

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Brant Lake, Lake County**  
**2102-F-21-R-47**  
**2014**



**Figure 1.** Brant Lake, Lake County

**Legal Description:** T105N- R51W-Sec. 3, 4, 9, 10

**Location from nearest town:** 2 miles north of Chester, SD

**Surface Area:** 1,037 acres

**Meandered (Y/N):** Yes

**OHWM elevation:** 1598.3

**Outlet elevation:** 1597.3

**Max. depth at outlet elevation:** 14 feet

**Observed water level:** Full

**Contour map available:** Yes

**Watershed area:** 7,658 acres

**Shoreline length:** 6.2 miles

**Date set:** December, 1981

**Date set:** February, 1987

**Mean depth at outlet elevation:** 9.5 feet

**Lake volume:** 11,000 acre feet

**Date mapped:** 2002

**DENR beneficial use classifications:** (4) warm water permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering

## Introduction

### General

Brant Lake is last in a chain of four natural lakes formed by receding glaciers at the end of the last ice age. It derived its name from the large number of white brant (snow geese) that occupy the area during the spring and fall migrations.

### Ownership of Lake and Adjacent Lakeshore Properties

Brant Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the South Dakota Department of Game, Fish and Parks (GFP) manages the fishery. GFP also owns and maintains access areas on the east, south, and west sides of the lake (Figure 1). The remainder of the shoreline property is privately owned.

### Fishing Access

The East Brant Access Area has a double lane boat ramp, boat dock, concrete vault toilet and large parking lot. The West Brant Access Area also has a double lane boat ramp, boat dock, concrete vault toilet, large parking lot and several shore fishing areas. The South Brant Access Area offers many shore fishing locations.

### Water Quality and Aquatic Habitat

Most of the water flowing into Brant comes from lakes Herman, Madison and Round, the upper three lakes in the chain. Outflows form the headwaters of Skunk Creek, which flows into the Big Sioux River in Sioux Falls.

Because it is the last lake in the chain, water quality and clarity in Brant is generally better than Round, Madison and Herman (Table 1). As a result, submerged aquatic vegetation is usually more abundant and emergent cattails are common in the west end bay. The lake also has a diversity of inflake habitat that includes an irregular, rocky shoreline, rocky points, and offshore humps (Figure 10).

**Table 1.** Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Brant Lake, Lake County, 2005-2014.

<b>Year</b>	<b>Water Temp °C (°F)</b>	<b>Secchi Depth cm (in)</b>	<b>Observations/Comments (algae, aquatic vegetation, water quality, etc.)</b>
2014	27 (81)	246 (97)	Floating leaf and sago pondweed
2013	26 (79)	127 (50)	Water was green with algae, some sago
2012	28 (82)	104 (41)	Sago pondweed
2011	29 (84)	33 (13)	Sago pondweed
2010	-- (--)	-- (--)	Sago pondweed
2009	23 (74)	183 (72)	Algae bloom, some sago
2008	27 (80)	99 (39)	Algae bloom, some sago
2007	27 (80)	122 (48)	
2006	26 (79)	107 (42)	Small amount of sago
2005	24 (75)	92 (36)	Sparse sago beds

## **Fish Community**

Brant Lake contains a fish community made up of many different species (Table 2).

**Table 2.** Fish species commonly found in Brant Lake, Lake County.

<b>Game Species</b>	<b>Other Species</b>
Walleye	Common Carp
Yellow Perch	White Sucker
Northern Pike	Bigmouth Buffalo
Black Crappie	Spottail Shiner
White Bass	
Bluegill	
Smallmouth Bass	
Channel Catfish	
Black Bullhead	

## **Fish Management**

Brant Lake is actively managed for walleye and yellow perch, but black crappie, bluegill, smallmouth bass, northern pike and white bass frequently provide additional fishing opportunity. Although three fish kills have been documented since 1999 (Table 3), they had no significant effects on game fish populations. Occasional stockings of yellow perch and walleye are made to maintain population abundance and fishing opportunity when natural reproduction is lacking (Table 4).

**Table 3.** Fish kill history for Brant Lake, Lake County.

<b>Year</b>	<b>Severity</b>	<b>Comments</b>
2007	Light	August – parasites, bacterial infection
2005	Moderate	July – bacterial infection
1999	Light	December – west end - stress

**Table 4.** Stocking history for Brant Lake, Lake County, 2005-2014.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
2005	385,950	Walleye	Fry
2006	104,910	Walleye	Small Fingerling
	3,582	Yellow Perch	Fingerling
2007	33,905	Yellow Perch	Fingerling
	4,000	Fathead Minnow	Adult
2008	103,540	Yellow Perch	Fingerling
2009	103,900	Walleye	Small Fingerling
	5,254,000	Yellow Perch	Fry
2013	102,660	Walleye	Small Fingerling
2014	103,602	Walleye	Small Fingerling
	499,000	Yellow Perch	Small Fingerling

## Methods

Brant Lake was sampled on July 22-23, 2014 with five overnight gill-net sets and 12 overnight trap-net sets. 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. The trap nets are constructed with 19-mm-bar-mesh ( $\frac{3}{4}$  in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. Brant was also electrofished for two hours the night of September 2, 2014 to evaluate walleye recruitment.

## Results and Discussion

### Net Catch Results

Overall, only a few more game fish were sampled in 2014 versus 2013 (Table 9). Black bullheads comprised the majority of gill net and trap net samples (Tables 5, 7).

**Table 5.** Total catch from five overnight gill nets set in Brant Lake, Lake County, July 22-23, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i> <sup>1</sup>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	138	52.5	27.6	<u>+12.2</u>	12.3	98	17	--
Yellow Perch	42	16.0	8.4	<u>+2.5</u>	17.1	19	5	107
White Sucker	34	12.9	6.8	<u>+1.7</u>	5.9	74	71	--
Walleye	20	7.6	4.0	<u>+0.9</u>	12.1	35	10	89
Northern Pike	9	3.4	1.8	<u>+0.6</u>	2.4	--	--	--
Smallmouth Bass	6	2.3	1.2	<u>+0.7</u>	4.7	--	--	--
Bigmouth Buffalo	5	1.9	1.0	<u>+0.7</u>	3.8	--	--	--
White Bass	5	1.9	1.0	<u>+0.6</u>	3.2	--	--	--
Common Carp	2	0.8	0.4	<u>+0.3</u>	0.9	--	--	--
Bluegill	1	0.4	0.2	<u>+0.3</u>	0.5	--	--	--
Spottail Shiner	1	0.4	0.2	<u>+0.3</u>	0.4	--	--	--

\*10 years (2005-2014)

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

**Table 6.** CPUE by length category for selected species sampled with gill nets in Brant Lake, Lake County, July 22-23, 2014.

