

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lake Byron, Beadle County
2102-F-21-R-48
2015



Figure 1. Lake Byron, Beadle County

Legal Description: T113N- R61W- Sec. 22-23, 25-26, 28, 34-35

Location from nearest town: 11 miles north, 3 miles east, 1½ north of Huron, SD

Surface Area: 1,805 acres

Meandered (Y/N): yes

OHWM elevation: 1,250.0

Outlet elevation: 1,248.1

Max. depth at outlet elevation: 10 feet

Observed water level: 1 foot low

Contour map available (Y/N): yes

Watershed area: 115,350 acres

Shoreline length: 12.4 miles

Date set: March, 2001

Date set: March, 2001

Mean depth at outlet elevation: 7 feet

Lake volume: 11,710 acre feet

Date mapped: 1970

DENR beneficial use classifications: (6) warmwater semipermanent fish propagation and irrigation (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering.

Introduction

General

Lake Byron is a natural lake formed by receding glacial ice. Indians originally named it Big Toad Lake because, from a distance, the large trees surrounding the lake looked like big toads. In 1866, an Indian trader named Byron Pay was camped by the lake and carved the initials of his Indian nickname “Bye” and the date on a tree. After that, local residents started calling the lake “Lake Byron”.

Lake Byron is a shallow lake subject to annual water level fluctuations of 3 feet or more. Fish kills are common, especially during low water years.

Ownership of Lake and Adjacent Lakeshore Properties

Lake Byron is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The meandered portion of the lake contains about 1,450 acres. The South Dakota Department of Game, Fish and Parks (GFP) owns and maintains property on the northwest, northeast, and south sides of the lake. The remaining lakeshore property is privately owned and heavily developed.

Fishing Access

The South Lake Access Area contains a boat ramp, boat dock and public toilet (Figure 1). The North Lake Access Area contains a boat ramp, boat dock, public toilet, picnic tables, and offers primitive camping. The Northwest Access Area has been renovated with a new boat ramp and a wooden fishing pier. All public areas on the lake have shorelines suitable for shore fishing.

Water Quality and Aquatic Vegetation

The water temperature during this year’s lake survey was 28°C (82°F) and the water clarity was poor at 30 cm (12 in) (Table 1). Consistently poor water clarity explains the low abundance of submerged aquatic vegetation (Table 1).

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Byron, Beadle County, 2006-2015.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2015	28 (82)	30 (12)	Bulrushes and cattail
2014	24 (75)	37 (14)	Blue green algae bloom
2013	24 (75)	41 (16)	No aquatic vegetation observed
2011	29 (85)	20 (8)	Sago pondweed and cattail
2009	21 (69)	46 (18)	Water was green from algae, some sago pondweed
2007	27 (80)	20 (8)	Sago pondweed bulrushes and cattail

Fish Community

Lake Byron has a relatively simple fish community comprised of typical shallow lake species (Table 2). Species like river carpsuckers and gizzard shad enter the lake during flood events on the nearby James River. A small number of Asian carp have also been captured during past commercial fishing operations but have not been seen the last two years.

Table 2. Fish species commonly found in Lake Byron, Beadle County.

Game Species	Other Species
Walleye	White Sucker
Yellow Perch	Bigmouth Buffalo
Northern Pike	River Carpsucker
Black Crappie	Common Carp
Black Bullhead	

Fish Management

Shallow water depth, poor water quality and typically high rough fish abundance contribute to the frequent fish kills experienced on Lake Byron (Table 3). As a result, it is difficult to maintain consistent fishing opportunity. The lake is actively managed for walleye and the population is maintained by frequent stocking (Table 4). The lake is too large to routinely stock with yellow perch, northern pike and black crappie so the abundance of those populations is dependent on natural reproduction and recruitment.

Table 3. Fish kill history for Lake Byron, Beadle County.

