NORTH SHORE
Steelhead
REPORT

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The Most Important Lesson

By Keith Ailey

Keith Ailey demonstrates proper catch and release techniques to senior SCVI students at McVickar Creek.

Inside This Issue

As adults, we have a responsibility to pass on our knowledge and experiences to future generations. In an era of ever-increasing natural disasters, record temperatures, and environmental phenomena around the globe, perhaps the most important lesson is one focused on conservation and preservation. So, when I was asked to accompany some high school science classes from Superior Collegiate and Vocational Institute to the nearby McVickar Creek to examine natural and man-made factors facing Lake Superior steelhead on the annual spring migration, I jumped at the opportunity.

Prior to the field trips, the students in Jason Pilot's and Karen Watt's senior classes were given a brief overview of the lifecycle of steelhead in Lake Superior. These migratory rainbow trout were first introduced to the Great Lakes in the late 1800s and have since established wild populations throughout. Steelhead do not die after spawning like salmon do, but they will return to spawn year after year. Each river flowing into Superior has a genetically unique strain of steelhead and these fish have captivated north shore anglers by proving to be a great challenge to find and even more difficult to catch.

On these class trips to McVickar creek, I was joined by fellow angler Kyle Stratton, who was working on a Master's thesis involving steelhead population health at the time. Kyle and I are part of a small team from the North Shore Steelhead Association that gather scale samples to contribute to a long-term data set used to support informed decisions regarding conservation efforts. This mark-and-recapture program is used to monitor the size and health of the migratory runs in a number of different sized streams and rivers feeding Lake Superior.

At first glance, McVickar Creek looks like it shouldn't have any fish in it. Beyond the large waterfall just a above the lake, there are countless cement structures, shopping carts and lawns mowed right to the bank. Despite the numerous obstacles, there remains a healthy run of steelhead in McVickar Creek thanks to a one-fish limit and the preference of most anglers to release their fish. On each trip we made with the classes, we caught some steelhead so students were able to see how to catch these fish and how to handle them without removing them from the water. The kids learned how we gather scales to determine the age of the fish when it first left the river for Lake Superior and how many spawning runs it has completed since. They observed how we clip a fin (with a special permit from the OMNRF) to ensure we are not sampling the same fish repeatedly, and how the fish is released in good health to complete its journey. Finally, the students learned how we record the data on a special envelope which holds the scales and is returned to the OMNRF so their biologists can analyze the findings and monitor the changes in the fish returning each year.

In addition to studying the reproductive journey of the steelhead, the students monitored several other factors to add to their data collection. They measured water flow and temperature change throughout the spring, they identified spawning areas and natural obstructions like log jams and waterfalls, and they noted the many man-made obstructions like cement weirs that the fish must jump to make it to the spawning grounds.

The Science department at Superior CVI has plans to expand the steelhead ecology study, which will provide a unique opportunity for our children to learn about the local stream, our impact on it, and mother nature's ability to adapt in an ever-changing environment.

About the author: *Keith Ailey is a Visual Arts teacher at Superior Collegiate & Vocational Institute where he volunteers his time with the Outdoors Club and Travel Club as well as the cycling, skiing and XC running teams.*

Fish counters for the Fishway at Boulevard Lake

The main question regarding the fishway on the Current River has always been "does it work?". After 28 years the answer to that question is not as evident as we would have liked it to be. While there is a general consensus amoung the members of the NSSA and the various ministries that the fishway does pass fish, it is unknown how many fish are involved.

In 2020 the NSSA made the decision to invest time and money to learn more about the fishway. Successful applications to Environment and Climate Change Canada provided funding assistance to hire consultants to evaluate the fishway for the determination of the optimum water requirements, and to review the actual physical structure with the idea of potential improvements. The assessment indicated that the optimum flow rate should be 1.5 cubic meters per second, which we hope can be achieved under the City's new water management plan.

There have been 2 significant changes in the management of the river flows on the Current River in the past 2 years. The primary change was the cessation of hydro production in 2019, which should allow for better use of water flows, and eliminate any fish mortalities associated the operation of the turbine. The second but important change was the rehabilitation of the Boulevard Lake Dam. The refurbished dam will have electronically controlled flow gates which will allow for much improved flow controls.

Subsequently the consultant's assessment indicated several minor modifications to the concrete which could be made to both facilitate the installation of fish sensors and improve fish passage.

