Fish Habitat Restoration Fund (FRHAP)
Final Five-Year Assessment, 1994-1999

The Story of an Innovative Judgement Worth Remembering

On May 31, 1993, Tioxide Canada appeared before Judge Paul A Bélanger of the Court of Quebec and pleaded guilty to the charge of illegally dumping effluent containing acids and heavy metals into the St Lawrence River in October 1991 from its plant in Tracy, Quebec. The company was ordered to pay a fine of $4 million, including $3 million in compensation for damage to fish and their habitat.

A precedent in Quebec, the fine was imposed under the *Fisheries Act*. Environment Canada, on behalf of the federal and provincial departments and agencies involved, was ordered by the Court to submit a list of 20 or so projects and a five-year action plan specifying how the fund would be managed.

The departments and agencies involved are: Environment Canada, Fisheries and Oceans Canada, The ministère de l'Environnement et de la Faune du Québec (the Quebec Department of the Environment and Wildlife) and the Fondation de la faune du Québec [Quebec wildlife foundation].

The projects chosen under the management plan meet current priorities for saving and rehabilitating fish habitats along the St Lawrence River. Two-thirds of the projects focus on Lake St Pierre, downstream from Tracy. The others are located upstream, along the River proper as far as Beauharnois in Lake St Louis.

On February 10, 1994, a five-year agreement to carry out the management project was signed by the Canadian government, the Fondation de la faune du Québec and the Quebec government. The agreement stipulated that a trust account be set up by the Fondation de la faune du Québec (the trustee) to carry out projects; the account would be administered by a steering committee made up of representatives from the departments and agencies involved. The *Fish Habitat Restoration Fund* (FRHAP) was thereby created and began operation.

In accordance with its mandate, the FRHAP involves a number of stakeholders, landowners, partners, and local and regional proponents in order to complete its fish habitat conservation and restoration projects. Its mission was completed in the fall of 1998 and the FRHAP steering committee submitted this final assessment of its activities. Without a doubt, the environmental and socio-economic spin-offs of the projects implemented have had a significant impact on the habitats.

Message from the Steering Committee

We are proud to be releasing this final assessment of the Fish Habitat Restoration Fund (FRHAP). Since it began in 1994, the Fund has implemented 20 of the 24 projects in the management plan, for which it has generated $5.4 million in investments, including contributions received from its partners over the course of its mandate ($1.7 million) and those guaranteed to date for the next two years.

This final assessment reviews each of the projects in the initial management plan, the objectives achieved, what remains to be done and how the projects will be carried on after the FRHAP has been dissolved. It also contains the enlightening results from the ichthyological monitoring carried out at three restored sites over the past few years.

The Bélanger ruling was a first in the legal world. It was the first time a large fine was used to protect and restore fish habitat. The judgment also led to the creation of new development techniques and solutions for fish in the St Lawrence River and its wetlands.

Part of the plan's success was due to the guarantee of funds made available at the beginning for use as needed as well as the latitude in the choice of projects. However, its success resulted mostly from the knowledge sharing that took place, the co-ordination that resulted and the catalyst effect the plan had on the many partners who supported the projects.

We believe that work done under the projects should be pursued. For example, Lake St Pierre was recently granted Ramsar designation, new game sanctuaries have been created and the recreational and educational aspects of some projects have been enhanced. Local organizations will play a key role in managing and operating the facilities developed.

We are grateful to the many stakeholders, proponents, owners, municipalities, managers and financial contributors who have been associated with the FRHAP over the past five years in carrying out this ambitious action plan to conserve fish and their habitat.

