

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

COMPLETION REPORT LAKE SUPERIOR SUMMER CREEL SURVEY 2019

by
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Abstract

Anglers fished for 188,235 hours in the Minnesota waters of Lake Superior in 2019 as measured in the summer access-based creel survey and charter census. Angler effort declined 4.9% from 2018 to 2019. Effort was mostly from boaters, at 98%, and minimally from shore anglers, at just 2% of total effort. Overall, 68% of effort occurred in the Lower Shore area from Duluth to Two Harbors. Effort in June was greatest near Duluth, effort shifted to the McQuade-Two Harbors area in July. Effort was consistently high from June through August near Duluth, in large part because private sport anglers fished out of Duluth area accesses more frequently than normal in the June period; private sport effort returned to the normal upshore locations for the rest of the year. Substantial rainfall created turbid runoff which affected fishing near Duluth and especially toward the Wisconsin border. Shore fishing was greatest in the McQuade-Two Harbors area in July and August. Angling effort in the Upper shore area peaked in July.

Minnesota-based anglers on Lake Superior generally target salmonines, which includes Lake Trout *Salvelinus namaycush* of both lean and siscowet strains, Coho Salmon *Oncorhynchus kisutch*, Chinook Salmon *O. tshawytscha*, and Rainbow Trout *O. mykiss* of both steelhead and kamloops strains. Anglers caught 40,380 salmonines, of which 34,670 were harvested. Anglers caught 12% fewer salmonines than in 2018, and most of the harvested fish were Lake Trout. Salmonid catch and harvest rates in 2018 were 0.2196 and 0.1885 fish per angler hour, respectively, a decline of 4% from 2018.

Anglers caught 22,726 lean Lake Trout (leans) and 1,725 siscowet Lake Trout (siscowet) and harvested 18,738 leans and 1,579 siscowets. Lean Lake Trout accounted for 56% of all salmonines caught and 54% of all salmonines harvested. The harvested leans were 85% wild fish, down slightly from 88% in 2018. In MN-1 near Duluth, stocked fish comprised 20% of the harvest. Anglers kept 0.1019 and released 0.0217 leans per angler hour. The total catch rate for leans was 30% lower than in 2018. The harvested leans were 22.6 inches long on average.

Anglers also caught Coho, Chinook, and Pink Salmon *O. gorbuscha*, and Rainbow, Brown *Salmo trutta*, and Brook Trout *Salvelinus fontinalis* in 2019. Anglers harvested 11,321 Coho Salmon at 0.0604 fish per angler hour, which was 79% higher than the 2018 rate of 0.0337 fish per angler hour. Anglers harvested 2,822 Chinook Salmon at 0.0153 fish per angler hour, about 68% higher than in 2018. Harvested Chinook Salmon were 22.4 inches on average in 2019, which is 0.3 inch longer than in 2018. Anglers caught 29% more salmon in the Upper Shore than in the Lower Shore. Anglers caught just 232 Pink Salmon. Anglers also kept 118 and released 1,305 steelhead, and kept 184 and released 65 other salmonines which included Brook Trout, Brown Trout, and kamloops. Anglers kept 39 Northern Pike, 783 Walleye, and 21 Cisco *Coregonus artedii* (local name is lake herring) and released 235 Walleye and 14 Cisco.

Fifty-one charter captains were licensed to fish in Minnesota waters of Lake Superior in 2019; two captain reported no trips and two captains fished only in St. Louis Bay. Beginning in 2018, charter results are reported as a separate angler type in the annual Lake Superior summer creel survey report.

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Introduction

Lake Superior and the portions of its tributaries available to anadromous fishes offer unique habitats that support fisheries, which contributes to the diversity of angling opportunities in Minnesota. Several salmonines, 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 the 20th century, Lake Trout was the mainstay of the Lake Superior sport fishery and, along with Cisco *Coregonus artedii* (local name is lake herring) 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 populations declined precipitously due to mortality from 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. Minnesota suspended stocking of Lake Trout in 2016. 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 2019 Lake Superior summer creel survey and charter fishing census. All data are from anglers who fished in Minnesota waters, which includes Minnesota-based private sport fishing from boats or shore (i.e. summer creel survey), Wisconsin-based private sport anglers who fished in Minnesota, and Minnesota or Wisconsin-based charter fishing that occurs in Minnesota (i.e. charter census).

Lake Superior Management Plans (Schreiner et al. 1995; Schreiner et al. 2006; Goldsworthy et al. 2016) have suggested periodic diet sampling for salmonines to evaluate changes in the fish community and the impact of limited forage on the salmonine populations. Lake Trout, a primary predator species in Lake Superior, historically persisted on a forage base of lake herring and other coregonines. Establishment of Rainbow Smelt *Osmerus mordax* (smelt) and over-fishing of Cisco stocks led to the replacement of coregonines by smelt as the primary forage of Lake Trout (Dryer et al. 1965). Conner et al. (1993) found that smelt was the most important forage item for various salmonines in Minnesota waters of Lake Superior. Smelt abundance declined in the early 1980s (Geving 1998) and remains low; however Lake Trout diet is comprised mostly of smelt in May (Blankenheim 2018), most likely due to their high concentrations in warmer waters and to the lack of Cisco recruitment in recent years (Goldsworthy et al. 2016). Diet samples will be collected again in 2022.

Methods

This report for summer Lake Superior fishing is comprised of two primary components and a subcomponent. The primary components include 1) a survey of private sport anglers, which is access-based and follows a stratified random statistical design, and 2) a census of chartered anglers. The subcomponent includes a survey of chartered trips to determine

specific catch characteristics that are not reported in the charter census. The basic statistical method and formulas for the private sport angler survey are described by Bindman and Mach (1997), and more detail of the design of the Lake Superior summer creel survey is described by Halpern (1995a, b). The private sport angling survey includes private sport boaters, charter captains' personal trips, and shore anglers. The charter census includes data that are supplied by charter captains in monthly fishing reports. These data are required of charter captains (State Statute 97C.311) and include location and time of fishing, number of anglers and lines, number of each species that were kept or released, and the number of fish with clipped fins that indicate stocking. Being a census, no measurement error exists with these data; however, reporting error does exist and is not readily calculated, is presumed to be unbiased, and is ignored in this report. In previous years, charter trips were included in the creel survey, which is somewhat redundant and may increase variance estimates. Beginning in 2018 as a subcomponent to the charter census, charter trips are also surveyed to determine angler demographics and fish attributes such as length and weight, number of Sea Lamprey wounds, and occurrence of clipped fins. The survey and census components included only anglers who fished in Lake Superior (Figure 1) and excluded angling that occurred in the St. Louis Estuary or in tributaries. The 2019 survey began on Memorial Day weekend (May 25) and ended when the Lake Trout season ended (October 6). May data are included in the June estimates and October data are included in the September estimates. The creel clerks visited the stations and groups of stations, or Clusters, that are described in Table 1. Clusters 1 and 2 are to the Southwest and comprise the Lower Shore, whereas Clusters 3 and 4 are to the Northeast and comprise the Upper Shore. Two clerks work on the creel survey, one in each Shore area. Halpern (2003) describes the general mechanics of the creel survey in more detail. The sampling design was revised in 2017 when sampling effort was dropped from two locations. One very small public access was dropped at Tofte in the Taconite Harbor area due to low use and high travel times to the access. Also, Harbor Cove was dropped from the Harbor Cove/Lakehead Marina station on 28 July 2017 due to the owner's removal of permission to use the property. The counts from the two stations, Taconite Harbor and Lakehead Marina, were adjusted based on previous estimates of effort at the dropped accesses. Taconite Harbor received 88% of the effort at Station 9 in 2014-2015 and Harbor Cove Marina received 50% of the effort at Station 2 from 2014 through 27 July 2017.

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 captured in assessments from 2015 through May 2019. References to 2018 creel survey numbers are from Reeves (2019). Results from the creel survey and charter census are reported separately within tables in this report and are also combined to produce attributes of total catch and effort. Figures generally include combined data, except for angler effort and for charter-specific attributes of number of captains and their number of trips.

Results and Discussion

Fishing Effort

Private sport fishing effort in Minnesota from Minnesota-based anglers was estimated from 595 activity counts for the Lower Shore and 495 activity counts for the Upper Shore in 2019 (Table 2). Effort along the North Shore was measured on 116 out of 135 days during the season. Private sport anglers fished for 120,832 hours in 13,881 trips, which lasted 4.02 hours on average and contained 2.17 anglers on average (Table 3). Charter anglers fished for 60,083 hours in 2,188 trips, which lasted 5.36 hours on average and contained 5.12 anglers on average (Table 4). Wisconsin-based private sport anglers who fished in Minnesota waters of Lake Superior took 194 fishing trips fished for an additional 4,346 hours (WIDNR data). Overall effort decreased by 5% from 2018 to 2019 (Figure 2). Beginning in 1994, the survey excluded shoreline angling at select stations that produced few fish in most years. Since 1994, effort from Minnesota-based anglers has varied from 138,522 to 204,881 hours (Figure 2). Effort in the Lower Shore area accounted for 68% of total Minnesota summer angling effort on Lake Superior in 2019 (Table 5).

Lake Superior boat anglers accounted for 98% of the effort and shore anglers accounted for 2% of the effort. Overall summer boat effort was greatest in the Duluth Area and lowest in the Grand Marais-Hovland area (Table 4). Monthly effort from private sport boats was greatest from the McQuade-Two Harbors area in July, similar among months from July and August in the McQuade-Two Harbors and Twin Points-Taconite Harbor areas and August in the McQuade-Two Harbors area, and was low after June in the Duluth area and throughout the season in the Grand Marais area (Table 5). In any period, charter boats from Duluth or Superior comprised at least 80% of the charter effort (Table 6). Charter boats in the Upper Shore area comprised at least 15% of charter effort in July and August. Overall, private sport and charter effort tended to occur in different areas of the lake, resulting in a wider distribution of effort.

Shore angling continued to comprise a small fraction of summer angling effort on Lake Superior. Shoreline anglers fished for 2,973 hours in 2019 (Table 3), compared to 3,538 hours in 2018. The highest shore angling effort (68%) was observed in the McQuade-Two Harbors area (Table 4).

Charter captains chartered 0 to 165 trips in 2019 (Figure 9). Two captains reported no trips and two captains reported trips only in the St. Louis River Estuary. Six captains chartered over 100 trips in 2019, which was lower than in 2018; however, more captains chartered 60 trips or more than in recent years. Wisconsin-based charters accounted for 262 of the 2,188 charter trips and for 7,843 angler hours, which was a 43% reduction from 2018. More captains docked at the Duluth Waterfront Plaza after re-construction of the marina in 2018.

Catch and Catch Rates

Salmonines

Salmonines include all trout and salmon species. Private sport anglers caught 27,054 salmonines (Table 7) and charter anglers caught 13,344 salmonines (Table 8), for a total catch of 40,398 salmonines in 2019 (Table 9). The salmonine catch in 2019 was 11% lower than the catch of 44,753 salmonines in 2018. Anglers released 14% of their catch (Table 9). Wisconsin-based private sport anglers caught 758 salmonines in 2019 (Table 10).

Regarding catch rates of salmonines as fish per hour, private sport anglers caught 0.2034 fish and kept 0.1759 fish per hour (Table 11). Charter anglers caught 0.2221 fish and harvested 0.2093 fish per hour (Table 12). Overall, anglers caught 0.2175 fish and harvested 0.1867 fish (Table 13). These rates were 5% lower than in 2018 (Figure 3). Wisconsin anglers caught 0.1744 fish per hour (WIDNR data).

Lean Lake Trout

Private sport anglers caught 14,704 and kept 11,199 lean Lake Trout, whereas charter anglers caught 8,021 and kept 7,538 lean Lake Trout in 2019. Overall, anglers caught 22,726 fish, which was 38% less than in 2018. Compared to the previous 10-year average of 25,033 fish, anglers caught 10% less fish in 2019. Anglers also released 18% of their catch, or 3,988 fish (Table 5). Anglers harvested 18,738 fish, which was 34% lower than in 2018, was similar to a relatively low catch in 2003, and was the lowest catch since 1999 (Figure 4). Lean Lake Trout accounted for 56% of all salmonines caught and 54% of all salmonines harvested. Sixty-eight percent of the harvested lean Lake Trout were from the Lower Shore area. Overall, anglers caught 0.1224 and kept 0.1009 fish per hour. Among private sport parties, 46% caught one or more, 25% caught two or more, and 16% caught at least three fish per trip (Table 7). Success rates were much higher for charter angling parties; 90.4% of parties caught at least one fish, 78.4% caught at least two fish, and 56.8% caught at least three fish.

Wisconsin-based private sport anglers kept an additional 257 lean Lake Trout in Minnesota waters in 2019 (WIDNR data) at a rate of 0.0591 fish per hour, which was less than half the rate of 0.1243 fish per hour in 2018. Wisconsin-based private sport anglers caught fish at a considerably lower rate than the 0.1086 fish per hour for Minnesota-based private sport anglers in Cluster 1. Summer rainfalls resulted in turbid waters, especially near the Wisconsin border near Superior; the turbid water affected fishing patterns during July and August.

