

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-44

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 4-6, 2011 (netting), June 6 and 15, 2011 (electrofishing for largemouth bass), September 6, 2011 (electrofishing for walleye)

Date last surveyed: July 6-8, 2010 (netting), September 30, 2010 (electrofishing for walleye)

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

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.

BIOLOGICAL DATA

Methods:

Lake Mitchell was sampled on July 4-6, 2011 with five 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 6, 2011 to monitor walleye recruitment. Sampling locations are displayed in Figure 4.

Gill Net Catch

Walleye and white sucker were the most common species caught in the gill nets. The sample also included smaller numbers of eight other species (Table 1).

Table 1. Total catch from five overnight gill net sets at Lake Mitchell, Davison County, July 4-6, 2011.

Species	Number	Percent	CPUE ¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Walleye	46	29.7	9.2	<u>+1.2</u>	2.2	5	0	82
White Sucker	34	21.9	6.8	<u>+3.7</u>	0.7	97	35	98
Freshwater Drum	25	16.1	5.0	<u>+1.7</u>	7.6	75	4	92
Northern Pike	15	9.7	3.0	<u>+1.5</u>	0.6	33	7	78
Black Bullhead	14	9.0	2.8	<u>+2.3</u>	0.9	54	0	102
Shorthead Redhorse	7	4.5	1.4	<u>+1.3</u>	6.4	--	--	--
Channel Catfish	6	3.9	1.2	<u>+0.7</u>	7.3	--	--	--
Smallmouth Bass	4	2.6	0.8	<u>+0.6</u>	1.7	--	--	--
Common Carp	3	1.9	0.6	<u>+0.8</u>	0.8	--	--	--
Bluegill	1	0.6	0.2	<u>+0.3</u>	0.5	--	--	--

* 10 years (2001-2010)

Table 2. Catch per unit effort by length category for various fish species captured by gill nets in Lake Mitchell July 4-6, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Walleye	1.2	8.0	7.6	0.4	--	9.2	<u>+1.2</u>
White Sucker	--	6.8	0.2	4.2	2.4	6.8	<u>+3.7</u>
Freshwater Drum	0.2	4.8	1.2	3.4	0.2	5.0	<u>+1.7</u>
Northern Pike	--	3.0	2.0	0.8	0.2	3.0	<u>+1.5</u>
Black Bullhead	0.2	2.6	1.2	1.4	--	2.8	<u>+2.3</u>
Shorthead Redhorse	--	1.4	--	0.2	1.2	1.4	<u>+1.3</u>
Channel Catfish	--	1.2	0.6	0.6	--	1.2	<u>+0.7</u>
Smallmouth Bass	--	0.8	0.8	--	--	0.8	<u>+0.6</u>
Common Carp	--	0.6	0.2	--	0.4	0.6	<u>+0.8</u>
Bluegill	--	0.2	--	0.2	--	0.2	<u>+0.3</u>

Length categories can be found in Appendix A.

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

Trap Net Catch

Black crappie and bluegill comprised over 60 percent of the trap net catch this year. (Table 3). Eleven additional species were also sampled.

Table 3. Total catch from twelve overnight trap net sets at Lake Mitchell, Davison County, July 4-6, 2011.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	103	31.9	8.6	+5.4	14.2	87	15	104
Bluegill	91	28.2	7.6	+2.9	26.7	59	8	114
Channel Catfish	37	11.5	3.1	+1.9	6.6	51	11	92
Common Carp	32	9.9	2.7	+1.7	3.0	63	22	95
Shorthead Redhorse	25	7.7	2.1	+1.5	5.6	100	96	92
Smallmouth Bass	13	4.0	1.1	+0.5	0.5	15	15	92
White Sucker	11	3.4	0.9	+0.6	0.3	100	100	100
Flathead Catfish	3	0.9	0.3	+0.2	0.0	--	--	--
Green Sunfish	2	0.6	0.2	+0.1	0.6	--	--	--
Freshwater Drum	2	0.6	0.2	+0.1	0.3	--	--	--
Hybrid Sunfish	2	0.6	0.2	+0.1	0.0	--	--	--
White Crappie	1	0.3	0.1	+0.1	0.2	--	--	--
Northern Pike	1	0.3	0.1	+0.1	0.3	--	--	--