Michel Lamontagne, President
Environment Canada

Réjean de Ladurantaye
Environment Canada

Gordon Walsh
Fisheries and Oceans Canada

Normand Traversy
Ministère de l'Environnement et de la Faune du Québec

Bernard Beaudin
Fondation de la faune du Québec

Fish Habitat RestorationFund - 1994-1999 5 - Year Results

Statement of financial results at June 30, 1998 and final estimates

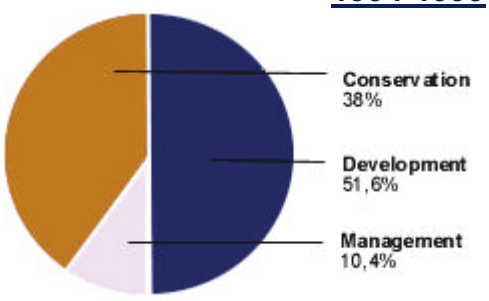
	spent	committed (expected))	
Revenues			
Fine collected	$3,000,000		$3,000,000
Interest income	$254,711	$3,639	$258,350
Total revenues			$**3,258,350**
Expenses			
Conservation projects	$1,198,428	$38,666	$1,237,094
Development and monitoring projects	$1,600,869	$79,875	$1,680,744
Management	$325,015	$15,497	$340,512
Total des dépenses			$**3,258,350**

At the end of the FRHAP agreement on February 10, 1999, provisions will be made with the Fondation de la faune du Québec and the ministère de l'Environnement et de la Faune du Québec for any remaining moneys to be used for fish habitat management plan projects.

Fund Use - cumulative to the end of the FRHAP

	1994-1999 overall - all regions	Sorel-Tracy region east to Lake St Pierre (compared with overall use)
conservation	$1,237 094 / 5 projects ≅ 290,9 ha protected	$337,089 (27,2%) /2 projects 127,5 ha protected
development (+ monitoring)	$1,680,744 / 15 sites	$1,313,533 (78,2%) / 10 sites
Budget used	**$2,917,838** (100%)	**$1,650,622** (56,6%)

1994-1999



Thank you to all our partners

Association des chasseurs et pêcheurs de Sainte-Anne-de-Sorel (ACPSAS)
Association des pêcheurs commerciaux du lac Saint-Pierre (APCLASP)
Association des propriétaires et locataires de l'île Saint-Eugène
Biodome of Montreal
Ducks Unlimited Canada
Congrégation des Soeurs Grises de Montréal
Corporation de la Commune de l'île Dupas
Department of National Defence, Experimentation Test Centre, Nicolet
Fondation Héritage Faune
World Wildlife Fund
Héritage Saint-Bernard
Hydro-Québec
Ministère des Transports du Québec
Municipality of Baie du Febvre
Municipality of Pointe du Lac
Option verte
Parks Canada
North American Waterfowl Management Plan (NAWMP) partners
St Lawrence Vision 2000 (SLV 2000) partners
Pisciculture de Tadoussac
Recyc-Québec
Nature Conservancy of Canada - Quebec
Société d'aménagement de la Baie Lavallière (SABL)
Société de conservation, d'interprétation et de recherche de Berthier et ses îles (SCIRBI)
Société de conservation Saint-Barthélemy/ Saint-Joseph-de-Maskinongé (SCOBAJM)
Montreal Port Corporation
University of Quebec at Montreal
Town of Boucherville
Town of Châteauguay
Town of Léry
Town of Maple Grove

As well as all private land owners involved in FRHAP activities and achievements

Five years to take action and create new development techniques and solutions

The mandate of the administrators of the *Fish Habitat Restoration Fund* (FRHAP) was to prioritize and implement 24 conservation and development projects selected for the 19 sites identified in the management plan.

The realization of 20 of these projects made it possible to protect and restore spawning grounds, re-establish the free movement of fish and free them after the spring floods, develop techniques to improve the situation of vulnerable species, acquire and develop habitats such as marshes and significant islands to ensure the survival of fishery resources, and restore their habitat.

Specific criteria were used to determine the priority of projects, including the importance of intervention for the fish habitat, regional priorities, the degree of urgency based on the threat of habitat destruction or deterioration, project costs and benefits, project feasibility and the possible participation of other partners and organizations in the community.

Intervening in aquatic environments is not an easy undertaking. Moreover, five years is a short time span given the complex administrative and environmental assessment processes, the complementary funding to be sought and, in some cases, the efforts to protect land prior to its development.

It was necessary to proceed one step at a time as opportunities presented themselves. The Steering Committee followed a number of guidelines in the course of its activities:

- involve the departments concerned, financial partners and community organizations as proponents, as well as local and regional managers such as municipalities;
- work together with North American Waterfowl Management Plan (NAWMP) partners at sites where the program was already involved or could get involved;
- check the funding capacity of projects, in particular with existing programs, proponents and concerned departments;
- acquire private land by mutual agreement or negotiate conservation and development agreements;
- seek co-operative, protection or stewardship agreements;
- maintain a biodiversity and multifauna development objective;
- assess all the risks of impact that projects might have on the environment, the water budget and nearby users (farmers, vacationers and residents);
- give preference to realistic, exportable development projects and flexible, adaptable structures;
- verify the performance of developments through ichthyological monitoring;
- educate and inform the public and local stakeholders about project objectives and the importance of conserving sites, show completed work and disseminate results.

