

2nd edition

REINTRODUCTION OF THE STRIPED BASS INTO THE ST. LAWRENCE

Background

The Striped Bass population of the St. Lawrence disappeared around the mid-1960s. In 1996, the province of Quebec officially designated the species as an extirpated population.

The fishers and shoreline residents who witnessed the loss of this resource perceived it as a sign of the river's deterioration, specifically the deterioration of its water quality. The result was that many people gave up fishing and engaging in related recreational activities.

In an analysis of historic data conducted in 2001, overfishing was identified as a key element in the disappearance of Striped Bass in the river. Dredging and maintenance work in the North Traverse (eastern tip of Île d'Orléans) and the deposition of dredged material in the river may have also contributed to reducing favourable



Fishing for Striped Bass in Lévis in the late 1950s

habitats for juvenile Striped Bass and increased the effect of fishing on these age groups.

The analysis also indicated, however, that the causes for the loss of this population could be reversed, prompting the Ministère des Ressources naturelles et de la Faune (MRNF) to

initiate species reintroduction work. The work is being carried out in close collaboration with partners such as the Fédération québécoise de la faune (Quebec Wildlife Federation), the Fondation de la faune du Québec (FFQ) and the Fondation Hydro-Québec







Overview of the Situation

The Striped Bass (Morone saxatilis) is a species typical of North American east coast estuaries and shorelines. Its range extends from the St. Lawrence River in the north to the St. Johns River in northeastern Florida. The Striped Bass population that once inhabited the St. Lawrence was the most northern of the various populations present along the North American east coast. Its distribution is thought to have been limited to a fluvial and estuarine stretch about 300-km long between Sorel and Kamouraska, Quebec.

The Striped Bass is an anadromous fish—that is, it reproduces in fresh water. After hatching, juveniles head downstream to the brackish water of the estuary to feed and grow for a few years before reaching maturity.

Striped Bass were once thought to spawn in the spring in the area of Lake Saint-Pierre, although this hypothesis has never been verified in the field. In summer, the smallest specimens abounded primarily around Île d'Orléans; the larger ones frequented the Rivière-Ouelle and Kamouraska areas.

The presence of an abundant Striped Bass population is therefore a good indicator of the health of a river and its estuary, because many conditions relating to habitat quality and prey abundance must be met.

Stocking

Because Striped Bass disappeared from the St. Lawrence nearly 40 years ago, another indigenous population was needed to form the foundation for their reintroduction. The Miramichi River population was selected mainly for its proximity to the St. Lawrence and its northernness. The first tests were conducted in 1999 to verify the feasibility of the project in terms of transportation and fry rearing.

As such, since 2002, juvenile Striped Bass (young-of-the-year of about 5 cm long) have been caught in the Miramichi River then transported and raised to maturity at the government fish farm in Baldwin Mills in Quebec's Eastern Townships. Using various techniques, spawners reproduce at the fish farm in spring and their young are stocked in the river in the fall of the same year.

Experiments have been conducted at the Baldwin Mills fish farm since 2004 to master the techniques of



Striped Bass: Morone saxatilis (Walbaum)

reproducing and rearing the young Striped Bass. The first Striped Bass produced at Baldwin Mills were released into the river in the larval stage in June 2006.

The objective of the reintroduction program is to stock the river with 50 000 young Striped Bass measuring 8 to 10 cm in length every fall for ten years. It is believed that this should make it possible to rebuild the population. Since 2002, 4470 Striped Bass (4 to 50 cm long and over) and more than four million larvae have been released in the area between Saint-Pierre-les-Becquets and Rivière-Ouelle (Table 1). To date, most of the stocked fish have been surplus fish not needed for breeding that year's young bass.



hoto: I. Robit

Stocking Striped Bass in the St. Lawrence River at Berthier-sur-Mer

Table 1. Number of Striped Bass released into the St. Lawrence River by age group

Age	Number	Size	
Larvae	4275000	2-4 mm	
0+	2 6 2 8	6-13 cm	
1+	731	~ 33 cm	
2+	692	35-41 cm	
3+	262	42-50 cm	
Spawners			
4+	141	~ 53 cm	
6+	16	~ 56 cm	

In the spring of 2007, all Striped Bass larvae were marked with the antibiotic oxytetracycline, which can be distinguished with fluorescent light for several months on the otolith, a small bone in the fish's head. Since 2003, fish measuring 10 cm and longer have been marked with numbered micro-labels identifying the fish's origin, the stocking date and site.

