

Statistical Analysis

Basic statistical analyses including, calculation of minimum, maximum, number of samples exceeding the criteria, average, average concentration exceeding the criteria, geometric mean, geometric mean concentration exceeding the criteria and total number of samples was prepared for all of the above noted surface water monitoring programs. These statistics were prepared for the 12 indicator parameters identified above over the 1998 to 2006 period and are presented in Appendix 9, Table A-9.

The following is a summary of the surface water quality monitoring programs discussed on a subwatershed basis. Data presented is from 2000 to 2005 with the exception of the MVC watershed watch program (1998-2005) and the City of Ottawa Baseline Surface Water Quality monitoring program (2000-2006). Each of the indicator parameters will be discussed for the sampling locations within the individual subwatersheds.

MVC Subwatersheds

Big Gull Subwatershed

Three sampling sites are monitored as part of the MVC watershed watch lake monitoring program in the Big Gull subwatershed. All average and geometric mean concentrations (1999 – 2004) for the indicator parameters pH and TP from all stations in the Big Gull subwatershed were in compliance with the relevant criteria.

Buckshot Creek Subwatershed

Eight sampling sites are monitored as part of the MVC watershed watch lake monitoring program in the Buckshot Creek subwatershed. All average and geometric mean concentrations (1998 – 2005) for the indicator parameters pH and TP from all stations in the Buckshot Creek subwatershed were in compliance with the relevant criteria.

Carp River Watershed

Seven sampling sites are monitored in the Carp River watershed (two PWQMN and five City of Ottawa Baseline Surface Water Quality Monitoring program). The following indicator parameters in the Carp River subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli* – only geometric mean concentrations at Carp River – Carp Rd., Richardson Side Rd., and John Shaw Rd. Ottawa Baseline surface water stations;
- TP – only geometric mean concentrations at Poole Creek; and
- TSS – both average and geometric mean concentrations at all stations except the average concentrations at Carp River – John Shaw Rd. and Poole Creek Ottawa Baseline surface water stations.

The following indicator parameters in the Carp River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Carp River – Craig Side Rd. and Poole Creek Ottawa Baseline surface water stations, and
 - only average concentrations for Carp River – Carp Rd., Richardson Side Rd., and John Shaw Rd. Ottawa Baseline surface water stations;
- nitrite – both average and geometric mean concentrations at all Ottawa Baseline surface water stations;
- TKN – both average and geometric mean concentrations for all stations;
- TP – both average and geometric mean concentrations at all stations except the geometric mean concentration at Poole Creek Ottawa Baseline surface water station; and
- TSS – only average concentrations for Carp River – John Shaw Rd. and Poole Creek Ottawa Baseline surface water stations.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Carp and Kinburn PWQMN stations:

- un-ionized ammonia, copper, nitrite, TKN, TP, TSS (Carp) and zinc – decreasing concentrations from 1981-1985 to 2001-2005; and
- chloride, lead, nitrate, pH and TSS (Kinburn) – increasing concentrations from 1981-1985 to 2001-2005.

Clyde River Subwatershed

Fifteen sampling sites are monitored in the Clyde River subwatershed (two PWQMN and thirteen MVC watershed watch). All average and geometric mean concentrations (2000 – 2005) for the indicator parameters un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH, TKN, TP, TSS and zinc from all stations in the Clyde River subwatershed were in compliance with the relevant criteria.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Kerr Lake and Lanark PWQMN stations:

- un-ionized ammonia (Lanark), copper, nitrate, nitrite, TKN, TP (Lanark), TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia (Kerr Lake) – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, lead, pH and TP (Kerr Lake) – increasing concentrations from 1981-1985 to 2001-2005.

CP Dam Subwatershed

Five sampling sites are monitored in the CP Dam subwatershed (one PWQMN and four MVC watershed watch). All average and geometric mean concentrations (2001 – 2005) for the indicator parameters un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH, TKN, TP, TSS and zinc from all stations were in compliance with the relevant criteria in the CP Dam subwatershed with the exception of the average and geometric mean concentrations of pH at the Dalhousie Lake MVC watershed watch station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Dalhousie Lake PWQMN station:

- copper, nitrate, nitrite, TKN, TP and zinc – decreasing concentrations from 1981-1985 to 2001-2005;

- un-ionized ammonia – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, lead, pH and TSS – increasing concentrations from 1981-1985 to 2001-2005.

Fall River Subwatershed

Eleven sampling sites are monitored in the Fall River subwatershed (one PWQMN and ten MVC watershed watch). All average and geometric mean concentrations (2000 – 2005) for the indicator parameters un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH, TKN, TP, TSS and zinc from all stations were in compliance with the relevant criteria in the Fall River subwatershed with the exception of the average and geometric mean concentrations of pH at the White Lake MVC watershed watch station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Bennett Lake PWQMN station:

- copper, nitrate, nitrite, TKN, TP and zinc – decreasing concentrations from 1981-1985 to 2001-2005; and
- un-ionized ammonia, chloride, lead, pH and TSS – increasing concentrations from 1981-1985 to 2001-2005.

