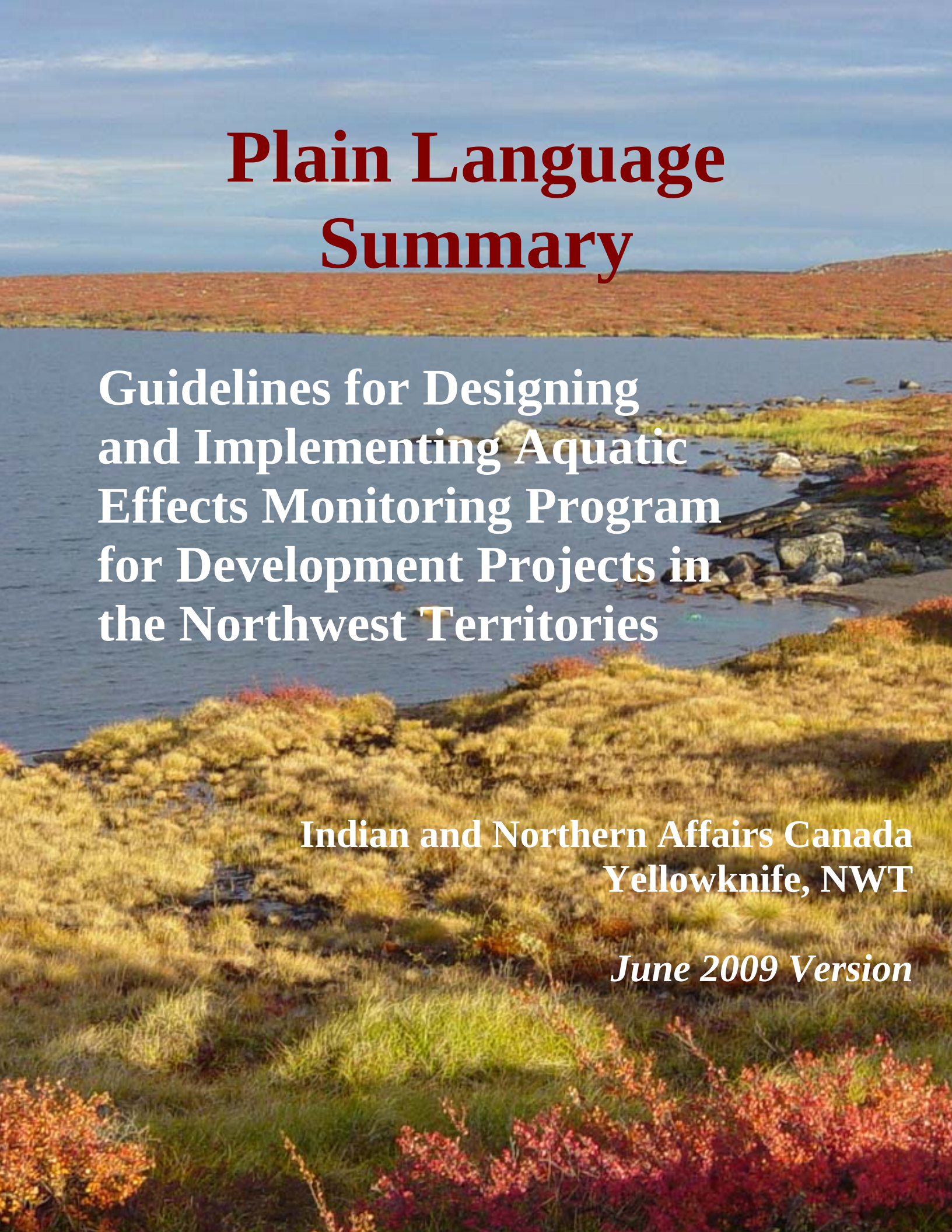

Plain Language Summary

Guidelines for Designing and Implementing Aquatic Effects Monitoring Program for Development Projects in the Northwest Territories

Indian and Northern Affairs Canada
Yellowknife, NWT

June 2009 Version

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OVERVIEW

The first Aquatic Effects Monitoring Program Guidelines for the NWT have been developed by Indian and Northern Affairs Canada, (INAC, Water Resources Division), after completing many interviews, meetings, workshops, and technical reviews with interested parties. These guidelines provide a step-by-step process when creating programs to monitor the health of the water environment (aquatic ecosystem) near large-scale development projects, from both a Traditional Knowledge and western science perspective.