The funds provided by the Fondation Hydro-Québec pour l'environnement and the Fédération québécoise de la faune have led to the recent completion by the MRNF of the section of the Baldwin Mills fish farm where Striped Bass will be bred and reared.

Monitoring the Reintroduction

Biological monitoring is a major element of the St. Lawrence Striped Bass reintroduction project. It is a tool that can be used with Striped Bass stocking strategies to optimize or even identify possible problems in the striper population being reconstructed or in the community into which new bass will be introduced.

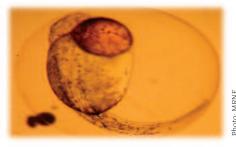
Monitoring is focused on the Striped Bass population itself, and it enables information to be collected on the establishment of stocked stripers (survival, growth, range), assessment of changes in population parameters and the fish's relative abundance. The monitoring is also aimed at obtaining evidence of natural reproduction: eggs, larvae or juveniles caught in the environment that were not placed there by stocking.

The reintroduction of Striped Bass into the St. Lawrence River could lead to changes in the ecosystem, so it is also crucial to monitor the larger fish community, which is already subject to many other pressures.

Although it was anticipated that the official juvenile Striped Bass stocking program would begin very soon, some surplus fish were released in 2002. Although several incidental Striped Bass catches were reported by commercial and sport fishers, commercial eel fishers in the St. Lawrence estuary only began to be surveyed in 2004, in order to collect data on bycatches. In 2007, those fishers accounted for 96% of the commercial eel fishing effort in

the estuary between Portneuf and Matane.

In 2005, the Fédération québécoise de la faune (FQF), in collaboration with the Priority Intervention Zones (ZIP) Program and various hunting and fishing associations, conducted an information and awareness campaign among sport fishers to encourage them to release all incidental catches



Striped Bass larva 48 hours after fertilization



Nine-day-old Striped Bass larva



Juvenile Striped Bass produced at the Baldwin Mills fish farm in fall

Photo: M

of Striped Bass back to the water and to report the catches to provincial authorities.

This information was added to that gathered by MRNF staff and other government or private agencies as part of surveys of fish catches (Table 2). Processing of this information makes it possible to track the establishment of stocked Striped Bass in the St. Lawrence. It also advances understanding of changes in the relative abundance of the new population, its movements and biological characteristics.

Catches reported since 2003 are distributed between the Lake Saint-Pierre area and Rimouski (see map). A sport fisher in the Saguenay River even reported catching a striper at Shipshaw,

Table 2. Confirmed Striped Bass catches, 2003–2007

Year	Commercial fishing network	Sport fishing	Wildlife surveys	Total
2003	_	3	_	3
2004	11	3	1	15
2005	42	1	1	44
2006	108	_	17	125
2007	119	2	7	128

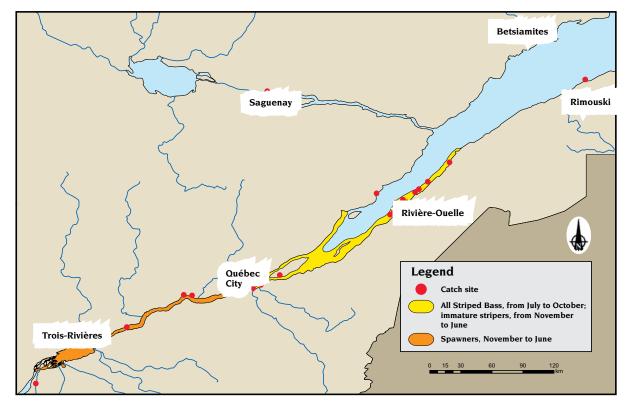
and another sport fisher reported one in the Richelieu River above the Saint-Ours dam. Most Striped Bass have been caught between Quebec City and Saint-André de Kamouraska.

The current distribution of catches corresponds very closely to the

historic distribution of the population (see map). There also seems to be a fall migration of large individuals to the upper estuary upstream of Quebec City, just like in the past.

