

LE FLEUVE

The St. Lawrence Action Plan: Third Anniversary

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The St. Lawrence Action Plan: Third Anniversary

Launched in 1988, the St. Lawrence Action Plan is still moving full speed ahead. The joint actions and coordination efforts of the Plan's various partners have truly been decisive in the success of the 1990-1991 activities.

The 1990-1991 annual report gives a factual outline of the progress made toward fulfilling the SLAP's objectives: 2540 hectares of farmland and wildlife habitats were preserved, the characterization and establishment of emission standards for the 50 priority industries is nearing completion, some twenty projects are being tested under the industrial technology program for priority plants, state-of-the-art scientific tools have been created and implemented, and various studies have been conducted on the status of the St. Lawrence and its behaviour, thereby increasing our understanding of the phenomena which characterize it.

Although these efforts point to a promising future for the St. Lawrence, much remains to be done. The coming years are sure to be busy but the outlook is very good. Joint action, coordination and partnership are essential in the pursuit of our ultimate objective: to protect and conserve the precious resource that is the St. Lawrence River.

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Conservation and Protection
Environment Canada

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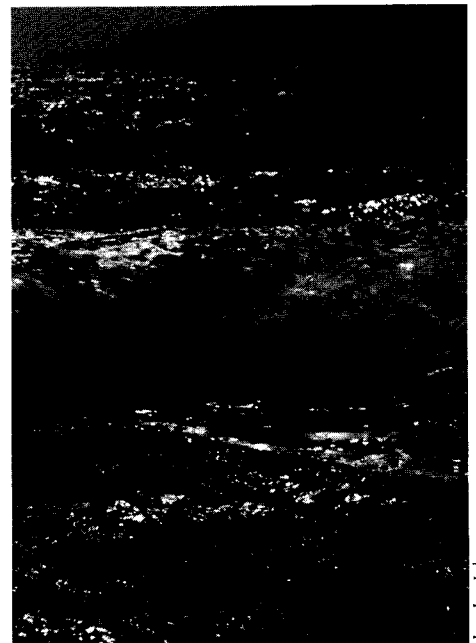
A Working Group on Zebra Mussels

Cooperating to Counter the Infestation

1990 The presence of zebra mussels is first heralded in Québec waters. Environment Canada's St. Lawrence Centre reacts quickly by setting up a working group to study the phenomenon and check the spread. "We knew that the arrival of the zebra mussels would create a climate of unease, and indeed, we're being bombarded by requests for information. But since we still don't know the extent of the problem, we created a working group to study these mollusks," explains Lynn Cleary of the St. Lawrence Centre's ecotoxicology and ecosystems branch.

The zebra mussel, which was introduced into the Great Lakes in 1986 when a ship from a European freshwater port discharged its ballast waters, unfortunately reproduces rapidly. Very rapidly, according to Louise Lapierre, biologist at the St. Lawrence Centre. "It has the highest fertility rate of all freshwater mussels. Females produce between 30 000 and 40 000 eggs a year."

Especially worrisome is the severe damage the zebra mussel can cause. "The species secretes filaments (up to 200 per individual) enabling it to cling solidly to hard surfaces. This is able to block water intake pipes, thereby reducing water flow by as much as 50%, which



Jean-Luc Leblond

is what happened in the Great Lakes area," explains Lapierre. Furthermore, the zebra mussel reduces the survival rate of young fish by invading spawning grounds and consuming plankton (adult mussels can filter up to a litre of water a day). "And that's not all," adds Louise Lapierre. "The zebra mussel is a filtering organism

