



The Atlantic Salmon Conservation Foundation

Final Report

This form has been developed to simplify the reporting of your accomplishments to the ASCF. Please use this form for your Final Report. Do not send final report in other formats.

ASCF relies on receiving accurate and transparent information. The information you provide will be used to document the specific and overall accomplishments of your project and the effectiveness of the ASCF grants and may be subject to audit.

This report is distinct, and may be different, from other final reports you may prepare for your project. The ASCF wishes to receive those reports in addition to this report.

Please note:

- Your Final Report and a statement of expenditures are due on the date provided in Schedule “C” of your contribution agreement.
- Attach copies of receipts for all ASCF funded expenditures.
- Any remaining balance of ASCF grant funds must be returned to the ASCF with the Final Report.
- Do not “refer to attachments” for information requested in this form.
- A final report is required on the date agreed to in your funding agreement. If it is not submitted, future applications to ASCF will not be considered. Amendment of the dates for reporting may be made by mutual agreement

For projects located in **New Brunswick** or **Québec**, or that resulted from an RFP for applied **scientific research**, please submit your completed report along with an invoice for your final payment by email to **Charline McCoy** at: charline@salmonconservation.ca

For projects located in **Nova Scotia**, **Prince Edward Island** or **Newfoundland and Labrador**, please submit your completed report along with an invoice for your final payment by email to **Gert Lawlor** at: gert@salmonconservation.ca

Call us at 506-455-9900

Section A: Project Information

ORGANIZATION: NASHWAAK WATERSHED ASSOCIATION INC			
Project Title: Assessing and Restoring Aquatic Connectivity in the Central Nashwaak Watershed			
Year Grant Acquired:	2021	End date:	November 30 th , 2021
Contact Person: Marieka Chaplin, Executive Director & Natalie Deseta, Project Coordinator			
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Section B: Project Description

Category of Project (check all that apply):

- A) Development of an Atlantic salmon and salmon habitat watershed plan
- B) Protection and restoration of salmon habitat
- C) Rebuilding of stocks and restoration of salmon populations
- D) Restoration of access to critical salmon habitat
- E) Education and awareness on the importance of salmon conservation

<input type="checkbox"/>
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Summary

Please state the importance, the objectives as stated in your funding agreement and the major results of this project.

In our 10-year Strategic Plan, the assessment and improvement of aquatic connectivity within the Nashwaak Watershed is as a key strategy, with a goal of opening up to 110 km of previously inaccessible salmon habitat in the next 10 years. This project builds on our successes over the last five years in assessing and improving fish passage through stream crossings within the watershed and engaging the local community. We have taken a comprehensive and collaborative approach to identify, prioritize, and restore barriers to fish passage using up-to-date tools and techniques.

Objectives

The objectives of the project were to:

- 1) Increase the capacity of the NWAJ to survey for aquatic connectivity
- 2) Increase our knowledge of the aquatic connectivity and fragmentation of the watershed
- 3) Decrease in habitat fragmentation within the Nashwaak watershed and an overall increase in habitat availability for the Atlantic salmon
- 4) Communicate the value of aquatic connectivity to the public.

Results

There are approximately 985 stream-road crossings in the Nashwaak watershed. In May 2017, the NWAJ began to map, assess, and remediate these crossings for fish passage. In our first field season we completed a full survey on 75 culverts and 70% were determined to be full or partial barriers to fish passage. In 2018, our second field season, we started by mapping out priority areas in the central watershed to survey, we then visited 114 sites and conducted a full-survey of 67 crossings. We updated our survey form so that full surveys included collecting water temperature, pH, conductivity, DO, and total dissolved solids as well as some additional measurements and observations that were not included in 2017 surveys. For our third field season (2019), we visited 83 sites and conducted a full survey on 50 culverts. In 2020, we visited 50 sites and conducted a full survey on 24 culverts. In 2021 visited over stream crossings and fully survey 8. We focused on culverts in the headwaters and on logging or forest service roads, which required more driving time, and were more difficult to access. Fewer crossings in the headwaters necessitated full surveys as they were either not fish habitat, inaccessible or in too poor a condition to survey. We cleaned all surveyed sites of debris and garbage where possible. There were no major debris blockages encountered this year.

