

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-47

Name: Bear Butte Lake

County: Meade

Legal description: Sec 25 & 30, T 6N, R 7E

Location from nearest town: 4 mi. W, 2.5 mi. N of Sturgis, SD

Dates of present survey: June 18-20, August 26, 2014

Date last surveyed: July 1-3, 2013

Management classification: Warmwater semi-permanent

Primary Species: (game and forage)

1. Largemouth bass
2. Yellow perch
3. Black crappie
4. Northern pike

Secondary and other species:

1. Green sunfish
2. Fathead minnow
3. Walleye
4. Black bullhead

PHYSICAL CHARACTERISTICS

Surface Area: 180 acres

Watershed: 2,000 acres

Maximum depth: 13 feet;

Mean depth: 7 feet

Lake elevation at survey (from known benchmark): 3 feet below full pool

Ownership of lake and adjacent lakeshore property

The lake and lakeshore are owned by the South Dakota Department of Game, Fish and Parks. Bear Butte State Park manages the lakeshore property adjacent to the lake.

Fishing Access

Bear Butte Lake is surrounded by a state park which provides public access to the entire shoreline (Figure 1). A state park entrance license is required. A gravel road, 203rd Street, runs adjacent to the north side of the lake and provides access to a concrete plank boat ramp on the northeast side of the lake. A picnic/parking area is on the north central side and a fishing pier and campground is on the northwest side of the lake. A smaller, unnamed gravel road provides access to the south side of the lake.

Observations of Water Quality and Aquatic Vegetation

Emergent vegetation is present in varying amounts, especially on the east side, consisting mostly of cattail. Submerged vegetation is excessive from mid summer to freeze up with lots of Claspings leaf and Sago pondweed.

Observations on condition of all structures, i.e. spillway, level regulators, boat ramps, etc.

The boat ramp is a new concrete ramp, installed during the summer of 2013. No other structures were inspected for condition.

