

# Understanding the Legal Complexities Involved in Integrated Water Resources Management

A white paper prepared for the Canadian Water Network research project:  
"An Integrated Risk Management Framework for Municipal Water Systems"

Serin Remedios, B.Sc Environmental Science and Economics  
JD Candidate, University of Toronto Faculty of Law  
Ontario, Canada  
2015

# Understanding the Legal Complexities Involved in Integrated Water Resources Management

A white paper prepared for the Canadian Water Network research project:  
"An Integrated Risk Management Framework for Municipal Water Systems"

Serin Remedios, B.Sc Environmental Science and Economics  
JD Candidate, University of Toronto Faculty of Law  
Ontario, Canada  
2015



## Prepared by:

Serin Remedios, B.Sc Environmental Science and Economics  
JD Candidate, University of Toronto Faculty of Law  
Ontario, Canada

Graphic Design by Richard Harvey - The School of Engineering at the University of Guelph

## Prepared for:

Canadian Water Network as part of deliverables for the research project "Development of Integrated Risk Management Framework for Municipal Water Systems (2015)."

## Research Team:

- Edward McBean, Professor and Canada Research Chair in Water Supply Security, The School of Engineering at the University of Guelph.
- Gail Krantzberg, Professor and Director of the Centre for Engineering and Public Policy, McMaster University.
- Rob Jamieson, Associate Professor and Canada Research Chair in Cold Regions Ecological Engineering, Dalhousie University.
- Andrew Green, Associate Professor, University of Toronto.

## Partners:

- City of Waterloo
- City of Kitchener
- Town of Oakville
- City of Mississauga
- Region of Peel
- Durham Region
- Town of Orangeville
- City of Surrey
- City of Calgary
- Town of Okotoks
- City of Fredericton
- Credit Valley Conservation Authority
- Alberta Low Impact Development Partnership
- Allstate Insurance
- Canadian Standards Association
- Institute for Catastrophic Loss Reduction
- Environment Canada
- Ontario Clean Water Agency
- Southern Ontario Water Consortium
- Clean Nova Scotia
- British Columbia Ministry of Transportation and Infrastructure
- WaterTAP
- Engineers Canada
- West Coast Environmental Law
- Watson and Associates
- AECOM
- Ecojustice
- Zizzo Allan Professional Corporation
- Royal Roads University
- City of North Vancouver
- University of British Columbia
- Carleton University

Part 1	INTRODUCTION	5
Part 2	OVERVIEW OF LEGAL COMPLEXITIES	6
2.1	The Legal Framework Involves Many Actors	
2.1.1	Federal	
2.1.2	Provincial	
2.1.3	Municipalities	
2.1.4	Conservation Authorities	
2.1.5	Non-Governmental Actors	
2.2	How Does This Magnitude of Actors Complicate Integration?	
2.3	Examples of Integration Attempts Between Actors	
Part 3	THE LEGISLATIVE FRAMEWORK IS COMPOSED OF NUMEROUS STATUES	11
3.1	How Does Having Numerous Statues Complicate Integration?	
Part 4	LAW'S DIFFICULTY WITH COMPLEX ENVIRONMENTAL PROBLEMS	13
4.1	How Do Complex Environmental Problems Complicate Integration?	
4.2	Potential Solutions for Integration	
Part 5	MANAGEMENT INSTRUMENTS	15
5.1	Growth Plans	
5.2	Subsidies	
5.3	Tradeable Permits	
5.4	How Does This Complicate Integration??	
5.5	Potential Solutions for Integration	
Part 6	CASE STUDY: ONTARIO FLOODPLAIN MANAGEMENT	18
Part 7	CONCLUSION	20
	REFERENCES	21

**M**anaging water in a way that balances social, economic, and environmental interests is an increasingly necessary and challenging endeavor. Climate change is expected to increase the risk of extreme weather events such as hail, thunderstorms, and flooding [1]. In the GTA, annual insurance disaster claims have increased 20 fold since the 1970's because of recent extreme weather events [2]. Municipalities struggle to provide water services that can handle population growth, climate change, aging infrastructure, and the increasingly limited ability of receiving waterways to absorb the impact of stormwater runoff and pollution. The need for integrated water management has been increasingly recognized.

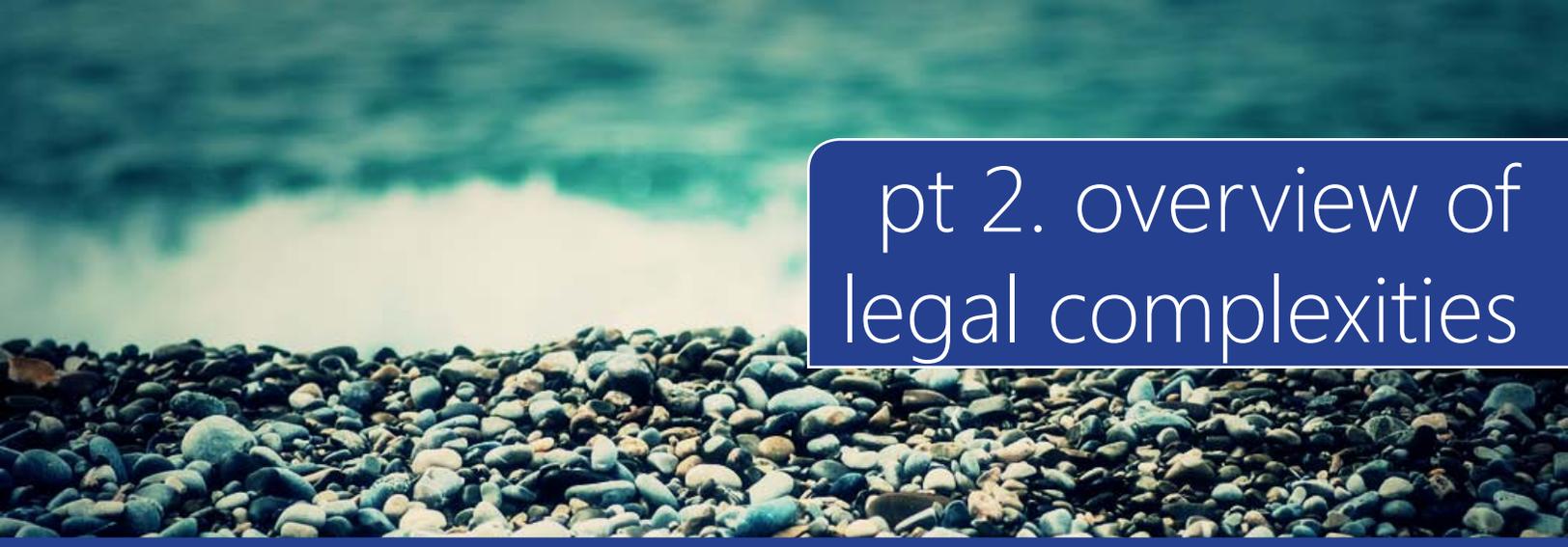
As a result, the Canadian Water Network has supported a project to develop a framework for integrated water management. The project involves Credit Valley Conservation, University of Guelph, McMaster University, Dalhousie University, and the University of Toronto Faculty of Law (the "project team"). With the guidance of Zizzo Allan DeMarco LLP, the University of Toronto law students provided legal research and memoranda to the project team to better understand the role and limits of the law in water management. The research focused on understanding the legal frameworks of wastewater, stormwater, drinking water, and floodplain management in British Columbia, Alberta, Ontario and Nova Scotia. A memorandum examined floodplain management in these provinces in greater depth:

---

---

A better understanding of the legal issues is necessary to recognize the obstacles and potential opportunities in the development of an integrated framework. Both legislation and common law play a critical role in integration. However, the complexity of the legal framework can obstruct integration and make it difficult for government players to understand the tools at their disposal and the extent of their obligations.

