

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Cook Inlet

Title: Testing the Use of Unmanned Aircraft Systems for Intertidal Surveys – proof of concept (AK-13-03-08)

BOEM Information Need(s) to be Addressed: This study will promote better understanding of marine, coastal, and human environments potentially affected by OCS oil and gas exploration and extraction. It will improve benchmark data on the biological communities that may be impacted by these stressors. This information will support analysis of potential impacts from oil spills in Cook Inlet. BOEM analysts and decision-makers will use this information in NEPA analysis and documentation for the upcoming Cook Inlet Lease Sale 244, as well as potential future lease sales, EPs and DPPs.

Total Cost: \$31,254
plus Joint Funding (\$25,254)

Period of Performance: FY 2014-2016

Conducting Organization: CMI, UAF

BOEM Contact: [Rick Raymond](#)

Description:

Background: Intertidal monitoring is important to sustain ecosystem health and functioning, as coastal systems are particularly vulnerable to environmental stressors from potential oil spills and other human impacts. Traditional land based intertidal monitoring efforts are currently limited in their practicality and usefulness because these methods greatly limit the spatial extent from which data can be collected. Presently, surveys are restricted to extreme low tide periods and researchers can only survey the various intertidal strata on small stretches of specific beaches. Ground surveying of multiple beaches or longer stretches of beach is time consuming, requires multiple investigators, and increases the costs of a monitoring program considerably. Because of the extremely high spatial heterogeneity in intertidal systems, monitoring programs need to cover extended areas to produce the most useful data for decision-making and management.

Using imagery obtained with unmanned aircraft systems (UAS) to collect larger scale benchmark data on intertidal communities is a cost-effective alternative to expand intertidal monitoring. As a proof-of concept, this study will build on existing, traditional monitoring efforts in the rocky intertidal and sea grass systems in Kachemak Bay, Alaska, which will allow ground-truthing of the UAS-derived data.

Objectives: The overall goal is to determine if UASs can be used to expand current intertidal monitoring in Cook Inlet, and ultimately elsewhere. Specific objectives include:

- Identify whether there is a statistical difference in intertidal community data collected by unmanned aircraft system using imagery for longer 1-km transects compared to shorter 50-m ground surveys using the quadrat method over the same spatial extent of surveyed beach.
- Identify whether longer beach stretches surveyed by UAS will capture more natural variability in intertidal systems, thus having higher variance in longer 1-km transects when compared to shorter 50-m transects.

Methods: Field work will be conducted along intertidal zones in Kachemak Bay during the summer season of 2014. Derived data will be used to assess the state, natural variability, and impacts of disturbances on intertidal communities. As part of the Gulf Watch Alaska monitoring program, intertidal systems will be examined using quadrat sampling to quantify biological variables such as percent cover of sessile organisms. Using Gulf Watch protocols, four intertidal strata (high, mid, low, -1 m) will be surveyed along 50 m transects at various beach sites (five rocky beaches and four seagrass sites). Along each transect, ten 1-m² quadrats will be surveyed for percent cover of sessile invertebrates and algae. Because the spatial extents of intertidal surveys are limited, UAS-supported imagery will expand the spatial coverage at one rocky and one seagrass site in Kachemak Bay. UAS surveys will allow comparable data to be collected from a much larger area than was previously possible using traditional ground quadrat sampling.

Current Status: Ongoing

Final Report Due: May 2016

Publications Completed: None

Affiliated WWW Sites: <http://www.boem.gov/akstudies/>
<http://www.sfos.uaf.edu/cmi/>

Revised Date: April 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