

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lake Mitchell, Davison County
2102-F-21-R-47
2014

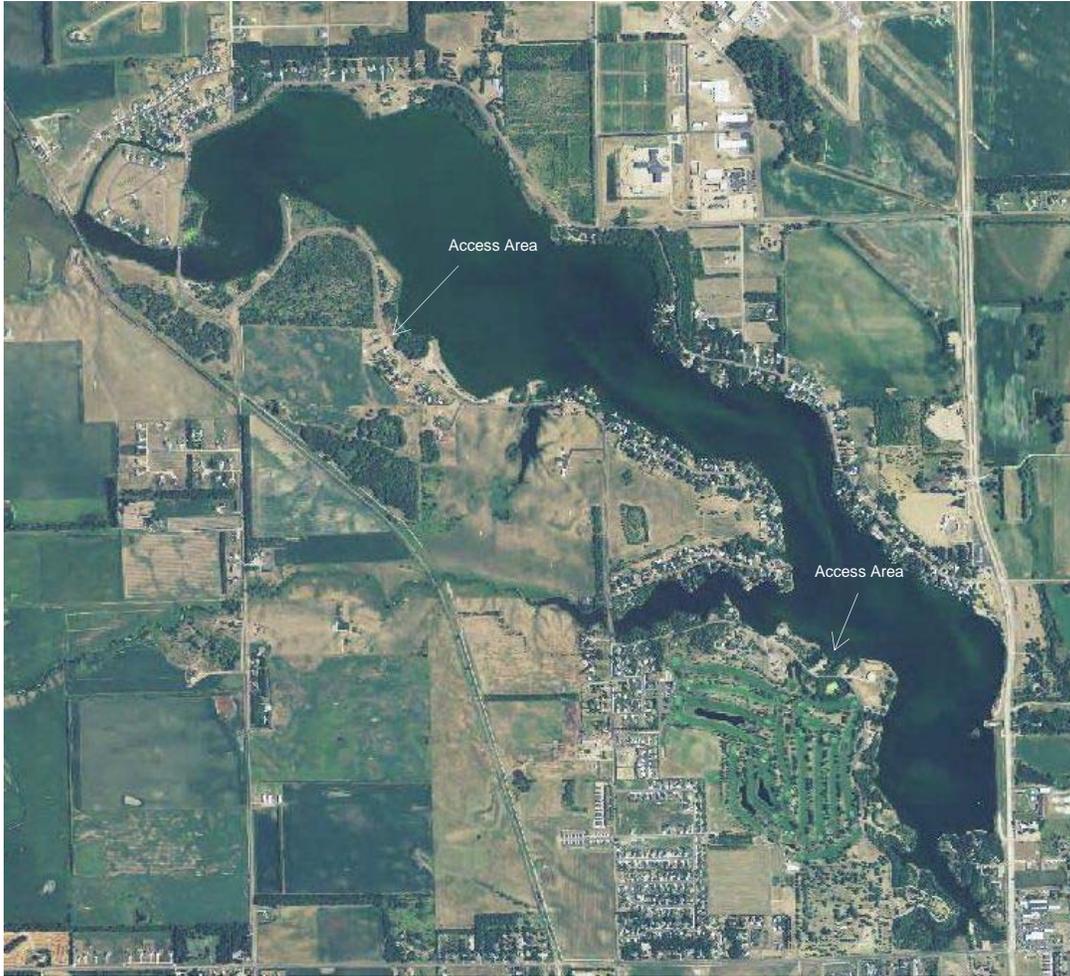


Figure 1. Lake Mitchell, Davison County

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

Location from nearest town: Northwest side of Mitchell, SD

Surface Area: 728 acres

Meandered (Y/N): No

OHWM elevation: none set

Outlet elevation: no data

Max. depth at outlet elevation: 29 feet

Observed water level: Full

Contour map available: Yes

Watershed area: 229,911 acres

Shoreline length: 10 miles

Date set: NA

Date set: NA

Mean depth at outlet elevation: 12.2 feet

Lake volume: 8,341 acre-/feet

Date mapped: 2012

DENR beneficial use classifications: (1) domestic water supply, (4) warm water permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering

Introduction

General

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 Lakeshore Properties

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

Fishing Access

The Northwest Access Area has a double lane boat ramp, boat dock, parking lot, and public toilets (Figure 1). The Southwest Access Area has a single lane boat ramp, dock, and parking lot. Numerous access areas and parks around the lake provide ample shore fishing opportunities. One handicapped-accessible fishing pier is located on the south side of the lake toward the west end and another is located in Kibbe Park on the northeast corner of the lake.

Water Quality and Aquatic Vegetation

Water clarity in Lake Mitchell was poorer during this survey and the previous three surveys (Table 1). 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. Curlyleaf pondweed (*Potamogeton crispus*), an invasive species, was not observed in 2014.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Mitchell, Davison County, 2005-2014.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2014	23 (74)	81 (32)	Sago pondweed beds and cattails
2013	27 (81)	127 (50)	Sago and curly leaf pondweed
2012	29 (84)	130 (51)	Sago and curly leaf pondweed
2011	27 (81)	137 (54)	Minimal vegetation
2010	26 (78)	76 (30)	Sago and longleaf pondweed, cattails
2009	24 (76)	67 (26)	Cattail, bulrush, milfoil, longleaf pondweed
2008	25 (77)	152 (60)	Sago pondweed in bays
2007	26 (78)	61 (24)	Sago pondweed in bays
2006	26 (79)	198 (78)	Small amounts of pondweeds
2005	27 (80)	89 (35)	Cattails, bulrush, and sago pondweed

Fish Community

Lake Mitchell contains a very diverse fish community and at least nine game species of interest to anglers (Table 2). All fish populations in the lake are self-sustaining by natural reproduction and only walleyes have been stocked in recent years in an attempt to increase their abundance (Table 4). The summer 2007 fish kill (Table 3) had a significant, but temporary, impact on black crappie abundance.

Table 2. Fish species commonly found in Lake Mitchell, Davison County.

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

Fish Management

Black crappie and bluegill populations are highly cyclical in Lake Mitchell. Variations in abundance are often incorrectly attributed to overfishing, and thus, GFP periodically is pressured to implement regulations to curb harvest. The reduction in daily bag limit from 25 to 10 sunfish, crappies, and yellow perch (each) in 2005 did not have a noticeable effect on abundance and panfish are now managed under statewide daily and possession limits (15 daily, 30 in possession). Natural reproduction supports a modest fishery for walleyes. Frequent fingerling stockings have been unsuccessful at increasing walleye abundance (Table 4). The lake also provides an excellent fishery for channel catfish which, based on the high abundance of larger fish, is probably underutilized.

