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Raising awareness and training professionals to assess climate risks to historic buildings and commence adaptation planning - Experiences from *Adapt Northern Heritage*

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Abstract. The European project Adapt Northern Heritage (2017-2020) was supporting northern communities to adapt historic places to the environmental impacts of climate change through community engagement and informed conservation planning. A risk management toolkit was developed to help stakeholders, caring for historic buildings and other places of the historic environment, to better understand climate hazards, impacts and risks and utilise this knowledge to commence the process of strategic adaptation planning. This paper focuses on the project's stakeholder engagement to develop and disseminate the toolkit: Firstly, workshops were held at the project's nine case study sites in Iceland, Ireland, Norway, Russia, Scotland and Sweden. Secondly, the structure of the workshops was compressed and simplified into training seminars, held in Greenland, Ireland, Northern Ireland and Scotland. Finally, digital modules for continued learning were created. The toolkit and digital modules remain freely available online. This paper discusses the workshop's engagement concept, structure and techniques and how they were developed and utilised for the seminars and modules. The paper draws conclusions from this process and reflects on its transferability to related fields of activities, such as using stakeholder engagement to improve the carbon / energy performance or sustainability of historic buildings.

Keywords – climate change; risk management; adaptation planning; development of educational / training materials; stakeholder engagement.

1. Introduction

The European project Adapt Northern Heritage (2017-2020) was supporting northern communities to adapt historic places to the environmental impacts of climate change through community engagement and informed conservation planning [1]. With funding from the Interreg Programme for the Northern Periphery and Arctic (Interreg NPA) [2], the four project partners Historic Environment Scotland, Minjastofnun Íslands, Norsk institutt for kulturminneforskning and Riksantikvaren have developed a risk management toolkit to help stakeholders, caring for historic buildings and other places of the historic environment, to, firstly, better understand climate hazards, impacts and risks in a systematic manner and, secondly, utilise this knowledge to commence the process of strategic adaptation planning. (Implementing and evaluating adaptation measures was outside of the project scope.)

This paper focuses on the project's formal stakeholder engagement to help develop and disseminate the toolkit, which is freely available online [3]. The toolkit and its development [4] will only be outlined here as far as is needed to discuss the stakeholder engagement, which was undertaken in three ways: Firstly, 17 two-day workshops were held in the summers of 2018 and 2019 at the project's nine case

study sites in Iceland, Ireland, Norway, Russia, Scotland and Sweden. These workshops were used to trial and demonstrate different development stages and engagement approaches of the toolkit and to develop the associated process for engaging with the stakeholders involved in managing these historic places. The structure of the workshops, discussed below, was then converted into the format of one-day professional training seminars, which were held in Greenland, Ireland, Northern Ireland and Scotland. Finally, from the assembled educational materials of the seminars and workshops, digital modules for continued learning were created, which also remain freely available online since project completion [3]. (The locations of the project partners, seminars and workshops are shown in Figure 1.)

