

<b>List of Tables for Chapter 3</b>	
3-1	Hydrologic Data Sources for the Water Budgets
3-2	Average Annual and Monthly Flows in the Mississippi and Rideau Rivers
3-3	Combined Surface Water and Groundwater Takings for MVSPA, RVSPA
3-4	Long-term (1971-2000) Annual Water Budgets for the Mississippi River and Rideau Rivers and the MRSPR
3-5	Long-term (1971-2000) Annual Water Budgets for Tier 1 Subwatersheds
3-6	Growth Estimates Used to Evaluate Future Water Demands
3-7	Consumptive Factors Used for Each Water Taking Activity
3-8	Consumptive Demand for Surface Water in Tier 1 Subwatersheds
3-9	Consumptive Demand for Groundwater in Tier 1 Subwatersheds
3-10	Surface Water Supply and Reserve in Tier 1 Subwatersheds
3-11	Groundwater Supply and Reserve in Tier 1 Subwatersheds
3-12	Provincial Criteria for Tier 1 Subwatershed Stress Levels
3-13	Percent Water Demands and Subwatershed Stress Levels - Surface Water
3-14	Percent Water Demands and Subwatershed Stress Levels - Groundwater (Monthly)
3-15	Percent Water Demands and Subwatershed Stress Levels - Groundwater (Annual)
3-16	Tier 1 Subwatershed Stress Levels and Decisions for Tier 2

**Table 3-1**  
**Hydrologic Data Sources for the Water Budgets**

Mississippi-Rideau Source Protection Region

Component	Data Sources
Precipitation and Temperature	Environment Canada Great Lakes Forestry Study (McKenney et al., 2006)
Land Cover	Ministry of Natural Resources, Land Cover 28 (1991-1998)
Ground Slope	Ministry of Natural Resources (2006)
Surface Water Flows	Surface water flow gauges owned and/or operated by: Water Survey of Canada - Environment Canada. HYDAT Database. Parks Canada Ontario Power Generation Mississippi Valley Conservation An inventory of the surface water data and data infilling approaches can be found in Appendix 3-1 of the Tier 1 study (MRSR, 2009).
Evapotranspiration Derived Calculated	Derived with precipitation and surface water flow data ( $P - SWOUT$ )
	2. Calculated by Thornthwaite & Mather (1957) using: Precipitation and Temperature (same as above) Land Cover (same as above) Soils (same as above) Vegetative Root Depths (MOE, 2003)
Groundwater Recharge (MOEE 1995)	MOEE 1995 methodology was used based on: Precipitation (same as above) Evapotranspiration (calculated by Thornthwaite and Mather above) Infiltration factors were determined based on: Land Cover (same as above) Ground Slope (same as above) Soil Permeability (Ministry of Northern Development & Mines) Professional judgment was applied to alter infiltration factors to suit the MRSR.

Compiled from: Conceptual Water Budget Technical Report (see Appendix A-1)

**Table 3-2****Average Annual and Monthly Flows in the Mississippi and Rideau Rivers**

Mississippi-Rideau Source Protection Region

<b>Month</b>	<b>Mississippi River At Appleton [Gauge 02KA006] (m3/s)</b>	<b>Rideau River At Ottawa [Gauge 02LA00]) (m3/s)</b>
January	28.5	35.2
February	27.5	31.8
March	42.2	77.1
April	95.2	146
May	62.4	44.4
June	28.4	20.9
July	14.0	12.7
August	10.3	10.4
September	10.6	12.6
October	12.5	20.0
November	20.2	32.5
December	27.4	40.6
Annual	31.5	40.6
Period of Record	1918-2007	1933-2008
Data source: Water Survey of Canada (HYDAT database)		

Compiled from: Conceptual Water Budget Technical Report (see Appendix A-1)

**Table 3-3****Combined Surface Water and Groundwater Takings for MVSPA, RVSAP and MRSPR**

Mississippi-Rideau Source Protection Region

Water Taking		Mississippi SPA	Rideau SPA	MRSPR
Municipal (Million m <sup>3</sup> /year)		3.1	6.3	9.4
Private (Million m <sup>3</sup> /year)		3.1	6.1	9.2
Agriculture (Million m <sup>3</sup> /year)		2.2	1.0	3.2
PTTW (Million m <sup>3</sup> /year)	Commercial	224	22	246
	Construction	57	11	68
	Dewatering	1343	27	1370
	Industrial	40	2353	2393
	Miscellaneous	70	482	552
	Agricultural	83	0	84
	Institutional	8	0	8
	Recreational	1	23	24
	Remediation	6092	51	6143
	Water Supply	719	27	746
	Totals	8636	2997	11634

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-4****Long-term (1971-2000) Annual Water Budgets for the Mississippi River and Rideau Rivers and the MRSPR**

Mississippi-Rideau Source Protection Region

<b>Study Area (area, km<sup>2</sup>)</b>	<b>Precipitation (mm/year)</b>	<b>Surface Water Flow (mm/year)</b>	<b>Derived Evapotranspiration (mm/year)</b>
Mississippi River (4,352)	898	367	531
Rideau River (4,234)	926	365	561
MRSPR (8,585)	912	366	546
Derived Evapotranspiration = Precipitation – Surface Water Flow			

Compiled from: Conceptual Water Budget Technical Report (see Appendix A-1)

**Table 3-5****Long-term (1971-2000) Annual Water Budgets for Tier 1 Subwatersheds**

Mississippi-Rideau Source Protection Region

Tier 1 Subwatershed (upstream to downstream)	Tier 1 Water Budget Component (mm/year)				
	Gauge ID	P <sub>1</sub>	ET <sub>2</sub>	SWOUT <sub>3</sub>	Residual <sub>4</sub>
Mississippi Valley Source Protection Area					
Mississippi River Below Marble Lake	02KF016	919	540	420	-41
Mississippi River At High Falls	Generating Station	925	543	359	23
Clyde River Near Lanark	02KF010	889	549	357	-17
Fall River At Bennett Lake	02KF014/18	900	561	383	-44
Mississippi River At Fergusons Falls	02KF001	905	550	375	-20
Mississippi River At Appleton	02KF006	904	552	358	-6
Indian River At Blakeney	02KF012	876	560	330	-15
Mississippi River At Galetta	ungauged	898	555	331	12
Mississippi River (Outlet)	ungauged	898	555	331	12
Carp River At Kinburn	02KF011	902	571	326	5
Carp River (Outlet)	ungauged	896	571	344	-19
Ottawa MVC	ungauged	884	573	344	-33
Rideau Valley Source Protection Area					
Tay River at Perth	02LA024	906	567	355	-16
Rideau River Above Smiths Falls	02LA005	909	570	383	-44
Rideau River Below Merrickville	02LA011	914	574	375	-35
Kemptville Creek At Kemptville	02LA006	949	586	383	-20
Rideau River Below Manotick	02LA012	925	576	368	-19
Jock River Near Richmond	02LA007	917	575	386	-44
Rideau River At Ottawa	02LA004	924	576	367	-19
Rideau River (Outlet)	ungauged	924	575	367	-18
Ottawa RVCA (West)	ungauged	916	544	477	-105
Ottawa RVCA (East)	ungauged	941	560	409	-28

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

1. P – Average annual precipitation
2. ET – Average annual evapotranspiration calculated from Thornwaite and Mather (1957)
3. SW<sub>OUT</sub> – Average annual surface water flowing out of the subwatershed. An inventory of the surface water data and the methods used to fill gaps for the period of record (1971-2000) can be found in Appendix A-1 of the Tier 1 study (MRSPR, 2009).
4. The residual term accounts for data errors and uncertainty and other water uses. It is calculated as precipitation (P) minus evapotranspiration (ET) minus surface water out (SW<sub>OUT</sub>).

