Independent Evaluation of the NWT Water Stewardship Strategy Implementation

Evaluation Report

September 22, 2015

Prepared for:

Government of Northwest Territories

Prepared by:

HCA

AND

Shared Value Solutions

Harry Cummings and Associates
96 Kathleen Street
Guelph, ON, NIH 4Y3
Phone: 519-823-1647/Fax: 519-821-0202
hca@web.ca
www.hcaconsulting.ca

Shared Value Solutions Ltd.
62 Baker Street
Guelph, ON, N1H 4G1
Phone:226-706-8888/Fax:226-314-1200
info@sharedvaluesolutions.com
www.sharedvaluesolutions.com

Executive Summary

The following report presents the results of the independent evaluation of the implementation of the NWT Water Stewardship Action Plan 2011-2014.

The Government of Northwest Territories – Environment and Natural Resources, initiated this evaluation as per the Action Plan, which calls for an independent evaluation to take place at the end of the first five years of implementation of the Action Plan.

The evaluation was designed to inform water partners about the implementation progress of the Water Strategy and Action Plan and provide recommendations to address emerging challenges and build upon successes to guide water partners in the future. The evaluation methods included a document review and interviews with key informants representing the different water partners.

The findings indicate that the Water Strategy has helped to promote greater collaboration between water partners. The findings also confirm that the current priorities in the 2011-2015 Action Plan are still priorities to work and focus on.

A common perspective shared by water partners is that traditional knowledge and western science represent different paths to knowledge but they should be treated equally, and that protocols designed to assist in balancing traditional knowledge and western science ought to be followed and improved upon. The report outlines a number of opportunities and potential next steps for enhancing the inclusion of traditional and local knowledge in the work of the Water Strategy.

Overall, significant progress has been made in achieving the outcomes and success criteria for the priority areas of implementation that are the focus of this evaluation.

Excellent progress has been made in achieving the objectives under the success criteria for Transboundary Water Management Agreements. Aboriginal governments of the NWT and residents were engaged and consulted in compiling the traditional and local knowledge that was used in conjunction with scientific data to inform the development of the agreements. The Transboundary Water Agreement was finalized between NWT and Alberta in March 2015 and the agreement between NWT and BC is expected to be completed in 2015. The collaborative approach used by ENR in engaging with Aboriginal governments and organizations is a key enabling factor in this result. A key focus going forward will be the implementation of the NWT/Alberta agreement and the other transboundary agreements as they are finalized.

Excellent progress has been made in achieving many of the objectives under the success criteria for Partnerships and Water Stewardship Information Sharing. ENR provides leadership in implementing the Water Strategy and also plays a key role in coordinating water strategy communications and information sharing. Many of the current water partners provided input to the development of the Water Strategy and have stayed on as water partners. More partners have been added over time. Improving communication and sharing information continues to be an important role for all water partners.

Substantial progress has been made in achieving many of the objectives under the success criteria for Community-based Monitoring and Research. Communities across NWT are participating in community-based monitoring programs to study local water and ecosystem

health. The number of communities (and sampling sites) in the NWT-wide CBM program has increased progressively since the program was initiated in 2012 but more needs to be done to expand the program into other communities. It remains challenging to retain a core group of trained samplers from year to year and more needs to be done to improve the appeal of these employment positions. It remains to be seen if communities can become fully independent and operate community-based monitoring programs for the long term without support (e.g., human resources, funding) from other water partners.

Substantial progress has been made in partially achieving the objectives under the success criteria for Source Water Protection. ENR has developed source water protection resources and a number of opportunities have been provided for source water protection training and capacity building. A Partnership Approach to Source Water Protection is currently being piloted to develop and implement a Source Water Protection Plan for the community of Trout Lake. Capacity issues and commitments to other projects (e.g., community-based monitoring) could potentially limit the ability and interest of other communities in developing and implementing their own source water protection plans.

Substantial progress has been made in achieving the objectives under the success criteria for Long-term Aquatic Monitoring. ENR oversees a number of water quality monitoring (WQM) projects that provide a baseline and long-term source of data. An evaluation of the NWT WQM network was completed in June 2014, which identifies water quality monitoring gaps and provides a framework for addressing the monitoring gaps. Other water partners are also engaged in long-term monitoring activities including Environment Canada and DFO. ENR, DFO and Environment Canada make their research results available to NWT communities and progress has been made in creating online access to water quality data through the LodeStar database and the NWT Discovery Portal.

Moderate progress has been made in achieving the objectives under the success criteria for Regulatory Processes. The *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the NWT* were completed jointly by AANDC and Land and Water Boards of the Mackenzie Valley in 2013. The licence review and assessment work carried out by ENR is being conducted in the spirit of the Water Strategy. Representatives from the different regulatory boards participate at the annual Water Strategy implementation workshops but linkages between the Water Strategy and the regulatory boards could be strengthened.

Moderate progress has been made in achieving the objectives under the success criteria for Municipal Water Licence Compliance. Although the number of unlicensed NWT communities increased slightly between 2011 and 2014, at least four communities have applied or are in the process of applying for a water licence since 2011 and there has been an increase in communities complying with submitting Annual Reports. Communities and other water partners have identified and are continuing to address challenges related to preparing water licence applications and complying with water licence requirements. Human resource capacity issues remain a challenge for some communities and training in water quality monitoring is being provided in some communities with a specific focus on the monitoring requirements of the community water licences. Standard reporting templates have been developed to assist communities in completing their Operation and Maintenance Plans for Municipal Water Licences.

The report provides a number of recommendations for each of the priority areas that should be considered to continue to build on the achievements made to date.

Table of Contents

Acknowledgements

Harry Cummings and Associates and Shared Value Solutions would like to thank the Evaluation Committee and the Aboriginal Steering Committee for their valuable guidance and feedback in preparing the evaluation framework and reviewing and finalizing the evaluation report.

We also wish to thank all of the representatives from the different water partners who shared their views and insights on the Water Strategy and the implementation of the Action Plan as part of the key informant interview process.

List of Abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada
AAROM	Aboriginal Aquatic Resources and Oceans Management Program
AEMP	Aquatic Effects Monitoring Program
ASC	Aboriginal Steering Committee
CABIN	Canadian Aquatic Biomonitoring Network
CBM	Community-based Monitoring
CIMP	NWT Cumulative Impact Monitoring Program
DFO	Fisheries and Oceans Canada
DGT	Diffusion Gradients in Thin-Films
ENR	Environment and Natural Resources
GLWB	Gwich'in Land and Water Board
GNWT	Government of Northwest Territories
HHS	Health and Social Services
ISR - CBMP	Inuvialuit Settlement Region - Community-Based Monitoring Program
IWB	Inuvialuit Water Board
MACA	Municipal and Community Affairs
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	Mackenzie Valley Resources Management Act
PADEMP	Peace-Athabasca Delta Ecological Monitoring Program
RBA	Risk-based analysis
RBBA	Risk-based basin analysis
SLWB	Sahtu Land and Water Board
SRDP	Slave River and Delta Partnership
SWAP	Source Water Assessment and Protection
SWEEP	Slave Watershed Environmental Effects Program
TAEMP	Tłı̨chǫ Aquatic Ecosystem Monitoring Program
WLWB	Wek'eezhii Land and Water Board
WQM	Water Quality Monitoring
WRRB	Wek'èezhìi Renewable Resources Board

1.0 Introduction

This report presents the results of the independent evaluation of the implementation of the NWT Water Stewardship Action Plan 2011-2014.

The Government of Northwest Territories – Environment and Natural Resources (GNWT-ENR), Water Resources Division initiated this evaluation as per the Action Plan, which calls for an independent evaluation to take place at the end of the first five years of implementation of the Action Plan.[1]

The purpose of the evaluation is to:

- inform water partners about the implementation progress of the Water Strategy and Action Plan and ensure the work supports achieving the goals and vision of the Water Strategy;
- recommend how to address emerging challenges and build upon successes to guide water partners in the future; and
- ensure accountability.

The independent evaluation will also be used to inform future implementation activities and guide the development of a new Action Plan.

An Evaluation Committee was formed in 2014 to develop the process and criteria for the independent evaluation and to provide a coordinating function during the actual evaluation.

As part of the RFP process, the Evaluation Committee developed a series of overarching evaluation questions, which were reviewed by the Water Strategy's Aboriginal Steering Committee. The questions served as broad overarching questions for the evaluation and they were applied across each of the priority areas of implementation under the Water Strategy and Action Plan. The questions are provided below.

1. What are the main inputs, outputs and outcomes within the implementation of each priority area?
2. Where are activities taking place geographically and by whom?
3. Are these outcomes different from what were desired by the water partners?
4. Are these outcomes contributing to advance the goals and vision of the Water Strategy?
5. What performance indicators could be developed to measure future progress?
6. What *Keys to Success* and associated action items are still priorities to work on and what are new areas recommended for inclusion in the next Action Plan?
7. What are the challenges for water partners to achieve the goals and the vision of the Water Strategy and the Action Plan?
8. How can water partners more effectively participate in implementing the Action Plan?

[1] On April 1, 2014 water resource responsibilities were transferred from Aboriginal Affairs and Northern Development Canada (AANDC) to GNWT-ENR as per the *NWT Lands and Resources Devolution Agreement*. ENR is now the main coordinator of Water Strategy implementation.

1.1 Program Background

Northern Voices, Northern Waters: NWT Water Stewardship Strategy (Water Strategy) was developed in collaboration with Aboriginal, territorial and federal government departments, non-governmental organizations and regulatory boards. It was released in 2010, and was followed by the *NWT Water Stewardship: A Plan for Action 2011-2015* (Action Plan) in 2011.

The Government of Northwest Territories, Environment and Natural Resources (GNWT-ENR) leads the implementation of the Water Strategy with input and guidance from an Aboriginal Steering Committee. The Action Plan identifies the lead water partners whose role it is to operationalize specific Keys to Success under each implementation component. Water partners include anyone with a role or interest in water management and stewardship and include government departments, regulatory boards/agencies, industry, non-government organizations, academic/research institutions and other interested parties.

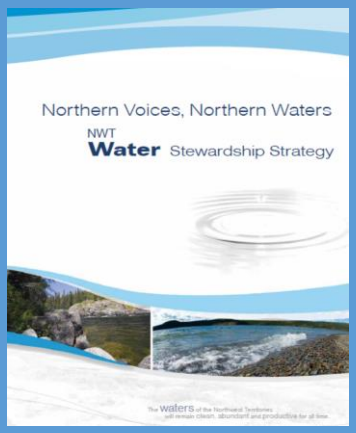
The Water Strategy sets a common path forward for achieving effective water stewardship in the Northwest Territories with a vision of maintaining clean, abundant, and productive water for all times. The goals of the Strategy are to assure:

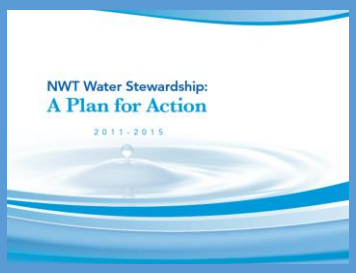
- Waters that flow into, within or through the NWT are substantially unaltered in quality, quantity and rates of flow.
- Residents have access to safe, clean and plentiful drinking water at all times.
- Aquatic ecosystems are healthy and diverse.
- Residents can rely on their water to sustain their communities and economies.
- Residents are involved in and knowledgeable about water stewardship.
- All those making water stewardship decisions work together to communicate and share information.

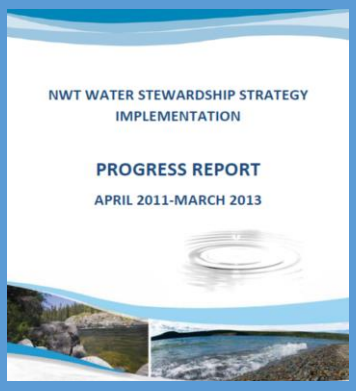
Since its release, the Water Strategy has informed and guided important initiatives such as negotiating and establishing transboundary water management agreements among jurisdictions in the Mackenzie River Basin, community-based water monitoring and source water protection planning.

VISION FOR WATER STEWARDSHIP IN NWT

"The waters of the Northwest Territories will remain clean, abundant and productive for all time."







The Water Strategy and the Action Plan are divided into four components of water stewardship: *Work Together*, *Know and Plan*, *Use Responsibly*, and *Check Our Progress*. *Keys to Success* have been identified for each component and some have become priority areas (see Figure inset).

NWT Water Stewardship drum diagram illustrates the four components of water stewardship in the NWT.

Source: NWT Water Stewardship: A Plan for Action 2011-2015

In 2013, ENR produced the first progress report to follow the release of the Water Strategy and the Action Plan. The *NWT Water Stewardship Strategy Implementation Progress Report: April 2011-March 2013* forms part of the routine checks of the Water Strategy and Action Plan (Check Our Progress, Key to Success 4.1 A). This progress report communicates water stewardship successes and identifies areas where there is room for improvement.

The 2015 evaluation responds to the requirement in the Action Plan (Check Our Progress component) that an independent evaluation is to be conducted at the end of the first five years of implementation of the Action Plan to inform future implementation activities and guide the development of a new Action Plan.

Water partners identified priority areas of implementation under the Water Strategy and Action Plan during the annual Water Strategy implementation workshops for 2011, 2012 and 2013 and the Evaluation Committee developed a series of corresponding outcomes and success criteria in 2014. This independent evaluation focuses on these priority areas (*Work Together*, *Know and Plan*, *Use Responsibly*).

For the purpose of this evaluation, the evaluators, Harry Cumming and Associates (HCA) and Shared Value Solutions (SVS) were tasked with assessing the effectiveness of the implementation work to date.

1.2 Report Structure

Section 2 of this report provides a description of how the evaluation was organized and the evaluation methods that were used to collect data and determine success.

Section 3 presents the results of the evaluation, which include a description and assessment of the observations/findings that emerged from the data analysis based on the established evaluation criteria.

Section 4 presents the conclusions which are founded on and directly linked to the evaluation findings and highlights the contribution made to date in advancing the vision and goals of the Water Strategy. Section 4 also provides recommendations and identifies steps / actions for further advancing the goals of the Water Strategy.

The appendices at the end of the report include the Water Strategy Program Logic Model and the list of water partners that participated in the key informant interviews.

2.0 Methodology

As a first step in the evaluation a comprehensive evaluation plan was developed. The plan included a program logic model and outlined the key evaluation issues and questions and the data collection methods.[2]

The plan was shared with the Evaluation Committee and the Aboriginal Steering Committee for review and was finalized based on the feedback provided.

The evaluation used a historical/retrospective approach, including 1) document review, 2) researcher observations, and 3) key informant interviews to collect data.[3]

Over 30 relevant documents were reviewed (as provided by ENR) and 40 individuals representing many of the different water partners were interviewed including representatives from Aboriginal governments and organizations, representatives from regulatory boards, GNWT/ENR staff, representatives from academic / research institutions, representatives from non-government organizations, and representatives from federal government departments. Key informants were selected based on their engagement / experience with the priority areas that are the focus of the evaluation and were confirmed with input from the Evaluation Steering Committee.[4]

Representatives from HCA and SVS attended the Water Strategy Implementation Workshop (Feb. 4-5, 2015). The Workshop event allowed the evaluators an opportunity to observe and listen in on the discussions between the different water partners as they were briefed on Water Strategy implementation initiatives (e.g. community-based monitoring, source water protection, regulatory activities, public education, and negotiation of Transboundary Water Management Agreements) and other water-related research and monitoring updates. The evaluators also facilitated a discussion session with the workshop participants using break-out groups to identify implementation successes and challenges across the different priority areas. The program updates provided by the presenters along with their feedback on successes and challenges helped to inform the questionnaire content for the key informant interviews.

---

[2] The program logic model for the implementation of the NWT Water Stewardship Strategy is presented in Appendix A.

[3] The historical/retrospective approach relies on the memory of people who have been engaged with the implementation of the Water Stewardship Strategy. This approach asks program participants / water partners to contribute information and opinions based on their experiences.

[4] The list of background documents is provided in Appendix B and the list of key informants is provided in Appendix C. The presentations provided by the different water partners at the 2015 Water Strategy Implementation Workshop (including Powerpoint slides and videos) also served as important background material (www.nwtwaterstewardship.ca/node/113).

Representatives from HCA and SVS also attended an Aboriginal Steering Committee Meeting (Feb. 6, 2015). This meeting allowed the evaluators to gain a better understanding of the role and function of the Committee.

With respect to analysis, the implementation outcomes and success criteria as developed by the Evaluation Committee were used as reference points for the developing the research questions that were applied to the three different sources of information (document review, researcher observations, key informant interviews with water partners).

In generating an overall assessment of implementation success, the information contained in the background documents and the findings from the key informant interviews and researcher observations were compared to identify consistencies and differences in relation to the desired implementation outcomes and success criteria. It is important to note that the different stakeholders interviewed as part of this evaluation are engaged in different ways and to varying degrees. Some stakeholders were able to comment on a wide array of implementation activities while others could only speak to very specific areas of engagement.

The draft evaluation report was reviewed by the Evaluation Committee and the Aboriginal Steering Committee to identify information gaps and ensure that information was factual.

2.1 Limitations

A small number of key informants were unavailable to participate in interviews. Only one individual formally declined to participate in the interview process and this was due to their limited engagement in the implementation of the Water Strategy. Where possible, substitute key informants were identified with the assistance of the Evaluation Committee. Industry / business representation was included through the evaluation committee.

As noted above, some key informants were engaged across multiple areas of the Water Strategy and some were only engaged in a narrow focus of activity. There was also some variation in the time period that key informants were engaged with Water Strategy related initiatives / programs. Some key informants did not have the most complete or up to date information on the status of initiatives / programs depending on their level and period of engagement. The document review that was conducted as part of this evaluation assisted in ensuring that the final analysis was based on current information. As noted above, the evaluation report was reviewed by the Evaluation Committee and the Aboriginal Steering Committee to assist in identifying factual errors.

3.0 Results

The findings of the evaluation are arranged by theme and priority areas. The first section examines the general findings from the key informant interviews and provides a summary of their views on the objectives and achievements of the Water Strategy, challenges in achieving the goals of the Water Strategy, suggestions for improving participation in the Water Strategy, and views on existing priorities, priorities that need more attention, and other potential priorities.

The sections that follow the general findings deal more specifically with the priority areas of implementation and synthesize findings from the document review and the key informant interviews:

- Work Together
    - Transboundary Water Management Agreements
    - Partnerships and Water Stewardship and Information Sharing
- Know and Plan
    - Community-based Monitoring and Research
    - Source Water Protection
    - Long-term Aquatic Monitoring
- Use Responsibly
    - Regulatory Processes
    - Municipal Water Licence Compliance

The final section focuses on Traditional Knowledge in relation to the implementation of the Water Strategy Action Plan.

3.1 General Findings from Key Informant Interviews

As part of the evaluation process, key informants were asked to provide their general views and observations on different aspects of the Water Strategy.

General Views on Objectives of the Water Strategy

Key informants were asked for their views on what they consider to be the most important objectives that the Water Strategy is trying to achieve.

The most common objective identified was on the theme of promoting greater community involvement in data collection and decision making (e.g., community-based monitoring) and supporting this process through community capacity building.

An equally popular goal / objective identified was the long-term protection and maintenance of water quality and water quantity in NWT.

Another widely recognized objective was on the theme of improving collaboration and communication. The Water Strategy is seen as playing an important role in facilitating communication between water partners, promoting and building partnerships, and improving intergovernmental cooperation.

The completion of the transboundary negotiations was also widely viewed as an important objective.

Other important objectives of the Water Strategy that were identified include:

- Increasing awareness about water stewardship
- Providing guidance on research and monitoring activities, identifying priorities and addressing community concerns
- Improving information management and access and supporting and enabling knowledge transfer
- Improving understanding of the aquatic ecosystem (how it functions, how it's structured and how it's changing)
- Improving management of water resources through well informed decisions based on scientific knowledge and traditional knowledge
- Identifying measures and strategies to protect the aquatic ecosystem

General Views on the Achievements of the Water Strategy

Key informants were also asked for their views on what they consider to be the most important achievements of the Water Strategy to date. The types of achievements that were most commonly identified were increased collaboration and improved relationships and trust which helped to facilitate the completion of certain activities.

<u>Collaboration and Promoting Relationships and Trust</u>

The most common achievement identified was on the theme of increased collaboration between water partners that resulted in increased trust and initiatives/projects to address concerns and issues at the community level. Included under this theme is increased community consultation, the establishment and continuation of community-based monitoring activities, the attraction of new partners such as research institutions, and the sharing of resources (human, equipment, training) and information.

Key informants were asked to assess the importance of the implementation of the Water Strategy in influencing positive outcomes related to the development of partnerships, commitment to the goals of the strategy, trust between the partners, and mutual understanding of values. The assessment was based on a 10 point scale where 1 = 'not at all important' and 10 = 'very important'.[5] All of the above themes with the exception of one registered an average score of 7 or higher indicating that the Water Strategy was somewhat important in having a positive effect on these areas (Table 1).

The implementation of the Water Strategy is seen as having an especially beneficial role in the development of new relationships where the average score was the highest (7.7). Although the implementation of the Water Strategy is viewed as somewhat important in promoting a greater sense of commitment to the goals of the strategy, this theme registered the lowest average score (6.8).

[5] Only the two anchor points (1 and 10) were labelled on the scale. The midpoints on the scale (5 and 6) can be interpreted as slightly important and slightly unimportant. Respondents could also indicate "Don't know" if they preferred not to select a number between 1 and 10. Those who indicated "Don't know" or skipped the question were not included in the average score.

Several of the key informants emphasized the important positive role of the Water Strategy in changing the nature of the relationship between the different water interest groups by promoting communities as vitally important and active contributors to the research process.

Many of the key informants singled out the signing of the transboundary agreement with Alberta along with the ongoing negotiations with the other border jurisdictions as the most important achievement of the Water Strategy. It was generally acknowledged that collaboration and consultation were important factors in enabling this result to be achieved.

