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Table 5-1

**Summary of Key Findings for HVA, SGRA, WHPAs - RVSPA
Mississippi - Rideau Source Protection Region**

HVA, SGRA, or WHPA	Number of Wells	Size of HVA, SGRA, or WHPA (km ²)	Area of WHPA where Potential Significant Threats (not including DNAPL zone) may be present (km ²)	Area of WHPA where Potential Significant Threats (including DNAPL zone) may be present (km ²)	Number of Potential Significant Threats	Number of Issues	Number of Conditions
Highly Vulnerable Aquifers (HVA)	Not Applicable	3631	0	0	0	1	0
Significant Groundwater Recharge Areas (SGRA)	Not Applicable	721	0	0	0		0
Kemptville WHPA*	5	575.6	0.16	92.6	105	0	0
Merrickville WHPA	3	182.6	0.04	32.6	24	0	0
Munster WHPA**	2	28.7	1.8	22.9	39	0	0
Richmond - King's Park WHPA****	2	27.5	0.17	15.9	23	0	0
Richmond-Western Development Lands*****	2	88.6	0.04	45.7	2	0	0
Westport WHPA***	2	3	0.6	0.9	51	0	0
TOTALS	16	5258	2.8	210.6	244	1	0

* Approx. 1.7 km² of the Kemptville WHPA extends into the South Natiion Source Protection Area

** Approx. 1.9 km² of the Munster WHPA extends into the Mississippi Valley Source Protection Area

*** Approx. 0.3 km² of the Westport WHPA extends into the Cataraqui Source Protection Area

**** Approx. 0.05 km² of the Richmond Kings Park WHPA extends into the Mississippi Valley Source Protection Area

***** Approx. 0.11km² of the Richmond Western Development Lands WHPA extends into the Mississippi Valley Source Protection Area

Total WHPA area for all WHPA in Rideau Valley Source Protection Area (km ²)	814.8
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Compiled from: MRSPR Groundwater Technical Reports (see Appendix A-1)

Table 5-2
Summary of Potentially Significant Threats for
Groundwater Based Municipal Drinking Water Systems - RVSPA
Mississippi - Rideau Source Protection Region

Prescribed Drinking Water Threat		Threat Sub Category	Total Significant Threats Count for each Threat Subcategory
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	Application Of Untreated Septage To Land	0
		Storage, Treatment And Discharge Of Tailings From Mines	0
		Waste Disposal Site - Landfarming Of Petroleum Refining Waste	0
		Waste Disposal Site - Landfilling (Hazardous Waste)	0
		Waste Disposal Site - Landfilling (Municipal Waste)	0
		Waste Disposal Site - Landfilling (Solid Non Hazardous Industrial or Commercial)	0
		Waste Disposal Site - Liquid Industrial Waste Injection into a well	0
		Waste Disposal Site - PCB Waste Storage	0
		Waste Disposal Site - Storage Of Hazardous Waste At Disposal Sites	0
		Waste Disposal Site - Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Combined Sewer discharge from a stormwater outlet to surface water	0
		Sewage System Or Sewage Works - Discharge Of Untreated Stormwater From A Stormwater Retention Pond	0
		Sewage System Or Sewage Works - Industrial Effluent Discharges	0
		Sewage System Or Sewage Works - Sanitary Sewers and related pipes	49
		Sewage System Or Sewage Works - Septic System	0
		Sewage System Or Sewage Works - Septic System Holding Tank	0
		Sewage System Or Sewage Works - Sewage treatment plant bypass discharge to surface water	0
		Sewage System Or Sewage Works - Sewage Treatment Plant Effluent Discharges (Includes Lagoons)	0
		Sewage System Or Sewage Works - Storage Of Sewage (E.G. Treatment Plant Tanks)	1
3	The application of agricultural source material to land.	Application Of Agricultural Source Material (ASM) To Land	3
4	The storage of agricultural source material.	Storage Of Agricultural Source Material (ASM)	0
5	The management of agricultural source material.	Management Of Agricultural Source Material - Aquaculture	0
6	The application of non-agricultural source material to land.	Application Of Non-Agricultural Source Material (NASM) To Land (Including Treated Septage)	0
7	The handling and storage of non-agricultural source material.	Storage Of Non-Agricultural Source Material (NASM)	0
8	The application of commercial fertilizer to land.	Application Of Commercial Fertilizer To Land	0
9	The handling and storage of commercial fertilizer.	Storage Of Commercial Fertilizer	1
10	The application of pesticide to land.	Application Of Pesticide To Land	3
11	The handling and storage of pesticide.	Storage Of A Pesticide	1
12	The application of road salt.	Application Of Road Salt	8
13	The handling and storage of road salt.	Storage Of Road Salt	0
14	The storage of snow.	Storage Of Snow	0
15	The handling and storage of fuel.	Handling Of Fuel	3
		Storage Of Fuel	475
16	The handling and storage of a dense non-aqueous phase liquid.	Handling Of A Dense Non Aqueous Phase Liquid (DNAPL)	12
		Storage Of A Dense Non Aqueous Phase Liquid (DNAPL)	12
17	The handling and storage of an organic solvent.	Storage Of An Organic Solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	Management Of Runoff Containing Chemicals Used In The De-Icing Of Aircrafts	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.		0
20	An activity that reduces the recharge of an aquifer.		0
21	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.	Management Or Handling Of Agricultural Source Material - Agricultural Source Material (ASM) Generation	0
		Management Or Handling Of Agricultural Source Material - Agricultural Source Material (ASM) Generation (Grazing and pasturing)	0
		Management Or Handling Of Agricultural Source Material - Agricultural Source Material (ASM) Generation (Yards or confinement)	0
Totals			568

