LE FLEUVE

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IN TUNE

A BUSY FALL

September marks the end of the summer season. Many federal and provincial managers of St. Lawrence Vision 2000 will be busily preparing the final phases of several projects that are to scheduled to end in a few months' time.

This issue looks at aspects which are of considerable interest to the general public, such as topics related to habitat conservation and the consumption of fish caught in the River, as well as other aspects which are more specifically directed at the environment industry or research. Research such as the study on the contribution of atmospheric pollution to the contamination of the St. Lawrence River Valley or the mass balance of contaminants in the River is rich in up-to-date technical data on the St. Lawrence; we are gaining new perspectives in the struggle to protect and preserve the ecosystems related to the River.

We have also included a short piece on how the upcoming Plan III is progressing; it is slated to take over from the St. Lawrence Action Plan and St. Lawrence Vision 2000 as of April 1988. In fact, this time-sensitive project monopolized several managers who, in many cases, had to cut short their summer vacations as the deadlines imposed could not coexist with a slowdown in work normally associated with the summer. On behalf of all those who take the River's state of health to heart, we thank you.

Plan III

Discussions under way

Following of the creation of the Development Committee for an eventual Plan III last June 20th, the summer was ripe for several dozen project managers and experts to kick off discussions and start making preparations. This groundwork will likely lead to a third five-year plan (1998–2003) for the restoration and conservation of the St. Lawrence River. According to the development schedule proposed by the Coordination Office of SLV 2000 last spring, the time had come to set up task forces and begin discussions, in keeping with the Development Committee's mandate and scheduled stages.

Formation of six task groups

"The Development Committee has brought together the current partners of SLV 2000 as well as new players, comments Jacinthe Leclerc, head of the Coordination Office of SLV 2000. Two federal departments, Transport Canada and Public Works and Government Services Canada, as well as two Québec departments – Affaires municipales and Agriculture, des Pêcheries et Alimentation (MAPAQ), agreed to take part in the preparation of a third phase, in addition to the current partners—Environment Canada, Fisheries and Oceans Canada, Health Canada, Agriculture and Agri-food Canada, the Federal Office of Regional Development, and the Québec ministère de l'Environnement et de la Faune and the ministère de la Santé et des Services sociaux. In addition, the Advisory Committee of SLV 2000 is taking an active part in the discussions held by the Development Committee through its chair and secretary."

"The presence of the ministère des Affaires municipales and the ministère de l'Agriculture was necessary, given the importance that the Agricultural and Urban Works components could take on in a future Plan III,' notes Ronaldo Raviolatti, the coordinator and provincial secretary of SLV 2000. "We also believe that the framework developed for fleshing out the plan fairlay reflects the principles on which the federal and provincial governments have agreed."

As early as last June 20th, the task forces charged with developing the action priorities and projects that would constitute a Plan III were formed. "Six task forces each

SUMMARY

concentrated on one of the following sectors: Health, Agriculture, Urban Works, Industrial, Community Involvement and Biodiversity. The last group was further subdivided into three smaller groups: Habitats and Water Levels, Species and Sediment Management. "Close to 150 people from government, scientific and community circles are taking part in these groups' discussions," points out Jacinthe Leclerc. "This shows the avid interest shoreline residents have in the conservation and enhancement of the River, more than ever before and interest is also growing among a sizable portion of the Québec population."

All groups and sub-groups of the various task forces met on several occasions over the summer in order to be in a position to propose a preliminary action plan for each sector to the Development Committee by the end of September.

"The process we have chosen reflects a very different approach from the one conducted when planning SLV 2000," notes Jacinthe Leclerc. "While the outline of the present-day plan had been basically handed to us by government managers, Plan III will be the fruit of a wide-scale participation process in which ordinary citizens, through the Advisory Committee, and community circles will be well-represented. Just like principle of partnership, the principle of public participation is indeed an inescapable reality for the Development Committee of the third phase. It is very important that such participation be concretely reflected in discussions and all of the development stages." "The future Plan III should greatly benefit from the contribution of each of the 150 people who took part, either directly, in the discussions," adds Mr. Raviolatti.

The preliminary programs of the six task forces will be sent, right on schedule, to the Development Committee at the end of September.

An Objective of 7,000 Hectares

One of the objectives of the Biodiversity Component of SLV 2000 is to protect 7,000 hectares of habitats that are representative of those found along the St. Lawrence River—a goal that is to be attained between 1994 and 1998. This activity represents a continuation of conservation work initiated under the St. Lawrence Action Plan (SLAP). Between 1988 and 1993, conservation measures focussed on more than 5,000 hectares of endangered or priority habitats located at 29 sites along the river, as well as on many small islands between Montreal and Sorel. The intent of SLV 2000 managers was to accelerate habitat conservation by targetting an additional 7,000 hectares for conservation during the second five-year plan.

"We are well on our way to attaining our objective of 7,000 hectares," according to Renée Langevin, a biologist with the Canadian Wildlife Service of Environment Canada in charge of compiling data for the annual progress reports. The conservation of twenty-five sites, totalling 5,416 hectares, had already been completed over a two-year period, ending in March 1996. By March 1997, the number of protected sites had increased to 29, representing an additional 565 hectares. It is expected that some 1,100 more hectares will have been added to the progress report for the 1997–1998 fiscal year. We thus hope to exceed our objective by the end of the SLV 2000 Action Plan."

A technical committee of federal and provincial experts was set up to plan and accept projects as well as to monitor habitat conservation. During the first three years of SLV 2000, approximately $4 million of the $16 million Biodiversity Component budget—fully one quarter—was spent on habitat conservation. These figures reflect the importance of the task. The habitats targeted for protection are selected from among a list of priority projects, based on the objective of protecting certain endangered habitats or to reinforce environments which are already the object of protective measures. "The term 'habitat' encompasses both flora and fauna," explains Normand Traversy, coordinator of agreements on fauna at the ministère de l'Environnement et de la Faune du Québec (MEFQ) and co-chairman of the technical committee. "Some projects are funded from a single source, whether federal or provincial, while others draw on funding from different programs, such as those under the *Fonds de restauration de l'habitat du poisson* (FRHAP) (Habitat Restoration Fund) or the Eastern Habitat Joint Venture (EHJV). In each case, it is the responsibility of the technical committee to coordinate planning stage activities related to the project, select the projects and monitor their implementation. Though the projects do not depend on the Biodiversity Component alone for funding, they must clearly, to reflect the spirit of SLV 2000, be in keeping with the broader perspective linked to protecting the river's biodiversity."

