



REPORT OF THE ROSENBERG INTERNATIONAL FORUM ON WATER POLICY TO THE GOVERNMENT OF THE NORTHWEST TERRITORIES

August 2009



**Rosenberg International Forum on Water Policy
University of California,
Division of Agriculture and Natural Resources**



Rosenberg Regional Forum
Northwest Territories
Table of Contents

Foreword

3

The Structure & Objectives of the Forum

4

General Observations

7

Concerning the NWT Water Strategy

9

Concerning the “WaterWise”
Decision-Support Tool

19

Concerning Ecosystem Valuation

21

Additional Considerations

23



Rosenberg Regional Forum Northwest Territories *Foreword*

The Rosenberg International Forum on Water Policy was created in 1996 by the Bank of America with an endowment gift to the University of California in honor of Richard Rosenberg upon the occasion of his retirement as Chairman of the Bank. The resources from this gift support the Rosenberg International Forum on Water Policy. The theme of the Forum is: Reducing Conflict in the Management of Transboundary Water Resources. The Forum meets biennially at different locations around the globe. Past Forums have been held in San Francisco, CA, USA; Barcelona, Spain; Canberra, Australia; Ankara, Turkey; Banff, Canada; and Zaragoza, Spain. Attendance at the Forum is by invitation only and is restricted to 50 water scholars and senior water managers from around the world.

In 2006, the Advisory Committee of the Rosenberg International Forum launched a second activity subsumed under the general title of “Regional Rosenberg Workshops.” These workshops utilize small, international, expert panels to assist governments in addressing regional water issues. The first of these workshops reviewed the “Water for Life” Strategy and the “Groundwater Action Plan” for the Province of Alberta in Canada. The second of these workshops brought together water management experts and water policy scholars from Iran and the United States with the aim of identifying commonalities in the challenges of assuring water supply for cities and agriculture in arid and semi regions that exist in both countries. This document is the report of the third Regional Rosenberg Workshop which was held in Yellowknife in Canada’s Northwest Territories in June of 2009.

The Yellowknife Workshop was convened at the request of the Deputy Premier of the Northwest Territories who also holds his government’s Environment and Natural Resources Portfolio. The Minister and the Ministry sought advice on three matters. The panel was asked first to review a draft plan called *Northern Voices, Northern Waters: Towards A Water Resources Management Strategy for the Northwest Territories* and to make recommendations as to how it could be improved. The panel was also asked to identify potential barriers to its implementation and to recommend examples from elsewhere from which the government could benefit as it set out to integrate the strategy into larger governance structures.

Second, the panel was charged with assessing the appropriateness and effectiveness of water resource management decision-making tools proposed for the government’s use.

Finally, the panel was asked to examine natural capital accounting approaches that have been developed for the Mackenzie River Basin; to recommend ways in which more credible assessments of the environmental assets of the Northwest Territories might be developed; and to recommend ways in which such estimates might be employed to strengthen public support for the water strategy through improved understanding of the value of the region’s water resources.



Rosenberg Regional Forum Northwest Territories *The Structure & Objectives of the Forum*

The Rosenberg Regional Forum was held in Yellowknife, in Canada's Northwest Territories between June 9th and 12th, 2009. The goal of the forum was to facilitate an exchange of information and experience that would benefit the management of water resources in the Northwest Territories. The objective of the forum was to inform the development of an NWT Water Resources Stewardship Strategy by providing a venue for discussion amongst distinguished scholars who are familiar with the science of water management and alternative approaches to water management around the globe.

Report Topics

1. NWT Water Resources Stewardship Strategy– Review and Recommendations

- a. *What modifications would improve the draft NWT Water Strategy?*
- b. *What are potential barriers or obstacles to implementation of the NWT Water Strategy? (focus in particular on technical and financial considerations)*
- c. *Putting Concepts into Practice: Lessons from elsewhere*

2. Water Management Decision Support Tool (DSS Model)

- a. *Assess Appropriateness/Effectiveness of Models in Water Resource Management Decision-Making in the NWT*

3. Natural Capital Accounting– Information Gathering and Review of the Utility of NCA in the Development of a Water Stewardship Strategy in the NWT

- a. *Are there inadequacies in current studies and what are they?*
- b. *What steps and studies need to be pursued to develop more scientifically credible estimates of the value of the environmental assets of the NWT?*
- c. *How might the results best be used to obtain widespread public support and understanding of the value of water resources in the Northwest Territories?*

The Rosenberg Regional Forum Panel

The Rosenberg International Forum on Water Policy convened a distinguished international panel of experts with appropriate disciplinary backgrounds and experience. The names, institutional affiliations and areas of expertise of the panel members are listed below.

Professor Henry Vaux Jr., Chair

Department of Agricultural and Natural Resource Economics
University of California, Berkeley, CA USA
(Natural Resource Economics)

Professor John Bergstrom

Department of Agricultural and Applied Economics
University of Georgia, Athens, GA USA
(Natural Resources Economics/Valuation)

Professor Kevin Boyle

Department Head, Agricultural and Applied Economics
Virginia Tech, Blacksburg, VA USA
(Natural Resource Economics/Valuation)

Professor Helen Ingram

School of Social Ecology
University of California, Irvine, CA USA
(Political Science)

Professor David Schindler

Department of Biological Sciences
University of Alberta, Canada
(Aquatic Ecology)

Mr. Robert Sandford, Secretary

Chair, Canadian Partnership Initiative United Nations “Water for Life” Decade
Canmore, Alberta, Canada

Rosenberg Regional Forum Observers

A second tier of outside experts was also invited to participate in the Regional Forum as observers to the process. It is anticipated that these observers will later offer advice on how emerging policies relating to water resources management in the Northwest Territories could be communicated to water management practitioners, political interests and to the general public in southern Canada and internationally. The names, institutional affiliations and areas of expertise of the official observers of the forum are listed below.

