

Interim Project Report

1. NWRT Project Number: 3-20-13

2. Project Title: Ecosystem Monitoring in Tremblay Sound 2020.

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4. Summary:

Narwhals are facing several changes related to their environment and to anthropogenic pressure. For example, changes in ice conditions and increasing shipping traffic are predicted to negatively impact the narwhal population. In order to better understand the potential threats to narwhals, it is important to study their ecosystem and understand the drivers of narwhal distribution and ecology.

Since 2017, the project Ecosystem Approach to Tremblay Sound has aimed to monitor narwhal and their ecosystem. Passive monitoring methods are used to document narwhal presence and quantify important aspects of their environment. Thirty six moorings were deployed with scientific equipment to study the environment. In addition, shore-based observation and sampling have been performed to get specific information on narwhal behaviour and fish presence.

5. Project Objectives:

The main project objectives are:

- 1) Monitor noise, physical parameters (water salinity and temperature profiles), and other species abundance in Tremblay Sound.
- 2) Examine timing and numbers of whales entering and using Tremblay Sound using drone-surveys, and obtain details on group sizes, animal condition, and mother-calf pairs.
- 3) Establish baseline data of environmental noise and vocalizations of narwhal while in their critical summer habitat in Tremblay Sound and relate these data to narwhal movement and behaviour. This will inform discussion on the potential impacts of shipping within this context.
- 4) Monitor ecosystem productivity and activity in order to better understand ecosystem function and variability and the role of ecosystem components in driving narwhal habitat selection.

However, because of the global pandemic and travel restrictions, the 2020 field season was scaled back. The only objective of the 2020 field season was to securely retrieve all moorings and recover the data.

6. Materials and Methods:

We placed small bottom anchored moorings within Tremblay Sound to record ambient noise and narwhal vocalizations. When possible (based on equipment availability), sensors to record water temperature and salinity were placed on these moorings. We also deployed instruments to detect fish movements and measure biomass of lower trophic level species (i.e. zooplankton and small fish). During the summer of 2020, moorings were retrieved using small boats and stored in Pond Inlet. The field team was entirely made up by Nunavut Beneficiaries; we hired one Inuit leader and 3 Inuit helpers. All of the

participants were involved in previous year's field work and were previously trained. We also provided videos on how to use the equipment as well as phone support for the team.

7. Results

All the moorings were successfully retrieved during the summer of 2020. They were brought back to Pond Inlet for storage and some of the moorings were shipped back to Winnipeg for repairs. The data were also transferred to Winnipeg.

We successfully completed a contract with JASCO to run preliminary analysis of the data. JASCO ran several of their algorithms for the automated detection of marine mammals and of ship noise. JASCO also provided measures of ambient noise. We are currently manually reviewing the results of the automated detector to determine how well the detector worked.

Once we have completed the validation of the detector, we will produce estimates of narwhal presence and calling rates. We will look at variation in narwhal present during the deployments and compare with data from previous years. We will also investigate interactions between narwhals and ship presence.

8. Discussion/Management implication

Passive acoustic monitoring is a powerful tool to examine the seasonal presence of marine mammals and roughly estimate their densities. It also allows for the monitoring of man-made sound. The hydrophones used in passive acoustic monitoring don't make noise and therefore, the disturbance to wildlife is minimal. The hydrophones can be left in the water for an entire year which allows for continuous monitoring when other methods might not be available.

Narwhals and other marine animals have evolved in a relatively quiet environment. They rely on sound to communicate with each other, to find food, to navigate and to detect predators. It is important to monitor the level of noise in the marine environment to make sure that marine mammals can thrive. With our project, we will produce information on noise and shipping levels that could guide the management of the marine environment and decisions on thresholds for acceptable level of noise.

9. Report by Inuit participants

The field component of the project was led by Inuit, and the field team was composed of Inuit only. The project provided employment of 4 Inuit participants. We did not received any formal written report from them but it was not part of their role to write a report.

10. Reporting to community/resource uses

Consultation and communication with the Mittimatalik HTO has been challenging due to the travel restrictions and therefore limited, but we have been in touch through email and phone. We are planning a face-to-face meeting with the Mittimatalik HTO during the week of November 15, 2021 and received confirmation from the HTO of their interest in the meeting. In the event our trip has to be cancelled due to changes in travel restrictions, we would look for guidance from the Mittimatalik HTO for the best way to engage in consultation in the coming months.