

Lily GPA

Site Description

Location

Water designation number (WDN)	22-0042-00
Legal description	T119N-R58W-Sec. 1,2 T120N-R58W-Sec. 25,26,27,35,36
County (ies)	Day, Clark
Location from nearest town	5 miles west of Lily, SD.

Survey Dates and Sampling Information

Survey dates	August 28-29, 2012 (GN)
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	36,806
Surface area (acres)	≈1300
Maximum depth (ft)	≈18
Mean depth (ft)	unknown

Ownership and Public Access

The waterbody referred to as Lily GPA is a non-meandered lake that covers both public (e.g., Game Production Area) and private lands. The fishery is managed by the SDGFP. No boat ramp exists and public access is limited to public road rights-of-way. Lands adjacent to Lily GPA are owned by the State of South Dakota and private individuals.

Watershed and Land Use

The 36,806 acre Town of Lily sub-watershed (HUC-12) encompasses Lily GPA and is located within the larger Upper Mud Creek (HUC-10) watershed. Land use within the Upper Mud Creek watershed is primarily agricultural with a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

Water levels on Lily GPA 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., Jesse Slough, Lynn, and Waubay Lakes).

Fish Management Information

Primary species	Walleye, Yellow Perch
Other species	Northern Pike
Lake-specific regulations	none
Management classification	none
Fish consumption advisories	none

