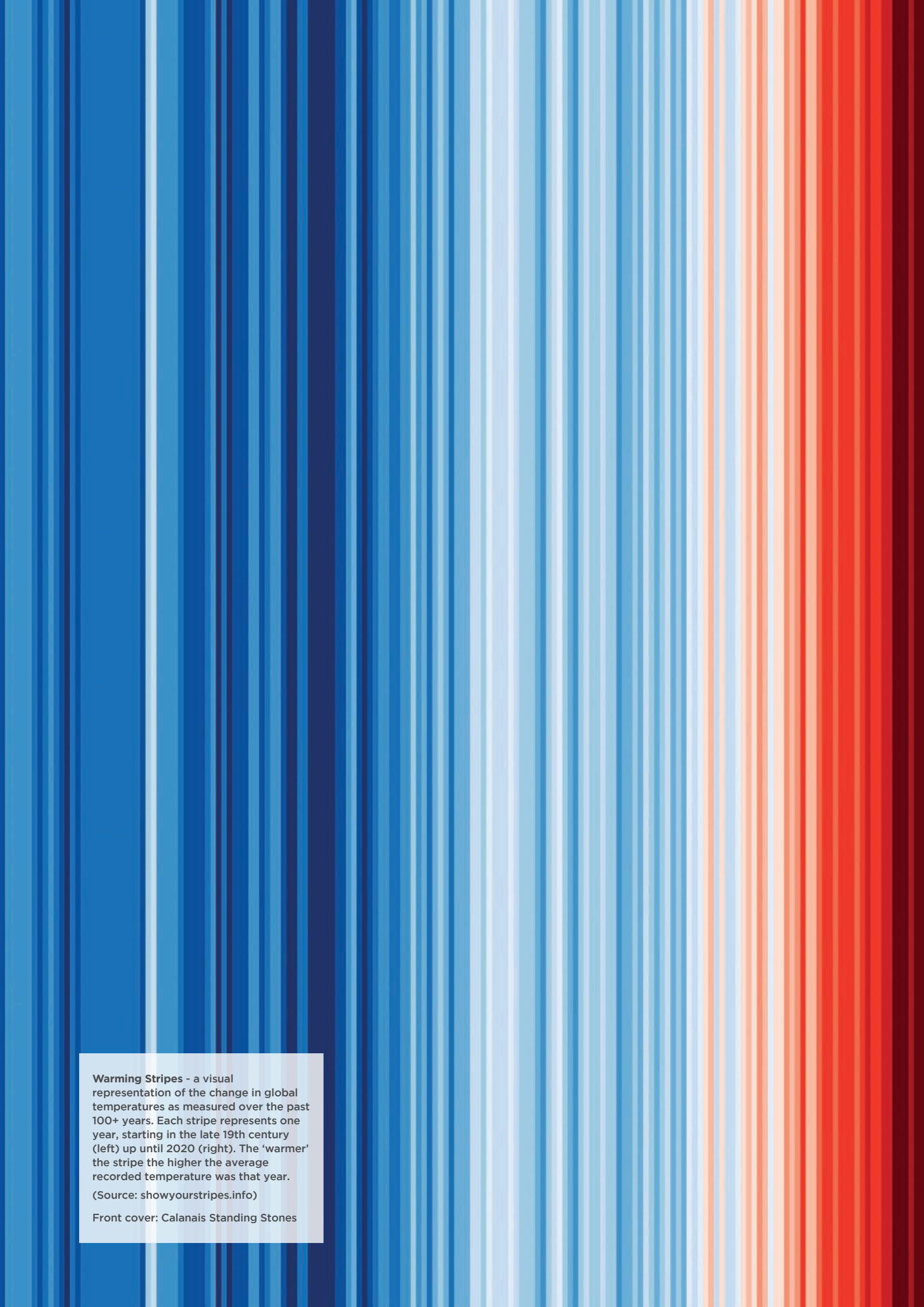
Towards a

Climate Ready HES

Project Methodology and Results

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA



Warming Stripes - a visual representation of the change in global temperatures as measured over the past 100+ years. Each stripe represents one year, starting in the late 19th century (left) up until 2020 (right). The 'warmer' the stripe the higher the average recorded temperature was that year.

(Source: showyourstripes.info)

Front cover: Calanais Standing Stones

PURPOSE AND SCOPE

Climate Ready Historic Environment Scotland (HES) is our first climate change adaptation plan. It sets out our response to a series of climate risks that we have identified that each have the potential to negatively impact our organisation. It is a plan directly for our organisation, though the steps we have taken in preparing it may be of interest to others.

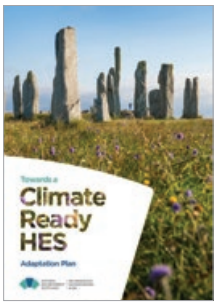
Addressing the climate risks identified is crucial to building organisational resilience against the impacts of climate change. It is also necessary if we are to achieve our wider climate action ambitions, such as becoming a net-zero organisation.

To create our Climate Ready HES plan we:

- Established a cross-organisational group to undertake a strategic level climate risk assessment of our organisation. This process identified the key climate risks of concern to our organisation.
- Sourced practical solutions, from people across our organisation, that we will implement over the next five years to begin addressing, or better understanding, the climate risks identified – this is our **'adaptation response'**.

There are two 'Climate Ready HES' documents:

1. **The Adaptation Plan**: This provides an overview of the project, the key climate risks identified and our adaptation response to these risks. This document is intended to provide an accessible overview of our plan, for both HES colleagues and external partners who may be interested in our approach.



2. **The Project Methodology and Results**, that you are reading now. This provides detailed insight (and our reflections) on the methodology used to identify the key climate risks. It also provides the results of the climate risk assessment process, including evidence supporting the inclusion of each risk. This document is intended to provide support to other organisations who may be looking to start their 'climate ready' journey.

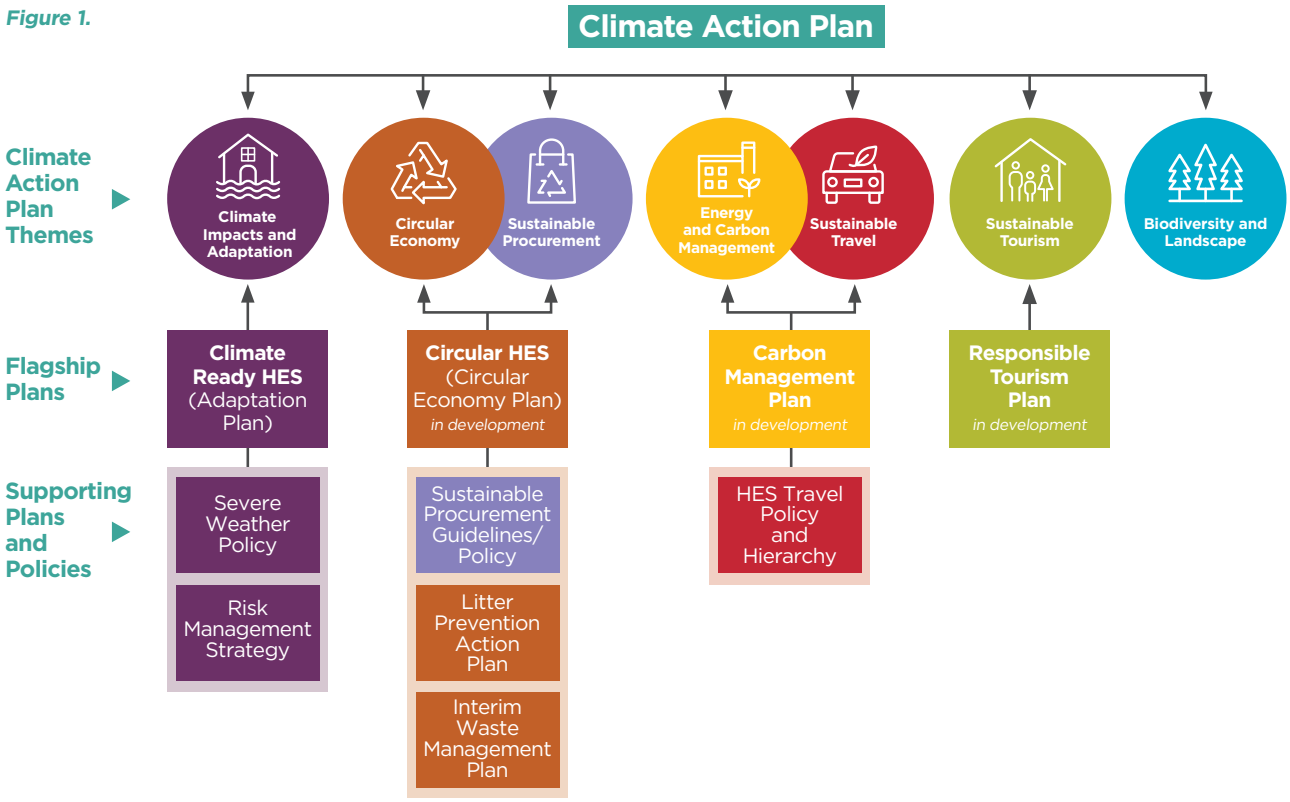
CLIMATE ACTION AT HES

Climate Ready HES is a flagship deliverable of our **Climate Action Plan (2020 to 2025)**. It is intended to help deliver parity between our climate change mitigation and adaptation efforts, and to help secure a more resilient, climate ready future for our organisation. It purposely focuses on the steps we will take to address, or better understand, a series of climate risks identified as part of an organisational wide climate risk assessment.

Our overarching Climate Action Plan sets out our high-level climate action objectives under seven themes (see Figure 1). More focused delivery plans are required for certain themes owing to their complexity. Climate Ready HES is the delivery plan for our Climate Impacts and Adaptation theme.

However, Climate Ready HES does not operate in isolation from the other six Climate Action Plan themes. As it deals with the overarching topic of climate risk, successful delivery of Climate Ready HES is required in order to achieve other key climate action commitments (such as becoming a net-zero organisation). It therefore works alongside these other more focussed plans and policies.

Figure 1.



CLIMATE READY HES

This is our first dedicated climate change adaptation plan. It sets out a series of actions that we will undertake in order to prepare for, and better manage, the risks and impacts associated with climate change – making our organisation 'climate ready'. Here we present a concise summary of our Climate Ready Plan.

Why do we need to get 'climate ready'?

As our climate changes, it is increasing the frequency and severity of many **physical climate risks** that impact our organisation (e.g. flood events). It is also introducing new physical climate risks that can impact our organisation (e.g. the spread of new and invasive pest species). We also know that as society responds to the climate crisis and moves towards a low-carbon economy that our organisation is being exposed to new types of **transition climate risk** (e.g. changing expectations of our visitors and other stakeholders).

Why do we want to get 'climate ready'?

It makes good business sense. We recognise it is a crucial activity in order to remain a high-performing organisation. It's how we will continue to deliver on **our key functions** as Scotland's lead public body for the historic environment now, and in the future. It is also how we play our part in contributing to a climate ready, resilient Scotland.

What have we done?

We established a cross-organisational group to undertake a strategic level climate risk assessment of our organisation. This assessment was informed by tools and guidance developed by Adaptation Scotland. This included the **Adaptation Capability Framework** and the **Strategic Climate Change Risk Assessment tool**.

Our climate risk assessment identified 28 key climate risks that, based on our current understanding, we believe to be areas where further action is required. The identified risks are grouped into five categories:

- Physical climate risks on our organisation's **physical assets**
- Physical climate risks on the **natural capital** of our Properties in Care
- Physical climate risks disrupting our day-to-day **operations**
- Varied climate risks impacting the safety and wellbeing of our **people**
- Key **transition** risks that would likely impact delivery of our core functions

What are we going to do?

The group established to carry out the climate risk assessment, gathered in views from across the organisation on actions we could take to reduce the impact of the risks identified. In total, ten priority actions were identified that together form our **'primary adaptation response'**. These actions are:

1. **Enhance our internal governance and management arrangements** to effectively mainstream 'climate ready' action and learning across all areas of our organisation.

2. **Commit appropriate resources** to climate change adaptation measures alongside mitigation measures to begin delivering parity between work areas of equal importance.

3. **Expand our in-house adaptation capabilities** to deliver the necessary tools, resources and skills required to mainstream our climate ready ambitions across our organisation.