Private sport anglers kept lean Lake Trout that were 22.6 inches long on average (Table 16) and most of the fish (72%) were between 17.5 and 27.4 inches in length. Charter anglers kept fish that were 22.5 inches long on average (Table 17) and most of the fish (76%) were between 17.5 and 26.4 inches in length. Overall, mean length and length distributions were similar to harvested fish in 2019, and the clerks measured one fish longer than 37.4 inches in 2019. Private sport anglers released 17% of fish that were ≥ 25 inches long (Tables 16 & 18) and charter anglers released 6% of fish that were ≥ 25 inches long (Tables 17 & 19). Private sport anglers kept fish that were 3.77 pounds on average (Table 20) and charter anglers kept fish that were 3.79 pounds on average (Table 21). Average weights differed by angler type in the Upper Shore; private sport anglers kept fish that were 0.53 pounds heavier on average than charter-caught fish. Yield for lean Lake Trout was 42,175 pounds by private sport anglers and 27,235 pounds by charter anglers. The total yield of 69,410 pounds in 2019 was 38% lower than the yield of 95,550 pounds in 2018 (Table 24). The fishing season started with cool water temperatures followed by frequent turbid water events in mid-summer, which may have reduced the effort and catches for Lake Trout.

The age distribution of all harvested lean Lake Trout was similar between private sport anglers (Table 25) and charter anglers (Table 26). Age seven and eight year old fish made up 44% of the anglers' harvest. Seven year old fish were the most abundant year class in the catch

overall. Overall, each age class from seven through nine years comprised at least 10% of the harvest (Table 27), which indicates a slight decline in the catch of six-year-old fish from the past few years. Older Lake Trout, at least nine years old, made up 46% of the harvest by number, which is similar to 44% in 2018 and 42% in 2017. The presence of many adult year classes indicates that the Lake Trout population has been rehabilitated and the proportion of older age classes is fairly stable; however, the proportion of younger fish may have decreased slightly and should be monitored closely.

In 2019, creel clerks checked 732 Lake Trout and observed no fin clips on 84% of harvested fish, which indicates that the fish were wild and not stocked. By area, wild fish comprised 67% of fish from the Duluth area, 93% from the McQuade-Two Harbors area, 97% from the Twin Points-Tofte area, and 99% from the Grand Marais area. Minnesota stocked Lake Trout through 2015 in the Lower Shore area and through 2003 in the Upper Shore area. Wisconsin has stocked Lake Trout through 2019. The 2009 through 2014 year classes were poorly represented in the recreational fishery in 2019, which indicates that Minnesota stocking produced few of the fish that anglers harvested. The high proportion of stocked fish near Duluth may have occurred due to the consistent turbid water pushing Lake Trout towards Minnesota.

Siscowet

Siscowet, a deepwater form of Lake Trout, have generally contributed little to the sport fishery, except for a slight increase from 2015 through 2018. The siscowet catch declined in 2019 and anglers caught 44% fewer siscowet than in 2018. In 2019, private sport anglers kept 410 and released 70 siscowet (Table 7) and charter anglers kept 1,170 and released 76 siscowet. Most (1,224) of the siscowet were caught in the Lower Shore area (Table 9). Only 3.6% of private sport angling parties caught at least one siscowet in 2019, compared to 26.1% of charter parties (Table 14 and 15). Wisconsin anglers reported keeping no siscowet in 2019.

Coho Salmon

Private sport anglers caught 8,520 and kept 8,311 Coho Salmon, whereas charter anglers caught 2,801 and kept 2,792 fish in 2019. Overall, anglers caught 11,321 fish, which was 67% more than in 2018 and almost three times the previous 10-year average catch of 3,871. Anglers also released 218 fish, or 2% of their catch (Table 9). Coho Salmon accounted for 28% of all salmonines caught and 32% of all salmonines harvested. Forty-nine percent of the fish were caught in the Upper Shore area, which is similar to 2018. Harvest rates were 0.0671 fish per hour for private sport anglers and 0.0465 fish per hour for charter anglers, or 0.0604 fish per hour overall. Among private sport parties, 29.2% caught one or more, 14.9% caught two or more, and 9.1% caught at least three fish per trip (Table 14). Success rates were much higher for charter angling parties; 37.4% of parties caught at least one fish, 19.6% caught at least two fish, and 3.7% caught at least three fish. Seasonally, Coho Salmon are first caught in the Lower Shore area and then later in the Upper Shore area; this pattern was repeated in 2019. Wisconsin-based private sport anglers caught 353 Coho Salmon in Minnesota waters in 2019 (Table 10). Anglers kept Coho Salmon that were 18.1 inches long on average (Tables 16 and 17), which is slightly smaller than the length of 18.7 inches in 2018. Average weight was lower in the Lower Shore, at 1.44-1.53 pounds, than in the Upper Shore, at 1.66-1.89 pounds in 2019 (Tables 20 and 21). Coho Salmon grow as they move up the shoreline toward Grand Marais in

the summer. Anglers harvested 20,328 pounds of Coho Salmon in 2019 (Table 11), which is a 50% increase from 2018. The harvest of Coho Salmon has varied considerably among years (Figure 5), which reflects the naturally fluctuating year-class strength for Coho Salmon in Lake Superior. Coho Salmon were last stocked in 2006 by the Michigan DNR and last stocked in Minnesota waters in 1974; thus, all Coho Salmon caught in Lake Superior are naturally reproduced.

Chinook Salmon

Private sport anglers kept 1,823 and released no Chinook Salmon, whereas charter anglers caught 999 and kept all but 5 fish in 2019. Overall, anglers caught 2,822 fish, which is 40% more fish than in 2018 and 19% less than the average of 3,000 fish over the previous 10 years. Chinook Salmon accounted for 7% of all salmonines caught and 8.1% of all salmonines harvested. Only 35% of the fish were from the Lower Shore area. Private sport anglers kept 0.0147 fish per hour and charter anglers kept 0.0165 fish per hour, or 0.0153 fish per hour overall. Among private sport parties, 12.8% caught one or more, 2.9% caught two or more, and 1.4% caught at least three fish per trip (Table 14). Success rates were much higher for charter angling parties; 25.2% of parties caught at least one fish, 8.4% caught at least two fish, and 2.8% caught at least three fish. Wisconsin anglers caught 127 Chinook Salmon in Minnesota waters in 2019 (Table 10). Anglers kept fish that were 22.2-22.5 inches long on average (Tables 16 and 17), which is about the same size as fish caught in 2018. Anglers harvested 10,448 pounds of Chinook Salmon in 2018 (Table 24), which is more than 49% higher than in 2018. Creel clerks examined 81 fish for stocking clips and observed 1 clipped fish, which indicates that Chinook Salmon stocking in other jurisdictions contributes minimally to catches in Minnesota.

Steelhead Rainbow Trout

Minnesota-based anglers caught 1,305 steelhead Rainbow Trout in 2019 (Table 9), which was 31% more than in 2018. Steelhead catches were highest in the Twin Points-Taconite Harbor area in 2019. The location of highest catches changes from year to year, indicating that steelhead movement patterns vary from year to year. Anglers kept 118 steelhead in the summer of 2019, despite the ban on harvest of steelhead in the Minnesota waters of Lake Superior. Anglers may sometimes mis-identify smaller steelhead as Coho Salmon.

Pink Salmon

Minnesota-based anglers caught only 232 Pink Salmon *Oncorhynchus gorbuscha* in 2019 (Table 5). Pink Salmon catches vary considerably over time, ranging from 0 fish in the late 1980s to 4,139 fish in 2010. Pink Salmon reproduce naturally in Lake Superior (Schreiner et al. 2006) and the fluctuations in catch reflect the fluctuations in reproductive success of Pink Salmon along the North Shore. The fish were mostly larger than in 2018, averaging 16 inches, and anglers released most of the fish.

Other Species

Other species are generally caught in low numbers during the summer creel survey. Catch data for the infrequently-caught salmonines were combined and reported as 249 other salmonines (Table 9). The combined species include harvests of 137 Brown Trout *Salmo trutta*, 14 Brook Trout *Salmo fontinalis*, and 33 Kamloops Rainbow Trout, and releases of 2 Brown Trout, 54 Brook Trout, and 9 Kamloops Rainbow Trout. Anglers caught these other salmonines

at a rate of 0.0014 fish per hour. Wisconsin-based anglers caught an estimated 21 Brown Trout, 20 Walleye, and 10 Lake Whitefish. Minnesota anglers also kept an estimated 783 Walleye *Sander vitreus*, 21 Cisco *Coregonus artedii*, and 39 Northern Pike *Esox lucius* and released 17 Cisco.

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 among Lake Superior fisheries management agencies. Effort and catch were relatively low in 2019, probably due to a cool start to the season and to high turbidity for much of the mid-summer period as a result of consistently heavy rainfall. The Lake Trout catches and catch rates were comparatively low; however Coho Salmon were caught at higher than usual numbers. The Lake Trout are now mostly (84%) wild, not clipped, and this is especially true in the Upper Shore where 98% of the harvested fish were wild. The percentage of stocked Lake Trout has increased in the past couple of years, potentially due to continued stocking by Wisconsin and also due to consistently turbid water toward the Wisconsin side which may have driven the Lake Trout, which are sight feeders, to clearer water.

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LAKE SUPERIOR SUMMER CREEL SURVEY
2019

by
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Lake Superior Fisheries Office

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Literature Cited

- Bindman, A. and D. Mach. 1997. GENCREEL, Version 2; General Angler Survey Analysis Program User's Guide. Minnesota Department of Natural Resources.
- Halpern, T.N. 1995a. Design for Lake Superior Summer Creel Survey. Minnesota Department of Natural Resources.
- Halpern, T.N. 1995b. Completion Report Lake Superior Creel Survey, 1994. Minnesota Department of Natural Resources, Study 4, Job 337.
- Halpern, T.N. 2003. Completion Report Lake Superior Creel Survey, 2002. Minnesota Department of Natural Resources, Study 4, Job 615.
- Hansen, M.J. (Editor). 1996. A Lake Trout restoration plan for Lake Superior. Great Lakes Fishery Commission. 34 pp.
- Hansen, M.J. and 11 co-authors. 1995. Lake Trout (*Salvelinus namaycush*) populations in Lake Superior and their restoration in 1959-1993. *Journal of Great Lakes Research* 21 (Supplement 1):152-175.
- Reeves, K.A. 2019. Completion Report Lake Superior Creel Survey, 2017. Minnesota Department of Natural Resources, Study 4, Job 1049.
- Schreiner, D.R., J.J. Ostazeski, T.N. Halpern and S.A. Geving. 2006. Fisheries management plan for the Minnesota waters of Lake Superior. Minnesota Department of Natural Resources Special Publication 163. 89 pp.

Table 1. Creel survey clusters and stations in the 2019 Lake Superior summer creel survey.

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

Table 2. Frequency of clerk visits and number of activity counts and interviews, by day type, cluster, shore area, and total area, for each cluster and day type in the 2019 Lake Superior summer creel survey.

District ²	Cluster ³	Day type	Days Visited	Activity Counts	Days			Interviews ¹		
					Boat	Shore	Charter	Boat	Shore	Charter
MN-1	1	Weekday	24	144	12	0	19	25	0	44
		Weekend	22	126	18	0	16	37	0	41
		Total	46	270	30	0	35	62	0	85
MN-1	2	Weekday	28	168	20	9	2	104	30	3
		Weekend	22	132	17	8	3	159	21	3
		Total	50	300	37	17	5	361	51	6
MN-2	3	Weekday	26	156	16	4	5	48	10	5
		Weekend	22	132	15	4	1	69	4	2
		Total	48	288	31	8	6	117	14	7
MN-3	4	Weekday	26	127	18	14	6	71	25	7
		Weekend	21	105	13	14	7	86	25	7
		Total	45	232	31	28	13	157	50	14
Lower	1,2	Weekday	52	312	37	20	21	129	30	47
		Weekend	44	258	36	17	19	196	21	44
		Total	96	570	73	37	40	325	51	91
Upper	3,4	Weekday	52	283	35	17	11	119	35	12
		Weekend	43	237	31	16	8	155	29	9
		Total	95	520	66	33	19	274	64	21
Total		Weekday	73	595	52	28	32	248	6	59
		Weekend	43	495	36	23	25	351	50	53
		Total	116	1090	88	60	57	599	115	112

¹ 2 angling parties refused to be interviewed. The clerk was excluded from ½ of Station 2 in 2019.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

Table 3. Fishing effort (angler hours¹) for private sport and shore anglers by angler type, location, and shore area in the 2019 Lake Superior summer creel survey². SE in parentheses.

