XII SIMPÓSIO DE RECURSOS HÍDRICOS DO NORDESTE

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# Aspectos da Gestão dos Recursos Hidrcos no Canadá

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# New approach : Integrated Water Resources Management

"a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"

Global Water Partnership. (2000). Integrated water resources management. Stockholm, Sweden: Global Water Partnership.

# Governance concepts

- *Legitimacy* of the organization's authority to govern
- *Transparency* in the decision-making process
- *Accountability* of actors and their responsibilities, including integrity concerns
- *Inclusiveness* of the different stakeholders
- *Fairness* in the service delivery or allocation of uses
- *Integration* of water policy making at horizontal and vertical levels
- *Capacity* of organizations and individuals managing water
- *Adaptability* to a changing environment

*Source* : OECD ( 2011 ).

# Water conservation

- Supply-side management: increase infrastructure to supply demands, environment not usually considered.
- Demand-side management: combines sociopolitical, economic, and technological strategies to "save money, conserve water, and reduce environmental impacts". (20-50% water use savings easily achievable)
- Soft-path approach: by considering the services water delivers rather than looking at water solely as an end product. This approach has four guiding principles:
  - "Treating water as a service rather than as an end in itself"
  - "Ensuring ecological sustainability"
  - "Conserving quality as well as quantity"
  - Supply-side management : increase infrastructure to supply demands, environment not usually considered.
  - Demand-side management : combines sociopolitical, economic, and

# Water Governance in Canada

Capilano Lake  water supply for Vancouver, BC

# Outline

- Jurisdictional responsibilities
- Overview of historical approach to water resources management
- Federal responsibilities and management
- Provincial responsibilities and management
- Adoption of integrated water resources management (IWRM)
- Examples of fully implemented IWRM
- Lessons learned in IWRM

# Jurisdictional Responsibilities for Water in Canada

- Federal: federal lands (incl. First Nations and territories), transboundary waters, ocean and inland fisheries and commercial navigation
- Provincial: owners of the water resources and manage flow regulation, water use development, water supply, pollution control, thermal and hydroelectric power development
- Municipal: delegated responsibilities from Provinces - for water supply and sewerage in urban areas.
- Shared federal-provincial responsibilities: agriculture, significant national water issues, health.

# History of changing approach to water management in Canada

- Initially in Canada there was a sectorial or allocation approach to water management. This was possible as long as there was sufficient good quality water.

- As soon as a stress appeared, such as insufficient water, competing interests and/or environmental degradation, a collaborative approach was required. The gave rise to collaborative advisory/management/ decision making bodies created to solve a particular problem. These were the forerunners of a comprehensive integrated water resources management approach.

  E.g. International Joint Commission (1909), Conservation Authorities (1948)

# History of changing approach to water management in Canada

- The development of the Federal Water Policy (1987) began the change of water management from a sectorial approach to an integrated approach at the basin scale.
- The Canada Water Act (1970) was modified in 1985 to provide a framework for more inter-jurisdictional collaboration. The Environmental Protection Act (1999) recognized the importance of conserving the environment – our resource base.
- At the provincial level, some provinces began to develop a framework for enabling an integrated collaborative approach to water management at the basin level. This has been supported to various levels resulting in varying stages of implementation.

# Water Management in Canada at the Federal Level

# Main Federal Legislation

- The Canada Water Act (1985) It enables the federal government to collect data, conduct research, and undertake cooperative arrangements with the provinces with respect to the comprehensive planning of water resources. First passed in 1970 ,which created the Department of the Environment in 1971. Amended in 1985 to provide a framework for cooperation between levels of government on conservation and development of water resources.
- Federal Water Policy (1987) provides the overall objectives of the Federal Government in managing Canadian waters including to encourage the use of freshwater in an efficient and equitable manner consistent with the social, economic, and environmental needs of present and future generations.

# Development of the Federal Water Policy

Led by Environment Canada, there was a 1984/85 Inquiry on Federal Water Policy, which conducted Canada-wide hearings, within and outside government, toward the development of a federal water policy.

- This water policy is to change the approach to water policy by developing anticipatory and preventative approaches to management of the water resources acknowledging its social, economic, and environmental value. (instead of a reactive approach, e.g. fines for polluters).
- It addresses the management of water resources, balancing water uses with the requirements of the many inter-relationships within the ecosystem.
- The policy stresses that government action is not enough. Canadians at large must become aware of the true value of water in their daily lives and use it wisely.

Goals:

- to protect and enhance the quality of the water resource : prevent pollution using polluter pays principle
- to promote the wise and efficient management and use of water: recognize the value of water by promoting realistic pricing of water and recognition of non-monetary value of water.

Strategies:

1. Water pricing for demand management,
2. science leadership for informed decisions,
3. integrated planning preferably at the watershed level,
4. legislation changed to being anticipatory and preventative,
5. public awareness to promote participatory water management

# Main Federal legislation (con't)

- Fisheries Act (1985) : protects fish populations that have First Nations cultural significance and economic opportunity. Recent changes (2010) removed protection to fish habitat
- The *Navigable Waters Protection Act* (1985) main purpose is to protect navigable waters and protect the public's right to navigate waters. Recent changes to the Act (2010) have redefined "navigable" to exclude "minor waters" and "minor works" and reduced the number of waterways that would be protected by 99%.
- The *Canadian Environmental Protection Act* (CEPA) (1999) is the main federal law to protect the environment. With respect to water resources, CEPA empowers the federal government to create and enforce regulations regarding toxic substances, fuels, and nutrients from cleaning products. CEPA enables the federal government to undertake environmental research, develop guidelines and codes of practice, and conclude agreements with provinces and territories.

