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Ross (Chemquasabamticook) Lake Sport Fishery Management

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ABSTRACT

Ross Lake supports a high quality coldwater fishery in a remote area of northern Maine. Between 1985 and 2017, we conducted six clerk creel surveys during the ice fishing season to estimate angler use, catch rates and harvest, as well as collect individual fish data. Estimates suggest an increasing trend in angler use on Ross Lake, despite declining angler use trends in other area waters. Catch rates and harvest of togue *Salvelinus namaycush* and brook trout *Salvelinus fontinalis* fluctuated over time, likely due to natural swings in population levels. Lake whitefish *Coregonus clupeaformis* catch rates and harvest changed drastically, with a large increase in harvest in 1999, and a sharp decline from 1999 to 2012. The population had likely experienced overharvest, and the post-2012 change to a more restrictive whitefish regulation appears to have resulted in the recovery of whitefish numbers back to 1999 levels. Cusk *Lota lota* harvest nearly tripled between 2012 and 2017. The existing fishing regulations appear adequate to support a high quality fishery in Ross Lake in the near term, though continued monitoring will be critical to help guide management in the future.

INTRODUCTION

Ross Lake is a large (2900 acre), oligotrophic (105 feet max depth) headwater lake located in T10 R15 in the Allagash River drainage. Its cold, deep, well-oxygenated water provides ideal habitat for coldwater gamefish species. The lake supports wild, native populations of togue *S. namaycush* (lake trout), brook trout *S. fontinalis*, lake whitefish *C. clupeaformis* and cusk *L. lota* (burbot). Rainbow smelt *Osmerus mordax* were introduced to Ross in the 1940's in an attempt to improve togue growth. Smelts are well established and provide the major component of the togue diet.

The lake is situated in the vast northern Maine forest about 70 miles west of Ashland, and supports popular sport fisheries in a remote setting during both the summer and winter seasons. Access is by vehicle over private logging roads within the North Maine Woods system, which charges seasonal day use and nightly camping fees, or by aircraft. The lake remains largely undeveloped, with less than a dozen private camps along the shoreline. Public access during the open water season is via an unimproved boat launch on the north end of the lake at the North Maine Woods campsite. Along the southwest shore of the lake, Ross Lake Camps is a sporting camp operation that caters to hunters and anglers, and is a popular destination for ice fishermen from late January through March.

Management of the Ross Lake sport fishery has included conservative size and bag limits to minimize the potential effects of angler harvest on fishing quality and long term population health. Togue have been managed under a limit of one fish, 18-inch minimum length since 1984. Brook trout were regulated by a five fish limit (aggregate with any togue harvested) during the 1985 and 1989 surveys, and a two fish bag

limit, 12-inch minimum length and only one fish exceeding 14 inches during the remaining survey period. Lake whitefish were managed under an eight fish bag limit in 1985, a three fish bag limit in 1989 and 1999, a three fish bag limit with 16-inch minimum length in 2007 and 2012, and a one fish bag limit with 18-inch minimum length in 2017. There is no size or bag limit on cusk.

METHODS

Maine Department of Inland Fisheries and Wildlife fisheries staff conducted clerk creel surveys during the ice fishing season on Ross Lake six times from 1985-2017 (1985,1989,1999,2007,2012,2017). Each survey spanned the entire ice fishing season, and was conducted using a stratified, systematic sampling schedule including both weekdays and weekend days. Number of days surveyed per three-month season ranged from 16 – 44, with 30+ days surveyed in the majority of years.

Creel survey activities for each day included a total count of the number of parties and anglers fishing on that day, data collection from all fish encountered on the ice (i.e. length, weight, scale sample for ageing), and interviews to collect information from recent angling trips (i.e. date, party size, hours fished, number of each species caught, kept and released). These data collection efforts allowed for estimation of total angler use, catch rates, and angler harvest for each species during the survey season.

RESULTS

Angler Use

Use estimates show a general pattern of increased angler use during the Ross Lake winter fishery over the years (Figure 1). A lower level of angler use, around 500-700 angler days per season, occurred between 1985 and 1999, and an increased level of angler use in the 700-900 angler days per season was evident in the more recent surveys.