* 10 years (2001-2010)

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Lake Mitchell July 4-6, 2011.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Crappie	--	8.6	1.1	5.2	1.3	8.6	+5.4
Bluegill	--	7.6	3.1	3.9	0.6	7.6	+2.9
Channel Catfish	--	3.1	1.5	1.3	0.3	3.1	+1.9
Common Carp	--	2.7	1.0	1.1	0.6	2.7	+1.7
Shorthead Redhorse	--	2.1	--	0.1	2.0	2.1	+1.5
Smallmouth Bass	--	1.1	0.9	--	0.2	1.1	+0.5
White Sucker	--	0.9	--	--	0.9	0.9	+0.6
Flathead Catfish	--	0.3	0.2	0.1	--	0.3	+0.2
Green Sunfish	--	0.2	--	0.2	--	0.2	+0.1
Freshwater Drum	0.1	0.1	0.1	--	--	0.2	+0.1
Hybrid Sunfish*	--	--	--	--	--	0.2	+0.1
White Crappie	--	0.1	--	--	0.1	0.1	+0.1
Northern Pike	--	0.1	--	--	0.1	0.1	+0.1

* No length categories established. 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 and 15, 2011.

Species	Number	CPUE	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	49	24.5	27.1	86	41	100

*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 stock length (20 cm or 8 inches) or greater fish and an RSD-P range of 20-40.

Although largemouth bass CPH has decreased since 2009, it remains above the management objective (Table 6). No substock-length fish were sampled this year and both CPH and RSD-P exceeded our management objective. Seven year classes were represented in the catch suggesting relatively consistent natural reproduction since no bass have been stocked since 1992 (Table 7). The size distribution of the population was relatively uniform and sampled fish ranged in length from 24 to 48 cm (9.4-18.9 in; Figure 1).

Mean growth is slower than regional averages (Table 7) but faster than statewide and large lakes and impoundments means. The sampled fish were in good condition with a mean Wr of 100 (Table 6).

Table 6. Largemouth bass electrofishing CPUE, PSD, RSD-P, and mean Wr for Lake Mitchell, Davison County, 1999-2011.

	1999	2001	2003	2005	2007	2009	2011	Mean*
CPUE	19.0	19.5	44.0	12.5	31.5	36.0	24.5	27.1
PSD	97	62	16	91	57	69	86	65
RSD-P	26	44	12	22	22	26	41	25
Mean Wr	106	99	107	109	104	106	100	105

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

Table 7. Average back-calculated lengths (mm) for each age class of largemouth bass in Lake Mitchell, Davison County, 2011.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2008	3	7	114	193	264						
2007	4	9	123	214	275	328					
2006	5	14	107	177	261	315	348				
2005	6	4	83	162	232	286	329	362			
2004	7	7	99	212	277	335	374	399	419		
2003	8	5	126	211	295	338	362	384	403	417	
2001	10	1	113	185	249	326	379	432	445	456	
All Classes		47	109	193	264	321	358	394	423	437	
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 in 2011 was the highest observed since 2002 and now surpasses the management objective (Table 8). The increase in abundance cannot be attributed entirely to stocking since stocking has seldom produced a strong year class. For example, stocking contributed only 59% to the moderate 2009 year class.

Table 8. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Lake Mitchell, Davison County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Mean*
CPUE	3.0	3.3	1.8	1.1	2.0	1.0	2.7	2.0	3.3	9.2	2.2
PSD	45	10	45	--	92	--	33	58	55	5	48
RSD-P	18	0	0	--	8	--	0	8	0	0	5
Mean Wr	90	85	85	--	89	--	85	86	83	82	86

*10 years (2001-2010)

Another moderate walleye year class was naturally-produced in 2011 and the condition of these age-0 fish was excellent (Table 9). Some age-0 walleyes have been present in all five non-stocked years indicating consistent natural reproduction. Many age-0 walleyes were observed on the west end of the lake while fall electrofishing for channel catfish and this area will be considered as a future walleye recruitment sampling location. Age-1 walleyes were abundant relative to the 2010 age-0 sample and they were of average length and condition.