Table 3. Fish kill history for Lake Mitchell, Davison County.

Year	Severity	Comments
2012	Severe	July 3, 2012-west canal-heavy algae bloom
2007	Moderate	BLC- July kill due to post-spawning stress and enviro. conditions
2006	Light	Late March in west end of lake

Table 4. Stocking history for Lake Mitchell, Davison County, 2005-2014.

Year	Number	Species	Size
2006	67,760	Walleye	Small Fingerling
2007	5,192	Walleye	Large Fingerling
2009	67,500	Walleye	Small Fingerling
2012	67,340	Walleye	Small Fingerling
2013	67,720	Walleye	Small Fingerling

Methods

Lake Mitchell was sampled on July 7-9, 2014 with four overnight gill nets and eight overnight trap nets. 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. 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. Two hours of nighttime electrofishing were done on September 8, 2014 to evaluate walleye reproduction and recruitment.

Results and Discussion

Net Catch Results

Channel catfish were the most abundant species in the gill nets followed by white crappies and walleye (Tables 5). Most fish sampled were stock length and larger (Table 6). Seven other species were observed in the gill nets. Black crappies were most abundant in the trap nets followed by channel catfish (Table 7). Nearly all crappies were sub-stock in length (Table 8). A few individuals from each of eight other species were sampled.

Table 5. Total catch from four overnight gill nets set in Lake Mitchell, Davison County, July 7-9, 2014.

Species	#	%	CPUE¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Channel Catfish	82	56.9	20.5	<u>+1.9</u>	8.8	32	6	85
White Crappie	17	11.8	4.3	<u>+5.0</u>	0.4	--	--	--
Walleye	11	7.6	2.8	<u>+1.4</u>	3.0	82	9	91
Common Carp	10	6.9	2.5	<u>+1.7</u>	1.1	100	60	--
Black Crappie	8	5.6	2.0	<u>+2.2</u>	1.2	--	--	--
Freshwater Drum	8	5.6	2.0	<u>+1.7</u>	5.8	--	--	--
Smallmouth Bass	4	2.8	1.0	<u>+0.9</u>	0.2	--	--	--
Shorthead Redhorse	2	1.4	0.5	<u>+0.4</u>	2.0	--	--	--
Largemouth Bass	1	0.7	0.3	<u>+0.3</u>	0.0	--	--	--
Northern Pike	1	0.7	0.3	<u>+0.3</u>	1.0	--	--	--

*10 years (2005-2014)

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

Table 6. CPUE by length category for selected species sampled with gill nets in Lake Mitchell, Davison County, July 7-9, 2014.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Channel Catfish	4.0	16.5	11.3	4.2	1.0	20.5	<u>+1.9</u>
White Crappie	3.5	0.8	0.8	--	--	4.3	<u>+5.0</u>
Walleye	--	2.8	0.5	2.0	0.3	2.8	<u>+1.4</u>
Common Carp	--	2.5	--	1.0	1.5	2.5	<u>+1.7</u>
Black Crappie	1.7	0.3	--	--	0.3	2.0	<u>+2.2</u>
Freshwater Drum	--	2.0	--	1.5	0.5	2.0	<u>+1.7</u>
Smallmouth Bass	0.3	0.7	--	--	0.7	1.0	<u>+0.9</u>
Shorthead Redhorse	--	0.5	--	--	0.5	0.5	<u>+0.4</u>
Largemouth Bass	0.3	--	--	--	--	0.3	<u>+0.3</u>
Northern Pike	--	0.3	--	0.3	--	0.3	<u>+0.3</u>

Length categories can be found in Appendix A.

Table 7. Total catch from eight overnight trap nets set in Lake Mitchell, Davison County, July 7-9, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Crappie	216	71.1	27.0	<u>+20.1</u>	11.8	--	--	--
Channel Catfish	42	13.8	5.3	<u>+3.6</u>	5.1	78	43	85
Bluegill	19	6.3	2.4	<u>+1.4</u>	18.9	33	6	101
White Crappie	9	3.0	1.1	<u>+1.0</u>	0.2	--	--	--
Freshwater Drum	7	2.3	0.9	<u>+0.4</u>	0.6	--	--	--
Walleye	4	1.3	0.5	<u>+0.3</u>	0.3	--	--	--
Smallmouth Bass	4	1.3	0.5	<u>+0.5</u>	0.6	--	--	--
Flathead Catfish	1	0.3	0.1	<u>+0.2</u>	0.1	--	--	--
Largemouth Bass	1	0.3	0.1	<u>+0.2</u>	0.0	--	--	--
Northern Pike	1	0.3	0.1	<u>+0.2</u>	0.2	--	--	--

*10 years (2005-2014)

Table 8. CPUE by length category for selected species sampled with trap nets in Lake Mitchell, Davison County, July 7-9, 2014.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Black Crappie	26.0	1.0	0.1	0.4	0.5	27.0	<u>+20.1</u>
Channel Catfish	0.6	4.7	1.0	1.7	2.0	5.3	<u>+3.6</u>
Bluegill	0.1	2.3	2.1	0.2	--	2.4	<u>+1.4</u>
White Crappie	0.8	0.3	0.2	--	0.1	1.1	<u>+1.0</u>
Freshwater Drum	--	0.9	--	0.6	0.3	0.9	<u>+0.4</u>
Walleye	--	0.5	--	0.4	0.1	0.5	<u>+0.3</u>
Smallmouth Bass	0.5	--	--	--	--	0.5	<u>+0.5</u>
Flathead Catfish	--	0.1	0.1	--	--	0.1	<u>+0.2</u>
Largemouth Bass	0.1	--	--	--	--	0.1	<u>+0.2</u>
Northern Pike	--	0.1	--	--	0.1	0.1	<u>+0.2</u>

Length categories can be found in Appendix A.

Table 9. Gill-net (GN), or trap-net (TN) CPUE for selected fish species sampled in Lake Mitchell, Davison County, 2005-2014.