Habitat conservation supported by a number of programs

In view of the habitats which have been identified by experts for protection, and considering the needs expressed by the public, the projects can draw on SLV 2000 as well as on FRHAP and EHJV programs for funding. While the two programs do not share identical goals, they are both oriented toward the protection of rich and productive environments.

In May 1993, Tioxide Canada inc. was fined $4 million for pollution produced at its plant in Tracy; the *Fonds de restauration de l'habitat du poisson* (FRHAP) was consequently set up. Three of the four million dollars imposed were for damages to fish and their habitat. The FRHAP's territory extends from Beauharnois to east of Lake Saint Pierre. Given the degree of environmental degradation and losses sustained in this portion of the river, the Fund chose to favour the conservation of wetland habitats and habitats susceptible to flooding. However, the Fund's activities will come to an end in 1998.

Launched in November 1989, the 15-year Eastern Habitat Joint Venture is part of a more general plan—the North American Waterfowl Management Plan. The Venture was initiated to preserve and increase the quality and surface area of wetland habitats, essential to waterfowl conservation. The

EHJV, which brings together permanent partners—the MEFQ, the Canadian Wildlife Service, Ducks Unlimited, the Québec Wildlife Foundation and Wildlife Habitat Canada—as well as occasional partners (businesses, NGOs, etc.)—is active at roughly 20 sites in Québec, half of which are in the Lake Saint Pierre region.

Policies over the last few years

"The steps involved in preserving a given habitat vary little," explains Renée Langevin. "First, we gather all knowledge and information needed to evaluate the quality of the habitat. Once the decision to protect a given habitat is made, we proceed with a number of activities, which are dictated by land tenure—whether it is public or private property—as well as by the degree of protection to be given the site." Ecological reserves are virtually untouchable and inaccessible, except where research and observation activities are concerned. Grand-Lac-Salé on Anticosti Island is one such reserve; all reserves are managed by the MEFQ. Though national wildlife sanctuaries, which fall under federal government jurisdiction, are also protected lands, activities such as hiking, farming, observation and hunting may be allowed. The Cap Tourmente Wildlife Reserve is a good example: the Canadian Wildlife Service manages a controlled hunting program within the reserve. Protection therefore does not necessarily have to be equated with the habitat being placed behind a glass wall, to the exclusion of the public.

A biologist with the Habitat Conservation section of the Canadian Wildlife Service and federal co-chairman of the technical committee, Yvon Mercier points out that the 5,000 hectares protected under the SLAP are found predominantly in the river section and in the estuary. As a consequence of SLV 2000, the committee has focussed its efforts on habitats in the Gulf of St. Lawrence, which accounts for 67% of the spaces protected during the first two years of the agreement. Most conservation habitats are wetlands. However, island environments comprise 81% of the total conservation habitat area due, in large part, to the creation of one particular ecological reserve on Anticosti Island—the 2,339-hectare Grand-Lac-Salé Reserve.

THREE SITES, THREE DISTINCT ENVIRONMENTS

Léo-Guy de Repentigny

A number of species of flora and fauna are found on Île de Grâce.

Ruisseau Saint-Jean

Located on the south shore of Lac Saint-Louis, within the southern suburbs of Montreal, the 200-hectare site lies along both sides of Ruisseau Saint-Jean in the municipalities of Châteauguay and Léry. The most important floodplain spawning area in Lac Saint Louis, the site is also one of the valuable waterfowl staging areas along the St. Lawrence River. The spawning areas are used by around 30 species of fish, including the Northern Pike, Largemouth Bass, Common Catfish, Yellow Perch and the Grass Pickerel. The brook is also an important alevin stocking area.

The object of very strong pressure exerted by residential expansion, the territory has also been the object of a step-by-step process, initiated in 1994, aimed at protecting and restoring the territory. This has been possible, in part, through habitat securement, notably by the *Québec Wildlife Foundation*, as a result of the cooperation of local municipalities (Châteauguay, Maple Grove and Léry), and through agreements with local landowners. It is expected that other securements will be concluded so that this important ecosystem may be fully protected.

Île de Grâce

The mainly privately-owned Île de Grâce (1,100 hectares) forms part of the Berthier-Sorel Archipelago. The island offers a number of very interesting bird fauna habitats: wetlands, flooded woodlands, wet meadows and agricultural sectors. Also of note is its silver maple grove—one of the three largest silver maple groves on the archipelago, covering 36% of the island.

While our information on waterfowl activity on the island is dated (1981), Île de Grâce can be said to be among those islands in the archipelago which are most favoured during migration periods. It is also a significant rearing habitat, particularly for ducks. With its diverse habitats, Île de Grâce has considerable potential for supporting a number of wildlife species. By the end of the 1995-1996 fiscal year, 167 hectares had already been protected.

Grand-Lac-Salé

The Grand-Lac-Salé ecological reserve extends over 2,339 hectares midway along the south shore of Anticosti Island. The reserve's landscape includes two remarkable features: the largest lagoon and the largest salt marsh in the Minganie-Anticosti region. The region can be divided into two parts: (1) the coast, made up of pebbles, sand and gravel, is always above water; and (2) the shoreline, certain portions of which are flooded at each tide; other portions during spring tides only.

Of considerable interest are the reserve's highly diversified flora and varied ecosystems—aquatic, semi-terrestrial and terrestrial. The reserve also has a large White-tailed Deer population, with a density of 15 deer per square kilometre.

Mass Balance of River Contaminants

No one would argue the fact that the pollution of the St. Lawrence River is a concern; the problem is knowing the exact extent of this pollution. It was this lack of precise information on contaminants that led the Contamination of the Aquatic Environment Section at Environment Canada's St. Lawrence Centre (SLC) to launch, in 1994, the Mass Balance of Chemical Contaminants in the St. Lawrence River Project.

"A mass balance is a model that enables us to establish the contaminant loading equilibrium at the inlets and outlets of a given system," explains Thanh-Thao Pham, project manager at the Contamination of the Aquatic Environment Section of the St. Lawrence Centre. "Actually, we hope to determine the nature and quantities of contaminants that enter the river from the Kingston-Cornwall Corridor and from the Ottawa River and to assess the transport of them toward the estuary, in the vicinity of Québec City-Lévis." The study covered that section of the St. Lawrence between the Cornwall dam, to the west, and the Québec City-Lévis filtration plant, to the east, and focussed on metals, PCBs, PAHs, organochlorine and organophosphorous pesticides, and triazines.

