

2013 Environmental Assessment Report

# PORTRAIT OF THE QUALITY OF MONTRÉAL'S WATER BODIES

Service de l'environnement

# Highlights

The Réseau de suivi du milieu aquatique (RSMA) in 2013 pursued its sampling program of water bodies and stormwater sewer networks on the territory of the agglomeration of Montréal. The data collected is instrumental in identifying those problem areas where we need to intensify our water sanitation initiatives.

## **QUALO: stable quality, despite the weather's whims**

The number of stations lending themselves to direct contact water uses has decreased somewhat, their number having declined from 63 to 60. This is the result of the deterioration observed in 12 stations compared to last year and an improvement in 9 others. With an average of 63%, the overall results for 2013 are similar to those of the past 10 years.

## **RUISSO: a positive trend**

The quality of streams and inland waters has improved. Indeed, the number of stations whose quality was deemed "fair, good or excellent" increased from 21 to 26. Although some of the improvements may be due to the corrective measures undertaken on illicit connections, it is still too soon to confirm this hypothesis.

## **PLUVIO: progression in the study of stormwater networks and sewers**

The RSMA completed its study of eight stormwater outfalls in Dorval, of two stormwater sewers in Côte-Saint-Luc and Montréal-Ouest and of 13 others in the Bouchard Stream, all contaminated. The study of 146 of the 180 contaminated networks was conducted for the first time. To date, 640 incorrectly connected civic addresses have been confirmed and no less than 300 have been corrected. Starting in 2014, the RSMA will be compiling, in collaboration with Montréal's Service de l'eau, the identification and remedial actions on illicit connections in order to initiate a second audit phase to ascertain their absence in the corrected networks.

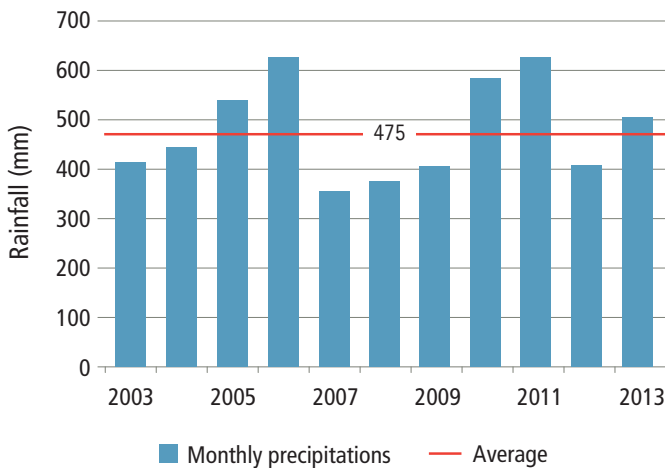


# Above average precipitations

Last winter, the Montréal region received 250 cm of snow, about 20% more than usual. In the spring, exceptionally warm temperatures accelerated the melting of the snow. As for the summer season, the average temperatures and precipitations were on par with seasonal averages despite conditions that varied significantly from one month to another.

With a total of 510 mm, precipitations for the summer of 2013 were 10% greater than the average for the past 15 years but equal to the average for the past 5 years. The month of June 2013 received 141 mm of precipitations against 74 mm in June 2012. July 2013 was a little warmer but as rainy as seasonal averages despite more frequent rainfall occurrences (31% of days recorded more than 2 mm of rain versus 20% in 2012). As far as August 2013 is concerned, it was drier than the average of the past 5 years (68 mm versus 112 mm).

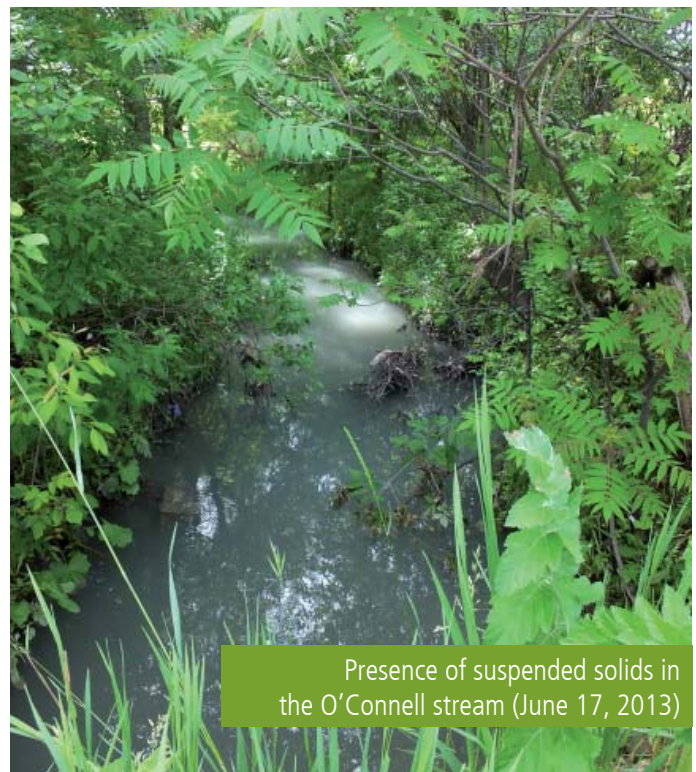
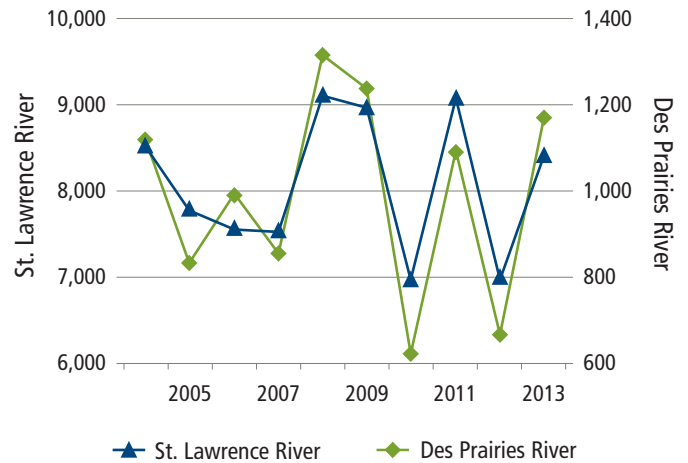
**Total precipitations from May to September (mm)**