Year	Severity	Comments
2011	Light	Winterkill of mostly carp and drum. Live game fish sampled
2008	Light	Drum, buffalo, carp, crappie found dead. All species found alive.
1998	Light	August kill of bullheads, perch, crappies
1997	Severe	Winterkill of all species
1994	Severe	Est. 1 million lbs. of carp killed. Some game fish survived.
1986	Severe	Winterkill
1969	Severe	Winterkill
1961	Light	Winterkill
1960	Severe	Winterkill

Table 4. Stocking history for Lake Byron, Beadle County, 2006-2015.

Year	Number	Species	Size
2008	2,000,000	Walleye	Fry
2010	2,000,000	Walleye	Fry
2012	1,003,118	Walleye	Fry
2013	950,000	Walleye	Fry
2014	950,000	Walleye	Fry
2015	891,071	Walleye	Fry

Methods

Lake Byron was sampled on August 3-4, 2015 with three overnight gill nets. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting.

Results and Discussion

Net Catch Results

Desirable game fish species only comprised 3.7% of the total gill net sample in 2015 (Table 5). Substock length freshwater drum and bigmouth buffalo comprised the majority of the gill net catch (Table 6).

Table 5. Total catch from three overnight gill nets set in Lake Byron, Beadle County, August 3-4, 2015.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i> ¹	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Freshwater Drum	205	43.3	68.3	<u>+34.1</u>	14.6	--	--	--
Bigmouth Buffalo	181	38.3	60.3	<u>+19.8</u>	18.9	0	0	--
Black Bullhead	55	11.6	18.3	<u>+2.6</u>	30.1	80	0	--
White Sucker	11	2.3	3.7	<u>+1.9</u>	2.9	91	82	--
Walleye	8	1.7	2.7	<u>+1.1</u>	9.1	--	--	--
Black Crappie	4	0.8	1.3	<u>+0.9</u>	0.0	--	--	--
Channel Catfish	4	0.8	1.3	<u>+0.9</u>	0.3	--	--	--
Common Carp	2	0.4	0.7	<u>+0.9</u>	1.6	--	--	--
Yellow Perch	2	0.4	0.7	<u>+0.4</u>	4.3	--	--	--
Shorthead Redhorse	1	0.2	0.3	<u>+0.4</u>	0.0	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with gill nets in Lake Byron, Beadle County, August 3-4, 2015.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Freshwater Drum	66.7	1.7	0.7	0.7	0.3	68.3	<u>+34.1</u>
Bigmouth Buffalo	55.3	5.0	5.0	--	--	60.3	<u>+19.8</u>
Black Bullhead	--	18.3	3.7	14.7	--	18.3	<u>+2.6</u>
White Sucker	--	3.7	0.3	0.3	3.0	3.7	<u>+1.9</u>
Walleye	--	2.7	1.0	1.7	--	2.7	<u>+1.1</u>
Black Crappie	--	1.3	1.3	--	--	1.3	<u>+0.9</u>
Channel Catfish	0.3	1.0	--	--	1.0	1.3	<u>+0.9</u>
Common Carp	--	0.7	0.3	0.3	--	0.7	<u>+0.9</u>
Yellow Perch	--	0.7	--	--	0.7	0.7	<u>+0.4</u>
Shorthead Redhorse	--	0.3	--	--	0.3	0.3	<u>+0.4</u>

Length categories can be found in Appendix A.

¹ See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Table 7. Gill-net (GN) CPUE for selected fish species sampled in Lake Byron, Beadle County, 2006-2015.