<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>
Black Bullhead	--	27.6	0.6	22.2	4.8	27.6	+12.2
Yellow Perch	--	8.4	6.8	1.2	0.4	8.4	+2.5
White Sucker	--	6.8	1.8	0.2	4.8	6.8	+1.7
Walleye	--	4.0	2.6	--	1.4	4.0	+0.9
Northern Pike	--	1.8	0.2	0.6	1.0	1.8	+0.6
Smallmouth Bass	--	1.2	0.6	0.2	0.4	1.2	+0.7
Bigmouth Buffalo	--	1.0	0.4	0.6	--	1.0	+0.7
White Bass	--	1.0	--	--	1.0	1.0	+0.6
Common Carp	--	0.4	0.2	--	0.2	0.4	+0.3
Bluegill	--	0.2	0.2	--	--	0.2	+0.3
Spottail Shiner*	--	--	--	--	--	0.2	+0.3

\*No length categories established. Length categories can be found in Appendix A.

**Table 7.** Total catch from 12 overnight trap nets set in Brant Lake, Lake County, July 22-23, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	583	81.9	48.6	+9.9	50.3	97	57	--
White Sucker	28	3.9	2.3	+0.7	6.4	100	96	--
Northern Pike	24	3.4	2.0	+0.6	2.5	91	13	98
White Bass	21	2.9	1.8	+0.7	1.2	100	100	91
Black Crappie	18	2.5	1.5	+0.7	5.8	100	100	102
Smallmouth Bass	18	2.5	1.5	+1.0	9.1	82	24	103
Common Carp	8	1.1	0.7	+0.3	3.4	--	--	--
Bigmouth Buffalo	4	0.6	0.3	+0.2	5.1	--	--	--
Bluegill	2	0.3	0.2	+0.2	3.8	--	--	--
Hybrid Sunfish	2	0.3	0.2	+0.1	0.0	--	--	--
Walleye	2	0.3	0.2	+0.1	1.1	--	--	--
Channel Catfish	1	0.1	0.1	+0.1	0.4	--	--	--
Yellow Perch	1	0.1	0.1	+0.1	1.8	--	--	--

\*10 years (2005-2014)

**Table 8.** CPUE by length category for selected species sampled with trap nets in Brant Lake, Lake County, July 22-23, 2014.

<b>Species</b>	<b>Substock</b>	<b>Stock</b>	<b>S-Q</b>	<b>Q-P</b>	<b>P+</b>	<b>All sizes</b>	<b>80% C.I.</b>
Black Bullhead	--	48.6	1.3	19.4	27.9	48.6	+9.9
White Sucker	--	2.3	--	0.1	2.2	2.3	+0.7
Northern Pike	--	2.0	0.2	1.5	0.3	2.0	+0.6
White Bass	--	1.8	--	--	1.8	1.8	+0.7
Black Crappie	--	1.5	--	--	1.5	1.5	+0.7
Smallmouth Bass	0.1	1.4	0.3	0.8	0.4	1.5	+1.0
Common Carp	--	0.7	0.2	0.3	0.2	0.7	+0.3
Bigmouth Buffalo	--	0.3	--	0.1	0.2	0.3	+0.2
Bluegill	--	0.2	--	--	0.2	0.2	+0.2
Hybrid Sunfish*	--	--	--	--	--	0.2	+0.1
Walleye	--	0.2	--	0.1	0.1	0.2	+0.1
Channel Catfish	--	0.1	0.1	--	--	0.1	+0.1
Yellow Perch	--	0.1	0.1	--	--	0.1	+0.1

\*No length categories established. Length categories can be found in Appendix A.

**Table 9.** Gill-net (GN) and trap-net (TN) CPUE for selected fish species sampled in Brant Lake, Lake County, 2005-2014.

<b>Species</b>	<b>Gear</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Bigmouth Buffalo	GN	3.3	19.3	3.5	1.0	4.0	4.4	--	0.8	0.3	1.0
	TN	0.3	22.0	3.0	7.8	6.5	4.4	4.5	1.9	0.7	0.3
Black Bullhead	GN	9.0	12.5	2.0	4.5	4.8	5.0	9.7	23.8	24.3	27.6
	TN	9.1	27.0	4.8	11.9	10.4	4.8	15.4	330.3	41.1	48.6
Black Crappie	GN	5.3	2.0	0.5	1.8	1.0	0.4	--	2.5	--	--
	TN	8.8	9.8	5.8	7.6	5.8	5.2	4.8	5.9	2.4	1.5
Bluegill	GN	0.3	1.3	0.8	1.3	0.2	0.2	--	0.3	--	0.2
	TN	6.8	6.9	4.6	9.4	1.9	3.2	2.7	1.3	0.7	0.2
Channel Catfish	GN	2.0	--	--	0.2	0.2	--	--	0.3	1.3	--
	TN	0.3	0.5	1.1	0.3	--	0.2	--	1.5	0.2	0.1
Common Carp	GN	2.5	0.3	2.5	1.0	0.2	1.2	--	0.5	0.7	0.4
	TN	4.8	3.5	6.2	3.4	2.6	3.7	1.2	7.1	0.3	0.7
Northern Pike	GN	0.3	0.8	1.3	1.0	0.2	1.8	13.0	1.8	1.7	1.8
	TN	--	0.7	0.9	2.0	0.7	5.0	3.1	5.9	1.8	2.0
Smallmouth Bass	GN	3.5	16.3	8.5	2.2	0.2	4.2	3.7	4.8	2.7	1.2
	TN	2.6	51.5	17.4	4.3	1.9	2.0	4.8	3.2	1.5	1.5
Spottail Shiner	GN	--	0.8	--	0.8	0.4	2.2	--	--	--	0.2
	TN	--	--	--	--	--	--	--	--	--	--
Walleye	GN	8.5	12.5	20.0	9.2	7.4	10.8	35.0	12.5	1.3	4.0
	TN	1.1	1.6	0.8	0.9	0.5	2.8	1.3	1.3	0.1	0.2
White Bass	GN	0.5	--	0.3	10.5	7.4	0.8	2.7	7.3	1.0	1.0
	TN	--	--	--	1.6	0.3	0.9	0.2	3.8	3.0	1.8
White Sucker	GN	8.5	8.8	5.5	4.2	3.4	7.2	6.0	6.0	2.7	6.8
	TN	45.1	7.1	0.8	0.2	1.5	3.9	0.6	1.5	0.9	2.3
Yellow Perch	GN	28.3	18.0	4.0	15.0	12.4	35.4	16.3	32.8	--	8.4
	TN	0.2	0.7	0.2	0.3	0.5	5.0	8.5	2.2	--	0.1

## Walleye

### Management Objective

- Maintain a walleye population with a total gill-net CPUE of at least 20.

