"Put a little back"

Nottawasaga River
Ontario, Canada

Nottawasaga Steelheaders

RE: Proposed Regulatory amendments to Ontario Regulations 267/03 under the *Nutrient Management Act*

ERO #013-4388 https://ero.ontario.ca/notice/013-4388

Dear Premier and Ministers:

The Nottawasaga Steelheaders would like to comment on the proposed amendments

"Water, Through the Preservation of Our Environment, is Our Most Precious Resource"

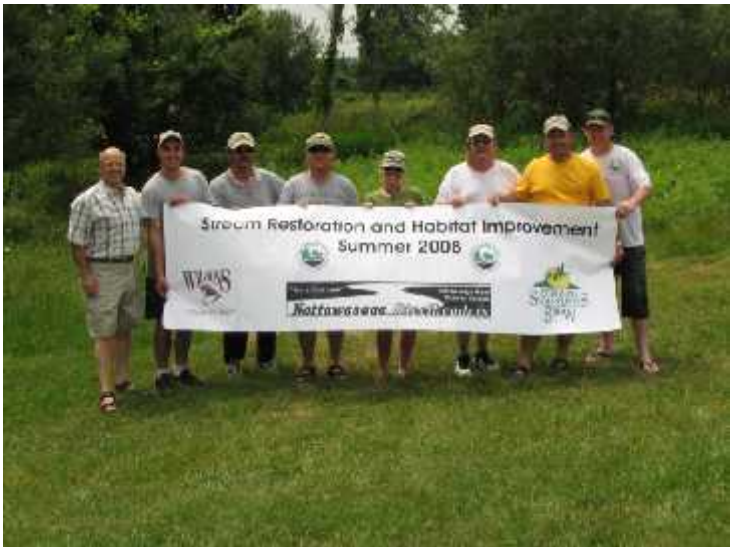
The Nottawasaga Steelheaders

The Nottawasaga Steelheaders, a volunteer group of anglers, conservationists and concerned residents, have been working with The Nottawasaga Valley Conservation Authority, Ministry of Natural Resources and Forestry and South Simcoe Streams Committee to improve, rehabilitate and preserve the integrity of various tributaries of the Nottawasaga River watershed over the past twenty years. Over this time we have removed numerous barriers to fish migration, undertaken countless garbage pick-ups, tree plantings, stream bank stabilizations, cold water delivery projects, spawning ground improvements, fish lift studies and commitments to ensure the survival of wild species in this watershed such as wild steelhead.

The Nottawasaga Steelheaders also have been instrumental in working with watershed communities to enhance awareness of critical conservation issues. We have also undertaken various projects in parallel and conjointly with these communities as a partner under the supervision of the Nottawasaga River Conservation Authority and Ministry of Natural Resources and Forestry to tackle the growing challenges of a rapidly growing population and its impact on important watersheds such as the Nottawasaga River.

The Nottawasaga Steelheaders are very concerned that amendments to the Nutrient Management Act could pose a potential threat to the health of the Nottawasaga River watershed. Over the past two decades we have noticed considerable negative changes in the watershed. As avid and focused anglers, we are among the first to see these changes even before biologists can set forth to understand and evaluate them. We very much value the importance of agriculture in our province and watershed and work hand in hand with farmers to maintain a healthy sustainable ecosystem from which all can benefit. The following response will explain the changes that are occurring and the significant impacts on the watershed. As the watershed suffers, so do all living in and around it and those that depend on it, including the agricultural community. We strongly urge the premier and ministers to read our report and respond to our concerns. The scientific data and trends already indicate serious deterioration in our watershed and environment.

The Nottawasaga Steelheaders – Stewards of the Nottawasaga River for over 20 Years



Our Great Lakes and Tributaries Watershed Fisheries are at Risk

As anglers, we have had the privilege to enjoy Ontario's world class recreational sport fishery. The Great Lakes Fishery is a $7 Billion fishery shared by the United States and Canada and the majority of that is recreational.[1] Many of the fish species of these lakes are migrational and depend on excellent source water for sustainability. Today 61 species of fish are considered threatened or endangered. In addition, these water sources, our Nottawasaga River being just one, are also critically important to many interdependent species and the fragile biodiversity within the Great Lakes as well as inland lakes and wetlands.

(1) *Great Lakes Fishery Commission*

The Nottawasaga River Watershed's Unique Biodiversity

The Nottawasaga River watershed's 1600 kilometers of river, streams and tributaries, covers over 3500 square kilometers over 3 counties. Its surrounding lands are home to some of the richest, most productive farmland in the province. By 2031 the population of the watershed is expected to grow by 40% to over 600,000, putting enormous pressures on it.[2]

The Nottawasaga River is also home to one of 2000 of the world's most significant wetlands (Ramsar Convention 1971). It is designated as Provincially Significant and ANSI (Areas of Natural and Scientific Interest) classified. This key biological wetland component of the Nottawasaga River Watershed is home to over 400 plant species (11 of which are provincially rare). It supports numerous plant species which are at the extremities of their natural range, including those indigenous to the arctic tundra in the north and the Carolinian to the south, and is home to the "largest pure stand of silver maple in the province". It also has 5 provincially rare birds indigenous to the swamp including one of the largest Blue Heronries.[3]

(2) *Places to Grow, Simcoe Area: A Strategic Vision for Growth, Government of Ontario, 2009*

(3) *Minesing Wetlands Biological Inventory – Bowles, Laverty, Featherstone NVCA, 2007*