Management Plan - Five Year Report

SITE	PROTECTION		DEVELOPMENT - MONITORING	STATUS
	Money invested by FRHAP and its partners (p)	**Area protected + planned**	**Money invested by FRHAP and its partners (p) and description**	
Beauharnois Dam			$20,000 (p : $152,900) Feasibility study of an eel fish pass	Study completed in 1996
Hébert and Goyette points	≅ $98,403 (p : $31,545)	27,1 + ≅ 5 ha	$138,647 (p : $54,253) Restoration of spawning grounds	Will be completed by NAWMP[1] in the short term (priority funding)
Saint-Jean Stream	≅ $734,570 (p : $318,514)	93,5 + ≅ 1 ha	$110,557 (p : $216,144) Restoration of spawning grounds	Will be completed by NAWMP in the short term (priority funding)
Lake sturgeon spawning grounds (St-François River)			$62,035 (p : $49,594) Restoration of spawning grounds	Construction in 1999 through compensation from the Montreal Port Corporation (and planned monitoring)
Rivière aux Pins	≅ $67,033 (p : $4,697)	29,6 + ≅ 7,2 ha	$46,153 (p : $42,762 Restoration of spawning grounds	Will be completed by NAWMP in the short term (priority funding)
Copper redhorse (Richelieu River)			$51,854 (p : $304,300) Restoration of a threatened population and its habitat	Continued by the St Lawrence Action Plan and Parks Canada (fish pass project at St Ours)
Du Milieu Island			$34,871 (p : $61,032) Restoration of spawning grounds	Will be evaluated by NAWMP
Corbeaux / de Grâce Islands			$153,101 (p : $352,307) Restoration of 145 m of shoreline	In addition, 275 m stabilized in 1998 or 1999 by Montreal Port Corporation
Berthier-Sorel Islands	$281,644 (p : $8,377)	68,8 ha + study about the islands		Future protection by NAWMP and St Lawrence Vision 2000
Dupas Island			$153,093 (p : $18,618) Restoration of spawning grounds + ichthyological monitoring	Completed in 1997
Lavallière Bay			$283,046 (p : $36,446) Restoration of spawning grounds + ichthyological monitoring	Completed in 1998
St Barthélemy (unit 4)	$55,445 (p : $34,031)	58,7 ha	$248,759 (p : $8,750) Restoration of spawning grounds	Completed in 1997
Louiseville			$55,909 Restoration and development of fish habitat	Completed in 1996
Baie du Febvre Common	Project not carried out by FRHAP		$124,827 (p : $4,434) Restoration and development (watercourses, 20 ponds)	Protective lease to be extended by NAWMP, development finished in 1998
Baie du Febvre / Nicolet South			$25,787 (p : $100) Restoration of fish habitat (four watercourses)	Completed in 1996
Spawing grounds in flowing water Lake St Pierre (rock			Project not carried out by FRHAP	Abandoned as a result of scientific knowledge (St Lawrence Action Plan

fish)				reintroduction project) Saint-Laurent Vision 2000)
Saint-Eugène Marsh			$172,105 (p : $34,464) Restoration of spawning grounds + ichthyological monitoring	Completed in 1997
Marguerite River	Project not carried out by FRHAP			Protection project less urgent, taken over by NAWMP
Sturgeon spawning grounds (St Maurice River)			Project not carried out by FRHAP	Restoration in 1996-1997; taken over by Hydro-Québec and St Lawrence Vision 2000
Total spent and committed	**$1,237,094 (p : $397,164)**	**≅ 290,9 ha 5 sites**	**$1,680,744 / 15 sites (p : $1,336,104)**	

[1]NAWMP: North American waterfowl Management Plan

Protection Projects: An Assessment

More than 291 ha of fish habitat, a total of 131 lots, were secured at five sites. The FRHAP invested $1,237,094 in protection while another $397,164 came from SLV 2000 and the NAWMP. Negotiations on protection initiatives were conducted by the Fondation de la faune du Québec on behalf of the Fund.

