Cottonwood Lake

Site Description

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 3.0 miles north of Bradley, SD

Survey Dates and Sampling Information

Survey dates	June 4, 2015 (GN)
Gill net sets (n)	3

Morphometry

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

The 21,736 acre Cottonwood Lake sub-watershed (HUC-12) is located within the larger Grass, Dry, and Still Lakes (HUC-10) watershed. Land use within the watershed is primarily agricultural including a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

Water levels on Cottonwood Lake are not monitored by SDDENR.

Fish Management Information

Primary species	northern pike, yellow perch, walleye
Other species	none
Lake-specific regulations	none
Management classification	none
Fish consumption advisories	none

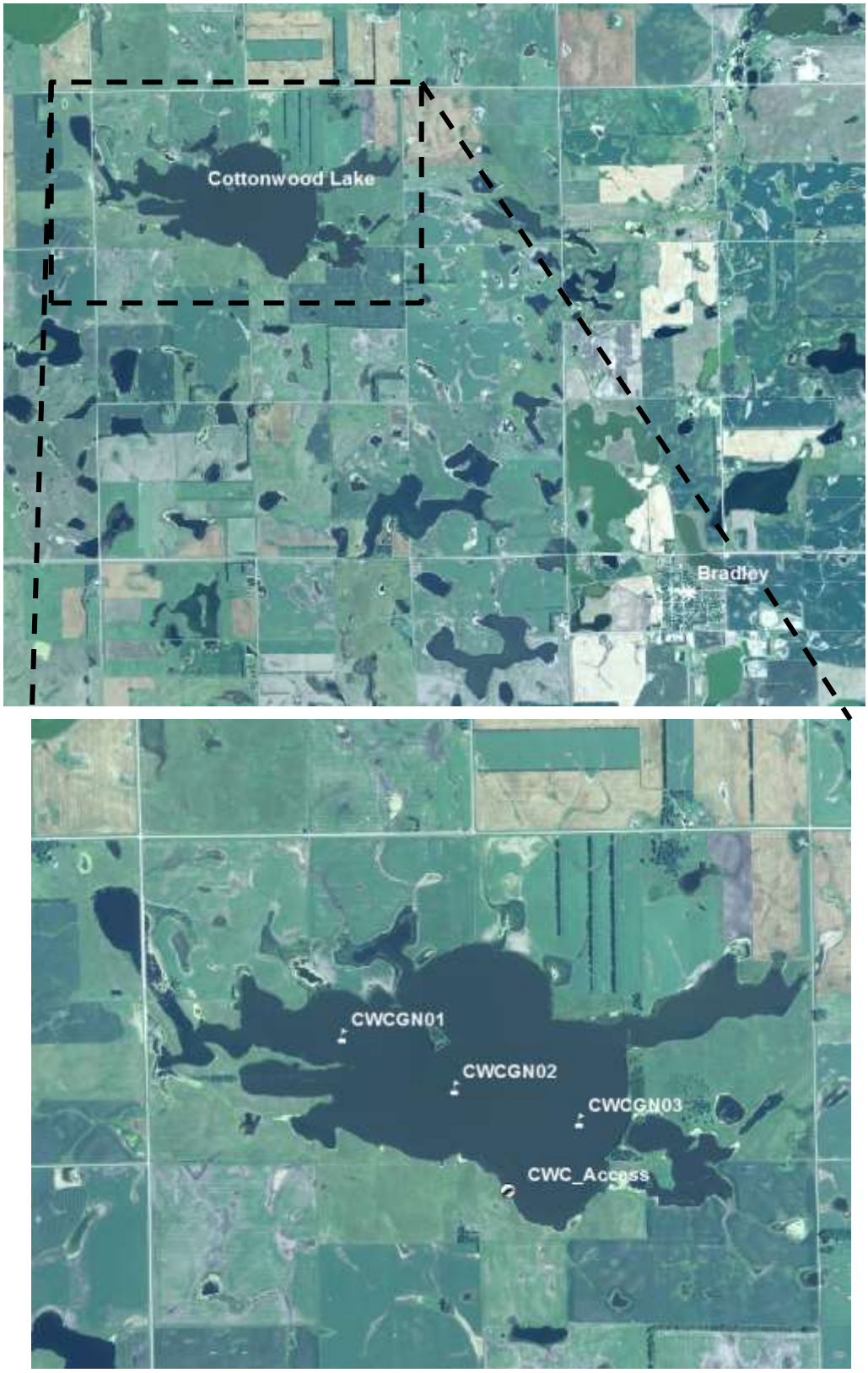


Figure 1. Map depicting geographic location of Cottonwood Lake from Bradley, South Dakota (top). Also noted is the public access and standardized net locations for Cottonwood Lake. CWCGN= gill nets

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) Establish a population and maintain a mean gill net CPUE of stock-length walleye ≥ 10, a PSD of 30-60, and a PSD-P of 5-10.