While acknowledging that the Water Strategy is playing an important role in promoting research and monitoring activities, several key informants noted that AANDC was involved in a number of water research related activities leading up to and during the development of the Water Strategy and these activities were transferred to GNWT with devolution. As noted by one official, prior to the development of the Water Strategy, there were discussions and gatherings taking place in the NWT on water concerns and upstream development projects including the oil sands development in Alberta and hydro dams in British Columbia. Climate change was also being talked about at this time. These discussions turned into something positive – the development of the Water Strategy which has helped to formalize and organize water research and monitoring priorities around the existing water related issues and ongoing research issues.

Community Needs and the Water Strategy

Key informants were asked to assess the extent to which they felt the Water Strategy was responding to NWT communities' water related needs based on a 10 point scale where 1 = 'not at all' and 10 = 'a great extent'. A total of 29 key informants responded to this question. Several key informants declined as they felt they were not familiar enough with the subject. The individual scores ranged from 5 to 10 with an average score of 7.3 which indicates that, collectively, the water partners believe the Water Strategy is responding to NWT communities' water related needs in a positive way.

Key informants pointed to a number of factors that indicate the Water Strategy is responding to the needs of communities including the process of developing the Water Strategy itself which was informed by community input and feedback.

A number of key informants noted that water partners have been supportive and helpful in responding to community research and monitoring interests (e.g., community-based monitoring was cited as an example of a community driven approach that water partners are promoting). Many of the key informants acknowledged the importance of reviewing and prioritizing Water Strategy initiatives from year to year and working with the available resources (human, financial, time) to progressively act on all aspects of the Water Strategy.

Several key informants noted that the Water Strategy has the appearance and feel of a GNWT initiative and suggested that more has to be done to cultivate a sense of local ownership. It was also suggested that the research / monitoring activity in northern NWT is more sporadic than the south and that the Water Strategy is not well known at the community level in northern NWT communities.

Community Capacity Building

Key informants were asked to assess the importance of the implementation of the Water Strategy in terms of its contribution in building community capacity to enable community members to participate in water related research and monitoring. This theme registered an average score of 7.3 indicating that the Water Strategy was somewhat important in having a positive effect on capacity building (Table 1).

While acknowledging that the Water Strategy has made important contributions in expanding community monitoring activity, some key informants noted that more work is needed to make effective links between water monitoring and water management (i.e., decision-making).

Communication

Key informants were asked to assess the importance of the implementation of the Water Strategy in terms of its contribution to improving both the frequency and quality of water-related communication and information sharing. Both of these themes registered an average score of 7.3 indicating that the Water Strategy was somewhat important in having a positive effect on these areas (Table 1).

Key informants credit the roll out of the Water Strategy with helping to raise awareness about water issues and the importance of water stewardship.

Table 1: Importance of the Implementation of the Water Strategy in Influencing Positive Outcomes

On a scale of 1 to 10 where 1 is "Not at all important" and 10 is "Very important", how important has the water strategy implementation process been in helping…	Total number of key informants that responded to the question	Average score	Highest score	Lowest score
A. Water partners develop new relationships	31	7.7	10	2
B. Water partners strengthen existing relationships	30	7.4	10	2
C. Water partners establish a mutual understanding of each other's values	31	7.4	10	4
D. Water partners develop a greater sense of commitment to the goals of the water strategy	29	6.8	10	2
E. Establish trust between the water partners	32	7.1	10	2
F. Improve the frequency of water-related communication and information sharing	32	7.3	10	2
G. Improve the quality of water-related communication and information sharing	32	7.3	10	3
H. Build the capacity within communities to participate in water related research and monitoring	31	7.3	10	3

Several of the key informants qualified their assessments with additional observations.

With respect to the matter of relationship building, it was noted that the implementation process has facilitated relationship building and some communities have seen more of this activity than others. Another key informant emphasized that some water partners have been more active and engaged than others and some water partners need to be encouraged to be more engaged (e.g., industry partners). It was also acknowledged that some partners are busy doing other things (e.g., settling land claims). While appreciating that GNWT is stretched for human and financial resources, it was suggested that GNWT needs to put more staff in the northern communities to strengthen and maintain partnership development as relationship building takes time and not having a presence in the community limits how much can be achieved in the short and long term.

With respect to the matter of establishing a mutual understanding of values, one key informant noted that communities are gaining more respect for the values and interests of communities upstream and downstream from them. Even in northern NWT the health of water in the southern communities is seen as important and border monitoring in Alberta and British Columbia needs to be viewed as very important given that the water eventually reaches the Arctic Ocean. One key informant noted that it can be difficult to achieve a mutual understanding when priorities / values change (e.g., policy changes with the federal government).

With respect to the matter of commitment to the Water Strategy, it was noted that some partners have commitments that overlap several tasks / activities and the Water Strategy is just one element of their motivation. Some partners have funding limitations that limit their participation / engagement in activities and their ability to make stronger commitments. Another challenge on this front is that many people perceive that ownership for the Water Strategy sits with ENR.

With respect to the matter of establishing trust between water partners, it was noted that the collaborative process used in developing the Water Strategy and many of the projects including community-based monitoring have helped initiate conversations and build trust. But some key informants feel that more needs to be done to facilitate the dissemination of information at the community level. It was also noted that more work needs to be done to get industry officials and other GNWT departments engaged as water partners and to encourage greater collaboration with the Protected Areas Strategy and Land and Water Boards.

With respect to the matter of improving the frequency and quality of water-related communication and information sharing, several key informants noted that the amount and type of information being provided is improving progressively but many acknowledged that more improvements are needed. Suggestions included providing more regular communications on Water Strategy activities beyond the annual Water Strategy workshop (e.g., quarterly or twice a year electronic newsletters and messaging on Facebook) and using more plain language in communications. ENR officials noted that they are trying to use more plain language in their communications but acknowledged that more could be done including expanding the use of short videos and interactive exercises in presentations. It was noted that the process for developing and testing communication approaches and tools takes time and ENR staff are looking into ways to better present and share information.

Although the annual Water Strategy workshop is generally viewed as an important and useful approach for sharing information and capturing feedback, some people feel that the workshop is

not equally accessible for those who reside in northern NWT and strategies should be examined to make this opportunity more accessible for an expanded presence from the north (e.g., provide compensation for more delegates to attend the Yellowknife session or conduct a workshop in a community in northern NWT). There is also strong interest in including more personal stories at the annual workshop to illustrate the water related work being completed and its importance.

With respect to the matter of community capacity building, it was noted that capacity is being built in some communities as a result of Water Strategy activities but this needs to be confirmed at the community level and performance measures are needed to assess this progress. It was suggested that communities need to be more proactive in taking advantage of training opportunities, preparing and submitting proposals for research, and reaching out to partner with research institutions. It was also suggested that local monitors need to be more engaged as spokespeople when research/monitoring results are being shared as the message resonates more strongly when provided by a local person. One key informant emphasized that as the population ages, new people will be coming in to take on water stewardship positions and responsibilities and there needs to be an orientation component for the Water Strategy to address this.

Several key informants emphasized that the Water Strategy has made significant progress in its first five years considering the capacity and funding limitations that exist across the water partners and the devolution process that is still being worked through. As noted by one key informant the Water Strategy “is doing reasonably well and even though the strategy is five years old it is relatively new and it’s a new process to many where they now have a say in their participation. It takes time to get used to the new relationship and things won’t happen overnight.” Several key informants mentioned that there continues to be a lot of concern and mistrust over the scientific data but they are seeing a shift as more community members are getting involved in collecting data.

General Views on Challenges in Achieving the Goals of the Water Strategy

A number of themes were identified that present challenges for the implementation of the Water Strategy.

The challenges that were highlighted most frequently were linked to communication and knowledge transfer issues as well as capacity issues.

A number of key informants emphasized that there is still limited community awareness of the Water Strategy and a more formal and extensive approach to outreach and information sharing is needed. As noted by one key informant, very little information gets to the community beyond the few Aboriginal delegates who are involved in discussions with ENR. It was suggested that too much is expected of ASC members who lack the time and resources to effectively pass on information and updates to communities.

With respect to research results, it was stressed that more needs to be done to get the results back to the communities in a timely manner. In some cases it can be a year or longer before the research results are shared. As noted by one key informant, time is needed for analysis and report writing and delays are sometimes the result of not having enough staff time and/or staff with sufficient qualifications to complete the work.

It was also emphasized that more needs to be done by researchers to improve the transfer of scientific results to communities in a format that is easy to access and understand. ENR and Aurora Research Institute have developed a template that researchers can use to make the science more accessible and ENR calendars featuring monitoring results, source water protection, etc. have been popular but it was suggested that the language in these tools could be made plainer. It was also suggested that a more strategic approach is needed in targeting different groups such as elders and youth using different mediums and content. ENR officials are aware of these challenges and they are examining ways to improve ENR products and communications. As noted by one key informant, it's important to be adaptable in an ongoing way rather than trying to perfect an approach first and causing a delay in the sharing of information.

Many of the key informants pointed to capacity issues as an ongoing challenge. Operationalizing the Water Strategy is challenging given the wide scope of objectives it is trying to achieve and the capacity (e.g., human, financial) within the GNWT and among the different partners is limited. Finding the funding and human resources to support all of the Water Strategy initiatives in an equal manner is challenging. As noted by one key informant, there are many people engaged in water related activities who don't get paid for all the work they do – they do it because they believe in it.

Key informants noted that there is a pool of scientists in NWT working in different departments (e.g., ENR, Industry Tourism and Investment / Geological Survey) and in NGOs (e.g., Aurora Research Institute) and it was suggested that they are fragmented and not formally linked and a good science strategy is needed to support implementation of the Water Strategy. One key informant noted that a culture shift needs to take place if NWT wants to improve science capacity in the north. There are a very limited number of research oriented jobs in NWT and a formal agenda / business plan needs to be developed that promotes research activity and employment opportunities. It was suggested that NWT will have to continue to rely on southern based institutions / scientists to address capacity issues in the north until this addressed. It was noted that there are good examples of government / private partnerships to address some community capacity issues.

At the community level, it takes time to involve communities in the research and monitoring process and to provide training for local people to take on this role. As described by one key informant, the scientific research capacity in the north, in general, is small. Although some communities have more capacity than others, it remains challenging to sustain capacity in research and monitoring at the community level when the community monitoring position only provides occasional employment for a few months each year. It was emphasized that it is unrealistic to expect a community member to remain committed to the occasional task of collecting samples. It was also noted that local monitoring activities need to be routinely assessed to ensure that the level of training is meeting the goal of providing quality data. Major capacity issues were also identified in relation to water licensing and there is a need to examine human resource planning and training in water compliance.

With respect to field research, one key informant noted that "you don't always know what the challenges are until you get there and sometimes the tools that are developed don't work the way they were intended." This reinforces the need for in-person / on-site engagement when testing tools and methodologies.

While key informants acknowledged that ENR plays an important role in supporting the development of community capacity, it was suggested that the Water Strategy could be used

more effectively to leverage support from other partners. For example, opportunities and mechanisms for utilizing renewable resource board staff in community monitoring activities could be explored. If a long-term objective of the Water Strategy is to have communities take more ownership of local monitoring activities, then more discussion needs to take place with communities to establish realistic short-term, medium-term and long-term objectives to work towards.

Other themes identified as ongoing challenges include:

- Promoting active engagement from all water partners. There is limited participation and engagement from some water partners, which is partly linked to capacity issues. Some key informants noted that more could be done to actively encourage partners to be more engaged (e.g., industry partners). Several key informants emphasized that the Water Strategy is still relatively new and Aboriginal groups are still getting accustomed to the being involved as partners. As noted by one key informant, “trust is still being established but progress is being made.”
- Addressing information gaps and gaining a comprehensive understanding of the aquatic ecosystem and climate change impact.
- Ensuring that scientific rigor and data quality are maintained as part of the process of turning monitoring and data collection responsibilities over to communities.
- Ensuring that local and traditional knowledge are meaningfully included in work under the Water Strategy and linked with science.
- Sustaining programs beyond the life of their current funding period (e.g., the Slave Watershed Environmental Effects Program funding from the Canadian Water Network is coming to an end and, although capacity has been built through trained community members, there are still costs associated with continuing the program).

Several key informants also pointed to the challenge of maintaining leadership on the Water Strategy and finding a balance with other GNWT priorities. It was suggested that strong leadership is key to maintaining momentum and ensuring that a balance is found between conservation and industrial development. As noted by one key informant, there is a risk of losing all the goodwill established through the development of the Water Strategy if development is not managed adequately and the environment is not given proper consideration in development reviews.

Participation in Implementing the Water Strategy

Key informants were asked how water partners could more effectively participate in the Water Strategy and the following suggestions were provided:

- Provide water partners with new ways to provide updates on their activities. For example, develop a monthly electronic newsletter to allow water partners to report on their ongoing or new research initiatives, policy development initiatives, etc. Information and updates need to be distributed to water partners directly through their email rather than relying on water partners to visit the Water Strategy website to retrieve information.
- Explore ways to make the annual workshop in Yellowknife more accessible to a wider group of delegates from the different regions / communities.

- Explore ways to support ASC members in sharing information and updates at the community level.
- Develop a community map of capacity assessment for community members and other partners to better understand local resources available, as well as opportunities to collaborate.
- Demonstrate to community members how they can get involved in supporting the objectives of the Water Strategy and participating in local initiatives.
- Encourage water partners to invest more time working with communities rather than working *for* communities to make it a true partnership approach.
- Encourage partnerships across government agencies to promote / support community capacity building.

The above suggestions were generally directed at ENR but there was also recognition that the water partners have a shared responsibility in contributing to the process.

General Views on Existing and Emerging Priorities

Most of the key informants confirmed that the current priorities in the 2011-2015 Action Plan are still priorities to work and focus on. A number of key informants acknowledged that they have not reviewed the priorities recently and/or are not familiar with all of the priorities.

Key informants noted that good progress has been made with several of the priorities including the transboundary agreement negotiations and community-based monitoring and work on these priorities needs to continue.

The completion of the Alberta/NWT transboundary agreement is seen as a great success and it's generally anticipated that the remaining transboundary negotiations will be completed within a relatively short period (e.g., within two years).

With respect to community-based monitoring, these initiatives are seen as work in progress and more time and support will be needed for local capacity to be developed and sustained. It was suggested that more advance planning is needed to make sure the right questions are being asked and that appropriate monitoring is being used to provide the answers. It was noted that the current community-based water monitoring taking place under the Water Strategy remains somewhat ad hoc in northern NWT and a more structured approach is needed. It was also suggested that performance indicators would be helpful to assist in measuring the progress of community capacity development.

Many of the key informants noted that information sharing / knowledge transfer remains a priority. It was suggested that more work needs to be done to identify and recruit the key people in communities who will take responsibility for receiving information and communicating this information in the community. Now that the Discovery Portal is in place water partners need to be encouraged to upload data and communities and other interest groups need to be encouraged to access and use the data. As noted by one key informant, the Discovery Portal tool is important but it's not being used to its full potential and more has to be done to educate and train water partners to maximize its utility.

Key informants acknowledged that there are many elements of the Water Strategy that have not been given sufficient attention to date. This is due in part to some elements being purposely prioritized over others as well as resource and capacity limitations.

ENR officials acknowledged that there are a lot of activities associated with the Slave River and Delta Partnership and although some groups may question if too much research activity is concentrated in the Slave River area, officials believe that many of the procedures tested and lessons learned through SRDP can be transferred to other communities.

Several key informants noted that there has been a heavy focus on community-based monitoring over the last few years and more attention needs to be directed at assisting decision makers, such as co-management and review boards. As noted by one key informant, these bodies need to better understand how the information / data that are being generated through research can help with community decisions and planning related to landfills, mining, and oil and gas development.

Several key informants suggested that more time and resources need to be devoted to regulatory action items. As noted by one key informant, the regulatory process remains a significant priority and this work is part of the day to day reality of living and doing business in the north. Managing the water resources and making decisions is challenging as the decisions have impacts on everyone at the community level. It was suggested that more guidelines (e.g., undertaking wastewater treatment) for regulatory review are needed at the community level. It was suggested that the Water Strategy needs a section that explains and demonstrates how the Strategy can work with the regulatory process.

It was also suggested that more needs to be done to assist communities in understanding the water licence requirements and the importance of monitoring and sampling. Communities also need to become more aware about water resources and waste management in relation to licence requirements.

It was suggested that municipal water licencing and source water protection need to be better linked in the Water Strategy and specific objectives for these two components need to be selected and a full implementation plan developed. More effort from water partners is needed to expand the source water protection sites and Municipal and Community Affairs (MACA) and Health and Social Services (HSS) need to be included in the discussion.

With respect to remote sensing, it was acknowledged that this activity is not necessarily a priority area for the Water Strategy but it does support the research activities that ENR is engaged in and it helps to address certain capacity issues for data collection.

It was suggested that the valuation of water in the economy needs to be explored further as this type of information could be useful in informing decisions

Several key informants suggested that a biological monitoring component needs to be developed for the Water Strategy. This component would need to identify / confirm stressors and identify indicators to measure. It was noted that biological monitoring can be expensive and unique partnerships will need to be established to help facilitate this.

It was suggested that the social science capacity for research could be examined as part of the Water Strategy. This involves looking at the human dimension and adaptation for climate

change and ways to connect the water partners with other key experts looking at land, climate, etc. and bringing knowledge systems together and mobilizing information.

Refinements to the Action Plan

Key informants identified a number of refinements that could be made for the next version of the Action Plan.

Several key informants advised that the Action Plan objectives need to be elaborated on to clearly define the challenge and provide specific details on what the desired outcomes are. The need for a full implementation plan was also raised (e.g., what steps will be taken to achieve the objective, who will take responsibility, and when).

It was also proposed that the number of actions needs to be narrowed down to allow greater focus and concentration of effort in areas deemed as priorities. Key informants noted that the devolution process is still fairly recent and GNWT is still working out the implications of this process. It was noted that the Water Strategy is broad but the northern reality is that you have to work with limited funds and staff and you have to remain focused on a few things.

Given the prevalence of community capacity issues, one key informant suggested that the Action Plan needs to strongly emphasize that the sustainability of the Water Strategy is linked to local capacity and that capacity development has to be supported. It was also suggested that a leadership training and development component should be incorporated in the Water Strategy.

ENR is identified as a lead partner on most of the initiatives in the current Action Plan but a number of key informants feel that this needs to change to develop and reinforce a sense of shared ownership of the Plan. As described by one key informant, the next Action Plan needs more emphasis on delegating specific roles / responsibilities across different water partners. Another key informant noted that, if the intent of the Water Strategy is to promote partnerships, then responsibility for its implementation needs to be shared with commitments made and delivered on by every member of the partnership. Related to this issue is the need for the Action Plan to better define whom a water partner is (e.g., their defined linkage to water) and what that entails (e.g., their roles, responsibilities as a water partner and the benefits of being a water partner).

The following sections deal specifically with the findings related to the priority areas of implementation and provide an assessment of success in their implementation to date.

3.2 Work Together – Transboundary Water Management Agreements

Summary Assessment on Progress/Success

Excellent progress has been made in achieving the objectives under the success criteria for Transboundary Water Management Agreements.

Aboriginal governments of the NWT and residents were engaged and consulted in compiling the traditional and local knowledge that was used in conjunction with scientific data to inform the development of the agreements.

The NWT-Alberta Water Management Agreement was signed on March 18, 2015 and it's anticipated that the NWT-British Columbia Agreement will be finalized later this year. The completion of these two agreements in 2015 would meet the target of having half the bilateral water management agreements completed by 2015.

Discussions with Saskatchewan began in early 2015 and preliminary talks with Yukon commenced in early 2015. It's anticipated that the agreement with Saskatchewan and the renegotiation agreement with Yukon will be completed in 2015/16.

The NWT-Alberta Water Management Agreement specifically acknowledges the need to consider traditional knowledge in cooperative water management decisions within the Mackenzie River Basin and outlines practices for the use of traditional and local knowledge in bilateral water management.

The NWT-Alberta Water Management Agreement includes an itemized approach to setting Transboundary objectives (e.g., water quality and quantity objectives). The agreement notes that development of transboundary water quality objectives is of utmost priority and work will begin on objective development within the first year of the agreement being signed.

SUCCESS CRITERIA

Water partners identified negotiating transboundary water management agreements with neighbouring jurisdictions in the Mackenzie River Basin as a priority area. The long-term outcome is that transboundary agreements are negotiated and finalized in accordance with the Water Strategy and that Aboriginal governments are involved in the negotiations of the agreements.

A successful implementation of this identified priority area is when:

- *All Aboriginal governments of the NWT have been involved in the consultation process to negotiate the transboundary agreements;*
- *NWT residents have had an opportunity for input in the development of the agreements;*
- *Environmental data from the transboundary rivers have been used to develop water quality objectives. These objectives are included in the transboundary agreements and will help to protect the waters flowing into the NWT.*
- *50% of the following bilateral water management agreements are finalized:*
  - *An Alberta – NWT agreement to protect the waters of the Slave River and Hay River;*
  - *A British Columbia- NWT agreement to protect the waters of the Liard River;*
  - *A Saskatchewan – NWT agreement to protect the waters of the Tazin River; and*
  - *A Yukon-NWT agreement to protect the waters of the Peel River (established before the development of the Water Strategy).*

Findings

An NWT transboundary negotiating team was formed in September 2011. The mandate of the team was influenced by the Water Strategy and the associated Action Plan.

As part of the information gathering stage of the negotiations process for the transboundary negotiations with Alberta, ENR sponsored two community workshops in Fort Resolution and Fort Smith, in partnership with local Aboriginal groups and municipal governments. The workshops were conducted in December 2011 and brought together local elders, land users, and government staff to share their knowledge with respect to water conditions and environmental change in the Slave River watershed and surrounding areas. The workshops provided a means for collecting traditional and local knowledge from within the Slave River Basin. The representatives were compensated for travel expenses and a per diem or honorarium for unsalaried employees.

