# <u>Shared waters</u>: a study to investigate how resident sperm whales are faring in habitat shared with increasing commercial shipping in the Bahamas?

*Physeter macrocephalus*

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## <u>Background</u>

The population status of sperm whales (*Physeter macrocephalus*) is listed as endangered under the United States' Endangered Species Act and vulnerable in the IUCN's Red List of Threatened Species. Longitudinal studies carried out by BMMRO in the northern Bahamas have shown that nursery groups of sperm whales reside there year-round, and exhibit long-term site fidelity to Northwest Providence Channel, an international shipping route (Figure 1).

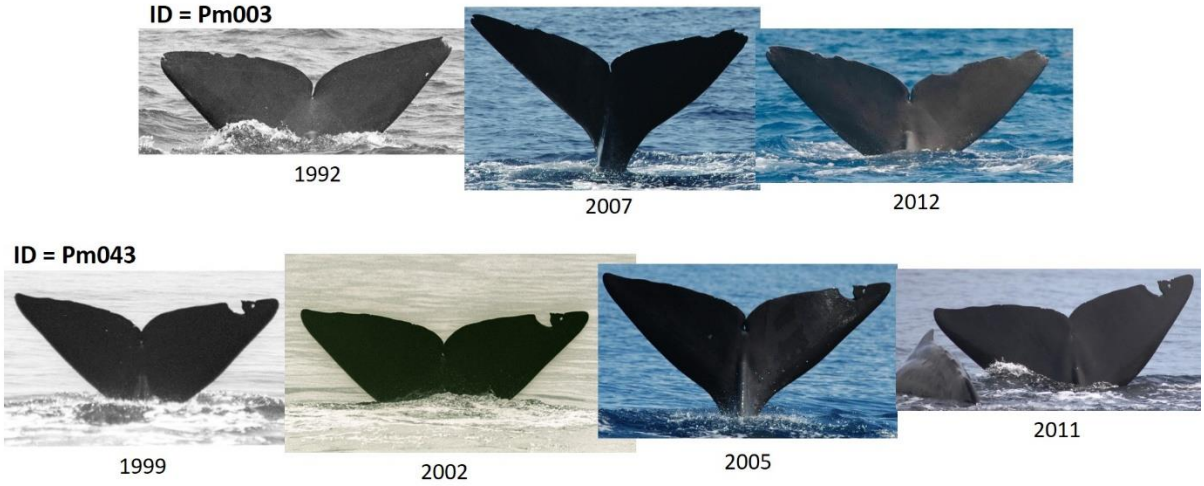


Figure 1. Photo-identification re-sightings of two adult female sperm whales (Pm003 & Pm043) in NW Providence Channel over two decades.

## <u>The Problem</u>

Globally, ship traffic has increased four-fold over the last 20 years which has led to an alarming increase in noise in our oceans, and this trend is predicted to continue in the future. Northwest Providence Channel is a primary international shipping route between Europe, Africa, the Middle East, Asia and the U.S. Its strategic location has led to the development of the largest oil storage facility and container port in the wider Caribbean

region, as well as plans to construct a new oil storage facility. Currently, the impacts of ship traffic on the resident sperm whale population is unknown but ship density data and satellite telemetry studies suggest commercial ships and sperm whales are sharing the same waters, and that ship traffic is increasing (Figure 2).

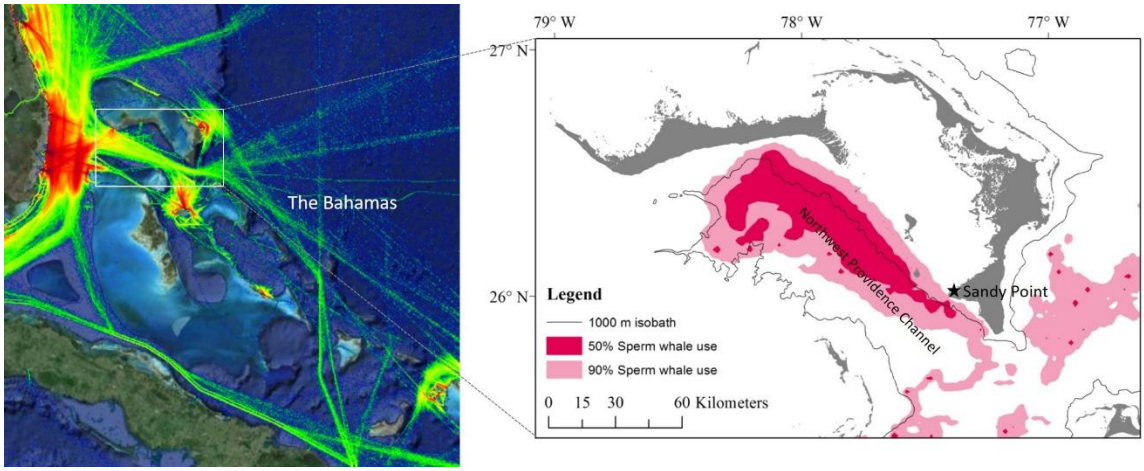


Figure 2. Ship traffic data summarised for 2014 (left) and sperm whale utilisation distribution plot derived from satellite telemetry data from 27 tagged whales (right) shows shared use of Northwest Providence Channel.

For cetaceans, like endangered sperm whales, that depend on sound for communication and foraging, there is growing concern that increasing noise from ships will affect their ability to carry out basic life functions, like feeding and that this will lead to population decline. As such, there is a need to assess the potential impacts of this shared use of Northwest Providence Channel.

## The Solution

This project aims to quantify the noise generated by ships, predict sound exposure levels for sperm whales, and develop solutions to limit impacts of maritime traffic on the resident sperm whale population. We are providing a unique opportunity for Bahamian university students to play an integral role in a research project and for younger students to discover the amazing world of whales.

To do this, we are deploying static acoustic recorders at strategic locations in Northwest Providence Channel to record ship noise and sperm whales (Figure 3 below), conducting vessel surveys to locate sperm whale groups and collecting individual-based data, and simultaneously gathering ship data using the Automated Information System. This combined dataset will be analysed, and recommendations will be made to the Government of the Bahamas and the International Maritime Organisation to limit the impacts of ship traffic to whales. This project is gathering critical data to assess current impacts and develop science-based solutions (e.g., decreasing ship speed in certain locations) to decrease the effects of ship noise on endangered cetaceans in one of the busiest international shipping channels in the wider Caribbean region.

Figure 3. Acoustic recorders are being placed in strategic locations in Northwest Providence Channel to record noise generated by ships and whales for one year.

An integral part of this project is to provide young Bahamians with increased awareness, knowledge and skills (Figure 4). Collaboration with the University of the Bahamas is supporting student participation during sperm whale surveys and outreach in communities that are adjacent to sperm whale habitat is directly involving them with our local research efforts. Making connections between Bahamian students and oceanic species will help develop the desire to protect marine life which are generally out-of-sight, yet critically important ecologically.

Figure 4. University of the Bahamas students joined the research team during a sperm whale survey in November 2017 and helped to host Grades 4-6 from Sandy Point, Abaco for an afternoon onboard the research vessel to teach them about whale conservation and marine science.