

SOUTH

DAKOTA

# FISHERIES

Lynn Lake, South Dakota  
Angler Use and Harvest  
December 2001 – March 2013

South Dakota  
Department Of  
Game, Fish and Parks  
Wildlife Division  
Joe Foss Building  
523 E Capitol Ave  
Pierre, South Dakota 57501-3182

Completion Report  
No. 14-04

**Lynn Lake, South Dakota  
Angler Use and Harvest Surveys  
December 2001 – March 2013**

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## Preface

Information in this report was collected between December 2001 and March 2013. Funding for this project was provided by Federal Aid in Sport Fish Restoration, (D-J) Project F-21-R, Job number 2109. Copies of this report and reference to the data can be made with written permission of the author or Director of the Division of Wildlife, South Dakota Department of Game, Fish and Parks, 523 East Capitol, Pierre, South Dakota, 57501.

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## Executive Summary

- Prior to the late 1990's, Lynn Lake was a shallow slough that was not conducive to long-term survival of sport fish. Periods of above normal precipitation since the late 1990's have increased the water depth increasing the probability for sport fish survival. South Dakota Department of Game, Fish and Parks first stocked fish into Lynn Lake in 1998 and has subsequently managed as a sport fishery. Lynn Lake has become an important fishery in northeast South Dakota.
- The objective of this long-term survey (December 2001 through March 2013) was to document trends in angler use and the catch and harvest of sport fish in Lynn Lake. Summer (May through August) and winter (December through March) surveys were completed as part of the objective.
- Summer fishing pressure peaked in 2005 (48,817 hours) and declined each summer through 2010. Walleyes were the main target of summertime anglers with the exception of 2002 and 2003 when anglers primarily targeted Black Crappie.
- Non-resident anglers comprised >50% of summertime anglers during nine of 11 summers surveyed. The greatest number of non-resident anglers originated from Minnesota and Iowa. Anglers from Brown, Codington, Day and Marshall Counties encompassed the highest percentages of South Dakota residents.
- Walleye catch and harvest was greatest during the 2005 summer. Average size of harvested walleye was 465 mm (18.3 in) total length (TL) during the 11 summers surveyed. Harvested biomass of Walleye averaged 6.3 kg/ha (5.6 lb/acre) across the 11 summers.
- Catches of Yellow Perch were minimal during the summer with the exception of 2006 and 2012 summers. In 2006, 15,614 Yellow Perch were caught and 5,982 were harvested, 25,440 and 13,127 were caught and harvested, respectively during the 2012 summer.
- The highest Black Crappie catch and harvest occurred in 2002 and 2003 summers when anglers caught in excess of 26,000 crappie each summer. As a result of limited Black Crappie recruitment, following the initial cohorts, angler catches were minimal after the 2003 summer.
- Bluegill, Northern Pike and Muskellunge occurred occasionally in the summer angler catch and harvest.
- Winter fishing pressure was less than that observed during the summer periods. The greatest pressure occurred during the 2011-12 winter when an estimated 17,117 hours were spent fishing at Lynn Lake. Walleye were the most targeted species during five winters, Yellow Perch were the most targeted species during six winters and during the 2007-08 winter most anglers indicated they were targeting anything.
- Resident anglers comprised the majority of anglers during all 12 winter periods. Anglers from Brown, Codington, Day, Marshall and Minnehaha Counties were the most common resident anglers and Iowa, Minnesota, Nebraska, and Wisconsin were common residences for non-resident anglers.

- The highest catch and harvest of Walleye occurred during the first winter (2001-02) when an estimated 6,512 were caught and 1,068 were harvested. Average size of harvested Walleye exceeded 432 mm (17 in) TL during all winters except 2009-10 when the average size was 385 mm (15.2 in) TL.
- The winters of 2003-04 through 2006-07 provided anglers with fair Yellow Perch catches and the average size of harvested fish exceeded 267 mm (10.5 in) TL during these winters. Increased Yellow Perch catches were observed during the 2010-11 and 2011-12 winters when catch rates exceeded 2.35 fish per hour. An estimated 12.70 kg/ha (1.33 lb/acre) of Yellow Perch were harvested during the 2011-12 winter.
- The highest Black Crappie catch and harvest occurred during the 2003-04 winter. Following the 2007-08 winter no Black Crappies were recorded in the angler catch.
- Bluegill and Northern Pike were not common in the angler catch during the winter periods.
- No Muskellunge were reported as being caught during the winter periods.
- Summertime angler catch rates for Walleye and Yellow Perch were correlated to annual gill net catch rates. Black Crappie angler catch rates were correlated to Black Crappie population estimates for 2001 through 2006. Correlations between winter angler catch rates and abundance indices were not as strong.
- Anglers were generally satisfied with the fishing at Lynn Lake. Harvesting fish was somewhat important in angler trip success. Catching fish was given as the most important factor for angler trip success.
- Anglers tended to be happy with the Lynn Lake Walleye regulations in place at the time they were fishing. Anglers were evenly divided on two, three and four fish as possible Walleye daily limits. The majority anglers favored making the one Walleye over 508 mm (20 in) at statewide regulation.
- Anglers favored the 10 fish panfish limits that were in place for northeast South Dakota.
- Anglers were generally neutral when asked about changing the Northern Pike daily limit from six to three.

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**Lynn Lake, South Dakota  
Angler Use and Harvest Surveys  
December 2001 – March 2013**

Lynn Lake is currently an important sport fishery in northeast South Dakota. Prior to the late 1990's, Lynn Lake was a shallow slough that was not conducive to long-term survival of sport fish. Periods of above average precipitation since the late 1990's have increased the water depth of Lynn Lake making it capable of sustaining sport fish populations. The South Dakota Department of Game, Fish and Parks (SDGFP) first stocked fish into Lynn Lake in 1998 when Saugeye *Sander canadense* x *Sander vitreus* and Black Crappie *Pomoxis nigromaculatus* were stocked. Muskellunge *Esox masquinongy* were stocked in 2001 creating the second Muskellunge fishery in northeast South Dakota.

In 2001, a 406-mm (16-inch) minimum length limit with one Walleye *Sander vitreus* or Saugeye over 508 mm (20 inches) was enacted. In 2002, the Walleye/Saugeye daily limit was reduced to two fish, the panfish (i.e., Black Crappie, Bluegill *Lepomis macrochirus*, Yellow Perch *Perca flavescens*) limit was reduced from 25 to 10 of each species daily, and a 1,016 mm (40 inch) minimum length limit was placed on Muskellunge. In 2010, the Walleye/Saugeye minimum length limit was changed to 381 mm (15 inch) to comply with the South Dakota Walleye Toolbox (Lucchesi and Blackwell 2009). The panfish daily limit was changed from 10 to 15 in 2011 to conform to statewide panfish daily limits.

An objective of this long-term creel survey was to document trends in angler use and the catch and harvest of various sport fish species as the Lynn Lake fishery developed and matured. Information concerning angler use and harvest is important in the ongoing fisheries management of the Lynn Lake fishery. This report summarizes angler use and harvest surveys that were completed between December 2001 and March 2013. Walleye and Saugeye are both present in Lynn Lake; within this report only Walleye will be used but it is also implied that Saugeye may be included.

### **Study Site**

Lynn Lake is a non-meandered lake located in Day County, South Dakota. Currently, the lake has a surface area of approximately 648 ha (1,600 acre), maximum depth of 7.9 m (26 ft), and an average depth of 3 m (10 ft).

During the study period, a single private boat access site (fee charged) was available on the west shore. Anglers also launch boats from roads that dead-end at the lake edge and shore fishing is primarily confined to areas adjacent to the dead-end roads.

### **Methods**

A roving angler use and harvest survey was completed at Lynn Lake during 12 winter (December through March) and 11 summer (May through August) periods between December 2001 and March 2013; no survey was completed during the 2011 summer. Weekdays and weekend days were treated separately when randomly assigning survey days to each month. Because weekends typically receive increased fishing pressure, most weekend days were represented in the survey. Time periods (4-hour

blocks) when clerks were to be present at the lake were randomly assigned to available days with weekdays and weekend days being treated separately when times were assigned.

The survey utilized instantaneous angler counts combined with angler interviews. Instantaneous angler counts provide fishing pressure estimates and angler interviews provide information necessary for estimating fish species catch and harvest rates, mean angler trip length, mean party size, angler residency, angler target species, angler opinion to select questions and total length (TL, mm) measurements of angler caught fish.

Two instantaneous counts of the total number of boats fishing and all shoreline anglers present were made during each 4-hour open-water period and during each 4-hour ice cover period all active ice shacks and open-ice anglers were counted. When counts were not being made, anglers were contacted and interviewed. Angler use and harvest estimates were computed using Creel Application Software (CAS; Soupir and Brown 2002).

The potential economic value of the Lynn Lake fishery was estimated by multiplying a daily angling expenditure of \$50 by the estimated number of angler days. The average daily expenditure of \$50 was derived from the reported total expenses of \$202,797,000 for anglers fishing South Dakota in 2011 and divided by 4,069,000 the estimated number of days spent fishing in South Dakota in 2011 (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce Bureau of Census 2011).

## **Results and Discussion**

### ***Summer***

#### Fishing Pressure

Summer fishing pressure peaked in 2005 (48,817 angler h; 75.3 h/ha [30.5 h/acre]) and then declined each summer through 2010 (6,977 angler h; 10.8 h/ha [4.4 h/acre]) before increasing in 2012 (27,165 angler h; 41.9 h/ha [17.0 h/acre]; Table 1). Fishing pressure across the 11 summer periods averaged 23,948 h (37.0 h/ha [15.0 h/acre]) and is comparable to angling pressure measured at Enemy Swim Lake (averaged 44.5 h/ha [18.0 h/acre] for 1997, 1998 and 2000-2004 summers; Blackwell 2005b). On a per hectare basis Lynn Lake had higher angling pressure than two popular and large lakes (Waubay Lake, 6,291 ha [15,540 acre] and Bitter Lake, 4,010 ha [9,909 acre]) in northeast South Dakota. Anglers fished an average of 19.8 h/ha (8.0 h/acre) at Waubay Lake during the summers of 1997-2004 (Blackwell and Hubers 2003; Blackwell 2005c) and at Bitter Lake fishing pressure averaged 12.0 h/ha (4.9/acre) during the 2000-2004 summers (Blackwell 2005a).

The average number of anglers per angler group exceeded two each summer and averaged 2.5 across the 11 summers. Trip length averages for the summers surveyed ranged from 3.41 to 6.10 hours and averaged 4.76 hours (Table 1). The number of angler days ranged from 1,826 (2012) to 8,957 (2005; Table 1). The economic impact of the Lynn Lake summer fishery ranged from \$91,300 (2010) to \$447,850 (2005) with an overall mean of \$249,409 (Table 1).

In 2001, 87% of anglers indicated they were targeting Walleye (Table 2). However, during the summer of 2002 and 2003 anglers targeting Walleye made up <40% of the anglers and Black Crappies were the primary target species. Walleyes were again the main targeted species from 2004 through 2012. Walleye are commonly the most sought fish species during the summer at eastern South Dakota lakes (Blackwell and Hubers 2003; Blackwell et al. 2007a; Lucchesi 2012).

Yellow Perch became more important to summertime anglers in 2012 when 14% of anglers interviewed targeted perch; prior to 2012, <5% of anglers pursued perch during the summer. Generalist anglers were greatest during the 2003 summer when 17% of the anglers interviewed indicated they were fishing for anything. Bluegills were targeted by interviewed anglers during the summer of 2004 through 2007 and in 2010 and 2012. A limited number of interviewed anglers indicated they were targeting Muskellunge during 2009 and 2012 summers.

### Angler Demographics

Non-resident anglers made up a >50% of the anglers fishing at Lynn Lake during all summer periods with the exception of 2001 and 2010 (Table 3). In 2003, 2004, 2006, and 2007 summers, >60% of the anglers interviewed were non-residents. Similarly, non-resident anglers were found to outnumber resident anglers at Waubay Lake during the 2005 and 2006 summers (Blackwell et al. 2007b). However, at many lakes in eastern South Dakota the percentage of non-resident anglers during the summer is generally lower than resident anglers. For example, non-resident anglers generally encompassed  $\leq$ 20% of the anglers fishing Lake Thompson from 1997 – 2008 (Lucchesi 2009) and residents comprised 52% to 90% of anglers at Enemy Swim Lake during 1997, 1998 and 2000-2006 summers (Blackwell 2005b; Blackwell et al. 2007a).

The majority of non-resident anglers fishing at Lynn Lake originated from Minnesota and Iowa, but anglers from Nebraska, North Dakota and Wisconsin were common. Anglers from Minnesota and Iowa often comprise the majority of non-resident anglers that fish northeast South Dakota waters (Blackwell et al. 2007b). Overall, anglers from 16 states in addition to South Dakota were interviewed during the summer periods (Table 3).

Resident anglers from 26 counties throughout South Dakota were interviewed (Table 4.). Anglers from Brown, Codington, Day and Marshall Counties comprised the highest percentage of South Dakota residents fishing at Lynn Lake.

Table 1. Number of interviews conducted and estimates of mean party size, mean trip length, angler hours, angler hours per surface hectare, angler days and economic value for angler use and harvest surveys completed at Lynn Lake, South Dakota during the summers (May – August) of 2001-2010 and 2012.

Parameter	Year and period										
	2001 Summer	2002 Summer	2003 Summer	2004 Summer	2005 Summer	2006 Summer	2007 Summer	2008 Summer	2009 Summer	2010 Summer	2012 Summer
Interviews (#)	104	113	166	166	156	264	116	66	42	28	94
Party size (#)	2.18	2.56	2.52	2.47	2.68	2.65	2.63	2.53	2.51	2.35	2.43
Trip length (hr)	5.51	4.73	5.03	4.92	5.46	4.04	4.36	6.10	3.41	3.82	5.01
Angler hours	23,799	19,609	30,899	23,306	48,817	32,729	24,619	14,818	10,695	6,977	27,165
Angler hr/ha	36.7	30.3	47.7	36.0	75.3	50.5	38.0	22.9	16.5	10.8	41.9
Angler days	4,319	4,146	6,143	4,737	8,957	8,101	5,647	2,429	3,136	1,826	5,422
Economic value (\$)	215,950	207,300	307,150	236,850	447,850	405,050	282,350	121,800	156,800	91,300	271,100

Table 2. Percent of interviewed angling parties that indicated they were primarily targeting a specific species or any species while fishing at Lynn Lake, South Dakota during the summers (May – August) of 2001-2010 and 2012; N equals the number of interviews.

