

2020 Environmental Assessment Report

Portrait of the Quality of Montréal's Water Bodies





Quai de l'Horloge Beach

QUALO: a Sub-Par Year

The sampling program of the bacterial quality of the Island of Montréal's shoreline waters (QUALO) was performed for a 22nd season, always using the same methodology. To best reflect the quality of the waters surrounding the territory, 103 monitoring stations, chosen on the basis of interesting wildlife sites, shoreline recreational uses as well as storm sewer and stream outfalls, were subjected to the sampling program from June 1st to October 15th, i.e. a period of 20 weeks.

Weather, Flow Rates and Levels

Since 1999, the overall results of the QUALO program indicate that the bacterial quality of shoreline waters is strongly impacted by precipitation levels. Indeed, the samples collected in the hours following heavy precipitations showed a deterioration in the quality of surface waters owing to the runoff waters feeding storm sewers and streams, and spillages of overflow structures.

In 2020, 23% of all samples were taken less than 24 hours after rainfalls greater than 8 mm compared to 16% in 2019.

411 mm of rain were recorded during the 2020 sampling season. This value is greater than the

average of 378 mm obtained for the past five years. One has to go back to 2015 to find such a rainy year. The first two months of the summer season were hot and dry; the trend changed in August with colder than average temperatures and abundant rainfalls (44 and 79 mm respectively in June and July compared to 169 mm in August).

In 2019, an inversion of the flow between Lac des Deux Montagnes and Lac Saint-Louis saw the waters of the Fleuve Saint-Laurent flow in the direction of the Rivière des Prairies and along the shoreline of Lac Saint-Louis. The good QUALO results obtained in 2019 were due in part to this exceptional situation. In 2020, the water flow resumed its normal orientation and it's the waters of the Rivière de l'Outaouais which fed these same sectors.

The waters of Lac Saint-Louis were kept at a relatively high level and this should remain the case in the future as long as the levels upstream, particularly those of Lac Supérieur, remain far from long term averages. For our region, this means that the average low-water levels of Lac Saint-Louis (21.2 m from 2003 to 2016 during the sampling months) were exceeded by 30 cm this summer and by 80 cm during the exceptional summers of 2017 and 2019.

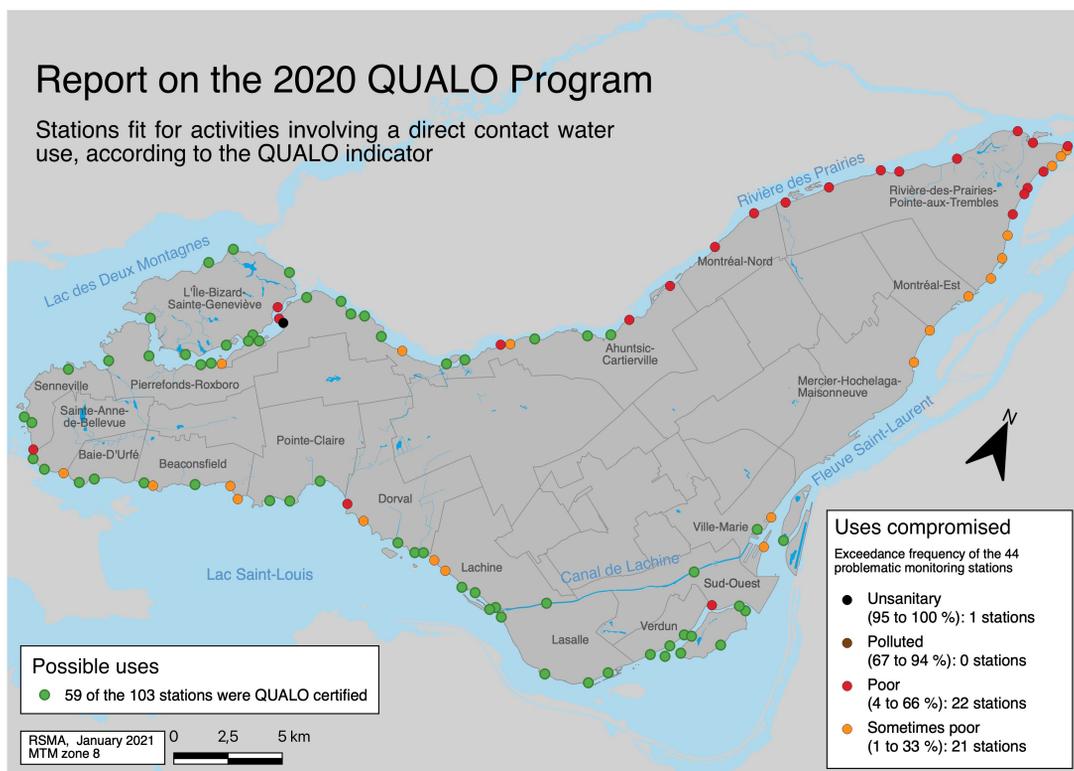
The average low-water levels of Lac des Deux Montagnes, which are a function of the level of Lac Saint-Louis and the water flow of the Rivière de l'Outaouais, were of 21.9 m this year, a low flood level similar to those of years prior to 2017. Obviously, the levels of these two lakes were regulated to avoid any flooding and any constraints for navigational purposes.

