

Antelope/Indian Springs

Site Description

Location

Water designation number (WDN)	18-0002-00
Legal description	T116N-R57W-Sec 14-16,19-23,27-30,33 T116N-R58W-Sec 25
County (ies)	Clark
Location from nearest town	2.5 miles south of Clark, SD

Survey Dates and Sampling Information

Survey dates	August 12, 2014 (GN)
Gill net sets (n)	6

Morphometry (Figure 1)

Watershed area (acres)	79,580
Surface area (acres)	3,275
Maximum depth (ft)	≈16
Mean depth (ft)	unknown

Ownership and Public Access

Antelope Lake, a meandered lake, is connected to Indian Springs (Figure 1) and together the waterbody is referred to as the Antelope/Indian Springs Complex. The fishery is managed by the SDGFP. Although no formal boat ramp exists, public access exists along 424th Ave. (east side) with parking available west of 424th Ave. Additionally, access has been gained via flooded road-rights-of-way in various locations (Figure 1). Lands adjacent to the Antelope/Indian Springs Complex are owned by private individuals.

Watershed and Land Use

The 79,580 acre Antelope Lake sub-watershed (HUC-12) encompasses the Antelope/Indian Springs Complex and 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

No OHWM or outlet elevation has been established by the South Dakota Water Management Board on the Antelope/Indian Springs Complex. On May 12, 2014 the elevation was 1755.4 fmsl; 0.7 ft above the fall 2013 elevation of 1754.7 fmsl. The water level had declined to an elevation of 1754.3 fmsl on October 14, 2014.

Fish Management Information

Primary species	walleye, yellow perch
Other species	northern pike
Lake-specific regulations	none
Management classification	warm-water semi-permanent
Fish consumption advisories	none

