

## Bierman Pit

### Site Description

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#### **Location**

Water designation number (WDN)	57-0009-00
Legal description	T120N-R65W-Sec. 15
County (ies)	Spink
Location from nearest town	4.0 miles west and 3.5 miles north of Northville, SD

#### **Survey Dates and Sampling Information**

Dates of current survey	August 15, 2014 (FN,GN)
Frame net sets (n)	4
Gill net sets (n)	1

#### **Morphometry**

Watershed area (acres)	27,050
Surface area (acres)	14
Maximum depth (ft)	23
Mean depth (ft)	8

#### **Ownership and Public Access**

Bierman Pit is an old gravel pit purchased by the State of South Dakota and the lakeshore is owned by the State of South Dakota and Spink County. An unimproved gravel area in the southeast corner serves as a boat ramp for small boats and shore fishing access is available in several locations around the pit (Figure 1).

#### **Watershed and Land Use**

The 27,050 acre Salt Lake-Snake Creek sub-watershed (HUC-12) encompasses Bierman Pit and is located within the larger Lower Snake Creek (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**

Water levels on Bierman Pit are not monitored by SDDENR.

#### **Fish Management Information**

Fish species	black bullhead, black crappie, bluegill, channel catfish, common carp, freshwater drum, northern pike, orangespotted sunfish, shortnose gar, walleye, white bass, white sucker, yellow bullhead, yellow perch
Lake-specific regulations	none
Management classification	warm-water permanent
Fish consumption advisories	none

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Figure 1. Map depicting geographic location of Bierman Pit from Northville, South Dakota (top). A close-up view of Bierman Pit area is provided (bottom). Note: designated access trails on west and south both may provide a primitive-type boat launch site (primarily for smaller boats).

## Results and Discussion

Bierman Pit is an old gravel pit located northwest of Northville, South Dakota. The gravel pit was purchased by the State of South Dakota and has been managed as a fishery since the mid 1970's. Initial management efforts included chemical renovation (1974) and stocking of catchable trout (1974-1978). More recently, relatively frequent flooding of the pit area by Snake Creek has resulted in high species diversity including the presence of rough fish (i.e., common carp). In recent surveys (i.e., 2009 and 2014), 14 fish species have been sampled (Table 2).

### *Species*

Black Bullhead: In 2014, black bullheads were the most abundant fish species captured in both the frame nets and gill nets (Table 1). The mean frame net CPUE for stock-length black bullheads was 177.8 (Table 1), this represented an increase from the 2009 CPUE of 147.3 (Table 2) and indicated high relative abundance.

Almost all of the black bullheads in the frame net catch were < quality-length (23 cm; 9 in), resulting in a PSD of 6 and PSD-P of 0 (Table 1; Figure 2). No age or growth information was collected.

Black crappie: In 2014, frame nets captured 13 stock-length black crappie that ranged in TL from 15 to 30 cm (5.9 to 11.8 in) resulting in a mean frame net CPUE of 3.3 (Table 1). The 2014 mean frame net CPUE represented a decrease from the 2009 CPUE of 11.8 (Table 2) and suggested moderate relative abundance.

No age or growth information was collected. Given the low sample size, few inferences can be made concerning size structure or condition.

Bluegill: Although not abundant, bluegill that ranged in TL from 9 to 21 cm (3.5 to 8.3 in) were captured during the 2009 fish community survey (Table 2; Figure 4). Unfortunately, none were captured during the 2014 fish community survey (Table 1).

Walleye: A single gill net night resulted in the capture of nine walleye and suggested moderate relative abundance (Table 1). Gill net captured walleye ranged in TL from 32 to 53 cm (12.6 to 20.9 in) with four year classes (2009-2011 and 2013) present; all of which appear to be naturally reproduced (Table 3; Table 5; Figure 5). Due to the limited netting effort, sample size was low and few inferences can be made concerning the size structure, growth, or condition of walleye in Bierman Pit.

Other: Channel catfish, freshwater drum, northern pike, orange spotted sunfish, yellow bullhead, yellow perch, and shortnose gar were other fish species sampled during the 2014 fish community survey (Table 1).

## **Management Recommendations**

- 1) Conduct fish community assessment surveys utilizing gill nets and frame nets on an every fifth year basis (next survey scheduled in summer 2019) to monitor fish relative abundance and fish populations.

