



WATER

SEDIMENTS

SHORELINES

BIOLOGICAL RESOURCES

USES

INVASIVE PLANT SPECIES OF THE ST. LAWRENCE WETLANDS



Photo: Caroline Savage, Environment Canada

Common Reed

Background

Wetland loss in the St. Lawrence River watershed has been declining steadily since the late 1970s (Jean et al. 2005). However, while the area occupied by wetlands has recently stabilized, these ecosystems continue to be very dynamic and changes in their

native plant composition have been observed. Of growing concern is the presence of invasive plant species, which often take advantage of disturbances to soils and vegetation in wetlands to become established and spread. Such pressures on wetlands can be amplified if combined with fluctuations (natural or induced) in

environmental conditions, such as water-level variations. The synergy among these variables creates conditions that favour the establishment of opportunistic plant species.

Some 50 exotic plant species have been surveyed along the St. Lawrence River (de Lafontaine and Costan 2002), including some that may be considered invasive. The purpose of this monitoring project is to describe the distribution and abundance of species considered invasive in St. Lawrence wetlands. In 2007, eight species were the subject of specific monitoring efforts (see photos opposite).



Eurasian Watermilfoil



Water Chestnut



Purple Loosestrife



Reed Canary Grass



European Frog-bit



Flowering Rush



Common Reed



Japanese Knotweed

Native plant species: A species that grows spontaneously in a country (i.e. without being cultivated and without human intervention).

Exotic plant species: A species introduced as a result of human activity to an area other than its past or present natural range.

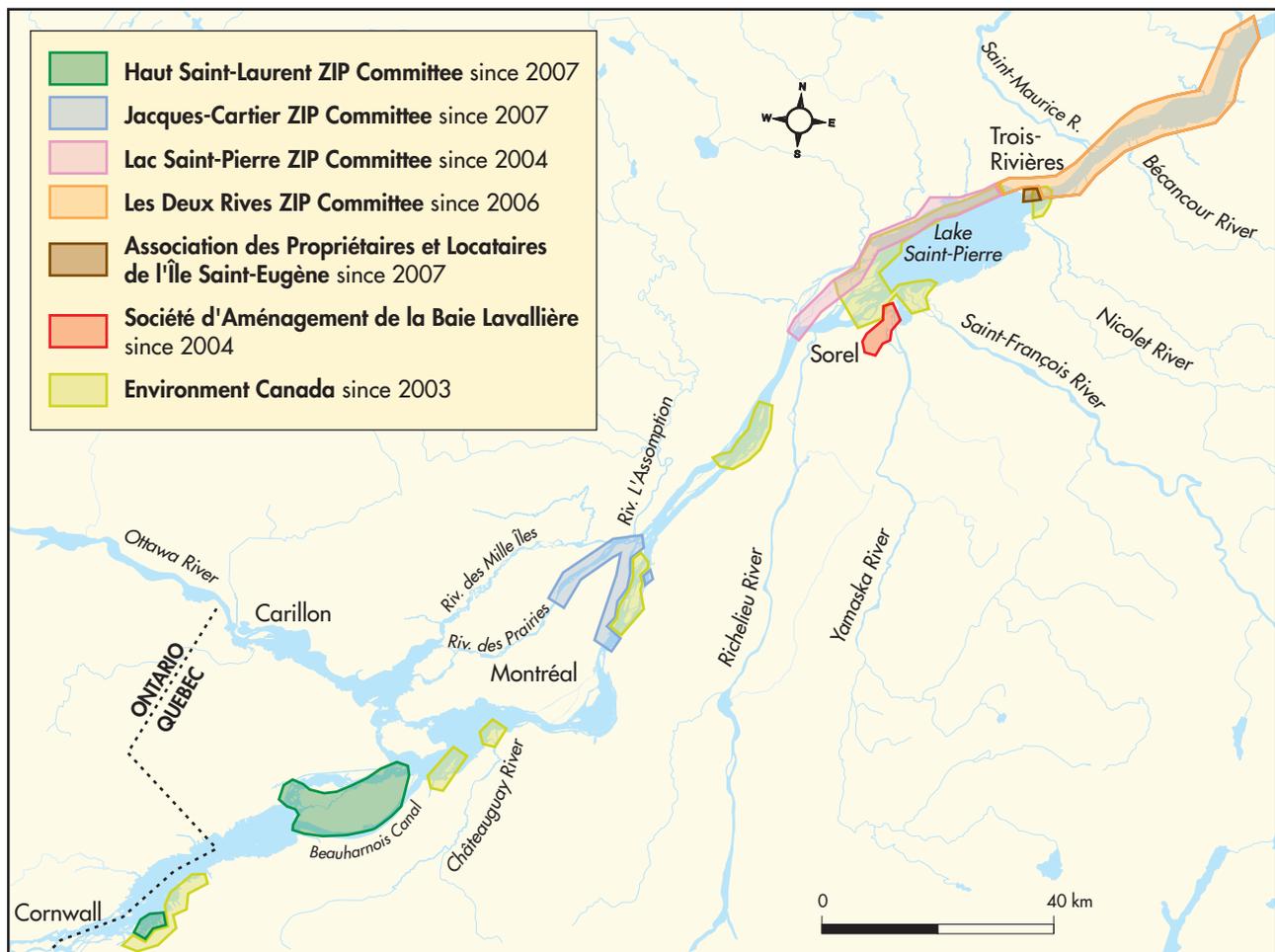
Invasive plant species: A species whose introduction or spread threatens the environment, the economy or society, including human health.