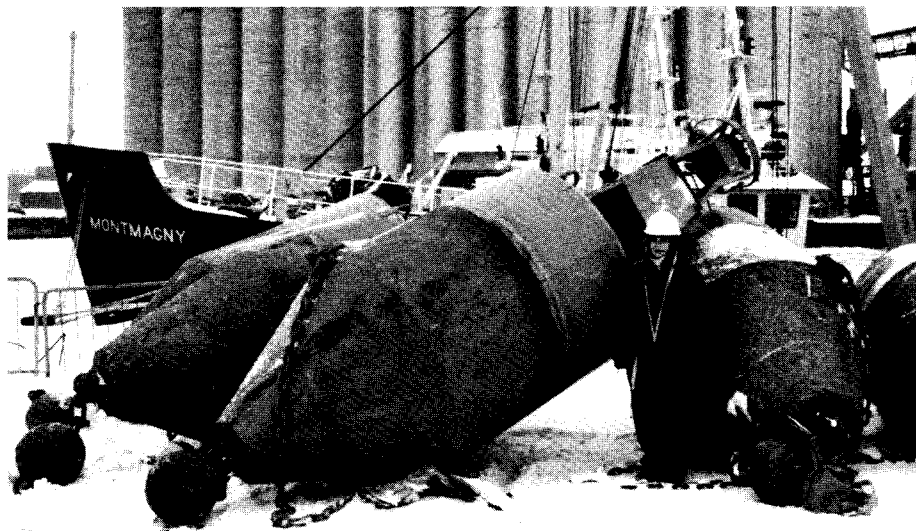


Photo: France Mongeau, Laboratoire SAB inc.

The many buoys dotting the St. Lawrence are a perfect place for zebra mussels to reproduce. The mussels secrete some 200 filaments and use them to cling solidly to the buoys, where they multiply.

in which toxic substances concentrate. Predators such as ducks and fish are, in turn, contaminated."

The Solution: Pooling Resources

Biologists feel that it is still too early to assess the consequences of the zebra mussel infestation. "Perhaps the zebra mussel won't find an environment favouring its spread in the St. Lawrence. After all, the current is stronger and water temperatures are lower than those of the Great Lakes," says Louise Lapierre. Adds Lynn Cleary, "We felt the best way to get a good idea of the situation was to pool human and financial resources in a working group. In this way, research can be carried out without duplication."

Currently in its first year, the working group includes representatives from Hydro-Québec, Université Laval, the ministère du Loisir, de la Chasse et de la Pêche du Québec, the Canadian Wildlife Service, and Environment Canada's

St. Lawrence Centre. The objectives of Year One are to create an information bank on the zebra mussel based on the studies carried out, to make this information as widely available as possible, and to assess the distribution of the mussel and its larvae in the River so as to compile a report. Gilles Ouellette, MLCP biologist, explains his Department's interest in this working group. "The mussel's larvae can attach themselves to the floaters of hydroplanes or the hulls of boats anchored in the River. People piloting these pleasure craft sometimes venture into inland lakes, thereby constituting potential sources of contamination. We're following this issue closely to protect species inhabiting inland waters."

"The main asset of this working group is its flexibility," points out Lynn Cleary. "Each year, additional participants will be invited to contribute to these information exchanges. We will thus be able to better understand and control the onslaught of the zebra mussel."

PARTNERS

THE ENVIRONMENTAL PARTNERS FUND

The "Partners" column usually highlights an organization whose activities mirror those of the St. Lawrence Action Plan, targeting the protection, conservation or restoration of the environment and, more specifically, of the St. Lawrence River. This issue is an exception in that it features a program targeting partnership in this area, rather than a particular group or organization.

The Environmental Partners Fund program was set up in June 1989 by Environment Canada. By providing administrative, technical and financial support to community projects targeting the environment, it aims to encourage citizens to become involved in environmental protection, improvement and restoration activities. As its name indicates, the program promotes partnership between various local non-profit groups and the federal government. All projects must correspond to regional needs and realities.

In Québec, special emphasis is being placed on projects targeting environmental conservation, management and reclamation. The main evaluation criteria for projects submitted under the program are their environmental scope and potential for partnership and awareness-raising. Examples of projects under way or already completed are the renovation of the Des Gorges facilities in Coaticook, the restoration of the Lake Saint-Francis walleye population in the Eastern Townships, the preservation of the environmental quality of Lake Magog, and the restoration of habitats in the Nordique ZEC, located near Les Escoumins.

