



NWWT

WATER RESOURCE MANAGEMENT STRATEGY

MARCH 12TH-13TH, 2009
KATIMAVIK A, EXPLORER HOTEL
YELLOWKNIFE, NT

DRAFT SUMMARY REPORT

WORKSHOP #3 INFORMATION NEEDS

Terriplan
CONSULTANTS



Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

TABLE OF CONTENTS

1.0	Introduction.....	2
2.0	Plenary Session.....	4
2.1	Introductory Presentations.....	4
2.2	Theme 1- Information Needs.....	6
2.3	Theme 2 – Information Access.....	12
2.4	Reports on Current Initiatives.....	14
3.0	Reports from Breakout Groups.....	16
3.1	Information Gaps.....	16
3.2	Information Access.....	18
4.0	Last Words.....	22
	Appendix A: Background and Agenda.....	23

NWT Water Resources Management Strategy Workshop #3: *Information Needs*

March 12, 2009
8:30 a.m. – 4:30 p.m.

March 13, 2009
8:30 a.m. – 2:30 p.m.

1.0 INTRODUCTION

On March 12 and 13, Terriplan Consultants assisted with the third of several workshops planned to engage stakeholders on aspects of a proposed NWT Water Resources Management Strategy. This initiative is directed in partnership by GNWT, Environment and Natural Resources, and Indian and Northern Affairs Canada. The first workshop was attended by over 35 participants representing government, industry, Aboriginal organizations and ENGOs, who assembled to discuss the information associated with developing a proposed strategy.

The purpose of the workshop was twofold:

1. To seek broader NWT input to help guide the preparation and implementation of an NWT Water Resources Management Strategy; and
2. Discussion of the sources, gaps and procedures for accessing and sharing information and knowledge needed for water management decisions.

It was intended that participants would come away with a shared understanding of:

- Types of water resource management decisions;
- The nature and sources of data, information and knowledge currently used to support water management decisions;
- Gaps in data, information and knowledge as well as ongoing efforts and plans to address them;
- Existing procedures for accessing and sharing data, information and knowledge and potential improvements in those procedures; and
- How TK and conventional scientific knowledge together can best inform water resource management decisions.

Participants	
Wanda Anderson	Mackenzie Valley Land and Water Board (MVLWB)
Rhonda Batchelor	GNWT, Department of Transport (DoT)
Richard Binder	Inuvialuit Regional Corporation (IRC); Inuvialuit Game Council
Sevn Bohnet	INAC, Water Resources Division
Gary Bohnet	GNWT, Environment and Natural Resources (ENR)
Peter Brunette	INAC, Information Management (IMAG)

Christian Bucher	Parks Canada
Vern Christensen	Mackenzie Valley Environmental Impact Assessment Board (MVEIRB)
Mark Cliffe-Phillips	Wek'èezhii Land and Water Board (WLWB)
Peter Csicsai	GNWT, Environment and Natural Resources (ENR)
Duane Fleming	GNWT, Health and Social Services (HSS)
Marjorie Fraser	INAC, Land Administration
Evelyn Gah	GNWT, Environment and Natural Resources (ENR)
Samuel Gargan	Dehcho First Nations
Kerri Garner	Tlicho Government
Anita Gue	Environment Canada (EC)
Martin Haeefe	Mackenzie Valley Environmental Impact Assessment Board (MVEIRB)
Michelle Hannah	GNWT, Environment and Natural Resources (ENR)
Mike Harlow	Northwest Territories Water Board (NWTWB)
Cathie Harper	GNWT, Centre for Geomatics
Tim Heron	NWT Métis First Nation
Joel Holder	GNWT, Environment and Natural Resources (ENR)
Jesse Jasper	Mackenzie River Basin Board (MRBB)
Kris Johnson	GNWT, Industry, Tourism & Investment (ITI)
Aiyana Lajeunesse	GNWT, Environment and Natural Resources (ENR)
Marc Lange	Department of Fisheries and Oceans (DFO)
Olivia Lee	GNWT, Municipal and Community Affairs (MACA)
Bea Lepine	GNWT, Environment and Natural Resources (ENR)
David Livingstone	INAC, Renewable Resources and Environment
Gord Macdonald	Mining Association of Canada (MAC); Rio Tinto
Sonny MacDonald	Mackenzie River Basin Board (MRBB)
Catherine Mallet	INAC
Claire Marchildon	INAC, Water Resources Division
Jane McMullen	GNWT, Environment and Natural Resources (ENR)
Tricia Melander-Forde	INAC, Renewable Resources and Environment
Zabey Nevitt	Wek'èezhii Land and Water Board (WLWB)
Darrin Ouellette	GNWT, Aboriginal Affairs and Intergovernmental Relations (DAAIR)
Angela Plautz	Mackenzie Valley Land and Water Board (MVLWB)
Bob Reid	INAC, Water Resources Division
Steve Schwarz	GNWT, Centre for Geomatics
Jennifer Skelton	GNWT, Environment and Natural Resources (ENR)
Mark Warren	GNWT, Environment and Natural Resources (ENR)
Randy Wedel	Environment Canada (EC)
Consultants	
David Finch	Terriplan
Ricki Hurst	Terriplan
Rachelle Laurin-Borg	Terriplan
Vicki McCulloch	Terriplan
David Milburn	Terriplan

2.0 PLENARY SESSION

Following an opening prayer by Sam Gargan (DFN), participants were addressed by Gary Bohnet (ENR) and David Livingstone (INAC). They provided the context for developing a strategy governing NWT water resources and welcomed participants to the workshop to get their input on its development.

Over the course of the two days, participants made 14 presentations that outlined water-related information needs in their respective organizations, as well as describing initiatives to acquire new information or that facilitate access to existing information. The presentations were divided into two complementary sections, Theme 1 being covered on March 12 and Theme 2 on March 13. Theme 1 was concerned with the information used and needed for decisions; Theme 2 was how to improve access and sharing of information. Two additional speakers presented on Day 2 with updates on their recent activities in these areas.

