

IN TUNE

Risks and Benefits Related to Consumption of Sport Fish

A study carried out by the *Direction régionale de la santé publique de Montréal-Centre* has been conducted to assess the risks and benefits of consuming sport fish caught in the Montreal area.

Hog production and corn growing

Hog production and corn cultivation have expanded considerably in Quebec since the 1970s. Efforts have been devoted to gaining a better understanding of the real and potential effects of these two agricultural activities.

ZIP report

The Ville-Marie ZIP Committee submitted its Ecological Rehabilitation Action Plan (ERAP) in February 1999. The ERAP contains 11 high-priority projects, two of which are described in this month's newsletter: the protection of the Boisé Saint-Paul (the woods on Nuns' Island) which is threatened by residential development; and the elimination of storm sewer overflows, an issue that the Committee has been following since 1997. To be continued...

Risks and Benefits Related to Consumption of Sport Fish in the Montreal Area

Over the last twenty years, lower levels of a number of environmental contaminants have been observed in the St. Lawrence River and its fish populations. Some fish species still have contaminant levels above the maximum allowable levels for commercial fish, however.

Many anglers in the Montreal region fish in the St. Lawrence River and many of them also eat the fish they catch. To assess the risks and benefits to sport fishermen of consuming their catch, a study was carried out by the Direction régionale de la santé publique de Montréal-Centre (Regional Branch of Public Health, Montreal Central Montreal). Although it is mainly the general conclusions of the study that are summarized here, the study also contains data on fishermen, their habits and the consequences of eating their catch.

The main objective of the study, which was conducted under the health component of St. Lawrence Vision 2000, was to determine if eating fish from the St. Lawrence exposes sport fishermen in the Montreal region to high enough levels of certain chemical substances or nutrients to affect their health.

The study was carried out in two phases, in 1995 and 1996, during which the team of researchers surveyed 1654 anglers. Out of this sample, 192 people, representative of fishermen who ate the greatest amount and the smallest amount of fish, were chosen to take part in an in-depth medical and nutritional evaluation comparing the two groups.

The anglers surveyed fished from shore, in open water and on the ice. The team visited fishing areas on the Quebec side of Lake St. Francis, on Lake St. Louis and on the St. Lawrence east to Repentigny.

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P.G. Adams

Sport fish found to be safe to eat

One of the findings of the study was that somewhere between 4000 and 10,000 Montreal area residents catch and eat fish from the St. Lawrence. Around 40% of fishermen never eat their catch or do so only once a season, while 33% consume their catch once or twice a month and 25% do so once or twice a week. Only 3% of fishermen eat their catch three times a week or more.

The most frequent consumers obtained around 10% of their protein intake from their catch. The most commonly eaten species is yellow perch, which is one of the fish lowest in contaminants as well as in omega-3 fatty acids, which are beneficial for the cardiovascular system.

The study, which covered various levels of fish consumption, concluded that mercury, PCB and mirex concentrations were significantly higher in blood samples from fishermen who frequently ate sport fish.

On the other hand, in terms of the toxic compounds studied, none of the sport fishermen who ate fish they caught from the St. Lawrence had levels of contaminants that pose a health concern. "In the light of these results, we are now questioning the relevance of government recommendations on sport fish consumption," said Tom Kosatsky, the head of the study's research team. "Taking into account the species eaten, their level of contamination, and the short period during which fisherman eat sport fish, the dangers linked to

Potentially significant risks and benefits

The researchers were especially concerned with several classes of contaminants, including organochlorine pesticides (mainly DDT and mirex), PCBs and heavy metals (lead, arsenic and methylmercury), all of which make their way into fish through contaminated soil, sediment, air or water.

High levels of contaminants have been linked to a variety of health dangers such as high risks of developing certain cancers; adverse effects on the nervous system, skin, liver, and male reproductive system; and congenital malformations. Fishermen's exposure to contaminants was assessed by analyzing urine, hair and blood samples.

The study also looked at the health benefits associated with eating fish. Fish contains omega-3 fatty acids, which improve cardiovascular health, blood pressure, cholesterol, and triglyceride levels and blood clotting.

Fishing areas – Sainte-Anne-de-la-Pérade



Photo : J.-P. Danvoye



Photo : Paul G. Adams
Trois-Rivières

consumption of fish from the St. Lawrence do not justify the advisories that are issued. We believe it would be more appropriate to promote a balanced diet, in which the consumption of sport fish from the St. Lawrence should play a part. These fish do not deserve the poor reputation they have acquired, not only among the general population but sport fishermen themselves, who tend to overestimate the dangers of consuming their catch, should be rehabilitated."