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 an experimental gill net from Bierman Pit, 2014. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). BLB= black bullhead; BLC= black crappie; CCF= channel catfish; HYB= sunfish hybrid; NOP= northern pike; OSF= orangespotted sunfish; SHG= shortnose gar; WAE= walleye; YEB= yellow bullhead; 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	177.8	160.7	6	1	0	---	82	1
BLC	3.3	1.6	92	14	8	14	109	3
CCF	0.3	0.4	0	---	0	---	91	---
HYB <sup>1</sup>	0.3	0.4	---	---	---	---	---	---
NOP	0.3	0.4	100	---	0	---	90	---
OSF <sup>1</sup>	0.3	0.4	---	---	---	---	---	---
WAE	1.8	0.8	100	0	14	28	86	5
YEB	0.3	0.4	100	---	100	---	92	---
YEP	0.3	0.4	100	---	100	---	85	---
<i>Gill nets</i>								
BLB	34.0	---	3	5	0	---	87	1
FRD	3.0	---	100	0	33	67	94	10
SHG <sup>1</sup>	3.0	---	---	---	---	---	---	---
WAE	9.0	---	89	21	11	21	87	1
YEP	2.0	---	100	0	0	---	105	8

<sup>1</sup>All fish sizes

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured in frame nets and an experimental gill net from Bierman Pit 2009-2014. BLB= black bullhead; BLC= black crappie; BLG= bluegill; COC= common carp; CCF= channel catfish; FRD= freshwater drum; HYB= sunfish hybrid; NOP= northern pike; OSF= orangespotted sunfish; SHG= shortnose gar; WAE= walleye; WHB= white bass; WHS= white sucker; YEB= yellow bullhead; YEP= yellow perch

Species	CPUE					
	2009	2010	2011	2012	2013	2014
<i>Frame nets</i>						
BLB	147.3	---	---	---	---	177.8
BLC	11.8	---	---	---	---	3.3
BLG	2.8	---	---	---	---	0.0
COC	0.5	---	---	---	---	0.0
CCF	0.0	---	---	---	---	0.3
HYB <sup>1</sup>	0.0	---	---	---	---	0.3
NOP	0.3	---	---	---	---	0.3
OSF <sup>1</sup>	0.0	---	---	---	---	0.3
WAE	0.5	---	---	---	---	1.8
WHS	0.3	---	---	---	---	0.0
YEB	0.0	---	---	---	---	0.3
YEP	0.3	---	---	---	---	0.3
<i>Gill nets</i>						
BLB	35.0	---	---	---	---	34.0
BLC	1.0	---	---	---	---	0.0
COC	6.0	---	---	---	---	0.0
FRD	0.0	---	---	---	---	3.0
NOP	3.0	---	---	---	---	0.0
OSF <sup>1</sup>	2.0	---	---	---	---	0.0
SHG <sup>1</sup>	4.0	---	---	---	---	3.0
WAE	5.0	---	---	---	---	9.0
WHB	1.0	---	---	---	---	0.0
YEP	0.0	---	---	---	---	2.0

<sup>1</sup>All fish sizes

Table 3. Year class distribution based on the expanded age/length summary for walleye sampled in the experimental gill net and associated stocking history (# stocked x 1000) from Bierman Pit, 2009-2014.

Survey Year	Year Class								
	2014	2013	2012	2011	2010	2009	2008	2007	2006
2014	---	1	---	3	3	2	---	---	---
2009	---	---	---	---	---	1	---	4	1
# stocked									
fry									
sm. fingerling									
lg. fingerling									

Table 4. Weighted mean total length at capture (mm) for walleye sampled in the experimental gill net (expanded sample size) from Bierman Pit 2009-2014.

