Ministry of the Environment and Climate Change

Source Water Protection

Background

Ontario borders on four of the five Great Lakes, has more than 250,000 inland lakes, 500,000 km of rivers and streams, and vast groundwater resources. The Great Lakes are the source of drinking water for over 75% of the population of the province. The remaining population sources its water mainly from other lakes, rivers and aquifers across the province, including approximately 1.6 million Ontarians that depend on private wells to draw their water from underground aquifers.

In May 2000, the drinking water system in the Bruce County town of Walkerton became contaminated with deadly bacteria. Seven people died, and more than 2,300 became ill. The primary source of the contamination was manure that had been spread on a farm near a well that was a source of the town's drinking water. Operations at the water treatment plant did not remove this contamination. In the aftermath of the outbreak in Walkerton, the government established a public inquiry to report on the causes of the tragedy, and to make recommendations to ensure the safety of drinking water across the province.

In January and May 2002, Justice Dennis O'Connor released two Reports of the Walkerton Commission of Inquiry. In his second report, Justice O'Connor recommended the following with respect to the protection of drinking water sources in the province:

> "The first barrier to the contamination of drinking water involves protecting the sources of drinking water. I recommend that the Province adopt a watershed-based planning process, led by the Ministry of the Environment (MOE) and by the conservation authorities (where appropriate), and involving local actors. The purpose is to develop a source protection plan for each watershed in the province. The plans would be approved by the MOE and would be binding on provincial and municipal government decisions that directly affect drinking water safety. Large farms, and small farms in sensitive areas, would be required to develop water protection plans that are consistent with the watershed-based source protection plans."

In response to Justice O'Connor's recommendations, the province enacted the *Clean Water Act* in 2006. The Ontario Ministry of the Environment and Climate Change (Ministry) is responsible for the protection of existing and future sources of drinking water through the administration of this Act.

Soon after the proclamation of the *Clean Water Act*, the Ministry identified 19 source water protection regions in the province, and established a Source Protection Committee in each of these regions to develop, in conjunction with local Conservation Authorities (non-profit organizations mandated to ensure the conservation, restoration and management of Ontario's water, land and natural habitats through various programs), source water protection plans. The plans were intended to assess existing and potential threats to source water, and ensure that policies would be in place to reduce or eliminate these threats. A third of the membership of Source Protection Committees is made up of representatives from local municipalities. A third is made up of representatives from the following sectors: agriculture, industry, aggregates, commerce, tourism and recreation, land developers, golf courses, mining, petrochemical, forestry and transportation. The remaining third is made up of representatives from landowner and lake associations, environmental groups, the public at large, and water specialists.

The *Nutrient Management Act*, proclaimed in 2002, is also important in the protection of source water. The objective of this Act is to manage nutrients (including manure, fertilizer, compost, and sewage and pulp and paper bio-solids) in ways that will better protect the natural environment, including source water, and at the same time provide a sustainable future for agricultural operations and rural development. The application of nutrients to land is essential for soil health and optimal crop yield since they are rich in nitrogen and phosphorus. However, applying more than crops require can lead to a build-up of these nutrients in the soil, which can run off into surface waters or leach into groundwater. This can be detrimental to the environment and ultimately to human health. For example, elevated phosphorus levels contribute to toxic algae growth in water, which can produce a liver toxin that is harmful to humans and impairs fish and wildlife habitats.

For the most part, a regulation under the *Nutrient Management Act* outlines requirements for larger farms that have livestock and produce significant quantities of manure (300 nutrient units per year, which would equate to, for example, manure from roughly 1,800 hogs or 300-900 beef cattle). These farms must use certified individuals to develop strategies and/or plans to adequately manage nutrients stored on farm properties or spread on fields.

The *Nutrient Management Act* is jointly administered by the Ontario Ministry of Agriculture, Food and Rural Affairs and the Ministry of the Environment and Climate Change. The Ministry of Agriculture, Food and Rural Affairs is responsible for certifying and licensing plan developers, and approving strategies and plans, while the Ministry of the Environment and Climate Change is responsible for compliance and enforcement of the Act and its regulations. **Figure 1** is a chronology that summarizes the key events leading to the proclamation of the *Clean Water Act*.

As seen in **Figure 2**, protecting source water is the first line of defence in a multi-barrier approach to protecting Ontario's drinking water. The other elements of this approach include water treatment to remove or neutralize contaminants, maintaining adequate water distribution systems to prevent contaminants from entering the water after treatment, ongoing water testing to detect problems with drinking water quality, and establishing systems that can effectively respond to incidents.

Audit Objective and Scope

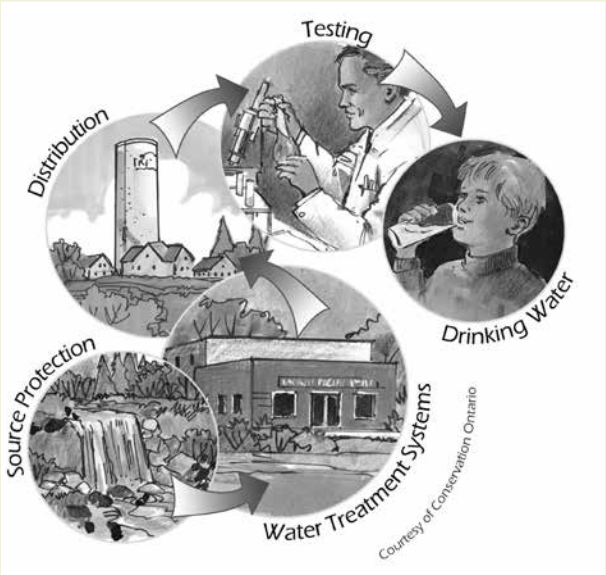
The objective of our audit was to assess whether the Ministry of the Environment and Climate Change (Ministry) had effective systems and procedures to:

- ensure the long-term sustainability of the sources of drinking water in the province;
- reduce health risks and potential future costs by effectively managing and protecting

Figure 1: Chronology of Key Events Leading to the Proclamation of the *Clean Water Act*
Prepared by the Office of the Auditor General of Ontario

May 2000	The drinking water system in the Bruce County town of Walkerton became contaminated with deadly bacteria.
June 2000	The Walkerton Commission of Inquiry was set up to examine the contamination of the water supply in Walkerton and to look into the future safety of the water supply in Ontario. Justice Dennis O'Connor was appointed Commissioner.
January 2002	The Walkerton Commission released Part 1 of its report, which detailed the events in Walkerton and the failures that led to the contamination.
May 2002	The Walkerton Commission released Part 2 of its report, in which it made many recommendations for improving the quality of water and public health in Ontario, including recommendations on source water protection.
June 2002	The *Nutrient Management Act* was proclaimed. This Act was not a direct response to the Walkerton tragedy.
October 2006	The *Clean Water Act* was proclaimed in response to Justice O'Connor's recommendations on source water protection.

Figure 2: Ontario's Multi-barrier Approach to Safe Drinking Water
Source of data: Conservation Ontario



drinking water sources in accordance with related legislation; and

- reliably measure and report on its performance.

Senior management at the Ministry reviewed and agreed to our objective and associated criteria.

Our audit work was predominantly conducted between November 2013 and April 2014. We interviewed key program staff and reviewed pertinent documents. As well, we met with the Chairs of a number of Source Protection Committees and representatives from Conservation Authorities and municipalities that were also part of the committees, as well as environmental groups and staff at the Office of the Environmental Commissioner of Ontario, to obtain their perspectives on source protection planning within the province. We also surveyed Source Protection Committees and Conservation Authorities, and visited two water treatment plants in southern Ontario.

We engaged a consultant with expertise in the field of water policy to review the *Clean Water Act, 2006*, the Ministry's framework for developing source protection plans in accordance with the Act, and a sample of plans, and to provide an opinion on whether the framework is consistent with the intent of the legislation and whether the plans, if implemented, would be effective in meeting the intent of the legislation.

Summary

Fourteen years after the crisis in Walkerton, the locally developed source water protection plans envisioned by the Walkerton Commission of Inquiry and legislated under Ontario's *Clean Water Act, 2006*, are not in place to ensure the first level of

defence for the safety of drinking water for Ontarians. As well, situations of non-compliance with the *Nutrient Management Act, 2002* and its regulations, and the Ministry of the Environment and Climate Change's (Ministry) weak enforcement activities, increase the risk that source water (water that flows into water treatment plants and wells) in Ontario is not being effectively protected.

