

1 Thames – Sydenham and Region Source Protection Committee

Meeting Notice

Please be advised that a meeting of the Thames-Sydenham and Region Source Protection Committee has been called for the following time. Please confirm attendance with Deb Kirk at 519-451-2800 x256.

Meeting Date: March 22, 2019

Meeting Time: 10:00 am -1:30 p.m.

Meeting Location: St. Clair Conservation Authority Board Room

Proposed Agenda

1	Chair's Welcome and Introductions (intro to Carlos and Cassandra)	10:00
2	Adoption of the Agenda	
3	Approval of October 19, 2018 SPC minutes	
4	Delegations (<i>none scheduled</i>)	
5	Declaration of Conflict of Interest	
6	Business arising from the minutes	10:15 -10:20
7	Business	
7a	Presentation (phosphorous) (30 min)	10:20-10:50
7b	SPC Reappointment/Replacement Update for 2019 (20 min)	10:50-11:10
<i>Break for Lunch</i>		
7c	Annual Report (60 min)	11:45-12:45
7d	LAWSS Risk Management Services	12:45-12:50
8	Information	12:50
8a	Source Water Videos	
8b	Made In Ontario Environment Plan	
8c	Paper: Integrated Water Management	
8d	Outgoing members presentations	
9	In Camera Session (not planned)	
10	Other Business	1:20
11	MECP Liaison report	
12	Member Reports	
13	Adjournment	1:30
	<i>Next Meeting:</i> in the fall (to be determined)	

SPC MEETING MINUTES

OCTOBER 19, 2018

Meeting #72

The Source Protection Committee Chair, Dean Edwardson called the meeting to order at 10:08 a.m. on October 19, 2018 at the St. Clair Conservation Authority Boardroom. The following members and staff were in attendance;

Members

Murray Blackie
Brent Clutterbuck
Dean Edwardson
Pat Feryn
Paul Hymus
Carl Kennes
George Marr
Gary Martin

David Mayberry
Hugh Moran
Earl Morwood
Darrell Randell
Nich Seebach
Darlene Whitecalf
Fatih Sekercioglu (HU Liaison)
Olga Yudina, MOECP

Regrets:

Mike Mortimer
John Trudgen
Brian Lima
John Van Dorp

Staff:

Jenna Allain
Deb Kirk
Bonnie Carey
Brian McDougall
Mark Peacock
Steve Clark
Katie Ebel
Jessica Schnaithmann
Emily DeCloet
Girish Sankar
Donna Blue

Others:

None

1) Chair's Welcome

Dean Edwardson welcomed the committee and acknowledged a quorum was achieved.

2) Adoption of the Agenda

The agenda was approved.

Moved by C. Kennes-seconded by D. Mayberry

“RESOLVED that the October 19, 2018 agenda be approved.”

CARRIED.

3) Approval of June 15, 2018 SPC minutes

Minutes of the June 15, 2018 meeting were approved.

Moved by D. Randall -seconded by N. Seebach

“RESOLVED that the June 15, 2018 meeting meetings be approved.”

CARRIED.

4) Delegations

None.

5) Declaration of Conflict of Interest

No conflict of interest was identified.

6) Business Arising from the minutes

None.

7a) Proposed Section 36 Workplan

The Proposed Section 36 Workplan was circulated to the members. The members were advised that the table of updates will be reviewed and discussed during the meeting, and that members can contact Jenna if they have any comments or concerns with any other sections of the workplan. All the updates included in the workplan are planned for completion by September 2020 and the updated Assessment Reports and Source Protection Plan will be submitted to MECP in October 2020. Each update item was reviewed; highlights of discussion were as follows:

