

Mid-Lynn Lake

Site Description

Location

Water designation number (WDN)	22-0052-00
Legal description	T123N-R57W-Sec. 2,3,10,11,14,15
County (ies)	Day
Location from nearest town	4 miles north, 6 miles west, 4.25 miles north, and 0.75 miles west of Webster

Survey Dates and Sampling Information

Survey dates	June 5-7, 2012 (FN, GN)
Frame net sets (n)	18
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	37,978
Surface area (acres)	≈1050
Maximum depth (ft)	≈25
Mean depth (ft)	---

Ownership and Public Access

Mid-Lynn 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, west and north provide public access to the lake. Recently, the access trail has been improved and a primitive boat ramp constructed on the south shore (Figure 1). Lands adjacent to the lake are owned by the State of South Dakota and private individuals.

Watershed and Land Use

The 37,978 acre Lynn Lake sub-watershed (HUC-12) encompasses Mid-Lynn Lake and is located within the larger Pierpont Lake (HUC-10) watershed. Land use within the Pierpont Lake watershed is primarily agricultural with a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

Water levels on Mid-Lynn 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 (e.g., Lynn, Bitter, and Waubay Lakes).

Fish Management Information

Primary species	Walleye, Yellow Perch
Other species	Black Bullhead, Black Crappie, Bluegill
Lake-specific regulations	Walleye: 2 daily; minimum length 15"
Management classification	none
Fish consumption advisories	none

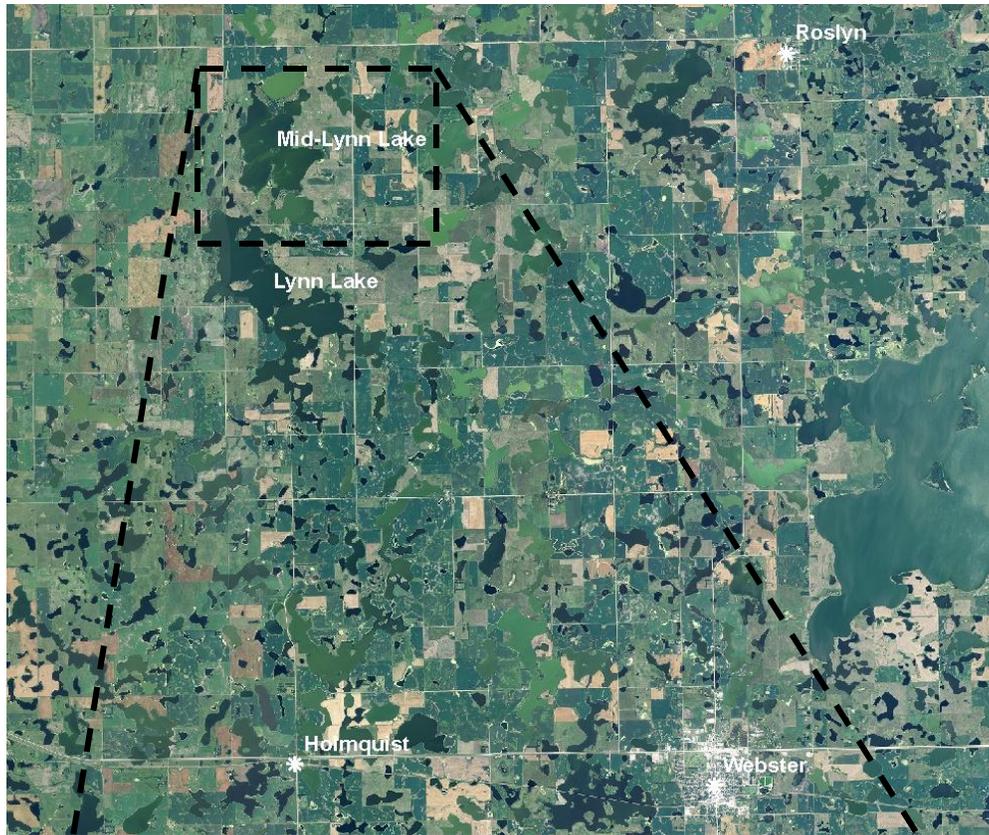


Figure 1. Map depicting geographic location of Lynn and Mid-Lynn Lakes from Webster, South Dakota (top). Also noted is the public access and standardized net locations for Mid-Lynn Lake (bottom). MLFN= frame nets; MLGN= gill nets

