Enemy Swim Lake, South Dakota
Angler Use and Harvest Surveys
December 2004 – August 2006

by

Brian G. Blackwell, Mark J. Ermer, Ryan J. Braun,
Steve J. Kennedy, and Todd M. Kaufman

South Dakota Department of Game, Fish and Parks
District Office
603 E 8th Ave
Webster, SD 57274

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Fisheries, Program Administrator
Dennis Unkenholz

Department Secretary
Jeff Vonk

Division Director
Douglas Hansen

Federal Aid Coordinator
Michael Lees

Preface

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Executive Summary

Enemy Swim Lake continues to be an important fishery in northeastern South Dakota. Residents and nonresidents alike spend many hours each year recreating on Enemy Swim Lake. A high percentage of the recreation that occurs on Enemy Swim Lake is fishing. A diversity of fish species are present in the lake and anglers commonly target walleyes, bluegills, yellow perch, black crappies, smallmouth bass, largemouth bass, and northern pike. Because of the popularity of the Enemy Swim Lake fishery the South Dakota Department of Game, Fish and Parks monitors the fishery by annually sampling the fish community and conducting intermittent angler use and harvest surveys. This report summarizes winter (December – March) and summer (May – August) angler use and harvest surveys that occurred between December 2004 and August 2006.

Summer fishing pressure approximated 38,000 angler hours during both the 2005 and 2006 summers. Walleyes and bluegills were the most sought fish species during each summer. The number of anglers targeting smallmouth bass increased to 14% during the 2006 summer. The 2004-05 winter had the highest measured winter fishing pressure for Enemy Swim Lake at 25,361 angler hours. During this winter 60.5% of the anglers interviewed were targeting bluegills. Fishing pressure decreased to 8,737 hours for the 2005-06 winter. Resident anglers comprised approximately 55% of the anglers interviewed during the 2005 and 2006 summers and the 2005-06 winter, but only 45% of the anglers during the 2004-05 winter. Minnesota was the most common home state of nonresident anglers at Enemy Swim Lake during both winter and summer surveys. The potential economic impact of the Enemy Swim Lake fishery on local economies during the 2005 summer was estimated at $524,931, $628,607 during the 2006 summer, $508,538 during the 2004-05 winter, and $181,106 during the 2005-06 winter.

Anglers caught in excess of 5,200 walleye during both the 2005 and 2006 summers, but caught less than 1,000 walleyes during each of the 2004-05 and 2005-06 winters. Bluegills were the most caught and harvested species during both summer periods and winter periods. The highest catch occurred during the 2004-05 winter when anglers caught an estimated 69,632 bluegills. The highest monthly bluegill catch rates occurred during March of each winter. Anglers caught an estimated 6.13 bluegills per hour during March 2005 and 9.36 per hour during March 2006. Smallmouth bass catch rates were relatively high during the summer months exceeding 0.25 bass per hour. Harvest of smallmouth bass and largemouth bass was minimal during this survey period.

Anglers at Enemy Swim Lake were supportive of having only one walleye over 508 mm (20 inches) in the daily limit as a statewide walleye regulation. Opinions were mixed when asked about potentially reducing the statewide daily walleye limit from four to three walleyes and on potentially reducing the northern pike daily limit from six to three pike. Support was high for the reduction in panfish daily limits from 25 to 10 fish. Greater than 60% of interviewed anglers were satisfied with their fishing trip at Enemy Swim Lake. Anglers indicated that catching fish and relaxation were the most important factors in determining the success of a fishing trip.

Historic fishing pressure, catch and harvest rates and numbers of fish caught and harvested at Enemy Swim Lake can be found in the appendices of this report.

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Enemy Swim Lake, South Dakota
Angler Use and Harvest Surveys
December 2004 - August 2006

Enemy Swim Lake is a well known fishery in northeastern South Dakota. Enemy Swim Lake is a permanent lake and is one of six South Dakota lakes that did not winterkill during the drought of the 1930's. Angler use and harvest surveys were completed at Enemy Swim Lake from 1956 – 1959 (Kathrein 1957, Kathrein 1958, Backlund 1960), 1971-1972 (Unkenholz 1973), 1988 and 1989 summers (Meester 1991), 1993-1994 (Lucchesi 1994) and 1997-1998 and 2000-2004 (Blackwell 2005).

Information concerning angler use and harvest is important in the ongoing fisheries management of the Enemy Swim Lake fishery. This report summarizes angler use and harvest surveys that were completed between December 2004 and August 2006.

Study Site

Enemy Swim Lake is a permanent lake in Day County, South Dakota. The lake has a surface area of 870 ha (2,150 acres), maximum depth of 7.9 m (26 ft), and an average depth of 3 m (10 ft). The lake is located 2.4 km (1.5 miles) east and 12.9 km (8 miles) north of Waubay, South Dakota. Enemy Swim Lake receives water from a 9,032 ha (22,301 acre) watershed.

A walleye minimum length restriction of 356 mm (14 inches) with one walleye over 508 mm (20 inches) was in place during the current survey period. The combined daily limit for largemouth and smallmouth bass was three fish daily with a protected slot limit between 305 and 457 mm (12 and 18 inches) and only one bass in the daily limit could be 457 mm (18 inches) or greater. The panfish daily limit was 10 fish for each species (i.e., yellow perch, black crappie, bluegill/sunfish) and a no cull rule for bluegill/sunfish was in place.

Methods

A roving angler use and harvest survey with two-stage stratification was completed during winter (December through March) and summer (May through August). The first stratification unit was between weekdays and weekend days and the second stratification was for the time periods that the clerk was present. Because weekends typically receive increased fishing pressure most weekend days were represented in the survey. Time periods 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 provided fishing pressure estimates and angler interviews provided information necessary for estimating fish species catch rates, mean angler trip length, and mean party size. Two instantaneous counts of the total number of boats fishing and all shoreline anglers present were made each day during open-water periods and during ice cover 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).

Additional questions asked during interviews were used to obtain angler primary residence, fish species targeted, and two questions concerning angler opinions were asked. Total length (TL; mm) measurements from angler caught fish were recorded during the interview process.

The potential economic value of the Enemy Swim Lake fishery was estimated by multiplying a daily angling expenditure of $61 times the estimated number of angler days. The average daily expenditure of $61 was derived from the reported total expenses of $182,480,000 for anglers fishing South Dakota in 2001 and divided by 2,984,000, the estimated number of days spent fishing in South Dakota in 2001 (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce Bureau of Census 2001).

Results and Discussion

Angler use and harvest surveys were completed during two winter and two summer periods (December 2004 – March 2005, May 2005 – August 2005, December 2005 – March 2006, and May 2006 – August 2006).

Summer

Fishing Pressure

Walleyes and bluegills were the most sought after fish species by anglers fishing Enemy Swim Lake during the 2005 and 2006 summers (Table 1). The percent of anglers targeting bluegills and walleyes during these two summers was similar to that of the previous five summers (Blackwell 2005). A high percentage of anglers fishing at Enemy Swim Lake tend to be generalists that target anything. Enemy Swim Lake likely attracts the generalist type of angler because of the diversity of sport fish present and because it is a summer vacation destination. The percentage of anglers targeting smallmouth bass was the highest ever measured during the 2006 summer when 14.2% of interviewed anglers indicated that they were fishing for smallmouth bass. A small percentage of anglers indicated that they were targeting northern pike during the 2006 summer and a small number of anglers targeted largemouth bass and black crappies during both the 2005 and 2006 summers. No anglers indicated that they were targeting yellow perch during either summer.

The number of angler hours during the last five summers has remained relatively stable. Summer fishing pressure approximated 38,000 angler hours during both the 2005 and 2006 summers (Table 2). This is similar to that measured for the 2002 through 2004 summers when approximately 40,000 angler hours occurred each summer (Blackwell 2005) and for July and August 1971 and May and June 1972 when angler hours totaled 39,437 (Unkenholz 1973).

In 2005 summer, anglers spent slightly longer than 4 hours on the water during a daily fishing trip, but less than 4 hours during the 2006 summer (Table 2). The average angling party

exceeded two anglers during both summers and angling pressure was generally evenly distributed between weekdays and weekend days (Table 2).

In 1971-72, only 49.8% of summer angling occurred from a boat (Unkenholz 1973). In this survey greater than 94% of fishing occurred from a boat (Table 2) and greater than 90% of angling occurred from a boat in all summer surveys completed since 1997 (Blackwell 2005). The increase in boat anglers in the last decade likely reflects that more people own boats or have access to a boat than in years past and that shore fishing opportunities have declined as more land is developed for housing on Enemy Swim Lake.

The Enemy Swim Lake fishery continues to be a foundational fishery in northeast South Dakota. Angler-use survey after survey have confirmed the amount of use this fishery has provided the angling public and its importance as a fishery. The potential economic impact of the Enemy Swim Lake fishery on local economies during the 2005 summer was estimated at $524,931 and $628,607 during the 2006 summer (Table 2). These values were based on an average South Dakota angling expenditure of $61 per day (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce Bureau of Census 2001).

Angler Demographics

The percentage of resident anglers approximated 55% during both the 2005 and 2006 summers (Table 3). Since 2000, the percentages of resident and nonresident anglers have remained relatively stable. In surveys completed between 2000 and 2004, the percentage of resident anglers ranged from 52 to 64% (Blackwell 2005). In surveys completed prior to 2000, resident anglers typically comprised 80% or greater of the anglers at Enemy Swim Lake. During the 1997 and 1998 summers, 90% of anglers fishing at Enemy Swim Lake were residents (Blackwell 2005). Aside from South Dakota, anglers fishing Enemy Swim Lake during this survey's summer months represented 10 states (Table 3). Residents of Minnesota were the most common anglers at Enemy Swim Lake during the 2005 and 2006 summers and Iowa residents were the next most common.

In 2005 summer, most of the resident anglers fishing Enemy Swim Lake resided in five counties - Brookings, Codington, Grant, Minnehaha, and Roberts (Figure 1). The counties of Codington, Day, and Minnehaha were the most frequently represented counties during the 2006 summer (Figure 1). Anglers from Minnehaha County were interviewed the most frequently during both the 2005 and 2006 summers (Figure 1). Blackwell (2005) noted that Minnehaha County had shown a progressive increase in the percentage of anglers fishing Enemy Swim Lake during the summer months between 1997 and 2004. This trend appears to have continued with the current survey and likely is a result of the population growth Minnehaha County has experienced.

