

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-47

Name: Durkee Lake

County: Meade

Legal description: Sec 21 & 28, T 12N, R 17E

Location from nearest town: 3 miles south of Faith, SD

Dates of present survey: June 2, 16-18, 2014

Date last surveyed: June 25-27, 2013

Management classification: Warmwater permanent

Primary Species: (game and forage)

1. Largemouth bass
2. Yellow perch
3. Bluegill
4. Black crappie

Secondary and other species:

1. Northern pike
2. Channel catfish
3. Black bullhead
4. Golden shiner

PHYSICAL CHARACTERISTICS

Surface Area: 70 acres

Watershed: 6,400 acres

Maximum depth: 20 feet

Mean depth: 15 feet

Lake elevation at survey (from known benchmark): full

Ownership of lake and adjacent lakeshore property:

The City of Faith owns Durkee Lake and the SD Department of Game, Fish and Parks manages the fishery in the lake. Hunting is illegal in or around Durkee Lake by city ordinance. A city-administered golf course is located adjacent to the lake.

Fishing Access

Fishing access is reasonable with a few shore fishing areas along the north side, but by June is very limited with heavy vegetation surrounding the entire lake. A boat ramp and dock are located on the north side. The concrete on the boat ramp was replaced in June 2013.

Observations of Water Quality and Aquatic Vegetation

Rooted aquatic vegetation consists of bulrushes and cattails. The vegetation covers approximately 90% of the shoreline. Submerged vegetation is excessive from mid summer until freeze up in less than 8 feet of water. Siltation due to natural erosion and cattle grazing has decreased depth and area of the lake. No other pollution problems were identified by the department during the 2014 survey.

Observations on conditions of structures (i.e. spillway, boat ramps, docks, roads, etc)

The dam grade was repaired in 1997, and is in good condition. A new boat ramp was put in by the city in June 2013.

MANAGEMENT OBJECTIVES

- Objective 1.** Maintain a largemouth bass fishery with a minimum night-time electrofishing CPUE for stock-length fish of 40, a PSD range between 40 and 70, PSD-P \geq 10.
- Objective 2.** Reach and maintain panfish (bluegill, black crappie and yellow perch) trap-net CPUE greater than 10 and less than 75 for each species. Maintain PSD's greater than 30 for at least two of the panfish species.
- Objective 3.** Maintain a mean trap net CPUE of stock-length black bullhead <100 and PSD between 30 and 60.

BIOLOGICAL DATA

Sampling Effort and Catch

Trap nets and experimental gill nets were used on June 16-18, 2014 to sample fish populations in the reservoir (Figure 1). The net sampling consisted of eight trap net nights and two gill net nights. The catch data is displayed in Tables 1 and 2. Discussion on selected fish species follows and completes this report.

