

Watersheds Canada

Fish Habitat Enhancement Pilot Project:

Third-Party Program Evaluation



Performed by Sustainable Eastern Ontario (March 2021)



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Executive Summary

Watersheds Canada conducted a Fish Habitat Enhancement Pilot Project that involved the completion of four habitat enhancements in three habitat types, and the development of three videos and two written resources as part of a Habitat Enhancement Toolkit. The projects consisted of two brush-bundle installation projects, one walleye spawning bed rehabilitation, and one cold water creek shoreline planting. Projects were completed with the help of community partners and volunteers with support for planning, logistics, correct protocol, and some funding provided by Watersheds Canada, and used to develop and refine the resources in the toolkit.

To assess the program, Watersheds Canada contracted Sustainable Eastern Ontario, a non-profit which serves mainly other environmental organizations and provides various capacity building services. Evaluation was done mainly through semi-structured interviews with key participants identified and recruited by Watersheds Canada. Results were supplemented with a review of the toolkit resources, and results of two past surveys done by Watersheds Canada.

Project participants and interviewees represented both experts and laypeople, and were involved in actual project installations and/or development of the toolkit resources in some capacity. Demographically, they skewed towards older males, but were reasonably diverse in age and balanced in gender representation. They were overall knowledgeable about the issues being addressed and either the specific local issues or the relevant background ecology, or both, although they varied in their confidence regarding that level of knowledge. Where they had not reviewed the written protocols, descriptions of work they had performed matched those protocols closely. Participants were overall happy with their experiences participating in the Fish Habitat Enhancement Project, with Watersheds Canada, and with the resources produced. As far as possible to assess, they were equally happy with the outcomes and expressed that there is a remaining need for further work, both ecologically and in terms of demand from groups and community members, and that the protocols used and developed could be applied elsewhere. None indicated they would change anything about how the project had been done, and all would recommend Watersheds Canada and the resources developed to others interested in fish habitat improvements. Additional benefits of education, community building, and increased collaboration were identified, as well as the direct project outcomes.

Combining the resource review, interview results, and results of previous surveys, and accounting for the limits of the data to answer several key questions, this evaluation concludes that the project was needed and successful, and that a continuing need exists for enhancing fish habitat. ***Key recommendations include more accurately assessing the scope of that need and determining how best to support continued evaluation of the ecological impacts of the habitat enhancements, finding organizational clarity about how cold water stream habitats fit into the larger program and how best to distribute resources and knowledge, and recommendations about assessing organizational and community capacity, developing goals and strategy around program expansion and building a longer-term program strategy based on that assessed capacity and chosen targets that includes appropriate fundraising, capacity building, communications, and ongoing evaluation components.***

Finally, a case for the advantages of tackling the problem of fish habitat degradation in a non-profit-led, community-based manner is made based on resiliency and additional positive impacts discussed during interviews.



Introduction

Across Ontario, fish stocks are threatened by invasive species and habitat loss as a result of overdevelopment, climate change, and changes in land use – both around the lakes they live in and far upstream in the rivers and creeks that feed into these lakes. Fish are a food source but also an important part of the local economies in many rural parts of Ontario, with sport fishing tourism and cottaging or camping drawing much of the economic activity for smaller towns. Ecologically, many sport fish are important both as aquatic predators and food sources for other species, as well as performing other ecosystem roles.

The ways in which lake ecosystems impact, and are impacted by, human activity and the use of surrounding land are complex and require a holistic, watershed-based approach to be managed and protected effectively in a way that allows for responsible human activity and the flourishing of the natural world. Watersheds Canada is a national charity based in rural Ontario that merges this holistic approach, with practical, actionable programming and projects that involve a range of stakeholders, including fish habitat management, creation, and protection projects. They identified a specific need to improve and rehabilitate certain kinds of fish habitats for key species that are important in many lakes and waterways in Ontario, and that many local groups of concerned residents and other stakeholders could benefit from support taking on this sort of work.

Your Lakes. Your Rivers. Your Future.



About Sustainable Eastern Ontario

Sustainable Eastern Ontario (SEO) is a nonprofit organization based in Ottawa, Ontario, officially incorporated in 2011. It was formed in response to an observed need for the environmental sector in the region to connect and collaborate more and access appropriate, affordable support services in order to function optimally.

SEO facilitates networking and collaboration within the sector and promotes greater capacity in other organizations through training programs and social-enterprise style support services. It also celebrates sustainability success stories and groups and individuals making a difference with their sustainability activities. More information about SEO, including programs, service offerings, and success stories, is available at

www.SustainableEasternOntario.ca

Developing a fish habitat improvement “toolkit” consisting of video and written materials was identified as a potentially low-cost, high-impact step to help facilitate habitat improvements. This program used the previous experience of Watersheds Canada and some of their key partners to develop such a toolkit through the design and implementation of four pilot projects and related expert consultations. Installations were filmed and documented to the extent possible and video content was produced. Experience gained in the installations informed written protocols that were further developed with expert input.

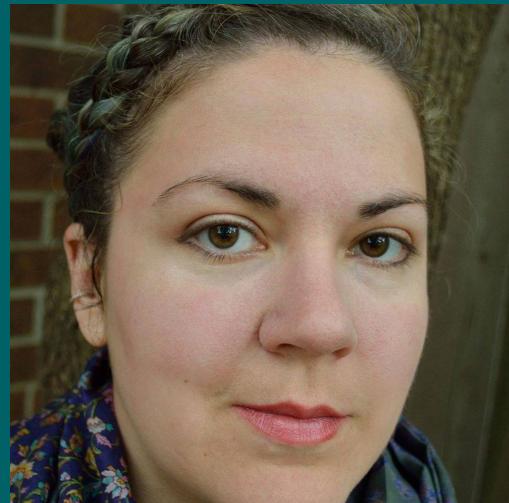
The result is a set of videos and written documents targeted at an interested

audience of lay-people. Watersheds Canada contracted Sustainable Eastern Ontario, a nonprofit that provides collaboration and capacity-building services to other organizations in the environmental sector, to perform a third-party evaluation of this work. The methods, results, and analysis thereof, as well as key recommendations for continuing this work, are found in this report.

About the Evaluator

Kathryn Norman, M.Sc., B.Sc.H., is the staff program evaluator at Sustainable Eastern Ontario. She holds two degrees in biology, psychology and ecology and has received program evaluation training from the Tamarack Institute and Capacity Canada.

Her training has included post-graduate statistics and data analysis, critical thinking skills and cognitive biases that impact perception, as well as the local ecology and environmental issues relevant to the work done in the sector. She has a diverse background of nonprofit, government, academic and private sector work, and teaches a module on program evaluation as part of SEO's capacity training programs. She can be reached for questions or comments about this evaluation at Kathryn@SustainableEasternOntario.ca.



Project Overview

Detailed information about this program and its pilot projects is available from Watersheds Canada and in the program report returned to Ontario Trillium Foundation, so only a brief overview will be given here. Four pilot projects were completed as part of this program: two brush bundle projects, one large walleye spawning bed rehabilitation, and one cold-water creek habitat restoration, which was additionally partially funded by the outdoors equipment company Cabella's. Projects took place mostly in 2019, although some preparation work took place prior – due to delays in receiving the grant, logistical and seasonal considerations with the life cycle of spawning fish and work restrictions on lakes in Ontario, as well as later delays due to the outbreak of COVID-19 which canceled or restricted the activities of many outdoors clubs and other groups, the timing of this project did not line up entirely with what was expected.