4. **Invest in early warning capabilities** for day-to-day physical climate risk (weather and natural hazard events), putting the safety and wellbeing of people, visitors, contractors and other stakeholders at the core of becoming 'climate ready'.

5. **Develop climate scenarios to stress-test decisions** we make as an organisation. This will ensure our decisions are robust enough to navigate the transition to a low-carbon economy and physical changes in our climate.

6. **Integrate assessments of climate risk across our organisation** to reduce the danger of 'locking in' future risk. This will be included throughout all major decisions we take and in major projects, long-term investment considerations, strategies, plans and policies that we develop for our organisation and the wider sector.

7. **Mainstream 'adaptation' action into our plans, policies, projects and procedures**. Reducing our dependence on a standalone 'climate ready' plan by integrating adaptation activities into all relevant plans, policies, projects and procedures.

8. **Enhance our data collection and analysis capability** in order to better monitor climate risks, support the development of thresholds that trigger action and to monitor progress and impact of our adaptation measures.

9. **Co-create an 'Adaptation Manual'** that provides staff with advice and guidance on how to take well-considered climate change adaptation actions, supplemented with training / upskilling opportunities for our people.

10. **Invest in our research capabilities** to test and trial innovative adaptation solutions that not only support our organisation, but the wider historic environment and public sectors.

KEY TERMS

Fossil Fuels
Since the industrial revolution, human use of, and dependence on, fossil fuels has increased concentrations of greenhouse gases in our atmosphere. This has caused our planet to warm.

Climate Change
As the planet warms, other elements of our climate system are changing (e.g. changing rainfall patterns).

Emerging Risks
The changing climate is causing 'risks' to emerge that have the potential to negatively impact our organisation.

Physical Climate Risks
There are risks that emerge directly as a result of changes in our climate. For example, more frequent weather extremes such as intense rainfall events, or more frequent natural hazard events such as floods and wildfires.

Transition Climate Risks
Then there are risks that emerge as regulators, legislators, consumers and companies take action to mitigate against climate change and transition towards a low-carbon economy.

Climate Change Adaptation
'Adaptation' is what we do to better manage and prepare for these risks and impacts associated with climate change (e.g. adjusting the way we work to avoid possible harm).

Our Adaptation Response
This describes the actions we will take in order to adapt our organisation to the risks and impacts associated with climate change.

Climate Ready HES – by implementing our adaptation response, we move towards being an organisation that is better prepared to deal with the risks and impacts associated with climate change – we become **'climate ready'**. We do this at the same time as transitioning toward being a resource efficient and net-zero emissions organisation.

METHODOLOGY SUMMARY

Here we provide a brief summary of the steps we undertook to create our Climate Ready HES plan.

Step One

Pre-project: Reviewing our adaptation progress to date, using tools and guidance developed by Adaptation Scotland, and establishing the need for our 'Climate Ready HES' project.

Step Two

Stakeholder engagement: Forming a cross-organisational working group that would carry out a series of 'climate ready' activities and briefing the group on project scope and tasks to be undertaken.

Step Three

Data and evidence gathering: Going out into our organisation to gather data and evidence that would support our climate risk assessment, including recording the key functions and responsibilities of each directorate and key areas of exposure or vulnerability to climate change.

Step Four

Making sense of data and evidence: Collating all the data and evidence gathered in and refining it down into series of key climate risks, this included identifying solutions to address the risks and trialling ways of prioritising.

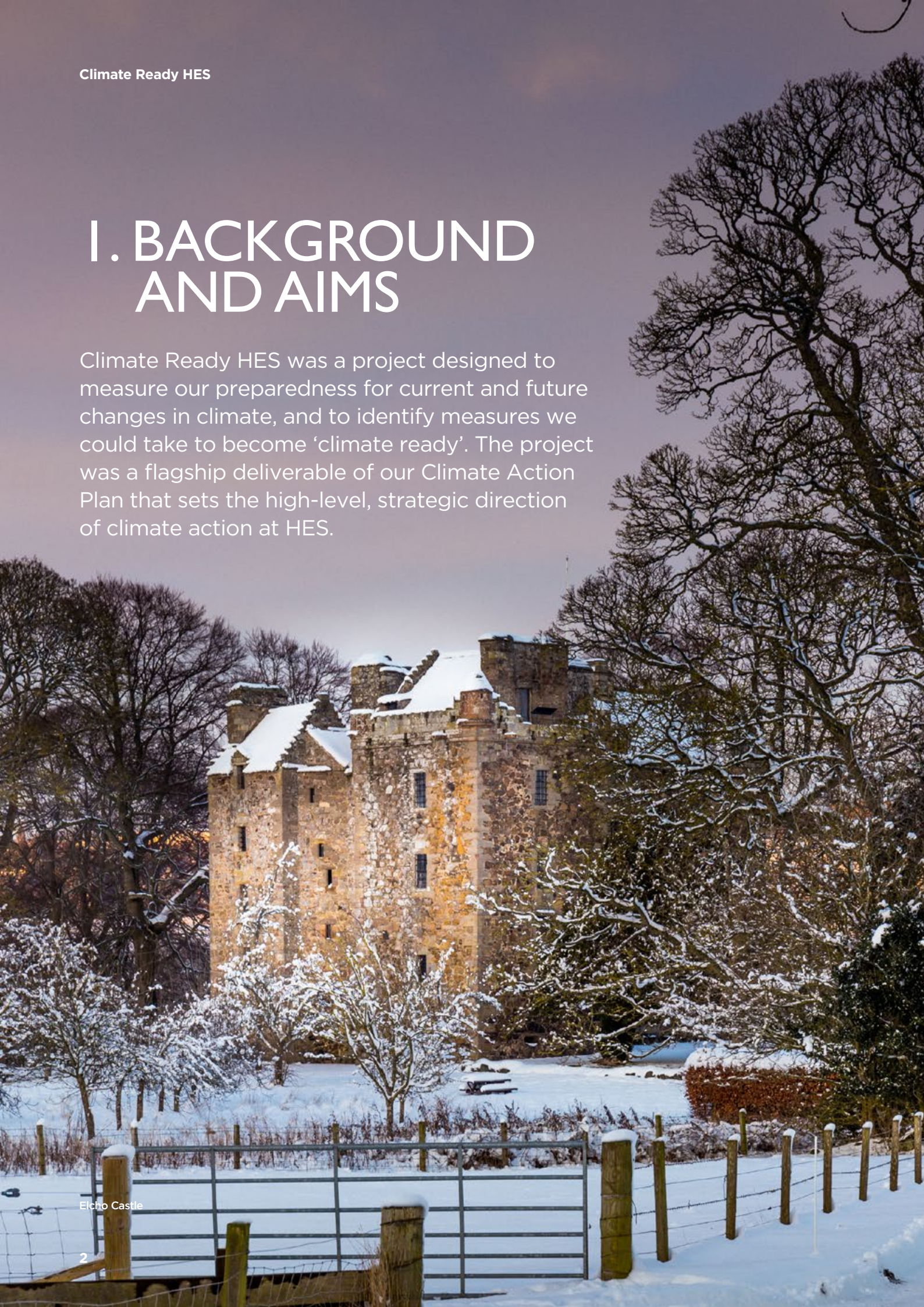
Step Five

Preparing the plan: Finalising risk descriptions and our adaptation response and presenting to our Senior Management Team for feedback, then approval.

CONTENTS

1. BACKGROUND AND AIMS

Climate Ready HES was a project designed to measure our preparedness for current and future changes in climate, and to identify measures we could take to become 'climate ready'. The project was a flagship deliverable of our Climate Action Plan that sets the high-level, strategic direction of climate action at HES.



Elcho Castle

1.1 PROJECT AIMS

- Carry out a strategic level climate risk assessment of our organisation
- Plan a series of measures to reduce the risks identified as part of the risk assessment process (our adaptation response)
- Identify the most logical place for action on addressing these risks to be owned in our organisation, facilitating the necessary mainstreaming of action
- Put in place a monitoring and evaluation framework to track progress of our climate ready ambitions
- Publish a 'Climate Ready Plan' for our organisation.

We used the development of this project to achieve a range of additional aims, including:

- Upskilling a cohort of our colleagues in the topics of climate risk, impacts and adaptation
- Creating greater awareness of the importance of climate change adaptation across our organisation
- Trialling the project methodology at a 'team' level as well as 'organisational' wide. This was to determine whether the approach could be replicated by others in the organisation.

Identify the most logical place for action on addressing these risks to be owned in our organisation.

1.2 PROJECT MOTIVATION

We developed Climate Ready HES because:

- We want to achieve parity between our efforts to address the root cause of climate change through reducing greenhouse gas emissions (climate change mitigation) and our efforts to prepare for changes we know are coming in our climate (climate change adaptation)
- We recognise that it makes good business sense. Understanding the climate risks and opportunities our organisation is exposed to is key to us remaining a high-performing organisation now, and in the future
- We recognise the co-benefits that adapting to our changing climate brings - the "triple-dividend" of adaptation that includes 1) avoiding future losses, 2) generating positive economic gains through innovation, and 3) delivering social and environmental benefits
- The **Scottish Government's Climate Change Adaptation Programme** provides a policy and legislative framework with clear expectations on public bodies to help close the climate resilience gap, and to report on progress through the Public Bodies Climate Change Reporting duties.

We recognise the co-benefits that adapting to our changing climate brings.

1.3 PROJECT SCOPE

The boundary of the assessment was HES as an organisation, including all our physical locations, assets and functions.

The project, including scoping, data gathering and sense-making and writeup took approximately 12 months.

The climate risk assessment we carried out explored both physical and transition risks.

Physical climate risks: These are risks directly linked to changes in our climate. This includes risks from increased frequency and severity of extreme weather events or from the continued shift in climate and ecosystems over time. Physical risks can be described as[1]:

- **Acute:** these are risks from higher frequency and severity of single events, e.g. an intense rainfall event, a flood, wildfire or heatwave.
- **Chronic:** these are risks introduced as a result of longer-term changes and shifts in our climate. This includes gradual changes in temperature, sea-level rise, and spread of pests and disease.

Transition climate risks: These are risks introduced as regulators, legislators, consumers and companies take action to mitigate climate change and transition towards a low-carbon economy. Guidance from the Task Force on Climate-related Financial Disclosures[2] categorises transition risks under the following themes:

- **Policy and legal:** This covers changing legislation and reporting requirements placed on public bodies to help address the climate crisis.
- **Technology:** This covers risks introduced as new technologies emerge, displacing older systems.
- **Market:** This area covers changes in the supply and demand for certain products and services and could include changing customer and stakeholder behaviours that impact our business operations.
- **Reputation:** This area covers risks around changing customer and stakeholder expectations and preferences on our organisation, as well as the possible stigmatisation of sectors that are viewed as part of the climate crisis problem (and not part of the solution).

1. McKinsey Global Institute: **Climate Risk and Response** (2020)
2. Task Force on Climate Related Financial Disclosures: **Recommendations of the Taskforce** (2017)

1.4 ADAPTATION SCOTLAND

Adaptation Scotland is a programme funded by the Scottish Government and delivered by the sustainability charity **Sniffer**.