Overview of the Situation

Following the implementation of a feasibility study (Savage and Jean 2004), an invasive plant monitoring project was developed in collaboration with the Lac Saint-Pierre ZIP Committee and the Société d'Aménagement de la Baie Lavallière (SABL). In 2006, the Les Deux Rives ZIP Committee joined the project, followed in 2007 by the Haut Saint-Laurent ZIP Committee, the Jacques-Cartier ZIP Committee, and the Association des Propriétaires et Locataires de l'Île Saint-Eugène in the region of Trois-Rivières (Figure 1).

Since 2004, a data collection method has been tested and modified in close collaboration with the community groups. Non-governmental organizations (NGOs) gather information on wetland types, dominant plant species, cover, diversity of plant strata, disturbances of the environment and, of course, the presence of invasive plant species and their representativeness in the area sampled. Geographic coordinates are used to represent the sites on maps, and digital photographs are used to illustrate the area sampled and to validate the data collected.

Figure 1. Growth of community group involvement in invasive plant monitoring efforts in St. Lawrence wetlands



State of Invasion of St. Lawrence Wetlands

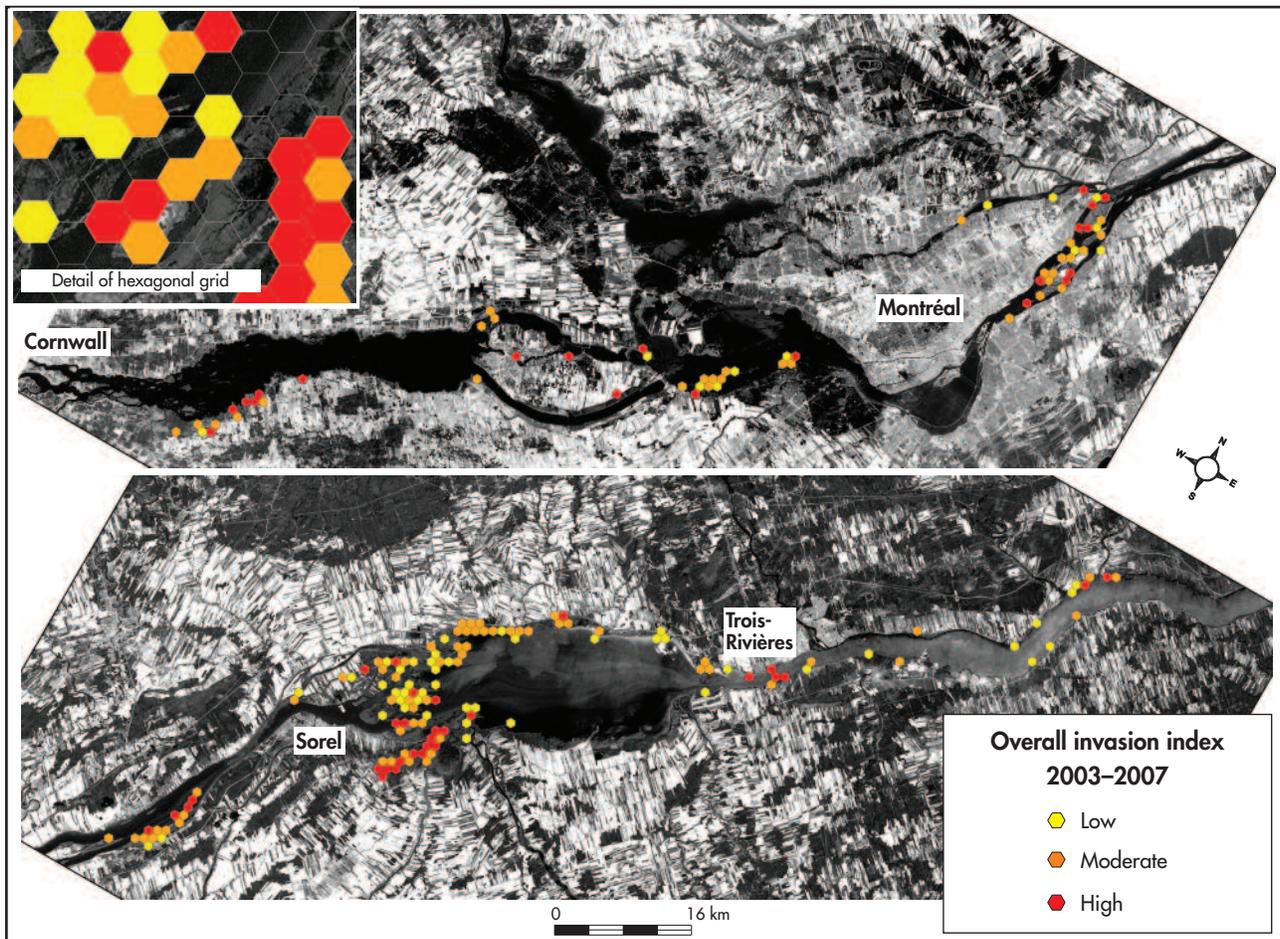
With regard to sites sampled by the community groups, 11 sites were sampled at Lake Saint-Pierre in 2004, 80 in 2005, 68 in 2006 and 83 in 2007. For the fluvial estuary, 16 sites were sampled in 2006, and 18 sites in 2007. The other sections of the river were not covered until 2007 and comprise fewer sites—12 for Lake Saint-François and the Beauharnois Canal (three and nine, respectively) and 13 for the Montréal region. In total, 301 sites were sampled over the four-year period.

In order to provide an overview of invasive plant species in St. Lawrence wetlands, data from various plant surveys carried out by Environment Canada between 2003 and 2005 (40 sites in 2003, 24 sites in 2004 and 160 sites in 2005) were added to the data collected by the NGOs between 2004 and 2007. For each site, an estimate of the presence and abundance of invasive plant species was used to calculate an overall invasion index (see Key Measures). The study area was divided using a 1-km-wide hexagonal grid. Using the grid, the