Although no harmful health effects could be linked to the consumption of sport fish, no significant benefits were observed either. Consumers of large amounts of sport fish were not found to be any healthier, in terms of their cardiovascular systems or levels of omega-3 acids, than less frequent consumers. Nutritional assessments did suggest, however, that consumers of sport fish take in large amounts of proteins, iron and vitamin B12.

Source:

KOSATSKY, T., B. SHATENSTEIN, R. PRZYBYSZ and S. NADON. 1999. Risks and benefits related to consumption of St. Lawrence River sport fish. Executive Summary, Montreal, Direction régionale de la santé et des services sociaux de Montréal-Centre, Direction de la santé publique, 13 p.

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Brochure on ZIP committees

The SLV 2000 advisory committee on community involvement, in co-operation with Stratégies Saint-Laurent, has just published an information brochure on the Areas of Prime Concern (ZIP) Program, entitled Working Together to Save the St. Lawrence River. In it you will find a wealth of useful information.

Strategic alliance between the Biosphere and the Cousteau Society

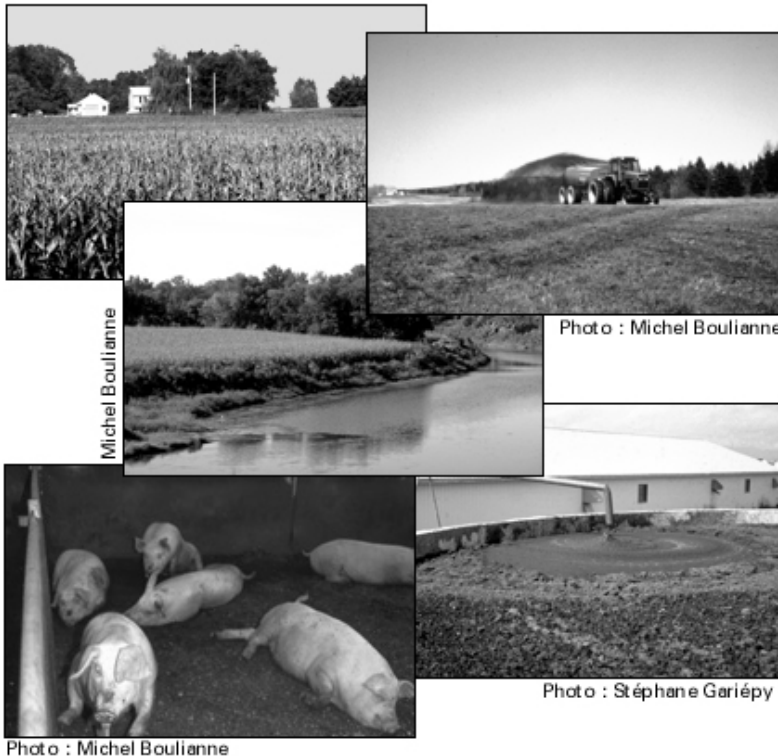
On March 1, Environment Canada's Biosphere and the Cousteau Society ratified a historic agreement that will be in effect until 2001. Under the agreement, joint projects will be developed and implemented in Canada to educate the general public about protecting water.

Several projects are already in the works under the agreement, including an exhibit at the Biosphere on the many activities and achievements of Cousteau Society members. In addition, the research ship Alcyone (successor to the Calypso) will sail up the St. Lawrence to Montreal, stopping at several ports along the way.

For the complete program of events, please contact the Biosphere: (514) 283-5000.

A press release is also available at the following address: <http://www.slv2000.qc.ec.gc.ca>.

The potential impacts of hog production and corn growing on water quality



The goal of the agriculture component of Phase III of St. Lawrence Vision 2000 is to lessen the negative impact of agricultural activities on water quality in the St. Lawrence and its tributaries, mainly by reducing inputs of pesticides into watercourses.

*This article provides a brief synthesis of the impacts of hog production and corn growing on water quality in the St. Lawrence. The full text appeared in the publication *Le Naturaliste canadien* (Winter 1999), published by the *Société Provancher d'histoire naturelle du Canada* (Provancher Society of Natural History of Canada). Its author, Jean Painchaud, is a biologist with the aquatic ecosystems unit of the Quebec Department of the Environment.*

Hog production and corn cultivation, which have expanded considerably since the 1970s, are activities central to Quebec's agricultural economy. In the last few years, the environmental impacts of these activities have been widely publicized in the media.

The adoption of intensive hog production has favoured the use of liquid manure as a way of managing the resulting livestock wastes. Spreading the manure may cause air and water pollution in regions where hog production is concentrated. Corn growing is generally accompanied by the massive use of fertilizers and pesticides, a portion of which may find their way into aquatic ecosystems. This field crop is also associated with farming practices that promote soil erosion, which in turn causes turbidity and silting in rivers.

