SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Ethan Lake, Hanson County
2102-F-21-R-47
2014

Figure 1. Ethan Lake, Hanson County

Legal Description: T101-R59-Sec 17, 18
Location from nearest town: 2 miles east and 1/2 mile north of Ethan, SD

Surface Area: 38.6 acres
Meandered (Y/N): No
OHWM elevation: none set
Outlet elevation: no data
Max. depth at outlet elevation: 11 feet
Observed water level: Full
Contour map available (Y/N): No

Watershed area: Unknown
Shoreline length: No data
Date set: NA
Date set: NA
Mean depth at outlet elevation: 4.7 feet
Lake volume: No data
Date mapped: NA

DENR beneficial use classifications: (5) warmwater semipermanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering

Introduction

General

Ethan Lake is an artificial impoundment created by the construction of a dam across Twelve Mile Creek by the Works Progress Administration (WPA) in 1937. It was named after the nearby town of Ethan, South Dakota.

Ownership of Lake and Adjacent Lakeshore Properties

The South Dakota Department of Game, Fish, and Parks (GFP) manages the lake and has easements for the original construction and for public access. Water rights for adjacent landowners to water livestock were included in these easements.

Fishing Access

Ethan Lake has a primitive rock boat launch and dock located on the west shore near the dam (Figure 1). The Ethan Lake Association has also installed a fishing pier and picnic shelter for lake users.

Water Quality and Aquatic Vegetation

The water in Ethan Lake was very turbid during the survey with a Secchi depth measurement of 25 cm (10 in). Scattered beds of common cattail (*Typha spp*.) surround the entire shoreline and no submerged vegetation was observed.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Ethan Dam, Hanson County, 2005-2014.

Year	*Water Temp ^{o}C (^{o}F)*	*Secchi Depth cm (in)*	*Observations/Comments (algae, aquatic vegetation, water quality, etc.)*
2014	27 (81)	25 (10)	cattails
2012	26 (78)	19 (7.5)	No aquatic vegetation
2006	26 (78)	20 (8)	No aquatic vegetation

Fish Community

Ethan Dam contains a diverse fish community consisting of many different species (Table 2).

Table 2. Fish species commonly found in Ethan Dam, Hanson County.

Game Species	***Other Species***
Black Crappie	Bigmouth Buffalo
Northern Pike	Common Carp
Largemouth Bass	
Channel Catfish	
Black Bullhead	
Walleye	
Yellow Perch	
Green Sunfish	

Fish Management

Ethan Dam is managed as a put-and-take fishery to provide fishing opportunity for local residents. Annual adult fish stocking is the primary management strategy (Table 3).

Table 3. Stocking history for Ethan Dam, Hanson County, 2005-2014.

Year	***Number***	***Species***	***Size***
2010	405	Largemouth Bass	Juvenile
	200	White Bass	Adult
2011	270	Channel Catfish	Adult
	160	Walleye	Large Fingerling
	632	Yellow Perch	Adult
2012	1,800	Yellow Perch	Adult
2013	400	Northern Pike	Adult
	1,800	Yellow Perch	Adult
2014	174	Northern Pike	Adult
	2,822	Black Bullhead	Adult

Methods

Ethan Dam was sampled on August 18-19, 2014, with 4 overnight trap nets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

Results and Discussion

Net Catch Results

Black bullheads were the most abundant species sampled with the trap nets in 2014 (Table 4), but their abundance has declined considerably since 2012 (Table 6). Respectable numbers of channel catfish and northern pike were also caught.

Table 4. Total catch from 4 overnight trap nets set in Ethan Dam, Hanson County, August 18-19, 2014.

