CASE STUDY

Working together to manage ocean noise in the Gully Marine Protected Area

Pilot whales in the Gully MPA. Credit: Hilary Moors-Murphy

Located about 200 kilometres off the coast of Nova Scotia, the Gully was the first Marine Protected Area (MPA) established in Atlantic Canada under the *Oceans Act*.[1] Named after its impressive deep-water canyon, the Gully has unique topographic and oceanographic features that provide habitat for many species of seabirds, deep-water fishes, and cold-water corals,[2] and is an area frequented by **cetaceans**.[3] Designated in 2004, the Gully MPA is part of the **critical habitat** for the endangered Scotian Shelf population of northern bottlenose whales.[4] It is also an important foraging area for 15 other species of whales and dolphins, including endangered blue whales.[5]

The Gully has become a focal point for human-generated underwater ocean noise (hereafter "ocean noise") research, management and monitoring on Canada's east coast. Ocean noise on the Scotian Shelf comes from a variety of sources including vessel traffic (e.g., commercial shipping, fishing, research activities, tourism), oil and gas exploration and development (e.g., seismic airgun surveys, drilling), and military activities, and have great impacts on the diversity and abundance of wildlife that use the area.[1]

To manage and mitigate the impacts of ocean noise and achieve one of the Gully's conservation priorities of "protecting whales and dolphins from the impacts of human activities," marine managers collaborate with multiple government departments, universities, industries, and non-governmental organizations. This includes a variety of initiatives to conduct research and monitoring, manage human activities, and coordinate and engage with partners and stakeholders.[1]

Cetaceans are whales, dolphins, and porpoises.

Critical habitat in the *Species at Risk Act* is "the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or action plan for the species."

Research:

- Fisheries and Oceans Canada (DFO) Maritime Region's Cetacean Research and Monitoring Program, with contributions from the cetacean research program of the Whitehead Lab at Dalhousie University, has collected passive acoustic monitoring data for more than 10 years. This research contributes to the understanding of the year-round presence and vocalization of whales and dolphins in deep waters,[6,7] and allows for the monitoring of ocean noise and its impact on the Gully's wildlife.[8,9]
- The acoustic research efforts coupled with information from extensive visual surveys, including photo-identification studies, have improved our understanding of how marine mammals use the area[10] and provide scientific evidence to support the MPA's management.[1,11] For example, researchers found an increased presence of Sowerby's beaked whales in the Gully since the designation of the MPA. It is hypothesized that this increase could be due to a reduction of noise in the MPA and nearby areas.[11]

Management:

- DFO collaborates with the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) to ensure that no oil and gas activities occur inside the MPA's boundaries, and activities outside of the MPA are assessed for their potential impacts on the Gully ecosystem before they are authorized to proceed.[12]
- Using the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment as a guide, DFO and the CNSOPB co-developed a draft set of enhanced mitigation measures to minimize acoustic disturbances from seismic surveys in and around the Gully MPA.
- The potential impacts of transboundary stressors, including noise produced by industrial activity, were addressed in the Gully MPA Regulations with a unique "vicinity" clause which prohibits adjacent activities that are likely to cause disturbance inside the MPA. Effects monitoring programs have demonstrated compliance with the clause by using hydrophones to measure seismic survey sounds reaching the MPA boundary[1,13]
- To facilitate dialogue and implementation of the Gully's Management Plan, DFO established the Gully Advisory Committee to provide cross-sectoral advice to support the MPA's management. This committee consists of individuals from federal and provincial governments, industry, non-governmental organizations, and Indigenous partners. The committee is also engaged while reviewing activity plans for proposed activities occurring in the MPA, including research expeditions that use active acoustics.

Coordination and Engagement:

- The annual Notice to Mariners issued by the Canadian Coast Guard asks vessel operators to voluntarily avoid the MPA; or reduce vessel speed to less than 10 knots, keep watch for marine mammals, and follow specific operating procedures if marine mammals are sighted. These procedures all help to minimize the vessel noise impact on marine mammals.[1]
- Activities in the Gully, including tourism or scientific expeditions, are scheduled to avoid overlaps to minimize vessel traffic in the MPA and encourage collaboration between the tourism industry and researchers.
- Coordination of vessel-traffic monitoring and enforcement activities in the Gully are carried out by Transport Canada, the Canadian Coast Guard, the Royal Canadian Navy and DFO. Universities, tourism operators, non-governmental organizations and government departments work together to conduct research, education and outreach activities relating to the MPA.

Deployment of an acoustic recorder in the Gully MPA beside a pod of pilot whales. Credit: Fisheries and Oceans Canada.

MARINE PROTECTED AREAS AND OCEAN NOISE

A Marine Protected Area, commonly called an MPA, is an area of the ocean that is legally protected and managed to achieve the long-term conservation of the ecosystem(s) within.

For most federal MPAs established after April 2019, the MPA Protection Standard prohibits noise-producing activities, such as oil and gas exploration and production, mining, and bottom trawling.

While noise is not a specific consideration in establishing an MPA, restrictions on noise-producing human activities result in quieter areas. MPAs are established by legislation and violating the prohibitions can result in significant fines.

DFO, Environment and Climate Change Canada, and the Parks Canada all have tools for MPA establishment.

Read more about Marine Protected Areas

While the Gully MPA has experienced successes, there are ongoing challenges associated with managing ocean noise. A multitude of factors, including biological, ecological, and environmental conditions, influence how marine life is impacted by ocean noise and these relationships are not yet well understood. As a result, it is difficult to set parameters for activities that take place in and around the Gully to reduce the impact of noise on different organisms that inhabit the Gully.[1] A variety of management options can be used to manage noise-producing activities outside the MPA, but it is difficult to determine clear geographical boundaries as the impacts of noise vary depending on the activity, species of concern, and oceanographic conditions. This complexity also leads to challenges in measuring the success of ocean noise management and conservation efforts in the Gully.

Addressing these challenges requires sustained cross-sectoral efforts. Additional research will help to better understand the impacts of different noise sources in and around the MPA. For example, aerial- and vessel-based sightings and remote surveillance tools, noise modelling, and other innovative technology can all be used in different ways to investigate the impacts of noise on marine mammals. Knowledge gained through these combined efforts will be essential in working towards the development of regulatory tools to manage different human activities. Finally, ongoing coordination, outreach, and communication will help Canadians better understand the impact of ocean noise and allow for a more coordinated exchange of MPA management best practices, which may also result in a quieter underwater environment for marine wildlife.

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