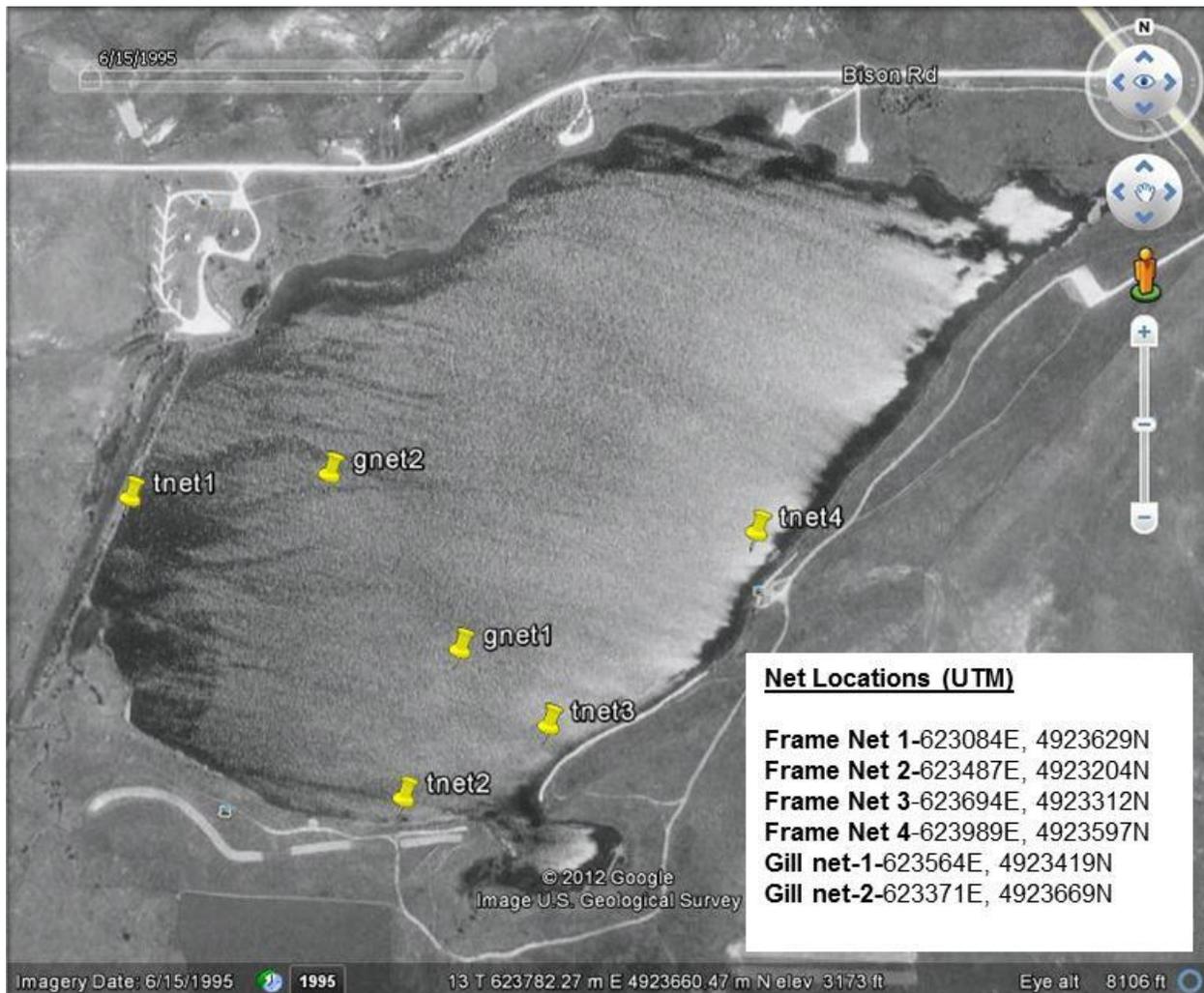


Figure 1. Locations, including GPS points, of experimental gill nets (gnet) and trap nets (tnet) during the annual fishery survey of Bear Butte Lake, Meade County, South Dakota, 2014.

MANAGEMENT OBJECTIVES, STRATEGIES AND ACTIONS

- Objective 1.** Maintain largemouth bass PSD between 40 and 70 and maintain bluegill, black bullhead, yellow perch and black crappie PSD's at 20 or greater.
- Objective 2.** Provide channel catfish and northern pike to add to angler opportunity.
- Objective 3.** Work towards improving fish condition and growth through stockings of forage fish.
- Objective 4.** Annually provide catchable rainbow trout to add to winter angler opportunity.

BIOLOGICAL DATA

Sampling Effort and Catch

Adult Fish survey

Trap nets and gill nets were used on June 18-20, 2014 to sample adult fish populations in the lake (Figure 1). Fifty minutes of night electrofishing was completed on August 26th to sample largemouth bass and walleye. The net sampling consisted of eight trap net nights and two gill net nights and catch data is displayed in Tables 1 and 2. Discussion on selected fish species follows and completes this report.

Table 1. Catch data from all species collected in eight trap nets in Bear Butte Lake, Meade County, June 18-20, 2014. CPUE's are listed with 80% confidence intervals in parentheses. PSD, PSD-P and $Wr \geq S$ values are listed with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	$Wr \geq S$
Black bullhead	7,039	879.9 (451.6)	879.9 (451.6)	0	0	90.1 (1.7)
Black crappie	214	26.8 (10.5)	26.8 (10.5)	100	0	96.8 (0.7)
Northern pike	1	0.1 (0.2)	0.1 (0.2)	--	--	74.4 (--)

Table 2. Catch data from all species collected in two gill nets in Bear Butte Lake, Meade County, June 18-20, 2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and Wr with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	$Wr \geq S$
Black bullhead	442	221.0 (147.7)	220.5 (146.2)	0	0	87.2 (1.0)
Channel catfish	3	1.5 (4.6)	1.5 (4.6)	(--)	(--)	104.3 (16.9)
Northern pike	2	1.0 (0.0)	1.0 (0.0)	(--)	(--)	81.2 (59.4)
Yellow perch	23	11.5 (20.0)	11.5 (20.0)	35 (17)	0	94.0 (1.7)