Table 9. Age-0 and age-1 walleyes sampled during 2 hours of nighttime electrofishing on Lake Mitchell, Davison County, 2000-2011.

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
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 fishery with a trap net CPUE of at least 20 and PSD of at least 40.

The black crappie trap net CPUE decreased slightly and remains below the abundance objective (Table 10). Population size structure and growth were excellent (Tables 10 and 11) and condition (Wr) was reasonably good, but below the 10-year average.

Table 10. Black crappie trap-net CPUE, PSD, and mean Wr for Lake Mitchell, Davison County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Mean*
CPUE	14.5	12.0	5.4	3.8	49.5	9.3	1.6	2.2	10.5	8.6	14.1
PSD	39	90	95	77	3	50	59	86	75	87	65
RSD-P	3	3	27	60	0	2	3	7	23	15	13
Mean Wr	120	105	102	110	113	109	105	110	99	104	109

*10 years (2001-2010)

Table 11. Average back-calculated lengths (mm) for each age class of black crappie in Lake Mitchell, Davison County, 2011.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2010	1	3	108								
2009	2	62	90	189							
2008	3	30	87	168	218						
2007	4	8	114	196	242	265					
All Classes		103	100	184	230	265					
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 fishery with a trap net CPUE of at least 20 and RSD-18 of at least 20.

Bluegill CPUE and RSD-P have decreased since 2010 (Table 12). Most of the bluegills sampled were from the 2008 and 2009 year classes (Table 13 and Figure 3). Growth is better than statewide, regional and small lakes and impoundments averages for age-3 and older fish (Table 13) and condition is very good.

Table 12. Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Lake Mitchell, Davison County, 2002-2011.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Mean*
CPUE	36.1	31.1	6.4	19.8	53.4	39.2	17.2	4.3	24.2	7.6	26.7
PSD	93	99	76	52	56	87	86	84	58	59	79
RSD-18	89	67	66	39	9	29	61	71	40	32	56
RSD-P	73	57	63	30	5	3	13	53	20	8	34
Mean Wr	116	112	99	117	107	107	111	106	100	114	109

*10 years (2001-2010)

Table 13. Average back-calculated lengths (mm) for each age class of bluegill in Lake Mitchell, Davison County, 2011.

Year Class	Age	N	Back-calculation Age								
			1	2	3	4	5	6	7	8	
2010	1	3	70								
2009	2	41	50	109							
2008	3	35	52	110	169						
2007	4	11	50	102	167	187					
2006	5	1	40	92	138	174	203				
All Classes		91	52	108	168	186	203				
Statewide Mean			55	103	141	166	180				
Region III Mean			60	116	157	180	190				
LLI Mean			62	109	149	173	180				

All Species

Walleye, northern pike and white sucker gill-net CPUE increased in 2011 (Table 14). Flathead catfish CPUE also increased from two to three fish sampled. The CPUE for all other species was within previously observed ranges (Table 14). Lake Mitchell has a diverse fish community with 15 species sampled this year and 21 species sampled in the past ten years (Table 14).

Table 14. Gill-net (GN) or trap-net (TN) CPUE for all fish species sampled in Lake Mitchell, Davison County, 2002-2011.

