

For more information:

St. Lawrence Vision 2000 Co-ordination Office 1141 Route de l'Église 6th Floor PO Box 10,100, St. Foy, Quebec G1V 4H5 Telephone : (418) 648-3444 Fax : (418) 649-6213 Email : nancy.laine@ec.gc.ca

Aussi disponible en français

Legal deposit — Bibliothèque nationale du Québec, 1997 National Library of Canada ISBN 2-550-31423-9

1

MESSAGE FROM THE FEDERAL MINISTER OF THE ENVIRONMENT

At the end of the third year of St. Lawrence Vision 2000, I am pleased to present the annual report of the results achieved between April 1, 1995 and March 31, 1996.

The Canadian and Ouebec governments have been working together for eight years now in a spirit of co-operation and are harmonizing their respective initiatives regarding the St. Lawrence in order to reclaim the river for the public while ensuring its sustainable development. These efforts, combined with those of our many partners and other stakeholders, hold the greatest promise of success.

As we are all aware, water will become the most coveted resource in the 21st century. For this reason, the federal government believes that initiatives aimed at protecting major ecosystems such as the Great Lakes and the St. Lawrence River are the best way to ensure that Canadians will be able to use this precious resource for a long time to come.

I am especially proud of the fact that this year we reached and even exceeded one of the objectives that was set in 1988, during the launch of the St. Lawrence Action Plan (SLAP). Toxic effluent discharged into the river by the first 50 priority plants was reduced by 96%. Thanks to the firms' co-operation and the \$650 million they invested to implement clean-up measures, the initial goal of 90% was exceeded. In addition to meeting established environmental standards, these investments created a number of jobs and stimulated the environmental industry in Quebec.

The year just ended was characterized by a growing interest in saving the St. Lawrence and the firm commitment of riverside communities to doing so. Under an agreement with the Stratégies Saint-Laurent organization, new ZIP (Priority Intervention Zone) committees were set up, among other things.

To support the committees' work, we produced and disseminated three environmental reports followed by public consultations in local communities. The new ideas and initiatives stemming from the meetings are proof that close co-operation between governments and communities is a winning formula for ensuring a better future for the St. Lawrence River.

Thanks to St. Lawrence Vision 2000's Community Interaction Program, nearly \$1.5 million were invested in more than 25 projects to restore, clean up and enhance the St. Lawrence and its tributaries. I would like to thank all of the volunteers and organizations who gave so generously of their time and energy to these projects.

I remain convinced that, more than ever, getting Quebecers involved is the way to ensure that an action plan such as St. Lawrence Vision 2000 can be carried out and that the St. Lawrence, the jewel of our heritage, will outlast us all.

Aligio Marchi Sergio Marchi



Blank page / Page blanche

MESSAGE FROM THE MINISTER OF THE MINISTÈRE DE L'ENVIRONNEMENT ET DE LA FAUNE DU QUÉBEC

As the Québec Minister of Environment and Wildlife and the Québec government coordinator for St. Lawrence Vision 2000, it gives me great pleasure to present the 1995-1996 annual report.

This second edition of the report details the accomplishments of the various St. Lawrence Vision 2000 teams, complete with the status of clean-up, restoration and conservation efforts designed to safeguard the St. Lawrence River, an environmental heritage which is unique.

Encouraging results for 1995-1996 include the protection of 820 priority habitats in conjunction with non-governmental organizations, which brings the total to approximately 5,415 hectares, or 77% of our target goal; the creation of a 9th ZIP committee (Ville-Marie committee); the production and publication of three regional reports (Québec-Lévis, Saguenay-Alma-Jonquière and Montréal-Longueuil sectors); an extensive survey of 5,000 agricultural producers to determine their use of pesticides and fertilizers for farming purposes in four drainage basins; further work on the St. Lawrence tributary water quality study (the number of tributaries has increased from 25 to 40); and the production of reports on water quality in seven tributaries.

Worth highlighting is the 96% reduction in toxic liquid waste discharged into the St. Lawrence by the fifty industries targeted by the St. Lawrence Action Plan. These results exceed our goal of 90%, and were achieved through the collaboration of the companies involved, which invested close to \$650 million to modernize their industrial processes.

These examples of partnership between industries, riverfront communities and NGOs clearly show that collective efforts are required to protect and restore the St. Lawrence. The ongoing public interest in the protection of the St. Lawrence ecosystem is a catalyst for changing traditional methods and processes. We need to work toward common objectives and continue to build new, solid partnerships with environmental groups, municipalities, companies and all those who have the interest of the magnificent St. Lawrence River ecosystem at heart.

David Cliche



Blank page / Page blanche

TABLE OF CONTENTS

Message from the federal Minister of the Environment	3							
Message from the Minister of								
the ministère de l'Environnement et de la Faune du Québec	5							
A word from the co-presidents of the agreement	8							
St. Lawrence Vision 2000	9							
Highlights:								
Biodiversity	11							
Agriculture	14							
Community Involvement	16							
Decision Support	19							
Health	23							
Protection	26							
Restoration	30							
Communications	33							
Government expenditures, 1995-1996	36							
Reports published	37							

A WORD FROM THE CO-PRESIDENTS OF THE AGREEMENT

In April 1994, the Canadian and Quebec governments signed the St. Lawrence Vision 2000 agreement. In doing so, our federal and provincial leaders reiterated their desire to restore, conserve and protect the St. Lawrence River and its ecosystem in order to reclaim the river for the public while ensuring its sustainable development. St. Lawrence Vision 2000 followed in the wake of the St. Lawrence Action Plan (1988-1993), which was the first major environmental harmonization agreement between the Canadian and Quebec governments.

We are proud to announce that the encouraging results obtained in 1995-1996 by the various teams working for St. Lawrence Vision 2000 lead us to believe that all of the action plan's objectives will be achieved by 1998. This report briefly describes these results and the progress being made in activities under way to achieve the goals of the seven components of St. Lawrence Vision 2000.

Without a doubt, the approach taken by St. Lawrence Vision 2000 plays a key role in the achievement of the objectives. This approach, based on partnership between all the stakeholders involved, is aimed at harmonizing all of their activities for the St. Lawrence and its ecosystem.

St. Lawrence Vision 2000 is clear evidence of the willingness of the Quebec and Canadian governments to focus and co-ordinate their activities for the sustainable development of the St. Lawrence. However, we would be remiss in not recognizing that the success of our activities also depends on the commitment of interested groups and the public to the conservation and protection of the St. Lawrence. Thanks to their support, the generations of today and tomorrow will be able to benefit from the majestic St. Lawrence River, the crowning glory of our natural heritage.

François Guimont DIRECTOR GENERAL Quebec Region Environment Canada

George Arsenault SOUS-MINISTRE ADJOINT Direction générale du patrimoine faunique et naturel Ministère de l'Environnement et de la Faune du Québec

ST. LAWRENCE VISION 2000

St. Lawrence Vision 2000 (SLV 2000) includes seven major components, each oriented towards the sustainable development of the St. Lawrence River. Five of these components centre on ecosystem conservation and pollution prevention, while the other two focus on protection and restoration of the environment.

The main objective of the **Biodiversity** component is to conserve habitats and re-establish species that are threatened or in decline, particularly the St. Lawrence beluga. It is also concerned with establishing an overall picture of biodiversity in the St. Lawrence. The Agriculture component seeks to establish the effects of agricultural pollution on the St. Lawrence ecosystem. The Community Involvement component promotes the active participation of riverside residents in the protection and restoration of the St. Lawrence. Under the Decision Support component, scientific and applied research activities are being carried out to improve our understanding of the St. Lawrence ecosystem and disseminate the information to decision-makers and the public, while the purpose of the Health component is to protect the health of riverside communities. The goal of the Protection component is to reduce toxic effluent discharges and virtually eliminate discharges of persistent toxic substances. Finally, the **Restoration** component is experimenting with and promoting new restoration technologies.

An ecosystem approach

An ecosystem approach was used to develop SLV 2000. This approach seeks first to tackle problems and focus activities in a comprehensive, integrated way. SLV 2000 looks at the St. Lawrence, the state of the environment of certain rivers and their impact on the St. Lawrence. Action is mainly concentrated on seven rivers: L'Assomption, Boyer, Chaudière, Richelieu, Saguenay, St. Maurice and Yamaska.

Governmental partners

In order to become more efficient in their activities to clean up and protect the St. Lawrence River, Canada and Quebec have agreed to pool their efforts. As a result, a large number of departments are participating in the implementation of SLV 2000. On the federal side, Environment Canada, Fisheries and Oceans Canada, Health Canada, Agriculture and Agri-Food Canada, the Department of Canadian Heritage and the Federal Office of Regional Development-Quebec are taking part. For Quebec, the ministère de l'Environnement et de la Faune, the ministère de la Santé et des Services sociaux, and the ministère de l'Agriculture, des Pêcheries et de l'Alimentation are closely involved.

Non-governmental partners

To better achieve its objectives, SLV 2000 encourages the co-operation and active participation of partners from the private sector, universities, environmental groups, research centres and other local organizations. Stratégies Saint-Laurent is a good example of such a partner. The mandate of this non-governmental, non-profit organization is to rally riverside communities and encourage them to work together to develop concrete measures to protect, restore and enhance the St. Lawrence and its tributaries.

Harmonization first and foremost

The activities engaged in cover such a broad range that a number of federal and provincial departments concerned with protecting and conserving the St. Lawrence ecosystem are called upon to participate. To simplify and facilitate management of the action plan, and also to ensure that all of its objectives are fully realized, a harmonization and co-ordination framework was set up.

An agreement management committee, made up of representatives from the signatory federal and provincial departments, meets regularly to establish major policies and monitor the implementation of each of the agreement's components. Component harmonization committees hold regular meetings to plan and monitor the implementation of activities in their areas of concern. There is also a committee responsible for communications. As the Restoration component is entirely a federal government responsibility, no harmonization committee was created.

Advisory Committee

In July 1995, the federal and provincial ministers of the environment appointed Harvey Mead as President of the SLV 2000 Advisory Committee. As the partners had agreed, the Committee was set up in the spring of 1996 to ensure that more attention is paid to the concerns and views of the Quebec public in the implementation of SLV 2000.

The Committee's mandate is to provide advice on the strategies, approaches and relations to be developed among the various partners, to comment on the results achieved, provide information on society's concerns and suggest actions for the future.

BIODIVERSITY

TARGET RESULTS for March 31, 1998:

Protect 7,000 hectares of habitat.

Increase productivity of five disturbed marine habitats.

Establish a plan to conserve, restore and enhance coastal areas.

Carry on the recovery plan for the St. Lawrence beluga.

Help maintain or restore 12 species that are threatened or in decline.

Restore the smelt population in the Boyer River.

Publish a report on St. Lawrence biodiversity.

Establish a network to monitor the condition of the River.

Habitat conservation

In 1995-1996, 820 hectares (ha) of priority habitats in 15 sites were protected with the co-operation of non-governmental agencies, for a total of 5,415 ha since the beginning of SLV 2000. After three years of effort, 77% of the target 7,000 ha was achieved.

The year was also marked by the creation of the Pointe Platon ecological reserve (60 ha) and changes to the boundaries of the Léon Provancher ecological reserve (Lake St. Paul), which was expanded by 40 ha.