Generally speaking, weather conditions for the summer of 2013 were consistent with seasonal averages. However, there were a few storms with very heavy rains and high winds, particularly on July 19<sup>th</sup> and August 13<sup>th</sup>. On August 13<sup>th</sup>, the recorded rainfall was 70 mm in a span of 4 to 6 hours. This phenomena is rather rare (once every 20 years or so) according to the rainfall statistics compiled by the weather stations for Southern Québec.

Water levels were at their lowest in August, even though they were not as low as in the preceding year. The RSMA noticed a jagged trend in the variations of water levels since 2003. In this respect, the 2013 season represents a peak in the data. It will be interesting to see what 2014 has in store for us.

**Average summer water flows from May to September (m<sup>3</sup>/s)**



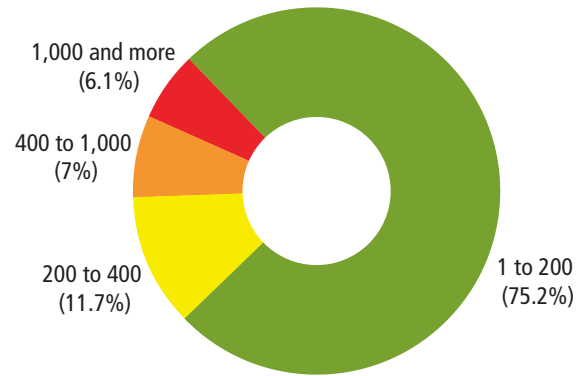
# QUALO: a stable situation

The QUALO program aims to determine whether the quality of shoreline waters is adequate for direct contact water uses, such as swimming. The number of stations and their geographic coverage have remained unchanged since 2012. The 96 stations are distributed as follows based on shoreline water uses: Des Prairies River (34), Lake Saint-Louis (25), La Prairie Basin (14), St. Lawrence River (15) and Île Bizard (8). The sampling activities were conducted four days at a time over a 20-week period (79 days) rather than three days at a time in 2012 (60 days).

60 of the 96 stations earned the QUALO certification, a decrease of 3% compared to 2012. With an average of 63%, 2013 results were similar to those of the past 10 years. Moreover, 75% of the 1,917 samples collected and analysed were lower than the 200 COLI threshold (78% in 2012) whereas 6% exceeded the 1000 COLI threshold (7% in 2012).

In comparison with 2012, it is the number of stations rated as "polluted" that increased the most, i.e. from 2 to 7. Also, more than half of the problem stations revealed themselves as being sensitive to precipitations. Given that 64% of the sampling tours

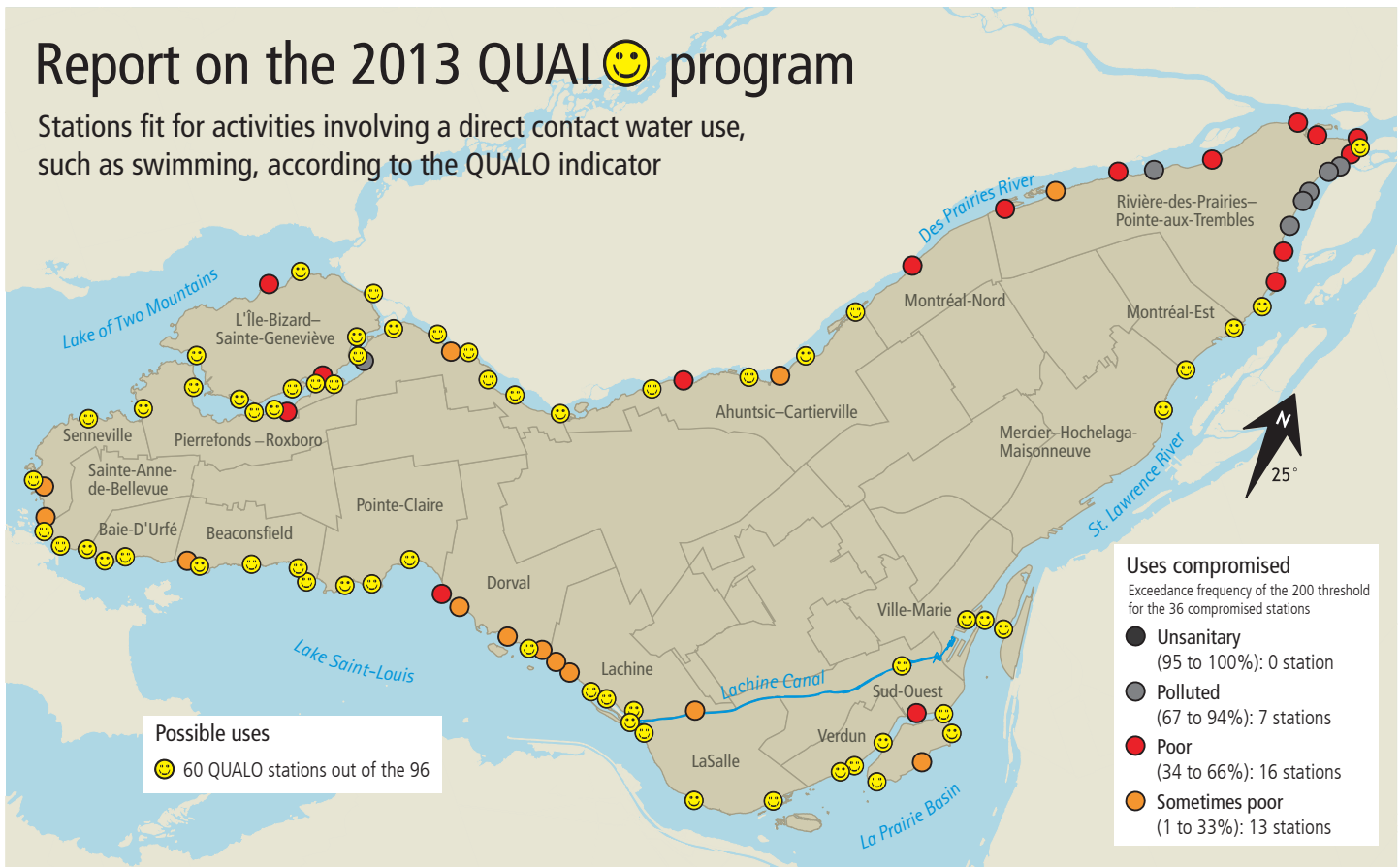
**Distribution of COLI results (faecal coliforms per 100 mL) in 2013**