There are a number of factors that have contributed to this:

Delays in Approving and Implementing the Source Water Protection Plans

- The Ministry lacks a long-term strategy that addresses funding and oversight of municipalities and Conservation Authorities to ensure the plans, once approved, are implemented; and timely updates of source protection plans to ensure that the local threats to source water identified in the plans, and the policies to address the threats, remain current.
- The Ministry does not have a clear time frame when all plans will be approved. At the time of our audit, 22 source protection plans had been developed by Source Protection Committees for 19 regions within the province that affect over 95% of Ontarians. However, the regions cover only about 14% of the total land mass of the province. At the time of our audit, three of these 22 source protection plans had been approved by the Ministry for regions that have a relatively small number of municipal water intakes that serve about 5% of the province's population (as of September 2014, eight of the plans were approved). Seven of the submitted plans are incomplete because they do not include a detailed water budget study to determine whether there are any threats to water quantity within the respective regions.
- There has been significant time spent on mediation discussions between Source Protection Committees, ministries and other government organizations such as the Technical Standards and Safety Authority (TSSA) whose mandate is to enhance public safety through programs that regulate the transportation, storage, handling, and use of fuels. Source protection plans have identified over 4,700 threats to water intakes in the various regions relating to the handling and storage of fuel. The source water protection plans have proposed policies to deal with these threats, such as directing the TSSA to increase fuel tank inspections in areas close to water intakes, or requiring the TSSA to share information with Conservation Authorities and municipalities about fuel spills. Negotiations are ongoing.
- There has been significant turnover in the Ministry staff responsible for reviewing source protection plans, delaying their approval.
- Conservation Authorities have expressed concern regarding the imminent future of the source protection program because of future funding uncertainty and the risk this poses to the retention of skilled staff. In our survey of Source Protection Committees and Conservation Authorities, 80% of respondents stated that the delay in plan approval and uncertainty in the funding of plan implementation are causing a loss of momentum within the program. Committee members are simply losing interest in the process and are starting to resign, contributing to the loss of technical knowledge.

Weaknesses in Source Water Protection Plans

The water policy expert we retained to assist us on the audit noted that source water protection plans will over time meet the intent of the *Clean Water Act* provided they are approved and implemented as soon as possible and go through at least one further iteration of affirmation and improvement to address unforeseen weaknesses and challenges. In this regard we noted that:

- Although plans identify many threats, they may not include all potential threats such as threats to the Great Lakes. There is a high likelihood that spills from industrial and commercial facilities may also pose a significant

threat to intakes in the Great Lakes, but plans do not currently address them.

- Private wells or intakes that serve one residence are currently excluded from source protection planning. An estimated 1.6 million people in Ontario rely on private wells for their drinking water supply. For them, protecting source water is the only line of defence. In 2013, over a third of the water samples from private wells tested positive for bacteria including E. coli. If private wells were held to the same safety standard used for public drinking water systems, water from these wells that tested positive for bacteria would be considered unsafe to drink.
- The plans also do not currently address the risk that abandoned wells may pose to sources of groundwater. Abandoned wells provide open pathways for contaminants to aquifers. Ministry records show that about 60,000 abandoned wells have been properly decommissioned in Ontario. However, a recent study estimated that 730,000 wells have been abandoned in Ontario. This suggests that there may be many abandoned wells that have not been properly decommissioned that may pose a threat to groundwater sources.

Limited Coverage and Enforcement Under the *Nutrient Management Act*

- Only a limited number of farms that produce and use manure are captured under the requirements of the *Nutrient Management Act* and its regulations. The farm that was the source of contamination in Walkerton would currently not be captured under the Act's regulations. The Ministry and the Ministry of Agriculture, Food and Rural Affairs have acknowledged the need to phase in more farms to adhere to the regulations, but to date this has not been done.
- Neither the Ministry nor the Ministry of Agriculture, Food and Rural Affairs have information on the total number of farms that produce manure and need to manage it in accordance with the Act and regulations. They rely on education and outreach to ensure that farms self-report whether they meet the conditions set out in the regulations, but we noted that these efforts were limited.
- In 2013/14, the Ministry inspected only 3% of the farms known to have to adhere to the Act's regulations for the proper storage and application of manure. Even though inspections normally take no longer than a day or two to perform, 17 agricultural inspection officers on staff set a target of inspections that equated to an inspector performing less than one farm inspection every two weeks.
- We also noted that the Ministry often did not follow up on issues of non-compliance, and rarely used punitive measures, such as issuing offence notices that may result in fines set by provincial courts. We noted that over the past two years, about 50% of the farms that had been inspected were found to be non-compliant with the *Nutrient Management Act* and its regulations. Of these, the Ministry found that about half of the non-compliance issues were causing a risk or threat to the environment and/or human health.

The *Nutrient Management Act* was proclaimed in 2002. Yet, since that time, phosphorous and nitrogen contamination continues to grow in the province's agricultural watersheds. Our review of data gathered by the Ministry since 2009 on the quality of water in streams in agricultural watersheds with intensive manure production suggested that phosphorous and nitrogen levels both continue to increase in the majority of the streams for which data is being collected.

Water-taking Charges Insufficient to Recover Program Costs

The Ministry is only recovering about $200,000 of the $9.5 million direct annual program costs attributable to the taking of water by industrial and commercial users. Since 1961, anyone taking more than

50,000 litres of water per day from either surface or groundwater sources in Ontario requires a permit issued by the Ministry. There are currently over 6,000 permit holders taking water in Ontario, of which about 1% or 60 are high-consumptive industrial or commercial users (such as water-bottling companies and other companies that incorporate water into their products). A regulation under the *Ontario Water Resources Act* allows the Ministry to charge high consumptive users a rate of only $3.71 for every million litres of water that they take, resulting in the low recovery cost.

OVERALL MINISTRY RESPONSE

The Ministry appreciates the work of the Auditor General and welcomes the input on how it can further improve the protection of source water in Ontario.

Ontario's multi-barrier approach to protecting drinking water has made our tap water among the best protected in the world. Protecting the sources of drinking water—our lakes, rivers and groundwater—is the foundation of our approach.

We protect our drinking-water sources first through prevention—by developing collaborative, watershed-based plans that are locally driven and based in science. Source-water protection plans are the result of many years of hard work at the local level and public consultation, and we thank all those who have contributed to the program to date.

We look forward to learning from the findings presented in the report to, with all our partners, continue to provide a strong framework to protect drinking water.

Detailed Audit Observations

The water policy expert we retained to assist us on the audit noted that three of Ontario's four Great Lakes are now in a measurable state of ecological decline because of the pressures of population growth, development, and threats including invasive species and climate change.

The Ministry of the Environment and Climate Change (Ministry), together with Conservation Authorities, municipalities and provincial parks, has a number of water quality monitoring programs for Ontario's lakes, rivers, streams and groundwater. Many of these are existing and future sources of drinking water for the population of the province. The scope of water quality monitoring is broadly designed to assess aquatic ecosystem health as well as the quality of drinking water. Samples of water, sediment, and aquatic life are collected and tested in Ministry laboratories for basic water quality indicators such as acidity, calcium and phosphorus, and pollutants such as mercury, lead, PCBs and pesticides. The intent of the water monitoring programs is to study what is currently affecting water quality in specific areas of the province and to track water quality over time. The Ministry primarily presents its findings in its annual Water Quality in Ontario report.

The Ministry's most recent public report, released in 2012 and available on its website, notes that although progress has been made in reducing contaminants in Ontario's waters, more work is needed to address new and ongoing challenges.

Protecting Source Water is Safer and More Cost-effective Than Treatment Alone

In his report of the Walkerton Commission of Inquiry, Justice O'Connor concluded that source water protection is one of the most effective and efficient means of protecting the safety of Ontario's drinking water. As the first line of defence, it can reduce health risks associated with contaminants such as bacteria and chemicals, particularly those that cannot be effectively removed by conventional treatment. As of June 30, 2014, the Ministry of Health and Long-Term Care had

nearly 300 advisories outstanding against treated drinking water in all parts of the province. Over 40% of advisories were in southern Ontario where population density is high. About two-thirds of the advisories had been outstanding for over a year. Over half were "boil water" advisories to reduce elevated levels of bacteria, while a number were "do not drink" due to elevated levels of chemicals in the water.

Preventing the contamination of the sources of drinking water is often easier and less costly than later having to treat the water. A study conducted by the U.S. Environmental Protection Agency in the mid-1990s estimated that the cost of dealing with contaminated source water is on average 30 to 40 times more than preventing contamination in the first place. In Ontario, there are more than 200 municipal water treatment plants and an average of $1.5 billion a year has been spent over the last five years on maintaining, upgrading and expanding them. Despite this level of spending, a significant amount of capital is still needed to upgrade these facilities.

Contaminated source water in various parts of Ontario has cost the government millions of dollars in remediation efforts. In some cases, the government continues to incur costs. For example, after a PCB leak from a storage facility in Smithville (located between Hamilton and Niagara Falls), the government assumed ownership of the facility in 1989. It has spent over $65 million in cleanup costs, including funding for a pipeline to provide safe drinking water to the town. Currently, there is no economically viable solution to clean up the PCB still present in the bedrock. Therefore, the Ministry is expected to monitor the site indefinitely at an annual cost of up to $860,000. In another case, the Ministry assumed control of an abandoned mine in Deloro (about 200 kilometres southwest of Ottawa) in 1979 after the mine contaminated nearby surface and groundwater sources with radioactive waste and metals. The government has had to operate an onsite water treatment plant at a cost of over $15 million to date. It expects to have to operate the plant for an additional 15 years at a minimum annual cost of about $1 million.

Conservation Authorities and Source Protection Committees also provided us with some examples of municipalities in the province that have, within the last two decades, incurred significant costs in dealing with contamination in their sources of drinking water. For instance, a township within the province lost six of its water supply wells because of industrial contamination. As a result of the contamination, the township had to spend $20 million on extensive upgrades to its water treatment facility and for the installation of a new emergency well and water pipeline. In another case, a city within the province had to invest $14 million in its drinking water treatment plant to deal with contamination in two of its wells caused by an old landfill.

