

HUMANS AND THE ARCTIC NEARSHORE ENVIRONMENT

REPORT OF AN ONLINE WORKSHOP ORGANIZED BY THE
HARC SCIENCE MANAGEMENT OFFICE
APRIL 22–24, 2002

BACKGROUND

The Human Dimensions of the Arctic System (HARC) research initiative, a component of the National Science Foundation's (NSF) Arctic System Science (ARCSS) Program, began in 1997. Since then, HARC projects have examined several ways in which humans affect and are affected by the arctic system. In an effort to spur greater activity in the initiative, NSF has sponsored a Science Management Office (SMO) for the HARC initiative. The Humans and the Arctic Nearshore Environment workshop is the fifth in a series of online workshops designed to stimulate discussion about topics related to HARC and to inspire researchers to submit proposals to the initiative.

INTRODUCTION

The nearshore area is vital for many arctic residents. Coastal communities depend on access to the sea and to sea ice, but are vulnerable to flooding and erosion. Significant subsistence activities take place in the nearshore area. The interactions among terrestrial, freshwater, and marine systems govern the boundary conditions associated with the nearshore as well as feedbacks on each of those systems. These interactions have a human element, too, as people affect the nearshore and are in turn affected by it. To involve natural scientists, social scientists, and arctic residents in a discussion of this topic, the HARC SMO organized an online workshop to discuss some of the issues related to humans and the arctic nearshore environment. Transcripts of the discussions in PDF format, the participants list, and further information about HARC and the workshop can be found on the HARC website (www.arcus.org/harc).

This report is intended to highlight research ideas and opportunities that arose during the workshop. These ideas are neither exhaustive nor exclusive. There is considerable overlap, and

potential projects may well include ideas from more than one section of this report. We hope readers and participants will use this report as a starting point for developing proposals to the HARC initiative. Some of the ideas described are worthy of further attention, but do not fit easily within the scope of HARC. Future workshops will also be held in an effort to help bring researchers together to collaborate on human dimensions research. The SMO welcomes ideas for additional workshops or other ways of promoting collaborative discussions about human dimensions of the arctic system. Those interested in proposing to HARC should visit the HARC website for further information, including contact information for the program director at the National Science Foundation.

PLANNING

As climate changes, the magnitude and frequency of extreme events may change, too. Quantifying new probabilities of extremes is likely to be impossible, but planning processes need to be able to incorporate new information and uncertainty. The characteristics of the planning process and the ways in which it can be adapted to increase flexibility are a ripe topic for research. In the nearshore environment, urgent planning issues include erosion, the location of communities, flooding, and water and wastewater practices and systems. Information about coastal dynamics and long-term patterns in erosion is essential to better planning, and such information needs to be made available in the planning process as well as to the research community. Past responses to climate and other environmental change offer some insight into the prospects of modern arctic communities and the potential decisions they will have to make. The perception of risk and the communication of both risk and probability of change are other areas where more research is needed.

WASTE MANAGEMENT

Most small arctic communities have limited systems for treating waste before releasing it into rivers or the ocean. A common assumption is that the quantity of waste is relatively small, so currents and dilution will effectively prevent any environmental impact. Nonetheless, waste releases in some areas may be a significant source of pollution, with potential impacts on biota. Arctic communities are often located next to biologically productive areas or mariculture sites, which may be particularly sensitive to pollution. Some comparative studies have looked at the effectiveness of various waste handling systems in arctic communities, but more work could be done on a wider scale. Furthermore, the application of knowledge to the design and operation of waste systems could benefit from better communication with scientists engaged in basic research in nearshore areas. A particularly important aspect of improved communication is the relationship with arctic communities, which develop over time and can benefit research and planning efforts as well as the community itself.

NEARSHORE BIOLOGY

Changes in oceanographic features such as the presence of sea ice and the extent of nearshore brackish water may have significant impacts on the productivity and biodiversity of nearshore areas. Human activities, too, may have an impact in this zone, particularly through the outflow of municipal waste, as discussed above. It is also important to recognize that humans have modified the nearshore environment for thousands of years, and the changing role of people within the ecosystem needs to be taken into account. Research on the potential impacts of climate change could start with an examination of the effects of extreme conditions in recent years or decades, such as years with greatly reduced sea ice or with above-average water temperatures. The effects of recolonization or recovery must be taken into account, since these reduce the long-term impact of interannual variation but may not be sufficient to counteract long-term change. The effects of such changes on humans depend greatly on the impacts to species that are hunted or fished, or to access routes across sea ice or through nearshore waters and river mouths.

VULNERABILITY AND PAST RESPONSES

Historical and archeological records clearly show the vulnerability of societies to major changes in the nearshore environment. These records also provide examples of adaptation and resilience. The role of social factors in successful adaptation is an important research topic, to better understand the interplay between society and environment for example in the successful adaptation of Thule Inuit to the Little Ice Age in contrast the demise of the Norse settlements in the same part of Greenland. The relative importance over time and space of certain characteristics to determine the desirability of settlement locations is another area for examination, especially in light of environmental and economic pressures related to re-location of villages in several parts of the Arctic. Non-linear changes, too, need careful consideration because they force the most immediate and perhaps drastic changes in human behavior.

CONCLUSIONS

The nearshore environment plays a major role in human activity in the Arctic, from hunting and fishing to industrial development and waste disposal. Understanding the ways humans affect and are affected by the nearshore and changes thereto is a compelling area for research today, especially when carried out in conjunction with the extensive natural science studies that are taking place or being planned. The workshop provided a starting point for researchers interested in developing proposals in this area, which we hope will grow into a substantive human dimensions component of the nearshore initiative currently being developed.

ACKNOWLEDGMENTS

The HARC Science Management Office would like to thank Anne Jensen and Lee Cooper for serving as moderators of the Humans and the Arctic Nearshore Environment workshop. We would also like to acknowledge the great behind-the-scenes work of Dan Ferguson at ARCUS, without whom the workshop would not have been possible. We are grateful to the National Science Foundation for funding the HARC SMO and its activities such as the online workshops. Finally, we would like to thank all the participants for joining us online and contributing their ideas.