Indian River Subwatershed

Two sampling sites are monitored as part of the MVC watershed watch lake monitoring program in the Indian River subwatershed. All average and geometric mean concentrations (2002) for the indicator parameters pH and TP from all stations were in compliance with the relevant criteria in the Indian River subwatershed with the exception of the average and geometric mean concentrations of pH at the Taylor Lake MVC watershed watch station.

Lower Mississippi Subwatershed

Eight sampling sites are monitored in the Lower Mississippi River subwatershed (four PWQMN and four City of Ottawa Baseline Surface Water Quality Monitoring program). The following indicator parameters in the Lower Mississippi subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli*:
 - both average and geometric mean concentrations at Cody Creek – March Rd. and Mississippi River – Galetta Side Rd. Ottawa Baseline stations; and
 - only geometric mean concentrations at Cody Creek – Hwy. 44 Ottawa Baseline surface water stations;
- TKN:
 - both average and geometric mean concentrations at all PWQMN stations; and
 - only geometric mean concentrations at Mississippi River – Galetta Side Rd. Ottawa Baseline surface water station;
- TP – both average and geometric mean concentrations at all stations except Cody Creek – Hansen Side Rd. Ottawa Baseline station; and
- TSS – both average and geometric mean concentrations at all stations except Cody Creek – Hansen Side Rd. Ottawa Baseline station.

The following indicator parameters in the Lower Mississippi subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Cody Creek – Hansen Side Rd. Ottawa Baseline surface water station, and
 - only average concentrations for Cody Creek – Hwy. 44 Ottawa Baseline surface water station;
- TKN:
 - both average and geometric mean concentrations for Cody Creek – Hansen Side Rd., Hwy. 44 and March Rd. Ottawa Baseline stations; and
 - only average concentrations for Mississippi River – Galetta Side Rd. Ottawa Baseline station;
- TP – both average and geometric mean concentrations at Cody Creek – Hansen Side Rd. Ottawa Baseline surface water station; and
- TSS – both average and geometric mean concentrations at Cody Creek – Hansen Side Rd. Ottawa Baseline surface water station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Almonte, Appleton, Galetta and Pakenham PWQMN stations:

- copper, nitrate (Galetta and Pakenham), nitrite, pH, TP, TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia (Almonte, Appleton and Pakenham) – no change in concentrations from 1981-1985 to 2001-2005; and
- un-ionized ammonia (Galetta), chloride, lead, nitrate (Almonte and Appleton) and pH – increasing concentrations from 1981-1985 to 2001-2005.

Mazinaw Subwatershed

Nine sampling sites are monitored in the Mazinaw subwatershed (one PWQMN and eight MVC watershed watch). All average and geometric mean concentrations (1998 – 2005) for the indicator parameters un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH, TKN, TP, TSS and zinc from all stations were in compliance with the relevant criteria in the Mazinaw subwatershed.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Mazinaw Lake PWQMN station:

- copper, nitrate, nitrite, TKN and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia and pH – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, lead and TSS – increasing concentrations from 1981-1985 to 2001-2005.

Upper Mississippi Subwatershed

Nine sampling sites are monitored as part of the MVC watershed watch lake monitoring program in the Upper Mississippi River subwatershed. All average and geometric mean concentrations (1998 – 2005) for the indicator parameters pH and TP from all stations were in compliance with the relevant criteria in the Upper Mississippi River subwatershed.

MVC Ottawa River Subwatersheds

Eight sampling sites are monitored in the MVC Ottawa River subwatersheds in the City of Ottawa Baseline Surface Water Quality Monitoring program. The following indicator parameters in the MVC Ottawa River subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- chloride – both average and geometric mean concentrations at all stations except Watts Creek – Corkstown Rd. Ottawa Baseline surface water station;
- copper:
 - both average and geometric mean concentrations at Casey Creek, Constance Creek, Constance Lake, Harwood Creek, Shirley’s Brook – Fourth Line Rd. and Hines Rd. Ottawa Baseline surface water stations; and
 - only geometric mean concentrations at Watts Creek – Shirley Blvd. and Corkstown Rd. Ottawa Baseline surface water stations;
- *E. Coli*:
 - both average and geometric mean concentrations at Constance Lake Ottawa Baseline station; and
 - only geometric mean concentrations at Constance Creek and Harwood Creek Ottawa Baseline surface water stations;
- nitrite:
 - both average and geometric mean concentrations at Casey Creek, Constance Creek, Constance Lake and Shirley’s Brook – Hines Rd. Ottawa Baseline surface water stations; and
 - only geometric mean concentration at Harwood Creek Ottawa Baseline surface water station;
- TKN:
 - both average and geometric mean concentrations at Shirley’s Brook – Hines Rd. and Watts Creek – Corkstown Rd. Ottawa Baseline surface water stations; and
 - only geometric mean concentrations at Shirley’s Brook – Fourth Line Rd. Ottawa Baseline surface water station;
- TP – both average and geometric mean concentrations at Constance Lake Ottawa Baseline station; and
- TSS:
 - both average and geometric mean concentrations at Constance Creek, Constance Lake and Harwood Creek Ottawa Baseline stations; and
 - only geometric mean concentrations at Shirley’s Brook – Fourth Line Rd. and Hines Rd. Ottawa Baseline stations.