Protecting source water is critical for other reasons as well:

- Many people in Ontario, especially in rural areas, are not connected to municipal drinking water systems and use wells to draw their drinking water directly from underground aquifers. For these people, protecting source water is the only barrier of protection against contaminated drinking water.
- The water policy expert we retained for this audit noted that source water protection also protects the quantity of water that is available at any given time. This is important to ensure there is enough supply in the future to provide for growing populations and increasing demand, while at the same time ensuring adequate supply for the natural ecosystem to function.

The Source Water Protection Planning Process

The *Clean Water Act's* primary objective is to protect existing and future sources of drinking water in Ontario by having a locally developed planning process that: 1) assesses existing and potential threats to source water; and 2) develops policies to either

reduce or eliminate the threats (including, in some instances, the prohibition of certain activities).

Responsible for administering the Act, the Ministry passed a number of regulations to:

- provide more detailed definitions of key terms under the Act;
- specify what is required in source protections plans (for example, in one regulation, the Ministry identified 21 specific threats that source water protection plans must address, as shown in **Figure 3**); and
- prescribe the consultation process when developing the plans.

The Ministry also supplemented the regulations with its own framework consisting of technical rules, as well as other bulletins, memoranda, and guidance materials. This framework was used by Source Protection Committees to develop their local plans by the deadline of August 2012.

Just prior to the proclamation of the *Clean Water Act*, the Ministry also set up a Source Protection Programs Branch (Branch) in the fiscal year 2004/05. The Branch works with program partners, including other ministries, municipalities, Conservation Authorities and Source Protection Committees, in the development and eventual implementation of source protection plans for each of the source protection regions across the province. The Branch consists of 36 employees whose key responsibilities are to:

- develop regulations and policies pertaining to the source water protection program;
- assist program partners in implementing the program (for example, by providing technical guidance and interpreting the *Clean Water Act* and its related regulations);
- review documents prepared and submitted by Source Protection Committees, including

Figure 3: Source Water Protection Plans Must Address 21 Threats

Prepared by the Office of the Auditor General of Ontario

1. The establishment, operation or maintenance of a waste disposal site.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land (for example, manure).
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land (for example, sewage and pulp and paper bio-solids).
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid (a liquid that is denser than water or does not dissolve in water).
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

assessment reports and source protection plans;
- develop and administer accredited training for Risk Management Officials and inspectors who ultimately will be responsible for implementing some of the policies contained in source protection plans; and
- administer funding to Conservation Authorities and municipalities in the 19 source protection regions to support local delivery of the program.

Figure 4 highlights the multi-stage process to be undertaken in accordance with the *Clean Water Act* in developing and ultimately implementing source protection plans.

At the time of our audit, 22 source protection plans had been developed by Source Protection Committees for 19 regions within the province. As seen in **Figure 5**, the 19 regions cover only about 14% of the total land mass in the province, but over 95% of Ontarians live within the boundaries of these source protection regions.

In total, the 22 proposed plans submitted to the Ministry contain over 12,500 recommended policies. These consist of:
- **Education and outreach**–Informing the public about best management practices to prevent activities from negatively affecting drinking water sources.
- **Risk management plans**–Requiring that a landowner create a risk management plan to manage significant threats to drinking water sources identified in a vulnerable area.
- **Prescribed instruments**–Regulatory tools that already exist under specific pieces of current provincial legislation. These allow an authority, such as a provincial ministry, to impose conditions on existing and/or future activities to protect drinking water sources. Examples of prescribed instruments include: nutrient management strategies and plans for farms, and certificates of approval issued by the Ministry for facilities such as waste disposal sites and waste management systems, permits to take water, and pesticide permits.

Figure 4: Multi-step Process for Developing Source Water Protection Plans

Prepared by the Office of the Auditor General of Ontario

Assessment Report	
Vulnerable area mapping (Source Protection Committee)	**Threat identification** (Source Protection Committee)
Locate municipal water intakes and map the vulnerable area around them.	Identify threats to source water within the vulnerable area. Determine if threats are deemed significant based on a system of scoring established by the Ministry that considers the risk associated with the threat and the vulnerability of an intake to the threat.

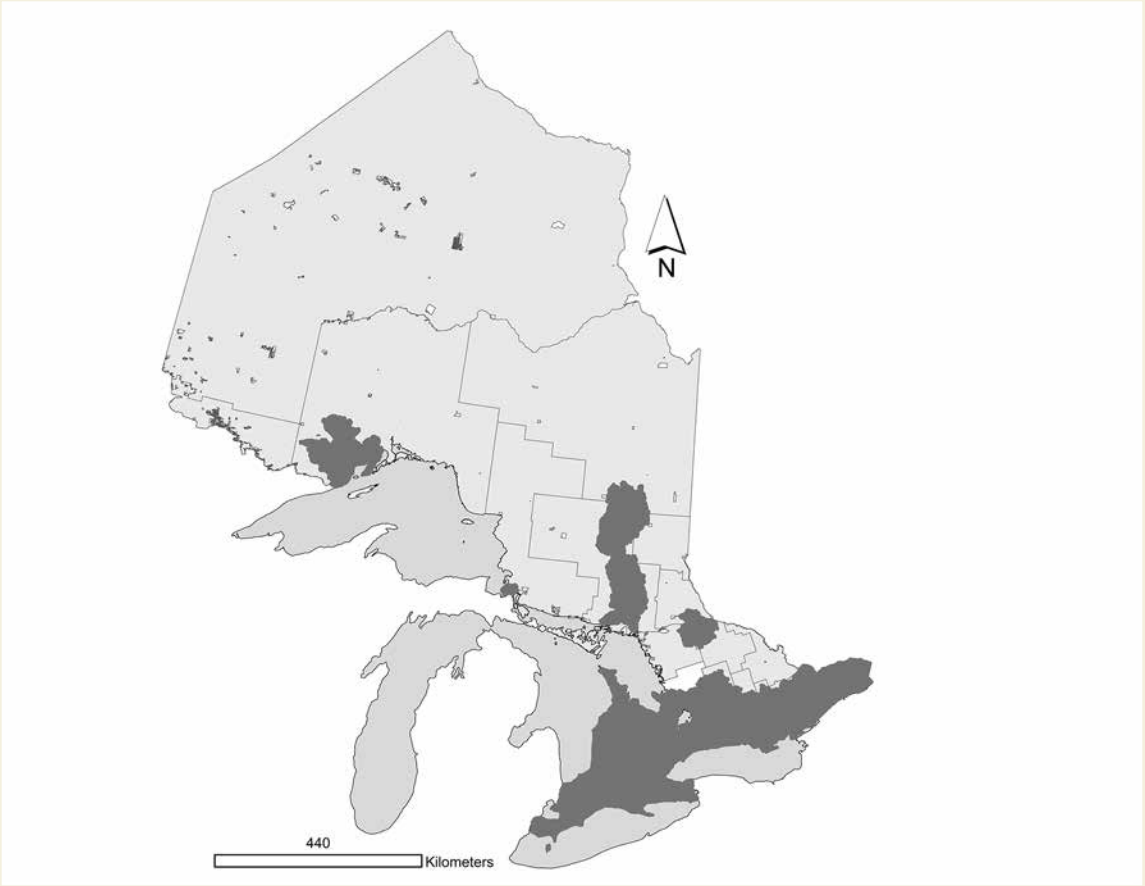
Ministry Approval of Assessment Report ↓

Source Water Protection Plans	
Policies for significant threats (Source Protection Committee)	**Plan review** (Ministry)
Develop policies to ensure that existing threats identified cease to be significant, and potential threats are managed in a way that they do not become significant.	Multi-stage review process that involves negotiation and mediation with respect to policies that are directed at various implementing bodies.

Ministry Approval of Source Protection Plan ↓

Plan Implementation
Legally binding policies come into effect Implementing Bodies (ministries and other government agencies, municipalities, conservation authorities)
Once plans are approved, implementing bodies are responsible for implementing the various policies that are included in a source water protection plan to mitigate threats to drinking water sources. These include land-use planning (i.e., by-laws and zoning), regulations, and stewardship (e.g., education and best management practices) to make sure an activity is not having a negative impact on vulnerable areas around drinking water intakes.

Figure 5: Map of the Area Covered by the Source Protection Regions in Ontario
Source of data: Ministry of the Environment and Climate Change



Note: Only 14% of the total land mass is covered by the source protection regions, but over 95% of Ontarians live within the boundaries of these regions.

- **Land use planning**–Allows the Source Protection Committees to manage or eliminate a future threat activity through policies that must be reflected in land use official plans, zoning by-laws and site plan controls.
- **Prohibition**–Allows the Source Protection Committees to prohibit certain existing or future activities that pose a particularly significant threat to drinking water sources. This tool is meant to be used only as a last resort if the committee is convinced no other method will reduce the risk the activity poses.

Source Protection Committees are required to designate an implementing body for each policy, such as a specific government ministry or agency, municipality, or a Conservation Authority. Once plans are approved by the Ministry, the implementing bodies will ultimately be responsible for implementing the policies contained in the plans. Implementing bodies will also be required to report on the progress of policy implementation to the Ministry.