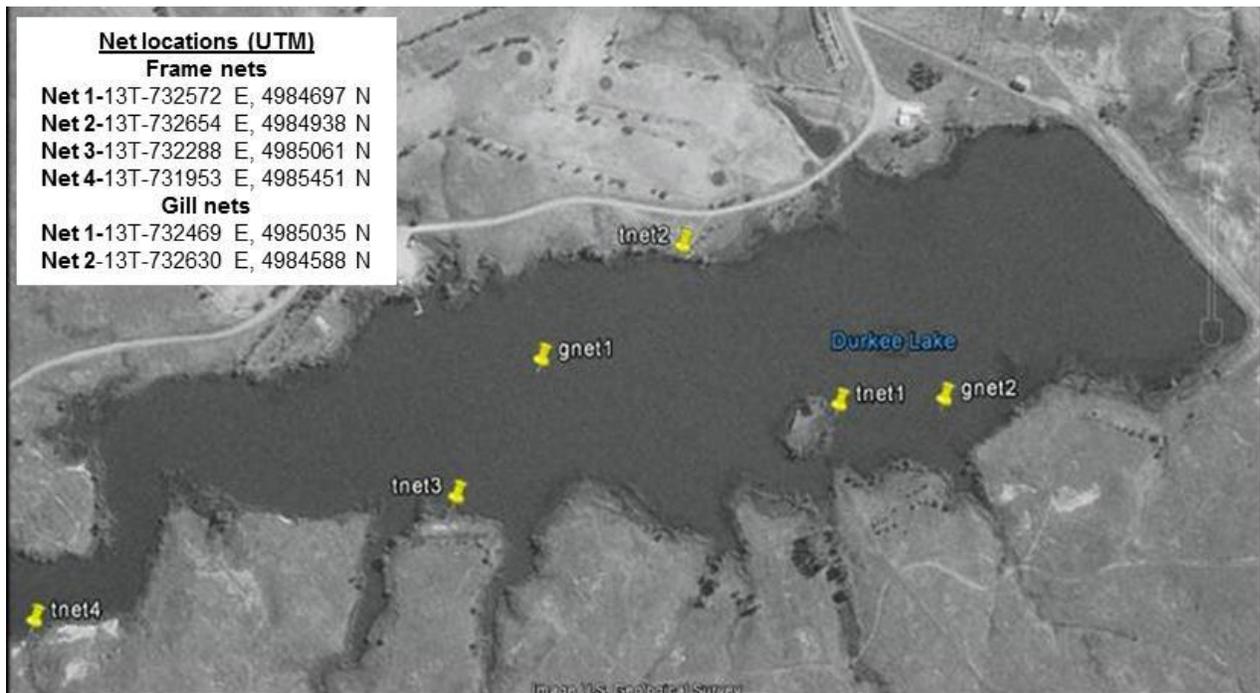


Figure 1. Locations of experimental gill (gnet) and frame (a.k.a. trap nets, tnet), including GPS coordinates, during the fish survey of Durkee Lake, Meade County, 2014

Table 1. Catch data from all fish species collected in eight trap nets in Durkee Lake, Meade County, June 16-18, 2014. CPUE 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	<i>Wr</i> ≥ S
Black bullhead	1827	228.4 (77.3)	228.4 (77.3)	21 (2)	0	84.7 (2.1)
Black crappie	587	73.4 (26.8)	73.4 (26.8)	7 (2)	0	97.8 (1.4)
Bluegill	360	45.0 (24.8)	45 (24.8)	84 (3)	0	112.0 (1.3)
Channel catfish	1	0.1 (0.2)	0.1 (0.2)	--	--	93.1 (--)
Northern pike	2	0.3 (0.2)	0.3 (0.2)	--	--	93.7 (--)
Yellow perch	19	2.4 (1.6)	2.4 (1.6)	0	0	89.4 (1.1)

Table 2. Catch data from all fish species collected in two experimental gill nets in Durkee Lake, Meade County, June 16-18, 2014. CPUE 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	<i>Wr</i> ≥ S
Black bullhead	54	27.0 (83.1)	27.0 (83.1)	15 (8)	0	89.5 (2.5)
Black crappie	88	44.0 (113.9)	44.0 (113.9)	92 (5)	0	89.5 (0.1)
Northern pike	5	2.5 (1.5)	2.5 (1.5)	100	20 (43)	97.7 (14.0)
Yellow perch	122	61.0 (9.2)	36.0 (36.9)	0	0	95.4 (0.4)

Table 3. Catch data for largemouth bass collected from 71 minutes of electrofishing in Durkee Lake, Meade County, South Dakota, June 2, 2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* ≥ S values with 90% confidence intervals in parentheses

Species	N	CPUE	CPUE-S	PSD	PSD-P	<i>Wr</i> ≥ S
Largemouth bass	34	28.2 (8.2)	28.2 (8.2)	88 (10)	21 (12)	94.9 (1.4)

Bluegill

Efforts were made to reestablish bluegill by stocking 50 adult and 22,000 fingerlings during the summer of 2008 after a winterkill the previous winter. Catch rates increased each year since the initial stocking, peaking in 2012 with a CPUE of 223.1 (Table 4). This year catch rates have to 45.0 fish per trap net. Size structure has risen from a PSD of 60 last year, to 84 this year with most fish sampled over quality length (Figure 2). Fish condition also increased slightly to a *Wr* of 112.0, versus 104.8 last year. If largemouth bass abundance can be increased, size structure should continue to increase.

Table 4. Composite listing of data for bluegill collected by trap nets in Durkee Lake, 2010-2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and $Wr \geq S$ with 90% confidence intervals in parentheses.

Year	N	CPUE	CPUE-S	PSD	PSD-P	$Wr \geq S$
2010	49	12.3 (8.0)	12.3 (8.0)	49 (12)	16 (9)	108.8 (1.5)
2011	775	96.9 (19.5)	96.9 (19.5)	21 (3)	1 (1)	105.1 (1.7)
2012	1,562	223.1 (49.3)	223.1 (49.3)	5 (1)	0	101.7 (1.9)
2013	656	82.0 (39.3)	82.0 (39.3)	60 (4)	0	104.8 (1.6)
2014	360	45.0 (24.8)	45 (24.8)	84 (3)	0	112.0 (1.3)