Summer	N	Percent targeting						
		Any	Northern Pike	Muskellunge	Bluegill	Black Crappie	Yellow Perch	Walleye
2001	103	10.7				1.9		87.4
2002	115	2.6				61.7		35.7
2003	166	16.9				43.4	0.6	39.2
2004	166	4.2			3.0	19.9		72.9
2005	155	3.2			0.6	5.2		91.0
2006	264	7.6			0.8	4.9	4.9	81.8
2007	116				1.7	1.7	0.8	95.8
2008	66	4.5				1.5		93.9
2009	41			7.3				92.7
2010	28	3.6			10.7			85.7
2012	90	10.0	1.1	3.3	3.3		14.4	67.8

Table 3. Percent of interviewed angling parties at Lynn Lake, South Dakota during the summers (May – August) of 2001-2010 and 2012 that indicated their home residence was within a specific state.

State	Percent										
	2001 Summer	2002 Summer	2003 Summer	2004 Summer	2005 Summer	2006 Summer	2007 Summer	2008 Summer	2009 Summer	2010 Summer	2012 Summer
Colorado	1.0				0.7	0.4	0.9				
Idaho							0.9				
Illinois			1.2	0.6		0.4					
Indiana	1.0			1.2	1.3	0.4		4.6			1.2
Iowa	5.8	17.4	22.9	23.0	16.8	19.3	17.8	18.5	9.8	3.4	25.3
Kansas			0.6	0.6							
Michigan					0.7						
Minnesota	16.5	34.8	37.4	30.3	25.2	32.8	34.8	29.2	31.7	28.6	24.1
Missouri			1.8	1.8	0.7	0.4	0.9				
Nebraska	1.9		2.4	4.9	5.2	3.1	1.7		9.8	3.6	
North Dakota	7.8	1.7	1.8	4.9	1.3	4.6	5.1	1.5	2.4	3.6	1.2
South Carolina							0.9				
South Dakota	65.0	41.7	29.5	30.3	45.2	35.5	33.9	44.6	41.5	57	47.1
Texas					0.7			1.5			
Washington	1.0										
Wisconsin		3.5	2.4	2.4	2.6	2.7	3.4		4.9	3.6	1.2
Wyoming		0.9					0.4				

Table 4. Percent of interviewed angling parties at Lynn Lake, South Dakota during the summers (May – August) of 2001-2010 and 2012 that indicated their home residence was within a specific South Dakota county.

County	Percent										
	2001 Summer	2002 Summer	2003 Summer	2004 Summer	2005 Summer	2006 Summer	2007 Summer	2008 Summer	2009 Summer	2010 Summer	2012 Summer
Beadle			2.0								
Brookings	1.5	2.1	2.0		2.9	1.1	5.0	7.1	6.3	7.1	
Brown	41.5	29.8	24.0	44.7	36.8	34.1	27.5	39.3	18.8	42.9	65.9
Brule				2.1	1.5						4.9
Charles Mix					1.5						
Clark				2.1							
Clay					2.9			10.7			
Codington	21.5	10.6	8.0	2.1	2.9	6.6	15.0		12.5	7.1	
Davison	1.5		2.0	2.1	1.5	1.1					
Day	15.4	29.8	26.0	10.6	13.2	15.4	22.5	10.7	18.8	7.1	
Deuel	1.5								6.3		
Edmunds	1.5	6.4		2.1							2.4
Grant	1.5		2.0	4.3	5.9	5.5					2.4
Hamlin			2.0		1.5				6.3		
Hand	0.0	2.1									
Hughes	1.5				1.5						
Kingsbury					1.5						
Lake		2.1		2.1						7.1	2.4

Table 4. Continued

County	Percent										
	2001 Summer	2002 Summer	2003 Summer	2004 Summer	2005 Summer	2006 Summer	2007 Summer	2008 Summer	2009 Summer	2010 Summer	2012 Summer
Lawrence											2.4
Lincoln	1.5	2.1	2.0		1.5	5.5					
Marshall	1.5	2.1	2.0	2.1	2.9	4.4	5.0	7.1	6.3	7.1	2.4
Potter	1.5				1.5						
Roberts	1.5				5.9	2.2	2.5		6.3		2.4
Spink	3.1		6.0	2.1		3.3	2.5				4.9
Union			2.0		1.5	1.1	2.5			7.1	
Yankton						1.1		7.1			

## Angler Catch and Harvest

### *Walleye*

The greatest numbers of Walleye caught and harvested occurred during the summers of 2001–2005 with a peak in 2005 when an estimated 30,393 Walleye were caught (Table 5). Walleye catch rates ranged from 0.06 (2009) to 1.21 fish per hour (2002). The observed Walleye catch rates were similar to those of other new and expanded waters in northeast South Dakota. At Waubay Lake, angler catch rates for Walleye ranged from 0.31 to 1.22 for the 1997-2002 summers (Blackwell and Hubers 2003) and at Bitter Lake angler catch rates ranged from 0.79 to 1.2 during the 2000-2004 summers (Blackwell 2005a).

Angler catch rates for Walleye during the summer periods were correlated to annual Walleye gill net catch rates (Figure 1; for gill net information see Kaufman et al. 2009 and Kaufman et al. 2013). Walleye density was found to be a good predictor of angler catch rates in northern Wisconsin lakes (Beard et al. 1997). However this relationship may not always hold true as prey abundance may impact angling success. At Oneida Lake, New York, 97% of variability in angler catch rates could be explained by combining Walleye population density and growth (VanDeValk et al. 2005). It was thought that Walleye growth rates may relate to prey abundance with angler catch rates decreasing when growth increased.

The 2005 harvest estimate of 11,199 Walleyes was the highest observed and the estimated harvest of 323 Walleyes in 2009 was the lowest (Table 5). Walleye harvest rates exceeded 0.10 fish per hour during 8 of 11 summers with the highest rate occurring in 2001 when 0.30 Walleye per hour were harvested (Table 5). Over the 11 summers, the average harvest rate was 0.15 Walleye per hour fished. Walleye harvest rates were similar to those observed at Waubay Lake (Blackwell and Hubers 2003) and Bitter Lake (Blackwell 2005a).

The average size of harvested Walleye exceeded 432 mm (17 in) TL during all summer periods and averaged 465 mm (18.3 in) TL (Table 5; Figure 2). The average size of harvested Walleye exceeds that of most eastern South Dakota fisheries. Lucchesi (2012) provided average sizes of harvested Walleye for 10 lakes surveyed in eastern South Dakota and the averages ranged from 362 mm (14.3 in) TL (Lake Herman) to 441 mm (17.4 in) TL (Bitter Lake). The high average size of harvested Walleye at Lynn Lake likely results from the minimum length limits in place during the study and the trophic upsurge as a result of flooding terrestrial vegetation. Few sub-legal Walleye were observed in the harvest (Figure 2).

Walleye harvest exceed 9.0 kg/ha (8.0 lb/acre) in 2001, 2005 and 2006 with the highest occurring in 2005 when 15.8 kg/ha (14.1 lb/acre) were harvested (Table 5). The average biomass harvested during the 11 summer periods was 6.3 kg/ha (5.6 lb/acre). This average biomass harvested is higher than other reported averages for eastern South Dakota and is above the 75% quartile for Walleye yield in 168 North America Walleye populations (Baccante and Colby 1996). Lucchesi (2012) reported summer yield values for 10 eastern South Dakota lakes as ranging from 0.80 kg/ha (0.71 lb/acre; Lake Madison) to 3.03 kg/ha (2.70 lb/acre; Pickerel Lake). The high biomass harvested likely is related to trophic upsurge resulting from lake expansion and the minimum length limits in place during the study period.

### *Yellow Perch*

Yellow Perch catches were minimal during the summer periods with the exception of 2006 and 2012 (Table 6). In 2006, anglers caught an estimated 15,615 Yellow Perch and 25,440 were caught during the 2012 summer. Summer catch rates ranged from 0.00 (2008 and 2009) to 0.94 fish per hour (2012). Angler catch rates for Yellow Perch were similar to other area fisheries. At Waubay Lake during the summers of 1997-2002 catch rates ranged from 0.00 to 1.25 Yellow Perch per hour (Blackwell and Hubers 2003). Average angler catch rates for Yellow Perch from 10 eastern South Dakota waters creel between 1996 and 2008 ranged from 0.03 (Lake Poinsett) to 0.52 fish per hour (Waubay Lake; Lucchesi 2012).

Angler catch rates for Yellow Perch during the summers were correlated to annual gill net catch rates (Figure 3; for gill net information see Kaufman et al. 2009 and Kaufman et al. 2013). Similar to Walleye, prey availability may play into this relationship.

Anglers harvested an estimated 5,982 Yellow Perch in 2006 and 13,127 in 2012; during all other summers the estimated harvest did not exceed 515 fish (Table 6). The average size of harvested Yellow Perch ranged from 232 mm (9.1 in) TL (2010) to 319 mm (12.6 in) TL (2002) and few fish < 200 mm (7.9 in) TL were harvested (Figure 4). In 2006, the estimated angler harvest of Yellow Perch was 3.59 kg/ha (3.20 lb/acre) and an estimated 5.22 kg/ha (4.66 lb/acre) were harvested during the 2012 summer (Table 6).

### *Black Crappie*

The highest Black Crappie catches occurred during the 2002 and 2003 summer when anglers caught in excess of 26,000 crappies and harvested an estimated 18,513 and 22,456 fish, respectively (Table 7). During these two years the average size of Black Crappie harvested was  $\geq 279$  mm (11 in) TL and (Table 7; Figure 5) and the biomass harvested exceeded 10 kg/ha (8.93 lb/acre).

Strong year classes of Black Crappie were produced from 1998 to 2000 (Kaufman et al. 2013). These cohorts provided for the robust Black Crappie fishery of 2002 and 2003. Black Crappie abundance was estimated through mark recapture techniques between 2001 and 2006 and population estimates ranged from 3,848 to 85,732 fish (unpublished data). Angler catch rates during the summer periods of 2001 through 2006 were correlated with corresponding yearly population estimates (Figure 6).

A lack of Black Crappie recruitment since the initial year classes led to reduced angler catches following the 2003 summer. A similar scenario occurred at Waubay Lake where Black Crappie recruitment was strong soon after the lake elevation increased but limited to no recruitment occurred in the years that followed. At Waubay Lake, angler catches of Black Crappies peaked in 2001 and 2002 but by 2005 Black Crappies were rarely observed in the angler creel (Blackwell et al. 2007b). Increased Black Crappie recruitment is needed for the Lynn Lake Black Crappie fishery to rebound.

Table 5. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Walleye during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001	23,898 (5,157)	1.00 (0.34)	7,141 (1,437)	0.30 (0.09)	433 (1.97)	874 (14.63)	9.63
2002	23,646 (4,004)	1.21 (0.18)	2,472 (383)	0.13 (0.03)	459 (2.54)	1,040 (18.54)	3.97
2003	23,285 (4,083)	0.75 (0.12)	3,747 (559)	0.12 (0.02)	438 (2.80)	916 (21.52)	5.30
2004	13,382 (2,916)	0.57 (0.22)	4,179 (830)	0.18 (0.07)	439 (1.39)	904 (10.29)	5.83
2005	30,393 (4,934)	0.62 (0.16)	11,199 (1,612)	0.23 (0.06)	440 (1.50)	913 (10.60)	15.78
2006	9,823 (1,407)	0.30 (0.07)	6,793 (848)	0.21 (0.05)	455 (1.40)	1,018 (10.60)	10.67
2007	7,641 (1,015)	0.31 (0.08)	3,666 (536)	0.15 (0.04)	479 (2.81)	1,212 (23.40)	6.86
2008	1,747 (719)	0.12 (0.05)	1,084 (376)	0.07 (0.03)	509 (6.05)	1,469 (56.76)	2.46
2009	611 (238)	0.06 0.03	323 (120)	0.03 0.01	549 (13.72)	1,912 (148.10)	0.95
2010	708 (323)	0.10 (0.06)	482 (258)	0.07 (0.11)	459 (11.48)	1,069 (89.07)	0.80
2012	11,330 (1,772)	0.42 (0.09)	4,586 (914)	0.17 (0.05)	452 (3.35)	1,005 (31.36)	7.11

