SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-45

Name: Lake Hanson **County**: Hanson
Legal Description: T102-R58-Sec. 21
Location from nearest town: 2 miles south of Alexandria, SD

Dates of present survey: June 4, 2012 (all species electrofishing)
Date last surveyed: August 9-10, 2010 (netting)

Game Species	Other Species
Largemouth Bass	Hybrid Sunfish
Bluegill	Common Carp
White Crappie	
Black Crappie	
Channel Catfish	
Black Bullhead	
Yellow Perch	
Northern Pike	

PHYSICAL DATA

Surface Area: 55 acres **Watershed area**: 40,053 acres
Maximum depth: 17 feet **Mean depth**: 8 feet
Volume: 418 acre-feet **Shoreline length**: 2.2 miles
Contour map available: yes **Date mapped**: 1970
Lake elevation observed during the survey: Full
Beneficial use classifications: (5) warmwater semipermanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Introduction

Lake Hanson is an artificial impoundment constructed by the Works Progress Administration (WPA) in 1934. It was named by a local lake committee in honor of the county.

Ownership of the Lake and Adjacent Lakeshore Property

The dam impounding Lake Hanson is owned by the South Dakota Department of School and Public Lands and the South Dakota Department of Game, Fish, and Parks (GFP) is responsible for managing the fishery. The land surrounding Lake Hanson is privately owned. However, two easements created in 1934 grant public access to a strip of land lying 12 feet above the ordinary high water mark around the entire lake.

Fishing Access

There is a concrete-plank boat ramp owned by Hanson County on the north side of the lake capable of handling most boats. Shore fishing is available at various sites along the north shore.

Field Observations of Water Quality and Aquatic Vegetation

Water clarity at the time of the survey was good with a Secchi depth measurement of 56 cm (22 in). Common cattail (*Typha spp.*) was found around most of the south shoreline and sparse beds of sago pondweed (*Potamogeton pectinatus*) and coontail (*Ceratophyllum demersum*) were also observed.

BIOLOGICAL DATA

Methods:

Lake Hanson was sampled on June 4, 2012 with 1 hour and 40 minutes of nighttime electrofishing. Sampling locations are displayed in Figure 5.

Results and Discussion:

Electrofishing Catch

Black bullhead, common carp and bluegill were the most abundant of nine species sampled by electrofishing in 2012 (Table 1). However, significant percentages of the catch for several species consisted of substock length fish (Table 2).

Table 1. Total catch from 1 hour and 40 minutes of nighttime electrofishing at Lake Hanson, Hanson County, June 4, 2012.

Species	No.	%	CPH[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	538	39.0	322.8	±31.3		2	0	91
Common Carp	376	27.2	225.6	±18.8		58	5	94
Bluegill	323	23.4	193.8	±28.8		15	0	110
Yellow Perch	47	3.4	28.2	±4.9		0	0	81
Northern Pike	36	2.6	21.6	±2.0		6	0	84
White Crappie	27	2.0	16.2	±3.3		22	11	112
Largemouth Bass	20	1.4	12.0	±2.2		95	95	104
Black Crappie	12	0.9	7.2	±1.7		--	--	--
Channel Catfish	1	0.1	0.6	±0.3		--	--	--

* 2012 is the first year of all species electrofishing. CPH (Catch Per Hour)

[1] See Appendix A for definitions of CPUE, PSD, and mean Wr.

Table 2. Catch per unit effort by length category for various fish species sampled by electrofishing in Lake Hanson June 4, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	157.2	165.6	162.0	3.6	--	322.8	±31.3
Common Carp	174.0	51.6	21.6	27.6	2.4	225.6	±18.8
Bluegill	34.2	159.6	135.0	24.6	--	193.8	±28.8
Yellow Perch	15.6	12.6	12.6	--	--	28.2	±4.9
Northern Pike	--	21.6	20.4	1.2	--	21.6	±2.0
White Crappie	10.8	5.4	4.2	0.6	0.6	16.2	±3.3
Largemouth Bass	--	12.0	0.6	--	11.4	12.0	±2.2
Black Crappie	3.6	3.6	1.8	1.2	0.6	7.2	±1.7
Channel Catfish	--	0.6	--	0.6	--	0.6	±0.3

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

Largemouth Bass

Management objective: Maintain a largemouth bass fishery with an electrofishing CPH of at least 20.

Largemouth bass CPH was well below the management objective (Table 3). The sampled was comprised almost entirely of preferred-length fish (Table 2) indicating a lack of recent recruitment.

