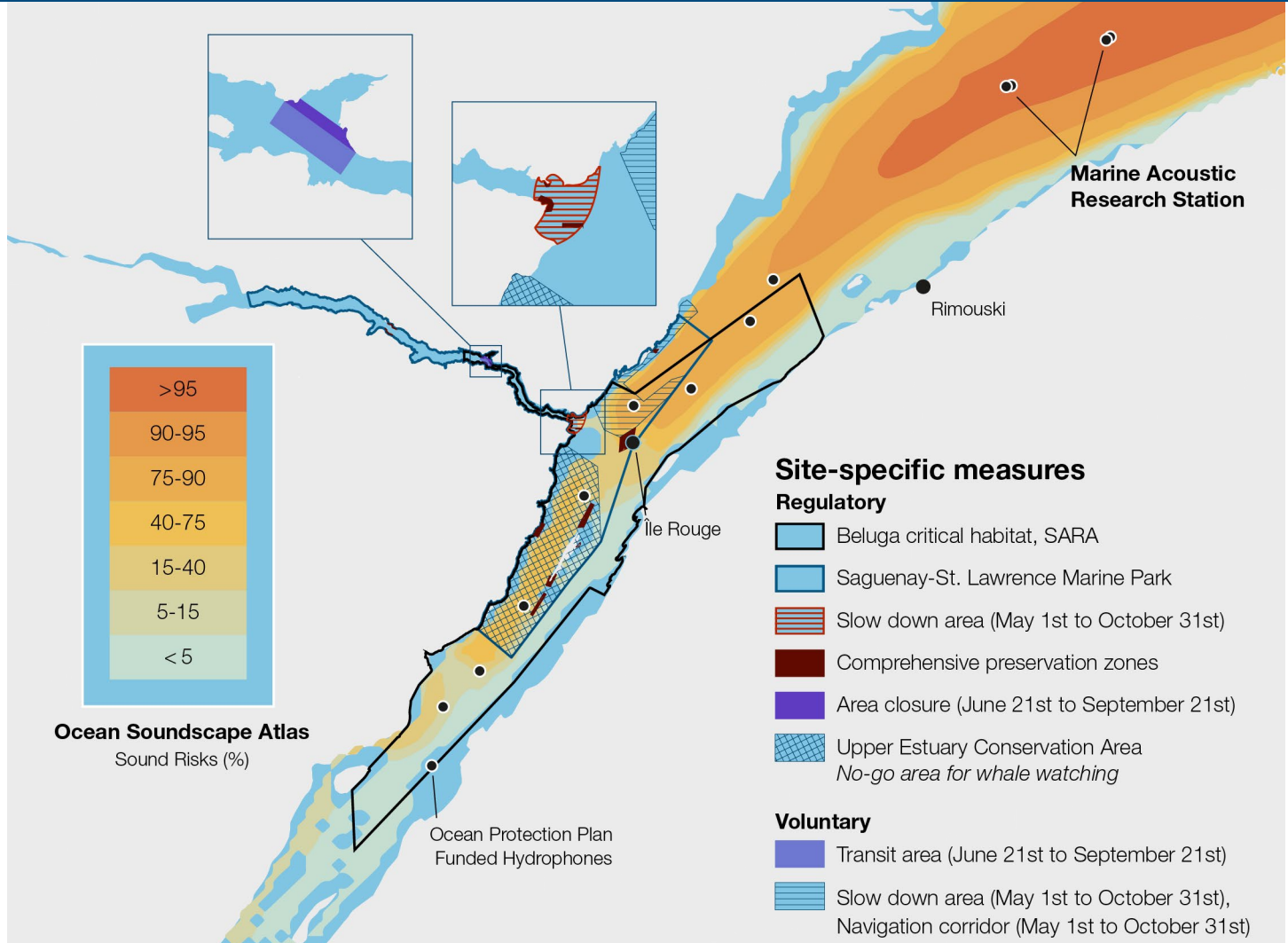


Protecting the St. Lawrence Estuary beluga and other whales from underwater noise



Research and management measures to support the protection of marine mammals in the St. Lawrence Estuary.

The St. Lawrence River is one of North America's longest, spanning about 1,200 km from Lake Ontario to the Gulf of St. Lawrence, where it meets the Atlantic Ocean.¹ Along a 400 km stretch from Quebec City to the Gulf, the river becomes increasingly salty, forming an estuary. The St. Lawrence Estuary is a distinct and dynamic ecosystem known for the diversity of its marine mammals. Migratory populations of humpback, minke, blue, and fin whales, among others, use this region as a summer feeding area.¹

This stretch of the river is also home to its best-known residents, the St. Lawrence Estuary beluga. These whales spend their entire lives in and around the estuary and the Gulf of St. Lawrence. Unfortunately, human activities,

particularly those generating underwater ocean noise (hereafter "ocean noise"), have put intense pressure on these and other whales.²

Beluga and other marine wildlife inhabit the St. Lawrence Estuary alongside thousands of vessels transporting goods and people to and from major Canadian ports. Cargo ships, container vessels, bulk carriers, oil tankers, pleasure craft, whale-watching vessels, and cruise ships all generate noise in the area, as do multiple ferry services that traverse the estuary daily.³ These activities, when combined with noise from coastal and marine construction projects, can create significant ecosystem disturbance, posing a threat to many marine species.⁴

SAGUENAY-ST. LAWRENCE MARINE PARK

The [Saguenay–St. Lawrence Marine Park](#) was established in 1998 and is jointly managed by Parks Canada and the Government of Quebec. It was created to protect marine wildlife, especially the estuary beluga population. Among other features, the park provides essential habitat for migratory whales to feed and for beluga to give birth and care for their newborn calves. For instance, to ensure the safety and well-being of female beluga whales and their young, all types of vessels, including canoes and kayaks, are not allowed in Baie Sainte-Marguerite from June 21 to September 21 annually. Fortunately, the majority of individuals follow this rule closely.

