

LAKE SUPERIOR SPRING CREEL SURVEY

North Shore Streams

2024



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Overview of Lake Superior Spring Creel Surveys and Fisheries Management

The Minnesota DNR uses fisheries assessments and creel surveys (angler surveys) to gather data for the Lake Superior Fisheries Management Plan (LSMP; [Goldsworthy et al. 2017](#)). The LSMP aligns with lake-wide management strategies developed by the Great Lakes Fisheries Commission ([GLFC 1997](#)) and other agencies ([Horns et al. 2003](#)). Creel surveys help understand public use of fisheries by collecting information about angling effort, catch, harvest, and satisfaction. These surveys involve in-person interviews where anglers share details about their fishing trips, catches, and opinions on regulations or management.

The Lake Superior spring creel survey starts when tributaries thaw and become fishable. The Minnesota shoreline is divided into two regions: the "Lower Shore" (Lester River to Split Rock River) and the "Upper Shore" (Beaver River to Brule River). Angler interviews are conducted at nine tributaries in each region, with combined data referred to as "shore wide" estimates. The survey measures fishing pressure, catch, and catch rates for individual tributaries, as well as for the lower shore, upper shore, and overall. Anglers fishing in tributaries are called stream anglers, while those fishing in Lake Superior near tributary mouths, including McQuade Harbor, are considered lake anglers (Figure 1).

The spring creel survey focuses on sport fish in Lake Superior tributaries, particularly Rainbow Trout *Oncorhynchus mykiss*. Two types of Rainbow Trout are managed in Minnesota waters: steelhead, a migratory form supported by limited natural reproduction and stocking, and Kamloops, a hatchery strain previously stocked for harvest ([Close and Hassinger 1981](#)). The Kamloops program ended in 2018 and was replaced by a genetically screened, fin clipped steelhead stocking program ([Miller et al. 2020](#)). Clipped Rainbow Trout, marked with an adipose fin clip, are legal to harvest at 16 inches or longer.

The Rainbow Trout stocking program has undergone significant changes in the past decade. The Kamloops were replaced with Superior strain steelhead derived from the French and Knife rivers. Before 2022, distinguishing between Kamloops and Superior strain catches was challenging. Since then, catch rates for the two strains have been reported separately due to the rarity of Kamloops and their differences in size and age (Table 5; [Peterson 2022](#), [Peterson 2023](#)).

The spring creel survey has also provided valuable data on other species in Lake Superior. Brook Trout *Salvelinus fontinalis*, one of the few native salmonids, are often the second most targeted species. Interest in Brook Trout has grown as agencies work on their protection and restoration ([Schreiner et al. 2008](#); [Miller et al. 2016](#); [Mamoozadeh et al. 2023](#)). Several non-native sport fish also offer angling opportunities in spring and fall, including Brown Trout *Salmo trutta*, Chinook Salmon *Oncorhynchus tshawytscha*, Coho Salmon *Oncorhynchus kisutch*, and Pink Salmon *Oncorhynchus gorbuscha*. However, most of these species are caught in Lake Superior, not its tributaries, during the spring. Other non-native species return to spawn in fall, so few or none are caught in rivers in spring. Additionally, species like Lake Trout *Salvelinus namaycush*, White Sucker *Catostomus commersoni*, Longnose Sucker *Catostomus catostomus*, and Round Whitefish *Prosopium cylindraceum* are occasionally caught in rivers or near their mouths in spring.

Fish lengths in the creel surveys were estimated by anglers or measured by creel clerks, while weights were calculated using regression data from Minnesota DNR surveys, such as Knife

River trap data ([Peterson 2023](#)). Rainbow Trout under and over 16 inches were analyzed separately to exclude juveniles, with this report focusing on fish 16 inches or larger unless stated otherwise. Long-term averages (1992 to present) provide a general value but do not show variability. To address this, data is also compared to the interquartile range (IQR), which represents the middle 50% of values and excludes outliers. The IQR spans from the first quartile (Q1), below which 25% of values fall, to the third quartile (Q3), below which 75% fall, indicating typical conditions and variability. Data outside the IQR suggests unusual conditions.

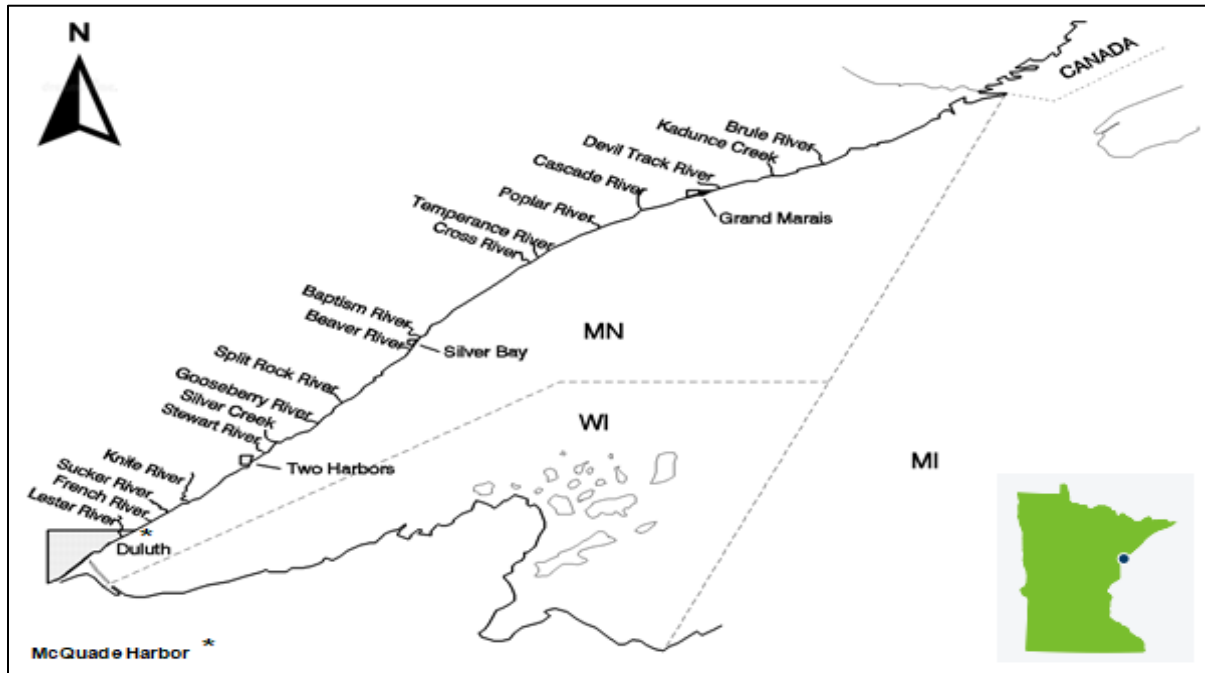


Figure 1. Map of sampling stations for the Lake Superior spring creel survey. The Poplar and Temperance rivers were not surveyed in 2024.

Hydrological Extremes in North Shore Rivers (2023-2024)

In late December 2023, a major flood event peaked at 1,200 cubic feet per second, breaking river ice—an unusual occurrence for the season. For the third consecutive year, much of the North Shore faced high water and turbid conditions due to frequent spring rains ([Peterson 2022](#), [Peterson 2023](#)). Water discharge stayed at or above the historic average until mid-July. Notable events included a rainstorm that caused Knife River discharge to surge from 26 to 3,580 cubic feet per second in just five hours, with similar flooding reported in other middle and upper shore rivers. Floods of this magnitude can harm newly hatched steelhead fry, leading to poor recruitment, growth, and survival (Figure 2).

Challenges from Droughts and Floods in North Shore Rivers (1997-2024)

Aquatic life in North Shore rivers has faced increasingly erratic conditions, including droughts and floods, over the past few decades. These trends were analyzed using data from the USGS Knife River gage (location: [04015330](#)), which represents lower shore rivers. While gages exist in the upper shore (e.g., Poplar and Brule Rivers), they lack consistent daily data, limiting their use for comparisons.

Stream conditions have become more variable in the past decade compared to 1997–2013, when there were only two flood years and one drought year. In contrast, from 2014–2024, there were three flood years, two drought years, and one year (2023) when maximum annual discharge exceeded the historic mean. These extreme events have likely impacted steelhead production in the Knife River over the past decade (Figure 3).

Droughts cause water scarcity, fluctuating levels, oxygen depletion, and dangerously high stream temperatures for cold-water fish. Floods, meanwhile, disrupt habitats and displace aquatic life, reducing survival and reproduction. The impact of a flood on a year-class of steelhead depends on its timing (frequency and duration) and magnitude (e.g., 2000 CFS or 8000 CFS). Timing, especially during spring/summer when eggs and early-life stages are vulnerable, likely matters more than flow magnitude. However, a major event, like 7 inches of rain, likely affects all streams to some extent, particularly in the lower stream reaches. Floods and droughts impact steelhead production but what constitutes a significant impact remains unknown.