### Management Strategy

- Stock small walleye fingerlings at the rate of 100/acre (103,700) as needed to achieve the management objective.

Walleye gill-net CPUE increased slightly in 2014 (Table 10), but remains far below the management objective. A moderately-strong year class was produced in 2014 and 85% of age-0 fish examined (Table 12) originated from the small fingerling stocking (Table 11). Although no age-1 walleyes were sampled by electrofishing, there were some sampled in the gill nets (Figures 2, 3). Walleye fishing opportunity will be limited until additional year classes are produced and recruit to the population.

**Table 10.** CPUE, PSD, RSD-P, and mean Wr for all walleyes sampled with gill nets in Brant Lake, Lake County, 2005-2014. Stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	8.5	12.5	20.0	9.2	7.4	10.8	35.0	12.5	1.3	4.0
<b>PSD</b>	59	44	28	16	13	15	37	11	--	35
<b>RSD-P</b>	0	5	13	7	6	3	1	4	--	10
<b>Mean Wr</b>	84	85	86	83	81	87	86	90	--	89

**Table 11.** Walleyes stocked into Brant Lake, Lake County, 2005-2014.

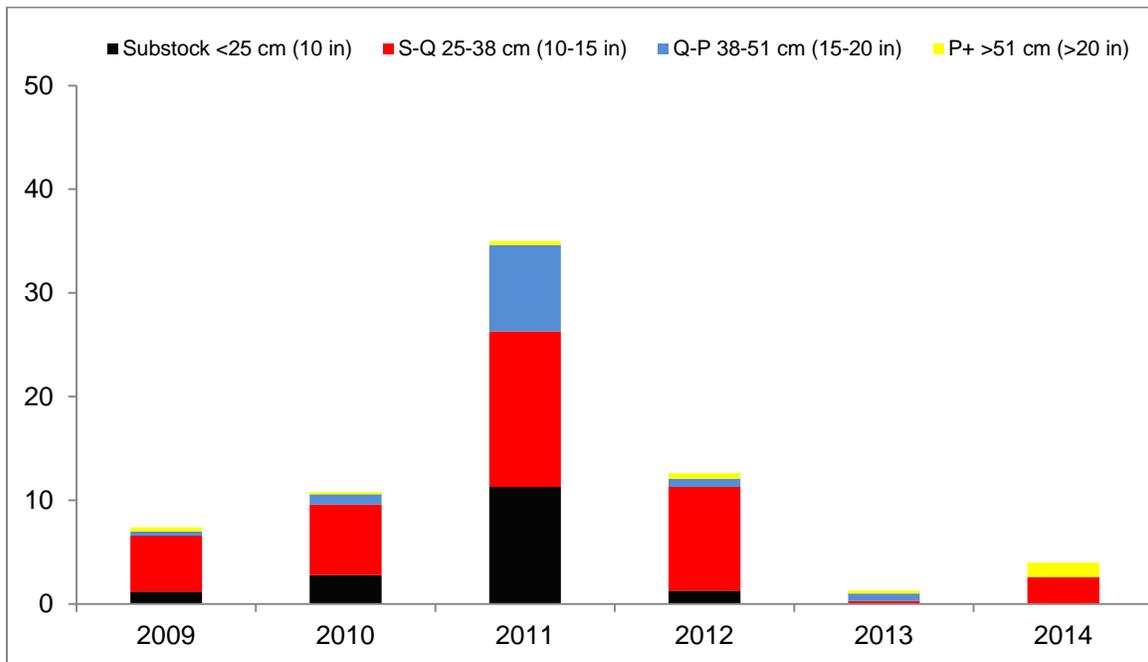
Year	Number	Size
2005	385,950	Fry
2006	104,910	Small Fingerling
2009	103,900	Small Fingerling
2013	102,660	Small Fingerling
2014	103,602	Small Fingerling