were performed on rainy days or with rainfalls in the two preceding days (compared to 56% in 2012), a deterioration in water quality was expected. There was also an increase in the percentage of sampling tours with more than 8 mm of rainfall in the 60-hour period preceding the collection of samples (43% in 2013 versus 35% in 2012).

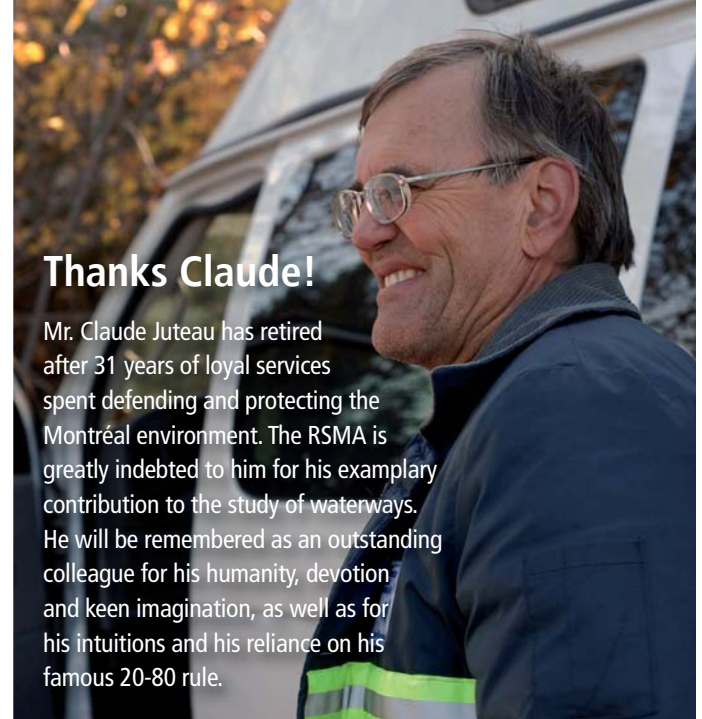
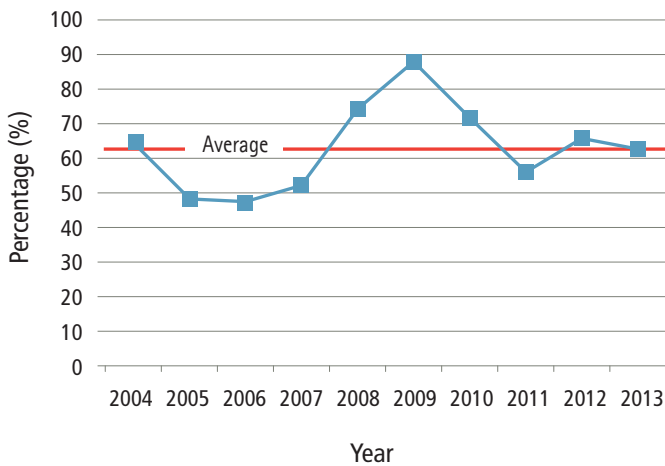
## Report on the 2013 QUALO 😊 program

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



If 2013 marked a certain decline in the quality of water bodies, the improvement observed in the last 10 years has by no means been compromised. Indeed, almost 40% of stations have satisfied the QVALO standards for at least five consecutive years and 18 stations for more than 10 years. Although these results are encouraging, there remains a lot of work to be done to fully recuperate the direct contact uses of the water surrounding the island of Montréal, particularly due to some faulty connections of sanitary sewer networks to rainwater networks resulting in the discharge of wastewaters into the environment.