The FRHAP achieved its objectives of its Lake St Pierre projects. Protection of unit 4 and development work at St Barthélemy were completed. In the Berthier-Sorel islands, a property was acquired in 1994-1995 in the Straham and Millette islands (13.7 ha). A 170-ha lot on de Grâce Island, one-third of which is fish habitat, was purchased in 1995-1996 in partnership with the Nature Conservancy of Canada, the NAWMP and SLV 2000. The Fund also conducted a study on priority sectors of fish habitat to be protected in the Lake St Pierre islands.

A large portion of the three sites making up the major spawning grounds in the Montreal region was protected: the Rivière aux Pins in Boucherville and the St Jean Stream and Hébert and Goyette points on the south shore of Lake St Louis in Châteauguay, Léry and Maple Grove.

Habitats on purchased land will be protected in perpetuity. They belong to the Fondation de la faune du Québec, with the exception of the property purchased on de Grâce Island by the Nature Conservancy of Canada and land in the Town of Boucherville at Rivière aux Pins, which is protected under an agreement.

To date, eight other voluntary conservation agreements, varying from five to 40 years in duration, have been signed by private property owners and the Fondation de la faune du Québec as part of the St Jean Stream and Hébert and Goyette point projects. Furthermore, the Quebec Department of Transport has relinquished 20 ha of land containing fish habitats at St Barthélemy and 17 ha along the St Jean Stream.

Development Projects : An Assessment

Among the 17 site development projects in the management plan, 15 projects were implemented by the FRHAP. Between 1994 and 1999, the Fund invested $1,680,744 in fish habitat development and monitoring while various partners contributed $1,336,104. The FRHAP gave priority to projects in and around Lake St Pierre (10 of the 15 projects, which required 78.2% or $1,313,353 of the total FRHAP development budget). All the Lake St Pierre projects have been completed, taking into account that development of spawning grounds in the St François River will be carried out by fund partners in 1999.

Within two to three years of implementation, all projects requiring a water-level operation and management protocol will be monitored by the ministère de l'Environnement et de la Faune du Québec.

After the Fund is wound up, construction work will still have to be carried out to restore spawning grounds in Rivière aux Pins, St Jean Stream and at Hébert and Goyette points. However, these projects will be continued by NAWMP partners already involved in these wildlife areas thanks in part to financial support from the Quebec Department of the Environment and Wildlife.

Ichthyological Monitoring: Discoveries and Findings

The FRHAP ($98,166) and its partners invested a total of $157,194 over two years in the monitoring of experimental fisheries at three spawning ground restoration project sites with water-level management. The ichthyological monitoring showed whether project objectives had been achieved and allowed adjustments to be made. It also ensured that the benefits of facilities and their operation for wildlife were maximized. The fish caught were identified, tagged, counted and released. New knowledge about fish movements and migrations was thereby gained.

Monitoring Fish Pass Work at Lavallière Bay

In this diked marsh developed by Ducks Unlimited at the junction of the Yamaska River, an innovative concept was developed. An outfall for downstream migration, designed to remain operational throughout the year, as well as a fish pass with successive ponds were installed in the northeast corner of the bay in the fall of 1994. The actual monitoring, which was carried out from July to September 1997, showed that:

- in addition to supporting a wide variety of fish (40 species), the marsh is a major spawning ground and nursery for a number of species (33 species of forage fish surveyed). The redfin pickerel, a fairly uncommon species whose preferred habitat is wet meadows (dense and shallow aquatic grass beds) was also spotted;
- approximately 20,00 fish from some 30 species, both the current year's young and adults, reached the marsh through the fish pass;
- the fish pass extended the access period for fish (for late spawning, among other things), which could be very useful in the event of low spring floods to facilitate fish movement and provide an exit for the fish;
- the outfall enabled more than 15,500 fish (36 species of young and adults) to leave, 46% of which were chubs; the fish pass was used by almost all the species surveyed and in the same proportion found in the fish community verified in the marsh;
- From July to September, the fish clearly moved towards the outfall;
- structures have been calibrated and operational procedures have been developed; this will enable an

operational water level to be maintained in the marsh and thereby avoid harming other established wildlife species.

