



ANNUAL MONITORING PLAN 2021

2021

Prepared for:

info@moricetrust.ca

Prepared by:

NORTHWEST RESEARCH AND MONITORING LTD.

250.877.7858

info@nwrml.ca



TABLE OF CONTENTS

1.0	Introduction and Background	1
1.1	Morice Water Management Area	1
1.2	Morice Water Monitoring Trust.....	1
1.3	Summary of Previous MWMT Field Programs	2
1.4	MWMT Collaborations.....	3
2.0	Annual Monitoring Program- 2021	3
2.1	Task 1 - Program Management.....	3
2.1.1	<i>Trust Project Management</i>	3
2.1.2	<i>Trust Project Coordination</i>	4
2.2	Task 2 – Agreement Monitoring	4
2.3	Task 3 – Field Programs	4
2.3.1	<i>Program Advisor</i>	5
2.3.2	<i>Water Quality/Quantity Monitoring</i>	5
2.3.3	<i>Fish and Habitat Productivity</i>	5
2.3.4	<i>Field Work - Contingency</i>	5
2.4	Task 4 – Data Management & Reporting.....	5
2.4.1	<i>Annual Data Management - Internal</i>	6
2.4.1	<i>Annual Data Management - External</i>	6
2.4.2	<i>Reporting</i>	6
2.5	Task 5 – Communication and Extension	7
2.5.1	<i>Website Maintenance</i>	7
2.5.2	<i>Charity Accounting and Annual Filings</i>	7
2.6	Task 6 - Training and Outreach	7
2.6.1	<i>Drinking Water Quality</i>	7
3.0	Budget	8
4.0	Schedule	9
5.0	References	10

List of Tables

Table 1.	Budget for the 2020 Annual Monitoring Program.....	8
----------	--	---

1.0 INTRODUCTION AND BACKGROUND

1.1 Morice Water Management Area

The Morice Water Management Area (MWMA) was established as part of the Morice Land and Resource Management Plan with the intent to protect the hydrological integrity, water quality, water quantity, and fisheries of the upper Morice River watershed in Wet'suwet'en traditional territory (MAL 2007). Overarching objectives for the MWMA included the development of an area-based water management plan and a water monitoring program. Initial objectives of the water monitoring program were to establish baseline data for the development of water quality objectives and guidelines.

A framework for water monitoring and assessment for the MWMA was prepared in June 2008, initial monitoring was conducted by the Office of the Wet'suwet'en (OW) in the summer of 2008, and the MWMA Multi-Year Operational Plan for water monitoring was created in 2009 (Gordon and Associates Ltd. 2009). Since 2008, there have been independent monitoring activities undertaken in the watershed by the Province, the Office of the Wet'suwet'en, and industry. These programs have focused largely on monitoring potential impacts from past disturbance or collecting baseline water quality data. While these efforts constitute a substantial amount of work accomplished within the watershed, there was need for a longer-term, scalable, and consistent program that could adapt with developing partnerships and provide opportunities for additional resources over time.

1.2 Morice Water Monitoring Trust

The Morice Water Monitoring Trust (MWMT) was established in 2012 to enable longer-term monitoring of the MWMA and establish a path forward for addressing objectives and guidelines. The MWMT is directed through its Trust Agreement to be responsible for monitoring the implementation and effectiveness of BC / Wet'suwet'en government-to-government agreements, and related natural resource management activities, plans, and policies in the MWMA (the 'Morice Plans').

One of the primary purposes of the MWMT is to gather baseline data within the MWMA to determine if water quality is sufficient to maintain the well-being of the Wet'suwet'en (in relation to fish and drinking water). The 2009 MWMA Operational Plan provided a well-structured framework for water quality monitoring and was instrumental in the development of the MWMT Monitoring Framework—a working document that provides operational guidance by defining and categorizing the anticipated risks/pressures in the watershed and sub-units, goals and objectives specific to each category, and tasks required to successfully address objectives.