This paper will examine the legal complexities of integrating water management. Part 2 will provide an overview of legal complexities. Parts 3 - 5 examine these legal complexities and Part 6 provides a case study of floodplain management in Ontario.



## pt 2. overview of legal complexities

**T**here are four main legal complexities facing integration of water management: 1) a multitude of actors, 2) numerous statutes, 3) the law's difficulty with complex environmental problems, and 4) the use of management instruments such as taxes, subsidies, and cap and trade systems.

### 2.1 THE LEGAL FRAMEWORK INVOLVES MANY ACTORS

The multitude of different actors involved in water management is an obstacle to integration. First, the responsibility for water management is shared between multiple orders of government involved in water management including federal, provincial and territorial (“provincial”), municipal, and other public bodies like conservation authorities.

Under Canadian constitutional law, water is a shared jurisdiction, and therefore, each order of government has responsibility over different aspects of water management [3]. Second, within those orders of government, different government departments and agencies are responsible for aspects of management. By its nature, water management involves the intersection of numerous actors within a government because water is related to many facets of society. Third, many non-governmental actors are involved in water management.

#### 2.1.1 Federal

The federal government has jurisdiction over fisheries [4], navigation [5], federal lands [6], and international relations, which includes boundary waters shared by the United States [7]. The federal government is also responsible for establishing national standards and policies on environmental and health issues such as drinking water quality standards [8]. National leadership for water management is the role of the Minister of the Environment [9]. This includes cooperating and consulting with provincial governments and agencies with similar water resource management objectives [10].

Within the federal government alone, over 20 departments and agencies are responsible for aspects of water management [11]. The following are some key federal departments and their legal responsibilities in water management.

Within the federal government alone, over 20 departments and agencies are responsible for aspects of water management [11]. The following are some key federal departments and their legal responsibilities in water management.

**Table 1 - Federal Government Department's Water management Roles and Responsibilities**

Department	Roles and Responsibilities
Environment Canada	<ul style="list-style-type: none"> <li>Assigned the national leadership of water management [12].</li> <li>Researches water quality and quantity, watershed management and climate change [13].</li> <li>Operates water quality monitoring networks in partnership with the provincial Ministries of Environment [14].</li> </ul>
Fisheries and Oceans Canada	<ul style="list-style-type: none"> <li>Administers the Fisheries Act, which protects fish habitat [15].</li> </ul>
Aboriginal Affairs and Northern Development Canada	<ul style="list-style-type: none"> <li>With First Nations governments, establishes water and wastewater protocols to help ensure that on-reserve standards are comparable to off-reserve [16].</li> </ul>
Health Canada	<ul style="list-style-type: none"> <li>Establishes drinking water guidelines and standards [17].</li> </ul>
Agriculture and Agri-Foods Canada	<ul style="list-style-type: none"> <li>Researches and monitors agricultural activities' effects on water quality and watersheds [18].</li> </ul>
Transport Canada	<ul style="list-style-type: none"> <li>Controls transportation on watercourses and marine waters.</li> </ul>
Natural Resources Canada	<ul style="list-style-type: none"> <li>Administers research programs such as the Groundwater Geoscience Program [19].</li> </ul>

### 2.1.2 Provincial

Provincial governments' enumerated powers under the *Constitution Act* give provincial governments the primary responsibility over water management [20]. Provincial governments enumerated powers related to water resource management include public lands, municipal institutions, local works and undertakings, non-renewable resources, property and civil rights, and shared jurisdiction over agriculture [21].

Provincial governments create policies, legislation, and programs to facilitate water management [22]. Province's legislative powers include, but are not limited to [23]:

- flow regulation
- authorization of water use development
- water supply
- pollution control
- thermal and hydroelectric power development

Water management at the provincial government level also relies on numerous government departments and agencies. The following are some key Government of Ontario departments and their legal responsibilities in water management:

**Table 2 - Government of Ontario Departments' Water Management Roles & Responsibilities**

Department	Roles and Responsibilities
Ministry of Environment and Climate Change	<ul style="list-style-type: none"> <li>• Main body that regulates Ontario's water supply</li> <li>• Registers all municipal drinking water systems, licenses system owners and operators, and issues drinking water works permits</li> <li>• Grants approvals for permits and licenses wastewater and stormwater management systems</li> </ul>
Ministry of Natural Resources	<ul style="list-style-type: none"> <li>• Provides leadership and directions for natural hazards including stormwater</li> </ul>
Ministry of Municipal Affairs and Housing	<ul style="list-style-type: none"> <li>• Regulates municipal planning including floodplain zoning</li> <li>• Administers Ontario's Building Code which regulates rainwater collection systems and puts in place other measures to protect water quality [25].</li> </ul>
Ministry of Health and Long Term Care	<ul style="list-style-type: none"> <li>• Has oversight over small drinking water systems [26].</li> </ul>
Ministry of Agriculture, Food, and Rural Affairs	<ul style="list-style-type: none"> <li>• Responsible for regulating potential impacts of farming activities on water quality [27].</li> </ul>
Ontario Clean Water Agency	<ul style="list-style-type: none"> <li>• Provides operation, maintenance and management for wastewater facilities, including stormwater, manages private sector and municipal corporations [28].</li> </ul>
Environmental Review Tribunal	<ul style="list-style-type: none"> <li>• An independent and impartial tribunal established by the province</li> <li>• Holds public hearings on appeals arising from decisions regarding the issuance/revocation of an order, approval, license or permit under the Clean Water Act, the Environmental Protection Act, the Ontario Water Resources Act, the Environmental Assessment Act, and the Safe Drinking Water Act [29].</li> </ul>

### 2.1.3 Municipalities

Municipalities are generally responsible for local administration and operation of water management services. Municipalities are given their power through provincial legislation, such as the Municipal Act in Ontario, which specifies municipalities' responsibilities [20].

Municipal governments may create by-laws and protocols to regulate water services within their jurisdictions [31]. Municipalities are also involved in land-use and water systems planning and must cooperate with other municipalities and the province in these endeavours [32].

## 2.1.4 Conservation Authorities

In Ontario, conservation authorities are another public body with water management responsibilities. Conservation authorities' jurisdictions are divided by watersheds.

The *Conservation Authorities Act* grants conservation authorities broad powers including the ability to make regulations restricting and regulating the use of water in or from water bodies within their jurisdiction subject to the approval of the provincial Minister [34].

## 2.1.5 Non-Governmental Actors

Water resource management also involves numerous non-governmental actors.

