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MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
SECTION OF FISHERIES

COMPLETION REPORT
LAKE SUPERIOR SUMMER CREEL SURVEY
2014

by
Keith A. Reeves
Lake Superior Fisheries Office

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Abstract

Fishing effort in the Minnesota waters of Lake Superior in the summer creel survey for 2014 was 161,067 angler hours, a 11% decrease from 2013. Boat anglers accounted for 98.5% of the effort and shore anglers accounted for 1.5% of the effort. Boat fishing effort was greatest in the McQuade area in July, and shore fishing was greatest in the Grand Marais area in July. Spring and early summer fishing was suppressed by the cold spring, especially at the more northern-most accesses.

Anglers caught 26,712 salmonids, of which 23,547 were harvested. Anglers caught 53% fewer salmonids than in 2013. Salmonid catch and harvest rates in 2014 were 0.163 and 0.1438 fish per angler hour, respectively, which were about 27% lower than the high rates observed in 2013.

Anglers caught 22,251 Lake Trout, of which 19,611 were harvested. Lake Trout accounted for 84% of all salmonids caught and 84% of all salmonids harvested. Wild fish comprised 89.5% of the harvested Lake Trout, up from 83% in 2013. Anglers caught 0.1381 and released 0.0164 Lake Trout per angler hour. Anglers harvested 0.1218 Lake Trout per angler hour, which was similar to harvest rates in 2012 and 2013. Cool water temperatures and bad weather suppressed the Lake Trout catches at the northern-most accesses.

Coho, Chinook, and Pink Salmon, and steelhead Rainbow Trout also contributed to the 2014 summer Lake Superior fishery, though considerably less so than in 2013. Anglers harvested 1,831 Coho Salmon at a rate of 0.0114 fish per angler hour, which was 73% lower than the rate of 0.0428 fish per angler hour in 2013. Anglers harvested 1,510 Chinook Salmon at a rate of 0.0094 fish per angler hour, which was 73% lower than the rate of 0.0351 fish per angler hour in 2013. The Chinook Salmon were 21.3 inches in length on average in 2014, which is 0.5 inch shorter than in 2013. Salmon catches were especially low in the Upper Shore area. Anglers reported harvesting no Pink Salmon in 2014. Anglers also kept 61 and released 215 steelhead, kept 138 and released 170 other salmonids which included Brook Trout, Brown Trout, and Kamloops Rainbow Trout, kept 8 Lake Whitefish and 27 Cisco, and kept 108 and released 21 Walleyes.

Wisconsin-based sport anglers who fished in Minnesota, excluding Charter anglers, fished for 4,348 hours and caught 349 Lake Trout, 8 Siscowet Lake Trout, 80 Coho Salmon, 66 Chinook Salmon, 6 Brown Trout, and 16 Walleyes.

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Introduction

Lake Superior and the portions of its tributaries available to anadromous fishes offer unique habitats that support fisheries, which contribute to the diversity of angling opportunities in Minnesota. Several salmonids, including Lake Trout (*Salvelinus namaycush*), Rainbow Trout (*Oncorhynchus mykiss*), Coho Salmon (*O. kisutch*), and Chinook Salmon (*O. tshawytscha*) provide recreational fisheries along the North Shore of Lake Superior throughout the year.

During the first half of this century, Lake Trout was the mainstay of the Lake Superior sport fishery and, along with Cisco (*Coregonus artedi*), supported an important commercial fishery. By the late 1940s the Lake Trout harvest began to decline as a result of overfishing (Hansen et al. 1995). During the 1950s the Sea Lamprey (*Petromyzon marinus*) became established in Lake Superior and preyed heavily on Lake Trout. Lake Trout could not withstand the additional mortality caused by Sea Lamprey, and both sport and commercial fisheries collapsed. By the early 1960s, effective control of Sea Lamprey had been achieved. Minnesota and other states and provinces began salmonid stocking programs to rehabilitate the depleted Lake Trout stocks, and to introduce new strains of salmon species to diversify the fishery. Creel surveys have been used to monitor the recreational fishery in Minnesota waters of Lake Superior for more than 40 years. Creel surveys have been conducted annually during late spring–early autumn since 1969. This report presents results from Minnesota's 2014 Lake Superior summer creel survey. All data are from anglers who fished in Minnesota waters and returned to a Minnesota access, unless noted otherwise.

Methods

The summer Lake Superior creel survey is access-based, and follows a stratified random statistical design. The basic statistical method and formulae used are given in Bindman and Mach (1997), and more detail of the design of the Lake Superior summer creel survey is given in Halpern (1995a,b). The survey included two types of anglers, including boaters from charter docks, public accesses, and marinas, and also shore anglers at the public accesses and marinas. Previous creel surveys have been conducted from the Memorial Day weekend through September 30. However, a regulation change that extended the Lake Trout season through the first full weekend in October was requested by anglers and took effect in 2011. Similar to 2013, spring arrived late in 2014, which delayed fishing through May. Thus, the 2014 survey began after Memorial Day, on May 31 in the Lower Shore and on June

7 in the Upper Shore. The survey ended on October 5 at the completion of the Lake Trout season. May data are included in the June estimates and October data are included in the September estimates. Stations and groups of stations, or Clusters, that were visited by creel clerks are described in Table 1. Clusters 1 and 2 are to the south and comprise the Lower Shore, and Clusters 3 and 4 are to the north and comprise the Upper Shore. The general mechanics of the creel survey are discussed in detail in Halpern (2003).

Age distribution of Lake Trout caught in the Lake Superior summer creel survey was determined using an age-length key based on all aged Lake Trout, both stocked and wild, captured in assessments during 2006-2010. References to 2013 creel numbers are from Reeves (2014).

Results and Discussion

Fishing Effort

Estimates of fishing effort by anglers using Minnesota accesses or fishing from the Minnesota shoreline were made from 534 activity counts for the Lower Shore and 469 activity counts for the Upper Shore (Table 2). Angling effort along the North Shore was measured on 113 days. The estimated total fishing effort for Minnesota waters of Lake Superior during the 2014 summer creel survey was 165,415 angler hours (AH: Table 3), which includes 161,067 AH from Minnesota-based anglers and 4,348 AH from Wisconsin-based anglers (WIDNR data). Effort in 2014 decreased 12% from 2013 (Figure 1). Since 1994, fishing effort has varied between about 138,000 and 180,000 AH (Figure 1) except for 2007 when effort exceeded 202,000 AH. Fishing effort in 2014 in the Lower Shore accounted for 78% of total Minnesota summer angling effort on Lake Superior (Table 3).

Lake Superior boat anglers accounted for 98.5% of the effort and shore anglers accounted for 1.5% of the effort. Summer boat effort was greatest in the McQuade cluster (Cluster 2) and lowest in the Grand Marais cluster (Cluster 4). Monthly boat effort was greatest from Duluth (Cluster 1) in May-June, shifted to Cluster 2 in July, was similar between Clusters 1 and 2 in August, then remained higher in Cluster 2 in September (Table 3). Boating effort at the northern-most stations was relatively low and was likely influenced by the late spring.

The 2014 shore angling effort was 2,386 AH (Table 3), which is a 79% increase from the 2013 shore effort of 1,330 AH. Shore angling continues to comprise a small fraction of angling effort during the summer on Lake Superior. The highest shore angling effort (59%) was observed at Grand Marais in Cluster 4 (Table 4).