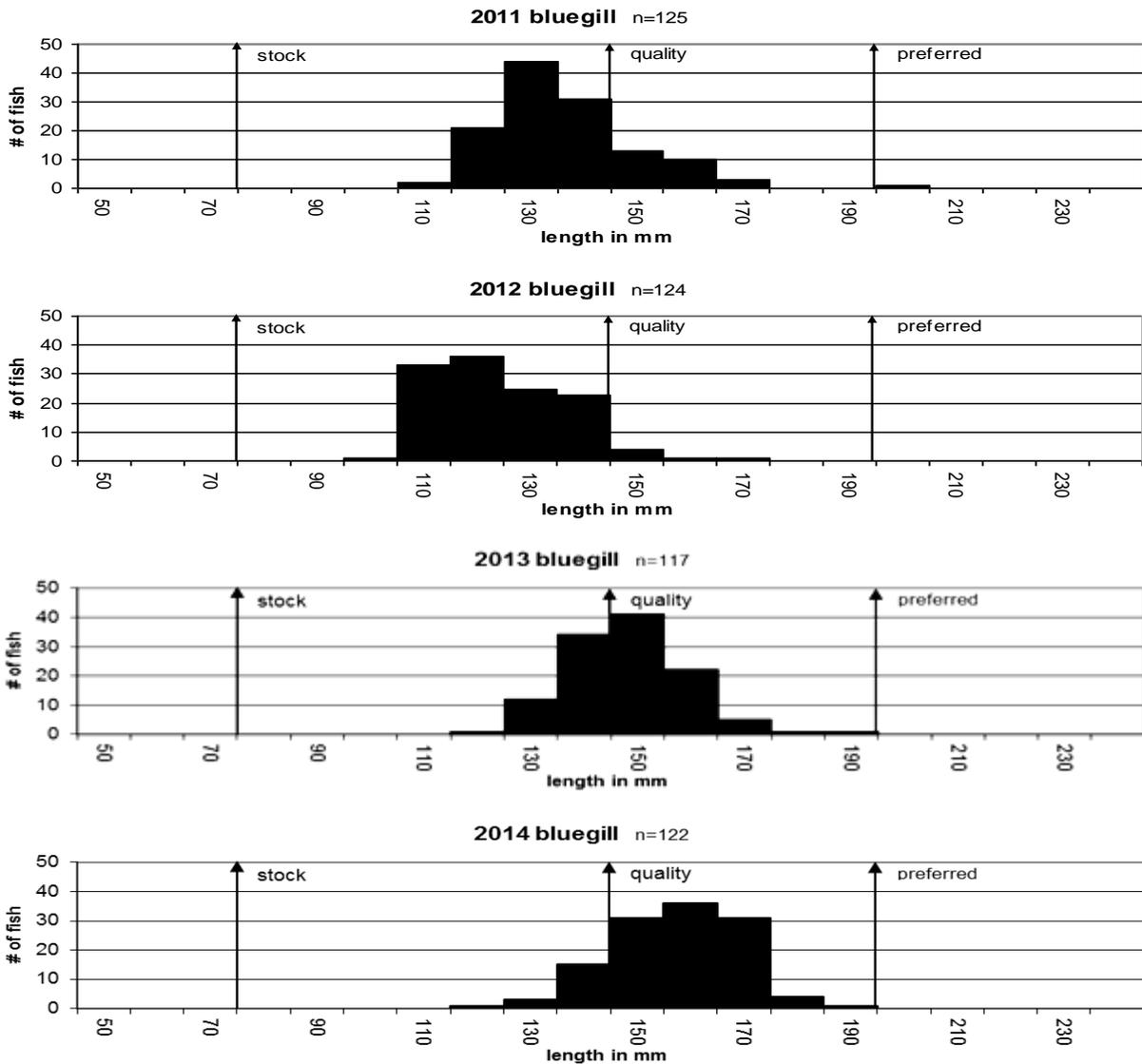


Figure 2. Length frequency histogram of bluegill collected from trap nets in Durkee Lake 2011-2014.

Black bullhead

Black bullheads continue to dominate the catch during surveys and were the most abundant fish sampled in 2014. In 2010, black bullhead numbers peaked with a CPUE of 739.8 (Table 5). This year numbers have decreased to 228.4 per trap net (Table 1). Size structure is characteristic of a high density, competing population with a small size structure (i.e. PSD of 21 with a PSD-P of 0). While these numbers are improving they are not meeting management objectives for Durkee Lake. In addition, mean fish condition was below average with a *Wr* for stock length and larger fish of 84.7. A large year class dominates the population with lengths ranging from 190-230 mm and length frequencies indicate very little growth in the last three years (Figure 3).

