

Northernmost Stejneger's Beaked Whale (*Mesoplodon stejnegeri*) Stranding, Saint Lawrence Island, Alaska

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INTRODUCTION

- Stejneger's beaked whales are a deep diving whale and the only species of *Mesoplodon* that occurs in Alaskan waters, typically the Gulf of Alaska, Aleutian islands, and southern Bering Sea (Allen and Angliss 2013).
- Saint Lawrence Island (SLI) is located in the shallow shelf region of the Bering Strait (Figure 1.). The village of Gambell on SLI relies on a subsistence-based economy that depend heavily on marine mammals for nutritional, cultural, and economic well being. Gambell residents reported an unusual whale ashore, recently dead, 8 October 2013 (63.38.435N, 171.25.695 W).
- A field examination was conducted 11 October with subsequent analyses of biological tissues to determine potential cause of death.

OBJECTIVES

- Describe logistics and protocols involved with a marine mammal stranding response in the Bering Strait region.
- Provide results of field examination and histology and other analyses.

RESULTS

LOCAL LOGISTICS / PROTOCOLS

- Initial discovery and detailed description of the freshly dead whale was by local residents engaged in subsistence activities.
- The Native Village of Gambell Tribal President approved examination and documentation.
- The Sivuqaq Native Corporation approved travel on their lands. A mandatory land access Permit was obtained.
- All Terrain Vehicles, necessary for travel, were provided by residents, as was a trailer to transport tissue specimens.
- The carcass initially was buffeted by high surf. Residents secured the whale allowing for a safe and detailed examination.
- The head was collected for subsistence purposes and the owner allowed it be exposed to a more detailed examination.
- Muscle tissue was collected for human consumption at the time of discovery. Freshly dead marine mammals are valued by Bering Strait coastal communities as a source of food and handicraft materials.

FIELD EXAMINATION

- Adult female Stejneger's beaked whale (STR-050-13; Figure 2). Total length 5.0 m.
- No evidence of entanglement injuries, predator wounds, ship strike, or other obvious trauma observed.
- Grossly visible gas bubbles observed in vascular locations (i.e. gastrointestinal mesentery, uterus mesentery, heart ventricles) and sub-capsular areas (i.e. kidney, lung, etc.) (Figure 3). Bronchi and lungs congested with blood.
- Light green milk present in the mammary gland; right uterine horn was more swollen more than left, indicative of uterine involution.
- Stomach and pyloric chamber inflated and empty. Blubber firm and white.
- Muscle fresh enough for human consumption at the time of examination.

HISTOLOGY

- Moderate post mortem changes present.
- Impressive congestion, edema, and hemorrhage in the lungs.
- Lesions consistent with mild trauma to the head; minor parasitic lesions.
- No major inflammation lesions present in any tissues examined.

CAT / MRI SCAN

- Preliminary evaluation indicated multiple air bubbles in brain, however shipping delays compromised tissue. Post mortem gas bubble production not excluded.
- Right jaw bone fractured - suspected post mortem.
- Mild bilateral pterygoid sinusitis present.



Figure 1. Location of Gambell on Saint Lawrence Island, Alaska.



Figure 2. Stejneger's beaked whale (STR-050-13) 13 miles east of Gambell, October 8, 2013. Photo: C. Koonooka

