



## BIOLOGICAL DATA

### Methods:

Twin Lakes was sampled on July 11-13, 2011 with four overnight gill-net sets and 9 overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (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 (1/2, 3/4, 1, 1 1/4, 1 1/2, and 2 in) monofilament netting.

### Results and Discussion:

#### Gill Net Catch

Walleye, black bullhead and yellow perch were the only species sampled in the gill nets this year (Tables 1 and 2).

**Table 1.** Total catch from four overnight gill net sets at Twin Lakes, Minnehaha County, July 11-13, 2011.

Species	Number	Percent	CPUE <sup>1</sup>	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Black Bullhead</b>	177	46.0	44.3	+17.4	55.7	18	3	107
<b>Walleye</b>	112	29.1	28.0	+2.6	38.0	13	1	84
<b>Yellow Perch</b>	96	24.9	24.0	+11.3	3.7	94	38	108

\* 4 years (2004, 2006, 2007, 2009)

**Table 2.** Catch per unit effort by length category for various fish species captured with gill nets in Twin Lakes, Minnehaha County, July 11-13, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
<b>Black Bullhead</b>	12.0	32.3	26.5	4.8	1.0	44.3	+17.4
<b>Walleye</b>	3.0	25.0	21.7	3.0	0.3	28.0	+2.6
<b>Yellow Perch</b>	--	24.0	1.5	13.5	9.0	24.0	+11.3

Length categories can be found in Appendix A.

#### Trap Net Catch

Black bullheads comprised the majority of the trap net sample this year on Twin Lakes (Table 3). Walleye, yellow perch and green sunfish were the only other fish caught.

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

**Table 3.** Total catch from five overnight trap net sets at Twin Lakes, Minnehaha County, July 11-13, 2011.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Black Bullhead</b>	9,412	98.2	1,045.8	<u>+553.5</u>	194.6	0	0	81
<b>Yellow Perch</b>	100	1.0	11.1	<u>+6.2</u>	3.1	71	21	108
<b>Walleye</b>	67	0.7	7.4	<u>+2.7</u>	9.3	23	0	84
<b>Green Sunfish</b>	1	0.0	0.1	<u>+0.1</u>	0.0	--	--	--

\* 3 years (2006, 2007, 2009)

**Table 4.** Catch per unit effort by length category for various fish species captured with trap nets in Twin Lakes, Minnehaha County, July 11-13, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
<b>Black Bullhead</b>	1035.3	10.5	10.5	--	--	1,045.8	<u>+553.5</u>
<b>Yellow Perch</b>	--	11.1	3.2	5.6	2.3	11.1	<u>+6.2</u>
<b>Walleye</b>	0.2	7.2	5.6	1.6	--	7.4	<u>+2.7</u>
<b>Green Sunfish</b>	--	0.1	--	0.1	--	0.1	<u>+0.1</u>

Length categories can be found in Appendix A.

## Walleye

**Management objective:** Maintain a walleye population with a gill-net CPUE of at least 15, a PSD range of 30-60, and a growth rate of 356 mm (14 inches) by age-3.

Walleye gill-net CPUE and growth exceeded management objectives in 2011 (Tables 5 and 6). Several strong year classes were present due to stocking, successful natural reproduction and a protective length limit (Tables 6 and 10; Figure 1). The large year class of age-2 fish was likely produced by the fingerling stocking in 2009. Even though walleye condition (mean WR) decreased to 84 in 2011, forage seemed to be abundant in the lake. Large numbers of fathead minnows were seen in the vegetation and the large black bullhead population mostly consisted of fish small enough to be consumed by walleyes.