2.1 INTRODUCTORY PRESENTATIONS

2.1.1 Ricki Hurst (Terriplan)

NWT Water Resources Management Strategy: Overview of Strategy

Terriplan provided an overview of the relevance and evolution of an NWT Water Management Strategy. Described were the components of the proposed Strategy as well as the communication & collaboration events related to its development. These included Northern Voices, Northern Waters (the July 2008 Discussion paper); a series of engagement sessions with Aboriginal leaders facilitated by Stephen Kakfwi & François Paulette; and a series of multi-party workshops that address technical aspects of developing a strategy. These efforts are based upon previous activities such as the Keepers of the Water gatherings led by Aboriginal leaders, WaterWise (2007), and NWT Legislative Motion 20(15):5 *Right to Water*. Among its other goals, the developing Strategy is intended to help the NWT prepare for future discussions of trans-boundary water agreements.

It was emphasized that the Strategy is not a 'done deal' and that considerable engagement must occur before a draft strategy goes to consultation. The Strategy is being developed with recognition of, and respect for, the rights, responsibilities and knowledge of Aboriginal people and is intended to support Comprehensive Land Claims and Self-government Agreements. It is intended to contribute to increased certainty in making water stewardship decisions and to advance the interests and rights of Northerners.

The presentation described the emerging information needs as being classed into 4 areas: Human Needs, Ecosystem Needs, Traditional Cultural Needs and Economic Needs. It was explained that the NWT Water Resources Management Strategy is intended to describe an approach to water management based on the coordination of knowledge and Information. The eventual Strategy will specify the information and knowledge available and needed for decision making. TK, in partnership with science, will be a valuable source of information and

understanding for NWT water management. As part of Strategy development a large quantity of existing information is being compiled on water supply and aquatic resources and the significance of these water resources to northerners.

2.1.2 Beatrice Lepine (ENR) and Gary Bohnet (ENR)
Report from Workshop #2 – Role of Traditional Knowledge in the Development of the NWT Water Resources Management Strategy

This presentation reported on the second of the multiparty workshops to develop the NWT Water Resources Management Strategy. Ms. Lepine outlined the participants and highlights of the workshop held in Hay River on March 4-5, 2009, the focus of which was on the role of Traditional Knowledge (TK) in the development of a Strategy. The objectives of the workshop were to identify the role of Traditional Knowledge (TK) and the roles of TK holders with respect to the development and implementation of the NWT Water Strategy, and to make recommendations for the role of Traditional Knowledge in the development and implementation of the NWT Water Resources Management Strategy.

Participants observed that in the development of a Strategy, it is imperative to reflect the values of NWT residents. This process represents an opportunity to create understanding and dialogue. In order to implement TK in a meaningful way, participants stated there was a need to ensure that it can be understood. Accordingly, the wording of a Strategy would be extremely important. Reservations were expressed around the incorporation of TK into a Strategy and concerns were raised that the process to develop it was not entirely consistent with the Dene world view. The Dene way was stated to involve concepts of *integrity* and *harmony*, and relationships are very important to Indigenous peoples.

Recommendations from the workshop included the following:

- Respect for and endorsement of the value of TK should form a prominent part of the NWT Water Resources Management Strategy;
- Indigenous values must drive the Strategy, and harmony between western science and TK must be achieved;
- NWT water management and stewardship agencies need to find a suitable approach to collaborating with Indigenous peoples in the NWT on TK, including a process for engaging TK holders in a meaningful way;
- Develop skills and capacity at the community and regional level;
- An appropriate framework for engaging TK holders must be developed (i.e. TK Protocol on a NWT-wide basis) by means of genuine dialogue between Aboriginal Leaders and Governments;
- Existing TK protocols which have been developed by communities and regions must be respected in the development of the NWT Water Resources Management Strategy;
- No decisions on water use should be made without consultation with the communities and regions affected, as a Section 35 obligation but also as a matter of respect and balance between Traditional Knowledge and western science.

From a *management perspective*, participants concluded that the following questions (and topics) were pertinent to the development of the NWT Water Strategy:

- How do TK and Western Science apply in an equal way in the development of the NWT Water Strategy? (BALANCE)

- What is needed for a reasonable and equitable dialogue to occur between science and TK? (DIALOGUE)
- How do we ensure that TK and Aboriginal values are fully represented at the decision-making and management levels in the development of the NWT Water Strategy? (VALUES)
- How do we ensure that Aboriginal rights and associated government responsibilities are clearly articulated in the NWT Water Strategy? (RECONCILIATION)

2.2 THEME 1- INFORMATION NEEDS

2.2.3 Angela Plautz (MVLWB)

The Role of Information in Water-Related Decision Making

Angela Plautz provided an overview of the decisions made by the Mackenzie Valley Land and Water Board and the information requirements for those decisions. The MVLWB mandate includes the issuing of type A and B water licences for the use of water and deposit of waste, the approval of associated plans and studies, and referring applications to Environmental Assessment as required. The information needs of the MVLWB (and indeed of all boards) are project-specific, taking into account project scale and location. The information submitted in support of an application is supplemented by that generated by reviewers, reports of environmental assessment, and technical advice. Plans and reports may be made conditions of the licence covering a range of activities from site abandonment and restoration, waste management, and water disposal. Most plans are for Board approval which means that they would get sent out for review and the comments would then be incorporated by the Licensee if required. Some plans are required in the application stage while others are requested through the Water Licence; plan requests are made on a project-by-project basis.

Ms. Plautz described the reporting used by the MVLWB including annual project reports which track (among other things) water use and waste amounts, geotechnical assessment reports, and results from the Surveillance Network Program (SNP) including aquatic ecosystem parameters and CCME guidelines. Ms. Plautz outlined common information gaps that exist in information around groundwater, tailings cover, Traditional use, geochemical aspects, and effluent quality criteria. To address these gaps, Land and Water Boards can hold public hearings and technical sessions, set consistent standards, and require plans and studies. Above all, the keys to gathering better information are to be specific, be flexible, and to keep communication lines open.