Angler Catch and Harvest

Walleye

Walleyes were the most sought fish species during both the 2005 and 2006 summers when greater than 30% of anglers targeted walleyes (Table 3). In the five previous summers, walleyes were targeted by greater than 25% of the anglers fishing at Enemy Swim Lake

(Blackwell 2005). Angler catch and harvest rates for walleyes were similar between the two summers (Table 4). Monthly walleye catch rates ranged from 0.02 (May 2005) to 0.26 (June 2006) walleyes per hour fished and monthly harvest rates ranged from 0.01 to 0.11 walleyes per hour (Table 4). The overall harvest rate did not exceed 0.10 walleyes per hour during either summer and has not since the 1998 summer (Blackwell 2005). In general, measured walleye harvest rates during the summer months have fluctuated little in the last 35 years. Walleye harvest rates during the 1971-1972 summer months averaged 0.11 walleyes per hour (Unkenholz 1973), in 1988 anglers harvested 0.09 walleyes per hour, 0.13 walleyes per hour were harvested during the 1989 summer (Meester 1991), and 0.02 walleyes were harvested per hour during the 1993 summer (Lucchesi 1994).

Anglers caught in excess of 5,200 walleyes during each of the 2005 and 2006 summers (Table 5). Walleye harvest in 2005 was less than one thousand fish, but in 2006 the harvest climbed to 3,448 walleyes (Table 5). During the last seven summers, walleye catch at Enemy Swim Lake has ranged from 3,846 (2004) to 21,769 walleyes (2000; Blackwell 2005) and the harvest has ranged from 904 (2005) to 5,367 walleyes (2000; Blackwell 2005). Fluctuations that have occurred in walleye catch and harvest likely have been the result of variable walleye year-class strength. Harvested walleyes ranged in length from 34 to 77 cm (13.4 to 30 inches; Figure 2).

Bluegill

Bluegills were the second most sought species by anglers fishing at Enemy Swim Lake during both the 2005 and 2006 summers (Table 1). Anglers averaged catching 0.89 bluegill per hour fished during the 2005 summer and 0.58 per hour during the 2006 summer (Table 4). Angler catch rates during these two summers were lower than that of the previous six surveyed summers when overall bluegill catch rates approximated one bluegill per hour fished (Blackwell 2005). As in previous summer surveys (Blackwell 2005), bluegill catch and harvest rates tended to be greatest during August of both the 2005 and 2006 summer. It is probable that a substantial number of bluegills are also caught during September of each year, but unfortunately manpower is not available to survey anglers beyond August.

Bluegills were the most often caught and harvested species at Enemy Swim Lake during both the 2005 and 2006 summers (Table 5). An estimated 34,188 bluegills were caught and 11,648 harvested during the 2005 summer and in the 2006 summer, anglers caught an estimated 21,997 bluegills and harvested 9,285 (Table 5). The greatest recorded bluegill catch and harvest at Enemy Swim Lake occurred during the 2000 summer when an estimated 68,138 were caught and 48,050 were harvested (Blackwell 2005).

Bluegills harvested during the 2005 and 2006 summers ranged in length from 14 to 28 cm (5.5 to 11 inches) and averaged approximately 20 cm (7.9 inches) each summer (Figure 3). The average size of harvested bluegills during this period is similar to that for the summers between 2000 and 2004 (Blackwell 2005).

Yellow Perch

Yellow perch catch and harvest rates during the 2005 and 2006 summers were similar (Table 3). Anglers averaged catching 0.10 yellow perch per hour during the 2005 summer and

0.09 perch per hour during the 2006 summer while average harvest rates were 0.02 and 0.01 perch per hour for the 2005 and 2006 summers. Anglers caught in excess of 3,000 yellow perch each summer while the harvest was substantially less (Table 5). Yellow perch catch rates have generally declined since the 2000 summer when anglers caught 0.29 perch per hour fished (Blackwell 2005). The decline in yellow perch catch rates by anglers appears to be related to the population abundance of perch. Yellow perch gill net catch rates have declined since the 2001 summer when 61.2 stock-length perch per net were caught to less than 20 stock-length perch per net during 2004 and 2005 summer gill net samples (Ermer et al. 2006).

Black Crappie

Angler catch and harvest rates for black crappies were low averaging 0.02 or less per hour fished during both the 2005 and 2006 summers (Table 4). Anglers caught an estimated 920 black crappies during the 2005 summer and 474 during the 2006 summer (Table 5). Although the catch and harvest were low during the most recent summer surveys, at times black crappies do provide angling opportunities to Enemy Swim Lake anglers. However, when compared to walleyes or bluegills they are a relatively small component of the overall fishery. Black crappies were more frequent in the anglers creel during the summers between 2000 and 2004 when anglers caught from 2,234 (2004 summer) to 6,201 (2001 summer) black crappies each summer (Blackwell 2005). Harvested black crappies ranged from 28 to 32 cm (11.0 to 12.6 inches) during the 2006 summer (Figure 3).

Smallmouth Bass

The percentage of anglers targeting smallmouth bass at Enemy Swim Lake increased in 2006 to 14.2% from 2.1% during the 2005 summer (Table 1). This is the highest recorded percentage of anglers targeting smallmouth bass during a summer period at Enemy Swim Lake. It is likely that smallmouth bass will comprise a larger percentage of Enemy Swim Lake anglers in future years as the smallmouth bass population structure continues to improve.

Smallmouth bass catch rates were relatively high during the 2005 and 2006 summers at 0.27 and 0.36 bass per hour fished, respectively (Table 4). Anglers caught in excess of 10,000 smallmouth bass during each summer, but harvest was minimal with 87 being harvested during the 2005 summer and 331 harvested during the 2006 summer (Table 5). Smallmouth bass catch appears to have moderated from that experienced between the 2000 summer and 2004 summer when anglers often caught in excess of 17,000 smallmouth bass during a summer (Blackwell 2005).

Largemouth Bass

Anglers averaged catching 0.03 largemouth bass per hour fished during the 2005 summer and 0.09 per hour during the 2006 summer (Table 4). Largemouth bass catch rates were greatest during May and June of both the 2005 and 2006 summers (Table 4). The estimated number of largemouth bass caught during 2005 was 1,042 and in 2006 anglers caught as estimated 4,571 largemouth (Table 5). The 2006 summertime catch is the largest recorded catch since the 1998 summer when anglers caught an estimated 9,522 largemouth bass (Blackwell 2005). No largemouth bass were reported as being harvested during the 2005 summer and a mere 69 fish were estimated in the harvest during 2006 (Table 5).

Northern Pike

Northern pike catch and harvest were similar between 2005 and 2006 summers. Anglers caught and harvested northern pike at an average rate of 0.02 or less per hour fished during each summer (Table 4). An estimated 698 northern pike were caught during 2005 summer and 457 during 2006 summer; the estimated harvest was 215 northern pike in 2005 summer and 156 in 2006 summer (Table 5). Fewer northern pike were caught during the 2005 and 2006 summers than during previous summer surveys when angler catch typically exceeded 1,200 pike per summer (Blackwell 2005). Anglers at Enemy Swim Lake have generally harvested less than 500 northern pike during a summer with the exceptions of the 1988 summer when Meester (1991) estimated that anglers harvested 14,980 pike, the 1989 summer when 2,109 pike were estimated to be harvested (Meester 1991) and 1956 summer when 950 pike were part of the angler harvest (Kathrein 1956).

Other Species

Anglers reported catching rock bass, white bass, pumpkinseeds, black bullheads, and common carp during the summer surveys. Although caught and occasionally harvested, these species represented a minor component of the overall summer fishery at Enemy Swim Lake.

Winter

Fishing Pressure

During the 2004-05 winter, 60.5% of interviewed anglers indicated that they were targeting bluegills while 36.4% targeted bluegills during the 2005-06 winter (Table 1). The percentage of anglers targeting bluegills during the 2004-05 winter represented a historic high. The proportion of anglers targeting walleyes increased from 10.7% in 2004-05 winter to 30.0% during the 2005-06 winter (Table 1). Generalist anglers, those targeting anything, comprised 11.9% of anglers during the 2004-05 winter and 13.6% during the 2005-06 winter (Table 1). A small percentage of anglers targeted northern pike, smallmouth bass, and black crappies each winter and yellow perch were only targeted during the 2004-05 winter.

Winter fishing pressure was greatest during the 2004-05 winter (25,361 hours) when 60.5% of interviewed anglers indicated that they were targeting bluegills, but the pressure decreased to 8,737 hours during the 2005-06 winter when 36.4% of anglers targeted bluegills. Blackwell (2005) believed that increases in winter fishing pressure at Enemy Swim Lake were related to more anglers targeting bluegills and ultimately catching bluegills. Winter pressure estimates were similar to those observed during the four previous winters (Blackwell 2005) and that historically observed at Enemy Swim Lake (Backlund 1960, Kathrein 1958, Lucchesi 1994, Unkenholz 1973).

The mean party size during the winters was less than that observed during the summers (Table 2). The mean party size during the 2004-05 winter slightly exceeded two anglers, but was less than two anglers during the 2005-06 winter. Fishing pressure was nearly evenly divided between weekdays and weekend/holidays during the 2004-05 winter, but in excess of two thirds of the fishing pressure during the 2005-06 winter took place during the weekend/holiday days (Table 2). Similar to the previous four winter surveys (Blackwell 2005) greater than 50% of anglers fished from an ice shack during the 2004-05 and 2005-06 winters (Table 2). The lowest

percentage of anglers fishing from ice shacks occurred during March of each winter when less than 25% were using shacks. This likely is a factor of warmer temperatures during March.

The Enemy Swim Lake winter fishery remains an important fishery in northeast South Dakota for anglers and local economic interests. The estimated economic value of the winter fishery, based on $61 per angler day (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce Bureau of Census 2001) was $508,538 during the 2004-05 and $181,106 in 2004-05 winter (Table 7).

Angler Demographics

Approximately 45% of the anglers fishing Waubay Lake during the 2004-05 winter were resident anglers and 56% were resident anglers during the 2005-06 winter (Table 2). The 2004-05 winter is the first winter that nonresident anglers outnumbered residents at Enemy Swim Lake. In the four previous winters the percentage of resident anglers ranged from 58% to 79% (Blackwell 2005). Anglers from Minnesota comprised greater than a third of the anglers fishing at Enemy Swim Lake during both the 2004-05 and 2005-06 winters (Table 3). The percentage of Minnesota anglers fishing at Enemy Swim Lake has remained relatively constant since the 2000-01 winter (Blackwell 2005). Blackwell (2005) indicated that the increase in nonresident anglers followed the pattern of higher fishing pressure and the escalation in anglers targeting bluegills.