The following indicator parameters in the MVC Ottawa River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- chloride – both average and geometric mean concentrations for Watts Creek – Corkstown Rd. Ottawa Baseline surface water station;
- copper – only average concentrations for Watts Creek – Shirley Blvd. and Corkstown Rd. Ottawa Baseline surface water stations;
- *E. Coli*:
 - both average and geometric mean concentrations for Casey Creek, Shirley’s Brook – Fourth Line Rd. and Hines Rd. and Watts Creek – Shirley Blvd. and Corkstown Rd. Ottawa Baseline surface water stations, and

- only average concentrations for Constance Creek and Harwood Creek Ottawa Baseline surface water stations;
- nitrate:
 - both average and geometric mean concentrations for Shirley's Brook – Fourth Line Rd. and Watts Creek – Shirley Blvd. and Corkstown Rd. Ottawa Baseline surface water stations; and
 - only average concentration at Harwood Creek Ottawa Baseline surface water station;
- TKN:
 - both average and geometric mean concentrations for Casey Creek, Constance Creek, Constance Lake, Harwood Creek and Watts Creek – Shirley Blvd. Ottawa Baseline stations; and
 - only average concentrations for Shirley's Brook – Fourth Line Rd. Ottawa Baseline surface water station;
- TP – both average and geometric mean concentrations at all stations except Constance Lake Ottawa Baseline surface water station; and
- TSS:
 - both average and geometric mean concentrations at Casey Creek and Watts Creek – Shirley Blvd. and Corkstown Rd. Ottawa Baseline surface water stations; and
 - only average concentrations at Shirley's Brook – Fourth Line Rd. and Hines Rd. Ottawa Baseline surface water stations.

RVCA Subwatersheds

Jock River Subwatershed

Seven sampling sites are monitored in the Jock River subwatershed (one PWQMN and six City of Ottawa Baseline Surface Water Quality Monitoring program). The following indicator parameters in the Jock River subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli*:
 - both average and geometric mean concentrations at Jock River – Prince of Wales Dr. and Jockvale Rd. Ottawa Baseline stations; and
 - only geometric mean concentrations at Jock River PWQMN station and Jock River – Moodie Dr., Ottawa St. (Richmond) and Bleeks Side Rd. Ottawa Baseline surface water stations;
- nitrite – both average and geometric mean concentrations at all stations except Flowing Creek Ottawa Baseline surface water station;
- TP:
 - both average and geometric mean concentrations at Jock River – Ottawa St. (Richmond) Ottawa Baseline station; and
 - only geometric mean concentration at Jock River – Bleeks Side Rd. Ottawa Baseline surface water station; and
- TSS – both average and geometric mean concentrations at all stations except Flowing Creek Ottawa Baseline station.

The following indicator parameters in the Jock River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Flowing Creek Ottawa Baseline surface water station, and
 - only average concentrations for Jock River PWQMN station and Jock River – Moodie Dr., Ottawa St. (Richmond) and Bleeks Side Rd. Ottawa Baseline surface water stations;
- nitrite – both average and geometric mean concentrations at Flowing Creek Ottawa Baseline surface water station;
- TKN – both average and geometric mean concentrations for all stations;
- TP:
 - both average and geometric mean concentrations at Jock River PWQMN station, Flowing Creek and Jock River – Prince of Wales Dr., Jockvale Rd., and Moodie Dr. Ottawa Baseline surface water stations; and
 - only average concentration at Jock River – Bleeks Side Rd. Ottawa Baseline surface water station; and
- TSS – both average and geometric mean concentrations at Flowing Creek Ottawa Baseline surface water station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations for the Jock River PWQMN station:

- un-ionized ammonia, copper, nitrate, TKN, TP and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- nitrite – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, *E. Coli*, lead, pH and TSS – increasing concentrations from 1981-1985 to 2001-2005.