Table 5-3

Summary of Non-Municipal Drinking Water Issues - MRSPR

Mississippi - Rideau Source Protection Region

NON-MUNICIPAL Drinking Water Issue	Contaminants	Activity	Reference Number	Circumstance
		From Provincial Threats Tables		
Beckwith Groundwater Contamination (MVSPA and RVSPA)	trichloroethylene, vinyl chloride and 1,1 dichloroethene	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	1660	1. The land disposal of municipal waste within the meaning of clauses (a) and (b) of the definition of land disposal in Section 1 of Regulation 347 (General – Waste Management) made under the Environmental Protection Act, is undertaken at the site. 2. The fill area is at least 1 but not more than 10 hectares. 3. A discharge from the area where the waste is disposed may result in the presence of Trichloroethylene or another DNAPL that could degrade to Trichloroethylene in groundwater or surface water.
		The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	1661	1. The land disposal of municipal waste within the meaning of clauses (a) and (b) of the definition of land disposal in Section 1 of Regulation 347 (General – Waste Management) made under the Environmental Protection Act, is undertaken at the site. 2. The fill area is at least 1 but not more than 10 hectares. 3. A discharge from the area where the waste is disposed may result in the presence of vinyl chloride or another DNAPL that could degrade to vinyl chloride in groundwater or surface water.
Crotch Lake Elevated Uranium (MVSPA)	uranium	Not Applicable because naturally occurring		
Village of Constance Groundwater Contamination (MVSPA)	nitrate	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	698	1. The system is an earth pit privy, privy vault, greywater system, cesspool, or a leaching bed system and its associated treatment unit. 2. The system is subject to the Ontario Building Code Act, 1992. 3. The discharge from the system may result in the presence of Nitrogen in groundwater or surface water.
Village of Lanark Groundwater Contamination (MVSPA)	nitrate and bacteriological parameters	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	698	1. The system is an earth pit privy, privy vault, greywater system, cesspool, or a leaching bed system and its associated treatment unit. 2. The system is subject to the Ontario Building Code Act, 1992. 3. The discharge from the system may result in the presence of Nitrogen in groundwater or surface water.
		The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1956	1. The system is an earth pit privy, privy vault, greywater system, cesspool, or a leaching bed system and its associated treatment unit and is a sewage system as defined in section 1 of O.Reg. 350/06 (Building Code) made under the Building Code Act, 1992 or a sewage works as defined in Section 1 of the Ontario Water Resources Act. 2. A discharge from the system may result in the presence of one or more pathogens in groundwater or surface water
Cranberry Estates Groundwater Contamination (RVSPA)	nitrate and bacteriological parameters	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	698	1. The system is an earth pit privy, privy vault, greywater system, cesspool, or a leaching bed system and its associated treatment unit. 2. The system is subject to the Ontario Building Code Act, 1992. 3. The discharge from the system may result in the presence of Nitrogen in groundwater or surface water.
		The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1956	1. The system is an earth pit privy, privy vault, greywater system, cesspool, or a leaching bed system and its associated treatment unit and is a sewage system as defined in section 1 of O.Reg. 350/06 (Building Code) made under the Building Code Act, 1992 or a sewage works as defined in Section 1 of the Ontario Water Resources Act. 2. A discharge from the system may result in the presence of one or more pathogens in groundwater or surface water

