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**CULTURAL HERITAGE
FACING CLIMATE CHANGE:
EXPERIENCES AND IDEAS
FOR RESILIENCE AND ADAPTATION**

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Informing Heritage Policy in an Uncertain Climate. Reflections from Ireland

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Abstract: Cultural heritage policy is likely to be most effective when it is well informed. When creating strategies for climate change adaptation the degree of uncertainty in future modelling poses a substantial challenge. This paper offers a brief exploration of this and other barriers to policy development as raised by professional respondents from fifteen different countries. Efforts to tackle the issue within the Republic of Ireland are explored as a case study. Research and policy developments over the last decade in Ireland are chronicled including the implications of the recently adopted Climate Change Bill. The Irish example demonstrates how uncertainty, future discounting, politics and financial instability impact on the translation of research into policy, and thus on adaptive capacity.

Résumé: La politique relative au patrimoine culturel est certainement plus efficace lorsqu'elle est bien documentée. Quand on bâtit des stratégies d'adaptation au changement climatique, le degré d'incertitude des modèles prédictifs pose un défi important. Cet article offre une brève exploration de cela et d'autres obstacles au développement de politiques telles qu'ils sont apparus aux professionnels correspondants de quinze pays différents. Les efforts pour résoudre le problème dans la République d'Irlande sont explorés comme un cas d'étude. Les développements de la recherche et de la politique durant la dernière décennie en Irlande sont rapportés en incluant les implications du projet de loi récemment adopté. L'exemple irlandais démontre comment l'incertitude, les futures réductions, l'instabilité politique et financière agissent sur la translation de la recherche vers la politique et donc sur la capacité d'adaptation.

Keywords: cultural heritage, policy, adaptation, climate change, Ireland.

Mots-Clés: patrimoine culturel, politique, adaptation, changement climatique, Irlande.

1. Introduction

That we are living in a period of accelerating climatic change is now an unequivocal fact (Pachauri and Reisinger, 2007). According to the Intergovernmental Panel on Climate Change (IPCC) it is *extremely likely* (i.e. a probability > 95%) that man-made fossil fuel emissions have been the dominant cause of this process since the mid-20th century (IPCC 2013). The cultural heritage profession, slow to respond to the challenge initially, has achieved much since the 2005 World Heritage Committee first addressed the problem (UNESCO, 2005). That Decision, which recognised climate change as a concern for cultural as well as natural heritage, arguably marks the point at which the topic began to receive widespread attention within the sector. The development of (the Republic of) Ireland's heritage policy in relation to climate change over the decade since that decision will be examined in this article.

2. Background

Climate change is defined as a change in the average climate or its variability as measured from one averaging period to the next (Parry and Carter, 1998). The standard averaging period or 'climate norm' is 30 years. Measuring the climate norm enables climatologists to distinguish long term patterns from normal climate variability and short term environmental influences (such as volcanic activity). In practice this means that it is not possible to point to any individual event, such as a flood or cyclone, and identify it as an impact of climate change. This lack of immediate and highly visible effects can be problematic when it comes to fostering engagement with the issue. The emphasis on long-term consequences can also lead to an element of future discounting amongst policy makers and funders, with more immediate issues being prioritised instead (Daly, 2013).

Factor	Sub-factor
Resources	e.g. Technological, financial, human
Authority	e.g. Plans and Policy instruments, Political will
Access to information	Monitoring, Guidance and information, Futures thinking
Learning capacity	e.g. Institutional memory, Heritage as a learning resource, Double and Single loop learning
Leadership	e.g. Commitment at senior level, Champions, Creation of a vision, Communication & collaboration, Holistic management
Cognitive factors	Individual perceptions e.g. view of risk, openness to uncertainty

Tab. I. - Six determinants of adaptive capacity relevant to cultural heritage management (adapted from Phillips, 2015).
Les six déterminants de la capacité d'adaptation relative à la gestion du patrimoine culturel (adapté de Phillips, 2015).

