Using eDNA to Determine Humpback Whale Prey
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Introduction

Glacier Bay National Park and Preserve have monitored its humpback whale population since 1985 via photo identification. One of the main concerns of the park is to ensure that the habitat, prey, and feeding activity of humpbacks are not disturbed by anthropogenic forces, which include rising ocean temperatures and noise pollution. To better understand humpback prey patch composition, this study is utilizing environmental DNA (eDNA) to confirm current understanding of prey patch makeup. We decided to test for Pacific Herring (Clupea pallasii), Walleye Pollock (Gadus chalcogrammus), Capelin (Mallotus villosus), and Sand Lance (Ammodytidae), as these are known to be common prey of humpback whales.

Objective

The purpose of this study is to identify the prey of humpback whales in Glacier Bay National Park and Preserve.

Methods

- Collect water samples
  - Two samples, each two liters, per collection site
- Filter eDNA from collected water samples
- Extract eDNA from filters
- Perform PCR with MiFish and a species-specific PCR
- Perform Digital PCR (dPCR) on samples

Results/Discussion

- Found indication of high DNA concentration from PCR
- Next steps:
  - Create primers for Walleye Pollock, Capelin, and Sand Lance
  - Continue with species-specific PCR
  - dPCR of samples for detection and quantification of specific species.
  - Collect more samples during the 2024 season
- dPCR less expensive than metabarcoding

References


MiFish, a set of universal PCR primers for metabarcoding ... (2015, July 1). https://royalsocietypublishing.org/doi/10.1098/rsos.150088


Acknowledgments

Thank you to Ellen Chenoweth, Brandi Cron, Maris Goodwin, Maggie Harings, Janet Neilson, Julian Pender, and Laura Timm for all the incredible work you've put into developing the research plan and techniques we are using and for teaching me them.

BLaST is supported by the NIH Common Fund, through the Office of Strategic Coordination, Office of the NIH Director with the linked awards: TL4GM118992, RL5GM118990, & UL1GM118991. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. UAF is an affirmative action / equal employment opportunity employer and educational institution: www.alaska.edu/nondiscrimination.

Image 1. Water sample collection. Photo: Chris Gabriele
Image 2. Filtering water samples. Photo: Rhayne Loggins
Image 3. Extracting eDNA from filters. Photo: Rhayne Loggins
Image 4. Glacier Bay sample sites. Map: Chris Gabriele
Image 5. Gel electrophoresis of PCR with MiFish and Pacific Herring PCR. Photo: Rhayne Loggins