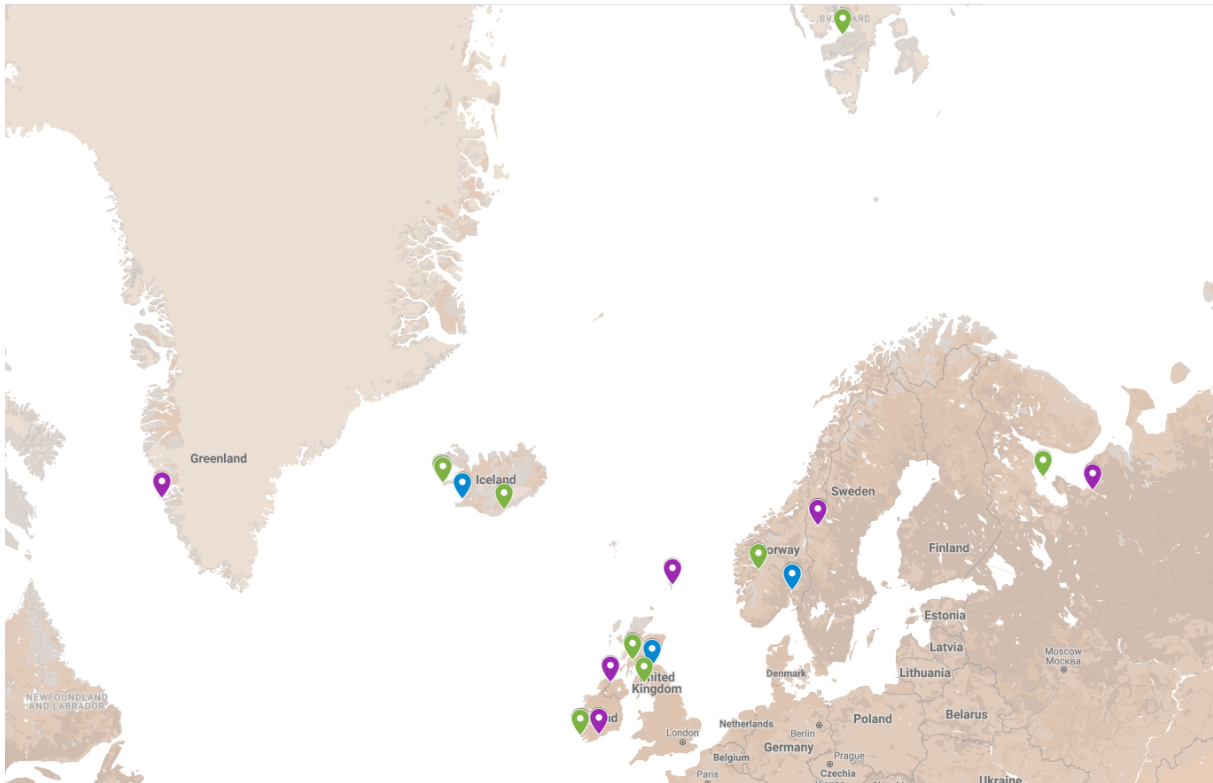


Figure 1. The activities of Adapt Northern Heritage focussed on northern Europe: Blue place markers show the locations of the four project partners; green markers identify the project’s case study sites where stakeholder workshops were held; and purple markers represent select professional seminars.

In the following, we will outline and discuss the concept, structure and techniques, used to engage with the relevant stakeholders in the case study workshops, and how this was utilised for the professional training seminars and digital learning modules. We will also draw conclusions from this process and reflect on its transferability to related fields of activities, such as using stakeholder engagement in codesign processes to improve the carbon / energy performance or sustainability of historic buildings.

2. Concept of the toolkit

The toolkit offers procedural guidance to develop, in relation to a specific historic place, a better understanding of the relevant climate hazards, impacts and risks and to subsequently commence producing an adaptation strategy for the place, based on conservation principals [5]. Engaging stakeholders from a wide variety of disciplines is a fundamental part of the procedure. Working with 11 associated partners, the four project partners concluded early in the project that inclusive engagement was important for the results of the toolkit to become widely acceptable, relevant and sustainable. Although the toolkit helps to explore specifically selected historic places, rather than providing general guidance, the toolkit is flexible and inclusive regarding what constitutes cultural heritage. The toolkit’s focus is northern Europe; a transfer to other regions is easily possible.

The toolkit is based on conventional concepts of risk management cycles, which are also commonly used to assess climate risks [6], and focusses on risk assessment and adaptation planning (Figure 2). The toolkit's process commences by defining the historic place to be assessed, before identifying environmental hazards affecting the place (both deterioration processes and natural hazards) and exploring how their frequency and intensity will develop due to climate change. This knowledge is used to define specific climate risks to the place and rate its exposure and vulnerability to these risks. Thereby, risk ratings can be calculated, into which we can subsequently also factor the place's cultural significance. The risk ratings, then, are used to inform the process of adaptation planning: Adaptation measures are identified to respond to the risks ranked highest and analysed to produce a plan, outlining when measures should best be implemented to make the place more resilient to climate change.