What Was Heard

Q. *What are the most common incomplete areas in applications?*

A. Usually community involvement. They have to show that they've made an effort to meet communities and provide feedback. Community engagement is the most common reason for sending info back. – Angela Plautz (MVLWB)

TK is about how you view the world. Burial sites are just known; they're not TK. TK would be, say, a child buried in a tree --- it has a different meaning, and knowledge of traditional migration routes. – Samuel Gargan (Dehcho First Nation)

2.2.4 Vern Christensen (MVEIRB) ***Better Information In = Better Information Out***

Vern Christensen provided an overview of the legislative and geophysical background in which the Mackenzie Valley Environmental Impact Review Board operates. MVEIRB is a co-management board established in 1998 under the MVRMA, to conduct assessments of proposed developments, to ensure impacts on the environment are carefully considered, and to ensure concerns of aboriginal people and the general public are taken into account. Mr. Christensen described the mission of MVEIRB as conducting quality EIAs that protect the environment and the social, economic and cultural well being of residents of the Mackenzie Valley and all Canadians. Describing the EIA process, the ultimate goals of MVEIRB include an effective integrated resource management system and building capacity to achieve their vision. The board utilizes an adaptive mechanism for project management, identifying valued components in the biophysical and sociocultural environment, determining appropriate indicators for assessing projects, standardizing methods of data collection and reporting, and providing information on baselines and sustainability thresholds.

Mr. Christensen described the development of an NWT Water Resources Management Strategy as a potential 'win-win' opportunity from the perspective of MVEIRB. Such a strategy could (a) provide a clear statement on water as a major Valued Component of the environment, (b) provide improved baseline information, sustainability thresholds and cumulative effects monitoring, and (c) assist the early resolution of competing water uses within the Mackenzie River watershed including transboundary uses.

What Was Heard

Q. *You mention lessons learned. What stands out?*

A. When we started out, we tried to develop a terms of reference for EA. It was made clear that we need more effort on the early parts of the process, scoping sessions --- identifying what's important. It saves time and money. – Vern Christensen (MVEIRB)

A. Better to spend more time up front. It limits the amount of additional information needed for the process. – Martin Haefele (MVEIRB)

Q. *You said that the process is board driven. What does that mean?*

A. The board is approving applications --- it's not staff-driven, not intervenor-driven. For example, the board issues information requests. The board tries to find the answers. It's a hands-on process. – Vern Christensen (MVEIRB)

2.2.5 Bob Reid (INAC) ***Baseline Water Monitoring Programs in the Northwest Territories***

Bob Reid described the baseline water monitoring programs in the NWT in which INAC Water Resources Division participates. These include the National Hydrometric Network, Snow Survey

Network, Weather Station Network, Regional Water Quality Network, Transboundary Rivers Monitoring, and Contaminated Sites Monitoring. INAC products include Hydrology Overview Reports for several regions (Coppermine, Gwich'in/Sahtu, Deh Cho, North & South Slave, Nunavut), and Water Quality/Aquatic Effects reports which help inform transboundary effects monitoring in several watersheds. Monitoring programs generate useful information for determining baselines and the effects of human activity while promoting interagency partnerships and extending capacity.

The National Hydrometric Network is operated in partnership with the Water Survey of Canada, providing near real-time water level data transmission from 88 stations. This is used to calculate streamflow and to monitor water quantity trends including flood analysis. The Snow Survey Network is operated in partnership with NWT Power Corp and INAC South Mackenzie District, measuring snow depth and water equivalent. This network is expected to be improved with the implementation of the NWT Cumulative Impact Monitoring Program (CIMP). The Weather Station Network collects evaporation data from a number of sites in the NWT, conducted in part with GNWT-ENR. While portions of this network are currently inactive, archived data is still useful in providing baseline information. The Water Quality Network includes a number of sites in the NWT, collecting information on sediment, metals, organic contaminants and hydrocarbons with direct application to monitoring transboundary streams. These studies are supplemented by biological analysis of fish on the Slave and Liard systems. Contaminated Sites monitoring is conducted with INAC Contaminants and Remediation Directorate (CARD), with results assisting in monitoring of water quality and hydrology at a variety of NWT sites, and in developing and implementing remediation plans.

What Was Heard

- Q. *If you have a short historical record, do you ever use information from communities?*
A. Not TK, though we can use tree rings to extend some data. Some info on snow pack is useful but hard to pull together. This is number-driven. – Bob Reid (INAC Water Resources Division)
- Q. *Do other jurisdictions do similar things? Do we have access to their information?*
A. Alberta has about 100 years of hydrometric data. Long-term data is limited and water cycles are not well understood. – Bob Reid (INAC Water Resources Division)

2.2.6 Marc Lange (DFO)

Fisheries and Oceans Canada: Information Needs

In describing information needs and decision making at DFO, Marc Lange outlined the core areas of DFO (Fisheries, Habitat, Oceans, and Compliance & Enforcement), their associated responsibilities, and the types of information required for effective decision making. The scope and quality of information for decision making is dependent on the magnitude and extent of decision. The sources of information may be in-house environmental data (e.g., fish stock demographics and health, habitat quantity and quality) either published or for internal use; external scientific data environmental data from public and private institutions (e.g., ice data, climate, flows, water quality, industrial development); and Traditional information. The latter is usually obtained on a case-by-case basis, exchanged during decision making with willing knowledge holders.

Mr. Lange outlined a number of DFO vehicles for the access and sharing of information in each of the four core areas. Discussing the limits of information sharing, he described the access to information as sometimes cumbersome as it is governed by Access to Information Act, has no centralized public registry, and most databases are not published and related to legal obligations for information management. Some public information openings are in the works including the Mackenzie Gas Project Portal and the Beaufort Sea Partnership. He noted gaps in information and knowledge including Land & Water Use Planning (i.e., few land and water use plans; limited description of details of human activity), the limited number and scope of large-scale Aquatic Health Monitoring Programs, and the current lack of an NWT-wide integrated body of aquatic information and knowledge. In closing, Mr. Lange described a knowledge management framework that assists in conceptualizing the flow of information and framing questions of data collection and access.