57% of Stations QVALO Certified

For a monitoring station to obtain the QVALO certification, it must fulfill the following two conditions: the geometric mean of all its results must not exceed 200 COLI (fecal coliforms, in colony forming units or CFUs per 100 mL) and no more than 10% of its samples can exceed 400 COLI.

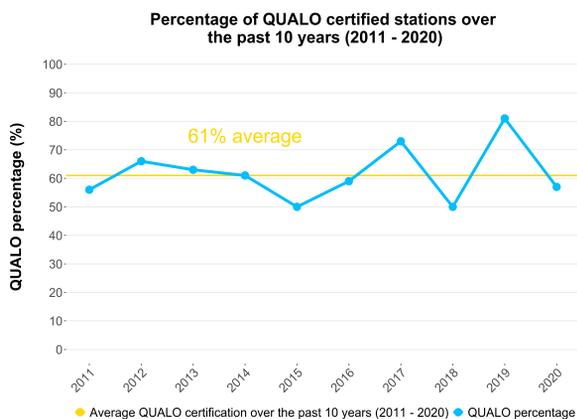
In 2020, 57% of monitoring stations obtained the QVALO certification compared to 81% in 2019. Last year was the second best in the program's history. This year, the QVALO percentage was less than the 61% average of the past 10 years. However, it still is a better year than 2018 when only 50% of the stations were QVALO certified. The exceptional hydrological conditions of the years 2017 and 2019 resulted in very good years in terms of water quality; 2020 simply represents a return to a more normal situation.

The map below presents the results of the 2020 monitoring campaign of the bacteriological quality of Montréal's shoreline waters. 59 stations obtained the QVALO certification, whereas 44 others failed to do so. Among these, 1 station was deemed "unsanitary", none was qualified as being "polluted", 22 were characterized as being "poor" and 21 as being "sometimes poor".



Of the 2,052 bacteriological analyses conducted in 2020:

- 79% of samples satisfied the 200 COLI criteria allowing for direct contact water uses, compared to 85% in 2019;
- 6% of the samples exceeded the 1000 COLI criteria compromising indirect contact water uses, compared to 4% in 2019.



Evolution of the Water Quality of Water Bodies

Rivière des Prairies : 51 % QVALO

The water quality of the Rivière des Prairies stations improved this year. The percentage of stations having obtained the QVALO certification (51%) was greater than the average of the past 10 years (45%) but lower than the percentage obtained in 2019 (57%). However, the precipitations impacted this result since 33% of the samples were taken in the 24 hours following a rainfall, compared to only 10% in 2019. Of the 25 monitoring stations located in the upstream section of Rivière des Prairies, from Lac des Deux Montagnes to the Nicolas-Viel Park station, 19 were QVALO certified compared to 21

stations in 2019. The other stations, located downstream of the river from Gouin Park, did not obtain the QVALO certification, as was the case in 2018 and 2019.