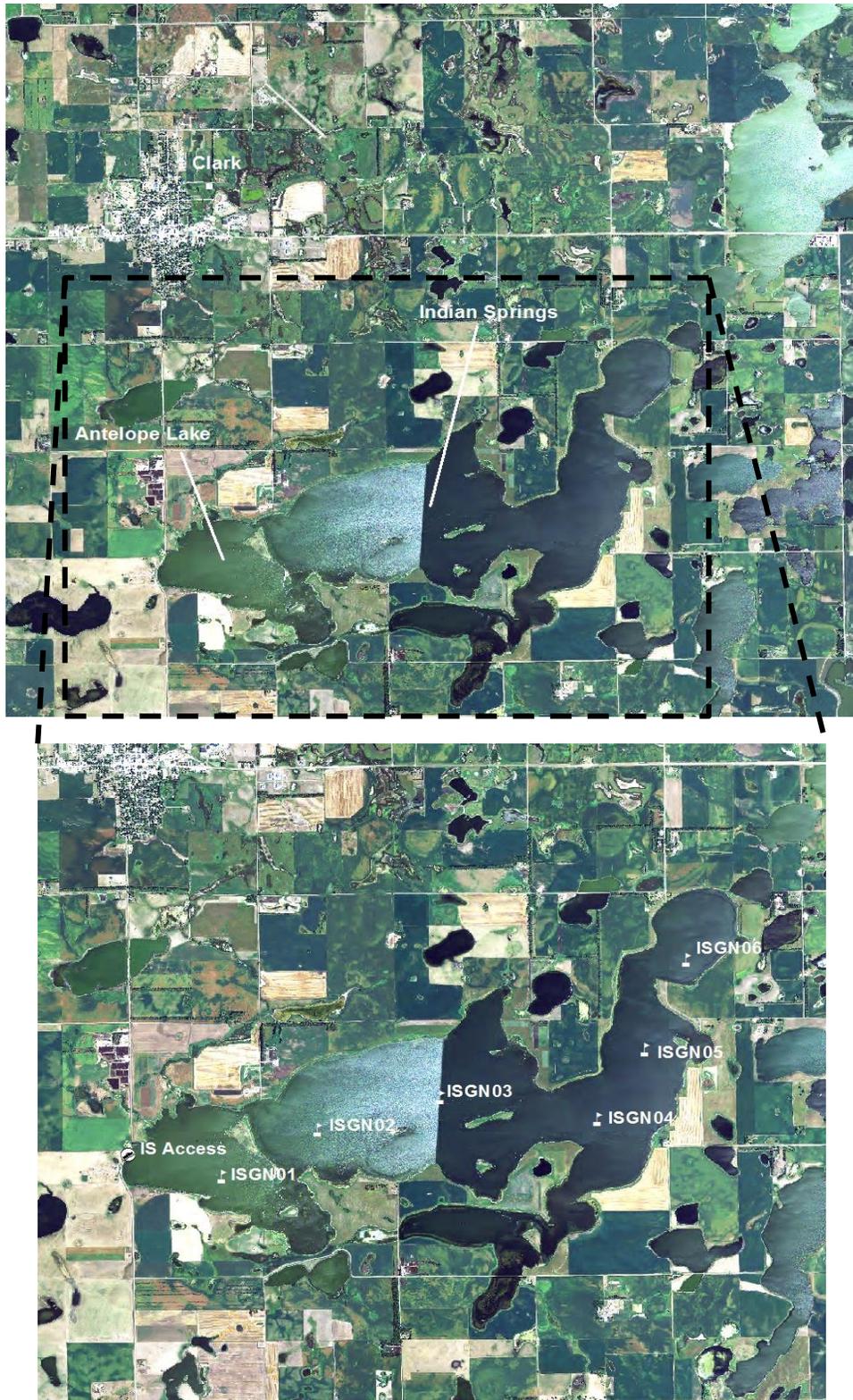


Figure 1. Map depicting geographic location of the Antelope/Indian Springs Complex (Clark County) from Clark, South Dakota (top). Also noted is the public access location and standardized net locations for Antelope/Indian Springs (bottom). ISGN= gill net

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

The Antelope/Indian Springs Complex is a relatively new fishery. Above normal precipitation during the mid to late 1990s and again from 2010-2012 increased the surface area and depth of the waterbody (SDDENR 2015), which diminished the threat of winterkill and created habitat capable of sustaining a sport fishery. As a result, sport fish populations have expanded and the Antelope/Indian Springs Complex has become a popular destination for anglers targeting northern pike, walleye, and yellow perch.

Primary Species

Walleye: The mean gill net CPUE of stock-length walleye was 16.3 (Table 1) and above the minimum objective (≥ 10 stock-length walleye/net night; Table 3).

Walleye in the gill net catch ranged in TL from 13 to 69 cm (5.1 to 27.2 in; Figure 2). A high proportion of walleye \geq quality-length (38 cm; 15 in) were present in the sample (Figure 2). The PSD was 85 and the PSD-P was 11 (Table 1), both exceeded management objectives of 30-60 and 5-10, respectively (Table 3).

Otoliths were collected from a sub-sample of walleye in the gill net catch. Age structure information suggested the presence of eight year classes (2006 and 2008-2014; Table 2). Walleye in the Antelope/Indian Springs Complex exhibit fast growth (Table 3). In 2014, the weighted mean TL at capture of age-2 and age-3 walleye was 415 and 475 mm (16.3 and 18.7 in; Table 3). Mean W_r values ranged from 84 to 92 for all length categories (e.g., stock to quality) sampled; the mean W_r of stock-length individuals was 91 (Table 1) and no length-related trends in condition were apparent.

Yellow Perch: The mean gill net CPUE of stock-length yellow perch was 101.7 (Table 1) and above the minimum objective (≥ 30 stock-length yellow perch/net night). Currently, relative abundance is high.

Gill net captured yellow perch ranged in TL from 8 to 34 cm (3.1 to 13.4 in), had a PSD of 26, and a PSD-P of 17 (Table 1; Figure 3). The PSD was below the management objective of 30-60; while the PSD-P was above the management objective of 5-10 (Table 1).

Otoliths collected from a sub-sample of gill net captured yellow perch indicated that six consecutive year classes (2009-2014) were present. The 2011 and 2013 year classes were the most represented and collectively comprised 90% of yellow perch in the gill net catch (Table 4).

The weighted mean TL at capture for age-1 and age-3 male yellow perch was 169 and 237 mm (6.7 and 9.3 in; Table 5). The weighted mean TL at capture for age-1 and age-3 females was 173 and 261 mm (6.8 and 10.3 in), respectively (Table 5). Few age-2 individuals of either gender were sampled. Gill net captured yellow perch had high condition, with mean W_r values that exceeded 100 for all length categories (e.g., stock to quality) sampled. The mean W_r of stock-length individuals was 104 (Table 1) and no length-related trends in condition were apparent.

Northern Pike: Northern pike typically are not sampled effectively during mid-summer fish community surveys. As a result, mean gill net CPUE values are often low. In 2014, the mean gill net CPUE was 4.3 (Table 1) and relative abundance was considered high.

Gill net captured northern pike ranged in TL from 58 to 89 cm (22.8 to 35.0 in), had a PSD of 100 and PSD-P of 54 (Table 1). Northern pike condition was similar to that of northern pike captured from other northeast South Dakota glacial lakes (e.g., Dry and Grass Lakes) with mean W_r values that ranged from 71 to 102 for all 10-mm length groups represented. A decreasing trend in condition was observed as TL increased.

Management Recommendations

- 1) Conduct fish community assessment surveys on an every fourth year basis (next surveyed scheduled for 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) Monitor winter and summer kill events. In cases of substantial winter/summer kill the need to re-establish a fishery in the Antelope/Indian Springs Complex 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 experimental gill nets from Antelope/Indian Springs, 2014. 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	4.3	0.5	100	0	54	17	84	2
WAE	16.3	6.9	85	6	11	6	91	1
YEP	101.7	25.4	26	3	17	3	104	1

Table 2. 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 Antelope/Indian Springs, 2014.

Survey Year	Year Class								
	2014	2013	2012	2011	2010	2009	2008	2007	2006
2014	19	9	9	39	28	10	1		2
# stocked									
fry									
sm. fingerling									
lg. fingerling									

Table 3. Weighted mean TL at capture (mm) for walleye captured in experimental gill nets (expanded sample size) from Antelope/Indian Springs, 2014.