Catch and Catch Rates

Salmonids

Anglers caught 26,261 salmonids in 2014, which was 35% lower than the catch of 40,340 salmonids in 2013. Anglers released 12% of their catch (Table 5). The salmonid catch rate in 2014 was 0.163 fish per AH and the salmonid harvest rate was 0.1438 fish per AH (Table 6). These rates were 27-28% lower than in 2013 and were the lowest rates since 1996 (Figure 2). Wisconsin anglers kept an additional 509 salmonids (WIDNR data).

Lake Trout

Anglers caught 22,251 Lake Trout in 2014, a 6% decrease from 2013 and a 31% decline from the most recent peak of 32,142 Lake Trout in 2011. Anglers also released 2,640 fish, or 12% of their catch of Lake Trout (Table 5). Anglers harvested 19,611 Lake Trout, which was 7% lower than in 2013 and well below the high harvest levels in 2007, 2010, and 2011 (Figure 3). Lake Trout accounted for 85% of all salmonids caught and 85% of all salmonids harvested. Sixty-nine percent of the harvested Lake Trout were from the Lower Shore area. Anglers caught 0.1381 Lake Trout per AH and harvested 0.1218 fish per AH (Table 6). Among Minnesota boating parties, 61% caught one or more Lake Trout, 46% caught two or more, and 33% caught at least three Lake Trout per trip (Table 7).

An additional 349 Lake Trout were harvested in Minnesota waters in 2014 by Wisconsin-based anglers (WIDNR data). The Lake Trout harvest rate for Wisconsin-based anglers was 0.0803 fish per AH, which was twice the rate of 0.0380 fish per AH in 2013. Wisconsin-based anglers caught Lake Trout at a lower rate than Minnesota anglers fishing the same area, Cluster 1, which was 0.1327 fish per AH (Table 6). This may occur because Minnesota's creel survey includes charter boats, whereas Wisconsin's creel survey does not, and the catch rates from charter boats are typically higher than for other boats.

Most harvested Lake Trout were between 18.5 and 26.4 inches in length; however, 3.6% were longer than 29.4 inches. The average length of harvested Lake Trout in 2014 was 21.8 inches (Table 8) and the average length released was 19.3 inches (Table 9). Anglers released 6.4% of Lake Trout that were 25 inches or longer (Table 9). The average weight of harvested Lake Trout was 3.48 lb. (Table 10), which is a 16% decrease from 2013. The average weight of harvested Lake Trout on the Upper Shore, 3.89 lb., was 0.5 lb. greater than on the Lower Shore average weight of 3.39 lb. (Table 10). Lake Trout yield in the sport fishery decreased by 20% from 88,799 lb. in

2013 to 71,260 lb. in 2014 (Table 11). The decreased yield was due to smaller and fewer fish in 2014 than in 2013.

The age distribution of harvested Lake Trout was determined for stocked and wild Lake Trout combined. Seven and eight year old fish made up the highest proportions of Lake Trout harvested. Six, seven, eight, and nine-year old fish each comprised at least 10% of the harvest. (Table 12); this represents a slight shift to younger ages than in 2013. Older Lake Trout, at least nine years old, made up 47% of the harvest by number, which is slightly less than the 56% of older fish in 2013. Despite the decline in percentage of older Lake Trout, the presence of many adult year classes continues to indicate that the Lake Trout population has been rehabilitated. However, the age distribution should be monitored to ensure that spawner abundance is adequate to sustain the fishery.

In 2014, creel clerks checked 822 Lake Trout and observed no fin clips on 89.5% of harvested fish, which indicates that the fish were wild and not stocked. This was the highest percentage of wild Lake Trout that has been observed in the summer creel survey since Lake Trout rehabilitation efforts began (Figure 4) and is approximately the target level which meets the criteria for discontinuing stocking, as established in the Lake Trout Rehabilitation Plan (Hansen 1996) and the Fisheries Management Plan for the Minnesota Waters of Lake Superior (Schreiner et al. 2006). By catch location, fish in Cluster 4 were 99% wild, fish in Cluster 1 were 85% wild, and fish from Clusters 2 and 3 were intermediate. Stocking of Lake Trout continues in the Lower Shore only.

Siscowet

Siscowet Lake Trout (deepwater form) have generally contributed little to the sport fishery. In 2014, 15 siscowet were kept from Cluster 3 and 21 siscowet were released from Cluster 1. Only 0.3% of boat angling parties caught one or more siscowet (Table 7). Wisconsin anglers reported keeping 8 siscowet in 2014.

Coho Salmon

Anglers kept 1,831 and released 24 Coho Salmon in 2014 (Table 5). The catch decreased by 77% from 2013. Anglers harvested Coho Salmon at a rate of 0.0114 fish per AH in 2014 (Table 6), which was 73% lower than the rate of 0.0428 fish per AH in 2013. Most Coho Salmon were caught in Cluster 1 (52%) and Cluster 2 (44%) and only 81 Coho Salmon were caught in Cluster 3 and 4 combined. In a normal year, Coho Salmon are first caught in the Lower Shore area and later in the Upper Shore; the migration northward did not occur in 2014. Among boating parties, only 8% caught one or more Coho Salmon and only 3% caught two or more Coho Salmon (Table 7). Wisconsin anglers harvested 80 Coho Salmon in Minnesota waters in 2014, which is 29% of the harvest of 272

Coho Salmon in 2013. The average length of Coho Salmon harvested in Minnesota waters of Lake Superior in 2014 was 16.9 inches (Table 8), which was about 1.3 inches shorter than the average length of 18.2 inches in 2013, and the average weight decreased from 1.78 lb. in 2013 to 1.46 lb. in 2014 (Table 10). The Coho Salmon yield in 2014 was 2,627 lb. (Table 11), which is down considerably from the 10,000+ lb. yields in 2012 and 2013. The harvest of Coho Salmon has varied considerably among years (Figure 5). These variations reflect natural fluctuations in year-class strength. All agencies discontinued Coho Salmon stocking programs on Lake Superior prior to 2007, and most Coho Salmon harvested in Minnesota are the result of natural reproduction in other jurisdictions on Lake Superior (Schreiner et al. 2006).

Chinook Salmon

Anglers caught 1,525 Chinook Salmon in 2014 (Table 5), which was a 77% decrease from 6,555 fish in 2013 (Figure 6). The Lower Shore accounted for 78% of the catch of Chinook Salmon in 2014; within the Lower Shore, catches were distributed evenly between Clusters 1 and 2. Creel clerks examined 72 fish for stocking clips and only 1 fish, from Cluster 4, was clipped, which indicates that Chinook Salmon stocking in other jurisdictions contributes little to the Minnesota salmon fishery.

The overall 2014 summer catch rate for Chinook Salmon taken by all anglers was 0.0095 fish per AH, a 74% decrease from 0.0364 fish per AH in 2013 (Table 6). Catch rates for Chinook Salmon were low in all Clusters in 2014. Wisconsin anglers harvested an additional 67 Chinook Salmon in Minnesota waters in 2014, which was 38% of their harvest of 178 Chinook Salmon in 2013. The 2014 Chinook Salmon harvest rate for Wisconsin anglers was 0.01619 fish per AH (WIDNR data). Among Minnesota boating parties, 13% caught one or more Chinook Salmon, 2.4% caught two or more, and 1.1% caught three or more Chinook Salmon per trip (Table 7).

