

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-45

**Name:** Lake Mitchell

**County:** Davison

**Legal Description:** T103W- R60N-Sec 4-6, 9; T104N- R60W-Sec 31-32

**Location from nearest town:** Northwest side of Mitchell, SD

**Dates of present survey:** July 9-11, 2012 (netting), June 6, 2012 (electrofishing for largemouth bass), September 17, 2011 (electrofishing for walleye)

**Date last surveyed:** July 4-6, 2011 (netting), June 6 and 15, 2011 (electrofishing for largemouth bass), September 6, 2011 (electrofishing for walleye)

Game Species	Other Species
Bluegill	Freshwater Drum
Black Crappie	Common Carp
Largemouth Bass	White Sucker
Smallmouth Bass	Shorthead Redhorse
Walleye	
Channel Catfish	
White Crappie	
Northern Pike	
Black Bullhead	

## PHYSICAL DATA

**Surface Area:** 670 acres

**Watershed area:** 229,911 acres

**Maximum depth:** 29 feet

**Mean depth:** 12.2 feet

**Volume:** 8,212 acre-feet

**Shoreline length:** 10 miles

**Contour map available:** Yes

**Date mapped:** 1970

**Lake elevation observed during the survey:** Full

**Beneficial use classifications:** (1) domestic water supply, (4) warmwater permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) wildlife propagation and stock watering.

### **Introduction**

Lake Mitchell was constructed in 1928 by the City of Mitchell to serve as a domestic water supply and a regional recreation center. The primary source of water is Firesteel Creek, which has two main branches and drains a watershed that extends 50 miles above the lake.

### **Ownership of Lake and Adjacent Shoreline Properties**

Lake Mitchell is owned by the City of Mitchell. The South Dakota Department of Game, Fish, and Parks (GFP) manages the fishery. The City of Mitchell owns several public access areas and parks around the lake. The remainder of the lakeshore is privately owned and heavily developed.

## **Fishing Access**

The West City Access Area has a double lane boat ramp, boat dock, parking lot, and public toilets. The Southeast City Access Area has a single lane boat ramp, dock, and parking lot. All access areas and parks provide ample shore fishing opportunities. A handicapped-accessible fishing pier is located on the south side of the lake toward the west end.

## **Field Observations of Water Quality and Aquatic Vegetation**

The water in Lake Mitchell was more turbid than usual during this survey with a Secchi depth measurement of 1.4 m (54 in). Beds of sago pondweed (*Potamogeton pectinatus*), common cattail (*Typha spp.*), and duckweed (*Lemna spp.*) were common in the bays and creek arms. Large stands of common cattail were found in Kippes Bay and in the west end of the lake where it had been absent for several years. Curlyleaf pondweed (*Potamogeton crispus*), an invasive species, was discovered for the first time in 2012.

## **BIOLOGICAL DATA**

### **Methods:**

Lake Mitchell was sampled on July 9-11, 2012 with six overnight gill net sets and twelve 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. Two hours of nighttime electrofishing was done on June 6 and 15, 2011 to sample the largemouth bass population. Two more hours of nighttime electrofishing was done on September 25, 2012 to monitor walleye recruitment. Sampling locations are displayed in Figure 4.

## Gill Net Catch

Channel catfish and freshwater drum were the most abundant of 11 species sampled in the gill nets (Table 1). Some of the catfish, drum, bullhead, bluegill and smallmouth bass were substock length (Table 2).

**Table 1.** Total catch from six overnight gill net sets at Lake Mitchell, Davison County, July 9-11, 2012.

Species	Number	Percent	CPUE <sup>1</sup>	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Channel Catfish</b>	152	50.0	25.3	<u>+13.4</u>	5.5	27	2	97
<b>Freshwater Drum</b>	72	23.7	12.0	<u>+3.8</u>	7.4	57	1	93
<b>Walleye</b>	20	6.6	3.3	<u>+2.2</u>	2.9	30	0	86
<b>Black Bullhead</b>	18	5.9	3.0	<u>+2.2</u>	1.0	53	0	92
<b>Black Crappie</b>	16	5.3	2.7	<u>+1.4</u>	1.1	69	56	104
<b>Shorthead Redhorse</b>	11	3.6	1.8	<u>+1.6</u>	5.6	100	100	91
<b>Common Carp</b>	6	2.0	1.0	<u>+1.0</u>	0.8	--	--	--
<b>Northern Pike</b>	4	1.3	0.7	<u>+0.4</u>	0.8	--	--	--
<b>Bluegill</b>	3	1.0	0.5	<u>+0.6</u>	0.4	--	--	--
<b>White Sucker</b>	1	0.3	0.2	<u>+0.2</u>	1.4	--	--	--
<b>Smallmouth Bass</b>	1	0.3	0.2	<u>+0.2</u>	0.1	--	--	--

\* 10 years (2002-2011)