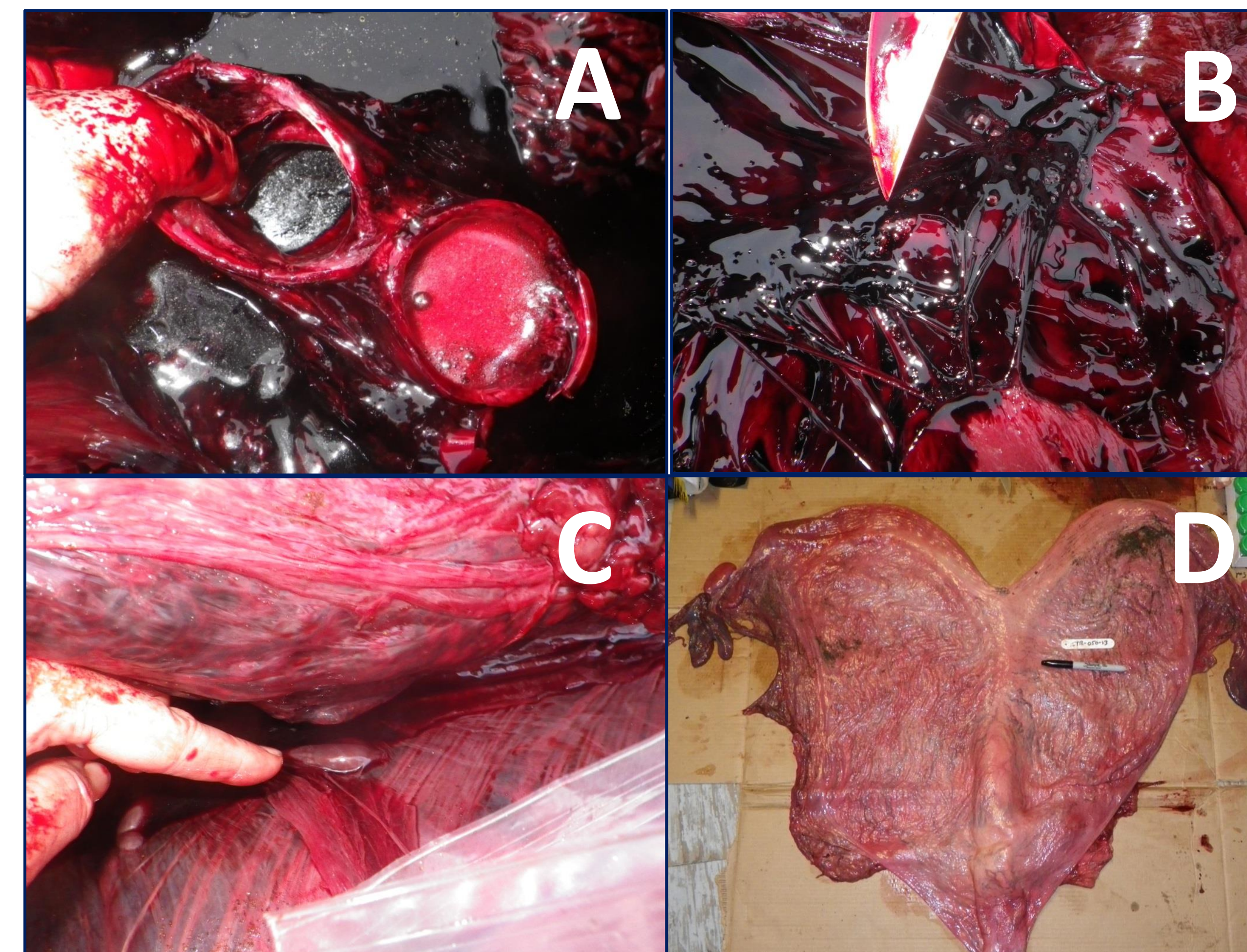


Figure 3. (A) Bronchi contained blood and dense froth; (B) heart ventricle – bubbles appear as white flecks due to camera flash; (C) gas in kidney membrane and large blood vessels adjacent; (D) reproductive tract with pronounced blood vessels in mesentery. Photos: G. Sheffield

HISTOPATHOLOGY

- Impressive congestion, edema, and hemorrhage in lungs due to trauma, or shock secondary to the stress of live stranding.
- Drainage of hemorrhage to cervical lymph nodes and laryngeal hemorrhage are indicative of acute trauma.
- Degenerative myopathy (Figure 4) and pigmentary nephrosis present.