**Table 12.** Age-0 and age-1 walleyes sampled with nighttime electrofishing on Brant Lake, Lake County, 2005-2014.

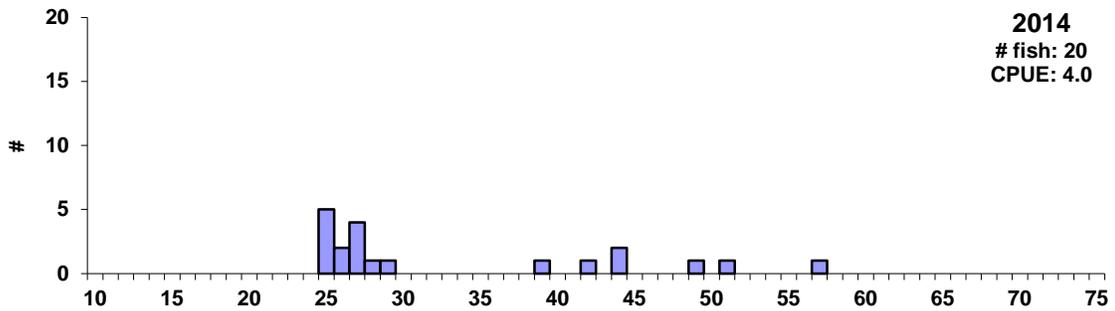
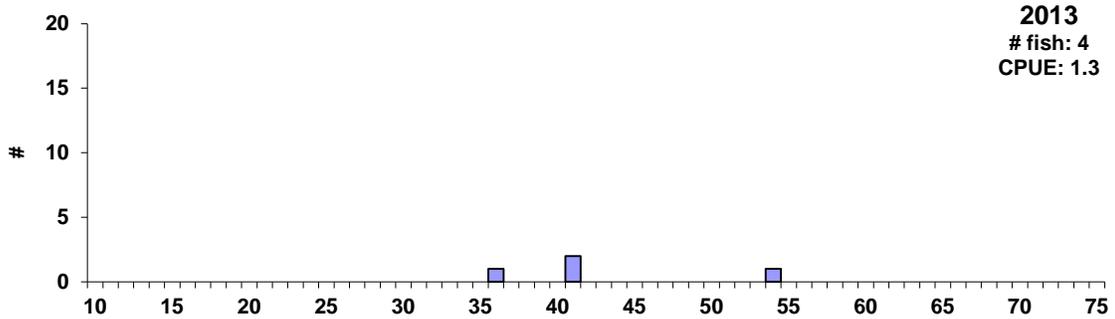
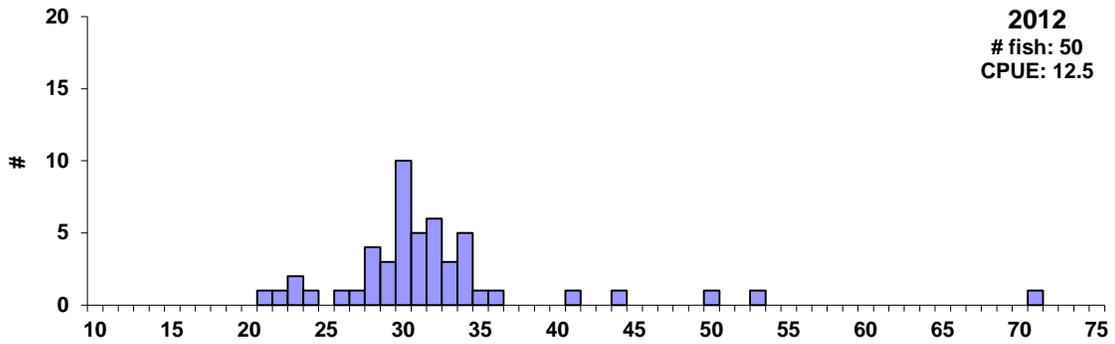
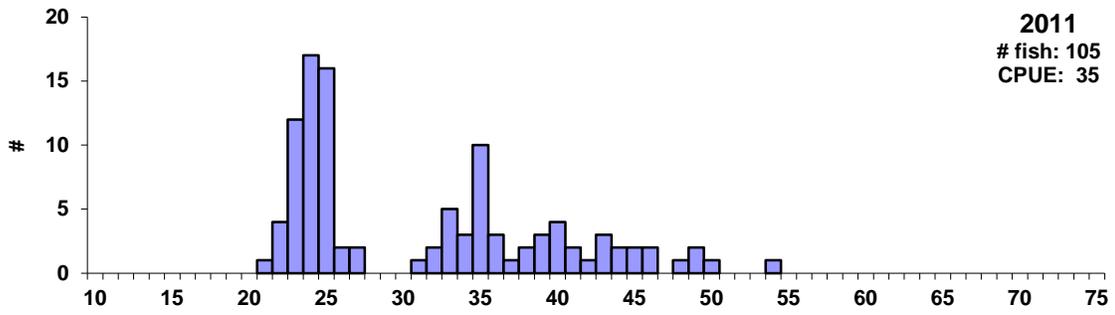
Year	Stocking	Age-0 CPH	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	Mean length (range; mm)	Wr
2014	fingerling	86	85	157 (135-192)	81	0		
2013	fingerling	27	58	170 (134 -203)	89	0		
2012	none	3		175 (163-185)	85	8	257 (227-270)	72
2011	none	7		145 (133-151)	84	92	268 (212-312)	85
2010	none	133	100	208 (171-236)	92			
2009	fingerling	111	84	151 (129-170)	87	11	274 (234-300)	86
2008	none	3		165 (152-186)	82	39	264 (228-297)	86
2007	none	40		188 (156-212)	93	9	290 (252-310)	89
2006	fingerling	124	73	170 (136-188)	90	11	290 (255-324)	88
2005	fry	62	45	174 (138-209)	94	0	-- --	--

**Table 13.** Weighted mean length at capture (mm) for walleyes sampled with gill nets in Brant Lake, Lake County, 2005-2014. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	Age-1	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10	Age-11
2014	266 (20)	293 (1)	398 (1)	465 (5)	578 (1)	--	--	--	--	--	--
2013	-- (4)	--	396 (3)	541 (1)	--	--	--	--	--	--	--
2012	236 (50)	314 (39)	419 (1)	474 (2)	539 (1)	--	--	--	--	--	718 (1)
2011	245 (105)	359 (32)	426 (8)	468 (11)	--	--	--	--	--	--	--
2010	249 (53)	334 (25)	372 (15)	--	--	--	--	586 (1)	--	--	--
2009	220 (37)	301 (6)	389 (25)	--	--	572 (1)	--	--	--	727 (1)	--
2008	243 (55)	332 (18)	419 (30)	--	--	--	535 (1)	--	644 (2)	--	485 (1)
2007	241 (80)	343 (40)	379 (25)	453 (3)	478 (3)	545 (1)	611 (3)	686 (2)	--	--	--
2006	258 (50)	257 (26)	394 (2)	417 (6)	442 (7)	478 (6)	478 (1)	500 (1)	--	692 (1)	--
2005	-- (34)	363 (12)	391 (10)	415 (12)	--	--	--	--	--	--	--



**Figure 2.** CPUE by length category for walleye sampled with gill nets in Brant Lake, Lake County, 2009-2014.



**Length-Centimeters**

**Figure 3.** Length frequency histograms for walleye sampled with gill nets in Brant Lake, Lake County, 2011-2014.

## Yellow Perch

### Management Objective

- Maintain a yellow perch population with a total gill-net CPUE of at least 30.

### Management Strategy

- Stock small yellow perch fingerlings at the rate of 500/acre (518,500) as needed to achieve the management objective. Mark the stocked fish with OTC to allow evaluation of stocking success.

Yellow perch abundance increased slightly in 2014 (Table 14) but remains far below the management objective. OTC marks were identified on 70% of age-0 yellow perch examined. Since 75% of the stocked small fingerlings (Table 15) were marked, this indicates a 93% stocking contribution to the 2014 year class. If this year class survives the winter and recruits to the population, yellow perch fishing opportunity should be much better by late 2015.

**Table 14.** CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Brant Lake, Lake County, 2005-2014. Stocked years are shaded.