A thoroughly innovative study

The validity of such a balance depends on the quality and quantity of data collected through water sampling. The objective is to obtain a precise balance; the sampling component of the study is consequently of great importance. We started out by concentrating on temporal variability," says Thanh-Thao Pham. "Sampling was thus carried out over an 18-month period, from May 1, 1995 to September 30, 1996, to make sure that we would cover at least one full annual hydrological cycle. And since contaminants are transported in dissolved as well as particulate form, that is, combined with suspended particulate matter, we have measured all contaminants separately in the two phases." Sampling varied, being dictated by the river's hydrological regimes and the type of contaminants. During high water periods, samples could be taken every two days; during low-flow periods, only once a month.

Several contaminants are toxic at even trace and ultratrace levels, the equivalent to less than one-third of a teaspoon in 2,000 Olympic-sized swimming pools. These very low concentrations in the water translated into two daunting challenges for the researchers. First, where sampling was concerned, precautions had to be taken at every stage—from the preparation of the sampling equipment to the final analysis of the sample—to avoid potential contamination.

Highly sensitive analysis techniques were used to overcome the second obstacle, that of quantifying the contaminants at trace or ultratrace levels. "The samples collected had to be sufficient for the analysis instruments to quantify the contaminants, even at very low concentrations," explains Thanh-Thao Pham. Among the approaches put forward to work around the problem was that of increasing the volume of water to be used for the analysis of dissolved organic contaminants; 50 litres were thus collected for this purpose. As for the particulate phase of the study, the samples to be used for the analysis of organic contaminants were filtered on site. According to the data from the sampling station, between 20 and 200 litres of water had to be filtered.

Interesting results

What can one expect to find in the soon- to- be- released report on the mass balance of contaminants? Researchers and managers will be able to determine the extent and seasonal variation of the chemical contamination of the St. Lawrence River, as well as precisely assess the contribution of the Great Lakes compared with that of the Ottawa River. The report also establishes the chemical contaminant loads transported to the estuary and the marine environment from the river reach.

Conversely, our knowledge of what takes place within the section of the river studied remains very limited. The study will not have clarified the questions concerning internal inputs into the river – industrial, municipal, natural, tributary, and atmospheric deposits, and their evolution – sedimentation, evaporation, and absorption by living beings. "The mass balance will have provided us with a clear idea of what enters the river at Cornwall and at Carillon, and what is found at Québec City-Lévis," points out Thanh-Thao Pham. "Other studies on internal sources will be needed to complete the mass balance. This study nonetheless represents a huge step forward with regards to the accuracy of the available data and the reliability of the findings."

VISUAL TOOLS

Since several of the water sampling and analysis techniques used by the St. Lawrence Mass Balance Team are new, the team has filmed the entire procedure followed to produce the balance. Though the images are not yet put together in documentary form, they in themselves already represent a valuable source of information for any interested researcher.

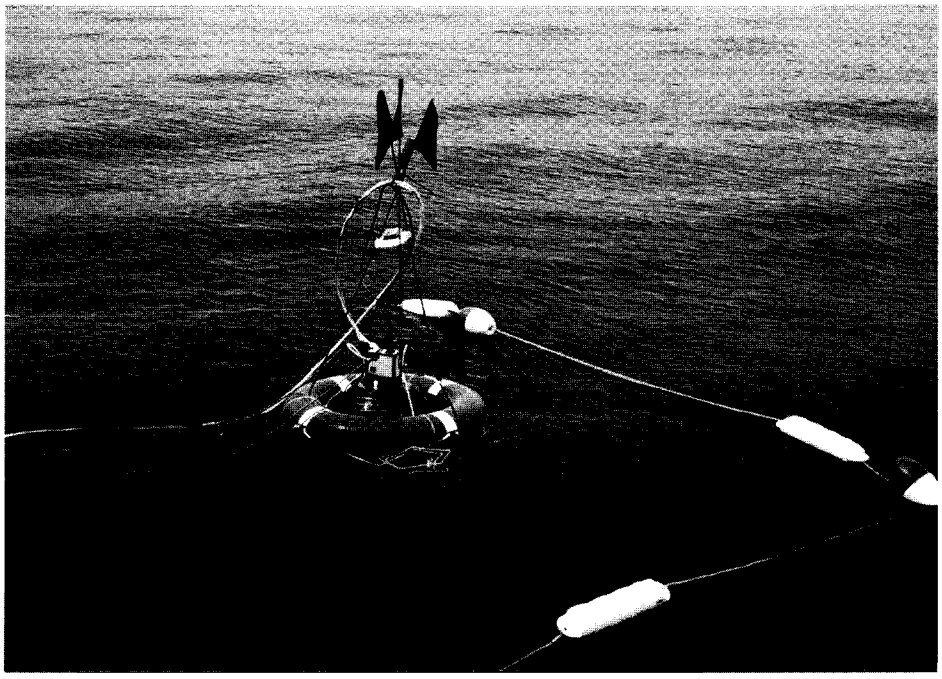
Toward a Better Understanding of the Contribution of Atmospheric Contamination

Air and water are privileged mediums through which both toxic and non-toxic substances circulate and interact. In the past fifteen years or so, many studies have highlighted the importance of the atmospheric pathways in the degradation of the environment. The problem of acid rain, which monopolized the attention of environmentalists and captured the headlines of the Canadian and American media during the 1980s, has helped to inform the public on how toxic substances are carried through the air and their impact on the environment.

In the context of SLV 2000, it was planned to carry out research to unearth more accurate information on the concentration and quantity of atmospheric pollutants that are present in the air and in rainfall over the St. Lawrence Valley. Three families of organic compounds—polyaromatic hydrocarbons (PAHs), organochlorine pesticides and polychlorinated biphenyls (PCBs)—as well as heavy metals such as mercury, copper, lead, zinc, arsenic and cadmium), were examined. This knowledge is essential for the managers who will have to develop environmental strategies designed to eliminate, or at least attenuate, the effects of this type of pollution along the St. Lawrence. The research project was spearheaded by Dr. Laurier Poissant, a scientific researcher at the Atmospheric Environment Directorate of Environment Canada-Québec Region.