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 above normal precipitation during the 1990's, Mid-Lynn Lake was a shallow cattail slough. Abundant precipitation and the resulting run-off increased water depth to levels capable of sustaining sport fish. The first SDGFP stocking of fish into Mid-Lynn Lake occurred in 2002 when Walleye were stocked (Table 6). Currently, Mid-Lynn Lake is managed as a Walleye and Yellow Perch fishery.

Primary Species

Walleye: The majority of Walleye captured in the gill net catch were less than stock-length (i.e., 25 cm; 10 in) resulting in a mean gill net CPUE for all sizes of walleye of 9.8. The mean gill net CPUE of stock-length Walleye was 1.8 (Table 1) and below the minimum objective (≥ 10 stock-length Walleye/net night; Table 3), as only 11 stock-length Walleye ranging in TL from 35 to 40 cm (13.8 to 15.7 in) were sampled (Figure 2). Currently, relative abundance appears to be low.

Otoliths were collected from a sub-sample of Walleye in the gill net catch. Age structure information suggested the presence of three year classes (2009-2011; Table 4). The naturally-produced 2011 cohort comprised 75% of Walleye in the gill net catch and accounted for the high proportion of sub-stock Walleye (Table 4; Figure 2). The 2009 and 2010 year classes coincided with fry stockings and comprised 3% and 22%, respectively, of Walleye in the gill net catch (Table 4; Table 6). The contribution of stocked or naturally-produced Walleye to year classes produced during stocked years is unknown, as stocked individuals were unmarked making it difficult to differentiate stocked from naturally-produced Walleye. Few inferences can be made concerning size structure, growth, and condition of stock-length Walleye due to low sample size.

Yellow Perch: The mean gill net CPUE of stock-length Yellow Perch was 177.2 (Table 1) and higher than the 2007 CPUE of 35.0 (Table 2). The 2012 mean gill net CPUE was above the minimum objective (≥ 30 stock-length perch/net night; Table 3) and indicated high relative abundance.

Gill net captured Yellow Perch ranged in TL from 9 to 30 cm (3.5 to 11.8 in), had a PSD of 31, and a PSD-P of 10. The PSD and PSD-P values were within management objectives and indicated a relatively balanced population (defined as PSD of 30-60 and a PSD-P of 5-10; Table 3).

Otoliths were collected from a sub-sample of gill net captured Yellow Perch. Age structure information indicated the presence of five year classes (2007-2011; Table 7). The majority (88%) of Yellow Perch in the gill net catch were from year classes produced in 2010 (47%) and 2011 (41%; Table 7). In 2012, the weighted mean TL at capture for age-2, age-3 and age-4 male Yellow Perch was 159, 225 and 250 mm (6.3, 8.9 and 9.8 in); while the weighted mean TL at capture for age-2, age-3 and age-4 female Yellow Perch was 189, 246 and 273 mm (7.4, 9.7 and 10.7 in), respectively (Table 8). Mean Wr values of gill net captured Yellow Perch ranged from 88 to 99 for all length categories (e.g., stock to quality) sampled, with the mean Wr of stock-length Yellow Perch being 98 (Table 1). No length-related trends in condition were apparent.