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

Table 5-4

Risk to Kemptville WHPAs Based on Managed Lands and Livestock Density Mississippi - Rideau Source Protection Region

WHPA Zone and Vul. Score	Percent Total	Risk for Over Application of	Livestock Density	Risk for Over Application of
Zone A (10)	45.79%	MODERATE	0.0	LOW
Zone B (8)	10.58%	LOW	0.0	LOW
Zone B (6)	45.32%	MODERATE	0.44	MODERATE
Zone C (6)	0.00%	LOW	0.0	LOW

Compiled from: BluMetric Environmental Revised Kemptville and Merrickville Groundwater Vulnerability, Threats Assessment, Managed Lands and Livestock Density Report

Table 5-5
Summary of Potentially Significant Threats to Kemptville Source Water
Mississippi - Rideau Source Protection Region

North Grenville

		Existing/Managed Threats					Removed Threats				
Land Use Activity	Land Use Activity	Electronic and Precision Equipment Repair and Maintenance	Residential Fuel / Hydracarbon Storage	Road Salt Application	Sewer Mainlines and Connections	Total	Other Ambulatory Health Care Services	Residential Fuel / Hydracarbon Storage	Dry Cleaning and Laundry Services	Other Wood Product Manufacturing	Total
Prescribed Drinking Water Threat	Threat Subcategory										
The application of road salt.	Application Of Road Salt			8		8					
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Sanitary Sewers and related pipes				3	3					
The handling and storage of a dense non-aqueous phase liquid.	Handling Of A Dense Non Aqueous Phase Liquid (DNAPL)	19				19			1	1	2
	Storage Of A Dense Non Aqueous Phase Liquid (DNAPL)	19				19			1	1	2
The handling and storage of fuel.	Handling Of Fuel					0	1				1
	Storage Of Fuel		1			1	1	77			78
	Total	38	1	8	3	50	2	77	2	2	83

Table 5-6

**Risk to Merrickville WHPAs Based on Managed Lands and Livestock Density
Mississippi - Rideau Source Protection Region**

WHPA Zone and Vul. Score	Percent Total Managed Lands	Risk for Over Application of Nutrients	Livestock Density (NU/acre)	Risk for Over Application of ASM
Zone A (10)	21.60%	LOW	0.0	LOW
Zone B (6)	28.28%	LOW	0.5	LOW
Zone C (6)	0.00%	LOW	0.0	LOW
Zone D (6)	0.00%	LOW	0.0	LOW

Compiled from: BluMetric Environmental Revised Kemptville and Merrickville Groundwater Vulnerability, Threats Assessment, Managed Lands and Livestock Density Report

Table 5-7
Summary of Potentially Significant Threats to Merrickville Source Water
 Mississippi - Rideau Source Protection Region
 Merrickville-Wolford

Prescribed Drinking Water Threat	Threat Subcategory	Existing/Managed Threats			Removed Threats		
		Land Use Activity Electronic and Precision Equipment Repair and Maintenance	Sewer Mainlines and Connections	Total	Electronic and Precision Equipment Repair and Maintenance	Electric Power Generation, Transmission and Distribution	Residential Fuel / Hydrocarbon Storage
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Sanitary Sewers and related pipes		1	1			
The handling and storage of a dense non-aqueous phase liquid.	Handling Of A Dense Non Aqueous Phase Liquid (DNAPL)			0	2	1	3
	Storage Of A Dense Non Aqueous Phase Liquid (DNAPL)			0	2	1	3
The handling and storage of fuel.	Handling Of Fuel						
	Storage Of Fuel					21	21
	Total	0	1	1	4	2	27

Table 5-7-1**Risk to Munster WHPAs Based on Managed Lands and Livestock Density
Mississippi - Rideau Source Protection Region**