District ³	Cluster ⁴	Value	Boat ⁵					Shore ⁶				
			June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
MN-1	1	Hours	9,722	3,722	3,325	1,945	18,714	0	0	0	0	0
		SE	(1,891)	(946)	(634)	(503)	(2,264)	0	0	0	0	0
MN-1	2	Hours	8,707	22,829	11,729	9,267	52,532	324	739	793	150	2,006
		SE	(2,200)	(5,966)	(3,856)	(3,012)	(8,023)	(145)	(266)	(282)	(73)	(420)
MN-2	3	Hours	2,516	13,851	14,451	4,634	35,452	16	213	54	0	284
		SE	(600)	(5,450)	(2,209)	(1,137)	(6,019)	(16)	(136)	(29)	0	(140)
MN-3	4	Hours	572	4,381	6,088	3,093	14,135	82	174	222	206	684
		SE	(146)	(612)	(2,105)	(1,238)	(2,522)	(34)	(83)	(82)	(125)	(174)
Lower	1,2	Hours	18,429	26,551	15,054	11,212	71,246	324	739	793	150	2,006
		SE	(2,901)	(6,041)	(3,908)	(3,053)	(8,337)	(145)	(266)	(282)	(73)	(420)
Upper	3,4	Hours	3,088	18,231	20,540	7,727	49,586	98	387	276	206	968
		SE	(618)	(5,484)	(3,052)	(1,581)	(6,526)	(38)	(159)	(87)	(125)	(223)
Total		Hours	21,517	44,783	35,594	18,939	120,832	422	1,126	1,069	356	2,973
		SE	(2,966)	(8,159)	(4,958)	(3,485)	(10,587)	(150)	(310)	(296)	(145)	(476)

¹ Estimates were rounded to the nearest whole number.

² Wisconsin anglers fished an additional 4,346 (SE=962) hours on the Minnesota waters of Lake Superior.

³ Great Lakes Fishery Commission Statistical Districts

⁴ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

⁵ Includes private boaters and unchartered fishing trips with charter captains.

⁶ All shore fishing in Cluster 1 occurs in the St. Louis Estuary, not in Lake Superior, and is not included.

Table 4. Fishing effort (angler hours¹) for charter anglers and for all anglers, by location and shore area, in the 2019 Lake Superior summer creel survey². SE in parentheses.

District ³	Cluster ⁴	Value	Charter					All			Total	
			June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
MN-1	1	Hours	16,518	12,819	14,247	7,538	51,122	26,240	16,541	17,572	9,483	69,836
		SE	0	0	0	0	0	(1,891)	(946)	(634)	(503)	(2,264)
MN-1	2	Hours	478	186	337	220	1,221	9,509	23,754	12,860	9,637	55,759
		SE	0	0	0	0	0	(2,345)	(6,232)	(4,139)	(3,085)	(8,425)
MN-2	3	Hours	1,043	1,698	1,806	546	5,093	3,575	15,762	16,312	5,180	40,828
		SE	0	0	0	0	0	(616)	(5,586)	(2,238)	(1,137)	(6,155)
MN-3	4	Hours	562	826	853	406	2,647	1,216	5,381	7,163	3,705	17,466
		SE	0	0	0	0	0	(180)	(695)	(2,187)	(1,363)	(2,675)
Lower	1,2	Hours	16,996	13,005	14,584	7,758	52,343	35,749	40,295	30,431	19,120	125,595
		SE	0	0	0	0	0	(3,013)	(6,303)	(4,187)	(3,125)	(8,724)
Upper	3,4	Hours	1,605	2,524	2,659	952	7,740	4,791	21,143	23,475	8,886	58,294
		SE	0	0	0	0	0	(642)	(5,629)	(3,129)	(1,775)	(10,434)
Total		Hours	18,601	15,529	17,243	8,710	60,083	40,539	61,438	53,906	28,006	183,889
Total		SE	0	0	0	0	0	(3,080)	(8,451)	(5,227)	(3,594)	(11,006)

¹ Estimates were rounded to the nearest whole number.

² Wisconsin anglers fished an additional 4,346 (SE=962) hours on the Minnesota waters of Lake Superior. The Minnesota results exclude Wisconsin-based non-chartered trips.

³ Great Lakes Fishery Commission Statistical Districts

⁴ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

Table 5. Monthly distribution of fishing effort for private sport boat and shore anglers by angler type, location, and shore area as a percentage of angler hours in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Station	Boat ³					Shore ⁴				
			June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
MN-1	1		45.2	8.3	9.3	15.5	0	0	0	0	0	0
		1	0	0	0	0	0	0	0	0	0	0
		2	6.3	5.3	5.9	5.7	0	0	0	0	0	0
		3	38.9	3.0	3.4	9.8	0	0	0	0	0	0
MN-1	2		40.5	51.0	33.0	43.5	67.5	76.8	65.6	74.2	42.1	67.5
		4	24.2	17.9	12.0	17.4	11.7	56.7	9.5	0	0	11.7
		5	13.3	14.2	8.5	11.8	1.4	2.9	0	0	8.4	1.4
		6	3.0	18.9	12.4	14.3	54.4	17.2	56.1	74.2	33.7	54.4
MN-2	3		11.7	30.9	40.6	29.3	9.5	3.8	18.9	5.1	0	9.5
		7	1.3	8.9	7.7	6.1	5.0	0	9.8	3.5	0	5.0
		8	6.2	18.4	23.1	17.0	0	0	0	0	0	0
		9	4.2	3.6	9.8	6.2	4.6	3.8	9.2	1.6	0	4.6
MN-3	4		2.7	9.8	17.1	11.7	23.0	19.3	15.5	20.7	57.9	23.0
		10	2.2	8.4	14.2	10.0	14.0	19.3	10.6	17.6	7.4	14.0
		11	0.4	1.4	2.9	1.7	9.0	0	4.9	3.2	50.6	9.0
Lower	1,2		85.7	59.3	42.3	59.2	67.5	76.8	65.6	74.2	42.1	67.5
Upper	3,4		14.4	40.7	57.7	40.8	32.5	23.1	34.4	25.8	57.9	32.5

¹ Great Lakes Fishery Commission Statistical Districts

² Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

³ Excludes charter fishing effort and includes personal charter captain's trips

⁴ All shore fishing in Cluster 1 occurs in the St. Louis Estuary, not in Lake Superior, and is not included.

Table 6. Monthly distribution of fishing effort for charter anglers and for all anglers, by angler type, location, and total area, as a percentage of angler hours in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Station	Charter ³					All ⁴				
			June	July	Aug	Sept	Summer	June	July	Aug	Sept	Summer
MN-1	1		88.8	82.6	82.6	86.5	85.1	64.7	26.9	32.6	33.9	38
		1	65.4	64.0	65.9	61.4	64.6	30.0	16.2	21.1	19.1	21.1
		2	23.1	18.4	16.8	25.2	20.4	13.9	8.5	9.3	11.7	10.4
		3	0.3	0.1	0	0	0.1	20.8	2.2	2.3	3.1	6.5
MN-1	2		2.6	1.2	2.0	2.5	2.0	23.5	38.7	23.9	34.4	30.3
		4	0	0.1	0	0	0	13.4	13.3	7.9	12.6	11.6
		5	2.5	1.1	1.8	2.3	1.9	8.2	10.6	6.2	8.0	8.4
		6	0.1	0	0.1	0.2	0.1	1.8	14.8	9.7	13.8	10.3
MN-2	3		5.6	10.9	10.5	6.3	8.5	8.8	25.7	30.3	18.5	22.2
		7	0	0.4	0	0	0.1	0.7	6.8	5.2	1.4	4.2
		8	1.8	3.6	5.2	1.1	3.1	4.1	14.3	16.9	10.1	12.2
		9	3.9	6.9	5.3	5.1	5.2	4.0	4.6	8.2	6.9	5.9
MN-3	4		3.0	5.3	4.9	4.7	4.4	3.0	8.8	13.3	13.2	9.5
		10	3.0	5.3	4.9	4.7	4.4	2.8	7.7	11.3	11.5	8.2
		11	0	0	0	0	0	0.2	1.1	2.0	1.8	1.3
Lower	1,2		91.4	83.8	84.6	89	87.1	88.2	65.6	56.5	68.3	68.3
Upper	3,4		8.6	16.2	15.4	11	12.9	11.8	34.5	43.6	31.7	31.7

¹ Great Lakes Fishery Commission Statistical Districts

² Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

³ Includes charter fishing effort that was based in Wisconsin.

³ Percentages may not add to 100 due to lack of specific station values for Private Charter Captains' Trips.

Table 7. Catch by species, location, and shore area for private sport boat and shore anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Fate	Lake	Coho	Chinook	Steelhead	Siscowet	Pink	Other ³	Total	Walleye
			Trout	Salmon	Salmon			Salmon	Salmonines	Salmonines	
MN-1	1	Kept	970	874	165	0	17	0	95	2,121	113
			(488)	(654)	(117)	(0)	(25)	(0)	(81)	(829)	(112)
		Released	75	0	0	47	44	0	0	166	206
		Total	1,045	874	165	47	61	0	95	2,287	319
			(497)	(654)	(117)	(49)	(51)	(0)	(81)	(837)	(238)
MN-1	2	Kept	5,892	2,736	165	41	377	24	0	9,235	12
			(2,723)	(1,481)	(104)	(47)	(221)	(35)	(0)	(3,110)	(18)
		Released	1,319	97	0	180	26	0	0	1,622	0
		Total	7,211	2,833	165	221	403	24	0	10,857	12
			(2,808)	(1,483)	(104)	(126)	(222)	(35)	(0)	(3,188)	(18)
MN-2	3	Kept	2,853	3,516	774	35	0	73	0	7,251	0
			(1,220)	(2,322)	(396)	(35)	(0)	(83)	(0)	(2,654)	(0)
		Released	1,862	106	0	536	0	101	0	2,605	0
		Total	4,715	3,622	774	571	0	174	0	9,856	0
			(1,953)	(2,325)	(396)	(398)	(0)	(167)	(0)	(3,092)	(0)
MN-3	4	Kept	1,484	1,185	719	38	16	26	20	3,488	0
			(662)	(678)	(409)	(38)	(23)	(34)	(20)	(1,027)	(0)
		Released	249	6	0	237	0	0	74	566	0
		Total	1,733	1,191	719	275	16	26	94	4,054	0
			(676)	(675)	(402)	(163)	(23)	(27)	(80)	(1,053)	(0)
Lower	1 & 2	Kept	6,862	3,610	330	41	394	24	95	11,356	125
			(2,766)	(1,619)	(157)	(47)	(222)	(35)	(81)	(3,219)	(113)
		Released	1,394	97	0	227	70	0	0	1,788	206
		Total	8,256	3,707	330	268	464	24	95	13,144	331
			(2,852)	(1,621)	(157)	(135)	(228)	(35)	(81)	(3,296)	(239)
Upper	3 & 4	Kept	4,337	4,701	1,493	73	16	99	20	10,739	0
			(1,387)	(2,418)	(564)	(52)	(23)	(87)	(20)	(2,846)	(0)
		Released	2,111	112	0	773	0	101	74	3,171	0
		Total	6,448	4,813	1,493	846	16	200	94	13,910	0
			(2,067)	(2,421)	(564)	(429)	(23)	(169)	(80)	(3,266)	(0)
Total	1,2,3,4	Kept	11,199	8,311	1,823	114	410	123	115	22,095	125
			(3,094)	(2,910)	(586)	(70)	(224)	(94)	(83)	(4,296)	(113)
		Released	3,505	209	0	1,000	70	101	54	4,939	206
		Total	14,704	8,520	1,823	1,114	480	224	189	27,034	331
			(3,519)	(2,913)	(586)	(422)	(229)	(173)	(84)	(4,635)	(239)

¹ Great Lakes Fishery Commission Statistical Districts

² Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

³ Other Salmonines include 77 Brown Trout, 14 Brook Trout, and 24 Kamloops that were harvested, and 54 Brook Trout that were reported as released. Anglers also kept 30 Northern Pike, released 20 Cisco, and reported keeping 19 and releasing 14 Cisco.

Table 8. Catch by species, location, and shore area for chartered anglers¹ in the 2019 Lake Superior summer creel survey. SE=0 for all values.