In 2015, MWMT developed a Strategic Direction Plan that focused on five Core Values: Water Quantity, Water Quality, Sediment Quality, Fish and Habitat Productivity, and Information Sharing (MWMT 2015). The initial focus of watershed monitoring program was to establish a scientifically valid baseline of water quality data that accounts for natural variation. The role of the MWMT is to collect information related to the goals and objectives for the Morice Water Management Area and communicate this information to the Trustees, decision makers, and others as appropriate.

In 2021, the Trustees passed a motion to formally expand the geographic scope of the MWMT activities outside the MWMA initially to include the Upper Bulkley and all of the Morice basins, pending legal advice.

1.3 Summary of Previous MWMT Field Programs

One of the main objectives of the MWMT is to collect baseline data on the aquatic health necessary to support salmon and other fish, including water quality, water quantity, biology, geomorphology and connectivity data, which collectively inform indicators of natural resource sustainability and ecosystem health identified in the Morice Plans. The following briefly summarizes MWMT field programs conducted to date:

- Between 2015 and 2017 sampling was conducted at various time steps at five sites within the MWMA with most monitoring effort being of short-term and spatially limited measurements.
- In 2019 MWMT initiated a 5-in 30-water quality program at eight sites within the MWMA (winter and summer programs).
- In 2019 the monitoring program expanded to include the Core Values of Water Quantity and Fish Habitat and Productivity:
 - Two hydrology stations were established at Maxan Creek and Gosnell River.
 - Fourteen Canadian Aquatic Biomonitoring Network (CABIN) sites were sampled using the Sequencing the Rivers for Environmental Assessment and Monitoring (STREAM) DNA (eDNA) protocols. This occurred through three different field programs: MWMT (8 sites), OW (three sites), and Ministry of Environment (three sites) The three Ministry of Environment and Climate Change Strategy (MOE) sites were also sampled using the traditional CABIN protocols for comparative purposes.
- In 2020, further water quality 5-in-30 sampling was completed to fill data gaps during the summer low flow period.
- The 2020 water quantity (hydrology) program developed a rating curve by monitoring both stage and discharge at Gosnell and Maxan stations. A discharge-discharge relationship between the Maxan (MWMT) and Topley (OW) hydrology stations was also successfully created.
- Water samples for environmental DNA (eDNA) analysis were collected at historically-known spawning grounds and nursery lakes of sockeye salmon populations in Wet'suwet'en Territory in 2020.

In 2018, a report was prepared for the MWMT that summarized and analyzed water quality data from the MWMT (2015-2017) and data from the BC environmental Monitoring System (EMS) database representing 37 additional sites monitored between 1996 – 2017 (Oliver 2018). In 2020, a follow up report was prepared for the MWMT with additional data from the last two years. This report is being reviewed by the MOE and revisions are expected. These reports provided several recommendations for potential additional questions and monitoring strategies that were considered in the development of the 2021 monitoring program. The full 2018 report can be accessed from the Morice Trust website <http://moricetrust.ca/reports.php>

1.4 MWMT Collaborations

The MWMT currently collaborates with several organizations in order to plan and implement our AMP. One important collaboration is with BC Freshwater Legacy, which has resulted in a part-time Watershed Coordinator position with the MWMT. The Watershed Coordinator supports communication and coordination between the Morice Water Monitoring Trust (MWMT), the Office of Wet'suwet'en (OW), the Province, and stakeholders within the watershed. They work closely with on-the-ground partners in MWMT and OW to facilitate coordination of organizations within the region, advance collaborative water monitoring initiatives, and undertake community engagement and education work. Having a dedicated watershed coordinator to bring together all the complex players, relationships and issues relating to water in the area has made great strides towards a cohesive and collaborative strategy with a goal of defining broader stakeholder values that need to be represented as water objectives and in a Water Sustainability Plan (WSP). By convening organizations for strategic meetings to align activities, leverage resources and coordinate planning, future decision-making will be improved by containing a broader perspective and knowledge base.