Year	Age					
	0	1	2	3	4	5
2014	---	320(1)	---	415(3)	432(3)	502(2)
2009	173(1)	---	398(4)	439(1)	---	---

Table 5. Stocking history including size and number for fishes stocked into Bierman Pit, 2000-2014. BLG= bluegill; LMB= largemouth bass

Year	Species	Size	Number
2005	BLG	adult	1,480
2006	LMB	fgl	1,500

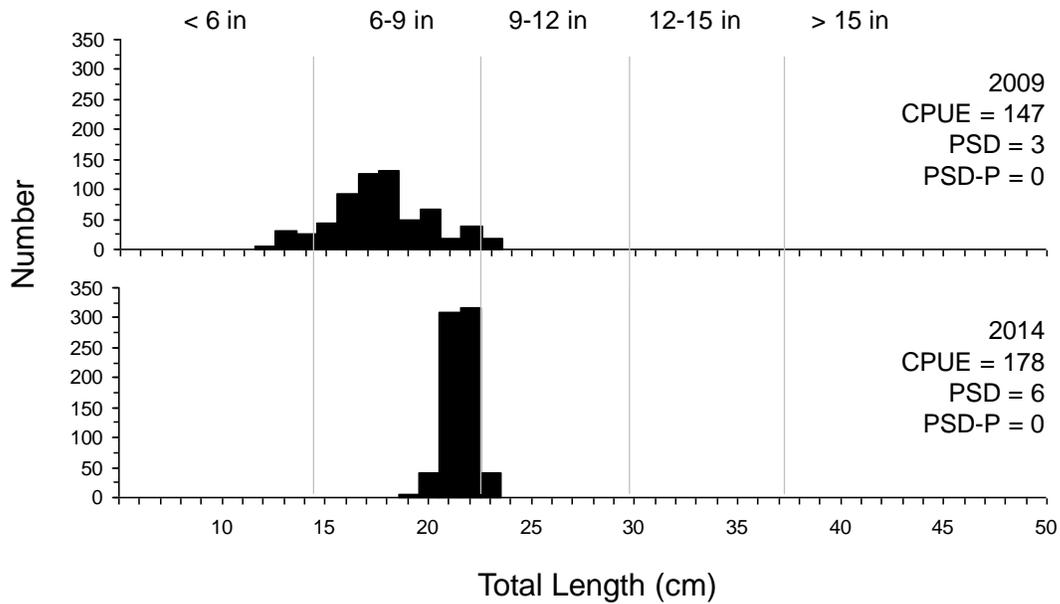


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black bullhead captured using frame nets in Bierman Pit, 2009 and 2014.

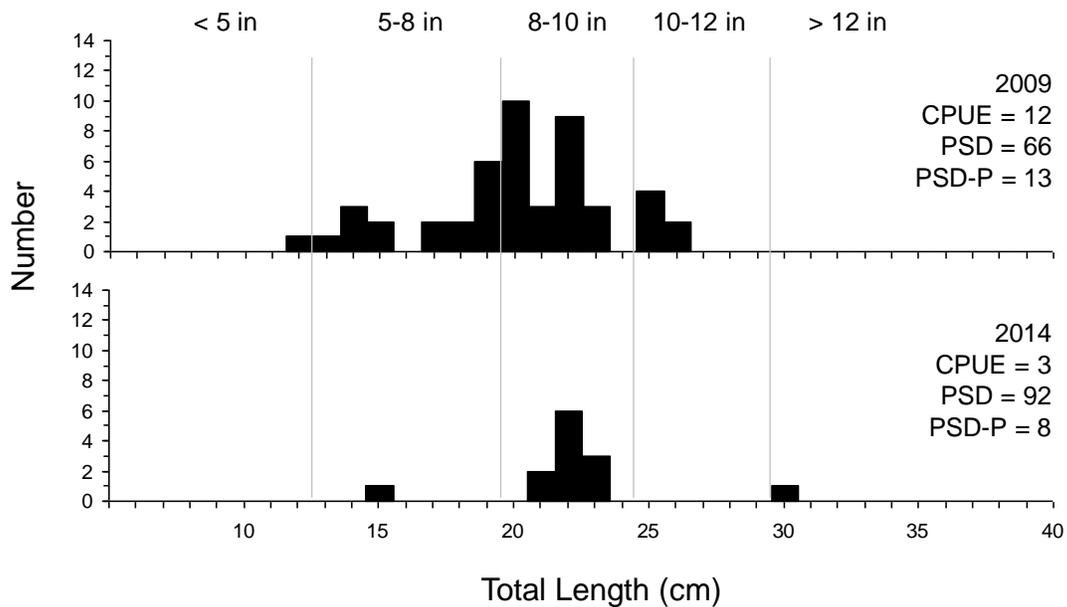


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for black crappie captured using frame nets in Lake Farley, 2009 and 2014.

