2021 Environmental Assessment Report

Portrait of the Quality of Montréal's Water Bodies

Service de l'environnement

A Hot and Dry Summer in 2021

The first few months in southern regions of the province experienced the second warmest temperature levels recorded over the past 100 years. This warm weather had an effect on snow cover, which reached its lowest level in mid-April, according to the Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). The earlier return of above-freezing temperatures, combined with a decrease in the amount of rain normally seen in April, encouraged rapid meltwater runoff and led to an early end to light spring flooding.

Precipitation (254 mm) during the 2021 sampling season was the lowest recorded since the Réseau de suivi du milieu aquatique (RSMA) programs began in 1999. Compared with the average over the last 10 years, a 33% decline in precipitation, a 40 cm decrease in the level of the Lac des Deux Montagnes and a 24% decrease in the flow of the Riviere Des Prairies were measured in 2021. The flow of the Fleuve Saint-Laurent was nevertheless maintained at a value within the historical average (8,500 m^3/s), due to the control structures and the water inflow from the Great Lakes.

August 2021 can be highlighted as the warmest August in at least 100 years, and the driest in the last 110 years. As a result, flows and levels in Montréal's inland water bodies reached low values during the 2021 summer season.

Rivière-des-Prairies (Pont Charles-De Gaulle)

QUALO: An Above-Average Year

The RSMA carries out the QUALO sampling program to measure the bacterial quality of the water along the shores of the Island of Montréal on a weekly basis. Over time, this initiative has identified areas that are suitable for the creation of new facilities to promote the reappropriation of water quality-related uses by citizens. In 2021, the QUALO program was carried out at 103 monitoring stations from May 17 to September 30, i.e. over a period of 20 weeks.

Sampling Method

Our sampling method consists of taking water samples at a distance of approximately one to two metres from the shoreline, using a pole equipped with a bottle holder and a sterile bottle. Samples are taken at a depth of approximately 30 cm below the water surface. The samples are then placed on a bed of ice and kept at about 4°C in a cooler until they are delivered to the laboratory for analysis.

Parc Stoney Point

QUALO Indicator

The QUALO indicator, created by the RSMA, makes it possible to determine whether the bacterial quality of the water along the shoreline is satisfactory for the practice of various recreational activities that involve direct contact with our water. For a monitoring station to obtain QUALO approval, it must fulfill the following two conditions: the geometric mean of all results must not exceed 200 COLI[1] and no more than 10% of its samples may exceed 400 COLI. The QUALO indicator is not a standard for bathing and results are not reported in real time due to the minimum 24-hour delay required for microbiological analysis. Since the bacterial quality of shoreline water is strongly influenced by precipitation, there may be a difference between the quality of the water at the time of sampling and the quality of the water at the time the results are published (rsma.qc.ca).

[1] Fecal coliforms in colony forming units (CFU) per 100 ml

65% of Stations Meet QUALO

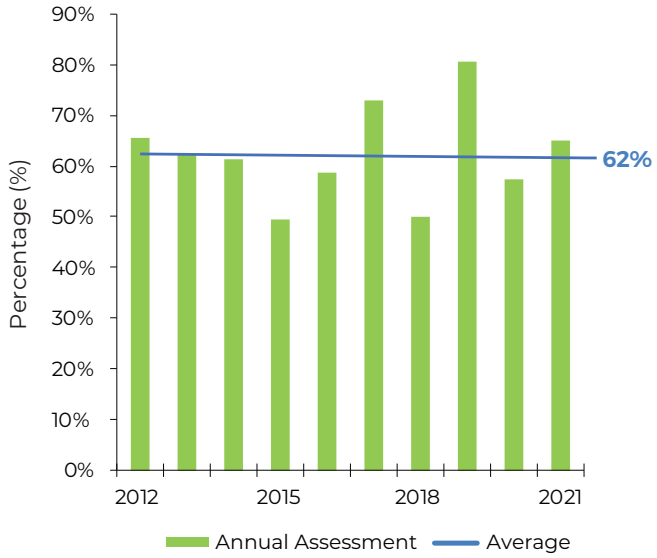
In 2021, 65% of monitoring stations achieved QUALO approval status compared with 57% in 2020. This result is above the 10-year average of 62%.

