AGENDA

Mississippi-Rideau Source Protection Committee (MRSPC)

May 6, 2010
7 pm
Carp Fairgrounds, Agricultural Hall
3790 Carp Road, Carp

		Pg.	
1.0	**Welcome and Introductions** a. Agenda Review b. Notice of Proxies c. Adoption of the Agenda (D) d. Declarations of Interest e. Approval of Minutes – April 1, 2010 (D) ► draft minutes attached as a separate document f. Status of Action Items – Staff Report Attached (D) …………………………… g. Correspondence (D): …………………………………………………………… 1. Cataraqui SPC re: draft Assessment Report posted for consultation	 1 4	*Chair Stavinga*
2.0	**Assessment Report Development** – Staff Report Attached …………………… a. *Preliminary Draft* Assessment Report chapter (D): i. Chapter 6 – Surface Water Sources …………………………………………	9 22	*Brian Stratton & Jackie Oblak*
3.0	**Ontario Drinking Water Stewardship Program** – Staff Report Attached (I) … a. Staff will give an overview of how the program will be delivered for 2010 b. 2007-2010 *Interim Progress Report* by MOE is attached	102	*Sommer Casgrain-Robertson*
4.0	**Tritium** – Staff Report Attached (D) …………………………………………………….. a. MOE will give an overview of Ontario's Drinking Water Standards process b. Consideration of draft motions regarding the current Ontario Drinking Water Standard for Tritium and the Chalk River Laboratories	108	*Chair Stavinga*
5.0	**Rural Clean Water Programs** – Staff Report Attached (D) ………………………. a. Proposed letter of support is attached for consideration	119	*Chair Stavinga*
6.0	**Community Outreach** – Staff Report Attached (D) …………………………………. a. Members & staff report on activities since the last meeting b. Discuss upcoming events & opportunities	122	*Chair Stavinga*
7.0	**Other Business**		*Chair Stavinga*
8.0	**Member Inquiries**		*Chair Stavinga*
9.0	**Next Meeting** – June 3, 2010, 6pm 443 Rideau Wing (RCAF) 44 Abbott Street North, Smiths Falls 5 pm – public "meet and greet"		*Chair Stavinga*
10.0	**Adjournment**		*Chair Stavinga*

(I) = Information (D) = Decision

Delegations wishing to speak to an item on the Agenda are asked to contact Sommer Casgrain-Robertson at 613-692-3571 ext 1147 or sommer.robertson@mrsourcewater.ca before the meeting.

1.0 f) STATUS OF ACTION ITEMS

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Recommendation:

1. That the Mississippi-Rideau Source Protection Committee receive the following report for information.

Staff & Chair Action Items:

Issue		Action	Lead	Status
1	Ontario Drinking Water Standards	Learn how Ontario establishes and reviews its drinking water standards. Consider recommending that the tritium standard be increased	Mary Wooding Chair Stavinga	**Complete** See Agenda Item 4.0
2	Rural Clean Water Programs	Send a letter to the Provincial government highlighting the value of long-term, province-wide funding for rural clean water programs	Sommer Casgrain-Robertson	**Complete** See Agenda Item 5.0
3	Vacant City of Ottawa seat on the MRSPC	Fill the vacancy on the MRSPC	Sommer Casgrain-Robertson	**In Progress** City staff is working to fill the seat.
4	Vacant industry / commercial seat on the MRSPC	Fill a vacancy on the MRSPC	Sommer Casgrain-Robertson	**Complete** Scott Berquist has been appointed to the Committee
5	Ottawa River Watershed Inter-Jurisdictional Committee	Encourage MOE to take the lead role in establishing an Ottawa River watershed inter-jurisdictional committee	Mary Wooding	**Ongoing** MOE held a meeting on April 20 for municipal, Ministry and Conservation Authority representatives from Ontario and Quebec along the Ottawa River.

Issue		Action	Lead	Status
6	Uranium	MVC and local Health Units work together to raise public awareness about naturally occurring uranium in drinking water	Sommer Casgrain-Robertson & Mary Wooding	**In Progress** Jean-Guy Albert will encourage Health Canada to release the "Uranium and Drinking Water" fact sheet they developed.
7	Geothermal Systems	Determine if geothermal systems should be considered a threat to drinking water sources	Sommer Casgrain-Robertson	**Ongoing** A lot of information has been collected on this topic, including a technical bulletin from MOE.
8	Compensation Models	Staff to collect other compensation models (e.g. Ottawa wetland policy, Alternate Land Use Services).	Sommer Casgrain-Robertson	**In Progress** Staff will build this in to the Source Protection Plan work plan (begin late 2010).

MRSPC Member Action Items:

Issue		Action	Lead	Status
1	Drainage Act is under review	Follow the process to see if it will impact source protection work	Peter McLaren & Richard Fraser	**In Progress** Peter and Richard are following the review and will inform the Committee of any concerns they have.
2	Members were concerned that attendance might be low at Assessment Report open houses and groups who should be involved in the process are not	Members were asked to provide Sommer with contact information for groups they feel should be involved in the process – they will be added to our mailing list.	All Members	**Ongoing**
3	OFEC Conference Calls & Training Sessions	Richard Fraser will provide the MRSPC with updates on OFEC conference calls & training sessions	Richard Fraser	**Ongoing**

4	Community Outreach opportunities	Members to notify Sommer of potential events and opportunities to engage the public about source protection	All members	**Ongoing**

1.0 g) CORRESPONDENCE

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Recommendation:

1. That the Mississippi-Rideau Source Protection Committee provide a letter of support for Rural Clean Water Programs.

Attached Correspondence:

	Correspondence From:	Regarding:	Response:
1	Cataraqui Source Protection Committee – April 15, 2010	They posted their draft Assessment Report for public consultation and have invited us to review it and provide comments.	Staff will review the report and draft any necessary comments

April 15, 2010 Files: SPP 5-5, 6

VIA E-MAIL & MAIL

Ms. Janet Stavinga
Chair, Mississippi-Rideau Source Protection Committee
c/o
Rideau Valley Conservation Authority
3889 Rideau Valley Drive, P.O. Box 599
Manotick ON K4M 1A5

Dear Ms. Stavinga,

**RE: DRAFT ASSESSMENT REPORT POSTED FOR REVIEW
CATARAQUI SOURCE PROTECTION AREA**

I am writing to notify the Mississippi-Rideau Source Protection Committee that the Cataraqui Source Protection Committee has published a Draft Assessment Report for public review and comment under the Ontario *Clean Water Act, 2006.* Its purpose as you know is to summarize the findings of numerous recent technical studies, in order to focus attention on what needs to be done to protect local drinking water sources.

Please share this letter and the attached public notice with your SP Committee and Conservation Authority staff. We welcome your comments on our draft report; information on providing comments is included in the notice.

Draft Assessment Report

Our Draft Assessment Report includes findings related to topics of shared interest to our SP Committees, including the Westport Wellhead Protection Area (WHPA 'D') which extends into the Cataraqui area. The relevant content is included in Chapter 5. In addition, our draft report indicates that a majority of the Cataraqui Source Protection Area is a highly vulnerable aquifer, which as you are aware means that the groundwater can easily be polluted by activities on the surface. Significant groundwater recharge areas are mapped in many locations. The latter types of vulnerable area will likely extend across the municipalities that are shared between our source protection areas.

The three volumes of the report are available on our website at www.cleanwatercataraqui.ca. A printed copy of the Summary and a DVD copy of the full Draft Assessment Report (Volumes I, II and III) are enclosed with this letter.

Public Open Houses

We invite you to attend one of three public open houses where key findings from our Draft Assessment Report will be discussed. As described on the attached notice, events will be held in Brockville, Kingston, and Greater Napanee. Content related to the Westport Wellhead Protection Area will be presented at the Kingston event.

Source Protection Planning

As part of our development of a source protection plan by 2012, our SP Committee will host events called "roundtables" for the each vulnerable area. Participants will be invited to contribute their ideas on how to best protect the source water in ways that are appropriate, effective, and economical for local communities. Advanced notice of the roundtables will be placed in local newspapers and on the Internet. Our SP Committees will need to develop a joint strategy for developing source protection plan policies for the Westport area and for other topics of shared interest.

If you have any questions about the above, please contact me at (613) 353-7335 or via e-mail at willj@kos.net. We look forward to receiving your comments on the Draft Assessment Report, and to working with you on the source protection plans.

Yours truly,

(original signed by)

John C. Williamson, Chair
Cataraqui Source Protection Committee

Attachment: Public Notice

Enclosures: Draft Assessment Report Summary
Draft Assessment Report: Cataraqui Source Protection Area DVD with Volumes I, II and III (April 2010)

PUBLIC NOTICE

Draft Assessment Report Posted For Public Comment

The Cataraqui Source Protection Committee has posted a Draft Assessment Report for public review and comment under the Ontario *Clean Water Act, 2006.* Its purpose is to summarize the findings of numerous recent technical studies, in order to focus attention on what needs to be done to protect local sources of drinking water. Comments on the document will be reflected in a Proposed Assessment Report, which will be submitted to the Ontario Ministry of the Environment for approval.

To Review a Copy of the Draft Assessment Report

- The three volumes of the Draft Assessment Report are available at www.cleanwatercataraqui.ca.
- Copies are available for public review at local municipal offices and at the CRCA Administration Office in Kingston at 1641 Perth Road (Division Street). The CRCA office hours are Monday through Friday from 8:30 AM to 4:30 PM.
- Copies of the report are also available for review at these public libraries:
    - Amherstview Public Library, 322 Amherst Drive, Amherstview (W.J. Henderson Recreation Centre) (613) 389-6006
    - Brockville Public Library, 23 Buell Street, Brockville (613) 342-3936
    - Front of Yonge Public Library, 76 County Road 5 South, Mallorytown (613) 923-1790
    - Gananoque Public Library, 100 Park Street, Gananoque (613) 382-2436
    - Kingston Public Library - Main Branch, 130 Johnson Street, Kingston (613) 549-8888
    - Lansdowne Public Library, 1B Jessie Street, Lansdowne (Leeds and Thousand Islands Municipal Office) (613) 659-3885
    - Napanee Public Library, 25 River Road, Napanee (613) 354-2525
    - Sydenham Public Library, 4432 George Street, Sydenham (South Frontenac Municipal Office) (613) 376-3437

Public Open Houses

We invite you to attend one of three public open houses where the key findings will be discussed:

Thursday May 6, 2010	Brockville Rowing Club 1 Ferry Street, Brockville (Regarding the Brockville, James W. King (Gananoque), Lansdowne, and Miller Manor Apartments (Mallorytown) areas)

Thursday May 13, 2010	Little Cataraqui Creek Conservation Area (Outdoor Centre) 1655 Perth Road, Kingston (Regarding the Cana Subdivision (Kingston Mills), Fairfield (Amherstview and Odessa), Kingston Central, Point Pleasant (Kingston West), Sydenham, and Westport areas)
Monday May 17, 2010	Strathcona Paper Centre 16 McPherson Drive, Napanee *(to be held jointly with the Quinte Source Protection Committee)* (Regarding the A.L. Dafoe (Napanee), Bath, Fairfield (Amherstview and Odessa), Napanee River, Picton, and Sandhurst Shores areas)

Larger areas of interest called highly vulnerable aquifers, significant groundwater recharge areas, and surface water intake protection zones (IPZ 3) will be discussed at all three events. Each public open house will run from 5:00 to 8:00 PM, with a presentation by Cataraqui Region Conservation Authority staff at 7:00 PM.

Your Comments are Appreciated

The Cataraqui Source Protection Committee welcomes your feedback on the draft report. Comments will be accepted until **4:00 PM** on **Thursday, May 20, 2010**. Please send your written comments to:

Rob McRae MCIP, RPP
Project Manager, Source Water Protection
Cataraqui Region Conservation Authority
1641 Perth Road, P.O. Box 160
Glenburnie ON K0H 1S0
robmcrae@cataraquiregion.on.ca

This notice was published on April 15, 2010 in accordance with the requirements in Section 15(3) of Ontario Regulation 287/07 under the Ontario *Clean Water Act, 2006.*

2.0 Assessment Report Development

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Recommendation:

1. That the Mississippi-Rideau Source Protection Committee approve the following chapter for inclusion in the *preliminary draft* Assessment Report:
   - **Chapter 6 – Surface Water Sources**

May 6, 2010 – MRSPC Meeting
The MRSPC will review a *preliminary draft* Assessment Report chapter: Chapter 6 (Surface Water Sources). The Committee will also review all comments received from the public on the draft surface water studies. The Committee will provide comments and feedback on the preliminary draft chapter that will be incorporated into the *preliminary draft* Assessment Report that will be reviewed and considered by the Committee at their June 3 meeting.

April 1, 2010 – MRSPC Meeting
The MRSPC approved revised IPZ 3 vulnerability scoring for the following three *draft* studies: surface water studies for Carleton Place, Perth and Smiths Falls. Finalized *draft* studies were presented to the Mississippi Valley and Rideau Valley Source Protection Authorities on April 21 and 22 respectively. Copies were provided to relevant municipalities and posted for public review and comment. Three public open houses were held in Carleton Place (April 29), Perth (April 26) and Smiths Falls (April 27).

The MRSPC also approved a *preliminary draft* Assessment Report chapter: Chapter 7 (Climate Change). The Committee provided revisions that will be included in the *preliminary draft* Assessment Report that will be reviewed and considered by the Committee at their June 3 meeting.

March 4, 2010 – MRSPC Meeting
The MRSPC approved three *preliminary draft* Assessment Report chapters: Chapter 1 (Introduction), Chapter 4 (Drinking Water Quality Threats and Issues Approach) and 5 (Groundwater Sources). The Committee reviewed a summary of public comments received on the draft Groundwater studies and provided revisions to the chapter that will be included in the *preliminary draft* Assessment Report that will be reviewed and considered by the Committee at their June 3 meeting.

The MRSPC also reviewed three *preliminary draft* studies and their summaries: surface water studies for Carleton Place, Perth and Smiths Falls. They received them as *draft* for public consultation subject to staff discussing with the consultants why wetlands and woodlots were given a vulnerability score of 1 in IPZ 3 regardless of distance from the intake. Staff had a discussion with the consultants who decided to revise the scoring in IPZ 3 and present revised *preliminary draft* studies and summaries to the Committee at their April 1 meeting.

February 4, 2010 – MRSPC Meeting
The MRSPC reviewed a preliminary draft Assessment Report chapter: Chapter 2 (Watershed Characterization). The Committee provided feedback that will be incorporated into the *preliminary draft* Assessment Report that will be reviewed and considered by the Committee at their June 3 meeting.

The MRSPC also reviewed and provided feedback on a preliminary list of topics for inclusion in Chapter 8 (Data Gaps and Topics for Additional Research). MOE then held a conference call with Committee Chairs in March and clarified that content outside of what is required to be included in an Assessment Report cannot be included in the Report because the Director would not be able to approve it. Staff has concluded that Chapter 8 will have to be limited to Assessment Report Data Gaps and a separate document will need to be developed to document outstanding issues, concerns and topics for additional research. This additional document will not form part of the Assessment Report.

January 7, 2010 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* surface water studies and summaries for Britannia and Lemieux Island (the City of Ottawa's intakes on the Ottawa River). They received them as *draft* for public consultation. They were presented to the Rideau Valley and Mississippi Valley Source Protection Authorities in January and March respectively. The study summaries were posted on the web site for public review and comment and two public open houses are being held on March 22 (Tom Brown Arena) and March 31 (Ron Kolbus Lakeside Centre).

December 3, 2009 – MRSPC Meeting
The MRSPC reviewed a *preliminary draft* Assessment Report chapter: Chapter 3 (Water Budget). The Committee provided feedback that will be incorporated into the *preliminary draft* Assessment Report that will be reviewed and considered by the Committee at their June 3 meeting.

November 5, 2009 – MRSPC Meeting
The MRSPC reviewed a *preliminary draft* study and summary that provided:

- An estimated inventory of existing land use activities that pose a potential significant threat to municipal groundwater source water; and
- A list of known documented groundwater quality issues.

This study and summary was approved as *draft* for public consultation and was presented to the Mississippi Valley and Rideau Valley Source Protection Authorities on December 2 and November 26 respectively. It will be circulated to municipalities for their review and comment. Notices will also be sent to property owners where a land use activity has been identified as a potential significant threat once a public consultation schedule has been finalized for the *draft* Assessment Report.

September 3, 2009 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* studies and summaries that provided a Conceptual Water Budget (regional scale), Tier 1 Water Budget (subwatershed scale)

and review of Climate Change knowledge. The Committee approved them as *draft* for public consultation. The summaries were presented to the Mississippi Valley and Rideau Valley Source Protection Authorities on September 16 and 24 respectively and will be circulated to municipalities for their review and comment. Summaries were posted on the web site for public review and comment.

July 9, 2009 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* studies and summaries identifying Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas at the regional scale and approved them as *draft* for public consultation. They were presented to the Mississippi Valley and Rideau Valley Source Protection Authorities on September 16 and August 27 respectively and have been circulated to municipalities for their review and comment. Study summaries were also posted on the web site for public review and comment.

June 4, 2009 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* municipal groundwater studies and summaries for Almonte, Munster, Richmond (King's Park) and Westport and approved them as *draft* for public consultation. Copies of the *preliminary draft* summaries were provided to all relevant municipalities and source protection authority members in advance of the meeting. The approved *draft* study summaries were presented to the Rideau Valley and Mississippi Valley Source Protection Authorities on June 25 and July 15 respectively. Study results were then presented to the public at three open houses in late July: Richmond/Munster (July 20), Westport (July 21), and Almonte (July 22). Summaries are also posted on the web site for public review and comment.

May 7, 2009 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* municipal surface water studies and summaries for Carleton Place, Perth and Smiths Falls. They chose to continue their deliberations at a later meeting following a technical briefing in late August with MOE staff and the study consultants (see March 4, 2010 meeting).

April 2, 2009 – MRSPC Meeting
The MRSPC reviewed *preliminary draft* municipal groundwater studies and summaries for Carp, Kemptville and Merrickville and approved them as *draft* for public consultation. These studies and their summaries were provided to municipalities and presented to the Mississippi Valley and Rideau Valley Source Protection Authorities on April 15 and 23 respectively. Study results were then presented at public open houses in Carp (June 8), Merrickville (June 10) and Kemptville (June 11). The summaries are also posted on the web site for public review and comment.

Background

Source Protection Committees are required to produce Assessment Reports. These reports will map local sources of drinking water, determine how vulnerable they are to contamination and overuse, and identify what land uses and activities pose a risk. Committees will then use this science to develop Source Protection Plans because they will know where source protection policies are needed and what risks those policies need to address.

The Mississippi-Rideau Source Protection Committee (MRSPC) must develop two Assessment Reports: one for the Mississippi watershed, and one for the Rideau watershed.

The Assessment Reports will contain the following components (underlining means the study has been approved as *draft* for public consultation by the MRSPC):

- Watershed Characterization
- Water Budget
- Vulnerable area delineation
  - Significant Groundwater Recharge Areas
  - Highly Vulnerable Aquifers
  - Wellhead Protection Areas for:
    - Almonte, Carp, Kemptville, Lanark (future planned system), Merrickville, Munster Hamlet, Richmond (King's Park subdivision) and Westport
  - Intake Protection Zones for:
    - Carleton Place, Ottawa (Britannia & Lemieux Island), Perth and Smiths Falls
- Prescribed Threats Summary
- Inventory of existing Issues and Significant Threats for groundwater
- Inventory of existing Issues and Significant Threats for surface water
- Climate Change Review

Due Date
Proposed Assessment Reports are due to the MOE one year after Terms of Reference are approved. Source Protection Committees submit *proposed* Assessment Reports to their Source Protection Authorities, who in turn submit them to MOE for approval.

Terms of Reference were approved for the Mississippi Valley Source Protection Area on February 5, 2009, therefore, a *proposed* Assessment Report for the Mississippi watershed must be submitted to MOE by February 5, 2010. Terms of Reference were approved for the Rideau Valley Source Protection Area on March 16, 2009, therefore, a *proposed* Assessment Report for the Rideau watershed must be submitted to MOE by March 16, 2010.

Staff hope to combine the two Assessment Reports into one document for the purposes of public consultation because:

- Much of the information is regional and would be repeated in both versions;
- Many municipalities are shared between the Mississippi and Rideau watersheds and it would be onerous for them to review and comment on two stand alone documents;
- It is more convenient for the public and cost effective if both Assessment Reports undergo public consultation at the same time.

This means both Assessment Reports would have to have been completed by February 5, 2010.

The MRSPC requested a due date extension for a number of reasons (finalized Techincal Rules were delayed by the Province, technical studies were delayed by concerns raised by the Committee, more time was needed for effective public consultation). The MOE granted the extension meaning a *proposed* Assessment Report must now be submitted to MOE by **September 21, 2010**.

Future Amendment Required

The *proposed* Assessment Report that will be submitted by September 21, 2010, will not contain information about the future municipal drinking water system planned for Lanark Village. This information will be identified as a data gap and included in a revised Assessment Report submitted in 2011. Since it is a self contained study, and pertains to a municipal system that does not currently supply people with drinking water, it seemed appropriate to submit it as a future amendment.

Detailed Work Plan and Timeline

The following work plan and timeline breaks the process of developing Assessment Reports into three phases.

Phase 1:

- Completion of background technical studies
- SPC, SPA, municipal and public review of draft findings
- Development of *preliminary draft* Assessment Report chapters
- SPC review of *preliminary draft* chapters

Phase 2:

- Consolidation of chapters into a *preliminary draft* Assessment Report
- SPC review, amendment and approval as "draft for public consultation"
- SPA, municipal and public consultation on the *draft* Assessment Report

Phase 3:

- SPC review of public comments received on *draft* Assessment Report
- Development of *proposed* Assessment Report
- Public consultation on the *proposed* Assessment Report
- Submission of the *proposed* Assessment Report to MOE for approval

Phase 1 Technical Studies

Staff and consultants have been developing background technical studies for a couple of years now. These studies began based on draft technical guidance from MOE and are now being finalized to meet the approved Technical Rules. These studies contain the scientific information the MRSPC needs to complete Assessment Reports.

In spring 2008, a *preliminary draft* Watershed Characterization Report and *preliminary draft* Conceptual Water Budget (based on MOE's draft guidance) were presented to the MRSPC. These studies are currently being updated to meet the final approved Technical Rules and will be brought back to the MRSPC as outlined below.

Once technical studies are completed, and in many cases peer reviewed:

- Staff will develop a summary outlining the study's purpose, methodology and findings (some studies will be grouped into one summary).
- The summary will be presented to the MRSPC for review and possible amendment (the technical study will be provided on CD).

- The summary will be presented to the Source Protection Authorities, then circulated to municipalities, and then the public for review.
    - Summaries will be posted on the web site for comment
    - 11 public open houses will be held.
    - Each open house will focus on the local municipal drinking water system (wellhead protection area or intake protection zone) and provide an overview of regional information as available.
    - Full technical studies will be available to anyone on CD
- Everyone will be encouraged to provide feedback and traditional and local knowledge at this early stage so it can be considered when the *preliminary draft* Assessment Reports are being developed.

Staff will develop a *preliminary draft* Assessment Report in collaboration with our neighbouring source protection regions to be consistent where possible. Individual *preliminary draft* chapters will be brought to the MRSPC for review and comment as soon as they are produced. Chapters will be amended to reflect MRSPC feedback and will be compiled into a *preliminary draft* Assessment Report.