- Update #7: An updated WHPA delineation for changes to the Ridgetown drinking water system will be required and undertaken by Chatham-Kent. There are 4 new wells that have been added to the system, and 3 wells that have been removed. A question was asked about why the new wells were drilled. Mark Peacock, General Manager from LTVCA indicated Chatham-Kent is upgrading the system.
- Update #8: New wellhead protection area mapping, vulnerability, and threats assessments for private water systems in the St. Clair Township will be undertaken, as requested through council resolution. The committee has discussed this in the past and technical work will be required to be undertaken by the municipality. The SPC would need to decide whether the current SPP policies should be applied to the private wells, or whether new policies should be developed. It is unclear whether these systems will be elevated due to the Otter Creek Wind turbine project being cancelled. In order for private systems to be elevated, the Clean Water Act requires it to be either a cluster of 6 or more wells, or located in an area of settlement as defined under the planning act. The size and shape of the protection area depends, in part, on the pumping rates. Based on the limited pumping of a private well compared to a municipal well, the vulnerable area most likely will not extend out much beyond the mandatory 100 meter zone around the well. It was noted in the news this week, that Premier Ford has promised to look further into the wells in Chatham-Kent. Olga Yudina reported a Health Hazard Investigation is being done with the lead being the Ministry of Health for the North Kent Wind farm that is still operating. The Ministry of Environment, Conservation & Parks (MECP) continues to monitor water quality and to date the analysis has shown no evidence of ongoing water quality impacts. Discussions will continue with all involved. Due to item #17 also relating to the wind turbines it was reviewed next.
- Update #17: A review of information relevant to the local impacts of wind turbines and wind turbine construction on private well water quality will be undertaken to determine whether wind turbines should be included as a new local threat. This update item is still important as several municipalities identified support for this item to remain in the

workplan. At this point there is not enough evidence to add wind turbines as local threat. More information needs to be collected. A question was asked of what the intent is if there is not additional data. The Chatham-Kent wind farm is still being monitored and studies are still being done by *Water Wells First* and the University of Windsor to determine whether there is a link between turbidity and chemical.

- Update #9: Agricultural application policies will be reviewed to discuss the intent of using the Risk Management Plan tool to align with Nutrient Management Act prohibitions. Jenna Allain noted the policies as currently stated have created challenges for the RMOs. The policy requires a RMP which should be based on NMA principals, including any prohibitions. It is difficult to use a management tool to prohibit. Policies are prohibiting the application of all nutrients within the 100 meter zone. If the intent is to prohibit these activities, then using the probation tool is recommended not a RMP. The impact has been seen on smaller farms that are not phased in under the Nutrient Management Act. The SPC will review these policies in detail prior to making any decisions about policy changes.
- Update #10: Agricultural policies for the Town of St. Marys, particularly the policies addressing grazing and pasturing will be reviewed. Prior to SPP approval, OFEC and OFA partnered to develop a guidance document ahead of implementation which sets out recommended management measures to address agricultural activities that would require a risk management plan. TSR RMOs have relied on this document to inform the risk management plans that are being developed for farms. Due to the sensitivity of the St. Marys area (GUDI system, history of bacterial contamination, and the geology), RMO's have asked farmers in the St. Marys WHPA to fence cattle out of areas with a vulnerability score of 10. This is based on the standards for depth to bedrock set out in OFEC guidance document. The SPC may want to consider creating different policies for agricultural activities in the Town of St. Marys. Although farmers have been asked to fence cattle out of these areas, they have generally been given a timeframe of 2 to 3 years to comply with this requirement. The question of why separate policies need to be developed was asked, and whether the issue can be solved with water treatment. Source protection is all about prevention, and policies were developed to prevent contamination of a water supply, regardless of treatment. With any new drinking water systems, source protection now needs to be considered early during the planning stages, and the types of impact source protection would have on activities occurring around the new system.
- Update #11: Whether or not timelines should be added to Part IV, S. 58 Risk Management Plan policies will be reviewed. At the time that the TSR SPP was developed, no timelines were given to when RMPs for existing threats should be completed. Risk management plans are being established, however, there is one municipality in the TSR that has not completed any RMPs. Adding a timeframe may help facilitate the completion of RMPs within this municipality.

A motion was brought forward to impose a timeline of 5 years to implement RMP policies.

Moved by P. Feryn -seconded by E.Morwood

“RESOLVED that a timeline of 5 years be placed on RMP policies being implemented.”

