WATER SECURITY GUIDANCE DOCUMENT

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PART 3 SECTION 6
WORKING TOWARDS WATER SECURITY: FOSTERING GOOD GOVERNANCE PRACTICES THROUGH ADAPTIVE GOVERNANCE

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ABSTRACT

In this section, we outline and define an adaptive governance approach. This approach is based on three overlapping processes: participation of stakeholders, policy setting, and monitoring and enforcement. The adaptive governance process helps to identify the links between risk assessment and risk management. Through this process, communities gather information from water security status and risk assessment, stakeholders make and implement decisions based on the risk and status assessment, and decision-makers are held accountable in the development and management of water resources and delivery of water services. We also provide examples of steps communities can take to work towards achieving water security through "good governance" practices.

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BACKGROUND: KEY ISSUES AND CONTEXT

The assessment of water security requires an integrated approach that includes both the evaluation of **current status** of water quality and quantity, through the use of indicators (see *Part II, Section 4*), and an assessment of *risk* to water, owing to uncertainty in foreseeable future events that may negatively impact water quality or quantity (see *Part II, Sections 2 & 3*). The uncertainties associated with stressors may include, but are not limited to, development pressures and climate change. The assessment of water security status and risk should be a long-term process through repeated (ideally continuous) evaluation (against thresholds or baselines), to determine improvements or decline, with this information being incorporated into a longer-term water *risk management strategy* (*Part III*).

Risk assessment (the identification, assessment and prioritization of risks) considers both the magnitudes of events, and the likelihood of those consequences occurring. Although the principles and methodologies are well documented for natural disasters (such as landslides and earthquakes), comprehensive risk assessments are seldom applied to water-related issues. In this Guidance Document, risk is defined as a function of *vulnerability* and consequence (*loss*), whereby *vulnerability* incorporates the susceptibility of the water source (e.g., stream or aquifer) and the presence of a hazard (potential contamination from land-use activities or excessive use of water). The magnitude of the consequences (i.e., *loss*) may be evaluated from social, health or economic perspective, such as consequence to human life or health, or ecological integrity. Through changes to resistance and capacity, a community's *vulnerability, loss,* and subsequent overall exposure to risk, can be strategically reduced over time.

An adaptive governance approach to managing water security risks focuses on the process by which the information from water security status and risk assessment is absorbed, decisions are made and implemented, and decision makers are held accountable in the development and management of water resources and delivery of water services.

PURPOSE OF THIS SECTION

In this section, we outline and define an adaptive governance approach and provide examples of steps communities can take to implement "good governance" practices with the aim of achieving water security. The adaptive governance process helps to identify the links between risk assessment and risk management.

INTENDED USERS

This approach has relevance for all water users including (but not limited to) volunteer groups, professionals, community watershed groups, citizen environmental committees, water managers, and municipal water policy and decision-makers.

GOOD WATER GOVERNANCE

Water governance is the range of political, organizational, and administrative processes through which communities articulate their interests, their input is absorbed, decisions are made and implemented, and decision makers are held accountable in the development and management of water resources and delivery of water services (Nowlan and Bakker 2010). It is conceptually distinct from water management, which is the operational, on-the-ground activity to provide and regulate water, although they are interrelated in practice.

Good governance is a means of facilitating improved decision-making; improving the efficiency of management and water use, and improving government responsiveness. Variables include: inclusiveness, participation, accountability, and transparency, which are linked to good governance outcomes.

Good governance requires a commitment to inclusion of stakeholders, adaptability, ongoing monitoring and assessment, and problem solving. No one-size-fits-all solution exists; rather, adhering to the basic principles of water governance can help communities in their effort to achieve water security. Furthermore, case studies of communities that have made changes to adopt the principles of good governance and water security into their water management plans may provide inspiration and guidance to other communities.

LINKING WATER SECURITY AND WATER GOVERNANCE

It is difficult to identify a singular water stressor for a community; rather, multiple stressors result in water insecurity. Narrow governance approaches that fail to link water quality and quantity, both in terms of human health and aquatic ecosystem health, hinder the ability of communities to achieve water security. Furthermore, inadequate assessment of status and risk hinder long-term plans for communities to achieve water security. In short, a broad integrative (and proactive) approach is needed.

Practicing good governance is crucial for communities to achieve water security and an adaptive governance approach can facilitate this. Succinctly defined, adaptive governance is a methodological approach to resource management, whereby policies are implemented as experiments and learning is integral to resource stewardship. Adaptive management is an iterative, systematic process for improving environmental management policies and practices, whereby decision-making is made through a structured process in the face of uncertainty. It is a learning by doing process, with the aim of reducing uncertainty over time through system monitoring.

Adaptive governance formalizes a "learning by doing" approach that can link science and policy. Risks and changes to ecosystem health and human health are monitored and assessed over time. Policies and decision-making processes are then adapted over time, creating a closed (and hopefully virtuous) feedback cycle.

