

WDNR Lake Superior Creel Report 2020

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Introduction

The WDNR Lake Superior Fisheries Management Team conducts an annual creel survey of the open-water and ice fishing seasons in Wisconsin waters of Lake Superior spanning all the way from Superior Entry to Saxon Harbor. In addition, mandatory monthly harvest reports are gathered from all licensed charter captains in Wisconsin waters of Lake Superior. This creel survey is a major undertaking for the Lake Superior Fisheries Management Team in terms of time and money; approximately 5,000 seasonal employee hours (i.e., creel clerks) and hundreds of hours of permanent staff (e.g., processing data, reports, etc.) are required each year to effectively run the creel survey.

The harvest estimates resulting from this creel survey are crucial for numerous reasons. First, Lake Trout harvest estimates from management unit WI-2 are monitored closely to ensure the sport harvest does not exceed the quota allotted to sport fishing. Second, Lake Trout sport harvest, fishing effort, and size distribution of harvested Lake Trout are important inputs into the statistical catch-at-age model used to estimate population size and ultimately set the Lake Trout total allowable catch in WI-2. Third, harvest estimates of all species from the creel survey are used to evaluate effects of fishing regulation changes on sport fishing harvest. Lastly, harvest results are continually used to monitor “return-to-creel” rates of stocked fish and assess sport fishing preferences and popularity of various fisheries.

Methods

The sport fishery harvest in Wisconsin waters of Lake Superior was estimated during the 2020 lake trout sport fishing season (December 1, 2019 through September 30, 2020). Fishing effort, harvest and harvest rates were determined from 1) a stratified, random creel survey during the ice fishing season (WI-2 only) and the open-water fishing season and 2) mandatory licensed charter boat reporting.

In summary, the creel survey works by estimating total fishing effort (hours) through a series of random vehicle/trailer counts at public access locations and then extrapolating those effort values to the total number of fishing days. Creel clerks interview anglers which provides information such as number of anglers in the party, time spent fishing, relative location fished, fish species targeted, number of fish harvested, and biological characteristics (e.g., length, fin clips, etc.) of harvested fish. From this information, anglers are separated into various “fisheries” (see more details of different fisheries below) in order to appropriately allocate the estimated effort to different fisheries. Harvest rates (number of fish per angler-hour) are also calculated from interview information; harvest rates and total effort are calculated for each fishery by day type (i.e., weekend/weekday) for each location (e.g., Ashland route) within each month. Harvest estimates are calculated by multiplying the harvest rate by the total effort (angler-hours) within each of these groupings.

Harvested fish were identified and measured to the nearest tenth of an inch. Fin clips as well as any tags that were present were recorded. The Wisconsin waters of Lake Superior are divided into two management units: WI-1 or the Western Arm (west of the line running north-south from Bark Point; 46 deg. 53.21 min. N, 91 deg. 11.16 min. W) and WI-2 or the Apostle Islands region (east of the Bark Point line; Figure 1). Creel results were therefore separated by management unit.

Interview and count (effort) data were entered into a Microsoft Access database and subsequently run through a program in the statistical program R (R version 3.6.1) to obtain harvest and effort estimates. Original functions to calculate creel statistics and randomize creel schedules were developed by Dr. Derek Ogle of Northland College.

December Open-Water Survey

An open-water creel survey was conducted along the main shore from December 1, 2019 – December 7, 2019 (final ice up) at access points near Washburn and Bayfield. Trailer and angler counts along with interviews were obtained using a stratified creel survey method. Interviews were conducted in the same manner as the open-water private method (below).

Ice Creel Survey

An ice creel survey was conducted near Ashland (i.e., Second Landing-Long Bridge) from December 14, 2019 to March 31, 2020 and near Washburn/Bayfield (“S” Curve-Bono Creek access through the northern most area of fishing activity Bayfield / Red Cliff) from December 14, 2019 – March 31, 2020. Trailer and angler counts were obtained using the stratified creel survey method. Two separate vehicle counts were made daily starting at approximately 9:00 AM and 2:00 PM for each site in each random route. Vehicles present in morning and afternoon checks were not counted twice. Interviews for the ice creel survey were obtained using a targeted method and were conducted at the site. Any number of anglers in a vehicle was considered an angling party. Anglers interviewed in the ice fishery were separated into three different fisheries: Ice Shallow Water (less than 60 feet), Ice Deep Water- “Bobbing” (greater than or equal to 60 feet) and Northern Pike Ice Spearing.

Open-Water Private Survey

In 2020, a single-loop time interval creel survey was conducted during the open-water fishing season on Wisconsin waters of Lake Superior. The following locations were surveyed (start date): Ashland (July 1), Bayfield (July 1), Cornucopia / Port Wing (July 1), Little Sand Bay (July 1), Red Cliff (July 1), Saxon (July 1), and Washburn (July 1). The open water survey ended on September 30, 2020 after the Lake Trout season closed.

Trailer and angler counts along with interviews were obtained using a stratified creel survey method. Using the time interval procedure, vehicles with boat trailers and harbor boats were counted at each access site. Boats going out to fish or returning from fishing were counted as a fraction of the time the clerk spent at the site (i.e., individual boat count = [creel shift in minutes – minutes at site] / creel shift in minutes). A boat beginning to fish was added to the initial count, and a boat stopping or returning from fishing was subtracted from the initial count.