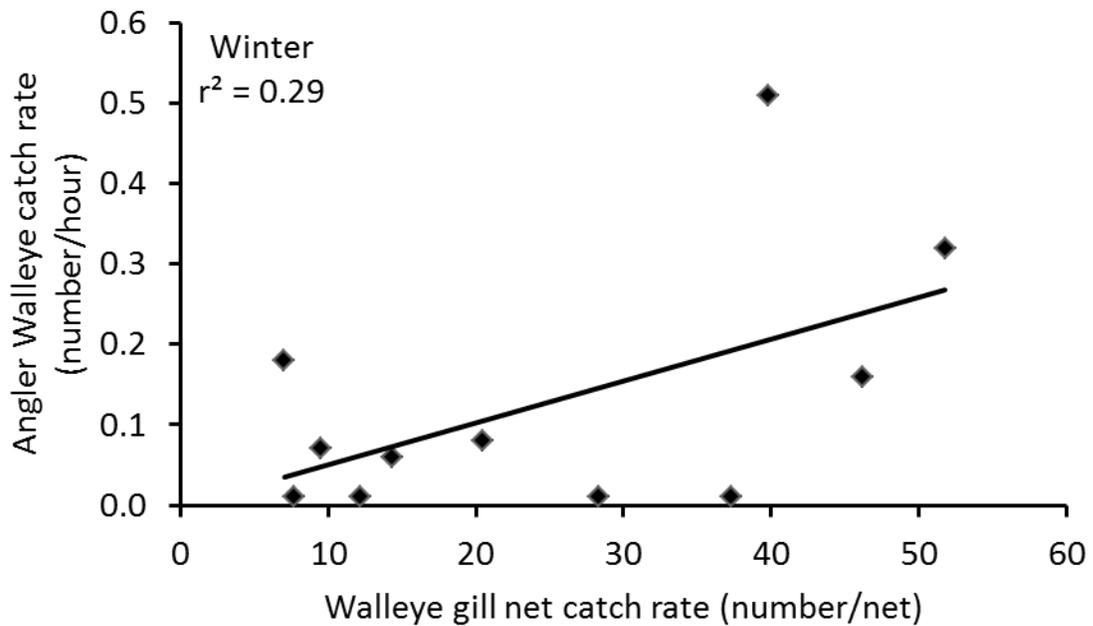
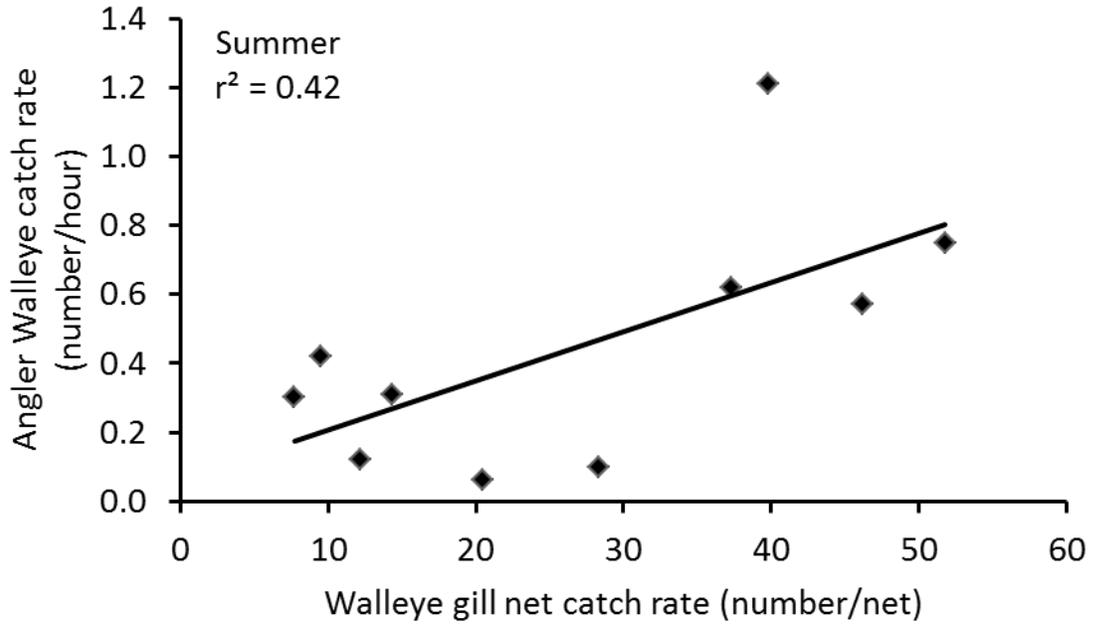


Figure 1. Correlation between annual Walleye gill net catch rates (mean number of Walleyes per gill net) and summer (top) and winter (bottom) angler catch rates (mean number per hour fished) for Walleyes at Lynn Lake, South Dakota 2001-2011 and 2012 ( $r^2$  = square of correlation coefficient).

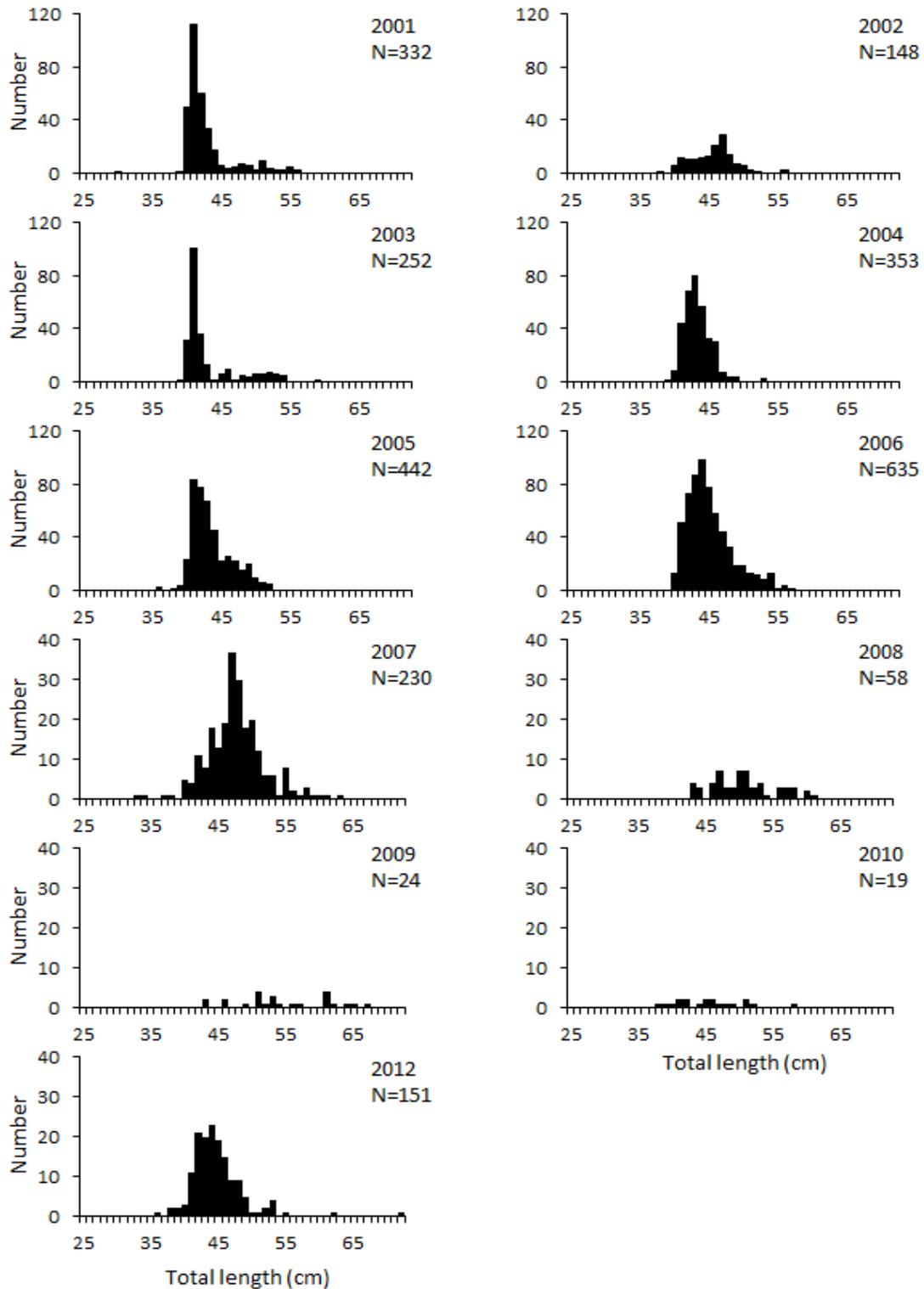


Figure 1. Length frequency of angler-harvested Walleyes measured during angler surveys at Lynn Lake, South Dakota during the summers (May-August) of 2001-2010 and 2012; N equals the number of fish measured.

Table 6. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Yellow Perch during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001	216 (199)	0.01 (0.01)	30 (20)	<0.01 (<0.01)	269 (-)	290 (-)	0.01
2002	121 (38)	0.01 (<0.01)	90 (41)	<0.01 (<0.01)	319 (7.13)	507 (39.24)	0.07
2003	627 (472)	0.02 (0.02)	512 (452)	0.02 (0.01)	283 (7.02)	358 (26.92)	0.28
2004	132 (57)	0.01 (<0.01)	113 (55)	0.01 (<0.01)	267 (8.70)	294 (32.12)	0.05
2005	322 (193)	0.01 (<0.01)	322 (193)	0.01 (<0.01)	285 (10.92)	366 (34.75)	0.18
2006	15,615 (13,752)	0.48 -	5,982 (3,763)	0.18 -	291 (2.55)	389 (12.76)	3.59
2007	17 (21)	0.01 (<0.01)	17 (21)	0.01 (<0.01)	343 (-)	635 (-)	0.02
2008	0	0	0	0			0.00
2009	0	0	0	0			0.00
2010	565 (282)	0.08 (0.04)	17 -	0.01 (<0.01)	232 (-)	180 (-)	<0.01
2012	25,440 (6,456)	0.94 (0.26)	13,127 (3,090)	0.48 (0.13)	257 (1.77)	258 (5.96)	5.22

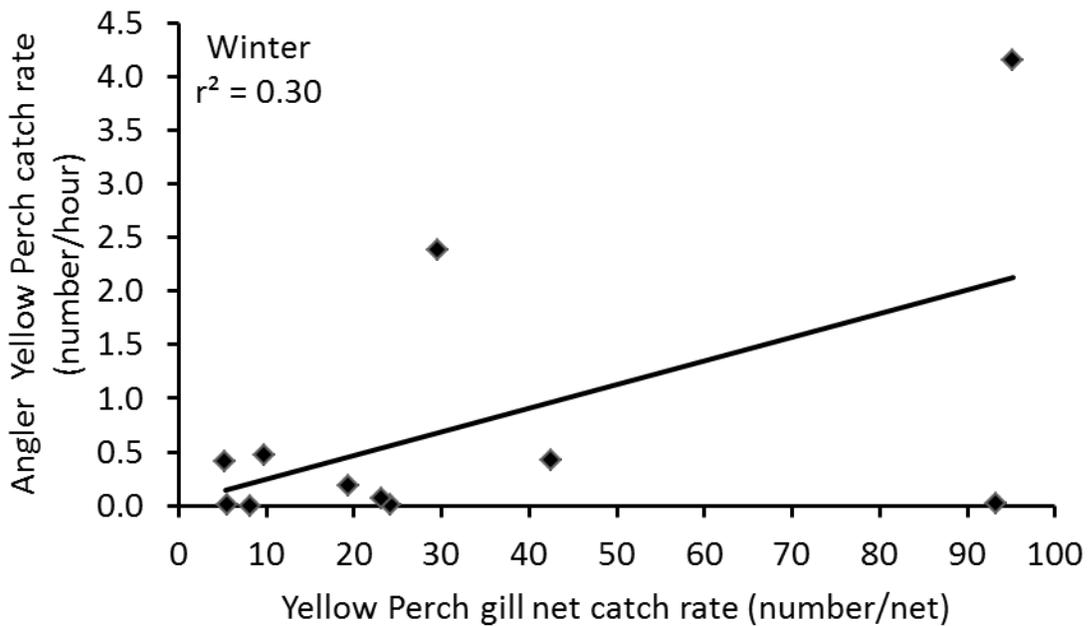
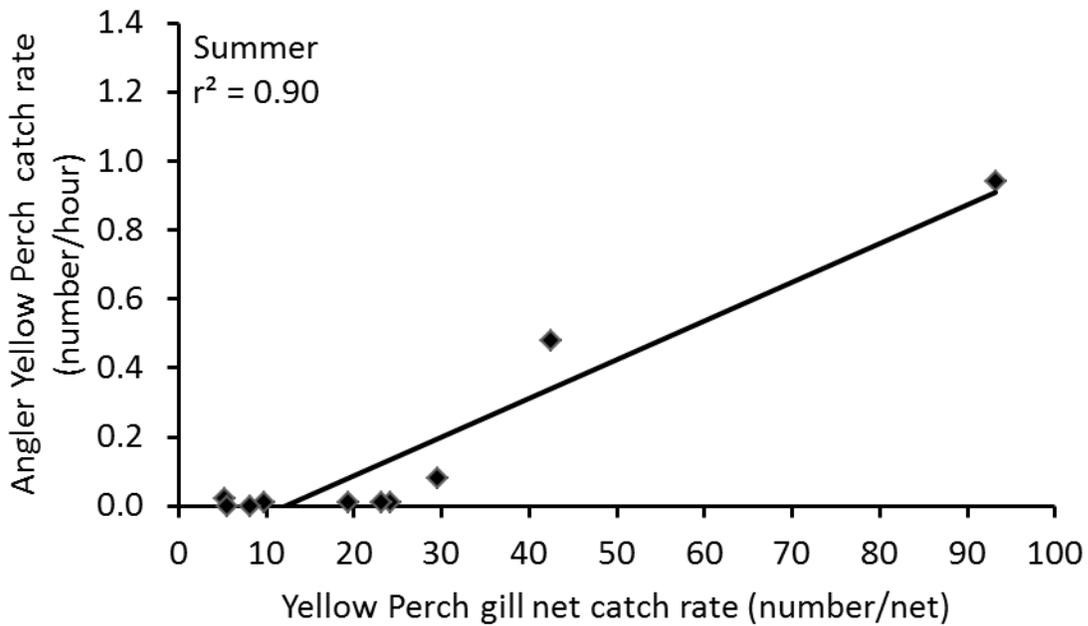


Figure 3. Correlation between annual Yellow Perch gill net catch rates (mean number of Yellow Perch per gill net) and summer (top) and winter (bottom) angler catch rates (mean number per hour fished) for Yellow Perch at Lynn Lake, South Dakota 2001-2011 and 2012 ( $r^2$  = square of correlation coefficient).

