SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-48

Name: Newell Lake **County**: Butte

Legal description: Sec 9, T 10N, R 6E
Location from nearest town: 8 miles north and 2 miles east of Newell, SD
Dates of present survey: July 6-8, September 30, 2015
Date last surveyed: July 22-24, 2013, September 17, 2014
Management classification: Warm-water permanent

Primary Species: (game and forage)	Secondary and other species:
1. Largemouth bass	1. Smallmouth bass
2. Bluegill	2. European rudd
3. Northern pike	3. White sucker
4. Yellow perch	4. Black bullhead
5. Walleye	5.

PHYSICAL CHARACTERISTICS

Surface Area: 183 acres **Watershed**: 7,680 acres
Maximum depth: 32 feet **Mean depth**: 13.6 feet
Lake elevation at survey (from known benchmark): -4 feet

Ownership of lake and adjacent lakeshore property:

The Department of Game, Fish and Parks owns Newell Lake, as well as the surrounding property. The shoreline is managed as a recreation area and a Game Production Area.

Fishing Access

Anglers must drive 2 miles along a maintained gravel road to access Newell Lake. Gravel roads and trails also allow access to the south and northwest shorelines. Shore fishing is generally good with open shorelines. A boat ramp and dock are located on the southeast side of the lake.

Observations of Water Quality and Aquatic Vegetation

The area has been negatively affected by heavy cattle grazing. Submerged aquatic vegetation in Newell Lake consists of coontail and cattail. Summer months are often characterized as having large amounts of vegetation in the shallow bays and inlets. Emergent vegetation consists of bulrush and cattail.

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

In 1998, following the lake survey, major damage occurred to the tubes that required rebuilding the spillway. Work on the spillway was completed in 1999. The spillway, dam and boat ramp are in good condition.

MANAGEMENT OBJECTIVES

Objective 1. Maintain a walleye fishery with a minimum gill-net CPUE for stock length and longer fish equal to or greater than 10/net and a PSD range of 30-60.

Objective 2. Maintain a largemouth bass fishery with a minimum night-time electrofishing CPUE for stock length and longer fish of 20/hr, PSD greater than 50, and PSD-P greater than 30.

Objective 3. Maintain bluegill trap net CPUE-S greater than 20, PSD at least 20 and PSD-P of 5 or greater.

BIOLOGICAL DATA

Sampling Effort and Catch

A fish survey was conducted at Newell Lake during July 6-8, 2015. Sampling consisted of eight trap nets and two experimental gill nets (Figure 1). Night electrofishing was completed on September 30, 2015. Discussion on selected fish species follows and completes this report.