Specific details about each type of project and the natural history relevant to understanding their need and methodology are available elsewhere (see list of toolkit resource links in Appendix 2), but they are briefly outlined here for convenience. Brush bundles are large bundles of natural wood and/or discarded Christmas trees that are weighted and sunk in carefully selected areas of lakes to replace natural wood debris such as fallen trees which cottagers and other lake users tend to remove to improve boating, swimming, etc. This sort of underwater structure is necessary for warm-water fish such as bass to reproduce and develop to adulthood successfully, and increases food available to many species. Brush bundles may also be called "fish sticks,"





Old Christmas trees being transported to a lake site where they will be sunk as part of a brush bundle project.
Photo: Watersheds Canada.

part of rehabilitating these habitats. Walleye, bass, and trout are all important sport fishing species in Eastern Ontario

These pilot projects were carried out with a mix of local partner groups such as conservation authorities, lake associations, and outdoors associations, and individual volunteers from those groups or the communities they served, with support from Watersheds Canada staff. In some cases, local businesses and other organizations contributed financially or with equipment loans as well. The resources were developed by Watersheds Canada staff with support from a video production service and a steering committee of experts who reviewed and contributed knowledge.

although that term is sometimes also used to refer to natural fallen trees in the water. Walleye spawning beds are installations of rock in a specific mix of sizes in areas that have appropriate water flow and levels for walleye to lay eggs, and those eggs to successfully develop and hatch. Often these locations are historical walleye spawning areas that have become degraded for some reason, which may also need to be addressed as part of the project to prevent recurrence.

Coldwater creeks are a relatively rare habitat in Ontario that are important for certain fish species, notably brook trout, to spawn in. Low water temperature is key and these habitats are increasingly threatened by climate change and changes in land use such as deforestation that removes shading from spring-fed streams, resulting in greater solar warming, and replacing tree cover is a key

Other Projects

Watersheds Canada and its local partners have been in the business of habitat restoration and enhancement for some time, and many of the participants who gave feedback on this program or a specific project discussed here have participated in other similar programs before and/or since, with Watersheds Canada or with other groups. Individual volunteers are not expected to know which habitat project is part of which funded program, and may additionally conflate their experiences at different installations. Several gave details about other installations they have worked on or other contact they have had with Watersheds Canada. Every reasonable attempt was made to isolate which feedback was relevant to the projects this evaluation focusses on, but some information, video footage, or learnings from other projects will be necessarily tied up with these projects and the toolkit materials.

Evaluation Methods

Discussion with Watersheds Canada Staff

Upon being contracted by Watersheds Canada, the Sustainable Eastern Ontario evaluator met with two of their staff – the Executive Director Barbara King and the Lake Stewardship Coordinator Melissa Dakers, who was the project lead for this program. The purposes of the meeting were to outline the project goals, designs, and background, including relevant materials produced and data gathered to date, as well as to discuss evaluation methodology and what questions they evaluation should address, and establish a timeline and responsibility for providing materials, contacts, etc., to all parties as needed. There was a short turn-around time on the evaluation, so a series of semi-structured interviews with key participants – to be selected by Watersheds Canada – was determined to be the best course of action. An evaluation deadline was selected that allowed for a buffer to correct any gaps or misunderstandings about the project before the final report was due.

Development of Interview Guide

Following this discussion and review of the relevant resources from Watersheds Canada, a draft outline for the interviews was produced and given to Watersheds Canada for review. It outlined the usual interview procedures including participant anonymity and how the interviews would be set up and framed. Additional details were exchanged to facilitate introducing key participants to the evaluator, and for the evaluator to frame and tailor the interview to the participants. Questions focussed on how the participant was involved and how they came to be involved, an overview of the work done that they participated in and their feedback on that experience and any results they have observed, their level of understanding of the work in its ecological context, and opinions on the quality and usefulness of the relevant toolkit resources. The complete survey outline is included in Appendix 1.

Contacting Interviewees & Interview Process

Key participants were identified by Watersheds Canada based on type of involvement and project, degree of responsiveness, and their perception of how well these individuals would be able to represent what took place at specific project sites. They were then individually introduced to the evaluator by email, with a brief background to establish the purpose of the connection and role of the evaluator. Further communication was handled by the evaluator to establish a time and preferred mode of interviewing, which turned out to be a phone call for participants. The contact information of backup interviewees was provided as well in case of low response rate, but they were not individually contacted.

Phone interviews were conducted at scheduled times using the interview guide. Participants were given a statement about Sustainable Eastern Ontario and the evaluation role, and their anonymity in the process, including a caution that depending on the nature of their involvement, their specific comments might reveal their identity to someone knowledgeable with the work. Participants universally seemed unconcerned about anonymity, but it is important to establish that it exists in order to minimize people's tendency to give positive feedback. In previous evaluation interviews (with other groups), it was noted that interviewees sometimes feel as if their work or their project is being evaluated, so every effort was made to ensure that it was the Watersheds Canada programming that was being assessed, which seemed to have been well understood.

In conducting the interviews, the interview guide was followed as much as possible given the differences how interviewees were involved and their level of knowledge and experience. For example, if the per-



son being interviewed was a key volunteer for a specific habitat improvement work day, but had no academic background and limited experience outside their own lake, they might be asked more follow up questions about the work done, and not about the scientific validity or regional generalizability of the techniques used. If an individual had not reviewed any of the toolkit resources, questions specific to them were skipped.

In some cases, the natural flow of conversation or of the description given by the interviewee led to them answering questions out of order or providing a great deal of additional information that might not be relevant to other projects or the program at large. Where relevant, interviewees were encouraged to share their opinions and impressions even if they expressed uncertainty or lack of expertise, and this was noted. Where multiple interviewees worked on the same project, they were all asked to describe it briefly to be sure everyone was discussing the same experience and protocols.

In general, participants were not made aware of who else had been interviewed, although in some cases it became necessary to clarify what project they were talking about by naming other individuals who had also participated or mentioning specific details the interviewee was uncertain about, and in at least one case individuals who worked together are known to have communicated about the evaluation interview between themselves before either was interviewed. Notes were taken during individual interviews, and interviewees were offered the opportunity to discuss anything else they felt would be relevant that was not addressed by the questions, as well as to follow up by email if they had additional comments to make later.

Data Synthesis

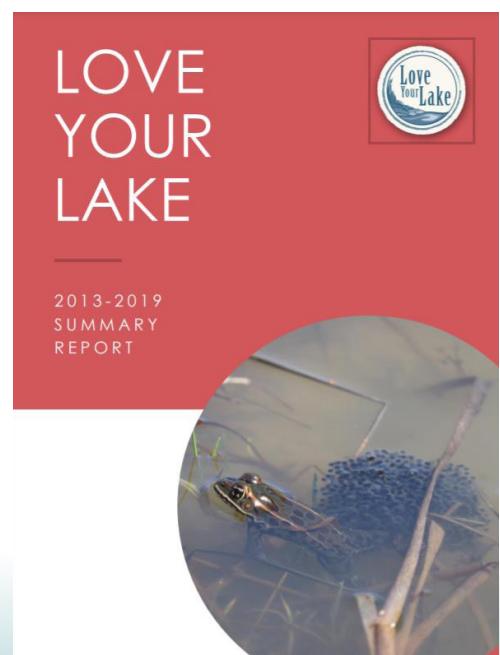
Qualitative data and themes were evaluated by comparing interview notes specific comments. Where possible and relevant, numerical values were taken from the results of existing surveys previously performed by Watersheds Canada, and used to support statements or conclusions from interviews. Where needed, clarifying questions were posed to Watersheds Canada or specific interviewees, or additional research on the topic was done using relevant local authorities such as hunting and fishing associations.