The mean length of harvested Chinook Salmon in 2014 was 21.8 inches (Table 8), which was about 0.5 inch shorter than in 2013. Their average weight decreased to 3.26 lb. (Table 10). The yield of Chinook Salmon in 2014 was 4,851 lb., which was 79% lower than 22,930 lb. in 2013.

Steelhead Rainbow Trout

Minnesota-based anglers caught 276 steelhead (anadromous Rainbow Trout) in 2014 (Table 5), which was substantially lower than their catch of 1,363 steelhead in 2013. The largest steelhead catches occurred in Cluster 2 (Table 5). Anglers kept 61 steelhead in the summer of 2014, despite the no-kill regulation on this species.

Pink Salmon

Anglers caught 10 Pink Salmon (*Oncorhynchus gorbuscha*) in 2014 (Table 5). Pink Salmon catches have fluctuated considerably over time. The Pink Salmon catch generally increased until 2006, when 2,500 fish were caught. The catch and harvest declined until only 120 Pink Salmon were caught in 2008 and none were caught in 2009. Catches increased again in 2010 and have declined since. In 2014, no Pink Salmon were recorded as harvested. All Pink Salmon in Lake Superior are a result of natural reproduction (Schreiner et al. 2006).

Other Species

Other species are generally caught in low numbers during the summer creel survey. In 2014, anglers reported keeping one Brown Trout (*Salmo trutta*), seven Kamloops Trout, and releasing three Brook Trout (*Salvelinus fontinalus*) and four Kamloops Rainbow Trout. Most (91%) of other species were caught from shore. Catch data for these infrequently-caught species were combined and reported as 308 other salmonids. The combined catch rate was estimated at 0.002 fish per AH. Minnesota anglers also kept an estimated 108 Walleyes (*Sander vitreus*), 8 Lake Whitefish (*Coregonus clupeaformis*), and 21 Cisco (Table 5). Wisconsin-based anglers caught an estimated 6 Brown Trout and 16 Walleyes.

Summary

The Lake Superior creel survey continues to provide essential information on the fishery in Minnesota waters of Lake Superior. This is vital to the future management of Lake Superior fish stocks and for coordinated management of the fishery among Lake Superior fisheries management agencies. Similar to 2013, the sport fishery was affected by cold spring weather in all areas and by adverse summer weather in the Upper Shore area in 2014. The adverse weather conditions and low Salmon catches resulted in lower fishing effort and success in 2014 than in the past few years. Lake Trout catches and catch rates were lower in 2012-2014 compared to the 2000s. The Lake Trout are now mostly (89.5%) wild, not clipped, and this is especially true in the Upper Shore where over 95% of the harvested fish were wild. The lower fishing success in 2014 appears to be weather-related and most significantly affected the catches of salmon and nonnative trout, which are less adapted to the cold waters of Lake Superior than are native Lake Trout. Fishing success is most likely to improve when the weather improves in the summer.

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Lake Superior Fisheries Office

Approved:_____ _____
Area Supervisor Date

Approved:_____ _____
Regional Fisheries Approval Date

Table 1. Creel survey clusters and stations, 2014 Lake Superior summer creel survey.

Cluster	Station	Description
Lower Shore		
1 - Duluth	1	Charter Dock
	2	Lakehead Boat Basin
	3	Rice's Point Landing
2 - McQuade Access - Two Harbors	4	McQuade Public Access
	5	Knife River - Knife River Marina
	6	Two Harbors - Agate Bay Access
Upper Shore		
3 - Twin Points – Tofte	7	Twin Points Access
	8	Silver Bay Access and Marina
	9	Taconite Harbor Access, Temperance and Cross Rivers, Tofte Landing
4 - Grand Marais – Hovland	10	Grand Marais Access and Marina
	11	Devil Track and Brule Rivers, Hovland Access

Table 2. Frequency of visits and number of activity counts and interviews for each cluster and day type in the 2014 Lake Superior summer creel survey.

Cluster	Day type	Days Visited	Activity Counts	Number of Days With Fishing Interviews		Number of Interviews[1]	
				Boat	Shore	Boat	Shore
1 – Duluth	Weekday	30	180	27	0	79	0
	Weekend	25	150	24	0	61	0
	Total	55	330	51	0	140	0
2 – McQuade to Two Harbors	Weekday	20	120	15	7	102	13
	Weekend	14	84	11	3	120	5
	Total	34	204	24	10	222	18
3 – Twin Points to Tofte	Weekday	26	156	16	1	35	1
	Weekend	23	138	14	1	59	1
	Total	49	294	30	2	94	2
4 – Grand Marais to Hovland	Weekday	20	100	15	14	101	27
	Weekend	15	75	10	11	80	16
	Total	35	175	25	25	181	43
Lower Shore	Weekday	50	300	42	7	181	13
	Weekend	39	234	35	3	181	5
	Total	89	534	77	10	362	18
Upper Shore	Weekday	46	256	31	15	136	28
	Weekend	38	213	24	12	139	17
	Total	84	469	55	27	275	45
Total	Weekday	73	556	60	23	317	41
	Weekend	40	447	37	16	320	22
	Total	113	1003	97	39	637	63

[1] 1 angling party refused to be interviewed

Table 3. Fishing effort estimates, in angler-hours[1], 2014 Lake Superior summer creel survey[2]. SE in parentheses.

	Boat Anglers					Shore Anglers[2]					All Anglers				
Cluster	June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
1-Duluth	14,251	15,109	19,904	8,979	58,243	0	0	0	0	0	14,251	15,109	19,904	8,979	58,243
	(2,301)	(1,941)	(2,793)	(1,840)	(4,500)						(2,301)	(1,941)	(2,793)	(1,840)	(4,500)
2-McQuade- Two Harbors	4,985	30,777	21,974	11,752	69,488	543	316	32	83	974	5,528	31,093	22,006	11,834	70,462
	(1,675)	(4,794)	(5,850)	(1,811)	(7,956)	(241)	(196)	(32)	(83)	(323)	(1,823)	(4,934)	(5,871)	(1,775)	(8,080)
3-Twin Points-Tofte	806	3,907	10,606	7,432	22,751	0	52	0	0	52	806	3,959	10,606	7,432	22,803
	(386)	(600)	(2,211)	(1,495)	(2,763)	(0)	(41)	(0)	(0)	(41)	(386)	(596)	(2,211)	(1,495)	(2,762)
4-Grand Marais-Hovland	422	4,046	4,886	1,891	11,245	20	686	218	549	1,473	442	4,732	5,104	2,440	12,718
	(213)	(793)	(1,198)	(649)	(1,591)	(20)	(275)	(74)	(203)	(350)	(217)	(753)	(1,235)	(718)	(1,629)
Lower Shore	19,236	45,886	41,878	20,731	127,731	543	316	32	83	974	19,779	46,202	41,910	20,813	128,705
	(2,846)	(5,172)	(6,483)	(2,582)	(9,140)	(241)	(196)	(0)	(83)	(323)	(2,936)	(5,302)	(6,502)	(2,557)	(9,249)
Upper Shore	1,228	7,953	15,492	9,323	33,996	20	738	218	549	1,525	1,248	8,692	15,710	9,872	35,521
	(440)	(994)	(2,515)	(1,630)	(3,188)	(20)	(278)	(74)	(203)	(353)	(445)	(960)	(2,533)	(1,658)	(3,207)
Total Shore	20,464	53,839	57,370	30,054	161,727	563	1,054	250	632	2,499	21,027	54,894	57,620	30,685	164,226
	(2,880)	(5,266)	(6,954)	(3,053)	(9,680)	(242)	(340)	(81)	(219)	(479)	(2,969)	(5,388)	(6,978)	(3,048)	(9,789)

[1] Estimates were rounded to the nearest whole number. Therefore, totals might not equal the sum of the individual estimates.