The Environmental Partners Fund program, enjoying a budget of \$50 million and initially supposed to last five years, has been extended for an additional two years. Over 486 projects, 97 of which were submitted by Québec, have received funding to date, for a total investment of close to \$19.2 million.

You can follow the developments of this program by reading the newsletter "Ensemble." Besides keeping you up to date on the activities, this newsletter encourages community participation.

For more information on this program and how you can help safeguard the St. Lawrence River, please contact:

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1141, route de l'Église
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Tel.: (418) 648-3537

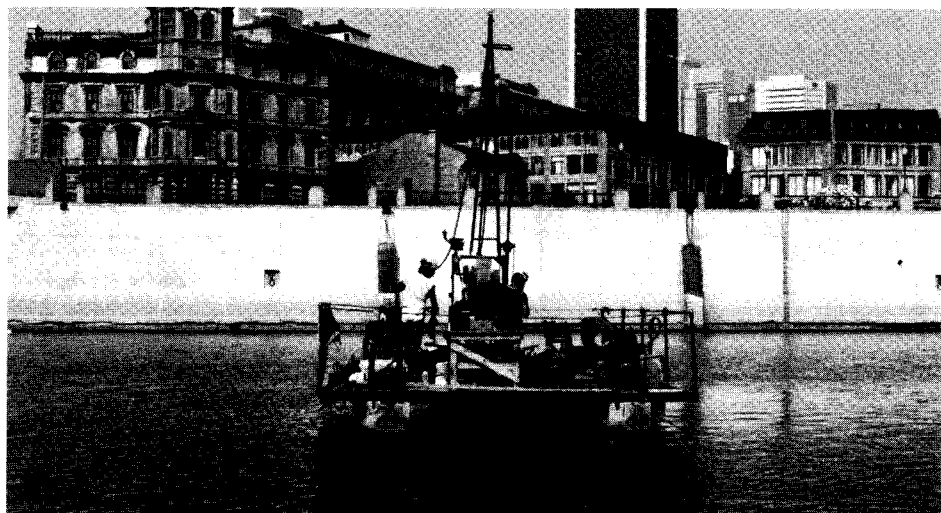
Restoration: An Important Objective for Year IV of the SLAP

This issue of *Le Fleuve* marks the beginning of a series of articles on restoration, a priority theme for Year IV (1991-1992) of the St. Lawrence Action Plan. This file deals specifically with the restoration of federal aquatic sites and improved management of dredging activities.

Restoration of Federal Aquatic Sites Full Speed Ahead

To protect the river ecosystem, the St. Lawrence Action Plan targets not only the reduction of industrial toxic discharge, but also the restoration of federal aquatic sites along the River. Three quarters of the budget allocated to the SLAP's restoration component (\$21 million in total) has been slated for site cleanup, with the Lachine canal decontamination project alone counting for \$10 million. This large-scale program, already well under way, calls on innovative technology and different environmental science disciplines.

The team in charge of Environment Canada's Federal Activities Clean-Up Program is composed of coordinator Caroll Bélanger and project directors Alain Latreille and Gervais Leclair, all of whom must show creativity and originality in drawing up scenarios for site restoration, a booming sector. The team members, who must make do with limited human and financial resources, given the large areas to be covered and the complexity of the issues, have had to use their wits in developing the technical tools required to implement the project.



Drilling operation in Montréal harbour

Photo: Environment Canada

Inadequate Tools, Creative Approaches

To adequately restore the federal aquatic sites, a five-phase approach was adopted. Since the River is immense and therefore impossible to decontaminate entirely, an inventory of potentially contaminated zones was first carried out, and priority sites identified (Phase 1). This phase was not required for the Montréal, Québec City and Trois-Rivières harbours, which since 1988 have been targeted by the SLAP. Located in urbanized areas marked by frequent cargo transfers, it was obvious that action would have to be taken on these harbours.