The majority of resident anglers fishing at Enemy Swim Lake during 2004-05 and 2005-06 winters were from Codington, Day, Grant, and Minnehaha Counties (Figure 1). Few anglers from western South Dakota fished Enemy Swim Lake during this survey.

Angler Catch and Harvest

Walleye

The percentage of anglers targeting walleyes was only 10.7% during the 2004-05 winter and represents the lowest measured percent in the last six winters (Blackwell 2005). An increase in anglers targeting walleyes was observed during the 2005-06 winter when 30% of the anglers contacted indicated they were fishing for walleyes. Walleye catch rates were lower during the winters than that observed in the summers of this survey. Anglers averaged catching 0.04 walleyes per hour during 2004-05 winter and 0.08 per hour during the 2005-06 winter (Table 4). The walleye harvest rate was greatest during the 2005-06 winter at 0.05 walleyes per hour (Table 4). Lucchesi (1994) reported that anglers harvested 0.03 walleyes per hour during the 1993-94 winter. The greatest walleye catch and harvest rates occurred during December of the 2004-05 and 2005-06 winters. This is similar to the five previous winter surveys completed at Enemy Swim Lake (Blackwell 2005). December typically has the highest percentage of anglers targeting walleyes (Table 1).

Less than 1,000 walleyes were caught during each of the 2004-05 and 2005-06 winters (Table 5). No walleyes were caught during March of each winter. Walleye harvest during the 2004-05 winter was estimated at 303 walleyes and 405 walleyes during the 2004-05 winter (Table 5). The catch and harvest of walleyes during the current two winter periods was substantially less than that reported for the previous winter period when anglers caught in excess of 3,700 walleyes and harvested greater than 1,300 walleyes (Blackwell 2005). However, the

number of walleyes caught and harvested during the 2004-05 and 2005-06 winters was comparable to that of past surveys. Walleye harvest during previous winter surveys has ranged from a low of 26 fish during the 1956-57 winter (Kathrein 1957) to a high of 1,355 walleyes in the 2003-04 winter (Blackwell 2005). Anglers harvested walleyes below the minimum length limit (356 mm; 14 inches) during both the 2004-05 and 2005-06 winters (Figure 2).

Bluegill

The winter of 2004-05 saw the highest measured percentage of anglers targeting bluegills at Enemy Swim Lake when 60.5% of anglers contacted indicated that they were fishing for bluegills (Table 1). The percent targeting bluegill during the 2005-06 winter dropped to 36.4% (Table 1). Anglers averaged catching 2.75 bluegill per hour during the 2004-05 winter and 1.92 during the 2005-06 winters. The highest monthly observed catch rates occurred during March of each winter; anglers caught 6.13 bluegills per hour fished during March 2005 and 9.36 bluegills per hour during March 2006 (Table 4). Anglers caught an estimated 69,632 bluegills during the 2004-05 winter and 16,771 during the 2005-06 winter (Table 5). The highest recorded bluegill wintertime catch occurred during the 2003-04 winter when anglers caught an estimated 100,271 bluegills through the ice (Blackwell 2005).

The harvest rate for bluegills decreased from 0.79 per hour during the 2004-05 winter to 0.18 per hour in 2005-06 winter (Table 4). The harvest rate of 0.18 bluegills per hour fished is the lowest of the last eight winter surveys at Enemy Swim Lake (Blackwell 2005). Bluegill harvest was estimated at 20,037 for the 2005-06 winter, but decreased to 1,569 during 2005-06 winter (Table 4). The decrease in harvest during the 2005-06 winter likely is a result of an increased percentage of smaller bluegill in the population. The 2005 frame net caught bluegill proportional stock density (PSD) was 18, which was the lowest PSD reported for the period between 1999 and 2005 (Ermer et al. 2005). Relative abundance, based on trap net catch rates, has remained relatively stable since 1999 averaging 54 stock-length bluegills per trap net night (Ermer et al. 2005). Harvested bluegills averaged 206 mm (8.1 inches) during the 2004-05 winter and 190 mm (7.5 inches) during the 2005-06 winter (Figure 3).

Yellow Perch

Anglers caught an average of 0.11 yellow perch per hour fished during the 2004-05 winter and 0.21 perch per hour during the 2005-06 winter (Table 4). Yellow perch catch rates were greatest during March of each winter (Table 4). Harvest rates were considerably lower than catch rates. Anglers harvested 0.03 yellow perch per hour during the 2004-05 winter and 0.01 perch per hour during the 2005-06 winter. Both the catch and harvest rates during the 2004-05 and 2005-06 winters were lower than that observed in winter surveys completed before the 2003-04 winter. During the 1956-57 winter, anglers harvested 1.89 yellow perch per hour fished (Kathrein 1957). Recently, the highest yellow perch catch and harvest rates occurred during the 2001-02 winter when anglers caught 0.66 perch per hour and harvested 0.30 for every hour fished (Blackwell 2005).

An estimated 2,860 yellow perch were caught during the 2004-05 winter and 1,822 during the 2005-06 winter (Table 5). Anglers harvested 734 yellow perch in 2004-05 winter and only 94 during the 2005-06 winter (Table 5). Yellow perch harvest has decreased each winter

since peaking at 6,138 perch during the 2000-01 winter (Blackwell 2005). As was indicated in the summertime yellow perch discussion above, the decline in yellow perch catch rates by anglers appears to be related to a decrease in perch abundance.

Black Crappie

Wintertime black crappie catch and harvest rates peaked during the 2002-03 winter when anglers caught 0.66 crappies per hour fished and harvested 0.17 crappies per hour (Blackwell 2005). During the 2004-05 winter, anglers caught 0.14 black crappies per hour and harvested 0.09 crappies per hour (Table 4). The catch rate decreased to 0.08 black crappies per hour during the 2005-06 winter and anglers harvested 0.03 crappies per hour (Table 4). Anglers caught an estimated 3,572 black crappies during the 2004-05 winter and 717 during the 2005-06 winter with harvest estimated at 2,389 for the 2004-05 winter and 282 during the 2005-06 winter (Table 5). Harvested black crappies ranged in length from 18 to 35 cm (7.1 to 13.8 inches; Figure 4).

Smallmouth Bass

Smallmouth bass catch in 2004-05 winter was similar to the previous two winters (Blackwell 2005) with greater than 4,000 smallmouth bass estimated as being caught (Table 5). The number of smallmouth bass caught during the 2005-06 winter decreased from that observed in 2004-05 to 1,450 (Table 5). Although fewer smallmouth bass were reported as being caught during the 2005-06 winter than during the 2005-06 winter the catch rate was the same for each winter at 0.17 smallmouth bass being caught per hour fished (Table 4). Smallmouth bass wintertime catch rates peaked during the 2002-03 winter when anglers caught 0.37 bass per hour fished (Blackwell 2005). No smallmouth bass were observed in the angler harvest during the winter months of this survey (Table 5).

Largemouth Bass

The estimated largemouth bass catch during the 2004-05 winter was 85 bass and none were reported as being caught during the 2005-06 winter (Table 5). Largemouth bass have been only occasional components of angler wintertime catch at Enemy Swim Lake.

Northern Pike

Catch and harvest rates for northern pike were similar during the 2004-05 and 2005-06 winters. During the 2004-05 winter, anglers caught 0.07 northern pike per hour and during the 2005-06 winter 0.08 pike per hour; anglers harvested northern pike at a rate of 0.06 fish per hour during both winters (Table 4). The highest catch and harvest rates were observed during March of each winter. Anglers caught an estimated 1,849 northern pike during the 2004-05 winter and harvested 1,469 pike (Table 5). The catch and harvest was lower during the 2005-06 winter when 736 northern pike were caught and 497 were harvested (Table 5). The harvest during the 2004-05 winter represents the largest amount of northern pike harvest that has been recorded for a winter period at Enemy Swim Lake. The next highest occurred during the 2003-04 winter when and estimated 1,409 northern pike were harvested (Blackwell 2005).

Other Species

Other species in the angler creel were rare. An occasional rock bass and white bass were caught during the 2004-05 winter, but their numbers were low and none were reported as being

caught during the 2005-06 winter (Table 2 and Table 3). No other species were reported as being caught during the 2004-05 nor 2005-06 winter.

Angler Opinions

Greater than 80% of interviewed anglers indicated that they sere supportive of the one walleye over 508 mm (20 inches) as a statewide regulation (Table 6). Angler opinions were mixed when asked about reducing the statewide walleye daily limit from four to three walleyes (Table 7). During the 2005 summer, 56% favored a reduction and 31% opposed a reduction in the statewide daily walleye limit and during the 2005-06 winter, 35% favored and 49% were against reducing the walleye daily limit. When asked during the 2003-04 winter what an acceptable daily walleye limit was, a majority (75%) of Enemy Swim Lake anglers indicated that a four fish walleye limit was acceptable (Blackwell 2005).

A majority of Enemy Swim Lake anglers during 2005 summer and 2005-06 winter favored the reduction in panfish daily limit from 25 to 10 for each species (i.e., yellow perch, crappies, bluegill/sunfish; Table 8). This is similar to angler responses during the 2002-03 winter when 88% of interviewed anglers at Enemy Swim Lake supported the reduction to 10 fish (Blackwell 2005).

Anglers at Enemy Swim Lake during the 2005 summer primarily opposed a reduction in the northern pike daily limit from six to three pike, but during the 2005-06 winter a higher percentage of anglers favored a reduction. During both the 2005 summer and 2005-06 winter, a large percentage of interviewed anglers were impartial about potentially changing the northern pike daily limit.

Anglers have generally been satisfied with their fishing trip at Enemy Swim Lake. Greater than 60% of interviewed anglers during the 2004-05 winter and 2006 summer indicated that they were satisfied with their fishing trip (Table 10). In past surveys, greater than 75% of interviewed anglers indicated that they were satisfied with their fishing trip at Enemy Swim Lake (Blackwell 2005). Dissatisfied anglers during the 2004-05 winter and 2006 summer made up a higher percentage of anglers than during past surveys. In the 2004 summer 10.8% of interviewed Enemy Swim Lake anglers were slightly dissatisfied to dissatisfied with their angling trip (Blackwell 2005). In the current survey, 26% of anglers were dissatisfied during the 2004-05 winter and 17% during the 2006 summer (Table 10).

Catching fish and relaxation were the two most common responses from anglers when asked what the most important factor to them was when defining a successful fishing trip (Table 11). In past surveys, relaxation and catching fish have also been the most common responses (Blackwell 2005).