[2] Wisconsin anglers fished an additional 4,348 hours on the Minnesota waters of Lake Superior.

[3] All shore fishing in Cluster 1 occurs in the St. Louis Estuary, not in Lake Superior, and is not included.

Table 4. Monthly distribution of fishing Effort, as a percentage of angler-hours[1], 2014 Lake Superior summer creel survey. SE in parentheses.

		Boat Anglers					Shore Anglers[2]					All Anglers				
Cluster	Station	June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
1-Duluth		69.6	28.1	34.7	29.9	36.0	0	0	0	0	0	67.8	27.5	34.5	29.3	35.5
	1	37.5	13.5	16.1	18.6	18.4	0	0	0	0	0	36.5	13.2	16.0	18.2	18.1
	2	14.1	11.7	14.1	9.5	12.4	0	0	0	0	0	13.7	11.4	14.0	9.3	12.2
	3	18.1	2.9	4.5	1.8	5.2	0	0	0	0	0	17.6	2.8	4.5	1.8	5.2
2-McQuade-Two Harbors		24.4	57.2	38.3	39.1	42.9	96.4	29.9	12.8	13.0	38.9	26.3	56.6	38.2	38.6	42.9
	4	7.2	37.1	13.1	18.0	21.2	83.4	22.9	12.8	0	29.8	9.3	36.8	13.1	17.6	21.3
	5	14.6	13.1	16.5	13.4	14.5	13.0	0	0	0	2.9	14.5	12.9	16.4	13.1	14.4
	6	2.6	7.0	8.7	7.7	7.2	0	7.0	0	13.0	6.2	2.5	7.0	8.7	7.9	7.2
3-Twin Points-Tofte		3.9	7.3	18.5	24.7	14.1	0	4.9	0	0	2.1	3.8	7.2	18.4	24.2	13.9
	7	0	1.0	2.4	4.5	2.0	0	0	0	0	0	0	1.0	2.4	4.4	2.0
	8	1.6	3.3	11.4	12.4	7.7	0	0	0	0	0	1.6	3.24	11.4	12.2	7.5
	9	2.3	3.0	4.6	7.8	4.4	0	4.9	22.6	0	2.1	2.2	3.0	4.6	7.6	4.4
4-Grand Marais-Hovland		2.1	7.5	8.5	6.3	7.0	3.6	65.2	87.2	87	59.0	2.1	8.6	8.9	8.0	7.7
	10	1.8	7.3	8.2	6.2	6.7	3.6	25.6	87.2	34.2	29.0	1.9	7.7	8.5	6.8	7.0
	11	0.2	0.2	0.4	0.1	0.3	0	39.5	0	52.8	30.0	0.2	1.0	0.4	1.2	0.7
Lower Shore		94.0	85.2	73.0	69.0	78.9	96.4	29.9	12.8	13.0	38.9	94.1	84.2	72.7	67.8	78.4
Upper Shore		6.0	14.8	17.0	31.0	21.1	3.6	70.1	87.2	87.0	61.1	5.9	15.8	27.3	32.2	21.6

[1] Estimates were rounded to the nearest whole number. Therefore, totals might not equal the sum of the individual estimates.

[2] All shore fishing in Cluster 1 occurs in the St. Louis Estuary and not in Lake Superior.

Table 5. Catch estimates[1] for boat and shore anglers combined, 2014 Lake Superior summer creel survey. SE in parentheses.

	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other[2] Salmonids	Total Salmonids	Walleye
1-Duluth									
Harvested	7,525	964	585	0	0	0	12	9,086	59
	(940)	(294)	(118)	(0)	(0)	(0)	(12)	(992)	(42)
Released	194	0	0	30	22	0	0	246	22
	(105)	(0)	(0)	(17)	(19)	(0)	(0)	(108)	(19)
Total	7,719	964	585	30	22	0	12	9,332	81
	(946)	(294)	(118)	(17)	(19)	(0)	(12)	(998)	(46)
2-McQuade-Two Harbors									
Harvested	6,306	794	635	39	0	0	125	7,899	51
	(1,107)	(389)	(220)	(70)	(0)	(0)	(79)	(1,199)	(41)
Released	909	26	0	93	0	0	80	1,108	0
	(377)	(24)	(0)	(34)	(0)	(0)	(68)	(385)	(0)
Total	7,215	820	635	132	0	0	205	9,007	51
	(1,170)	(390)	(220)	(77)	(0)	(0)	(104)	(1,259)	(41)
3-Twin Points - Tofte									
Harvested	3,956	10	144	0	15	0	0	4,125	0
	(738)	(12)	(72)	(0)	(15)	(0)	(0)	(742)	(0)
Released	964	0	15	59	0	10	0	1,048)	0
	(342)	(0)	(14)	(30)	(0)	(7)	(0)	(344)	(0)
Total	4,920	10	159	59	15	10	0	5,173	0
	(814)	(12)	(73)	(30)	(15)	(7)	(0)	(818)	(0)
4-Grand Marais-Hovland									
Harvested	2,164	68	173	27	0	0	5	2,437	0
	(401)	(46)	(47)	(27)	(0)	(0)	(4)	(407)	(0)
Released	635	0	0	34	0	0	94	763	0
	(173)	(0)	(0)	(21)	(0)	(0)	(75)	(190)	(0)
Total	2,799	68	173	61	0	0	99	3,200	0
	(437)	(46)	(47)	(34)	(0)	(0)	(75)	(449)	(0)
Lower Shore									
Harvested	13,831	1,758	1,220	39	0	0	137	16,985	110
	(1,453)	(488)	(250)	(70)	(0)	(0)	(80)	(1,556)	(58)
Released	1,103	26	0	123	22	0	80	1,354	22
	(391)	(24)	(0)	(38)	(19)	(0)	(68)	(400)	(19)
Total	14,934	1,784	1,220	161	22	0	217	18,339	132
	(1,504)	(488)	(250)	(79)	(19)	(0)	(105)	(1,607)	(61)
Upper Shore									
Harvested	6,120	78	317	27	15	0	5	6,562	0
	(840)	(47)	(86)	(27)	(15)	(0)	(4)	(847)	(0)
Released	1,599	0	15	93	0	10	94	1,811	0
	(383)	(0)	(14)	(36)	(0)	(7)	(75)	(393)	(0)
Total	7,719	78	332	120	15	10	99	8,373	0
	(924)	(47)	(87)	(46)	(15)	(7)	(75)	(933)	(0)
Total									
Harvested	19,951	1,836	1,537	66	15	0	142	23,547	110
	(1,678)	(490)	(264)	(75)	(15)	(0)	(80)	(1,772)	(58)
Released	2,702	26	15	216	22	10	174	3,165	22
	(548)	(24)	(14)	(53)	(19)	(7)	(101)	(561)	(19)
Total	22,653	1,862	1,552	282	37	10	316	26,712	132
	(1,765)	(490)	(265)	(91)	(24)	(7)	(129)	(1,858)	(61)

[1] Wisconsin anglers who fished Minnesota waters of Lake Superior also caught an estimated 349 Lake Trout, 8 Siscowet, 80 Coho Salmon, 66 Chinook Salmon, 6 Brown Trout, and 16 Walleyes.

