

*POTENTIAL CMI STUDIES, MMS ALASKA ENVIRONMENTAL STUDIES PROGRAM*

**Region:** Alaska

**Planning Area:** Chukchi

**Title:** COMIDA Phase I: Spatial and Seasonal Distribution and Abundance of the Forage Fish Prey Resource of Chukchi Marine Mammals and Birds.

**MMS Information Need(s) to be Addressed:** Understanding key ecological transfer events and other forage fish factors that cascade to higher trophic level predators are necessary to assess oil spill risks. Results from this study will provide information for lease sale MMPA authorizations, ESA consultations, Essential Fish Habitat and NEPA analyses. The results will also contribute information useful for developing mitigation measures to reduce potential impacts to upper trophic level birds, fish, and marine mammals from proposed oil and gas exploration and development activities.

**Period of Performance:** Three years

**Description:**

Background:

Having a good understanding of the seasonal distribution, abundance, and habitat use of forage fish in the Chukchi Sea is fundamentally important to monitoring the potential upper trophic level environmental impacts associated with offshore development. However, information on the forage fish resource and its relation to apex predators in the Chukchi Sea is lacking or out of date, especially in light of ecological changes that have occurred in recent decades. Without a reliable current baseline, effects from other anthropogenic activities or other natural causes cannot be ruled out from possible oil and gas development impacts.

This prey resource information was identified as highly time-sensitive and important decision-applicable information that should be initiated as soon as possible by MMS-sponsored "Chukchi Sea Information Status and Research Planning Meeting" attendees and the Alaska OCS Region to assure availability of critical mission related information.

Higher trophic level marine mammals, birds and fish are highly dependent on forage fish concentrations for energy. Forage fish migration and spawning are also the basis of transient but key energy transfer events during critical seasons of apex predator life history cycles such as molting, calving, pupping, and feeding. Collapse of forage fish can result in collapse of whole year classes or populations of the apex predators. For example, the failure of a forage fish spawning event can result in the complete failure of chicks for the year.

Thus, impacts to key forage fish species are likely to cascade throughout the foodweb in a complex way, further exacerbating direct effects on higher trophic level marine mammals

and birds. Monitoring key forage fish species and their key ecological events (e.g. peak migration, spawning, nursery and settling periods) will provide information critical to accurately assessing and mitigating the ecological effects that cannot be adequately captured without a better understanding of this bottle neck resource.

Understandings gained from the survey, including forage fish abundance and distribution and the transfer of energy to higher trophic levels during key ecological events, will contribute to the basic ecological knowledge necessary for estimating oil spill impacts. It will also contribute information useful for developing mitigation strategies to reduce impacts to the forage fish and their marine mammal and bird predator populations from proposed oil and gas exploration and development activities.

Collaboration and integration with marine mammal and bird research activities will provide maximum ecological characterization and take advantage of existing logistical investments and operations including providing information on important zooplankton prey as well as forage fish prey.

This study also benefits monetarily and logistically by being contemporaneous with a similar study in the North Aleutian Basin.

#### Objectives:

1. Identify spatial and seasonal location of forage fish and key transfer events contributing energy to apex predators.
2. Provide Geographical Information System (GIS) based maps and attribute tables of forage fish for oil spill risk analysis.
3. Identify high priority locations for mitigation or deferral areas under consideration in environmental assessments.

#### Methods:

1. Geographically delineate the location and timing of forage fish concentrations, through aerial digital imaging and Light Detection and Ranging (LiDAR).
2. Coordinate with on-going marine mammal and bird surveys to evaluate forage fish availability in the vicinity of fish, bird, and marine mammal 'hot spots'.
3. Perform ground truthing through use of local fishing vessels.
4. Develop GIS map layers for EIS analysis of potential sensitive areas.

**Date Information is Required:** Preliminary information is required in interim reports during first and second year. Final report and GIS-based maps due in third year.