Dr. Dennis Fitzpatrick

Vice-President Research
University of Lethbridge
Lethbridge, Alberta, Canada

Dr. Rob de Loë

Professor and University Research Chair in Water Policy and Governance
University of Waterloo
Waterloo, Ontario, Canada

Tony Maas

Senior Policy Advisor, Freshwater
World Wildlife Fund – Canada
Ottawa, Ontario, Canada

Tim Morris

Water Policy & Research Analyst
Walter and Duncan Gordon Foundation
Toronto, Ontario, Canada

Dr. Jeff Wells

Senior Scientist
International Boreal Conservation Campaign
Gardiner, Maine, USA

Presenters and Resource Staff

Government of the Northwest Territories

Department of Environment and Natural Resources

Gary Bohnet – Deputy Minister

Mark Warren – Assistant Deputy Minister

Jane McMullen – Head, Land and Water Unit

Aiyana Lajeunesse – Advisor, Water Stewardship

Department of Indian and Northern Affairs Canada

David Livingstone – Director, Renewable Resources and Environment

Carole Mills - Manager, Water Resources Division

Sven Bohnet - Water Resources Division

Bob Reid – Head, Water Management and Planning

Terriplan Consultants

Dr. Andy Swiderski – Senior Associate

Ricki Hurst – Senior Associate

Ed Hanna – Senior Project Consultant



Rosenberg Regional Forum Northwest Territories *General Observations*

As the proceedings of the Yellowknife forum unfolded, the Rosenberg Panel was increasingly struck by both the magnitude of the water resources that exist in the Northwest Territories and by the global importance of proper and timely management of those resources. The lands and waters of the Mackenzie basin not only form the cultural and economic foundation of the peoples who live in the region, they in tandem perform eco-hydrological functions that bring benefit not just to the rest of Canada but to the entire continent as a whole.

The Mackenzie River Basin is thought to be one of the lynch-pins holding North America's water-ice-climate interface together. If the stability of this important eco-hydrologic system is compromised, it could cause the Earth's climate to wobble further out of its current equilibrium with implications for all the ecosystems on the continent whose stability is coupled to current climate variability.

Such concerns are clearly not being taken lightly in the Northwest Territories. The Rosenberg Forum panel was enormously impressed with the *Northern Voices, Northern Water* strategy. The panel was particularly impressed with the engagement process that has been used in developing the strategy. The panel had nothing but praise for the way in which the Government of the Northwest Territories has collaborated with Indian and Northern Affairs Canada, the Aboriginal Steering Committee and the citizens of the NWT on the strategy's development. The Government of the Northwest Territories has demonstrated that their blend of hard-working senior leaders and young energetic staff can generate positive results that far exceed what is often expected of considerably larger and much better funded agencies.

The panel acknowledged and praised the fact that the strategy embraces cultural and spiritual as well as economic values. The panel also observed that while the strategy is clear on why water is a priority in the Northwest Territories, the chances of its being implemented as conceived might be greatly enhanced by clearer explanation of how the appropriate management of water and related resources will contribute to a larger vision of what the Northwest Territories would like to become at its future and ultimate social, environmental and economic best. The panel observed that while the strategy is abundantly clear on why water is important today, it is almost silent on why the abundant water resources of the NWT will be important in the world emerging out of current continental and global environmental, economic and population circumstances.

The panel felt that the strategy would be strengthened by the addition of a clearer statement of purpose and direction of territorial stewardship goals relating to environmental assets. The strategy in its current iteration suggests that it would be valuable if the NWT could articulate a more clearly stated vision of what it wants to become so that those in decision-making

positions know how to proactively respond to circumstances related to the management of the region's water resources to that defined end. Discussion of this point underscored the need for greater common acceptance of how sustainability should be defined within the context of the political, economic, social and environmental aspirations of the Northwest Territories now and in the future; a topic that is discussed separately elsewhere in this report.

It was also the opinion of the panel that *Northern Voices, Northern Water* needs to further underscore the current and future importance of the over-arching inter-relationships upon which the strategy will ultimately depend for its success. Because the headwaters of its most important watercourses are located in upstream jurisdictions, the water resources of the Northwest Territories could be dramatically impacted by forces outside of its boundaries and beyond its immediate political influence. As has already been mentioned, however, this is a two-way street. The benefits of careful stewardship of the water resources of the Mackenzie Basin do not just accrue to locals. The benefits of effective management accrue also to many who live well beyond the boundaries of the Northwest Territories. They can accrue to the entire continent and to the hemisphere as a whole. To a very real extent the success of the Northwest Territories water strategy may hinge on how well this fact is communicated to riparian neighbors and political interests throughout Canada.

The population of the Northwest Territories is small and its fiscal and scientific resources are limited. Thus, partnerships with influential southern interests will be required if the strategy is to achieve the broader communications and outreach objectives that are central to its success. All partners – whether they acknowledge they are partners or not – have to know why they are better off with this strategy than without.

In order for the strategy to succeed criteria will have to be developed on an on-going basis to ensure that the Government of the Northwest Territories and Indian and Northern Affairs Canada can measure what social and environmental costs are avoided by defined sustainable management and what the successes that arise from effective water management look like. Because of the expansive scope of the strategy it will be important to identify tangible immediate successes, both quantifiable and qualitative, and to appropriately build on them.

The people of the Northwest Territories have embarked on what could be a global landmark in eco-hydrological management. Though it will not be an easy project, a very good start has been made. To enhance the chances of success the Rosenberg panel believes that it is imperative that the *Northern Voices, Northern Water* strategy be finalized and implemented in the same thoughtful, well-focused, collaborative and strategic manner in which it was initially conceived and developed.



Rosenberg Regional Forum Northwest Territories *Concerning the NWT Water Strategy*

Why the Northwest Territories Needs A Water Strategy

The desire to create a water strategy in the Northwest Territories appears to be driven by practical considerations. Because of the region's territorial status, Northerners were for generations silent about their concerns relating to water resources. When they wanted to speak they were ignored by government and by industry. Many Northerners believe their views are still being marginalized in Ottawa by people who don't know Northern aspirations or values. Ten years ago, Northerners grew tired of being ignored and began to speak loudly about the state of their water resources. Since then public interest has galvanized around the issue. On this matter at least all interests have agreed to leave other differences aside. There is unanimous support in the Northwest Territories for improved water management.

The peoples who live in the Mackenzie River Basin respect water in the same way that people who live in the desert do. The difference is that the volumes of water in the Mackenzie are vast in comparison to those present in any desert. People here do not separate water from land as many do elsewhere. The peoples of the Northwest Territories need a water strategy because the land-water relationship that is fundamental to their lives is not being respected. A balance between environment and responsible development has yet to be struck in the Northwest Territories.