**Table 3-6****Growth Estimates Used to Evaluate Future Water Demands**

Mississippi-Rideau Source Protection Region

<b>Community</b>	<b>Growth Estimate</b>	<b>Source</b>
Carleton Place	49%	Carleton Place Director of Planning
Perth	86%	Official Plan Review (Tunnock Conslling Ltd., 2007)
Smiths Falls	37%	Official Plan (Delcan, 2007)
Carp	50%	Wastewater Infrastructure study (Stantec, 2007)
Almonte	30%	Official Plan
Kemptville	270%	Wastewater Master Plan (Stantec, 2005)
Munster and Kings Park	5%	Wellhead Protection Area Study (Golder, 2003)
Merrickville	60%	Official Plan (Delcan, 2004)
Westport	5%	Personal Communication
Lanark	0%	Water and Wastewater Environmental Study (Stantec, 2008)

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-7****Consumptive Factors Used For Each Water Taking Activity**

Mississippi-Rideau Source Protection Region

<b>Water Taking Activity</b>	<b>Consumptive Factor</b>
Municipal Water Use	0.2
Private Water Use	0.2
Camp Grounds	0.2
Agriculture	1
Irrigation	0.7
Pits and Quarries	0.25
Industrial Heating/Cooling	0.25
Food Processing	1
Groundwater Remediation	0.25

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-8**  
**Consumptive Demand for Surface Water in Tier 1 Subwatersheds**  
 Mississippi-Rideau Source Protection Region

Subwatershed	Surface Water - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mississippi Valley Source Protection Area												
Mississippi River Below Marble Lake												
PTTW	0.625	0.625	0.625	0.625	0.909	0.909	0.909	0.909	0.909	0.909	0.625	0.625
Agriculture	0.801	0.801	0.801	0.801	0.801	0.801	3.967	3.967	0.801	0.801	0.801	0.801
Total - Current	1.426	1.426	1.426	1.426	1.711	1.711	4.877	4.877	1.711	1.711	1.426	1.426
Total - Future	1.426	1.426	1.426	1.426	1.711	1.711	4.877	4.877	1.711	1.711	1.426	1.426
Mississippi River At High Falls												
PTTW	5.440	5.440	5.440	5.440	5.440	5.440	5.440	5.440	5.440	5.440	5.440	5.440
Agriculture	0.996	0.996	0.996	0.996	0.996	0.996	4.905	4.905	0.996	0.996	0.996	0.996
Total - Current	6.435	6.435	6.435	6.435	6.435	6.435	10.345	10.345	6.435	6.435	6.435	6.435
Total - Future	6.435	6.435	6.435	6.435	6.435	6.435	10.345	10.345	6.435	6.435	6.435	6.435
Clyde River At Lanark												
PTTW	15.046	15.046	15.046	15.046	15.046	15.046	15.046	19.803	15.046	15.046	15.046	15.046
Agriculture	0.462	0.462	0.462	0.462	0.462	0.462	4.451	4.451	0.462	0.462	0.462	0.462
Total - Current	15.509	15.509	15.509	15.509	15.509	15.509	19.498	24.254	15.509	15.509	15.509	15.509
Total - Future	15.509	15.509	15.509	15.509	15.509	15.509	19.498	24.254	15.509	15.509	15.509	15.509
Fall River At Bennett Lake												
PTTW	17.500	17.500	17.500	17.500	17.500	17.500	17.500	17.500	17.500	17.500	17.500	17.500
Agriculture	0.308	0.308	0.308	0.308	0.308	0.308	0.447	0.447	0.308	0.308	0.308	0.308
Total - Current	17.808	17.808	17.808	17.808	17.808	17.808	17.947	17.947	17.808	17.808	17.808	17.808
Total - Future	17.808	17.808	17.808	17.808	17.808	17.808	17.947	17.947	17.808	17.808	17.808	17.808
Mississippi River At Fergusons Falls												
PTTW	25.240	25.240	25.240	25.882	26.487	27.234	30.161	32.704	33.752	25.882	25.240	25.240
Agriculture	0.889	0.889	0.889	0.889	0.889	0.889	3.779	3.779	0.889	0.889	0.889	0.889
Total - Current	26.129	26.129	26.129	26.771	27.376	28.123	33.940	36.483	34.641	26.771	26.129	26.129
Total - Future	26.129	26.129	26.129	26.771	27.376	28.123	33.940	36.483	34.641	26.771	26.129	26.129
Mississippi River At Appleton												
Municipal - Current	15.020	14.777	14.164	14.617	14.186	15.134	16.826	15.653	14.417	14.121	14.390	14.835
Municipal - Future	22.453	22.088	21.172	21.849	21.206	22.622	25.151	23.398	21.550	21.108	21.510	22.175

Subwatershed	Surface Water - Consumptive Demand (m3/s x 1,000) (or L/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW	-	-	-	-	13.078	17.575	17.575	17.575	13.078	-	-	-
Agriculture	0.654	0.654	0.654	0.654	0.654	0.654	3.371	3.371	0.654	0.654	0.654	0.654
Total - Current	15.675	15.431	14.818	15.271	27.918	33.363	37.772	36.599	28.148	14.775	15.044	15.489
Total - Future	23.107	22.743	21.826	22.503	34.937	40.851	46.097	44.344	35.282	21.762	22.164	22.830
Indian River Near Blakeney												
PTTW	-	-	10.198	10.198	10.198	10.198	10.198	10.198	10.198	10.198	10.198	-
Agriculture	0.471	0.471	0.471	0.471	0.471	0.471	2.740	2.740	0.471	0.471	0.471	0.471
Total - Current	0.471	0.471	10.669	10.669	10.669	10.669	12.938	12.938	10.669	10.669	10.669	0.471
Total - Future	0.471	0.471	10.669	10.669	10.669	10.669	12.938	12.938	10.669	10.669	10.669	0.471
Mississippi River At Galetta												
PTTW	8,884.56	8,867.19	8,849.82	8,849.82	8,849.82	8,849.82	8,851.46	8,851.46	8,849.82	8,849.82	8,849.82	8,867.19
Agriculture	1.320	1.320	1.320	1.320	1.320	1.320	6.545	6.545	1.320	1.320	1.320	1.320
Total - Current	8,885.88	8,868.51	8,851.14	8,851.14	8,851.14	8,851.14	8,858.00	8,858.00	8,851.14	8,851.14	8,851.14	8,868.51
Total - Future	8,885.88	8,868.51	8,851.14	8,851.14	8,851.14	8,851.14	8,858.00	8,858.00	8,851.14	8,851.14	8,851.14	8,868.51
Mississippi River (Outlet)												
Agriculture	0.151	0.151	0.151	0.151	0.151	0.151	1.244	1.244	0.151	0.151	0.151	0.151
Total - Current	0.151	0.151	0.151	0.151	0.151	0.151	1.244	1.244	0.151	0.151	0.151	0.151
Total - Future	0.151	0.151	0.151	0.151	0.151	0.151	1.244	1.244	0.151	0.151	0.151	0.151
Carp River Near Kinburn												
PTTW	20.031	20.031	20.031	21.596	32.316	32.316	34.425	32.316	32.316	21.596	20.031	20.031
Agriculture	1.498	1.498	1.498	1.498	1.498	1.498	12.791	12.791	1.498	1.498	1.498	1.498
Total - Current	21.528	21.528	21.528	23.094	33.813	33.813	47.216	45.106	33.813	23.094	21.528	21.528
Total - Future	21.528	21.528	21.528	23.094	33.813	33.813	47.216	45.106	33.813	23.094	21.528	21.528
Carp River (Outlet)												
Agriculture	0.283	0.283	0.283	0.283	0.283	0.283	2.418	2.418	0.283	0.283	0.283	0.283
Total - Current	0.283	0.283	0.283	0.283	0.283	0.283	2.418	2.418	0.283	0.283	0.283	0.283
Total - Future	0.283	0.283	0.283	0.283	0.283	0.283	2.418	2.418	0.283	0.283	0.283	0.283
Ottawa MVC												
PTTW	-	-	-	-	-	23.325	23.325	23.325	23.325	-	-	-
Agriculture	1.647	1.647	1.647	1.647	1.647	1.647	14.061	14.061	1.647	1.647	1.647	1.647
Total - Current	1.647	1.647	1.647	1.647	1.647	24.972	37.387	37.387	24.972	1.647	1.647	1.647