Review of Resources

Written resources were critically reviewed by the evaluator as well as soliciting feedback on their content and development process from appropriate interviewees. Video content was in the process of being refined by a video production service during this evaluation, so both the initial drafts already available through the Watersheds Canada YouTube channel, and the final versions, were viewed, but only the existing drafts were addressed with interviewees. Differences between the versions were minimal and mainly cosmetic – a slight difference in “feel” and branding was noted, but the information presented was substantially identical.

Additional Data

Additional data had been collected by Watersheds Canada internally prior to this evaluation, including a Fish Habitat Survey which asked questions specific to this program regarding fish habitat specifics as well as beliefs and understanding of relevant issues, and a values and attitudes survey from a separate program (the “Love Your Lake” program, data provided covers six years of surveys from 2013-2019). This additional data has been used in this evaluation, but the methods by which they were collected are not discussed in this report as they were not done by Sustainable Eastern Ontario.



Results & Analysis

Interview Results

Watersheds Canada staff indicated at the outset of evaluation planning that ten to twelve individual interviews would be ideal. Fourteen key participants were identified and initially contacted and connected with the evaluator, with at least one follow-up for those who did not reply promptly. Of these, eleven were responsive, although one later declined an interview after discussion with a colleague who wished to represent the group. Three did not respond to Watersheds Canada or Sustainable Eastern Ontario in the timeframe of this evaluation.

Ten interviews were conducted, all by telephone at scheduled, mutually convenient times. They typically lasted between ten and fifteen minutes. Interviewees were generally happy to discuss the program and their involvement and showed a good understanding of the purpose of the evaluation and the issues being discussed. They represented all four habitat improvement projects as well as other aspects of the program and toolkit development.

In terms of background, they included past Watersheds Canada employees, employees of other aquatic conservation organizations, smaller, local community organizations, and experts in other aspects of fisheries and aquatic ecosystems. Some had formal academic credentials, and some were knowledgeable laypeople. In general, interviewees were older, either late-career experts or retired community members, but a range of ages from post-secondary to long-term retirement was represented. There was a slight male bias in the number of interviewees, which was less pronounced in the group of all those who were contacted, and which would be balanced by female staff members at Watersheds Canada in the actual implementation of the program – although one interviewee specifically mentioned and applauded the fact that Watersheds Canada staff were women working in a traditionally male-dominated field, and that they seemed to be well respected within that field.

In general, interviewees were aware of Watersheds Canada before working on their specific projects, although in some cases that work was their first direct contact with the organization. They generally came to the organization, and this work, through past collaborations or volunteer activity on a related aquatic habitat project, or were referred through another person or group who had that background. All indicated a long-term interest in environmental sustainability and aquatic habitats in general or their lake area in particular. The majority were involved with fisheries in some way, although not all fished themselves. When asked about the habitats they had worked in, all were generally knowledgeable about the habitat and particular issues at play. Removal of naturally occurring debris by cottagers who wanted to improve their waterfront for boating and swimming, reduced water flow due to dams and changes in upstream land management, and deforestation or degradation of habitat along the edge of waterways were all identified as the major ecological issues that resulted in a need for habitat improvement. Approximately half of the interviewees mentioned either specific declines in fish numbers or anecdotal reports and casual observations that fishing had been better in their location decades before.

When asked about the protocols they had used, all interviewees who had participated directly in a workday associated with one or more habitat improvement projects described procedures consistent with those outlined in the video and written content, including mentions of site-specific challenges/advantages and alterations of original protocols based on experience. Those who had reviewed the written protocols



indicated that having a resource aimed at the general public which was easily accessible and addressed some of the planning details that might not be obvious to an average person was a good idea and would be helpful. In general, interviewees mentioned that Watersheds Canada staff had been instrumental in planning and locating specific sites for brush bundles and that this sort of expert knowledge was helpful. Specific questions about written content and videos will be addressed more fully later in this section.

When asked about results seen since the habitat improvement, responses varied, but there was a theme of not having had an opportunity to properly evaluate how the improved sites were doing due to COVID-19 shutdowns, and/or that not enough time had passed to be truly confident or quantitative about the outcomes. In the Mary Jane's Creek project, participants indicated that fish had returned to the area almost immediately, and when they had gone at night to assess spawning behaviour, fish appeared to be engaged in spawning. However, all interviewees associated with this project noted that they had been expecting greater numbers of fish and suspected an unusually low water level that year of causing the lower numbers. That site is a historical walleye spawning area that had been degraded by silt and vegetation as a result of upstream water level control that reduced water flow from the mouth of the stream, which was also addressed by this project. Further habitat improvement upstream was in the preliminary planning stages at the time of writing, and interviewees seemed very optimistic about this habitat hosting more walleye over time, but it remains to be seen if this will be the case, especially with increasingly erratic weather and precipitation patterns due to climate change.

Interviewees who had participated in brush bundle installations on Pine Lake and Kashawakamak lake (the pilot project sites), as well as other brush bundle projects, indicated that to some extent snorkelers and underwater video showed that fish of varying sizes were using the brush bundle habitat and that young fish had been seen, but not enough time had passed or systematic evaluation been done to conclusively say that bundles were being successfully used for breeding. Some indicated plans for further follow-up in the coming summer and described anecdotal reports of the previous summer having been good for fishing or of similar projects having had a positive impact in other lakes they were aware of. There were no reports of complaints from users of the lake about the brush bundles or walleye spawning area created, suggesting placement satisfied those requirements. Interviewees who had been involved with or were knowledgeable about the Easton's Creek cold water creek shoreline rehabilitation indicated there had not been enough time to see impacts, as the nature of this work requires trees to grow large enough to shade the deforested areas. This area has been under regular monitoring by the Mississippi Valley Conservation Authority for some time and will continue to be monitored, so when results are available, they will be good quality indicators of the success of this project.

Interviewees were universally happy with their experiences working on all projects, indicating that the workdays themselves were fun and went well, that Watersheds Canada had been great to work with and made things easy, and that it was great to see groups of people coming together to work on something to benefit the community. It was specifically noted by a few individuals that this sort of project brings together segments of the local population that might not otherwise cross paths, which builds community, that it was good to see the educational component and people becoming more aware of ways in which their actions are connected to the health of the watershed, and that it was rewarding to see modifications to a technique that were developed on-site with their help informing the toolkit resources and future projects so that others would not have to "reinvent the wheel". Phrases like "extremely happy", "proud", and "privileged to take part" were used often, and a desire to collaborate or contribute to future projects was expressed widely.

When asked about their satisfaction with the outcomes of the projects, most reiterated that not enough time had passed or enough follow up been done to assess the full range of outcomes, but that they



were happy with how the installations had gone and what they had seen so far. One individual expressed mild concern that brush bundles may not have been tied tightly enough and desire to check on them by snorkeling when the weather allowed. Among participants who had worked on the toolkit documents, they were happy with how those had turned out and that they had been created. Notable specific comments were that it was good to see things being done well and according to good protocols and that the work would benefit the community as well as the fish populations.

When asked if they would make any changes if they were to go back and repeat the work done, all initially indicated they would not, but a minority then followed up with minor suggested changes. These related mainly to content that was echoed in the toolkit materials: smaller brush bundles were more manageable, stacking brush material closer to the dock site where they would be loaded on the boat would have made work easier, and that a large portion of the local community and volunteer pool was older it would be good to seek out more physically able-bodied volunteers and/or take additional safety precautions to protect potentially more vulnerable older adults when doing physical work. One individual indicated that they had had some anxiety during planning because they were borrowing a boat motor, and that a motor might be something Watersheds Canada could have in their “kit” in case arrangements fell through.