Table 1. Winter (December – March), and summer (May – August) angler primary target species (percentage) by month and combined season for anglers fishing at Enemy Swim Lake, South Dakota between December 2004 and August 2006. NOP=northern pike, BLG=bluegill, SMB=smallmouth bass, LMB=largemouth bass, BLC=black crappie, YEP=yellow perch, and WAE=walleye.

		Percent (%) of anglers targeting								
Year	Month	Any	NOP	BLG	SMB	LMB	BLC	YEP	WAE	Other
2004	December	9.5	19.1	33.3	0.0	0.0	4.8	14.3	19.1	0.0
2005	January	12.4	4.9	67.9	0.0	0.0	2.5	1.2	9.9	1.2
	February	12.5	2.1	60.4	4.2	0.0	6.3	4.2	10.1	0.0
	March	11.1	14.8	59.3	3.7	0.0	3.7	0.0	7.4	0.0
	Total	11.9	7.3	60.5	1.7	0.0	4.0	3.4	10.7	0.6
2005	May	7.1	0.0	14.3	7.1	28.6	0.0	0.0	42.9	0.0
	June	38.1	0.0	21.4	0.0	0.0	0.0	0.0	40.5	0.0
	July	36.3	0.0	31.8	4.6	0.0	4.6	0.0	22.7	0.0
	August	15.8	0.0	57.9	0.0	5.3	0.0	0.0	21.1	0.0
	Total	28.9	0.0	29.9	2.1	5.2	1.0	0.0	33.0	0.0
2005	December	8.3	0.0	25.0	0.0	0.0	8.3	0.0	58.3	0.0
2006	January	19.4	3.2	32.3	0.0	0.0	9.7	0.0	35.5	0.0
	February	18.5	3.7	18.5	11.1	0.0	18.5	0.0	29.6	0.0
	March	0.0	11.1	77.8	5.6	0.0	5.6	0.0	0.0	0.0
	Total	13.6	4.6	36.4	4.6	0.0	11.4	0.0	30.0	0.0
2006	May	3.1	6.3	12.5	12.5	0.0	6.3	0.0	59.4	0.0
	June	6.5	0.0	16.1	14.5	3.2	0.0	0.0	59.7	0.0
	July	17.0	0.0	23.4	17.0	0.0	2.1	0.0	40.4	0.0
	August	14.3	0.0	57.1	9.5	0.0	4.8	0.0	14.3	0.0
	Total	9.9	1.2	22.8	14.2	1.2	2.5	0.0	48.2	0.0

Table 2. Winter (December – March), summer (May – August), and overall by season, number of angler interviews (# Int), estimated angler hours, estimated angler days, estimated economic value (Eco Value), estimated trip length, average party size, percent of interviewed anglers that were South Dakota residents, percent of angling activity by shack or boat and percent of angling activity that occurred during weekend/holidays at Enemy Swim Lake, South Dakota between December 2004 and August 2006. One standard error is provided in parentheses when calculated.

Year	Month	# Int	Angler hours	Angler Days	Eco Value ($)	Trip Length (h)	Party Size	% SD	% Shack or Boat	% WE/H
2004	December	21	2,085 (1,304)	690	42,114	3.02 (0.84)	1.73 (0.44)	61.9	78.5	61.2
2005	January	81	9,656 (1,929)	3,537	215,757	2.73 (2.15)	2.30 (1.87)	55.6	72.6	44.4
	February	48	8,599 (1,138)	2,679	163,408	3.21 (1.74)	2.26 (1.54)	22.9	57.0	45.5
	March	27	5,021 (2,722)	1,430	87,260	3.51 (1.09)	2.34 (0.63)	37.0	19.5	65.8
	Total	177	25,361 (3,759)	8,337	508,538	3.12 (0.77)	2.15 (0.63)	44.6	57.3	50.4
2005	May	14	4,955 (1,641)	1,757	107,183	2.82 (---)	2.09 (0.22)	57.1	92.8	35.5
	June	42	9,495 (2,342)	1,962	119,668	4.84 (---)	2.13 (0.00)	45.2	93.0	40.1
	July	22	8,139 (1,598)	1,825	111,318	4.46 (---)	2.13 (---)	59.1	93.5	44.3
	August	21	13,257 (3,109)	3,062	186,761	4.33 (---)	2.53 (---)	73.7	97.3	51.3
	Overall	99	38,274 (4,464)	8,605	524,931	4.11 (---)	2.22 (---)	55.7	94.6	44.5
2005	December	12	1,169 (299)	409	24,933	2.86 (---)	2.07 (0.52)	91.7	55.2	40.6
2006	January	31	3,845 (1,049)	1,277	77,922	3.01 (0.76)	1.85 (1.21)	54.8	78.3	74.6
	February	26	2,600 (660)	887	54,130	2.93 (1.07)	1.60 (0.22)	60.0	84.6	83.5
	Total	18	1,123 (414)	395	24,121	2.84 (---)	2.05 (0.74)	27.8	22.7	50.5
	Overall	87	8,737 (1,340)	2,969	181,106	2.91 (0.25)	1.90 (0.39)	55.8	69.9	69.6
2006	May	31	9,620 (2,500)	3,352	204,467	2.87 (---)	2.99 (0.58)	53.3	99.5	70.7
	June	62	11,171 (2,711)	2,610	159,213	4.28 (0.55)	2.43 (0.55)	58.1	95.7	54.2
	July	47	10,443 (2,432)	2,326	141,876	4.49 (0.17)	2.68 (0.14)	58.7	96.7	55.7
	August	21	7,020 (2,654)	2,017	123,052	3.48 (1.04)	2.40 (0.49)	42.9	97.4	38.8
	Total	161	38,253 (5,154)	10,305	628,607	3.78 (0.30)	2.63 (0.24)	55.4	97.2	55.9

Table 3. Home state residence (percentage) of anglers fishing Enemy Swim Lake during winter (December – March) and summer (May – August) between December 2004 and August 2006.

	Percent (%) of anglers			
State	2004-05	2005	2005-06	2006
South Dakota	44.6	55.7	55.8	55.4
Arizona				0.6
Arkansas		2.2		
California		1.0		
Iowa	6.8	13.4	3.5	9.4
Michigan		1.0		
Minnesota	37.3	16.5	34.9	23.9
Nebraska	1.1	5.2	1.2	4.4
North Dakota	2.8	3.1	4.7	3.8
Washington				0.6
Wisconsin	7.3	2.1		1.9

Table 4. Estimated winter (December – March), summer (May – August), and overall angler catch rate per hour fished (C/h) and harvest rate per hour fished (H/h) for all anglers by species at Enemy Swim Lake, South Dakota between December 2004 and August 2006. Standard errors of estimates are provided in parentheses where they could be calculated. Abbreviations for species are as follow walleye (WAE), bluegill (BLG), yellow perch (YEP), black crappie (BLC), smallmouth bass (SMB), largemouth bass (LMB), northern pike (NOP), and other species (Others).

		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Month	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h
2004	December	0.19 (0.17)	0.06 (0.06)	0.19 (0.39)	0.15 (0.31)	0.04 (0.03)	0.04 (0.03)	0.05 (0.04)	0.05 (0.04)	<0.01 (<0.01)	<0.01 (<0.01)	0.0	0.0	0.08 (0.10)	0.05 (0.08)	<0.01 (0.01)	0.0
2005	January	0.03 (0.02)	0.01 (<0.01)	1.00 (0.46)	0.72 (0.34)	0.06 (0.03)	0.04 (0.02)	0.30 (0.16)	0.18 (0.09)	0.01 (0.02)	0.0	<0.01 (<0.01)	0.0	0.05 (0.04)	0.04 (0.04)	0.02 (0.02)	0.02 (0.02)
	February	0.02 (0.02)	<0.01 (0.01)	3.38 (1.39)	1.03 (0.58)	<0.01 (0.01)	<0.01 (<0.01)	0.05 (0.04)	0.05 (0.04)	0.14 (0.11)	0.0	<0.01 (<0.01)	0.0	0.05 (0.02)	0.03 (0.01)	0.0	0.0
	March	0.0	0.0	6.13 (3.27)	0.79 (0.53)	0.41 (0.26)	0.05 (0.04)	0.03 (0.02)	0.03 (0.02)	0.56 (0.79)	0.0	0.0	0.0	0.15 (0.13)	0.15 (0.13)	0.02 (0.12)	0.02 (0.02)
	Total	0.04 (0.02)	0.01 (<0.01)	2.75 (0.68)	0.79 (0.26)	0.11 (0.06)	0.03 (0.01)	0.14 (0.07)	0.09 (0.04)	0.17 (0.15)	0.0	<0.01 (<0.01)	0.0	0.07 (0.03)	0.06 (0.03)	0.01 (0.01)	0.01 (0.01)
2005	May	0.02 (0.01)	0.01 (<0.01)	0.0	0.0	0.0	0.0	0.01 (0.01)	0.01 (0.01)	0.31 (0.27)	0.0	0.16 (0.23)	0.0	0.01 (0.01)	0.0	0.01 (0.01)	0.0
	June	0.17 (0.13)	0.05 (0.04)	0.41 (0.21)	0.09 (0.07)	0.04 (0.02)	<0.01 (<0.01)	<0.01 (0.01)	<0.01 (0.01)	0.26 (0.12)	<0.01 (<0.01)	0.01 (<0.01)	0.0	0.03 (0.04)	<0.01 (<0.01)	0.02 (<0.01)	0.01 (0.01)
	July	0.15 (0.03)	0.01 (<0.01)	0.0	0.0	0.07 (0.01)	0.0	0.06 (0.05)	0.01 (0.02)	0.33 (0.45)	0.0	<0.01 (<0.01)	0.0	0.02 (<0.01)	0.0	0.0	0.0
	August	0.16 (0.12)	0.02 (0.01)	1.59 (0.50)	0.49 (0.19)	0.22 (0.11)	0.06 (0.04)	<0.01 (<0.01)	<0.01 (<0.01)	0.14 (0.06)	0.0	<0.01 (<0.01)	0.0	0.01 (<0.01)	0.01 (<0.01)	0.01 (<0.01)	0.0
	Total	0.14 (0.05)	0.02 (<0.01)	0.89 (0.26)	0.30 (0.12)	0.10 (0.04)	0.02 (0.01)	0.02 (0.02)	<0.01 (<0.01)	0.27 (0.13)	<0.01 (<0.01)	0.03 (0.02)	0.0	0.02 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)
2005	December	0.40 (0.29)	0.22 (0.15)	0.38 (0.50)	0.0	0.04 (0.03)	0.04 (0.03)	0.31 (0.29)	0.0	0.0	0.0	0.0	0.0	<0.01 (<0.01)	<0.01 (<0.01)	0.0	0.0
2006	January	0.05 (0.03)	0.04 (0.02)	1.27 (1.53)	0.09 (0.11)	0.04 (0.05)	<0.01 (<0.01)	0.02 (---)	0.02 (---)	0.10 (0.05)	0.0	0.0	0.0	0.09 (0.07)	0.09 (0.07)	0.0	0.0
	February	<0.01 (<0.01)	<0.01 (<0.01)	0.36 (0.32)	0.10 (0.09)	0.01 (<0.01)	<0.01 (<0.01)	0.06 (0.10)	0.06 (0.10)	0.36 (0.11)	0.0	0.0	0.0	0.02 (<0.01)	<0.01 (<0.01)	0.0	0.0
	March	0.0	0.0	9.36 (3.68)	0.87 (0.33)	1.42 (1.39)	0.01 (<0.01)	0.09 (0.04)	0.03 (0.02)	0.12 (0.18)	0.0	0.0	0.0	0.30 (0.12)	0.13 (0.05)	0.0	0.0
	Total	0.08 (0.03)	0.05 (0.02)	1.92 (0.82)	0.18 (0.07)	0.21 (0.17)	0.01 (<0.01)	0.08 (0.05)	0.03 (0.02)	0.17 (0.04)	0.0	0.0	0.0	0.08 (0.03)	0.06 (0.03)	0.0	0.0

Table 4 Continued.