WITHDRAWN.

Moved by D. Mayberry -seconded by H.Moran

“RESOLVED that a timeline of 5 years be placed on RMP policies being implemented be withdrawn until a formal report is prepared for review by the SPC.”

WITHDRAWN.

Discussion:

After a discussion the committee agreed that the SPC defer any decisions today and wait until a more formal staff recommendation is provided to be discussed further at a future SPC meeting.

- Update #12: The CWA regulation was changed to add liquid hydrocarbon pipelines as a new mandatory prescribed threat. Updates to the AR /SPP to identify where pipelines would be a significant, moderate and low threat are required. We are also required to assess this threat, and risk for the entire region, in addition to the *Event Based Areas* where they are already identified as a local threat. Consideration will need to be given to whether new policies to address new pipeline threats are necessary, or we the existing polices can be applied. Natural gas is not considered a liquid gas and would not pose a threat to ground or surface water; oil is. Liquid hydrocarbon pipelines have been added as an additional threat to the list of 21 prescribed drinking water threats as #22. Update #13: Another mandatory change that needs to be included in the next update to the AR and SPP is to reflect that above grade fuel storage is now a significant threat in IPZs and in WHPA-E where the vulnerability score is 9 or higher. The IPZ for Wallaceburg and a WHPA-E in Oxford County are the only areas in the TSR where this would apply.
- Update #16: New information provided by municipalities has resulted in the need for the removal, addition and or adjustments of transport pathways identified within vulnerable areas. For Perth County this includes abandoned wells (pits & quarries). Vulnerable area mapping and scoring will be updated to reflect these changes.

The Source Protection Plan and Assessment Report amendments will be brought to the SPC for approval in September 2020 and submitted to the Minister for approval in October 2020. Once the wells that are planned for decommissioning have been decommissioned in London (Hyde Park and Fanshawe), Middlesex Centre (Melrose), and Chatham-Kent (Highgate), these systems can be removed from the AR and SPP through a Section 51 minor amendment that does not require consultation, council resolution, or minister approval.

Recent comments on the draft workplan provided by MECP, requested that more detail be included in the workplan about education and outreach efforts to reduce blue-green algae, phosphorus and nitrate contributions into Lake Erie. This information was directed by the Minister, in the SPP approval letter, to be included in the workplan. Jason Wintermute has provided presentations and reports to the SPC in the past on the microcystin issue. This is a broader issue than just a drinking water specific issue, with broader implications. Microcystins have been identified as an issue for the Lake Erie intakes in the TSR, but if an *issue contributing area* was identified, it would encompass the whole Lake Erie basin. Binational partners have been working on defining targets that CA staff have been involved in. An International Joint Commission report will be coming out soon on this topic. Pat Feryn noted the efforts farmers have taken to reduce nutrients. It was suggested that the *Thames River Phosphorus Reduction Collaborative* group be invited to the next SPC meeting to provide an update on the work being done.

Recommendation: That the Thames-Sydenham and Region Source Protection Committee endorse the draft Section 36 Workplan for submission to the Ministry of Environment, Conservation and Parks by November 30, 2018, subject to any further amendments as a result of feedback from the Source Protection Authorities at their October and November meetings.

Moved by G. Marr -seconded by D. Randall

“RESOLVED that the Source Protection Committee endorse the Proposed Section 36 Workplan for submission on November 30, 2018”.

CARRIED.

b) SPC Reappointments/Replacement for 2019

On June 1, 2019 the terms of appointments for eight SPC members will expire, and will need to be re-appointed or replaced. Jenna gave a slide presentation to outline the details of the reappointment/replacement process. The SPC regulation requires that the term of all current members must expire before January 1, 2020. Members appointed in 2018 have a term to June 2021 and members appointed in 2019 will have a term that extends until June 2023. After these appointments all terms will be for 4 years, with half of the members' terms expiring every other year. The members were asked to consider what

their wishes are: to remain on the committee or to step down and to advise Jenna Allain in the next few weeks. All non-municipal positions must be advertised regardless of existing members intentions. Liaison positions do not expire. The same process will take place as in the previous year; notices will be advertised online and municipalities will be consulted. All members will be invited to the meeting in June 2019.