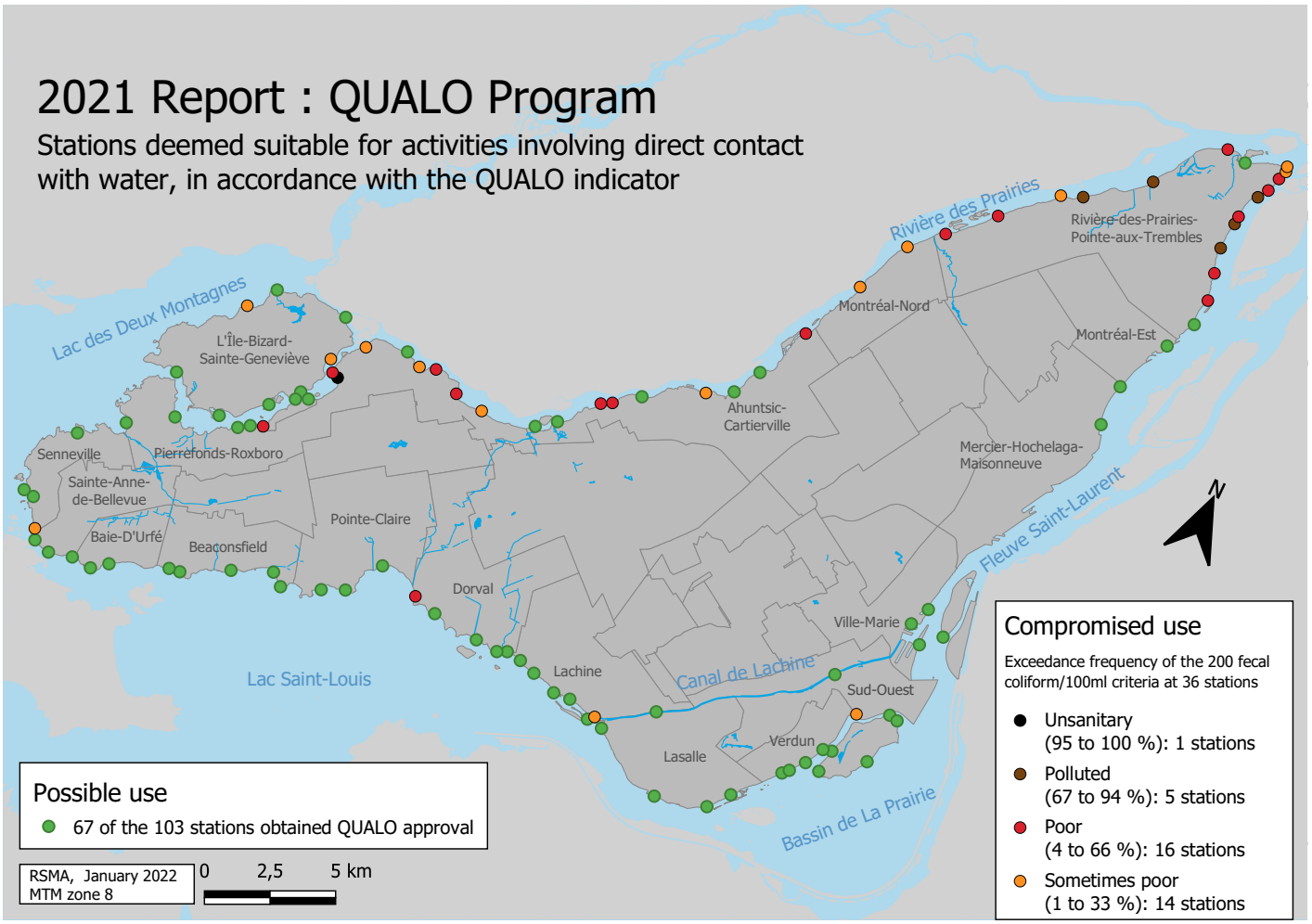
Of the 2,058 bacterial analyses performed in 2021 based on MELCC water quality criteria:

- **80%** of samples fulfilled the criterion of 200 COLI, allowing for recreational uses;
- **6%** of samples exceeded the criterion of 1,000 COLI, compromising all recreational uses.

Of the 103 monitoring stations, 67 obtained QUALO approval, while 36 had their uses compromised due to exceeding the 200 COLI criterion. The following map shows the results for 2021.