Table 3. Largemouth bass electrofishing CPUE, PSD, RSD-18, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2004-2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
CPUE	36.8		3.0						12.0
PSD	67		92						95
RSD-P	28		83						95
Mean Wr									104

Bluegill

Since 2012 was the first year the Lake Hanson fish populations were sampled exclusively by electrofishing, abundance trends cannot be evaluated (Table 4). The bluegills sampled were mostly small which indicates good natural reproduction in the past 2-3 years (Figure 2).

Table 4. Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2004-2012. *Electrofishing was used for sampling in 2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012*
CPUE	89.6		36.6		3.3		5.0		193.8
PSD	12		45		54		40		15
RSD-18	2		16		0		8		0
RSD-P	1		12		0		0		0
Mean Wr	88		96		95		91		110

White Crappie

Crappie abundance over the past ten years, as measured by trap nets, has varied widely and is somewhat cyclic. The fish sampled by electrofishing during this year's survey ranged in length from 90-320 mm (4.3-13.0 in), but was mostly comprised of smaller fish (Figure 2).

Table 5. White crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2004-2012. Electrofishing was used for sampling in 2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
CPUE	27.2		2.4		2.0		19.8		16.2
PSD	19		68		--		16		22
RSD-P	4		64		--		14		11
Mean Wr	87		89		--		85		112

Black Crappie

Size structure and condition of the black crappie population was better than the white crappie population (Table 6 and Figure 3). Lengths of sampled black crappies ranged from 90-320 mm (4.3-13.0 in) (Figure 3).

Table 6. Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Lake Hanson, Hanson County, 2004-2012. Electrofishing was used for sampling in 2012.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
CPUE	66.0		74.2		5.8		11.2		7.2
PSD	4		14		100		38		--
RSD-P	0		5		55		29		--
Mean Wr	111		99		107		92		--

Other Species

Since 2012 was the first year electrofishing was used to sample all species, direct comparisons to past abundance is not possible. However, CPH for common carp and black bullhead would indicate fairly high abundance for those species (Table 7).

Table 7. Trap-net CPUE for all fish species sampled in Lake Hanson, Hanson County, 2004-2012. Electrofishing was used for sampling in 2012.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012
COC	--		0.1		1.5		0.8		225.6
BLB	0.4		--		--		46.6		322.8
CCF	--		0.8		0.5		0.2		0.6
NOP	0.4		0.4		5.0		1.0		21.6
BLG	89.6		36.6		3.3		5.0		193.8
LMB	0.2		--		0.3		--		12.0
WHC	27.2		2.4		2.0		19.8		16.2
BLC	66.0		74.2		5.8		11.2		7.2
YEP	1.2		35.9		0.5		0.6		28.2

COC (Common Carp), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), LMB (Largemouth Bass), BLG (Bluegill), WHC (White Crappie), BLC (Black Crappie), YEP (Yellow Perch),

MANAGEMENT RECOMMENDATIONS

1. Stock largemouth bass as needed to accomplish management objective. Lake Hanson would be a good candidate to receive stockings of yearling largemouth bass produced at Blue Dog State Fish Hatchery.

2. Monitor the fishery by conducting an all-species electrofishing survey every other year.

Table 8. Stocking record for Lake Hanson, Hanson County, 1991-2012.

Year	Number	Species	Size
1991	3,100	Largemouth Bass	Fingerling
1996	1,336	Walleye	Lrg. Fingerling
1997	1,375	Saugeye	Fingerling
	1,375	Walleye	Fingerling
1998	801	Saugeye	Fingerling
	1,335	Walleye	Fingerling
1999	637	Saugeye	Lrg. Fingerling
	1,375	Walleye	Fingerling
2002	2,000	Largemouth Bass	Fingerling
2008	22,900	Bluegill	Fingerling
	6,560	Largemouth Bass	Fingerling