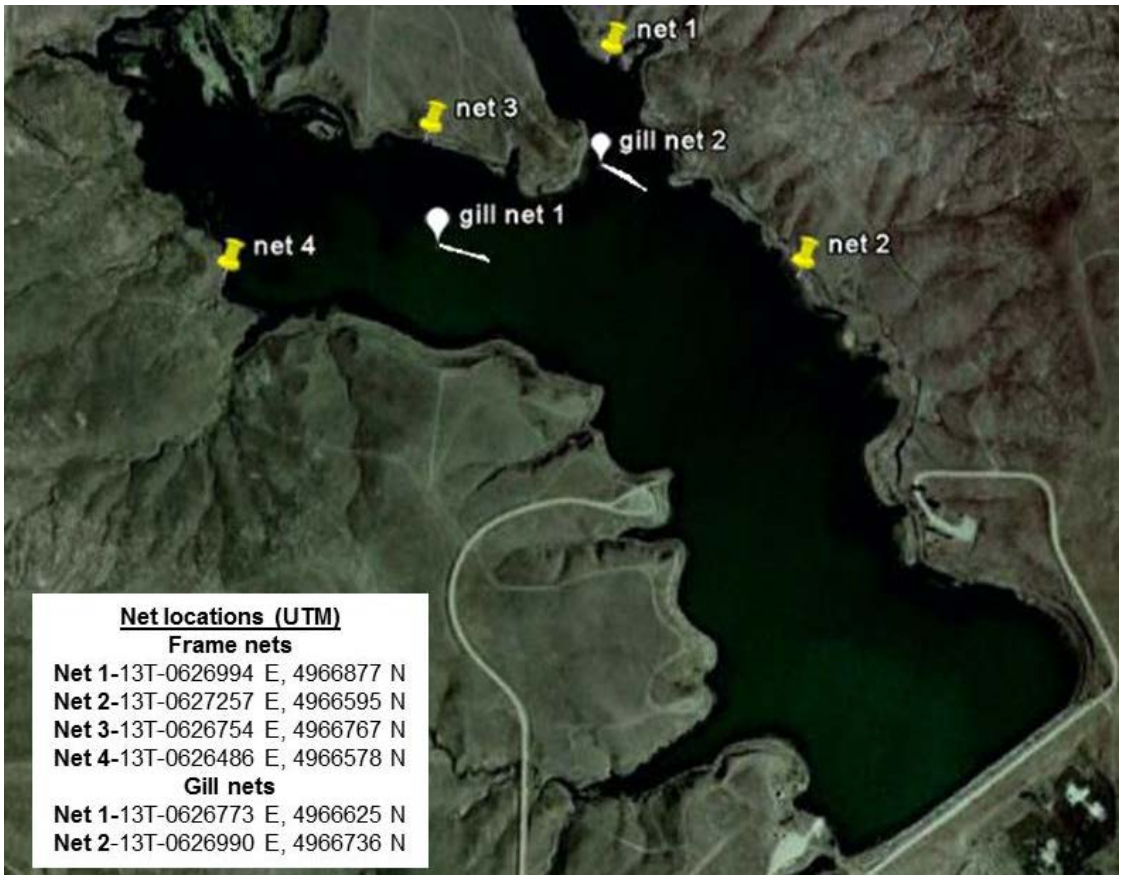

Figure 1. Locations, with GPS coordinates, of experimental gill nets and trap nets (net) during the fisheries survey of Newell Lake, Butte County, South Dakota, 2015.

Table 1. Catch data from all species collected in eight trap nets in Newell Lake, Butte County, July 6-8, 2015. 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* ≥ S
Bluegill	139	17.4 (6.7)	17.3 (6.7)	41 (7)	7 (4)	111.1 (1.1)
Northern pike	6	0.8 (0.4)	0.6 (0.5)	--	--	77.1 (6.9)
European rudd	170	21.3 (14.9)	21.3 (14.9)	98 (2)	65 (6)	--
Walleye	9	1.1 (1.1)	1.0 (0.9)	75 (31)	13 (23)	79.9 (3.1)
White sucker	3	0.4 (0.3)	0.4 (0.3)	--	--	88.8 (11.2)

Table 2. Catch data from all species collected in two gill nets in Newell Lake, Butte County, July 6-8, 2015. 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* ≥ S
Northern pike	6	3.0 (9.2)	3.0 (9.2)	17 (33)	17 (33)	78.0 (4.8)
European rudd	75	37.5 (47.7)	25.5 (23.1)	78 (10)	27 (11)	--
Walleye	8	4.0 (6.2)	4.0 (6.2)	75 (31)	13 (23)	81.1 (2.0)
White sucker	7	3.5 (4.6)	3.5 (4.6)	--	--	98.7 (1.5)
Yellow perch	12	6.0 (9.2)	3.5 (7.7)	0	0	97.1 (2.4)

Table 3. Catch data from night electrofishing at Newell Lake, Butte County, South Dakota, September 30, 2015. CPUE's with 80% confidence intervals in parentheses. *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	*Wr* ≥ S
Largemouth bass	26	25.5 (9.7)	13.8 (6.9)	71 (23)	36 (24)	114.3 (4.6)
Walleye	113	101.0 (41.1)	74.7 (33.9)	42 (9)	1 (2)	84.1 (0.4)

Bluegill

Bluegill was the most abundant game fish sampled in Newell Lake with a trap net CPUE of 17.4 (Table 1 and 4), a decrease from 29.1 in 2013. Bluegill density is slightly lower than management objectives and sizes are with in the current objectives with a proportional stock density (PSD) of 41 and a proportional stock density for preferred-length fish (PSD-P) of 7. Fish condition of adult bluegill remains high with a mean relative weight for stock-length and larger fish (*Wr*>S) of 111.1. The length frequency histogram shows a balanced population with good recruitment the last two surveys (Figure 2).