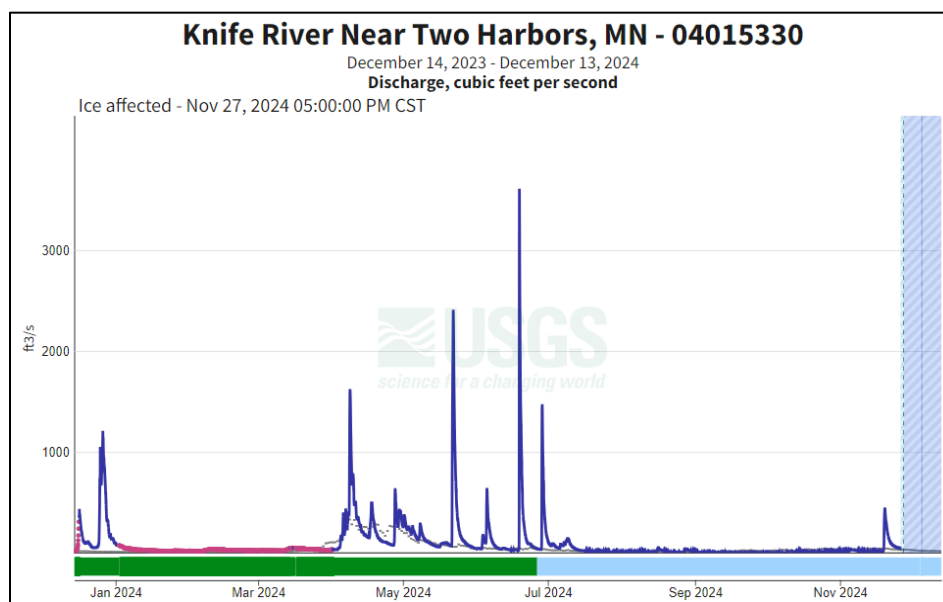


Figure 2. Figure showing Knife River streamflow (cfs) from December 14, 2023, to December 31, 2024, based on data from the USGS gage (location: [04015330](https://waterdata.usgs.gov/mn/nwis/04015330)).

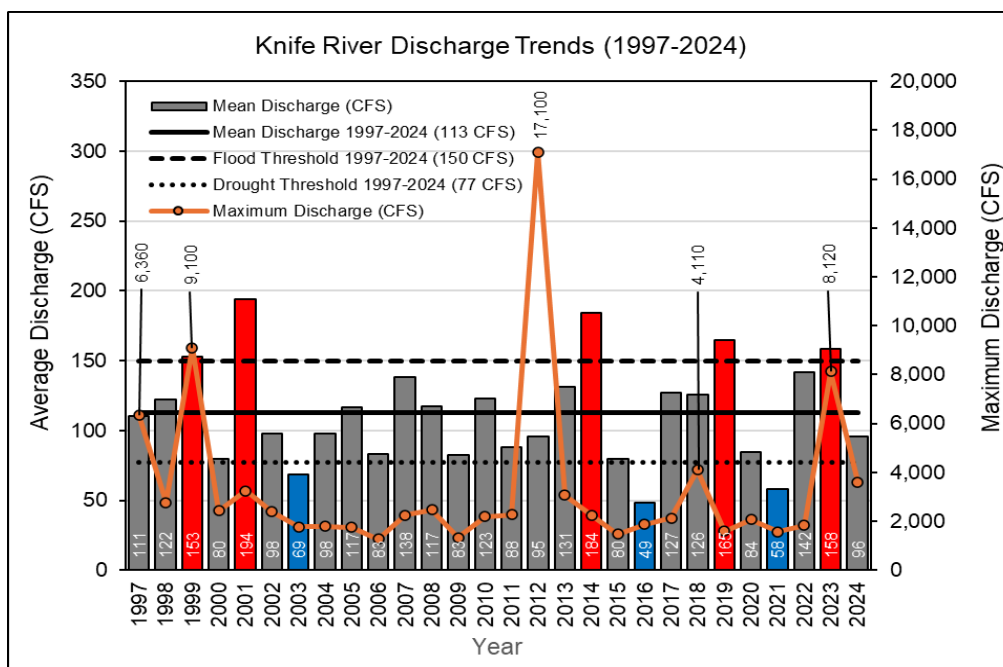


Figure 3. Average and maximum yearly discharge (cfs) for the Knife River from 1997 to 2024. The solid black line represents the overall average discharge, while the dashed lines mark the drought threshold (77 cfs) and flood threshold (150 cfs), based on one standard deviation from the mean. Years with average discharge below the drought threshold are shaded blue, and years above the flood threshold are shaded red. Data is from the USGS Knife River streamflow gage (location: [04015330](https://waterdata.usgs.gov/mn/nwis/04015330)).

Fishing Pressure Trends and Regional Insights (2024)

The 2024 spring creel survey ran from April 13 to May 19, with creel clerks completing 390 site visits and interviewing 813 anglers across the region. Most interviews (69%; N=557) were conducted in the lower shore, and nearly all anglers (96%; N=780) were fishing streams. The Lester River had the most interviews in the lower shore (108), while the Baptism River led in the upper shore (95). Total fishing pressure in 2024 was 21,309 angler-hours, below the historic average range of 30,204 hours (Q1: 22,747, Q3: 37,894). Fishing pressure is highest in lower shore rivers near Duluth, where environmental conditions or management changes have the greatest impact (Figure 4).

Lower shore fishing pressure totaled 13,910 angler-hours, within the historic range (24,072; Q1: 17,804, Q3: 30,319). The Split Rock River (3,038) and Stewart River (2,389) saw the most angling activity, while McQuade Harbor/Talmadge River (205) and the French River (250) had the least (Figure 5). These two stations historically contributed about 6,000 angler-hours annually but dropped to 454 in 2024, largely due to changes in hatchery production and stocking. Kamloops Rainbow Trout, previously stocked in these areas, were more accessible in late winter and spring, while Superior strain steelhead return closer to ice-out and spawn further upstream, making them less available to nearshore anglers.



Upper shore fishing pressure totaled 7,399 angler-hours, within the historic range (5,997; Q1: 4,149, Q3: 7,967). The Baptism River had the most fishing activity (3,330), while the Beaver River had the least (161). The Temperance and Poplar rivers were excluded from the 2024 schedule. Poplar River access was restricted due to a fire investigation, while excluding the Temperance River helped simplify creel clerk schedules. Historically, these rivers contributed only 2% and 1% of annual angler-hours, respectively (Figure 5).

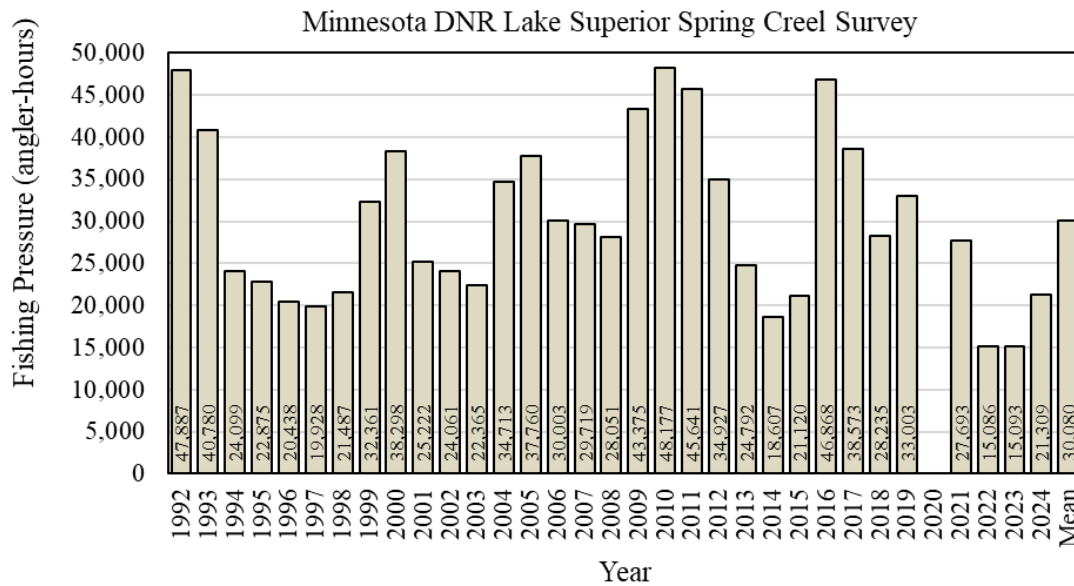


Figure 4. Total annual fishing pressure (angler-hours) in the Lake Superior spring creel survey compared to the historic average (Mean).

