

Environmental Studies Program: Ongoing Study

Title	Early Detection Plan for Marine Non-native Species on the Arctic Outer Continental Shelf (OCS) (AK-20-07)
Administered by	Alaska Regional Office
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Procurement Type(s)	Interagency Agreement
Conducting Organization(s)	Smithsonian Environmental Research Center
Total BOEM Cost	\$649,983
Performance Period	FY 2020–2025
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PICOC Summary	
<i><u>Problem</u></i>	The potential for introduction of marine Non-Native Species (mNNS) in the Alaska region is increasing in response to a changing climate coupled with increased shipping and other human activities. There are currently no tools or protocols in place for oil and gas activities on the Alaska OCS to provide guidance for the early detection, containment and/or removal of invasive species.
<i><u>Intervention</u></i>	This study will create a baseline record of the current planktonic, benthic and attached organism communities to provide a benchmark comparison to detect mNNS and develop early detection monitoring and response plans for any mNNS that is deemed invasive.
<i><u>Comparison</u></i>	This study complements planned and ongoing efforts by multiple organizations in Alaska to establish a baseline record of plankton, attached and benthic communities, including those currently associated with existing infrastructure in state waters.
<i><u>Outcome</u></i>	This study will provide baseline data and a monitoring plan for the early detection of mNNS, and an associated response plan aimed at containment and eradication of detected invasive species.
<i><u>Context</u></i>	Beaufort Sea and Chukchi Sea, focusing on areas with existing or potential future offshore infrastructure.

BOEM Information Need(s): The National Environmental Policy Act (NEPA) requires BOEM to evaluate potential impacts that may be associated with Outer Continental Shelf (OCS) oil and gas activities. In addition, NOAA’s National Marine Fisheries Service has emphasized the importance for marine non-native species (mNNS) monitoring as part of the Essential Fish Habitat (EFH) consultation process. Results from this study will inform analyses under the NEPA for future lease sales and may facilitate development of potential mitigation measures.

Background: Increased ship traffic and other activities offshore of Alaska, including new OCS infrastructure that could create new habitats for establishment of mNNS, together with ocean warming will increase the potential for the introduction of mNNS. The definition of a non-native species is any

species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to a particular ecosystem; whereas the definition of an invasive species is a non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health ([Executive Order 13112](#)). The detection of mNNS is the first step towards identifying and preventing the establishment of invasive species.

Monitoring for mNNS has not been a primary focus in relation to oil and gas development in Alaska. This project will develop a standardized monitoring plan for mNNS to guide current and future development activities within the Beaufort and Chukchi Sea Planning Areas. Results from this project will complement other BOEM-supported efforts in the Arctic (AK-15-01; AK-20-07) and in Cook Inlet (NT-17-x10) and may help to extend the reach of PlateWatch (platewatch.nisbase.org), a citizen science network in southeast Alaska, as well as parallel efforts to monitor plankton communities by the Prince William Sound Regional Citizens' Advisory Council.

Objectives:

- Establish a baseline dataset of benthic and planktonic species associated with key habitat types in the Beaufort Sea and Chukchi Sea Planning Areas to use as a comparison benchmark for future monitoring.
- Establish a monitoring plan for detection of benthic and planktonic mNNS covering key habitat types in the vicinity of current and potential future oil and gas activities in the Beaufort and Chukchi Sea Planning Areas.
- Record LTK for comparison and inclusion into biological assessments and incorporate citizen science in the monitoring plan, where practical.
- Provide an early detection response plan that includes evaluation and protocols for potential containment and eradication, in the event mNNS are detected and considered invasive.

Methods: Work will include the development of a current biological inventory for selected taxonomic groups of benthic and planktonic organisms associated with key substrate types (e.g., hard, soft, and artificial, among others) to contribute to the baseline dataset for comparison with future sampling efforts. Additional field sampling, including settlement devices, plankton tows, substrate scrapes, and collection of open water eDNA, may be required to achieve an adequate inventory across key substrate types. Taxonomic and genetic data will be verified by experts and compared with the compiled baseline community database to determine presence of mNNS; sequences will be accessible through GenBank. Species records will be archived, linked with results from other relevant projects, and published on the AOOS website. The status of LTK as it relates to marine invertebrates and introductions of non-native species may be captured via community and panel discussions, reporting from the LEO network, and digitization of physical records. Where practical, local citizens will be involved with the field surveys.

A monitoring plan will be developed for detecting mNNS in the Beaufort and Chukchi Sea near areas of existing State of Alaska oil and gas installations and potential future OCS activity. This monitoring plan will include a sampling design that covers the necessary temporal and spatial scales needed to identify the introduction of mNNS based on known pathways of introduction. Species distribution models will also be considered to highlight species with broad environmental tolerance that would be considered likely invaders as the climate changes. This study also will develop an early detection response plan that includes containment and eradication protocols in the event mNNS are detected and deemed invasive.

Suggested protocols for containment and/or eradication will be based on current best practices used in analogous habitats, when possible, or analogous taxonomies.

Specific Research Question(s):

1. What do marine invertebrate communities look like near areas of current and potential future oil and gas installations in the Arctic?
2. Are artificial substrates and habitats created from Installations facilitating the establishment of mNNS in the Arctic?
3. How can LTK inform mNNS monitoring and management?
4. What is an appropriate response plan for notification, containment and eradication if an invasive species is identified?

Current Status: Ongoing, data analysis underway.

Publications Completed: None

Affiliated WWW Sites:

<http://www.boem.gov/akstudies/>