Table 3. Catch data from largemouth bass and walleye collected in 50 minutes of night electrofishing in Bear Butte Lake, Meade County, August 26, 2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and Wr with 90% confidence intervals in parentheses

Species	N	CPUE	CPUE-S	PSD	PSD-P	$Wr \geq S$
Largemouth bass	9	2.4 (2.3)	2.4 (2.3)	50 (50)	0	119.8 (50.0)
Walleye	2	1.2 (1.8)	1.2 (1.8)	--	--	102.5 (--)

Black bullhead

Black bullheads continue to dominate the fish population of Bear Butte Lake comprising 97.0% of the trap net catch and 94.0% of the gill net catch. Black bullhead trap net catch rates fell from 2,116.0 in 2013 to 879.9 this year (Tables 1 and 4). Size structure was low with no fish sampled over quality length (230 mm) for the past three years (Figure 2). The length frequency shows an overabundant year class apparently experiencing no growth, as sizes were 160-170 mm, the same as last year.

All black bullhead sampled were removed from the lake to help reduce density. Stockings of largemouth bass, channel catfish, walleye and northern pike have been completed the past few years to increase densities of predatory fish. It is intended that the higher predatory pressures on the abundant black bullhead population will also help decrease black bullhead density and increase size structure.

Table 4. Composite listing of data for black bullhead collected by trap nets in Bear Butte Lake, 2010-2013. CPUE's are listed with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* are listed with 90% confidence intervals in parentheses.

Year	N	CPUE	CPUE-S	PSD	PSD-P	<i>Wr</i> ≥S
2010	6,435	919.3 (583.8)	260.4 (165.4)	14 (2)	0	*90.1 (4.0)
2011	7,794	1,948.5 (701.5)	863.8 (310.7)	11 (1)	0	80.5 (4.3)
2012	6,060	757.5 (223.6)	757.5 (223.6)	0	0	78.2 (2.2)
2013	16,928	2,116.0 (608.5)	2,116.0 (608.5)	0	0	82.4 (2.0)
2014	7,039	879.9 (451.6)	879.9 (451.6)	0	0	90.1 (1.7)

