

# 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 miles west and 3.5 miles north of Northville, SD

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

Survey dates	September 1, 2009 (FN, GN)
Frame net sets (n)	4
Gill net sets (n)	1

### **Morphometry (Figure 1)**

Watershed area (acres)	25,867
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**

Land-use within the 25,867 acre watershed is primarily agricultural including pasture and cropland.

### **Water Level Observations**

No water level observations were made in 2009.

### **Aquatic Nuisance Species Monitoring**

#### *Plant Survey*

No plant survey was conducted in 2009. Past reports indicate that both emergent and submersed vegetation is present.

#### *Macro-Invertebrate/Mussel Survey*

No aquatic nuisance macro-invertebrate or mussel species were sampled in 2009.

#### *Fish Community Survey*

Common carp was the only aquatic nuisance fish species captured during the 2009 survey.

### **Fish Management Information**

Primary species	bluegill, largemouth bass
Other species	black bullhead, black crappie, common carp, northern pike, orangespotted sunfish, shortnose gar, walleye, white bass, white sucker, yellow perch
Management classification	warm-water permanent
Fish consumption advisories	none

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Figure 1. Map depicting geographic location of Bierman Gravel Pit from Northville, SD.

## Management Objectives

- 1) Maintain a mean fall electrofishing CPUE of stock-length largemouth bass  $\geq 30$ , a PSD of 40-70, and a PSD-P of 10-20.
- 2) Maintain a mean fall electrofishing CPUE of stock-length bluegill  $\geq 50$ , a PSD of 30-60, and a PSD-P of 5-10

## 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). During the early 1990's management shifted to a combination of largemouth bass and bluegill. 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). Currently, Bierman Pit is managed for largemouth bass and bluegill, but several other species contribute to the fishery (Table 1).

### *Primary Species*

In 2009, Bierman Pit was sampled utilizing frame nets and a single experimental gill net set. Future surveys will likely be conducted utilizing night electrofishing an effective method of sampling the primary management species (i.e., bluegill and largemouth bass).

Bluegill: Relative abundance of bluegill in Bierman Pit appears to be low as the 2009 mean frame net CPUE was 2.8 (Table 1). Bluegills ranged in total length from 9 to 21 cm (3.5 to 8.3 in), had a PSD of 45 and PSD-P of 9 (Figure 2). No growth information was collected in 2009. Condition of bluegills was excellent with a mean Wr of 128 (Table 1).

Largemouth bass: No largemouth bass were captured in the frame nets in 2009. Frame nets are typically ineffective at sampling largemouth bass. Future surveys will be conducted using electrofishing. Largemouth bass were most recently stocked in 2006 (Table 2) and it is likely that bass are present in the lake; however their population status is currently unknown.

### *Other Species*

Black Bullhead: The 2009 mean frame net CPUE of stock-length black bullhead was 147.3 and above the objective ( $\leq 100$  stock-length black bullhead/net night) indicating high relative abundance (Table 1).

Black bullheads in the 2009 frame net catch ranged in total length from 12 to 23 cm (4.7 to 9.1 in; Figure 3). The majority of black bullheads in the 2009 frame net catch were in the stock-quality length category resulting in the low PSD of 3 and no preferred-length bullheads were captured (Figure 3). No growth information was collected during 2009. The mean  $W_r$  for stock-length black bullheads was 86 (Table 1).

Black Crappie: The mean frame net CPUE of stock-length black crappie during 2009 was 11.8 (Table 1). Black crappie sampled in 2009 ranged in total length from 12 to 26 cm (4.7 to 10.2 in), had a PSD of 66 and PSD-P of 13 (Figure 4). Condition of black crappie is excellent with a mean  $W_r$  of 112 (Table 1).

Northern Pike: A single gill net set captured three stock-length northern pike ranging in total length from 50 to 62 cm (19.7 to 24.4 in) and resulted in a gill net CPUE of 3.0 (Table1). Few inferences can be made concerning size structure, growth, and condition due to limited netting effort and low sample size.