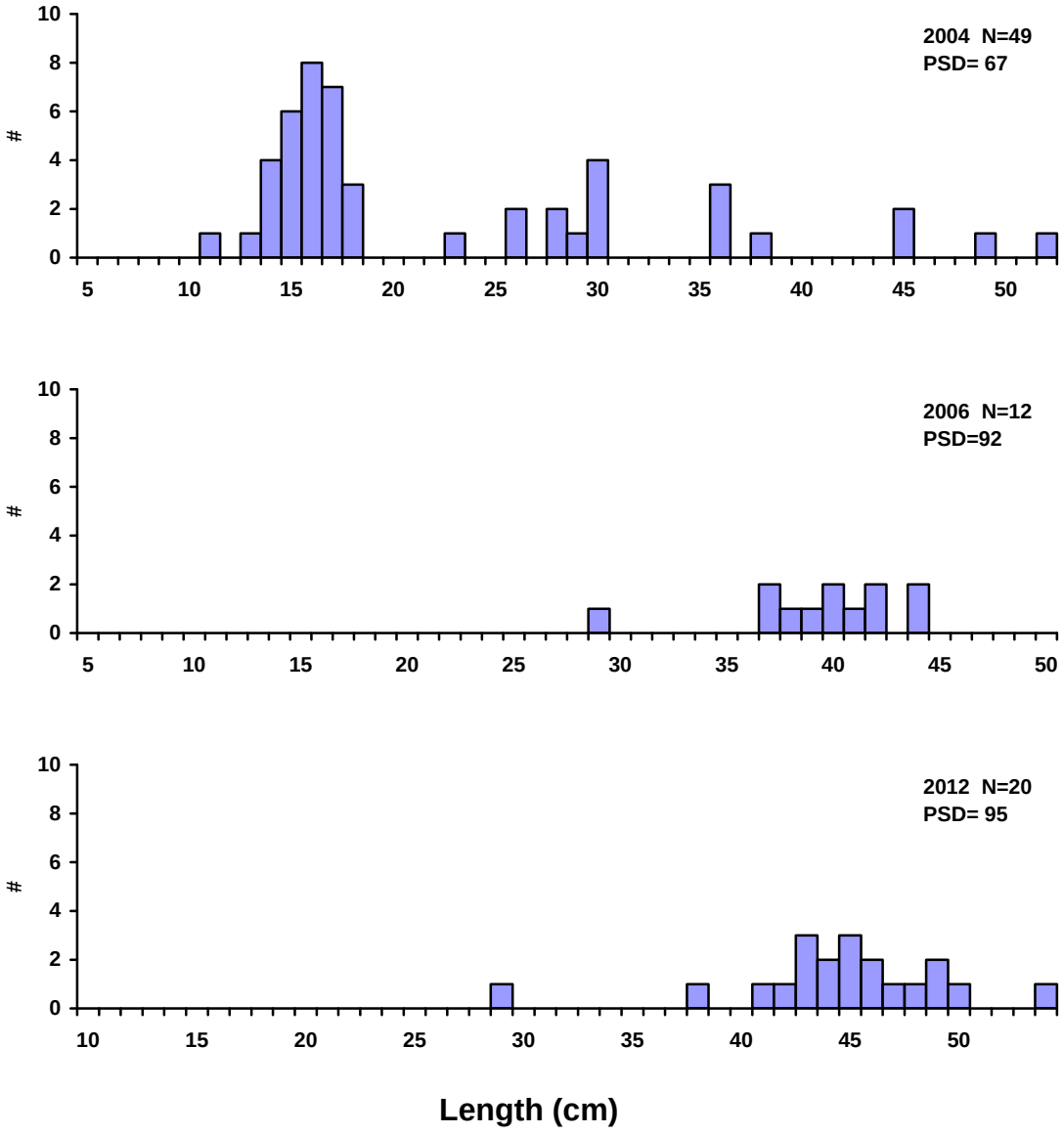

Figure 1. Length-frequency histograms for largemouth bass sampled by electrofishing in Lake Hanson, Hanson County, 2004, 2006, and 2012.