# Other Federal Legislation

- *Arctic Waters Pollution Prevention Act* (1985),
- *Canada Shipping Act* (2001),
- *Canada Water Act* (1985),
- *Canadian Environmental Assessment Act* (1992),
- *Canadian Wildlife Act*(1994),
- *Canadian Environmental Protection Act* (1999),
- Department of the *Environment Act* (1985),
- *Dominion Water Power Act* (1985),
- *International Boundary Waters Treaty Act* (1985),
- *International Rivers Improvement Act* (1985),
- *Northwest Territories Water Act* (1992),
- *Oceans Act* (1996) and
- *Yukon Waters Act* (2003).

# Key Ministries and Departments involved in water governance

- Agriculture and Agri-Food Canada, Canadian International Development Agency, Environment Canada, CMHC (Canadian Mortgage and Housing Corporation), Fisheries and Oceans Canada,
- Foreign Affairs and Trade Canada, Health Canada, Aboriginal Affairs and Northern Development Canada, Industry Canada,
- Infrastructure Canada, International Trade Canada, National Defence, National Research Council, National Water Research Institute, Natural Resources Canada, Parks Canada, Public Works and Government Services Canada, Statistics Canada, Transport Canada,

# Water rights

There are 5 approaches to water rights in Canada: riparian, prior allocation, civil code, public authority management, and Aboriginal rights

# Data Collection and Monitoring

Federal departments primarily responsible for data collection and monitoring of water resources in Canada include Environment Canada, Fisheries and Oceans, and Natural Resources Canada .

→December 2010, the Commissioner for the Environment and Sustainable Development Reported that "Environment Canada is not adequately monitoring the quality and quantity of Canada's surface water resources".

→Environment Canada agreed (monitoring is been severely cut back e.g. 4000 to 2500 water quality monitoring sites).

# Transboundary agreements

- Boundary Waters Treaty (1909) between US and Canada for transboundary waters. Created the International Joint Commission (IJC),a binational body for dispute resolution.
- The Canadian-Ontario Agreement Respecting the Great Lakes Ecosystem (COA) is an agreement between the federal and provincial governments that helps meet requirements established under the Great Lakes Water Quality Agreement.
- The Great Lakes-St Lawrence River Basin Sustainable Water Resources Agreement (2005) was signed between Great Lakes states and Ontario and Quebec and is meant to improve the health and economic vitality of the Great Lakes.
- The Agreement for Water Supply and Flood Control (1989) in the Souris River basin establishes stream flow apportionment arrangements between Saskatchewan, Manitoba, and North Dakota.

# Transboundary agreements (con't)

- The Prairie Provinces Water Board Agreement (1948) is an agreement between Alberta, Saskatchewan, Manitoba, and the Federal Government to resolve upstream and downstream needs. The agreement provides an apportionment formula for eastward flowing interprovincial streams
- Inter-provincially, one of the Federal government's responsibilities for water is in assisting provinces to resolve interprovincial water-related disputes. The Master Apportionment Agreement (1969) assists in working towards interprovincial cooperation regarding waters that flow east across the Prairies.
- The Mackenzie River Basin Transboundary Master Agreement (1997) deals with waters shared among Saskatchewan, Alberta, British Columbia, Yukon, and Northwest Territories. The Yukon - Northwest Territories Transboundary Water Management Agreement was completed in 2002. This is the first Bilateral Agreement completed under the Mackenzie River Basin Transboundary Waters Master Agreement.

# Drinking Water

- There is no Federal drinking water legislation but there are Guidelines for Canadian Drinking Water Quality (2010)
- Source water protection is primarily a provincial responsibility.
- A Canada-wide Strategy for the Management of Municipal Wastewater Effluent was endorsed by the Canadian Council of Ministers of the Environment in 2009. The federal government contributes by regulating via the Fisheries Act (1985).

Montreal aqueduct (open canal ) running approx 8km from LaSalle to Verdun

# Climate Change

- Natural Resources Canada (NRCan) and Environment Canada have a number of programs dedicated to understanding and adapting to the impacts of climate change. Many of these initiatives specifically focus on the relationship between water and climate.
- Canadian Climate Centre in Environment Canada does climate modelling.
- NRCan has a Climate Change Impacts and Adaptation Division, which works to facilitate climate change adaptation decision making across the country.

# Research and information

- National Water Research Institute (NWRI) is a federally funded research body, which undertakes studies of on water resources, for example:

NWRI is also leading the assessment of climate change on Arctic freshwater ecosystems and hydrology, and contributing to the Arctic Climate Impact Assessment for the Arctic Council.

- Canada also funds research undertaken mainly at Universities (NSERC). A portion of the funding is towards specific federal priorities and a portion goes to researcher defined projects.