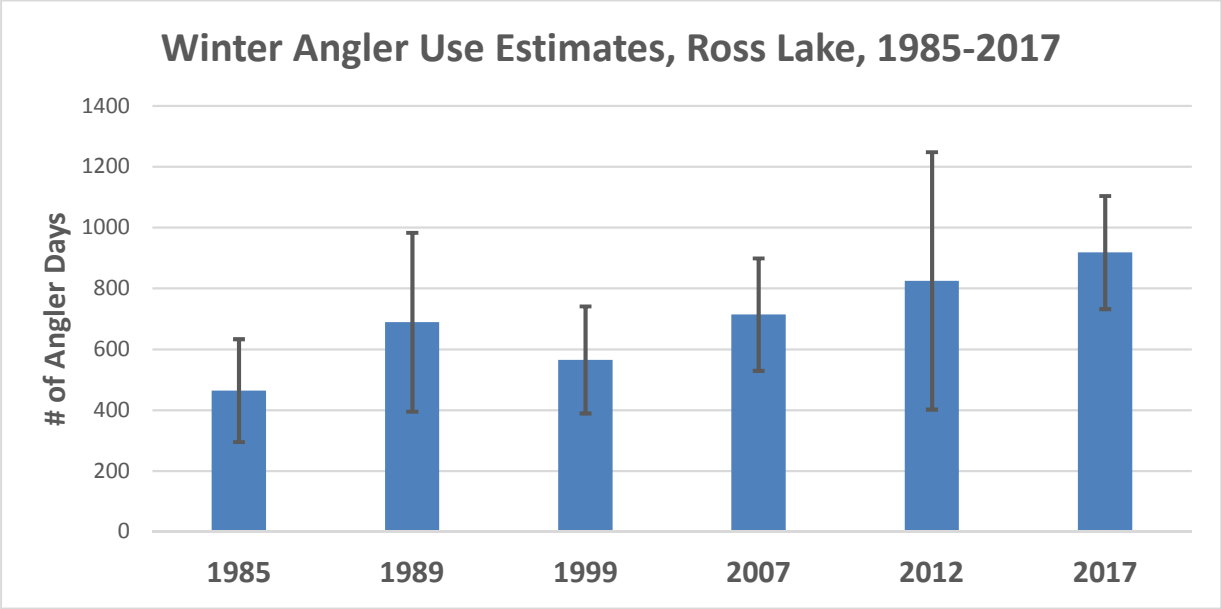

Figure 1. Estimates of angler use during the winter fishery in Ross Lake, 1985-2017.

Catch Rates

Angler catch rates for brook trout, togue and cusk fluctuated up and down over the course of the study period, with no indications of substantial trends in most cases (Figure 2). Brook trout catch rates tended to be much lower than togue, and similar to cusk in most years. Brook trout catch showed an increasing trend from 1989-2012, with a drop in 2017. Togue catch rates peaked in 2007 and pulled back in 2012 and 2017. Cusk catch rates were relatively steady over the years, but showed a large increase between 2012 and 2017.

Whitefish catch rates in Ross Lake show a much different pattern than other species over the years (Figure 3). The 1985 and 1989 surveys showed very few whitefish caught in the fishery, but catch rates of whitefish exploded between 1989 and 1999. They then declined in 2007 and again in 2012, with a recent increase back to 1999 levels in 2017.