Kemptville Creek Subwatershed

Fifteen sampling sites are monitored in the Kemptville Creek subwatershed (one PWQMN, one City of Ottawa Baseline Surface Water Quality Monitoring program and 13 RVCA surface water monitoring program). The following indicator parameters in the Kemptville Creek subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli*:
 - both average and geometric mean concentrations at Kemptville Creek PWQMN station and Kemptville Creek – Highway 43, County Rd. 18, Oxford Mills, Pattersons Corners, Limerick Rd. and Garretton RVCA surface water stations, and
 - only geometric mean concentrations at Kemptville Creek Ottawa Baseline station, Kemptville Creek – Hurd St., County Rd. 20, Kyle Rd. and upstream of North Augusta and North Kemptville Creek RVCA surface water stations;
- TP:
 - both average and geometric mean concentrations at Kemptville Creek – Hurd St., County Rd. 18, Oxford Mills, Pattersons Corners and upstream of North Augusta and North Kemptville Creek RVCA surface water stations and Kemptville Creek Ottawa Baseline station, and

- only geometric mean concentrations at Kemptonville Creek – County Rd. 20, Limerick Rd., Garretton and Kyle Rd. RVCA surface water stations; and
- TSS – both average and geometric mean concentrations at all stations except the average concentration at Barnes Creek RVCA surface water station.

The following indicator parameters in the Kemptonville Creek subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Barnes Creek RVCA surface water station, and
 - only average concentrations for Kemptonville Creek Ottawa Baseline station, Kemptonville Creek – Hurd St., County Rd. 20, Kyle Rd. and upstream of North Augusta and North Kemptonville Creek RVCA surface water stations;
- TKN – both average and geometric mean concentrations for all stations;
- TP:
 - both average and geometric mean concentrations for Kemptonville Creek PWQMN station and Barnes Creek and Kemptonville Creek – Highway 43 RVCA surface water stations, and
 - only average concentrations for Kemptonville Creek – County Rd. 20, Limerick Rd., Garretton and Kyle Rd. RVCA surface water stations; and
- TSS – only average concentration for Barnes Creek RVCA surface water station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Kemptonville Creek PWQMN station:

- copper, *E. Coli*, nitrate, nitrite, TKN, TP, TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, lead and pH – increasing concentrations from 1981-1985 to 2001-2005.

Lower Rideau Subwatershed

Thirty-eight sampling sites are monitored in the Lower Rideau River subwatershed (four PWQMN, 29 City of Ottawa Baseline Surface Water Quality Monitoring program and five RVCA surface water monitoring program). The following indicator parameters in the Lower Rideau River subwatershed had the average and geometric mean concentrations (2000 – 2005) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- chloride:
 - average concentrations at all stations except Nepean Creek and Sawmill Creek – Brookfield Rd., Riverside Dr. and Walkley Rd. Ottawa Baseline stations;
 - geometric mean concentrations at all stations except Sawmill Creek – Brookfield Rd. Ottawa Baseline station;
- copper – both average and geometric mean concentrations at all stations except the average concentrations at Nepean Creek and Sawmill Creek – Brookfield Rd. Ottawa Baseline stations and both average and geometric mean concentrations at Sawmill Creek – Riverside Dr. Ottawa Baseline stations;
- *E. Coli*:
 - both average and geometric mean concentrations for Rideau River – Hogs Back and Kars PWQMN stations, Brassils Creek RVCA surface water station and

- Brassils Creek, Rideau River, Stevens Creek – Roger Stevens Rd. Ottawa Baseline stations; and
- only geometric mean concentrations for Rideau River – Long Island and St. Patrick St. PWQMN stations, Black Rapids Creek, Cranberry Creek, Hunt Club Creek – Country Club Rd. and DeNiverville Dr., Mosquito Creek – Leitrim Rd. and Limebank Rd., Mud Creek, Nepean Creek, Sawmill Creek – NE tributary, Stevens Creek – Second Line Rd. and Taylor Drain Ottawa Baseline stations and Arcand, McDermott and Murphy Drains RVCA surface water stations;
- nitrite – both average and geometric mean concentrations for Rideau River PWQMN stations and Brassils Creek, Cranberry Creek, Rideau River, Stevens Creek and Taylor Drain Ottawa Baseline surface water stations;
- TKN – both average and geometric mean concentrations for Hunt Club Creek – DeNiverville Dr. Ottawa Baseline station;
- TP:
 - both average and geometric mean concentrations for Brassils Creek RVCA surface water station, Brassils Creek, Rideau River – Burritts Rapids and Stevens Creek – Roger Stevens Rd. Ottawa Baseline stations; and
 - only geometric mean concentrations for Rideau River – Kars and Long Island PWQMN stations, Hunt Club Creek – DeNiverville Dr., Rideau River – Roger Stevens Rd. and Sawmill Creek – NE tributary Ottawa Baseline stations; and
- TSS:
 - both average and geometric mean concentrations at all PWQMN stations, Arcand Drain, Brassils Creek, McDermott Drain – MCD-02 and Murphy Drain RVCA surface water stations and Brassils Creek, Cranberry Creek, Hunt Club Creek, Mosquito Creek – Leitrim Rd. and Rideau Rd., Mud Creek, Rideau River, Stevens Creek – Church St. and Roger Stevens Rd. Ottawa Baseline stations; and
 - only geometric mean concentrations at Black Rapids Creek, Mosquito Creek – Limebank Rd., Sawmill Creek – NE tributary and Walkley Rd., Stevens Creek – Second Line Rd. and Taylor Drain Ottawa Baseline stations and McDermott Drain – MCD-03 RVCA surface water station.