Two intensive agricultural activities that go hand in hand

A total of 80% of the province's hog production is concentrated in three regions of the province: Montérégie, Chaudière-Appalaches and Mauricie-Bois-Francs. The highest concentrations occur in the watershed of the Yamaska and Chaudière rivers, while the watersheds of the L'Assomption, Etchemin, Richelieu, Saint-François, Nicolet, Bayonne and Boyer rivers are affected to a lesser extent.

Although corn is grown throughout southwestern Quebec, the province's main cornbelt runs north to south through the Yamaska, Châteauguay and Richelieu river watersheds. In addition, large areas are devoted to corn cultivation in the watersheds of the Saint-François, Nicolet and Bécancour rivers. On the north shore of the St. Lawrence, the L'Assomption River basin and the Lake St. Pierre region are also important corn growing areas.

"The environmental impacts of these agricultural activities are often exacerbated by the fact that they are not only largely concentrated but they are often linked in a number of regions," said Jean Painchaud.

Hog production

Hog numbers increased significantly between 1975 and 1980 in the province, and now Quebec is the leading hog producer in Canada.

The environmental effects of hog production include, first of all, the microbial contamination of soil and water. Studies have shown that the improper storage of swine manure and the spreading of manure on farm fields may lead to the contamination of surface water and ground water by viruses, bacteria, protozoa, fungi and some parasites. Surface water contamination occurs directly from field runoff when the manure is spread during wet periods. Bacteria have even been found to survive for several years in the soil or in the soil-water interface, thus acting as a long-term source of contamination of surface and ground water.

Contamination may also have a negative impact on recreation, limiting or preventing the use of watercourses. Swimming is often restricted in bodies of water in southwestern Quebec due to excessive coliform counts. Coliform bacteria are also potentially pathogenic to aquatic animals. Indeed, research on rivers in southwestern Quebec has shown that fish communities are vulnerable to viral and bacterial infections and

parasites. When infected water is used for drinking, human health may also suffer.

Runoff and leaching of the manure from intensive hog production can also have deleterious effects on surface water and ground water due to the high organic content. In surface water, the input of organic materials may cause an oxygen deficit harmful to fish and other aquatic animals. In addition, the organic carbon can react with the chlorine used to treat drinking water, forming potentially toxic by-products. The situation is exacerbated by the fact that untreated water containing large quantities of organic carbon requires even more chlorine for successful disinfection.

The nitrogen and phosphorous in hog manure also have a negative impact on water quality. Nitrogen compounds may be harmful or toxic to aquatic life and human health. Furthermore, the excessive use of fertilizer leads to the saturation of soils with phosphorous and the eutrophication of lakes and rivers.

Corn cultivation

Roughly one third of all the pesticides used in Quebec (and one half of agricultural pesticides) are used in corn growing, despite the fact that corn represents only 17% of the cultivated area in the province. Pesticide use causes the contamination of ground water and surface water.

Corn cultivation also requires large amounts of fertilizers and is often associated with farming practices that promote soil erosion. The

nutrients in fertilizer used in corn production are subject to runoff and leaching, through which a large portion finds its way into surface and ground water. The phosphorous and nitrogen compounds in fertilizer have a similar impact to hog manure on the environment.

Most of the corn produced in Quebec (around 98%) is used for animal feed. However, the potential use of corn for fuel ethanol, an additional market for the crop, may result in an increase in the total corn acreage.

The challenge of sustainable agriculture

Certain farming practices may mitigate the impact of these two activities on the St. Lawrence and its tributaries. For example, the time of year and way in which hog manure is spread on fields can have a significant effect on loadings of nitrogen and phosphorous to watercourses. Integrated weed management may also reduce or eliminate the use of herbicides in corn crops ¹.

¹ *The December 1998 issue of the Le Fleuve newsletter reports on the Quebec Government's Programme Agro-environnemental de Soutien à la Stratégie phytosanitaire (agro-environmental support program for plant health strategy), the objective of which is to reduce the use of agricultural pesticides in Quebec and increase the percentage of cultivated area in which integrated pest management is used.*

Furthermore, in Quebec, corn production and pork production often go hand in hand in terms of the use of fertilizers. Hog manure, when applied in adequate amounts, has been found to be an effective substitute for chemical fertilizers in corn cultivation. Therefore, the significant fertilizer requirements in corn growing must be taken into account when managing swine manure on a regional scale.