Species	Gear	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Bigmouth	GN	--	--	--	--	0.2	--	--	--	1.0	--
Buffalo	TN	0.1	--	0.2	--	--	0.1	--	--	0.1	--
Black	GN	--	--	0.3	1.5	0.2	4.3	2.8	3.0	--	--
Bullhead	TN	0.2	0.7	--	--	0.3	0.2	--	0.7	--	--
Black	GN	0.5	5.2	0.4	0.3	0.5	0.2	--	2.7	0.6	2.0
Crappie	TN	3.8	49.5	9.3	1.6	2.3	10.5	8.6	3.8	1.4	27.0
	GN	0.9	0.8	--	--	0.2	0.3	0.2	0.5	0.6	--
Bluegill	TN	19.8	53.4	39.2	17.2	4.3	24.2	7.6	18.7	2.3	2.4
Channel	GN	5.3	4.3	6.0	2.7	4.2	5.7	1.2	25.3	12.6	20.5
Catfish	TN	3.2	1.5	1.2	24.4	6.0	1.8	3.1	1.9	2.8	5.3
Common	GN	1.9	1.2	1.0	0.5	0.7	0.5	0.6	1.0	1.0	2.5
Carp	TN	4.8	2.4	1.7	2.6	6.3	2.6	2.7	3.6	2.3	--
Flathead	GN	--	--	--	--	--	0.2	--	--	--	--
Catfish	TN	--	--	0.1	0.1	0.1	0.1	0.3	--	0.3	0.1
Freshwater	GN	10.0	7.0	9.9	3.5	2.2	5.2	5.0	12.0	1.4	2.0
Drum	TN	0.2	0.5	0.5	0.7	0.1	0.3	0.2	1.6	0.5	0.9
Northern	GN	0.6	0.5	0.3	1.2	1.8	0.5	3.0	0.7	0.8	0.3
Pike	TN	0.2	0.4	0.1	0.2	0.3	0.2	0.1	0.1	0.3	0.1
Shorthead	GN	6.0	7.7	0.3	0.2	0.8	0.3	1.4	1.8	0.6	0.5
Redhorse	TN	10.2	3.3	2.9	1.7	1.1	2.4	2.1	1.0	0.4	--
Smallmouth	GN	--	--	--	--	--	--	0.8	0.2	0.2	1.0
Bass	TN	0.3	0.3	--	0.5	0.4	1.6	1.1	0.5	0.5	0.5
	GN	1.1	2.0	1.0	2.7	2.0	3.3	9.2	3.3	2.4	2.8
Walleye	TN	0.4	--	0.4	0.6	0.3	0.3	--	--	0.1	0.5
White	GN	--	--	--	--	--	--	--	--	--	4.3
Crappie	TN	--	0.2	0.3	--	--	0.2	0.1	--	--	1.1
White	GN	0.8	1.2	0.3	0.5	0.8	2.5	6.8	0.2	0.4	--
Sucker	TN	0.6	0.1	0.3	0.1	0.3	0.9	0.9	0.3	0.3	--

Walleye

Management Objective

- Maintain a walleye population with a total gill net CPUE of at least 3.

Management Strategy

- Stock small walleye fingerlings the year after total gill-net CPUE falls to 3.0 or less.

Aside from 2011, walleye gill net CPUE has varied little in the past 10 years (Table 10). Five year-classes were represented in the catch of 11 fish indicating consistent, but very low recruitment (Table 12). Contribution of fish from stocked and unstocked years (Table 11) was nearly identical (Table 12) providing further evidence that stocking is ineffective. Walleye growth has recently improved with individuals reaching the 38 cm (15-inch) legal size in less than 3 years (Table 12).

No age-0 walleyes were sampled during fall electrofishing (Table 13). The CPUE of age-1+ fish was reasonably good as anticipated given the high fall 2013 electrofishing catch of age-0 fish. Age-1+ walleyes were shorter than average possibly reflecting the high abundance (Table 13).

Table 10. CPUE, PSD, RSD-P, and mean Wr for all walleye sampled with gill nets in Lake Mitchell, Davison County, 2005-2014. Stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE	1.1	2.0	1.0	2.7	2.0	3.3	9.2	3.3	2.4	2.8
PSD	--	92	--	33	58	55	5	30	42	82
RSD-P	--	8	--	0	8	0	0	0	8	9
Mean Wr	--	89	--	85	86	83	82	86	87	91

Table 11. Walleye stocked into Lake Mitchell, Davison County, 2005-2014.

Year	Number	Size
2006	67,760	Walleye Small Fingerling
2007	5,192	Walleye Large Fingerling
2009	67,500	Walleye Small Fingerling
2012	67,340	Walleye Small Fingerling
2013	67,720	Walleye Small Fingerling

Table 12. Weighted mean length at capture (mm) for walleye captured in gill nets in Lake Mitchell, Davison County, 2005-2014. Sample size is in parentheses.

Year	1	2	3	4	5	6	7	8	9	10	11	12
2014	259 (11)	-- (2)	418 (4)	468 (2)	486 (2)	--	475 (1)	--	--	--	--	--
2013	-- (12)	391 (12)	--	--	--	--	--	--	--	--	--	--
2012	266 (20)	327 (1)	375 (7)	505 (10)	467 (1)	--	--	--	--	--	--	--
2011	230 (46)	298 (7)	383 (36)	-- (2)	452 (1)	--	--	--	--	--	--	--
2008	251 (14)	337 (3)	-- (7)	--	494 (1)	--	470 (2)	487 (1)	--	--	--	--
2005	-- (9)	354 (1)	390 (2)	395 (4)	462 (1)	484 (1)	--	--	--	--	--	--

Table 13. Age-0 and age-1 walleyes sampled during 2 hours of nighttime electrofishing on Lake Mitchell, Davison County, 2000-2014.

Year	Stocking	Age-0 CPH	% stocked	Mean length (range; mm)	Wr	Age-1 CPH	Mean length (range; mm)	Wr
2014	none	0				15	238 (194-272)	83
2013	fingerling	121	59	184 (158-213)	84	0		
2012	fingerling	1	100	186 (180-192)	93	2	280	91
2011	none	25		167 (141-210)	98	24	267 (239-310)	86
2010	none	50		185 (160-210)	83	18	283 (260-325)	84
2009	fingerling	37	59	183 (156-226)	91	1	250	91
2008	none	8		180 (156-211)	89	2	301 (287-305)	88
2001	none	73		187 (145-218)		2	267 (255-273)	
2000	none	21		173 (141-203)		23	230 (207-270)	