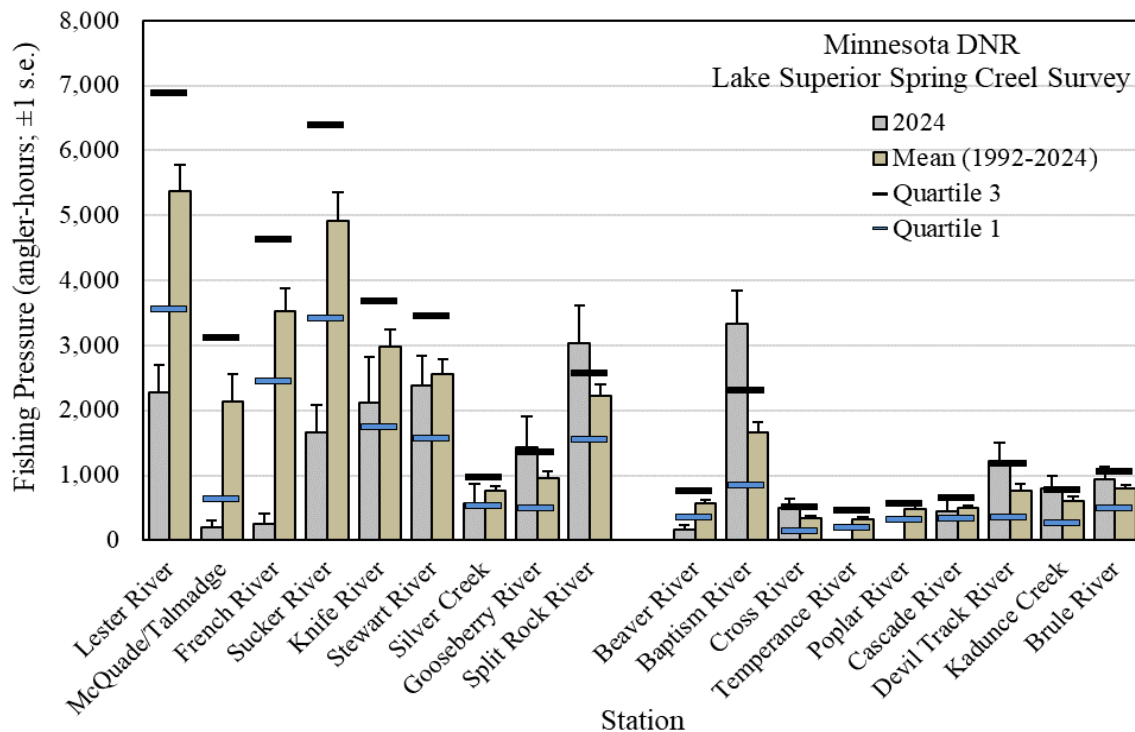


Figure 5. Annual fishing pressure (angler-hours) compared to the historic average and interquartile range at each station. Quartiles (black and blue lines) highlight the typical range of fishing pressure by excluding outliers, offering a clearer picture of normal variation.

Angler Population Estimates, Demographics, and Target Species (2024)

Angler population estimates were based on the total number of new anglers (first-time interviews) and recap anglers (previously interviewed) each day. Anglers were identified as new or recap by asking, “Have you been interviewed by a creel clerk this spring?” This method wasn’t used before 1996, so estimates aren’t available for 1992–1995. The Schnabel modification of the Lincoln-Petersen estimator calculated daily angler abundance and variance. Estimates typically increased during the first half of the survey and then stabilized, so the average of the last nine estimates was used for final population numbers and confidence intervals.

In 2024, about 1,161 anglers participated in the Lake Superior spring fishery, below the historic average of 1,593 (Table 3; Figure 6). Lower participation was expected due to unfavorable stream conditions. A total of 813 anglers were interviewed, with 609 being first-time participants. Most anglers (93%) were Minnesota residents, 4% were from Wisconsin, and less than 1% came from other states. Female anglers accounted for 6% (36) of interviews, an increase from 5.5% in 2022 and 4.7% in 2023.

Rainbow Trout were the most popular species targeted by anglers, mentioned in 97% (N=792) of interviews. Steelhead were the primary target species for most anglers (97%, N=787), while very few (<1%; N=5) targeted Kamloops as their primary species. Forty-six anglers stated steelhead or Kamloops as a secondary target species. Brook Trout were a primary or secondary target in 20% (N=229) of interviews. Other species, including Atlantic Salmon *Salmo salar*, Brown Trout, Chinook Salmon, Coho Salmon, Lake Trout, Longnose Sucker, Northern Pike *Esox lucius*, Smallmouth Bass *Micropterus dolomieu*, Walleye *Sander vitreus*, and White Sucker, were rarely mentioned ($\leq 1\%$).

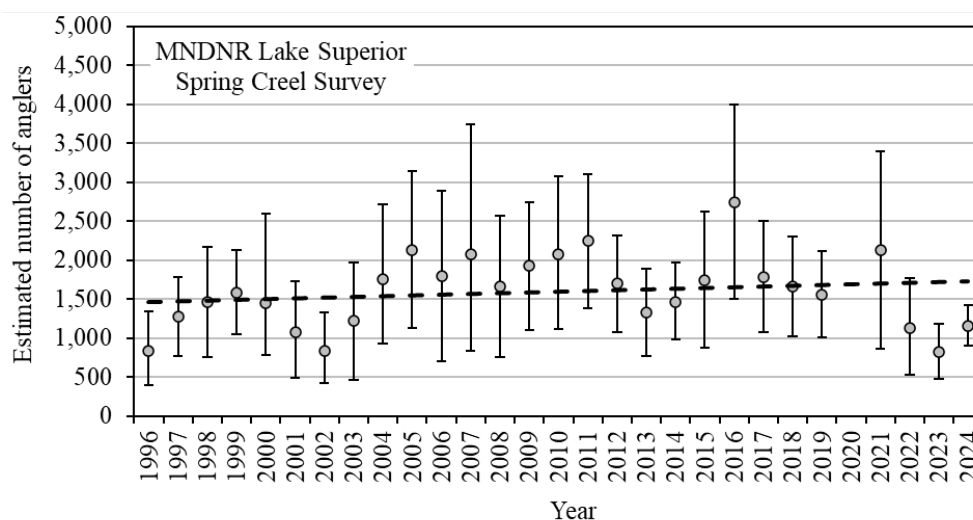


Figure 6. Estimated number of anglers fishing each year in the Lake Superior spring creel survey, with error bars indicating 95% confidence intervals and a dashed line showing the historic trend.

Fish Catch, Catch-Rates, and Harvest

Unclipped Steelhead

In 2024, an estimated 2,570 unclipped steelhead were caught, below the historic average of 2,872 (range: 403–7,184). Lower shore catches totaled 1,838, led by the Stewart River (617) and Split Rock River (333), while the upper shore contributed 732, led by the Baptism River (317) and Devil Track River (181). Four-hundred small Rainbow Trout (<16 inches) were caught in 2024, the highest since 2018 (Table 5; Figure 7). The average size was 24.3 inches and 4.6 pounds, with the largest fish at 31 inches and 9.1 pounds (Table 6).

Although shore wide total catches of steelhead have declined slightly in recent years, catch rates have remained stable. In 2024, anglers averaged one fish every 8.2 hours (0.121 fish per hour), better than the historic average of one fish every 10.6 hours (0.095 fish per hour) (Table 5; Figure 7). Lower shore rates were highest, with anglers catching one fish every 7.6 hours (0.132 fish per hour), with the best catch rates at the Stewart River (3.9 hours per fish) and Gooseberry River (5.4 hours per fish). Upper shore anglers averaged one fish every 10.1 hours (0.099 fish per hour), and the best catch rates were at the Kadunce River (5.9 hours per fish) and Devil Track River (6.8 hours per fish) (Table 5; Figure 8).

Steelhead catch rates have improved over the past 30 years due to stocking programs and restrictive harvest regulations. Since 2006, anglers have averaged one fish every 10 hours (0.10 fish per hour) nearly every year except for 2012 and 2014. Historically, upper shore rates were better, with anglers averaging one fish every 6.7 hours (0.15 fish per hour) between 2002 and 2018. However, since 2018, lower shore rates have surpassed those on the upper shore (Figure 8).