Break for lunch. 12:00-12:30 p.m.

c) New Regulation under the *Safe Drinking Water Act* Update

A presentation was given by Jenna Allain on the new Regulation under the *The Safe Drinking Water Act*. The proposed regulation was posted on the EBR from December 22, 2017 to February 20, 2018. The committee discussed it at the March 23, 2018 SPC meeting. The decision notice was posted for Regulation 205/18 on the EBR on April 5, 2018. The new regulation is to ensure sources of drinking water for any new systems are protected and municipalities or system owners ensure work is done to delineate and score vulnerable areas before a permit is issued. The new SDWA regulation requires system owners to have a notice from the Source Protection Authority stating that the technical work is complete, in order to apply for a permit. Concerns have been raised relating to SPA liability, workload, timing of the SPP and AR Amendments, and amendments initiated when not required. Concerns have since decreased when it was stated that notices from the SPA are not intended to be an approval of the technical work complete, and not all changes to drinking water systems necessarily require new technical work or changes to the SPP/AR.

8) Information

a) Correspondence from South Georgian Bay Lake Simcoe SPC to Minister of the Environment, Conservation and Parks

A letter was included in the package from the Lake Simcoe SPC to the Minister of Environment, Conservation and Parks to streamline the approvals of amendments to SP Plans for new drinking water systems when new policies are not required. The approval process can be lengthy and creates significant delays in allowing a municipality to provide critical services to residents. They added that delegating this approval to the Director of the SP Programs Branch would reduce timelines.

b) Correspondence from John Williamson, Cataraqui SPC, on behalf of the 19 SPC Chairs

John Williamson Chair from the Cataraqui SPC, on behalf of the nineteen Source Protection Chairs, sent a letter to Hon. Rod Phillips of the Ministry of Environment,

Conservation and Parks welcoming the new Minister, and highlighting the work that still needs to be done based on the recommendations from the Walkerton Inquiry to protect sources of drinking water. The letter notes the high percentage of wells that do not meet the standard for drinking water, and large areas in Ontario with vulnerable groundwater; reinforcing the need to continue with the work that has been done.

c) July 2018 Ontario Farmer Article by Tom Van Dusen, Raison-South Nation SPC

Article by Tom Van Dusen was included in the meeting package titled “Reasonable bias” In the article he highlights the need to continue *to guard precious communal drinking water resources* though the Source Protection programs that have been established across the province.

d) News Release: Binational Poll re: Great Lakes Protection

A news release was circulated from the Second Binational poll from July 10, 2019 reaffirming that citizens feel that Great Lakes protection is critical.

e) CELA Blog Article re: The Walkerton Tragedy

On May 22, 2018 an article was posted on the CELA blog by Richard D. Lindgren and included in the members package, titled “*The Walkerton Tragedy: Lessons Learned and Unfinished Business*”.

Chair Edwardson noted the articles being an endorsement and reminder of the importance and value of the SP program. He noted his concerns of the future of the SP program with the change in government. It was noted the many articles also speak about the need for adding other types of drinking water systems into the source protection program, not just municipal systems.

9) In Camera Session

None.

10) Other Business

None.

11) MOE Liaison Report

Olga Yudina reported there have been questions about the future of the SP program. No funding decisions have been made to date but they will continue to keep everyone apprised. The government did complete a line by line audit of all programs which is now going to generate a more thorough review of the programs.

12) Members Report

George Marr-advised the committee of the Ducks Unlimited dinner being held on November 15, 2018. If interested, please see him for tickets or if anyone has raffle items to donate.

Earl Morwood-congratulations to Jenna Allain who will be off on maternity leave starting in February 2019.

13) Adjournment

There being no further business, the meeting was adjourned **at 12:55 p.m.** PLEASE NOTE: The next SPC meeting is scheduled for **March 22, 2019** and the meeting location is to be at the St. Clair Region Conservation Authority office. Staff will confirm the date and time in advance of the meeting.