**Table 2.** Catch per unit effort by length category for various fish species captured by gill nets in Lake Mitchell July 9-11, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
<b>Channel Catfish</b>	8.7	16.7	12.2	4.2	0.3	25.3	<u>+13.4</u>
<b>Freshwater Drum</b>	0.7	11.3	4.8	6.3	0.2	12.0	<u>+3.8</u>
<b>Walleye</b>	--	3.3	2.3	1.0	--	3.3	<u>+2.2</u>
<b>Black Bullhead</b>	0.2	2.8	1.3	1.5	--	3.0	<u>+2.2</u>
<b>Black Crappie</b>	--	2.7	0.8	0.4	1.5	2.7	<u>+1.4</u>
<b>Shorthead Redhorse</b>	--	1.8	--	--	1.8	1.8	<u>+1.6</u>
<b>Common Carp</b>	--	1.0	0.2	0.2	0.6	1.0	<u>+1.0</u>
<b>Northern Pike</b>	--	0.7	0.2	0.5	--	0.7	<u>+0.4</u>
<b>Bluegill</b>	0.3	0.2	0.2	--	--	0.5	<u>+0.6</u>
<b>White Sucker</b>	--	0.2	--	--	0.2	0.2	<u>+0.2</u>
<b>Smallmouth Bass</b>	0.2	--	--	--	--	0.2	<u>+0.2</u>

Length categories can be found in Appendix A.

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

## Trap Net Catch

Bluegills were the most abundant of 10 species caught in the trap nets this year (Table 3). Just a few of the bluegill, channel catfish and smallmouth bass sampled were substock length (Table 4).

**Table 3.** Total catch from twelve overnight trap net sets at Lake Mitchell, Davison County, July 9-11, 2012.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Bluegill	187	58.1	18.7	+9.7	23.9	97	48	111
Black Crappie	38	11.8	3.8	+1.6	11.8	63	50	105
Common Carp	36	11.2	3.6	+2.6	2.9	83	22	98
Channel Catfish	19	5.9	1.9	+1.0	6.4	78	44	92
Freshwater Drum	16	5.0	1.6	+0.5	0.5	69	13	94
Shorthead Redhorse	10	3.1	1.0	+1.0	4.6	100	90	90
Black Bullhead	7	2.2	0.7	+0.9	0.1	--	--	--
Smallmouth Bass	5	1.6	0.5	+0.5	0.5	--	--	--
White Sucker	3	0.9	0.3	+0.3	0.4	--	--	--
Northern Pike	1	0.3	0.1	+0.1	0.3	--	--	--

\* 10 years (2002-2011)

**Table 4.** Catch per unit effort by length category for various fish species captured with trap nets in Lake Mitchell July 9-11, 2012.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Bluegill	0.2	18.5	0.5	9.1	8.9	18.7	+9.7
Black Crappie	--	3.8	1.4	0.5	1.9	3.8	+1.6
Common Carp	--	3.6	0.6	2.2	0.8	3.6	+2.6
Channel Catfish	0.1	1.8	0.4	0.6	0.8	1.9	+1.0
Freshwater Drum	--	1.6	0.5	0.9	0.2	1.6	+0.5
Shorthead Redhorse	--	1.0	--	0.1	0.9	1.0	+1.0
Black Bullhead	--	1.7	--	0.5	0.2	0.7	+0.9
Smallmouth Bass	0.1	0.4	0.4	--	--	0.5	+0.5
White Sucker	--	0.3	--	0.1	0.2	0.3	+0.3
Northern Pike	--	0.1	0.1	--	--	0.1	+0.1

Length categories can be found in Appendix A.

## Electrofishing Catch

**Table 5.** Total catch from two hours of nighttime electrofishing on Lake Mitchell, Davison County, June 6, 2012.

Species	Number	CPUE	Mean CPUE*	PSD	RSD-P	Mean Wr
<b>Largemouth Bass</b>	29	14.5	27.1	88	41	101

\*6 years (1999, 2001, 2003, 2005, 2007, 2009)

## Largemouth Bass

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

Largemouth bass abundance has been declining since 2009 and is now below the management objective (Table 6). Fish up to eight years old from seven different year classes were sampled (Table 7, Figure 1). This indicates consistent natural reproduction and recruitment, but not at a high enough level to maintain abundance at the objective level. The sampled bass were in good condition (Table 6) and growth is consistent with statewide and regional means (Table 7).