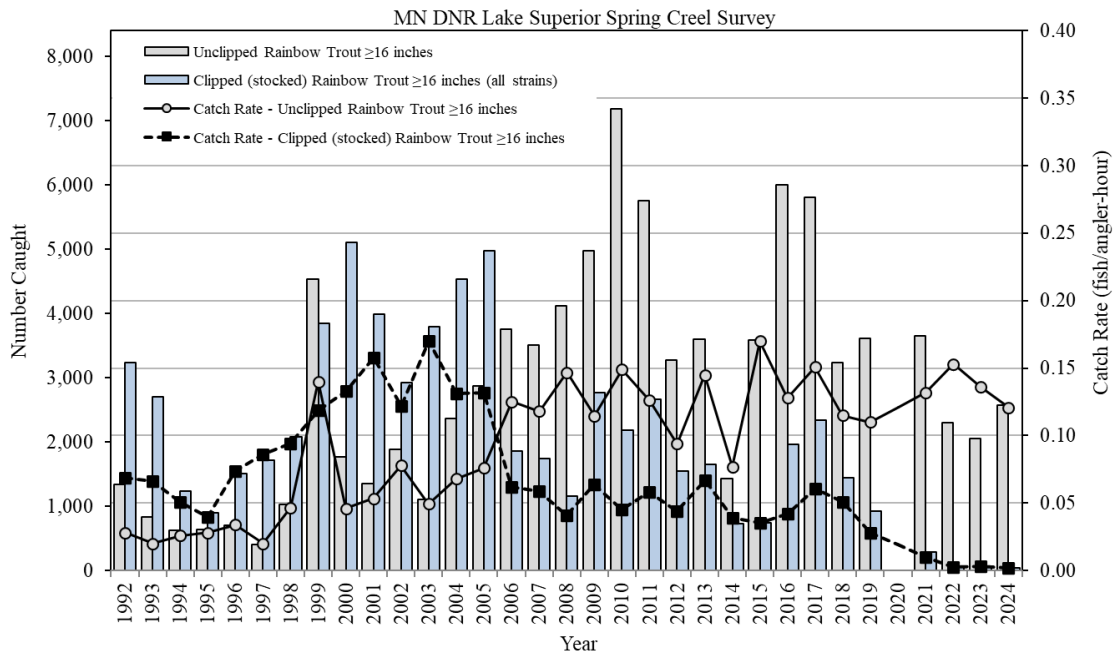


Figure 7. Shore wide estimated catch and catch-rate (fish per angler-hour) of unclipped and clipped (stocked) Rainbow Trout from the Lake Superior spring creel survey by year. Clipped Rainbow Trout totals in 2022 were combined for Kamloops and clipped Superior strain steelhead.

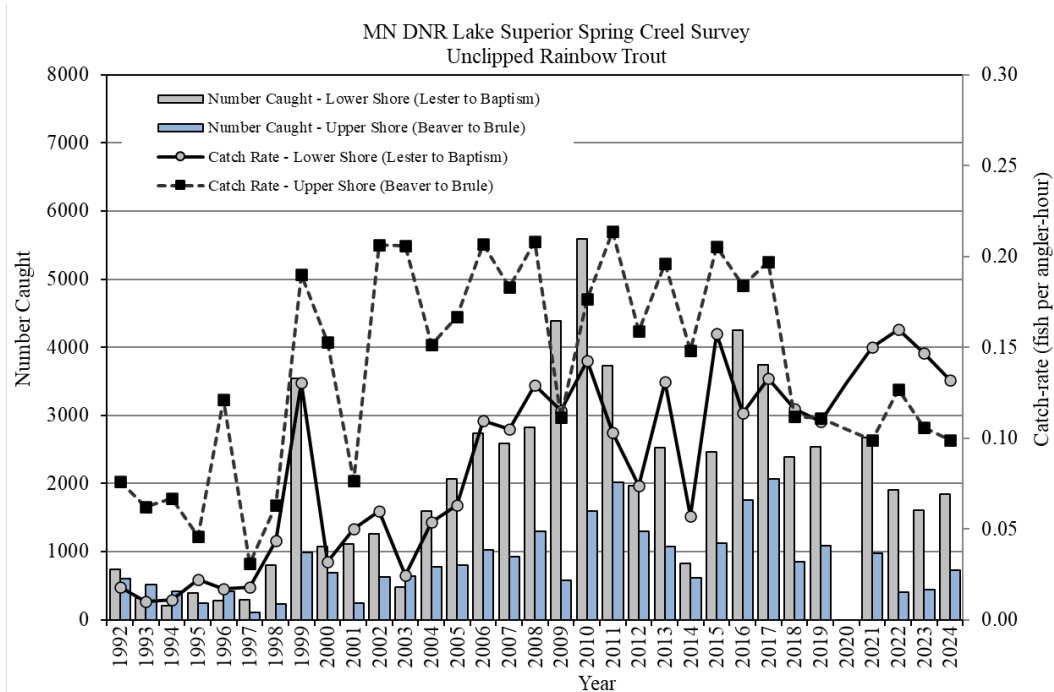


Figure 8. Estimated catch and catch rate (fish per angler-hour) of unclipped Rainbow Trout in the lower and upper shore from the Lake Superior spring creel survey by year.

Steelhead Fry Stocking Evaluation

Unclipped steelhead are naturally produced or remnants of the Minnesota DNR's former steelhead fry stocking program, which ended in 2018 to focus on the Superior strain program and assess natural reproduction. Steelhead fry stocked with intact adipose fins still exist in Lake Superior but are not legal to harvest. Since 1992, nearly nine million fry have been stocked across 13 rivers with angler creel survey stations (Table 7). The fry stocking program ended with the closure of the French River Coldwater Hatchery in 2018, redirecting gametes originally intended for fry stocking to support the newly established Superior strain clipped steelhead program. The clipped steelhead program was created to sustain harvest opportunities after the Kamloops stocking program ended.

The contribution of natural reproduction by steelhead spawning below barriers in North Shore streams has been uncertain due to decades of fry stocking, the small size of fry, and catch-and-release regulations. At 1 to 2 inches long, stocked fry cannot be fin-clipped, making them visually indistinguishable from wild steelhead. While oxytetracycline marking of fry is possible, catch-and-release regulations prevent the harvest needed to detect these chemical marks on otoliths, fin rays, or vertebrae. Suspending fry stocking was necessary to separate the effects of stocking from natural reproduction ([Goldsworthy et al. 2017](#)).

Steelhead fry stocking in lower shore rivers ended in 2017 and in all upper shore rivers after 2015. In the lower shore, mean catch rates for unclipped steelhead have not (yet) declined in any rivers from the fry stocking era (1992–2019) to the post-fry stocking era (2021–2024). Mean catch rates did not change after fry stocking ended at the Lester, Knife, Silver, and Gooseberry rivers, while catch rates improved post-fry stocking at the Sucker, Stewart, and Split Rock rivers. However, the contribution of natural reproduction and fry stocking remains uncertain in many lower shore rivers, particularly at rivers that were stocked in 2016 and 2017 (Stewart, Silver, and Split Rock). Adult steelhead that were stocked as fry in 2016 and 2017 would be 7 and 8 years old in 2024 and could still contribute to catches and catch rates in some lower shore rivers (Figure 9; Table 7).

Steelhead fry stocking ended in all Upper Shore rivers after 2015. Since then, mean catch rates for unclipped steelhead have declined across all Upper Shore rivers, though the extent of the decline varies. Post-stocking catch rates dropped only slightly in the Baptism and Brule rivers (requiring 2.6 and 3.4 more angler hours per fish, respectively) and moderately in the Temperance and Cascade rivers (12.0 and 13.1 more angler hours per fish, respectively). In contrast, catch rates in the Beaver and Cross rivers declined sharply, requiring over 174 additional angler hours per fish. These findings suggest that natural reproduction may sustain steelhead fisheries at the Baptism and Brule rivers with only a slight reduction in catch rates, while stocking is likely necessary to maintain fisheries in the Beaver and Cross rivers. The Temperance and Cascade rivers benefited from stocking, but natural reproduction or straying from other rivers also supports their fisheries (Figure 9; Table 7).

Current regulations require all unclipped Rainbow Trout with intact adipose fins to be released immediately. This catch-and-release rule, in place since 1997, has successfully protected naturally produced Rainbow Trout and supported steelhead rehabilitation over the past few decades. Regulation compliance is monitored through spring creel surveys, with enforcement as needed. Compliance has been good over the past couple decades. Management goals and regulations for unclipped Rainbow Trout will be revisited during the next Fish Management Plan revision in 2025.