Photograph : Jacques Brisson

With regard to disturbed habitats, restoration work begun in 1994 on the Bonaventure barachois in Chaleur Bay was completed. Characterization studies of the Chandler, Malbaie and Pointe aux Outardes barachois were conducted to assess the type of work needed to be carried out to restore these habitats. A project aimed at identifying island habitats in marine environments between Tadoussac and Pointe des Monts was also completed. A Geographic Information System (GIS) that may one day be used to develop a coastal habitat plan was completed with the incorporation of biogeographical and anthropogenic data from the North Shore, Saguenay, Gaspesia and lower estuary. In addition, a major plant survey was carried out in marshes in the fluvial estuary. Finally, with regard to the St. Lawrence's tributaries, biological and plant studies of the St. Maurice, Boyer, Saguenay and Richelieu Rivers were continued.

The St. Lawrence beluga recovery plan

Since June 1995, the Department of Fisheries and Oceans has been working with the World Wildlife Fund (WWF) to develop a plan for the recovery of the St. Lawrence beluga under SLV 2000. Developed by a team of experts, the recovery plan for the St. Lawrence beluga was announced on February 14, 1996. It is the first of its kind to be created for a marine species in Canada.

Species that are threatened or in decline

Work carried out in 1995-1996 affected 48 of 155 priority species covered by SLV 2000. The projects were oriented towards the conservation, maintenance and recovery of these species. Work was carried out to increase knowledge of 15 species, including lake sturgeon, rare plants at Mont St. Pierre and the Barrow's Goldeneye. This work, as well as previous efforts, led to the production of 17 status reports on various species with a view to their legal designation as threatened or vulnerable. Ten reports on plants and three on fish in the St. Lawrence, including the striped bass and rainbow smelt in the southern part of the estuary, were produced. After the reports were completed, a priority species endemic in the Gulf, the Griscom arnica, was designated threatened in the regulations.

In addition, 15 projects specifically concerned with recovery were carried out on 17 species. Recovery plans continued to be implemented for the copper redhorse and seven species of birds (Piping Plover, Horned Grebe, Roseate Tern, Loggerhead Shrike, Yellow Rail, Caspian Tern and Peregrine Falcon). Measures were implemented to control off-road traffic on the Magdalen Islands to protect the Piping Plover, research was carried out on the Yellow Rail, Horned Grebe and Peregrine Falcon, and a second spawning site for the copper redhorse was discovered. Awareness activities aimed at protecting sites containing concentrations of endemic or disjunct plant populations in the Gulf of St. Lawrence also took place on the Lower North Shore.

In 1995-1996, new recovery plans for species such as the spiny softshell turtle and the endemic or disjunct plant populations in the Gulf of St. Lawrence were added.

Recovery of the smelt population in the Boyer River

The first step in developing an action plan under the project to restore the Boyer River drainage basin, namely characterizing the territory, was completed in 1995-1996.

With regard to the activities planned, 31 producers took courses in integrated fertilization. One hundred and eighty farm resource management and development plans were prepared for farms, which can now make use of this planning tool. In order to maintain a buffer zone of vegetation, 500 panels were set up, 34 livestock watering troughs were installed away from the river and vegetation was planted on 800 metres of riverbank. Research projects on phosphorus saturation in soils and soil loss were continued. In addition, federations of the Quebec City region Union des producteurs agricoles (farm producers' union) developed and tested an agro-environmental assessment methodology in the field.

In terms of wildlife, a check was made of the number of smelt that frequent the Boyer River. A survey and characterization study of cut-offs along the Boyer River were conducted with a view to future fish habitat enhancement.

Portrait of biodiversity in the St. Lawrence

Two teams gathered and processed information collected to date on biodiversity in the St. Lawrence River in order to prepare a report. The first team focused on the physical aspects, carrying out ecological mapping and preparing a general description of the St. Lawrence's 23 regions. The second team, concentrating on the biological aspects, completed a literature review on the themes "biology of the St. Lawrence" (7,000 references), "biological surveys" (1,500 references) and "the concept of biodiversity (800 references). More than 120 authors have agreed to contribute to the work.

Biological survey data from 250 selected studies were input to create five computerized directories, each containing several databases on vegetation, invertebrates, fish, birds and reptiles/amphibians.

A network to monitor the river's state

Since the ecological integrity of the St. Lawrence River is seriously threatened by its multiple uses, a network that makes wise use of bio-indicators was set up to monitor the state of the River. An initial report was published using sea birds as bio-indicators. Diet and breeding conditions provide useful information on contamination in the St. Lawrence. Data gathered by the fish monitoring network under the Decision Support component were integrated with the information gathered by the network.

ASSESSMENT OF HABITAT CONSERVATION IN 1995-1996 Sites Area Protected (hectares) 1994-1995 4 595,43 ha (15 sites) 1995-1996 Lake St. François* 56,78 Hébert and Govette points 9,36 St. Jean Brook 20,39 Île des Juifs 10,57 Grande-Île* 14,00 Île de Grâce 167,28 Île Lapierre* 54,83 Lavallière Bay* 6,84 Lake St. Paul* 40,00 Pointe au Platon 60,00 Cap Tourmente* 7,78 Kamouraska 11,72 Saint-André de Kamouraska* 15,01 Île aux Lièvres flats 287,17 Pointe de l'Est* 58,45 Total (15 sites) 820,18 ha Cumulative 5 415,61 ha

* An increase in the area of sites already protected prior to 1995.



AGRICULTURE

TARGET RESULTS for March 31, 1998:

Publish a layman's brochure on the agroenvironmental issue and possible solutions.

Support four pilot projects initiated by the local community and assess their feasibility for the entire drainage basin.

Produce a report on the presence of pesticides in drainage basin waterways.

Produce a report on the use of pesticides and fertilizers and on farming practices.

Publish an agro-environmental assessment for each drainage basin, including the state of water quality, contamination sources and agricultural clean-up activities to date.

Publish an agricultural clean-up action plan for each of the four basins.

The agro-environmental issue and possible solutions

In 1995-1996, the Agriculture component of SLV 2000 published a brochure entitled *Pour une eau de qualité en milieu rural - comprendre et agir collectivement*. The brochure presents general notions about surface and groundwater quality and pollution. It then discusses the impact that certain farming practices have on the environment and the risks associated with the use of fertilizers and pesticides. It also proposes preventive and corrective solutions that could be used on farms.



Photograph : Richard Laroche, ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Ouébec

Support for four pilot projects

Pilot projects were carried out in each of the drainage basins targeted by SLV 2000: the entire Boyer River basin, Turmel Brook (Chaudière River basin) and the St. Esprit Brook (L'Assomption River basin). A fourth project was recently begun on Corbin Brook (Yamaska River drainage basin). The experience gained from these four small-scale projects will contribute to the development of action plans to extend agricultural clean-up to all four drainage basins.

Reports on the presence and use of pesticides

In order to complete the information available on pesticide-contaminated water, initial sampling of waterways in the L'Assomption, Chaudière and Yamaska River drainage basins will take place in 1996. A preliminary analysis will allow us to target the products used most often and to focus research in terms of the pesticide families to be analysed.

To complement the gathering of this environmental data, a survey was carried out among some 5,000 farmers by the Bureau de la statistique du Québec. The survey provided detailed information on pesticide and fertilizer use (manure, liquid manure and inorganic fertilizers) in farming in four drainage basins targeted under the Agriculture component.



Agro-environmental diagnosis of drainage basins

Research was conducted and data compiled for the production of agroenvironmental diagnosis for each of the four drainage basins. On the basis of current knowledge and using the pressure-state-response approach, the diagnosis describe the pressure exerted on the land and water quality by farming activities while relating them to municipal and industrial pressures. A report on nitrogen, phosphorus, soil particle and pesticide inputs allows us to assess the risks of contamination and the contribution of agriculture to water pollution. Other topics studied were the use and quality of surface water and groundwater resources and activities already undertaken to reduce the environmental impact of human activities. The four reports will be published in the spring of 1997.

15

COMMUNITY INVOLVEMENT

TARGET RESULTS for March 31, 1998:

Prepare 11 reports covering 18 areas of prime concern (ZIPs) to support participation in developing and implementing Ecological Remedial Action Plans (ERAPs).

Provide funding and other support for 140 community projects.

The ZIP (Priority Intervention Zone) Program

In 1995, the Community Involvement component signed a contribution agreement with Stratégies Saint-Laurent, a non-governmental organization active in co-ordinating riverside communities along the St. Lawrence. It is responsible for organizing and setting up ZIP committees and supporting their efforts to carry out their mandates.



Photograph : Michel Chouinard

During the year, a ninth ZIP committee, the Ville Marie ZIP Committee, was created. Three regional reports were produced and published for the Montreal-Longueuil, Quebec City-Lévis and Saguenay sectors. Regional reports were presented during four public conferences organized by the Montreal East, Quebec and Chaudière-Appalaches, Alma-Jonquière and Saguenay ZIP committees. The first ERAP, for Lake St. Louis, was submitted in early June 1996.

Funding and other support for community projects

The Community Interaction Program provides community organizations with financial and technical assistance to plan and carry out projects to conserve, restore and enhance the St. Lawrence River and its tributaries designated under SLV 2000. In 1995-1996, 25 new projects were added to the 24 already under way. The total value of the projects was \$1,470,631 and the program's contribution was \$859,201.



ORGANIZATIONS FUNDED IN 1995-1996

Aquarium des Îles-de-la-Madeleine

Association des pêcheurs du poisson des chenaux de la rivière Sainte-Anne

Attention Frag'Îles

Chaleur Bay ZIP committee

Chambre de commerce du Grand Paspébiac

Club de golf St. Michel

Comité de l'environnement de Chicoutimi

Comité de valorisation de la rivière Beauport

Comité pour l'environnement de Matane

Corporation d'amélioration et de protection de l'environnement de Baie-Comeau

Corporation de développement Les Capucins

Corporation de l'aménagement de la rivière L'Assomption

Fédération de l'Union des producteurs agricoles of Lévis-Bellechasse, Lotbinière-Mégantic and the North Shore

Fondation québécoise pour la protection du patrimoine naturel

Interaction Pointe-Claire

Regroupement des pêcheurs professionnels du sud de la Gaspésie

Saguenay ZIP committee

Société d'histoire naturelle de la vallée du Saint-Laurent

Société de conservation de la baie de l'Isle-Verte

Société de verdissement du Montréal métropolitain

Société Duvetnor ltée

17

ENVIRONMENTAL AND SOCIO-ECONOMIC RESULTS OF PROJECTS FUNDED IN 1995-1996

Waste collected	737 t
Restoration or improvement of habitats	48 ha
Restored shorelines (stabilized and replanted)	145 km
Tree and shrub planting	14,330 beds
Action on sources of agricultural pollution	50 farming enterprises affected
Volunteers recruited	2,222 person-days
Increased first-hand awareness in the population	30,000 individuals (approx.)
Job creation	25 person-years
Money invested locally	\$1.16 million

18

DECISION SUPPORT

TARGET RESULTS for March 31, 1998:

Publish a second joint state of the environment report on the St. Lawrence.

Make four types of scientific and environmental documents available to the public.