Other Species

Other: Black Bullhead, Black Crappie, and Bluegill were captured in low numbers during the 2012 survey (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys on an every third year basis (next surveyed scheduled for summer 2015) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Stock Walleye on a biennial basis (\approx 500 fry/acre) to establish additional year classes.
- 3) Collect otoliths from Walleye and Yellow Perch to assess age structure and growth rates of each population.
- 4) Maintain the 381-mm (15-in) minimum length limit and daily limit of two on Walleye to comply with tool box options (Lucchesi and Blackwell 2009). The regulation is designed to protect smaller fish from harvest, increase average fish size, and provide a more equitable distribution of the Walleye harvest.
- 5) Monitor winter and summer kill events. In cases of substantial winter/summer kill the need to re-establish a fishery in Mid-Lynn Lake should be evaluated. If water levels are sufficient, 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 frame nets and experimental gill nets from Mid-Lynn Lake, 2012. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; 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>Frame Nets</i>								
BLB	11.2	4.5	98	2	33	5	114	1
BLC	0.1	0.1	50	50	0	---	116	9
BLG	0.4	0.2	57	39	0	---	128	6
WAE	1.8	0.4	97	5	84	11	94	2
YEP	84.3	34.8	62	2	9	1	100	1
<i>Gill Nets</i>								
BLB	0.7	0.5	100	0	25	59	118	22
WAE	1.8	1.6	55	29	0	---	95	2
YEP	177.2	37.1	31	2	10	2	98	1

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured in frame nets and experimental gill nets from Mid-Lynn Lake, 2004-2012. BLB= Black Bullhead; BLC= Black Crappie; BLG= Bluegill; WAE= Walleye; YEP= Yellow Perch

Species	CPUE				
	2004	2005	2006	2007	2012
<i>Frame Nets</i>					
BLB	---	---	---	---	11.2
BLC	---	---	---	---	0.1
BLG	---	---	---	---	0.4
WAE	---	---	---	---	1.8
YEP	---	---	---	---	84.3
<i>Gill Nets</i>					
BLB	1.0	0.7	0.0	0.0	0.7
WAE	16.3	15.7	12.3	1.7	1.8
YEP	27.0	24.0	118.7	35.0	177.2

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 Mid-Lynn Lake, 2004-2012. WAE = Walleye; YEP = Yellow Perch

Species	2004	2005	2006	2007	2012	Objective
<i>Gill nets</i>						
WAE						
CPUE	16	16	12	2	2	≥ 10
PSD	94	100	97	40	55	30-60
PSD-P	0	2	68	40	0	5-10
Wr	107	109	91	100	95	---
YEP						
CPUE	27	24	119	35	177	≥ 30
PSD	73	86	29	38	31	30-60
PSD-P	20	38	14	14	10	5-10
Wr	100	100	112	121	98	---

Table 4. 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 Mid-Lynn Lake, 2012.

Survey Year	Year Class									
	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
2012	---	44	13	2	---	---	---	---	---	---
2007 ¹	---	---	---	---	---	---	3	1	---	2
# stocked fry	---	---	700	700	700	---	---	700	---	700
sm. fingerling	---	---	---	---	---	---	---	---	---	---
lg. fingerling	---	---	---	---	---	---	---	---	---	---

¹ Monofilament gill net mesh size change (0.75", 1.00", 1.25", 1.50", 2.00" and 2.50")

Table 5. Weighted mean length at capture (mm) for Walleye captured in experimental gill nets (expanded sample size) from Mid-Lynn Lake, 2005-2012. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends.

Year	Age				
	1	2	3	4	5
2012	200 (44)	340 (13)	379 (2)	---	---
2007	258 (3)	253 (1)	---	531 (2)	---
2006	208 (46)	---	---	---	517 (36)
2005	---	---	---	471 (47)	---

Table 6. Stocking history including size and number for fishes stocked into Mid-Lynn Lake, 2002-2012. GIZ= Gizzard Shad; WAE= Walleye; YEP= Yellow Perch

Year	Species	Size	Number
2002	WAE	fry	700,000
2003	WAE	fry	700,000
2005	WAE	fry	700,000
2008	GIZ	adult	117
	WAE	fry	700,00
	YEP	fry	701,000
2009	GIZ	adult	125
	WAE	fry	700,000
	YEP	fry	703,000
2010	WAE	fry	700,000

Table 7. Year class distribution based on the expanded age/length summary for Yellow Perch sampled in gill nets from Mid-Lynn Lake, 2012.

Survey Year	Year Class					
	2012	2011	2010	2009	2008	2007
2012		727	839	163	42	10

Table 8. Weighted mean TL (mm) at capture by gender for Yellow Perch captured in experimental gill nets (expanded sample size) from Mid-Lynn Lake, 2012.