Boats returning from fishing were interviewed at the site. Total number of anglers on board was treated as an angler party, and parties were categorized by fishery. For example, if the boat was fishing for cool-water species such as northern pike, walleye, or yellow perch in a predominately cool-water area, it was recorded as “Open-Water Cool”. If the boat was trolling for trout and salmon (i.e., cold-water species), it was recorded in “Open-Water Cold”. If the boat was strictly practicing catch-and-release smallmouth bass fishing, it was recorded as “Smallmouth Bass Only.” If the boat was targeting lake whitefish by jigging, it was recorded under the “Open-Water Whitefish” fishery. These various fisheries are distinguished so that effort from boat and trailer counts will accurately represent fishers on the water (e.g., smallmouth bass catch-and-release effort will not inflate walleye harvest estimates). If the boat was fishing for “anything that bites”, the area the boat fished would determine which category to place the boat. Finally, if the party was not fishing, it was placed in the category “Pleasure”, and therefore, that effort was not applied to harvest estimates. Charter boats were not counted in effort estimates at a site due to mandatory reporting (see below). Sailboats were also excluded from counts unless fishing gear (e.g., downriggers or rods) was present. The jurisdiction in which the boat fished was also determined. Saxon Harbor and Superior are considered boundary waters with Michigan and Minnesota, respectively. Effort and harvest of parties fishing in non-Wisconsin waters were not included in Wisconsin harvest estimates. Boats that fished both states’ waters had half the total effort/harvest assigned to Wisconsin waters.

COVID-19 Restrictions - The Superior creel route was not completed in WI-1 in 2020. Creel survey results from Management Unit WI-1 are therefore not comparable to previous years (with the exception of Charter fishing data). The open-water creel survey was not conducted in WI-2 in April, May and June of 2020. Therefore, the mean angler effort and harvest from 2017 to 2019 for each fishery was used to estimate angler effort and harvest for each of these same months in 2020. No biological data (e.g., length, fin clips) were collected during angler interviews during the months of July, August and September in 2020.

Charter Reporting

Harvest estimates for guided charters came from mandatory monthly reports that were initiated in 1973. Information on number of anglers, hours fished, location (grid), and number of various species harvested was included in the Sport Trolling License Monthly Report (Form 9400-249).

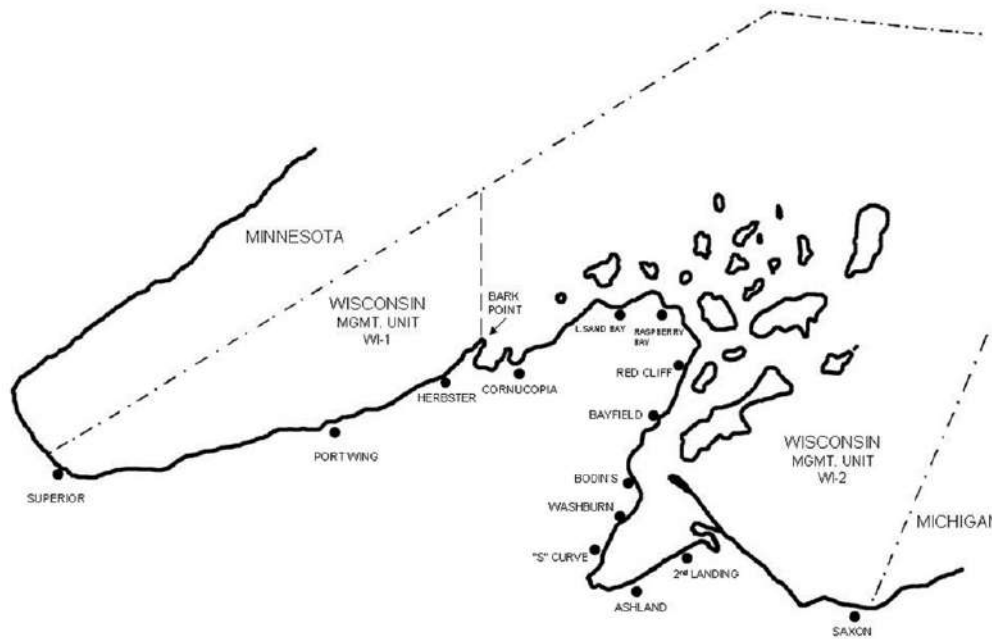


Figure 1. Wisconsin waters of Lake Superior, management units WI-1 and WI-2, and major ports in the WDNR Creel Survey.

Results

WI-1

The 2020 Creel Survey in Management Unit WI-1 included 62 creel interviews of angler parties resulting in 14,580 angler-hours in management unit WI-1 including Charter fishing reporting (Figure 2). The estimated harvest from all three fisheries in this management unit was 2,297 fish (Figure 3). Lake Trout (1,537), Walleye (378) and Coho Salmon (214) accounted for 92.7% of the harvest. Overall harvest rate was 0.1575 fish/hour (Figure 4); Lake Trout harvest rate was the highest (0.1054 fish/hour) followed by Walleye (0.0259 fish/hour) and Coho Salmon (0.0147 fish/hour).

Open-Water Cold

The Open-Water Cold fishery had the highest effort in WI-1 with 9,289 angler-hours or 63.7% of the total angler-hours (Figure 2). Anglers in the Open-Water Cold fishery harvested 1,060 total fish; Lake Trout (775) and Coho Salmon (176) accounted for 89.7% of the harvest in this fishery. Overall harvest rate was 0.1141 fish/hour; Lake Trout harvest rate was highest (0.0834 fish/hour) followed by Coho Salmon (0.0189 fish/hour).

Open-Water Cool

The Open-Water Cool fishery accounted for 1,391 angler-hours or 9.5% of the total angler-hours in WI-1 (Figure 2). Anglers in the Open-Water Cool fishery harvested 277 fish. Walleye dominated this fishery with a harvest of 249 or 90% of the harvest. Overall harvest rate was 0.1991 fish/hour, and Walleye harvest rate was 0.1790 fish/hour.

Charter

The Charter fishery accounted for 3,900 angler-hours or 26.7% of the total angler-hours in WI-1 (Figure 2). This was the most Charter effort since 2006. Anglers in the Charter fishery harvested 960 fish; Lake Trout (734) and Walleye (107) accounted for 87.6% of the harvest. The overall harvest rate was 0.2462 fish/hour; Lake Trout harvest rate was highest (0.1882 fish/hour) followed by Walleye (0.0274 fish/hour). The overall harvest rate and the Lake Trout harvest rate were slightly lower than the previous three seasons.