Interviewees were asked about the generalizability of the protocols used and resources developed, as well as their impressions of the need for further habitat improvement work from a biological and human-driven perspective. Most interviewees indicated, with varying degrees of certainty, that the protocols and materials were generalizable. Two were too uncertain to make a statement about how broadly the protocols would apply but indicated they were trying to determine applicability to specific other sites, indicating they had at least enough confidence in the protocols to start a planning process. Interestingly, individuals from a more expert background were more confident about applicability in a wider geographical and habitat range, while individuals from the local community and more of a lay-background were more cautious in their assessment and reluctant to specify for regions outside their local watershed or the lake(s) they were personally familiar with.

There was a common theme of stipulating that some sort of local or expert knowledge consultation was important to ensure applicability and/or adapt protocols to local conditions, which was particularly strongly expressed concerning cold water creek habitats, which are relatively rare in Ontario and more vulnerable to damage by poorly done attempts to improve habitat, perhaps to the extent that individuals and community groups should not attempt to initiate this sort of work themselves. One notable expert comment was that the protocols were broadly adaptable to most of North America and possibly Europe as well and that even in very different habitats, portions of the protocols such as figuring out permits and doing stakeholder consultations, and the very fact that protocols existed and raised awareness about the need for habitat improvement, were still applicable. It was minorly noted that causes of habitat degradation are many and ongoing and that the possibility of having to repeat improvements in the future could not be ignored.

Similarly, interviewees largely agreed that the protocols used were in line with evidence-based best practices in fish habitat management and improvement, with expert background individuals having more confidence in this statement than community members with less or no specific background training. A few were not confident enough to say but trusted Watersheds Canada to have made that determination. A few mentioned that scientific knowledge is always evolving but that the information presented matched with the best current research, and that it was a good balance of the known technical information and what the average person would need to know to do the work.



In terms of addressing the need for the work, the consensus among interviewees was that there is a need, likely both biologically and human-driven. There was again a range of confidence expressed regarding these questions, more so in terms of biological need. Several interviewees indicated they were not knowledgeable enough about the extent that habitat had been degraded outside their own region or how much fish stocks in other water bodies were limited by habitat to make a worthwhile assessment. Fewer individuals indicated uncertainty about the human-driven need, indicating that they were aware of other interested groups or individuals even if they didn't have a sense of the broader need. There was near-total overlap between those who expressed uncertainty, although generally interviewees were more confident speaking to the human-driven need. A few specifically mentioned an additional dimension of human-driven need in terms of education and awareness-raising about the issues and possibilities for remediation: there are many groups and people who want to do the work but lack knowledge, connections, or resources, but there are even more people and groups who don't even know they could be improving their lakes. One individual mentioned that they had done improvements in a lake that was regularly stocked with fish by the MNRF (not one of the program pilot sites, but an area they were most familiar with the protocols from) and that they suspected the biological need was greater in areas where this wasn't done.

Of the three types of habitat improvement, there was highest agreement and confidence that improvements would be needed for walleye spawning habitat, some interviewees noting that walleye had previously been much more common decades earlier, referencing reports from other associations that walleye fisheries in the region had collapsed, or relating personal observations of siltation and decreased water flow being common, or knowledge of other spawning areas which had become degraded and were not used or not as productive as they had been in the past. Feedback about the need for cold water creek habitat improvement was incredibly varied, with some respondents indicating there would not be much interest because it is not a common habitat, while others indicating interest would be high because it is not a common habitat and therefore the need for improvements is higher. Need to conserve existing good quality cold water creek habitat as a higher priority than trying to remediate damaged habitat, need for careful and expert planning in this rarer and more sensitive habitat, and difficulty relating to complex impacts of land use over a broad area of the watershed were all mentioned in discussion as well.

All respondents indicated they would refer other interested groups or individuals to Watersheds Canada and the protocols created if they were interested in doing a similar project. About half of respondents emphasized the experience of working the Watersheds Canada more than the materials, specifically noting the organization of Coordinator Melissa Dakers and the work that partnering on a funded project allowed them to do which they would have been unable to do alone. Since several of the interviewees completed their projects before the protocols were produced or relied on Watersheds Canada to follow the best technique. This is not surprising, but may indicate that toolkit resources without some sort of professional support would not be sufficient to overcome barriers to taking action for a larger percentage of other interested groups. Further evaluation after the documents have been widely distributed would be needed to determine how many barriers are overcome by the resources alone.

A few individuals noted that the video content, in particular, made a good introductory resource, and/or that they already had referred other interested parties to Watersheds Canada and the resources developed. One noted semi-jokingly they wanted others to wait until they had personally completed additional projects with Watersheds Canada before taking up organizational capacity.

Overall, interview participants did not feel that anything important had been missed during the interview and needed to be brought up in the open-ended discussion of the last question, giving some indication



that the questions adequately assessed what could be assessed from this population. A few respondents re-iterated discussion points they had brought up previously, noting the aging population of lake associations and cottage communities as a potential barrier, especially for projects that demanded hard physical labour. Repeating that the experience had been good and that they would be interested in working with Watersheds Canada and/or on other habitat improvement projects was also common.

Other comments noted in this section when the came up elsewhere in the interview included a concern that well-meaning volunteers could spread invasive glossy buckthorn by inadvertently using it brush bundles, that the assistance of heavy equipment and skilled operators had made the walleye spawning area rehabilitation surprisingly fast and easy, and that it was good to see communities coming together through the consultations and workdays, especially in situations where there was sometimes tension between groups with different goals or priorities (conservation authorities vs cottagers who want to remove dead trees, for example).

Written Materials

Two written documents were produced as part of this program and are available on the Watersheds Canada website, in the Publications section of their Resources page. These two documents are entitled "In-Water Brush Bundle Protocols" and "Walleye Spawning Bed Protocols" and were produced in partnership with the Lanark County Stewardship Council. Both documents start with an introductory section that explains the relevant basic biology, the issues that lead to habitat needing improvement, etc., and a general section about acquiring permits and consulting with relevant stakeholders, as well as specific information about the steps involved in conducting the work required for the different types of projects and a breakdown of typically required materials, costs, volunteer requirements, and potential funding sources. There is no cold-water creek document specific to this program. Somewhat confusingly, at the time of evaluation, when visiting the Watersheds Canada website, it is easier to navigate to a more general Fish Habitat Program page that details several examples of past habitat improvement projects and mentions the fish habitat enhancement toolkit is coming soon but does not link to these specific documents, which are somewhat difficult to find in the less obvious Resources section without some direction. It is unclear at this time what the communications plan is for disseminating these documents and this information.

On review, the documents are well written and professional, with a logical layout and appropriate balance of information, images, and references for pursuing greater detail. They maintain a good balance of comprehensiveness and accessibility and are not too long or technical for the average interested layperson. Interview responses indicate that experts who have reviewed them find them to be in-line with current research and evidence-based best practice in fish habitat management, while lay-people found them helpful and informative without being too technical, and in-line with the basic biology of the relevant fish species to the extent that they were familiar with that subject. Two additional themes emerged from the interviews. Firstly, respondents from both professional and volunteer backgrounds identified that the importance of seeking permits and that being told where and how to do this was a key item many people would have been unaware of without the toolkit. Secondly, the degree to which stakeholders and experts should be consulted when designing specific interventions and selecting sites was also identified as a key item, particularly with regard to placing brush bundles where they will be helpful for fish but not pose a hazard for boating and swimming.