**Table 5.** Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Twin Lakes Minnehaha County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE					70.0	37.8		16.8		28.0
PSD					42	24		84		13
RSD-P					3	4		4		1
Mean Wr					97	92		97		84

**Table 6.** Weighted mean length at capture (mm) for walleye captured in gill nets in Twin Lakes Minnehaha County, 2006-2011. Sample size is in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
2011 (112)	248 (22)	324 (78)	407 (8)	480 (2)	488 (2)	--	--	--	--	--	--	--
2009 (101)	244 (28)	381 (1)	418 (46)	463 (19)	500 (7)	--	--	--	--	--	--	--
2007 (190)	297 (100)	363 (51)	416 (20)	472 (10)	499 (3)	523 (2)	538 (2)	558 (1)	--	670 (1)	--	--
2006 (71)	267 (104)	408 (34)	444 (9)	--	491 (2)	547 (3)	--	--	--	--	--	--

## **Yellow Perch**

**Management objective:** Maintain a yellow perch population with a gill-net CPUE of at least 25.

Yellow perch CPUE increased this year and is very close to the management objective. The stocking of 3,980 adult perch in 2010 may be partially responsible for the increase in abundance (Table 10). The population size structure and condition of the fish are both excellent (Table 7 and Figure 2).

**Table 7.** Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for Twin Lakes Minnehaha County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE			16.5		5.8	5.2		1.0		24.0
PSD			8		75	69		--		71
RSD-P			8		42	38		--		21
Mean Wr			89		101	109		--		108

## **Black Bullhead**

**Management objective:** Maintain a black bullhead population with a trap-net CPUE of 100 or less.

Black bullhead trap net CPUE has increased significantly since 2009 (Table 8) due to the production of a single, very large year class in 2010. However, since most of the bullheads sampled are still small enough for walleyes to consume (Figure 3), it will be interesting to observe if the high-density walleye population created by the protective size limit will quickly reduce bullhead abundance.

**Table 8.** Black bullhead trap net CPUE, PSD, RSD-P, and mean Wr for Twin Lakes, Minnehaha County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CPUE			250.6		514.3	69.5		23.2		1,045.8
PSD			76		11	33		82		0
RSD-P			6		8	1		26		0
Mean Wr			98		113	89		112		81

## **All Species**

Twin Lakes contains very few fish species. Fathead minnows, white suckers and northern pike have been reported by anglers or netted during other operations but have not been sampled during scheduled lake surveys.

**Table 9.** Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Twin Lakes, Minnehaha County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>BLB (GN)</b>					122.5	42.8		66.0		44.3
<b>BLB (TN)</b>			250.6		514.3	69.5		23.2		1,045.8
<b>GSF (GN)</b>										
<b>GSF (TN)</b>										0.1
<b>WAE (GN)</b>					70.0	37.8		16.8		28.0
<b>WAE (TN)</b>					17.3	8.1		13.0		7.4
<b>YEP (GN)</b>					5.8	5.2		1.0		24.0
<b>YEP (TN)</b>					5.2	2.3		1.8		11.1