As far as the Anciens-Combattants Park station is concerned, its water quality deteriorated for the first time since 2013. Indeed, high coliform counts were observed after rainfalls.

Île Bizard : 88 % QVALO

As in the past, the quality of shoreline waters in this sector was very good. The result obtained of 88% was identical to that of 2019. Just one station failed to obtain its QVALO certification, namely the Émile Street station, a first since 2002.

Nine values exceeding 200 COLI, of which 4 were greater than 400 COLI, were observed. Special samples taken in this sector revealed the presence of a strong contamination by coliforms originating from the storm sewer outlet upstream of the usual sampling point. This sector should be studied within the framework of the PLUVIO program in order to identify the origin of this contamination.

Lac Saint-Louis : 64 % QVALO

The results obtained for 2020 showed a return to normal in Lac Saint-Louis. Indeed, only 64% of stations were QVALO certified compared to 96% in 2019. However, this percentage is close to the 68% average of the past 10 years, excluding the years 2017 and 2019 whose results were exceptional. Approximately 17% of the samples were taken after 8 mm of rain had been recorded in the 24-hour period preceding the sampling, twice as much as in 2019 (9%), which contributed to the downgrading of the Lac Saint-Louis stations.

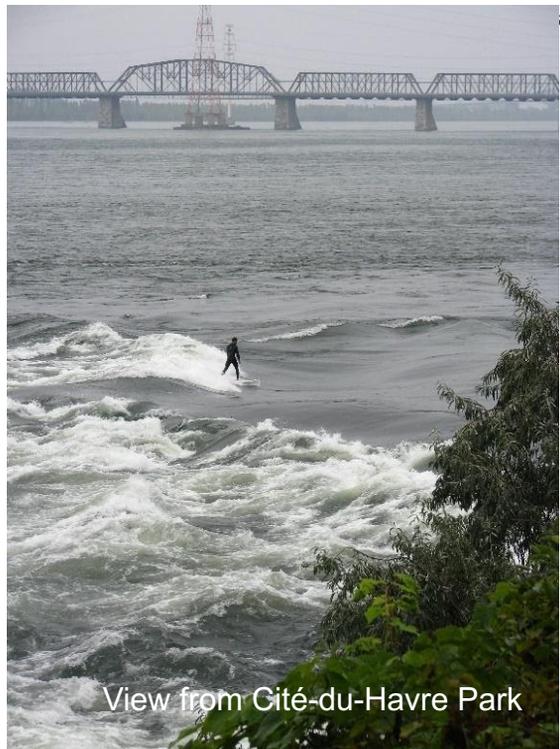
In 2020, 85% of the 500 samples taken showed fecal coliform counts lower than 200 compared to 90% in 2019. Ultimately, 9 of the 25 stations were downgraded compared to only one in 2019. The Macdonald Campus station did not obtain the QUALO certification, a first since 2003, owing to three coliform counts greater than 1000 COLI. These results can be explained by the abundant and frequent presence of birds along the banks and on the land adjacent to the campus.

Bassin de La Prairie : 88 % QUALO

The percentage of QUALO stations exceeded the 80% average achieved for the sector since the program's launch in 1999. Due to the excellent water quality, 91% of the samples showed a bacterial count lower than the 200 COLI criteria (96% in 2019) and 6 of the 17 stations did not exceed, even once, the criteria during all of the 2020 season. However, in addition to the station located at the far end of the Saint-Pierre floodway control structure, which recorded very high counts this year, the Cité-du-Havre Park station did not earn its QUALO certification, a first ever in 14 years.