Assess inputs of contaminants from the Great Lakes and 5 tributaries and their effects on the ecosystem.

Determine the proportion of airborne sources for 18 organic substances and 7 metals.

Monitor water quality in the St. Lawrence and 24 of its tributaries.

Expand knowledge of and evaluate the condition and dynamics of the beluga and other marine mammal populations of the St. Lawrence.

State of the Environment Report on the St. Lawrence

The first State of the Environment Report on the St. Lawrence River. released in the summer of 1996, contains data collected until 1993. At present, a team composed of representatives from Fisheries and Oceans Canada, Environment Canada and the ministère de l'Environnement et de la Faune du Québec is working on the second report, to be published in 1998. By adopting a *pressure-state-response* analytical framework, this report will seek to identify causal links among the various components of the St. Lawrence system. As part of this undertaking, a few fact sheets on issues will be written, and the indicators used in the first report will be updated.



Photograph : C. Ménard

Dissemination of information

Ten new Info-Flash articles on various aspects of the river were published in the last year, bringing to 90 the total number of documents in this series.

Modelling work on water circulation in the river led to the publication last year of the *Atlas numérique des courants et autres caractéristiques des écoulements en eau libre du tronçon Tracy - Lac Saint-Pierre.*

Inputs of contaminants and their effects on the St. Lawrence ecoystem

A project to measure chemical contaminants in the St. Lawrence, initiated in May 1995, was continued throughout the year. More than 60 contaminants in dissolved or particulate form, including mercury, PCBs, PAHs and pesticides, were analysed.

To shed more light on the effects of contaminants on marine resources, laboratory experiments were conducted in which some male Canadian plaice were exposed to contaminated sediment samples (PAHs, dioxins, furans and PCBs) taken from Baie des Anglais near Baie Comeau. The findings indicated that the contaminants affected the fertilization rate.



As well, surface sediment samples taken from the St. Lawrence estuary were analysed for organochlorine compounds (PCBs, chlorinated pesticides, dioxins, furans) and metals; the results showed that organic contaminant concentrations in sediments are higher at the head of the lower estuary than farther downstream.

A monitoring network was set up in cooperation with a number of partners to study the environmental effects of chemical contaminants on the fish species of the St. Lawrence. The goal is to build a picture of the condition of the fish, contaminant levels in their flesh, the associated human health risks, and the degree of contamination of certain organs to provide a measure of the extent of chemical contamination of the river.

Tracking of toxic substances from industrial sources was also done in an effort to identify links between the contaminants and their effects on river uses and aquatic life. This led to the publication of a report on the St. Maurice River, which revealed that dioxin and furan levels had declined as a result of actions directed at industrial plants. Nonetheless, mercury concentrations remain problematic, and restrictions have been placed on the consumption of game fish.

20

Airborne chemical contaminants

Sampling of organic and inorganic chemical substances in the air and precipitation was continued at the three sampling sites, St. Anicet, St. Françoise and Mingan. To get a broader picture of a limited number of toxic compounds in the river, two temporary stations, one at St. Anne de Bellevue and the other at L'Assomption, were set up, coupled and synchronized with the water sampling program. They will be in operation for at least one year.

Water quality monitoring

Water quality monitoring in tributaries of the St. Lawrence also continued. In 1995-1996, the number of tributaries monitored was increased from 25 to 40 after the activities were streamlined. The goal is to assess the impact of clean-up action and identify problem areas and residual sources of pollution. Reports on water quality in seven watercourses, the Etchemin, Matapedia, Outaouais, St. Anne, St. Charles and St. Maurice Rivers, and the stretch of the St. Lawrence near Quebec City, were made public. A quality indicator called the bacterial and physicochemical quality index was developed with the aim of synthesizing and popularizing the data collected and permitting comparisons among the rivers.

Monitoring of the biological quality of rivers provided the opportunity to assess pathologies in fish and the abundance and diversity of fish species and bottom-dwelling fauna. The Yamaska and Richelieu Rivers were sampled during summer 1995, and data interpretation for these rivers, together with the Chaudière, Châteauguay and St. François Rivers, is currently under way. Two indices, one for fish and the other for bottomdwelling fauna, were developed.

Sampling surveys on the diversity of fish species were carried out on Lake St. Pierre, near the Quebec City Aquarium and at eight stations located in the estuary. The catches and results were analysed and combined with historical data where available. Some 30,000 records from private collections and the databank of the ministère de l'Environnement et de la Faune du Québec were standardized and computerized, thereby providing access to historical data on various fish species compiled since 1922.

Analysis and measuring tools

The laboratories of participating organizations actively provided analytical support for the different components of SLV 2000. In addition to conducting tens of thousands of analyses, such as characterizations of industrial discharges and of the aquatic environment, government laboratories handled quality control of analyses done by private laboratories and certification of such facilities. As well, new analytical methods, such as bioassays, were developed.

Belugas and other marine mammals

Further to an aerial survey of the St. Lawrence beluga population, conducted in August 1995, an abundance index was derived indicating that there were 705 belugas in the lower estuary and Saguenay Fjord. This contrasts with a count of 526 in 1992. The monitoring program is continuing and will eventually provide a more accurate picture of the population trend of the St. Lawrence belugas.

The study on whales in the Tadoussac-Escoumins sector revealed that the population in this particular area declined in 1995 in comparison to the previous year. The study also showed that the distribution of individuals had changed.

In the study of harbour seals in the lower estuary, a follow up of some individuals was done in order to evaluate the abundance of the population, its activities and movements. An analysis of PCB and DDT levels in the seals' tissues showed higher contamination rates in this sedentary species than in the other seals that frequent the St. Lawrence estuary, such as harp seals.



Remote sensing and modelling

Studies conducted with a view to protecting the St. Lawrence are opening up new opportunities for using remote sensing as a tool for observing, assessing and predicting changes in the environment.

A new coupled *ocean-ice-atmosphere* model, which is time dependent, has been developed for marine research. The model's ability to simulate changes in three dimensions, at the scale of hours and years, makes it especially useful for studying the influence of environmental conditions on the Gulf of St. Lawrence biomass.

Monitoring reports on water quality indicate an appreciable improvement in the 6 rivers thanks to the urban and industrial cleanup work undertaken. Nonetheless, there are still some areas where the water quality falls short of the established objectives. Agricultural practices and discharges of urban or industrial effluents whose treatment had not yet been installed are generally to blame. A marked improvement has been noted in the water quality of the St. Lawrence in the Quebec City area.

22

HEALTH

TARGET RESULTS for March 31, 1998:

Evaluate the risks associated with contaminants by developing exposure indicators and other tools.

Prepare a report on public awareness of the risks associated with contamination.

Develop and communicate three strategies for reducing risks.

Monitor contaminant levels in human tissues.

Publish a report on public health in 20 ZIPs.

Risks associated with contaminants

In 1995-1996, a number of studies were carried out to expand knowledge of the exposure of riverside residents. For example, an epidemiological study conducted on the North Shore of the St. Lawrence looked at foetal exposure and certain effects due to organochlorine compounds (PCBs, chlorinated pesticides), heavy metals and omega-3 acids (fat contained in fish). The contaminant levels found in the study population appear not to have had negative effects on foetal growth despite prenatal exposure.



Photograph : Léo-Guy de Repentigny

Another epidemiological study of women of child-bearing age in the Quebec City area showed that exposure to PCBs and chlorinated pesticides did not represent a significant risk factor for endometriosis, a uterine disorder linked with infertility.

Research on the algal communities of the St. Lawrence revealed that the algae contain very low levels of organochlorine compounds, mercury and arsenic. The health risks associated with eating algae are therefore minimal. However, regular consumption of algae such as kelp could on one hand result in an overdose of iodine, and on the other hand cause an appreciable buildup of cadmium in human tissues.

Another study indicated that contaminant levels in the flesh of fish in the St. Lawrence have declined over the past ten years. However, some species, such as walleye and northern pike, are still contaminated. Mercury and PCB concentrations in Lake St. François and Lake St. Louis have been found to exceed the Health Canada criteria. According to estimates based on regular consumption of species with the highest levels of mercury and PCB, people who eat fish from the river are at little risk provided they follow the recommendations contained in the *Guide de consommation du poisson de* pêche sportive en eau douce.

Giardia is a parasite found in surface waters which can cause an intestinal disease called giardiasis. Researchers have analysed the cases of this illness reported in Quebec. Based on their findings, for the same type of water treatment, the risk of giardiasis is lower for residents of municipalities that draw their water from the St. Lawrence than for people living in municipalities that use a different water supply.

Е

н

т

L

н

Finally, a project was undertaken to identify the main chemicals and petroleum products transported on the St. Lawrence and the main risks to human health from accidental spills. The project included an exercise simulating both a chemical and a petroleum spill, which sensitized the participating municipalities to the possibility of a major spill occurring near their water treatment works and the vulnerability of their water intakes.

Risk reduction strategies

In keeping with its goal of developing and disseminating three strategies for reducing risk, the Health component undertook a study on swimming in the freshwater sectors of the St. Lawrence. The goal of this study was to assess the swimmers' motivations and identify the swimming areas and environmental conditions. In a number of locations, swimmers have no information about water quality. It was also determined that some municipalities are not fulfilling their responsibility to prohibit swimming in polluted water. Finally, health issues are not among the swimmers' main concerns.

In research on consumption of game fish, a strategy was elaborated in order to inform participants of their individual findings. The goal was not necessarily to change the participants' behavior, but rather to enable them to make their own decisions about eating fish based on knowledge of the risks.

The study on the *Guide de consommation du poisson de pêche sportive en eau douce* had two goals: to determine the relationship between the underlying public health objectives and the use made of the document and to come up with proposals for improving it. One of the findings was that fishermen are not very familiar with the guide; however, they have been alerted to the problem of contaminated fish flesh through specialized media to which they lend considerable credence.

Public health surveys

In 1995-1996, the Health component produced two public health surveys, one for the Quebec-Chaudière-Appalaches ZIP committee and another for the Saguenay and Alma-Jonquière ZIP committees.

Knowledge acquisition

н

Е

A

L

т

н

The Fonds de développement des connaissances offers financial assistance for innovative, multidisciplinary projects in the area of environmental health. In 1995-1996, two projects were subsidized: an epidemiology study on the relationship between the drinking water supply in Quebec City and childhood cancers, and a study to document the presence of pathogenic microorganisms in the St. Lawrence drainage basin.

Financial assistance program

A financial assistance program was established in 1995-1996 to encourage citizens and community organizations to participate in developing and implementing projects addressing human health issues related to the St. Lawrence. The approved projects got under way in April 1996.



PROTECTION

TARGET RESULTS for March 31, 1998:

Implement measures targeting 106 priority industrial plants, including 56 new ones, in order to:

Reduce by 90% the amount of toxic effluent discharged from 11 plants with inadequate wastewater treatment (Group 1).

Optimize the reduction of discharges of toxic effluent at 22 plants where treatment technologies have already been installed (Group 2).

Assess the toxic effluents discharged by 23 regulated plants and determine the corrective measures necessary to minimize effects on the receiving environment (Group 3).

Fund and support 60 technology development projects designed mainly to virtually eliminate toxic substances.