Another reason the people of the Northwest Territories need a water strategy is because outside jurisdictions are already affecting northern waters. Moreover, the Northwest Territories is facing transboundary negotiations with jurisdictions that are affecting the quality and quantity of northern water and must have a mandate and a strategy for advancing those negotiations.

The issue of climate change also points to the need for a comprehensive water strategy since northerners are already experiencing measurable warming effects. Many wildlife species in the region are being affected. Another issue is the intensity of forest fires; which is measurably greater than in the past. Fires are creating their own weather. Fires are also burning down to the permafrost. The leaching of contaminants into water from melting permafrost is making water in some communities undrinkable. The Government of the Northwest Territories is creating a water strategy because it cannot afford not to; the northern way of life depends on it.

Part One: What modifications would improve the draft NWT water strategy?

Concerning Hydrological Stationarity

In light of the information presented to it, the panel was concerned that the Northwest Territories water strategy not be developed on established intellectual or policy foundations based on hydrological stationarity. Because of accelerated warming the hydrology of the Northwest Territories is on the move. Changes in ecological conditions are already following in the wake of changing hydrology. If current trends persist, the future for which the Northwest Territories is preparing through this policy exercise will not be a mere variation of the circumstances that exist today. The future will likely be radically different than those living today can presently imagine. The extent and rate of change may present a much greater intellectual, technical and practical challenge to adaptive management than is presently appreciated. The need for substantially enhanced adaptive capacity should be underscored in this strategy.

Recommendation: The Government of the Northwest Territories should make allowance in its water strategy for more rapid and more expansive changes in the eco-hydrologic circumstances of the Mackenzie River Basin caused by climatic variability and global change. Such changes should be anticipated and water management goals should be reviewed periodically to ensure that they remain appropriate.

Employing the Precautionary Principle

The panel was impressed with the strategy's basic principles. The strategy is founded upon the principles of respect, sustainability, knowledge, adaptability, accountability and the precautionary principle. This latter dictum holds that where there is a threat of significant reduction or loss of biodiversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat. The panel acknowledged and praised the strategy's commitment to the precautionary principle and urges that it continue to be employed in the further development and implementation of the strategy. It was, however, noted that the assignment of arbitrary values to environmental risk was not consistent with the precautionary principle.

Recommendation: In order for the strategy to succeed, a further shift in government attitude toward a more precautionary mode must be encouraged. Greater confidence in the precautionary approach can be achieved through the employment of new natural capital tools that identify the geographical extent, quantity and quality of natural assets and that will assist in the clarification of when and to what extent the precautionary principle should be exercised to prevent deterioration of baseline conditions.

Defining Sustainability

Acceptance of a common definition of sustainability remains a universal problem in the management of eco-hydrological resources worldwide. It was clear to the panel that *Northern Voices, Northern Water* was a long-term strategy for sustainability. But what was to be sustained was not clear. Is the Northwest Territories trying to sustain a certain quality of life; or is trying to sustain the functions and services of natural systems? The members of the panel surmised that the purpose of the strategy was to protect both. The integrity of the land-water

interface and the vitality of local cultures whose way of life depends upon the sustained health of that interface are in fact expressions of the same ideal. This did not, however, come out as strongly in the wording of the strategy as it might. In fact, the two objectives appear at odds.

What sustainability means in terms of the management of water resources is not specifically stated. Without that foundation, it is unclear what sustainability should mean in terms of the perpetuation of established local culture. The panel noted that sustainability of current lifestyles, especially in some struggling First Nations community circumstances is not what the strategy seeks. Nor is the goal to aim for the sustainability that existed in the past, as the world has changed and it is no longer possible nor desirable to return entirely to traditional subsistence lifestyles.

The key to cultural sustainability as explained to the panel was the perpetuation of lifestyle choices. People living in the Northwest Territories want to keep their options open. They want to be able to work in a mine, or take a job in Yellowknife but they don't want the existence or demands of those jobs to threaten in any way their option to return at any time to live off the land. They want these opportunities to co-exist in their daily lives. Though it came out in the discussion, how the protection of water resources perpetuates that option is not clearly explained in the strategy itself.

The notion of optimization of resources means something very different in the south than it does in the Northwest Territories. In the south it usually means money or quantity produced; for people who live in the North it means optimization of local values. Sustainability in the Northwest Territories context implies maintaining the water resource base so that future generations maintain the broadest range of future opportunities to make choices. If the resources are gone for subsistence then northerner's options are diminished. Sustain the natural resources of the Northwest Territories and you sustain lifestyle choices.

For a relatively small investment the Northwest Territories could preserve sustainability at least as it appears to be defined locally. There is also strong economic logic in this. For example, it is far cheaper to retain natural contaminant assimilation and self-purification properties of a stream than to treat water to drinking water standards through costly and sometimes inferior engineering solutions.

The fact is that for the Northwest Territories careful management of water has to become the basis for generating livelihoods which have minimal impacts on environmental assets.

Recommendation: The panel recommends that the strategy more strongly acknowledge that the relationships between aquatic and terrestrial ecosystems are at least as important as relationships within aquatic ecosystems so as to strengthen the strategy's argument relating to the strong link between water, land and the sustainability of local cultures.

Overcoming Jurisdictional Fragmentation

Of all the structural barriers that have to be overcome, the current fragmentation of jurisdiction over water may be the most difficult and time-consuming to achieve. Fragmentation may be beneficial to areas like the Northwest Territories when it provides a veto point to prevent getting run over by some central government expressing majority opinion and ignoring minority rights. However, when the issue is getting something positive

done for minorities, as in this case in the Northwest Territories, fragmentation can become a great impediment to action. Thus, cooperation and constant consultation are essential.

The *Northern Voices, Northern Water* strategy will not succeed in the absence of at least some reform of jurisdictional boundaries. This cannot occur without outstanding cooperation. Such cooperation can be facilitated by a widespread commitment across government to common goals and objectives. In this, however, it must be remembered that it is not just a matter of getting this strategy done, but keeping it done. The willingness to cooperate between departments and agencies on this strategy is one of its most impressive elements. Keeping that momentum going and expanding it beyond the borders of the Northwest Territories is crucial. It may be the most important feature of this process.