*gill net data

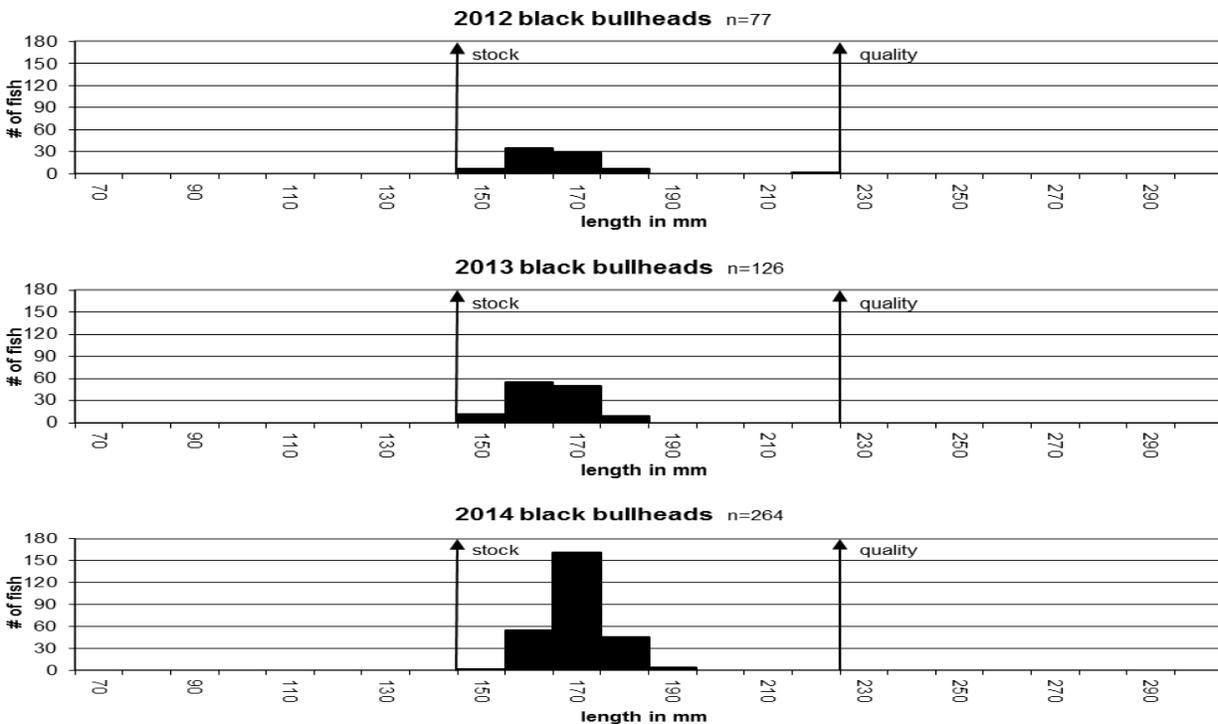


Figure 2. Length frequency histograms for black bullheads sampled from trap nets in 2012-2014, Bear Butte Lake, Meade County, South Dakota.

Black crappie

The black crappie population also appears to be dominated by one, strong year class. Trap net CPUE was 26.8 (Table 1). Fish condition was good with a *Wr* for stock length and larger fish of

96.8. Size structure was high with a PSD of 100. Despite the overabundance of black bullheads, black crappies have grown to a size large enough to provide a quality fishery at Bear Butte Lake (Figure 3). Growth was just above the regional average (Table 5).