WHPA Zone and Vul. Score	Percent Total Managed Lands	Risk for Over Application of Nutrients	Livestock Density (NU/acre)	Risk for Over Application of ASM
Shallow WHPA				
Zone A #1 (10)	39.90%	LOW	0.0	LOW
Zone A #2 (10)	35.40%	LOW	0.0	LOW
Zone B (8)	73.40%	MODERATE	0.0	LOW
Zone B (10)	46.20%	MODERATE	0.0	LOW
Zone C (6)	82.70%	HIGH	0.0	LOW
Zone C (8)	63.90%	MODERATE	0.0	LOW
Zone D (6)	73.60%	MODERATE	0.0	LOW
Deep WHPA				
Zone A #1 (10)	39.90%	LOW	0.0	LOW
Zone A #2 (10)	35.40%	LOW	0.0	LOW
Zone B (6)	66.00%	MODERATE	0.2	LOW
Zone B (8)	20.50%	LOW	0.0	LOW
Zone C (4)	24.00%	LOW	0.0	LOW
Zone C (6)	21.90%	LOW	0.0	LOW
Zone D (2)	17.80%	LOW	0.0	LOW

Compiled from: Dillon Managed Lands and Livestock Density Technical Report

Table 5-7-2
Summary of Potentially Significant Threats to Munster Source Water
Mississippi - Rideau Source Protection Region

City of Ottawa

Prescribed Drinking Water Threat	Threat Subcategory	Land Use Activity			
		Residential Fuel / Hydrcarbon Storage	Sewage Treatment Facilities	Sewer Mainlines and Connections	Total
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Sanitary Sewers and related pipes			28	28
	Sewage System Or Sewage Works - Storage Of Sewage (E.G. Treatment Plant Tanks)		1		1
The handling and storage of fuel.	Storage Of Fuel	10			10
	Total	10	1	28	39

Table 5-7-3**Risk to King's Park WHPAs Based on Managed Lands and Livestock Density
Mississippi - Rideau Source Protection Region**

WHPA Zone and Vul. Score	Percent Total	Risk for Over Application of	Livestock Density	Risk for Over Application of
Shallow WHPA				
Zone A #1 (10)	66.90%	MODERATE	0.0	LOW
Zone A #2 (10)	53.70%	MODERATE	0.0	LOW
Zone B (8)	55.30%	MODERATE	0.0	LOW
Zone B (10)	51.30%	MODERATE	0.0	LOW
Zone C (6)	57.90%	MODERATE	0.0	LOW
Zone D (6)	41.40%	MODERATE	0.0	LOW
Deep WHPA				
Zone A #1 (10)	66.90%	MODERATE	0.0	LOW
Zone A #2 (10)	53.70%	MODERATE	0.0	LOW
Zone B (6)	70.60%	MODERATE	0.2	LOW
Zone C (4)	64.60%	MODERATE	N/A	N/A
Zone D (4)	0.00%	LOW	N/A	N/A
Zone D (2)	29.90%	LOW	N/A	N/A

Compiled from: Dillon Managed Lands and Livestock Density Technical Report

Notes: WHPA-A#1 (1 refers to northern WHPA-A
WHPA-A#2 (1 refers to southern WHPA-A

Table 5-7-4
Summary of Potentially Significant Threats to Richmond - King's Park Source Water
Mississippi - Rideau Source Protection Region

City of Ottawa

Prescribed Drinking Water Threat	Threat Subcategory	Land Use Activity			Total
		Residential Fuel / Hydrocarbon Storage	Sewer Mainlines and Connections	Automotive Servicing	
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Sanitary Sewers and related pipes		14		14
The handling and storage of a dense non-aqueous phase liquid.	Handling Of A Dense Non Aqueous Phase Liquid (DNAPL)			4	4
	Storage Of A Dense Non Aqueous Phase Liquid (DNAPL)			4	4
The handling and storage of fuel.	Storage Of Fuel	1			1
	Total	1	14	8	23

Table 5-7-5**Risk to Richmond West WHPAs Based on Managed Lands and Livestock Density
Mississippi - Rideau Source Protection Region**

WHPA Zone and	Percent Total	Risk for Over Application of Nutrients	Livestock Density	Risk for Over
Zone A (10)	91.30%	HIGH	0.0	LOW
Zone B (6)	46.90%	MODERATE	0.1	LOW
Zone C (6)	0.00%	LOW	0.0	LOW
Zone C (4)	44.50%	MODERATE	0.4	LOW
Zone D (4)	6.50%	LOW	0.0	LOW
Zone D (2)	47.00%	MODERATE	0.3	LOW