Priority industrial plants

Between 1988 and 1995, the 50 industrial plants targeted under the St. Lawrence Action Plan (SLAP) invested nearly \$650 million to adopt clean-up measures or modify their processes. In 1995, discharges of toxic effluent decreased by 96% according to the Chimiotox Index, suspended solids by 92%, and biochemical oxygen demand by 96%. While this objective was not reached until a little over two years after SLAP ended, the originally targeted 90% reduction in the discharge of toxic substances has finally been exceeded appreciably. With regard to the 56 new industrial plants associated with SLV 2000, the first official results are expected in 1997 under current programming.



Photograph : Environment Canada

The targeted reductions in toxic substances are achieved through an approach involving six stages or activities (see the table listing the 56 new priority industrial plants):

- 1. preparing or updating the plant's inventory;
- 2. characterizing the effluents;
- computing the environmental discharge targets;
- 4. determining discharge standards;
- 5. carrying out clean-up work;
- 6. conducting environmental monitoring of the plant.

This essentially pro-active approach, which in most cases is not backed up or prompted by existing regulations, calls for voluntary action by the industry and leads to a true partnership.

In addition, priorities have been set for each of the 106 industrial plants in the action plans of the different government departments involved. The principle of integrated action directed at water, air and land underpins all measures related to industry. In other words, although its focus is on reducing effluent discharges, the Protection component also tackles issues related to air, soil and solid waste on a priority basis.



In 1995-1996, an inventory and a database on the 106 industrial plants were updated, and fact sheets on the plants were written. In addition, for 33 of the 56 new plants (Groups 1 and 2), the majority of effluents have been characterized, the environmental objectives are being calculated and the process of establishing or revising discharge standards has begun. As regards the 23 pulp and paper mills (Group 3), the data from the voluntary effluent monitoring program are being assessed and the environmental objectives are being calculated. Finally, environmental monitoring of the 50 plants targeted under SLAP has been carried out.

Virtual elimination of toxic substances

One long-range objective of the Protection component is the virtual elimination of 11 persistent bioaccumulative substances. While it is known that complete elimination cannot be achieved within the scope of SLV 2000, steps are being taken to bring us closer to that goal. An approach centring on adherence to *environmental discharge objectives* for targeted substances has been adopted. It seeks to protect human health and biological resources by preserving or restoring all uses of the river.

27

Development of treatment technologies

The mandate of the Protection component also includes developing new environmental technologies, conducting demonstration projects and promoting the expansion of the environmental industry. In all, 16 new projects have been launched, bringing to 56 the total number of initiatives funded since the start of SLV 2000. The 29 projects under way in 1995-1996 required a total investment of over \$12 million and dealt with industrial wastewaters, atmospheric emissions, soil and hazardous waste management, dredging and sediment treatment, and shoreline erosion. Pollution prevention, sustainable development and the virtual elimination of toxic substances were the criteria for selecting and implementing the projects.

		tory	acterization	onmental tives	large lards	1-up work	toring
No	56 NEW PRIORITY INDUSTRIAL PLANTS	Inven	Chara	Envin objec	Disch	Clear	Moni
51	BICC Phillips Inc.						
52	Quebec Cartier Mining Company						
53	Cuirs Sal-Tan Inc.			N.A.			
54	ICI Explosives Inc.			N.A.			
55	ICI Explosives Inc.						
56	Wabush Mine						
57	Norton Advanced Ceramics of Canada Inc.						
58	SNC Industrial Technologies Inc.			N.A.			
59	Napierville Refineries Inc.						
60	Alcan Smelters and Chemicals Ltd, Shawinigan Works						
61	Stella-Jones Inc.						
62	Aluminerie Alouette Inc.						
63	Aluminerie Lauralco Inc.						
64	Chemprox Chemicals Inc.						
65	Duchesne & Fils Ltd		N.A.	N.A.	N.A.	N.A.	
66	Les Emballages Knowlton Inc.						
67	Eka Nobel Canada Inc.						
68	General Motors of Canada Ltd						
69	Goodfellow Inc.						
70	Hyundai Auto Canada Inc.		N.A.	N.A.	N.A.	N.A.	closed
71	IBM Canada Ltd						
72	Infasco Division of Ifastgroupe and Company, Limited Partnership						
73	Manufacturier Granford Inc. (Le)						
74	Montupet Ltd						
75	Norsk Hydro Canada Inc.			DALE:			
76	Nova PB Inc.		N.A.	N.A.	N.A.	N.A.	
77	Alcan Smelters and Chemicals Ltd, Laterrière Works						
78	SNW Québec						

Completed Under way Not applicable

N.A.

28

PROTEC	TION
--------	------

		Ŀ.	erization	mental Jes	ge ds	ıp work	ing
No	56 NEW PRIORITY INDUSTRIAL PLANTS	Invento	Charact	Environ	Dischar standar	Clean-u	Monitor
79	SKW Canada Inc.						
80	Canadian Reynolds Metals Company, Reynolds Rod Plant						
81	Stelco-McMaster Ltd						
82	Sterling Pulp Chemicals						
83	Albright & Wilson Americas Ltd						
84	Avenor Inc., Gatineau Mill		N.A.				
85	St. Laurent Paperboard Inc., Matane Mill		N.A.				
86	St. Laurent Paperboard Inc., La Tuque Mill		N.A.				
87	Cascades Inc., Joliette Division		N.A.				
88	Cascades Inc., Paper Division		N.A.				
89	Cascades East Angus Inc.		N.A.				
90	Mohawk Pulp Company Ltd		N.A.				
91	Stone-Consolidated Corporation, Belgo Division		N.A.				
92	Stone-Consolidated Corporation, Laurentide Division		N.A.				
93	Désencrage Cascades, Rolland Division.Inc.		N.A.				
94	Désencrage C.M.D. Inc.		N.A.				
95	Domtar Papers, Windsor Business Centre		N.A.				
96	Stone Container (Canada) Inc. Pontiac Division		N.A.				
97	BPCO, Division of EMCO Ltd		N.A.			and a second	
98	James Maclaren Industries Inc., Newsprint Division		N.A.				
99	James Maclaren Industries Inc., Kraft Pulp DivisionN.A.		N.A.				
100	J. Ford & Company Ltd		N.A.				
101	Kruger Inc.		N.A.				
102	Malette Québec Inc.		N.A.				
103	Matériaux Cascades Inc.		N.A.				
104	Scott Paper Ltd		N.A.				
105	E.B. Eddy Forest Products Ltd		N.A.				
106	Tembec Inc.		N.A.				

Completed

29

Under way Not applicable

N.A.

RESTORATION

TARGET RESULTS for March 31, 1998:

Clean up the Lachine Canal.

Implement 6 habitat restoration pilot projects.

Produce four enhancement and restoration plans

Lachine Canal

The project to clean up the Lachine Canal made headway during 1995-1996. On April 5, 1995, the Joint Environmental Assessment Panel announced that, in its view, the revised environmental impact assessment contained the information required to proceed with a public hearing. Subsequently, the BAPE (Quebec environmental hearings board) was mandated to hold the hearings.

In March 1996, the Joint Environmental Assessment Panel made public the environmental impact assessment on this Parks Canada project. Since the key stages in the evaluation process have been completed and the environmental impact assessment has received the requisite approvals, a public hearing is to take place in 1996.

30



Photograph : Denis Lehoux

Wildlife habitat restoration pilot projects

In 1995-1996, three new pilot projects were launched. One of these, located at St. Marie de Beauce, involves creating an artificial marsh that will be used to treat wastewater from a dairy plant and provide wildlife habitat, primarily for waterfowl. In 1995, the plans and specifications were prepared and the excavation work was carried out.

An enhancement project has begun on land adjacent to Cacouna Port where some natural habitats, including a former spartina marsh, have become seriously degraded over the years. The project consists in creating a small pond on the embankment for aquatic birds and to revegetate the site. The excavation and part of the planting work were done in 1995.

At the Iles de la Paix National Wildlife Area, which has experienced serious erosion problems for many years now, a pilot project employing bioengineering techniques was undertaken to stabilize a slope that had eroded over a distance of some 50 metres. In 1995, two projects completed earlier were followed up: the Isle Verte peat bog and Riviere du Loup marsh. The follow-up at Isle Verte involved evaluating the filter's effectiveness in raising the pH and documenting how fast the habitat, which had become less acidic, was being colonized by invertebrates and plants. At Riviere du Loup, the aim was to evaluate the performance of the sediment settling sites in terms of halting erosion of the spartina marsh and eventually creating a new marsh.

Management plans for National Wildlife Areas

In early 1996, a second management plan was drawn up for the islands under federal jurisdiction located in the section of the river between Kamouraska and Tadoussac. Pertinent information is given on the area of Crown-owned islands in the sector, the bird species that frequent them and the main habitat-related problems. Some 47 management and enhancement recommendations are also laid out in the plan. The plan for developing and restoring federal government-owned islands in the Montreal-Sorel sector was adopted in early 1995.

Multipurpose marina in the Mingan region

The multipurpose marina at Havre St. Pierre will be a major asset for protecting and enhancing ecosystems in the Mingan region.

During the first phase of the project, breakwaters will be built and dredging will be carried out to deepen the basin for vessel traffic, and a pontoon-based dock network will be installed along with two modern fuel pumps.

Clean-up of port areas

Although cleaning up port areas is not covered under the agreement, steps have been taken in this regard with various partners.

The eastern sectors of the Port of Montreal, especially around Wharf 103, were targeted for action in 1995-1996. The temporary measures implemented to stop or minimize dispersion of hydrocarbons that occasionally rise from bottom sediments helped to significantly reduce emergency response action during the year.

Further to the characterization study conducted in 1994, which examined the extent of the sediment problem in this sector, the partners agreed to launch a second phase, to consider intervention options. The third stage, which involves evaluating the risks to human health and ecosystems posed by the contaminated sediments in the vicinity of Wharf 103, has also begun. With regard to the Port of Quebec City, study findings have shown that the bottom sediments in the port area do not call for action. Consequently, efforts are being directed at remediating persistent sources of contamination. Since the St. Charles River represents a major source of contaminant inputs to the estuary, and given that a panel has been charged with examining remedial options for the river, the Port of Quebec Corporation has been involved in this work since the fall of 1995.

32

COMMUNICATIONS

A number of communication activities connected with the different SLV 2000 components were carried out during the period covered by this report. Information was thus disseminated to keep the general public and our different partners abreast of the progress achieved in implementing the plan. The key communications activities are listed below.

Corporate activities

Production and distribution of the *Biennial Report 1993-1995*.

Preparation and dissemination of four issues of the newsletter *Le Fleuve*.

Participation in the conference of mayors of the municipalities of the St. Lawrence and the Great Lakes.

Series of reports on the St. Lawrence River broadcast on Radio Canada North Shore.

Insert published in the magazine *Écodécision*.

Distribution of a video on the St. Lawrence Vision 2000 action plan to all community television stations located along the river.

Participation in environment week activities at the École des hautes études commerciales.

Operation of a booth during the consultations for the Quebec and Chaudière-Appalaches ZIP and Saguenay and Alma-Jonquière ZIP.

33

Biodiversity

Diffusion of the *St. Lawrence Beluga Recovery Plan.*

Staging of workshop entitled "Place à la biodiversité", which brought together stakeholders of the Biodiversity component.