Fleuve Saint-Laurent : 13 % QUALO

The water quality of the Fleuve Saint-Laurent stations was the most impacted by the abundant rainfalls that occurred during the sampling or just before. Indeed, with just 13% of stations having recorded a good water quality in 2020, one needs to go back to the year 2000 to observe such a low percentage. For comparative purposes, during the 2011-2018 period, the average percentage of QUALO certified stations was 44% (2019 being exceptional with 94%). Although the year 2020 was not as good as 2018 (38% QUALO), it is worthwhile



mentioning that 30% of the samples were taken less than 24 hours after rainfalls compared to only 18% in 2018. Notably, the station located at the Quai de l'Horloge Beach did not obtain its QUALO certification this year, a first since it joined the program in 2015. The same holds true for the two Promenade Bellerive stations which were QUALO certified from 2000 to 2019, except for 2015, and which lost their certification in 2020. The contamination in these three stations was observed at the same dates, following abundant rainfalls the day preceding and during the sampling, which leads us to believe that it may have been caused by a spillage of the overflow facilities upstream of these stations.



Ruisseau Bertrand

RUISSO: a little changed quality

Streams and inland waters are irreplaceable environments necessary for biodiversity in urban areas. In 2020, the 19th year of the program focused on 24 streams and inland waters, and relied on 51 monitoring stations, sampled on seven occasions between July 6th and November 10th. Due to the pandemic, the program started later than usual, which explains why no data were collected in the spring.

More than 8,300 measures and physicochemical and bacteriological analysis results, obtained from the 355 water samples collected during the monitoring season, were used to calculate the RUISSO Index (RI).

Based on this index, we can observe, compared to 2019, that the water quality improved in only 5 of the 24 streams and inland waters. It remained stable in 12 of them and deteriorated in the last 7.

RUISSO Index, a Water Quality Assessment Tool for Streams and Inland Waters

The RUISSO Index is an adaptation of the MELCC's (Ministère de l'Environnement et de la Lutte contre les changements climatiques) index of bacteriological and physicochemical quality (IBPQ). It takes into account the hydrology of streams and water bodies (marshes, swamps, basins or ponds) and the key criteria relative to the protection of aquatic life or to acute and chronic toxicity.

The RI is used to assess the relative quality of streams and inland waters as well as to identify parameters leading to a downgrading of a water's quality. It requires an analysis of 24 parameters: suspended matter (SM), dissolved oxygen (DO), ammoniacal nitrogen (NH₃), total phosphorus (TP), fecal coliforms (COLI) and the main heavy metals. Their analysis allows one to check whether these contaminants are in sufficient quantity to result in a deterioration of the health of aquatic ecosystems.

Still comparing with 2019, this year's results at the 51 monitoring stations show a decrease in the number of stations whose quality was deemed "excellent, good or fair" (from 22 to 20) and an increase in both the number of stations of "poor" quality from 12 to 13 and those whose water quality was found to be "polluted" from 17 to 18.

This slight decrease in the quality of streams is due to more frequent rainfalls the day of the sampling or the day before (55% of samples impacted in 2020 relative to 34% in 2019).

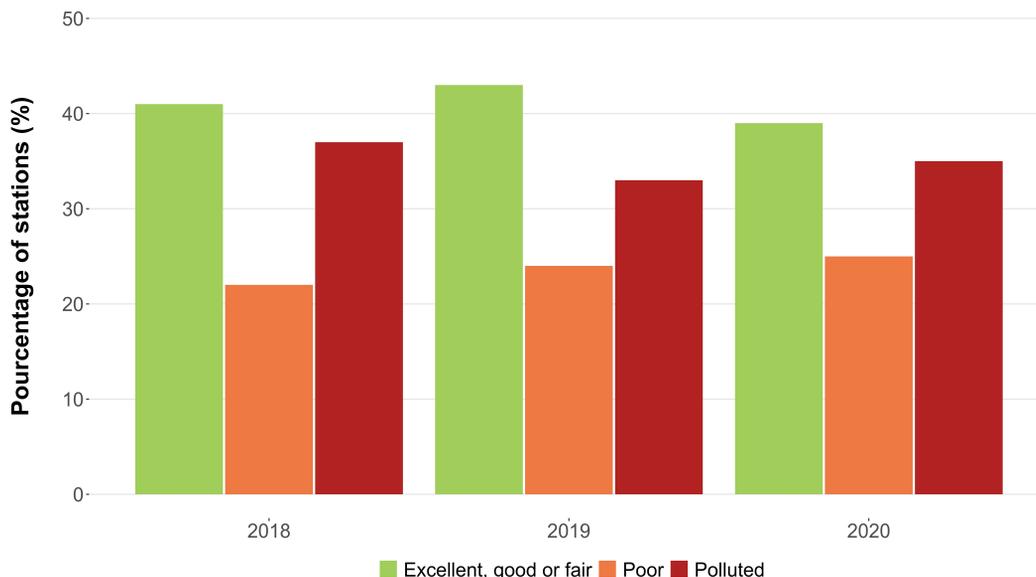
Storm waters and the waters from storm sewers are a significant source of pollution of water bodies,