Carp, Kemptville and Merrickville

Municipal Drinking Water Systems (groundwater)

Month	Task	Timeline
March 2009	Golder complete Wellhead Protection Area Studies	**Completed** Early March
	Staff complete Threats Summary	**Completed** Early March
	Staff develop study summaries (reviewed by municipal technical staff)	**Completed** March 16
April 2009	MRSPC review *preliminary draft* study summaries & technical studies (CD). Provide to municipalities before the meeting.	**Completed** April 2
May 2009	Send *draft* study summaries & technical studies (CD) to municipalities with invitation to attend open house	**Completed** May 21
	Advertise three open houses (Carp, Kemptville and Merrickville) and comment period	**Completed** May 21
	Send an open house invitation to every property in an area that could score significant threat	**Completed** May 22 - 25
	SPAs review study summaries	**Completed** April 15 & 23
	Make study summaries available at MVC & RVCA offices for public review	**Completed** May 22
June 2009	Hold Open houses for municipal staff & council (afternoon session) and public (evening session)	**Completed** June 8, 10 & 11
February 2010	Post study summaries on web site	**Completed** mid February
	Collect comments on study summaries	**Completed** mid February
	Staff compile comments received on technical study findings	**Completed** March 3

Month	Task	Timeline
	Staff prepare *preliminary draft* AR chapter	**Completed** February 24
March 2010	MRSPC review summary of public comments and *preliminary draft* AR Chapter	**Completed** March 4

Almonte, Munster, Richmond (King's Park), and Westport
Municipal Drinking Water Systems (groundwater)

Month	Task	Timeline
May 2009	Malroz complete Wellhead Protection Area Study for Westport; Intera / Golder complete other three studies	**Completed** Early May
	Staff complete Threats Summary	**Completed** Early March
	Staff develop study summaries (reviewed by municipal technical staff)	**Completed** May 19
June 2009	MRSPC review *preliminary draft* study summaries & technical studies (CD). Provide to municipalities before the meeting	**Completed** June 4
July 2009	Send *draft* study summaries & technical studies (CD) to municipalities with invitation to attend open house	**Completed** July 7
	Advertise three open houses (Almonte, Richmond and Westport) and comment period	**Completed** July 10
	Send an open house invitation to every property in an area that could score a significant threat	**Completed** July 7
	SPAs review study summaries	**Completed** June 25 & July 15
	Make study summaries available at MVC & RVCA offices for public review	**Completed** July 16
	Hold public Open Houses	**Completed** July 20, 21 & 22
February 2010	Post study summaries on web site	**Completed** mid February
	Collect comments on study summaries	**Completed** mid February
	Staff compile comments received on technical study findings	**Completed** March 3
	Staff prepare *preliminary draft* AR chapter	**Completed** February 24
March 2010	MRSPC review summary of public comments and *preliminary draft* AR Chapter	**Completed** March 4

Significant Groundwater Recharge Areas & Highly Vulnerable Aquifers

Month	Task	Timeline
June 2009	Intera / Golder complete studies	**Completed** Early June

Month	Task	Timeline
	Staff complete Threats Summary	**Completed** Early June
	Staff develop study summaries (reviewed by municipal technical staff)	**Completed** Mid June
July 2009	MRSPC review *preliminary draft* study summaries & technical studies (CD).	**Completed** July 9
	Send *draft* study summaries & technical studies (CD) to municipalities for review	**Completed** July 29
August 2009	SPAs review study summaries	**Completed** August 27 & Sept 16
February 2010	Post study summaries on web site	**Completed** mid February
	Staff prepare *preliminary draft* AR chapter	**Completed** February 24
March 2010	MRSPC review *preliminary draft* AR Chapter	**Completed** March 4

Conceptual and Tier 1 Water Budget & Climate Change Review

Month	Task	Timeline
August 2009	Staff, Intera & Delcan complete Tier 1 Water Budget and staff revise Conceptual Water Budget. Jacqueline Oblak complete Climate Change Review	**Completed** August 14
	Staff develop summaries	**Completed** August 18
September 2009	MRSPC review technical studies (CD) and summaries	**Completed** September 3
	SPAs review summaries	**Completed** September 24
November 2009	Staff prepare *preliminary draft* Water Budget AR chapter	**Completed** November 16, 2009
December 2009	MRSPC review *preliminary draft* Water Budget AR Chapter	**Completed** December 3
February 2010	Post study summaries on web site	**Completed** February
March 2010	Send summaries to municipalities for review and comment	**Completed** March
	Staff prepare *preliminary draft* Climate Change AR chapter	**Completed** March 23
April 2010	MRSPC review *preliminary draft* Climate Change AR Chapter	**Completed** April 1

Groundwater Issues and Significant Threats Inventory

Month	Task	Timeline

Month	Task	Timeline
October 2009	Dillon complete Threats & Issues Inventory for groundwater	**Completed** Early October
	Staff develop study summary (reviewed by municipal technical staff)	**Completed** October 20
November 2009	MRSPC review study summaries & technical studies (CD). Provide to municipalities before the meeting.	**Completed** November 5
	SPAs review study summaries	**Completed** November 26 & December 2
February 2010	Post study summary on web site	**Completed** February
	Staff prepare *preliminary draft* AR chapter	**Completed** February 23
March 2010	MRSPC review *preliminary draft* AR chapter	**Completed** March 4
	Send study summaries to municipalities for review	**Completed** March

Watershed Characterization Report

Month	Task	Timeline
Spring 2008	Staff complete Watershed Characterization report	**Completed** March 2008
	MRSPC review *preliminary draft* technical study	**Complete** March, May and June 2008
January 2010	Staff complete Watershed Characterization report revisions and *preliminary draft* AR chapter	**Completed** January 23
February 2010	MRSPC review technical study revisions and *preliminary draft* AR chapter.	**Completed** February 4

Britannia & Lemieux Island (Urban Ottawa)
Municipal Drinking Water Systems (surface water)

Month	Task	Timeline
Winter 2009	Baird complete Intake Protection Zone Study	**Completed** December 21
	Staff complete Threats Summary	**Completed** April 2009
	Staff develop study summary (reviewed by municipal technical staff)	**Completed** December 22
January 2010	MRSPC review study summay & technical study (CD). Provide to relevant municipalities before the meeting.	**Completed** January 7
February 2010	Work with City of Ottawa staff to organize open houses	**Completed** February
	Advertise open houses (urban Ottawa) & comment period	**Completed** March

Month	Task	Timeline
	SPAs review study summary	**Completed** January 28 & March 24
	Post study summary on web site and make available at MVC & RVCA offices for public review	**Completed** February
March 2010	Hold public open houses	**Completed** March 22 & 31
April 2010	Collect comments on study summaries	**Completed** April 16
	Staff compile comments received on technical study findings and prepare *preliminary draft* AR chapter	**Completed** April 28
	MRSPC review summary of public comments and *preliminary draft* AR Chapter	May 6

Carleton Place, Perth and Smiths Falls
Municipal Drinking Water Systems (surface water)

Month	Task	Timeline
April 2009	J.F. Sabourin complete Intake Protection Zone Studies	**Completed** April 2009
	Staff complete Threats Summary	**Completed** April 2009
March 2010	J.F. Sabourin revise Intake Protection Zone Studies	**Completed** March 22
	Staff revised study summaries (reviewed by municipal technical staff)	**Completed** March 23
April 2010	MRSPC review revised *preliminary draft* study summaries & technical studies (CD). Provide to municipalities before the meeting.	**Completed** April 1
	Send link to *draft* study summaries to municipalities with invitation to attend open house	**Completed** April 14
	Advertise three open houses (Carleton Place, Perth and Smiths Falls) and comment period	**Completed** April 14
	Send an open house invitation to every property in an area that could score significant threat	**Completed** April 16
	SPAs review study summaries	**Completed** April 21 & 22
	Post study summaries on web site and make available at MVC & RVCA offices for public review	**Completed** April 13
	Hold public open houses	April 26, 27 & 29
May 2010	Collect comments on study summaries	May 5
	Staff compile comments received on technical study findings and prepare *preliminary draft* AR chapters	May 5
	MRSPC review summary of public comments and *preliminary draft* AR Chapter	May 6

Surface Water Issues and Significant Threats Inventory

Month	Task	Timeline
April 2010	Dillon complete Threats & Issues Inventory for surface water	April 2010
	Staff develop study summary (reviewed by municipal technical staff)	April 2010
May 2010	MRSPC review technical study and *preliminary draft* AR chapter.	May 6
	Send technical study to municipalities for review	May 2010
	SPAs review study summaries	May 2010
	Post study summary on web site	May 2010

Phase 2 *Draft* Assessment Reports

Staff will compile all *draft* Assessment Report chapters into a *preliminary draft* Assessment Report. The MRSPC will review all public comments received on individual technical studies and will consider them when developing a *draft* Assessment Report for public consultation.

Month	Task	Timeline
June 2010	SPC review *preliminary draft* AR. Consider publishing *preliminary draft* AR for public consultation (now *draft* AR)	June 3
	SPC publish *draft* AR on website and make available at MVC and RVCA offices	Mid June
	SPC send copy of *draft* AR to each municipal clerk for comment	Mid June
	SPC send notice of *draft* AR to each person known to be potentially engaging in a significant threat	Mid June
	SPC send copy of *draft* AR to each neighbouring SPC for comment	Mid June
	SPC issue notice* on website, in newspapers and at other locations advising the public of the opportunity to view and comment on the *draft* AR	Mid June
	SPC send copy of *draft* AR to SPAs for comment	Mid June
	SPC receive written comments on *draft* AR	July 2010
July 2010	SPC host 2 public meetings to consult on *draft* AR (one meeting in each Source Protection Area)	June / July 2010
	Staff prepare a summary of comments received on *draft* AR and prepare recommendations about how to address them	July 2010

Phase 3 *Proposed* Assessment Reports

Staff will summarize all comments received on the *draft* Assessment Report during public consultation and make recommendations about how these comments could be addressed. The MRSPC will consider all comments when making final revisions to the *draft* Assessment Report.

The MRSPC will forward their *proposed* Assessment Report to the SPAs and post it for a final public consultation period. SPAs will submit the *proposed* Assessment Report to MOE for review and approval along with any public comments they receive or comments they wish to make.

Month	Task	Timeline
August 2010	SPC review summary of comments received on *draft* AR and staff recommendations for proposed changes Consider submitting revised *draft* AR to SPAs and posting for public consultation (now *proposed* AR)	August 12
	Staff prepare *proposed* AR Staff prepare a summary of public comments received on *draft* AR and how they were addressed	August 2010
	SPC publish *proposed* AR on website and make available at MVC and RVCA offices	August 2010
	SPC send copy of *proposed* AR to each municipal clerk for comment	August 2010
	SPC send notice of *proposed* AR to each person known to be potentially engaging in a significant threat	August 2010
	SPC send copy of *proposed* AR to neighbouring SPCs for comment	August 2010
	SPC send notice of *proposed* AR to each person who submitted comments on *draft* AR	August 2010
	SPC issue notice* on website, in newspapers and at other locations advising the public of the opportunity to submit written comments on *proposed* AR to SPAs	August 2010
	SPC submit *proposed* AR to SPAs along with a summary of comments received on the *draft* AR and whether they were addressed in the *proposed* AR	August 2010
September 2010	SPAs receive written comments on *proposed* AR	September 2010
	Staff compile comments received	September 2010
	SPAs submit to the Minister of the Environment: - *proposed* AR - summary of comments received on *draft* AR and how they were addressed; and - new comments received on *proposed* AR	September 21
October 2010	SPAs provide SPC with copy of comments received on *proposed* AR	October 7
	Minister will review the package and approve *proposed* AR <u>or</u> require SPAs to amend them and resubmit	approval timeline unknown
	Once approved the Minister will publish a notice on the Environmental Bill of Rights Registry	Soon after approval
	SPAs publish *approved* AR on web site and make available at other locations	Soon after approval

* Notice will specify deadline for public comments, how to submit comments, locations of public meetings and locations where the ARs can be viewed (electronically and in hard copy).

Assessment Reports will be prepared in accordance with:

- *Clean Water Act, 2006*
- Ontario Regulation 287/07 “General” (amended by O.Reg. 386/08)
- *Technical Rules: Assessment Report* (dated December 12, 2008)

Attachments:

- *Preliminary draft* Assessment Report Chapter 6
- Summary of public comments received on the draft Surface Water Studies

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Note to SPC:
Municipal Boundaries are to be included in final maps (where applicable)
All IPZ-3 maps will printed on 11 x 17 paper

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List of Appendices

6 Surface Water Sources

Introduction

This chapter provides information on surface-water based municipal drinking water systems in the Mississippi-Rideau Source Protection Region (MRSPR). Information on the general process of determining intake protection zones (IPZs) for municipal surface water intakes is provided, followed by discussion on how each of the five municipal IPZs in the region was delineated. Significant threats, issues, and conditions are discussed where applicable for each of the intakes.

There are five municipal surface drinking water intakes in the MRSPR. Two are located in the Ottawa River, supplying the City of Ottawa, and three are in smaller inland rivers, supplying the Towns of Carleton Place, Perth, and Smiths Falls.

IPZs have been delineated for each of the municipal intakes. The IPZ studies for Carleton Place, Perth and Smiths Falls drinking water systems were completed together and are referred to as Type C: Inland Rivers Intake Protection Zone studies. The IPZ studies for Britannia and Lemieux Island (Ottawa) drinking water systems were completed together, and are referred to as Type C: Ottawa River Intake Protection Zone Studies.

There are no issues or conditions identified at any of the municipal surface water intakes in the MRSPR. A summary of key results is in Table 6-1.

There were a number of potentially significant threats identified in the MRSPR IPZs. Carleton Place has 10 potentially significant threats, Perth 13, Smiths Falls five, Britannia has six, and Lemieux Island did not have any potentially significant threats. Table 6-2 is a summary of potentially significant threats in the MRSPR.

A number of lower or single tier municipalities have IPZs located within their boundaries. Table 6-3 lists which municipalities within the MRSPR have IPZs and the associated water intake.

A numbers of questions have been raised regarding how vulnerability scores were derived and Section 6.2 discusses concerns which have been identified with the approach taken to delineation of IPZs. A summary of vulnerability scores for all the IPZs in the region can also be found in that section.

Technical Studies

Five background technical studies were completed for the surface water sources chapter. The following table summarizes “who did what”, including a peer review, if applicable. Further information about peer review is provided following the table.

Study & Completion Date	Lead Consultant	Peer Review
Inland Rivers (Carleton Place, Perth, Smiths Falls) Intake Protection Zone Study, 2010	J.F. Sabourin and Associates Inc., and Water and Earth Science Associates	Baird & Associates Ltd.
Ottawa River Intake Protection Zone Study, 2010	Baird & Associates Ltd.	J.F. Sabourin and Associates Inc.
Managed Lands and Livestock Density, 2010	Dillon Consulting	not peer reviewed
Impervious Surfaces, 2010	Mississippi-Rideau Conservation Authority Staff	not peer reviewed
Drinking Water Threats and Issues, 2010	Dillon Consulting	not peer reviewed

Surface Water Sources – Technical Reports

Peer Review

An independent consultant was retained to undertake a peer review of each IPZ study. The objectives of the IPZ study peer review were as follows:

- To ensure consistency with the expectations of the MOE Technical Guidance modules, which have since been replaced by the Technical Rules
- To validate the approach for development of surface water vulnerability studies
- To ensure scientifically defensible surface water vulnerability studies.

The table above lists the names of consultants who undertook the peer review for each study. Each technical study contains a peer review record.

This chapter is a summary of the MRSPR surface water studies' processes and results. Further information on threats and issues processes may be found in Chapter 4. Information on data gaps may be found in Chapter 8. A list of all Assessment Report technical reports and data source information may be found in Appendix A-1. For further information on the work completed in the MRSPR related to surface water sources, see the related technical report(s).

6.1 Intake Protection Zones

This section provides information on IPZs; how they are classified, delineated and scored for vulnerability within the MRSPR.

6.1.1 What is an Intake Protection Zone?

An IPZ is the land and water area that contributes water to a municipal surface water intake. Within this area it is important to monitor or regulate drinking water threats. IPZ studies aim to provide an understanding of local surface water flow conditions and potential sources of contamination surrounding one or more intakes that supplies a public drinking water system.

6.1.2 Classification of Intakes

The Technical Rules require classification of each municipal surface water intake into one of the following four categories:

- **Type A** intakes are located in a Great Lake;
- **Type B** intakes are located in a Great Lake Connecting Channel or River (such as the St. Lawrence River);
- **Type C** intakes are located in a smaller river where neither the direction nor flow rate at the intake is affected by a water impoundment structure (e.g. a dam); and
- **Type D** intakes are anything not classified as a Type A, B or C intake. Type D intakes are typically located in smaller inland lakes.

The classification of an intake determines how the related IPZs are developed and assessed. As discussed in Chapter 2, there are 5 municipal surface-water based drinking water systems in the MRSPR. The following table provides the source water and classification of each of the five systems.

<table>
<tr><th>Municipal Drinking Water System</th><th>Source Water</th><th>Intake Classification</th></tr>
<tr><td>Carleton Place</td><td>Mississippi River</td><td rowspan="5">Type C</td></tr>
<tr><td>Perth</td><td>Tay River</td></tr>
<tr><td>Smiths Falls</td><td>Rideau River</td></tr>
<tr><td>Britannia (Ottawa)</td><td rowspan="2">Ottawa River</td></tr>
<tr><td>Lemieux Island (Ottawa)</td></tr>
</table>

MRSPR Surface Water Intake Classification

The IPZ studies for Carleton Place, Perth and Smiths Falls drinking water systems were completed together and are referred to as Type C: Inland Rivers Intake Protection Zone studies. Information relevant to the three inland river systems is presented as Section 6.3 and the individual study results are presented in Sections 6.4 through 6.6.

The IPZ studies for Britannia and Lemieux Island (Ottawa) drinking water systems were completed together, and are referred to as Type C: Ottawa River Intake Protection Zone Studies. Information related to the Ottawa systems is presented in Section 6.7 and the individual study results are presented in Sections 6.8 and 6.9.

Although all municipal surface water intakes in the MRSPR are classified as Type C systems, the Technical Rules have different requirements for the delineation of IPZ-3s for the inland river intakes and Ottawa River intakes.

6.1.3 Delineation of Intake Protection Zones

An IPZ is made up of three separate zones: IPZ-1, IPZ-2, and IPZ-3. These areas are adjacent to one another, but do not overlap. The zones are made up of both water areas and land areas which have the potential to contribute contamination to a municipal surface water intake. A general description of how the three IPZs are delineated follows.

IPZ-1

The IPZ-1 represents the most vulnerable area immediately surrounding the municipal surface water intake. The size and shape of the IPZ-1 is set by the Technical Rules but may be modified to reflect local conditions. If the IPZ-1 delineation includes land, it may only extend onto the land by 120 m from the high water mark or the Conservation Authority Regulation Limit, whichever is greater. The general IPZ-1 requirements for each type of intake is shown in the following table.

Intake Type	Location	General Area Shape	Area Dimensions for IPZ-1
A	Great Lakes	Circle	One kilometre radius
B	Connecting Channels	Semi-Circle/Rectangle	One kilometre radius upstream of intake, rectangle two kilometres long and 100 m wide downstream
C*	Rivers	1) Circle, or 2) Semi-Circle/Rectangle	1) One kilometre radius, or 2) 200 m radius upstream of intake, rectangle 400 m long and ten m wide downstream
D	Other	Circle	One kilometre radius

IPZ-1 General Features

***MRSPR Municipal Surface Water Intake Type**

IPZ-2

The in-river portion of IPZ-2 is based on a specified Time of Travel (ToT) within the river. This is the period required for surface water to travel to the intake. Under the Technical Rules, the required ToT must be equal to or less than the time that is sufficient to allow operators to shut down the water treatment plant in the event of a spill, or 2 hours, whichever is greater.

The Technical Rules also require that all storm sewers that may contribute water to the intake within the 2 hour ToT or the water treatment shut down time (if the shut down time is greater than 2 hours) be included in IPZ-2.

The on-land portion of IPZ-2 adjacent to the river is based on a setback of 120 m from the high water mark or the Generic Regulation limit as maintained by the Mississippi Valley and Rideau Valley Conservation Authorities, whichever is greater.

IPZ-3

The IPZ-3 is an area where contaminants, if released, could be transported to the municipal surface water intake. For municipal surface water intakes located on inland rivers other than the Ottawa River, the standard approach is to buffer all rivers, streams, and lakes upstream of the intake by 120 m, or the generic regulation limit line.

The Technical Rules prescribe a different approach for municipal surface water intakes on the Ottawa River, called the event-based approach (EBA). This approach considers the dispersion of a contaminant spill within the watershed, and results in the delineation of an IPZ-3 that includes areas beyond IPZ-1 and IPZ-2 which could contribute contaminants to the intake in the case of an extreme weather event. For the work done in the MRSPR, extreme events have been defined as 1:100 year (also called one hundred year return) flood events.

Inclusion of Transport Pathways in IPZ Delineation

A transport pathway (TP) is anything that provides a direct route for contaminants to enter surface water. These are human-made or natural features such as drainage ditches, tile drains, roadways, or creeks and streams. Since these pathways can drain water from a larger area than the river's main channel alone, the intake protection zones must be expanded to include them.

Transport pathways are considered once a preliminary IPZ delineation has been completed. The IPZ-2 and/or IPZ-3 is expanded to include the transport pathways. In the case of the inland river municipal surface water intakes, a 120 m setback on both sides of the transport pathway was used to define the transport pathway area since not all information on conditions was known.

The delineation of the Type C: Inland Rivers IPZs in the MRSPR is presented in Section 6.3.1. This section provides information for the Carleton Place, Perth, and Smiths Falls municipal surface water intakes. The delineation of the Type C: Ottawa River IPZs in the MRSPR is presented in Section 6.7.1. The section provides information on the two municipal surface water intakes for the City of Ottawa located at Britannia and Lemieux Island.

6.1.4 Vulnerability Scoring

Once the IPZs are delineated, the next step is to assess how susceptible the surface water in these zones is to contamination. This is done in order to identify areas where extra care is needed to protect the water supply.

The Technical Rules set out a process for assessing the vulnerability for each intake protection zone. The final vulnerability score is based on the following equation:

$$V = B \times C$$

Where:

V is the vulnerability score

B is the area vulnerability factor

C is the source vulnerability factor

These factors, and how their values were calculated, are described below.

Determining the Area Vulnerability Factor (B)

The first step in the evaluation of surface water vulnerability is to determine the area vulnerability factor (B) for each intake protection zone. The area vulnerability factor B must be a whole number (no decimal points), and the possible values range from 1 to 10, with 10 being the highest vulnerability.

IPZ-1

The area vulnerability factor for IPZ-1 is always 10, as required in the Technical Rules, since this zone is closest to the intake and encompasses the area of water and land to which the water intake is most vulnerable. It is assumed that if contaminants were released within IPZ-1 they would not be diluted or filtered before reaching the intake.

IPZ-2

The Technical Rules require that the area vulnerability factor for IPZ-2 can be 7, 8, or 9. One score must be assigned to the whole zone and the following factors must be taken into consideration:

- **Percentage of area of IPZ-2 that is land**. This factor reflects the assumption that as the percentage of land within an IPZ increases, the potential risk increases for a spill to occur that may impact water quality at the water intake.
- **The land cover, soil type, permeability of the land and the slope of the land.** This factor reflects the potential for overland water to flow into the zone. Whether vegetation is present, as well as the type of vegetation, affects how much of the water is overland water flow and how much of it soaks into the ground. Permeable soils allow for more infiltration. Slopes increase the percentage of overland flow compared to the amount of infiltration.
- **The hydrological and hydrogeological conditions where transport pathways are located**. This factor reflects the extent of the transport pathways including sewer systems that may exist in the zone and their influence on water (and potential contaminant) movement from land to rivers which are the source of water intakes.

IPZ-3

The area vulnerability factor for IPZ-3 is based on proximity to the municipal surface water intake as well as the three factors considered for IPZ-2, shown above. Unlike IPZ-2, the area vulnerability factor for IPZ-3 may differ by location throughout the area. According to the Technical Rules, no value in the IPZ-3 may be a higher value than the value assigned to IPZ-2.

Determining the Source Vulnerability Factor (C)

The second step is to assess the source vulnerability factor (C). This is an assessment of the location of the municipal surface water intake and how vulnerable it is to the impact of contaminants. The source vulnerability factor is assigned to each intake in accordance with the following table from the Technical Rules.

Intake Type	Location	Source Vulnerability Factor (C)
A	Great Lakes	0.5 to 0.7
B	Connecting Channels	0.7 to 0.9
C*	Rivers	0.9 to 1
D	Other	0.8 to 1

Source Vulnerability Factor Ranges for Surface Water Intakes

*** Intake Type for all MRSPR Municipal Surface Water Intakes**

In the MRSPR where there are only Type C intakes, a factor of 1 corresponds to a higher vulnerability and 0.9 indicates relatively less vulnerability.

The source vulnerability factor is based on:

- the depth of the intake below the water surface - the deeper the intake, the lower the vulnerability;
- the distance of the intake from land - the further away from shore, the lower the vulnerability; and
- the number of recorded drinking water quality issues at the intake, if any.

Calculating IPZ Vulnerability Scores

Once the area (B) and source (C) vulnerability factors have been finalized, the final step is to complete the calculation of the final vulnerability scores, according to the prescribed equation.

The table below summarizes the possible area vulnerability factors (B), source vulnerability factors (C) and vulnerability scores (V) for Type C intakes.

	Possible Area Vulnerability Factors (B)			Possible Source Vulnerability Factors (C)	Possible Vulnerability Scores (V) [B x C = V] *Expressed to a max. of one decimal point, depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*

Ranges of Possible Vulnerability Factors and Scores for Surface Water IPZs

6.2 Outstanding Concerns with the Vulnerability Scoring Methodology

There has been considerable debate in the MRSPR about how vulnerability scores should be determined for IPZs. While specific concerns have been documented in the record of public comments (*to be included in the Assessment Report submission package*), the intent of the following section is to:

- inform readers that concerns have been raised before they review the scores;
- document that the Committee considers the scores to be a reasonable first time assessment and can be updated at a later date; and
- demonstrate that the Province must develop strong Technical Guidance detailing how vulnerability scores should be derived for Intake Protection Zones.

First Time for Surface Water Studies

Professionals have been carrying out groundwater Wellhead Protection Studies since the late 1990s, providing experience and established best practices for the MOE to draw from for its development of the Technical Rules governing groundwater studies. The result is a fully prescribed approach for how to derive vulnerability scores for the Wellhead Protection Areas, discussed in Chapter 5, and an approach has been applied consistently across the province.

In contrast, surface water IPZ studies are being undertaken for the first time in Ontario. With little experience and few "lessons learned" to draw from, the Technical Rules for surface water studies did not prescribe how to carry out vulnerability scoring for Intake Protection Zones. The Technical Rules requires locally developed methodologies to be used.

Current Technical Rules for Surface Water Vulnerability Scores

The Technical Rules for surface water vulnerability scores rely on the determination of an area vulnerability factor (B) and a source vulnerability factor (C) to derive vulnerability scores (V), where V = B x C.

Specifically, the Technical Rules indicate that for the area vulnerability factor (B), one must consider:

- the percentage of area of IPZ-2 or IPZ-3 that is land;
- the land cover, soil type, permeability of the land and the slope of the land;
- the hydrological and hydrogeological conditions where transport pathways are located; and
- the proximity of the area of the IPZ-3 to the intake.

For the Source Vulnerability Factor (C), one must consider:

- the depth of the intake below the water surface;
- the distance of the intake from land; and
- the history of water quality concerns at the intake.

In addition to the above, the Technical Rules specify:

- the area vulnerability factor for IPZ-1 must be 10;
- the area vulnerability factor for IPZ-2 is not less than 7 and not more than 9;
- the area vulnerability factors for IPZ-3 are not less than 1 and not more than 9;
- the area vulnerability factor for IPZ-3 shall not be greater than the area vulnerability factor assigned to IPZ-2; and
- the source vulnerability factor shall be 0.9 or 1 for the municipal surface water intakes located in the Mississippi-Rideau Source Protection Region.

The Debate

The Technical Rules for surface water vulnerability scoring presented above set boundaries within which to derive vulnerability scores. The Rules allow enough flexibility that they may be applied in a number of different ways, each producing different results. The resulting vulnerability scores may be considered to be somewhat subjective due to the arbitrary decisions required in response to this flexibility. It also means the Rules can be applied differently across the Province.

