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# Physical Characteristics of the Mississippi River

Mississippi - Rideau Source Protection Region

Characteristics	Size
Drainage Area	3,765 km2
Watershed Length	212 km
Upper Elevation	325 masl
Downstream Elevation	73 masl
Total Drop	252 m
Average Slope	0.1 %

Compiled from: MRSPR Watershed Characterization Technical Report

### Physical Characteristics of the Rideau River

Mississippi - Rideau Source Protection Region

Characteristics	Size
Drainage Area	3,849 km2
Watershed Length	160 km
Upper Elevation	163 masl
Downstream Elevation	40 masl
Total Drop	123 m
Average Slope	0.1 %

### Mississippi-Rideau Subwatersheds

Mississippi - Rideau Source Protection Region

Mississippi Valley Source Protection Area (MVSPA)	Ottawa (Source Protection Area)	Rideau Valley Source Protection Area (RVSPA)
Big Gull	Carp River (MVSPA)	Jock River
Buckshot Creek	Ottawa River (MVSPA)	Kemptville Creek
Clyde River	Ottawa River West (MVSPA)	Lower Rideau
CP Dam	Ottawa River East (RVSPA)	Middle Rideau
Fall River		Rideau Lakes
High Falls		Tay River
Indian River		
Lower Mississippi		
Mazinaw		
Upper Mississippi		

### Major Drainage Areas

Mississippi - Rideau Source Protection Region

<b>Conservation Authority</b>	Watershed	Subwatershed	Area (km2)
(Source Protection Area)	·		
MVC (MVSPA)	Mississippi River	Big Gull Lake	150
		Buckshot Creek	291
		Clyde River	663
		CP Dam	503
		Fall River	487
		High Falls	203
		Indian River	213
		Lower Mississippi	665
		Mazinaw Lake	357
		Upper Mississippi	233
		Sub-Total	3,765
	Carp River	Carp River	300
	Ottawa River	Tributaries	287
		Total	4,352
RVCA (RVSPA)	Rideau River	Jock River	569
		Kemptville Creek	451
		Lower Rideau	757
		Middle Rideau River	823
		Rideau Lakes	450
		Tay River	799
		Sub-Total	3,849
	Ottawa River	East Tributaries	263
		West Tributaries	122
		Total	4,234
MVC & RVCA		Total	8,585

#### Notes:

MVC - Mississippi Valley Conservation MVSPA - Mississippi Valley Source Protection Area RVCA - Rideau Valley Conservation Authority RVSPA – Rideau Valley Source Protection Area

## Summary of Soil Texture in the MRSPR

Mississippi - Rideau Source Protection Region

Soil Texture	Total Area (km2)	Percentage of MRSPR
Eroded	249	2.9%
Heavy Clay	78	0.9%
Loam	2,618	30.5%
Loamy Sand	3,510	40.9%
Silty Clay	485	5.6%
Silty Loam	112	1.3%
Sandy Loam	1,535	17.9%
Totals	8,585	100%