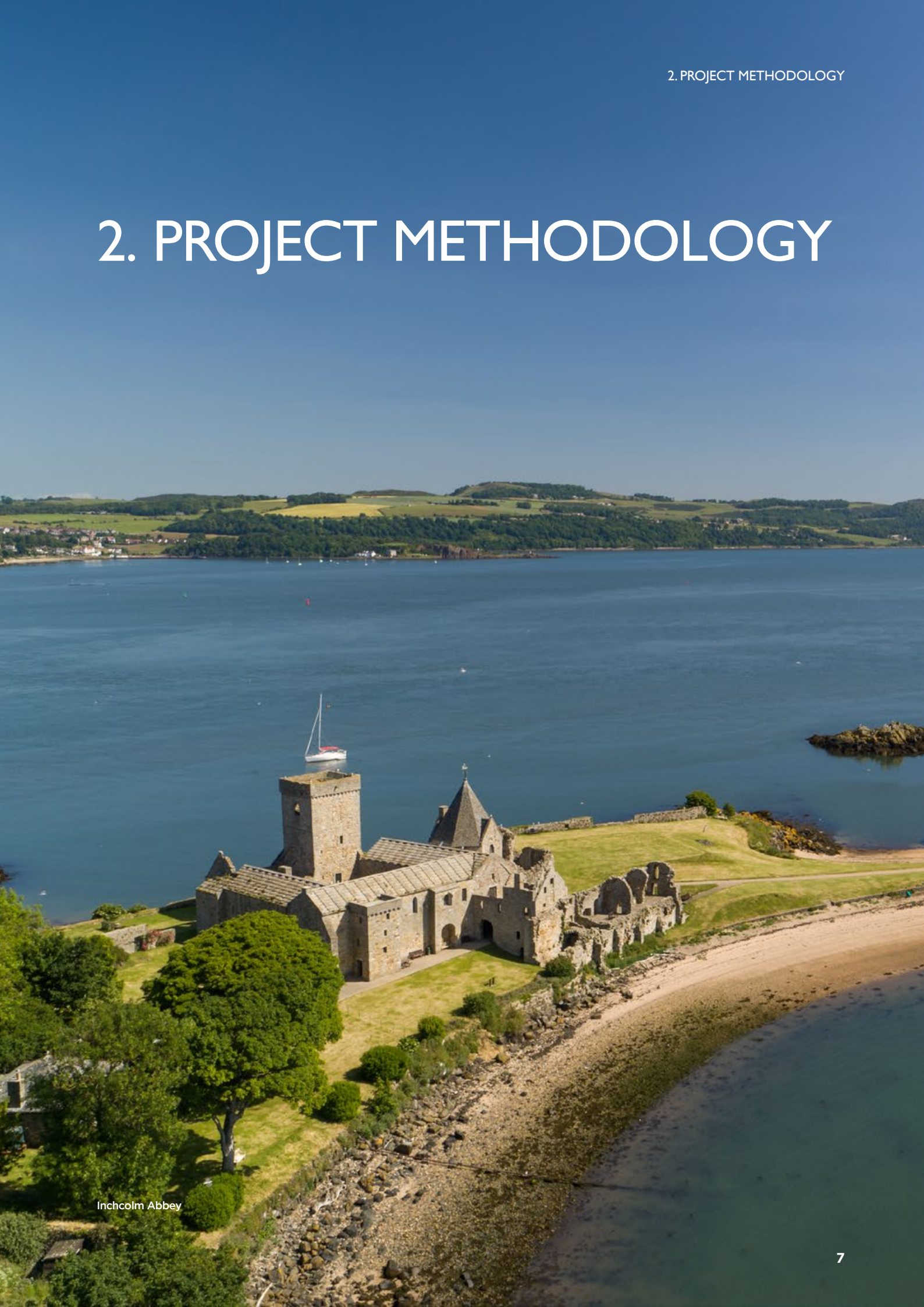
Their team of adaptation experts offers advice, and link organisations, businesses and communities to tools, resources and projects that can help them adapt.

Adaptation Scotland provided direct input into our Climate Ready HES project, helping to shape and facilitate workshops, advising on the content of our final plan and providing guidance throughout the process. Our general approach to Climate Ready HES was further informed by tools and guidance they developed. This included:

- **The Guide to Strategic Climate Change Risk Assessments:** This is a step by step guide to carrying out a strategic climate change risk assessment. It provides details of the different tasks involved in developing, completing and using a strategic climate change risk assessment at an organisational level.
- **The Adaptation Capability Framework:** This is a series of tools and guidance that can be used by public sector bodies to assess and monitor how well they are doing with respect to climate change adaptation activities.

Adaptation Scotland provided direct input into our Climate Ready HES project.

2. PROJECT METHODOLOGY



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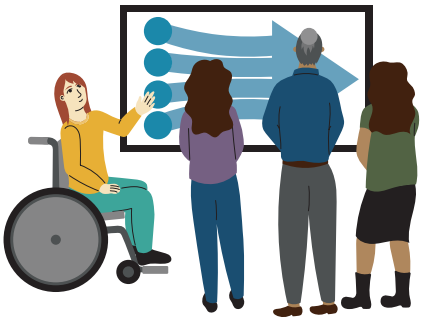
2.1 STEP ONE
Pre-Project



To help public sector bodies make sense of what is needed to adapt to climate change, Adaptation Scotland published the Adaptation Capability Framework.

This framework sets out a series of activities that public sector bodies should undertake in order to adapt to climate change. These activities are grouped into four capabilities:

1. **Understanding the challenge:** Developing a robust evidence base on climate change risk and vulnerability that helps us make 'climate ready' decisions as an organisation.

2. **Organisational culture and resources:** Assessing organisational priorities, governance structures and availability of resources across all our directorates, and looking for opportunities to embed and align climate change resilience / adaptation measures across our work.

3. **Planning and implementation:** Identifying the gaps in our adaptation objectives and creating a strategy to formalise the process, as well as considering how our objectives and goals as an organisation fit in with Scotland's wider adaptation ambitions.

4. **Working together:** We can't adapt alone; we need to forge connections with key partners to share ideas and find opportunities to collaborate. This includes developing new and innovative partnerships, as well as strengthening existing ones.

A benchmarking tool was developed alongside the Adaptation Capability Framework. This tool allows organisations to benchmark what progress they have made against each of the four capabilities listed above. We used this tool to assess our own progress. In doing so, we identified areas and activities where we needed to do better with respect to our climate change adaptation activities. Those key areas were:

- The need for a strategic level climate risk assessment of our organisation
- The need for a dedicated adaptation strategy to boost our adaptation capabilities
- Improved mechanisms in place to devolve climate action responsibility out across the organisation

We took these areas and created a package of work that would boost our maturity in several of the Adaptation Capability Framework capabilities. Together, this package of work became our Climate Ready HES project.

A project proposal was prepared and presented to the HES Senior Management Team. In this our Senior Management Team were asked to identify representatives of their business areas who would actively take part in a project to:

- collate a 'risk register' of climate change impacts for each of our directorates
- identify solutions to lower these risks (climate change adaptation)
- identify resources (internal / external) to support delivery of adaptation measures
- produce an 'adaptation plan' for our organisation

2.2 STEP TWO
Stakeholder Engagement

Development of our Climate Ready HES project presented a unique opportunity to engage with colleagues across our organisation on the topics of climate risk, impacts and adaptation.

Representatives from each of the HES directorates were invited to participate in a Project Working Group. This group had governance arrangements to oversee the process and was coordinated by HES' Climate Change Scientist and Adaptation Scotland's Adaptation Services Specialist.

Key goals of this step:

- To form a project group comprised of representatives from each of our current eight directorates, from a diverse range of roles.
- To hold an introductory workshop for the project group, providing them with the background to the project, its justification and an outline of the key steps we would work through together over the course of the project.
- To provide project group members with an overview of the tools and support available to them as they undertake exercises to gather data and evidence.

Activities:

1. The HES Senior Management Team issued a call for participants amongst their teams to find individuals who would like to take part in the project. This was issued alongside a brief project outline, including an overview of the key tasks the group would be working to achieve.
2. Once members were recruited, an introductory workshop was held for the working group to meet each other and learn more about the project (and what was expected of them). At this workshop they were asked a series of questions to help shape the project and its outputs. Questions asked included:

- Imagine a future where HES is 'Climate Ready' - what does that organisation look like?
- As a project team, what impact do we want to make on the organisation?
- Wouldn't it be fantastic if in five-months' time we have...
- Wouldn't it be fantastic if in five-years' time we have...

As this was a learning and development opportunity for the project group, they were also asked:

- Is there anything you would like to learn as part of this process?
- What working principles do we need in order to work effectively as a group?
- How often would you like to meet?

3. At the introductory workshop, the project group were also introduced to the resources that had been developed to help them carry out their tasks. This included:

- A **'project guide'** that provided easy access to, and a shared understanding of, the key aims and objectives of the project and the reasoning behind the project.
- The **'project workbook'** where group members would record the data and evidence they collected.
- **90-minute and a 30-minute 'climate ready workshop' templates** that group members could use when holding data and evidence gathering workshops with their areas of the organisation.
- A **10-minute 'climate ready presentation'** that group members could use when presenting an overview of the project to their areas of the organisation.
- A **template survey** that group members could use / send out to their area of the organisation to gather in data and evidence.

Key outputs:

The introductory workshop provided a wealth of information that helped shape the project. For example, when group members were asked to imagine a future 'climate ready' organisation, their statements helped create a shared vision that would go on to influence our 'adaptation response'. Common responses included a 'climate ready' organisation is one that is:

- Proactively managing climate risks and impacts
- Considers and assesses climate risk at the start of projects and incorporates it into decision making
- Flexible / agile, adaptive and has transparent ways of working
- Leading and supporting the (historic environment) sector and beyond, and demonstrably puts people at the centre of its efforts to adapt to climate change
- Developing, training and supporting its people to make 'climate smart' decisions.

What worked well:

- Getting the support of the Senior Management Team and asking them to put a call out for participants. The invitation coming directly from Directors indicated their support for the project and legitimised people to spend time working on it (after seeking approval from line managers).
- Having representatives from each area of the organisation worked very well – it brought a diversity of roles, backgrounds and views and made for a much richer project and outputs.
- Asking early in the process what a 'climate ready' future for our organisation could look like helped motivate and inspire participants. It helped us create a shared vision for the future of the organisation.
- Asking group members to set parameters like how often we would meet, how we would communicate with each other and how we would support each other helped form a sense of camaraderie early on.

What we would do differently:

- Be more explicit about the expectations of the group and the time likely involved in participating.
- Provide more time and space for the group to get to know each other, particularly as we carried out the process entirely virtually.
- Provide time and space early on to test some of the virtual tools we would use throughout the process, such as Slido, Miro and Microsoft Teams.

What did the project group members think themselves?

'I really valued the preparation that had been done for us – like the pre-prepared presentations and workshop templates – this made it simple to hit the ground running. I really learned a lot in the initial workshop.'

'I would have liked more time in this initial step to learn about the project and the topic of climate impacts and adaptation. I think with more time and knowledge we could understand in practice how different areas of our work would be affected by climate change which would lead to more informative survey results.'

'I liked the introductory workshop arranged by David and Ellie (project leads). It was really well thought out and provided a good introduction to the project in a timely manner.'

'I'd like to have understood better the time commitment and how much learning I would need to do - however this may have been my fault for not reading all the documentation (there was quite a lot), which was great but I found it hard to find the time to read it all.'

2.3 STEP THREE
Data and evidence gathering

The next stage in the process was to consider how HES has been affected by climate impacts in the past as well as how it may be affected in the future.

The project group members led on the collection of this data. Through hosting workshops, asking for survey responses, and speaking to targeted individuals, the group members explored experiences and gathered evidence from each of their directorates and departments. They recorded this data and evidence in the project workbook provided.

Key goals of this step:

- Identify the key functions and responsibilities of each area of our organisation
- Collate views (and examples) of how these key functions and responsibilities could be impacted by different physical climate risks
- Each directorate to highlight key areas of vulnerability and exposure and produce a preliminary climate risk register for their area

Activities:

4. The project group worked to complete the project workbook that they were provided with. The first step was to identify some baseline information on the roles and functions of their business area. This included identifying:
   - What are the core functions of your business area?
   - What key services/ products / markets does your business area need to deliver its core function?
   - What key pieces of infrastructure do you rely on?
   - Where does your business area do its work? Offices / depots / in communities / online etc?
5. With information on the key functions and responsibilities of each of our directorates collated in Activity 4, the project group were then asked to consider:
   - **How could the weather and natural hazard events currently impact our ability to deliver the key functions and responsibilities outlined in the previous step?** A simplified scoring system was produced and provided as part of the 'Project Workbook'. The project group then exercised their own judgement and provided an 'impact' score based on the Table 1.

Table 1.

Key	Description
Low impact	Likely to cause no damage/ harm/disruption
Medium impact	Has potential to cause damage/harm/disruption
High impact	More likely than not to cause damage/harm/disruption

Table 2.

Code	Key	Description
↑	Increase	Likely to increase chance of damage/harm/ disruption
↓	Decrease	Likely to decrease chance of damage/harm/ disruption
↔	No change	Likely to not change chance of damage/harm/ disruption

- **How might future changes in the climate impact your ability to deliver those key functions?** Example changes in future climate were provided in the Project Workbook and the project group were asked to indicate whether they thought these changes would increase, decrease or result in no change to the level of risk (Table 2)

6. With the information collated in Activities 4 and 5, group members then prepared a preliminary climate risk register. They brought forward the key areas of risk identified, created short risk statements and provided additional information (also collected as part of the workshops and surveys). The additional information included:

- Are we already aware of this risk and if so, are there any mitigants and controls already in place to manage it?
- What could we do differently to manage this risk, now and in the future?