# Water Management in Canada at the Provincial Level

Parc national du Mont-Tremblant

# Provincial Legislations

Provinces are the main “owners” of water and hence have the greatest responsibility and legislative powers.

•Each province its own administrative structure to manage water resources, which could be part of a Ministry of Environment or Natural Resources, or a separate agency, based on their historical development and local needs.

For example,

In British Columbia, water falls under the mandates of ministries for air, land and water protection, sustainable resource management, agriculture and food, health, forests, community, womens’ and aboriginal services.

The province of Manitoba is trying a more integrated form of water management with the creation of its new Department of Water Stewardship.

# Water Management in Quebec

430 major watersheds distributed in
10 hydrographic regions draining
4 main hydrographic basins.

# Quebec's Water Management

Sectorial approach (7 ministries, main one is ministry of the environment) changing towards an integrated approach:

- 1977 Symposium on Water Management, Premier laid down the principles for a public consultation on policy preparation.
- 1998 Minister of the Environment directed BAPE (Bureau d'audiences publiques sur l'environment) to hold hearings.
- 1999 public hearings held across Quebec
- 2000 Report made public: Le rapport de la Commission sur la gestion de l'eau au Quebec: L'eau, ressource à protéger, à partager et à mettre en valeur pp 1-792 pages(www.bape.gouv.qc.ca)

Conclusions : water resources management is not sufficiently integrated and does not consider the environment.

Recommendations: to integrate water resources management and organise it at the basin level and to develop policy and legislation to ensure better management. Described in 13 short, medium and long term goals.

- 2002 Quebec Water Policy was released. This represented a move towards establishing the administrative structure for a comprehensive management of water ww.menv.gouv.qc.ca/eau/politique/index-en.htm

# Quebec's Water Policy 2002

A framework to change from a sectorial approach to an integrated approach revolving around 5 key orientations:

1. Water governance reform
2. Integrated management of the St. Lawrence River
3. Protection of water quality and aquatic ecosystems
4. Continued clean-up and improved management of water services
5. Promotion of water-related recreo-tourism activities

# Quebec's Water Management legislated

- 2009 Act to Declare the Common Nature of Water Resources and to Reinforce their Protection: confirms the legal status of water as a common resource of the people of Quebec and specifies the responsibilities of the province-guardian of the resource on the behalf of the people and the rights and responsibilities of the collective. Allows for a permitting system and creates the Water Information Office (within the Ministere du development durable, de l'environement et des Parcs).
- 2009 Environmental Quality Act modified (adopted in 1972): objective is to protect the quality of the natural environment, prevent pollution and encourage environmental remediation.
- 2008 Regulation on Potable Water Quality modified (adopted in 2001) : provides standards for potable water quality.
- 2006 Sustainable Development Act : establishes a new management framework within the Administration to ensure that powers and responsibilities are exercised in the pursuit of sustainable development.

# Key Ministries and Departments

- Ministry of Sustainable Development, Environment and Parks is the primary department in Québec responsible for managing water resources. It's main objective is to promote sustainable development and, in keeping with that responsibility, it aims to keep the environment healthy within the confines of economic development and social progress.

- Ministry of Natural Resources and Wildlife: manages water resources and the use and management of public lands; Ministry of Health and Social Services: manages surveillance of water quality for bathing and consumption and the regulation of certain food products; Ministry of Agriculture, Fisheries and Food: manages fishing rights and surveillance of agricultural activities; and the Ministry of Municipal Affairs, Regions and Territorial Occupation: manages wastewater treatment and land use.

# Water Rights

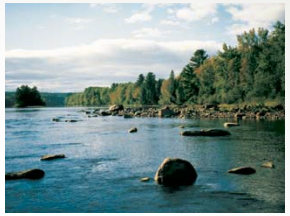
- Civil Code of Quebec (1991): surface water and groundwater are considered a collective good for the people of Quebec.
- Act to Declare the Common Nature of Water Resources and to Reinforce their Protection (2009) reaffirms this and allows for permitting of water use.

# Data collection and monitoring

- Water Information Office (2009) is responsible for communicating and sharing key environmental information related to water management. The Office collects data and monitors wastewater treatment levels, wastewater bypass, potable water quality and water quantity at designated bathing areas.
- Program to Acquire Understanding of Groundwater in Québec aims to develop a practical and realistic picture of groundwater resources found within municipalities in southern Québec.

# Transboundary issues

- Signatory to the Great Lakes Charter between (ON, QC, 8 States)



# Water Quality

- Potable Water: Regulation on Potable Water Quality (2001) sets water quality standards and operator certifications .
- Source Water Protection: not explicitly addressed but the integrated approach should improve protection.
- Wellfield Protection: Regulation on the Extraction of Groundwater (2002) protects 30 m around well and must asses vulnerability of well to contamination.
- Groundwater: Regulation on the Use of Groundwater (2002) protects groundwater for human consumption, provides for permitting of extraction.
- Storm/Waste Water Management : no specific policy, however, government programs and regulations since the 1970s have aimed at extending wastewater treatment to the majority of industrial and municipal sources (pulp and paper, petrol refineries, mining operations, waster water effluent discharge requirements)
- Ecosystem Quality Needs : Environmental Quality Act(2001) regulations for effluent water quality, Regulation on Agricultural Operations (2002), Policy to Protect Shorelines, Coasts and Floodplains (2005)

# Water Quantity

- Water conservation: within the Quebec Water Policy (2002) (but weakly)
- Ecosystem needs: theoretically within Act to Declare the Common Nature of Water Resources and to Reinforce their Protection (2009) but no mechanism for implementation.
- Interbasin Transfers: Preservation of Water Resources Act (1999, 2001) prohibits transfer of water outside Quebec.