Species	*#*	*%*	*CPUE[1]*	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Black Bullhead	139	70.9	34.8	±19.7	82.6	12	0	--
Bigmouth Buffalo	23	11.7	5.8	±2.5	3.9	57	0	--
Channel Catfish	13	6.6	3.3	±2.1	1.7	--	--	--
Northern Pike	13	6.6	3.3	±1.8	2.2	92	8	82
Black Crappie	5	2.6	1.3	±0.8	2.0	--	--	--
Common Carp	1	0.5	0.3	±0.3	0.9	--	--	--
Walleye	1	0.5	0.3	±0.3	0.2	--	--	--
Yellow Perch	1	0.5	0.3	±0.3	0.2	--	--	--

*10 years (2005-2014)

Table 5. CPUE by length category for selected species sampled with trap nets in Ethan Dam, Hanson County, August 18-19, 2014.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Black Bullhead	1.0	33.8	29.8	4.0	--	34.8	±19.7
Bigmouth Buffalo	--	5.8	--	5.8	--	5.8	±2.5
Channel Catfish	3.3	--	--	--	--	3.3	±2.1
Northern Pike	--	3.3	0.3	2.8	0.3	3.3	±1.8
Black Crappie	--	1.3	--	0.5	0.8	1.3	±0.8
Common Carp	0.3	--	--	--	--	0.3	±0.3
Walleye	--	0.3	--	0.3	--	0.3	±0.3
Yellow Perch	--	0.3	--	--	0.3	0.3	±0.3

Length categories can be found in Appendix A.

Table 6. Trap-net (TN) CPUE for selected fish species sampled in Ethan Dam, Hanson County, 2005-2014.

Species	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
Bigmouth Buffalo		0.2						5.8		5.8
Black Bullhead		6.8						206.2		34.8
Black Crappie		3.4						1.2		1.3
Channel Catfish		0.2						1.6		3.3
Common Carp		0.4						2.0		0.3
Green Sunfish		--						1.8		--
Largemouth Bass		--						0.8		--
Northern Pike		1.6						1.8		3.3
Walleye		--						0.2		0.3
White Crappie		0.6						0.2		--
Yellow Perch		--						0.4		0.3

[1] See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Northern Pike

Management Objective

- Maintain a northern pike population with a total trap-net CPUE of at least 2.

Management Strategy

- Stock adult northern pike, when available, at the rate of 5/acre (195) as needed to achieve the management objective.

It is likely the adult stockings in 2013 and 2014 (Table 8) are responsible for the increase in CPUE measured this year (Table 7).

Table 7. CPUE, PSD, RSD-P, and mean Wr for all northern pike sampled with trap nets in Ethan Dam, Hanson County, 2005-2014. Stocked years are shaded.

	2005	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***
CPUE		1.6						1.8		3.3
PSD		100						--		92
RSD-P		25						--		8
Mean Wr		87						--		82

Table 8. Northern pike stocked into Ethan Dam, Hanson County, 2005-2014.