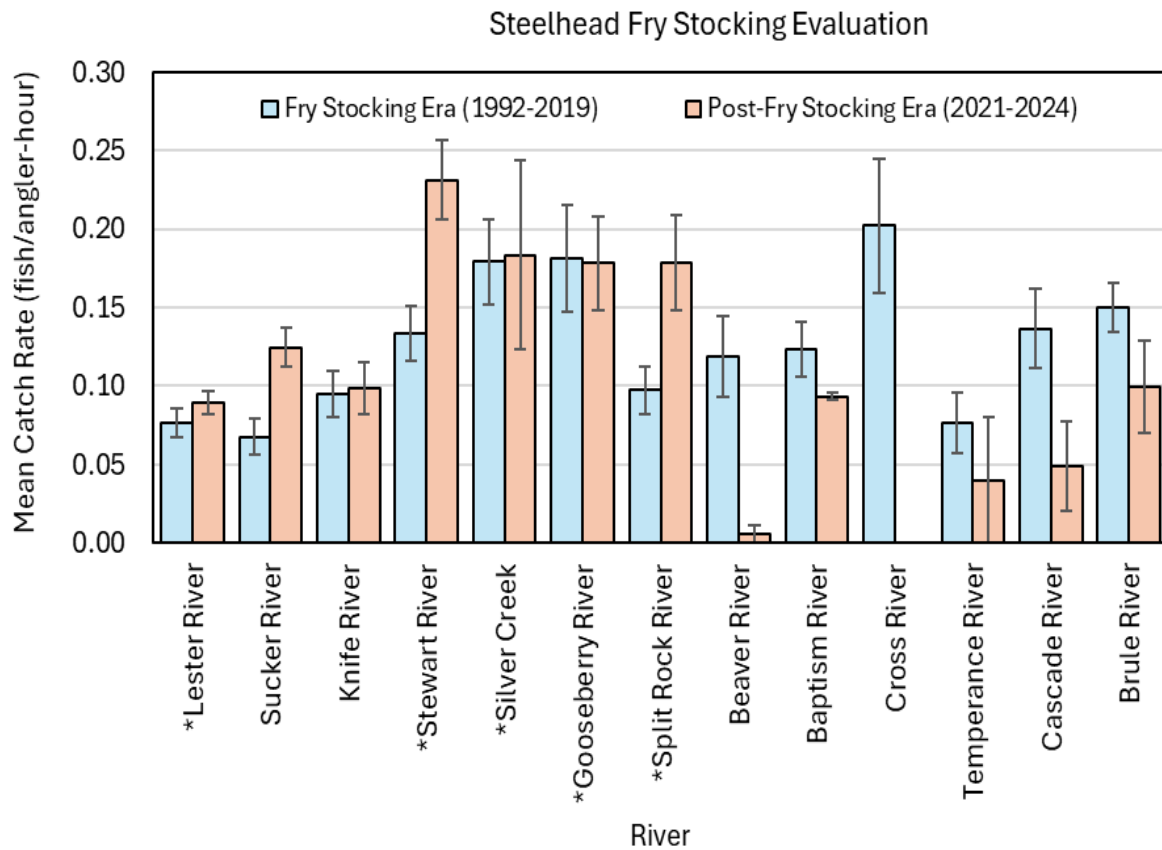
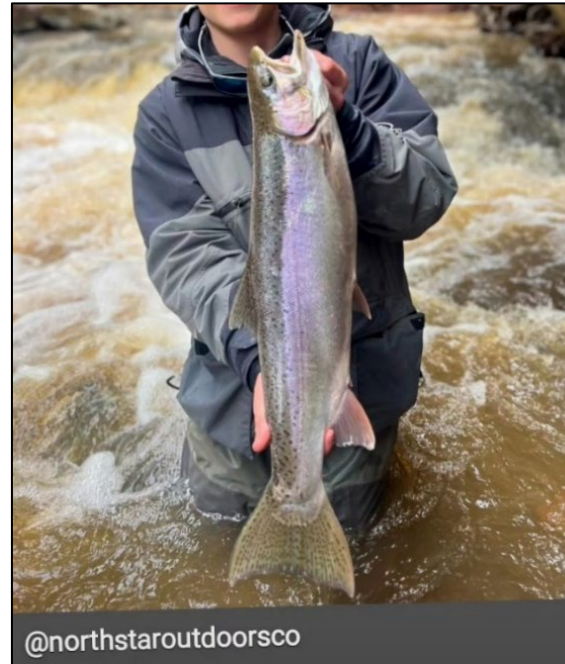


Figure 9. Mean catch rate (fish per angler-hour) by river during the fry stocking era (1992-2019) and post-fry stocking era (2021-2024). Asterisks indicate rivers where the contribution of natural reproduction is still unclear as adults from fry stocked in most recent years (2016 and 2017) could still contribute to catches in the post-fry stocking era (2021-2024).

Superior Strain Steelhead Rainbow Trout

Anglers caught 60 clipped Superior strain steelhead in spring 2024, including 45 legal-sized fish (≥ 16 inches) and 15 sub-legal fish (< 16 inches). On average, anglers caught one fish every 500 hours of fishing (0.002 fish per hour) (Figure 10). Legal-sized steelhead were caught in four rivers: Lester River (15), Stewart River (11), Split Rock River (7), and Baptism River (12). All sub-legal fish were caught in the Lester River. Most legal-sized steelhead (58%) were harvested, while all sub-legal fish were released (Table 5). Legal-sized fish averaged 25.3 inches (range: 21.0–28.0) and 5.1 pounds (range: 2.9–6.7), while sub-legal fish averaged 10 inches and 0.3 pounds (Table 6). The average size of Superior strain steelhead captured at the French River trap over the past three years was 12.9 inches at age-2, 15.9 inches at age-3, 21.0 inches at age-4, 24.6 inches at age-5, and 26.0 inches at ages 6 and 7. No clipped steelhead were reported caught in the lake during the creel survey (Figure 11), but social media posts showed some fish caught in the lake before rivers thawed.



Returns from the first stocked year classes of clipped Superior strain steelhead to the creel have been low; most of the 2017- and 2018-year classes were expected to return to rivers as adults to spawn by 2024. The return of adult steelhead, both wild and hatchery-produced, depends on many factors, including hatchery production, stocking efficiencies, and external influences like disease outbreaks and juvenile survival in streams and Lake Superior, many of which are outside the Minnesota DNR's control. Clipped Rainbow Trout catches, including any remaining Kamloops and Superior strain steelhead, are expected to stay low until more year-classes of Superior strain steelhead mature and return as adults, improving catch rates and harvest opportunities.

Kamloops Rainbow Trout

No Kamloops were caught shore-wide in spring 2024 (Table 4). Eight were captured at the French River fish trap, and one at the Knife River fish trap, with an average size of 27 inches and 7.6 pounds. Any Kamloops caught in 2024 were at least 8 years old, far exceeding their typical 4-year life expectancy ([Hallam and Peterson 2019](#)), and very few are likely to still exist in Lake Superior.

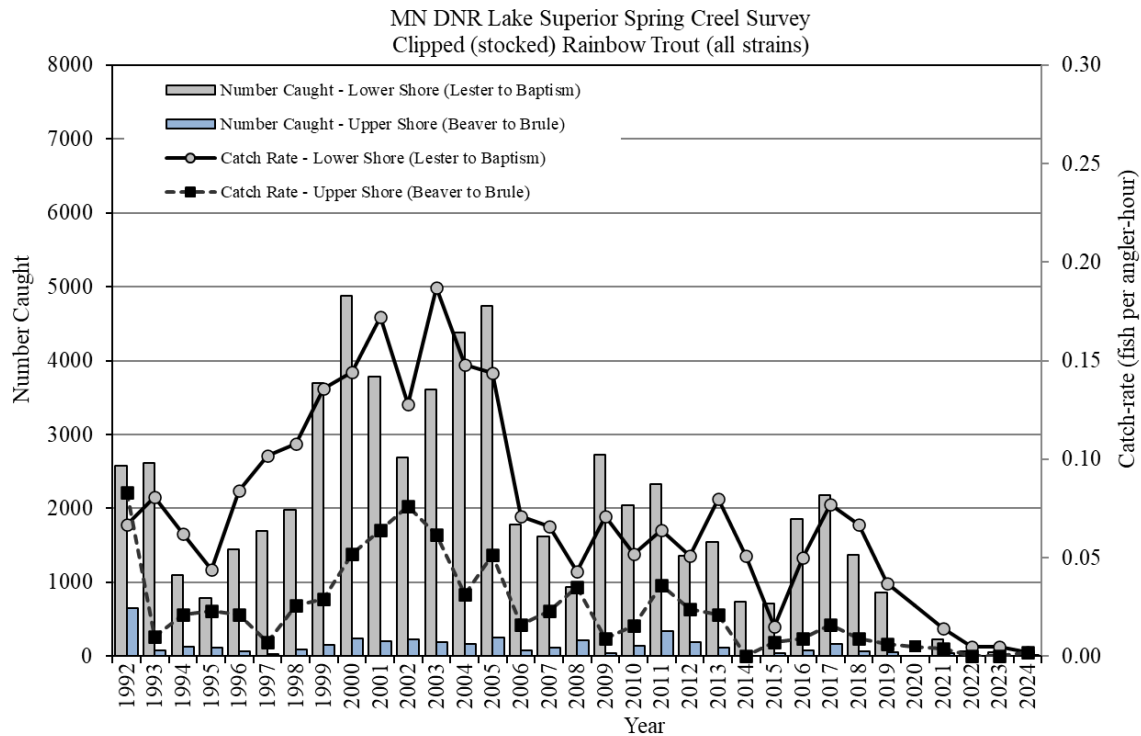


Figure 10. Estimated catch and catch rate (fish per angler-hour) of clipped (stocked) Rainbow Trout in the lower and upper shore from the Lake Superior spring creel survey by year. Totals in 2022 are combined for Kamloops and clipped Superior strain steelhead.