Exemplary cooperation between federal and territorial agencies on the development of the strategy to date has allowed a good draft strategy to be developed. The panel observed, however, that a great deal more cooperation is going to be necessary on an on-going basis as the difficult work of implementation begins. Long established attitudes, habits and structures will have to be reformed. This will take time, patience and persistence as many of the existing water management protocols within the Northwest Territories are part of larger governance structures that have emerged as fundamental expressions of the cultural values that at the heart of the unique identity of northern peoples. However, upstream water use and management are artifacts of a different government structure and different social perspectives on water resources.

These differences are fundamental to the unresolved issues relating to jurisdiction that could stand in the way or even stall implementation of the strategy. Technically water in the Northwest Territories belongs to the Crown. This jurisdiction could be challenged in the future by First Nations under the terms of land claims agreements. Should such challenges emerge at sensitive junctures in the implementation process, the strategy could be slowed or even halted depending upon how explosive the challenge to federal powers is perceived to be. Formal ownership of water is likely to be less important to protection of resources than the alignment of economic and political power. The potential for influential partnerships ought not to be set aside in pursuit of symbolic victories that are emotionally satisfying but do not contribute to gaining momentum for the water strategy.

As has already been mentioned the management of water resources in the Mackenzie River Basin isn't just in the hands of the peoples of the Northwest Territories; it is also in the hands of outside others, particularly upstream riparian neighbors. The importance of such relationships must be recognized in the strategy.

Recommendation: Undue focus on formal, legal institutions in the implementation phase of this strategy could slow progress. The focus during implementation should be on the benefits that cooperation on this strategy will bestow on the Northwest Territories and the rest of Canada. These benefits include the opportunity to minimize the human impacts on aquatic systems; strengthen water quality standards, establish more reliable key indicators and thresholds of water use and quality, develop better database protocols and data outputs, slow or moderate climate change impacts, recognize different cultural perspectives on water and – the biggest prize of them all – to manage water resources on a watershed basis in support of sustainable ecosystems, water usage and local culture.

Part Two: What are the potential barriers or obstacles to the implementation of the strategy?

The Scale of the Challenge

Strategic plans like the NWT water strategy often start out with great fanfare but fail because they are not fully and properly supported politically and financially; because they are not practically achievable within reasonable timeframes or because they are expensive to implement and the benefits are realized in the future. Another reason strategic initiatives like *Northern Voices*, *Northern Waters* don't succeed is because those responsible for implementing them often burn out or are in time called upon to perform other functions that are seen to supersede the priority of full implementation causing the initiative to lapse. This latter failure could be associated with the lack of political/financial support or because goals are set that cannot be achieved with current resources.

The Government of the Northwest Territories does not have the luxury of taking ten years to further develop its water strategy. That means that an efficient – even surgical - approach must be taken to the implementation of the framework. It means also that the input of others must continue to be orchestrated so that it adds to rather than slows the momentum of the framework's development.

Recommendation: Now is not the time to relax. One of the ways in which this process has succeeded most is through the bringing together of people and the sharing of ideas and interests. This process must be carried on in the next phase of the strategy's development so that implementation continues to be as collaborative and inclusive as it has been in the past. Steps to the future must be as carefully laid out as near-term goals that can demonstrate success and long-term goals that meet the ultimate intent of the strategy.

Capacity

In the panel's view capacity is a central issue. Capacity in this context means leadership, appropriate expertise, human resources and funding. A signature feature of the development of the strategy to date has been the presence of strong leadership. Real leaders, as we have seen in the Northwest Territories, do not stop with simply exploring public policy choices. They make the leap from promise to practice. In other words, they cross the line from concept to effective implementation.

The lesson here is that the real leaders in water resources management are not just those with power but those with the ability to influence power. Being in that position, however, requires clear focus on the long term goals; careful attention to detail and accuracy; and a strong sense of political reality, possibility and opportunity. Leadership will continue to be a defining element in the development of the *Northern Voices*, *Northern Waters* strategy and will continue to be so throughout the implementation process.

The panel observed that the small staff responsible for the development and implementation of the strategy was stretched to the limits of their capacity. On one hand this could produce burn-out in the long-term, on the other it is commendable that the strategy has been advanced

so far in such a short period of time. The panel does not recommend fundamental structural changes in order to improve capacity. Organizational changes at this point are neither necessary nor desirable and could in fact be highly disruptive of the implementation process. The object should be to keep the momentum that has been created going. This can be accomplished through the purposeful hiring of people in areas of need and skills not currently possessed by members of the team. Developing capacity beyond the agency is also important. This can be accomplished through the further development of network linkages to communities that result in local capacity building in support of implementation actions that do not make further demands on existing staff. This can also be done through further development of local networks that contribute to implementation and bring traditional and scientific information back to the focal agency as a means of measuring progress toward the strategy's goals. This may be particularly valuable in areas such as monitoring, water and land resources and the water/land linkage.

Resourcing for the *Northern Voices, Northern Water Strategy* is also a serious problem. The panel observed that funding is presently being drained from departmental operations to complete the water plan. This, in itself, is not sustainable. Inadequate and diminishing funding in support of the strategy poses a serious threat to the ultimate success of the strategy. Panel members pointed to experiences in which inadequate funding of important initiatives of this kind ultimately cost governments more in the end than actually funding them. The reason for this is that while development and implementation of a water strategy may appear expensive in the short term, not having one costs a great deal more in the long term. The Northwest Territories is presently on the cusp of major changes to its ecosystems that may result in great damage to local cultures. The panel wishes to emphasize that once sustainability is lost, it can be enormously – even prohibitively – expensive to buy back. While many threats exist, the Northwest Territories still possesses what many places in the rest of the world are trying to attain again: healthy natural ecosystems that provide valuable ecosystem goods and services including water quality. In this context the development of a proactive water strategy for the Northwest Territories at this moment in its history, may be the financial deal of the century.

In addition, if funding the strategy takes people and financial resources away from other important agency tasks this will undermine long-term political support and serve to increase the probability of staff frustration and burn-out. Funding the water strategy needs to be part of a balanced environmental/cultural portfolio for the Northwest Territories. Adequate resources need to be found to allow the development and implementation of the *Northern Voice, Northern Waters* plan without drawing away from existing operational capacity.