The Minesing Wetlands is Dying

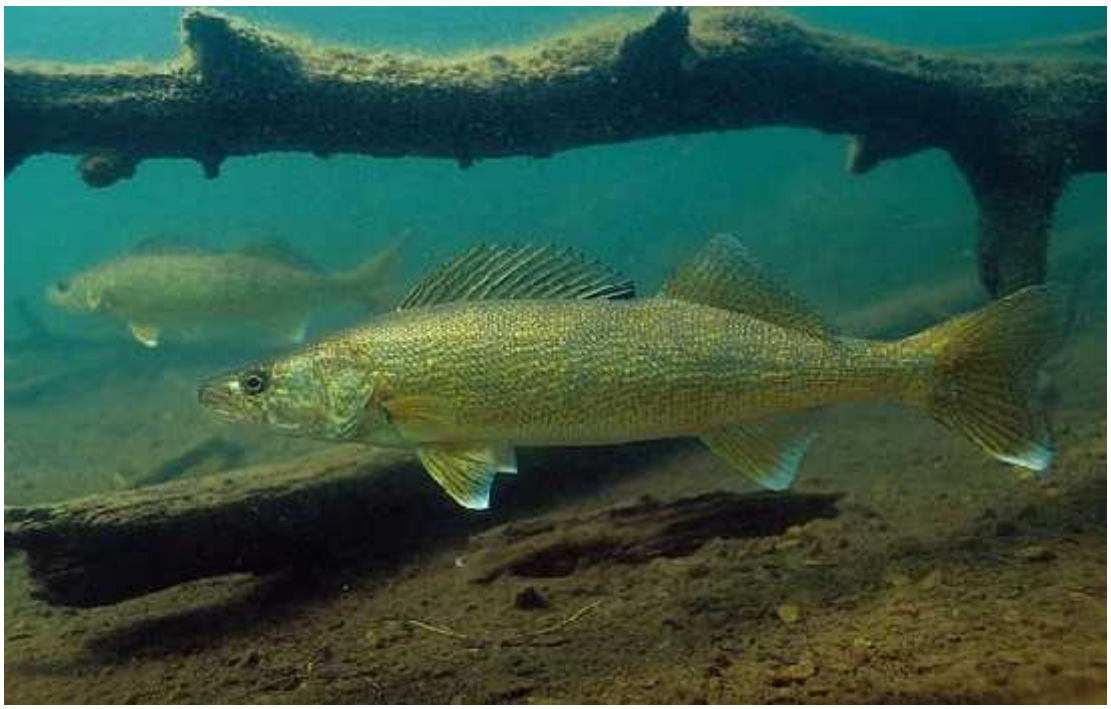
The Minesing Wetlands is home to one of only two North American shallow wetland spawning walleye. These walleye migrate from the Great Lakes to the Minesing to spawn each year. Over the last two decades, these walleye, once abundant in the Nottawasaga and its productive fishery have all but disappeared. As anglers, we have the unique ability to see impacts to our watershed as they begin, sometimes and unfortunately as in this case, long before they reach severity. Ironically, some 20 years later, in 2014, The Nottawasaga Valley Conservation Authority produced an in-depth report describing a demise in the health of the Minesing over the last 60 years, citing stagnation from land use change as key factors. This included 60% decrease in deciduous cover and 37% overall decrease in tree cover.[(4)]
The Minesing Wetlands also serves as a natural and significant flood control protecting many communities including Wasaga Beach, downstream. That natural defense capability is disappearing with its rapidly deteriorating health and filtering viability.
McMaster University in conjunction with the NVCA, determined in a 2014 and 2015 study that the Nottawasaga River and the Minesing Wetlands were becoming negatively impacted through a process of "Eutrophication", (excessive nutrient discharge overload which results in the over stimulation of algae and plant life resulting in depleted oxygen). The study concluded that nutrient loading and inability to assimilate these pollutants by the Wetlands has resulted in release of pollutants downstream.[(5)] Areas of low dissolved oxygen (hypoxia) and no dissolved oxygen (anoxia) were also observed in 2015 and 2016 and noted in a follow up study.[(6)]

(4) 60 years of forest change in the Minesing Wetlands (1953-2013): Causal factors, ecological implications and recommendations for reforestation - Sean Rootham and Dave Featherstone, NVCA, 2014
(5) Land-use effects on nutrient and algae in the Middle and Lower Nottawasaga River and in the Minesing Wetlands – J. Rutledge, P. Fraser (McMaster University), M.Narini, A. Kirkwood (U. Of Ont.Inst of Technology), T. Duval (University of Toronto) Submitted to: Environment Canada, Lake Simcoe and Southern Georgian Bay Cleanup Fund, 2015)
(6) Factors Influencing Water Quality in a Large Riverine System – J. Rutledge, P. Fraser (McMaster U), 2016, (Study for Thesis Submission)

The Nottawasaga River Fisheries – Under Pressure, Declining Returns and Numbers

The Nottawasaga River is home to over 75 species of fish including both migratory and resident species. These species are already experiencing pressure from encroaching development as noted in the NVCA 2009 Fisheries Habitat Plan. Several of these including the Great Lakes Sturgeon are listed as "Threatened" by the Federal Government (COSEWIC) and Provincial Government (SAR).[7]

We have already noted that a very healthy and robust walleye population and fishery has all but disappeared from the Nottawasaga River after anglers noticed decreased frequencies of catches as early as the 1990s.[7][8] The diminishing Nottawasaga walleye population is a unique strain, one of only two shallow wetland spawning walleye in North America. They spawn in the Minesing Wetlands, a important spawning habitat that has been going through tremendous negative impacts and deterioration.[3]



(7) Nottawasaga River Walleye Population Study – W.Calder, MNR, Midhurst, Spring 1994
(8) Nottawasaga River Walleye Population Study – F. Dobbs, B. Perreault, NVCA, Spring 2000

The Nottawasaga River Fisheries – Under Pressure, Declining Returns and Numbers (*Cont'd*)

Migratory rainbow trout (Steelhead), a much sought after angling species, are also being impacted by pressures on our watersheds.

