

Dry Lake #2

Site Description

Location

Water designation number (WDN)	18-0020-00
Legal description	T114N-R56W-Sec. 5,6,7,8 T114N-R57W-Sec. 1,9,10,11,12,13,14,15,16,17,20,21,22,23 T115N-R56W-Sec. 30,31,32 T115N-R57W-Sec. 25,36
County (ies)	Clark
Location from nearest town	3.5 miles north of Willow Lake, SD

Survey Dates and Sampling Information

Survey dates	July 26-27, 2011 (GN)
Gill net sets (n)	6

Morphometry

Watershed area (acres)	48,274
Surface area (acres)	≈6,475
Maximum depth (ft)	≈15
Mean depth (ft)	unknown

Ownership and Public Access

Dry Lake #2 is a non-meandered lake that covers both public (e.g., Game Production Area) and private lands. The fishery is managed by the SDGFP. Public access to Dry Lake #2 exists via a single boat ramp located on state-owned land in the southwest corner of the lake and flooded road rights-of-way. Lands adjacent to the lake are owned by the State of South Dakota, U. S. Fish and Wildlife Service, and private individuals.

Watershed and Land Use

Land-use within the Dry Lake #2 watershed is primarily agricultural with a mix of pasture or grassland, cropland, and woodland.

Water Level Observations

Water levels on Dry Lake #2 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., Antelope, Reid and Round Lakes).

Fish Management Information

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

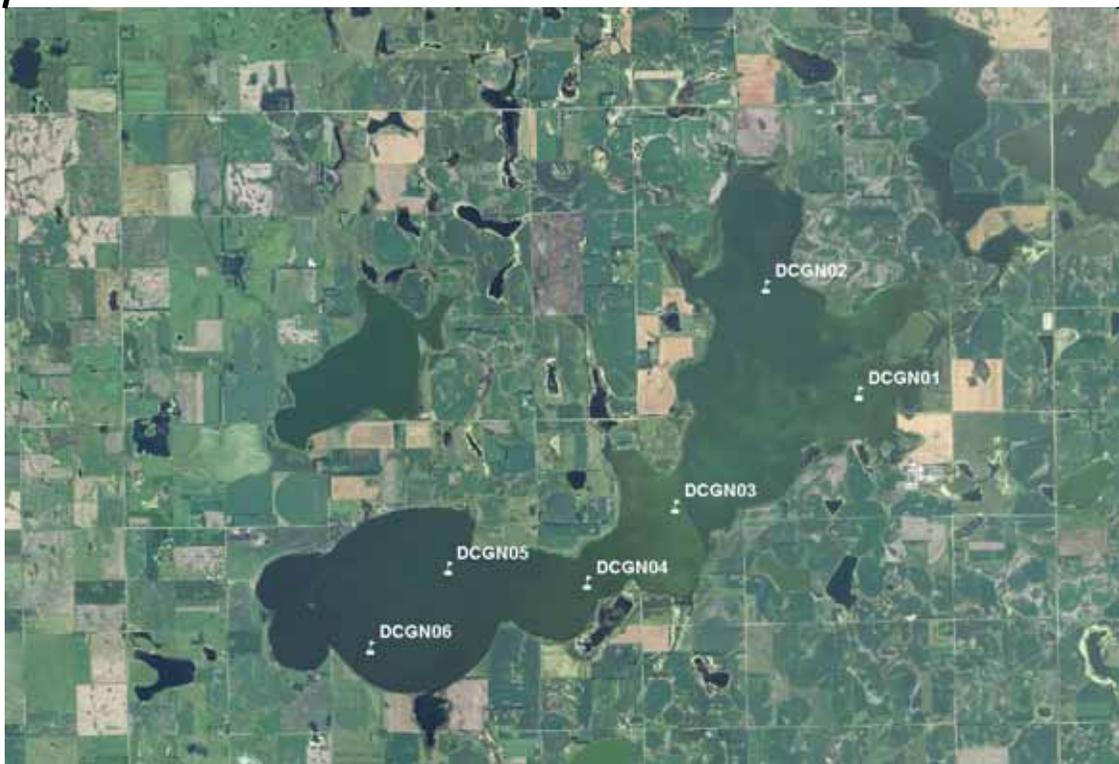


Figure 1. Map depicting location of Dry Lake #2 from Willow Lake, South Dakota (top). Also noted are standardized net locations for Dry Lake #2 (bottom). DCGN= gill nets

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 gill net CPUE of stock-length yellow perch ≥ 30 , a PSD of 30-60, and a PSD-P of 5-10.

Results and Discussion

Prior to the 1990's, Dry Lake #2 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 the lake. Subsequently, Dry Lake #2 has been capable of sustaining a sport fishery, and is currently managed as a walleye and yellow perch fishery.

