

Final Project Report to NWMB – September 2022

1. **NWRT Project Number:** 3-21-06
2. **Project Title:** Foxe Basin bowhead telemetry, photo-id, and biopsy collection
3. **Project Leader:** Brent Young, Fisheries and Oceans Canada, 501 University Crescent, Brent.Young@dfo-mpo.gc.ca, 204-984-0938
4. **Summary:**

The proposed project was planned to take place in Foxe Basin, based out of the community of Igloolik. The three main components of the project were to be: 1) Unmanned Aerial Systems (UAS), or drones, used to collect high resolution aerial photographs of bowhead whales, for the development of a photo-identification (photo-id) catalogue; 2) crossbows used to collect small Biopsy samples consisting of both skin and blubber to contribute to updated population abundance estimates, and 3) up to 10 satellite tags deployed, to track whale movements.

Unique scars and markings captured in the photographs allow for individual whales to be identified and tracked over time through subsequent sightings. The development of a photo-id catalogue will contribute to our overall understanding of important life history traits and, over time, will provide measures of body condition, growth rates, calving intervals, and abundance. The continued collection of biopsy samples is important for providing new samples needed for updating genetic mark-recapture abundance estimates. Updated data on bowhead movements is necessary to continue to monitor habitat-use, to detect any changes in movement patterns, and to help in planning future research activities. Bowhead whales in Foxe Basin were last tagged in 2013.

5. Project Objectives:

The specific objectives of the proposed project, as outlined in the original proposal to NWMB, were to:

- Collect high resolution aerial photographs of bowhead whales to develop a photo-id catalogue
- Collect bowhead biopsy samples for use in genetic mark-recapture abundance estimates of the EC-WG bowhead population
- Deploy satellite transmitters on bowhead whales to track movements

Due to the pandemic, we were unable to travel to Foxe Basin to carry-out the field work. However, field teams were hired from both Sanirajak and Igloolik to conduct the biopsy sampling and drone portions of the project. Tagging bowheads using the ARTS system requires additional training that we were unable to provide remotely, so the tagging portion of the project was not attempted.

6. Materials and Methods:

The methods used for biopsy collection and drone work in Foxe Basin were the same as those outlined in the project proposal, the only difference being that all work was carried out by local field personnel hired from the communities of Sanirajak and Igloodik.

Whales are approached to a distance between about 10 to 20 m and biopsy samples are obtained using crossbows with special bolts equipped with biopsy tips. After the whale is hit, these bolts bounce back into the water, with a small piece of skin in the tip, and they float until they are retrieved. A Styrofoam float/stopper prevents the bolt from penetrating any deeper than 4 cm. The biopsy samples are very small – less than 5 g each. A small rotary wing drone was used to collect high resolution photographs of whales for development of a photo-id catalogue. When whales are sighted, the operator will launch the drone and take photographs from directly above the whales. Due to its small size the whales are generally not disturbed by the presence of the drone. Satellite tagging work was not completed.

7. Results:

The field work in Foxe Basin was carried out by field teams hired from the communities of Sanirajak and Igloodik. Unfortunately the timing of the work did not coincide with the timing of peak bowhead abundance in the area, and skin biopsy samples were only collected from 4 individuals with drone photographs from just a single whale. The samples collected in Foxe Basin in 2021, although limited in number, will contribute towards future genetic mark-recapture abundance estimates as well as diet studies and epigenetic ageing studies. Similarly, the drone photographs will be added to our photo-id catalogue which is being used to identify individual whales, assess population structure, and measure whale body condition.

8. Discussion/Management Implications:

Despite the limited success in the number of samples or the amount of data collected, the field work conducted in Foxe Basin in 2021 represents an important step that will lead to more successful bowhead whale research in the area in the coming years. Through our efforts in 2021 we have established important contacts in both communities and the field personnel gained valuable experience in locating, approaching, and biopsying bowheads. Given the fact that field work was able to go forward given the ongoing constraints caused by the COVID-19 pandemic we consider the 2021 field season to be a success. An important next step in this project will be to expand data collection to cover more areas and sample a greater portion of the population.

9. Report by Inuit participants:

The field work conducted in 2021 relied heavily on Inuit participants in the form of conducting field work and reporting information through regular communications.

One of the drone pilots that was part of the field team out of Sanirajak had the following to say in regards to participating in the 2021 field activities and planning for future bowhead research in the area.

“I highly recommend starting in end of June and early July that's when the bowheads are most abundant and easier to spot. From my experience living here in Sanirajak those months are most we see bowhead whales. Last season, we started too late we were able to spot whales but not as much as end of June and early July. I believe that this kind of research is important for all of us, inuit and science perspective to get more information on bowhead and would recommend doing it more with collaboration of inuit hunters and elders too. I would like to see that incorporated to research, not just rely on research but also with Inuit hunters and elders too.

Being part of the research was a great experience with other people and was beneficial for all of us, once we understand what needed to be done and being mostly locals working was a great experience for all of us. Far too many times we have seen southern researchers come up here and do the work when Inuit are much as capable of doing the work for them. I am not against the idea of southern researchers coming here but it very beneficial when it is done by mostly local people.”

To highlight our ongoing collaboration with Inuit research partners for research in Cumberland Sound, we recently produced a manuscript (see below) detailing the mutual benefits of such a partnership.

Young, B.G., Koski, W.R., Kilabuk, R., Watt, C.A., Ryan, K.P. and Ferguson, S.H., 2022. Collaborative field research using drones for whale photo-identification studies in Cumberland Sound, Nunavut. *Drone Systems and Applications*, 10(1), pp.256-265.

10. Reporting to Communities/Resource Users:

Schedule of Consultations with Igloolik HTA and Hall Beach HTA

Consultation	Date	Type	Status/Changes
Before Research	Dec 2020	Email correspondence proposing project and requesting support.	Completed
During Research	June/July 2021	In person meetings with HTA before and during field work to update on field research activities.	Not completed – In person meetings were not possible due to the pandemic. Instead we corresponded regularly through email and phone to coordinate community led field work.
Completion of Research	Fall/Winter 2022	In person meeting to discuss findings from previous field season and to propose work for the coming year.	In person meeting have been postponed, but email and phone communications went on. On 20 June DFO met with Igloolik HTA and discussed the 2022 field season and updated the 2021 field work.