Adaptive governance of human-nature systems relies on numerous institutions with decision-making ability at various scales from the local to the national (Folke et al 2005). Adaptive governance encourages synergy and align-

ment between these polycentric institutions, which enhances the resilience of human-nature systems because they offer greater flexibility, and improve the ability to respond to uncertainty.

Adaptive governance may be operationalized through adaptive management, where understandings of ecosystem dynamics are integrated into management institutions (Folke et al. 2005, 448). (A simple distinction between management and governance is that the former focuses on daily operational decision-making, whereas the latter focuses on higher-level institutions and 'steering' of systems). The Resilience Alliance[1] defines adaptive management as: an approach which uses management not only to control the system, but also to learn about the system, in an iterative, continuous process of scientific experimentation conjoined with day-to-day management.

Facilitating "good governance" and adopting a good governance model[2] includes integrating community governance processes, facilitating participation, and operating at a scale commensurate with local water management capacity. Achieving water security may seem like a daunting task, but through systematic planning and good governance, water security can – and should – be achieved throughout Canada (and beyond).

BOX 1 – WATER SECURITY IN ONTARIO

Reviewing the developments in Ontario over the decade since the Walkerton tragedy may provide context to understand the process of moving toward water security. The Walkerton Inquiry into the events of the tragedy issued a number of recommendations for the provincial government to implement in order to improve drinking water security. Review of Ontario's water governance, developments, including new laws, new training programs, and new agencies emphasizes that there are many facets to improving water security. Ontario exemplifies a provincial approach to water security that aims to engage communities.

Table 1: Water security initiatives in Ontario

Water Security Initiative	Example Ontario Institution
Watershed approach	Conservation Authorities (1946); Source Protection Areas & Regions (under *Clean Water Act 2006*)
Integration of land and water use planning	Source Protection Regions (2007)
Integration of ecosystem and human health concerns	*Clean Water Act (2006); Drinking Water Ontario, Safe Drinking Water Act (2002)*

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[1] http://www.resalliance.org/index.php/adaptive_management

2 Governance model is a "description of good governance, and of the allocation of responsibilities and relationships between stakeholders for tasks and practices for good governance" (Bakker 2003, 4).

Water Security Initiative	Example Ontario Institution
Integrated assessment of stressors and effects	Ontario Regulation 387/04 *Water Taking*, O.Reg. 169/03 *Ontario Drinking Water Quality Standards*
Demand management	Ontario water conservation strategy (2009)

WATERSHED APPROACH

The watershed approach is a key aspect of water security, because it facilitates components of good governance—participatory management, collaborative decision-making, and delegation. Ontario adopted the watershed approach to address interrelated land and water management issues in 1946, when it created Conservation Authorities (CA) to work with the predecessor to the Ministry of Natural Resources. Historically, CAs have mainly focused on water in its 'natural environment'. Municipalities, which are responsible for drinking water service delivery under the oversight of the Ontario Ministry of Environment, also manage land use within the framework set by the Ministry of Municipal Affairs and Housing. These divisions in responsibility for water issues and land-use planning persist today, and present a continuing challenge for integration.

INTEGRATION OF LAND-USE PLANNING AND WATER MANAGEMENT

Since land use can have significant impacts on water quality and quantity, integration of land-use planning and water management is critical to water security, but has been elusive in Ontario. Traditionally, municipalities have limited their water management concerns to provision of drinking water and wastewater systems. As noted, watershed management is the purview of conservation authorities, which manage surface water flows and regulate floodplain protection. CAs are comprised of the territories of several municipalities (or parts of municipalities) that have jurisdiction over land-use planning within a provincially-set framework. In planning land use, municipalities must develop and implement 'official plans' which CAs review; this is one way municipalities and conservation authorities collaborate.

The *Clean Water Act* (2006) expands the watershed-planning framework to include source protection. As the key facilitators of the source protection planning process, CAs now have relationships with both the Ministry of Natural Resources (*Conservation Authorities Act*) and the Ministry of Environment (*Clean Water Act 2006*).

INTEGRATION OF ECOSYSTEM AND HUMAN HEALTH CONCERNS

Working toward water security requires integrated planning, since ecosystem and human health concerns are interdependent. Watershed planning in Ontario has tended to focus on management of the ecosystem rather than on ecosystem health. Post-Walkerton Ontario's new legislative framework is driven primarily by human health concerns. Making protection of drinking water sources the main purpose of the *Clean Water Act* (2006) underscores this point. Additionally, the government created *Drinking Water Ontario* as a clearinghouse for public information on drinking water in Ontario.