Funding for the strategy needs to be regularized. The panel recommends investigation into funding mechanisms whereby those who are putting stress on the system pay directly to support programs related to the implementation of the water strategy on an on-going basis. Past precedents of equal funding from each province/territory in support of coordinating institutions makes no sense in situations where burdens on the resource and ability to pay are disproportionate. This situation can be made more equitable by linking the need to make those who are creating the problems that have necessitated the development of the strategy to payments that fund the advancement of the strategy through licenses, development fees etc.

Such funding mechanisms should contribute independently and directly to the on-going implementation of the strategy and not be subject to budgetary cuts that may affect the function of the Ministry of Environment and Natural Resources in other ways.

The panel also noted that with the development of additional research and data collection capacity and links to outside universities, the Aurora Institute in Inuvik could provide a broader range of information and research services that could turn the strategy into its own successful quasi-business, perhaps leading to partial repayment of costs. This option is explored elsewhere in this report.

As resource extraction revenues in the northern territories go to Ottawa, Federal government ministers will have to be convinced of the need to create innovative funding mechanisms of funding to generate on-going support for the strategy. Gaining this support will require clear definition of why the strategy is important not just to the peoples of the Northwest Territories, but to the rest of Canada. This suggests the need to create a compelling narrative of the importance of federal support for the strategy as central to the nation's future. This also suggests that the narrative has to be compelling enough to win southern votes.

Recommendation: The panel recommends an analysis be undertaken of the kinds of innovative options available to the Northwest Territories in support of reliable, permanent funding for its water strategy, and a White Paper be developed that articulates the benefits of the water strategy to all Canadians and explains the global linkages.

Monitoring

Any environmental strategy must have a sound knowledge of baseline conditions to be effective. We use the term baseline here rather than current conditions because the water/land linkages are a dynamic interface and baseline conditions recognize this changing interface and are not locked at a single point in time. These baseline conditions are a necessary prerequisite in order to identify whether any action is having immediate or long-term effects on the water/land interface. Monitoring in terms of both scientific and traditional knowledge is the key to developing credible baseline data. It is also important to recognize that monitoring is not just data collection, but also documenting and maintaining these data in electronic files so that they are available and useful for future analyses.

However, consistent with what has been happening in other parts of Canada, cuts to monitoring programs have been on-going on a continuing basis in the Northwest Territories for twenty years. It was also noted that transboundary monitoring capacity presently employed by the NWTs most immediate southern riparian neighbor was developed in the 1980s for the purpose of monitoring of pulp and paper impacts. That effort apparently ceased in 1998. At the time these monitoring systems were put into service there were only two small oils sands operations. Given dramatic increase in mining activity, present oil sands monitoring capacity has been deemed inadequate to current needs. It was further noted that there were no long term ecological monitoring stations anywhere in the Northwest Territories. Successful monitoring cannot be focused on single activities that affect the land/water interface, but must be targeted more broadly to support refined sustainability goals. However, within this broader framework, some activities, such as pulp mills or oil sands development, are likely to require some specialized monitoring. This is one reason why development fees or other charges should be assessed to offset these monitoring costs.

Because of the deep on-going cuts to current monitoring programs and the apparent inadequacy of remaining systems the panel was not confident that monitoring in the Northwest Territories is adequate to know if upstream activities such as those taking place at

the oil sands in Alberta are actually having an impact on water quality or eco-hydrologic dynamics.

The panel accepted that there was a lot of experience within federal and territorial agencies in the Northwest Territories in determining what information monitoring should seek to gather. It noted, however, that while monitoring knowledge and expertise exists it is not adequately supported. The panel fears that the absence of relevant monitoring information will have a cascading effect over time on the success of the proposed strategy. In order to manage for the future, the Government of the Northwest Territories will have to rely on predictive models. Long-term trend analyses require long term data. No model can recover data from a single lost year. Further complicating this process is the fact that the ecological baseline in the Northwest Territories is shifting rapidly as a result of climate warming and development. Water and climate models are only as good as the information that powers them. If the results of models are different from what years of common sense garnered from traditional and local knowledge indicate is happening, the models will not be trusted which could cast doubt upon the effectiveness of and diminish support for the *Northern Voices, Northern Waters* strategy.

Members of the expert panel also expressed concerns about the structure of community-based citizen water quality monitoring programs. Monitoring may not be helpful if it is done only where and when it is convenient for volunteers. To be successful such programs require oversight which is both substantial and broad. Care must be taken to ensure that individual jurisdictions do not building data collection systems with inconsistent information or with information that does not align systematically with other regional monitoring programs. A lot of money can be wasted as a result of the failure to put into place consistent data collection, storage and interpretation standards.

Even given limited funds, the panel recommends that the Government of the Northwest Territories invest in data collection as a first priority in the implementation of the *Northern Voices, Northern Waters* strategy. As is noted elsewhere in this report, breakthroughs in contemporary technology can make improved monitoring affordable. In order to enhance data analysis opportunities, monitoring data should be easily accessible to outside partners via portals such as the World Wide Web. The results of outside data analyses will provide the Government of the Northwest Territories with valuable information and insights that will help guide implementation of the water strategy.

Recommendation: The importance of monitoring of water resources in the Northwest Territories needs to be recognized. Adequate monitoring has to form the foundation of implementation of the *Northern Voices, Northern Waters* strategy if it is to be successful. Monitoring must be developed in proportion to current and expected development. Coordination of monitoring throughout the region is also essential. Adequate funding must also be provided to document and maintain the monitoring data. An outside expert advisory group may be helpful in ensuring that quality assurance and quality control are adequate and consistent and that data is organized so as to inform effectively other powering elements of the water strategy. The panel recommends the creation of such an advisory group.

Part Three: Bridging the gulf between promise and practice: lessons from elsewhere

Outreach & Extension

The panel acknowledged that it was important that the strategy be developed by and for northerners. The panel also acknowledged that the small size of the department limited its capacity for outreach and the sharing of information outside of the Northwest Territories regarding the development of the *Northern Voices, Northern Waters* strategy. The panel did, however, observe that where similar projects had been successful elsewhere, their development had been accompanied by expanded communications efforts that assured that interested and influential others knew why the strategy was important and supported it wherever possible. Participation by community volunteers is important for two reasons. First, it enhances buy-in and trust in that messages are coming from locals who people know and believe. Second, it is a means of expanding resources within a very limited budget.