**Evolution of the total percentage of QVALO stations over the past 10 years**



## Thanks Claude!

Mr. Claude Juteau has retired after 31 years of loyal services spent defending and protecting the Montréal environment. The RSMA is greatly indebted to him for his exemplary contribution to the study of waterways. He will be remembered as an outstanding colleague for his humanity, devotion and keen imagination, as well as for his intuitions and his reliance on his famous 20-80 rule.

## Report by water body

### Des Prairies River: 56% QVALO

Of the 19 QVALO stations in 2013, five are newly QVALO certified and four were decertified, which ranks this water body slightly above the average for the last decade (46% for this sector). The latter four, located in the western sector of the river, were affected by precipitations. Just one of these is found in the eastern sector, specifically in Moulin-du-Rapide Park. The proximity to a site frequented by many herring gulls may be the cause of this declassification. Generally speaking, the stations located upstream of the Lachapelle Bridge (Cartierville) post better results than those located downstream. The Cheval-Blanc (Rivière-des-Prairies–Pointe-aux-Trembles) and Rive-Boisée (Pierrefonds-Roxboro) parks once again posted the worse results (200 COLI threshold exceeded respectively 15 and 17 times out of 20). A significant proportion of the contamination measured in these sectors is due to the poor quality of the waters channeled by the rainwater networks in the vicinity.

### Île Bizard : 75% QVALO

The water quality at the Terrasse-Martin Park station is deemed "poor" with a 35% exceedance frequency of the 200 COLI threshold. The one located in the Denis-Benjamin-Viger Park lost its QVALO certification this year, despite the fact that it had been QVALO certified since 2008. Its sensitivity to precipitations will have finally compromised its quality. The six other stations around Île Bizard were QVALO certified. There were only three exceedances of the 1000 COLI threshold for this water body.

## Lake Saint-Louis: 68% QVALO

The quality of the shore waters of Lake Saint-Louis was generally good despite its deterioration in times of rainfalls. This is the sector that showed the greatest improvement in 2013 with an 8% increase in the number of QVALO stations (17 out of 25). The Ducharme Street station (Dorval) and the Angell (Beaconsfield) and Bertold (Baie-D'Urfé) park stations joined the ranks of the QVALO stations. However, the Lakeview Park (Beaconsfield) station lost its certification after six consecutive years of good results owing to three exceedances of the 400 COLI value (geometric mean of 118 COLI). The Baie-de-Valois (Dorval) Park station posted the worse results with an exceedance of the 1000 COLI threshold on five occasions during the season.

## La Prairie Basin: 79% QVALO

This year, 11 of the 14 stations obtained their QVALO certification, which is one less than in 2012. The Champlain Bridge station, located near an overflow structure, again fared poorly. Two other stations also did poorly: the first is located 2 km downstream of the inlet to the Lachine Canal while the second is found in West-Vancouver Park (Île des Sœurs in Verdun). These two stations had respectively enjoyed six and five years of good quality water. Overall, the water quality of the sector of the La Prairie Basin is rather good. Excluding the three non-QVALO stations, only two exceedances of the 1000 COLI threshold were measured in two stations.

## St. Lawrence River: 47% QVALO

It is in this sector where water quality has deteriorated the most. Of last year's 11 QVALO stations, only seven made the grade this year, placing this year's results below the average of the past 10 years. The newly decertified stations are located in the Pointe-aux-Trembles sector, more specifically in the Pointe-aux-Trembles marina and in the Marcel-Léger, Pierre-Payet and Bout-de-l'Île parks. The weather seems to have affected the quality of the water sampled in this sector, due to the presence of many contaminated stormwater outfalls and overflow structures. Several developments are scheduled in the vicinity of the Bout-de-l'Île Park (94<sup>th</sup> Avenue). The RSMA measured no less than 12 exceedances of the 200 COLI threshold and one exceedance of the 1000 COLI threshold among the 20 results obtained for that sector. With 12 exceedances superior to 1000 COLI, it's in the Pierre-Payet Park that the water quality was the worse followed, as is the case every year, by Clémentine-de-la-Rousselière Park with six exceedances of that same threshold.

## The QVALO indicator

This indicator signifies the maintenance of a very good bacterial quality allowing for direct contact water uses for a given station throughout the season, although a few exceedances of the 200 faecal coliforms per 100 mL (COLI) threshold may be tolerated. To earn the QVALO rating, a station must satisfy two conditions: its seasonal results must not present a geometric mean above the 200 COLI per 100 mL and a maximum of 2 samples (i.e. 10% of the 20 weeks of the sampling period) may exceed 400 COLI.

For further information about the location of the stations and the QVALO indicator, the reader should consult the *Qualité de l'eau en rive* (Quality of shoreline waters) section of the [rsma.qc.ca](http://rsma.qc.ca) Web site.

## Keep your eyes peeled!



Although our sampling staff tours the Island of Montréal over a 20-week period in the summer, your contribution is always welcome. Please don't hesitate to share your observations with them and question them. In doing so, you will help us to identify local problems and define some of our actions and initiatives.

# RUISSO: a better quality water

In 2013, a total of 54 stations were sampled from March to October. This year, the proportion of water bodies having an “excellent, good or fair” rating increased from 35% to 43% (on the basis of the 46 stations sampled in the past five years). The proportion of stations qualifying as “polluted” remained stable at 35% and those rating as “poor” decreased from 28% to 22%. Beyond these general trends, the results of the RUISSO index (RI) calculated for each station reveal that the quality of water has improved at 16 of the 53 stations relative to last year. It remained stable at 31 stations and deteriorated at only 6 stations. It is important to point out that Beaver Lake was closed in 2012 to benefit from restoration work.