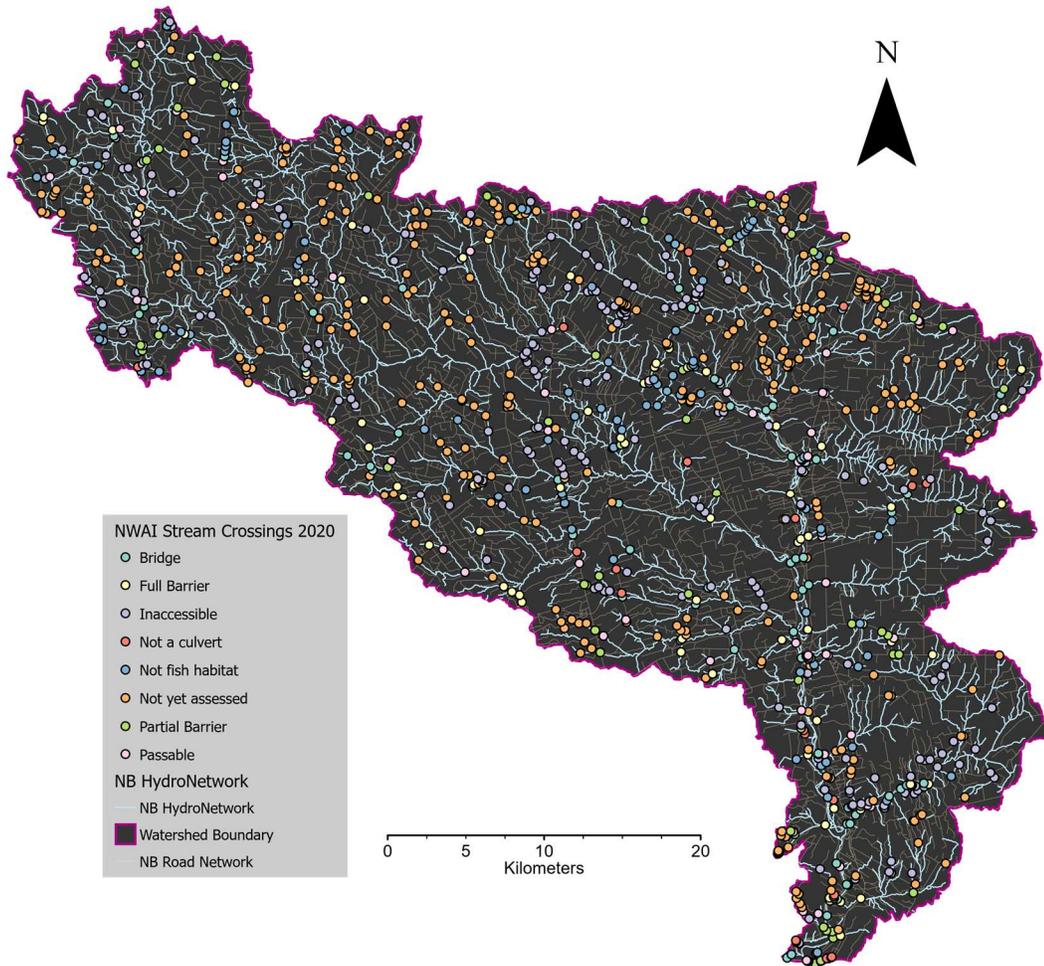


Fig. 1 2021 map of stream crossings in the Nashwaak watershed, with barriers symbolized by passability for fish.

Our 2021 survey information was entered into a central GIS database and use to generate an updated map of all the stream crossings in the watershed. These data will be shared with our partners at the end of the year. So far, we have visited 435 of the 985 crossings in the watershed (~44% complete) and we have done a full survey on 224 culverts. We have surveyed almost all accessible the crossings on public paved roads and logging or forest roads.

Throughout the summer season we conducted monthly monitoring of our previous 4 culvert projects to ensure they remained free of debris and were functioning as planned. It was noted that for one of our previous projects (culvert on Limekiln Brook), the drop at the outlet was higher (40 cm) than ideal to permit fish passage. To address the drop at the outlet we partnered with HILCON Ltd. to design an additional weir, that was built by TEK Steel and installed in fall.

In September, with the assistance of DFO and ACAP St John, we completed electrofishing above and below our 4 previous project barriers, as well as one site that we plan to remove a culvert on in future (Porter's Brook).



Figure 2. Limekiln Brook, additional weir installation at the mouth of the culvert was carried out to ensure the outlet drop was low enough to facilitate fish passage.

	Fallfish	White Sucker	Burbot	Brook trout	A. Eel	Slimy Sculpin	Pearl Dace	Black Nose Dace	Small Mouth Bass	A. Salmon
Limekiln Brook Upstream				1	1					1
Limekiln Brook Downstream	1			1	3					
Manzer Brook Upstream						16	2	10		
Manzer Brook Downstream			2	1	5	7	2	14		
East Ryan Brook Upstream				6						
East Ryan Brook Downstream				16						
Porter's Brook Upstream				9						
Porter's Brook Downstream				13				1		1
McGiveney Brook Upstream				6	1	4		1		
McGiveney Brook Downstream				6		13	5	5		

Table 1. 2021 electrofishing data for NWA culvert projects. Electrofishing was carried out using a “walk-&-shock” method to determine species present and approximate abundances.