**Table 6.** Largemouth bass electrofishing CPUE, PSD, RSD-P, and mean Wr for Lake Mitchell, Davison County, 1999-2012.

	1999	2001	2003	2005	2007	2009	2011	2012	Mean*
CPUE	19.0	19.5	44.0	12.5	31.5	36.0	24.5	14.5	26.7
PSD	97	62	16	91	57	69	86	88	68
RSD-P	26	44	12	22	22	26	41	41	28
Mean Wr	106	99	107	109	104	106	100	101	104

\*7 years (1999, 2001, 2003, 2005, 2007, 2009, 2011)

**Table 7.** Average back-calculated lengths (mm) for each age class of largemouth bass in Lake Mitchell, Davison County, 2012.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2011	1	12	144								
2010	2	1	141	261							
2009	3	1	121	239	303						
2008	4	5	132	212	273	305					
2005	7	2	110	198	238	282	325	348	365		
2004	8	5	116	215	259	307	338	362	380	392	
2003	9	3	99	191	243	311	360	396	412	426	
<b>All Classes</b>		<b>29</b>	<b>123</b>	<b>219</b>	<b>263</b>	<b>301</b>	<b>341</b>	<b>369</b>	<b>385</b>	<b>409</b>	
Statewide Mean			96	182	250	305					
Region III Mean			111	212	287	347					
LLI* Mean			89	178	256	316					

## Walleye

**Management objective:** Establish and maintain a walleye population with a gill net CPUE of at least 5.

Walleye gill net CPUE declined in 2012 and is below the management objective once again (Table 8). Comparing annual gill net catches with annual fall electrofishing surveys since 2008 illustrates that the fingerling stockings in 2009 and 2012 did not increase walleye abundance in Lake Mitchell (Tables 8, 10).

Walleye gill-net CPUE objectives for most waters in southeastern South Dakota are at least 15 fish per net and those objectives are frequently met. After examining long-term survey results, the CPUE objective for Lake Mitchell was set at 5 fish per net and that has only been attained once in the last 10 years (Table 8). One has to question whether future expenditures on stocking are justified.

**Table 8.** Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Lake Mitchell, Davison County, 2003-2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	3.3	1.8	1.1	2.0	1.0	2.7	2.0	3.3	9.2	3.3	2.9
PSD	10	45	--	92	--	33	58	55	5	30	43
RSD-P	0	0	--	8	--	0	8	0	0	0	4
Mean Wr	85	85	--	89	--	85	86	83	82	86	86

\* 10 years (2002-2011)

**Table 9.** Weighted mean length at capture (mm) for walleye captured in gill nets in Lake Mitchell, Davison County, 2012. Sample size is in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
2012 (20)	266 (1)	327 (7)	375 (10)	505 (1)	467 (1)	--	--	--	--	--	--	--

Only two age-0 walleyes were sampled this fall indicating poor survival of stocked fingerlings. Additionally, very few age-1 walleyes were sampled from the moderate 2011 year class. Size and condition of age-1 fish were good.

**Table 10.** Age-0 and age-1 walleyes sampled during 2 hours of nighttime electrofishing on Lake Mitchell, Davison County, 2000-2012.

Year	Stocking	Age-0 CPH	80% C.I.	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	80% C.I.	Mean length (range; mm)	Wr
2012	fingerling	1	0-2		186 (180-192)	93	2	1-3	280	91
2011	none	25	11-39		167 (141-210)	98	24	18-30	267 (239-310)	86
2010	none	50	16-84		185 (160-210)	83	18	10-26	283 (260-325)	84
2009	fingerling	37	15-59	59	183 (156-226)	91	1	0-2	250	91
2008	none	8	3-13		180 (156-211)	89	2	1-3	301 (287-305)	88
2001	none	73	33-111		187 (145-218)		2	0-3	267 (255-273)	
2000	none	21	9-33		173 (141-203)		23		230 (207-270)	

## **Black Crappie**

**Management objective:** Maintain a black crappie population with a trap net CPUE of at least 20.

Black crappie trap-net CPUE has declined for the third straight year and remains well below the abundance objective (Table 11). Most of the population consists of two year classes naturally produced in 2009 and 2011 (Table 12, Figure 2), but they were not large enough to increase overall abundance. The crappies sampled were in excellent condition (Table 11) and they grow faster than statewide and regional means (Table 12).

**Table 11.** Black crappie trap-net CPUE, PSD, and mean Wr for Lake Mitchell, Davison County, 2003-2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	12.0	5.4	3.8	49.5	9.3	1.6	2.2	10.5	8.6	3.8	11.7
PSD	90	95	77	3	50	59	86	75	87	63	66
RSD-P	3	27	60	0	2	3	7	23	15	50	14
Mean Wr	105	102	110	113	109	105	110	99	104	105	108

\* 10 years (2002-2011)

**Table 12.** Average back-calculated lengths (mm) for each age class of black crappie in Lake Mitchell, Davison County, 2012.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2011	1	14	107								
2010	2	6	114	224							
2009	3	11	97	194	239						
2008	4	6	97	180	235	257					
2007	5	1	81	118	200	241	262				
<b>All Classes</b>			<b>99</b>	<b>179</b>	<b>225</b>	<b>249</b>	<b>262</b>				
Statewide Mean			83	147	195	229	249				
Region III Mean			95	167	219	253	274				
LLI Mean			89	161	210	247	271				

## **Bluegill**

**Management objective:** Maintain a bluegill population with a trap net CPUE of at least 20.

Bluegill abundance has increased significantly since 2011 and is approaching the management objective (Table 13). PSD, RSD-18, and RSD-P values have also increased which indicates the overall size structure of the population has also improved. Bluegill grow rates are excellent (Table 14) and sampled fish were in good condition (Table 13).