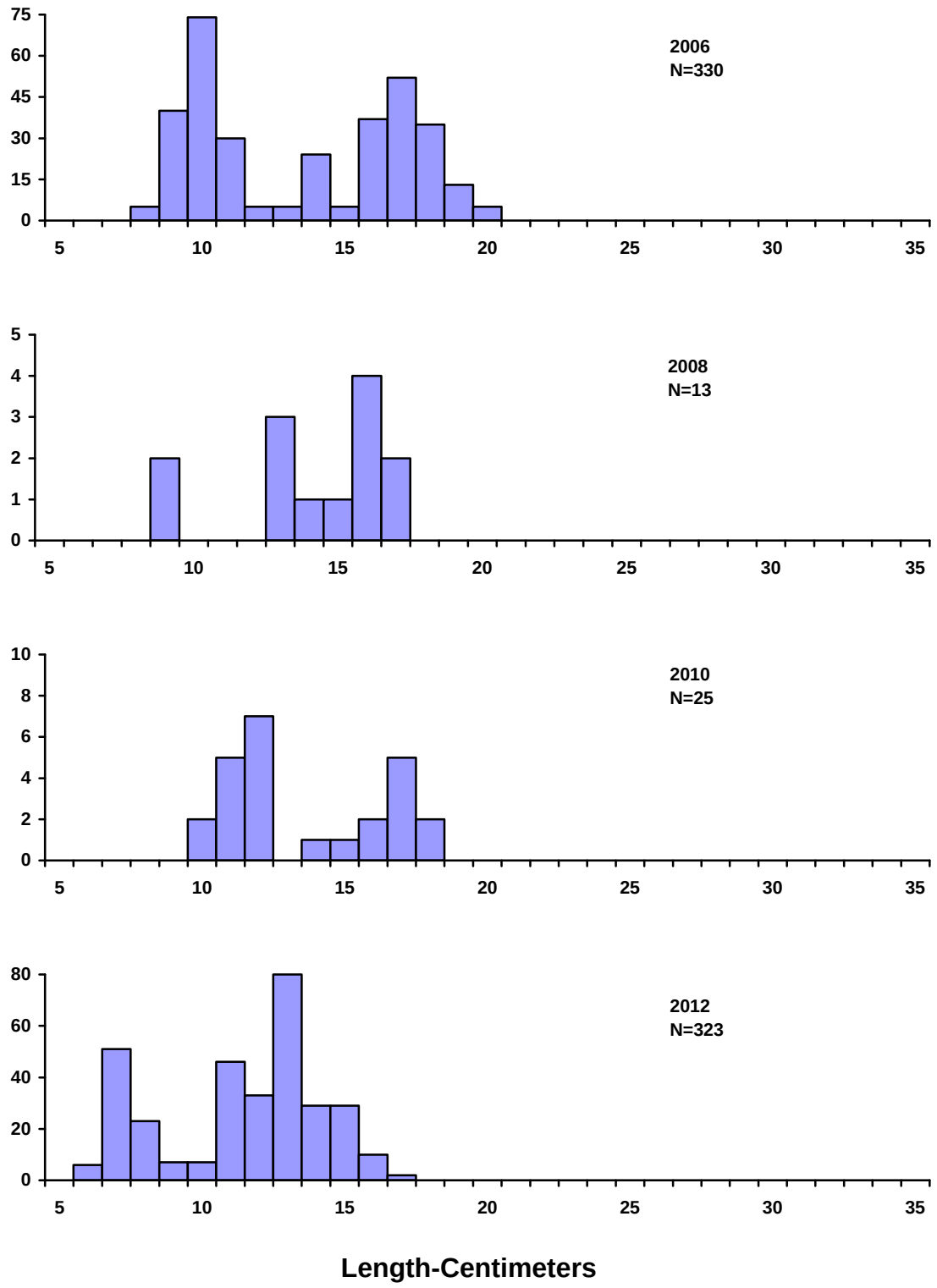

Figure 2. Length frequency histograms for bluegills sampled with trap nets in Lake, Hanson, Hanson County, 2006, 2008, 2010, 2012. Electrofishing was used for sampling in 2012.

