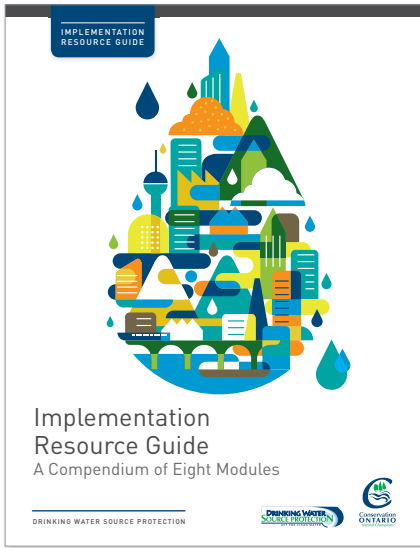




MODULE 4

Annual Reporting & Information Management

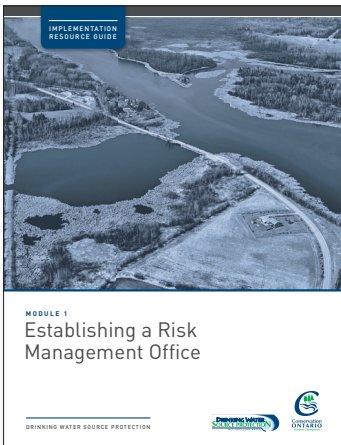


Implementation Resource Guides

A Compendium of Eight Modules

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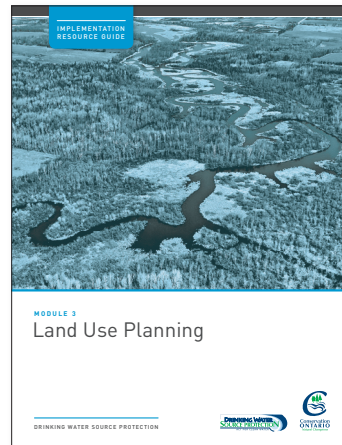
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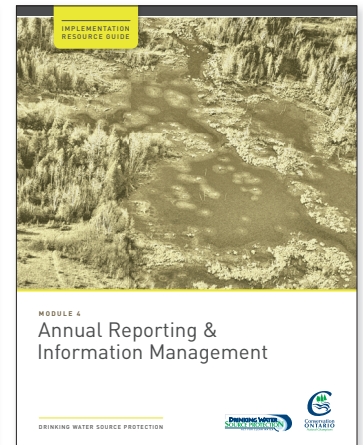
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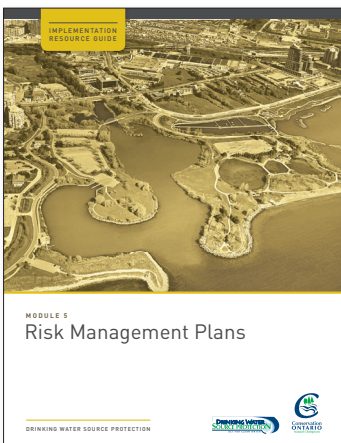
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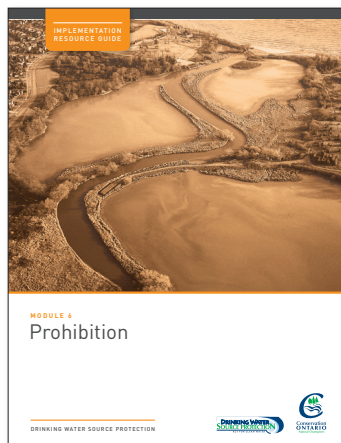
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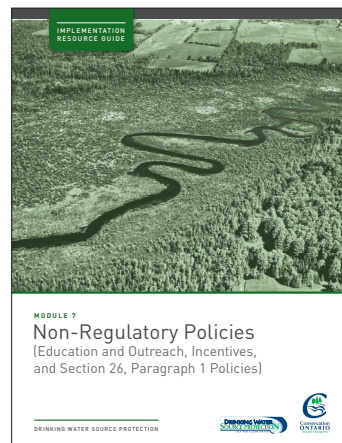
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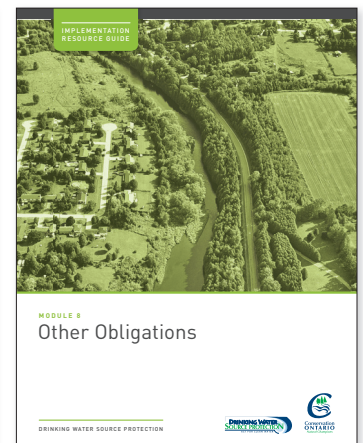
MODULE 6



MODULE 7



MODULE 8



Module 4: Annual Reporting and Information Management

Implementation Resource Guide

06/05/2014

Note to Reader: This document is one of a series developed by staff at conservation authorities and Conservation Ontario in support of source protection plan implementation. These documents cover a variety of tools related to plan implementation, but not all will apply in your municipality. Consult your local source protection plan to determine which policies are applicable in your municipality. This document has not been reviewed by legal counsel and is not presented as legal advice.

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A. Introduction

This module aims to provide information on annual reporting and information management requirements for source protection plan implementation to municipalities or other implementation bodies. Information has also been included regarding the data management associated with source water protection in general.

Annual reporting makes up the first section of this module and includes a summary of requirements under the *Clean Water Act, 2006*, as well as how to fulfill these obligations. The annual reporting requirements are available through the *Clean Water Act*, specifically Sections 46 and 81, as well as Sections 52 and 65 of Ontario Regulation 287/07. Reference the legislation for exact wording and provisions.

The second section of this module discusses data and information management. The module also explores how data and information management pertain to annual reporting and general source water protection.

Data is not static; therefore changes may be made to annual reporting and information management requirements in the future. The Ministry of the Environment will be developing requirements and/or recommendations to assist with annual reporting or information management. The information contained in this module is current at the time of writing.

B. Annual Reporting

The *Clean Water Act* requires that Risk Management Officials, source protection authorities, other implementing bodies, as well as the Minister of the Environment, report annually on the implementation of source protection plans. The goal of annual reporting is to track and advise the public that the implementation of the source protection plans and their respective policies are protecting Ontario's drinking water sources.

The *Clean Water Act* prescribes the annual reporting process flow, as summarized in Figure 1 and described here. Ontario Regulation 287/07 requires that all implementing bodies, including the Risk Management Official, report¹ directly to the source protection authority on the actions taken to implement the source protection plan. The source protection authority combines the information from the various implementing bodies into one succinct report for the source protection area. Once complete, the report is provided to the source protection committee for commenting. All comments provided by the source protection committee are incorporated into the final version of the report provided to the Director. Upon submission to the Director, the

¹ *In addition to reporting directly to the source protection authority, Ontario Regulation 287/07 prescribes that upon the Director's request, the Risk Management Official shall also provide an additional copy of the Annual Report directly to the Director.*

source protection authority shall make the report publicly available as soon as reasonably possible.

Annual Reports describe the measures taken to implement the source protection plans, ensure activities cease to be significant drinking water threats, and ensure activities do not become significant drinking water threats. The goal of the Minister's Annual Report is to provide a provincial larger scale picture of all the measures taken.

There are two separate and distinct annual reporting processes that need to be completed under the requirements of the *Clean Water Act* in order for the Ministry of the Environment to complete its Annual Report for the public. The general contents of the Annual Progress Report are outlined in Section 65 of O. Reg. 287/07, and the general contents of the Section 46 Annual Report are outlined in the monitoring policies of each source protection plan.

1. Under Section 81 of the *Clean Water Act*, annual reporting focuses on the implementation of Part IV powers and is completed by the Risk Management Official. The Province is currently developing a reporting mechanism to facilitate Section 81 Annual Reporting.
2. Section 46 Annual Reporting focuses on the implementation of the remaining source protection plan policies and includes a summary of the Risk Management Official Annual Report. The general contents of the Section 46 Annual Report are outlined in Section 65 of Ontario Regulation 287/07.

The information required to complete the Section 46 Annual Report will be provided by the implementing bodies to the source protection authority. Your local source protection authority will be providing additional details on the information required to complete Section 46 Annual Reporting. The Ministry of the Environment is in the process of creating guidance – which could come in the form of templates, software, or forms – for long-term annual reporting assistance. The local source protection authorities may also provide templates or forms in the interim to assist with annual reporting; however, source protection authority data collection will continue along with the Ministry of the Environment data collection once in place. Data collection by the source protection authority may be more extensive than what the Ministry of the Environment requires. The source protection authority needs to gather information to assist the source protection committee in assessing the effectiveness of source protection plan policies and gauging the need for revisions in the future.