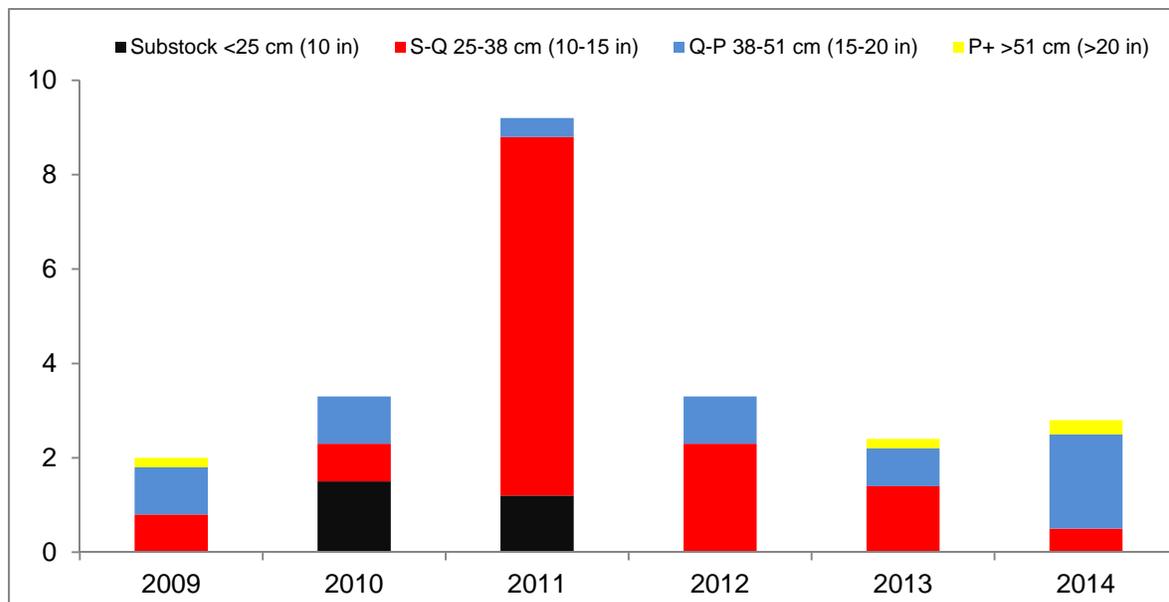


Figure 2. CPUE by length category for walleye sampled with gill nets in Lake Mitchell, Davison County, 2009-2014.

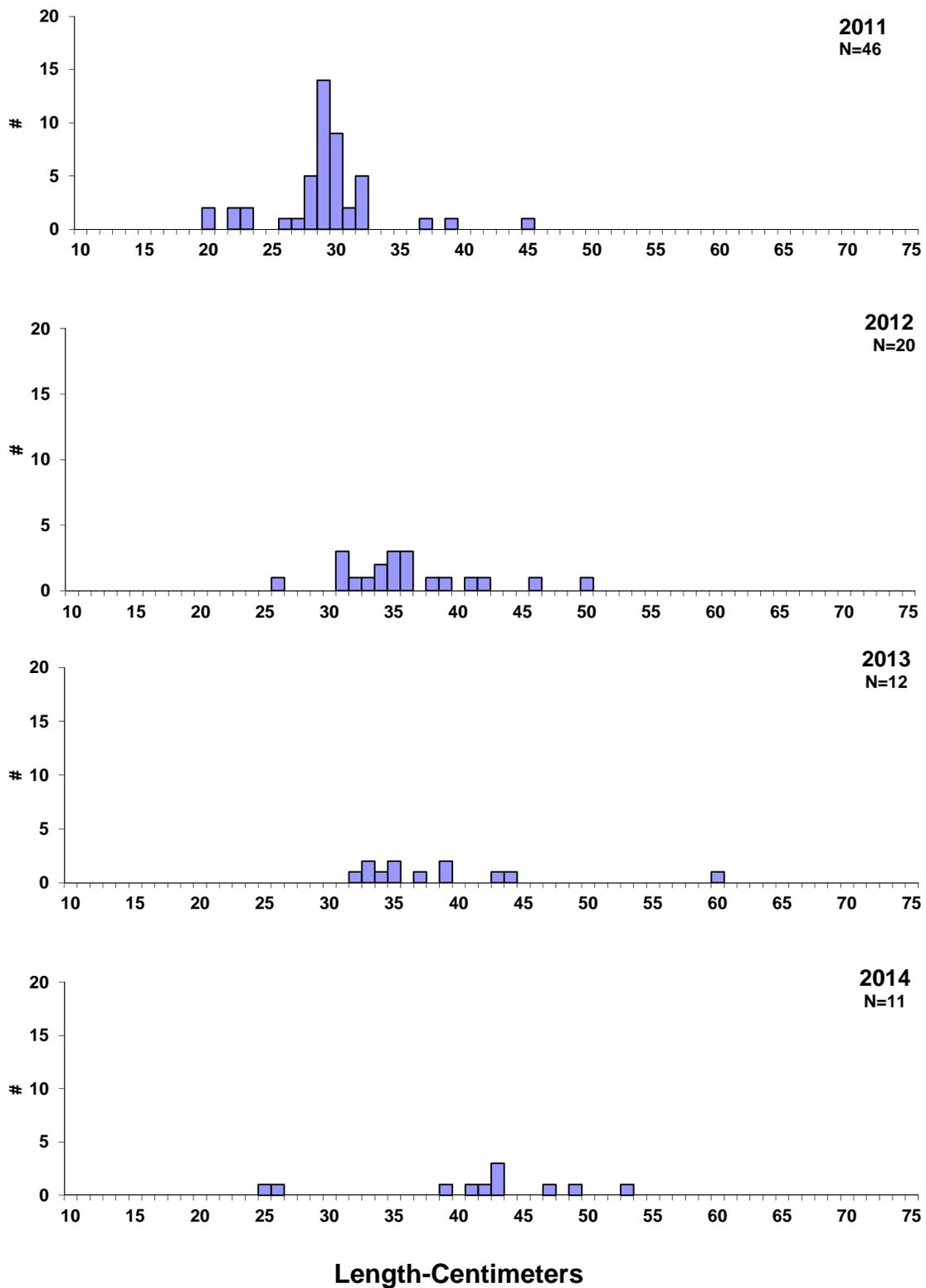


Figure 3. Length frequency histograms for walleye sampled with gill nets in Lake Mitchell, Davison County, 2011-2014.

Black Crappie

Black crappie trap-net CPUE increased in 2014 (Table 14) as the large 2013 year class starts to recruit to the gear (Table 15). Individuals from that year class are growing slower than normal averaging only about 11 cm (4.3 inches, Figures 4 and 5) well into their second season of growth. This year class appears to be the largest one produced since 2006 (Table 15).