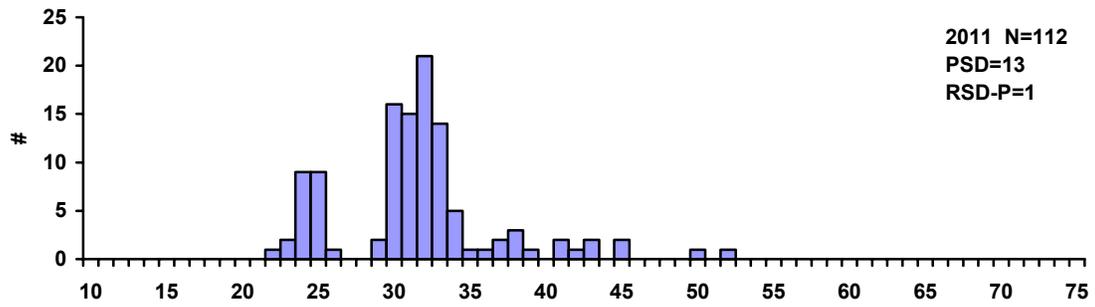
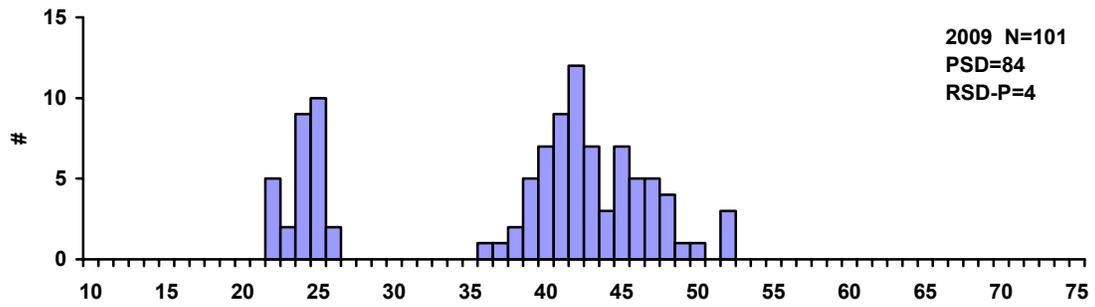
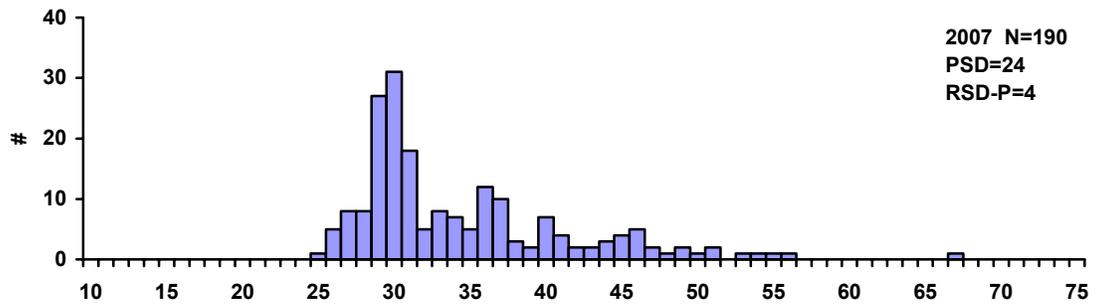
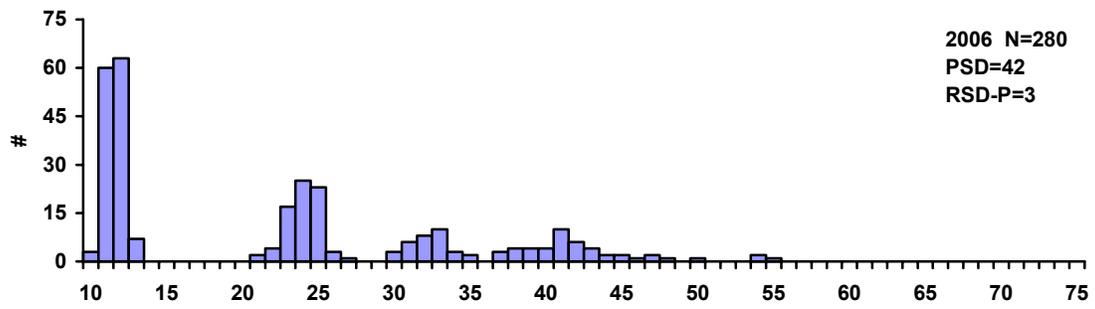
BLB (Black Bullhead), GSF (Green Sunfish), WAE (Walleye), YEP (Yellow Perch)

## **MANAGEMENT RECOMMENDATIONS**

1. Conduct annual netting surveys to monitor the adult fish populations and annual fall electrofishing surveys to monitor stocked or natural walleye recruitment.
2. Stock walleyes and yellow perch as needed to maintain the populations.

