

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
West 81 Lake, Kingsbury County
2102-F-21-R-47
2014

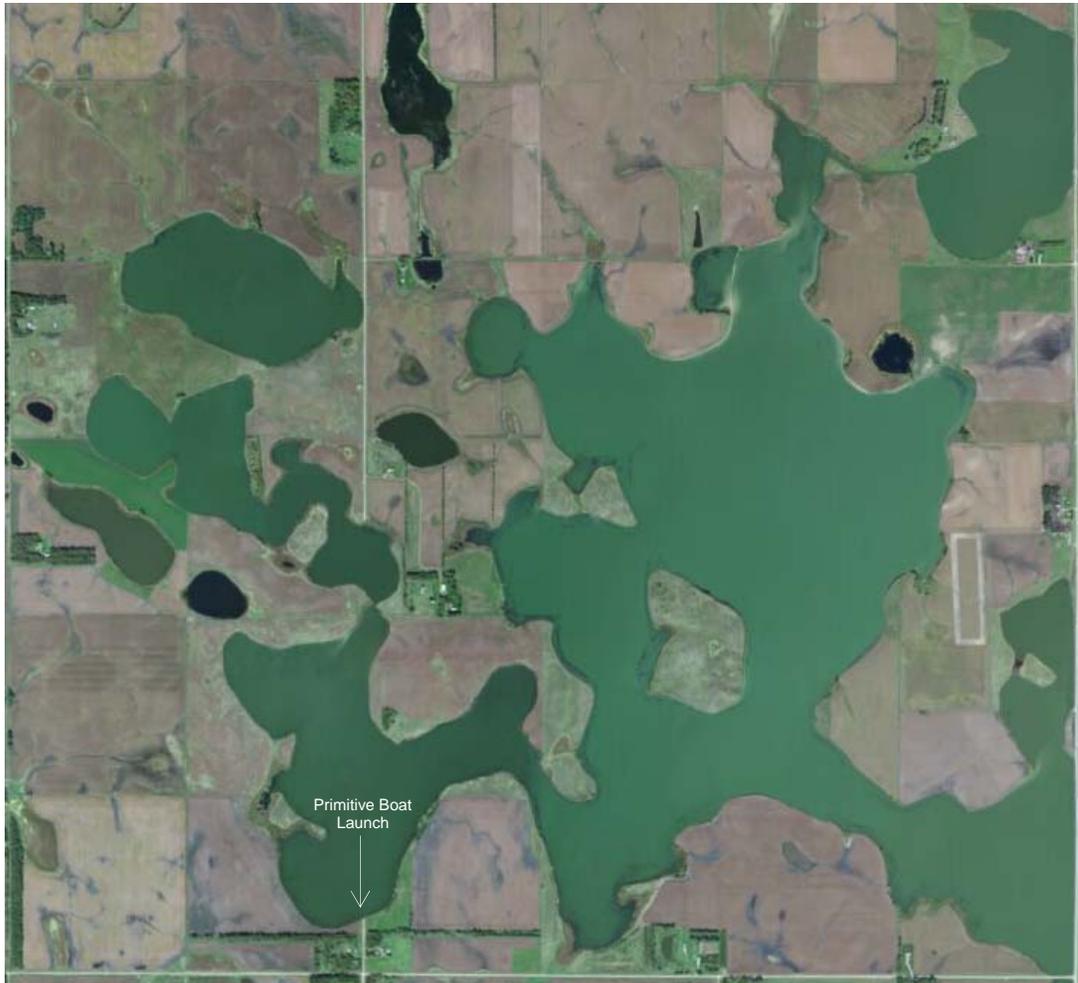


Figure 1. West 81 Lake, Kingsbury County

Legal Description: T109N-R53W-Sec.22-27, 34-36

Location from nearest town: 4 miles south of Arlington, SD

Surface Area: 1,368 acres

Meandered (Y/N): Yes

OHWM elevation: no data

Outlet elevation: no data

Max. depth at outlet elevation: 22.8 feet

Observed water level: 1.5 feet low

Contour map available: yes

Watershed area: no data

Shoreline length: no data

Date set: no data

Date set: no data

Mean depth at outlet elevation: 12.9 feet

Lake volume: 17,675 acre feet

Date mapped: 2012

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

Introduction

Ownership of Lake and Adjacent Lakeshore Properties

The original lake basin for West 81 Lake, known legally as Twin Lakes, is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The fishery in West 81 Lake is managed by the South Dakota Department of Game, Fish, and Parks (GFP). Part of the western end of the lake lies within a Waterfowl Production Area (WPA) owned and managed by the United States Fish and Wildlife Service (USFWS). The remainder of the shoreline, other than public road right-of-ways, is privately owned.