Do you know where your drinking water comes from?

<https://www.youtube.com/watch?v=nVrXvD5Eupw>

Indigenous Water Protection: Chippewa, Munsee, Oneida and the Thames River

<https://m.youtube.com/watch?feature=youtu.be&v=wInig0ou35o>

Thames – Sydenham and Region Drinking Water Source Protection Source Protection Committee Discussion Paper

Report to Chair and members
Thames – Sydenham and Region
Source Protection Committee

Agenda # 2019.03.22 8b

Cc SP Management Committee

Date March 22, 2019

Prepared By Julie Welker, Source Protection Coordinator

Re: Made In Ontario Environment Plan

Background

The Government of Ontario has proposed a Made in Ontario Environment Plan that reflects the government's commitment to addressing various environmental pressures. They plan to use the best science, real-time monitoring where available, and strong, transparent enforcement to protect our air, land and water, prevent and reduce litter and waste, support Ontarians to continue to do their share to reduce greenhouse gas emissions, and help communities and families prepare for climate change.

The plan makes several positive references to the work that is being done with Drinking Water Source Protection. Including the following statement:

'Quick Fact: Thanks to local source protection committees and conservation authorities, Ontario has source protection plans being implemented across 38 watershed-based areas. These locally developed plans identify and protect areas where drinking water is vulnerable to contamination and depletion.'

For more information on this plan, visit: <https://www.ontario.ca/page/made-in-ontario-environment-plan>

Discussion

With the 2019-2020 Workbook submission, we made several connections between the Made in Ontario Environment Plan and Drinking Water Source Protection to promote the relevancy of this program to Ontarians.

Recommendation

The SPC receive this report as information.

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

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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

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Managing 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

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

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"> • Main body that regulates Ontario's water supply • Registers all municipal drinking water systems, licenses system owners and operators, and issues drinking water works permits • Grants approvals for permits and licenses wastewater and stormwater management systems
Ministry of Natural Resources	<ul style="list-style-type: none"> • Provides leadership and directions for natural hazards including stormwater
Ministry of Municipal Affairs and Housing	<ul style="list-style-type: none"> • Regulates municipal planning including floodplain zoning • Administers Ontario's Building Code which regulates rainwater collection systems and puts in place other measures to protect water quality [25].
Ministry of Health and Long Term Care	<ul style="list-style-type: none"> • Has oversight over small drinking water systems [26].
Ministry of Agriculture, Food, and Rural Affairs	<ul style="list-style-type: none"> • Responsible for regulating potential impacts of farming activities on water quality [27].
Ontario Clean Water Agency	<ul style="list-style-type: none"> • Provides operation, maintenance and management for wastewater facilities, including stormwater, manages private sector and municipal corporations [28].
Environmental Review Tribunal	<ul style="list-style-type: none"> • An independent and impartial tribunal established by the province • 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].

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?