District ²	Cluster ³	Fate	Lake	Coho	Chinook		Pink	Other ⁴	Total		
			Trout	Salmon	Salmon	Steelhead			Siscowet	Salmon	Salmonines
MN-1	1	Kept	5,609	1,895	644	3	829	4	63	9,047	657
		Released	110	8	4	124	14	0	7	267	29
		Total	5,719	1,903	648	127	843	4	70	9,314	686
MN-1	2	Kept	180	55	13	0	0	0	3	251	1
		Released	38	0	0	12	0	0	1	51	0
		Total	218	55	13	12	0	0	4	302	1
MN-2	3	Kept	1,071	468	164	0	323	4	3	2,033	0
		Released	193	1	1	41	58	0	0	294	0
		Total	1,264	469	165	41	381	4	3	2,327	0
MN-3	4	Kept	679	374	173	1	17	0	1	1,245	0
		Released	142	0	0	10	4	0	0	156	0
		Total	821	374	173	11	21	0	1	1,401	0
Lower	1,2	Kept	5,789	1,950	657	3	829	4	66	9,298	658
		Released	148	8	4	136	14	0	9	319	29
		Total	5,937	1,958	661	139	843	4	75	9,617	687
Upper	3,4	Kept	1,750	842	337	1	340	4	3	3,277	0
		Released	335	1	1	51	62	0	2	452	0
		Total	2,085	843	338	52	402	4	5	3,729	0
Total		Kept	7,539	2,792	994	4	1,169	8	69	12,575	658
		Released	483	9	5	187	76	0	11	771	29
		Total	8,022	2,801	999	191	1,245	8	80	13,346	687

¹ The Minnesota results include all charter fishing, including trips that originated from Wisconsin.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

⁴ Other Salmonines includes 60 Brown Trout and 9 kamloops Rainbow Trout that were harvested, and 2 Brown Trout and 9 kamloops Rainbow Trout that were released. Anglers also kept 9 Northern Pike, 2 Cisco and 4 Lake Whitefish.

Table 9. Catch¹ by species, location, and shore area for all anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ²	Cluster ³	Fate	Lake	Coho	Chinook		Pink	Other ⁴	Total		
			Trout	Salmon	Salmon	Steelhead			Siscowet	Salmon	Salmonines
MN-1	1	Kept	6,579	2,769	809	3	846	4	158	11,168	770
		(SE)	(488)	(654)	(117)	(0)	(25)	(0)	(81)	(829)	(112)
		Released	185	8	4	171	58	0	9	435	235
		(SE)	(92)	(0)	(0)	(49)	(44)	(0)	(0)	(113)	(210)
		Total	6,764	2,777	813	174	904	4	165	11,603	1,005
		(SE)	(497)	(654)	(117)	(49)	(51)	(0)	(81)	(837)	(238)
MN-1	2	Kept	6,072	2,791	178	41	377	24	3	9,486	13
		(SE)	(2,723)	(1,481)	(104)	(47)	(221)	(35)	(0)	(3,110)	(18)
		Released	1,357	97	0	192	26	0	1	1,672	0
		(SE)	(687)	(86)	(0)	(117)	(25)	(0)	(0)	(703)	(0)
		Total	7,429	2,888	178	233	403	24	4	11,158	13
		(SE)	(2,808)	(1,483)	(104)	(126)	(222)	(35)	(0)	(3,188)	(18)
MN-2	3	Kept	3,924	3,984	938	35	323	77	3	9,283	0
		(SE)	(1,220)	(2,322)	(396)	(35)	(0)	(83)	(0)	(2,654)	(0)
		Released	2,055	107	1	577	58	101	0	2,901	0
		(SE)	(1,525)	(109)	(0)	(396)	(0)	(145)	(0)	(1,586)	(0)
		Total	5,979	4,091	939	612	381	178	3	12,184	0
		(SE)	(1,953)	(2,325)	(396)	(398)	(0)	(167)	(0)	(3,092)	(0)
MN-3	4	Kept	2,163	1,559	892	39	33	26	21	4,733	0
		(SE)	(659)	(675)	(402)	(38)	(23)	(27)	(20)	(1,027)	(0)
		Released	391	6	0	247	4	0	74	722	0
		(SE)	(150)	(9)	(0)	(158)	(0)	(0)	(77)	(219)	(0)
		Total	2,554	1,565	892	286	37	26	95	5,435	0
		(SE)	(676)	(675)	(402)	(163)	(23)	(27)	(80)	(1,050)	(0)
Lower	1 & 2	Kept	12,651	5,560	987	44	1,223	28	161	20,654	783
		(SE)	(2,766)	(1,619)	(157)	(47)	(222)	(35)	(81)	(3,219)	(113)
		Released	1,542	105	4	363	84	0	8	2,107	235
		(SE)	(693)	(86)	(0)	(127)	(51)	(0)	(0)	(712)	(210)
		Total	14,193	5,665	991	407	1,307	28	169	22,761	1,018
		(SE)	(2,852)	(1,621)	(157)	(135)	(228)	(35)	(81)	(3,296)	(239)
Upper	3 & 4	Kept	6,087	5,543	1,830	74	356	103	23	14,016	0
		(SE)	(1,387)	(2,418)	(564)	(52)	(23)	(87)	(0)	(2,846)	(0)
		Released	2,446	113	1	824	62	101	56	3,603	0
		(SE)	(1,532)	(109)	(0)	(426)	(0)	(145)	(21)	(1,601)	(0)
		Total	8,533	5,656	1,831	898	418	204	79	17,619	0
		(SE)	(2,067)	(2,421)	(564)	(429)	(23)	(169)	(21)	(3,265)	(0)
Total	1,2,3,4	Kept	18,738	11,103	2,817	118	1,579	131	184	34,670	783
		(SE)	(3,094)	(2,910)	(586)	(70)	(224)	(94)	(81)	(4,296)	(113)
		Released	3,988	218	5	1,187	146	101	65	5,710	235
		(SE)	(1,682)	(139)	(0)	(445)	(51)	(145)	(21)	(1,752)	(210)
		Total	22,726	11,321	2,822	1,305	1,725	232	249	40,380	1,018
		(SE)	(3,519)	(2,913)	(586)	(422)	(229)	(173)	(81)	(4,635)	(239)

¹ The Minnesota results include all charter fishing and excludes Wisconsin-based private sport anglers.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

⁴ Other Salmonines include 137 Brown Trout, 14 Brook Trout, and 33 Kamloops that were harvested, and 2 Brown Trout, 9 kamloops, and 54 Brook Trout that were reported as released. Anglers also kept 39 Northern Pike, and reported keeping 21 and releasing 18 Cisco.

Table 10. Catch¹ by species, cluster, and shore area for private sport boats from Wisconsin in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ²	Cluster ³	Fate	Lake	Coho	Chinook	Steelhead	Siscowet	Pink	Other ⁴	Total	
			Trout	Salmon	Salmon			Salmon	Salmonines	Salmonines	Walleye
MN-1	1	Kept	257 (63)	353 (98)	127 (84)	0 (0)	0 (0)	0 (0)	21 (8)	758 (144)	7 (5)

¹ Wisconsin anglers who were surveyed by Wisconsin DNR.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth

⁴ Anglers who fished Minnesota waters also caught an estimated 21 Brown Trout and 10 Lake Whitefish.

Table 11. Catch rate (fish hour⁻¹) by species, location, and shore area for private sport and shore anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Fate	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other ⁴ Salmonines	Total Salmonines	Walleye
MN-1	1	Kept	0.0518	0.0467	0.0088	0.0000	0.0009	0.0000	0.0051	0.1133	0.0060
		(SE)	(0.0272)	(0.0354)	(0.0067)	0.0000	(0.0013)	0.0000	(0.0044)	(0.0460)	(0.0060)
		Released	0.0040	0.0000	0.0000	0.0025	0.0024	0.0000	0.0000	0.0089	0.0110
		(SE)	(0.0049)	0.0000	0.0000	(0.0026)	(0.0024)	0.0000	0.0000	(0.0061)	(0.0113)
MN-1	2	Total	0.0558	0.0467	0.0088	0.0025	0.0033	0.0000	0.0051	0.1222	0.0170
		(SE)	(0.0276)	(0.0354)	(0.0067)	(0.0026)	(0.0027)	0.0000	(0.0044)	(0.0464)	(0.0128)
		Kept	0.1080	0.0502	0.0030	0.0008	0.0069	0.0004	0.0000	0.1693	0.0002
		(SE)	(0.0524)	(0.0283)	(0.0020)	(0.0009)	(0.0042)	(0.0006)	0.0000	(0.0623)	(0.0003)
MN-2	3	Released	0.0242	0.0018	0.0000	0.0033	0.0005	0.0000	0.0000	0.0297	0.0000
		(SE)	(0.0131)	(0.0016)	0.0000	(0.0022)	(0.0005)	0.0000	0.0000	(0.0136)	0.0000
		Total	0.1322	0.0519	0.0030	0.0041	0.0074	0.0004	0.0000	0.1991	0.0002
		(SE)	(0.0540)	(0.0283)	(0.0020)	(0.0024)	(0.0042)	(0.0006)	0.0000	(0.0638)	(0.0003)
MN-3	4	Kept	0.0798	0.0984	0.0217	0.0010	0.0000	0.0020	0.0000	0.2029	0.0000
		(SE)	(0.0376)	(0.0670)	(0.0117)	(0.0010)	0.0000	(0.0023)	0.0000	(0.0816)	0.0000
		Released	0.0521	0.0030	0.0000	0.0150	0.0000	0.0028	0.0000	0.0729	0.0000
		(SE)	(0.0436)	(0.0031)	0.0000	(0.0114)	0.0000	(0.0041)	0.0000	(0.0460)	0.0000
Lower	1 & 2	Total	0.1319	0.1014	0.0217	0.0160	0.0000	0.0049	0.0000	0.2758	0.0000
		(SE)	(0.0576)	(0.0671)	(0.0117)	(0.0114)	0.0000	(0.0047)	0.0000	(0.0937)	0.0000
		Kept	0.1001	0.0800	0.0485	0.0026	0.0011	0.0018	0.0013	0.2354	0.0000
		(SE)	(0.0476)	(0.0475)	(0.0287)	(0.0026)	(0.0016)	(0.0023)	(0.0014)	(0.0799)	0.0000
Upper	3 & 4	Released	0.0168	0.0004	0.0000	0.0160	0.0000	0.0000	0.0036	0.0368	0.0000
		(SE)	(0.0105)	(0.0006)	0.0000	(0.0111)	0.0000	0.0000	(0.0052)	(0.0170)	0.0000
		Total	0.1169	0.0804	0.0485	0.0186	0.0011	0.0018	0.0050	0.2722	0.0000
		(SE)	(0.0487)	(0.0475)	(0.0287)	(0.0114)	(0.0016)	(0.0023)	(0.0054)	(0.0817)	0.0000
Total	1,2,3,4	Kept	0.0937	0.0493	0.0045	0.0006	0.0054	0.0003	0.0013	0.1550	0.0017
		(SE)	(0.0392)	(0.0228)	(0.0022)	(0.0006)	(0.0031)	(0.0005)	(0.0011)	(0.0473)	(0.0016)
		Released	0.0154	0.0011	0.0000	0.0025	0.0008	0.0000	0.0000	0.0198	0.0023
		(SE)	(0.0097)	(0.0012)	0.0000	(0.0018)	(0.0007)	0.0000	0.0000	(0.0101)	(0.0029)
Total	1,2,3,4	Total	0.1091	0.0504	0.0045	0.0031	0.0062	0.0003	0.0013	0.1748	0.0040
		(SE)	(0.0404)	(0.0228)	(0.0022)	(0.0019)	(0.0032)	(0.0005)	(0.0012)	(0.0548)	(0.0033)
		Kept	0.0858	0.0930	0.0295	0.0014	0.0003	0.0020	0.0004	0.2124	0.0000
		(SE)	(0.0295)	(0.0493)	(0.0119)	(0.0010)	(0.0005)	(0.0018)	(0.0004)	(0.0625)	0.0000
Total	1,2,3,4	Released	0.0240	0.0013	0.0000	0.0088	0.0000	0.0011	0.0006	0.0358	0.0000
		(SE)	(0.0308)	(0.0022)	0.0000	(0.0087)	0.0000	(0.0029)	(0.0015)	(0.0327)	0.0000
		Total	0.1098	0.0943	0.0295	0.0102	0.0003	0.0031	0.0010	0.2482	0.0000
		(SE)	(0.0426)	(0.0493)	(0.0119)	(0.0088)	(0.0005)	(0.0034)	(0.0016)	(0.0705)	0.0000
Total	1,2,3,4	Kept	0.0905	0.0671	0.0147	0.0009	0.0033	0.0010	0.0009	0.1785	0.0010
		(SE)	(0.0261)	(0.0242)	(0.0049)	(0.0006)	(0.0018)	(0.0008)	(0.0009)	(0.0379)	(0.0009)
		Released	0.0197	0.0012	0.0000	0.0056	0.0004	0.0006	0.0003	0.0277	0.0012
		(SE)	(0.0138)	(0.0011)	0.0000	(0.0037)	(0.0004)	(0.0012)	(0.0006)	(0.0146)	(0.0017)
Total	1,2,3,4	Total	0.1101	0.0683	0.0147	0.0065	0.0037	0.0016	0.0012	0.2062	0.0022
		(SE)	(0.0295)	(0.0242)	(0.0049)	(0.0037)	(0.0018)	(0.0014)	(0.0011)	(0.0406)	(0.0019)

¹ Wisconsin anglers who fished Minnesota waters of Lake Superior also caught an estimated 257 Lake Trout, 253 Coho Salmon, 127 Chinook Salmon, 21 Brown Trout, 7 Walleyes, and 10 Lake Whitefish.