An overall portrait of the contamination levels of these three sites had to be drawn up to determine the distribution of the contaminated sediment. This was the second phase, that of characterization. Conducted in 1989 on the three harbours, this phase included its share of obstacles. "Tools are often inadequate or lacking in this area," explains Caroll Bélanger. "First, we had to carry out in-depth research to determine which sediment quality criteria (currently under review at the St. Lawrence Centre) should be used to determine the zones requiring cleanup. Given the surface area of

the harbours in question, a comparative analysis of the characterization results was done."

The use and adaptation of quality indices enabled the team members to rank the harbours in order of importance regarding the action to be taken. Since the Trois-Rivières harbour showed a lower level of contamination, it was decided to postpone action there for the time being.

The Fine Art of... Extracting Cores

Phase 3 of the site cleanup program consists in drawing up action scenarios, a crucial step on which final restoration (Phase 4) and follow-up (Phase 5) depend. Here again, specific tools had to be created and restoration criteria determined to deal with the volumes of sediment requiring treatment. "For each pollutant, we had to set a maximum and a minimum limit to determine when to go ahead with restoration activities and when not to," explains Caroll Bélanger.

To choose the best scenario, some months ago, the restoration team carried out a more in-depth analysis of hydrodynamics and contamination sources; now it is conducting more detailed sediment characterization. This is the process which raises the greatest challenge for those responsible. "We have to determine the exact location of the contaminated material and the degree of contamination," says Caroll Bélanger. "To do this, we take vertical samples, called 'cores.' The problem lies in the fact that these samples can't be reconstituted, that is, they must remain intact along their entire length, which sometimes exceeds two metres. Often, we can't get quality cores using conventional samplers because the sediment varies from harbour to harbour."

In some areas the sediment is too hard; in others it is too liquid. For example, large quantities of wood chips can be found in certain areas of the Québec City harbour. These chips block the sampler



Photo: Environment Canada

To obtain intact sediment samples, drilling equipment must be adapted to the characteristics of each harbour. This photo shows the Rossfelder vibrasonic drill, which was recently used in the Québec City harbour—a provincial first.

openings. The Montréal harbour poses a different problem: contaminants are often organic, which means they are loose and contain a high percentage of water. This often prevents the core sampler from retaining the sample.

"After a month of field work, we've managed to adapt the drilling instruments to the specific characteristics of each harbour, and the sediment is now ready for laboratory analysis," says Caroll Bélanger. He adds that there is still some work to be done before satisfactory wood chip sediment samples can be obtained.

Despite the delays caused by these technical problems, Caroll Bélanger is optimistic about the deadlines and predicts that the action scenarios will be completed by December of this year.

Of course, the Montréal and Québec City harbours are not the only federal sites requiring restoration. The Lachine canal is also a SLAP priority. This project, for which the action scenarios are already completed, is currently undergoing public review by a joint federal-provincial environmental assessment committee. Furthermore, the inventory of potentially contaminated zones also revealed 12 federal sites which required cleanup. Topping the list are the Îles de la Paix National Wildlife Area, downstream of the Beauharnois canal, and the Sainte-Catherine-Saint-Lambert section of the St. Lawrence Seaway. Following the characterization phase, action scenarios will also be developed to restore these sites if necessary. At the halfway mark of the St. Lawrence Action Plan, federal aquatic site cleanup activities are moving right along!

Improved Management of Dredged Materials

The increase in commercial navigation and pleasure boating since the construction of the Seaway has resulted in many dredging activities to maintain the channel and its harbour, as well as giving rise to the excavation of considerable quantities of material for the construction of new harbours, marinas and other riverbank facilities.



Photo: Environment Canada

Every year, between 30 and 40 dredging projects are undertaken on the St. Lawrence. The quantity of material to be dug up can total up to a million cubic metres. "Dredging activities in the River sometimes cause problems," says Jacques Bérubé, biologist at the St. Lawrence Centre. "The presence of sediment often conflicts with other uses, not to mention that the sediment is sometimes a veritable reservoir of pollutants and that its excavation can have a negative effect on the environment."

