

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-45

Name: Wall Lake

County: Minnehaha

Legal Description: T101N-R51W-Sec. 21 & 28

Location from nearest town: 6 miles south and 1/2 mile west of Hartford, SD

Dates of present survey: June 25-27, 2012

Date last surveyed: June 21-23, 2010

Game Species	Other Species
Walleye	White Sucker
Black Crappie	Common Carp
Yellow Perch	Bigmouth Buffalo
Channel Catfish	
Black Bullhead	
Northern Pike	
Pumpkinseed Sunfish	
Bluegill	
Sunfish Hybrids	

PHYSICAL DATA

Surface Area: 207 acres

Maximum depth: 24 feet

Volume: 1,785 acre-feet

Contour map available: Yes

OHWM elevation: 1559.5

Outlet elevation: 1559.0

Lake elevation observed during the survey: Full

Beneficial use classifications: (5) warmwater semi-permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation and (9) wildlife propagation and stock watering.

Watershed area: 1,118 acres

Mean depth: 11.5 feet

Shoreline length: 2.5 miles

Date mapped: 1994

Date set: April, 1983

Date set: April, 1983

Ownership of Lake and Adjacent Lakeshore Properties:

Wall 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. The entire shoreline is privately owned with the exception of the Wall Lake Access Area on the southwest corner of the lake and a public swimming beach managed by Minnehaha County on the south shore.

Fishing Access:

The Wall Lake Access Area has a double lane boat ramp, boat dock, public toilet, handicapped-accessible fishing pier and excellent shore fishing access.

Field Observations of Water Quality and Aquatic Vegetation:

The Secchi depth measurement was 82 cm (32 in) during the survey. No aquatic vegetation observations were recorded.

BIOLOGICAL DATA

Methods:

Wall Lake was sampled on June 25-27, 2012 with three overnight gill net sets and ten overnight trap net sets. 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. 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. Sampling locations are displayed in Figure 5.

Results and Discussion:

Gill Net Catch

Black bullhead and channel catfish were the most abundant of the eleven species sampled in the gill nets this year (Table 1). Except for a few catfish, all fish sampled were stock length or larger (Table 2).

Table 1. Total catch from three overnight gill net sets at Wall Lake, Minnehaha County, June 25-27, 2012.

Species	Number	Percent	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	168	49.0	56.0	<u>+30.8</u>	44.8	7	0	92
Channel Catfish	112	32.7	37.3	<u>+6.7</u>	14.0	5	1	86
Common Carp	29	8.5	9.7	<u>+4.7</u>	1.8	14	3	95
Walleye	10	2.9	3.3	<u>+1.1</u>	13.4	0	0	73
Yellow Perch	10	2.9	3.3	<u>+2.3</u>	23.7	90	0	95
Northern Pike	4	1.2	1.3	<u>+0.4</u>	1.1	--	--	--
White Sucker	4	1.2	1.3	<u>+0.9</u>	2.4	--	--	--
Bluegill	2	0.6	0.7	<u>+0.9</u>	1.9	--	--	--
Hybrid Sunfish	2	0.6	0.7	<u>+0.4</u>	0.0	--	--	--
Black Crappie	1	0.3	0.3	<u>+0.4</u>	19.3	--	--	--
Pumpkinseed	1	0.3	0.3	<u>+0.4</u>	3.0	--	--	--

* 5 years (2002, 2004, 2006, 2008, 2010)

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

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in Wall Lake June 25-27, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	--	56.0	52.0	4.0	--	56.0	<u>+30.8</u>
Channel Catfish	0.3	37.0	35.0	1.7	0.3	37.3	<u>+6.7</u>
Common Carp	--	9.7	8.3	1.0	0.3	9.7	<u>+4.7</u>
Walleye	--	3.3	3.3	--	--	3.3	<u>+1.1</u>
Yellow Perch	--	3.3	0.3	3.0	--	3.3	<u>+2.3</u>
Northern Pike	--	1.3	0.3	1.0	--	1.3	<u>+0.4</u>
White Sucker	--	1.3	--	--	1.3	1.3	<u>+0.9</u>
Bluegill	--	0.7	--	--	0.7	0.7	<u>+0.9</u>
Hybrid Sunfish*	--	--	--	--	--	0.7	<u>+0.4</u>
Black Crappie	--	0.3	--	0.3	--	0.3	<u>+0.4</u>
Pumpkinseed	--	0.3	--	0.3	--	0.3	<u>+0.4</u>

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

Trap Net Catch

Thirteen different species were sampled in the gill nets in 2012 (Table 3). Bluegills and black bullheads comprised 82.6% of the total catch. All fish sampled were stock length or longer except for common carp (Table 4).