² Other Salmonines include 77 Brown Trout, 14 Brook Trout, and 24 Kamloops that were harvested, and 54 Brook Trout that were reported as released. Anglers also kept 30 Northern Pike, and reported keeping 19 and releasing 14 Lake Herring.

Table 12. Catch rate (fish* hour⁻¹) by species, location, and shore area for charter anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Fate	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other ³ Salmonines	Total Salmonines	Walleye
MN-1	1	Kept	0.1097	0.0371	0.0126	0.0001	0.0162	0.0001	0.0012	0.1770	0.0129
		Released	0.0022	0.0002	0.0001	0.0024	0.0003	0.0000	0.0001	0.0052	0.0006
		Total	0.1119	0.0372	0.0127	0.0025	0.0165	0.0001	0.0014	0.1822	0.0134
MN-1	2	Kept	0.1466	0.0450	0.0106	0.0000	0.0008	0.0000	0.0025	0.2056	0.0008
		Released	0.0311	0.0000	0.0000	0.0098	0.0000	0.0000	0.0008	0.0418	0.0000
		Total	0.1777	0.0450	0.0106	0.0098	0.0008	0.0000	0.0033	0.2473	0.0008
MN-2	3	Kept	0.2103	0.0919	0.0322	0.0000	0.0634	0.0008	0.0006	0.3992	0.0000
		Released	0.0379	0.0002	0.0002	0.0081	0.0114	0.0000	0.0000	0.0577	0.0000
		Total	0.2482	0.0921	0.0324	0.0081	0.0748	0.0008	0.0006	0.4569	0.0000
MN-3	4	Kept	0.2565	0.1413	0.0654	0.0004	0.0064	0.0000	0.0004	0.4703	0.0000
		Released	0.0536	0.0000	0.0000	0.0038	0.0015	0.0000	0.0000	0.0589	0.0000
		Total	0.3102	0.1413	0.0654	0.0042	0.0079	0.0000	0.0004	0.5293	0.0000
Lower	1,2	Kept	0.1106	0.0373	0.0126	0.0001	0.0159	0.0001	0.0013	0.1776	0.0126
		Released	0.0028	0.0002	0.0001	0.0026	0.0003	0.0000	0.0002	0.0061	0.0006
		Total	0.1134	0.0374	0.0126	0.0027	0.0161	0.0001	0.0014	0.1837	0.0131
Upper	3,4	Kept	0.2261	0.1088	0.0435	0.0001	0.0439	0.0005	0.0005	0.4235	0.0000
		Released	0.0433	0.0001	0.0001	0.0066	0.0080	0.0000	0.0000	0.0581	0.0000
		Total	0.2694	0.1089	0.0437	0.0067	0.0519	0.0005	0.0005	0.4817	0.0000
Total	1,2,3,4	Kept	0.1255	0.0465	0.0165	0.0001	0.0195	0.0001	0.0012	0.2093	0.0110
		Released	0.0080	0.0001	0.0001	0.0031	0.0013	0.0000	0.0001	0.0128	0.0005
		Total	0.1335	0.0466	0.0166	0.0032	0.0207	0.0001	0.0013	0.2221	0.0114

¹ Great Lakes Fishery Commission Statistical Districts

² Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

³ Other Salmonines includes 60 Brown Trout and 9 kamloops that were harvested, and 2 Brown Trout and 9 kamloops that were released. Anglers also kept 9 Northern Pike, and kept 2 Herring (Cisco) and 4 Lake Whitefish.

Table 13. Catch rate (fish* hour⁻¹) by species, location, and shore area for all anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ¹	Cluster ²	Fate	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other ³ Salmonines	Total Salmonines	Walleye
MN-1	1	Kept	0.0942	0.0397	0.0116	0.0000	0.0121	0.0001	0.0023	0.1599	0.0110
		(SE)	(0.0272)	(0.0354)	(0.0067)	0.0000	(0.0013)	0.0000	(0.0044)	(0.0460)	(0.0060)
		Released	0.0026	0.0001	0.0001	0.0024	0.0008	0.0000	0.0001	0.0062	0.0034
		(SE)	(0.0049)	0.0000	0.0000	(0.0026)	(0.0024)	0.0000	0.0000	(0.0061)	(0.0113)
MN-1	2	Total	0.0969	0.0398	0.0116	0.0025	0.0129	0.0001	0.0024	0.1661	0.0144
		(SE)	(0.0276)	(0.0354)	(0.0067)	(0.0026)	(0.0027)	0.0000	(0.0044)	(0.0464)	(0.0128)
		Kept	0.1089	0.0501	0.0032	0.0007	0.0068	0.0004	0.0001	0.1701	0.0002
		(SE)	(0.0524)	(0.0283)	(0.0020)	(0.0009)	(0.0042)	(0.0006)	0.0000	(0.0623)	(0.0003)
MN-2	3	Released	0.0243	0.0017	0.0000	0.0034	0.0005	0.0000	0.0000	0.0300	0.0000
		(SE)	(0.0131)	(0.0016)	0.0000	(0.0022)	(0.0005)	0.0000	0.0000	(0.0136)	0.0000
		Total	0.1332	0.0518	0.0032	0.0042	0.0072	0.0004	0.0001	0.2001	0.0002
		(SE)	(0.0540)	(0.0283)	(0.0020)	(0.0024)	(0.0042)	(0.0006)	0.0000	(0.0638)	(0.0003)
MN-3	4	Kept	0.0961	0.0976	0.0230	0.0009	0.0079	0.0019	0.0000	0.2274	0.0000
		(SE)	(0.0376)	(0.0670)	(0.0117)	(0.0010)	0.0000	(0.0023)	0.0000	(0.0816)	0.0000
		Released	0.0503	0.0026	0.0000	0.0141	0.0014	0.0025	0.0000	0.0711	0.0000
		(SE)	(0.0436)	(0.0031)	0.0000	(0.0114)	0.0000	(0.0041)	0.0000	(0.0460)	0.0000
MN-3	4	Total	0.1464	0.1002	0.0230	0.0150	0.0093	0.0044	0.0001	0.2984	0.0000
		(SE)	(0.0576)	(0.0671)	(0.0117)	(0.0114)	0.0000	(0.0047)	0.0000	(0.0937)	0.0000
		Kept	0.1460	0.1052	0.0602	0.0026	0.0022	0.0018	0.0014	0.3194	0.0000
		(SE)	(0.0476)	(0.0475)	(0.0287)	(0.0026)	(0.0016)	(0.0023)	(0.0014)	(0.0799)	0.0000
Lower	1 & 2	Released	0.0264	0.0004	0.0000	0.0167	0.0003	0.0000	0.0036	0.0474	0.0000
		(SE)	(0.0105)	(0.0006)	0.0000	(0.0111)	0.0000	0.0000	(0.0052)	(0.0170)	0.0000
		Total	0.1723	0.1056	0.0602	0.0193	0.0025	0.0018	0.0051	0.3668	0.0000
		(SE)	(0.0487)	(0.0475)	(0.0287)	(0.0114)	(0.0016)	(0.0023)	(0.0054)	(0.0817)	0.0000
Upper	3 & 4	Kept	0.1007	0.0443	0.0079	0.0004	0.0097	0.0002	0.0013	0.1644	0.0062
		(SE)	(0.0392)	(0.0228)	(0.0022)	(0.0006)	(0.0031)	(0.0005)	(0.0011)	(0.0473)	(0.0016)
		Released	0.0123	0.0008	0.0000	0.0029	0.0007	0.0000	0.0001	0.0168	0.0019
		(SE)	(0.0097)	(0.0012)	0.0000	(0.0018)	(0.0007)	0.0000	0.0000	(0.0101)	(0.0029)
Upper	3 & 4	Total	0.1130	0.0451	0.0079	0.0032	0.0104	0.0002	0.0014	0.1812	0.0081
		(SE)	(0.0404)	(0.0228)	(0.0022)	(0.0019)	(0.0032)	(0.0005)	(0.0012)	(0.0548)	(0.0033)
		Kept	0.1044	0.0951	0.0314	0.0013	0.0061	0.0018	0.0004	0.2404	0.0000
		(SE)	(0.0295)	(0.0493)	(0.0119)	(0.0010)	(0.0005)	(0.0018)	(0.0004)	(0.0625)	0.0000
Total	1,2,3,4	Released	0.0420	0.0019	0.0000	0.0141	0.0011	0.0017	0.0010	0.0618	0.0000
		(SE)	(0.0308)	(0.0022)	0.0000	(0.0087)	0.0000	(0.0029)	(0.0015)	(0.0327)	0.0000
		Total	0.1464	0.0970	0.0314	0.0154	0.0072	0.0035	0.0014	0.3022	0.0000
		(SE)	(0.0426)	(0.0493)	(0.0119)	(0.0088)	(0.0005)	(0.0034)	(0.0016)	(0.0705)	0.0000
Total	1,2,3,4	Kept	0.1019	0.0604	0.0153	0.0006	0.0086	0.0007	0.0010	0.1885	0.0043
		(SE)	(0.0261)	(0.0242)	(0.0049)	(0.0006)	(0.0018)	(0.0008)	(0.0009)	(0.0379)	(0.0009)
		Released	0.0217	0.0012	0.0000	0.0065	0.0008	0.0005	0.0004	0.0311	0.0013
		(SE)	(0.0138)	(0.0011)	0.0000	(0.0037)	(0.0004)	(0.0012)	(0.0006)	(0.0146)	(0.0017)
Total	1,2,3,4	Total	0.1236	0.0616	0.0153	0.0071	0.0094	0.0013	0.0014	0.2196	0.0055
		(SE)	(0.0295)	(0.0242)	(0.0049)	(0.0037)	(0.0018)	(0.0014)	(0.0011)	(0.0406)	(0.0019)

¹ Great Lakes Fishery Commission Statistical Districts

² Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

³ Other Salmonines include Brown Trout, Brook Trout, Kamloops Rainbow Trout, and Atlantic Salmon.

Table 14. Percent of private sport angling parties, by angler type, that caught specific numbers of fish in the 2019 Lake Superior summer creel survey.

	Lake Trout		Coho Salmon		Chinook Salmon		Steelhead		Siscowet		Pink Salmon		Total Salmonines	
	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore	Boat	Shore
0	53.9	98.3	70.8	94.9	87.2	98.3	93.0	98.3	96.4	100	98.7	100	34.9	84.7
1	21.3	1.7	14.3	0	9.9	1.7	5.3	1.7	2.9	0	1.0	0	17.9	5.1
2	9.0	0	5.8	3.4	1.5	0	1.4	0	0.5	0	0	0	14.1	5.1
3	7.5	0	4.1	0	1.0	0	0.3	0	0.3	0	0.3	0	12.2	1.7
4	2.9	0	2.0	1.7	0.2	0	0	0	0	0	0	0	7.8	3.4
5	1.7	0	1.4	0	0.2	0	0	0	0	0	0	0	3.2	0
6	1.4	0	0.5	0	0	0	0	0	0	0	0	0	3.6	0
7	1.2	0	0.3	0	0	0	0	0	0	0	0	0	2.6	0
8	0.5	0	0.2	0	0	0	0	0	0	0	0	0	1.4	0
9	0.2	0	0.2	0	0	0	0	0	0	0	0	0	0.5	0
10	0	0	0.2	0	0	0	0	0	0	0	0	0	0.5	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0
>=12	0.4	0	0.2	0	0	0	0	0	0	0	0	0	0.8	0

Table 15. Percent of chartered angling parties that caught specific numbers of fish in the 2019 Lake Superior summer creel survey.

Number of Fish Caught	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other Salmonines	Total Salmonines
0	9.6	62.6	74.8	91.6	73.9	99.1	97.2	3.1
1	14.0	17.8	16.8	6.5	15.9	0.9	2.8	5.6
2	19.6	2.8	5.6	1.9	6.5	0	0	10.3
3	15.9	5.6	2.8	0	2.8	0	0	9.3
4	14.0	2.8	0	0	0	0	0	12.1
5	6.5	5.6	0	0	0.9	0	0	15.0
6	4.7	0	0	0	0	0	0	9.3
7	5.6	2.8	0	0	0	0	0	9.3
8	0.9	0	0	0	0	0	0	8.4
9	2.8	0	0	0	0	0	0	6.5
10	2.8	0	0	0	0	0	0	3.7
11	0.9	0	0	0	0	0	0	3.7
>=12	2.7	0	0	0	0	0	0	3.7

Table 16. Length-frequency distribution (inches) and sample size of harvested salmonines by private sport boat and shore anglers in the 2019 Lake Superior summer creel survey.