**Table 13.** Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Lake Mitchell, Davison County, 2003-2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean*
CPUE	31.1	6.4	19.8	53.4	39.2	17.2	4.3	24.2	7.6	18.7	23.9
PSD	99	76	52	56	87	86	84	58	59	97	75
RSD-18	67	66	39	9	29	61	71	40	32	91	50
RSD-P	57	63	30	5	3	13	53	20	8	48	33
Mean Wr	112	99	117	107	107	111	106	100	114	111	109

\* 10 years (2002-2011)

**Table 14.** Average back-calculated lengths (mm) for each age class of bluegill in Lake Mitchell, Davison County, 2012.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2011	1	7	52								
2009	3	11	51	112	182						
2008	4	84	69	127	166	186					
2007	5	55	50	103	161	181	195				
2006	6	32	52	93	140	170	186	195			
<b>All Classes</b>		<b>189</b>	<b>55</b>	<b>109</b>	<b>162</b>	<b>179</b>	<b>190</b>	<b>195</b>			
Statewide Mean			55	103	141	166	180				
Region III Mean			60	116	157	180	190				
LLI Mean			62	109	149	173	180				

## Other Species

The sharp increase in channel catfish gill-net CPUE was due to high catches in two of the six gill net sets (Table 15). CPUE of all other species sampled is consistent with previous surveys.

**Table 15.** Gill-net (GN) or trap-net (TN) CPUE for all fish species sampled in Lake Mitchell, Davison County, 2003-2012.

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>COC (GN)</b>	--	0.3	1.9	1.2	1.0	0.5	0.7	0.5	0.6	1.0
<b>COC (TN)</b>	2.1	2.6	4.8	2.4	1.7	2.6	6.3	2.6	2.7	3.6
<b>RIC (GN)</b>	--	--	0.1	--	--	--	--	--	--	--
<b>RIC (TN)</b>	--	--	--	--	--	--	--	--	--	--
<b>WHS (GN)</b>	--	0.8	0.8	1.2	0.3	0.5	0.8	2.5	6.8	0.2
<b>WHS (TN)</b>	0.3	0.1	0.6	0.1	0.3	0.1	0.3	0.9	0.9	0.3
<b>BIB (GN)</b>	1.0	--	--	--	--	--	0.2	--	--	--
<b>BIB (TN)</b>	--	--	0.1	--	0.2	--	--	0.1	--	--
<b>SHR (GN)</b>	20.0	9.3	6.0	7.7	0.3	0.2	0.8	0.3	1.4	1.8
<b>SHR (TN)</b>	5.6	6.8	10.2	3.3	2.9	1.7	1.1	2.4	2.1	1.0
<b>BLB (GN)</b>	--	0.3	--	--	0.3	1.5	0.2	4.3	2.8	3.0
<b>BLB (TN)</b>	0.2	--	0.2	0.7	--	--	0.3	0.2	--	0.7
<b>BCF (GN)</b>	--	--	--	--	--	--	--	--	--	--
<b>BCF (TN)</b>	--	--	--	--	--	--	0.1	--	--	--
<b>CCF (GN)</b>	15.0	3.3	5.3	4.3	6.0	2.7	4.2	5.7	1.2	25.3
<b>CCF (TN)</b>	16.8	3.9	3.2	1.5	1.2	24.4	6.0	1.8	3.1	1.9
<b>FCF (GN)</b>	--	--	--	--	--	--	--	0.2	--	--
<b>FCF (TN)</b>	--	--	--	--	0.1	0.1	0.1	0.1	0.3	--
<b>NOP (GN)</b>	--	0.5	0.6	0.5	0.3	1.2	1.8	0.5	3.0	0.7
<b>NOP (TN)</b>	0.3	0.5	0.2	0.4	0.1	0.2	0.3	0.2	0.1	0.1
<b>GSF (GN)</b>	--	--	--	--	--	--	--	--	--	--
<b>GSF (TN)</b>	0.3	--	--	0.1	0.1	0.1	--	--	0.2	--
<b>HYB (GN)</b>	--	--	--	--	--	--	--	--	--	--
<b>HYB (TN)</b>	--	--	--	--	--	0.1	--	0.1	0.2	--
<b>OSF (GN)</b>	--	--	--	--	--	--	--	--	--	--
<b>OSF (TN)</b>	--	--	0.1	--	--	--	--	--	--	--
<b>BLG (GN)</b>	0.7	0.8	0.9	0.8	--	--	0.2	0.3	0.2	0.5
<b>BLG (TN)</b>	31.1	6.4	19.8	53.4	39.2	17.2	4.3	24.2	7.6	18.7
<b>SMB (GN)</b>	0.3	--	--	--	--	--	--	--	0.8	0.2
<b>SMB (TN)</b>	0.6	0.1	0.3	0.3	--	0.5	0.4	1.6	1.1	0.5
<b>LMB (GN)</b>	--	--	--	--	--	--	--	--	--	--
<b>LMB (TN)</b>	0.3	0.1	0.2	1.6	--	--	--	--	--	--
<b>WHC (GN)</b>	0.3	0.2	--	--	--	--	--	--	--	--
<b>WHC (TN)</b>	--	0.1	--	0.2	0.3	--	--	0.2	0.1	--
<b>BLC (GN)</b>	2.7	0.3	0.5	5.2	0.4	0.3	0.5	0.2	--	2.7
<b>BLC (TN)</b>	12.0	5.4	3.8	49.5	9.3	1.6	2.3	10.5	8.6	3.8
<b>SAR (GN)</b>	--	--	--	--	0.1	--	--	--	--	--
<b>SAR (TN)</b>	--	--	--	--	--	--	--	--	--	--
<b>WAE (GN)</b>	3.3	1.8	1.1	2.0	1.0	2.7	2.0	3.3	9.2	3.3
<b>WAE (TN)</b>	--	0.4	0.4	--	0.4	0.6	0.3	0.3	--	--
<b>FRD (GN)</b>	6.3	6.7	10.0	7.0	9.9	3.5	2.2	5.2	5.0	12.0
<b>FRD (TN)</b>	0.3	1.2	0.2	0.5	0.5	0.7	0.1	0.3	0.2	1.6