Table 3. Total catch from ten overnight trap net sets at Wall Lake, Minnehaha County, June 25-27, 2012.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Bluegill	1,159	46.6	115.9	<u>+37.1</u>	31.9	100	7	104
Black Bullhead	895	36.0	89.5	<u>+46.9</u>	89.1	28	1	93
Black Crappie	142	5.7	14.2	<u>+4.3</u>	40.3	99	0	96
Hybrid Sunfish	95	3.8	9.5	<u>+6.9</u>	0.8	--	--	--
Common Carp	81	3.3	8.1	<u>+634</u>	7.0	4	0	106
Pumpkinseed	41	1.6	4.1	<u>+3.0</u>	12.1	76	0	102
Channel Catfish	16	0.6	1.6	<u>+0.7</u>	2.0	38	0	90
Yellow Bullhead	13	0.5	1.3	<u>+1.0</u>	0.5	100	23	101
Green Sunfish	12	0.5	1.2	<u>+0.7</u>	0.3	58	0	103
Walleye	12	0.5	1.2	<u>+0.7</u>	0.3	17	0	76
O. S. Sunfish	9	0.4	0.9	<u>+0.6</u>	0.0	--	--	--
Bigmouth Buffalo	7	0.3	0.7	<u>+0.6</u>	1.8	--	--	--
Northern Pike	5	0.2	0.5	<u>+0.3</u>	0.1	--	--	--

* 5 years (2002, 2004, 2006, 2008, 2010)

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Wall Lake June 25-27, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Bluegill	--	115.9	--	107.8	8.1	115.9	+37.1
Black Bullhead	--	89.5	64.6	24.0	0.9	89.5	+46.9
Black Crappie	--	14.2	0.2	14.0	--	14.2	+4.3
Hybrid Sunfish*	--	--	--	--	--	9.5	+6.9
Common Carp	0.7	7.4	7.1	0.3	--	8.1	+634
Pumpkinseed	--	4.1	1.0	3.1	--	4.1	+3.0
Channel Catfish	--	1.6	1.0	0.6	--	1.6	+0.7
Yellow Bullhead	--	1.3	--	1.0	0.3	1.3	+1.0
Green Sunfish	--	1.2	0.5	0.7	--	1.2	+0.7
Walleye	--	1.2	1.0	0.2	--	1.2	+0.7
O. S. Sunfish*	--	--	--	--	--	0.9	+0.6
Bigmouth Buffalo	--	0.7	--	0.5	0.2	0.7	+0.6
Northern Pike	--	0.5	--	0.5	--	0.5	+0.3

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

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 15.

Walleye gill-net CPUE continues to decline and remains well below the management objective (Table 5). All sampled fish ranged in length from 29-33 cm (11 – 13 in) (Figure 1). Stockings in 2010 and 2011 have not been successful in restoring walleye abundance following the 2010 summer fish kill.

Table 5. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Wall Lake, Minnehaha County, 2004-2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	7.0		33.5		10.3		9.3		3.3	13.4
PSD	0		61		97		43		0	53
RSD-P	0		2		13		39		0	14
Mean Wr	83		93		99		82		73	90

* 5 years (2002, 2004, 2006, 2008, 2010)

Black Crappie

Black crappie trap-net CPUE continues vary widely between surveys (Table 6). Currently, the population consists of one group of fish ranging in length from 19-23 cm (7.5-9 in) (Figure 2).

Table 6. Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Wall Lake, Minnehaha County, 2004-2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	4.9		133.7		14.7		47.2		14.2	40.3
PSD	8		13		94		1		99	29
RSD-P	0		0		1		0		0	0
Mean Wr	109		125		108		91		96	108

* 5 years (2002, 2004, 2006, 2008, 2010)

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 30.

