

LE FLEUVE

NEWSLETTER
ST. LAWRENCE VISION 2000

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IN TUNE

THE HEALTH ASPECT

We still know very little of the impact the waters of the St. Lawrence have on human health. In order to evaluate health-related risks, we must know more about the contaminants that are found in the river basin, the extent of exposure riverside dwellers have to the contaminants, and the impact of the contaminants on health. That is why the Health Component has concentrated its efforts primarily on the human exposure to contaminants, an aspect that still eludes researchers, interested partners and the public today.

People are exposed to contaminants in various ways. For example, while swimming, by eating fish (or other marine animals) and by drinking water from the river. It is necessary to measure the extent of human exposure be able to eventually establish links with very specific uses of the river for the future.

It is suspected that certain groups such as sportfishers, Native peoples and the members of various cultural communities who eat more fish than average are at greater risk because they are more exposed to it. Projects undertaken by the *Health Component* will allow us understand more intimately the relationship between the river's contaminants and the health of the shoreline population.

Harmonization Committee

The Health Component of SLV 2000

A Most Appropriate Means to Reach Riverside Communities

"Health is the most appropriate means to increase the awareness of the importance of a clean river, much more than a single component of a comprehensive clean-up and development plan," states Sophie de Villers of Health Canada, Co-president of the Harmonization Committee of the Health Component of St. Lawrence Vision 2000 (SLV 2000).

"For most citizens, the definition of a clean river is a river that is safe for their health and their families," adds Michèle Bélanger of the *Ministère de la Santé et des Services sociaux du Québec*, Co-president of the Harmonization Committee of the Health Component.

These are the parameters that have been guiding those responsible for the Health Component of SLV 2000 since its creation in 1993. One of the two newcomers of Phase II of the St. Lawrence Action Plan, the Health Component has helped to protect the health of riverside populations against the effects of exposure to contaminants found in the river basin.

"The clean-up of the river is the best way to protect people's health close to the St. Lawrence basin", emphasizes Sophie de Villers. "People want to know the risks they are taking. This is why it is important with those associated with the river."

"More in-depth studies are needed to better understand the risks, in order to support the public health network in its role of prevention and information," Michèle Bélanger goes on to say. "The need to find out more is more pressing when we consider that most farmland and 75% of industries in

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► the province are located along the shores of the river, that more than half of Quebec's population lives along it – a proportion that reaches 80% if the major tributaries are taken into account, and 45% of Quebecers draw their water from it. Moreover, the river contributes to a great extent to the quality of life of the population, especially by being the backdrop to a variety of recreational activities, including sportfishing and windsurfing. That is undoubtedly why the St. Lawrence is known as "the heart of Quebec!".

"Right from the beginning, we knew we had to make up for the lack of information. We therefore decided to access the exposure of the riverside residents to contaminants in the river and study the relationship between those contaminants and human health. We will then be able to help safeguard residents' health," explains Sophie de Villers.

"Researchers mainly take into account the persistent toxic contaminants, but they also consider biological contamination," specifies Michèle Bélanger. What are the effects of the river's water on the health of riverside populations? Is the river water really drinkable? Should pregnant women and children avoid all contact with the St. Lawrence? Can the contaminants in the river cause cancer? All these questions hinge on the research undertaken by the Health Component.

"The work of researchers could lead us to advise people as to what kinds of fish are safe to eat or to reassure the population about the quality of the drinking water drawn from the river, as we did last fall for instance. At that time, we made public a study conducted by the *Centre de santé publique du Québec* (the Quebec Public Health Centre) on the drinking water of four municipalities in the Québec City region, two of which draw their water directly from the river," Michèle Bélanger adds.

The findings of the studies conducted by the Health Component will also determine priorities for taking actions to control pollution and protect the river. They could identify unsafe situations related to the river for the population. "Thanks to a more accurate picture of the effects the river water has on health, authorities will be able to inter-

THE KNOWLEDGE DEVELOPMENT FUND

The Knowledge Development Fund is a three-year research support fund that was set up by three partners, the Health Component of St. Lawrence Vision 2000, the National Health Research and Development Program and the *Fonds de la recherche en santé du Québec (FRSQ)*. The last two agencies, united through the Health Component, are united in a partnership for the first time. Their contribution allowed for an additional investment in the Health Component.

The Fund was created in order to address Quebecers' concerns on the impacts contaminants have on their health. Its aim is to promote the conduct of innovating and interdisciplinary research to establish a link between the health of riverside populations and the state of the St. Lawrence River, while encouraging new researchers to participate in the objectives of the Health Component.

