Climate Change Resilience of Museum Collections

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What were previously predictions of climate models are being felt in earnest now, and not only in far-away places affected by retreating glaciers or on low-lying islands becoming submerged in rising seas, but also, and very acutely, in the UK. 2022 saw the joint hottest summer on record, the driest summer on record, and the highest temperature on record.

Museums have statutory and conservation obligations to protect cultural heritage collections from deterioration. Deterioration comes in many forms, including inappropriate humidity (too damp—mould; too dry—brittleness), light (fading pigments), air pollutants (chemical deterioration). Some of these 'agents of deterioration' are managed by controlling environmental conditions in collection stores and display galleries. Stable conditions of relative humidity and temperature are frequently maintained with the help of air conditioning systems.

Whilst the presence of air conditioning means that some museums are energy-hungry beasts—something the sector is addressing urgently by modernizing and reducing energy demand as part of climate change mitigation—it also makes museums vulnerable to the impacts of climate change. The discussion about power cuts as a result of heat waves has not quite reached the UK, but museums in other parts of Europe have been warned already to anticipate interruptions to their electricity supplies specifically as a consequence of the impact of climate change. This, combined with searing temperatures, would result in loss of environmental control and, as a result, almost certain damage to cultural heritage collections. In addition, the roof drains of historic buildings were not designed for high-volume rainfall, frequently resulting in flooding.

The impacts of climate change may be direct, as above, or cascading and compound —such as drought affecting urban water infrastructure, energy production, food production, financial services and governance. The combined effects of interacting stressors may affect the ability of individuals and institutions, including museums, to adapt in time, before widespread damage occurs.

For the sake of business continuity, and collections' management and care, this is something that museums must address urgently. Risk assessment approaches are familiar to every conservator—we assess and mitigate as far as possible the risks posed to collections by the 10 'agents of deterioration'. We now need to include the compound effects of climate change in these risk assessments, followed by the incorporation of these risk management strategies into our existing operational and emergency plans. This task is new to the museum sector, yet is incredibly urgent and will require a steep learning curve that can only be achieved effectively in collaboration with competent partners. National Museums Liverpool is currently planning a climate change risk assessment on which to base an adaptation strategy, and we are talking to academic institutions about ways of achieving this. We are only at the beginning of this journey, but we have taken the first steps.

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