Fishing Access

There are no boat ramps on West 81 Lake, but boats can be launched off the county road right-of-way on the southwest corner of the lake. Shore fishing access is limited to the WPA at the west end of the lake and public road right-of-ways.

Water Quality and Aquatic Habitat

The water in West 81 Lake was clear with a Secchi depth measurement of 1.5 m (61 in) (Table 1). Large, dense beds of clasping leaf pondweed, coontail, and sago pondweed are common around the entire lake.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in West 81 Lake, Kingsbury County, 2005-2014.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2014	25 (75)	155 (61)	Dense mats of sago and clasping leaf pondweed in shallows
2012	22 (71)	378 (149)	No observations were recorded
2010	26 (78)	76 (30)	Clasping leaf and sago pondweed, coontail, and algae
2008	25 (77)	178 (70)	Heavy northern water milfoil, sago, and clasping leaf pondweed
2006	21 (70)	100 (39)	Heavy sago, clasping leaf pondweed, coontail and others

Fish Community

West 81 Lake supports a diverse fish community comprised of many different species (Table 2). Walleye and yellow perch are most popular with anglers fishing the lake but largemouth and smallmouth bass, northern pike, and white bass are also available. No fish kills have been observed in West 81 Lake. The lake did not have common carp until 2011 when they swam in from Lake Sinai during a period of high water.

Table 2. Fish species commonly found in West 81 Lake, Kingsbury County.

Game Species	Other Species
Walleye	Common Carp
Yellow Perch	
Northern Pike	
Black Crappie	
White Bass	
Bluegill	
Smallmouth Bass	
Muskellunge	
Black Bullhead	
Largemouth Bass	
Orange-spotted Sunfish	
Hybrid Sunfish	
Green Sunfish	

Fish Management

Occasional stockings of walleye are made to maintain population abundance and fishing opportunity when natural reproduction is lacking (Table 3). Smallmouth bass and muskellunge have been introduced into West 81 Lake to provide additional fishing opportunity. The muskellunge population is maintained by stocking since no natural production has been documented.

Table 3. Stocking history for West 81 Lake, Kingsbury County, 2005-2014.

Year	Number	Species	Size
2005	1,500	Muskellunge	Juvenile
	154,300	Walleye	Fingerling
2006	905	Muskellunge	Juvenile
	139	Smallmouth Bass	Adult
2010	790	Muskellunge	Juvenile
2012	1,150	Muskellunge	Large Fingerling
2014	1,063	Muskellunge	Large Fingerling

Methods

West 81 Lake was sampled on August 12-14, 2014 with five overnight gill-net sets and 10 overnight trap-net sets. 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.

Results and Discussion

Net Catch Results

Black bullheads were most abundant species sampled in the gill nets and frame nets (Tables 4 and 6) followed by walleyes and yellow perch (gill nets). Substock length common carp were the second most abundant species sampled in the trap nets (Tables 6, 7).

Table 4. Total catch from five overnight gill nets set in West 81 Lake, Kingsbury County, August 12-14, 2014.

Species	#	%	CPUE¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	454	72.8	90.8	+21.6	58.6	90	1	--
Yellow Perch	79	12.7	15.8	+10.0	41.5	42	24	95
Walleye	49	7.9	9.8	+3.7	32.3	77	31	91
Smallmouth Bass	15	2.4	3.0	+2.0	0.9	0	0	109
Common Carp	12	1.9	2.4	+1.9	0.5	--	--	--
White Bass	12	1.9	2.4	+1.7	3.3	--	--	--
Northern Pike	2	0.3	0.4	+0.5	0.6	--	--	--
Largemouth Bass	1	0.2	0.2	+0.3	0.0	--	--	--

*10 years (2005-2014)