INTEGRATED ASSESSMENT OF STRESSORS & EFFECTS

Ontario Regulation 387/04 *Water Taking* introduces a set of indicators for assessment of stressors regarding water quantity. Under the regulation, the Minister of Environment is obligated to consider specific water availability issues (impacts on water balance, sustainable uses, water conditions, and allocated uses) prior to issuing a Permit To Take Water (PTTW). The PTTW scheme is intended to address the cumulative effects of a number of withdrawals in a watershed. However, critics, such as Garfinkel et al (2008), note the qualified nature of the mandatory consideration of water availability and the complaints-based nature of the PTTW scheme that, in effect, means that cumulative effects go unnoticed unless complained about by other water users. The effect of a complaints-based system is that by the time another water licensee reports a reduction in quantity, the watershed's hydrological integrity has likely already been affected.

The *Safe Drinking Water Act (2002)*, and its regulations addressed a number of the barriers envisaged by the Walkerton Inquiry Report by introducing "binding standards, enhanced operator certification, requirements for laboratory certification, source water protection, and public notification if drinking water is unsafe" (Hill 2006). Specific microbiological, chemical, and radiological standards for drinking water quality are set out in the regulations. A program to ensure safe drinking water must do more than focus on direct measurement of water quality because to do so necessarily results in reactive responses – most water quality monitoring tests are not useful indicators of effects because they cannot be done in real time. A preventative approach to assessment would include the adoption of best practices and continuous improvement; 'real time' process control (e.g., the continuous monitoring of turbidity, chlorine residual, and disinfectant contact time) wherever feasible; the effective operation of robust multiple barriers to protect public health; preventive rather than strictly reactive strategies to identify and manage risks to public health; and effective leadership (O'Connor 2002).

Subsequent to the Walkerton Inquiry, Hrudey et al (2006) note the value of good governance (namely, transparency, accountability, and inclusiveness) to a total water quality management framework. Specifically, they cite an Australian example, which "provide[s] consumers with the means

for judging whether their water provider is functioning as safely and effectively as circumstances reasonably allow" (Hrudey, S.E., Hrudey, and Pollard 2006).

DEMAND MANAGEMENT

The province has not done as much about demand management as certain municipalities have with pricing mechanisms and efficiency installations. However, more recently, Ontario has begun to consider, more broadly, conservation measures. In 2010, Ontario passed the Water Opportunities Act that has three objectives: (1) to make Ontario the North American leader in the development and sale of water conservation and treatment technologies; (2) to encourage sustainable infrastructure and conservation planning using made-in-Ontario technologies to solve water, wastewater and stormwater infrastructure challenges; and (3) encourage all Ontarians to use water more wisely.

LEGISLATIVE TOOLS FOR PROVINCIAL GOVERNMENTS

Based on our review of Ontario initiatives toward water security, we suggest provincial legislators and policy-makers keep three goals in mind:

- Create outcome-oriented legislation and regulations. Rather than mandating how something must be done, legislation should set expectations and goals.

- Create boundary institutions that bridge levels of government and science, law, and policy (e.g. watershed institutions can facilitate coordination but they must have capacity for both knowledge and skills as well as financial means to operate).

- Review regulations and legislation to ensure cumulative effects are accounted for (e.g. are applications for pollution permits reviewed in the abstract or in the cumulative?)

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A STEP BY STEP GUIDE TO AN ADAPTIVE GOVERNANCE APPROACH

In this section, we outline key steps communities can take to implement "good governance" practices with the aim of achieving water security.

Step	
1	Identify Key Stakeholders and Decision-Makers and Define Scale
2	Create a Governance Map (to Understand the Decision-Making Process in your Defined Community)
3	Define status of water security (refer to *Part II, Section 4 WSSI*) - which includes identifying and locating key data sources
4	Identify Risks to Water Security (refer to *Part II, Section 2 WSRA*)
5	Identify Adaptive Management Practices
6	Develop Short and Long-term Policy and Planning Recommendations for Water Security (Decision-Making)
7	Undertake Ongoing Assessment, Monitoring, and Management to Reflect Changes in Status and Risk (Behaviour Change)

STEP 1 – IDENTIFY KEY STAKEHOLDERS AND DECISION-MAKERS AND DEFINE SCALE

The first step is to define who will participate in the assessment process and identify the physical boundaries and jurisdictional scale used to define your community (e.g., municipal, conservation authority, watershed). Identifying the scale will likely occur as a group process with key stakeholders and decision makers within the community.
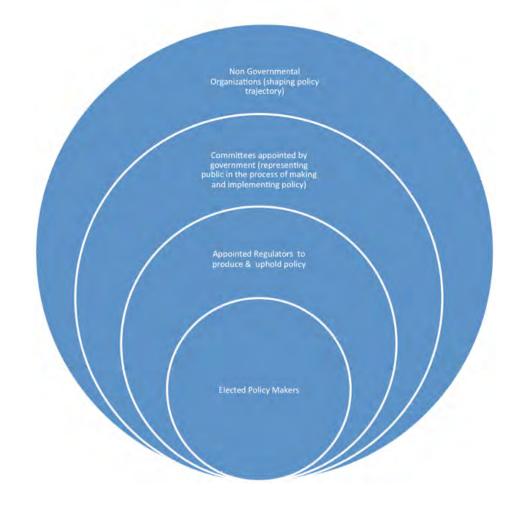
The adaptive governance approach reflects ongoing calls by water practitioners and scholars for the integration of governance in assessment and the need for individual and community engagement.[3] What is the governance structure of your community? Identify the key actors, decision-makers, and special interest groups in your community. Identify the links between assessment, action and re-assessment in your community (including which if any, links are missing?).[4]

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[3] Scholz and Stiftel (2005), in particular, highlight different challenges to adaptive water governance, which include the challenge of "representation" of stakeholders, such as resource users and managers.