- Professional Associations  
Professional associations involve groups such as engineers, geo-scientists, planners, waste-water professionals and many more. Such associations can administer professional certificate programs, facilitating knowledge sharing amongst professionals, advise on policy matters and provide technical support [35]. Industry organizations can also play a key role in advocacy and public education [36].
- Industry  
Industry members including those from agriculture, oil and gas, manufacturing, and forestry to name a few are key stakeholders in water resource management. These industry stakeholders often rely on water as a business input and their activities can impact water quality [37].
- Environmental and Watershed Conservation Organizations:  
Environmental non-governmental organizations and watershed conservation groups advocate for the protection of water resources, the environment, and public health. These organizations play a vital role in community outreach, advocacy, environmental monitoring, and restoration.
- Academic Institutions:  
Academic institutions play a key role in water management through conducting research on water quality, watershed function, climate change, law and policy, and other related topics.

## 2.2 HOW DOES THIS MULTITUDE OF ACTORS COMPLICATE INTEGRATION OF WATER MANAGEMENT?

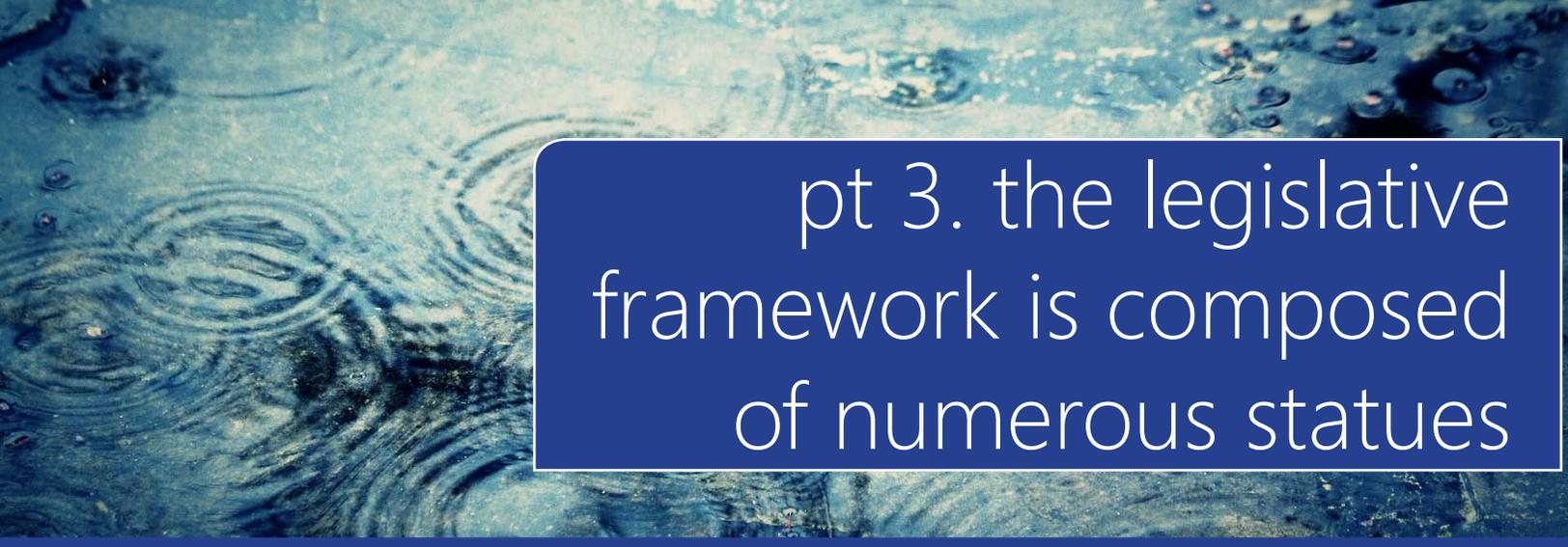
Numerous organizations, regulators, and researchers involved in water policy have recognized the need for increased coordination and focus in Canadian water management [38], but the number of different actors involved in water management often makes it difficult to facilitate coordination and integration. The division of powers amongst orders of government can result in a lack of support for provinces, municipalities or conservation authorities. For example, smaller provinces or municipalities often do not have the capacity to fund these studies due to lack of resources and expertise [39]. Further, the existence of various departments encourages specialization often resulting in silos or departments acting in isolation [40]. This isolation presents difficulties when actors are faced with complex, interrelated problems [41].

## 2.3 EXAMPLES OF INTEGRATION ATTEMPTS BETWEEN ACTORS

A number of initiatives have tried to address the integration problems created by the number of actors involved in water management. The federal government has introduced several attempts at coordinating policies and actions across government departments and agencies. Some notable examples include the following:

- The *Federal Water Policy* in 1987 was created to address the management of water resources. The policy spoke specifically to the need for a supportive federal government that enabled the different federal agencies and departments, other orders of government, and industry to fulfill their responsibilities [42]. However, the policy was never implemented and is of limited relevance today [43].
- The Canadian Council of Ministers of the Environment is an intergovernmental forum comprised of environmental ministers from federal, provincial, and territorial governments [44]. The Council develops national strategies, norms, and guidelines for water supply and sanitation [45].

Provincial governments have made similar attempts at integration. For example, Alberta's *Water For Life* strategy involves a multi-stakeholder partnership of government, industry and non-government organizations [46]. The strategy is one of the main vehicles for coordinating water management in Alberta, and acts as a roadmap for government and its partners for actions related to water quality and quantity and environmental concerns [47].



## pt 3. the legislative framework is composed of numerous statutes

**A**nother barrier to integration is that the legal framework for water management relies on numerous statutes. Statutes are the written laws passed by Parliament federally or provincial legislatures. In relation to water resource management, statutes are used to outline the specific rules and standards that must be followed [48]. For example, statutes may establish effluent pollutant levels or a licensing scheme for wastewater systems. Ontario has several acts related to water management, many of which interact and overlap. Table 3 (shown on the following page) includes some examples of key water management related legislation in Ontario.

### 3.1 HOW DOES HAVING NUMEROUS STATUTES COMPLICATE THE INTEGRATION OF WATER MANAGEMENT?

As demonstrated by the non-comprehensive list of 12 statutes shown on the following page, the existence of numerous acts and regulations relating to water management can make the legal framework complex and cumbersome. The legislation is often unclear about how statutes relate to others.

It is a huge administrative and operational challenge for those responsible for water management to be familiar with all the related legislation and regulation [49]. For example, in a commissioned paper for the Walkerton Inquiry, it was found that the complex framework of legislation compromised the province's ability to provide comprehensive drinking water services [50]. Further, the multiple sources of legislation can lead to regulatory fragmentation of water management [51].

Regulatory fragmentation can prevent the implementation of more expansive protections that would better protect ecosystems, watersheds, water resources, and human health [52].