Table 14. CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Lake Mitchell, Davison County, 2004-2013.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE	3.8	49.5	9.3	1.6	2.2	10.5	8.6	3.8	1.4	27.0
PSD	77	3	50	59	86	75	87	63	65	--
RSD-23	63	2	5	38	21	63	27	63	47	--
RSD-P	60	0	2	3	7	23	15	50	41	--
Mean Wr	110	113	109	105	110	99	104	105	106	--

Table 15. Weighted mean length at capture (mm) for black crappie sampled with trap nets in Lake Mitchell, Davison County, 2005-2014. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	Age-1	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10
2014 (216)	108 (208)	199 (1)	246 (5)	302 (2)	--	--	--	--	--	--
2013 (17)	140 (5)	194 (3)	259 (4)	271 (3)	265 (2)	--	--	--	--	--
2012 (38)	163 (14)	254 (6)	255 (11)	268 (6)	271 (1)	--	--	--	--	--
2011 (103)	151 (3)	209 (62)	232 (30)	270 (8)	--	--	--	--	--	--
2010 (127)	141 (26)	204 (19)	245 (75)	259 (6)	278 (1)	--	--	--	--	--
2009 (27)	111 (15)	212 (9)	--	244 (3)	--	--	--	--	--	--
2007 (112)	140 (31)	203 (69)	216 (9)	255 (2)	295 (1)	--	--	--	--	--
2006 (609)	152 (584)	186 (13)	240 (12)	--	--	--	--	--	--	--
2005 (46)	123 (15)	204 (4)	205 (6)	269 (19)	285 (1)	271 (1)	--	--	--	--

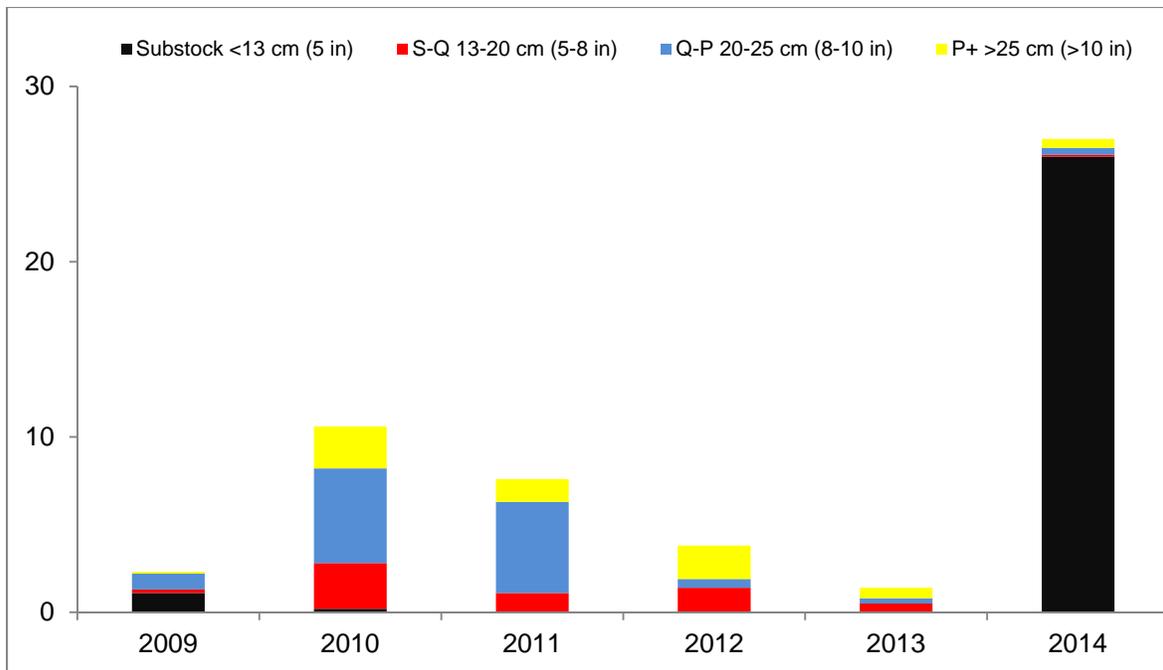


Figure 4. CPUE by length category for black crappie sampled with trap nets in Lake Mitchell, Davison County, 2009-2014.

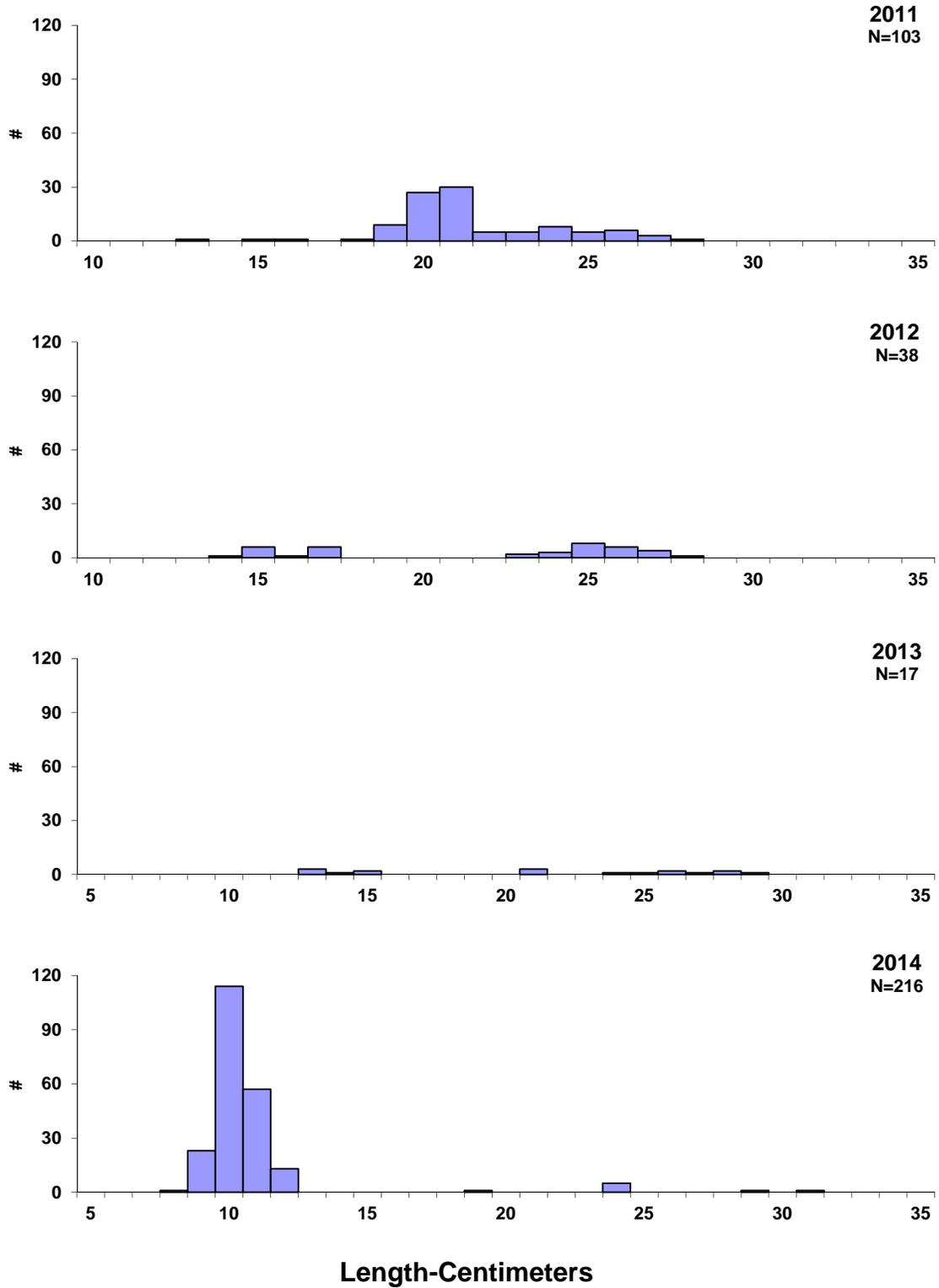


Figure 5. Length frequency histograms for black crappie sampled with trap nets in Lake Mitchell, Davison County, 2011-2014.