A report[10] undertaken by the Nottawasaga Steelheaders in 1998 had determined that the repeat spawner rate or percentage of steelhead in the Nottawasaga River, through past fish lift data conducted at Earl Rowe and Nicolston Dam Fishways is below a critical point of 55% as noted by Brian Morrison, Ganaraska River Conservation Authority[11]. A healthy repeat spawner return percentage or rate should be equal to or preferably exceed this number for a healthy sustainable population. All but one year of fish lifts from 1982 showed a poor return.

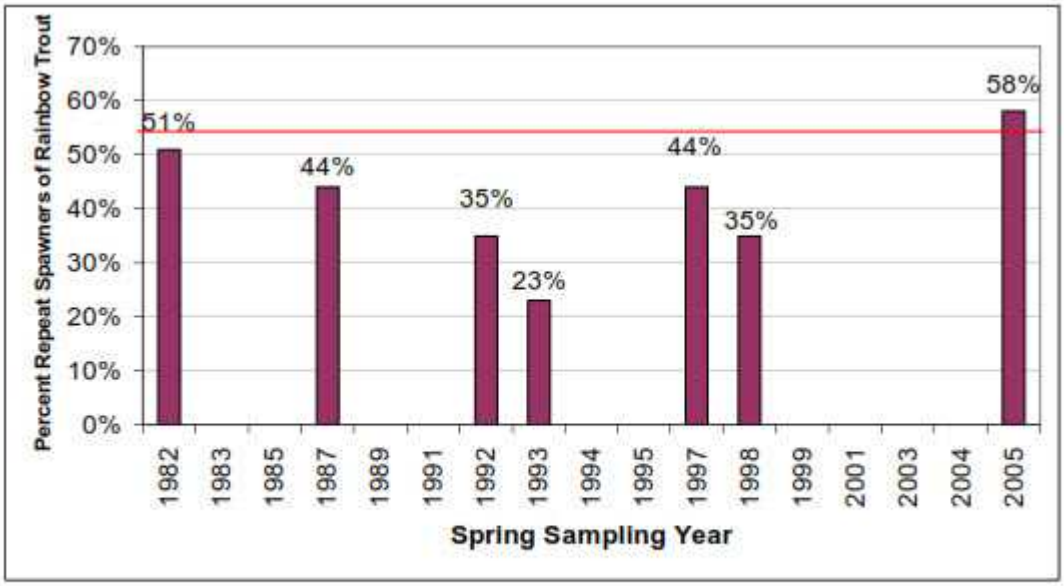


Figure 20. Historical and current repeat spawning rate for rainbow trout captured during the spring from the Earl Rowe Fishway, Boyne River. The red line delineates the optimum minimum of 55% repeat spawners.

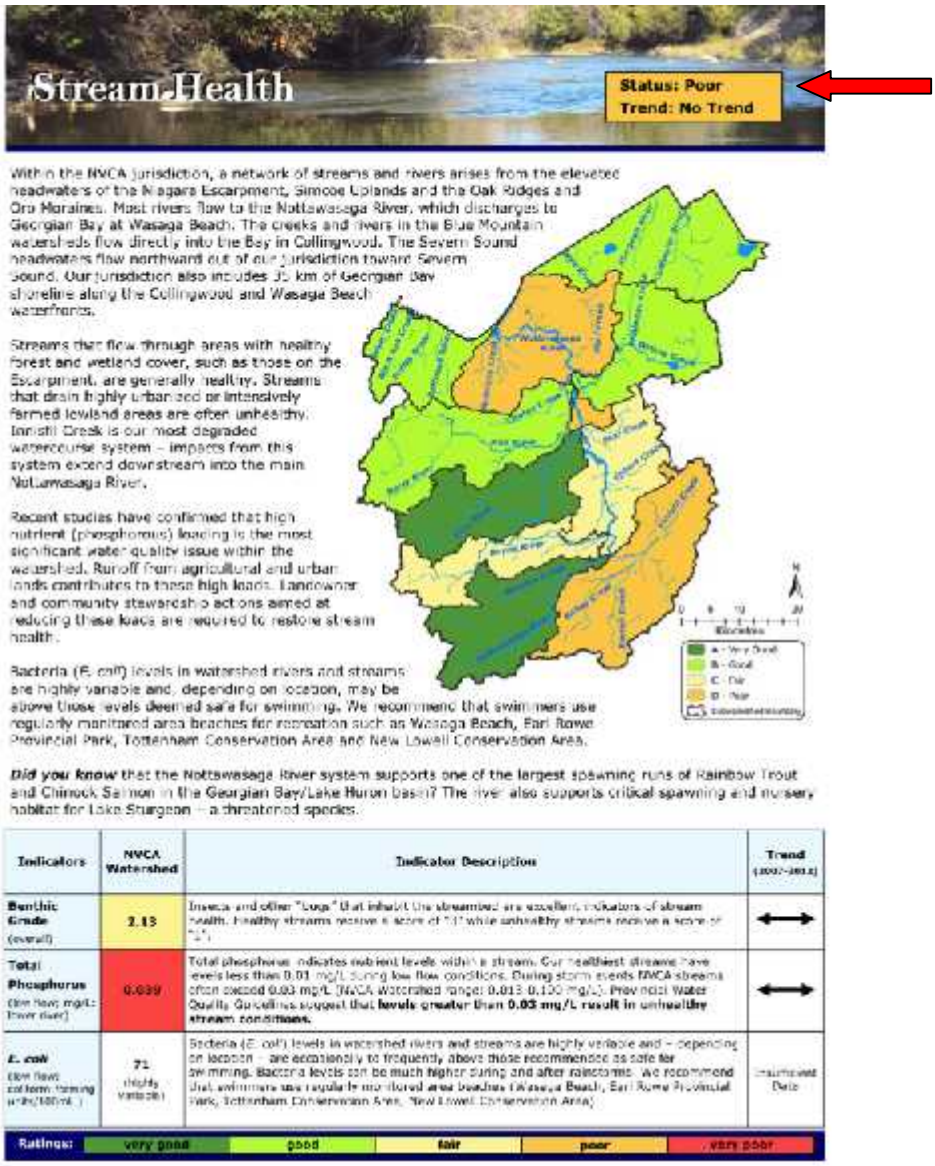
The Nottawasaga River Fisheries – Under Pressure, Declining Returns and Numbers (*Cont'd*)