WI-2

The 2020 Creel Survey in Management Unit WI-2 included 2,543 interviews of angler parties resulting in 253,013 angler-hours in management unit WI-2 including Charter fishing reporting (Figure 2). The estimated harvest was 48,650 fish (Figure 3). Lake Trout (13,185), Lake Whitefish (9,559), Yellow Perch (8,969), Coho Salmon (4,437) and Brown Trout (4,128) were the top five species harvested and accounted for 82.8% of the harvest. Overall harvest rate was 0.1923 fish/hour (Figure 4). Lake Trout harvest rate was highest (0.0521 fish/hour) followed by Lake Whitefish (0.0378 fish/hour), Yellow Perch (0.0354 fish/hour), Coho Salmon (0.0175 fish/hour) and Brown Trout (0.0163 fish/hour).

December Open-Water

The December Open-Water fishery accounted for 78 angler-hours or 0.03% of the total angler-hours fished in WI-2 (Figure 2). This fishery harvested 33 fish (Figure 3). Brown Trout harvest was the highest with 11 fish or 33.3% of the total harvest, followed by Coho Salmon (8), Splake (6) and Lake Whitefish (3). Overall harvest rate was 0.4231 fish/hour.

Ice Shallow Water < 60 ft.

The Ice Shallow Water < 60 ft. fishery accounted for 91,278 angler-hours or 39.1% of the total angler-hours fished in WI-2 (Figure 2). The effort in 2020 was higher than the previous three years. Anglers in this fishery harvested 24,137 fish or 49.6% of the total harvest in this management unit. Yellow Perch (8,251), Lake Whitefish (6,035), Rainbow Smelt (3,166), Brown Trout (1,986) and Splake (1,796) were the top five species harvested and accounted for 80.5% of the total harvest in this fishery. Yellow Perch harvest was lower than each of the previous three seasons, while Brown Trout and Splake harvest were higher than each of the previous three seasons. Of the 1,986 Brown Trout harvested, approximately 63.4% were hatchery-origin (stocked). Overall harvest rate was 0.2644 fish/hour, lower than each of the previous three seasons. Yellow Perch harvest rate was highest (0.0904 fish/hour) followed by Lake Whitefish (0.0661 fish/hour), Rainbow Smelt (0.0347 fish/hour), Brown Trout (0.0218 fish/hour) and Splake (0.0197 fish/hour).

Ice Deep Water ≥ 60 ft.

The Ice Deep Water ≥ 60 ft. fishery accounted for 4,419 angler-hours or 1.7% of the total angler-hours fished in WI-2 (Figure 2). This was the lowest effort since 2017 (3,728 hours). Anglers in this fishery harvested 809 fish or 1.7% of the total harvest in this management unit. Lake Trout (558) and Lake Whitefish (99) accounted for 81.2% of the harvest in this fishery. Overall harvest rate was 0.1831 fish/hour. Lake Trout harvest rate was highest (0.1263 fish/hour) followed by Lake Whitefish at 0.0224 fish/hour.

Open-Water Cold

The Open-Water Cold fishery accounted for 95,486 angler-hours or 40.9% of the total angler-hours in WI-2 (Figure 2). The effort in 2020 was higher than each of the previous three seasons. Anglers in this fishery harvested 15,306 fish or 31.5% of the total harvest in this management unit. Lake Trout (8,892), Coho Salmon (3,684) and Brown Trout (1,938) were the top three species harvested and accounted for 94.8% of the harvest in this fishery. Overall harvest rate was 0.1603 fish/hour. Lake Trout harvest rate was the highest (0.0931 fish/hour) followed by Coho Salmon (0.0386 fish/hour) and Brown Trout (0.0203 fish/hour).

Open Water Cool

The Open-Water Cool fishery accounted for 29,718 angler-hours or 12.7% of the total angler-hours in WI-2 (Figure 2). Anglers in this fishery harvested 2,120 fish or 4.4% of the total harvest in this management unit. Walleye (1,073) and Yellow Perch (679) accounted for 82.6% of the harvest in this fishery. Overall harvest rate was 0.0713 fish/hour. Walleye harvest rate was the highest (0.0361 fish/hour) followed by Yellow Perch (0.0228 fish/hour).

Open-Water Whitefish

The Open-Water Whitefish fishery accounted for 4,300 angler-hours or 1.7% of the total angler-hours in this management unit (Figure 2). Anglers in this fishery harvested 3,301 fish or 6.8% of the total harvest in this management unit. Lake Whitefish represented the highest catch with a harvest of 3,169 fish or 96% of the harvest in this fishery.

Smallmouth Bass Only

The Smallmouth Bass Only fishery accounted for 19,273 angler-hours or 7.6% of the total angler-hours in this management unit (Figure 2). Most of this effort occurs in May and June from anglers fishing the eastern side of Chequamegon Bay.

Charter

The Charter fishery accounted for 8,461 angler-hours or 3.6% of the total angler-hours in this management unit. This represented the highest amount of effort in the Charter fishery since 2000. Anglers in this fishery harvested 2,909 fish or 6.0% of the total harvest in this management unit. Lake Trout (2,586), Brown Trout (131) and Coho Salmon (127) accounted for 97.8% of the harvest in this fishery. Overall harvest rate was 0.3438 fish/hour. Lake Trout harvest rate was the highest (0.3056 fish/hour) followed by Brown Trout (0.0155 fish/hour) and Coho Salmon (0.0150 fish/hour).

