

Juneau Whale HEALTH Project

Humpbacks, Ecosystem Monitoring, And Long-Term Histories

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Juneau-based Research Team

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Summary

The purpose of this proposed project is to monitor the sub-population of humpback whales that are critical to Juneau's whale-watching industry. The Juneau Whale HEALTH Project builds on years of research and expertise and proposes a new research chapter aimed at monitoring Juneau's most valuable marine resource and a key driving attraction for visitors from all over the world- humpback whales. We seek support for fieldwork, lab analyses, and University team members' time to oversee the project and analysis. NOAA team members and NOAA's research vessel are included in this project proposal at no additional cost, greatly reducing the overall budget. This research team represents decades of expertise and includes benefits of leveraging in-kind support to conduct a rigorous and affordable monitoring program. This project could successfully be funded at different levels to be more comprehensive and we have broken these out below.

Background

Juneau is Alaska's largest whale-watching port and likely the largest and most lucrative whale-watching hub in the world. Local tour operators work closely with Alaska's cruise industry to offer convenient shore excursions for cruise ship passengers during Juneau port-of-calls. The whale-watching industry is estimated to generate over \$60 million in direct economic revenue while offering a conduit for 367,000 cruise travelers to share in the wonder and beauty of humpback whales each year¹. The industry has grown steadily over the last 20-30 years, however, the subpopulation of humpback whales that this industry relies on is actually quite small. There are typically about 8-10 humpbacks in the Juneau area at any given point during the summer, but this can dip to only 2-3 whales at times depending on prey availability and other environmental factors, leaving limited viewing options for the ~72 whale-watching tour boats.

¹ McDowell Group. [Economic Analysis of Whale Watching Tourism in Alaska](#). Report prepared for NOAA Fisheries in October 2020.

The number of humpback whales has remained fairly constant or even decreased in the Juneau area over the past decade, and so as the whale-watching industry has grown, there has been increasing pressure on any given individual whale. While prey is surely an important factor driving humpback whale distributions, we still don't understand all the ways that prey contributes to humpback whale distributions or how it interacts with other factors that impact the health and productivity of humpback whale populations.

The whale-watching industry in Juneau is completely dependent upon humpback whales frequenting the tour area. However, there is no monitoring support for humpback whales in Juneau to be able to detect concerns or track population health. We propose to responsibly monitor this valuable population to help ensure sustainability into the future. In short, this project will be an investment in the future of Juneau's tourism industry. Our proposed project builds upon a highly successful 4-year collaboration between NOAA, UAS, and UAF to assess humpback whale residency and health from 2020-2023.

Abundance, reproduction, and health

As a base-level monitoring approach, we propose to conduct regular surveys in the Juneau area to collect photo ID and biopsy samples. Photo ID uses photographs of the underside of humpback whale flukes (tails) to track individuals through time and space and will be used to monitor abundance, reproduction, and residency. Photographs will also be used to monitor the population for vessel strike and entanglement scaring and to document outcomes from these human interactions. Biopsy samples are a common marine mammal science field method for collecting small samples of blubber and skin that can be used to analyze the physiology of a whale. A single sample can be subdivided and used for measuring a suite of steroid hormones, along with genetics, disease, and stable isotope analyses. These metrics are important for monitoring, health, reproductive status, stress, genetic relatedness, population origin, and diet composition. Using this combination of methods, we will be able to monitor humpback whale abundance, residency patterns, reproduction, and health.

The quantity and composition of prey available to humpback whales feeding in Alaska in the summer is undoubtedly an important factor in characterizing humpback whale distribution and health. We will also include a small-scale prey monitoring component to provide a qualitative assessment of the prey availability to whales in the study. This can be an important context in our monitoring and ideally would eventually be expanded to a quantitative assessment of the prey availability.

UAF Graduate Student

This project would be greatly enhanced by also including support of a graduate student to collaborate on the aforementioned monitoring aspects and to investigate specific research questions with the data. This would reduce the support necessary for University faculty and bring in an early career scientist in as a dedicated team member who would work under close advisement of Dr. Heidi Pearson (who holds appointments at UAS and UAF).

This is a great way to help support and train the next generation of scientists and this project would be well poised to integrate a graduate student. A graduate student would also allow us to expand our research to include other interesting elements, for example the use of drones to establish body condition. Drones are increasingly being used in marine mammal science as a way to monitor humpback whale body condition by collecting and analyzing aerial photographs. Further, work is being done to correlate body condition to pregnancy status. By adding a drone component to the study, we would be able to add several surveys each summer to focus on aerial body condition to monitor health and detect pregnancy.

Annual Budget (preliminary)

- Baseline level monitoring: Abundance, reproduction, and health: \$90,000
- Addition of a UAF Graduate Student: \$70,000 (includes a full student support package for one year and a small budget for field equipment)

*Depending on the funding mechanism used to transfer funds, UAS may require ~5% overhead in addition to these values.

Select media and publications from earlier years of this study:

- [BBC clip](#) of humpback whale research from this team
- NOAA webstories in [2020](#) and [2021](#) highlighting work from this research team
- Recent Publication - S. Atkinson, V. Melica, S. Teerlink, K. Mashburn, J. Moran, H. Pearson, Use of hormones in assessing reproductive physiology of humpback whales (*Megaptera novaeangliae*) from Juneau, Alaska, *Theriogenology Wild*, Volume 3, 2023, 100050, ISSN 2773-093X, <https://doi.org/10.1016/j.therwi.2023.100050>.