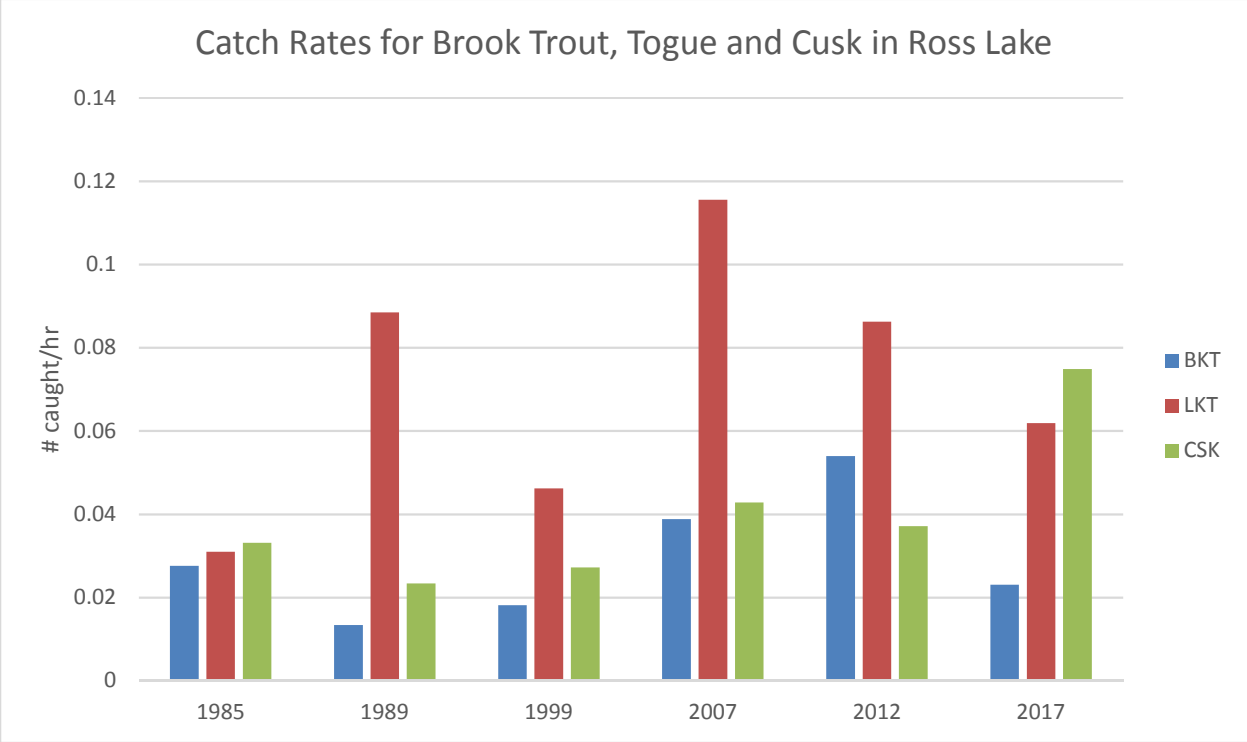

Figure 2. Catch rates for brook trout, togue and cusk in the Ross Lake winter fishery, 1985-2017.

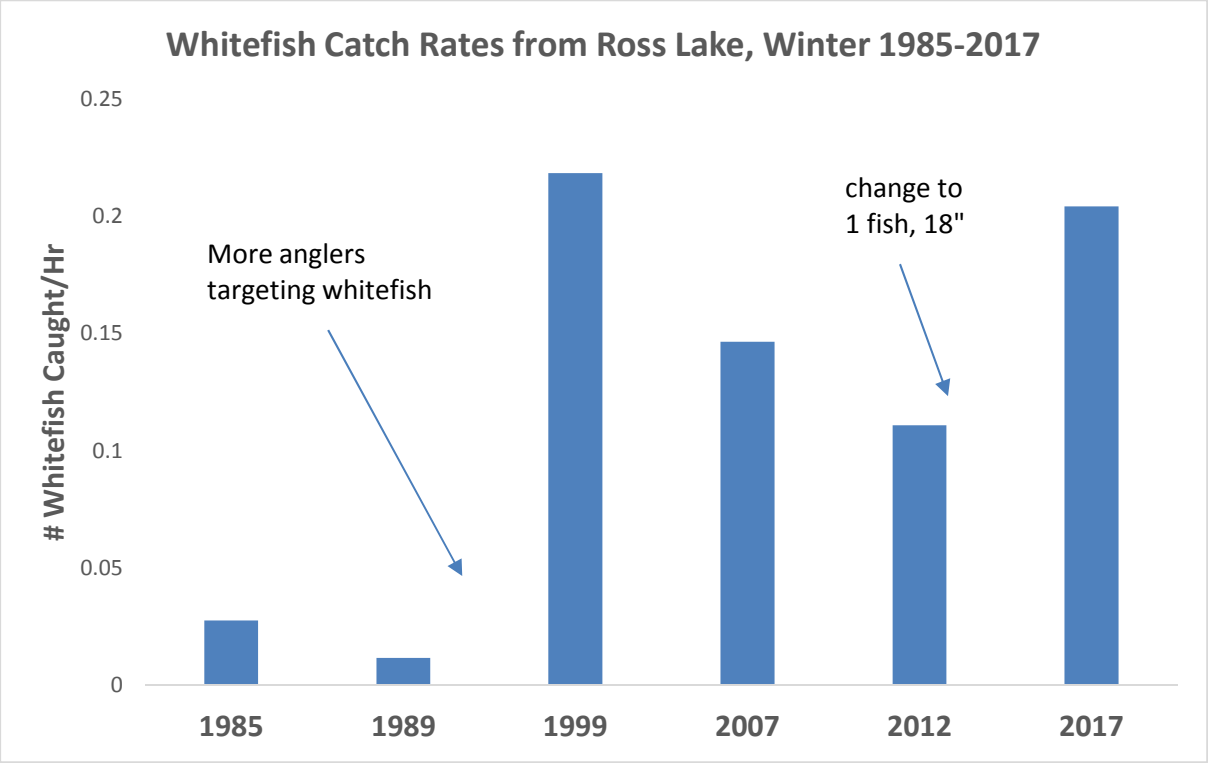

Figure 3. Whitefish catch rates in the Ross Lake winter fishery, 1985-2017.