Table 5. CPUE by length category for selected species sampled with gill nets in West 81 Lake, Kingsbury County, August 12-14, 2014.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	1.2	89.6	9.6	78.8	1.2	90.8	+21.6
Yellow Perch	--	15.8	9.2	2.8	3.8	15.8	+10.0
Walleye	4.6	5.2	1.2	2.4	1.6	9.8	+3.7
Smallmouth Bass	1.0	2.0	2.0	--	--	3.0	+2.0
Common Carp	2.0	0.4	--	0.2	0.2	2.4	+1.9
White Bass	1.8	0.6	0.2	--	0.4	2.4	+1.7
Northern Pike	--	0.4	--	--	0.4	0.4	+0.5
Largemouth Bass	0.2	--	--	--	--	0.2	+0.3

Length categories can be found in Appendix A.

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

Table 6. Total catch from ten overnight trap nets set in West 81 Lake, Kingsbury County, August 12-14, 2014.

Species	#	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	3,623	81.8	362.3	+363.3	108.0	9	0	--
Common Carp	684	15.4	68.4	+59.2	13.9	40	0	--
Yellow Bullhead	67	1.5	6.7	+2.8	7.3	91	90	--
Yellow Perch	28	0.6	2.8	+2.5	3.3	11	7	104
Smallmouth Bass	11	0.2	1.1	+0.3	0.8	90	70	109
Walleye	8	0.2	0.8	+0.3	2.1	--	--	--
Largemouth Bass	4	0.1	0.4	+0.5	1.0	--	--	--
White Bass	2	0.0	0.2	+0.2	0.7	--	--	--
Northern Pike	1	0.0	0.1	+0.1	0.1	--	--	--
Hybrid Sunfish	1	0.0	0.1	+0.1	0.1	--	--	--

*10 years (2005-2014)

Table 7. CPUE by length category for selected species sampled with trap nets in West 81 Lake, Kingsbury County, August 12-14, 2014.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	322.5	39.8	36.2	3.6	--	362.3	+363.3
Common Carp	64.9	3.5	2.1	1.4	--	68.4	+59.2
Yellow Bullhead	--	6.7	0.6	0.1	6.0	6.7	+2.8
Yellow Perch	--	2.8	2.5	0.1	0.2	2.8	+2.5
Smallmouth Bass	0.1	1.0	0.1	0.2	0.7	1.1	+0.3
Walleye	0.2	0.6	0.2	0.3	0.1	0.8	+0.3
Largemouth Bass	0.4	--	--	--	--	0.4	+0.5
White Bass	0.1	0.1	--	--	0.1	0.2	+0.2
Northern Pike	--	0.1	--	0.1	--	0.1	+0.1
Hybrid Sunfish*	--	--	--	--	--	0.1	+0.1

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

Table 8. Gill-net (GN) and trap-net (TN) CPUE for selected fish species sampled in West 81 Lake, Kingsbury County, 2005-2014.

<i>Species</i>	<i>Gear</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>
Black Bullhead	GN	--			--		3.3		198.7		90.8
	TN		0.7		1.2		0.7		175.2		362.3
Black Crappie	GN	--			--		--		--		--
	TN		--		0.1		--		0.1		--
Bluegill	GN	--			--		--		--		--
	TN		0.3		--		0.4		4.1		--
Common Carp	GN	--			--		--		--		2.4
	TN		--		--		--		1.2		68.4
Green Sunfish	GN	--			--		--		--		--
	TN		1.7		--		0.2		3.0		--
Hybrid Sunfish	GN	--			--		--		--		--
	TN		--		--		--		0.3		0.1
Largemouth Bass	GN	--			--		--		--		0.2
	TN		0.7		--		3.9		0.2		0.4
Muskellunge	GN	--			--		--		0.3		--
	TN		--		--		--		--		--
Northern Pike	GN		1.0		1.0		0.3		0.3		0.4
	TN		0.2		0.2		0.1		0.1		0.1
O. S. Sunfish	GN	--			--		--		--		--
	TN		--		--		0.1		0.2		--
Smallmouth Bass	GN		1.0		--		0.3		--		3.0
	TN		0.1		1.4		0.5		0.9		1.1
Walleye	GN		65.0		32.3		34.0		20.3		9.8
	TN		1.4		1.6		3.7		3.0		0.8
White Bass	GN	--			2.0		5.0		7.3		2.4
	TN		--		--		0.8		2.6		0.2
Yellow Bullhead	GN	--			--		--		1.0		--
	TN		4.3		--		5.2		20.1		6.7
Yellow Perch	GN		52.5		5.3		39.3		94.7		15.8
	TN		--		1.2		0.9		11.7		2.8