The two separate annual reporting processes are discussed in greater detail later in this module.

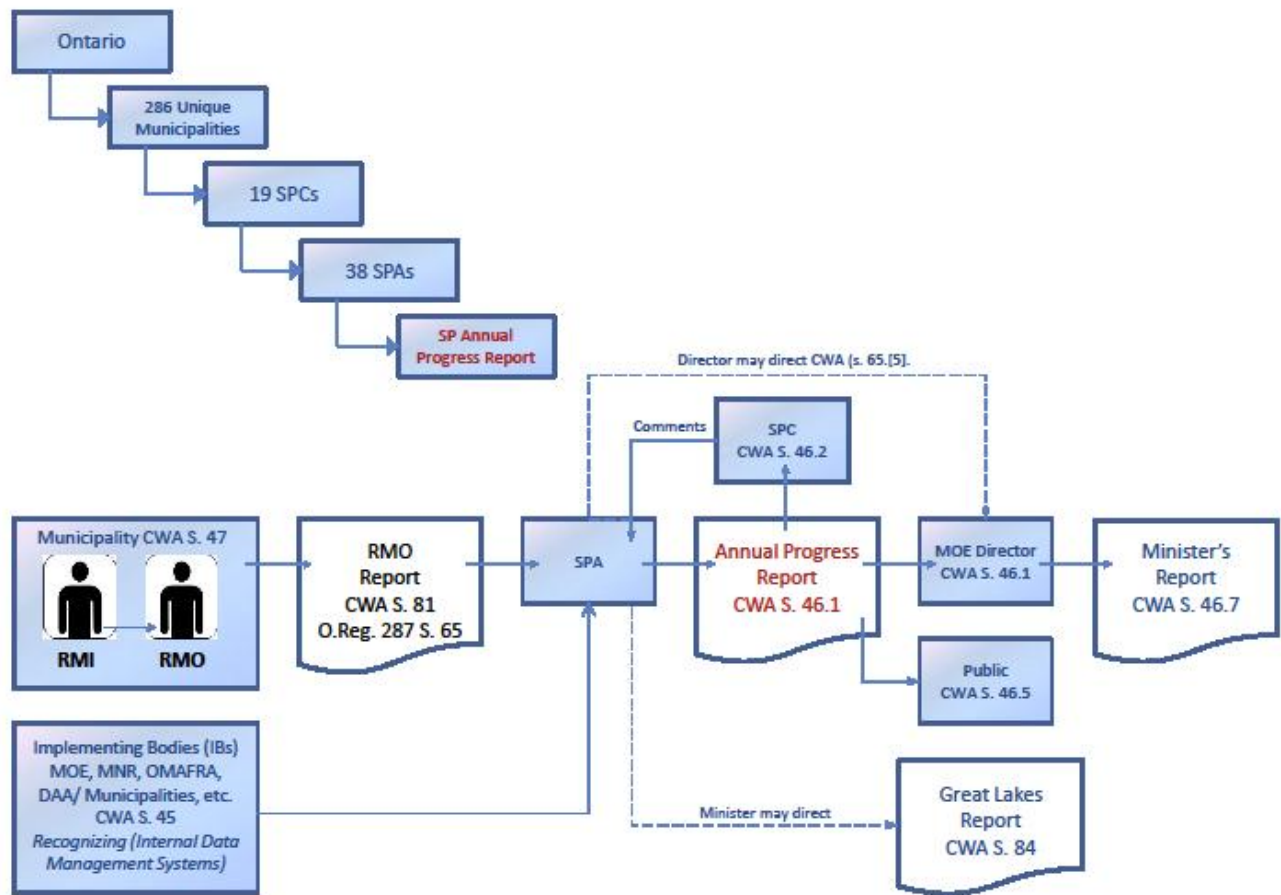


Figure 1: Annual Reporting Process

i. Risk Management Official Annual Reporting

Legislated Requirements

Section 81 of the *Clean Water Act* states that the Risk Management Official is required to submit an Annual Progress Report to the source protection authority. The report must contain a summary of all actions taken by the Risk Management Official and Risk Management Inspector(s). The Ministry may ask that a standard summary template be included to enable easier review of the report. The deadline for submitting the report to the source protection authority is February 1 in the year following the year to which the report applies. Additional Risk Management Official and Risk Management Inspector duties can be found in Module 1 of this guide.

Section 65 of Ontario Regulation 287/07 requires the Risk Management Official's Annual Report to contain:

- Description of Risk Management Plans agreed to and established by the Risk Management Official including the property location, Wellhead Protection Area (WHPA) or Intake Protection Zone (IPZ), and the activity to which the plan relates.
- The number of Risk Management Plans the Risk Management Official refuses to agree to or to establish, which must include the property location, WHPA or IPZ where the property is located, the activity to which the plan relates, and the reason for refusal.
- The number of orders issued under Part IV of the *Clean Water Act*. Each order must include a brief description of the circumstances, property location, WHPA or IPZ where the property is located, and the activity to which the plan relates.
- The number of notices given to and the number of notices given by the Risk Management Official under Section 61 of the *Clean Water Act*, which must include the property location, WHPA or IPZ where the property is located, the activity to which the plan relates, the type of prescribed instrument referred to in the notice, and any information needed to identify the prescribed instrument.
- The number of inspections carried out under Section 62 of the *Clean Water Act*, including:
 - the activity to which the inspection related
 - the number of inspections carried out under Section 56 of the *Clean Water Act* and the number of those cases where the person was not complying with a Risk Management Plan
 - the number of inspections carried out under Section 58 of the Act and the number of those cases where the person was not complying with a Risk Management Plan and the number of those cases where the person was carrying out an activity in contravention of Subsection 58 of the *Clean Water Act*
 - the number of inspections carried out under Section 57 of the *Clean Water Act* and the number of those cases where the person was carrying out an activity in contravention of Subsection 57 of the *Clean Water Act*
- The number of risk assessments submitted, both accepted and not accepted, including property location, WHPA or IPZ where the property is located, and the activity to which the plan relates.
- The number of times the Risk Management Official caused a thing to be done under Section 64 of the *Clean Water Act*, which must include the property location, WHPA or IPZ where the property is located, and the activity to which the plan relates.
- Total number of prosecutions and the number of prosecutions that resulted in a conviction under Section 106 of the *Clean Water Act*, including a brief description of each offence.

Find additional information on Risk Management Plans in Module 5.

If the Risk Management Official has jurisdiction in multiple source protection areas, the Risk Management Official must complete a separate report for each area. The first report will begin the day the Risk Management Official is appointed and will end on December 31 of that year.

The report needs to be submitted to the source protection authority by February 1 of the year following the year for which the report was written. For example, if a Risk Management Official is appointed on June 1, 2013, the Annual Report would cover the period from June 1 to December 31, 2013 and would be submitted to the source protection authority on February 1, 2014. The Risk Management Official must submit a copy of the report to the Director upon the Director's request. In addition, the Director may require that the report be prepared according to standards currently being developed by the Ministry of the Environment in consultation with the various source protection areas and municipalities. Until that time, the reports may be prepared using guidance from the local source protection authority.

Section 65 of Ontario Regulation 287/07 requires that the Risk Management Official Annual Report contain the WHPA or IPZ information for the property where a Risk Management Plan, notice, or order applies. Each WHPA and IPZ in the province will have a unique ID and standard name based on the well and system it serves. In addition, the location of the site will be based on either a GPS value or assessment roll number, so its association with a particular WHPA or set of WHPAs (where they overlap) can be made with confidence. These unique identifiers will enable the Annual Reports to accurately reflect how policies are being addressed in each source protection authority for each drinking water system. Where there is a requirement to provide the WHPA or IPZ in which the property is located, the unique ID and name must also be provided. The Ministry is currently working in partnership with source protection authorities and municipalities to develop spatial information to support this process.

General Steps for Annual Reporting Data Collection

Data collection consists of three steps.

1. Determine the data your municipality needs to collect for annual reporting purposes. To establish data requirements, review the *Clean Water Act* and source protection plan policies. Municipalities should also consult with local source protection authorities to determine full data requirements for annual reporting and monitoring policies. Source protection authorities can advise whether data needs to be provided using specific software or formats.
2. Determine the methods to use to collect data. Consult with municipal departments with implementation responsibilities. Table 1 provides examples of departments that may have these responsibilities.

