

## Goose Lake Site Description

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### **Location**

Water designation number (WDN)	05-0024-00
Legal description	T116N-R54W-Sec. 13,14,15,22,23,24,26
County (ies)	Codington
Location from nearest town	7 miles west and 2.5 miles south of Watertown, SD

### **Survey Dates and Sampling Information**

Survey dates	August 3-5, 2010 (GN)
Gill net sets (n)	6

### **Morphometry**

Watershed area (acres)	unknown
Surface area (acres)	≈1615
Maximum depth (ft)	≈14
Mean depth (ft)	unknown

### **Ownership and Public Access**

Goose Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. No formal boat ramp exists on Goose Lake; however, a small parking lot and graveled approach to the lake have been created on the south shore to facilitate boat launching (Figure 1). At the time of the 2010 fish community survey, water levels were high and the parking and boat launch area were not useable. Lands adjacent to Goose Lake are owned by the State of South Dakota and private individuals.

### **Watershed and Land Use**

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

### **Water Level Observations**

Water levels on Goose Lake are not monitored by SDDENR. Visual observation indicated that Goose Lake has experienced a substantial increase in water levels in recent years, similar to other waters in the area (i.e., Dry Lake, Long Lake, and Grass Lake).

### **Aquatic Nuisance Species Monitoring**

#### *Plant Survey*

Areas of both emergent and submergent vegetation were sparse in Goose Lake. Scattered beds of sago pondweed and northern water milfoil were found in shallow water (i.e., < 5 ft) areas of the lake. 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, yellow perch
Other species	black bullhead
Lake-Specific regulations	NE Panfish Management Area: 10 daily; 50 possession
Management classification	---
Fish consumption advisories	none

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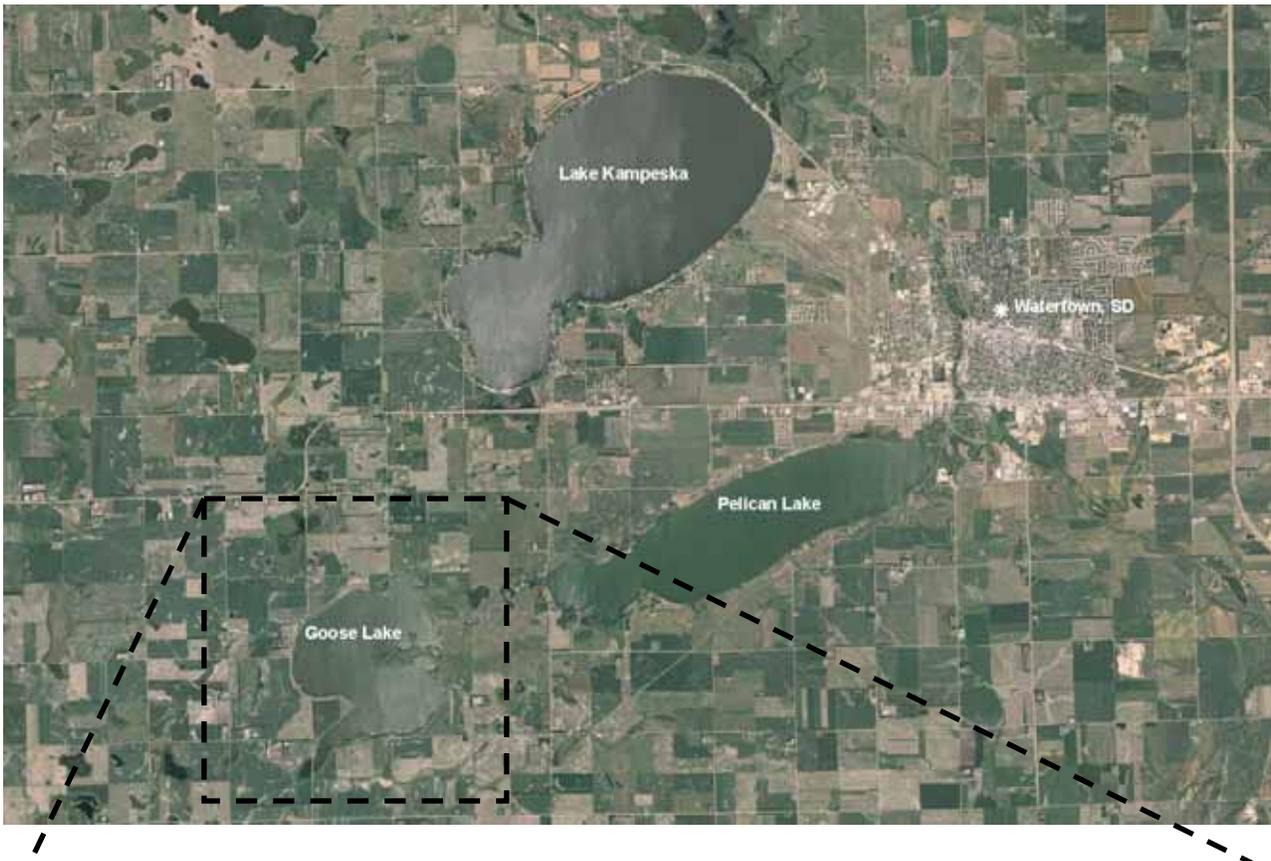