WHAT IS AQUATIC EFFECTS MONITORING?

Aquatic effects monitoring means watching closely for changes to the water environment through observations or measurements. Both Traditional Knowledge-based and western science-based observations provide information on the quality of the water, the amount of water, and the health of the fish and insects (organisms) that live in the water. By collecting this information before construction begins for a specific development project, any changes that might occur during construction or operation can be identified. The monitoring results can also be used to change or manage the operation of a development project to make sure the water environment continues to be protected.

WHAT IS AN AQUATIC ECOSYSTEM?
Simply defined it is the water environment. It is made up of water, sediments, living organisms such as fish and insects, and the way they interact in different water bodies (lakes, rivers, etc.).

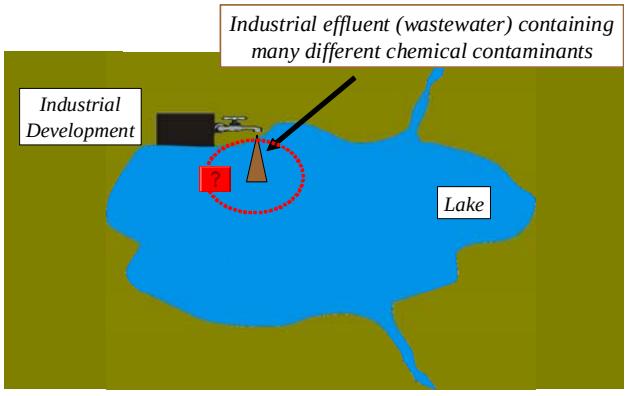
WHY DO WE NEED AQUATIC EFFECTS MONITORING PROGRAMS (AEMPS)?

An AEMP is a program created by a developer (proponent) to measure the effects of the development project (such as a mine, oil and gas facility, or hydro development), on the water environment. In the NWT, AEMPs are generally a requirement of the water licences issued by the regulatory boards (such as the Mackenzie Valley Land and Water Board). AEMPs provide an early warning of any negative effects of a development project on the water environment. This early warning system is used to manage the project to reduce these effects.

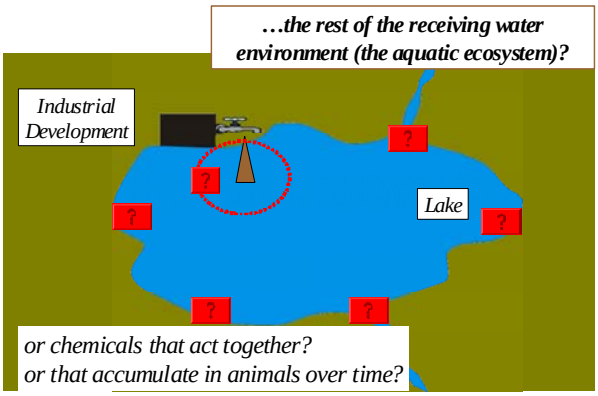
It is important that from the very first step the developer consults with affected Aboriginal governments/organizations and other interested parties to determine their needs and to make sure that they are involved in developing a monitoring program for the water environment. Developers want to know exactly what is expected of them by Aboriginal governments/organizations, regulatory boards, federal and territorial governments and other interested parties. Together, these groups want the developer to prove that they are not harming the environment in the long term.

The figures below help to visualize why AEMPs are needed. On the left, the waste water (effluent) from the end of pipe (where discharge of waste into a water body occurs) at a particular development project is measured and monitored. The regulatory boards manage the use of water and deposits of waste by issuing a water licence. The water licence sets the limits and rules that must be followed specifically at the end of pipe. The figure on the right asks questions such as "how do chemicals act together over time". Because the quality of the entire water body is very important to Aboriginal governments/organizations and other interested parties, these questions need to be carefully reviewed. AEMPs focus on this through monitoring, taking the entire water environment into consideration, not only the conditions at the end of pipe.

Assessing Aquatic Effects: The First Step



But what about…?



WHY DO WE NEED AEMP GUIDELINES?