Table 1: Municipal Departments for Implementation Reporting

POLICY TYPE	MUNICIPAL DEPARTMENT
Land Use Planning Policies	Planning, Development Services, Community Development, Administrative, Legal
Spill Contingency or Management Plans	Public Works
Education and Outreach	Public Works, Environmental Services
Incentives	Building, Public Works, Environmental Services
Specify and Promote Best Management Practices	Public Works, Environmental Services
Transport Pathways†	Planning, Building, Public Works
Septic System Policies*	Building, Planning

†Section 27 of Ontario Regulation 287/07 requires the municipality to provide notice to the source protection authority when a person applies for approval of a proposed activity in a WHPA or IPZ that may result in the creation of a new, or modification of an existing, transport pathway. Transport pathways are further discussed in Module 8.

*** Under the Ontario Building Code, municipalities have new responsibilities related to septic systems; however, some source protection plan monitoring policies require reporting on the implementation of the Ontario Building Code.**

A gap analysis can help determine which data is already collected through regular business processes versus the data required for source protection plan implementation purposes. If the data required for implementation purposes is not collected during regular business, it will be important to integrate new data collection processes into daily operations.

Some data is required to be kept and reported; however, your municipality may choose to keep additional data, beyond annual reporting requirements, to assist with record keeping. Some of this additional data may include the names and addresses of property owners, the date and nature of contact with property owners, and links to relevant documents, such as correspondence, notices, site diagrams, or Risk Management Plans.

3. Make data available in formats for municipal use. For example, including vulnerable areas in municipal mapping can help ensure that municipal land use planning decisions are consistent with the source protection plan policies, and the data collected can be easily compiled for Annual Reporting needs.
4. Store data using a standardized format and file naming system to ensure future staff members can find, access and use data. It may be useful to have inventories of common datasets that relate to source water protection, along with a description of the methods

used to collect the data. If external organizations provide the datasets, be sure to log the data source and date the information was received.

Ensuring a Property is Correctly Identified

The source protection authority will provide data on the location of drinking water threats as identified in the Assessment Reports. The legislated requirements for the Risk Management Official (Section 81) require reporting on the locations where Part IV policies, such as Risk Management Plans, are being implemented. Data on significant drinking water threat locations may also be helpful for other municipal programs or departments.

Collecting threat location and activities is necessary when the Risk Management Official is implementing Part IV policies. More details follow.

1. Threat Location

The location of the activity must be recorded, and there are various ways the location could be described. GPS coordinates are useful at the local level, but other location information may also be necessary as part of the provincial requirements (e.g. inclusion of parcel boundary and assessment roll number).

- **GPS coordinates** may help verify the threat location. The correct vulnerability score for that location can then be attributed to the activity and a determination made about the threat level of the activity, i.e. significant, moderate, low, or none. It is possible for several vulnerability scores and activities to be located on one parcel, as Figure 2 demonstrates. Plotting an activity at the centre of the property (centroid), can lead to an incorrect consideration of the threat level. Where there are multiple overlapping zones, scores with the highest zone/score combination should be chosen (e.g. multiple overlapping zones, two wells labelled A and B, A will override the B. When multiple vulnerability scores exist within a parcel, the Risk Management Official will manage the activities within the appropriate zone/score (e.g. agricultural source material spreading within WHPA-A and WHPA-B on same parcel, an example policy may prohibit in WHPA-A Score 10, and Manage Spreading in WHPA-B Score 6). The Risk Management Official will also need to use professional judgment when dealing with such circumstances.

In some cases, Assessment Report data has been plotted by parcel, so the exact location of each threat was not identified. In these instances, it was difficult to assign accurate x/y coordinates to describe the threat location (e.g. spreading of agricultural source material). To address this problem, threats were assigned the maximum possible vulnerability score for the parcel. However, knowing the exact location can assist in determining if an activity (e.g. fuel storage) is located in a certain vulnerability score on a particular parcel.

GPS data collected as part of the process of verifying threats or through the risk management process can be a valuable improvement to the knowledge about activities that may affect drinking water sources. Having accurate GPS coordinates will help to verify and document this information. The format used when recording GPS coordinates (i.e. Universal Transverse Mercator (UTM), Degrees/Minutes/Seconds (DMS) or Decimal Degrees) should also be standardized within your municipality.



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Figure 2: Recording GPS Coordinates for Activities in a Parcel Shows these Activities in Relation to Vulnerability Scores and the Wellhead

- Assessment Roll Number:** The roll number can be used to connect all other information for the property together, such as ownership, contact details, correspondence, enforcement, and documents. This number can be listed on all data and documents that deal with the property. In some cases (e.g. roads) a roll number will not be available. Use the Parcel Identification Number (PIN) in these instances.

- **Property Address:** A standard street address can be useful when conducting field work or discussing a property with a landowner, particularly if the owner does not reside at the property or owns multiple parcels. This information can be recorded or can be retrieved from another database using the roll number.
- **Vulnerable Area:** The area where the activity is located should be recorded (e.g. Municipal Well 2, WHPA-B, vulnerability score 10).

2. Activity

Basic information about the activity must be recorded. The provincial Tables of Drinking Water Threats list the activities considered drinking water threats and further divide these activities based on particular sets of circumstances. Find a full description of how to use the Tables of Drinking Water Threats in Module 2.

- **Threat Reference Number:** The threat reference number should be taken from the most current provincial Tables of Drinking Water Threats or Tables of Circumstances. It itemizes the type of activity and circumstances that exist in order to deem an activity as being a significant drinking water threat and subject to particular source protection plan policies. Ideally, this number, as well as the version of the threats table, will be recorded along with the GPS coordinates (for local requirements), parcel boundary (for provincial roll-up), and the roll number to facilitate record-keeping. This information is important to verify the correct threat circumstances. At the very least, a circumstance (or quantity) must be listed.

The current version of the Tables of Drinking Water Threats (7.1.2 as of July 2013) was issued in November 2009. Complete a periodic check for updates to ensure your municipality is using the correct version of the threat tables. Find the Tables of Drinking Water Threats on the Ministry of the Environment's website:

<http://www.ontario.ca/environment-and-energy/tables-drinking-water-threats>

Additionally, a database of the 7.1.2 tables is available from your local source protection authority.

- **Prescribed Threat Subcategory:** There are a total of 21 drinking water threats prescribed under the *Clean Water Act*. The list can be found in Ontario Regulation 287/07 s. 1.1 (1). While listing the prescribed threat would help to narrow down the type of activity, it would not provide the same high level of detail about the circumstances related to the activity as the threat reference number would. The Threats Analysis Tool provides additional detail regarding the circumstances, and is available from conservation authorities or Conservation Ontario.
- **Issues and Local Threats:** There may be local threats, such as transportation corridors, that have been added through an approval from the Director at the

Ministry of the Environment. As well, in some locations a drinking water source protection issue, such as nitrates, may be identified in the Assessment Report. In these cases there may not be a corresponding threat reference number; instead, a description of the activity will need to be recorded. The Ministry of the Environment will provide standardized wording for the local threats.

- **Municipality:** It is important to maintain standardized naming conventions when providing municipal names for provincial reporting requirements. The Threats Analysis Tool can be used to find the standard name of a local municipality. Contact your local source protection authority or Conservation Ontario to access the tool.

RMO Annual Reporting Process

The Ministry of the Environment is creating a database for Risk Management Officials (Section 81) Annual Reporting; however, this database is still in development and may not be completed until 2015. This database may include many of the items you are already recording. This database may not require some information you are recording; however, your source protection authority may require it, or it may be useful for your own organizational purposes. The source protection authority can support the Risk Management Official during this initial reporting period. The source protection authority will provide the Risk Management Official with further details regarding the Ministry of the Environment annual reporting database as it is released.

Under Section 54 of the *Clean Water Act*, every person or body responsible for the enforcement of Part IV of the *Clean Water Act* must retain records as prescribed by the regulations. These records must be available to the public. Record retention requirements are listed in Section B (i) of this module. Additional requirements for the Risk Management Official (Section 81) Annual Report may be provided in the local source protection plan.