particularly when they are located in heavily industrialized areas of the Montréal metropolis. However, the control at the source of industrial pollution is governed by the regulations relative to the discharges of waste waters in sewers and water bodies. The CRSE (contrôle des rejets et suivi environnemental) division of the Service de l'environnement of the Ville de Montréal is responsible for both the monitoring of the quality of aquatic environments and the application of the regulations aiming to reduce at the source industrial discharges throughout the territory of the Agglomeration of Montréal.

Evolution of the Water Quality of Streams and Inland Water Bodies

The results obtained globally for the water bodies sampled in 2020 are compared to those of the previous year, and graded as to whether an improvement (+), a stability (=) or a deterioration (–) of at least five units of the RUISSO Index (RI) has been recorded. The graph below shows the evolution of the water quality of streams and inland water bodies since 2018.

Evolution of the water quality of streams and inland water bodies (51 monitoring stations)



Streams Located in Ecoterritories

The quality of the waters of the Rivière à l'Orme (=) remained stable in 2020 despite a slight improvement of two points in the RI. Indeed, the quality of the waters improved to "fair" at the station fed by the drainage waters of the sector of Ville de Kirkland, North of Autoroute 40. As far as the stations neighboring the lake's outlet are concerned, an improvement in water quality was also observed. Dissolved oxygen and phosphorus are generally the two limiting factors for this water body.

In May 2020, an inspector of the CRSE division issued a statement of offence to a transportation company responsible for an accidental oil spill on Autoroute 40 that reached the Rivière à l'Orme basin.

Located in the heart of the Bois-de-Liesse Nature Park, Ruisseau Bertrand (-) is fed by the storm waters of Ville de Dorval and the boroughs of Saint-Laurent and Pierrefonds- Ville de Roxboro, in addition to those of Autoroutes 40 and 13. The water quality deteriorated at 5 of the 7 monitoring stations, remained stable in 1 station and improved in the last station. The global RI was downgraded from "fair" to "poor" because of a decrease of almost 15 units, due to the following parameters: phosphorus, coliforms and suspended matters.

The storm water drain system contributed to the deterioration of the water quality of Ruisseau Bertrand. Indeed, high contents in SM and metals were observed after periods of rainfalls.

In 2020, notices of correction were issued by the CRSE division to various companies whose activities resulted in the dispersal of mud, debris and oils in sewer manholes that channel their waters into Ruisseau Bertrand.

Also, during the monitoring tours of the stream

conducted on October 20th and November 3rd, traces of hydrocarbons were observed at the monitoring station located upstream of the water body. These observations related to an oil spill that occurred October 16th in the yard of a company in Dorval.

Limiting parameters

For several years now, it can be seen that the limiting parameters that most often result in a deterioration of the water quality of streams and inland waters are phosphorus, COLIs, suspended matters and an oxygen deficiency. Occasionally, a sample can also reveal high metal concentrations. The source of these parameters can be the stormwaters or sanitary wastewaters that make their way to the storm sewer.

Subsequent rainfalls drove the contaminant into the stream. A rigorous cleaning operation of the contaminant was done by the staff of the CRSE division over the course of some 10 days.