Despite the stocking of 2,124 yellow perch adults in 2011 (Table 10), gill-net CPUE has declined to a 10-year low (Table 7). All of the fish sampled ranged in length from 19-23 cm (7.5-9 in) (Figure 3).

Table 7. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for Wall Lake, Minnehaha County, 2004-2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	47.5		23.5		4.3		12.3		3.3	23.7
PSD	88		79		31		0		90	45
RSD-P	9		49		8		0		0	13
Mean Wr	101		89		91		91		95	95

* 5 years (2002, 2004, 2006, 2008, 2010)

Other Species

Black bullhead abundance has increased since 2010, but is not a management concern at this time (Table 9). Bluegill abundance has been increasing steadily since 2008 and they are becoming an important species in the Wall Lake fishery.

Table 8. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Wall Lake, Minnehaha County, 2004-2012.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012
COC (GN)	--		2.5		1.3		5.3		9.7
COC (TN)	--		34.1		0.5		0.3		8.1
WHS (GN)	2.0		0.5		2.7		1.0		1.3
WHS (TN)	0.2		0.3		0.4		0.2		--
BIB (GN)	--		2.0		--		--		--
BIB (TN)	0.4		3.6		0.8		4.1		0.7
BLB (GN)	98.5		15.0		13.7		8.0		56.0
BLB (TN)	182.2		45.4		49.7		20.4		89.5
YEB (GN)	--		--		--		--		--
YEB (TN)	--		0.1		2.3		0.1		1.3
CCF (GN)	4.0		12.0		7.0		39.0		37.3
CCF (TN)	0.4		1.6		0.2		2.8		1.6
NOP (GN)	1.0		--		0.7		4.0		1.3
NOP (TN)	0.1		--		--		0.1		0.5
GSF (GN)	--		--		--		--		--
GSF (TN)	0.1		0.6		--		0.2		1.2
OSF (GN)	--		6.0		0.7		--		--
OSF (TN)	--		0.1		0.2		--		0.9
HYB (GN)	--		--		--		--		0.7
HYB (TN)	--		--		1.6		0.9		9.5
PKS (GN)	1.5		8.0		4.0		1.7		0.3
PKS (TN)	1.3		36.6		17.7		5.0		4.1
BLG (GN)	--		6.0		1.0		2.3		0.7
BLG (TN)	0.5		52.1		13.3		93.4		115.9
LMB (GN)	--		1.0		--		--		--
LMB (TN)	--		--		--		0.1		--
BLC (GN)	1.0		68.0		7.7		20.0		0.3
BLC (TN)	4.9		133.7		14.7		47.2		14.2
YEP (GN)	47.5		23.5		4.3		12.3		3.3
YEP (TN)	1.1		5.9		1.1		1.3		--
WAE (GN)	7.0		33.5		10.3		9.3		3.3
WAE (TN)	0.3		0.3		--		0.6		1.2

COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), YEB (Yellow Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), HYB (Hybrid Sunfish), PSF (Pumpkinseed Sunfish), OSF (Orange-spotted Sunfish), BLG (Bluegill), LMB (Largemouth Bass), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye).

MANAGEMENT RECOMMENDATIONS

1. Stock small walleye fingerlings annually as needed to achieve the management objective.
2. Stock yellow perch fingerlings annually as needed to achieve the management objective. Mark the fingerlings with oxytetracycline to allow evaluation of the stockings.
3. Monitor the Wall Lake fishery with biennial netting surveys.

Table 9. Stocking record for Wall Lake, Minnehaha County, 1996-2012.

Year	Number	Species	Size
1996	2,069	Black Crappie	Adult
	5,000	Walleye	Sml. Fingerling
	14,580	Yellow Perch	Fingerling
1997	2,220	Black Crappie	Adult
1999	20,700	Walleye	Fingerling
	2,100	Yellow Perch	Adult
	2,093	Yellow Perch	Juvenile
2000	545	Black Crappie	Adult
	24	Channel Catfish	Adult
	23	Walleye	Adult
	3,482	Yellow Perch	Adult
2001	1,659	Black Crappie	Adult
	21,120	Walleye	Fingerling
	2,245	Yellow Perch	Adult
2002	9,230	Yellow Perch	Adult
2003	22,414	Walleye	Fingerling
2004	667	Yellow Perch	Adult
	4,827	Black Crappie	Adult
	383	Walleye	Adult
2005	359	Channel Catfish	Adult
	1,034	Yellow Perch	Adult
	7,680	Walleye	Fingerling
2006	3,568	Black Crappie	Adult
	400	Channel Catfish	Adult
	26	Bluegill	Adult
2008	2,472	Walleye	Fingerling
2010	20,340	Walleye	Sml. Fingerling
	3,445	Walleye	Lrg. Fingerling
2011	20,800	Walleye	Sml. Fingerling
	2,124	Yellow Perch	Adult