# **Physiographic Regions Descriptions**

Mississippi-Rideau Source Protection Area

Physiographic Region	Percent of MRSPR	Description
Algonquin Highlands	40%	Covers an area of 3,400 km2 in the MRSPR, and is characterized by shallow to non-existent acidic sandy or stony soils, underlain by Precambrian bedrock. Topographic elevations range from 470 masl to 102 masl (from west to east). The region is heavily forested, with bogs and swamps typically found in low-lying areas. This physiographic region characterizes much of the Canadian Shield.
Smiths Falls Limestone Plain	26%	Covers an area of 2,200 km2 in the MRSPR, and is characterized by poorly-drained, shallow soil over limestone or dolostone bedrock. The terrain is relatively flat, ranging from 165 masl in the southwest, to 85 masl near the City of Ottawa.
Ottawa Valley Clay Plains	17%	Covers an area of 1,500 km2 in the northern portion of the MRSPR, along the Ottawa River. Characterized by thick deposits of grey, silty clay interrupted by ridges of rock or sand. The terrain is flat, ranging from 160 masl to 40 masl, and is highly productive as agricultural land.
Georgian Bay Fringe	10%	Covers an area of 860 km2 in the westernmost portion of the MRSPR, and is characterized by very shallow soil and bare rock. Elevation ranges from 400 masl to 180 masl, and similarly to the Algonquin Highlands, is heavily forested.
Edwardsburg Sand Plain	3%	Covers an area of 270 km2 in a thin slice along the eastern edge of the MRSPR adjacent to the Smiths Falls Limestone Plain, and is characterized by glaciofluvial (deposited by glacial meltwater) sand deposits overlying bedrock, till or clay. Terrain is relatively flat, with sand ridges and moraines providing some relief.
North Gower Drumlin Field	3%	Covers small, localized areas within the southern portions of the City of Ottawa, totalling 250 km2. Characterized by a north-south oriented drumlinized till plain, with clay and silt deposits filling the land between the scattered drumlin formations. Terrain is undulating, ranging from 115 to 80 masl, with rounded drumlins protruding up to 30 m above the surrounding area.
Russell and Prescott Sand Plains	1%	Covers a small area at the northeastern boundary of the MRSPR totalling 80 km2, and is characterized by relatively thick sand deposit overlying red and grey clay. Terrain is flat, ranging from 115 to 90 masl, and the sands reach thicknesses between 3 to 10 m.

#### Wetlands

Mississippi - Rideau Source Protection Region

Wetland Type MVC (MVSPA)			RVCA (RVSPA)				
	Provincially Significant	Locally Significant	Not Significant	Provincially Significant	Locally Significant	Not Significant	Total (km2)
Bog	3.3	0.1		11.0			14.5
Fen	1.7	0.0		4.6	0.2		6.5
Marsh	28.2	3.2		49.2	3.8	0.5	84.8
Open Water	24.9	1.4		16.1	1.4		43.7
Swamp	97.1	12.2		279.1	21.4		409.8
Upland				0.0			0.0
Unclassified			0.3	20.4		3.6	24.3
Totals	155.2	17.0	0.3	380.5	26.7	4.1	583.7

#### Notes:

MVC - Mississippi Valley Conservation MVSPA - Mississippi Valley Source Protection Area RVCA – Rideau Valley Conservation Authority RVSPA - Rideau Valley Source Protection Area

### Species at Risk in the Rideau Valley Source Protection Area

Mississippi-Rideau Source Protection Region

Common Name	OMNR Status	Species Type
Bald Eagle	Endangered	Bird
Black Tern	Special Concern	Bird
Cerulean Warbler	Special Concern	Bird
Common Nighthawk*	Special Concern	Bird
Henslow's Sparrow	Endangered	Bird
Least Bittern	Threatened	Bird
Loggerhead Shrike	Endangered	Bird
Louisiana Waterthrush	Special Concern	Bird
Peregrine Falcon	Threatened	Bird
Whip-poor-will*	Threatened	Bird
Yellow Rail	Special Concern	Bird
Lake Sturgeon	Special Concern	Fish
Northern Brook Lamprey	Special Concern	Fish
American Eel*	Endangered	Fish
Common Gray Fox	Threatened	Mammal
American Ginseng	Endangered	Plant
Blunt-lobed Woodsia	Endangered	Plant
Butternut	Endangered	Plant
Eastern Prairie Fringed-Orchid*	Endangered	Plant
Flooded Jellyskin	Threatened	Plant
Blanding's Turtle	Threatened	Reptile
Eastern Musk Turtle	Threatened	Reptile
Eastern Ratsnake	Threatened	Reptile
Eastern Ribbonsnake	Special Concern	Reptile
Five-lined Skink	Special Concern	Reptile
Milksnake	Special Concern	Reptile
Northern Map Turtle	Special Concern	Reptile
Snapping Turtle	Special Concern	Reptile
Spotted Turtle	Endangered	Reptile
Wood Turtle	Endangered	Reptile

