Dry Lake

Site Description

Location

Water designation number (WDN)	05-0011-00
Legal description	T118N-R54W-Sec. 5,6,7,8,9,10,11,14,15,16
County (ies)	Codington
Location from nearest town	one half mile south of Florence

Survey Dates and Netting Information

Dates of current survey	July 1 – 2, 2003; June 7 – 8, 2005
Date of most recent survey	none
Gill net sets (n)	6 (2003); 4 (2005)
Frame net sets (n)	0

Morphometry (Figure 1)

Watershed area (acres)	---
Surface area (acres)	2,455
Maximum depth (ft)	15
Mean depth (ft)	---

Ownership and Public Access

Dry Lake is a meandered lake managed by the SDGFP. A public access site is located on the east shore off highway 25 and is maintained by the SDGFP (Figure 1). Lands adjacent to Dry Lake are under mixed ownership including private individuals, and SDGFP.

Watershed and Land Use

The Dry Lake watershed is comprised of a mix of grassland, cropland, and woodland.

Water Level Observations

Water levels remain above the historic average. Dry Lake is classified as eutrophic.

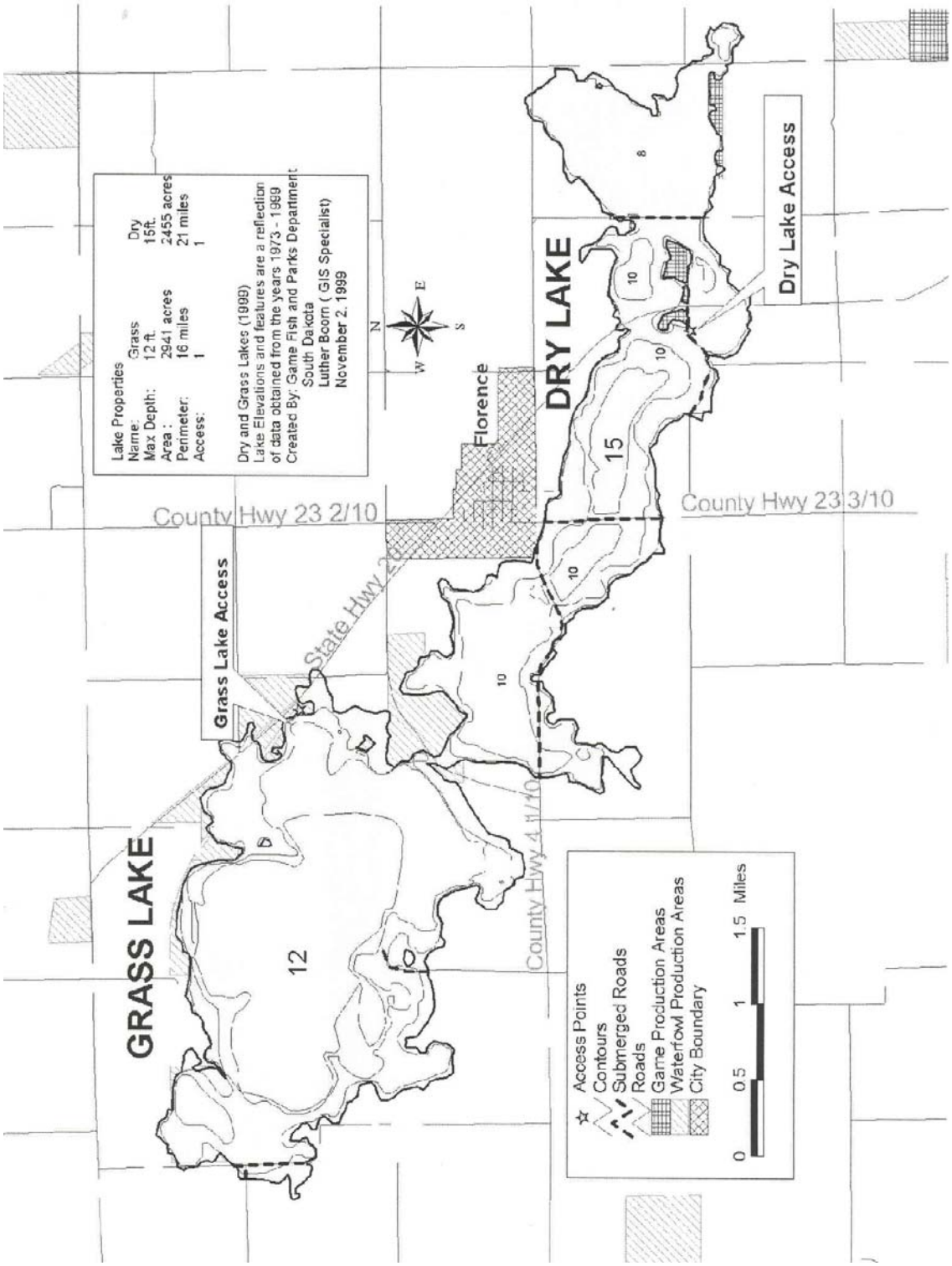
Aquatic Vegetation and Exotics

Aquatic vegetation has not been surveyed in Dry Lake. No un-naturalized exotic vegetation or wildlife was reported during this survey.

Fish Management Information

Primary species	walleye, yellow perch
Other species	black bullhead, common carp, fathead minnow, northern pike, orange spotted sunfish, white sucker
Management classification	warm-water semi-permanent
Fish Consumption Advisories	none

Figure 1. Dry Lake contour map.



Management Objectives

1) Maintain a mean gill net CPUE of stock length walleye ≥ 10, a PSD of 40 – 60, an RSD-P of 5 – 10, and a mean Wr > 80.

2) Maintain a mean gill net CPUE of stock length yellow perch ≥ 15 and a mean Wr > 80.

3) Monitor water levels and winterkill events.

Results and Discussion

Dry Lake is a shallow, expansive lake located just on the southern outskirts of Florence, SD. Historically Dry Lake was generally considered a slough and did not support a sport fishery due to its shallow nature and susceptibility to winterkill. During the 1990's above average rainfall resulted in Dry Lake becoming much larger and deeper, connecting to Grass Lake to the northwest, and enabling the system to support sport fish such as walleye and yellow perch. Walleye were stocked into Dry Lake in 1999 and the lake has been managed as a walleye and yellow perch fishery.

Primary species