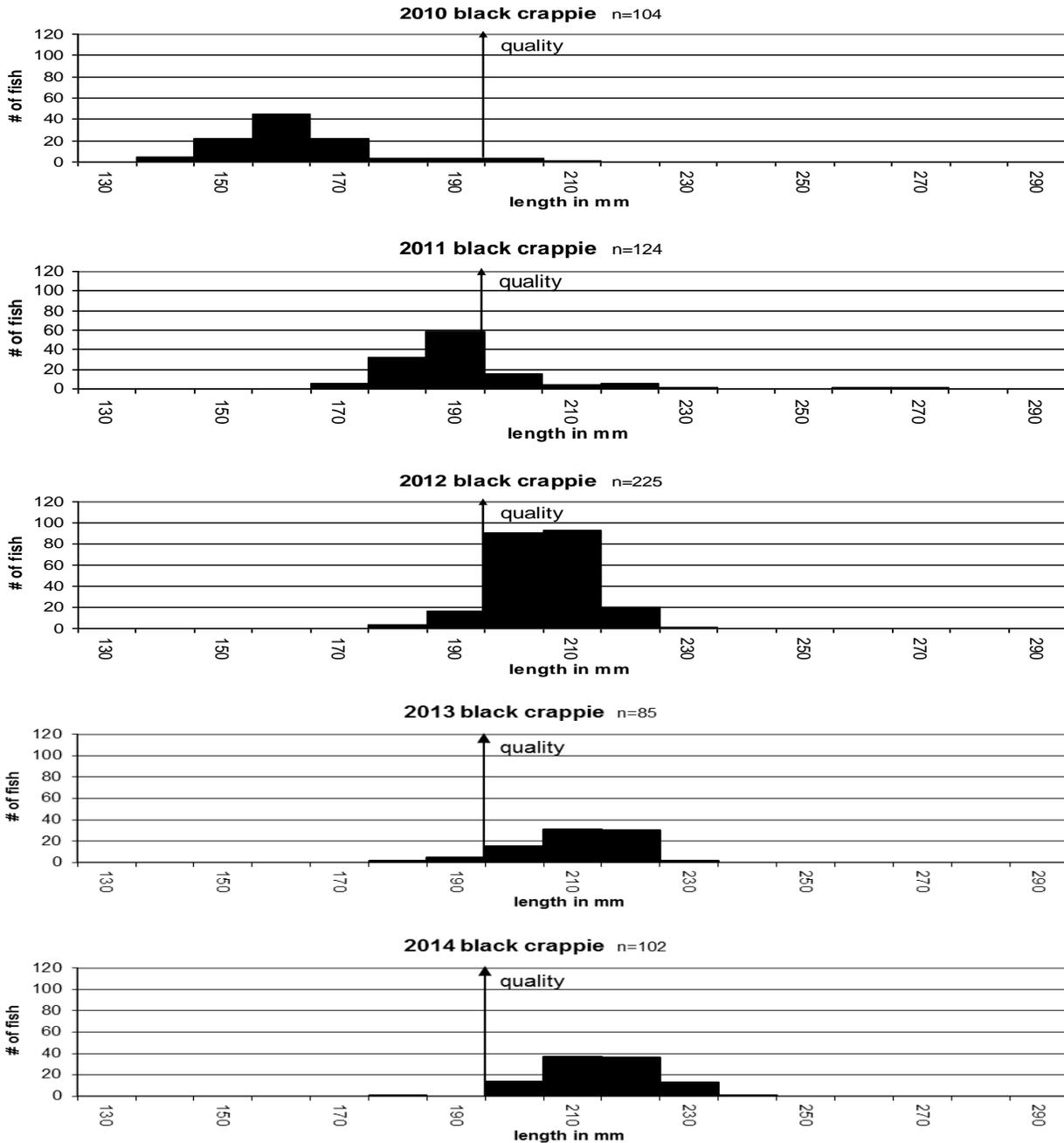


Figure 3. Length frequency histogram of black crappie sampled with trap nets from Bear Butte Lake, 2010-2014.

Table 5. Bear Butte Lake black crappie year class, age in 2014, sample size (N), mean back-calculated total length-at-age, the Region 1 (western SD) mean length-at-age, and the South Dakota state-wide black crappie mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5
2011	3	1	117	170	188		
2010	4	17	104	161	191	211	
2009	5	196	89	149	191	206	220
2014 Pop. mean (SE)		214	103 (8)	160 (6)	190 (1)	209 (2)	220 (0)
Region 1			74 (3)	122 (7)	158 (9)	197 (13)	217 (16)
South Dakota			83 (2)	147 (4)	195 (5)	229 (6)	249 (6)

Yellow perch

In 2009, 1,400 pre-spawn yellow perch were stocked after the lake refilled the year before. Gill nets caught 23 adult fish in two nets during the 2014 survey. In 2013, no perch were sampled in the gill net. Stock density values from the gill net sample yielded a PSD of 35. Fish condition was low with a $Wr \geq S$ of 79.6. The length frequency histogram shows fish between 160-220 mm (Figure 4).