Year	1	2	3	4	5
2012					
Male	101 (269)	159 (315)	225 (35)	250 (4)	---
Female	100 (406)	189 (550)	246 (123)	273 (42)	271 (11)
Combined	101 (727)	176 (839)	238 (163)	271 (42)	270 (10)

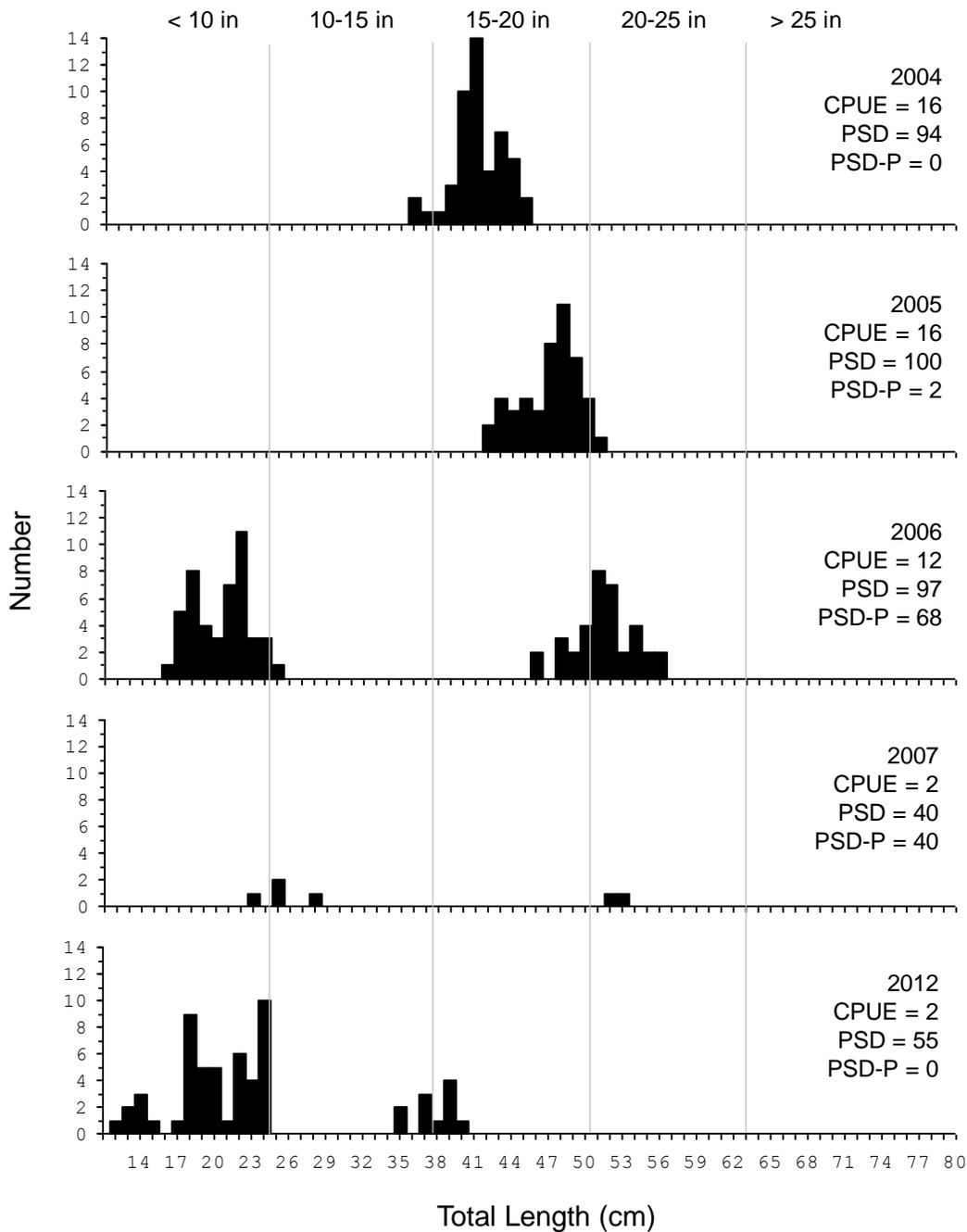


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using experimental gill nets in Mid-Lynn Lake, 2004-2012.

