

NSF NNA: RCN: Establishing a North Atlantic Arctic Network (NAAN)

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Summary: The Arctic is at the vanguard of anthropogenic climate change, and regional and global impacts are expected to grow and amplify in the future. Alaska has traditionally been the focus for U. S. based Arctic research and policy. However, as climate continues to change, the prospect of more navigable Arctic Sea routes, more accessible natural resources, changing ocean and atmospheric circulation patterns, and rising seas increases. There is an urgent need to expand the nation's focus to study and respond to the impacts of Arctic change on the North Atlantic sector of the Arctic, including New England and the Gulf of Maine. We propose to launch a **North Atlantic Arctic Network (NAAN)**, building from a core group of researchers and stakeholders who participated in the March 2018 workshop *Convergence: Preparing for a Northwest Passage – The Role of New England in Navigating the New Arctic* (NSF #1744346).

Our primary goal is to foster connections and research collaborations among people living and working in the North Atlantic Arctic via the development and evolution of the NAAN. Our objectives are to: 1) identify and coordinate convergent, North Atlantic Arctic research efforts; 2) engage Arctic and other North Atlantic coastal communities; and 3) communicate findings broadly across the NAAN and beyond.

Convergent Research Questions

1. How can we better anticipate unexpected and abrupt responses of ecosystems to changing climate, northward shifts of species ranges, and human exploitation of natural and biotic resources?
2. How can traditional knowledge, citizen science, and fully engaging stakeholders in design and execution of research improve understanding of the scale and rate of change across all the inter-linked systems in the Arctic and connected regions?
3. Does education about risk-assessment for communities facing environmental change and development of contingency plans (including managed retreat) result in better outcomes? Are communities the appropriate focus or will collective/regional efforts be more effective? How can non-market valuation of ecosystem and cultural services be better factored into such risk assessment?
4. What is the economic impact across the North Atlantic region of projected changes in destination and trans-Arctic shipping, tourism, and resource extraction? Can ecosystem based management with public participation be balanced against this increased economic activity?

Table 1: Examples of convergent Arctic research questions stemming from the March 2018 *NE Arctic Convergence Workshop* hosted by UNH

Impact of Arctic environmental change

In the Arctic

How can Arctic infrastructure (roads, ports, telecommunications, buildings) be made more resilient in response to thawing permafrost, sea level rise, and eroding coastlines? Can redevelopment-replacement of these assets incorporate smart sensors to improve understanding of the rates and controlling processes putting communities at risk?

What is the impact on human health of toxic pollution and “zombie” pathogens from melting glaciers and thawing permafrost re-entering ecosystems in the Arctic?

In the Eastern North Atlantic

Can we understand and predict how ocean circulation, salinity, and nutrient loading in the North Atlantic will change due to Arctic ice melt, and impact biological productivity and fisheries?

How will the atmospheric response to changes in Arctic ice and oceanic adjustments impact key ecosystems services in the North Atlantic region?

Connections

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Does education about risk-assessment for communities facing environmental change and development of contingency plans (including managed retreat) result in better outcomes? Are communities the appropriate focus or will collective/regional efforts be more effective? How can non-market valuation of ecosystem and cultural services be better factored into such risk assessment?

Impact of Arctic social and economic change

In the Arctic

What historical comparative models can be used to assess and improve Arctic policy and regional management efforts? Can past gold rushes and similar bonanzas inform more sustainable oil, gas, and mineral exploration in the Arctic? Can lessons from the history of New England and North Atlantic fisheries be applied to new fisheries in the Arctic?

In the Eastern North Atlantic

Can sustainable, equitable development of shipping in the NW Passage be done in a way that does not disproportionately harm coastal communities and ecosystems? Which North Atlantic ports and industries are most attractive for sustainable economic investment, with smallest ecological and social collateral damage, in response to a changing Arctic?

Connections

What is the economic impact across the North Atlantic region of projected changes in destination and trans-Arctic shipping, tourism, and resource extraction? Can ecosystem based management with public participation be balanced against this increased economic activity?

How can traditional knowledge, citizen science, and fully engaging stakeholders in design and execution of research improve understanding of the scale and rate of change across all the inter-linked systems in the Arctic and connected regions?