In Source Protection Committee meetings and public open houses, an argument has been advanced that where there is flexibility, the Technical Rules should be applied in the most precautionary manner producing the highest vulnerability scores allowed under the Rules because the methodology used by the consultants is not scientifically defensible. Since the Technical Rules rely on the consideration of the simple indicators previously listed to derive vulnerability scores rather than a physics-based assessment of how a contaminant spill would behave, it is difficult to scientifically justify any methodology that applies the Technical Rules in a certain way. However, simply opting to produce the highest scores possible is also subjective. Additionally it carries with it the implication that this would be to allow for the greatest number of land use activities to be regulated by the Source Protection Plan in the largest possible area, without the science-based rationale for doing so.

Committee members, staff, and the consultants clearly recognize that there is too much flexibility in the Technical Rules and the debate surrounding the surface water vulnerability scoring has helped identify particular concerns. However, the Committee considers the surface water vulnerability scores for the MRSPR, derived by the method described in the next sections, as a reasonable first time assessment and understands that the scores can be adjusted in an updated Assessment Report if and when a rigorous scientific methodology becomes available. The vulnerability scores are, in some instances, at or close to the highest possible values permissible in the Technical Rules and the vulnerability scores that are not reflect the individual river and intake characteristics.

	Zone	IPZ-1	IPZ-2	IPZ-3
	Possible Vulnerability Scores Values	9 or 10	6.3 to 9	0.9 to 9
	Vulnerability Scores Values Results			
Intake Protection Zones	Carleton Place	10	9	1 to 8
	Perth	10	9	1 to 8
	Smiths Falls	10	8	1 to 7
	Britannia	9	8.1	0.9 to 7.2
	Lemieux Island	9	8.1	0.9 to 7.2

Summary of Possible and Final Vulnerability Scores for Intake Protection Zones in the MRSPR

The Solution – Provincial Technical Guidance Required

In order to address concerns raised by the public as well as staff, consultants and Committee members, it is suggested that a panel of experts be assembled to develop appropriate Technical Guidance, in order to ensure that scoring is carried out in a scientifically-based manner consistently across the province in the future. This could involve:

- an assessment of existing methodologies from other source protection areas and regions to derive vulnerability scores;
- the identification of a preferred scoring methodology; and
- the preparation of a Technical Guidance document for vulnerability scoring.

Timing

The development of a Technical Guidance document for surface water vulnerability scoring could be completed by the MOE in time to enable the MRSPR to reassess their surface water vulnerability scoring and amend their Assessment Report, if required, prior to the implementation of Source Protection Plan policies in 2013.

6.3 Type C: Inland River Intake Protection Zones in the Mississippi-Rideau Source Protection Region

This section provides information on inland river municipal intake protection zones. Three municipal intakes are included in this category; Carleton Place, Perth, and Smiths Falls.

6.3.1 Delineation of Type C: Inland Rivers Intake Protection Zones

The following describes the process which was undertaken to complete the IPZ delineation for the municipal intakes for Carleton Place, Perth, and Smiths Falls.

Collection and assembly of data and information

Local hydrology, water quality, and climate data was collected from federal, provincial, and municipal governments as well as other sources. Information collected includes the generic regulation limit lines for the study area, as maintained by the Rideau Valley and Mississippi Valley Conservation Authorities. Generic regulation areas identify land which could be unsafe for development due to naturally occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock.

The characteristics of the municipal surface water intakes and identification of surrounding land uses were determined through site visits, discussions with municipal staff and review of available records and reports. Current and high-quality digital aerial photography and elevation data is an integral part of the analysis of Carleton Place, Perth and Smiths Falls. This data was acquired by the Mississippi-Rideau Source Protection Region in 2006.

Delineation of IPZ-1

As discussed in Section 6.1.3, the IPZ-1 surrounds the municipal surface water intake. The Technical Rules outline how to create IPZ-1. For Type C intakes, IPZ-1 can be created using a;

- one km radius (centred on the intake); or
- 200 m radius (centred on the intake) upstream of intake, plus a rectangle 400 m long and 10 m wide downstream of the intake.

The first method is more appropriate for intakes located in large surface water features such as lakes, where there is little or no flow. The second of the two methods listed above was selected for the three inland municipal water intakes in the MRSPR because, unlike a lake, the rivers have a continuous downstream flow.

Wherever the IPZ-1 intersects the shore, it was expanded to a setback of 120 m from the high water mark or the Conservation Authority generic regulation limit, whichever is greater.

It should be noted that the Smiths Falls IPZ-1 accommodates two intakes, the main intake and the auxiliary intake for the new water treatment plant. Delineation of the IPZ-1 for the Smiths Falls water intakes included some minor modifications to reflect local hydrodynamic conditions. The 10 m downstream limit for the intakes was extended approximately 23 m downstream to a structure that would prevent backflow from points downstream during lower flows. The 200 m upstream distance in the water was extended 10 m in a small part of the IPZ-1's northwest corner to completely encompass infrastructure located there rather than passing through the middle of the structures.

Development of a computer model

Aforementioned datasets were used to develop a general understanding of the local surface water system. Using the geometry from cross-sections at various points along each river, along with water flow data from a stream flow gauge, the HEC-RAS computer model was chosen to determine how quickly water flows towards the three intakes.

HEC-RAS models how water flows through natural rivers and channels. This modeling software is publicly available and has been peer reviewed. The model was used to determine the velocity with which water (at the various points) travels towards the intake in the river. This information was used to determine the IPZ-2 Time of Travel (ToT).

Delineation of IPZ-2

As discussed in Section 6.1.3, the IPZ-2 is based in part on the distance upstream from the intake that represents how far a contaminant in the water travels in a minimum of two hours.

Under the Technical Rules, the required ToT must be equal to or less than the time that is sufficient to allow operators to shut down the water treatment plant (WTP) in the event of a spill. The following table shows the approximate shut down time for the three inland municipal water intakes ranges from five to 15 minutes after detection or notification, so the ToT was set to the minimum two hour limit.

Municipal Surface Water System	Approximate Shut Down Time as Reported by Municipality
Carleton Place	5 minutes
Perth	5 minutes
Smiths Falls	15 minutes

Approximate Shut Down Time for MRSPR Inland Water Treatment Plants

In-river

The HEC-RAS model defined the upstream limits of IPZ-2 using the two hour ToT, as prescribed by the Technical Rules. The equivalent of each river's bankfull velocity was also required and this was represented by using the 2-year return period flow, which is considered to be representative of bankfull conditions.

The bankfull flow rate for each of the three rivers follows. The upstream limits of the IPZ-2s were extended to take into account wind effects on the ToT in the river.

Intake	Source Water	Bankfull flow (m^3/s)
Carleton Place	Mississippi River	144
Perth	Tay River	24.3
Smiths Falls	Rideau River	53

MRSPR Inland Rivers Bankfull Velocity

On-land

The next step involved determining the upstream limits of the storm sewer systems. Storm sewer outlets are located upstream of the intakes in Perth and Smiths Falls. No storm sewer outlets were identified upstream of the Carleton Place intake. The ToT in the Perth and Smiths Falls storm sewers were determined using flowing full velocities. Calculations were done to determine the distance up the storm sewer to be included in the IPZ-2. Storm sewers where the sum of the ToT in the river and the ToT in the storm sewer are less than or equal to two hours are included, with the delineation being at the two hour ToT. The identified on-land IPZ-2 areas were also extended to take into account wind effects on the ToT.

To complete the delineation, the outer boundaries of the zone, along the edges of the river, needed to be set. According to the Technical Rules, the outer boundary of the IPZ-2 on-land area along the river includes a setback of 120 m from the high water mark, or the generic regulation limits line (as developed and maintained by MVC and RVCA), whichever is greater.

Delineation of IPZ-3

The third intake protection zone (IPZ-3), was created by buffering all rivers, first order streams, and lakes upstream of IPZ-2 to include a setback of 120 m from the high water mark, or the generic regulation limits line, whichever is greater.

Inclusion of Transport Pathways

The final step in the IPZ delineation process was to expand the preliminary IPZ-2 and IPZ-3 zones where transport pathways are present. Transport pathways are natural or anthropogenic features such as natural tributaries, roadways and ditches. The ToT up the transport pathways was determined by either a ToT formula or by the drainage divides. When the ToT formula was used, the distance up the transport pathways was calculated so the sum of the ToT in the river and the ToT in the transport pathway was equal to two hours.

Mapped wetlands within the watershed that are contiguous to the IPZ-3 water courses were identified as potential transport pathways and were included in the preliminary delineation of the IPZ-3 along with a 120 m setback around the wetlands.

6.3.2 Vulnerability Scoring of Type C: Inland Rivers Intake Protection Zones

As presented in Section 6.1.4, the area vulnerability score is based on the following equation: **V = B x C,**

Where;

V is the vulnerability score

B is the area vulnerability factor

C is the source vulnerability factor

The Technical Rules identify the possible IPZ area vulnerability factor (B) values.

- **IPZ-1** is always 10
- **IPZ-2** may be 7, 8, or 9, same score throughout
- **IPZ-3** 1 to 9, must not be higher than IPZ-2, score varies but is always a whole number.

For Type C intake, the source vulnerability factor (C), can be either 0.9 or 1. The source vulnerability factor is the same for IPZ-1, IPZ-2 and IPZ-3.

The methodologies used to determine the area vulnerability factor for IPZ-2 and IPZ-3 follow. This is followed by the methodology used to determine source vulnerability factor.

Determination of Area Vulnerability Factor (B) for IPZ-2

At each of the three intakes, the area vulnerability factor (B) for IPZ-2 was established based on a numerical approach involving a weighted combination of the factors in the Technical Rules requirements:

- **Percentage of area of IPZ-2 that is land**. This factor reflects the assumption that as the percentage of land within an IPZ increases, the potential risk increases for a spill to occur that may impact water quality at the water intake.
- **The land cover, soil type, permeability of the land and the slope of the land.** This factor reflects the potential for overland water flow into the zone. Vegetation presence, as well as the type of vegetation, will affect the percentage of overland water flow which occurs and how much of the water infiltrates the ground. Permeable soils allow for increased infiltration. Slopes increase the percentage of overland flow compared to the amount of infiltration.
- **The hydrological and hydrogeological conditions where transport pathways are located**. This factor reflects the extent of the transport pathways and sewer systems that may exist in the zone and their influence on water (and potential contaminant) movement from land to rivers which are the source of water intakes.

As discussed, according to the Technical Rules the area vulnerability factor (B) may be a 7, 8 or 9. For each of the three factors shown above, circumstances were identified where, when combined and weighted, the area vulnerability factor (B) would be set at the minimum value of 7. This also was done to identify circumstances where there would be the maximum value of 9. From that, a number of different circumstances were identified to quantify a range in the vulnerability experienced locally in the study region.

Using a scenario where the channel is relatively wide compared to the land setback for that location, it was estimated that the minimum percentage of IPZ-2 land area would be 10%. This was set as the assumed minimum value of 7. Then, scenarios were identified to determine an approximate maximum value which would represent an area vulnerability factor (B) of 9. This would occur in a situation such as where the channel would be relatively narrow compared to the amount of land included in the setback. The maximum percentage of IPZ-2 land area was then set as 90% which became the assumed maximum value.

Similarly, scenarios related to the land characteristics were used to determine the curve number (CN) (discussion follows in #2 of Determination of Area Vulnerability Factor for IPZ-3), and slope, both of which help determine runoff potential on the lands adjacent to the river. From this, the minimum and maximum assumptions were determined for the curve number and slope.

Finally, scenarios on the extent or density of transport pathways were developed to determine the minimum and maximum numbers for the ratio of the total length of transport pathways over the length of the main channel in the IPZ-2.

All of these “assumptions” were reached by considering the physical characteristics of the waterway, the adjacent land, and transport pathways, combined with professional judgement.

Each of the three factors was then given an assumed weight, again based on consideration of the area and professional judgement, with the total weights summing to 100%. The assumed minimum and maximum vulnerability factor values for each of the three factors as well as the assumed weighting factors used at each of the three water intakes follows.

Three factors used for Area Vulnerability Factor (B)	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Assumed Weighting
Percentage of Area Composed of Land	10 %	90%	30%
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =36, Slope = 0.25%	CN =95, Slope = 2%	30%
Transport Pathways (total length / main channel length)	0	9	40%

Components of Area Vulnerability Factor and Assumed Weighting

In the final step, the actual or calculated value for each specific IPZ-2 was then converted, by interpolation, between the minimum and maximum values of

B=7 and B=9. For example, an actual land area for IPZ-2 of 72% would result in a converted B value of B=8.55.

Appendix 6-1 provides additional details on the vulnerability scoring methodology for the Type C: Inland Rivers Intake Protection Zones.

Determination of Area Vulnerability Factor (B) for IPZ-3

The methods used in determining the area vulnerability factor (B) for IPZ-3 are similar to those for IPZ-2, except that in IPZ-3 the factor varies as the distance increases from the water intake and can also vary dependent on characteristics of the river and the adjacent lands.

The area factor was calculated using GIS by means of the following steps.

1. Determine Proximity to Intake

An initial score was developed by location within the IPZ-3 based solely on distance to the intake, where points closest to the intake had a score of one less than the IPZ-2 area vulnerability factor and the points furthest from the intake had a score of 1. Scores for locations between these two points were varied linearly based on distance.

As wetlands can include transport pathways to adjacent water courses particularly in times of high water, the wetland areas are considered to have an equivalent vulnerability to the adjacent water course. As with the water areas, the vulnerability factor assigned to wetlands is not changed for the curve number and slope (discussion follows).

2. Calculation of Curve Number (CN)

The curve number method is a simple, widely used and efficient method for evaluating the relative amount of runoff generated by a rainfall event in a particular area. A high curve number value reflects highly impermeable surface conditions that would generate considerable runoff. A low curve number value indicates highly permeable soils and natural land uses, where rainfall (or a spilled contaminant) would readily soak into the ground.

Once the curve number value is calculated, the initial area vulnerability score is adjusted using the following values. The range of values in the score adjustments for the curve number and slope were determined through professional judgement.

CN Value	Score Adjustment
<36	-0.5
36 – 73	0
>73	+0.5

Curve Number Value and Score Adjustment

3. Calculate Slope

Slope was calculated for all locations within IPZ-3 from the Provincial Digital Elevation Model and the initial area vulnerability score was then modified based on the slope value to give the final adjusted area vulnerability factor. The following table shows slope values and how the corresponding score adjustment to the area vulnerability score.

Slope Value	Score Adjustment
<1%	0
1%< Slope <7%	+0.5
>7%	+1.0

Slope Value and Score Adjustment

Determination of Source Vulnerability Factor (C)

At each of the three intakes, the source vulnerability factor (C) was established based on a review of the following factors;

- the depth of the intake below the water surface (the deeper the intake, the lower the vulnerability);
- the distance of the intake from land (the further away from shore, the lower the vulnerability); and
- the number of recorded drinking water quality issues at the intake, if any, based on required water quality monitoring and a voluntary drinking water surveillance program.

The available information was considered adequate to assign the source vulnerability factor (C) a score of 0.9 (lower vulnerability) or 1 (higher vulnerability).

6.3.3 Managed Lands and Livestock Density

The percentage of managed lands and nutrient units are indicators of the degree of agricultural activity and other land management activities. In some cases the storage and application of pesticides, fertilizers, and other agricultural materials associated with agricultural activities may result in pathogen and chemical contamination of drinking water sources.

MRSPR studies on managed lands and livestock density have been completed in accordance with the MOE Technical Guidance Bulletin entitled "Proposed Methodology for Calculating Percentage of Managed Land and Livestock Density for Land Application of Agricultural Source of Material, Non-Agricultural Source of Material and Commercial Fertilizers" issued December 2009.

MOE lists a number of definitions for agricultural operations which fall under the Farm Unit. A summary of definitions follows and more information may be found at; http://www.ene.gov.on.ca/en/water/cleanwater/cwdocs/tbmanagedLandsAndLivestock.pdf.

Table 6-4 shows scoring for managed lands and livestock density for the three inland rivers IPZs.

Key Definitions

Managed lands are lands to which fertilizers and/or nutrient units are, or may be, applied. Managed lands can be broken into two subsets: agricultural managed land and non-agricultural managed land. Agricultural managed land includes areas of cropland, fallow, and improved pasture that may receive nutrients. Non-agricultural managed lands includes golf courses (turf), sports fields, lawns (turf) and other built-up grassed areas that may receive nutrients (primarily commercial fertilizer).

Nutrient Units (NU) are used to measure how much manure an animal produces annually. MOE has categorized different types of livestock. It uses beef cattle as a base (conversion factor of 1 or NU=1) and compares the number of animals in other species which would be required to produce an equal annual amount of manure. From this, nutrient units for livestock of any category can be calculated.

Livestock density is defined as the number of nutrient units over a given area and is generally measured in nutrient units per hectare (NU/ha) or nutrient units per acre (NU/ac). The Technical Rules require NU/ac be used here.

A farm unit is the area where nutrients generated must be at least the size of the property deed, the generating facility, or all land receiving nutrients. It should include all facilities on other deeds owned by the same person if the nutrients generated there are used on the land of the first deed, and can consist of separate farm units if nutrients are applied to different land bases. The size of a farm unit depends on whether or not the unit generates nutrients. If the farm unit does not generate nutrients, it must be at least the size a single field where nutrients are applied.

The Province defined thresholds, as shown in the following table, based on the area of managed lands in a vulnerable area to determine the risk of over-application of nutrients causing contamination of drinking water sources.

Land Use	Risk
<40% of vulnerable area is managed lands	Low potential
40-80% of vulnerable area is managed lands	Moderate potential
>80% of vulnerable area is managed lands	High potential

Risk Thresholds

MOE also defines thresholds based on livestock density in order to evaluate the risk of over-application of agriculturally sourced materials:

- If livestock density in the vulnerable area is less than 0.5 NU/acre, the area is considered to have a low potential for nutrient application exceeding crop requirements,
- If livestock density in the vulnerable areas is over 0.5 and less than 1.0 NU/acre, the area is considered to have a moderate potential for nutrient application exceeding crop requirements, and
- If livestock density in the vulnerable areas is over 1.0 NU/acre, the area is considered to have a high potential for nutrient application exceeding crop requirements.

Method used for Calculating Percentage of Managed Lands for IPZ-1 and IPZ-2

The areas of agricultural and non-agricultural lands were determined using land assessment and Municipal Property Assessment Corporation property classifications. The areas were confirmed through analysis of satellite imagery.

The percentage of managed lands within IPZ-1 and IPZ-2 was calculated by summing the total area of managed lands (both agricultural and non-agricultural) and dividing the result by the total land area.

Method used for Calculating Managed Lands for IPZ-3

The land area was determined using Landsat imagery of the study areas to identify vegetation types. Wooded areas were identified and removed from these calculations as, for the purpose of the study, it is assumed that these areas would not be used for grazing and nutrients would not be applied in these areas.

The percentage of managed lands within the IPZ-3 was calculated by summing the total area of managed lands (both agricultural and non-agricultural) and dividing the result by the total land area of the IPZ-3.

Method for Calculating Livestock Density

Livestock Density is measured in Nutrient Units per acre (NU/ac) to estimate the generation, storage and application of nutrients from agricultural source material (ASM) in an area. The NU represents amount of manure and biosolids used to fertilize a Farm Unit either produced by animals on the farm or brought from the outside. A farm unit is a single field, the land base that generates nutrients or the land base that receives nutrients.

The calculation of livestock density within the intake protection areas was based on the calculation of Nutrient Units per acre (NU/ac) of agricultural managed lands. Two values for livestock density were calculated. The first value is the Land Application of Nutrients, which represents the nutrient units applied to crops or turf, and was computed for IPZ-1, IPZ-2 and IPZ-3. The second value reported is for livestock density associated with grazing or pasturing, and was computed for IPZ-1 and IPZ-2. This value was calculated using the estimated number of livestock in each farm unit or pasture area. The following method describes the calculation of each of these values.

Method used for Calculating Livestock Density in IPZ-1 and IPZ-2

The following steps were used to determine Livestock Density in IPZ-1 and IPZ-2.

1. Determine the number of animals on a farm unit and estimate how many of each type of animals (e.g. poultry – broiler, cattle - cow, or swine - sows) are present. Estimates of the number of animals on a farm were carried out based on building design and size.
2. Convert the number of each type of animals to nutrient units using nutrient unit conversion tables supplied by MOE.

3. Determine the area of managed lands that are within the intake protection zone. For the purposes of estimating the NUs required for the estimation of livestock density in a farm unit, where a portion of a farm unit falls within a vulnerable area, the NUs generated on the entire parcel of land should be factored into the calculations rather than the NUs generated within the portion of land that falls within a vulnerable area.
4. Determine the area of land used for pasturing or grazing associated with each farm unit.
5. Calculate the livestock density for the application of nutrients to land by dividing the total number of nutrient units by the area of managed lands that are within a vulnerable area.
6. Calculate the livestock density for pasturing/grazing by dividing the total number of nutrient units by the area available for pasturing/grazing for each farm unit.

Method for Calculating Livestock Density in IPZ-3

The calculation of livestock density within IPZ-3 is based on the calculation of nutrient units per acre (NU/ac) of agricultural managed lands, as shown for IPZ-1 and IPZ-2.

Livestock density for the region was initially calculated in 2003 using 1996 Agriculture Canada data, which was the newest available at the time. The data areas were based on clusters of consolidated subdivision enumeration area boundaries. Twenty-two enumeration areas fell within the MRSPR.

In 2009, livestock density was again calculated for the region with the objective of updating information and determining whether livestock density in the MRSPR was changing. Data areas for the latter period were determined using Agriculture Canada's 2006 Soil Landscapes of Canada boundaries. Thirty-three soil landscape areas were identified in the MRSPR.

The two data bases were not identical so were adjusted to the same scale to facilitate comparison and provide the opportunity to determine whether there were changes in regional livestock density between 1996 and 2006.

6.3.4 Impervious Surfaces

Impervious surfaces are primarily constructed surfaces such as roads and parking lots that are covered by impenetrable materials such as asphalt, concrete and stone. These materials are a barrier to groundwater infiltration. Impervious surfaces also generate more runoff during melt or storm events.

Road salt applied to roads and walkways for winter maintenance is included in the list of Prescribed Drinking Water Threats, shown in Table 4-1. Impervious surface area calculations are required to determine if road salt application in the vulnerable areas could be a drinking water threat.

Method for Calculating the Percentage of Impervious Surfaces

The Southern Ontario Land Resource Information System (SOLRIS) was the primary data source used to identify impervious surfaces. SOLRIS is a landscape-level inventory of natural, rural, and urban areas. For the areas without SOLRIS coverage, a combination of the Ontario Road Network (ORN), Ministry of Natural Resources (MNR) built-up areas and some digitized areas were used (e.g. village boundaries).

Using GIS software, a 1000m x 1000m grid was created to cover the MRSPR. With permission from the MOE, the grid was then shifted so that one of the grid cell intersections overlapped the centroid (centre of mass) of the MRSPR. The use of one grid over the entire MRSPR was to eliminate grid overlap between the Mississippi and Rideau Source Protection Areas. The data sources listed above were then combined into one layer, impervious surfaces. For each grid cell, the amount of impervious surface area is divided by the area of the cell to determine the percentage of impervious surfaces.

Appendix 5-1 provides information on the modifications.

6.4 Carleton Place Water Supply

The Mississippi River is 170 km in length, drains an area of approximately 3,750 km^2 and has an average annual flow rate of 40 m^3/s. Upstream of Carleton Place, the Mississippi River flows through a series of lakes (Crotch, Dalhousie, and Mississippi Lakes). It then flows past Carleton Place, Almonte, and turns north, where it flows into the Ottawa River.

The Carleton Place Water Treatment Plant (WTP) provides treated drinking water to the Town of Carleton Place for approximately 9,400 people each day. Figure 6-1 shows the town boundaries of Carleton Place and the location of the municipal surface water intake.

The Carleton Place WTP intake crib is located in the Mississippi River, approximately 48 m from shore and at 2.2 m below low flow water levels. A map showing the local setting of the Carleton Place WTP and municipal surface water intake is shown in Figure 6-2.

The natural water quality in the Mississippi River is characterized as having a high organic carbon content, which results in elevated colour levels. In general, the natural, or raw water exhibits relatively low turbidity levels (although elevated turbidity levels in the raw water have been measured on occasion). The natural water quality is generally soft, with hardness levels within the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG) Operational Guideline range. Regular water quality testing is carried out by the Ontario Clean Water Agency, on behalf of the Town of Carleton Place, in both the untreated and treated water and the results are compared with the ODWSOG. *E. coli* and total coliforms are sometimes detected in the untreated source water samples at levels above the ODWSOG, which is typical for surface water, and can be removed during treatment. A review of available untreated water quality results indicates that turbidity, colour and Dissolved Organic Carbon (DOC) exceed the ODWSOG aesthetic objectives.

Water from the Mississippi River is treated at the WTP by first pretreating and screening to remove solids. It is then mixed with a coagulant which binds with remaining solids. The coagulant forms into sticky particles (called 'floc'), which attract and trap suspended particles before settling out of the water in large settling tanks. The 'floc' collects at the bottom of each settling tank, while the clear water flows into collection troughs at the top. The clear water is then filtered through layers of sand and anthracite and is disinfected. Fluoride is added as the last step before it is distributed. The treated water quality is consistently compliant with the Ontario Drinking Water Standards.

6.4.1 Delineation of the Carleton Place Intake Protection Zones

The steps undertaken to complete the intake protection zone delineation for Carleton Place are presented in Section 6.3.1. The results of the delineation process are discussed below.

Figure 6-3 shows the various components that make up Carleton Place's IPZ-1 and IPZ-2. These components include:

- the default IPZ-1 shape which is a semi-circle (200m radius) upstream of intake, plus a rectangle 400 m long and 10 m wide downstream of the intake
- the in-river IPZ-2 limit, with and without the wind extension
- the anthropogenic transport pathways, including a 120 m buffer
- a 120 m buffer on watercourses
- the Mississippi Valley Conservation Generic Regulation Limit line.

Figure 6-4 shows the complete delineation for the Carleton Place IPZ-1 and IPZ-2. IPZ-1 is approximately 0.09 km^2, and IPZ-2 is approximately 3.9 km^2. Figure 6-4 also shows a portion of the Carleton Place IPZ-3 which is adjacent to IPZ-2. The full IPZ-3 is shown in Figure 6-5. The IPZ-3 is approximately 1,525 km^2 and includes the 120 m on-land buffer. The total area covered by IPZs for the Carleton Place municipal surface water intake is 1529 km^2.