Depending on the scope of work for your Risk Management Office, there are several options for facilitating the annual reporting process. The amount of staff time required may vary. The easiest way for the Risk Management Office to complete annual reporting will be to integrate the collection of metrics required by the regulations and the source protection plan into regular business processes. For example, when the Risk Management Official writes a notice, relevant annual reporting information could be included in the notice. Additionally, a database or spreadsheet where risk management information is entered to track progress internally could be modified to ensure that annual reporting information is collected concurrently with regular business processes. The database or spreadsheet would need to be accessible by all staff members who participate in the enforcement of Part IV policies, for example, the Risk Management Inspector. If data is collected and inputted into a central location on a regular basis, it is easier to produce a report.

If data for annual reporting is not collected on a regular basis during regular business processes, it will be important to develop an organized filing system so staff can manually produce a report.

After the Risk Management Official's (Section 81) report is received by the source protection authority, the authority is required to compile its own Annual Report, which will incorporate the Risk Management Official's report details. The source protection authority's Annual Report must be submitted by May 1. The source protection committee reviews and comments on this report, and then it is submitted to the Director at the Ministry of the Environment. The report will be made available to the public after it has been submitted to the Director; it should not contain any personal or proprietary information.

What This Means for My Municipality

1. The Risk Management Official will be required to provide an Annual Report to the source protection authority by February 1 in the year following the year to which the report applies.
2. The report must contain a summary of all actions taken by the Risk Management Official and Risk Management Inspector. Find the required report contents in Section 65 of Ontario Regulation 287/07.
3. If the Risk Management Official has jurisdiction in more than one source protection area, a separate report must be prepared for each area.
4. The municipality and/or the Risk Management Official must determine which data to collect by reviewing the *Clean Water Act* and the source protection plan, as well as consulting with the source protection authority. Determine methods for collecting data and present the data using a standardized format and file naming system per source protection authority or future Ministry of the Environment guidance.

ii. Section 46 Annual Reporting

Legislated Requirements

Section 46 of the *Clean Water Act* requires the source protection authority to annually prepare and submit a report to the Director that describes the measures taken to implement the source protection plan. The first report will begin the day the plan takes effect and will end on December 31 of the second calendar year following the year the plan takes effect. The report needs to be submitted to the Director by May 1 in the year following the year for which the report was written. For example, the first reporting period for a source protection plan with an effective date of June 7, 2013 would be from June 7, 2013 to December 31, 2015 and would be submitted to the Director by May 1, 2016. The Director may require that the report be prepared using an approved form and/or specific software.

Section 46 of the *Clean Water Act* requires the source protection authority's Annual Report contain:

- A description of the measures taken to implement the source protection plan, including measures to ensure that activities cease to be significant drinking water threats and measures to ensure activities do not become significant drinking water threats.
- A description of the results of any monitoring program conducted in accordance with Section 45 of the *Clean Water Act*.
- A description of the extent to which the objectives set out in the source protection plan are being achieved.
- Other such information as prescribed by the regulations.
- A copy of the comments supplied by the source protection committee, if any were provided.

Section 52 of Ontario Regulation 287/07 contains a list of the other information that is prescribed by the regulations to include in the Annual Report. The list includes:

- If the source protection plan sets out a policy that specifies a date by which a particular action shall be taken by a person or body, and the person or body fails to take that action by that date, a description of the failure and the reasons for the failure.
- A description of any steps taken during the reporting period to address any deficiencies in the information that was used in developing the Assessment Report set out in the source protection plan.
- A summary of the report prepared and submitted by the Risk Management Official under Section 81 of the *Clean Water Act* for the same calendar year to which the report under Section 46 of the *Clean Water Act* applies.
- Any other information that the source protection authority considers advisable.

Section 22 of the *Clean Water Act* requires source protection plans to include monitoring policies for significant drinking water threat policies. Monitoring policies provide information to support the annual reporting requirements of the source protection authority, and help the source protection committees gauge policy effectiveness. The source protection plan may also include policies to monitor activities or conditions that are moderate or low threats to prevent them from becoming significant and to monitor drinking water issues.

Much of the information required to prepare this report will come from the monitoring policies that accompany each significant drinking water threat policy. Municipalities, local boards, conservation authorities, a ministry, board, agency, or official of the Government of Ontario may be designated as implementing bodies for monitoring policies. If designated, these public bodies must conform to obligations set out in monitoring policies as stated in Section 45 of the *Clean Water Act*.

Certain monitoring policies may require annual reporting, although some may require a one-time report on a certain event or order only. These policies will mainly focus on the progress of implementation of the significant threat policy. Additionally, these policies include specific dates

by which the implementing body is required to report to the source protection authority to facilitate the annual reporting process. Find the monitoring policies to which a municipality must conform in the source protection plan appendix that designates the legal effect of each policy.

The information gathered from monitoring policies is an essential part of the material that will be used to prepare the Annual Report. However, the information generated from monitoring policies is not the only information source protection authorities can use to prepare the Annual Report.

Monitoring policies will vary depending on the significant threat, the implementing body, and the policy tool used to manage the threat. At a minimum, a monitoring policy may require reporting on actions taken to implement a policy or, if a policy has not been implemented, the reason implementation has not yet occurred. To ensure you are collecting the appropriate data, consult with your source protection authority. Table 2 provides examples of potential reporting requirements, based on the policy tool used.

Table 2: Monitoring Policy Requirement Example

<i>POLICY TOOL</i>	<i>REQUIREMENT EXAMPLE</i>
Planning Act Tools (e.g. Official Plan)	Copy of Official Plan or zoning by-law amendment
	Date Official Plan or zoning by-law amended
	Number of approvals issued under the <i>Planning Act</i>
Specify and Promote Best Management Practices	Management plan updated (e.g. salt management plan, stormwater management plan, pesticide management plan)
	Date management plan updated or comes into effect
Education	Type of program (e.g. mail-out, open house, public service announcements, site visits, hazardous material collection, etc.)
	Number of persons contacted or number of participants
	Location of participants or event
Establish Stewardship Programs	Type of stewardship (e.g. fencing along agricultural properties, creation of buffer zones, etc.)
	Number of landowners contacted
	Number of projects completed
	Amount of land impacted (hectares)
Incentives	Type of Program (fuel storage upgrades, septic upgrades*, agricultural best management practices, etc.)
	Total amount of funding made available
	Number and locations of funded projects

**Note that septic systems are now managed through the Ontario Building Code; however, many source protection plans have policies that directly reference the Ontario Building Code and septic inspection program, including monitoring policies related to the outcomes of septic inspection programs.*

As part of the source protection plan implementation, your source protection authority will determine the information that requires collection to comply with the significant drinking water threat monitoring policies under Section 22 of the *Clean Water Act*. The source protection authority will then communicate this information to each municipality and work collaboratively to organize a process for the information transfer. Contact the source protection authority prior to setting an information collection process to ensure the system meets the reporting needs of both parties.

Municipal Annual Reporting Process to the Source Protection Authority

Since data and other information will be collected for multiple purposes, it is important to establish internal procedures to facilitate the process of data collection and data transfer to the source protection authority. Data collection procedures will vary based on the source protection plan policy; procedures for transferring data should be established through meetings with the source protection authority.

In addition, Section 87 of the *Clean Water Act* includes provisions that allow source protection authorities to ask for information related to a drinking water threat from public bodies. The

Information generated and collected outside of source water protection may also be considered by source protection authorities during the annual reporting process. This includes copies of any documents or records related to source water, including technical studies and records related to drinking water threats, such as private well data and location of septic systems.

Municipalities will need to arrange procedures to ensure data is properly maintained. Proper documentation is not only good practice, but it is also needed in case of appeals to the Environmental Review Tribunal or Ontario Municipal Board.

Municipalities will need to decide on internal procedures for:

- which data is collected
- which data is inputted
- who enters the data
- how frequently data is entered
- how frequently data is summarized
- how and where log books and other notebooks are kept

If your municipality is within two source protection authorities, you will be required to submit information to both to track source protection plan implementation. However, the information submitted to each source protection authority should only apply to the threats in that source protection authority. To facilitate this process, it may be useful to ensure that the source protection authority data is recorded as part of regular business processes, such as when land use planning applications or risk assessments are submitted.

The tasks involved with data collection and annual reporting are ongoing. Figure 3 summarizes Municipal (Section 46) Annual Reporting. These are some of the key tasks:

- determining what data to collect
- establishing a data collection method
- developing data standards (e.g. units always reported in km² vs. ha)
- developing a database schema
- compiling a database of collected data
- assigning staff members with various data collection tasks
- determining how data will be stored

To provide the required reports under the *Clean Water Act*, staff will need to complete them. Staff time must be taken into consideration for these additional requirements; however, ensuring the required data is collected regularly can help municipalities reduce the level of effort required to produce a report.