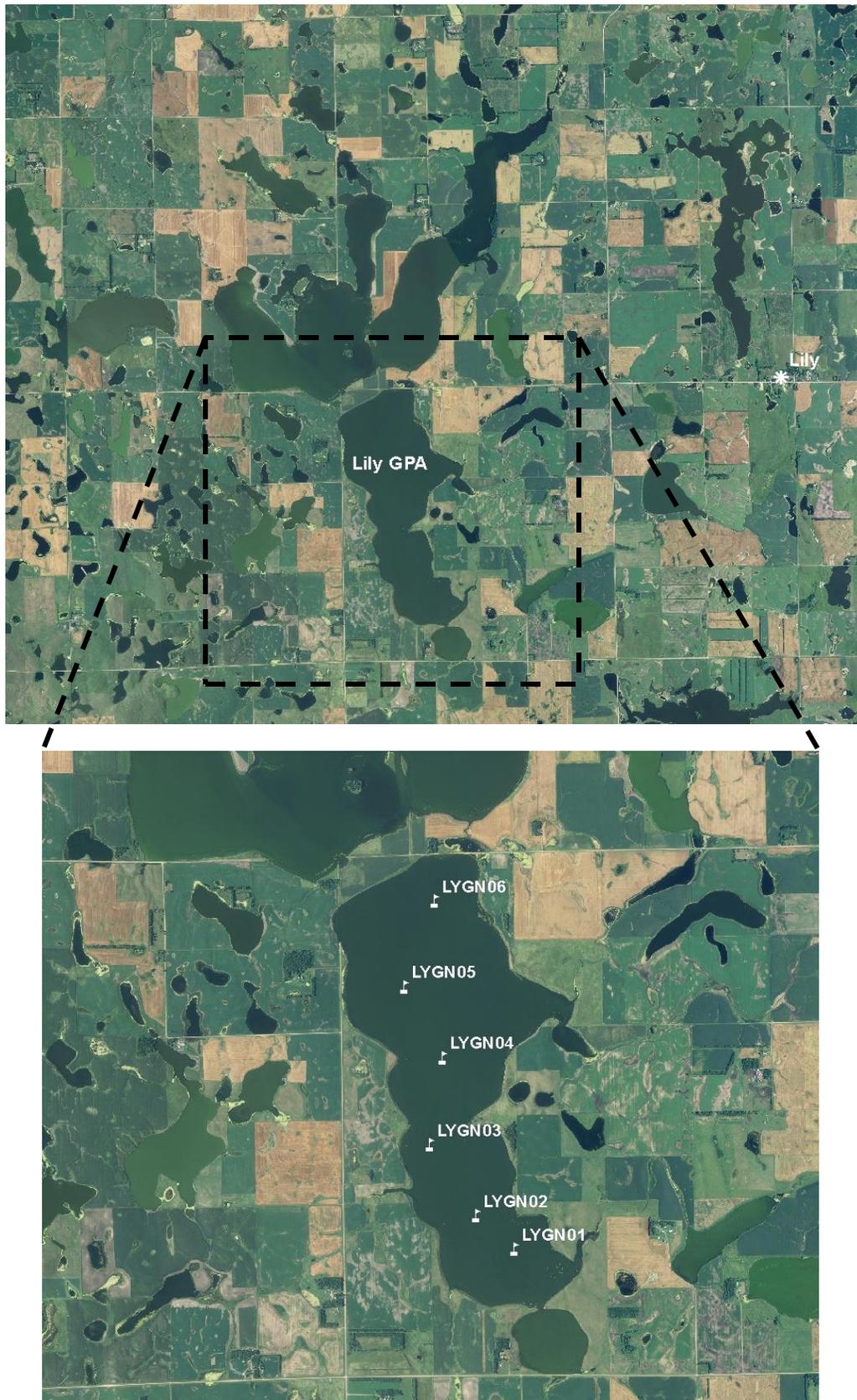


Figure 1. Map depicting geographic location Lily GPA from Lily, South Dakota (top). Also noted are standardized net locations for Lily GPA (bottom). LYGN= gill nets

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 1990's, Lily GPA was a shallow slough and did not support a sport fishery. During the mid-1990's above average precipitation and the resulting run-off provided an increase in surface area and depth making the lake capable of sustaining a sport fishery. Currently, Lily GPA is managed as a Walleye and Yellow Perch fishery.

Note: In 2012, sampling took place approximately one month later than in 2008.

Primary Species

Walleye: In 2012, Walleye relative abundance was high with a mean gill net CPUE of 21.2 (Table 1). The 2012 mean gill net CPUE was above the minimum objective (≥ 10 stock-length Walleye/net night; Table 3) and was a substantial increase from the 0.2 observed in 2008 (Table 2).

Walleye captured in the 2012 gill net catch ranged in TL from 10 to 51 cm (3.9 to 20.1 in; Figure 2). Otoliths were collected from a sub-sample of gill net captured Walleye in 2012 and age structure information suggested that stocking efforts were successful as year classes produced in 2008, 2010 and 2012 which coincided with fry stockings comprised 82% of Walleye in the 2012 gill net catch (Table 4; Table 6; Figure 2). However, the contribution of natural reproduction during stocked years is unknown because we did not OTC mark stocked fry. Year-classes from 2009 and 2011 do not coincide with stocking events and are the result of natural reproduction. The majority of Walleye were less than quality length which resulted in low PSD and PSD-P values of 12 and 1 (Table 1; Table 3; Figure 2).

The large 2010 Walleye year class in Lily GPA has exhibited good growth with a weighted mean TL at capture of 354 mm (13.9 in) at age 2 (Table 5). Mean Wr values of Walleye captured in the 2012 gill net catch ranged from 77 to 84 for all length categories sampled with the mean Wr of stock-length Walleye being 79 (Table 1). No length-related trends in condition were apparent.

Yellow Perch: The mean gill net CPUE of stock-length Yellow Perch in 2012 was 14.3 (Table 1) and below the minimum objective (≥ 30 stock-length Yellow Perch/net night; Table 3). The 2012 gill net CPUE represents an increase from the 1.3 observed in 2008 (Table 2). Relative abundance of Yellow Perch in Lily GPA is considered moderate.

In 2012, gill net captured Yellow Perch ranged in TL from 13 to 34 cm (5.1 to 13.4 in; Figure 3). Based on otolith age estimates, four year classes (2007, 2009-2011) comprised the entire sample (Table 7).

Yellow Perch growth appeared to be fast with a weighted mean TL at capture for age-2 males of 234 mm (9.2 in) and age-2 females of 257 mm (10.1 in, Table 8). Sampled Yellow Perch had mean W_r values that were ≥ 100 for all length categories sampled with the mean W_r of stock-length Yellow Perch being 103 (Table 1). No length-related trends in condition were apparent.