# Climate Change

Climate Change Action Plan 2006-2012, created 2008 outlines the government's intention to develop hydrological models of highly populated watersheds in the province in order to test different climate change scenarios to better understand the potential impacts and potential adaptation responses .

Public hearings were undertaken to formulate the next Climate Change Action Plan 2013-2020.

# Watershed organisations

- 2002 Quebec Water Policy , Orientation 1, Action 2: (2 out of 57 actions items)

- The government of Quebec undertakes to
- 2. Gradually introduce integrated watershed-based management.
- 3. Provide financial and technical support for the establishment of 33 watershed agencies

# Comments on the situation in Quebec

- The framework developed is good and progress is being made (depends somewhat on the ruling party).
- More funding needed to really implement basin scale management.
- Criticism: First Nations rights to water are not explicit or legally acknowledged, they are not explicitly included in decision-making.

# Implementing Integrated Water Resources Management in Canada

# Integrated Water Resources Management in Canada

- The Canada Water Act (1985) enables cooperative agreements for consultation and collaboration between the federal, provincial, and territorial governments in matters relating to water resources.
- Joint projects involve the regulation, apportionment, monitoring, or surveying of water resources, and the pre-planning, planning, or implementation of sustainable water resources programs.
- The planning studies encompass interprovincial, international, or other basins where federal interests are important. Implementation of planning recommendations occurs on a federal, provincial, territorial or federal-provincial-territorial basis. Agreements for specific water programs provide for the participating governments to contribute funding, information and expertise.

# Increasing emphasis on IWRM

- Canadian jurisdictions are increasingly moving to adopt integrated water resources management as a central water management strategy – changing from traditional water management planning based on water allocation issues.
- Integrated Watershed Management (IWM) is viewed as a multidisciplinary and iterative process that seeks to optimize the contribution of aquatic resources to the social, environmental, and economic welfare of Canadians, while maintaining the integrity of aquatic ecosystems, both now and into the future.
- The aim (accomplished to varying extents) is to bring together the work of federal and provincial/territorial governments, Aboriginal peoples, and other stakeholders -- municipalities, industry, energy, agriculture, non-governmental organizations, community groups, and research teams -- into full partnership in the processes of planning, decision-making, management, and implementation.

# IWRM integrated into Governance

Mechanisms are needed to enable an integrated approach.

International governance mechanisms:

- Example 1 - International Joint Commission (US & Canada)
- Example 2 – Great Lakes Commission (Ontario, Quebec, 8 US states)

Intra-national governance mechanisms:

Example 3 – Prairie Provinces Water Board

Example 4 – Mackenzie River Basin Board

Example 5- Canadian Council of Ministers of the Environment (CCME)

# IWRM integrated into Governance

Intra-provincial governance mechanisms:

Example 6 – Federation of Canadian Municipalities

Example 7 – Conservation Authorities of Ontario

Example 8 – River Basin management framework in Quebec

Partnership Projects:

-Based on specific watersheds – St. Lawrence River and Great Lakes, Fraser River

-Water quantity monitoring (federal and provicincial), water quality (being developed : federal and provincial), water borne diseases (with Health Canada)


Great Lakes

# Challenges in IWRM

- IWRM is a change in approach and thus changes the inter-institutional interactions

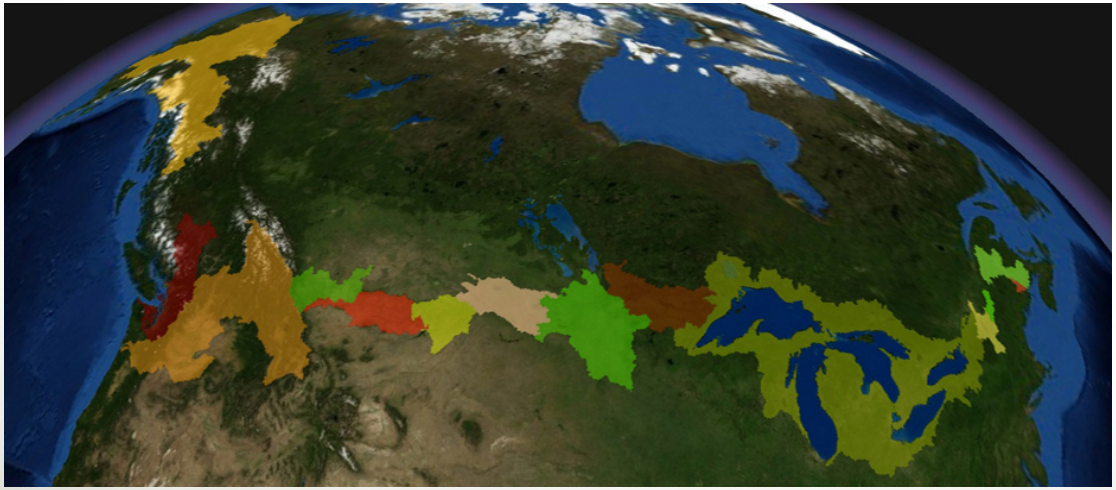
- Some aspects of IWRM already exist but others have to be implemented. There is an inertia in existing institutions and to be changed this needs both time and extra resources.