Municipalities which are located within the Carleton Place IPZs are shown in Table 6-3.

Uncertainty

The Technical Rules requires that uncertainty be categorized as low or high. The level of uncertainly associated with the delineation of the Carleton Place Intake Protection Zones is as follows;

- IPZ-1 delineation is assigned a low uncertainty as its value is predetermined by the Technical Rules.
- IPZ-2 and IPZ-3 are assigned a high uncertainty due to the data available for the transport pathways.

Further details regarding the uncertainty assessment are provided in Appendix 6-2.

6.4.2 Vulnerability Scoring – Carleton Place Intake Protection Zones

The approach used to complete the vulnerability scoring, including the area vulnerability factor (B) and the source vulnerability factor (C), for the Carleton Place intake protection zones is presented in Section 6.3.2. The specific vulnerability scoring inputs and results are discussed below.

Area Vulnerability Factor – IPZ-1

The IPZ-1 area vulnerability factor for the Carleton Place intake is 10 as defined in the Technical Rules.

Area Vulnerability Factor – IPZ-2

The area vulnerability factor for the IPZ-2 may range from 7 to 9. The following table summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria. For more information on the assumed values, please see Section 6.3.2.

Parameter	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Calculated value for Carleton Place IPZ-2 (based on local data)
Percentage of Area Composed of Land	10 %	90%	72%
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =36, Slope = 0.25%	CN =95, Slope = 2%	CN =83, Slope = 1.42%
Transport Pathways (total length / main channel length)	0	9	14.86 km/2.12 km = 7.0

Summary of Specific Information used to determine the Carleton Place IPZ-2 Area Vulnerability Factor (B)

It should be noted that all three calculated values fall well into the higher half of the ranges between the assumed minimum values and the assumed maximum values. The final area vulnerability scoring falls in the higher half (above 8 which is the midpoint) of the predetermined 7-9 range for B and close to the ¾ point in the range.

The table below summarizes the derivation of the IPZ-2 area vulnerability factor (B) for the Carleton Place IPZ-2. It includes the converted area vulnerability values between assumed minimum value (B=7) and assumed maximum value (B=9) for each of the three parameters, as well as the assumed weighting. The factor is then rounded to a whole number.

The final area vulnerability factor for the Carleton Place IPZ-2 is 9.

Parameter	Calculated value for Carleton Place IPZ-2 (based on local data)	Converted B values for Carleton Place IPZ-2 between assumed minimum value (B=7) and assumed maximum value (B=9)		
		$B_{\%LA}$	$B_{CN, Slope}$	B_{TP}
Percentage of Area Composed of Land	72%	8.55		
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =83, Slope = 1.42%		8.88	
Transport Pathways (total length / main channel length)	14.86 km/2.12 km = 7.0			8.56
Assumed Weighting		30 %	30%	40%
Weighted Area Vulnerability Factor (B)	**8.65**			
Assigned Area Vulnerability Factor (B)	**9**			

Summary of Scoring for the IPZ-2 Area Vulnerability Factor (B)

Area Vulnerability Factor – IPZ-3

The area vulnerability factors for IPZ-3 range from 8 (adjacent to IPZ-2) to 1. The methodology for determining the area vulnerability factor for IPZ-3 can be found in Section 6.3.2.

Source Vulnerability Factor

As indicated in Section 6.1.4, the source vulnerability factor for Type C intakes, can be either 0.9 or 1. Although there have been no reported water quality incidences and there are no hydraulic structures in close proximity upstream of the intake, the source vulnerability factor was assessed to be 1 for Carleton Place due to the following:

- shallow depth of water intake, 2.2 m below surface at low water level; and
- moderate distance of the intake from shore, 48 m.

Final Vulnerability Scoring for Carleton Place Intake Protection Zones

As presented above, the Carleton Place source vulnerability factor (C) was assessed to be 1. Thus, the final vulnerability scores (V) for each of the zones are the same as the area vulnerability factors (B). Carleton Place's IPZ-1 has a final vulnerability score of 10, IPZ-2 has a score of 9, and the IPZ-3 has a range of scores from 1 to 8. Figure 6-6 shows the final vulnerability scoring for Carleton Place's IPZ-1 and IPZ-2, and Figure 6-7 shows the final vulnerability scoring for Carleton Place's IPZ-3. Following are the summarized results.

	Area Vulnerability Factor (B) *Expressed as a whole number*			**Source Vulnerability Factor (C)**	**Vulnerability Score (V)** *Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Carleton Place Scores	**10**	**9**	**1 to 8**	**1**	**10**	**9**	**1 to 8**

Summary of Carleton Place IPZ Vulnerability Scoring Results

Uncertainty

The Technical Rules require that uncertainty be categorized as low or high. The level of uncertainly associated with the vulnerability scoring for the Carleton Place Intake Protection Zones is as follows;

- IPZ-1 delineation is assigned a low uncertainty as its value is predetermined by the Technical Rules.
- IPZ-2 and IPZ-3 are assigned a high uncertainty due to the data available for transport pathways.

Further details regarding the uncertainty assessment are provided in Appendix 6-2.

6.4.3 Managed Lands and Livestock Density – Carleton Place Intake Protection Zones

The method for calculating managed lands and livestock density is described in Section 6.3.3.

The Total Managed Lands for the Carleton Place IPZs are:

- 18.2% of the total IPZ-1 area; and
- 28.3% of the total IPZ-2 area.

This is shown in Table 6-4 and Figure 6-8, which also shows the various scores for IPZ-3.

6.4.4 Impervious Surfaces – Carleton Place Intake Protection Zones

Impervious surfaces are primarily constructed surfaces such as roads and parking lots that are covered by impenetrable materials such as asphalt, concrete and stone. These materials are a barrier to groundwater infiltration. Impervious surfaces also generate more runoff during melt or storm events.

The method for calculating impervious surfaces is described in Section 6.3.4. In the Carleton Place IPZs the percentage of land which has impervious surfaces ranges from 0-75%

6.4.5 Water Quality Threat Assessment – Carleton Place Intake Protection Zones

Water quality threats are existing conditions (e.g. contaminated sediment, soil or surface water) or existing or future land use activities that could contaminate a drinking water supply. A land use inventory was completed in 2008 for IPZ-1 and IPZ-2, and in 2010 for IPZ-3 areas that have a vulnerability score of 8.

It should be noted that a single land use activity can fall into multiple threat categories. For example, a crop farm may have fuel storage, may apply commercial fertilizer to land, and apply agricultural source material to land. Each of these activities is a separate threat category in the provincial table (see Section 4.3), and so therefore each is treated as a separate threat.

A land use activity and associated threats that occur where the vulnerability score is high may result in a determination that it is a significant threat. In many cases, the specific circumstances that apply to a threat category are unknown. Using the same example, a crop farm may have fuel storage, but the volume of fuel stored is unknown. Unless additional information was available, it was assumed that enough material was stored for that activity to be a significant threat.

A total of 10 potentially significant drinking water threats, areas where the vulnerability score is 8 or greater, were identified in the Carleton Place IPZs. The list of identified potentially significant drinking water threats is provided in Table 6-5. The term “Poly” in the table refers to a polygon, or an area that may contain multiple threats. For example, a polygon may be a farm field, representing a single potential threat, or a residential area with an unknown number of septic systems, each which may be a potential threat. The term “Point” in the table refers to a point source. Figure 6-10 shows the areas containing potential significant threats in purple. The size of the area where significant threats may be present is approximately 159 km^2. See Section 4.3.3 for information on the full list of significant, moderate, and low threats.

Transportation Corridors

A number of transportation corridors exist within the Carleton Place IPZs where there may be the transportation of dangerous and/or hazardous goods and the potential for a spill exists. Spills within the IPZs have the potential to impair the surface water quality; however they are not included as threats in this report as they are not listed in the provincial drinking water threats categories issued by MOE, discussed in Section 4-3.

This Assessment Report provides this key information for municipalities and other agencies to assist in ensuring all available information is accessible for emergency response planning purposes. Transportation corridors (e.g. roads, railway lines) can be seen in Figure 6-4.

6.4.6 Issues and Conditions – Carleton Place Intake Protection Zones

As discussed in Chapter 4, issues are documented cases of water quality contamination approaching or exceeding acceptable provincial levels.

No issues were identified for the Carleton Place WTP. However, a number of parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines are noted below. For the Mississippi River raw water, the following parameters exceed the Ontario Drinking Water Standards and Operational Guidelines:

- aesthetic objectives for turbidity, colour, and DOC; and
- health-related criteria for *E. coli* and total coliforms.

None of the above parameters are considered to be issues as they are known to be naturally occurring and do not represent a problem for the water treatment plant operator. The presence of *E. coli* and total coliforms is not unusual in surface water sources and they are easily removed during the treatment processes.

A condition is a situation where past activities resulted in a drinking water threat in accordance with the criteria found in the Technical Rules. Based on the criteria, there are no confirmed conditions in the Carleton Place IPZs. However, there were two spills noted in the Drinking Water Threats and Issues Technical Report.

6.5 Perth Water Supply

The Tay River is 95 km in length, drains an area of approximately 800 km^2 and has an average annual flow rate of 7.4 m^3/s. A number lakes are upstream of Perth (e.g. Long, Eagle, Elbow, Crow, Bobs, Christie). Control structures at Eagle Lake and at Bobs Lake are used for flood control and for maintaining summer water flow within the Rideau Canal system.

The Perth WTP is located in Perth, Ontario on the Tay River. It provides treated drinking water to the Town of Perth for approximately 6,000 people each day. Figure 6-11 shows the town boundaries and the location of the municipal surface water intake. The intake is located approximately 4 m from shore and 2 m below the water surface at low water level. Figure 6-12 shows the local setting of the Perth WTP and the municipal surface water intake.

The natural water quality in the Tay River is characterized as generally alkaline, attributed to the limestone bedrock upstream of the WTP intake, but with alkalinity values typically within the ODWSOG Operational Guideline range. Colour and turbidity in the raw water vary seasonally. Regular water quality testing is carried out by the Town of Perth, in both the untreated and treated water and the results are compared with the ODWSOG. *E. coli* and total coliforms are occasionally detected in the untreated source water samples at levels above the ODWSOG, which is common for surface water, and can be removed during treatment. A review of available water quality test results on untreated source water does not show any exceedances except for *E. coli* and total coliforms.

Water from the Tay River is treated at the WTP by first pretreating and screening to remove solids, then mixing it with a coagulant which binds with remaining solids. The coagulant forms into sticky particles (called ‘floc’). The floc attracts and traps suspended particles before settling out of the water in large settling tanks. It then collects at the bottom of each settling tank, while the clear water is pumped from the top of the tank. The clear water is filtered through layers of activated carbon, sand and gravel and is disinfected with chlorine and lime is added to adjust for pH. Fluoride is added as the last step before it is distributed. The treated water quality is consistently compliant with the Ontario Drinking Water Standards.

6.5.1 Delineation of the Perth Intake Protection Zones

The steps undertaken to complete the intake protection zone delineation for Perth are presented in Section 6.2.1. The results of the delineation process are discussed below.

Figure 6-13 shows the various components that make up Perth’s IPZ-1 and IPZ-2. These components include:

- the default IPZ-1 shape which is a semi-circle (200 m radius) upstream of intake, plus a rectangle 400 m long and 10 m wide downstream of the intake;
- the in-river IPZ-2 limit, with and without the wind extension;
- the anthropogenic transport pathways, including a 120 m buffer;
- a 120 m buffer on watercourses; and

- the Rideau Valley Conservation Generic Regulation Limit line.

Figure 6-14 shows the complete delineation for the Perth IPZ-1 and IPZ-2. The IPZ-1 is approximately 0.06 km^2, and IPZ-2 is approximately 2.9 km^2. Figure 6-14 also shows a part of the Perth IPZ-3 which is adjacent to IPZ-2. The full IPZ-3 is shown in Figure 6-15. The Perth IPZ-3 is approximately 364 km^2. The total area covered by IPZs for the Perth municipal surface water intake is 367 km^2.

Municipalities which are located within the Perth IPZs are shown in Table 6-3.

Uncertainty

The level of uncertainly associated with the delineation of the Perth IPZs is summarized below. The Technical Rules require that uncertainty be assigned as low or high.

- IPZ-1 is assigned a low uncertainty;
- IPZ-2 has a high uncertainty due to the limitations of the numerical model and available flow data; and
- IPZ-3 is assigned a high uncertainty due to the lack of certain digital and field data.

Further details regarding the uncertainty assessment are provided in Appendix 6-2.

6.5.2 Vulnerability Scoring – Perth Intake Protection Zones

The method used to complete the vulnerability scoring, including the area vulnerability factor (B) and the source vulnerability factor (C), for the Perth intake protection zones is presented in Section 6.3.2. The specific vulnerability scoring inputs and results are discussed below.

Area Vulnerability Factor – IPZ-1

The IPZ-1 area vulnerability factor for the Perth intake is 10 as predetermined by the Technical Rules.

Area Vulnerability Factor – IPZ-2

The area vulnerability factors for the IPZ-2 may range from 7 to 9.The table below summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria. For more information on the assumed values, please see Section 6.3.2.

Parameter	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Calculated value for Perth IPZ-2 (based on local data)
Percentage of Area Composed of Land	10 %	90%	87%
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =36, Slope = 0.25%	CN =95, Slope = 2%	CN =85, Slope = 1.26%
Transport Pathways (total length / main channel length)	0	9	13.84 km/2.95 km = 4.7

Summary of Specific Information used to determine the Perth IPZ-2 Area Vulnerability Factor (B)

It should be noted that two of the three calculated values fall well into the higher half of the ranges between the assumed minimum values and the assumed maximum values, with transport pathways falling just above the midpoint. Since weighting is fairly even with a slightly higher percentage given to transport pathways, the final area vulnerability scoring will fall in the higher half (above 8 which is the midpoint) of the predetermined 7-9 range for B.

The following table summarizes the derivation of the IPZ-2 area vulnerability factor (B) for the Perth IPZ-2. It includes the converted area vulnerability values between assumed minimum value (B=7) and assumed maximum value (B=9) for each of the three parameters, as well as the assumed weighting. The final area vulnerability factor for the Perth IPZ-2 is 9.

Parameter	Calculated value for Perth IPZ-2 (based on local data)	Converted B values for Perth IPZ-2 between assumed minimum value (B=7) and assumed maximum value (B=9)		
		$B_{\%LA}$	$B_{CN, Slope}$	B_{TP}
Percentage of Area Composed of Land	87%	8.92		
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =85, Slope = 1.26%		8.88	
Transport Pathways (total length / main channel length)	13.84 km/2.95 km = 4.7			8.04
Assumed Weighting		30 %	30%	40%
Weighted Area Vulnerability Factor (B)	**8.56**			
Assigned Area Vulnerability Factor (B)	**9**			

Scoring for Perth IPZ-2 Area Vulnerability Factor (B)

Area Vulnerability Factor – IPZ-3

The area vulnerability factors for IPZ-3 range from 8 (adjacent to IPZ-2) to 1. The methodology for determining the area vulnerability factor for IPZ-3 can be found in Section 6.3.2.

Source Vulnerability Factor

Although there have been no reported water quality incidences and there are no hydraulic structures in close proximity upstream of the intake, the source vulnerability factor was assessed to be 1.0 for Perth due to the:

- shallow depth of intake (2 m)
- short distance of the intake from shore (4 m).

Final Vulnerability Scoring for Perth IPZs

As presented above, the Perth source vulnerability factor (C) was assessed to be 1. Thus, the final vulnerability scores (V) for each of the zones are the same as the area vulnerability factors (B).

Perth's IPZ-1 has a final vulnerability score of 10, IPZ-2 a score of 9, and IPZ-3 a range of scores from 1 to 8. The results are summarized below. Figure 6-16 shows the final vulnerability scoring for Perth's IPZ-1 and IPZ-2, and Figure 6-17 shows the final vulnerability scoring for Perth's IPZ-3.

	Area Vulnerability Factor (B) *Expressed as a whole number*			**Source Vulnerability Factor (C)**	**Vulnerability Score (V)** *Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Perth Scores	**10**	**9**	**1 to 8**	**1**	**10**	**9**	**1 to 8**

Summary of Perth IPZ Vulnerability Scoring Results

Uncertainty

The level of uncertainly associated with the vulnerability scoring of the Perth IPZs is summarized below. Further details regarding the uncertainty assessment are provided in Appendix 6-2.

- IPZ-1 vulnerability scoring for Perth is assigned low uncertainty as its value is predetermined by the Technical Rules.
- IPZ-2 is assigned a high uncertainty due to the data available for curve number and length of transport pathways.
- IPZ-3 is assigned a high uncertainty due to the available data on land use and soils.

6.5.3 Managed Lands and Livestock Density – Perth Intake Protection Zones

The method for calculating managed lands and livestock density is described in Section 6.3.3.

The Total Managed Lands for the Perth IPZs are:

- 35% of the total IPZ-1 area; and
- 42.4% of the total IPZ-2 area.

This is shown in Table 6-4 and Figure 6-18, which also shows the various scores for IPZ-3.

6.5.4 Impervious Surfaces – Perth Intake Protection Zones

Impervious surfaces are primarily constructed surfaces such as roads and parking lots that are covered by impenetrable materials such as asphalt, concrete and stone. These materials are a barrier to groundwater infiltration. Impervious surfaces also generate more runoff during melt or storm events.

The method for calculating impervious surfaces is described in Section 6.3.4. In the Perth IPZs the percentage of land which has impervious surfaces ranges from 0-81%.

6.5.5 Water Quality Threat Assessment – Perth Intake Protection Zones

Water quality threats are existing conditions (e.g. contaminated sediment, soil or surface water) or existing or future land use activities that could contaminate a drinking water supply. A land use inventory was completed in 2008 for IPZ-1 and IPZ-2, and in 2010 for IPZ-3 areas that have a vulnerability score of 8.

It should be noted that a single land use activity could fall into multiple threat categories. For example, a crop farm may have storage of fuel, may apply commercial fertilizer to land, and apply agricultural source material to land. Each of these activities is a separate threat category in the provincial table, and so each is therefore a separate threat.

Land use activities and associated threats that occur where the vulnerability score is high may result in determining it to be a significant threat. In many cases, the specific circumstances that apply to a threat category are unknown. Using the same example, a crop farm may have fuel storage, but the volume of fuel stored is unknown. Unless additional information was available, it was assumed that enough material was stored for that activity to be a significant threat.

A total of 13 potentially significant drinking water threats, areas where the vulnerability score is 8 or greater, were identified in the Perth IPZs. The list of identified potential significant drinking water threats is provided in Table 6-6. The term "Poly" in the table refers to a polygon, or an area that may contain multiple threats. For example, a polygon may be a farm field, representing a single potential threat, or a residential area with an unknown number of septic systems, each which may be a potential threat. The term "Point" in the table refers to a point source. Figure 6-20 shows the areas containing potentially significant threats in purple. The size of the area where significant threats may be present is approximately 65 km^2. See Section 4.3.3 for information on the full list of significant, moderate, and low threats.

Transportation Corridors

A number of transportation corridors exist within the Perth IPZs where there may be the transportation of dangerous and/or hazardous goods and the potential for a spill exists. Spills within the IPZs have the potential to impair the surface water quality however they are not included as threats as per the prescribed drinking water threats categories (see Section 4-3).

This Assessment Report provides this key information for municipalities and other agencies to assist in ensuring all available information is accessible for emergency response planning purposes. Transportation corridors are shown in Figure 6-14, Perth IPZ-1 and IPZ-2.

6.5.6 Issues and Conditions – Perth Intake Protection Zones

As discussed in Chapter 4, issues are documented cases of water quality contamination approaching or exceeding acceptable provincial levels. No issues were identified for the Perth WTP. However, parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines are noted below. For the Tay River raw water, the following parameters exceed the Ontario Drinking Water Standards and Operational Guidelines:

- health-related criteria for *E. coli* and total coliforms.

The parameters are not considered to be issues as they are known to be naturally occurring and do not represent a problem for the water treatment plant operator. The presence of *E. coli* and total coliforms is not unusual in surface water sources and they are easily removed during the treatment processes.

The Links 'O Tay golf course, located just upstream of the Perth intake, provides the Town of Perth with a list of chemicals that are applied on the golf course in the spring and fall of each year. The Town tests raw water samples for these potential contaminations immediately after each application. To date, none of the chemicals have been detected in the raw water samples.

A condition is a situation where past activities resulted in a drinking water threat in accordance with the criteria found in the Technical Rules. Based on the criteria, there are no confirmed conditions in the Perth IPZs. However, there were two spills noted in the Drinking Water Threats and Issues Technical Report.

6.6 Smiths Falls Water Supply

The Rideau River is 146 km in length, drains an area of approximately 4,100 km^2 and has an average annual flow rate of 14 m^3/s. The river is a ‘regulated’ waterway as it has several dams, operated by Parks Canada – Rideau Canal, which control water levels and flows in the river. The Rideau River flows north from Upper Rideau Lake and empties into the Ottawa River at Rideau Falls.

The Smiths Falls WTP is located in Smiths Falls, Ontario on the Rideau River. It provides treated drinking water to the Town of Smiths Falls for approximately 10,000 people each day. Figure 6-21 shows the town boundaries and the location of the municipal surface water intake. Smiths Falls WTP has two municipal surface water intakes (main and auxiliary). The main intake is located approximately 30 m from shore and 1.8 m below the top of the water surface during low flow levels. Figure 6-22 shows the local setting of the Smiths Falls WTP and the intake locations.

The natural water quality in the Rideau River is characterized as generally soft, with elevated colour levels and slightly elevated Dissolved Organic Carbon (DOC). Alkalinity of the raw water is usually within the ODWSOG Operational Guideline range. Regular water quality testing is carried out by the Town of Smiths Falls, in both the un-treated and treated water and the results are compared with the ODWSOG. *E. coli* and total coliforms are sometimes detected in the untreated samples at levels above the ODWSOG, which is common for surface water, and can be removed during treatment. A review of available untreated water quality results indicates that colour and DOC exceed the ODWSOG aesthetic objectives.

Raw water from the Rideau River is treated at the WTP by first screening the raw water as it enters the water intake to remove large solids and debris. Low lift pumps then pump the water to the AquaDAF which is a high rate dissolved air floatation clarifier. A coagulant & polymer are added to aid in the removal of particles. The clarified water from the AquaDAF flows to the filters which comprise of granular activated carbon (GAC) & sand. The treated water passes through ultraviolet reactors, at which point the water is chlorinated for disinfection purposes along with a chemical for pH adjustment. The water then flows to the in-ground reservoir where it is stored before it is pumped to the distribution system. Fluoride is added as it is pumped to the distribution system. The treated water quality is consistently compliant with the Ontario Drinking Water Standards.

6.6.1 Delineation of the Smiths Falls Intake Protection Zones

The steps undertaken to complete the intake protection zone delineation for Smiths Falls are presented in Section 6.3.1. The results of the delineation process are discussed below.

Figure 6-23 shows the various components that make up Smiths Falls IPZ-1 and IPZ-2. The components include;

- the default IPZ-1 shape which is a semi-circle (200 m radius) upstream of main intake with a 10 m extension in the water around the structures in the northwest corner of the IPZ-1, plus a

rectangle 400 m long and 187 m wide downstream of the main intake and extending downstream of the auxiliary intake;
- the in-river IPZ-2 limit, with and without the wind extension;
- the anthropogenic transport pathways, including a 120 m buffer;
- a 120 m buffer on watercourses; and
- the Rideau Valley Conservation Generic Regulation Limit line.

Figure 6-24 shows the complete delineation for the Smiths Falls IPZ-1 and IPZ-2. The IPZ-1 is approximately 0.14 km^2, and IPZ-2 is approximately 3.5 km^2. Figure 6-24 also shows a part of the Smiths Falls IPZ-3 which is adjacent to IPZ-2. The full IPZ-3 is shown in Figure 6-25. The IPZ-3 is approximately 864 km^2 which includes the 120 m on-land buffer. The total area covered by IPZs for the Smiths Falls municipal surface water intake is 869 km^2.

Municipalities which are located within the Smiths Falls IPZs are shown in Table 6-3.

Uncertainty

The level of uncertainly associated with the delineation of the Smiths Falls Intake Protection Zones follows.

- IPZ-1 delineation for Smiths Falls has low uncertainty;
- IPZ-2 delineation has a high uncertainty due to the level of model precision and accuracy;
- IPZ-3 is assigned a high uncertainty due to a lack of certain digital and field data.

Further details regarding the uncertainty assessment are provided in Appendix 6-2.

6.6.2 Vulnerability Scoring – Smiths Falls Intake Protection Zones

The approach used to complete the vulnerability scoring, including the area vulnerability factor (B) and the source vulnerability factor (C), for the Smiths Falls intake protection zones is presented in Section 6.2.2. The specific vulnerability scoring inputs and results are discussed below.

Area Vulnerability Factor – IPZ-1

The IPZ-1 area vulnerability factor for the Smiths Falls intakes is 10 as predetermined by the Technical Rules.

Area Vulnerability Factor – IPZ-2

The area vulnerability factors for the IPZ-2 may range from 7 to 9. The table below summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria.

Parameter	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Calculated value for Smiths Falls IPZ-2 (based on local data)
Percentage of Area Composed of Land	10 %	90%	47%
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =36, Slope = 0.25%	CN =95, Slope = 2%	CN =91, Slope = 0.45%
Transport Pathways (total length / main channel length)	0	9	3.57 km/1.90 km = 1.9

Summary of Specific Information used to determine the IPZ-2 Area Vulnerability Factor

It should be noted that of the three calculated values the land area falls just below the midpoint between the assumed minimum values and the assumed maximum values. The curve number falls at the high end of the range while the slope is at the lower end. Transport pathways are much lower than those found at the two previously discussed inland WTPs and are much lower than the midpoint. Since weighting is fairly even with a slightly higher percentage given to transport pathways, the final area vulnerability scoring will likely fall in the lower half (below 8 which is the midpoint) of the predetermined 7-9 range for the area vulnerability factor.