Walleye

Management Objective

- maintain a walleye population with a total gill-net CPUE of at least 15

Management Strategy

- stock small walleye fingerlings at the rate of 70/acre (95,760) as needed to achieve the management objective

Walleye gill-net CPUE dropped below the management objective for the first time in 10 years (Table 9). Age-1+ walleyes comprised just over half of the sample and will recruit to the fishery in 2 to 3 years (Table 11). Large walleyes made up much of the remainder of the catch (Figures 2 and 3). Walleyes in West 81 grow quickly, reaching 43 cm (17 in) by age-3 (Table 11).

Table 9. CPUE, PSD, RSD-P, and mean Wr for all walleyes sampled with gill nets in West 81 Lake, Kingsbury County, 2005-2014. Stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE		65.0		32.3		34.0		20.3		9.8
PSD		23		66		23		85		77
RSD-P		6		24		1		10		31
Mean Wr		95		88		90		87		91

Table 10. Walleyes stocked into West 81 Lake, Kingsbury County, 2005-2014.

Year	Number	Size
2005	154,300	Fingerling

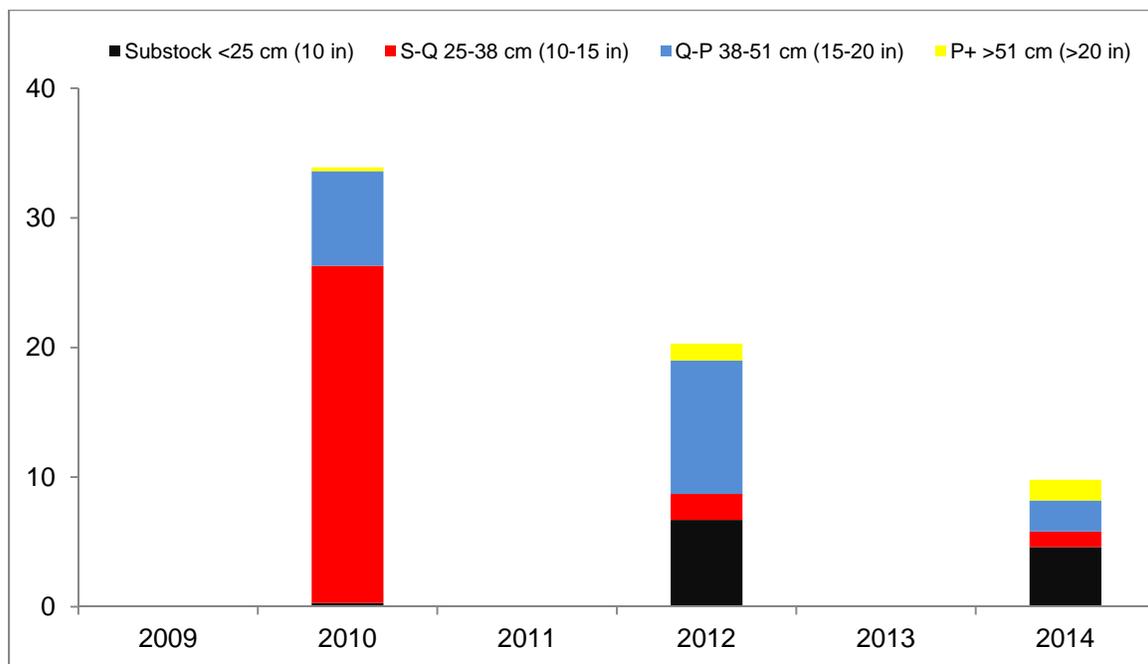
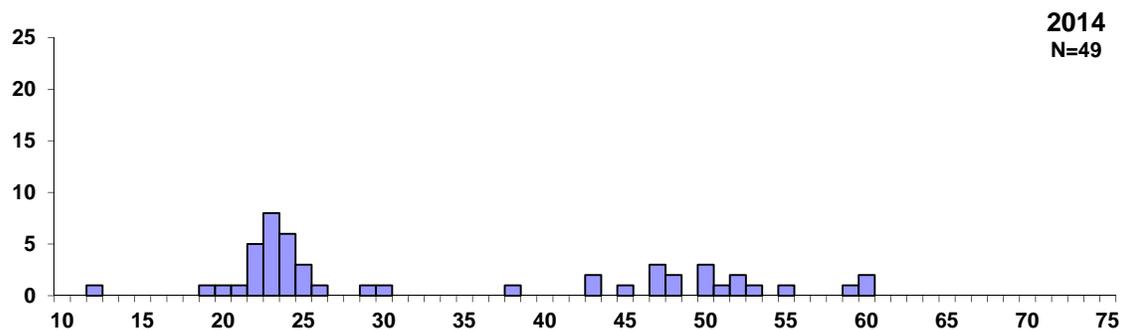
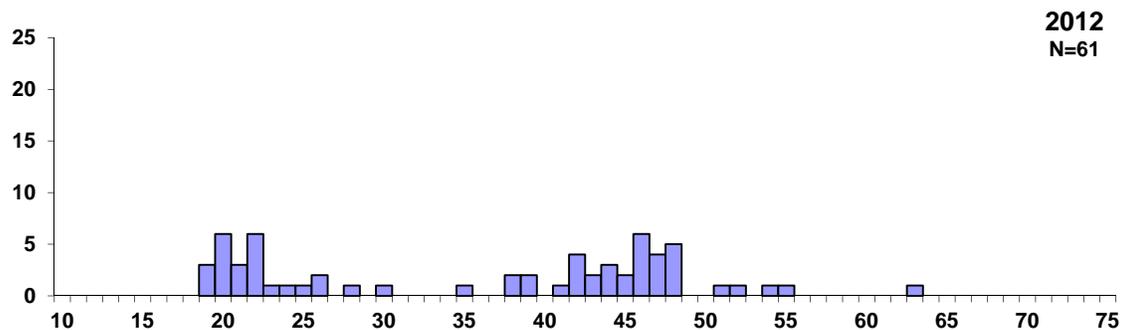
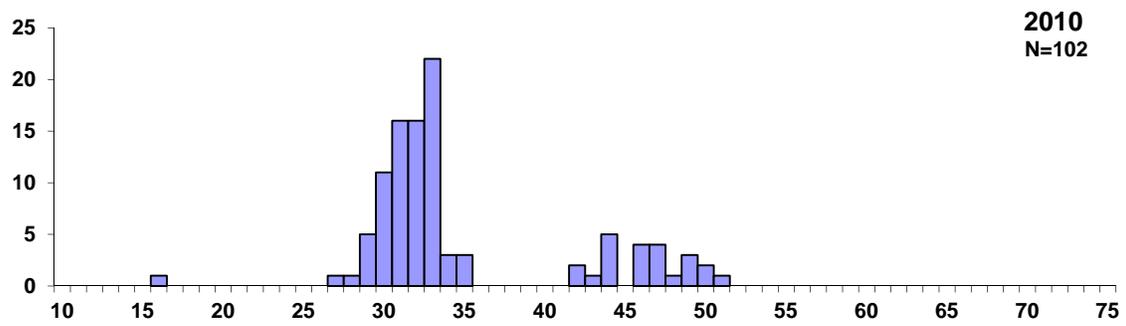
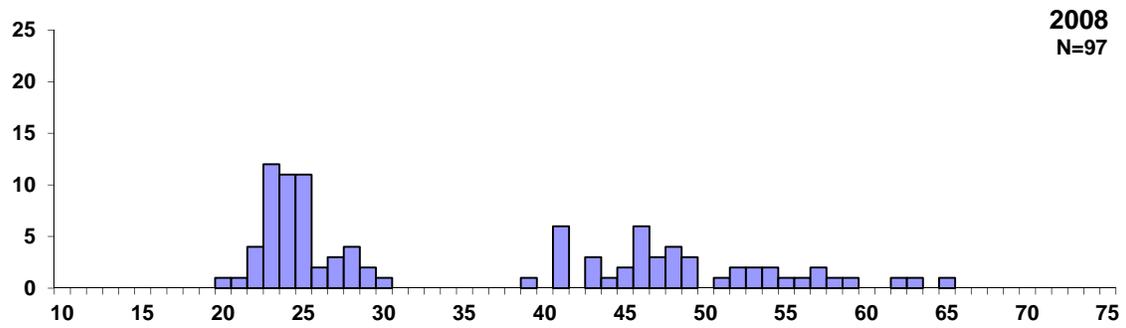


Figure 2. CPUE by length category for walleye sampled with gill nets in West 81 Lake, Kingsbury County, 2009-2014.