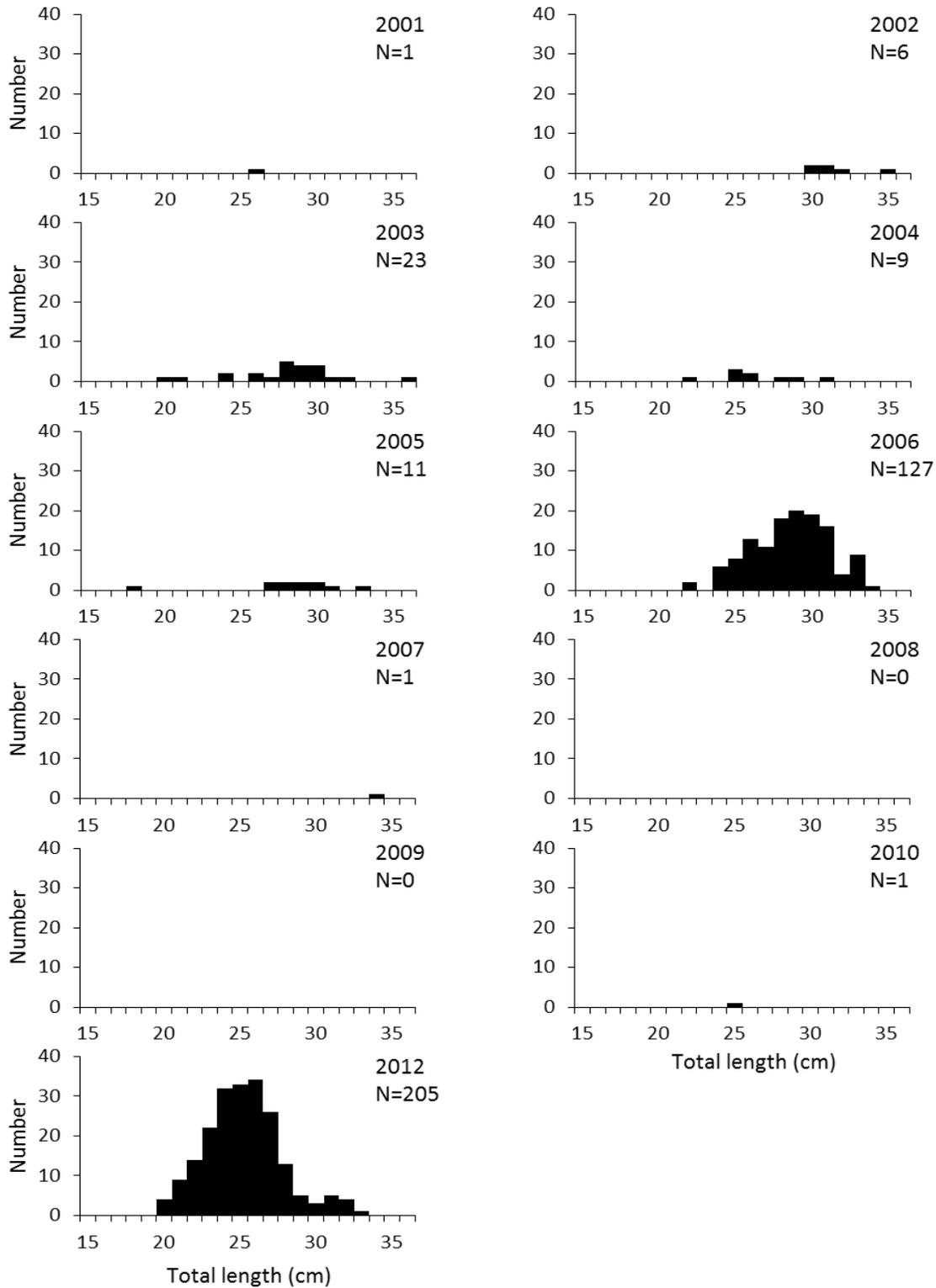


Figure 4. Length frequency of angler-harvested Yellow Perch measured during angler surveys at Lynn Lake, South Dakota during the summers (May-August) of 2001-2010 and 2012; N equals the number of fish measured.

Table 7. Estimated number caught, catch rate (number /h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Black Crappies during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001	3,784 (1,136)	0.16 (0.06)	2,125 (605)	0.09 (0.03)	255 (1.94)	277 (7.06)	0.91
2002	26,836 (5,101)	1.37 (0.41)	18,513 (3,051)	0.94 (0.30)	279 (1.37)	375 (6.40)	10.71
2003	27,506 (5,298)	0.89 (0.26)	22,456 (4,884)	0.73 (0.24)	284 (1.21)	397 (5.48)	13.76
2004	4,865 (1,237)	0.21 (0.09)	4,435 (1,166)	0.19 (0.09)	304 (1.06)	490 (5.66)	3.35
2005	1,014 (481)	0.02 (0.01)	890 (470)	0.02 (0.01)	304 (3.62)	496 (16.79)	0.68
2006	3,977 (1,212)	0.12 (0.04)	2,100 (565)	0.06 (0.02)	297 (3.83)	483 (18.44)	1.57
2007	119 (142)	<0.01 (<0.01)	119 (142)	<0.01 (<0.01)	342 (4.45)	724 (30.97)	0.13
2008	40 (22)	<0.01 (<0.01)	40 (22)	<0.01 (<0.01)	298 (12.37)	459 (63.10)	0.03
2009	0	0	0	0			0.00
2010	0	0	0	0			0.00
2012	3,235 (1,684)	0.12 (0.06)	492 (228)	0.02 (0.01)	238 (11.05)	250 (44.95)	0.19

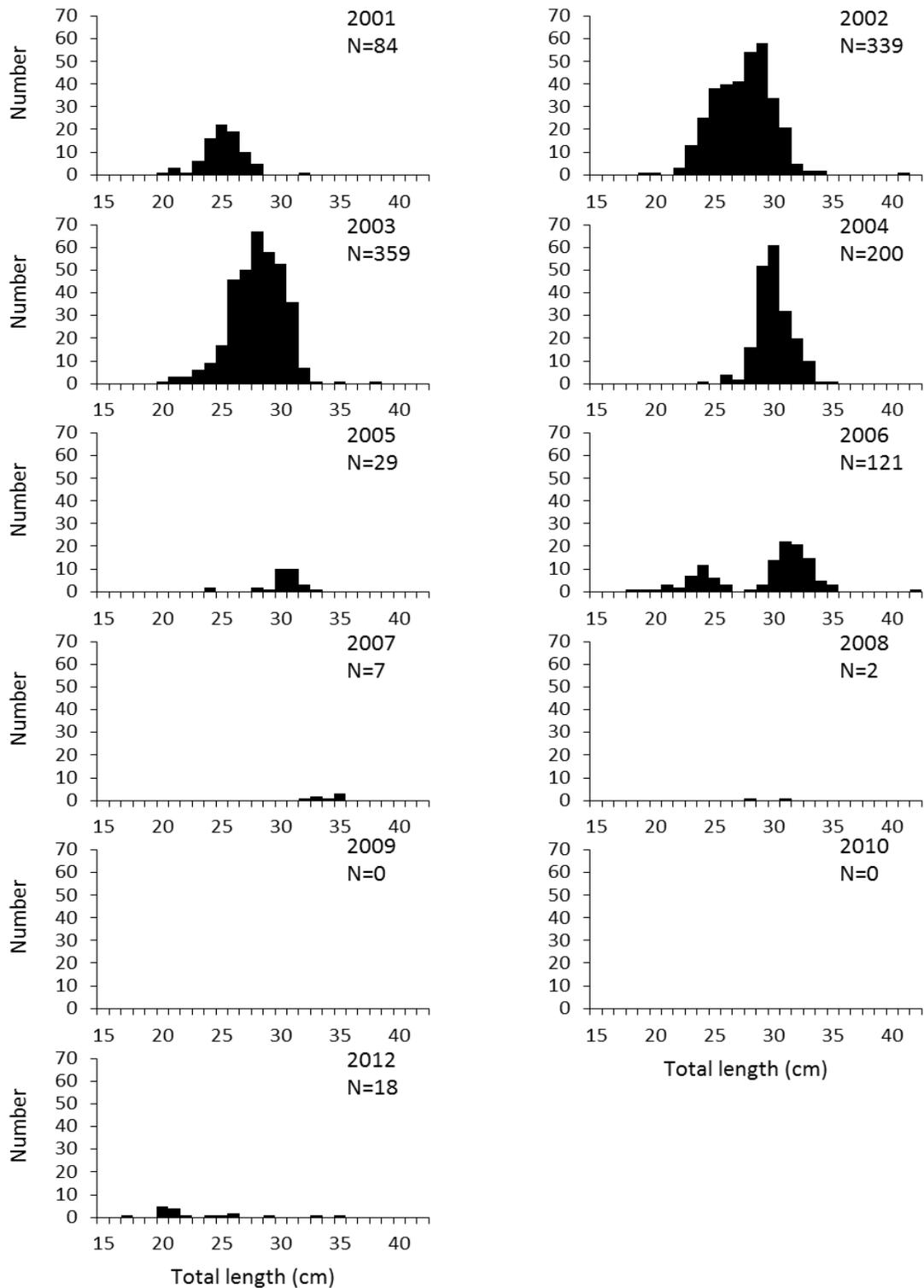


Figure 5. Length frequency of angler-harvested Black Crappies measured during angler surveys at Lynn Lake, South Dakota during the summers (May-August) of 2001-2010 and 2012; N equals the number of fish measured.

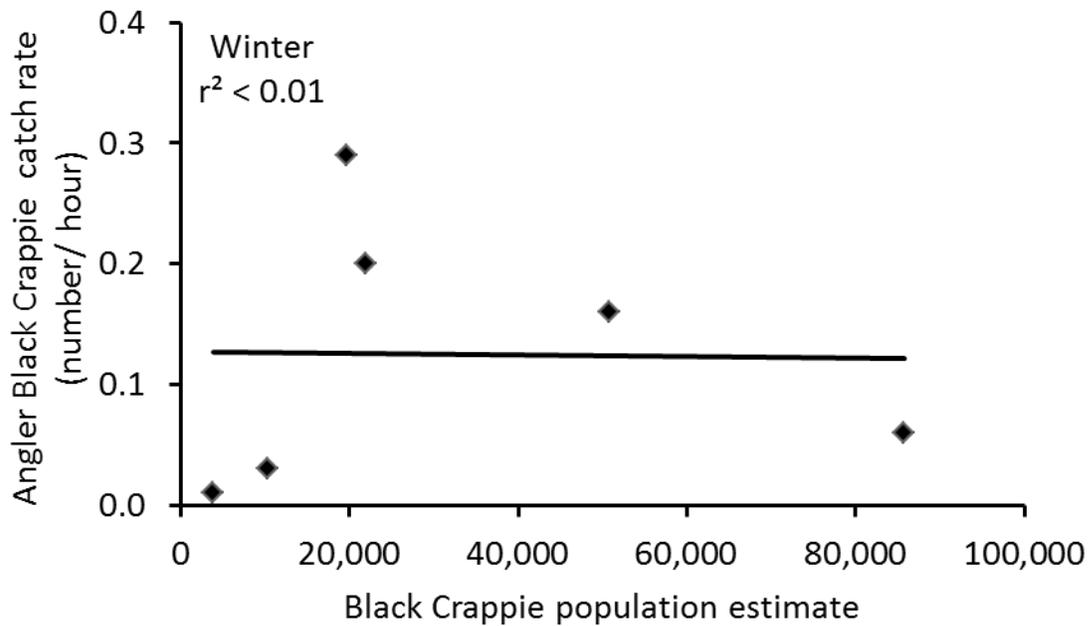
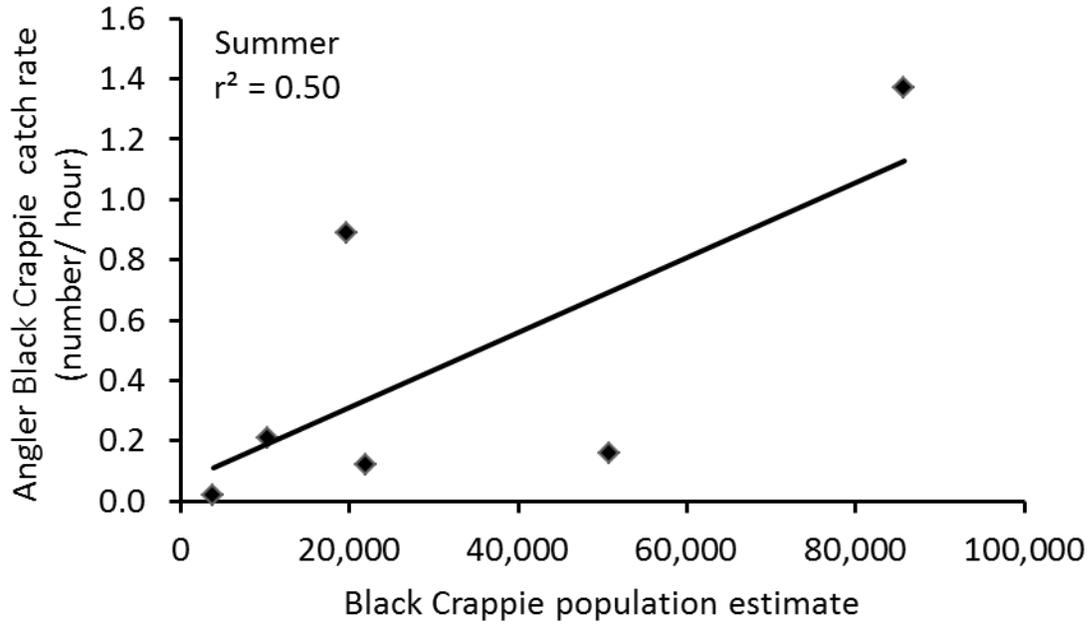


Figure 6. Correlation between annual Black Crappie spring population estimates and summer (top) and winter (bottom) angler catch rates (mean number per hour fished) for Black Crappies at Lynn Lake, South Dakota 2001-2006 ( $r^2$  = square of correlation coefficient).

### *Bluegill*

The summer Bluegill fishery has been sporadic with overall catches being low. No Bluegills were identified as being caught in 2001 and 2007 through 2010 summers (Table 8). The highest Bluegill catch occurred in 2012 summer when 6,350 fish were estimated to have been caught (Table 8). Besides 2012, the highest Bluegill catches occurred in 2003 and 2006 when 2,276 and 3,886 Bluegill were caught.

A high percentage of Bluegills caught during the 2002 to 2006 summers were harvested, while only 39% were harvested in 2012. The average size of harvested Bluegill in 2012 was 200 mm (7.9 in) TL which is lower than that observed during the 2002 to 2006 summers when average size exceeded 225 mm (8.9 in) TL (Table 8; Figure 7). The estimated biomass of harvested Bluegills during the 11 summers ranged from 0 (2007-2010) to 2.0 kg/ha (2.25 lb/ha; 2006).