Source:

PAINCHAUD, J. 1999. "La production porcine et la culture du maïs. Impacts potentiels sur la qualité de l'eau," *Le Naturaliste canadien*, Volume 123, Number 1, Winter 1999, p. 41-46.

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The Ville-Marie ZIP Committee supports local initiatives by riverside communities

The Ville-Marie ZIP Committee works in the southwestern part of the greater Montreal region. Its territory encompasses three geographic areas: the north side of Lake St. Louis, the Lachine Rapids and the La Prairie Basin. In the north, the territory extends from Ste. Anne de Bellevue in the west to the mouth of the Lachine Canal in the east, at Montreal's Old Port. The southern sector goes from the Kahnawake reserve in the west to Longueuil in the east. This stretch of shoreline is one of the most heavily urbanized of the entire St. Lawrence.

The Ville-Marie ZIP Committee submitted its ERAP in February. It consists of 11 high-priority projects, selected from among 112 proposals formulated during extensive consultations beginning in 1997. The projects come under four themes: pollution prevention and clean-up; education and awareness; environmental protection and habitat conservation; and recreation, tourism and development. Additional projects proposed by the community will be added to the ERAP as time goes on. Below, we will discuss two of the ZIP Committee's current projects.

The purpose of this column is to highlight the work done by ZIP committees (ZIP stands for Area of Prime Concern) in protecting and restoring the resources and uses of the St. Lawrence River. Under Phase III of the St. Lawrence Vision 2000 Action Plan, these joint action organizations are working to implement Ecological Rehabilitation Action Plans (ERAP) for each riverside community. There are currently 12 ZIP committees, and two new ones will be added shortly.

Protecting the woods on Île des Soeurs



Photo : Claude Thiffault

The southwestern part of Île des Soeurs was once covered with extensive wetlands, comprising marshes and swamps, as well as extensive beds of aquatic vegetation offshore. In the 1960s and 1970s, most of the wetlands were filled in, creating a break in the landscape between the St. Lawrence River and a wooded area called the Bois  St. Paul (St. Paul Woods).

Over the years, the woodland has been encroached on significantly by residential development and now covers only 30 hectares. According to recent observations, however, the area continues to harbour unique species of plants and animals, including eight species of rare plants such as hackberry and rock elm. In winter, it is frequented by several species of nocturnal raptors, notably the Great Gray Owl, a rare owl.

Two thirds of the Bois  St. Paul is owned by the City of Verdun, which has set this natural habitat aside as a conservation area. The other third, consisting of ten hectares, is in private hands and is currently threatened by a residential housing project.

In accordance with the priorities for action defined under its ERAP, the Ville-Marie ZIP Committee intends to ensure the total protection of the privately owned portion of the woodland. "We are currently working with the City of Verdun, the Quebec Department of the Environment and the Canadian Wildlife Service to formulate a strategy for acquiring the woods, which will be done with the participation of a number of partners," said Luc Bergeron,

the committee co-ordinator. "First, we hope to receive continued support from our partners, the City of Verdun and local citizen's groups, both of which are working on the front lines to protect the woods. We also plan to seek the help of the various levels of government, through their respective financial assistance programs. Lastly, a working group will be set up to encourage the participation of the business community."

Preventing overflows from the storm sewer network

Along the stretch of the St. Lawrence that the ZIP Committee is responsible for, the river is used for swimming and a number of other water sports. These activities are often impeded, however, by overflows from the region's storm sewer network into the St. Lawrence. The impacts of these overflows are four-fold: bacteriological, physico-chemical, biological and aesthetic. Bacterial contamination from the effluent discharged into the river can affect human health. The reduction in physico-chemical and biological water quality causes the deterioration of wildlife habitat, affecting many organisms that use this section of the river during one or more stages of their life cycle.

Well before the committee filed its ERAP, it had already begun tackling the problem of storm sewer runoff. Since 1997, the committee has been involved, along with the East Montreal ZIP Committee, in the work of the *Comité de suivi permanent des eaux usées du territoire de la Communauté urbaine de Montréal*, the permanent

wastewater monitoring committee of the Montreal Urban Community.

Continuing its work in this area, the Ville-Marie ZIP Committee plans to undertake a study in spring on the problem of stormwater overflows. The results of the study, and the synthesis of knowledge that it will produce, will help the Committee to mobilize river users in the community and representatives of the main levels of government engaged in managing storm sewer discharges, to devise the most appropriate solutions for this problem.

"These two projects clearly illustrate the mandate that the Ville-Marie ZIP Committee has taken on, which involves establishing links between major players and the general public, in order to encourage riverside communities to participate in projects that will help to reclaim this section of St. Lawrence for the benefit of all users," said Mr. Bergeron in closing.

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