

FLOAT-BY SAMPLING:

Development of a Simple and Quick Methodology for Vessel-Based PSOs to Collect Biological Samples from Floating Marine Mammal Carcasses



FAIRWEATHERSCIENCE

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BACKGROUND

Overview:

A floating Cook Inlet beluga whale (CIBW; *Delphinapterus leucas*) carcass was successfully and quickly sampled for biological data by vessel-based PSOs during the 2019 Hilcorp Lower Cook Inlet Seismic Project (September 10-October 17, 2019) in Cook Inlet, AK.

Protected Species Observers (PSOs):

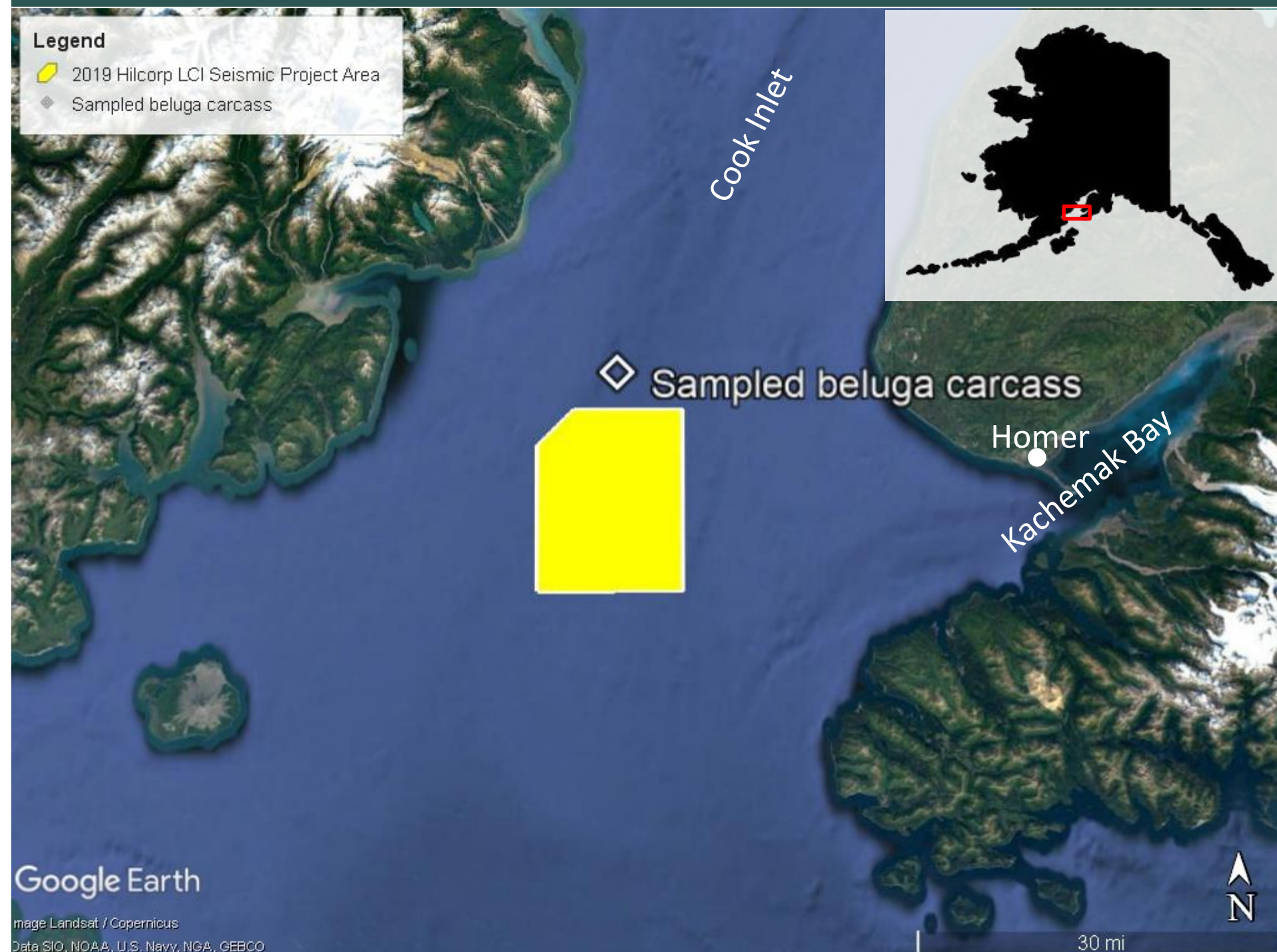
PSOs are an essential component of monitoring and mitigation programs for industry projects that have the potential to expose marine mammals to noises which may result in injury or disturbance (i.e., to “take” marine mammals). PSOs implement the project’s Marine Mammal and Mitigation Measures Plan (4MP), and are responsible for monitoring designated zones around the project activity to observe and visually track marine mammals which may approach or enter the zones, and to implement required mitigation (e.g. shut down of noise-making operations).

Cook Inlet Marine Mammal Carcasses:

In past studies/projects in Cook Inlet, vessel-based PSOs have closely approached floating marine mammal carcasses, including CIBWs, to photograph the carcass for reporting and analyses. Given the currents and limited infrastructure along most of Cook Inlet’s coastline, these sightings may be the only time the animal is observed, and thus opportunities to collect biological data about the species are lost. This is particularly unfortunate for a species like the endangered CIBW, whose numbers have declined by approximately 75% since the late 1970s (~1,300 in 1979; ~328 in 2016), whose population trend continues to decline despite management intervention, and for which there is no clear or single threat hindering recovery. As such, any biological data that can be collected has the potential to be extremely valuable in helping improve the knowledge and management of the species.