Key outputs:

- Preliminary climate risk registers for each of our directorates that included possible solutions to address the climate risks identified.

What worked well:

- Producing a 'Project Workbook' to allow for consistent collection and recording of data and evidence across all our directorates. It also provided a clearly formulated process.
- Producing workshop, survey and interview templates that were flexible so group members could amend to suit their needs.
- Having dedicated support from the project leads to aid group members in hosting / facilitating workshops, as well as having them come along to team / directorate meetings to raise awareness of the project.
- Flexibility of the project leads to amend the process. For example, it became clear that certain areas of the organisation were less impacted by physical climate risks than others (due to the nature of their work). As a result, the Project Workbook was updated to provide space for data and evidence gathering more closely linked to transition climate risks – not originally considered in the initial project scope.

What we would do differently:

- Project timings for this stage were very tight and further complicated by the Christmas holiday period. In hindsight, this was not a good time of year to carry out this part of the project.
- Clearer articulation of the time that would likely be involved in the data and evidence gathering processes.
- Provide a more focused session for the group on terminology and a more detailed walk-through of the Project Workbook.

What did the group members think themselves?

'I learned so much about the work of my Directorate during this phase, which will help me beyond this one project. It's easy to slip into thinking that because most of us work in Headquarters, the issues we face will be the same, but that's not the case at all.'

'I would have benefitted from a few more workshops prior to conducting the survey/workshop with Directorate and compiling the risk register, so that we would have had a sounder understanding of everything, especially before speaking with the wider team about it.'

'I'd have liked a bit more time to dedicate to participating in the project and getting away from the day job.'

'Having several 'reps' from each directorate was really useful, so the workload was shared, and ideas and experience were shared too.'

'For my Directorate, I think the engagement on our Climate Risk Register was useful to highlight that climate change is everyone's issue, i.e. not just affecting those at site where there are obvious weather or climatic risks. It's something we all need to adapt to.'

2.4 STEP FOUR

Making sense of the data and evidence

The next step saw the project group attend monthly sessions to further review and refine the results of the previous step.

In total, three two-hour workshops were prepared and hosted by the Project Leads.

Key goals of this step:

- Agreeing on key risks to take forward to adaptation plan write-up
- Trialling ways of prioritising risks
- Identifying key internal and external stakeholders who could help address identified risks
- Refinement of 'solutions' to address risks
- Seeking feedback from group participants to inform production of a methodology and reflections document.

Activities:

7. In advance of the next project group workshop, the project lead reviewed all climate risk register submissions and combined them. They then carried out a first pass refinement of the risks identified, merging duplicates, providing consistency across risk descriptions and grouping risks into theme areas.

8. The project group then met for the first of three workshops in this step. At this workshop the group collectively undertook the following tasks:

- **Assigning risks to Directorates**
  In breakout groups, each group explored a subset of the identified risks. The first task asked participants to identify the directorates that each risk would likely have the greatest impact on.

- **Refining Risk Descriptions**
  Each risk was discussed individually to see if it made sense and if wording needed to be altered.

- **Gathering additional information**
  The project group were then asked to suggest and consider any evidence that supported the identified risks (e.g. examples of it having occurred already), any potential 'risk' gaps and any opportunities arising in addressing each risk.

9. One month later, the group met for the second workshop in this series. At this session they were asked to prioritise the risks using an urgency scoring approach developed for the UK Climate Change Risk Assessment. The risks were categorised based on the level of urgency which the group deemed necessary, considering the level of risk, the shortfall in adaptation and the additional benefits of short-term action.

The flowchart in Figure 2 was provided as a Miro Board template and participants discussed where they felt each risk was best placed.

10. At the second workshop, the project group were asked to provide further information on each risk including:

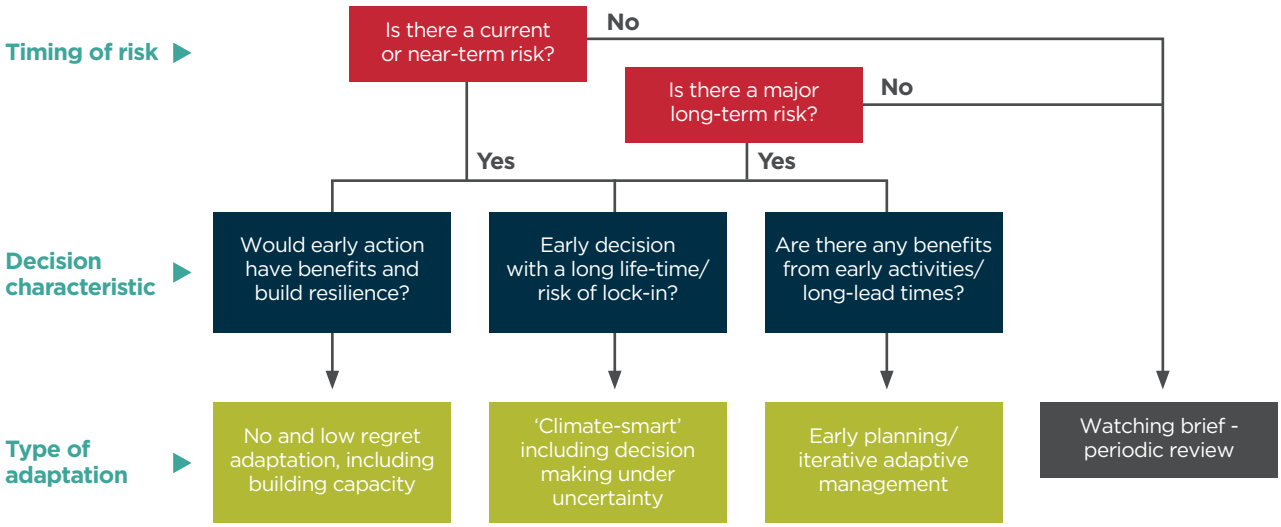
- What evidence could we provide to verify this risk that the organisation is already collecting? This was a repeat of a question asked in Activity 8 as time ran short in that initial workshop.
- What evidence / data should we be collecting to make an informed judgement on this risk?

11. A month later, the group met for the third and final workshop in this series. At this workshop the group were asked to provide their final views on the risks identified. They also provided additional information on:

- The resources that would likely be required to address each risk category (skills, knowledge, data etc.)
- The partnership opportunities that might exist with external organisations – seeking others who are likely looking to solve the same problems
- Any existing plans or strategies that we have, or are developing, that could become a logical home for addressing the risks identified.

This concluded the formal input from the project group.

Figure 2.



What worked well:

- Invitations for the final three workshops were sent out well in advance. The sessions took place once a month, for three months. This provided clarity to the participants on the time commitment required of them.

- In between workshops, the Project Leads held a tutorial session on how to use **Miro** (the online workshopping tool). This allowed members of the group who were not familiar with the technology to try it in advance of the workshops.

- 'Group thinking' ideas using Miro and **Slido** – providing opportunity for people to contribute lots of different ideas. Leaving these platforms open outside of the scheduled workshop time proved effective as well, as it allowed people to contribute further ideas after they had time to reflect. This also allowed those who could not attend the workshop to still contribute.

What we would do differently:

- The prioritisation method we used in Activity 9 was not successful. Participants found the terminology and categorisation difficult to understand and challenging to assign risks based on the proposed headings. Following on from this session, we asked the group what parameters they would like from a prioritisation exercise, the responses included:

  - Focus on risks with the most impact, both across the organisation and per directorate

  - Focus on current climate risks and near-term future climate risks (up to 2050)

  - Focus on risks with attainable 'quick win' solutions to inspire and motivate the more ambitious action needed for other emerging climate risks

What did the group members think themselves?

'Having been to a few Miro Board sessions, having assigned facilitators to move the post-it notes about and ask targeted questions was a good approach.'

'Having information to read before each session to be able to think about some of the questions before would have been good. Sometimes the amount of information was overwhelming.'

'The workshops were really beneficial and spaced out well timewise - not too many and not too little. Having drop-in sessions in-between was useful even if we didn't use them it was good to have them offered.'

2.5 STEP FIVE
Preparing the plan and next steps

Preparing the plan:

Using the data and evidence gathered by the project group during steps three and four, the project leads:

- Finalised the risk descriptions and prepared the collated evidence that justified the inclusion of each risk in our 'climate ready' plan
- Wrote up the 'adaptation responses' required to address each risk and an overview of the key resources likely required to tackle these
- Sought the views of the project group and other key internal stakeholders on draft versions of the plan as they were prepared
- Proposed a monitoring, evaluation and reporting schedule for the 'climate ready' plan
- Presented the findings of our climate ready project to the Senior Management Team and sought approval for proposed approach. Approval was then sought from our organisation's Board.

Next Steps:

To achieve a climate resilient organisation, action on tackling and addressing climate risk must be mainstreamed across all areas of our organisation. Guidance and support for this will be provided by the organisation's Climate Change Scientist. In the short-term, immediate activities that need to be undertaken include:

- Development of an internal communications plan to raise awareness of the project and its findings.
- Collation of resources and flagging of training opportunities for staff to help support the necessary mainstreaming of action.
- Planning for our next benchmarking exercise using the Adaptation Capability Framework.

2.5 STEP SIX
Final reflections

At the final workshop we held with the project group we (the project leads) allocated significant time to seek feedback from participants on how they found the process overall. The benefits of the collaborative approach taken were clear to see in responses from the group members.

- 95% of participants increased their knowledge of climate impacts, risk and adaptation, in comparison to before taking part in the project.
- 60% of participants felt more confident in speaking about climate impacts, risk and adaptation compared to when they started the process.
- General feedback captured that staff felt more engaged with the topic and empowered to take adaptation action.
- The virtual environment through which we carried out the project was well-received. This allowed for wider membership of the group and meant colleagues who were not based at one of our Head Offices could also participate – enriching the entire project and its outputs.
- Participants enjoyed getting to work with colleagues that they would not often 'cross paths' with. They also enjoyed getting actively involved in the development of the plan - an opportunity many had not been given before. Many said they felt like they were really contributing to something important (and they were).
- Participants liked the resources provided (project workbook and workshop templates) as it empowered them to lead sessions with their colleagues and helped them through the process in a systematic manner.

There are key areas where the process could have been improved. The project group told us that:

- We needed to spend more time upskilling participants at the start, including more time dedicated to understanding key terminology and more focused training on assessing climate risks and impacts.
- More information provided in advance of workshops to help inform discussions on the day would have been useful.
- Despite great membership of the group, some areas of the organisation were harder to reach. Time should have been planned in to allow the project leads to focus on engaging with these areas.
- More time was needed for the data and evidence collection stage of the process.

Final thoughts from the project group:

'Being able to undertake the project fully remotely had significant benefits in making it truly an opportunity available to all staff across the organisation. The workshops were essential to providing us with some key bits of information prior to really kicking off the project; and having the templates available for our own information gathering made the project seem less intimidating than it would have done without these. I was surprised by how much more widely I've benefitted from being involved in this project than I had originally thought and anticipated.'

'Both myself and my colleagues in my Directorate had very little appreciation for how much climate change would have an impact on our day-to-day work, being office based and mostly purely computer based. If we could still access the internet, flooding and rising temperatures surely wouldn't affect us doing our job? However, it was eye-opening to learn just how affected we would be by 'transitional' climate change risks, particularly in relation to how it could affect HES's reputation if what we say and what action we take are not properly aligned.'

SUPPLEMENTARY INFORMATION

Apprentice joiner at Stirling Depot

1. SUPPLEMENTARY INFORMATION – CLIMATE RISKS

Our climate risk assessment identified 28 key climate risks that, based on our current understanding, we believe to be areas where further action is required. The identified risks group into five risk categories, those are:

Physical assets: This category covers risks on the assets that we own or care for, such as increased frequency and severity of flooding. This includes built assets such as our offices, depots and warehouses, and their supporting infrastructure such as IT and mechanical and engineering equipment. Additional risks to the Properties in Care and their other associated designations, such as Designed Gardens and Landscapes, are covered here too.

Natural capital: This category covers risks, for example, to the flora and fauna of our Properties in Care from the spread of new and invasive species. It also includes increased rates of degradation of our Property in Care grounds, such as increasing frequency of rockfall events. The risks described in this section also cover other designations often associated with the places we look after, for example, **Sites of Special Scientific Interest**.