The interdisciplinary approach of the project favours the development of validated tools to analyse links between human health and the use of the river and effective intervention methods. The research projects deal with fundamental, clinical, epidemiological and evaluative aspects of environmental health.

vene not only in terms of protection, but also in terms of health promotion," underlines Ms. de Villers.

Public information occupies the nerve centre in the Health Component. It is all the more necessary that the public be called upon to take part in fair share of the research activities. The two coordinators stated that public involvement is essential to conduct studies dealing with consumer habits or the public's perception of the risks associated with drinking water or eating fish.

Seven projects have already been funded: one is investigating the link between cancer in children and the consumption of drinking water; another is examining the presence of pathogenic microorganisms (viruses and parasites) in the water of the St. Lawrence River basin; a third is designed to evaluate the impact of various mixtures of contaminants as they are found in the river by using an assortment of bio-indicators that combine chemistry, cellular biology and toxicology. Two research endeavours have targeted the populations living along the lower North Shore; the first will attempt to establish the impact of prenatal exposure to organochlorines and heavy metals on the immune system of newborns, and the second will test bio-markers to assess the genotoxic risk and developmental delay for infants. Another research project will explore the antimicrobial and anticancer potential of marine microalgae and certain isolated photosynthetic bacteria occurring in the estuarine environment of the St. Lawrence. Finally, in the recreation sector, a project will attempt to estimate the risks of minor infection for windsurfers in Lake Saint-Louis providing helpful information that could lead to the re-opening of the lake's beaches to swimmers.

The Health Component is jointly coordinated by Health Canada and the *Ministère de la Santé et des Services sociaux du Québec* (MSSSQ – Health and Social Services Department). The projects are conducted by researchers working in environmental health at universities and public health institutions of Quebec. The Health Component has a total budget of \$16.5 million, spread over 5 years, \$10 million of which from Health Canada and \$6.5 from the MSSSQ.

Recreational Activities in the River:

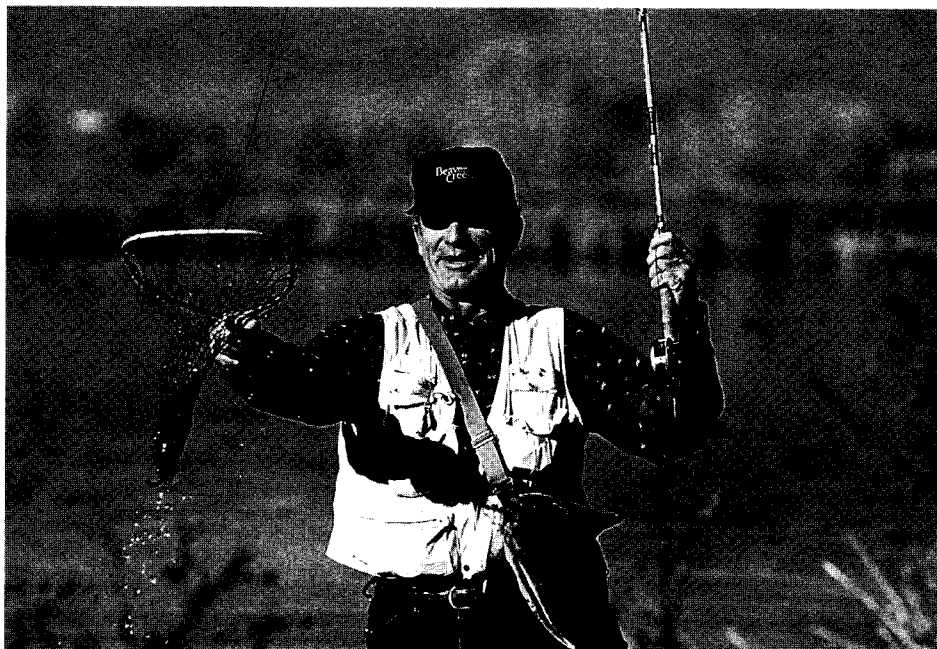
● Sportfishing and Swimming

Sportfishing is very popular in Québec. It is estimated that more than 300,000 sports enthusiasts take part in this activity in both the fresh water and salt water sections of the St. Lawrence River. But since they love eating their catches, sportfishers and their families are exposed to certain pollutants. Several projects of the Health Component of St. Lawrence Vision 2000 are therefore aimed at delving further into this topic.