In the opinion of the panel extended communication is also important for two reasons. First it permits expert outsiders to offer informed independent and objective support for the strategy in influential academic, professional and political circles. This support will assist in the shifting of attitudes in support of new understanding of the importance of northern waters. Second, by raising the profile of the strategy beyond the region it immediately affects, it affirms that local commitment to the strategy has broader importance in a national context. In the case of the Northwest Territories, carefully orchestrated outreach also has the power to amplify the voice of a small population so that it can be heard in distant centres where important decisions concerning the North are often made without local consultation.

The panel recommends that influential water-related organizations in the south be encouraged to help develop and communicate the message of the continental importance of the *Northern Voices, Northern Waters* strategy to the Canadian public. Some of the organizations that may be of assistance to the Northwest Territories in this outreach effort include the Walter and Gordon Duncan Foundation, the Forum for Leadership on Water (FLOW), the Polis Institute, Waterlution, the Canadian Water Network, the Canadian Water Resources Association, Canada's UN Water for Life Decade and Ducks Unlimited. It would also be valuable to enlist the support of an international organization working on global water resource issues such as the World Wildlife Fund.

Recommendation: The Northwest Territories should develop a network of local communicators to maintain dialogue within the Northwest Territories. Local leaders should also actively cultivate the support of outside expert water resource interests in the promotion of the *Northern Voices, Northern Waters* Strategy in southern Canada and elsewhere with the aim of making the rest of the country and the continent aware of the benefits that will accrue to the north and to the rest of the world as a result of the success of this strategy.

New Technologies and Broader Scientific Partnerships

The panel also observed that universities have not been a big part of advancement of the *Northern Voices, Northern Waters* strategy. The panel noted that partnership in expanded earth monitoring programs that employed breakthroughs in remote sensing might prove to be of great value to the Northwest Territories. One program in particular, the United States

Geological Survey's National Water-Quality Assessment (NAWQA) Program, was cited as a potential model for how integrated monitoring could emerge as a more successful tool in the management of northern waters.¹ The NAWQA program is designed to continually monitor the condition of rivers in the United States and to determine how natural features and human activities affect these conditions

The panel discussed the steps by which such a program could be created in the Northwest Territories. It was noted that a technical revolution is taking place in the field of remote sensing. The cost of putting satellites into space has dropped by an order of magnitude and the range of parameters that can be measured and the accuracy of remote sensing measurement is improving with each passing year. The panel observed that a comprehensive remote sensing program could provide considerable benefits to Canada as a whole through contributions to polar science, northern resource development and national sovereignty. It was also noted, however, that while satellite-based remote sensing is improving it will not replace the need for validation through surface monitoring.

Recommendation: The Government of the Northwest Territories and its federal partners are encouraged to analyze the potential for establishing an institutional partnership with the goal of creating a NAWQA-like remote sensing and data interpretation capacity based on the ideal location and existing facilities at Inuvik. The plan for expanding remote sensing data collection needs to be developed in a way that will merge with on-site water and land monitoring, and the collection of traditional knowledge.

Water as a Capacity Builder In and Of Itself

The strategy is already serving to build capacity because common expectations are being built throughout the Northwest Territories with respect to the importance of managing the region's water resources.

In order to maintain the quality of life that the peoples of the Northwest Territories aspire to the panel recommends exploring sustainable economic opportunities beyond extractive activities. A greater focus on the region's remarkable water resources may be a means of doing that. As water becomes an increasingly scarce and precious resource worldwide, places with abundance will attract new attention. It will be important to put the locals in charge of new livelihoods in ways will allow them to bring the revenues from these livelihoods back into the community as a means of supporting cultural and spiritual values. To that end it may be useful to create a very strong link between abundant clean water and the Northwest Territories in the world's imagination.

Recommendation: Consider elevating the importance of abundant water resources and remarkable water and eco-hydrological features in the economic development and tourism profiles established for the Northwest Territories.

¹ See <http://water.usgs.gov/nawqa/>



Rosenberg Regional Forum Northwest Territories *Concerning the “WaterWise” Decision-Support Tool*

The panel was asked to review the WaterWise Decision-Support tool and to respond to two related questions: 1) Is it necessary to do the kind of modeling proposed as part of the WaterWise Decision-Support? 2) If so, is this the appropriate mode? The panel’s answer to both questions was no.

A number of weaknesses were identified in the proposed tool. The panel noted that for any analysis it is essential to know the current environmental conditions and the increments of change. The panel concluded that there was insufficient monitoring data to establish baseline conditions let alone model increments of change. The panel observed that if the Northwest Territories is to have any hope of being successful in negotiations with their upstream riparian neighbors they must know where they stand now and fully understand the potential effects of current threats. Such an understanding of the potential effects must be based on accurate monitoring data. This is crucial.

The panel noted that the fact that a Linear Program of this kind was used "successfully" in a forestry situation in Saskatchewan provided no confidence that it would work equally well in the circumstances to which it was being applied in the Northwest Territories. In fact, no evaluation data were provided on how well the model worked for the forestry applications and whether it adequately addressed all the forest policy issues. Nor were evaluation data provided that demonstrated how well the proposed model would work for water issues in the Northwest Territories.

The panel observed that the development of large scale LP models and environmental accounting has been under taken by US agencies that were much better funded than the Northwest Territories. An example put forward was the US Forest Service's FORPLAN tool. The panel noted that efforts to use this tool proved costly and insufficient. It was further noted that the FORPLAN tool had to be abandoned even though it had been the target of millions of dollars of investment.

It is simply not true that a single analytical tool will work equally well for all policy issues. To assume so is placing the “cart before the horse”. This is because there is a tendency to reduce all issues to fit the existing model rather than attempting to identify and understand the issues and then deciding on the best analytical approach. For example, what relevance would a water-allocation model have for the terrestrial impact of a natural gas pipeline in the Mackenzie Basin?

It was noted that while models of the kind proposed by the consultants have been used for irrigation allocation, the basic framework becomes totally inadequate when non-linear ecosystem and threshold effects are introduced.

The panel also noted that use of linear programming or other types of models could undermine the transparency and collaborative focus developed throughout the rest of the *Northern Voices, Northern Waters* strategy development process. This view was based on the proposition that workings and results of the model would be very difficult to explain to any lay population.