The study undertaken within the scope of SLV 2000 has five objectives:

- Determining the concentrations of specific toxic substances in the air and in rainfall above the St. Lawrence basin;
- Evaluating the annual deposits of such substances along the River;
- Assessing the distribution in time and space of such deposits;
- Ascertaining their probable origins;
- Estimating the contribution of atmospheric contamination to the chemical contamination of the St. Lawrence.



At the Saint-Anicet station, near Montreal, measuring instruments were placed above the river water in an effort to study air-water exchanges of mercury.

Methodology

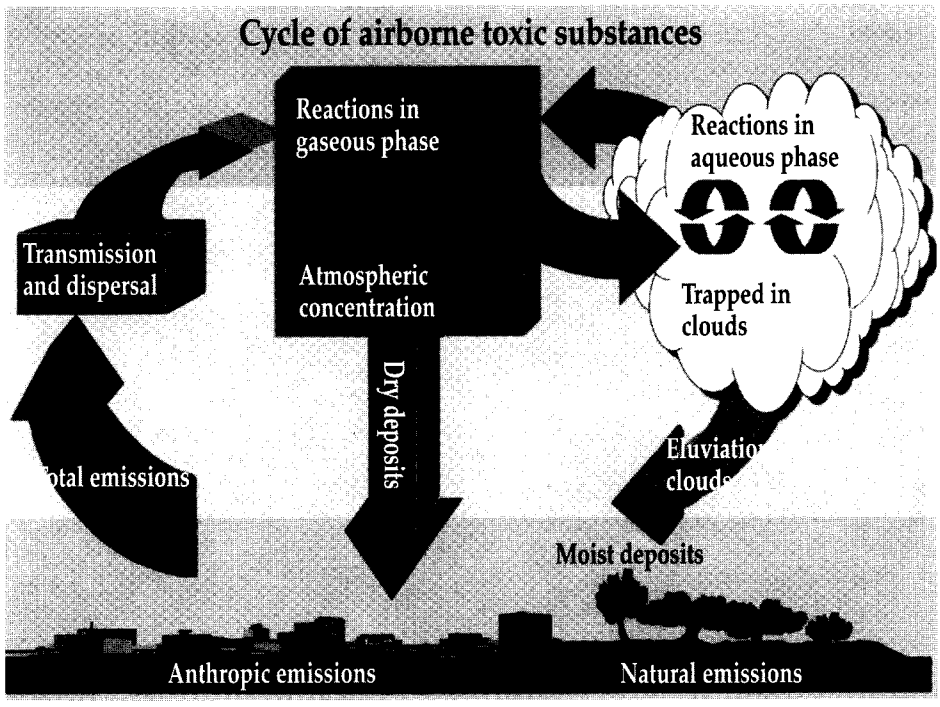
These airborne toxic substances have been measured in three air-quality stations situated along the St. Lawrence River: at Saint-Anicet, along the southern shore of Lake Saint-François, approximately 100 km upstream from Montréal; at Villeroy, between Trois-Rivières and Quebec City on the south shore of the St. Lawrence; and Mingan, on the North Shore in the Gulf of St. Lawrence. Since the latter station is located so far from the urban centres and farmlands, it acts as a sort of control station.

The instruments used to take the measurements, set up on platforms one metre above ground level, were designed to gauge the presence and the quantities of organic and inorganic compounds in their dry phases in the air (gas and particles) and in the hydrometeors (rain and snow). Data on the airborne toxic substances were gathered over a period varying between twelve months and three years, depending on the stations and the chemical families being studied.

At Saint-Anicet, the instruments were also placed above the water, approximately 20 m from the shoreline, in order to study the fluxes in air-water exchanges of the mercury and to compare them with the air-soil fluxes obtained at the ground station located about two kilometres from the shore.

Cycles in the atmospheric lifetime of toxic substances

"The atmosphere is a 'physical and chemical well' in which compounds undergo change," explains Dr. Laurier Poissant. On a chemical level, the compounds' molecules can decompose in the air; oxidation is a good example of this. On a physical level, the compounds can be captured by other particles; they can then be carried away, deposited on the ground, or scavanged from the atmosphere by precipitation. To attain the study's objectives, we had to be able to learn about what we call the 'atmospheric lifetime



cycle' of a pollutant. Once a compound has been released into the atmosphere, it will be carried by air masses, perhaps undergo a transformation and later be deposited (some compounds can leave the lower air) into the environment. For instance, a compound whose lifetime cycle in the air is short (a few days), such as pyrene—a polyaromatic hydrocarbon (PAH) linked to the incomplete combustion of wood—, cannot travel over long distances. On the other hand, PCBs have a much longer chemical lifetime (close to one year). Therefore, they can be carried by air masses to at times very lengthy distances, fall to the earth and become volatile again until their chemical contents are destroyed or they are immobilized in reservoirs which keep them prisoners for a varying period. Sediments are a good example of this."

Complex processes

Among the toxic substances scrutinized by the study, mercury was measured extensively. t is present in the atmosphere mainly in a gaseous state; researchers sought to quantify the exchanges of this heavy metal between the ground and the air as well as between water and the air. It is possible to accurately measure mercury since the analytical tools to do so have been developed and are available to the researchers. The data gathered at Saint-Anicet have led to highly informative findings.

"The data gathered during the summer of 1995 on the ground and water sites of Saint-Anicet tell us that the action of the wind is probably what differentiates the air-soil fluxes from the air-water fluxes the most," comments Dr. Poissant. "Although over the ground the wind promotes the escape of mercury in the soil towards the atmosphere, over the surface of water, the opposite is true. The escape of mercury contained in water toward the atmosphere will be accelerated when the air layer located immediately above the water (between 0 and 100 cm) is stable and the REDOX (oxidation-reduction) processes are operative. Let me also mention that the ground-air exchanges are 6 to 8 times greater than the water-air exchanges." The experiment has also shown that the fluxes peak during the day, both between the ground and air and between water and air.

