Draft Scottish National Adaptation Plan (2024 – 2029)

Actions today, for a climate resilient future.

Scottish Government
Riaghaltas na h-Alba

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Ministerial Foreword

Tackling the twin crises of climate change and nature loss is the collective fight of our lifetime, with defining implications for generations to come. Globally, the need for climate leadership could not be more urgent. Scotland must continue to step up and play our part in becoming Net Zero.

Scotland's climate has changed significantly and, however successful the global effort to combat climate change is, we can expect further changes over coming decades. 10 of our hottest years have all come in the last 20 years. Intense, short periods of rainfall are causing increased flooding. Extended periods of drought are bringing water scarcity. Extreme weather events, and the cascading impacts of climate change, are putting more pressure than ever before on lives and livelihoods.

These changes impact all of us. From the Highlands to the Borders, our islands and cities, climate change risks are pervasive, varied and already here; challenging families, communities, and businesses across Scotland.

As highlighted in the Climate Change Committee's latest assessment report, we are taking notable steps forward on adaptation policy. We are making Scotland more resilient to flooding, investing £42 million per year, as well as an extra £150 million for flood resilience over the course of this Parliament. We are getting our homes ready for extreme weather, with building regulations now including measures to address overheating and other extreme weather events. Nature Networks are being created across Scotland to help our wildlife adapt to the changing climate and make our local places more flood resilient and cooler in warmer weather. Scottish farmers are being supported to prepare for a changing climate and our Farm Advisory Service advises on climate risks like water scarcity and resilience to both droughts and flooding. To keep Scotland moving, we have also published our first comprehensive approach to ensuring that Scotland's transport network is adapting and resilient to climate impacts. Publication of our 4th National Planning Framework and NHS Scotland's Climate Emergency Strategy are also notable recent steps forward.

There is, however, no room for complacency. We must get ahead of the curve, building resilience in step with our changing climate. Scotland's net zero targets are part of global efforts to limit climate change to 1.5°C. But we know that the future is uncertain. The Climate Change Committee's advice is to adapt now to a global temperature rise of 2°C and assess the risks up to 4°C - even though it is imperative the world avoids this catastrophic scenario. Planning and preparation is always better than response and recovery. The decisions we make today must stand the test of time. Everyone has a part to play. Businesses, public sector, the third sector, communities and individuals all stand to benefit from learning more about their exposure to climate change risks and – crucially – how they can respond and what support is available.

Just like our work to reduce carbon emissions, adaptation action also needs to be grounded in fairness, equality and seizing economic opportunities. I am therefore happy to confirm Scotland's Just Transition Commission have agreed to receive and comment on this draft Adaptation Plan. This contribution, alongside your feedback and advice from organisations

such as the Climate Change Committee, will help shape development of the final Adaptation Plan, which is due for publication in Autumn 2024.

So please, let us know how climate change is impacting your life and help us build a more climate resilient Scotland, together.

Màiri McAllan MSP

Cabinet Secretary for Transport, Net Zero and Just Transition

Public Consultation Summary

The final Adaptation Plan will only be effective if it is informed by Scots' local and lived experience of climate change. During the public consultation period on this draft Adaptation Plan a formal public consultation will be opened on the Scottish Government's 'Citizen Space'. Alongside this we will run a series of events tailored to both delivery partners and the general public, to gather a wide range of views on the policy proposals in this draft Adaptation Plan.

In this Public Consultation Summary, you will find details on:

- The **proposed structure** of the Adaptation Plan.
- General questions on **local and lived** experience of Climate Change
- Introductions to each of the Plan's **five Outcomes**, with policy proposal highlights and public consultation questions.
- Policy proposals to enable **cross-cutting action** for all five Outcomes.
- A summary of the **legal framework and evidence base for** Climate Adaptation in Scotland.
- Conclusion and post-consultation **next steps**

You will find questions in two formats, either open ended questions asking for general opinions or specific questions asking you to share how much you agree with the relevant question.

To respond to these questions please go to the Scottish Government's Citizen Space here - Scottish Government consultations - Citizen Space – and search for 'draft Scottish National Adaptation Plan' or just 'Adaptation Plan'.

Finally, in addition to this Public Consultation Summary, you will also find Annexes outlining Detailed Policy Proposals for each Outcome (Annex A), Cross-Cutting Policy Proposals (Annex B) and an overview of work to develop an Adaptation Monitoring Framework for Scotland that will be published alongside the final Adaptation Plan (Annex C).

Proposed structure: 5 Outcomes, 22 Objectives. Climate adaptation is a complex picture of risks, opportunities and dependencies between policies. To break down this complexity, the draft Adaptation Plan is structured around five outcomes, setting out the case for adaptation action for:

1. Nature Connects,
2. Communities,
3. Public Services and Infrastructure,
4. Economy, Business and Industry, and
5. International Action.

Each outcome is grounded in a 'big idea' for how we want to deliver adaptation action differently in Scotland. For example, the Nature Connects outcome is centred on the view that – for climate adaptation – ensuring connectivity with and within the natural environment is the crucial factor for how communities and the natural environment can build climate resilience.

Big ideas are one thing, but it is action that counts. So, each outcome has its own set of objectives. These objectives define how we will deliver adaptation action. They also provide the structure around which the Adaptation Monitoring Framework is being built. To achieve each objective, we are presenting a series of proposed policies. When taken as a whole, this structure will allow clear, transparent and accountable reporting on adaptation action.

Local and lived experience of climate change

We are all living with climate change – now and in the future. That is why you will see that, alongside shaping the Adaptation Plan around 5 big outcomes, we are also taking a place-based approach to designing and delivering adaptation action. This is because the Scottish Government recognises climate change impacts vary massively depending on where you live. A rural, island community in the Outer Hebrides will experience climate change differently compared to a community on the banks of the Clyde in Glasgow.

Simply put, local and lived experience is a fundamental part of effective adaptation action.

Lived and local experience - public consultation Questions:

1. What do you think the current effects of climate change are on people in Scotland?
2. The next Scottish National Adaptation Plan will cover the period of September 2024 to 2029. What effects, if any, do you expect climate change will have on people in Scotland over the next five years?
3. What actions, if any, would you be willing and able to take to adapt to climate change? You may wish to consider the action you could take a) in your community and b) around your home and/or business.
4. What factor(s), if any, would prevent you from taking action to adapt to climate change and become more climate-resilient?
5. What action(s) do you think the Scottish Government should prioritise in order to build greater resilience to the impacts of climate change?

Introducing the five Outcomes

Outcome One: Nature Connects

Nature connects across our lands, settlements, coasts and seas.

Our efforts to address the risks posed by climate change must have nature at the centre. Both because climate change is degrading our natural environment, and it must be protected and restored in its own right, but also because nature is one of the best tools we have to adapt to the changing climate. We cannot address one without the other. This is not a “rural issue” - nature has a place throughout our towns, cities, villages and built environment as well as our less populated areas.

Climate change is the biggest threat to Scotland’s wildlife and habitats. Changing rainfall patterns, water scarcity, flooding, extreme heat and wildfire, are all impacting the rate and

extent of terrestrial, freshwater and marine species losses across Scotland. The negative consequences on native species, from a greater number of pests, pathogens and invasive non-native species (INNS) are already thought to be increasing.

Strong, protected, biodiverse ecosystems help us adapt to the changing climate. Strong natural environments enhance the resilience of ecosystems, and as such support societies to adapt to climate hazards such as flooding, sea-level rise, and more frequent and intense droughts, floods, heatwaves, and wildfires.

Connectivity is essential for functioning healthy ecosystems. It is key for the survival of animal and plant species, and crucial to ensuring genetic diversity and adaptation to climate change. Connectivity and nature networks also help overcome the urban/rural divide and reinforce the importance of place in adapting to climate change. The greening of our urban environments to make them more "rural" is important for increasing overall climate resilience.

Key policy proposals:

- As defined by the finalised Scottish Biodiversity Strategy, Scotland is Nature Positive and has restored and regenerated biodiversity by 2045.
- Development planning which takes current and future climate risks into account and is a key lever in enabling places to adapt, supported by the National Planning Framework 4 and new guidance.
- Scotland's net zero pathway is supported by increasing the resilience of natural carbon stores and sinks to the changing climate, supported by actions on peatland, forests and blue carbon.
- Nature networks implemented in every local authority area to connect nature-rich sites, deliver local priorities and support climate resilience.
- Enhanced climate resilience in marine ecosystems and the Blue Economy, supported by the National Marine Plan 2, marine protected areas and a marine restoration plan.
- A new Scottish Plan for Invasive Non-Native Species.

Should you want to read a more detailed breakdown of these policy proposals for the Nature Connects please see here.

Outcome 1: Nature Connects - Public Consultation Questions:

6. Which of the following actions should the Scottish Government prioritise? Please check all that apply.
    i. More trees and green spaces in built-up places for flood resilience and cooling
    ii. More joined up natural habitats ("nature networks")
    iii. Managing pests and diseases which will be more prevalent with climate change
    iv. Restoring forests and peatland
    v. Reinforcing natural coastal barriers such as dunes
    vi. Other

7. When you consider your local natural space e.g. park, canal, woodland or beach, what would you like to see improved in terms of blue and green space in your local area?

Note: to avoid duplication, data from separate consultations on the Scottish Biodiversity Strategy, Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses the above noted questions.

Outcome Two: Communities

Communities creating climate-resilient, healthy and equitable places.

People shape places, and places shape people. The physical, social, and economic environment in which we are born, grow, live, work and age has a big impact on our health, wellbeing, opportunities, and experiences. The climate emergency will change Scotland's places. Challenges like heatwaves, flooding, and accelerating sea level rise are affecting our countryside, towns, and cities, and we know these changes we are seeing now will only increase in the future. To protect our communities, we need our places to adjust to the effects of climate change, and to reduce our need for coal, oil, and gas.

Our places are unique and have always changed over time. Building on their strengths can help us navigate the difficulties of climate change and the need to adapt. By taking a place-based approach to these problems, we can design local solutions to a global problem. Solutions which address community concerns and priorities. Solutions which are fair and just. Solutions which make the most of local opportunities and resources. Scotland's most disadvantaged people and communities will be disproportionately affected by climate change, widening existing inequalities. Our responses to climate change can protect and improve population health, wellbeing and reduce inequalities.

But we can't make these changes alone. Government, communities, and place-makers will all need to collaborate to ensure that Scotland's places are designed with tackling climate change and improving people's wellbeing at their heart. Across Scotland we will need to imagine, experiment, learn, innovate, and adapt our places together.

Key policy proposals:

- A strong and active national network of **Climate Action Hubs** supporting community-led adaptation.
- Collaborative planning and investment partnerships on adaptation, **covering all regions by 2029**.
- Capacity building support from **Adaptation Scotland** and the Community Climate Adaptation Routemap.
- An increased focus on climate action that can deliver 'triple wins' for **health, wellbeing and equity**.
- The adaptation of Scotland's **historic environment and traditional buildings**.
- A transformational **National Flood Resilience Strategy** to guide management of flooding from all sources.
- **Carbon Neutral Islands** which support adaptation and resilience in Scotland's Island communities.
- The **transformational power of culture, heritage and creativity** supporting Scotland's adaptation journey.
- Continued improvements to SEPA's **flood forecasting and warning services**.

Should you want to read a more detailed breakdown of these policy proposals for the Communities outcome please see here.

Outcome 2: Communities - Public Consultation Questions:

8. For Scotland to adapt to the impacts of climate change, lots of different groups, such as individuals, communities, businesses and public bodies, will need to work together and support each other. **How could others support you (or your organisation) to adapt to climate change over the next five years?**

   You might want to think about some of the groups listed below and the roles that they could take:

   - Central and local government
   - Other public bodies, such as NHS Boards or enterprise agencies
   - Small and large businesses
   - Third sector organisations
   - Communities

9. **In what way(s) could the plan help different groups across Scotland and/or its regions to collaborate on climate adaptation?**

   Please offer suggestions that could support collaboration on climate adaptation. For example, the plan could describe how different groups should work together and support each other. Or the plan could define geographic areas, roles and responsibilities for responding to climate change risks. Please offer suggestions that could support collaboration on climate adaptation.

   You might want to think about collaboration between some of the groups listed below:

   - Central and local government
   - Other public bodies, such as NHS Boards or enterprise agencies
   - Small and large businesses
   - Third sector organisations
   - Communities

Outcome Three: Public Services and Infrastructure

Public services are collaborating in effective, inclusive adaptation action.

Collaboration is essential for a just transition to a climate resilient Scotland. There is no single blueprint for effective climate adaptation partnerships and collaborations; but we know that collaboration on shared outcomes is vital to tackle complex challenges in a way that is equitable, inclusive and builds on the strengths of a place.

The public sector is playing a crucial role in delivering action to enable Scotland to adapt to the impacts of climate change. Adaptation needs to be aligned with a public sector organisation's strategic outcomes and priorities; and with those it contributes to locally. By doing this, adaptation becomes integral to the functions of an organisation and its ability to

achieve outcomes. It can also be more efficient, with cost savings made possible when adaptation is delivered as part of business-as-usual rather than an additional activity.

Adaptation is a legal imperative for the public sector and is supported by legislative and policy drivers. The Climate Change (Scotland) Act 2009 requires the Scottish Government to implement a statutory Adaptation Plan. The Public Bodies Climate Change Duties contained within the Act require public sector organisations to act in the way best calculated to implement the Adaptation Plan and report progress annually.

Key policy proposals:

- A strengthened **Public Sector Climate Adaptation Network** in Scotland, with key resources updated to support collaboration across the public sector and beyond.
- A modernised **water industry** adapting for the changing climate, informed by the public consultation on water, wastewater and drainage services.
- Adaptation and resilience embedded across **trunk road, rail, aviation, active travel and maritime transport networks**, supported by Transport Scotland adaptation strategy.
- All **Health Boards** preparing and implementing adaptation plans, informed by regional Climate Change Risk Assessments.
- Roll out of the **Persons at Risk Distribution (PARD) system** across Scotland, to help local authorities and the NHS to identify vulnerable individuals during an emergency, such as an extreme weather event.
- Updated **statutory guidance** on public bodies climate change duties to set Ministers expectations on adaptation for all public bodies and support more collaboration.
- A transformational National Flood Resilience Strategy to guide management of flooding from all sources.