Walleye: The mean gill net CPUE of stock length walleye during 2005 was 25 (Table 1) and above the objective range (≥ 10 stock length fish/net night). Dating back to 2003, abundance in Dry Lake based on gill net CPUE has ranged from 14 to 25 stock length walleye/net night with an average of 20 (Table 2; Table 3). No historical data was available from Dry Lake for comparison to determine historical trends; however, a gill net CPUE of near 25 would classify the Dry Lake walleye population as having high density when compared to other lakes in northeastern South Dakota.

Walleye captured in gill nets during 2005 ranged in length from 380 to 560 mm (Figure 2). The PSD of walleye captured in gill nets during 2005 was 100 and the RSD-P was 15 (Table 1; Table 3; Figure 2). The PSD and RSD-P of walleye in Dry Lake indicated that the population is comprised mostly of larger fish. In fact, at the time of this survey all of the walleye population in Dry Lake was above the 380-mm quality length (15-inches). The walleye condition in Dry Lake was above the objective range (≥ 80) with a Wr value for walleye captured in gill nets of 102. No length related change in Wr of walleye was apparent indicating sufficient prey availability to all walleye sizes.

Aging data from the 2003 survey indicated the presence of two year classes including 2001 and 2002 (Table 5; Table 7). Small fingerling walleye were stocked into Dry Lake in 1999 and walleye fry were stocked in 2001 (Table 6). However, a winterkill event occurred in Dry Lake during the winter of 2000

likely subjecting the 1999 stocked year class to high mortality. Therefore, the 2001 year class comprised a large proportion of the walleye population (Table 7) at the time of this survey. A 2002 year class was likely attributed to natural reproduction or inaccurate aging. Potentially, a few walleye survived the 2000 winterkill and successfully reproduced in spring 2002 at age-3.

During the 2005 survey only the 2001 fry stocking was represented in the walleye catch, which was comprised of a total of 4 year classes (2000, 2001, 2002, and 2003) (Table 5; Table 7). Grass Lake was connected to Dry Lake up until 2003 and walleye were stocked into Grass Lake in 2000. Because the two water basins were connected this likely allowed movement of walleye between the two basins and may explain the presence of the 2000 year class in Dry Lake. Natural reproduction by walleye in Dry Lake was apparently successful in 2002, and 2003, with the 2002 year class being particularly strong. Biennial stocking of walleye should continue in Dry Lake to maintain the walleye population because natural reproduction is inconsistent and has been limited since 2002. The success of the 2005 walleye stocking was not known at the time of this survey.