Operations: This category covers risks, such as increased frequency of travel disruption as a result of weather extremes, and the impact on delivery of our key functions. For example, operating visitor attractions and their supporting activities (e.g. catering and retail offerings) or travelling throughout the country to survey, record and inspect sites of historic interest.

People: This category covers risks associated with our people. For example, the increased risk of overheating in office spaces due to hotter summers. It also includes the impact of the climate crisis more generally on our people, including increased levels of concern and worry.

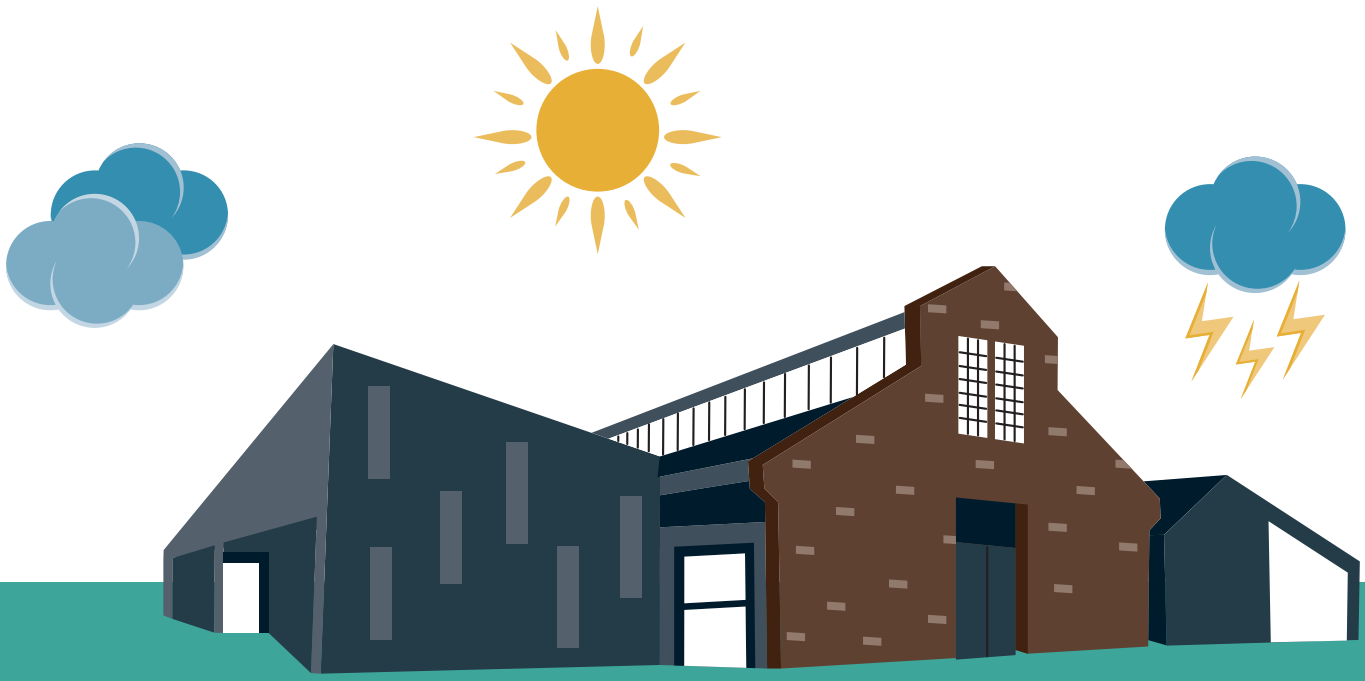
Transition: This category covers risks associated with the transition to low-carbon economy. This includes risks associated with rapidly changing climate change legislation and policy, or the changing expectations of visitors and other stakeholders.

Over the course of this section, and for each of the five risk categories, we provide additional information collated for each risk as part of the 'climate ready' process. This comprises:

- **A description of each risk and risk category**. This includes evidence or a justification for its inclusion as a risk of concern. An interactive summary that allows you to jump to the individual risks, or risk categories, that you are interested in can be found on the next page.
- **A risk summary table:** This includes information on current and future risk drivers, as well as information on any existing mitigants or controls we have in place that currently manage that risk. See Table 3 below for full definitions.

Table 3.

Code	Risk (cause + effect)	Weather Driver(s)	Natural Hazard(s)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
Unique risk code	Risk description, each tends to follow a formula of describing the cause then the effect of the cause	What weather drivers are causing this risk to materialise (if any)	What natural hazards are causing this risk to materialise (if any)	What actions we already take to reduce the likelihood or impact of this risk	What future changes in our climate could alter the likelihood or impact of this risk



PHYSICAL ASSETS OVERVIEW

We have a diverse range of physical assets with a wide geographical spread across the country. This includes built assets such as our offices, depots and warehouses and their supporting infrastructure such as IT and mechanical and engineering equipment.

Included within our definition of physical assets are the 336 Properties in Care (PiCs) and their associated collection of over 40,000 objects. We also look after, and curate, an extensive archive and library relating to Scotland's architectural, archaeological, industrial and maritime heritage, as well as the National Collection of Aerial Photography (NCAP). All these 'assets' have potential to be impacted by climate change, some more than others, and with varying degrees of risk.

An additional complexity with our assets is that many, by their very nature, have very long lifespans. We look after assets that have been around for millennia, and we want them to be around for many years still to come.

These 'assets' have potential to be impacted by climate change, some more than others.

Key risks at a glance

- **PA01:** Changing weather patterns / increased occurrence of natural hazard events causing increased rates of decay of our Properties in Care
- **PA02:** Increased risk of flooding and associated impacts on our offices, depots and other supporting infrastructure
- **PA03:** Weather extremes / natural hazard events causing increased risk of damage to IT infrastructure
- **PA04:** Rising temperatures causing increased demand for cooling (and energy) in our buildings
- **PA05:** Hotter and drier summers increasing the risk of wildfire across our estate
- **PA06:** Changing weather patterns / increased occurrence of natural hazard events causing increased risk of damage/ loss to our collections and archives
- **PA07:** Changing visitor behaviours and numbers (combined with changes in climate) increasing rates of degradation of Properties in Care

See Table 1 for a breakdown of these risks, including the weather and natural hazard stressors that currently drive the risk, and those that will likely alter the risk in the future.

Table 1 - Physical Assets

Code	Risk (cause + effect)	Weather Driver(s)	Natural Hazard(s)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
PA01	Changing weather patterns / increased occurrence of natural hazard events causing increased rates of decay of our Properties in Care	Rainfall (seasonal, annual); temperature (seasonal, annual); storm events	Flooding (fluvial, pluvial, coastal, groundwater); coastal erosion; ground instability	Regular inspection / site visits / condition surveys; ongoing maintenance and conservation works; ongoing monitoring and research (e.g. materials analysis and digital documentation)	More frequent weather extremes; hotter and drier summers; warmer and wetter winters; more frequent natural hazard events
PA02	Increased risk of flooding and associated impacts on our offices, depots and other supporting infrastructure	Rainfall (hourly, daily, weekly);	Flooding (fluvial, pluvial, groundwater, coastal)	Regular inspection / site visits / condition surveys; ongoing maintenance	More frequent weather extremes; hotter and drier summers; warmer and wetter winters; more frequent natural hazard events
PA03	Weather extremes / natural hazard events causing increased risk of damage to IT infrastructure	Rainfall (hourly, daily, weekly); temperature (daily, weekly); Wind/ storms	Flooding (fluvial, pluvial, coastal)	Business continuity plans	More frequent weather extremes; hotter and drier summers; warmer and wetter winters; more frequent natural hazard events
PA04	Rising temperatures causing changing heating and cooling needs in our buildings	Temperature (daily, weekly, monthly, seasonal, annual)			Hotter and drier summers; more frequent weather extremes
PA05	Hotter and drier summers increasing the risk of wildfire across our estate	Temperature (monthly, seasonal, annual); rainfall (monthly, seasonal, annual)		Clearing of 'fuel' as part of site maintenance; regular inspection	Hotter and drier summers; more frequent weather extremes
PA06	Changing weather patterns / increased occurrence of natural hazard events causing increased risk of damage/loss to our collections and archives	Rainfall (hourly to seasonal); temperature (daily to seasonal); wind/ storms	Flooding (fluvial, pluvial, coastal, groundwater); changing species distribution	Salvage plans in place; environmental monitoring of some collections; other collections management procedures in place	More frequent weather extremes; hotter and drier summers; warmer and wetter winters; more frequent natural hazard events
PA07	Changing visitor behaviours and numbers (combined with changes in climate) increasing rates of degradation of Properties in Care	Rainfall (hourly to seasonal); temperature (daily to seasonal); wind/ storms	Flooding (fluvial, pluvial, coastal, groundwater); coastal erosion; ground instability	Regular inspection / site visits / condition surveys; ongoing maintenance and conservation works	More frequent weather extremes; hotter and drier summers; warmer and wetter winters; more frequent natural hazard events

PA01: Changing weather patterns / increased occurrence of natural hazard events causing increased rates of decay and damage to our Properties in Care

In 2018 we published an initial **climate risk assessment of the Properties in Care**. This assessment focussed on levels of current risk from natural hazards such as flooding and ground instability. The results of this assessment informed us that approximately 50% of our properties are exposed to high or very high levels of risk from natural hazards.

The reasons for such high levels of risk to natural hazards is often intrinsically linked to the history of the site. We look after 336 properties, located across the country. Each property has its own unique set of conservation challenges often guided by aspects such as its geographic location, the materials and methods used in its construction and its current state of conservation. We have properties that are roofed and occupied, such as Edinburgh Castle. We have properties that have been unroofed and left in a ruinous state for centuries, such as Kilchurn Castle. There is an extensive series of field monuments and standing and carved stones as well, located in a variety of landscapes and locations.

Many of our properties are located near rivers, on top of volcanic crags or near the coast because of the benefits those strategic points in the landscape brought those that built and used those properties. The legacy of this is now high levels of risk to various natural hazards associated with those types of landscapes.

PA02: Increased risk of flooding and associated impacts on our offices, depots and other supporting infrastructure

Across our estate we have assets exposed and vulnerable to flooding. This includes fluvial, coastal, surface water and groundwater flooding. For example, nearly 50% of our Properties in Care are located within 100m of a river or stream course. In recent years, we have experienced flood events, particularly linked to surface water flooding after intense rainfall events, at many locations across our estate.

In Scotland, and as a result of climate change, we expect to see rainfall patterns changing in the years and decades ahead. It is likely we will experience wetter winters and drier summers and more frequent intense, heavy rainfall events. As a result, we expect to see the severity and frequency of flood events to increase[3].

PA03: Weather extremes / natural hazard events causing increased risk of damage to IT infrastructure

Our IT infrastructure is business critical. There is increasing evidence of the impacts of weather-related events on information and communication technology. This includes disruption as a result of power failures, poorer performance during periods of inclement weather and physical damage to assets[4]. Despite the growing evidence base, uncertainty still exists in what future risks will be here, though it is likely that changes in severity and frequency of weather extremes will lead to more disruption and damage of IT infrastructure and the knock-on impacts and disruption that can bring.

3. Adaptation Scotland: **Climate Projections for Scotland Summary** (2021)
4. Climate Change Committee: **UK CCRA3 Telecoms and ICT Briefing** (2021)

PA04: Rising temperatures causing changing heating and cooling needs in our buildings

As climate change intensifies, and we begin to experience more frequent hot days and heatwaves, it is likely we will experience an increase in demand for cooling during the summer months and a decrease in demand for heating during winter months across our estate. This could have implications for energy use and associated costs in the procurement and maintenance of new equipment.

PA05: Hotter and drier summers increasing the risk of wildfire across our estate

As our climate changes and we expect to experience more frequent hot and dry spells, and as the growing season lengthens, conditions are created that are potentially more suitable for allowing wildfire to take hold. Wildfire can cause considerable damage to important wildlife habitats. It can also cause damage to underlying archaeological remains, either directly as it passes over, or indirectly as a result of increased susceptibility to soil erosion once binding vegetation is destroyed.

Data provided by Scottish Fire and Rescue tells us that since 2009 there have been over 300 incidents of outdoor fire at our Properties in Care, this figure doubles when looking at incidents of outdoor fire within 100 metres of our Property in Care boundaries.