The following indicator parameters in the Lower Rideau River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- chloride:
 - both average and geometric mean concentrations for Sawmill Creek – Brookfield Rd. Ottawa Baseline station; and
 - only average concentrations for Nepean Creek and Sawmill Creek – Riverside Dr. and Walkley Rd. Ottawa Baseline stations;
- copper:
 - both average and geometric mean concentrations for Sawmill Creek – Riverside Dr. Ottawa Baseline station; and
 - only average concentrations for Nepean Creek and Sawmill Creek – Brookfield Rd. Ottawa Baseline stations;
- *E. Coli*:
 - both average and geometric mean concentrations for Hunt Club Creek – Riverside Dr., Mosquito Creek – Rideau Rd., Sawmill Creek – Johnston Rd., Brookfield Rd., Riverside Dr. and Walkley Rd. and Stevens Creek – Church St. Ottawa Baseline stations;
 - only average concentrations for Rideau River – Long Island and St. Patrick St. PWQMN stations, Black Rapids Creek, Cranberry Creek, Hunt Club Creek –

Country Club Rd. and DeNiverville Dr., Mosquito Creek – Leitrim Rd. and Limebank Rd., Mud Creek, Nepean Creek, Sawmill Creek – NE tributary, Stevens Creek – Second Line Rd. and Taylor Drain Ottawa Baseline stations and Arcand, McDermott and Murphy Drains RVCA surface water stations;

- nitrate – both average and geometric mean concentrations at Black Rapids Creek, Hunt Club Creek, Mosquito Creek, Mud Creek, Nepean Creek and Sawmill Creek Ottawa Baseline surface water stations;
- TKN – both average and geometric mean concentrations at all stations except for Hunt Club Creek – DeNiverville Dr. Ottawa Baseline stations;
- TP:
 - both average and geometric mean concentrations for Rideau River – Hogs Back and St. Patrick St. PWQMN stations, Arcand, McDermott and Murphy Drains RVCA surface water stations and Black Rapids Creek, Cranberry Creek, Hunt Club Creek – Riverside Dr. and County Club Rd., Mosquito Creek, Mud Creek, Nepean Creek, Rideau River – St. Patrick St., Bank St., Black Rapids Dam, Long Island, Barnsdale Rd. and Mooney’s Bay, Sawmill Creek – Johnston Rd., Brookfield Rd., Riverside Dr. and Walkley Rd., Stevens Creek – Church St. and Second Line Rd. and Taylor Drain Ottawa Baseline stations; and
 - only average concentrations for Rideau River – Kars and Long Island PWQMN stations and Hunt Club Creek – DeNiverville Dr., Rideau River – Roger Stevens Dr. and Sawmill Creek – NE tributary Ottawa Baseline stations; and
- TSS:
 - both average and geometric mean concentrations at Nepean Creek and Sawmill Creek – Johnston Rd., Brookfield Rd. and Riverside Dr. Ottawa Baseline stations; and
 - only average concentrations at Black Rapids Creek, Mosquito Creek – Limebank Rd., Sawmill Creek – NE tributary and Walkley Rd., Stevens Creek – Second Line Rd. and Taylor Drain Ottawa Baseline stations and McDermott Drain – MCD-03 RVCA surface water station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Hogs Back, Kars, Long Island and St. Patrick St. PWQMN stations:

- un-ionized ammonia (Hogs Back, Kars and Long Island), copper, *E. Coli* (St. Patrick St.), nitrite (Hogs Back, Kars and Long Island), TKN, TP, TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia (St. Patrick St.) and nitrite (St. Patrick St.) – no change in concentrations from 1981-1985 to 2001-2005; and
- chloride, *E. Coli* (Hogs Back, Kars and Long Island), lead, nitrate and pH – increasing concentrations from 1981-1985 to 2001-2005.

Middle Rideau Subwatershed

Eleven sampling sites are monitored in the Middle Rideau River subwatershed (two PWQMN, eight RVCA surface water monitoring program and one RVCA watershed watch monitoring program). The following indicator parameters in the Middle Rideau River subwatershed had the average and geometric mean concentrations (2001 – 2005) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH and zinc– both average and geometric mean concentrations at all stations;

- *E. Coli*:
 - both average and geometric mean concentrations for Rideau River – Andrewsville and Kilmarnock PWQMN stations, Irish and Rideau Creeks RVCA surface water stations and Otter Lake RVCA watershed watch station, and
 - only geometric mean concentrations for Cockburn and Dales Creeks RVCA surface water stations;
- TKN – both average and geometric mean concentrations for Otter Lake RVCA watershed watch station;
- TP – both average and geometric mean concentrations for Rideau River – Andrewsville and Kilmarnock PWQMN stations, Dales, Irish and Rideau Creeks RVCA surface water stations and Otter Lake RVCA watershed watch station; and
- TSS – both average and geometric mean concentrations at all stations except Otter Lake RVCA watershed watch station.