[4] A recent report by the United Nations Global Compact Cities Programme outlines a process in which citizens design their project assessment and methodological tools for achieving sustainable practices with the end goal of reducing stressors leading to global climate change (United Nations 2010). As Becker (2005: 88) suggests, "educating stakeholders about the process of achieving sustainable development may be the most important result of the indicator selection process, even if implementation remains uncertain." In addition, Local Agenda 21, launched at the UNCED conference in 1992, adopts a citizen-focused "process" approach to "good governance". Although this approach is widely adopted in other parts of the world (in particular Europe), its application in North America is limited (Brugman 1997; Smardon 2008).

STEP 2 – GOVERNANCE MAPPING

A preliminary step in assessment and adaptive governance is mapping the governance structure of your community and identifying key actors involved in the governance structure (i.e., community end-users, water managers, water policy specialists, and local decision-makers). Figure 1 shows a general diagram that outlines categories of stakeholders involved in the water policy-making process. The details of the specific stakeholders should be revised and updated to correlate with the specific community structure. Figure 2 provides an example of mapping the governance structure of a community by listing and categorizing different actors involved in water governance specific to the Township of Langley, British Columbia. This list is by no means exhaustive: rather it is used as an example of how to initiate the process. This activity would be a useful part of an introductory community meeting, where the mapping could be part of an interactive, facilitated process.

Figure 1: Outline of stakeholders involved in water policy – making process (Source: adapted from Bakker 2003)
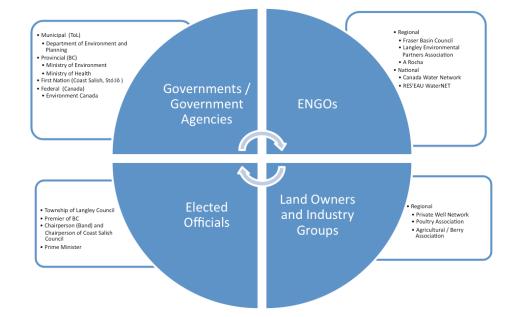
• Municipal (ToL)
  • Department of Environment and Planning
• Provincial (BC)
  • Ministry of Environment
  • Ministry of Health
• First Nation (Coast Salish, Stó:lō)
• Federal (Canada)
  • Environment Canada

Governments / Government Agencies

• Regional
  • Fraser Basin Council
  • Langley Environmental Partners Association
  • A Rocha
• National
  • Canada Water Network
• RES'EAU WaterNET

ENGOs

• Township of Langley Council
• Premier of BC
• Chairperson (Band) and Chairperson of Coast Salish Council
• Prime Minister

Elected Officials

Land Owners and Industry Groups

• Regional
  • Private Well Network
  • Poultry Association
  • Agricultural / Berry Association

Figure 2: Mapping actors involved in water governance activities, using Township of Langley, British Columbia, as an example

STEP 3 – ASSESS WATER SECURITY STATUS

Two important steps in adaptive governance are the identification of appropriate indicators to monitor and assess the ***current status*** of water security (step 3), and the identification and evaluation of water-related ***risks*** (step 4). The utility of indicators is greatly enhanced when linked to decision-making (step 6). Using an adaptive governance approach means linking findings back to behaviour change (step 7), not just about changing plans, but assessing the effectiveness of management actions on the ground. Well-formulated policies could be structured to anticipate the conditions that lie ahead using integrated and forward-looking analysis. Indicators of success should be part of the assessment process from a governance or performance point of view, as well as from a results perspective. As more information is available and technologies change, the process can be revised and updated.

Decision-makers need access to timely information (demonstrating whether a system is moving closer to, or further away from the outlined goals). Developing adaptive short and long-term policies and informing decision-makers in a timely manner is central for water security in an uncertain world. Similar to the indicator development cycle (Figure 3), an adaptive governance approach allows for communities to react to - and continually revise plans - as new information becomes available. Indicators also have the potential to play an important role in the dissemination of information. For example, they can be used to transform complex scientific and social data points into a simplified and quantified expression that can be easily communicated to the general public.