<i>Species</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Bigmouth Buffalo		28.3		6.7		4.3		4.5	9.0	60.3
Black Bullhead		16.0		4.3		21.3		94.0	26.7	18.3
Channel Catfish		--		0.3		--		--	--	1.3
Common Carp		5.0		1.3		0.3		2.0	0.3	0.7
Freshwater Drum		13.7		0.3		0.7		4.5	--	68.3
Gizzard Shad		48.7		89.3		0.3		--	--	--
Northern Pike		0.7		--		0.7		2.0	1.0	--
River Carpsucker		--		0.3		--		--	0.3	--
Shortnose Gar		0.3		2.0		--		1.0	--	--
Walleye		4.3		16.3		20.7		4.0	6.3	2.7
White Sucker		--		1.7		2.7		4.5	1.7	3.7
Yellow Perch		3.3		2.7		12.0		7.0	0.3	0.7

Walleye

Management Objective

- maintain a walleye population with a total gill-net CPUE of at least 15

Management Strategy

- stock walleye fry at the rate of 500/acre (902,500) as needed to achieve the management objective

Walleye gill-net CPUE declined in 2015 (Table 8) and remains far below the management objective despite four consecutive years of stocking (Table 9). A few medium length fish are all that remain in the population (Figures 2-3).

Gill-net CPUE for walleye rose slightly in 2014 (Table 7). Although some larger fish were caught (Table 7, Figures 2-3), no age-1 fish were sampled indicating failed natural reproduction and stocking (Table 8) in 2013.

Table 8. CPUE, PSD, RSD-P, and mean Wr for all walleyes sampled with gill nets in Lake Byron, Beadle County, 2006-2015. Stocked years are shaded.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CPUE		4.3		16.3		20.7		4.0	6.3	2.7
PSD		92		43		61		--	42	--
RSD-P		0		14		0		--	11	--
Mean Wr		98		91		97		--	97	--

Table 9. Walleyes stocked into Lake Byron, Beadle County, 2006-2015.

Year	Number	Size
2008	2,000,000	Fry
2010	2,000,000	Fry
2012	1,003,118	Fry
2013	950,000	Fry
2014	950,000	Fry
2015	891,071	Fry