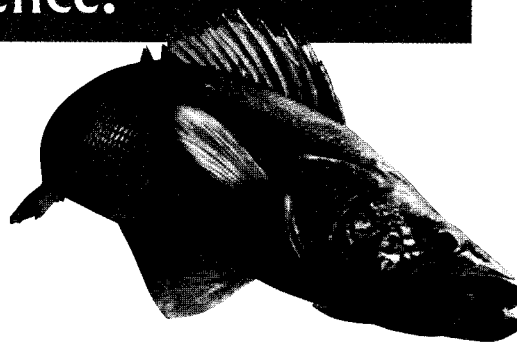
Another compound that Dr. Poissant's team focussed on is lindane: one of the most common insecticides used in Canada, particularly to protect seeds in corn crops. The data gathered in 1992 at Villeroy, a station located 50 km north of the geographic belt where corn is grown intensively, indicates a maximum peak of lindane in the atmosphere in the month of May, the time of year when corn is grown.

Findings expected from the study

Despite the complex nature of the processes analysed, Dr. Laurier Poissant is confident that his report will be completed by March 1998, a report that will answer the questions which shaped the drafting of the study's objectives. "We will have an estimate of the deposits by extrapolating certain findings over wider areas," he adds. "For example, the findings obtained at Mingan should be representative of the situation in the entire Gulf of St. Lawrence. For the whole gamut of target compounds studied, we will likely be in a situation where we can determine the origin of the substances and draw up a 'map of the atmospheric pollution' of the St. Lawrence."

Research in recent years has helped scientists and managers alike boost their knowledge on the type of processes involved in the fluxes of substances in the atmosphere. The ultimate goal of this research is, of course, to find out the link between the source of pollutants and the receiving body of water with a view to better control the situation.

For or Against the Contamination of Fish in the St. Lawrence?



The findings of the pilot study on the habits of fish consumption and exposure to chemical contaminants in the fish caught by sportfishers of the Montreal region, carried out in the winter of 1995, are now available. The study, carried out within the scope of the Health Component of SLV 2000, had two objectives: 1) assess the maximum and average tissue concentrations of the major contaminants and certain fatty acids present in the fish caught by sportfishers of the Montreal region; 2) test and perfect the methodology for a more comprehensive future study on the hazards and benefits of sportfishers in that region of eating their own catches.

Initially, 223 fishers were approached in February and March of 1995 while fishing on lakes Saint-Louis and Saint-François and in the Laprairie Basin; they agreed to a brief interview. They were questioned on their fishing habits and sportfishing consumption. Later, 40 fishers of this group who usually ate their catches—25 high- and 15 low-level consumers were selected to answer a more detailed questionnaire on their fishing practices and their fish-eating habits. The interview-questionnaire was completed by taking samples of the participants' blood, hair and urine, as well as gathering data on sociodemographic and health aspects.

The 40 fishers interviewed, all over the age of 20, have been active sportfishers, in all seasons, for more twenty years. The average age was 46, and the group comprised 85% and 15% women. Most participants (79%) had eaten their catches in the winter of 1995: the fish most eaten were yellow perch, pike and walleye.

Fishing habits

It is not surprising to note that these people were regular sportfishing enthusiasts, as the study focussed on fishers who caught a relatively high number of fish. On average, they went fishing 27.6 times during the winter of 1995, and as many times during the previous summer. They do not limit themselves to fishing in the River, as they also frequented other waterways, especially in summer, a time when 89% of these fishing enthusiasts eat their catches.

The link between regular consumption and accumulation

"The first thing we noted when compiling the findings was that a link can be established between the contaminants found in the St. Lawrence and the consumers of fish from that source", points out Tom Kosatsky, a researcher at the Direction régionale de la santé publique–Montréal Centre, who also led the study. "Indeed, the toxicological analysis measured the differences in the tissue concentrations of mercury, PCBs and DDE (a derivative of the well-known pesticide 'DDT') with those who ate quite a lot of their catches as opposed to those who consumed little caught fish." On the other hand, adds Tom Kosatsky, "the rates of tissue contaminants were not high among the participants of the study, except for two people; in addition, they do not exceed the standards set by Health Canada. In other words, there is a correlation, but the hazards are insignificant since the uptake levels of toxic substances are low".

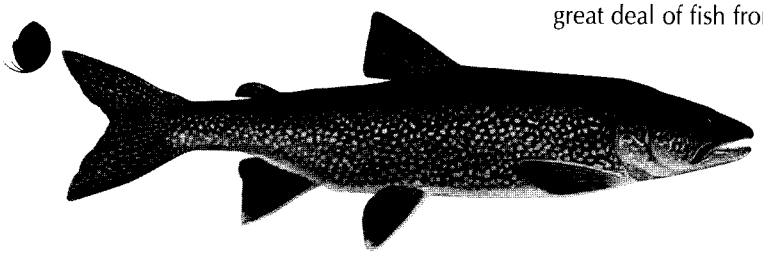
This pilot study therefore shows that the hazards associated with eating fish caught in the St. Lawrence have not risen since analyses were carried out in 1987 by the Regional Environmental Health Office based on data available at the time concerning fish consumption and contamination. At the time, the findings pointed to low risks involved in eating sportfishing catches. Moreover, the study indicates that some of the fishers who eat a great deal of fish from the River exceed the standards set out by the *Guide de consommation de pêche sportive en eau douce.*

The benefits of eating fish

This study did not focus solely on a fish-eating hazard assessment. Researchers also measured the concentration of Omega-3 fatty acids in the blood of the study's participants. These fatty acids are found in the flesh of all fish species and have been proven to safeguard people against cardiovascular disease. Figures indicate that plasmatic fatty acids were slightly higher with big fish eaters as compared to those who ate few catches. The gap is not very wide between the two categories, but findings seem to suggest that there are benefits - although not very noticeable—to eating the fish caught in the St. Lawrence.

The next step

As its name suggests, the pilot study designed to prepare the groundwork for another, a more comprehensive study, one that was carried out with a large number of sportfishers of the Montreal region who eat their catches. This second study was conducted through interviews and detailed questionnaires with 120 big fish-eaters and small fish-eaters during the fall of 995, the winter of 1996 and the fall of 1996. The data are being analysed at this time by the same team of researchers led by Tom Kosatsky. That study's findings will be released in the spring of 1998. They should indicate whether the trend observed in the sampling applies to all fishers of the Montreal region.



A Growing Field of Expertise

The Technology Development and Demonstration Program (TDDP), designed to promote the growth of the environmental industry in Quebec and Canada, has changed considerably since it was first created under the St. Lawrence Action Plan. In its early days, in 1988, the TDDP gave priority to projects that provided solutions to pollution problems, and especially those involving toxic industrial waste and contaminated sediments. Over the years, however, as the priority industries increased their environmental awareness, the approach was gradually transformed into a proactive process, directed more towards controlling the sources and causes of pollution. New components giving priority to prevention and environmental monitoring were added to the traditional areas of pollution control and restoration of damaged environments.