Table 5. Data for black bullhead collected by trap nets in Durkee Lake, 2010-2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Year	N	CPUE	CPUE-S	PSD	RSD-P	<i>Wr</i> ≥S
2010	2,959	739.8 (352.3)	490.5 (724.1)	54 (2)	5 (1)	91.0 (2.8)
2011	1,312	164.0 (58.9)	162.5 (58.3)	9 (1)	2 (1)	91.7 (2.7)
2012	1,644	234.9 (60.0)	234.9 (60.0)	4 (1)	2 (1)	81.3 (2.4)
2013	2,967	370.9 (130.9)	370.9 (130.9)	3 (1)	0	*89.2 (1.1)
2014	1827	228.4 (77.3)	228.4 (77.3)	21 (2)	0	84.7 (2.1)

*gill net data

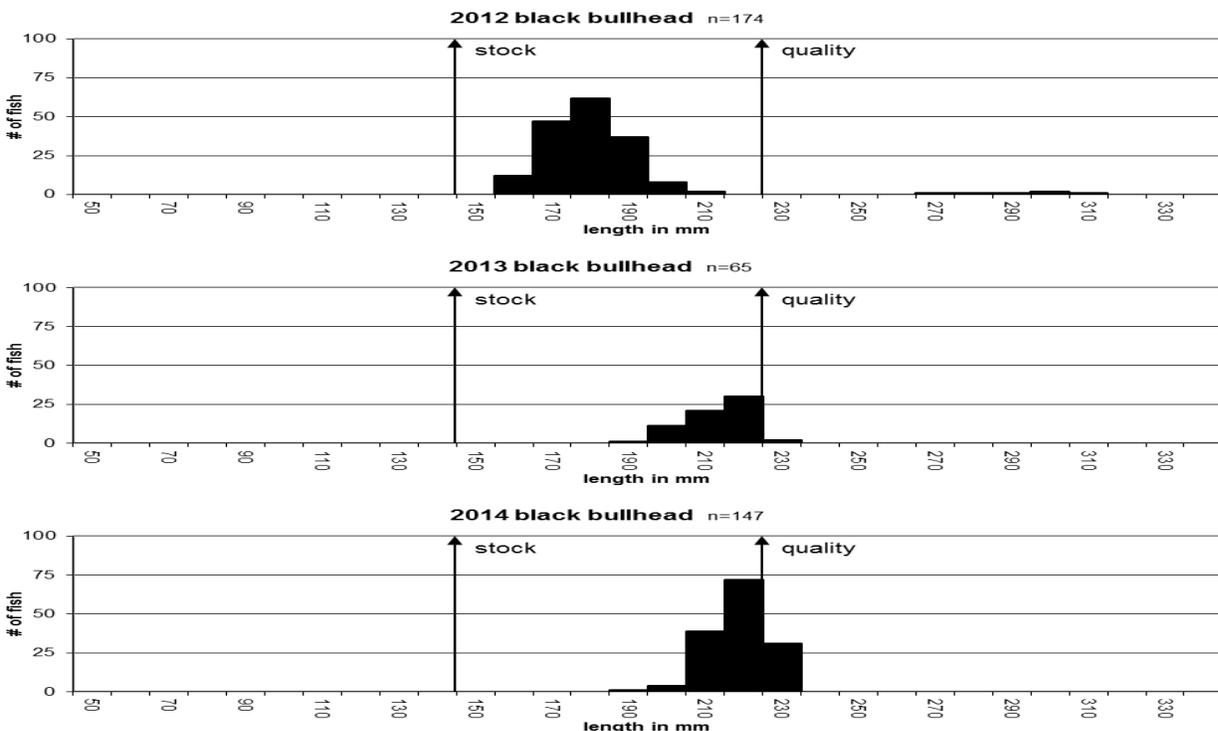


Figure 3. Length frequencies of black bullhead collected from trap nets in Durkee Lake, 2012-2014.

Black crappie

After a winterkill in 2007, no black crappie were sampled in the 2008 survey. In 2009, 150 adults were stocked to reestablish black crappie in Durkee Lake. Last year, black crappies sampled from trap nets had a CPUE of 96.4, and this year was similar with a CPUE of 73.4 (Tables 1 and 6). PSD decreased slightly from 10 last year to 7 this year. Fish condition remains good with a Wr of 97.8. These numbers are below the size structure objectives currently set for panfish in Durkee Lake. The length frequency shows a good number of fish just below quality length (Figure 4). Growth was good with the population near the regional average (Table 7).

Table 6. Composite listing of data for black crappie collected by trap nets in Durkee Lake, 2010-2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and Wr with 90% confidence intervals in parentheses.