### *Northern Pike*

Lynn Lake did not follow the trend of high Northern Pike catches soon after the water level increased that has been observed at other new and expanded waters in northeast South Dakota (e.g., Waubay Lake; Blackwell and Hubers 2003). Anglers caught few Northern Pike during the summer periods with the exception of 2012 when an estimated 6,833 were caught (Table 9). Fewer than 110 Northern Pike were caught during the 2001 and 2005 through 2010 summers. The higher angler catch in 2012 corresponds to the 2012 Northern Pike gill net catch which was the highest catch since 2003 (Kaufman et al. 2013).

Because of the low catches, few Northern Pike were measured. The average size Northern Pike that were measured ranged from 482 mm (19.0 in; 2002) TL to 693 mm (27.3 in; 2006) TL (Table 9).

### *Muskellunge*

The angler catch of Muskellunge from Lynn Lake has been limited. The greatest catch and harvest occurred during the 2009 summer when an estimated 153 fish were caught and the harvest was estimated at 17 fish (Table 10). Catch rates for Muskellunge never exceeded 0.01 fish per hour. No Muskellunge were reported as being caught in 2001 (first year stocked) nor 2007.

Anecdotally (i.e., increased telephone calls inquiring about Muskellunge population) it appears that interest in fishing for Muskellunge at Lynn Lake has increased. The current survey may not provide a complete picture of the open-water Muskellunge fishery because September and October were not included. Approximately 28% of the Muskellunge caught by 128 anglers, participating in an evaluation of angler diaries while fishing in Minnesota, Michigan and Ontario waters during 1986 through 1989, were caught in September and October (Younk and Cook 1992).

Table 8. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Bluegills during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001	0	0	0	0			0.00
2002	293 (168)	0.01 (0.01)	181 (91)	0.01 (<0.01)	226 (6.85)	379 (38.33)	0.11
2003	2,276 (1,484)	0.07 (0.05)	2,276 (1,484)	0.07 (0.05)	233 (4.10)	416 (17.16)	1.46
2004	816 (666)	0.04 (0.03)	766 (650)	0.03 (0.03)	242 (4.14)	476 (22.73)	0.56
2005	326 (217)	0.01 (<0.01)	326 (217)	0.01 (<0.01)	252 (3.99)	534 (26.85)	0.27
2006	3,886 (1,858)	0.12 (0.06)	3,133 (1,806)	0.10 (0.06)	230 (4.78)	413 (26.69)	2.00
2007	0	0	0	0			0.00
2008	0	0	0	0			0.00
2009	0	0	0	0			0.00
2010	0	0	0	0			0.00
2012	6,350 (3,642)	0.23 (0.14)	2,500 (1,186)	0.09 (0.05)	200 (3.71)	252 (15.35)	0.97

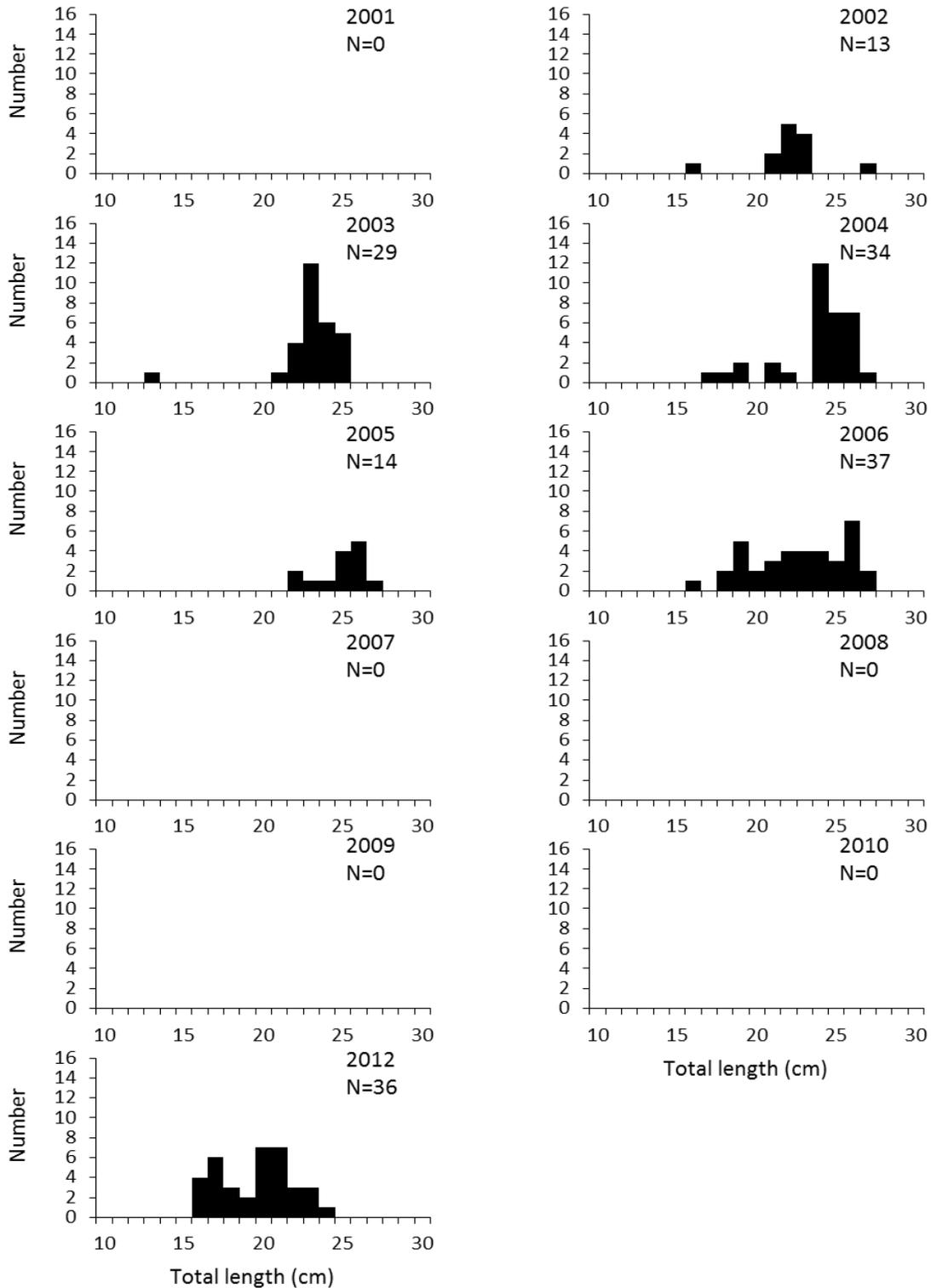


Figure 7. Length frequency of angler-harvested Bluegills measured during angler surveys at Lynn Lake, South Dakota during the summers (May-August) of 2001-2010 and 2012; N equals the number of fish measured.

Table 9. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Northern Pike during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001	0	0	0	0			0.00
2002	1,123 (373)	0.06 (0.02)	15 (15)	<0.01 (<0.01)	482	741	0.08
2003	615 (140)	0.02 (<0.01)	311 (105)	0.01 (<0.01)	595 (41.60)	1,683 (304.27)	0.81
2004	806 (206)	0.03 (0.01)	125 (50)	0.01 (<0.01)	631 (7.95)	1,709 (64.72)	0.33
2005	106 (51)	<0.01 (<0.01)	51 (40)	<0.01 (<0.01)			
2006	87 (41)	<0.01 (<0.01)	57 (40)	<0.01 (<0.01)	693 (4.27)	2,281 (41.97)	0.20
2007	74 (18)	<0.01 (<0.01)	49 (0)	<0.01 (<0.01)	680	2,150	0.16
2008	0	0	0	0			0.00
2009	17 (25)	<0.01 (<0.01)	0	0			0.00
2010	0	0	0	0			0.00
2012	6,833 (1,828)	0.25 (0.07)	1,214 (499)	0.04 (0.02)	609 (10.04)	1,568 (72.24)	2.94

Table 10. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h) of Muskellunge by anglers during summer (May-August) at Lynn Lake, South Dakota 2001-2011 and 2012. Standard error values are provided in parentheses.

Summer	Caught	Catch rate (n/h)	Harvest	Harvest rate (n/h)
2001	0	0	0	0
2002	24 (19)	<0.01 (<0.01)	0	0
2003	8 (8)	<0.01 (<0.01)	0	0
2004	48 (20)	<0.01 (<0.01)	0	0
2005	61 (48)	<0.01 (<0.01)	0	0
2006	19 (12)	<0.01 (<0.01)	0	0
2007	0	0	0	0
2008	81 (30)	<0.01 (<0.01)	0	0
2009	153 (70)	<0.01 (<0.01)	17 (25)	<0.01 (<0.01)
2010	12 (0)	<0.01 (<0.01)	0	0
2012	9 (10)	<0.01 (<0.01)	0	0

## **Winter**

### Fishing Pressure

Winter fishing pressure was generally less than that observed during the summer periods. Poor access as a result of deep snow or poor ice conditions can limit angling opportunities during some winters. Winter fishing pressure was greatest during the 2011-12 winter when an estimated 17,117 hours were fished and fishing pressure never exceeded 10,000 hours during the other 12 winters surveyed (Table 11). The average number of anglers per group ranged from 1.74 (2010-11) to 2.66 (2004-05) and averaged 2.05 anglers across the 12 winter periods. Trip length averages ranged from 2.83 (2003-04) to 5.00 (2010-11) hours and averaged 3.92 hours (Table 11). The number of angler days ranged from a low of 284 (2010-11) to 3,619 (2011-12). The economic impact of the Lynn Lake winter fishery ranged from \$14,200 (2010-11) to \$180,950 (2011-12) with an overall mean of \$74,446 (Table 11).

Walleyes were the most targeted species during five winters, Yellow Perch were the most targeted species during six winters and during the 2007-08 winter the greatest percentage of anglers indicated they were targeting anything (Table 12). Yellow perch and Walleye are commonly targeted by anglers fishing in northeast South Dakota during the winter (Blackwell et al. 2007b, Blackwell et al. 2007d.) Few anglers indicated they were targeting Northern Pike and no interviewed anglers targeted Muskellunge. The highest percentage of anglers targeting Black Crappies occurred in 2003-04 when 16.8% targeted them. Anglers targeted Bluegills during three winters with the greatest percentage occurring in 2004-05 when 9.6% of interviewed anglers indicated they were fishing for Bluegills. Generalist anglers made up from 0% (2010-11) to 43.9% (2007-08) of the anglers fishing during the winter and typically comprised >10% of the anglers.

### Angler Demographics

Contrary to the summer periods, resident anglers comprised the majority (55% [2004-05] to 100% [2010-11]) of anglers interviewed at Lynn Lake during all winter periods (Table 13). Resident anglers have been found to comprise the majority of winter anglers at Waubay Lake (Blackwell et al. 2007b), Bitter Lake (Blackwell et al. 2007d) and Cattail-Kettle Lake (Blackwell et al. 2007c). Anglers from Iowa, Minnesota, Nebraska and Wisconsin were the most common non-resident anglers interviewed during the winter. Anglers from Colorado, Illinois, Indiana, North Dakota and Wyoming were also interviewed.

Resident anglers from 25 counties throughout South Dakota were interviewed (Table 14.). Anglers from Brown, Codington, Day, Marshall and Minnehaha Counties comprised the highest percentage of South Dakota residents fishing at Lynn Lake.

Table 11. Number of interviews conducted and estimates of mean party size, mean trip length, angler hours, angler hours per surface hectare, angler days and economic value for angler use and harvest surveys completed at Lynn Lake, South Dakota during the winters (December – March) between December 2001 and March 2013.

Parameter	Year/period											
	2001-02 Winter	2002-03 Winter	2003-04 Winter	2004-05 Winter	2005-06 Winter	2006-07 Winter	2007-08 Winter	2008-09 Winter	2009-10 Winter	2010-11 Winter	2011-12 Winter	2012-13 Winter
Interviews (#)	58	75	132	73	62	105	41	13	14	13	64	25
Party size (#)	1.75	2.11	2.04	2.66	2.40	2.04	2.18	2.04	1.96	1.74	1.86	1.78
Trip length (hr)	4.13	3.22	2.83	3.77	4.88	3.96	4.30	2.83	3.16	5.00	4.73	4.22
Angler hours	7,679	4,891	9,752	6,776	4,805	8,407	2,358	1,128	1,886	1,418	17,117	2,918
Angler hours/ha	11.9	7.5	15.0	10.5	7.4	13.0	3.6	1.7	2.9	2.2	26.4	4.5
Angler days	1,859	1,519	3,446	1,797	985	2,123	548	399	597	284	3,619	691
Economic value (\$)	92,950	75,950	172,300	89,850	49,250	106,150	27,400	19,950	29,850	14,200	180,950	34,550

Table 12. Percent of interviewed angling parties that indicated they were primarily targeting a specific species or any species while fishing at Lynn Lake, South Dakota during the winters (December – March) between December 2001 and March 2013; N equals the number of interviews.

Winter	N	Percent targeting						
		Any	Northern Pike	Muskellunge	Bluegill	Black Crappie	Yellow Perch	Walleye
2001-02	58	12.1					1.7	86.2
2002-03	75	18.7				10.7	1.3	69.3
2003-04	131	22.9			0.8	16.8	11.5	48.1
2004-05	73	12.3	1.4		9.6	4.1	38.4	34.3
2005-06	62	4.8				1.6	71.0	22.6
2006-07	105	35.2			1.9	8.6	45.7	8.6
2007-08	41	43.9	2.4			7.3	29.3	17.1
2008-09	13	30.8					7.7	61.5
2009-10	14	28.6				7.10		64.3
2010-11	13						84.6	15.4
2011-12	64	1.6					90.6	7.8
2012-13	25	20.0					68.0	12.0

Table 13. Percent of interviewed angling parties at Lynn Lake, South Dakota during the winters (December – March) between December 2001 and March 2013 that indicated their home residence was within a specific state.

