

## Environmental Studies Program: Ongoing Study

Title	Marine Arctic Ecosystems Study (MARES): A Multi-Agency NOPP Partnership (NT-13-05)
Administered by	Alaska Regional Office
BOEM Contact(s)	Dr. Heather Crowley, <a href="mailto:heather.crowley@boem.gov">heather.crowley@boem.gov</a>
Conducting Organizations(s)	Stantec Consulting Services Inc.
Total BOEM Cost	\$5,415,501 plus Joint Funding (\$547,583)
Performance Period	FY 2015–2020
Final Report Due	September 2020
Date Revised	October 15, 2020
PICOC Summary	
<i>Problem</i>	BOEM needs additional comprehensive and integrated information to better understand and assess arctic ecosystem sensitivities and vulnerabilities that can aid decision-makers in minimizing the impact of the oil & gas activities on the Outer Continental Shelf.
<i>Intervention</i>	This partnership between BOEM, ONR, Shell, and USARC takes an integrated ecosystem approach to monitoring environmental change in the Arctic while coordinating the efforts of several Federal agencies.
<i>Comparison</i>	Coordinated observational and modeling efforts will produce information that will be analyzed from different perspectives: a) ecosystem understanding and environmental protection, b) climate change and monitoring, and c) Oil-Spill Risk Analysis.
<i>Outcome</i>	This study will develop a description of the biogeochemical-physical interactions and feedback processes in ice free and ice covered areas, including a detailed spatio-temporal description of ocean currents at different depths along the Beaufort continental shelf, including ice covered areas.
<i>Context</i>	The U.S.-Canada border region of the Beaufort Sea

**BOEM Information Need(s):** Through this multi-agency agreement under the National Oceanographic Partnership Program (NOPP) BOEM expects to enhance multi-lateral arctic research coordination and to improve regulatory decisions and NEPA analyses pertinent to lease sales, EPs, and DPPs in the Beaufort Sea. The partnership will lead to specific task orders and objectives that will be developed and procured as discrete study profiles. Final reports will be available to inform NEPA analyses and decision-making; interim data products and inputs may also be used to address information needs.

**Background:** BOEM needs additional comprehensive and integrated information in the Arctic on the spatio-temporal distribution of fundamental physical, biological and chemical variables, their associated interactions and regulating mechanisms, as well as the distribution of cultural and subsistence resources which sustain local communities. This information will be used to better understand and assess arctic ecosystem

sensitivities and vulnerabilities as a function of space and time to aid decision-makers in minimizing the impact of the oil & gas activities on the Outer Continental Shelf. The resulting information will support NEPA analyses, in validating models, and in Oil-Spill Risk Analysis. Additionally, these observations and improved description and understanding of biogeochemical and physical interactions will aid to improve the accuracy of model simulations and forecasts. Coordinated observational and modeling efforts will produce information that will be analyzed from different perspectives: a) ecosystem understanding and environmental protection, b) climate change and monitoring, and c) Oil-Spill Risk Analysis.

This partnership between BOEM, ONR, Shell, and USARC takes an integrated ecosystem approach to monitoring environmental change in the Arctic while coordinating the efforts of several Federal agencies. It is also responsive to the Interagency Arctic Research & Policy Committee (IARPC) 5-year plan (2017-2021) and research priorities, as well as recommendations from earlier MMS/BOEM studies.

### **Objectives:**

- Identify and delineate areas of high biological productivity, as well as relative sensitivities and resiliencies to changes in environmental conditions within ecosystem components. This includes a detailed description of different trophic levels and their composition in terms of species abundance, distribution, and behavior in both ice free and ice covered habitat.
- Provide a qualitative and quantitative description of the biogeochemical-physical interactions and feedback processes in ice free and ice covered areas.
- Provide a detailed spatio-temporal description of ocean currents at different depths along the Beaufort continental shelf, including ice covered areas.

**Methods:** Proposed studies will emphasize an integrated, or ecosystems approach to data collection or synthesis. Each study will be based on the application of appropriate scientific methodologies, coordinating observational and modeling efforts, while focused on essential processes, functions and interactions among organisms and their environment. Proposed studies will recognize that humans, with their cultural diversity, are an integral component of ecosystems, and will accommodate appropriate methods of integration where possible, including access to traditional knowledge with active involvement of Alaska Natives in research planning and execution. Proposed studies will also seek to advance, where appropriate, the use of technology and instrumentation in monitoring and understanding complex ecosystem processes.

### **Specific Research Question(s):**

1. What ecosystem changes are being observed in the Arctic?
2. How are different ecosystem components responding to these changes?

**Current Status:** Completed.

## **Publications Completed:**

- Wiese FK, Ashjian C, Asplin MG, Borg K, Fabijan M, Fissel D, Gryba RD, Gong D, Harvey R, Lin P, McMahon R, Monacci N, Nelson RJ, Neubert P, Pickart R, Rousseau S, Stafford K, Turner C. 2020. Marine Arctic Ecosystem Study (MARES): Moorings on the Beaufort Sea shelf (2016–2018) and Program Synthesis. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2020-029. 286 p.
- Wiese, F.K., R. Gryba and B.P. Kelly. 2017. Marine Arctic Ecosystem Study - Pilot Program: Marine Mammals Tagging and Tracking. US Dept. of the Interior, Bureau of Ocean Energy Management, Alaska Region, Anchorage, AK. OCS Study BOEM 2017-017. 78 pp.
- Wiese F.K., Harvey H.R., McMahon R., Neubert P., Gong D., Wang H., Hudson J., Pickard R., Ross E., Fabijan M., Gryba R.D. 2018. Marine Arctic Ecosystem Study—Biophysical and chemical observations from glider and benthic surveys in 2016. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2018-024. 98 p.
- Wiese, F., E. Ross, D. Gong, R. Pickart, M. Fabijan, D. Fissel, R. Gryba. 2018. Marine Arctic Ecosystem Study (MARES): New Measurements on the Eastern Beaufort Sea Shelf. Poster presentation at the Alaska Marine Science Symposium, January 2018, Anchorage, AK.

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

<https://marinecadastre.gov/espis/#/search/study/27034>