Harvest

Estimates of angler harvest revealed several patterns over the course of the study. Togue harvest generally ranged between 50-125 fish/year during most years except 2007, where around 175 togue were estimated harvested (Figure 4). The 2017 togue harvest estimate was similar to 1989. Brook trout harvest generally ranged between 40-80 fish, with a high of more than 90 harvested in 2007 (Figure 5). Similar to the pattern seen in togue, brook trout harvest in 2017 was very close to that in 1989. Whitefish harvest showed a much more drastic change over the years, with lows of less than 100 fish harvested per season in 1985 and 1989, a spike to 650 in 1999, a decline to less than 100 in 2012, and a recovery to more than 200 in 2017 (Figure 6). Cusk harvest remained low and steady over the years, with fewer than 150 cusk harvested from 1985-2012 (Figure 7). It then skyrocketed to an estimate of almost 450 cusk harvested in 2017.

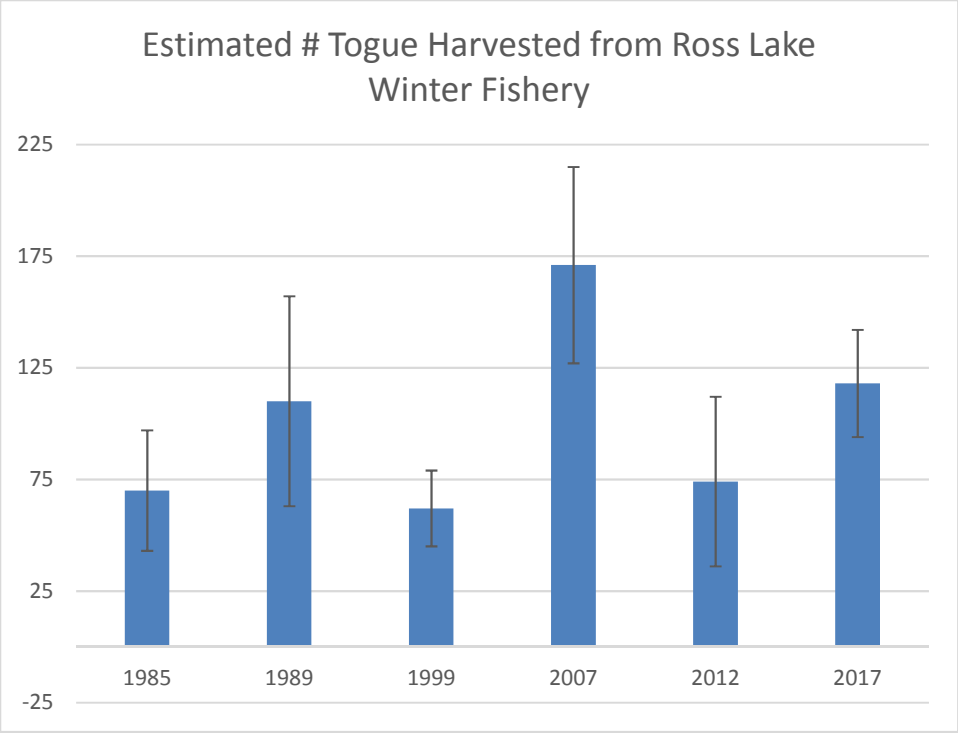

Figure 4. Estimated harvest of togue from Ross Lake winter fishery, 1985-2017.