Starting in March 2012, ENR solicited input on NWT interests and negotiation principles from the public and Aboriginal governments. Consultation on development of negotiation positions for the NWT-Alberta Transboundary Water Agreement began in August 2012 and involved letters to regional and local Aboriginal leadership in NWT and numerous meetings at the local and regional level between ENR, AANDC (until March 31, 2014) and Aboriginal governments throughout the NWT. Consultation letters also were sent to those groups outside the NWT but with asserted territory in the NWT. Similar letters were sent to the public. Building on this approach, ENR and AANDC (until March 31, 2014) consulted (through letters and regional meetings) on development of negotiation positions for NWT's agreements with British Columbia, Saskatchewan and Yukon from March until August 2014. ENR also solicited input from the public on development of positions for NWT's agreements with British Columbia, Saskatchewan and Yukon.

Between 2011 and 2014, the negotiating team conducted four in-person negotiating sessions with British Columbia, eight in-person negotiating sessions with Alberta, and three in-person multi-jurisdictional sessions with three or more Mackenzie River Basin jurisdictions. There were also numerous teleconference meetings for each of the three processes noted above. The purpose of these meetings was to share background and technical information, compare interests, and discuss options that would address those interests.[6]

Aboriginal government consultation and public engagement on the NWT-British-Columbia Transboundary Water Management Agreement Intentions Document and the NWT-Alberta Transboundary Water Management Agreement Intentions Document took place between August 2014 and January 2015.

Negotiations with Alberta were finalized in February 2015 and the NWT-Alberta Water Management Agreement was signed on March 18, 2015. NWT anticipates signing the NWT-British Columbia Agreement sometime in 2015.

[6] In April 2014, AANDC discontinued its involvement in the transboundary water negotiations process in accordance with the Land and Resources Devolution Agreement.

Discussions for the NWT-Saskatchewan agreement began in early 2015 and preliminary talks to renegotiate the NWT-Yukon agreement commenced in early 2015. Further public engagement and Aboriginal government consultation will take place once Transboundary Water Agreement Intentions Documents have been drafted for NWT's agreements with Saskatchewan and Yukon Territory.

A total of eight key informants including four ENR officials and four representatives from Aboriginal organizations provided their observations on Transboundary Water Management Agreements.

In general, ENR officials felt that they received sufficient information and input through the consultation process from different stakeholder groups to effectively engage in negotiations. However, as noted by one official, a challenge in any consultation process is ensuring that the information being provided has the right level of detail for meaningful discussion / engagement and avoids overwhelming the audience. It was acknowledged that the information being provided by ENR was technical in nature, and may have been challenging to some audiences.

An Aboriginal liaison was hired to be on the GNWT negotiating team. Although there was some criticism that delegates from the different Aboriginal governments were not on the team, ENR felt that the liaison provided a means for Aboriginal input to the process. ENR also conducted over 20 consultation meetings across the NWT to inform the negotiations. As noted by one ENR official, "traditional knowledge factored into the negotiations in a very big way" and the contributions made by the Aboriginal liaison informed and shaped the agreement.

Several of the key informants who were acting as Aboriginal Steering Committee members confirmed that the committee members provided input and feedback to the process and reviewed draft documents. As noted by one ASC member, there was good representation from all Aboriginal groups on the committee and the members received a lot of information to review. A key interest of the ASC was ensuring that the agreement provisions respected the land claim agreements including specifications on water quality and quantity. As noted by one ASC member, "ENR provided updates on how the negotiations were progressing and it was uplifting to see no major barriers getting in the way of the negotiations."

While some Aboriginal groups were generally satisfied with the negotiation process and the information that was provided, there were some concerns raised over the process. While the regional information meetings conducted by ENR were well received as a good format for direct engagement and collecting feedback, concerns were expressed about the challenge of providing updates on the negotiation process at the community level through the ASC. ASC members felt this was something they struggled to do on their own in light of their other responsibilities away from the ASC. Another concern raised was that consultation timelines were too tight for some Aboriginal organizations to be properly engaged. Some groups also noted that the information provided was not in plain language which made it difficult for some people to understand.

Key informants identified a number of crucial factors that helped with the negotiation of the agreements.

GNWT had a strong negotiating team with good support staff. It was emphasized that the political will was in place to complete the agreements and GNWT allocated sufficient resources

to work through the consultation and negotiation process. Although there was some pressure to complete the negotiations as soon as possible, GNWT recognized the importance of providing time for consultation and gathering feedback from the communities, Aboriginal governments and organizations.

An important piece of context to the Alberta/NWT negotiations was the initial information gathering work that began as early as 2002 through a trilateral party consisting of AANDC and the Alberta and NWT governments. AANDC initially took the lead in collecting technical information but ENR began to contribute to this process significantly as the Water Strategy was being developed several years before devolution. It was also significant that no provincial / territorial elections occurred during the final negotiations which removed the political aspect from interfering with the process.

Aboriginal governments appreciated that the GNWT took a strong position in making Aboriginal government involvement in the transboundary agreements a priority and ensuring that they were involved and engaged from the very start.

The Water Strategy itself was viewed as a key document in facilitating the negotiations. As noted by one ASC member, it was crucial for NWT to have its “house in order” and the Water Strategy enabled GNWT (with AANDC prior to devolution) to negotiate with credibility.

ENR officials believe that the Aboriginal liaison and the extensive consultation with Aboriginal governments helped shape the negotiated agreement with Alberta. ENR officials reported that they received a lot of verbal input / feedback through the consultation process but very little written feedback was provided. It was acknowledged that due to complexity of the matters under discussion, the follow-up with communities and Aboriginal governments sometimes took longer than typical. However, review periods were extended to accommodate the complexity of the information provided.

As noted by one ASC member, the ASC worked well as a review body and provided relevant input and feedback on the process and the draft documents. One ASC member noted that the ideal situation would have been to have every community represented in the discussion but this was not financially possible and therefore representation at the regional level was the best solution.

ASC members generally feel that their engagement in the process did influence the negotiated outcomes to some extent. As noted by one ASC member, it was important for the negotiating partners to reach common ground in understanding priorities and for NWT a priority was the inclusion of specifications for water quality and quantity – linked to and supported by baseline data and traditional knowledge. It was also noted that the content of land claim settlements informed the provisions in the agreements – and the claims are linked to traditional knowledge.

As emphasized by one ASC member, the transboundary agreement is a negotiated document, which means that “you are not going to get 100% of what you want.” One of the perceived gaps with the negotiated agreement is that it lacks details on the enforceability of agreements. Another observed deficiency is that the agreement does not place enough emphasis on the impact of pre-existing contaminants in the water system.

3.3 Work Together – Partnerships and Water Stewardship Information Sharing

Summary Assessment on Progress/Success

Excellent progress has been made in achieving many of the objectives under the success criteria for Partnerships and Water Stewardship Information Sharing.

ENR plays a key role in distributing stewardship information to all NWT regions using multiple approaches including information brochures, annual reports, calendars, presentations and conference calls. ENR also coordinates the annual NWT Water Stewardship Strategy Implementation Workshop in Yellowknife.

ENR oversees the NWT Water Stewardship website which provides a variety of water related resources and publications. Between April 1, 2014 and May 31, 2015, over 5,000 Canadian residents visited the NWT Water Stewardship website and 44% of these visitors were from the NWT. The majority of NWT visitors are from Yellowknife but there are also visitors from other NWT regions and communities.

Water related research results are available through the NWT Discovery Portal and the LodeStar database. The Discovery Portal was launched in 2012 and includes over 2,500 environmental monitoring entries in a variety of formats including scientific monitoring data and reports, traditional knowledge reports, maps, presentations, videos and images.

The Lodestar environmental database features water, soil, sediment and air data from site investigations, remediation projects, and long-term monitoring programs and can produce statistical summaries and graphical outputs. The data can be accessed by request to the Water Resources Division, ENR. A third database in development is the Mackenzie River Basin Initiative Data Management System (DMS), which will feature information about freshwater quality and compile data that is regularly collected through the NWT-wide CBM program and will be publicly available.

Meetings and workshops related to water

SUCCESS CRITERIA

Water partners identified that it is a priority to engage and communicate with residents about water stewardship initiatives, and for water partners to continue to develop partnerships and ensure that water-related information and data are well managed, linked and accessible. The long-term outcome is that water partners can access water-related information to inform decision-making within their organization and act as water stewards in their regions.

A successful implementation of this identified priority area is when:

- *Water stewardship information is distributed to all the NWT regions;*
- *The distributed information is designed in multiple ways to target youth, elders, NWT communities and water partners;*
- *Water stewardship meetings took place in all the NWT regions (organized by ENR, co-hosted or hosted by other water partners);*
- *Residents from all the NWT regions visit the NWT water stewardship website; and*
- *Increased funding and other resources (e.g., in-kind support) for water strategy initiatives have been obtained as a result of established partnerships*

stewardship have taken place across the NWT. For example, training workshops for community-based monitoring initiatives have been conducted by ENR and other water partners and ENR conducted over 20 consultation meetings across the NWT to inform the transboundary negotiations.

Improving communication and sharing information continues to be an important role for all water partners. ENR as well as other water partners are making their research information available using a variety of approaches to share and communicate results. Many of the water partners have tried to design / present information differently depending on the audience or the subject matter and they are continuing to examine best methods to convey information and community-based materials in user friendly formats. A common challenge faced by many of the water partners is the lack of capacity/resources and time availability to prepare materials for target audiences such as youth and elders. In general, more work needs to be done to provide information and research results for communities in plainer language and to customize communication formats for specific audience groups.

A number of water research related partnerships have developed over the years. Some of these partnerships formed as a direct result of the Water Strategy while others formed as the Water Strategy was being developed or earlier and continue to operate. A variety of partnerships have also been formed through the NWT Cumulative Impact Monitoring Program (CIMP), which provides funding for monitoring and capacity building projects with a key emphasis on promoting partnership initiatives.

More needs to be done to formally structure water partners around their engagement in the different priority areas of the Water Strategy and to formally recognize the efforts and contributions of the different water partners. Some water partners have greater capacity issues than others which limit their level of engagement with the Water Strategy.

Findings on Partnerships

ENR provides leadership in implementing the Water Strategy and also plays a key role in coordinating water strategy communications and information sharing. Many of the current water partners provided input on the development of the Water Strategy and have stayed on as water partners. More partners have been added over time.

The NWT Water Stewardship website defines a water partner as “anyone who has a role in water stewardship – from every individual who uses water on a daily basis to regulatory boards and territorial and federal departments who regulate and manage water use, to environmental organizations and industry who have an interest in how water is used.” The Water Stewardship website identifies over 40 water partners including ENR, Aboriginal governments and organizations, regulatory boards, non-profit organizations, research institutions, industry and federal government departments.

A number of water research related partnerships have developed over the years. Some of these partnerships formed as a direct result of the Water Strategy (e.g., NWT-wide Community-based Water Quality Monitoring Program – established in 2012) while others formed as the Water Strategy was being developed (e.g., Slave River and Delta Partnership - established in 2010; Tłı̨chǫ Aquatic Ecosystem Monitoring Program - established in 2010) or earlier (e.g., Peace-Athabasca Delta Ecological Monitoring Program - established in 2008) and continue to operate. These and other partnerships are looked at in greater detail in other sections of this report.

A variety of partnerships have also been formed through CIMP. CIMP provides funding for monitoring and capacity building projects with a key emphasis on promoting partnership initiatives. A review of the projects supported by CIMP between 2009 and 2015 reveals that the number of CIMP funded projects has increased over this period. In the 2009/10 fiscal year CIMP was supporting about 19 projects and this has risen to 30 or more projects in the each of the three most recent fiscal years. These figures include a combination of water and other ecosystem projects initiatives. When we separate out those projects that have a focus on aquatic ecosystems (e.g., water monitoring, fish monitoring) we find that the number of water related projects supported by CIMP has increased from about 5 projects in 2009/10 to more than 10 projects in each of the three most recent fiscal years. The diversity of organizations leading water related projects has also increased over this period. In the two most recent fiscal years, CIMP water related projects were led by a number of different Aboriginal governments and organizations, regulatory boards, federal government departments, academic institutions, as well as GNWT ENR.

A total of 11 key informants including ENR officials, Aboriginal government officials, research institute officials and a representatives of a non-governmental organization, the federal government, and a resource board provided their observations on Partnerships and the Water Strategy.

As noted by ENR officials, the general role of water partners is to attend meetings, stay informed and provide input on water related issues relevant to the Water Strategy. As noted by one official, the use of a broad definition for describing who a water partner is has created opportunities for people with different water related interests to come forward and participate. Water partners are not bound to any specific commitments in the Water Strategy and one official suggested that this flexible approach leads to more positive relationships as partners are more willing to collaborate if commitments are open. Conversely, some key informants noted that the lack of specific and action oriented commitments for the different water partners means that a lot of the leadership in implementing the Action Plan falls on the shoulders of ENR and this has led some individuals to suggest that the Strategy is driven too much by ENR, creating the impression that the Water Strategy is a top-down initiative.

ENR officials believe that more work could be done to formally structure water partners / organizations / communities around their engagement in the priority areas and to formally recognize the efforts and contributions of the different water partners. For example, communities and partner organizations could be specifically recognized for their engagement in water related initiatives in addition to being listed as water partners on the Water Strategy website.

As noted by one key informant, partnerships tend to be developed in an ad hoc way, as needs and issues are identified. Some partnerships are long-standing relationships and some are reactive as funding becomes available for a research project. Some water partners are engaged in very specific activities that occur on a regular basis each year. For example, it was noted that the partners involved in the annual Fish Camp through the Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP) are familiar with their roles and are aware of this event on their calendar and prepare for requests for assistance (providing assistance with funding or human resources) as the event approaches.

Key informants identified a number of important factors in developing and maintaining strong partnerships including:

- having a good understanding of each other's interests and open dialogue on priorities
- having common goals to work towards
- respecting each other's views and interests
- having defined roles and responsibilities
- being involved in planning and decision making
- being motivated and committed
- using good communication practices (e.g., clear and regular communications) and staying informed about what's going on
- having adequate capacity (time, human, financial) to support program initiatives, activities and events

When reflecting on successful partnerships, key informants often pointed to community-based monitoring programs as good examples including TAEMP, the Slave Watershed Environmental Effects Program (SWEEP), the Aboriginal Aquatic Resources and Oceans Management Program (AAROM) and the Peace-Athabasca Delta Ecological Monitoring Program (PADEMP). Additional details on these partnerships and other community-based monitoring programs are provided in section 3.4 of the report: Community-based Monitoring and Research.

While some water partners feel that they have been adequately engaged as a partner in the Water Strategy others do not. In part, this is a reflection of the priorities that have been a major focus of implementation to date including the transboundary negotiations and community-based monitoring. A key informant with one Aboriginal organization noted that the group has great interest and good engagement with the transboundary negotiations and their engagement continues to evolve as community-based monitoring programs continue to be developed and implemented across NWT.

As noted earlier in this report (section 3.1) some water partners have capacity issues that limit their level of contribution and engagement and some partners are purposely focused on narrow areas of the Water Strategy. An official with the federal government commented that their department would be more involved but their internal capacity is not sufficient and "the Strategy is not to blame." One key informant acknowledged that the current work demands faced by Aboriginal governments make it challenging to be engaged and remain responsive to Water Strategy related inquiries. There is a gap between what their potential involvement could be and what it currently is.

It was suggested that the Water Strategy should be more proactive in establishing partnerships. For example, it was suggested that ENR needs to partner with local education and research institutions to develop and promote an intergenerational strategy to promote the Water Strategy through the schools and teachers. Key informants also pointed out that engagement with industry groups need to be encouraged and water boards and regulatory groups need to be more strongly incorporated into the Water Strategy.

Findings on Information Sharing

Water partners played a key role in working together and sharing information to develop the Water Strategy. Improving communication and sharing information continues to be an important role for all water partners.

As noted above, ENR plays a key role in coordinating water strategy communications and information sharing.

ENR produces community brochures, annual reports and information related to research projects, source water protection, community-based monitoring, and transboundary water negotiations. It also uses presentations and conference calls to share information and gather feedback. Some of the water information products produced by ENR include:

- Transboundary River Reports (Slave River, Liard River, Peel River, Hay River)
- Network Reports (Coppermine, Lac de Gras)
- Hydrometric Overview Reports (Coppermine, Gwich'in/Sahtu, Deh Cho, North Slave, South Slave, Nunavut)
- Annual Water Calendar
- 2012 results booklet and 2013 results poster from the NWT-wide CBM program

ENR hosts an annual NWT Water Stewardship Strategy Implementation Workshop in Yellowknife. In 2015, a two-day workshop took place in February 4-5 and featured presentations and updates on NWT related water research and monitoring activities, regulatory activities, public education, and negotiations of transboundary water agreement negotiations. The workshop also included panel discussions on how these initiatives could inform water management and decision making. The workshop provided a platform for discussing how water partners could collaborate, prioritize and work together to protect water in the NWT.

ENR also oversees the NWT Water Stewardship website, which provides an introduction and overview of the Water Strategy and related projects and an inventory of resources and publications. Table 2 presents the overall frequency of visits to the NWT Water Stewardship website over the most recent two year period. Between 2013/14 and 2014/15 the number of visits to the site almost doubled from 4,037 to 7,316 and the large majority of the visitors in 2014/15 were new visitors, more than doubling the number of new visitors in 2013/14. Although the majority of visitors to the website in 2014/15 were Canadian (59%), the number and proportion of international visitors is increasing. In 2013/14 international visitors represented 21% of the visitors and this increased to 41% in 2014/15. The largest number of international visitors is from the United States followed by Brazil, India, Australia and the United Kingdom.

Table 2: Frequency of Visits to NWT Water Stewardship Website - International

	Total Site Visits			New Users		
	April 1, 2013 to March 31, 2014	April 1, 2014 to March 31, 2015	% Change	April 1, 2013 to March 31, 2014	April 1, 2014 to March 31, 2015	% Change
All countries	4,037	7,316	81.2%	2,438	5,279	116.5%
Canada	3,191	4,326	35.6%	1,655	2,544	53.7%
Top 5 countries after Canada						
USA	328	1,027	213.1%	306	918	200.0%
Brazil	8	290	3525.0%	8	285	3462.5%
India	102	199	95.1%	92	183	98.9%
Australia	29	131	351.7%	26	118	353.8%
United Kingdom	45	124	175.6%	44	107	143.2%

Source: GNWT / ENR - NWT Water Stewardship Strategy, Google Analytics. April 2015

Within Canada, the largest proportion of visitors to the NWT Water Stewardship website was from the Northwest Territories (44%). Ontario (22%), Alberta (12%) and British Columbia (8%) were the next leading provinces in terms of visits to the website (Table 3). Within the Northwest Territories, the largest proportion of visitors to the NWT Water Stewardship website was from Yellowknife (86%) followed by Hay River (5%), Inuvik (4%) and other NWT communities (5%).

Table 3: Frequency of Visits to NWT Water Stewardship Website - Canada

Province / Territory	April 1, 2014 to May 31, 2015	
	Total Site Visits	Percent
Northwest Territories	2,213	44.0%
Ontario	1,092	21.7%
Alberta	610	12.1%
British Columbia	408	8.1%
Quebec	214	4.3%
Saskatchewan	205	4.1%
Yukon	88	1.8%
Nova Scotia	73	1.5%
Manitoba	62	1.2%
Nunavut	28	0.6%
Other provinces	33	0.7%
Total	5,026	100.0%

Source: GNWT / ENR - NWT Water Stewardship Strategy,
Google Analytics. June 2015

Table 4 presents the top 10 NWT Water Stewardship web pages by frequency of visits over the most recent two year period. The home page for the NWT Water Stewardship is the number one ranked page and was visited almost 2,800 times in 2013/14 and just over 3,000 times in 2014/15. The second most popular web page is “How Do We Measure Aquatic Ecosystem

Health?" with close to 600 visits in 2013/2014 and over 1,800 visits in 2014/15. This page experienced the greatest change in absolute numbers as well as the greatest percentage change over the two year period. The "Transboundary Water Agreements" page was the third most visited page in 2014/15 with over 700 visits and the number of visits to this page more than doubled from 2013/14.

Table 4: Top Ranked NWT Water Stewardship Strategy Web Pages by Visits

NWT Water Stewardship Web Page	Number of Web Page Views		
	April 1, 2013 to March 31, 2014	April 1, 2014 to March 31, 2015	% Change
1. NWT Water Stewardship	2,792	3,036	8.7%
2. How Do We Measure Aquatic Ecosystem Health?	592	1,865	215.0%
3. Transboundary Water Agreements	290	722	149.0%
4. Where Does the Water Flow?	179	560	212.8%
5. Water Strategy	301	482	60.1%
6. Community-based Monitoring Support and Programs	273	389	42.5%
7. Publications	344	384	11.6%
8. What Affects Water and Aquatic Ecosystems?	183	378	106.6%
9. Slave River and Delta Partnership	164	311	89.6%
10. Maps	310	299	-3.5%

Source: GNWT / ENR - NWT Water Stewardship Strategy, Google Analytics. April 2015

ENR is active in public education through partnerships with Ecology North and other organizations. Some of the water education resources and learning opportunities developed include:

- Pepper and the Mighty Mackenzie Activity Book
- Canada Water Week Activities (3rd week of March)[7]
- Drinking Water in the NWT and the Journey of a Bottle of Water (teacher's guide and student workbook)
- Rivers to Oceans
- Ecology North programs (On the River Program, Grade 8 Northern Waters Curriculum, day camps and after school programming)
- ENR Public Education Activities (Pond Studies, Tundra Science and Culture Camp, Great Canadian Shoreline Cleanup, Stream of Dreams, Centre for Indigenous Environmental Resources (CIER) – Youth Water Leaders, Project Wet Training)

An important resource for researchers and decision makers are the NWT Discovery Portal and LodeStar databases. The Discovery Portal was in development at the time the Water Strategy was being established. It was co-developed by GNWT (Centre for Geomatics), AANDC and DFO. The Centre for Geomatics and the NWT Cumulative Impact Monitoring Program (CIMP) took over full responsibility for the Portal following devolution in April 2014. A soft launch of the

[7] *Get To Know Your Watershed! - A Teacher Resource Guide for Northern Watershed Education* was developed for Canada Water Week 2015. Between 2012 and 2014, Water Week activities featured school based and public activities including public film screenings, Snow King Castle, youth-elder art contests, photo contests, a water stewardship radio trivia contest, and a speaker's panel.

Portal was initially conducted to test the Portal followed by the full launch. The Portal was enhanced after 2 years based on additional input from users / water partners.

