

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Cook Inlet

Title: Subtidal and Intertidal Habitats and Invertebrate Biota in Lower Cook Inlet, Alaska (AK-15-08)

BOEM Information Need(s) to be Addressed: The BOEM *2017-2022 Outer Continental Shelf Oil & Gas Leasing Draft Proposed Program* includes a lease sale in the Cook Inlet Planning Area. Updated and readily accessible intertidal and shallow subtidal habitat information is needed to conduct environmental analyses for OCS development in Cook Inlet, as well as for ongoing spill response planning. The subtidal and intertidal areas are home to many grazing invertebrates which provide an important source of prey for marine and terrestrial mammals, birds, other invertebrates and humans and is particularly susceptible to oil spills. Updated information from this study will be important to understanding and assessing potential impacts of an oil spill in Cook Inlet.

Total Cost: \$600,000
plus Joint Funding (~\$150,000)

Period of Performance: FY 2015-2019

Conducting Organization: National Park Service

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Description:

Background: Benthic invertebrates and their habitats are susceptible to effects from oil and gas exploration and development activities. The subtidal invertebrates and habitats adjacent to the OCS are particularly susceptible to oil spills and updated information is needed to assess impacts from a potential large oil spill in Cook Inlet. Previous research on intertidal and subtidal habitats in Cook Inlet includes the Outer Continental Shelf Environmental Assessment Program (OCSEAP) begun in 1975, as well as work done by the Cook Inlet Regional Citizens Advisory Council (CIRCAC) in 2000.

Subtidal and intertidal communities are also an important conduit of energy, nutrients, and pollutants between terrestrial and marine environments; provide resources for subsistence, sport, and commercial harvests; and are important for recreational activities such as wildlife viewing and fishing. Changes in the structure of the intertidal community serve as valuable indicators of disturbance, both natural and human induced. Further, changes in overall and relative abundance of intertidal species may have serious consequences for the bird and mammal species that forage in nearshore areas.

Marine bivalves (clams, mussels, and chitons [badarkis]) in particular are subsistence species for Alaska Natives and residents. Native communities in Port Graham and Nanwalek have noted a substantial decline in shellfish populations and have expressed

concern over the potential loss or contamination of subsistence resources. Bivalves are ubiquitous and critical components of the nearshore intertidal environment, and have been used widely as sentinels in monitoring programs. Community monitoring for bivalves for potential contaminants would be an important component to address concerns about release of contaminants, most notably polycyclic aromatic hydrocarbons (PAH), into the environment. It is important to improve our understanding of the following: the extent and details of benthic habitat that support subsistence resources, hydrocarbon loads in these resources, as well as the sources and extent of local contamination, particularly those where subsistence harvest continues.

This study will be conducted with a collaborative approach between communities and Federal agencies. The study will provide a better understanding of invertebrate biota including distribution and densities, and will depict the variety of habitat structures. A subset of the species will be used as sentinel species to assess the vulnerability of marine ecosystems to the effects of oil contamination. Hydrocarbon work will also leverage previous surveys by CIRCAC and NOAA-NOS. Potential cooperators include USGS, CIRCAC, NOAA, USFWS, Gulf Watch Alaska, Kenai Peninsula Watershed Forum, and the Port Graham Tribe and Chugach Regional Resources.

Objectives:

- Describe lower Cook Inlet nearshore habitats, including invertebrate and algal communities, using existing ShoreZone data and imagery and the results of prior intertidal and shallow subtidal sampling programs.
- Identify areas and habitats across a range of different habitat strata in Lower Cook Inlet that should be included in a long-term monitoring program to provide baseline conditions.
- Conduct intertidal and shallow subtidal sampling in identified monitoring areas, including appropriate habitats within Kamishak Bay and extending north to Tuxedni Bay.
- Based on evaluation of existing hydrocarbon data, develop and facilitate a plan for a community monitoring program that monitors hydrocarbon concentrations in tissues of potential nearshore sentinel species (e.g. clams, mussels, chitons) for important subsistence areas near Port Graham and Nanwalek in Kachemak Bay.
- Integrate new information collected during the biological monitoring component with existing spatial habitat data in the context of known physical and oceanographic conditions.

Methods: This study will compile and collate important historical and ongoing temporal and geospatial habitat and intertidal and shallow subtidal data into a publically-accessible interactive platform. Data will be compiled in a manner that allows creation of digital and web-based synoptic maps to better portray ecological information and support resource management decisions. Researchers will conduct targeted subtidal surveys across an range of habitat types and areas using protocols from the Census of Marine Life/NaGISA (Natural Geography In-Shore Areas), Exxon Valdez Oil Spill

Trustee Council-Gulf Watch Alaska, and National Park Service Inventory programs, as well as the BOEM-MARINE program where suitable. Researchers will apply an analytical approach to utilize existing habitat data supplemented with newly collected biological data to better document ecological processes in nearshore areas, producing derived geographical datasets and maps to help inform resource managers, stakeholders, and decision-makers.

This project will also coordinate with existing efforts to compile historical hydrocarbon data and provide online public access. The data will include appropriate concomitant parameters (e.g. organic carbon, sediment grain size) and associated metadata. Based on this information, areas with accessible marine bivalves will be selected near two communities in Kachemak Bay for community monitoring of PAHs.

Current Status: Ongoing

Final Report Due: December 2019

Publications Completed: None

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

Revised Date: August 2016

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