LAKE TROUT FISHERY

WI-1

Daily bag limit: 3, minimum length limit: 15 inches, only one > 25 inches

The estimated Lake Trout harvest by sport anglers fishing in management unit WI-1 was 1,537 fish (Figure 5). The Open-Water Cold fishery represented the highest harvest (775) followed by the Charter (734) and the Open-Water Cool fisheries (28). The Charter fishery harvest of 734 Lake Trout was higher than the previous three seasons.

The overall Lake Trout harvest rate was 0.1054 LT/hour. The Charter fishery had the highest Lake Trout harvest rate with 0.1882 LT/hour (Figure 6). This was lower than the previous three seasons. The Open-Water Cold fishery had a Lake Trout harvest rate of 0.0834 LT/hour and the Open-Water Cool fishery had a harvest rate of 0.0201 LT/hour.

WI-2

Daily bag limit: 2, minimum length limit: 15 inches, only one > 25 inches

The estimated Lake Trout harvest by sport anglers fishing in management unit WI-2 was 13,185 fish (Figure 5). This was higher than last season's total harvest of 10,819. Lake Trout harvest in WI-2 in 2020 was slightly higher than the long-term average, and Lake Trout harvest rate was slightly lower than the long-term average (Figure 7). The total Lake Trout harvest of 13,185 filled approximately 77.6% of the 17,000-fish annual quota in WI-2 in 2020. The Open-Water Cold fishery represented the highest Lake Trout harvest (8,892) followed by the Charter fishery (2,586), Ice < 60 ft. (1,054), Ice ≥ 60 ft. (558) and the Open-Water Whitefish fishery (95).

The overall Lake Trout harvest rate was 0.0521 LT/hour. This was higher than last season's harvest rate of 0.0515 LT/hour. The Charter fishery had the highest Lake Trout harvest rate of all fisheries in WI-2 (0.3056 LT/hour; Figure 6). This was higher than last season's harvest rate of 0.2454 LT/hour. The Ice ≥ 60 ft. fishery represented the second-highest Lake Trout harvest rate in 2020 (0.1263 LT/hour). This was a higher harvest rate than each of the previous three seasons. The Open-

Water Cold fishery had the third-highest Lake Trout harvest rate in 2020 (0.0931 LT/hour). This was higher than last season's harvest rate of 0.0906 LT/hour. The Open-Water Whitefish fishery had the fourth-highest Lake Trout harvest rate (0.0221 LT/hour). The Ice < 60 ft. fishery had the fifth-highest Lake Trout harvest rate (0.0115 LT/hour).

Acknowledgements

We thank the creel clerks. They work hard at obtaining accurate data for the survey, and they also play an important role by having positive interactions with the public. Their effort is greatly appreciated. The creel clerks involved for this report were: Mark Hanson (Open-Water: Bayfield, Little Sand Bay, Red Cliff; Cornucopia, Port Wing. Winter Creel: Washburn-Red Cliff), Dean Kolpin (Open-Water: Saxon), and Sam Schneider (Winter Creel: Ashland; Open-Water: Ashland, Washburn). I would also like to thank Dr. Derek Ogle of Northland College, who developed the functions to calculate creel statistics and randomize creel schedules in the statistical program R. I would also like to thank Dray Carl for his help with the statistical program R and for reviewing/editing this report.

Note: For more detailed breakdowns of the WDNR Lake Superior Creel Survey results, please refer to the Supplemental Creel Statistics document.