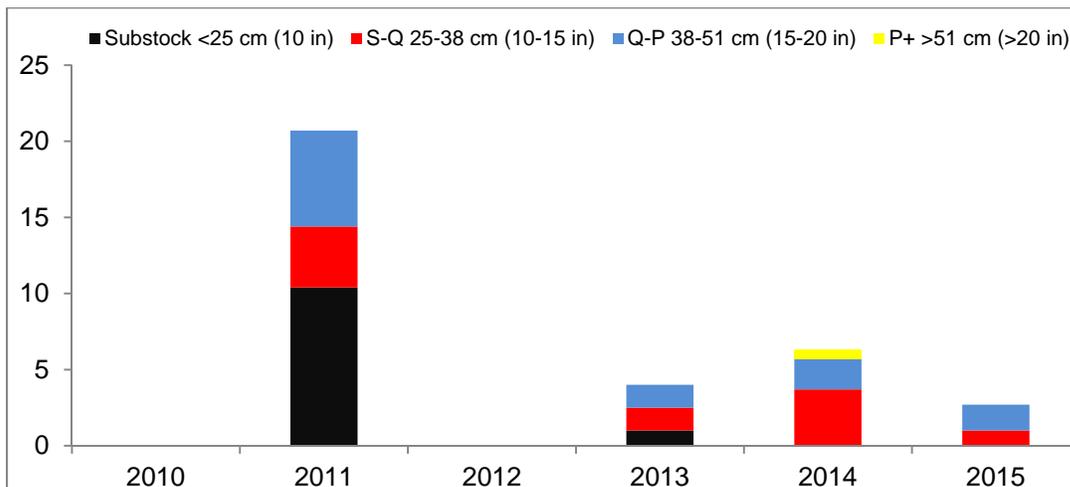
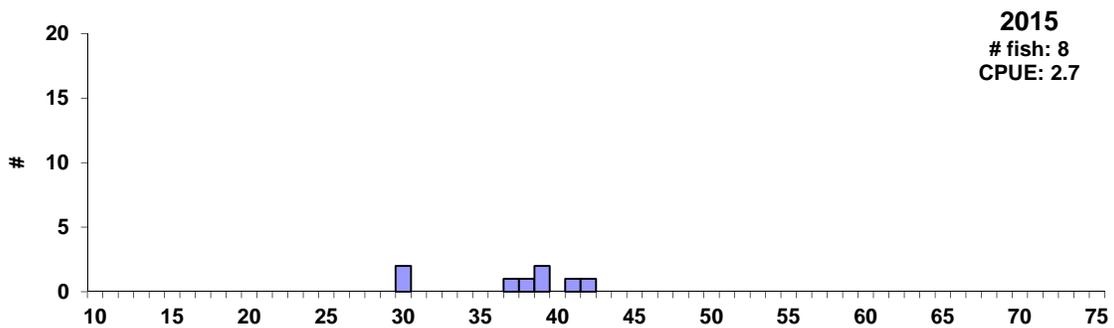
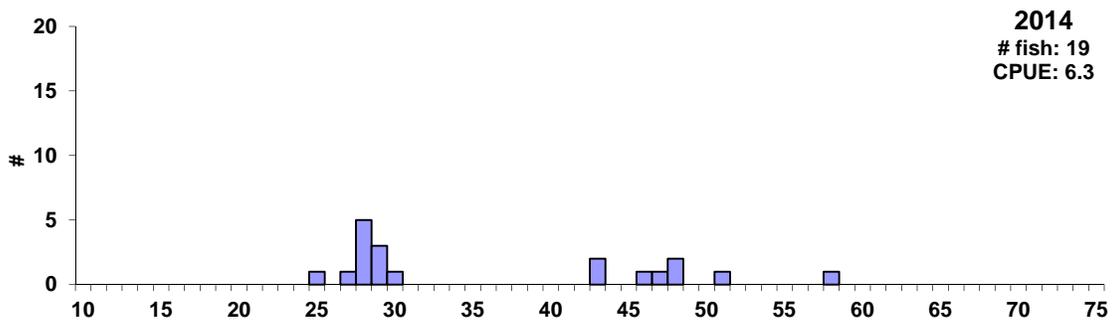
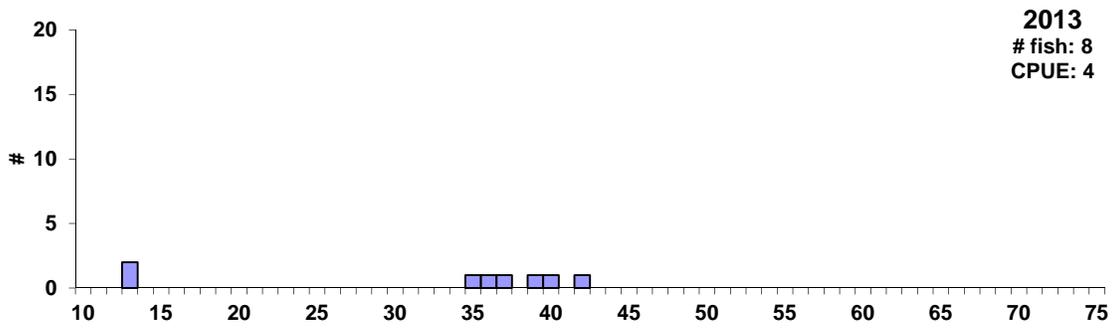
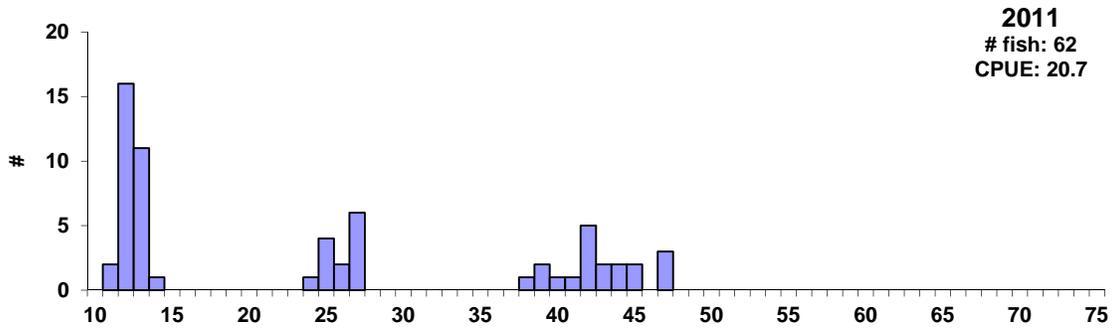


Figure 2. CPUE by length category for walleye sampled with gill nets in Lake Byron, Beadle County, 2010-2015.