average of the points for all years within each hexagon was calculated. The rates of invasion were categorized to visualize the areas in which invasion is low (yellow), moderate (orange) and high (red) (Figure 2).

Thus, we determined which areas had the highest rates of invasion. At Lake Saint-François, several Common Reed communities were found, primarily in managed wetlands. In densely populated areas such as Salaberry-de-Valleyfield and Montréal, where wetlands are more hemmed in and

Figure 2. Map of overall invasion of St. Lawrence wetlands



therefore more vulnerable to pressure, there are several zones that are highly invaded by Reed Canary Grass, Flowering Rush and Purple Loosestrife. The Baie de Lavallière on the south shore of Lake Saint-Pierre is a managed marshland in which several monospecific communities of Common Reed occur. Further downstream, the sector around the Laviolette Bridge in Trois-Rivières appears subject to the combined effect of a few invasive plant species.

Status of Invasive Plant Species

Overall, we find essentially the same distribution of invasive species, regardless of the section of river or sampling

year. The results from 2005 to 2007 collected by the community groups are presented here. For each invasive plant species, we also calculated an invasion index, which represents the space occupied by the species within the study area (Figure 3).

Purple Loosestrife is the species most frequently observed, but almost always at low rates of cover. It occurs over small areas and is often found as isolated plants or in small patches. With respect to its geographic range, it is more abundant in certain sectors of the fluvial section such as the Îles de



Contrecoeur National Wildlife Area, where several highly dense communities occur, and in Lake Saint-Pierre, where it seems to be abundant, particularly on the north shore. It is also present in the wetlands of the fluvial estuary.