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
COC (GN)	1.0	--	0.3	1.9	1.2	1.0	0.5	0.7	0.5	0.6
COC (TN)	1.5	2.1	2.6	4.8	2.4	1.7	2.6	6.3	2.6	2.7
RIC (GN)	--	--	--	0.1	--	--	--	--	--	--
RIC (TN)	--	--	--	--	--	--	--	--	--	--
WHS (GN)	0.2	--	0.8	0.8	1.2	0.3	0.5	0.8	2.5	6.8
WHS (TN)	0.6	0.3	0.1	0.6	0.1	0.3	0.1	0.3	0.9	0.9
BIB (GN)	0.2	1.0	--	--	--	--	--	0.2	--	--
BIB (TN)	--	--	--	0.1	--	0.2	--	--	0.1	--
SHR (GN)	9.5	20.0	9.3	6.0	7.7	0.3	0.2	0.8	0.3	1.4
SHR (TN)	9.5	5.6	6.8	10.2	3.3	2.9	1.7	1.1	2.4	2.1
BLB (GN)	0.3	--	0.3	--	--	0.3	1.5	0.2	4.3	2.8
BLB (TN)	0.4	0.2	--	0.2	0.7	--	--	0.3	0.2	--
BCF (GN)	--	--	--	--	--	--	--	--	--	--
BCF (TN)	--	--	--	--	--	--	--	0.1	--	--
CCF (GN)	7.3	15.0	3.3	5.3	4.3	6.0	2.7	4.2	5.7	1.2
CCF (TN)	2.4	16.8	3.9	3.2	1.5	1.2	24.4	6.0	1.8	3.1
FCF (GN)	--	--	--	--	--	--	--	--	0.2	--
FCF (TN)	--	--	--	--	--	0.1	0.1	0.1	0.1	0.3
NOP (GN)	--	--	0.5	0.6	0.5	0.3	1.2	1.8	0.5	3.0
NOP (TN)	0.5	0.3	0.5	0.2	0.4	0.1	0.2	0.3	0.2	0.1
GSF (GN)	--	--	--	--	--	--	--	--	--	--
GSF (TN)	--	0.3	--	--	0.1	0.1	0.1	--	--	0.2
HYB (GN)	--	--	--	--	--	--	--	--	--	--
HYB (TN)	0.2	--	--	--	--	--	0.1	--	0.1	0.2
OSF (GN)	--	--	--	--	--	--	--	--	--	--
OSF (TN)	--	--	--	0.1	--	--	--	--	--	--
BLG (GN)	0.3	0.7	0.8	0.9	0.8	--	--	0.2	0.3	0.2
BLG (TN)	36.1	31.1	6.4	19.8	53.4	39.2	17.2	4.3	24.2	7.6
SMB (GN)	--	0.3	--	--	--	--	--	--	--	0.8
SMB (TN)	0.4	0.6	0.1	0.3	0.3	--	0.5	0.4	1.6	1.1
LMB (GN)	--	--	--	--	--	--	--	--	--	--
LMB (TN)	0.5	0.3	0.1	0.2	1.6	--	--	--	--	--
WHC (GN)	0.2	0.3	0.2	--	--	--	--	--	--	--
WHC (TN)	0.5	--	0.1	--	0.2	0.3	--	--	0.2	0.1
BLC (GN)	0.5	2.7	0.3	0.5	5.2	0.4	0.3	0.5	0.2	--
BLC (TN)	14.5	12.0	5.4	3.8	49.5	9.3	1.6	2.3	10.5	8.6
SAR (GN)	--	--	--	--	--	0.1	--	--	--	--
SAR (TN)	--	--	--	--	--	--	--	--	--	--
WAE (GN)	3.0	3.3	1.8	1.1	2.0	1.0	2.7	2.0	3.3	9.2
WAE (TN)	0.9	--	0.4	0.4	--	0.4	0.6	0.3	0.3	--
FRD (GN)	17.8	6.3	6.7	10.0	7.0	9.9	3.5	2.2	5.2	5.0
FRD (TN)	1.0	0.3	1.2	0.2	0.5	0.5	0.7	0.1	0.3	0.2

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. 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.

Table 15. Stocking record for Lake Mitchell, Davison County, 1991-2011.