Eating your daily catch

One of the studies, conducted under the supervision of Dr. Denis Gauvin of the *Centre de santé publique de Québec* (CSPQ, or Public Health Centre of Québec City), is aimed at evaluating the human health risks associated with the consumption of contaminated fish to human health. The first task of the research group was to make an inventory of all the surveillance programs reporting levels of contaminants in fish to delineate the scope of the contamination. Data were gathered on the number of species caught, the number of sportfishers per sector, the popular fishing grounds, and the fish consumption patterns. Some priority contaminants were retained to evaluate health risks: PCBs, mirex, hexachlorobenzene, dieldrine, DDT, dioxins and furans, benzo[a]pyrene, toxaphene, mercury and di(2-ethylhexyl)phtalate. In the second phase of the project, a synthesis of the information on fish contamination as well as human health risks from fish consumption is being prepared. The findings of published studies have shown that certain species of fish from the river have contamination levels higher than those acceptable for commercial fish. Nonetheless, it is recognized that fish is an important source of nutrients and oils that are known to protect the cardiovascular system.

The low occurrence of cardiovascular disease in the Inuit and certain Asian



populations was been attributed to their high consumption of fish and aquatic mammals. The beneficial effects of omega-3 fatty acids on the cardiovascular system have already been documented. In addition, the fatty acids from fish seem to offer a certain protection against high blood pressure, diabetes, low birth weight, colon and breast cancer and rheumatoid arthritis.

Another project was carried out to determine the nutritive value of the 16 species of fish caught in the waters of Lake Saint-Pierre and likely to be used as human food. Analyses will provide information that could be incorporated into the recommendations on the consumption of each of these species.

In the Montréal region, ice-fishing enthusiasts on Lake Saint-Louis as well as open-water fishers have been questioned on their sportfish eating habits to compare risks and benefits associated with this consumption. Tissue samples obtained from partici-

pants who consume small quantities of fish (low consumption) and from those who eat large quantities of fish (high consumption) were analysed for the presence of contaminants and fatty acids to correlate their eating habits with the analytical results. The project was conducted under the supervision of Dr. Tom Kosatsky of the *Direction régionale de la santé et des services sociaux de Montréal-Centre*.

Some studies have already shown that contamination significantly affects the marine resources of the St. Lawrence River. A number of Montagnais communities are located along the shoreline, and a great deal of their subsistence economy depends on the harvesting of the river's resources, including fish, migratory birds, molluscs and crustaceans. They are therefore identified as communities at risk. However, the Montagnais were rarely interviewed on the relationship between the contamination of their environment and their health. One project of the Health Component is aimed at



making up for this lack of knowledge. Under the direction of Jacques Grondin of the CSPQ, six Montagnais communities established along the shores of the St. Lawrence were consulted on their perception of risks related to the river's contamination. The aim of this project is to establish the platform for partnerships between the Montagnais participants and the environmental health researchers, with a perspective to allow the Montagnais to integrate their expectations into the health objectives of the action plan.

The latest word on swimming

The St. Lawrence River has long been a preferred site for summer bathing. Unfortunately, this use of the river is fast declining due to the closure of many beaches. Despite the contamination and the presence of signs prohibiting swimming, it remains a popular activity along some sections of the river. Other recreational activities such as windsurfing and waterskiing have been immensely popular since the 1980s. It was believed that windsurfing was less dangerous than swimming, but several studies today tend to prove otherwise.

Young children are most at risk when swimming in water polluted by various microorganisms. Contamination can occur by involuntary ingesting water, through skin contact or through contact of mucous membranes with the microorganisms. Sometimes, only a few viruses or bacteria are enough to cause gastro-enteritis or inflammation of the skin, eyes or ears. In

THE CONSUMER'S GUIDE TO SPORTFISHING IN FRESH WATER

The *Guide de consommation de pêche sportive en eau douce* was first published in 1982, an initiative of two Quebec departments: the *Ministère de la Santé et des Services sociaux* and the *Ministère de l'Environnement et de la Faune*. The Guide has been updated several times since then. Its objective is to inform sportfishers on the risks associated with the consumption of sportfish. However, Quebec health authorities suspect that this work has only been met with lukewarm success with sportfishing enthusiasts in Québec. Researchers at the *Centre de santé publique de Québec (CSPQ)* and the *Direction régionale de la santé publique de la Montérégie* are currently investigating the popularity of the guide and the reasons limiting its impact or usefulness.