On November 10th, the staff of the CRSE division again observed the presence of hydrocarbons in the watershed of Ruisseau Bertrand. An accidental spill caused this contamination and preventive and corrective measures were required of the establishment responsible for this situation. A dredging of the storm sewer pipe and the pumping of hydrocarbons were done under the supervision of the CRSE division.

Just like last year, the global water quality of Ruisseau De Montigny (=) remained "polluted" at three of the four stations, from the beginning of the stream, near Bombardier Boulevard, until its mouth in Rivière des Prairies.

High phosphorus counts downstream and high COLI counts upstream impacted the quality of the water and occurrences of contamination due to concentrations of SM and copper were again observed in the storm water collector draining the industrial sector of the borough of Anjou.

Two complaints, indicating the presence of oil and a pile of gravel and earth at the outfall of Lac Anjou as well as plastic pellets at the outlet of a storm sewer pipe, were filed with the division of the CRSE division in 2020. These complaints did not lead to any remedial measures, given that the source of contaminants could not be identified.

In 2020, Ville de Montréal obtained a judgment imposing a fine of \$60,000 on a company for having spilled a coloring substance in Ruisseau De Montigny, in contravention of By-law 2008-47 of the Communauté métropolitaine de Montréal. This judgment is the result of a complaint lodged by a citizen in 2018.

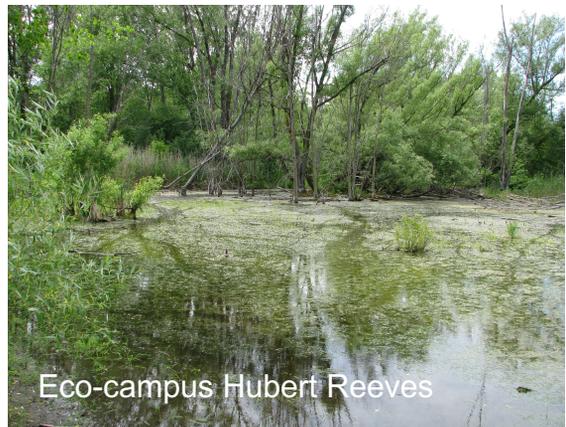
The water quality of Ruisseau Pinel (=) remained stable, but still “poor”. Again this year, as in 2019, the stream was dry 30% of the time (i.e. during two of the seven sampling tours).

The water quality at the mouth of Coulée Grou (=) remained “polluted”. A water deficiency was observed 43% of the time (3 sampling tours out of 7).

Marshes and Swamps

Marshes and swamps are mainly fed by the drainage waters brought by storm waters and snowmelts.

The quality of the waters at the outlet of the marshes of the Pointe-aux-Prairies Nature Park remained unchanged this year (=) and are still considered as being “polluted”. The decomposition



The decomposition of organic matter and animal droppings affect the quality of these waters. This situation can only be improved through a better water supply.

At the Lac des Battures (-) monitoring station, the value of the RI remained stable in the “fair” category despite a decline of 10 points essentially due to an increase in phosphorus contents from 34.3 µg/L in 2019 to 53.6 µg/L in 2020.

Streams with a Stormwater Vocation

Located in the west end of the island, these streams are channeled over a major portion of their course with a few open-air sections. These streams allow for the evacuation of storm waters.

Graded in the “polluted” category, the quality of the waters of Ruisseau Saint-James (-) deteriorated, essentially at the station near Autoroute 20. As in previous years, the stream's two monitoring stations, one located downstream of Autoroute 20 and the other at the estuary of Lac Saint-Louis, remained polluted and showed signs of contamination of a sanitary origin with geometric means of counts of 9627 and 1129 COLI respectively, i.e. ten times greater upstream than downstream.

The waters of Ruisseau Meadowbrook (+) remained polluted despite an improvement of 10 RI points and seem to be always impacted by the discharges of sanitary waste waters (6 of 7 results showed COLI \geq 1000 and 4 of 7 phosphorus \geq 30 $\mu\text{g/L}$).