There is no quality in human nature, which causes more fatal errors in our conduct, than that which leads us to prefer whatever is present to the distant and remote... (Hume, 1817)

Another significant problem is the level of uncertainty that surrounds climate change. The uncertainty in climate science, as to how exactly the global climate system will respond to rising temperatures, is compounded by the fact that future levels of greenhouse gases depend on unknown policy choices and economic development scenarios (Schneider *et al.*, 2010). To allow for this, the IPCC produce a series of imagined socio-economic futures, 'Scenarios', in which different levels of emissions are forecast. These Scenarios are used to drive the computerised climate models generating projections for the future, based on varying emission levels.

Uncertainty itself cannot be used as an excuse for inaction however. Faced with the possible loss of non-renewable heritage resources decision makers should refer instead to the 'Precautionary Principle' (for example Article 191 of the Treaty of the European Union). This principle of international law aims at ensuring a high level of environmental protection by enshrining the concept of preventative action in cases, such as climate change, where scientific evaluation

identifies a risk but cannot determine it with certainty (European Union, 2012; United Nations, 1992).

The degree to which material cultural heritage is vulnerable to the impacts of climate change will be dependent on its exposure, sensitivity, and adaptive capacity (IPCC, 2001). The IPCC defines adaptive capacity as:

The ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. (IPCC, 2001)

Unlike exposure and sensitivity however, adaptive capacity is not an inherent quality of the system and deliberate efforts to increase the capacity to cope with (or avoid) the impacts of climate change are possible (Allen Consulting Group, 2005). In her analysis of the management of World Heritage properties in the UK Phillips (2015) identified six key determinants for the adaptive capacity of cultural heritage (see tab. I).

3. Common Barriers within the Heritage Sector

Between 2011 and 2012 a series of interviews were conducted with heritage professionals; those either working or researching in the area of climate change and cultural heritage (Daly, 2013). Thirty individuals from fifteen different countries were asked about their work and their opinions on future research and policy requirements. Respondents were asked whether they had noted any impacts on cultural heritage which they attributed to climate change. Their answers highlighted areas where cultural heritage is most vulnerable to climate change impacts, namely Polar and Sub-Polar regions and coastal zones. The majority of respondents were already seeing damage caused by changes in the environment. Whether these could be attributed to climate variability or long-term climate change however, was a matter they were divided on. The responses highlighted a key conceptual issue for research on the topic of climate change, i.e. whether an observed impact can be said to be caused by climate change rather than any other environmental actor.

The fact that the same effect could be attributable to different events or processes is described as equifinality. There were two main approaches to equifinality taken by respondents:

- 1) Seek to manage the impacts without identifying the root cause.
- 2) Gather long-term data to enable clarification of causality in the future.

In terms of data collection there was agreement amongst those questioned on the importance of monitoring climate change impacts. The variety of approaches being taken and the scarcity of national strategies or models (for long-term data collection and management) was noted as a problem however.

Cultural heritage is often seen as a low priority for government support and, since the global financial crisis in 2008, many countries have cut back on public funding. The issue of the lack of finance for new projects was cited as a barrier to research and monitoring of climate change impacts by over half of the respondents. The crisis in funding was creating a serious problem for heritage managers, and one which was reducing the capacity of sites to cope with climate change impacts. *In many countries they haven't even got the budget to do maintenance which is the first line of defence against extreme climate¹.* Involving unpaid volunteers in research and monitoring was enabling the continued operation of some projects. Public engagement was also seen as vital for the future of heritage funding; *if the public are not interested in what we do, why should they pay for us to do it².*

Researchers flagged short term thinking in policy and funding decisions as a barrier to their work. The grant funding system, partly due to a political desire for visible outputs, tends to favour research that can deliver results within a 3-5 year period rather than over the 30 year norm of climate change. Some respondents also reported that they had encountered a level of fear and/or denial amongst policy makers, both in relation to the scale of the problem and the possible impacts. In the experience of two respondents (from different countries) tying their research to climate change, particularly the concept of anthropogenic climate change, proved a handicap because it was both politically controversial and socially divisive.

The barriers identified by respondents relate to many of Philips' (2015) determinants of adaptive capacity at management level, including resources (financial), leadership (political will) and access to information (uncertainty and short-termism in research).