3) Maintain a mean gill net CPUE of stock-length yellow perch ≥ 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. During the mid to late 1990's, above normal precipitation and the resulting runoff increased both the surface area and depth of the lake, which diminished the threat of winterkill and created habitat capable of supporting a sport fishery. For many years, the lake was managed as a self-sustaining northern pike and yellow perch fishery because public access was limited.

Recently, SDGFP purchased land on the west and south shore that provides public access to the lake and a primitive boat ramp (i.e., constructed using over-sized rock and gravel) has been installed (Figure 1). As a result of the increased public access, walleye was added as a primary management species and an initial fry stocking was made in 2015 (Table 4), with subsequent stockings planned in 2016 and 2017. Cottonwood Lake will be managed as a northern pike, walleye, and yellow perch fishery, provided water levels remain adequate.

Primary Species

Northern Pike: The mean gill net CPUE of stock-length northern pike was 17.0 (Table 1) and above the minimum objective (≥ 3 stock-length fish/net night; Table 3). Based on the 2015 gill net catch, relative abundance of northern pike in Cottonwood Lake appears to be high.

Gill net captured northern pike ranged in TL from 31 to 85 cm (12.2 to 33.5 in) had a PSD of 75 and a PSD-P of 37 (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 2015. A decreasing trend in northern pike condition was apparent as TL increased. Northern pike in the preferred-memorable length category had a mean Wr of 79; while stock-quality length pike had a mean Wr of 93. Sampling took place during early-June; therefore, mean Wr values were likely influenced by recent spawning activity and at a seasonal low.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch in 2015 was 19.0 (Table 1) and below the minimum objective (≥ 30 stock-length yellow perch/net night; Table 3). Based on the 2015 gill net catch, relative abundance appears to be moderate.

Yellow perch in the gill net catch ranged in TL from 15 to 32 cm (5.9 to 12.6 in; Figure 3). Otoliths were collected from a sub-sample of gill net captured yellow perch. Five consecutive year classes were represented (2009-2013) with the 2013 year class accounting for 56% (Table 5).

The weighted mean TL at capture for age-2 and age-4 yellow perch was 182 mm and 252 mm, respectively (7.2 in and 9.9 in; Table 6). The mean Wr of stock-length yellow perch was 100 (Table 1) and no length-related trends in yellow perch condition were apparent in 2015.

Management Recommendations

1) Conduct fish community assessment surveys utilizing gill nets every fourth year (next scheduled for summer 2019) to monitor fish relative abundance, fish population size structure, fish growth, and stocking success.

2) Complete introductory walleye stockings (≈500 fry/acre) for three consecutive years (2015-2017) to establish the population.

3) Following the introductory stocking period (2015-2017), stock walleye (≈500 fry/ acre) on a biennial basis (odd years) provided water levels remain sufficient.

4) Collect otoliths from walleye and yellow perch to assess age structure and growth rates of each population.

5) Monitor winter and summer kill events. In cases of substantial winter or summer kill the need to re-establish a walleye fishery in Cottonwood Lake should be evaluated. If water levels are sufficient; northern pike, walleye and yellow perch should be stocked 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 Cottonwood Lake, 2015. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). NOP= northern pike; YEP= yellow perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Gill nets								
NOP	17.0	5.0	75	10	37	11	82	2
YEP	19.0	10.4	49	11	28	10	100	1

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured experimental gill nets from Cottonwood Lake, 2011-2015. NOP= northern pike; YEP= yellow perch

	CPUE				
Species	2011	2012	2013	2014	2015
Gill nets					
NOP	7.0	---	---	---	17.0
YEP	4.0	---	---	---	19.0

Table 3. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) for selected species captured in experimental gill nets from Cottonwood Lake, 2011-2015. NOP= northern pike; YEP = yellow perch

Species	2011	2012	2013	2014	2015	Objective
Gill nets						
NOP						
CPUE	7	---	---	---	17	≥ 3
PSD	90	---	---	---	75	30-60
PSD-P	33	---	---	---	37	5-10
Wr	81	---	---	---	82	---
YEP						
CPUE	4	---	---	---	19	≥ 30
PSD	92	---	---	---	49	30-60
PSD-P	42	---	---	---	28	5-10
Wr	102	---	---	---	100	---

Table 4. Stocking history including size and number for fishes stocked into Cottonwood Lake, 2015. WAE= walleye

Year	Species	Size	Number
2015	WAE	fry	200,000

Table 5. Year class distribution based on expanded age/length summary for yellow perch sampled in gill nets from Cottonwood Lake, 2011-2015.