Compiled from: Dillon Managed Lands and Livestock Density Technical Report

Table 5-7-6

**Summary of Potentially Significant Threats to Richmond West Source Water
Mississippi - Rideau Source Protection Region**

City of Ottawa

Prescribed Drinking Water Threat	Threat Subcategory	Land Use Activity	Automotive Servicing	Total
The handling and storage of a dense non-aqueous phase liquid.	Handling Of A Dense Non Aqueous Phase Liquid (DNAPL)		1	1
	Storage Of A Dense Non Aqueous Phase Liquid (DNAPL)		1	1
	Total		2	2

5-7-7 Drinking Water Threats
Mississippi - Rideau Source Protection Region

Prescribed Drinking Water Threats Ontario Regulation 287/07 s.1.1 (1)		Land Use/Activity	Wellhead Protection Area (WHPA) Vulnerability Scoring											
			Chemical					Pathogen						
			10	8	6	4	2	10	8	6	4	2		
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	Landfills - active & closed; Hazardous Waste Disposal; Liquid Industrial Waste	✓	✓						✓				
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage Infrastructure; Septic Systems, etc.	✓	✓						✓				
3	The application of agricultural source material to land.	e.g. manure, whey, etc.	✓							✓				
4	The storage of agricultural source material.	e.g. manure, whey, etc.	✓							✓				
5	The management of agricultural source material.	aquaculture												
6	The application of non-agricultural source material to land.	Organic Soil Conditioning; Biosolids	✓							✓				
7	The handling and storage of non-agricultural source material.	Organic Soil Conditioning; Biosolids	✓							✓				
8	The application of commercial fertilizer to land.	Agriculture fertilizer	✓											
9	The handling and storage of commercial fertilizer.	General Fertilizer Storage	✓											
10	The application of pesticide to land.	Pesticides	✓											
11	The handling and storage of pesticide.	General Pesticide Storage	✓											
12	The application of road salt.	Road Salt Application	✓											
13	The handling and storage of road salt.	Road Salt Storage	✓											
14	The storage of snow.	Snow Dumps	✓											
15	The handling and storage of fuel.	Petroleum Hydrocarbons	✓											
16	The handling and storage of a dense non-aqueous phase liquid (DNAPLs)*.	DNAPLs								Anywhere in 5 year time of travel				
17	The handling and storage of an organic solvent.	Organic Solvents	✓											
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	De-Icing	✓											
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.**	Private Water Taking												
20	An activity that reduces the recharge of an aquifer.**	Impervious Surfaces												
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.	Agriculture Operations	✓							✓				
22	The establishment and operation of a liquid hydrocarbon pipeline.	Liquid Hydrocarbon Pipeline	✓											

*DNAPLs are chemicals that are heavy and sink in water (e.g. trichloroethylene)

Table 5-12**Risk to Westport WHPAs Based on Managed Lands and Livestock Density
Mississippi - Rideau Source Protection Region**

WHPA Zone and Vul. Score	Percent Total Managed Lands	Risk for Over Application of Nutrients	Livestock Density (NU/acre)	Risk for Over Application of ASM
Zone A (10)	47.6	MODERATE	0.00	LOW
Zone B (8)	33.6	LOW	0.37	LOW
Zone B (10)	23.6	LOW	0.61	MODERATE
Zone C (6)	22.7	LOW	0.66	MODERATE
Zone C (8)	19.8	LOW	0.38	LOW
Zone D (6)	33.1	LOW	0.15	LOW

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

Table 5-13
Summary of Potentially Significant Threats to Westport Source Water
Mississippi - Rideau Source Protection Region

Westport

		Vulnerability Score				10
Prescribed Drinking Water Threat	Threat Subcategory	Land Use Activity				Total
		Other Crop Farming	Rail Transportation	Residential Fuel / Hydrcarbon Storage	Sewer Mainlines and Connections	
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Sewage System Or Sewage Works - Sanitary Sewers and related pipes				4	4
The handling and storage of commercial fertilizer.	Storage Of Commercial Fertilizer	1				1
The handling and storage of fuel.	Handling Of Fuel	1				1
	Storage Of Fuel	1	1	42		44
The handling and storage of pesticide.	Storage Of A Pesticide	1				1
Total		4	1	42	4	51