

2015 Environmental assessment report

PORTRAIT OF THE QUALITY OF MONTRÉAL'S WATER BODIES

Service de l'environnement

Highlights

In 2015, the *Réseau de suivi du milieu aquatique* (RSMA) pursued its sampling program of water bodies and stormwater sewer systems on the territory of the agglomeration of Montréal.

A rainy summer and a rather high level St. Lawrence River

The summer of 2015 was marked by relatively significant precipitations (558 mm), exceeding the average of the past 10 years (495 mm). While the pattern of variation of flow rates and levels of the Des Prairies River was normal, the one for the St. Lawrence River was not typical, given that there were no floods, nor low flows and its level remained stable throughout the summer.

QUALO: a below average year

Barely 50% of sampling stations obtained their QUALO approval, that is to say that their water quality was conducive to direct contact water uses, compared to a historical average of 59% since the beginning of the program.

RUISSO: difficult preservation of the water's quality

An analysis of the results of the RUISSO index shows that the number of stations whose quality is "excellent, good or fair" decreased slightly while the number of "polluted" stations increased significantly.

PLUVIO: first portrait of stormwater systems

The study of the contamination origins of the 190 problematic stormwater sewer networks known to date was completed. The contamination source for 94 of these was of a diffuse or animal origin. As regards the other 96 networks, detailed screening efforts and corrective works are ongoing.

Closing of the southeast interceptor: localized and short-term impacts

An analysis of the results to date reveal a temporary increase in bacteria and nutrients, but not of metals. The return to normal was rapid and there was no indication of any persisting impacts.

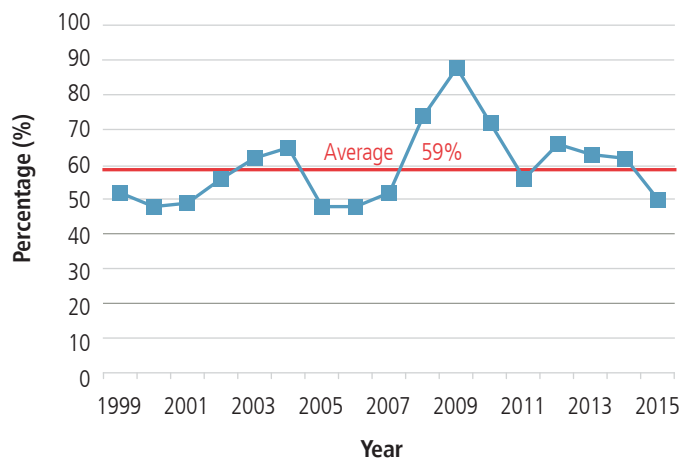


QUALO: deterioration due to rainfalls

The sampling season of the 2015 QUALO program was carried out over 20 weeks, from May 11th to September 24th, for a total of 79 sampling days. The distribution of the program's 101 sampling stations was the following: Des Prairies River (36), Lake Saint-Louis (25), La Prairie Basin (16), St. Lawrence River (16) and Île Bizard (8). As the work conducted on the southeast interceptor was performed after the program's sampling period, it could not have had any influence on the results obtained.

Of the 101 stations sampled in 2015, 50% obtained their QUALO certification, that is to say that they were deemed safe for direct contact water uses (threshold of 200 COLI or fecal coliforms per 100 mL). As indicated in the graph, this percentage is lower than the historical average of 59% obtained since the beginning of the program and that of 68% over the past seven years. Furthermore, 64% of the 1,915 samples analysed were inferior to the 200 COLI threshold, whereas 10% exceeded the 1000 COLI threshold (for indirect contact water uses). The distribution of the 51 problematic stations was the following: 16 sometimes poor, 25 poor, 7 polluted and 3 unsanitary.