Participation in a forum and workshops attended by 70 of the 300 agricultural producers from the Boyer River drainage basin.

Publication of four issues of the newsletter *Au Courant*.

Staging of the annual workshop on habitat conservation.

Press conference on the copper redhorse.

Distribution of three reports on plants found in the Assomption River basin, the Blanc Sablon region and along the Mille-Iles River that are likely to be listed as threatened or vulnerable.

Dissemination of *Plan d'action pour le rétablissement du Râle jaune au Québec.*

Publication of an insert entitled "Place à la biodiversité" in the magazine *Franc-Vert*.

Community Involvement

Announcement made concerning the signature of a contribution agreement with Stratégies Saint-Laurent.

Production and dissemination of the following regional environmental assessments: Montreal East in May 1995, Quebec and Chaudière-Appalaches in September 1995 and Alma-Jonquière in January 1996.

Diffusion of the first annual report of the Community Interaction program.

Announcements concerning financial contributions granted under the Community Interaction program.

Distribution of a brochure on the ZIP (Priority Intervention Zone) Program.

Decision Support

Distribution of technical reports on water quality in Lake Etchemin and the St. Maurice, St. Charles, St. Anne, Matapedia and Outaouais Rivers.

Distribution of 2,000 copies of the document *"The Aerial Census of St. Lawrence Belugas"* to members of the whale-watching industry in the St. Lawrence estuary.

Distribution of 500 copies of the video "Mission: Marine Mammals" to municipal libraries, school boards and tourism associations in Quebec.

Broadcast of a report on research concerning rorquals of the St. Lawrence estuary on the program *Découverte*.

Staging of a scientific forum on the objectives achieved under the Decision Support component.

Opening of the St. Lawrence Centre's documentation facility to the public.

Publication of an insert profiling the St. Lawrence Centre in the magazine *Continuité*.

Installation at Expotec of a conversational terminal dealing with water circulation in the St. Lawrence and the impact of inputs of external factors.

Press visit focussing on the fish species and contaminant monitoring program at Lake St. Pierre.

Health

Dissemination of the study on perceptions of the health risks associated with the drinking water supply in the Quebec City area.

Participation in public consultations held by the Saguenay and Alma-Jonquière, Quebec and Chaudière-Appalaches, and Montreal East ZIP committees.

Publication of articles in the weekly newspapers of riverside communities to promote the Financial Assistance Program for projects related to the St. Lawrence and human health.

Publication of advertisements in 11 university newspapers to announce the project solicitation period for the Fonds de développement des connaissances.

Publication and dissemination of the brochure *Projets du Volet Santé 1993-1996,* which describes the main health projects implemented between April 1993 and March 1996.

Protection

Presentation on the Protection component given at the 1995 annual meeting of the Great Lakes Commission, held in Quebec City.

Dissemination of a guide on the environmental effects of dredging projects, in co-operation with the Ontario Region.

Staging of the annual symposium "Protection 1996" at Longueuil, which brought together all the key partners of the Protection component and representatives from most of the 106 priority industrial plants. The theme was "establishing discharge standards and technology development".

Workshop on the virtual elimination of persistent bioaccumulative toxic substances, attended by representatives from the different components.

Staging of the annual symposium "Protection 1995" in Quebec City, which dealt with characterization of industrial effluents and brought together all the main partners.

Participation in a trade mission to Tunisia and another to Morocco, in conjunction with the Canadian embassies in Tunis and Rabat, the Canadian International Development Agency (CIDA) and the Department of Foreign Affairs and International Trade, which led to negotiations with Canadian environmental firms. Presentation given at EcoSommet 1996 on the reduction of discharges of toxic substances from the 50 priority plants targeted under the St. Lawrence Action Plan. This abatement effort was cited as an example of a Quebec-wide environmental achievement.

Presentation on the Protection component's programming and activities at the annual conference of the Centre patronal de l'environnement du Québec (Quebec Centre for Industry and the Environment), held in Montreal.

Press conference staged jointly with the City of Montreal to announce a partnership for a project to halt shoreline erosion.

Production and dissemination of seven new fact sheets in the "St. Lawrence Technologies" series.

Preparation and diffusion of six new DESRT technology sheets, describing the results of technology development and demonstration projects.

Restoration

Media visit to the agricultural pond at St. Marie de Beauce.

Media visit to the site of the Cacouna marsh restoration project.

Media visit related to the sand pit restoration project in Lévis.

Media visit concerning the shoreline restoration work at Ile de la Paix.



GOVERNMENT EXPENDITURES IN 1995-1996 (IN THOUSANDS OF DOLLARS)

COMPONENT	GOVERNMENT OF CANADA				GOVERNMENT OF CANADA GOVERNMENT OF QUÉBEC			TOTAL
	Environment Canada	Fisheries and Oceans	Health Canada	Agriculture and Agri-Food Canada	Canadian Heritage	Ministère de l'Environnement et de la Faune	Ministère de la Santé et des Services sociaux	
Biodiversity	2,103.60	1,575.60				1,541.30		5,220.50
Agriculture				400		100		500
Community Involvement	1,364.60	119.40				137.60		1,621.60
Decision Support	3,906.20	1,715				4,216.08		9,837.28
Health			2,120.81				1,038	3,158.81
Protection	3,553.20					10,015.77		13,568.97
Restoration	1,264.00				1,020			2,284
Communication and Administration						300		300
TOTAL	12,191.60	3,410	2,120.81	400	1,020	16,310.75	1,038	36,491.16

PUBLISHED DOCUMENTS

Biodiversity

Bulletin Habitats 1995–96. Sainte Foy: Canadian Wildlife Service, Vol. 6, Nos. 1, 2 and 3.

Cogisol inc. *Contribution du ruissellement superficiel et de l'érosion des sols à la dégradation de la rivière Boyer: apport des mesures de redistribution spatiale césium 137.* (Sainte Foy): Cogisol inc., 1996, 12 pp.

GDG Environnement. *évaluation des perspectives de restauration de la rivière Saint-Maurice suite à l'arrêt du flottage du bois.* Cap de la Madeleine: GDG Environnement, 1996, 21 pp., ill., appendices.

GDG Environnement. *évaluation des perspectives de restauration et de mise en valeur des habitats fauniques de la rivière Saint-Maurice.* Cap de la Madeleine: GDG Environnement, 1996, 2 pp., appendix.

GDG Environnement. *Inventaire et stratégie de conservation des milieux humides de la baie de Shawinigan*. Cap de la Madeleine: GDG Environnement, 1996, 34 pp., appendices.

Gélinas, N. et al. La bande riveraine du milieu agricole: importance pour les micro-mammifères et l'herpétofaune: revue de littérature. Ministère de l'Environnement et de la Faune du Québec, 1996, VII, 47 pp.

Gilbert, H. *Caractérisation de la problématique du lit de la frayère à éperlan – Rivière Boyer.* (Québec): Le Groupe Dryade ltée, 1996, 19 pp.

Harvey, C. *Portrait biophysique des secteurs perturbés du Barachois du Grand Pabos.* (Québec): Groupe-conseil Génivar for the Association pour la Valorisation du Barachois du Grand Pabos, 1996, 69 pp., appendices.

Langevin, R. *Bilan de conservation des habitats* 1994–95/1995–96: *rapports du Comité technique Habitats, Volet Biodiversité*. Sainte Foy: Environment Canada, Canadian Wildlife Service, 1996, 29 pp., cartographic appendices; ill. Laporte, P. and M. Robert. "The Decline and Current Status of the Loggerhead Shrike in Quebec" in *Proceedings Western Foundation Vertebrate Zoology*, 1995, Vol. 6, pp. 85–87.

Les consultants Argus inc. *Barachois de Malbaie: étude d'avant-projet de conservation et de mise en valeur,* (Sainte Foy): Les consultants Argus inc. for the Club des ornithologues de la Gaspésie, 1995, 70 pp., appendices.

Lesueur C. Recherche des frayères d'ombles de fontaine anadromes de la rivière Saguenay. Rapport des travaux effectués en 1995–1996. (Jonquière): Saguenay ZIP Committee for the Department of Fisheries and Oceans of Canada and the ministère de l'Environnement et de la Faune du Québec, 1996, 17 pp., appendix.

Lesueur, C. and M. Archer. *Description de la pêche récréative estivale sur la rivière Saguenay*. (Jonquière): Saguenay ZIP Committee for the Department of Fisheries and Oceans of Canada and the ministère de l'Environnement et de la Faune du Québec, 1996, 37 pp., appendix.

Lesueur, C. *Plan d'acquisition de connaissance sur les poissons du Saguenay en 1996–1997 et 1997–1998*. (Jonquière): Saguenay ZIP Committee for the Department of Fisheries and Oceans of Canada and the ministère de l'Environnement et de la Faune du Québec, 1996, 21 pp., appendix.

Massicotte, B. *et al. Guide d'évaluation environnementale des techniques de stabilisation des berges.* Sainte Foy: Les consultants Argus inc. for the Department of Fisheries and Oceans of Canada, Fish Habitat Management Division, 1996, 1 v., appendix, ill.

Ministère de l'Environnement et de la Faune du Québec and Environment Canada. Place à la biodiversité. *Atelier sur le volet Biodiversité de Saint-Laurent Vision 2000.* (Sainte Foy): Ministère de l'Environnement et de la Faune du Québec and Environment Canada, 1996, 43 pp.



Morrisset, P. and M. Garneau. *Les plantes susceptibles d'être désignées menacées ou vulnérables et autres plantes rares de la région de Blanc-Sablon, Basse-Côte-Nord.* Sainte Foy: Ministère de l'Environnement et de la Faune du Québec, 1995, 48 pp., ill.

Naturam Environnement inc. *Caractérisation physique et biologique de l'habitat du poisson du secteur de Pointe-aux-Outardes*. n.p.; Naturam Environnement inc., report submitted to the Corporation du parc régional de Pointe-aux-Outardes, 1996, 120 pp., appendices.

Pesca. *Caractérisation physico-chimique, hydrodynamique et biologique des habitats du poisson du barachois de Malbaie.* n.p.: final report submitted to the Club des ornithologues de la Gaspésie inc., 1996, 114 pp.

Rail, J.-F., G. Chapdeleine, P. Brousseau and
J.-P. L. Savard. Utilisation des oiseaux marins comme bioindicateurs de l'écosystème du Saint-Laurent. Sainte Foy: Environment
Canada, Canadian Wildlife Service, 1996, II,
113 pp.

Robert, M. and P. Laporte. *Le Râle jaune dans le sud du Québec: inventaires, habitats et nidi-fication.* Sainte Foy: Environment Canada, Canadian Wildlife Service, 1996, 87 pp., ill.

Robert, M., P. Laporte and F. Shaffer. *Plan d'action for the rétablissement du Râle jaune* (Coturnicops noveboracensis) *au Québec*, Sainte Foy: Environment Canada, Canadian Wildlife Service, 1995, 38 pp.

Sabourin, A. *et al. Les plantes susceptibles d'être désignées menacées ou vulnérables et les sites à protéger le long de la rivière des Mille-Îles.* Sainte Foy: Ministère de l'Environnement et de la Faune du Québec, Direction de la conservation et du patrimoine écologique, 1995, 137 pp., maps.

