

# Cottonwood Lake

## Site Description

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### **Location**

Water designation number (WDN)	18-0051-00
Legal description	T119N-R57W-Sec. 8,9,16
County (ies)	Clark
Location from nearest town	3.5 west and 3 miles north of Bradley, SD

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

Survey dates	June 2-3, 2011
Gill net sets (n)	3
Frame net sets (n)	12

### **Morphometry (Figure 1)**

Watershed area (acres)	21,736
Surface area (acres)	≈ 525
Maximum depth (ft)	≈ 16
Mean depth (ft)	unknown

### **Ownership and Public Access**

Cottonwood Lake is a non-meandered lake that covers both public (e.g., Game Production Area) and private lands. The fishery is managed by the SDGFP. State-owned land on the south and west shore provide public access to the lake. Recently, an access trail and primitive boat ramp were constructed on the south shore. Lands adjacent to the lake are owned by the State of South Dakota and private individuals.

### **Watershed and Land Use**

Land-use within the watershed is primarily agricultural with a mix of pasture or grassland, cropland, and woodland.

### **Water Level Observations**

Water levels on Cottonwood Lake are not monitored by SDDENR; however, visual observation indicated that the lake has experienced a substantial increase in water levels in recent years, similar to other waters in the area (i.e., Dry Lake #2, Reid, and Round Lakes).

### **Fish Management Information**

Primary species	northern pike, yellow perch
Other species	none
Lake-specific regulations	none
Management classification	none
Fish Consumption Advisories	none

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Figure 1. Map depicting location of Cottonwood Lake from Bradley, South Dakota (top). Also noted are standardized net locations for Cottonwood Lake (bottom). CWCFFN= frame nets; CWCGN= gill nets

## Management Objectives

- 1) Maintain a mean gill net CPUE of stock-length northern pike  $\geq 3$ , a PSD of 30-60, and a PSD-P of 5-10.
- 2) Maintain a mean gill net CPUE of stock-length yellow perch  $\geq 30$ , a PSD of 30-60, and a PSD-P of 5-10.

## Results and Discussion

Cottonwood Lake is a natural lake located in northern Clark County, South Dakota. Prior to the 1990's the lake was shallow with limited sport fishery potential. However, above normal precipitation during the mid to late 1990's increased the surface area and depth of the lake which diminished the threat of winterkill and created habitat capable of sustaining a sport fishery. Recently, SDGFP purchased a large tract of land that provides public access and the lake will be managed as a self-sustaining northern pike and yellow perch fishery.

### *Primary Species*

Northern Pike: The mean gill net CPUE of stock-length northern pike was 7.0 (Table 1) and above the minimum objective of ( $\geq 3$  stock-length fish/net night). Based on the 2011 gill net catch, relative abundance of northern pike in Cottonwood Lake appears to be high.

Gill net captured northern pike ranged in total length from 28 to 74 cm (11.0 to 29.1 in) had a PSD of 90 and a PSD-P of 33 (Table 1; Figure 2). High PSD and PSD-P values for gill net captured northern pike exceeded management objective ranges of 30-60 and 5-10 and indicated a population skewed towards larger individuals (Figure 2).

No growth information was collected for northern pike in 2011. Although sample size was low, a decreasing trend in northern pike condition was apparent as total length increased. Northern pike in the preferred-memorable length category had a mean  $W_r$  of 77; while stock-quality length pike had a mean  $W_r$  of 96. Sampling took place during early-June; therefore, mean  $W_r$  values were likely influenced by recent spawning activity and at a seasonal low. 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.

Yellow Perch: Gill nets captured 12 stock-length yellow perch ranging in total length from 19 to 35 cm (7.5 to 13.8 in) which resulted in a mean gill net CPUE of 4.0 (Table 1). The 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.

## **Management Recommendations**

- 1) Conduct fish community assessment surveys utilizing gill nets every fourth year (next scheduled for summer 2015) to monitor fish relative abundance, fish population size structure, fish growth, and stocking success.
- 2) Continue to manage as a self-sustaining northern pike and yellow perch fishery.
- 3) Collect otoliths from yellow perch to assess the age structure and growth rate of the population.
- 4) Monitor winter and summerkill events. In cases of substantial winter/summerkill northern pike and yellow perch should be stocked to re-establish a fish community.

Table 1. Mean catch rate (CPUE; gill/frame nets = catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) of stock-length fish, for various fish species captured in experimental gill nets and frame nets in Cottonwood Lake, 2011. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). NOP= northern pike; 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>								
NOP	0.7	0.2	75	31	25	31	74	---
YEP	0.2	0.2	100	0	100	0	---	---
<i>Gill nets</i>								
NOP	7.0	3.9	90	11	33	18	81	2
YEP	4.0	3.9	92	15	42	27	102	3

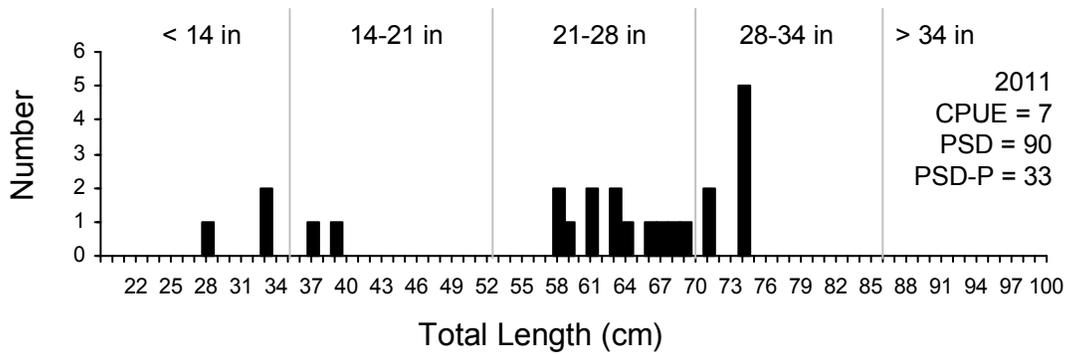


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for northern pike captured using gill nets in Cottonwood Lake, 2011.

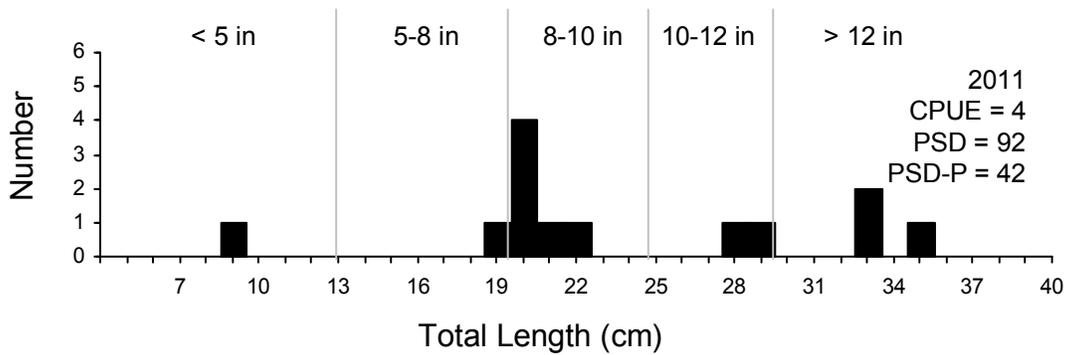


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for yellow perch captured using gill nets in Cottonwood Lake, 2011.