**Table 3 - Ontario Statutes Related to Water Resource Management**

**Acts Focusing Specifically on Water Management**

Safe Water Drinking Act, 2002, SO 2002, c 32	<ul style="list-style-type: none"><li>• Sets drinking water standards and requires all municipal drinking water systems to obtain an approval from the Ministry of Environment</li><li>• Imposes a statutory standard of care upon managers of municipal drinking water systems.</li></ul>
Clean Water Act, 2006, SO 2006, c 22	<ul style="list-style-type: none"><li>• Aims to protect sources of drinking water in Ontario</li></ul>
Ontario Water Resources Act, RSO 1990, c O.40 ("OWRA")	<ul style="list-style-type: none"><li>• The most significant law governing water quality and quantity in Ontario.</li><li>• Regulates the discharge of potentially deleterious materials into groundwater and surface water</li></ul>
Municipal Water and Sewage Transfer Act, 1997, SO 1997, c 6	<ul style="list-style-type: none"><li>• Transferred the ownership of 230 provincially owned water and wastewater plans to municipalities</li></ul>
Sustainable Water and Sewage Systems Act, 2002, SO 2002, c 29	<ul style="list-style-type: none"><li>• Requires municipalities to implement full cost accounting and full cost recovery to promote water conservation and awareness</li></ul>
Lakes and Rivers Improvement Act, RSO 1990, c L.3	<ul style="list-style-type: none"><li>• Regulates the public and private use of Ontario's lakes and rivers</li></ul>
Conservation Authorities Act, RSO 1990, c.27	<ul style="list-style-type: none"><li>• Empowers conservation authorities to implement programs to further the conservation and protection of watersheds and water resources</li></ul>

**Acts Relating More Generally to the Protection of the Environment**

Environmental Protection Act, RSO 1990, c E.19	<ul style="list-style-type: none"><li>• The principal pollution control statute in Ontario and can be used interchangeably with the Ontario Water Resources Act to address sources of water pollution</li></ul>
Environmental Assessment Act, RSO 1990, c E.18	<ul style="list-style-type: none"><li>• Ontario's primary environmental planning statute</li><li>• Generally, public sector undertakings are required to identify and evaluate the ecological, social, cultural and economic impacts of a project</li></ul>

**Acts Indirectly Affecting Water Resource Management by Regulating Related Activities**

Municipal Act, SO 2001, c 25	<ul style="list-style-type: none"><li>• Enables municipalities to finance their water systems through the use of debentures and reserves</li></ul>
Planning Act, RSO 1990, c P.13	<ul style="list-style-type: none"><li>• Sets out rules for land use planning and includes in its scope conservation and efficient use of water; ecological protection; provision of sewage and waste water management systems</li></ul>
Health Protection and Promotion Act, RSO 1990, c H.7	<ul style="list-style-type: none"><li>• Organizes public health programs and aims to prevent the spread of disease</li></ul>



## pt 4. law's difficulty with complex environmental problems

**A**nother factor complicating the integration of water management is the struggle regulators face in creating legislation that adequately addresses the complex nature of environmental problems. The following three problems pose particular difficulties to regulators: scientific uncertainty, the transboundary nature of issues, and non-point source pollution.

### **Scientific Uncertainty**

Regulators are faced with scientific uncertainty and complexity when establishing standards. For instance, processes such as bioconcentration, bioaccumulation, biomagnification, and additive and synergistic effects can make it difficult to predict how water borne pollutants will affect human health and the environment. Scientific uncertainty can make it difficult for regulators to create efficient and environmental regulation [54].

### **Transboundary Nature**

Additionally, the complexity of environmental problems is exacerbated by their transboundary nature. While water crosses borders, legislation generally applies to a specific jurisdiction. This misalignment has the potential to aggravate disputes over the use and protection of water resources between political jurisdictions and undermine the effectiveness of one jurisdiction's water management legislation [55].

### **Non-Point Source Pollution**

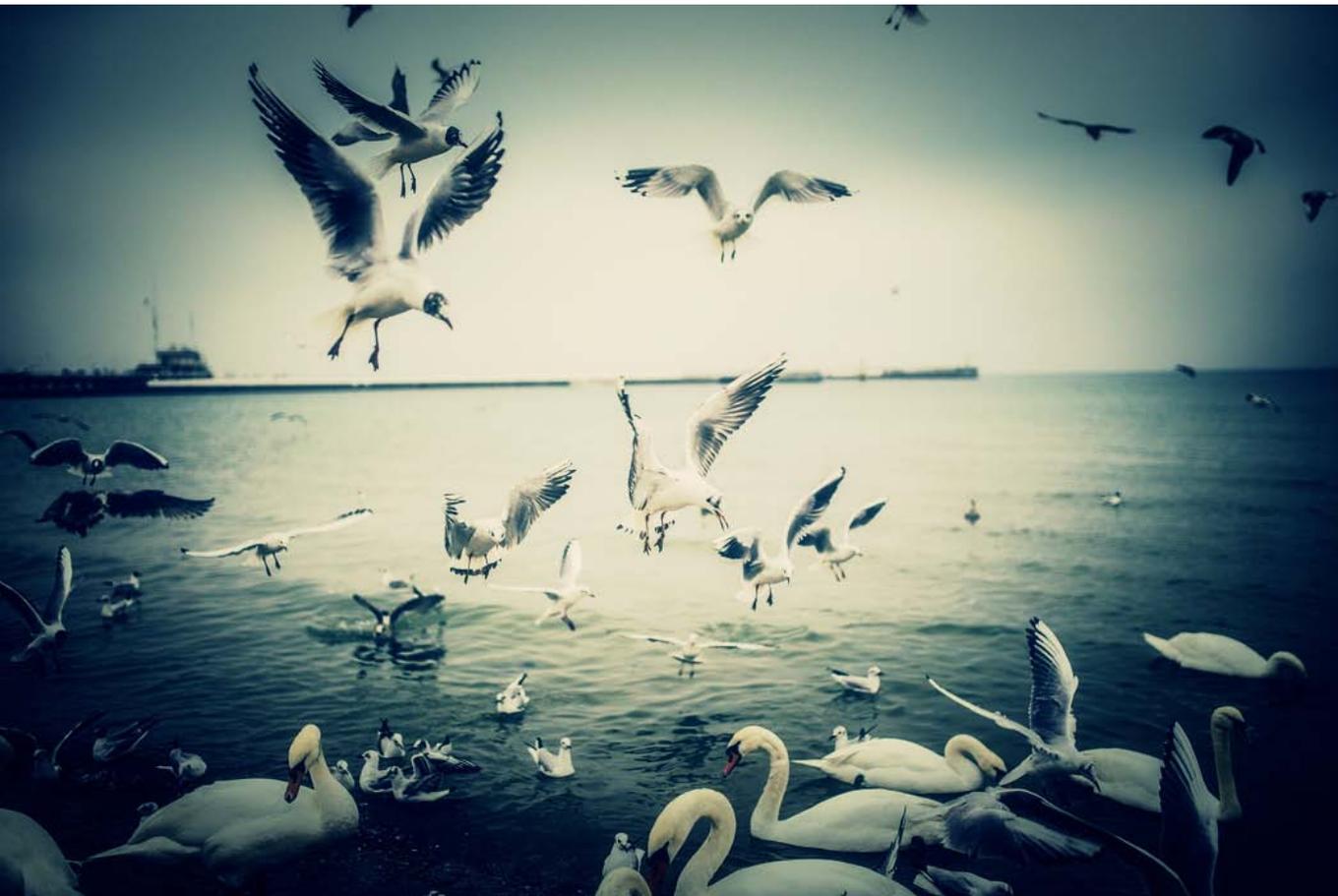
As well, regulators have difficulty capturing non-point source pollution in legislation. Non-point source pollution, such as runoff from municipalities and farms, comes from diffuse effluent sources. This can make it difficult and expensive to implement effective control mechanisms [56]. Additionally, local governments are often responsible for implementing regulations addressing non-point sources pollution, but coordination and incentivization amongst local governments can be difficult [57].