The Portal is an open access virtual library that includes over 2,500 environmental monitoring entries in a variety of formats including scientific monitoring data and reports, traditional knowledge reports, maps, presentations, videos and images. All information generated by CIMP funded projects can be accessed through the Portal and scientists, community members, regulators, industry and anyone interested with environmental information can contribute to the Portal's content. If reports are confidential, water partners can identify a contact person that can be reached to request the information. Training on the Portal was provided to ENR staff and instruction was offered by ENR officials during the Water Strategy implementation workshops. A video showing how to use the Portal is also available.

ENR partners with AANDC in operating the LodeStar environmental database. The goal is to provide a consistent approach to environmental data management across NWT. The database features water, soil, sediment and air data from site investigations, remediation projects, and long-term monitoring programs. The database allows for automatic upload of laboratory data and features rigorous data validation procedures. The database can produce statistical summaries and graphical outputs. Currently data is available upon request, however, next steps include making this environmental data publicly available on the internet through a GIS interface or though linkages with other public databases.

A third database that is currently in development is the Mackenzie River Basin Initiative Data Management System (DMS), which is being developed by the Walter and Duncan Gordon Foundation and GNWT. This database will feature information about freshwater quality in the Mackenzie River Basin. The DMS will compile data that is regularly collected through the NWT-wide CBM program and make it publicly available. It is anticipated that the DMS will launch in the fall 2015.

Several of the water partners provided details on the way they make their research information available.

TAEMP makes all of its research findings available through a variety of approaches including presentations, workshops, meetings, reports, posters, phone calls, newsletters, WRRB website / Facebook page, and links to other organizations' web pages. The information is designed / presented differently depending on the audience and communities and the subject matter. Challenges associated with preparing and targeting information for different audiences / communities include staff capacity and time availability, funding and distances to communities. TAEMP research results are available on the Discovery Portal and the Polar Data Catalogue (metadata).

The Slave River and Delta Partnership (SRDP) makes the SWEEP results available to communities through workshops. ENR representatives are in attendance at these workshops to provide context. The SWEEP workshop typically occurs twice a year after data collection and purposely provides the information that people want to see. At this point the monitoring results have not been placed on the Discovery Portal. The University of Saskatchewan is developing its own web portal for SWEEP which could eventually include a mobile version that could be hosted by the Discovery Portal. Their portal will allow for the inclusion of scientific and traditional knowledge (quantitative and qualitative data) and it should be available later in 2015. They have

also developed a video on the traditional knowledge component that they will soon share with communities.

DFO makes its research information available through its website and newsletters and research reports. The raw data is also available if a data sharing agreement is put in place. The information is designed / presented differently depending on the audience but this can be challenging as resources are limited to do that type of work. DFO is not populating the Discovery Portal with its monitoring and research findings.

A common challenge faced by many of the water partners is the lack of capacity/resources to prepare materials for targeted audiences such as youth and elders.

ENR officials are continuing to examine ways to best convey information and community-based materials in user friendly formats. For example, ENR has explored the use of radio announcements to help elders and others to stay informed about water research related initiatives (e.g., announcements have been translated into Aboriginal languages). ENR is continuing to explore different methods for communicating / sharing information with the different groups.

One key informant noted that more could be done to develop educational materials directed at high school youth and youth up to the age of 20. It was suggested that a new and attractive format is needed to reach this older age group including Facebook and short videos.

The annual water calendar has been very well received. One edition of the calendar featuring photos of local people involved in community-based monitoring was especially popular as people could relate to the individuals they recognized from the calendar in their own community. About 1,500 copies of the calendar are produced each year in addition to the electronic version available at the water stewardship website.

While the annual workshop is generally recognized as an important event for sharing information, a number of key informants suggested that it needs to have more people and a greater cross section of people attending. Several key informants noted that with a mixed audience the information content needs to be less technical. It was also suggested that the discussion on priorities needs to be moved to an earlier slot on the agenda and more time needs to be allotted for a meaningful discussion before the priorities are confirmed. As noted by one key informant, the discussion on priorities at the forum tends to feel like a one-way conversation and it needs to be made more participatory.

Officials with the Discovery Portal noted that they are generally satisfied with the way information is being provided by water partners. Consistency in data format is important and the preference is for data in shape files ideally but point data in Excel format is also fine. It was suggested that better and more consistent baseline data would be useful and the baseline data available at the moment is too limited for small catchment areas to do good analysis. It was noted that the amount of traditional knowledge on the Portal could be expanded to better balance the amount of science based information. One limitation of the Portal is that it does not collect data on who is accessing the data and for what purpose.

ENR officials reported that CIMP staff provide very good support for the Portal, as needed, if questions arise. Only a small number of the key informants reported being trained on the Portal. As noted by one key informant, the Portal has been an effective way to bring information together but there is a need to better understand why some water partners are not uploading their findings / research results. Another key informant noted that the Portal will be helpful and students (e.g. Aurora College) will use the data but more needs to be done to educate and train water partners to maximize its utility.

In general, water partners are receptive to receiving information / research results in a variety of ways including direct contact (conference calls, meetings, and workshops) and reports. It was noted that more needs to be done to try and standardize reporting formats so that the data can be more easily retrieved and compared. It was also suggested that more needs to be done to access data collected by industry for compliance purposes and a user friendly web approach is needed to view results on maps and comparison to guidelines (e.g., Canadian Council of Ministers of the Environment standards).

It was noted that the technical information in reports needs to be put in plain language to make it more accessible. As noted by one key informant, “the challenge isn’t with information distribution from ENR, the challenge is with knowledge translation and understanding what it means.” Another key informant suggested that the “scientific data is relevant to policy but it’s not easy to understand and use in policy making.”

As noted in section 3.1, many of the key informants noted that information sharing / knowledge transfer remains a priority. It was suggested that more work needs to be done to identify and recruit the key people in communities who will take responsibility for receiving information and communicating this information in the community.

3.4 Know and Plan – Community-based Monitoring and Research

Summary Assessment on Progress/Success

Substantial progress has been made in achieving many of the objectives under the success criteria for Community-based Monitoring and Research.

Communities across the Northwest Territories are participating in community monitoring programs to study local water and ecosystem health. The Water Strategy is a key motivating factor behind several of these programs including the NWT-wide CBM program.

The number of communities (and sampling sites) in the NWT-wide CBM program has increased progressively since the program was initiated. Between 2012 and 2014 the number of participating communities increased from 12 (24 sampling sites) to 21 (42 sampling sites) communities. The program could be expanded into other communities.

Community members play a substantial role in conducting the sampling at sites for the NWT-wide CBM program. At this time ENR staff is continuing to travel to all of the participating communities to provide support.

A number of factors including the limited hours and short seasonal duration of this work activity and the availability of other work opportunities in some communities makes it challenging to retain a core group of trained samplers from year to year.

Community members can access training for the NWT-wide CBM program at annual workshops conducted by ENR staff.

Community monitoring at NWT-wide CBM program sites is intended to directly address the water interests/concerns of the community. Accordingly, traditional and local knowledge is supporting the identification of sampling sites.

ENR and other water partners are making community-based monitoring data available to communities. The extent to which communities are actually accessing the data and using the data

SUCCESS CRITERIA

Water partners identified that it is a priority to undertake community-based monitoring to help communities to address water-specific concerns. The long-term outcome of this priority area is to have well established community-based monitoring programs under the Water Strategy that address local concerns and build local capacity. The programs aim for communities to become independent to conduct the collection of water data on their own and to provide reliable data for spatial and temporal trends.

A successful implementation of this identified priority area is when:

- *Community members (supported by ENR) lead the sampling for 50% of the sites of the NWT-wide Community-based Water Quality Monitoring Program (CBM program);*
- *Community members participating in the sampling for the CBM program can access training every year;*
- *Communities and other water partners request and use data from community-based monitoring programs; and*
- *Communities have more opportunities to build capacity and to be involved in water-related education, research and monitoring.*

in decision making requires further review as more data becomes available.

There are a number of other community-based monitoring initiatives across the NWT that are also providing communities with opportunities to build capacity and be involved in water-related education, research and monitoring (e.g., TAEMP, Inuvialuit Settlement Region - Community-Based Monitoring Program (ISR-CBMP), SWEEP, AAROM, and PADEMP).

It remains to be seen if communities can become fully independent and operate community-based monitoring programs for the long term without support (e.g., human resources, funding) from other water partners.

Findings

DFO examined ways to enhance community-based aquatic monitoring through collaborative workshops in 2010 and 2011. The goal of the workshops was to build a foundation of mutual trust, understanding and communication on which to build better aquatic resource monitoring programs that make the best use of government expertise and community-based knowledge. The workshops were designed to help understand the key issues and programs related to aquatic monitoring in the NWT and identify ways to improve collaboration among all those involved in community monitoring. The workshops were attended by key government and community partners actively involved in aquatic resource monitoring in the southern NWT. Community representatives included program administrators, resource managers, leaders, youth and elders.[8] Participants at both workshops identified key obstacles to community-based monitoring which fell into five general categories: capacity and training, planning, coordination, communication and information sharing, and funding.[9]

ENR developed a 3 phase approach for promoting and supporting Aquatic Ecosystem Health Community-based Monitoring Initiatives. Phase 1 involves identifying community water related issues and concerns, itemizing past and current water monitoring and research, identifying a community- concern driven research project, determining level of community participation, and identifying partnership members. Phases 2 and 3 involve conducting a vulnerability assessment and prioritization report, preparing a state of knowledge report, identifying funding, and conducting monitoring and research. Four communities (Fort Good Hope, Sambaa K'e / Trout Lake, Fort Resolution and Fort Smith) have collaborated with ENR to develop State of the Knowledge Reports and Vulnerability Assessment Reports.[10]

---

[8] The first workshop was held in Dettah (March 2010) and participants included: Akaitcho Territory Government, Dehcho First Nation, Environment Canada, DFO, AANDC, GNWT – ENR, and Aurora College. The second workshop was held in Yellowknife (Feb. 2011) and participants included most of the same government representatives along with members of the North Slave Métis Alliance, and NWT Métis Association.

[9] Additional details on the key obstacles are provided in the full report, *Enhancing Community-based Aquatic Monitoring: Workshop Recommendations - Summary of Two Collaborative Workshops Held in Dettah, March 2010 and in Yellowknife, February 2011.*

[10] A community workshop took place in 2011 with community representatives from Fort Resolution and Fort Smith. This workshop was the kick-off for what would become the Slave River and Delta Partnership. Some projects that took place as a result of the formation of the partnership include a sediment coring project led by researchers from Wilfred Laurier University to study contaminant deposition in the Slave River and Delta, as well as the development of State of the Knowledge and Vulnerability Assessment reports for the Slave River and Delta. The reports together consolidate a large number of reports and articles referring to the Slave River and Delta and identify information gaps and areas for future research. Both reports and the sediment study were financially supported by NWT CIMP.

Communities across the Northwest Territories are participating in monitoring programs to study local water and ecosystem health. Current community-based monitoring programs include the NWT-wide CBM program, TAEMP, ISR-CBMP, SWEEP, AAROM, and PADEMP.

Another important program that supports community-based research is CIMP. CIMP coordinates and conducts monitoring-related initiatives in the NWT using scientific and traditional knowledge and supports these activities through awarding project funding to applicants. CIMP promotes a community-based approach, meaning that communities must be involved throughout the program: in the design, monitoring, analysis/interpretation and reporting of traditional knowledge or science-based activities.[11]

Additional details on community-based monitoring programs and research are presented below along with observations provided by 22 key informants including ENR officials, Aboriginal government officials and community monitors, research institute officials, Water/ Resource Managment Board officials, federal government department officials, and an NGO official.

NWT-wide CBM Program

In 2012, ENR initiated the NWT-wide CBM program. The Water Strategy was a key motivating factor behind the development of the NWT-wide CBM program. ENR along with other water partners collaborate to provide ongoing training and support to community monitors to collect water samples using standard methods. The water quality data is analyzed and the results are first shared with the communities involved in the CBM program before being shared publicly. Communities are able to access the data collected and use it for local decision making and other monitoring and research activities.

The program currently focuses on water quality monitoring using grab water sampling and passive sampling and YSI sondes. The program examines over 70 water quality parameters including: water temperature, pH, turbidity, oxygen, conductivity, chlorophyll-a, and hydrocarbons and metals.[12] A total of 12 communities (24 sampling sites) participated in the CBM program in 2012 and a major expansion of the program occurred in 2013 with an additional eight communities (14 sampling sites) joining the program. In 2014, the total number of participating communities reached 21 (42 sampling sites). ENR officials view this as a great achievement considering the program has only been active since 2012.

[11] CIMP is involved in developing a watershed approach to monitoring cumulative impacts of landscape change. It also worked on mapping permafrost disturbance and impacts to aquatic systems. CIMP strives to fill information gaps in current monitoring activities including the cumulative impacts of land and water uses and waste deposits. The program supports community-based monitoring, capacity building and training. CIMP related projects are involved in monitoring a number of different parts of the environment including water quality and quantity, fish population and health, marine and terrestrial mammals, birds, vegetation and landscape change. CIMP is governed by a multi-party Working Group, which provides strategic advice and information that assists in decision making related to the monitoring of cumulative impacts in the North. The working group is composed of members and observers of regional Aboriginal, federal and territorial government representatives and other organizations.

[12] See the following report for additional details: *Bringing Water Quality Results Back to Your Community: 2012 Results from the NWT-wide Community-based Water Quality Monitoring Program*.

Trent University became involved with the CBM program when ENR wanted a robust and easy-to-use passive sampling tool. The University developed a sampler for measuring concentrations of dissolved metals in rivers (Diffusion Gradients in Thin-Films – DGTs).[13] The DGT samplers are produced at Trent University and mailed to Yellowknife where ENR forwards them to the participating communities. The samples are returned to Trent University for analysis.

ENR officials reported that they are learning through practice and adapting projects as needed. As noted by one official, it was important to make a start on the CBM program and not get delayed in the design phase trying to perfect things. Communities are involved in selecting the sites where the water sampling takes place and ENR provides training to local people to undertake the sampling. The long-term vision is to have communities doing all of their own monitoring. The number of communities involved in monitoring is increasing and the capacity for communities to conduct the monitoring activities is also improving although not as quickly as some officials had hoped for. ENR officials acknowledged that there is room for further growth and staff are continuing to travel to all of the participating communities to provide support.

Training is provided to community members through workshops conducted by ENR staff. The workshop covers water science and sampling methodologies and approximately 30 community members participated in the workshop this year. The goal is to conduct this workshop annually before the sampling season starts. There are no specific prerequisites for becoming a water monitor but individuals are encouraged to attend the training workshops. There are turnover challenges with local monitors due to the seasonal and temporary nature of the work and full time job opportunities elsewhere in the industry and government sectors.

Collaboration has been important in facilitating the progress made to date in the CBM program. The program started with State of Knowledge community consultation activities in each community with strong local involvement (e.g., Fort Smith, Fort Resolution, Fort Good Hope, Trout Lake). Community monitoring at all of the current sites is intended to directly address the local interests/concerns that were brought forward. In many cases community input informed the location of the water sampling sites and community input was respected if the residents felt that the sampling/monitoring sites needed to be relocated to areas they deemed more important. Community members are active participants in the CBM program. They go out on the water to conduct the sampling themselves or assist researchers with the sampling. If the process is not working they report back to ENR and the process is adapted where possible.

ENR is supporting efforts to include the use of traditional, local and western scientific knowledge in water stewardship decision-making processes but officials note that more can be done. Although the Water Strategy weighs the value of traditional knowledge and scientific knowledge equally, this is not always happening in practice and there is an ongoing need to fully

[13] The DGT sampler is a simple tool but very robust and easy to use (i.e., you don't need a background in science to use the tool). There is very minimal of risk of the sample being contaminated which makes the results very reliable. DGTs also have the advantage of measuring over longer periods of time (3-4 days) compared to sampling water on one occasion (i.e., one off grab samples). Trent University also developed a 'how to' pamphlet which explains how to deploy and retrieve the sampler and how to return the sampler to ENR in Yellowknife. Communities submit a request to ENR to participate and ENR determines the number of communities that can participate in any given year based on available funding. It was noted that ENR staff visit the communities and provide training to one or two people in the use of the passive sampler (as well as other water sampling techniques depending on the other projects the communities are participating in).

understand and embrace the role and application of local and traditional knowledge in the decision making process. ENR has used workshops to collect traditional / local knowledge as part of the CBM program and community representatives are treated as specialists in their own field as holders of local and traditional knowledge.

With respect to information sharing of the DGT results, ENR and Trent University attempt to use plain language in writing up the results of the analysis and where possible the results are written in the context of the issues of concern to the community (e.g., oil sands development, mining development, etc.). The results are shared with the communities first before they are used for any other purpose (e.g., placed on the Discovery Portal, published in research papers). Trent University provided the results to ENR by end of fiscal year and communities had an opportunity to ask questions about the results through a conference call with ENR and Trent University officials.

For wider circulation, ENR makes information available through the Water Strategy website, through booklets and brochures,[14] the annual calendar[15] and the annual workshop, and radio and newspapers. Information is also shared through word of mouth.

ENR officials believe that the information from community-based monitoring activities is helping communities to better understand and respond to their water issues. It was noted that ENR staff are working closely with communities and improving relationships and this is helping to establish the foundation for communities to do their own monitoring and interpretation.

With respect to challenges, there continues to be some uncertainty about where ownership lies with the CBM program. It is not clear that the program is meant for the community and that the role of ENR is to assist in establishing the program in their community. It was noted that ENR officials are trying to improve how they communicate their role in the program and their relationship with the community and being explicit about the intentions of the program.

One key informant noted that community involvement in the CBM program continues to be somewhat limited as the focus is mainly on having local monitors collect samples. It was suggested that local monitors and other community members should be engaged to compile

[14] In 2014, ENR produced an information brochure, Bringing Water Quality Results Back to Your Community, which presents results from activities of the NWT-wide Community-based Water Quality Monitoring Program. The brochure describes the way samples are collected and the different equipment used and provides a summary of the water quality monitoring results sampled between June and October 2012. ENR has prepared a separate poster with results from 2013 NWT-wide community-based monitoring.

[15] ENR produced an information calendar in 2014 which provided an overview of findings from the NWT Community-Based Water Monitoring activities in 2012 and 2013. The calendar features select results for specific community-based monitoring activities for the Slave River, Great Slave Lake, Yellowknife River, Franks Channel, Hay River, Trout Lake and Island River, Kakisa River and Liard River, Mackenzie River, Arctic Red River, Peel River and Mackenzie Delta, as well as the Tłı̨chǫ Aquatic Ecosystem Monitoring Program and the Inuvialuit Settlement Region Community-Based Monitoring Program. Photos of local community members participating in CBM activities are prominently featured in the calendar. ENR also produced an information calendar in 2012 on community-based monitoring/funding opportunities. The calendar includes a month by month overview of the different funding opportunities and the corresponding funding caps and proposal deadlines. It also provides proposal writing tips and information on application criteria for each of the funding sources and contact information.

regular and routine observations on the water features such as flow rate and ice break up activity as a way of taking the program to “the next level of monitoring.” It was also suggested that the CBM program needs to be better coupled with local needs and research interests to get sustainable buy in from the communities.

It was suggested that the program could do more to demonstrate that it’s reaching across the entire expanse of NWT. For example, a test site could be established in Sachs Harbour and sites could be established in some of the more remote communities. While it’s appreciated that cost/resource factors make this problematic, it was suggested that ENR at a minimum needs to provide a fuller explanation of why testing is being conducted in some communities / regions and not others. It was noted that if cost and convenience are the factors behind decisions on testing locations then this should be communicated.

It was recommended that more action is needed on collaborating and communicating with co-management boards and other organizations (e.g., Fisheries Joint Management Committee, Wildlife Management Advisory Council NWT, Hunters and Trappers Committees). It was noted that the organizational structure of these organizations are worth tapping into in order to access feedback and share information.

Retaining monitors is challenging given that the work only amounts to a few days over the full year, so there is not a lot of incentive to take on the position. This challenge can vary depending on the community and on the local conditions (e.g., in communities where the economy is more diverse and residents have other opportunities to do other things, it is a struggle to find people who want to take on the role of a monitor and/or to find people with boats).

It was suggested that the performance of CBM program monitors in general should be regularly assessed to ensure that they are consistently recording the information they are supposed to be recording (e.g., recording the day of sample collection and temperature). If protocols are not being followed it needs to be reported so that action can be taken to better educate the monitors and continually improve the practice to ensure high quality data.

Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP)

TAEMP consists of a partnership between the Wek'èezhìi Renewable Resources Board (WRRB), Tłı̨chǫ communities, Tłı̨chǫ Government, Health and Social Services, Fisheries and Oceans Canada (DFO), Environment Canada, Health and Social Services, and research institutions.

A key focus of TAEMP is the Fish Camp which involves fish monitoring and collecting biological information and conducting contaminants analyses in relation to fish, water and sediments. TAEMP rotates through Tłı̨chǫ communities every four years (i.e., one of the four Tłı̨chǫ communities is sampled each year). Fish Camp features a basic training and hands on participation approach to community monitoring. Participants are trained on proper (i.e., standardized) monitoring practices (e.g., what it involves, how it’s done) while demystifying the science-based approach and fostering interest and mutual understanding. The Fish Camp provides a forum for exchanging Tłı̨chǫ knowledge and science interests and promotes relationship and respect building in a field and community context. TAEMP was established as a result of community concerns and not as a direct result of the Water Strategy. The program is

viewed as a gateway to more specific training. Funding for the continuation of the program is an issue. It was also noted that retention and repeat interest of participants in the summer of 2015 may be a challenge.

Fish Camp is community-based and the community specific perspective plays a key role in decision making. Community members are part of the WRRB and the research requires that knowledge holders be approached directly with assistance from local community representatives / Tłı̨chǫ Government. Knowledge holders are acknowledged for their contributions in reports and presentations and some members are compensated for their services at the Fish Camp (e.g., boat captains, elders). With respect to challenges, there are sometimes information gaps (e.g., lack of knowledge of certain invertebrates) and the WRRB considers all the best available information in decision-making including Tłı̨chǫ and scientific knowledge. The use of traditional / local knowledge depends on the topic. Knowledge transfer occurs at TAEMP meetings through groups of elders (focus group), using maps, video, visits to traditional sites, and storytelling. Traditional Knowledge informs decision making in a variety of ways. At Fish Camp elders dictate where the sampling occurs and community members provide knowledge of the area ecology and history to make the camp a success. The selection of community participants is done by community.