Other Species

Northern Pike: The mean gill net CPUE for stock-length Northern Pike in 2012 was 2.3 and is similar to the mean gill net CPUE of 2.8 observed in 2008 (Tables 1-2). Northern Pike relative abundance is considered to be moderate.

In 2012, gill net captured Northern Pike ranged in TL from 44 to 73 cm (17.3 to 28.7 in). Condition was good with a mean W_r value of 80 (Table 1).

Management Recommendations

- 1) Conduct fish community assessment surveys every fourth year (the next survey will be scheduled for the summer of 2016) to monitor fish relative abundance, fish population size structures, and fish growth.
- 2) Stock Walleye every other year (≈ 500 fry/acre) to maintain the sport fishery.
- 3) Collect otoliths from Walleye and Yellow Perch to assess age structure and growth rates of each population.
- 4) Monitor winter and summerkill events. In cases of substantial winter/summerkill the need to re-establish a fishery in Lily GPA should be evaluated. If water levels are sufficient, Walleye and Yellow Perch should be stocked to re-establish a fish community.
- 5) Establish a public boat ramp and parking area.

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 Lily GPA, 2012. Confidence intervals include 80 percent (\pm CI-80) or 90 percent (\pm CI-90). 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	2.3	0.6	93	13	14	17	80	2
WAE	21.2	4.5	12	5	1	1	79	<1
YEP	14.3	4.2	26	8	16	7	103	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 Lily GPA, 2008-2012. NOP= Northern Pike; WAE= Walleye; YEP= Yellow Perch

Species	CPUE				
	2008	2009	2010	2011	2012
<i>Frame Nets</i>					
NOP	1.9	---	---	---	---
WAE	0.2	---	---	---	---
YEP	0.1	---	---	---	---
<i>Gill Nets</i>					
NOP	2.8	---	---	---	2.3
WAE	0.2	---	---	---	21.2
YEP	1.3	---	---	---	14.3

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 Lily GPA, 2008-2012. NOP= Northern Pike; WAE = Walleye; YEP = Yellow Perch

Species	2008	2009	2010	2011	2012	Objective
<i>Gill nets</i>						
NOP						
CPUE	3	---	---	---	2	---
PSD	76	---	---	---	93	---
PSD-P	18	---	---	---	14	---
Wr	95	---	---	---	80	---
WAE						
CPUE	<1	---	---	---	21	≥ 10
PSD	0	---	---	---	12	30-60
PSD-P	0	---	---	---	1	5-10
Wr	85	---	---	---	79	---
YEP						
CPUE	1	---	---	---	14	≥ 30
PSD	38	---	---	---	26	30-60
PSD-P	38	---	---	---	16	5-10
Wr	107	---	---	---	103	---

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 Lily GPA, 2008-2012.

Survey Year	Year Class					
	2012	2011	2010	2009	2008	2007
2012	5	28	123	1	2	
2008	---	---	---	---	25	1
# stocked						
fry	600		1200		1200	
sm. fingerling						
lg. fingerling						

Table 5. Weighted mean length at capture (mm) for Walleye captured in experimental gill nets (expanded sample size) from Lily GPA, 2008-2012. Note: sampling was conducted approximately three weeks later during 2012.

Year	Age				
	0	1	2	3	4
2012	121 (5)	215 (28)	354 (123)	468 (1)	511 (2)
2008	111 (25)	318 (1)	---	---	---

Table 6. Stocking history including size and number for fishes stocked into Lily GPA, 2002-2012. WAE= Walleye; YEP= Yellow Perch

Year	Species	Size	Number
2002	WAE	fry	1,200,000
2003	WAE	fry	1,500,000
2008	WAE	fry	1,200,000
2010	WAE	fry	1,200,000
2012	WAE	fry	600,000

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

Survey Year	Year Class					
	2012	2011	2010	2009	2008	2007
2012		65	13	7		1

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

Year	Age				
	1	2	3	4	5
2012					
Male	160 (15)	234 (5)	---	---	---
Female	172 (44)	257 (8)	303 (7)	---	343 (1)
Combined	169 (65)	248 (13)	303 (7)	---	343 (1)