"Increasingly, we tend to prefer projects directed at preventing and eliminating pollution at the source," explains Jean Tremblay, Interim Head of Technology Development for Environment Canada's Environmental Protection Branch. "In the perspective of sustainable development, a notion such as ecoefficiency, which means preventing pollution and enhancing the use of energy and matter in all its forms, has gained favour with industrialists and government managers."

The TDDP provides support for private sector initiatives designed to develop new environmental technologies at the pilot or pre-commercial stages. Most of the support takes the form of scientific expertise and contributions to project funding. Generally speaking, TDDP financial input accounts for between 25% and 30% of the total, and the input of the partners—technology promoters, research centres, universities and federal and Quebec government departments—for 75%. Expert scientific support can take a variety of forms, from supervision of tests to advice regarding loan arrangements. The TDDP covers three areas of intervention: industrial waste (water, air, garbage), soil and sediment management, and the development of guides, tools and instruments. The goal of implementing 60 projects was achieved by April 1996, and 67 projects are currently under way or completed, for a total of $28 million.

In the industrial waste sector, the projects reflect the new industrial priority of environmentally friendly manufacturing processes. Of the 24 projects in this group, more than a dozen were carried out in one or more of the 106 SLV 2000 priority plants.

In the soil and sediment management sector, Quebec has made great progress in a number of areas since 1990. Several treatment technologies (biological, physicochemical and thermic) have been demonstrated. In all, 22 projects have been launched, for a total of $13 million.

Finally, in the guides and tools sector, companies are faced with new and increasingly complex standards, and need tools to help them make decisions and justify their interventions in natural and human environments. The 21 projects undertaken in this area represent a total of $4 million.

A new agreement

A new agreement has been in force since last July between Environment Canada's Environmental Protection Branch and the *Idées-PME* program run by the Federal Office of Regional Development-Quebec (FORD-Q). The agreement covers a period of three years, renewable every year, and provides an overall budget of approximately $2 million for environmental projects. "We are working in close in collaboration with the FORD-Q's," comments Jean Tremblay. "Projects requiring environmental expertise will be sent to us for examination and assessment. We will also be responsible for overall monitoring, which was our role when we were involved in SLV 2000, and we will help orient the projects according to the needs of Canadian industry." This new agreement with FORD-Q, replacing the agreement which ended on March 31, 1997, makes Environment Canada's resource network available to environmental technology promoters who call on FORD-Q's services, and opens the door to networking and synergy between companies wishing to open new markets abroad, for example.

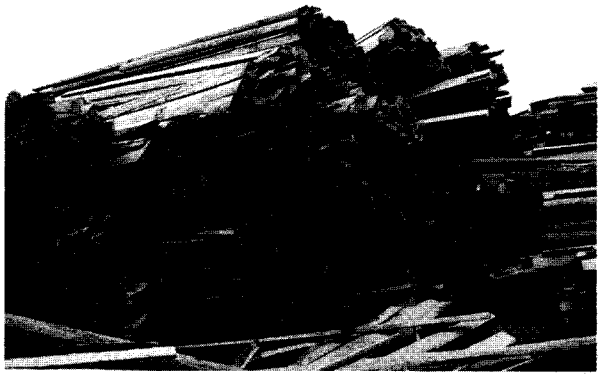
Economic and environmental consequences

In 1996, to obtain as accurate an assessment as possible of the TDDP's effects, Environment Canada asked Tecsult to carry out a study of 23 of the program's projects. "The report, submitted in March 1997, describes results that are extremely positive, both for the promoters and companies involved and for the federal and Quebec governments," mentions Michel Chevalier, project manager for the Dredging and Restoration Technology sector of the Environmental Protection Branch, who was responsible for the study.

From the financial standpoint, the 23 projects studied generated an average increase of $1.75 million in the annual turnover of the companies concerned, and a reduction in capital and operating expenses of $1.8 million. For many companies, the program enabled them to bring forward their environmental projects. Others—56.5% of participants—said they would not have carried out the project at all if they had not received TDDP support.

From the environmental standpoint, several of the technologies demonstrated will be marketed commercially. In the soil and sediment sector, for example, this will be the case for nearly 80%, once the projects are completed. TDDP projects have also helped train graduate students and create highly specialized jobs.

The Tecsult study also sought to assess the value of the program's spinoffs for government. Using an intersector exchange model developed by Quebec's Bureau de la statistique, the researchers updated the information obtained during the study over a five-year period (the duration of SLV 2000). They found that the projects funded by the TDDP required 145 person-years of work, for an added value of $7 million, including $4.6 million in salaries and professional fees.



STEPPE/UQAM

Sawn telephone poles.

Finally, satisfaction of promoter expectations is extremely high, in particular because the TDDP provides an excellent showcase for the product or technology, helps develop expertise and improves the company's environmental image.

Technology Platforms

"The development of technology platforms is the way of the future," declares Jean Tremblay. "In fact, technology platforms are theme areas around which groups of partners, all of whom who would benefit by joining forces to find optimum solutions in the spirit of sustainable development, are formed." In the next two years, the technology platforms will become technology incubators in eight areas related to the environment. The Centre d'excellence de Montréal en réhabilitation des sites (Montreal's centre of excellence in site restoration), created earlier this year, is the first such platform to see the light of day. The platform concept is one of the means devised for the economic recovery of Montreal. It is hoped that approximately 1,000 jobs will be created by the eight platforms.

SOLUTIONS FOR TREATED WOOD

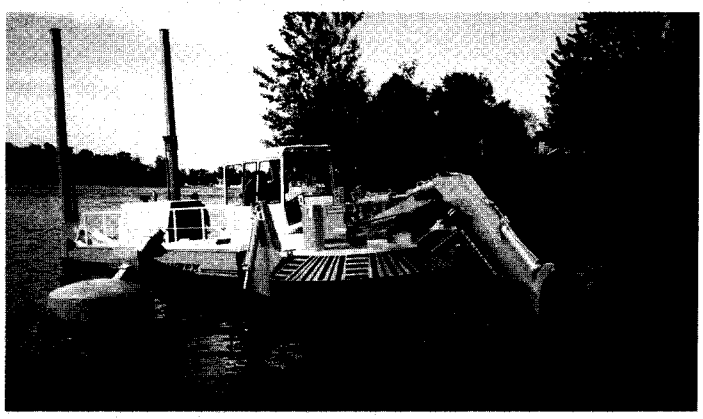
Railroad ties and telephone poles are bulky industrial waste products—the question was, could they be reclaimed? The first phase of the project revealed the technical, economic and environmental feasibility of recycling poles treated with pentachlorophenol. The poles can be cut into sections and sawn to produce planks and materials, provided certain precautions are taken with cutting waste and processing room ventilation.