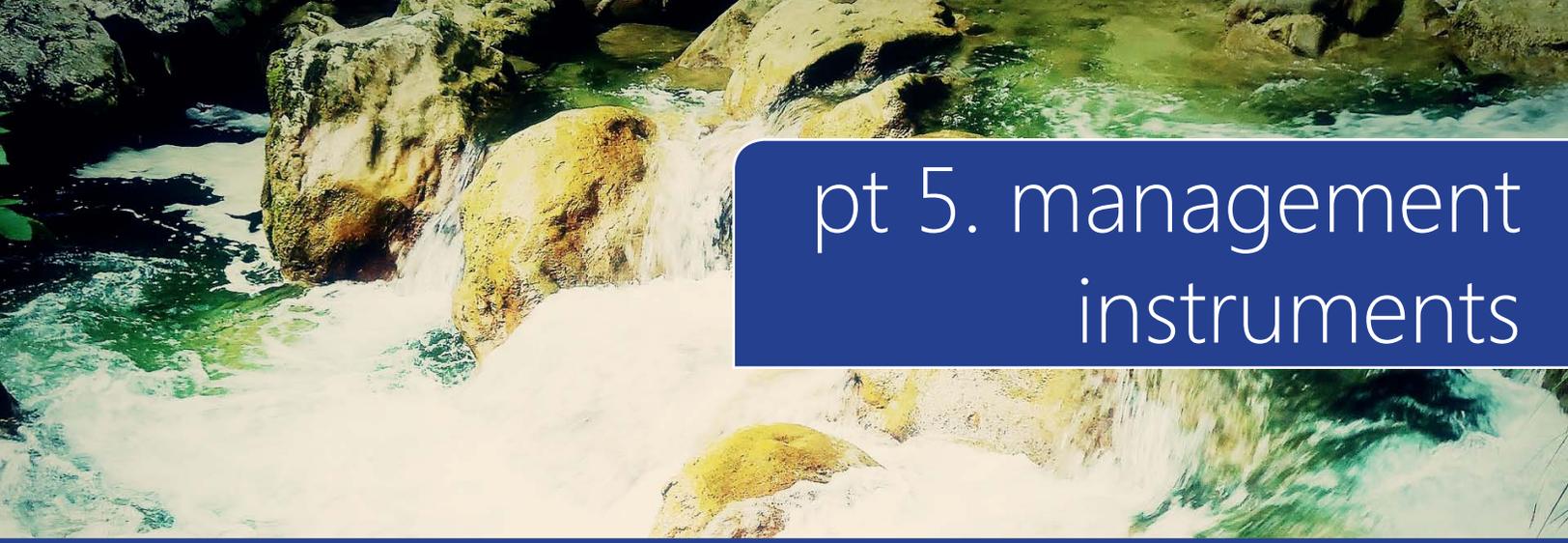
## 4.1 HOW DO COMPLEX ENVIRONMENTAL PROBLEMS COMPLICATE INTEGRATION OF WATER MANAGEMENT?

Law's difficulty with complex environmental problems can be a significant barrier to integration by pressuring governments to adopt many actors and many statutes. As discussed above, complex environmental problems make it difficult for regulators to create comprehensive, effective regulation. As a result, regulators may be forced to create multiple statutes and involve multiple actors to try and effectively address these issues. The problems resulting from multiple statutes and actors further prohibit integration. As well, a sectoral approach that manages resources such as water, vegetation, fauna, and minerals in isolation may lead to resource deterioration [58].

## 4.2 POTENTIAL SOLUTIONS FOR INTEGRATION

Systems using integrated water management have attempted to overcome the problems posed by complex environmental problems through the use of an ecosystems or watershed based approach. Chapter 8 of Agenda 21 from the 1992 Earth Summit in Rio de Janeiro stated that integrated water resource management should be carried out at the level of watersheds to ensure better understanding of the relationships within the ecosystem [59]. In Ontario, the division of conservation authorities' jurisdictions into watersheds supports this approach.





# pt 5. management instruments

**I**n addition to legislation, the use of regulatory and economic instruments may pose barriers to integrating water management. Regulatory and economic instruments include tools such as growth plans, taxes, subsidies, and tradeable permits that can be useful for water management [60]. Ontario uses a number of such instruments in relation to water management.

## 5.1 GROWTH PLANS

Growth management plans are tools used by the government to shape and guide development and growth in a particular region. They enable governments to strategically plan how and where growth should occur. Through planning, the government can decide how a community will take shape, for instance, where homes should be built, where parks should be located, or where sewers should be provided [61]. Ideally, this accommodates future population growth, sustains a robust economy, promotes strong communities, and allows for better protection of the environment and natural resources [62].

An example of a growth plan is the *Growth Plan for the Greater Golden Horseshoe, 2006*, which is a provincial initiative to plan growth in the Toronto region [63]. It was established under the *Places to Grow Act, 2005* [64]. The Growth Plan integrates water management in land-use decision-making. In the Growth Plan's guiding principles, water quality is explicitly recognized as a central issue in growth planning [65]. The Growth Plan also provides specific goals for wastewater and sewer planning such as watershed plans prepared cooperatively by municipalities and conservation authorities [66]. Additionally, the Growth Plan requires municipalities to develop official plans that support water conservation [67].

## 5.2 SUBSIDIES

Subsidies are payments used to incentivize certain behaviours to reduce harm to water resources. The Region of Waterloo has used two subsidization programs. The first, the “Rural Water Quality Program” targets rural water quality. It was developed in 1998 as part of the Region of Waterloo’s “Water Resource Protection Strategy” [68]. Administered by the Grand River Conservation Authority, the program provides financial assistance to rural landowners to implement best management practices. In 2008, the program had already provided over \$3 million in incentives [69]. Under the program, rural landowners have implemented more than 2,190 projects across the watershed [70]. Projects involve measures such as fencing off streams to keep livestock away and retiring fragile land from agricultural production [71].

The “Business Water Quality Program” was another subsidization program in the Region of Waterloo that ran from 2001 to 2005. It was aimed at mitigating the impacts of businesses handling hazardous chemicals. The program provided financial incentives to businesses to prevent harmful spills to surface water, groundwater, and sewers. However, the program faced problems with lower than expected participation and the high administration to grant ratio [72]. A possible explanation for the lower than expected participation rate is that the subsidy was too low to incentivize businesses to change their behavior. The low participation rate forced the program to end prematurely.

## 5.3 TRADEABLE PERMITS

In a tradeable permit system, also known as cap and trade, the government sets a cap on the total maximum level of pollution allowed. Permits equaling one unit of pollution are then divided and distributed to individual polluters. The total number of permits equals the cap on pollution set by the government. Permits can either be given away or can be auctioned off. The revenue from the auction can be reinvested into sustainability initiatives or be used to stimulate the economy in other ways.

South Nation Conservation Authority (SNC) in Eastern Ontario implemented a water quality trading program called Total Phosphorus Management (TPM) in 2000. Phosphorus loading had been a significant problem in the South Nation Conservation watershed. Annual mean phosphorus levels in South Nation River often exceeded provincial water quality objectives by 3-5% [73]. Phosphorus was released into the watershed from a variety of sources. Wastewater lagoons discharged their effluent at peak flows. However, over 90% of the pollution came from non-point sources [74]. Non-point source pollution is often more difficult to regulate than point source pollution because it comes from diffuse sources such as agricultural runoff.