Parameter	Calculated value for Smiths Falls IPZ-2 (based on local data)	Converted B values for Smiths Falls IPZ 2 between assumed minimum value (B=7) and assumed maximum value (B=9)		
		$B_{\%LA}$	$B_{CN, Slope}$	B_{TP}
Percentage of Area Composed of Land	47%	7.93		
Runoff Potential based on land cover/soil type/permeability (CN) and slope	CN =91, Slope = 0.45%		8.80	
Transport Pathways (total length / main channel length)	3.57 km/1.90 km = 1.9			7.42
Assumed Weighting		30 %	30%	40%
Weighted Area Vulnerability Factor (B)	**7.98**			
Assigned Area Vulnerability Factor (B)	**8**			

Summary of Scoring for the IPZ-2 Area Vulnerability Factor

The previous table summarizes the derivation of the IPZ-2 area vulnerability factor (B) for the Smiths Falls IPZ-2. It includes the converted area vulnerability values between assumed minimum value (B=7) and assumed maximum value (B=9) for each of the three parameters, as well as the assumed weighting.

The final area vulnerability factor for the Smiths Falls IPZ-2 is 8.

Area Vulnerability Factor – IPZ-3

The area vulnerability factors for IPZ-3 range from 7 (adjacent to IPZ-2) to 1. The methodology for determining the area vulnerability factor for IPZ-3 can be found in Section 6.3.2.

Source Vulnerability Factor

Although there have been no reported water quality incidences and there are no hydraulic structures upstream of the main intake, the source vulnerability factor was assessed to be 1 for Smiths Falls due to:

- the shallow depth of the main intake (1.8 m);
- the moderate distance of the intake from shore (30 m); and

- the presence of a hydraulic structure upstream of the auxiliary intake.

Final Vulnerability Scoring for Smiths Falls IPZs

As presented above, the Smiths Falls source vulnerability factor (C) was assessed to be 1. Thus, the final vulnerability scores (V) for each of the zones are the same as the area vulnerability factors (B). Smiths Falls IPZ-1 has a final vulnerability score of 10, IPZ-2 a score of 8, and IPZ-3 a range of scores from 1 to 7. The results are summarized below. Figure 6-26 shows the final vulnerability scoring for Smiths Falls IPZ-1 and IPZ-2, and Figure 6-27 shows the final vulnerability scoring for Smiths Falls IPZ-3.

	Area Vulnerability Factor (B) *Expressed as a whole number*			**Source Vulnerability Factor (C)**	**Vulnerability Score (V)** *Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Smiths Falls Scores	**10**	**8**	**1 to 7**	**1**	**10**	**8**	**1 to 7**

Summary of Smiths Falls IPZ Vulnerability Scoring Results

Uncertainty

The level of uncertainly associated with the vulnerability scoring of the Smiths Falls Intake Protection Zones is summarized below.

- IPZ-1 vulnerability scoring for Smiths Falls is assigned low uncertainty as its value is predetermined by the Technical Rules.
- IPZ-2 is assigned a high uncertainty due to the uncertainty of the curve number value and length of transport pathways.
- IPZ-3 is assigned a high uncertainty due to the available land use and soil data.

Further details regarding the uncertainty assessment are provided in Appendix 6-2.

6.6.3 Managed Lands and Livestock Density – Smiths Falls Intake Protection Zones

The method for calculating managed lands and livestock density is described in Section 6.3.3.

The Total Managed Lands for the Smiths Falls IPZs is:

- 23.8% of the total IPZ-1 area; and
- 13.4% of the total IPZ-2 area.

This is as shown in Table 6-4 and Figure 6-28, which also shows the various scores for IPZ-3.

6.6.4 Impervious Surfaces – Smiths Falls Intake Protection Zones

Impervious surfaces are primarily constructed surfaces such as roads and parking lots that are covered by impenetrable materials such as asphalt, concrete and stone. These materials are a barrier to groundwater infiltration. Impervious surfaces also generate more runoff during melt or storm events.

The method for calculating impervious surfaces is described in Section 6.3.4. In the Smiths Falls IPZs the percentage of land which has impervious surfaces ranges from 0-81%

6.6.5 Water Quality Threat Assessment – Smiths Falls Intake Protection Zones

Water quality threats are existing conditions (e.g. contaminated sediment, soil or surface water) or existing or future land use activities that could contaminate a drinking water supply. A land use inventory was completed in 2008 for IPZ-1 and IPZ-2.

It should be noted that a single land use activity could fall into multiple threat categories. For example, a crop farm may have storage of fuel, may apply commercial fertilizer to land, and apply agricultural source material to land. Each of these activities is a separate threat category in the provincial threats table (see Section 4.3), and so each is therefore a separate threat.

Land use activities and associated threats that occur where the vulnerability score is high may result in determining it to be a significant threat. In many cases, the specific circumstances that apply to a threat category are unknown. Using the same example, a crop farm may have fuel storage, but the volume of fuel stored is unknown. Unless additional information was available, it was assumed that enough material was stored for that activity to be a significant threat.

A total of 5 potentially significant drinking water threats, areas where the vulnerability score is 8 or greater, were identified in the Smiths Falls IPZs. The list of identified potential significant drinking water threats is provided in Table 6-7. The term “Poly” in the table refers to a polygon, or an area that may contain multiple threats. For example, a polygon may be a farm field, representing a single potential threat, or a residential area with an unknown number of septic systems, each which may be a potential threat. The term “Point” in the table refers to a point source. Figure 6-30 shows the areas containing potential significant threats in purple. See Section 4.3.3 for information on the full list of significant, moderate, and low threats.

Transportation Corridors

A number of transportation corridors exist within the Smiths Falls IPZs where there may be the transportation of dangerous and/or hazardous goods and the potential for a spill exists. Spills within the IPZs have the potential to impair the surface water quality however they are not included as threats as they are not included in the provincial drinking water threats categories (see Section 4-3).

This Assessment Report provides this key information for municipalities and other agencies to assist in ensuring all available information is accessible for emergency response planning purposes. Transportation corridors (e.g. roads and railway lines) are shown in Figure 6-24.

6.6.6 Issues and Conditions – Smiths Falls Intake Protection Zones

As discussed in Chapter 4, issues are documented cases of water quality contamination approaching or exceeding acceptable provincial levels. No issues were identified for the Smiths Falls WTP. However, a number of parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines are noted below. For the Rideau River raw water, the following parameters exceed the Ontario Drinking Water Standards and Operational Guidelines:

- aesthetic objectives for turbidity, colour, and DOC; and
- health-related criteria for *E. coli* and total coliforms.

None of the above parameters are considered to be issues as they are known to be naturally occurring and do not represent a problem for the water treatment plant operator. The presence of *E. coli* and total coliforms is not unusual in surface water sources and they are easily removed during the treatment processes.

Staff from the Town of Smiths Falls has indicated that there is a community concern with the taste and odour of the drinking water. Taste and odour become more pronounced during the summer months, most likely due to higher temperatures, increased organics concentrations and algae blooms. The Town has added granular activated carbon filters to address the taste and odour problems.

The drinking water has been tested for pesticides due to the presence of a golf course located approximately 0.5 km upstream of the intake. Pesticides have not been detected.

A condition is a situation where past activities resulted in a drinking water threat in accordance with the criteria found in the Technical Rules. Based on the criteria, there are no confirmed conditions in the Smiths Falls IPZs. However, there was one spill and one contaminated site noted in the Drinking Water Threats and Issues Technical Report.

6.7 Type C: Ottawa River Intake Protection Zones in the Mississippi-Rideau Source Protection Region

This section provides information on the two municipal surface water intakes in the Ottawa River which supply the City of Ottawa.

6.7.1 Delineation of Type C: Ottawa River Intake Protection Zones

The following steps were undertaken to complete the intake protection zone delineation for the municipal intakes at Britannia and Lemieux Island.

Collection and assembly of data and information

Local hydrology and climate data was collected from federal, provincial, and municipal governments as well as other sources. This included the generic regulation limit lines for the study area, as maintained by the Rideau Valley and Mississippi Valley Conservation Authorities. Areas within the generic regulation limit identify lands that could be unsafe for development due to naturally occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock.

The characteristics of the surface water intakes and surrounding land uses were determined through site visits, discussions with municipal staff, and review of available records and reports. In the summer of 2007, a hydrographic survey was conducted to map the riverbed topography from the Deschênes Rapids to the Chaudière Dam. Current measurements were also carried out to develop a better understanding of the river flow conditions around the intakes.

Delineation of IPZ-1

As discussed in Section 6.1.3, the IPZ-1 is directly adjacent to the surface water intake. The Technical Rules outline how to create IPZ-1. For Type C intakes, IPZ-1 can be created using a;

- one kilometre radius (centered on the intake) or
- 200 m radius (centered on the intake) upstream of intake, plus a rectangle 400 m long and ten m wide downstream of the intake.

The first method is more appropriate for intakes located in large surface water features such as lakes, where there is little or no flow. The second of the two methods listed above was selected for the Ottawa River municipal water intakes in the MRSPR because, unlike a lake, the river has a continuous downstream flow.

The Technical Rules also state that the dimensions of IPZ-1 may be modified to suite "local hydrodynamic conditions". For both the Britannia and Lemieux Island water intakes, IPZ-1 was modified from a semi-circle to a complete circle with a radius of 200 m. This was done to allow for the potential influence of winds on surface currents in the vicinity of the intakes. Where IPZ-1 intersected the shore, it was expanded to a setback of 120 ms from the high water mark or the Conservation Authority generic regulation limit, whichever was greater.

Development of computer models

A computer model was used to determine the flow rates upstream of the municipal water intake. The datasets collected were used to develop a general understanding of the local surface water system. Then, an appropriate surface water computer model was chosen to suit the conditions being modelled.

For both the Britannia and Lemieux Island intakes, the MIKE21 model was used to refine the river's bathymetry (the picture of the terrain of the river bed), and then another model, MISED, was used to delineate the in-river portion of IPZ-2. MISED is a three-dimensional numerical model that has the ability to handle the accelerated current speeds that occur in rapids. The MISED model was calibrated against measured current data collected in August 2007, and then utilized to determine the current patterns in the river and around the intakes.

Delineation of IPZ-2

As discussed in Section 6.1.3, the IPZ-2 was based, in part, on the distance upstream from the intake that represents how long a contaminant in the water takes to travel a minimum of two hours.

Under the provincial Technical Rules, the required ToT must be equal to or less than the time that is sufficient to allow operators to shut down the water treatment plant in the event of a spill. Since the Britannia and Lemieux Island plants both take less than 30 minutes to shut down after detection or notification, the time of travel was set to the minimum 2 hour limit.

In-river

The MISED model defined the outer limits of IPZ-2 using the two hour ToT, as defined by the Technical Rules. The equivalent of the river's bankfull velocity was also required and this was represented by using the two year return period flow, which is considered to be representative of bankfull conditions.

The bankfull flow for the Ottawa River is 3100 m^3/s. The outer limits of IPZ-2 were also extended to take into account wind effects on the time of travel in the river. Additional modeling was carried out at low flow conditions to investigate the potential effluent discharged from a large area of stormwater catchments located to the south of the Lemieux intake. The results of the additional modeling helped define the limits of IPZ-2 south of the Lemieux Island intake.

On-land

For both Britannia and Lemieux Island, the inland portion of IPZ-2 is governed by storm sewer systems. To include the drainage areas of these systems, the distances inland were calculated using established hydraulic formulations based on flows through the sewer pipe network. For nearby tributaries, the distance upstream was also calculated using an established hydrological formula.

According to the Technical Rules, the outer boundary of IPZ-2 is a setback of 120 m from the high water mark, or the generic regulation limits line (as developed and maintained by the RVCA), whichever is greater.

Québec and the Ottawa IPZ-2 Delineation

Although the MRSPR does not extend across the provincial border, which essentially runs down the centre of the Ottawa River, sufficient information was obtained from the Ville de Gatineau that permitted a preliminary assessment of the delineation of IPZ-2 into Quebec. The preliminary IPZ-2 shown for Quebec is for information purposes only.

Delineation of IPZ-3

For intakes located on the Ottawa River, the Technical Rules prescribe an Event-Based Approach (EBA) that considers the dispersion of a contaminant spill within the watershed. The EBA results in the delineation of an IPZ-3 which includes the areas beyond IPZ-1 and IPZ-2 that could contribute contaminants to the intake if a spill occurred during an extreme weather event. IPZ-3 zones for the Britannia and Lemieux Island intakes were delineated using a worst case scenario model. Under the Technical Rules IPZ-3 is delineated using the 1:100 year flow. This differs from the standard approach for other inland rivers, which is to include all rivers, streams, and lakes upstream of the intake by 120 ms, or the generic regulation limit line.

The first step in the EBA is to delineate an IPZ-3 based on considerations of extreme high flow event conditions, in this case the 100 year flood conditions, and an understanding of how contaminants may be transported to the intake.

The EBA then allows activities to be identified as a significant drinking water threat if it can be shown through modeling that a release of a specific contaminant from an activity would result in an issue at the municipal water intake.

Potential contaminant spill threats were identified. Due to the large dilution potential of the Ottawa River, it was considered that only catastrophic large-volume contaminant releases would have a potential impact at the intakes. Thus, the "worst case" scenarios would result from spills on transportation corridors, such as rail and road crossings on the key waterways. Approximately 65 road crossings and 10 rail crossings were identified upstream of the IPZ-2.

Using different spill scenarios, the concentrations at the Britannia and Lemieux Island drinking water intakes were estimated. The calculations started with potential spill sites directly at the Ottawa River, then proceeded up each major tributary until the point at which no significant impact on drinking water quality at the municipal intake was found.

Chalk River and the Ottawa IPZ-3 Delineation

The Chalk River Nuclear Laboratory is situated on the Ottawa River approximately 180 km upriver of the City of Ottawa. In December of 1988, a tritium spill occurred at the facility that eventually reached the Ottawa intakes approximately 16 days later with peak concentrations observed at the Britannia WTP 23 days later. Although no drinking water standards were exceeded at that time, provincial standards are currently being reviewed by the Ontario Drinking Water Advisory Council. If provincial standards for allowable levels for tritium are lowered significantly in the future, a similar spill could result in levels exceeding provincial limits at Ottawa's municipal intakes. The Technical Rules state that IPZ-3 is to terminate at the edge of the Source Protection Region, which for the Ottawa River is near the mouth of the Mississippi River, but for discussion purposes a secondary IPZ-3 was extended beyond the Source Protection Region to include the Chalk River facility.

Inclusion of Transport Pathways

The final step in the IPZ delineation process was to expand the preliminary IPZ-2 and IPZ-3 zones where transport pathways are present. Transport pathways are natural or anthropogenic features such as natural tributaries, roadways and ditches. The ToT up the transport pathways was determined by either a ToT formula. The distance up the transport pathways was calculated so the sum of the ToT in the river and the ToT in the transport pathway was equal to two hours.

6.7.2 Vulnerability Scoring of Type C: Ottawa River Intake Protection Zones

As presented in Section 6.1.4, the vulnerability score is based on the following equation: **V = B x C**

Where:

V is the vulnerability score

B is the area vulnerability factor

C is the source vulnerability factor

The Technical Rules identify the possible IPZ area vulnerability score (B) values.

- **IPZ-1** is always 10;
- **IPZ-2** may be 7, 8, or 9, same score throughout; and
- **IPZ-3** 1 to 9, must not be higher than IPZ-2, score varies.

For a Type C intake, the source vulnerability factor, C can be either 0.9 or 1. The source vulnerability factor is the same for IPZ-1, IPZ-2 and IPZ-3.

The methodologies used to determine B for IPZ-2 and IPZ-3 are presented below. This is followed by the methodology used to determine C.

Determination of Area Vulnerability Factor (B) for IPZ-2

Similar to the three inland intakes, at each of the Ottawa River intakes the area vulnerability factor (B) for IPZ-2 was established based on a numerical approach involving a weighted combination of the factors required to be considered in the Technical Rules:

- **Percentage of area of IPZ-2 that is land**. This factor reflects the assumption that as the percentage of land within an IPZ increases, the potential risk increases for a spill to occur that may impact water quality at the water intake.
- **The land cover, soil type, permeability of the land and the slope of the land.** This factor reflects the potential for overland

water flow into the zone. Vegetation presence, as well as the type of vegetation, will affect the percentage of overland water flow which occurs and how much of the water infiltrates the ground. Permeable soils allow for increased infiltration. Slopes increase the percentage of overland flow compared to the amount of infiltration.

- **The hydrological and hydrogeological conditions where transport pathways are located**. This factor reflects the extent of the transport pathways and sewer systems that may exist in the zone and their influence on water (and potential contaminant) movement from land to rivers which are the source of water intakes.

The following four parameters were developed to account for the three factors listed above:

- Percentage of area composed of land;
- Type of land use;
- % imperviousness of the land; and
- Extent of transport pathways.

Four parameters used for Area Vulnerability Factor (B)	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Assumed Weighting
Percentage of Area Composed of Land	10 %	90%	33.3%
Type of Land Use	- Natural land cover was scored as 7 - Agricultural, open space was scored as 8 - Mainly developed land was scored as 9		16.65%
% Imperviousness of the Land	0%	80%	16.65%
Extent of Transport Pathways	Transport pathways were classified on the basis of the percentage of the preliminary IPZ-2 land area that is drained by storm sewer systems. - <10% of the land area was scored as 7 - 10 to 50% of the land area was scored as 8 - >50% of the land area was scored as 9		33.3%

Determination of Area Vulnerability Factor

Determination of Area Vulnerability Factor (B) for IPZ-3

The methods used in determining the area vulnerability factor (B) for IPZ-3 are similar to that for IPZ-2, except that the factor varies spatially with watershed hydrologic characteristics, and with the distance from the intake. The area factor was calculated within GIS by means of the following steps.

1. Determine Proximity to Intake

An initial score was developed by location within the IPZ-3 based solely on distance to the intake, where areas closest to the intake have a score of 8 and the areas furthest from the intake have a score of 1. Scores for locations between these two points were varied linearly based on distance, and converted to integer values.

2. Calculate Curve Number (CN)

The curve number method is a simple, widely used and efficient method for evaluating the relative amount of runoff generated by a rainfall event in a particular area. A high curve number value reflects highly impermeable surface conditions that would generate considerable runoff. A low curve number value indicates highly permeable soils and natural land uses, where rainfall (or a spilled contaminant) would readily soak into the ground.

Once the curve number value was calculated the interim area vulnerability score was adjusted using the following values. The range of values in the score adjustments for the curve number and slope were determined through professional judgement.

CN Value	Score Adjustment
<30	-1
30 – 80	0
>80	+1

CN Value and Score Adjustment

While the correct curve number values for water and wetlands are 98-100, wetlands and water were excluded from calculation of CN-based IPZ-3 scoring. The inclusion of all areas of water skews the distribution of curve number values, and makes the discrimination between different land-use/soil characteristics less distinct.

3. Calculate Slope

Slope was calculated for all locations within IPZ-3 from the Provincial Digital Elevation Model and the interim area vulnerability score was then modified based on the slope value to give the final adjusted area vulnerability factor. Areas with a slope of <0.73% were not changed. Areas with a slope of >0.73% had the area vulnerability score increased by 1.

Determination of Source Vulnerability Factor (C)

At each of the Ottawa River intakes, the source vulnerability factor (C) was established based on a numerical approach involving a weighted combination of the following factors:

- the depth of the intake below the water surface (the deeper the intake, the lower the vulnerability);
- the distance of the intake from land (the further away from shore, the lower the vulnerability); and

- the number of recorded drinking water quality issues at the intake, if any, based on required water quality monitoring and a voluntary drinking water surveillance program.

Each factor was assigned an equal weighting. The following assumptions were made in order to quantify the range of possible intake designs that might be encountered in practice.

Low Vulnerability

A deep water intake represents a low vulnerability scenario. Based on the provincial boundary line and the bathymetric features of the river within the study domain, an intake representing the lowest bracket of vulnerability would be located in water depths of less than 15 m, and up to 1000 m offshore.

High Vulnerability

An example of a high vulnerability within the source protection region might be a shallow intake located adjacent or close to the shore in a small river. Such an intake might have a depth of 2 m.

The assumed minimum and maximum source vulnerability factor (C) values for each of the three factors as well as the assumed weighting factors used at each of the three intakes is presented below. The Technical Rules do not specify how weighting is to be determined so weighting was distributed equally for the Ottawa River municipal surface water intakes.

Factors used for Source Vulnerability Factor (C)	Assumed Minimum Value (C = 0.9)	Assumed Maximum Value (C = 1)	Assumed Weighting
Depth of Intake	15 metres	2 metres	33.3%
Distance of the Intake from land	1000 metres	0 metres	33.3%
Historical Water Quality Issues	A value of 0.9 was assumed if there were no water quality concerns at Intake	A value of 1 was assumed if persistent or chronic water quality concerns were present at Intake	33.3%

Source Vulnerability Weighting for Ottawa River Surface Water Intakes

Source Vulnerability (C) Determination

The actual or calculated value for each of the factors (e.g., depth of intake = 7 ms) was converted between the minimum and maximum allowable values of C=0.9 and C=1. Results for the Britannia municipal surface water intake are shown in Section 6.7.2 and for the Lemieux Island municipal surface water intake in Section 6.8.2.

6.8 Ottawa Water Supply – Britannia

The Ottawa River is 1,130 km in length, drains an area of approximately 146,000 km^2 in both Ontario (35%) and Quebec (65%), and has an average annual flow rate of 1,200 m^3/s (near Britannia). The river originates northwest of Ottawa east of the Dozois Reservoir in Quebec. It then flows west into Lake Timiskaming and southeast before it discharges into the St. Lawrence River west of Montreal, Quebec. Over most of its length, the river forms the inter-provincial boundary between Ontario and Quebec.

The Britannia WTP is one of two water treatment plants in the City of Ottawa, Ontario on the Ottawa River. The Britannia and Lemieux Island WTPs provide treated drinking water to the City of Ottawa for approximately 814,000 people each day. The Britannia municipal surface water intake is located approximately 300 m from shore and seven m below the water surface in the Ottawa River. Figure 6-31 shows the location of the municipal surface water intake.

As shown on Figure 6-32, the Britannia WTP is situated along a section of the river that extends from the Chaudière Dam upstream to Lac Deschênes. This segment of the river is unique and hydraulically complex due to the presence of several sets of rapids, a number of islands, and the Chaudière Dam. These physical features make this section of the river non-navigable for most watercraft, although canoes and kayaks are often seen in this reach. Large cribs made of wood and rock are remnants of the logging industry and were used to anchor large log booms. These permanent mooring stations are scattered throughout this part of the river, some sitting only inches below the water surface making navigation very hazardous, even for small boats.

The natural water quality in the Ottawa River is characterized as soft water with a low alkalinity. Regular water quality testing is carried out by the City of Ottawa in both the untreated and treated water and the results are compared with the Ontario Drinking Water Standards (ODWS). Hardness is below the ODWS – Operational Guidelines range. *E. coli* is present in some of the untreated source water samples, which is common for surface water, and can be removed during treatment. A review of available untreated water quality results indicates that turbidity, colour and DOC exceed the ODWS aesthetic objectives and alkalinity also exceeds the ODWS – operational guidelines.

Raw water from the Ottawa River is treated at the Britannia WTP by screening the water at the intake to remove larger debris and then mixing the water with a coagulant which binds with suspended particles within the water. The coagulant forms into sticky particles (called ‘floc’), which attract and trap suspended particles before settling at the bottom of large settling tanks. The clear water from the top of the tank is then filtered through layers of anthracite, sand, and gravel. The filtered water is then disinfected, sodium hydroxide is added to adjust for pH (as well as to help reduce pipe corrosion), and fluoride is added before the water is ready for distribution. The treated water quality is consistently compliant with the Ontario Drinking Water Standards.

A tritium spill into the Ottawa River at the Chalk River nuclear laboratory in 1988 reached the City of Ottawa in approximately 16 days. Peak concentrations in the water were approximately 420 Bq/L which was below the

ODWS maximum acceptable concentration of 7000 Bq/L. However, the allowable levels are currently being reviewed by the Ontario Drinking Water Advisory Council. It is possible that the allowable levels will be significantly reduced in the future. If a similar spill should occur, the peak concentrations in the water could be above the new standard. The City of Ottawa has indicated that untreated water is tested at least weekly for tritium and concentrations are usually below the laboratory detection limit of 5.0 Bq/L.

6.8.1 Delineation of Britannia Intake Protection Zones

The steps undertaken to complete the intake protection zone delineation for Britannia are presented in Section 6.6.1. The results of the delineation process are discussed below.

Figure 6-33 shows the various components that make up Britannia's IPZ-1 and IPZ-2. The components include:

- the default IPZ-1 shape which is circle (200 m radius) around the intake;
- the in-river IPZ-2 limit based on reverse particle tracking;
- the anthropogenic transport pathways (storm sewersheds) including a 120 m buffer; and
- the Mississippi Valley/Rideau Valley Conservation Generic Regulation Limit line.

Figure 6-34 shows the complete delineation for the Britannia IPZ-1 and IPZ-2. IPZ-1 is approximately 0.13 km^2, and IPZ-2 is approximately 31 km^2. Figure 6-35 shows the Britannia IPZ-1 and IPZ-2, including the Quebec side of the Ottawa River. The full extent of IPZ-3 within the MRSPR is shown in Figure 6-36 for the Britannia intake. The total area of the IPZ-3 within the MRSPR is 335 $km^{2.}$ Figure 6-37 illustrates the extent of the IPZ-3 if the Chalk River nuclear facility were to be considered. The total area covered by IPZs for the Britannia municipal surface water intake is 366 km^2.

Municipalities which are located within the Britannia IPZs are shown in Table 6-3.

Uncertainty

The level of uncertainly associated with the delineation of the Britannia IPZs is summarized below.