Percentage of QUALO Stations from 2012 to 2021





Parc Denis-Benjamin-Viger

Analysis by Water Body

Rivière-des-Prairies: 43% Meet QUALO

The number of stations on the Rivière des Prairies that obtained QUALO approval in 2021 is slightly lower than the average of 45%, calculated from the results of the past 23 years since the program began. This result could be explained by the reduced water exchange due to low water levels found in the Lac des Deux Montagnes and low flow rates in the RDP.

Notably, six of the sixteen monitoring stations that obtained QUALO approval in 2021 have now had it for over 15 years.

Île Bizard–Sainte-Geneviève: 75% Meet QUALO

The quality of the water on Île Bizard-Sainte—Sainte-Geneviève is generally good.

Only two of eight monitoring stations did not obtain QUALO approval in 2021, one more than in 2020. Three exceedences of the 400 COLI criterion out of twenty samples (15%) did not meet the maximum percentage set at 10%, which prevented QUALO approval for the monitoring stations at Terrasse Martin and Rue Émile.

Lac Saint-Louis: 88% Meet QUALO

In 2021, the number of monitoring stations with QUALO approval in the Lac Saint-Louis area is higher than the average of 71% over the past 23 years. Of the 498 samples collected during the season, 89% had counts below 200 COLI and only three of the 25 monitoring stations did not obtain QUALO approval.


Canal de Lachine

Bassin de La Prairie: 94% Meet QUALO

The Bassin de La Prairie area had a higher percentage of stations passing the QUALO criteria than the average of 81%, calculated from the results of the past 23 years. In 2021, 16 of 17 monitoring stations obtained QUALO approval, one more than in 2020. For the samples collected, 95% had analytical results below 200 COLI, compared with 91% in 2020. Only the monitoring station affected by the control structure of the Saint-Pierre collector did not obtain QUALO approval.

Fleuve Saint-Laurent: 44 % Meet QUALO

The percentage of stations passing the QUALO criteria improved from 2020 (13%), but remained slightly below the average of 47%, obtained from the results of the past 23 years. The Quai de l'Horloge beach station and the two stations on the Promenade-Bellerive were among the five monitoring stations that regained their QUALO approval in 2021. This improvement can be explained by the fact that only 16% of the samples were taken less than 24 hours after precipitation greater than 8 mm, compared with 30% in 2020.

Rivière à l'Orme

Few Changes for RUISSO

For the past 20 years, the RSMA has been monitoring changes in the water quality of streams and inland water bodies in urban areas through the RUISSO program. This program focuses on the importance of streams and inland water bodies and prioritizes actions to protect them. In 2021, the RUISSO program covered 24 streams and inland water bodies with 51 monitoring stations, which were sampled seven times between May 11 and November 9.

Conductivity, temperature, pH, and dissolved oxygen (DO) measurements were taken at each monitoring station. Other parameters, such as fecal coliforms (COLI), total phosphorus (Ptot), ammonia nitrogen (NH_3), suspended solids (SS), total organic carbon (TOC), turbidity and the main heavy metals, were analyzed in the laboratory.

In 2021, more than 8,300 measurements and results of physicochemical and bacterial analyses, obtained from the 349 water samples collected during the season, were used in the calculation of the RUISSO Index (RI). This index is used to assess the relative quality of the streams and to identify the downgrading parameter(s). It has been noted for several years that the parameters that most often decrease the water quality of streams and inland water bodies are total phosphorus, COLI, SS and oxygen deficiency.

Stormwater and water from storm drains are a significant source of pollution to waterways, particularly when they are located in highly industrialized areas of the city. It should be noted that the control of industrial pollution at the source is governed by regulations on the discharge of wastewater into sewer systems and waterways. The Service de l'environnement de la Ville de Montréal is responsible for both monitoring the quality of the aquatic environment and enforcing regulations aimed at reducing industrial discharges at the source throughout the territory of the Urban Agglomeration of Montréal.

RUISSO Index (RI)

The results obtained on the basis of the RUISSO Index (RI) for the water bodies sampled in 2021 are compared with those of the previous year. Their change is established according to whether an improvement (▲), stability (=) or deterioration (▼) of at least five units in the RI is observed. Overall, in 2021, water quality improved in 7 of the 24 streams and inland water bodies. The quality remained stable in 13 of them, and deteriorated in the remaining 4.