38

Sabourin, A. et al. Les plantes susceptibles d'être désignées menacées ou vulnérables du bassin versant de la rivière L'Assomption: observations préliminaires. Sainte Foy: Ministère de l'Environnement et de la Faune du Québec, 1995, 18 pp., ill.

Shaffer, F. and P. Laporte. *Rapport sur la situation du Pluvier siffleur* (Charadrius melodus) *au Québec*. Sainte Foy: Environment Canada, Canadian Wildlife Service, 1995, 53 pp., ill.

Société Duvetnor ltée. *Stratégie de conservation d'Îles et d'Îlots de Tadoussac à Rivière-Pentecôte.* n.p.: Société Duvetnor ltée, 1996, 53 pp., appendices.

St. Lawrence Beluga Recovery Team. *St. Lawrence Beluga Recovery Plan.* Mont Joli: Department of Fisheries and Oceans of Canada, Maurice Lamontagne Institute; Montreal: World Wildlife Fund, 1995, 73 pp., appendices.

Agriculture

Bédard, Y., F. Delisle and C. Doré. *Pour une eau de qualité en milieu rural – comprendre et agir collectivement*. Québec City: Department of the Ministère de l'Environnement et de la Faune du Québec, 1996, 35 pp., ill.

Community Involvement

Armellin, A. Synthèse des connaissances sur les communautés biologiques du secteur d'étude Montréal–Longueuil: rapport technique: zone d'intervention prioritaire 9. Montreal: Environment Canada, St. Lawrence Centre, 1995, XXIV, 174 pp., ill.

Auclair, M.-J. Regional Assessment: Montreal–Longueuil Sector. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 60 pp. Bibeault, J.-F. Synthèse des connaissances sur les aspects socio-économiques du secteur d'étude Montréal–Longueuil: rapport technique: zone d'intervention prioritaire 9. Montreal: Environment Canada, St. Lawrence Centre, 1995, XXI, 213 pp., ill., maps.

Environment Canada, Pêches et Océans Canada. *Community Interaction, 1994–1995 Update.* (Sainte Foy): Environment Canada, 1995, 61 pp., appendices.

Fortin, G. Synthèse des connaissances sur les aspects physiques et chimiques de l'eau et des sédiments du secteur d'étude Montréal–Longueuil: rapport technique: zone d'intervention prioritaire 9. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 162 pp., ill.

Fortin, G. Synthèse des connaissances sur les aspects physiques et chimiques de l'eau et des sédiments du secteur d'étude Québec–Lévis: rapport technique: zone d'intervention prioritaire 14. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 187 pp., ill.

Fortin, G. Synthèse des connaissances sur les aspects physiques et chimiques de l'eau et des sédiments du secteur d'étude du Saguenay: rapport technique: zones d'intervention prioritaire 22 et 23. Montreal: Environment Canada, St. Lawrence Centre, 1995, XX, 191 pp., ill.

Gagnon, M. *Regional Assessment: Quebec City–Lévis Sector.* Montreal: Environment Canada, St. Lawrence Centre, 1995, XVI, 60 pp., ill.

Gagnon, M. *Regional Assessment: Saguenay Sector*. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 66 pp., ill.

Jourdain, A. Synthèse des connaissances sur les aspects socio-économiques du secteur d'étude Québec–Lévis: rapport technique: zone d'intervention prioritaire 14. Montreal: Environment Canada, St. Lawrence Centre, 1995, XXI, 202 pp., ill. Jourdain, A. Synthèse des connaissances sur les aspects socio-économiques du secteur d'étude du Saguenay: rapport technique: zones d'intervention prioritaire 22 et 23. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 185 pp., ill.

Mousseau, P. Synthèse des connaissances sur les communautés biologiques du secteur d'étude Québec–Lévis: rapport technique: zone d'intervention prioritaire 14. Montreal: Environment Canada, St. Lawrence Centre, 1995, XXV, 194 pp., ill.

Mousseau, P. Synthèse des connaissances sur les communautés biologiques du secteur d'étude du Saguenay: rapport technique: zones d'intervention prioritaire 22 et 23. Montreal: Environment Canada, St. Lawrence Centre, 1995, XXIV, 222 pp., ill.

Decision Support

Battat, A. "Nouvelle approche en analyse environnementale: analyses immunoenzymatiques" in *Vision Science*, 1996, Vol. 3, No. 3, pp. 7–10.

Battat, A. "Practical Methods for Environmental Analysis" in EnviroAnalysis, Eds. R. Burk and R. E. Clement, Polyscience Publishers, 1996, pp. 163–166.

Beaulieu, S., M. Blouin, N. Brassard and M. Retamal. "Évaluation du milieu ColilertMD et de QuantitrayMD pour l'analyse des coliformes totaux et fécaux dans des échantillons d'eau" in *Vision Science*, 1996, Vol. 3, No. 3.

Béland, P. *et al. Mortalité de bélugas observés dans le Saint-Laurent.* St. Lawrence National Institute of Ecotoxicology for the Department of Fisheries and Oceans of Canada, 1996, 66 pp. (unpublished)

Bélanger, C. and K. Lee. "L'activité exoenzymatique microbienne: outil dans l'évaluation des impacts environnementaux sur le milieu marin" in *Nouvelles des Sciences*, 1996, Vol. 7, pp. 5–8.



Bérubé, S. and J.-D. Lambert. *Suivi ichtyologique dans l'estuaire du Saint-Laurent (1986–1995)*. Mont Joli: Department of Fisheries and Oceans of Canada, Maurice Lamontagne Institute, 1996, 62 pp. (unpublished)

Brochu C., S. Moore and E. Pelletier. "Polychlorinated Dibenzo-p-dioxins and Dibenzofurans en Sediment and Biota of the Saguenay Fjord and the St. Lawrence Estuary" in *Marine Pollution Bulletin*, 1995, Vol. 30, No. 8, pp. 515–523.

Brochu, C. *et al.* "Contribution of PCDD/PCFDs, Planar and Ortho Substitued PCB Congeners to the Total TCDD-Equivalent Concentration in Fish Fillet from St. Lawrence River" in *Organohalogen Compounds*, 1995, Vol. 26, pp. 293–298.

Browman, I. H. "L'augmentation du rayonnement ultraviolet B peut-elle avoir des incidences négatives sur les ressources marines dans le golfe du Saint-Laurent ?" in *Le Naturaliste Canadien*, 1996, Vol. 120, No. 2, pp. 66–68.

Browman, I. H. "Effets des UVB sur les ressources marines" in *CMOS Bulletin SCMO*, 1996, Vol. 24, No. 1, pp. 1–2.

Cattaneo, A. *et al.* "Epiphyte Size and Taxonomy as Biological Indicators of Ecological and Toxicological Factors in Lake Saint François (Québec)" in *Environmental Pollution*, 1995, Vol. 87, No. 3, pp. 357–372.

Caux, P.-Y. and R. A. Kent. "Towards the Development of a Site-Specific Water Quality Objective for Atrazine in the Yamaska River, Québec, for the Protection of Aquatic Life" in *Water Qual. Res. J. Canada*, 1995, Vol. 30, No. 2, pp. 157–178.

Clair, T. A. *et al.* "Regional Precipitation and Surface Water Chemistry Trends in Southeastern Canada (1983–1991)" in *Canadian Journal of Fisheries and Aquatic Sciences*, 1995, Vol. 52, pp. 197–212.



De Lafontaine, Y. *et al.* "Chemical Contamination and Ulcerative Lesions in Atlantic Tomcod *(Microgadus Tomcod)* from the St. Lawrence River" in Westlake, G. F., J. L. Parrot and A. J. Niimi (eds.), *Proceedings of the 21st Annual Aquatic Toxicity Workshop*, October 1994, Sarnia, Ontario, Can. Tech. Rep. Fish. Aquat. Sci., 2050, 179 pp.

De Lafontaine, Y., L. Lapierre, M. Henry and Y. Grégoire. *Abondances des larves de moule zébrée* (Dreissena polymorpha) *et de Quagga* (Dreissena bugensis) *aux abords des centrales hydroélectriques de Beauharnois, Les Cèdres et Rivière-des-Prairies*. Montreal: Environment Canada, St. Lawrence Centre, 1995, 52 pp.

Dionne, E. *et al. Répartition de certains hydrocarbures dans le seston de l'estuaire du Saint-Laurent et du fjord du Saguenay, 1990.* Mont Joli: Department of Fisheries and Oceans of Canada, Maurice Lamontagne Institute, Rapp. stat. can. sci. halieut. aquat. No. 977, 1996, VI, 186 pp., ill.

Dumouchel, F. and P. Hennigar. *Canadian Shellfish Contaminants Monitoring: QA/QC Analytical Guidelines*. Ottawa: Laboratory Managers' Committee, 1995, 25 pp., tab.

Environment Canada. *Guide de caractérisation des eaux usées industrielles.* Montreal: Environment Canada, St. Lawrence Centre, 1996, XV, [230 pp.], ill.

Foster Roberts, G. *et al.* "Effective Approaches to Optimizing Recovery of PCDD/DF for Sediments" in *Organohalogen Compounds*, 1995, Vol. 23, pp. 41–45.

Fouquet, A. Directives d'assurance et de contrôle de la qualité pour l'analyse de substances chimiques organiques dans différents milieux environnementaux: Devis technique. Montreal: Environment Canada, St. Lawrence Centre, 1996, XII, 57 pp. tab.



Fuentes Yaco, C. *et al. Catalogue of Phytoplankton Pigment Images from the Gulf of St. Lawrence: Coastal Zone Colour Scanner Data from 1979–1981.* Can. Data Rep. Hydrogr. Ocean Sci. No. 135, 1995, V, 91 pp.

Gagné, F. and C. Blaise. "Evaluation of the Genotoxicity of Environmental Contaminants in Sediments to Rainbow Trout Hepatocytes" in *Environmental Toxicology and Water Quality: An International Journal*, 1995, Vol. 10, pp. 217–229.

Gagné, F. and C. Blaise. "Fluorescence in situ Hybridization en Suspension (FISHES) Using Biotin-Labeled DNA Probes for Measuring Genetic Expression of Metallothionein and Cytochrome P 450 1A1 (CYP1A1) in Rainbow Trout Hepatocytes Exposed to Wastewaters" in Mervyn Richardson (ed.), *Environmental Toxicology Assessment*, Bristol, PA: Taylor & Francis Ltd., 1995, ch. 4, pp. 41–54.

Gagné, F. *Intérêt de l'application de tests alternatifs en écotoxicologie: cas des hépatocytes primaires de truite arc-en-ciel* (Oncorhynchus mykiss). Thesis (DSc), Metz, France: Université de Metz, 1996, 117 pp., tab.

Gagné, F., S. Trottier and C. Blaise. "Genotoxicity of Sediment Extracts Obtained in the Vicinity of a Creosote-Treated Wharf to Rainbow Trout Hepatocytes" in *Toxicology Letters*, 1995, Vol. 78, pp. 175–182.

Galbraith, P. S. and D. E. Kelly. "Identifying Overturns in CTD Profiles" in *J. Atm. Ocean. Tech.*, 1996, Vol. 13, pp. 688–702.