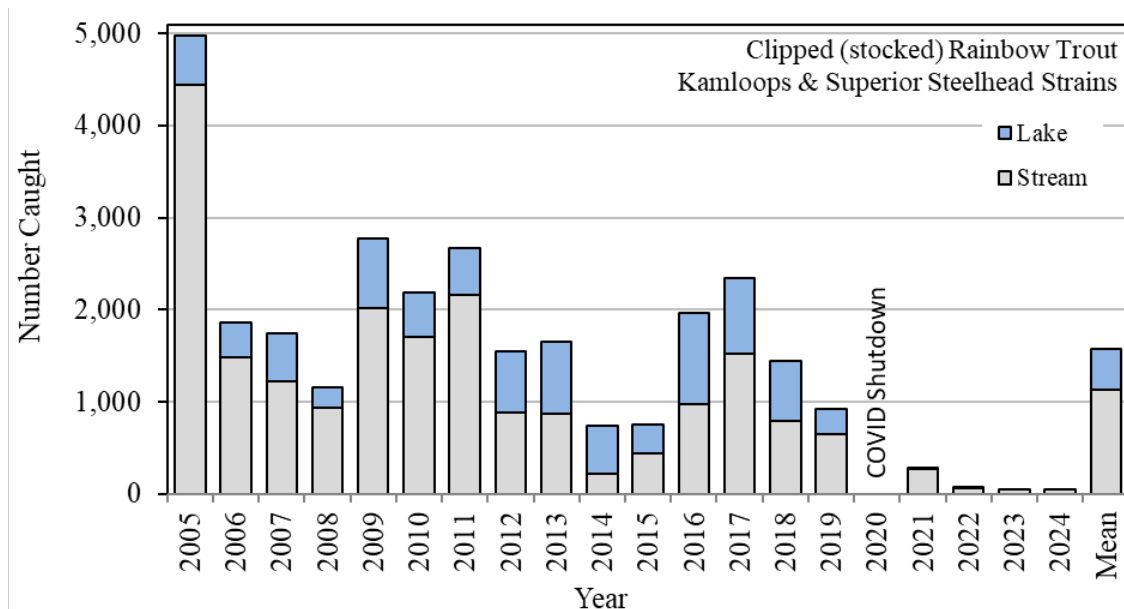


Figure 11. Estimated number of clipped (stocked) Rainbow Trout ≥ 16 inches caught in the lake and stream and the historic average (Mean) since 2005. Totals in 2022 are combined for Kamloops and clipped Superior strain steelhead.

Brook Trout

Brook Trout are the second most common species caught in the spring creel survey. In 2024, an estimated 237 were caught, below the historic average of 479 (Figure 12). The average size was 10.2 inches and 0.7 pounds (Table 6). The catch rate was low, with anglers catching one Brook Trout every 90 hours (0.011 fish per hour). Low spring catches are not concerning, as they do not reflect Brook Trout abundance below barriers at other times of the year ([Peterson 2018](#)).

Compliance with Brook Trout harvest regulations (bag limit of 1, minimum size 20 inches) was excellent, with no illegal harvests in spring 2024. The Minnesota DNR prioritizes Coaster Brook Trout rehabilitation, and regulatory compliance is key to its success. To address reports of sub-legal harvests during summer, the DNR partnered with stakeholders, including [The Greater Lake Superior Foundation](#), [Minnesota Trout Unlimited](#), and [Minnesota Steelheader](#), to post educational signs along the North Shore and increase public outreach via social media. Additional information on Brook Trout in Minnesota's Lake Superior waters is available on the Minnesota DNR's [Lake Superior Area Fisheries website](#) and the [Coaster Genetics Project website](#).

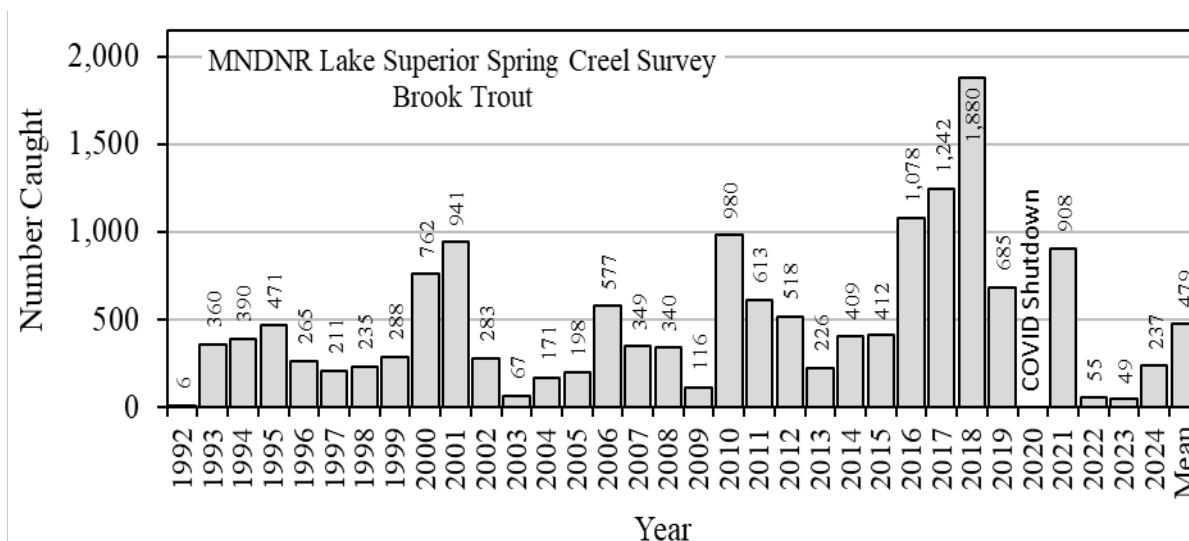


Figure 12. The estimated number of Brook Trout caught during the Lake Superior spring creel survey by year and the historic average (Mean).

Other Fish Species

In the 2024 spring creel survey, anglers caught and released an estimated 453 suckers (White and Longnose) and 8 Coho Salmon (Table 6). Online reports suggested additional Coho Salmon were caught by shore anglers before the survey began. Coho Salmon catches and fishing activity vary with Lake Superior conditions and year-class strength. These fish are naturally produced, as the last Coho stocking in Lake Superior occurred in Michigan in 2006. Most Coho caught in Minnesota waters likely originate from Wisconsin, Michigan, or Ontario, where stream habitats better support fall-run reproduction. Natural reproduction in Minnesota streams below barriers is largely unknown but likely minimal due to limited access and less favorable conditions. Low water levels, ice, and gravel bars in the fall often block access from Lake Superior, making North Shore streams unsuitable for fall-spawning species like Brook Trout, Brown Trout, and salmon.



Table 1. Average, minimum, and maximum annual discharge are shown, along with drought (<55 cfs) and flood (>150 cfs) years. Annual average discharge was categorized as drought or flood based on thresholds calculated as one standard deviation below (77 cfs) or above (150 cfs) the overall mean discharge (113 cfs).

Year	Discharge (CFS)			Drought/Flood Status*
	Average	Minimum	Maximum	
1997	111	<1	6,360	-
1998	122	<1	2,780	-
1999	153	3	9,100	Flood
2000	80	<1	2,430	-
2001	194	<1	3,240	Flood
2002	98	<1	2,390	-
2003	69	<1	1,780	Drought
2004	98	4	1,790	-
2005	117	<1	1,760	-
2006	83	<1	1,280	-
2007	138	2	2,250	-
2008	117	5	2,480	-
2009	83	3	1,340	-
2010	123	5	2,190	-
2011	88	3	2,270	-
2012	95	2	17,100	-
2013	131	6	3,060	-
2014	184	6	2,250	Flood
2015	80	2	1,470	-
2016	49	6	1,870	Drought
2017	127	4	2,140	-
2018	126	5	4,110	-
2019	165	5	1,590	Flood
2020	84	5	2,070	-
2021	58	<1	1,570	Drought
2022	142	7	1,830	-
2023	158	3	8,120	Flood
2024	96	3	3,610	-
Mean	113	4	3,365	
SD	37	1	3,309	
N	28	19	28	

*The drought (77 cfs) and flood (150 cfs) thresholds were calculated with minus or plus one standard deviation from the overall mean discharge, respectively. Drought or Flood Status was determined by annual average discharge values that were below (drought) or above (flood) the thresholds.