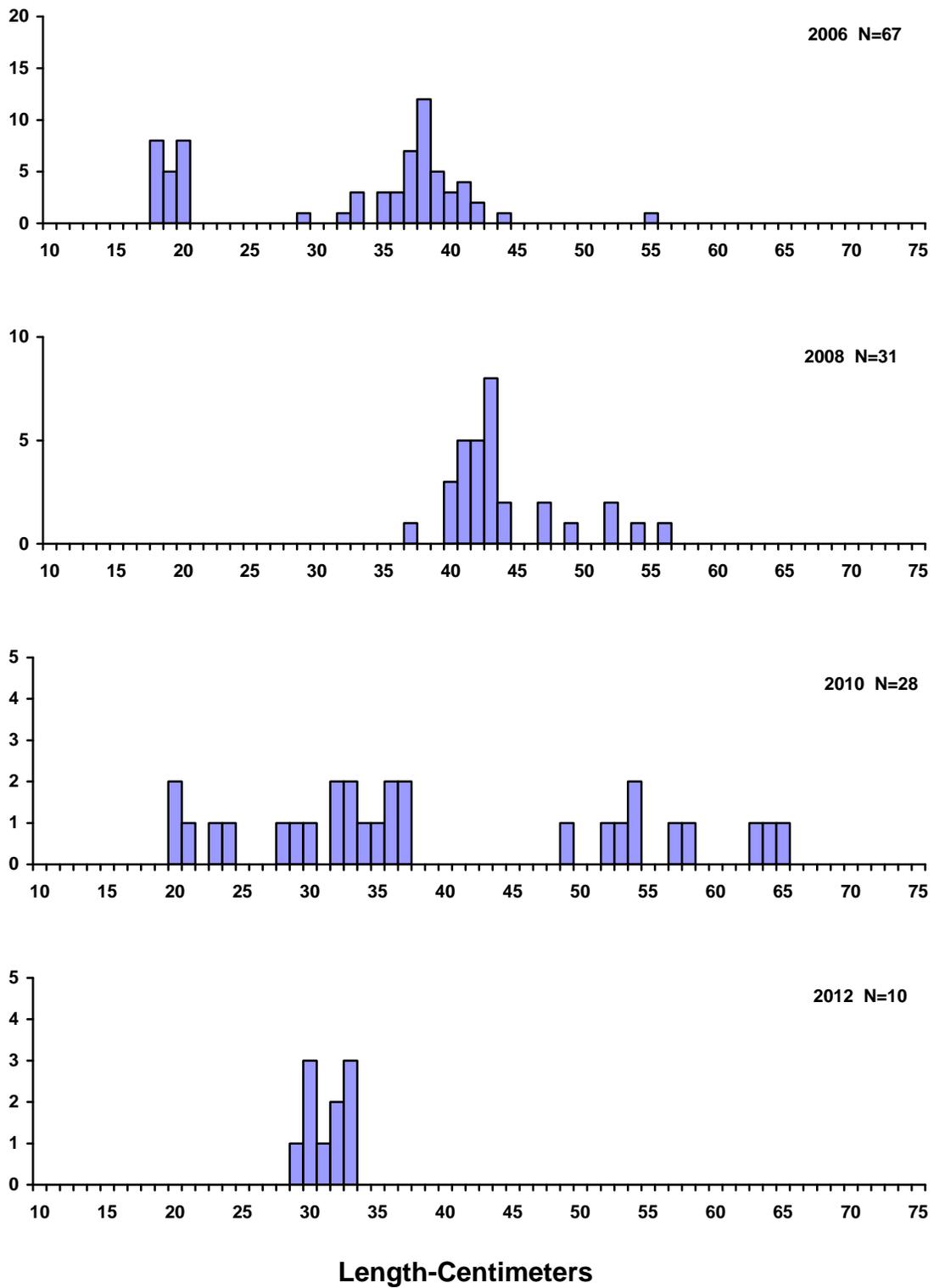


Figure 1. Length frequency histograms for walleye sampled with gill nets in Wall Lake, Minnehaha County, 2006, 2008, 2010, and 2012.