4. Politics and the Economy: the Irish Example

The current regional projections for Ireland suggest that in the medium to far future the annual temperatures will be higher, rainfall will be heavier (especially in autumn and winter) and there will be longer dry periods (especially in summer) (Nolan, 2015). These projections are supported by observed long-term trends in rising temperatures and increased rainfall for the latter half of the twentieth century (Dwyer, 2012). In addition, sea level rise (anything from 2 to 6mm/year) and an increase in Atlantic storms and wave heights are expected (McGrath & Lynch, 2008, Kell & Stack, 2009).

From the responses of international experts it is clear that cultural heritage policy is often shaped by extrinsic factors such as politics and the economy. The story of the development of an Irish strategy for monitoring climate change impacts on cultural heritage provides a good illustration of this. In 2009, Ireland was governed by a coalition of the centre left. The minister responsible for heritage, John Gormley, was also the leader of the Green Party and had been elected on an environmental platform. At Mr Gormley's request, the Department of Environment, Heritage & Local Government commissioned a report from the Climate Change Subcommittee of the International Council on Monuments and Sites (ICOMOS) in Ireland. The sub-committee was requested to recommend solutions for monitoring climate change impacts on two high profile National Monuments, Brú na Bóinne and Clonmacnoise. Unfortunately the publication of the report in 2010 coincided with a period of deep financial crisis in the country. This was the year that the Irish government entered a bailout programme and relinquished fiscal control to the Troika of the European Union, the European Central Bank and the

International Monetary Fund. The financial crisis subsequently triggered elections in 2011 and a new centre right coalition came to power, with no Green involvement. Austerity followed, with huge cuts in the heritage sector combined with a lack of political emphasis on climate change. Thus very little was done to move policy on the issue forward. By 2013 the Government's Heritage Unit had suffered a 77% budget cut and by 2015 the Heritage Council's³ budget had been reduced by almost 90% (Ó'Fátharta, 2015). Such reductions inevitably meant that only the most pressing and urgent tasks were being addressed and policy tended to be developed on a reactive basis.

An example of one such piece of policy is work by the National Monuments Service and the National Museum of Ireland in response to the exposure of ancient human remains by extreme weather events/coastal erosion. Under the existing system a report of exposed human remains triggers a procurement process to engage an osteo-archaeologist who visits the location. This process can take up to three weeks and creates extra work for the staff of National Monuments. The severe winter storms of 2013-2014 resulted in a doubling of the normal number of reported incidents and the procedure became unworkable. As a direct result of this experience a new operational method, based on creating semi-permanent contractual arrangements, has been designed. The new process is aimed at enabling a rapid and efficient response in the anticipation of increased events in the future (Gleeson, P.⁴, pers. comm.).

5. Informing Policy in Ireland

5.1 Multi-Disciplinary Research

Over the decade since 2005 there was a rapid growth in international research surrounding climate change and cultural heritage respectively (Sabbioni *et al.*, 2010; Climate for Culture, 2013; English Heritage, 2008a; Haugen & Mattson, 2011; Bumbaru *et al.*, 2006; ICCROM, 2007). In Ireland the first substantial publication to address the topic was a document produced in 2009 by

the Heritage Council in conjunction with Fáilte Ireland (the Irish tourist board) (Kelly & Stack, 2009). This desk based multi-disciplinary study explored the possible implications of climate change for the natural and cultural heritage of Ireland's coastal and inland waterways. The publication sought to inform policy on tourism and recreation where this intersected with heritage resources. It has impacted on the shaping of current ideas around tourism and heritage at the coast and was also received with interest by the insurance industry (Kelly, pers. comm.). Unfortunately, as was the case with the ICOMOS report discussed above, the timing of its publication (at the start of the recession) meant that it never led to policy development (Stack, pers. comm.). The inter-sectoral approach taken by Kelly and Stack remains unusual amongst published research in the field. The majority of the work internationally having been produced by and for those involved in the heritage field (e.g. Cassar, 2005, 2007; Colette, 2007; Hunt, 2011).