As recommended under the Montréal Community Sustainable Development Plan, streams would benefit from being enhanced, restored and protected, as they constitute irreplaceable environments essential to biodiversity in an urban milieu. With its 54 stations, the RUISSO program allows us to collect essential data on the quality of the main streams and inland waters on the Montréal territory.

Evolution of the water quality of streams and inland waters

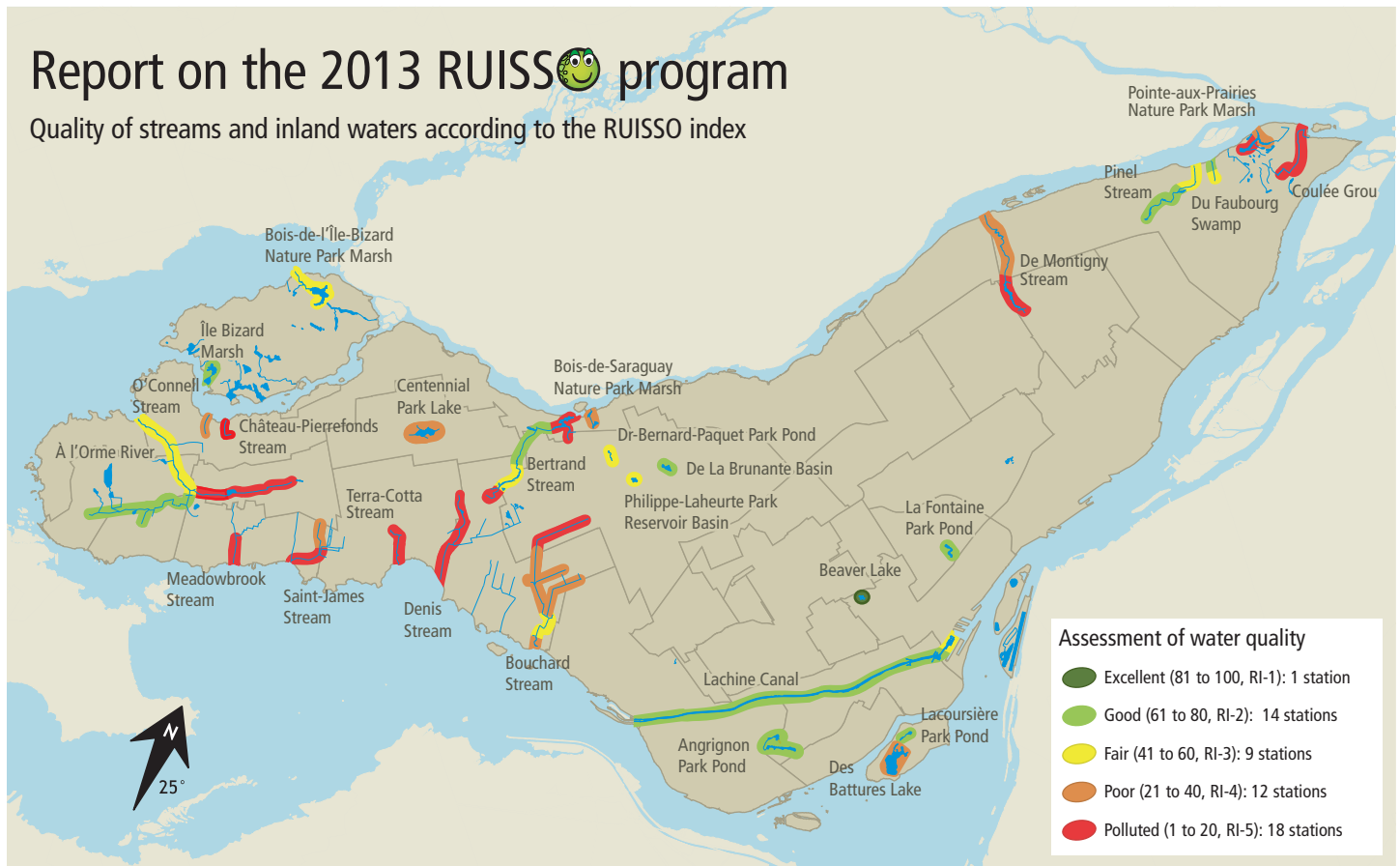


Note : The percentage for each year is based on the number of active stations during the current year.

For further information about the RUISSO program, the reader should refer to the *Qualité des ruisseaux* (Quality of streams) section of the [rsma.qc.ca](http://rsma.qc.ca) Web site.

## Report on the 2013 RUISSO program

Quality of streams and inland waters according to the RUISSO index



# Quality assessment of streams and inland waters

The overall assessment of the quality of streams and inland waters indicates that it is Beaver Lake that obtained the highest RUISSO index (RI) in 2013. This is a significant improvement relative to 2011 and its index inferior to 50. Lachine Canal and the urban marshes, located in parks, follow in terms of rating with very good RIs (between 64 and 71). All of these, supplied by the St. Lawrence River or the aqueduct network, are generally of good quality, except in periods of rainfall. Their sampling enables us to better understand the nature of pollution issues.