The NVCA has noted declining water conditions in the Notty over the years and has established a report which denotes zones of water temperature and associated fish species (i.e. cold water, cool water and warm water)[9] This will be used as biological reference in addition to other reports provided by the conservation authority including the 5 year Watershed Health Check[10]. The last report published was in 2013. Declining water conditions are a significant factor to maintainable fish populations from early juvenile to adult stages.[9]

(9) Fisheries Habitat Management Plan – Nottawasaga Valley Conservation Authority and Department of Fisheries and Oceans Canada – 2009
(10) Steelhead – A Report on Nottawasaga River Rainbow Trout – Nottawasaga Steelheaders – 2000)
(11) Boyne River, Earl Rowe Provincial Park, Rainbow Trout (Oncorynchus Mykiss) Fall 2004 and Spring 2005 Monitoring Survey
(12) Nottawasaga Valley Watershed Health Check – Nottawasaga Valley Conservation Authority, 2013

Essential Aquatic Benthic Communities are Not Healthy

Benthic or aquatic originating bug communities are a key indicator of the health of river system. These bug communities play a significant and critical role in early juvenile fish and trout development. They are also a critical part of a very sensitive interdependent watershed biodiversity. The 2013 NVCA Watershed Health Check[12] showed only a marginal level of a healthy benthic community and very poor total phosphorus (TP) level. This does not bode well for the watershed!



Essential Aquatic Benthic Communities "Stream Health Indicator" are Not Healthy (cont'd)

The Nottawasaga Valley Conservation Authority in 2015 published the Stream Health, Upper Nottawasaga River Report[(13)], showing impacts to fragile benthic communities in the Nottawasaga River. The Hilsenhoff Family Biotic Index (FBI) is commonly used as an indicator of the level of organic pollution such as livestock waste, sewage from failed septic systems, etc. in a river. Some bugs are more sensitive to organic pollution levels, whereas some are more tolerant. The species found in a sample can indicate what level of organic pollution is present. A community with a lower FBI score suggests less organic pollution and therefore better water quality.

Based on NVCA FBI data, there is a significant difference between the two monitoring sites in the Upper Nottawasaga Sub-watershed, indicating a decline in stream health as you move downstream. Land use is a strong driver of water quality.

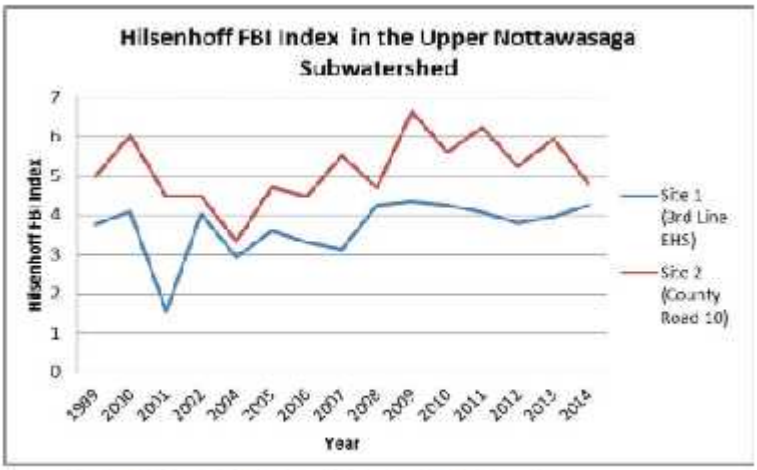


Figure 2. Hilsenhoff Family Biotic Index (FBI) results for the Upper Nottawasaga

Bugs are very selective on where they like to live, having good water quality is not the only thing they look for! Sensitive bug communities also like to live in faster flowing, gravel-bottom streams that provide them with lots of different nooks and crannies in which to hide and feed. The availability of good bug habitat can be represented by %EPT. The %EPT is a measure of the number of mayflies (Ephemeroptera), stoneflies (Plecoptera) and caddisflies (Trichoptera0 in a river or stream. These bug orders are associated with good habitat and water quality. If there are a high percentage of these bugs, this suggests a site has desirable conditions: the preferred substrate (boulder, cobble and/or gravel river bottoms) and good water quality. Based on the data below, there is a significant difference between the two sites, indicating a decline in bug habitat quality as you move downstream. Site 1 has more preferred substrate (cobble and gravel) than Site 2 (gravel and sand), and based on the FBI score, better water quality.