Notes: \* Updated December 2009, update source MNR

### Species at Risk in the Mississippi Valley Source Protection Area

Mississippi-Rideau Source Protection Region

Common Name	OMNR Status	Species Type
Black Tern	Special Concern	Bird
Common Nighthawk*	Special Concern	Bird
Least Bittern	Threatened	Bird
Loggerhead Shrike	Endangered	Bird
Peregrine Falcon	Threatened	Bird
Short-eared Owl	Special Concern	Bird
Whip-poor-will*	Threatened	Bird
Channel Darter*	Threatened	Fish
Lake Sturgeon	Special Concern	Fish
River Redhorse	Special Concern	Fish
American Eel	Endangered	Fish
Common Gray Fox	Threatened	Mammal
Rainbow Mussel*	Threatened	Mussel
American Ginseng	Endangered	Plant
Butternut	Endangered	Plant
Flooded Jellyskin	Threatened	Plant
Blanding's Turtle	Threatened	Reptile
Eastern Musk Turtle*	Threatened	Reptile
Eastern Ribbonsnake	Special Concern	Reptile
Five-lined Skink	Special Concern	Reptile
Milksnake	Special Concern	Reptile
Northern Map Turtle	Special Concern	Reptile
Snapping Turtle*	Special Concern	Reptile
Spotted Turtle	Endangered	Reptile
Wood Turtle	Endangered	Reptile

Notes: \* Updated December 2009, update source MNR

### Species at Risk Programs in the MRSPR

#### Mississippi-Rideau Source Protection Region

Program name	SAR targeted	Organization(s)	Description
American Eel Passage	American Eel	MVC, Queens, Plenty	Addressing migration barrier issues
		Canada	
Turtle inventory	SAR Turtles (Blandings, etc.)	MVC, Queens, Plenty	Turtle habitat ID in Mississippi watershed
		Canada	
Field Verification of Eastern Prairie Fringed-	Eastern Prairie Fringed-	Ottawa Stewardship	Habitat field verification of modelling
Orchid Habitat Modeling in Ottawa	Orchid, Spotted Turtle	Council	exercise.
Butternut recovery program	Butternut Tree	RVCA, Ottawa	Ongoing work to identify healthy seed
		Stewardship Counc	trees, etc.
Petrie Island Turtle Nesting Habitat Surveys	Northern Map Turtle,	Ottawa Stewardship	Survey of Nesting Turtles / Nesting Habitat
	Blandings Turtle, Musk Turtle	Council	on Petrie Island
	(Stinkpot)		
Petrie Island SAR Turtle Nesting Habitat	the 3 above-mentioned SAR	Ottawa Stewardship	Creation of an artificial nesting site
Project	turtles	Council	
Ottawa Chimney Swift Nesting Survey and	Chimney Swift	Ottawa Stewardship	Landscape Level Survey Planning
Public Outreach		Council	
Municipal Drains habitat assessment and	Aquatic species	RVCA	Review of drains as SAR habitat
protection			

#### Notes:

MVC - Mississippi Valley Conservation Authority RVCA - Rideau Valley Conservation Authority Queen's - Queen's University

#### Sources:

Mississippi Valley Conservation Rideau Valley Conservation Authority Ottawa Stewardship Council

# Surface Water - Water Quality Monitoring Programs

Mississippi - Rideau Source Protection Region

Water Source	Parameter	Parameter Parameter Class	Number of Locations Monitored				
	Class		MVC WW	Ottawa1	PWQ MN	RVCA SW	RVCA WW
	General						
Surface Water	Chemistry	Alkalinity		70	21	54	
		Ammonia (Total)		70	21	54	
		Ammonia (Unionized)		70			
		Biochemical Oxygen Demand					
		(5 day) - (BOD)			21		
		Chloride		70	21	54	
		Chlorophyll a	39				
		Conductivity		70	21	54	
		Dissolved Órganic Carbon -					
		(DOC)		70		54	41
		Dissolved Oxygen - (DO)	39	70	21	54	41
		Hardness		70	21		
		Nitrate + Nitrite		70	21		
		Nitrate				54	
		Nitrite			21	54	
		pH	39	70	21	54	
		Phosphorus (Reactive) - (RP)		70	21	54	
		Phosphorus (Total) - (TP)	39	70	21	54	41
		Secchi Disk	39	70			41
		Sulphate		70		54	
		Temperature	39	70	21	54	41
		Total Kjedahl Nitrogen - (TKN)		70	21	54	41
		Total Suspended Solids - (TSS)		70	21	54	
		Turbidity			21		
	Metals	Aluminum		70	21	54	
		Antimony		70	1	54	
		Barium		70	21	54	
		Beryllium		70	21	54	
		Bismuth		70	1	54	
		Cadmium		70	21	54	
		Calcium		70	21	54	
		Chromium		70	21	54	