Yellow Perch: The mean gill net CPUE of stock length (200 mm) yellow perch in 2005 was 9 (Tables 1 – 3) and below the objective range (≥ 15 fish/net night). Since 2003 the gill net CPUE of stock length yellow perch has generally increased (Tables 1 – 3); however, the abundance of yellow perch in Dry Lake is still considered low density. During 2005, yellow perch ranged in total length from 160 to 320 mm (Figure 3), had a PSD of 80, and an RSD-P of 20 (Table 1; Table 3). The condition of yellow perch in Dry Lake was within the objective (≥ 80) with a mean Wr of 91.

Other Species

Northern Pike: The gill net CPUE of stock length northern pike in Dry Lake during 2005 was 1.0 (Table 1). Northern pike were collected that ranged in length from 640 to 850 mm. The PSD was 100 and the RSD-P was 50 for northern pike captured in gill nets (Table 1). No growth information was available; however, the condition of northern pike was acceptable with a mean Wr of 98 for pike captured in gill nets (Table 1). Overall, the northern pike population in Dry Lake is considered low density. The population abundance of northern pike in Dry Lake will likely remain low due to the lowering water levels recently. Northern pike require flooded vegetation during the early spring to successfully reproduce, which has not occurred during recent years. Sufficient numbers of northern pike are present in Dry Lake so that if water levels increase successful reproduction can be expected. Currently, a large proportion of the pike population is greater than 25 inches in TL and anglers can expect to catch pike up to 35 inches in length.

Other: Black bullhead, common carp, orangespotted sunfish and white sucker were other fish species captured during the 2005 survey; however, the

abundance of these fish species is considered low density and the species do not likely contribute significantly to the fishery.

Summary

Dry Lake is managed as a walleye and yellow perch fishery. Based on the 2005 netting survey the fish assemblage in Dry Lake is indeed mostly comprised of walleye, yellow perch and northern pike. The mean gill net CPUE of stock length walleye (25) was above the objective range (≥ 10) indicating a high density population. Conversely, the yellow perch mean gill net CPUE of stock length fish (9) during 2005 was below the objective range of ≥ 15. The growth of walleye in Dry Lake is above average with walleye obtaining quality length (380 mm) by age 2. The condition of walleye and yellow perch were each within the objective range (≥ 80). Biennial walleye stockings should be continued to maintain consistent year classes. Northern pike abundance in Dry Lake has declined since it was considered high density in 2003. Lowering water levels and the lack of flooded vegetation during spring spawning has likely limited northern pike and yellow perch reproductive success. Dry Lake should be monitored closely for winterkill events as water levels have dropped considerably.

Management Recommendations

1) Conduct fish population assessment surveys on a biennial basis (next survey scheduled in summer 2007) to monitor fish abundance, fish population size structures, fish growth, and stocking success.

2) Stock walleye on a biennial basis at 1,000 fry/acre to maintain consistent year classes. Stock northern pike and yellow perch in cases of complete winterkill events to establish a fish population. Monitor water levels and winterkill events to assess stocking strategies.

Table 1. Mean catch rate (CPUE; Catch/net night) of stock length fish, mean relative weight (Wr) of stock length fish, proportional stock density (PSD) and relative stock density of preferred length fish (RSD-P) of various fish species captured in experimental gill net sets in Dry Lake, 2003 - 2005. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90).

Survey Year	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	RSD-P	CI-90	Wr	CI-90
2003								
Gill nets								
BLB	4.5	2.5	7	9	4	6	104	2
COC	0.2	0.3	0	---	0	---	125	---
NOP	5.3	0.9	97	3	6	8	100	1
OSF[1]	0.7	0.5	---	---	---	---	---	---
WAE	14.2	2.4	38	8	0	---	101	1
WHS	1.7	0.7	100	0	100	0	112	4
YEP	4.2	1.9	64	17	4	7	105	1
2005								
Gill nets								
BLB	1.5	0.8	50	45	0	---	---	---
NOP	1.7	1.3	100	0	50	27	98	7
OSF [1]	5.5	9.0	---	---	---	---	---	---
WAE	25.0	2.0	100	0	15	6	102	1
WHS	2.0	3.3	100	0	100	0	---	---
YEP	8.8	1.2	80	12	20	12	91	1

[1] CPUE of all fish sizes captured.