Year	Age								
	0	1	2	3	4	5	6	7	8
2014	163(19)	333(9)	415(9)	475(39)	537(28)	546(10)	495(1)	---	697(2)

Table 4. Year class distribution based on the expanded age/length summary for yellow perch sampled in gill nets from Antelope/Indian Springs, 2014.

Survey Year	Year Class					
	2014	2013	2012	2011	2010	2009
2014	61	449	2	153	2	4

Table 5. Weighted mean TL (mm) at capture by gender for yellow perch captured in experimental gill nets (expanded sample size) from Antelope/Indian Springs, 2014.

Year	Age					
	0	1	2	3	4	5
2014						
Male	92(36)	169(71)	205(2)	237(23)	---	---
Female	94(18)	173(368)	---	261(129)	304(2)	339(4)
Combined	93(61)	172(449)	205(2)	257(153)	304(2)	339(4)

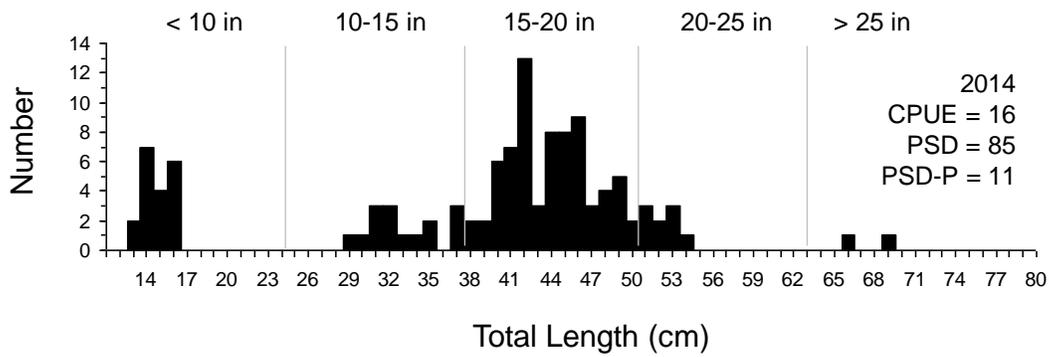


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Antelope/Indian Springs, 2014.

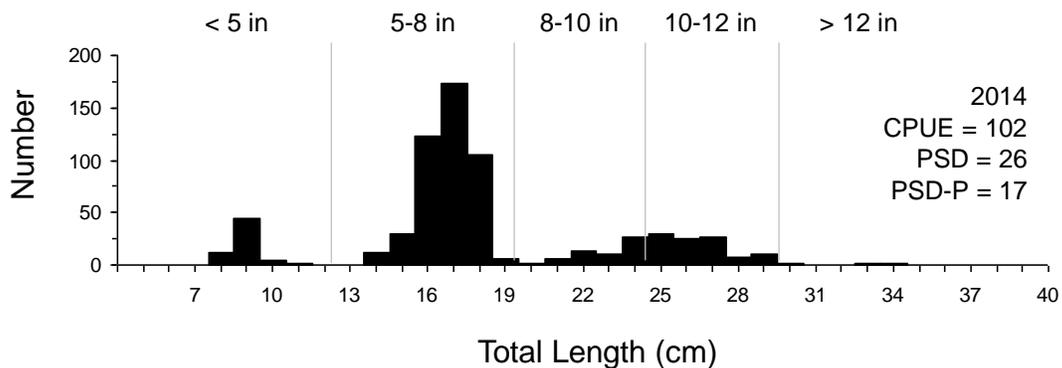


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for yellow perch captured using experimental gill nets in Antelope/Indian Springs, 2014.

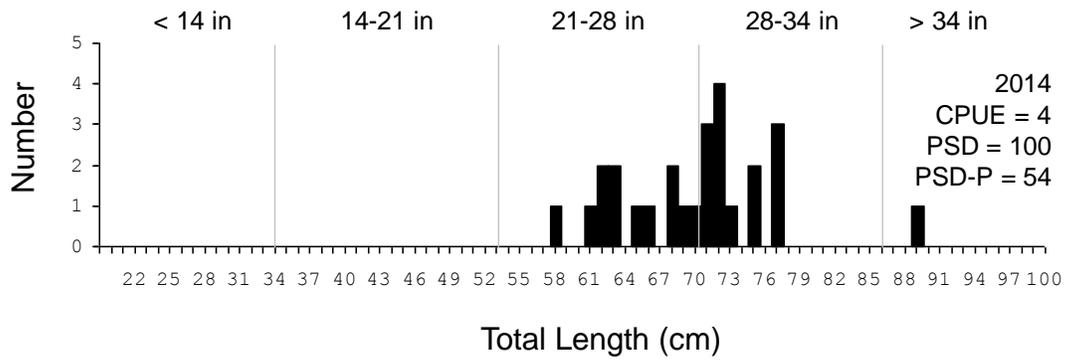


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for northern pike captured using experimental gill nets in Antelope/Indian Springs, 2014.