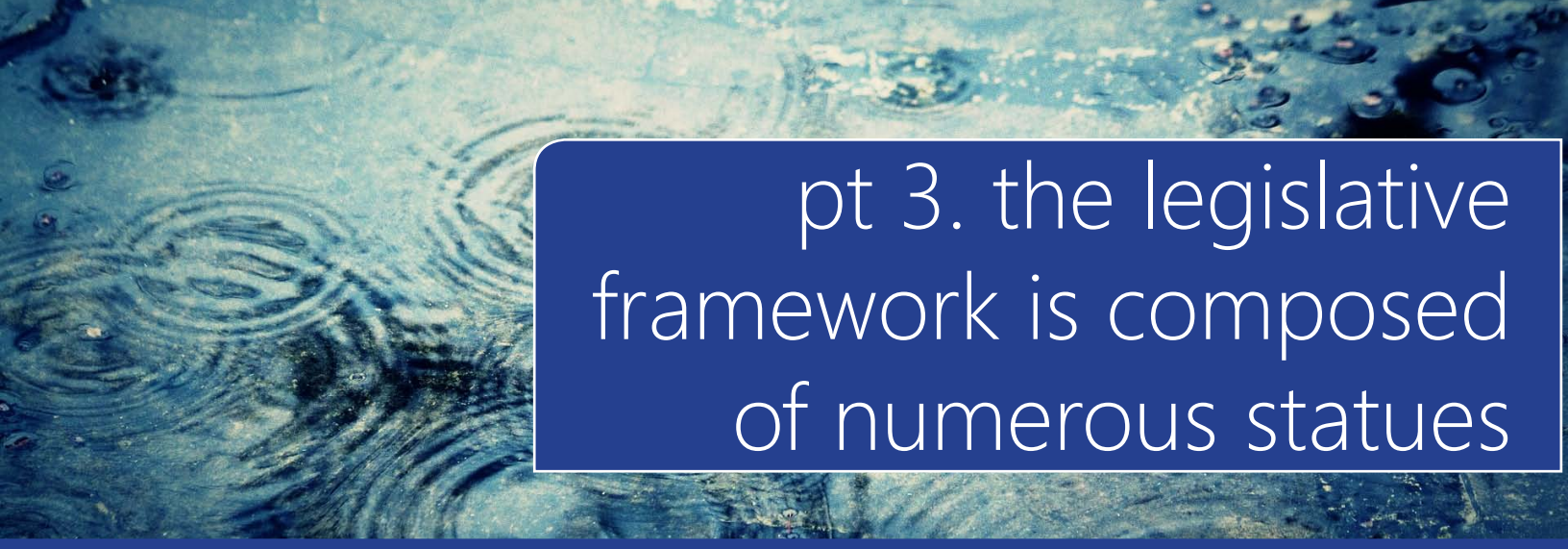
Numerous organizations, regulators, and researchers involved in water policy have recognized the need for increased coordination and focus in Canadian water management [38], but the number of different actors involved in water management often makes it difficult to facilitate coordination and integration. 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

Another 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

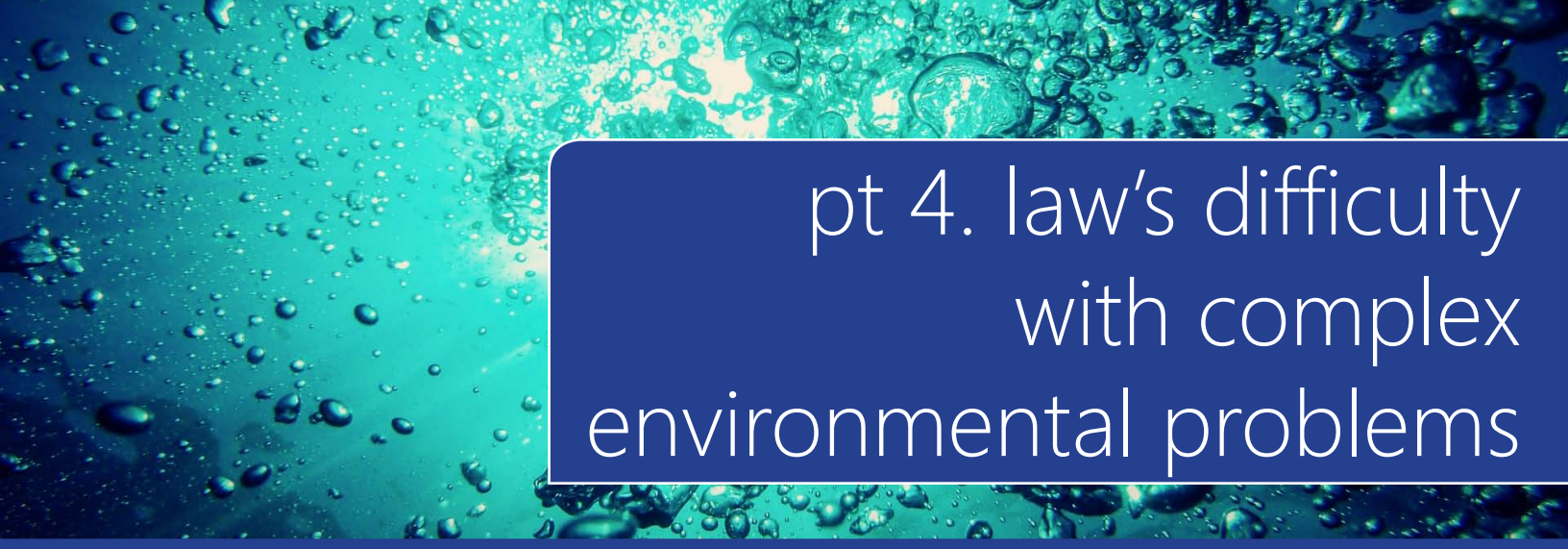
Safe Water Drinking Act, 2002, SO 2002, c 32	<ul style="list-style-type: none">• Sets drinking water standards and requires all municipal drinking water systems to obtain an approval from the Ministry of Environment• Imposes a statutory standard of care upon managers of municipal drinking water systems.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