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

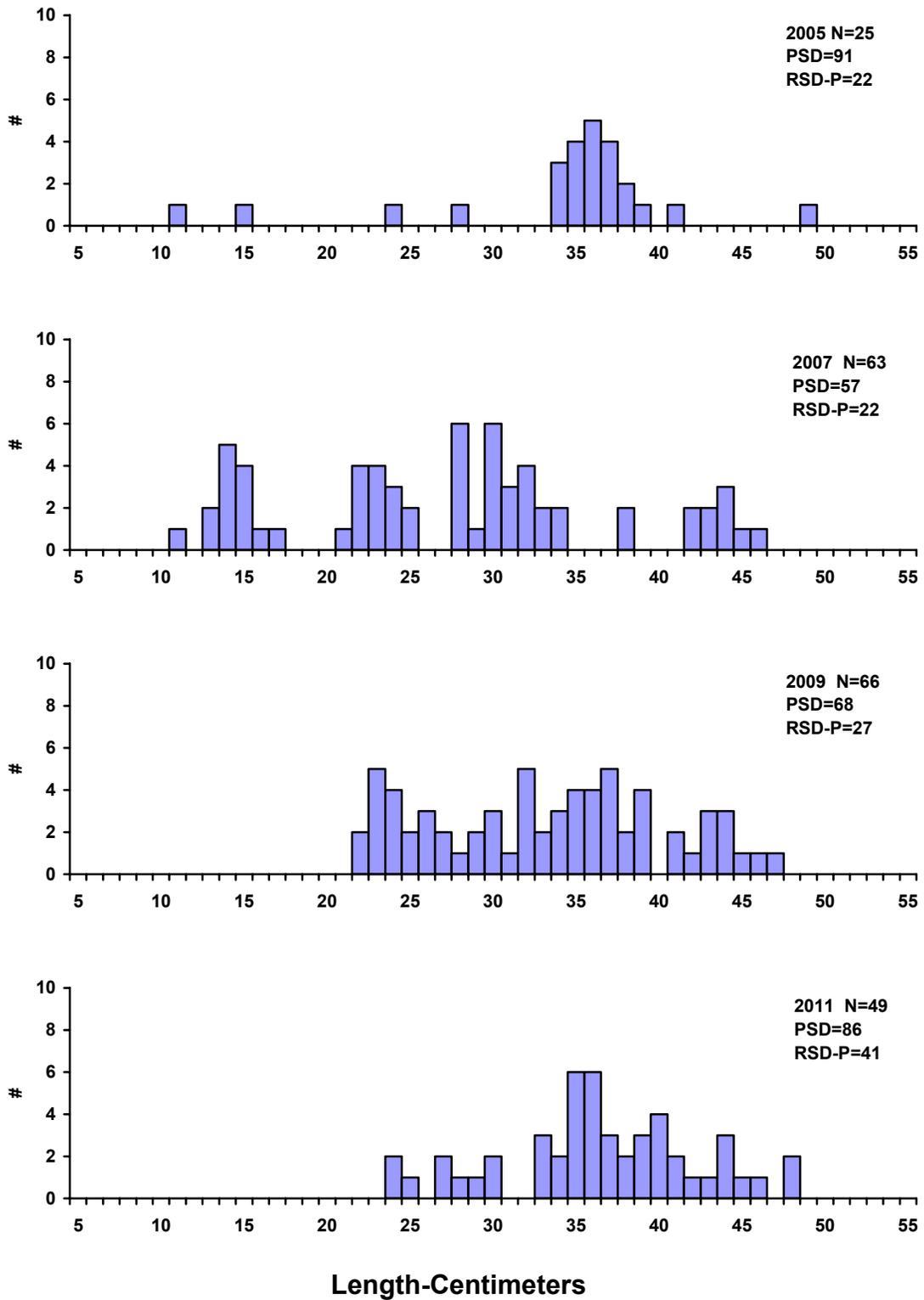


Figure 1. Length frequency histograms for largemouth bass sampled by electrofishing in Lake Mitchell, Davison County, 2005, 2007, 2009, and 2011.