Subwatershed	Surface Water - Consumptive Demand (m3/s x 1,000) (or L/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rideau Valley Source Protection Area												
Tay River At Perth												
Municipal - Current	10.589	11.017	10.909	10.453	11.132	11.446	12.745	13.388	12.754	11.68	10.66	10.288
Municipal - Future	19.663	20.458	20.256	19.411	20.672	21.253	23.667	24.859	23.683	21.689	19.794	19.104
PTTW	3.7649	4.4578	3.7588	4.3451	5.0095	8.9904	9.8259	8.7532	9.0587	4.9563	3.2014	2.8816
Agriculture	1.419	1.419	1.419	1.419	1.419	1.419	1.6855	1.6855	1.419	1.419	1.419	1.419
Total - Current	15.773	16.894	16.087	16.217	17.561	21.855	24.257	23.826	23.232	18.055	15.28	14.589
Total - Future	24.847	26.334	25.434	25.175	27.1	31.663	35.178	35.298	34.161	28.064	24.415	23.404
Rideau River Above Smiths Falls												
PTTW	-	-	-	-	-	1.199	1.199	1.199	1.199	-	-	-
Agriculture	1.860	1.860	1.860	1.860	1.860	1.860	2.197	2.197	1.860	1.860	1.860	1.860
Total - Current	1.860	1.860	1.860	1.860	1.860	3.058	3.396	3.396	3.058	1.860	1.860	1.860
Total - Future	1.860	1.860	1.860	1.860	1.860	3.058	3.396	3.396	3.058	1.860	1.860	1.860
Rideau River Below Merrickville												
Municipal - Current	21.678	22.778	23.185	21.108	21.415	21.704	22.407	22.905	22.067	20.534	20.296	20.416
Municipal - Future	29.629	31.132	31.689	28.850	29.269	29.665	30.626	31.306	30.161	28.065	27.739	27.904
PTTW	0.530	0.530	0.530	6.149	11.767	11.767	11.767	11.767	11.767	11.767	0.530	0.530
Agriculture	3.075	3.075	3.075	3.075	3.075	3.075	14.064	14.064	3.075	3.075	3.075	3.075
Total - Current	25.284	26.384	26.791	30.333	36.258	36.547	48.239	48.736	36.910	35.377	23.902	24.022
Total - Future	33.234	34.738	35.294	38.075	44.112	44.508	56.457	57.137	45.004	42.908	31.345	31.510
Kemptville Creek Near Kemptville												
Agriculture	1.638	1.638	1.638	1.638	1.638	1.638	9.2006	9.2006	1.638	1.638	1.638	1.638
Total - Current	1.638	1.638	1.638	1.638	1.638	1.638	9.2006	9.2006	1.638	1.638	1.638	1.638
Total - Future	1.638	1.638	1.638	1.638	1.638	1.638	9.2006	9.2006	1.638	1.638	1.638	1.638
Rideau River Below Manotick												
PTTW	-	-	-	47.864	288.846	290.476	298.370	306.154	298.370	112.643	-	-
Agriculture	3.500	3.500	3.500	3.500	3.500	3.500	25.457	25.457	3.500	3.500	3.500	3.500
Total - Current	3.500	3.500	3.500	51.364	292.346	293.976	323.827	331.611	301.870	116.144	3.500	3.500
Total - Future	3.500	3.500	3.500	51.364	292.346	293.976	323.827	331.611	301.870	116.144	3.500	3.500
Jock River Near Richmond												
PTTW	3.788	3.788	3.788	3.788	10.160	41.119	25.640	29.718	33.435	24.113	3.788	3.788
Agriculture	2.584	2.584	2.584	2.584	2.584	2.584	18.477	18.477	2.584	2.584	2.584	2.584
Total - Current	6.373	6.373	6.373	6.373	12.745	43.704	44.117	48.195	36.020	26.697	6.373	6.373
Total - Future	6.373	6.373	6.373	6.373	12.745	43.704	44.117	48.195	36.020	26.697	6.373	6.373

Subwatershed	Surface Water - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rideau River At Ottawa												
PTTW	509.685	509.685	509.685	535.548	538.650	566.600	567.982	567.982	591.861	538.650	509.685	509.685
Agriculture	0.628	0.628	0.628	0.628	0.628	0.628	4.387	4.387	0.628	0.628	0.628	0.628
Total - Current	510.313	510.313	510.313	536.176	539.278	567.228	572.370	572.370	592.489	539.278	510.313	510.313
Total - Future	510.313	510.313	510.313	536.176	539.278	567.228	572.370	572.370	592.489	539.278	510.313	510.313
Rideau River (Outlet)												
Agriculture	0.177	0.177	0.177	0.177	0.177	0.177	1.226	1.226	0.177	0.177	0.177	0.177
Total - Current	0.177	0.177	0.177	0.177	0.177	0.177	1.226	1.226	0.177	0.177	0.177	0.177
Total - Future	0.177	0.177	0.177	0.177	0.177	0.177	1.226	1.226	0.177	0.177	0.177	0.177
Ottawa RVCA (West)												
Agriculture	0.688	0.688	0.688	0.688	0.688	0.688	5.827	5.827	0.688	0.688	0.688	0.688
Total - Current	0.688	0.688	0.688	0.688	0.688	0.688	5.827	5.827	0.688	0.688	0.688	0.688
Total - Future	0.688	0.688	0.688	0.688	0.688	0.688	5.827	5.827	0.688	0.688	0.688	0.688
Ottawa RVCA (East)												
PTTW	-	-	-	-	7.858	7.858	7.858	14.501	7.858	7.858	-	-
Agriculture	0.100	0.100	0.100	0.100	0.100	0.100	0.837	0.837	0.100	0.100	0.100	0.100
Total - Current	0.100	0.100	0.100	0.100	7.959	7.959	8.696	15.338	7.959	7.959	0.100	0.100
Total - Future	0.100	0.100	0.100	0.100	7.959	7.959	8.696	15.338	7.959	7.959	0.100	0.100

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-9**  
**Consumptive Demand for Groundwater in Tier 1 Subwatersheds**

Mississippi-Rideau Source Protection Region

Sub-watershed	Groundwater - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual <sub>1</sub>
Mississippi Valley Source Protection Area													
Mississippi River Below Marble Lake													
PTTW	0.000	0.000	0.000	0.000	0.038	0.040	0.038	0.038	0.040	0.000	0.000	0.000	0.016
Agriculture	0.801	0.801	0.801	0.801	0.801	0.801	3.967	3.967	0.801	0.801	0.801	0.801	1.339
Private (150) <sub>2</sub>	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198
Total Current	0.999	0.999	0.999	0.999	1.037	1.039	4.203	4.203	1.039	0.999	0.999	0.999	1.553
Total Future	0.999	0.999	0.999	0.999	1.037	1.039	4.203	4.203	1.039	0.999	0.999	0.999	1.553
Mississippi River At High Falls													
PTTW	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083
Agriculture	0.996	0.996	0.996	0.996	0.996	0.996	4.905	4.905	0.996	0.996	0.996	0.996	1.660
Private (919)	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213	1.213
Total Current	2.292	2.292	2.292	2.292	2.292	2.292	6.201	6.201	2.292	2.292	2.292	2.292	2.956
Total Future	2.292	2.292	2.292	2.292	2.292	2.292	6.201	6.201	2.292	2.292	2.292	2.292	2.956
Clyde River Near Lanark													
Municipal – Current	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300
Municipal – Future	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300	11.300
Agriculture	0.462	0.462	0.462	0.462	0.462	0.462	4.451	4.451	0.462	0.462	0.462	0.462	1.140
Private (735)	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Total Current	12.732	12.732	12.732	12.732	12.732	12.732	16.721	16.721	12.732	12.732	12.732	12.732	13.410
Total Future	12.732	12.732	12.732	12.732	12.732	12.732	16.721	16.721	12.732	12.732	12.732	12.732	13.410

1. The annual demand was calculated by a weighted average of the monthly demands to account for the different number of days in each month.
2. Denotes the number of private wells in subwatershed