The frequency of wildfire events is expected to increase as a result of climate change, though the causality is complex. As wildfires are generally started by humans, it is likely a combination of an increase in favourable conditions for wildfire plus the impact of people potentially spending more time outside, increasing the chance of accidental fire, that will drive this risk.

PA06: Changing weather patterns / increased occurrence of natural hazard events causing increased risk of damage/loss to our collections and archives

We care for a diverse range of objects, stored and displayed in variety of ways. Our Archive Team, for example, care for and curate photographic materials, books, drawings, plans, manuscripts and born-digital records that are stored in our strong rooms or digital vaults. Our Collections Team care for over 40,000 objects associated with the Properties in Care. These range from architectural fabric through to tapestries and paintings. Some of the collection is displayed on site and in a variety of locations, some of which are climate controlled to keep them in a good state of conservation. There are also stores throughout the country where other objects are housed.

We know as our climate changes it can have implications on the condition of our collections and archives. For example, this could be as a result of the spread of new and invasive pest species that could impact on the condition of vulnerable collections.

PA07: Changing visitor behaviours and numbers (combined with changes in climate) increasing rates of degradation of Properties in Care

Changing weather patterns, combined with an increasing number of customers visiting many of our properties, is already having a notable impact on the condition of many of the properties we care for. For example, increased levels of rainfall combined with growing visitor numbers is responsible for damage to the access paths at Ring of Brodgar and Doune Castle – with access restrictions now in place at both properties to help give the grounds a chance to recover.

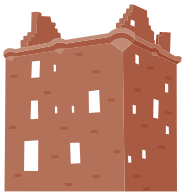
NATURAL CAPITAL OVERVIEW

Natural Capital is defined as *'the stocks of natural assets which include geology, soil, air, water and all living things'*[5]. It also speaks to the benefits that nature brings to humans and, by default, organisations like ours.

The properties we care for contain more than just the physical monuments. They contain a mix of habitats, landforms and ecosystems that are part of our country's natural capital. From beaches and dunes to exposed hilltops to river valleys and everything in between. These landscapes and landforms provide key benefits such as spaces for recreation and enjoyment, important wildlife and ecological habitats and natural defences against hazards such as flooding and coastal erosion.

The sustained shift in our climate is already having an impact on the natural capital associated with our properties. Changes in temperature, precipitation and other elements of our climate are impacting the distribution of flora and fauna and altering patterns of decay and degradation across our estate. These changes also increase the risk of pre-existing natural hazards, such as wildfire, landslides and rockfall.

The sustained shift in our climate is already having an impact on the natural capital associated with our properties.



Key risks at a glance

- **NC01:** Extreme weather / natural hazard events causing increased need for maintenance of green space
- **NC02:** Changing weather patterns causing degradation and changing character of Property in Care landscapes
- **NC03:** Increasing temperatures causing spread of invasive pest species and changes to established Property in Care biodiversity
- **NC04:** Hotter, drier summers causing increased risk of drought and water supply issues
- **NC05:** More frequent weather extremes / natural hazard events causing breakdown of vulnerable natural barriers
- **NC06:** Changing weather patterns causing increased risk of ground instability and rockfall / deterioration of geological exposures

See Table 2 for a breakdown of these risks, including the weather and natural hazard stressors that currently drive the risk, and those that will likely alter the risk in the future.

5. Scottish Forum on Natural Capital: **Natural Capital Scotland**

Table 2 - Natural Capital

Code	Risk (cause + effect)	Weather Driver(s)	Natural Hazard(s)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
NC01	Extreme weather / natural hazard events causing increased need for maintenance of green space	Rainfall (daily, weekly, monthly, seasonal)	Flooding (fluvial, pluvial, groundwater, coastal); Ground instability; Changing species distribution	Routine maintenance of green space; regular inspection / site visits	More frequent weather extremes; wetter winters; drier summers
NC02	Changing weather patterns causing degradation and changing character of Property in Care landscapes	Rainfall (seasonal, annual); Temperature (seasonal, annual); Storm events	Changing species distribution	Regular inspection / site visits	More frequent weather extremes; warmer and wetter winters; hotter and drier summers
NC03	Increasing temperatures causing spread of invasive pest species and changes to established Property in Care biodiversity	Temperature (seasonal, annual)	Changing species distribution	Unknown impact + increasing likelihood	Warmer and wetter winters; hotter and drier summers
NC04	Hotter, drier summers causing increased risk of drought and water supply issues	Rainfall (monthly, seasonal, annual); Temperature (monthly, seasonal, annual)		Unknown impact + increasing likelihood	Hotter, drier summers; more frequent weather extremes
NC05	More frequent weather extremes / natural hazard events causing breakdown of vulnerable natural barriers	Wind/Storms	Sea-level rise; coastal erosion; flooding; river scour	Routine maintenance; regular inspection / site visits; restoration of natural barriers (e.g. Links of Noltland); digital monitoring of some at risk sites (e.g. Skara Brae)	More frequent weather extremes; rising sea-levels
NC06	Changing weather patterns causing increased risk of ground instability and rockfall / deterioration of geological exposures	Rainfall (monthly, seasonal, annual); Temperature (monthly, seasonal, annual)	Ground instability; rockfall; changing plant species distribution	Scaling of vulnerable rock faces; routine inspection and monitoring; installation of rock traps; closure of exposed footpaths/ routes	More frequent weather extremes; warmer and wetter winters; hotter and drier summers; longer growing season

NC01: Extreme weather / natural hazard events causing increased need for maintenance of green space

NC02: Changing weather patterns causing degradation and changing character of Property in Care landscapes

NC03: Increasing temperatures causing spread of invasive pest species and changes to established Property in Care biodiversity

Risks NC01, NC02 and NC03 are grouped due to similarities in risk description and action proposed

Our Properties in Care (PiCs) contain many areas of green space, including parks and gardens, lawns, woodlands, orchards and moorland. As the changes in our climate intensify it is likely that there will be an increased need for maintenance required to keep these spaces in good condition. It is likely that our approaches to maintenance will need to change as well.

Across our estate we already have a taster of things to come. For example, at properties such as Aberdour Castle and Kings Knot, increased occurrence of waterlogging is leading to failing tree health and increased prevalence of disease. Changing climatic conditions are thought to have brought on the rapid onset of Chalara Ash Die Back, Clindrocladium buxicola (box blight) and Phytophthora. These diseases have been observed impacting tree species at 25 of our properties to date. We are also seeing new species move into some of the properties we look after. For example, in recent years new species of butterfly have colonised in Holyrood Park including Wall, Speckled Wood and Small Skipper.

The flora and fauna found at our properties often adds to the established historic character of a place. Alongside the risk of changing species distribution and increased rates of decay, is the risk of changing character of these places as new species take hold and others disappear. These changes could negatively impact on the intrinsic social and cultural value of these places.

NC04: Hotter, drier summers causing increased risk of drought and water supply issues

Changing rainfall patterns, including increased risk of longer dry and hot spells could impact water supplies, particularly when combined with increased demand for water. Our estate uses water in a variety of ways and in 2019/20 we used around 390,000 m^3 of water. The supply of this water was responsible for approximately 133 tonnes of CO_2 equivalent emissions. Knowing there might be water supply issues as a result of climate change will help us to reduce water usage. Along with having a positive impact on our greenhouse gas emissions, this will help us to assess what the impact might be if water supplies were to be disrupted.

NC05: More frequent weather extremes / natural hazard events causing breakdown of vulnerable natural barriers

Many of our properties benefit directly from protection offered by natural capital assets. For example, dune systems can act as an important natural barrier protecting what's on their landward side from the full force of high-winds and storm surges.

There have been instances across our estate of natural barriers breaking down resulting in damage and loss to affected properties. For example, at Links of Noltland, the erosion and breakdown of the dune system, that previously offered protection to the archaeological remains, has increasingly left the remains exposed and experiencing the active loss of significant archaeological deposits.

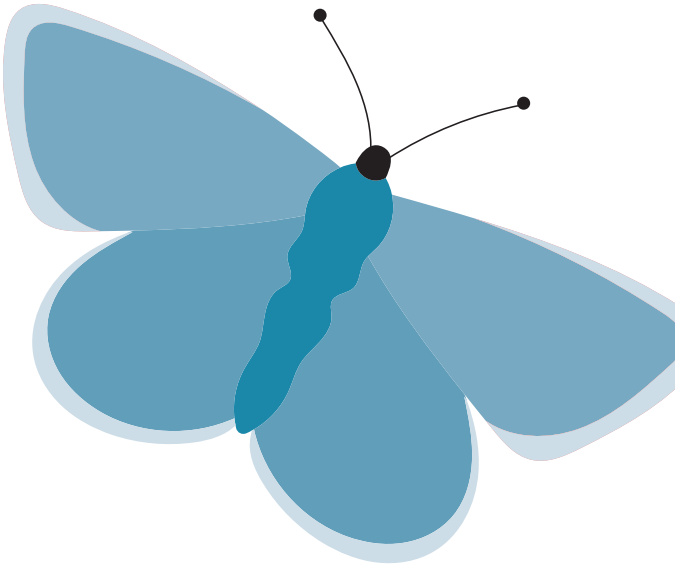
Another example could be the impact of prolonged periods of drought and high temperatures reducing the ability of soil and vegetation to absorb water. This could lead to greater incidence of flash flooding. In a similar vein, the drying out of peatbogs would have a negative impact on the state of preservation of buried archaeological remains.

NC06: Changing weather patterns causing increased risk of ground instability and rockfall / deterioration of geological exposures

36 of the properties we care for contain substantial geological exposures. Well known examples include Castle Rock, on which Edinburgh Castle is situated, and Salisbury Crags in Holyrood Park. A substantial rockfall event occurred on Salisbury Crags in 2018, with tonnes of material falling on to the Radical Road pathway which has remained closed since. Rockfalls associated with these exposures across our estate are linked to climatic and biological methods of decay as well as the type of geology.

As well as the risk of rockfall specifically, there is a more general risk of slope instability across many of the properties we care for. In our 2018 Climate Change Risk Assessment of the Properties in Care, we assessed that just over 60 properties had potential to be impacted by slope instability (e.g. a landslide). The varied characteristics of the properties we look after, particularly their geology, gradient of landscape, proximity to sources of water and varied drainage characteristics can combine to create this risk.

As our climate changes we expect the number and nature of damaging events associated with ground instability and rockfalls to change.



OPERATIONS OVERVIEW

Due to the nature of our organisation, we are inherently vulnerable to disruption caused by unpredictable, often extreme, weather events.

Extremes in temperature, precipitation and wind can result in disruption at our Properties in Care, depots and offices, impacting on staff and visitors, and reducing the financial performance and resilience of the organisation. It can also disrupt the supply chains that we depend on and consequently our ability to deliver business critical functions and key operations.

We have a geographically wide-spread workforce and diverse set of operations that combine to form lots of opportunities for the weather to impact our organisation. This includes the running of visitor attractions and supporting activities (e.g. catering and retail offerings) and the need for staff to travel throughout the country to survey, record and inspect sites of historic interest - and a whole host of activities in between.

Disruption to our organisation can also affect our ability to deliver our core functions, which are set out in the **Historic Environment Scotland Act 2014**. Those core functions include: (a) identifying and recording the historic environment; (b) understanding and interpreting the historic environment; (c) learning about, and educating others about, the historic environment; (d) protecting and managing the historic environment; and (e) conserving and enhancing the historic environment.

Key risks at a glance

- **OP01:** Extreme weather / natural hazard events causing increased risk of disruption/ shock to our supply chain
- **OP02:** Extreme weather / natural hazard events and associated challenges in communicating closures with public
- **OP03:** Extreme weather / natural hazard events resulting in increasing number of working days lost / disrupted
- **OP04:** Extreme weather / natural hazard events resulting in more frequent postponement / cancellation of events
- **OP05:** Extreme weather / natural hazards leading to more frequent closure of our Properties in Care
- **OP06:** Extreme weather / natural hazard events causing disruption to staff travel (commute / business travel)

See Table 3 for a breakdown of these risks, including the weather and natural hazard stressors that currently drive the risk, and those that will likely alter the risk in the future.

Disruption to our organisation can also affect our ability to deliver our core functions.