- The greatest change is to involve stakeholders more, and more meaningfully in the process. Although many special interest groups already exist, this might require education of stakeholders.

# Example 1: International Joint Commission (IJC) .www.ijc.org (Canada and US)

IJC was created to implement the Boundary Waters Treaty (1909).

The treaty provides general principles for preventing and resolving disputes – with specific application decided on a case-by-case basis.



E.g. Trail Smelter 1928
Columbia River 1944

- Shared basins covered under the IJC.
- Issues: water quality, air quality

# IJC (Canada & US)

Responsibilities are: regulating shared water uses and investigating transboundary water issues and recommending solutions.

- can issue orders of approval to place conditions on the application and operation of projects.
- governments can request a study and recommended solutions, references, to transboundary issues. A board with equal numbers of experts (not institutional representatives) from both countries is appointed.

IJC recommendations are not binding but are usually accepted by US and Canada
→Effective because it provides a neutral working group made of experts

Recently it has been getting declining support from Canadian and US federal governments.

# Example 2: Great Lakes Commission

(Ontario, Quebec, Illinois, IndianaMichigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin ) , www.glc.org

Formed by the Great Lakes Compact in 1955 between the US states with congressional consent in 1968. Ontario and Quebec added in 1999.

Mission: To promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin.

Activities: Commission products and services focus on communication and education, information integration and reporting, facilitation and consensus building, and policy coordination and advocacy.

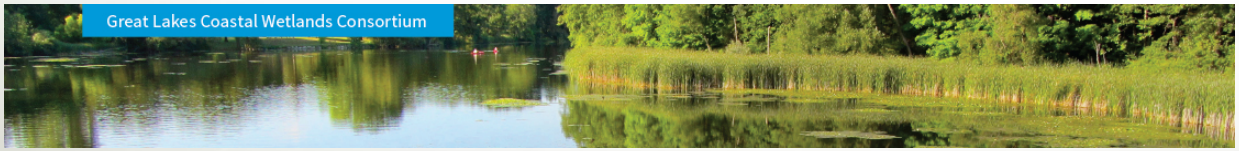
- built on collaboration with others, encourage economic prosperity and environmental protection, and are science-based.
- is an important binational forum that fosters dialogue among decisionmakers in its Member states and provinces to enable them to reach consensus on the region's priorities and speak with a unified voice.

# Great Lakes Commission

- A committee and task force structure is the primary vehicle for identifying and addressing issues and recommending the adoption of policy positions by the membership.

Projects in the areas of

- 1) Clean Energy and Climate;
- 2) Habitat and Coastal Management;
- 3) Invasive Species;
- 4) Water-dependent Economy and Infrastructure;
- 5) Water Quality and Ecosystem Health; and 6) Water Resources Management.




E.g.

- Great Lakes Wind Collaborative
- Great Lakes Coastal Wetlands Consortium

# Ex.3: Prairie Provinces Water Board

www.ppwb.org (Alberta, Saskatchewan, Manitoba, Canada)

Created in 1948 and modified in 1969 to ensure that interprovincial surface waters and groundwaters are equitably shared by Canada's Prairie provinces and to prevent potential conflicts.

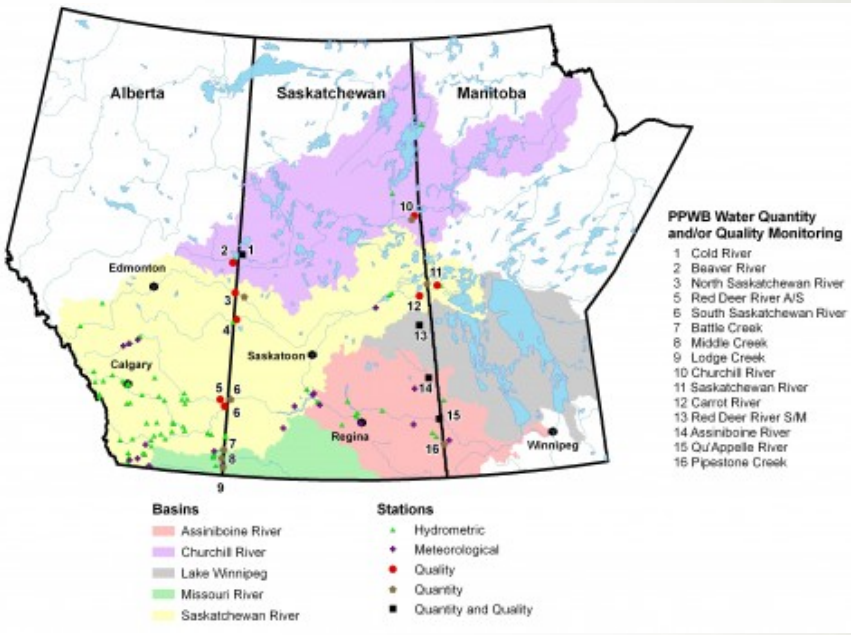
Purpose: in 1948 the Prairie Provinces Water Board Agreement was signed. This Agreement established a Board to recommend the best use of interprovincial waters, and to recommend allocations between provinces. 20 years later they signed the Master Agreement on Apportionment (1969), which provided an apportionment formula for eastward flowing interprovincial streams, gave recognition to the problem of water quality, and reconstituted the Prairie Provinces Water Board.