Table 11. Weighted mean length at capture (mm) for walleyes sampled with gill nets in West 81 Lake, Kingsbury 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	1	2	3	4	5	6	7	8	9	10	11	13
2014 (49)	238 (27)	303 (1)	446 (3)	475 (4)	520 (11)	503 (1)	--	590 (1)	--	--	--	--
2012 (61)	226 (25)	401 (8)	462 (24)	--	518 (3)	--	636 (1)	--	--	--	--	--
2010 (102)	322 (78)	436 (3)	471 (20)	--	--	--	--	--	--	--	--	--
2008 (93)	248 (48)	412 (6)	462 (18)	501 (3)	530 (8)	532 (1)	515 (1)	--	557 (4)	612 (2)	--	614 (2)
2006 (78)	344 (61)	415 (2)	473 (7)	457 (3)	553 (1)	510 (1)	605 (3)	--	--	--	--	--
2004 (30)	294 (1)	426 (1)	452 (6)	490 (4)	541 (10)	594 (5)	642 (1)	660 (2)	--	--	--	--
2002 (16)	311 (3)	404 (4)	455 (8)	--	509 (1)	--	--	--	--	--	--	--



Length-Centimeters

Figure 3. Length frequency histograms for walleye sampled with gill nets in West 81 Lake, Kingsbury County, 2008, 2010, 2012, 2014.

Yellow Perch

Yellow perch gill-net CPUE declined from 2012 (Table 12). The sample was mostly comprised of age-1+ and age-3+ fish and growth is good with fish reaching 25 cm (10 in) by age-3 (Table 13). Some natural reproduction has occurred in each of the past 5 years (Table 13, Figures 4, 5).

Table 12. CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in West 81 Lake, Kingsbury County, 2005-2014.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE		52.5		5.3		39.3		94.7		15.8
PSD		--		13		11		57		42
RSD-P		--		6		0		7		24
Mean Wr		--		119		98		77		95

Table 13. Weighted mean length at capture (mm) for yellow perch sampled with gill nets in West 81 Lake, Kingsbury 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	1	2	3	4	5	6	7	8
2014 (79)	166 (46)	227 (2)	258 (31)	--	--	--	--	--
2012 (284)	163 (121)	231 (160)	251 (3)	--	--	--	--	--