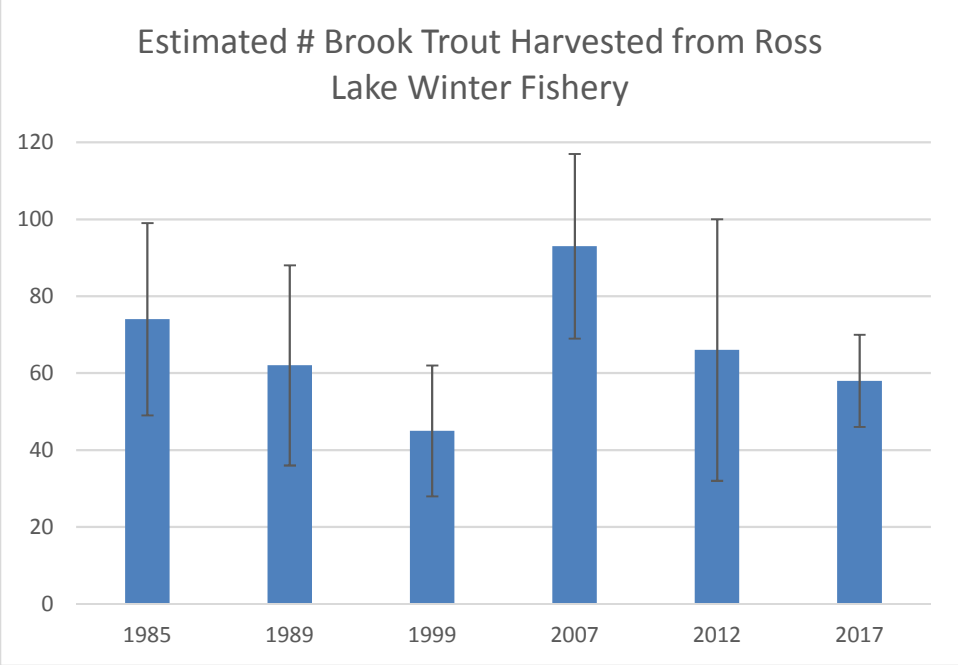

Figure 5. Estimated harvest of brook trout from Ross Lake winter fishery, 1985-2017.

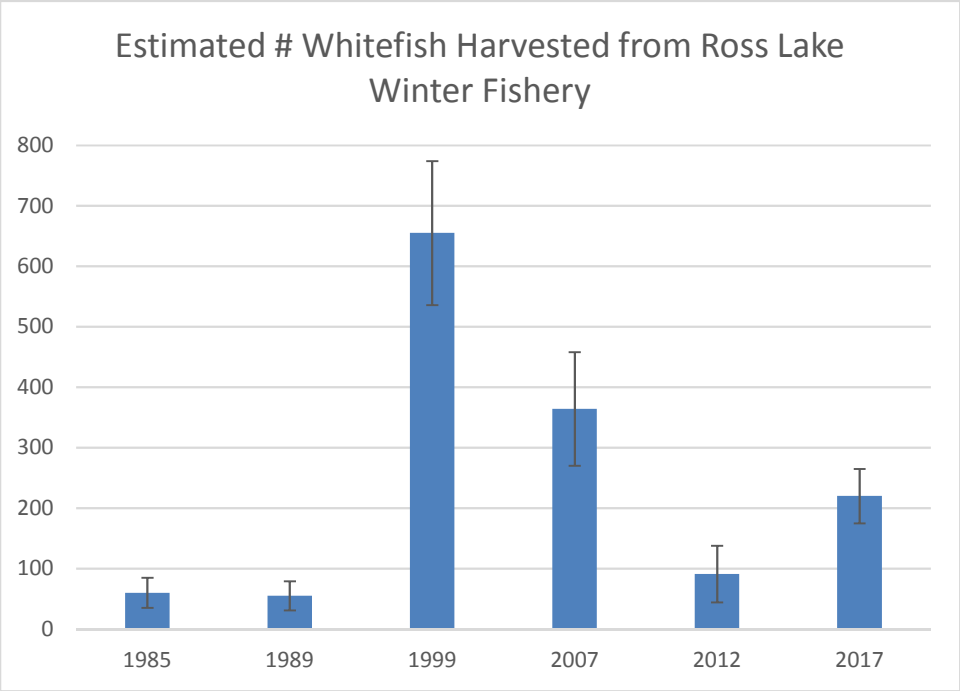

Figure 6. Estimated harvest of lake whitefish in the Ross Lake winter fishery, 1985-2017.