What Was Heard

- Q. *How do you determine the best sites for habitat replacement?*
- A. Initial plans are from the proponents. The intent is for proponents to do that and engage the communities. The decisions are based on keeping the replacement [area] close, and replacement value should be equal or greater. In other words, no net loss. – Marc Lange (DFO)
- Q. *Is there any long-term monitoring of fish health and habitat in other areas other than what you've mentioned?*
- A. Not much in the NWT. Government is not great at long-term data collection so it's mostly universities and industry. However, we're plugging away with CABIN (*see 2.2.7 below*) and community-based aquatic monitoring. If successful, we could build this into permit requirements. – Marc Lange (DFO)

2.2.7 Anita Gue (EC)

Environment Canada: Water Quality Monitoring & Surveillance Division Activities in NWT

Water Quality Monitoring & Surveillance Division is situated within the Science & Technology branch of Environment Canada, conducting water quality programs with a number of them having application in the monitoring of transboundary watersheds. Program drivers include legislation such as the Canada Water Act, Canadian Environmental Protection Act, the Fisheries Act, and MVRMA. Anita Gue explained that the Division conducts programs in partnership with the Water Survey of Canada (co-location of sites and conducts majority of fieldwork) and Parks Canada (joint aquatic quality monitoring within 7 national parks), as well as DFO, INAC and the Alberta Government. She described ongoing monitoring programs including long-term baseline water quality monitoring, automated water quality monitoring, and CABIN biomonitoring.

Long-term baseline water quality programs collect baseline data on northern river systems, assessing ecosystem health and the impacts of human activity. EC operates 37 sites nationally, of which 25 are in the NWT, including pipeline-related and transboundary sites. Automated monitoring systems are part of a national automated pilot network since 2006, with sites

established within the Mackenzie Gas Pipeline regional study area for continuous baseline data. These systems, while expensive, provide data in near real-time and expand baseline and trend monitoring, and early warnings. The CABIN program samples benthic macroinvertebrate communities as an indicator of water quality, using ‘bugs’ as a proxy for water quality. There are currently 16 completed sites in 4 ecoregions, and work continues on collecting reference sites to create models. Other federal departments are also doing CABIN work (Parks, DFO) allowing the opportunity for collaboration. In conclusion, Ms. Gue stressed that monitoring site locations and parameters monitored are decided upon through discussion with partners and include site-specific considerations. Programs emphasize consistent protocols followed by all samplers, and national programs with established protocols (such as CABIN) allow for comparable datasets between departments.

What Was Heard

- Q. *Can CABIN be used on bigger rivers?*
A. Protocols are being developed for larger rivers, lakes and wetlands. Currently it is limited to smaller streams. – Anita Gue (EC)
- Q. *There is a lot of data being collected. How is it being combined? Who coordinates it?*
A. INAC and EC meet regularly, and there are also informal communications. Our site selections complement one another. – Bob Reid (INAC Water Resources Division)

2.2.8 Randy Wedel (EC)

Environment Canada: Water Survey of Canada Activities in NWT

Randy Wedel followed Ms. Gue’s presentation by describing activities within Environment Canada related to water quantity monitoring. The Water Survey of Canada is the federal agency in Canada responsible for the observation, compilation, archiving, and dissemination of hydrometric data and information. It operates some 2900 observational sites in Canada nationally in partnership with Provincial and Territorial Governments. The uses of hydrometric and other data include Federal science programs (e.g. climate change, IPY), water supply, hydro-electric generation, infrastructure design, mining, high water reporting and navigation (such as Mackenzie River forecasting). Water level information is publicly accessible through a number of media such as releases on spring breakup. Some datasets and data products are also available via the WSC national website including real-time and archived hydrometric data. Mr. Wedel provided examples of possible queries and information available on the website. In conclusion, he stated that a sustainable monitoring program is possible only through a combination of long-term funding and collaborative effort.

2.2.9 Joel Holder (ENR)

GNWT Water Management and Stewardship Initiative

Joel Holder reported on GNWT water-related initiatives, which apply to a broad range of decisions including design, use, protection, management and stewardship. Multiple GNWT departments are involved in water issues and Mr. Holder described the types of decisions made by each department. Environment and Natural Resources (ENR) is directly involved in water management agreements, frameworks and strategies; wildlife habitat management; protected areas; forest management and protection; and climate change adaptation and mitigation

The Department of Transportation (DOT) engages in projects and mitigation that affect water management. Public Works and Services (PWS) provides infrastructure development advice that also affects water management decisions. Finally, Municipal and Community Affairs (MACA) provides funding formulas/policies and establishes infrastructure locations that can involve water resources.

Information currently used in GNWT decision making ranges from legislation and policy, to public feedback, Traditional Knowledge (TK), and a variety of field data collected by the departments and in partnership with other agencies. Notable gaps include the need for more routine monitoring over a broader geographic area; weather and climate data; information on needs associated with in-stream flow and aquatic ecosystems; groundwater; land cover and classification; and building an interdependence between TK and western science. Initiatives to fill these gaps include the development of information portals and data sharing networks, monitoring programs, modeling, and venues such as this workshop for the opportunity for dialogue and networking.

What Was Heard

- Q. *On the principle of stewardship, how do you see the GNWT role? For First Nations, this has historically been a role for them.*
- A. GNWT can take a more proactive role in land management and initiatives like the Land Use Framework and the Water Strategy. It can provide clarity and transparency around management. – Joel Holder (GNWT-ENR)

2.2.10 Gord Macdonald (Mining Association of Canada) Water Management at Diavik Mine Site

The Diavik mine was established in 2003 and now consists of two open-pit mines and an underground mine. Water uses and potential impacts include wastewater from an 800 person facility, water used in kimberlite processing (approximately 1.5 million cubic metres per year), and the creation of waste rock with some potential for metal leaching. Water management decisions made at the site include waste management design, operation, and closure, water treatment design and operation, mining methods, and a water use strategy that incorporates the principles of reuse and recycling. Water management principles used at the site include the protection of beneficial water uses, design for closure, planned and engineered control of site waters, reuse/recycling of water, treatment of waters prior to discharge, and full and transparent reporting. He outlined the types of information used in predevelopment and operational phases and described the surveillance network and Aquatic Effects Monitoring Plan (AEMP) activities that monitor ecosystem health in the surrounding watershed.

Mr. Macdonald's presentation included a suggestion to improve the use of existing information. He noted that water users collect significant amounts of pre-development, operational and post-closure information. This information is distributed widely and readily available on regulatory web sites, however the external use of information is limited. He attributed this to a lack of a standard electronic format and centralized database. He observed that this was a possible role for government to take the lead in information management. Outlining the gaps in the information currently available, Mr. Macdonald identified several items. He stated that

there was a need for long-term reference lakes for northern research to enable understanding current and changing conditions. He also noted that standards for water quality and treatment technology could be improved.