Of the ten individuals interviewed, four had reviewed the relevant written protocols and/or been involved with their development in some capacity they were aware of. Based on other interview comments, at least two other individuals participated in projects that impacted the written reports, even if they were not

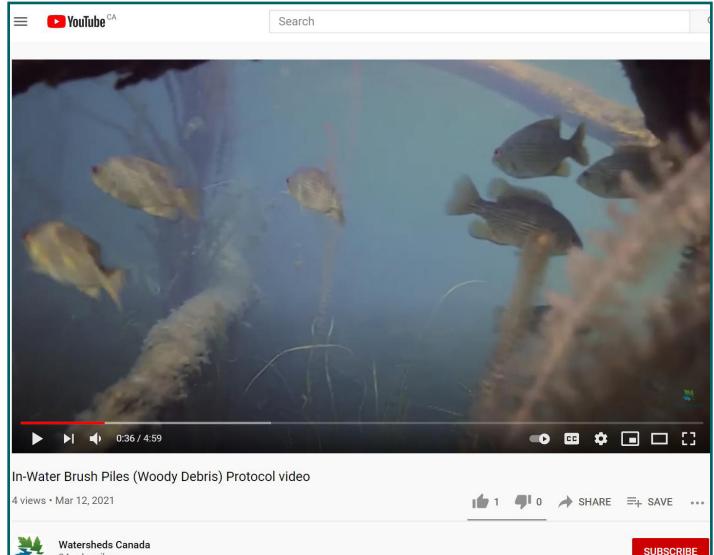


aware of their input. One individual specified that they used protocols from the MNRF, and others indicated that they had relied on Watersheds Canada direction in person during the installation of habitat improvements. In all cases where interviewees had not reviewed or contributed to the written documents, their described protocols matched very closely with what is outlined in the documents. Seven of the ten interviewees indicated that the protocols were helpful, would have been helpful had they been complete, or were likely to be helpful for others, in some cases specifically noting the permit and funding sections or the fact that other documentation was not available or accessible to smaller groups and community members.

Video Content

Three short videos were produced focussing on cold water creek habitats, walleye spawning sites, and brush bundles. The videos were in the process of being updated with a final edit during the evaluation, but the content was essentially identical between older and newer versions of the walleye spawning habitat and brush bundle videos. Some form of this content has been available on the Watersheds Canada YouTube channel since June 2015, with newer versions being updated with footage and learnings from projects in this program. At the time of writing, the walleye spawning habitat video had 227 views, and the brush bundle video had 575 views. The cold water creek video was not published on the YouTube channel at the time of writing.

Video content was produced using footage from several habitat enhancement projects, with updated narration and video editing contributed by one of the interviewees. Videos are between six and ten minutes long and cover the same material as the written documents but with less time devoted to discussions of permits and stakeholder consultations, and fundraising. Much more time is devoted to explanations of the habitat issues and specifics of installations, as would be expected with a visual medium – permit and grant applications do not make for exciting video content. An effort was made in video editing to visually portray some of the variety found in similar habitats in different settings – such as a mid-lake shoal as well as a stream outlet for walleye spawning. This was a deliberate effort to make sure possible habitat improvements weren't abandoned because of superficial differences between what was portrayed in the videos and the reality of the setting in other locations and shows a high quality of work from the video editors. Like the written documents, the videos have a good balance of detail and would serve as a good introduction to the topic of fish habitat improvement and the specific techniques employed.



Screenshot of the new brush bundle protocol video available on the Watersheds Canada Youtube channel, showing fish and natural woody debris.

Survey Outcomes

Of the two prior surveys provided to aid in this evaluation, one is highly specific to the program being evaluated but had a poor response rate, while the other is very large but does not address the relevant issues as directly or thoroughly. Commenting on the survey design and implementation of these falls outside of the



scope of this report as they were not conducted by Sustainable Eastern Ontario. Both, however, offer additional, relevant insights into the program and the key questions that need to be addressed when evaluating it.

The **Fish Habitat Survey** consisted primarily of a series of statements about respondent's understanding of different aspects of fish habitat and ecology, including questions specific to walleye spawning and woody debris, as well as some opinions and values about fish, and experiences with habitat enhancement, to be ranked on a five-point scale of agreement/disagreement. It also collected the names of respondents and their bodies of water, and how they had found out about Watersheds Canada's Fish Habitat programs. Names are not associated with responses in the results provided, so it is possible to assess overlap with interview participants, but not corresponding beliefs and self-assessments. Two respondents and two bodies of water overlap with the projects and interviews discussed in this report, out of six responses. Due to the small number of responses and inherent unreliability of self-assessments of knowledge, it is hard to draw firm conclusions or do meaningful statistical analysis, but some trends and outliers are worth discussing.

In general, survey respondents rated themselves as fairly knowledgeable about environmental issues, human impacts on freshwater, the role of healthy shorelines, woody debris, and water temperatures in the health of fish populations, how cold water stream habitat works, and the spawning habits of walleye, although in most cases at least one individual selected "neutral" response. All participants strongly agreed with the statement "I understand how having a natural shoreline protects water quality." The lowest agreement in this set was with the statement "I understand cold water stream fish habitat." It is somewhat ambiguous what "understand" in this context means, perhaps accounting for the low agreement.

Survey respondents all strongly agreed that they valued fish, wildlife, and the habitat that protects them, which is positive although not surprising given the target population and tendencies of people who are likely to respond to a survey about environmental issues. There was also good agreement with the statement about understanding the process for a habitat improvement project.

Notably, the lowest agreement across the entire survey was with the statement "I am aware of who to contact if I want to undertake a fish habitat project," with the "disagree" and "strongly disagree" options both being selected once and not everyone who agreed having done so strongly. This is notable primarily because one would assume that Watersheds Canada contacts filling out the survey would know at least to contact Watersheds Canada, even if they are unaware of who to contact for permits, etc., but it is hard to draw firm conclusions from this as the numbers are small – it could be a case of simply misreading the scale when responding, for example. It is consistent, however, with the statement made by several interviewees that there is a lack of printed material targeted at people who are not already experts.

Five participants indicated they had helped with a habitat project, although it is unclear how to parse the difference between agreeing and strongly agreeing with this statement. A follow-up question asked for descriptions of those projects. The responses were quite brief and sometimes merely referenced a protocol used, but most refer to brush bundle projects, with some mention of shoreline rehabilitation and spawning beds. Most participants (five) agreed that the "Guidance and education from the Fish Habitat Enhancement Program Toolkit was critical" to their participation. One disagreed.

All respondents agreed or agreed strongly that they were willing to talk to their peers about the importance of fish habitat. When asked how they had found the program, half selected the "other" option, with no additional comments shedding light on what that might be. Others indicated the Watersheds Canada website or AGM, and word of mouth from a friend. It is not possible to draw conclusions as to how most people find these resources from these data, but it would be illuminating to know what "other" meant in this context.



Results provided from the more general **Love Your Lake survey** represented combined data from six years (2013-2019) of administering the Love Your Lake survey to participants in that program. Response numbers varied highly by year and it is not clear to what extent the same individual is completing the survey in multiple years, and much of the data gathered do not relate specifically to fish habitat enhancement, but with over 2600 responses gathered, some trends are robust enough to consider here.

The majority (65%) identified as seasonal residents in their lake area, which is in-line with the observations from interviewees that a large proportion of their communities and volunteers are older, retired cottagers. In a ranking of recreational activities, swimming, canoeing & kayaking, and other forms of boating/jet-skiing were all identified as popular activities, which is consistent with the observation that people clear wood debris because they want to improve conditions for these activities. Happily, nature appreciation and fishing are also in the top five popular activities, which supports the idea that people are interested in improving natural habitats for fish. Socializing was also in the top five, which may have some interesting tie-ins to the observation that project workdays make good community activities. Water quality was clearly the most important factor people identified as impacting their enjoyment of the lake. While swimming (presumably good conditions for doing so) was the second most important, people also indicated that natural shorelines, scenery, tranquility, and other factors which are consistent with good fish habitat were also very important. Fishing fell in the middle of the list, but it is unclear whether this refers to opportunities to do so, the quality of the fish or fishing experience, or even if the presence of others fishing negatively impacts enjoyment.

