

Policy Perspective: Heritage and climate change

The built and archaeological heritage of Northern Ireland is incredibly valuable, both intrinsically and also in the opportunity that it presents for local and regional economies (an idea explored in recent years in NI¹). There is, perhaps, an assumption that our built and archaeological heritage is immutable – possibly because it is so often stone-made. And yet even stone-built heritage is vulnerable to change and decay² - especially in the context of our changing climate. Climate change impacts on heritage sites include flooding, extreme weather events, and the more insidious threat of prolonged periods of winter wetness and high intensity rainfall.



The 'greening' of Fitzroy Presbyterian Church, Belfast

Contrary to popular perception, many monuments and buildings are 'sensitive' to their environment. This means that they will often respond to exposure conditions by manifesting a change in surface characteristics. This has traditionally been seen in the soiling of stone as a result of atmospheric sulphur, but in recent years a change in the nature of pollution (greater proportion of vehicular encouraging deposition of NO_x), combined with increased and more prolonged periods of winter rainfall, has led to a perceived increase in biological soiling. Such changes can be more than simply aesthetic, masking fundamental shifts in the behaviour of the material, with profound implications for decay and conservation³.

¹ <http://www.nienvironmentlink.org/cmsfiles/policy-hub/files/documentation/Built/Heritage-Opportunity-proceedings.pdf>

² Smith, B. J., Gomez-Heras, M. & McCabe, S. 2008. Understanding the decay of stone-built cultural heritage. *Progress in Physical Geography* 32: 439 - 461.

³ McCabe, S., McAllister, D., Warke, P. & Gomez-Heras, M. 2015. Building sandstone surface modification by biofilm and iron precipitation: emerging block-scale heterogeneity and system response. *Earth Surface Process and Landforms* 40:112-122.

The 'deep wetting' of heritage structures is also becoming a recognised issue by authorities such as Historic Scotland and English Heritage⁴, with moisture penetrating further than before through historic structures, weakening materials and causing persistent damp problems triggering other decay processes. This kind of 'deep wetting' has been observed and recorded in research carried out in Northern Ireland⁵.

Understanding the complex impact of climate change seems crucial to the knowledge underpinning the long-term management policies and strategies of our built and archaeological heritage sites. Awareness of these issues is becoming heightened year-on-year as wetter winters and more extreme events emphasise the vulnerable nature of our irreplaceable built and archaeological heritage. NIEL will be presenting on these issues at several upcoming conferences⁶ and Climate Northern Ireland will also be addressing the issue with a conference on climate change and construction in April.

Related recommendations:

- Promotion of the built heritage as an economic driver in Northern Ireland by highlighting its inherent value. DOE's 'Study of the Economic Value of Northern Ireland's Historic Environment' has highlighted that, for every pound of Listed Building Grant Aid invested, there was on average a £7.65 return and for every pound spent by NI core organisations for the historic environment, private sector (construction and out-of-state tourists) spent £3–4
- Investment in research and innovation to assess, monitor and predict the potential impacts of climate change on the built heritage
- Development and implementation of science-based mitigation and adaptation policies and practices to address climate change impacts on built heritage
- Development of policy and guidance to promote conservation/renovation of listed and vernacular buildings as an alternative to replacement/new build and as a means of stimulating economic growth
- Engagement of NGOs in partnership programmes for the restoration and maintenance of sites of built heritage importance, utilising their access to experience, resources and volunteers
- Promotion of traditional skills and employment through local 'skills directories' and delivery of traditional building skills programmes to ensure a new generation of skilled craftspeople for the future

⁴ <http://conservation.historic-scotland.gov.uk/focus2014.pdf>, <https://www.english-heritage.org.uk/professional/research/buildings/building-environment/damp-towers/>

⁵ Smith, B. J., McCabe, S., McAllister, D., Adamson, C., Viles, H. A. & Curran, J. M. 2011. A commentary on climate change, stone decay dynamics and the 'greening' of natural stone buildings: new perspectives on 'deep wetting'. *Environmental Earth Sciences* 63: 1691 – 1700.

McCabe, S., Brimblecombe, P., Smith, B. J., McAllister, D., Srinivasan, S. & Basheer, P. A. M. 2013. The use and meanings of 'time of wetness' in understanding building stone decay. *Quarterly Journal of Engineering Geology and Hydrogeology* 46:469-476.

⁶ Hygrothermal simulation in building conservation and retrofit, 24th February, Historic Scotland; Weather Beaten Archaeology conference, 7th March, IT Sligo