Table 4. Composite listing of data for bluegill collected by trap nets in Newell Lake, Butte County, 2010-2013, 2015. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses

Year	N	CPUE-S	PSD	PSD-P	*Wr*>S
2010	66	8.3 (2.4)	97 (4)	42 (11)	115.6 (1.3)
2011	46	5.5 (3.5)	80 (11)	30 (12)	104.3 (1.1)
2012	172	21.5 (6.8)	94 (3)	20 (5)	106.3 (0.7)
2013	204	29.1 (10.8)	38 (6)	10 (4)	113.1 (1.4)
2015	139	17.3 (6.7)	41 (7)	7 (4)	111.1 (1.1)

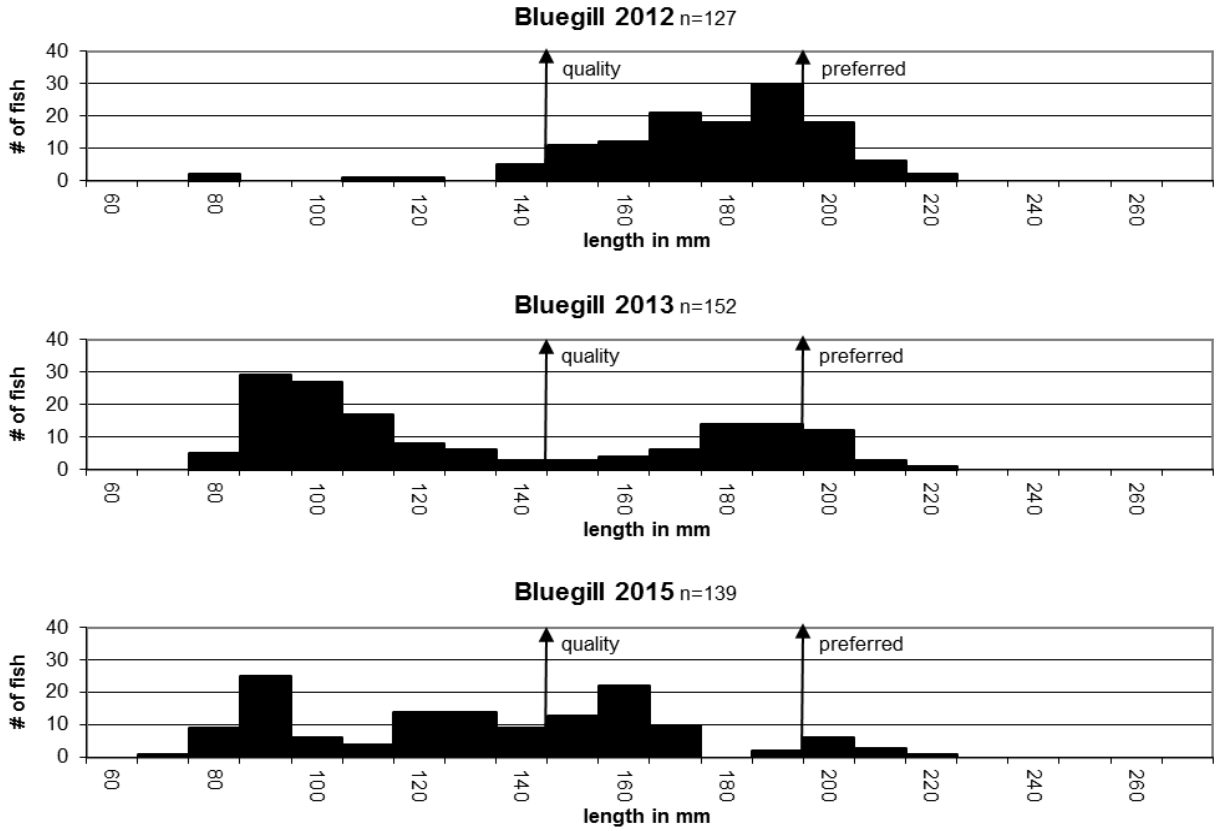

Figure 2. Length frequencies of bluegill collected in trap nets in Newell Lake, Butte County, South Dakota, 2012-2013, 2015.