Species	Lake Trout	Coho Salmon	Chinook Salmon	Kamloops	Steelhead	Siscowet	Pink Salmon
Sample Size	380	209	52	1	6	27	2
6.5 to 7.4							
7.5 to 8.4							
8.5 to 9.4							
9.5 to 10.4							
10.5 to 11.4							
11.5 to 12.4							
12.5 to 13.4	1						
13.5 to 14.4		1					
14.5 to 15.4	3	1					
15.5 to 16.4	12	12	1				1
16.5 to 17.4	12	56	2				1
17.5 to 18.4	21	62	2				
18.5 to 19.4	23	32	3		2		
19.5 to 20.4	41	18	4			5	
20.5 to 21.4	40	19	8			6	
21.5 to 22.4	37	5	8		1	4	
22.5 to 23.4	44	1	9		1	4	
23.5 to 24.4	41	2	4	1	2	6	
24.5 to 25.4	37					1	
25.5 to 26.4	16		4			1	
26.5 to 27.4	15		4				
27.5 to 28.4	11		2				
28.5 to 29.4	10		1				
29.5 to 30.4	6						
30.5 to 31.4	5						
31.5 to 32.4	2						
32.5 to 33.4							
33.5 to 34.4	1						
34.5 to 35.4							
35.5 to 36.4							
36.5 to 37.4	1						
37.5 to 38.4							
38.5 to 39.4							
39.5 to 40.4							
>40.4	1						
Average Length (inch)	22.6	18.3	22.5	23.7	22.0	22.1	16.4

Table 17. Length-frequency distribution (inches) and sample size of harvested salmonines by charter anglers¹ in the 2019 Lake Superior summer creel survey.

	Lake Trout	Coho Salmon	Chinook Salmon	Kamloops	Steelhead	Siscowet	Pink Salmon
Length(in)	333	79	28	0	2	45	1
6.5 to 7.4							
7.5 to 8.4							
8.5 to 9.4							
9.5 to 10.4							
10.5 to 11.4							
11.5 to 12.4							
12.5 to 13.4							
13.5 to 14.4	0				1		
14.5 to 15.4	2						
15.5 to 16.4	4	18			1		1
16.5 to 17.4	12	27	1				
17.5 to 18.4	23	21				1	
18.5 to 19.4	31	5	4			5	
19.5 to 20.4	30	3	3			4	
20.5 to 21.4	44	2	4			13	
21.5 to 22.4	42	2	3			7	
22.5 to 23.4	36		7			6	
23.5 to 24.4	30		1			6	
24.5 to 25.4	11	1	2				
25.5 to 26.4	16					1	
26.5 to 27.4	13		3				
27.5 to 28.4	8					1	
28.5 to 29.4	10						
29.5 to 30.4	7						
30.5 to 31.4	7						
31.5 to 32.4	2						
32.5 to 33.4	2						
33.5 to 34.4							
34.5 to 35.4							
35.5 to 36.4							
36.5 to 37.4							
37.5 to 38.4							
38.5 to 39.4							
39.5 to 40.4							
>40.4							
Average Length (inch)	22.5	17.6	22.2	0	14.8	21.8	21.5

¹ Includes clients of chartered boat trips and excludes personal trips by licensed charter captains.

Table 18. Length-frequency distribution (inches) and sample size of released salmonines by private sport boat and shore anglers in the 2019 Lake Superior summer creel survey.

	Lake Trout	Coho Salmon	Chinook Salmon	Kamloops	Steelhead	Siscowet	Pink Salmon	Brook Trout
Length(in)	122	13	0	0	51	3	4	5
6.5 to 7.4					2			
7.5 to 8.4	1	1			2			
8.5 to 9.4								
9.5 to 10.4		1					3	3
10.5 to 11.4								
11.5 to 12.4	1	1					1	
12.5 to 13.4					1			
13.5 to 14.4	4	2						2
14.5 to 15.4	7							
15.5 to 16.4	17	2						
16.5 to 17.4	6	1						
17.5 to 18.4	14	1			2			
18.5 to 19.4	4							
19.5 to 20.4	17	4				2		
20.5 to 21.4	2				3			
21.5 to 22.4	11				5	1		
22.5 to 23.4	2				5			
23.5 to 24.4	12				9			
24.5 to 25.4	5				9			
25.5 to 26.4	2				3			
26.5 to 27.4					6			
27.5 to 28.4	2				2			
28.5 to 29.4	1							
29.5 to 30.4	3							
30.5 to 31.4	3				1			
31.5 to 32.4	1				1			
32.5 to 33.4								
33.5 to 34.4								
34.5 to 35.4	1							
35.5 to 36.4	3							
36.5 to 37.4								
37.5 to 38.4	1							
38.5 to 39.4								
39.5 to 40.4								
>40.4								
Average Length (inch)	21.0	15.0			23.5	20.7	11.0	12.0

Table 19. Length-frequency distribution (inches) and sample size of released salmonines by charter anglers¹ in the 2019 Lake Superior summer creel survey.

	Lake Trout	Coho Salmon	Chinook Salmon	Kamloops	Steelhead	Siscowet	Pink Salmon
Length(in)	16	0	0	0	8	0	0
6.5 to 7.4							
7.5 to 8.4							
8.5 to 9.4							
9.5 to 10.4							
10.5 to 11.4							
11.5 to 12.4	1						
12.5 to 13.4							
13.5 to 14.4							
14.5 to 15.4							
15.5 to 16.4	1						
16.5 to 17.4	2						
17.5 to 18.4	1				1		
18.5 to 19.4							
19.5 to 20.4	0				2		
20.5 to 21.4							
21.5 to 22.4	4				4		
22.5 to 23.4					2		
23.5 to 24.4							
24.5 to 25.4							
25.5 to 26.4							
26.5 to 27.4							
27.5 to 28.4							
28.5 to 29.4							
29.5 to 30.4							
30.5 to 31.4	1						
31.5 to 32.4							
32.5 to 33.4							
33.5 to 34.4	1						
34.5 to 35.4	1						
35.5 to 36.4							
36.5 to 37.4							
37.5 to 38.4							
38.5 to 39.4							
39.5 to 40.4	1						
>40.4							
Average Length (inch)	24.3	0	0	0	21.3	0	0

¹ Includes clients of chartered boat trips and excludes personal trips by licensed charter captains.

Table 20. Average weight (pounds) of harvested fish by species, location, and shore area for private boat and shore anglers in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ²	Cluster ³	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Walleye
	Sample size (n)	380	209	52	8	2	6	7
MN-1	1	3.62 (2.74)	1.31 (1.38)	3.52 (3.54)	0 (0)	3.00 (6.20)	0 (0)	2.45 (3.43)
MN-1	2	3.88 (2.65)	1.60 (1.22)	3.52 (3.15)	3.69 (4.49)	3.00 (2.49)	1.30 (2.05)	2.45 (5.34)
MN-2	3	4.05 (2.58)	2.12 (1.95)	3.90 (2.90)	3.69 (3.97)	0 (0)	1.30 (1.59)	0 (0)
MN-3	4	2.87 (1.82)	2.29 (1.88)	3.74 (3.04)	3.69 (4.02)	3.14 (4.88)	1.30 (1.55)	0 (0)
MN-1	Lower Shore	3.84 (2.30)	1.53 (0.98)	3.52 (2.37)	3.69 (4.49)	3.00 (2.40)	1.30 (2.05)	2.45 (3.14)
MN-2 & 3	Upper Shore	3.64 (1.77)	2.17 (1.55)	3.83 (2.10)	3.69 (2.83)	3.14 (4.88)	1.30 (1.24)	0.00 (0.00)
	Total Shore	3.77 (1.56)	1.89 (0.95)	3.77 (1.76)	3.69 (2.43)	3.00 (2.32)	1.30 (1.08)	2.45 (3.14)

Table 21. Average weight (pounds) of harvested fish by species, location, and shore area for charter anglers¹ in the 2019 Lake Superior summer creel survey. SE in parentheses.

District ²	Cluster ³	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Walleye
	Sample size (n)	354	91	35	2	45	1	14
MN-1	1	3.79 (0.36)	1.45 (0.27)	3.43 (0.54)	4.62 (0.28)	2.93 (0.31)	1.05 (0.21)	2.81 (0.26)
MN-1	2	2.97 (0.92)	1.10 (0.75)	0 (0)	2.64 (3.23)	2.56 (1.60)	0 (0)	- -
MN-2	3	3.11 (0.58)	2.13 (0.54)	3.67 (0.63)	4.10 (4.41)	3.14 (0.80)	0 (0)	- -
MN-3	4	3.11 (0.59)	2.18 (0.63)	4.12 (1.06)	3.75 (5.50)	3.19 (1.79)	0 (0)	- -
MN-1	Lower Shore	3.76 (0.35)	1.44 (0.26)	3.43 (0.54)	4.62 (0.56)	2.93 (0.31)	1.05 (0.21)	2.81 (0.26)
MN-2 & 3	Upper Shore	3.11 (0.43)	2.15 (0.37)	3.90 (0.79)	3.75 (1.67)	3.14 (0.81)	0 (0)	- -
	Total Shore	3.61 (0.29)	1.66 (0.22)	3.60 (0.48)	4.40 (0.32)	2.99 (0.31)	1.05 (0.21)	2.81 (0.26)

¹ Includes clients of chartered boat trips and excludes personal trips by licensed charter captains.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

Table 22. Yield¹ (pounds) by species, location, and shore area for private sport boat and shore anglers in the 2019 Lake Superior summer creel survey. SE values are in parentheses.

District ²	Cluster ³	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other Salmonines ⁴	Total Salmonines	Walleye ⁵
MN-1	1	3,507 (2,185)	1,141 (851)	581 (414)	0 (0)	51 (75)	0 (0)	422 (146)	5,702 (2,386)	276 (259)
MN-1	2	22,860 (11,520)	4,388 (2,363)	581 (369)	151 (50)	1,131 (668)	31 (18)	0 (0)	29,141 (11,784)	29 (24)
MN-2	3	11,546 (5,462)	7,470 (4,773)	3,020 (1,629)	129 (58)	0 (0)	95 (54)	0 (0)	22,260 (7,434)	0 (0)
MN-3	4	4,262 (1,932)	2,709 (1,608)	2,692 (1,586)	140 (151)	50 (23)	34 (20)	77 (33)	9,964 (2,972)	0 (0)
MN-1	1 & 2	26,367 (11,725)	5,528 (2,511)	1,161 (554)	151 (50)	1,182 (673)	31 (18)	422 (146)	34,843 (12,023)	306 (260)
MN-2 & 3	3 & 4	15,808 (5,793)	10,179 (5,037)	5,712 (2,274)	269 (162)	50 (23)	129 (57)	77 (33)	32,224 (8,007)	0 (0)
Total		42,175 (13,078)	15,707 (5,628)	6,874 (2,340)	421 (169)	1,232 (673)	160 (60)	499 (150)	67,068 (14,445)	306 (260)

¹ Estimates are rounded to the nearest pound.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

⁴ Other Salmonines included Brown Trout (352 lb.), kamloops Rainbow Trout (104 lb), and Brook Trout (9 lb)

⁵ Anglers also harvested Northern Pike (174 lb) and Cisco (34 lb).

Table 23. Yield¹ (pounds) by species, location, and shore area for charter anglers in the 2019 Lake Superior summer creel survey. SE values are in parentheses.

District ²	Cluster ³	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other Salmonines ⁴	Total Salmonines	Walleye
MN-1	1	21,258 (7,632)	2,748 (1,438)	2,210 (1,618)	14 (7)	2,430 (1,362)	4 (2)	266 (198)	28,930 (8,051)	1,847 (333)
MN-1	2	534 (512)	61 (53)	51 (0)	0 (0)	0 (0)	0 (0)	12 (5)	658 (515)	3 (1)
MN-2	3	3,334 (2,537)	999 (734)	601 (475)	0 (0)	1,013 (342)	4 (2)	8 (7)	5,960 (2,705)	0 (0)
MN-3	4	2,109 (1,620)	814 (643)	712 (733)	4 (2)	54 (23)	0 (0)	4 (4)	3,697 (1,891)	0 (0)
MN-1	1 & 2	21,792 (7,649)	2,808 (1,439)	2,261 (1,618)	14 (7)	2,430 (1,362)	4 (2)	279 (198)	29,588 (8,068)	1,850 (333)
MN-2 & 3	3 & 4	5,443 (3,010)	1,813 (976)	1,313 (873)	4 (2)	1,067 (343)	4 (2)	13 (8)	9,657 (3,300)	0 (0)
Total		27,235 (8,220)	4,621 (1,739)	3,574 (1,839)	18 (8)	3,497 (1,404)	8 (2)	291 (198)	39,245 (8,717)	1,850 (333)

¹ Estimates are rounded to the nearest pound.

² Great Lakes Fishery Commission Statistical Districts

³ Cluster 1=Duluth, Cluster 2=McQuade-Two Harbors, Cluster 3=Twin Points-Taconite Harbor, Cluster 4=Grand Marais-Hovland.

⁴ Other Salmonines included Brown Trout (255 lb.) and kamloops Rainbow Trout (37 lb.).

⁵ Anglers harvested Northern Pike (35 lb.), Cisco (7 lb.), and Lake Whitefish (7 lb.).