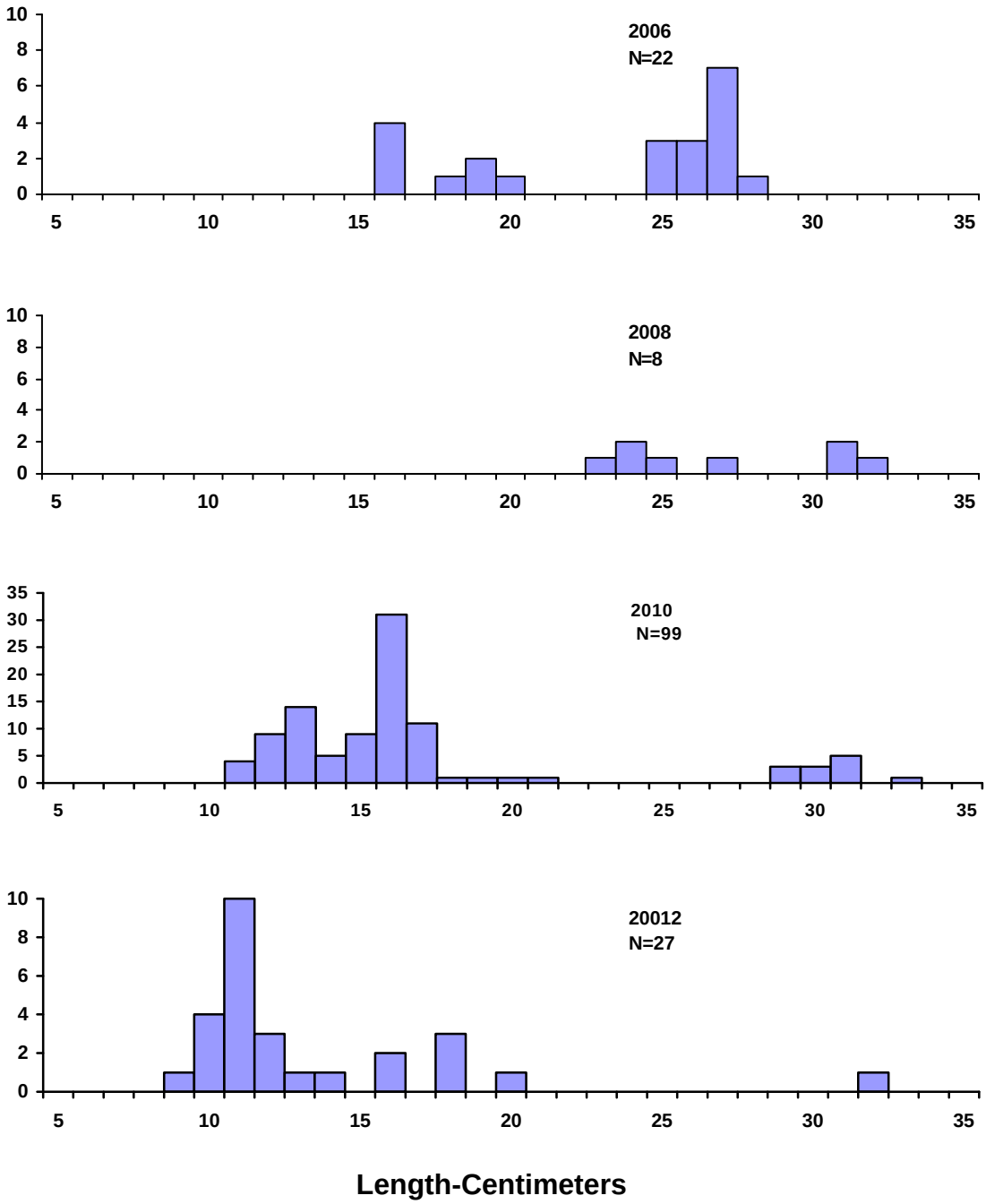

Figure 3. Length frequency histograms for white crappies sampled with trap nets in Lake, Hanson, Hanson County, 2006, 2008, 2010, 2012. Electrofishing was used for sampling in 2012.