The Indicator Development 'Cycle': Design, Implement, Evaluate

Each step should involve end-users where appropriate

Figure 3: The Indicator Cycle: Design, Implement, Evaluate Source: Dunn and Bakker (2009)

For more detailed information refer to *Part II, Section 4 Water Security Status Indicators,* and *Part II, Section 5 Mapping the Likelihood of Groundwater Contamination.*

STEP 4 – ASSESS RISKS TO WATER SECURITY

An assessment of risks to water security should consider the hydrologic components of the community-defined scale (which includes both surface water and groundwater), together or separately, depending on the driving issues and practicalities (e.g. data availability, knowledge). The risk assessment framework should also consider water quality and quantity, together (or separately, for similar reasons).[5] Risk includes two fundamental components: vulnerability and loss. **Vulnerability** is the potential for damage caused by various hazards (e.g., contamination, over use), offset by the natural protection provided by the physical (unaltered or altered) system. **Loss** is the economic, environmental or health consequence associated with the deterioration of a water resource.

The Water Security Risk Assessment (WSRA) framework, based on the principles of risk assessment methodology, provides spatial indicators of risk by mapping attributes of the built and natural environments (ideally at a watershed scale). For further information refer to *Part II Section 2 Water Security Risk Assessment, and Part II, Section 3 Water Security Vulnerability Scoring.*

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[5] It may be impractical or unnecessary to assess risks to each hydrologic component and their respective attributes (quality and quantity), although integrated management of these two water sources is ultimately necessary.

STEP 5 – IDENTIFY ADAPTIVE MANAGEMENT PRACTICES

Adaptive management entails three overlapping activities: participation of stakeholders; policy-setting; and monitoring and enforcement. Participation is central to the process, as a means of improving information flows, improving compliance, and enabling stakeholders to be agents of change (rather than passive observers) (Sabatier and Jenkins-Smith 1993; Sabatier et al. 2005). This, in turn, can facilitate effective responses to changes in water security status and risks by, for example, lifting or imposing moratoriums, updating standards, addressing cumulative effects, coordinating across political jurisdictions, and acting to promote long-term goals. In order to assess whether policies have been implemented, and assess their effects, monitoring and enforcement are required. A robust monitoring system should be delivering regular updates on status. A long-term commitment to monitoring the system being governed relies on institutional capacity and community engagement. Institutional capacity requires an understanding of the stakeholders and their roles as well as investment in collecting and analyzing data. Each of these activities is associated with good governance goals: for example, participation should be inclusive; policy-setting should be responsive; monitoring and enforcement should be transparent and accountable. The ability and flexibility of a governance model to respond to changing conditions is critical to its effectiveness.

Once you have gained a preliminary understanding of the status of your community's water security and risks to water security you can work your way through the adaptive management approach--linking assessment, action, and re-assessment.

Key considerations of an adaptive management approach:

- Monitoring capacity – data availability (e.g. quality and timeliness) and comprehensiveness, accessibility to information;

- Regulatory capacity and rule of law – comprehensiveness of regulatory framework, training of water purveyors, effectiveness and predictability of the judiciary, enforceability of contracts;

- Decision-making capacity – accountability, transparency, inclusiveness and participation (e.g. integration of stakeholders into decision-making).

Identify how the information gained from assessment (i.e. the WSSI and the WSRA) can feed into land use practices and management. Steps 6 (Development of short and long-term policy and planning recommendations for water security) and step 7 (Ongoing assessment, monitoring, and managing to reflect changes in status and risk) are integral to this practice of adaptive management.

STEP 6 – DEVELOPMENT OF POLICY AND PLANNING RECOMMENDATIONS

The next critical piece is adaptation, i.e. having plans in place to link the findings back to behaviour change. This critical component requires continued buy-in from citizenry and policy-makers. Civic engagement and general awareness of water-related issues are important considerations for linking assessment to change (Nowlan and Bakker 2010; Sabatier et al. 2005).

It is essential to identify existing mechanisms for data assessment and water management. For example, in Township of Langley (ToL), British Columbia (one of our case study communities for the Water Security project), a number of special interest networks and community groups exist whose general goals include improving water quality through data exchange networks or through habitat restoration. However, the scope of these organizations is often narrowly defined and rarely integrated with other resources. Incorporating assessment methods - such as the Water Security Assessment Indicator (WSSI) - into the design and development of policy will aid the community to think more broadly about assessing water status and risk, and in turn, meet goals of water security in a more integrated manner.

In ToL, the community partners involved in the water security project noted that the process of undertaking the WSSI assessment method proved useful for highlighting gaps in current practices, particularly in relation to data collection and availability. In addition, participants indicated that the user-friendly output of the WSSI assessment could help revitalize the interest in ongoing assessment and planning, and be of particular use in engaging with community leaders and decision-makers. Similar approaches in other Canadian jurisdictions have yielded positive outcomes. For example, the town of Oliver, British Columbia has made great strides in closing the assessment-governance gap by incorporating a groundwater susceptibility map (Liggett and Allen 2011) into their official community plan (Smart Growth on the Ground 2008).