- Within the provincial regulation limits, the IPZ-1 and IPZ-2 delineation has been assigned a low uncertainty. Preliminary information was made available for the IPZ-2 delineation in Quebec but detailed work has not been completed.
- The IPZ-3 delineation, limited to Ontario, is assigned a high uncertainty due to the overall analytical methodology related to the Event Based Approach.

Further details regarding the uncertainty assessment are provided in Appendix 6-4.

6.8.2 Vulnerability Scoring – Britannia Intake Protection Zones

The approach used to complete the vulnerability scoring, including the area vulnerability factor (B) and the source vulnerability factor (C), for the Britannia intake protection zones is presented in Section 6.7.2. The specific vulnerability scoring inputs and results are discussed below.

Area Vulnerability Factor – IPZ-1

The IPZ-1 area vulnerability factor for the Britannia intake is 10 as predetermined by the Technical Rules.

Area Vulnerability Factor – IPZ-2

The area vulnerability factor for IPZ-2 ranges from 7 to 9.

The following table summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criterion.

Parameters used for Area Vulnerability Factor (B)	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Calculated Value for Britannia IPZ-2 (based on local data)
Percentage of Area Composed of Land	10 %	90%	73%
Type of Land Use	- Natural land cover was scored as 7 - Agricultural, open space was scored as 8 - Mainly developed land was scored as 9		Developed =9
% Imperviousness of the Land	0%	80%	34%
Extent of Transport Pathways	Transport pathways were classified on the basis of the percentage of the IPZ-2 land area that is drained by storm sewer systems. - <10% of the land area was scored as 7 - 10 to 50% of the land area was scored as 8 - >50% of the land area was scored as 9		>50%

Summary of Specific Information used to determine the IPZ-2 Area Vulnerability Factor (B)

The estimated minimum and maximum values for percentage of area composed of land is discussed in Section 6.3.2 and found under assumed minimum and maximum values, while the measured values for Britannia are shown in the last column of the previous table. Similarly, the estimated range of minimum and maximum percentage of Imperviousness of the Land is found in the assumed minimum and maximum value columns, with the calculated value in the last column.

Parameter	Calculated value for Britannia IPZ 2 (based on local data)	Converted B values for Britannia IPZ-2 between assumed minimum value (B=7) and assumed maximum value (B=9)			
		$B_{\%LA}$	B_{land}	B_{Imp}	B_{TP}
Percentage Land Area ($B_{\%LA}$)	73%	8.6			
Type of Land Use (B_{land})	Developed		9.0		
% Imperviousness (B_{imp})	34%			7.9	
Percentage of Land Area Drained by Storm Sewer (B_{TP})	>50%				9.0
Assumed Weighting Factor		1/3	1/6	1/6	1/3
Weighted Factor	**8.66**				
Selected Area Factor	**9**				

Summary of Scoring for the IPZ-2 Area Vulnerability Factor (B)

The table summarizes the derivation of the IPZ-2 area vulnerability factor (B) for the Britannia IPZ-2. It includes the converted area vulnerability values between assumed minimum value (B=7) and assumed maximum value (B=9) for each of the four parameters, as well as the assumed weighting. The final area vulnerability factor for the Britannia IPZ-2 is 9.

Area Vulnerability Factor – IPZ-3

The area vulnerability factors for IPZ-3 range from 8 (adjacent to IPZ-2) to 1. The methodology for determining the area vulnerability factor for IPZ-3 can be found in Section 6.3.2.

Source Vulnerability Factor

The approach used to complete the source vulnerability factor for the Britannia intake protection zones is presented in Section 6.7.2. The specific vulnerability scoring inputs and results are discussed below.

The table below summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria.

Three Factors used for Source Vulnerability Factor (C)	Assumed Minimum Value (C = 0.9)	Assumed Maximum Value (C = 1)	Calculated value for Britannia (based on local data)
Depth of Intake (C_{depth})	15 metres	2 metres	7 metres
Distance of the Intake from land (C_{Dist})	1000 metres	0 metres	300 metres
Historical Water Quality Issues (C_{DWI})	A value of 0.9 was assumed if there were no water quality concerns at Intake	A value of 1 was assumed if persistent or chronic water quality concerns were present at Intake	none

Summary of Specific Information used to determine the Source Vulnerability Factor (C)

The table below summarizes the derivation of the Britannia source vulnerability factor (C). It includes the converted source vulnerability values between assumed minimum value (C=0.9) and assumed maximum value (C=1) for each of the three parameters, as well as the assumed weighting. The final source vulnerability factor for the Britannia intakes is 0.9.

Parameter	Calculated value for Britannia (based on local data)	Converted B values for Britannia between assumed minimum value (C=0.9) and assumed maximum value (C=1)		
		(C_{depth})	(C_{Dist})	(C_{DWI})
Depth of Intake (C_{depth})	7 metres	0.96		
Distance of the Intake from land (C_{Dist})	300 metres		0.97	
Historical Water Quality Issues (C_{DWI})	none			0.9
Assumed Weighting Factor		1/3	1/3	1/3
Weighted Factor	**0.943**			
Selected Area Factor	**0.9**			

Summary of Scoring for the Source Vulnerability Factor (C)

Final Vulnerability Scoring for Britannia IPZs

As presented above, the Britannia source vulnerability factor (C) was assessed to be 0.9. Thus, the final vulnerability scores (V) for each of the zones is less than the area vulnerability factors (B).

As shown in the following table, Britannia's IPZ-1 has a final vulnerability score of 9, IPZ-2 a score of 8.1, and IPZ-3 a range of scores from 0.9 to 7.2.

Figure 6-38 shows the final vulnerability scoring for Britannia's IPZ-1 and IPZ-2, and Figure 6-39 shows the final vulnerability scoring for Britannia's IPZ-3. Following is a summary of results.

	Area Vulnerability Factor (B) *Expressed as a whole number*			**Source Vulnerability Factor (C)**	**Vulnerability Score (V)** *Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Britannia Scores	**10**	**9**	**1 to 8**	**0.9**	**9**	**8.1**	**0.9 to 7.2**

Summary of Britannia IPZ Vulnerability Scoring Results

Uncertainty

The Britannia IPZs vulnerability scoring uncertainty levels are as follows:

- IPZ-1, and IPZ-2 vulnerability scores are assigned a low uncertainty
- IPZ-3 vulnerability scores are assigned a high uncertainty due to associated uncertainties with guidance provided in the Technical Report.

Further details regarding the uncertainty assessment are provided in Appendix 6-4.

6.8.3 Managed Lands and Livestock Density – Britannia Intake Protection Zones

The method for calculating managed lands and livestock density is described in Section 6.3.3.

The Total Managed Lands for the Britannia IPZs are:

- 0% of the total IPZ-1 area; and
- 27.8% of the total IPZ-2 area.

This is shown in Table 6-8 and Figure 6-40, which also shows various scores for IPZ-3.

6.8.4 Impervious Surfaces – Britannia Intake Protection Zones

The method for calculating impervious surfaces is described in Section 6.3.4. The percentage of impervious surfaces within the Britannia IPZs range from 0-98.3%.

6.8.5 Water Quality Threat Assessment – Britannia Intake Protection Zones

Water quality threats are existing conditions (e.g. contaminated sediment, soil or surface water) or existing or future land use activities that could contaminate a drinking water supply. A land use inventory was completed in 2010.

It should be noted that a single land use activity could fall into multiple threat categories. For example, a crop farm may have storage of fuel, may apply commercial fertilizer to land, and apply agricultural source material to land. Each of these activities is a separate threat category in the provincial table, and so each is therefore a separate threat.

A land use activity and associated threats that occur where the vulnerability score is high may result in determining it to be a significant threat. In many cases, the specific circumstances that apply to a threat category are unknown. Using the same example, a crop farm may have fuel storage, but the volume of fuel stored is unknown. Unless additional information was available, it was assumed that enough material was stored for that activity to be a significant threat.

A total of 6 potentially significant drinking water threats, areas where the vulnerability score is 8 or greater, were identified in the Britannia IPZ-1 and IPZ-2. The list of identified potential significant drinking water threats is provided in Table 6-9. The term “Poly” in the table refers to a polygon, or an area that may contain multiple threats. For example, a polygon may be a farm field, representing a single potential threat, or a residential area with an unknown number of septic systems, each which may be a potential threat. The term “Point” in the table refers to a point source. Figure 6-42 shows the areas containing potential significant threats in purple. The size of the area where significant threats may be present is approximately 31 km^2. See Section 4.3.3 for information on the full list of significant, moderate, and low threats.

Transportation Corridors

A number of transportation corridors exist within the Britannia IPZs where there may be the transportation of dangerous and/or hazardous goods and the potential for a spill exists. Spills within the IPZs have the potential to impair the surface water quality however they are not included as threats as per the prescribed drinking water threats categories (see Section 4-3).

This Assessment Report provides this key information for municipalities and other agencies to assist in ensuring all available information is accessible for emergency response planning purposes. Transportation corridors are shown in Figure 6-34, Britannia IPZ-1 and IPZ-2.

6.8.6 Issues and Conditions – Britannia Intake Protection Zones

As discussed in Chapter 4, issues are documented cases of water quality contamination approaching or exceeding acceptable provincial levels. A condition is a situation where past activities resulted in a drinking water threat. No issues or conditions were identified for the Britannia WTP. However, a number of parameters that exceed the Ontario Drinking Water Standards and

Operational Guidelines are noted below, including tritium which is identified as parameter that could potentially impact the Ottawa water supply.

For the Ottawa River raw water, there are numerous parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines. The exceeding parameters include;

- aesthetic objectives of turbidity, colour, DOC and iron
- alkalinity, hardness and aluminum which are operational objectives,
- health-related criteria for *E. coli* and total coliforms

None of the above parameters are considered to be issues as they are known to be naturally occurring and do not represent a problem for the water treatment plant operator. *E. coli* and total coliforms presence is usual in surface water sources and they are easily removed during the treatment processes.

The one parameter identified that could potentially impact the Ottawa water supply is tritium. The current maximum allowable concentration for tritium in the Ontario Drinking Water Standards is 7,000 Bq/L. In May 2009, the Ontario Drinking Water Advisory Council recommended that the guideline be revised to 20 Bq/L, applied as a running annual average. Chalk River Laboratories, the site of nuclear technology research and development, is located approximately 180 km upstream of the drinking water intakes.

In December 1988, a spill of heavy water containing tritium entered the Ottawa River. Personnel at the Britannia WPP were notified of the incident, and began monitoring raw water for tritium. Concentrations peaked at approximately 440 Bq/L, never exceeding the 7,000 Bq/L guideline set in the Ontario Drinking Water Standards. Increased tritium levels were observed from approximately Day 16 after the spill until Day 38 after the spill, with the peak occurring at Day 21.

The City of Ottawa currently tests raw water for tritium at least weekly and the concentrations are usually below the detection limit of 5.0 Bq/L. Between the year 2000 and August 2009, the highest (partial) annual average tritium concentration measured in the raw water at the Britannia WTP was 7.0 Bq/L (January to August 2009), with a maximum measured concentration of 22.8 Bq/L. While the annual average concentrations in recent years have been well below the current and proposed guidelines, an upstream heavy water release (similar to the 1988 incident) might have the potential to result in an annual average tritium concentration above the proposed guideline level.

Based on this information, tritium is currently not considered a drinking water issue in accordance with the Technical Rules. However tritium is considered to represent a potential concern that should continue to be tracked. It should be noted that municipal water treatment plants do not have the capacity to remove tritium from source water.

It is recommended that a reassessment of this parameter be carried out as part of a future Assessment Report update when and if the current tritium standard is revised.

6.9 Ottawa Water Supply – Lemieux Island

The Lemieux Island Water Treatment Plant (WTP) is located in Ottawa, Ontario on the Ottawa River, as shown in Figure 6-31. The Lemieux Island and Britannia WTPs provide treated drinking water to the City of Ottawa for approximately 814,000 people each day. For more background information on the Ottawa River source water supply, see Section 6.7.

The Lemieux Island WTP intake is located approximately 450 m from the mainland and 11 m from the shore of Lemieux Island, and 6 m below the water.

6.9.1 Delineation of Lemieux Island Intake Protection Zones

The steps undertaken to complete the intake protection zone delineation for Lemieux Island are presented in Section 6.6.1. Discussion on the results of the delineation process follow.

Figure 6-43 shows the various components that make up Lemieux Island's IPZ-1 and IPZ-2. The components include:

- the default IPZ-1 shape which is circle (200 m radius) around the intake;
- the in-river IPZ-2 limit based on reverse particle tracking;
- the anthropogenic transport pathways (storm sewersheds), including a 120 m buffer; and
- the Rideau Valley Conservation Generic Regulation Limit line.

Figure 6-44 shows the complete delineation for the Lemieux Island IPZ-1 and IPZ-2. IPZ-1 is approximately 0.07 km^2, and IPZ-2 is approximately 13 km^2. Figure 6-45 shows the Lemieux Island IPZ-1 and IPZ-2, including the Quebec side of the Ottawa River. The full extent of IPZ-3 within the MRSPR is shown On Figure 6-46 for the Lemieux Island intake. The total area of the IPZ-3 within the MRSPR is approximately 377 km^2. Figure 6-47 shows the extent of IPZ-3 if the Chalk River nuclear facility were to be considered. The total area covered by IPZs within the MRSPR for the Lemieux Island municipal surface water intake is 390 km^2.

Municipalities which are located within the Lemieux Island IPZs are shown in Table 6-3.

Uncertainty

The level of uncertainly associated with the delineation of the Lemieux Island Intake Protection Zones is summarized below. Further details regarding the uncertainty assessment are provided in Appendix 6-4.

- Within the provincial regulation limits, the IPZ-1 and IPZ-2 delineation has been assigned a low uncertainty. Preliminary information was made available for the IPZ-2 delineation in Quebec but detailed work has not been completed.
- The IPZ-3 delineation, limited to Ontario, is assigned a high uncertainty due to the overall analytical methodology related to the Event-Based Approach.

6.9.2 Vulnerability Scoring – Lemieux Island Intake Protection Zones

The approach used to complete the vulnerability scoring, including the area vulnerability factor (B) and the source vulnerability factor (C), for the Lemieux Island intake protection zones is presented in Section 6.7.2. The specific vulnerability scoring inputs and results are discussed below.

Area Vulnerability Factor – IPZ-1

The IPZ-1 area vulnerability factor for the Lemieux Island intake is 10 as predetermined by the Technical Rules.

Area Vulnerability Factor – IPZ-2

The area vulnerability factor for IPZ-2 ranges from 7 to 9.

The table summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria.

Four parameters used for Area Vulnerability Factor (B)	Assumed Minimum Value (B = 7)	Assumed Maximum Value (B = 9)	Calculated value for Lemieux Island IPZ-2 (based on local data)
Percentage of Area Composed of Land	10 %	90%	55%
Type of Land Use	- Natural land cover was scored as 7 - Agricultural, open space was scored as 8 - Mainly developed land was scored as 9		Developed
% Imperviousness of the Land	0%	80%	42%
Extent of Transport Pathways	Transport pathways were classified on the basis of the percentage of the IPZ-2 land area that is drained by storm sewer systems. - <10% of the land area was scored as 7 - 10 to 50% of the land area was scored as 8 - >50% of the land area was scored as 9		>50%

Summary of Specific Information used to determine the IPZ-2 Area Vulnerability Factor (B)

The following table summarizes the derivation of the IPZ-2 area vulnerability factor (B) for the Lemieux Island IPZ-2. It includes the converted area vulnerability values between assumed minimum value (B=7) and assumed maximum value (B=9) for each of the four parameters, as well as the assumed weighting.

The final area vulnerability factor for the Lemieux Island IPZ-2 is 9.

Parameter	Calculated value for Lemieux Island IPZ-2 (based on local data)	Converted B values for Lemieux Island IPZ-2 between assumed minimum value (B=7) and assumed maximum value (B=9)			
		$B_{\%LA}$	B_{land}	B_{Imp}	B_{TP}
Percentage Land Area ($B_{\%LA}$)	55%	8.1			
Type of Land Use (B_{land})	Developed		9.0		
% Imperviousness (B_{imp})	42%			8.1	
Percentage of Land Area Drained by Storm Sewer (B_{TP})	>50%				9.0
Assumed Weighting Factor		1/3	1/6	1/6	1/3
Weighted Factor	**8.55**				
Selected Area Factor	**9**				

Summary of Scoring for the IPZ-2 Area Vulnerability Factor (B)

Area Vulnerability Factor – IPZ-3

The area vulnerability factors for IPZ-3 range from 7.2 (adjacent to IPZ-2) to 1. The methodology for determining the area vulnerability factor for IPZ-3 can be found in Section 6.3.2.

Source Vulnerability Factor

The approach used to complete the source vulnerability factor for the Lemieux Island intake protection zones is presented in Section 6.6.2. The specific vulnerability scoring inputs and results follow.

The following table summarizes the specific information, including assumed minimum and maximum values for area vulnerability factor (B) that were used in the analysis to quantify each criteria.

Three Factors used for Source Vulnerability Factor (C)	Assumed Minimum Value (C = 0.9)	Assumed Maximum Value (C = 1)	Calculated value for Lemieux Island (based on local data)
Depth of Intake (C_{depth})	15 metres	2 metres	6 metres
Distance of the Intake from land (C_{Dist})	1000 metres	0 metres	450 metres
Historical Water Quality Issues ($\mathbf{C}_{DWI}$)	A value of 0.9 was assumed if there were no water quality concerns at Intake	A value of 1 was assumed if persistent or chronic water quality concerns were present at Intake	none

Summary of Specific Information used to determine the Source Vulnerability Factor (C)

The table below summarizes the derivation of the Lemieux Island source vulnerability factor (C). It includes the converted source vulnerability values between assumed minimum value (C=0.9) and assumed maximum value (C=1) for each of the three parameters, as well as the assumed weighting.

The final source vulnerability factor for the Lemieux Island intakes is 0.9.

Parameter	Calculated value for Lemieux Island (based on local data)	Converted B values for Lemieux Island between assumed minimum value (C=0.9) and assumed maximum value (C=1)		
		(C_{depth})	(C_{Dist})	(C_{DWI})
Depth of Intake (C_{depth})	6 metres	0.97		
Distance of the Intake from land (C_{Dist})	450 metres		0.96	
Historical Water Quality Issues (C_{DWI})	none			0.9
Assumed Weighting Factor		1/3	1/3	1/3
Weighted Factor	**0.943**			
Selected Area Factor	**0.9**			

Summary of Scoring for the Source Vulnerability Factor (C)

Final Vulnerability Scoring for Lemieux Island IPZs

As presented above, the Lemieux Island source vulnerability factor (C) was assessed to be 0.9. Thus, the final vulnerability scores (V) for each of the zones is less than the area vulnerability factors (B).

Lemieux Island's final vulnerability scores are;

- IPZ-1 has a score of 9;
- IPZ-2 has a score of 8.1; and
- IPZ-3 has a range of scores from 0.9 to 7.2.

The results are summarized in the following table. Figure 6-48 shows the final vulnerability scoring for Lemieux Island's IPZ-1 and IPZ-2, and Figure 6-49 shows the final vulnerability scoring for Lemieux Island's IPZ-3.

	Area Vulnerability Factor (B) *Expressed as a whole number*			**Source Vulnerability Factor (C)**	**Vulnerability Score (V)** *Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Lemieux Island Scores	**10**	**9**	**1 to 8**	**0.9**	**9**	**8.1**	**0.9 to 7.2**

Summary of Lemieux Island IPZ Vulnerability Scoring Results

Uncertainty

The level of uncertainly associated with the vulnerability scoring of the Lemieux Island IPZs is summarized below:

- IPZ-1, and IPZ-2 vulnerability scores for Lemieux Island are assigned a low uncertainty; and
- IPZ-3 vulnerability scores are assigned a high uncertainty due to associated uncertainties with guidance provided in the Technical Report.

Further details regarding the uncertainty assessment are provided in Appendix 6-4.

6.9.3 Managed Lands and Livestock Density – Lemieux Island Intake Protection Zones

The method for calculating managed lands and livestock density is described in Section 6.3.3.

The Total Managed Lands for the Lemieux Island IPZs are:

- 0% of the total IPZ-1 area; and
- 20.7% of the total IPZ-2 area.

This is shown in Table 6-8 and Figure 6-50, which also shows various scores for IPZ-3.

6.9.4 Impervious Surfaces – Lemieux Island Intake Protection Zones

The method for calculating impervious surfaces is described in Section 6.3.4. The percentage of impervious surfaces within the Britannia IPZs range from 0-98.3%.

6.9.5 Water Quality Threat Assessment – Lemieux Island Intake Protection Zones

Water quality threats are existing conditions (e.g. contaminated sediment, soil or surface water) or existing or future land use activities that could contaminate a drinking water supply. A land use inventory was completed in 2010.

It should be noted that a single land use activity could fall into multiple threat categories. For example, a crop farm may have fuel storage, may apply commercial fertilizer to land, and apply agricultural source material to land. Each of these activities is a separate threat category in the provincial table, and so each is therefore a separate threat.

Land use activities and associated threats that occur where the vulnerability score is high may result in determining it to be a significant threat. In many cases, the specific circumstances that apply to a threat category are unknown. Using the same example, a crop farm may store fuel, but the volume of fuel stored is unknown. Unless additional information was available, it was assumed that enough material was stored for that activity to be a significant threat.

No potentially significant drinking water threats, areas where the vulnerability score is 8 or greater, were identified in the Lemieux Island IPZs. Even though no potentially significant threats were identified for the Lemieux Island IPZs, Figure 6-42 shows the areas where potential significant threats would be found if they existed. Please see Section 4.3.3 for information on the full list of significant, moderate, and low threats.

Transportation Corridors

A number of transportation corridors exist within the Lemieux Island IPZs where there may be the transportation of dangerous and/or hazardous goods and the potential for a spill exists. Spills within the IPZs have the potential to impair the surface water quality however they are not included as threats as per the prescribed drinking water threats categories (see Section 4-3).

This Assessment Report provides this key information for municipalities and other agencies to assist in ensuring all available information is accessible for emergency response planning purposes. Transportation corridors are shown in Figure 6-44, Lemieux Island IPZ-1 and IPZ-2.

6.9.6 Issues and Conditions – Lemieux Island Intake Protection Zones

As discussed in Chapter 4, issues are documented cases of water quality contamination approaching or exceeding acceptable provincial levels. A condition is a situation where past activities resulted in a drinking water threat. No issues or conditions were identified for the Lemieux Island WTP. However, a number of parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines are noted below, including tritium which is identified as parameter that could potentially impact the Ottawa water supply.

For the Ottawa River raw water, there are numerous parameters that exceed the Ontario Drinking Water Standards and Operational Guidelines. The exceeding parameters include:

- aesthetic objectives of turbidity, colour, DOC and iron;
- alkalinity, hardness and aluminum which are operational objectives; and
- health-related criteria for *E. coli* and total coliforms.

None of the above parameters are considered to be issues as they are known to be naturally occurring and do not represent a problem for the water treatment plant operator. *E. coli* and total coliforms presence is usual in surface water sources and they are easily removed during the treatment processes.

The one parameter identified that could potentially impact the Ottawa water supply is tritium. Tritium is currently not considered a drinking water issue in accordance with the Technical Rules. However tritium is considered to represent a potential concern that should continue to be tracked. It is recommended that a re-assessment of this parameter be carried out when and if the current tritium standard is revised. See Section 6.7.6 for more details.