[2] Other Salmonids include Brown Trout (25), Brook Trout (94), and Kamloops Rainbow Trout (197).

Table 6. Catch rate (number of fish per hour) estimates for boat and shore anglers combined, 2014 Lake Superior summer creel survey. SE in parentheses.

		Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other[2] Salmonids	Total Salmonids	Walleye
1-Duluth										
	Harvested	0.1292	0.0166	0.0100	0	0	0	0.0002	0.1560	0.0010
		(0.0190)	(0.0052)	(0.0022)	(0)	(0)	(0)	(0.0002)	(0.0209)	(0.0007)
	Released	0.0033	0	0	0.0005	0.0004	0	0	0.0042	0.0004
		(0.0018)	(0)	(0)	(0.0003)	(0.0003)	(0)	(0)	(0.0019)	(0.0003)
	Total	0.1325	0.0166	0.0100	0.0030	0.0004	0	0.0002	0.1602	0.0019
		(0.0192)	(0.0052)	(0.0022)	(0.0009)	(0.0003)	(0)	(0.0002)	(0.0211)	(0.0009)
2-McQuade-Two Harbors										
	Harvested	0.0895	0.0113	0.0090	0.0006	0	0	0.0018	0.1121	0.0007
		(0.0187)	(0.0057)	(0.0033)	(0.0010)	(0)	(0)	(0.0011)	(0.0212)	(0.0006)
	Released	.0129	0.0004	0	0.0013	0	0.0005	0.0011	0.0157	0
		(0.0055)	(0.0003)	(0)	(0.0005)	(0)	(0.0005)	(0.0010)	(0.0057)	(0)
	Total	0.1024	0.0117	0.0174	0.0018	0	0.0005	0.0029	0.1278	0.0007
		(0.0202)	(0.0057)	(0.0047)	(0.0011)	(0)	(0.0005)	(0.0015)	(0.0230)	(0.0006)
3-Twin Points - Tofte										
	Harvested	0.1735	0.0004	0.0063	0	0.0007	0	0	0.1809	0
		(0.0386)	(0.0005)	(0.0032)	(0)	(0.0007)	(0)	(0)	(0.0392)	(0)
	Released	0.0423	0	0.0007	0.0026	0	0.0004	0	0.0460	0
		(0.0159)	(0)	(0.0006)	(0.0013)	(0)	(0.0003)	(0)	(0.0161)	(0)
	Total	0.2157	0.0004	0.0070	0.0026	0.0007	0.0004	0	0.2268	0
		(0.0325)	(0.0005)	(0.0033)	(0.0013)	(0.0007)	(0.0003)	(0)	(0.0452)	(0)
4-Grand Marais-Hovland										
	Harvested	0.1701	0.0053	0.0136	0.0021	0	0	0.0004	0.1916	0
		(0.0383)	(0.0036)	(0.0041)	(0.0022)	(0)	(0)	(0.0004)	(0.0404)	(0)
	Released	0.0499	0	0	0.0027	0	0	0.0074	0.0600	0
		(0.0150)	(0)	(0)	(0.0017)	(0)	(0)	(0.0060)	(0.0168)	(0)
	Total	0.2200	0.0053	0.0136	0.0048	0	0	0.0078	0.2516	0
		(0.0444)	(0.0036)	(0.0041)	(0.0028)	(0)	(0)	(0.0060)	(0.0478)	(0)
Lower Shore										
	Harvested	0.1075	0.0137	0.0095	0.0003	0	0	0.0011	0.1320	0.0009
		(0.0136)	(0.0039)	(0.0021)	(0.0005)	(0)	(0)	(0.0006)	(0.0153)	(0.0005)
	Released	0.0086	0.0002	0	0.0010	0.0002	0	0.0006	0.0105	0.0002
		(0.0031)	(0.0002)	(0)	(0.0003)	(0.0001)	(0)	(0.0005)	(0.0032)	(0.0001)
	Total	0.1160	0.0139	0.0095	0.0013	0.0002	0	0.0017	0.1425	0.001
		(0.0143)	(0.0039)	(0.0021)	(0.0006)	(0.0001)	(0)	(0.0008)	(0.0161)	(0.0005)
Upper Shore										
	Harvested	0.1723	0.0022	0.0089	0.0008	0.0004	0	0.0001	0.1847	0
		(0.0283)	(0.0013)	(0.0025)	(0.0008)	(0.0004)	(0)	(0.0001)	(0.0291)	(0)
	Released	0.0450	0	0.0004	.00026	0	0.0003	0.0026	0.0510	0
		(0.0115)	(0)	(0.0004)	(0.0011)	(0)	(0.0002)	(0.0021)	(0.0120)	(0)
	Total	0.2173	0.0022	0.0093	0.0034	0.0004	0.0003	0.0027	0.2357	0
		(0.0326)	(0.0013)	(0.0026)	(0.0013)	(0.0004)	(0.0002)	(0.0021)	(0.0338)	(0)
Total										
	Harvested	0.1215	0.0112	0.0094	0.0004	0.0001	0	0.0009	0.1434	0.0007
		(0.0125)	(0.0031)	(0.0017)	(0.0005)	(0.0001)	(0)	(0.0005)	(00137)	(0.0004)
	Released	0.0165	0.0002	0.0001	0.0013	0.0001	0.0001	0.0011	0.0193	0.0001
		(0.0035)	(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0001)	(0.0006)	(0.0036)	(0.0001)
	Total	0.1380	0.0114	0.0095	0.0017	0.0002	0.0001	0.0020	0.1627	0.0008
		(0.0135)	(0.0031)	(0.0017)	(0.0006)	(0.0001)	(0.0001)	(0.0008)	(0.0148)	(0.0004)

[1] Wisconsin anglers who fished Minnesota waters of Lake Superior also caught an estimated 349 Lake Trout, 8 Siscowet, 80 Coho Salmon, 66 Chinook Salmon, 6 Brown Trout, and 16 Walleyes.

[2] Other Salmonids include Brown Trout (25), Brook Trout (94), and Kamloops Rainbow Trout (197).

Table 7. Percent of angling parties catching specific numbers of fish, 2014 Lake Superior summer creel survey.

Number of Fish Caught	Lake Trout		Coho Salmon		Chinook Salmon		Steelhead		Siscowet		Pink Salmon		Total Salmonids	
	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore
0	38.6	92.3	92.4	100	87.2	100	97.8	92.3	99.7	100	99.8	100	33.5	77
1	15.6	7.7	4.1		10.4		1.6	7.7	0.3		0.2		15.1	3.8
2	12.6		1.7		1.3		0.6						12.1	15.4
3	9.6		0.6		0.9								11.8	
4	6.0		0.6		0.2								7.2	3.8
5	3.9		0.2										4.1	
6	4.3		0.2										4.7	
7	2.5												3.0	
8	2.0												2.0	
9	2.0												2.0	
10	0.6												1.3	
11	0.3		0.2										0.6	
>=12	2.0												2.6	

Table 8. Length-frequency distribution of salmonid fish harvested by boat and shore anglers combined, 2014 Lake Superior summer creel survey.