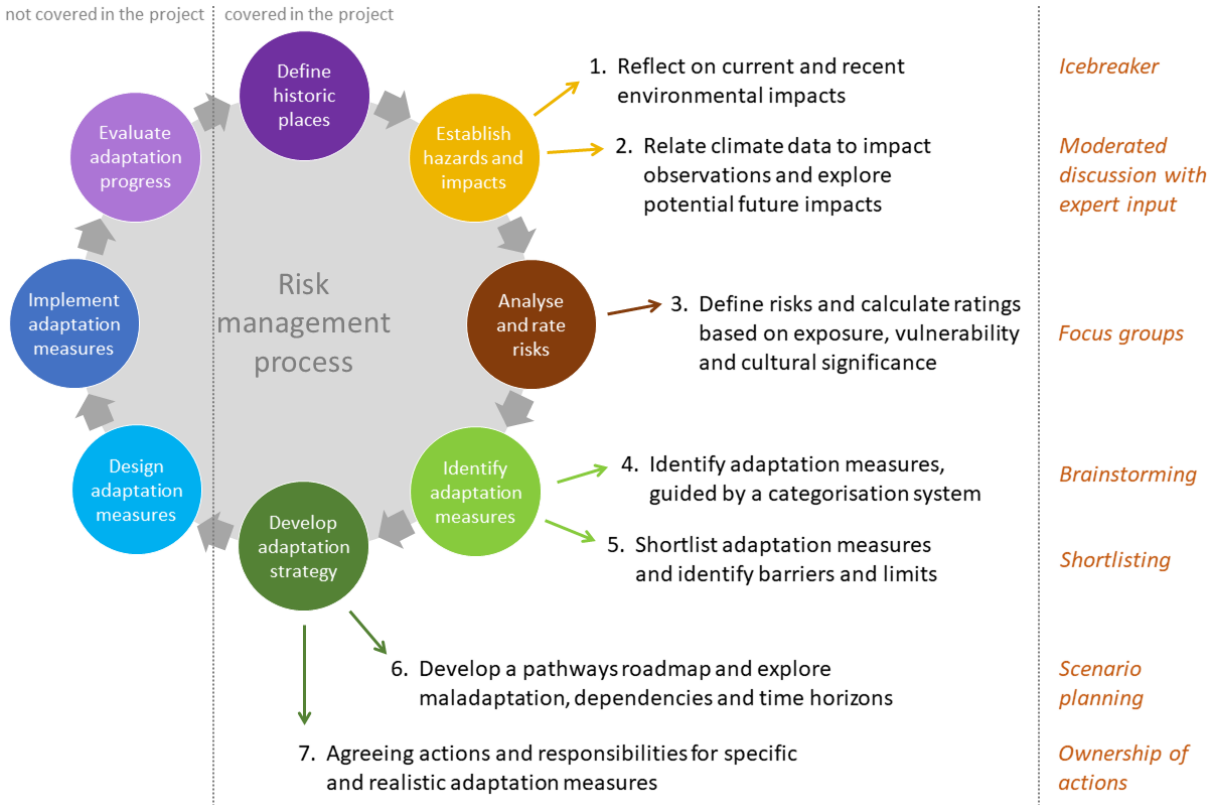


Figure 2. The risk management process used in the Adapt Northern Heritage toolkit follows conventional risk management cycles. The case study workshops were structured into seven consecutive steps, which followed parts of the cycle and used the engagement techniques listed on the right.

At most case study sites, two workshops were held, which allowed us to trial two basic engagement approaches concerning climate change impacts. The first approach, trialled in 2018, was to commence the workshops by exploring observed and projected climate data as the basis for discussions about the environmental impacts on a historic place. We found this approach unsatisfying, as neither the project partners nor the workshop participants had extensive knowledge of the complexity of the underlying climatic processes and the scale of the remaining uncertainty. Additionally, the climate data easily accessible have generally only limited applicability, e.g. data are often of too low resolution and do not offer the combination of climate variables required for making decisions to adapt historic places. This demotivated the workshop participants to creatively explore adaptation measures and could be framed as: *We need better climate data before we can do anything.*

The second approach, explored 2019, was to utilise the participants' expertise, who generally had an intimate and intricate knowledge of the specific historic place under consideration and the environmental factors which affect it today and have affected it in the (recent) past. Inviting the participants to describe

and collate the effects of weather and natural hazards produced detailed and useful descriptions of the current situation at the place and how this had changed over the past decades. Only subsequently was the so-collated information put into context with data on observed climate change and natural hazards. This approach gave the participants the feeling of empowerment, limited discussions about the climate data (and its limitations and the uncertainties involved) and offered a better platform for exploring adaptation creatively. This might be laxly captured as: *Look, we've already adapted to recent climate change. We don't know exactly where it's going, but we can continue to do our best here and now.*

Due to our experiences from the 2018 and 2019 workshops, the project's final toolkit version is based on the latter approach. In the following, we will explore how this has informed the development of the toolkit and the structuring of the associated workshops, seminars and digital learning modules.