Should you want to read a more detailed breakdown of these policy proposals for the Public Services and Infrastructure outcome please see here.

Outcome 3: Public Services and Infrastructure - Public Consultation Questions:

10. Scotland's net zero targets are part of global efforts to limit global temperature rise to 1.5°C. At the same time, the Climate Change Committee's advice is to adapt now to a minimum global temperature rise of between 1.5 and 2°C for the period 2050 – 2100, and to consider the risks of up to a 4°C warming scenario. Should the Scottish Government adopt the Climate Change Committee's advice to 'adapt to 2°C and assess the risks for 4°C'?

    Strongly Agree Agree Don't know Disagree Strongly Disagree

    Please share detail on your answer:

11. Some decisions, for example those in relation to long-term planning or infrastructure investment, may require greater consideration of future climate conditions. Would further guidance on the appropriate future climate scenario(s) to consider when you (or your organisation) are making plans and investment decisions be useful?

    Y / N

12. If yes, what sort of information or advice would be useful for you or your organisation when considering future climate scenarios in long-term planning or investments?

13. Climate change makes extreme weather more likely in Scotland. When weather events disrupt one part of our infrastructure (e.g. energy, telecoms, transport networks), the impacts can quickly "cascade" out to disrupt other infrastructure networks or vital services. For example, an interruption in electricity will quickly affect businesses, hospitals and transport. Would an assessment of "cascading" risks from weather-related disruptions to infrastructure help you or your organisation to adapt?

    Y / N. Please share your reasons:

Note: to avoid duplication, data from separate consultations on the Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses the above noted questions.

Outcome Four: Economy, Industry and Business

Economies and industries are adapting and realising opportunities in Scotland's Just Transition.

Developing greater climate resilience will be crucial to ensure the future security and prosperity of Scotland's economy. We know the costs of climate change are high, and no longer hypothetical. It is estimated climate change already costs the Scottish economy billions of pounds per year. By 2050, the economic costs are estimated at 1.2% to 1.6% of GDP per year. Taking action to respond to current and projected climate change makes economic sense.

With a changing climate there are not just costs, but economic opportunities as well. For example, the growth of sectors, services and products which help us adapt to future climate conditions and build resilience to physical climate-related hazards.

Over the next 5 years, The Scottish Government and the private sector can take action to minimise the scale of the long-term economic costs, invest in measures to generate value and harness the market opportunities presented by changes in climate. The National Strategy for Economic Transformation (NSET) sets out a new culture of delivery where partners come together as 'Team Scotland' to deliver the actions needed to transform the Scottish economy. This includes ensuring that businesses and communities are involved in the pursuit of the strategy's ambition of a fairer, wealthier and greener country – a wellbeing economy.

Key policy proposals:

- Transform how we support farming and food production in Scotland to become a **global leader in sustainable and regenerative agriculture**.

- From 2025, shift **half of all agricultural funding** to be conditional on delivering for climate and nature, including climate adaptation.
- A transformational **National Flood Resilience Strategy** to guide management of flooding from all sources.
- Establish a values-led, high-integrity market for responsible **private investment in natural capital** building on the existing Woodland Carbon Code and Peatland Code.
- Establish a **private-sector adaptation leaders network** to champion adaptation
- work with Adaptation Scotland, industry bodies and business support services, including Scotland's Enterprise Agencies to **disseminate information on climate risk and opportunities** to businesses across Scotland, including our SMEs.
- Support the UK-wide roll-out of corporate climate risk disclosures
- Continue to invest in SEPA's Scottish **Flood Forecasting and warning services** to ensure flood-risk information is available to businesses across Scotland
- Deliver a forestry Resilience Action Plan in 2024 and **invest more than £650k in yearly surveillance of 1.5 million hectares of woodland.**

Should you want to read a more detailed breakdown of these policy proposals for Economy, Business and Industry outcome please see here.

Outcome 4: Economy, Business and Industry - Public Consultation Questions:

14. The Climate Change Committee suggests more Scottish businesses should be assessing and responding to climate risks. What, if any, are the barriers to businesses accessing advice and support on climate risks?
15. Climate change is projected to increase disruption of international and domestic supply chains. How do you anticipate disruption to domestic and/or international supply chains caused by climate change will affect Scottish business, industry and consumers?
16. What, if any, should the role of government be in supporting more resilient supply chains?
17. Farming, fishing and forestry sectors are particularly exposed to impacts of climate change. How should farming, fishing and forestry businesses be supported to adapt to climate change?
18. Scottish businesses will face challenges as a result of climate change impacts. However, climate change will also present business and innovation opportunities. What, if any, do you think are the business and innovation opportunities arising from climate change in Scotland?
19. What, if any, support would be required to encourage businesses in Scotland to take advantage of innovation opportunities arising from climate change?

Note: to avoid duplication, data from separate consultations on the Scottish Biodiversity Strategy, Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses the above noted questions.

Outcome Five: International Action

Scotland's international role supports climate justice and enhanced global action on climate adaptation.

Climate impacts do not recognise or respect national borders. 2022 saw records broken for the hottest and driest summers, unprecedented flooding and damage and lives lost due to weather extremes. No single community will be left untouched by the effects of climate change. Some communities however will be disproportionately affected, and it is usually those who are least able to adapt who are the most impacted.

Scotland is a small country, but it is an open and outward looking nation which aims to put people at the heart of its international climate action. We act in solidarity with the Global South to build their capacity to adapt to the impacts of climate change. And not just to survive, but to thrive. We have a voice in international institutions, and we can use that voice to share knowledge and to provide a platform for our partners in the Global South and other states and regions. This will put pressure on national governments to keep to the commitments set out in the Paris Agreement and the UN CBD Global Biodiversity Framework. Scotland is also taking strides forward in research and innovation on climate adaptation and strengthening the policy-academia dialogue. However, we also have a lot to learn about adaptation from communities hardest hit across the world and those facing similar challenges to us here in Scotland.

Finally, the measures to manage our international climate risks fall in many cases to policy areas reserved to the UK Government. However, the Scottish Government is committed to taking all actions within its devolved competency to increase international action and improve domestic resilience to shocks and cascading failures and avoid maladaptation. The actions set out in this chapter, combined with those focused on

Key policy proposals:

- Deliver Scotland's world's first - and recently trebled - £36 million **Climate Justice Fund**.
- Continue to use our platform as an international **climate leader** to influence and engage on climate adaptation, mitigation and loss and damage.
- Provide a platform to **amplify the voices** of those communities most vulnerable to climate change, including women, young people and indigenous groups.
- Create an Adaptation and Resilience **Knowledge Exchange Network**

Should you want to read a more detailed breakdown of these policy proposals for the International Action outcome please see here.

Outcome 5: International Action - Public Consultation Questions:

20. How could the Scottish Government support communities impacted by climate change across the world?
21. Scotland is known for its excellence in climate change research. Are there international adaptation focussed research opportunities which Scottish-based academic work should focus on?

Cross-cutting action

Just like the Scottish Government's work on climate mitigation, effective and inclusive adaptation action is a whole-of-government endeavour. This also means there are a number of things we need to get right that cut right across all five outcomes, such as:

- Ensure the Adaptation Plan reinforces other key policy areas, like the Climate Change Plan
- Effective partnership and collaboration with delivery partners
- Development of a climate-smart workforce and skills
- Scaled-up private investment

You can read more about proposed approaches on cross-cutting action here.

Public Consultation Questions on Private Investment:

22. Both public finance and mechanisms to leverage greater private finance will be required to deliver adaptation action. What do you see as the main barrier to private investment for adaptation action?
23. How can SG support/incentive more private investment? Some potentials ways of promoting private investment are provided below.

- Blended finance models
- Mainstreaming adaptation in existing market codes
- Grant funding schemes
- Open data platform and industry-led common metrics

Should you want to read a more detailed breakdown of these policy proposals for Private Investment please see here.

Monitoring Adaptation

Measuring and monitoring how we are doing is also crucial to delivering inclusive and effective adaptation action. Considering the complexity of the adaptation policy landscape, this is a challenge for all Governments. At the end of this document, you will find a section describing how we intend Scotland to be a leader in this field.

Monitoring and Evaluation - Public Consultation Questions:

24. The draft Adaptation Plan sets out plans to develop an adaptation monitoring and evaluation framework. Our proposed approach is for annual reports to include a set of quantitative indicators to monitor progress to the Adaptation Plan's objectives. In addition, we propose to publish a baseline at the start and report on progress at the end of the Adaptation Plan to track longer-term outcomes. Do you agree with the proposed approach to monitoring adaptation?

    Strongly Agree Agree Disagree Strongly Disagree Don't know

25. Do you have suggestions of data or indicators that could be used to track adaptation outcomes in Scotland? The proposed outcomes and objectives of this draft Plan are set out here.

Impact Assessments

Impact Assessments - Public Consultation Questions:

The following questions will inform the impact assessments in considering the possible effects and outcomes of the Adaptation Plan on people, businesses, and communities. It is important that the Adaptation Plan delivers a just distribution of the costs and benefits associated with climate resilience measures and avoids any unjust negative impacts.

Personal characteristics that are protected by law against discrimination are: age; disability, gender reassignment; marriage and civil partnership; pregnancy and maternity.

26. What, if any, impacts do you think this Adaptation Plan will have on groups/individuals who share the aforementioned protected characteristics?
27. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

Lower-income households are already at increased risk from the impacts of climate change. Measures to increase climate resilience should aim to reduce the social and economic disadvantages experienced in Scotland.

28. What, if any, impact do you think this Plan will have on inequality caused by socio-economic disadvantage?
29. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

The United Nations Convention on the Rights of the Child (UNCRC) is the base standard for children's rights and sets out the fundamental rights of all children.

30. What, if any, impact do you think the Adaptation Plan will have on children's rights and wellbeing?
31. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

Our Islands face unique challenges around distance, geography, connectivity and demography that we must be mindful of when planning a climate resilient Scotland.

32. What, if any, impacts do you think the Adaptation Plan will have on Island communities?
33. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

Legal framework and evidence-base

The Climate Change (Scotland) Act 2009 requires Scottish Ministers to set out an Adaptation Plan responding to each UK wide 'Climate Change Risk Assessment' (CCRA). A new CCRA is published every five years. The CCRA acts as a common evidence base underpinning adaptation plans in Scotland, Wales, Northern Ireland and the UK Government.

The third CCRA, or CCRA3 – to which this draft Adaptation Plan will respond – establishes 61 risks, and opportunities, from a changing climate. The Climate Change Committee's advice accompanying the CCRA3, includes the need to "**adapt to 2°C; assess the risks up to 4°C**. This consultation asks for your views on this advice.

Conclusion and Next Steps

We are all living with climate change. That is why your views and lived experiences of climate impacts are so crucial to shaping an effective and inclusive national response. During the public consultation period on the draft Adaptation Plan, besides launching the draft via the Scottish Government's Citizen Space platform, we will also be running a series of public

and stakeholder engagement events. Publication of the final Adaptation Plan is scheduled for September 2024.

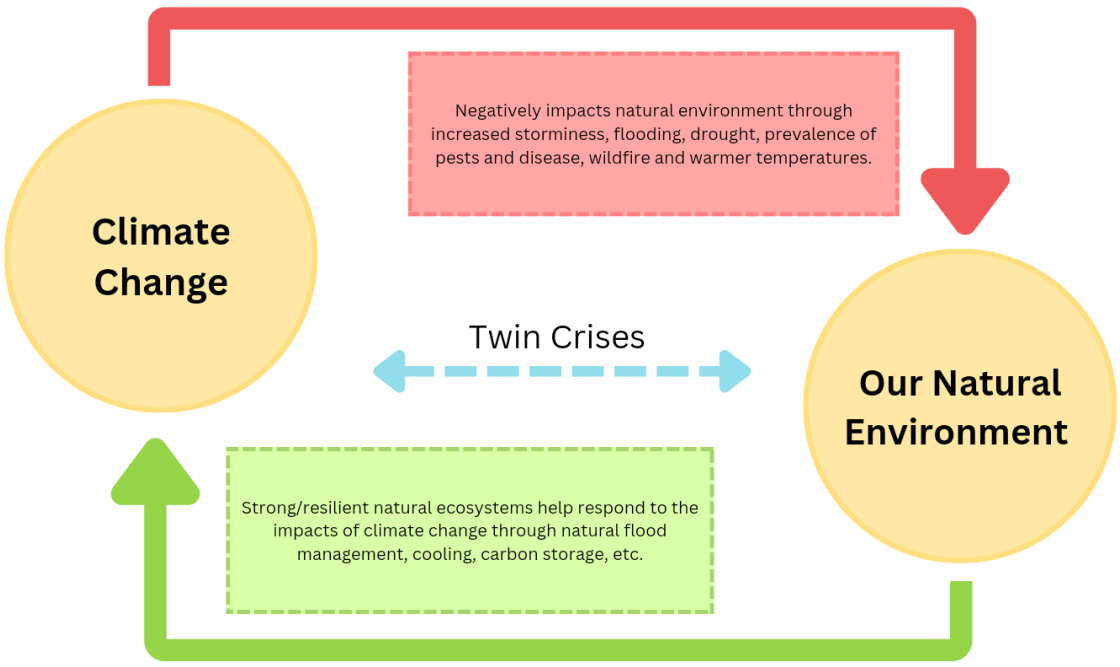
Annex A: **Detailed Policy Proposals**

Outcome One: Nature Connects (NC)

Nature connects across our lands, settlements, coasts and seas.