The following indicator parameters in the Middle Rideau River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Barbers, Hutton, Otter and Rosedale Creeks RVCA surface water stations, and
 - only average concentrations for Cockburn and Dales Creeks RVCA surface water stations;
- TP – both average and geometric mean concentrations for Barbers, Cockburn, Hutton, Otter and Rosedale Creeks RVCA surface water stations; and
- TSS – both average and geometric mean concentrations for Otter Lake RVCA watershed watch station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Andrewsville and Kilmarnock PWQMN stations:

- un-ionized ammonia (Andrewsville), copper, nitrate, nitrite, TKN, TP, TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005; and
- un-ionized ammonia (Kilmarnock), chloride, *E. Coli*, lead and pH – increasing concentrations from 1981-1985 to 2001-2005.

Rideau Lakes Subwatershed

Twenty sampling sites are monitored in the Rideau Lakes subwatershed (five RVCA surface water monitoring program and thirteen lakes within the RVCA watershed watch monitoring program). The following indicator parameters in the Rideau Lakes subwatershed had the average and geometric mean concentrations (2002 – 2005) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli* – both average and geometric mean concentrations at all stations except Adrains Creek RVCA surface water station;
- TKN:
 - both average and geometric mean concentrations for Westport Dam RVCA surface water station and Adam, Bass, Big Rideau, Big Rideau – Hoggs Bay, Burridge, Long (East), Round, Lower Rideau, Westport Sand, Wolfe Lakes RVCA watershed watch stations, and

- only geometric mean concentration for Upper Rideau Lake RVCA watershed watch station;
- TP – both average and geometric mean concentrations at all stations with exception of Adrains, Black (average only) and Sheldons Creeks RVCA surface water stations; and
- TSS – both average and geometric mean concentrations at all stations with the exception of the average concentrations at Adrains Creek and Westport Dam RVCA surface water stations.

The following indicator parameters in the Rideau Lakes subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli* – both average and geometric mean concentrations for Adrains Creek RVCA surface water station;
- TKN:
 - both average and geometric mean concentrations for Adrains, Black and Sheldons Creeks RVCA surface water stations and Black and Loon Lakes RVCA watershed watch stations, and
 - only average concentrations for Upper Rideau Lake RVCA watershed watch station;
- TP:
 - both average and geometric mean concentrations for Adrains and Sheldons Creeks RVCA surface water stations, and
 - only average concentration for Black Creek RVCA surface water station; and
- TSS – only average concentrations for Adrains Creek and Westport Dam RVCA surface water stations.

Tay River Subwatershed

Fifty-seven sampling sites are monitored in the Tay River subwatershed (two PWQMN, 23 RVCA surface water monitoring program and 32 RVCA watershed watch monitoring program). The following indicator parameters in the Tay River subwatershed had the average and geometric mean concentrations (2001 – 2005) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, copper, lead, nitrate, nitrite, pH and zinc – both average and geometric mean concentrations at all stations;
- *E. Coli* – both average and geometric mean concentrations for all stations except Fish Creek – County Rd. 38 (average only), Grants Creek – Upper Scotch Line and downstream of Upper Scotch Line, Ruddsdale Creek (average only) and Tay River – Craig St. (average only) RVCA surface water stations;
- TKN – both average and geometric mean concentrations for Tay River – Bolingbroke PWQMN station, Grants Creek – County Rd. 10 and Pike Lake Dam, Scotts Snye and Tay River (all stations except Port Elmsley and upstream of Tay Marsh) RVCA surface water stations and Bobs Lake (all stations except Mill Bay), Christie Lake, Crosby Lake, Crow Lake, Davern Lake, Eagle Lake, Farren Lake, Leggatt Lake, Little Crosby Lake, Little Silver Lake, O’Brien Lake, and Pike Lake RVCA watershed watch stations;
- TP – both average and geometric mean concentrations for all stations except Fish Creek – County Rd. 38, Grants Creek – Glen Tay Rd., Upper Scotch Line (average only) and downstream of Upper Scotch Line and Jebbs Creek (average only) RVCA surface water stations; and
- TSS – both average and geometric mean concentrations for all stations except for the average concentration at Grants Creek – Glen Tay Rd RVCA surface water station.