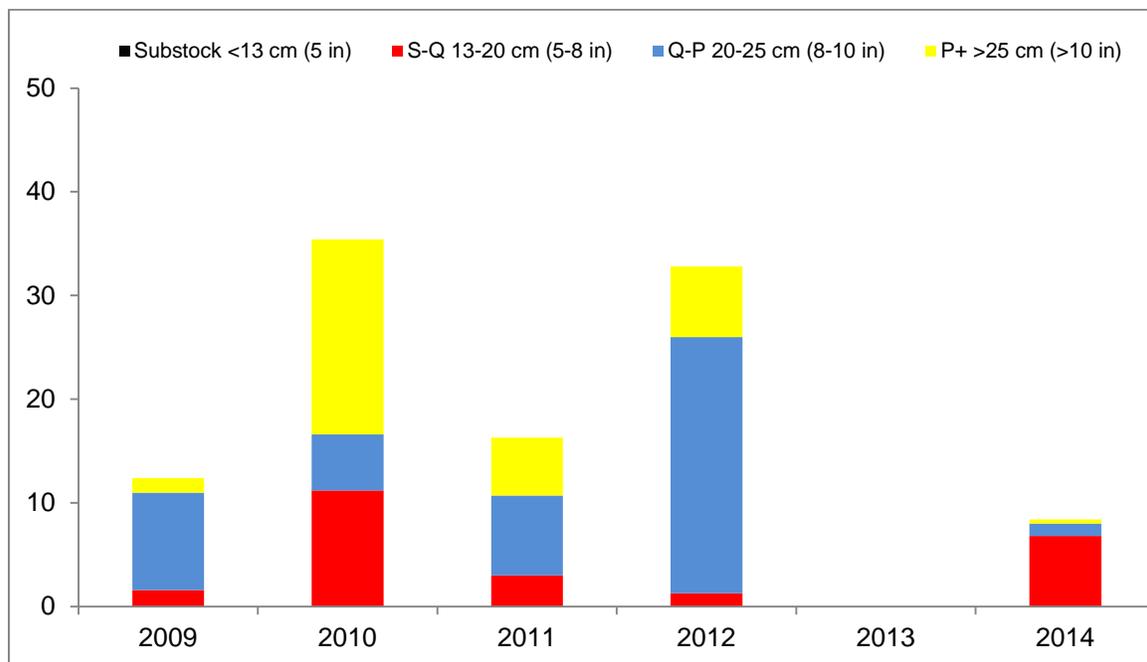
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	28.3	18.0	4.0	15.0	12.4	35.4	16.3	32.8	0.0	8.4
<b>PSD</b>	63	60	56	47	87	68	82	96	--	19
<b>RSD-P</b>	53	39	13	34	11	53	35	21	--	5
<b>Mean Wr</b>	102	103	104	104	103	95	102	96	--	107

**Table 15.** Yellow perch stocked into Brant Lake, Lake County, 2005-2014.

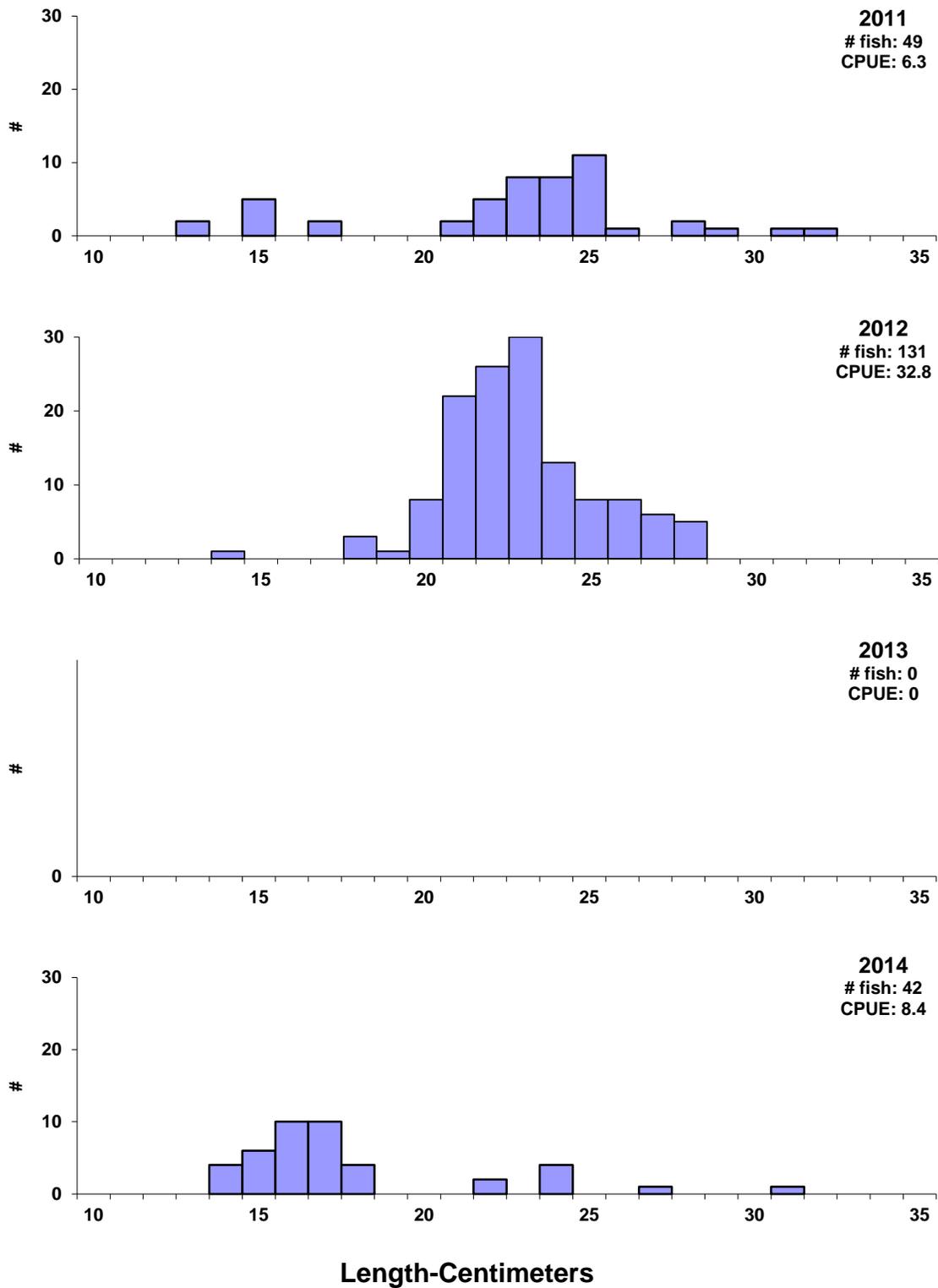
<b>Year</b>	<b>Number</b>	<b>Size</b>
2006	3,582	Fingerling
2007	33,905	Fingerling
2008	103,540	Fingerling
2009	5,254,000	Fry
2014	499,000	Fingerling

**Table 16.** Weighted mean length at capture (mm) for yellow perch sampled with gill nets in Brant Lake, Lake County, 2005-2014. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	Age-1	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10
2014	165 (42)	236 (5)	260 (2)	313 (1)	--	--				
2013	--	--	--	--	--	--				
2012	173 (131)	226 (106)	271 (22)	--	--	--				
2011	155 (49)	241 (32)	261 (5)	308 (2)	318 (1)	--				
2010	158 (177)	230 (56)	265 (21)	311 (94)	307 (2)	--				
2009	161 (61)	220 (2)	270 (53)	303 (3)	--	--				
2008	150 (90)	228 (45)	276 (16)	240 (27)	--	--				
2007	167 (16)	199 (4)	248 (6)	--	--	--				
2006	180 (72)	238 (32)	259 (10)	262 (7)	291 (1)	295 (18)	295 (4)			
2005	164 (107)	239 (38)	243 (9)	276 (3)	280 (42)	--				