<u>European Rudd</u>

European Rudd was the most abundant species sampled in trap nets and gill nets, with a catch per unit effort (CPUE) of 21.3 and 37.5, respectively (Table 1, 2, 5). In 2013, no European rudd were sampled in the gill nets, while trap net CPUE was the highest ever recorded at 46.0. It appears Newell Lake has a very large density European Rudd population, the effects on the other game fish species is largely unknown. The length frequency histogram shows a balanced population with consistent recruitment (Figure 3).

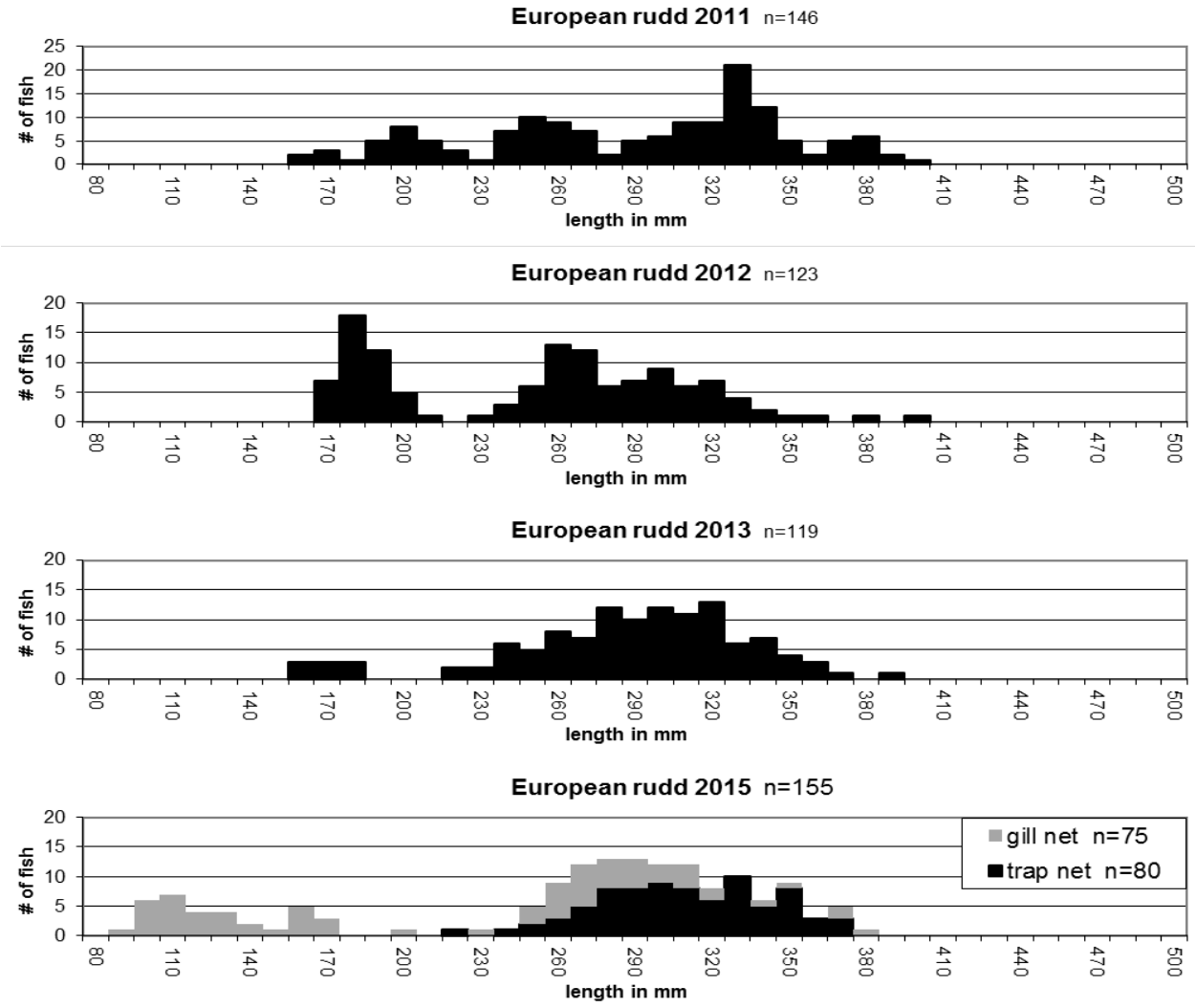

Figure 3. Length frequencies of European Rudd collected in trap nets in Newell Lake, Butte County, South Dakota, 2011-2013 and trap nets and gill nets in 2015.

Table 5. Year, number captured (N) and catch per unit effort (CPUE; 80% confidence intervals given in parentheses), for European Rudd collected in trap nets and gill nets CPUE in Newell Lake, Butte County, South Dakota, 2002, 2004, 2006, 2007, 2010- 2013, 2015.

Year	N	Trap net CPUE	Gill net CPUE
2002	144	18.0 (9.2)	4.0 (12.3)
2004	53	7.6 (3.4)	0.0 (--)
2006	173	21.6 (11.9)	0.0 (--)
2007	130	18.6 (6.4)	2.0 (0.0)
2010	96	12.0 (6.4)	2.0 (6.2)
2011	146	18.3 (5.8)	2.0 (0.0)
2012	123	15.4 (9.6)	57.5 (13.9)
2013	322	46.0 (16.7)	0.0 (--)
2015	170	21.3 (14.9)	37.5 (47.7)

Largemouth bass