Length(in)	N=	Lake Trout	Coho Salmon	Chinook Salmon	Kamloops	Steelhead
6.5 - 7.4						
7.5 - 8.4						
8.5 - 9.4						
9.5 - 10.4						
10.5 - 11.4						
11.5 - 12.4		1				
12.5 - 13.4		3				
13.5 - 14.4		5	4			
14.5 - 15.4		12	8			
15.5 - 16.4		28	19			
16.5 - 17.4		48	28	4		
17.5 - 18.4		76	12	1		
18.5 - 19.4		63	4	5		
19.5 - 20.4		82	3	10		
20.5 - 21.4		91	4	12		
21.5 - 22.4		82		18	3	
22.5 - 23.4		78		9	3	
23.5 - 24.4		63		7		1
24.5 - 25.5		48		5	1	
25.5 - 26.4		33		1		
26.5 - 27.4		36		2		
27.5 - 28.4		26		2		
28.5 - 29.4		9		1		
29.5 - 30.4		8				
30.5 - 31.4		15				
31.5 - 32.4		5				
32.5 - 33.4		4				
33.5 - 34.4		2				
34.5 - 35.4		2				
35.5 - 36.4		1				
36.5 - 37.4		1				
37.5 - 38.4						
38.5 - 39.4						
39.5 - 40.4						
40.5 - 41.4						
Average Length (in)		21.8	16.9	21.8	22.8	22.5

Table 9. Length-frequency distribution of salmonid fish released by boat and shore anglers combined, 2014 Lake Superior summer creel survey.

Length(in)	N =	Lake Trout	Coho Salmon	Chinook Salmon	Pink Salmon	Steelhead
		142	0	1	1	12
6.5 - 7.4						
7.5 - 8.4						
8.5 - 9.4						
9.5 - 10.4						
10.5 - 11.4						
11.5 - 12.4		4		1		
12.5 - 13.4		1			1	
13.5 - 14.4		9				
14.5 - 15.4		4				
15.5 - 16.4		28				
16.5 - 17.4		19				
17.5 - 18.4		12				
18.5 - 19.4						
19.5 - 20.4		27				1
20.5 - 21.4						
21.5 - 22.4		18				
22.5 - 23.4		2				
23.5 - 24.4		5				2
24.5 - 25.5		7				4
25.5 - 26.4		1				1
26.5 - 27.4						3
27.5 - 28.4		1				1
28.5 - 29.4						
29.5 - 30.4						
30.5 - 31.4						
31.5 - 32.4		1				
32.5 - 33.4						
33.5 - 34.4		2				
34.5 - 35.4						
35.5 - 36.4						
36.5 - 37.4						
37.5 - 38.4						
38.5 - 39.4		1				
39.5 - 40.4						
40.5 - 41.4						
Average Length (in)		19.3		12	13	25.3

Table 10. Average weight (lbs) of fish harvested, 2014 Lake Superior summer creel survey. SE in parentheses.

Cluster	N=	Lake Trout	Coho Salmon	Chinook Salmon	Pink Salmon[1]
		619	59	71	0
1 - Duluth		3.49	1.23	3.14	-
		(0.15)	(0.05)	(0.27)	-
2 - McQuade - Two Harbors		3.25	1.59	3.24	-
		(0.15)	(0.07)	(0.22)	-
3 - Twin Points - Tofte		4.49	1.86	2.93	
		(0.62)	(0)	(0.11)	
4 - Grand Marais - Hovland		3.68	2.37	3.56	-
		(0.27)	(0.30)	(0.33)	-
Lower Shore		3.39	1.40	3.19	-
		(0.11)	(0.05)	(0.17)	-
Upper Shore		3.89	2.24	3.46	
		(0.26)	(0.25)	(0.28)	
Total Shore		3.48	1.46	3.26	
		(0.10)	(0.05)	(0.15)	

[1]No Pink Salmon were measured.

Table 11. Yield (lb) estimates[1] for boat and shore anglers combined, 2014 Lake Superior summer creel survey. SE values are in parentheses.

Cluster	Lake Trout	Coho Salmon	Chinook Salmon	Siscowet[2]	Pink Salmon[3]	Total Salmonids
1 - Duluth	26,270	1,186	1,838	-	-	29,294
	(3,129)	(120)	(182)	-	-	(2,980)
2 - McQuade - Two Harbors	20,478	1,265	2,061	-	-	23,804
	(2,960)	(240)	(287)	-	-	(2,971)
3 - Twin Points - Tofte	17,758	19	421	63	-	18,261
	(2,685)	(19)	(80)	(-)	-	(2,886)
4 - Grand Marais - Hovland	7,956	161	616	-	-	8,733
	(1,080)	(66)	(78)	-	-	(1,082)
Lower Shore	46,748	2,451	3,898	-	-	53,097
	(3,066)	(173)	(222)	-	-	(2,977)
Upper Shore	25,714	180	1,037	63	-	26,995
	(2,046)	(57)	(79)	(-)	-	(2,048)
Total Shore	72,462	2,631	4,935	63	-	80,092
	(2,656)	(161)	(184)	(-)	-	(2,614)

[1] Estimates are rounded to the nearest pound.

[3] Siscowet were not weighed in 2014 therefore Siscowet yield in Clusters 3 & 4 were measured as harvest numbers * average weight (4.23 lb), which was derived from 120 measured Siscowet from summer creel surveys in 2003-2012.

[3] No Pink Salmon were recorded as kept in the summer creel survey in 2014.

Table 12. Age distribution, in percent, of harvested lake trout (wild and stocked), 2014 Lake Superior summer creel survey. n=822.

	Age												
	4	5	6	7	8	9	10	11	12	13	14	15	16+
%	0.49	4.01	14.72	16.42	16.92	10.83	9.49	7.66	5.96	3.53	1.95	2.07	5.72

