

Background

The Arctic Integrated Ecosystem Research Program (IERP) will invest approximately \$16 million in studying marine processes in the northern Bering and Chukchi Seas in 2017-2021, beginning in the summer of 2017. The program is sponsored by North Pacific Research Board (NPRB), Collaborative Alaskan Arctic Studies Program (formerly the North Slope Borough/Shell Baseline Studies Program), Bureau of Ocean Energy Management, and the Office of Naval Research Marine Mammals and Biology Program. Generous in-kind support has been contributed by the National Oceanic and Atmospheric Administration and the University of Alaska Fairbanks.

The program will integrate observations collected during spring, summer, and fall in 2017, 2018, and 2019 to better understand how reduced Arctic sea ice and associated environmental changes influence the flow of energy through the marine ecosystem from plankton to fish, seabirds, marine mammals, and humans. Late spring and early summer sampling will occur in 2017 and 2018 aboard the R/V *Sikuliaq*. Late summer and early fall sampling will occur in 2017 and 2019; a research vessel for this portion of the program has not been determined.

Late Spring Season Cruises | 2017 & 2018 (May - June)

Who is conducting the research?

Scientists with the University of Alaska Fairbanks and the University of Washington with guest collaborators from Hokkaido University, the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration.

What is the objective?

To better understand changes to the regional marine ecosystem resulting from the changing sea ice environment.

What and where?

Late spring expeditions will take place on the UAF-based R/V *Sikuliaq* between St. Lawrence Island and Cape Lisburne over a 3-week period from mid or late May into June in 2017 and 2018.

In the first half (approx. 10 days) of each expedition, we plan on working at ten research “*process station*” locations from south to north (yellow squares on Figure 1), setting up experiments for plankton and sediment growth and respiration incubations. As the ship visits these research locations, we would service five sets of submerged moorings (blue stars on Figure 1) that carry underwater instruments, retrieving the sound and data recordings and changing batteries. The ship will next transition to a “*survey station*” mode of operation for the remaining 10 days, returning south again.

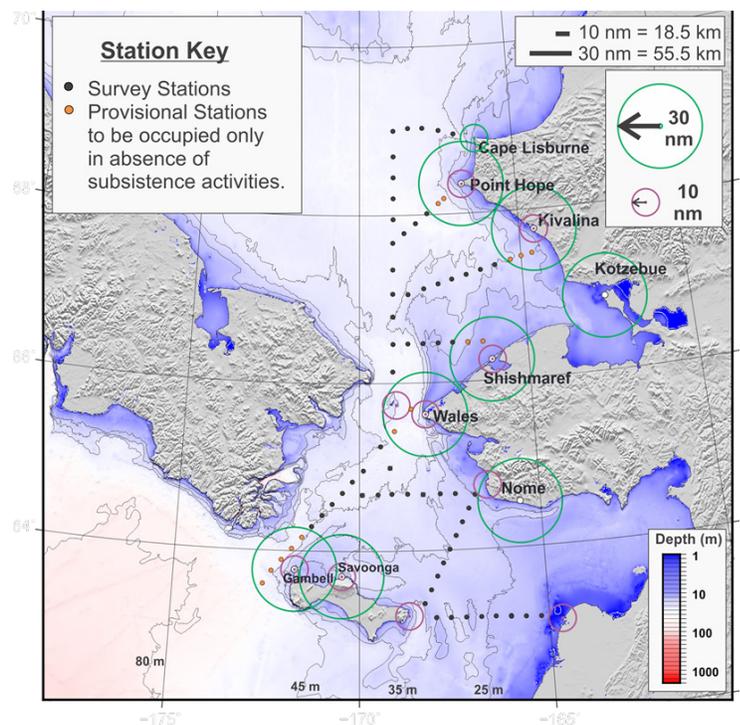


Figure 1: Map showing proposed ship stations and mooring locations of the Arctic Shelf Growth, Advection, Respiration and Deposition (ASgard) measurements.

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Mooring-based underwater instruments (blue stars on Figure 1) are submerged 60 or more feet below the sea surface to gather information on:

- » marine mammal underwater calls, level of large ship noises, and other sources of sound;
- » ocean temperature, salinity, and nutrient concentrations;
- » amount and composition of water flowing north past the east and west sides of St. Lawrence Island;
- » amount of nutrients and algae in the water column that are available to seafloor-dwelling organisms (i.e. clams, crabs, worms); and
- » how winds can change the speed and direction of ocean currents.

How close to shore will you get?

Six “process stations” are within 30 miles of shore, and none are within 10 nautical miles of shore. Five of our 75 planned “survey stations” are located within 10 nautical miles of shore, with the closest of these being about 3 miles offshore. We anticipate that the vessel will remain at “process stations” for less than 16 hours and that “survey stations” will be occupied for 3 hours each or less.

What kind of gear will be used?

Water column: We will collect net tow samples for phytoplankton with a 35 µm ring net, and for zooplankton with 150 µm and 505 µm Bongo nets. We will collect water samples for nutrients and plankton using a 24-place 10-liter bottle Rosette.

Seafloor: Bottom grabs with a 0.25 m² Van Veen grab or a 0.1 m² Haps core or a 12-place multicore.

No fishing activities have yet been funded for this cruise, but UAF collaborator B. Norcross has a pending proposal to add up to 20 midwater and benthic trawl stations using an Aluette midwater trawl and a 3-m plumbstaff beam trawl, respectively.

When can we expect to hear back from someone on results of the research?

We will have a cruise report available for email distribution within 30 days of each cruise. Our final report and numerous science results publications will be available prior to the project end in September 2021. Additionally, we anticipate participating in opportunities to bring our research results to coastal communities via lectures and workshops that will be part of the Arctic Integrated Ecosystem Research Program.

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