Table 3 - Operations

Code	Risk (cause + effect)	Weather Driver(s)	Natural Hazard(s)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
OP01	Extreme weather / natural hazard events causing increased risk of disruption/ shock to our supply chain	Rainfall (seasonal, annual); temperature (seasonal, annual); storm events	Flooding (fluvial, pluvial, coastal)		More frequent weather extremes; warmer and wetter winters; hotter and drier summers; longer growing season
OP02	Extreme weather / natural hazard events and associated challenges in communicating closures with public	Wind/storms; weather extremes	Flooding (fluvial, pluvial, coastal); Ground instability; wildfire	Site closure mailing list; #HSclosures procedures in place	More frequent weather extremes; more frequent natural hazard events
OP03	Extreme weather / natural hazards leading to more frequent closure of our Properties in Care	Wind/storms; weather extremes; rainfall (hourly, daily)	Flooding (fluvial, pluvial, groundwater, coastal); rockfall; ground instability	Site closure mailing list; #HSclosures procedures in place	More frequent weather extremes; more frequent natural hazard events
OP04	Extreme weather / natural hazard events resulting in increasing number of working days lost / disrupted	Wind/storms; weather extremes; rainfall (hourly, daily)	Flooding (fluvial, pluvial, coastal)	Flexible working; remote access to networks	More frequent weather extremes; more frequent natural hazard events
OP05	Extreme weather / natural hazard events causing disruption to staff travel (commute / business travel)	Rainfall (hourly, daily, weekly); temperature (daily, weekly); Wind/ storms	Flooding (fluvial, pluvial, coastal); rockfall; ground instability	Flexible working; remote access to networks	More frequent weather extremes; more frequent natural hazard events
OP06	Extreme weather / natural hazard events resulting more frequent postponement / cancellation of events	Wind/Storms; weather extremes; rainfall (hourly, daily)	Flooding (fluvial, coastal, pluvial, groundwater)	Events primarily held in summer; Event Management Plans in place that consider weather conditions on the day	More frequent weather extremes; more frequent natural hazard events

OP01: Extreme weather / natural hazard events causing increased risk of disruption / shock to our supply chain

Many of our operations are often dependent on the supply of goods and materials. From sourcing products for our retail and catering offerings to the procurement of stone for use in the conservation of our properties – we are the customer at the end of a diverse and often complex supply chain network.

Climate change is expected to increase the frequency of weather-related disruption to supply chains (local to global). This would likely cascade down to have impacts on our organisation, such as interruption of supply of goods, increased purchase costs and reduced revenue for the organisation[6]. In the evidence report produced for the Third UK Climate Change Risk Assessment (UK CCRA3), disruption to supply chains caused by extreme weather was said to already be *'one of the top reported causes of supply chain disruption across all sectors ... nearly 60% of business surveyed by the Business Continuity Institute reported productivity losses due to extreme weather in 2018.*[7]

OP02: Extreme weather / natural hazard events and associated challenges in communicating closures with public

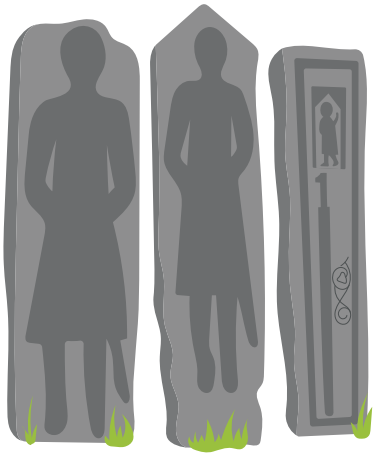
OP03: Extreme weather / natural hazards leading to more frequent closure of PiCs

Risks OP02 and OP03 are grouped due to similarities in risk description and action proposed

In the 4 years from 2016 to 2019 a total of 808 site closure notices were issued due to inclement weather across our estate. 2018 saw the greatest number of notices issued with a total of 346, around 190 of these were due to the 'Beast from the East'. This was a spell of inclement weather in February and March that saw widespread disruption across the country as a result of low temperatures and heavy snow fall, particularly in Scotland's Central Belt. Expected income generated through our commercial activities over the course of the 'Beast from the East' ended up being 82% lower than forecast, demonstrating the knock-on financial impact of disruption caused by the weather in this example.

A recent example of an active spell for site closures was February 2020. Scotland had its second wettest February since records began in 1862, recording over double the expected rainfall total for the month. Much of this rain was brought in by Storms Ciara, Dennis and Jorge which caused widespread disruption across the country. Edinburgh Castle was closed for seven days in February as a result of these storms, a new record for the site.

Due to the changeable nature of our weather, sites are often closed at relatively short notice. Our Social Media channels are used to communicate these closures as quickly as possible, with this information pulled through to a dedicated closures page on the HES website. Between September 2019 – December 2019, when the full estate was open, we published 199 #HSclosure posts, around 50 posts per month – not all these were attributed to the weather, often ongoing conservation works can result in the temporary closure of a site, or part of a site, as well.



6. McKinsey Global Institute: **Supply Chain Risk** (2020)
7. Climate Change Committee: **UK CCRA3 Business Briefing** (2021)

OP04: Extreme weather / natural hazard events resulting in increasing number of working days lost / disrupted

OP05: Extreme weather / natural hazard events causing disruption to staff travel (commute / business travel)

Risks OP04 and OP05 are grouped due to similarities in risk description and action proposed

With staff located across the country, working in a variety of locations and in a variety of roles, it is inevitable that we experience disruption from time to time due to inclement weather. This could be disruption to travel, temporary closure of visitor facing properties or postponement of planned conservation works as examples.

The 'Beast from the East' in March 2018 is a good example of the impact of extreme weather on our ability to work. As a result of amber and red weather warnings issued by the Met Office, we closed most of our staffed sites, offices and depots and asked staff to remain at home. Analysis carried out after the event estimated that around 92% of our staff were unable to attend their designated place of work as a result.

As our climate changes we expect the number of working days disrupted due to inclement weather to increase.

OP06: Extreme weather / natural hazard events resulting more frequent postponement / cancellation of events

We arrange and facilitate a wide-reaching programme of events at HES. For example, we deliver a variety of outreach events with a technical focus, including practical craft skills taster events for school children, bespoke technical seminars for Local Authorities and larger conferences for building and heritage professionals on a variety of themes. We also deliver content-led visitor facing events staged across the Properties in Care, ranging from large-scale events such as jousting at Linlithgow Palace to more intimate single-person living history performances at sites such as Edinburgh Castle. We also facilitate a range of third-party and partnership event requests including charity runs, theatrical productions and music performances.

As we begin to experience more frequent weather extremes, and changes in the seasonality of weather events that we are accustomed to, more frequent disruption to our events programme is likely. This would likely have knock on impacts on our finances and visitor experience. We've had a taster of this already - In March 2018 our 'Climate Change Impacts on the Historic Environment' seminar at The Engine Shed ironically had to be postponed due to the 'Beast from the East'.

PEOPLE OVERVIEW

The way climate change could impact our people is varied, and often hard to predict or pinpoint. We employ around 1400 people who are located throughout the country, with a diverse range of roles and responsibilities.

Many roles within our organisation require our people to travel around the country and carry out site-visits and field work. Others, with primarily desk-based or location specific roles, work in a variety of property types from offices, to laboratories, to workshops and visitor centres (amongst other types).

This creates many ways our people could be impacted by both physical and transition climate risks. There are some more obvious examples like the risk of overheating in enclosed spaces or the risk of natural hazard events (e.g. flooding) when travelling. Many of these are occupational risks that we already know about, though they are exacerbated by climate change.

There are then risks that are trickier to tie down. For example, around increasing levels of concern and anxiety as the climate crisis further dominates our day to day lives.

Key risks at a glance

- **PE01:** Extreme weather / natural hazard events impacting on staff health and safety when traveling / onsite visits / outdoor working
- **PE02:** High temperatures increasing the risk of overheating in offices, depots and other enclosed spaces
- **PE03:** Heightened awareness of climate crisis issues leading to increased levels of concern and anxiety amongst our people

See Table 4 for a breakdown of these risks, including the weather and natural hazard stressors that currently drive the risk, and those that will likely alter the risk in the future.

Many of these are occupational risks that we already know about, though they are exacerbated by climate change.

Table 4 - People

Code	Risk (cause + effect)	Weather Driver(s)	Natural Hazard(s)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
PE01	Extreme weather / natural hazard events impacting on staff health and safety when traveling / onsite visits / outdoor working	Rainfall (hourly, daily, weekly); temperature (daily, weekly); Wind/ storms	Flooding (fluvial, pluvial, coastal); rockfall; ground instability	Severe Weather Policy; Site work risk assessments	More frequent weather extremes; more frequent natural hazard events; hotter and drier summers
PE02	High temperatures increasing the risk of overheating in offices, depots and other enclosed spaces	Temperature (hourly, daily, weekly)		Outdoor working risk assessments	More frequent weather extremes; more frequent natural hazard events; hotter and drier summers
PE03	Heightened awareness of climate crisis issues leading to increased levels of concern and anxiety amongst our people	Global changes in climate		Development of the climate change virtual learning environment course	Increasing awareness of climate change linked issues; enhanced reporting requirements; enhanced climate action expectations

PE01: Extreme weather / natural hazard events impacting on staff health and safety when traveling / on site / outdoor working

As climate change intensifies and we begin to experience more frequent weather extremes and natural hazard events, this could have an impact on the health and safety of our people. The diverse nature of the roles and responsibilities of our people, and their widespread geographic location, means there are a range of physical climate risks that could impact our people.

PE02: High temperatures increasing the risk of overheating in offices, depots and other enclosed spaces

Average and extreme temperatures will continue to increase across the whole of the UK as a result of climate change. High temperatures can have negative impacts on our people's health and wellbeing and ability to commute to work[8]. We expect to see winters get warmer, summers get hotter and more frequent very hot days and heatwaves. This increases the risk of overheating in internal spaces where our people work and could impact their health and safety. There are clear signs of these increasing temperatures in Scotland, in fact our top 10 hottest years have now all occurred since 1997 in a record dating back to the late 1800's[9].

PE03: Heightened awareness of climate crisis issues leading to increased levels of concern and anxiety amongst our people

The way climate change impacts our people is not reserved to physical risks only. Persistent messaging in the media and online on the severity and scale of the challenge to address the climate crisis could leave our people feeling overwhelmed. As our organisation responds to the climate crisis it is also likely that ways of working we have become accustomed to will need to change as well. Our response to the climate crisis will need new skillsets and knowledge, with opportunities to upskill our people as well as areas where new skills will need to be brought in. It is reported in the media that levels of climate-anxiety are likely on the increase amongst the population[10].

8. Climate Change Committee: **UK CCRA3 High Temperatures Briefing** (2021)
9. Met Office: **UK and Regional Series** (2021)
10. BBC: **'Eco-anxiety': how to spot it and what to do about it** (2019)

The diverse nature of the roles and responsibilities of our people, and their widespread geographic location, means there are a range of physical climate risks that could impact our people.

Staff vegetable garden at Longmore House

TRANSITION RISKS OVERVIEW

We have a diverse range of functions as an organisation:

- We care for more than 300 sites of national importance across the country and are the largest operator of paid visitor attractions in Scotland.
- We look after internationally significant archives and artefacts.
- We are at the forefront of investigating and researching the historic environment and addressing the impacts of climate change on its future.
- We protect our historic places through designations and consents, promote their sustainable development, and provide millions of pounds each year to local communities to repair and revitalise their historic environment.
- We provide advice and guidance about the historic environment and offer a wide range of training and learning opportunities.

This diverse range of functions leaves us open to a range of different transition climate risks, many centred around the transition toward a more sustainable, or responsible, means of operating large visitor attractions (sustainable tourism).

We are at the forefront of investigating and researching the historic environment and addressing the impacts of climate change on its future.

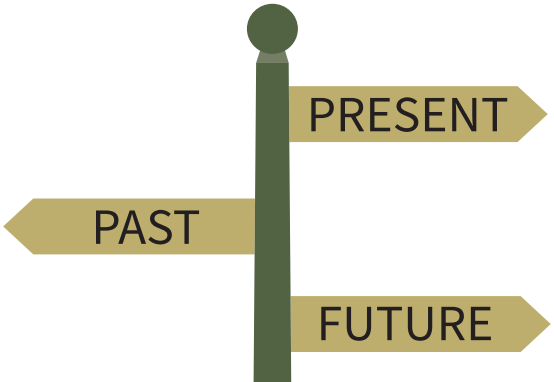
Key risks at a glance

- **TR01:** Enhanced climate action expectations on public sector bodies and misalignment of our own policy and strategy with Scottish Government climate change targets
- **TR02:** Dependence on a carbon and resource intensive operational model, and tourism sector, to generate revenue increasing the risk of reputational damage and impact on income
- **TR03:** Rapidly changing customer and stakeholder expectations for climate action not met resulting in reputational damage & impact on income
- **TR04:** Rapidly evolving knowledge of action needed to address the climate crisis misaligned with the advice and guidance we publish leading to misinformation / reputational damage
- **TR05:** Changing government priorities leading to risk of reduced funding in future
- **TR06:** Maintenance deficit in historic environment, combined with a changing climate, leading to increased demand on resources (e.g. PiC conservation budget and HES Grants)

See Table 5 for a breakdown of these risks, including the weather and natural hazard stressors that currently drive the risk, and those that will likely alter the risk in the future.