2.2.11 Catherine Mallet (INAC)

Northern Research Working Group for Municipal Wastewater Effluent

The Northern Research Working Group (NRWG) for Municipal Wastewater Effluent emerges from the Canada-Wide Strategy for Municipal Wastewater Effluent (MWWE). Work on this strategy was felt to require adaptation to Northern conditions of climate, community capacity, cost factors and the unique receiving environment. Beginning in 2007, the NRWG is co-chaired by Environment Canada and INAC and engages in the MWWE Sampling Program, reporting and activities in the areas of education and communication. Data collected includes field data and operator interviews, and end-of-pipe sampling includes a full suite of parameters.

Ms. Mallet observed a number of information gaps that applied to wastewater effluent monitoring. These included environmental effects (e.g., contaminants, relative toxicity in Northern waters), technology (e.g., mechanical systems; lagoon and wetland performance in cold climates), and risk assessment associated with human health risks.

2.3 THEME 2 - INFORMATION ACCESS

2.3.1 Peter Brunette (INAC)

NWT Monitoring Portal – Overview

The NWT Monitoring Portal is being developed by INAC, DFO and GNWT with Terriplan/DPRA assisting in its technical design. Input from other government agencies, regulators and other organizations are encouraged in order to increase its utility. Describing a decision cycle similar to that described by Marc Lange on Day 1, Mr. Brunette noted that the NWT Monitoring Portal contributes to three steps related to the information base, knowledge access ('discovery'), and knowledge processing. It therefore contributes to decision making, actions and monitoring. He noted that maximum utility of the Portal depends upon the provision of adequate metadata (i.e., data about the data), and at minimum should point to a contact for further information.

Proponents, regulators, governments, and others store and manage their own data, and access to data is controlled by the owner. The portal is not intended to be the database that stores actual datasets; rather it allows users to discover the existence of information and describes how data may be accessed. A spatial viewer will be provided to enable geographic searching of data or making simple maps. A metadata search engine will be provided to enable the user to search by category or key word and subsequently display data that matches the search. It will enable users to share their data and use data for decision-making. The portal will ensure that data and metadata standards are used to enable consistency, reliability and quality of data and to facilitate a data sharing environment.

What Was Heard

Q. *The big fear is that information isn't a one-shot deal but that it may be reused for purposes after the one in question.*

A. Information can get reused or misrepresented. Metadata records help, and constraints or time limits [*on using data*] may exist and should be available. – Peter Brunette (INAC)

Q. *Does this tool allow sharing only with certain users?*

A. Yes. However, everyone should know that [the information] exists. If it is so sensitive then it should not be registered. If it is not made available then you can provide a contact for it. Everything should be discoverable, though. – Peter Brunette (INAC)

Information sits on a drive or a shelf and the organization doesn't know it exists. We need to think of information as a corporate asset. – Peter Brunette (INAC)

2.3.2 Rachelle Laurin-Borg (Terriplan)

Water Strategy: Geographically Integrated Supporting Database

Terriplan provided an overview of the Mackenzie River Basin Geodatabase, a tool being developed to centralize and normalize data from various sources and jurisdictions. A geodatabase is a relational database designed to store, query, and manipulate spatial data. It is also a powerful tool for organizing and managing information in a central repository, rich in local knowledge. Its objective is to compile information about any component of the Mackenzie River Basin that impacts or is impacted by a change in water quality and/or quantity.

The geodatabase is broken into feature datasets (~7) and classes (~30) in order to organize large amounts of data. Terriplan outlined a number of datasets compiled to date and provided examples of some spatial representations of the data. Water related datasets include hydrology, weather, water quality, aquatic ecosystems, water supply and demand, recreation and cultural values. Primary sources include water and environmental agencies, Traditional Knowledge holders, technical experts, and various national and regional spatial databases. Secondary sources include published models and remote sensing data. These data are then subject to statistical and GIS analysis.

Information Gaps noted in the presentation included: aquatic ecosystems (fisheries, wildlife and biodiversity data); a spatial inventory of spiritual and cultural values (and the relationships between these values and marginal changes in water quality and quantity); groundwater; non-point source pollution; in-stream flow needs; and water-related information for B.C., Alberta and Saskatchewan.

What Was Heard

Q. *How does this relate to the previous portal [i.e. NWT Monitoring Portal]?*

A. You would use [the NWT Monitoring Portal] to discover it. This is an actual predictive model that requires information to operate. They are unique but complementary systems. There would be a need to link them and that would require some gap analysis. – Peter Brunette (INAC)

2.3.2 David Livingstone (INAC) ***NWT Cumulative Impact Monitoring Program (CIMP)***

David Livingstone gave an overview of the Environmental Stewardship Framework and NWT CIMP. As a requirement of the MVRMA and Gwich'in, Sahtu and Tlicho Agreements, CIMP includes the Mackenzie Valley and ISR with the exception of Wood Buffalo National Park. The program design and implementation have been coordinated by INAC, NWT CIMP and the Audit Working Group since 1999. The program is community-focused and structured to include a working group of Aboriginal, federal and territorial government representatives. It emphasizes partnerships and linkages, and examines regional priorities within an NWT-wide context. Objectives of the program are to monitor cumulative impacts of land and water uses in the NWT using both traditional knowledge and science, with an emphasis on Valued Components of the environment (both biophysical & human). In this way the program can fill priority gaps in monitoring, build community and regional capacity, determine and report on trends in environmental quality, and support other elements of the NWT Environmental Stewardship Framework.

Mr. Livingstone gave an overview of recent activities including the Delta Region Pilot Project and information management, analysis and reporting. He emphasized the need for standardized data collection and reporting and metadata-assisted access, and made connections to state of knowledge (SOK) reporting and the NWT Environmental Audit. He also stated that pilot projects and CIMP in general must have communities at the core of the program in order to be effective. Collaborative approaches such as this offer the potential to integrate western science and TK and to unify communities and investigators. Next steps include the securing of long-term funding and the ongoing work on standardizing valued components.