As part of our pre-removal work for the Porter’s Brook culvert removal project we carried out baseline monitoring of the site, upstream and downstream of the culvert. This included: flow monitoring, eDNA sampling for presence/absence of Atlantic salmon, American eel and wood turtle, and CABIN macro benthic invertebrate sampling. These data are being compiled into a baseline monitoring report that will be updated annually, as the project progresses.

In addition, we contracted Boreal Environmental to assist us with a fish habitat assessment of the watercourse and development of a management plan for the culvert removal tentatively planned for 2022 (pending funding).



Figure. 3 Porter's Brook Culvert – proposed 2022 removal and stream restoration project. In 2021 we conducted baleline monitoring of the site, and developed a management plan for the culvert removal. This culvert is located on Nashwaak West road and is a severe barrier to fish. The pool at the mouth of this brook is an important salmon holding pool that DFO closes annually in June. Nashwaak West Road has been closed for many years and will not reopen. If this culvert blows out in a storm, the brook, the pool at the mouth of the brook, and downstream habitat in the Nashwaak River will be irreversibly damaged.

We have updated our GIS aquatic connectivity map. We will share this information with our partners this fall and winter and carry out our “Healthy Nashwaak” social media campaign to further inform the public about the importance of connected stream habitats.

Next Steps:

Pending funding in 2022, and permission from DTI, we will remove the Porter's Brook culvert and restore the stream channel and fish passage, as per our management plan for the project.

Unfortunately, one of our previously planned culvert remediation projects (Sands Brook) was determined to not be feasible at this time, due to the fact the DTI has been unable to locate the original design plans for this culvert. However, maintenance of this culvert is planned in the near future, and we hope to partner with DTI to remove the coarse woody debris at the mouth of the culvert.

This winter we will continue to prioritize barriers for remediation using the Nature Conservancy's GIS Barrier Assessment Tool. Over the past 5 years we have collated a long-list of over 90 potential barrier remediation projects that we will work through to develop a short-list of most feasible sites and present those to our partners at DTI and DERD for consideration.

We continue to communicate the importance of aquatic connectivity to the public via our social media channels, our annual newsletter, and conversations with landowners.

Project performance and evaluation:

Please provide an evaluation and assessment of the performance of your project according to the performance measures outlined in the funding agreement. Include problems you encountered and how they were solved, unexpected outcomes, budget inaccuracies, timing changes, and recommendations for future work.

Evaluation and assessment:

Over the past five years our aquatic connectivity project have been a great success for NWA. We have exceeded our goal for number of culverts to map and survey. So far we have trained 7 staff, 3 board members, 6 summer students, and 5 volunteers on the survey protocol. This has increased our capacity of our organization to survey the aquatic connectivity of the watershed, as well as our knowledge about the fragmentation of the rivers in the Nashwaak watershed. We have surveyed nearly all of the accessible culverts in the watershed and have developed a long-list of over 90 potential barrier remediation projects, which will be further evaluated into a short-list of priority projects for the next 10 years – as per our Strategic Plan.

In 2021, we continued to monitor our previous restoration sites to ensure functionality of installed fish passage solutions and monitor any potential impacts on fish species diversity and abundances in relation to these projects. We partnered with ACAP St John and DFO Aboriginal Fisheries Strategies teams from St Marys, Woodstock, Ormocoto, and Kingsclear First Nations to complete electrofishing up and downstream of these barriers. NBDTI has been generous with their time for reviewing proposed projects, drawings and answering queries about certain barriers.

The Barrier Assessment Tool is a GIS tool developed by The Nature Conservancy to prioritize culverts for assessment and remediation and quickly calculate upstream habitat gain, land use information, and other parameters. This is an extremely useful tool to have when approaching DTI and other culvert owners. This partnership has turned into a pilot project, where NWA's culvert data was combined with NCC's newly released Freshwater Ecological Classification and Aquatic Blueprint. These data will allow us to contribute to the newly developed Canadian Aquatic Barrier Database being developed by the Canadian Wildlife Federation, of which we have been a partner throughout the database development life-cycle.

As this project has other funders and funding has been provided until March 31, 2021, a final report will be produced for this deadline and shared with all project partners and funders.