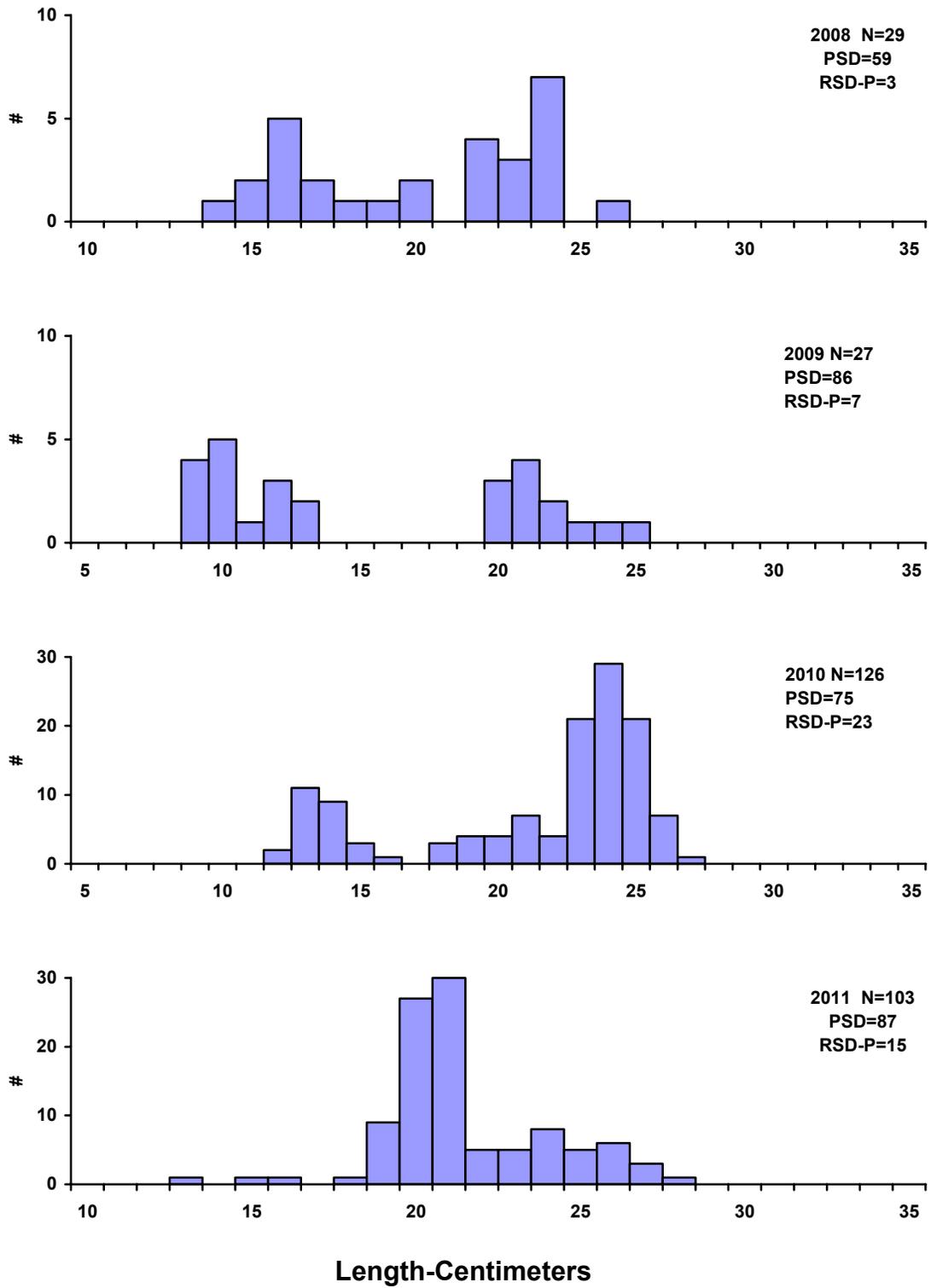


Figure 2. Length frequency histograms for black crappies sampled with trap nets in Lake Mitchell, Davison County, 2008-2011.