For the most part, streams and inland water bodies with RI values below 40 ("poor" or "polluted" quality) were affected by pollution problems and, in some cases, by inadequate water supply.

Classification of Streams and Inland Waterways in Accordance with the Ruisso Index (RI)

Streams and Inland Waters	RI 2021	Change
Lac aux Castors	86	=
Ruisseau Provost	80	=
Canal de Lachine	79	=
Étang du parc Docteur-Bernard-Paquet	78	▲
Étang du parc Lacoursière	73	▼
Étang du parc Lafontaine	61	▲
Étang du parc Angrignon	58	=
Lac des Battures	58	▲
Ruisseau Pinel	56	▲
Ruisseau Terra-Cotta	47	=
Bassin de La Brunante	45	▲
Lac du parc Centenaire William Cosgrove	38	=
Fossé Smith	36	=
Coulée Grou	35	▲
Ruisseau Bertrand	30	=
Ruisseau Saint-James	30	▲
Ruisseau O'Connell	29	▼
Ruisseau Bouchard	28	▼
Rivière à l'Orme	28	▼
Ruisseau Denis	27	=
Ruisseau De Montigny	23	=
Marshes at the Pointe-aux-Prairies Nature Park	20	=
Ruisseau Meadowbrook	19	=
Ruisseau Château-Pierrefonds	18	=

Excellent (RI 81 to 100):

Good (RI 61 to 80):

Satisfactory (RI 41 to 60):

Poor (RI 21 to 40):

Polluted (RI 1 to 20):

In other words, 38% of stations sampled were rated "excellent, good or satisfactory"; 27% were rated "poor" and the remaining 35% were rated "polluted."

The RUISSO Index, a water quality assessment tool for streams and inland water bodies

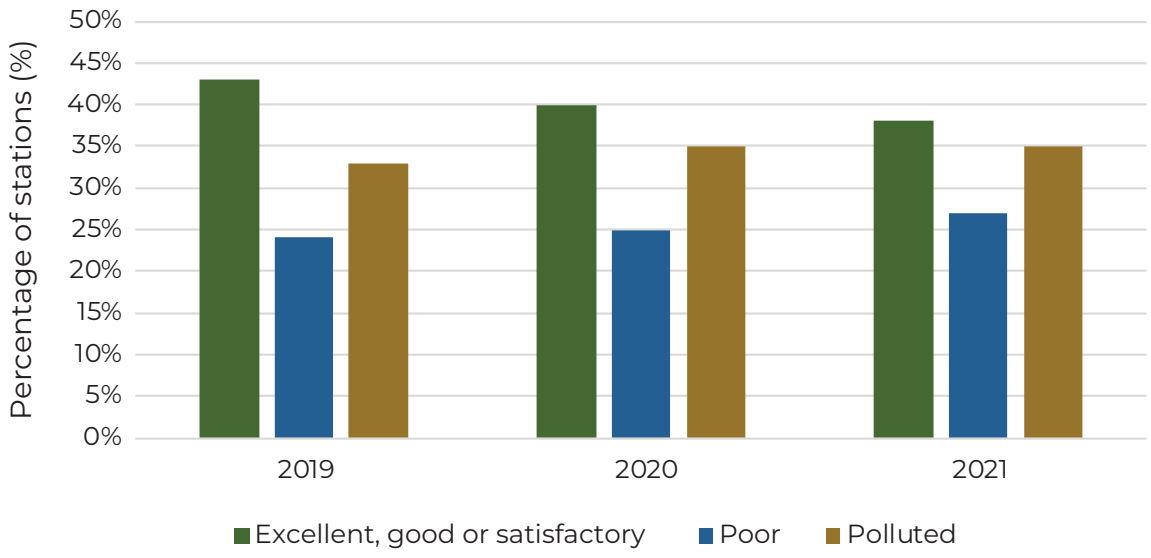
The RUISSO Index (RI) is an adaptation of the MELCC (Ministère de l'Environnement et de la Lutte contre les changements climatiques) bacterial and physicochemical quality index (IQBP). The RI considers the hydrology of streams and water bodies (marshes, swamps, basins, or ponds) and key criteria for protection of aquatic life or acute and chronic toxicity.

The figure below shows the three-year trend in the percentages of monitoring stations rated by category. There is a slight downward trend in the number of stations with "excellent, good or satisfactory" water quality, which translates into an increase in stations with "poor" or "polluted" water quality.