In response to this problem, the Ministry of Environment piloted the TPM. The program allows new wastewater operators to discharge effluent from their lagoons and release phosphorus into the watershed. However, they must compensate by controlling phosphorus emissions from non-point sources. Wastewater operators pay SNC a specified amount of money for permits to release phosphorus. SNC then uses this money to fund projects by the Clean Water Program, which helps landowners apply best management practices.

The project has been remarkably successful and highly acclaimed. From 2000-2007, the Clean Water Program implemented 212 phosphorus-reducing projects with funding help from the TPM. From 2000 to 2009, it was estimated that phosphorus emissions were reduced by a total of 11, 843 kg [75]. This far exceeded the reductions required to meet the TPM agreements [76]. Other environmental benefits observed were reduction of other pollutants such as nitrogen, sediment and bacteria and an improvement in well water quality [77]. Additionally, the project has been a cost effective way to help dischargers meet provincial standards of phosphorus release and to fund the Clean Water program [78]. There have also been less tangible, but important social benefits. The project was developed through thorough stakeholder consultations, and the program itself has created strong bonds between the distributors, landowners, and other stakeholders involved [79].

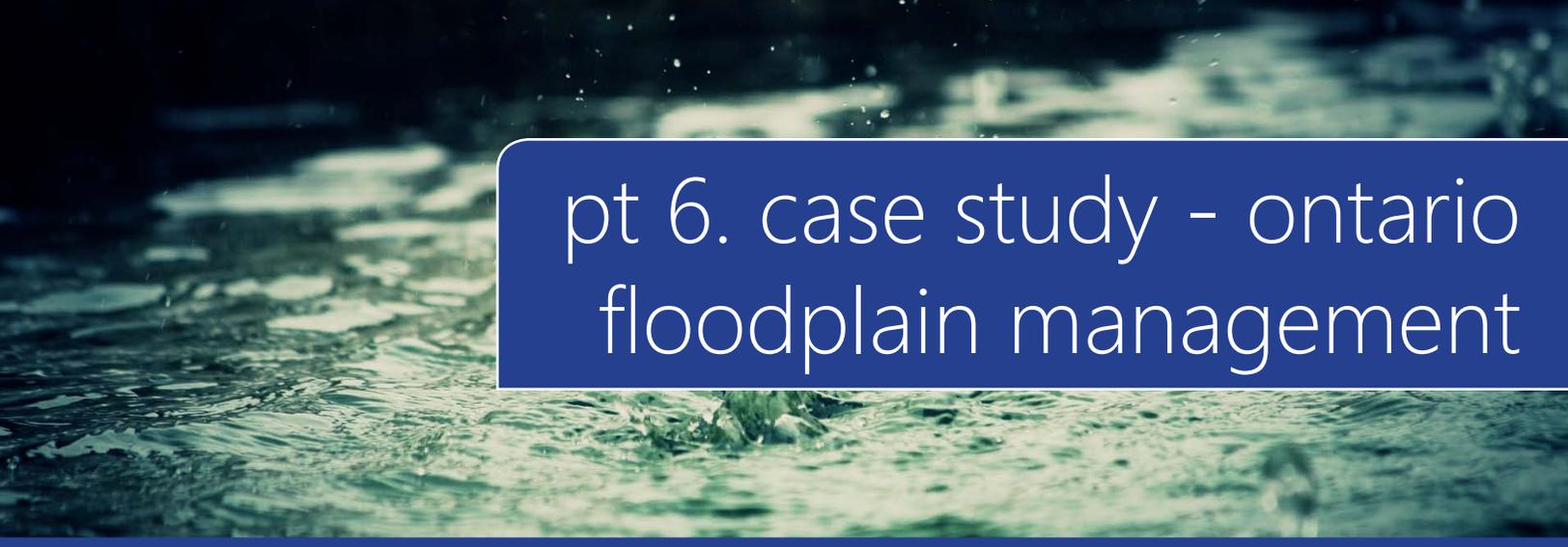
#### 5.4 HOW DOES THIS COMPLICATE INTEGRATION OF WATER MANAGEMENT?

While these instruments can be useful in water resource management, decision makers must exercise caution because these instruments can have effects that can inhibit integration. For example, while taxes may be an effective method of curbing water pollution, taxes are also politically unpopular [80]. Disagreement between orders of government over the use of such instruments can create friction making an instrument less effective and ultimately decreasing coordination and integration [81]. Another example is that subsidies can signal that the care for the water resources can be monetized rather than being a responsibility [82]. This can change environmental values making it difficult to address water resource problems in the future [83].

#### 5.5 POTENTIAL SOLUTIONS FOR INTEGRATION

To avoid these barriers to integration, decision-makers can often adapt the instruments to better support the integration of water management. Decision-makers should carefully analyze local needs, consult with stakeholders, and conduct research to adapt these instruments to support their needs and better integration. The watershed approach used by conservation authorities supports this emphasis on local ideas, flexibility, and demand management [84].





# pt 6. case study - ontario floodplain management

## **Floodplain Management in Ontario Involves Many Actors**

The federal government provides assistance and leadership in floodplain management across Canada. In the past, the federal government administered the Flood Reduction Program, which was a joint federal-provincial effort to discourage development in flood-vulnerable areas [85]. This program is now defunct, but it was foundational in mapping floodplains in communities across Canada, including Ontario [86]. Today, the federal government provides funding for provincial floodplain mapping efforts through the Regional Adaptation Collaboratives Climate Change Program, a three year \$30 million program [87]. The program helps communities prepare for the effects of climate change including flooding. However, concerns have been raised about the capacity and commitment of provinces and their municipalities to keep floodplain maps up to date [88]. Presently, the bulk of the financial burden for floodplain mapping falls on municipal governments since conservation authorities are funded mainly by their member municipalities [89]. Inadequate federal assistance challenges the ability of municipalities to fund conservation authorities and floodplain mapping studies [90].

The Government of Ontario and its various ministries is responsible for making regulations and administering legislation in relation to floodplain management. The Ministry of Natural Resources (MNR) prescribes the standard of protection for flood events to define the perimeters of the floodplain and designates flood zones. The MNR is also able to make regulations governing construction and cooperation of dams. The Ministry of Municipal Affairs and Housing (MMAH) makes regulations governing standards for the construction and demolition of buildings and sets rules for land use planning in Ontario, including the regulation and prohibition of development in flood prone areas. It also administers the *Municipal Act*, which empowers municipal governments to manage floodplains. Emergency Management Ontario coordinates disaster management to events like floods across the province.

Municipalities are responsible for the creation of bylaws relating to flood management and for land use decisions. Municipalities are enabled by the *Municipal Act* to enact bylaws regulating drainage and flood control. The Act also allows municipalities to make decisions about municipal planning and services. Municipalities also cooperate with the MNR to regulate and restrict development in flood prone areas.

Conservation authorities are the main actors in floodplain identification and mapping in Ontario. They are also responsible for flood mitigation efforts within their jurisdiction. Under the *Conservation Authorities Act*, conservation authorities can control the flow of surface waters, prevent flooding, and regulate development adjacent to certain lakes. They are also able to expropriate land (including flood prone areas) to construct dams and regulate the use of water.