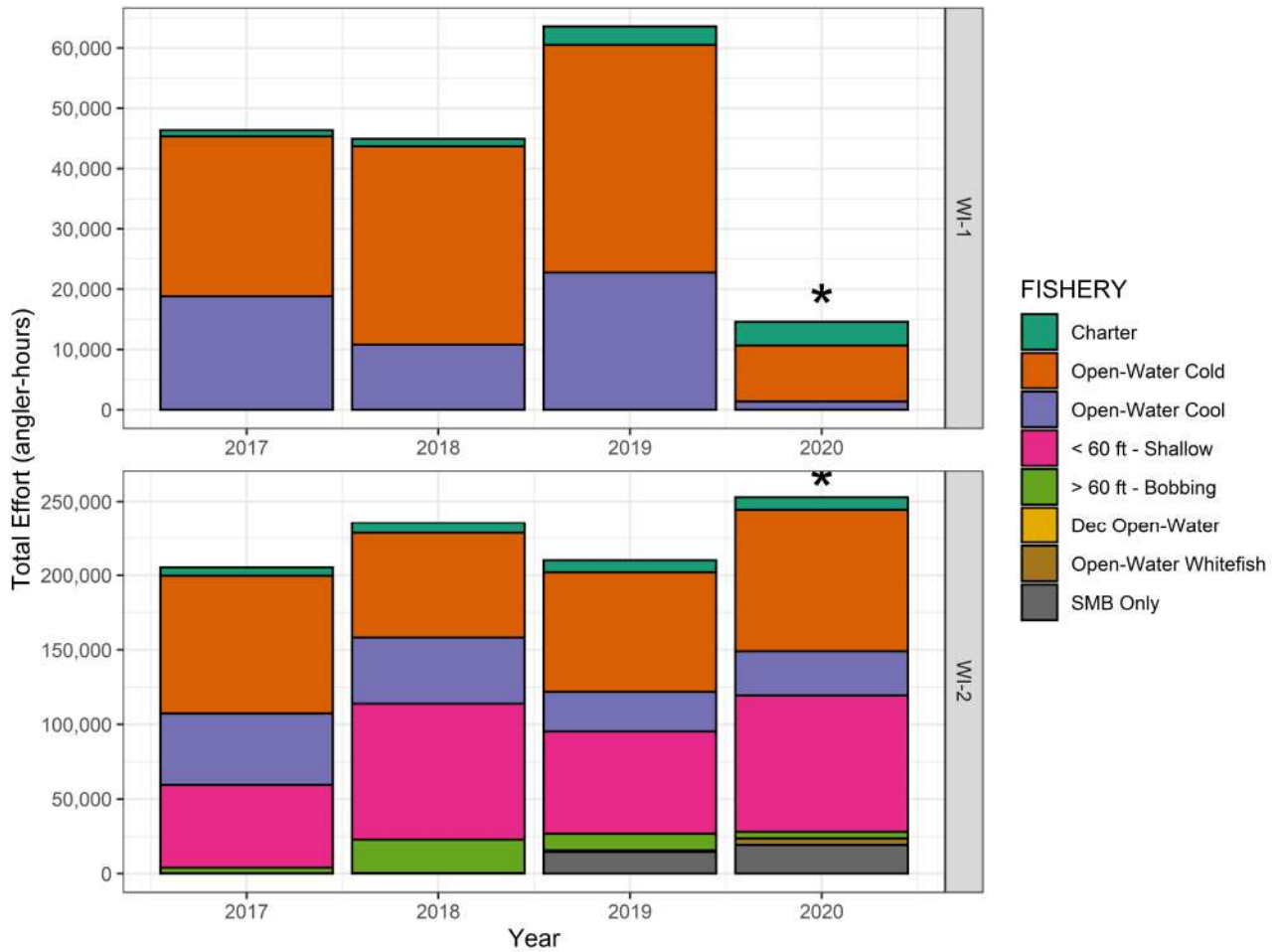


Figure 2. Total estimated fishing effort (angler-hours) by each fishery sampled in the WDNR Creel Survey within each management unit (WI-1 and WI-2) from 2017 to 2020.

* In WI-2, averages of "Open-Water" fisheries (does not include Charter) from 2017 to 2019 were used to estimate April, May, and June values in 2020. In WI-1, the Superior creel route was not completed in 2020. Both of these changes were due to COVID-19 restrictions.

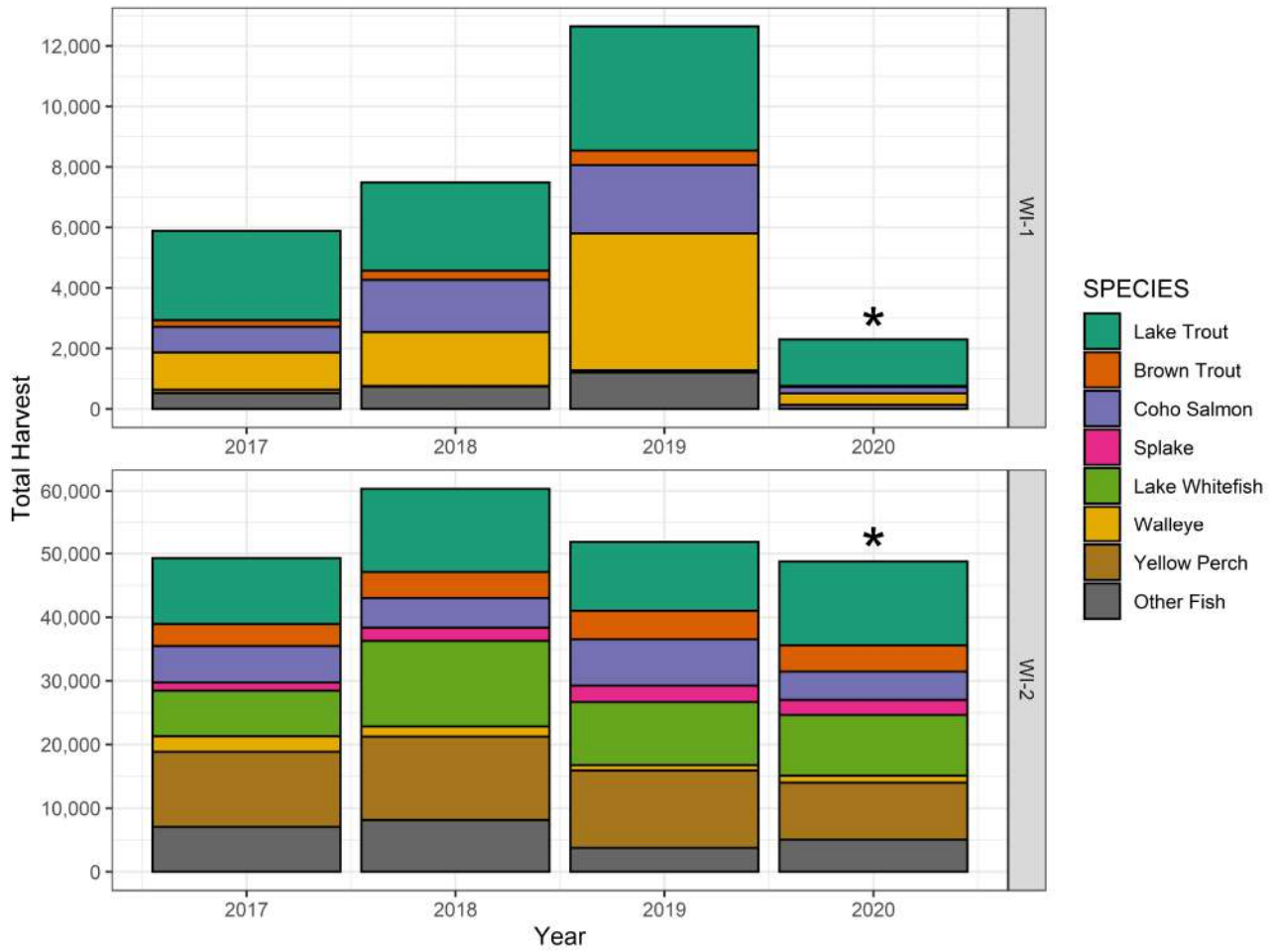


Figure 3. Total estimated harvest of the main seven species in the WDNR Creel Survey within each management unit (WI-1 and WI-2) from 2017 to 2020. All other species are represented into the "Other Fish" category.