Year	N	CPUE	CPUE-S	PSD	RSD-P	$Wr \geq S$
2010	1	0.3 (0.4)	0.3 (0.4)	--	--	82.5 (--)
2011	21	2.6 (0.8)	2.6 (0.8)	0	0	104.6 (0.2)
2012	31	4.4 (1.7)	4.4 (1.7)	6 (--)	0	98.5 (1.5)
2013	771	96.4 (36.7)	96.4 (36.7)	10 (2)	1	99.0 (1.8)
2014	587	73.4 (26.8)	73.4 (26.8)	7 (2)	0	97.8 (1.4)

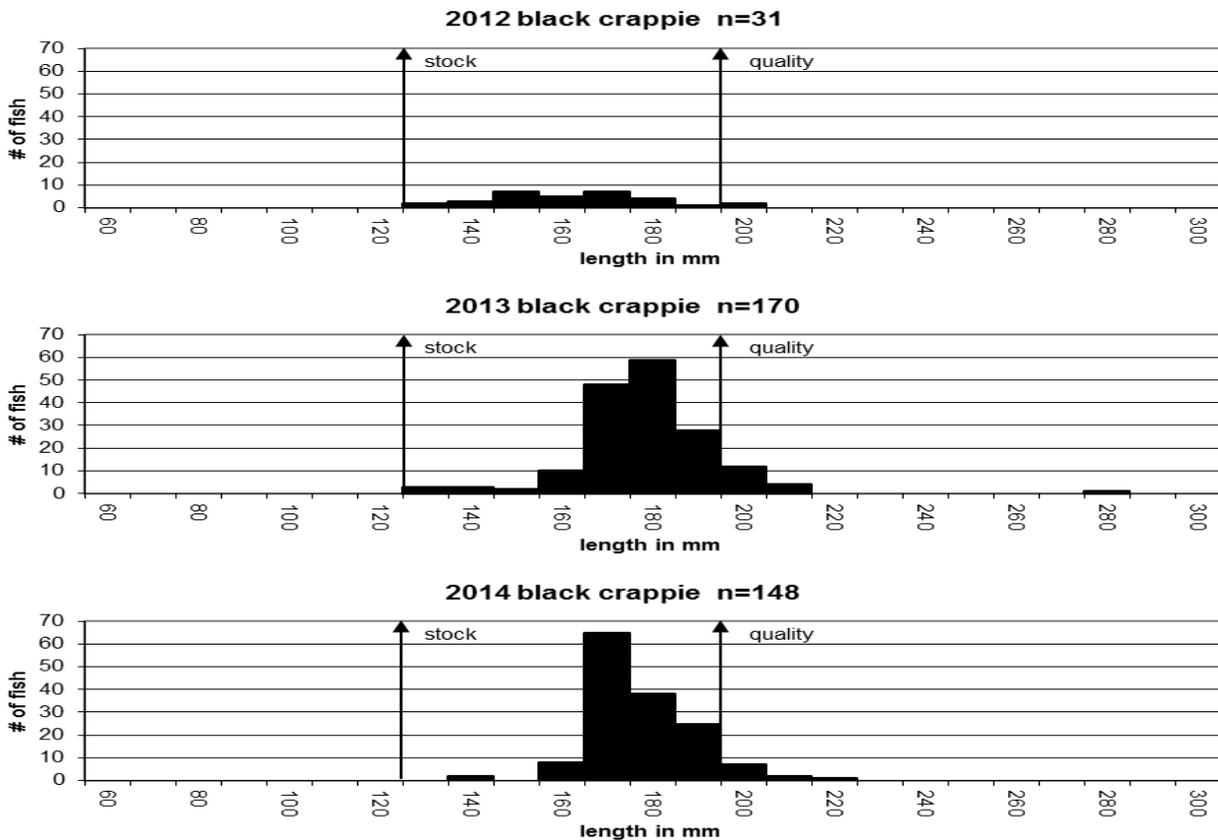


Figure 4. Length frequency histogram of black crappie collected in Durkee Lake, 2012-2014.

Table 7. Durkee 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 mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5
2012	2	7	71	135			
2011	3	541	66	138	179		
2010	4	35	81	136	190	206	
2009	5	4	61	134	165	205	222
2014 Pop. mean (SE)		587	70 (4)	136 (1)	178 (7)	206 (1)	222 (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)

Largemouth bass

Durkee Lake continues to exhibit a low density largemouth bass population with an electrofishing CPUE for stock length bass of 28.2 (Table 3). This is below the objective CPUE of 40 largemouth bass per hour. Size structure was above the objective PSD range of 40 to 70 with a PSD of 88. Fish condition was average with a *Wr* of 94.9. Growth of the largemouth bass in Durkee was good, faster than the state and regional average (Table 8). The length frequency histogram suggests little recruitment is occurring (Figure 5).