The largemouth bass density has dipped below objective level with a CPUE for stock length and larger bass of 13.8 (Table 3 and 6). The management objective CPUE for greater than stock length is 20. Last year CPUE was 20.8. Size objectives are within the objective range with a PSD of 71 and a PSD-P of 36. Fish condition was excellent with a *Wr* of 114.3. It appears all the recent stockings of largemouth bass are showing up with some smaller fish showing up since the 2011 survey (Figure 4). Largemouth bass recruitment appears to have declined in recent years while the walleye density and recruitment have increased. Though sample size was small, growth appears good with age 3 bass beating the state and regional average (Table 7)

Table 6. Catch data for largemouth bass from night electrofishing at Newell Lake, Butte County, South Dakota, 2007-2015. CPUE's with 80% confidence intervals in parentheses. *Wr* with 90% confidence intervals in parentheses.

Year	N	Pedal Time (seconds)	CPUE	CPUE-S	PSD	PSD-P	*Wr*≥S
2007	69	3,650	67.9 (15.8)	55.2 (15.1)	73 (10)	23 (10)	117.2 (1.3)
2010	6	4,098	4.7 (2.7)	4.7 (2.7)	--	--	114.8 (5.2)
2011	15	3,600	15.0 (9.1)	15.0 (9.1)	100	100	103.0 (2.6)
2012	37	3,000	44.4 (14.7)	30.0 (7.7)	32 (16)	32 (16)	111.3 (3.1)
2014	19	3,000	21.8 (8.6)	20.8 (8.5)	83 (16)	78 (18)	110.6 (1.9)
2015	26	3,795	25.5 (9.7)	13.8 (6.9)	71 (23)	36 (24)	114.3 (4.6)

Table 7**.** Newell Lake largemouth bass scale aged year class, age in 2015, 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
2014	1	5	93		
2012	3	4	89	215	286
2015 Pop. mean (SE)		9	91 (2)	215 (0)	286 (0)
Region 1			78 (4)	154 (10)	214 (11)
South Dakota			96 (3)	182 (6)	250 (7)