Streams Located in Ecoterritories

The Rivière à l'Orme originates in the city of Sainte-Anne-de-Bellevue and flows through an urban environment with parkland before reaching its mouth in Anse à l'Orme. The water quality of the Rivière à l'Orme (▾) deteriorated in 2021 at 4 of the 6 monitoring stations and remained stable at the other 2. Only the water at the Baie-D'Urfé monitoring station, coming from the Autoroute 20 junction, has "satisfactory" quality, while all the others are rated "poor" or "polluted." As in previous years, dissolved oxygen and phosphorus were the two limiting factors in this body of water. In 2021, beaver activity in the area caused the level of a portion of the Rivière à l'Orme to change.

Change in water quality at the 51 monitoring stations




Ruisseau Bertrand

Ruisseau Bertrand begins its journey north of Pierre Elliott Trudeau Airport, passing through industrial areas before winding its way through the Bois de Liesse Nature Park. In 2021, a slight improvement in water quality was noted at 3 of the 7 monitoring stations. However, the overall water quality of Ruisseau Bertrand (=) remained stable in the “poor” category, with phosphorus and COLI being the primary downgrading parameters.

Following a complaint received on February 23, 2021, the staff of the environmental monitoring and wastewater control division (CRSE) noticed the presence of hydrocarbons on the surface of Ruisseau Bertrand. Absorption pads were put into place to contain the spill, and in March, a clean-up operation was conducted to remove the contamination. On May 28, CRSE staff again found hydrocarbons in Ruisseau Bertrand. This was explained by a hydraulic oil spill from a damaged truck. The company responsible reported the incident and implemented corrective measures to prevent the incident from happening again.

In 2021, the overall water quality of Ruisseau De Montigny (=) remained in the “poor” category. This finding is largely due to the creek receiving water from a collector that drains the large industrial area of Anjou. Furthermore, CRSE staff responded four times during the year to oil and other contaminants found in Lac Anjou, where the creek originates. At each event, CRSE staff ensured that a proper cleanup was done to remove the contamination in its entirety. Dredging work was also carried out by the City of Montréal's Service de l’eau to remove sediment that had accumulated over the years in Lac Anjou.

The water quality of Ruisseau Pinel (▲) improved to “satisfactory.” But on three of the seven sampling tours, the stream was dry and no samples could be taken at the monitoring station.

Water quality at the Coulée Grou (▲) monitoring station also improved from “polluted” in 2020 to “poor” in 2021. However, insufficient water preventing any sampling at the monitoring station was noted during four out of seven of the tours.

Marshes and Swamps

Marshes and swamps are mainly fed by the drainage waters brought by stormwater and melting snow. These environments can sometimes suffer from a chronic water supply problem. They may also have elevated levels of ammonia nitrogen, phosphorus or COLI from animal sources. In these cases, the RUISSO Index must be interpreted with caution.

Étang aux Hérons

In August 2021, the Étang aux Hérons, an important wetland in Montréal's West End, dried up, endangering the habitat of several animal species. In September, in agreement with the MELCC, rehabilitating the environment with potable water made it possible to restore its natural state and thus preserve biodiversity in the urban environment.

For the past five years, the quality of the water at the outlet of the marshes at the Pointe-aux-Prairies Nature Park (=) remained in the "polluted" category. The parameters responsible for this result are phosphorus and dissolved oxygen. Only a better water supply can improve this situation.

Water quality at the Lac des Battures (▲) monitoring station improved, but remained in the "satisfactory" category, despite a 13-point increase in the RI. The main limiting factor remained phosphorous.

Rainfed Streams

Rainfed streams in the West Island of Montréal are canalized over much of their course, with some open sections.

Unlike in the previous year, the water quality of Ruisseau Saint-James (▲) improved and moved from the "polluted" to "poor" category. The monitoring station at the mouth of Lac Saint-Louis remains "polluted" and the contamination may well be sanitary in nature, as 6 of the 7 results obtained for COLI and total phosphorus were above 1000 and 30 µg/L, respectively.

For over 15 years, the water quality of Ruisseau Meadowbrook (=) has remained in the "polluted" category and the contamination seems to be from wastewater, as 6 of the 7 results obtained were above 1,000 and 30 µg/L for COLI and above 30 µg/L for total phosphorous.