Length-Centimeters

Figure 3. Length frequency histograms for walleye sampled with gill nets in Lake Byron, Beadle County, 2011, 2013, 2014, 2015.

Yellow Perch

Management Objective

- none

Management Strategy

- monitor the yellow perch population during annual lake surveys

The few remaining yellow perch in Lake Byron grew to a larger size over the last year (Figures 4-5) but, there is no evidence of successful reproduction for several years.

Table 10. CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Lake Byron, Beadle County, 2006-2015.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CPUE		3.3		2.7		12.0		7.0	0.3	0.7
PSD		100		--		56		49	--	--
RSD-P		50		--		0		1	--	--
Mean Wr		99		--		104		111	--	--

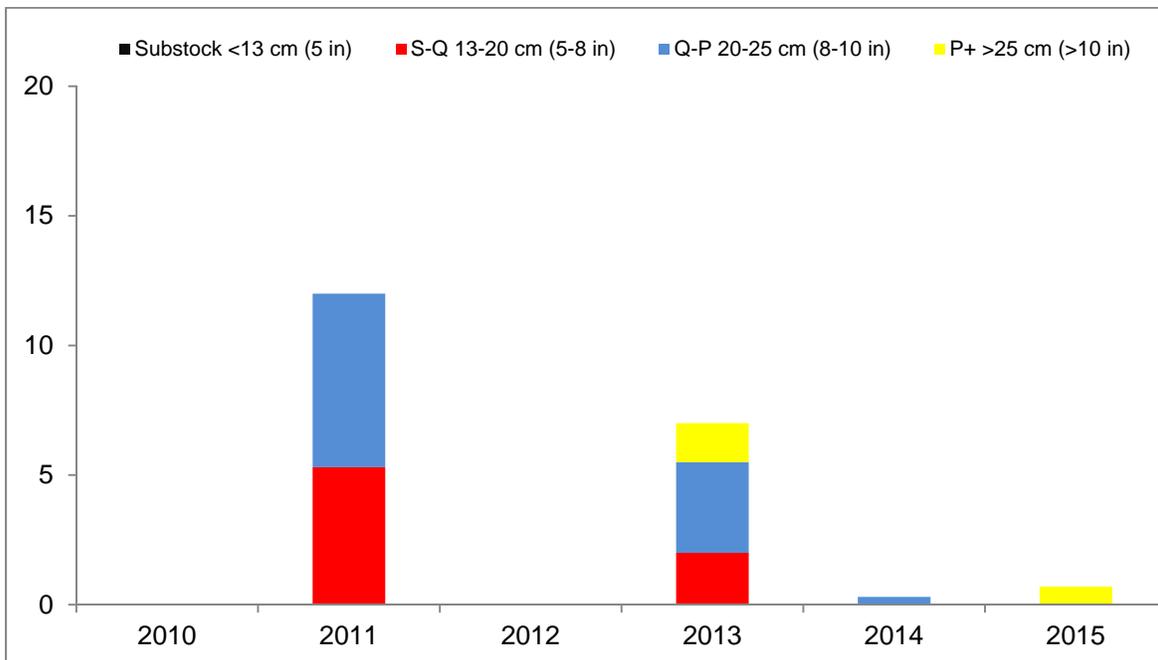


Figure 4. CPUE by length category for yellow perch sampled with gill nets in Lake Byron, Beadle County, 2010-2015.