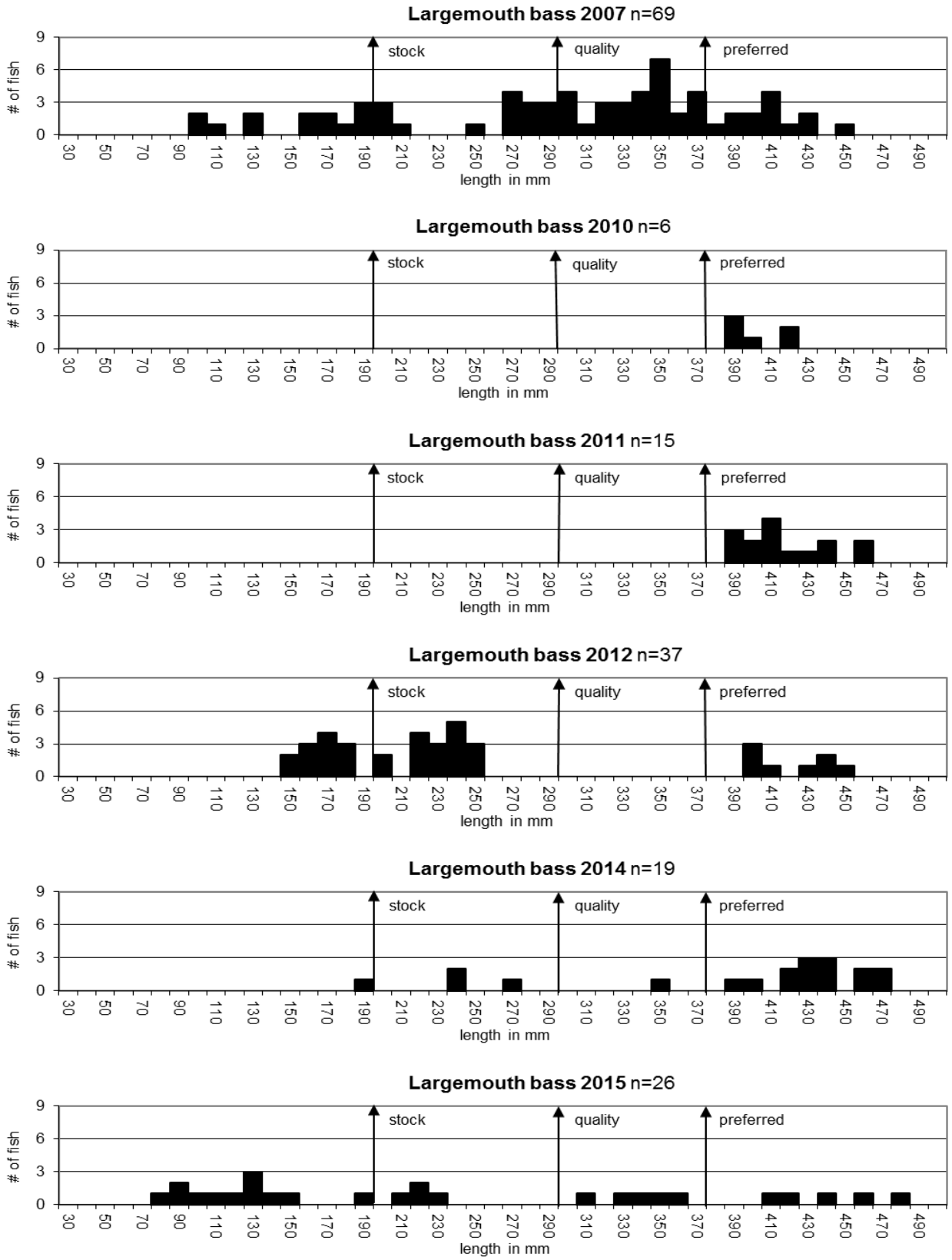

Figure 4. Length frequency histograms for largemouth bass from electrofishing at Newell Lake, Butte County, 2007, 2010-2012, 2014-2015.