The staff member best suited for completing the reporting requirements will be proficient in software that will facilitate the reporting. In addition, that person should have general knowledge of the source protection plan to ensure the reporting requirements follow the appropriate methodology as set forth by the local source protection authority and the Ministry of the Environment.

Figure 3 provides a sample process to follow when developing and setting-up internal procedures to comply with annual reporting requirements. It is recommended that municipalities consult the source protection authority prior to setting-up internal procedures. Once information needs have been established, consult with the various departments responsible for annual reporting data collection. The consultation process will make each department aware of its reporting responsibilities. From there, the various departments will need to integrate the annual reporting requirements into daily business practices. Integration approaches will vary depending on the municipality. Once the internal procedures have been put in place, and the source protection plan effective date has occurred, the annual reporting process begins. The various departments will work together or report to the main department responsible for report compilation. The report may require council approval prior to submission to the source protection authority.

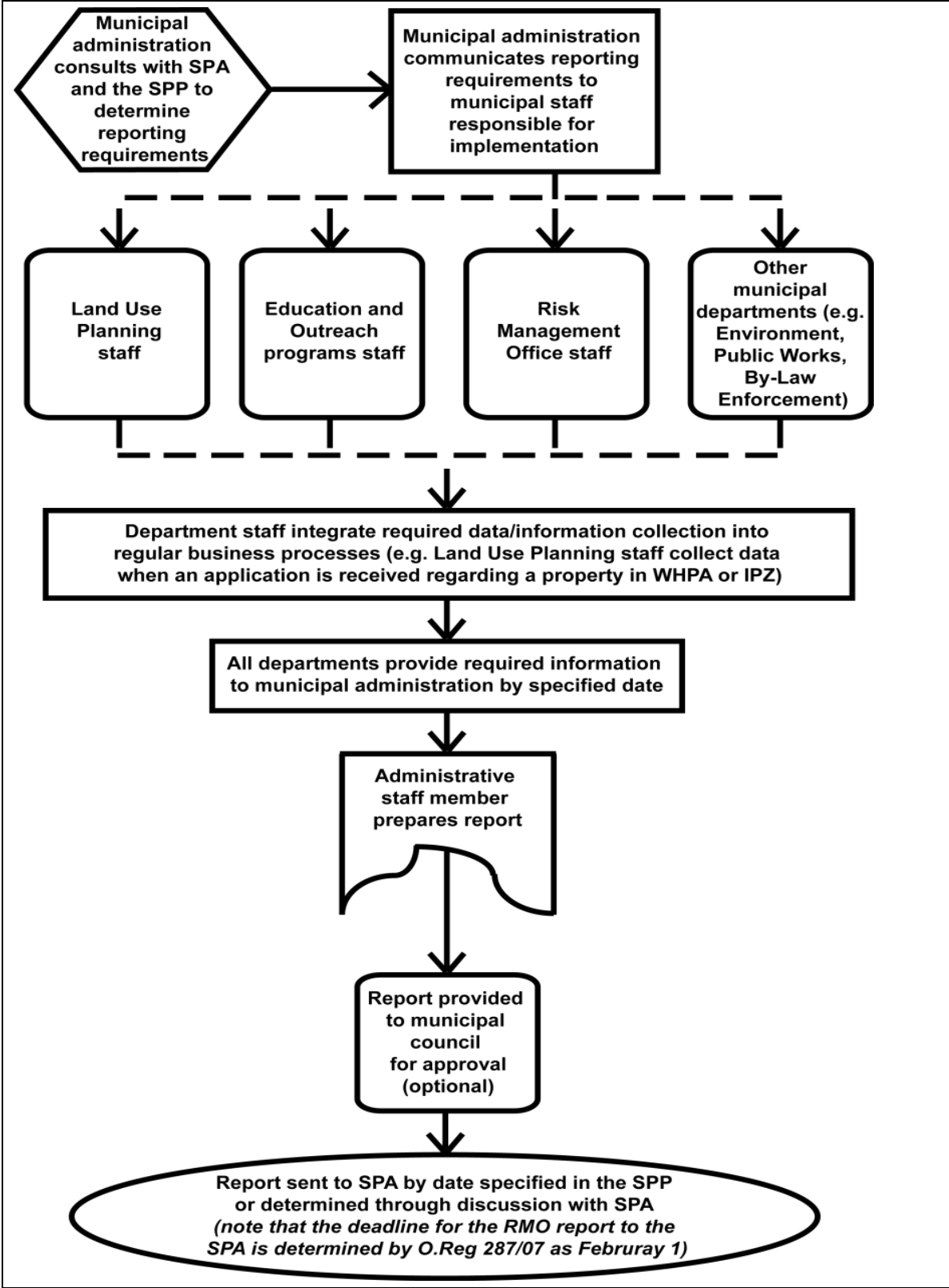


Figure 3: Example Procedures for Municipal Annual Reporting to the SPA

In addition to the Risk Management Official and Risk Management Inspector, source protection plan implementation involves municipal staff such as planners, administrative staff for reporting on applications received, and by-law enforcement officers for some violations that are relevant to reporting to the source protection authority on monitoring policies.

If your municipality has an Information Management department, consult these staff members for assistance in determining data requirements as well as data collection and storage methods. Your municipality may have database software available that can be used for source protection plan purposes. Additionally, Information Management staff with database knowledge may be able to develop a data schema and create your database structure.

It may be necessary to train staff members who will be required to implement source water protection along with regular business about source water protection data management. For example, land use planning staff may need training on where to find mapping on source protection plans. Your municipality may need to integrate source water protection with municipal mapping and your local source protection authority may be able to assist with this task.

GIS staff will be of great assistance when dealing with source water protection data. Depending on the scope of the workload, hiring a GIS staff member may not be feasible; however, in larger areas with a vast number of threats, it could be an option. Staff knowledge of a database program consistent with municipal needs is beneficial when it comes time to input all necessary data. If your municipality does not have GIS capabilities, connect with your source protection authority for help and advice. Source protection authority staff will be able to guide you in alternate data recording methods that will facilitate an easy transfer of data between agencies for implementation purposes.

Several items may be beneficial to reporting and record keeping. Certain computer software will be of benefit to input data in a form that is easily transferable to the source protection authority. At the very least, a spreadsheet program will be required, such as Microsoft Excel. Some more efficient and usable programs include database programs, such as Microsoft Access. Your municipality may also utilize software that is already available in your office and can be tailored to store and report information relevant to source water protection. In the future, the Ministry of the Environment may also require the use of certain software and formats for this information; however, there are no current requirements.

Technological items, such as handheld GPS devices, can also facilitate annual reporting. GPS coordinates will be valuable when completing the Annual Report. Taking GPS coordinates at each threat location when completing source water protection tasks is advisable.

At the bare minimum, it would be helpful for reporting purposes to have a portable GPS device, a simple database program and a GIS-enabled mapping program. The GPS device will allow coordinates to be taken at each location and can be used in a GIS program to spatially display

information and correlate it to other features. A simple database will allow for data management. As an example, most conservation authorities and source protection authorities use ESRI software for GIS mapping.

Your municipality may want to use software that will integrate a variety of business processes in one location. For example, using Information, Planning and Conservation System (iPaC) or Cityview software can help integrate development permitting and risk management in one central location. Your municipality may already have software that can be modified to collect other data required for source water protection purposes.

In addition to assisting with the collection and storage of data, a database program can also assist with the information management life cycle. A database can be setup to retain and dispose of records in a 15-year cycle. Required reporting will be much more streamlined if data is well organized within a database structure, rather than in multiple formats and various locations. Your source protection authority may have specific reporting requirements beyond those of the Province. Data from the municipality must be in a format that can be used directly by the source protection authority or converted into a usable format.

To ensure data is not lost, schedule regular backups using internal backup storage such as an external hard drive, or cloud technology at an off-site location. When dealing with hosted (cloud) based applications and solutions, it is very important to ensure private information (e.g. landowner name) resides in a country where privacy laws are consistent with Canada's *Privacy Act*.

Source protection authorities may provide municipalities with certain options to assist with annual reporting. These options may be provided through forms, templates or online databases, and would allow for consistency across the source protection authorities and prevent municipalities from having to create these items from scratch. Not all source protection authorities will provide these options, so check with your local source protection authority to determine if options are available to your municipality.