	Year Class											
Survey Year	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
2015			32	2	13	9	1					
2011	---	---	---	---			7		2		1	2

Table 6. Weighted mean total length (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Cottonwood Lake, 2015.

	Age						
Year	1	2	3	4	5	6	7
2015	---	182(32)	222(2)	252(13)	296(9)	319(1)	---
2011	---	209(7)	---	290(2)	---	338(1)	346(2)

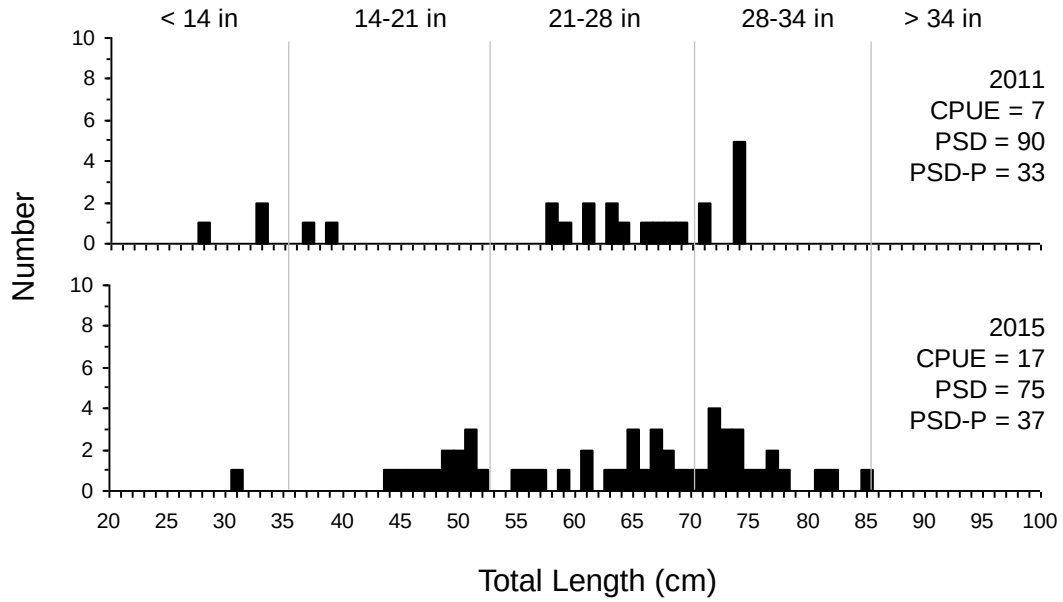
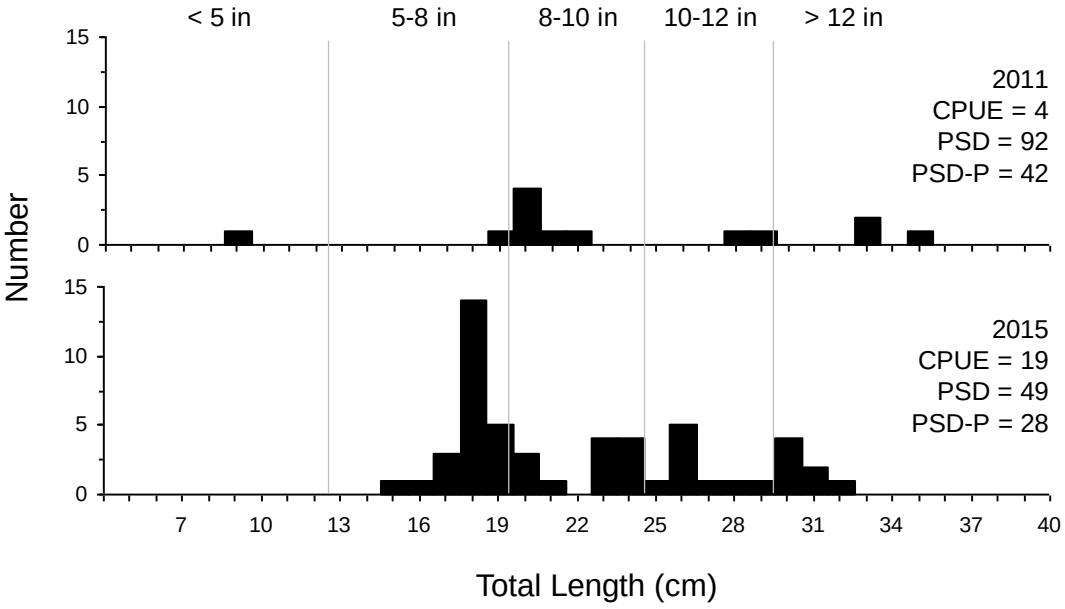


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using experimental gill nets in Cottonwood Lake, 2011-2015.



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