The water quality of Ruisseau Terra-Cotta (=) remained in the "satisfactory" category, but phosphorus levels stayed high.

The water quality of Ruisseau O'Connell (▾) deteriorated from "satisfactory" to "poor" mainly due to dissolved oxygen deficiency.

For more than 10 years, the Ruisseau of Château-Pierrefonds (=) has remained polluted because its waters are heavily contaminated with coliforms and phosphorus.

Streams Draining from the Airport

Fossé Smith drains a significant portion of stormwater from the Montréal-Trudeau Airport. In 2021, the water quality of Fossé Smith (=) remained stable in the "poor" category, due to high levels of suspended solids and COLI.

The same holds true for Ruisseau Denis (=), where the overall water quality remained stable in the "poor" category. Only the monitoring station located at the mouth of the brook obtained a "satisfactory" quality assessment. In addition, a complaint received on May 18 by CRSE staff identified an orange-red viscous substance found on the surface of Ruisseau Denis. The source of this contamination could not be determined, but the substance was pumped out to restore the stream's equilibrium.


Contamination of Ruisseau Denis

The water quality of Ruisseau Bouchard (▾) deteriorated due to high SS, but remained in the "poor" category. Ruisseau Bouchard is impacted by industrial areas, the airport and the road network. On January 4, an accidental gasoline spill on the grounds of a commercial establishment resulted in the presence of hydrocarbons in Ruisseau Bouchard. Absorption pads were put into place to contain the spill and oil recovery and clean-up work was carried out to reduce the environmental impact.

In 2021, CRSE staff also identified oil and trash on the grounds of a commercial establishment. Its manager quickly corrected the identified problems to prevent pollutants from being washed into the stormwater sewer and Ruisseau Bouchard.

Inland Waters

The overall quality of the waters of Canal de Lachine (=), fed by the Fleuve Saint-Laurent, was stable in the "good" category. The RI (79) was only one point short of the "excellent" category, as were 2 of its 4 monitoring stations.

The water quality of Lac aux Castors (Beaver Lake) (=) remained "excellent" with an RI of 86, attributable to a low amount of suspended solids.

The water quality of the Parc Angrignon pond (=) also was stable in the "satisfactory" category, with the limiting factor still remaining total phosphorus.

The water quality of Étang du parc Lacoursière (▾) deteriorated, but remained in the "excellent" category despite a seven-point decrease in RI.