Since the 2004/05 fiscal year, the Ontario government has invested over $240 million in source protection planning and implementation, less than 20% of which has been devoted to the latter. This does not include the time invested by members of the Source Protection Committees, or by Conservation Authorities, municipalities, and provincial ministry staff. Until 2011, the Ministry of Natural Resources and the Ministry jointly funded the program. In 2011, the Ministry assumed funding responsibility for the program. **Figure 6** provides a breakdown of total funding to date.

Figure 6: Breakdown of Total Funding Provided for Source Protection Planning and Implementation Over a 10-year Period Since 2004/05

Source of data: Ministry of the Environment and Climate Change

Program Initiative	Funding Since 2004/05 ($ 000)	% of Total Funding
Capacity funding–Conservation Authorities: To support source protection planning, Source Protection Committee costs, consultation, and other legislative obligations.	117,900	
Technical studies: To support completion of technical work necessary to develop assessment reports and source protection plans.	57,400	
Water quantity studies: To support the completion of water quantity studies and the inclusion of the results in source protection plans.	28,000	
Planning Total	**203,300**	**84**
Support for local initiatives: To support voluntary actions by landowners to address threats to drinking water sources in advance of the implementation of approved source protection plans.	24,500	
Source Protection Municipal Implementation Fund: One-time funding for smaller municipalities to help with the cost of implementing source protection plans.	13,500	
Implementation Total	**38,000**	**16**
Total	**241,300**	**100**

Delays in Source Water Protection Plan Approval and Implementation

Fourteen years after the crisis in Walkerton and 12 years after the Walkerton Commission of Inquiry first recommended the development of local source water protection plans, the Ministry is still in the process of reviewing and approving plans. At the time of our audit, only three plans had been approved by the Ministry, and these are for regions that have a relatively small number of municipal water intakes that serve about 5% of the province's population (as of September 2014, eight plans were approved). The Ministry does not have a clear time frame when all plans will be approved; however, its best case scenario is by 2016.

Source Protection Committees were responsible for preparing and submitting, by August 2012, their proposed source protection plans for review and approval by the Ministry. Even though all 22 proposed plans were submitted to the Ministry on time, the following sections highlight issues regarding the completeness of the plans submitted, their review and approval process, and the ultimate implementation of the plans once approved.

Significant Turnover in Ministry Staff Responsible for Reviewing Source Water Protection Plans

The review of each source water protection plan is led by one of four ministry review co-ordinators. These co-ordinators play a key role in the review and approval of plans. Their responsibilities include: assessing whether the plans have been prepared in accordance with the *Clean Water Act*; assessing whether the proposed policies within the plans adequately address the threats to source water; co-ordinating the review of technical data within the plans by ministry experts; and facilitating mediations between Source Protection Committees and other ministries and government agencies that would ultimately have to implement the proposed policies. We noted that in early 2014, three of the four co-ordinators left their positions for reasons such as retirement. The Ministry filled these vacancies in the spring of 2014 and hired five

additional temporary co-ordinators to alleviate the backlog; however, given the complexity of the plans, the newer co-ordinators must first overcome a steep learning curve to become fully effective in their roles, which can take several months.

Seven Regions Lacked the Water Budget Studies Needed to Complete their Source Water Protection Plans for Approval

The *Clean Water Act* requires that both source water quality and quantity be protected and, therefore, the plans must address threats to both. Twelve of the 19 regions identified water quantity threats in certain areas of their regions that required a more detailed water budget study to assess the significance of the threat. Water budget studies look at how much water enters a watershed, how much of the water is stored, and how much water leaves. This information helps determine how much water is available for human uses, while ensuring there is still enough left for natural processes (for example, there has to be enough water in a watershed to maintain streams, rivers and lakes to support ecosystems). Despite having submitted source water protection plans for Ministry approval, eight of the 12 regions were still finalizing their detailed water budget studies as of March 31, 2014. According to the Source Protection Committees we spoke to, there are two main factors that contributed to the water budgets not being completed on time. First is the complexity of the work, and second is a lack of qualified consultants to conduct the work. The Ministry informed us that it would only approve the plans once the water budget studies have been submitted. At the time of the drafting of this report, water budget studies in seven regions were still outstanding.

The Ministry has had to Conduct Significant Mediations Between Source Protection Committees and Other Ministries and Government Organizations

There has been a significant amount of time spent on mediation between Source Protection Committees and other ministries and government agencies affected by the policies proposed within the plans. Even though the *Clean Water Act* obligates affected parties to comply with the policies, in some cases the Ministry has been unsuccessful in mediating, and some significant threats to source water had to be excluded from the policies as initially envisioned by the Source Protection Committees. For example, the Technical Standards and Safety Authority (TSSA) is a not-for-profit, self-funded government organization under the legislative authority of the Minister of Consumer Services (MCS). Its mandate is to enhance public safety through programs such as its Fuels Safety Program, where it regulates the transportation, storage, handling, and use of fuels. Source protection plans have identified over 4,700 threats to water intakes in the various regions relating to the handling and storage of fuel. Fuel spills can cause significant contamination of source water; for example, only one gallon of oil can contaminate a million gallons of water. The source protection plans have proposed policies to deal with these threats, such as directing the TSSA to increase fuel tank inspections in areas close to water intakes, or requiring the TSSA to share information with Conservation Authorities and municipalities about fuel spills, or assist with developing and delivering education and outreach programs for the safe handling and storage of fuel. The TSSA initially did not agree to incorporate the proposed policies in its operations as it felt that the policies did not align with its mandate. Instead, it requested that its name be removed as the implementing body of the policies, and that the Committees reassign the policies to some other, more applicable organization, or remove the policies from the plans altogether. This led to significant consultations between the TSSA,

Source Protections Committees and the Ministry that were still ongoing at the time of our audit.

Funding Uncertainty for the Implementation of Policies in Source Protection Plans

The report of the Walkerton Commission of Inquiry noted the importance of the Ministry taking a lead role in all aspects of providing safe drinking water, including source protection. Currently, the Ministry lacks a long-term strategy that addresses:

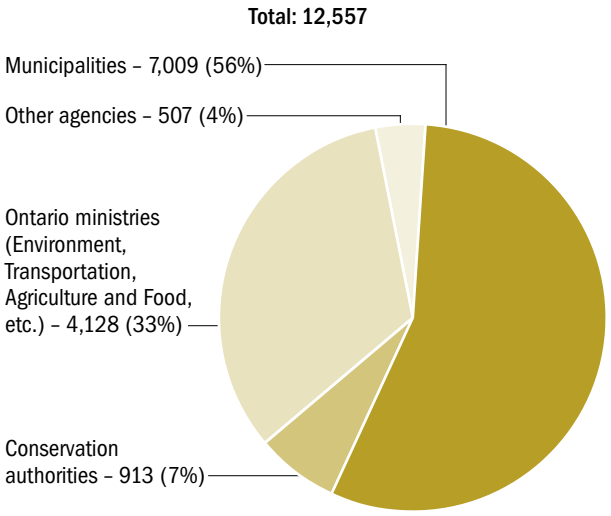
- funding and oversight of municipalities and Conservation Authorities to ensure the source protection plans, once approved, are implemented appropriately; and
- timely updates of source protection plans to ensure that the local threats to source water identified in the plans, and the policies to address the threats, remain current.

The 22 source protection plans that have been developed by Source Protection Committees for the 19 regions within the province contain over 12,500 proposed policies designed to reduce or eliminate threats against sources of drinking water. As seen in **Figure 7**, municipalities and Conservation Authorities are responsible for implementing about two-thirds of the total proposed policies. They will also be responsible for updating plans to ensure that they remain current.

However, once the plans are approved by the Ministry, there is still a great deal of uncertainty about who will fund their implementation. Specifically, municipalities and Conservation Authorities are looking to the province for additional funding. Smaller municipalities are affected the most with respect to funding. Unlike some of the larger municipalities that have a greater property tax base, these municipalities would have difficulty funding plan implementation from their existing tax base. In total, the proposed plans contain approximately 50 policies that require funding from the Ministry or the Ministry of Agriculture, Food and Rural Affairs in support of plan implementation. For example, some policies are directed at funding incentive programs for landowners who would incur losses or costs in implementing source protection policies.

Figure 7: Breakdown of Total Number of Policies by the Authorities Responsible for Implementing Them

Prepared by the Office of the Auditor General of Ontario



A February 2014 letter written by Conservation Ontario (the office that supports the network of Conservation Authorities in the province) to the Deputy Minister of the Ministry of the Environment and Climate Change on behalf of Ontario's 36 Conservation Authorities expressed concern regarding the imminent future of the source protection program because of future funding uncertainty. Specifically, the letter stated that the successful implementation of the *Clean Water Act* is highly dependent on the knowledge, expertise and skill sets of the professionals who have a long history with the program. However, given the uncertainty around future funding for the program, the retention of these individuals is at risk. In fact, many key individuals are either leaving the program in search of other employment, or are being terminated because of funding restraints. We noted an example of this in one of the smaller regions whose source water protection plan had been approved by the Ministry. A Conservation Authority there lost, due

to the funding uncertainty, most of the key staff that were responsible for developing the region's plan.