What This Means for My Municipality

- Procedures must be established for data collection, maintenance and transfer to the source protection authority. The source protection authority may consider information outside of source water protection; therefore, it may be useful to include the source protection authority in regular business processes.
- The municipality must consider which staff would be best suited to complete reporting requirements, including the Risk Management Official, Risk Management Inspector, municipal planners, GIS staff, administrative staff, and by-law enforcement officers. Staff training will be required.

- Certain computer software and technological items, such as a simple database program, a portable GPS device and a GIS enabled mapping program, can facilitate reporting. Staff training will be required.
- Many municipal staff members will be involved in annual reporting tasks. Therefore, it will be important to integrate tasks into daily business practices.

C. Data and Information Management

Information management is an important component in implementing source protection plan policies, completing Annual Reports, verifying and identifying significant drinking water threats, and transferring information back to the source protection authority. Collecting this data, and then being able to easily extract and report the desired information, requires some planning and consistent data entry.

Managing data involves deciding and coordinating what, who, when, where, and why information is used, disclosed, collected, and retained. Information and related processes and technology to support it include operations-critical information assets. These assets are the essential information that must be properly managed because failure to do so will impact the ability of the municipality to function or meet legislated obligations. Examples of operations-critical information assets related to source water protection include:

- mandated information – e.g. risk management information
- executive accountability and legal risk (e.g. Environmental Review Tribunal, Ontario Municipal Board, *Municipal Freedom of Information and Protection of Privacy Act, 1990*)

Information management is also the management of organizational processes and systems that acquire, create, organize, distribute, and use information.

i. Types of Data and Information to Manage

To date, the information available from your local source protection authority includes the Terms of Reference, the Assessment Report, and the Proposed Source Protection Plan. These documents contain valuable information to assist you with implementation.

Additionally, raw data may be available in a number of digital formats. This includes water budget information and Assessment Report data. Your municipality should review the policies in the local source protection plan to determine the data you require to implement different policies. Consultation with municipal staff, such as land use planners, who will be responsible for implementing policies, will establish the datasets to which the municipality already has access, and which datasets are needed from the source protection authority.

Specific datasets that are available from your local source protection authority may include, but are not limited to:

- WHPAs
- IPZs
- highly vulnerable aquifers
- significant groundwater recharge areas
- vulnerability mapping
- livestock density mapping
- managed lands mapping
- municipal wells and/or intakes
- threats
- ownership parcel boundaries with parcel identification number
- assessment parcel boundaries with assessment roll number
- private well data
- septic data
- permits to take water
- water quality reports

The local source protection authority has a list of significant drinking water threats enumerated during the Assessment Report process, which includes locations, prescribed threat, and threat subcategory, and may include circumstances. This information can be provided to each municipality, or has already been provided in some cases, in GIS, database, Excel spreadsheet, or other formats.

Other tools that are available to assist municipalities are the Threats Analysis Tool, the Risk Management Measures Catalogue (RMMC) and the Policy Database. Links to these tools are provided in Section B (iv). Certain information may also be readily available at your municipality, such as orders, by-laws, enforcement information, GPS data, and education programs.

Confirming threats will be ongoing for all municipalities. Threat verification will involve fieldwork to visit and confirm each threat in your municipality. Each threat will need to be investigated and either verified or removed from the list of enumerated threats. This information will assist your local source protection authority when updating Assessment Reports. Data that would be used to support Assessment Reports updates will also need to be provided in specific formats, and you should consult with your source protection authority to determine the preferred format. Data for Assessment Reports will be used to populate models that support the implementation of source protection plans, such as water quantity or quality models. It will also be useful to report any municipal changes that may be forthcoming, such as new municipal wells or changes in pumping rates. New drinking water threats may be identified during threats verification and, in the future, during the review of proposed development and

other activities. This information should also be collected and retained. See Module 2 for more details on how threats can be verified.

Since the requirements for the Ministry of the Environment annual reporting database are in development, the data that will need to be managed to complete the Annual Reporting is unclear. Therefore, the source protection authority will provide additional information regarding these data to municipalities as they receive it.

According to Section 53 of Ontario Regulation 287/07, the following records must be kept for a period of 15 years:

- risk management plans – taken from the date the risk management plan ceases to be in effect
- a notice or order – taken from the date the notice or order is issued
- Risk Assessment – taken from the date of acceptance
- acceptance of a Risk Assessment – taken from the date of acceptance
- any record related to source water protection – taken from the date the record is acquired or created

ii. Data Cycle and Data Sharing

Your local source protection authority currently has a readily available structure and format for data. Contact your local source protection authority for details on how to obtain these data and to discuss what format best suits your needs. In future years, the local source protection authority will continue to share information that will be useful to you during implementation, including any updates to Assessment Reports.

Figure 4 outlines the basic data cycle process implementing bodies can expect to follow. Assessment Reports and any associated data is translated into the various source protection plan policies (e.g. land use policies, risk management plan policies, prescribed instrument policies), which are in turn implemented by multiple agencies (e.g. the Province, municipalities, other public bodies). During policy implementation, implementing bodies will collect new data; this new data may inform regular business for these agencies, and will be transferred back to the source protection authority, and used to update the Assessment Report as part of the annual reporting cycle prescribed under the *Canada Water Act*.

Agreements should be made between the municipality and source protection authority regarding access to and use of data. The source protection authority, represented by the conservation authority or other body as defined under the *Clean Water Act* (see Ontario Regulation 284/07), is expected to have rights to the raw data used to generate the Assessment Report and source protection plan. If someone else owns the rights to the data (e.g. a municipality) used in the development of the approved Assessment Report and source protection plan, the source protection authority is expected to attain an unrestricted license

agreement with those parties to use, execute, modify, manufacture, copy, reproduce, distribute, publish, sublicense to others, and prepare, in any form, derivative works with the data for source water protection planning and implementation purposes.

Data sharing agreements are required to ensure data can be used for these purposes:

- to provide and publish deliverables and/or derivative works within the Ontario Public Service
- to provide and publish derivative works to the public, such as maps of vulnerable areas
- to enable the Ministry and/or clients to make evidence based policy and program area decisions and to meet obligations required of the Ministry and/or clients to review prescribed instruments
- to meet obligations as described in policies in approved source protection plans
- to ensure that owners and operating authorities of all drinking water systems in source protection areas in Ontario have the information needed to be in compliance with the *Clean Water Act, 2006* and the *Safe Drinking Water Act, 2002*
- to enable the Ministry and clients to make evidence based decisions regarding policy and any related program area planning and risk assessment initiatives
- to meet obligations pursuant to the Canada-Ontario Agreement Respecting the Great Lakes Ecosystem
- to meet the principles and carry out the roles and responsibilities under the Low Water Response Program
- to meet any obligations required of the Ministry and clients to address concerns associated with climate change initiatives