The following indicator parameters in the Tay River subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- *E. Coli*:
 - both average and geometric mean concentrations for Grants Creek – Upper Scotch Line and downstream of Upper Scotch Line RVCA surface water stations, and
 - only average concentrations for Fish Creek – County Rd. 38, Ruddsdale Creek and Tay River – Craig St. RVCA surface water stations
- TKN – both average and geometric mean concentrations for Tay River – Tay Marsh PWQMN station, Eagle Creek, Fish Creek, Grants Creek – Glen Tay Rd., Upper Scotch Line and downstream of Upper Scotch Line, Jebbs Creek, Ruddsdale Creek, Stub Creek, Tay River – Port Elmsley and upstream of Tay Marsh and Uens Creek RVCA surface water stations and Bobs Lake – Mill Bay, Carnahan Lake, Elbow Lake, Long Lake (West), Otty Lake, Rainbow Lake RVCA watershed watch stations;
- TP:
 - both average and geometric mean concentrations for Fish Creek – County Rd. 38 and Grants Creek – Glen Tay Rd. and downstream of Upper Scotch Line RVCA surface water stations, and
 - only average concentrations for Grants Creek – Upper Scotch Line and Jebbs Creek RVCA surface water stations;
- TSS – only average concentration from Grants Creek – Glen Tay Rd. RVCA surface water station.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations (Appendix 11) for the Bolingbroke and Tay Marsh PWQMN stations:

- copper, *E. Coli* (Bolingbroke), nitrate, nitrite, TKN, TP, TSS and zinc – decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia (Bolingbroke) – no change in concentrations from 1981-1985 to 2001-2005; and
- un-ionized ammonia (Tay Marsh), chloride, *E. Coli* (Tay Marsh), lead and pH – increasing concentrations from 1981-1985 to 2001-2005.

RVCA Ottawa River East Subwatersheds

Ten sampling sites are monitored in the RVCA Ottawa River East subwatersheds in the City of Ottawa Baseline Surface Water Quality Monitoring program. The following indicator parameters in the RVCA Ottawa River East subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- chloride:
 - both average and geometric mean concentrations at Becketts Creek, Black Creek, Cardinal Creek, MacKay Lake and Ramsay Creek Ottawa Baseline surface water stations; and
 - only geometric mean concentrations at Greens Creek, Taylor Creek and Voyager Creek Ottawa Baseline surface water stations;
- copper:

- both average and geometric mean concentrations at Beckets Creek, Black Creek, Cardinal Creek and MacKay Lake Ottawa Baseline surface water stations; and
- only geometric mean concentrations at Greens Creek – Innes Rd. and Taylor Creek Ottawa Baseline surface water stations;
- *E. Coli*:
 - both average and geometric mean concentrations at Black Creek and MacKay Lake Ottawa Baseline stations; and
 - only geometric mean concentrations at Beckets Creek and Cardinal Creek Ottawa Baseline surface water stations;
- nitrite:
 - both average and geometric mean concentrations at Beckets Creek, Black Creek and MacKay Lake Ottawa Baseline surface water stations; and
 - only geometric mean concentrations at Ramsay Creek Ottawa Baseline surface water stations;
- TP – both average and geometric mean concentrations at MacKay Lake Ottawa Baseline station; and
- TSS:
 - both average and geometric mean concentrations at Black Creek and MacKay Lake Ottawa Baseline stations; and
 - only geometric mean concentrations at Taylor Creek Ottawa Baseline station.

The following indicator parameters in the RVCA Ottawa River East subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- chloride:
 - both average and geometric mean concentrations for Bilberry Creek Ottawa Baseline surface water station; and
 - only average concentrations for Greens Creek, Taylor Creek and Voyager Creek Ottawa Baseline surface water stations;
- copper:
 - both average and geometric mean concentrations for Bilberry Creek, Greens Creek – Montreal Rd., Ramsay Creek and Voyager Creek Ottawa Baseline stations; and
 - only average concentrations for Greens Creek – Innes Rd. and Taylor Creek Ottawa Baseline surface water stations;
- *E. Coli*:
 - both average and geometric mean concentrations for Bilberry Creek, Greens Creek, Ramsay Creek, Taylor Creek and Voyager Creek Ottawa Baseline surface water stations; and
 - only average concentrations for Beckets Creek and Cardinal Creek Ottawa Baseline surface water stations;
- nitrite:
 - both average and geometric mean concentrations for Bilberry Creek, Cardinal Creek, Greens Creek, Taylor Creek and Voyager Creek Ottawa Baseline surface water stations; and
 - only average concentrations at Ramsay Creek Ottawa Baseline surface water stations;
- TKN – both average and geometric mean concentrations for all stations;
- TP – both average and geometric mean concentrations at all stations except MacKay Lake Ottawa Baseline surface water station; and
- TSS:

- both average and geometric mean concentrations at Beckets Creek, Bilberry Creek, Cardinal Creek, Greens Creek, Ramsay Creek and Voyager Creek Ottawa Baseline surface water stations; and
- only average concentrations at Taylor Creek Ottawa Baseline surface water station.