2.4 REPORTS ON CURRENT INITIATIVES

2.4.1 Jesse Jasper (MRBB) ***MRBB Activities, 2009-10***

Jesse Jasper provided a summary of recent activities by the Mackenzie River Basin Board (MRBB) and highlighted its priorities for the coming year. Beginning with an overview of the Mackenzie River basin Master Agreement (1997), he reiterated the principles of the management of aquatic ecosystems before discussing the upcoming update to the State of the Aquatic Environment Report (SOAER). The 2009 report will focus on three issues: oil sands/hydrocarbon development; climate change; and integrating TK into reporting. In discussing current board activities, Mr. Jasper discussed business planning and an expanded secretariat though he observed that the budget had not increased since 1998. He noted that the process of bilateral negotiation between jurisdictions in the MRB has been slow and may not be the only answer.

2.4.2 Mark Cliffe-Brown (WLWB) ***Proposed Watershed Management Program: Marion Lake Watershed***

The Wek'èezhii Forum is a group of organizations including the Wek'èezhii Land and Water Board (WLWB), Wek'èezhii Renewable Resources Board (WRRB), and Tlicho Land Protection.

They are a vehicle for discussing data sharing and management issues in the Wek'èzhii area and contributing to a proposed management program in the Marion Lake watershed. The forum goes into communities to disseminate information as well as to collect feedback; initial steps are concerned with building connections with interested parties (including academic partners). The proposed method addresses community concerns regarding water and wildlife in an area where future development is likely. It involves breaking the region into sub-basins, promoting and integrating community monitoring programs, and utilizing historical data (science and TK) to better coordinate ongoing monitoring work. This will assist the land use planning process as a moratorium on development is about to end. An information portal is planned to support land and water managers.

3.0 REPORTS FROM BREAKOUT GROUPS

Participants were divided into three breakout groups to allow for a facilitated discussion of information needs and access. Discussion of Theme 1 (Information Gaps) occurred on Day 1, and discussion of Theme 2 (Information Access) occurred on Day 2.

3.1 INFORMATION GAPS

This breakout session focused on the information used and needed for decisions. Participants were asked the following questions:

1. *What are some of the gaps in the information/knowledge needed to make informed water management decisions?*
2. *What are some of the ongoing initiatives to collect information and knowledge to fill these gaps?*

Overall the groups were consistent in emphasizing (1) a community focus on information collection, related in part to encouraging buy-in around the proposed water strategy and other programs. All three groups also listed as important (2) effective communications and coordination (both inter-agency and with the public) (i.e. around future research and planning) and (3) access to information (including storage and management). All three groups further identified (4) gaps in baseline data, (5) gaps in ecosystem linkages, including knowledge of in-stream flow, and (6) the need to develop a standardized approach to ecosystem monitoring.

3.1.1 Question 1

Group One:

- ▶ Insufficient baseline information can limit decision-making.
- ▶ Inconsistency in monitoring can limit decision-making – e.g. lack of consistent surveillance network points in regards to water licencing.
- ▶ Centralized data access and/or management. Data may be present but not accessible to land and water boards [note: this response relates to session 2]. A related issue is who would be responsible for managing this information.
- ▶ Data provided by proponents is by its nature a snapshot and is therefore limited.
- ▶ An effective community-driven system requires recognition of local values.
- ▶ National standards and guidelines may not reflect Northern circumstances, including the challenges presented by the physical environment as well as unique social and political circumstances. The group raised the idea of drafting a ‘northern CCME’, for example.
- ▶ Participants also discussed building buy-in for a water strategy and the role of the NWT public in its development and implementation. Information must be understandable by the general public. Where possible, data gaps should be identified by the public and not just by agencies.

Group Two:

- ▶ Baseline mapping and geospatial mapping was identified as a notable gap. Human activity around a resource cannot be managed unless the resource is understood.

- ▶ The use of Traditional Knowledge was identified as another gap. The information may be extant but questions remain about its use (and potential misuse or appropriation), as well as issues of copyright and ownership of information. [Similar issues of ownership were raised in Session 2 around scientific knowledge which was seen as sometimes being 'hoarded' by researchers or agencies.]
- ▶ The lack of coordination of information was seen as a gap. Participants felt that there was limited understanding of who is doing what and how existing mechanisms inter-relate. As a result there are potential risks of duplication of effort and lack of accountability.
- ▶ There is insufficient focus on ecosystem-level information. More baseline and monitoring work is required.
- ▶ The issue of buy-in was also discussed by this group. Participants felt that communities need to see the value of participating. This could be addressed through educational initiatives, both to inform communities and agencies of the benefits of such a relationship.
- ▶ A gap analysis should be undertaken to identify inconsistencies in programs (and categories of programs), as well as within and between organizations. Defining the respective areas of responsibility of organizations and agencies would assist in this process. This was linked to the notion of information stewardship, of 'keeping knowledge alive'.

Group Three:

- ▶ Gaps exist in all knowledge areas, including local, TK and western science. TK in particular was seen as a large gap. Its nature as an orally-transmitted body of knowledge complicates its integration with scientific knowledge. Anthropology and Ecology were identified as the closest scientific approaches to TK as they take a more holistic approach and have communications aspects. Formal protocols for **collecting, using and disseminating** TK must be established.
- ▶ It was unclear if local knowledge (such as changes in fish anatomy) was being recorded in a consistent and formal manner.
- ▶ Groundwater was noted as a specific gap in understanding water.
- ▶ Relationships between water levels, flows, and biota were noted as complex. As a result, both aquatic ecosystem indicators and in-stream flow needs assessment were noted as specific gaps in understanding water. Baseline inventories of NWT waters should be conducted in all areas.
- ▶ Coordination between agencies (federal, territorial) is an ongoing gap. These relationships may change within the context of devolution.
- ▶ Understanding the relationship between the Beaufort Delta and marine waters.
- ▶ Understanding the impact of communities upon local waters and watersheds.
- ▶ Understanding thawing permafrost and potential contaminants.
- ▶ Understanding non-point source pollution on water quality (e.g. airborne contaminants, run off).

3.1.2 Question 2

Group One:

- ▶ Examine best practices from other studies.

- Projects such as the West Kitikmeot Slave Study (WKSS) can be examined for **best practices** and lessons learned to inform the development of a water strategy.

Group Two:

- ▶ Examine best practices from other studies.
 - This group also suggested that the West Kitikmeot Slave Study be examined for best practices and lessons learned, though it was noted that the study is only one model.
- ▶ Regional fora and **working groups** such as that described by Mark Cliffe-Phillips (see section 2.4.2) can facilitate discussion on priorities, policy and extending capacity and resources.
- ▶ **Standardized approaches** to ecosystem monitoring, such as CABIN, can provide consistency and build regional capacity. They also require adequate funding, and participants stressed the need for strategic or long-term funding to encourage retention.