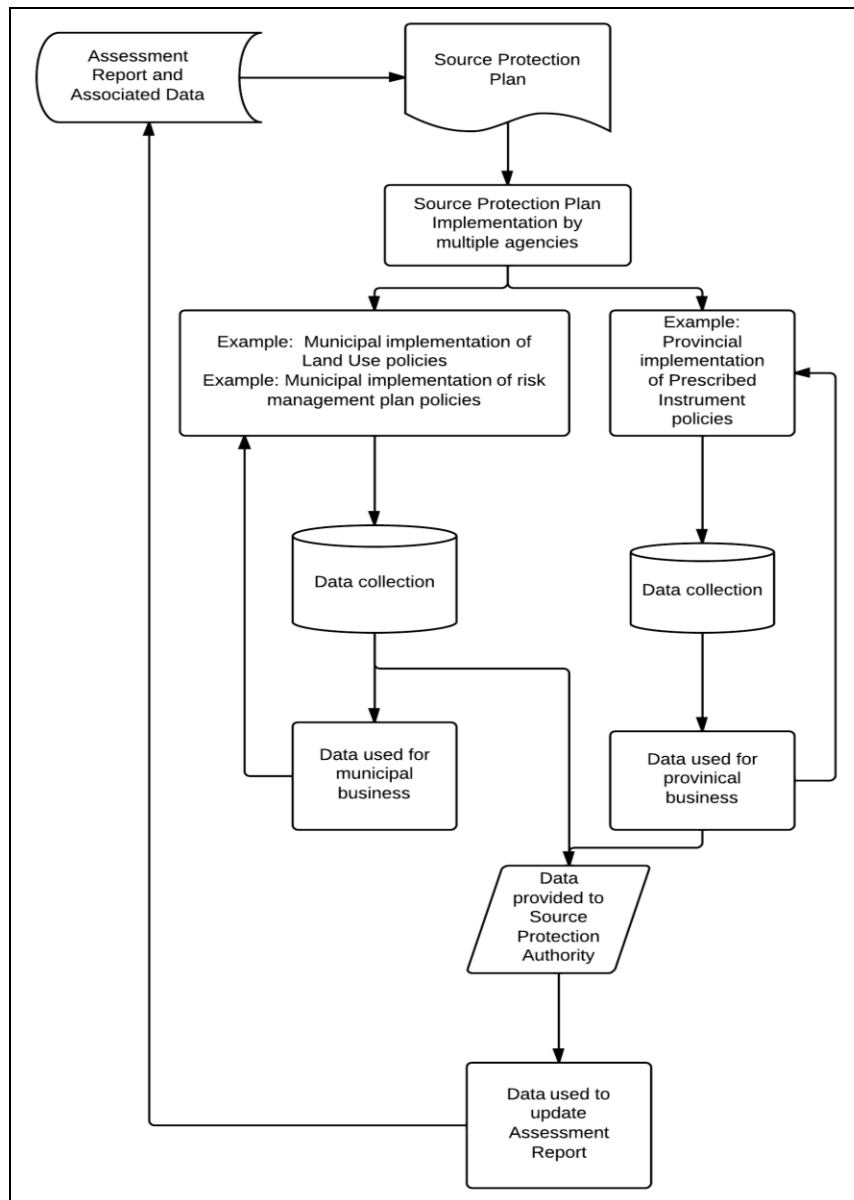


Figure 4: Data Maintenance Cycle for Municipalities

Sharing data with your source protection authority or other agencies will occur; therefore, it is important to generate useable and shareable data. Source protection authorities and the Ministry of the Environment are developing a streamlined process that will require data to be stored in a format that is easily sent to other agencies. Some things to consider:

- having a database that can be searched and filtered to extract the desired information
- using software that can export data to other formats, including ones that are easily read by other programs; for example, comma separated values are readable by spreadsheet, database and GIS applications
- ensuring spatial data (assessment roll number and GPS coordinates) are related to information such as notices, documents and Risk Management Plans

- ensuring staff adheres to data standards so data are collected and reported in a standardized way

Please review this document in its entirety to determine programming and data requirements as the Ministry of the Environment may dictate certain requirements in the future.

iii. Setting up a Data Management Model

The process and functions of information can be organized into an information management framework comprised of elements (Figure 5). This framework is dependent on the data and information made available through the technical work that was completed to develop the Assessment Reports; these data and information are available from your local source protection authority.

Figure 5 demonstrates that agencies responsible for implementing source protection plan policies will also be responsible for managing the corresponding information. Implementing bodies should collaborate to ensure consistent, standard data are maintained and stored to support program requirements for multiple agencies. The formation of teams with representatives from these agencies could assist in streamlining information management. Six steps have been derived from this framework and are specific to source protection plan implementation.

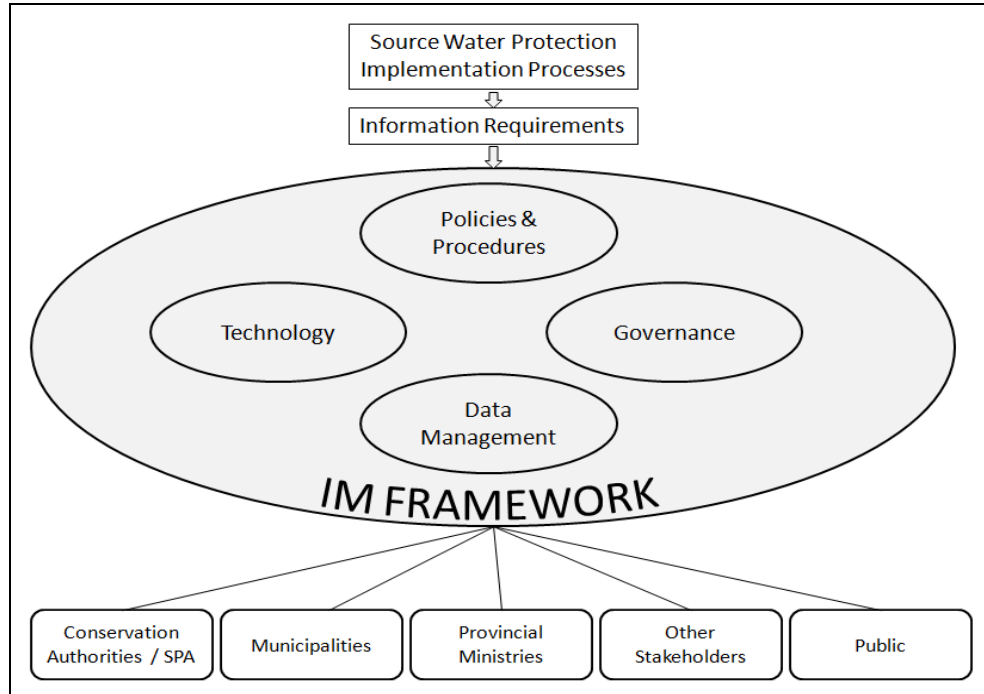


Figure 5: Information Management Framework

Step 1: Define Information Requirements and Resources

Municipalities must assess their particular situation with respect to existing data management structures to better understand the effort that will be required to maintain, exchange, and make source water protection data available. Source protection authorities will be able to provide lists of data used to generate the Assessment Reports and source protection plans.

Information resources that can facilitate successful source protection plan implementation may include:

- tabular and geospatial databases (e.g. Assessment Report Database, Threats Database, Water Quantity Databases, Boundaries and Models)
- images, photographs, graphics, maps, and reports
- look-up tools, key tables and Risk Management Measures

Municipalities will need to determine the information they already have and what additional information they will require to successfully implement source protection plan policies. Municipalities should also assess the data and information related to source water protection they will collect during implementation, or through other regular municipal business processes.

Step 2: Define Guiding Principles

The implementation of source protection plan policies and ongoing data management should be an open and transparent process; therefore, defining the guiding principles required to manage data effectively and efficiently in a collaborative inter-agency environment is essential. The principles can be determined internally or in collaboration with partner agencies, such as the local source protection authority or conservation authority.

- **Define custodianship:** Custodianship implies a primary custodian or curator of data. A custodian does not have to be an individual or a single agency, and responsibilities can be jointly shared or transferred between business departments or agencies. Data custodians provide a leadership role by ensuring that staff and stakeholders derive the greatest benefit from the investment made in data collection, maintenance and storage.
- **Accountability for information management:** Accountability for management of the information required for implementation should be clearly defined and understood. The designation of accountability should be appropriate to the capabilities and availability of staff or agencies involved.
- **Accessible and shared information:** The custodian ensures the design of the information promotes easy use, access and sharing. This does not mean that private information should be shared beyond the limits imposed by legislation, such as MFIPPA, FIPPA, existing or future licensing agreements, access, confidentiality rights, and internal policies.
- **Integrated information management:** Information should be defined and managed to promote integration regardless of medium. At the municipal level, integrated

information should be managed and displayed across shared municipal boundaries. Based on the diversity of municipal information systems, the management solution for integration will be different in almost every case.

- **Define a sustainable funding model:** It is essential that municipalities secure long-term sustainable funding to allow the program to support the minimum ongoing requirements, such as annual reporting. It is anticipated that the increased recent investment in information related to source water protection will require financial planning to ensure the value of the information collected to date are maintained.
- **Collected and maintained information value and efficiency:** Information has significant value and plays an important role in source water protection, both currently and in the future. Source water protection information is a resource and a reusable asset. Municipalities and other agencies should aim to find efficiencies, by eliminating the need to collect, maintain or provide access to the same or similar source water protection information more than once.
- **Business-driven information:** Source water protection information gathered and maintained by municipalities and other agencies must be relevant to the decisions that will be made, such as whether or not a Risk Management Plan is required. Sustainable funding is required to support effective decision-making, public accountability and cost-effective delivery of programs and services. Information management should be planned and integrated into the municipal business planning process.

Step 3: Define a Data-Sharing Framework

Data-sharing agreements are fundamental to enabling a collaborative environment. The agreements follow from the ‘information is shared’ principle, and they represent the legal agreements enabling fair exchange of data among all parties involved. Further discussion about data agreements is provided in Section C (ii).