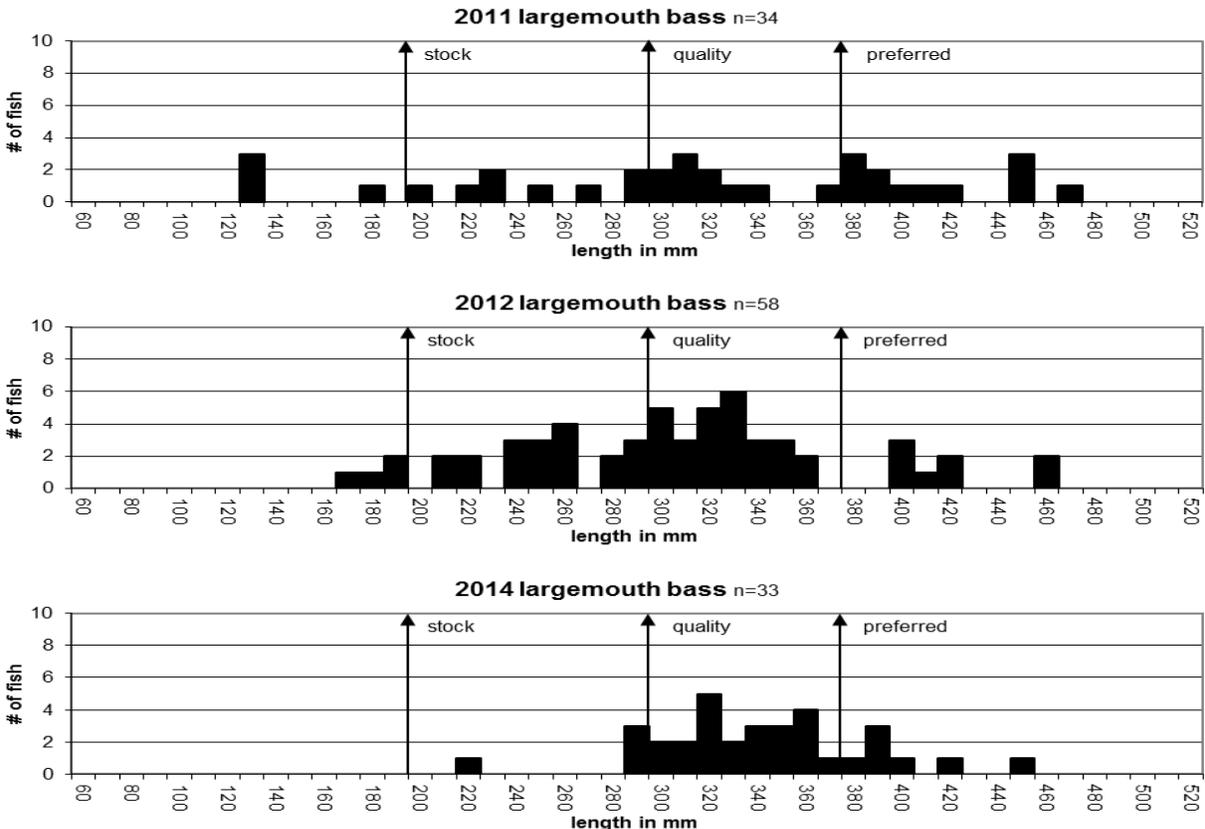


Figure 5. Length frequency histogram of largemouth bass collected by electrofishing in Durkee Lake, 2011-2012, 2014.

Table 8. Durkee Lake largemouth bass 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 largemouth bass mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5	6	7	8
2011	3	1	64	123	228					
2010	4	1	117	186	251	298				
2009	5	6	97	174	234	281	327			
2008	6	22	91	180	240	293	325	352		
2007	7	1	98	147	177	219	266	303	336	
2006	8	1	104	158	219	290	370	389	406	429
2014 Pop.			95	161	225	276	322	348	371	429
Mean (SE)			(7)	(10)	(11)	(15)	(21)	(25)	(35)	(0)
Region 1			74	122	158	197	217			
			(3)	(7)	(9)	(13)	(16)			
South Dakota			83	147	195	229	249			
			(2)	(4)	(5)	(6)	(6)			

Northern pike

The northern pike population remains at a low density with a trap net CPUE of 0.3 and a gill net CPUE of 2.5 (Tables 1 and 2). Last survey, trap net CPUE was 0.6 with a gill net CPUE of 8.5, respectively. Fish condition was good with both gear types yielding *Wr*'s in the mid-nineties. All but one fish in the seven fish sample were greater than quality length (Figure 6). Lower water levels in Durkee Lake in recent years may be limiting northern pike recruitment.