		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Month	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h
2006	May	0.16 (0.12)	0.11 (0.08)	<0.01 (<0.01)	<0.01 (<0.01)	0.04 (0.04)	<0.01 (<0.01)	0.02 (0.01)	0.02 (0.01)	0.26 (0.17)	0.0	0.20 (0.15)	0.0	0.04 (0.08)	0.01 (<0.01)	0.01 (0.01)	<0.01 (<0.01)
	June	0.26 (0.22)	0.11 (0.09)	0.08 (0.07)	0.01 (0.01)	0.14 (0.08)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)	0.28 (0.15)	<0.01 (<0.01)	0.20 (0.07)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)	0.07 (0.06)	0.01 (0.01)
	July	0.18 (0.12)	0.10 (0.06)	0.33 (0.17)	0.14 (0.08)	0.09 (0.05)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)	0.45 (0.25)	0.02 (0.01)	0.03 (0.05)	0.0	<0.01 (<0.01)	0.0	<0.01 (<0.01)	0.0
	August	0.04 (0.02)	0.02 (0.01)	2.51 (2.56)	1.09 (1.10)	0.06 (0.06)	0.02 (0.02)	0.02 (0.03)	0.02 (0.03)	0.47 (0.38)	0.02 (0.02)	<0.01 (<0.01)	0.0	0.0	0.0	0.01 (0.01)	0.01 (0.01)
	Total	0.17 (0.07)	0.09 (0.04)	0.58 (0.35)	0.24 (0.15)	0.09 (0.03)	0.01 (<0.01)	0.01 (0.01)	0.01 (0.01)	0.36 (0.11)	0.01 (<0.01)	0.12 (0.05)	0.0	0.01 (0.01)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)

Table 5. Estimated winter (December – March), summer (May – August), and overall angler catch (C) and harvest (H) for walleye (WAE), bluegill (BLG), yellow perch (YEP), black crappie (BLC), smallmouth bass (SMB), largemouth bass (LMB), northern pike (NOP), and other species (Others) at Enemy Swim Lake, South Dakota between December 2004 and August 2006. Standard errors of estimates are provided in parentheses where they could be calculated.

		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Month	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H
2004	December	387 (262)	128 (92)	386 (408)	304 (323)	90 (32)	90 (32)	109 (35)	109 (35)	11 (---)	0	0	0	163 (64)	103 (64)	14 (20)	0
2005	January	312 (107)	99 (44)	9,390 (3,333)	6,914 (2,463)	613 (274)	363 (177)	2,914 (1,677)	1,731 (851)	143 (150)	0	68 (51)	0	521 (267)	375 (315)	221 (232)	221 (232)
	February	203 (196)	76 (92)	29,037 (11,455)	8,874 (4,814)	83 (100)	10 (10)	418 (306)	418 (306)	1,202 (660)	0	17 (17)	0	401 (157)	255 (108)	0	0
	March	0	0	30,818 (7,851)	3,945 (1,711)	2,074 (1,764)	270 (173)	132 (34)	132 (34)	2,833 (3,634)	0	0	0	765 (526)	736 (510)	79 (82)	79 (82)
	Total	902 (344)	303 (138)	69,632 (14,287)	20,037 (5,681)	2,860 (1,788)	734 (250)	3,572 (1,706)	2,389 (906)	4,190 (3,696)	0	85 (53)	0	1,849 (614)	1,469 (613)	315 (315)	300 (314)
2005	May	78 (55)	52 (40)	0	0	0	0	52 (56)	52 (56)	1,515 (836)	0	781 (706)	0	52 (61)	0	52 (55)	0
	June	1,640 (736)	506 (222)	3,933 (886)	898 (414)	346 (216)	29 (17)	94 (49)	94 (49)	2,515 (715)	87 (33)	130 (55)	0	246 (129)	50 (36)	195 (94)	108 (77)
	July	1,213 (114)	84 (24)	7,163 (3,050)	3,186 (1,712)	573 (24)	0	464 (408)	117 (132)	2,711 (2,279)	0	29 (24)	0	167 (66)	0	0	0
	August	2,153 (1,178)	242 (113)	21,105 (4,510)	6,449 (1,684)	2,969 (1,320)	741 (506)	27 (18)	27 (18)	1,918 (502)	0	81 (45)	0	192 (124)	165 (123)	165 (123)	0
	Total	5,246 (1,408)	904 (257)	34,188 (6,899)	11,648 (3,368)	3,908 (1,338)	770 (506)	920 (717)	371 (242)	10,200 (4,032)	87 (33)	1,042 (711)	0	698 (222)	215 (128)	412 (251)	108 (77)
2005	December	462 (235)	257 (119)	445 (578)	0	51 (36)	51 (36)	364 (322)	0	0	0	0	0	10 (---)	10 (---)	0	0
2006	January	194 (92)	136 (69)	4,870 (4,105)	340 (331)	144 (145)	19 (24)	92 (64)	92 (64)	387 (242)	0	0	0	348 (144)	329 (142)	0	0
	February	12 (12)	12 (12)	943 (555)	253 (175)	37 (15)	12 (12)	159 (151)	159 (151)	928 (259)	0	0	0	45 (10)	12 (10)	0	0
	March	0	0	10,513 (409)	976 (40)	1,590 (1,448)	12 (0)	102 (15)	31 (15)	135 (193)	0	0	0	332 (41)	146 (0)	0	0
	Total	668 (253)	405 (138)	16,771 (4,203)	1,569 (376)	1,822 (1,456)	94 (45)	717 (362)	282 (165)	1,450 (404)	0	0	0	736 (150)	497 (143)	0	0

Table 5 Continued.

		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Month	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H
2006	May	1,491 (669)	1,020 (407)	52 (20)	26 (24)	340 (269)	52 (48)	209 (79)	209 (79)	2,516 (878)	0	1,897 (1,359)	0	357 (259)	115 (81)	104 (101)	26 (24)
	June	2,849 (1,262)	1,239 (501)	853 (694)	129 (142)	1,580 (1,002)	60 (35)	37 (31)	23 (28)	3,167 (1,027)	46 (26)	2,272 (765)	69 (47)	64 (28)	41 (23)	744 (221)	116 (58)
	July	1,931 (610)	1,056 (364)	3,459 (1,004)	1,496 (500)	892 (461)	72 (62)	73 (42)	36 (26)	4,745 (1,201)	163 (93)	364 (201)	0	36 (21)	0	55 (56)	0
	August	255 (127)	133 (55)	17,633 (11,439)	7,633 (4,936)	444 (272)	133 (55)	155 (188)	155 (188)	3,309 (1,477)	122 (71)	39 (49)	0	0	0	89	89
	Total	6,526 (1,558)	3,448 (742)	21,997 (11,504)	9,285 (4,964)	3,255 (1,168)	318 (138)	474 (211)	424 (207)	13,737 (2,335)	331 (120)	4,571 (1,573)	69 (47)	457 (261)	156 (85)	992	231

Table 6. Enemy Swim Lake, South Dakota angler responses, during the 2005 summer and 2005-06 winter, to the question: "What is your opinion on making the one walleye over 508 mm (20 inches) a statewide restriction?" n is the number of responses.

	Percent (%)	
Response	2005 (n=62)	2005-06 (n=43)
Strongly oppose	4.8	2.3
Somewhat oppose	4.8	0.0
Neutral	8.1	4.7
Somewhat favor	11.3	14.0
Strongly favor	71.0	79.1

Table 7. Enemy Swim Lake, South Dakota angler responses, during the 2005 summer and 2005-06 winter, to the question: "What is your opinion on reducing the statewide daily walleye limit from four to three?" n is the number of responses.

	Percent (%)	
Response	2005 (n=62)	2005-06 (n=43)
Strongly oppose	19.4	32.6
Somewhat oppose	11.3	16.3
Neutral	12.9	16.3
Somewhat favor	17.7	14.0
Strongly favor	38.7	20.9

Table 8. Enemy Swim Lake, South Dakota angler responses, during the 2005 summer and 2005-06 winter, to the question: "What is your opinion on reducing the panfish limit from 25 to 10?" n is the number of responses.

	Percent (%)	
Response	2005 (n=25)	2005-06 (n=30)
Strongly oppose	8.0	6.7
Somewhat oppose	4.0	13.3
Neutral	24.0	3.3
Somewhat favor	4.0	13.3
Strongly favor	60.0	63.3

Table 9. Enemy Swim Lake, South Dakota angler responses, during the 2005 summer and 2005-06 winter, to the question: "What is your opinion on reducing the statewide daily northern pike limit from six to three?" n is the number of responses.

	Percent (%)	
Response	2005 (n=25)	2005-06 (n=30)
Strongly oppose	40.0	13.3
Somewhat oppose	8.0	3.3
Neutral	36.0	46.7
Somewhat favor	0.0	16.7
Strongly favor	16.0	20.0

Table 10. Enemy Swim Lake, South Dakota angler responses, during the 2004-05 winter and 2006 summer, to the question: "Considering all factors, how satisfied are you with your fishing trip today?" n is the number of responses.