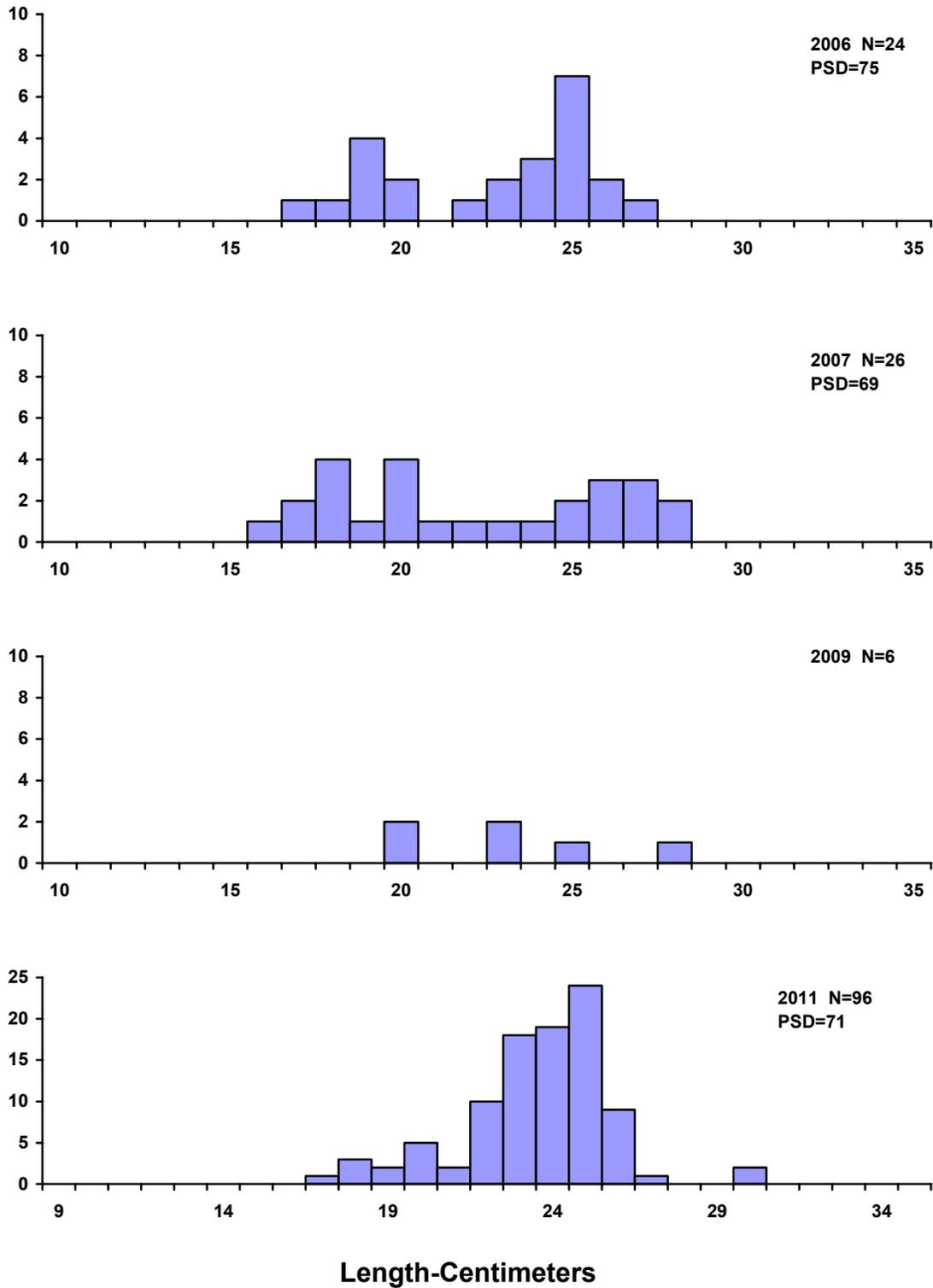
**Table 10.** Stocking record for Twin Lakes, Minnehaha County, 1995-2011.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
1995	32	Walleye	Adult
1996	500	Yellow Perch	Adult
2000	1,920	Yellow Perch	Adult
2002	109	Walleye	Adult
2003	58,784	Walleye	Fingerling
2004	5,606	Walleye	Large Fingerling
	25	Walleye	Juvenile
2005	19,616	Walleye	Large Fingerling
2006	31,030	Walleye	Fingerling
	5,372	Yellow Perch	Adult
2007	1,493	Yellow Perch	Adult
2009	29,300	Walleye	Fingerling
	3,980	Yellow Perch	Adult
2011	29,120	Walleye	Fingerling