Our efforts to address the risks posed by climate change must have nature at the centre. Both because climate change is degrading our natural environment, and it must be protected and restored in its own right, but also because nature is one of the best tools we have to adapt to the changing climate (see figure below). We cannot address one without the other. This is not a "rural issue" - nature has a place throughout our towns, cities, villages and built environment as well as our less populated areas.

Climate Change and Our Natural Environment – an interconnected crisis.



Impact of climate change on nature

Climate change is the biggest threat to Scotland's wildlife and habitats. Changing rainfall patterns, water scarcity, flooding, extreme heat and wildfire, are all impacting the rate and extent of terrestrial, freshwater and marine species losses across Scotland. The negative consequences on native species, from a greater number of pests, pathogens and invasive non-native species (INNS) are already thought to be increasing.

Nature is already degrading. The 2023 State of Nature in Scotland report found that since systematic monitoring of 407 Scottish species began in 1994, the numbers of those species has declined by 15%. Some habitats and species are directly affected but it is the interconnected nature of our ecosystems that means climate impacts can cascade across landscape and affect lives and livelihoods at scale.

Nature as a climate adaptation tool

Strong, protected, biodiverse ecosystems help us adapt to the changing climate. Strong natural environments enhance the resilience of ecosystems, and as such support societies to adapt to climate hazards such as flooding, sea-level rise, and more frequent and intense droughts, floods, heatwaves, and wildfires.

Access to nature also has major health and wellbeing benefits. For example, green infrastructure can contribute to better mental and physical health through providing opportunities for physical activity, social interaction and relaxation. A Public Health Scotland study on access to greenspace during the covid-19 pandemic brought together surveys which registered between 70% and 90% agreement that greenspaces benefit mental health. This was the case across income groups (PHS, 2022).

Why focus on nature "connects"?

Connectivity is essential for functioning healthy ecosystems. It is key for the survival of animal and plant species, and crucial to ensuring genetic diversity and adaptation to climate change. Connectivity and nature networks also help overcome the urban/rural divide and reinforce the importance of place in adapting to climate change. The greening of our urban environments to make them more "rural" is important for increasing overall climate resilience.

To ensure Scotland's nature can thrive, nature-rich areas in the terrestrial, freshwater and coastal environment must be connected through a series of ecological networks linking them all together. These ecological networks may be in the form of nature corridors or stepping stones and so might overlap with green spaces that are also important for people, such as local conservation areas, parks, or active travel networks. Nature Networks can therefore provide multiple benefits to both people and nature.

NatureScot has set out its draft Framework for Nature Networks in Scotland which is being consulted on as part of the public consultation on the Scottish Biodiversity Strategy's first Delivery Plan.

Nature Network definition: A Nature Network connects together nature-rich sites, including restoration areas and other environmental projects, through a series of areas of suitable habitat, habitat corridors, and stepping-stones.

Connectivity is also important in the marine environment and interventions to improve the biodiversity of marine and coastal resilience are explored in this 'Nature Connects' outcome.

Scottish Biodiversity Strategy

In December 2022 the Scottish Government published its Scottish Biodiversity Strategy to 2045. It set out our clear ambition for Scotland to be Nature Positive with restored and regenerated biodiversity by 2045. The first 5-year delivery plan of the Scottish Biodiversity Strategy is closely aligned with this draft Adaptation Plan. Like the other cross-cutting strategies and documents which help inform this whole plan, the documents should be read as mutually reinforcing one another. This avoids duplication of effort but strengthens key messages and interventions which have the same goal. In ensuring high quality, healthy, climate resilient habitats across our landscapes we can help individual species to be resilient and adaptive to our changing climate.

Objective: Nature-based solutions (NC1)

Nature based solutions at all scales are protected, enhanced and connected to enable healthier, cooler, water resilient and nature-rich places.

Action is delivered through nature-based solutions including street trees, raingardens, green roofs, improved walking, wheeling and cycling and water ways. Action is designed to ensure that all our places are cooler in hot weather, more flood resilient, and provide an opportunity for people to enjoy and benefit from nature. It includes policies on:

- Flood resilience and coastal change
- Blue-Green infrastructure investment (see definition below)
- Landscape scale interventions (bringing together multiple land-types and interests across larger scales I.e. the communities, farms and landowners around a particular river basin, or commercial, community and local authority interests to decide on interventions to manage heat effects in a town)
- Specific measures for freshwater habitats
- Measures to improve soil resilience across land-use types

Compared to technology-based solutions to climate challenges, nature-based solutions are often more cost-effective, longer lasting, and have multiple synergistic benefits including:

- Reducing net emissions
- Expanding carbon sinks
- Providing habitats for biodiversity
- Benefiting human health and well-being
- Helping our society and economy adapt to climate change
- Making more resilient and nicer places to live and work

What is blue-green infrastructure?

Blue-green infrastructure is a subset of nature-based solutions. It is the green and blue features of natural and built environments and the connections between them that provide benefits for people and nature.

- Green features include parks, woodlands, trees, play spaces, allotments, community growing spaces, outdoor sports facilities, churchyards and cemeteries, swales, hedges, verges, green roofs and gardens.

- Blue features include rivers, lochs, wetlands, canals, ponds, porous paving and sustainable urban drainage systems.
- Paths, cycleways and blue corridors such as rivers or canal paths provide connections through and between areas of green infrastructure.

Flood Resilience and Coastal Change

The Scottish Government will promote wider uptake of blue-green infrastructure to manage surface water and drainage. This will reduce the risks associated with surface-water flooding and maximise water efficiency.

- **Legislation** - Policy is being developed with a view to informing new legislation which will enshrine the principles of sustainable flood risk management and enable the delivery of blue-green places at all scales. The Scottish Government's Wastewater and Drainage Policy Consultation will close on 21 February 2023.
- **Draft Scottish Biodiversity Strategy Delivery Plan 2025-2030** (SBS DP) - The draft SBS DP commits every local authority to consider the need to prepare and implement a vision for surface water management including appropriate actions for blue green infrastructure by 2030.
- **Flood Resilience Strategy** (FRS) - The Scottish Government's FRS will set out what we need to do to enable Scotland's places to become more resilient to warmer, wetter winters and increased instances of storms and flash flooding. The FRS will take a whole catchment approach and support interventions to increase resilience to river, coastal and surface water flooding. The natural environment will be crucial in increasing flood resilience.
- **Coastal Change Adaptation Plans** [see NC4], promote naturally functioning coastal landforms to reduce the risk of coastal erosion and so reduce the risk of coastal flooding.
- **Flooding and Coastal Erosion Maps** - The Scottish Environment Protection Agency (SEPA) will review the Natural Flood Management and Natural Susceptibility to Coastal Erosion Maps available on its website to better understand what information may be required to improve implementation of nature-based solutions.

Blue-green Infrastructure Investment

Collaboration between the public and private sectors is crucial to enable delivery of blue-green infrastructure at scale and bring benefits to communities.

- **Facility for Investment Ready Nature in Scotland (FIRNS)** - Scottish Government guidance Green Infrastructure: Design and Placemaking provides guidance on attracting responsible private investment in Scotland's nature. FIRNS is co-funded by The National Lottery Heritage Fund in partnership with the Scottish Government and NatureScot. Over £3 million has already been distributed to nature projects across Scotland to help scale up conservation work and ensure the benefits are shared with local communities.
    - In 2023, 27 diverse projects will share over £3.6 million; split approximately £1.8 million from public funds and another £1.8 million matched by The National Lottery Heritage Fund. The funded projects are spread across Scotland: from the Solway Firth to Shetland, Fife, across central Scotland, and the Hebrides.

    - Example projects include using private finance to restore river catchments to improve water quality and reduce flood exposure, while creating community assets such as growing spaces and improved greenspace.
- **Open Source Platform for blue-green infrastructure** – By 2030 the Scottish Government will develop an open source platform for blue and green infrastructure and other nature assets in urban areas to support approaches to valuing and financing blue and green infrastructure. Increased investment in urban blue green infrastructure will increase the flood resilience of our built environment and promote natural solutions to cooling.

Freshwater Habitats

Freshwater habitats and species are particularly vulnerable to reduced water availability and higher water temperatures due to climate change. In Scotland, this puts salmon and their habitats at risk. The Cabinet Secretary for Rural Land and Island Affairs deems the Atlantic salmon "one of the most magnificent animals in the rich and vibrant tapestry of nature in Scotland" (2022) and the revival of sustainable salmon populations key for many parts of the rural economy.

- **Wild Salmon Strategy** – The Strategy sets out 5 priority themes for action to protect wild salmon. A priority theme of this approach is improving the condition of rivers and giving salmon free access to cold, clean water. This will not only support salmon recovery but will benefit the diversity of life in our rivers, including the critically endangered freshwater pearl mussel whose life cycle is inextricably linked to salmon and trout. The accompanying implementation plan, published in February 2023, lists over 60 actions to be taken over a 5-year period which will aid recovery of salmon populations, working with international and Scottish partners, including Scottish Forestry, SEPA, NatureScot, District Salmon Fishery Boards and Trusts. This includes raising awareness of the multiple benefits of riverine tree planting, which includes increasing the resilience of rivers, and species living within it, to increased water temperature. This approach is further supported via a tailored Scottish Forestry grant system.
- **Monitoring and assessment of Scotland's Salmon** – This increased evidence gathering provides essential insight into the health and vulnerability of salmon and habitats on which they depend. This is essential to understanding the various pressures acting on the species and connected habitats including the impacts of climate change and the potential success of any adaptive strategies and the long-term resilience of the species. In the life of the 5-year implementation plan, we will:
    - establish and operate a Scientific Advisory Board to coordinate and harmonise research and monitoring activities across science organisations and regulators;
    - produce an annual report on the status of salmon in Scotland;
    - maintain regular monitoring using rod catches, fish counters and sampling of adult salmon; and
    - refresh the Salmon Conservation Regulations annually and grade rivers based on our adult salmon assessment.

Landscape Scale Interventions

Large scale, collaborative projects can improve the effectiveness and efficiency of policy delivery compared to what is achievable through individual or bilateral actions only.

- **Scotland's Third Land Use Strategy (LUS3)** - LUS3 sets out policies to achieve sustainable land use. Scotland's next Land Use Strategy (LUS4) is due for publication in 2026. Through the development of this strategy, the SG shall seek to respond more fully to the CCC's recommendation in its 2022 independent assessment of the previous adaptation programme to provide an overarching 'wrapper strategy' to clearly outline the relationships and interactions between the multiple action plans and strategies relating to the broader environment. This strategy will also work with stakeholders to explore the role of a national land use framework building upon the work of the current Regional Land Use Partnership pilots.
- **Land Use and Agriculture Just Transition Plan (LAJTP) –** The LAJTP will focus on the livelihoods, skills, health, and wellbeing of those who live in and rely on Scotland's land and agricultural sector for their livelihoods and wellbeing, as well as focusing on maintaining and supporting thriving rural, island and coastal communities. As this will be the first Just Transition Plan for the land and agriculture sectors, its focus will be on introducing and promoting our baseline approach and policy actions whilst setting out the strategic direction of travel for future LAJTP plans. The plan will set out how wider Scottish Government policies will support our actions to tackle and adapt to climate change as we transition to our future net zero, climate resilient economy, through:
    - the creation of new or expanded economic opportunities in sectors such as nature-based solutions, natural capital investment and maintenance, green tourism, sustainable and regenerative food production, and wood products;
    - an increase in health and wellbeing for both people and the environment; and
    - greater community empowerment as we look to ensure those already disadvantaged do not carry the burden, and that more benefits such as skills enhancement and employment opportunities flow to local communities.
- **River Basin Management Plan for Scotland 2021-2027 (RBMP)** - The third RBMP, sets out a framework for protecting and improving the benefits provided by the water environment across Scotland at the catchment level. SEPA, on behalf of the Scottish Government, is working closely with businesses, land managers, voluntary groups and organisations to work towards ambitious statutory objectives at local and regional levels.
- **Skills** - The Scottish Government's Independent Commission established to review learning pathways in our land-based and aquaculture sectors, reported to Scottish Ministers in January 2023 with 22 recommendations on how to attract and equip more people with the skills and knowledge needed to work in these sectors. The Scottish Government is committed to publish its response in 2023 to the land-based learning review and take forward those recommendations accepted.

Soil-Health

Scottish soils are at the heart of all life and underpin much of our social and economic activity. Nutrient rich soils help produce fresh crops and healthy trees and our peatlands

and carbon-rich soils sequester and store carbon and are used in our whisky industry. Soils also help control the flow and quality of water in our rivers, contain and support important biodiversity and habitats, preserve our cultural and archaeological heritage and provide a platform for buildings and roads. However, exacerbated by climate change, soils are at high risk of damage through compaction, erosion, flooding and drought and loss of organic matter. This creates impacts locally, regionally and nationally which can be difficult to reverse. Responsibility for soils spans across the Scottish Government and the final SNAP3 will provide leadership and direction for managing this vital natural asset.

There are a number of actions ongoing to protect our soils including through peatland restoration, sustainable forest management and through the promotion of regenerative agriculture practices. This means reducing the disturbance of soils so as they do not release carbon or are in poor condition which can lead to flooding and landslides. NPF4 includes national planning policy on soils that sets out the intention of protecting carbon-rich soils, restoring peatlands and minimising disturbance to soils from development. This would have the policy outcomes that: Valued soils are protected and restored; Soils, including carbon-rich soils, are sequestering and storing carbon; Soils are healthy and provide essential ecosystem services for nature, people and our economy.