3. Structuring the workshops

Following the toolkit's process, the workshop structure consisted of seven consecutive stages, which utilised a variety of techniques to engage with small to medium-sized stakeholder groups. For climate adaptation planning, "[d]ecision-making may be assisted by the use of a wide variety of analytical tools and techniques" [7], including: brainstorming; expert judgement and elicitation; focus groups; problem mapping; scenario analysis; [8] and analysis of barriers, limits and maladaptation potentials; use of multiple time horizons; pathways roadmaps [9]. The workshop structure and the used engagement techniques are described in more detail below and illustrated and summarised in Figure 2.

The stakeholders were from different fields of interest and professions, and often acquainted with each other and involved in the management of historic places. Generally, the groups of participants were well-engaged and highly experienced, jointly offering excellent, interdisciplinary expertise, which, in this context, includes both scholarly knowledge as well as practical experiences and local expertise.

To illustrate the discussion below, we will use examples from the 2018 and 2019 workshops in Ballinskelligs, County Kerry, Ireland, where Ballinskelligs Abbey and Ballinskelligs Castle were used as one of the project's case study, and from the seminar in Nuuk, Sermersooq, Greenland, held in 2020.

3.1. Reflecting on current and recent environmental impacts

Our starting point for the workshops was to utilise the participants' detailed knowledge of the historic place under consideration and the environmental impacts affecting it. This helped pooling interdisciplinary expertise about the place and created a commonly agreed basis for discussions. From the perspective of a workshop facilitator, starting with the participants' contributions acted as an *icebreaker*, helping to motivate the participants to work together proactively.

Holding workshops in closer proximity to the historic place under consideration allows site visit, as not all participants might be equally familiar with the place, especially if it is complex, large and not publicly accessible. This also provides the opportunity of a breakout session during a longer workshop indoors. We visited the place after either the first or second stage of the workshop / seminar.

3.2. Relating climate data to impact observations and exploring future impacts

The information gathered in the previous, first step is to some degree subjective, especially regarding the perception of climate change, namely changes occurring over time periods equalling or exceeding a human generation, say 30 years. "Long-term climate is a phenomenon not easily detected by personal experience, yet one that invites personal observation and evaluation. ... There is, however, significant variability in people's reactions to climate risks, much of which is mediated by cultural values and beliefs." [10] To objectify the impacts recorded in the workshop's first step, we used a *moderated discussion* to put them into context with prepared data on observed climate and natural hazards. Thus, we could understand if impacts are rare extremes or trends and validate the stakeholders' information.

Although exploring complex climate data can be intimidating, using this specifically for a discussion about impacts on the historic place helps psychologically to retain a feeling of control and ownership, enabling more explorative adaptation discussions about how to respond to current and future impacts.

Ballinskelligs is a good example for the uncertainties of climate projections. Storms remain difficult to predict, with some reports suggesting that storm frequency will decrease, while the intensity increases.

3.3. Define risks and calculate ratings based on exposure, vulnerability and cultural significance

The toolkit provides a process to rate the exposure and vulnerability of a historic place to a specific risk at a specific point in time. These exposure and vulnerability ratings calculate an inherent risk rating, which can be adjusted to account for the place's cultural significance. This rating process can also be repeated for the same risk, using future points in time, to establish how the risk rating might develop.

During the workshops, participants were invited to work in small *focus groups* to, firstly, identify possible risks by associating them to select environmental hazards / impacts, and, secondly, determine their exposure and vulnerability ratings and calculate the resulting risk ratings. The focus groups were brought back together to compare their results. This process helped the participants to better understand the systemic differences of environmental hazards, their impacts and associated risks, as well as to express impacts and risks quantitatively, in order to compare often different risks with each other.