Table 2. Fishing pressure estimates (angler-hours) from the Lake Superior spring creel survey by shore zone, station, and year.

Shore Zone	Station	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	1992-2024		
													Mean	Minimum	Maximum
Lower Shore	Lester River	2,580	3,699	7,293	4,955	3,051	3,115	--	2,933	2,215	2,199	2,272	5,373	2,199	10,476
	McQuade/Talmadge	1,340	1,659	5,453	3,612	2,657	3,158	--	359	401	196	205	2,127	196	5,453
	French River	3,080	2,409	6,014	3,678	1,868	2,033	--	422	295	131	250	3,531	131	8,544
	Sucker River	2,880	2,265	4,914	4,713	4,131	3,613	--	2,342	2,469	1,437	1,659	4,925	1,437	12,990
	Knife River	1,540	1,629	6,597	3,215	3,363	3,461	--	2,574	1,730	1,110	2,113	2,980	1,110	6,597
	Stewart River	1,280	1,653	3,385	3,658	2,620	3,830	--	4,111	2,265	3,247	2,389	2,561	720	5,782
	Silver Creek	312	577	582	529	522	759	--	703	403	254	561	758	131	1,996
	Gooseberry River	257	532	1,105	1,330	612	778	--	837	231	451	1,423	958	231	2,475
	Split Rock River	1,200	1,217	1,993	2,402	1,756	2,444	--	3,545	1,880	1,916	3,038	2,221	1,145	5,400
Upper Shore	Beaver River	233	473	436	685	346	572	--	565	134	169	161	570	134	1,159
	Baptism River	630	1,173	2,285	3,303	2,370	2,918	--	3,545	725	1,465	3,330	1,655	448	3,570
	Cross River	339	338	700	1,004	549	381	--	518	145	120	500	336	53	1,004
	Temperance River	83	359	370	494	319	306	--	175	91	30	-	328	30	788
	Poplar River	330	357	645	508	299	803	--	488	160	150	-	484	150	1,347
	Cascade River	309	438	846	601	307	301	--	789	160	180	454	497	160	939
	Devil Track River	677	1,355	1,421	1,841	2,066	1,833	--	1,481	276	266	1,227	771	75	2,066
	Kadunce Creek	770	448	1,420	1,030	570	1,630	--	1,006	1,092	1,405	795	597	79	1,630
	Brule River	767	539	1,410	1,015	829	1,069	--	1,302	415	369	932	795	207	1,505
Lower Shore		14,469	15,641	37,336	28,093	20,579	23,191		17,825	11,889	10,940	13,910	24,072	10,940	39,994
Upper Shore		4,138	5,479	9,533	10,480	7,656	9,812		9,868	3,197	4,153	7,399	5,997	3,046	10,480
Shorewide		18,607	21,120	46,868	38,573	28,235	33,003		27,693	15,086	15,093	21,309	30,080	15,086	48,177

Table 3. Fishing pressure estimates (angler-hours $\pm$ 1 standard error [SE]) from the 2024 Lake Superior spring creel survey by shore zone and station.

Shore Zone	Station	Stream Pressure	(SE)	Lake Pressure	(SE)	Total Pressure	(SE)
Lower Shore	Lester River	2,136	378	136	76	2,272	421
	McQuade/Talmadge	114	80	91	71	205	103
	French River	0	0	250	164	250	164
	Sucker River	1,659	424	0	0	1,659	424
	Knife River	2,090	695	23	23	2,113	704
	Stewart River	2,337	428	51	51	2,389	446
	Silver Creek	561	302	0	0	561	302
	Gooseberry River	1,370	451	54	54	1,423	491
	Split Rock River	3,038	568	0	0	3,038	568
Upper Shore	Beaver River	161	80	0	0	161	80
	Baptism River	3,330	519	0	0	3,330	519
	Cross River	500	145	0	0	500	145
	Temperance River	0	0	0	0	0	0
	Poplar River	0	0	0	0	0	0
	Cascade River	386	164	68	50	454	171
	Devil Track River	1,204	271	23	23	1,227	268
	Kadunce Creek	750	206	45	45	795	205
	Brule River	932	208	0	0	932	208
Lower Shore		13,305	1,269	605	209	13,910	1,320
Upper Shore		7,263	695	136	71	7,399	695
Shorewide		20,568	1,447	741	221	21,309	1,492

Table 4. The number of new (first time interviewed the spring) anglers who were interviewed in the Lake Superior spring creel survey by year.

Year	Estimate	Lower C.I.	Upper C.I.
1996	832	393	1,336
1997	1,269	764	1,775
1998	1,463	756	2,170
1999	1,587	1,051	2,122
2000	1,454	775	2,601
2001	1,069	494	1,725
2002	833	416	1,329
2003	1,218	468	1,968
2004	1,752	923	2,712
2005	2,133	1,122	3,145
2006	1,794	703	2,885
2007	2,073	840	3,744
2008	1,664	757	2,571
2009	1,923	1,106	2,741
2010	2,070	1,112	3,080
2011	2,243	1,379	3,107
2012	1,698	1,078	2,318
2013	1,325	769	1,882
2014	1,459	978	1,970
2015	1,744	872	2,616
2016	2,743	1,496	3,991
2017	1,787	1,074	2,500
2018	1,660	1,026	2,295
2019	1,561	1,002	2,121
2020	--	--	--
2021	2,128	862	3,394
2022	1,125	527	1,773
2023	825	473	1,178
2024	1,161	904	1,418
Mean	1,593	861	2,374

Table 5. Estimated catch and catch rate (fish per angler-hour) for unclipped (wild-produced) and clipped (stocked) Rainbow Trout in the 2024 Lake Superior spring creel survey by station.

Station		Unclipped Steelhead Rainbow Trout						Clipped Rainbow Trout (Kamloops strain)						Clipped Steelhead Rainbow Trout (Superior strain)					
		Catch ≥16			Catch-rate ≥16			Catch ≥16			Catch-rate ≥16			Catch ≥16			Catch-rate ≥16		
		All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)
Lester River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	15	15	15	0.006	0.006	0.007
	Released	264	191	136	0.116	0.084	0.060	0	0	0	0.000	0.000	0.000	15	0	0	0.006	0.000	0.000
	Total	264	191	136	0.116	0.084	0.060	0	0	0	0.000	0.000	0.000	29	15	15	0.013	0.006	0.007
McQuade Harbor	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	34	34	0	0.165	0.165	0.222	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	34	34	0	0.165	0.165	0.222	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
French River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	18	18	10	0.073	0.073	0.033	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	18	18	10	0.073	0.073	0.033	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Sucker River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	207	148	74	0.124	0.089	0.039	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	207	148	74	0.124	0.089	0.039	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Knife River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	234	187	90	0.111	0.089	0.030	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	234	187	90	0.111	0.089	0.030	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Stewart River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	11	11	11	0.005	0.005	0.004
	Released	628	617	172	0.263	0.258	0.055	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	628	617	172	0.263	0.258	0.055	0	0	0	0.000	0.000	0.000	11	11	11	0.005	0.005	0.004
Silver Creek	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	46	46	46	0.082	0.082	0.082	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	46	46	46	0.082	0.082	0.082	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Gooseberry River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	265	265	161	0.186	0.186	0.100	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	265	265	161	0.186	0.186	0.100	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Split Rock River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	340	333	74	0.112	0.110	0.013	0	0	0	0.000	0.000	0.000	7	7	7	0.002	0.002	0.002
	Total	340	333	74	0.112	0.110	0.013	0	0	0	0.000	0.000	0.000	7	7	7	0.002	0.002	0.002
Lower Shore Total	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	26	26	18	0.002	0.002	0.001
	Released	2,036	1,838	309	0.146	0.132	0.025	0	0	0	0.000	0.000	0.000	22	7	7	0.002	0.001	0.000
	Total	2,036	1,838	309	0.146	0.132	0.025	0	0	0	0.000	0.000	0.000	48	34	19	0.003	0.002	0.001

Table 5 *continued*. Estimated catch and catch rate (fish per angler-hour) for unclipped (wild-produced) and clipped (stocked) Rainbow Trout in the 2024 Lake Superior spring creel survey by station.