In our survey of Source Protection Committees and Conservation Authorities, 80% of respondents stated that the delay in plan approval and uncertainty in the funding of plan implementation is causing a loss of momentum that threatens the program. Committee members are simply losing interest in the process and are starting to resign, contributing to the loss of technical knowledge. Municipalities are reassigning staff, including some who had previously received training to become Risk Management Officers in anticipation of plan approval (discussed further below). The delay in approving and implementing the plans is having the following consequences:

- Work cannot be done to protect drinking water sources in accordance with the proposed policies contained in the plans. For example, the policies could prohibit the construction of a gas station near a drinking water source. Without these approved policies, in the meantime, the gas station could be built and the Ministry would then have to manage the risk the gas station poses to the water source.
- Conservation Authorities informed us that some of the plans may become outdated and would require an update before they are implemented. This will result in additional costs being incurred.
- Extensive training of municipal staff is at risk of becoming obsolete, requiring retraining at additional costs. Beginning in 2011, the Ministry started to provide mandatory training to municipal Risk Management Officers who will ultimately be responsible for implementing the enforceable policies within source protection plans. The qualifications obtained through this training expire after five years. If the majority of the plans do not begin to be implemented in 2016, many of these Risk Management Officers will have to be retrained at an additional cost.

RECOMMENDATION 1

To ensure that source water protection plans are reviewed, approved and implemented in a timely manner, the Ministry of the Environment and Climate Change should:

- internally set a firm commitment of when plans should be approved and then review its current staffing of the key personnel responsible for reviewing and approving plans to ensure it is sufficient to meet the commitment;
- work with Source Protection Committees to ensure that outstanding water budget studies are completed and submitted as soon as possible; and
- in consultation with municipalities and Conservation Authorities, devise an approach to fund the implementation of many of the policies within the plans once the plans are approved.

MINISTRY RESPONSE

The Ministry agrees with the Auditor General that source water protection plans should be reviewed, approved and implemented in a timely manner. The Ministry has created dedicated internal teams that focus on plan approval and implementation. As well, the Ministry works with subject matter experts across government, and program partners such as municipalities, conservation authorities and source protection committees to expedite plan approvals. The Ministry is on track to have half of the 22 source protection plans approved by the end of 2014 and its target is to have all plans approved by the end of 2015.

The Ministry continues to work with source protection committees to ensure that remaining technical studies (i.e., detailed water budgets) are completed in a timely way, recognizing that the external third-party technical expertise to perform this work is in limited supply and is a constraining factor.

The Government of Ontario has funded the source protection planning process to date in the order of $240 million to, for example, invest in technical and scientific studies, develop local plans and encourage early voluntary actions by landowners. The Ministry has listened and responded to small, rural municipalities who needed assistance with preparing for implementation by providing funding through the $13.5 million Source Protection Municipal Implementation Fund. Moving forward, implementation of local source protection plans is a shared responsibility involving all program partners.

RECOMMENDATION 2

In the longer term, the Ministry of the Environment and Climate Change, in conjunction with Source Protection Committees, should develop a strategy that addresses timely updates of the plans to ensure that local threats to source water, and policies that eliminate or mitigate the threats, remain current.

MINISTRY RESPONSE

The Ministry agrees that there should be timely updates of the source protection plans to ensure that threats to source water, and policies that address these threats, remain current. Moving forward, all source protection plans will have a mechanism for updates.

Limitations in Source Water Protection Plans

Based on a review of a sample of plans, the water policy expert we retained noted that source water protection plans will over time meet the intent of the *Clean Water Act* provided they are approved and implemented as soon as possible and go through at least one further iteration of affirmation and improvement that will address unforeseen weaknesses and challenges. In this regard, we note the following with respect to the 22 plans that have been submitted to the Ministry for approval:

Ministry Framework Does Not Identify All Significant Threats to Source Water

The Ministry's framework, which is used by Source Protection Committees when developing their plans, contains technical rules to assess the significance of the 21 threats (See **Figure 3**) to drinking water intakes. The Committees can develop stronger policies to address those threats classified as significant. To determine the significance of a threat, the rules assign a score to the risk associated with the threat and the vulnerability of an intake to the threat.

According to the Ministry, the science behind the protection of groundwater is fairly well established, whereas the protection of surface water is an emerging science. For that reason, the technical rules it used to classify threats to surface water that supply drinking water intakes are limiting and require an update to reflect new scientific data.

Source Protection Committees and Conservation Authorities indicated to us that the scoring system did not allow them to appropriately classify a number of threats they felt were significant. This is because the data and assumptions used in the scoring system to determine, in particular, the risk associated with a threat, are outdated. For example, some threats that could not be assessed as significant included the transport of petroleum products in a pipeline, the transport of hazardous substances across or in the vicinity of surface water, and the application of road salt and the storage of snow. Source Protection Committees and Conservation Authorities also noted that, in light of the extended time it has taken to develop and approve source protection plans, new information has resulted in the need to update the scoring system.

RECOMMENDATION 3

To strengthen source water protection and better ensure all significant threats are identified and addressed, the Ministry of the Environment and Climate Change should ensure that the data and assumptions used in its framework for assessing the significance of threats to drinking water intakes in the various regions of the province are current and properly enable significant threats to be classified as such.

MINISTRY RESPONSE

The Ministry is committed to ensuring that its overall framework for assessing significant threats to drinking water remains current. Emerging and new threats will be systematically captured and considered during the course of plan update and review.

In addition, as part of plan approval, municipalities and source protection committees will have a duty to report annually on source protection implementation and to identify emerging and new issues. As well, clear linkages have been established between the municipal land use planning framework and source protection planning, which allow municipalities to be far more pro-active in identifying and addressing potential threats to sources of drinking water.

Source Protection Plans Do Not Address All Potential Threats to Drinking Water Intakes in the Great Lakes

The majority of Ontario's population obtains its drinking water from the Great Lakes. In its technical rules for classifying threats as significant to the Great Lakes, the Ministry assumed that many drinking water intakes in the Great Lakes are far from shore and in deep waters, and therefore not susceptible to unsafe concentrations of contamination. However, we requested information about the depth and distance from shore of all Great Lake municipal water intakes and found that the Ministry did not have this data. Conservation Authorities that we visited informed us that, of the 154 intakes in the Great Lakes, there is only one intake, which supplies a portion of the Greater Toronto Area, that is significantly deep and offshore (90 metres deep and 2 km offshore). The remaining intakes are much closer to shore and closer to the surface (some very close to shore and only 3 metres deep).

After extensive discussions, the Ministry allowed Source Protection Committees and Conservation Authorities to use an alternative method, called "events-based modeling", for assessing significant threats to drinking water intakes in the Great Lakes. This method simulates whether events such as a spill of contaminants will reach water intakes at concentration levels high enough to pose a threat to human health. In the eight regions where Great Lake intakes exist, "events-based modeling" was used to determine if spills—from sources such as a pipeline transporting petroleum products or large industrial and municipal facilities on the shores of the Great Lakes—could be classified as a significant threat.

The results of the modeling exercises revealed that contaminants do in fact have the potential to reach drinking water intakes in the Great Lakes at elevated levels. The Source Protection Committees then developed policies in their source protection plans to address these. However, without further funding, the Committees could model only a limited number of scenarios. Therefore, source protection committees and municipalities informed us that there is a risk that spills from other existing industrial and commercial facilities may also pose a significant threat to intakes in the Great Lakes, but the plans do not address these. Conservation Authorities and Source Protection Committees confirmed to us that they haven't had the resources or opportunity to do a complete inventory of conditions and near-shore activities that pose a threat to drinking water intakes in the Great Lakes.

RECOMMENDATION 4

To ensure that source water protection plans address all potential threats to drinking water intakes in the Great Lakes, the Ministry of the Environment and Climate Change should work with the relevant Conservation Authorities and Source Protection Committees to complete an inventory of all conditions and near-shore activities that pose a threat to the intakes, assess the conditions, and incorporate into the protection plans ways of dealing with these threats.

MINISTRY RESPONSE

The Ministry agrees with the Auditor General that protecting the Great Lakes from potential drinking water threats is of critical importance. Ontario has a strong regulatory framework to help protect water quality and quantity. Legislation and water protection programs are founded on science and are often ecosystem- or watershed-based.

The Ministry is continuing its work with the federal government, and internationally through the Canada–U.S. Great Lakes Water Quality Agreement, to set goals relating to nutrient loading, cleaning up contaminated sites, spills prevention planning and improving overall Great Lakes health.

The Ministry is working with conservation authorities and municipalities to augment the existing inventory of threat activities on the Great Lakes. This includes assessing wastewater treatment plants, pipelines and fuel storage facilities. We will continue to work with conservation authorities and municipalities as part of future plan updates to ensure that all near-shore activities that pose a threat are captured. Monitoring and investigations will continue and focus as necessary on lake-wide threats and conditions that provide the backdrop for localized threats.

Private Wells Excluded from Source Protection Planning

An estimated 1.6 million people in Ontario rely on private wells for their drinking water supply. In the aftermath of the Walkerton tragedy, the second report of the Walkerton Commission of Inquiry noted:

> "Protecting drinking water sources can in some instances be less expensive than treating contaminated water. Moreover, protecting sources is the only type of protection available to some consumers—at present, many rural residents drink untreated groundwater from wells. The protection of those groundwater sources is the only barrier in their drinking water systems."