Acts Relating More Generally to the Protection of the Environment

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

Acts Indirectly Affecting Water Resource Management by Regulating Related Activities

Municipal Act, SO 2001, c 25	<ul style="list-style-type: none">• Enables municipalities to finance their water systems through the use of debentures and reserves
Planning Act, RSO 1990, c P.13	<ul style="list-style-type: none">• 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
Health Protection and Promotion Act, RSO 1990, c H.7	<ul style="list-style-type: none">• Organizes public health programs and aims to prevent the spread of disease



pt 4. law's difficulty with complex environmental problems

Another 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

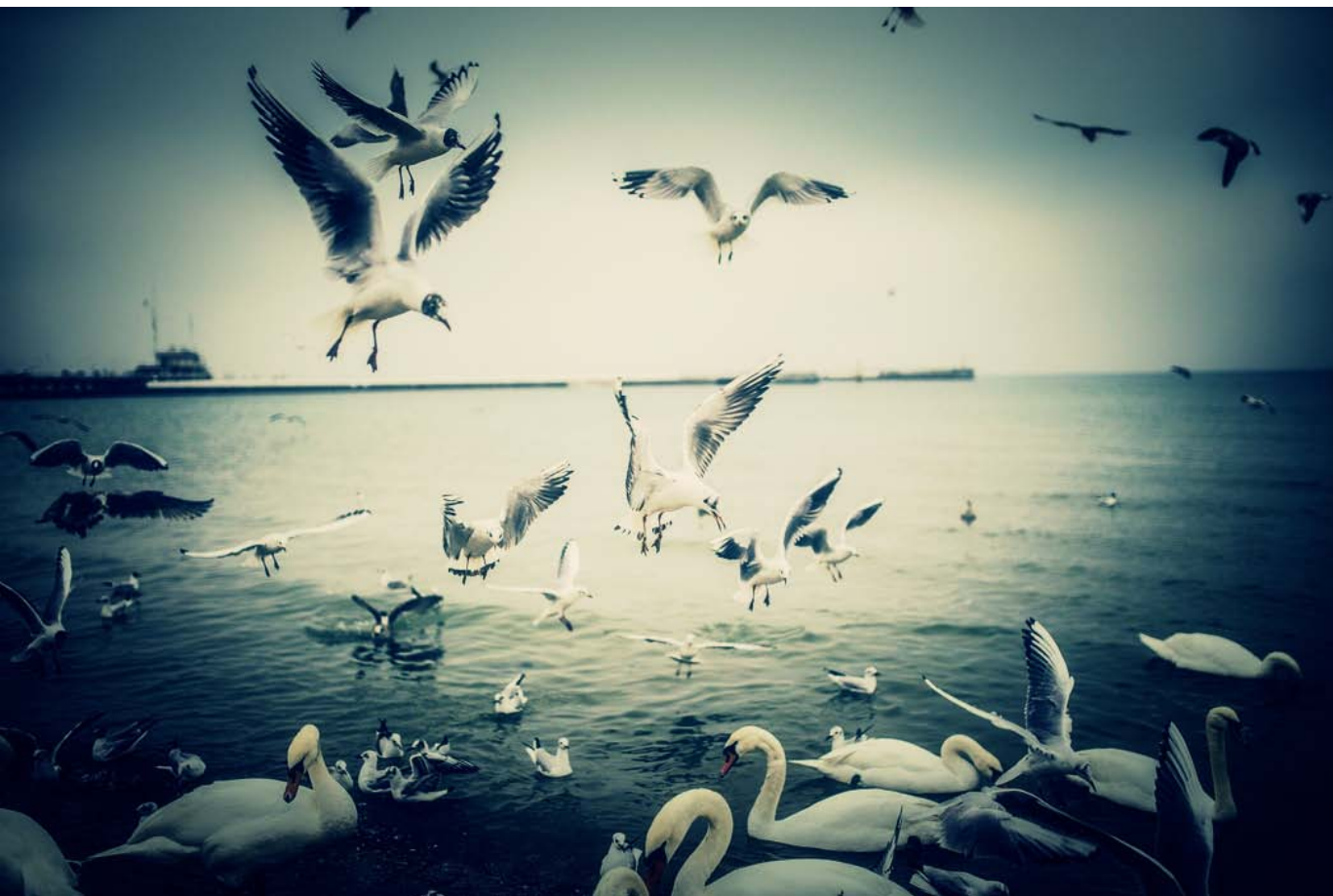
As well, regulators have difficulty capturing non-point source pollution in legislation. Non-point source pollution, such as runoff from municipalities and farms, comes from diffuse effluent sources. This can make it difficult and expensive to implement effective control mechanisms [56]. Additionally, 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