- **Research Fellowship** – Through ClimateXChange, one of the Scottish Government's Centres of Expertise, the Scottish Government will employ an external lead to bring together policy interests on soils across Scottish Government and then appoint a fellow with research and policy experience to identify targeted areas for action. These actions will be identified by March 2024 with key actions set out in the final Adaptation Programme document.
- **Research Project** – The Scottish Government funded Centre of Expertise for Waters (CREW) is currently conducting a capacity building project to assess the socio-economic impacts of soil degradation on Scotland's water environment. This project will provide an enhanced understanding of the impacts and costs of soil degradation to inform development and implementation of more holistic actions to prevent wider (and potentially more costly) social and environmental impacts.
- **Draft Scottish Biodiversity Strategy Delivery Plan** – The draft Scottish Biodiversity Strategy Delivery Plan sets out a number of actions relevant to improving the resilience of Scottish soils. These are still at the proposal stage and can be summarised as follows:
    - Revise and update Scotland's Soil Framework and action/implementation plan by 2030.
    - Develop evidence-based Soil Health Indicators (SHIs) that can be considered for inclusion in Whole Farm Plans and forest management plans
    - Improve information for land managers on how to assess soil erosion risks and implement measures to avoid erosion (and other impacts on soil health related to climate change), including: i) raising awareness about the impacts of extreme rainfall/drought events on soils; and ii) mapping soils that have been subject to anthropogenic degradation and are candidates for soil improvement programmes by 2027/28.
    - Develop and promote clear guidance for practitioners on soil compaction and ensure that by 2030 farm and forestry machinery contractors are engaged in

ensuring appropriate use of equipment, uptake of decision-making tools and training, to minimise and ultimately avoid compaction damage to soils.
- Set up monitoring frameworks to assess change in soil health, based on evidence from the Strategic Research Programme (2022-27).

Objective: Development planning (NC2)

Development planning (including Local Development Plans and associated delivery programmes) takes current and future climate risks into account and is a key lever in enabling places to adapt.

National Planning Framework 4

Adopted in 2023, the National Planning Framework 4 (NPF4) sets out Scottish Government's long-term strategy for working towards a net-zero Scotland by 2045. The framework signals a significant change in direction in how we plan for the future of our places and communities, placing the twin crises of climate and nature at the front of our thinking in the choices and decisions we all make. NPF4 offers key priorities for 'where' and 'what' development should take place at a national level and is combined with national planning policy on 'how' development planning should manage change.

- **Current action:** The Scottish Government is working with planning authorities and other stakeholders to support the preparation of a new round of Local Development Plans (LDPs). LDPs are prepared by local authorities and are applicable to their local area. In their preparation local authorities must take into account the National Planning Framework.

The planning system in Scotland is plan-led and decisions on planning applications must be made in accordance with the development plan. NPF4 forms part of the statutory development plan, along with the Local Development Plan applicable to the area at that time and its supplementary guidance. As such NPF4 directly influences all planning decisions. Along with Regional Spatial Strategies (RSSs) and Local Place Plans (LPPs) this creates a spatial framework for decision making that will support the delivery of a wide range of strategic priorities.

NPF4 sets out how we will work together in the coming years to improve people's lives by making sustainable, liveable and productive places with the twin crises of climate and nature at its heart. NPF4 is a comprehensive document that should be read and implemented as a whole and is key to delivering multiple objectives under the 4 domestic high-level outcomes in this Plan.

Delivering on all of the ambitions of NPF4 will be challenging, which needs a commitment from all sectors who have an interest in creating sustainable places. This section highlights the key aspects of NPF4 policies and actions that are vital in preparing for current and future climate change. All of which serves to ensure that planners are supported by the policy and guidance that are needed to consider and integrate climate risks in plans and decision-making.

NPF4's policy intent and outcomes include the encouragement, promotion and facilitation of development that addresses the global climate emergency and nature crisis (NPF4 Policy 1), with specific policy on climate mitigation and adaptation (NPF4 Policy 2) that seeks an

outcome of our places being more resilient to climate change impacts. We have to pay close attention to what we're building and where we are building it and NPF4 policy 2 is further supported by a suite of policies that are considered critical to action on adaptation, including:

- NPF4 Policy 3 Biodiversity
- NPF3 Policy 4 Impact on Natural Environment
- NPF4 Policy 5 Soils
- NPF4 Policy 6 Protecting woodlands and enhancing nature networks
- NPF4 Policy 10 Coastal change management
- NPF4 Policy 19 Adapting to extreme temperatures
- NPF4 Policy 20 Blue-Green infrastructure
- NPF4 Policy 21 Green infrastructure for play provision
- NPF4 Policy 22 Flood and water management

Further Planning Actions

- **Scottish Environment Protection Agency and Local Development Plans** - SEPA has a statutory duty to cooperate in the preparation of local development plans. It currently supports the evidence gathering stage. SEPA's evidence is critical in planning for climate resilient places that can adapt to change. The evidence will help the planning authority understand the implications and opportunities for areas such as future flood exposure , coastal change, the water environment, and nature networks. This information can be used to underpin the spatial strategy through an infrastructure first approach to blue and green infrastructure which is designed to deliver multiple functions such as flood prevention, water management, nature restoration, protecting soil functionality and bringing vacant and derelict land back into positive use for people and communities.

- **Open Space Strategies –** The Planning (Scotland) Act 2019 introduced a new duty on planning authorities to prepare and publish an open space strategy. An open space strategy sets out a strategic framework of the planning authority's policies and proposals as to the development, maintenance and use of green infrastructure in their district, including open spaces and green networks. It must contain an audit of existing open space provision, an assessment of current and future requirements, and any other matter which the planning authority consider appropriate. The draft OSS regulations regarding the preparation and content of OSS were consulted on in 2021/22 and comments received will be taken into consideration in their finalisation. Scottish Ministers expect to lay the regulations in Parliament and bring them into force in 2024. OSS will also contribute to the development of Nature Networks – the SBS DP plans to incorporate and embed Nature Networks into policy frameworks and decision-making processes as a component of Local Development Plans and Regional Land Use Partnerships nationally by 2030.

- **New transport infrastructure –** Every new transport and active travel infrastructure project should incorporate elements of blue-green infrastructure (and seek opportunities for enhancing/expanding blue green infrastructure) by 2030.

Objective: Nature Networks (NC3)

Nature networks across every local authority area are improving ecological connectivity and climate resilience, alongside other transformative national actions to halt biodiversity loss by 2030

As noted above, Nature Networks are an effective tool for improving nature restoration, biodiversity, climate resilience and mitigating climate change. Whilst improving ecological connectivity between habitats, the creation of new and improved areas for nature will help to overcome rural/urban boundaries, connect green and blue space – locally, regionally and across the whole of Scotland - and promote a myriad of health and social benefits. Connected ecosystems are inherently more resilient and offer a place for nature to adapt and thrive.

Nature Networks

- **Nature Networks in all local authority areas** - The Scottish Government will work with local authorities to ensure nature networks are implemented in every local authority area to provide connectivity between important places for biodiversity, deliver local priorities and contribute to strategic priorities at regional and national scales by 2030.The Scottish Government will support local authorities to:
    - undertake mapping of opportunities for creating local-authority wide nature networks by 2030.
    - in their land use decision making to deliver overall positive outcomes for biodiversity and the creation of nature network delivery through developing toolkits, including a nature networks mapping tool and development of training by 2025

Case Study – Glasgow and Clyde Valley Nature Network

The Glasgow and Clyde Valley Green Network Partnership was formed in 2007 to develop the idea of a 'Green Network' for the Glasgow City Region to support the long-term economic, social, and environmental prosperity of the area. The vision of the Network is to "connect all quarters of the Glasgow metropolitan region with the range and quality of greenspace that is required of a vibrant growing city in the 21st century for the benefit of people, visitors and wildlife".

The Glasgow and Clyde Valley (GCV) catchment contains a wide range of diverse habitats and landscape types. A long history of intensive land-use throughout the area has resulted in the loss and fragmentation of semi-natural habitats and a subsequent reduction of biodiversity. Conservation policy and practice now seek to reverse the effects of fragmentation by combining site protection and rehabilitation measures with landscape-scale approaches that improve connectivity and landscape quality.

The GCV Green Network will be delivered through the 'Blueprint' – a strategic masterplan, which consists of (a) a Strategic Access Network (facilitating the off-road movement of people around and between communities through Green Active Travel routes and greenspace); and (b) a Strategic Habitat Network (facilitating the movement of wildlife through the landscape), both of which are fundamental functions of a Green Network. The key mechanisms to deliver the Blueprint include:

-Planned development (as part of planning proposals).
-Public sector programmes (enhancing publicly-owned assets).
-Infrastructure investments (combining Green Network delivery with grey infrastructure projects).
-Funding opportunities (applying for environmental funding).

The Green Network will be delivered through six key components:

-New & Improved Greenspace (parks, gardens, woodlands and meadows).
-Urban Green Infrastructure (street trees, green roofs, rain gardens and ponds).
-Greening Vacant & Derelict Land (transformed spaces and places for wildlife).
-Community Growing Spaces (allotment sites, orchards and community gardens).
-Wildlife Habitats (more and better-connected places for nature).
-Active Travel Routes (more opportunities to walk, cycle and wheel away from busy roads).

Sources: Green Cities Europe, Increasing species movement - Glasgow Clyde Valley - Integrated habitat network (forestresearch.gov.uk)

Invasive Non-Native Species (INNS)

A co-benefit of delivering Nature Networks is the improved management of invasive-non-native species (INNS)- ie animals and plants that do not naturally belong in Scotland such as American mink, rhododhendron and japanese knotweed. INNS are considered amongst the top three global threats to biodiversity according to the recently published Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Invasive Alien Species report by outcompeting native species, disrupting ecosystem function and introducing novel pathogens and diseases.

- **Scottish Plan for INNS** – The Scottish Government will implement a Scottish Plan for INNS surveillance, prevention and control, and secure wider support measures to enable effective INNS removal. In partnership with agencies, environment non-governmental organisations (eNGOs) and other stakeholders, both in Scotland and the United Kingdom, we will reduce the rate of establishment of known or potential INNS by at least 50% by 2030 compared to 2020 level, and; detect priority INNS through increased inspections and vigilance of citizen scientists, ensuring they are eradicated or contained before they become established and spread.
- **Priority sites** – Develop and implement a pipeline of strategic INNS projects to coordinate the control of priority INNS at scale, to eliminate or reduce the impacts of INNS in at least 30% of priority sites by 2030.
- **Public awareness and biosecurity** – Raise public awareness of the impacts of INNS and embed INNS biosecurity practice across industries and recreational activities linked to the most important pathways of introduction and spread by 2030.
- **Scottish Plan for INNS (Marine) -** For the marine environment, the Scottish Plan for INNS will include actions which will prevent, detect and control marine INNS, as well as enhance the resilience of native marine ecosystems and species to enable them to adapt to the additional pressure of climate change. We will:
    - Develop best practice guidelines and a voluntary code of conduct for INNS biosecurity suitable for supporting marine habitat restoration by 2025;
    - Complete feasibility study of eradication/managed control of marine INNS and develop and implement a rolling programme of island INNS management,

focussed on targeted removal of predators impacting on nesting seabirds by 2026. This will include Island INNS management and the Seabird Island Biosecurity Programme

- **Marine INNS Monitoring and Surveillance –** Marine Directorate will work with marine users to establish an effective risk-based monitoring and surveillance programme for marine INNS. Outreach is underway to ports and harbours to enable improved INNS monitoring and reporting and robust INNS biosecurity. There are also Angling and Boating Pathway Action Plans developed at a UK level, with Scottish input, and a Scottish Angling PAP to engage directly with targeted stakeholders and manage these pathways of INNS introduction and spread
- **Marine research –** Currently the Marine Directorate Science, Evidence, Data and Digital portfolio is scoping a programme of work including identification of new pathways and hotspots for introduction and spread of INNS, biosecurity advice to various sectors, identification of future adaptive management actions and interventions and also developing novel DNA-based monitoring approaches to enable a better measurement of potential impact of INNS driven by climate change or otherwise.
    - Environmental DNA analysis in marine water bodies is used to assess presence/absence of marine INNS currently and assays to monitor for additional species are being acquired as required. Monitoring of INNS is a requirement under the OSPAR Programme of Measures to assess marine environmental quality.
- **Marine Biosecurity –** By 2025 we will develop best practice guidelines for biosecurity suitable for supporting marine habitat restoration. With an ongoing commitment to supporting marine restoration through providing robust biosecurity advice to ensure habitats are as resilient as possible to the threats of climate change by preventing new introductions of INNS. Reintroducing locally extinct species such as native oysters aims to enhance marine habitats, and coastal restoration of salt marsh, sand dunes and seagrass seeks to combat coastal erosion and enhance ecosystem function and services – these may help neutralise some of the expected impacts of climate change in the coming decades.

Vector borne disease

Related to this are efforts to manage the risks posed by vector borne diseases. A vector borne disease is a human illness caused by parasites, viruses and bacteria that are transmitted by vectors, for example mosquitos or ticks. Climate change is already affecting vector-borne disease transmission and spread, and its impacts are likely to worsen. CCRA Summary for Scotland states that:

“Lyme disease cases may increase with climate change due to an extended transmission season due to warmer weather and increases in person-tick contact, although non-climate drivers such as agriculture, land use, tourism and wild animal populations are also dominant influences. Scotland has more reported cases of Lyme disease compared to other parts of the UK, due to higher humidity and high rates of outdoor tourism, both of which are likely to increase with climate change.” (CCC, 2021)

Scottish Government will continue to work with partners to provide vector-borne disease surveillance, risk assessment, incident management and public health and veterinary advice.

