

# INTERNATIONAL POLAR HERITAGE COMMITTEE

## Heritage at Risk in the Polar Regions

In the *Heritage at Risk* publications of 2001, 2002/2003, 2004 and 2006/2007 various threats to and challenges concerning the conservation of monuments and sites in the polar regions were presented. Unfortunately, none of these negative concerns have been reduced during the past years; on the contrary, the challenges to the health and safety of polar heritage are only increasing.

### Global warming is the greatest threat to the polar regions

Where the history of human presence in the High Arctic can be traced back to at least 28000 years ago, when small groups began moving into north-eastern Siberia from eastern Asia, human history in Antarctica began as late as the early 19th century and for reasons of climate and logistics was only scattered and intermittent up to recent times.<sup>1</sup> However, even though the global climate has earlier seen both Ice Ages and interglacial warm periods, reconstructions show that the current global temperature is higher than at least 75 % of the temperatures during the past 11 300 years or so and that the current temperature increase is an almost vertical line on the graph.<sup>2</sup> The latest Intergovernmental Panel on Climate Change (IPCC) Special Report on the impacts of global warming estimates that human activities have caused from 0.8°C to 1.2°C of global warming above pre-industrial levels.<sup>3</sup> Over

and above this, the Arctic is warming at almost twice the global average.<sup>4</sup> In Antarctica the mean annual air temperature of the Antarctic Peninsula has increased by nearly 3°C in the last 50 years, with parts of the Arctic being the only comparable region. The temperature of the rest of Antarctica shows indications of rising at a slower rate, but still rising.<sup>5</sup> At the end of July 2019 the regular temperature observations in the Arctic archipelago of Svalbard (Longyearbyen) showed 104 continuous months of average temperatures over the normal (= the period 1961–1990).<sup>6</sup>

### Cruise tourism is a huge challenge

Therefore, our previous reports of the negative impacts of the warming polar regions are still relevant, and at an increasing rate. Diminishing sea ice has steadily opened areas to cruise tourism at the same time as cruise tourism is becoming a global problem with its fuel-consuming pollution as well as the impact of up to several thousand passengers being disgorged at vulnerable sites of both cultural and natural significance. New cruise ships were being built in 2018 by “Just about every major cruise line”,<sup>7</sup> while 41 new cruise ships designed for sea ice conditions are planned to be launched between 2019 and 2022.<sup>8</sup>

There is a small consolation in the messages from some cruise operators that they understand the challenges and are modernising and adapting the design of ships towards more “environmentally friendly” ships with regard to details ranging from fuel to plastic spoons. However, the best way for cruise operators to



Fig. 1: The historical trapping station 'Fredheim' in Svalbard was moved in 2015 to the ridge to be seen on the left in order to escape from the rapid shoreline erosion (photo Susan Barr)



Fig. 2: Attempts to stop coastal erosion in Barrow, Alaska (photo Susan Barr)



Fig. 3: Snow Hill historic hut in Antarctica showing an attempt to stop increasing erosion of the gravel mound it sits on (photo Mike Pearson)

help to protect polar heritage is to refrain from transporting large numbers of people to these fragile areas, where even a few boots walking around a modest heritage site can cause indelible tracks and irreparable damage to the logs, planks, turf and whale bone structures that are hardly comprehensible without knowledgeable explanations, yet are unique bearers of information about earlier human activity in these harsh regions.

### Natural erosion threatens many polar sites

A large percentage of heritage sites in the polar regions are situated near to the coast. For many indigenous people in the Arctic the sea was a major source of food and necessary materials for much of what they needed in life through the food, skins, bones and sinews they could get from seals, small whales, fish, shellfish and polar bears. For explorers, trappers, scientists, sealers and others who travelled to the polar regions, ships and boats were a major means of transportation and dwellings and other structures were naturally established by the coast. Coastal and riverbank erosion has happened throughout time, but the recent accelerated temperature rises, permafrost thaws and diminishing sea ice are causing a rapid increase in erosion which is taking many heritage sites with it to be lost in the sea or river. IPHC member Anne M. Jensen has extensive experience with archaeological challenges in the face of rapid coastal erosion on the north coast of Alaska,<sup>9</sup> while Antarctic colleagues are anxiously debating how Snow Hill hut, one of the six “Heroic Age” huts on the continent, can be saved as the sediment mound on which it was situated in 1902 becomes destabilised owing to thawing permafrost.