When asked to identify actions that would benefit the lake and community, between 25% and 33% of respondents identified each of the obvious solutions like restricting development, maintaining septic systems, education, developing a lake management plan, etc. Limiting development was the most-selected action (33%), and only 2% of respondents indicated nothing could be done. Overall, while there is probably some mismatch between what residents believe will most benefit their lake and what evidence shows, the results of this section indicate that a reasonable proportion of respondents have a reasonable understanding of how human actions and behaviours impact the aquatic ecosystems they love. It is worth noting that respondents to a survey through Love Your Lake have probably self-selected into a group that is somewhat more engaged on these issues than the average person.

Breaking down concerns about water quality showed that algae and aquatic vegetation were the main concern, indicated by roughly 70% of respondents. How this relates to fish habitat is complex, as vegetation and algae form the base of many aquatic food chains, provide habitat, etc., but can also be associated with deadly algal blooms and invasive species that drastically alter the ecosystem.

A strong majority (77%) indicated an interest in learning more about lake stewardship and the impacts of individual actions, and while a slight majority (51%) indicated no interest in participating in stewardship actions, a significant minority (38%) indicated they were interested. In terms of community engagement on sustainability issues, 38% is quite high, which is encouraging. In 2015, an additional question about barriers to participating in stewardship activities was added. This subset of responses indicated lack of time was the most common barrier, with lack of information mentioned roughly half as often. Only a minority indicated it was not a priority, and happily cost was identified as a barrier fairly rarely (<10%).

Taken as a whole, these results indicate that there is a significant population of residents around rural lakes who care about water quality and preserving natural ecosystems, have a reasonable understanding of how human activity impacts their lakes and an interest in learning more, and are relatively willing to be involved in appropriate stewardship activities, especially if those can be made convenient for them and any lack of information can be addressed.



Key Questions & Recommendations

Several key questions need to be asked, and how well the available data can answer them needs to be determined, before concluding this evaluation and generating recommendations. Based on the nature of the program and the issues it addresses, and the discussion with – and broader mandate of – Watersheds Canada, these questions are as follows:

Was there a need for this pilot program?

This question was addressed indirectly in interviews. Individuals revealed through their stories of how and why they became involved, their assessments of the toolkit materials, and their impressions of the need for further work that there was a lack of good material accessible to the average lake resident, a decline in fish stocks and quality of fishing (and therefore in economic activity associated with fishing tourism), and an awareness that overdevelopment of lakefronts was or could become an issue. The message from individuals working in the lake/fisheries management and environmental sectors was clear that habitat degradation is a significant issue, on a scale larger than what they individually can address, and that there is a communications barrier because the best information tends to be very technical and not available or accessible to the general public.

The results from the surveys indicate that people value fish and their habitats and that maintaining a good quality lake ecosystem is important to lake residents, who are interested in learning more and taking action but face some barriers to doing so, including not knowing who to reach out to. Based on these results, it seems clear that Watersheds Canada correctly identified a need that they could address through this project, by raising awareness and improving understanding of how fish habitats work and are impacted by humans, and by developing techniques and resources that would help lower the barriers to action by groups and communities. Additionally, although collaboration and communication between a few key players (such as conservation authorities and the MNRF) appear to be common in this sector, smaller groups indicated that the projects they worked on would not have been possible without the new or greater collaborations facilitated by Watersheds Canada and this work.

Key Recommendations

- Consider conducting a sector scan to more accurately assess the need for fish habitat enhancement and perhaps identify “hotspots” where habitat is in greatest need of protection and enhancement, or examples of holistic community approaches to lake management that could be replicated elsewhere.
- Consider enhancing networking and collaboration activities between lake associations, etc. (Watersheds Canada already hosts an annual “Lake Links” forum for this purpose, but whether and how to expand that opportunity should be considered.)



What were the successes of program, and is it a success overall?

Four habitat improvement projects were planned and carried out as part of this program, two high-quality written protocols were produced, and three good introductory videos. Interview participants indicated that their habitat improvements would probably not have been possible and/or would have been much more difficult, without the support from Watersheds Canada. In the case of Mary Jane's Creek, in particular, multiple respondents indicated they had been wanting to proceed with rehabilitation for many years but were unable to make it happen prior to this program. Regarding brush bundles, some respondents noted that they had not been aware of the role woody debris played in fish habitat, or that it could be replaced, before becoming aware of this work.

In terms of projects completed, this program appears to have been a success. Participants were happy with the work accomplished, and in most cases, it is reasonable to conclude that the work would not have been done otherwise (possibly the cold water creek planting would have eventually proceeded as it is a conservation area managed habitat). Preliminary results indicate that fish are using the improved habitats, although due to COVID-19 the first season where good assessment would have been possible, the impact in the water has been hard to assess and more time and observation will be needed to conclude that the new habitat is having the intended effect.

The resources produced are successful in that they are of good quality, are appropriate to fill an information gap that previous surveys and interviewees identified, and were assessed by those who had reviewed them as very good and likely to be very useful to others. However, it is unclear at this time what the plans for disseminating the resources and the information they contain is, and somewhat confusing to locate them on the Watersheds Canada website. Additionally, it is unclear why there is a cold-water creek video but not specific written content. Whether to pursue creating a written protocol for this type of habitat or to hold back and allow that type of project to be driven more by experts than by communities, will need to be assessed by Watersheds Canada and its key partners and network of experts. It is unclear from the results of a survey and the interviews conducted how much demand there is for a more general resource related to this sensitive habitat.

Project participants universally agreed that the experience of working on a habitat enhancement was very positive, saying that it was educational, community building, inspiring, a privilege to be part of, a lot of fun, etc., and praising Watersheds Canada and Melissa Dakers in particular for organization and excellent support. Combined with feedback that they would do things the same way if they had to repeat the experience and that they would universally refer others to the organization and resources produced, indicate that this program was a strong success from a participant experience perspective.

Overall, the Fish Habitat Enhancement Program appears to have been a success. There is limited ability to assess the actual ecological impacts of the improvements made during the pilot projects, but this is not surprising given the timescales needed for fish and vegetation to mature and reproduce. Early indications suggest positive ecological outcomes, and further follow-up is outside the scope of this project (although ideally it could be supported by future projects and collaborations).

The biggest gap appears to be around cold water creek habitat, the lack of a specific written document on that topic, and a lack of consensus among interviewees that the need for that document is or whether managing that more rare and sensitive habitat type should be left to experts. With regards to walleye spawning habitat and brush bundles, it seems clear that there is an appetite among current and prospective partners to continue this work, and an ecological imperative to do so. The additional benefits of education, building community, and supporting the stability of smaller, local economies, are well recognized, although were incidental to the aims of this program.



Key Recommendations

- Consider whether it is appropriate to encourage community groups to instigate improvement projects of cold-water creek habitat, and either develop additional materials to support this if so, or reposition the existing video content as more educational than a part of the Fish Habitat Enhancement Toolkit.
- Update the Watersheds Canada website content and layout in such a way that toolkit resources are easier to find and identify as specific to this program.
- Develop and implement a communications plan for dissemination of the toolkit materials, including a means to assess how widely they are used and to what extent they are reaching the best audiences.
- Explore the additional benefits of this work identified in this report as additional tools to promote good lake stewardship, build connections with other groups and leverage additional resources.
- Explore how to support ongoing monitoring of habitat improvements to determine if they are offering the intended benefits for the fish populations they are meant to support.
- Celebrate the good work done by participants and Melissa Dakers, and share the success stories with other lake communities and environmental groups.