Walleye

In attempt to increase Walleye density, a 15 inch minimum length limit with a daily limit of two Walleye was placed on Newell Lake on January 1, 2010. In addition to the regulation, 50,000 fingerlings were stocked annually from 2007-2009. Though the netting survey shows mixed results on walleye density, fall electrofishing shows an increasing density in recent years (Table 8). Growth was slow with the average four year old walleye measuring 337 mm, well below the state and regional averages (Table 9). The one hundred thirteen fish electrofishing sample (Figure 5) yielded a PSD of 42 and a PSD-P of 1. Fall walleye condition was low with a *Wr* for stock length and longer fish of 84.1 (Table 3). Last year the electrofishing survey yielded a PSD of 67, PSD-P of 7 with a *Wr* for stock length and larger fish of 83.1.

Table 8. Year and catch per unit effort by gear type (CPUE with 80% CI's) for Walleye collected during fisheries surveys in Newell Lake, Butte County, South Dakota, 2002, 2004–2007, 2010-2015.

Year	Gill net	Trap net	Fall electrofishing
2002	2.0 (3.1)	1.1 (0.6)	----
2004	6.0 (9.2)	0.1 (0.2)	11.0 (5.3)
2005	----	----	16.4 (7.5)
2006	0.5 (1.5)	0.4 (0.4)	26.8 (5.7)
2007	2.0 (3.1)	2.6 (1.3)	67.1 (22.1)
2010	11.5 (7.7)	2.4 (0.8)	77.5 (35.7)
2011	4.0 (9.2)	1.0 (0.5)	68.0 (17.7)
2012	12.5 (7.7)	0.8 (0.6)	46.8 (20.9)
2013	8.5 (10.8)	1.1 (0.5)	----
2014	----	----	123.8 (47.8)
2015	4.0 (6.2)	1.1 (1.1)	101.0 (41.1)

Table 9**.** Newell Lake walleye scale aged year class, age in 2015, 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 walleye 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	9
2014	1	31	168								
2013	2	20	184	234							
2012	3	14	185	269	311						
2011	4	9	190	164	330	365					
2010	5	14	149	225	288	339	379				
2009	6	3	128	189	239	312	361	391			
2006	9	2	197	246	289	333	379	400	416	436	448
2015 Pop. mean (SE)		93	171 (9)	238 (12)	292 (15)	337 (11)	373 (6)	396 (4)	416 (0)	436 (0)	448 (0)
Region 1			160 (17)	260 (22)	332 (27)	385 (32)	444 (42)				
South Dakota			168 (3)	279 (6)	360 (7)	425 (8)	490 (9)				