Figure 1. Map depicting location of Lake Kampeska, Goose, and Pelican Lakes from Watertown , SD (top). Also noted is the public access point and standardized net locations for Goose Lake. GOCGN= gill nets

## Management Objectives

- 1) Maintain a mean gill net CPUE of stock-length walleye  $\geq 10$ , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a mean gill net CPUE of stock-length yellow perch  $\geq 30$ , a PSD of 30-60, and a PSD-P of 5-10.

## Results and Discussion

Prior to the 1990's, Goose Lake was a shallow slough with limited sport fishery potential. However, above normal precipitation during the mid to late 1990's increased the surface area and depth of Goose Lake diminishing the threat of winterkill and created habitat capable of sustaining a sport fishery.

Today, Goose Lake has become popular destination for anglers targeting walleye and yellow perch. Currently, Goose Lake is managed as a walleye and yellow perch fishery.

### *Primary Species*

Walleye: Prior to 2009, walleye were not stocked into Goose Lake by SDGFP personnel; however, an established walleye population has been present. The majority of walleye captured in the 2010 gill net catch were less than stock-length resulting in a mean gill net CPUE for all sizes of walleye of 103.3. The mean gill net CPUE of stock-length walleye was 42.7 (Table 1) and well above the minimum objective ( $\geq 10$  stock-length walleye/net night)

Walleye captured in gill nets during 2010 ranged in total length from 12 to 58 cm (4.7 to 22.8 in), had a PSD of 20 and a PSD-P of 2 (Figure 2). Both the 2010 PSD and PSD-P were below the objective ranges of 30-60 and 5-10 indicating a population skewed towards smaller individuals. As individuals from the large 2009 year class continue to obtain stock-length the PSD will likely decline.

Otoliths were collected from a sub-sample of gill net captured walleye in 2010. Six walleye year classes were present (2004-2009) with the 2008 and 2009 cohorts being the most represented (Table 2). The 2009 cohort comprised approximately 86% of walleye captured in the 2010 gill net catch. Year classes produced prior to 2009 were the result of natural reproduction; while the 2009 year class coincides with the stocking of 800,000 walleye fry (Table 2; Table 4). The contribution of stocked or naturally-produced walleye to the 2009 year class is unknown, as stocked fry were unmarked making it difficult to differentiate stocked from naturally-produced walleye.

Walleye growth appears to be fast, as age-2 and age-3 walleye had mean weighted length at capture values of 383 and 485 mm (15.1 and 19.1 in), respectively in 2010 (Table 3). Walleye in the 2010 gill net catch had mean  $W_r$  values ranging from 86-88 for all length categories sampled. The mean  $W_r$  of stock-length walleye in the 2010 gill net catch was 86 and no length-related trends were apparent.

Yellow Perch: Fourteen yellow perch ranging in total length from 23 to 33 cm (9.1 to 13.0 in; Figure 3) were captured in the 2010 gill net catch resulting in a mean gill net CPUE of stock-length yellow perch of 2.3 (Table 1). The 2010 gill net CPUE was below the minimum objective ( $\geq 30$  stock-length yellow perch/net night) and indicated low relative abundance. Few inferences can be made concerning yellow perch size structure, growth, and condition due to low sample size.