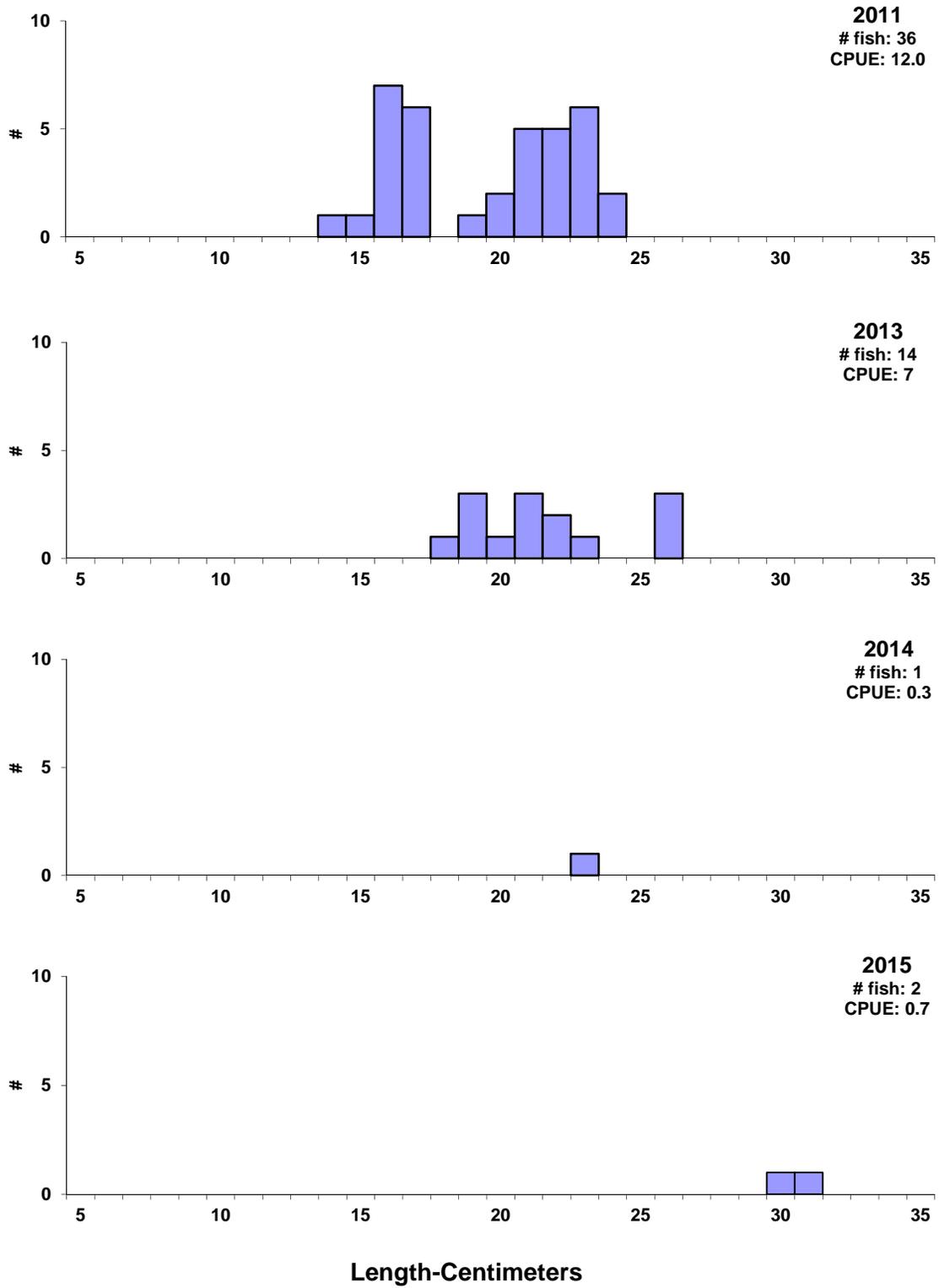


Figure 5. Length frequency histograms for yellow perch sampled with gill nets in Lake Byron, Beadle County, 2011, 2013, 2014, 2015.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.