

Photo credit: Erica Stuart

2023

# ANNUAL REPORT

| Musquash Estuary  
| Marine Protected Area



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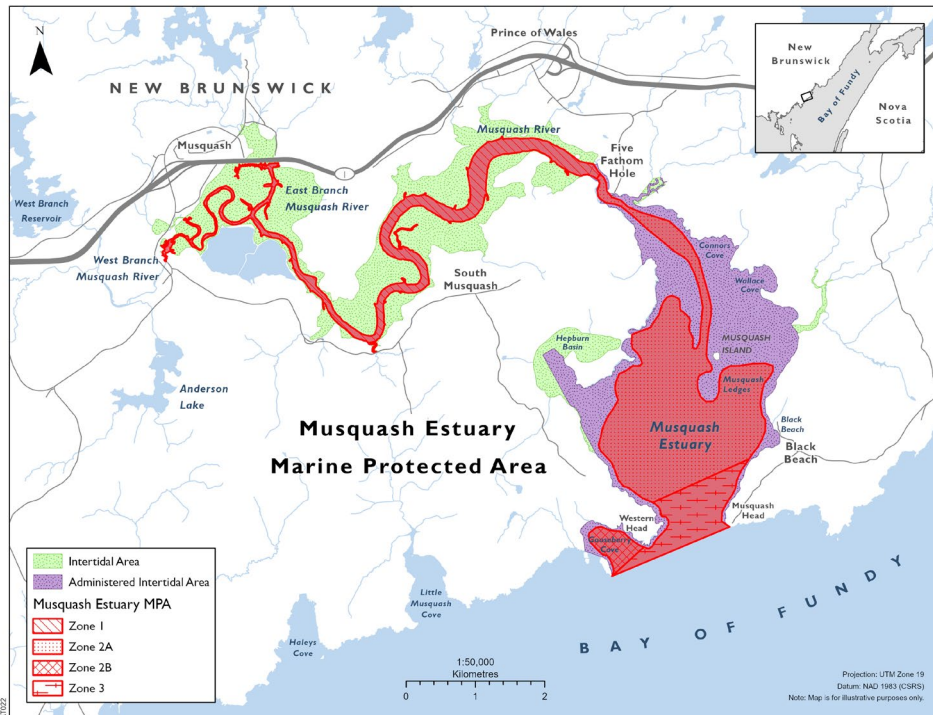
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## At-a-glance

### Date of designation:

2006

### Size:

7.4 km<sup>2</sup>

### Contribution towards the marine conservation targets:

< 0.01%

### Location:

This MPA is located in Southwest New Brunswick (NB), within the Bay of Fundy Bioregion; Atlantic Ocean.

### Managed by:

Fisheries and Oceans Canada (DFO)

### Acknowledgement:

Musquash Estuary is located within Wabanakik, the unceded homelands of the Mi'kmaq, Wolastoqey, and Peskotomuhkati peoples.

### Zones:

There are several management zones, including:

- Zone 1 - The Upper estuary, which includes the lower reach of Musquash River surrounded by saltmarsh
- Zone 2a - Middle to lower estuary, where fresh and saltwater mix
- Zone 2b - Gooseberry Cove
- Zone 3 - Lower estuary, which is bordered by cliffs and opens to the Bay of Fundy



## Key highlights

This small coastal MPA saw some big visitors with 20 different White Sharks detected during the summer of 2023 on an acoustic telemetry array in partnership with the Ocean Tracking Network. White Sharks are seasonal visitors that arrive in the warm summer months to search for food like harbour and grey seals, which are monitored in the MPA by the Atlantic Coastal Action Program (ACAP) Saint John . A number of harbour porpoise were detected in the upper estuary during a pilot study by partners Eastern Charlotte Waterways using a passive acoustic monitoring device that records porpoise vocalizations. Harbour porpoise are currently being considered for a *Species at Risk Act* (SARA) listing.

In 2023, the [research document](#) from the 2021 Canadian Science Advisory Secretariat (CSAS) was published. It includes recommendations for improving efforts to monitor the MPA.

In 2023, we also saw further protection of adjacent lands including vital saltmarsh and floodplain forest habitats by the Province of New Brunswick through their Nature Legacy initiative.