#### *Other Species*

Other: A single black bullhead was the only other fish species captured during the 2010 fish community survey (Table 1).

### **Management Recommendations**

- 1) Conduct fish community surveys utilizing gill nets on an every third year basis (next survey scheduled in summer 2013) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Collect otoliths from walleye and yellow perch to assess age structure and growth rates of each population.
- 3) Stock walleye on a biennial basis ( $\approx 500$  fry/acre) to establish additional year classes.
- 4) Improve boat access, either through an agreement with private landowners or further development of state lands located on the southeast corner of the lake.
- 5) Monitor winter and summerkill events. In cases of substantial winter/summerkill stock with walleye and yellow perch 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 experimental gill nets from Goose Lake, 2010. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). BLB= black bullhead; WAE= walleye; 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	0.2	0.2	100	---	100	---	92	---
WAE	42.7	13.8	20	4	2	1	86	<1
YEP	2.3	0.8	100	0	71	23	114	5

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 Goose Lake, 2010.

Survey Year	Year Class						
	2010	2009	2008	2007	2006	2005	2004
2010		528	78	5	3	2	1
# stocked							
fry		800					
small fingerling							
large fingerling							

Table 3. Weighted mean total length (mm) at capture for walleye age-1 through age-6 captured in experimental gill nets (expanded sample size) from Goose Lake, 2010.

Year	Age					
	1	2	3	4	5	6
2010	243(528)	383(78)	485(5)	519(3)	510(2)	587(1)

Table 4. Stocking history including size and number for fishes stocked into Goose Lake, 2004-2010.

Year	Species	Size	Number
2009	WAE	fry	800,000

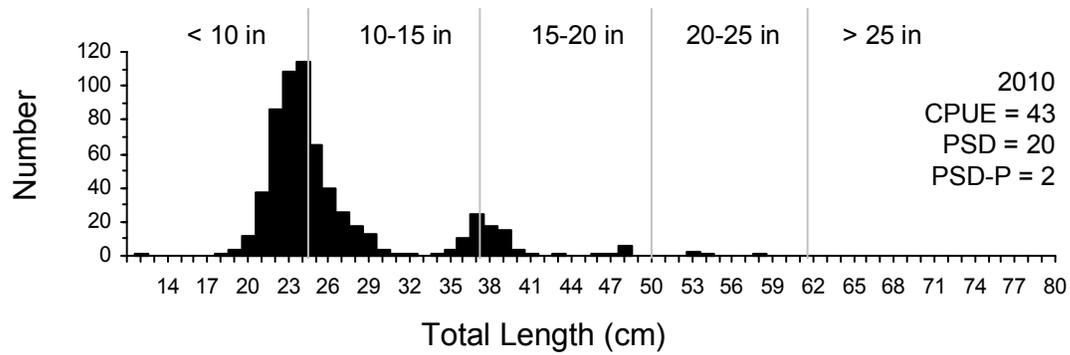


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for walleye captured using gill nets in Goose Lake, 2010.

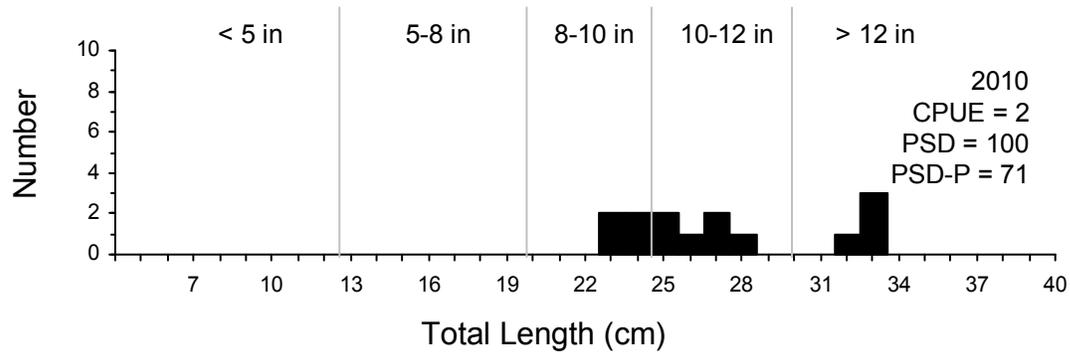


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for yellow perch captured using gill nets in Goose Lake, 2010.