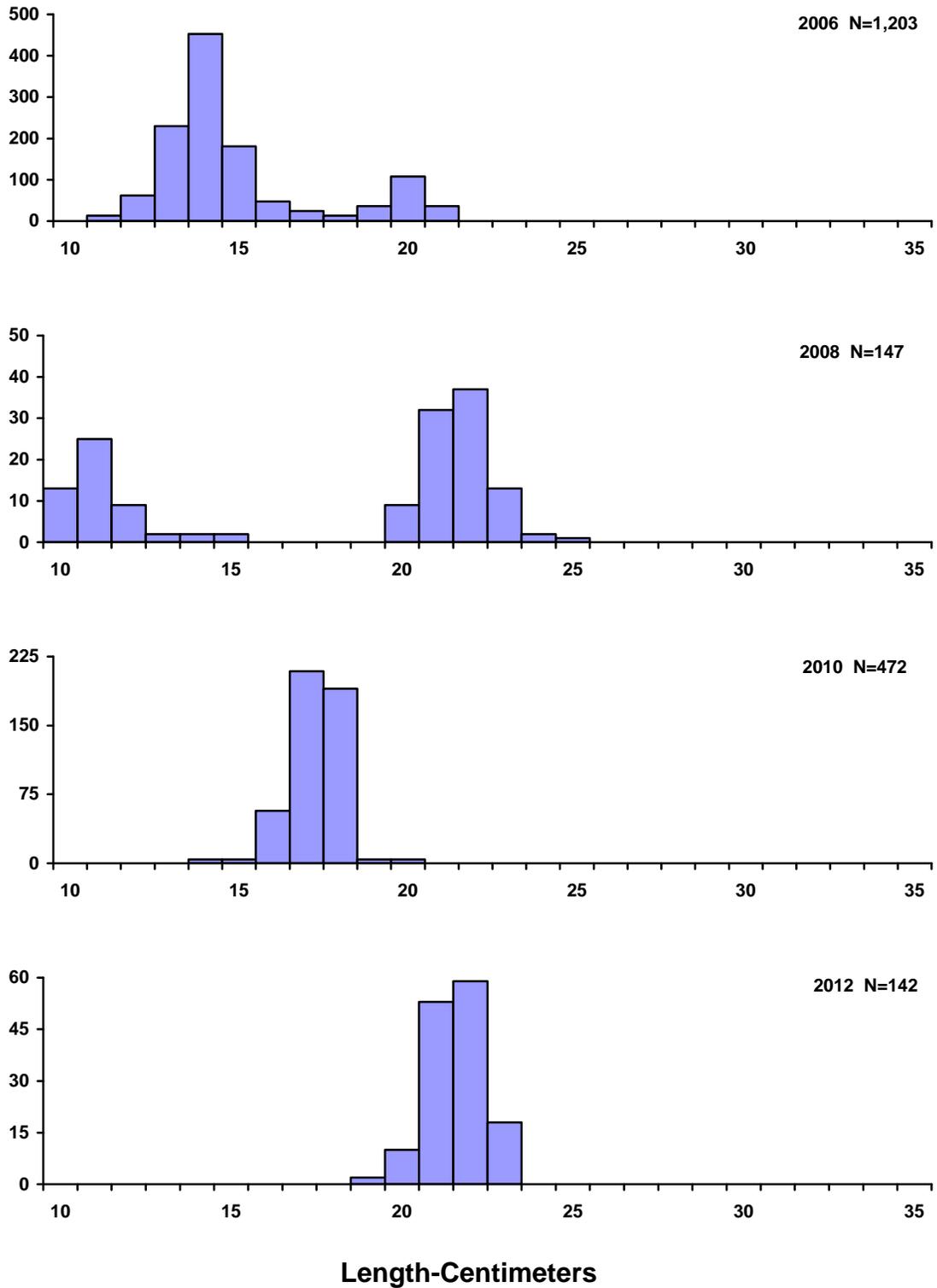


Figure 2. Length frequency histograms for black crappies sampled with trap nets in Wall Lake, Minnehaha County, 2006, 2008, 2010, and 2012.