Photo credit Amelia Matthews





## In the spotlight: benefits

### Ecological

Estuaries are considered one of the Earth's most productive ecosystems, hosting several habitat types that support a diverse range of fish and wildlife. They are often surrounded by low-lying coastal grasslands, called salt marshes, which are frequently covered by the tide. Over 85% of the salt marshes in Bay of Fundy (BoF) have been altered or encroached upon by human settlement. Musquash Estuary represents the largest ecologically intact estuary in the BoF and is home to an abundance of species. This MPA contains habitat types, such as:

- mud and sand flats
- rocky intertidal
- salt marsh
- seagrass beds
- shallow waters
- tidal pools

### Socio-cultural

The saltmarsh in Musquash Estuary is a well-known sweetgrass harvesting area for Wolastoqwiik who have frequented this area since time immemorial. Sweetgrass (known as welimahask in the Wolastoqey language) is a plant that grows in the upper edges of saltmarshes and is a sacred medicine for many Indigenous Peoples, including the Wolastoqey. The Musquash Estuary remains a site of great cultural significance and is frequented often by those who have inherited the responsibility of caring for it and all of its relations, including the cherished sweetgrass beds.

The MPA is located 20 km southwest of Saint John, NB and its proximity to the city makes it one of the more popular natural spaces for residents & visitors to escape the city for recreation or relaxation. The MPA has a number of public access points for visitors to experience its unique and beautiful ecosystem. A network of trails on lands owned by Nature Conservancy Canada and stewarded by a community of local volunteers provide ample opportunity for responsible recreation. The trails are dotted with informative panels about the habitats and species that make Musquash Estuary so special and an important site for conservation.

### Economic

This MPA is nestled in between small coastal communities that rely on the ocean for their livelihoods. Musquash benefits from local stewards and members of the general public that care for the MPA and its surrounding habitats.

A small craft harbour is located at Five Fathom Hole inside Zone 2A of the MPA, where a number of lobster and scallop fishing vessels are moored. There is an active commercial lobster fishery in Zones 2 and 3 of the MPA, with traps set in both Spring and Fall fisheries. The scallop fishery takes place during the Winter in Zone 3.

In addition to commercial fisheries, some hunting occurs throughout the marshes and woodlands surrounding the Musquash Estuary. Deer, moose, grouse, duck, and snowshoe hare are hunted in the Fall.



Photo credit: Erica Stuart



Photo credit: Eastern Charlotte Waterways



## Education and outreach

In February 2023 at [IMPAC5](#), the Musquash Estuary MPA was featured in a presentation on the complexity of managing coastal MPAs. The focus was on small coastal sites which may seem simple due to their size and accessibility, but are in fact challenging to manage for the same reasons. This presentation was a chance for this small coastal MPA, and those who manage it, to join the conversation amongst the rest of the world's MPAs on the international stage.

The annual 2023 Festival of Nature, organized by Nature NB, was held in Saint John, NB and overlapped with World Oceans Day. A giant ocean floor map was displayed at the event headquarters. One of the events included a guided hike around the MPA on one of the many trails built and maintained by the Nature Conservancy of Canada.

In 2023, the NB chapter of the Canadian Parks and Wilderness Society (CPAWS) conducted a series of marine conservation learning sessions across the province. Open to the public, the information sessions were about the various existing protected areas, including the Musquash Estuary MPA. Participants learned about the different tools available for protection, and how to get involved in advocating and caring for these important areas.



## Research and monitoring

In 2023, a review of the Musquash Estuary MPA monitoring program recommended improvements to both the current monitoring plan and the suite of monitoring programs. DFO Science and the Ocean Tracking Network continued to support an acoustic telemetry project, which involves the deployment and retrieval of acoustic receivers in the MPA to monitor acoustically tagged fish. In 2023, a variety of marine species were detected including White Sharks and American Eels. DFO scientists also completed the second year of environmental DNA (eDNA) sampling. This year was more successful in yielding high quality samples. Several other DFO Science programs also continued in 2023, for example:

- benthic infaunal monitoring
- oceanographic modelling for oil spill risks
- rocky and sandy intertidal sampling

In addition, another DFO Science project looked at impacts of marine-based aquaculture, and the MPA was used as a reference site because there are no aquaculture sites in its vicinity. This project is using acoustic telemetry, hydroacoustics, and drones to evaluate how marine-based aquaculture affects pelagic fish species and marine mammals, and their behaviour.

A new project in 2023 began when DFO Scientists deployed a number of collector plates in the MPA to monitor for aquatic invasive species.



Photo credit: Eastern Charlotte Waterways

A new contribution agreement was signed with ACAP Saint John for a new monitoring project in the MPA. This is a continuation of work that began in 2018 with a much larger study area, and project members are monitoring seal populations and gathering information about their diets.