Wildlife surveys conducted by a private firm in the spring of 2006

Historic and current distribution of Striped Bass based on incidental catches since 2003



recorded the capture of four sexuallymature stripers at Gentilly, presumably once an established spawning ground. Could this be the first sign of natural reproduction of Striped Bass in the St. Lawrence? Perhaps, because in 2006, 77 young-ofthe-year bass were caught in eel fishing gear in the area between Rivière-Ouelle and Kamouraska. In 2007, another 63 young-of-the-year were caught. They are either the result of natural reproduction or grown from the first larvae stocked in 2006 and 2007. The question may be answered in 2008 because, since 2007, all stocked larvae can be identified by a mark that distinguishes them from larvae born by natural means in the St. Lawrence.

Although there has been no detailed analysis of the growth of stripers caught over the last few years. it seems fairly clear that their growth in the river is excellent.

The information collected to date indicates that the survival rate of Striped Bass stocked since 2002 seems to be very high, that they occupy the same range as their predecessors, and that their growth is excellent. It remains to be determined if stripers can reproduce successfully and, if applicable, to monitor the progression of their abundance.

Outlook

Under the Striped Bass reintroduction program, the river will continue to be stocked with 50 000 young stripers (8–10 cm long) every fall for about ten years. It is believed that this should begin the process of rebuilding the population.

Our current information on survival. growth and distribution of several hundred Striped Bass stocked since 2002 demonstrates that habitat quality and the abundance of prey are favourable to the recovery of a Striped Bass population.

A crucial phase remains: to confirm, through the presence of eggs, larvae and juveniles we are sure were not stocked, that natural reproduction is occurring.



Fédération québécoise de la faune poster informing sport fishers that it is mandatory to release all catches of Striped Bass and to report them to authorities.



Eel fishing at Kamouraska





KEY MEASURES

The following four elements have been selected as indicators of the successful recovery of the St. Lawrence Striped Bass population:

- data confirming growth at a pace comparable to the original population's;
- evidence of natural reproduction: eggs, larvae and juveniles we are sure were not stocked:
- recolonization of most of their original range;
- re-establishment of sufficient abundance to permit a sustainable fishery and introduction of a properly managed fishery generating tourism activity in the upper estuary.

To Know More

COSEWIC – Committe on the Status of Endangered Wildlife in Canada. 2005. COSEWIC Assessment and Status Report on the Striped Bass (Morone saxatilis) in Canada. Ottawa. http://www.registrelep.gc.ca/ and ftp://ftp.mrnf.gouv.qc.ca/ Public/DEFH/Sfa/ReferencesSL/>.

DUBOIS, P. 1998. Le bar rayé du Saint-Laurent. Corporation pour la restauration de la pêche à l'île d'Orléans. http://crpio.iquebec.com/>.

ROBITAILLE, J.A. 2001. Biologie et exploitation de la population disparue de bar rayé (Morone saxatilis) du Saint-Laurent. Fondation de la faune du Québec. Société de la faune et de parcs du Québec et Bureau d'écologie appliqué. <ftp://ftp.mrnf.gouv.qc.ca/Public/DEFH/Sfa/ReferencesSL/>.

ROBITAILLE, J.A. 2002. Reintroduction of the Striped Bass: An Important Milestone in Restoring the St. Lawrence River. Fact sheet in the series "Monitoring the State of the St. Lawrence River." Société de la faune et des parcs du Québec, Direction du développement de la faune. http://www.planstlaurent.qc.ca/sl_obs/sesl/publications/fiches_indicateurs/bar_raye_2002_e.pdf.

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State of the St. Lawrence Monitoring Program

Under the current Canada–Québec agreement, the St. Lawrence Plan for a Sustainable Development, six government partners—Environment Canada, the Ministère du Développement durable, de l'Environnement et des Parcs du Québec, Fisheries and Oceans Canada, the Ministère des Ressources naturelles et de la Faune du Québec,

the Canadian Space Agency, and the Parks Canada Agency—together with Stratégies Saint-Laurent, a non-governmental organization that works actively with riverside communities, are pooling their expertise to provide Canadians with information on the state of the St. Lawrence River at regular intervals.

To obtain the fact sheets and additional information about the State of the St. Lawrence Monitoring Program, please visit our Web site at:

www.planstlaurent.qc.ca

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