RVCA Ottawa River West Subwatersheds

Seven sampling sites are monitored in the RVCA Ottawa River East subwatersheds in the City of Ottawa Baseline Surface Water Quality Monitoring program. The following indicator parameters in the RVCA Ottawa River West subwatershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, copper, lead, nitrate, pH and zinc – both average and geometric mean concentrations at all stations;
- chloride:
 - both average and geometric mean concentrations at Graham Creek – Siskin Crt., Mud Lake, Rideau Canal and Stillwater Creek Ottawa Baseline surface water stations; and
 - only geometric mean concentrations at Graham Creek – Carling Ave. Ottawa Baseline surface water station;
- *E. Coli*:
 - both average and geometric mean concentrations at Mud Lake and Rideau Canal – Bronson Ave. Ottawa Baseline stations; and
 - only geometric mean concentrations at Graham Creek – Siskin Crt. and Rideau Canal – Rideau St. Ottawa Baseline surface water stations;
- nitrite – both average and geometric mean concentrations at Mud Lake and Rideau Canal Ottawa Baseline surface water stations;
- TKN – only geometric mean concentrations at Graham Creek – Carling Ave. and Pinecrest Creek Ottawa Baseline stations;
- TP – only geometric mean concentrations at Pinecrest Creek Ottawa Baseline station; and
- TSS:
 - both average and geometric mean concentrations at Mud Lake and Rideau Canal Ottawa Baseline stations; and
 - only geometric mean concentrations at Graham Creek – Carling Ave. and Pinecrest Creek Ottawa Baseline stations.

The following indicator parameters in the RVCA Ottawa River West subwatershed had the average and/or geometric mean concentrations in excess of the criteria:

- chloride:
 - both average and geometric mean concentrations for Pinecrest Creek Ottawa Baseline surface water station; and
 - only average concentrations for Graham Creek – Carling Ave. Ottawa Baseline surface water station;
- *E. Coli*:
 - both average and geometric mean concentrations for Graham Creek – Carling Ave., Pinecrest Creek and Stillwater Creek Ottawa Baseline surface water stations; and
 - only average concentrations for Graham Creek – Siskin Crt. and Rideau Canal – Rideau St. Ottawa Baseline surface water stations;

- nitrite – both average and geometric mean concentrations for Graham Creek, Pinecrest Creek and Stillwater Creek Ottawa Baseline surface water stations;
- TKN:
 - both average and geometric mean concentrations for Graham Creek – Siskin Crt., Mud Lake, Rideau Canal and Stillwater Creek Ottawa Baseline stations; and
 - only average concentrations for Graham Creek – Carling Ave. and Pinecrest Creek Ottawa Baseline stations;
- TP:
 - both average and geometric mean concentrations at all stations except Pinecrest Creek Ottawa Baseline surface water station; and
 - only average concentrations at Pinecrest Creek Ottawa Baseline station; and
- TSS:
 - both average and geometric mean concentrations at Graham Creek – Siskin Crt. and Stillwater Creek Ottawa Baseline surface water stations; and
 - only average concentrations at Graham Creek – Carling Ave. and Pinecrest Creek Ottawa Baseline surface water stations.

Ottawa River Watershed

Sixteen sampling sites are monitored on the Ottawa River watershed (one PWQMN and fifteen City of Ottawa Baseline Surface Water Quality Monitoring program). The following indicator parameters in the Ottawa River watershed had the average and geometric mean concentrations (2000 – 2006) for the indicator parameters in compliance with the relevant criteria:

- un-ionized ammonia, chloride, lead, nitrate, nitrite, pH, TKN, TP, TSS and zinc – both average and geometric mean concentrations at all stations;
- copper – both average and geometric mean concentrations at all stations except the average concentration at Ottawa River – Hiawatha ORS-450.20 Ottawa Baseline station; and
- *E. Coli*:
 - both average and geometric mean concentrations at Ottawa River – Woolsey Narrows, Deschenes Rapids, Petrie Island ORS-500.10 and Petrie Island-500.20 Ottawa Baseline stations; and
 - only geometric mean concentrations at Ottawa River – Upper Duck Island, Kettle Island, Hiawatha ORS-450.10, Hiawatha ORS-450.20 and Hiawatha ORS-450.30 Ottawa Baseline surface water stations.

The following indicator parameters in the Ottawa River watershed had the average and/or geometric mean concentrations in excess of the criteria:

- copper – only average concentration for Ottawa River – Hiawatha ORS-450.20 Ottawa Baseline station; and
- *E. Coli*:
 - both average and geometric mean concentrations for Ottawa River – Hiawatha ORS-450.40 and Petrie Island ORS-500.50 Ottawa Baseline surface water station, and
 - only average concentrations for Ottawa River – Upper Duck Island, Kettle Island, Hiawatha ORS-450.10, Hiawatha ORS-450.20 and Hiawatha ORS-450.30 Ottawa Baseline surface water stations.

The following observations for the indicator parameters were noted for the five year interval geometric mean concentrations for the Ottawa River PWQMN station:

- chloride, copper, nitrate, nitrite, TKN, TP, TSS and zinc– decreasing concentrations from 1981-1985 to 2001-2005;
- un-ionized ammonia – no change in concentrations from 1981-1985 to 2001-2005; and
- lead and pH – increasing concentrations from 1981-1985 to 2001-2005.