## **Floodplain Management in Ontario Relies on Several Statutes**

The number of statutes regulating floodplain management in Ontario also presents problems to integration. In relation to flood prevention, the *Conservation Authorities Act* gives conservation authorities the power to control the flow of surface waters, prevent flooding and regulate development and activities adjacent to certain lakes [91]. The *Lakes and Rivers Improvement Act* empowers the Minister of Natural Resources to make regulations governing the design, construction, operation, and maintenance of dams [92].

The Ministry of Municipal Affairs and Housing Act, Building Code Act, and *Planning Act* are key statutes in flood damage mitigation. The acts relate to the provincial governments ability to regulate land use planning in Ontario. The *Planning Act* requires that development must be directed away from natural hazards such as flood prone land if there is unacceptable risk to public safety [93].

*OWRA* regulates municipal sewage works, which includes stormwater. The design of municipal stormwater management systems will affect drainage of stormwater. If the drainage cannot accommodate stormwater, flooding will often result. *OWRA* requires that municipalities operating sewage works maintain and monitor the stormwater management system and obtain provincial approval [94]. The *EPA* establishes that the provincial government has oversight of sewage works.

## **The Complex Nature of Flood Events Presents Difficulties to Integration**

Recently, regulators have begun to recognize the need to incorporate climate change data into floodplain mapping. Currently, Ontario has four “flood event standards” that are used to define the parameters of the floodplain: (1) Hurricane Hazel, (2) Timmons storm, (3) the 100 year flood, and (4) the historic flood [95]. Municipalities use floodplain maps designed from these standards to regulate development and land use in flood-prone areas. However, these standards do not appear to incorporate climate change data. This can result in outdated, inaccurate floodplain mapping. In British Columbia, a study conducted to update the flood profile of the Fraser Basin found that in some places, the new profile was a meter higher than the original design profile [96].

Incorporation of climate change data requires ongoing environmental monitoring to ensure floodplain mapping is accurate. Additionally, climate change data is necessary to predict and plan for future flood events.

**T**he complexity of the Canadian legal system presents several challenges to integration of water resource management. The number of actors involved in water management often makes it difficult to facilitate coordination and supports isolation. The existence of multiple sources of legislation related to water resource management can be difficult to manage administratively, and can also lead to regulatory fragmentation of water management. The complexity of environmental problems makes it difficult for regulators to create comprehensive, effective regulation, which creates the need for more actors and more legislation. The use of management instruments in water resource management may have unintended effects that hamper integration.

Potential solutions to these challenges should focus on the coordination of these seemingly disparate elements and coordinate water management across political and physical boundaries. Multi-stakeholder partnerships between different orders of government, organizations, and stakeholders are useful for engaging different actors and interests. This coordination can help address some of the complexities with transboundary water issues and reduce conflict over which the use of water management industries. Additionally, an ecosystem or watershed approach to water resource management can also help to address regulatory fragmentation and support local needs. In Ontario, conservation authorities, whose jurisdictions are divided by watersheds, are able to play a key role in that integration.

1. Blanca E Jiménez & Taikan Oki, *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2014) at 28-29, online: Intergovernmental Panel on Climate Change <[http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap3\\_FGDall.pdf](http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap3_FGDall.pdf)>.
2. Laura Zizzo, Travis Allan, & Alexandra Kocherga, "Stormwater Management in Ontario: Legal Issues in a Changing Climate", online: Credit Valley Conservation < [http://www.creditvalleyca.ca/wp-content/uploads/2014/05/Stormwater-Management-in-Ontario\\_Legal-Issues-in-a-Changing-Climate\\_2014.04.29.pdf](http://www.creditvalleyca.ca/wp-content/uploads/2014/05/Stormwater-Management-in-Ontario_Legal-Issues-in-a-Changing-Climate_2014.04.29.pdf)>.
3. Constitution Act, 1867 (UK), 30 & 31 Vict, c 3, s 91-92, reprinted in RSC 1985, Appendix II, No 5, [Constitution Act].
4. Fisheries Act, RSC 1985, c F-14.
5. Navigation Protection Act, RSC 1985, c N-22.
6. Canadian Environmental Protection Act, SC 1999, c 33, s 3(1).
7. International Boundary Waters Treaty Act, RSC 1985, c I-17.
8. Environment Canada, "Federal Policy and Legislation", online: Government of Canada <<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E05A7F81-1>> [Federal Policy]; Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment, "Guidelines for Canadian Drinking Water Quality Summary Table", October 2014 [Guidelines].
9. Department of the Environment Act, RSC 1985, c E-10 [Department Act].
10. *Ibid* at s 5 (b); Canada Water Act, RSC 1985, c C-11, s 4.
11. Federal Policy, *supra* note 8.
12. Department Act, *supra* note 10.
13. Canada Water Act, *supra* note 12..
14. *Ibid*.
15. Fisheries Act, *supra* note 4.
16. Aboriginal Affairs and Northern Development Canada, "Water", online: Government of Canada <<http://www.aadnc-aandc.gc.ca/eng/1100100034879/1100100034883>>.
17. Guidelines, *supra* note 9.
18. Canada Water Act, *supra* note 12.
19. Natural Resources Canada, "Groundwater Geoscience Program", online: Government of Canada <<http://www.nrcan.gc.ca/earth-sciences/resources/federal-programs/groundwater-geoscience-program/10909>>.
20. Constitution Act, *supra* note 3 at s 92.
21. *Ibid*, at s 92, 92(A), 95.
22. Rob de Loë, *Toward a Canadian National Water Strategy: Final Report*, (Guelph, ON: Canadian Water Resources Association, 2008) at 7 [de Loë, Strategy].
23. Environment Canada, "Provincial/Territorial", online: Government of Canada <<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=24C5BD18-1>>.
24. Safe Drinking Water Act, 2002, SO 2002, c 32.
25. Ontario's 2012 Building Code, O Reg 332/12.