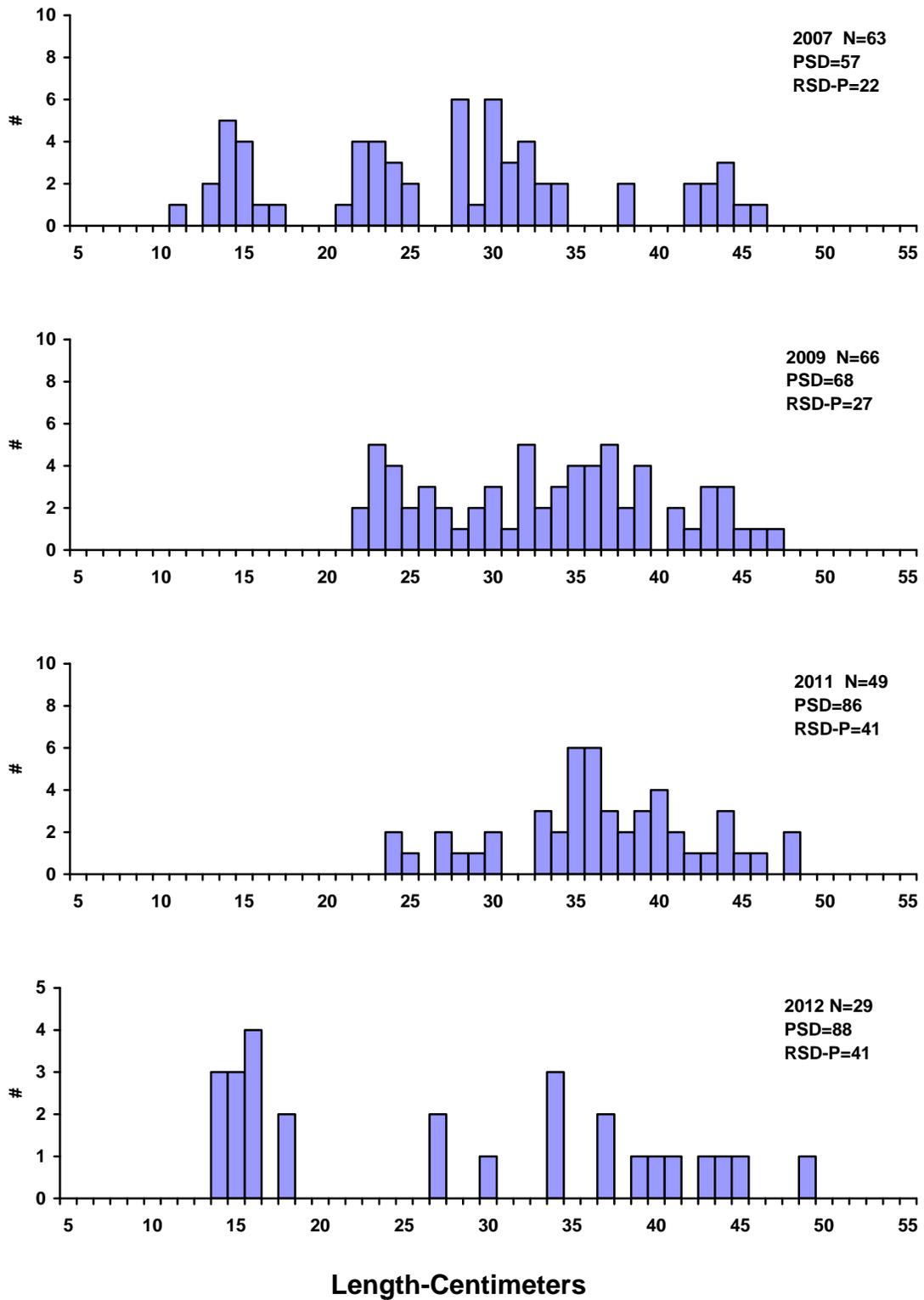
COC (Common Carp), RIC (River Carpsucker), WHS (White Sucker), BIB (Bigmouth Buffalo), SHR (Shorthead Redhorse), BLB (Black Bullhead), BCF (Blue Catfish), CCF (Channel Catfish), FCF (Flathead Catfish), NOP (Northern Pike), GSF (Green Sunfish), HYB (Hybrid Sunfish), OSF (Orange-spotted Sunfish), BLG (Bluegill), SMB (Smallmouth Bass), LMB (Largemouth Bass), WHC (White Crappie), BLC (Black Crappie), SAR (Sauger), WAE (Walleye), FRD (Freshwater Drum),