Bluegill

The 2014 bluegill trap-net CPUE was similar to 2013 and far below the 10-year average (Table 16). Moreover, RSD-18 has dropped to 11 indicating that there are very few fish of a harvestable-size in the population. The 19 bluegills caught were from five different year classes demonstrating weak, but consistent recruitment. With only a few smaller fish sampled (Figures 6 and 7), an improvement in the fishery is at least 3 to 4 years away.

Table 16. CPUE, PSD, RSD-P, and mean Wr for all bluegill sampled with trap nets in Lake Mitchell, Davison County, 2004-2013.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE	19.8	53.4	39.2	17.2	4.3	24.2	7.6	18.7	2.3	2.4
PSD	52	56	87	86	84	58	59	97	96	33
RSD-18	39	9	29	61	71	40	32	91	85	11
RSD-P	30	5	3	13	53	20	8	48	67	6
Mean Wr	117	107	107	111	106	100	114	111	97	101

Table 17. Weighted mean length at capture (mm) for bluegills sampled with trap nets in Lake Mitchell, Davison County, 2005-2014. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	Age-1	Age-2	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Age-9	Age-10
2014 (19)	92 (6)	109 (7)	160 (4)	181 (1)	--	212 (1)	--	--	--	--
2013 (26)	118 (1)	160 (2)	185 (2)	208 (13)	212 (7)	232 (1)	--	--	--	--
2012 (189)	86 (7)	--	201 (11)	193 (84)	202 (55)	203 (32)	--	--	--	--
2011 (91)	95 (3)	133 (41)	182 (35)	194 (11)	209 (1)	--	--	--	--	--
2010 (258)	--	137 (114)	187 (113)	209 (14)	229 (13)	221 (2)	224 (2)	--	--	--
2009 (51)	87 (2)	145 (11)	178 (4)	204 (24)	209 (10)	--	--	--	--	--
2008 (307)	83 (20)	160 (44)	181 (158)	196 (64)	194 (21)	--	--	--	--	--
2007 (465)	106 (27)	159 (170)	160 (51)	179 (176)	196 (37)	201 (4)	--	--	--	--
2006 (617)	100 (26)	146 (361)	167 (185)	178 (15)	214 (18)	239 (6)	233 (6)	--	--	--
2005 (218)	88 (102)	158 (43)	199 (15)	207 (28)	217 (30)	--	--	--	--	--

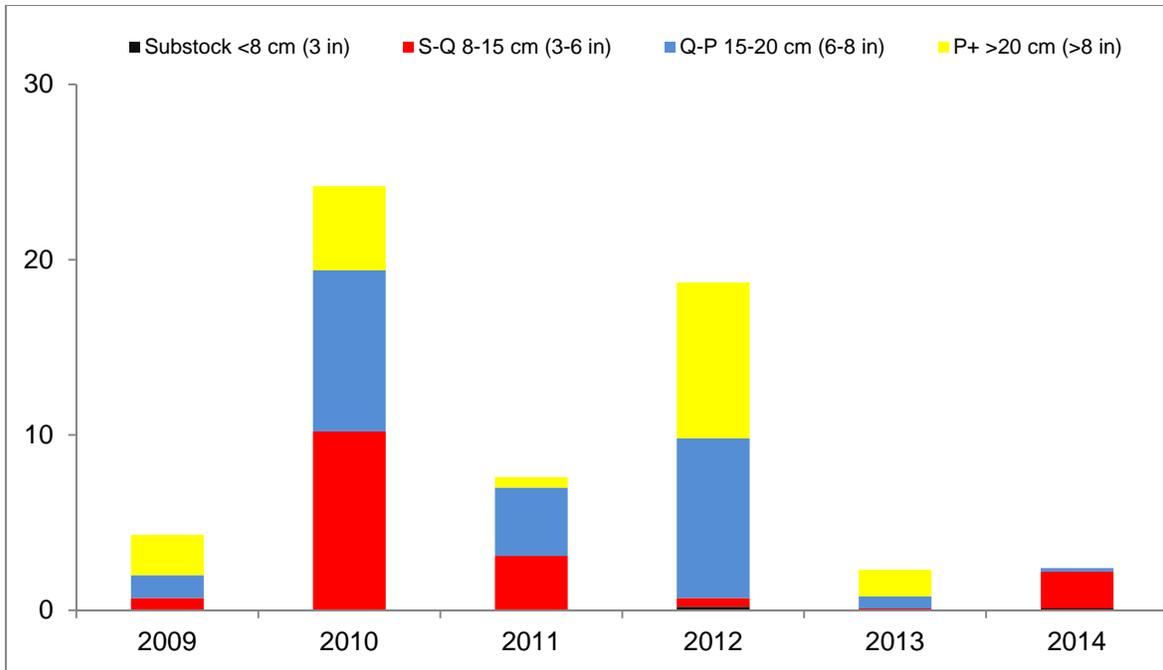


Figure 6. CPUE by length category for bluegill sampled with trap nets in Lake Mitchell, Davison County, 2009-2014.