Monitoring Partial Spring Flushing in 1996 and Flushing in September 1997 at Dupas Island

In the eastern section of the île Dupas Common, a system of agricultural border strips and channels was created by Ducks Unlimited. When the spring floods arrive, the area is visited by a number of fish that come to spawn, including yellow perch, northern pike and brown bullhead. As the wintering conditions are too severe for the fish to survive, it is essential that they be evacuated to the St Lawrence River before winter arrives. In an effort to improve the fish evacuation techniques used since 1991, the control structures and pond at the end of the system of channels were modified in 1994. In addition, the evacuation channel (downstream channel) was altered in 1997 to shorten the fish's route to the St Lawrence. The flushing process was monitored twice:

- In spring 1996, 27,000 young perch born in the enclosure and 16,000 pike fingerlings were evacuated to the River to increase their chances of survival and dispersal. For the future, it is recommended that the area be partially flushed in spring and then refilled, just as in this experiment, as soon as the young perch are large enough (15 mm) to migrate.
- An almost complete flushing in September 1997, after the course of the channel was altered, led to the evacuation of 64,000 young and adult fish (including 31,000 bullhead) that remained after the flood waters receded, compared to 37,000 fish in 1994. During the monitoring exercise, few of the evacuated fish among those tagged downstream from the control structure reached the St Lawrence; they preferred to stay in the shortened evacuation stream, which was deep enough. However, when the time came, they used the route to rejoin the River.

Monitoring Work at the St Eugène Marsh

During the spring floods, there remained only one narrow connection between Lake St Pierre and this natural, 34-ha marsh at Pointe du Lac in the St Lawrence River floodplain. The restoration work carried out involved installing two long pipes equipped with water-level control devices (with sluices) at the eastern and western edges of the marsh. A pipe with a stop log was also installed under the road dividing the marsh into two separate parts.

In June 1996, a partial spring flushing was successfully tested in the eastern sector: 80% of the current year's young (about 500,000 most of them yellow perch) and a large number of adults left through the pipe. Fifteen of the 19 species surveyed reached the St Lawrence this way.

In 1996-1997 and 1997-1998, monitoring of wintering conditions in the marsh and fishing in open water before and after the winter were carried out to more fully document the problem of fish mortality in winter among fish left after the spring flushing. Flooding that allowed fish to move between the marsh and the River in November 1996 (as a result of heavy rains) and April 1998 (major flood) prevented us from evaluating the real mortality rate. However, physical and chemical data show that at the beginning of February, and even more critically in mid-March, toxic gases such as sulphurs, nitrites and ammonia nitrogen are present in very high concentrations while dissolved oxygen is rather rare. This would normally cause significant mortality in fish.

One interesting detail is that despite very restrictive conditions in winter, the brown bullhead survived. During the spring 1998 fishery, three of the 210 bullheads tagged the previous fall were caught again even though only 2% of the water's surface was sampled. Another interesting scientific discovery was the fall spawning of redfin pickerel, in addition to its spring breeding.

The Importance of Habitats

FRHAP projects were carried out in wetlands and floodplain marshes along the St Lawrence River and its tributaries. They took place on priority sites in Lake St Pierre and upstream as far as Lake St Louis. These southern Quebec habitats are recognized for their wildlife productivity potential and biological diversity. The projects carried out by the Fund have contributed to the renewal of biological resources in the St Lawrence. The habitats are closely interconnected and many of the living organisms that frequent the River benefit from the nutrients at these sites, breed there or spend extended periods of time there.

Lake St Pierre

The projects selected were identified in the *Plan de conservation et de mise en valeur des habitats et de la faune du lac Saint-Pierre* [Lake St Pierre habitat and wildlife conservation and enhancement plan] produced by the ministère de l'Environnement et de la Faune du Québec in 1987. Especially since the early 1980s, conservation initiatives have led to the protection and development of more than 20% of wildlife habitats for wildlife purposes. One of the outcomes of the plan and these activities was the recent designation in 1998 of Lake St Pierre as the 36th wetland of international importance in Canada under the Ramsar Convention. This designation applies to 120 km^2 of private and public land. It includes all protected wildlife areas, including those protected by the Fund on the islands and in the surrounding area, but excludes municipal property. Lake St Pierre's ecological value is partly due to the following characteristics:

- it is the largest floodplain in Quebec (14,000 ha);
- it is the habitat of more than 70% of freshwater fish species in Quebec (80 species);
- it is the largest spring staging area in Quebec for geese and ducks;
- it is the source of at least 400,000 days of recreation annually for 60,000 outdoor enthusiasts and results in the injection of close to $8.4 million into the regional economy each year (through commercial and sport fishing, nature study, waterfowl hunting, muskrat trapping and frog catching).