Problems encountered & solutions:

The summer of 2021 incurred unusually high rainfall throughout the season, resulting in unusually high water levels, which hampered our culvert surveying as well as our efforts to install an additional weir at our Limekiln Brook project site by the end of September. That said, we managed to extend our WAWA permit into October and successfully installed the weir (Figure 2). The high rainfall also delayed our electrofishing effects, and high flow discharge likely resulted in lower recorded fish abundances than in 2020.

While we had permission from DTI to design a fish passage solution for a culvert on Sands Brook, which was one of our next targets, they were unable to locate the original design. Therefore, this project has been set aside.

Limitations to successful fish passage projects include: the nature of the year-to-year funding, the highly variable scale or budgets for remediations projects, how many culverts we can remediate in a year, and the timeline of gaining DTI's permission to move forward on projects.

The results of our surveys showed that remediation of the most severe barriers will be bigger, higher budget projects than expected.

We have also realized that the majority existing barrier culverts cannot be remediated to provide fish passage; they simply need to be replaced with new, properly designed and sized infrastructure. We have communicated these barriers to DTI, DERD, and other owners. It continues to be a challenge to find suitable projects that are within our budget, on structurally sound culverts, down accessible roads, and which have the potential to open up sufficient upstream habitat to warrant remediation. With continued surveys we hope to find more potential project candidates.

We have a good relationship with DTI have, and have now also started conversations with DNRED about culverts on logging roads. However, timelines for approval of projects and remediation remain long, as culvert remediation for fish passage is not a priority for these provincial entities, and they have a decade's long back-log of culvert infrastructure that needs to be replaced and maintained which takes higher precedence.

Performance measure <i>Please take from Schedule "A" of the Funding Agreement</i>	Results
Number of NWA staff and volunteers trained/ mentored in survey techniques	4 NWA staff were training in culvert surveying techniques.
Number of NWA staff and volunteers trained/ mentored in remediation techniques	4 NWA staff were training in remediation techniques.
Number of stream crossings visited and assessed	More than 40 stream crossings assessed, approximately 50 % of which were determined inaccessible by vehicle or were not fish habitat.
Number of culverts surveyed	8 culverts were surveyed fully.
Area surveyed for connectivity	474 km ² – This encompasses the sub-watersheds of Cross Creek, Young's Brook and Dunbar.
Amount of garbage cleaned	More than 20 kg of garbage and debris were removed from surveyed culverts.
Number of water quality measurements taken	8 water quality measurements were taken and will be entered into our database. All water quality measurements will be submitted to Atlantic Datastream this winter.
List of priority culverts to re-examine in follow up survey with hydraulic engineers/NBDTI	We have a list of approximately 90 culverts that are short-listed for remediation, which we will revisit to select future projects.

Number of culverts examined with hydraulic engineer	2 culverts were surveyed earlier this year. We may survey more this fall.
Number of culverts repaired, remediated, and unblocked	1 culvert project was remediated – Limekiln Brook.
Area (km ²) of previously inaccessible habitat opened upon removal of barriers	None
Length (km) of river made accessible to fish	None
Number of species of fish noted during electrofishing surveys	<p>9 species were detected during electrofishing of 5 culvert project sites:</p> <p>Limekiln Brook: fall fish, brook trout, American eel, Atlantic salmon</p> <p>East Ryan Brook: brook trout</p> <p>Manzer Brook: burbot, black-nose dace, slimy sculpin, white sucker, American eel, pearl dace</p> <p>McGivney Brook: slimy sculpin, pearl dace, black-nose dace, brook trout, American eel,</p> <p>Porter's Brook: brook trout, small mouth bass</p>
Number of recommendations made to culvert owners about repairing culverts beyond NWA's budget	We are in communication with DNRED and DTI regarding the culvert surveyed and will determine this number in our final report.
Number of maps produced with NCC using BAT	We are in the process of updating our barrier assessment map for our final report.
Aquatic Connectivity Report is shared with funders, partners, and the public	We will share final report upon its completion with our funders and the public.
Updated aquatic connectivity map	This map has been updated with our 2021 survey data.
Number of people reached through social media posts and newsletters	We send out 10,000 newsletters annually. We are continually increasing our followers on social media with our 920 followers on Instagram, 733 followers on Twitter, and 1996 followers on our Facebook page, 1784 likes. We posted several times on the topic of aquatic connectivity.

Number of volunteers engaged in this project	6 volunteers were engaged in this project.
Number of volunteer hours contributed	Approximately 60 volunteer hours have been contributed to this project.
Data shared with partners	The data from this project will be shared at the end of fall 2021.

