

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

Survey Dates and Sampling Information

Survey dates	July 21-22, 2015 (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 double-lane concrete boat ramp located on state-owned land in the southwest corner of the lake. 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

The 48,274 acre Dry Lake #2 sub-watershed (HUC-12) is located within the Dry and Willow Lakes (HUC-10) watershed. Land use within the watershed is primarily agricultural with a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

Water levels on Dry Lake #2 are not monitored by SDDENR.

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 is the access location and 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 supporting a sport fishery, and is currently managed as a walleye and yellow perch fishery.

Primary Species

Walleye: The first recorded walleye stocking by SDGFP into Dry Lake #2 occurred in 1999 and subsequent stockings were made in 2000 and 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 22.0 (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 TL from 11 to 59 cm (4.3 to 23.2 in; Figure 2). Both the PSD of 52 and PSD-P of 5 were within the management objective ranges of 30-60 and 5-10, respectively (Table 1; Figure 2).

Otoliths were collected from a sub-sample of gill net captured walleye. Age structure information indicated nine year classes were present (2006-2009, 2011-2015; Table 4). Naturally produced year classes were not observed in the 2011 survey; however, four naturally produced year classes were represented in the 2015 survey (2006, 2008, 2012 and 2014; Table 4). The naturally produced 2012 and 2014 year classes comprised 13% and 16% of gill net captured walleye, respectively (Table 4). The strongest year class was the 2011 cohort that coincided with a fry stocking and comprised 35% of the gill net captured walleye (Table 4). The capture of seven individuals from the 2015 (age-0) year class may indicate a potentially strong 2015 year-class as this cohort was not fully recruited to our gear at time of sampling.

Walleye growth appears to be good. Gill net captured walleye had a weighted mean TL at capture of 338 and 416 mm (13.3 and 16.4 in) at age-2 and age-4,

respectively (Table 5). Mean W_r values ranged from 82 to 91 for all length categories sampled and the mean W_r of stock-length walleye was 85 (Table 1).

Yellow Perch: Although potentially present prior to stocking, the first known stocking of yellow perch into Dry Lake #2 by SDGFP was completed in 1999 with a subsequent stocking in 2000 (Table 4). In 2015, the mean gill net CPUE of stock-length yellow perch was 16.5 (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 TL from 14 to 32 cm (5.5 to 12.6 in), had a PSD of 90 and a PSD-P of 35. 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. Six year classes (2009-2014) were present (Table 7). The 2011 and 2014 year-classes were the most represented and comprised 32% and 61% of yellow perch in the gill net catch, respectively (Table 7).

The weighted mean TL at capture for age-2 yellow perch was 215 mm (8.5 in; Table 8). Collected yellow perch were in excellent condition with mean W_r values that exceeded 105 for all length categories sampled. The mean W_r of stock-length yellow perch was 108 (Table 1) and a slight increasing trend in W_r was observed as total length increased.

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. The mean gill net CPUE of stock-length northern pike was 1.8 (Table 1) and indicated moderate relative abundance. Collected northern pike ranged in total length from 52 to 70 cm (20.5 to 27.6 in), had a PSD of 91, 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 85 and 79, respectively.

Management Recommendations

- 1) Conduct fish community surveys utilizing gill nets on an every third year basis (next survey scheduled in summer 2018) 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 summer kill events. In cases of substantial winter or summer kill 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, 2015. 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	1.8	0.7	91	16	0	---	80	5
WAE	22.0	1.6	52	7	5	3	85	<1
YEP	16.5	9.0	90	5	35	8	108	1

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

Species	CPUE				
	2011	2012	2013	2014	2015
<i>Gill nets</i>					
NOP	3.7	---	---	---	1.8
WAE	28.8	---	---	---	22.0
YEP	25.0	---	---	---	16.5

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 Dry Lake #2, 2011-2015. WAE = walleye; YEP = yellow perch

Species	2011	2012	2013	2014	2015	Objective
<i>Gill nets</i>						
WAE						
CPUE	29	---	---	---	22	≥ 10
PSD	36	---	---	---	52	30-60
PSD-P	0	---	---	---	5	5-10
Wr	93	---	---	---	85	---
YEP						
CPUE	25	---	---	---	17	≥ 30
PSD	95	---	---	---	90	30-60
PSD-P	22	---	---	---	35	5-10
Wr	125	---	---	---	108	---

Table 4. Year class distribution based on the expanded age/length summary for walleye sampled in gill nets and associated stocking history (# stocked x 1,000) from Dry Lake #2, 2011-2015.