The NSSA will be working with InStream Technologies to install two fish sensor units and fish fences within the fishway, one in the lower most cell of the fishway and one in the highest cell. This combination of sensors will provide data on fish entering into the fishway and determine if the fish continues through the fishway and enters Boulevard Lake.

The sensors themselves are a circular tube located within a box of approximately 36" long and 24" wide and high which will be set at the bottom of the cells. See photo. When a fish passes through the tube, 3 electronic detectors will identify the fish's direction and time of detection. Each sensor unit will be equipped with an underwater camera, which will be triggered by a fish passing upstream through the sensor unit. This combination of a camera recording and electronic detection will validate the results.

While the goal was to have the modifications and counters installed for this spring's run, the time may not be practical, but will be ready for the fall run.

Dock 5 Update

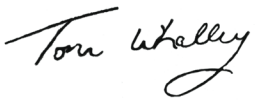
Lake Superior is right at our doorstep, an inland sea of opportunity for angling adventures. Many fishers with large boats based at marinas have plied these waters with great success, yet many 'small water' anglers are reluctant to venture out on Superior, as they are intimidated by the great expanse of it all, as well as weather that can change quickly and lead to some 'interesting' boating.

Equally true is that Superior has a myriad of sheltered bays and inlets that are perfectly safe for small boats and unseasoned boaters, but it can often be a challenge for boaters to find a place to safely launch and retrieve their craft. Many existing launch locations are of poor quality and difficult to access with the family vehicle, keeping many on shore instead of on the water.

The NSSA is helping to make a difference for small water anglers wishing to access Lake Superior. At Dock 5, on Sibley Bay (also known as Squaw Bay), the parking area and boat ramp have been recently improved and expanded, thanks to Thunder Bay District MNRF. However, the existing dock at the site (which is owned by the commercial fishermen at this location) has now become unusable. At the request of NSSA member Dave Nuttall (also the Chairman of Fisheries Management Zone Council #9), the NSSA has sponsored an effort to have a new public dock installed at this site. In cooperation with Parks Canada, OMNRF and the commercial fishermen of Sibley Bay, Dave has been successful in moving the process forward, and the possibility of seeing a new floating and removeable dock at this location appears close at hand.

As well as sponsoring the new dock initiative, NSSA has offered a financial contribution to the project, if required. Many thanks go to Dave Nuttall for his efforts in wading through the process and moving this process forward. Due largely to his efforts, we may have a new facility in place as early as this summer, 2022

Thanks, Dave!



Tom Whalley, *President,*
North Shore Steelhead Association

DOCK 5 Proposed Upgrades

The Status of Wild Steelhead Populations in Ontario Waters of Western Lake Superior

By Jon George (jgeorge@tbaytel.net)

A healthy wild steelhead population in Ontario waters of Lake Superior exhibits a wide variety of life history characteristics (number of stream and lake years, age at maturity, migration patterns and spawning time) plus maintains a repeat spawning rate of > 50% over one generation (four years). This enables individual tributary populations to maximize recruitment of juveniles and maintain the integrity of localized adaptations.

The **"Swanson Index"** uses the repeat spawning rate to index the annual mortality and angler harvest rate from an adult steelhead population. **For example, a 50% repeat spawning rate (survival rate) equals a 50% total mortality rate. Annual natural mortality in Lake Superior has been calculated at 30%; therefore, fishing mortality in this example would be 20%. It is recommended that Lake Superior fisheries managers maintain harvest levels at or below 20%.** (Swanson 1885, Clarkson and Jones 1997)

Applying Swanson's repeat spawning index to the ten tributaries listed in Table 1, most populations achieve the acceptable harvest levels. The exception being small tributaries on Lake Shore Drive.

Note: Population estimate on the Neebing River is only for the north branch. The population estimate for the Cypress Rivers is from 2016. On the Jackpine River the harvest rate is low and cannot be detected using this method.