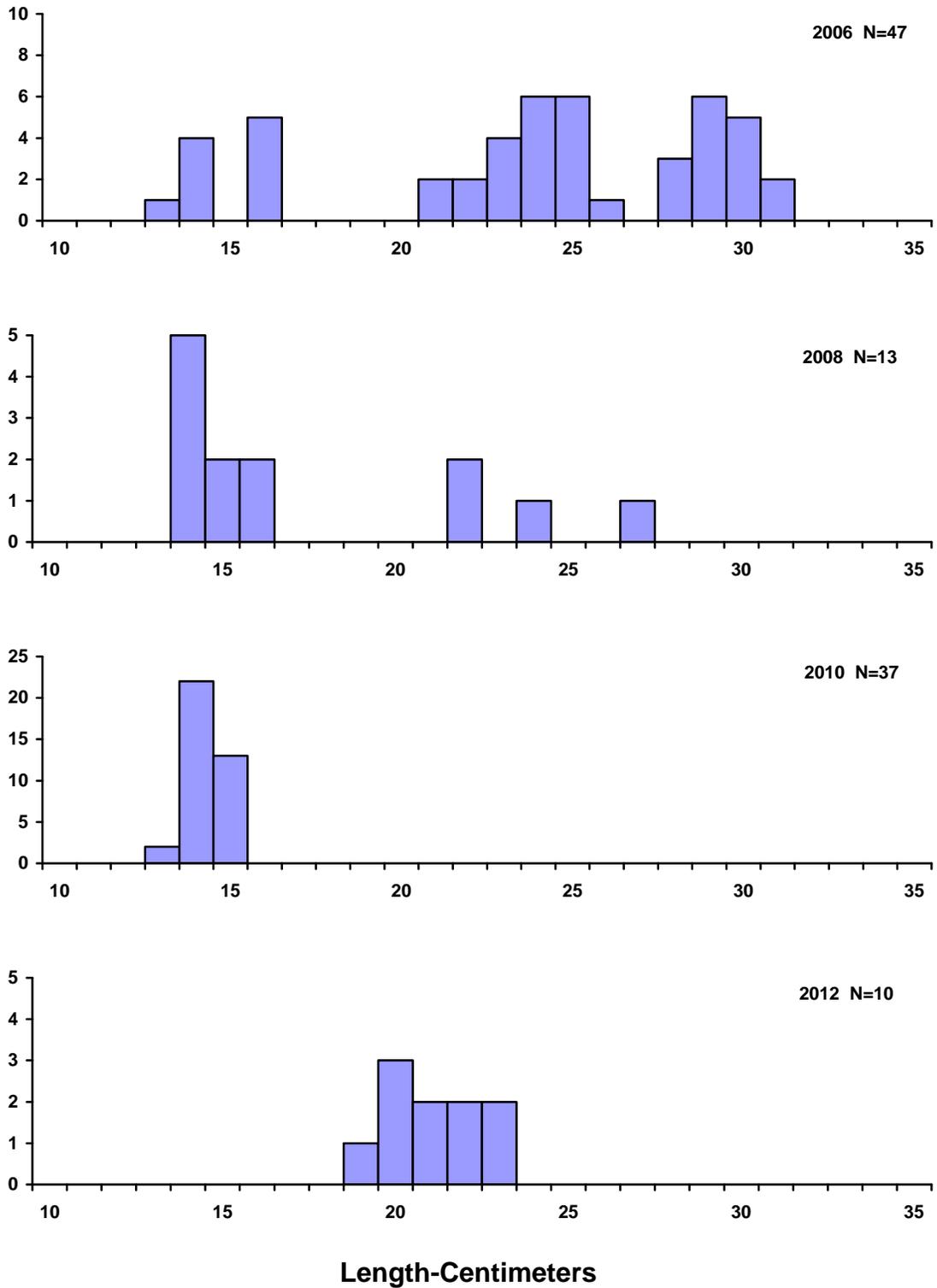


Figure 3. Length frequency histograms for yellow perch sampled with gill nets in Wall Lake, Minnehaha County, 2006, 2008, 2010, and 2012.