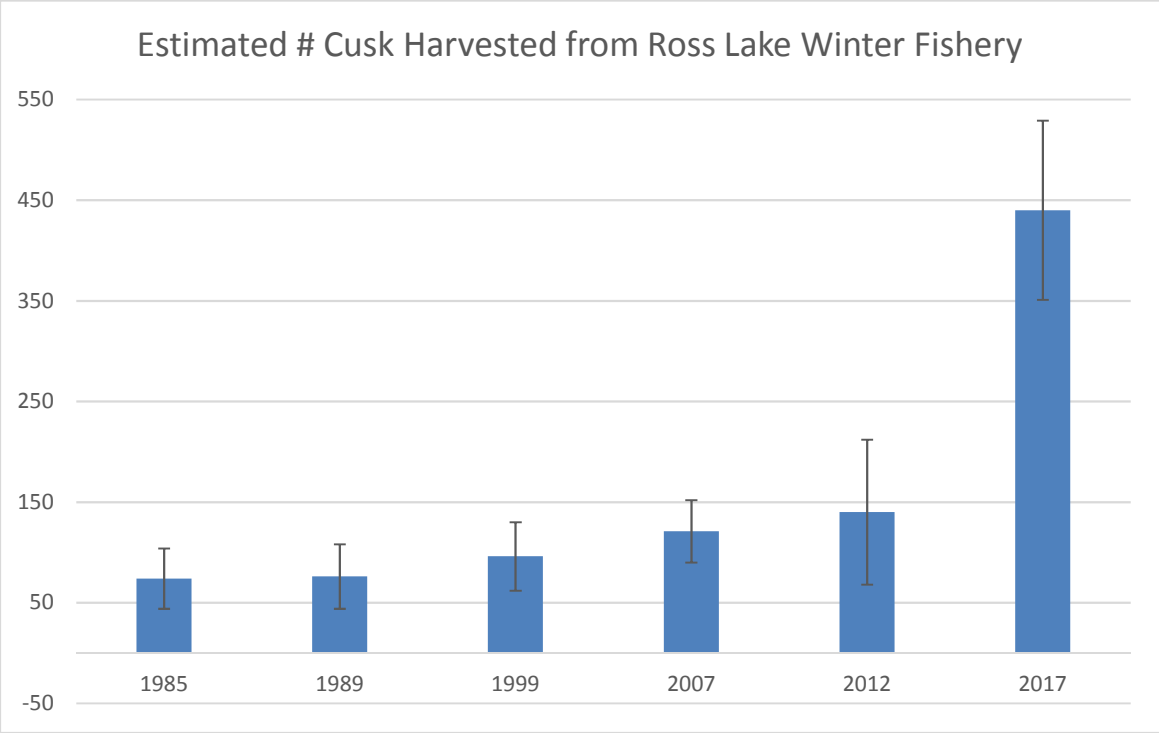

Figure 7. Estimated harvest of cusk in the Ross Lake winter fishery, 1985-2017.

Fish Length

Changes in harvest regulations for most species made it difficult to use fish length data to determine trends and patterns over time. However, togue regulations were constant throughout the study period, so length data from measured togue can be used to determine changes in the size of adult fish. Average togue length appears to show a declining trend from 1985-2007, with an increase between 2007 and 2012 (Figure 8). The year with the lowest average togue length, 2007, was also the year with the highest catch rate and harvest of togue (Figure 2, Figure 4). Although togue lengths were significantly greater in 2012 and 2017 than in 2007, the difference in averages was only about an inch.

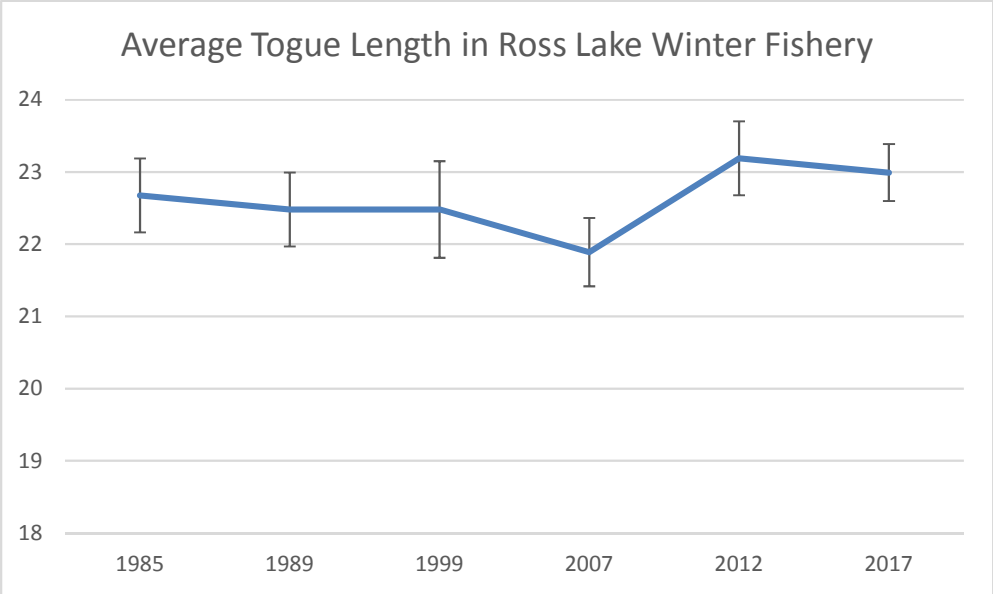

Figure 8. Average length of togue harvested from Ross Lake, winter 1985-2017.