Sub-watershed	Groundwater - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual <sub>1</sub>
Fall River At Bennett Lake													
PTTW	0.000	0.000	0.000	0.201	0.201	0.201	0.201	0.201	0.000	0.000	0.000	0.000	0.084
Agriculture	0.308	0.308	0.308	0.308	0.308	0.308	0.447	0.447	0.308	0.308	0.308	0.308	0.332
Private (1061)	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Total Current	1.708	1.708	1.708	1.909	1.909	1.909	2.048	2.048	1.708	1.708	1.708	1.708	1.815
Total Future	1.708	1.708	1.708	1.909	1.909	1.909	2.048	2.048	1.708	1.708	1.708	1.708	1.815
Mississippi River At Fergusons Falls													
PTTW	23.119	23.161	23.119	23.132	23.119	23.132	23.119	23.119	23.132	23.119	23.132	23.119	23.127
Agriculture	0.889	0.889	0.889	0.889	0.889	0.889	3.779	3.779	0.889	0.889	0.889	0.889	1.380
Private (1535)	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025	2.025
Total Current	26.034	26.075	26.034	26.046	26.034	26.046	28.924	28.924	26.046	26.034	26.046	26.034	26.532
Total Future	26.034	26.075	26.034	26.046	26.034	26.046	28.924	28.924	26.046	26.034	26.046	26.034	26.532
Mississippi River At Appleton													
PTTW	0.823	0.823	0.823	0.823	0.988	2.594	2.537	2.537	2.594	0.823	0.823	0.823	1.418
Agriculture	0.654	0.654	0.654	0.654	0.654	0.654	3.371	3.371	0.654	0.654	0.654	0.654	1.116
Private (2206)	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911	2.911
Total Current	4.388	4.388	4.388	4.388	4.553	6.159	8.819	8.819	6.159	4.388	4.388	4.388	5.444
Total Future	4.388	4.388	4.388	4.388	4.553	6.159	8.819	8.819	6.159	4.388	4.388	4.388	5.444
Indian River Near Blakeney													
PTTW	7.504	8.309	7.504	7.755	7.504	7.755	7.504	7.504	7.755	7.504	7.755	7.504	7.655
Agriculture	0.471	0.471	0.471	0.471	0.471	0.471	2.740	2.740	0.471	0.471	0.471	0.471	0.857
Private (587)	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775
Total Current	8.750	9.554	8.750	9.000	8.750	9.000	11.019	11.019	9.000	8.750	9.000	8.750	9.286
Total Future	8.750	9.554	8.750	9.000	8.750	9.000	11.019	11.019	9.000	8.750	9.000	8.750	9.286
Mississippi River At Galetta													
Municipal - Current	21.244	25.609	26.899	26.473	21.989	21.690	22.971	19.826	21.306	22.548	23.824	25.274	23.285
Municipal - Future	27.617	33.292	34.968	34.415	28.586	28.197	29.863	25.773	27.697	29.313	30.971	32.856	30.271
PTTW	24.284	26.885	1.556	1.608	1.556	1.608	1.556	1.556	1.608	1.556	1.608	24.284	7.472
Agriculture	1.320	1.320	1.320	1.320	1.320	1.320	6.545	6.545	1.320	1.320	1.320	1.320	2.207
Private (2075)	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738	2.738
Total Current	49.585	56.552	32.512	32.138	27.603	27.355	33.811	30.665	26.971	28.162	29.489	53.615	35.702
Total Future	55.958	64.235	40.582	40.080	34.200	33.862	40.702	36.613	33.363	34.926	36.636	61.197	42.688
Mississippi River (Outlet)													
PTTW	1.167	1.292	1.167	1.206	1.167	1.206	1.167	1.167	1.206	1.167	1.206	1.167	1.190

Sub-watershed	Groundwater - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual <sub>1</sub>
Agriculture	0.151	0.151	0.151	0.151	0.151	0.151	1.244	1.244	0.151	0.151	0.151	0.151	0.337
Private (177)	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234
Total Current	1.551	1.676	1.551	1.590	1.551	1.590	2.645	2.645	1.590	1.551	1.590	1.551	1.761
Total Future	1.551	1.676	1.551	1.590	1.551	1.590	2.645	2.645	1.590	1.551	1.590	1.551	1.761
Carp River Near Kinburn													
Municipal – Current	11.793	11.768	11.373	12.816	15.665	15.769	16.333	15.062	13.885	11.307	11.213	10.624	13.142
Municipal – Future	17.689	17.652	17.060	19.224	23.498	23.654	24.499	22.594	20.827	16.960	16.820	15.936	19.713
PTTW	28.428	28.713	27.929	28.612	30.175	30.377	30.136	29.873	30.028	30.156	29.065	28.836	29.361
Agriculture	1.498	1.498	1.498	1.498	1.498	1.498	12.791	12.791	1.498	1.498	1.498	1.498	3.416
Private (2130)	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810	2.810
Total Current	44.528	44.789	43.610	45.736	50.148	50.455	62.070	60.537	48.221	45.771	44.586	43.768	48.729
Total Future	50.424	50.673	49.296	52.144	57.981	58.339	70.236	68.068	55.163	51.424	50.193	49.081	55.300
Carp River (Outlet)													
PTTW	0.000	0.000	0.000	0.251	0.251	0.251	0.251	0.251	0.251	0.000	0.000	0.000	0.126
Agriculture	0.283	0.283	0.283	0.283	0.283	0.283	2.418	2.418	0.283	0.283	0.283	0.283	0.646
Private (267)	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352	0.352
Total Current	0.635	0.635	0.635	0.887	0.887	0.887	3.022	3.022	0.887	0.635	0.635	0.635	1.124
Total Future	0.635	0.635	0.635	0.887	0.887	0.887	3.022	3.022	0.887	0.635	0.635	0.635	1.124
Ottawa MVC													
PTTW	14.525	14.811	14.525	14.614	14.525	81.545	80.587	80.587	81.545	14.525	14.614	14.525	36.744
Agriculture	1.647	1.647	1.647	1.647	1.647	1.647	14.061	14.061	1.647	1.647	1.647	1.647	3.755
Private (2641)	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485	3.485
Total Current	19.657	19.942	19.657	19.745	19.657	86.676	98.133	98.133	86.676	19.657	19.745	19.657	43.984
Total Future	19.657	19.942	19.657	19.745	19.657	86.676	98.133	98.133	86.676	19.657	19.745	19.657	43.984
Rideau Valley Source Protection Area													
Tay River At Perth													
PTTW	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733	3.733
Agriculture	1.419	1.419	1.419	1.419	1.419	1.419	1.686	1.686	1.419	1.419	1.419	1.419	1.464
Private (2397)	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163	3.163
Total - Current	8.315	8.315	8.315	8.315	8.315	8.315	8.582	8.582	8.315	8.315	8.315	8.315	8.360
Total - Future	8.315	8.315	8.315	8.315	8.315	8.315	8.582	8.582	8.315	8.315	8.315	8.315	8.360
Rideau River Above Smiths Falls													



Sub-watershed	Groundwater - Consumptive Demand (m <sup>3</sup> /s x 1,000) (or L/s)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual 1
(6861)													
Total Current	183.090	186.656	195.431	196.061	212.767	223.405	242.780	241.324	221.425	211.190	194.548	179.484	207.417
Total Future	216.580	220.365	229.060	228.251	244.707	257.211	274.363	270.432	251.867	240.449	224.163	206.844	238.761
Jock River Near Richmond													
Municipal -	22.568	23.249	23.805	27.773	30.099	28.788	28.960	28.933	29.124	28.651	25.434	26.959	27.051