- **NHS Guidance** – NHS inform will continue to provide public advice and guidance on avoiding bugs outdoors, which includes avoiding ticks.
- **Lyme Disease Awareness** – Scottish Government will work with stakeholders to carry out proactive awareness raising campaigns during Lyme Disease awareness month (May) and during the summer months when people are more likely to be outdoors.
- **Lyme Disease Testing** - the Scottish Lyme Disease and Tick-borne Infections Reference Laboratory (SLDTRL) provides comprehensive and standardised testing for tick borne infections, technical and clinical advice to healthcare staff and in collaboration with PHS, provides epidemiological data on Lyme disease in Scotland; maintaining close links with the UKHSA Rare and Imported Pathogens Laboratory (RIPL).
- **Research into impact of warmer temperatures on tick populations** - Work on tick ecology is helping to identify those species that will arrive and/or increase as Scotland's climate gets warmer. Understanding the tick population allows risk assessment for the appearance of tick-borne diseases that have not previously been seen in Scotland.
- **Veterinary Advisory Service** - Scottish Government will continue to fund the Veterinary Advisory Service to help practicing vets identify, treat and prevent tick-borne disease in animals and surveillance of Schmallenberg virus, a disease of ruminants that is spread via biting midges.

To better understand and address climate-driven vector borne disease risks over the period of the adaptation plan:

- **Risk Mapping –** Public Health Scotland will work with Scottish Government and other stakeholders to map the risk of emergent vector-borne disease due to climate change to anticipate future changes to this risk.
- **Research on enhanced surveillance** – PHS will scope what enhanced surveillance could look like and link in with research projects such as the University of Glasgow Mosquito Scotland Project to fill considerable knowledge gaps on the size, distribution, seasonality, and presence/absence/potential of various vector species in Scotland, with impacts on both human and animal health.
- **Enhanced surveillance** - Explore opportunities for utilising whole genome sequencing data to enhance vector borne disease surveillance programmes.
- **Contingency planning** - Scottish Government, along with partners, will review vector borne disease contingency plans in England and scope out their adoption, with appropriate modifications, in Scotland including communication and planning with operational partners.
- **Horizon scanning** - Scottish Government, along with partners, will continue to horizon-scan for vector borne diseases of livestock, such as Blue Tongue Virus, that are endemic in warmer parts of Europe and spread Northwards when climatic conditions allow.

Objective: Marine Ecosystems and the Blue Economy (NC4)

Evidence informed planning and management is increasing the climate resilience of Scotland's marine ecosystems and Blue Economy, with coastal change adaptation plans safeguarding coastal communities and assets.

Scotland's seas and coastline are famous across the world and home to our most beautiful plants, animals and marine life. The biodiversity of our marine and coastal environment is crucial to supporting thriving ecosystems and local economies and must be protected from the impacts of climate change. Fisheries and aquaculture will be discussed further in the 'Economy, Business and Industry' outcome, whereas this objective will set out action focused on marine planning, coastal planning, habitat restoration and biodiversity and further research and evidence gathering to ensure that how we manage our coasts and seas and plan for change is based on the best available evidence.

The risks to our marine and coastal environments from climate change are stark and accelerating. Our coastlines are threatened by coastal erosion perpetuated by rising sea levels. Our marine environment is threatened by ocean warming and acidification and the increased prevalence of pests, diseases and INNS.

For example:

- Globally, by 2021, the ocean had absorbed around 90% of the heat generated by rising greenhouse gas emissions trapped in the Earth's system and has taken in 30% of carbon emissions. This has caused significant changes impacting marine biodiversity. (UNFCCC, 2021)
- UK seas show an overall warming trend. Over the past 30 years, warming has been most pronounced to the north of Scotland and in the North Sea, with sea-surface temperature increasing by up to 0.24°C per decade. (MCCIP 2020 Report Card)
- The North Atlantic contains more anthropogenic CO2 than any other ocean basin, and ocean surface measurements between 1995 and 2013 reveal a pH decline (increasing acidity) of 0.0013 units per year (MCCIP 2020 Report Card)
- Whichever pathway our warming climate follows, we are locked into sea level rise in Scotland beyond 2100 (Dynamic Coast 2, 2021)
- Estimates suggest that between £0.8bn and £1.2bn of coastal assets in Scotland may be at risk of erosion by 2050. (Dynamic Coast, 2021)

This is already affecting our marine and coastal habitats and species.

Source: NatureScot – Text Puffins on the Isle of May.

Atlantic Puffins are threatened by climate for a number of reasons, including their main source of food, sand eels, being very sensitive to ocean warming and can disappear entirely even under marginal temperature changes –(WWF 2021). The British Trust for Ornithologists projects a decline of puffin across Britain and Ireland of nearly 90% by 2050 (BTO, 2021)]

Conversely, thriving, nature-rich marine and coastal ecosystems can help reduce the negative impacts of climate change and act as powerful carbon stores as well as contributing to local, national and global economies (as set out in the 'Economy, Business and Industry Outcome).

Marine Planning

- **National Marine Plan –** The National Marine Plan sets out high-level and sector-specific climate change mitigation and adaptation objectives (as required under the Marine Scotland Act) and provides a contextual framing around climate change mitigation and adaptation to guide authorisation, licensing, and enforcement decisions for each marine sector. The requirements for monitoring the National Marine Plan are set out in the "National Marine Plan – Monitoring and Reporting" document (March 2016).
- **National Marine Plan 2** – A new National Marine Plan 2 (NMP2) is under development which aims to help tackle the twin climate and biodiversity crises and support our net zero ambition and will seek to provide a clear decision-making framework to support the management of marine space. The NMP2 will intertwine with the Blue Economy Vision which will strengthen the integration of climate change into the plan, building climate adaptation and mitigation considerations into decisions on consenting and licencing.
- **Marine Climate Change Impacts Project –** Currently, the Marine Climate Change Impacts Project (MCCIP) brings together expertise from across the UK to develop high quality evidence and scientific consensus. The partnership also works with the marine industry, policy and management to inform climate action and increase the evidence base.
- **Climate Vulnerability Assessment (CVA) -** Scotland would benefit from an in depth climate vulnerability assessment of the marine environment and all human related

activities to be able to identify key species and sectors that are more/less vulnerable to climate change. This would help inform prioritisation of policy action. An initial review of CVA methodologies was funded through ClimateXChange, however further action needs to be taken to build on this work.

Biodiversity and Habitat Restoration

- **Scottish Marine Environmental Enhancement Fund (SMEEF)** - SMEEF was launched in May 2022 to invest in marine and coastal restoration throughout Scotland. It has enabled investment to support the health and biodiversity of Scotland's seas through habitat and restoration projects.. Over the duration of the Adaptation Plan, SMEEF will continue to seek to increase investment and fund projects that recover, restore or enhance the health of marine and coastal habitats .
    - Currently, SMEEF has secured and distributed £3.2 million, with a mix of public and private investment into 45 restoration and enhancement projects in Scottish coasts and seas with positive impacts. These projects support climate adaptation by enhancing recovery of marine species and habitats and building ecological resilience to the impacts of climate change as well as improving social and economic resilience.
- **Marine Protected Areas (MPA)** - Scotland has some of the most beautiful and diverse marine ecosystems in the world. Marine Directorate in Scottish Government is committed to protecting and enhancing these amazing ecosystems to ensure they are safeguarded for future generations to enjoy. Protected areas are used to ensure protection of some of the most vulnerable species and habitats**.** The Scottish MPA network includes sites for nature conservation, protection of biodiversity, demonstrating sustainable management, and protecting our heritage. In total the network covers approximately 37% of our seas. We are delivering and planning a range of actions to ensure that the Scottish MPA network is well managed and that we meet our statutory obligations. To do this we will:
    - Assess the network of marine protected areas in respect of the resilience of marine biodiversity to climate change by 2026, based on a regional assessment by OSPAR;
    - Introduce fisheries closures to protect Vulnerable Marine Ecosystems in offshore waters between 400-800m depth by 2027;
    - Develop and implement an adaptive management framework for the MPA network by 2028;
    - Deliver the required fisheries management measures for offshore MPAs, where they are required by 2024; and
    - Deliver fisheries management measures for inshore MPAs, where they are required, and for Priority Marine Features identified as most at risk from bottom-contacting mobile fishing gear outwith MPAs in 2025.
- **Marine Nature Enhancement -** In the next 2 years, we will develop a marine restoration plan for 2026-2045, including prioritising marine habitats and locations suitable for restoration. This will include the development of a library of restoration measures. This supports adaptation by contributing to the recovery of marine habitats and species, restoring ecosystem function, and enhancing biodiversity. Combined, these improvements have the potential to deliver resilience to the impacts of climate change, for example, through enhanced coastal protection, and

opportunities to limit climate change through carbon sequestration. Within the next 5 years we aim to implement specific measures to protect and enhance relevant blue carbon sequestration and storage habitats, deliver additional protection for spawning and juvenile congregation areas, and for species which are integral components of the marine food web, such as sandeels, herring, and sprat.

- **Safeguarding marine biodiversity** - By 2026, we will work with stakeholders to complete a review of opportunities for increasing community participation in safeguarding marine biodiversity. Based on this review, we will secure resources and begin piloting new approaches to community engagement by 2028.
- **Internal governance -** By 2028, Marine Directorate will undertake a review of how to mainstream marine biodiversity into government decision-making to ensure governance arrangements better support the recovery of marine biodiversity
- **Seabird Conservation Strategy** - By 2025, we will develop and publish a Scottish Seabird Conservation Strategy which will deliver action to conserve and increase the resilience of seabird populations.
- **UK Dolphin and Porpoise Conservation Strategy** - By 2025, we will begin implementation of actions relevant to Scotland in the UK Dolphin and Porpoise Conservation Strategy.
- **Seals** – By 2026, we will review the approach to and locations of designated seal haul-out sites to ensure important locations are protected.

Coastal

- **Working with Local Authorities** - We are working with local authorities to improve the resilience of our valuable natural coastal defences which protect us from flooding. Local authorities have a responsibility to take coastal erosion risks into consideration within their Local Development Plans. In February 2023, the Scottish Government published new Coastal Change Adaptation Planning Guidance (CCAP) to assist local authorities in developing coastal change adaptation plans. This guidance broadly follows the approach set out in the DEFRA 2006 SMP guidance but deviates due to the different arrangements for coastal management in Scotland. This allows local authorities to widen the scope of strategic planning beyond the 'shoreline' to include the coastal hinterland and allow planning space for relocation adaptation. The CCAP must be integrated with wider Local Authority adaptation planning. Funding is available for the development and implementation of the Plans. This guidance and associated funding help protect Scotland's people and assets (including property, roads, rail and other infrastructure) from flooding caused by coastal erosion.
- **Coastal Flood Risk Maps** - SEPA has a role in providing the evidence for coastal flood risk and how this will increase with climate change. SEPA will update its coastal flood risk maps as required to include the latest information including climate change projections. The coastal flood risk maps are being updated in phases, with review and updates of mapping for all regions by 2029. SEPA recognise the same processes that cause coastal flooding cause coastal change and sit on the steering group for Coastal Change Adaptation Plans.

Case Study **SMEEF: Protecting coastal sites through "dune recharge" - St Andrews Links Trust**

Through the Scottish Marine Environmental Enhancement Fund, nearly £70,000 was invested in restoring the natural dunes on West Sands Beach in St Andrews to slow the rate of coastal erosion and provide a natural flooding barrier. The St Andrews Links Trust have a long record of strong community engagement and effective management of the dunes near the golf course at St Andrews both for positive nature outcomes but also for their amenity value. Between 2010 and 2013 there had been several flood events due to storm surges which had damaged the integrity of the dune system. A programme of dune recharge and stabilisation has been underway since then under licence and with full stakeholder and community support, culminating in this the most recent restorative effort. Areas to the southern end of the dune system had been identified a priority for restoration by local monitoring and within the Scottish Government's Dynamic Coast report.

"Thanks to funding from SMEEF/NRF1 St Andrews Links Trust was able to harvest 2600m3 of sand from our licenced area and use it to boost the target areas and the new dunes were profiled into wind aspect sensitive dune shapes and compacted to assist with sand loss. Washed out areas were raised between 3 and 6 meters in places protecting and restoring valuable habitats and improving erosion resistance as well as adding amenity value for recreational users. 48 volunteers helped with replanting using local donor Marram and Lyme grasses." Sandy Reid, Director of Greenkeeping at St Andrews Links Trust

This important work has meant that the dunes in this area are now better 'equipped' with gate dunes along two linear access points affording much needed protection against east driven storm floods. The dunes are now higher in areas where they vulnerable to storm surges and also hold increased volume, which is critical.

Objective: Natural Carbon Stores and Sinks (NC5)

Resilient natural carbon stores and sinks (such as peatland, forests and blue carbon) are supporting Scotland's net zero pathway, alongside timber production, biodiversity gains, flood resilience and the priorities of local communities.

Protecting and restoring our natural carbon stores is crucial as part of our just transition to net zero both for their carbon sequestration and storage potential but also for multiple co-benefits such as flood resilience and improved biodiversity. Scotland's natural carbon stores can be broadly categorised into peatland, forestry and woodland, and blue carbon. Blue carbon refers to carbon that is captured from the atmosphere and stored in marine and coastal ecosystems like seagrass, and tidal marshes.

Peatland

Scotland has around 2 million hectares of peatland, representing around 25% of its land area. In good condition, peatlands provide multiple benefits: capturing and storing carbon, supporting nature, reducing flood impacts, improving water quality, and providing places that can support physical and mental wellbeing. However, around three quarters of our peatlands is degraded through drainage, extraction, overgrazing, burning, afforestation and development. Degraded peat offers fewer benefits and emits greenhouse gases, now accounting for around 15% of Scotland's total net emissions. Caring for our peatlands through protection, management and restoration is critical to mitigating and adapting to the linked climate and nature emergencies and achieving a Just Transition to net zero.