Just like with FBI scores, Site 1 is undergoing a significant decline in %EPT, whereas Site 2 is not. This means that the number of good bugs at Site 1 is declining.

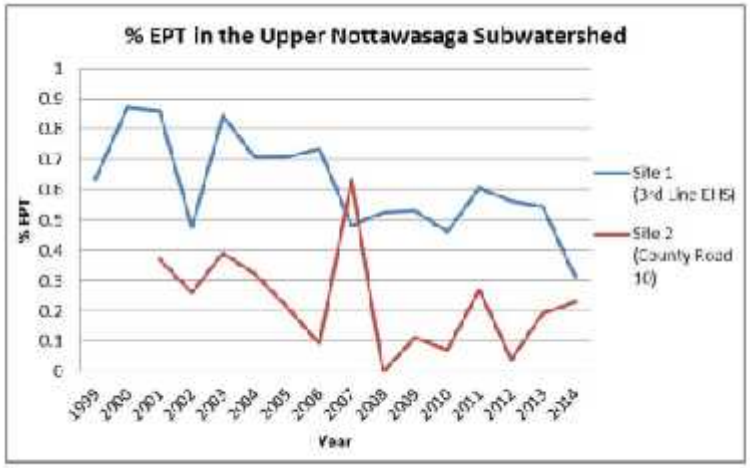


Figure 3. %EPT results for the Upper Nottawasaga

(13) NVCA Science and Stewardship Stream Health, Upper Nottawasaga River Report, 2015

Our Cold Water Streams and Recharge Systems are Disappearing

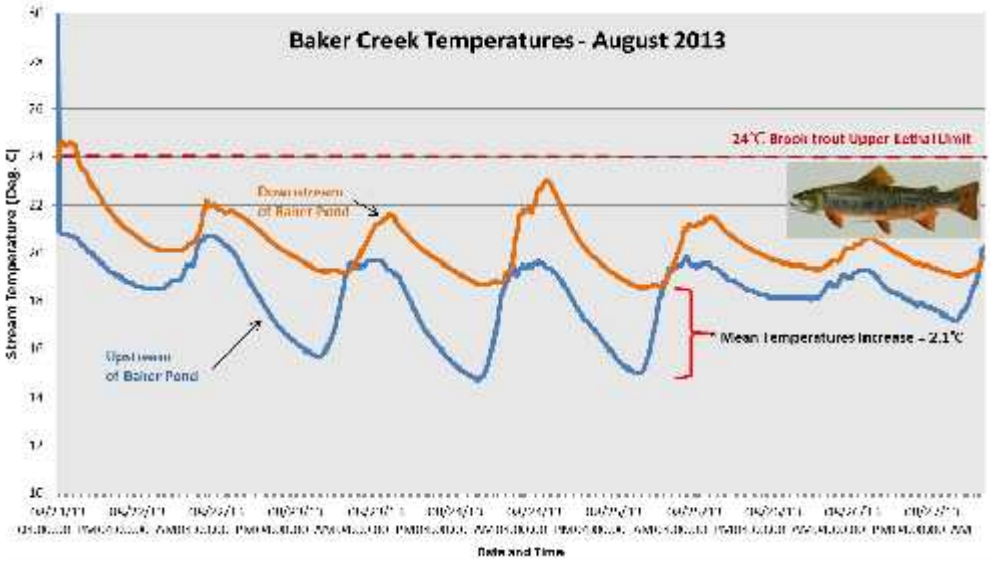
Water temperature affects all aspects of the river environment: physical (ice), chemical (oxygen concentrations), and biological (metabolic rates). Rivers are classified into three groups based on summer temperatures.[9][13]

- **Coldwater streams and rivers receive significant amounts of cold groundwater inputs that support sensitive fish (brook trout) and bug populations. They are also the systems most sensitive to urban development, agriculture, online ponds.**
- **Warm water streams and rivers receive lower groundwater inputs that support less sensitive bug populations and sport fish like pike, bass and perch.**
- **Cool water streams and rivers are in between both categories and support rainbow and brown trout and moderately sensitive bug populations.**

The Water Quality Index can be used to describe the effects of stream temperature on the bug population. Higher index values indicate the bugs have a greater reliance on cold water. Decreases in the index over time can indicate a warming in river conditions. Human influences are the main cause of river warming, although natural factors like beaver ponds play a role. Human activities that increase stream temperatures include: removing streamside trees and plants, damming rivers to create ponds and urban development.

Based on NVCA temperature data, the Nottawasaga River at Site 1 is classified as a cool water system. In 2005, Site 2 was also classified as a cool water system, but in the last 5-7 years has shifted and is now considered a warm water system. This means there are fewer locations on the Nottawasaga River for temperature-sensitive species like rainbow trout and stoneflies to live and breed. Possible reasons for increased temperatures at Site 2 include the upstream removal of streamside vegetation and increased sediment in the water ("sediment loading") due to development.[11] Insufficient data was available to determine Site 1 temperature trends.

The Baker Creek Rehabilitation Project coordinated by the NVCA with volunteer help demonstrated the effect of correcting warm water on cold water species such as Brook trout.[13]



Our Cold Water Streams and Recharge Systems are Disappearing (cont'd)

As indicated, species such as Aquatic Bugs and Brook Trout serve as our ''canaries in the coal mine'', informing us years ahead of impending stream and environmental demise!