Primary Species

Walleye: The first recorded walleye stocking by SDGFP personnel into Dry Lake #2 occurred in 1999 and subsequent stockings were made in 2000-2001 (Table 4). Based on angler reports, initial walleye stockings were successful and a substantial walleye population developed. No walleye stockings were made from 2001-2006 due to a combination of factors including but not limited to management status of the fishery (i.e., marginal), walleye fry availability and declining water levels which increased the risk of winterkill. Since 2007, water levels have increased and biennial walleye stockings have been completed (Table 4).

The mean gill net CPUE of stock-length walleye was 28.8 (Table 1) and above the minimum objective (≥ 10 stock-length walleye/net). Based on the walleye gill net catch, relative abundance appears to be high.

Walleye captured in gill nets ranged in total length from 11 to 46 cm (4.3 to 18.1 in) with majority being 30 to 46 cm (11.8 to 18.1 in; Figure 2). The PSD was 36 and within the management objective of 30-60; while no preferred-length walleye were captured (Table 1; Figure 2).

Otoliths were collected from a sub-sample of gill net captured walleye. Age structure information indicated that year classes produced in 2007, 2009, and 2011 coincided with fry stockings and comprised the entire sample (Table 2; Table 4). The 2007 and 2009 year classes were well represented and comprised 44% and 55% of walleye in the gill net catch (Table 2). The capture of two individuals from the 2011 (age-0) year class may indicate a potentially strong 2011 year-class as this cohort was not fully recruited to our gear at time of sampling.

Gill net captured walleye had a weighted mean total length at capture of 343 and 402 mm (13.5 and 15.8 in) at age-2 and age-4, respectively (Table 3). Mean W_r values ranged from 91 to 94 for all length categories sampled. The mean W_r of stock-length walleye was 93 (Table 1) and no length-related trends in condition were apparent.

Yellow Perch: Although potentially present prior to stocking, the first known stocking of yellow perch into Dry Lake #2 by SDGFP personnel was completed in 1999 with a subsequent stocking in 2000 (Table 4). In 2011, the mean gill net CPUE of stock-length yellow perch was 25.0 (Table 1) and below the minimum objective (≥ 30 stock-length yellow perch/net night). Based on the gill net catch, relative abundance of stock-length yellow perch is moderate.

Yellow perch captured in gill nets ranged in total length from 15 to 32 cm (5.9 to 12.6 in), had a PSD of 95 and a PSD-P of 22. The PSD and PSD-P values exceeded management objectives of 30-60 and 5-10, indicating a population skewed towards larger individuals (Table 1; Figure 3).

Otoliths were collected from a sub-sample of gill net captured yellow perch. Four year classes (2005, 2007, 2009, and 2010) were present (Table 5). The 2009 (age-2) year class was the most represented and comprised 89% of yellow perch in the gill net catch (Table 5).

The weighted mean total length at capture for age-2 male yellow perch was 213 mm (8.4 in; Table 6). Few male yellow perch other than age-2 were captured in the gill net catch (Table 6). The weighted mean total length at capture for age-2 and age-4 female yellow perch was 240 and 291 mm (9.4 and 11.5 in; Table 6). Collected yellow perch were in exceptional condition with mean W_r values that exceeded 120 for all length categories sampled. The mean W_r of stock-length yellow perch was 125 (Table 1) and no length-related trends in condition were apparent.

Other Species

Northern Pike: Northern pike typically are not sampled effectively using standard lake survey methods. As a result, mean gill net CPUE values are often low. Neumann and Willis (1995) reported the most reliable time to sample northern pike in eastern South Dakota natural lakes with gill nets was late spring following the spawn.

The mean gill net CPUE of stock-length northern pike was 3.7 (Table 1) and indicated high relative abundance. Northern pike captured ranged in total length from 37 to 60 cm (11.8 to 23.6 in), had a PSD of 14, and a PSD-P of 0 (Table 1; Figure 4). No northern pike growth information was collected. Sampled northern pike in the stock-quality and quality-preferred length categories had mean W_r values of 96 and 82, respectively.

Management Recommendations

- 1) Conduct fish community surveys utilizing gill nets on an every fourth 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 and yellow perch to assess age structure and growth rates of each population.
- 3) Stock walleye (≈ 500 fry/acre) on a biennial basis (odd years) to establish additional year classes.
- 4) 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 Dry Lake #2, 2011. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). NOP= northern pike; 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>Gill nets</i>								
NOP	3.7	1.0	14	13	0	---	94	3
WAE	28.8	3.1	36	6	0	---	93	<1
YEP	25.0	7.5	95	3	22	6	125	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 Dry Lake #2, 2011.

Survey Year	Year Class				
	2011	2010	2009	2008	2007
2011	2		96		77
# stocked					
fry	3,500		1,500		3,000
small fingerling					
large fingerling					

Table 3. Weighted mean total length (mm) at capture for walleye captured in experimental gill nets (expanded sample size) from Dry Lake #2, 2011.

Year	Age				
	0	1	2	3	4
2011	113 (2)	---	343 (96)	---	402 (77)

Table 4. Stocking history including size and number for fishes stocked into Dry Lake #2, 1998-2011.