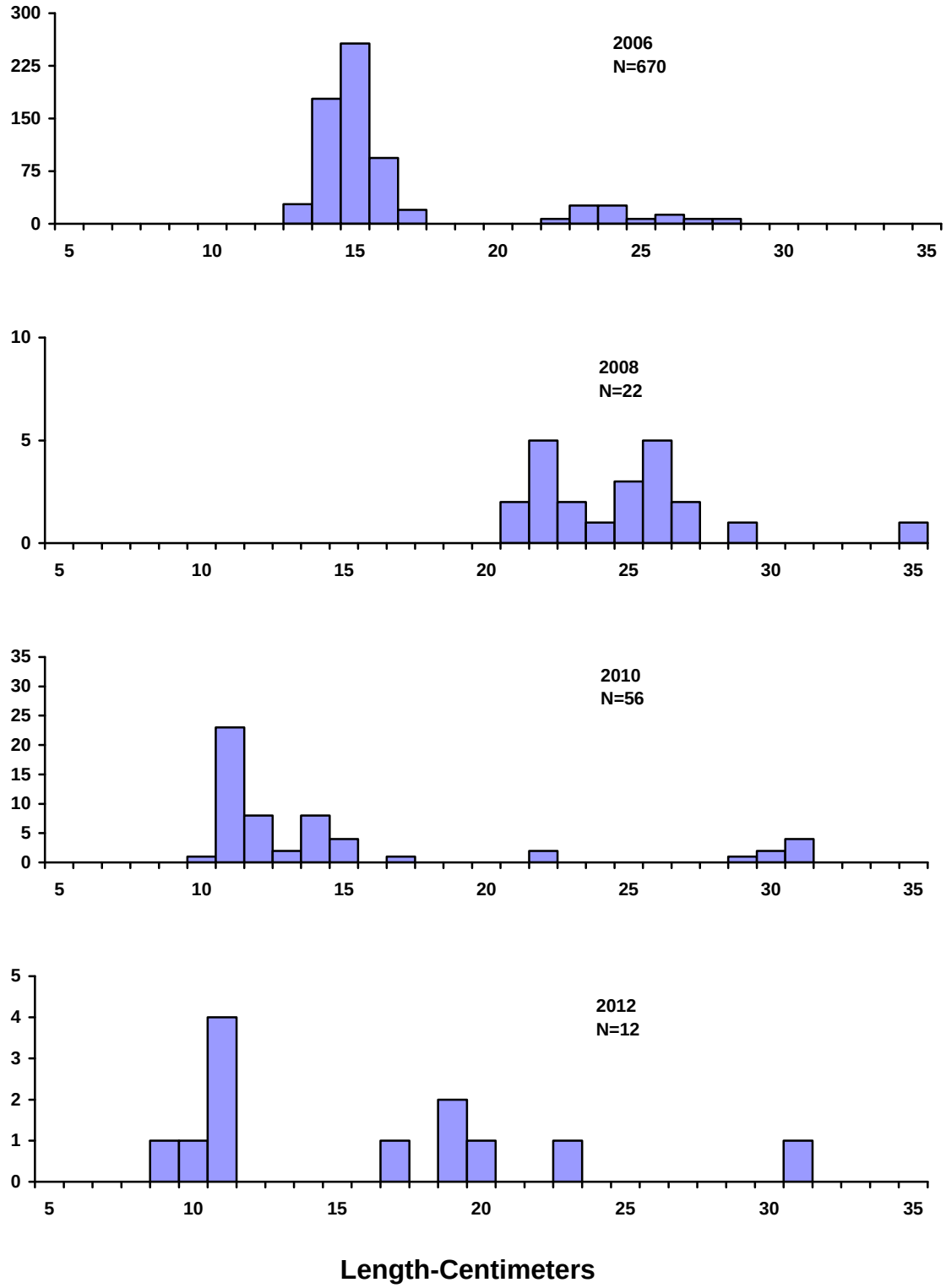

Figure 4. Length frequency histograms for black crappies sampled with trap nets in Lake, Hanson, Hanson County, 2006, 2008, 2010, 2012. Electrofishing was used for sampling in 2012.

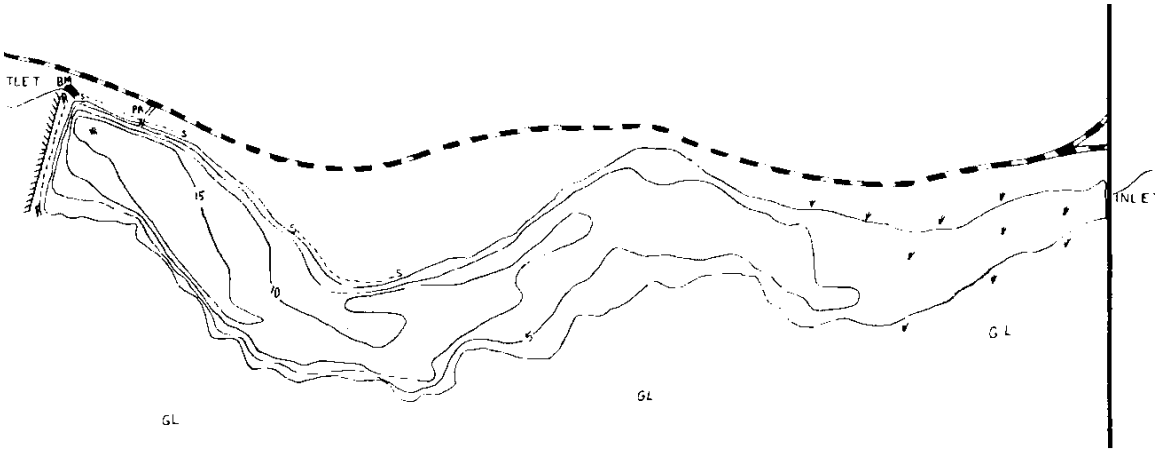

Figure 5. Sampling locations on Lake Hanson, Hanson County, 2012.

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:

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

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

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

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.