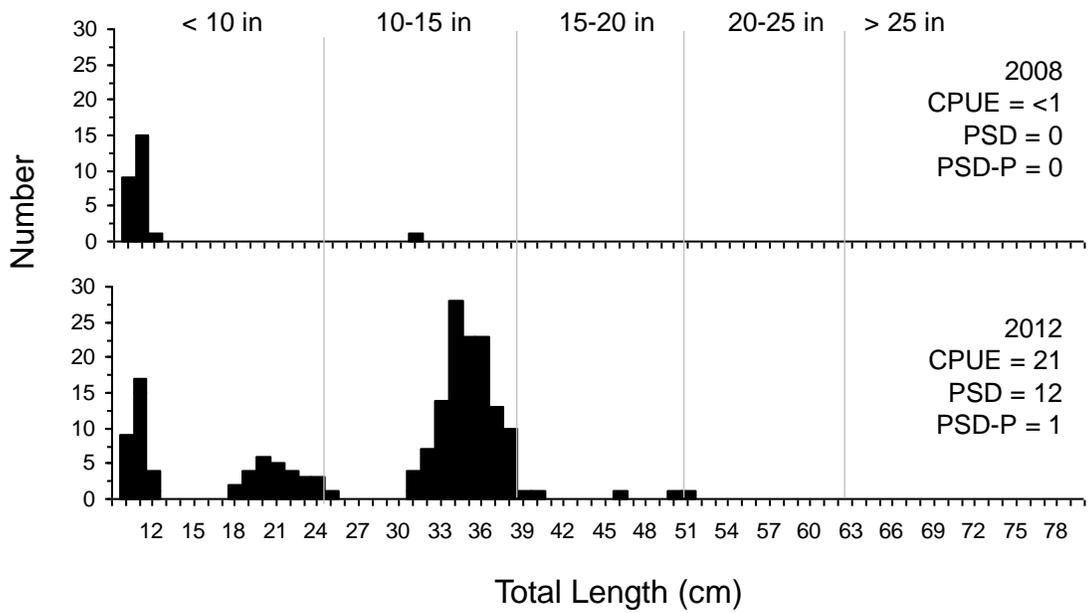


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Walleye captured using experimental gill nets in Lily GPA, 2008 and 2012.

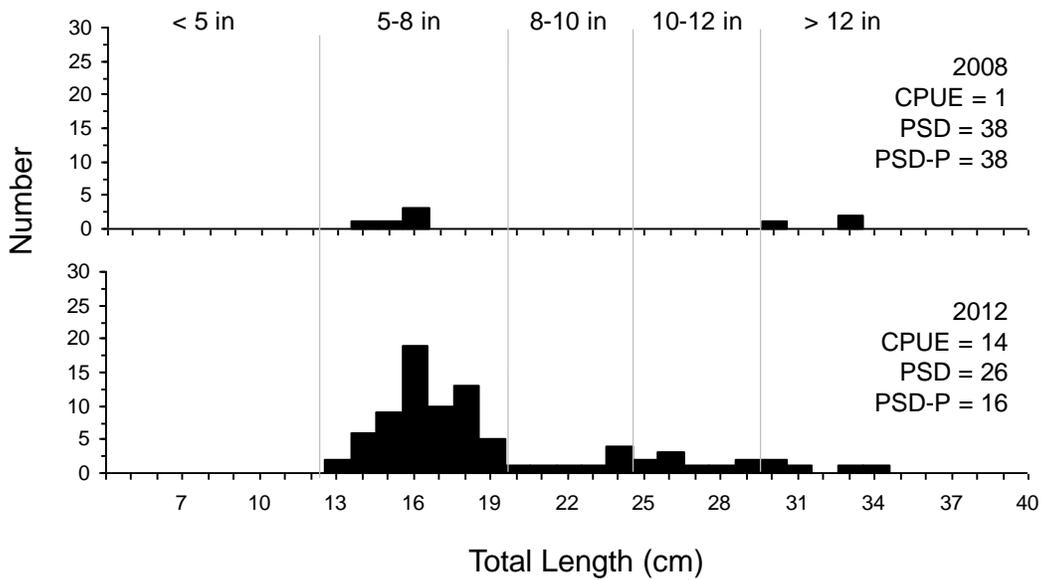


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