The second phase was used to test energy reclamation from cutting waste and railroad ties, by using them as fuel in a cement plant kiln. The tests and analyses revealed that the kilns were able to destroy most of the organic components in the treated wood. As regards the inorganic waste (metals, etc.), the tests showed that, although the content of certain metals in air emissions increased, the percentage still remained below the standards set by Quebec's Ministère de l'Environnement et de la Faune.

With the project, the partners—Ciment Saint-Laurent, Poteaux LPB, Bell Canada, Hydro-Québec, Canadian National and the Canadian Pacific Railway Company—won the 1996 Industry-University Synergy award presented by the Conference Board of Canada for their work with the environmental pilot process experimental station at the Université du Québec à Montréal, known by its French acronym STEPPE-UQAM.

AMPHIBEX, DESIGNED FOR COMPLEX DREDGING IN SHALLOW WATER

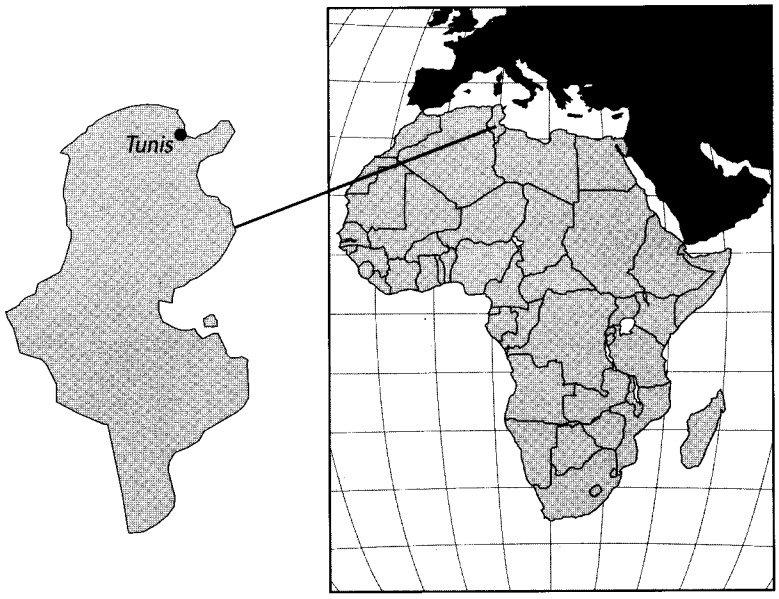
Thanks to support received from the TDDP, Les Industries Normrock inc. have been able to build a versatile amphibian excavator—Amphibex—that can be used to dredge sediments, control spring ice jams and install sewer pipes. The TDDP also helped demonstrate the machine's reliability and publicize it in domestic and foreign dredging circles. Amphibex can intervene quickly in water and littoral zones, and causes only minor disturbances in areas where traditional excavators would cause extensive damage.



Amphibex: high-performance features at the service of environmental protection.

The first Amphibex has already completed 3,000 hours of work in the field, and has generated contracts worth well over $1 million. Three new machines are currently being built, and negotiations with foreign buyers are under way. In March 1997, the President of Les Industries Normrock Inc., Mr. Normand Grant, received an Environmental Citizenship certificate for Amphibex from Canada's Minister of the Environment.

Canadian Expertise in Dredging Sediment Regulation and Management in Tunis



Last March, Environment Canada's Technology Development section organized the first workshop on the regulation and management of dredging sediment in Tunis, Tunisia. The workshop was designed for Tunisian managers in the environmental and land use planning fields. Tunisia has many small fishing ports and around seven major commercial ports where frequent dredging is required, in particular because of silting and the dynamics of the coastal waters. Unlike Canada and Quebec, Tunisia has no environmental tradition in its management of dredging work. Given the growing environmental concerns of its citizens and public authorities, the Tunisian government asked for more information on the Canadian experience.

The workshop lasted four days, from March 25 to March 28, 1997. The sessions were concerned, among other things, with classification of materials, dredging and sediment sites, operating methods, dredging equipment, the process of environmental impact assessment and mitigation and monitoring measures required during work involving threats or disadvantages for the environment.

"The Tunisians are just beginning to implement environmental management systems, while we have made considerable progress in this area," comments Jacques Bérubé, biologist and President of Jacques Bérubé inc., a Quebec company specialized in environmental management which was a member of the Canadian mission. "They must therefore assimilate notions and methods very quickly, while we have had the chance to learn them gradually over the last 15 or 20 years."

The small size of the ports, their importance in the daily lives of Tunisian fishermen, and the speed with which they silt up following storms sometimes complicates the assessment process. "The Tunisians are not used to analyses and studies which cause delays in the planning of urgent dredging work," says Jacques Bérubé. "They will certainly have to adapt our methods to their own situation."

Positive results

The Canadian mission, led by René Rochon, a manager in Environment Canada's Technology Development section, was part of Canadian efforts to develop and promote Canadian environmental technologies in partnership with the private sector. Slightly over thirty people took part in the four days of activities.