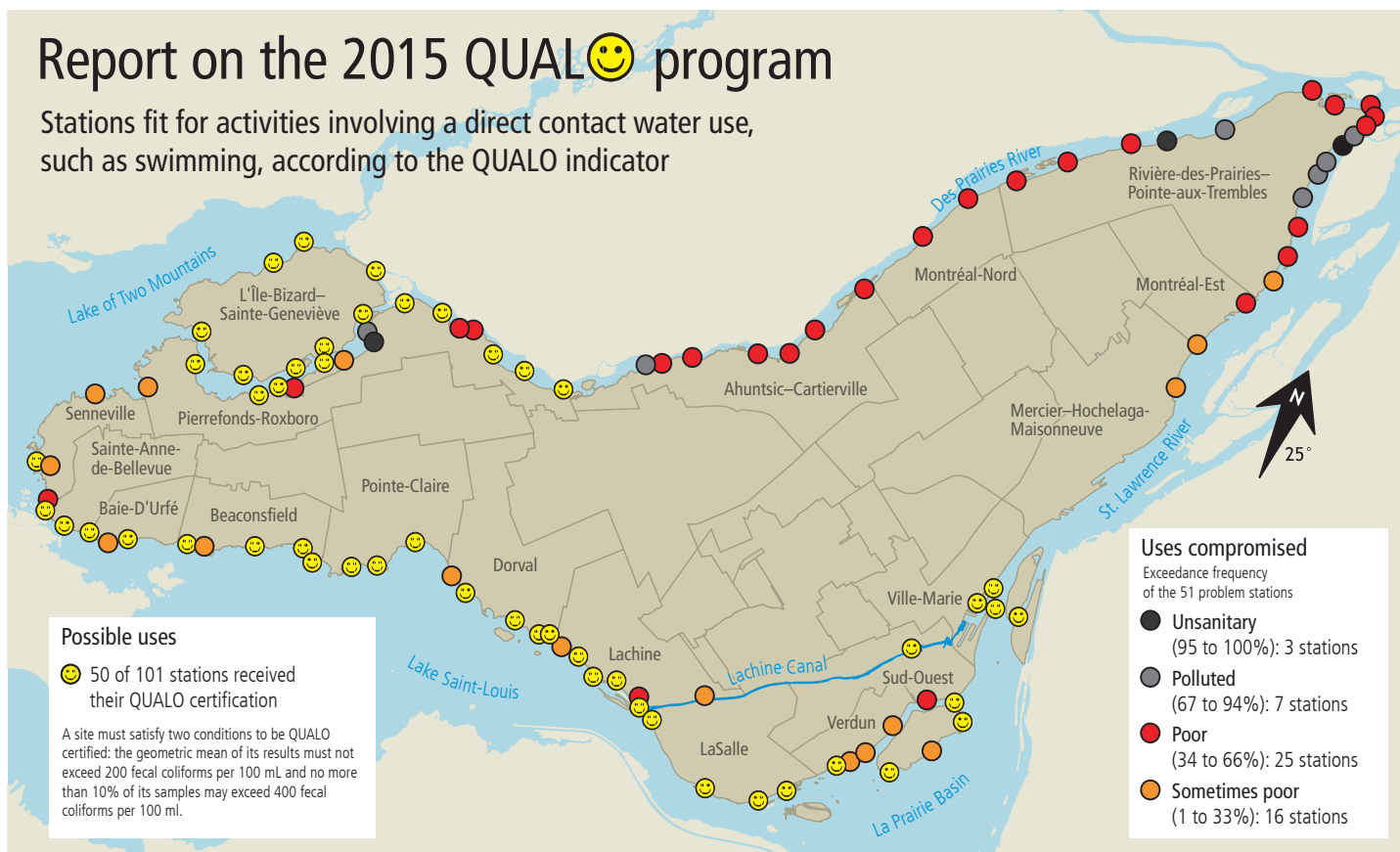
Evolution of the total percentage of QUALO stations since the beginning of the program in 1999



The year 2015 marked a sharp decline in the quality of shoreline waters which seemed to have improved over the past eight years. Since the beginning of the program in 1999, we must go back to 2006 to find a year with a such a low percentage of QUALO certified stations. The decline is essentially the result of the abundant rainfalls measured over the summer season (among the three rainiest summers in the past 20 years).