Year	***Number***	***Size***
2013	400	Adult
2014	174	Adult

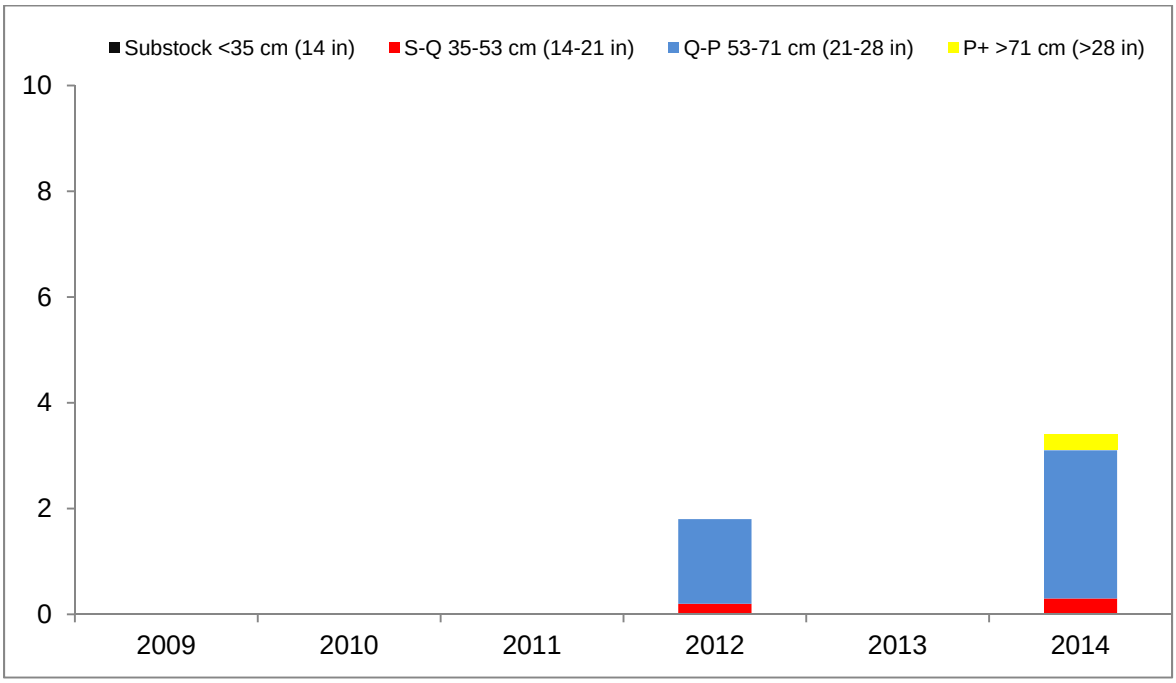

Figure 2. CPUE by length category for northern pike sampled with trap nets in Ethan Dam, Hanson County, 2009-2014.

Channel Catfish

Management Objective

- Maintain a channel catfish population with a total trap-net CPUE of at least 2.

Management Strategy

- Stock channel catfish, when available and as needed, to achieve the management objective.

Ethan Dam was stocked with 270 adult channel catfish obtained from Lake Oahe in 2011 (Table 7). Some of these fish were sampled in 2012 and they ranged in length from 50-60 cm (20-24 in) (Figures 8, 9). However, in 2014, none of these larger fish were sampled. Instead, the only catfish sampled ranged in length from 13-21 cm (5-8 in) which indicates successful natural reproduction by the older fish before they disappeared from the population.

Table 7. CPUE, PSD, RSD-P, and mean Wr for all channel catfish sampled with trap nets in Ethan Dam, Hanson County, 2005-2014. Stocked years are shaded.

	2005	***2006***	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***
CPUE		0.2						1.6		3.3
PSD		--						--		--
RSD-P		--						--		--
Mean Wr		--						--		--

Table 8. Channel catfish stocked into Ethan Dam, Hanson County, 2005-2014.