Table 1. Repeat spawning, mortality and population Size

Tributary	Repeat Spawning *	Total Mortality	Harvest Rate **	Population Size ***
Whitefish R. (Thunder Bay)	63%	37%	7%	
Neebing R. (Thunder Bay)	67%	33%	3%	2133 +-1169
McIntyre R. (Thunder Bay)	68%	32%	2%	3532 +- 1126
McVicar Cr. (Thunder Bay)	60%	40%	10%	2184
Lake Shore Drive tribs. (Thunder Bay)	46%	54%	14%	
MacKenzie River (Thunder Bay)	55%	45%	15%	252 +- 20
Portage Cr. (Black Bay)	60%	40%	10%	182
Jackpine R,. (Nipigon Bay)	73%	27%	N/A	
Cypress R. (Nipigon Bay)	68%	32%	2%	1600
Big Gravel R. (Nipigon Bay)	65%	35%	5%	

* Four year average
** Based on 30% natural mortality (Swanson 1985)
*** 2020 adult spawning population size is based on 2021 recaptures (Petersen estimate)

Thunder Bay tributaries (Neebing, McIntyre and McVicar) not only have low harvest, but an estimated adult steelhead population size greater than 2000. (Table 1) This is mainly the result of large numbers of repeat spawners and excellent survival of the stream dwelling juvenile year classes of 2015, 2016 and 2017. Steelhead typically spend one to three years in their home stream before migrating (smolting) to Lake Superior.

Nipigon Bay tributaries were represented by the Jackpine, Cypress and Big Gravel Rivers. These adult steelhead populations had a high repeat spawning rate over the past four years. This, in combination with sufficient annual recruitment of juveniles (2015, 2016 and 2017), indicates a low angler harvest rate and healthy steelhead populations.

Black Bay tributaries (Wolf R., Coldwater R., Black Sturgeon R. and Portage Cr.) express high repeat spawning rates, but have poor recruitment of juveniles. Figure 1 illustrates the contrast in population size between Thunder Bay and Black Bay using the McIntyre River (Thunder Bay) and Portage Creek (Black Bay) as "Index Streams". Portage Creek representing Black Bay has seen a 90% decline of adult steelhead over the past twelve years, whereas the McIntyre River has had a dramatic increase in its population size over the same period. Changes in the Black Bay predator/prey relationships since 2004 is likely responsible for the decline of the adult steelhead abundance within the bay.

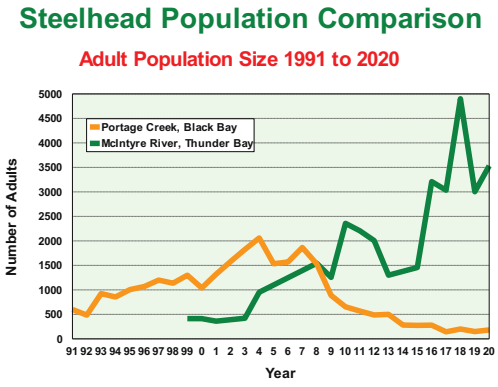


Figure 1

Literature Cited

Clarkson, J. and M.L. Jones.1997. A method to estimate an Index of Mortality based on proportion of repeat spawners in rainbow trout (Oncorhynchus mykiss) population.

Swanson, B. 1985. Pikes Creek/Lake Superior: population dynamics, fishery and management alternatives. Wisconsin DNR. Management Report 125, 29p.

Birch Beach Migration Corridor Improvement Project

The NSSA chose to restore Birch Beach creek to be a barrier free stream due to its significant contribution to the cold-water fishery of Lake Superior. The project entailed the construction of a series of pools and riffles below the existing culverts, which raised the water level sufficiently so as to allow water to back fill the culverts and eliminate the perching. This project removed the last barrier to migration, restored connectivity within the stream and established protection from future climatic events.

These small rural nursery streams form the backbone of the self-sustaining naturalized cold-water populations along the north shore of Lake Superior. Supporting their continued success ensures a viable sport fishery along the north shore, for both residents and tourists.

This project was completed in August of 2021 at a cost of approximately $75,000.00 with funding assistance from the Ontario Ministry of the Environment, Conservation and Parks through the Great Lakes Local Action Fund, the Ministry of Northern Development, Mines, Natural Resources and Forestry as part of the Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health and the North Shore Steelhead Association.

Future Project

Cliff falls on the lower Current River

The assessment report completed by EOR in 2020 suggested that the rock fall located approximately 60m downstream of the entrance to the fishway may be a barrier to fish under certain flows and temperatures. The report stressed that the remediation of this barrier will improve the opportunity for more fish to move upstream and locate the fishway. The more fish that are able to reach the fishway the better the changes they will pass through the fishway.