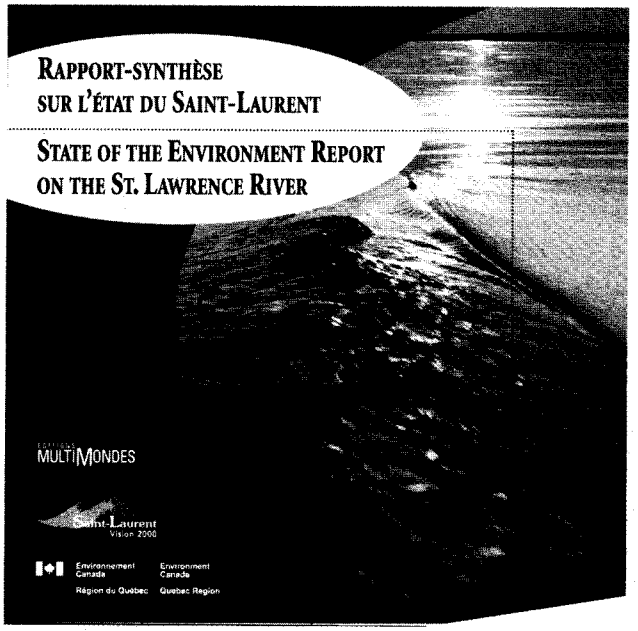
Theoretically speaking, the Tunisian managers have a good basic knowledge of the problems associated with dredging work. On the other hand, they have very little practical experience with large environmental projects. The workshop proved to be fertile ground for the creation of joint projects and partnership agreements between Tunisia and Canada. In fact, most of the industrial partners in Environment Canada's Technology Development network who made presentations at the workshop are currently negotiating projects in Tunisia. Others, like Normrock, the Amphibex promoter, are considering the possibility of selling dredging equipment. It is still too early to estimate the economic results of the Tunis experience, but the workshop certainly proved to be an excellent showcase for Quebec know-how acquired from SLV 2000.

RECENT PUBLICATIONS

STATE OF THE ENVIRONMENT REPORT ON THE ST. LAWRENCE RIVER – ON CD-ROM

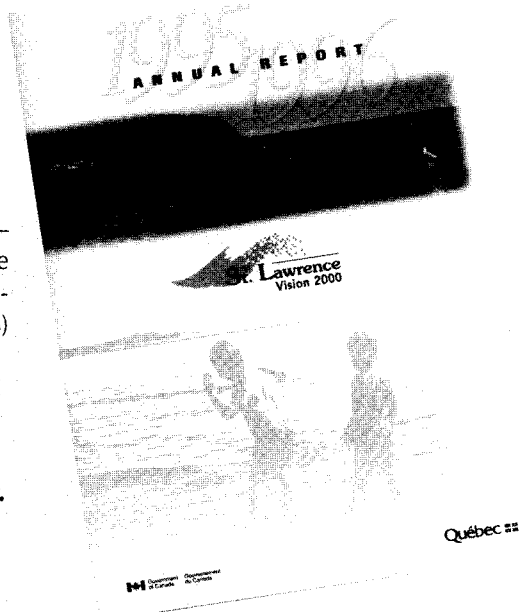
Our readers will be happy to learn that all volumes of the *State of the Environment Report on the St. Lawrence River* are now available on CD-ROM in English and in French, in format Adobe Acrobat™ for Windows and Macintosh. More than 2,500 hyperlinks.

The cost is $32.10 (taxes and shipping included). Copies may be ordered from Éditions MultiMondes: 1 800 840-3029, or by fax: 1 888 303-5931.



1995–1996 Annual Report

Published several weeks ago, the 1995–1996 Annual Report of St. Lawrence Vision 2000 may be obtained by contacting its Coordination Office at (418) 648-3444.



Also available on-line on the Internet.

INVITATION

Visit SLV 2000's new Internet site
http://www.slv2000.qc.ec.gc.ca

LETTERS to the Editor

CONGRATULATIONS TO *LE FLEUVE!*

I don't write very often to tell you how much I enjoy receiving and reading your newsletter *Le Fleuve*. It gives us information on the laudable work being accomplished by the clean-up teams who toil on the banks of the River and its tributary rivers. Because of them, we can keep the fauna and flora that abound and marvel shoreline residents and tourists alike. Thank you for your work and the dedication of the volunteer workers who work alongside you.

It is of course by making people aware of the situation that they become more sensitized and more informed of the good they can do by respecting nature. This laudable work must be kept up even with the low budgets the governments are allowing you.

I hope that you will succeed in giving us back the Lachine Canal in good condition so that the public can benefit from this navigable route just like the Rideau Canal in Ottawa.

Congratulations on work well done.

Lucien Pilon, Saint-Hyacinthe
(Translated from French)

For several months now, the readership of *Le Fleuve* has been invited to send in comments, opinions or questions concerning the articles we publish. To date, we have received just one, and it is a message of congratulations!

A reminder that you may write to us at the following address:

Letters to the Editor

Le Fleuve Newsletter
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1141, route de l'Église, 1er étage
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Habitat Conservation: An Objective of 7,000 Hectares
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Renée Langevin
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Mass Balance of River Contaminants
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Toward a Better Understanding of the Contribution of Atmospheric Contamination
Dr. Laurier Poissant
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For or Against the Contamination of Fish in the St. Lawrence?
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Technology Development: A Growing Field of Expertise
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René Rochon
Technological Development Section
Environment Canada
(514) 283-0676

AGENDA

- **From October 31 to November 1, 1997**
  Agriculture et environnement: vers des choix fertiles, 22nd Convention of the *Association des biologistes du Québec* and the 14th convention of the *Association des microbiologistes du Québec,* in Montréal.
  For information, contact: ABQ – Tel. (514) 279-7115; Fax: (514) 279-9315
- **November 14 and 15, 1997**
  Biodiversity and Impact Assessment, 6th Annual Conference of the *Association québécoise pour l'évaluation d'impacts* (AQEI), in Montréal.
  For information, contact: Ms. Françoise Mondor – Tel: (514) 990-2193; Fax: (514) 276-0438; e-mail: mondor@aqei.qc.ca; Web site: http://www.cam.org/~aqei/
- **November 19 and 20, 1997**
  Industrial Wastewater and Pollution Prevention, 20th Wastewater Symposium, 9th Drinking Water Workshop, 13th Eastern Canadian Conference on Water Quality of the CAWQ, in Montréal.
  For information, contact: CAWQ/AESEQ – Tel: (514) 270-7110; Fax: (514) 270-7154; e-mail: assqenv@login.net
- **From October 18, 1997 to January 5, 1998**
  Exhibit "KALÉID'EAUSCOPE" presented at the Biosphere, in cooperation with the Mutual of Canada, on Sainte-Hélène Island in Montreal.
  For information: The Biosphere, Environment Canada – Tel: (514) 283-5000; Fax: (514) 283-5021; e-mail: biospher@www.wul.qc.doe.ca

LE FLEUVE

NEWSLETTER
St. Laurence Vision 2000

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Communications Component
St. Lawrence Vision 2000

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Bob van Oyen, Co-president of the Communications Harmonization Committee
Ministère de l'Environnement et de la Faune du Québec

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