

Application: Narwhal body condition and impacts of shipping

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Nunavut Wildlife Research Trust (2024-2025)

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NWRT Final Project Report

1. **NWRT Project Number:** NWRT-2023-0000000002
2. **Project Title:** Narwhal body condition and impacts of shipping 2024
3. **Project Leader:** Marianne Marcoux (Marianne.Marcoux@dfo-mpo.gc.ca), 204-228-8042
4. **Summary:** Inuit and researchers have observed a decline in narwhal abundance in the summering area of Eclipse Sound, which coincides with increased shipping through the eastern Canadian Arctic. The goal of this project is to collect data on narwhals from areas undergoing different levels of disturbance, across seasons, to better understand the impact of increased shipping traffic. The data collected (body condition, stress levels, movements/distribution, dive pattern) will also be used to further our knowledge of narwhal ecology.
5. **Project Objectives:** The overall objective for this study is to understand the impact of shipping and other disturbances on narwhals. The specific research objectives of this study are to:
 - a. determine the body condition/health of narwhal from different areas with different shipping levels;
 - b. measure the stress level in narwhal from different areas;
 - c. investigate the movement of narwhal between summer aggregations and in relation to shipping;
 - d. determine proportion of time that narwhal spend at the surface of the water to adjust the 2023 abundance estimate.
6. **Materials and Methods:** To collect the data, we wanted to set up a floe edge camp in June (Pond Inlet), a summer camp in August and train an independent local field team that would be flexible with data collection timing. We did not get approval from Pond Inlet's HTO and did not have enough time to fully train an independent field team so the data was only collected during our summer camp.

We had planned to deploy satellite tags and collect biopsies on narwhal, but we did not get the right opportunity in the field to try it. Part of this is because we had to shut down our camp after 2 days because of the high density of polar bears. We tried collecting data doing day trips from Arctic Bay thereafter, but it was more challenging to find narwhals and the weather did not allow for many boating days. We were still able to capture videos of narwhal with DJI Mavic 3 and Mini 4 Pro drones.

As for the training and employment opportunities, we organized a drone training workshop in Cambridge Bay in April 2024, where 9 Inuit from different communities learned how to pilot a drone and analyze narwhal images for body condition. Two participants were from Arctic Bay and were hired as research partners for our summer field work (Camille Lavallée and Calvin Kigutikakjuk). They



supported field work planning and logistics, attended HTA meetings and provided input about research ideas / research methods. They also received training on how to tag and biopsy narwhal, and some equipment was left with them in Arctic Bay after the field season.

In addition to our 2 research partners, we set up contracts with 3 boat captains (Jason Qaunaq, Damien Qaunaq, Adrian Arnauyumayuq) and 3 bear monitors (Brad Taqtu, Joseph Kilabuk, Paul-Andrew Siakuluk) in Arctic Bay. We hired a total of 8 Nunavut beneficiaries for a total of 100 person-days.

- 7. Results:** We collected 5 hours and 32 mins of video footage, of that the following table lists how much footage was collected of each marine mammal species.

Species	Time
Narwhal	3 hours and 30 mins
Bowhead	31 mins

All the footage was collected between August 23 and September 6 at Qakkiaq Point (8 flights), Sannirugaaluq (8 flights), Sauniqsiutit (3 flights) and an unknown location 10km south of Qakkiaq Point (1 flight). Because we did not received support from Grise Fiord and Pond Inlet, the data collected this year doesn't allow us to compare different summering stocks. However, we were able to follow complete dive cycles of narwhals, which will allow us to extract the surface and dive time for the Admiralty Inlet stock. Narwhal group sizes ranged from single individuals to larger groups of several dozen animals, and we saw males, females (including a tusked female), and calves. The images will also allow us to estimate whale body condition. In addition, a few interesting behaviours were captured (e.g. males socializing, females nursing) and will be further analyzed.

It's worth mentioning that one of our local research partners was very outstanding and showed a lot of interest and initiative during the project. He was given the opportunity to attend the Arctic Change 2024 conference in Ottawa and he even co-presented our preliminary results during a session dedicated to drones (see references).