It is the assumption that, under low flows, migration past this pinch point may not occur, which is likely more of a concern in terms of fall water flows and the establishment of a fall migration. With our changing weather patterns developing a low water passageway is critical in providing protection from future unforeseen climate changes.

TBT Engineering has been hired to design a low water passageway and to provide stamped drawings, which, once received, will be submitted to the MNDMNRF for discussion and approval.

The design should be available by the end of the month. The remediation of the cliff falls will be considered only after the fish counters have collected some baseline numbers for the existing fish population.

It is hoped that this work might be done in the summer of 2024 providing additional funding can be secured. The ongoing monitoring of the population through the use of the fish counters will provide a means of determining the effects of the changes to the riverbed.

NORTH SHORE Steelhead ASSOCIATION

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The NSSA welcomes your contributions, opinions and ideas.

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Catch and Release

Catch and release is vital when it comes to ensuring self-sustaining wild Steelhead populations. Steelhead are an aggressive species making them a favourite among many anglers – especially during their annual spawning migrations. However, from the fish's perspective, being aggressive during times of high angling pressure leads to a greater susceptibility of being harvested by anglers. In Thunder Bay, we are extremely fortunate to have many streams that see relatively large runs (for Lake Superior) of adult Steelhead on an annual basis. At the same time, many of these streams are seeing an increase in the number of anglers targeting Steelhead. Thankfully, two of the most popular angling streams in Thunder Bay have strict harvest limits of only 1 fish over 69cm; a regulation that most likely saved these populations from collapse in the late 1990's due to over harvest and contributed to the large populations we see today on those streams. The second, and perhaps more important reason why we have such large adult Steelhead populations in many tributaries along the North Shore of Lake Superior is because of anglers' who regularly practice catch and release.

Catch and release of Steelhead has proven to be effective in maintaining world class Steelhead fisheries in Lake Superior, even in the face of high angling pressure. For example, the Wisconsin Department of Natural Resources (WDNR) conducted angler creel surveys on the Bois Brule River between the fall of 2016 and the spring of 2018. Their results showed that "total steelhead catch during each of the two survey years was 5,623 and 6,240, which either approached or exceeded the total [Steelhead] run and thus demonstrated the species' vulnerability to harvest without the protective regulations and catch-and-release fishing that are currently in place and commonly practiced." The WDNR's results echo similar sentiment to what we see locally. For example, in 2021 a Steelhead with the tag number 51490 was reported being caught by 6 different anglers over a 4 period, in one of those days it was caught and reported 3 separate times. This is just one of many examples that highlights the effectiveness in catch and release. While there is nothing wrong in harvesting the odd legal Steelhead, we as anglers cannot control most factors that influence Steelhead abundance (i.e. environmental conditions, invasive species etc.), but we can control our own harvest limits. Please remember, the future of Steelhead fishing along the North Shore is in your hands.

Join The NSSA! Membership is Free

Sign Up At: www.northshoresteelhead.com

The North Shore Steelhead Association (NSSA) was formed on January 13, 1973, as a non-profit organization concerned with the conservation and preservation of fisheries in the tributaries of Lake Superior.

NSSA's primary mission is the protection and enhancement of the North Shore migratory Rainbow Trout (Steelhead) fishery, however this has evolved to include all coldwater species of the Lake Superior Watershed.

The NSSA's constitution stresses public education and close collaboration with authoritative bodies (M.N.R.F., L.R.C.A., and North Shore Community Councils) as strategies for conservation.

Our financial base is developed exclusively from fundraising and donations from supporters. These activities not only generate capital for our projects, they also heighten public awareness of the need for environmental protection of Lake Superior's North Shore.

The Objects of the NSSA are:

The conservation and preservation of the coldwater fisheries of Lake Superior and Lake Superior watershed (Ontario). This includes activities and programs that promote and achieve environmental preservation and enhancement, such as:

- Lake and stream rehabilitation
- fish habitat restoration and enhancement
- activities to combat invasive species
- data collection and analyses (including genetic, DNA, tissue, cell, molecular)
- fish population monitoring (sampling, aging, tagging, counting), restoration, and
- associated scientific research for the purpose of understanding and enhancing fish populations and habitat.

The NSSA also engages in awareness campaigns, programs, and signage consistent with, and for the purposes of pursuing, its objects.

The NSSA may from time to time make donations to other organizations whose activities are consistent with and beneficial to the NSSA's Objects.

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