The mechanism for sharing data can be as simple as sending some files by email, creating a CD, or posting to an FTP site. Another method is a data exchange, in which member organizations can share their data and have access to the data of other members. A data exchange is similar to a data-sharing agreement; however, it is more streamlined, flexible and open to numerous organizations. Land Information Ontario’s Ontario Geospatial Data Exchange is one good example of a data exchange framework. A direct data transfer can be made from one Ontario Geospatial Data Exchange member to another as long as:

- the other party is an Ontario Geospatial Data Exchange member
- the party providing the data has the rights to do so
- it is solely for the transfer of data

A similar process could be set-up between the source protection region and its municipalities to easily facilitate data sharing among the partners.

Step 4: Agree to a Data Maintenance Protocol

Data standards for both input and output data can ensure consistent, standardized deliverables across municipalities that span multiple source protection areas or regions. Standards also allow for the efficient use of automated systems and facilitate data transfer between agencies to enable managers, planners and others to compile data at the municipal or watershed region scale. A list of standards and reference tools used in source water protection to date is included in Section C (iv). These standards and tools can be used as a starting point for local business requirements, while maintaining the necessary data fields to support provincial reporting and update needs. The local source protection authority may have further information and can provide assistance.

Many datasets lack maintenance protocols and many data holdings are not properly catalogued or documented; therefore, they are unknown to others that may benefit from the data. Maintaining current data will provide benefits to the planning cycle and position local organizations to benefit from future planning cycles and other water management activities. Information requirements are used as a starting point for the assessment of existing and potential data sources. Detailed investigations are required at the local level to ensure that source water protection data are available on the right scale and in sufficient detail for the data to be used for a specific purpose.

Municipalities should conduct a gap analysis should be conducted by comparing the existing spatial and tabular data against the specific requirements for each of the municipal business areas that will require source water protection data. When data are unavailable to support a specific source water protection requirement, a gap exists. Where gaps exist, the best available data source should be determined. In cases where local efforts cannot reasonably satisfy gaps, municipalities should make these gaps known to the source protection authority, conservation authority, and other implementing bodies. Ultimately, municipalities must ensure that appropriate data and information exist to support the implementation requirements of the local source protection plan.

Metadata is defined as a description of your dataset. As data are created or enhanced, metadata should be recorded for the dataset. The metadata catalogue addresses the fundamental requirement that data be discoverable. The catalogue increases the value of data assets by making their existence more widely known and used, especially if using best practice standards, such as the Federal Geographic Data Committee.

Step 5: Define Your Technology Environment

Source protection plan implementation involves many participating organizations and a large number and variety of datasets. Consequently, the process requires a mechanism to enable discovery, distribution and data standardization.

There are several database models, such as centralized or disconnected database environments. However, to support the implementation phases and the integration of source water protection information into other business processes, municipalities need to establish or leverage existing local data storage and analysis environments, including analytical software, geographic information systems, database management systems, internet servers, analytical software, and communication/consultation capabilities.

Models were used to delineate vulnerable areas and determine vulnerability scores, which are described in the Assessment Report. Models used varied between source protection areas and regions, and each model will have different input requirements, analysis methodology and output processes. The Ministry of the Environment streamlined the selection of the specific models to a limited list of preferred models; however, variations with respect to in-house capacity and the software used for modeling, can significantly impact software and hardware requirements.

Step 6: Refined Governance Model

Existing governance models should be refined to capture the requirements for source protection plan implementation and oversee implementation of the information management framework. The refined governance model will be used to resolve technical issues, as well as foster data standardization and collaboration among partners.

The ideal governance model effectively coordinates the information management needs of the municipality and other partners. A multi-agency technical committee is an example of a governance model that may work well for source water protection data management. The collaborative information management environment envisioned in the framework involves multiple organizations working together.

iv. Data Standards and Reference Tools

Data standards exist for several source water protection related tools and databases. Here are some of these tools:

- **Assessment Report Database:** A fixed set of source water protection data that includes threats, issues, intake protection zones, wellhead protection areas, significant groundwater recharge areas, and highly vulnerable aquifers. These standards and associated data are available from source protection authorities.
- **Threats Database 1.9:** Source protection authority conducted threat assessments for which the Province of Ontario has prescribed specific activities and circumstances that when combined can create significant, low or moderate threats to municipal drinking water sources.
- **Threats Analysis Tool:** The threats data standard includes tables describing the threat and associated attributes including standard “lookup tables” for a set list of chemicals,

allowing toxicity and persistence values to be automatically selected when a land use activity (i.e. threat) is identified. Similarly, hazard scoring for pathogens has been set at a fixed value for a specific pathogen depending on whether the occurrence was within groundwater or surface water.

<http://maps.thamesriver.on.ca/swpCAMaps/threatslookup/default.aspx> (Note some aspects of this tool are currently undergoing revision and are subject to change.)

- **Risk Management Measures Catalogue:** The catalogue describes hundreds of tools and techniques that can be utilized in the management of activities that may pose a drinking water threat. <http://www.trcgauging.ca/RmmCatalogue/>
- **Water Budget:** Includes the Water Budget Geodatabase and associated Risk Assessments. www.waterbudget.ca
- **Policy Database:** <http://maps.thamesriver.on.ca/swpPolicyEntry/disclaimer.aspx>
- **Symbology Standards:** For source water protection cartographic and web products, Conservation Authorities used standards, guidelines and best management practices for the production of output products (i.e. maps and other images) found in the document titled Source Water Protection Mapping Symbology and Standards (Ontario Ministry of Natural Resources, 2006).
- **GIS Software:** The Ministry of the Environment requires Source Protection Authorities and Conservation Authorities to work with ESRI GIS software. Therefore, for spatial water quality outputs, and some water quantity outputs, data are available in ESRI geodatabase format. Regardless of the GIS or planning software tools a municipality may be using, ESRI format is flexible enough to import ESRI GIS format into any platform or format.

v. **What This Means for My Municipality**

- The municipality and the source protection authorities should make agreements regarding access and data usage. Datasets are available from the source protection authority.
- Confirming threats will be an ongoing task for all municipalities.
- Record retention requirements are generally 15 years and can be found in Section 53 of Ontario Regulation 287/07.
- Implementing bodies should collaborate to ensure consistent, standard data are maintained and stored to support program requirements for multiple agencies.
- Proper data management can help municipalities integrate source water protection information into regular decision making, and leverage this knowledge for other municipal processes.

vi. **York Region Data Management Example**

The following information was provided by York Region as an example for other municipalities. This example provides information on the upgrading of their data management system. Note that this is strictly an example and may or may not suit the specific needs of your municipality.

The goal of the York Region Data Management Project was to upgrade the current environmental data management system (e.g. Access and Excel databases) to a system that will support business processes for source water protection risk management and all industrial waste control functions. When the project was initiated in early 2012, there were no *Clean Water Act* source water protection data management systems available. In fact, there is no system or guidance available for source water protection data management. These steps helped create this system:

1. A request for tenders was jointly released by the York Region Risk Management Office and the group that enforces the York Region sewer use by-law because partnering on the project had benefits for the Environmental Services department.
 - The groups have similar data management requirements; however, the processes of the two groups are very different and added to the challenge of finding a suitable system.
2. A contractor was selected based on their ability to meet the needs of both groups by providing a customizable product that was capable of working with GIS.
3. To clarify requirements for the system, several meetings were held with the contractor to develop flow charts, checklists and templates to describe the process requirements.
4. The contractor released several versions of the system, each version requiring extensive review and testing.
 - The development process required a great deal of time and effort since the system and the risk management program were being refined at the same time. The added benefit of conducting this work was that the Risk Management Office developed a number of tools that will be of benefit as the risk management program is implemented, such as a system to manage work flows.

As a result, the Risk Management Office now has a data management system that will manage threats data, as well as data related to other programs such as development review. Data quality has also been improved through the quality assurance/quality control process required during development of the system. The data management system includes:

- a 'dashboard' for the Risk Management Officials and Risk Management Inspectors that displays tasks such as inspections required and Risk Management Plan follow-up
- templates for documents, such as notices
- access to information for Annual Reports
- the capability to manage and track applications, fees, inspections, enforcement, correspondence, and Risk Management Plan conditions
- GIS capabilities that can populate WHPAs, produce vulnerability scores as well as validate addresses
- a lookup tool that can quickly and accurately summarize threats for a given location