The quality of the waters of Ruisseau Terra-Cotta (+) fared better in 2020, resulting in an upgrade to the “fair” category owing to a lesser bacterial contamination and a better oxygenation, but phosphorus concentrations remained high (greater than 30 $\mu\text{g/L}$). As was the case last year, an episode of suspended matter was observed (87 $\mu\text{g/L}$).

The waters of Ruisseau O’Connell (-) slightly deteriorated, but remained in the “good” category, limited as it were by phosphorus (still $>30 \mu\text{g/L}$) and dissolved oxygen.

Ruisseau Château-Pierrefonds (=) remained polluted due to a strong contamination of its waters by coliforms and phosphorus.

Streams Draining the Airport

The quality of the waters of Fossé Smith (-) were downgraded to the “fair” level, due to strong contents in suspended matter and phosphorus. This ditch drains a significant portion of the stormwaters originating from the Montréal-Trudeau Airport.

As far as Ruisseau Denis (=) is concerned, its water quality remained stable in 2019, with a rating of “fair”. The two monitoring stations located upstream of the territory of Montréal-Trudeau Airport, are always polluted, which affects the overall quality of the stream’s waters.

In 2020, notices of correction were issued by the CRSE division to establishments that stored liquid containers or had wood, metal or oil residues on their property, because of the risk of their winding up in the storm sewer. These notices required the

immediate implementation of corrective measures in order to prevent any spills into Ruisseau Denis.

The quality of the waters of Ruisseau Bouchard (+) improved this year, but not sufficiently to earn a “fair” rating. Five of the stream’s seven stations recorded an improvement or remained stable. However, the water quality measured at the station located the furthest upstream, whose waters come from the airport and at the station located at the stream’s outlet, deteriorated. It’s mainly the coliforms and dissolved oxygen which obtained poorer results.

In 2020, notices of correction were issued by the CRSE division to establishments whose activities resulted in stone and earth littering public roadways and entailed a risk of their being carried into the storm sewer and Ruisseau Bouchard. These notices compelled the establishments to submit plans for remedial works and operating procedures in order to avoid any matter from being scattered on public roadways.



Inland Waters

The quality of the waters of Canal de Lachine (=), fed by the Fleuve St-Laurent, remained stable in the “good” category for four of the stations.

Only the Monk Boulevard station, with an index decrease of 7 units, was downgraded from “excellent” to “good”. The limiting factor involved at all stations was phosphorus with values reaching 19 µg/L. An occurrence of spillage at the overflow facilities, located just downstream of Pont Lafleur, was measured this year and a count of 7000 COLI was recorded. This is the greatest value out of 102 results ever recorded at this station since 2005.



The waters of Lac aux Castors (Beaver Lake) (+) were upgraded to “excellent” this year (just one of three water bodies in the RUISSO program having earned the “excellent” rating), with an index of 86 over 100, the only limitation being a low content in suspended matter.

The Parc Angrignon pond (-) saw its RI decline by 5 points and was downgraded to “fair”. The limiting factor as always is phosphorus with average values of 27 µg/L.

As for the water quality of the Lacoursière Park pond (=), it remained stable, which allowed it to remain in the “excellent” category.

The water quality of the Parc Dr-Bernard-Paquet pond (-) changed significantly, a decline of 20 points

in its index resulting in a downgrading of its rating from “excellent” to “good”. Dissolved oxygen and total phosphorus were the two limiting factors responsible for the downgrading at this station

A decline of 28 points in its RI downgraded the water quality of the La Brunante pond (-) to “poor” for just the second time in the history of the RUISSO program since 2005. This is explained by strong contents in suspended matter exceeding on four occasions 25 g/L and in phosphorus, twice as high as in 2019. The work conducted in the pond at the end of the season last year possibly resulted in greater suspended organic matter which decomposed this year.