A [number of other measures](#) have been put in place to help reduce collision risk, minimize disturbance, and improve the acoustic environment of the Marine Park for the benefit of the beluga and other whale populations, including:

- Navigation activities, including whale-watching, are [regulated](#) and include the following measures:
 - Vessels must remain at least 400 m away from endangered or threatened marine mammals;
 - Commercial navigation activities, with the exception of shipping, are managed by a permit system; and
 - Approach distances, speeds and activities are prescribed in the regulation.
- Seismic surveying for oil exploration is prohibited.

Collaboration in research has been crucial for protecting and conserving beluga and other cetaceans in the park. In 2018, Fisheries and Oceans Canada and Parks Canada worked with the principal operators in the area — research vessels, whale-watching boats, and ferries — for an acoustic signature project, measuring vessel noise at various speeds. In 2019, a study assessed the effect of slower ship speeds on Baie Sainte-Marguerite's soundscape. Since 2022, Parks Canada established two acoustic recording stations for ongoing monitoring and to establish baseline data for potential further measures in reducing ocean noise.



Beluga. Credit: Yvette Barnett.

With participation from multiple departments and agencies, the Government of Canada is collaborating with Indigenous peoples, the Government of Quebec, shipping partners, universities, and environmental organizations to implement management measures and utilize technology advancements to help prevent or mitigate the impacts of ocean noise. While many initiatives focus on belugas, others seek to understand how ocean noise associated with vessel traffic impacts all species of marine life.

The [Groupe de travail sur le transport maritime et la protection des mammifères marins \(G2T3M\)](#) working group includes representatives from provincial and federal governments, shipping industry, environmental organizations, and universities. Co-chaired by the Parks Canada and Fisheries and Oceans Canada (DFO), the group aims to reduce collision risks, shipping disturbances, and ocean noise impacts on all whale species. The working group collaborated with the Canadian Coast Guard to develop a [Notice to Mariners](#) (NOTMAR), a publication providing safety information and procedures for vessels navigating Canadian waters. In the St. Lawrence Estuary, working group recommendations are incorporated into the NOTMAR as voluntary protection measures, with the aim of reducing collision risks and minimizing the impact of noise. Recent data on adherence to voluntary speed reductions at the head of the Laurentian Channel and vessel routing north of Île Rouge, designed to protect crucial beluga habitat, demonstrate strong support and participation from the shipping industry.

Underwater sound-detecting microphones, called hydrophones, play a vital role in understanding the underwater acoustic environment. The [Marine Acoustic Research Station](#) initiative, for example, has four hydrophone

arrays positioned in a busy shipping area off the coast of Rimouski. The Institut des sciences de la mer de Rimouski (ISMER) and Innovation Maritime (IMAR) use the hydrophones in this listening station to measure the noise generated by different vessel types under various operating conditions. This research is done to better understand the effectiveness of technological innovations and operational practices in reducing underwater vessel noise. Under the [Oceans Protection Plan](#), 10 fixed hydrophone stations, a drifting acoustic recording buoy, aerial surveys, and acoustic tags placed on belugas were used over five years to map marine acoustic quality and reactions to noise.

Other advances in technology, including acoustic modelling and computer simulations, offer insights into the locations of marine mammals and ocean noise in the estuary. [One such project](#) (available in French only) used a simulator to estimate beluga and other whale movements, as well as boat traffic and its associated noise in the estuary and the Saguenay Fjord. The [Ocean Soundscape Atlas](#) features a user-friendly interface showing vessel and environmental noise levels throughout the year. These and other projects yield vital data for implementing targeted mitigation measures like zoning or speed reduction areas for boat traffic, benefiting all marine animals in this bustling estuary.

In addition to the impacts of ocean noise, the St. Lawrence Estuary beluga and other whales in the St. Lawrence face threats posed by contaminants, vessel traffic and ship strikes, as well as the general industrialization of the St. Lawrence watershed, which has degraded their habitat. Listed as endangered under the *Species at Risk Act* (SARA), DFO developed a [recovery strategy](#) for the St. Lawrence Estuary Beluga. This recovery strategy establishes objectives for beluga population and distribution and also identifies critical habitat to support the survival and recovery of this beluga population. To address the threat of ocean noise DFO, completed an [action plan](#) under SARA to mitigate noise impact on the beluga and other at-risk marine mammals in the estuary. This action plan includes 32 measures aimed at identifying and understanding sources of ocean noise, evaluating and implementing noise-reduction strategies, and increasing awareness among users of the Saguenay and St. Lawrence waterways.

While the challenges confronting the beluga whales are substantial, especially given their small population and high exposure to vessel noise, there is hope for their recovery. However, effectively managing and mitigating the threats from ocean noise will require the collective efforts of governments, stakeholders, and marine users, with the support of all Canadians. Meanwhile, ocean noise will persist as a focus of study for numerous scientists and remain a top priority for the Government of Canada and the G2T3M working group.

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St. Lawrence Estuary Beluga (*Delphinapterus leucas*). Credit: Fisheries and Oceans Canada.

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