The team of researchers is trying to get a clearer picture on how sportfishers use and interpret the information contained in the Guide on how they evaluate the quality of the resource as well as the risks and benefits inherent to the consumption of fish. In addition, the study explores the issue of credibility attributed to the field intervenors and the usual, preferred sources of information.

Researchers held discussion groups with sportfishers who fish in the St. Lawrence. They also met with several parties involved in the production and distribution of the Guide in order to gather their comments and suggestions on the best way to present the information concerning risks related to the consumption of sportfish. These findings should initiate new avenues in setting up communication strategies to reach the targeted public.



contamination in the areas frequented by swimmers and evaluating the health risks incurred by swimming in the river. This study also determines swimmers' motives, improves communication strategies used in swimming advisories and strengthens the effectiveness of public health intervention.

several areas of the river, the microbiological contamination has reached records levels.

One of the projects of the Health Component of SLV 2000 led by Dr. Jacques Grondin of the *Centre de santé publique de Québec* aims at assessing the level of

Impact of the River's Contamination on Health

During the 1980s, the alarmist media coverage of the pollution in the St. Lawrence River prompted the citizens to question of their drinking water supply. Studies conducted at the time, however, showed that the quality of water taken from the river and treated did not warrant their fears.

Once treated, the water drawn from the river contains minute concentrations of pesticides and other substances that are potentially carcinogenic: two herbicides from the triazine family, several organochlorines and PAHs. Even though their chemical toxicity is still not well-known, their presence is not of great concern to researchers since the drinking water taken from the river supplies our bodies with less than 1% of the total amount of such substances, food being the major source. In 1989, after an analysis of the situation, a team from the *Centre de santé publique de Québec* (CSPQ, or Public Health Centre of Quebec) concluded that there was no danger in using the river water as a source of drinking water.

However, there is a shadow on the horizon: the chlorine added during the water treatment process reacts with organic matter naturally present in the water to create trihalomethanes, toxic substances that are potentially carcinogenic. In response, water purification plants have modified their treatment procedure by introducing chlorine in the final stage of the treatment, after the organic matter has already been removed. Recent data show a sharp decline in the level of these contaminants.

A matter of perception

Experts have no cause for alarm because contaminants in treated water occur at very low concentrations. However, the public is still concerned with the quality of their drinking water, as indicated by the rising use of bottled water and the current vogue of domestic activated carbon water treatment



systems, which are effective to a certain degree in eliminating contaminants and any unpleasant taste. Nevertheless, the reasons why consumers prefer bottled water over tap water is still not known.

One of the projects of the Health Component led by Drs. Jacques Grondin and Patrick Levallois of the CSPQ, was aimed to fill this information gap through a telephone survey of the residents of four municipalities in the Québec city region. The results allowed researchers to determine which factors – esthetic qualities of tap water – motivate the public's behaviour regarding the consumption of drinking water from the river. These factors will be used to improve intervention and communication strategies of the public health authorities and municipalities with regard to drinking water.

Another project is aimed at establishing a correlation between the incidence rate and giardiasis – a type of gastro-enteritis known as “beaver fever” – and the characteristics of untreated water and the water treatment method used by municipalities. Untreated water contains pathogenic microorganisms such as viruses and protozoans that can cause infectious diseases. One of these protozoans, *Giardia*, is associated with gastro-intestinal symptoms and weight loss.

In a study conducted by Dr. Benoît Lévesque from the CSPQ, data from the Notifiable Disease Index (giardiasis being a reportable disease in Québec) were used to determine the incidence rate of giardiasis in the various municipalities. Water quality data including microbiological parameters and criteria based on the sources of pollution were obtained to establish an association between standardized incident rates, the age and the quality of the source of the water supply (the river as opposed to other sources) and the water treatment method.

The spectre of cancer

Are certain types of cancer more numerous in some region of Quebec? Are environmental factors involved in such cases? One of the projects led by Dr. Germain Lebel of the CSPQ was to examine geographical and temporal variations in the incidence and mortality rates from certain cancer types found in riverside populations and to assess the feasibility of integrating environmental indicators into a Geographic Information System (GIS). Such a system will develop maps to integrate and compare data on cancer incidence and mortality, socioeconomic data and contaminant levels in the river. The study will indicate the presence of a higher-than-normal incidence or mortality rate for certain types of cancer in people living along the shores of the river. It will also be used to elaborate some working hypotheses and, depending on the results, will allow for more in-depth research.

Do the Industrial Activities of the Bécancour Area Pose any Particular Health Risks?