Report on the 2015 QUALO 😊 program

Stations fit for activities involving a direct contact water use, such as swimming, according to the QUALO indicator



Report by water body

Des Prairies River: 28% QUALO

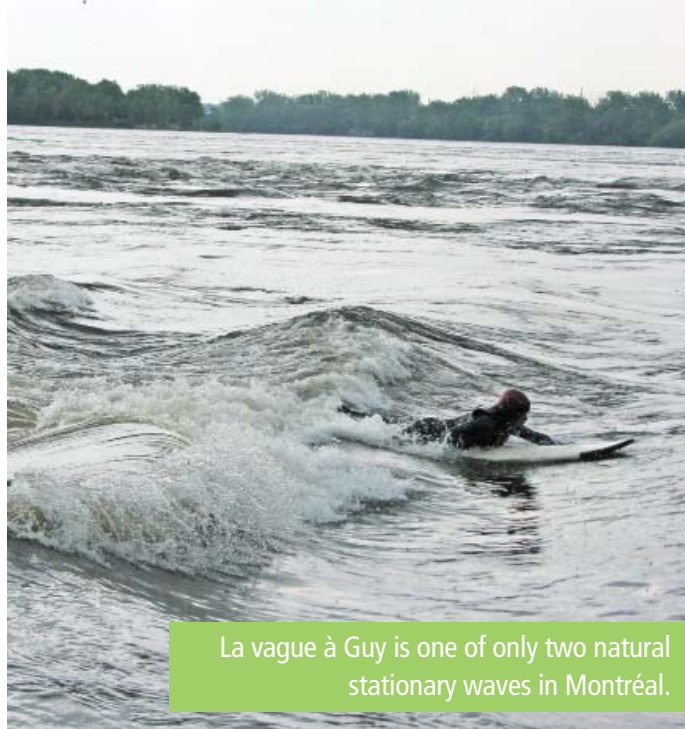
The number of QUALO certified stations declined by almost 20% relative to 2014, from 16 in that year to only 10 out of 36 in 2015. This is one of the lowest proportions recorded since the beginning of the program in 1999. Eight stations changed status: while a new station received its QUALO certification, seven were decertified. Once again, the results of the stations located upstream of the Lachapelle Bridge (Ahuntsic-Cartierville) were far better than those obtained downstream. With exceedance percentages of 95% of the 200 COLI threshold, the Rive-Boisée (Pierrefonds-Roxboro) and Cheval-Blanc (Rivière-des-Prairies—Pointe-aux-Trembles) parks obtained the worst results of the river. Significant water quality deteriorations, due to heavy rainfalls, were observed in two stations located downstream of Des Sources Blvd., i.e. those located in Île de Roxboro and Louise-Deschênes parks, with increases respectively of 35 and 45% of exceedances of the 200 COLI threshold.

Lake Saint-Louis: 76% QUALO

In 2015, the number of QUALO certified stations increased from 16 to 19 out of a total of 25 for the Lake Saint-Louis stations. The stations located in the Beaconsfield Yacht Club and Saint-James Park (Beaconsfield) regained their QUALO certification. The same is true of the Stoney-Point (Lachine) and Du Millénaire (Dorval) Park stations, often non-QUALO in recent years. As far as the water quality of Angell Park (Beaconsfield) is concerned, its station was decertified owing to three exceedances of the 400 COLI threshold. The quality at the Godin Park station (Sainte-Anne-de-Bellevue) still revealed signs of contamination. Overall, the water quality in that sector is rather good (geometric mean < 100 COLI at all stations) despite 22 exceedances of the 1000 COLI threshold.

La Prairie Basin: 63% QUALO

This sector witnessed a slight deterioration in water quality given that the number of non-QUALO stations increased from 3 to 6 out of a total of 16. The three decertified stations are located in the Lachine Canal (Lachine) and West-Vancouver (Île des Sœurs) parks and at Champlain Bridge (South-West). The downstream sector of the Honourable-Georges-O'Reilley (Verdun) Park still shows signs of contamination. However, the new stations located at La vague à Guy in the Des Rapides Park (LaSalle) and at l'Esplanade de la



La vague à Guy is one of only two natural stationary waves in Montréal.

Pointe-Nord (Île des Sœurs) received their QUALO certification. This last station replaces the one located downstream from Champlain Bridge, now inaccessible because of the construction work on the new bridge. A new venue for kayakers, the NAVI Centre, is located nearby.

St. Lawrence River: 19% QUALO

This sector experienced a very significant deterioration, the number of QUALO certified stations having declined from 8 to only 3 out of a total of 16. This is the lowest percentage recorded since the year 2000. The eight non-QUALO stations in 2014 remained so in 2015. Among the six newly decertified stations are the two stations of the Promenade-Bellerive Park (Mercier—Hochelaga-Maisonneuve) as well as the station at Fort-de-Pointe-aux-Trembles Park (Rivière-des-Prairies—Pointe-aux-Trembles) that were all QUALO certified for more than 5 consecutive years. Generally speaking, the stations located upstream from the Pointe-aux-Trembles Marina show an exceedance percentage of the 200 COLI threshold lower than 30% whereas those located downstream reveal exceedances greater than 60%. An analysis of the results obtained at these stations shows that they were sensitive to the heavy rainfalls, thus the significant deterioration measured.