Year	Species	Size	Number
1998	NOP	fingerling	190,650
	NOP	fry	1,650,000
1999	WAE	small fingerling	406,200
	YEP	adult	5,511
	YEP	fingerling	10,080
2000	WAE	fry	7,000,000
	YEP	juvenile	40,850
2001	WAE	fry	7,000,000
2007	WAE	fry	3,000,000
2009	WAE	fry	1,500,000
2011	WAE	fry	3,500,000

Table 5. Year class distribution based on expanded age/length summary for yellow perch sampled in gill nets from Dry Lake #2, 2011.

Survey Year	Year Class						
	2011	2010	2009	2008	2007	2006	2005
2011		4	134		11		1

Table 6. Weighted mean total length (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Dry Lake #2, 2011.

Year	Age					
	1	2	3	4	5	6
2011						
Male	156 (2)	213 (30)	---	263 (1)	---	---
Female	160 (2)	240 (104)	---	291 (10)	---	325 (1)
Combined	158 (4)	234 (134)	---	288 (11)	---	325 (1)

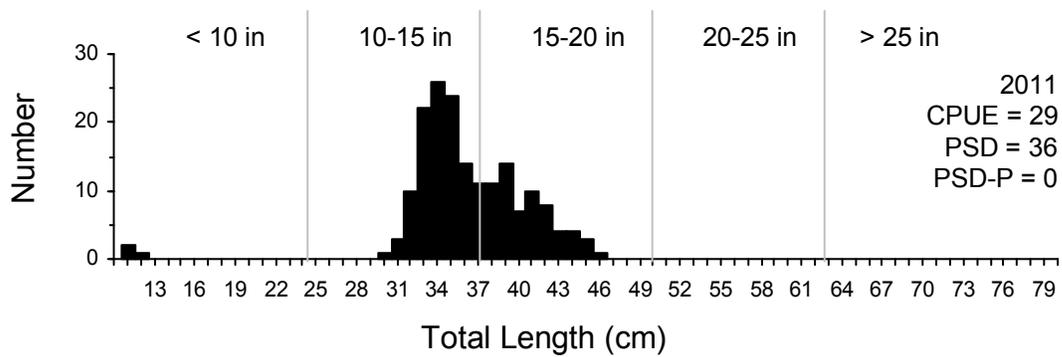


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for walleye captured using gill nets in Dry Lake #2, 2011.

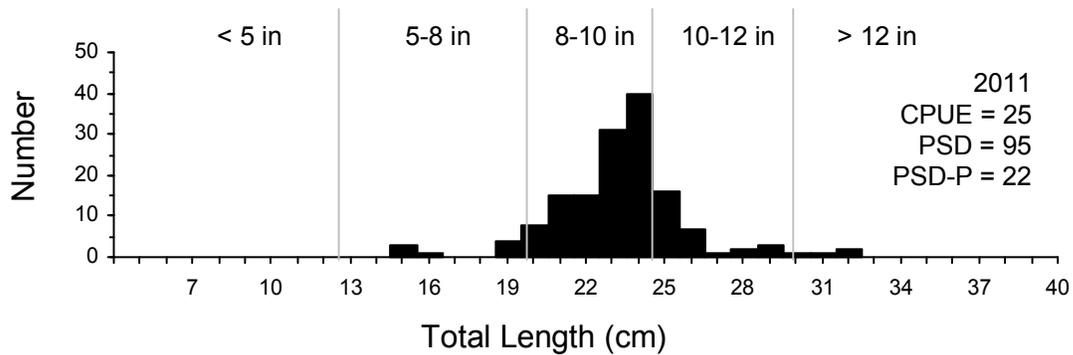


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for yellow perch captured using gill nets in Dry Lake #2, 2011.

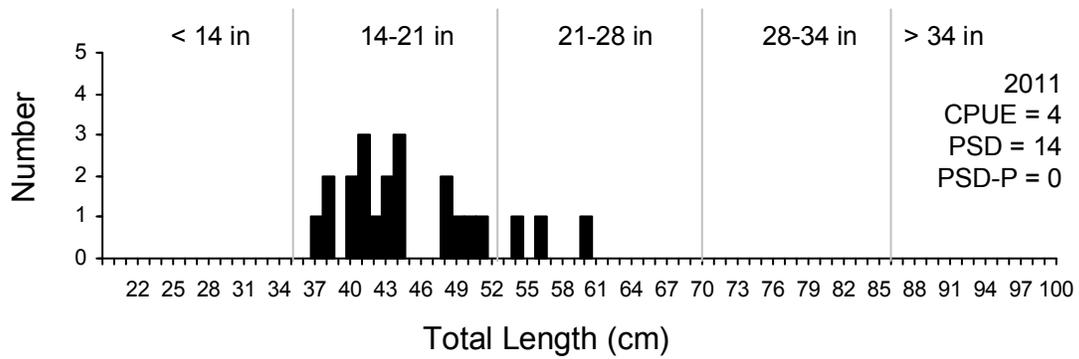


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for northern pike captured using gill nets in Dry Lake #2, 2011.