Sub-watershed	Groundwater - Consumptive Demand (m3/s x 1,000) (or L/s)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual 1
Current													
Municipal - Future	23.696	24.411	24.995	29.161	31.604	30.227	30.408	30.379	30.580	30.084	26.705	28.307	28.404
PTTW	99.669	96.146	110.065	134.760	131.782	129.901	130.237	128.709	129.515	109.588	110.560	95.988	117.243
Agriculture	2.584	2.584	2.584	2.584	2.584	2.584	18.477	18.477	2.584	2.584	2.584	2.584	5.284
Private (3415)	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506	4.506
Total Current	129.327	126.485	140.960	169.623	168.971	165.779	182.181	180.624	165.730	145.330	143.084	130.037	154.085
Total Future	130.455	127.647	142.150	171.011	170.476	167.219	183.629	182.071	167.186	146.762	144.356	131.385	155.437
Rideau River At Ottawa													
PTTW	43.998	45.144	63.171	96.992	95.413	96.992	95.413	95.413	96.992	63.171	59.680	43.998	74.698
Agriculture	0.628	0.628	0.628	0.628	0.628	0.628	4.387	4.387	0.628	0.628	0.628	0.628	1.267
Private (2119)	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796	2.796
Total Current	47.422	48.568	66.595	100.415	98.837	100.415	102.597	102.597	100.415	66.595	63.104	47.422	78.761
Total Future	47.422	48.568	66.595	100.415	98.837	100.415	102.597	102.597	100.415	66.595	63.104	47.422	78.761
Rideau River (Outlet)													
PTTW	0.119	0.132	0.119	0.123	0.119	0.123	0.119	0.119	0.123	0.119	0.123	0.119	0.121
Agriculture	0.177	0.177	0.177	0.177	0.177	0.177	1.226	1.226	0.177	0.177	0.177	0.177	0.355
Private (544)	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718
Total Current	1.013	1.026	1.013	1.017	1.013	1.017	2.063	2.063	1.017	1.013	1.017	1.013	1.194
Total Future	1.013	1.026	1.013	1.017	1.013	1.017	2.063	2.063	1.017	1.013	1.017	1.013	1.194
Ottawa RVCA (West)													
PTTW	24.313	24.480	24.313	24.365	24.313	24.365	24.313	24.313	24.365	24.313	24.365	24.313	24.344
Agriculture	0.688	0.688	0.688	0.688	0.688	0.688	5.827	5.827	0.688	0.688	0.688	0.688	1.561
Private (2288)	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019	3.019
Total Current	28.020	28.188	28.020	28.072	28.020	28.072	33.158	33.158	28.072	28.020	28.072	28.020	28.924
Total Future	28.020	28.188	28.020	28.072	28.020	28.072	33.158	33.158	28.072	28.020	28.072	28.020	28.924
Ottawa RVCA (East)													
PTTW	28.668	29.056	28.668	34.630	37.089	37.968	39.988	39.988	37.968	34.320	28.789	28.668	33.817
Agriculture	0.100	0.100	0.100	0.100	0.100	0.100	0.837	0.837	0.100	0.100	0.100	0.100	0.226
Private (2539)	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
Total Current	32.118	32.507	32.118	38.080	40.540	41.419	44.176	44.176	41.419	37.771	32.239	32.118	37.392
Total Future	32.118	32.507	32.118	38.080	40.540	41.419	44.176	44.176	41.419	37.771	32.239	32.118	37.392

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-10**  
**Surface Water Supply and Reserve in Tier 1 Subwatersheds**

Mississippi-Rideau Source Protection Region

Subwatershed	Surface Water - Supply and Reserve (m3/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mississippi Valley Source Protection Area												
Mississippi River Below Marble Lake												
Supply	4.20	3.51	3.95	11.15	5.71	3.04	1.17	0.57	0.43	1.94	5.33	7.85
Reserve	2.92	2.27	2.00	4.95	2.66	1.17	0.50	0.23	0.19	0.96	3.13	5.62
Supply – Reserve	1.28	1.25	1.94	6.20	3.05	1.88	0.67	0.35	0.24	0.98	2.20	2.23
Mississippi River At High Falls												
Supply	18.54	17.44	16.22	23.43	13.91	8.02	5.82	6.78	5.88	6.59	9.87	16.03
Reserve	10.47	12.38	9.44	8.29	5.71	5.23	4.97	4.92	4.82	4.42	4.98	5.14
Supply – Reserve	8.07	5.06	6.79	15.14	8.19	2.79	0.85	1.87	1.06	2.17	4.90	10.89
Clyde River Near Lanark												
Supply	4.27	3.95	10.38	32.00	12.70	4.05	1.45	0.76	0.57	1.22	3.16	5.30
Reserve	2.35	1.68	3.63	15.82	5.56	2.05	0.62	0.21	0.14	0.26	1.21	2.06
Supply – Reserve	1.92	2.27	6.75	16.18	7.14	2.00	0.83	0.55	0.43	0.96	1.95	3.24
Fall River At Bennett Lake												
Supply	2.96	2.99	4.09	8.90	5.42	2.28	0.67	0.18	0.11	0.26	1.00	2.75
Reserve	1.41	1.38	2.32	6.69	2.73	1.02	0.20	0.07	0.04	0.03	0.20	0.92
Supply – Reserve	1.55	1.61	1.77	2.21	2.69	1.27	0.47	0.12	0.06	0.23	0.80	1.83
Mississippi River At Fergusons Falls												
Supply	30.60	29.85	36.30	80.25	42.30	21.90	10.15	8.78	7.99	11.39	19.00	30.39
Reserve	15.40	17.60	24.35	49.23	19.24	12.14	6.84	5.41	6.30	5.56	9.37	12.06
Supply – Reserve	15.20	12.25	11.95	31.02	23.06	9.76	3.31	3.37	1.69	5.83	9.63	18.33
Mississippi River At Appleton												
Supply	33.05	33.30	37.35	84.05	44.20	23.90	10.17	8.45	8.00	12.33	18.90	32.01
Reserve	15.68	17.78	24.33	55.16	19.69	11.55	6.03	5.03	5.90	5.97	8.82	12.30
Supply – Reserve	17.37	15.52	13.02	28.89	24.51	12.35	4.13	3.42	2.10	6.36	10.08	19.71
Indian River Near Blakeney												
Supply	1.58	1.27	2.63	7.27	3.24	1.18	0.59	0.35	0.29	0.48	0.75	1.88
Reserve	0.67	0.25	1.45	4.45	1.34	0.37	0.29	0.20	0.19	0.21	0.28	0.25
Supply – Reserve	0.91	1.02	1.18	2.81	1.90	0.81	0.30	0.16	0.10	0.27	0.47	1.63

Subwatershed	Surface Water - Supply and Reserve (m3/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mississippi River At Galetta												
Supply	37.76	37.11	49.73	114.07	55.15	27.67	11.97	9.57	9.02	14.23	23.02	38.58
Reserve	17.62	18.61	30.13	71.60	24.05	12.74	7.01	5.58	6.45	6.87	10.61	13.53
Supply – Reserve	17.37	15.52	13.02	28.89	24.51	12.35	4.13	3.42	2.10	6.36	10.08	19.71
Mississippi River (Outlet)												
Supply	37.91	37.23	50.22	115.20	55.53	27.79	12.03	9.61	9.05	14.30	23.19	38.81
Reserve	17.68	18.63	30.35	72.19	24.20	12.78	7.04	5.60	6.47	6.90	10.69	13.58
Supply – Reserve	17.37	15.52	13.02	28.89	24.51	12.35	4.13	3.42	2.10	6.36	10.08	19.71
Carp River Near Kinburn												
Supply	0.77	0.77	5.84	12.25	2.46	0.92	0.31	0.16	0.25	0.59	1.71	1.69
Reserve	0.30	0.19	2.07	5.04	1.06	0.26	0.14	0.07	0.06	0.23	0.63	0.55
Supply – Reserve	0.47	0.58	3.77	7.21	1.40	0.66	0.16	0.09	0.19	0.36	1.08	1.14
Carp River (Outlet)												
Supply	0.91	0.92	6.93	14.55	2.92	1.10	0.36	0.19	0.29	0.70	2.03	2.01
Reserve	0.35	0.23	2.45	5.99	1.26	0.31	0.17	0.08	0.07	0.27	0.75	0.65
Supply – Reserve	0.56	0.69	4.48	8.56	1.66	0.79	0.19	0.11	0.23	0.43	1.28	1.36
Ottawa MVC												
Supply	0.91	0.75	5.88	12.22	3.10	0.91	0.38	0.27	0.32	0.71	2.26	2.02
Reserve	0.34	0.21	2.25	5.60	1.11	0.29	0.26	0.08	0.10	0.37	1.10	0.61
Supply – Reserve	0.58	0.53	3.63	6.62	1.99	0.63	0.12	0.19	0.22	0.34	1.16	1.41
Rideau Valley Source Protection Area												
Tay River At Perth												
Supply	7.82	6.23	6.43	18.93	11.19	5.40	3.26	3.70	4.90	4.32	2.51	6.41
Reserve	3.60	2.56	3.21	9.97	4.11	3.05	1.75	2.45	2.47	1.43	1.17	1.58
Supply – Reserve	4.22	3.66	3.22	8.96	7.07	2.35	1.51	1.25	2.43	2.89	1.34	4.83
Rideau River Above Smiths Falls												
Supply	12.81	12.35	14.60	33.35	19.46	11.60	10.24	9.36	10.27	11.78	8.76	10.55
Reserve	5.59	4.75	7.85	16.26	8.72	8.06	7.57	7.90	6.85	5.84	4.41	4.16
Supply – Reserve	7.22	7.61	6.75	17.09	10.73	3.55	2.67	1.46	3.42	5.94	4.35	6.39
Rideau River Below Merrickville												
Supply	19.25	19.32	35.32	66.09	23.45	11.30	8.15	7.79	9.00	14.40	17.85	22.25
Reserve	9.68	11.68	24.61	33.54	9.65	6.87	5.69	6.72	6.48	9.18	7.06	9.05
Supply - Reserve	9.57	7.64	10.70	32.55	13.80	4.42	2.46	1.07	2.52	5.22	10.79	13.20
Kemptonville Creek Near Kemptonville												

