

Environmental Studies Program: Studies Development Plan | FY 2022–2023

Title	Using Multiple Tools to Assess Marine Mammal Distribution, Numbers, and Habitat use in Cook Inlet (AK-22-03)
Administered by	Alaska Regional Office
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Procurement Type(s)	Inter-agency Agreement
Conducting Organization(s)	NOAA
Total BOEM Cost	TBD
Performance Period	FY 2022–2025
Final Report Due	TBD
Date Revised	April 30, 2021
PICOC Summary	
<i><u>Problem</u></i>	Updated information is needed on the temporal occurrence, distribution, and habitat use of cetaceans in Cook Inlet to evaluate potential effects from future OCS activities. Federal agencies need reliable information on the abundance and distribution on various ESA-listed large whale species (e.g., humpback, fin) and endangered Cook Inlet beluga whales to accurately evaluate potential impacts to these species and inform mitigation.
<i><u>Intervention</u></i>	A combination of aerial surveys and acoustic monitoring, paired with eDNA sampling, will provide seasonal information on abundance and distribution and year-round documentation of occurrence and quantification of the potential for disturbance.
<i><u>Comparison</u></i>	The implementation of a directed study will provide this information for a variety of uses by multiple agencies, including agency analyses, incidental harassment authorization requests, and future comparisons of anthropogenic impacts on cetacean distribution in this important area.
<i><u>Outcome</u></i>	This study will provide up-to-date information on the abundance, distribution, and habitat use of endangered large whales, Cook Inlet beluga, and other cetacean species in a key area of interest for oil and gas operations.
<i><u>Context</u></i>	Cook Inlet

BOEM Information Need(s): Information gained from this study is needed to establish abundance and distribution of several species of marine mammals, including two endangered large whale species (i.e., humpback, fin) and Cook Inlet beluga whales in lower Cook Inlet. Increased understanding of the seasonal density and distribution of the relevant species will assist BOEM and NMFS in pre- and post-lease NEPA assessment, design of temporal and spatial mitigation, and monitoring effects of activities.

Results will support future Section 7 ESA consultations and preparation of future BOEM Biological Assessments/Evaluations and NMFS Biological Opinions.

Background: There are numerous species of marine mammals that occur within Lower Cook Inlet (LCI). Endangered fin whales are known to be present and to feed in this and adjacent areas in large numbers year-round, and feed intensively within and downstream of this area seasonally. Up to three populations of humpback whales (including one threatened and one endangered) occur in this area; assessment of the extent of use by these three populations is currently based on dated information. Aerial surveys, satellite-tag data, and passive acoustics show belugas inhabit LCI waters; knowledge of their distribution and use of the lower Inlet is scarce due to limited survey effort. Detection of the critically endangered North Pacific right whale in the bays of eastern Kodiak Island and historical sightings along the southern entrance to Shelikof Strait and near the Barren Islands demonstrate the potential presence of this ESA-listed species near Cook Inlet. Several other marine mammal species are present in or near these areas, including blue, sei, gray, killer, and minke whales, as well as harbor and Dall's porpoise, but their year-round seasonal distribution is not well documented and seasonal estimates of density from dedicated surveys are unavailable.

Objectives:

- Document the geospatial and temporal distribution of cetaceans in the LCI, from Kalgin Island to Shelikof Strait, and to the east and west of the entrance to Cook Inlet.
- Document Cook Inlet beluga seasonal occurrence throughout the LCI for multiple years.
- Develop a database cataloging DNA and acoustic signatures for specific cetacean species for use in comparisons in the field.
- Assess the relative strength of low-cost emerging technologies (eDNA) compared to more traditional methods in monitoring marine mammal presence in LCI

Methods: Quarterly aerial surveys for endangered large whales and Cook Inlet belugas will be conducted in the LCI from March to October to provide information on abundance and distribution. Researchers will investigate the use of modern video-capture and analysis methods, including artificial intelligence techniques, to supplement or substitute for some crewed survey efforts. Year-round passive acoustics monitoring will be conducted for no less than three (3) years to determine the interannual variability in the spatio-temporal distribution of all calling and echolocating marine mammals. Seasonal eDNA sampling will be used to develop a database of genetic samples, which can then be compared to, and potentially augment, results from survey and acoustic data. Coastal sampling will be informed by current efforts funded by BOEM, including the Cook Inlet Beluga Acoustic Monitoring in Lower Cook Inlet Rivers project. Moorings will be deployed in year 1 and turned around every six months to reduce potential mooring loss and to allow continuous year-round monitoring at maximum sampling rates, until they are retrieved in year 3. Recordings will be analyzed to determine the inter-annual variability in the geospatio-temporal distribution of all calling and echolocating marine mammals, vessel and airgun signals, and ambient soundscape. Existing data on humpback and fin whales will be mined to understand the relative proportions of various populations in this area; directed field work will occur in outyears if existing data are insufficient to indicate why humpback and fin whale populations might be using the area.

Specific Research Question(s):

1. What is the cetacean density and seasonal distribution in and around the Cook Inlet lease areas, as well as in the surrounding coastal areas that could be impacted by OCS development?
2. How is cetacean distribution changing in response to various changes in environmental and anthropogenic parameters?
3. Can eDNA expand capabilities for population assessment of cetaceans, facilitate research on their behavior and habitat requirements, and improve understanding about their population status and habitat use in a warming Cook Inlet?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A