- 8. Discussion/Management Implications:** The data generated from this study will be used to feed into the estimation of the abundance of the Baffin Bay narwhal population. It will be used to develop a factor to account for narwhals that are underwater during the time of aerial surveys. Ultimately, new abundance estimates will be used to provide advice on sustainable hunt of the Baffin Bay narwhal population.

Once thoroughly analyzed, the narwhal footage data from this project will also address knowledge gaps by improving our understanding of narwhal biology, health, and the consequences of disturbance. These are crucial information that will help to guide decision-making related to the Admiralty Inlet stock management. More specifically, we have collected data that can be used to create a baseline on the body condition of narwhals, which will could be used to monitor the impact of commercial and industrial development in Nunavut.



- 9. Report by Inuit participants:** *As an Inuk participant in the project, I got the opportunity to take part in a drone training week and used drones as one of the methods for the project. While I wasn't directly involved in designing the methods, I felt that my participation and perspective were valued, especially in ensuring that the approach was respectful and aligned with Inuit values. The use of drones at specific altitudes to avoid disturbing narwhals was a thoughtful and appropriate method, and the decision not to pursue/chase narwhals for tagging or biopsying showed that we were committed to respect wildlife.*

I think the project effectively incorporated Inuit Qaujimajatuqangit by not starting until all narwhal tags were gone to avoid interfering with hunting activities. This approach also helped ensure that tagged animals wouldn't be harvested during the open season, which is respectful of traditional and community practices. Although our tagging and biopsying efforts were ultimately unsuccessful, the methods remained considerate and we never pushed ethical limits just to get close to narwhals.

I was involved in analyzing and interpreting narwhal behaviour from drone videos collected during the project and was offered to do an oral presentation to share these preliminary results at the ArcticNet conference 2024.

I believe the results of this project can contribute meaningfully to wildlife management in Nunavut, particularly in understanding how shipping may impact narwhal migration routes and behavior. This kind of research is important for studying how narwhals react to disturbance, especially if marine traffic increases in the region.

- Camille Lavallée, research partner

10. Reporting to communities/resource users

Community HTO	Before Research	During Research	After Research	Further in-person consultation?
Arctic Bay Ikajutit HTA	Date: December 2023 Type: Letter to request support for 2024 research activities was sent. Support was granted. Date: May 2024 Type: In-person meeting. Board members provided advice with regards to camping sites, transportation and narwhal behaviour for the project. A presentation was also	Date: August 2024 Type: In-person meetings. DFO staff and local research partners met with the HTA board a total of 3 times (check ins, updates, seek advice for alternative camp locations, etc.). Date: Aug – Sep 2024 Type: Text and/or radio calls. DFO staff and research partners were providing daily	Date: September 2024 Type: In-person meeting. 1 DFO staff and our 2 local research partners met with the HTA board to provide a summary of the field season and show some narwhal footage they had collected. Date: April 2025 Type: In-person meeting. 1 DFO	Date: Fall 2025 Type: In-person community visit and meeting with the HTA to plan a passive-acoustic monitoring project funded by the Nunavut General Monitoring Plan.



	done at Inuujaq School.	updates to the HTA through VHF radio while out boating.	staff and 1 local research partner met with the HTA board to present the final field report. Provided update that funding from NWRT had not been received for 2025-2026 but that Camille Lavallée would apply to the NWSF to keep the project going.	
Pond Inlet Mittimatalik HTO	Date: December 2023 Type: Letter to request support for 2024 research activities was sent. Support was denied.			
Grise Fiord Iviq HTA	Date: December 2023 Type: Letter to request support for 2024 research activities was sent. There was no answer. Date: May 2024 Type: In-person meeting. The board was not complete and did not support the work as it was too short notice.			

11. References

Oral presentation

Lavallée, C., C. Kigutikakjuk, F. Lapierre Poulin, M. Ghazal, M. Auger-Méthé and M. Marcoux, 2024. Investigation of narwhal behaviour in Admiralty Inlet using drones. International Arctic Change Conference 2014, December 9-12. Oral presentation, Ottawa, Canada.



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Some narwhal photos were also shared with the NWMB for use in social media posts and their annual report.