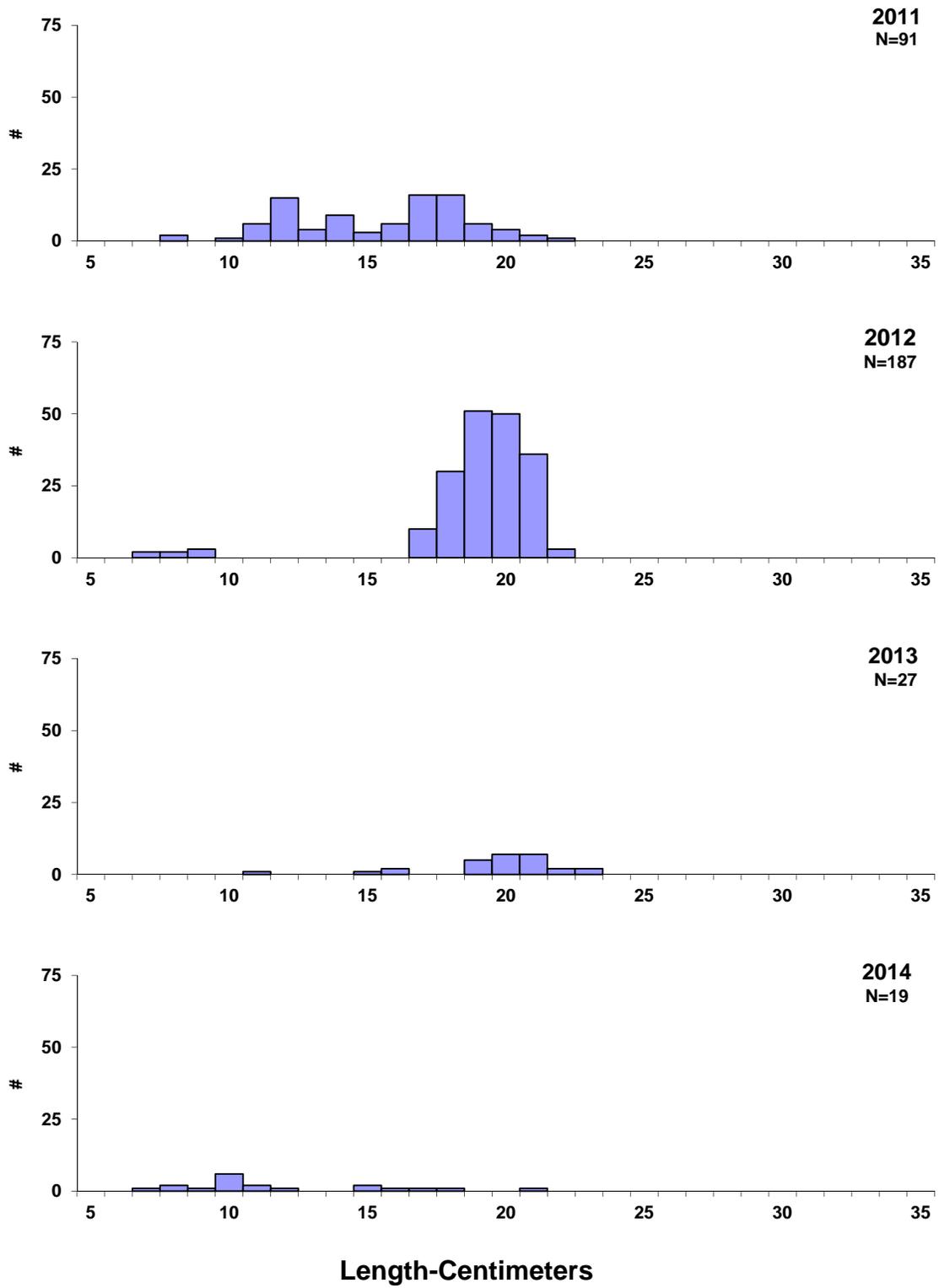


Figure 7. Length frequency histograms for bluegill sampled with trap nets in Lake Mitchell, Davison County, 2011-2014.

Channel Catfish

Lake Mitchell supports an excellent channel catfish population containing multiple year classes of fish ranging in length from 20-67 cm (8-26 in) (Figures 8 and 9). This population is sustained entirely by natural reproduction and abundance has significantly increased the last 3 years (Table 18).

Table 18. Channel catfish gill-net CPUE, PSD, RSD-P, and mean Wr for Lake Mitchell, Davison County, 2005-2014.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE	5.3	4.3	6.0	2.7	4.2	5.7	1.2	25.3	12.6	20.5
PSD	86	85	93	73	64	78	--	27	61	32
RSD-P	2	8	0	20	12	13	--	2	16	6
Mean Wr	90	102	89	87	103	91	--	97	89	85

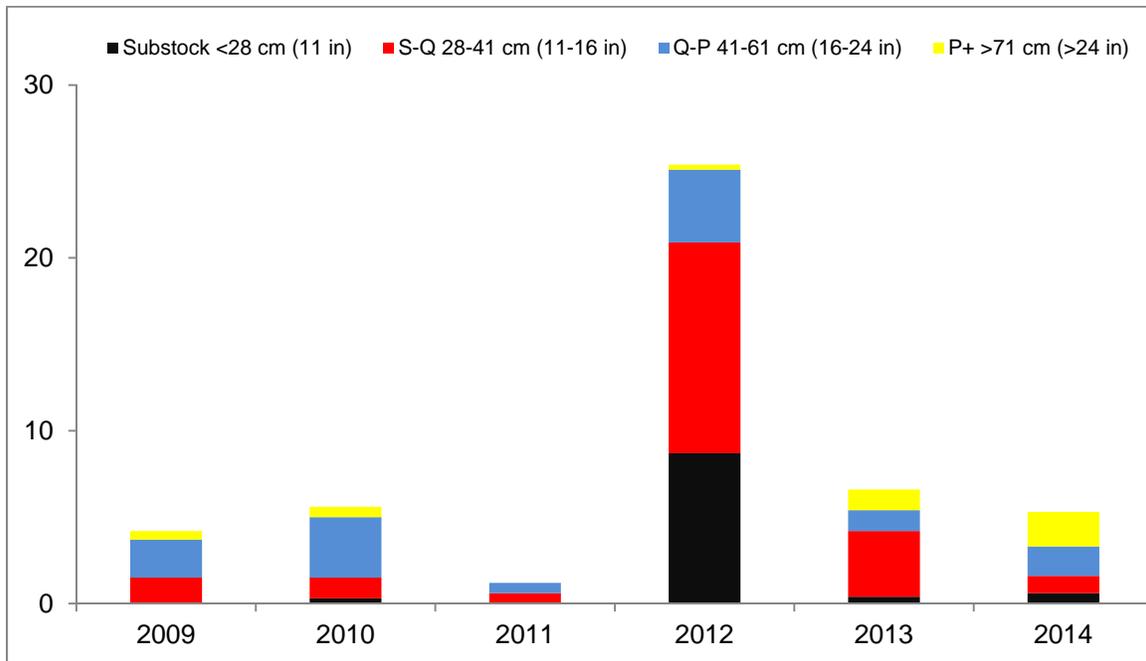


Figure 8. CPUE by length category for channel catfish sampled with gill nets in Lake Mitchell, Davison County, 2009-2014.

