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**Table 9-1**

**Lower/Single Tier Municipalities located in Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas**  
Mississippi - Rideau Source Protection Region

Municipality	Highly Vulnerable Aquifer (HVA)	Significant Groundwater Recharge Area (SGRA)
Addington Highlands	✓	✓
Athens	✓	✓
Augusta	✓	✓
Beckwith	✓	✓
Carleton Place	✓	✓
Central Frontenac	✓	✓
Clarence – Rockland	✓	✓
Drummond/North Elmsley	✓	✓
Elizabethtown – Kitley	✓	✓
Greater Madawaska	✓	✓
Lanark Highlands	✓	✓
Merrickville – Wolford	✓	✓
Mississippi Mills	✓	✓
Montague	✓	✓
North Dundas	✓	✓
North Frontenac	✓	✓
North Grenville	✓	✓
Ottawa	✓	✓
Perth	✓	✓
Rideau Lakes	✓	✓
Smiths Falls	✓	✓
Tay Valley	✓	✓
Westport	✓	✓

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

**Table 9-2**  
**Summary of Key Findings for HVA, SGRA, WHPAs - MVSPA**  
**Mississippi-Rideau Source Protection Region**

HVA, SGRA, or WHPA	Number of Wells	Size of HVA, SGRA, or WHPA (km <sup>2</sup> )	Area of WHPA where Potential Significant Threats (not including DNAPL zone) may be present (km <sup>2</sup> )	Area of WHPA where Potential Significant Threats (including DNAPL zone) may be present (km <sup>2</sup> )	Number of Potential Significant Threats	Number of Issues	Number of Conditions
Highly Vulnerable Aquifers (HVA)	Not Applicable	4032	0	0	0	3	0
Significant Groundwater Recharge Areas (SGRA)	Not Applicable	413	0	0	0		0
Almonte Wellhead Protection Areas (WHPA)	5	18.9	1.4	8.0	93	0	0
Carp WHPA	2	5.7	0.7	1.0	137	0	1
Munster WHPA*	Not Applicable	1.5	0	0	Not Applicable	Not Applicable	Not Applicable
<b>TOTALS</b>	<b>7</b>		<b>2</b>	<b>9</b>	<b>230</b>	<b>3</b>	<b>1</b>

\* Munster WHPA originates in the Rideau Valley Source Protection Area

Total WHPA area for all WHPA in Mississippi Valley Source Protection Area (km <sup>2</sup> )	<b>26</b>
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Compiled from: MRSPR Groundwater Technical Reports (see Appendix A-1)

**Table 9-3****Lower/Single Tier Municipalities located in Wellhead Protection Areas - MVSPA****Mississippi - Rideau Source Protection Region**

Municipality	Almonte WHPA	Carp WHPA
Mississippi Mills	✓	
Ottawa	✓	✓

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

**Table 9-4****Summary of Potentially Significant Threats to Groundwater Based Municipal Drinking Water Systems - MVSPA**

Mississippi - Rideau Source Protection Region

**A) Significant Threats Count before Adjustment for Septic Systems and Residential Heating Oil Tanks**

System Name (Municipality)	Potential Significant Threats			Total
	Line	Point	Poly*	
Almonte (Mississippi Mills)	3	4	26	33
Carp (City of Ottawa)	2	7	8	17
<b>TOTAL</b>	<b>5</b>	<b>11</b>	<b>34</b>	<b>50</b>

[A]

**B) Significant Threats Count for Septic Systems and Residential Heating Oil Tanks**

\* Clusters of residential septic systems and residential fuel oil tanks in the significant threats inventory are grouped together and represented as polygons, as it is often difficult to determine the exact number of systems/oil tanks in an area. Each polygon is counted once in the inventory, but represents multiple potentially significant threats. Based on a review of the sanitary sewer information, the *approximate* number of septic systems for all the groundwater based municipal drinking water systems is provided below. A 'worst-case' estimate (assuming everyone uses a residential heating oil tank) is also provided below.