Table 5 - Transition Risks

Code	Risk (cause + effect)	Mitigants & Controls (Existing treatments)	Future Risk Modifiers
TR01	Enhanced climate action expectations on public sector bodies and misalignment of our own policy and strategy with Scottish Government climate change targets	Creation of Climate Change Policy Manager role; revised Carbon Management Plan (2021)	Rapidly evolving policy and legislation (Climate Change Act, SCCAP, Emissions Reduction Act, Climate Change Plan)
TR02	Dependence on a carbon and resource intensive operational model, and tourism sector, to generate revenue increasing the risk of reputational damage and impact on income	Development of Sustainable / Responsible Tourism strategy and series of high-level actions included in Climate Action Plan 2020-25; creation of Responsible Tourism Officer role	Rapidly evolving policy and legislation (Climate Change Act, SCCAP, Emissions Reduction Act)
TR03	Rapidly changing customer and stakeholder expectations for climate action not met resulting in reputational damage & impact on income		Rapidly evolving public awareness of climate change and associated issues – likely to be heightened pre and post COP26 in Glasgow
TR04	Rapidly evolving knowledge of action needed to address the climate crisis misaligned with the advice and guidance we publish leading to misinformation / reputational damage	Development and implementation of Research Strategy	Rapidly evolving policy and legislation (Climate Change Act, SCCAP, Emissions Reduction Act); Rapidly growing area of research and development
TR05	Changing government priorities leading to risk of reduced funding in future	Creation of External Relations and Partnerships Directorate (2021)	Rapidly evolving policy and legislation
TR06	Maintenance deficit in historic environment, combined with a changing climate, leading to increased demand on resources (e.g. PiC conservation budget and HES Grants)	Revision of grants programme in 2020 to better consider climate change adaptation and mitigation need	Rapidly evolving policy and legislation (Climate Change Act, SCCAP, Emissions Reduction Act)



TR01: Enhanced climate action expectations on public sector bodies and misalignment of our own policy and strategy with Scottish Government climate change targets

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (an amendment of the Climate Change (Scotland) Act 2009) sets targets for the reduction of greenhouse gases emissions and makes provision about advice, plans and reports in relation to those targets. The Act requires that public bodies contribute to carbon emissions reduction targets, contribute to climate change adaptation and that they act sustainably.

The Act also allows ministers *'to impose other climate change duties on public bodies, require reports on compliance with climate change duties and the ability to designate one or more bodies or persons to monitor compliance and carry out investigations'*[11]. Some of these powers have not yet been used. HES is however identified as a major player in the Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015, meaning we annually report on compliance with the climate change duties.

The Scottish Government recognises that the public sector - as a provider of services, a major employer and procurer of goods and services - has an important role to play in decarbonising Scotland. As such, the Public Sector is expected to lead by example. For example, in The Scottish Government's updated Climate Change Plan (released in 2020), commitments were made to phasing out the need for new petrol, and diesel cars and vans by 2030. However, the public sector is expected to lead by example and achieve this by 2025[12] - indicative of the government's expectations on public sector bodies to act more quickly.

This complex and evolving landscape of policy and legislation, and ever-increasing expectation on the public sector, will likely result in the risk that our own internal plans and strategies become outdated at a pace faster than they are reviewed.

TR02: Dependence on a carbon and resource intensive operational model, and tourism sector, to generate revenue increasing the risk of reputational damage and impact on income

Our Properties in Care are a vital part of Scotland's culture and heritage. Welcoming people to these properties, and creating a world-class visitor experience, is a key function of our organisation and something we take great pride in. There is a conflict though – our commercial income streams are dependent on carbon-intensive sectors, such as aviation, but are crucial for the financial stability of the organisation.

Scotland Outlook 2030[13] commits the Scottish tourism sector to fully contribute to the national government target to become net-zero by 2045, recognising that tourism must change, away from measuring success in visitor volume and financial gains only, towards securing sustainable growth by increasing and widening value in key areas. In 2020, Visit Scotland signed up to 'Tourism Declares' to showcase their commitment to sustainability, and are now developing a Responsible Tourism strategy. These are both indicators of a sector starting to recognise its responsibility for helping Scotland to achieve its net-zero targets. As the largest operator of paid for visitor attractions in Scotland, HES has a key role to play here.

TR03: Rapidly changing customer and stakeholder expectations for climate action not met resulting in reputational damage & impact on income

Research commissioned in 2020 by the Scottish Government to explore public attitudes toward climate change[14], and to a green recovery after the COVID-19 pandemic, provides a clear insight into the shifting expectations of society. Examples include:

- 79% of respondents agreed that climate change is an 'immediate and urgent problem' with the level of concern increasing over time

11. Scottish Government: **Decarbonisation in the Public Sector** (2020)
12. Scottish Government: **Climate Change Plan 2018 – 2032 Update** (2020)
13. Scottish Tourism Alliance: **Scotland Outlook 2030** (2021)
14. Ipsos MORI Scotland: **Research into public attitudes to climate change policy and a green recovery** (2020)

- 82% of respondents supported 'the introduction of additional charges for the sale or provision of items that are harmful to the environment that can be replaced with sustainable alternatives (for example, single-use disposable drinks cups or food containers)'
- Regarding travel, 74% said they 'would be able and willing to reduce the amount they travel by car'

This shifting sentiment and desire for action could introduce risks to our business operations if we don't keep pace with the changing expectations of our customers, and society more generally. There are opportunities in this as well for our organisation, particularly around innovation and development of new products, services and experiences for the people that engage with our organisation, e.g. visitors to our properties.

TR04: Rapidly evolving knowledge of action needed to address the climate crisis misaligned with the advice and guidance we publish leading to misinformation / reputational damage

In support of the wider historic environment, we publish an extensive range of advice and guidance. This includes our technical publications (Short Guides, Technical Papers, Refurbishment Case Studies, INFORM Guides) and Managing Change Guidance, to one-off publications such as our Climate Change Risk Assessment 2018 and the Guide to Climate Change Impacts on the historic environment.

The climate crisis is forcing society to change at an unprecedented pace. Providing advice in a societal and physical landscape that is shifting rapidly in response to the climate crisis comes with challenges. This includes making sure our advice and guidance is up to date with government policy and legislation, and that what we say doesn't inadvertently lock in risk. It is also vital that we continue to undertake research to test and trial solutions to the climate crisis and that we reflect critically on their success – this will help us present solutions to the wider sector whilst reducing the risk of introducing unintended consequences or maladaptation of the historic environment.

TR05: Changing government priorities leading to risk of reduced funding in future

There are clear parallels between responding to the climate crisis and the COVID-19 pandemic and subsequent Green Recovery agenda. Though they materialise over different timescales, both are requiring a fundamental shift in Scottish Government spending priorities. Uncertainty remains over how this may impact our sector specifically in the future, though it is an area where attention should be given in the coming years.

TR06: Maintenance deficit in historic environment, combined with a changing climate, leading to increased demand on resources (e.g. PiC conservation budget and HES Grants)

One in five (approximately 483,000) of Scotland's dwellings are more than 100 years old (built pre-1919). 67% of pre-1919 housing stock needs critical repairs (which refers to weather tightness and structural stability). This has reduced from 74% in 2008 but still represents a significant maintenance shortfall in the wider historic environment[15]. Changes in our climate are likely to exacerbate this maintenance deficit and threaten the long-term viability of many historic assets.

We already provide a wide range of grants and funding for projects that share our aims to protect and promote the historic environment, from repair grants to the Conservation Areas Regeneration Schemes. The number of applications received annually already exceeds the funds available and it is likely climate change will add additional pressure. However, there are opportunities in this to better demonstrate the inherent value, resilience and sustainability of the historic environment where it is looked after properly. Equally, there are opportunities for our Grants Programme to align with wider societal goals, e.g. the retrofit movement required to get the built historic environment to net-zero.

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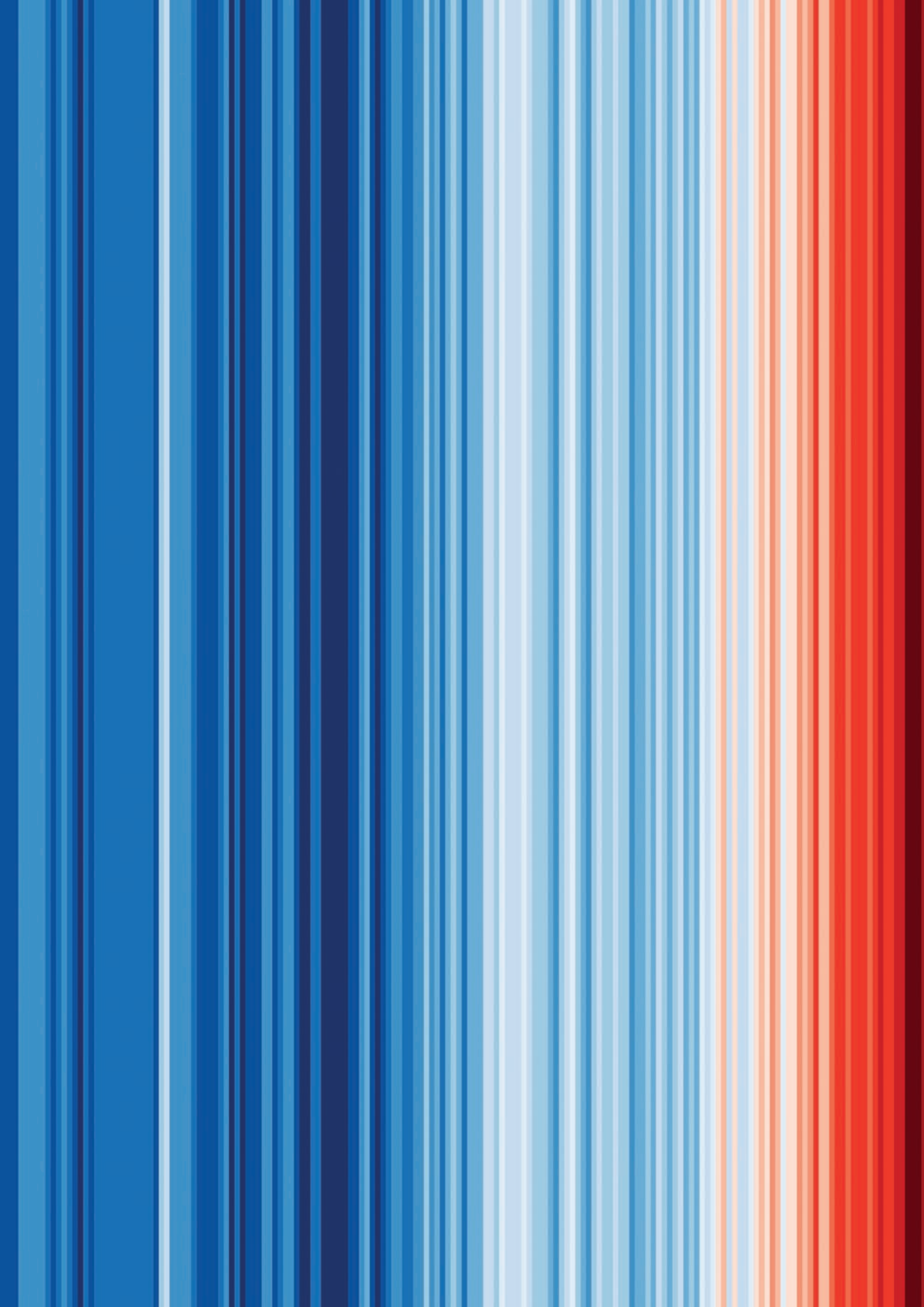

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