5.2 Vulnerability Assessments

The methodology used by ICOMOS Ireland (Daly, 2010) to identify the requirements for monitoring was subsequently developed into a framework for site based vulnerability assessments (Daly 2014). This six step framework was applied to Ireland's two World Heritage sites, Brú na Bóinne and Skellig Michael and the results enabled a relative ranking of climate change impacts for defined heritage values. Long term cumulative effects such as salt damage, were considered in addition to indirect effects such as changes in agricultural practices and catastrophic effects such as flooding and structural collapse. In some cases the study highlighted areas which were already of concern, where climate change may act as an added stressor, while in other cases new issues were raised. The aim was to inform policy makers so they could account for potential climate effects when developing conservation and management plans. The results from this, and the ICOMOS report, fed into the early drafts of the Management Plan for Brú na Bóinne (Ritchie, M.⁵, pers. comm.). Thus objective 14 of the current draft plan relates to climate change and states that

management actions will include monitoring of condition and vulnerability, identifying threats and designing responses.

5.3 Site Specific Monitoring programmes

The 2010 ICOMOS Ireland report identified potential impacts of climate change for two sites. The Early Christian monastic site of Clonmacnoise and the World Heritage passage grave assemblage of Brú na Bóinne, (including its collection of rock carvings). The report made recommendations for two sets of monitors; firstly climate monitors to monitor local environmental conditions at each site, and secondly impact monitors, specific to the values and impacts identified as being of concern. The intention was that comparison of these two sets of data over the long term would allow correlations to be made between changes in the climate and measured deterioration. Although the recommendations were not implemented (for reasons outlined in section 4) a weather station was subsequently established at Clonmacnoise (fig. 1). The station was set up in a partnership between the Office of Public Works (OPW), who manage the site, and Met Éireann (the Irish weather service). It measures relative humidity, temperature and rainfall and is an official part of the national meteorological network. The state owned National Monument provides a secure location for the equipment and Met Éireann manages the data collection and provides a reliable archiving facility. The scheme thus has benefits for both agencies, and there is clear potential for replication at other sites.

There are difficulties in monitoring the effects of climate change however, due to the long time periods involved (Brimblecombe, 2010). A pilot study into the potential of an indicator designed to address this problem is currently taking place on five National Monuments in Ireland. The sites taking part are Brú na Bóinne, Clonmacnoise, Rock of Cashel, Dublin Castle and Skellig Michael. The ‘Legacy Indicator Tool’ (LegIT) on trial is testing the long-term potential of indicators for the tracking of climate change impacts (Daly 2011, Daly 2016). It relies on the exposure of ‘sacrificial’ cubes of stone and related materials, and is designed to capture any change in rates and/or patterns of surface weathering over time (fig. 2).

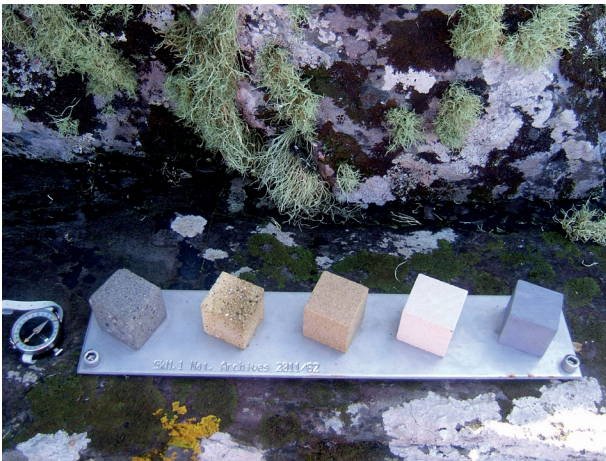


1. - Weather station at Clonmacnoise.
Station météorologique à Clonmacnoise.

6. National Adaptation Framework

The European Union’s strategy on adapting to climate change encourages all member states to develop a National Climate Change Adaptation Framework (European Commission, 2013). Ireland’s Framework strategy identifies ‘Heritage’ as one of eleven key climate sensitive sectors requiring specific adaptation plans (2012). A joint sectoral approach is currently being recommended by the Environmental Protection Agency (EPA) for the development of Adaptation Plans at Government level in Ireland (Kirwan, S.⁶ pers. comm.). This process, which has been underway since 2015, is being led by the EPA and will include plans for built and archaeological heritage. The success of their inter-departmental strategy will be vital to ensuring that cultural heritage is considered in the policies of cross cutting areas such as energy, agriculture and tourism.