At Ballinskelligs, these engagement techniques enabled us to compare, for example, the impacts of storms in the form of high wind and coastal processes (including wave action, wave overtopping, boulder throw) with the impacts of increased precipitation (including surface water flooding, water penetration of building fabric by wind-driven rain). For Ballinskelligs Abbey, the stakeholders ranked wave overtopping as highest risk, provided the sea wall offers continued protection against wave action.

3.4. Identifying adaptation measures, guided by a categorisation system

To respond to the highest, identified risks, the participants were asked, either on their own or in pairs / small groups, to identify adaptation measures, regardless of acceptability, feasibility, practicalities, technicalities, viability etc. The aim of this *brainstorming* exercise was to create a longlist of measures, while *avoiding snap judgements*.

To support this exercise, the participants were invited to identify at least one measure for the following six adaptation categories: 1. Protect historic place (by reducing its exposure to the risk), 2. Strengthen historic place (by reducing its vulnerability), 3. Relocate historic place (by removing it from the risk), 4. Respond to damage to the historic place (to reduce impact on historic place), 5. Manage loss of historic place (to reduce impact on communities associated with the historic place) and 6. Manage uncertainty at the historic place (to reduce uncertainties regarding adaptation planning). Finally, the measures identified by the participants were collated and summarised in the larger group.

Responses at the Ballinskelligs workshop (Figure 3) included extending the sea wall, increasing its height, constructing wave breakers either at the wall or at other locations in Ballinskelligs Bay, building a shelter structure around the abbey and/or castle, investigating tidal movement in the bay, documenting the place's deterioration and loss, and recording it digitally to create virtual reconstructions.



Figure 3. Stakeholder workshop at Ballinskelligs, County Kerry, Ireland, in 2019: The left photo shows a facilitated group discussion; the right photo summarises the results of a *brainstorming* exercise to identify adaptation measures, using a categorisation system (represented here with coloured markers).

3.5. Shortlisting adaptation measures and identifying barriers and limits

In this step, focus groups were used to review the adaptation measures identified in the previous step, in order to produce a shortlist. (A similar process of long- and shortlisting is used in the European standard EN 16887:2017 *Guidelines for improving the energy performance of historic buildings* [11].) The *shortlisting* was based on considerations concerning the measures' acceptability (e.g. impact on cultural significance), feasibility (e.g. required economic resources), practicalities (e.g. availability of expertise), technicalities (e.g. availability of technologies) and viability (e.g. longer-term sustainability). The considerations were grouped into barriers, which can be overcome, and limits, which cannot be overcome. To check the effectiveness of measures to reduce the previously calculated risk ratings, these were recalculated with suitably amended base values, depending if a measure reduces either the place's exposure or vulnerability to the risk or both.

The Ballinskelligs participants, for example, concluded that building sheltering structures around the abbey and/or castle is not feasible, while tidal investigations, construction of wave breakers and works to the sea wall could be appropriate (with regard to the places' cultural significance, despite the potential visual impact of such adaptation measures) and would be feasible and technically easily possible.

3.6. Developing a pathways roadmap and exploring maladaptation, dependencies and time horizons

In this step, the (inter)dependencies of the shortlisted measures were investigated: Some measures benefit from being combined or building onto each other, while other measures are excluding each other. During this exercise of *scenario planning*, time horizons were also introduced. The group discussions were guided by drawing a horizontal bar chart, where the X-axis expresses time from today into the longer-term future, say 50 to 100 years, and the Y-axis lists the identified adaptation measures. Thus, a programme chart can be developed, illustrating which (combination of) measures could be implemented and when this should best be done. This helped the participants to understand how measures could be utilised in the shorter, medium and longer term and how they could either be combined or hinder each other (i.e. maladaptation). As the graph develops into a form of a simple project schedule / Gantt chart, it can be enriched with preparatory elements, such as scheduling feasibility studies or resource funding activities. Once the chart's bars are suitably connected, pathways (scenarios) become visible in the form of a roadmap (time plan options).

At Ballinskelligs, the participants concluded that no immediate construction activities are required and that investigating tidal movement in the bay should instead be prioritised to help decide in the future if wave breakers or alterations of the sea wall would be the better adaptation measure (Figure 4).