The potential health risks of several emissions from the industrial port zone of Bécancour are still not well-known. That is why researchers at the *Ministère de la Santé et des Services sociaux du Québec*, under the direction of Dr. Maurice Poulin, began a project in 1995 to analyse the health risks associated with the industrial port zone. This analysis includes the characterization of the atmospheric pollutants linked to activities in the industrial port zone, the measurement of the exact levels of the various pollutants and the identification of the contaminants that may constitute a risk for human health. The results will provide a basis with which propose recommendations regarding the implementation of new industries in the port zone or an increase in activities already present, while informing the public on the risks to which it is exposed.

An industrial park was created in the port zone of Bécancour over 20 years ago. Industries that set up there emit certain contaminants, such as polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds, benzene, NO_2 and SO_2 into the air, soil and water. Some contaminant levels at times exceed the standards set by the World Health Organization. While some of these contaminants may affect the respiratory function, other possess carcinogenic properties that can affect human beings or animals, or both. Even though some industries established after the enforcement of the *Environment Quality Act* have been monitored through environmental impact assessments, no overall evaluation of health risks has yet been carried out.

The public's exposure to ambient air contaminants will be determined through the data gathered between April 1, 1995 and March 31, 1996 at the sampling stations of Gentilly, Bécancour and Sainte-Françoise. The targeted atmospheric pollutants include SO_2 , NO , NO_2 , volatile organic compounds, dioxins and furans, PCBs and



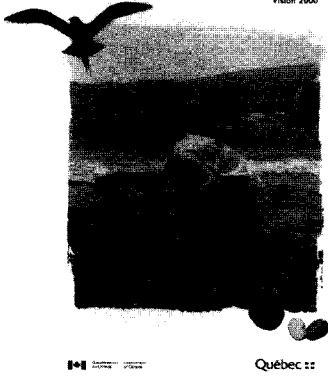
Aerial photo of the industrial port zone of Bécancour.

certain metals. In addition, the results from analyses of drinking water samples from the town of Bécancour, collected during the same period by the *Ministère de l'Environnement et de la Faune*, will be used to assess the river's role in the exposure of contaminants to the population.

For each detected contaminant, the exposure of children and adults will be calculated by using values of average weight daily inhalation and water intake, while taking into account the toxico-kinetic parameters specific to each contaminant. A risk assessment for the Bécancour population will be performed by comparing exposure estimates with available toxicological information (toxicity estimators) for each contaminant.

Finally, health risks will be prioritized and those requiring intervention will be identified and recommendations will be formulated to the appropriate authorities.

The town of Bécancour, Environment Canada, the Quebec *Ministère de l'Environnement et de la Faune*, Hydro-Québec, the *Société du parc industriel et portuaire de Bécancour* (PIPB), the *Association des industriels du PIPB* (Industry Association of the PIPB), the Quebec *Ministère de la Santé et des Services sociaux*, the *Direction de santé publique de la Mauricie—Bois-Francs* as well as one representative of the citizens of Bécancour have combined their efforts to carry the project through to a successful conclusion. The final report is to be tabled by the end of the summer of 1996. The results of the analyses as well as the recommendations will be released to the Bécancour population sometime next fall.



Biennial Report 1993-1995 – St. Lawrence Vision 2000. The report relates how the various projects are progressing and gives an overview of the results attained to date by the St. Lawrence Vision 2000 Action Plan. You may obtain a copy of the report, free of charge, by contacting the Coordination Office of St. Lawrence Vision 2000, tel: (418) 648-3444.

Guide d'intervention en restauration naturelle des rives du Saint-Laurent... entre Cornwall et l'île d'Orléans (Guide to natural restoration of the shores of the St. Lawrence River... between Cornwall and Ile d'Orléans). This Guide will be of use to the municipalities and organizations wishing to implement natural shoreline restoration projects. The Guide (French-language only) may be purchased for \$30; the Guide plus the accompanying cartographic atlas may be purchased for \$150. To order, contact the Canadian Wildlife Service, 1141, route de l'Église, P.O. Box 10100, 9th Floor, Sainte-Foy (Québec), tel: (418) 648-7225.

Quebec Biodiversity Strategy - Summary. Catalogue No: 96-3348A-04.

Pour une eau de qualité en milieu rural, comprendre et agir collectivement ("For quality water in farming districts: understanding and acting together"; French-language only). Catalogue No: 96-3207-01.