Streams and inland waters with a RI of less than 40, i.e. those rated as being “poor” or “polluted”, are generally affected by pollution issues, such as illicit connections in the collectors that feed them and, in many cases, by a deficient water supply despite abundant rainfalls. For many, this is a chronic problem and their RI is more or less stable over the years.

To resolve the growth of algae in the La Fontaine Park Marsh, the borough of Plateau-Mont-Royal undertook some major works and tested various approaches in 2013. Aerators were also installed, an organic sun screen was used and, according to the samples taken in July by the RSMA, a copper-based algicide was also utilized.

Although a slight RI improvement was noticed in the À l’Orme River, the results at the station located downstream of the residential sectors of Kirkland (median COLI = 4500) indicate that the improvements expected following the remedial measures undertaken have yet to materialize. However, it is possible that this may be due to the illicit connections that still need to be corrected. The RSMA intends to keep a watchful eye on the water quality of the collectors feeding the river over the next few years.

It seems that the overall water quality of the Bouchard Stream has slightly improved since last year, its RI having progressed from 23 to 28. However, relatively high values in ammonia nitrogen (approaching 600 µg/l) have sometimes been recorded in the various stations of the stream in the early sampling tours conducted during the snow melt period.

As for the Coulée Grou, the Pointe-aux-Prairies Nature Park Swamp and the Bois-de-Saraguay Nature Park Marsh, they still suffer from a chronic insufficient water supply.

Closing out the list are the Meadowbrook, Château-Pierrefonds and Denis streams, still affected by illicit connections. The Château-Pierrefonds Stream, in addition to poor connection problems, is also negatively impacted by the melted snow waters of the neighboring Pierrefonds-Roxboro snow dump and the many works in progress in its vicinity. As far as the Denis Stream is concerned, an intervention, led by the Service de l’environnement, allowed for the correction of a faulty connection resulting in the presence of a dye in the stream. However, it still ranks dead last and this, mainly because of many COLI exceedances.

## Spring peeper (*Pseudacris crucifer*)



The spring peeper is one of the most common amphibians in Québec. It is best identified by the “X” shaped mark on its back. It is difficult to observe owing to its small size (about 3.7 cm). Forests, wastelands, ponds, cattail marshes, swamps and bogs constitute its habitat. Adult spring peepers pass most of their time on the ground and in trees. The adhesive pads on the end of their legs allow them to cling to plant stems and leaves. Their presence is a good indicator of the quality of natural habitats. A variety of terrestrial and aquatic habitats is needed to ensure their protection.



## Assessment of RUISSO\* Index

Watercourses and inland waters	2013 Index	2012 Index	RI** Evolution
Beaver Lake	86	-	Restoration in 2012
Lachine Canal	71	73	Stable
Angrignon Park Pond	69	70	Stable
Lacoursière Park Pond	67	62	Improvement
La Fontaine Park Pond	65	61	Stable
De La Brunante Basin	64	56	Improvement
Du Faubourg Swamp	64	-	-
Pinel Stream	62	54	Improvement
Île Bizard Marsh (Cap-Saint-Jacques Nature Park)	61	48	Improvement
Dr-Bernard-Paquet Park Pond	56	59	Stable
Bois-de-l'Île-Bizard Nature Park Marsh	56	52	Stable
À l'Orme River	51	44	Improvement
Philippe-Laheurte Park Reservoir Basin	48	51	Stable
O'Connell Stream	40	49	Deterioration
Des Battures Lake	37	38	Stable
Centennial Park Lake	36	37	Stable
Bertrand Stream	33	22	Improvement
Bouchard Stream	28	23	Improvement
Saint-James Stream	28	27	Stable
Bois-de-Saraguay Nature Park Marsh	28	15	Improvement
Pointe-aux-Prairies Nature Park Marsh	24	16	Improvement
De Montigny Stream	22	22	Stable
Terra-Cotta Stream	20	20	Stable
Meadowbrook Stream	20	17	Stable
Coulée Grou	19	18	Stable
Château-Pierrefonds Stream	17	16	Stable
Denis Stream	12	22	Deterioration

\* The RUISSO index allows us to assess the physico-chemical and bacterial quality of a watercourse relative to 25 quantified parameters (principal metals, phosphorus, ammonia nitrogen, dissolved oxygen, suspended solids and faecal coliforms). The index threshold below which water quality is deemed poor (IR-4) or polluted (IR-5) for a given parameter is "40".

\*\* The situation has been characterized as stable when the RI reading from one year to the next indicates a variance of less than 5 points.



A dye spill in the Denis Stream due to an illicit connection (August 28, 2013)

# PLUVIO: toward a first diagnosis

The greater portion (2/3) of the Montréal agglomeration territory is served by a sewer network which combines rainwaters and sanitary waters and diverts them to the Jean-R. Marcotte waste water treatment plant. The rest of the territory (mainly in the Island of Montréal's two extremities, as well as Île des Sœurs and Île Bizard), is served by a dual network. The rainwater network evacuates rainwaters directly into adjacent water bodies, which surround the Montréal archipelago, or into inland waters (streams or basins). The other network, the sanitary network, catches and diverts wastewaters from private homes, businesses or industries to the water treatment plant. It is precisely in these separate sectors that one may find illicit connections (Ic).