DISCUSSION

Ross Lake has supported a highly valuable fishery for multiple species over the past three decades, though some populations have experienced significant changes over the years. Overall angler use of the Ross Lake winter fishery has increased over the past 30 years. This increase in use is notable, considering that we have observed the opposite trend in most regional waters, particularly remote waters in northern Maine where use has declined substantially (Wood 2017). There are a number of possible reasons for this increased use in Ross Lake, but the primary underlying cause is likely increased popularity due to its sustained, high quality fishery. Beginning in the 1980's, popular winter fisheries for lake whitefish declined substantially in waters around Ross Lake, including Big Eagle, Churchill, Spider, Clear and 1st/2nd Musquacook lakes (Wood 2016). These declines were likely due to introductions of smelt and their impact on whitefish recruitment (Wood 2016), and lower whitefish catch rates in these waters caused anglers to look elsewhere for the opportunity to catch large numbers of whitefish. Today, there is virtually no sport fishery for whitefish in the above-mentioned waters, and many anglers

who once fished them are spending much of their time fishing on Ross Lake. In addition, the ownership of Ross Lake Camps changed hands during the study period, and the new owners are more proactive in advertising and promoting the lake's high quality fishery.

Though angler use is higher in Ross Lake than it was historically, overall use is still relatively low for a water of its size and habitat quality. At less than 1000 angler days per winter on a 2800 acre lake, this level of angling pressure is not concerning given the restrictive fishing regulations in place to protect fish populations and angling quality.

Catch rates are an important index of fish population abundance, and catch rates of brook trout and togue were up and down over the course of the study period. This is normal in wild populations, and probably represents natural swings in population abundance. Togue catch rates peaked in 2007, which also represented the year of highest togue harvest. Brook trout catch rates peaked in 2012. In the most recent survey, catch rates of both species appear to be near or above past levels.

Catch rate data can sometimes be confounded by changes in angler effort. For instance, if an angler is targeting brook trout in shallow water near shore, their catch rate for togue or whitefish would be quite low. At the same time, anglers jigging on bottom in deep water would catch far more whitefish and cusk, and fewer brook trout and togue. Whitefish catch rates in Ross Lake appear to show a major shift in the fishery during the study period. In the 1980's, whitefish catch rates were extremely low, and they skyrocketed between 1989 and 1999. This was about the same time whitefish sport fisheries in other nearby waters were disappearing, and anglers shifted their efforts to Ross Lake. This is further corroborated by the increase in angler use during that time period. The spike in whitefish catch rates probably does not represent an increase in whitefish abundance; rather, it probably points to increased effort on the part of anglers specifically targeting whitefish.

From the high in 1999, whitefish catch rates declined steadily to 2012. These data appear to represent a decade-long time period when whitefish were overharvested in Ross Lake, resulting in a decline in abundance. By 2012, the catch rate of whitefish was down to almost half of what it was in 1999. Harvest was drastically reduced as well. The harvest of whitefish between 1999 and 2012 dropped from about 650 to less than 100 fish. The reduction in harvest between 1999 and 2007, could be partially explained by the implementation of a 16-inch minimum length limit, but harvest continued the same decline between 2007 and 2012 under the same three fish, 16-inch minimum length limit regulation. The likely explanation for the decline in harvest between 1999 and 2012 was that large, adult whitefish were being overharvested, and much of the 2012 whitefish catch consisted of fish less than 16 inches.

After the 2012 winter fishing season at Ross Lake, more restrictive regulations were put in place to protect the whitefish population. The new regulation allowed the harvest of only 1 fish, with a minimum length of 18 inches. Data from 2017 show catch rates increased to near 1999 levels, indicating a recovery in the overall number of whitefish in the population. Harvest increased to more than 200 fish, all of which were greater than 18 inches, indicating a recovery of adult whitefish. The current state of the whitefish population in Ross Lake appears to be much healthier than in past years, though it is uncertain whether the population can sustain a harvest of more than 200 fish greater than 18 inches

long each season over the long term. Additional data describing the age structure of this whitefish population is a critical information need. Otoliths were collected from harvested whitefish during the 2017 survey, and these will need to be processed to determine how many age classes of whitefish are represented in the currently harvestable population. Continued monitoring and further data collection are also necessary to better understand this population.