State	Percent											
	2001-02 Winter	2002-03 Winter	2003-04 Winter	2004-05 Winter	2005-06 Winter	2006-07 Winter	2007-08 Winter	2008-09 Winter	2009-10 Winter	2010-11 Winter	2011-12 Winter	2012-13 Winter
Colorado								7.7				
Illinois					1.6	2.9						
Indiana					1.6							
Iowa	6.9	4.0	6.1	6.9	3.2	13.3	12.2				10.9	4.2
Kansas			0.8									
Minnesota	24.1	17.3	22.1	34.3	6.5	14.3	12.2	30.8	14.3		3.1	12.5
Nebraska	1.7	2.7	4.6	4.1	9.7	1.9	2.4				1.6	
North Dakota			0.8			1.9	2.4					
South Dakota	67.2	74.7	63.4	54.8	74.2	59.1	61.0	61.5	71.4	100	84.4	79.2
Wisconsin		1.3	2.3		3.2	6.7	9.8		14.3			
Wyoming												4.2

Table 14. Percent of interviewed angling parties at Lynn Lake, South Dakota during the winters (December – March) between December 2001 and March 2013 that indicated their home residence was within a specific South Dakota county.

County	Percent											
	2001-02 Winter	2002-03 Winter	2003-04 Winter	2004-05 Winter	2005-06 Winter	2006-07 Winter	2007-08 Winter	2008-09 Winter	2009-10 Winter	2010-11 Winter	2011-12 Winter	2012-13 Winter
Beadle			1.3									
Brookings						24.6				7.7		
Brown	10.5	53.8	51.3	30.0	44.4		32.0	12.5	40.0	76.9	55.6	73.7
Brule											3.7	
Buffalo												
Clark												
Clay											1.9	
Codington	42.1	9.6	5.0	40.0	11.1	6.6					5.6	
Day	21.1	23.1	25.0	17.5	28.9	44.3	28.0	62.5	50.0	7.7	7.4	5.3
Edmunds			1.3	2.5							1.9	
Fall River			1.3									
Faulk			1.3									
Grant	2.6		1.3			3.3	4.0					
Hamlin	5.3		1.3									
Kingsbury					2.2							

Table 14. Continued.

County	Year/period											
	2001-02 Winter	2002-03 Winter	2003-04 Winter	2004-05 Winter	2005-06 Winter	2006-07 Winter	2007-08 Winter	2008-09 Winter	2009-10 Winter	2010-11 Winter	2011-12 Winter	2012-13 Winter
Lake	2.6		1.3								1.9	
Lincoln							4.0	12.5				
Marshall	2.9	3.8	1.3	2.5	6.7	1.6				7.7	14.8	5.3
Minnehaha	7.9	1.9	7.5	5.0		8.2	12.0	12.5	10.0		3.7	
Potter												5.3
Pennington		1.9										
Roberts						3.3						
Spink	5.3	3.8		2.5	6.7	4.9	4.0				3.7	10.5
Sully							4.0					
Yankton		1.9	1.3			3.3	12.0					

## Angler Catch and Harvest

### *Walleye*

The highest Walleye catch and harvest occurred during the 2001-02 winter when an estimated 6,512 Walleye were caught and 1,068 were harvested (Table 15). Anglers caught in excess of 1,000 Walleye during each of the next three winters but fewer than 150 were caught during each of the next six winters. Walleye catch rates ranged from <0.01 (2005-06) to 0.85 (2001-02) fish per hour. Angler catch rates for Walleyes were weakly correlated with annual gill net catch rates (Figure 1).

Walleye harvest rates ranged from <0.01 (2005-06) to 0.14 (2001-02) fish per hour and only exceeded 0.10 fish per hour during the 2001-02 winter (Table 15). Similar to summer, the average size of Walleyes in the creel exceeded 432 mm (17 in) TL during all winters with the exception of 2009-10 winter when the average Walleye was 385 mm (15.2 in) TL (Table 15; Figure 8). However, few Walleyes were measured during most winters (Figure 8). Harvested biomass exceeded 1.0 kg/ha (0.89 lb/acre) only during the 2001-02 and 2003-04 winters.

### *Yellow Perch*

Few Yellow Perch were caught during the 2001-02 and 2002-03 winters. However, the winters of 2003-04 through 2006-07 provided anglers with fair Yellow Perch fishing for quality-sized fish. During this time frame, catch rates ranged from 0.19 (2004-05) to 0.47 (2005-06) fish per hour and harvest rates were similar. The average size of fish harvested during these four winters exceeded 267 mm (10.5 in) TL (Table 16; Figure 9).

Following the 2006-07 winter, Yellow Perch became infrequent in the angler catch until the 2010-11 winter when anglers caught 2.38 fish per hour. The next winter (2011-12) the catch rates increased to 4.15 fish per hour and an estimated 71,036 fish were caught. Angler catch rates for Yellow Perch were weakly correlated with annual gill net catch rates for Yellow Perch (Figure 3).

Anglers harvested an estimated 35,803 Yellow Perch during the 2011-12 winter, but harvest never exceeded 3,100 fish any other winter (Table 16). The biomass of Yellow Perch harvested during the 2011-12 winter was estimated at 12.70 kg/ha (11.33 lb/acre).

### *Black Crappie*

Similar to summer, anglers caught few Black Crappies after the initial year classes were produced. Black Crappies were recorded in the angler catch during the winters of 2001-02 through 2007-08, but following the 2007-08 winter, no Black Crappies were recorded as having been caught during the winter (Table 17). The highest catch of Black Crappies occurred during the 2003-04 winter when an estimated 2,839 fish were caught and 2,054 were harvested. Winter angler catch rates for Black Crappie were not correlated with Black Crappie population estimates (Figure 6).

Because of their size, a high percentage of the fish caught were harvested. The average size of Black Crappie in the harvest ranged from 229 mm (9.0 in; 2006-07) TL to 342 mm (13.5 in; 2005-06) TL (Table 17; Figure 10). The highest yield occurred in 2003-04 winter when 1.39 kg/ha (1.24 lb/acre) of Black

Crappies were estimated to be harvested. Until Black Crappie recruitment increases few crappies will be reported in the angler creel.

### *Bluegill*

Bluegills were not common during the winter fishery at Lynn Lake. The highest catch occurred during the 2006-07 winter when an estimated 1,151 Bluegills were caught and 454 were harvested (Table 18). The average size of harvested Bluegill ranged from 195 mm (7.7 in; 2006-07) to 248 mm (9.8 in; 2004-05) TL (Table 18; Figure 11).

### *Northern Pike*

The estimated Northern Pike catch never exceeded 300 fish during any of the 12 winters (Table 19). Because of the low catches and harvest, few Northern Pike were measured. The average size of the Northern Pike that were measured exceeded 610 mm (24.0 in) TL (Table 19)

### *Muskellunge*

No Muskellunge were reported as being caught during the 12 winter periods. It is likely that any Muskellunge caught during the winter would be the result of incidental catch. Limited Muskellunge angling was reported by Muskellunge anglers, participating in an evaluation of angler diaries, during December and no Muskellunge fishing was reported for January and February (season was closed in March; Younk and Cook 1992).

Table 15. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Walleyes during winter (December-March) at Lynn Lake, South Dakota December 2001-March 2013. Standard error values are provided in parentheses.

Winter	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001-02	6,512 (3,038)	0.85 (0.50)	1,068 (379)	0.14 (0.08)	433 (1.98)	710 (14.71)	1.17
2002-03	2,473 (770)	0.51 (0.17)	432 (175)	0.09 (0.03)	465 (10.09)	1125 (79.86)	0.75
2003-04	3,072 (874)	0.32 (0.15)	905 (307)	0.09 (0.05)	449 (5.71)	991 (47.43)	1.38
2004-05	1,065 (287)	0.16 (0.07)	499 (138)	0.07 (0.04)	452 (6.86)	991 (48.52)	0.76
2005-06	21 (10)	<0.01 (<0.01)	21 (10)	<0.01 (<0.01)	434 (36.42)	898 (230.13)	0.03
2006-07	89 (31)	0.01 (<0.01)	59 (32)	0.01 (<0.01)	454 (7.53)	999 (53.41)	0.09
2007-08	132 (52)	0.06 (0.03)	29 (10)	0.01 (<0.01)	525 (36.39)	1680 (358.27)	0.08
2008-09	9 (0)	0.01 (<0.01)	9 (0)	0.01 (<0.01)	498 (-)	498 (-)	0.01
2009-10	143 (67)	0.08 (0.06)	30 (24)	0.02 (0.01)	385 (1.41)	587 (6.86)	0.03
2010-11	12 (12)	0.01 (3.01)	12 (12)	0.01 (0.01)	445 (-)	931 (-)	0.02
2011-12	3,100 (1,368)	0.18 (0.11)	378 (280)	0.02 (0.02)	460 (12.35)	1056 (94.48)	0.62
2012-13	204 (57)	0.07 (0.03)	33 (35)	0.01 (0.02)	553 (24.23)	1906 (285.86)	0.10

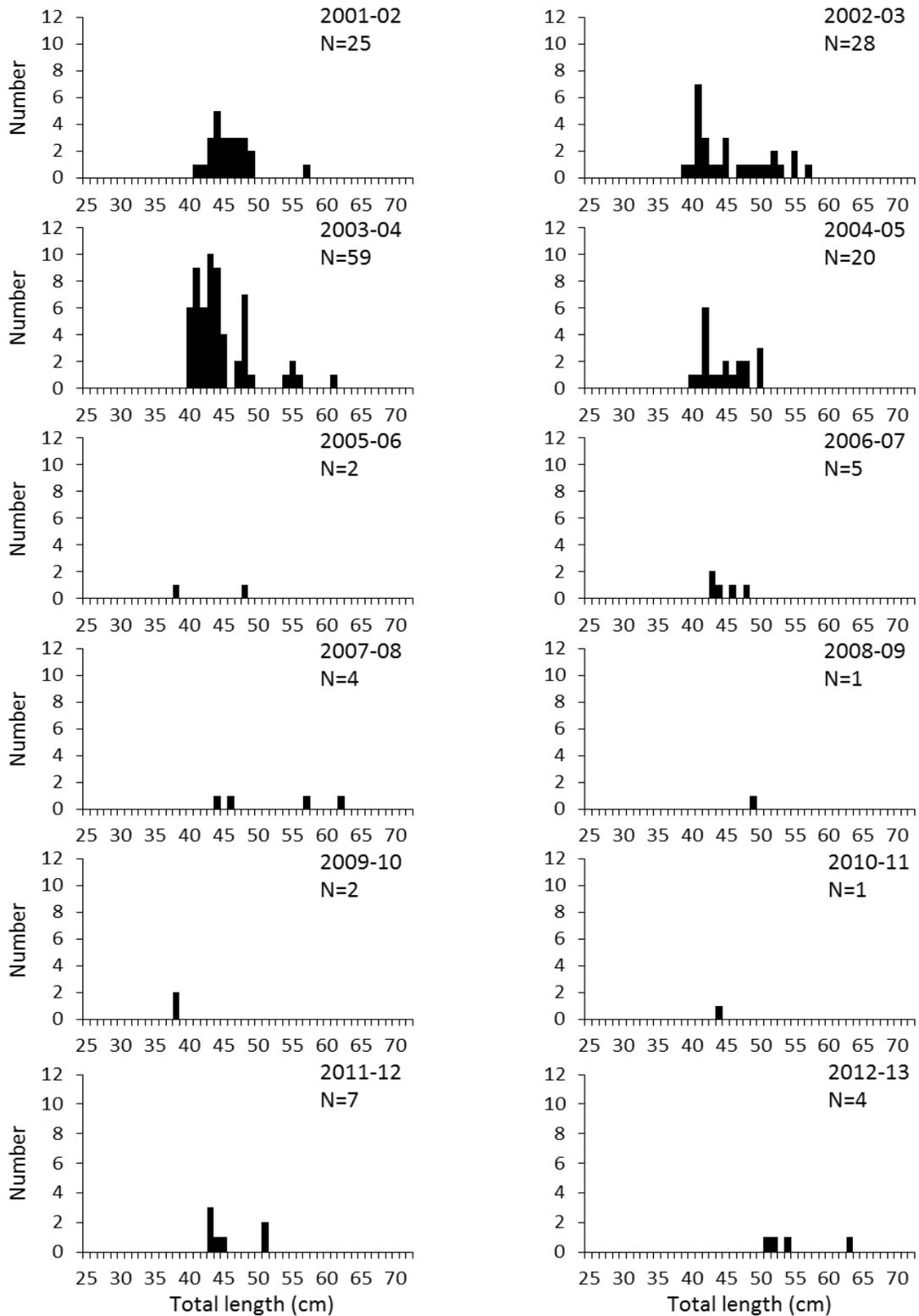


Figure 8. Length frequency of angler-harvested Walleyes measured during winter (December-March) at Lynn Lake, South Dakota December 2001- March 2013; N equals the number of fish measured.

Table 16. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Yellow Perch during winter (December-March) at Lynn Lake, South Dakota December 2001-March 2013. Standard error values are provided in parentheses.