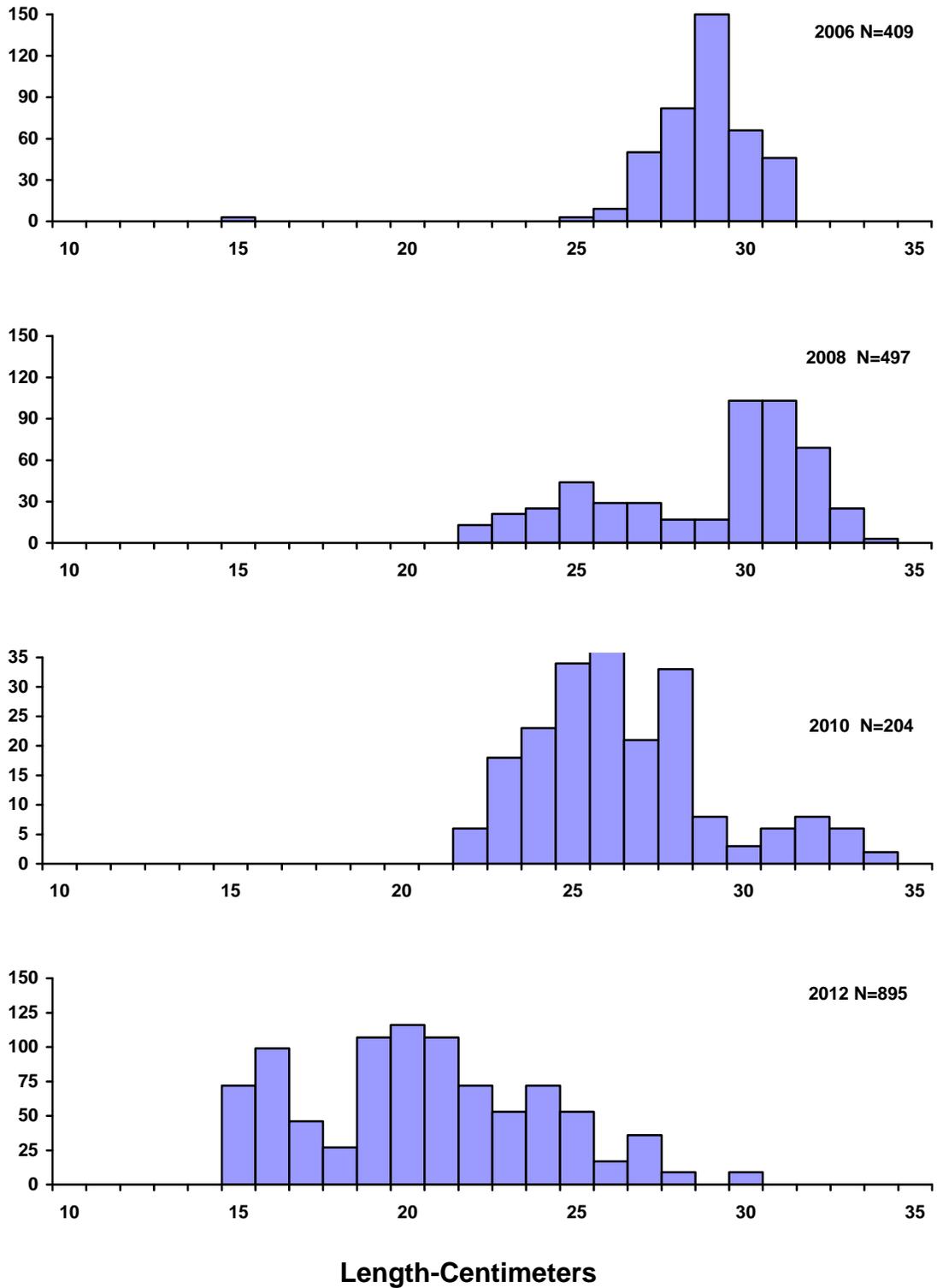
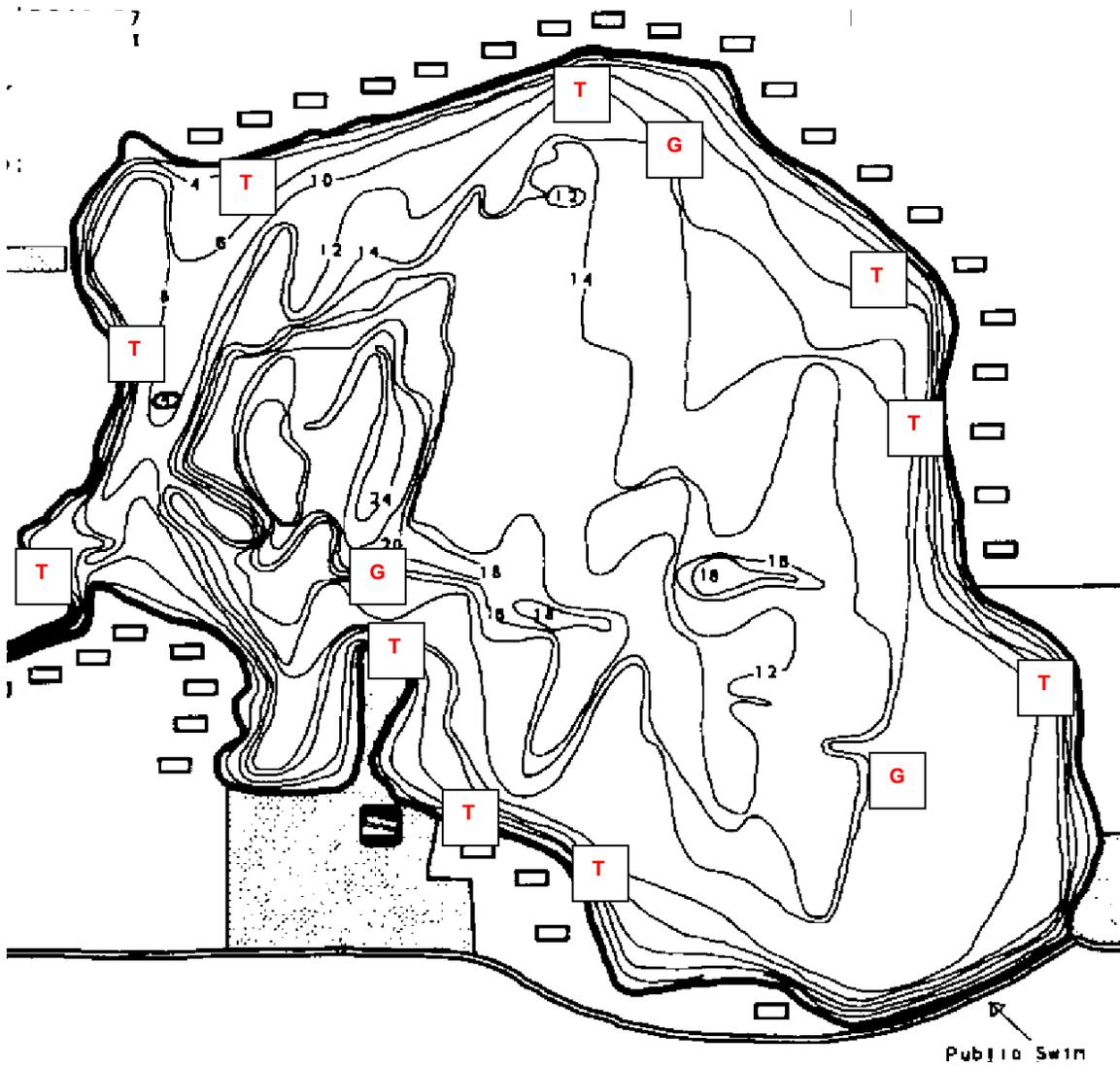


Figure 4. Length frequency histograms for black bullhead sampled with trap nets in Wall Lake, Minnehaha County, 2006, 2008, 2010, and 2012.



Legend
 Gill Nets: G
 Trap Nets: T

Figure 5. Sampling locations on Wall Lake, Minnehaha County, 2012

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.