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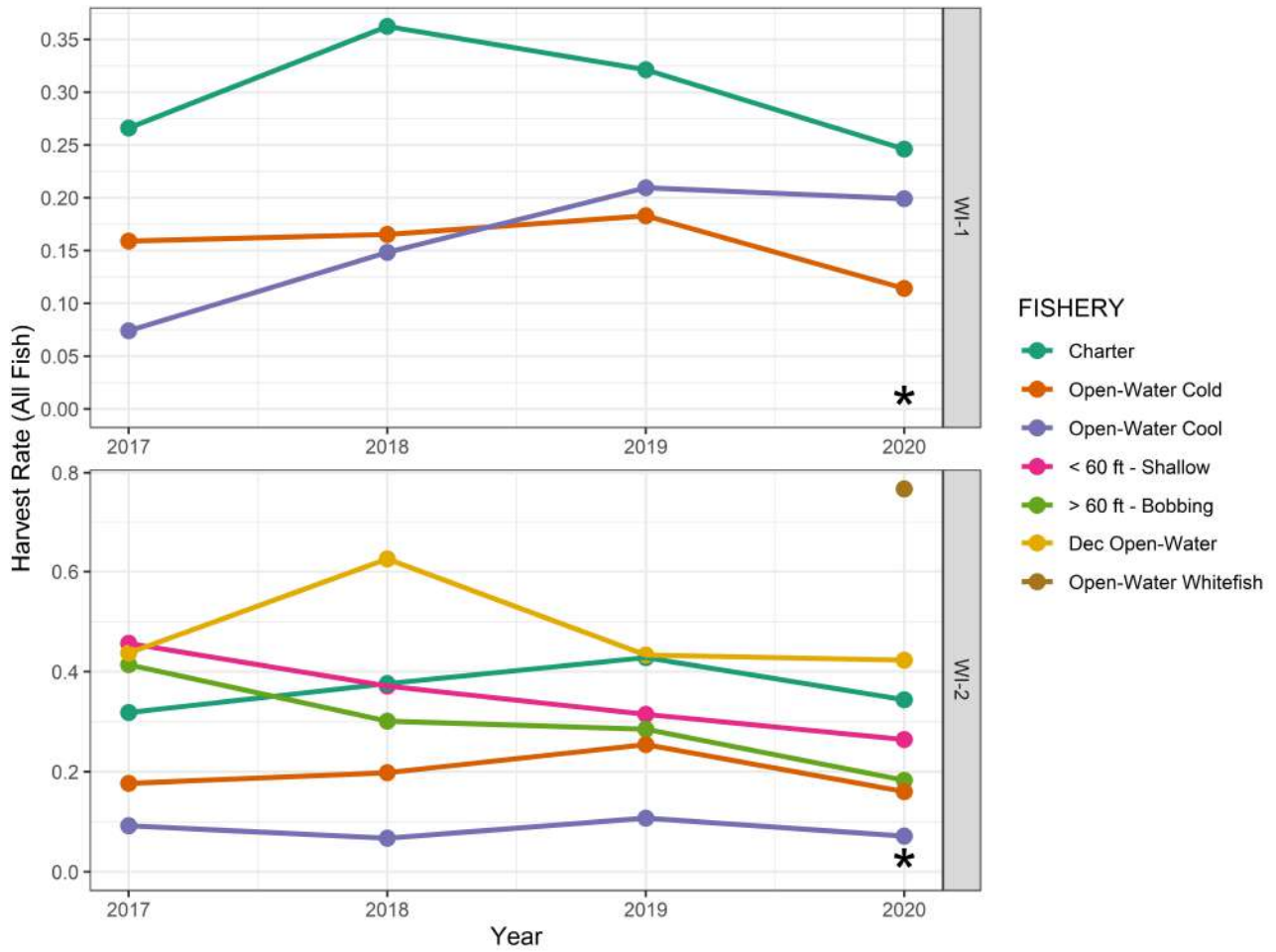


Figure 4. Estimated harvest rate (fish per angler-hour) of all fish within each fishery sampled in the WDNR Creel Survey within each management unit (WI-1 and WI-2) from 2017 to 2020.