## MANAGEMENT RECOMMENDATIONS

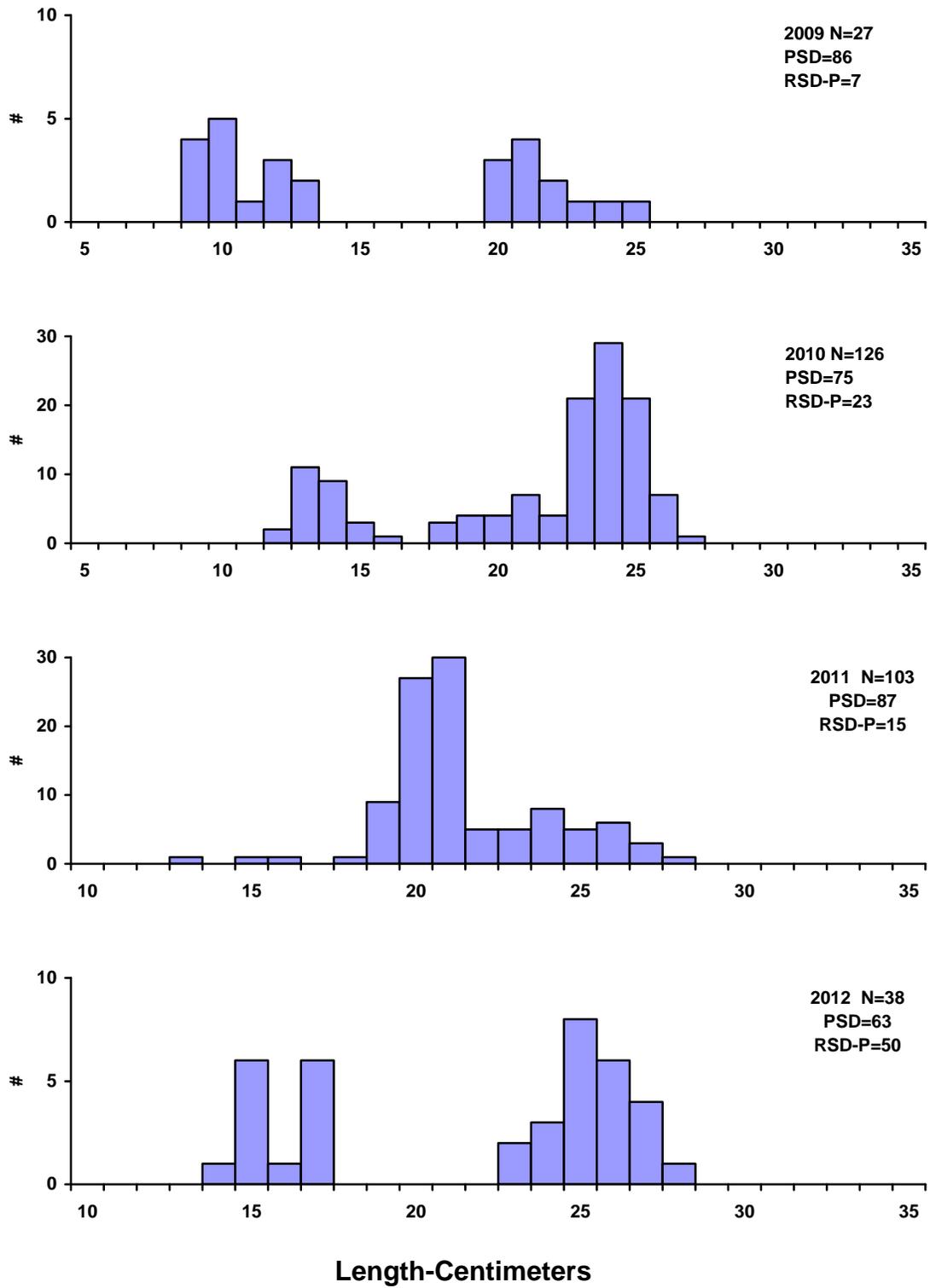
1. Monitor the Lake Mitchell fishery with annual netting surveys to sample the general fish population and biennial electrofishing surveys to sample the bass population.
2. Work with the city of Mitchell and local sportsmen to preserve and enhance water quality and aquatic habitat.
3. Continue to stock OTC-marked walleye fingerlings in an attempt to accomplish the management objective. Conduct fall electrofishing surveys annually to evaluate contributions of stocked and naturally-produced fish to the fishery.
4. Consider the stocking of hatchery-produced yearling largemouth bass as needed to achieve the management objective.