Figure 4. The Ballinskelligs workshops involved site visits of the abbey and castle as case study sites, with guided tours for the stakeholders and local community. The workshop finished with producing a pathways roadmap, illustrating the temporal dependencies of the adaptation measures identified.

3.7. Assigning actions and responsibilities to implement adaptation measures

In the final step, a pathway was selected, and actions and responsibilities were assigned for the immediate and shorter-term future to enable the implementation of the pathway's early measures. Often these included acquisition of additional data, preparatory works and engagement with relevant communities and high-level stakeholders to seek acceptance and support. Early measures might also include continued monitoring until agreed threshold are reached before a measure should be implemented. The individual outcomes of the workshops were summarised (by the workshop facilitator and key stakeholders) to create a Climate Risk Management Plan (CRMP or simply Adaptation Plan) which could / should integrate with other (conservation) planning tools, e.g. Conservation Management Plans or the development plans of local governments. (see [12] for select CRMP examples)

At the Ballinskelligs workshop, the Office of Public Works, a national governmental organisation managing Ballinskelligs Abbey, committed to undertake the immediate action agreed upon, namely investigating how tidal movements impacts at the site on wave action, wave overtopping etc.

4. Professional training seminars

The workshops discussed above were two-day events concerned with the project's case studies and attended by the stakeholders involved in managing or using these historic places. To engage with professional stakeholders not so closely involved with the project, present the project toolkit to them and train them in using it, the project partners also organised one-day professional seminars. These were held in early 2020 in Godthåb / Nuuk (Sermersooq, Greenland), Derry / Londonderry (Derry and Strabane, Northern Ireland), Corcaigh / Cork City (Ireland) and Lerwick (Shetland Islands, Scotland). Two seminars scheduled for Iceland were cancelled due to the Covid-19 pandemic.

The seminars were essentially condensed and simplified versions of the workshops, using a well-known, local historic place, selected in collaboration with a seminar's host organisation. The seminar in Nuuk, for example, took place in March 2020 in collaboration with Nunatta Katersugaasivia Allagaateqarfialu / Greenland National Museum and Archives, and the Moravian Brethren Mission House, a historic place at the tip of the old city's peninsula, was chosen to explore adaptation strategies for this coastal site with its colonial buildings and remains of an associated Inuit settlement (Figure 5).



Figure 5. The training seminars for professionals were a condensed and simplified version of the workshop format. The seminar in Nuuk, Greenland, depicted above, used the site of the Moravian Brethren Mission House as case study (left) for explore various assessment techniques (right).

5. Reflections on the development and implementation of the dissemination events

Engaging with an interdisciplinary group of stakeholders has enriched the development of the toolkit and the structure of the associated dissemination activities. The event facilitators created an environment of trust in the seminars and workshops, bringing stakeholders together to collaboratively explore how cultural heritage can be adapted to climate change. The feedback from the events praised the composition of the groups, which furthered interdisciplinary networking. The structure of both the toolkit and the dissemination events developed a clear focus on identifying *solutions*, namely conservation-minded adaptation measures. The various engagement techniques used by the facilitators provided an inclusive seminar / workshop structure, creating relationships amongst participants which generally resulted in the acceptance of ownership and responsibility.

Holding the case study workshops over two days was sufficient time to deploy a range of engagement techniques –from *brainstorming* to *shortlisting* and from *focus groups* to *scenario planning*– and

conclude with CRMPs for the case study sites. Condensing the workshop experiences into a single-day event allowed us to raise awareness about climate change and historic places amongst professionals and disseminate our toolkit, which now consists of a series of digital guidance documents, assessment techniques and workbooks freely available online. (Due to the pandemic, the creation of an interactive online version was no longer possible.) The toolkit also includes digital learning modules, in the form of slide presentations and workbooks, enabling those interested to explore the toolkit on their own.

While the project was concerned with the adaptation of cultural heritage, the assessment principles and engagement techniques are transferable to other subject matters. Historic Environment Scotland is currently exploring their use and transferability in the Interreg NPA project Energy Pathfinder, which is concerned with improving the energy performance of historic buildings in northern Europe [13].

Acknowledgements

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Adapt Northern Heritage utilised concepts implemented in the Australian project CoastAdapt [9], which was concerned with coastal adaptation to climate change but not focussed on cultural heritage.

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