It was noted that the program is helping communities to understand how information is being collected and why it is being collected. With respect to the use of results in decision making, it was noted that the baseline phase of the program is now switching to the comparative phase and although it's still early some of the data has been used by the Wek'èezhìi Land and Water Board in review of a water licence application.

Inuvialuit Settlement Region - Community-Based Monitoring Program (ISR-CBMP)

ISR initiated its own community-based monitoring program over the last two years and it also collaborates with the NWT-wide CBM program. CBMP is interested in water quality and fish and wildlife monitoring while NWT-wide CBM focuses on water quality only. ENR sends two technicians to the region twice a year (spring and summer) and they work with local community members to deploy and extract the sampling / monitoring equipment. During one of these visits ISR staff recorded the process on video tape as a way to show others what they do and the proper techniques.

It was noted that more research / monitoring activities in general need to be established for communities along the ocean and it was emphasized that communities have to be a true partner in the monitoring process. ISR has four sites that it is testing that are linked to local concerns.

Slave River and Delta Partnership (SRDP) - Slave Watershed Environmental Effects Program (SWEEP)

SRDP is an example of a community-based monitoring initiative that emerged directly from the NWT Water Stewardship Strategy. SRDP was formed in 2010 to provide support to communities in developing community-based monitoring programs. Partners include communities, federal and territorial government agencies, Aboriginal governments, non-government organizations and academic institutions.

One of the initiatives that SRDP supports is SWEEP which is a two year community-based monitoring program involving researchers from the University of Saskatchewan with funding from the Canadian Water Network. The program was developed with assistance from the University of Saskatchewan which started conducting fish monitoring in the Slave River in 2011 and conducts sampling 2-3 times per year. The SWEEP program is using western science and traditional knowledge to understand what the ecosystem looked like in the past, how the ecosystem has changed over time and the human relationship to the land and water.

SWEEP is a community-based program that addresses key concerns and priorities in the Slave River and Delta watershed. Experts on traditional knowledge, ice, and aquatic invertebrates from the University of Saskatchewan are included on the team. Indicators focus on cumulative effects and potential contributions from different stressors. Indicators are measured by the community including observations based on local and traditional knowledge (Type1). Traditional knowledge is respectfully gathered through sharing circles and one-to-one interviews. Indicators are also based on western science (Type 2) and provide a baseline assessment of the condition of the river system (e.g., measures of water quality, bottom-dwellers, hydrology, and fish health). Air monitoring was initially considered as a research interest but the funding could only support so many research activities and so air monitoring was left off the project.

SWEEP is active with Aboriginal groups in Fort Smith and Fort Resolution. Monitoring equipment was provided and local community members were trained. The program also provides educational opportunities through the school curriculum. The focus was to develop knowledge at the local level that would stay with the community and be used in the community. It was suggested that it will be a challenge to maintain the current program as its funding ends in November 2015.

With respect to information sharing, it was noted that the first priority is to share monitoring results with the SRDP communities first. Workshops are conducted in the communities to share information and updates and this allows the participants to ask questions. It was noted that an ENR representative is in attendance at the community meetings to provide context. The community workshops for fish monitoring are sporadic and depend on funding but are typically conducted when collecting samples. The SWEEP workshops typically occur twice a year after data collection and purposely provide the information that people want to see. Results are also presented at conferences with the authorization of the SRDP.

It was noted that results and updates are provided to ENR and ENR converts the results into plain language. At this point the monitoring results have not been placed on the Discovery Portal. The University of Saskatchewan is developing its own web portal for SWEEP which will allow for the inclusion of scientific and traditional knowledge (quantitative and qualitative data) through a Bayesian Belief Network (BBN) which can be used to identify where uncertainty is greatest and if more data is required. It was noted that this could eventually include a mobile version that could be hosted by the Discovery Portal. The next step is to populate the website portal with scientific data and traditional knowledge and it should be available later in 2015. A video on the traditional knowledge component has also been developed and this will soon be available to share with communities.

DFO - Aboriginal Aquatic Resources and Oceans Management Program (AAROM)

AAROM is funded by DFO and is intended to build capacity for aquatic resource management in regions where DFO manages the fisheries. DFO fisheries management includes a community-based monitoring component which serves to inform the decisions made by DFO. AAROM involves Aboriginal partners and DFO runs community-based monitoring programs for fisheries in many of the communities. In large research programs DFO runs a scientific program that's based on the needs of fisheries with considerable community input. It was noted that through community monitoring DFO went from monitoring a small area to monitoring a whole lake and community members were involved "every step of the way." DFO offers a week of training for community members that are hired. Training content depends on the program itself but field program training is included. It was noted the participants are trained in water testing and record keeping as well as first aid and operating a watercraft (where needed). It was noted that recruiting and retaining people is very challenging. Much of the work is seasonal and it's difficult to find people seasonally or on short notice. Retraining is often required to run the program because of participant availability issues. It was noted that continuity is a major challenge as some people are looking for consistency in employment and may leave the position on short notice for other opportunities while others only want a short time work commitment.

The level of collaboration and community engagement in DFO community-based monitoring programs varies from community to community. In some cases it is a community concern that is driving the project. Where communities find that it's a priority for them, then traditional knowledge will shape the program. It was noted that it remains challenging to interpret and apply traditional knowledge to a scientific perspective.

A typical approach to collecting traditional knowledge is through formal meetings with community members and elders and these meetings shape the priority of the programs. Community members are provided an honorarium for their participation at meetings. In some cases where traditional knowledge is critical to the monitoring, interviews are conducted with knowledge holders. For example, if an ecosystem has changed in the past and there is no scientific evidence of this change or a scientific reason for the change, then traditional knowledge is used. The knowledge holders have stories relating to the changing ecosystem (e.g., when the change started). A couple of examples were provided to illustrate how traditional knowledge is being used to inform decision making. In one case, community elders were interviewed to learn about environmental changes and the timing of changes in relation to commercial fishery activity. In another case, formal meetings were conducted with community members to discuss ways to reduce bycatch of species. Community members were able to provide insights on the way certain fish hit the net and how this impacts the amount of bycatch. Community members suggested that shorter nets be used to reduce bycatch.

With respect to information sharing, it was noted that information is shared through formal presentations to council or community and through letters and bulletins.

It was suggested that DFO community-based monitoring initiatives are helping communities to better understand their water issues by creating a communication channel which has helped with the decision making process. It was noted that the research is helping to answer the questions that communities have about their water resources. For example, communities want to know if contaminants coming from the south are affecting fisheries and this question is being

answered. Although community-based monitoring has helped in improving collaboration, it's uncertain whether this is directly improving water management.

Parks Canada - Peace-Athabasca Delta Ecological Monitoring Program (PADEMP).

Parks Canada works with an existing community-based monitoring program with a focus on water quality and quantity monitoring. The program consists of a partnership between Parks Canada, GNWT, Aboriginal organizations, and NGOs. The group holds regular meetings and an annual forum.

Training on monitoring methods is made available to community-based monitoring employees. In some cases, training is provided by government departments such as Environment Canada. Long-term funding uncertainty was identified as a challenge for maintaining community-based monitoring training.

It was noted that traditional knowledge is considered alongside scientific knowledge. Community representatives are hired and they assist with site selection and interpreting results through surveys and workshops.

It was suggested that community-based monitoring initiatives are helping communities to better understand their water issues and also helping communities take more ownership over their water quantity and quality monitoring. It was also noted that communities are now able to advocate better on how to bring water issues forward.

Strengths and Challenges of Community-based Monitoring

Qualified human resources, financial resources and passion for and commitment to community-based monitoring were most often cited as the key factors that have contributed to the progress with community-based monitoring initiatives to date. The presence of local community-based monitoring champions, good relationships between water partners, and respect for the value of traditional knowledge were also identified as key factors.

As noted by one key informant, there is a "very supportive political climate for community-based monitoring initiatives and ENR has great staff that are all on the same wavelength." It was reported that ENR is also playing an important role in providing assistance in completing funding applications for community-based monitoring related projects. It was noted that funding applications are typically challenging to complete due to the level of detail required.

Progress has also been linked to the flexible and collaborative nature of support being provided. For example, Dehcho First Nations has their own community-based monitoring technician as part of their AAROM staff instead of an ENR technician. They wanted to avoid a duplication of the work that ENR was undertaking and entered into a partnership with ENR to access ENR training for the AAROM team and increase data collection responsibilities at the local level.

Many of the key informants suggested that community-based monitoring is a good approach to building local capacity. As observed by one key informant, communities gain "a degree of confidence and comfort" from their participation in community-based monitoring activities. It was

noted that some communities have secured funding to support their own coordinators which gives them a sense of community empowerment.

It was generally recognized that the Water Strategy has contributed to the intensification of community-based monitoring activity but it was also noted that a degree of community-based monitoring training/mentoring was occurring prior to the establishment of the Water Strategy (e.g., AAROM, Canadian Aquatic Biomonitoring Network (CABIN) training, Aurora College Training Certificate program). One key informant suggested that the results coming out of the NWT-wide CBM program are not influencing decision making at this stage and that the program needs more time to expand and mature with a stronger methodology before it becomes valuable.

It was noted that there is a waitlist of communities that want to be involved in community-based monitoring and it was also noted that ENR does not have the capacity or resources to support community-based monitoring in every community. It was suggested that it may not be possible to have a dedicated community-based monitoring monitor in each community and in some areas the regional organizations may have to provide support/resources until local capacity is built. It was suggested that resource management boards could fill this role where needed.

Several key informants emphasized that dedicating resources and time to capacity building is crucial for ensuring that the quality of the data (e.g., completeness, consistency) is not compromised.

Many of the key informants stressed the importance of educating youth about water stewardship and introducing them to different monitoring activities as a way of spurring their interest and participation. Bringing youth and elders together to learn about traditional knowledge is also viewed as a crucial part of this process for readying the next generation for water stewardship.

It was suggested that more planning was needed for the community-based monitoring approach to help water partners gain a common understanding of the future of community-based monitoring. Several questions need to be addressed such as what are the different community-based monitoring strengths of the water partners, who will lead and who will support the process, what are the job opportunities and how can the jobs be structured to better meet the needs of communities, how can the scope of work for local monitors be expanded beyond the role of providing assistance to researchers, what is the vision for community-based monitoring going forward?

One key informant suggested that the sampling locations for community-based monitoring initiatives need to be reviewed to confirm that the areas at greatest risk are being monitored. It was also suggested that it would be helpful to have community-based monitoring data aggregated to provide results at the watershed level.

With respect to the field monitors, the current positions are seasonal and as needed (e.g., 3-5 times per summer) and it's an ongoing challenge to retain trained monitors. As noted by one key informant, "you have to have the right people involved at the community level participating in community-based monitoring. People who are interested and care about the process and are willing to learn - even if they make small errors in their techniques (e.g., not recording the day of the sample and temperature) they take instruction well and make the necessary corrections to improve their techniques. If you can find the right people in the community ENR can avoid / limit the cost of sending technicians to the community every year. Community-based monitoring in its

fullest and truest sense has to be community led and implemented… currently this is not always the case depending on the community."

For some monitors the seasonal part-time work represents an important employment opportunity but for others the work is too inconsistent and there is not enough incentive to stay. It was suggested that more work hours and/or more pay would work as incentives to help retain monitors. It was noted that boat operators are sometimes hired to assist with water sampling and this typically requires half a day to do the sampling but half a day compensation may not be a sufficient incentive if they have other opportunities. It was suggested that a full day pay should be provided as an incentive for them to make the sampling a priority.

One monitor noted that she would like to see more youth/students (e.g., 16-17 years) take up monitoring opportunities. It was suggested that the experience could motivate them to stay in school and continue with higher education.

While acknowledging that some communities are at the point where they are able to send out their own monitors to conduct the sampling, one key informant commented that some of the training is not very formal and could more accurately be described as mentoring as technicians return each year to oversee most of the CBM details and local people provide assistance. It was suggested that a more sustainable structure needs to be promoted through community-based monitoring that goes beyond simply looking for seasonal field assistants.

Monitors reported that they were generally satisfied with the training they received which typically involves a 5 day workshop. The classroom training provides an introduction on what is being tested and the tools being used and instruction on the techniques for sampling (e.g., grab sampling and DGTs) and how to record information. In some cases the sampling techniques are demonstrated and practiced in the classroom and in other cases field training is provided out on the water.

Monitors were brought together for a meeting last year where they learned about the different contexts that the monitors work in (e.g., sampling from lakes vs. rivers). It was noted that this was a very worthwhile event as it helps facilitate greater understanding of the diversity of the water system and the different monitoring challenges (e.g., differences when the ice breaks up – including differences on opposite sides of the same lake).

Several key informants suggested that other work opportunities should be explored as a way of expanding the monitor positions into full-time jobs with greater responsibilities. One key informant described a need for linking community-based monitoring training and municipal water licensing and exploring opportunities for monitors to support water quality sampling in the water licence context.

With respect to expanded training, it was suggested that a modular training package (water, wildlife, forestry) could be developed to enable monitors to expand their credentials and their research and monitoring related activities could potentially be expanded into a full time equivalent as they become more attractive as potential research associates for southern research institutions or other organizations. It was suggested that the modular training package could be promoted and introduced with ties to business development / job creation and developed / tested through a year-long pilot project. ENR is partnering with Environment Canada and Aboriginal organizations to explore additional ways to offer training and develop local capacity including environmental leadership training. It was also suggested that local monitors

could be supported in participating in formal environmental training programs such as Building Environmental Aboriginal Human Resources (BEAHR) through Aurora College.

With respect to communication and information sharing, many of the key informants stressed the importance of using plain language – in the documentation being provided and in the presentations being made to communities. It was suggested that more time and resources need to be dedicated to working with interpreters and translators and getting the terminology right for articulating / communicating the meaning of technical information. It was noted that the "Working Together" guidance document prepared by the Aurora Research Institute (and available on the NWT Discovery Portal) is a helpful resource on communicating effectively. As noted by one key informant, the guidance document is good for emerging scientists in the north on how stakeholders should be involved.[16]

A number of key informants reported that the wait times for some community-based monitoring results can be excessive (e.g., sometimes a year or more before the results are made available for broad release) and this needs to be addressed.

It was suggested that the direct engagement and communication between elders and researchers has been a positive experience and technicians have adjusted their approach based on what they have learned from the elders.

One key informant observed that a lot of the traditional knowledge being collected is being used in the planning stages of research (e.g., determining the locations where sampling needs to take place in response to concerns over water quality, contaminants, fish health). In some instances elders are accompanying researchers in the field where they learn from the technicians about the research taking place and they share their knowledge about local conditions. Sometimes community meetings are used as forums for collecting traditional knowledge and it was suggested that these sessions need to be properly facilitated with adequate time allowances for meaningful input and feedback.

Monitors noted that the location of the water sampling is directly informed by where the community elders feel the water needs to be sampled. It was noted that community elders are very interested in knowing what type of research is being conducted and what the results indicate. Of primary interest to the elders is knowing if the water is clean and safe to drink and if the fish are healthy. It was suggested that more effort needs to put into communicating the results to the broader community.

It was also suggested that the results would have greater utility if they included a comparison to previous years (e.g., at least going back to 2012 and comparing to 2014) and it would be helpful to examine whether the federal government data from the 1990s is compatible / comparable to the current data being collected to see what longer term changes are occurring (e.g., water quality).

Several key informants noted that determining how traditional knowledge should be presented alongside scientific knowledge in the interpretation of the results continues to be a challenge.

[16] *Working Together towards relevant environmental monitoring and research* was developed by Aurora Research Institute to help researchers engage with community members as part of the research process and make their research more relevant to communities and resource managers. The guidebook provides tips on building community relationships, involving communities in project design and data / information collection, using traditional and local knowledge, and communicating the results effectively.

It was noted that since the start of CIMP and the Water Strategy there has been an improvement in community engagement in research and their understanding of their water issues. CIMP has specific criteria for funding approval that are linked to the Water Strategy. For example, southern-based research institutions doing work on CIMP water-related projects have to link their project to the Water Strategy as a priority and there has to be a focus on issues of importance to the community and community involvement in the research. Other funders (e.g., NSERC) do not have this requirement and the Water Strategy is a lesser order priority.

With the requirement for CIMP proposals to integrate community involvement in the project, the intensity of community involvement / engagement in monitoring activities has increased. It was suggested that communities are happy with the CIMP approach and with the capacity building that has taken place. However, it was also noted that ENR needs to look more extensively at the extent to which the monitoring and research being conducted is accomplishing what it set out to do, and the ENR should also assess the degree to which the work is yielding data that can answer the questions being asked.

3.5 Know and Plan – Source Water Protection

Summary Assessment on Progress/Success

Substantial progress has been made in partially achieving the objectives under the success criteria for Source Water Protection.

ENR has developed source water protection resources in partnership with other organizations. These resources include community watershed maps, a Source Water Assessment and Protection (SWAP) Guide Document and Workbook (2012), and a Source Water Protection Calendar (2013).

A number of opportunities have been provided for source water protection training and capacity building including workshops in Inuvik and Yellowknife (2012) as well as workshops the Yellowknives Dene First Nation (2013 and 2014) and a Source Water Protection Facilitators Workshop (2014).

A Partnership Approach to Source Water Protection is currently being piloted to develop and implement a Source Water Protection Plan for the community of Trout Lake. This initiative is testing the SWAP guide document and workbook and adapting it to local conditions. The partnership consists of Sambaa K'e Dene Band, Ecology North, and ENR. The source water protection plan for Trout Lake was completed in March 2015 and is now being implemented over the next year.

The process of building the right partnership is a challenge and requires engagement with and encouraging partnerships to address source water protection. Funding for source water protection planning is available through ENR but not for large scale implementation of the community plans as this needs to come from the community and additional funding grants.

Capacity issues and commitments to other projects (e.g., community-based monitoring) could limit the ability and interest of other communities in developing and implementing their own source water protection plans.

SUCCESS CRITERIA

Water partners identified that it is a priority to work with communities and others to undertake source water protection planning. The long-term outcome of this priority area is to ensure NWT communities are familiar with the concepts of source water protection planning, know how to access resources and potential partners, and have the capacity to put together community-driven source water protection plans.

A successful implementation of this identified priority area is when:

- *Opportunities have been developed for training and capacity building to support development and implementation of community source water protection planning (i.e., train the trainer workshops);*
- *All the regions have had the opportunity to participate in source water protection planning workshops;*
- *Community source water protection plans have been developed by interested communities; and*
- *Partnerships are established to support source water protection planning (i.e., the partnership model) and there have been integration and linkage made with other research and monitoring initiatives.*

Findings

GNWT is following a multi-barrier approach for ensuring that NWT drinking water is safe. Source water protection is the first barrier in the multi-barrier approach to safe drinking water.[17] ENR has been responsible for coordinating the source water protection initiative in NWT and implementation activities have included partnerships with other organizations.

ENR developed the community watershed maps (in PDF format) to enable communities to learn and adapt them based on their local knowledge. Some of these maps were updated in 2014 and they are available through the ENR website. ENR is currently working on an interactive source water protection mapping platform.

ENR also worked with Dr. Robert Patrick (University of Saskatchewan) to develop a Source Water Assessment and Protection Guide Document (Feb. 2012) and a Source Water Assessment and Protection Workbook (Feb. 2012) which can be used by NWT communities to develop their own plans to protect their source water. The guidance document and workbook are designed to be used in a workshop setting and are adaptable for different communities.

ENR produced a NWT Source Water Protection Calendar for 2013 that provides an overview of the key stages and activities associated with developing and implementing a Source Water Protection Plan.

Workshops in Inuvik (Feb. 2012) and Yellowknife (March 2012) were held to provide information and training on source water protection and the steps involved in developing a community source water protection plan. More recent activities include the Yellowknives Dene First Nation Source Water Protection, Permafrost and Climate Change Workshop (Sept. 2013), the Yellowknives Dene First Nation Sharing Knowledge and Planning for the Future of the Yellowknife River Watershed Workshop (Feb. 2014), and the Source Water Protection Facilitator's Workshop (Feb. 2014).

A Partnership Approach to Source Water Protection is currently being piloted to develop and implement a Source Water Protection Plan for the community of Trout Lake. The intent of the initiative is to pilot the SWAP guide document and workbook and adapt it to local conditions. The partnership consists of Sambaa K'e Dene Band, Ecology North, and ENR. The source water protection plan for Trout Lake was developed through workshops which also facilitated the process of community skills building in source water planning. The plan was completed in March 2015 and is now being implemented over the next year. Additional tools were developed as part of the Trout Lake plan including more visual representation and planning better suited to smaller communities (e.g., Trout Lake is a community of 100 people).

A total of four key informants including two ENR officials and two representatives from non-government organizations provided their observations on Source Water Protection.

Key factors that contributed to the progress made on the Trout Lake pilot project include the three way partnership approach between ENR, Ecology North and the community of Trout Lake. The partnership put together a technical advisory group that was supported by ENR and this group was able to answer technical questions from the community as they arose.

[17] The other barriers to ensure clean driking water include water treatment and operator training, water system maintenance (such as water pipes), water quality monitoring, and emergency response planning.

The Trout Lake community was also familiar with the researcher from Ecology North through her prior research activity in the community and this allowed for a trusting relationship to be quickly established.

A key success associated with source water protection is that the planning is very much based on community engagement and input. The partnership has well-defined roles and responsibilities and has worked well in sharing their network of expertise. The project team found aspects of the guidance document that did not work for the community and adapted the document as they progressed and prepared a reflections document to illustrate how the guidance document can be adapted.

A key component of source water protection planning is assessing the state of things and this requires a desktop review of all monitoring work that has been done. It was noted that relevant information can be accessed through the ENR website and the MACA website.

The technical advisory group provided expertise as needed and was especially helpful in assessing risk / magnitude of risk and providing useful input to elders and the community. Bringing people together for mapping was a very useful exercise.