### Some mitigation attempts

Three methods currently used in the face of rapid erosion of cultural heritage sites are emergency excavation, digital documentation and physical intervention at the site. Jensen has worked for many years out of Barrow, Alaska on emergency excavations to salvage paleoenvironmental information and indigenous heritage from the rapidly eroding coastline. Amongst several multi-year projects, she has worked with local students to excavate a threatened major Thule cemetery (c. AD 1000–1500) at Point Barrow, Alaska, where the northernmost Ipiutak (c. AD 300–400) occupation in the world was recently discovered.<sup>10</sup>

Digital documentation – 3D scanning – is becoming more widely used as a detailed archival reference where the cultural heritage itself cannot be permanently saved. Currently in Norwegian Arctic Svalbard the coal mining settlement of Sveagruva, which was first established in 1917 but has now been closed down, is being digitally recorded before an ambitious project to erase as much as possible of the activity’s impact on the area is completed. A previous ambitious project on the sub-Antarctic island of South Georgia 3D-scanned the large industrial whaling sites that were in use between 1904 and 1965. These industrial complexes cannot be maintained and are closed to visitors owing to environmental hazards such as decaying buildings and loose asbestos materials. The results of the scanning project, which was financed in cooperation between British and Norwegian authorities, enable virtual visits to the stations and detailed examination of the buildings inside and out.<sup>11</sup>

Physical intervention at an erosion-threatened heritage site can consist of barriers of stone, concrete, sandbags, or other methods to stop the water eating away at the shoreline. This may be effective but is certainly a huge impact on the appearance of the site itself. In the polar areas, there are usually logistical challenges that add to the infeasibility of this approach. In the last instance, if the heritage is a standing structure and not an archaeological site such as a burial area, the structure might possibly be moved to a better-protected site nearby. Two such examples among several are from Herschel Island, Canada in 2003 and Svalbard, Norway in 2015. In 2003 a small building belonging to a whaling and trading company that acted in the Canadian Arctic area at the beginning of the last century was moved back from the shore even as the sea was already lapping around its base.<sup>12</sup> In Svalbard a highly-prioritised historical trapping station from 1927, consisting of three small buildings, was moved 37 metres in from the erosion edge and placed in the same pattern on a raised ridge in order to keep it for, hopefully, a good number of years to come.

### Modern technology aids

IPHC Secretary General Bryan Lintott adds that polar heritage work already also utilises satellite technology for monitoring coastal erosion. This technology provides information on potential archaeological coastal sites at risk and allows informed decisions on how limited heritage conservation resources are allocated. It can also be utilised to monitor illegal activity such

as pillaging of mammoth tusks and the destruction of associated archaeological sites by thieves using high-pressure hoses to erode riverbanks – the sediment generated producing a plume downstream. Illegal surface excavations are also visible.

At the terrestrial level, through motion analysis photogrammetry, images of historic sites and monuments can be used to monitor processes of change caused by natural and anthropogenic factors. Tour operators could contribute to this by ensuring that with each site visit, they produce a set of images that are available to heritage managers and researchers.

### No immediate solutions

Although some may think of the High Arctic and Antarctica as barren, icy wildernesses they in fact contain in sum thousands of monuments and sites, mostly small and modest but all with an important historical message for us today. At a faster rate than ever before the “heritage population” is being reduced owing to both natural causes and to the phenomenon well known amongst us all of heritage being “loved to death”. Those with responsibility and feelings for the polar heritage are doing their best to mitigate degeneration and destruction from either natural or human impact, but the most effective solution to all these challenges would be to be able to influence a return to the frozen state of the regions that we all considered some years ago to be the “natural” state of these extremities on the globe. Unfortunately, it will not happen on my watch!

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### Footnotes

<sup>1</sup> Barr, Susan 2019: Polar Cultural Heritage, Too Important to Lose (English and Chinese). Shanghai.

<sup>2</sup> <https://www.climate.gov/news-features/climate-qa/what%E2%80%99s-hottest-earth-has-been-%E2%80%9C lately-%E2%80%9D>

<sup>3</sup> <https://www.ipcc.ch/sr15/>

<sup>4</sup> <https://arcticwwf.org/work/climate/>

<sup>5</sup> [https://coolantarctica.com/Antarctica%20fact%20file/science/global\\_warming.php](https://coolantarctica.com/Antarctica%20fact%20file/science/global_warming.php)

<sup>6</sup> Statistics from the Norwegian Meteorological Institute.

<sup>7</sup> <https://eu.usatoday.com/story/travel/cruises/2018/01/02/preview-hottest-new-cruise-ships-2018/985165001/>

<sup>8</sup> <https://www.highnorthnews.com/en/french-cruise-ship-set-travel-north-pole-2021>

<sup>9</sup> See for example her slides about this at <https://iceandtime.files.wordpress.com/2016/08/jensen-saa-2016-final-reduced.pdf>

<sup>10</sup> <https://www.arcus.org/researchers/36204/display>

<sup>11</sup> <http://www.shadowindustries.co.uk/south-georgia>

<sup>12</sup> See the article “Canada’s Yukon Territory – Heritage at the Edge” by IPHC member Doug Olynyk, in: *Cultural Heritage in the Arctic and Antarctic Regions*, IPHC publication 2004, pp. 53–56.