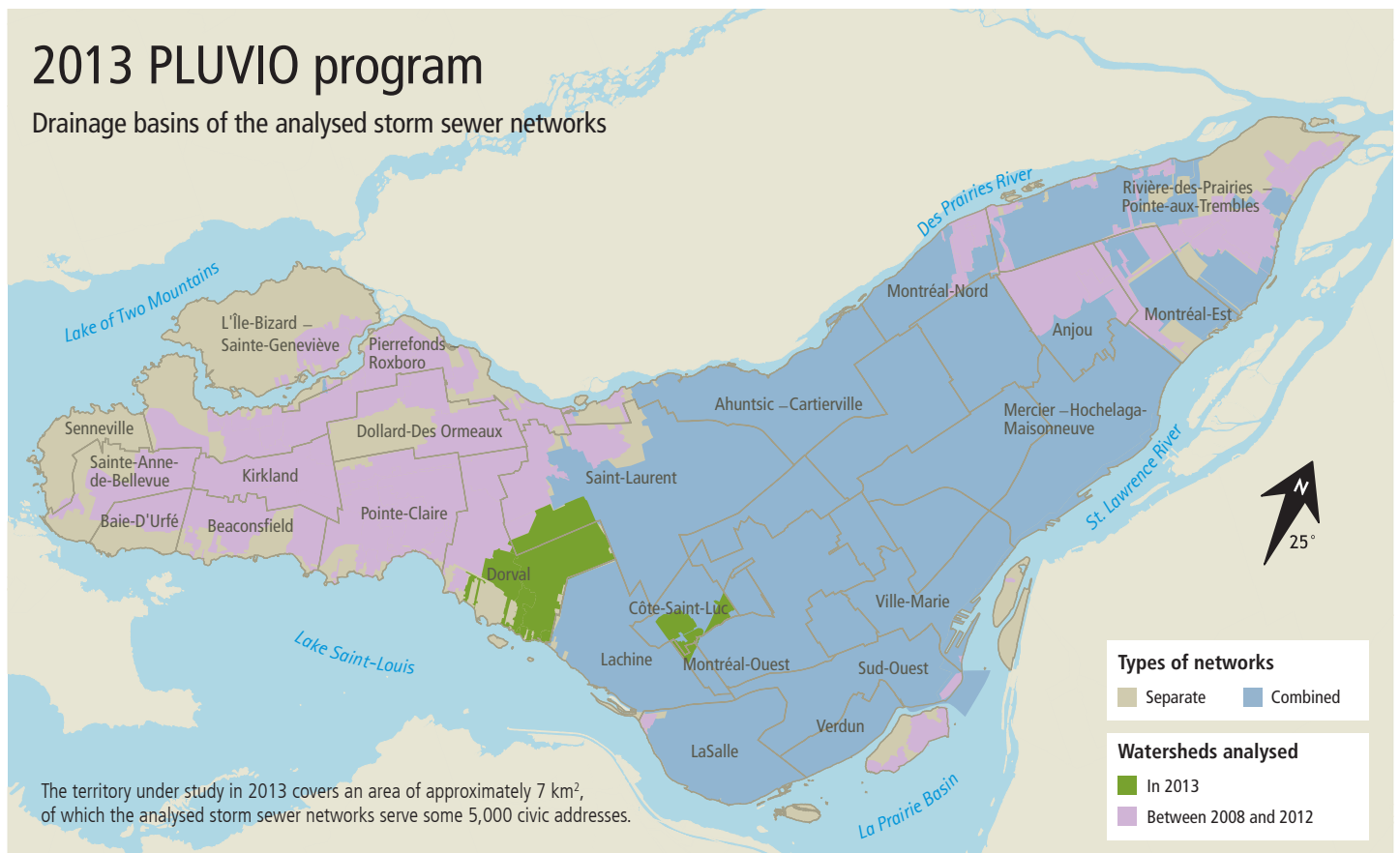
For many years now, the RSMA has identified stormwater networks as an important source of contamination of water bodies, due, not only to diffuse pollution, but also to illicit connections from the sanitary network to the stormwater network. The PLUVIO program was thus set up to identify and locate problems with the aim of correcting them. Until now, the territory under study by the program covers an area of approximately 100 km<sup>2</sup>, whose stormwater networks serve 63,000 civic addresses.



Stormwater sewer: take care of our watercourses!

## 2013 PLUVIO program

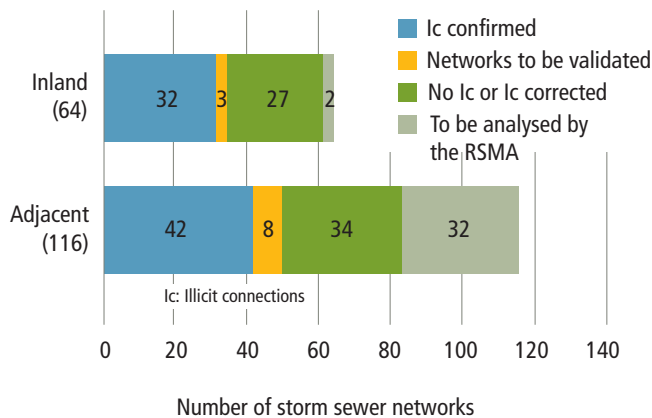
Drainage basins of the analysed storm sewer networks



According to studies performed by the RSMA, there may be some 560 storm sewer networks on the agglomeration's territory, excluding the port area. Of these 560 networks, almost 180, a third of them, are contaminated by faecal coliforms at their outlet. 450 problem areas have then been identified by the RSMA within these contaminated networks. Since the beginning of the millennium, the boroughs and reconstituted cities have verified some 13,000 civic addresses.