Île Bizard: 100% QUALO

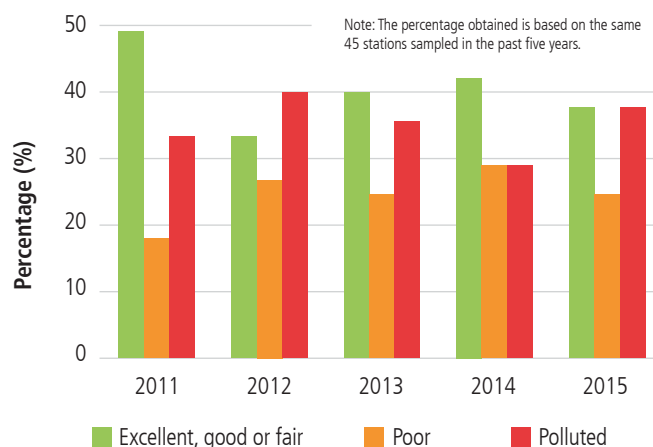
For a second consecutive year, the eight stations surrounding Île Bizard were all QUALO certified. Exceedance frequencies of the 200 COLI threshold lower than 15% were obtained at all of the sector's stations, except for the station located in Terrasse-Martin Park (25%). Only four exceedances of the 1000 COLI threshold were measured out of the 160 samples taken.

RUISSO: difficult preservation of the water's quality

In 2015, the sampling program focused on 24 streams and inland waters, and relied on a total of 50 stations. Certain adjustments were made to the RUISSO program with the addition of five new stations and the withdrawal of five others for reasons of accessibility and relevance. Sampling at the stations was conducted on seven occasions between the months of May and November. A total of 342 water samples were collected and 8,322 analysis results were used to compute the RUISSO Index (RI).

Based on the results of the RI calculated for the same 45 stations sampled in the past five years, one can state that the water's quality in 2015 improved at 29% of these stations, while it remained stable at 42% of them and deteriorated at 29% of them. Comparing the results of these 45 stations with those of 2014, one can observe that the number of stations having an "excellent, good or fair" water quality declined from 19 to 17, the number of stations whose quality was rated "poor" also declined, from 13 to 11, and the number of stations with "polluted" water increased from 13 to 17. This comparison indicates a deterioration in the water quality of streams in 2015, essentially due to heavier and more frequent rainfalls.