Lake St Louis

A great deal of the work carried out since 1971 has highlighted the value of Lake St Louis in terms of its biological resources and the major interest in maintaining and renewing wildlife in the southern portion of the lake between Beauharnois and Kahnawake.

After a significant deterioration in the quality and quantity of wildlife habitats in and around Lake St Louis, FRHAP partners were urgently required to implement two conservation projects in the St Jean Stream and Hébert and Goyette point wildlife areas. These initiatives led to the consolidation of other protected habitats: the Marguerite D'Youville game sanctuary (on St Bernard Island and the Châteauguay common) and the Îles de la Paix National Wildlife Area.

The purpose of the Hébert and Goyette point and St Jean Stream projects is to conserve two of the largest spawning grounds in Lake St Louis and priority wildlife habitat.

These areas are among the rarest riparian habitats still viable in this highly urbanized sector. Lake St Louis' importance resides in the following characteristics:

- it contains the most diverse fish and plant species in Quebec (77 and 450 species respectively);
- it is a fall and spring staging area for diving and dabbling ducks:
- the economic impact of sport and commercial fishing is $16.9 million annually, produced mainly during 609,000 days of sport fishing that result in a catch of four million fish

Managing Sites in the Future: Pursuing Projects

On land owned by the Fondation de la faune du Québec, management of sites and facilities will be delegated to a local, non-profit public or private organization. This delegation will be carried out pursuant to a memorandum of understanding ensuring respect for conservation objectives and combined with a recreational-educational enhancement plan aimed at making the sites accessible and attractive to the public through the construction of low-impact infrastructures: reception and picnic areas, trails and paths. Enhancement plans, funded by NAWMP partners, have been prepared for the St Barthélemy, Rivière aux Pins and St Jean Stream projects. Others are expected for Lavallière Bay and Hébert and Goyette points in 1998-1999.

Moreover, in order to reinforce the permanent protection of habitats and their uses, steps will be taken to have a number of sites recognized as game sanctuaries. The resulting benefits will be measured as much in terms of the maintenance of natural habitats and the renewal of animal populations as in the contribution to the quality of tourism activities and wildlife use. Over the years, the investments made since the projects were initiated have become increasingly significant in terms of local and regional socio-economic spin-offs. For example, since 1994, the activities carried out in the Marguerite D'Youville game sanctuary, St Jean Stream and at Hébert and Goyette points represent an investment of $2.6 million by all the partners to date. In the short term, this investment will rise to at least $4 million with the addition of the known costs for completing wildlife protection and fish habitat development projects.

The project sites are showcases for the maintenance and development of partnerships and wildlife enhancement. The future of conservation projects will be ensured by the departments concerned through existing wildlife habitat programs. This will require a commitment from local communities, sponsoring organizations and municipalities to finance and ensure their enhancement.

Useful addresses for post-FRHAP inquiries

Environment Canada
Environmental Conservation Directorate
1141 Route de l'Église
St Foy, Qc
G1V 4H5
Tel: (418) 648-7225

Environment Canada
Environmental Protection Directorate
105 McGill Street
Montreal, Qc
H2Y 2E7
Tel: (514) 283-4671

Fisheries and Oceans Canada
Habitats Directorate
Maurice Lamontagne Institute
850 Route de la mer
Mont Joli, Qc
G5H 3Z4
Tel: (418) 775-0584

Le ministère de l'Environnement et de la Faune du Québec (MEF)
Marie Guyart Building
675 René Lévesque Blvd East
11th Floor, Box 92
Quebec City, Qc
G1R 5V7
Tel: (418) 521-3940, ex : 4430

Fondation de la faune du Québec
1175 Lavigerie Avenue, Suite 420
St Foy, Qc
G1V 4P1
Tel: (418) 644-7926