Little progress has been made however, largely due to constraints on financial and human resources within the Department of Arts Heritage and the Gaeltacht (DAHG) (Kirwan, S. pers. comm.). The effect of a lack of political interest is hard to gauge but is also likely to have been a significant factor in the hiatus. Phillips (2015) identified Resources and Authority (including political will) as key factors in creating adaptive capacity for cultural heritage management. The Climate Action and Low Carbon Development Act came into force in 2016 however, and it



2. - Legacy Indicator Tool (LegIT) *in situ*.
Instrumentation Indicatrice d'Héritage (LegIT) in situ.

requires a National Adaptation Strategy to be prepared within 24 months with sectoral plans to follow rapidly (2015). The statutory obligation this places on individual Ministers is likely to ensure the entire process moves forward more rapidly.

The sectoral plans will consider impacts up to the medium term (2050) as recommended by the EPA and agreed to by an Inter-Departmental Steering Committee (information provided to stakeholder committee 21.4.15). From the perspective of built heritage, where preservation over centuries is desired, this is a relatively short timescale. In addition, as some of the worst effects of climate change are likely to occur in the latter half of this century, the plan may be based on an overly optimistic view of the future climate. Conversely by taking a short term view the strategy may avoid the problem of future discounting, ensuring actions cannot be postponed indefinitely.

In formulating the plan for heritage the DAHG aims to provide a framework for the better management of risks associated with climate change. In practical terms, resources, and therefore activities, are liable to be limited (Kirwan, pers. comm.). In terms of adapting to losses of cultural heritage the emphasis is likely to be on monitoring and recording rather than performing heroic measures. When it comes to implementing adaptation measures, the plan is expected both to identify areas where existing work should be continued and

to determine new priorities for research. It will not detail activities but by establishing research objectives (i.e. enabling the targeting of funding) it should ultimately lead to the development of appropriate responses (Kirwan, pers. comm.). The development of an adaptation plan for heritage will be a positive step towards breaking the cycle of reactive policy development in Ireland. The heritage sector has engaged with the issue, but whether the government strategy eventually translates into concrete adaptation measures will be largely dependent on broader political and economic influences.

7. Conclusion

This paper has outlined the development of policy and research in Ireland in relation to climate change impacts on cultural heritage. The issues described are common to many countries and regions however, as illustrated by the experience of the 30 international experts interviewed.

Although the implications of climate change have been increasingly evident over the last decade, policy makers in Ireland have continued to focus on the financial crisis. The cutbacks suffered by heritage agencies crippled the sector's ability to respond in anything other than a reactive way to climate change threats. Thus the factors that adversely impacted on the development of adaptation measures in Ireland's recent past were primarily; resources (financial), authority (lack of policy, lack of political will) and leadership (absence of commitment at senior level). The Irish case study also highlighted projects however, where creating sustainable partnerships (as with OPW & Met Eireann) and developing inter-sectoral approaches (Failte Ireland & Heritage Council) have helped to address some of the identified barriers in relation to resources and knowledge.

The magnitude of future climate change depends on two unknowns: how the human population will act, and how the earth's climate system will respond. This lack of certainty makes it impossible for heritage practitioners to know what the future will bring, yet we must nonetheless begin to address the most probable impacts. The

alternative will be to operate in a reactive way as extreme events and ill-informed environmental policies come to impact on the heritage resource. While Ireland still has no Adaptation Plan for heritage, the impetus for meaningful progress was provided in 2016 by the Climate Action Act. It is hoped that this marks the beginning of a new and positive phase in the story of Ireland's heritage resources.

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Notes

¹J. Hurd, ICOMOS President Advisory Committee. Author of 'Preparing for climate change: the importance of' maintenance in defending the resilience of cultural heritage' in *Historic Environment* 21 2008.

²T. Dawson, Manager of SCAPE and Shorewatch community monitoring of coastal erosion in Scotland.

³The Heritage Council is a public body providing expert advice, funding, education and advocacy.

⁴Senior Archaeologist, National Monuments Service of Ireland.

⁵Architectural Conservation Advisor, Department of Arts Heritage and the Gaeltacht.

⁶Senior Archaeologist, National Monuments Service, Department of Arts Heritage and the Gaeltacht.

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