# Prairie Provinces Water Board

Mission:

1.To ensure that transboundary waters are protected and equitably apportioned and protected in accordance with the *Master Agreement on Apportionment*;
2.To provide a forum for exchange of information in order to prevent and resolve transboundary water management conflicts; and
3.To promote cooperation in transboundary water management.

Membership: Environment Canada, Agriculture and Agri-Food Canada, Alberta Environment, Saskatchewan Water Security Agency, Manitoba Infrastructure and Transportation




Apportionment made based on water monitoring by Environment Canada. Flows are apportioned and water quality monitored at 12 sites.

# Ex 4: Mackenzie River Basin Board

(Canada, Saskatchewan, Alberta, British Columbia, Yukon,North-West Territories) , www.mrbb.org

MRBB
MACKENZIE RIVER BASIN BOARD

Created in 1997. Vision: A healthy and diverse aquatic ecosystem for the benefit of present and future generations.

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# Ex 4: Mackenzie River Basin Board

(Canada, Saskatchewan, Alberta, British Columbia, Yukon,North-West Territories) , www.mrbb.org

MACKENZIE RIVER BASIN BOARD

Created in 1997. Vision: A healthy and diverse aquatic ecosystem for the benefit of present and future generations.

**Guiding Principles**

The Agreement commits the parties to the following principles in carrying out their responsibilities in the Basin.

- Manage the water resources in a manner consistent with the maintenance of the ecological integrity of the aquatic ecosystem.
- Manage the use of the water resources in a sustainable manner for present and future generations.
- Allow each Party to the Agreement to use or manage the use of water resources within its jurisdiction provided such use does not unreasonably harm the ecological integrity of the aquatic ecosystem in any other jurisdiction.
- Provide for early and effective consultation, notification and sharing of information on developments and activities that might affect the ecological integrity of the aquatic ecosystem in another jurisdiction.
- Resolve issues in a cooperative and harmonious manner.

# Mackenzie River Basin Board

Aims:
Improve knowledge though monitoring and study.
Protecting the Basin : responding to climate change, understanding contaminants, protecting biodiversity, developing a watershed approach.
Provides broad guidance for negotiating bilateral agreements (cooperative, sustainable, equitable)
the importance of Aboriginal participation and traditional knowledge in transboundary water management is recognised.

4 major watersheds to make more manageable:

- Peace, Athabasca, Slave watershed
- Hay, Great Slave Lake Watershed
- Liard Watershed
- Peel Watershed

Little progress has been made in negotiating details of water sharing and other responsibilities
(Morris, et al., 2007)


Approximate extent of tar sands development

MRBB has the responsibility to ensure consistency and coherence among the agreements and to ensure that collectively, the agreements will result in fulfillment of the terms and principles of the Master Agreement

# Ex5: Canadian Council of Ministers of the Environment (CCME)

www.ccme.org

The primary minister-led intergovernmental forum for collective action on environmental issues of national and international concern

CCME is comprised of the 14 environment ministers from the federal, provincial and territorial governments, who meet at least once a year to discuss national environmental priorities and determine work to be carried out under the auspices of CCME.

CCME has identified consensus decision-making as one of its fundamental operating principles.

# CCME Canadian Council of Ministers of the Environment (CCME)

Working definition of Consensus:

"Having heard and understood all views expressed, a solution has been proposed, and while I may not hold that this proposal is optimal, I believe it will work and I will support it."

Although all participants may not agree with each specific aspect of the solution, consensus is reached if all participants are willing to live with the total package.

- The process of voting does not lead to consensus
- Bargaining does not produce consensus
- Majority rule is not consensus
- Minority or one-person rule is not consensus

# Canadian Council of Ministers of the Environment (CCME)

Working definition of Consensus:

Four Steps To Consensus

1. Look beyond people's positions to understand their interests
2. Invent options for mutual gain: what is fair vs. what is best for each, or for all
3. Use objective criteria to assess options
4. Build sound solutions

A Back-up Process to Achieve Consensus, When Other Processes Have Failed

- Identify the problem causing the blockage
- Identify areas of agreement and those of disagreement
- Self-evaluation will determine if process so far is leading toward original goals
- Look for exaggeration, hyperbole, distortion and separate facts from fiction
- Switch roles: have participants argue from another person's standpoint
- Modify the best solution so far
- Develop two lists: one "agreed upon", the other "not agreed upon"

# CCME Canadian Council of Ministers of the Environment (CCME)

Ministers set the strategic direction for the Council, setting out the broad outcomes they seek to achieve. Senior officials establish working groups of experts from the federal, provincial, and territorial environmental ministries to work collaboratively to accomplish specific goals, with the support of a permanent secretariat. In most cases, group membership may include experts from other relevant government departments (such as Health). Depending on the nature of the work, expertise from the private sector, academia, aboriginal groups, environmental and health public interest groups may be sought.