Group Three:

- ▶ Examine best practices from other studies.
 - Studies conducted by the Environmental Monitoring Advisory Board (EMAB) study are opportunities to link science and TK, and to link research to communities.
- ▶ A water strategy could benefit from **shared understanding** of processes and their products, such as monitoring site information.
 - The coordination of future research and planning is assisted by participating in events such as Science in the Changing North.
 - Communications and education activities were seen as desirable, such as community involvement in monitoring and mechanisms to report results to communities.
- ▶ **Basin-level approaches** to monitoring and reporting were seen as desirable. This included the MRBB State of the Aquatic Environment Report and the Northern River Basin Study.

3.2 INFORMATION ACCESS

This breakout session focused on how to improve access to and sharing of existing information. Participants were asked the following questions:

1. *Is there data, information or knowledge that Northern managers and decision-makers do not have ready and easy access to? If so, why?*
2. *What type of processes or mechanisms would improve access to, and sharing of, data/information/knowledge for use in water-related decision-making?*

All three groups raised issues of standardizing or formalizing the information management process, and adopting a more holistic approach to project design that incorporates effective and adaptive information management.

3.2.1 Question 1

Group One:

- ▶ There may be a lack of confidence in TK from the point of view of western science practitioners. Definition is needed of what is needed and why.
- ▶ Confidentiality issues were discussed by participants. Not all knowledge can be made public.
- ▶ Information portals and related structures are useful but must be scaled appropriately. A portal can be too broad in scope, or may be operational but empty.
- ▶ Participants suggested keeping an eye on who or what is driving a project. For example, the group questioned reliance upon consultants and contractors for work on information management. Orphaned applications were suggested as a possible outcome of this type of relationship, in which IM structures were created but left unsupported after the end of a contract.

Group Two:

- ▶ There is a limited understanding overall of what information is out there. There appears to be a lot of information but no good means of tracking it. This can lead to redundancy through the duplication of effort ('reinventing the wheel').
- ▶ Existing databases and information management structures (such as CIDM) are limited in utility and the ability to export information to other systems.
- ▶ Access to some information is limited due to a number of issues, including privacy issues, copyright, data 'hoarding', and concerns over the risk of misinterpretation. This makes verifying information problematic.
- ▶ Despite the utility of portals and data sharing mechanisms, we run the risk of building bigger and better silos. There must be greater emphasis on communication and understanding existing information-related initiatives. Education could assist in this area, both of the public and government employees.
- ▶ It is not always possible to identify the source or author of specific information.
- ▶ Changes in the medium can impact access to information. This could include changes in technology (e.g. non-digital data), software version, or even maintenance of links on websites (i.e. 'linkrot').

Group Three:

- ▶ 'Sensitive' information may not be shared except in limited cases (e.g. in court).
- ▶ Information may exist but be incompatible due to being in different formats.
- ▶ Information may exist but be in institutional silos due to concerns of cost, time and misuse.
- ▶ Information may exist but it is vast and often specialized, precluding easy access (especially by the public).
- ▶ Protocols may differ between data compiled for monitoring purposes and those for research. Monitoring has a long-term focus whereas research tends to be snapshots.

3.2.2 Question 2

Group One:

- ▶ In regards to control of knowledge, **defining ownership of information** would assist users as well as decision-makers. The ownership of information might reside with knowledge holders rather than users or governments.
- ▶ Consider the **scale of data sharing mechanisms**, such as portals.
 - Must be commensurate to the needs.
 - It is better to start small and focused and then move up a level of resolution.
- ▶ **Education** of knowledge users and holders was linked to improving access and sharing of information.
 - Understanding why data is being shared could encourage good information management practices.
- ▶ The group discussed the use of 'carrots and sticks' to ensure effective information access. Participants titled this *coercive cooperation*.
 - There must be commitments from partners to effectively share and maintain information. This might be achieved at a managerial level by linking information management to performance reviews. This could also apply to commitments to provide data in specific formats and by certain times, or (more broadly) political commitments to recognize the importance of information management.

Group Two:

- ▶ Information management should be **built from the outset** into projects and initiatives.
- ▶ It might be more appropriate to consider **information stewardship** rather than information management, and consider the collective responsibility of effectively accessing and storing knowledge.
- ▶ Delineating **responsibilities** for information management might address some issues around data (or access to it) expiring.
- ▶ **Standards** for information use and access are required.
 - Information users and holders would be assisted by formal standards for queries, storage, description (i.e. metadata) and management of information.
 - Information is needed for whom to contact for access and availability of data (i.e. metadata).
 - Formalizing or standardizing access to information, either scientific or TK, would assist in granting certainty to information users and holders alike. This was likened to an end-users licensing agreement (EULA) to which computer users agree when installing software.
- ▶ Examining the **best practices** of information management would contribute to improving access and sharing.
 - The discussion could occur among researchers (who have a vested interest in the information) rather than managers.
 - Examples of programs to examine include WKSS, IPY, and GWEX.
 - Suggested that a GIS distribution list be formed for information exchange.
- ▶ More frequent state of knowledge (SOK) reporting would contribute to a shared understanding of what information is being collected and stored, and why.

Group Three:

- ▶ Information Management ‘units’ could be **better integrated** with data providers and users.
 - Resourcing issues to be overcome. Increased automation is preferable.
 - Pilots and linking initiatives needed among boards.
 - More collaboration at staff level among boards.
- ▶ Information collection and storage requires **greater standardization** to facilitate use and comparison.
 - Need criteria for baseline data, e.g. protocols, reference sites.
 - Need to know context and connections of data (i.e. metadata).
 - Need to determine who is responsible for standardization. CIMP, for example, is a multipartner initiative but has an INAC lead. Possible role for MRBB.
- ▶ Need to be clear on **terms of use** of information.
 - Confidentiality & availability.
 - Needs to be stated up front.

3.3 OTHER COMMENTS

Participants from Group One questioned how an NWT Water Resources Management Strategy would track and accommodate changing values and thresholds, and how the strategy would define traditional/cultural use of water. The group felt that the strategy as outlined is broad in scope but needs to narrow the focus of monitoring and research.