To obtain your copy of these publications, please contact the *Centre d'accueil et de renseignements du* of the Ministère de l'Environnement et de la Faune du Québec, tel: (418) 643-3127; 1-800-561-5974; Internet: ino@mef.gouv.qc.ca

RECENT PUBLICATIONS

Amphibex: Multifunctional Excavation Equipment For Use in the Aquatic Environment. A Fact Sheet in the series *St. Lawrence Technologies*.

Nettoyage des vêtements, prévention de la pollution par l'aquanettoyage. A technological development and demonstration

program on the wet cleaning of clothing and prevention of pollution.

These publications may be obtained from the Technological Development section, Environmental Protection Branch, Environment Canada at 105 McGill Avenue, Montréal, H2Y 2E7, tel: (514) 283-7000.

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Inset: The Consumer's Guide to Sportfishing in Fresh Water

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Do the Industrial Activities of the Bécancour Region Pose any Particular Health Risks?

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A POSITIVE ASSESSMENT

A report relating the St. Lawrence River's state of health was made public June 6th last. Entitled *State of the Environment Report on the St. Lawrence River*, the report comprises two volumes. Persons or agencies wishing to have a copy may order directly from *Éditions MultMondes*: at 1-800-840-3029, or by fax at (418) 651-6822. You may also obtain, free of charge, a colour brochure summarizing the report by calling 1-800-463-4311.

AGENDA

• May, June, July and August 1996

THE SECRETS OF THE ST. LAWRENCE RIVER

A series of 12 French-language conferences on the St. Lawrence River is being hosted by St. Lawrence Vision 2000 at the Montréal Biosphère, in concert with *Le Devoir*, *Saute Mouton*, *Croisières des îles de Sorel inc.*, the Biosphère and the St. Lawrence Centre of Environment Canada. The series began last May 29, and will be continuing until August 14. The following five conferences have already taken place:

May 29: *Le fleuve aux grandes eaux* ("The Mighty River"); by Frédéric Back and Claude Villeneuve.

June 5: *Les îles du Saint-Laurent, riches d'histoire et d'aventures* ("The islands of the St. Lawrence: rich in history and adventure"); by André Croteau.

June 12: *Sur le navire du temps, une croisière dans l'histoire du Saint-Laurent* ("A cruise through time in the history of the St. Lawrence"); by Michel Lessard.

June 19: *L'opération Irving Whale: une défi environnemental à relever* ("The Irving Whale Operation: an environmental challenge"); specialists from the Emergency Intervention Team of Environment Canada.

June 26: *À la recherche des plantes rares du Saint-Laurent* ("On the lookout for rare plantes in the St. Lawrence"); by Line Couillard.

Upcoming Conferences:

July 3: *La tourte, le canard du Labrador, le Wapiti, le suceur... et si la liste s'arrêtait là!* ("The passenger pigeon, Labrador duck, wapiti, copper redhorse... if only the list could stop there!"); by Michel Huot.

July 10: *Des berges à la dérive en voie de réhabilitation* ("Shores adrift being rehabilitated"); by Pierre Bertrand and Marie-Claude Massicotte.

July 17: *L'organisation sociale chez le Béluga; de la fascination à la conservation* ("Social organization of the Beluga; from fascination to conservation"); by Robert Michaud.

July 24: *Le Béluga du Saint-Laurent: nos meilleurs vœux de prompt rétablissement* ("The St. Lawrence Beluga: best wishes for a quick recovery"); by Richard Bailey.

July 31: *Le mercure dans le Saint Laurent* ("Mercury in the St. Lawrence"); by Daniel Cossa.

August 7: *Le Saint-Laurent dans tous ses états* ("All about the St. Lawrence"); by Hélène Bouchard.

August 14: *Ces plantes qui agissent comme des usines d'épuration* ("Plants that act as purification stations"); by Gilles Vincent and Lucie Olivier.

• September 1996

Tabling of the environmental assessment report of the Baie-Comeau ZIP Committee.

• October 1996

A public consultation organized by the Baie-Comeau ZIP Committee, following the tabling of their report.

• September-October 1996

The *Neuvièmes entretiens Jacques Cartier. 1996 River and Heritage Symposium* on the theme "Rivers: Why Protect and Enhance Them?" The symposium will be held in Quebec City on September 30 and October 1, and in Montreal from October 1 to 4, 1996. For information, contact Martine Bugeaud: (418) 649-8228.

• November 1996

A symposium on the St. Lawrence River, co-organized by St. Lawrence Vision 2000 and the *Association des biologistes du Québec*. For information, contact Clément Dugas (418) 649-5777 or Yvan Bédard (418) 644-3055.

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