26. Health Protection and Promotion Act, RSO 1990, c H.7.
27. Nutrient Management Act, 2002 SO 2002, c 4.
28. Ontario Water Resources Act, RSO 1990, C O.40, s 63-73.
29. Environmental Review Tribunal, "About the ERT" online: Environmental Review Tribunal <<http://www.ert.gov.on.ca/english/about/index.htm>>.
30. Municipal Act, 2001, SO 2001, c 25, s 2.
31. See e.g. *ibid* at s 10.
32. See e.g. Planning Act, RSO 1990, c P13.
33. Conservation Ontario Natural Champions, "Conservation Authorities of Ontario Mandate," online: Conservation Ontario Natural Champions <<http://www.conservation-ontario.on.ca/about-us/conservation-authorities>>.
34. Conservation Authorities Act, RSO 1990, c 27, s 28(1)(a) [CA Act].
35. BCWWA, "About BC Waste & Wastewater Association", online: BCWWA < <http://www.bcwwa.org/about-2/about-bcwwa.html>>.
36. *Ibid*.
37. Fraser Basin Council, "4.5 Other Organizations" online: Rethinking Water <[http://www.rethinkingwater.ca/other\\_organizations.html](http://www.rethinkingwater.ca/other_organizations.html)>.
38. de Loë, Strategy, *supra* note 24 at 3.
39. de Loë, Rob, "Floodplain management in Canada: overview and prospects" (2000) 44:4 *Canadian Geographer* at 364-365 [de Loë, Floodplain].
40. Morris, Tim, "The Future of Freshwater in Canada: Mobilizing Collective Resources for Healthy Watersheds", (2014) online: Canadian Environmental Grantmaker's Network <<http://www.cegn.org/wp-content/uploads/2014/05/waterfunders-low.pdf>>.
41. *Ibid*
42. Federal Policy, *supra* note 8.
43. de Loë, Strategy, *supra* note 24.
44. Canadian Council of the Ministers of the Environment, "About", online: Canadian Council of the Ministers of the Environment <<http://www.ccme.ca/en/about/index.html>>.
45. *Ibid*.
46. Alberta Water Council, "About Us", online: Alberta Water Council <<http://www.albertawatercouncil.ca/AboutUs/tabid/54/Default.aspx>>.
47. *Ibid*.
48. Peter J May, "Regulatory Regimes and Accountability," (2007) 1 *Regulation and Governance* at 8-26.
49. James Merrit & Christopher Gore, "The Walkerton Inquiry: Commissioned Paper 5—Drinking Water Services: A Functional Review of the Ontario Ministry of Environment", (Toronto: Ontario Ministry of the Attorney General, 2002) at 32.
50. *Ibid*.
51. Robin Kundis Craig "Climate Change, Regulatory Fragmentation, and Water Triage", (2008) 79(3) *University of Colorado Law Review* at 825-928.
52. *Ibid*.
53. C H Walker, *Organic Pollutants: An Ecotoxicological Perspective*, 2nd Ed (New York: Taylor & Francis, Inc, 2008).
54. Jorge E Vinueles, "Legal techniques for dealing with scientific uncertainty in environmental law" (2010) 43(2) *Vanderbilt Journal of Transnational Law* at 437.
55. Gabriel Eckstein & Amy Hardberger, "State Practice in the Management and Allocation of Transboundary Groundwater Resources in North America" (2008) 18 *Yearbook of International Environmental Law* 2007 at 96.
56. Daniel R Mandelker, "Controlling nonpoint source water pollution: Can it be done?" (1989) *Chicago-Kent Law Review* 65 at 479-502.
57. *Ibid*
58. B P Hooper & J A Duggin, "Ecological riverine floodplain zoning: its application to rural floodplain management in the Murray-Darling Basin" (1996) *Land Use Policy* 13:2 87 at 91.
59. Agenda 21, UN Conference on Environment and Development, 14 June 1992, UN Doc. A/CONF. 151/26/Rev.1.
60. Global Water Partnership, "IWRM Pillars" (25 March 2010), online: Global Water Partnership < <http://www.gwp.org/en/The-Challenge/What-is-IWRM/IWRM-pillars/>>.
61. Ministry of Municipal Affairs and Housing, "Citizen's Guide to Land-use Planning" (2008), online: Government of Ontario <<http://www.mah.gov.on.ca/Page338.aspx>>.
62. Places to Grow Act, 2005, SO 2005, c 13, preamble.

63. Ministry of Public Infrastructure Renewal, A Guide to the Growth Plan for the Greater Golden Horseshoe, (2006) [GGH Guide] online: Places to Grow <<https://www.placestogrow.ca/images/pdfs/FINAL-GUIDE-ENG.pdf>>.
64. O Reg 416/05.
65. Ibid at s 1.2.2.
66. Ibid at 3.2.5.
67. Ibid, at 4.2.4.
68. Region of Waterloo, "Water Resources Master Protection Plan," (January 2008) at 3 [Waterloo], online: Region of Waterloo <<http://www.regionofwaterloo.ca/en/aboutTheEnvironment/resources/WRPMP.pdf>>.
69. Ibid.
70. Grand River Conservation Authority, "Program Accomplishments" (2014), online: Grand River Conservation Authority <<http://www.grandriver.ca/index/document.cfm?Sec=25&Sub1=108>>.
71. Ibid.
72. Waterloo, supra note 89 at 3, Table 1.
73. Conservation Ontario, Watershed Economic Incentives Through Phosphorous Trading and Water Quality, (Ontario: Conservation Authorities of Ontario, 2003) at 7, online at <[http://www.conservationontario.ca/projects/pdf/reports/PHASE%20I/watershed\\_economic\\_incentives.pdf](http://www.conservationontario.ca/projects/pdf/reports/PHASE%20I/watershed_economic_incentives.pdf)>.
74. Dennis O'Grady & Mary Ann Wilson, "Phosphorus Trading in the South Nation River Watershed, Ontario, Canada" at 1, online: Environmental Trading Network <<http://www.envtn.org/uploads/ontario.PDF>>.
75. South Nation Conservation Authority, "Clean Water Program: 2009 Annual Report" (July 2010) at 18, online: South Nation Conservation Authority <<http://www.nation.on.ca/sites/default/files/SNC%202009%20Clean%20Water%20Program%20Annual%20Report%20EN.pdf>>.
76. Ibid.
77. Environment Canada, "South Nation Conservation", [South Nation CA] online: Government of Canada <<https://www.ec.gc.ca/p2/default.asp?lang=En&n=21E379B9-1>>.
78. Ibid.
79. Ibid.
80. See e.g. Laura Payton, "Tony Abbott, Stephen Harper take hard line against carbon tax" (9 June 2014) Canadian Broadcasting Corporation, online: CBC <<http://www.cbc.ca/news/politics/tony-abbott-stephen-harper-take-hard-line-against-carbon-tax-1.2669287>>.
81. Stewart, Michael J, "Growth and Its Implications: An Evaluation of Tennessee's Growth Management Plan" (2000) 67 Tenn L Rev 983.
82. Andrew Green, "You Can't Pay Them Enough: Subsidies, Environmental Law, and Societal Norms" (2006) 30 Harvard Environmental Law Review at 408.
83. Ibid.
84. Bruce Mitchell et al, "Integrated Water Resource Management: Lessons from Conservation Authorities in Ontario, Canada," (2014) 30 International Journal of Water Resources Development 3 at 460–474.
85. Environment Canada, Flood Damage Reduction Program [archived content], online: Government of Canada <<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=0365F5C2-1>> [Flood Damage Reduction Program].
86. Ibid.
87. Natural Resources Canada, "Regional Initiatives: Facilitating Regional Adaption Planning and Decision Making", online: Government of Canada <<http://www.nrcan.gc.ca/environment/impacts-adaptation/regional-initiatives/10631>>.
88. de Loë, Floodplain, supra note 41 at 365.
89. Ibid.
90. Ibid at 361.
91. Conservation Authorities Act, RSO 1990, c 27.
92. Lakes and Rivers Improvement Act at s 14.
93. Planning Act, supra 34 at s 3(5).
94. OWRA, supra note 30 at s 53.
95. CA Act, supra note 36.
96. Fraser Basin Council, "Lower Fraser Flood Model", online: Fraser Basin Council <[http://www.fraserbasin.bc.ca/water\\_flood\\_model.html](http://www.fraserbasin.bc.ca/water_flood_model.html)>.



CANADIAN WATER NETWORK  
RÉSEAU CANADIEN DE L'EAU