Survey Year	Year Class									
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
2015	7	22	31	18	49		4	1	8	1
2011					2		96		77	
# stocked										
fry	3,500		3,500		3,500		1,500		3,000	
sm. fingerling										
lg. fingerling										

Table 5. Weighted mean TL (mm) at capture for walleye captured in experimental gill nets (expanded sample size) from Dry Lake #2, 2011-2015.

Year	Age									
	0	1	2	3	4	5	6	7	8	9
2015	118(7)	258(22)	338(31)	383(18)	416(49)	---	473(4)	473(1)	523(8)	545(1)
2011	113(2)	---	343(96)	---	402(77)	---	---	---	---	---

Table 6. Stocking history including size and number for fishes stocked into Dry Lake #2, 2006-2015.

Year	Species	Size	Number
2007	WAE	fry	3,000,000
2009	WAE	fry	1,500,000
2011	WAE	fry	3,500,000
2013	WAE	fry	3,500,000
2015	WAE	fry	3,500,000

Table 7. Year class distribution based on expanded age/length summary for yellow perch sampled in gill nets from Dry Lake #2, 2011-2015.

Survey Year	Year Class										
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
2015		3	60	1	32	2	1				
2011	---	---	---	---		4	134		11		1

Table 8. Weighted mean TL (mm) at capture for yellow perch captured in experimental gill nets (expanded sample size) from Dry Lake #2, 2011-2015.

Year	Age					
	1	2	3	4	5	6
2015	149(3)	215(60)	257(1)	288(32)	299(2)	315(1)
2011	158(4)	234(134)	---	288(11)	---	325(1)

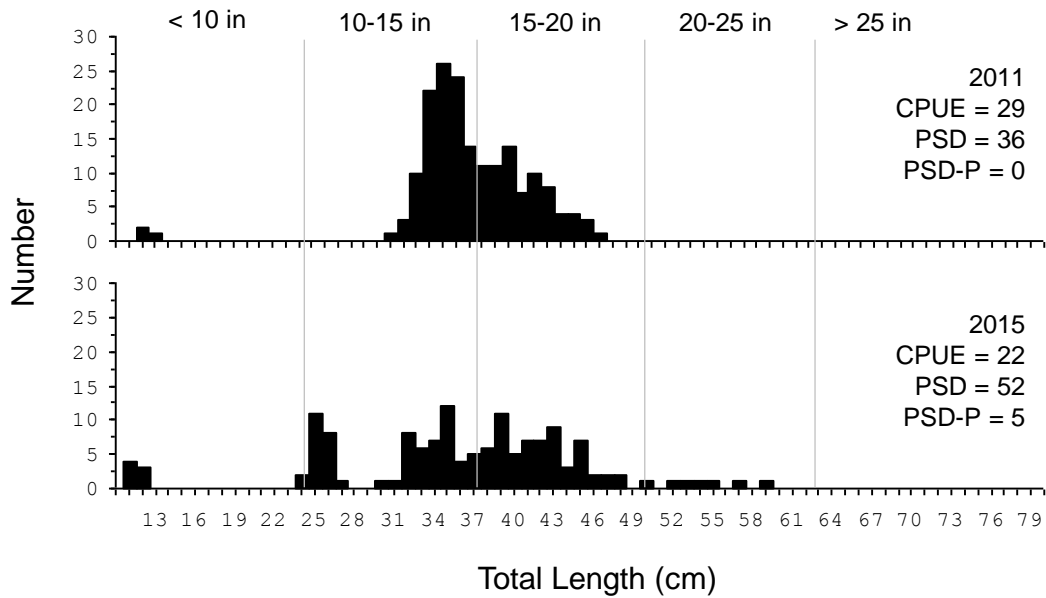


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Dry Lake #2, 2011-2015.