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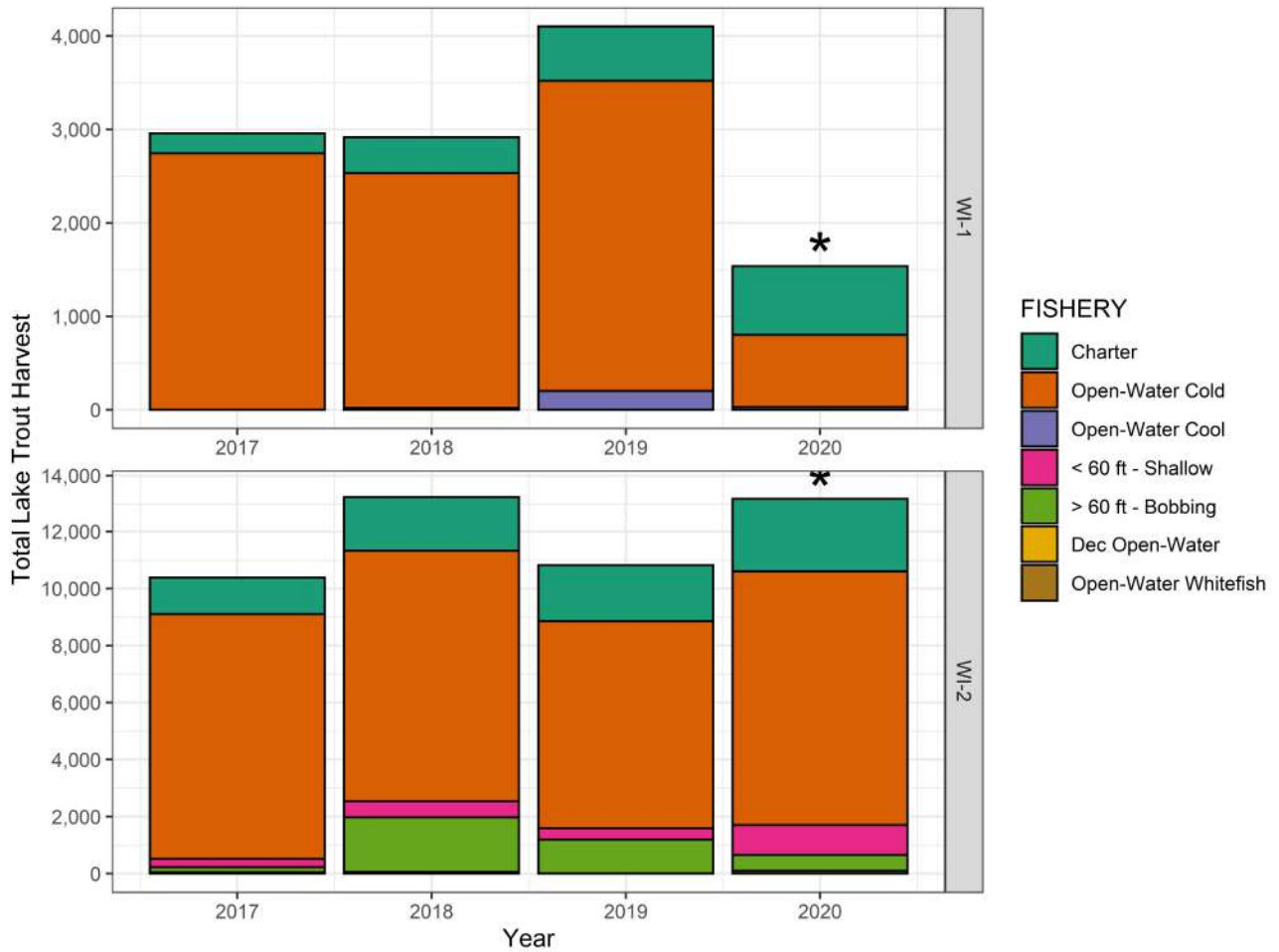


Figure 5. Total estimated harvest of Lake Trout by each fishery sampled in the WDNR Creel Survey within each management unit (WI-1 and WI-2) from 2017 to 2020.

* In WI-2, averages of "Open-Water" fisheries (does not include Charter) from 2017 to 2019 were used to estimate April, May, and June values in 2020. In WI-1, the Superior creel route was not completed in 2020. Both of these changes were due to COVID-19 restrictions.