Table 6-1

Summary of Key Findings for Intake Protection Zones

Mississippi - Rideau Source Protection Region

Municipal Drinking Water System	Number of Intakes	Size of IPZ (km^2)		Vulnerability Scores	Area of IPZ where Potential Significant Threats may be present (km^2)	Number of Potential Significant Threats (line, polygon or point)	Number of Issues	Number of Conditions
Carleton Place	1	IPZ-1	0.10	10	159.04	10	0	0
		IPZ-2	3.85	9				
		IPZ-3	1525	1 to 8				
		Total IPZ	1529					
Perth	1	IPZ-1	0.08	10	65.22	13	0	0
		IPZ-2	2.90	9				
		IPZ-3	364	1 to 8				
		Total IPZ	367					
Smiths Falls	2	IPZ-1	0.14	10	3.68	5	0	0
		IPZ-2	3.54	8				
		IPZ-3	865	1 to 7				
		Total IPZ	869					
Britannia (Ottawa)	1	IPZ-1	0.13	9	30.90	6	0	0
		IPZ-2	30.78	8.1				
		IPZ-3	335	0.9 to 7.2				
		Total IPZ	366					
Lemieux Island (Ottawa)	1	IPZ-1	0.07	9	13.16	0	0	0
		IPZ-2	13.09	8.1				
		IPZ-3	377	0.9 to 7.2				
		Total IPZ	390					
				Total	272	34	0	0

Total IPZ area for Carleton Place, Perth and Smiths Falls (km^2)	2,400
Total IPZ area for Britannia and Lemieux Island (km^2)	390
Total IPZ area for Mississippi-Rideau Source Protection Region (km	2,790

Compiled from: MRSPR Surface Water Technical Reports (see Appendix A-1)

Table 6-2

Summary of Potential Significant Threats to Surface Water Based Municipal Drinking Water Systems

Mississippi - Rideau Source Protection Region

	Potential Significant Threats			
System Name	**Line**	**Point**	**Poly**	**Total**
Carleton Place	0	1	9	10
Perth	0	0	13	13
Smiths Falls	1	0	4	5
Britannia (Ottawa)	0	0	6	6
Lemieux Island (Ottawa)	0	0	0	0
TOTAL				34

Compiled from: Dillon Surface Water Threats and Issues Technical Report (see Appendix A-1)

Table 6-3

Lower/Single Tier Municipalities located in Intake Protection Zones

Mississippi - Rideau Source Protection Region

Municipality	Intake Protection Zones			
	Carleton Place	Perth	Smith Falls	Britannia and Lemieux Island (Ottawa)
Addington Highlands	✓			
Beckwith	✓		✓	
Carleton Place	✓			
Central Frontenac	✓	✓	✓	
Drummond/North Elmsley	✓	✓	✓	
Greater Madawaska	✓			
Lanark Highland	✓			
Mississippi Mills	✓			✓
Montague			✓	
North Frontenac	✓			
Ottawa				✓
Perth		✓	✓	
Rideau Lakes		✓		
Smiths Falls			✓	
South Frontenac		✓	✓	
Tay Valley	✓	✓	✓	
Westport			✓	

Compiled from: MRSPR Surface Water Technical Reports (see Appendix A-1)

Table 6-4

Risk to Carleton Place, Perth and Smiths Falls IPZs based on managed lands and livestock density

Mississippi - Rideau Source Protection Region

Municipal Drinking Water System	IPZ and Vulnerability Score	Percent Total Managed Lands	Risk for Over Application of Nutrients	Livestock Density		Risk for Over-Application of ASM
				Application of Nutrients (NU/acre)	Pasture/Grazing (NU/acre)	
Carleton Place	IPZ 1 (10)	18.2	LOW	0.00	0	LOW
	IPZ 2 (9)	28.3	LOW	0.06	0.15	LOW
	IPZ 3 (5)	1.5	LOW	0.11	N/A	LOW
	IPZ 3 (6)	2.1	LOW	0.11	N/A	LOW
	IPZ 3 (7)	5.4	LOW	0.12	N/A	LOW
	IPZ 3 (8)	18.6	LOW	0.13	N/A	LOW
Perth	IPZ 1 (10)	35	LOW	0.00	0	LOW
	IPZ 2 (9)	42.4	MODERATE	0.26	0.72	LOW
	IPZ 3 (5)	5.3	LOW	0.10	N/A	LOW
	IPZ 3 (6)	4.2	LOW	0.10	N/A	LOW
	IPZ 3 (7)	4.2	LOW	0.10	N/A	LOW
	IPZ 3 (8)	19.2	LOW	0.12	N/A	LOW
Smiths Falls	IPZ 1 (10)	23.8	LOW	0.00	0	LOW
	IPZ 2 (8)	13.4	LOW	0.00	0	LOW
	IPZ 3 (5)	6.1	LOW	0.10	N/A	LOW
	IPZ 3 (6)	12.4	LOW	0.11	N/A	LOW
	IPZ 3 (7)	19.6	LOW	0.14	N/A	LOW

Compiled from: Dillon Managed Lands and Livestock Density Technical Report (see Appendix A-1)

Table 6-5

Summary of Potentially Significant Threats to Carleton Place Source Water and Prescribed Activities Considered Applicable

Mississippi - Rideau Source Protection Region

Land Use Activity	Prescribed Drinking Water Quality Threat Category				TOTAL
	The handling and storage of fuel.	The handling and storage of pesticide.	The storage of agricultural source material.	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	
	Point	Poly	Poly	Poly	
Cattle Ranching and Farming				1	**1**
Elementary and Secondary Schools	1				**1**
Other Animal Production			4	3	**7**
Other Crop Farming		1			**1**
TOTAL	**1**	**1**	**4**	**4**	**10**

Compiled from: Dillon Surface Water Threats and Issues Technical Report (see Appendix A-1)

Table 6-6

Summary of Potentially Significant Threats to Perth Source Water and Prescribed Activities Considered Applicable

Mississippi - Rideau Source Protection Region

Land Use Activity	Prescribed Drinking Water Quality Threat Category			TOTAL
	The application of pesticide to land.	The storage of agricultural source material.	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	
	Poly	Poly	Poly	
Cattle Ranching and Farming		2	4	**6**
Golf Courses and Country Clubs	1			**1**
Other Animal Production		4	2	**6**
TOTAL	**1**	**6**	**6**	**13**

Compiled from: Dillon Surface Water Threats and Issues Technical Report (see Appendix A-1)

Table 6-7

Summary of Potentially Significant Threats to Smiths Falls Source Water and Prescribed Activities Considered Applicable

Mississippi - Rideau Source Protection Region

Land Use Activity	Prescribed Drinking Water Quality Threat Category				TOTAL
	The application of pesticide to land.	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	The handling and storage of fuel.	
	Poly	Line	Poly	Poly	
Electric Power Generation, Transmission and Distribution			1	1	**2**
Golf Courses and Country Clubs	1				**1**
RV (Recreational Vehicle) Parks and Recreational Camps				1	**1**
Sewer Mainlines and Connections		1			**1**
TOTAL	**1**	**1**	**1**	**2**	**5**

Compiled from: Dillon Surface Water Threats and Issues Technical Report (see Appendix A-1)

Table 6-8

Risk to Britannia and Lemieux IPZs based on managed lands and livestock density.

Mississippi - Rideau Source Protection Region

Municipal Drinking Water System	IPZ and Vulnerability Score	Percent Total Managed Lands	Risk for Over Application of Nutrients	Livestock Density		Risk for Over-Application of ASM
				Application of Nutrients (NU/acre)	Pasture/Grazing (NU/acre)	
Britannia	IPZ 1 (9)	0	LOW	0.00	0	LOW
	IPZ 2 (8)	27.8	LOW	0.00	0.004	LOW
	IPZ 3 (4.5)	31	LOW	0.15	N/A	LOW
	IPZ 3 (5.4)	23.4	LOW	0.14	N/A	LOW
	IPZ 3 (6.3)	19.8	LOW	0.13	N/A	LOW
	IPZ 3 (7.2)	37.6	LOW	0.13	N/A	LOW
Lemieux Island	IPZ 1 (9)	0	LOW	0.00	0	LOW
	IPZ 2 (8)	20.7	LOW	0.00	0	LOW
	IPZ 3 (4.5)	31.3	LOW	0.15	N/A	LOW
	IPZ 3 (5.4)	26.1	LOW	0.14	N/A	LOW
	IPZ 3 (6.3)	29.4	LOW	0.13	N/A	LOW
	IPZ 3 (7.2)	43.4	MODERATE	0.13	N/A	LOW

Compiled from: Dillon Managed Lands and Livestock Density Technical Report (see Appendix A-1)

Table 6-9

Summary of Potentially Significant Threats to Britannia Source Water and Prescribed Activities Considered Applicable

Mississippi - Rideau Source Protection Region

Land Use Activity	Prescribed Drinking Water Quality Threat Category				TOTAL
	The application of agricultural source material to land.	The application of pesticide to land.	The storage of agricultural source material.	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	
	Polygon	Polygon	Polygon	Polygon	
Fruit and Tree Nut Farming	1	1			**2**
Oilseed and Grain Farming	1	1			**2**
Other Animal Production			1	1	**2**
TOTAL	**2**	**2**	**1**	**1**	**6**

Compiled from: Dillon Surface Water Threats and Issues Technical Report (see Appendix A-1)

Table 6-10

Summary of Vulnerability Scores for Municipal Surface Water Intakes in the MRSPR

	Area Vulnerability Factor (B)			Source Vulnerability Factor	Vulnerability Score (V)		
	Expressed as a whole number			**(C)**	*Expressed to one decimal point or as whole number depending on the value of C*		
Zone	**IPZ-1**	**IPZ-2**	**IPZ-3**		**IPZ-1**	**IPZ-2**	**IPZ-3**
Possible Values	*10*	*7 to 9*	*1 to 9*	*0.9 or 1*	*9 or 10*	*6.3 to 9*	*0.9 to 9*
Carleton Place	10	9	1 to 8	**1**	**10**	**9**	**1 to 8**
Perth	10	9	1 to 8	**1**	**10**	**9**	**1 to 8**
Smiths Falls	10	8	1 to 7	**1**	**10**	**8**	**1 to 7**
Britannia	10	9	1 to 8	**0.9**	**9**	**8.1**	**0.9 to 7.2**
Lemieux Island	10	9	1 to 8	**0.9**	**9**	**8.1**	**0.9 to 7.2**

Compiled from: MRSPR Surface Water Technical Reports (see Appendix A-1)

3.0 Ontario Drinking Water Stewardship Program

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Background

The *Clean Water Act* established the *Ontario Drinking Water Stewardship Program* (ODWSP) to provide financial assistance to:

a. Persons whose activities or properties are affected by the *Clean Water Act*;
b. Persons and bodies who administer incentive programs and education and outreach programs that are related to source protection plans; and
c. Other persons and bodies, in circumstances specified in the regulations that are related to the protection of existing or future sources of drinking water.

The province committed $7 million dollars per year in funding to this program from 2007-2011 for a total of $28 million dollars.

2007-2010 Funding

The annual funding allotment of $7 million dollars is broken into three components which eligible people can apply for:

1. Early Actions:
    - Implement voluntary eligible best management practices in advance of approved Source Protection Plan policies. Eligible areas are:
        i. 200 metres around municipal surface water intakes; and
        ii. 2 year time-of-travel for municipal wells
2. Outreach & Education
    - raising awareness about drinking water source protection and the ODWSP
3. Special Projects
    - Additional projects that protect municipal sources of drinking water

The Ministry of the Environment's *2007-2010 Interim Progress Report* is attached.

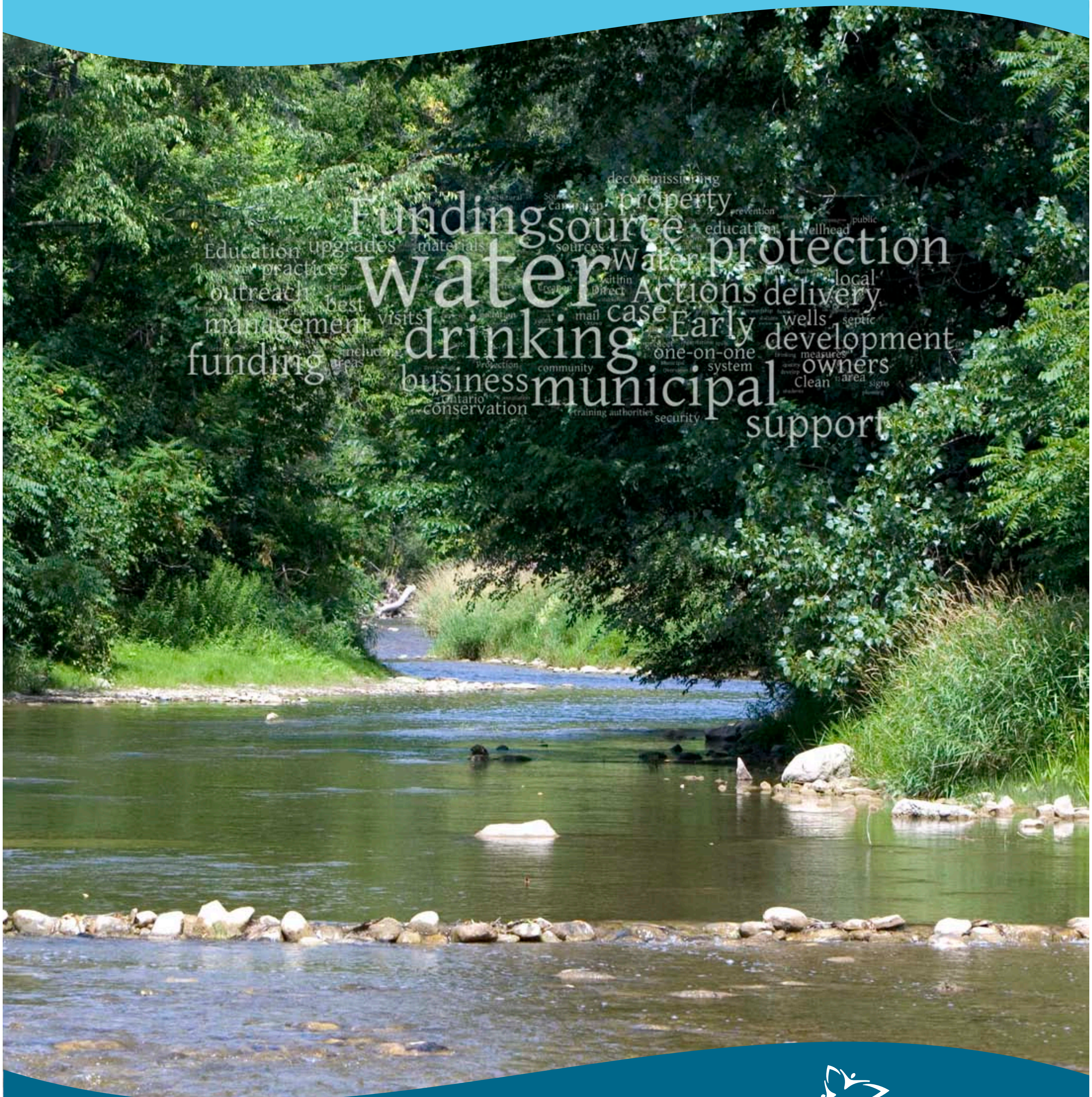
Mississippi-Rideau Region

1. Early Actions:
    - For 2008-2009 we received $83,000 in funding which funded 17 projects:
        - o 8 septic system inspection/upgrade grants
        - o 9 well decommission/upgrade grants
    - **For 2010 we received $418,500 in funding**
        - o A press release will be issued late April
        - o Newspaper ads will appear in local papers mid May
        - o Businesses will be approached about pollution prevention reviews

2. Outreach & Education:
    - In 2007-2008 we received funding (in partnership with Cataraqui and Quinte) to undertake a variety of projects to raise awareness about drinking water source protection
    - In 2008-2009 Mississippi Valley Field Naturalists received funding to educate grade 8 students about source protection planning
3. Special Projects
    - In 2009 the Village of Merrickville-Wolford and the Municipality of North Grenville applied for funding to deepen their municipal well casing to ensure the wells were only drawing water from the Nepean Aquifer. Neither application has been approved yet, Chair Stavinga will follow up with MOE.

Ontario Drinking Water Stewardship Program

Interim Progress Report 2007-2010



Protecting our environment.

Ontario

PIBS 7303e

Ontario Drinking Water Stewardship Program

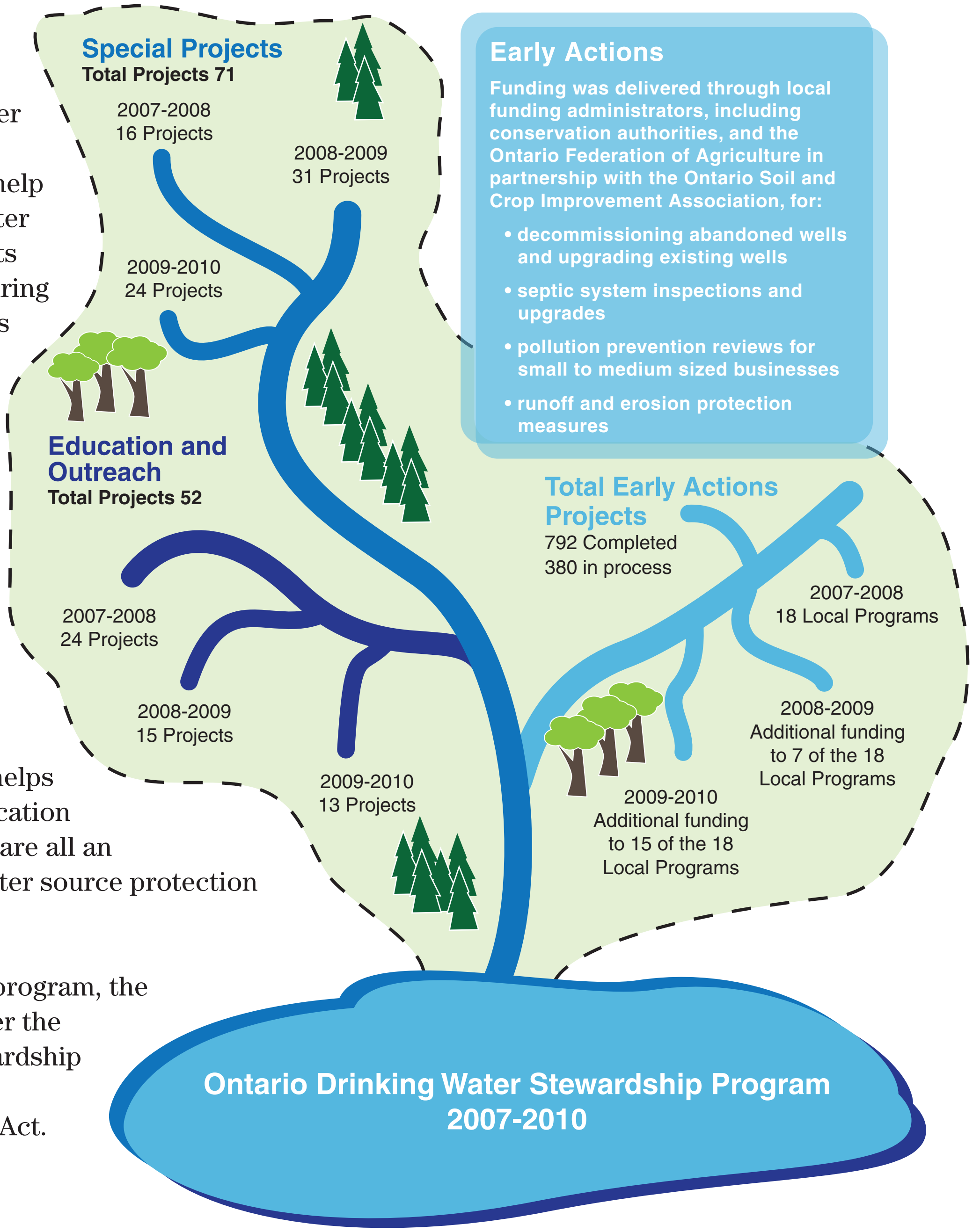
Projects funded during the first three years

The Clean Water Act enables communities to protect their drinking water supplies through prevention, by developing collaborative, locally-driven, watershed-based drinking water source protection plans founded on sound science. The Ontario Drinking Water Stewardship Program was established under the Act to provide financial assistance for measures that help protect Ontario's drinking water sources. Protecting water at its source is the first step in ensuring that every Ontarian has access to safe drinking water.

The Ontario Drinking Water Stewardship Program makes it easier for landowners and small businesses to be partners in protecting their communities' environment and public health. The program recognizes the shared responsibility of all stakeholders to protect local sources of drinking water. It helps fund local incentives and education and outreach projects, which are all an important part of drinking water source protection planning.

In the first three years of the program, the ministry funded projects under the Ontario Drinking Water Stewardship Program that supported the principles of the Clean Water Act.

Projects were funded in the following components: Early Actions, Special Projects, and Education and Outreach.



The three components of the Ontario Drinking Water Stewardship Program

Early Actions funds actions to protect drinking water sources immediately within surface water intake and wellhead protection areas. Property owners apply to and receive payment for their actions from conservation authorities or the Ontario Soil and Crop Improvement Association (OSCIA) on behalf of the Ontario Federation of Agriculture.

Between 2007 and 2010, property owners, farmers, municipalities and small to medium sized businesses received funding for drinking water source protection measures such as:

- decommissioning abandoned wells and upgrades to existing wells
- septic system inspections and upgrades
- pollution prevention reviews, and
- runoff and erosion protection measures and additional best management practices.

Education and Outreach funds local education and outreach activities related to source protection planning.

During this period, the Ontario Drinking Water Stewardship Program funded projects that supported the principles of the Clean Water Act and:

- promoted best management practices for drinking water source protection in the agricultural community
- encouraged businesses and industries to develop best management practices for drinking water source protection
- developed strategies to incorporate drinking water source protection into teaching programs, and/or
- developed outreach strategies encouraging local communities to support drinking water source protection initiatives.

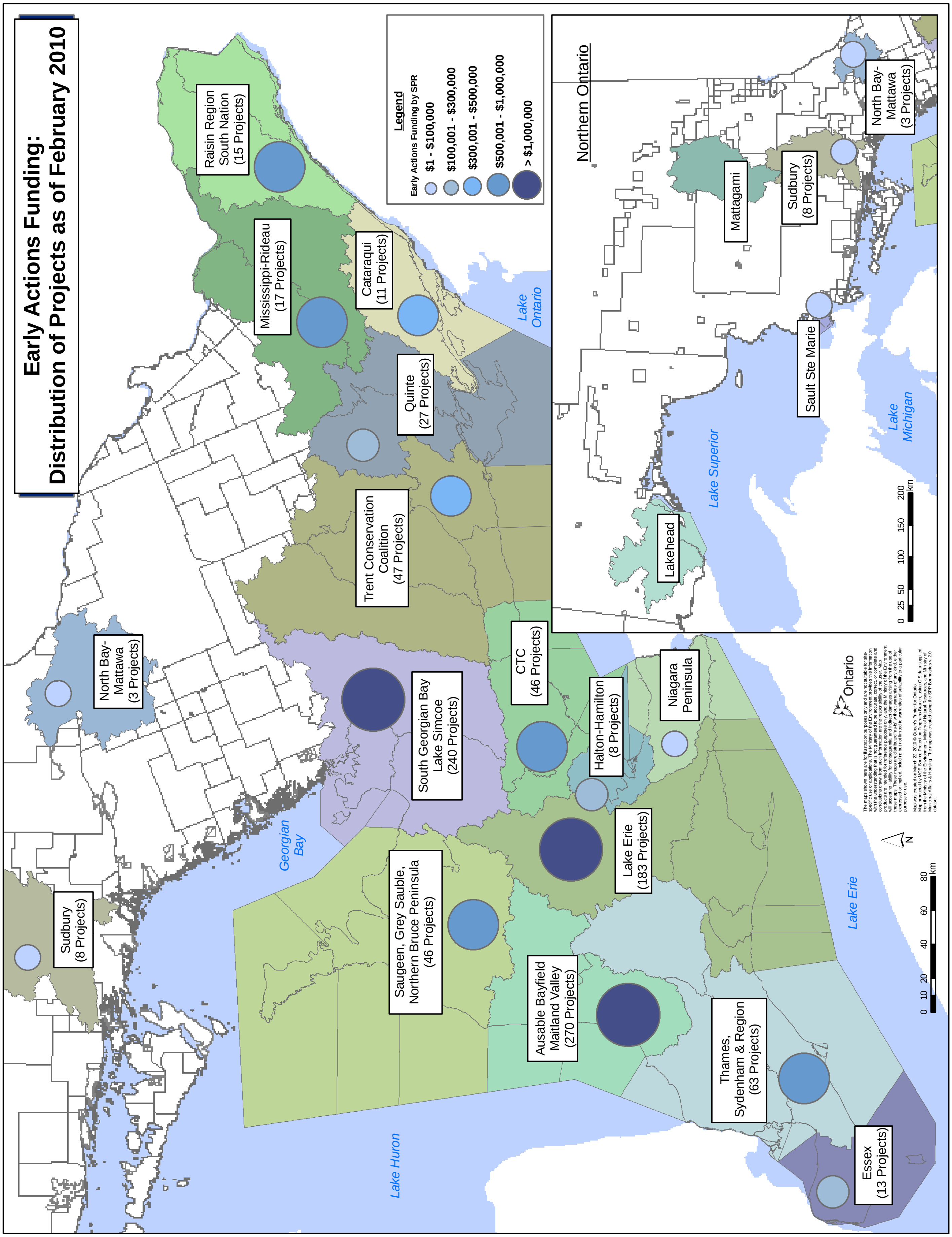
Special Projects funds activities that complement the Early Actions and Education and Outreach components.

Through this component, from 2007 to 2010 the ministry funded projects that supported the principles of the Clean Water Act and:

- illustrated a new or innovative approach to municipal drinking water source protection
- supported First Nations projects to protect municipal drinking water or First Nations communal drinking water sources, and/or
- protected municipal drinking water sources outside of source protection areas.

Visit www.ontario.ca/cleanwater for more information about the Ontario Drinking Water Stewardship Program and the Clean Water Act.

Please contact SourceProtectionFunding@ontario.ca for program details.



Early Actions Funding:
Distribution of Projects as of February 2010
Legend
Early Actions Funding by SPR
$1 - $100,000
$100,001 - $300,000
$300,001 - $500,000
$500,001 - $1,000,000
> $1,000,000
Raisin Region South Nation (15 Projects)
Mississippi-Rideau (17 Projects)
Cataraqui (11 Projects)
Quinte (27 Projects)
Trent Conservation Coalition (47 Projects)
North Bay-Mattawa (3 Projects)
South Georgian Bay Lake Simcoe (240 Projects)
CTC (46 Projects)
Halton-Hamilton (8 Projects)
Niagara Peninsula
Lake Erie (183 Projects)
Saugeen, Grey Sauble, Northern Bruce Peninsula (46 Projects)
Ausable Bayfield Maitland Valley (270 Projects)
Thames, Sydenham & Region (63 Projects)
Essex (13 Projects)
Sudbury (8 Projects)
Georgian Bay
Lake Huron
Lake Erie
Lake Ontario
Northern Ontario
Mattagami
Sault Ste Marie
Lakehead
Lake Superior
Lake Michigan
0 25 50 100 150 200 km
0 10 20 40 60 80 km
N
Ontario

4.0 Tritium

Date: **April 27, 2010**
To: **Mississippi-Rideau Source Protection Committee**
From: **Sommer Casgrain-Robertson, Co-Project Manager**
Mississippi – Rideau Source Protection Region

Recommendation 1

Whereas, the primary focus of Ontario's *Clean Water Act* is to ensure communities are able to protect their municipal drinking water supplies now and in the future from overuse and contamination.

Whereas, the Act requires municipalities, conservation authorities, First Nations, agriculture, business and industry, environmental groups, health units, government agencies, and local residents to work together to identify threats to source water and develop policies to address them.

Whereas, under the auspices of the Mississippi-Rideau Source Protection Committee, the draft Surface Water Vulnerability Studies (December 2009) for the two Intake Protection Zones on the Ottawa River for the City of Ottawa illustrate the potential for contamination of tritium from the AECL's Chalk River Laboratories (CRL) on the municipal source water for the City of Ottawa (serving over 814,000 people) as well as other municipalities, downstream of the CRL.

Whereas, although the Chalk River Laboratories is situated approximately 190 kilometres northwest of Ottawa and deemed to be beyond the jurisdictional boundaries of the Mississippi-Rideau Source Water Protection Region, the Committee recognizes the importance of mitigating this potential for contamination given that there is no treatment technology available to remove tritium at drinking water treatment plants, and the only approach to lower tritium levels in drinking water is to avoid contamination of the source water.