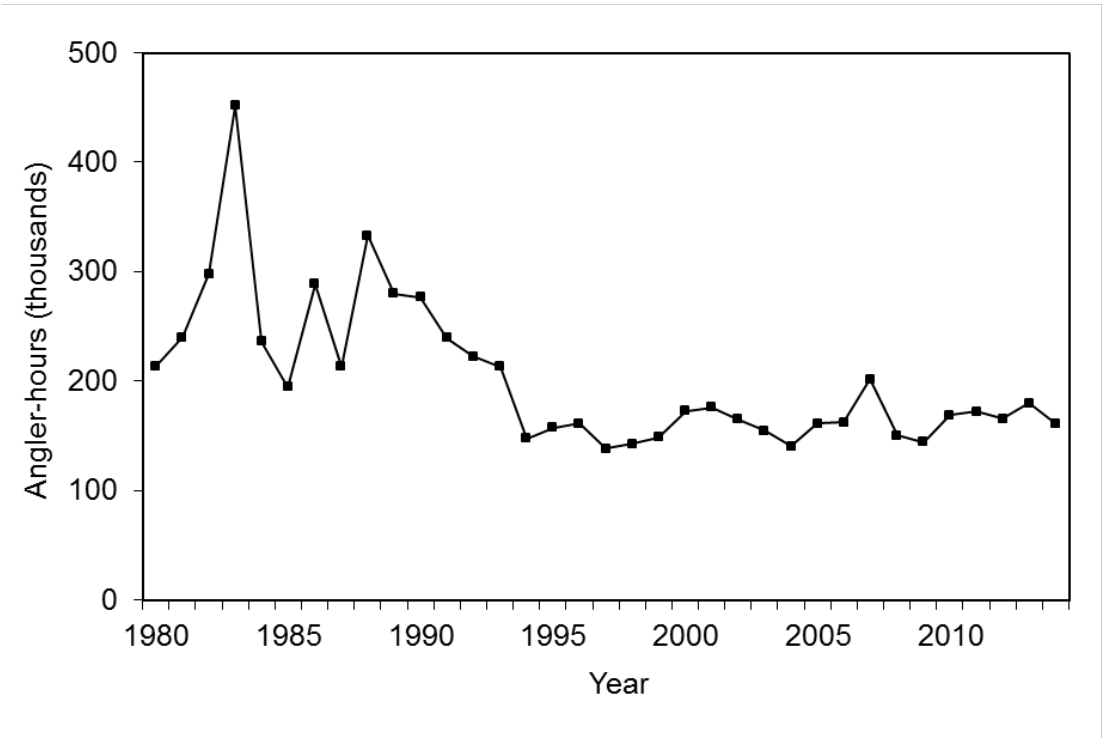

Figure 1. Angling effort in the Lake Superior summer creel survey, 1980-2014. The design of the summer Lake Superior creel survey was changed in 1994 (Halpern 1995a,b).

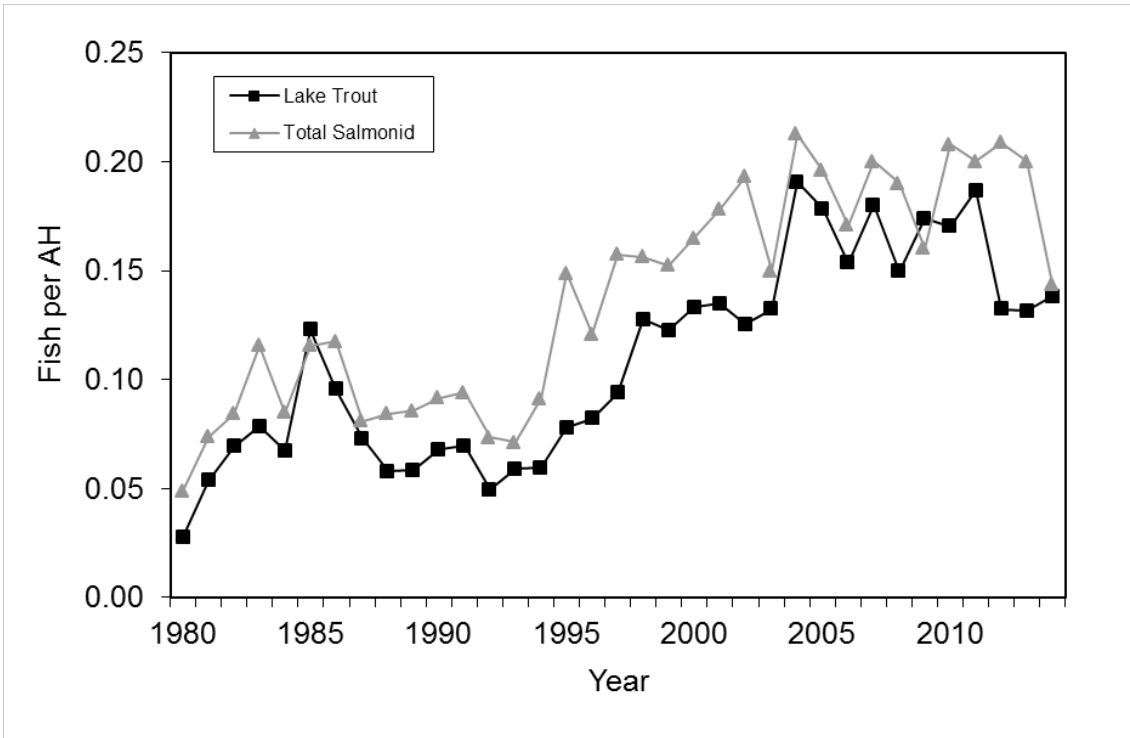

Figure 2. Harvest rate for Lake Trout and all Salmonids combined in the Lake Superior summer creel survey, 1980-2014.

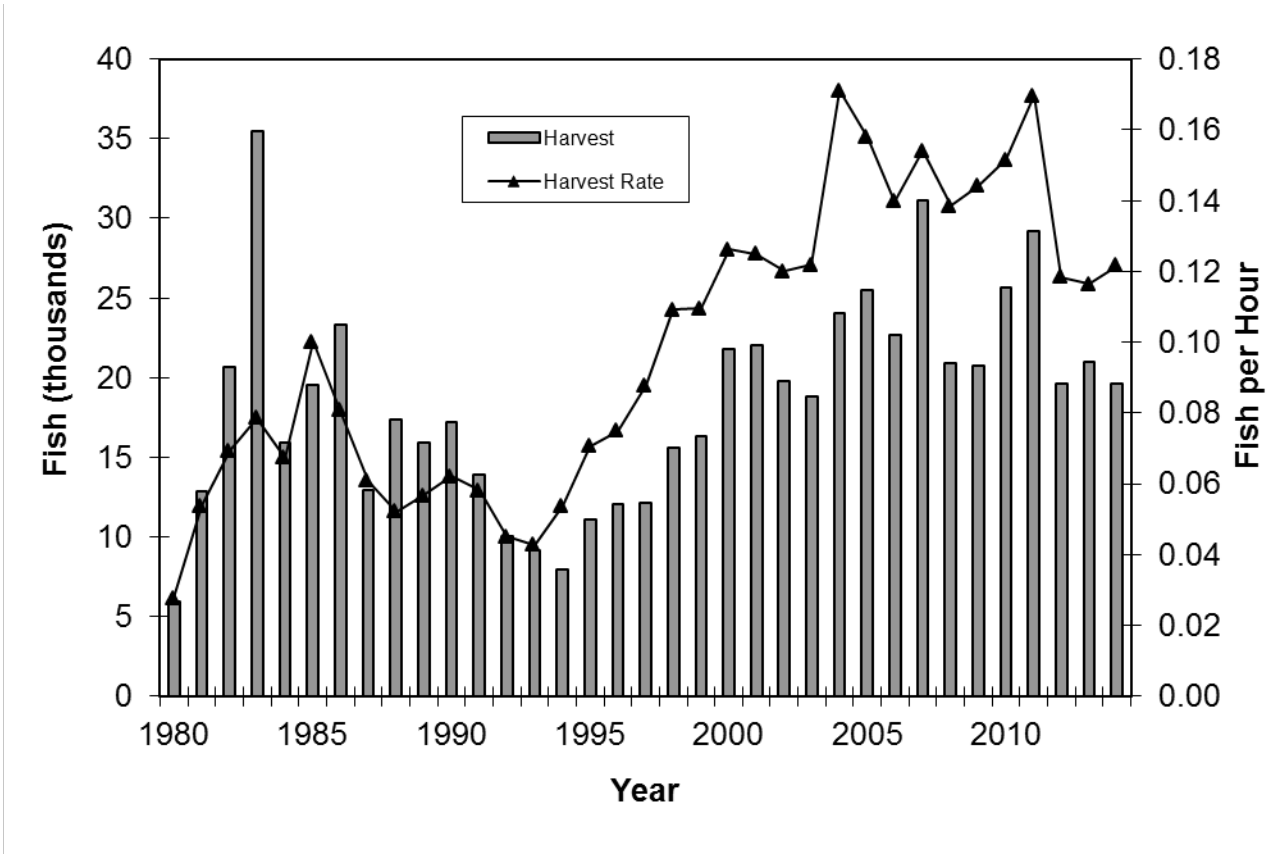

Figure 3. Lake Trout harvest and harvest rate in the Lake Superior summer creel survey, 1980-2014.