To explain this phenomenon, Jacques Bérubé describes the sediment formation process. "Pollutants, whether industrial, domestic or agricultural, have many affinities with particles suspended in the water and cling together, somewhat like a magnet, rather than remaining in solution form. After having adsorbed the pollutants, the particles tend to accumulate in hollows and form contaminated sediment." The sediment mixing which occurs during dredging releases toxic elements into the water, thereby harming aquatic plants and animals. Problems can result when sediment is discharged into open water, but also when materials are contained in sites provided for this purpose, since use of these areas as storage sites may not be ideal for man or beast.

Developing Adequate Restoration Tools

Given these constraints, how can a sound method of sediment management be developed in conjunction with dredging activities? The St. Lawrence Centre restoration technologies section is trying to solve this problem. Explains René Rochon, head of the section, "We realized that the tools necessary for improved sediment management were either inexistent or obsolete. We had to begin by designing and developing new restoration tools."

To do so, two programs were created as part of the restoration component of the St. Lawrence Action Plan: a dredging technologies program and another program dealing with sediment disposal technology, which was mentioned in a preceding issue of *Le Fleuve* (Vol. 1, No. 3, June 1990).

HOT OFF THE PRESS

Part of the "St. Lawrence Update" Series THE SAGUENAY MARINE PARK

The most recent in the St. Lawrence Centre's series of information leaflets entitled "St. Lawrence Update", published in June, deals with the Saguenay Marine Park. Some of the topics investigated are the physicochemical characteristics of the Saguenay River mouth, the geomorphologic characteristics of the Saguenay Fjord, plant and animal species, the history of the region, the state of the environment, and the creation of the marine park. A map showing the tourism activities offered is also included. All the leaflets in the "St. Lawrence Update" series are available free of charge in French or English.

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Tel.: (514) 283-7000

Hydrology of Floods in Canada: A PLANNING AND DEVELOPMENT GUIDE

Published under the auspices of the Associate Committee on Hydrology of the National Research Council of Canada, this document offers a comprehensive look at the analysis of floods in Canada and the determination of values appropriate to the estimation of water levels, as well as the development of various procedures. Besides the conditions and problems specific to Canada, the guide includes a summary of current knowledge on hydrology and floods analysis. It is available in both French and English at a cost of \$60.

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National Research Council of Canada
Montréal Road
Ottawa, Ontario
K1A 0R6
Tel.: (613) 993-2054
Fax: (613) 952-7928

A SLAP POSTER AND BROCHURE

Beginning this fall, those who wish to find out more about the St. Lawrence Action Plan will have access to a new 10-page information brochure and a poster, produced jointly by Environment Canada, the ministère de l'Environnement du Québec, and the ministère du Loisir, de la Chasse et de la Pêche du Québec. These documents will be available at the communications branch of each of these departments.