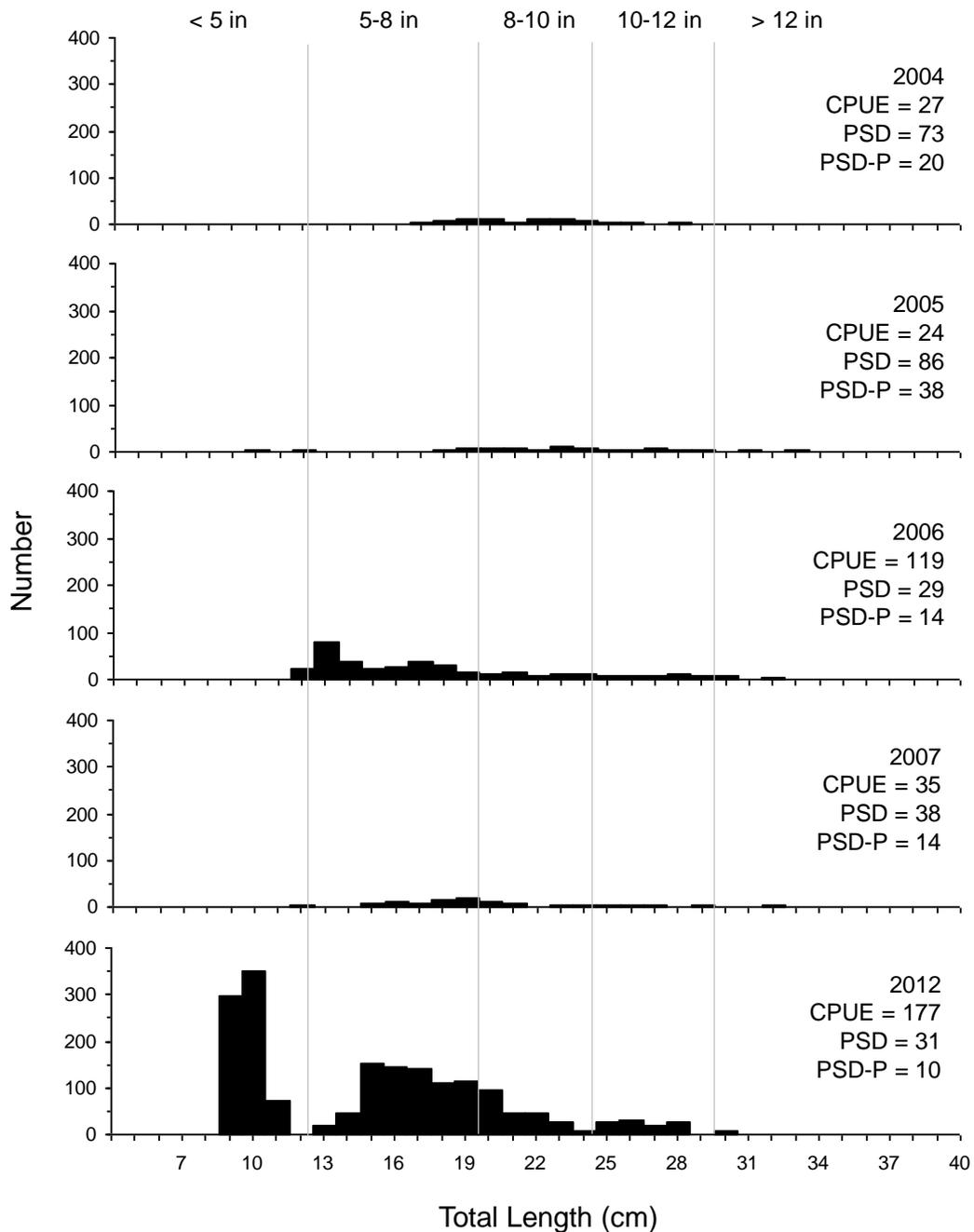


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Mid-Lynn Lake, 2004-2012.