In 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.

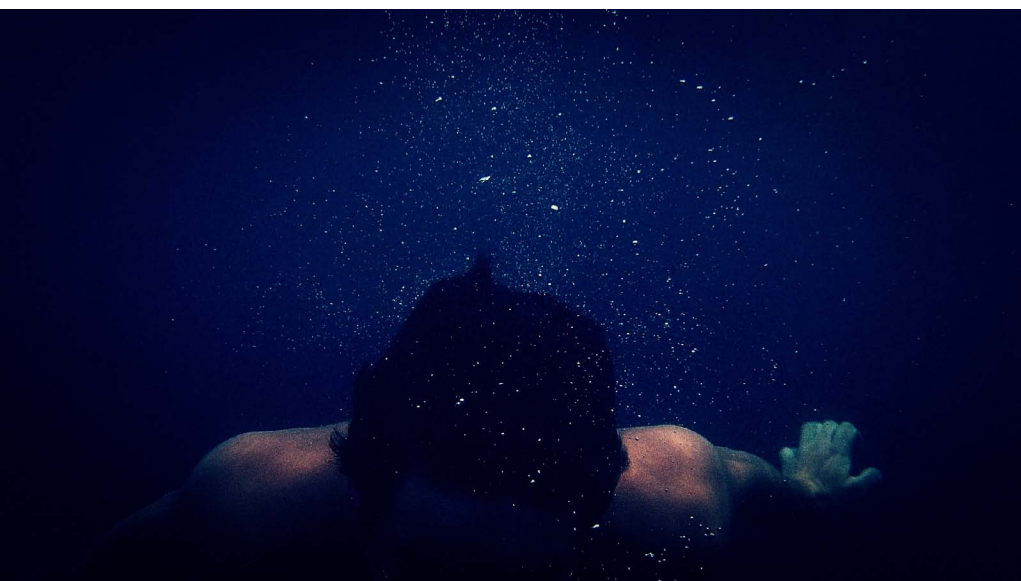
The project has been remarkably successful and highly acclaimed. From 2000-2007, the Clean Water Program implemented 212 phosphorus-reducing projects with funding help from the TPM. From 2000 to 2009, it was estimated that phosphorus emissions were reduced by a total of 11, 843 kg [75]. This far exceeded 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.

The 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.

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CANADIAN WATER NETWORK
RÉSEAU CANADIEN DE L'EAU