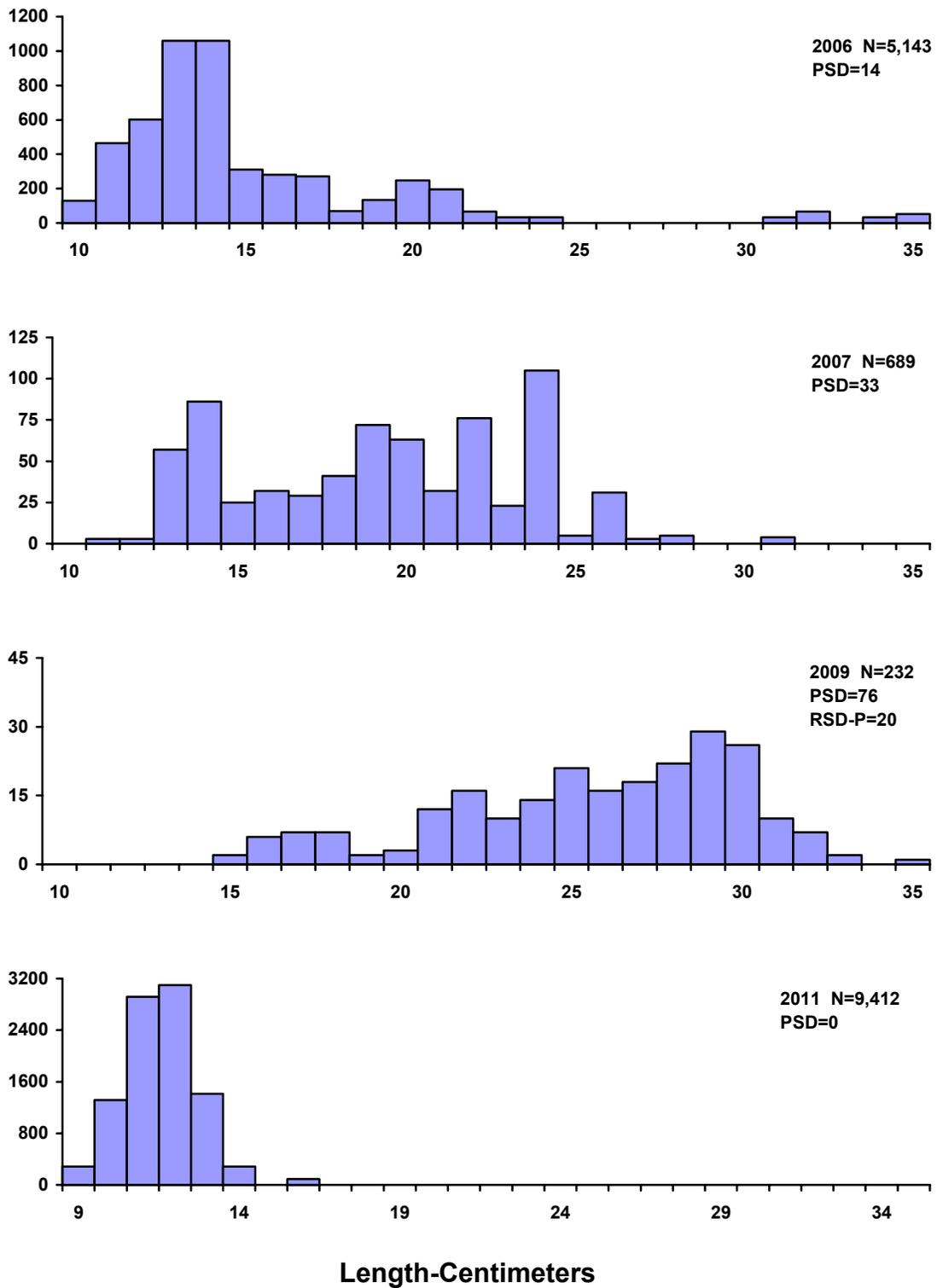


**Length-Centimeters**

**Figure 1.** Length frequency histograms for walleye sampled with gill nets in Twin Lakes, Minnehaha County, 2006, 2007, 2009 and 2011.



**Figure 2.** Length frequency histograms for yellow perch sampled with gill nets in Twin Lakes, Minnehaha County, 2006, 2007, 2009 and 2011.



**Figure 3.** Length frequency histograms for black bullheads sampled with trap nets in Twin Lakes, Minnehaha County, 2006, 2007, 2009 and 2011.

**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.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

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.