Current working groups are

- Air Management Committee
- Cumulative Effects Working Group
- Mobile Sources Working Group
- Municipal Wastewater Effluent Coordinating Committee
- Soil Quality Guidelines Task Group
- Spills Scoping Group
- Waste Management Task Group
- Water Management Committee

Current WATER priorities are:

•developing tools for jurisdictions to manage impacts of nutrient loading on water quality

•improving jurisdictions' ability to evaluate cumulative impacts of allocation and withdrawals on surface water and groundwater.

•increasing jurisdictions' capacity to manage the impact of land use activities on surface water and groundwater quality, by developing technical tools

•developing tools to assist jurisdictions adapt to climate change impacts on the hydrologic cycle.

# Ex 6: Federation of Canadian Municipalities www.fcm.ca

Since 1901, formed of member cities and communities from across Canada (i.e. voluntary).

Aim: get results for member municipalities because we listen, unite and influence.

LISTEN: Through FCM, we listen to each other, to our partners and to decision-makers in the Government of Canada.
Most importantly, listening gives us the power to build constructive relationships that benefit all parties involved.


UNITE: Through FCM's Annual Conference, Board meetings, committees, policy forums and programs, we work side-by-side to identify our challenges, analyze options and develop effective ways to overcome the issues we face.

INFLUENCE: Influencing policy and programs that fall within federal jurisdiction is vital to helping us build strong, sustainable communities across the country and share our expertise around the world.

# Federation of Canadian Municipalities

Working method: members can put forward resolutions which are voted on, these can then become issues supported by FCM.

Issues: Environment – includes climate change adaptation, wastewater and water

Climate change – emphasis on adaptation and infrastructure

Waster water – improving septic tanks and municipal utilities

Water efficiency – water metering and water pricing.

# Ex 7: Conservation Authorities of Ontario. www.conservation-Ontario.on.ca

A network of 36 Conservation Authorities, which are community-based watershed management agencies dedicated to conserving, restoring and managing Ontario's natural resources on a watershed basis. (accounts for 90% of pop. of ON)

Conservation Authorities legislated by the Conservation Authorities Act (1946) in response to the populations concern about degraded watersheds due to deforestation and drought.

Three fundamental concepts to this new approach:

1. Local initiative: only established by request of locals who will contribute financially and assume the burden of running the authority.
2. Cost sharing: between municipalities and provincial government.
3. Watershed Jurisdiction: has power to establish regulations.

# Conservation Authorities of Ontario

Conservation Authorities are mandated to ensure the conservation, restoration and responsible management of Ontario's water, land and natural habitats through programs that balance human, environmental and economic needs.

**Objectives**

ensure that Ontario's rivers, lakes and streams are properly safeguarded, managed and restored;

- protect, manage and restore Ontario's woodlands, wetlands and natural habitat;
- develop and maintain programs that will protect life and property from natural hazards such as flooding and erosion;
- provide opportunities for the public to enjoy, learn from and respect Ontario's natural environment.

# Conservation Authorities of Ontario

History of action is  over 60 years.

Activities depend on the needs of each watershed.

Large complex watersheds such Grand River and Rideau River compared to small watersheds such as the Cataraqui River.

Funding comes from both the province and institutions in the local watershed.  This funds the personnel and their activities in the conservation authority.  Therefore there is a pressure to be effective so that the funding continues.

# Ex 8: River Basin management . framework in Quebec

Québec

2002 Quebec Water Policy , Orientation 1, Action 2: (2 out of 57 actions items)

The government of Quebec undertakes to

2. Gradually introduce integrated watershed-based management.

3. Provide financial and technical support for the establishment of 33 watershed agencies

2014 Stage of implementation

33 watershed agencies have been established

Funding is at the rate of approximately 1 person year per watershed (meaning that there is high turn over of personnel)

therefore the progress is very gradual due to low funding rate.

# Lessons Learned in IWRM implementation in Canada

Canada's experience to date confirms the importance of an enabling environment based on effective governance, sound science, appropriate instruments, and relevant information.

•**Governance and coordination mechanisms are critical**, particularly at the watershed level, for fostering transparency, accountability, and stakeholder involvement and collaboration. Effective leadership will help energize stakeholders, recognize contributions made, and celebrate community successes.

•**A wide spectrum of tools needs to be applied** -- a "one size fits all" approach is not effective to deal with the increasing complexity of water management issues -more tailored instruments can be used to suit various situations and challenges. Application of voluntary guidelines, promotion of targeted water policies, and consensus-based tools, such as accords and protocols, are an expanding part of the toolbox. There is also increasing recognition of the impacts that economic and information instruments can have, as well as the value of having transparent and structured planning processes to further lever integrated actions on water.