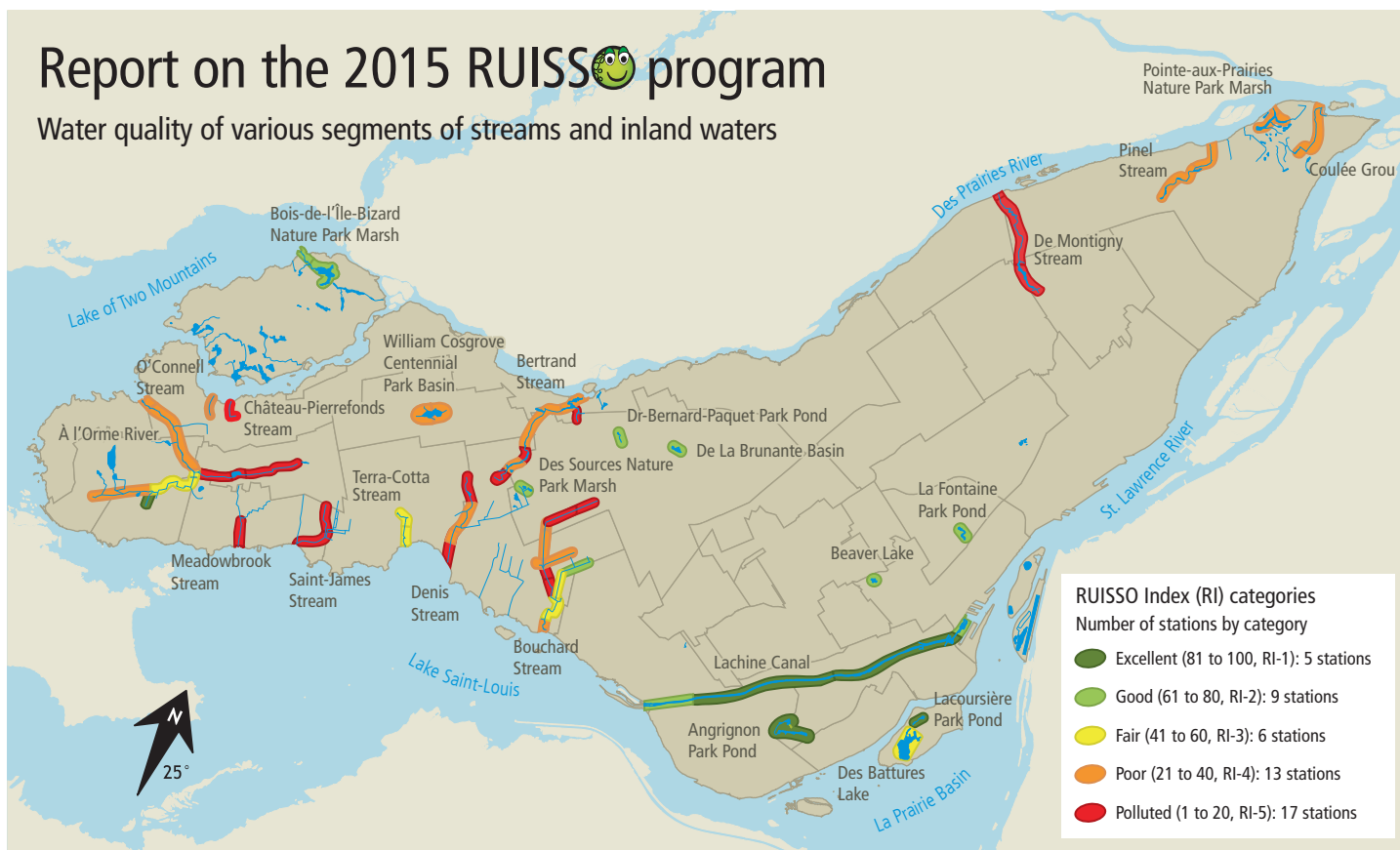
Evolution of the water quality of streams and inland waters



As always each year, the water bodies that are supplied by an aqueduct system, artesian wells or the waters of the St. Lawrence River are generally of good quality. Thus, the Lacoursière and Angrignon Park ponds obtained a rating of RI-1, the very best (water is rated "excellent"), while seven other water bodies obtained a RI-2 rating, their water being deemed "good", particularly urban ponds and certain marshes.

Report on the 2015 RUISSO program

Water quality of various segments of streams and inland waters



Two water bodies were rated “fair” (category 3), i.e. the Des Battures Lake and the À l’Orme River. The water quality in the Des Battures Lake showed a slight improvement (10-point progression). As far as the À l’Orme River is concerned, sampling of the tributaries from Baie-D’Urfé and Sainte-Anne-de-Bellevue was resumed, as was the case before 2011. The results demonstrate that the water from Baie-D’Urfé is of excellent quality, whereas that of the other tributary, on the contrary, indicates a phosphorus enrichment. Other poor results were also obtained further downstream, close to a tributary supplied by the stormwaters from residential districts in Kirkland. The strong values of fecal coliforms (an average of nearly 9,000) indicate the probable persistence of illicit connections despite the corrections performed.

The streams and inland waters with an RI-4, a water rated “poor”, are generally affected by pollution issues, such that the RI calculated remains more or less stable year after year. Illicit connections are present in many of the main sewers that supply them. Among these are the Bertrand, Pinel, Bouchard and O’Connell streams as well as the William Cosgrove Centennial Park Basin. Furthermore, the overall water quality of the Bouchard Stream is unchanged since last year. Occasional high values of suspended matter were measured at the stations in the vicinity of the airport. Moreover, the ammoniacal nitrogen values measured were generally lower than those in past years. Indeed, the maximum values measured declined by a little more than half, from 950 to 450 µg/L. Finally, certain water bodies in this category suffer from a chronic or occasional lack of water supply. This is particularly true of the Pointe-aux-Prairies Nature Park Marsh and the Coulée Grou, whose results, despite this, were better than in 2014.