Year	***Number***	***Size***
2011	270	Adult

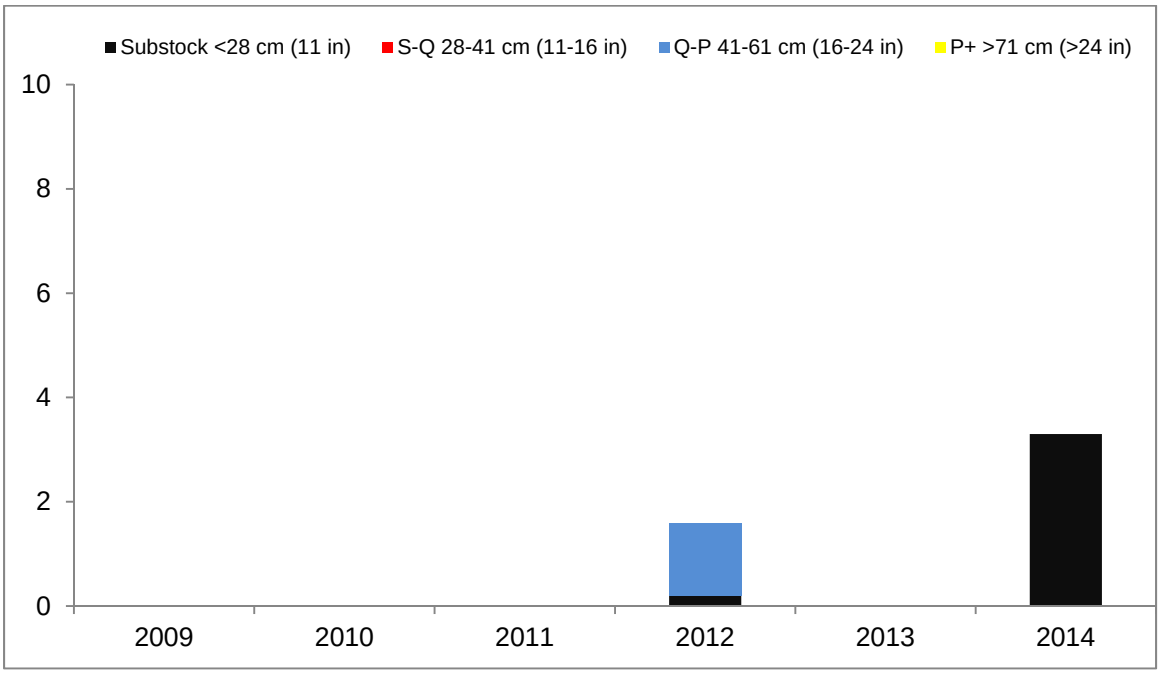

Figure 8. CPUE by length category for channel catfish sampled with trap nets in Ethan Dam, Hanson County, 2009-2014.