Brook trout and togue harvest levels were highest in 2007, but showed no apparent trends in the other years of the study. These rates of harvest appear to be having little to no impact on the status of these two populations. Cusk harvest was extremely high in 2017, approximately three times the 2012 harvest, and far more than the number harvested during other years in the study. Cusk catch rates were also high, likely indicating a more abundant population combined with increased targeting of cusk associated with whitefish angling. It is also possible that more anglers harvested cusk to mitigate the loss of harvest opportunity for whitefish, allowing them to continue to take fish home despite the restrictive whitefish regulation. Little is known about cusk populations statewide, including whether particular harvest levels are sustainable. This species may warrant more attention in future years as anglers continue to increasingly recognize them as a sportfish and valuable source of food.

The togue fishery in Ross Lake attracts anglers due to the relatively high catch rates and exceptional size quality. Average length of harvested togue appears to have increased during the past ten years of the study, though this number has not varied by more than one inch over the past three decades.

Ross Lake is an excellent example of a high quality sport fishery for native coldwater fish in a remote setting. Anglers travel long distances to fish here, and enjoy a multi-tiered fishery for togue, whitefish, brook trout and cusk. Despite a long term decline in overall angler use in the region, the popularity of the Ross Lake fishery has increased over the years. The six labor-intensive creel surveys carried out by fisheries biologists over the past three decades have resulted in a robust dataset that has been used to make important management decisions, particularly the maintenance and adjustment of fishing regulations. Though some changes have occurred in this fishery over time, current fish populations appear to be healthy, and the level of angling pressure and harvest sustainable. Continued monitoring and future research will be a critical component to maintaining the quality of the Ross Lake fishery and its salmonid populations over the long term.

RECOMMENDATIONS

1) Recommence winter creel census and angler counts in 2022 to evaluate changes in angler use, catch rates and harvest of brook trout, togue, whitefish and cusk.
2) Understanding age class structure of whitefish is a critical information need. Future sampling should include obtaining more whitefish otoliths for age evaluation.
3) Little is known about cusk populations statewide. The fact that the harvest estimate from the 2017 season was nearly three times the level of the 2012 harvest at Ross Lake may be of concern. Future work should focus on whether this increase in harvest is sustainable and if regulations are needed for future management of cusk at Ross Lake.

ACKNOWLEDGEMENTS

Late fisheries biologist and mentor David P. Boucher provided much of the inspiration for creel survey work in remote settings and a greater emphasis on the lake whitefish research that has gathered momentum in recent years. Retired fisheries biologist David J. Basley collected and analyzed much of the data provided in this report, and has been a strong advocate for winter sport fishery surveys, quality fisheries management, and the recognition and management of whitefish as a sportfish. Current MDIFW biologists Frank Frost and Derrick Cote collected much of the field data included in this study. The owners and operators of Ross Lake Camps provided voluntary fishing data and angler counts that helped contribute to the study. Biologists Steve Seeback and Nick Kalejs provided helpful review and comments on earlier drafts of this report.

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Wood, J.R. 2017. Observations of angler use in northern Maine lakes, 1996-2016. Maine Department of Inland Fisheries and Wildlife, Fishery Progress Report, Series 17-2.

COOPERATIVE

STATE FEDERAL

PROJECT

This report has been funded in part by the Federal Aid in Sport Fish Restoration Program. This is a cooperative effort involving federal and state government agencies. The program is designed to increase sport fishing and boating opportunities through the wise investment of angler's and boater's tax dollars in state sport fishery projects. This program which was founded in 1950 was named the Dingell-Johnson Act in recognition of the congressmen who spearheaded this effort. In 1984 this act was amended through the Wallop Breaux Amendment (also named for the congressional sponsors) and provided a threefold increase in Federal monies for sportfish restoration, aquatic education and motorboat access.

The program is an outstanding example of a "user pays-user benefits" or "user fee" program. In this case, anglers and boaters are the users. Briefly, anglers and boaters are responsible for payment of fishing tackle, excise taxes, motorboat fuel taxes, and import duties on tackle and boats. These monies are collected by the sport fishing industry, deposited in the Department of Treasury, and are allocated the year following collection to state fishery agencies for sport fisheries and boating access projects. Generally, each project must be evaluated and approved by the U.S. Fish and Wildlife Service (USFWS). The benefits provided by these projects to users complete the cycle between "user pays – user benefits."

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