The quality of the waters of the Parc La Fontaine pond (-) were downgraded from “good” to “fair” owing to a decrease of 9 points, mainly caused by phosphorus (40 µg/L in 2020 compared to 28 µg/L in 2019), but also because of a bacterial contamination of 1900 COLI, the greatest value in the program's history. One has to go back to 2009 and 2011 to find other values exceeding 1000 COLI in this pond fed by drinking water. However, this anomaly can be explained by the rainfalls and significant presence of ducks near the monitoring station during the sampling.

The waters of the Parc Centenaire William Cosgrove basin (+) were of better quality and were categorized as “fair”, owing to a lesser content in phosphorus.

Finally, the waters of Ruisseau Provost (+) improved by 20 points and were upgraded to the “excellent” category, a first since its monitoring in 2017.

Status of stormwater networks in 2020		
Non problematic networks	391	
Problematic networks	194	
Details re. problematic networks		
No illicit connection (Ic)	83	100
Corrected	17	
Awaiting corrections	58	94
Awaiting screening or validation	36	
Total	194	

RSMA Studies in 2020

The RSMA validated sectors where no Ic had been confirmed and where corrections had been done by boroughs and reconstituted municipalities. Six problematic sectors located in five stormwater systems were thus analysed. These were located in the boroughs of Pierrefonds-Roxboro and Saint-Laurent as well as in the cities of Beaconsfield, Dorval and Senneville.

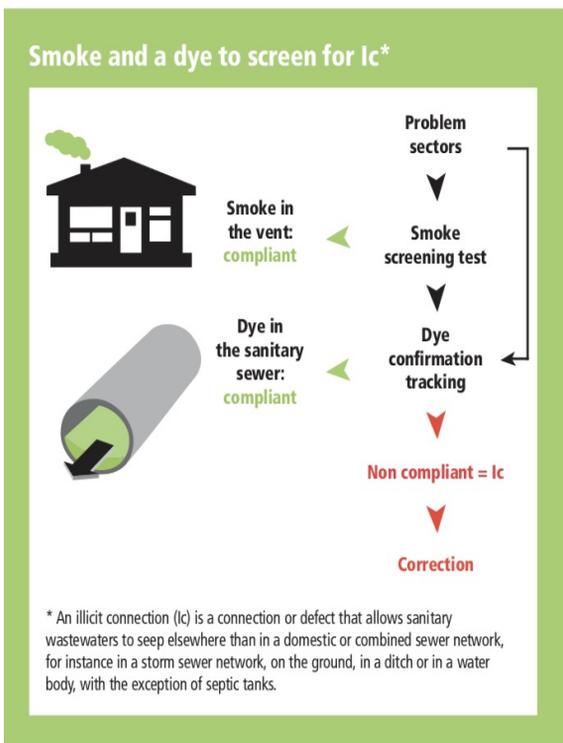
Once the study was completed, four new problematic sectors were confirmed. Their location and the addresses concerned were then communicated to the local authorities in order for the buildings located in these sectors to be subjected to a detailed screening. As for the two remaining problematic sectors, they revealed themselves to be exempt of any signs of sanitary contamination.

Progression of the PLUVIO Program

Since the inception of the PLUVIO program, more than 19,800 civic addresses have been identified and 93% of these were exempt of IC. To date, of the 1186 confirmed Ic¹, 605 or 51% have been corrected.

In 2020, despite the difficult context caused by the pandemic, some administrations, of which Ville de Montréal's Direction des réseaux d'eau as well as the municipalities of Dollard-des-Ormeaux and Ste-Anne-de-Bellevue continued to screen and correct illicit connections on a portion of their storm water systems.

Progress of the Correction of Ic (at Decembre 31, 2020)			
	Cities	Bor.	Total
Corrected Ic	310	295	605
Non corrected Ic	30	551	581
Confirmed Ic	340	846	1186



¹ The number of confirmed Ic changes according to the information sent by the related cities and boroughs following their verifications

FOR FURTHER INFORMATION

Readers are invited to consult the RSMA's Web site at <https://montreal.ca/> and Ville de Montréal's open data site at <http://donnees.ville.montreal.qc.ca/>.

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