System Name (Municipality)	Number of Polygons with septic systems	Approximate Number of Septic Systems	Number of Polygons with residential heating oil tanks	Worst Case Estimate of residential heating oil tanks
Almonte (Mississippi Mills)	1	5	4	60
Carp (City of Ottawa)	0	0	2	122
<b>TOTAL</b>	<b>1</b>	<b>5</b>	<b>6</b>	<b>182</b>

[B]

[C]

[D]

[E]

**C) Final Significant Threats Count**

Total Number of Potential Significant Threats in the MRSPR	
Total number of significant threats (from above summary)	50
Total Approximate Septic Systems	5
Total Estimated heating oil tanks	182
Number of polys - septic systems	1
Number of polys - heating oil tanks	6
<b>TOTAL SIGNIFICANT THREATS COUNT</b>	<b>230</b>

[A]

[C]

[E]

[B]

[D]

A + C + E - B - D

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

**Table 9-5**  
**Summary of Potentially Significant Threats by Prescribed Drinking Water Threat Category for**  
**Groundwater Based Municipal Drinking Water Systems - MVSPA**  
**Mississippi Valley Source Protection Area**

Prescribed Drinking Water Threat Category		Mississippi Valley Source Protection Area
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	1
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	13
3	The application of agricultural source material to land.	3
4	The storage of agricultural source material.	0
5	The management of agricultural source material.	0
6	The application of non-agricultural source material to land.	0
7	The handling and storage of non-agricultural source material.	0
8	The application of commercial fertilizer to land.	3
9	The handling and storage of commercial fertilizer.	0
10	The application of pesticide to land.	3
11	The handling and storage of pesticide.	5
12	The application of road salt.	0
13	The handling and storage of road salt.	0
14	The storage of snow.	0
15	The handling and storage of fuel.	193
16	The handling and storage of a dense non-aqueous phase liquid (DNAPLS).	4
17	The handling and storage of an organic solvent.	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	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.	5
<b>Totals</b>		<b>230</b>

(1) Total Significant Threats Count for each Prescribed Drinking Water Threats with adjustments for Septic Systems and Heating Oil Tanks

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

**Table 9-6**  
**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 9-7**  
**Summary of Key Findings for Intake Protection Zones - MVSPA**  
**Mississippi - Rideau Source Protection Region**

Municipal Drinking Water System (Source Protection Area)	Number of Intakes	Size of IPZ (km <sup>2</sup> )		Vulnerability Scores	Area of IPZ where Potential Significant Threats may be present (km <sup>2</sup> )	Number of Potential Significant Threats (line, polygon or point)	Number of Issues	Number of Conditions
		IPZ-1	IPZ-2					
Carleton Place (MVSPA)	1	IPZ-1	0.10	10	7.92	20	0	0
		IPZ-2	3.85	9				
		IPZ-3	1551	4 to 8				
		Total IPZ	1555					
Britannia and Lemieux Island (Ottawa) (MVSPA)	N/A	IPZ-3	2567	3.6 to 7.2	0	0	0	0
		IPZ-3	2567	3.6 to 7.2				
Total					7.92	20	0	0

Total IPZ area for Carleton Place (km <sup>2</sup> )	1,555
Total IPZ area for Britannia and Lemieux Island within MVSPA (km <sup>2</sup> )	2,567
Total IPZ area for Mississippi Valley Source Protection Area (km <sup>2</sup> )	2,596

Notes: MVSPA - Mississippi Valley Source Protection Area  
RVSPA - Rideau Valley Source Protection Area

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



**Table 9-8**  
**Lower/Single Tier Municipalities located in Intake Protection Zones**  
**- MVSPA**  
**Mississippi - Rideau Source Protection Region**

Municipality	Intake Protection Zones	
	Carleton Place	Britannia and Lemieux Island (Ottawa)
Addington Highlands	✓	✓
Beckwith	✓	✓
Carleton Place	✓	✓
Central Frontenac	✓	✓
Drummond/North Elmsley	✓	✓
Greater Madawaska	✓	✓
Lanark Highlands	✓	✓
Mississippi Mills	✓	✓
North Frontenac	✓	✓
Ottawa		✓
Tay Valley	✓	✓