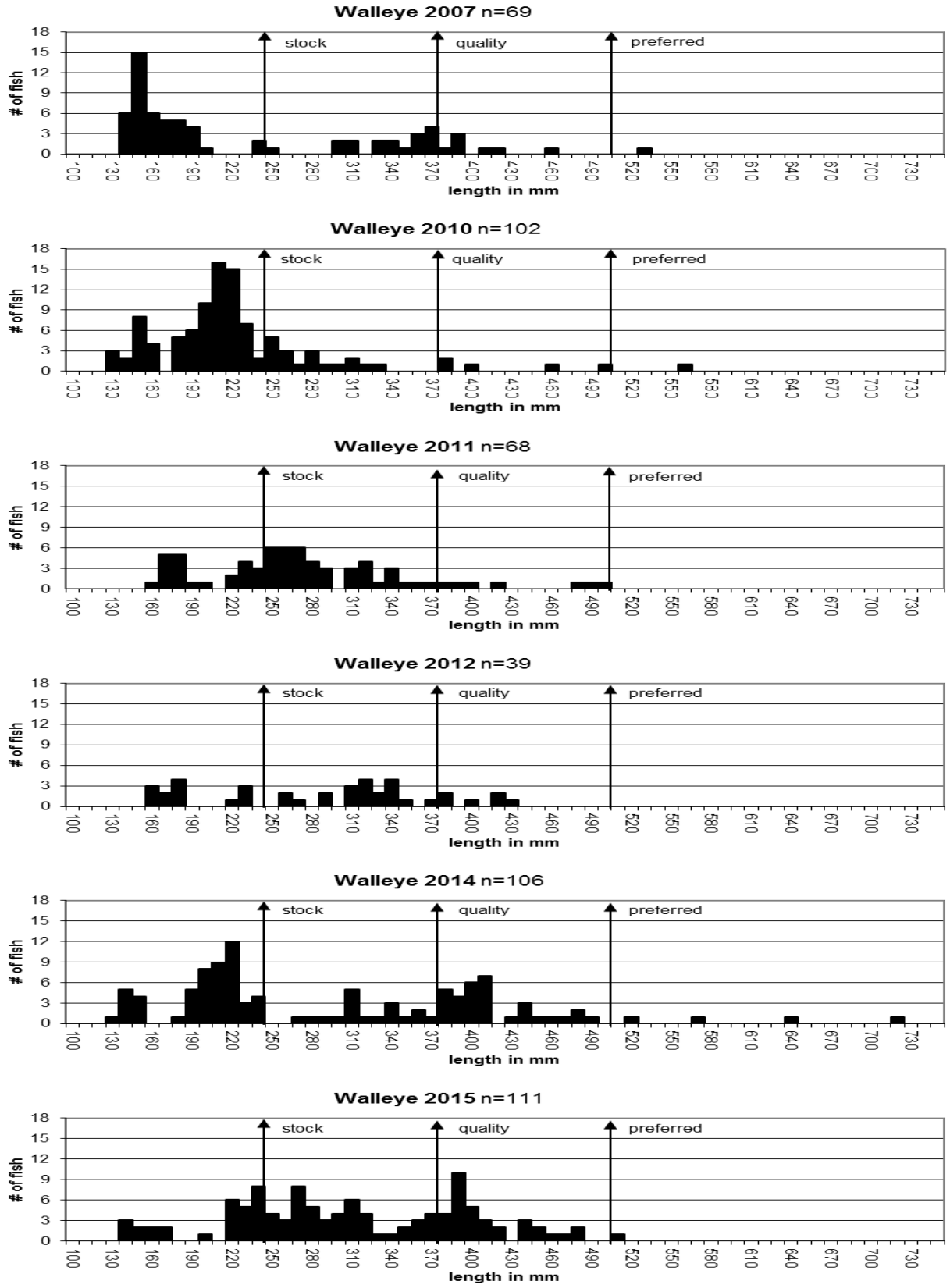

Figure 5. Length frequency histograms of walleye collected from fall, nighttime electrofishing at Newell Lake, Butte County, South Dakota, 2007, 2010-2015.

RECOMMENDATIONS

1. Conduct standard fish netting surveys every 1 to 3 years to monitor fish populations.

2. Sample largemouth bass, smallmouth bass and walleye annually with nighttime boat electrofishing to identify population changes and effectiveness of special regulations.

3. Stock adult or fingerling largemouth bass when available to supplement the population.

4. Stock gizzard shad to provide forage for sportfish especially to help increase walleye growth and condition.

APPENDIX

Appendix A. Stocking history, including year, number stocked, species and size of fish stocked into Newell Lake, Butte County, South Dakota, 2004-2015.

Year	Number	Species	Size
2004	308	Walleye	Large fingerling
2005	2,230	Walleye	Large fingerling
2006	180	Largemouth bass	Adult
	187	Walleye	Large fingerling
2007	50,000	Walleye	Small fingerlings
2008	53,975	Walleye	Small fingerlings
2009	54,100	Walleye	Small fingerlings
2012	5,130	Smallmouth bass	Small-fingerlings
	9,120	Largemouth bass	Small-fingerlings
	540	Largemouth bass	Adult
2013	11,970	Largemouth bass	Small-fingerlings
2014	750	Largemouth bass	Juvenile
2015	3,690	Largemouth bass	Small-fingerlings
	230	Largemouth bass	Adult