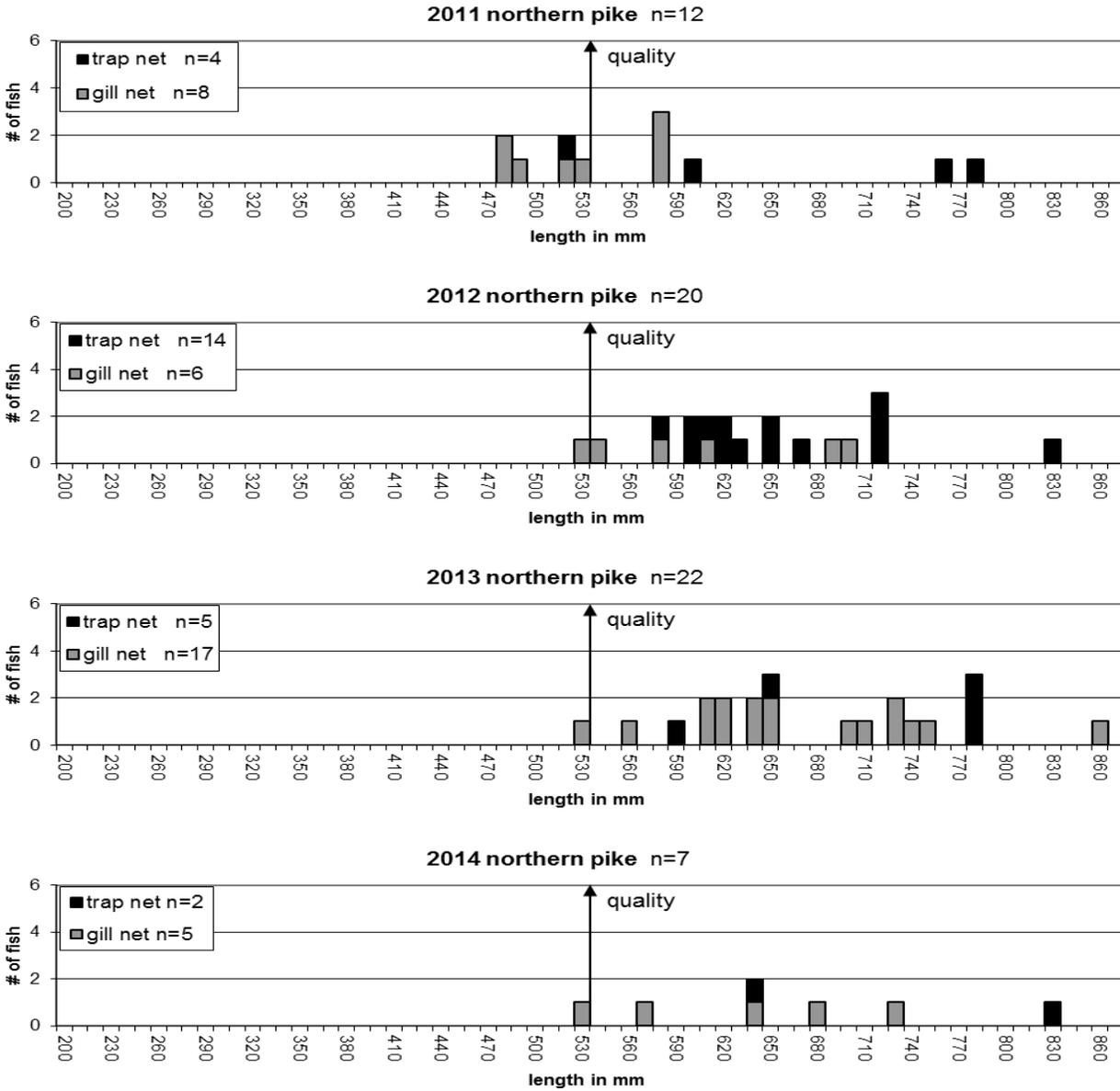


Figure 6. Length frequency histogram of northern pike collected by trap nets and gill nets in Durkee Lake, 2011-2014.

Yellow perch

The yellow perch density increased substantially with a gill net CPUE of 61.0, compared to 12.0 last year (Table 9). Yellow perch sizes, however, are small and no gear type sampled a fish over quality length (Figure 7). Yellow perch condition was on par with previous years with a *Wr* value of 95.4. Growth was slow, well below the state and regional average by age 3 (Table 10).

Table 9. Composite listing of data for yellow perch collected by gill nets in Durkee Lake, 2010-2014. CPUE with 80% and PSD, PSD-P and $Wr \geq S$ with 90% confidence intervals in parentheses

Year	N	CPUE	CPUE-S	PSD	RSD-P	$Wr \geq S$
2010	5	5.0 (--)	0.0 (--)	--	--	--
2011	22	11.0 (9.2)	2.5 (1.5)	0	0	90.0 (8.9)
2012	27	13.5 (20.0)	9.0 (9.2)	0	0	95.9 (1.5)
2013	24	12.0 (3.1)	12.0 (3.1)	4 (7)	4 (7)	93.5 (1.4)
2014	122	61.0 (9.2)	36.0 (36.9)	0 (--)	0 (--)	95.4 (0.4)

Table 10. Durkee Lake yellow perch 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 yellow perch mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4	5
2013	1	45	86				
2012	2	10	83	131			
2011	3	31	78	125	150		
2010	4	14	83	116	144	165	
2009	5	14	81	116	141	163	180
2014 Pop. mean (SE)		114	82 (1)	122 (4)	145 (3)	164 (1)	180 (0)
Region 1			70 (3)	117 (6)	158 (6)	186 (6)	208 (8)
South Dakota			86 (2)	145 (4)	190 (5)	220 (5)	242 (8)