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

**Table 9-9****Summary of Vulnerability Scores for Municipal Surface Water Intakes - MVSPA  
Mississippi-Rideau Source Protection Region**

Zone	Area Vulnerability Factor (B) <i>Expressed as a whole number</i>			Source Vulnerability Factor  (C)	Vulnerability Score (V)  <i>Expressed to one decimal point or as whole number depending on the value of C</i>		
	IPZ-1	IPZ-2	IPZ-3		IPZ-1	IPZ-2	IPZ-3
<i>Possible Values</i>	10	7 to 9	1 to 9	0.9 or 1	9 or 10	6.3 to 9	0.9 to 9
<b>Carleton Place</b>	10	9	4 to 8	<b>1</b>	<b>10</b>	<b>9</b>	<b>4 to 8</b>
<b>Britannia</b>	10	9	4 to 8	<b>0.9</b>	<b>9</b>	<b>8.1</b>	<b>3.6 to 7.2</b>
<b>Lemieux Island</b>	10	9	4 to 8	<b>0.9</b>	<b>9</b>	<b>8.1</b>	<b>3.6 to 7.2</b>

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

**Table 9-10****Summary of Potential Significant Threats to Surface Water Based Municipal Drinking Water Systems - MVSPA****Mississippi - Rideau Source Protection Region**

System Name (Source Protection Area)	Potential Significant Threats			
	Line	Point	Poly	Total
Carleton Place (MVSPA)	0	1	19	<b>20</b>
Britannia (Ottawa) (MVSPA)	0	0	0	<b>0</b>
Lemieux Island (Ottawa) (MVSPA)	0	0	0	<b>0</b>
<b>TOTAL</b>	<b>0</b>	<b>1</b>	<b>19</b>	<b>20</b>

Notes: MVSPA - Mississippi Valley Source Protection Area  
RVSPA - Rideau Valley Source Protection Area

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

Table 9-11

**Summary of Potentially Significant Threats by Prescribed Drinking Water Threat Category for Surface Water Based Municipal Drinking Water Systems - MVSPA****Mississippi - Rideau Source Protection Region**

Prescribed Drinking Water Threat Category		Total Significant Threats Count for each Prescribed Drinking Water Threats in the Mississippi Valley Source Protection Area
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	0
3	The application of agricultural source material to land.	3
4	The storage of agricultural source material.	6
5	The management of agricultural source material.	0
6	The application of non-agricultural source material to land.	3
7	The handling and storage of non-agricultural source material.	0
8	The application of commercial fertilizer to land.	0
9	The handling and storage of commercial fertilizer.	0
10	The application of pesticide to land.	0
11	The handling and storage of pesticide.	1
12	The application of road salt.	0
13	The handling and storage of road salt.	0
14	The storage of snow.	0
15	The handling and storage of fuel.	1
16	The handling and storage of a dense non-aqueous phase liquid (DNAPLs).	0
17	The handling and storage of an organic solvent.	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	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.	6
<b>Totals</b>		<b>20</b>

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

Table 9-12

**Summary of Potentially Significant Threats by Prescribed Drinking Water Threat Category for Groundwater and Surface Water Based Municipal Drinking Water Systems - MVSPA  
Mississippi - Rideau Source Protection Region**

Prescribed Drinking Water Threat Category		Total Significant Threats Count for each Prescribed Drinking Water Threats in the Mississippi Valley Source Protection Area
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	1
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	13
3	The application of agricultural source material to land.	6
4	The storage of agricultural source material.	6
5	The management of agricultural source material.	0
6	The application of non-agricultural source material to land.	3
7	The handling and storage of non-agricultural source material.	0
8	The application of commercial fertilizer to land.	3
9	The handling and storage of commercial fertilizer.	0
10	The application of pesticide to land.	3
11	The handling and storage of pesticide.	6
12	The application of road salt.	0
13	The handling and storage of road salt.	0
14	The storage of snow.	0
15	The handling and storage of fuel.	194
16	The handling and storage of a dense non-aqueous phase liquid (DNAPLs).	4
17	The handling and storage of an organic solvent.	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	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.	11
<b>Totals</b>		250

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