Table 2. Historic mean catch rate (CPUE; Catch/net night) of stock length fish for various fish species captured in experimental gill net sets, frame net sets, or electrofishing in Dry Lake, 1999 - 2005.

	CPUE							
Species	1999	2000	2001	2002	2003	2004	2005	Mean
Gill nets								
BLB	---	---	---	---	4.5	---	1.5	3.0
COC	---	---	---	---	0.2	---	0.0	0.1
NOP	---	---	---	---	5.3	---	1.7	3.5
OSF [1]	---	---	---	---	0.7	---	5.5	3.1
WAE	---	---	---	---	14.2	---	25.0	19.6
WHS	---	---	---	---	1.7	---	2.0	1.9
YEP	---	---	---	---	4.2	---	8.8	6.5

[1] CPUE of all fish sizes captured.

Table 3. Mean catch rate (CPUE; catch/net night), proportional stock density (PSD), relative stock density of preferred length fish (RSD-P), and relative weight (Wr) for primary management species captured in experimental gill net sets, frame net sets, or electrofishing in Dry Lake, 1999 - 2005.

Species	1999	2000	2001	2002	2003	2004	2005	Average	Objective
Gill nets									
WAE									
CPUE	---	---	---	---	14	---	25	20	≥ 10
PSD	---	---	---	---	38	---	100	69	40 – 60
RSD-P	---	---	---	---	0	---	15	8	5 – 10
Wr	---	---	---	---	101	---	102	102	≥ 80
YEP									
CPUE	---	---	---	---	4	---	9	7	≥ 15
PSD	---	---	---	---	64	---	80	72	---
RSD-P	---	---	---	---	4	---	20	12	---
Wr	---	---	---	---	105	---	91	98	≥ 80

[1] Historic data from all surveys conducted since 1999.

Table 4. Mean back-calculated length (mm) at age and standard error (SE) for walleye captured during fall night electrofishing in Dry Lake, 2003.

			Age	
Year	Age	N	1	2
2002	1	10	218	---
2001	2	75	139	336
Mean	---	85	179	336
SE	---	---	40	0
Mean Comparison [1]				
Small lakes/impoundments			176	271
Large lakes/impoundments			169	280
Region IV			161	281
Statewide			168	279

[1] Willis et al. 2001.

Table 5. Weighted mean length at capture (mm) for walleye age-1 through age 6 captured in experimental gill net sets in Dry Lake, 1999 – 2004. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

		Age				
Year	N	1	2	3	4	5
2005	100	---	380	463	493	554
2003	85	282	378	---	---	---

Table 6. Stocking history (10-year) including size and number for fishes stocked into Dry Lake, 1994 - 2003.

Year	Species	Size	Number
1999	WAE	fingerling	202,600
2001	WAE	fry	3,000,000
	YEP	fingerling	22,570
2005	WAE	fry	1,400,000

Table 7. Numbers of walleye sampled (n) by year class and associated stocking history (Number stocked x 1,000) for walleye captured in Dry Lake, 1999 - 2004.

	Year Class								
Survey Year	2004	2003	2002	2001	2000	1999	1998	1997	1996
2005		1	49	48	2				
2003	---	---	10	75					
Number stocked									
fry				3,000					
small fingerling						203			
large fingerling									

Figure 2. Length frequency, catch-per-unit-effort (CPUE; catch/net night) of stock length fish, proportional stock density (PSD), relative stock density of preferred length fish (RSD-P), and relative weight (Wr) of stock length fish for walleye captured in experimental gill net sets in Dry Lake, 2003 - 2005.