Walleye: Walleye have never been stocked by the SDGFP in Bierman Pit. Their presence in the lake is likely due to fish movement from the Snake Creek during flooding events or unauthorized introduction by private individuals.

A single gill net set captured five stock-length walleye ranging in total length from 37 to 43 cm (14.6 to 16.9 in) which resulted in a gill net CPUE of 5.0 (Table1). Few inferences can be made concerning size structure, growth, and condition due to limited netting effort and low sample size.

Other: Common carp, orangespotted sunfish, shortnose gar, yellow perch, white bass and white sucker were also captured in low numbers during 2009 (Table 1).

### **Management Recommendations**

- 1) Conduct fish community surveys utilizing spring night electrofishing on an every fifth year basis (next survey scheduled in summer 2014) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.
- 2) Continue to manage as a self-sustaining largemouth bass and bluegill fishery.
- 3) Collect otoliths from bluegill and scales from largemouth bass to assess age structure and growth rates of each population.
- 4) Monitor winter and summerkill events. In cases of substantial winter/summerkill stock with largemouth bass and bluegill 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 an experimental gill net from Bierman Pit, 2009. Confidence intervals include 80 percent ( $\pm$  CI-80) or 90 percent ( $\pm$  CI-90). BLB= black bullhead; BLC= black crappie; BLG= bluegill; COC= common carp; NOP= northern pike; OSF= orangespotted sunfish; SHG= shortnose gar; WAE= walleye; WHB= white bass; WHS= white sucker; 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	147.3	103.9	3	1	0	---	86	1
BLC	11.8	7.3	66	12	13	8	112	2
BLG	2.8	1.3	45	29	9	17	128	9
COC	0.5	0.5	50	50	0	---	100	88
NOP	0.3	0.4	100	---	0	---	97	---
WAE	0.5	0.5	100	0	0	---	85	6
WHS	0.3	0.4	100	---	100	---	113	---
YEP	0.3	0.4	0	---	0	---	101	---
<i>Gill nets</i>								
BLB	35.0	---	3	5	0	---	92	1
BLC	1.0	---	0	---	0	---	130	---
COC	6.0	---	0	---	0	---	92	4
NOP	3.0	---	67	33	0	---	85	7
OSF	2.0	---	---	---	---	---	---	---
SHG	4.0	---	---	---	---	---	---	---
WAE	5.0	---	80	20	0	---	88	6
WHB	1.0	---	100	---	0	---	105	---

Table 2. Stocking history including size and number for fishes stocked into Bierman Gravel Pit, 2000-2009.

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

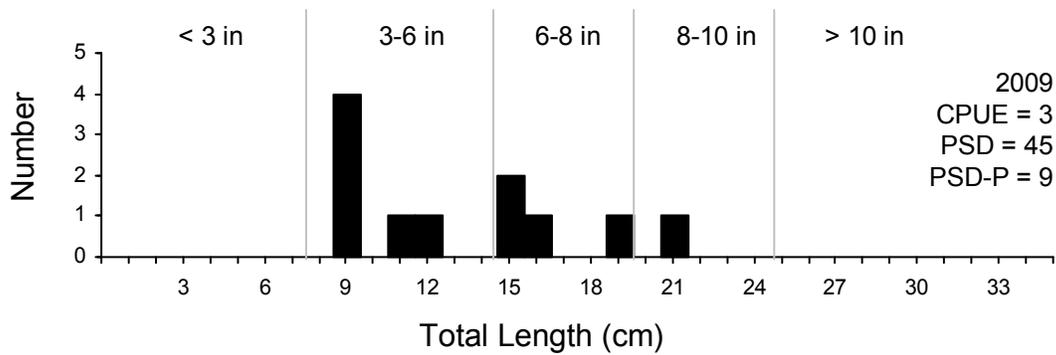


Figure 2. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for bluegill captured using frame nets in Bierman Gravel Pit, 2009.