**Figure 4.** CPUE by length category for yellow perch sampled with gill nets in Brant Lake, Lake County, 2009-2014.



**Figure 5.** Length frequency histograms for yellow perch sampled in gill nets in Brant Lake, Lake County, 2011-2014.

## Smallmouth Bass

### Management Objective

- none

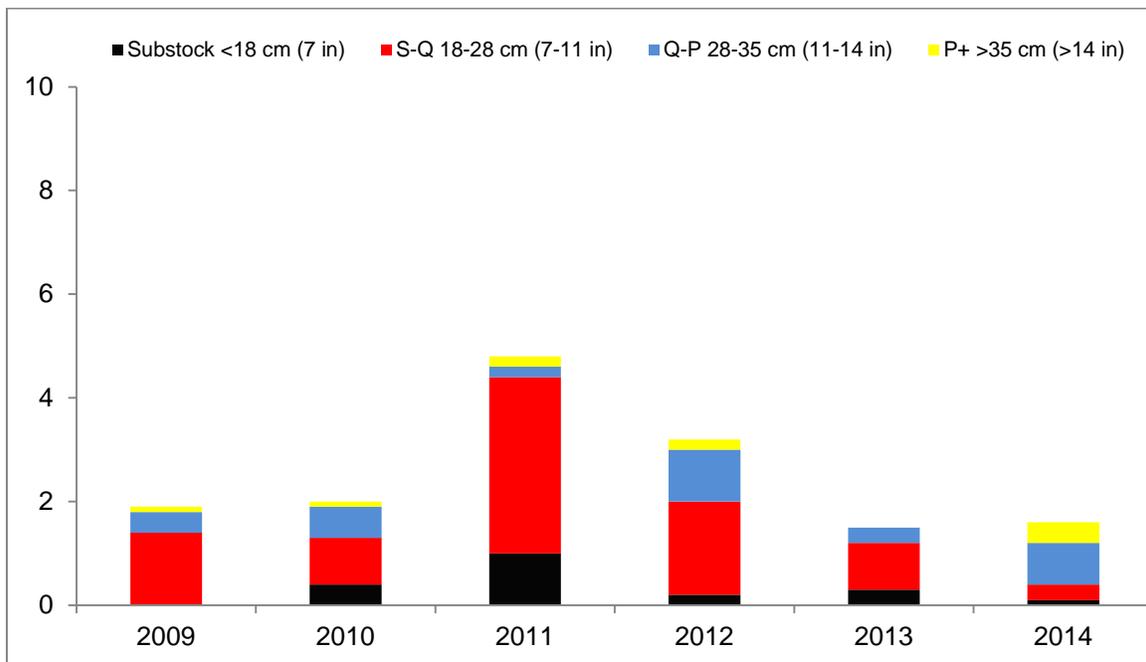
### Management Strategy

- monitor the population during annual lake surveys

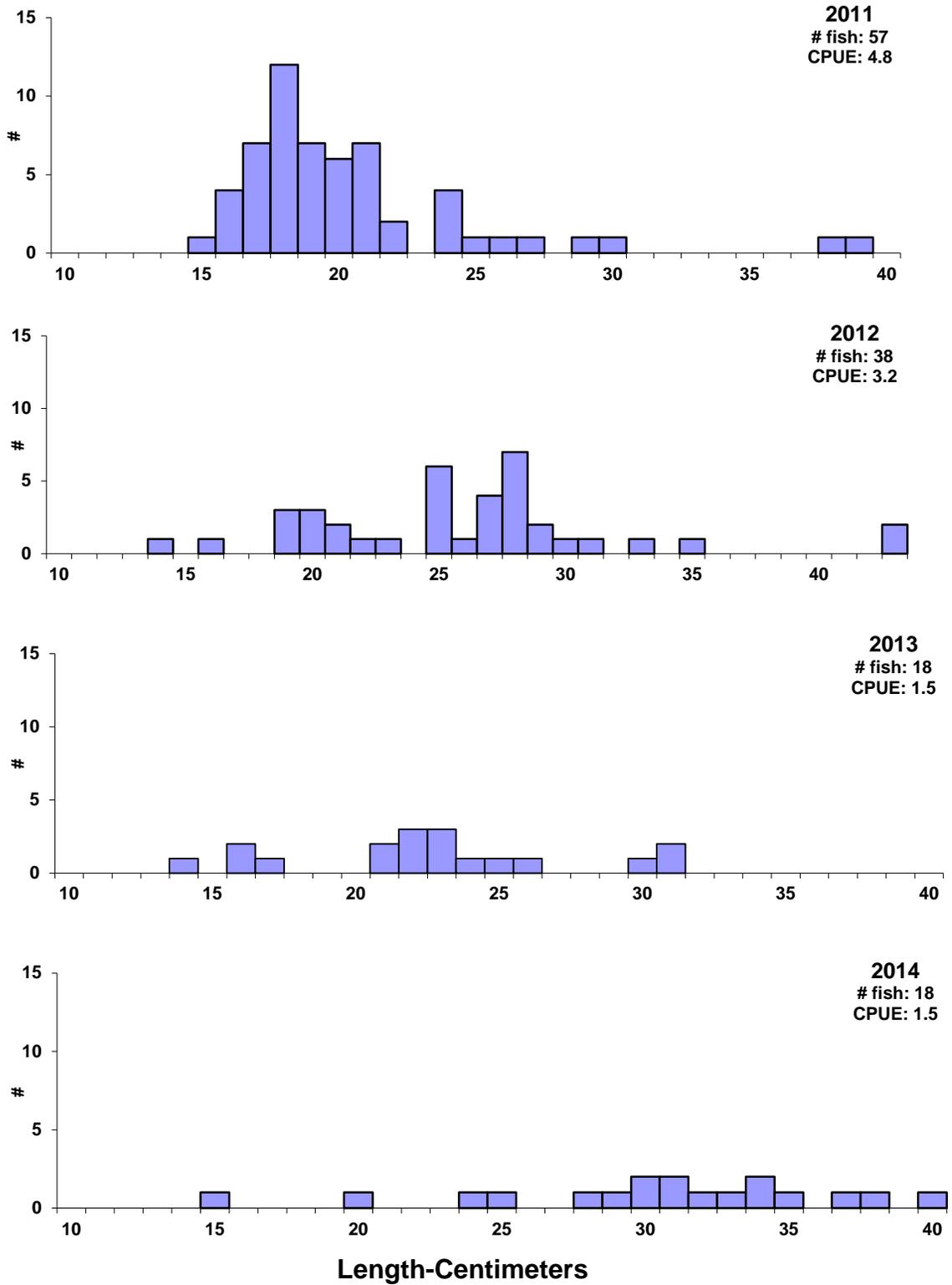
Although trap-net CPUE was unchanged from 2013 (Table 17), PSD and RSD-P values increased significantly indicating a general increase in the size structure of the population. Figures 6 and 7 also illustrate the increase in size structure.