The water quality of the Saint-James, Denis and De Montigny streams worsened in 2015 with a decline in RI of 5 to 10 points. The Meadowbrook and Château-Pierrefonds streams complete the group of water bodies with a RI-5, categorized as “polluted”. The waters of the De Montigny Stream, fed by the drainage waters of Anjou’s industrial sector, fared particularly poorly in 2015 (fecal coliforms, copper, lead and total phosphorus). Again this year, the waters of the Château-Pierrefonds Stream ranked last, due mainly to bacterial contamination issues (at least two values > 60,000 fecal coliforms), the adverse effects of the runoffs of the melting snow of the Pierrefonds-Roxboro snow dump and the many ongoing works in the neighbourhood.

The following table reveals an improvement of more than five points (Evolution: +) of the RI in 8 of the 24 streams and inland waters and a deterioration of more than 5 points (Evolution: -) of their RI in 10 water bodies.

Evolution of the categorization of streams and inland waters according to the RUISSO* Index

Streams and inland waters	Deficiency in water	RI 2015	RI 2014	Evolution **
Lacoursière Park Pond		1	2	+
Angrignon Park Pond		1	2	+
Lachine Canal		2	2	+
Des Sources Nature Park Marsh		2		
Beaver Lake		2		
Bois-de-l’Île-Bizard Nature Park Marsh		2	2	+
La Fontaine Park Pond		2	2	-
Dr-Bernard-Paquet Park Pond		2	2	-
De La Brunante Basin		2	2	=
À l’Orme River	Rare	3	3	=
Des Battures Lake		3	4	+
Terra-Cotta Stream		4	4	+
Pinel Stream	Occasional	4	2	-
Bouchard Stream		4	4	=
Pointe-aux-Prairies Nature Park Marsh	Occasional	4	5	+
O’Connell Stream		4	3	-
William Cosgrove Centennial Park Basin		4	4	-
Bertrand Stream	Rare	4	3	-
Coulée Grou	Chronic	4	5	+
Saint-James Stream		5	4	-
Meadowbrook Stream		5	5	=
Denis Stream		5	4	-
De Montigny Stream		5	4	-
Château-Pierrefonds Stream		5	5	-

* Taking into account all parameters, the RI determines the water quality category of each of the stations. The category of a water body is determined by calculating the average of the RIs obtained at all of its stations.

** The evolution was characterized as stable (Evolution: =) when the reading of the RI from one year to another revealed a variance of less than 5 points, unless it changes class. Thus, a water body can remain in the same RI category (20 points by category) even though it may have evolved by more than five points, as was the case for the Lachine Canal.

PLUVIO: first portrait of stormwater systems

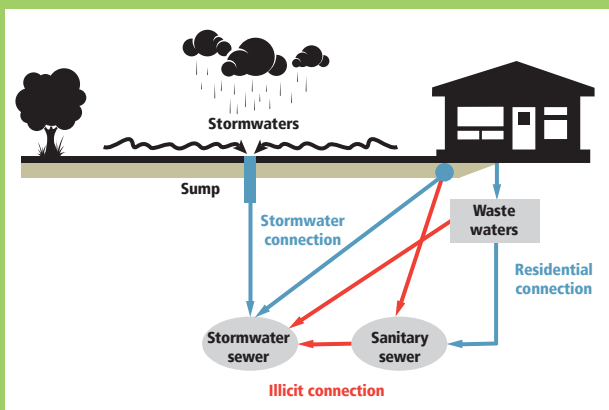
The PLUVIO program was implemented in 2007 in order to identify, locate and correct illicit connection (Ic) problems on the territory of the agglomeration of Montréal. All stormwater systems have now been studied. These systems serve an area of about 107 km², which includes some 71,000 civic addresses mainly located in the Island's two extremities, in Île des Sœurs and in Île Bizard. These sectors are served by separate sewer systems, namely a stormwater system that evacuates stormwaters directly into water bodies and a sanitary system that catches and directs the waste waters toward the treatment plant. It's only in those sectors served by separate sewer systems that illicit connections can be found.