Section C : Project Results

1. Stream(s) or river(s) where project was located :

Nashwaak watershed including the main stem and tributaries. Monitoring of remediation structures took place on East Ryan Brook, Limekiln Brook, McGivney Brook and Manzer Brook. Baseline monitoring took place on Porter's Brook.

2. Please provide the following information if it is relevant to your project. *Please include only new achievements that have not been reported to ASCF in past projects.*

Check	Indicator	Measure	Project Achievement
Development of Atlantic salmon and salmon habitat watershed plan			
<input type="checkbox"/>	Watershed plans developed/implemented	Number of watersheds involved	
		Number of plans	
		Km ² of watershed area under planning and priority setting	
Restoration of salmon habitat			
<input type="checkbox"/>	In-stream habitat length restored	Length (m)	
<input type="checkbox"/>	In-stream habitat area restored	Area (m ²)	
<input type="checkbox"/>	Riparian length restored or stabilized	Length (m)	
<input type="checkbox"/>	Riparian area restored or stabilized	Area (m ²)	
<input type="checkbox"/>	Trees and shrubs planted	Number of trees/shrubs	
<input type="checkbox"/>	In-stream structures installed	Number of structures	
Rebuilding of stocks and restoration of salmon populations			
<input type="checkbox"/>	Fish tagged	Number of fish tagged	
Restoration of access to salmon habitat			
<input type="checkbox"/>	Restored access to habitat	Area (m ²)	
<input checked="" type="checkbox"/>	Debris removed	Kg	> 30
Education and Awareness on the importance of salmon conservation			
<input checked="" type="checkbox"/>	Type of project	Community stewardship	<input type="checkbox"/>
		Education and awareness	<input checked="" type="checkbox"/>
		Volunteer training	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Target Audience and participants	Number of Grade k-12	
		Number of Post Secondary	
		Number of Landowners contacted	
		Number of audience members at public presentations	
		Number of participants at community planning	
Other indicators of success			
<input checked="" type="checkbox"/>	Number of Management Plans Developed	Number of Plans	1
<input checked="" type="checkbox"/>	Stream crossings visited	Number sites visited	> 40
<input checked="" type="checkbox"/>	Full culvert surveys	Number of surveys	8

Section D: Communications and Media

1. Did you use the ASCF logo or sign? Yes _____ quantity No
 If No, please explain why not:

2. Did you provide recognition to the Foundation for its grant? Yes No
 Please explain the nature of the recognition:

The ASCF logo was included in a new sign installed at Limekiln Brook, after remediation was completed this year. In addition, the ASCF logo was displayed on a signboard with our other funders' logos displayed at all of our community events; we displayed the ASCF sign at our AGM and thanked the Foundation verbally; the ASCF logo was included on our annual newsletter that was distributed to 10,000 households and business in the watershed; a number of social media posts also thanked ASCF for helping to fund our work; and, finally, the ASCF sign is displayed daily in our office.

3. Please indicate which communication tools were used to highlight the project as well as the quantity (check all that apply). Be sure to attach any news clippings to the Final Report.

Newspaper	<input type="checkbox"/>	_____	quantity
Interview	<input type="checkbox"/>	_____	
Brochure	<input checked="" type="checkbox"/>	Annual Newsletter	> 10 000
Website	<input checked="" type="checkbox"/>	https://www.nashwaakwatershed.ca/	
Other	<input type="checkbox"/>	Twitter, Facebook, Instagram	5

4. Are you submitting a project report (other than this one)? Yes No
 If yes, please be sure to send the foundation a pdf copy.

5. Did you send your data and results to another organization or data warehouse where people can access the information?
 Please state the organizations:

Culvert assessment data will be shared with with NB Department of Transportation and Infrastructure, NB Department of Natural Resources and Energy Development, The City of Fredericton, and with the Nature Conservancy of Canada for inclusion in their Classification and Blueprint for the Maritimes. Water quality data is submitted to Atlantic Datastream.

Section E: Human Resources

1. Total number of staff (including students) paid:

through ASCF grant: 2

through other organizations: 2

2. Total number of students paid:

through ASCF grant: 0

through other organizations: 2

3. Volunteers involved in the project:

Total number of volunteers 6

Total hours worked 60

Section E: Statement of Expenditures

Please provide a detailed financial statement of ASCF grant expenditures, in-kind and other funds using the Financial Report spreadsheet.

Be sure to attach copy of receipts for ASCF expenditures only to this Final Report.

Section F: Recommendations to ASCF

To assist us in improving our process, please provide any comments or suggestions you may have on your experience with the ASCF.