AEMP Guidelines are needed to provide clarity and consistency in monitoring the water environment surrounding a development project. The result is an AEMP that meets the expectations of the regulatory board and the interested parties. Guidelines will help provide information and data that is comparable between development projects and can assist in the study of cumulative effects from multiple development projects.

AEMPs Guidelines will help:

- Provide a step-by-step process for designing and conducting high quality monitoring of the water environment related to a development project.
- Highlight the need for consultation with Aboriginal governments/organizations and other interested parties at each step in the development of the AEMP.
- Make sure that concerns of interested parties are incorporated into an AEMP in a meaningful and relevant way.
- Describe the roles of Traditional Knowledge and western science in developing and conducting monitoring of the water environment surrounding a development project.
- Determine if the water environment, including, for example, subsistence fishing and harvesting activities, is being protected in areas affected by mining, oil and gas facilities, or other development projects.
- Determine any effects from the construction and operation of a development project on the water environment over time (short term could take months, or long term could take years).
- Determine whether changes to the water environment need to be addressed by changes to parts of the operation of the development project.
- Determine whether specific mitigation measures decrease the effects of a development project on the water environment and identify the need for additional impact mitigation measures.

WHAT IS A MITIGATION MEASURE?

Let's say that preserving the whitefish population in a particular bay of a given lake is deemed extremely important by all interested parties. Then a proponent needs to come up with ways to make sure that the construction and operation of the development project does not affect the whitefish or their habitat. A solution might be to ensure an ore processing plant is built as far as possible from this important habitat. This represents a mitigation measure before the development project is accepted to avoid a negative effect on the whitefish population. Similarly, if during operation an increase in a particular contaminant is measured in small insects, a mitigation measure could be that a treatment plant be built to remove the contaminant from the wastewater that is released into the lake.

REGULATORY SETTING

The AEMP Guidelines have been designed to support the protection of the unique and sensitive water environment of the NWT. Under the *Northwest Territories Waters Act* and the *Mackenzie Valley Resources Management Act*, public consultation is required. Consultation with Aboriginal governments/organizations must be based on mutual respect and consider the capacity (human and financial) of those interested in participating in the regulatory process (water licence application, environmental assessment and water licencing phases).

ROLE OF TRADITIONAL KNOWLEDGE AND COMMUNITY CONSULTATION

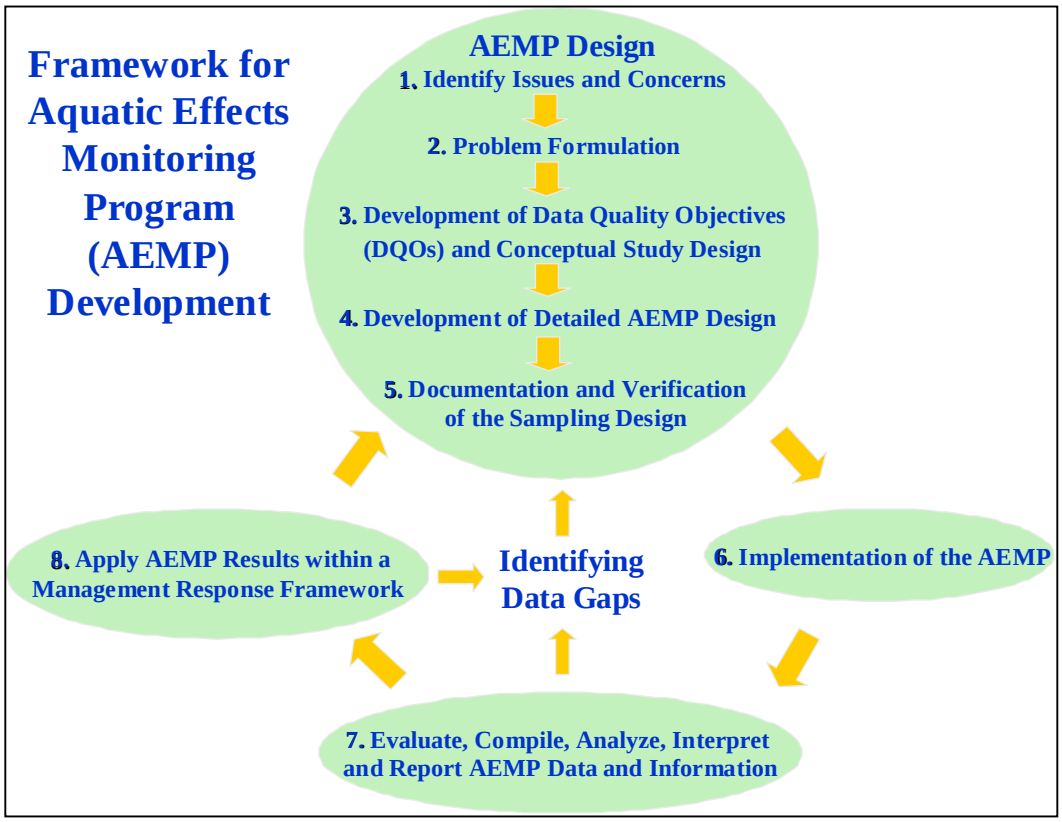
Traditional Knowledge provides a set of information, not available elsewhere, to help design a good aquatic monitoring program. It plays an extremely important role in highlighting issues and concerns for a development project since Traditional Knowledge holders have very detailed knowledge of specific locations and species within the NWT. Traditional Knowledge provides an understanding of baseline conditions (before construction) within an area potentially impacted by a development project. Also, it can identify that a stressor (such as a particular chemical) might have a negative impact on part of the water environment (such as whitefish spawning or survival).