Eastern Charlotte Waterways, a local NGO, continued their baseline nekton (fish and invertebrate), water quality and sediment hydrocarbon monitoring as well. An existing contribution agreement with Eastern Charlotte Waterways was amended to include a pilot project to determine the feasibility of using hydrophones to monitor Harbour Porpoise in the MPA. A hydrophone that was deployed in Zone 2A detected Harbour Porpoise vocalizations and presence for 15 out of the total 20 days that it was in the MPA.



Photo credit: Aiden Isbill



## Collaborations and partnerships

The Musquash Estuary MPA is privileged to have an active network of partners as part of its Advisory Committee and beyond. These partnerships have been paramount to the successes of this MPA since its designation in 2006 until present day. In 2023, the committee welcomed a number of new partners, including:

- CPAWS NB
- ACAP Saint John
- Dr. Myriam Barbeau's Lab at the University of NB

Researchers at the University of NB and Mount Allison University work with Ducks Unlimited to monitor and research active saltmarsh restoration sites alongside the MPA, which also benefit the research community in the Musquash Estuary. Although the MPA boundaries end at the low water mark, the species that inhabit the area move freely to and from these restored saltmarshes and benefit greatly from the improvements to habitat connectivity.

The province of NB protected another 3,600 hectares of important habitat including parcels alongside the MPA through the Nature Legacy Initiative. These newly protected areas were nominated by conservation partners including First Nations and ENGOS, and local residents, and will serve to increase the already impressive mosaic of protected lands and waters in the Musquash Estuary.

Partners often work collaboratively to monitor the MPA. For example, when ACAP Saint John was without a vessel for their seal monitoring work in the fall, Eastern Charlotte Waterways provided a vessel and boat operator so that the monitoring could be completed.



## Surveillance and enforcement

The Musquash Estuary MPA has a high rate of compliance with MPA regulations. In 2023, no violations nor occurrences were recorded.





Photo credit: Erica Stuart

As a coastal site with many public access points, the likelihood that actions will not go unnoticed likely serves as a deterrent for potential would-be offenders. Despite an increased level of activity in the area due to the elver fishery, fisheries-related violations in the MPA are rare. Commercial fishing activity within the MPA is limited to a number of vessels and operators from nearby communities.

Reports of all-terrain vehicles (ATVs) using unsanctioned watercourse crossings adjacent to the MPA have been received. This nearby activity could negatively impact the MPA through downstream effects of erosion, excess sedimentation, and pollution, as well as directly impacting sensitive diadromous fish species that may be using these watercourses to feed or spawn.

In 2023, Conservation & Protection developed an enforcement plan for this MPA, which includes a set number of land-based and vessel patrols. The Quispamsis detachment conducts most of the patrols. Vehicle patrols occur a few times a week and vessel patrols are conducted when weather permits. Offshore fishery officers completed 10 hours of aerial patrols and the local Quispamsis office completed 66 hours of patrols. Additional aerial patrols, via fixed and rotary wing aircrafts,

were conducted over the MPA. For example, a Canadian Coast Guard helicopter patrol gave officers a chance to view the MPA from a different vantage point. No issues were noted, and photographs were taken as a reference and baseline for future enforcement activities.



## Management and governance

DFO manages the MPA in collaboration with the Musquash Estuary MPA Advisory Committee. The Advisory Committee members represent groups with an interest in the MPA, such as:

- community groups
- First Nations
- government
- industry
- non-government organizations

The Musquash Estuary MPA management plan that was published in 2017 continues to guide ongoing management of the MPA. In 2023, 6 new activity plans for the MPA were approved, and several multi-year approvals from past years remained active as well. The Advisory Committee provides valuable feedback on these activity plans approval processes.

In April 2023, an Advisory Committee meeting was held where representatives from NB's Department of Natural Resources and Energy Development presented on the new protected areas surrounding the MPA. An overview of the Nature Legacy initiative was presented and used to nominate and select the sites to be protected.

Another event in 2023 included a mock environmental response exercise. The Atlantic Environmental Response Team arrived in the MPA and simulated the containment and remediation of a potential industrial pollution event.

Lastly, there were also preliminary engagements with partners and stakeholders on the newly released departmental guidance for the MPA Protection Standard regarding the evaluation of mobile bottom gear use.

## Looking to the year ahead

Continued efforts to engage with industry and First Nations on the MPA Protection Standard will occur in 2024 and 2 Advisory Committee meetings are planned to be held.