2.0 ANNUAL MONITORING PROGRAM- 2021

Each year an Annual Monitoring Plan (AMP) is developed to set out the year's proposed activities and budget which are created from the MWMT Monitoring Framework and is consistent with the MWMT Agreement. The 2021 AMP documents and generally describes monitoring programs that will be implemented by the MWMT, either independently or through partnerships. The Plan also contains considerations regarding integration between disciplines, and annual reporting recommendations.

The following subsections describe the components of the 2021 monitoring program. A detailed budget is provided in **Section 3.0** and a schedule is provided in **Section 4.0**.

2.1 Task 1 - Program Management

Project management activities include those functions that are necessary for the effective delivery of MWMT projects. Administrative project management duties will be performed by Northwest Research and Monitoring Ltd. (NWRM).

2.1.1 Trust Project Management

Program management tasks include:

- Prepare and update Trust management documents as directed by Trustees (present bank balance monthly, budget, quarterly variance and expense reporting – to be presented at quarterly Trustee meetings).
- Facilitate meetings. Six Trust meetings will occur each year:
 - Quarterly Trustee meetings to discuss regular MWMT operations. Meetings will occur the second week of each quarter.
 - One annual financial meeting with the RBC Securities Financial Manager.

- One annual vision/strategic planning meeting.
- Manage Trust expenditures as defined by the AMP.
- Develop 2022 Annual Monitoring Plan in collaboration with the Trustees:
 - Provide initial description of projects and cost estimates.
 - Facilitate discussion in relation to project selection.
- Advise Trustees as necessary on strategic and operational planning.
- Continue water quality monitoring within the MWMA in partnership with the OW Fisheries staff.
- The Project Manager will continue to find new opportunities to fulfill the purposes of the Trust. Research grant and partnership opportunities, and coordinate and write funding proposals.
- Liaise and collaborate with relevant stakeholders to strengthen existing and build new relationships.
- Continually improve, adapt and implement the safety protocol and procedures. Operate as the Safety Manager.
- Overall data coordination and warehousing.

2.1.2 *Trust Project Coordination*

- Prepare Trustee meeting agendas and take minutes.
- Coordinate MWMT programs with other programs occurring in 2020.
- Overall field coordination tasks including, but not limited to:
 - ordering required supplies and keeping an inventory.
 - Scheduling sampling sessions with OW Fisheries staff and other stakeholders.
 - coordinating shipping of samples to laboratory.

2.2 Task 2 – Agreement Monitoring

As mentioned in Section 1.2 above, one of the purposes of the MWMT, as outlined in the MWMT Strategic Direction report, is to monitor the implementation and the effectiveness of any British Columbia/Wet’suwet’en government-to-government agreements, and related natural resources management activities, plans, and policies in the Morice Water Management Area (the “Morice Plans”).

The objective of this task is to conduct land use scoping within MWMA and the budget for this task is \$5,000. If future funding becomes available, work on this task can be increased.

2.3 Task 3 – Field Programs

The 2021 field programs align with the Water Quality, Water Quantity, and Fish and Habitat Productivity Core Values.

2.3.1 Program Advisor

The Program Advisor will assist NWRM in:

- Planning field programs.
- Filling in as a backup field crewperson when required.
- Providing technical advice, such as, but not limited to:
 - General technical reviews.
 - Annually reviewing all MWMA/MWMT literature and supporting documents and updating as necessary.
 - Ensuring project objectives and goals are being pursued and/or achieved.
 - Ensuring all data and procedures are up to provincial standards.
 - Adaptively managing the program to respond to varying water quality data, budget, and stakeholder influences.

2.3.2 Water Quality/Quantity Monitoring

The Core Issues of Water Quality and Water Quantity as identified in the MWMT Strategic Direction report will continue to be addressed with monitoring activities in 2021.

Water quality and quantity monitoring of streams and lakes within the MWMA and surrounding Morice Watershed will be implemented via OW Fisheries staff. A budget of \$15,000 has been provided for 2021.

