

## **BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies**

**Region:** Alaska

**Planning Area(s):** Chukchi Sea

**Title:** Distribution of Fish, Crab and Lower Trophic Communities in the Chukchi Sea Lease Area (AK-11-08a/b)

**BOEM Information Need(s) to be Addressed:** This project continues collection of marine fish baseline in the Chukchi Sea, and will provide information on the abundance and distribution of fish, crab, and lower trophic communities in the Chukchi Sea lease area. The study will provide the basis for a better understanding of distribution and relative importance of fish communities. The Alaska OCS Region identified a need for continued fish and invertebrate baseline monitoring during the 2007 MMS-sponsored “Chukchi Sea Information Status and Research Planning Meeting” to provide useful information to upcoming NEPA reviews and post-sale needs.

**Total Cost:** \$2,600,000

**Period of Performance:** FY 2012-2016

**Conducting Organization:** University of Alaska Fairbanks; NOAA

**BOEM Contact:** [Catherine Coon](#)

### **Description:**

**Background:** This study proposes to develop a broader understanding of abundance and distribution of demersal and pelagic fish, crab, and lower trophic communities needed to evaluate and mitigate the effects of offshore oil and gas development. Interim results from a current BOEM funded Coastal Marine Institute (CMI) project, “Current and Historic Distribution and Ecology of Demersal Fish in the Chukchi Sea Planning Area,” have identified temporal, seasonal, and spatial gaps in data on fish in the Chukchi Sea in particular to sampling on or near the lease areas. This proposal was designed specifically to fill these information needs. It will build upon recent information on invertebrate communities in the Chukchi offshore lease area obtained by the 2009 study “Chukchi Sea Offshore Monitoring in Drilling Area (COMIDA): Chemistry and Benthos (CAB).” This will also complement the 2010 LGL component of COMIDA CAB that undertook midwater and benthic fishery samples at 20 sites within the COMIDA CAB sample design. This study would utilize these data and create a similar survey design such that data sets were compatible, comparable, and extend the time series. This study would contribute to further knowledge of pelagic fishes in the northeast Chukchi Sea. Data from this study will provide abundance and distribution information for NEPA analysis on fish and invertebrate species. This study will coordinate with the BOEM central Beaufort Sea Fish Survey for under-ice pilot survey which will occur near Barrow, Alaska, and examine the potential for using icebreakers for fish samples in the ice-covered season. The pilot under-ice marine survey will implement a design outlined in the 2007 MMS “Under-Ice Sampling Workshop.”

In the well-studied Bering Sea, it is apparent that the distribution and community composition of fish has changed in recent decades and many species are shifting their distributions northward. A MMS Beaufort Sea fish survey in 2008 indicated presence of common Bering Sea species, such as walleye pollock and dense aggregations of snow crab in the western Beaufort Sea. These species are also likely to be present in the adjacent Chukchi Sea. This study will increase the extent of fisheries information within the lease area and extend a baseline for further studies linking species distributions between the Bering and Beaufort Seas.

The demersal fish and invertebrate community of the Chukchi Sea is thought to be less dense and diverse than in the Bering Sea and does not support major commercial fisheries at this time. The Chukchi Sea, however, is critical to the existence of many protected species of marine mammals and birds. Alaskans living in coastal Chukchi villages depend on the Sea for many of their subsistence foods critical to their way of life. Although the Chukchi has historically been considered a benthic dominated system, the data that are available indicate that there is a large biomass of pelagic fish in the area that has not been adequately sampled. This pelagic fish community seems to be dominated by forage fish, including Arctic cod, sand lance and capelin. These species serve as an important mechanism of energy transfer to top predators such as birds, ice-dependent seals, and cetaceans.

#### Objectives:

- Document, characterize and understand the distribution of pelagic and demersal fish and invertebrate communities in the Chukchi Sea lease area for the open water season.
- Estimate the geographic range of fish, invertebrates, and lower trophic biomass in the lease area by comparing recent and historic fishery databases.
- Provide a comparison of these communities with that of prior studies, as well as adjacent regions (Beaufort and Bering Seas) and relate the data to oceanographic fronts.
- Assess utilizing icebreakers to undertake sampling during the winter for the iced-covered season.
- Provide GIS based maps and attribute tables of marine fish and lower trophics for OSRA and NEPA analysis.

Methods: Conduct a one-two year field study with fisheries and lower trophic survey in the Chukchi Sea region to obtain baseline data on the structure and function of these ecosystems and on the ecology of important fish species. Samples locations will be determined such that it compliments and extends recent work in the COMIDA CAB, and could provide for collaboration with the logistics and project goals of the Arctic Ecosystem Integrated Survey scheduled for 2012 in the northeastern Bering Sea to the southern portion of the Chukchi Sea. The abundance of pelagic fish, jellyfish, and large zooplankton (e.g., euphausiids) will be estimated with a multi-frequency echo-sounder and ground-truthed using pelagic gear. The results will be directly comparable to historic surveys conducted by COMIDA CAB, RUSALCA, Conoco/Shell, and Beaufort surveys which will allow them to be placed into a broader latitudinal context. A series of coordinated bottom trawls would use the same survey methodology used by in the 1990/1991 Chukchi Sea Survey, and the RUSALCA surveys 2004-2008. The results will extend the time series (2004-2008) and build upon the earlier surveys (1990, 1991) of demersal fish and invertebrate communities. To interpret the distribution of fishes and their importance as prey, water column properties (temperature, salinity, light level, chlorophyll fluorescence) will be

measured at all trawl stations. This study will coordinate with other ongoing BOEM or other agency or university studies in oceanography and biology to maximize data needs and study design. This study has several collaborators which reference the study as Arctic Ecosystem integrated survey (Arctic Eis).

**Current Status:** Ongoing

**Final Report Due:** December 2015

**Publications Completed:** None

**Affiliated WWW Sites:** <http://www.boem.gov/akstudies/>  
<http://www.commerce.state.ak.us/dca/planning/cciap/ArcticEcosystemIntegratedSurvey.htm>

**Revised Date:** December 2012

**ESPIS: Environmental Studies Program Information System**

**All *completed* ESP studies can be found**

**here:** [http://www.data.boem.gov/homepg/data\\_center/other/espis/espisfront.asp](http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp)