Observing Needs for Arctic Heritage and Paleoecological Resource Conservation Management

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Archaeological sites in the Arctic and Subarctic hold an irreplaceable record consisting not only of material remains relating to long-term human history, but also of extensive paleoecological data accumulated by past human actions. However, climate change related processes are leading to the accelerated destruction of these heritage resources, with all the information they contain. As a result, on behalf of the Polar Archaeology Network, we present this short note to introduce these issues to the Arctic Observing Summit (AOS).

Two primary types of information are stored in archaeological sites. First, and most obvious, are cultural materials that allow reconstruction of the histories and societies of peoples who have inhabited northern regions, from Pleistocene hunter-gatherers through historic European exploration to modern indigenous peoples. Much of this record is irreplaceable, because associated written records do not exist; in conjunction with modern peoples' traditional historical and ecological knowledge, it can be used to reconstruct the cultural and environmental histories of the circumpolar Arctic. Moreover, for northern peoples, a strong connection to history and traditional culture is an important element of identity and well-being; the part of this connection that is contained in archaeological and historic sites is at risk of loss. Second, over millennia, northern peoples accumulated and concentrated zoological, botanical, and microbial organisms in their settlements. These biological materials simply do not survive in most other contexts, but rapid burial, dry and cold conditions, and incorporation into permafrost in arctic archaeological sites allows their preservation. These biological data are useful for the reconstruction of paleoclimate, and of marine and terrestrial ecosystem structure and function. They also yield invaluable direct evidence of species diversity, distributions, and genetic variability during the Holocene. Thus, they can provide necessary baseline information for understanding current ecological change, and planning for and managing future changes.

Climate change related threats to the arctic archaeological record are numerous. Sea level rise, often in concert with land subsidence, leads to increased coastal erosion. Longer open water periods lead to increased storm impacts on coasts, and also to increased shipping, tourism, and industrial activities that can have direct negative impacts. Thawing of permafrost is potentially the most damaging factor, as increasingly deep active layers are exposing long-frozen deposits to accelerated wet/dry and freeze/thaw cycles, microbial activities, and other physical processes.

Heritage resource scientists, administrators, and cultural organizations in many circumpolar nations are developing strategies for coping with this loss. For example, threat assessment matrices are being developed to explore regional variability in coastal erosion and permafrost thawing, and important threatened sites are being mapped and in some cases excavated. However, daunting challenges remain in terms of coordinating international activities, leveraging the use of existing observational programs and relevant instrumentation and field stations, raising funds, prioritizing critical sites and regions, developing protocols for preservation and archiving of archaeological and paleoecological materials, developing data sharing policies, and establishing new research networks.

We seek to incorporate heritage and paleoecological resource observing issues into AOS discussions. Often overlooked, these matters transcend the boundaries between the past, present and future, and between the physical and human dimensions of the arctic system. The observing needs are systematic, long-term and multi-disciplinary, and they are closely linked to other initiatives within the AOS, including cryosphere observing, community-based monitoring, and coastal observing.

Polar Archaeology Network: http://uit.no/publikum/prosjekter/prosjekt?p_document_id=270892