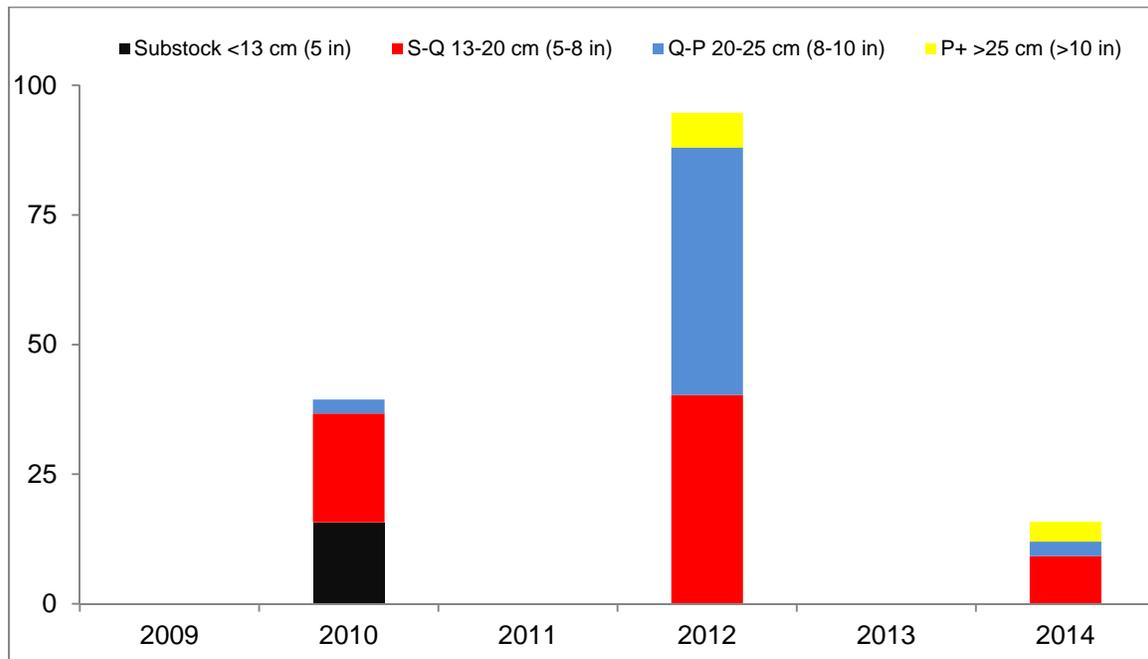


Figure 4. CPUE by length category for yellow perch sampled with gill nets in West 81 Lake, Kingsbury County, 2009-2014.