Winter	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001-02	157 (62)	0.02 (0.01)	79 (45)	0.01 (0.01)	a	a	a
2002-03	11 (12)	<0.01 (<0.01)	0	0			0.00
2003-04	4,013 (1,852)	0.41 (0.21)	3,073 (1,433)	0.32 (0.16)	269 (2.06)	295 (7.46)	1.40
2004-05	1,259 (141)	0.19 (0.05)	1,140 (138)	0.17 (0.04)	281 (2.62)	341 (10.07)	0.60
2005-06	2,257 (670)	0.47 (0.26)	2,191 (626)	0.46 (0.25)	284 (2.18)	357 (8.51)	1.21
2006-07	3,552 (672)	0.42 (0.14)	2,770 (571)	0.33 (0.12)	277 (2.11)	333 (5.78)	1.42
2007-08	154 (75)	0.07 (0.03)	98 (67)	0.04 (0.03)	252 (12.04)	261 (22.57)	0.04
2008-09	9 (21)	0.01 (0.02)	0	0			0.00
2009-10	0	0	0	0	0.02 (0.01)	0.02 (0.01)	0.00
2010-11	3,374 (1,789)	2.38 (3.22)	1,088 (525)	0.77 (0.97)	262 (3.11)	274 (9.38)	0.46
2011-12	71,036 (17,644)	4.15 (3.21)	35,803 (10,511)	2.10 (1.14)	249 (1.25)	230 (3.78)	12.70
2012-13	58 (21)	0.02 (0.01)	49 (17)	0.02 (0.01)	258 (6.84)	262 (20.89)	0.02

<sup>a</sup> sample size of measured fish inadequate to calculate

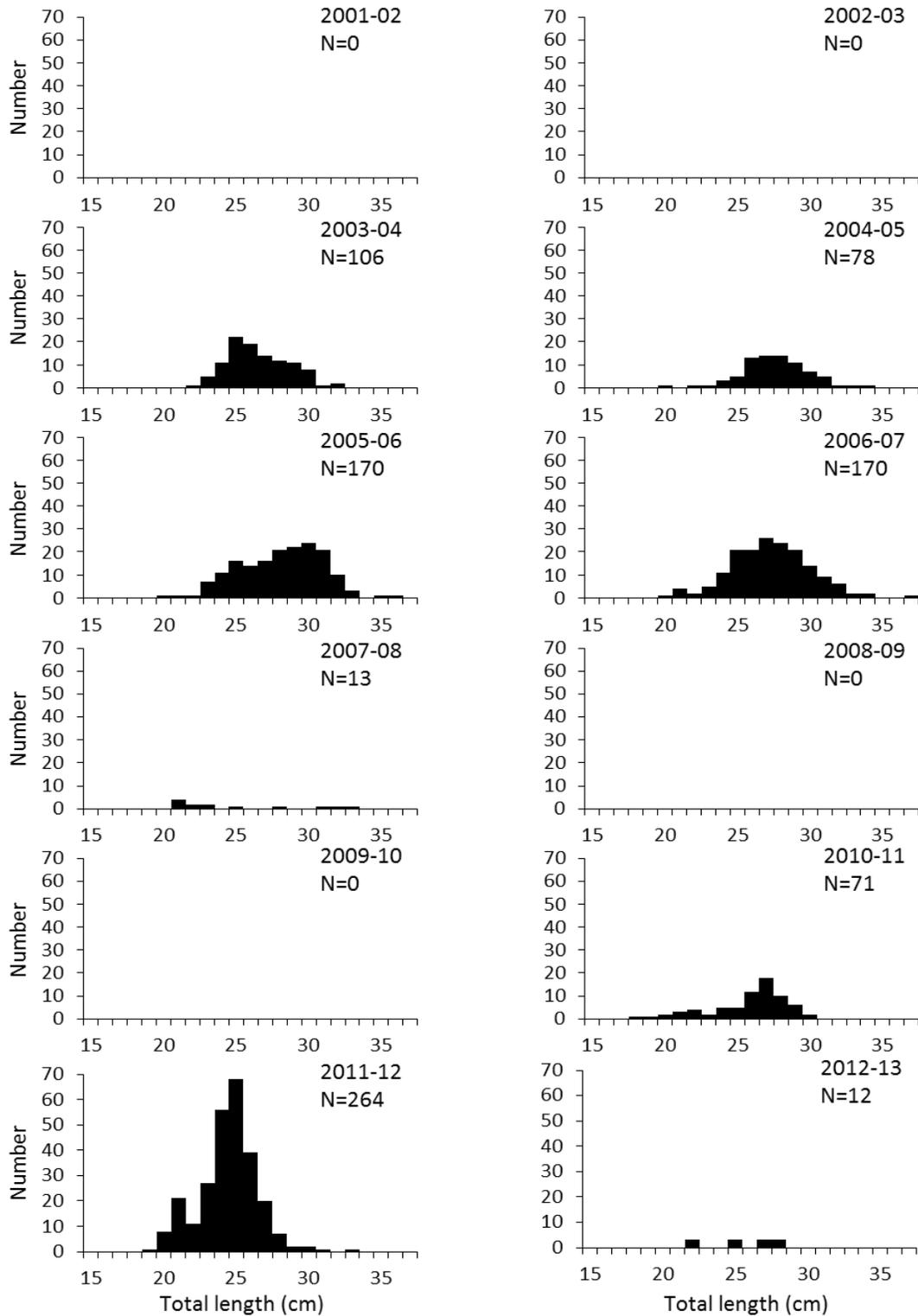


Figure 9. Length frequency of angler-harvested Yellow Perch measured during winter (December-March) at Lynn Lake, South Dakota December 2001- March 2013; N equals the number of fish measured.

Table 17. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Black Crappies during winter (December-March) at Lynn Lake, South Dakota December 2001-March 2013. Standard error values are provided in parentheses.

Winter	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001-02	1,213 (603)	0.16 (0.09)	1,070 (598)	0.14 (0.09)	255 (1.94)	2.77 (7.06)	0.46
2002-03	272 (132)	0.06 (0.03)	244 (115)	0.05 (0.02)	285 (8.54)	401 (44.37)	0.15
2003-04	2,839 (988)	0.29 (0.10)	2,054 (625)	0.21 (0.06)	293 (2.41)	438 (11.89)	1.39
2004-05	205 (98)	0.03 (0.02)	205 (98)	0.03 (0.02)	314 (2.92)	544 (16.37)	0.17
2005-06	11 (6)	<0.01 (<0.01)	11 (6)	<0.01 (<0.01)	342 (-)	722 (-)	0.01
2006-07	1,656 (554)	0.20 (0.09)	1,191 (457)	0.14 (0.07)	229 (2.81)	198 (12.36)	0.36
2007-08	107 (77)	0.05 (0.03)	107 (77)	0.05 (0.03)	242 (0.71)	227 (2.22)	0.04
2008-09	0	0	0	0			0.00
2009-10	0	0	0	0			0.00
2010-11	0	0	0	0			0.00
2011-12	0	0	0	0			0.00
2012-13	0	0	0	0			0.00

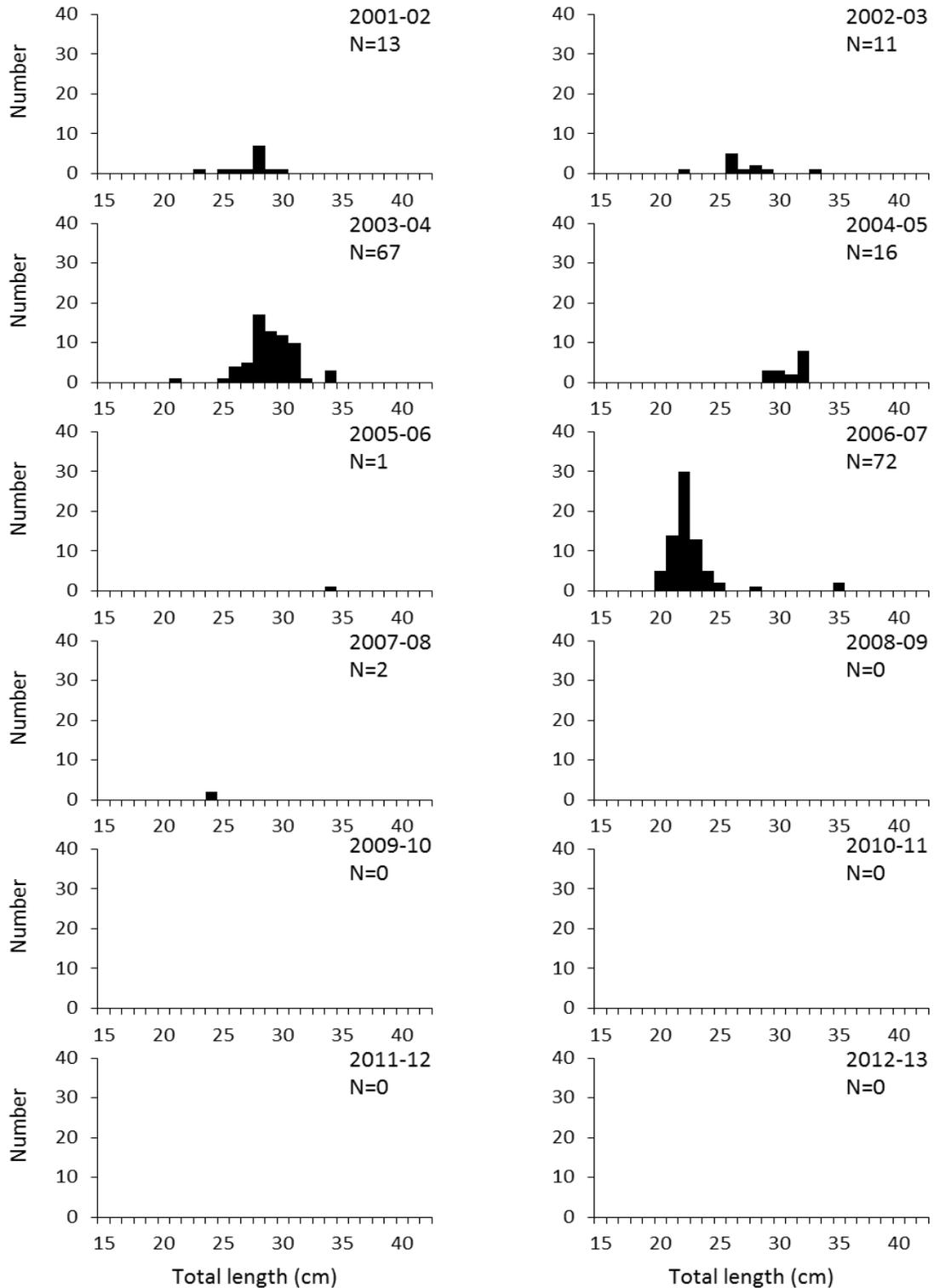


Figure 10. Length frequency of angler-harvested Black Crappies measured during winter (December-March) at Lynn Lake, South Dakota December 2001- March 2013; N equals the number of fish measured.

Table 18. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Bluegills during winter (December-March) at Lynn Lake, South Dakota December 2001- March 2013. Standard error values are provided in parentheses.

Winter	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001-02	0	0	0	0			0.00
2002-03	0	0	0	0			0.00
2003-04	112 (57)	0.01 (0.01)	91 (57)	0.01 (0.01)	240 (2.60)	445 (16.19)	0.06
2004-05	127 (19)	0.02 (<0.01)	110 (14)	0.02 (<0.01)	248 (14.58)	521 (84.17)	0.09
2005-06	0	0	0	0			0.00
2006-07	1,151 (410)	0.14 (0.05)	454 (123)	0.05 (0.02)	195 (3.51)	230 (17.82)	0.16
2007-08	113 (84)	0.05 (0.04)	88 (55)	0.04 (0.02)	208 (3.26)	280 (14.14)	0.04
2008-09	0	0	0	0			0.00
2009-10	0	0	0	0			0.00
2010-11	0	0	0	0			0.00
2011-12	24 (26)	<0.01 (<0.01)	24 (26)	<0.01 (<0.01)	227 (-)	370 (-)	0.01
2012-13	0	0	0	0			0.00

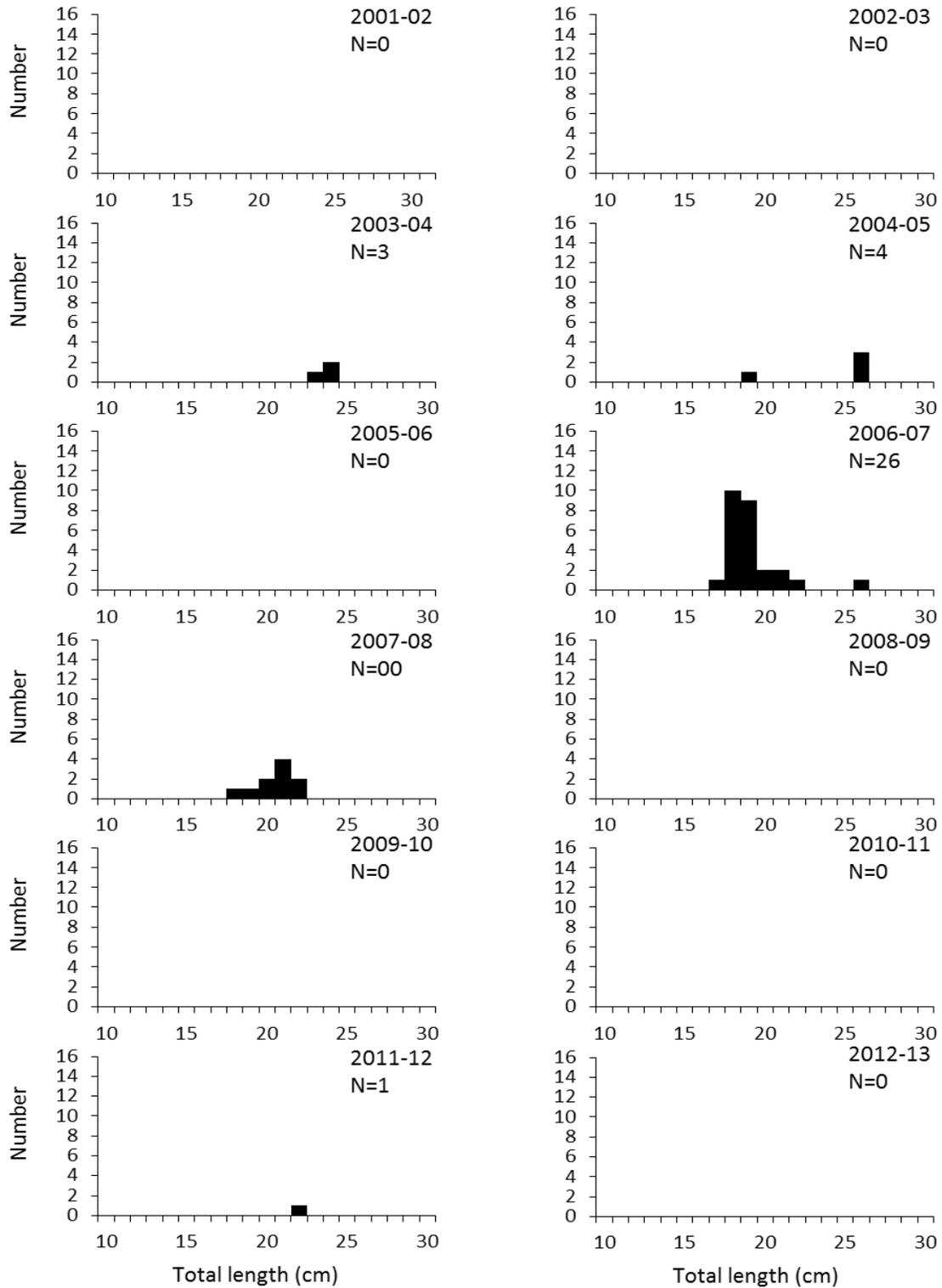


Figure 11. Length frequency of angler-harvested Bluegills measured during winter (December-March) at Lynn Lake, South Dakota December 2001- March 2013; N equals the number of fish measured

Table 19. Estimated number caught, catch rate (number/h), number harvested, harvest rate (number/h), harvest mean total length (TL; mm), harvest mean weight (Wt; g) and harvested biomass (kg/ha) of Northern Pike during winter (December-March) at Lynn Lake, South Dakota December 2001-March 2013. Standard error values are provided in parentheses.