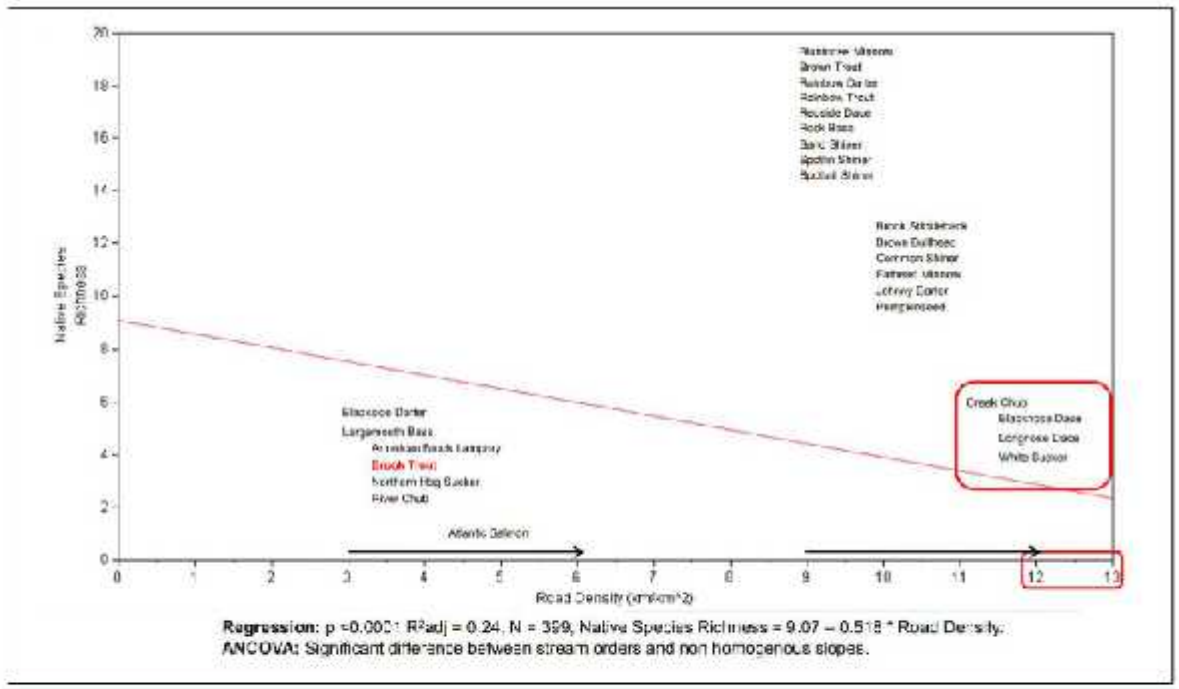
Brook Trout are known to prefer coldwater streams (less than 23 degrees Celsius) that have a year-round supply of clear, well-oxygenated waters protected by overhanging branches, logs and rocks. For these reasons, Brook Trout are often used as indicators of coldwater habitat and good water quality conditions.[14]

The Toronto Region Conservation Authority released an alarming report indicating that Brook Trout populations have dramatically declined over the past 16 years![15]

''*Brook Trout are the only remaining native Salmonid fish species naturally occurring in Toronto and region tributaries. Monitoring data from TRCA's long-term Regional Watershed Monitoring Program shows that the occurrence of Brook Trout in Toronto and region has decreased over the last sixteen years (2001-2017*)''!!

The study indicates many factors including human land use change and development as major factors in their population demise. Brook Trout are not found in regional streams where surrounding road density thresholds exceed 6km per km^2.

Effect of Road Density on Regional Fish Communities[13]



The Regional Watershed Monitoring Program data from 2001-2012 shows that Brook Trout are not found in regional streams where surrounding road density thresholds are above 6 km/km^2, and that only four fish species typically persist when road densities are higher than 11 km/km^2. The assumption here is that the higher the density of roads in a given catchment, the greater the level of urbanization.

Our Cold Water Streams and Recharge Systems are Disappearing (cont'd)

Effect of Road Density on Regional Fish Communities[13] (Note Brook Trout Outlined in Red Box)
As development increases, species disappear!!

Axis	% Total Variance	Cumulative %	Driver 1	Driver 2
1	27.7	27.7	Temperature	Stream Order
2	25.1	52.8	Road Density	Specific Conductivity
3	19.4	72.2	DO	Road Density

What do these sites have in common?

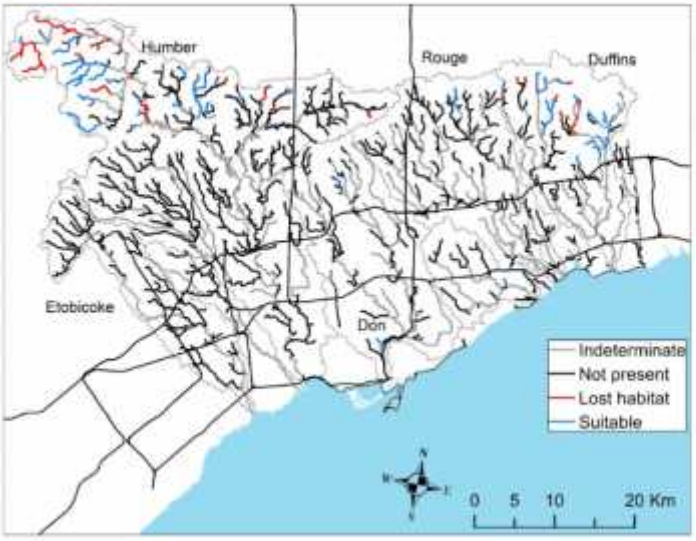
- High DO
- pH range from ≈ 6.5 – 8
- Water temperatures < 24°C, > rarely spikes
- Surrounding area has low to little land use change (% Forest)
- Stream sediment mainly gravel with lots of interstitial spaces (%EPT)
- Lower levels of urbanization (Road Density)
- Low levels of conductivity, less influence of NaCl.
- FBI is low hence influence of P and N is lower