Given the NWT's water strategy vision and goals, particularly with respect to protecting spiritual, cultural, ecosystem service and other non-market values, the panel felt that the LP model proposed by the consultants is simply the wrong "tool" for the Northwest Territories situation because of the difficulty of quantifying these values and the lack of opportunities for ongoing public participation. The panel believes that a participatory, adaptive management approach is more appropriate as used now by the U.S. Forest Service for developing National Forest management plans instead of "black box" tools such as the LP model proposed by the consultants.

The panel was concerned that the consultants had, in the case of the decision support model, become lost in process. In light of the models inability to value the ecological services of the Northwest Territories there was concern that the scarce financial resources of the Ministry of Environment and Natural Resources were being eaten up in the development of a decision-support tool that could in the end prove to be worse than having no tool at all.

The panel concluded that the crucial focus in the strategy should be on the need for improved and expanded monitoring, adaptive and inclusive decision-making processes and the use of economic models that are appropriate to specific policy decisions. The panel recommended that resources currently being directed to the development of this LP decision-making tool be re-directed toward improved and enhanced data collection, interpretation and sharing, and completing the water strategy as recommended at the beginning of this report.

It was proposed that the Northwest Territories would be better served on this matter by an advisory committee that could assist in ensuring that there is high quality and consistent monitoring of data collection, documentation of the values of water and land resources (see next section), and completion of the water strategy.

Recommendation: It is recommended that the work to date by the consultants be recognized for its value and that a panel of scientific experts be created to advise the Minister on the further development of the strategy and attendant monitoring valuation processes.

The names of a number of respected Canadian's were put forward as possible members of such an advisory committee. These include:

Vic Adamowicz	University of Alberta
Peter Boxall	University of Alberta
Casey Van Kooten	University of Victoria
Murray Rudd	University of Newfoundland
Rob de Loe	Waterloo University
David Schindler	University of Alberta
John Pomeroy	University of Saskatchewan
Diane Dupont	Brock University



Rosenberg Regional Forum Northwest Territories *Concerning Ecosystem Valuation*

Recognizing Different Concepts of Value

People have different systems of values. Ethical and religious values are not talked about in the same way as economic values. Many spiritual and environmental values cannot be captured in typical economic terms. They must be valued in some way, however, so that these values are not undervalued or, worse yet, assigned the value of zero.

The fact that it is not possible to measure the value of all components of spiritual, cultural and environmental assets does not mean that the economic value of such assets is small. Nor does it mean that values that cannot be measured should be allowed to drop off the table. It is the opinion of the panel that to the extent that monetary values can be measured they should be. To the extent that careful monetary measures can be made, such measures will represent minimum value boundaries. If the sum of other minimum values is estimated to be high enough, it may be possible to make informed decisions without having to examine spiritual or other values that are difficult if not impossible to monetize.

The panel recognizes that these are highly contentious issues in the North. Assigning a monetary value to resources like water is an alien, even antithetical concept to many people in the Northwest Territories. Unfortunately, the failure to value spiritual, cultural and environmental elements of place commensurately with economic needs has resulted elsewhere in these important qualities being assigned little or no value. Though it will be distasteful to some an attempt should be made to estimate the monetary value of as many of these qualities as possible recognizing that some of these qualities may simply not be amenable to monetary valuation because of technical and/or ethical considerations and constraints.

To ensure that the same thing doesn't happen in the Mackenzie Basin, the panel recommends that the Northwest Territories obtain scientifically credible estimates of environmental values that can be used to mobilize political support for this strategy locally and in southern Canada.

It is recognized, however, that it is important that such valuations go beyond natural capital arguments to include such measures as biodiversity and carbon capture so that the monetary aspect of natural capital is balanced against important cultural values.

Undertaking Valuations Sensitive: Building on What Has Already Been Done

The panel's collective experiences strongly suggest that an assessment of the total, *in situ* values of the NWT's water resources is crucially important. This assessment will include those values that can be monetarized (including commercial and recreational use of water resources) and those that are difficult or impossible to monetarize (including some ecological services, and cultural and spiritual relationships to place). Such an assessment will establish baseline data from which changes in value can be evaluated to address specific policy issues. Development of the baseline assessment of total values is important, first, in and of itself, to educate various groups on the importance of the water resources in the Northwest Territories.

Primary studies to establish economic and ecosystem values must be combined with on-going research specific to the region so that values arrived at are not simply extrapolations from elsewhere but reflect accurate assessment of the value of ecosystems locally and to the rest of the world.

The panel recommends a total value approach that inventories and measures, where possible, all values of the NWT's water resources that have been identified in the public participation process. This approach would be similar to that presented in the document titled "*The Real Wealth of the Mackenzie Region.*" The approach will apply established benefit-transfer procedures to develop estimates of monetary values where feasible. The "*Geodatabase*" can be used to identify and catalogue water sources that have values that are not commensurate to monetization.

Natural capital accounting, as discussed in "*Natural Capital: Accounting for the Asset Value of Water,*" is an accepted economic approach but it is still in the conceptual development stage and not a relevant or feasible tool to provide a cost-effective assessment of the total value of the NWT's water resources. The panel concluded that this methodology will not deliver the type of valuation information needed by the Northwest Territories and will exclude cultural and spiritual components that the water strategy process has worked so diligently to include. The accounting framework is unlikely to include ecological services not directly enjoyed by humans.

The value of traditional and local knowledge should also be included as a complement to this valuation. The panel acknowledges that traditional knowledge is not just a way of using knowledge of the past; but a mechanism by which the past can be brought into the present and how both can contribute to decision-making.

Recommendation: The panel recommends that a total economic value study be conducted under the auspices of a Canadian university by a respected nonmarket economic valuation scholar and researcher. This is a project that can be effectively accomplished as a MS thesis project.



Rosenberg Regional Forum Northwest Territories *Additional Considerations*

Resolving Transboundary Water Issues

The panel noted that one of the strengths of the *Northern Voices, Northern Waters* strategy is that it is at a fork on the road at which decisions can be made in support of truly collaborative management in support of defined cultural and environmental values. This prefigures a different form of governance with different values at its centre. These kinds of issues are crucially important in that they distinguish the Northwest Territories and its strategy in a manner that will shape processes of implementation down to the level of the way water is managed in even the smallest community and up to the level of transboundary water agreements.