Gilbert, D., B. Pettigrew, D. Swain and M. Couture. *State of the Gulf of St. Lawrence: oceanographic conditions in 1994.* Can. Data Rep. Hydrogr. Ocean Sci. No. 143, 1996, XI, 85 pp.

Godet, F. *Mise au point d'un test des micronoyaux sur* Dreissena polymorpha. Montreal: Environment Canada, St. Lawrence Centre, 1995, X, 33 pp., ill.

41

Gratton, Y. and A. F. Vézina. "Variabilité des phénomènes physiques et biologiques à la méso-échelle dans l'estuaire maritime du Saint-Laurent" in *Océanis*, 1994, Vol. 20, No. 6, pp. 45–57.

Hébert, S. *Qualité des eaux du bassin de la rivière Saint-Charles, 1979–1995.* Sainte Foy: Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, 12 pp., appendices.

Hébert, S. Qualité des eaux du fleuve Saint-Laurent dans la région de Québec 1990–1994: mise à jour des données concernant le phosphore, les coliformes fécaux et les matières en suspension. (Québec): Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, VII, 11 pp., appendix: ill., graph., tabl.

Houle, D., D. Dupras and A. Sylvestre. *évaluation et bilan du programme de la qualité de l'eau*. Montreal: Environment Canada, St. Lawrence Centre, 1995, XVIII, 129 pp., ill.

Jacquaz, B. *Analyse d'échantillons de benthos provenant du lac Saint-Louis*, Montreal: Environment Canada, St. Lawrence Centre, 1995, VIII, 35 pp.

Kent, R. A. and P. Y. Caux. "Sublethal Effects of Insecticide Fenitrothion on Freshwater Phytoplankton" in Can. *J. Bot.*, 1995, Vol. 73, pp. 45–53.

Kusui, T. and C. Blaise. "Acute Exposure Phytotoxicity Assay Based on Motility Inhibition of Chlamydomonas Variabilis" in Mervyn Richardson (ed.), *Environmental Toxicology Assessment*, Bristol (PA): Taylor & Francis Ltd., 1995, chap. 10, pp. 125–135.

Laflamme, D. *Qualité des eaux du bassin de la rivière Sainte-Anne, 1979 à 1994*. Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, XVII, 66 pp., appendices.

Laflamme, D. *Qualité des eaux du bassin de la rivière Saint-Maurice, 1979 à 1992.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1995, 87 pp., appendices.

Lallemant, C. *Expérimentation en vue de la mise au point d'un test d'immunotoxicité en microplaque sur hémocytes de* Mytilus edulis. Montreal: Environment Canada, St. Lawrence Centre, 1995, XII, 22 pp., ill.

Lapierre, L. *Teneurs en dioxines, furanes, mercure, BPC et autres contaminants dans les poissons capturés dans le Saint-Maurice en 1989 et en 1993.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, 82 pp., appendices.

Lavoie, D. *et al. Distribution des masses d'eau à la tête du chenal laurentien dans l'estuaire du Saint-Laurent aux étés 1994 et 1995.* Rapp. tech. can. hydrogr. sci. océan. No. 176, 1996, X, 126 pp.

Lebeuf, M., C. Gobeil, C. Brochu and S. Moore. "Direct Atmospheric Deposition Versus Fluvial Inputs of PCDD/Fs to the Sediments of the Lower St. Lawrence Estuary" in *Organohalogen Compounds*, 1996, Vol. 28, pp. 20–24.

Lemieux, C., B. Quémerais and K. Lum. "Seasonal Patterns of Atrazine Loading for the St. Lawrence River (Canada) and its Tributaries" in *Water Research*, 1995, Vol. 29, No. 6, pp. 1491–1504.

Matthieu, R. et al. Substances toxiques aéroportées: stations d'échantillonnage de L'Assomption (WEW) – description du site et aspects météorologiques. [Saint-Laurent]: Environment Canada, Atmospheric Environment Service, 1995, 18p.

Matthieu, R. et al. Substances toxiques aéroportées: stations d'échantillonnage de Sainte-Anne-de-Bellevue (WVQ) – description du site et aspects météorologiques. [Ville Saint-Laurent]: Environment Canada, Atmospheric Environment Service, 1995, 18p. Measures, L. N., P. Béland and D. Martineau. "Helminths on an Endangered Population of Beluga, *Delphinapterus Leucas*, in the St. Lawrence Estuary" in *Canada. Can. J. Zool.*, 1995, Vol. 73, pp. 1402–1409.

Ménard, C., A.-M. Prud'Homme, J. Bureau and M. Léveillé. *Les oxydases à fonction mixte* (*OMF*) et les indicateurs morphologiques (IGS et IHS) chez la Perchaude (Perca flavescens) et le Grand Brochet (Esox lucius) au lac Saint-Louis. Montreal: Environment Canada, St. Lawrence Centre, 1995, XI, 52 pp.

Ministère de l'Environnement et de la Faune du Québec and the ministère de la Santé et des Services sociaux du Québec. *Guide de consommation du poisson de pêche sportive en eau douce 95.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, 132 pp.

Ministère de l'Environnement et de la Faune du Québec. *étude pilote: application des tests immunoenzymatiques à l'analyse des triazines dans les eaux souterraines et de surface en comparaison avec la méthode classique.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1995, 48 pp.

Ministère de l'Environnement et de la Faune du Québec. *Guide d'échantillonnage à des fins d'analyses environnementales*. Sainte Foy: Les éditions Le Griffon d'argile, 1995, 4 v.

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux du bassin de la rivière des Outaouais, 1979–1994.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1996, 88 pp., appendices.

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière Matapédia, 1979–1993.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1995, 8 pp. (information leaflet)



Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière Saint-Maurice, 1979–1992.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1995, 8 pp. (information leaflet)

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière Saint-Charles, 1979–1995.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1995, 12 pp. (information leaflet)

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière Saint-Anne, 1979–1994.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1996, 8 pp. (information brochure)

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière Etchemin, 1979–1994.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1996, 8 pp. (information brochure)

Ministère de l'Environnement et de la Faune du Québec. *Qualité des eaux de la rivière des Outaouais, 1979–1994.* (Quebec City): Ministère de l'Environnement et de la Faune du Québec, 1996, 12 pp. (information brochure)

Pham, T. Transport des contaminants et dynamique sédimentaire: compte rendu d'un atelier de travail. Montreal: Environment Canada, St. Lawrence Centre, 1995, 10 pp.

Pinel-Alloul, B., G. Méthot, L. Lapierre and A. Willsie. "Macroinvertebrate Community as a Biological Indicator of Ecological and Toxicological Factors in Lake Saint François (Quebec)" in *Environmental Pollution*, 1995, Vol. 91, No. 1, pp. 65–87.

Poissant, L. and J. F. Koprivjnak.

"Concentrations de quelques composés organiques semi-volatils dans l'air et la précipitation en milieu rural (Villeroy, Québec) et leur dynamique environnementale" in *Vecteur Environnement*, 1996, Vol. 29 No. 1, pp. 29–39. Poissant, L. and J. F. Koprivnjak. "Fate of Atmospheric Concentrations of α - and γ -Hexachlorocyclohexane in Québec, Canada" in *Environmental Science & Technology*, 1996, Vol. 30, No. 3, pp. 845–851.

Poissant, L., *et al.* "Mesures en continu de la vapeur mercurielle atmosphérique en milieu rural au sud du Québec, Canada" in *Vecteur Environnement*, 1995, Vol. 28, No. 2, pp. 41–46.

Poissant, L., J. F. Koprivnjak, and R. Matthieu. Analyses multivariées de la pollution atmosphérique contribuant à la pollution du fleuve Saint-Laurent (Québec, Canada). Compte rendu conférence SEFA, Rouen, France, 1995.

Poissant, L., P. Rancourt and B. Harvey. "Relations mesurées en milieu rural au sud du Québec (Canada) entre la concentration de la vapeur mercurielle atmosphérique and quelques facteurs environnementaux" in *Pollution atmosphérique*, 1995, pp. 52–60.

Quémerais, B. and D. Cossa. *Protocoles d'échantillonnage et d'analyse du mercure dans les eaux naturelles*. Montreal: Environment Canada, St. Lawrence Centre, 1995, 39 pp.

Radetski, C. M., J.-F. Marcos and C. Blaise. "A Semistatic Microplate-Based Phytotoxicity Test" in *Environmental Toxicology and Chemistry*, 1995, Vol. 14, No. 2, pp. 299–302.

Robitaille, P. *Qualité des eaux du bassin de la rivière Etchemin, 1979 à 1994.* Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, XVII, 43 pp., appendices.

Robitaille, P. *Qualité des eaux du bassin de la rivière Matapédia, 1979 à 1993.* Sainte Foy: Ministère de l'Environnement et de la Faune du Québec, Direction des écosystèmes aquatiques, 1995, XVII, 44 pp., appendices, ill.

Sabik, H. *et al.* "Determination of Atrazine, Its Degradation Products and Metolachlor in Runoff Water and Sediment Using Solid Phase Extraction" in *Int. J. Pure (Appl. Anal. Chem. & Talanta)*, 1995, Vol. 42, No. 5, pp. 717–724.



Silverberg, N., J.-M. Gagnon and K. Lee. "A benthic mesocosm facility for maintaining soft-bottom sediments" in *Neth. J. Sea Res,* 1996, Vol. 34, pp. 289–302.

St. Laurent, D. and C. Blaise. "Validation of a Microplate-Based Algal Lethality Test Developed with the Help of Flow Cytometry" in Mervyn Richardson (ed.), *Environmental Toxicology Assessment*, 1995, chap. 11, pp. 137–155.

Trottier, S. *Mise au point d'un test de dépistage des effets toxiques létaux et sublétaux (tératogénicité) avec le coelentéré d'eau douce* Hydra attenuata. Montreal: Environment Canada, St. Lawrence Centre, 1995, VII, 30 pp., ill.

White, P. A. Detection, Discharge and Ecological Behaviour of Genotoxic Organic Contaminants in the St. Lawrence and Saguenay Rivers. Thesis (Ph. D.), Montreal: McGill University, Department of Biology, 1995, XXI, 443 pp.

White, P. A., J. B. Rasmussen and C. Blaise. "Genotoxicity of Snow in the Montreal Metropolitan Area" in *Water, Air and Soil Pollution*, 1995, Vol. 83, pp. 315–334.

Health

Blaney, S., M. Thibeault and D. Gauvin. Synthèse de la contamination du poisson du fleuve Saint-Laurent et évaluation des risques à la santé. [Quebec City]: Centre de santé publique de Québec, 1996, 135 pp.

Chartrand, J., J.-F. Duchesne and D. Gauvin. Synthèse des connaissances sur les risques à la santé reliés aux divers usages du fleuve Saint-Laurent dans le secteur d'étude Québec-Lévis: rapport technique: zone d'intervention prioritaire 14. (Quebec City): Centre de santé publique de Québec, Direction régionale de santé publique Chaudière Appalaches, 1995, XIV, 113 pp., appendices. Deck, W. and T. Kosatsky. *Communicating the Results of an Environmental Exposure Study to Individual Study Subjects.* [Montreal]: McGill University, 1996, 18 pp.