In November 2008, the Ministry passed a regulation under the *Clean Water Act* that excludes private wells or intakes from source protection planning. This regulation was developed through consultation with the parties involved in source protection planning. The parties agreed that in order to expedite the process, wells or intakes that serve one private residence would be excluded from the initial phase of source protection planning, but their inclusion would be considered in subsequent phases. Under the Act, municipalities, through a council resolution, could request that a cluster of six or more private wells or intakes, or a well(s) serving a designated facility such as a school or a day care, be included in source protection planning. However, we noted that municipalities for the most part have not elected to include these in source water protection planning.

The responsibility of private well maintenance and testing falls on the owner. Public Health Ontario offers free testing for bacterial contamination; however, it costs $150 on average to test a well for chemical contamination, and these tests are conducted by private labs. Since there are no accurate records on the total number of private wells in the province, it

is impossible to tell what percentage of private well owners actually gets their water tested.

We requested results of bacterial contamination tests from Public Health Ontario and found that overall private well water submissions had decreased by 40% since 2003. In 2013, private well owners submitted approximately 166,000 water samples to Public Health Ontario, of which 36% tested positive for bacteria including E. coli. If private wells were held to the same safety standards used for public drinking water systems (that is, for every 100 mL of drinking water tested, no bacteria including E.coli bacteria should be detected), water from these wells that tested positive for bacteria would be considered unsafe to drink.

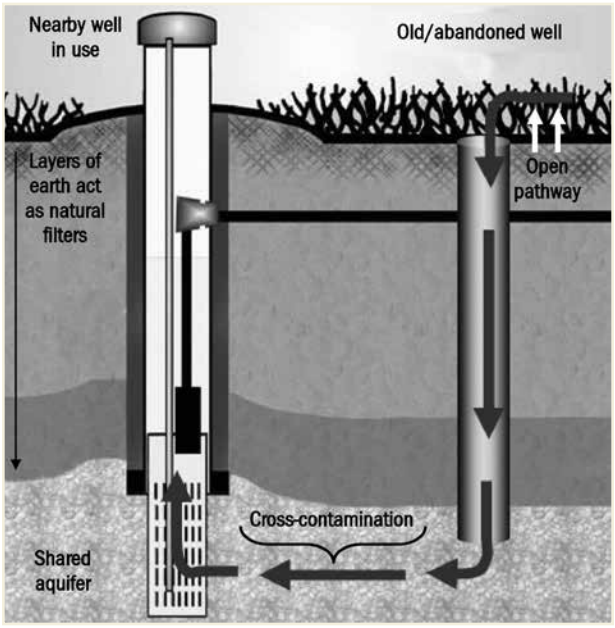
The government does not have records on the number of private wells tested for chemical contamination since private labs conduct these tests. The Ministry, however, through approximately 380 monitoring wells located mainly in southern Ontario, monitors whether a suite of chemicals in groundwater has exceeded standards considered safe for public drinking water systems. Currently, there are no mechanisms in place to notify private well owners when chemical levels in groundwater are known to exceed acceptable levels. In 2013, 31 unique well locations revealed that chemical levels, mainly fluoride and nitrate, had exceeded acceptable drinking water standards by nearly 30% on average. Fluoride and nitrate can get into groundwater either naturally or from runoff of fertilizers used in agricultural areas, from septic and sewage treatment system discharges, and from industrial sources. In effect, any water drawn by private wells from these groundwater sources would have been contaminated until such time as the chemicals went down to acceptable levels.

The Risk that Abandoned Wells Pose to Sources of Groundwater Not Addressed in Source Water Protection Planning

Abandoned wells that have not been properly decommissioned pose a risk to groundwater. As seen in **Figure 8**, they provide open pathways to aquifers that bypass the natural filtration processes afforded by the different layers of the earth. The risk of abandoned wells can only be mitigated through proper well decommissioning. In Ontario, dry wells and wells that are not being used must be plugged and sealed according to the regulations under the *Ontario Water Resources Act*. To minimize the risk that the well will contaminate groundwater sources, the regulations set out detailed requirements on how to choose a filling material to plug the well, how deep it must be filled, and how to properly seal the well at ground level.

Figure 8: Example of Cross-contamination caused by an Improperly Decommissioned Abandoned Well

Source of data: Adapted from Agriculture and Agri-Food Canada



Ministry records show that about 60,000 abandoned wells have been decommissioned properly in Ontario. The Ministry acknowledged that its information may not be complete because many wells were abandoned prior to the 1920s, when the Ministry first began tracking abandoned wells. Also, private landowners are reluctant to report abandoned wells on their properties because it could cost as much as $10,000 to properly decommission the well. However, a recent Canada-wide report published by the University of Alberta

estimated that 730,000 wells have been abandoned in Ontario. Therefore, evidence suggests that there may be many abandoned wells in the province that have not been properly decommissioned and that these pose a threat to groundwater sources. However, they are not listed as one of the 21 specific threats required to be addressed in source water protection planning.

RECOMMENDATION 5

To strengthen source water protection, the Ministry of the Environment and Climate Change should consider the feasibility of requiring source protection plans to identify and address threats to sources of water that supply private wells and intakes and threats that abandoned wells may pose to sources of groundwater. As well, in conjunction with the Ministry of Health and Long-Term Care and public health units, the Ministry should put mechanisms in place to notify private well owners when bacterial and chemical levels are known to exceed acceptable levels in their area.

MINISTRY RESPONSE

The Ministry appreciates the Auditor General's recommendation. The Ministry's regulatory and compliance focus is on larger drinking water systems, such as the municipal drinking water systems that serve over 8 million Ontarians. A multi-pronged regulatory framework addresses the licensing, construction and decommissioning of private wells in Ontario. It is important to note that private well owners have responsibility for the proper constructing and maintenance of their wells. The Ministry will work with conservation authorities to examine the issue of abandoned wells in significant risk areas that may pose an issue to groundwater.

The Ministry, along with the Ministry of Health and Long-Term Care, local health units and conservation authorities, provides support and assistance to private well owners on several fronts. If chemical levels in groundwater exceed health-based criteria, results are shared within two days to ensure proper notification and awareness. The Ministry publicly posts all information from the groundwater monitoring program. Free water sample collection kits are also available to private well owners along with instructions on how to take a sample and obtain water test results, and what to do if the well tests positive for contamination. Public health inspectors are available to help interpret the test results and provide advice to private well owners to assist them in addressing such issues. The Ministry, in conjunction with the Ministry of Health and Long-Term Care, will review and, where necessary, improve its current practices of ensuring that private well owners are duly notified when bacterial and chemical levels are known to exceed acceptable levels in their area.

Some Eligible Municipalities Left Out of One-time Funding for Source Protection Plan Implementation

In 2013, the Ministry received one-time funding approval to distribute $13.5 million over three years to qualifying municipalities to assist them with the implementation of source protection plans. Under the Source Protection Municipal Implementation Fund (SPMIF), the Ministry determined that 189 small and rural municipalities qualified for, and would receive, this funding. Municipalities received funding ranging from about $18,000 to as high as $100,000. An additional $2.8 million of the SPMIF has been set aside as an incentive for municipalities to collaborate with one another in the implementation of the policies in the plans.

The Ministry allocated SPMIF funding based on a formula that considered the number of threats specified in source protection plans and the types of policies that the municipalities are required to implement. When the Ministry allocated the funds,

it was aware that some municipalities were still in the process of verifying threat counts; however, the Ministry committed all funds before verification was complete. Consequently, in some source protection regions, additional municipalities were identified as eligible to receive funding under the formula, but didn't receive funding because all funds had been allocated.

RECOMMENDATION 6

To better ensure that any future funding to municipalities for the implementation of source protection plans is allocated fairly to achieve intended objectives, the Ministry of the Environment and Climate Change should ensure all eligible municipalities are identified before distributing funds.

MINISTRY RESPONSE

The Ministry recognizes that, to achieve the best outcomes, funding to prepare municipalities for source protection implementation needs to be fairly allocated. The $13.5-million three-year Source Protection Municipal Implementation Fund created in 2013 targeted small, rural municipalities for funding assistance. Some 189 small, rural municipalities were identified as eligible. The Ministry worked collaboratively with the Ministry of Finance to define "small, rural" in such a way that would maintain consistency with other Ontario government programs. This funding approach was strongly endorsed by the Association of Municipalities of Ontario.

The Ministry will strive to ensure that, for any future funding, all eligible municipalities are identified before funds are distributed.

The *Nutrient Management Act*

The primary source of the deadly bacteria that contaminated Walkerton's drinking water system was manure that had been spread on a cattle farm near one of the wells that was the source of the town's drinking water. Operations at the water treatment plant did not remove this contamination. For the most part, a regulation under the *Nutrient Management Act* requires larger farms that have livestock and produce more than 300 nutrient units of manure to use certified individuals to develop:

- Nutrient management strategies for storing and handling manure. For example, these strategies must address the amount of manure that the farm generates; the size, location and other specific requirements related to the storage facilities; and whether the land base is sufficient to accommodate the material.
- Nutrient management plans for applying manure. For example, these plans must document any nearby environmentally sensitive sites and features, and maintain minimum buffer zones from wells and surface water, and outline the application rates, timing and methods for the different crops that may be grown on the farm.