Water	Parameter	Parameter	Numb	er of Locat	er of Locations Monitored				
Source	Class		MVC WW	Ottawa1	PWQ MN	RVCA SW	RVCA WW		
		Cobalt		70	21	54			
		Copper		70	21	54			
		Iron		70	21	54			
		Lead		70	21	54			
		Magnesium		70	21	54			
		Manganese		70	21	54			
		Molybdenum		70	21	54			
		Nickel		70	21	54			
	Metals	Potassium		70	21	54			
		Silicon		70		54			
		Silver		70					
		Sodium		70	21	54			
		Strontium		70	21	54			
		Thallium		70					
		Tin		70		54			
		Titanium		70	21	54			
		Uranium		70		54			
		Vanadium		70	21	54			
		Zinc		70	21	54			
	Biological	Escherichia Coli - (E. Coli)		70		54	41		
	Totals		6	45	36	41	7		

#### Notes:

MVC WW - Mississippi Valley Conservation - Watershed Watch Ottawa -

City of Ottawa – Surface Water Quality Monitoring

PWQMN - Provincial Water Quality Monitoring Network

RVCA SW - Rideau Valley Conservation Authority – Surface Water Quality Monitoring RVCA WW - Rideau Valley Conservation Authority - Watershed Watch

1 - Sample locations within the MRSPR only

## Groundwater Quality Exceedances in the MRSPR

Mississippi - Rideau Source Protection Region

Parameter	ODWQS Criteria	ODWSOG Criteria	ODWQS or ODWSOG Qualifier	No. of Exceedance Locations	No. of Samples	% of Exceedance
Inorganic Chemicals						
Chloride		250 mg/l	AO	95	3,517	3%
Fluoride	1.5 mg/l		MAC	6	489	1%
Nitrate	10 mg/L		MAC	72	3,235	2%
Sodium		200 mg/l	AO	51	738	7%
Metals						
Iron		0.3 mg/L	AO	264	824	32%
Aesthetics parameters						
Total Dissolved Solids		500mg/l	AO	103	374	28%
Hardness		80-100 mg/l	OG	851	875	97%
Sulphate		500 mg/l	AO	4	2,970	0%
Sulfide (H2S)		0.05 mg/l	AO	18	116	16%
Turbidity		5 NTU	AO	10	6,701	0%
pH		6.5-8.5	OG	36	2,937	1%
Alkalinity		30-500 mg/l	OG	7	356	2%
Dissolved Organic Carbon		5 mg/l	AO	8	136	6%
Microbiological Standards						
E. Coli	ND		MAC	204	7,624	3%
Total Coliform	ND		MAC	301	7,619	4%

### **Mississippi-Rideau Municipalities**

Mississippi - Rideau Source Protection Region

	on Upper / Single Tier Lower Tier Source Protection Area	
MVC/MVS	Frontenac, County of	North Frontenac Township
PA	Lanark County	Carleton Place, Town of
		Lanark Highlands, Township of
		Mississippi Mills, Town of
	Lennox & Addington, County of	Addington Highlands, Township of
	Renfrew, County of	Greater Madawaska, Township of
RVCA/MV	Frontenac, County of	South Frontenac, Township of
SPA	Lanark County	Montague, Township of
		Perth, Town of
	Leeds & Grenville, United Counties of	Athens, Township of
		Augusta, Township of
		Edwardsburg - Cardinal, Township of
		Elizabethtown - Kitley, Township of
		Merrickville - Wolford , Village of
		North Grenville, Municipality of
		Rideau Lakes, Township of
		Westport, Village of
	Prescott & Russell, United Counties of	Clarence - Rockland, City of
	Smiths Falls, Town of	
	Stormont, Dundas & Glengarry, United	North Dundas, Township of
	Counties of	
MVC &	Frontenac, County of	Central Frontenac Township
RVCA	Lanark County	Beckwith Township
MVSPA/R		Drummond/North Elmsley, Township of
VSPA		Tay Valley Township
	Ottawa, City of	