2.3.3 Fish and Habitat Productivity

The Core Value of Fish and Habitat Productivity will continue to be addressed with the characterization of the current distribution of sockeye salmon in Wet'suwet'en traditional territory, including the upper Bulkley River and tributaries of the Morice River, and cataloguing potentially extirpated populations. This work involved visiting spawning grounds and nursery lakes of each of these populations in 2020. Water samples for eDNA analysis were collected at each site. The project has a \$2,000 carry over from last year and has raised \$20,000 independently. With an \$8,000 MWMT contribution, each site visited last year will be sampled three more times with the possibility of adding more sites. Such information can be used to quantify fisheries interceptions, and for monitoring these populations in the Skeena Tye Test Fishery, as well as assess the potential for strategic re-introduction programs of potentially extirpated populations.

2.3.4 Field Work - Contingency

The focus of the 2020 field program was to collect water quantity (hydrology) monitoring data on stage and discharge, as well as additional water quality data via 5-in-30 during the summer low flow period. In 2021, a \$7,000 contingency fund will be allocated to filling any data gaps necessary if they arise.

2.4 Task 4 – Data Management & Reporting

The data management and reporting task aligns with the Information Sharing Core Value.

2.4.1 Annual Data Management - Internal

Survey data will be scanned, uploaded and organized to a secure cloud-based project management platform after each survey. Data will be processed and managed through standard QA/QC procedures.

We have adopted a standardized approach to long term data archiving, analysis, interpretation and reporting. Templates will continue to be developed for data compilation and reporting and will include provisions that address dealing with an evolving monitoring program.

2.4.1 Annual Data Management - External

Funds have been allocated for fees and preparation of MWMT data to be uploaded on external databases. This aligns with the MWMT Strategic Direction document goal of providing data to support monitoring and improve further planning.

2.4.2 Reporting

Glacier Change Work

The glacier change work the Trust has embarked on with Skeena Fisheries Commission (SFC) and Coast Mountain College (CMC) is divided into three "Work Points" which will lead to having projections to 2100 of the evolution of meltwater flows primarily to the Atna / Morice lake drainage and the Nanika drainage, and secondarily to other main tributary drainages to the Morice River. The three Work Points are:

1. Watershed Morphometry – spatial analysis of elevation, hypsometry, slope, aspect, and land-cover characteristics related to the watershed. Deliverables include morphometric data for each sub-basin, all spatial data layers produced and a short report synthesizing the methods and results.
2. Current Glacier Inventory – complete a current (based on most recent, useable Landsat 8 imagery) glacier inventory of all glaciers within watershed detailed in Work Point 1. Deliverables include complete, current morphometric data for all glaciers in watersheds of concern, all spatial data layers produced and a short report synthesizing methods and results.
3. Glacier Change to 2100 – Modeled changes in glacier extent and meltwater contributions of watersheds of concern as defined in Work Point 1. Deliverables include projected glacier extent and meltwater contributions, and a report detailing methods and results.

Within the 2019-2020 AMP budget, Work Points 1 and 2 were completed, but were not billed with anticipation of the final Work Point 3 report arriving in 2021. The funds were carried over to this budget from the previous year. Completing the work for the Upper Morice drainages concurrently with the work for the other drainages being paid for by the SFC, will allow the Trust to plan an additional multidisciplinary phase together with SFC. This phase will combine the flow predictions to 2100 with other physical, chemical and biological data to produce valuable information about how Sockeye and other salmon species in these drainages are likely to fare as headwater glaciers continue to retreat over the coming decades. This kind of information is key to making durable decisions in the context of Sockeye Recovery Planning, and other related work (e.g. potential Water Sustainability Act planning pilot).

The 2020 AMP budget carry over amount of \$5,000 for the continued glacier change work will allow for CMC to invoice for Workpoint 2 and complete Workpoint 3.

Water Quality Formal Assessment Report

In support of the development of WQO's for the MWMA, the formal assessment report for water quality submitted to MOE will be revised to include provincial changes and potentially a new section on OW Values.