	Percent (%)	
Response	2004-05 (n=129)	2006 (n=160)
Satisfied	49.6	45.0
Slightly satisfied	13.2	21.3
Neutral	10.9	16.9
Slightly dissatisfied	8.5	9.4
Dissatisfied	17.8	7.5

Table 11. Enemy Swim Lake, South Dakota angler responses, during the 2004-05 winter and 2006 summer, to the question: "What is the most important factor to you in defining a successful fishing trip?" n is the number of responses.

	Percent (%) by survey period	
Response	2004-05 (n=128)	2006 (n=160)
Relaxation	33.6	35.6
Harvesting fish	12.5	2.5
Participating	13.3	3.8
Catching fish	39.1	27.5
Being with others	1.6	12.5
Other	0.0	8.1

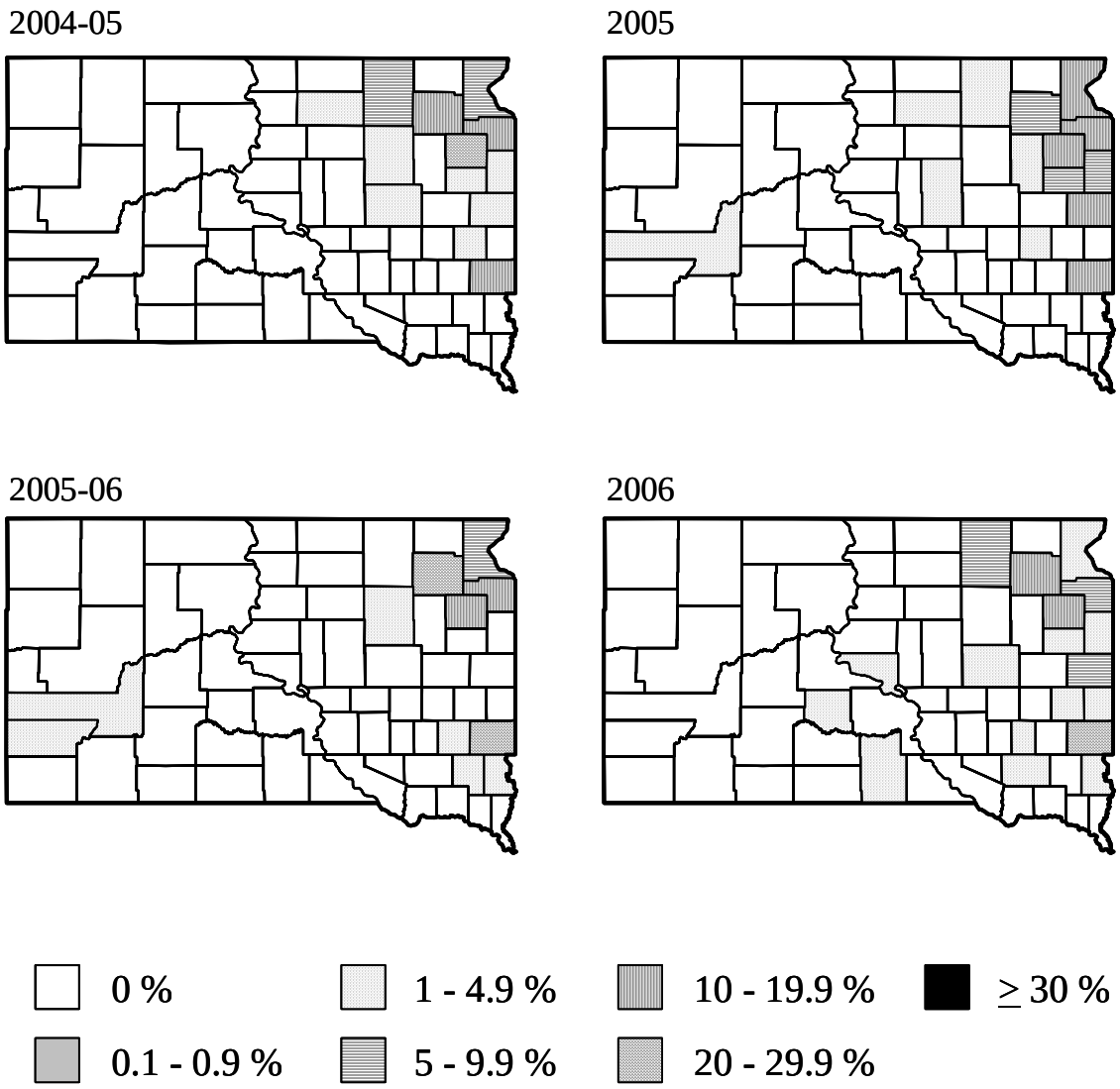

Figure 1. South Dakota county of residence for winter (December – March) and summer (May – August) resident anglers fishing Enemy Swim Lake, South Dakota between December 2004 and March 2006

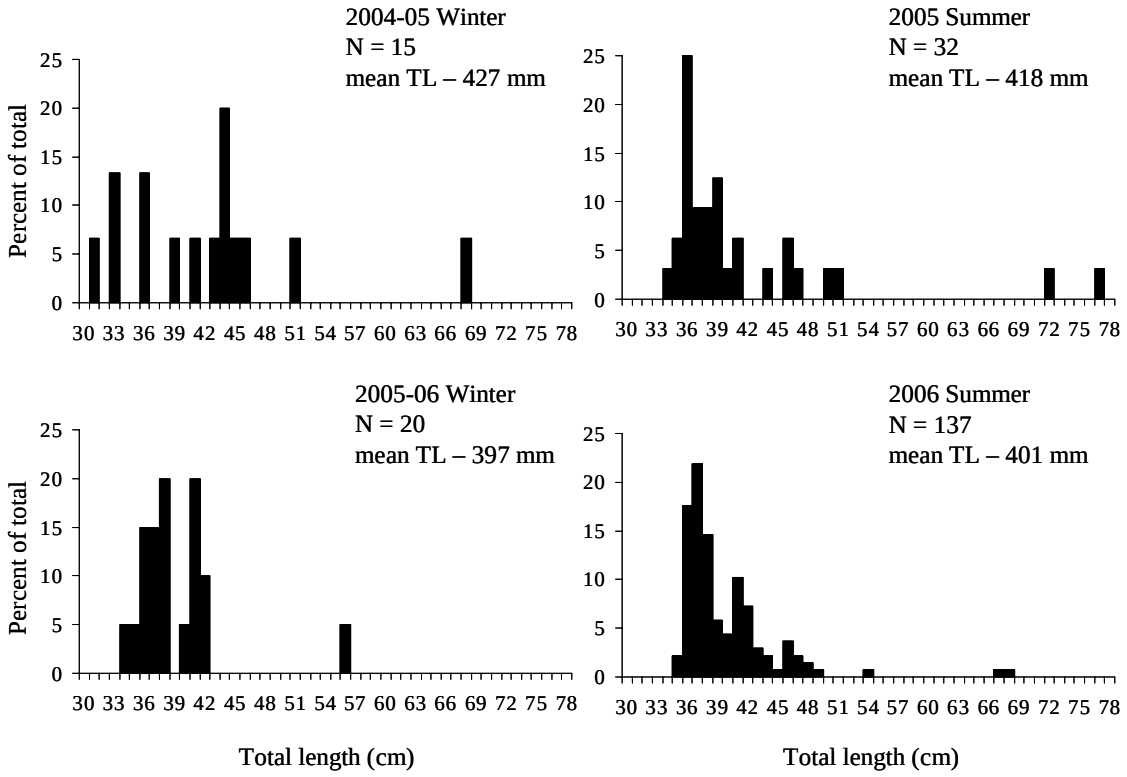

Figure 2. Length frequency histograms of walleyes harvested by anglers fishing Enemy Swim Lake, South Dakota during winter and summer periods between December 2004 and August 2006, N is the total number of fish measured and the mean total length (TL) in mm is provided for each survey period.

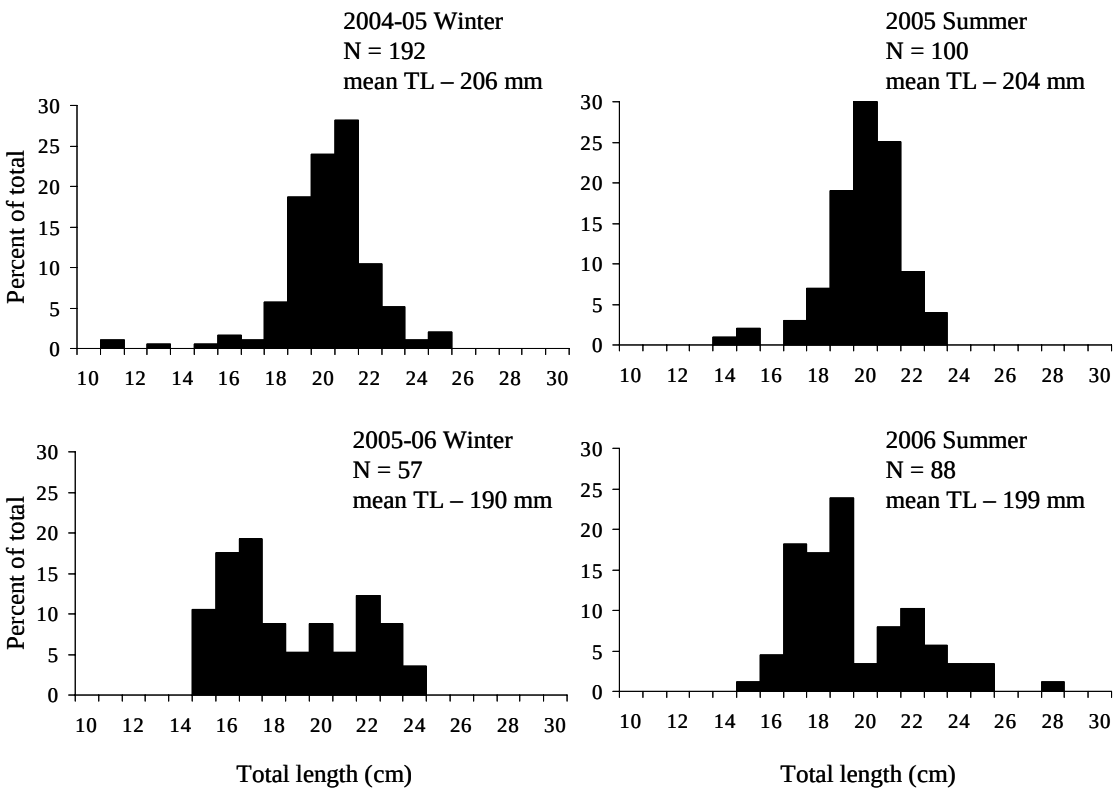

Figure 3. Length frequency histograms of bluegills harvested by anglers fishing Enemy Swim Lake, South Dakota during winter and summer periods between December 2004 and August 2006, N is the total number of fish measured and the mean total length (TL) in mm is provided for each survey period.