- **Peatland restoration** - The Scottish Government has committed £250 million over 10 years to restore 250,000 hectares of degraded peatlands by 2030. To date, we have achieved around 65,000 hectares of this, and the First Minister's April 2023 policy prospectus commits us to reaching 110,000 hectares by 2026. Through supporting good, green jobs in the rural economy, our investment will also play a part in Scotland's Just Transition to net zero by 2045. A detailed delivery improvement plan is in place through which we are working with our delivery partners in the Peatland Action partnership to upscale annual rates of peatland restoration.
- **Peatland management and protection -** Alongside restoration, we are taking a number of other actions to manage and protect Scotland's peatlands to keep them in a healthy condition and reduce their emissions. This includes: incorporating peatlands into the new agricultural support framework to assist farmers and crofters wishing to undertake peatland restoration and management; progressing our commitment to phase out the use of peat in horticulture; developing new tools and guidance to help manage the construction of windfarms on peat; and creating mechanisms to increase private investment in natural capital including peatlands.
- **Evidence gathering** - We will use new scientific evidence/monitoring data to better target restoration and maximise co-benefits such as biodiversity gain, flood resilience, water quality improvements, and better soil health among others
- **SEPA Land-use planning** - SEPA seek to protect and improve carbon rich soils including peatland through our land-use planning role. Due to their multiple co-benefits, it is therefore important that carbon rich soils are included in the

preparation of blue and green infrastructure audits and/or strategies and identifying nature networks in Local Development Plan preparation.

- **Muirburn and moorland management** – The management of upland moor areas for grouse shooting (including muirburn – burning back heather so grouse are attracted to new growth to eat) can have an adverse impact on soil carbon content and lead to associated disadvantages such as run off of soil and water to lower altitude areas. This can also involve the removal of natural predators to grouse such as raptors, foxes and stoats, leading to an imbalance in the biodiversity of an area. To address this, the Scottish Government will:
    - Introduce legislation and develop a licensing approach to grouse moor management.
    - Develop with stakeholders a new Code of Practice on grouse shooting to ensure moorland management supports biodiversity by 2025.
    - Introduce legislation to licence muirburn and ban muirburn on peatland unless under licence.

Forestry and Woodland

Woodland and forest covers more than 1.3 million hectares in Scotland (about 16% of our total land area) and is one of the best tools we have to sequester carbon released into the atmosphere. However, it is important that new trees are planted in a way that maximises co-benefits such as landslide and flood mitigation and avoids releasing more carbon through soil disturbance.

- **Right tree in the Right Place –** Actions related to this – the Right Tree in the Right Place Guidance contains information related to the preparation of Forestry and Woodland Strategies. Reviewing the Right Tree Right Place Guidance is a commitment in the National Planning Framework 4 Delivery Programme (2023-28) and Scotland's Forestry Strategy Implementation Plan (2022-2025)
- **Woodland creation –** We are committed to reaching woodland creation targets set by the Scottish Government of 18,000 hectares of new woodland annually
- **Woodland Carbon Code (WCC) –** The WCC provides financial support and future income stream for woodland creation schemes that would not be financially viable without the additional support of carbon income.
- **Woodland removal –** The Scottish Government's Policy on Control of Woodland Removal & Implementation Guidance – there is a strong presumption in favour of protecting Scotland's woodland resources. Woodland removal should be allowed only where it would achieve significant and clearly defined additional public benefits. In appropriate cases a proposal for compensatory planting may form part of this balance.
- **Increasing species diversity** - We will support training and implementation of the updated UK Forestry Standard (UKFS) General Forestry Practice Guideline which reduces the maximum percentage of any one species planted in a forest management unit reducing risks associated with over reliance on one species.
- **Improving resilience** - One of the 3 key objectives in the Scottish Forestry Strategy is to 'improve the resilience of Scotland's forests and woodlands and increase their contribution to a healthy and high quality environment'. Scottish Forestry have engaged with a national level stakeholder group on this issue, have developed a Steering Group with cross sector representation and are currently developing an

Adaptation and Resilience work programme to ensure that Scotland's forests are able to mitigate, adapt, respond and recover from disturbances related to climate change and attacks by pests and diseases. Scottish Forestry are also working on increasing the contribution of forestry to wider land use adaptation such flood mitigation and water management.

Agriculture

Our farmers and crofters play a significant role in protecting and enhancing our carbon stores and sinks as key land managers with peatland, woodland and other natural features on their land. "Objective: Farming, Fishing and Forestry (B2)" provides extensive detail on our actions to support agriculture to deliver climate adaptation, much of which is relevant to maintaining and enhancing our carbon stores and sinks. For example, the future support framework will have measures to support our farmers to maintain and improve their carbons stores and sinks. That will include improved sequestration and storage of carbon in agricultural soils and our vision emphasises the importance of soils in regenerative agriculture.

- **Vision for Agriculture** - Our Vision for Agriculture is for Scotland to become a global leader in sustainable and regenerative agriculture and supporting our farmers to manage the land for climate and biodiversity outcomes, as well as food production, is fundamental to that vision. Many of the woodland and peatland actions described above will be delivered by farmers and crofters.
- **Preparing for Sustainable Farming** - We are already delivering on soil carbon through Preparing for Sustainable Farming which offers funding for farmers and crofters to understand their carbon emissions and sequestration, including through carbon audits and soil sampling and analysis.
- **Support payments** - From 2025, to qualify for farming support payments farmers will be required to have the foundations of a 'Whole Farm Plan' which will include soil testing, animal health and welfare declarations, carbon audits, biodiversity audits and supported business planning.

Blue Carbon

- **Scottish Blue Carbon Forum** – The Scottish Blue Carbon Forum (SBCF) will help to improve our understanding of Scotland's blue carbon habitats and support evidence-informed decision making. Led by its independent chair, Professor William Austin, the SBCF connects blue carbon science, policy and delivery experts from the Scottish Government, public bodies and research institutions, in the UK and internationally. Working in partnership, we will strengthen our knowledge base on Scotland's blue carbon habitats, to better understand their extent, condition and vulnerability to climate change and how these important habitats can contribute to climate change mitigation, adaptation and resilience.
- **Blue Carbon Action Plan** - We will develop and publish a Blue Carbon Action Plan, setting out the current position and priority evidence needs to enable improved management, protection, and enhancement.

Outcome Two: **Communities (C)**

Communities creating climate-resilient, healthy and equitable places.

People shape places, and places shape people. The physical, social, and economic environment in which we are born, grow, live, work and age has a big impact on our health, wellbeing, opportunities, and experiences. The climate emergency will change Scotland's places. Challenges like heatwaves, flooding, and accelerating sea level rise are affecting our countryside, towns, and cities, and we know these changes we are seeing now will only increase in the future. To protect our communities, we need our places to adjust to the effects of climate change, and to reduce our need for coal, oil, and gas.

Our places are unique and have always changed over time. Building on their strengths can help us navigate the difficulties of climate change and the need to adapt. By taking a place-based approach to these problems, we can design local solutions to a global problem. Solutions which address community concerns and priorities. Solutions which are fair and just. Solutions which make the most of local opportunities and resources. Scotland's most disadvantaged people and communities will be disproportionately affected by climate change, widening existing inequalities. Our responses to climate change can protect and improve population health, wellbeing and reduce inequalities.

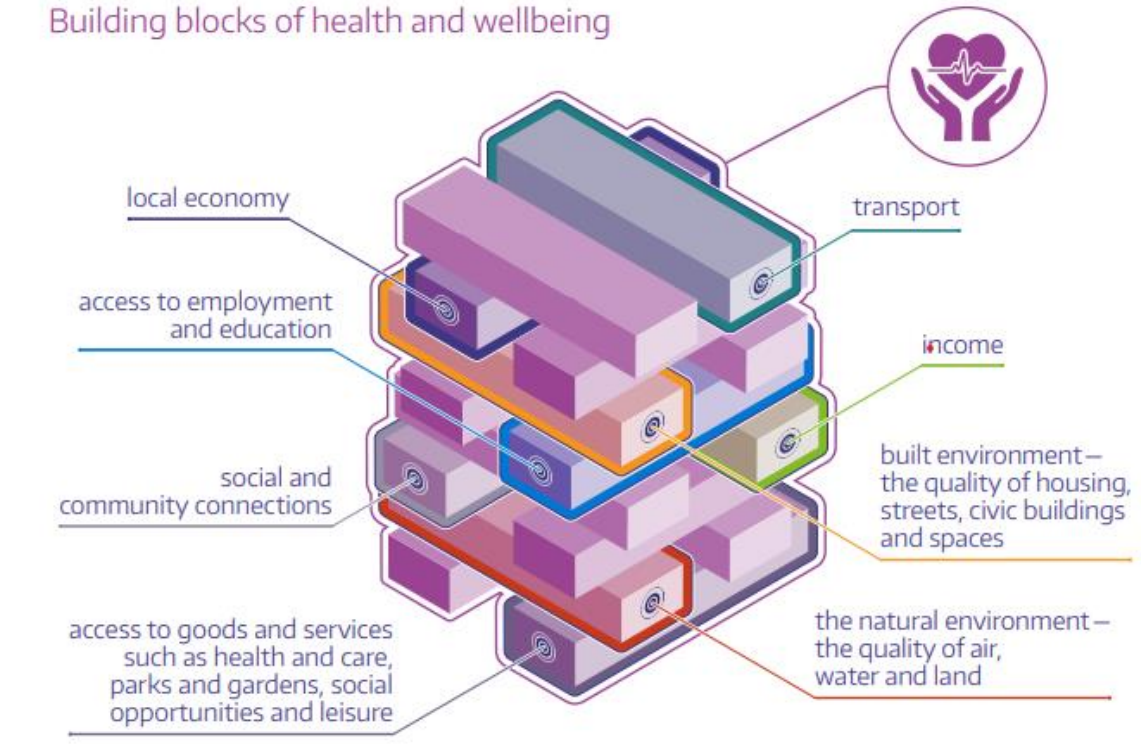
But we can't make these changes alone. Government, communities, and place-makers will all need to collaborate to ensure that Scotland's places are designed with tackling climate change and improving people's wellbeing at their heart. Across Scotland we will need to imagine, experiment, learn, innovate, and adapt our places together.

The elements of this 'place-based' approach to climate adaptation are described below and are relevant for all our adaptation objectives.

How does climate change affect health?

Often when we think about the risks to health from climate impacts, we think about the direct effects. High temperatures are associated with an increased risk of acute mortality, particularly among older people and those with pre-existing health conditions. High temperatures can also, for example, increase the risk of preterm birth and the risk of injury, particularly among children. Extreme flood events can result in death or injury, and biological or chemical contaminants resulting from flood events can cause illness. Flooding of people's homes or businesses can have a significant impact on their short and long-term mental health

Climate impacts also affect health and wellbeing indirectly through the social, economic, and physical environment we live in. Known as the building blocks of good health, these factors include high-quality housing, transport systems and natural environments, strong social relationships and networks, good nutrition, and secure, high-quality employment.



Source: Public Health Scotland, Adaptation Scotland, Improvement Service (2023). Working together to build climate-resilient, healthy and equitable places: A briefing for local government and partners

Objective: Place-Based Collaboration (C1)

Place-based collaborations across Scotland have delivered inclusive and effective adaptation action across cities, regions, and localities engaging a broader range of delivery partners.

Responding to the Climate Emergency requires partnership at all scales. The challenge is too big to face alone. For Scotland to flourish in a changing climate, we need to adapt together – central and local government, health boards, public bodies, communities, business, third sector, and individuals.

Scotland's pioneering collaborations on climate adaptation are already growing and finding their own innovative paths, for example:

- Climate Ready Clyde is a pioneering cross-sector initiative funded by 13 member organisations to create and deliver a shared vision, strategy, and action plan for 1.8 million people adapting to climate change across the Glasgow City Region.
- Highland Adapts is bringing communities, businesses, land managers, and public sector together to facilitate transformational action towards a prosperous, climate-ready Highland.
- The Outer Hebrides Community Planning Partnership has created a shared case for action being taken up the Climate Hebrides CIC.
- Edinburgh and South East local authorities are collectively embedding climate adaptation into their ambitious economic development plans.

Local authorities are leading collaborations on climate adaptation in Scotland. They are founders or key anchors in all existing collaborations, and the Climate Change Committee has highlighted examples of local excellence. The next step is for the Scottish Government and others to strengthen our partnership working on adaptation, and for collaborations on adaptation action to scale up, covering the whole of Scotland and broadening out our set of delivery partners.

The Verity House Agreement sets out how central and local government will work in partnership across 3 shared priorities: climate change; child poverty; and public services.

- Through the overarching Agreement, COSLA and Scottish Government will establish a **joint climate delivery framework, which will include climate adaptation**. This joint framework will enhance our collective ability to make best use of collective resources and enable joint decision-making on climate action.

Across the period of this Adaptation Programme, the Scottish Government want to drive collaboration on adaptation planning and investment with a broader set of partners, covering all of Scotland's regions. Scottish Government will work in partnership with local government and a broad range of others to facilitate **mature regional adaptation partnerships and collaborations covering all regions in Scotland by 2029**.

- Scottish Government, supported by Adaptation Scotland, will work with local partners to identify options for progressing climate adaptation in the context of local needs and priorities. Partnerships and collaborations will avoid a 'one size fits all' approach.
- Scottish Government, working with a range of other partners, will develop a route map to extending mature regional collaborations on adaptation to all of Scotland by 2029.
- We propose that action at a regional scale should include collaborating on regional risk and opportunity assessment, adaptation priority setting, and long-term planning and investment, taking a place-based approach. This is particularly important where actions in one place will affect another, or changes include relocation of infrastructure or individuals to an area that is more resilient to climate change.

Scottish Government will investment over this Parliament in adaptation collaborations and extend best practice to all areas of Scotland. This will include capacity building, supporting climate resilient economic development, and support for financing place-based adaptation actions.

One of the preconditions to successful partnership working is a shared understanding of how to work together. We propose that the final Adaptation Plan will set out a clearer **collective understanding of partnership working roles** for:

- central government;
- public bodies;
- local authorities;
- business and industry; and
- communities and individuals.

COSLA and the Scottish Government will continue to implement the **Place Principle**.