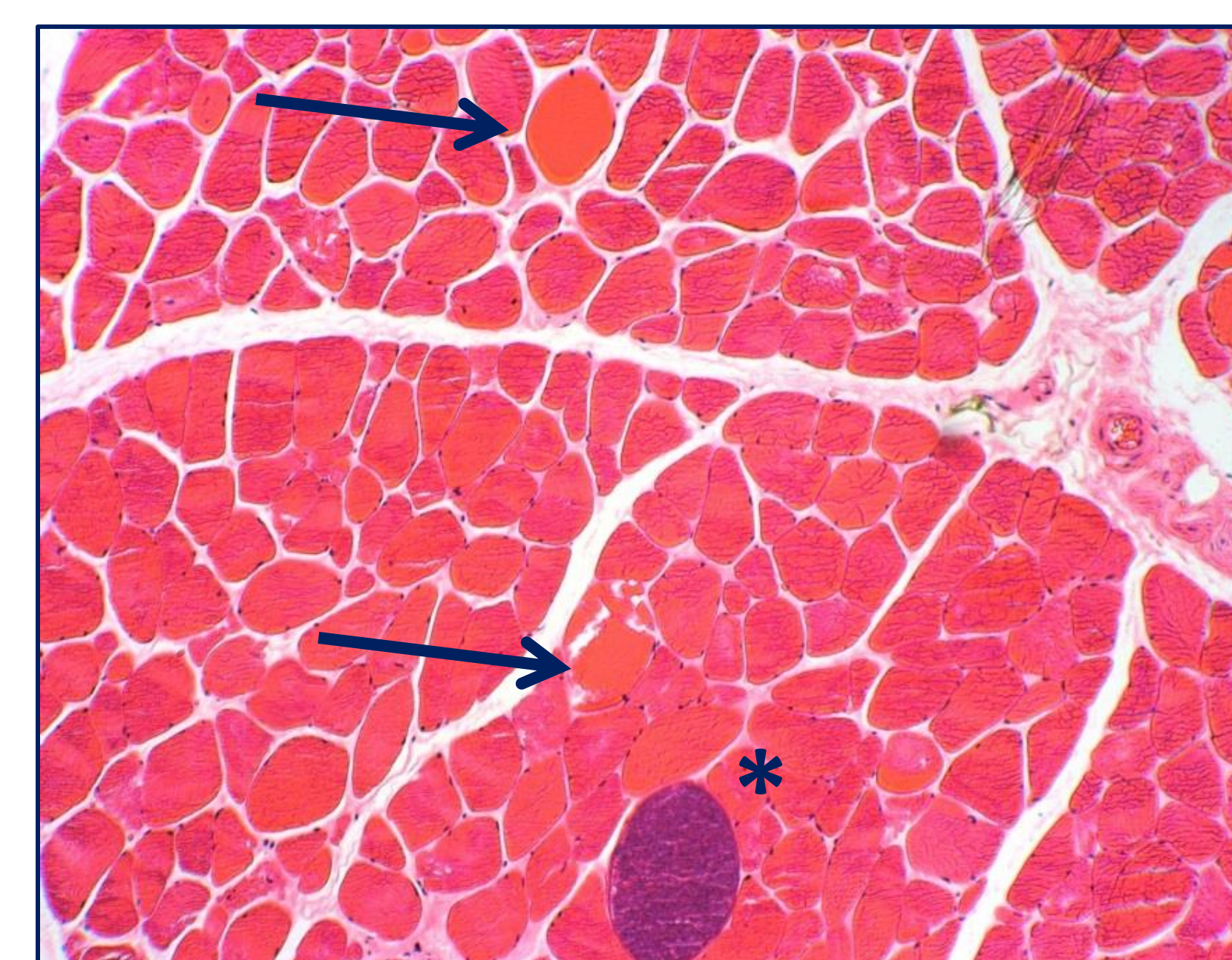


Figure 4: Skeletal muscles with scattered swollen myofibers (arrows). A protozoal cyst is indicated by *. Photo: K. Burek-Huntington

OTHER FINDINGS

- Table 2 provides results from viral and other analyses. All were negative for major pathogens.
- Results pending for several viral cultures and parasites analyses including *Toxoplasma gondii* and *Trichinella* sp.

Table 2. Tissues sent for other analyses and results to date.

Lab	Sample	Test	Type	Agents	Results
AVDL	Larynx	Bacteriology	Aerobic	<i>Serratia proteomaculans</i>	Positive
	Sinus	Bacteriology	Aerobic	Open	Negative
	Uterus	Bacteriology	PCR*	<i>Brucella</i> sp.	Negative
CSU	Uterus	Bacteriology	Aerobic	Open	Negative
	Uterus	Bacteriology	PCR*	<i>Coxiella</i> sp.	Negative
MIT	Swab	Virology	Culture	Influenza A/B	Negative

* = polymerase chain reaction

DISCUSSION

- Information presented here is the result of local discovery, adhering to tribal and land owner access protocols, and collaborative participation between all involved in the discovery and examination.
- Combined findings suggest barotrauma (a.k.a. gas bubble disease, "the bends") as the most likely cause of death. Field examination revealed grossly visible gas bubbles in various locations and histopathology indicated pulmonary hemorrhage and edema with degenerative myopathy present. Barotrauma occurs when an animal is exposed to a significant pressure change such as uncontrolled decompression or a shock wave. Barotrauma may potentially be due to a deep diving whale's behavioral response to severe acoustic exposure, causing a rapid change in diving pressure, and is a likely mechanism for injury and death (Fernandez et al. 2005, Cox et al. 2006). Compromised brain tissue prevented a definite diagnosis of barotrauma.
- During September-November 2013, three additional Stejneger's beaked whales stranded in the Gulf of Alaska (Valdez; AMMSN 2014), and central Aleutian Islands (Adak I.; USFWS 2013). The unusual number and timing of these events merits further investigation.

ACKNOWLEDGEMENTS

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- We thank Sivuqaq Native Corporation and Native Village of Gambell for their consent to examine the whale.
- Dr. James Mead, Curator Emeritus of Marine Mammals, Smithsonian Institution, confirmed identification to species. Alaska Spine Institute donated time and equipment for detailed imaging of the head. Tissues collected under Permit 17350-00 issued to the North Slope Borough Dept. of Wildlife Management.

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