STUDY PURPOSE

In an attempt to prevent the loss of biological data from floating marine mammal carcasses in Cook Inlet, a study was designed to assess the feasibility of vessel-based PSOs collecting biopsy samples from floating carcasses in the project vicinity. The equipment had to be portable, easy, and inexpensive, with quick and safe methods not requiring extensive training (~30 minutes).



ABOVE: Map showing the 2019 Hilcorp Lower Cook Inlet Seismic project area and location of the CIBW carcass sighting/sampling
BELOW: Floating CIBW carcass observed October 4, 2019



SAMPLING TRAINING & FIELD TESTING

PSO Training:

PSOs aboard the project mitigation vessel (R/V *Qualifier 105*) were chosen to receive training since it was a smaller vessel, which increased the probability of accessing carcasses and obtaining samples; no seismic activities would occur off that vessel; and it had an on-board freezer (-18°C) available for immediate sample storage. Fairweather Science’s four PSOs assigned to observe from the R/V *Qualifier 105* received a 30-minute carcass sampling training from Broad Conservation prior to their departure to review the sampling equipment, protocols, and reporting requirements. Since authorization was only granted to sample dead animals, extensive training to avoid injury to animals was not necessary.

Field Testing:

Mitigation vessel PSOs tested the sampling methods and equipment over the project duration (September 10-October 17, 2019). Upon sighting of a marine mammal carcass, PSOs were directed to record specific sighting data, and contact the captain immediately. Fairweather Science was also informed immediately so that all required documentation/agency reporting could occur. The vessel captain made the final decision on whether to approach and sample a carcass based on: other project activities occurring, weather, carcass accessibility, and human safety. Upon approval, the sampling protocols were followed.



Mitigation vessel R/V *Qualifier 105*

CIBW CARCASS SAMPLING EVENT - RESULTS

On October 4, 2019, at 15:12, a dead adult male CIBW was first observed by the PSOs 600 meters in front of the mitigation vessel. The vessel approached the carcass to collect photographs and to test the sampling gear and methods. By 15:17 the vessel had come alongside the CIBW and the PSOs finalized the preparation of the gear. Sampling efforts began at 15:18 and ended by 15:23.



The first two attempts to sample the carcass with the shorter, lighter pole were unsuccessful; on the first attempt the PSOs missed the whale, and after contact on the second attempt the pole malfunctioned and was unusable (Fig. A). The third and fourth attempts with the heavier, more rigid pole were successful and two biopsy samples were obtained (Fig. B). Total sampling time, to include setting up the second pole after the first pole malfunctioned and transferring samples from the biopsy tip into cryovials (Fig. C), was five minutes. One biopsy sample was placed in an empty cryovial and one was placed in a cryovial containing DMSO. Both vials were immediately stored in the vessel’s -18°C freezer until the vessel returned to shore at the end of the project. At that time, the samples were turned over to the Alaska Marine Mammal Stranding Network for distribution to various labs, per NMFS direction. This was the only marine mammal carcass encountered, and hence sampled, by the mitigation vessel PSOs during the study period.




SAMPLING AUTHORIZATIONS & EQUIPMENT

Authorizations:

Fairweather Science, LLC was contracted by Hilcorp Alaska, LLC to provide PSO services during Hilcorp Alaska’s seismic surveys of lower Cook Inlet in September and October 2019. Broad Conservation, LLC was contracted by Fairweather Science to develop a carcass sampling feasibility study, including supplies and training, for their PSOs to implement during the project, when safe and feasible. Prior to field work commencing, Broad Conservation worked with the NMFS Alaska Region’s Interim Marine Mammal Stranding Coordinator to obtain permission under NMFS Permit #18786-02 for trained PSOs to collect biopsy samples from any floating marine mammal carcasses under the jurisdiction of NMFS during Hilcorp Alaska’s September-October 2019 seismic surveys in lower Cook Inlet.

Equipment:

The kit developed by Broad Conservation consisted of a “screw on/off” system connecting custom biopsy tips to two styles of adjustable length (4-16 ft) poles, and a tacklebox of miscellaneous items. Both poles were lightweight, hollow metal, extension poles with quick release mechanisms to allow for variable extension as the case warranted. One pole extended from 4 to 9 feet in 6 inch increments at the push of a button; the other pole extended up to 16 feet in any increment, and used a twisting mechanism to lock the pole at the desired length. The longer pole weighed more and had more rigidity than the shorter pole.

Biopsy Tips	Connectors & Poles	Biopsy Containers
<ul style="list-style-type: none"> • Custom made to retain skin & blubber • 3 internal prongs + vent hole • Threaded for “connector” attachment • Stainless steel 	<ul style="list-style-type: none"> • Connectors attach biopsy tips to poles • Commercial, lightweight, collapsible poles (4-16 ft range) • All screw on/off 	<ul style="list-style-type: none"> • Cryovials with DMSO • Empty cryovials • Formalin jars 

CONCLUSION & RECOMMENDATION

This study shows that it is feasible for biopsies to be collected from floating marine mammal carcasses by vessel-based PSOs without impeding their primary monitoring and mitigation responsibilities, or requiring extensive training, experience, or funds. Although this sampling effort only took five minutes, with practice and repeated implementation, the process would be streamlined and become even more efficient and safe.

The information that could be learned from biological samples (skin and blubber) of marine mammal carcasses collected by vessel-based PSOs potentially includes genetic fingerprinting, sex, skin microbiome, age, reproductive status, cortisol levels, and diseases. This information would be helpful to managers and researchers trying to recover threatened or endangered species, while having no adverse effects to the animals themselves. It is recommended that government agencies charged with species management recognize the potential conservation benefits of authorizing such biological sample collection efforts by vessel-based PSOs, especially in cases when no other data is likely to be collected from the animal.

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