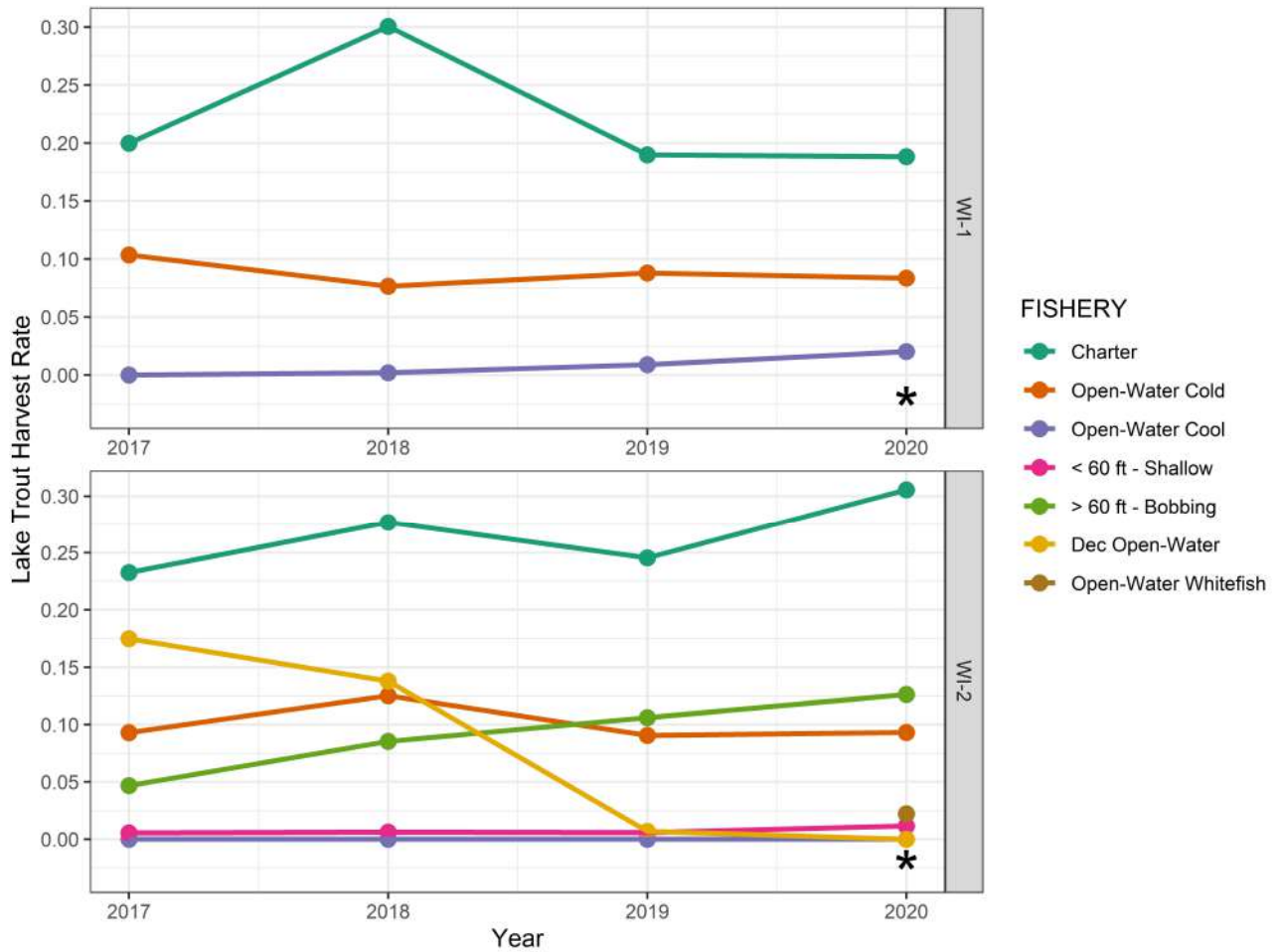


Figure 6. Estimated harvest rate (fish per angler-hour) of Lake Trout by each fishery sampled in the WDNR Creel Survey within each management unit (WI-1 and WI-2) from 2017 to 2020.

* In WI-2, averages of "Open-Water" fisheries (does not include Charter) from 2017 to 2019 were used to estimate April, May, and June values in 2020. In WI-1, the Superior creel route was not completed in 2020. Both of these changes were due to COVID-19 restrictions.

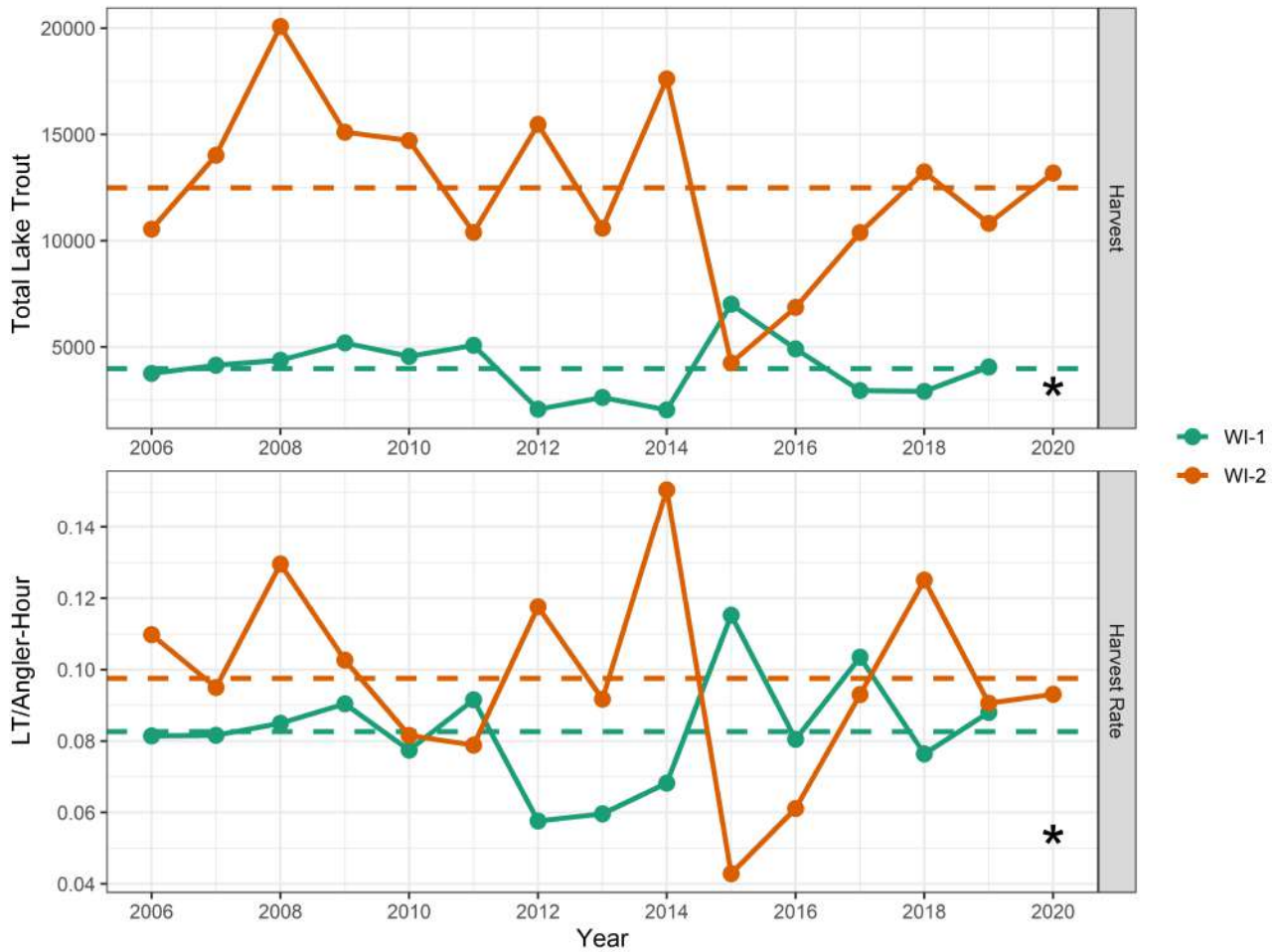


Figure 7. Estimated Lake Trout harvest (top) and harvest rate (fish per angler-hour) within each management unit (WI-1 and WI-2) from 2006 to 2020. Total harvest is from all fisheries sampled in the WDNR Creel Survey, and harvest rate is from the Open-Water Cold fishery. Dashed lines are average values from throughout the time series.

* In WI-2, averages of "Open-Water" fisheries (does not include Charter) from 2017 to 2019 were used to estimate April, May, and June values in 2020. In WI-1, the Superior creel route was not completed in 2020. Both of these changes were due to COVID-19 restrictions.