The assessment process also revealed some important gaps among data collection, assessment and implementation. In particular, the assessment revealed that although there were substantial "water quality" data, its utility was compromised (i.e. fragmented, poor quality, narrowly-defined, and location-specific). There are no guidelines for the collection and storage of water quality data. In addition, data gaps highlighted that many departments and organizations are not effectively communicating regarding existing data or ongoing monitoring efforts (Table 2). Step 7 can address these gaps to help close the link between assessment and application.

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Table 2: Ongoing assessment of water status through WSSI assessment: Community reported benefits and new findings (institutional gaps)

Benefits of WSSI Assessment (Reported by case study communities)	Key Findings & Institutional Gaps
Overall, results corroborated municipalities findings (validating)	Existing datasets were not as streamlined (or complete) as the municipality originally understood
User-friendly output	Transfer (sharing) of information between departments and sectors needs greater attention
Presentation of results revitalized community interest in water-related issues	Data were often narrowly-defined, inconsistent (e.g., for aquatic ecosystem health data was largely collected in response to "incidents" rather than ongoing assessment)
Increased buy-in from community leaders and decision-makers	For drinking water quality, although the datasets are more complete (than aquatic ecosystem health databases), the different formats due to various types of water sources (private wells, public wells, and GVRD surface water) made it difficult and time consuming to compare
Closing assessment – governance gap	Greater work needs to occur to address mismatch between scale of assessment and scale of governance
Visually rich educational tools	Great need to improve feed-back loop between assessment and community education, and assessment and policy change

STEP 7 – ONGOING ASSESSMENT, MONITORING AND MANAGEMENT

In order to assess whether policies have been implemented, and assess their effectiveness, monitoring and enforcement are required. A robust monitoring system should deliver regular updates on status. A long-term commitment to monitoring the system being governed relies on institutional capacity and community engagement. Institutional capacity requires an understanding of the stakeholders and their roles as well as investment in collecting and analyzing data. Each of these activities is associated with good governance goals: for example, participation should be inclusive; policy-setting should be responsive; monitoring and enforcement should be transparent and accountable. The ability and flexibility of a governance arrangement to respond to changing conditions is critical to its effectiveness.

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CASE STUDIES [6]

Although the term, "water security" has not yet been fully embraced in Canada, many Canadian communities implicitly accept the goals of water security. Full implementation of this concept, however, is relatively rare. Here, we present three examples of communities integrating governance with elements of water security: the Yukon Intertribal Watershed Committee, the Okanagan Basin (British Columbia), and Oak Ridges Moraine (Ontario).

These communities, true to our definition, aim to achieve sustainable access to adequate quantities of water, of acceptable quality, for human and environmental uses, on a watershed basis.

CASE 1: HIGHLIGHTING BEST PRACTICES: YUKON INTERTRIBAL WATERSHED COUNCIL

The Yukon River Inter-Tribal Watershed Council (YRITWC or the Council) is a collective initiative of 70 First Nations and tribes across Alaska and the Yukon Territory that aims to improve the health and well-being of the watershed and the people who live within it. The Council's vision, simply put, is "to be able to drink water directly from the Yukon River" (YRITWC 2009).

The multijurisdictional (and transboundary) nature of the watershed (Figure 4) had, in years past, complicated the governance of the watershed. Whilst agencies at the federal, state, and / or territorial level had some regulatory responsibility for the watershed, no single group existed to manage the watershed in its entirety. Recognizing that need, the Council was established in 1997 as a treaty-based organization of indigenous governments dedicated to preserving and protecting the environmental quality of the Yukon River for the health of their communities, and the continuation of a traditional Native way of life for generations to come. The YRITWC is an innovative and highly collaborative organization. It is the first (committee) dedicated solely to promoting the responsible management, use, protection, and enhancement of the watershed. The council achieves these goals through a variety of methods, including education programs, water quality monitoring, stewardship and land management practices. In addition, the Council serves as a vehicle to involve the First Nations and tribal communities in direct decision making related to the governance of the watershed and to provide a forum in which to express the needs of the member villages, tribes, and nations collectively (YRITWC 2009). In 2005, Harvard University recognized the innovations of the Council as an award-winning program. The Council was described as a model of self-determination, governance, and collaboration, with high achievements in three main areas: the initiation of the YRITWC; the development of a complex and high quality operational system; and the impact and reach of the Council on the health of Native peoples along the Yukon River and beyond (Harvard University 2005).

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[6] These case studies are reproduced from Norman et al (2010).

The Council continues to develop new programs with a focus of five main tenets:

- Understanding the Watershed through monitoring, measuring and researching, and using this knowledge to clean, enhance and preserve life along the River.

- Education: Promoting environmental and traditional education for the Indigenous Peoples of the Watershed through education programs, scholarships, internships, volunteer opportunities and incentive programs.

- Stewardship: Honouring the traditional heritage through good stewards of the Watershed and its tributaries, and to restore and preserve its health for the benefit of future generations.

- Enforcement: Developing and enforcing strong state, federal, territorial and provincial environmental standards to preserve the long-term health of the watershed.