Reed Canary Grass is the second most common invasive plant species. It is therefore relatively widespread and, in contrast to Purple Loosestrife, poses a serious concern given its high invasion rate at a large proportion of sites. It appears to be particularly abundant in Lake Saint-Pierre, where it



Figure 3. Distribution of the abundance of invasive plant species from 2005 to 2007 sites based on their invasion index

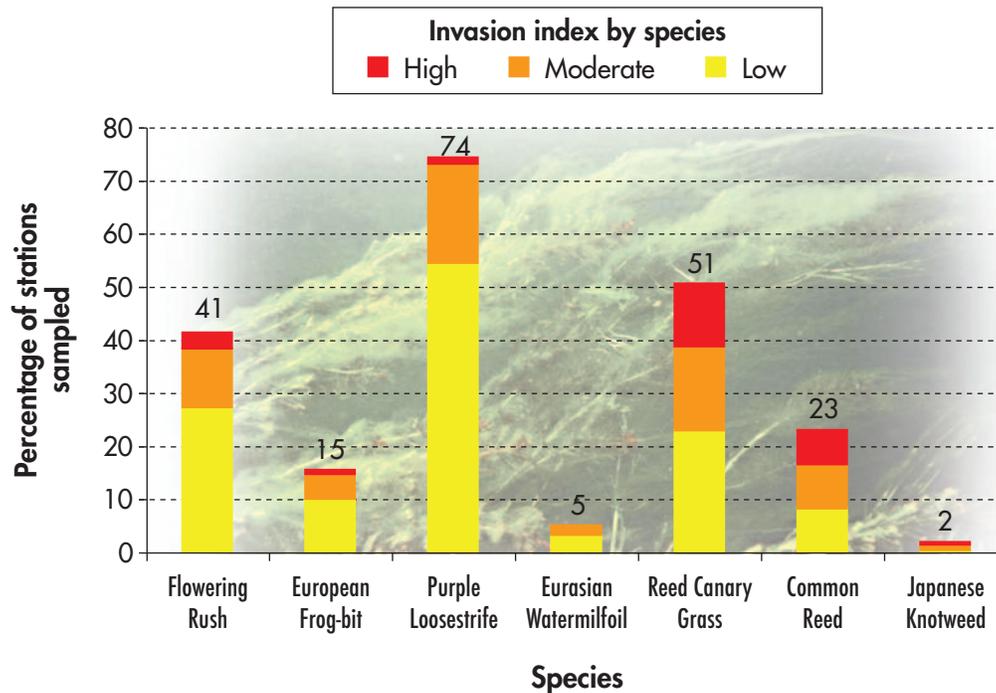


Photo: Richard Carignan, Université de Montréal

forms large monospecific communities on the islands, along the edge of the Baie de Lavallière and on the north shore. Several high marshes in these sectors have been or are currently being used for agriculture, providing favourable conditions for the species, which is highly opportunistic in open and disturbed areas. Its use as a forage plant also contributes to its spread.

Flowering Rush is typically found at low or moderate rates of invasion.



The species is distributed throughout the section of river under study, at varying rates of invasion, primarily in low marshes. It is found at high invasion rates in several sectors, such as the Baie de Lavallière and the north shore of Lake Saint-Pierre.

Common Reed is a gregarious species that forms monospecific communities almost exclusively, as reflected by sampling of the areas



invaded by the species. In 2005, 80% of sites where the species was present were highly invaded, primarily in the Baie de Lavallière, whereas in 2006 and 2007, sites where the species was reported extended throughout the fluvial section of the river, often at lower rates of abundance. A Common Reed control project undertaken in 2006 in the Baie de Lavallière also helped

reduce populations at some locations. It is found at high invasion rates in certain areas of the fluvial section, in large colonies in Lake Saint-François, in the Îles de la Paix National Wildlife Area (Lake Saint-Louis), on the Boucherville islands, the Îles de Contrecoeur National Wildlife Area, at several isolated sites on the Sorel islands, and in the Baie de Lavallière. It may not be possible to stabilize the spread of this species, because many potential invasion sites are present along the river. Common Reed is therefore a species of great concern.