TORONTO AND REGION CONSERVATION AUTHORITY

At the rate we are proceeding, our coldwater streams and Brook Trout will have disappeared in the next 50 years!![15]

Future Brook Trout presence prediction

- Habitat Suitability Model with boosted regression trees
- Using climate change projections (water temperature)
- 50 yrs into the future



TORONTO AND REGION CONSERVATION AUTHORITY

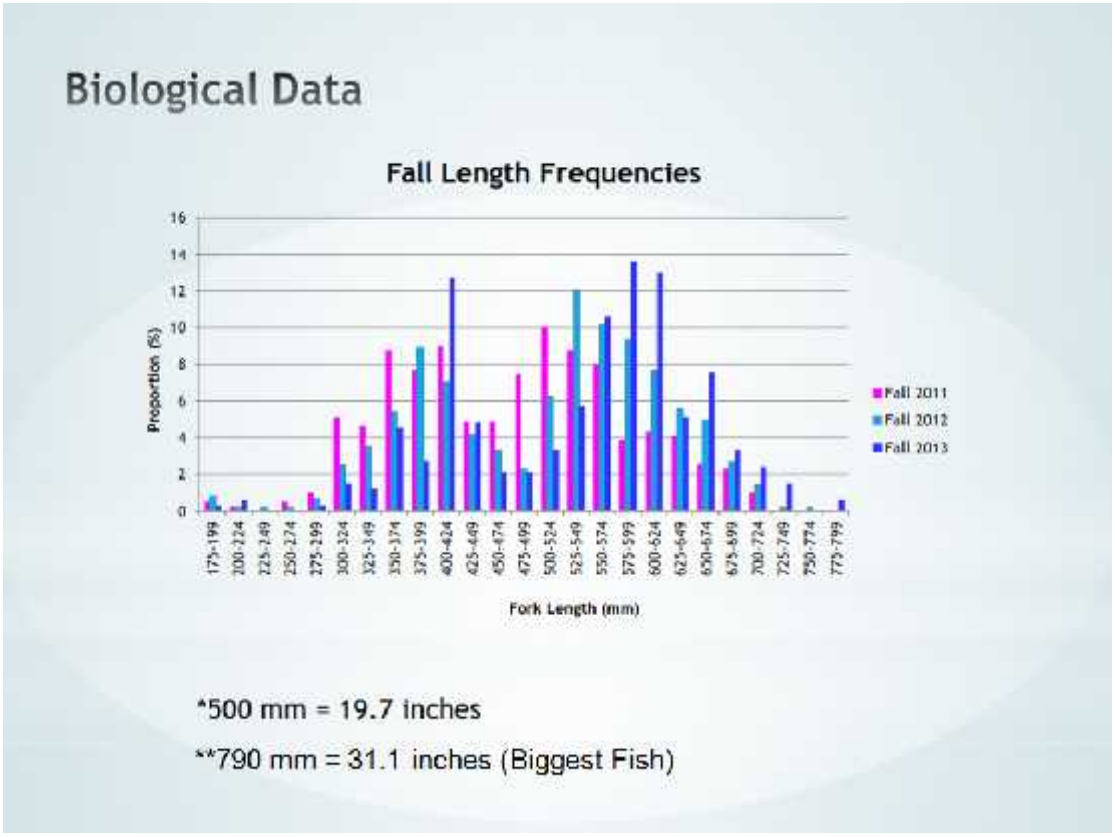
(14) Fresh Water Fishes of Canada – W.B.Scott -1988
(15) Brook Tout on the Decline: What Can We Do – Report (Regional Watershed Monitoring Program) TRCA – Dec 2017