As part of a strategy to phase in the remaining farms, the regulation also requires that landowners develop strategies for the proper storage and handling of manure if the farm expands or builds new storage and/or animal housing facilities. Under the regulation, farms that don't have livestock and therefore would not be producing manure, but may still be applying it on crops, do not have to develop plans for its application.

Many Farms in the Province Do Not Have to Adhere to the *Nutrient Management Act* and its Regulations

Under the requirements of the *Nutrient Management Act* and its regulations, only a limited number of farms that produce and use manure are captured. For the most part, manure that is generated at a farm is either used on that farm on its crops or is provided to other farms for use on their crops. Based on information reported in the most recent Statistics Canada census in 2011, we calculated that approximately 1.8 million nutrient units of manure

was produced in Ontario in 2011. However, the regulation under the Act would require that plans be in place for the proper application of only about 800,000, or less than half, of the nutrient units produced. The farm that was the source of contamination in Walkerton's drinking water would currently not be captured under the Act's regulations since it generated only about 60 nutrient units of manure, well below the threshold of 300 nutrient units stipulated in the regulation. Neither the Ministry of Agriculture, Food and Rural Affairs nor the Ministry has a definite time frame to phase in all farms that generate and/or apply manure in the province. In this regard, Alberta and Quebec, comparable provinces in Canada that have intensive livestock farming, require all farms to adhere to legislation and regulations relating to the proper storage, handling, and application of manure.

Neither the Ministry of Agriculture, Food and Rural Affairs nor the Ministry has information on the number of farms that produce more than 300 nutrient units of manure and, therefore, need to manage it in accordance with the *Nutrient Management Act* and its regulations. Instead, they rely on education and outreach to ensure that farms self-report whether they meet the conditions set out in the Act and its regulations. However, apart from the initial education and outreach that was targeted at selected farms when the regulations under the Act first came into effect in 2003, the Ministry of Agriculture, Food and Rural Affairs's efforts to inform farmers about their obligations under the Act have been limited. Sometimes through public complaints, incidences of non-compliance by farms become known.

Concerns also exist with respect to crop farms that apply commercial fertilizers containing nitrogen and phosphorus. According to the 2011 Statistics Canada census, commercial fertilizer was applied to approximately two-thirds, or 2.4 million hectares, of all crop land in Ontario. However, regulations under the *Nutrient Management Act* only require large livestock farms, which make up only about 250,000 hectares of land according to the Ministry of Agriculture, Food and Rural Affairs, to develop detailed management plans for applying nutrients (including commercial fertilizer). The remaining 2.1 million hectares of land on which commercial fertilizers were applied was not subject to such planning. The plans for large livestock farms, for example, determine the amount of nutrients that can be applied to lands adjacent to surface water, and also prescribe minimum buffer zones to safeguard surface water and municipal wells. For all other farms, if the environment becomes contaminated through improper nutrient management, the Ministry can lay charges against a farmer through other Acts, but only after the fact and only if the contamination is reported to the Ministry and can be traced back to the source or farm.

The regulation under the *Nutrient Management Act*, which includes specific requirements and strategies for the storage, handling and application of manure, came into effect in 2003. Yet, since that time, phosphorus and nitrogen contamination continues to grow in the province's agricultural watersheds. Between 2004 and 2009, the Ministry gathered data on the quality of water in streams in agricultural watersheds with intensive manure production. In nine of 15 streams, the median phosphorus concentration exceeded the Provincial Water Quality Objectives for sustaining a healthy ecosystem. The nitrate concentrations in nearly all of the streams exceeded guidelines suggested by the Canadian Council of Ministers of the Environment (comprising the environment ministers from the federal, provincial and territorial governments). Since 2009, the Ministry has continued to gather data on streams, but at the time of our audit had not analyzed the data. Our review of the data suggested that both phosphorus and nitrogen levels continue to increase in the majority of the streams for which data is being collected.

The Ministry and the Ministry of Agriculture, Food and Rural Affairs have acknowledged the need to phase in all farms to adhere to the Act's regulations, but to date have been unsuccessful. In 2003, the Provincial Nutrient Management

Advisory Committee (Committee) was created to provide recommendations to the Minister of Agriculture, Food and Rural Affairs and the Minister of the Environment related to certain aspects of nutrient management in Ontario. The members of the Committee were drawn from a broad range of stakeholder groups, including farm organizations, the livestock industry, rural municipalities and the environmental community. Among other things, the Committee was tasked with recommending an effective way to phase in all farms to meet the requirements of the *Nutrient Management Act* and its related regulations. In 2006, this mandate of the Committee was transferred to another committee, but the second committee also did not report on a phase-in strategy since this was subsequently scoped out of its mandate.

RECOMMENDATION 7

To better ensure that the objectives of the *Nutrient Management Act* are being met, the Ministry of the Environment and Climate Change, together with the Ministry of Agriculture, Food and Rural Affairs, should develop an approach to gather information on the total number of farms in the province that need to manage nutrients in accordance with the *Nutrient Management Act* and its regulations.

MINISTRY RESPONSE

The Ministry agrees with the recommendation and is committed to ensuring that the *Nutrient Management Act* (Act) is applied uniformly to all relevant farming operations. With the implementation of source protection plans, the ministries of environment and agriculture will review the current approvals inventory against threat assessments and existing farming operations, and develop a strategy to ensure that the farming operations captured by the Act are being managed accordingly.

When the Act came into force, the Ministry of Agriculture, Food and Rural Affairs assessed the numbers of existing farms using information from a variety of sources to ensure that the Act's objectives were being met. Since that time, new and expanding farming operations have been captured as municipal building officials have required proof of an approved Nutrient Management Strategy as a condition in obtaining a building permit. Moving forward, the Ministry of Agriculture, Food and Rural Affairs will consider other approaches to gathering information on farms that need to manage nutrients in accordance with the Act.

RECOMMENDATION 8

The Ministry of the Environment and Climate Change, in conjunction with the Ministry of Agriculture, Food and Rural Affairs, should phase in the remaining farms in Ontario that generate or apply nutrients so that they also must adhere to the requirements of the *Nutrient Management Act* and its regulations.

MINISTRY RESPONSE

The Ministry and the Ministry of Agriculture, Food and Rural Affairs appreciate the Auditor General's recommendation regarding the phase-in of additional farm operations. Both ministries currently manage nutrient generation and application under complementary legislative frameworks to manage risks to drinking water: the *Nutrient Management Act* and the *Clean Water Act*. The *Nutrient Management Act* was brought into effect to manage the risks from nutrient application on large and expanding farm operations. If they are undertaken in significant risk areas, farming activities, regardless of size, would be captured under the *Clean Water Act*. This includes the risks posed by fertilizers, manure application, fuels and pesticides.

As Source Protection Plans are implemented, the ministries will work together to assess the management of risks from nutrient applications to determine if the phase-in of additional farms would enhance the protection offered under the *Clean Water Act*.

Ministry's Enforcement of the *Nutrient Management Act* is Limited

The Ministry's enforcement of the *Nutrient Management Act* consists of inspecting farms that have reported to the Ministry that they meet the criteria of the Act. The Ministry then inspects for compliance with the Act and regulations in three specific areas:

- application and/or storage of agricultural source material (i.e. manure);
- application of non-agricultural source material (i.e. sewage and pulp and paper bio-solids); and
- proper identification of environmentally sensitive features in the plans for the application of non-agricultural source material.

In 2013/14, the Ministry employed 17 agricultural inspection officers across the province to carry out the above inspections. However, as seen in **Figure 9**, the number of inspections of farms that are known to have to adhere to the Act and its regulations is limited. We noted that the Ministry could target and complete more inspections. Specifically, with 17 agricultural inspection officers on staff, the set target of 336 inspections equates to an inspector performing less than one farm inspection every two weeks. We noted that over half of the inspections take no longer than a day to perform, with the remainder of the inspections taking a couple of days to conduct. Despite this, in 2013/14, the Ministry did not meet its planned inspection target because it performed only 269 of the 336 planned inspections.

Due to the limited number being conducted, inspections may not be serving as an effective deterrent. The Ministry may not be establishing a strong enough presence in the farm community. We noted that over the past two years, approximately 50% of the farms that had been inspected had been found to be non-compliant with the *Nutrient Management Act* and its regulations. Of these, the Ministry found that about half of the non-compliant issues were causing a risk or threat to the environment and/or human health from the overloading of nitrogen and phosphorous in the soil. Also, even though the *Nutrient Management Act* allows punitive measures such as issuing offence notices that may result in fines set by provincial courts, we noted that these measures are rarely used. In the past 11 years, the Ministry had issued only seven such notices.

In 2003, when the *Nutrient Management Act* was implemented, the Ministry released a regulation that detailed its requirements for new manure storage and livestock housing facilities, specifically relating to:

- siting (for example, minimum required distances from wells, municipal drains, and bedrock and aquifers that hold groundwater); and
- construction (for example, requirements for the quality of the concrete used, for a structurally solid floor, and for a system to handle run-off from the facility).