It was noted that tri-lateral agreement negotiations with Alberta and British Columbia were scheduled to begin in the fall of 2009 or early in 2010. The panel's first recommendation regarding these negotiations was that if all possible the Government of the Northwest Territories and its partners should proceed in as focused a strategic manner as possible on the implementation of the *Northern Voices, Northern Waters* strategy and not bog down now in the issues related to transboundary water agreements. It might seem that early conclusion of negotiations to put some protections in place is advisable. But, premature closure in a trilateral agreement prior to the time that broad-based public and political support of the water strategy is mobilized, and on the basis of too little information, would be a mistake.

That is not to say that transboundary negotiations with the Northwest Territories' upstream neighbours aren't important. If not successfully concluded, the outcome of these negotiations could undermine public support for the NWT's developing but still fragile strategy.

Important parameters for these negotiations have already been established through precedent. Land claims already concluded in the NWT require water quality and quantity parameters which must be considered necessary components of any transboundary agreement between the NWT and its riparian neighbors. Settled land claim agreements, which carry federal force, argue that a transboundary water agreement with Alberta cannot be a mere apportionment agreement. New transboundary agreements with Alberta should not be defined exclusively by proportional sharing arrangements. In fact, any negotiation should be based on the premise that water in the Northwest Territories has equal standing with water in Alberta and British Columbia. The Northwest Territories' water standing should not be diminished by its smaller population and economic base. Water quantity is only one element that should be of concern to a downstream riparian like the Northwest Territories. Water quantity and aquatic ecosystem health are just as important as water quantity. Any compact that permits impairment of these qualities by an upstream riparian should not be considered acceptable. Such impairments are

likely to have costs to upstream neighbors, most Canadians and people worldwide due to the unique ecosystem role played by the water resources of the Northwest Territories.

The importance and timeliness of these considerations cannot be over-estimated. The Northwest Territories will not be able to achieve its broader water management goals, especially as they relate to sustainability, renewability, multiple use, joint production of benefits or integrated management of water resources unless it begins with the “clean slate”. This means that transboundary agreements with upstream riparians need to be equitable, recognize ecological, cultural and economic consequences, and be enforceable.

That said it is also important to recognize riparian neighbors as partners in the joint-management of a mutually important resources. There is a need to validate new language with respect to cultural values and to teach that language to the NWT’s riparian neighbours. Negotiation of a transboundary agreement presents an opportunity to introduce upstream partners to the meaning and significance of new ecosystem valuations in the Northwest Territories context. Once again, the importance of making it clear that what happens in terms of the management of eco-hydrological resources in the North is important to the entire hemisphere cannot be overstated.

The panel observed that ample legal precedent already existed with respect to establishing the NWTs water quality and ecosystem health interests. The panel was alarmed that the terms and conditions of already existing agreements were being regularly violated. Forceful evidence was presented by experts at the forum that suggested that existing federal regulations protecting upstream waters were not being enforced. Experts on the panel were surprised by evidence that the Federal Fisheries Act, the Federal Navigable Waters Act, the Canadian Environmental Assessment Act, the Canadian Environmental Protection Act and Treaty Eight all appear to be systematically violated at Alberta’s oil sands.

The panel judged that the current situation is simply unacceptable. Evidence from experience with public policy failures from around the world suggests that they inevitably generate conflict. The panel observed that the failures of existing agreements need to be addressed independently of the outcomes of transboundary agreement negotiations.

It was noted that provinces and territories cannot legally bargain away that which falls under federal jurisdiction. It was further noted that the U.S. Supreme Court has held that upstream riparians cannot impose standards on downstream riparians that are stricter than the standards they themselves observe. Further, where there are two benchmarks, the higher of the two should become the standard. Such rulings make it clear that other parties cannot be legally forced to comply with rules that were not being enforced by the upstream riparian.

Recommendation: The panel recommends that the Northwest Territories should be pressing hard, even to the point of threatening legal action, for enforcement of already existing federal laws regarding water quality threats posed by its upstream neighbors. The Government of the Northwest Territories also needs to refine and articulate its transboundary negotiation plans concurrently with the development of the water strategy, and not subsequent to the completion of that strategy or in place of it.

Building Legal and Administrative Capacity

The panel identified three issues related to the capacity of the Northwest Territories to undertake successful transboundary negotiations with its southern neighbors. First the panel was concerned that the Northwest Territories may not have sufficient funding relative to its southern neighbors to carry out the agreement. The panel observed that durable transboundary arrangements do not always result from negotiations in which one side is overwhelmingly better funded than the other.

Second the panel was concerned about the proportional cost of the negotiation relative to the burden in funding. Though impressed with some of the language in the Mackenzie River Master Agreement with respect to the importance of spiritual and other local values, the panel took issue with the cost sharing arrangement under which the transboundary negotiations were to be conducted. Under the terms of the Mackenzie River Master Agreement, the total cost of negotiating a transboundary agreement between the Northwest Territories and its southern neighbors should not exceed \$280,000 and that each of the provinces and the Northwest Territories should come up with an equal share. The expected cost here is severely under-estimated, and payments ought to be based on some measure of ability to pay. Otherwise, smaller partners are implicitly squeezed from effective participation.

The panel felt this was inequitable in that this cost sharing arrangement assumes the equality of the partners as stewards but does not recognize that Alberta has been the burdening the resource most, is having the biggest impact and has the most resources behind them.

Finally the panel was concerned that the Northwest Territories did not have adequate staff to both conduct the transboundary negotiations and to simultaneously maintain the momentum it has developed in the implementation of the *Northern Voices, Northern Waters* strategy.

With respect to negotiation of a transboundary waters agreement with its southern neighbors, the panel concluded that existing federal laws can be the basis for workable and durable results. The Boundary Waters Treaty of 1909 may be a good model upon which to build a multilateral agreement in that it addresses both water quality and quantity issues and could be the foundation for the creation of an International Joint Commission-like body to oversee the terms and conditions of the agreement. It was also noted that many contemporary negotiations over water matters now have provisions by which non-government organizations such as environmental groups can observe and participate in such processes.

The transboundary agreement should not be seen as a one-shot affair. Continual participation, resources and data gathering and on-going negotiation are required to make it work. This means additional support is required.

Recommendation: The Northwest Territories needs to build greater internal legal and administrative capacity in order to assist in negotiation of on-going relations with its southern riparian neighbours and to ensure that transboundary and other agreements are consistent with and develop in tandem with the goals and objectives of its water resources management strategy.