Notes: MVC - Mississippi Valley Conservation

MVSPA - Mississippi Valley Source Protection Area

RVCA - Rideau Valley Conservation Authority

**RVSPA - Rideau Valley Source Protection Area** 

### **Estimated Population Distribution**

Mississippi - Rideau Source Protection Region

Upper/Single Tier	Lower Tier	% Area in MRSPR	2006 Census Population	2006 Population in MRSPR1
Frontenac County	Central Frontenac Township	54	4,665	2,593
-	North Frontenac Township	71	1,904	1,543
	South Frontenac Township	13	18,227	801
Lanark County	Beckwith Township	100	6,387	6,387
-	Carleton Place, Town of	100	9,453	9,453
	Drummond/North Elmsley Township	100	7,118	7,118
	Lanark Highlands Township	91	5,180	4,924
	Mississippi Mills, Town of	89	11,734	11,254
	Montague Township	100	3,595	3,595
	Perth, Town of	100	5,907	5,907
	Tay Valley Township	100	5,634	5,634
Leeds&Grenville	Athens Township	4	3,086	43
County	Augusta Township	19	7,510	810
	Edwardsburg - Cardinal Township	1	6,689	5
	Elizabethtown - Kitley Township	61	10,201	3,742
	Merrickville-Wolford, Village of	100	2,867	2,867
	North Grenville Township	67	14,198	11,756
	Rideau Lakes Township	51	10,350	6,200
	Westport, Village of	100	645	645
Lennox & Addington County	Addington Highlands Township	21	2,512	362
Ottawa, City of	Ottawa, City of	73	812,129	770,006
Prescott and Russell County	Clarence-Rockland, City of	3	20,790	726
Smiths Falls, Town of	Smiths Falls, Town of	100	8,777	8,777
Stormount, Dundas &	North Dundas Township	1	11,095	134
Renfrew County	Greater Madawaska Township	3	2,751	106
Total		1	1	865,388

**Notes:** Population data collected from Statistics Canada 2006 Census by Dissemination Area 1 - Population data not for entire municipality % in MRSPR based on portion of the area within region.

### **Projected Population Distribution**

Mississippi - Rideau Source Protection Region

Upper/Single Tier Municipality	Total Population	Total Projected PopulationProjected PGrowth (%)				-		
	2001	2011	2021	2031	2011	2021	2031	
Frontenac County	138,606	158,600	172,800	184,200	14%	25%	33%	
Lanark County	62,495	72,900	80,400	85,600	17%	29%	37%	
Leeds&Grenville County	96,606	106,200	112,200	117,000	10%	16%	21%	
Lennox & Addington County	39,461	43,000	45,600	48,000	9%	16%	22%	
Ottawa, City of	774,072	904,900	1,014,100	1,116,700	17%	31%	44%	
Prescott and Russell County	76,446	89,100	96,700	102,200	17%	26%	34%	
Stormount, Dundas & Glengarry	109,522	119,500	124,100	127,900	9%	13%	17%	
Renfrew County	95,138	101,200	106,200	110,300	6%	12%	16%	
Average					12%	21%	28%	

**Notes:** Population data collected from Statistics Canada 2001 Census Projected population data collected from Ministry of Finance Projected population growth referenced to 2001 population data.

### Population of Municipal & Non-Municipal Water Serviced Areas

Mississippi - Rideau Source Protection Region

Upper/Single Tier	Lower Tier	Name of Municipal Water Service Area	Populatio n in MRSPR1	Municipally Serviced Population2, 3	Non-Municipally Serviced Population
Frontenac	Central Frontenac Township		2593		2593
County	North Frontenac Township		1543		1543
	South Frontenac Township		801		801
Lanark County	Beckwith Township		6387		6387
	Carleton Place, Town of		9,453	9,453	
	Drummond / North Elmsley		7,118		7,118
	Lanark Highlands Township		4924		4924
	Mississippi Mills, Town of		11,254		6,595
		Almonte		4,659	
	Montague Township		3595		3,035
		Adirondo		560	
	Perth, Town of	Perth	5,907	5,907	
	Tay Valley Township		5,634		5,634
Leeds&Grenville	Athens Township		43		43
County	Augusta Township		810		810
	Edwardsburg - Cardinal Township		5		5
	Elizabethtown - Kitley Township		3,742		3,742
	Merrickville-Wolford, Village of		2,867		1,766
		Merrickville		1,101	
	North Grenville Township		11,756		8,361
		Kemptville		3,395	
	Rideau Lakes Township		6200		6200
	Westport, Village of	Westport	645	645	
Lennox & Addington County	Addington Highlands		362		362
Ottawa, City of			770,006		74,352
		Urban Area4, 5	, í	695,654	
Prescott & Russell County	Clarence-Rockland, City of		726		726