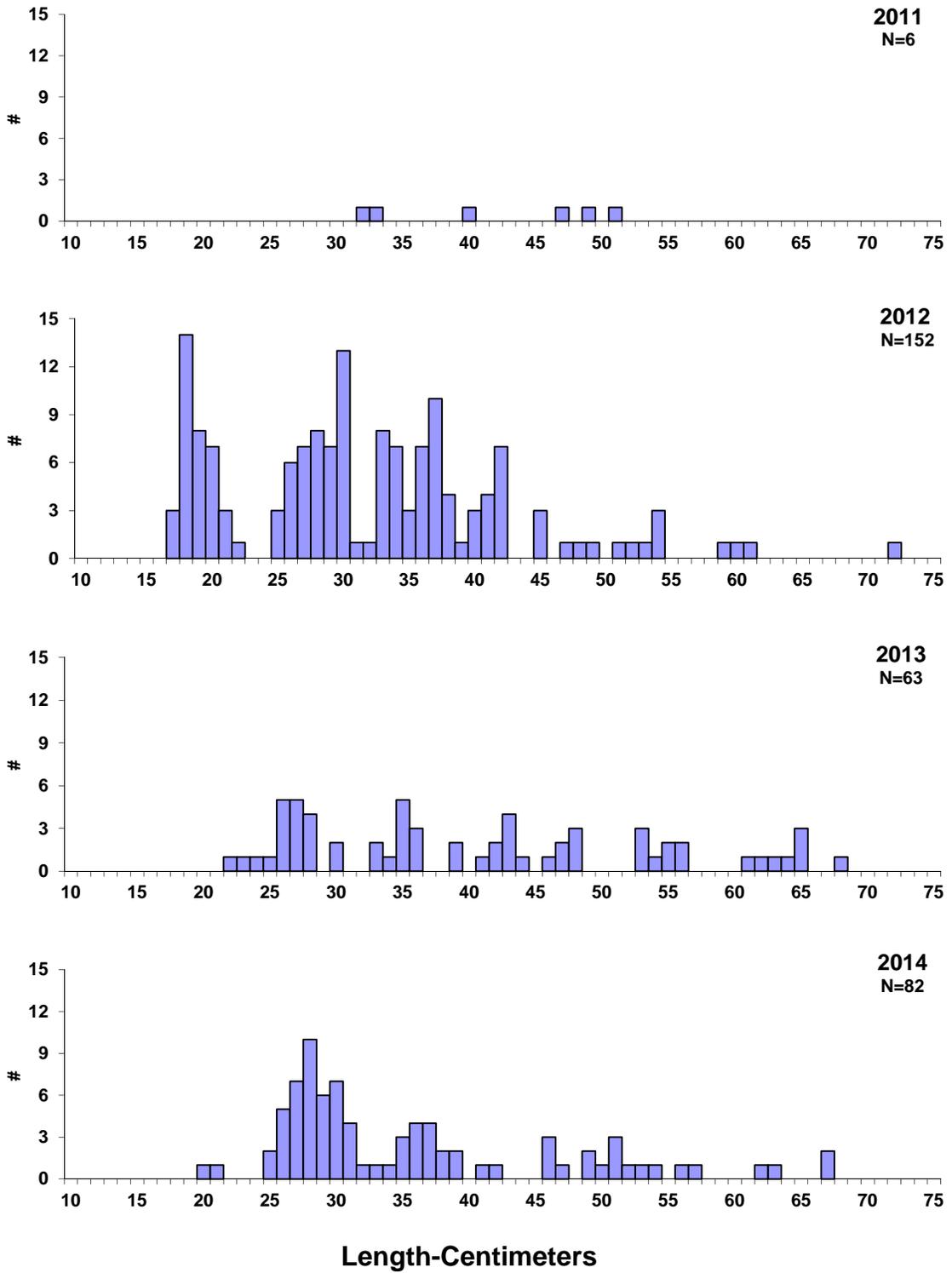


Figure 9. Length frequency histograms for channel catfish sampled with gill nets in Lake Mitchell, Davison County, 2010-2013.

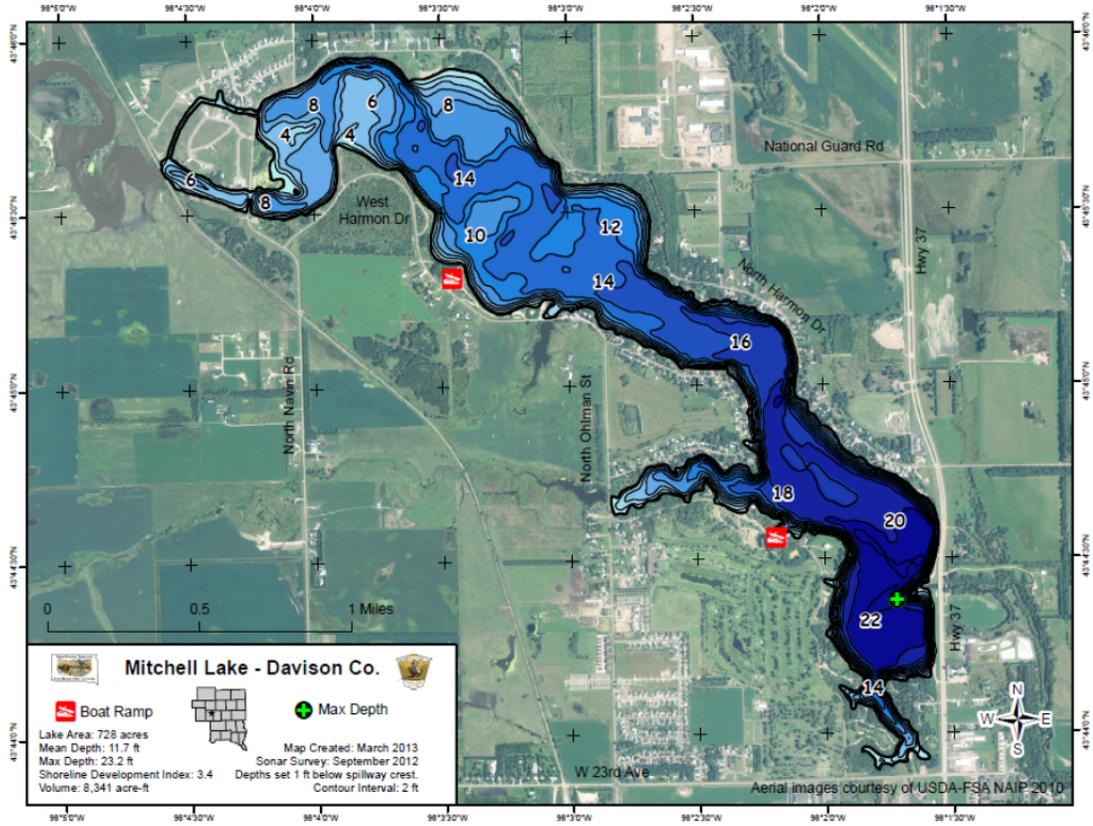


Figure 10. Contour map of Lake Mitchell, Davison County.

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.