In discussing the nature of gaps as they relate to a water strategy, Group Two suggested that an analysis be undertaken to identify inconsistencies in programs (and categories of programs), as well as within and between organizations. Linkages between programs should be understood to improve efficiency, and actions based upon this understanding. For example, assessing water quality would benefit from identifying the standards involved, who is involved in related processes and the specifics of the process itself, and creating an implementation plan to weave these threads together.

4.0 LAST WORDS

4.1 Plenary Session, Day 2

A summary of the workshop was made during a plenary session at the end of Day 2. Facilitators reiterated what was heard during the preceding two days and invited participants to comment on the proceedings. Participants were asked what would they change if they were king or queen for a day.

- ▶ We need to do a better job at describing the current state of knowledge. Pull out all that old information from the past. Get caught up, identify the gaps. The problem is that most of us are not generalists but specialists and this is something different.
- ▶ We can't use old tools and old thinking to solve new problems.
- ▶ TK and science can work together.
- ▶ Effective information management requires communication and education.
- ▶ Information management is everyone's collective responsibility. We'll be here again in five years if we don't accept that.
- ▶ Managers should be accountable for making sure that information is accessible and shared. Use a stick or a carrot, but be accountable so that the information is available.
- ▶ No one organization can do it all. To take it to the next level, we need to push and commit to some sort of cooperative approach. Look to the corporate world for examples. Don't need senior government to effect this; it can be done at this level.

In terms of specific direction for the *NWT Water Resources Management Strategy*, the following was also heard at the final plenary session:

- ▶ The Water Strategy discussion paper does not have enough Aboriginal perspective. When discussing section 35 obligations, have courage when writing.
- ▶ We can't just think water management. The land is linked to the water. We can't design just for one or the other.
- ▶ Information management or information stewardship is fundamental to making good decisions.

APPENDIX A: BACKGROUND AND AGENDA

NWT WATER MANAGEMENT STRATEGY WORKSHOP #3: INFORMATION NEEDS

Explorer Hotel, Yellowknife
March 12-13, 2009

1.0 PURPOSE AND OUTCOMES

1.1 Purpose

The purpose of this Water Management Strategy Workshop #3 is to seek broader NWT input to help guide the preparation and implementation of an NWT Water Resources Management Strategy, through discussion of the sources, gaps and procedures for accessing and sharing information and knowledge needed for water management decisions.

1.2 Outcomes

A shared understanding of:

- Types of water resource management decisions in the NWT.
- The nature and sources of data, information and knowledge currently used to support water management decisions.
- Gaps in data, information and knowledge as well as ongoing efforts and plans to address these priority needs.
- Existing procedures for accessing and sharing data, information and knowledge and potential improvements in those procedures.
- How TK and conventional scientific knowledge together can best inform water resource management decisions.

2.0 WHO, WHEN AND WHERE

Workshop Attendants:

- NWT Water Management Strategy Steering Committee (ASC) members
- Northern Board staff
- Water managers in federal govt including INAC, EC and DFO
- Water managers in territorial govt including ENR, MACA, DoT, ITI, Hydro and PWS
- Representatives of NWT ENGOs
- Representatives of Industry Associations and companies
- Terriplan Consultants

When and Where Workshop will be Held:

- March 12 and 13, 2009
- Explorer Hotel, Yellowknife NT, Katimavik A room

3.0 WORKSHOP AGENDA

March 12, 2009 DAY 1 Explorer Hotel, Katimavik A Room, Yellowknife NT		
Time	Topic	Lead
8:30 – 9:00	Refreshments	
9:00 – 9:10	Opening Remarks	INAC & GNWT
9:10 – 9:15	Introductions	Facilitator
9:15 – 9:30	Purpose of Workshop in Relation to NWT Water Management Strategy	Facilitator
9:30 – 10:00	Report from Hay River TK Workshop Presentation and Questions	Bea Lepine & Gary Bohnet (GNWT)
Theme 1: INFORMATION USED AND NEEDED FOR DECISIONS 1. What types of decisions does your organization/agency make? 2. What Information do you use now to help make decisions? 3. What information do you want/need to help make decisions? 4. What are the information gaps? 5. What are ongoing initiatives to collect information and fill these gaps?		
10:00 – 10:20	MVLWB	Angela Plautz
	Refreshment Break	
10:40 – 11:00	MVEIRB	Vern Christensen
11:00 – 11:20	INAC	Bob Reid
11:20 – 11:40	DFO	Marc Lange
	LUNCH (provided)	
1:10 – 1:15	Introduction to Breakout Groups	Facilitator
1:15 – 2:15	Breakout Groups	
2:15 – 2:35	DOE	Anita Gue & Randy Wedel
2:35 – 3:00	GNWT	Joel Holder
	Refreshment Break	
3:15 – 3:35	Mining Association of Canada	Gord MacDonald
3:35 – 4:00	Waste water	Catherine Mallet
4:00 – 4:30	Facilitated Discussion	Terriplan
4:30	Closing Remarks	GNWT & INAC

March 13, 2009 DAY 2 Explorer Hotel, Katimavik A, Yellowknife NT		
Time	Topic	Lead
8:30 – 9:00	Refreshments	
9:00 – 9:10	Opening Remarks	INAC & GNWT
9:10 – 9:20	Summary of Previous Day	Terriplan
Theme 2: ACCESS - How to Improve Access and Sharing of Information 1. Where do you get that information used to help make decisions? 2. What can be changed to allow better access and sharing of information?		
9:20 – 9:40	CIMP	Christa Domchek
9:40 – 10:00	NWT Monitoring Portal	Peter Brunette
10:00 – 10:30	Water Strategy: Information Management	Rachelle Laurin-Borg (Terriplan)
	Refreshments	
10:50 – 11:00	Introduction to Breakout Groups	Terriplan
11:00 – 12:00	Improving Access & Sharing of Information	Breakout Groups
	LUNCH (provided)	
1:15 – 1:40	Report from Breakout Groups in Plenary	
1:40 – 2:15	Information and Knowledge Management for Water Management Decisions	Terriplan Facilitated
2:15 – 2:30	Confirming Messages and Next Steps	Terriplan Facilitated
2:30	Closing Remarks	GNWT & INAC