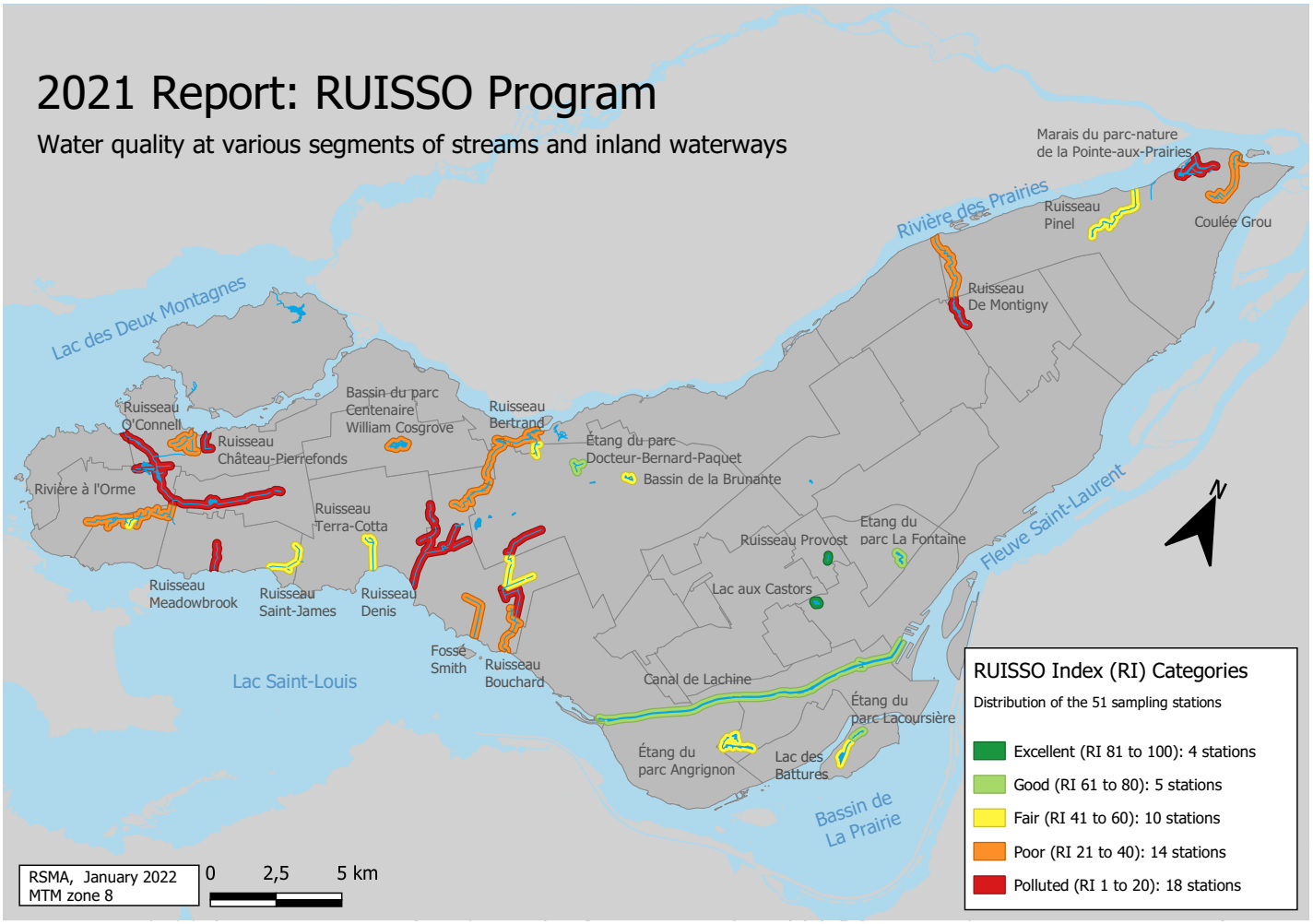
The water quality of Étang du parc Docteur-Bernard-Paquet (▲) improved, but remained in the "good" category, despite a seven-point increase in the RI (78).

The water quality of Bassin de la Brunante (▲) improved and once again remained at a "satisfactory" level, but as in the previous two years, the SS was a limiting factor.

The water quality of the Étang du parc La Fontaine (▲) improved sufficiently to be classified as "good" with an RI of 61. Total phosphorus and COLI are still the limiting parameters at this station. The presence of a high number of ducks near the monitoring station is likely the cause of the bacterial contamination in this pond fed by potable water.

The waters of the Parc Centenaire William Cosgrove basin (=) remained relatively stable, but the drop in RI to 38 due to high phosphorus still resulted in a category downgrade from "satisfactory" to "poor."

In closing, the water quality of Ruisseau Provost (=) remained in the "excellent" category for a second consecutive year since monitoring began in 2017.



PLUVIO: Continued Screening and Correction

The majority, or two-thirds, of the Urban Agglomeration of Montréal is served by a combined sewer system that carries rainwater and sanitary water to the Jean-R. Marcotte wastewater treatment plant. The remainder of the territory (mainly the two extremities of the Island of Montréal, as well as Île-des-Sœurs and île Bizard) is served by separate sewer systems made up of two distinct networks: 1) the stormwater network that evacuates stormwater runoff directly to inland water bodies or to boundary water bodies surrounding the Montréal archipelago; 2) the sanitary network that collects and directs wastewater from residences, businesses or industries to the wastewater treatment plant.

Reverse connections (Rc) can be found in the sectors served by separate sewer systems.

