

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

**Region:** Alaska

**Planning Area(s):** Cook Inlet

**Title:** Cook Inlet Circulation Model Calculations (AK-13-x10)

**BOEM Information Need(s) to be Addressed:** Oil-Spill Risk Analysis (OSRA) is a cornerstone foundation for evaluating alternatives in OCS oil and gas leasing, NEPA analyses, and oil spill response plans. The results of this study will be used by BOEM to create the OSRA estimates of oil-spill trajectories. The ocean models have been shown to have skill in estimating the near surface currents. This study will result in a time series of simulated current and wind fields that will be compared to field projects that have been conducted in the Cook Inlet and will be used in the OSRA calculations.

**Total Cost:** \$499,528

**Period of Performance:** FY 2014-2017

**Conducting Organization:** CESU-UAF

**BOEM Contact:** [Dr. Heather Crowley](#)

### **Description:**

**Background:** Ocean currents in Cook Inlet are forced by winds and river runoff, as well as having very large tidal amplitude and extreme tidal currents. The Alaska Coastal Current that flows into Lower Cook Inlet and continues out through Shelikof Strait is an important element of the nearshore circulation of the northern Gulf of Alaska. Sea ice forms in Cook Inlet, but its effect on the overall circulation pattern has not been studied in detail.

The circulation of Cook Inlet has been studied through previous model simulations, with funding by NOAA, BOEM, USACE, and others. The models were subjected to many sensitivity calculations and skill was assessed by teams of oceanographers and the models were shown to have significant skill in simulating the ocean surface currents. Many field programs that may provide observational data for assimilation and validation have also been conducted in this area.

**Objectives:** The objective of this study is to obtain simulations of the surface circulation in Cook Inlet for use in OSRA. The simulations must have significant skill in reproducing the near-surface currents, compared to drifting buoy data, fixed current meters, ADCPs, and other data sets. The results of the model will provide environmental variability input into the OSRA calculations.

**Methods:** This study will adapt an existing community ocean model to produce a high-resolution hindcast of the current fields in Cook Inlet, using data assimilation methods whenever practical. The hindcast period will be determined by data availability, but shall be no less than 5 years. The tidal current must be accurately reproduced. The wind forcing will be derived from the products of an atmospheric model. Skill assessment comparisons against historical field observations, i.e. current meters and drifting buoy velocities, will be performed.

**Current Status:** Awaiting final report

**Final Report Due:** October 2016

**Publications Completed:** None

**Affiliated WWW Sites:** <http://www.boem.gov/akstudies/>

**Revised Date:** August 2016

**ESPIS: Environmental Studies Program Information System**

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**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)