Therefore be it resolved that the Government of Canada, the Federal Minister of Health, the Federal Minister of Natural Resources, the Canadian Nuclear Safety Commission, AECL, and local area Members of Parliament be advised of the following:

1. The potential contamination of tritium from the AECL's Chalk River Laboratories and the impacts to municipal source water protection efforts for the City of Ottawa and other municipalities.
2. The potential impact of the Ontario Drinking Water Advisory Council's six recommendation to existing operational protocols at the AECL's Chalk River Laboratories given that there is no treatment technology available to remove tritium at drinking water treatment plants and the only approach to lower tritium levels in drinking water is to avoid contamination of the source water.

Recommendation 1 (continued)

Be it further resolved that the respective regulatory/governing agencies of AECL's Chalk River Laboratories be requested:

1. To work with the Mississippi-Rideau Source Protection Region, and partners, as part of the source protection planning process to develop policies, protocols and best management practices to protect the municipal source water quality of the Ottawa River.
2. To produce monthly reports of weekly test results for tritium and running annual averages and that these reports be sent to regulatory bodies, including the Ontario Ministry of the Environment, municipalities and health units located downstream of CRL, local public interest groups, and to make these reports available to the general public via a website.
3. To monitor trends in the monthly data and if there is an indication of increases (even if they are below the Standard), the province and the responsible federal agency should require AECL's Chalk River Laboratories to take appropriate corrective actions, in collaboration with other appropriate authorities.
4. That monitoring and reporting at the point of discharge should be the focus for emergency response in that monitoring at drinking water treatment plants is not an appropriate approach for alerting authorities and the public of significant and / or elevated discharges of tritium. And, that the current program should be enhanced to require AECL's Chalk River Laboratories to report monthly to regulatory authorities and other public bodies on the levels of tritium discharges and immediately in each case where discharges exceed designated notification level(s).
5. To speak to the Mississippi-Rideau Source Protection Committee about their current regulatory/governing framework with regards to minimizing tritium releases as well as efforts underway to further align operational practices with the recommendations of the Ontario Drinking Water Advisory Council.

And, be it further resolved, that this motion be circulated to our neighbouring source protection region, Raisin-South Nation and other municipalities within the Ottawa watershed for further consideration and endorsement.

Recommendation 2

Whereas, the primary focus of Ontario's *Clean Water Act* is to ensure communities are able to protect their municipal drinking water supplies now and in the future from overuse and contamination.

Whereas, the Act requires municipalities, conservation authorities, First Nations, agriculture, business and industry, environmental groups, health units, government agencies, and local residents to work together to identify threats to source water and develop policies to address them.

Recommendation 2 (continued)

Whereas, under the auspices of the Mississippi-Rideau Source Protection Committee (the Committee), the draft Surface Water Vulnerability Studies (December 2009) for the two Intake Protection Zones on the Ottawa River for the City of Ottawa illustrate the potential for contamination of tritium from the AECL's Chalk River Laboratories (CRL) on the municipal source water for the City of Ottawa (serving over 814,000 people) as well as other municipalities, downstream of the CRL.

Whereas, the measured tritium levels in the City of Ottawa's drinking water are consistently well below the most stringent established health standards, including Ontario's health standards as well as other standards outside of Canada (see attached memos dated 5 March 2009 and 19 November 2009).

Whereas, even though the AECL's Chalk River Laboratories are outside of the jurisdictional boundaries of the Mississippi-Rideau Source Protection Region, the Committee is concerned with the potential for contamination, particularly given that there is no treatment technology available to remove tritium at drinking water treatment plants and the only approach to lower tritium levels in drinking water is to avoid contamination of the source water.

Whereas, on February 21, 2007, then Minister of the Environment Laurel Broten requested the Ontario Drinking Water Advisory Council (Advisory Council) to provide advice on the current Ontario Drinking Water Quality Standard (ODWQS) for tritium as a result of the issue being raised by the Medical Officer of Health for the City of Toronto.

Whereas, in undertaking its review on tritium, the Advisory Council established a working group comprised of members with knowledge of the issue and experience in radionuclide risk and regulation to assist the Council as a whole.

And whereas, the Advisory Council made the following six recommendations in their *Report and Advice on the Ontario Drinking Water Quality Standard for Tritium* to the Minister of Environment on May 21, 2009:

1. The Ontario Drinking Water Quality Standard for tritium should be revised to 20 Bq/L, recognizing that:

    - 20 Bq/L relates to heath effects from long-term, chronic exposure over a life time of exposure of 70 years;
    - 20 Bq/L is within the range of variations considered by the Council (7 Bq/L to 109 Bq/L), for a 10-6 risk level; and
    - 20 Bq/L, based on a running annual average, is achievable in drinking water, without significant cost to the nuclear power industry, according to the Canadian Nuclear Association.

2. The Standard of 20 Bq/L should be applied as the running average of the preceding 52 weekly composite samples. This running annual average is consistent with the current weekly sampling and reporting programs, and should also be used to generate monthly averages and identify trends.

Recommendation 2 (continued)

3. The current sampling and monitoring programs, as conducted by the Ministry of labour and the industry, are appropriate, and should continue. Sampling and reporting should only be required for those drinking water treatment plants that are in the proximity of or under the influence of sources of tritium. As well, the Ministry of the Environment should continue to monitor tritium at drinking water systems as part of the Drinking Water Surveillance Program (DWSP).

4. Monthly reports of weekly test results and running annual averages should be sent to regulatory bodies, local municipalities and health units, local public interest groups, and should also be made available to the general public.

5. To monitor trends in the monthly data and if there is an indication of increases (even if they are below the Standard), the province should require the discharger to take appropriate corrective actions, in collaboration with other appropriate authorities.

6. Monitoring and reporting at the point of discharge should be the focus for emergency response in that monitoring at drinking water treatment plants is not an appropriate approach for alerting authorities and the public of significant and / or elevated discharges of tritium. The current program should be enhanced to require the dischargers to report monthly to regulatory authorities and other public bodies on the levels of tritium discharges and immediately in each case where discharges exceed designated notification level(s).

Therefore be it resolved that the Mississippi-Rideau Source Protection Committee requests that the Minister of the Environment adopt the above-noted recommendations of the Ontario Drinking Water Advisory Council to strengthen the *Safe Drinking Water Act* as well as source water protection efforts currently underway across Ontario under the *Clean Water Act.*

And, be it further resolved, that this motion be circulated to all Source Protection Committees across Ontario for further consideration and endorsement.

Background

The Britannia and Lemieux Island Surface Water Vulnerability Study identified the Chalk River Laboratories had a tritium spill in 1988. The Committee raised questions about the Ontario Drinking Water Standard for Tritium (how it got established and how it gets reviewed) and how concerns regarding the Laboratories could be addressed. Chair Stavinga agreed to look into these concerns and prepare draft motions for the Committee's consideration.

Attachments:

- *Update on Radioactivity in Ottawa Drinking Water*, City of Ottawa Memo, March 5, 2009
- *Tritium Levels in Ottawa Drinking Water*, City of Ottawa Memo, November 19, 2009

MEMO / NOTE DE SERVICE

To / Destinataire	Mayor and Members of Council	File/N° de fichier:
From / Expéditeur	Director, Water and Wastewater Services Branch	
Subject / Objet	Update on Radioactivity in Ottawa Drinking Water	Date: 5 March 2009

Background

The City's drinking water continues to meet or be better than all federal guidelines and provincial standards for radiological parameters including tritium.

In recent months there has been increased media attention on the subject of radioactivity in the Ottawa River and potential effects on Ottawa's drinking water supply. Much of the focus has been on radioactive "leaks" from the Chalk River nuclear reactor and the public reporting of these events by the Canadian Nuclear Safety Commission. The City of Ottawa has received a number of public inquiries about the safety of our drinking water supply. This memo will provide an update on the City monitoring program and test results over the last eight years. *It is important to note that the drinking water supply remains safe and well within the standards for radioactive substances in drinking water established by Health Canada.*

Sources of Radioactive Substances

Radionuclides are found in the environment both as naturally occurring elements and as products and by-products of various nuclear technologies (e.g. medical isotopes, nuclear power). By far the greatest contribution to the average public radiation exposure comes from naturally occuring radioactive elements in the Earth's crust, and from radionuclides that originate in deep space. In fact, these natural sources contribute more than 98% of the average human radiation dose, not including individual medical exposures[1].

Radionuclides in Drinking Water

Typically, the contribution to total radiation exposure from drinking water is small and is largely due to naturally occurring radionuclides. However, the presence of nuclear power facilities or other nuclear industries within the watershed area means that there is the potential for release of artificial radionuclides as well.

[1] Guidelines for Canadian Drinking Water Quality (Health Canada) – Radiological Characteristics: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/radiological_characteristics/index-eng.php

The artificial radionuclides of greatest concern from a health perspective in terms of the potential for normal or accidental release from nuclear fuel industries into drinking water supplies are tritium, strontium-90, iodine-131, caesium-137 and radium-226. Average tritium concentrations in surface waters across Canada are on the order of 5 to 10 Bq/L (Becquerels per Litre), owing primarily to residual fallout from atmospheric weapons testing during the 1950's and 1960's.

In the case of the Ottawa River, there is potential for tritium releases resulting from operations at the Chalk River nuclear facility located upstream near Deep River, Ontario. Tritium (^{3}H) is a contaminant that cannot be removed through the drinking water treatment process. For these reasons, the City of Ottawa conducts extensive monitoring of river and treated water samples to ensure the safety of the drinking water supply.

Drinking Water Guidelines for Radionuclides

Health Canada (1995) has established safe drinking water guidelines for 14 natural and 64 artificial radionuclides, expressed as maximum acceptable concentrations in Bq/L. However, rather than test for all 78 radionuclides, drinking water quality is assessed through several "screening" tests that measure the aggregated radiation from alpha and beta particles. If the "screening" level is below the lowest radionuclide limit, then drinking water safety is inferred. If an exceedance is observed, then detailed analysis is carried out to determine the specific element present and to verify that the drinking water supply is safe for human consumption.

A revised guideline for radiological parameters is currently in preparation by Health Canada, and is expected to be posted over the next several months. In addition, the Ontario Drinking Water Advisory Council to the Ministry of Environment has reviewed the guideline for tritium in drinking water and is expected to post additional recommendations for monitoring and responding to tritium levels in drinking water. City staff will be reviewing these updated documents as they become available.

International Limits for Tritium in Drinking Water

The guidelines for radionuclides in drinking water adopted by the majority of the international community are based on international radiation protection methodologies and recommendations of the International Commission on Radiological Protection (ICRP) and the World Health Organization (WHO)[2]

The following is a table summarizing the limits for tritium in drinking water[3]:

[2] Standards and Guidelines for Tritium in Drinking Water, January 2008, Canadian Nuclear Safety Commission
[3] Current as of September 2007

Country / Organization	Tritium Limit for Drinking Water (Bq/L)
Canada (Ontario)	7,000
European Union	100[4]
Finland	30,000
Australia	76,103
Russia	7,700
Switzerland	10,000
United States	740
WHO	10,000

The City of Ottawa test results for tritium in drinking water average from 5 to 6 Bq/L. As seen from the above table, the City's drinking water is well below current limits for tritium. There are on-going discussions within the regulatory community to revise and likely lower the current limit for tritium in drinking water.

It is important to note that the tritium concentration in the City of Ottawa's drinking water is very low and we expect to meet future standards.

Ottawa's Monitoring Program

For Ottawa's drinking water supply, three radioactive parameters are monitored weekly, namely gross alpha, gross beta and tritium. Weekly test results give an adequate trend of river water quality since changes occur on a gradual basis over many weeks owing to the size and flowrate of the Ottawa River. It is worth noting that there are separate monitoring programs for each of the Lemieux Island and Britannia Water Purification Plants. The combined test results from the two sites give a more detailed picture of Ottawa River water quality.

As a matter of explanation, the gross alpha and gross beta tests are "screening level" tests that include all 78 potential radioactive parameters based on whether they emit alpha or beta particles as they decay. These screening levels have been set as the lowest level Maximum Acceptable Concentration (MAC) for all radionuclide parameters. Should the screening level be exceeded more detailed analyses are carried out to identify the specific individual radionuclide(s) that are causing the radioactivity.

Summary of Results 2000 - 2008

For the City of Ottawa's ongoing monitoring program, please refer to the attached table which summarizes the results observed from 2000 to 2008 for the three test parameters.

Over many years of monitoring, the results in the table demonstrate that the gross alpha and gross beta results have been safely within the prescribed screening levels. For this reason, it has not been necessary to carry out detailed analyses for the individual radionuclides.

[4] The EU does not use this number as a limit but rather a screening value to indicate the possible presence of other artificial radionuclides

For tritium, the measured levels are typically in the 5 to 6 Bq/L range. This level of tritium is comparable to background concentrations in most Canadian lakes and rivers. It is also well below the safe drinking water standard of 7000 Bq/L, established by Health Canada.

It is on the basis of these figures that we are able to state that the City's drinking water meets or is better than all radiological standards.

The ongoing weekly monitoring program for gross alpha, gross beta, and tritium will continue for both water treatment plants. Test results will continue to be reported publicly through annual Summary Reports to City Council with analytical summaries, including radiological results, posted on the City's Drinking Water website accessible at Ottawa.ca. In addition, City staff are working with the Canadian Nuclear Safety Commission to improve communication protocols and response procedures in the event of a spill.

If there are further questions or comments, please do not hesitate to contact the undersigned at ext. 22002.

Original Signed By

Dixon Weir, P.Eng.,
Director, Water and Wastewater Services Branch

Attach. (1)

cc: Executive Management Committee
Nancy Schepers, DCM, Infrastructure Services and Community Sustainability

Attachment 1

Summary of Radioactivity Results for City of Ottawa Raw and Treated Water
2000 - 2008

Lab Analysis by Radiation Protection Bureau (Health Canada) & DWSP Lab (Ontario Ministry of Environment)

YEAR		gross-Alpha (Bq/L)		gross-Beta (Bq/L)		Tritium (Bq/L)	
		Britannia	Lemieux	Britannia	Lemieux	Britannia	Lemieux
2000	Ave.	**< 0.04**	**< 0.04**	**0.04**	**0.04**	**< 5.0**	**< 5.0**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(<0.01 - 0.08)	(0.01 - 0.09)	(<5.0 - <5.0)	(<5.0 - <5.0)
	# of Tests	*N = 4*	*N = 2*	*N = 57*	*N = 53*	*N = 4*	*N = 2*
2001	Ave.	**< 0.04**	**< 0.04**	**0.04**	**0.04**	**< 5.0**	**< 5.0**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(<0.01 - 0.08)	(0.02 - 0.08)	(<5.0 - <5.0)	(<5.0 - <5.0)
	# of Tests	*N = 4*	*N = 4*	*N = 56*	*N = 56*	*N = 4*	*N = 4*
2002	Ave.	**< 0.04**	**< 0.04**	**0.04**	**0.05**	**< 5.0**	**< 5.0**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(0.01 - 0.10)	(0.02 - 0.13)	(<5.0 - <5.0)	(<5.0 - <5.0)
	# of Tests	*N = 2*	*N = 2*	*N = 54*	*N = 54*	*N = 2*	*N = 2*
2003	Ave.	**< 0.04**	**< 0.04**	**0.05**	**0.04**	**< 5.0**	**5.3**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(0.02 - 0.12)	(0.01 - 0.09)	(<5.0 - <5.0)	(5.0 - 6.0)
	# of Tests	*N = 2*	*N = 4*	*N = 44*	*N = 46*	*N = 2*	*N = 4*
2004	Ave.	**< 0.04**	**< 0.04**	**0.05**	**0.04**	**< 5.0**	**< 5.0**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(<0.01 - 0.20)	(<0.01 - 0.07)	(<5.0 - <5.0)	(<5.0 - <5.0)
	# of Tests	*N = 2*	*N = 2*	*N = 53*	*N = 53*	*N = 2*	*N = 2*
2005	Ave.		**< 0.04**	**0.04**	**0.04**		**5.4**
	Range	**N/A**	(<0.04 - <0.04)	(0.01 - 0.09)	(0.01 - 0.07)	**N/A**	(5.1 - <5.6)
	# of Tests		*N = 2*	*N = 51*	*N = 51*		*N = 2*
2006	Ave.	**< 0.04**	**< 0.04**	**0.04**	**0.04**	**6.1**	**6.6**
	Range	(<0.04 - <0.04)	(<0.04 - <0.04)	(0.02 - 0.06)	(0.02 - 0.07)	(8.4 - < 9.0)	(5.6 - 14.0)
	# of Tests	*N = 2*	*N = 2*	*N = 9*	*N = 10*	*N = 5*	*N = 5*
2007	Ave.	**0.01**	**0.02**	**0.04**	**0.04**	**< 5.0**	**< 5.0**
	Range	(<0.01 - 0.02)	(<0.01 -< 0.03)	(<0.01 - 0.07)	(<0.01 - 0.09)	(<5.0 - 21.3)	(<5.0 - 30.0)
	# of Tests	*N = 8*	*N = 9*	*N = 49*	*N = 47*	*N = 51*	*N = 52*
2008	Ave.	**0.01**	**0.01**	**0.05**	**0.04**	**5.3**	**4.9**
	Range	(<0.01 - 0.03)	(<0.01 - 0.03)	(<0.01 - 0.11)	(0.01 - 0.08)	(<5.0 - 22.8)	(<5.0 - 11.5)
	# of Tests	*N=45*	*N=52*	*N=45*	*N=52*	***n=44***	***n=52***
		gross-Alpha (Bq/L)		**gross-Beta (Bq/L)**		**Tritium (Bq/L)**	
Drinking water guidelines*		**0.10** (Bq/L)		**1.0** (Bq/L)		**7000** (Bq/L)	

*Guidelines for Canadian Drinking Water Quality - Health Canada

< means less than analytical detection limit

N/A - no data available

M E M O / N O T E D E S E R V I C E

To / Destinataire	Mayor and Members of Council	File/N° de fichier:
From / Expéditeur	General Manager, Environmental Services Department	
Subject / Objet	Tritium Levels in Ottawa Drinking Water	Date: 19 November 2009

The Sierra Club of Canada has prepared a report entitled "Tritium on Tap – Keep Radioactive Tritium out of our Drinking Water". In this report, the Sierra Club states that tritium released from the Chalk River nuclear facility is contaminating the Ottawa River and that our drinking water is contaminated.

We would like to reassure you that Ottawa's drinking water is safe to drink and well below the standards established by Health Canada for radioactive substances.

Each year we test our drinking water for over 300 different substances and we perform over 100,000 tests to ensure the safety of our drinking water. Tritium is tested weekly at each water treatment plant (Britannia and Lemieux Island) and we have not found any radioactive substance, including tritium, which tested above the established health standards for drinking water.

The following is a summary of tritium test results for drinking water for the past three (3) years. The current maximum allowable concentration in drinking water for Ontario is 7,000 Bq/L.

Year	Britannia	Lemieux Island
2009 to date (August 23)		
Average	**7.0 Bq/L**	**6.6 Bq/L**
Range	< 5.0 to 16.6 Bq/L	< 5.0 to 13 Bq/L
2008		
Average	**5.3 Bq/L**	**4.9 Bq/L**
Range	< 5.0 Bq/L to 22.8 Bq/L	< 5.0 Bq/L to 11.5 Bq/L
2007		
Average	**< 5.0 Bq/L**	**< 5.0 Bq/L**
Range	< 5.0 to 21.3 Bq/L	< 5.0 Bq/L to 30.0 Bq/L

It is on the basis of these results that we are able to state that the City's drinking water meets or is better than all radiological standards.

As a matter of comparison, the following table lists tritium limits for other countries and organizations:

Country / Organization	**Tritium Limit for Drinking Water (Bq/L)**
Canada (Ontario)	7,000
European Union	100[1]
Finland	30,000
Australia	76,103
Russia	7,700
Switzerland	10,000
United States	740
WHO	10,000

The above table indicates that, the measured tritium levels in Ottawa's drinking water are well below the most stringent established health standards.

We have also attached for your reference a memo that was circulated on March 5, 2009 to Mayor and Members of Council that provided an update on Radioactivity in Ottawa Drinking Water. This memo contains further technical information and details about tritium in drinking water and also contains a table of radiological test results from 2000 to 2008.

To summarize, Ottawa's drinking water remains safe to drink. Although tritium can be found in drinking water, the concentration remains well below Ontario health standards as well as other standards outside of Canada. We continue to test drinking water at both water treatment plants on a weekly basis for radiological substances and we continue to monitor new research information pertaining to radioactivity in drinking water.

If there are any questions or comments, please do not hesitate to contact Tammy Rose, Manager, Drinking Water Operations at Extension, #23931.

Original Signed By,

Dixon Weir, P.Eng.
General Manager, Environmental Services Department

Attach. 1

[1] The EU does not use this number as a limit but rather a screening value to indicate the possible presence of other artificial radionuclides

5.0 Rural Clean Water Programs

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Recommendation

1. That the Mississippi-Rideau Source Protection Committee approve the attached letter of support for local Rural Clean Water Programs and send it to the Ministers of the Environment; Agriculture, Food and Rural Affairs; and Health and Long-term Care.

Background

The Rideau Valley Rural Clean Water Program Steering Committee sent a letter to the Mississippi-Rideau Source Protection Committee (dated February 25, 2010) asking them to prepare a letter of support for local Rural Clean Water Programs.

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER
Mississippi-Rideau Source Protection Region
Mississippi Valley Conservation
RIDEAU VALLEY CONSERVATION AUTHORITY

The Honourable John Gerretsen
Minister of the Environment
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, ON M7A 2T5

May 7, 2010

Re: LETTER OF SUPPORT FOR RURAL CLEAN WATER PROGRAMS

Dear Minister Gerretsen,

On behalf of the Mississippi-Rideau Source Protection Committee we are writing to you to bring to your attention the important role that the Rideau Valley Rural Clean Water Program and the City of Ottawa Rural Clean Water Program provides in reaching out and building partnerships with property owners beyond those areas that are currently eligible for the Ontario Drinking Water Stewardship Program. The Mississippi-Rideau Source Protection Committee appreciates the collaborative nature of these programs both in the delivery of services through the Rideau Valley Conservation Authority, and in partnership with the Mississippi Valley Conservation and South Nation Conservation.

The key objectives of these programs are to protect water quality and reduce the likelihood of contaminants such as chemicals, pathogens, and nutrients from reaching surface and groundwater. These two programs also assist and educate rural landowners in the adoption of best management practices and other environmental stewardship practices on private property. Our Committee shares these objectives with the Rural Clean Water Programs through our municipal source water protection efforts under the *Clean Water Act*.

The Rural Clean Water Programs have a strong and successful track record of supporting hundreds of water quality protection projects, both on-farm and in the wider rural community. These programs provide critical support to property owners in their efforts to improve management plans, farm yard and manure storage works, upgrade and replace well and septic systems, as well as many other projects.

We recognize that the various projects delivered through the Rural Clean Water Programs are distinct from, yet complement our efforts under the Ontario Drinking Water Stewardship Program. We also appreciate the crucial role that the Rural Clean Water Programs are playing across our watershed, particularly given that the Ontario Drinking Water Stewardship Program is primarily focused on those properties located within municipal wellhead protection areas and intake protection zones.

Minister Gerretsen, we sincerely look forward to working with your Ministry and through our Committee to strengthen our partnerships with the Rural Clean Water Programs in the delivery of programs to protect our surface and groundwater resources.

Box 599, 3889 Rideau Valley Drive
Manotick, ON K4M 1A5
Telephone 613-692-3571
1-800-267-3504
Fax 613-692-0831

Sincerely,

Janet Stavinga
Chair, Mississippi-Rideau Source Protection Committee

cc: The Honourable Carol Mitchell
Minister of Agriculture, Food and Rural Affairs

The Honourable Deborah Matthews
Minister of Health and Long-Term Care

6.0 Community Outreach

Date: April 27, 2010
To: Mississippi-Rideau Source Protection Committee
From: Sommer Casgrain-Robertson, Co-Project Manager
Mississippi – Rideau Source Protection Region

Recommendation:

1. That the Mississippi-Rideau Source Protection Committee receive the following report for information.

Background
Staff and MRSPC members participate in many different community outreach activities that raise awareness and promote the source protection planning process. These activities include information booths at events, presentations at meetings and articles in newsletters and local papers. It is important that staff and members keep each other informed about the activities they are involved in so that we can coordinate our participation and prepare appropriate materials in advance. This includes coordinating with our neighbouring regions for meetings and events that cover Eastern Ontario.

Past Activities
Members & staff are asked to give a verbal update on any other activities that took place in the past month related to source protection.

1. *City of Ottawa – Conservation Authority Staff Info Exchange*
    - April 12, Ottawa (Sommer attended)
2. *MOE Chairs Conference Call*
    - April 12 (Brian and Chair Stavinga participated)
3. *Project Managers Conference Call*
    - April 14 (Sommer participated)
4. *Quebec-Ontario Ottawa River Meeting*
    - April 20, Ottawa (Sommer, Brian and Chair Stavinga presented)
5. *Mississippi Valley Source Protection Authority Meeting*
    - April 21, Almonte (Sommer presented)
6. *Rideau Valley Source Protection Authority Meeting*
    - April 22, Manotick (Sommer presented)
7. *2010 Ottawa Eco-Stewardship Fair*
    - April 24, Ottawa (Sommer had a booth)
8. *Perth Maplefest*
    - April 24, Perth (Friends of the Tay Watershed had a booth)
9. *Inland Surface Water Study Open Houses*
    - April 26 (Perth), April 27 (Smiths Falls), April 29 (Carleton Place)
    - Staff presented and Chair Stavinga and Members attended
10. *Huntley Centennial School "Coffee House"*
    - April 28, Carp (Patricia Larkin attending)

11. *Ontario Water Works Association/Ontario Municipal Water Association Joint Annual Conference & Trade Show*
    - May 3, Windsor (Chair Stavinga attended)
12. *Quarterly Chairs Meeting*
    - May 4, Windsor (Chair Stavinga attended)

Upcoming Activities

Members & staff are asked to give a verbal update about any other activities they know about in the coming months related to source protection.

None to report