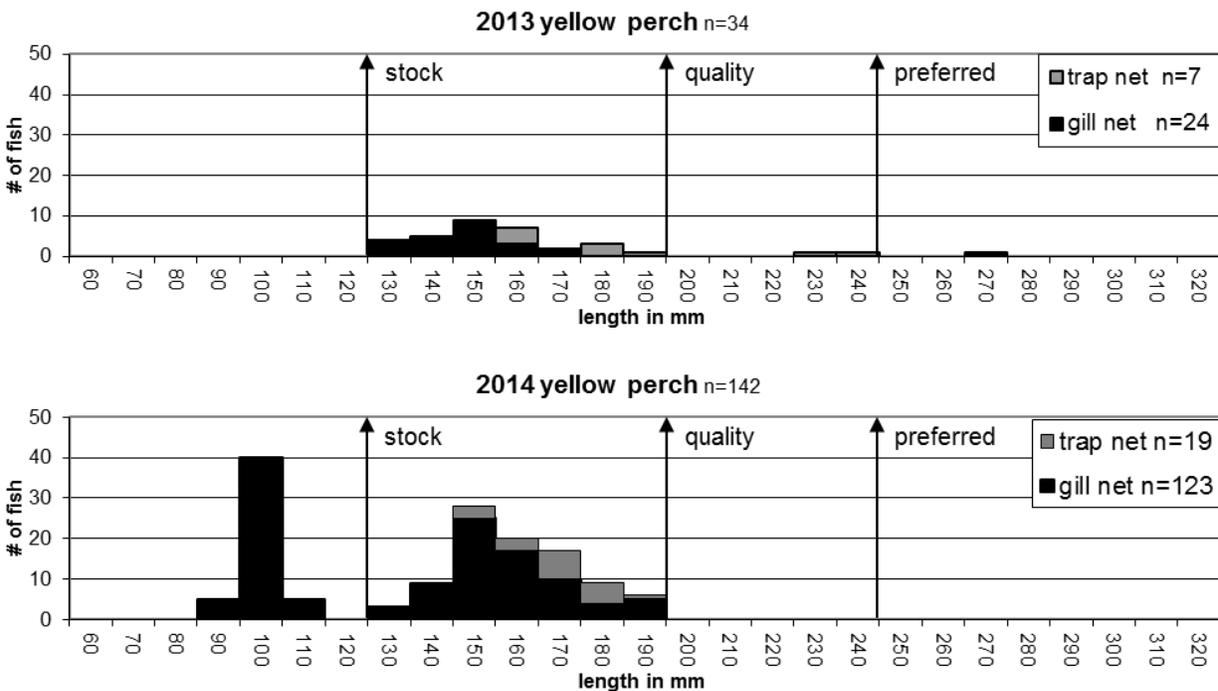


Figure 7. Length frequency histogram of yellow perch collected in experimental gill and trap nets in Durkee Lake, 2013-2014.

RECOMMENDATIONS

1. Continue conducting night electrofishing surveys annually to monitor the largemouth bass population in Durkee Lake.
2. Re-evaluate yellow perch, bluegill and black bullhead populations in 2015 with a netting survey. Remove black bullheads to reduce density. Use the bluegill population as a source for transferring to other waters.
3. Stock adult largemouth bass when available to increase predation on over abundant panfish species and to increase their abundance into objective ranges.

LITERATURE CITED

Willis, D.W., D.A. Isermann, M.J. Hubers, B.A. Johnson, W.H. Miller, T.R. St. Sauver, J.S. Sorenson, E.G. Unkenholz, and G.A. Wickstrom. 2001. Growth of South Dakota Fishes: A Statewide Summary with means by region and Water Type. Special Report. South Dakota Department of Game, Fish and Parks. Pierre, South Dakota.

APPENDIX

Appendix A. Stocking history, including year, number, species and size of fish stocked into Durkee Lake, Meade County, South Dakota, 2000-2014.

Year	Number	Species	Size
2000	500	Black crappie	Adult
	8,500	Largemouth bass	Fingerling
2002	7,700	Largemouth bass	Fingerling
	589	Largemouth bass	Adult
	100	Smallmouth bass	Adult
2008	192,500	Northern pike	Fry
	50	Bluegill	Adult
	22,000	Bluegill	Fingerling
	200	Largemouth bass	Adult
	10,000	Largemouth bass	Fingerling
2009	1,155	Largemouth bass	Juvenile
	150	Black crappie	Adult
2011	400	Yellow perch	Adult
2014	200	Largemouth bass	Juvenile