The regulation also requires a professional engineer or geoscientist to carry out a site characterization study (to identify soil types and the presence of any aquifer or bedrock) to further safeguard the environment, including source water. Facilities built prior to 2003 were not required to adhere to any of these standards. Neither the

Figure 9: Inspections of Farms in 2013/14 Known to Have to Adhere to the *Nutrient Management Act*

Source of data: Ministry of the Environment and Climate Change, and the Ministry of Agriculture, Food and Rural Affairs

Inspection Type	# of Farm Units*	# of Inspections	% of Farms Inspected
Application and/or Storage of Agricultural Source Material (i.e., manure).	4,709	138	3
Application of Non-agricultural Source Material (i.e., sewage, pulp and paper bio-solids).	1,456	104	7
Inspections to ensure environmentally sensitive features have been properly identified in Non-agricultural Source Material plans.	1,456	27	2

* As of February 2014.

Ministry of Agriculture, Food and Rural Affairs nor the Ministry know the total number of manure storage and livestock housing facilities in Ontario. Therefore, they cannot determine whether facilities built after 2003 were actually built in accordance with the regulation and what risk facilities built prior to 2003 pose to the environment and sources of drinking water. In 2001, Statistics Canada last surveyed 70% of the farms in Ontario and identified that there were 22,740 manure storage facilities. The survey determined that a good number of these were within a 30-metre radius of a well. No subsequent counts of manure storage facilities have been conducted and a count of livestock housing facilities in the province has never been conducted.

We also noted a number of other concerns with respect to the Ministry's enforcement of the *Nutrient Management Act* and its regulations. Specifically:

- Inspections are currently not determined by any formal risk-based criteria. Instead, inspection officers have the discretion to select which farms to inspect, in collaboration with their manager. A formal risk assessment would increase the probability that resources are used to inspect farms that are most likely to be non-compliant with the Act and its regulations or where non-compliance poses higher risks to the environment due to a farm's characteristics.
- We reviewed a sample of completed inspections that were identified by the Ministry as being non-compliant with the Act and its regulations and noted the following:
  - In nearly two-thirds of our sample, the inspection officer did not request the farm to report back to the Ministry on whether the non-compliant issues had been resolved. We noted that many of the farms were repeat offenders. In a number of cases, the inspection officer gave only a verbal warning to the farmer. Over two-thirds of the non-compliant issues posed a risk to the environment. For example, they included insufficient buffer areas around ditches where nutrients could accumulate over time and seep into groundwater sources, and a lack of appropriate run-off management systems to prevent nutrients from harming the environment, including source water.
  - In almost 60% of the inspections we sampled, farms had not accurately reported key operational and site features, such as manure storage or animal housing facilities, in their approved strategies and/or plans that had been previously submitted to the Ministry of Agriculture, Food and Rural Affairs. In all cases, the inspectors from the Ministry, who actually conducted the inspections, encouraged the farmer to update their strategy and/or plan, but failed to notify the Ministry of Agriculture, Food and Rural Affairs so that the Ministry of Agriculture, Food and Rural Affairs could follow up with the farm.
  - In 15% of our sample, we noted that the severity of non-compliance was documented inappropriately. Specifically, the non-compliance was formally documented as being administrative only; however, according to the inspectors' notes, the non-compliant issue posed a risk to the environment.

RECOMMENDATION 9

To better ensure that the *Nutrient Management Act* and its regulations are being enforced, the Ministry of the Environment and Climate Change should:

- set appropriate inspection targets that fully utilize inspection staff and maximize the number of inspections being performed;
- use appropriate risk-based criteria to select farms for inspection; and
- follow up on any noted cases of non-compliance and encourage compliance by using, where necessary, all available punitive measures, such as offence notices.

MINISTRY RESPONSE

The Ministry agrees with the Auditor General that it would be beneficial to review the criteria used to select farms for inspections with a view to further refining risk-based selection. The Ministry will undertake a review of our selection criteria and apply it more uniformly across regions and districts.

Ministry inspection targets are based on a number of factors, including aspects of the site (location, equipment, complexity of operations, proximity to sensitive areas, etc.) and compliance history. Staff are assigned to the highest-risk activities to meet ministry compliance objectives, including selecting farms for proactive inspection. Inspections include file review, review of additional information after the site inspection, and the preparation of an inspection report. In addition to proactive inspections, our inspectors also respond to about 450 complaints from agricultural operations every year, including odours and spills associated with the storage of materials and/or their application on land, pesticide usage, well construction, deadstock management and other related on-farm environmental issues. The Ministry will continue work to refine its approach to setting inspection targets in order to maximize the number of inspections being performed.

The Ministry's staff work collaboratively with farmers and the Ministry of Agriculture, Food and Rural Affairs to assist farmers in addressing non-compliance issues and implementing preventative measures, such as addressing renewals of nutrient management strategies and plans. The Ministry will consider the use of offence notices as a tool to promote compliance under the *Nutrient Management Act* and will explore the development of *Provincial Offences Act* tickets.

Water Taking

Since 1961, anyone taking more than 50,000 litres of water per day from either surface or groundwater sources in Ontario requires a Permit to Take Water (permit) issued by the Ministry. The purpose of the permit system is to promote fair sharing of water supplies, help ensure the sustainable use of water resources, protect the natural functions of the ecosystem, and to help the Ministry better plan for and manage the usage of water resources.

As of March 2014, there were over 6,000 active permits in the province, located mostly in southern Ontario. Permit holders are required to maintain daily water-taking records and report this information to the Ministry for each calendar year. Individual permit information can be found on the Ministry's website and includes, for example, the purpose of the permit, the maximum amount of water allowed to be taken, and the expiration date of permits.

When assessing a permit application, ministry staff relies on information from 470 well sites across the province that provide hourly groundwater level data. The water budget studies that were submitted by Conservation Authorities for the purposes of the source water protection plans may also be available to staff.

The Ministry's Water-taking Charges Are Insufficient to Recover Program Costs

The province's annual cost of administering its water quantity management programs, which include the Ministry's Permit to Take Water program and its Provincial Groundwater Monitoring Network, is $16.2 million. Of this amount, $9.5 million are direct program costs attributable to industrial and commercial users which may be recovered through water-taking charges. However, the Ministry, at the time of our audit, was recovering only about $200,000 through its water-taking charges.

As of January 1, 2009, a regulation under the *Ontario Water Resources Act, 1990*, allowed the Ministry for the first time to charge high-consumptive

industrial or commercial water users (such as water-bottling companies and other companies that incorporate water into their products). These high-consumptive industrial or commercial users account for about 1% or 60 of the over 6,000 permit holders currently taking water in Ontario. The rate was set at $3.71 for every million litres of water that they take and was established based on the assumption that the affected users would take the maximum amount of water allowed under their respective permits. However, actual takings have been significantly less, resulting in much lower revenue than costs.

In his fiscal 2008 annual report, the Environmental Commissioner of Ontario weighed in on the regulation, stating that it will not meaningfully "promote the conservation, protection or wise management of Ontario's waters", despite the fact that this purpose is explicitly authorized by the regulation. The Commissioner went on to recommend that the Ministry establish fees that are proportionate to the full cost of administering the government's water quantity management programs. Both the 2012 Drummond report and the 2012 Ontario Budget suggested that the government should recover a greater portion of the province's water quantity management costs through water-taking charges.

In 2012, the Ministry conducted a review of its water-taking charges and found that actual water takings were 85% less than the permitted volumes, on average, resulting in lower revenues than originally expected. Based on these volumes, rates would have to increase significantly in order for the Ministry to recover the actual costs of its programs. At the time of our audit, the Ministry had begun working on proposals to Treasury Board and Management Board of Cabinet to phase in new water charges for both low- and medium-consumptive users and to increase the charge rates for high-consumptive users.

The Ministry Does Not Use All Information When Issuing Water Permits

As noted previously in this report, the development of source water protection plans requires Conservation Authorities to create advanced water budgets where water quantity threats have been identified. To date, six water budget studies have been carried out in five regions at a cost to the Ministry ranging from approximately $250,000 to $2.5 million per study. These studies were not only meant to be used for source protection planning, but also by the Ministry to support the review and approval of water-taking permits. The *Ontario Water Resources Act* requires that the Ministry, to the extent that information is available and relevant, consider the use of all water information (such as water budget studies) when issuing water-taking permits. However, at the time of our audit, we found that the water quantity studies had not been integrated into the permit program, and found no evidence that they were used in the permit evaluation and granting process.

RECOMMENDATION 10

To ensure the Ministry of the Environment and Climate Change will be able to recover the province's cost of administering its water quantity management programs, and to ensure the sustainability of sources of water in the province, the Ministry should:

- charge industrial and commercial users of either surface or groundwater sources in Ontario an appropriate fee; and
- refer to the relevant water budget studies prepared by Conservation Authorities when deciding to issue water-taking permits.

MINISTRY RESPONSE

The Ministry concurs with the Auditor General's recommendation that the province move toward further recovery of costs for administering its water quantity management program. Consistent with the recommendations of the

Commission on the Reform of Ontario's Public Services (the Drummond Report), the Ministry is working on proposals that would bring water charges towards full cost recovery and sustainability. This will be done in consultation with key stakeholders.

Current information contained in technical studies (i.e., water budgets) prepared by Conservation Authorities is shared within the Ministry to be considered in reviewing applications for water-taking permits. As more technical studies are completed, they will also be shared with staff for consideration in issuing water permits. The Ministry is updating internal procedures to formalize this process.