Annual Technical Summary Report

A brief MWMT Annual Technical Summary Report will be prepared that summarizes the activities / field programs completed and will explain any deviations from the activities described in the AMP (as needed). The field program summary reports will be appended to this brief report. The MWMT annual report will be submitted to the Trustees and stakeholders by end of March 2022.

2.5 Task 5 – Communication and Extension

2.5.1 Website Maintenance

A new MWMT website was created in 2020 that allows for the website to be updated internally. Updates will continue in 2021-2022 to maintain a website that meets the obligations towards the extension of our research, and to better communicate our results.

2.5.2 Charity Accounting and Annual Filings

The MWMT was registered as a charity with the Canada Revenue Agency (CRA) in 2020. Charitable status requires regular reporting, meetings and filings with the CRA that are more onerous than before we became a charity. As a result, our annual expenditures in this regard will slightly increase.

2.6 Task 6 - Training and Outreach

2.6.1 Drinking Water Quality

A new Task 6 is being added to the 2021 AMP to allow for further capacity building through training and outreach. The intention is for training Wet'suwet'en people currently living on the territories in Water Quality sampling as this is one of the primary goals of the MWMT Strategic Direction report.

3.0 BUDGET

Funding for the 2021 Annual Monitoring Program is provided by the MWMT Revenue Trust Account and external agencies (i.e., ENV) The budget provided below in **Table 1** is based on high end projections for the field work and some programs may cost less.

Table 1. Budget for the 2021 Annual Monitoring Program

Tasks	Cost
Task 1 Program Management	
Trust Project Management and Coordination	\$13,000
Task 2 Agreement Monitoring	
Land Use Scoping	\$5,000
Task 3 Field Programs	
Program Advisor	\$3,000
Water Quality/Quantity Sampling	\$15,000
Fish and Habitat Productivity - Characterize the current distribution of sockeye salmon in Wet'suwet'en traditional, territory, and catalogue potentially extirpated populations (includes reporting)	\$10,000*
Field Work - Contingency	\$7,000
Task 4 Data Management & Reporting	
Annual Data Management – Internal (data entry, compilation, formatting, QA/QC)	\$4,000
Annual Data Management – External (coordinating MWMT data with external databases)	\$2,000
Glacier Change Work Points	\$5,000
Water Quality Assessment Report Revisions	\$4,000
Annual Technical Summary Report	\$3,000
Task 5 Communication and Extension	
Website Maintenance	\$2,500
Charity Accounting and Annual Filings	\$5,000
Task 6 Training and Outreach	
Drinking Water Quality for Wet'suwet'en	\$10,000
Sub-total	\$88,500
BC Ministry of Environment and Climate Change Strategy Funding Contribution**	(Unknown)
Total	\$88,500

*Please refer to 2.3.3 Fish and Habitat Productivity section for more information

** BC MOE funding will be applied towards the Water Quality 5-in-30 laboratory analysis costs and preparation of the Water Quality Assessment Report.

4.0 SCHEDULE

The following outlines the proposed schedule for the 2021 field program and associated reporting. Other 2021 tasks are ongoing throughout the year and not shown. The final field schedule would be developed in collaboration with the OW and we will make every effort to ensure the final schedule coordinates efficiently with the OW Field Fisheries staff availability.

	Q1 - 2021			Q2			Q3			Q4			Q1 - 2022		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Field Contingency															
Water Quality/ Quantity															
Fish and Habitat Productivity															
Data Management															
Reporting															

5.0 REFERENCES

- Gordon and Associates Ltd. 2009. Morice Water Management Area - Multi-Year Operational Plan. <<http://moricetrust.ca/reports.php>>.
- MAL. 2007. Morice Land & Resource Management Plan, Prepared by the Ministry of Agriculture and Lands (MAL) Integrated Land Management Bureau. <<https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/skeena/morice-lrmp>>.
- MWMT. 2015. Morice Water Monitoring Trust (MWMT) Strategic Direction - Draft.
- Oliver, A. 2018. Analysis of water quality monitoring in the Morice Water Management Area. Prepared for the Morice Water Monitoring Trust. <<http://moricetrust.ca/reports.php>>.