Subwatershed	Surface Water - Supply and Reserve (m3/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Supply	3.23	2.72	11.45	18.65	5.18	1.40	0.38	0.12	0.07	1.16	4.15	3.99
Reserve	1.02	0.69	6.19	11.15	1.70	0.40	0.08	0.04	0.03	0.04	0.38	1.22
Supply – Reserve	2.21	2.02	5.26	7.50	3.48	1.00	0.30	0.08	0.04	1.12	3.77	2.76
Rideau River Below Manotick												
Supply	26.30	25.86	65.09	111.37	39.11	14.40	7.70	6.91	7.83	17.12	29.80	35.55
Reserve	11.33	13.72	40.08	66.97	12.82	7.58	5.05	4.86	5.51	9.81	10.41	11.90
Supply – Reserve	14.97	12.14	25.01	44.40	26.29	6.82	2.65	2.05	2.31	7.31	19.39	23.65
Jock River Near Richmond												
Supply	2.63	2.23	11.90	24.45	6.07	1.62	0.48	0.31	0.27	0.99	4.25	4.50
Reserve	0.86	0.50	4.10	14.14	2.56	0.52	0.10	0.07	0.05	0.14	0.84	1.28
Supply – Reserve	1.77	1.73	7.80	10.31	3.51	1.10	0.37	0.24	0.22	0.85	3.41	3.22
Rideau River At Ottawa												
Supply	29.55	28.20	71.35	130.00	46.50	22.30	11.40	9.13	9.30	20.90	36.35	35.20
Reserve	16.34	13.11	41.79	71.14	14.04	9.07	5.88	6.03	6.52	11.82	13.12	18.27
Supply – Reserve	13.21	15.09	29.56	58.86	32.46	13.23	5.52	3.10	2.78	9.08	23.23	16.93
Rideau River (Outlet)												
Supply	29.89	28.52	72.16	131.48	47.03	22.55	11.53	9.23	9.41	21.14	36.76	35.60
Reserve	16.53	13.26	42.27	71.95	14.20	9.17	5.95	6.10	6.59	11.95	13.27	18.48
Supply – Reserve	13.36	15.26	29.90	59.53	32.83	13.38	5.58	3.13	2.81	9.18	23.49	17.12
Ottawa RVCA (West)												
Supply	0.31	0.33	1.26	2.38	0.88	0.50	0.32	0.21	0.36	0.37	0.61	0.52
Reserve	0.17	0.11	0.52	1.13	0.32	0.16	0.22	0.06	0.11	0.20	0.33	0.20
Supply – Reserve	0.15	0.22	0.74	1.25	0.56	0.35	0.10	0.15	0.25	0.18	0.27	0.32
Ottawa RVCA (East)												
Supply	0.66	0.58	3.84	7.85	2.13	0.76	0.37	0.26	0.36	0.58	1.54	1.36
Reserve	0.27	0.17	1.49	3.62	0.77	0.24	0.26	0.08	0.11	0.30	0.77	0.44
Supply – Reserve	0.39	0.40	2.35	4.23	1.37	0.52	0.11	0.18	0.25	0.28	0.77	0.93

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-11**  
**Groundwater Supply and Reserve in Tier 1 Subwatersheds**

Mississippi-Rideau Source Protection Region

Subwatershed	Area	Average Recharge Rate	Annual Recharge Volume	Monthly Recharge Volume	Groundwater Supply	Groundwater Reserve	Supply - Reserve
	km <sup>2</sup>	mm/year	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s
Mississippi Valley Source Protection Area							
Mississippi River Below Marble Lake	359	122	43,954,614	3,662,884	1.394	0.139	1.254
Mississippi River At High Falls	874	136	119,089,426	9,924,119	3.776	0.378	3.399
Clyde River Near Lanark	617	124	76,495,606	6,374,634	2.426	0.243	2.183
Fall River At Bennett Lake	281	129	36,168,384	3,014,032	1.147	0.115	1.032
Mississippi River At Fergusons Falls	532	126	67,086,418	5,590,535	2.127	0.213	1.915
Mississippi River At Appleton	272	130	35,227,099	2,935,592	1.117	0.112	1.005
Indian River Near Blakeney	212	115	24,316,102	2,026,342	0.771	0.077	0.694
Mississippi River At Galetta	588	116	68,383,076	5,698,590	2.168	0.217	1.952
Mississippi River (Outlet)	29	107	3,113,695	259,475	0.099	0.010	0.089
Carp River Near Kinburn	255	148	37,797,052	3,149,754	1.199	0.120	1.079
Carp River (Outlet)	48	113	5,417,610	451,467	0.172	0.017	0.155
Ottawa MVC	283	131	37,011,113	3,084,259	1.174	0.117	1.056
Rideau Valley Source Protection Area							
Tay River at Perth	676	121	81,723,189	6,810,266	2.591	0.259	2.332
Rideau River Above Smiths Falls	572	121	69,179,391	5,764,949	2.194	0.219	1.974
Rideau River Below Merrickville	715	132	94,743,575	7,895,298	3.004	0.300	2.704
Kemptville Creek At Kemptville	413	156	64,306,399	5,358,867	2.039	0.204	1.835
Rideau River Below Manotick	764	168	128,476,725	10,706,394	4.074	0.407	3.667
Jock River Near Richmond	524	161	84,365,994	7,030,499	2.675	0.268	2.408
Rideau River At Ottawa	143	165	23,638,538	1,969,878	0.750	0.075	0.675
Rideau River (Outlet)	43	164	7,122,233	593,519	0.226	0.023	0.203
Ottawa RVCA (West)	120	139	16,654,331	1,387,861	0.528	0.053	0.475
Ottawa RVCA (East)	263	160	42,155,264	3,512,939	1.337	0.134	1.203

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-12****Provincial Criteria for Tier 1 Subwatershed Stress Levels**

Mississippi-Rideau Source Protection Region

Subwatershed Stress Level	Percent Water Demand – Surface Water	Percent Water Demand – Groundwater	
		Monthly	Annual
Significant	Greater than 50%	Greater than 50%	Greater than 25%
Moderate	20% - 50%	Greater than 25%	Greater than 10%
Low	Less than 20%	0% to 25%	0% to 10%

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-13****Percent Water Demands and Subwatershed Stress Levels – Surface Water**