Table 24. Yield¹ (pounds) by species, location, and shore area for all anglers in the 2019 Lake Superior summer creel survey. SE values are in parentheses.

District ³	Cluster ⁴	Lake Trout	Coho Salmon	Chinook Salmon	Steelhead	Siscowet	Pink Salmon	Other Salmonines ⁴	Total Salmonines	Walleye
MN-1	1	24,765 (7,938)	3,889 (1,671)	2,791 (1,670)	14 (7)	2,481 (1,364)	4 (2)	688 (246)	34,632 (8,397)	2,123 (422)
MN-1	2	23,394 (11,531)	4,448 (2,363)	632 (369)	151 (50)	1,131 (668)	31 (18)	12 (5)	29,799 (11,795)	32 (24)
MN-2	3	14,880 (6,022)	8,468 (4,829)	3,621 (1,697)	129 (58)	1,013 (342)	99 (54)	8 (7)	28,220 (7,911)	0 (0)
MN-3	4	6,371 (2,521)	3,523 (1,732)	3,404 (1,747)	144 (151)	104 (32)	34 (20)	81 (33)	13,662 (3,523)	0 (0)
MN-1	1 & 2	48,159 (13,999)	8,337 (2,894)	3,422 (1,710)	165 (51)	3,612 (1,519)	35 (18)	701 (246)	64,431 (14,479)	2,156 (423)
MN-2 & 3	3 & 4	21,251 (6,528)	11,991 (5,131)	7,026 (2,436)	273 (162)	1,118 (343)	133 (57)	90 (34)	41,881 (8,660)	0 (0)
Total		69,410 (15,447)	20,328 (5,891)	10,448 (2,976)	438 (169)	4,729 (1,557)	168 (60)	791 (248)	106,313 (16,871)	2,156 (423)

¹ Estimates are rounded to the nearest pound.

² Other Salmonines included Brown Trout (607 lb.), kamloops Rainbow Trout (141 lb.), and Brook Trout (9 lb.).

³ Anglers harvested Northern Pike (209 lb.), Cisco (41 lb.), and Lake Whitefish (7 lb.).

Table 25. Age distribution, in percent, of harvested lean Lake Trout (wild and stocked) for private sport boat and shore anglers in the 2019 Lake Superior summer creel survey. n=379.

Age	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI+
%	0	1.32	8.97	24.54	19.79	13.46	8.44	4.75	4.49	3.69	2.37	1.85	6.07

Table 26. Age distribution, in percent, of harvested lean Lake Trout (wild and stocked) for all chartered anglers in the 2019 Lake Superior summer creel survey. n=333.

Age	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI+
%	0	0.30	9.31	25.53	18.02	11.71	8.41	5.71	5.41	3.60	2.40	2.10	7.21

Table 27. Age distribution, in percent, of harvested lean Lake Trout (wild and stocked) for all anglers in the 2019 Lake Superior summer creel survey. n=712.

Age	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI+
%	0	0.84	9.14	25.04	18.99	12.66	8.44	5.20	4.92	3.66	2.39	1.97	6.75

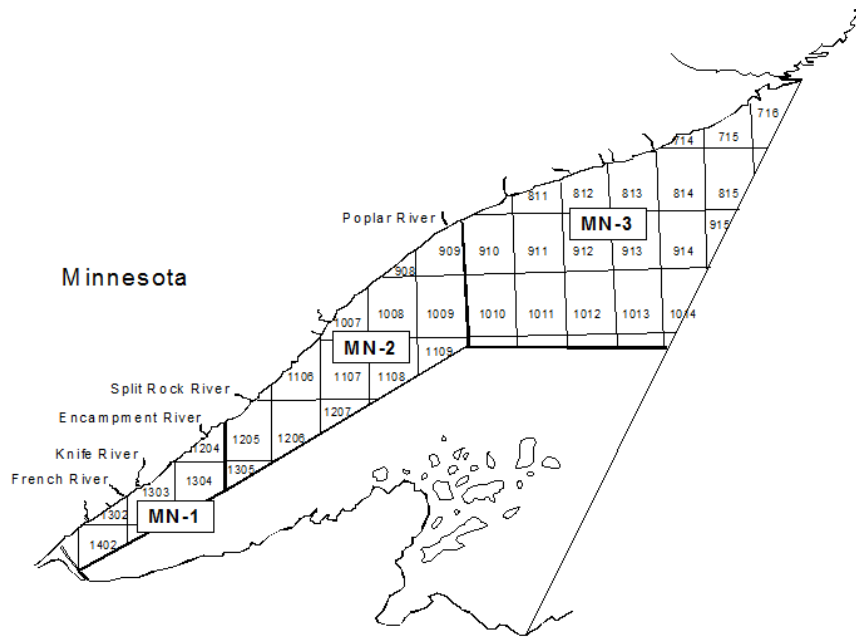


Figure 1. Statistical districts in Minnesota waters of Lake Superior.

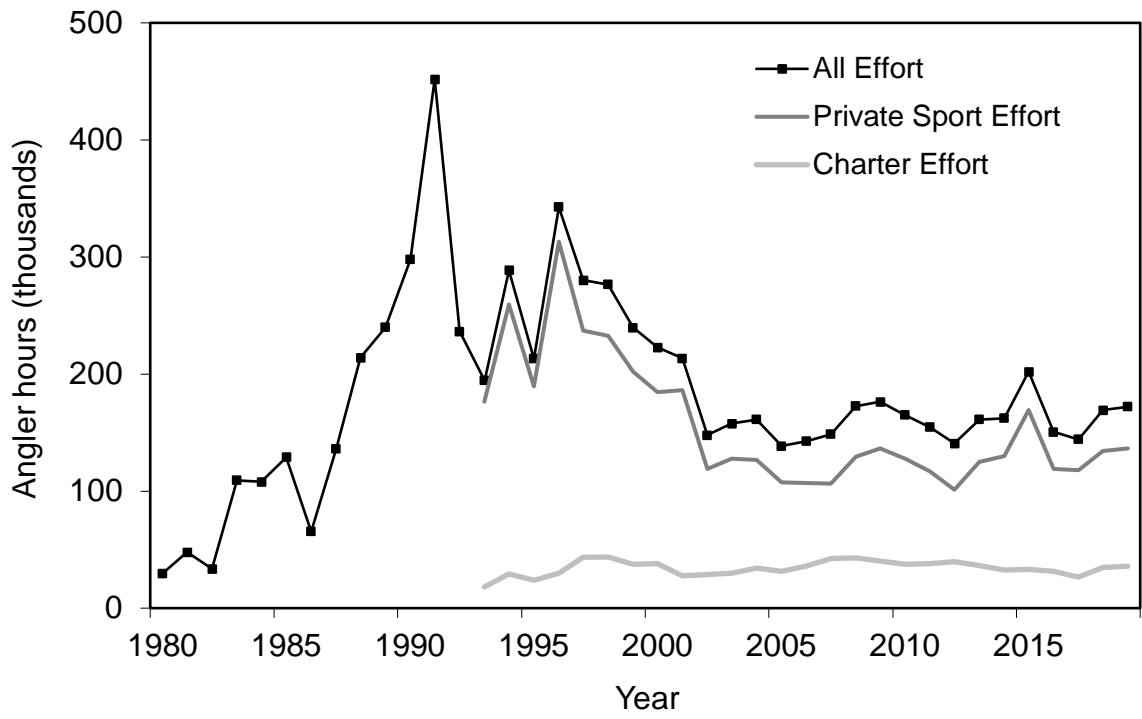


Figure 2. Angling effort in the Lake Superior summer creel survey, 1980-2019. The design of the summer Lake Superior creel survey was changed in 1994 (Halpern 1995a,b).

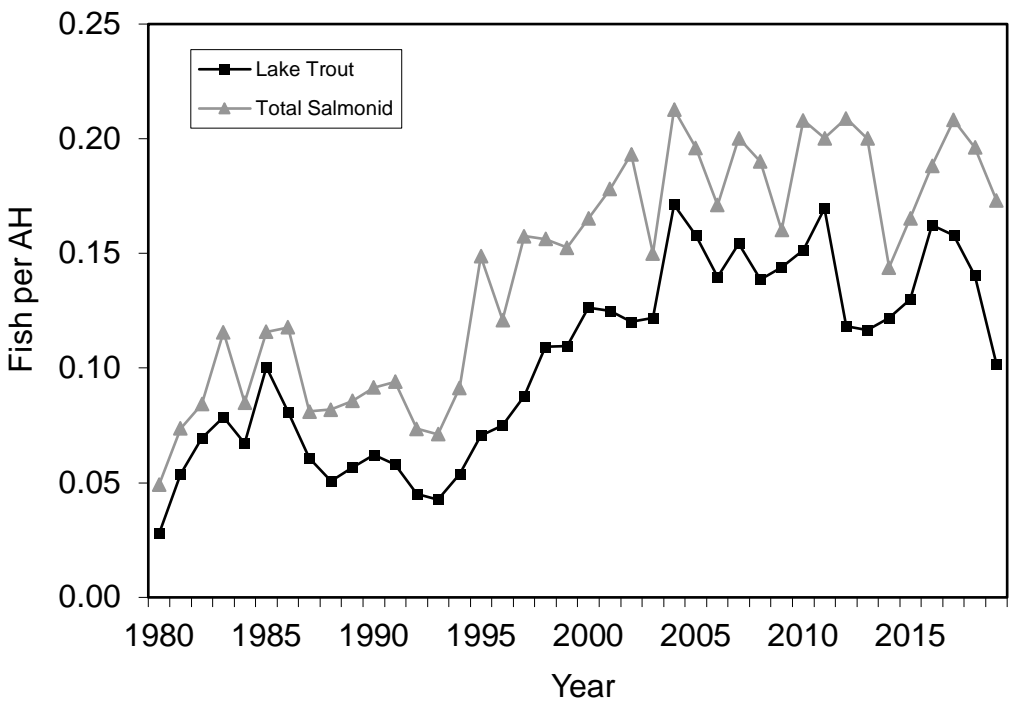


Figure 3. Harvest rate for Lake Trout and all Salmonines combined in the Lake Superior summer creel survey, 1980-2019.

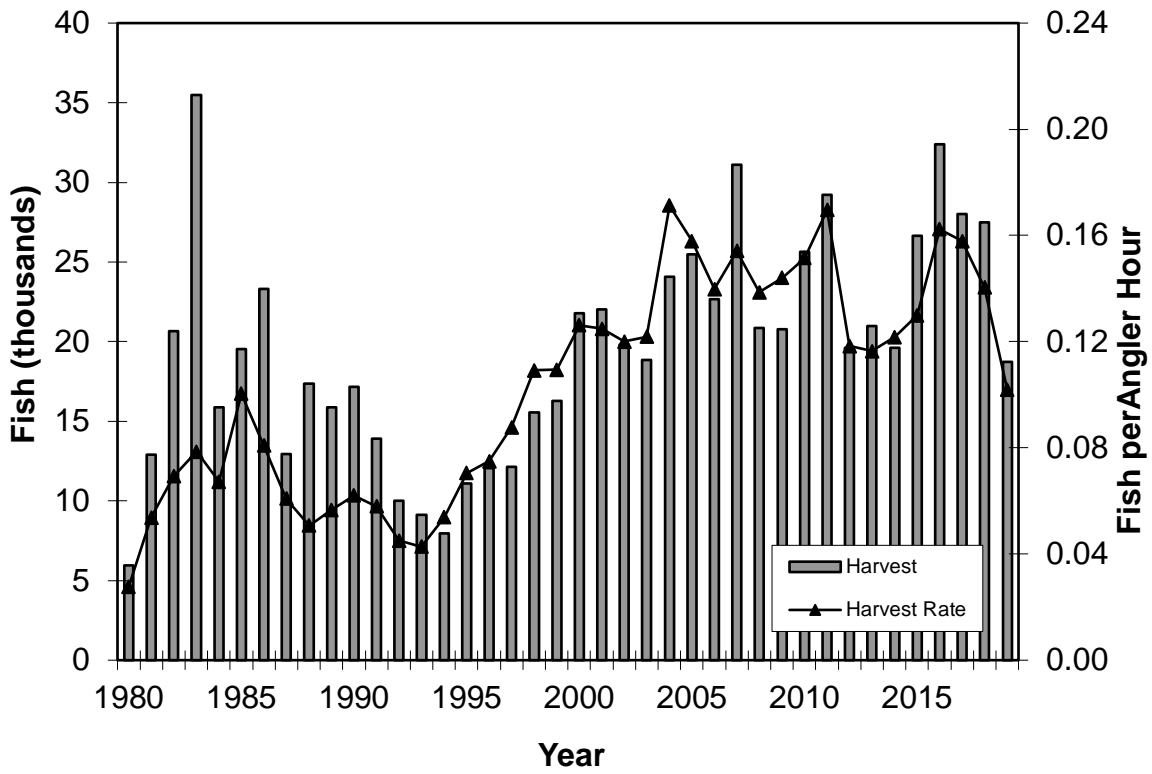


Figure 4. Lake Trout harvest and harvest rate in the Lake Superior summer creel survey, 1980-2019.