ENR officials believe that traditional knowledge should play a dominant role in source water protection planning. As noted by one ENR official, communities know the land better than government staff and traditional knowledge can play an important role in the assessment when planning (e.g., identifying sites of concern that could be a threat to water quality).

Some general challenges facing communities interested in source water protection planning is limited capacity (e.g., human resources), funding and community interest. It was noted that communities need to be interested in source water protection and the process is easier if it's undertaken through a partnership.

As noted by one ENR official, source water protection does not attract a lot of interest as communities tend to be more interested in community-based monitoring activities. Communities that want to participate in source water protection are encouraged to approach ENR and indicate their interest.

The process of building the right partnership is a challenge on its own and requires engagement with partners, and fostering of relationships between those partners (e.g., communities and NGOs) In the case of the Trout Lake project it was important to supplement the wage for an environmental coordinator who could work with the NGO. Funding for source water protection planning is available through ENR but not for large scale implementation of the community plans as this needs to come from the community and additional funding grants.

3.6 Know and Plan – Long-term Aquatic Monitoring

Summary Assessment on Progress/Success

Substantial progress has been made in achieving the objectives under the success criteria for Long-term Aquatic Monitoring.

ENR and Environment Canada oversee a number of water quality monitoring (WQM) projects and the hydrometric network that provide a baseline and long-term source of data.

An evaluation of the NWT WQM network was completed in June 2014 which identifies water quality monitoring gaps (e.g., monitoring locations, schedules, parameters) and provides a framework for addressing the monitoring gaps. The evaluation report also identifies key roles for GNWT ENR within the overall water quality monitoring network including: watershed or regional-scale monitoring to assess cumulative effects of multiple stressors; climate change monitoring; transboundary monitoring; setting guidelines and standards for monitoring; and scientific oversight.

Environment Canada's water quality monitoring program is currently being evaluated and key gaps will be identified in the coming months to inform decision making for water quality monitoring.

Other water partners are also engaged in long-term monitoring activities. DFO is helping to monitor areas in the long-term through its Aboriginal program funding. Community consultations were used to prioritize sites that need to be monitored. DFO has identified vulnerability assessment as an information gap.

ENR, DFO and Environment Canada are using consistent sampling and data validation protocols.

ENR, DFO and Environment Canada make their research results available to NWT communities and progress has been made in creating online access to water quality data through the LodeStar database and the NWT Discovery Portal.

SUCCESS CRITERIA

Water partners identified compiling data from water quality and quantity monitoring programs and determining gaps in aquatic monitoring programs as a priority area. The long-term outcome is to address and fill monitoring gaps to better understand the baseline of the different water bodies and improve the protection of the waters of the NWT.

A successful implementation of this identified priority area is when:

- *Gaps in aquatic monitoring (quality, quantity and bio monitoring) are identified;*
- *A plan is developed on how to fill the identified gaps;*
- *Existing aquatic monitoring plans are reviewed to ensure they are addressing current issues and parameters, appropriate sampling and analytical protocols are being implemented;*
- *Consistent sampling and data validation protocols are being developed and implemented;*
- *The environmental database (Lodestar) is populated; and*
- *Results of each monitoring program are published and made available to NWT residents.*

Findings

ENR oversees a number of water quality and quantity monitoring projects that provide a baseline and long-term source of data.[18] WQM projects include the North Slave Water Quality Network[19], Snow Survey Monitoring Network[20], the Abiotic Monitoring Network[21], and the Hydrometric Program[22].

Water quality monitoring under the Transboundary Rivers Monitoring Program currently takes place on the Slave, Hay, Liard, and Peel rivers and status and trend reports on water quality have been completed by AANDC for each of the rivers on a periodic basis.[23] Open water seasonal sampling on all four of these transboundary sites is ongoing.

An evaluation of the NWT WQM network was conducted by Summit Environmental Consultants Inc. for ENR (June 2014). The report was completed to assist ENR with program planning as GNWT ENR, assumed additional responsibilities for water resource management through the devolution process. The report provides a profile of existing water quality monitoring activities and identifies and summarizes the water quality programs currently run by ENR and other

[18] An inventory of NWT water monitoring initiatives / programs led by Aboriginal, federal and territorial governments, communities, industry, and others was compiled by ENR in November 2013 and updated in December 2013. http://www.nwtwaterstewardship.ca/sites/default/files/YELLOWKN-%23599863-v1-water_strategy_-_water_monitoring_inventory_-_updated_December2013.PDF

[19] Cumulative effects of mining and other development are being examined within Coppermine and Lockhart River Basins. Using historic monitoring programs as a foundation, seasonal monitoring was initiated in 2000 and continues to be carried out in the upper reaches of the Coppermine and Lockhart basins. A status and trends report and program review was completed in early 2015. Water quality and quantity information was analyzed for seasonal and long-term trends. Water quality information at three rivers located near Yellowknife (Marian, Yellowknife, and Cameron rivers) is being collected and assessed as a matter of local community interest for source water protection, recreation, and overall aquatic health. These three rivers have been monitored monthly since 1999 and results, along with historic values, are currently being assessed for seasonal and long-term trends.

[20] ENR Water Resources Division (WRD) is measuring the volume of snow at the end of the season (April) at a network of survey sites. An annual spring bulletin is distributed to various government agencies and industry to inform them of anticipated freshet conditions. Historic snow quantity data can be viewed and downloaded online, and trend analysis is currently being completed.

[21] ENR WRD has a network of eight climate monitoring stations across the NWT that monitor a variety of environmental parameters. Data have been used to compare evaporation rates (published reports available), calculate local site water balances (contaminated sites), inform regulatory applications, and are used to inform numerous academic research projects. Current discussions include working with Department of Transportation to expand the network to sites beneficial for both groups.

[22] ENR WRD contributes funding to the operation of the Northwest Territories portion of the National Hydrometric Network. This network is operated by the Water Survey Division of Environment Canada. Stream flows and lake levels are measured routinely at 93 sites. Fourteen additional sites are being either added or reactivated in 2015/16. Data are published annually and are available from Water Survey of Canada's National Water Quantity Survey Program website. This site also includes real-time hydrometric data for many river stations.

[23] The transboundary water quality sampling sites were established to characterize the water quality in the major transboundary rivers flowing into the NWT. Water sampling (as well as fish sampling in some cases) was initiated at different periods for the four rivers (Slave – 1990; Hay – 2004; Liard – 1991; Peel – 2002) and follow-up sampling has occurred at approximate 5-year intervals.

organizations.[24] The report identifies the most valuable roles for GNWT within the overall water quality monitoring network including: watershed or regional-scale monitoring to assess cumulative effects of multiple stressors; climate change monitoring; transboundary monitoring; setting guidelines (e.g., parameter lists, schedules) and standards (field, laboratory, and quality assurance / quality control) for monitoring; and scientific oversight. The report also identifies monitoring gaps (e.g., monitoring locations, schedules, parameters)[25] and provides a framework for addressing the monitoring gaps.

Environment Canada and DFO are also engaged in long-term monitoring activities.

The Freshwater Quality Monitoring and Surveillance Division of Environment Canada have a mandate to monitor and report on freshwater quality and aquatic ecosystem status and trends. These activities assess threats to freshwater quality and aquatic ecosystems to ensure they meet federal commitments related to transboundary watersheds. Environment Canada maintains a network of long-term water quality stations in the north, which includes close to 50 stations across the three territories (including 22 sites in the NWT), and 60 years of records. Environment Canada's water quality monitoring program has been evaluated using a risk-based approach.

Several different tools have been employed as part of the national water quality monitoring network review including:

- Site-level Risk-based analysis (RBA), which involved the scoring of sites based on risk to water quality posed at that site and within its drainage area.
- Risk-based basin analysis (RBBA), which is a GIS analysis of all sub-drainage and sub-sub-drainage basins in the country using several layers of information on risks to water quality, allowing Environment Canada to compare existing site locations with locations of highest risk
- Power analysis, in which current sampling frequencies and data were used in a statistical analysis to determine the existing power to detect trends at water quality sites and the changes in the ability to detect trends at reduced sampling frequencies.

The RBA and RBBA are designed to identify and rank environmental stressors, or combinations of stressors, on watersheds. All three of these projects are wrapping up and key results are now under review and key gaps will be identified in the coming months and discussed to guide decision making for Environment Canada water quality monitoring.

DFO is helping to monitor areas in the long-term through its Aboriginal program funding. The DFO water strategy group has met with communities and prioritized sites that need to be monitored. DFO has a fishery sustainability checklist that they use to assess any impact that a fishery may have on water resources. If water temperatures are rising they are incorporated into the management plan. DFO examines the "whole picture" to the degree that they can. DFO acknowledges that there are information gaps and some priorities may be unrealistic to implement. As an example, there was concern related to water removal in the south and how

[24] Approximately 240 unique monitoring sites, both active and inactive, were identified in NWT or nearby on inflowing rivers. Some of these sites include more than one sampling station and the total number of individual stations with at least one data point is more than 500.
[25] The report identifies special consideration for lake monitoring as lakes are currently underrepresented in NWT WQM programs.

that may affect productivity in fisheries in the lakes.

A total of three key informants including one ENR official and representatives from Environment Canada and DFO provided their observations on Long-term Aquatic Monitoring.

As noted above, Environment Canada is currently evaluating its water quality network and gaps in the water quality network will be identified and discussed over coming months/years. There are obvious spatial gaps in the northern network, and the RBBA is being refined for the northern context which should allow better identification of sub drainage areas or sub-sub drainage areas with greater risk that may or may not be being monitored right now.

Environment Canada is also responsible for the CABIN water quality monitoring initiative. The CABIN initiative focuses on the collection of freshwater benthic invertebrates as an indicator of ecosystem health in northern rivers. Benthic biomonitoring has also been done in the north but with few final CABIN models being completed. Biomonitoring gaps are being addressed by running more training courses for CABIN biomonitoring certification in the north and supporting interested parties but this phase is just beginning. Sampling and model-building north of 60˚ have been identified as a monitoring gap and planning is underway for increased CABIN sampling in NWT in the coming years. This could potentially provide a number of training opportunities for community field staff and project managers.

DFO is working to improve the existing program to incorporate water monitoring so that not only is there improved water monitoring but also improved communication that allows one to take advantage of existing programs. In general, DFO feels that water partners are making some progress in collecting water quality and quantity data in a standardized manner but ENR officials need to continue to promote and monitor this. DFO also feels that the data management and sharing systems (e.g., NWT Discovery Portal, Lodestar) are going in the right direction. With respect to the progress made by the Water Strategy in enhancing the water quality and quantity monitoring network in the NWT, DFO recognizes that there are capacity and resource challenges and monitoring is very difficult when you take into consideration the number of people in NWT versus the amount and distribution of water in this vast region.

An ENR official noted that they are doing a good job of water monitoring upstream and downstream of existing developments but more attention needs to be given to collecting advance baseline data in locations where development is likely to take off. It was suggested that this could potentially be done based on existing knowledge of where mineral deposits are located with potential for resource extraction. It was suggested that GNWT tends to rely too much on the development proponent to take responsibility for collecting water samples and this is often insufficient as there should ideally be five years of baseline data.

In general, ENR officials believe the Water Strategy has made good progress in creating online access for water quality data while acknowledging that more needs to be done. ENR officials view the LodeStar database as a useful resource for researchers that will assist in analyzing year to year changes and patterns at sites. LodeStar is designed to provide a consistent approach to environmental data management across NWT using rigorous data validation procedures. One official emphasized the importance of properly resourcing the LodeStar database with a full time employee as it requires oversight to ensure ongoing data compatibility. It was noted that ENR needs to have its own water monitoring network and it needs to manage

its own data to ensure the data is well maintained and that technical reports are supported by plain language reports.

An ENR official also noted that the Discovery Portal is useful for researchers and can be accessed by anyone through the Internet.

As noted by one key informant, a potential challenge in promoting access to data is resistance to open access sharing of data and this will need to be addressed in a formal manner. It was also noted that more could be done to incorporate traditional knowledge in long-term aquatic monitoring activities and to ensure that it’s done in a meaningful way.

3.7 Use Responsibly – Regulatory Processes

Summary Assessment on Progress/Success

Moderate progress has been made in achieving the objectives under the success criteria for Regulatory Processes.

The *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the NWT* were completed jointly by AANDC and Land and Water Boards of the Mackenzie Valley in 2013. The report identifies the Water Strategy as a relevant reference document.

The importance of cooperative and coordinated stewardship of shared water resources is identified as a principle in the policy document on Water and Effluent Quality Management completed by the Land and Water Boards of the Mackenzie Valley in 2011. This is consistent with the importance that the Water Strategy attaches to improving cooperation among water managers and interveners in the environmental assessment and regulatory process.

At the annual Water Strategy implementation workshop in February 2015, the Water Regulatory Section of Water Resources Division (ENR) provided a general overview of Regulatory Processes. This included a summary of the licence review and assessment work carried out by the Water Regulatory Section in 2014. This work is conducted in the spirit of the Water Strategy.

Representatives from the different regulatory boards participate at the annual Water Strategy implementation workshops.

Linkages between the Water Strategy and the regulatory boards could be strengthened. At this time the current water licencing procedure documents for the Mackenzie Valley Land and Water Board (MVLWB) and the Inuvialuit Water Board (IWB) do not make any specific references to the Water Strategy.

SUCCESS CRITERIA

Water partners identified implementing the Water Strategy in light of regulatory processes and guidelines as a priority area. The outcome of this priority area is to ensure the initiatives of the water strategy inform regulatory processes and address any challenges identified.

A successful implementation of this identified priority area is when:

- *The intent of the Water Strategy is acknowledged in Water Licence approval processes;*
- *Information needs in the regulatory processes are discussed and acknowledged during the annual implementation workshops (or alt. there is participation from boards at the annual workshop); and*
- *The Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories are completed.*

Findings

ENR is responsible for managing water resources in the Mackenzie Valley and inland waters in the Inuvialuit Settlement Region through the administration of the *Waters Act* and Regulations.[26] Regulation of water use in the Northwest Territories is a shared responsibility. The Mackenzie Valley Land and Water Board (MVLWB) along with the Sahtu, Gwich'in and Wek'eezhii land and water boards, issues water licences in the Mackenzie Valley. The Inuvialuit Water Board (IWB) issues water licences in the Inuvialuit Settlement Region (ISR). ENR Water Resources is responsible for reviewing water licence applications and evaluating proposals and licences issued by the boards. These are delegated responsibilities under the *Mackenzie Valley Resource Management Act*.

In 2014, ENR provided reviews and assessments of proponent submissions for over 15 Type "A" water licence processes and reviews and recommendations were provided on various Type "B" water licence submissions.[27] The reviews were conducted in the spirit of the Water Strategy to ensure that water is protected through proper water and waste management practices, mitigation measures to protect water quantity (water recycling) and quality (waste disposal), and proper monitoring and assessment of the development. In 2014, ENR also contributed to the development of landfill guidelines with the Land and Water Boards of the Mackenzie Valley and these guidelines are expected to be released in the 2015 fiscal year.

Regulatory boards and ENR work on the development, review and implementation of specific water-related regulatory procedures and guidelines. Guidance and policy documents pertaining to aquatic effects monitoring programs, water and effluent quality management, closure and reclamation, spill contingency plans, and waste management plans are available through ENR and the Land and Water Boards of the Mackenzie Valley.

In 2011, the Land and Water Boards of the Mackenzie Valley completed a policy document on Water and Effluent Quality Management. The policy describes the Boards' approach to managing the deposit of waste to the receiving environment through enforceable terms and conditions set in water licences. The policy is intended to ensure that Board licensing decisions are clear, timely, consistent, and transparent. The policy also highlights the importance of cooperative and coordinated stewardship of shared water resources which is consistent with the importance that the Water Strategy attaches to improving cooperation among water managers and interveners in the environmental assessment and regulatory process. The policy promotes the inclusion of traditional and local knowledge in water licence applications (e.g., knowledge about the environment, knowledge about interacting with the environment, and environmental values; traditional and potential uses of the receiving water bodies; and cultural significance of the water bodies to local residents).

---

[26] Responsibilities related to water and land management were transferred from AANDC to GNWT in April 2014. The regulatory process remained the same as it was prior to April 2014 with the Land and Water Boards processing and reviewing plans and submissions, including conducting water licence issuance, renewal and amendment application processes.

[27] Type "A" water licences are required for larger scale development projects and typically include the use of more than 300 m^3 of water per day or the deposit of milling/industrial waste. Type "A" water licences require the Minister of ENR to approve them before they can be issued. Type "B" water licences are required for smaller scale development projects and typically include the use of more than 100 m^3 but less than 300 m^3 of water per day or the deposit of specified wastes. Type "B" licences with a public hearing also need Minister of ENR approval.

In 2013, *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the NWT* were completed jointly by AANDC and Land and Water Boards of the Mackenzie Valley. The document represents a single guidance document containing direction on the level of detail, the information required, and the process for developing closure and reclamation plans required by water licences. The document identifies the Water Strategy as a relevant reference document.

At this time the current water licencing procedure documents for MVLWB and IWB do not make direct mention of the Water Strategy or the term 'stewardship'. The MVLWB procedural guide was last updated in 2003[28], prior to the development of the Water Strategy, and the IWB procedural guide was revised in 2014[29].

Workshops are being used to educate and inform the public and industry about the regulatory system. For example, the Sahtu Land and Water Board (SLWB) conducts an annual training workshop that guides members of Sahtu organizations, the public, and industry through the regulatory system in the North and the roles and processes of the SLWB. [30] The SLWB recently started making annual presentations to high school students as well to inform students about the various career and education paths available in the Sahtu and in the broader regulatory field and to encourage students to take an active role by attending proponent's community engagement meetings.

MVLWB and Wek'eezhii Land and Water Board (WLWB) representatives have delivered information sessions as part of the Environment and Natural Resources Technology Program (ENRTP) at Aurora College's Fort Smith campus.[31] The one day session provides an overview of the legislative framework of the Mackenzie Valley and outlines the steps in the regulatory process and the roles of the different organizations/ parties involved in the regulatory system. The session also includes a role-playing exercise where students experience the regulatory system from various perspectives.

A total of six key informants including two ENR officials and representatives from four different Regulatory / Resource Boards provided their observations on Regulatory Processes.

It was generally recognized among the key informants that the linkages between the regulatory process and the Water Strategy are not well developed or defined at this time. As noted by one key informant, the intent is acknowledged in the licensing process but it has not been well documented. It was suggested that a clear explanation is needed on how the Water Strategy could be incorporated into the licensing and the review of management plans of various development projects. It was also suggested that an education component is needed to

[28] Guide to Completing Water Licence Applications to the Mackenzie Valley Land and Water Board, 2003.
[29] Water Licencing in the Inuvialuit Settlement Region, Northwest Territories. Summary of Procedures and Information Requirements, July 2014.
[30] The typical approach has been to conduct the annual workshop in one Sahtu community and these sessions attract about 20 residents. In 2012, the SLWB expanded the opportunity for Sahtu residents to learn about the regulatory process by presenting material in the Sahtu communities and high schools of Fort Good Hope, Norman Wells, Tulita, and Deline. This expanded approach reached over 100 residents.
[31] ENRTP prepares students for work in the environmental field through courses on wildlife management, Geographic Information Systems (GIS), environmental assessment, the northern regulatory system, and field-work opportunities.

reinforce how the integration of the Water Strategy goals in the regulatory process can help reduce environmental impact.

Key informants noted that there is good collaboration between the regulatory boards and they identified several successful initiatives that were completed including the Environmental Research and Monitoring Forum, a community engagement session in Fort Good Hope, and an experiential cross cultural research camp where scientists learned about how people understand research from a science perspective and what they have to contribute in terms of their own knowledge of the land.

The bulk of the feedback provided by key informants related to ongoing challenges and information gaps.

As emphasized by one key informant, the environmental management context is becoming increasingly complex and it needs to be dealt with carefully as efforts to engage with community organizations and recruit experts on research and monitoring can inadvertently undermine existing organizations and their leadership roles. It was suggested that greater consultation needs to take place on how to undertake community-based work and work with established organizations rather than creating new mechanisms and organizations to interact with communities.

With respect to developing guidelines it was noted that developing a joint guideline with the federal government and a regulatory board was a challenge from the standpoint of having to work through a federal government process which took longer than anticipated. It was also a challenge to determine the right level of detail in the guidelines and how prescriptive the document needed to be. A key factor in overcoming this challenge was staying engaged with industry.

Guidelines and approaches for integrating traditional knowledge in monitoring and assessment processes have been developed and these tools should be reviewed by boards that are trying to link regulatory strategy and traditional knowledge.[32]

One key informant noted that there are many site specific considerations and it's difficult to implement the various aspects that need to be considered. For example, there are different considerations for effluent limits as some water bodies have Canadian Council of Ministers of the Environment (CCME) standards already in place but CCME relies on toxicity only and traditional use and treaty rights also need to be considered when determining effluent limits and discharge contaminants. In one case, a board has tried to incorporate traditional concerns (e.g., land use, burial grounds, spiritual connections, harvesting areas, etc.) into a decision making framework to consider the potential impact from the development. This approach is still in

[32] *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment*. Mackenzie Valley Environmental Impact Review Board, July 2005. This report outlines the Review Board's expectations and processes for the incorporation of traditional knowledge in the Review Board's environmental impact assessment process.
Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories: Overview Report. AANDC, June 2009. This report includes a section on the role of traditional knowledge in the development and implementation of aquatic effects monitoring programs (AEMP) in the NWT and approaches to integrating traditional knowledge into the AEMP development process.

development, but, as one key informant suggested, it has the potential to align with the goals of the Water Strategy to incorporate Aboriginal groups in the water standards and licensing components. Another challenge relates to weighing the concerns of a few residents vs. the interests of the community as a whole.

With respect to gaps in monitoring and preparedness for future needs, it was noted that there is no systematic data on wetlands across the NWT. Several key informants commented on the need for continued action on policy and regulation development for fracking development. The GNWT has moved beyond policy and is developing hydraulic fracturing filing regulations which include a requirement for baseline surface and groundwater information. The GNWT has conducted public engagement and discussions seeking input on the regulations.