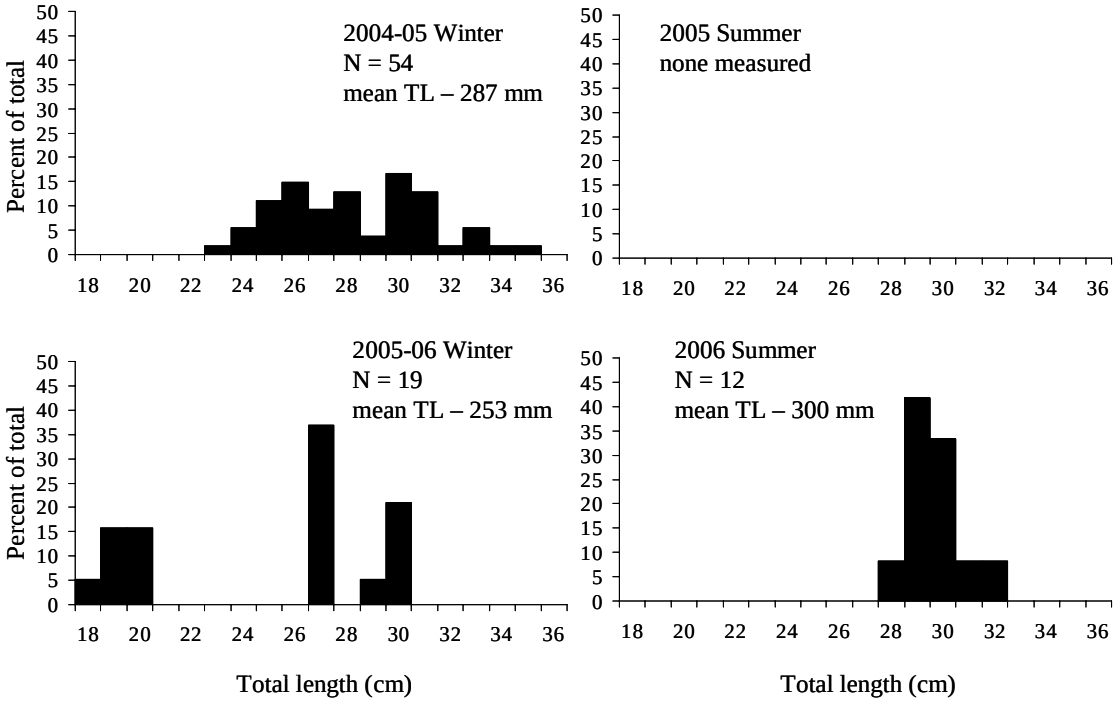

Figure 4. Length frequency histograms of black crappies harvested by anglers fishing Enemy Swim Lake, South Dakota during winter and summer periods between December 2004 and August 2006, N is the total number of fish measured and the mean total length (TL) in mm is provided for each survey period.

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Appendix a. Common and scientific names of fishes mentioned in this report.

Common name	Scientific name
Black bullhead	*Ameirus melas*
Black crappie	*Pomoxis nigromaculatus*
Bluegill	*Lepomis macrochirus*
Common carp	*Cyprinus carpio*
Largemouth bass	*Micropterus salmoides*
Northern pike	*Esox lucius*
Pumpkinseed	*Lepomis gibbosus*
Rock bass	*Ambloplities rupestris*
Smallmouth bass	*Micropterus dolomieui*
Walleye	*Sander vitreus*
White bass	*Morone chrysops*
Yellow perch	*Perca flavescens*

Appendix B. Winter and summer number of angler interviews (# Int), estimated angling hours, estimated angler days, estimated trip length (h), average party size, percent of interviewed anglers that were South Dakota residents (% SD), percent of angling activity by boat or ice shack (%B or S) and percent of angling activity that occurred during weekend/holidays (%WE/H) at Enemy Swim Lake, South Dakota. One standard error is provided in parentheses when calculated.

Season /Year	Months	# Int	Angler hours	Angler Days	Trip Length (h)	Party Size	% SD	% B or S	% WE/H
Winter									
1956-57 [a]	12,1,2	NA	14,955	4,484	NA	NA	NA	NA	NA
1958/59 [b]	12,1,2	NA	14,482	3,229	NA	NA	NA	NA	NA
1971-72 [c]	12,1,2,3	341	11,069	1,864	NA	NA	NA	NA	NA
1993-94 [e]	12,1,2,3	NA	1,633	596	NA	NA	NA	NA	NA
1997-98 [f]	12,1,2	175	5,251	1,380	4.07	1.00	91.8	27.9	72.8
2000-01[f]	12,1,2,3	209	18,904	6,680	3.72	2.13	68.2	83.1	68.8
2001-02 [f]	12,1,2,3	108	9,519 (1,379)	2,028	5.77 (0.52)	1.86 (0.66)	60.2	77.4	47.4
2002-03 [f]	12,1,2,3	210	13,453 (3,515)	4,209	5.99 (0.13)	1.65 (0.27)	78.5	58.2	66.4
2003-04 [f]	12,1,2,3	285	21,974 (3,156)	6,742	3.12 (0.46)	1.89 (0.77)	63.5	62.7	60.9
2004-05 [g]	12,1,2,3	177	25,361 (3,759)	8,337	3.12 (0.77)	2.15 (0.63)	44.6	57.3	50.4
2005-06 [g]	12,1,2,3	87	8,737 (1,340)	2,969	2.91 (0.25)	1.90 (0.39)	55.8	69.9	69.6
Summer									
1956 [a]	6,7,8	NA	68,221	17,057	NA	NA	NA	NA	NA
1958 [b]	5,6,7,8	NA	58,376	18,177	NA	NA	NA	NA	NA
1971-72 [c]	5,6,7,8	1,596	39,437	7,941	NA	NA	NA	NA	NA
1988 [d]	4,5,6,7,8,9	NA	26,349	7,133	3.75	NA	85.6	83.4	52.9
1989 [d]	5,6,7,8,9	NA	24,442	5,981	4.20	NA	81.9	83.2	50.7
1993 [e]	5,6,7,8	NA	12,180	6,638	NA	NA	NA	NA	NA
1997 [f]	5,6,7,8	270	16,518	4,850	3.54	2.22	87.4	90.3	66.0
1998 [f]	5,6,7,8	208	21,232	5,219	4.13	2.49	88.3	85.8	55.3
2000 [f]	5,6,7,8	288	53,004	11,184	4.75	2.45	63.7	92.7	60.1
2001[f]	5,6,7,8	273	56,553 (6,326)	9,410	6.01 (0.66)	2.42 (0.41)	59.6	93.2	47.4
2002 [f]	5,6,7,8	174	36,350 (3,075)	8,614	4.22 (0.13)	2.28 (0.27)	56.6	92.8	49.9
2003 [f]	5,6,7,8	156	41,369 (4,008)	9,538	4.70 (0.19)	2.20 (0.14)	52.3	93.6	55.8
2004 [f]	5,6,7,8	256	45,705 (5,275)	10,729	4.26 (--)	2.24 (0.18)	57.7	95.7	50.2
2005 [g]	5,6,7,8	99	38,274 (4,464)	8,605	4.11 (---)	2.22 (---)	55.7	94.6	44.5
2006 [g]	5,6,7,8	161	38,253 (5,154)	10,305	3.78 (0.30)	2.63 (0.24)	55.4	97.2	55.9

a - Kathrein (1957), b – Backlund (1960), c - Unkenholz (1973), d - Meester (1991), e - Lucchesi (1994), f – Blackwell (2005), g – current report

Appendix C. Estimated winter and summer angler catch rate per hour fished (C/h) and harvest rate per hour fished (H/h) of walleye (WAE), bluegill (BLG), yellow perch (YEP), black crappie (BLC), smallmouth bass (SMB), largemouth bass (LMB), northern pike (NOP), and other species (Others) at Enemy Swim Lake, South Dakota. One standard error is provided in parentheses when calculated.