Environment Canada
(514) 283-0198
MENVIQ
(418) 643-6071
MLCP
(418) 644-9492

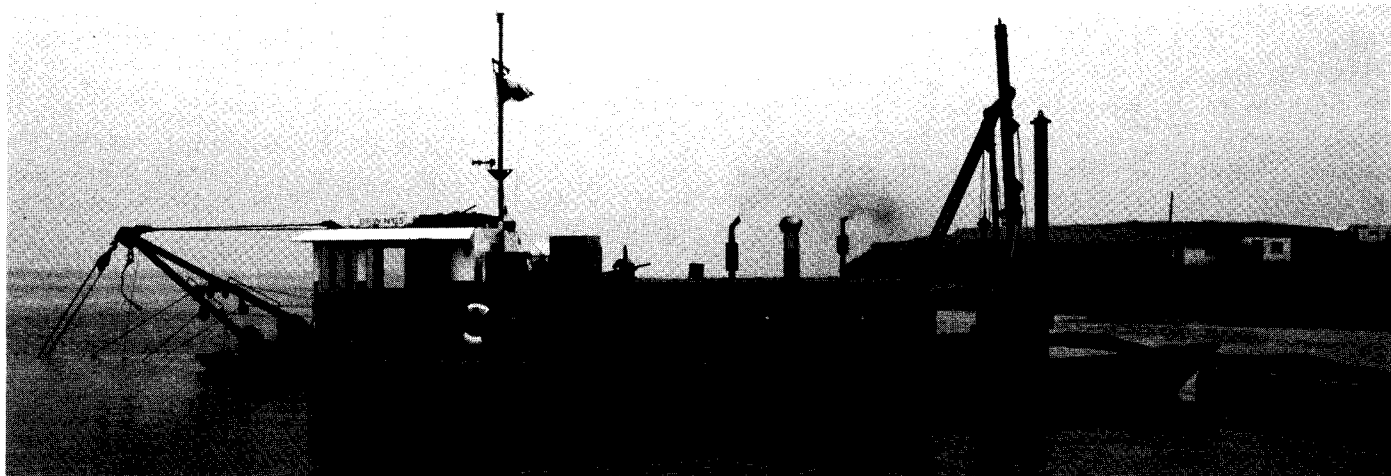


Photo: Environment Canada

Between 30 and 40 dredging projects are undertaken every year on the St. Lawrence, excavating up to 1 million cubic metres of material. To promote sound sediment management related to this type of project, the St. Lawrence Centre created two specific programs.

Objective: Limit Environmental Impacts

The objective of the dredging technologies program is to more accurately assess the environmental impact of dredging activities and to limit pollutant suspension and dispersal by developing tools to assess and control environmental hazards. Promoters do not always have access to the tools necessary for environmental assessment, such as criteria to determine sediment quality and pollution levels. "The criteria being used were established in 1976; it's high time they were reviewed! Their updating is moving right along, and the resulting document will be distributed in December 1991."

The development of these tools is of vital importance, because overly stringent or permissive criteria can affect the cost of dredging and result in an incorrect assessment of the degree of sediment contamination. The sampling, conservation and analysis techniques used to determine the physicochemical characteristics of the sediment are also under review and will be available as of next year.

The restoration technologies section also reviewed the environmental efficiency of the dredging techniques and equipment used on the St. Lawrence. The result will be a booklet designed for dredging machinery users and promoters, providing them with guidelines to ensure better environmental protection.

This year, a document will be published on the quality control of analytical data. Four other guides dealing with sediment conservation and sampling, bioassays applied to dredging projects, selection of storage and containment sites, and inspection and follow-up of dredging projects, will follow.

"X-Raying" the River

The dredging technologies program aims to offset the lack of knowledge in areas where work is being done by ensuring that information on the sediment quality in the St. Lawrence is updated regularly. To do so, a computerized bank was set up to gather data on sediment quality and the water volume being dredged in the St. Lawrence. "The entire surface area of the River was covered, from Cornwall to the Magdalen Islands. We collected all data published in scientific literature and in federal and provincial dredging

documents since 1976," says René Rochon. As of this year, promoters, consulting firms and the general public will have access to this computerized data bank.

Another data bank which will soon be available contains a bibliography on river uses and on the threatened areas which could be affected during dredging activities or any other development projects carried out on the River. "This tool will be useful not only for those in charge of dredging projects, but also for promoters of riverbank development activities," points out René Rochon.

The St. Lawrence Centre team could not have accomplished all these projects alone. "Thanks to the tireless efforts of various partners, both federal and provincial, we'll be able to provide dredging project promoters and environmental consultants with better assessment tools and sediment management techniques. In this way, it will be possible to manage the various activities conducted each year on the St. Lawrence on an overall basis," concludes René Rochon.

A Working Group for the Improvement of Physicochemical Analyses

Quality Control on the Agenda

The St. Lawrence Action Plan has resulted in an entire series of studies based on the physicochemical analysis of samples. Studies range from characterizing industrial waste, determining the level of sediment contamination, and discovering the effect of pollutants on aquatic organisms. To promote partnership with private enterprise, these analyses are increasingly being performed by private firms. "We have to ensure the quality of the analysis results because when all is said and done, decision-makers use them results to determine restoration methods, establish standards and regulations, and provide information to the public," explains Dominique Duval, who is in charge of the quality assurance and control laboratory at the St. Lawrence Centre.