Duchesne, J.-F., J.-M. Leclerc, J. Chartrand and D. Gauvin. Synthèse des connaissances sur les risques à la santé reliés aux divers usages du fleuve Saint-Laurent dans le secteur d'étude du Saguenay: rapport technique: zones d'intervention prioritaire 22 et 23. (Quebec City): Centre de santé publique de Québec, Direction régionale de santé publique du Saguenay–Lac Saint Jean, 1995, XIII, 115 pp., appendices.

Guerrier, P. and M. Paul. Le projet SHORES, Santé humaine: organisation de la réponse d'urgence dans l'estuaire du Saint-Laurent. [Quebec City]: Centre de santé publique de Québec, 1996, 104 pp.

LaRue, A. *et al. La baignade dans le secteur d'eau douce du Saint-Laurent: discours et pratiques sur les risques à la santé.* [Quebec City]: Centre de santé publique de Québec, 1996, 109 pp.

Lebel, G. *et al. Organochlorés et endométriose: une étude pilote.* [Quebec City]: Centre de santé publique de Québec and Centre de recherche, Hôpital Saint François d'Assise, 1996, 63 pp.

Phaneuf, D. et al. évaluation de la contamination des algues croissant dans le Saint-Laurent et susceptibles d'être consommées par l'homme, phase II. [Sainte Foy]: Centre de toxicologie du Québec, 1996, 83 pp.

Rochette, L. *et al. étude de l'association spatiale entre l'incidence de la giardiase et la qualité de l'eau potable pour les municipalités du Québec*. Beauport: Centre de santé publique de Québec, 1996, 33 pp.

Protection

The *caractérisations bioanalytiques* were realised with the help of the Decision Support component.



L'industrie Norsk Hydro Canada Inc. *Caractérisation des effluents liquides de Norsk Hydro Canada Inc. – Bécancour.* n.p.: L'industrie Norsk Hydro Canada Inc. for SLV 2000, March 1996, 11 pp., appendices.

Legault, R. and M. Harwood. *Caractérisation bioanalytique des eaux usées de La Compagnie minière Québec Cartier à Port-Cartier.* Montreal: Environment Canada, St. Lawrence Centre, 1996, XII, 27 pp., ill.

Legault, R. and M. Harwood. *Caractérisation bioanalytique des eaux usées de l'Aluminerie Alouette inc. – Sept-Îles*. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 27 pp.

Legault, R. and M. Harwood. *Caractérisation bioanalytique des eaux usées de Les emballages Knolton inc. – Lac Brome*. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 25 pp.

Legault, R. and M. Harwood. *Caractérisation bioanalytique des eaux usées de Mines Wabush – Sept-Îles*. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 28 pp.

Legault, R. and M. Harwood. *Caractérisation bioanalytique des eaux usées de Monupet ltée* – *Rivière-Beaudette*. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées d'Aluminerie Lauralco inc.-Deschambault.* Montreal: Environment Canada, St. Lawrence Centre, Sept. 1995, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Albright & Wilson Amérique Limitée – Buckingham*. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de BICC Phillips inc. – Rivière Malbaie.* Montreal: Environment Canada, St. Lawrence Centre, March 1996, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Chemprox Chimie inc. – Bécancour.* Montreal: Environment Canada, St. Lawrence Centre, Jan. 1996, 26 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Cuirs Sal-Tan inc. – Louiseville.* Montreal: Environment Canada, St. Lawrence Centre, Jan. 1996, 28 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de IBM Canada ltée – Bromont.* Montreal: Environment Canada, St. Lawrence Centre, Dec. 1995, 26 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de ICI Explosifs inc. – McMasterville.* Montreal: Environment Canada, St. Lawrence Centre, March 1996, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de l'usine ICI Explosifs Inc. à Brownsburg.* Montreal: Environment Canada, St. Lawrence Centre, Jan. 1995, XIII, 29 pp., ill.

Legault, R. *Caractérisation bioanalytique des eaux usées de la Société canadienne de métaux Reynolds ltée – Bécancour.* Montreal: Environment Canada, St. Lawrence Centre, August 1995, 29 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de la Société d'électrolyse et de chimie Alcan ltée – Shawinigan*. Montreal: Environment Canada, St. Lawrence Centre, April 1995, 34 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Manufacturier Grandford inc. (Le) – Saint-Alphonse-de-Granby.* Montreal: Environment Canada, St. Lawrence Centre, March 1996, 29 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Norsk Hydro Canada inc. – Bécancour.* Montreal: Environment Canada, St. Lawrence Centre, Jan. 1996, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Norton Céramiques avancées du Canada inc. – Shawinigan.* Montreal: Environment Canada, St. Lawrence Centre, Sept. 1995, 27 pp.



Legault, R. *Caractérisation bioanalytique des* eaux usées de Produits chimiques Sterling – Buckingham. Montreal: Environment Canada, St. Lawrence Centre, Dec. 1995, 27 pp.

Legault, R. *Caractérisation bioanalytique des eaux usées de Raffinerie Napierville inc. – Napierreville*. Montreal: Environment Canada, St. Lawrence Centre, July 1995, 27 pp.

Les consultants Environnement E.S.A. Inc. Caractérisation des effluents liquides de la Société Canadienne de Métaux Reynolds – Bécancour. n.p.: Les consultants Environnement E.S.A. Inc. for SLV 2000, Oct. 1995, 61 pp. appendices.

Les consultants Environnement E.S.A. Inc. *Caractérisation des effluents liquides de la Société d'électrolyse et de chimie Alcan ltée – Shawinigan.* n.p.: Les consultants Environnement E.S.A. Inc. for SLV 2000, July 1995, 59 pp., appendices.

Les consultants Exploitation Santec Inc. Caractérisation des effluents liquides de l'Aluminerie Lauralco Inc. – Deschambault. n.p.: Les consultants Exploitation Santec Inc. for SLV 2000, Feb. 1996, 22 pp.

Les consultants Les Laboratoires Shermont Inc. Caractérisation des effluents liquides de Albright & Wilson Amérique Limitée – Buckingham. n.p.: Les consultants Les Laboratoires Shermont Inc. for SLV 2000, March 1996, 47 pp.

Les consultants Les Laboratoires Shermont Inc. *Caractérisation des effluents liquides de Produits chimiques Sterling – Buckingham.* n.p.: Les consultants Les Laboratoires Shermont Inc. for SLV 2000, March 1996, 30 pp.

Les consultants Sodexen Inc. *Caractérisation des effluents liquides de Raffineries Napierville inc. – Napierville.* n.p.: Les consultants Sodexen Inc. for SLV 2000, Nov. 1995, 31 pp. appendices.

Ministère de l'Environnement et de la Faune du Québec, Environment Canada and Laboratoires Savoie Dufresne inc. *Guide général de caractérisation SLV 2000.* Montreal: Direction de la protection de l'environnement, Groupe d'Intervention SLV 2000, Volet Protection,1995, 246 pp., appendices.

Roberge, S. évaluation de la qualité des résultats de caractérisation chimique des eaux usées de Raffineries de Napierreville inc., Napierreville. Montreal: Environment Canada, St. Lawrence Centre, March 1996, 38 pp., appendices.

Roberge, S. évaluation de la qualité des résultats de caractérisation chimique des eaux usées de la Société d'électrolyse et de chimie Alcan ltée – Shawinigan. Montreal: Environment Canada, St. Lawrence Centre, Oct. 1995, 33 pp. appendices.

Restoration

Bédard, J. and J. F. Giroux. Sommaire des informations concernant les Îles de juridiction fédérale et propositions d'aménagement (tronçon Kamouraska–Tadoussac). Sainte Foy: Environment Canada, Canadian Wildlife Service, 1996, 79 pp.

Canadian Wildlife Service. *Perspectives écotechnologiques de restauration des rives de la Réserve nationale de faune des Îles de la Paix.* Sainte Foy: Les consultants Argus inc. For the Canadian Wildlife Service, 1995, IV, 43 pp., map, ill.

Lehoux, D. and C. Grenier. *Sommaire des informations concernant les Îles de juridiction fédérale et propositions d'aménagement.* Sainte Foy: Environment Canada, Canadian Wildlife Service, 1995, 82 pp.

Lemieux, C and R. Lalumière. *Répartition de la Zostère marine (Zostera marina) dans l'estuaire du fleuve Saint-Laurent et dans la baie des Chaleurs (1994).* Sainte Foy: Environment Canada, Canadian Wildlife Service, 1995, V, 58 pp., appendices, ill.



Les consultants Argus inc. *Amélioration de la valeur faunique des Îlots de la Voie maritime: travaux d'ensemencement sur l'Îlot Brossard: rapport de suivi 1995.* Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, the St. Lawrence Centre, the Société d'énergie de la Baie James, Quebec Department of Transport and Ducks Unlimited, 1995, 19 pp., appendix.

Les consultants Argus inc. *Description et suivi des aménagements des mares à la tourbière de l'Isle-Verte 1994–1995*. Sainte Foy: Les consultants Argus inc. and Foramec for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James and Quebec Department of Transport, 1996, 54 pp., appendix.

Les consultants Argus inc. *évaluation du potentiel des sablières pour l'aménagement d'habitats fauniques.* Sainte Foy: Environment Canada for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James, Quebec Department of Transport and Ducks Unlimited, 1995, 19 pp., appendix.

Les consultants Argus inc. *Mise en valeur du marais de Rivière-du-Loup et protection d'un tronçon de l'autoroute 20.* Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James, Quebec Department of Transport and Ducks Unlimited, 1995, 50 pp.

Les consultants Argus inc. *Projet pilote d'amélioration de l'habitat de nidification de la sauvagine sur les Îlots de dragage de la Voie maritime à l'aide d'une technique d'ensemencement sur petites surfaces.* Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James, Quebec Department of Transport and Ducks Unlimited, 1995, 16 pp., appendix. Les consultants Argus inc. *Projet pilote de stabilisation des rives de l'Île-aux-Plaines, Réserve nationale de la faune des Îles de la Paix, Clauses techniques.* Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, Quebec Department of Transport and Ducks Unlimited, 1995, 12 pp., map.

Les consultants Argus inc. *Restauration du marais intertidal de la baie de Rivière-du-Loup: suivi du projet pilote de parc de sédimentation.* Sainte Foy: Les consultants Argus inc for the Canadian Wildlife Service, Quebec Department of Transport and Ducks Unlimited, 1996, 23 pp., ill.

Les consultants Argus inc. *Stabilisation des rives des Îlets à Lacroix (Îles de Contrecoeur) à l'aide de techniques végétales: rapport de suivi 1995.* Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, Quebec Department of Transport and Ducks Unlimited, 1996, 29 pp., appendix, ill.

Les consultants Argus inc. *Suivi des aménagements de la tourbière de l'Isle-Verte été 1994.* Sainte Foy: Les consultants Argus inc. and Foramec for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James and Quebec Department of Transport, 1995, 33 pp., appendix.

Ministère des Transports du Québec. Service de l'environnement. *Plan de mise en valeur et de restauration des habitats fauniques du marais de Cacouna*. Sainte Foy: Les consultants Argus inc. for the Canadian Wildlife Service, the St. Lawrence Centre, la Société d'énergie de la Baie James, Quebec Department of Transport and Ducks Unlimited, 1995, 18 pp.