- Organization: Providing greater organizational strength to the Indigenous Peoples of the Yukon River Watershed, both by assisting and improving Indigenous governments, and by being a model of organization built on collaboration and mutual respect. (YRITWC 2009).
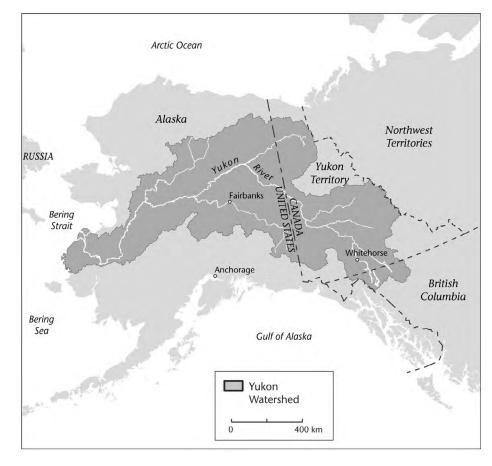

Figure 4: Map of Yukon Watershed

CASE 2: THE OKANAGAN BASIN, BRITISH COLUMBIA

The Okanagan Basin, located in south-central British Columbia, is almost 200 kilometres long and 8,000 square kilometres in area (Figure 5).1 As one of the most arid watersheds in Canada, the basin is at risk of severe water shortages, particularly in summer months. The Okanagan Basin is experiencing significant population growth, recently becoming one of the fastest growing regions in British Columbia. So much so, that the Okanagan Basin now has the smallest volumes of fresh water per capita in British Columbia (Neilson-Welch and Allen 2007).

The water users in the basin are primarily agricultural, making up approximately 70 percent of the total annual water consumption. However, there is now growing demand from commercial, institutional, and residential users (Patrick 2008). The pressure of agricultural and industrial demand, coupled with growing household needs, is placing strain on both surface and ground water sources in the basin. Similarly, a large proportion of the region's aquifers are highly vulnerable to surface contamination. Limited knowledge about the region's aquifers and their susceptibility to contamination exacerbates the issue (Neilson-Welch and Allen 2007).

The increasing population growth coupled with growing water scarcity prompted the lead basin water institution, the Okanagan Basin Water Board (OBWB), to develop the "Sustainable Water Strategy". Launched in October 2008, the plan includes methods to protect the area's water resources and secure the region's water supplies. This plan builds on more than forty years of water planning for the region; starting with the Municipalities Enabling and Validating Act of 1969, which created the OBWB. The original mandate of the OBWB was to coordinate the eradication of invasive weeds and provide grants to improve local water waste treatment. Since its inception the OBWB has expanded its mandate to tackle more holistic water security issues.

As a response to mounting ecological and social stresses, the Okanagan Basin is making great strides in achieving water security. Foremost among these strides are the partnerships between the OBWB, government agencies and universities which have produced useful studies such as the Water Supply and Demand Study and the Groundwater Assessment of the Okanagan Basin Program.

Other governance innovations include:

- The Smart Growth on the Ground Partnership in Oliver, British Columbia with a focus on groundwater and land use;[8]

- The Groundwater Bylaws Toolkit which brings together a number of tools for integrating land and water management;

- The development of an integrated information system - Okanagan Basin Information Network Water Balance model; and

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[7] The Basin spans the communities of Osoyoos to the south to Armstrong in the north.

[8] See, http://www.sgog.bc.ca/uplo/OliverSummaryMarch2007.pdf

- Assistance with groundwater mapping and vulnerability assessments by those at senior levels of government.

In sum, although the Okanagan Basin has not fully achieved water security in its region, it exhibits great strides in meeting its goals.
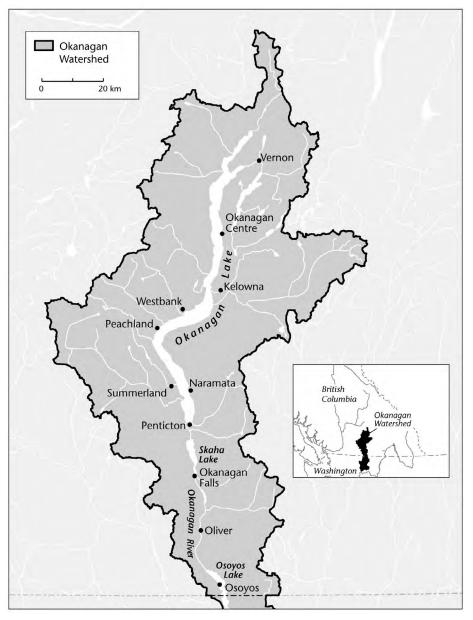

Figure 5: Okanagan Basin map

CASE 3: OAK RIDGES MORAINE, ONTARIO

Water security has become an important flash point in the ongoing debate about development in the environmentally sensitive, geological landform known as the Oak Ridges Moraine, which extends 160 kilometres from the Niagara Escarpment in the west to the Trent River in the east, north of Toronto (Figure 6). The moraine covers 190,000 hectares, contains the largest

concentration of headwater streams in the Greater Toronto Area, and is an important recharge area for groundwater.