Present situation of stormwater systems

In 2015, sampling of the last 97 stormwater networks, that had not yet been diagnosed since the beginning of the PLUVIO program, allowed the RSMA to complete its sampling of all the stormwater systems on its territory. The RSMA estimates at 587 the total number of stormwater networks, excluding those located in the port area. About a third of these 587 networks, 190 more precisely, are contaminated (> 400 COLI or fecal coliforms by 100 mL) at their outlet into a stream or watercourse. Consequently, the 397 other networks should not be affected by Ic.

Illicit connection

An illicit connection (Ic) is a connection or defect that allows sanitary waste waters to seep elsewhere than in a domestic or combined sewer network, for instance in a storm sewer network, on the ground, in a ditch or in a water body, with the exception of septic tanks.



Status of the 587 stormwater networks in 2015

Non problematic networks	397
Problematic networks	190

Details of the 190 stormwater networks

No illicit connection (Ic)	82
Corrected	12
Corrections to be validated	12
Awaiting corrections	54
Awaiting screening	30

The search, conducted in 2015, for the origins of the contamination in the last 39 problem networks allowed for the completion of the analysis of these 190 networks. About half are exempt of Ic, either because the contamination observed was of a diffuse or animal origin (82), or because the Ic were corrected (12). This complete portrait of the contamination's origin was established on the basis of the search for hints of sanitary contamination (paper, faeces, etc.) and bacterial measures.

As for the 96 other networks, some corrections (12) still need to be validated by the RSMA. The 84 others (54 + 30) are still waiting to be corrected and screened (smoke test and dye confirmation tracking) by local authorities.

The Baie-D'Urfé territory, served by septic tanks, was the subject of a detailed study in 2015 aiming to measure their impacts on the quality of stormwaters. Although we are not dealing with Ic, every effort should be made to improve their performance.

Continuance of the PLUVIO program

Upon completion of the work carried out in 2015 by the Service de l'eau, the boroughs, the reconstituted cities and the RSMA, it is estimated that some 1,500 civic addresses, found among 30 networks, are still waiting for a detailed screening by local authorities to identify the addresses that have an illicit connection. To date, 17,540 addresses have been screened. Of these, 16,110 were found to be compliant, 920 had an illicit connection, 510 still need to be confirmed and no less than 343 Ic had to be corrected. Over the next few years, the RSMA will pursue its efforts to check and approve the corrected stormwater networks to ensure that they have been totally rehabilitated or ascertain if some problem sectors still subsist.



FOR FURTHER INFORMATION

The reader is invited to consult the RSMA's Web site at rsma.qc.ca and Ville de Montréal's open data at donnees.ville.montreal.qc.ca.

Work in the southeast interceptor: localized and short-term impacts

Maintenance and rehabilitation work in the southeast interceptor of the Ville de Montréal's wastewater treatment network was conducted from November 11 to 14, 2015. During this period, the *Division du contrôle des rejets industriels* carried out a monitoring program of the St. Lawrence River water quality and an intensified surveillance of industrial discharges near targeted establishments. The monitoring program, designed by the RSMA, aimed to document the impact of the exceptional discharge of untreated wastewaters directly into the St. Lawrence River through 27 outfalls associated with 24 control and connection structures at the southeast interceptor, and this, before, during and after the work. These two special programs required more than 9,000 microbiological and physico-chemical analyses.



The results at the 69 stations revealed localized and short-term impacts during the discharge. Between November 11 and 16, a strong increase in the quantities of fecal coliforms was observed, particularly in shoreline stations. Bacteriological analyses also showed that 42 stations were influenced by the discharge. As for the chemical analyses, they revealed that a mere five stations located near the outfalls, particularly near the four structures discharging the greatest volumes, presented very occasional exceedances (less than 1%) of the threshold set by the *Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques* for surface waters in terms of ammoniacal nitrogen, copper, phosphorus and suspended matter. Also, there was no significant enrichment

for metals. By November 18, the values measured returned to the pre-discharge levels and there was no indication of any persisting impacts.

VILLE DE MONTRÉAL

PRODUCTION

Service de l'environnement
Division du contrôle des rejets industriels
Réseau de suivi du milieu aquatique

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PHOTOGRAPHY

Réseau de suivi du milieu aquatique
Ville de Montréal

GRAPHIC DESIGN

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COVER

Map turtles sunbathing in the
Lacoursière Park Pond in Île des Soeurs

2nd quarter 2016

ISSN 2291-7616 (Print)

ISSN 2291-7624 (PDF)

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