Mississippi-Rideau Source Protection Region

Sub-watershed	Surface Water - Percent Demand (%)												Max. (%)	Stress Level
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec		
Mississippi Valley Source Protection Area														
Mississippi River Below Marble Lake														
Current	0.1	0.1	0.1	0.0	0.1	0.1	0.7	1.4	0.7	0.2	0.1	0.1	1.4	Low
Future	0.1	0.1	0.1	0.0	0.1	0.1	0.7	1.4	0.7	0.2	0.1	0.1	1.4	Low
Mississippi River At High Falls														
Current	0.1	0.1	0.1	0.0	0.1	0.2	1.2	0.6	0.6	0.3	0.1	0.1	1.2	Low
Future	0.1	0.1	0.1	0.0	0.1	0.2	1.2	0.6	0.6	0.3	0.1	0.1	1.2	Low
Clyde River Near Lanark														
Current	0.8	0.7	0.2	0.1	0.2	0.8	2.3	4.2	3.5	1.6	0.8	0.5	4.2	Low
Future	0.8	0.7	0.2	0.1	0.2	0.8	2.3	4.2	3.5	1.6	0.8	0.5	4.2	Low
Fall River At Bennett Lake														
Current	1.1	1.1	1.0	0.8	0.7	1.4	3.7	13.5	22.5	7.1	2.2	1.0	22.5	Moderate
Future	1.1	1.1	1.0	0.8	0.7	1.4	3.7	13.5	22.5	7.1	2.2	1.0	22.5	Moderate
Mississippi River Fergusons Falls														
Current	0.2	0.2	0.2	0.1	0.1	0.3	1.0	1.1	2.0	0.5	0.3	0.1	2.0	Low
Future	0.2	0.2	0.2	0.1	0.1	0.3	1.0	1.1	2.0	0.5	0.3	0.1	2.0	Low
Mississippi River At Appleton														
Current	0.1	0.1	0.1	0.1	0.1	0.3	0.9	1.1	1.3	0.2	0.1	0.1	1.3	Low
Future	0.1	0.1	0.2	0.1	0.1	0.3	1.1	1.3	1.6	0.3	0.2	0.1	1.6	Low
Indian River Near Blakeney														
Current	0.1	0.0	0.9	0.4	0.6	1.3	4.1	7.6	10.0	3.8	2.2	0.0	10.0	Low
Future	0.1	0.0	0.9	0.4	0.6	1.3	4.1	7.6	10.0	3.8	2.2	0.0	10.0	Low
Mississippi River At Galetta														
Current	33.8	36.4	40.5	23.5	26.5	41.7	68.2	72.1	80.8	58.2	46.7	31.0	80.8	Significant
Future	33.8	36.4	40.5	23.5	26.5	41.7	68.2	72.1	80.8	58.2	46.7	31.0	80.8	Significant
Mississippi River (Outlet)														
Current	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Low
Future	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Low
Carp River Near Kinburn														

Sub-watershed	Surface Water - Percent Demand (%)												Max. (%)	Stress Level
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec		
Current	4.3	3.6	0.6	0.3	2.4	4.9	22.5	32.5	15.0	6.0	2.0	1.8	32.5	Moderate
Future	4.3	3.6	0.6	0.3	2.4	4.9	22.5	32.5	15.0	6.0	2.0	1.8	32.5	Moderate
Carp River (Outlet)														
Current	0.1	0.0	0.0	0.0	0.0	0.0	1.2	2.1	0.1	0.1	0.0	0.0	2.1	Low
Future	0.1	0.0	0.0	0.0	0.0	0.0	1.2	2.1	0.1	0.1	0.0	0.0	2.1	Low
Ottawa MVC														
Current	0.3	0.3	0.0	0.0	0.1	3.8	24.5	16.6	10.0	0.5	0.1	0.1	24.5	Moderate
Future	0.3	0.3	0.0	0.0	0.1	3.8	24.5	16.6	10.0	0.5	0.1	0.1	24.5	Moderate
Rideau Valley Source Protection Area														
Tay River At Perth														
Current	0.4	0.5	0.5	0.2	0.2	0.9	1.6	1.9	0.9	0.6	1.1	0.3	1.9	Low
Future	0.6	0.7	0.8	0.3	0.4	1.3	2.3	2.7	1.4	1.0	1.8	0.5	2.7	Low
Rideau River At Smiths Falls														
Current	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.2	Low
Future	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.2	Low
Rideau River Below Merrickville														
Current	0.3	0.3	0.2	0.1	0.3	0.8	1.9	4.4	1.4	0.7	0.2	0.2	4.4	Low
Future	0.3	0.5	0.3	0.1	0.3	1.0	2.2	5.1	1.8	0.8	0.3	0.2	5.1	Low
Kemptville Creek Near Kemptville														
Current	0.1	0.1	0.0	0.0	0.0	0.2	3.0	10.6	3.8	0.1	0.0	0.1	10.6	Low
Future	0.1	0.1	0.0	0.0	0.0	0.2	3.0	10.6	3.8	0.1	0.0	0.1	10.6	Low
Rideau River Below Manotick														
Current	0.0	0.0	0.0	0.1	1.1	4.1	10.9	13.9	11.5	1.6	0.0	0.0	13.9	Low
Future	0.0	0.0	0.0	0.1	1.1	4.1	10.9	13.9	11.5	1.6	0.0	0.0	13.9	Low
Jock River Near Richmond														
Current	0.4	0.4	0.1	0.1	0.4	3.8	10.6	16.6	14.3	3.0	0.2	0.2	16.6	Low
Future	0.4	0.4	0.1	0.1	0.4	3.8	10.6	16.6	14.3	3.0	0.2	0.2	16.6	Low
Rideau River At Ottawa														
Current	3.7	3.3	1.7	0.9	1.6	4.1	9.4	15.6	17.6	5.6	2.1	2.9	17.6	Low
Future	3.7	3.3	1.7	0.9	1.6	4.1	9.4	15.6	17.6	5.6	2.1	2.9	17.6	Low
Rideau River (Outlet)														
Current	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Low
Future	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Low
Ottawa West (RVCA)														
Current	0.5	0.3	0.1	0.1	0.1	0.2	5.6	3.8	0.3	0.4	0.3	0.2	5.6	Low
Future	0.5	0.3	0.1	0.1	0.1	0.2	5.6	3.8	0.3	0.4	0.3	0.2	5.6	Low
Ottawa East (RVCA)														
Current	0.0	0.0	0.0	0.0	0.6	1.5	7.1	7.9	3.0	2.8	0.0	0.0	7.9	Low
Future	0.0	0.0	0.0	0.0	0.6	1.5	7.1	7.9	3.0	2.8	0.0	0.0	7.9	Low

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-14****Percent Water Demands and Subwatershed Stress Levels – Groundwater (Monthly)**

Mississippi-Rideau Source Protection Region

Subwatershed	Groundwater - Percent Demand (%)												Max. (%)	Stress Level
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec		
Mississippi Valley Source Protection Area														
Mississippi River Below Marble Lake														
Current	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.1	0.3	Low
Future	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.1	0.3	Low
Mississippi River At High Falls														
Current	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	Low
Future	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	Low
Clyde River Near Lanark														
Current	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.8	Low
Future	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.8	Low
Fall River At Bennett Lake														
Current	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Low
Future	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Low
Mississippi River At Fergusons Falls														
Current	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.4	1.4	1.4	1.4	1.5	Low
Future	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.4	1.4	1.4	1.4	1.5	Low
Mississippi River At Appleton														
Current	0.4	0.4	0.4	0.4	0.5	0.6	0.9	0.9	0.6	0.4	0.4	0.4	0.9	Low
Future	0.4	0.4	0.4	0.4	0.5	0.6	0.9	0.9	0.6	0.4	0.4	0.4	0.9	Low
Indian River Near Blakeney														
Current	1.3	1.4	1.3	1.3	1.3	1.3	1.6	1.6	1.3	1.3	1.3	1.3	1.6	Low
Future	1.3	1.4	1.3	1.3	1.3	1.3	1.6	1.6	1.3	1.3	1.3	1.3	1.6	Low
Mississippi River At Galetta														
Current	2.5	2.9	1.7	1.6	1.4	1.4	1.7	1.6	1.4	1.4	1.5	2.7	2.9	Low
Future	2.9	3.3	2.1	2.1	1.8	1.7	2.1	1.9	1.7	1.8	1.9	3.1	3.3	Low
Mississippi River (Outlet)														
Current	1.7	1.9	1.7	1.8	1.7	1.8	3.0	3.0	1.8	1.7	1.8	1.7	3.0	Low
Future	1.7	1.9	1.7	1.8	1.7	1.8	3.0	3.0	1.8	1.7	1.8	1.7	3.0	Low
Carp River Near Kinburn														