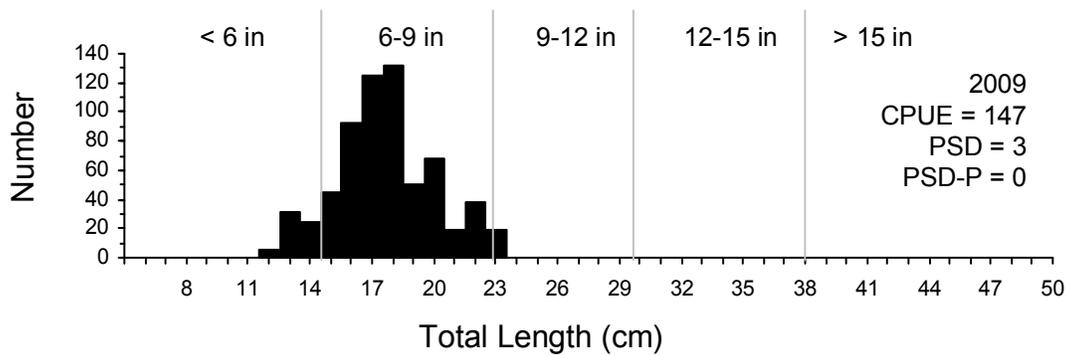


Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for black bullhead captured using frame nets in Bierman Gravel Pit, 2009.

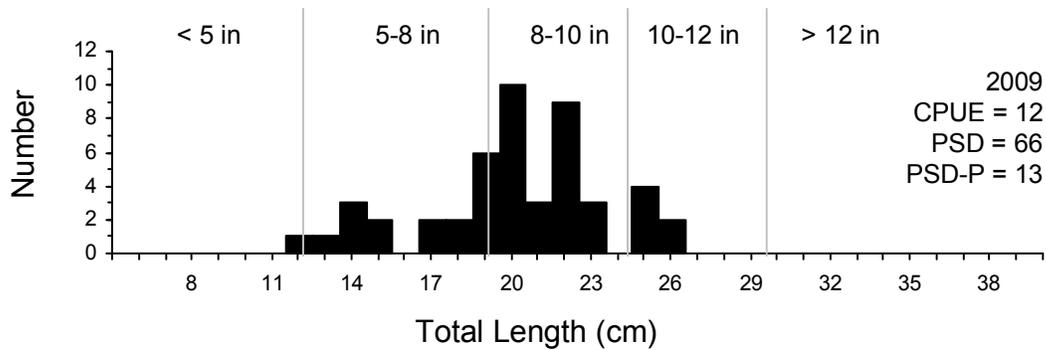


Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for black crappie captured using frame nets in Bierman Gravel Pit, 2009.

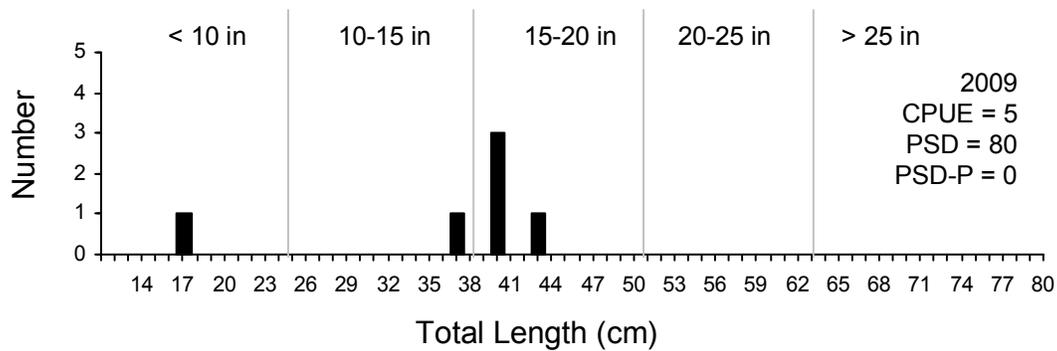


Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P) for walleye captured using a single gill net in Bierman Gravel Pit, 2009.