**Table 16.** Stocking record for Lake Mitchell, Davison County, 1991-2012.

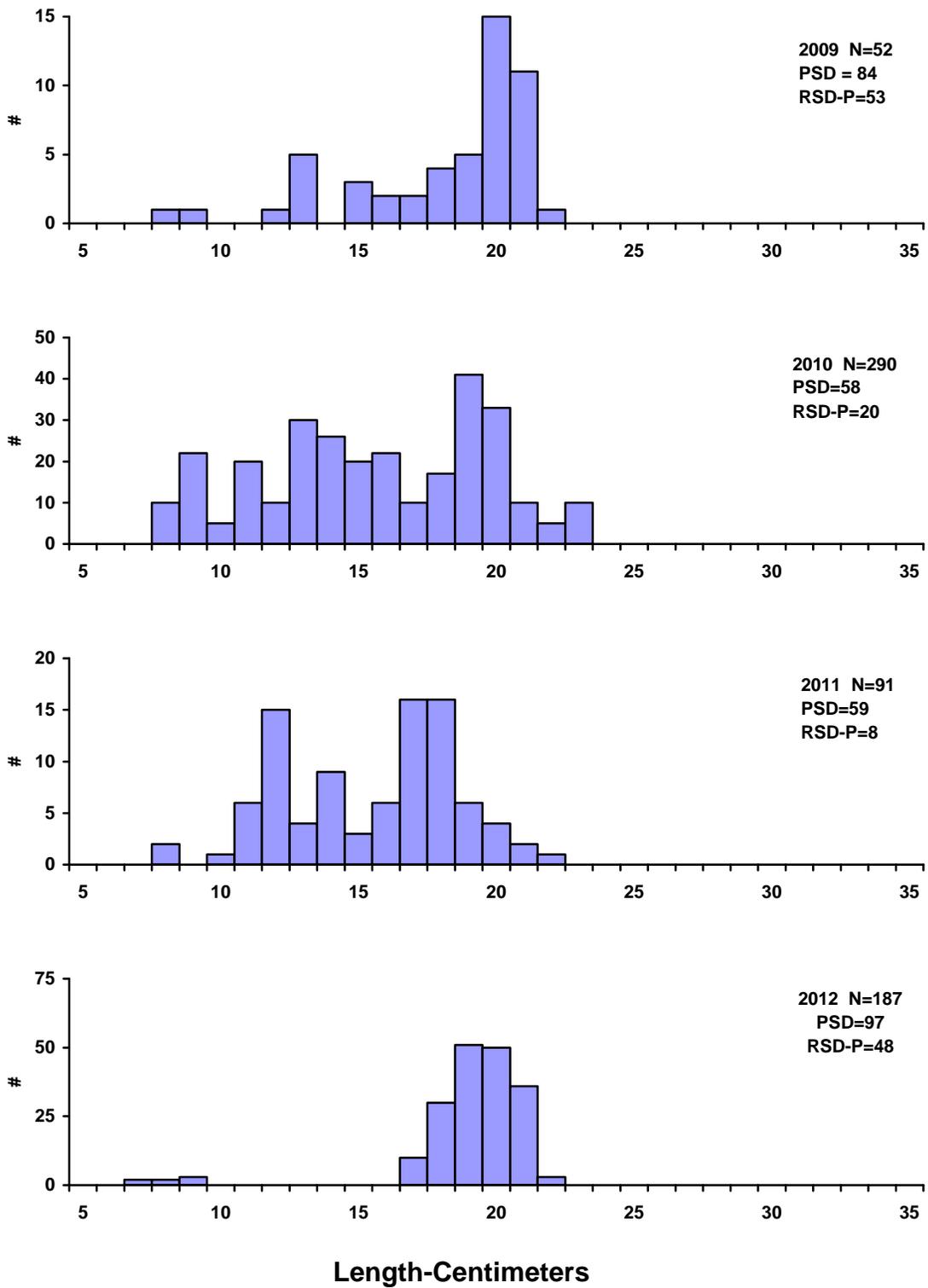
<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
1991	67,000	Saugeye	Fingerling
1992	35,000	Largemouth Bass	Fingerling
	67,000	Saugeye	Fingerling
	35,000	Smallmouth Bass	Fingerling
1993	82,900	White Crappie	Fingerling
	70,000	Walleye	Fingerling
	67,200	Smallmouth Bass	Fingerling
1994	13,125	Channel Catfish	Fingerling
1995	12,438	Black Crappie	Adult
	67,000	Walleye	Fingerling
1996	22,746	Black Crappie	Fingerling
	3,198	Black Crappie	Adult
	42,500	Smallmouth Bass	Fingerling
1997	254,205	Walleye	Fingerling
1999	73,700	Walleye	Fingerling
	13,850	Walleye	Large Fingerling
2003	20,640	Black Crappie	Fingerling
2006	67,760	Walleye	Fingerling
2007	5,192	Walleye	Large Fingerling
2009	67,500	Walleye	Fingerling
2012	67,340	Walleye	Fingerling