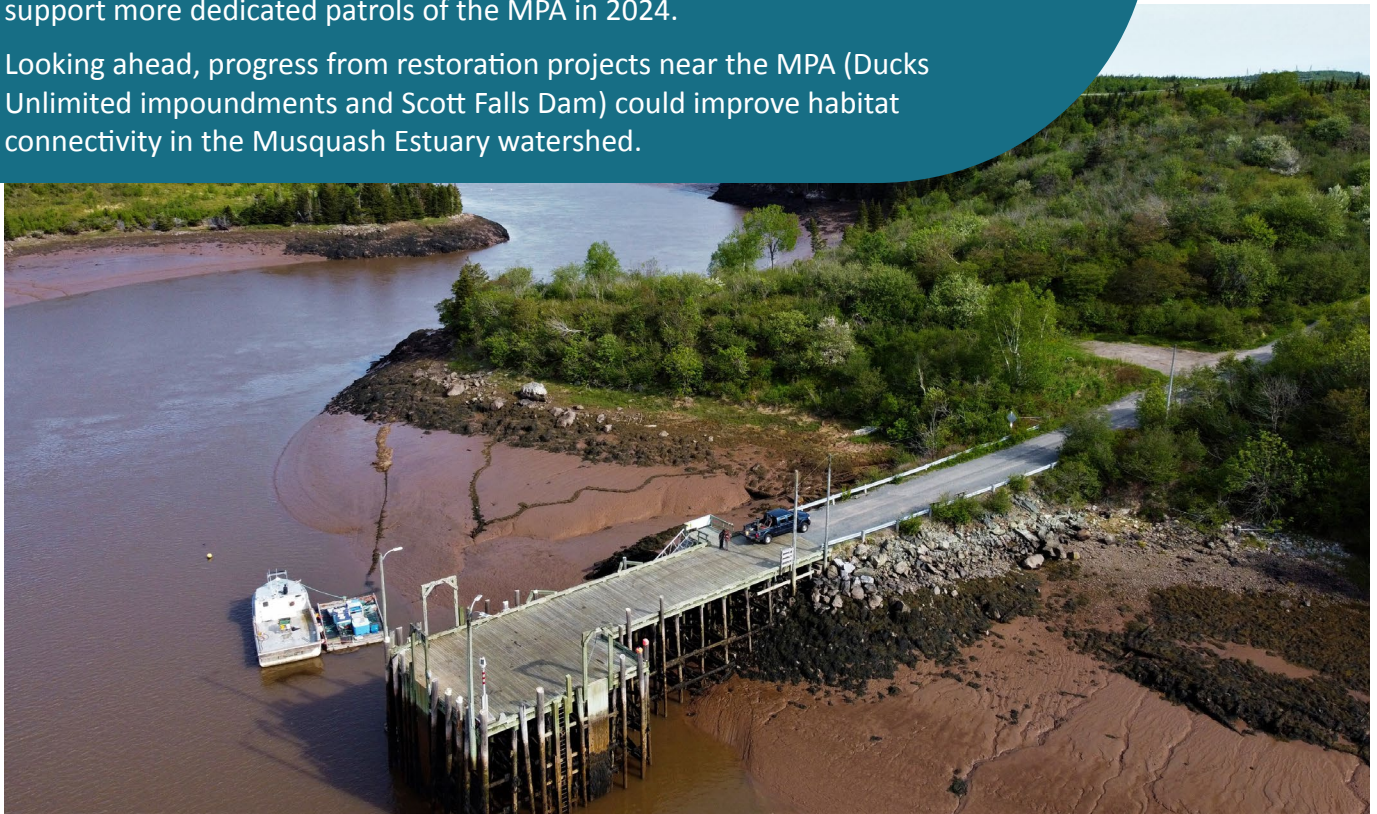
A hybrid collaborative science workshop is also being planned to follow-up on the 2021 CSAS on the Musquash Estuary MPA monitoring. It will be an opportunity for the research and monitoring community to share and learn about each other's work in the Musquash Estuary. Participants will include:

- DFO researchers and management
- partners from the province of NB
- First Nations
- academia
- industry
- ENGOS

In 2024, Indigenous partners and DFO Science will be leading another suite of new monitoring projects in the MPA. Several new research and monitoring projects are proposed for the near future; for example, projects to update existing habitat classification maps, and using stable isotopes to improve our understanding of the food web in the MPA.

Presentations on MPAs in the Maritimes Region are being developed to increase awareness about these important sites and their respective regulations for Fishery Officers. An additional small vessel is being purchased for the local detachment to support more dedicated patrols of the MPA in 2024.

Looking ahead, progress from restoration projects near the MPA (Ducks Unlimited impoundments and Scott Falls Dam) could improve habitat connectivity in the Musquash Estuary watershed.







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