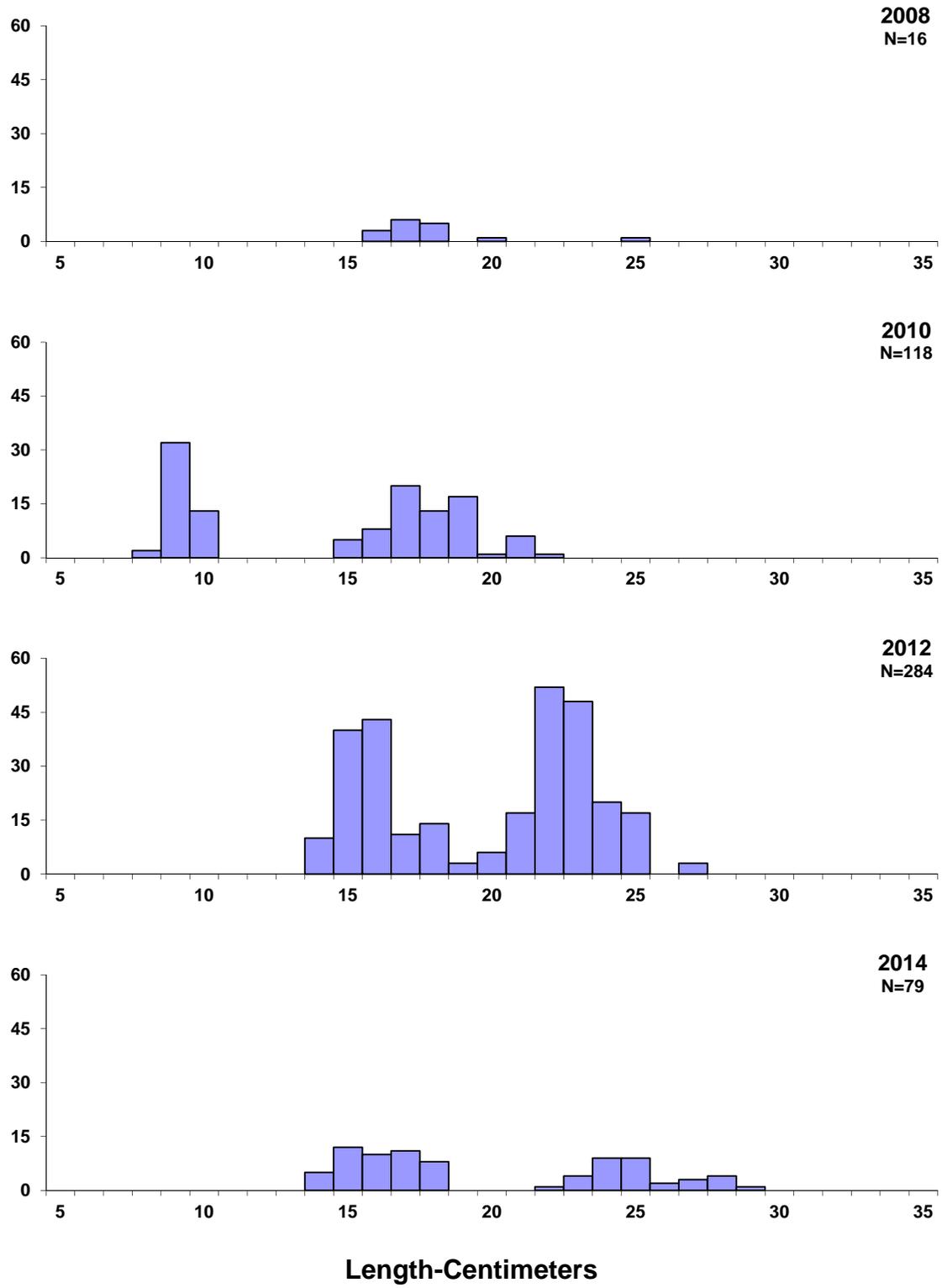


Figure 5. Length frequency histograms for yellow perch sampled in gill nets in West 81 Lake, Kingsbury County, 2008, 2010, 2012, 2014.

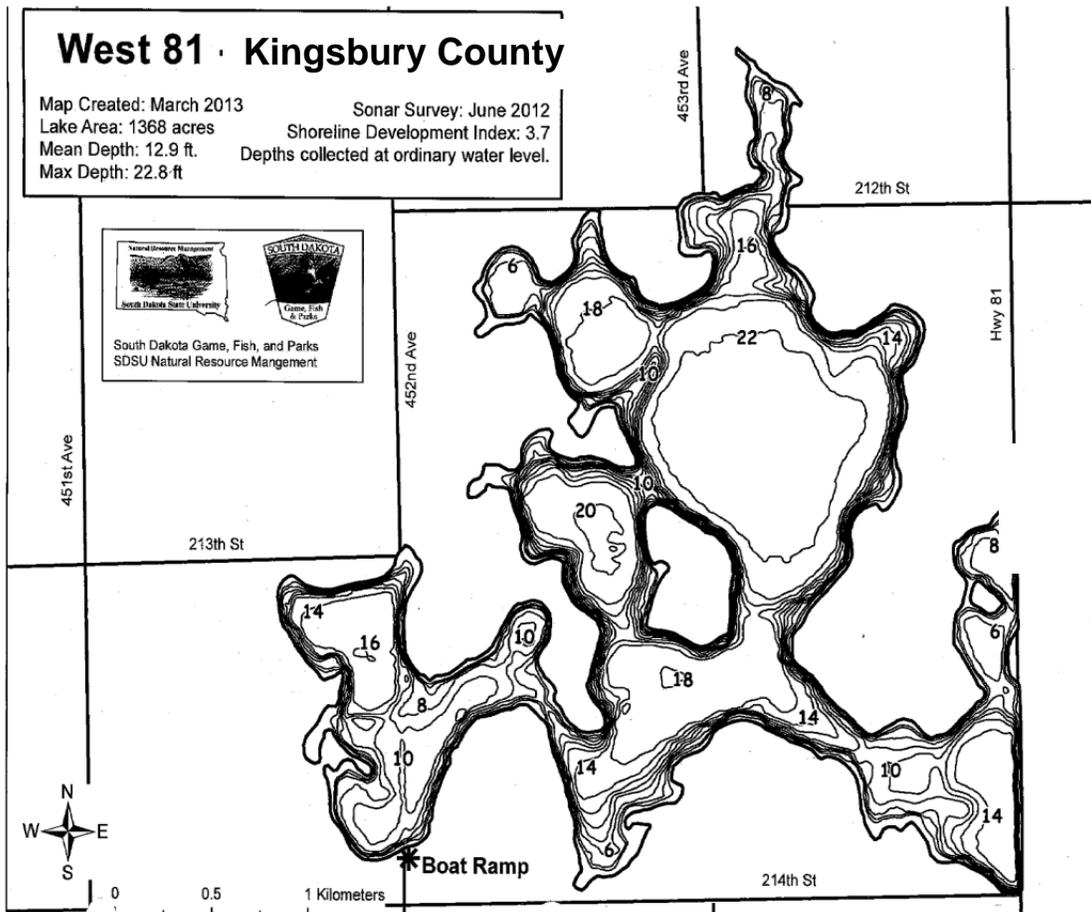


Figure 10. Contour map of West 81 Lake, Kingsbury County.

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.