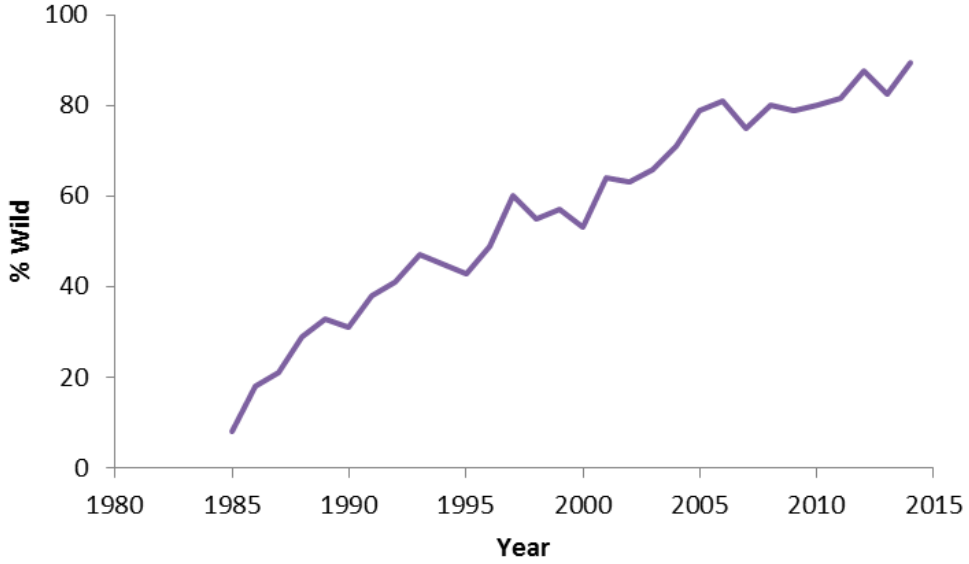

Figure 4. Percent wild Lake Trout observed by creel clerks in the Lake Superior summer creel survey, 1985-2014.

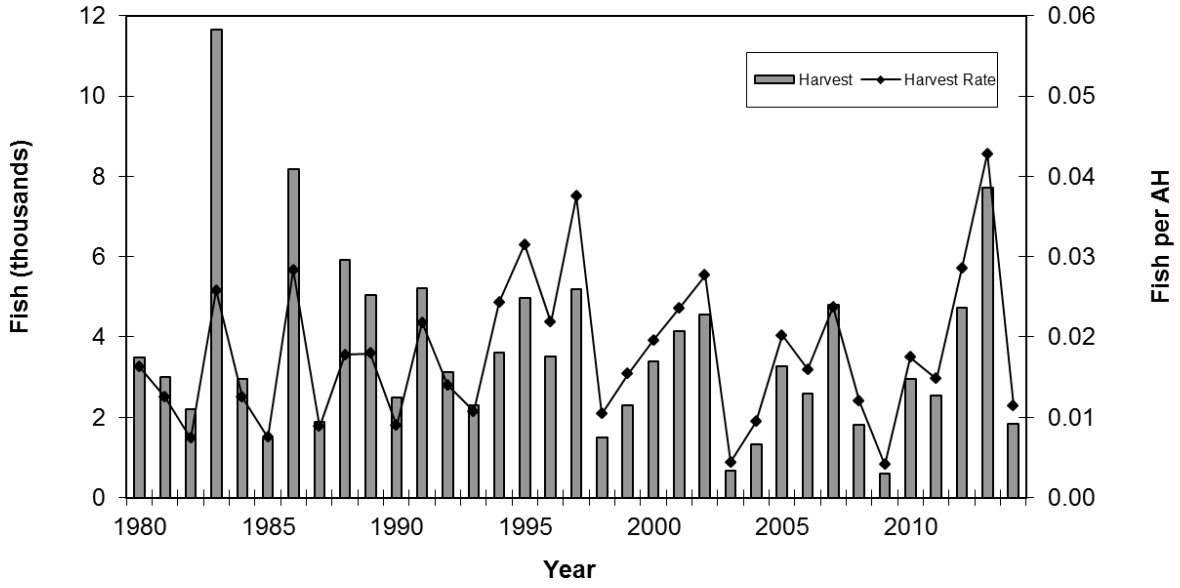

Figure 5. Coho Salmon harvest and harvest rate in the Lake Superior summer creel survey, 1980-2014.

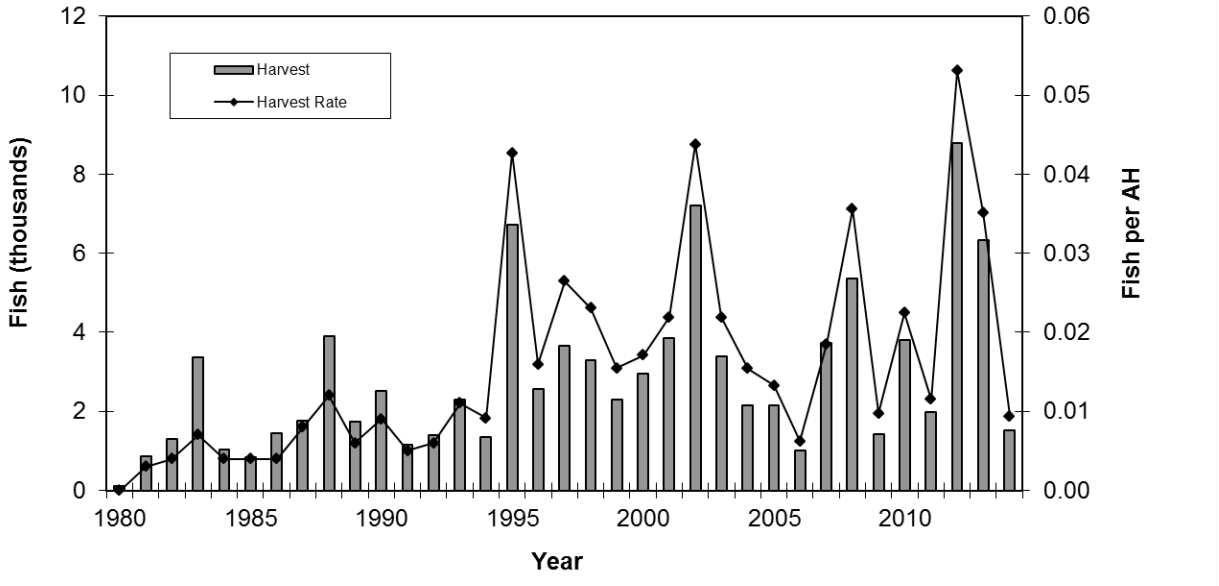

Figure 6. Chinook Salmon harvest and harvest rate in the Lake Superior summer creel survey, 1980-2014.