**Table 17.** CPUE, PSD, RSD-P, and mean Wr for all smallmouth bass sampled with trap nets in Brant Lake, Lake County, 2005-2014. Stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	2.6	51.5	17.4	4.3	1.9	2.0	4.8	3.2	1.5	1.5
<b>PSD</b>	42	10	10	39	26	42	9	42	21	82
<b>RSD-P</b>	17	5	3	4	4	5	4	8	0	24
<b>Mean Wr</b>	102	93	98	85	88	94	99	91	99	103



**Figure 6.** CPUE by length category for smallmouth bass sampled with trap nets in Brant Lake, Lake County, 2009-2014.



**Figure 7.** Length frequency histograms for smallmouth bass sampled with trap nets from Brant Lake, Lake County, 2011-2014.

## **Black Crappie**

### **Management Objective**

- none

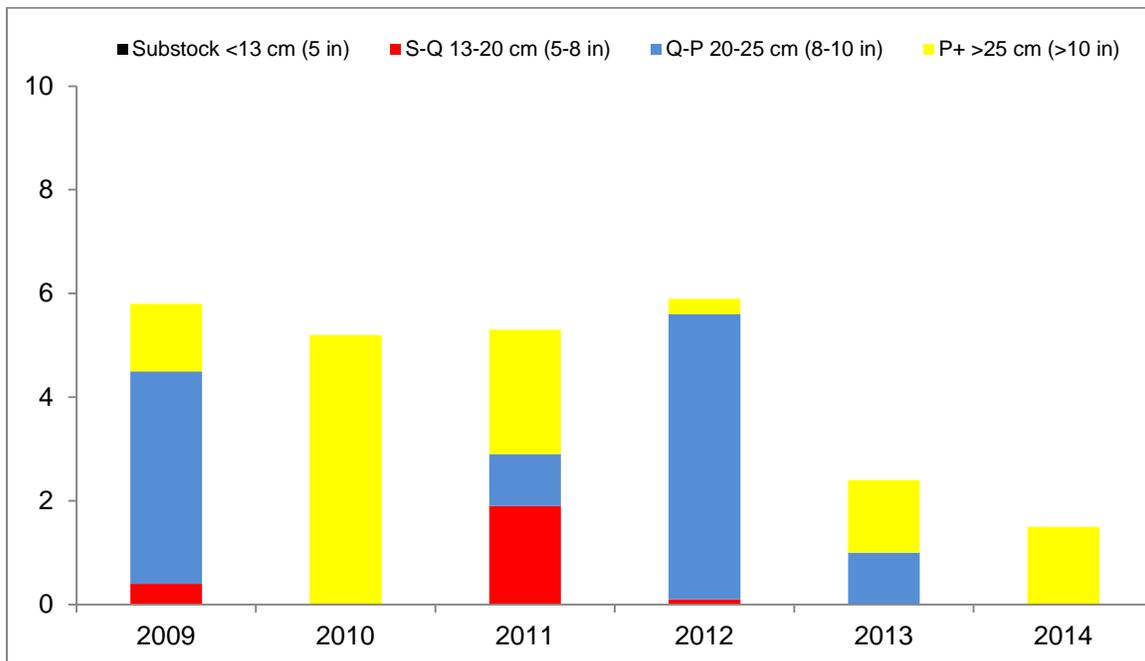
### **Management Strategy**

- monitor the population during annual lake surveys

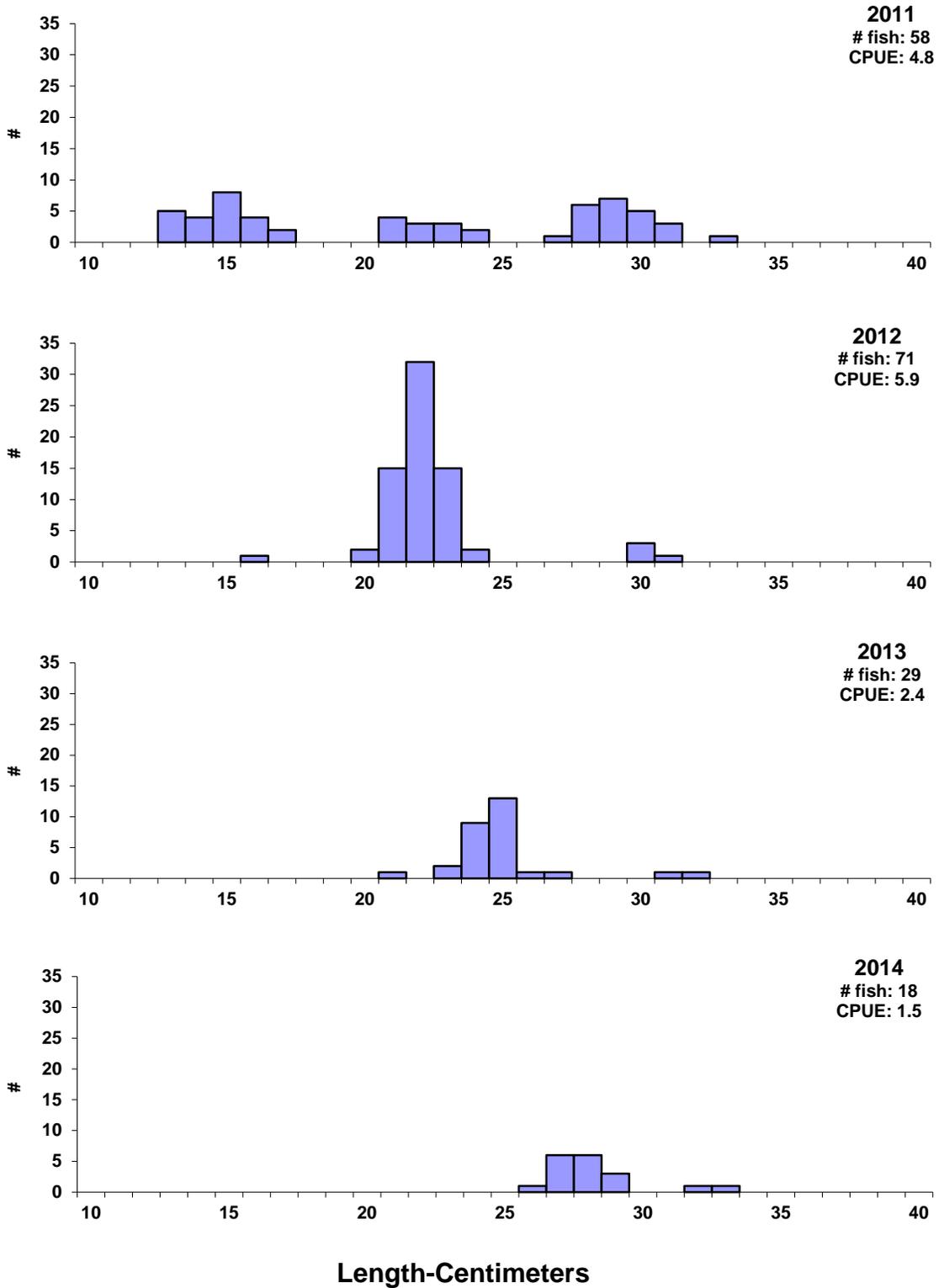
Black crappie trap-net CPUE continued to decline in 2014 (Table 18). Population size structure indices (Table 18), CPUE by length category (Figure 8) and length frequency histograms (Figure 9) all indicate an aging population with no significant recruitment of a new year class for several years. However, field staff working on Brant in September 2014 reported catching large numbers of age-0 crappies as bycatch to age-0 yellow perch sampling. If this year class survives the winter and recruits to the population, there should be a large increase in trap-net CPUE in 2015.