- The Place Principle helps establish a clear vision for collaboration around place. This includes collaboration on climate adaptation and the use of climate adaptation-specific resources, such as the Place Standard Tool with a climate lens. The Place Standard Tool with a climate lens is designed to support a joined up, collaborative, and participative approach to climate action within a place.
- NPF4 is Scotland's national planning policy and it is clear that local development plans should be created in line with the place principle to promote development that applies the place principle.
- The Scottish Government will continue to support the application of the place principle in the planning system including in preparation of regional spatial strategies to inform national and local level planning, enabling the consideration of important cross-boundary matters, and when working with stakeholders to support preparation of local development plans, prepared by all planning authorities across Scotland.

To see the benefits of the Place Principle become an everyday reality in the way Scotland's places are created, adapted and sustained by 2031, **Architecture and Design Scotland** will:

- Promote a whole-place collaborative approach in creating resilient places;
- Embed adaptation in work to support the preparation and implementation of Local Development Plans in six local authority area; and
- Ensure adaptation to climate change is explicit in A&DS updated corporate plan, shaping all work delivery in places across Scotland from 2024-27.

Actions to address climate impacts can deliver 'triple wins' for health, wellbeing and equity. To provide public health leadership and contribute to enabling effective partnership working on climate change, **Public Health Scotland** will:

- work with national and local government to implement the Health in All Policies approach;
- scale up capacity to use Health Impact Assessments, the Place Standard Tool and other tools and resources with our partners at a local level (such as the Working together to adapt to climate change and deliver health benefits for all briefing) to support climate action and realise 'triple wins' for health, wellbeing and equity.
- engage through key forums such as Community Planning Partnerships, Regional Economic Partnerships, and City Region Deals; and
- Continue to implement its Climate Change and Sustainability Strategic Approach 2023–2026.

Climate adaptation is equally important in Scotland's marine environment and Blue Economy. The **Scottish Government** is supporting the development of **Regional Marine Plans** in 3 of Scotland's 11 marine regions – Shetland, Orkney, and the Clyde. These plans will include objectives relating to the mitigation of, and adaptation to, climate change.

Objective: Community and Individual support (C2)

Communities and individuals are supported, informed, and able to take locally led adaptation action, supporting local priorities and resilient, healthy, and equitable places.

Every community is unique and so are the impacts of climate change to them. Action under this objective recognises that climate change is complex, but there are meaningful actions that every community can take to address it and flourish together.

It is both crucial and possible to build resilience and adapt to the changing climate whilst tackling other local priorities such as such as housing and neighbourhoods, getting around, and skills and employment. Through support and resources, we can identify things all communities can do to build resilience and prepare for climate change and, at the same time make places healthier, equitable, and more comfortable to live in.

This approach to locally led adaptation is central to Scotland's Community Climate Adaptation Routemap. This practical guide for communities to adapt to climate change has been developed by Adaptation Scotland in collaboration with multiple community-facing organisations.

The Scottish Government will continue to facilitate a national network of **Climate Action Hubs** to support communities to take forward climate action in their areas. The network of regional climate action hubs will continue to support communities to come together and engage collectively on climate action, whilst supporting the transition to low carbon and climate resilient healthy living, and driving wider behaviour change. The hubs will achieve this by:

- building awareness of the climate and nature emergency across all communities;
- Increasing community resilience and knowledge of how to respond to climate change;
- stimulating community level climate action;
- embedding cooperation and learning;
- encouraging community groups to collaborate at a regional level;
- working in partnership with other key local stakeholders; and
- allowing an approach to be developed within each region that reflects local circumstances and priorities.

This approach fosters peer-to-peer learning, encourages collaboration between projects, and equips groups with the tools to seize funding opportunities.

The Scottish Government, working through Adaptation Scotland, will continue to facilitate a collaborative **community adaptation learning programme**.

- This will include advice, training, and support in collaboration with intermediary organisations and communities. This will empower communities by enabling them to use Adaptation Scotland resources to integrate climate adaptation into wider community priorities.
- These resources include: the Communities Climate Adaptation Routemap, Place Standard with a Climate Lens, and tools to support local place-based adaptation including participatory mapping, adaptation personas, and stakeholder mapping.

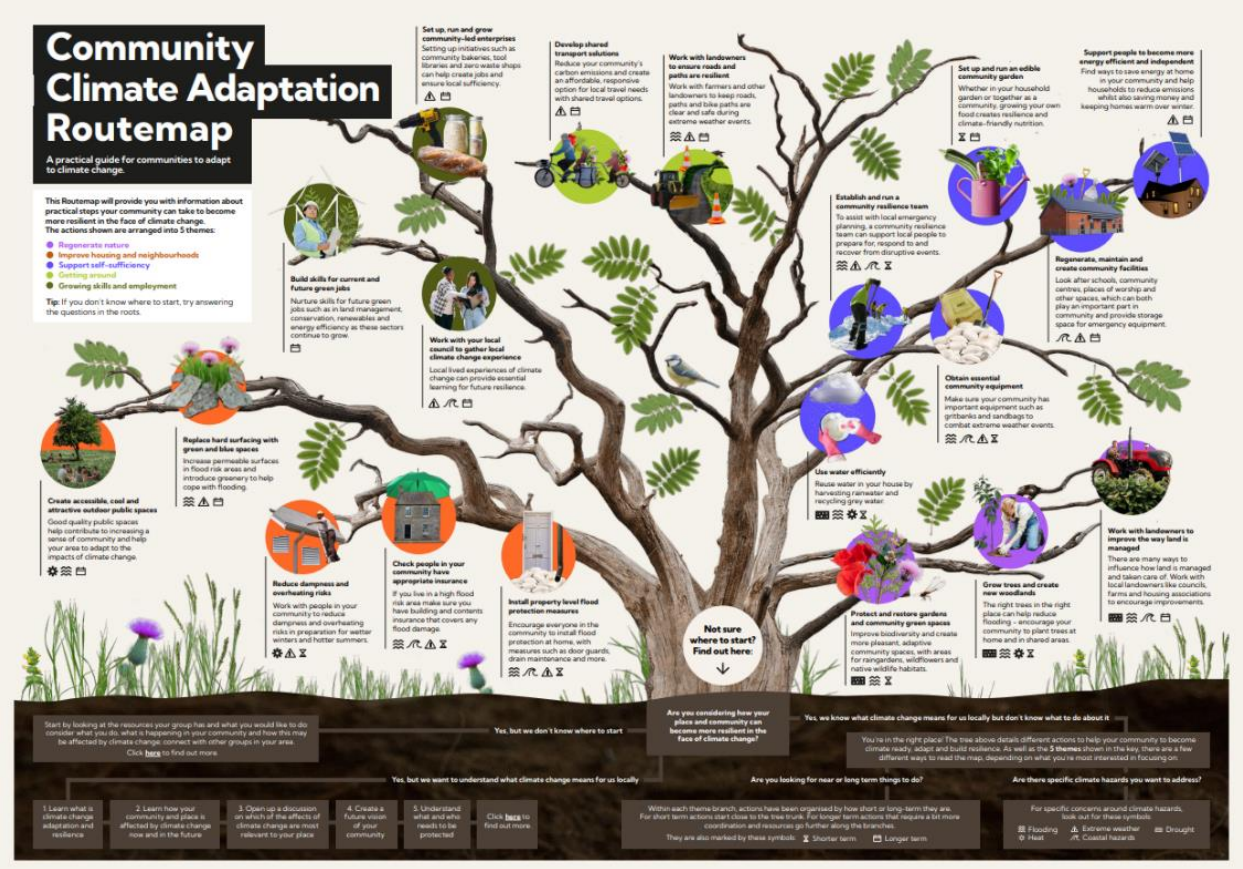
Given the significant links between adaptation action and health, the Scottish Government commits to leading a **Health Impact Assessment** on the draft Adaptation Plan.

- This will be completed in stages. The first stage will allow health input to the adaptation plan. The later process will help inform how the plan is implemented over

the course of its lifetime. Together, this will increase ability across government and wider partners to improve population health, reduce health inequalities, and improve health and care system sustainability through their work to adapt to a changing climate.

Case Study - **Community Climate Adaptation Routemap**:

Following many fruitful months of research, collaboration and engagement, Adaptation Scotland launched its Community Climate Adaptation Routemap, a practical guide for communities to adapt to climate change. This resource was developed collaboratively with Highlands and Islands Climate Hub, the Development Trusts Association Scotland (DTAS), North East Scotland Climate Action Network Hub (NESCAN Hub), and the Scottish Communities Climate Action Network (SCCAN).



CASE STUDY – Climate Action Towns project worked with nine communities to support place-based climate, action sharing learning across Scotland, and building on Architecture & Design Scotland's Carbon Conscious Place principles.

To support **climate adaptation and resilience in Scotland's island communities**, the Scottish Government will work with partners to:

- Continue to deliver the current National Islands Plan throughout its lifetime, including its recognition of the strengths and vulnerabilities of island communities in relation to climate change, coastal change, and extreme weather.

- Complete the review of the National Islands Plan to understand its impact and inform whether a new plan is required.
- Deliver the Carbon Neutral Islands project, supporting island communities to lead the way in Scotland's decarbonisation journey. Community Climate Action Plans were published in June 2023 setting out multiple steps that will support communities reach carbon neutrality by 2040. Action taken will include climate resilience as well as adaptation. Investment strategies to support the mid to long term project delivery are under development. Such strategies will include adaptation and resilience related finance.
- Work with community groups to enhance marine protection, including for the purpose of protecting coastal communities from the impacts of storms and sea level rise in their local area. For instance, certain habitats such as kelp forests or seagrass beds can help stabilise sediments and attenuate/reduce wave energy thus slowing floodwater advancing and reducing coastal damage from storms. Examples of community initiatives that enhance marine protection include: St. Abbs and Eyemouth Voluntary Marine Reserve; Fair Isle Demonstration and the Research MPA; and Lamlash Bay No Take Zone.

Objective: Preparation and Response (C3)

Communities and individuals are able and supported to prepare for, respond to and recover from emergencies in a way that builds future climate resilience, complements the work of emergency responders and protects those with vulnerabilities to multiple risks.

Building community resilience to extreme weather is increasingly important. When emergencies happen, the best recoveries will involve learning and equipping us to deal with future disruptions in a way that is equitable and protects people with more social vulnerabilities.

Community resilience is defined by the Scottish Government as:

- *"Communities and individuals harnessing resources and expertise to help themselves prepare for, respond to and recover from emergencies, in a way that complements the* work *of the emergency responders."*

It is based on a culture of preparedness, in which individuals, communities and organisations take responsibility to prepare for, respond to, and recover from emergencies.

Community resilience is built though community development, based on community priorities and working through local initiatives. This means providing individuals and groups of people with the knowledge and skills they need to effect change in their own communities, through a process of engagement, education, empowerment, enablement, and evaluation.

This is not the responsibility of one organisation. Scottish Government guidance on Building Resilient Communities suggests the following roles:

- **Scottish Government:** Setting strategic direction, determining national policy, developing national resources, and carrying out national-level analytical work.

- **Regional Resilience Partnerships:** Bringing together all the relevant organisations in an area to develop an effective approach to dealing with emergencies. They have robust plans in place to respond to all kinds of events. These plans are regularly tested in joint exercises and during real emergencies.
- **Local Authorities:** Leading on engagement with communities, promoting and supporting community emergency planning, promoting resilience education through schools, supporting local training, and exercising with community groups.
- **All responders (including voluntary sector):** Contributing to public information campaigns, services aimed at household and individual resilience, initiatives such as first aid training and participating in education initiatives.

SEPA and the Met Office provide flood warnings and weather warnings to enable all responders and the public to prepare for extreme weather.

What is mean by social vulnerability?
The extent to which individuals and communities living in climate-impact-prone areas are adversely affected by climate impacts depends on their social vulnerability. Social vulnerability has three elements:

- Exposure to climate impacts
- Adaptive capacity
- Sensitivity to climate impacts:

People living in social and economic disadvantage are more likely to experience poor-quality environments, less likely to have the adaptive capacity, more likely to be sensitive to the impacts of climate change.
Climate change and these social, economic and personal factors act together as risk multipliers to increase the impacts on health and health inequalities.

Resilience (General)

Ready Scotland is a year-round **Scottish Government** public information campaign which aims to highlight the risks associated with severe weather before it occurs and provides advice to the public. It promotes positive behaviours during severe weather and raises awareness of information, advice, and guidance about what to do in advance to prepare for, respond to, and recover from severe weather emergencies.

- The ready.scot website provides advice for the public on how to prepare their home, family, and business for disruption caused by emergencies including extreme weather. And when emergencies do occur, it provides information on how to respond, keep safe, and help others in the community.
- The Scottish Government will continue to provide advice, through ready.scot and social media channels, on steps that households and businesses can take to help prepare for extreme weather such as storms, heatwaves, or flood events.
- The Ready Scotland public information marketing campaign quickly highlights the most severe Met Office weather warnings, using geographically targeted social media, local radio, and partnership activity to highlight the risks of specific extreme weather events and provide advice on sensible measures to prepare and respond.

- The Scottish Government will continue to improve and develop community-facing learning modules on how Scotland plans and prepares for emergencies and how community groups can play a safe and effective part at Ready Scotland Learn.

To strengthen **Community Resilience in Emergencies** in the context of climate change risks, the **Scottish Government** will:

- Maintain and strengthen links between third sector, business, and statutory responder organisations, relating to third sector involvement in resilience arrangements through effective inclusion in Scotland's resilience structures and processes, including hosting the Voluntary Sector Resilience Partnership;
- Promote the appropriate involvement of volunteers and the third sector, within government and beyond, to support emergency planning and response arrangements and to better harness the third sector's capability and capacity to assist during any emergency events;
- Promote best practice guidance for safe and effective humanitarian donations and volunteering;
- Support the Scottish Fire and Rescue Service together with third sector and statutory responders, through the Voluntary Sector Resilience Partnership, to further develop the Community Asset Register to ensure access is improved to deploy Voluntary Sector assets which might be needed in emergencies; and
- Continue to develop and enhance the Ready Scotland platform with its associated communications channels as an accessible and inclusive means to raise public awareness of risks associated with emergencies, and provide information and advice on sensible preparation and response measures.

