey Year	Year Class				
	2010	2009	2008	2007	2006
2010		156		59	
# stocked					
fry		100		750	
small fingerling					
large fingerling					

Table 3. Weighted mean length at capture (mm) for walleye age-0 through age-10 captured in experimental gill nets (expanded sample size) from Bailey Lake, 2010.

Year	Age				
	1	2	3	4	5
2010	243(156)	---	428(59)	---	---

Table 4. Stocking history including size and number for fishes stocked into Bailey Lake, 2006-2010.

Year	Species	Size	Number
2007	WAE	fry	750,000
2009	WAE	fry	100,000

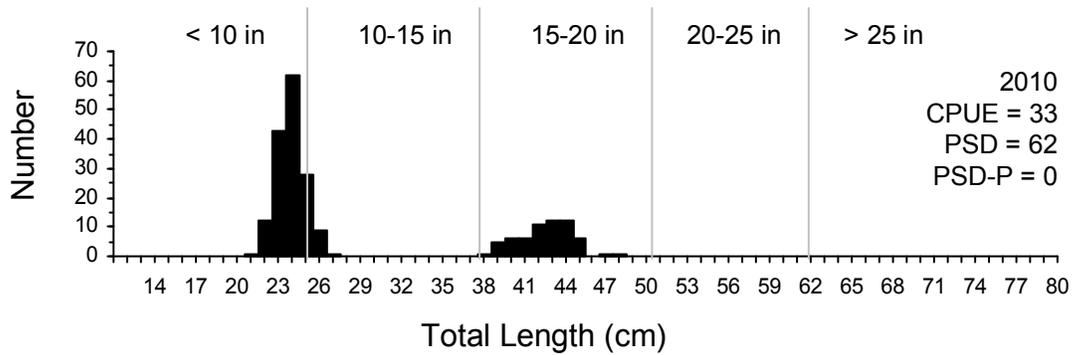


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for walleye captured using gill nets in Bailey Lake, 2010.

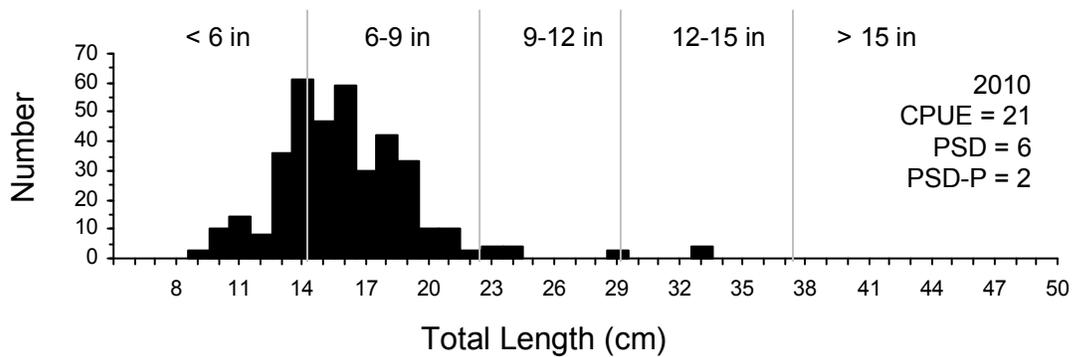


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for black bullhead captured using frame nets in Bailey Lake, 2010.