European Frog-bit occurs at several sites at varying rates of invasion around Lake Saint-Pierre, where it is abundant in canals, ditches and ponds.



It has also been observed in the sub-canopy of treed and shrub swamps. It is known to occur elsewhere along the St. Lawrence, particularly at Lake Saint-François.

Eurasian Watermilfoil has been reported in several areas of Lake Saint-Pierre and in the fluvial estuary, but is not highly invasive.



Nonetheless, caution must be exercised in the interpretation of these results, since few sites were sampled in shallow waters due to their lesser accessibility.

Japanese Knotweed was added to the list of species to watch in 2007.



Since then, the number of reports of the species along the St. Lawrence River continues to rise. After only one year of monitoring, it has been observed at at least three sites along the fluvial section: Salaberry-de-Valleyfield, Saint-Eugène Island, and the fluvial estuary in the area of Sainte-Anne-de-la-Pérade. Although the species is known to be highly invasive, it has occurred at a moderate rate of invasion to date.

Water Chestnut is another species to watch. In 2004, Water Chestnut plants were found near Lake Saint-Louis in ditches



in the Château-guay region. The eradication and monitoring of this species have been carried out by the Ministère des Ressources naturelles et de la Faune du Québec. In 2004, 428 Water Chestnut plants were uprooted and, in 2007, only one remained. The community groups found no other Water Chestnut colonies elsewhere along the St. Lawrence in 2007. However, a large, well-established colony was discovered in 2007 in Voyageur Provincial Park (Chute-à-Blondeau, Ontario) along the Ottawa River.

Outlook

The freshwater invasive plant species monitoring network is still in the development stage. It is based on an evolving approach that involves working with shoreline communities. The results to date show a situation similar to that reported by Lavoie et al. (2003). However, the problem of invasive plant species in Lake Saint-Pierre appears to be more serious than previously believed. Common Reed is of particular concern in the sector. The presence of Water Chestnut near Lake Saint-Louis and in the Ottawa River is also a concern, as is Japanese Knotweed along the St. Lawrence. Special efforts will be made within the framework of the project, in cooperation with the communities, to increase the monitoring of these two species with a view to assessing their status.

Improvements designed to increase the effectiveness of the invasive plant species monitoring work are planned with the communities. One such improvement consists of using the hexagonal grid presented in this document to more effectively distribute field efforts, identify areas where information is missing and provide a more accurate overall snapshot of the situation. Another improvement consists of increasing the number of partners so as to cover all of the St. Lawrence system between Cornwall, Ontario and Quebec City, including the Lake of Two Mountains. The addition of this lake is important, given the recent reports of Water Chestnut plants in the Ottawa River.

Increased collaboration between the various stakeholders involved in the issue of invasive plant species is needed in order to better address the

four major priorities of the Invasive Alien Species Strategy for Canada (prevention, early detection, rapid response and management). Specifically, the implementation of impact studies on current and future invasive plant species is essential to optimize monitoring and action efforts.

The engagement of community groups in monitoring invasive plant species since 2004 has generated considerable enthusiasm. They have always participated in a spirit of cooperation and with a high level of interest. This monitoring activity, which was developed in order to strengthen the capacities of the community groups, suggests that the issue of invasive plant species can be more community-driven, specifically through the implementation of an early warning network.



Photo: Claude Lessard, Environment Canada



Photo: Caroline Savage,
Environment Canada

KEY MEASURES

Overall Invasion Index

The three categories of invasion—low, moderate and high—represent the space occupied by invasive plants at the sampling site. To calculate the overall invasion index, the sum of the median cover classes of each invasive plant present at each site is first obtained and the average value of the plots within a given hexagon is then calculated.

Invasion Index by Species

The three categories of invasion—low, moderate and high—represent the space occupied by each invasive plant species at the site sampled by its area, coverage and frequency in the environment.

Photo: Caroline Savage, Environment Canada



To Know More

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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

Published by Authority of the Minister of the Environment
© Her Majesty the Queen in Right of Canada, 2008
Published by Authority of the Ministre du Développement durable,
de l'Environnement et des Parcs du Québec
© Gouvernement du Québec, 2008
Catalogue No.: En154-55/2008E-PDF
ISBN 978-1-100-10541-3
Legal deposit – National Library of Canada, 2008

Aussi disponible en français sous le titre: *Espèces végétales envahissantes des milieux humides du Saint-Laurent*