Is there a continuing need for this work?

To truly and accurately assess the objective need for this work would require a comprehensive ecological survey of Ontario's lake and stream habitats and the degree to which they are threatened or degraded, and a large community and sector survey of the existing lake groups, the general population of lakefront residents, etc., both of which are outside the scope of this evaluation.

However, the data gathered here represent the values and attitudes of a large number of community members and experts, and to the extent that they are able to, indicate a clear need. Ecologically, development, land-use changes, and climate change are almost certainly going to place increased pressure on aquatic ecosystems as time passes. While the values survey and the interviews indicate that lake residents are increasingly aware of the impacts of overdevelopment and aware that it should be curbed, the ability to do so does not generally lie with them, but with larger municipal bodies or housing developers. Interviewees referenced personal observation, anecdote, and third-party reports of decreased fish numbers, degraded habitat, and collapsed local fisheries, all pointing to an ecological imperative. Surveys indicated water quality and natural shorelines are important to communities – unsurprising for a population composed mainly of people who purchased additional property in natural settings, to be used for recreation. Further, experts generally indicated that the protocols used in this program had broad applicability in Ontario and beyond, and laypeople were almost universally aware of specific other locations near them that required improvement or rehabilitation, or of factors that were likely to cause habitat degradation in the near future.



Looking at the question in another way, it appears that there is also a human-driven need for this work to continue. In surveys and interviews, respondents indicated that the support of Watersheds Canada and the toolkit resources were critical or extremely helpful for their projects, that they had been unable to proceed on the project before connecting with Watersheds Canada, and that not knowing who to contact in terms of permits, fundraising, etc. was an issue. Individuals in the Love Your Lake survey indicated lack of time and information were the main barriers to participating in stewardship activities, and that they had an interest in learning more and taking action. Interviewees repeatedly indicated that support from Watersheds Canada with regards to site selection was key and that an average interested community member would have difficulty accessing the information they would need to plan and proceed with an enhancement project. Multiple interviewees indicated another level of need with regards to education and raising awareness, saying they knew of examples where groups and individuals were not aware anything could be done to improve fish habitat, or even that there was a need to do so.

Based on the data gathered here it is reasonable to conclude there is a real need, both ecologically and from a human-driven perspective, to continue this type of work, and that doing so will have positive outcomes for fish populations, aquatic ecosystems, local economies, and communities.

Key Recommendations

- Pursue further assessment of ecological and human-driven need across an appropriate region and within appropriate communities. Whether that consists of in-house research, third-party contracted research, or a survey of existing findings from other sources (universities, government research, etc.) will depend on capacity and priorities of Watersheds Canada as determined by staff and Board Members. There may be good opportunities to partner with post-secondary institutions and research already being done by students and faculty there, if connections can be made.
- Leverage the high quality, accessible information resources produced during this program to advance the goals of education and awareness on an ongoing basis. • Develop and implement a communications plan for dissemination of the toolkit materials, including a means to assess how widely they are used and to what extent they are reaching the best audiences.
- Explore how to support local partners in pursuing other projects in their areas and/or acting as mentors themselves to other interested groups and individuals in their networks.
- Pursue additional funding and capacity building to continue the good work that was started here, with the modifications and insights gained from this evaluation and the input of participants and the community.

How well is this program able to scale in response to that need? What changes and considerations, if any, need to be made for that to happen?

In assessing any pilot project, an essential question must be how much it can grow and apply outside its original setting. In this case, it appears that there is already a community of participants who are aware of



additional habitats that could benefit from enhancement, are happy with their current work and willing and eager to participate in further work, and who have learned a great deal that they could share with new participants. Experts believe the content of the toolkit to be widely generalizable, and existing networks among conservation and stewardship organizations should allow for easy recruitment of new partners in other areas.

On the other hand, many interviewees seemed to have relied on Watersheds Canada staff doing key assessments as part of the project and/or doing a significant portion of planning and volunteer recruitment. Coordinator Melissa Dakers was highly praised for her organization, but she is only one person – how much additional capacity she has to support habitat enhancement projects, and how much Watersheds Canada can have her focus on that vs other responsibilities within the organization, can only be determined by her and them. This project did not attempt to train participants to take on a supporting or mentoring role themselves, and so far as the evaluator is aware, it was not mentioned to participants. These individuals are some of the best suited to replicate what Watersheds Canada has done, but as noted many are elderly and retired and may lack the physical stamina for the work or not have a desire to take on more responsibilities in retirement. Additionally, many interviewees either felt they lacked knowledge and expertise about the scientific and ecological aspects of the work, while many of the experts focussed their research elsewhere and would not have the capacity to provide more support than they already have. Additional work and planning by Watersheds Canada would need to be done to assess staff capacity and whether there is potential to use a “train the trainer” approach to improve capacity within their existing networks. This work aligns well with the mission and strategic priorities of Watersheds Canada, but it is possible that the Director, Board Members, and key staff prefer to focus on another area of work.

How much Watersheds Canada can and should be responsible for expanding fish

Key Recommendations

- *Assess existing organizational capacity and priorities at Watersheds Canada, internally or with the help of a capacity check-up or strategic planning facilitator.*
- *Assuming a desire to continue and expand this work, assess likely funding sources and other key capacity resources (such as partnerships with heavy equipment operators).*
- *Develop a strategic plan that addresses how quickly and broadly the work can and should expand, and reassess existing capacity in light of those targets.*
- *Assess the ability and willingness of existing partners and volunteers to take on a support role for other projects. This may be as straightforward as having a few conversations over coffee (public health conditions permitting), or may involve trialling projects that are supported in this way.*
- *Develop a fundraising/fund development strategy and recruitment/communications strategy proportional to the scale of work decided on.*
- *Longer term, integrate ongoing assessment of project success and ecological impact, and collect data about the lifespan of specific enhancements and other longer-term factors such as factors determining the ideal number of improvements for a lake. Ongoing collaboration with academic researchers is encouraged to ensure best practices are updated appropriately, and opportunities to study impacts of various habitat enhancements are taken advantage of.*



habitat enhancement projects will depend on their decisions and the capacity and funding available to them. Presumably, it was their intention on starting a pilot project that if it went well, it would lead to expanded programming in the same area, and certainly based on their mission and experience they are ideally suited to do so. The need for the work as assessed is clearly present, even if the scope is unclear without further research, and the resources produced are likely to be highly useful for recruiting new projects and volunteers. Slow expansion based on existing connections and local knowledge could almost certainly proceed quickly, but more assessment of needs and capacity, and best practices for training, tracking, and supporting projects would need to be done to support more rapid, broader scaling up. Work on walleye spawning habitat and brush bundles is ready to proceed, but decisions need to be made about cold water creek habitats before considering expanding that aspect of habitat improvement could continue.

What are the limitations of this evaluation?

Limitations on the data due to various factors are detailed in the results and analysis section of this report, but to briefly summarize, there are limits imposed by the small sample size (offset to some degree by the selection of key participants), unreliability introduced by relying on self-assessment of knowledge and memory of events that may have happened over a year prior to the time of the interview, and because much of the data collected relates to opinions or questions with some latitude in how they are interpreted or answered. By interviewing multiple participants from each project and asking follow-up questions, confidence in the data can be increased, and in some cases data from one or both surveys can partially confirm conclusions drawn from interviews, or at least produce a broader but consistent picture. To some extent, the

Key Recommendations

- *Follow-up dialogue to address questions, uncertainty, or possible miscommunication between Watersheds Canada and the evaluator should be pursued before implementing changes to programming as a result of the recommendations provided.*
- *Future projects would benefit from earlier consultation with an evaluator.*

short timeline for evaluation limited what type of data could be collected and how much it could be verified or backed up with other sources, and has the potential to contribute to misunderstanding.

