Field	Study Information
Title	Late Fall, Winter, and Early Spring Surveys of Tuxedni, Chinitna, and Kamishak Bays to Assess Fish and Invertebrate Community and Beluga Whale Feeding Behavior (AK-26-02)
Administered by	Alaska Regional Office
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Procurement Type(s)	Interagency Agreement, Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2026–2030
Final Report Due	February 2030
Date Revised	February 20, 2025
Problem	Fish and invertebrates are important marine ecosystem components. Data is limited on fish and invertebrate communities along the westside of Lower Cook Inlet, particularly during late-fall, winter, and early spring. Bays in this region of Lower Cook Inlet are known to be frequented by endangered Cook Inlet Beluga Whales (CIBW), primarily during the fall and winter months, but data is lacking on why these whales are visiting these areas.
Intervention	Collect data on the fish and invertebrate community composition, relative abundance, and energetic value within Tuxedni, Chinitna, and Kamishak Bays. Monitor CIBW and other marine predator activity in these bays over a 3-year period. Provide an index of importance for these bays as foraging areas and as Essential Fish Habitat.
Comparison	Determine the Index of each bay as a potential foraging area based on prey abundance and energetic value compared to frequency of visits by CIBW
Outcome	A better understanding of important overwintering areas and what factors seem to limit foraging range of CIBWs.
Context	Lower Cook Inlet

BOEM Information Need(s): Enhanced information on the composition of fish and invertebrate assemblages, their energetic value, and their seasonal variation in key west Cook Inlet areas will address multiple information needs to support BOEMSs active Oil and Gas Lease sale (LS 258) in the region and the NEPA and other consultation processes. More specifically BOEM is trying to assess what areas along western Cook Inlet should be avoided and/or what mitigation measures are needed for any future exploration and development activities in proximity to the active lease sale area. These needs include the distribution of fish and invertebrates that sustain Cook Inlet belugas in non-summer months, and the geography of fish habitat in western Cook Inlet bays. This research, therefore, will address BOEM and its partners' needs by:

1. Understanding vulnerability and reducing impact risks to Cook Inlet beluga whales, which is critical to meet regulatory requirements under the Endangered Species Act (ESA) Section 7, Marine Mammal Protection Act (MMPA), and National Environmental Policy Act (NEPA) analyses supporting energy development efforts in LCI.
2. Providing better estimates of forage fish availability and habitat use through the year, will yield a better understanding of where, when, and why belugas use the area. BOEM can use this information to develop science-based mitigation measures as part of the NEPA analyses.
3. Additionally, the development of a port in Tuxedni Bay as part of the proposed Johnson Tract mine may affect belugas and their habitat in ways that BOEM needs to understand as part of understanding any future reasonable and foreseeable events as part of the NEPA processes in this region.

Background: BOEM must understand and account for the coastal impacts of its activities on the Outer Continental Shelf (OCS). Habitat impacts on the OCS, particularly disturbances caused by underwater noise or spilled oil, can affect nearshore fish and invertebrates even miles away. In Cook Inlet, Alaska, offshore oil and gas activities may impact nearshore fishes and invertebrates on the west side of Lower Cook Inlet, for example through habitat modification from development activities or potential spilled oil. Fish and invertebrates provide important food web linkages to key species managed under the ESA and MMPA. Additionally, certain nearshore areas may be important habitat for commercially- and recreationally-fished species, and marine birds. The NMFS Alaska Nearshore Fish Atlas has limited data for the west side of Lower Cook Inlet. Recent research (Castellote et al. 2024) indicates that the endangered population of Cook Inlet Belugas forage in the winter on nearshore, lower trophic level assemblages in that region, particularly in Tuxedni and Chinitna Bays. The forage that beluga target in winter is unknown. Additionally, the relative importance of certain nearshore areas as beluga winter feeding habitat warrants further investigation.

Additionally, BOEM is currently involved in litigation on adequate assessment of potential reasonable and foreseeable impacts to beluga whales. This information would assist in addressing these requirements. This area is likely to be a focus area for BOEM, federal agencies, and NGOs. Initial information, albeit limited, indicates Tuxedni Bay is important habitat during specific seasons, so additional information is needed to greater understanding of its importance to BOEM's mission. BOEM is currently assessing whether this area should be avoided during lease sale activities. This information would be important to this process.

Objective(s): The overall goal of this study is to understand the importance of Tuxedni, Chinitna, and Kamishak Bays to the foraging and energetic budget of Cook Inlet Beluga Whales during late fall, winter, and early spring. The specific objectives include:

- Assess the density, temporal and seasonal variation of the surface, mid-water and benthic fish and invertebrate communities in Tuxedni, Chinitna, and Kamishak Bays.
- Measure the energetic value of fish and invertebrate species.
- Compare fish community composition, biomass, energetic value among bays.
- Monitor marine mammal activity to assess temporal presence, residence time, and foraging behavior.

- Establish an index of importance for each bay to the energetic foraging budget of Beluga Whales based on their residence time in each bay.

Methods: For the nearshore and offshore areas of Tuxedni, Chinitna, and Kamishak Bays, a stratified grid of sampling sites will be established. The sites in each bay will be sampled for three years to establish a statistical baseline. Within each year, sites will be sampled every other month beginning in October and ending in April. At each site the fish and invertebrate community will be sampled using mid-water and benthic trawls for the offshore locations. Nearshore locations will be sampled using beach seines and passive gear like fyke nets or variable mesh gillnets. Sonar will be used to estimate fish biomass, and trawls will be used to confirm species aggregations. Other methods, such as eDNA may also be used to assess presence of fish and invertebrate species as a comparison to trawl and other net catches. The invertebrate community, in addition to trawl and beach seines, should also be sampled with pots or other passive gear appropriate to assess presence and density. All fish and invertebrates caught will be quantified, identified to species, and for fish, a subset of 50 individuals will be measured for length. Additionally, for all species caught at each site a subsample of 50 to 100 individuals, representative of the length structure present, will be saved and frozen for later analysis. All subsamples will later be weighed, assessed for age, and energetic value.

The presence of marine mammals will be assessed using passive acoustic sonar on a year-round schedule. Video or other methods, that are appropriate, will also be considered to assess feeding behavior of birds and marine mammals.

The fish and invertebrate communities will be compared among each bay and an index of relative importance as a foraging area will be estimated based on the energetic biomass of each bay and the residence time observed by Beluga whales and other predators.

Specific Research Question(s):

1. What lower trophic level species are present in nearshore areas of Lower Cook Inlet?
2. What are Cook Inlet Beluga whales feeding on during the late fall, winter, and early spring months in Tuxedni, Chinitna, and Kamishak bays?
3. How important are these bays to the energetic foraging budget of Cook Inlet Beluga whales based on their observed cumulative time spent in each bay?
4. Why do Beluga whales utilize some bays more than others? Is it related to importance as a refuge, prey availability, or both?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Castellote M, Gill VA, Garner C, Gilstad A, Hou B, Brewer A, Noth J. 2023. Using passive acoustics to identify a winter foraging refugia and quiet space for an endangered beluga population in Alaska. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management.

57 p. Report No.: OCS Study BOEM 2023-074.
https://espis.boem.gov/final%20reports/BOEM_2023-074.pdf.