To obtain reliable results and facilitate information exchange, a single working group was formed with members from both the private and public sectors.

Private Enterprise: A Valued Partner

Chaired by private-sector representative, John D. Fenwick of Novalab, the working group includes representatives from the ministère de l'Environnement du Québec, Environment Canada, and the two largest associations of private chemical laboratories in Canada, the Canadian Testing Association, Québec branch (CTA) and the Canadian Association for Environmental Analytical Laboratories (CAEAL).

The working group's mandate is to facilitate the transfer of information and implement the quality control re-

quired by the St. Lawrence Centre. Together, the group members identify the factors undermining the scientific accuracy and credibility of the results and the completion of the projects, and propose solutions.

In 1989, the St. Lawrence Centre set up a quality assurance control program within its analytical services branch. Under a federal-provincial agreement, the ministère de l'Environnement du Québec and Environment Canada currently share responsibility for quality control as part of industrial waste characterization measures. "Quality control of inorganic substance analysis is carried out by the St. Lawrence Centre laboratory, while organic substance analysis is performed by the MENVIQ laboratory," explains Raymond Vézeau of the St. Lawrence Centre ecotoxicology and ecosystems branch. Private enterprise, for its part, is contributing wholeheartedly to the establishment of improved quality control methods.

The resulting improvement is proof of the program's effectiveness, according to Raymond Vézeau. "At first, only 40% to 60% of the results were accepted. In some laboratories, we were seeing inadequate facilities, inefficient analytical methods, and insufficient internal quality control. Today, thanks to this program, over 95% of the results are approved!"

"Most of the laboratories have implemented quality control measures and are better equipped to meet our analysis needs," observes Dominique Duval. "This new approach heightens the credibility of the results for more productive partnership," concludes Lynn Cleary.



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Restoration of Federal Aquatic Sites FULL SPEED AHEAD

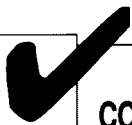
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COMING EVENTS

Integrated Waste Management and Sustainable Development Symposium

The Fondation québécoise en environnement and Collecte sélective Québec, the symposium organizers, are issuing an invitation to all political and administrative supervisors, economic managers, and professional, scientific, social and environmental associations to participate in this symposium, which targets more informed decisions on waste management. October 17-18, 1991

Montréal Convention Center
Information: Marie-Claude Rivet
(514) 987-1491

14th International Symposium on Wastewater Treatment

Sponsored by Environment Canada, the ministère de l'Environnement du Québec, the Association québécoise des techniques de l'eau and the Société québécoise d'assainissement des eaux, this symposium aims to promote the dissemination and exchange of information on wastewater treatment research and techniques. November 12-14, 1991

Hôtel Le Méridien, Montréal
Information: Fax (514) 866-4020

The International Environment and Economy Exhibition Crossroads

The second edition of this event aims to promote the exchange of scientific and technical knowledge in the area of environmental protection.

October 16-19, 1991
Montréal Convention Centre
Exhibition Hall

Conference on Acid Rain and Ground Level Ozone (SMOG)

Organized by the Association pour la prévention de la pollution de l'air et du sol, Environment Canada, the ministère de l'Environnement du Québec and the Ordre des ingénieurs du Québec (Régionale Plein-Sud)

November 4-5, 1991
Queen Elizabeth Hotel, Montréal
Information: (514) 376-7447

IN BRIEF

Pratt & Whitney Canada: Focus on the Environment

Pratt & Whitney Canada is taking an important step toward environmental protection. The expansion and modernization plan for the P&WC engine shop, located in Saint-Hubert, includes the construction of a wastewater treatment plant for rinsing waters and solutions used in the various engine repair and

overhaul procedures. Of the \$10 million budgeted for the project, some \$3 million are directly linked to construction of the treatment plant, which should be completed by April 1992. Pratt & Whitney Canada is one of the priority industrial plants targeted by the St. Lawrence Action Plan.

LE FLEUVE

St. Lawrence Action Plan Newsletter

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