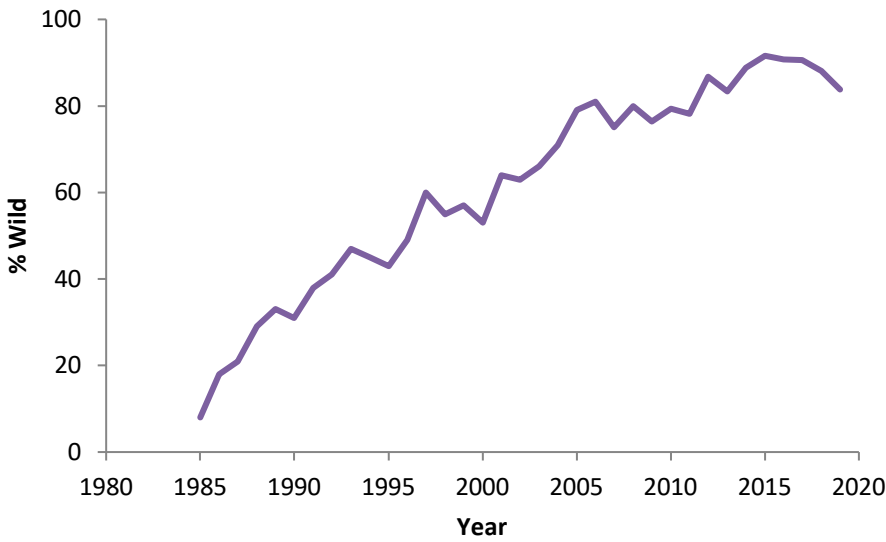


Figure 5. Percent wild Lake Trout observed by creel clerks in the Lake Superior summer creel survey, 1985-2019.

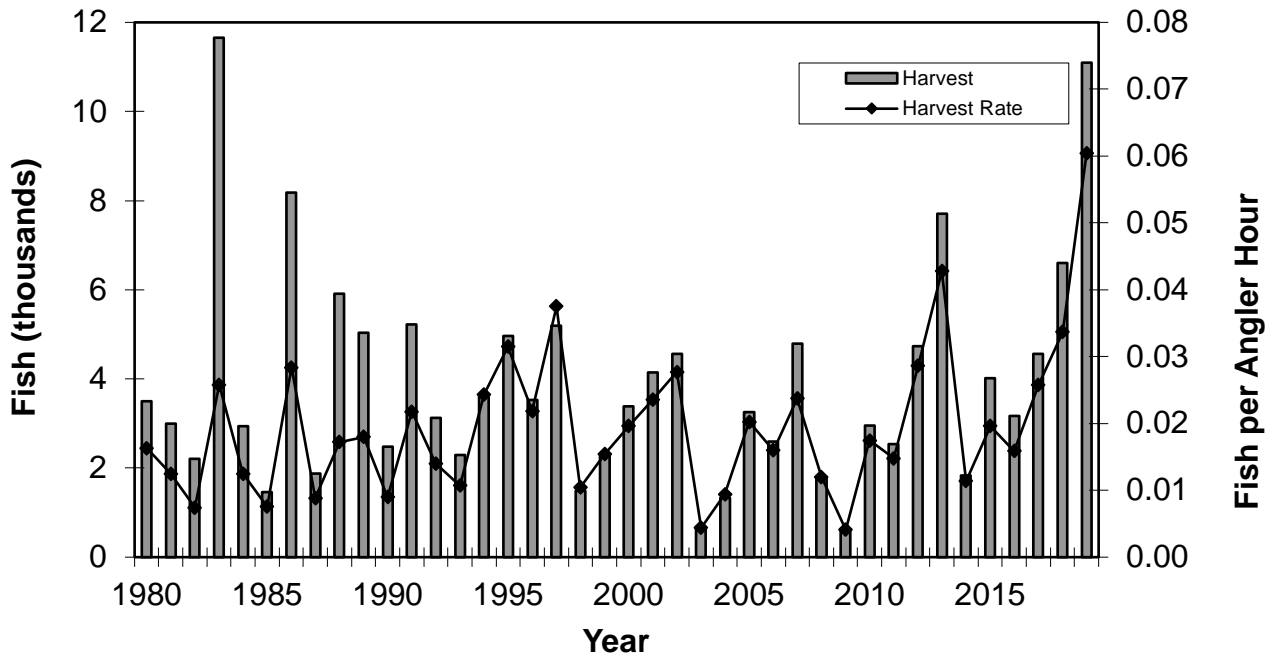


Figure 6. Coho Salmon harvest and harvest rate in the Lake Superior summer creel survey, 1980-2019.

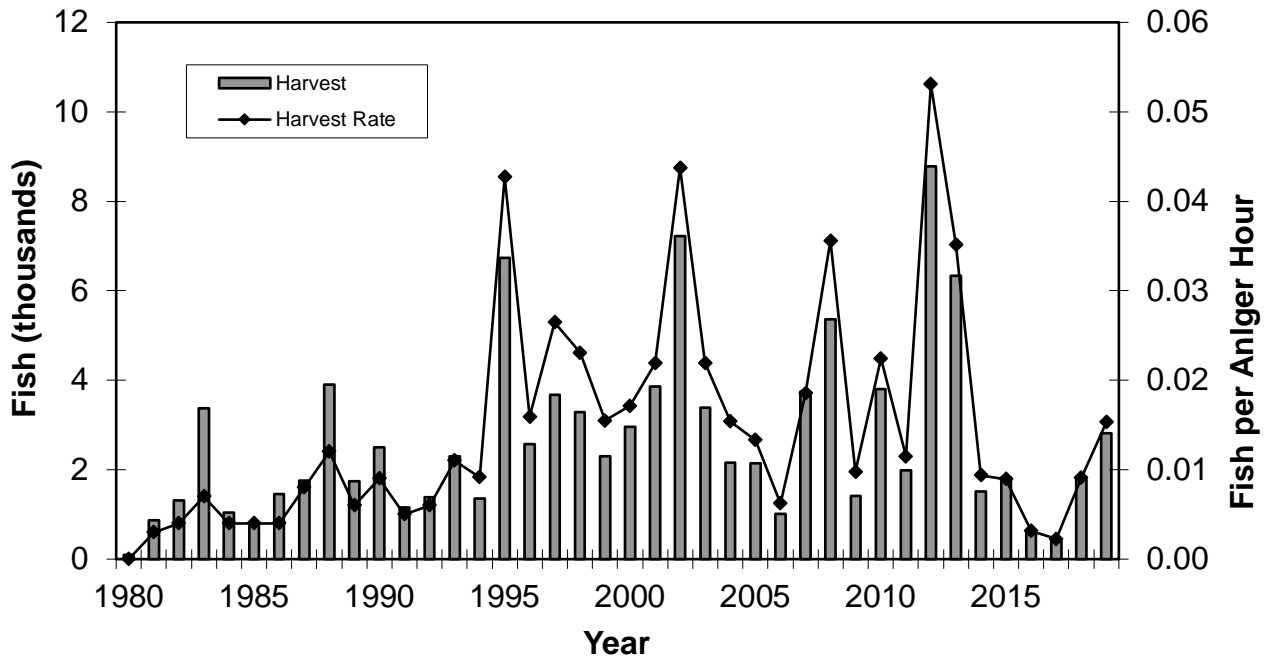


Figure 7. Chinook Salmon harvest and harvest rate in the Lake Superior summer creel survey, 1980-2019.

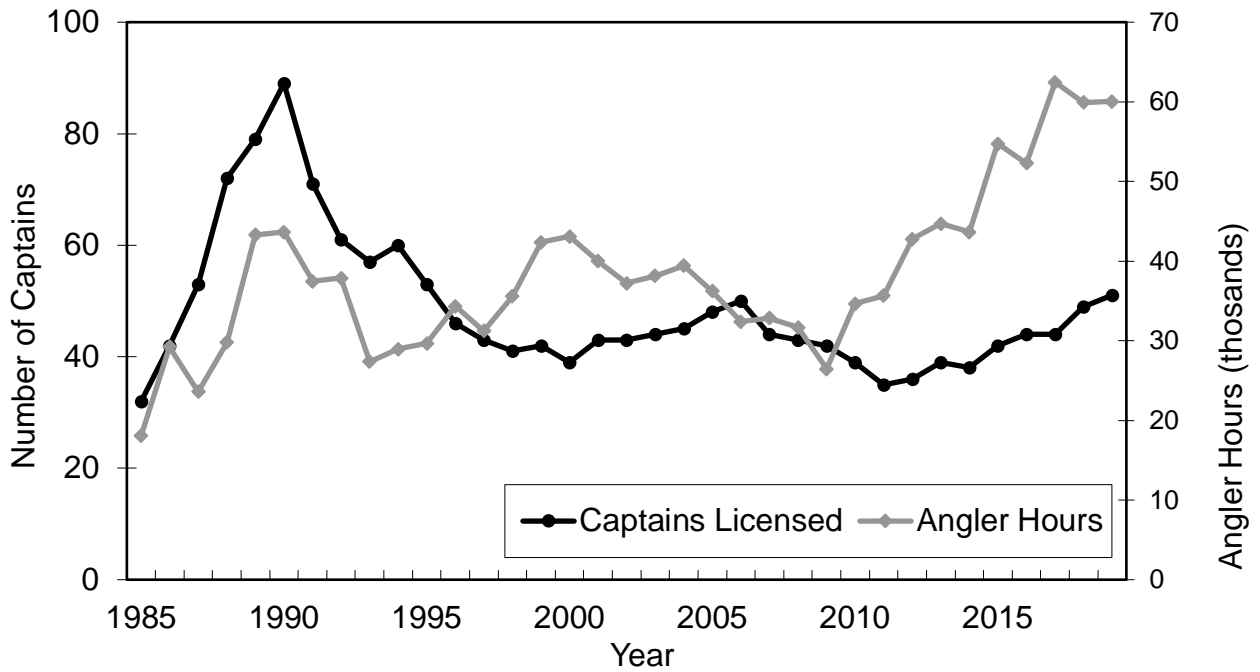


Figure 8. Number of licensed charter captains and fishing effort (angler hours) in the charter fishery; Minnesota waters of Lake Superior, 1985-2019.

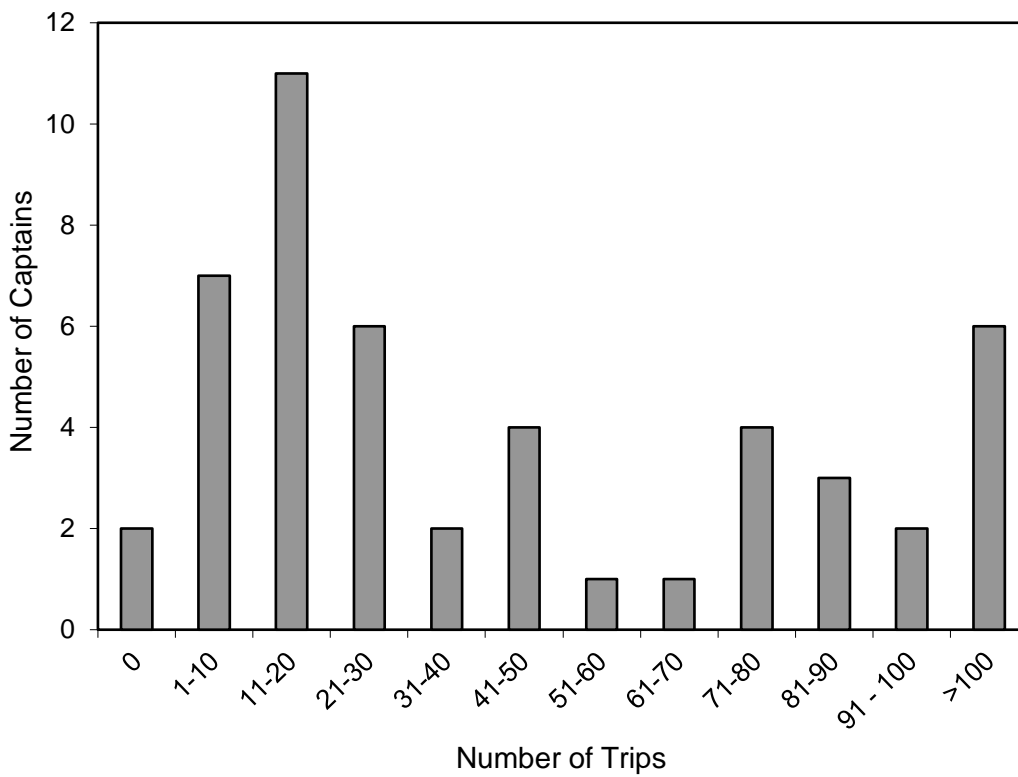


Figure 9. Number of charter captains making specific numbers of trips in Minnesota waters of Lake Superior, 2019.