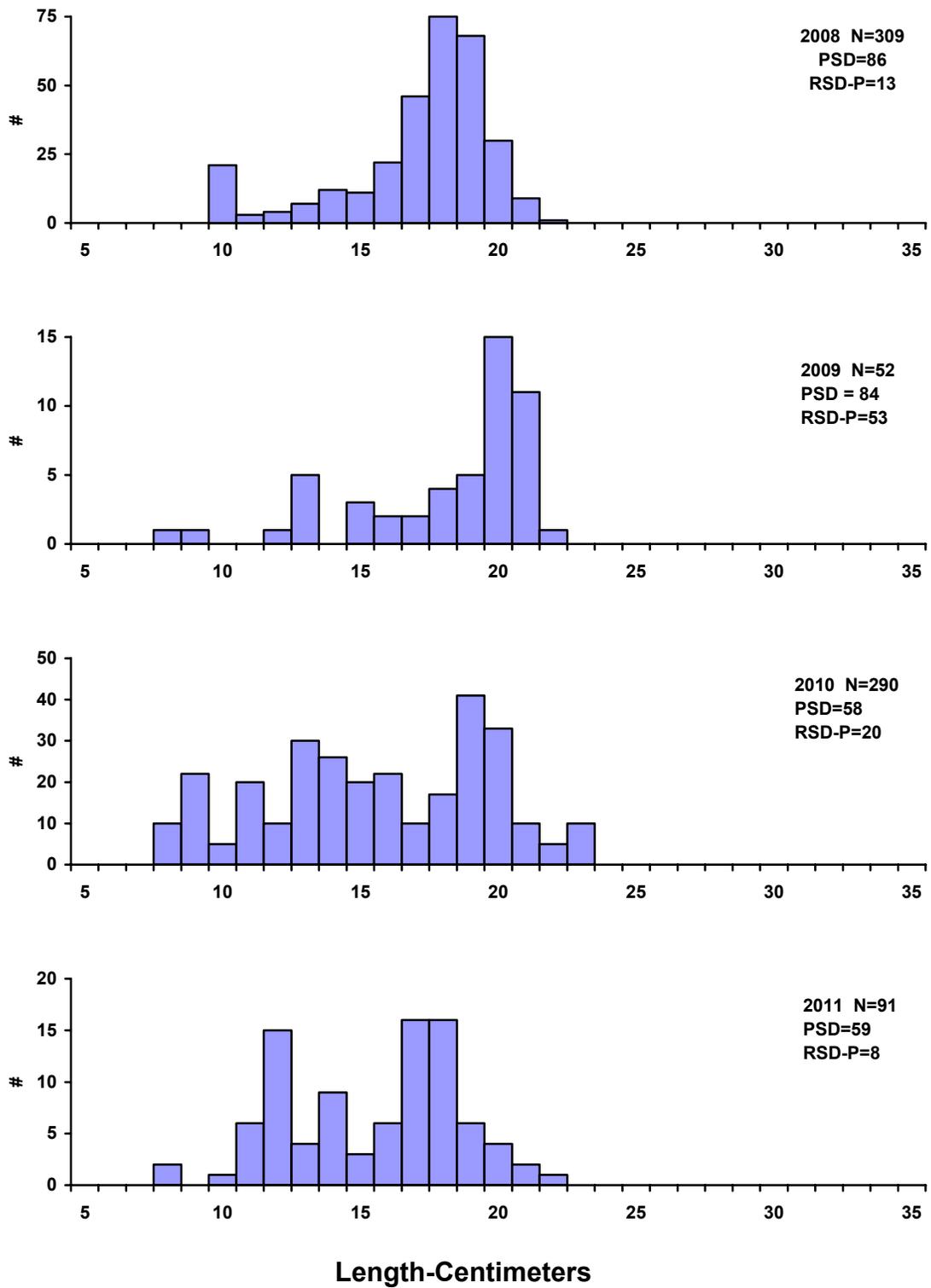
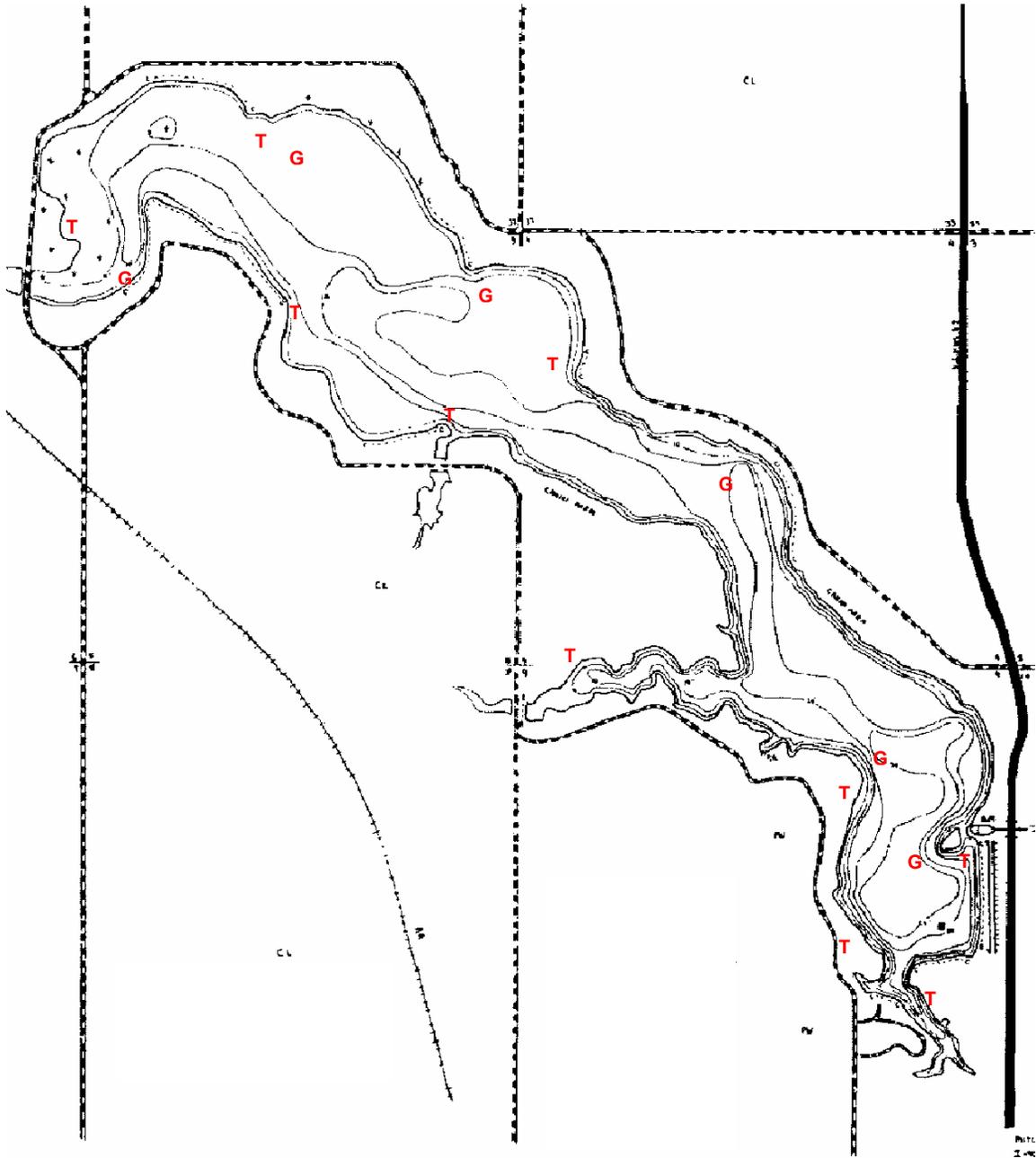


Figure 3. Length frequency histograms for bluegill sampled with trap nets in Lake Mitchell, Davison County, 2008-2011.



Legend
 Gill Nets: G
 Trap Nets: T

Figure 4. Sampling locations on Lake Mitchell, Davison County, 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 (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.