WHAT IS TRADITIONAL KNOWLEDGE?
Traditional Knowledge provides factual knowledge about the environment that is based on direct observation and experience, shared information within the community, and an oral history spanning multiple generations. It provides essential information on the use and management of the environment, and on the values that people place on the environment (*Mackenzie Valley Environmental Impact Review Board, Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment, 2005*).

Settled and unsettled land claim areas and communities have different processes or protocols in place for the collection of Traditional Knowledge information. Therefore, early community consultation is most important. It must be noted that lack of involvement by an Aboriginal government or organization does not mean acceptance of the development project by default. Developers need to respect that human and financial capacity is a major challenge for all northern communities. Details on Traditional Knowledge and community consultation are provided in the AEMP Guidelines overview document and in a Traditional Knowledge "Toolbox"/Guidance Document that will soon be released by INAC for review.

AEMP Framework Steps

An eight step process has been developed for designing and conducting high quality monitoring of the water environment while the development project proposal is being completed, during environmental assessment, and following its approval. This step-by-step process is also referred to as the AEMP framework. The figure below shows how this process is repeated over time. Each of the eight steps is then summarized.



STEP 1: Identification of Issues and Concerns

The first step in the AEMP development process involves identifying issues and concerns regarding the water environment that Aboriginal governments/organizations and interested parties may have about a proposed development project. This step should occur when the proponent prepares a development project description to support the preparation of a water licence application. By asking for input from all interested parties at this stage, a preliminary list of stressors that may be of concern is documented and the developer can make changes to the project description while considering the issues

What is a Stressor?
A stressor is a substance (such as a chemical like mercury) or a change (such as a rise in water levels) that can have negative effects on the water environment.

and concerns. Step 1 provides an opportunity for the developer to establish an AEMP Working Group to provide an organized way to meet with all interested parties.

STEP 2: PROBLEM FORMULATION FOR AQUATIC EFFECTS MONITORING

During the second step, the final list of possible stressors is completed, then each stressor is looked at to see if it could have effects on the water environment or human health. Next, the ways a stressor can affect the water environment need to be determined (such as elevated levels of a chemical changing the quality of the water). The parts of the water environment that could be affected, such as fish, plants, birds, sediment, water quality, need to be recorded. These are called receptors. Diagrams are prepared that show how each stressor is linked to parts of the water environment that could be affected. These diagrams are called conceptual site models. These models are then used to identify the parts of the water environment that need to be protected and what will be measured to determine if the water environment is being adequately protected.