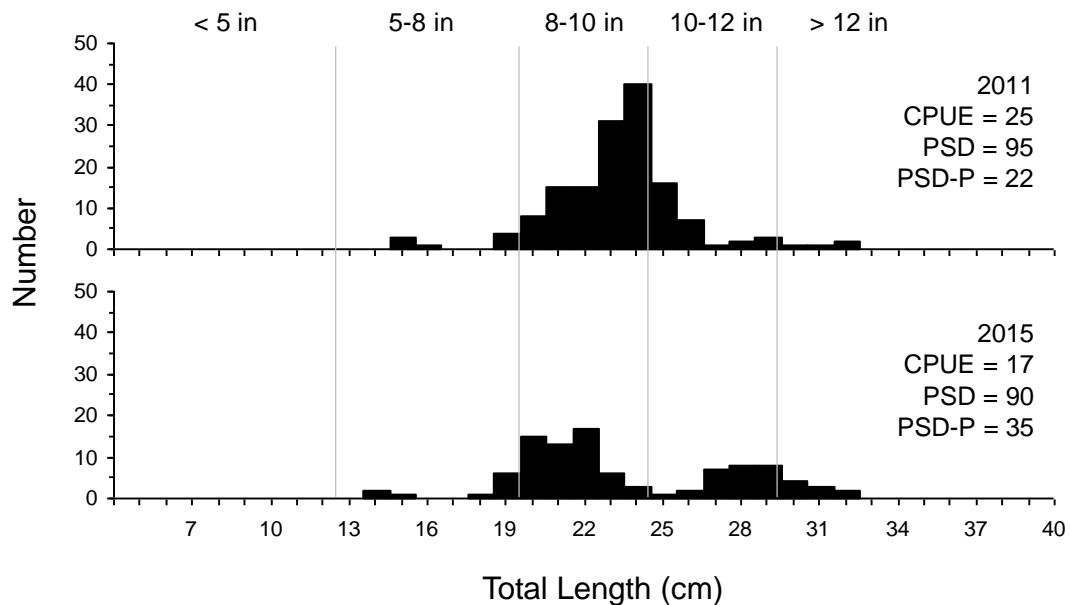


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Dry Lake #2, 2011-2015.

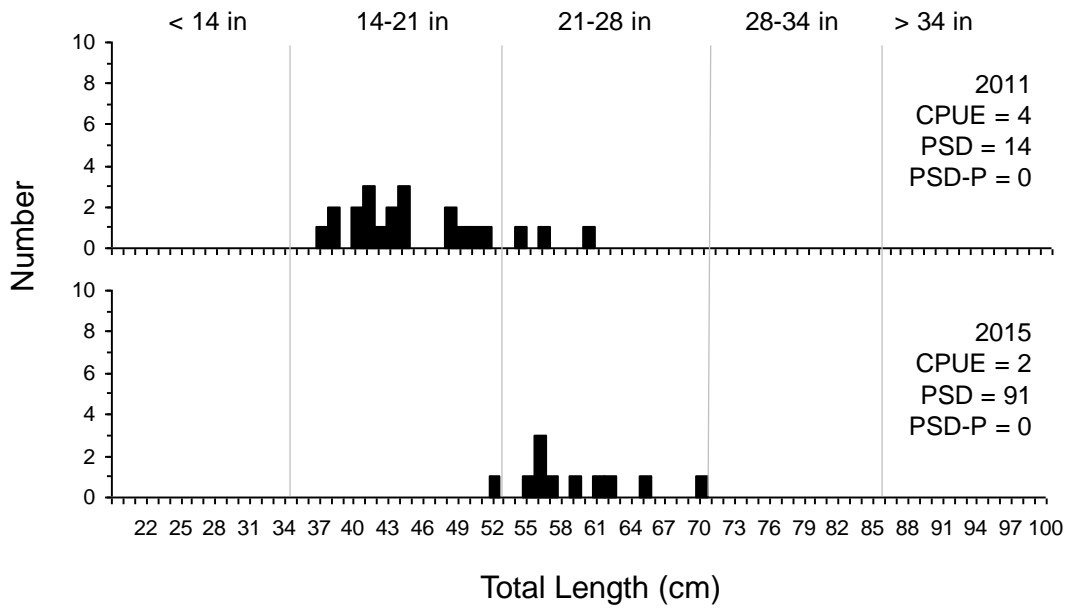


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using experimental gill nets in Dry Lake #2, 2011-2015.