Season/		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Months	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h	C/h	H/h
Winter																	
1956-57 [a]	12,1,2		0.05		0.0		1.89		0.03		0.0		0.0		0.03		<0.01
1958/59 [b]	12,1,2		<0.01		<0.01		0.39		<0.01		0.0		<0.01		0.03		<0.01
1971-72 [c]	12,1,2,3		0.10		0.0		0.66		0.0		0.0		0.0		0.05		0.0
1993-94 [e]	12,1,2,3		0.02		0.0		0.72		0.0		0.0		0.0		<0.01		0.0
1997-98 [f]	12,1,2	0.22	0.07	0.0	0.0	0.50	0.15	0.01	0.01	0.02	0.02	0.0	0.0	0.05	0.04	0.41	0.24
2000-01 [f]	12,1,2,3	0.20	0.06	0.52	0.35	0.90	0.32	0.06	0.03	0.05	0.01	0.01	0.0	0.04	0.02	0.0	0.0
2001-02 [f]	12,1,2,3	0.09 (0.03)	0.05 (0.02)	0.51 (0.30)	0.14 (0.06)	0.66 (0.26)	0.30 (0.11)	0.07 (0.02)	0.06 (0.02)	0.05 (0.06)	0.0	0.0	0.0	0.05 (0.02)	0.01 (0.01)	0.0	0.0
2002-03 [f]	12,1,2,3	0.15 (0.08)	0.05 (0.03)	2.52 (1.99)	0.59 (0.43)	0.36 (0.23)	0.16 (0.12)	0.63 (0.48)	0.17 (0.13)	0.37 (0.21)	0.0	0.01 (0.01)	0.0	0.11 (0.05)	0.05 (0.02)	0.0	0.0
2003-04 [f]	12,1,2,3	0.17 (0.08)	0.06 (0.03)	4.56 (1.40)	1.34 (0.34)	0.19 (0.05)	0.05 (0.02)	0.16 (0.05)	0.12 (0.03)	0.18 (0.13)	0.0	0.01 (<0.01)	0.0	0.13 (0.05)	0.06 (0.03)	0.01 (<0.01)	0.0
2004-05 [g]	12,1,2,3	0.04 (0.02)	0.01 (<0.01)	2.75 (0.68)	0.79 (0.26)	0.11 (0.06)	0.03 (0.01)	0.14 (0.07)	0.09 (0.04)	0.17 (0.15)	0.0	<0.01 (<0.01)	0.0	0.07 (0.03)	0.06 (0.03)	0.01 (0.01)	0.01 (0.01)
2005-06 [g]	12,1,2,3	0.08 (0.03)	0.05 (0.02)	1.92 (0.82)	0.18 (0.07)	0.21 (0.17)	0.01 (<0.01)	0.08 (0.05)	0.03 (0.02)	0.17 (0.04)	0.0	0.0	0.0	0.08 (0.03)	0.06 (0.03)	0.0	0.0
Summer																	
1956 [a]	6,7,8		0.31		0.05		0.12		<0.01		0.01		0.0		0.01		<0.01
1958 [b]	5,6,7,8		0.01		0.01		0.01		<0.01		0.00		<0.01		<0.01		<0.01
1971-72 [c]	5,6,7,8		0.11		0.01		0.07		0.0		0.0		<0.01		0.02		0.02
1988 [d]	4,5,6,7,8,9		0.09		0.01		0.09								0.57		0.03
1989 [d]	5,6,7,8,9		0.13		0.09		0.11						<0.01		0.09		0.05
1993 [e]	5,6,7,8		0.02				0.06				<0.01				0.01		0.01
1997 [f]	5,6,7,8	0.99	0.06	0.13	0.04	0.44	0.02	0.03	<0.01	0.38	0.04	0.0	<0.01	0.26	0.03	0.0	<0.01
1998 [f]	5,6,7,8	0.36	0.11	1.07	0.48	0.19	0.06	0.04	0.01	0.31	0.03	0.03	0.01	0.07	0.01	0.03	<0.01
2000 [f]	5,6,7,8	0.41	0.10	1.29	0.91	0.29	0.09	0.11	0.06	0.52	0.05	0.04	<0.01	0.05	<0.01	<0.01	<0.01
2001 [f]	5,6,7,8	0.17 (0.05)	0.05 (0.01)	0.97 (0.23)	0.48 (0.13)	0.22 (0.05)	0.07 (0.02)	0.11 (0.03)	0.08 (0.02)	0.30 (0.09)	0.05 (0.01)	0.04 (0.01)	<0.01 (--)	0.03 (0.02)	0.01 (<0.01)	0.16 (0.06)	0.04 (0.02)
2002 [f]	5,6,7,8	0.13 (0.03)	0.04 (0.01)	1.10 (0.23)	0.35 (0.10)	0.20 (0.04)	0.01 (0.03)	0.13 (0.04)	0.06 (0.02)	0.28 (0.07)	<0.01 (<0.01)	0.09 (0.02)	<0.01 (<0.01)	0.03 (0.01)	<0.01 (<0.01)	0.21 (0.12)	0.02 (0.01)
2003 [f]	5,6,7,8	0.37 (0.10)	0.09 (0.02)	1.12 (0.25)	0.66 (0.19)	0.13 (0.04)	0.04 (0.02)	0.15 (0.08)	0.09 (0.04)	0.49 (0.10)	0.0	0.08 (0.04)	0.0	0.03 (0.01)	<0.01 (<0.01)	0.13 (0.04)	0.03 (0.01)
2004 [f]	5,6,7,8	0.22 (0.07)	0.06 (0.02)	0.93 (0.30)	0.52 (0.17)	0.16 (0.04)	0.02 (0.01)	0.05 (0.02)	0.04 (0.02)	0.41 (0.11)	<0.01 (<0.01)	0.07 (0.02)	<0.01 (<0.01)	0.03 (0.02)	<0.00 (<0.01)	0.01 (0.01)	0.01 (0.01)
2005 [g]	5,6,7,8	0.14 (0.05)	0.02 (<0.01)	0.89 (0.26)	0.30 (0.12)	0.10 (0.04)	0.02 (0.01)	0.02 (0.02)	<0.01 (<0.01)	0.27 (0.13)	<0.01 (<0.01)	0.03 (0.02)	0.0	0.02 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)
2006 [g]	5,6,7,8	0.17 (0.07)	0.09 (0.04)	0.58 (0.35)	0.24 (0.15)	0.09 (0.03)	0.01 (<0.01)	0.01 (0.01)	0.01 (0.01)	0.36 (0.11)	0.01 (<0.01)	0.12 (0.05)	0.0	0.01 (0.01)	<0.01 (<0.01)	<0.01 (<0.01)	<0.01 (<0.01)

a - Kathrein (1957), b – Backlund (1960), c - Unkenholz (1973), d - Meester (1991), e - Lucchesi (1994), f – Blackwell (2005), g – current report

Appendix D. Estimated winter and summer angler catch (C) and harvest (H) of walleye (WAE), bluegill (BLG), yellow perch (YEP), black crappie (BLC), smallmouth bass (SMB), largemouth bass (LMB), northern pike (NOP), and other species (Others) at Enemy Swim Lake, South Dakota. One standard error is provided in parentheses when calculated.

Season/		WAE		BLG		YEP		BLC		SMB		LMB		NOP		Others	
Year	Months	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H
Winter																	
1956-57 [a]	12,1,2		750		0		28,325		378		0		0		500		50
1958/59 [b]	12,1,2		26		6		5,597		61		0		7		479		3
1971-72 [c]	12,1,2,3		1,107		0		7,276		0		0		0		538		0
1993-94 [e]	12,1,2,3		43		0		1,182		0		0		0		2		
1997-98 [f]	12,1,2	1,159	385	0	0	2,625	787	29	29	101	94	0	0	260	201	2,130	1,261
2000-01 [f]	12,1,2,3	3,746	1,166	9,775	6,643	16,985	6,138	1,179	521	933	240	97	0	713	291	0	0
2001-02 [f]	12,1,2,3	810 (205)	447 (116)	4,844 (2,817)	1,371 (615)	6,308 (1,555)	2,888 (595)	637 (210)	540 (199)	519 (577)	24 (31)	0 (0)	0 (0)	439 (130)	137 (64)	12	12
2002-03 [f]	12,1,2,3	2,025 (489)	724 (182)	33,940 (20,463)	7,909 (4,328)	4,851 (2,125)	2,199 (1,008)	8,499 (5,805)	2,353 (1,509)	4,943 (2,541)	9 (6)	171 (62)	0 (0)	1,536 (580)	686 (127)	61	51
2003-04 [f]	12,1,2,3	3,727 (1,262)	1,355 (505)	100,271 (16,450)	29,372 (5,669)	4,167 (573)	1,070 (336)	3,582 (952)	2,545 (600)	4,039 (2,653)	27 (19)	113 (31)	0 (0)	2,759 (712)	1,409 (345)	168	137
2004-05 [g]	12,1,2,3	902 (344)	303 (138)	69,632 (14,287)	20,037 (5,681)	2,860 (1,788)	734 (250)	3,572 (1,706)	2,389 (906)	4,190 (3,696)	0	85 (53)	0	1,849 (614)	1,469 (613)	315 (315)	300 (314)
2005-06 [g]	12,1,2,3	668 (253)	405 (138)	16,771 (4,203)	1,569 (376)	1,822 (1,456)	94 (45)	717 (362)	282 (165)	1,450 (404)	0	0	0	736 (150)	497 (143)	0	0
Summer																	
1956 [a]	6,7,8		20,875		3,525		7,925		300		0		725		950		4,250
1958 [b]	5,6,7,8		356		776		673		190		0		39		63		54
1971-72 [c]	5,6,7,8		4,192		200		2,738		0		0		34		958		735
1988 [d]	4,5,6,7,8,9		2,291		381		2,323								14,980		721
1989 [d]	5,6,7,8,9		3,266		2,163		2,563						83		2,109		1,305
1993 [e]	5,6,7,8		264				748				5				84		74
1997 [f]	5,6,7,8	16,435	1,045	1,840	594	7,270	275	425	39	6,228	610	856	69	4,297	414	453	79
1998 [f]	5,6,7,8	7,720	2,282	22,636	10,181	4,057	1,217	917	227	6,628	710	9,522	228	1,399	248	732	60
2000 [f]	5,6,7,8	21,769	5,367	68,138	48,050	15,489	4,536	5,752	3,011	27,452	3,183	1,926	126	2,630	234	104	32
2001 [f]	5,6,7,8	9,485 (2,209)	2,771 (643)	54,720 (8,465)	27,051 (5,063)	12,450 (2,392)	3,719 (833)	6,201 (1,331)	4,463 (883)	17,066 (3,245)	2,718 (635)	2,054 (557)	77 (20)	1,803 (676)	314 (129)	8,978 (2490)	2,169 (773)
2002 [f]	5,6,7,8	4,737 (794)	1,330 (258)	39,899 (6,662)	12,693 (3,174)	7,195 (1,319)	3,606 (918)	4,705 (1,262)	2,035 (451)	10,278 (1,760)	160 (107)	3,240 (654)	14 (16)	1009 (242)	173 (81)	7,595 (3,667)	708 (319)
2003 [f]	5,6,7,8	15,327 (2,607)	3,715 (758)	46,498 (7,614)	27,268 (6,056)	5,242 (1,270)	1,771 (465)	6,128 (3,036)	3,742 (1,752)	20,319 (3,043)	0	3,291 (1,518)	0	1,268 (358)	194 (103)	5,373 (1,388)	1,425 (512)
2004 [f]	5,6,7,8	3,846 (2,187)	2,778 (653)	42,298 (10,349)	23,966 (6,356)	7,343 (1,303)	914 (278)	2,234 (800)	1,673 (721)	18,758 (3,130)	84 (65)	3,001 (679)	117 (0)	1,740 (520)	221 (64)	922 (357)	350 (169)
2005 [g]	5,6,7,8	5,246 (1,408)	904 (257)	34,188 (6,899)	11,648 (3,368)	3,908 (1,338)	770 (506)	920 (717)	371 (242)	10,200(4,032)	87 (33)	1,042 (711)	0	698 (222)	215 (128)	412 (251)	108 (77)
2006 [g]	5,6,7,8	6,526 (1,558)	3,448 (742)	21,997 (11,504)	9,285 (4,964)	3,255 (1,168)	318 (138)	474 (211)	424 (207)	13,737 (2,335)	331 (120)	4,571 (1,573)	69 (47)	457 (261)	156 (85)	992	231

a - Kathrein (1957), b – Backlund (1960), c - Unkenholz (1973), d - Meester (1991), e - Lucchesi (1994), f – Blackwell (2005), g – current report