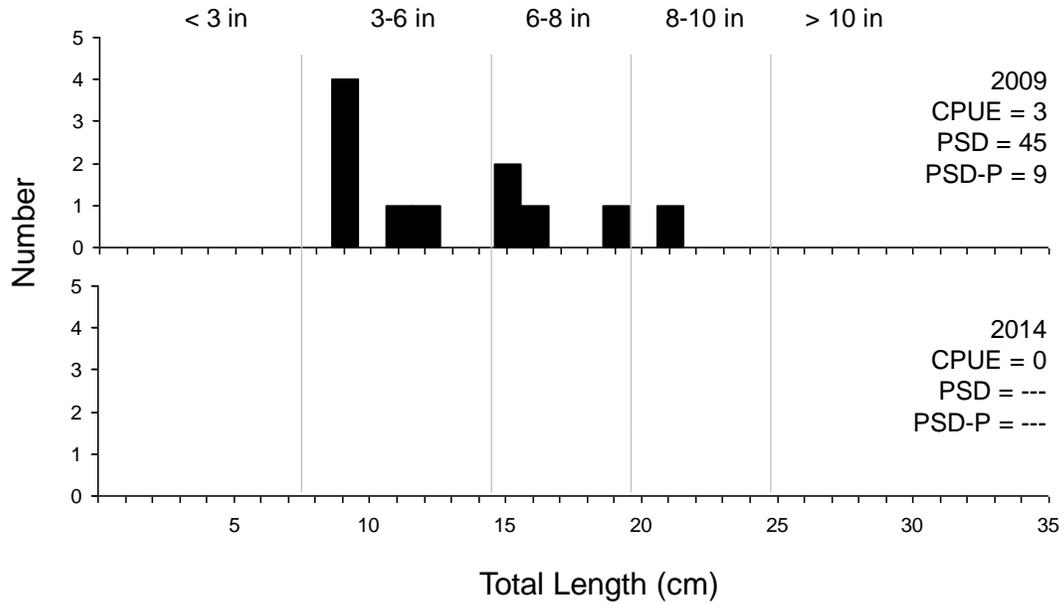


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for bluegill captured using frame nets in Bierman Pit, 2009 and 2014.

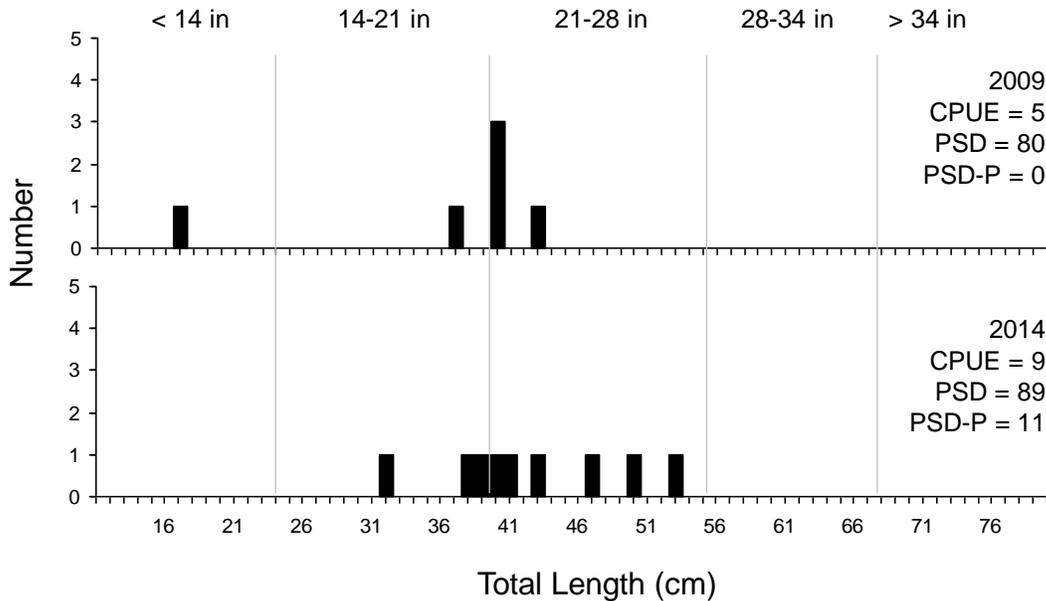


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for walleye captured using experimental gill nets in Bierman Pit, 2009 and 2014.