The moraine is a regional groundwater recharge area and the source of drinking water for more than 250,000 people through municipal groundwater supplies and more than 135,000 private domestic wells. The moraine's water resources also support industrial uses, sand and gravel extraction, and processing which serves the Greater Toronto Area and a vibrant agricultural base (Bradford 2008; Holysh 2009).

Land and water management on the moraine is challenging given the 32 municipalities involved, as well as by the high concentration of privately-held land (upwards of 90 percent). The pressure to develop land on the moraine for housing and urban settlement is increasing as the Greater Toronto Area population grows and greenfield land is in short supply.

Although proposals to preserve the moraine have circulated for more than 60 years, the implementation of a comprehensive plan to protect groundwater and ecologically sensitive areas did not occur until 2001. In 1991, the Ontario Ministry of Natural Resources undertook a broad hydrogeological review of the Oak Ridges Moraine, which was followed by a five-year study by the Geological Survey of Canada. Despite these efforts, development continued on the moraine. A lengthy and controversial series of hearings at the Ontario Municipal Board in 2001 surrounding proposed new housing for an additional 100,000 people precipitated the development (and enforcement) of a conservation plan for the moraine.

An advisory panel made up of key stakeholders, as well as an inter-ministerial team of senior Ontario Government officials were established, both of which made a series of recommendations to the government. An extensive outreach process, involving a series of day-long stakeholder sessions and evening public meetings, strengthened the protection strategy. From this the Province developed and passed the Oak Ridges Moraine Conservation Act with all-party support on December 14, 2001. This was followed by the Oak Ridges Moraine Conservation Plan (ORMCP), which was released in April 2002.

The main objective of the ORMCP is to protect the ecological and hydrological integrity of the Oak Ridges Moraine Area. Although the ORMCP was created by the Provincial Government, it is administered by local and regional municipalities. At the same time as the ORMCP was released, the Province announced the creation of the Oak Ridges Moraine Foundation – a registered corporation with its own Charter. The Foundation operates primarily by funding others in five program areas including land conservation, land stewardship, education, research and support for the Oak Ridges Trail. It also offers leadership or coordination for moraine-wide activities by bringing people and interests together to identify common ground.

Despite great social and ecological challenges, the communities and government agencies are working together to achieve water security in the Oak Ridges Moraine.

Figure 6: Oak Ridges Moraine map

**WATER SECURITY GUIDANCE DOCUMENT
PART 3 SECTION 6
WORKING TOWARDS WATER SECURITY: FOSTERING GOOD
GOVERNANCE PRACTICES THROUGH ADAPTIVE GOVERNANCE**
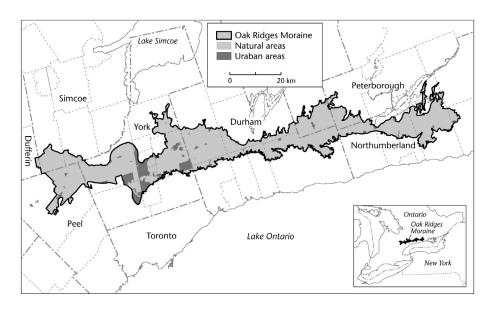
SUMMARY TABLE OF KEY GOVERNANCE PRINCIPLES FROM CASE STUDIES

Table 3: Examples of Governance Principles for water management from Case Studies

Source	Governance Principles
Yukon River Intertribal Watershed Council (2009)	• Understanding the watershed: Ongoing monitoring, measuring and researching • Education: Promoting environmental and traditional education for the Indigenous Peoples of the Watershed • Stewardship: Honouring the traditional heritage through good stewards of the Watershed and its tributaries • Enforcement: Developing and enforcing strong state, federal, territorial and provincial environmental standards • Organization: Providing greater organizational strength to the Indigenous Peoples of the Yukon River Watershed
Okanagan Basin Water Board (OBWB)	• Strong Partnerships between the OBWB and government agencies • Commitment to producing meaningful research reports and assessment programs • Smart Growth plan with a focus on groundwater and land use • Commitment to integrating land and water management • Development of an integrated information system
Oak Ridges Moraine Conservation Plan	• Establishment of advisory panel made up of key stakeholders and senior government officials • Extensive outreach process • Development of meaningful legislation (*Oak Ridges Moraine Conservation Act*) • Development of governance plan (*Oak Ridges Moraine Conservation Plan*) • Commitment to protect the ecological and hydrological integrity of the Moraine • Ongoing Governance: Creation of Foundation operating with five program areas including land conservation, land stewardship, education, research and support for the Oak Ridges Trail • Provides leadership or coordination for moraine-wide activities by bringing people and interests together to identify common ground