The Nottawasaga Angling Experience - Our Anglers Voice Their Concerns

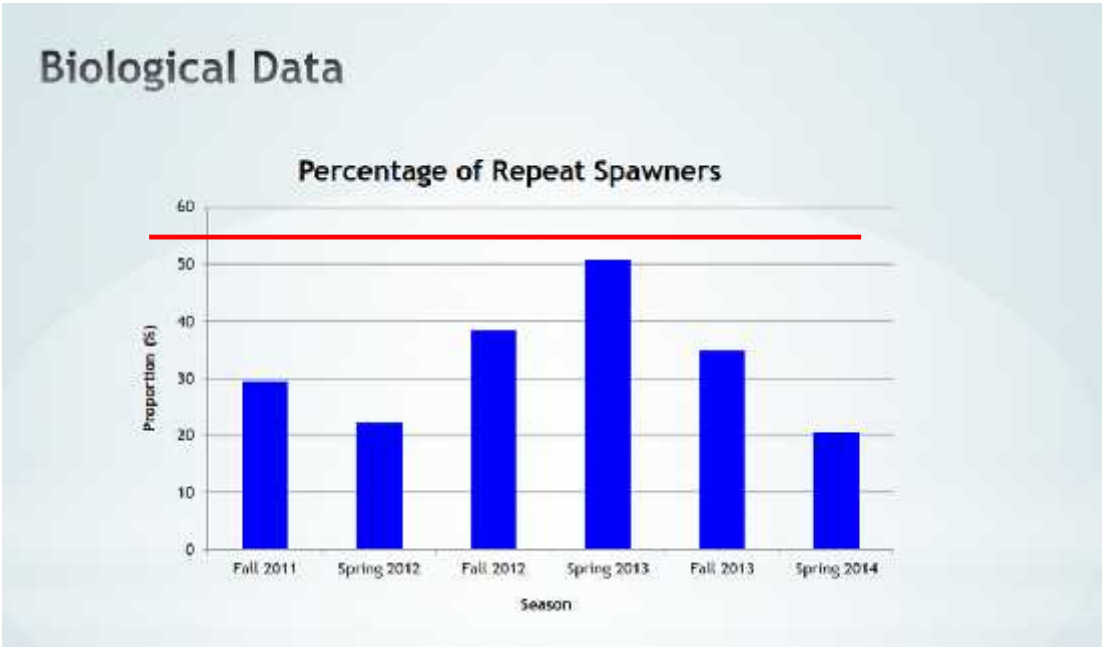
The Nottawasaga Steelheaders have recently concluded a 4 year study on Nottawasaga river steelhead, which was initiated upon responses from anglers concerned about declining frequency of catches and overall quality of the angling experience as it related to catch over the past decade. It involved over 30 MNRF approved anglers and members of the Nottawasaga Steelheaders. The anglers caught, took data info (measurements, scale samples for aging and locations) and released back almost 2000 steelhead over the 4 years. The data is presently being finalized by the Upper Great Lakes Management Unit of the MNRF. Preliminary data seems to confirm poor repeat spawner rates below 55%. There also appears to be a decrease in the size of fish caught compared to fish over a decade, ago from our club derbies. The largest of these fish did not exceed 790mm (31.1inches). Though the contribution of lake health and growth is important, spawning and juvenile habitat contribution is significant and critical.[9][13]

The Nottawasaga Angling Experience - Our Anglers Voice Their Concerns (cont'd)

Our Steelhead Fishery is feeling the stress as returning fish #'s appear to fall off after 5 years



All but one component of the Assessment failed to meet critical 55% Repeat Spawner Rate



The 2011-2015 Angler Catch Assessment data appears to duplicate and confirm that from the Earl Rowe Fish Lift (2005/2005)[11] with regards to low repeat spawner rate % (below 55%)

The Nottawasaga Angling Experience - Our Anglers Voice Their Concerns "Decline in Our Fishery"

Anglers, by virtue of the frequency they fish and their passion for the recreational sport, often are the initial group to experience change and impacts that are occurring in watersheds.
In December of 2017, the Nottawasaga Steelheaders on the FaceBook page, (Nottawasaga Steelheaders) requested responses to a survey assessing anglers experience on the Nottawasaga River.
The anglers, many of whom have fished the Notty for decades and are very experienced and proficient, have indicated in their responses, a decline in the steelhead fishery. This is in terms of numbers of fish caught, frequency of fish caught and size of fish caught.

Stream rehab work (buffer zone enhancement) done by the Nottawasaga Steelheaders in conjunction with farmers and landowners on Boyne River tributary of the Nottawasaga River 1997

This picture demonstrates that pro-active conservation minded anglers working together with farmers, can remediate streams back to health and minimize wasteful and harmful nutrient run off. There has been little to no additional concession of land from the farmer. The result…a healthier stream providing fresher water to all.

Before (1997)

After (2014)

In Summary

This report demonstrates and further supports the urgency of not only preserving the integrity of the Nottawasaga River Watershed but providing a well thought out program to provide a robust agricultural community around a healthy watershed. Both are attainable and one need not suffer at the expense of the other. World recognized research, well underway by the University of Waterloo on the Holland Marsh[18,19,20], has proven that cost effective technologies and programs offered by conservation authorities, exist to prevent the negative effects of nutrient run off into our rivers.

Timing is ticking and this government can be one that will be ever-remembered for making truly positive decisions for both the agricultural community and the watershed. We are already experiencing the effects of climate change. And our watersheds, including the Nottawasaga River, are succumbing to these effects at an alarming rate. Studies by York University[16] and the United States Geological Survey[17] are showing changes in fish populations due to warming. Our cold and cooler water species are giving way to warm water species. The Nottawasaga River watershed and its delicate interdependent biodiversity is already experiencing impacts due to climate change and the pressures associated with land use change and development. We have all ready lost so much!

The Nottawasaga Steelheaders, stewards of the Nottawasaga River for over twenty years, extend our hand out to your government to join us in making that difference by keeping our agriculture strong, our watersheds healthy and leaving our children with a healthy legacy, one that we can all be proud of.

(16) Examining the Effects of Climate Change and Species Invasions on Ontario Walleye Populations: Can Walleye Beat the Heat – T. Zuiden, S. Sharma, York University, 2016
(17) Climate Change and Fresh Water Fish, Lakes in Wisconsin are Getting Warmer and Fish Communities are Changing as a Result – J.S. Reed, U.S. Geological Survey, Global Change Biology, 2016
(18) Phosphorus Removal and Recovery from Wastewater using Sorbent Technologies- Holly Erin Gray - U of Waterloo, 2018
(19) Phosphex™ – Technology Summary – University of Waterloo, 2017
(20) https://www.newmarkettoday.ca/local-news/holland-marsh-research-aimed-at-cleaning-up-lake-simcoe-1244773?utm_source=orilliamatters.com&utm_campaign=orilliamatters.com&utm_medium=referral&sfns=mo

We leave you with this message

Thank you for the opportunity to provide input for this important proposal.

...The Nottawasaga Steelheaders

Report prepared
by

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