Subwatershed	Groundwater - Percent Demand (%)												Max. (%)	Stress Level
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec		
Current	4.1	4.2	4.0	4.2	4.6	4.7	5.8	5.6	4.5	4.2	4.1	4.1	5.8	Low
Future	4.7	4.7	4.6	4.8	5.4	5.4	6.5	6.3	5.1	4.8	4.7	4.6	6.5	Low
Carp River (Outlet)														
Current	0.4	0.4	0.4	0.6	0.6	0.6	2.0	2.0	0.6	0.4	0.4	0.4	2.0	Low
Future	0.4	0.4	0.4	0.6	0.6	0.6	2.0	2.0	0.6	0.4	0.4	0.4	2.0	Low
Ottawa MVC														
Current	1.9	1.9	1.9	1.9	1.9	8.2	9.3	9.3	8.2	1.9	1.9	1.9	9.3	Low
Future	1.9	1.9	1.9	1.9	1.9	8.2	9.3	9.3	8.2	1.9	1.9	1.9	9.3	Low
Rideau Valley Source Protection Area														
Tay River At Perth														
Current	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Low
Future	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Low
Rideau River At Smiths Falls														
Current	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	Low
Future	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.5	0.5	0.5	0.7	Low
Rideau River Below Merrickville														
Current	2.6	2.7	2.6	2.9	2.9	2.9	3.3	3.3	2.9	2.8	2.6	2.6	3.3	Low
Future	2.8	2.8	2.8	3.0	3.0	3.0	3.4	3.4	3.0	3.0	2.7	2.7	3.4	Low
Kemptville Creek Near Kemptville														
Current	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.6	0.2	0.2	0.2	0.2	0.6	Low
Future	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.6	0.2	0.2	0.2	0.2	0.6	Low
Rideau River Below Manotick														
Current	5.0	5.1	5.3	5.3	5.8	6.1	6.6	6.6	6.0	5.8	5.3	4.9	6.6	Low
Future	5.9	6.0	6.2	6.2	6.7	7.0	7.5	7.4	6.9	6.6	6.1	5.6	7.5	Low
Jock River Near Richmond														
Current	5.4	5.3	5.9	7.0	7.0	6.9	7.6	7.5	6.9	6.0	5.9	5.4	7.6	Low
Future	5.4	5.3	5.9	7.1	7.1	6.9	7.6	7.6	6.9	6.1	6.0	5.5	7.6	Low
Rideau River At Ottawa														
Current	7.0	7.2	9.9	14.9	14.7	14.9	15.2	15.2	14.9	9.9	9.4	7.0	15.2	Low
Future	7.0	7.2	9.9	14.9	14.7	14.9	15.2	15.2	14.9	9.9	9.4	7.0	15.2	Low
Rideau River (Outlet)														
Current	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	0.5	0.5	0.5	0.5	1.0	Low
Future	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	0.5	0.5	0.5	0.5	1.0	Low
Ottawa West (RVCA)														
Current	5.9	5.9	5.9	5.9	5.9	5.9	7.0	7.0	5.9	5.9	5.9	5.9	7.0	Low
Future	5.9	5.9	5.9	5.9	5.9	5.9	7.0	7.0	5.9	5.9	5.9	5.9	7.0	Low
Ottawa East (RVCA)														
Current	2.7	2.7	2.7	3.2	3.4	3.4	3.7	3.7	3.4	3.1	2.7	2.7	3.7	Low
Future	2.7	2.7	2.7	3.2	3.4	3.4	3.7	3.7	3.4	3.1	2.7	2.7	3.7	Low

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-15****Percent Water Demands and Subwatershed Stress Levels – Groundwater (Annual)**

Mississippi-Rideau Source Protection Region

Mississippi Valley Source Protection Area	Scenario	% Water Demand	Stress Level	Rideau Valley Source Protection Area	Scenario	% Water Demand	Stress Level
Mississippi Below Marble Lake	Current	0.1	Low	Tay River At Perth	Current	0.4	Low
	Future	0.1	Low		Future	0.4	Low
Mississippi River At High Falls	Current	0.1	Low	Rideau River Above Smiths Falls	Current	0.6	Low
	Future	0.1	Low		Future	0.6	Low
Clyde River Near Lanark	Current	0.6	Low	Rideau River Below Merrickville	Current	2.8	Low
	Future	0.6	Low		Future	3.0	Low
Fall River At Bennett Lake	Current	0.2	Low	Kemptville Creek Near Kemptville	Current	0.3	Low
	Future	0.2	Low		Future	0.3	Low
Mississippi River At Fergusons Falls	Current	1.4	Low	Rideau River Below Manotick	Current	5.7	Low
	Future	1.4	Low		Future	6.5	Low
Mississippi At Appleton	Current	0.5	Low	Jock River Near Richmond	Current	6.4	Low
	Future	0.5	Low		Future	6.5	Low
Indian River Near Blakeney	Current	1.3	Low	Rideau River At Ottawa	Current	11.7	Moderate
	Future	1.3	Low		Future	11.7	Moderate
Mississippi River At Galetta	Current	1.8	Low	Rideau River (Outlet)	Current	0.6	Low
	Future	2.2	Low		Future	0.6	Low
Mississippi River (Outlet)	Current	2.0	Low	Ottawa RVCA (West)	Current	6.1	Low
	Future	2.0	Low		Future	6.1	Low
Carp River At Kinburn	Current	4.5	Low	Ottawa RVCA (East)	Current	3.1	Low
	Future	5.1	Low		Future	3.1	Low
Carp River (Outlet)	Current	0.7	Low				
	Future	0.7	Low				
Ottawa MVC	Current	4.2	Low				
	Future	4.2	Low				

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)

**Table 3-16****Tier 1 Subwatershed Stress Levels and Decisions for Tier 2**

Mississippi-Rideau Source Protection Region

Subwatershed [Flow Gauge ID]	Municipal Drinking Water Systems		Maximum Percent Water Demand (%)		Assigned Stress Level		Reported Historical Issues	Is Tier 2 required?
	Surface Water	Ground-water	Surface Water	Ground-water	Surface Water	Ground-water		
Mississippi Valley Source Protection Area								
Mississippi River Below Marble Lake [02KF016]			1.4	0.1	Low	Low	None	No
Mississippi River At High Falls [Generating Station]			1.2	0.1	Low	Low	None	No
Clyde River Near Lanark (02KF010)			4.2	0.6	Low	Low	None	No
Fall River At Bennett Lake [02KF014/18]			22.5	0.2	Moderate	Low	None	No
Mississippi River At Fergusons Falls [02KF001]		Lanark (future)	2.0	1.4	Low	Low	None	No
Mississippi River At Appleton [02KF006]	Carleton Place		1.6	0.5	Low	Low	None	No
Indian River Near Blakeney [02KF012]			10.0	1.3	Low	Low	None	No
Mississippi R. At Galetta		Almonte	5.1	2.2	Low	Low	None	No
Mississippi R. (Outlet)			0.0	2.0	Low	Low	None	No
Carp River Near Kinburn [02KF011]		Carp	32.5	5.1	Moderate	Low	None	No
Carp River (Outlet)			2.1	0.7	Low	Low	None	No
Ottawa MVC			24.5	4.2	Moderate	Low	None	No
Rideau Valley Source Protection Area								
Tay R. At Perth [02LA024]	Perth		2.7	0.4	Low	Low	None	No
Rideau River Above Smiths Falls [02LA005]		Westport	0.2	0.6	Low	Low	None	No
Rideau River Below Merrickville [02LA011]	Smiths Falls	Merrickville	5.1	3.0	Low	Low	None	No
Kemptville Creek Near Kemptville [02LA006]			10.6	0.3	Low	Low	None	No
Rideau River Below Manotick [02LA012]		Kemptville	13.9	6.5	Low	Low	None	No
Jock River Near Richmond [02LA007]		Munster & Richmond	16.6	6.5	Low	Low	None	No
Rideau River At Ottawa [02LA004]			17.6	11.7	Low	Moderate	None	No
Rideau River (Outlet)			0.0	0.6	Low	Low	None	No
Ottawa West			5.6	6.1	Low	Low	None	No
Ottawa East			7.9	3.1	Low	Low	None	No

Compiled from: Tier 1 Water Budget Technical Report (see Appendix A-1)