**Table 18.** CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Brant Lake, Lake County, 2005-2014.

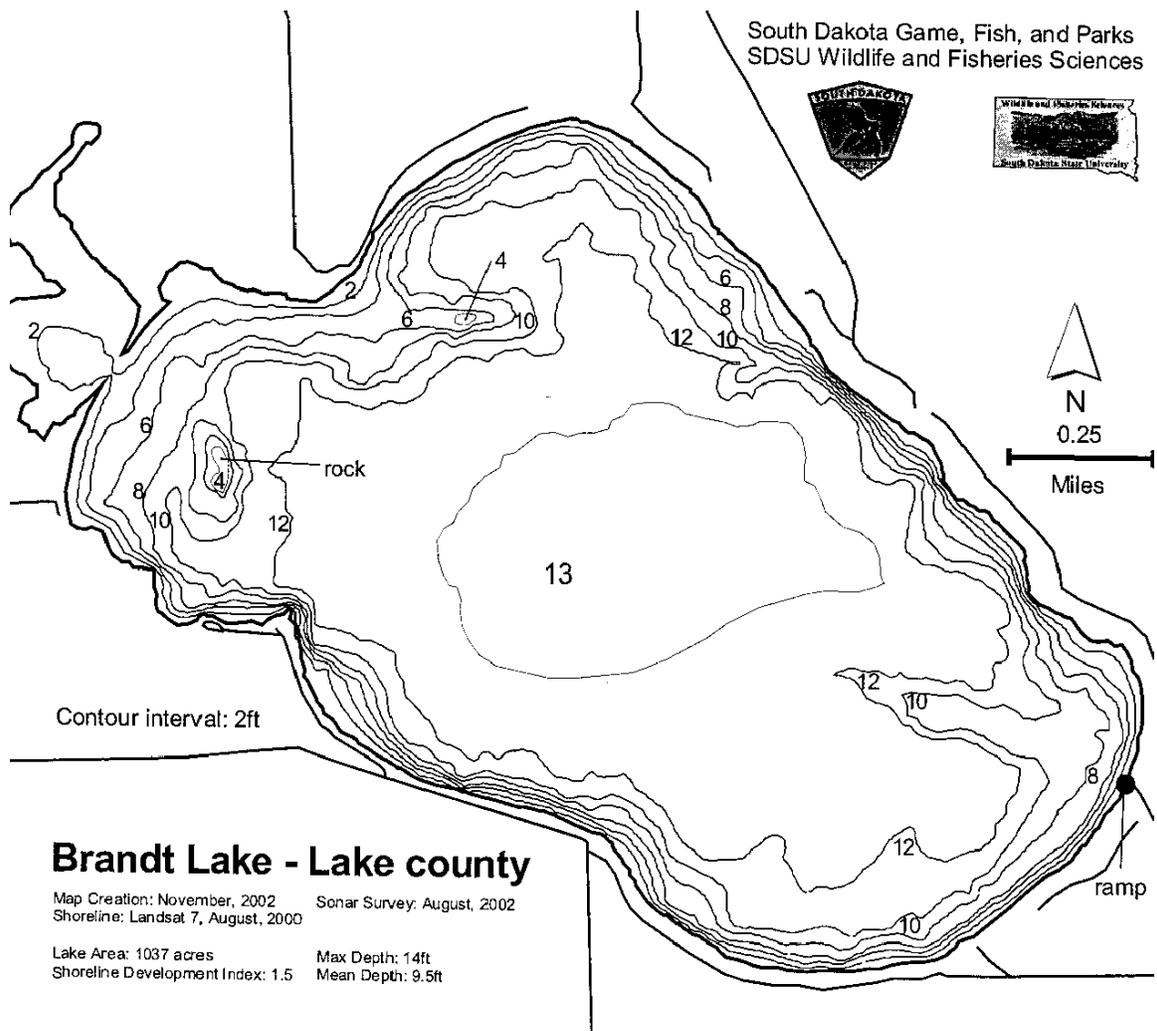
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	8.8	9.8	5.8	7.6	5.8	5.1	4.8	5.9	2.4	1.5
<b>PSD</b>	35	76	94	89	93	100	60	99	100	100
<b>RSD-P</b>	26	32	21	40	22	100	40	6	59	100
<b>Mean Wr</b>	116	110	109	104	105	102	106	108	101	102



**Figure 8.** CPUE by length category for black crappies sampled with trap nets in Brant Lake, Lake County, 2009-2014.



**Figure 9.** Length frequency histograms for black crappies sampled with trap nets in Brant Lake, Lake County, 2011-2014.



**Figure 10.** Contour map of Brant Lake, Lake County.

**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).

<b>Species</b>	<b>Stock</b>	<b>Quality</b>	<b>Preferred</b>	<b>Memorable</b>	<b>Trophy</b>
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.