•**Water science is a major building block for applying IWM**. Water research plays an important role in helping develop environmental policy, regulations and guidelines, and instruments and tools, and in decision-making in general. Efforts continue to be made to strengthen linkages between researchers and decision-makers across governments and disciplines, as well as with other countries.

•**Water management information and reporting systems are needed** to help guide and assess priorities and emerging IWM issues. Jurisdictions have collaborated in many ways, such as developing guidelines to assess water quality, building data collection networks, modelling, and developing indicators to report on water resource trends.

# Lessons Learned in IWRM implementation in Canada → areas for improvement

- Maintain and sustain effort to pursue IWRM
- Improve decision support tools, particularly at watershed scale
- Need to develop best practice recommendations for a variety of circumstances
- Enhance availability of data and information
- Improve measurement and reporting systems.
- Better account for full economic, social and ecological value of water in decision making
- Strengthen socioeconomic and physical science for water management

# Examples of Research in Integrated water resources management

1. Developing scientific tools to model processes – Mexico Basin

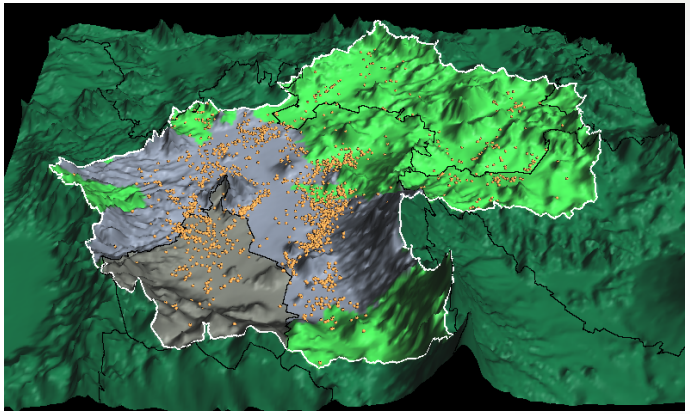
2. Demand management using water pricing – Barbados
   Determining pricing levels – Trinidad and Tobago

3. Participatory methods tailored to local context – Buea, Cameroon

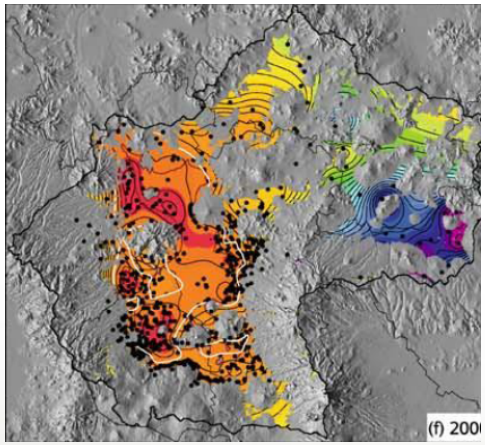
# IWRM: Mexico City Basin

Mexico City Basin:
- Closed high altitude basin with a population of 20 million.
- 5 political entities and 4 water agencies managing the resource.

Total water supply ⟹ 70.5 $m^3/s$
- 67% groundwater : 18 $m^3/s$ overexploitation
- 28% imported : 20 $m^3/s$
- 5% surface



Land subsidence due to decrease in potentiometric levels of 7.5 – 15 m since 1847.



*Problems*:
-unsustainable water use
- land subsidence

*Objectives*:
Develop regional groundwater model (comprehensive relational database, soil-water balance, aquifer recharge ⇒ groundwater model)

Jaime Carrera-Hernández, Ph.D. (2007)

# Water supply: demand management and pricing

**Barbados**:

• Small Caribbean island with population density of 625/km$^2$, is at the limit of sustainable extraction of groundwater from area with karst geology. Overexploitation would lead to saltwater intrusion.

• 2/3 of water use is from residential supply.

• Econometric demand model on a time-series of cross-sectional observations performed.

• Results: Applying an increasing block rate tariff combined with universal metering will reduce demand.


Walid Khawam, M.Eng. (2004)

**Trinidad and Tobago**:

• Once excellent water supply system has deteriorated due to falling real tariffs being insufficient to maintain and operate the utility.

• Contingent valuation and choice modelling were used to determine the willingness to pay of consumers for improvements to water supply.

• Consumers priorities varied depending on availability of substitute water sources and coping mechanisms (for both quality and quantity).

Kameel Virjee, Ph.D. (2006)

# Buea, Cameroon: Participatory advocacy to improve water supply services

Greater Buea lies on the slopes of Mount Cameroon at 1000m with 2000-3000 mm/yr rainfall. It has a population of 200,000 and is growing at 3%/yr.

Two water providers: SNEC/CDE (70,000) and community organizations (130,000).

Service is poor: unreliable, lack of pressure and poor quality.

Main service levels:
- house supply 30%
- public standpipes 40%

*Research goals*:
- Baseline data on water supply
- Advocate for education and awareness
- Increase stakeholder communication and participation

*Methods:*
- Schools competitions
- Focus group meetings
- Workshops
- Radio programs

Fidelis Folifac, Ph.D. candidate

SIMPÓSIO DE RECURSOS HÍDRICOS DO NORDESTE

4 a 7 / novembro / 2014 ★ Natal ★ RN

# Thank you

ABRH

McGill