Station		Unclipped Steelhead Rainbow Trout						Clipped Rainbow Trout (Kamloops strain)						Clipped Steelhead Rainbow Trout (Superior strain)					
		Catch ≥16			Catch-rate ≥16			Catch ≥16			Catch-rate ≥16			Catch ≥16			Catch-rate ≥16		
		All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)	All	inches	(SE)
Beaver River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Baptism River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	340	317	130	0.102	0.095	0.036	0	0	0	0.000	0.000	0.000	12	12	12	0.004	0.004	0.003
	Total	340	317	130	0.102	0.095	0.036	0	0	0	0.000	0.000	0.000	12	12	12	0.004	0.004	0.003
Cross River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	46	0	0	0.092	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	46	0	0	0.092	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Temperance River	Harvested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Released	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poplar River	Harvested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Released	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cascade River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	51	51	33	0.111	0.111	0.060	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	51	51	33	0.111	0.111	0.060	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Devil Track River	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	247	181	64	0.201	0.147	0.041	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	247	181	64	0.201	0.147	0.041	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Kadunce Creek	Harvested	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	193	135	67	0.243	0.170	0.072	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	193	135	67	0.243	0.170	0.072	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Brule River	Harvested	8	8	8	0.009	0.009	0.009	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	49	41	23	0.053	0.044	0.022	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Total	57	49	23	0.061	0.053	0.021	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
Upper Shore Total	Harvested	8	8	8	0.001	0.001	0.001	0	0	0	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000
	Released	926	724	164	0.125	0.098	0.024	0	0	0	0.000	0.000	0.000	12	12	12	0.002	0.002	0.002
	Total	934	732	164	0.126	0.099	0.024	0	0	0	0.000	0.000	0.000	12	12	12	0.002	0.002	0.002
Shorewide Total	Harvested	8	8	8	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	26	26	18	0.001	0.001	0.001
	Released	2,962	2,562	350	0.139	0.120	0.018	0	0	0	0.000	0.000	0.000	34	19	13	0.002	0.001	0.001
	Total	2,970	2,570	350	0.139	0.121	0.018	0	0	0	0.000	0.000	0.000	60	45	22	0.003	0.002	0.001

Table 6. Yield, average length (inches), and average weight (pounds) of fish species caught in the 2024 Lake Superior spring creel survey.

Species	*Strain	Yield			Average Length (inches)				Average Weight (pounds)			
		Number Caught	Number Harvested	Pounds Harvested	Harvested	Released	All	(SE)	Harvested	Released	All	(SE)
Brook Trout	--	237	0	--	--	10.2	10.2	0.3	--	0.7	0.7	0.1
Coho Salmon	--	8	0	--	--	16.0	16.0	--	--	1.3	1.3	--
Sucker species	--	453	0	--	--	14.5	14.5	0.4	--	1.4	1.4	0.1
Unclipped Steelhead Rainbow Trout ($\geq 16"$)	Wild	2,570	8	54	28.0	24.3	24.3	2.0	6.7	4.6	4.6	0.1
Unclipped Steelhead Rainbow Trout ($< 16"$)	Wild	400	0	--	--	8.5	8.5	0.9	--	0.3	0.3	0.0
Clipped Steelhead Rainbow Trout ($\geq 16"$)	Superior	45	26	115	24.0	26.5	24.2	1.5	4.4	5.8	5.1	0.8
Clipped Steelhead Rainbow Trout ($< 16"$)	Superior	15	0	--	--	10.0	10.0	--	--	0.3	0.3	--
Clipped Kamloops Rainbow Trout ($\geq 16"$)	Kamloops	0	0	--	--	--	--	--	--	--	--	--

*Strain descriptions: Wild strain are an unclipped, wild-produced strain; Superior strain are a clipped (stocked) hatchery strain derived from steelhead captured at French and Knife rivers; Kamloops strain is a clipped (stocked) hatchery strain originally sourced from a hatchery in Montana, USA.

Table 7. Steelhead fry stocking program summary (years stocked, total fry stocked since 1992, and last year stocked) and evaluation with angler creel catch and catch rates at 13 North Shore rivers during the fry stocking era (1992-2019) and post-fry stocking era (2021-2024). The post-fry stocking era account for lag time (years) after stocking when surviving fry would return to rivers to spawn as adults.

River	Years Stocked (since 1992)	Total Fry Stocked (since 1992)	Last Year Fry Stocked	Fry Stocking Era (1992-2019)					Post-Fry Stocking Era (2021-2024)				
				Mean Catch	Mean Catch-Rate	SD	N	SE	Mean Catch	Mean Catch-Rate	SD	N	SE
*Lester River	21	1,293,238	2017	409	0.077	0.05	28	0.01	214	0.089	0.02	4	0.01
Sucker River	4	85,700	2003	327	0.068	0.06	28	0.01	251	0.125	0.02	4	0.01
Knife River	8	610,592	2006	308	0.095	0.08	28	0.01	183	0.099	0.03	4	0.02
*Stewart River	16	1,234,911	2016	385	0.134	0.09	28	0.02	668	0.231	0.05	4	0.03
*Silver Creek	13	585,313	2016	152	0.179	0.13	22	0.03	74	0.183	0.12	4	0.06
*Gooseberry River	10	452,387	2016	196	0.181	0.18	28	0.03	128	0.178	0.06	4	0.03
*Split Rock River	16	1,225,784	2017	228	0.097	0.08	28	0.02	464	0.179	0.06	4	0.03
Beaver River	13	767,094	2014	63	0.119	0.14	28	0.03	3	0.006	0.01	4	0.01
Baptism River	9	896,156	2015	223	0.124	0.09	28	0.02	212	0.094	0.01	4	0.00
Cross River	7	340,640	2012	53	0.202	0.23	28	0.04	0	0.000	0.00	4	0.00
Temperance River	12	709,019	2014	27	0.077	0.10	28	0.02	7	0.040	0.07	3	0.04
Cascade River	11	536,446	2014	75	0.137	0.13	28	0.03	30	0.049	0.06	4	0.03
Brule River	2	163,943	2005	113	0.150	0.08	28	0.02	72	0.100	0.06	4	0.03
All Rivers (N=13)		8,901,223		198	0.125	0.13	358	0.01	181	0.107	0.08	51	0.01

*Denote rivers where last stockings might still be contributing to catch rates in post-fry stocking years

**Calculated as the percent change in the catch and catch-rates from the fry stocking era (1992-2019) and the post-fry stocking era (2021-2024)

Table 8. Summary of Superior (SUP) Strain steelhead Rainbow Trout stocking by stocking location, year stocked, and size between 2018 and 2024. The stock date range is the first and last date that fish were stocked at each river year and size.

Stocking Location	Year Stocked	Size			Total	Stock Date Range
		*Fryling	**Fingerling	***Yearling		
French River	2018	0	0	53,081	53,081	April 27-May 7
	2019	0	0	70,301	70,301	April 22-May 6
	2020	0	0	35,994	35,994	April 20-April 21
	2021	0	0	0	0	
	2022	0	0	31,194	31,194	May 17.
	2023	59,359	0	26,150	85,509	June 1-June 23
	2024	0	0	61,436	61,436	April 8-April 17
Lester River	2018	0	0	60,290	60,290	April 23-May 1
	2019	0	0	69,768	69,768	April 8-May 6
	2020	0	0	0	0	
	2021	0	0	0	0	
	2022	0	0	29,407	29,407	May 17-June 2
	2023	0	0	52,300	52,300	June 6.
	2024	0	0	72,740	72,740	April 8-April 17
^b Sucker River	2024	0	62,499	0	62,499	October 22.
^b Knife River, Little	2023	0	9,704	0	9,704	November 17.
^a Knife River	2024	0	0	6,992	6,992	April 30-May 2
^a Knife River, West Branch	2024	0	0	6,873	6,873	April 30-May 2
^b Lake Superior (Two Harbors)	2024	0	62,499	0	62,499	October 24.
Totals		59,359	134,702	576,526	770,587	

*Frylings averaged 2 inches total length and were not clipped prior to stocking.

**Fingerlings averaged 3 inches total length and were not clipped prior to stocking.

***Yearlings averaged 4 inches total length and were adipose (only) or adipose + pelvic fin clipped prior to stocking.

^a Unplanned stocking provided by surplus hatchery production that exceeded the 120,000 annual stocking quota of clipped pre-smolt yearlings for spring stockings the Lester and French rivers.

^b Unplanned stocking provided by surplus eggs from Superior strain adult captive broodstock.

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MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISHERIES

COMPLETION REPORT:

LAKE SUPERIOR SPRING CREEL SURVEY

North Shore Streams

2024

Report Completed By:
Nick Peterson

Area Supervisor \ Date

Regional Fisheries Approval \ Date