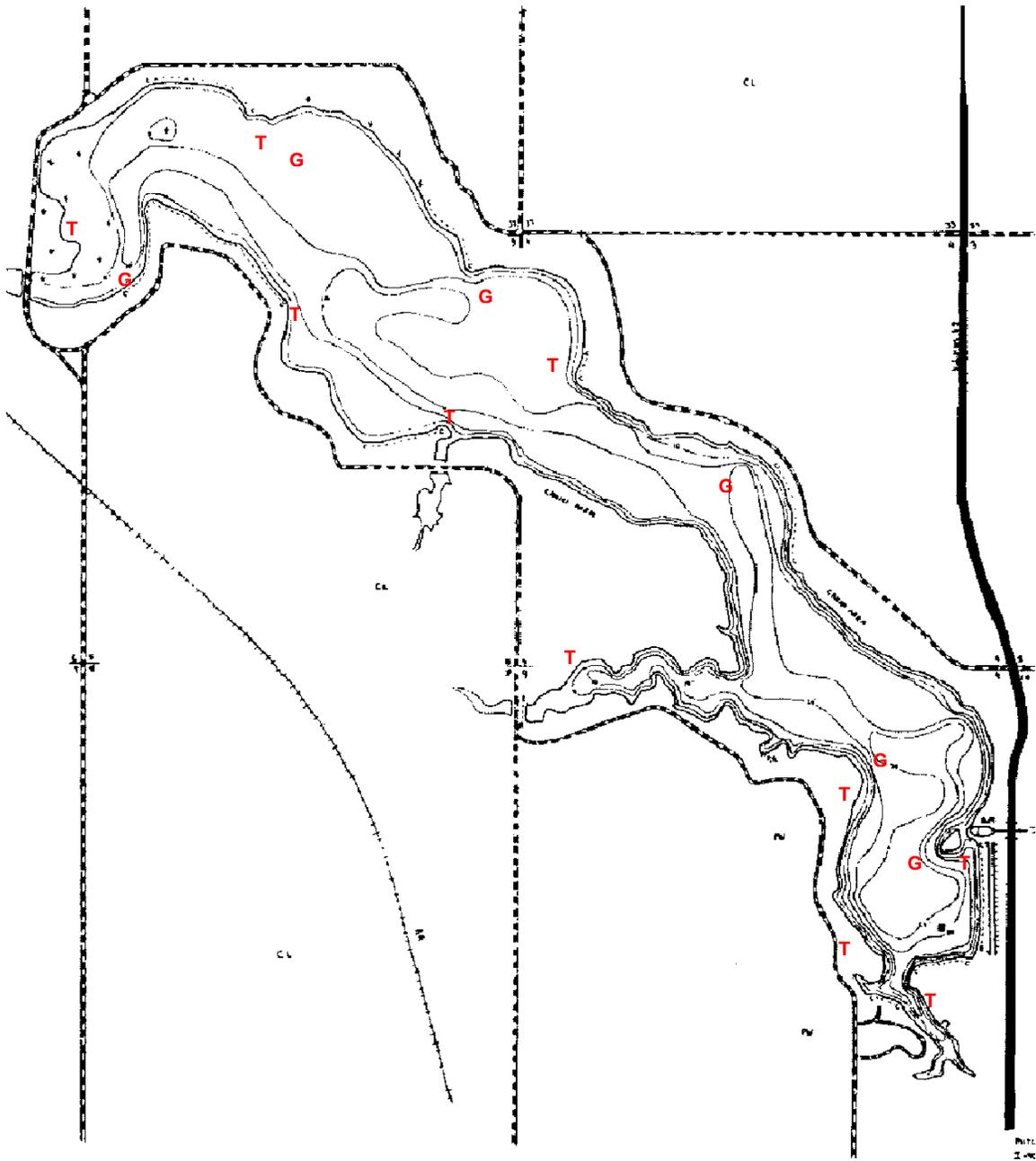
**Figure 1.** Length frequency histograms for largemouth bass sampled by electrofishing in Lake Mitchell, Davison County, 2007, 2009, 2011 and 2012.



**Figure 2.** Length frequency histograms for black crappies sampled with trap nets in Lake Mitchell, Davison County, 2009-2012.



**Figure 3.** Length frequency histograms for bluegill sampled with trap nets in Lake Mitchell, Davison County, 2009-2012.



**Legend**  
 Gill Nets: G  
 Trap Nets: T

**Figure 4.** Sampling locations on Lake Mitchell, Davison 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).

<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.