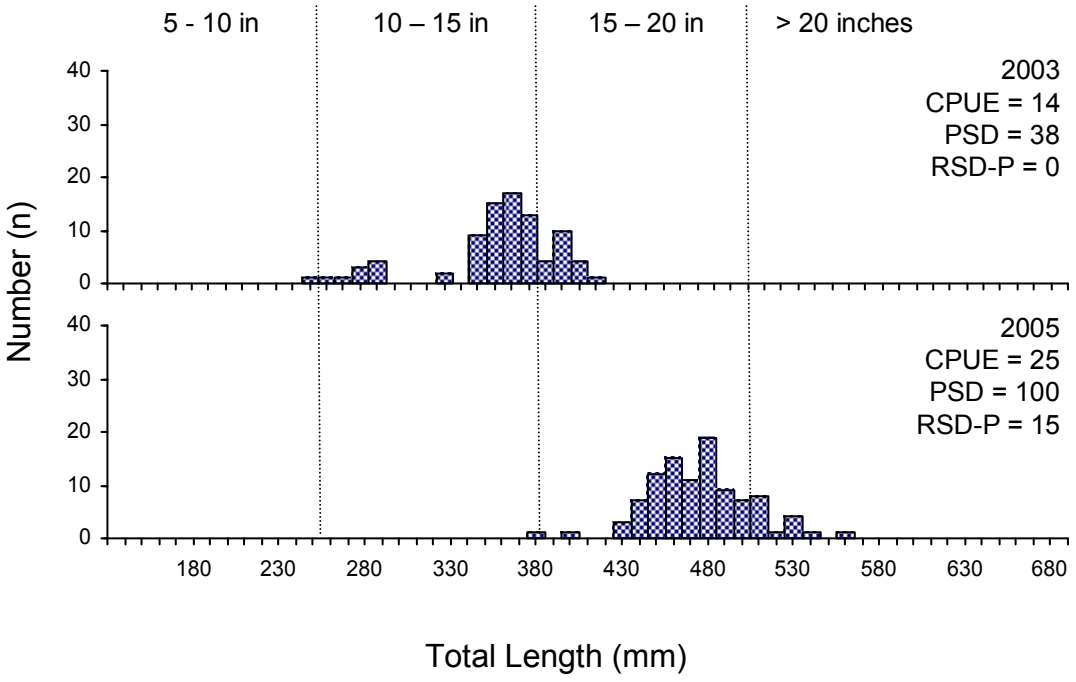
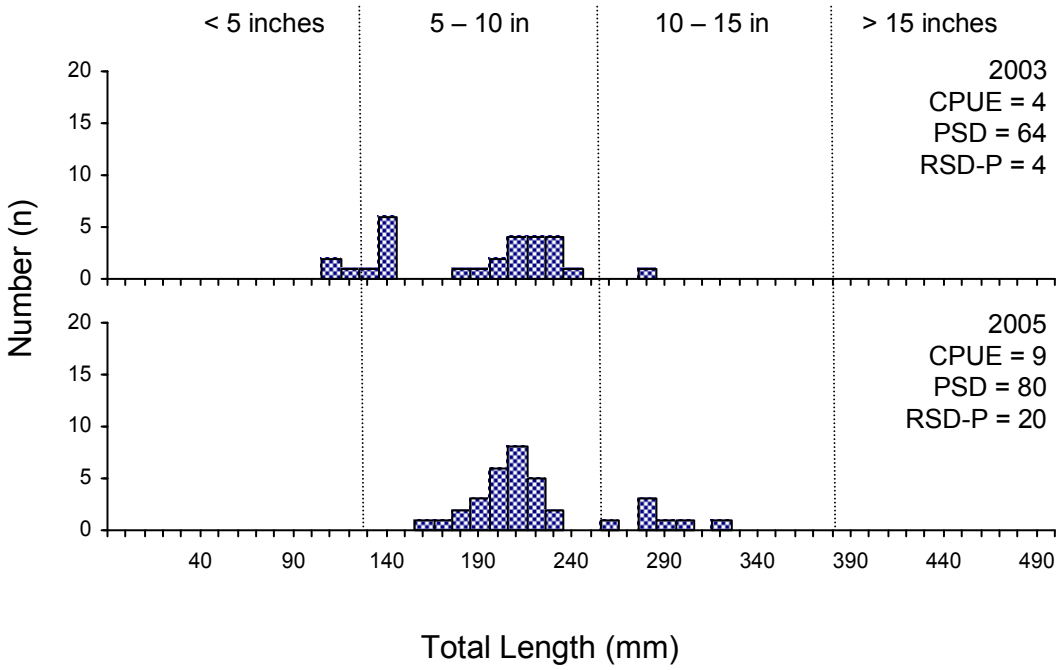



Figure 3. Length frequency, catch-per-unit-effort (CPUE; catch/net night) of stock length fish, proportional stock density (PSD), relative stock density of preferred length fish (RSD-P), and relative weight (Wr) of stock length fish for yellow perch captured in experimental gill net sets in Dry Lake, 2003 - 2005.