The graph below shows the degree of advancement of the studies performed to date by the RSMA on the 180 contaminated storm sewer networks. Of the 64 networks that flow into inland waters, 32 are deemed problematic (likely presence of Ic), 3 need to be checked, 27 networks showed no Ic or have been corrected (contamination from other sources) and only 2 networks still need to be studied. As for the 116 networks that flow into adjacent waters, 42 are problematic, 8 need to be checked, 34 were free of any Ic or have been corrected and 32 still need to be assessed. 11 networks will therefore be validated by a second study to verify the absence of Ic in the networks that are being corrected.

**Progress of the analysis of the 180 contaminated storm sewer networks discharging into waterbodies**



## Illicit connection

It's a connection or defect in a piece of equipment that allows sanitary wastewaters 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 watercourse, with the exception of a septic tank. The PLUVIO program identifies the problem areas, namely the segments of the storm sewer network that include buildings liable to be affected by illicit connections.

N.B. The expression "illicit connection" is used to distinguish it from a cross-connection. This expression, used in the field of potable water networks, designates a permanent or temporary connection between an intake for potable water and one for non potable water, for instance a connection with fire protection sprinklers or cooling water intakes.

The 2013 PLUVIO program allowed for the study of the two storm sewer networks located on the territory of the City of Côte-Saint-Luc, one of which is partially located on the territory of the City of Montréal-Ouest, and the completion of the study of the last eight contaminated stormwater networks on the territory of the City of Dorval. The study of the two first networks will allow us to better understand the sources of contamination of the Meadowbrook Golf Club stream, then to correct them. Also, the 36 outlets of the stormwater networks supplying the Bouchard Stream were sampled and more detailed research was performed on the 13 that were found to be contaminated. In 2013, the RSMA studied in detail a total of 23 networks.

Although the interpretation of the results obtained were still being assessed at the time this report was produced, the PLUVIO findings in 2013 indicate that Ic were present in some 40 sectors serving 360 civic addresses distributed among six stormwater networks. A more thorough screening will allow for the identification of the buildings that are incorrectly connected. Furthermore, 17 networks were found to be exempt from any Ic. Once again, bacterial contamination of animal origin revealed itself as a major factor of contamination of stormwater networks in dry weather conditions.



Station on the shore side of the Cours-du-Fleuve Park, downstream of Champlain Bridge, Île des Soeurs in Verdun

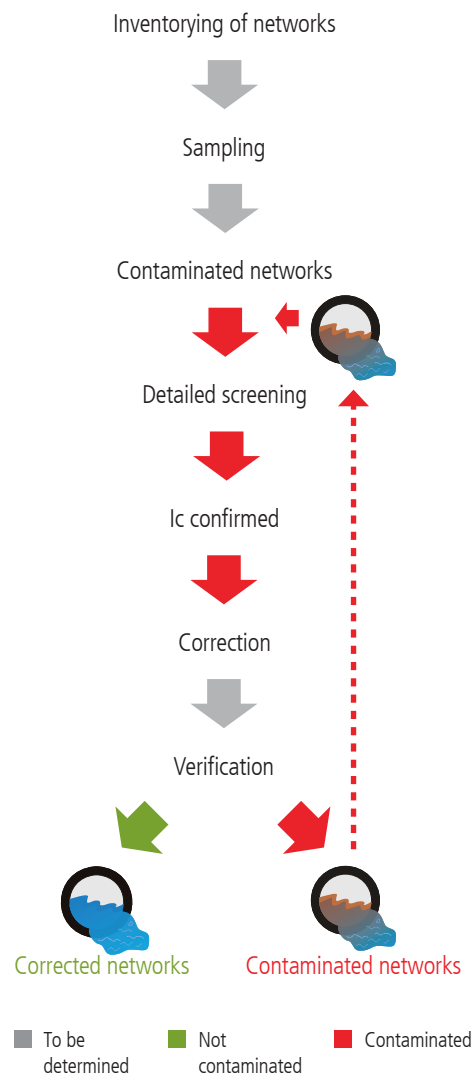
## From identifying problems to correcting them...

During a first inspection and sampling phase, the RSMA identified the problem sectors having streets that were liable to be affected by illicit connections (Ic). The boroughs and reconstituted cities, in collaboration with the Montréal's Service de l'eau and the RSMA, then identified the civic addresses that were indeed incorrectly connected and needed to be rectified. This screening is quite advanced with 640 Ic identified at this time, of which almost 300 have been corrected in the following boroughs and reconstituted cities: Ahuntsic-Cartierville, Beaconsfield, Kirkland, L'Île-Bizard–Sainte-Geneviève, Montréal-Nord, Pierrefonds-Roxboro, Pointe-Claire, Rivière-des-Prairies–Pointe-aux-Trembles, Sainte-Anne-de-Bellevue, Verdun and Ville-Marie.

However, the presence of Ic upstream of stormwater networks may mask the presence of incorrectly connected civic addresses downstream of the contaminated sewer. Once these Ic have been rectified upstream, the network needs to be sampled once again to check whether there are any remaining Ic downstream other than those already discovered. Ic identification and correction is an iterative process that is followed in an upstream to downstream direction.

In 2014, besides continuing the study of contaminated networks, the RSMA will undertake a second screening phase of 14 stormwater networks where corrections were made. Some networks may then be considered completely rectified while new problem sectors will be identified.

### The PLUVIO program process



#### VILLE DE MONTRÉAL

##### PRODUCTION

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