One key informant suggested that there needs to be more engagement in cross regional development of climate change guidelines to mitigate the impacts of climate change.

3.8 Use Responsibly – Municipal Water Licence Compliance

Summary Assessment on Progress/Success

Moderate progress has been made in achieving the objectives under the success criteria for Municipal Water Licence Compliance.

Although the number of unlicensed NWT communities increased slightly from seven to nine between 2011 and 2014, at least four communities have applied or are in the process of applying for a water licence since 2011 and there has been an increase in communities complying with submitting Annual Reports.

Communities and other water partners have identified and are continuing to address challenges related to preparing water licence applications and complying with water licence requirements. Human resource capacity issues remain a major challenge in some communities.

Training in water quality monitoring is being provided to communities with a specific focus on the monitoring requirements of the community water licences. Training has been provided by Land and Water Boards (e.g., IWB and WLWB).

Standard reporting templates have been developed to assist communities in completing their Operation and Maintenance Plans for Municipal Water Licences but the extent to which these templates are being used needs further review.

MACA is able to provide support to communities who need assistance with sampling and offers training for solid waste and wastewater facility operators through their MACA's School of Community Government Water and Waste Management Program. MACA also provides funding assistance for communities preparing a water licence application with a priority on communities that do not have an existing water licence.

SUCCESS CRITERIA

Water partners identified building community capacity for monitoring required under municipal water licences as a priority area. The outcome of this priority area is to ensure an increase in the number of communities that comply with municipal water licences.

A successful implementation of this identified priority area is when:

- *The number of communities with a current municipal water licence increased from 2011 to 2015;*
- *The number of communities complying with their municipal water licence increased from 2011 to 2015;*
- *Training has been made available to communities that did not comply with their municipal water licences;*
- *Standard reporting templates and guidance on plan requirements have been made available to communities that did not comply with their municipal water licences; and*
- *Regular and routine inspections of municipal water licences have been conducted.*

Findings

ENR data indicates that 70% of the NWT communities with a water licence were valid in 2014.[33] In 2014, there were 9 unlicensed NWT communities compared to 7 unlicensed NWT communities in 2011. In 2013 and 2014, the water licences for two communities expired while four more communities have applied or are in the process of applying for a water licence since 2011 (Table 5).

ENR officials reported on several water licence improvements that have occurred since 2011:

- Most municipalities submit Annual Reports regularly and there has been an increase in communities complying with submitting Annual Reports.[34] For example, Tulita submitted its first Annual Report in 2012.
- Although Surveillance Network Program (SNP) samplings for most municipalities is a challenge, there has been an increase in communities complying with completing SNP sampling. For example, Whatì completed its first SNP sampling round in 2011 and continued the program in 2012. However, it was noted that 13 NWT communities do not fully understand the potential impact of wastewater effluent releases to their surrounding water environment. This is due to the challenges in collecting and reporting results from SNP samples on an annual basis.
- More communities are complying with submitting Operation and Maintenance (O&M) Plans for sewage disposal facilities and solid waste disposal facilities as well as spill contingency plans.

Table 5: NWT Communities without a Valid Water Licence, 2011 and 2014

Unlicensed communities	Year		Status update
	2011	2014	
Colville Lake	✓	✓	
Fort McPherson		✓	Expired 2013-08-31
Fort Resolution	✓	✓	Currently applying
Jean Marie River	✓	✓	Process initiated in 2011 – not yet finalized
Lutselk'e	✓	✓	Process initiated in 2011 – not yet finalized
Nahanni Butte	✓	✓	
Sambaa K'e / Trout Lake	✓	✓	Process initiated at end of 2012 – not yet finalized
Tuktoyaktuk		✓	Expired 2014-06-30
Wrigley	✓	✓	Communication initiated regarding licence

Source: GNWT ENR, July 2015.

Communities and other water partners have identified and are continuing to address challenges related to preparing water licence applications and complying with water licence requirements. Training in water quality monitoring is being provided in a number of communities in response to the issue of limited local capacity.

[33] This represents 22 of 31 communities. Hay River Reserve and Kakisa are exempt.
[34] Annual Reports include the results of water testing and effluent testing and to be reported regularly in accordance with the water license and any MACA requirements.

Water compliance testing training took place in three communities in 2014 (Behchokǫ̀, Gamètì, Whatì) and is planned for five communities in 2015 (Enterprise, Fort Providence, Fort Resolution, Fort Smith, Hay River).

WLWB staff have been working collaboratively with Tłı̨chǫ communities to build local capacity for water quality monitoring, focusing on the monitoring requirements of the community water licences, including: sampling procedures, reporting and recordkeeping, communication and interpretation of results. Training workshops have been designed and delivered in three parts: in the classroom where water licence requirements and water sampling procedures are discussed; in the field collecting water samples; and through discussions on the results. Community staff members are provided with a field manual that describes the sampling locations, parameters, and procedures specific to the community, instructions for pre and post sampling logistics, and templates for record keeping and annual reporting. Training on sampling procedures and reporting takes place every spring/summer in the Tłı̨chǫ communities.

To help foster understanding of water quality issues and to connect community staff with staff from the agencies responsible for various aspects of water management, the WLWB has worked collaboratively with other organizations, including: ENR, Environment Canada, MACA, AANDC, and Ecology North. Community participants have included: community Senior Administrative Officers, foremen, land officers, water treatment plant operators, Chiefs and council members, and other interested community members.

MVLWB, MACA and ENR have collaborated to develop templates for O&M Plans for Municipal Water Licences. These documents have been created in a fillable, user-friendly format in order to reduce the work-load on communities to complete these plans. These documents will ultimately be used by community staff and/or their consultants. The templates were developed to assist with older facilities that do not have operations and maintenance plans and to provide some guidance to communities and consultants when developing Operation and Maintenance plans for new sewage and solid waste sites.

MACA has staff who travel to communities and are familiar with the sampling requirement for municipal water licences and can provide sampling assistance to operators upon request. Training for solid waste and wastewater facility operators is available through MACA's School of Community Government Water and Waste Management Program. MACA has made funding assistance available, upon request, for communities preparing a water licence application. The priority for this funding is for communities that do not have an existing water licence.

In 2013, MACA produced a *Water Quality Summary* of water sampling between 2011 and 2013. The summary covered all communities and provided an overview of the communities that met their regulatory requirements for sampling (treated water bacteria tests) and those that did not and required continued effort to meet the sampling requirements.[35] In both 2012 and 2013, a total of 11 communities did not meet their regulatory requirements for sampling and one community in each of those years was under a boil water advisory. This represents a slight decline from 2011 when 13 communities did not meet their regulatory requirements for sampling and one community was under a boil water advisory.[36]

A total of four key informants including one ENR official, one NGO and two representatives from two different Water Boards provided their observations on Municipal Water Licence Compliance.

[35] Water treatment methods differ depending on the quality of the source water.
[36] Source: http://www.maca.gov.nt.ca/wp-content/uploads/2012/03/MACA-2013-DWQ-Primer.pdf

Although stakeholders feel that limited progress has been made on this component of the Water Strategy, there is growing recognition for the need to increase the number of communities with a current municipal water licence and ensuring their compliance and this change in awareness is seen as an achievement in itself. As noted by one key informant, the main focus to date has been on compliance with existing licences and the next step is to make improvements. Resource challenges (e.g., time, financial, human) at the community level and within government departments are commonly noted as factors that are limiting action on water licensing.

It remains a challenge for Aboriginal organizations to engage effectively due to resource and capacity limitations. As noted by one organization, their resources are “stretched thin” doing regulatory business which makes it very challenging to get into all the communities. Continued support from GNWT and other water partners will be needed for some time in the future to assist with the transition as local capacity is built. As emphasized by one key informant, support for capacity building has to be consistent during the transition and not piecemeal or the momentum and gains being made will not be maintained.

It was also noted that some communities are not interested in obtaining a water licence until land claims are recognized and will not recognize the role of review boards. Although a real breakthrough may not be achieved until the land claims are settled, one key informant suggested that more work could be done in these communities to communicate the value of water licencing as a tool for protecting the environment.

NGOs in general are limited in what they can do in this and other aspects of engagement in the Water Strategy. Given their limited resources their involvement with projects and communities can be sporadic and short term. As noted by one key informant, NGOs often work on small initiatives with isolated pockets of funding and it is frustrating to complete the work with limited or no ability to determine how the work they initiated is followed-up on.

Specific challenges in conducting regular licence inspections vary from region to region but some of the common elements identified include staffing problems with inspectors and coordinating the availability of people, complications with travel and accessing sites, and comprehension of the water license.

Communities face challenges related to aging infrastructure and missing information that is needed to satisfy the requirements set out by partners and reviewers. There is also a need for guidelines and operations and maintenance manuals and a clearer understanding of who is responsible for the elements.

There is a general feeling among the key informants that more linkages need to be made between ENR objectives and MACA and the Water Strategy could be used as a guidance document as part of the municipal water licencing process (e.g., using the water protection concepts from the Water Strategy as criteria for licencing).

It was suggested that the community-based monitoring component of the Water Strategy should have a water licencing component. As noted by one key informant, ENR and the water partners need to look at opportunities within community-based monitoring to expand monitoring in places

near development. It was also noted that the municipal licence initiative in the Water Strategy lacks a component for aquatic effects monitoring.

It was suggested that specific objectives for municipal water license compliance need to be identified and a full implementation plan developed for each objective identifying the challenges, issues, roles and responsibilities, and accountability for progress.

Finally, it was suggested that the Water Strategy should be used to leverage more funding for promoting action on municipal water licencing as a priority as political level decisions are needed to correct problems and make changes.

3.9 Overview of Traditional and Local Knowledge and the Water Strategy

The following provides a general overview of the successes, challenges, and opportunities related to traditional knowledge and the Water Strategy noted by all key informant interview groups (Aboriginal organizations, GNWT/ENR, federal government, NGOs, and research institutions).

A common perspective shared in key informant interviews is that traditional knowledge and western science represent different paths to knowledge but they should be treated equally, and that protocols designed to assist in balancing traditional knowledge and western science ought to be followed and improved upon. Likewise, it was expressed that ENR could work closely with water partners to more effectively incorporate traditional knowledge in decision-making.

Factors Influencing the Use of Traditional and Local Knowledge in Implementing the Water Strategy

Some of the factors influencing the use of traditional knowledge in implementing the Water Strategy as expressed by multiple respondents include:

- An unequal amount of investment being made in traditional knowledge research compared to western science (i.e., less time and resources allocated to traditional knowledge compared to western science research).
- Traditional knowledge is being regarded as an add-on aspect of programs as opposed to being ingrained and playing a role in informing processes and decisions. In other words, traditional knowledge needs to extend beyond surveys and focus groups to playing a larger role in informing the process.
- Recording traditional knowledge and managing data appropriately and effectively.
- Implementing adequate information sharing agreements between communities and other stakeholders looking to access traditional knowledge data needs to be strengthened such that communities feel comfortable sharing knowledge and stakeholders have access to the information they require to be effectively integrating traditional knowledge.
- Adequately engaging Aboriginal governments such that concerns are effectively represented and that relationships are built between GNWT and Aboriginal governments.
- Government not being the knowledge holder with respect to traditional knowledge and therefore having difficulty integrating traditional knowledge into decision-making processes.
- A lack of training and capacity within ENR on traditional knowledge research and inclusion that prevents traditional knowledge from being adequately included and factored into decision-making.
- Current emphasis is placed on individual knowledge and less so on community knowledge. Key informants identified this as a need to develop more group-oriented collaborative approaches to traditional knowledge research at the community level.
- “Western-science” technicians sometimes have limited time in the field for connecting with elders and land users.

The factors articulated pointed to general trends regarding time, resources, and capacity limitations of those involved in work on the Water Strategy that serve to constrain the inclusion of traditional knowledge in implementing the Water Strategy.

Successes with the Inclusion of Traditional and Local Knowledge in Implementing the Water Strategy

Despite the host of constraining factors, key informants also identified many noteworthy successes with respect to the inclusion of traditional knowledge integration. Some of the instances of successful integration of traditional knowledge in implementing the Water Strategy include:

- Traditional knowledge played a major role in informing and shaping the transboundary agreement with Alberta and the final agreement includes an appendix outlining the need for a framework for incorporating traditional knowledge in the implementation of the agreement.
- The TAEMP Fish Camp utilizes traditional and local knowledge extensively through active engagement with elders and the participating communities.
- Traditional knowledge is gathered through sharing circles and one-to-one interviews as part of the SRDP SWEEP program to identify different environmental stressors and inform sampling locations.
- Meetings with community members and elders are used to shape the priority of AAROM programs. Elders provide key information on environmental changes and the timing of changes in relation to commercial fishery activity.
- The Trout Lake Source Water Protection plan was developed with involvement of elders and brought together the community and technical groups to co-develop areas of focus and an implementation plan.
- Traditional knowledge has been applied in the Water Strategy in providing a baseline understanding of the state of the environment pre-development and has informed how the environment has changed over time.
- Traditional knowledge research conducted in the outer Mackenzie Delta in the mid-2000s helped inform researchers on huge swaths of land that had been inundated by sea water that killed vegetation. Despite the area being well studied this fact was missed until traditional knowledge was integrated.

Opportunities for Enhancing Inclusion of Traditional and Local Knowledge in Implementing the Water Strategy

Understanding the current state of traditional knowledge in implementing the Water Strategy assists in identifying the opportunities and paths forward that can be forged in enhancing traditional and local knowledge inclusion in the work of the Water Strategy. Opportunities and potential next steps include:

- A framework for including traditional and local knowledge in the different aspects of the Water Strategy decision-making should be developed. With each Aboriginal community, or through a pre-developed process that has been agreed upon by all members of the Water Strategy, seek a formal or informal agreement on how traditional and local knowledge should be considered in the Water Strategy. Engage the communities in which ways are best for traditional and local knowledge to be incorporated and considered in the Water Strategy, and establish terms and principles for such consideration and incorporation.

- Continue to promote the use of existing traditional knowledge protocols by water partners.[37]

- Exploring and implementing different methodologies for gathering traditional and local knowledge, which are verified by Aboriginal representatives as appropriate. Methodologies to consider could include, but are not limited to:
    - Youth, elders, land users, and scientists coming together in workshops, sharing circles, and being on the land together.
    - Communities that have not carried out traditional knowledge or land use studies, could be funded to carry out map biography and oral history interviews with a representative sample of land users and elders. This data would help ensure that the Aboriginal representatives who provide information to the Water Strategy are more informed about and representing community-wide land use and occupancy.
    - Using photography and/or video to document changes alongside sampling for the community-based monitoring program could also be effective.
    - Including questions around climate and environmental change to give land users the opportunity to share the changes noticed over time was also mentioned as a future need.

- Consistent compensation and acknowledgement of community members who are sharing knowledge.

- Information on how traditional and local knowledge are considered, incorporated, and how they have influenced decision-making processes should be explicitly and specifically recorded. This information should clearly show how traditional and local knowledge was received, considered, and addressed in different projects and programs. Clear and specific information will allow all those involved in the Water Strategy, including regulators, researchers, and Aboriginal groups to clearly understand how traditional and local knowledge was considered and the influence it had on decisions.

- Exploring and implementing different ways to communicate the results of traditional and local knowledge and western science studies. Some ideas to consider include, but are not limited to:
    - Integrating technology such as tablets for information sharing to be happening on the land with elders, youth, and land users in a participatory manner as appropriate.
    - Improved translation of material from English to Aboriginal languages by providing more plain language terminology.
    - Including more preparation with technical people to ensure presentations are impactful for communities and build understanding between community members and technical groups

[37] *Summary of Best Practices for Applying Traditional Knowledge in GNWT Programming and Services; Gwich'in Tribal Council Traditional Knowledge Policy; Dehcho First Nations Traditional Knowledge Research Protocol; Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment - Mackenzie Valley Environmental Impact Review Board; Sambaa K'e Dene Band Policy Regarding the Gathering, Use and Distribution of Traditional Knowledge; Traditional Knowledge Guide for the Inuvialuit Settlement Region – Volume I & II*.

- Funding for more traditional and local knowledge projects and a common protocol for reviewing traditional and local knowledge funding proposals through CIMP or other funding bodies.

- Public acknowledgement of the value and contribution of traditional and local knowledge is beneficial. A formal and public statement is necessary to provide traditional and local knowledge with equal footing as western scientific knowledge.

- Traditional and local knowledge, wherever possible, should be considered in similar complementary and influential ways as western scientific knowledge and methods. This can be accomplished through collaborative and mutually respectful consideration of various ways of knowing and types of knowledge to come up with common understandings of problems or opportunities and appropriate courses of action.

- The gathering, analysis, and use of traditional and local knowledge should occur early on and continue to be influential throughout various programs within the Water Strategy to be continually informing planning stages, data collection and analysis, policy development, licensing, etc. It should be recognized that developing relationships between traditional and local knowledge holders and other partners takes time and requires understanding of each other's needs and motivations.

Developing a common understanding across water partners on how to include traditional and local knowledge is an important step moving forward. The successes, and opportunities identified by key informants demonstrate that traditional and local knowledge has been included in some cases, but that there are key next steps to further enhance the inclusion of traditional and local knowledge in the work of the Water Strategy in a meaningful way.

4.0 Conclusions and Recommendations

The Water Strategy has helped to promote greater collaboration between water partners and it has helped change the nature of the relationship between communities and different water interest groups as communities become more equal partners in the research process.

Feedback from the key informant interviews with Aboriginal governments, regulatory boards, territorial and federal government departments, NGOs, and research institutions confirm that the current priorities in the 2011-2015 Action Plan are still priorities to work and focus on.

Some elements of the Water Strategy have not received the same level of attention and action as others. This is the result of some elements being purposely prioritized over others as well as resource and capacity limitations and other factors but progress has been made across all of the priority areas.

Excellent progress has been made in achieving the objectives under the success criteria for Transboundary Water Management Agreements. Aboriginal governments of the NWT and residents were engaged and consulted in compiling the traditional and local knowledge that was used in conjunction with scientific data to inform the development of the agreements. The Transboundary Water Agreement was finalized between NWT and Alberta in March 2015 and the agreement between NWT and BC is expected to be completed in 2015 as well. The collaborative approach used by ENR in engaging with Aboriginal governments and organizations is a key enabling factor in this result. There is a need to better engage with communities to share updates on the negotiation process. A key focus going forward will be the implementation of the NWT/Alberta agreement and the other transboundary agreements as they are finalized.

Excellent progress has been made in achieving many of the objectives under the success criteria for Partnerships and Water Stewardship Information Sharing. ENR provides leadership in implementing the Water Strategy and also plays a key role in coordinating water strategy communications and information sharing. Many of the current water partners provided input to the development of the Water Strategy and have stayed on as water partners. More partners have been added over time. Improving communication and sharing information continues to be an important role for all water partners. More needs to be done to formally structure water partners around their engagement in the different priority areas of the Water Strategy and to formally recognize the efforts and contributions of the different water partners.

Substantial progress has been made in achieving many of the objectives under the success criteria for Community-based Monitoring and Research. Communities across NWT are participating in community-based monitoring programs to study local water and ecosystem health. The number of communities (and sampling sites) in the NWT-wide CBM program has increased progressively since the program was initiated in 2012 but more needs to be done to expand the program into other communities. It remains challenging to retain a core group of trained samplers from year to year and more needs to be done to improve the appeal of these employment positions. It remains to be seen if communities can become fully independent and operate community-based monitoring programs for the long term without support (e.g., human resources, funding) from other water partners.

Substantial progress has been made in partially achieving the objectives under the success criteria for Source Water Protection. ENR has developed source water protection resources and a number of opportunities have been provided for source water protection training and capacity

building. A Partnership Approach to Source Water Protection is currently being piloted to develop and implement a Source Water Protection Plan for the community of Trout Lake. The source water protection plan for Trout Lake was completed in March 2015 and is now being implemented over the next year. Capacity issues and commitments to other projects (e.g., community-based monitoring) could limit the ability and interest of other communities in developing and implementing their own source water protection plans.

Substantial progress has been made in achieving the objectives under the success criteria for Long-term Aquatic Monitoring. ENR oversees a number of water quality monitoring (WQM) projects that provide a baseline and long-term source of data. An evaluation of the NWT WQM network was completed in June 2014, which identifies water quality monitoring gaps (e.g., monitoring locations, schedules, parameters) and provides a framework for addressing the monitoring gaps. Other water partners are also engaged in long-term monitoring activities including Environment Canada and DFO. ENR, DFO and Environment Canada make their research results available to NWT communities and progress has been made in creating online access to water quality data through the LodeStar database and the NWT Discovery Portal.

Moderate progress has been made in achieving the objectives under the success criteria for Regulatory Processes. The *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the NWT* were completed jointly by AANDC and Land and Water Boards of the Mackenzie Valley in 2013. The licence review and assessment work carried out by ENR is conducted in the spirit of the Water Strategy. Representatives from the different regulatory boards participate at the annual Water Strategy implementation workshops but linkages between the Water Strategy and the regulatory boards could be strengthened. At this time the current water licencing procedure documents for the Mackenzie Valley Land and Water Board and the Inuvialuit Water Board do not make any specific references to the Water Strategy.

Moderate progress has been made in achieving the objectives under the success criteria for Municipal Water Licence Compliance.[38] Although the number of unlicensed NWT communities increased slightly between 2011 and 2014, at least four communities have applied or are in the process of applying for a water licence since 2011 and there has been an increase in communities complying with submitting Annual Reports. Communities and other water partners have identified and are continuing to address challenges related to preparing water licence applications and complying with water licence requirements. Human resource capacity issues remain a challenge for some communities and training in water quality monitoring is being provided in some communities with a specific focus on the monitoring requirements of the community water licences. Standard reporting templates have been developed to assist communities in completing their Operation and Maintenance Plans for Municipal Water Licences.

The following recommendations should be considered to continue to build on the achievements made to date:

Transboundary Water Management Agreements

1. Continue to work toward finalizing the transboundary agreements with British Columbia, Saskatchewan and Nunavut and update the existing agreement with Yukon.

[38] Landfill requirements not included. The developmwnt of landfill guidelines with the Land and Water Boards began in 2014.