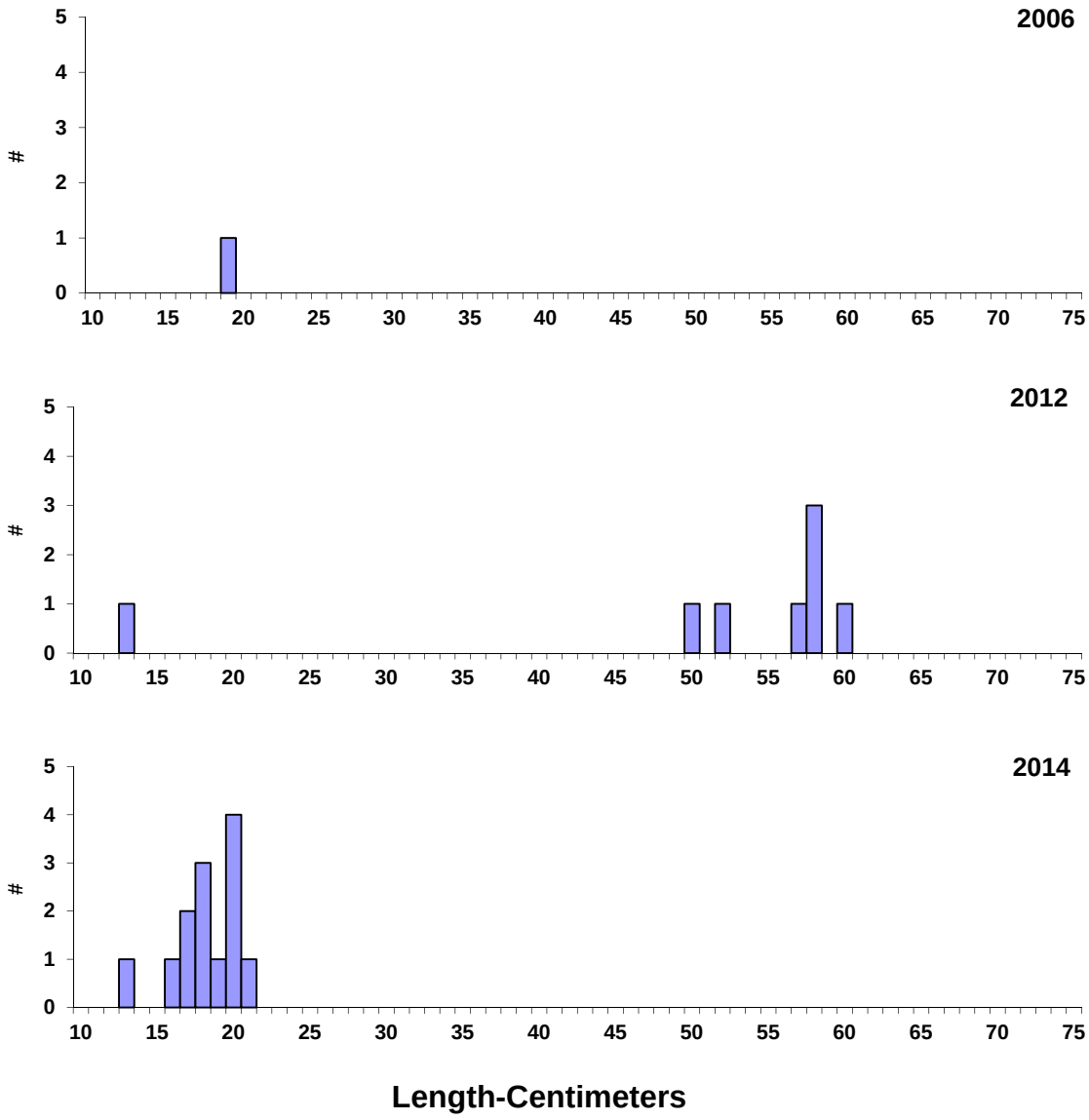

Figure 9. Length frequency histograms for channel catfish sampled with trap nets in Ethan Dam, Hanson County, 2010-2013.

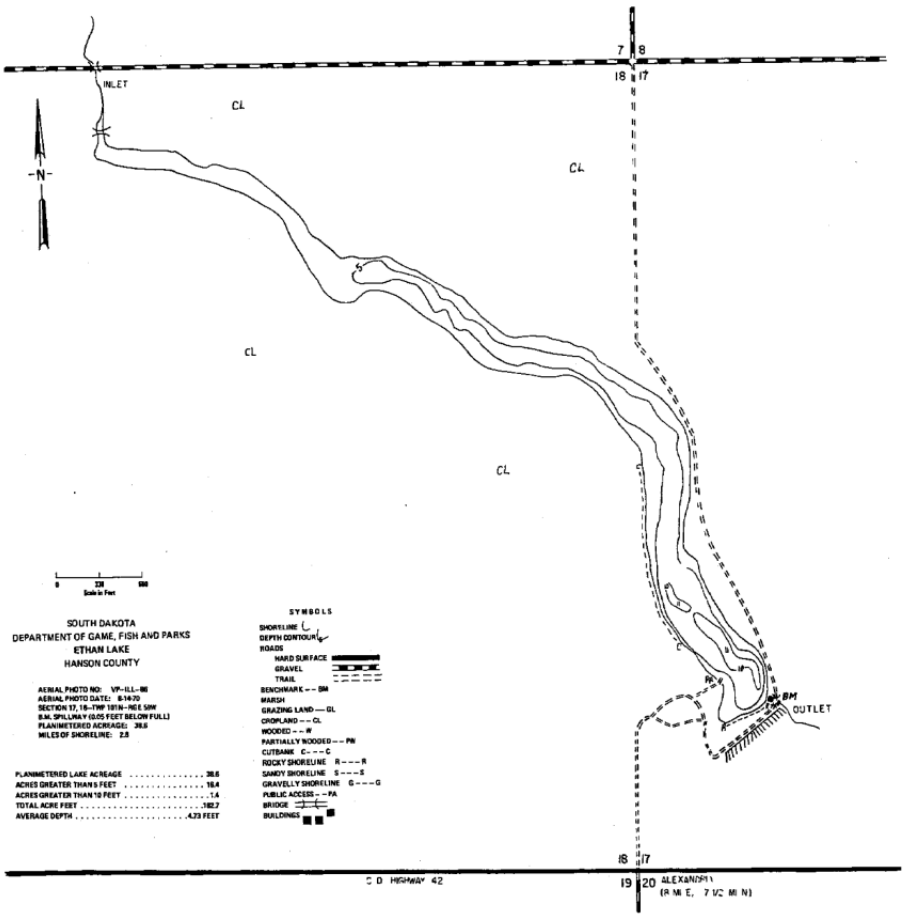

Figure 3. Contour map of Ethan Dam, Hanson County. (insert appropriate lake contour map above as in example)

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.