STEP 3: DEVELOPMENT OF DATA QUALITY OBJECTIVES AND CONCEPTUAL STUDY DESIGN

This step of the process identifies the important parts of an AEMP and helps determine what the monitoring program will look like. This step also determines what types of information and how much data are needed to evaluate the effects of the development project on the water environment. The levels of stressors that would harm the water environment (called Action Levels) are identified. The Action Levels reflect the level of protection that is agreed to in the environmental assessment. The data quality objectives also describe how the AEMP results will be used to determine if the development project has caused negative effects on the water environment.

WHAT IS AN ACTION LEVEL?

An Action Level is the level of a stressor that is established to make sure that a development project is managed in a way that protects the water environment. For example, the level of copper in water that has been shown to reduce the growth of whitefish could be established as an Action Level. If the levels of copper in the lake are higher than the Action Level, then mitigation measures would be used to reduce releases of copper from the development project.

STEP 4: DEVELOPMENT OF DETAILED AEMP DESIGN

This step provides guidance to help the developer decide what study design to choose. For example, an exposed water body located near an effluent discharge can be compared to a non-exposed (or reference) water body upstream or in a different location than the development project. Another example could be several measurements taken a certain distance apart, downstream of a development project. Choosing the most appropriate sampling locations and timing for sampling is critical. Traditional Knowledge is extremely valuable in this regard as Traditional Knowledge holders will know where to find certain species at different times of the year.

STEP 5: DOCUMENTATION AND VERIFICATION OF THE SAMPLING DESIGN

Various plans will be prepared during this step to describe the procedures to be followed by the people conducting field sampling since it is important that the data is collected properly. There will be specific guidance for all field work (to collect high quality data and information), and a plan to make sure the people collecting samples or visiting the site take all safety precautions necessary. Changes to any of these plans by the developer should be reviewed by the AEMP Working Group and interested parties and approved by the regulatory boards.

STEP 6: IMPLEMENTATION OF THE AEMP

This step begins following the approval of the AEMP by the regulatory board. It involves the collection of environmental samples, Traditional Knowledge, and other information and the analysis of the results to produce data (for example, laboratory measurements for water quality data). The plans developed in Step 5 must be carefully followed for all types of data and information collection.

STEP 7: EVALUATION, COMPILATION, ANALYSIS, INTERPRETATION AND REPORTING OF AEMP RESULTS

Once data and information have been collected under the AEMP (both Traditional Knowledge and western science based), it needs to be evaluated, compiled, analyzed, interpreted and reported by the developer. This data is compared to baseline data collected before the AEMP began to see if there are changes.

Data evaluation means making sure there is enough data or information available. Next, the data need to be compiled and put in an easy to reach place, such as a computer database, that can be shared with all interested parties. The results are then analyzed, interpreted, and presented and possibly shared with interested parties and AEMP Working Group at a workshop (both technical and plain language versions should be prepared by the developer).

STEP 8: APPLICATION OF AEMP RESULTS WITHIN A MANAGEMENT RESPONSE FRAMEWORK

Management response, also commonly known as adaptive management, is a way to continually improve the management of the development project by learning from the information collected year after year by the AEMP. For example, the results of the AEMP could lead to a change in the amount or location of waste that is released from a development project, if the AEMP results show that a certain chemical being discharged had a negative effect on the water environment.

CONCLUSION

The framework described above is recommended for developing AEMPs for large-scale development projects in the NWT. The steps are intended to be followed through the life of a project. The AEMP Guidelines support the collection and interpretation of baseline data prior to the environmental assessment, and aquatic effects monitoring during construction and operation of the development project.

Opportunities for consultation with Aboriginal governments/organizations and other interested parties are highlighted throughout all steps of the AEMP framework. Establishment of an AEMP Working Group by the developer is encouraged to provide consistent input by interested parties throughout AEMP development and implementation. This group will exchange ideas and information and provide guidance to the developer.

The results of well-designed AEMPs must be used to guide decisions regarding the management of a development project and support a developer's goal of continuously improving operations. Specifically, the results need to identify the need for further mitigation to decrease and avoid negative effects on the water environment or on uses of the water environment. Both Traditional Knowledge and western science should be used to gather information and data needed to support the AEMP. Developers will be able to design AEMPs that can be reviewed and approved in a timely manner by the regulatory boards by following this step-by-step process and engaging Aboriginal governments/organizations and other interested parties at the earliest stages in the design of the development project.