2. Begin to focus on implementation of the transboundary agreement with Alberta and the other jurisdictions as those agreements are finalized.

3. Explore ways to support ASC members in sharing information and updates on transboundary negotiations at the community level.

Partnerships and Water Stewardship Information Sharing

4. Promote greater ownership of the Water Strategy among the water partners. Given that the Water Strategy was intended to be a shared initiative, other water partners should be encouraged and supported in taking on or sharing leadership roles and responsibilities in the next version of the Action Plan.
    a. Related to this issue is the need for the Action Plan to better define whom a water partner is (e.g., their defined linkage to water) and what that entails (e.g., their roles, responsibilities as a water partner and the benefits of being a water partner). Encourage the involvement of water partners that have not been very engaged to date (e.g., industry partners, other GNWT departments) and formally recognize the efforts and contributions of the different water partners.

5. Continue to communicate the importance of the Water Strategy, the research and monitoring initiatives that are underway and the results that are coming out of these initiatives. ENR could potentially take the lead on several initiatives to help water partners stay informed and promote participation.
    a. Develop a monthly electronic newsletter that provides updates on Water Strategy initiatives. Invite water partners to provide brief descriptions of ongoing or new research initiatives, policy development initiatives, etc. for the newsletter. The newsletter should be sent directly to water partners by email rather than relying on water partners to visit the Water Strategy website to access the newsletter.
    b. Explore ways to make the annual workshop in Yellowknife more accessible to a wider group of delegates from the different regions / communities (sponsor more delegates from northern NWT and/or conduct a comparable workshop in the north).
    c. Work with ASC members to identify and recruit other key people in communities who can assist with receiving and communicating information at the community level.

6. Continue to explore ways to use more plain language in Water Strategy communications and research results and continue to explore different communication approaches for different audience groups (e.g., youth, elders).

7. During the annual Water Strategy workshop include more personal stories on how water related research is being conducted and the importance of this research at the community level and include an earlier discussion on the agenda on what the priorities will be for the coming year.

8. Conduct a roundtable discussion with traditional knowledge holders and western science researchers on ways to facilitate the presentation of traditional knowledge alongside western scientific knowledge.

9. Continue to encourage water partners to upload their research / monitoring data to the Discovery Portal in a consistent data format and provide linkages to other web portals where relevant data is available.
    a. Continue to expand the amount of traditional knowledge on the Discovery Portal.
    b. Continue to educate water partners and communities about the utility of the Discovery Portal.

Community-based Monitoring and Research

10. Continue to expand the NWT-wide CBM program into other communities and encourage all water partners to promote and support community-based monitoring approaches.

11. Encourage partnerships across government agencies to promote / support community capacity building.

12. Community-based monitoring projects need to routinely assess that best practices and research procedures are being followed and that the quality of the data (e.g., completeness, consistency) is not compromised.

13. Continue to encourage water partners to make their research results available to communities and encourage and support communities in using this research to inform decision making.

14. Explore opportunities for expanding monitor training and employment opportunities.
    a. Pilot test a modular training package (e.g., air, water, soil, wildlife, forestry) to enable community monitors to expand their credentials and their research and monitoring related activities.[39]
    b. Strengthen linkages with southern research institutions or other organizations to promote hiring opportunities for community monitors with expanded credentials.

15. In light of the capacity issues faced by many communities, it might be beneficial to include a leadership training and development component in the next version of the Water Strategy.

[39] Environmental monitor training programs are currently offered through Aurora College (Environmental Monitor Training Program – 5-week certificate program; Environment and Natural Resources Technology Program – 2-year diploma program). The modular program could be a similar short-term format as the 5-week certificate program at Aurora College with expanded training on wildlife and forestry monitoring practices.

Source Water Protection

16. Continue to promote the importance of source water protection and make a stronger linkage between source water protection and municipal water licencing in the Water Strategy.

17. Continue to support source water protection training and capacity building.

18. Share the results (successes, challenges, opportunities) of the pilot study of the Partnership Approach to Source Water Protection in Trout Lake with other communities and promote the approach in other communities.

Long-term Aquatic Monitoring

19. Follow through on the recommendations from the WQM network evaluation (June 2014) for responding to water quality monitoring gaps (e.g., monitoring locations, schedules, parameters).

20. Continue to consult with water partners engaged in long-term monitoring activities (e.g., Environment Canada, DFO) to understand the gaps in their water quality monitoring programs and identify areas for potential collaboration.

21. Continue to ensure that research results are uploaded to data sharing platforms (e.g., NWT Discovery Portal, Lodestar) in a timely manner. Ensure that Lodestar is adequately resourced with sufficient human resources to provide oversight for ongoing data compatibility.

22. Explore opportunities for collecting advance baseline data in locations where development is likely to occur.

23. Develop a biological monitoring component for the Water Strategy. This component would need to identify / confirm stressors and identify indicators to measure.

Regulatory Processes

24. Develop a clear description of how the Water Strategy can be incorporated into the licensing and the review of the plans of various development projects. Use case studies to illustrate how the intent of the Water Strategy can be incorporated in the review process.

25. Provide support for Aborginal governments / organizations to bring traditional knowledge to the regulatory boards.

Municipal Water Licence Compliance

26. Continue to promote the importance of water sampling and monitoring in relation to water licence requirements.

27. Identify the current status of human resource planning and training in water licence compliance.

28. Continue to promote and support training where resource gaps are identified.

29. Follow-up with communities to assess the utility of the report templates for Operation and Maintenance Plans for Municipal Water Licences and adjust the templates as needed.

30. Consider expanding the community-based monitoring section of the Water Strategy to include a water licencing component.

Traditional and Local Knowledge

Understanding the current state of the implementation of the Action Plan assists in identifying the opportunities and paths forward that can be forged in enhancing the inclusion of traditional and local knowledge in the work of the Water Strategy. A number of opportunities and potential next steps were identified section 3.9 of this report and should be considered to continue to build on the achievements made to date.

Appendices

Appendix A – Program Logic Model

The following program logic model (PLM) presents a picture in words of the cause-effect relationships in the implementation of the NWT Water Stewardship Strategy. A PLM is a tool to help design and evaluate a program. It is a "picture" of the logical cause and effect relationships among the following program components: inputs, activities, outputs, outcomes and impact.

- *Inputs* are all resources which contribute to program activities.
- *Activities* are descriptions of the day-to-day work of the program staff and stakeholders/program delivery agents described under inputs.
- *Outputs* are indications of activities completed.
- *Outcomes* are *Results* and indicate changes taking place in program delivery agents and beneficiary groups as a result of the program.
- *Impacts* are the long-term and sustainable changes experienced as a result of the program.

The logical relationships can be understood as follows. The inputs must be made available if the activities are to be done. Activities must be completed for the outputs to be produced. Outputs must be produced and used if the outcomes are to be realized. Outcomes must be achieved in order for impacts to be experienced.

The following PLM provides a narrative summary of the inputs, activities, outputs, and outcomes associated with the NWT Water Stewardship Strategy with an emphasis on the priority areas for implementation as identified by the water partners during the annual Water Strategy implementation workshops for 2011, 2012 and 2013 which are outlined in Table 1 below.

Table 1. Water Stewardship Strategy Component Priority Areas

1. Work Together	2. Know and Plan	3. Use Responsibly
• Transboundary Water Management Agreements • Partnerships and Water Stewardship • Information Sharing	• Community-based Monitoring and Research • Source Water Protection • Long-term Aquatic Monitoring	• Regulatory Processes • Municipal Water Licence Compliance

The inputs in the PLM are consistent across all the priority areas as these resources collectively contribute to the implementation of activities. Similarly the long term impacts of the implementation of the Water Strategy are realized through the collective effort of the water partners and the communities.

The success criteria for the Water Stewardship Strategy include both process and outcome related indicators. Resources, activities, and units produced (outputs) constitute process related indicators while outcome indicators typically correspond with measures of change in individuals, institutions and communities.

NWT Water Stewardship Strategy Implementation – Program Logic Model

Inputs / Resources	Activities	Outputs	Outcomes (Success Criteria) Short-term (1-2 yrs)	Medium-term (2-5 yrs)	Long-term Impact
1. Work Together – Priority Area					
Transboundary Water Management Agreements					
GNWT-ENR AANDC Aboriginal Steering Committee Water Partners • Aboriginal Governments / organizations • Local government / communities • Non-profit organizations • Industry Associations • Land / Water Resource Boards • Research institutions Other Provincial, Territorial, Federal Government Departments	• GNWT consults with all Aboriginal governments of the NWT (from interests and options -negotiation principles – intention document - draft agreement) and collects their input. • GNWT communicates and engages with NWT residents to collect their input. • Relevant environmental data is compiled and used to develop provisions to maintain the ecological integrity of the aquatic ecosystem – e.g. water quality objectives are developed.	• Input received from all Aboriginal governments of the NWT and utilized in informing the agreements. • Input received from residents across the NWT and utilized in informing the agreements. • Intention documents for Alberta-NWT and British Columbia-NWT are established. • NWT Negotiation Principles, Interests and Options are defined.	• Increased awareness of the transboundary agreement process among NWT Aboriginal governments and NWT residents. • Increased participation of NWT Aboriginal governments and NWT residents in the transboundary agreement process.	• Final transboundary water agreements are negotiated and finalized consistent with the goals of the Water Strategy. ○ Alberta-NWT agreement to protect transboundary waters, including the Slave River and Hay River ○ BC-NWT agreement to protect the waters of the Liard River watershed; ○ Saskatchewan-NWT agreement to protect transboundary waters, including the Tazin River; ○ An updated Yukon-NWT agreement to protect the waters of the Peel River watershed (established before the development of the Water Strategy)	• Waters that flow into, within or through the NWT are substantially unaltered in quality, quantity and rates of flow. • Residents have access to safe, clean and plentiful drinking water at all times. • Aquatic ecosystems are healthy and diverse. • Residents can rely on their water to sustain their communities and economies. • Residents are involved in and knowledgeable about water stewardship. • All those making water stewardship decisions work together to communicate and share information.
Partnerships and Water Stewardship					
	• Water stewardship information and data (local, traditional and western scientific knowledge) is compiled and made accessible. • Information is designed in multiple formats to target different interest groups (e.g. youth, elders, NWT communities, water partners). • Discovery Portal is developed. • Lodestar database or other databases are populated with water quality data from long-term data monitoring programs. • Information is distributed / made available to different interest groups in all NWT regions. • ENR and water partners host water stewardship meetings in all NWT regions. • Information / data is made available through the NWT Water Stewardship website. • Existing partnerships / collaborations between water partners are identified. • Opportunities for funding and supporting water strategy initiatives are identified.	• Information and data is prepared in customized formats for different interest groups. • Water partners / interest groups access information and data in different formats including information made available through the NWT Water Stewardship website and Lodestar. • Water partners and NWT residents attend the water stewardship meetings in all the regions. • Water partners / interest groups identify new opportunities to collaborate on water strategy initiatives. • Funding and other resources (including in-kind support) for implementing water strategy initiatives are obtained through partnerships.	• Existing partnerships are strengthened and new partnerships are established. • Management of water related information and data is improved. • Linkages and communication between data collection agents are improved. • Collection of and access to local, traditional and western scientific water related knowledge is expanded / improved. • Water partners and communities become more informed about the status of water resources (e.g. quality, quantity) and water related issues.	• Water partners and communities have enhanced access to timely and reliable water-related information. • Decision makers increasingly use more timely and reliable information for water management. • Water stewards act on the information and the decisions made.	

NWT Water Stewardship Strategy Implementation – Program Logic Model

Inputs / Resources	Activities	Outputs	Outcomes (Success Criteria) Short-term (1-2 yrs)	Medium-term (2-5 yrs)	Long-term Impact
		2. Know and Plan – Priority Area			
		Community-based Monitoring and Research			
GNWT-ENR AANDC Aboriginal Steering Committee Water Partners • Aboriginal Governments / organizations • Local government / communities • Non-profit organizations • Industry Associations • Land / Water Resource Boards • Research institutions Other Provincial, Territorial, Federal Government Departments	• Communities introduced to CBM concept. • Community members recruited by Aboriginal Governments and trained by ENR to conduct water quality monitoring activities. • Community members participate in sampling in 100% of the sites of the NWT-wide Community-based Water Quality Monitoring Program (CBM program) with support from ENR. • ENR supports ongoing CBM training and water related education, research and monitoring.	• Community-based monitoring programs are established. • Community members become competent in conducting water quality monitoring activities. • Water quality data from the NWT-wide program or data generated from other CBM initiatives is produced, compiled and made available to communities. • Communities and other water partners access the CBM data.	• Communities become more independent to conduct the collection of water data on their own. • Communities continue to build capacity and participate in water-related education, research and monitoring.	• Communities increasingly use the water quality data from the NWT-wide program or data generated from other CBM initiatives to inform decision making at the local level. • Water quality data from the NWT-wide program and data generated from other CBM initiatives is utilized to identify regional and NWT-wide temporal trends.	• Waters that flow into, within or through the NWT are substantially unaltered in quality, quantity and rates of flow. • Residents have access to safe, clean and plentiful drinking water at all times.
		Source Water Protection			
	• Source water protection training workshops and resources developed. • Communities introduced to the concepts of source water protection planning and informed about how and where to access resources and potential partners. • Train the trainer workshops delivered across all regions. • Community members participate in source water protection planning. • Communities share their progress and lessons learned with other communities and water partners.	• Community members become competent in source water protection planning. • Partnerships are established to support source water protection planning • Communities develop and implement their own source water protection plans. • Local initiatives are integrated / linked with other research and monitoring initiatives.	• Source water protection planning becomes increasingly community driven. • Communities continue to build capacity to implement their source water protection plans.	• Source water protection plans are successfully implemented.	• Aquatic ecosystems are healthy and diverse. • Residents can rely on their water to sustain their communities and economies. • Residents are involved in and knowledgeable about water stewardship. • All those making water stewardship decisions work together to communicate and share information.
		Long-term Aquatic Monitoring			
	• Existing agency-lead aquatic monitoring is reviewed to assess appropriateness / adequacy. • Appropriate sampling and analytical protocols are developed and implemented where needed.	• Gaps in aquatic monitoring (quality, quantity and bio monitoring) are identified. • Data is compiled in the Lodestar database or other databases. • Results of monitoring programs are published and circulated. • Communities and other water partners access the data.	• Status of the different water bodies and the changes that are occurring are better understood by communities and water partners • NWT residents are more informed about the water quality and quantity status of the different water bodies	• Communities and water partners increasingly use the aquatic monitoring data to inform decision making for the protection of the water of the NWT.	

NWT Water Stewardship Strategy Implementation – Program Logic Model

Inputs / Resources	Activities	Outputs	Outcomes (Success Criteria) Short-term (1-2 yrs)	Medium-term (2-5 yrs)	Long-term Impact
		3. Use Responsibly – Priority Area			
		Regulatory Processes			
GNWT-ENR AANDC Aboriginal Steering Committee Water Partners • Aboriginal Governments / organizations • Local government / communities • Non-profit organizations • Industry Associations • Land / Water Resource Boards • Research institutions Other Provincial, Territorial, Federal Government Departments	• The intent of the Water Strategy is acknowledged in Water Licence approval processes. • Water Resource Boards participate at the annual implementation workshops and information needs in the regulatory processes are discussed / acknowledged.	• Water Resource Boards are more informed about the regulatory processes. • The Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories are completed	• The Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories are implemented.	Water Resource Boards continue to adhere to the Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories.	• Waters that flow into, within or through the NWT are substantially unaltered in quality, quantity and rates of flow. • Residents have access to safe, clean and plentiful drinking water at all times. • Aquatic ecosystems are healthy and diverse. • Residents can rely on their water to sustain their communities and economies. • Residents are involved in and knowledgeable about water stewardship. • All those making water stewardship decisions work together to communicate and share information.
		Municipal Water Licence Compliance			
	• Training is made available to and utilized by communities that do not comply with their municipal water licences • Standard reporting templates and guidance on plan requirements are made available to communities that did not comply with their municipal water licences; and • Regular and routine inspections of municipal water licences are conducted	• Communities utilize the training and resources and become increasingly competent in complying with their municipal water licenses. • The number of communities with a current municipal water licence increases between 2011 and 2015.	• Communities continue to build and acquire sufficient capacity for monitoring required under municipal water licenses. • The number of communities complying with their municipal water licence increases between 2011 and 2015	• Communities become more independent to conduct the monitoring on their own.	

Appendix B – Key Background Documents

Topic	Document
Water Strategy and Action Plan	NWT Water Stewardship Strategy
	NWT Water Stewardship: A Plan for Action
General Implementation and Progress	Implementation Workshop Summary Reports
	Implementation Progress Report April 2011-2013
	NWT Water Stewardship Report Card April 2011-March 2013
Source Water Protection	Calendar 2013- Source Water Protection
	Source Water Assessment and Protection (SWAP) Guidance Document
	Example of Trout Lake - Source Water Protection Assessment.
Community-based Research and Monitoring Initiatives	Bringing Water Quality Results Back to Your Community
	Enhancing Community-based Aquatic Monitoring Workshops
	CBM FAQs
	Aquatic Ecosystem Health Community-based Monitoring Initiative
	DRAFT State of the Knowledge – SRDP
	DRAFT- Vulnerability Assessment –SRDP
	Our Water, Our Life: Building Partnerships to Assess the Health of the Slave River and the Slave River Delta
	Example of Results from the Fish Health Study
	SWEEP
	Delta Dialogue Network
	CBM Calendar 2014
	CBM Calendar 2012
Transboundary Water Management Agreements	Mackenzie River Basin Transboundary Waters Master Agreement (1997)
	Transboundary Water Agreements general information (website - http://www.nwtwaterstewardship.ca/transboundary)
	Transboundary FAQs

	NWT-Alberta Mackenzie River Basin Bilateral Water Management Agreement
	NWT Negotiation Principles
	NWT Interests
	Traditional Workshop Report to inform Transboundary Negotiations (Slave River)
Long-term Water Monitoring	Devolution 3-5: Water Quality Monitoring Network (Summit Environmental)
	Gap analysis Hydrometric Network
	Water Quality Monitoring Networks
	Monitoring Inventory
	Slave River Summary Report
	Water Quality Monitoring Networks http://www.enr.gov.nt.ca/programs/water-management/water-quality-monitoring-networks
Regulatory - Municipal Water Licence	Wek'èezhìi Land and Water Board -supporting compliance
	2013 Water Quality Summary, MACA http://www.maca.gov.nt.ca/wp-content/uploads/2012/03/MACA-2013-DWQ-Primer.pdf
	MVLWB - Water and Effluent Quality Management Policy. March 31, 2011 http://mvlwb.com/sites/default/files/documents/MVLWB-Water-and-Effluent-Quality-Management-Policy-Mar-31_11-JCWG.pdf
	MVLWB / AANDC - Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the NWT. Nov. 2013 http://mvlwb.com/sites/default/files/documents/wg/WLWB_5363_Guidelines_Closure_Reclamation_WR.pdf

Appendix C – Key Informants

The following individuals were interviewed as key informants as part of the evaluation.

Organization	Name, position
NWT Métis Nation	Tim Heron, Environment Manager
Inuvialuit Regional Corporation	Richard Binder, Inuvialuit Game Council
Dehcho First Nations	George Low, AAROM Program Coordinator
Dehcho First Nations	Dahti Tsetso, Resource Management Coordinator
Smith's Landing First Nation	Cochise Paulette -substitute for Jeff Dixon
K'ágee Tu First Nation and Dehcho First Nations	Melanie Simba, Environment Coordinator
Kátł'odeeche First Nation and Dehcho First Nations	Peter Redvers, Consultation Facilitator
Inuvialuit Settlement Region	Jennie Knopp, Program Coordinator
Inuvialuit Water Board	Mardy Semmler, Executive Director
Mackenzie Valley Land and Water Board	Heather Scott
Wek'èezhìi Land and Water Board	Ryan Fequet
Wek'èezhìi Renewable Resources Board	Boyan Tracz, Wildlife Management Biologist
Wek'èezhìi Land and Water Board	Sarah Elsasser, Regulatory Specialist
Mackenzie Valley Environmental Impact Review Board	Mark Cliffe Phillips, Executive Director, Environmental Impact Review Board
Sahtu Renewable Resources Board	Deborah Simmons, Executive Director
Community-based monitoring	Dianne Betsina
Community-based monitoring	Rosy Bjornsen
Community-based monitoring	Shawn McKay
Environment and Natural Resources (GNWT)	Erin Kelly, Lead Negotiator and Technical Advisor
Environment and Natural Resources (GNWT)	Annie Levasseur, Technical Coordinator
Environment and Natural Resources (GNWT)	Meghan Beveridge, Negotiations Coordinator
Environment and Natural Resources (GNWT)	Andrea Czarnecki, Water Quality Specialist
Environment and Natural Resources (GNWT)	Katarina Carthew, Water Resources Division
Environment and Natural Resources (GNWT)	Jennie Vandermeer, Watershed Management Advisor
Environment and Natural Resources (GNWT)	Jennifer Fresque-Baxter, Watershed Management Advisor
Environment and Natural Resources (GNWT)	Julian Kanigan, Manager NWT CIMP
Industry, Tourism and Investment (GNWT)	Steve Kokelj, Permafrost scientist
NWT Centre for Geomatics (GNWT)	Emily Mahon, GIS Specialist
NWT Centre for Geomatics (GNWT)	Evangelos Kirizopoulos, Data Coordinator

Municipal and Community Affairs (GNWT)	Olivia Lee
NWT Protected Areas Strategy (GNWT)	Claudia Haas, Conservation Planning
Fisheries and Oceans Canada	Deanna Leonard, Fisheries Management Biologist
Parks Canada	Stuart Macmillan, Wood Buffalo National Park
Environment Canada	Kerry Pippy
Aurora Research Institute	Sarah Rosolen, Manager
Trent University	Céline Guéguen, Associate Professor, Department of Chemistry
University of Saskatchewan	Paul Jones, Associate Professor, School of Environment and Sustainability
Ecology North	Christine Wenman, Board of Directors
Ecology North	Blair Carter, Water Specialist
Pembina Institute	Shauna Morgan, Senior Analyst