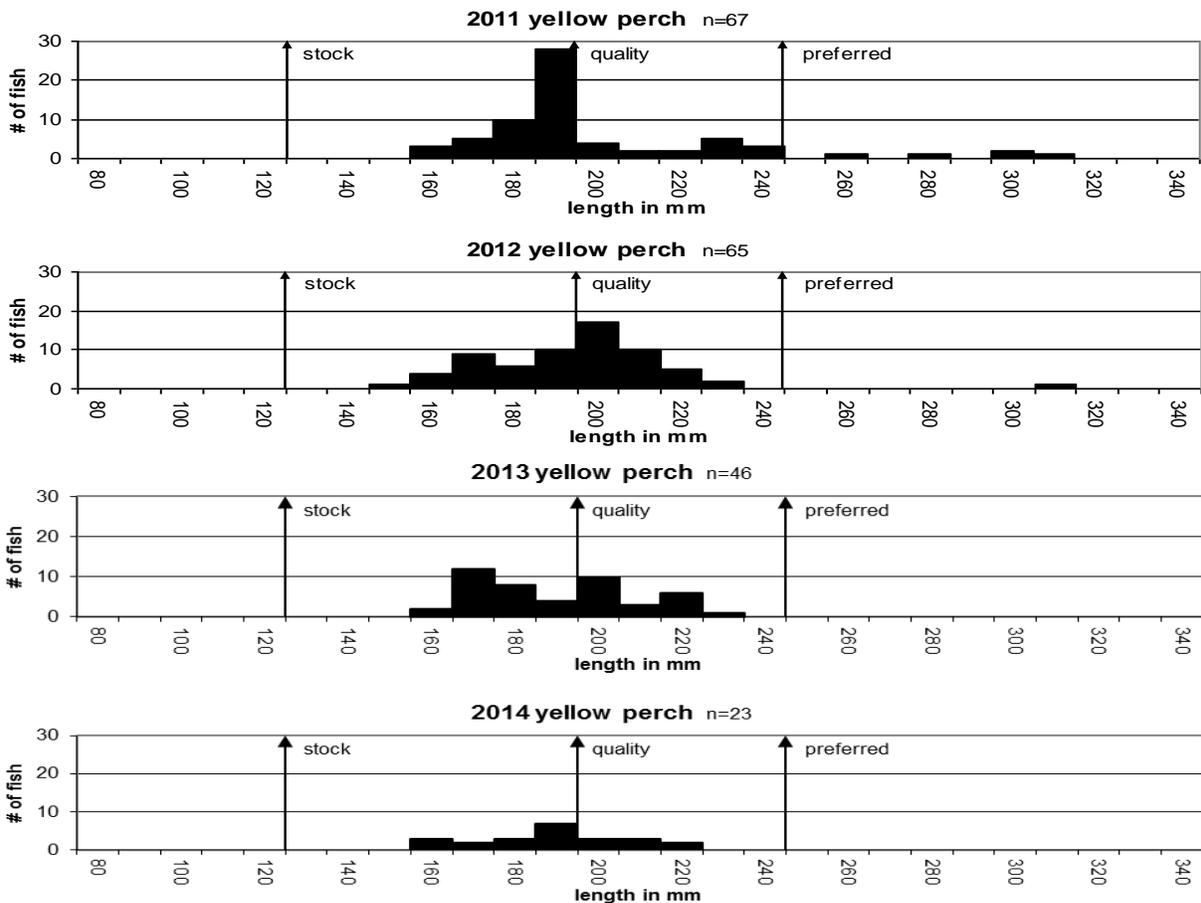


Figure 4. Length frequency histogram for yellow perch sampled from trap nets in Bear Butte Lake, 2011-2013 and in gill nets in 2014.

RECOMMENDATIONS

1. Continue to remove black bullheads and monitor fish populations annually until management objectives have been achieved.
2. Begin stocking rainbow trout in November 2014 to add to ice angling opportunity.
3. Explore stocking gizzard shad as a forage fish.

LITERATURE CITED

Willis, David W. Daniel A. Isermann, Matthew J. Hubers, Bruce A. Johnson, William H. Miller, Todd R. St. Sauver, Jason S. Sorensen, and Eric G. Unkenholz. 2001. Growth of South Dakota Fishes: A Statewide Summary with Means by Region and Water Type. South Dakota Game, Fish and Parks Special Report. Pierre, SD.

APPENDIX

Appendix A. Stocking history, including year, number, species and size of fish stocked in Bear Butte Lake, Meade County, South Dakota, 2008-2014.

Year	Number	Species	Size
2008	230	Black crappie	Adult
	2,400	Fathead minnow	Adult
	5,620	Largemouth bass	Fingerling
2009	500	Yellow perch	Adult
	570	Channel catfish	Adult
	13,000	Largemouth bass	Fingerling
2010	50	Golden shiner	Adult
	900	Yellow perch	Adult
	20,000	Walleye	Fingerling
	110	Northern pike	Adult
2011	77,600	Northern pike	Fry
	200	Channel catfish	Adult
	700	Yellow perch	Adult
	10,000	Largemouth bass	Fingerling
	150	Largemouth bass	Adult
2012	341	Yellow perch	Adult
	350	Largemouth bass	Adult
2014	305	Northern pike	Adult
	1,875	Largemouth bass	Fingerling
	100	Largemouth bass	Adult
	3,238	Walleye	Large fingerling
	100	Rainbow trout	Catchable