Is this type of program the best way to address the ecological issues at play?

Strictly speaking, this question is beyond the scope of this evaluation, and perhaps current research in conservation biology and lake management, but it is important to address and the data presented here do have something to say on the topic.

Considered briefly, if the goal is to protect and enhance fish habitat in lakes across Ontario and beyond, another good strategy might be to simply provide more funding to conservation authorities, lake management organizations, and the MNRF or Department of Fisheries and Oceans more broadly. These organizations could in turn hire or train more experts and workers, and simply do the work themselves. From their perspective, this might even be preferred because it would be more efficient in terms of dollars spent turning into more productive fisheries and all the associated benefits of those. However, in the current political climate and with multiple pressing priorities for higher levels of government, such expanded funding



seems highly unlikely. Even if it were a possibility, there is still an argument to be made for proceeding with the nonprofit and community-driven approach piloted in this program.

Although this program set out with a goal of developing resources and creating improved fish habitat, the outcomes noted by survey respondents were broader than that. These included community building, education, increased collaboration between groups, and consultation done in a way that unified groups with differing priorities and goals for the lakes they all used. Community consultations are in some ways the opposite of efficient, as anyone who has organized or participated in one is likely to attest, but the long-term, secondary, and unexpected benefits of a more connected, collaborative approach to solving any problem are often more beneficial than a simple improvement in efficiency would be – albeit, harder to measure. Creating a network of well-funded professional organizations would likely create be very successful at improving fish habitat, but it would also be dependent on continued government funding to remain operational, and is more likely to operate in a way that is unknown to the community, or at least poorly understood. When people don't understand or know about something, it is hard for them to support or value it, and they are more likely to act against it. In this context, that might mean lake associations that refuse to participate in habitat enhancement or education because they believe it means swimming in murky, weedy water and boating amongst unsafe logs and branches. An organization tasked solely with improving and monitoring fish habitat is unlikely to monitor local economic activity, community cohesion, or how aware local residents are of the impacts their actions have on the habitats they value.

In short, determining which approach to addressing the problem of habitat loss for fish species is a large question and depends significantly on how "best" is determined. In the current political climate, and looking at the issues through the widest possible lens, an approach based on networks of groups and individuals from diverse backgrounds, which educates and empowers community members to take action on issues they feel are important in an evidence-based, consistent way which builds a sense of ownership and responsibility for stewardship of cherished natural resources while also building its own capacity to continue the work seems like the best course of action. Not only is fish habitat improved, but a certain degree of resiliency is built into the "ecosystem" of stakeholders willing to take action, and the secondary impacts are better appreciated.



Conclusions

Information about four pilot projects and resources associated with the Fish Habitat Enhancement Project was collected through surveys administered previously by Watersheds Canada and a semi-structured interview process developed by Sustainable Eastern Ontario with their input and administered by Sustainable Eastern Ontario. Interview results were collected and compared, and survey results, where relevant to this project, were used to support and expand on those conclusions. Although highly qualitative, the resulting data revealed several key themes and allowed for assessment of several key questions regarding the success of and need for the work done through this program, which in turn led to several key recommendations.

Overall, the program was a success to the extent that can be measured without longer-term follow-up and assessment of ecological consequences. Projects were completed following evidence-based best-practices, and participants were satisfied with their experiences, the results they have seen so far, and the resources produced. The key priority moving forward will be finding clarity around cold water creek habitats and effectively sharing the resources developed and information gathered. Assuming a desire to continue and expand this work on the part of Watersheds Canada, they will need to assess their capacity and that of their existing networks, and locate funding and other capacity resources that will allow the work to continue and expand according to targets they must determine based on their initial assessments. There was a need for a fish habitat enhancement approach that was more accessible to non-experts, and the need for that work exists and is likely to continue to exist or even grow. The observable success of the pilot project and the secondary effects of education, community building, and enhanced collaboration indicate that this approach is suitable for addressing the issue of habitat loss and degradation for freshwater fish species, notably walleye, trout, and bass.



Appendix 1: Interview Guide & Questions

Evaluation Survey Interview Guide/Questions, February-March 2021

Semi-structured interviews conducted by SEO as part of a third party evaluation of the fish habitat improvement pilot project. Four habitat improvement installations were done and 10-12 interviews with key participants will be conducted.

Background: When I open an interview, I tell them a bit about myself and SEO and why I'm talking to them about a project I wasn't involved with, etc. Generally I practice participant confidentiality but in a smaller sample it might still be obvious who is who based on content, and I may ask to quote them on something specific but I won't identify who said it unless they want to be identified or I follow up with them to okay that. I explain that to them.

Using the information from Watersheds Canada, I will start by saying something like "So, it's my understanding from what Melissa has told me that you are with (group name), and were involved in this program in (xyz) capacity, is that correct?" This will help me verify details but also gives them an understanding of my level of understanding of the work.

Q: How did you come to be part of this project specifically? How did you get involved with it or Watersheds Canada?

Follow up: what was your motivation for getting involved (if relevant)

Q: Can you describe the type of habitat you were working in and what you did to improve it?

Follow up: are there any specific ecological threats or other habitat protection issues in that region that you were hoping to address or that you needed to work around?

Were there specific fish species you were trying to help, or specific goals you wanted to achieve by doing the habitat improvement?

Q: Did you make use of the videos and/or the protocols developed by Watersheds Canada in doing this work?

- Were you involved in the development of those protocols?
- If no, were the methods you used substantially the same as those described in the protocols? Estimate percent similarity.
- If yes, did you find them helpful? Would you have been able to do this work without them/ what would be different if you didn't have them?
- If no, have you reviewed them and in your opinion would they have been helpful to you, would they be helpful to another group doing this work, etc.
- If the person is able to make an education statement about this, how in-line with evidence-based best practice for fish habitat management/improvement do you think these protocols are?

Q: What results, if any, have you seen as a result of the improvements? Are there other results you expect to see as more time passes?

Q: Overall, how happy are you with your experiences participating in the program?

Q: Overall, how happy are you with the outcomes of the program?

Q: How broadly do you think the protocols used in this program can apply to other areas with similar habitats?

Q: What is your opinion of the need for this sort of work? Do other similar groups have the knowledge they need to implement habitat improvements? Is there a need for habitat improvements - i.e. what proportion of habitat do you feel needs improving, how many groups want to improve habitats, etc. There might be a fair bit of wiggle room in how this is discussed.

Q: Would you recommend participation in this program to other groups if that were an option?

Q: Is there anything you would do differently if you repeated your experience?

Q: Is there anything else you'd like to add that hasn't been addressed in this interview?

Appendix 2: Resource & Data List with Links

Watersheds Canada YouTube Channel: <https://www.youtube.com/channel/UCB7DOdTPcstp-1spoCoZv1yw>

Publications portion of Watersheds Canada website (as of March 12, 2021): <https://watersheds.ca/our-work/resources/publications/>

Brush Bundles Written Protocol: <https://watersheds.ca/wp-content/uploads/2015/07/CSWoo27-Stewardship-Report-Brush-WEB-READY.pdf>

Walleye Spawning Habitat Written Protocol: <https://watersheds.ca/wp-content/uploads/2015/07/CSWoo27-Stewardship-Report-Walleye-Final-WEB-READY.pdf>

Programs portion of Watersheds Canada website (as of March 12, 2021): <https://watersheds.ca/our-work/>

Fish Habitat Enhancement Survey: contact Watersheds Canada for Access

Love Your Lake Survey:

View survey here: <http://loveyourlake.ca/survey/>

Contact Watersheds Canada for a copy of the survey report.