Winter	Catch		Harvest				
	Number	Rate (N/h)	Number	Rate (N/h)	Mean TL (mm)	Mean Wt (g)	Biomass (kg/ha)
2001-02	20 (-)	<0.01 (-)	0	0			0.00
2002-03	75 (38)	0.02 (0.01)	36 (34)	0.01 (0.01)	<sup>a</sup>		
2003-04	140 (72)	0.01 (0.01)	67 (67)	0.01 (0.01)	695 (14.84)	2,314 (151.68)	0.24
2004-05	18 (13)	<0.01 (<0.01)	18 (13)	<0.01 (<0.01)	<sup>a</sup>		
2005-06	0	0	0	0			0.00
2006-07	0	0	0	0			0.00
2007-08	0	0	0	0			0.00
2008-09	0	0	0	0			0.00
2009-10	0	0	0	0			0.00
2010-11	20 (12)	0.01 (0.01)	20 (12)	0.01 (0.01)	<sup>a</sup>		
2011-12	296 (181)	0.02 (0.01)	138 (88)	0.01 (0.01)	612 (16.72)	1,560 (133.51)	0.33
2012-13	54 (40)	0.02 (0.01)	54 (40)	0.02 (0.01)	641 (14.88)	1,805 (128.02)	0.15

<sup>a</sup> sample size of measured fish inadequate to calculate

## ***Angler Opinions***

### Satisfaction

Anglers were asked during nine summer and eight winter periods, “Considering all factors, how satisfied are you with your fishing trip today?” In the summer the percentage of anglers that were slightly to very satisfied with their fishing trip ranged from 40.3% (2008) to 89.3% (2012;Table 20). Dissatisfaction ranged from 0% (2012) to 42.8% (2009) during the summers with the highest percent of anglers dissatisfied with their fishing trip occurring during the 2009 summer. In general, >60% of the winter anglers were satisfied with their fishing trip with the exception of the 2012-13 winter when satisfaction was only 37.5% and 45.9% of interviewed anglers indicated they were dissatisfied (Table 21).

In the 2002 summer and the 2001-02 winter, most anglers viewed harvesting fish as somewhat to very important in the success of their fishing trip (Table 22). When asked, “What is the most important factor to defining a successful fishing trip?” ‘catching fish’ and ‘relaxation’ were most common responses by anglers fishing during the summer (Table 23). In the winter, ‘catching fish’ was generally the most important factor in determining success (Table 24). ‘Relaxation’, ‘harvesting fish’ and ‘being able to participate’ were also important to winter anglers.

In the summer of 2012, anglers were asked, “Considering the numbers, sizes and species caught, how satisfied are you with you fishing experience?” Of the anglers interviewed 92.4% indicated that they were slightly to very satisfied and only 5.8% indicated dissatisfaction (Table 25).

### Fish limits

When anglers were asked if they supported the current Walleye regulations on Lynn Lake during the 2001 and 2003 summers and the 2003-04 winter, >86% of the interviewed anglers indicated that they were in favor of the regulations (Table 26). Responses were fairly evenly divided across two, three and four fish as an acceptable Walleye daily limit during the 2003-04 winter (Table 27). Most interviewed anglers during the 2005 summer and 2005-06 winter supported a possible change in the statewide Walleye daily limit from four to three fish but opposition also existed (Table 28). In the 2005 summer and 2005-06 winter, 69% and 82.4% of anglers favored making the one Walleye over 20 inches regulation a statewide regulation (Table 29).

During the winter of 2002-03, anglers were asked if they supported the recent reduction in panfish limits from 25 to 10 fish per day. Most (82.6%) anglers responded that they favored the reduction and only 6.5% did not favor them (Table 30). In 2005 summer, 65.3% of interviewed anglers indicated that they supported reducing the panfish daily limit from 25 to 10 and 89.2% supported it when asked during the 2005-06 winter (Table 31). When asked a similar question in 2009, 46.4% of interviewed anglers indicated that they favored the reduced panfish limits in northeast South Dakota, 3.6% did not like them and 50.0% had no opinion and in the 2009-10 winter, 83.3% favored the reduction (Table 32). The 10-fish panfish limit was popular with anglers in northeast South Dakota (Blackwell et al. 2007b; Blackwell et al. 2007d).

Angler responses were mixed when asked during the 2005 summer and 2005-06 winter their opinion on reducing the Northern Pike statewide daily limit from six to three fish per day. During the 2005 summer,

43.0% of interviewed anglers opposed a change in the Northern Pike daily limit and 23.6% supported a change (Table 33). Support for a change in Northern Pike daily limit was slightly higher during the 2005-06 winter when 29.7% favored a daily limit of three fish and 21.6% were opposed (Table 33). Similar responses were recorded at Bitter Lake (Blackwell et al. 2007d).

Table 20. Responses of angling parties at Lynn Lake, South Dakota during the summers (May – August) of 2001, 2003, 2004, 2006-2010 and 2012 to the question, “Considering all factors, how satisfied are you with your fishing trip today?” n is the number of responses.

Response	Percent (%)								
	2001 Summer (n=96)	2003 Summer (n=162)	2004 Summer (n=165)	2006 Summer (n=259)	2007 Summer (n=116)	2008 Summer (n=62)	2009 Summer (n=28)	2010 Summer (n= 28)	2012 Summer (n=28)
Very Satisfied							10.7	17.9	35.7
Satisfied	69.8	74.7	52.7	56.4	27.6	22.6	10.7	14.3	35.7
Slightly satisfied		13.6	20.0	15.1	25.0	17.7	21.4	28.6	17.9
Neutral	21.9	8.0	13.3	11.2	19.8	32.3	14.3	14.3	10.7
Slightly dissatisfied		1.9	9.1	8.1	24.1	24.2	32.1	7.1	
Dissatisfied							7.1	14.3	
Very Dissatisfied	8.3	1.9	4.9	9.3	3.5	3.2	3.6	3.4	

Table 21. Responses of angling parties at Lynn Lake, South Dakota during the winters (December – March) of 2002-03, 2003-04, 2004-05, 2006-07, 2009-10, 2011-12 and 2012-13 to the question, “Considering all factors, how satisfied are you with your fishing trip today?” n is the number of responses.

Response	Percent (%)							2012-13 Winter (n=24)
	2002-03 Winter (n=46)	2003-04 Winter (n=97)	2004-05 Winter (n=50)	2006-07 Winter (n=86)	2009-10 Winter (n=10)	2010-11 Winter (n=8)	2011-12 Winter (n=44)	
Very Satisfied					40.0	50.0	36.4	12.5
Satisfied	52.2	59.8	56.0	34.9	10.0	25.0	20.5	12.5
Slightly satisfied	19.6	8.3	12.0	26.7	10.0	12.5	20.5	12.5
Neutral	8.7	19.6	12.0	22.1	10.0	12.5	13.6	16.7
Slightly dissatisfied	15.2	6.2	6.0	10.5	10.0		6.8	4.2
Dissatisfied	4.4	6.2	14.0	5.8	10.0		2.3	12.5
Very Dissatisfied								29.2

Table 22. Responses of angling parties at Lynn Lake, South Dakota during the 2002 summer (May-August) and 2001-02 winter (December – March) to the question, “ How important do you view harvesting fish in the success of your fishing trip?” n is the number of responses.

Response	Percent (%)	
	2002 Summer (n=96)	2001-02 Winter (n=46)
Not important	26.0	43.5
Somewhat important	38.5	41.3
Important	18.8	13.0
Very Important	16.7	2.2

Table 23. Responses of angling parties at Lynn Lake, South Dakota during the 2003, 2004, 2006-2008 and 2010 summers (May-August) to the question, “What is the most important factor to you in defining a successful fishing trip?” n is the number of responses.

Response	Percent (%)					
	2003	2004	2006	2007	2008	2010
	Summer (n=162)	Summer (n=165)	Summer (n=259)	Summer (n=116)	Summer (n=62)	Summer (n=28)
Relaxation	31.3	32.1	33.2	11.2	12.9	28.6
Harvesting fish	4.2	4.9	1.9	26.7	19.4	7.1
Participating	10.4	22.4	5.0	14.7	4.8	7.1
Catching fish	24.0	26.7	37.5	38.8	62.9	35.7
Being with friends	6.3	12.1	17.0	6.9		17.9
Other	24.0	1.8	5.4	1.7		3.4

Table 24. Responses of angling parties at Lynn Lake, South Dakota during the 2001-02, 2004-05, 2006-07, 2010-11, 2011-12 and 2012-13 winters (December-March) to the question, “What is the most important factor to you in defining a successful fishing trip?” n is the number of responses.

Response	Percent (%)					
	2001-02	2004-05	2006-07	2010-11	2011-12	2012-13
	Winter (n=44)	Winter (n=50)	Winter (n=86)	Winter (n=8)	Winter (n=44)	Winter (n=24)
Relaxation	36.4	22.0	4.7	12.5	11.4	8.3
Harvesting fish	13.6	10.0	3.5	12.5	22.7	16.7
Participating	9.1	24.0	40.7		22.7	16.7
Catching fish	27.3	44.0	44.2	62.5	36.4	54.2
Being with friends	13.6		3.5		2.3	
Other			3.5	12.5	4.6	4.2

Table 25. Responses of angling parties at Lynn Lake, South Dakota during the 2012 summer (May-August) to the question, “Considering the numbers, sizes, and species caught, how satisfied are you with your fishing experience ?” n is the number of responses.

Response	Percent (%)
	2012 Summer (n=52)
Very satisfied	46.2
Satisfied	32.7
Slightly satisfied	13.5
Neutral	1.9
Slightly dissatisfied	3.9
Moderately dissatisfied	
Dissatisfied	1.9

Table 26. Responses of angling parties at Lynn Lake, South Dakota during the 2001 and 2003 summers (May-August) and 2003-04 winter (December-March) to the question, "Are you supportive of the Walleye harvest regulations for this lake?" n is the number of responses.

Response	Percent (%)		
	2001 Summer (n=96)	2003 Summer (n=162)	2003-04 Winter (n=97)
Yes	93.8	86.3	86.6
No	3.1	7.5	6.2
No opinion	3.1	6.3	7.2

Table 27. Responses of angling parties at Lynn Lake, South Dakota during the 2003-04 summer (May-August) to the question, "What do you believe is an acceptable daily limit for Walleye?" n is the number of responses.

Response	Percent (%)
	2003-04 Winter (n=74)
2 fish	31.1
3 fish	25.7
4 fish	37.8
5 fish	5.4

Table 28. Responses of angling parties at Lynn Lake, South Dakota during the 2005 summer (May-August) and 2005-06 winter (December-March) to the question, "What is your opinion on reducing the statewide daily Walleye limit from 4 to 3?" n is the number of responses.

Response	Percent (%)	
	2005 Summer (n=71)	2005-06 Winter (n=17)
Strongly oppose	18.3	17.7
Somewhat oppose	16.9	
Neutral/no opinion	15.5	29.4
Somewhat favor	28.12	11.8
Strongly favor	21.1	41.2

Table 29. Responses of angling parties at Lynn Lake, South Dakota during the 2005 summer (May-August) and 2005-06 winter (December-March) to the question, “What is your opinion on making the one Walleye over 20 inches restriction a statewide regulation?” n is the number of responses.

Response	Percent (%)	
	2005 Summer (n=71)	2005-06 Winter (n=17)
Strongly oppose	1.4	
Somewhat oppose	1.4	
Neutral/no opinion	28.2	17.7
Somewhat favor	23.9	11.8
Strongly favor	45.1	70.6

Table 30. Responses of angling parties at Lynn Lake, South Dakota during the 2002-03 winter (December-March) to the question, “Northeast South Dakota panfish daily limits were recently reduced from 25 to 10. Are you supportive of this reduction?” n is the number of responses.

Response	Percent (%)
	2002-03 Winter (n=46)
Yes	82.6
No	6.5
No opinion	10.9

Table 31. Responses of angling parties at Lynn Lake, South Dakota during the 2005 summer (May-August) and 2005-06 winter (December-March) to the question, “What is your opinion on reducing the panfish daily limit from 25 to 10?” n is the number of responses.

Response	Percent (%)	
	2005 Summer (n=72)	2005-06 Winter (n=37)
Strongly oppose	5.6	5.4
Somewhat oppose	4.2	
Neutral/no opinion	25.0	5.4
Somewhat favor	16.7	18.9
Strongly favor	48.6	70.3

Table 32. Responses of angling parties at Lynn Lake, South Dakota during the 2009 summer (May-August) and 2009-10 winter (December-March) to the question, "Are you in favor of the reduced panfish limits in northeast South Dakota?" n is the number of responses.

Response	Percent (%)	
	2009 Summer (n=28)	2009-10 Winter (n=12)
Yes	46.4	83.3
No opinion	50.0	8.3
No	3.6	8.3

Table 33. Responses of angling parties at Lynn Lake, South Dakota during the 2005 summer (May-August) and 2005-06 winter (December-March) to the question, "What is your opinion on reducing the northern daily limit from 6 to 3?" n is the number of responses.

Response	Percent (%)	
	2005 Summer (n=72)	2005-06 Winter (n=37)
Strongly oppose	23.6	10.8
Somewhat oppose	19.4	10.8
Neutral/no opinion	33.3	48.7
Somewhat favor	8.3	13.5
Strongly favor	15.3	16.2

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