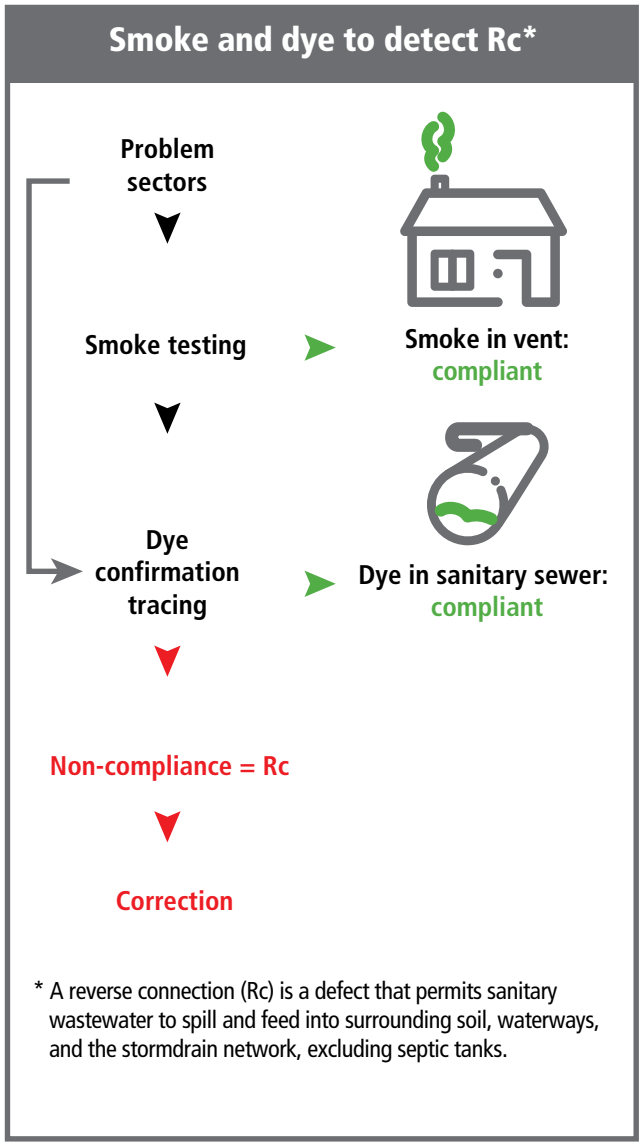
The PLUVIO program was launched in 2007 to identify, locate and correct problems related to reverse connections (Rc) on the territory of the Urban Agglomeration of Montréal.

The territory of Montréal has 585 stormwater networks. Of the 194 networks considered problematic because their outflow showed signs of contamination, 84 were found to be free of Rc during detailed studies. In fact, the contamination of these networks was of a diffuse or animal origin. In addition, all Rc were corrected in 20 networks. As for the other 90 networks, the detection and correction efforts will continue over the next few years.

Status of the Stormwater Networks in 2021	
Non problematic networks	391
Problematic networks	194
Details of the Problematic Networks	
No reverse connection (Rc)	84
Corrected	20
Awaiting corrections	64
Awaiting screening or validation	26
Total	**194**

Réseau de suivi du milieu aquatique (RSMA) Studies in 2021

The RSMA validated sectors where no Rc had been confirmed and where corrections had been made by boroughs and related cities. This is how 33 problematic sectors were identified in 23 stormwater networks. These were located in the boroughs of Rivière-des-Prairies—Pointe-aux-Trembles, Anjou, Montréal-Nord, Île-Bizard—Sainte-Geneviève, Pierrefonds—Roxboro, Saint-Laurent as well as in the cities of Dorval, Pointe-Claire, Dollard-des-Ormeaux and Sainte-Anne-de-Bellevue.



Once the study was completed, 22 were confirmed to be problematic. Their location was communicated to the local officials in order for the buildings located in these sectors to be subjected to a detailed screening.

As for the remaining 11 problematic sectors, they were found to be exempt of any signs of sanitary contamination. As a result of these validations, the number of corrected stormwater networks has increased from 17 to 20 compared with the previous year.

Progress of the PLUVIO Program

Since the inception of the PLUVIO program, over 21,000 civic addresses have been screened and, of these, 93% had no Rc. To date, of the 1298 confirmed[2] Rc, 623 were corrected, or 48%.

Progression of the Correction of the Confirmed Rc (as of December 31, 2021)

	Cities	Boroughs	Total
Corrected Rc	311	312	623
Non corrected Rc	63	612	675
Confirmed Rc	374	924	1,298

In 2021, the RSMA team participated in studies conducted by the Village of Senneville to identify defective septic system installations that may be the cause of bacterial contamination in the stormwater networks located on its territory. Although these deficiencies are not considered Rc, the RSMA encourages efforts to protect or improve water quality for the benefit of citizens throughout the Urban Montréal Agglomeration.

For any other information on water quality, contact us at:
environnement@montreal.ca
514-280-4330 or 311

[2] The number of confirmed Rc varies depending on the information provided by the related cities and boroughs following their verifications.

Montréal

montreal.ca

City of Montreal (April 2022)