Upper/Single Tier	Lower Tier	Name of Municipal Water	Populatio n in	Municipally Serviced	Non-Municipally Serviced
		Service Area	MRSPR1	Population2, 3	Population
Smiths Falls,		Smiths Falls	8,777	8,777	
Town of					
Stormont,	North Dundas Township		134		134
Dundas &					
Glengarr					
Renfrew County	Greater Madawaska Township		106		106
Totals			865,388	730,151	135,237

Notes:

- 1. Population data not for entire municipality, Stats Canada 2006 Census by Dissemination Area
- 2. Municipally serviced population data collected from Statistics Canada Municipal Water Use Database (MUD)
- 3. Population of entirely serviced municipalities adjusted to Stats Canada 2006 Census data
- 4. Urban Area of the City of Ottawa includes Barrhaven / Riverside South, Kanata / Stittsville, Orleans and Ottawa
- 5. Urban Area also includes municipal service areas of Carp, King's Park, Manotick and Munster

### **Details of Large Municipal Water Systems**

Mississippi - Rideau Source Protection Region

Facility	Permit Number	Drinking Water System Number	PTTW (m3/day)	5-year average (2000-2005) (m3/day)
MVSPA				
Almonte	8474-6MJR6X	200001290	6,895	1,831
Carleton Place	6882-686R5M	210000372	12,000	6,318
Carp	3630-62UPSJ	210002272	2,782	311
RVSPA Britannia	00-P-4139	220003154	360,000	171,968
Kemptville	97-P-4036 00-P-4138 01-P-4061	220001236	4,490	1,492
King's Park	6540-64UJKL	200007999	2,620	186
Lemieux Island	2642-642LKE	220003207	325,000	162,380
Merrickville	87-P-4101	220001227	4,295	515
Munster Hamlet	3876-6QBL9J	220008006	2,362	433
Perth	5464-6MHL84	220001272	9,092	4,833
Smiths Falls	88-P-4010	220001307	18,100	9,494
Westport	00-P-4134 0154-62QJ3N	210001004	1,750	365

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

### **Communal Wells and Designated Facilities in the MRSPR**

Mississippi - Rideau Source Protection Region

Municipality	Facility Type						
	Non- Municipal Seasonal Residential Supply (NMSRS)	Non- Municipal Year-Round Residential Supply (NMYRRS)	Large Non- Municipal Non- Residential Supply (LNMNRS)	Small Non- Municipal Non- Residential Supply (SNMNRS)	Large Municipal Non- Residential Supply (LMNRS)	Small Municipal Non- Residential Supply (SMNRS)	
Addington Highlands	2			12		2	
Athens				4		1	
Augusta							
Beckwith	1	2		2		1	
Carleton Place				3			
Central Frontenac	2		1	22		1	
Clarence-Rockland	2	3		5			
Drummond/North Elmsley	1	2		8			
Edwardsburgh - Cardinal	1			9	1	4	
Elizabethtown-Kitley			1	13		14	
Greater Madawaska	3	2	1	19		3	
Lanark Highlands	3	2		12		10	
Merrickville-Wolford				3		1	
Mississippi Mills	2	2		11		5	
Montague	1	1		4		2	
North Dundas		1		12		7	
North Frontenac	4		2	6		1	
North Grenville		1		10			
Ottawa Amalgamated	4	16	3	128	1	49	
Perth							
Rideau Lakes	6	4		29	1	17	
Smiths Falls				3			
South Frontenac	11	3		23	1	13	
Tay Valley	4		2	22			
Westport				1			
Totals	47	39	10	361	4	131	