Public Health Scotland will develop an Adverse Weather Health Protection Response Plan. The plan will be iterative, initially focusing on public health messaging.

Case Study: Scotland's unique approach to resilience

The development of resilience in Scotland is based on the principle of Integrated Emergency Management (IEM). The aim of IEM is to develop flexible and adaptable arrangements for dealing with emergencies, whether foreseen or unforeseen including those caused or exacerbated by the effects of climate change. It is based on a multi-agency approach and the effective co-ordination of those agencies. It involves Category 1 and Category 2 responders (as defined in the Civil Contingencies Act 2004) and the voluntary sector, commerce, and a wide range of communities. Resilience goes far beyond organisations and communities alone with individual responsibility playing a vital part in the establishment of a resilient nation. This wider approach to the concept of resilience will ensure that we make use of all skills and resources at our disposal and will play a central role in working towards the national outcome of having strong, resilient and supportive communities able to cope effectively with emergencies, whatever their cause.

Resilience (Flooding)

Developing community resilience to flooding is particularly important.

We are already experiencing more intense heavy rainfall as a result of climate change, leading to higher river flows and more difficult to predict 'surface water' flooding. Climate change has accelerated sea level rise, leading to more coastal erosion and coastal flooding.

This requires Scotland to build greater community resilience to flood events, informed and supported by public sector action (see Public Services outcome for more supporting actions).

In tandem with the Adaptation Plan, the Scottish Government is developing the first National **Flood Resilience Strategy for Scotland**:

- The National Flood Resilience Strategy will form an integral part of shaping a climate resilient Scotland. Through transformational change, we will manage flooding from all sources through a collaborative, whole catchment, place-based approach, including working with nature to reduce flood impacts where appropriate
- This strategy will be followed by delivery plans to translate our ambition into actions as we prepare Scotland for increased risk of flooding.

To support community flood resilience (i.e**.** ability to respond and recover from flooding), the **Scottish Government** will:

- Invest in flood forecasting and warning services including for coastal flooding;
- Continue to develop polices around property flood resilience through the Property Flood Resilience Development Group;
- Engage with FloodRe to ensure that flood insurance remains affordable for those at risk of flooding; and
- Continue to support the Scottish Flood Forum, an independent charity that provides immediate support in the event of flooding and facilitates a network of community resilience groups in areas at risk of flooding, to enable communities to help themselves.

To increase flood resilience across Scotland, **SEPA in partnership with the Met Office** will continue to deliver and improve the **Scottish Flood Forecasting and Warning Service**.

- The Flood Guidance Statement, a five-day outlook of where flooding is likely to occur provided to emergency responders.
- The Scottish Flood Forecast, a three-day outlook of where flooding is likely to occur launched in February 2023 providing communities with the earliest possible indication of when and where flooding is expected.
- Floodline, a messaging service that everyone can sign up to, that provides live flooding information through:
    - Regional flood alerts that cover the whole of Scotland and provide between 2 hours and 2 days' notice of when flooding is possible,
    - Local flood warnings available in local areas for river or coastal flooding, where this is monitored, and provide between 3-6 hours' notice that flooding is expected.
- SEPA's planned actions are outlined in the Flood Warning Development Framework 2022-28 (sepa.org.uk)
- SEPA will launch a Future Flood and Incident Messaging Service (FIMMS) in 2024 to expand messaging channels beyond text messaging, include email and X (formally twitter) and improve how alerts and warnings are issued.
- SEPA is investigating options for a long-term approach to surface water flood forecasting.

- SEPA is investigating potential improvements to 10 established schemes and where appropriate will make improvements by 2028.

Resilience (Wildfires)

Most wildfires experienced in Scotland occur during the Spring, with a second smaller peak in late Summer. Over the past ten years the SFRS has handled, on average, approximately 180 outdoor fires each year classed as grassland/woodland/crops fires. Many resulted in significant damage to agriculture, forestry, biodiversity, recreational and sporting interests, threatening infrastructure, property, and life.

While the increase in the number of wildfires over the last 10 years has been small, fires have lasted for longer and exhibited more challenging fire behaviours. Conditions are projected to be warmer and wetter overall, although periods of water scarcity are also anticipated as a result of our changing climate. This combination of extremes will result in longer growing periods for vegetation, which in turn means more fuel for wildfires to consume, and water scarcity will make the fuel drier and more likely to catch on fire from any ignition source, increasing the wildfire risk, with the lack of water making the fires more challenging to put out. Wildfires on peat soils that have unmanaged vegetation above the surface can also lead to large amounts of carbon being released into the atmosphere, contributing further to climate change.

To reduce the risk of **wildfires** across Scotland, and provide an effective response to wildfire incidents the **Scottish Fire and Rescue Service** will:

- Support the Scottish Wildfire Forum in its objectives to provide information and education on the wildfire risk in Scotland to all audiences. The Scottish Wildfire Forum in conjunction with the SFRS and other agencies release fire danger information and maps when conditions are “very high” or “extreme”;
- Support the ongoing promotion of training for anyone who uses fire as a land management tool;
- Participate in a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible;
- As part of wider contingency planning over catastrophic loss of forest areas, seek to strengthen assessment of fire risk linking it to long term forest plans for individual forest areas.
- Seek to support a review of the Scottish Outdoor Access Code to strengthen and clarify the information it contains on when and where fires, portable barbecues, and stoves can be used;
- Work to further develop a partnership approach with the land management sector to respond safely and effectively to wildfire incidents;
- Identify the most efficient and cost-effective use of aerial assets, both publicly and privately funded, to maximise the utility of these tools; and
- Continue to provide good quality information to empower property owners to protect their properties from wildfires.

Legislative proposals to ensure grouse moors are managed sustainably and extend licencing for muirburn are covered under Outcome One.

Objective: New and existing Buildings (C4)

New buildings are designed for a future climate, and opportunities for adaptation in existing buildings are taken during maintenance or retrofit.

Climate-resilient places need buildings that are adaptable to our changing climate. Buildings constructed today need to be designed for the future climate. Many of Scotland's existing buildings and wider built environment (such as streets and other urban spaces) will need to be adapted to projected increases in heavy rainfall and temperature.

New Buildings

To ensure new and converted buildings are designed to be adaptable to future climate:

- Scottish **building regulations** now include measures to address overheating in new homes and some other new residential buildings. New residential buildings must be designed and constructed in such a way that the risk to the health of the occupants from overheating is reduced, with developers asked to consider two of the key elements of design which can contribute to or mitigate overheating risk – management of excessive solar gain through glazing and the provision of ventilation to assist in cooling (Standard 3.28 Overheating risk). The Scottish Government will consider reviewing this standard when a suitable sample size of new dwellings have been built to allow sufficient monitoring to take place.
- The Building Standards Division currently have a working group reviewing and considering the guidance within Section 3.3 (Flooding and groundwater) of the Building Standards Technical Handbooks. A particular focus is on property flood resilience (PFR) for new buildings and new building work. Any updated guidance will be applicable to all future new buildings at flood risk, where planning permission has first been approved.
- The Scottish Government is involved in UK work to update climate data which informs resources such as wind-driven rain maps and to understand how this may provide a more informed approach to future building specification.
- An ongoing topic for investigation is a greater understanding of the extent that British and European standards, which are cited in building regulations, consider future climate scenarios in the setting of relevant provisions and how this can be made more commonplace.

Where buildings are built, and how the land around is used and managed, also determine a building's vulnerability to climate change impacts.

- Scotland's land use planning system aims to ensure our places are more resilient to climate change impacts (see Nature connects outcome). In preparing their Local Development Plans, planning authorities must take into account the National Planning Framework 4 which supports adaptation to the current and future impacts of climate change, setting out the framework for taking into account climate risks, guiding development away from vulnerable areas, and enabling places to adapt to those risks.
- NPF4 Policy 2 supports development proposals that are sited and designed to adapt to current and future risks from climate change.

Existing and Traditional Buildings

When an existing building is being maintained, improved or changed there is an important opportunity to consider ways to adapt to climate change. But not everyone has the capacity or opportunity to adapt their homes.

- Development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change will be supported, via the **National Planning Framework 4** (Policy 2).

To build household flood resilience, and as part of the **Living with Flooding action plan**:

- Scottish Government will continue to raise awareness of the benefits of **property flood resilience** and encourage property owners, the construction and insurance industries, and the public to implement property flood resilience measures.
- **Scottish Flood Forum** offers advice and information to individuals to help them protect their homes from flooding or to recover from flooding.
- **Flood Re** makes affordable flood insurance available to flood-prone households and businesses.

Around 20% of Scotland's homes can be dated to pre-1919 and are of traditional construction. Well-maintained and retrofitted traditional buildings are more resilient and emit less carbon helping deliver net zero targets and contributing to the resilience of the historic environment and supporting Scotland's adaptation journey.

Historic Environment Scotland (HES) advocates building maintenance as the first line of defence in a changing climate; buildings that are wind and water-tight, with well-maintained roofs, rainwater goods, windows and ventilation systems are best equipped to respond to a shift to anticipated climatic changes. Traditional buildings have an inherent capacity to moderate extreme temperatures with passive qualities that were designed to maximise natural light and ventilation. Retrofit measures can be used to improve the energy efficiency of traditional buildings, thus lowering carbon emissions, and adapt them to the changing climate whilst creating healthy indoor environments. Traditional buildings play a part in supporting the innovative solutions and technologies that will be required to deliver adaptation. In support of this, HES undertakes research on:

- The importance of good practice in repair and maintenance to ensure traditional buildings are able to adapt to a changing climate;
- The use of traditional materials as a tool for adapting the traditionally constructed built environment, e.g. use of lime coatings and renders;
- Appropriate energy efficiency and low emission heating retrofit in traditional buildings, to minimise maladaptation and loss of historic fabric through inappropriate application of measures designed for buildings of more recent construction;
- The measurable benefits of reusing, adapting and upgrading traditional buildings with appropriate materials and techniques to make them more energy efficient and ready for the changing climate (in preference to demolition and new construction);
- Change of behaviour and decay tipping points of traditional building materials due to the impact of climate change;
- Risk and vulnerability assessment for HES Properties in Care;

- Management of access to Heritage Assets due to combination of increase of tourism and the effect of climate change; and
- Developing our understanding of the impacts of climate change on earth and turf mortars, buildings and monuments including archaeological remains, and the opportunities these materials present.

To support **owners of traditional buildings and other heritage assets**, HES will disseminate advice and guidance including:

- Free, accessible advice delivered via the Historic Environment Scotland technical advice service;
- A refreshed Historic Environment Scotland Guide to Climate Change Adaptation;
- Refurbishment Case Studies covering retrofit and adaptation projects, to avoid maladaptation and encourage best practice;
- An updated Guide to Energy Retrofit, ensuring the resilience of traditional buildings and minimising maladaptation;
- Talks and learning events for the public, including homeowners; and
- Tools to inform decision-making on building conservation, e.g. Building Stone Database for Scotland.

To support climate resilience in the public sector estate:

- the **Scottish Government's Green Public Sector Estate Decarbonisation Scheme** supports energy efficiency including support for cooling systems. The application for funding under the Scottish Central Government Energy Efficiency Grant Scheme will be updated to include a requirement for overheating risk to be assessed for heat decarbonisation projects in residential buildings.

Objective: Culture and Historic Environment (C5)

Scotland's historic environment is preparing for a future climate, and the transformational power of culture, heritage and creativity supports Scotland's adaptation journey.

The historic environment is part of our everyday lives. It provides character to our landscapes, strengthens and enhances our local communities, and helps to forge a sense of place.

The historic environment is a physical thing; whether that's a building, monument, site, or landscape; above or underground, or underwater. It can be culturally significant, and integral to our understanding of the past and the people whose lives came before ours; or perform a more functional role through providing a home, workplace, public park, farmland, or hospital. The historic environment can create spaces for recreation, leisure, tourism, education, and places for nature to thrive. And while the historic environment is a physical thing, it's shaped by things we cannot touch or see: by stories, traditions, and concepts that help to give the physical traces of the past their meaning, significance, and value.

At its heart, therefore, the historic environment is about people, and about our collective past, present, and future. It's about our connections with each other and with our places and planet; about the legacies we inherit and those we leave behind. This culture is part of

'our way of life', the way we 'be', incorporating our language, politics and values as well as the arts and humanities.

In a wider sense, it is through culture that we consciously or unconsciously express the world as we see it. Shared cultural experiences foster inclusivity, creativity, and understanding, which can help individuals and communities to grow and to imagine alternative futures. Culture can therefore play a key role in helping the public visualise the potential impacts of climate change, challenge our beliefs, and shift ways of seeing and thinking about the world and the way we live.

Scotland's rich culture sector - from artists, creative practitioners, producers, and businesses as well as local and national cultural organisations - deal in the values that are intrinsic to transformational change. All these contributors can speak to and engage a wide range of people, using their cultural assets, programming, and content and by changing their own behaviours and practices, to influence public opinion and enable subsequent behavioural change across society.

This objective aims to address the threats from climate change to Scotland's historic environment, and realise the power of culture and creativity to support the transformations and transitions in society needed to live well in a different climate.

Historic Environment

Our historic environment is on the front line of climate change, and Scotland is a global leader in heritage-related responses.

Our Past, Our Future (OPOF) is a 5-year collaborative strategy for Scotland's historic environment that commits to making the historic environment more climate resilient. Resilience covers more than just the protection we provide to our physical heritage. It means having the right skills and materials to work with, and it means having the right knowledge to realise benefits sustainably and so that people can make informed decisions about the future of the assets they care for.

OPOF outcome 2 that '*The historic environment is more climate resilient*' means that we have the right skills, materials, expertise, and data available. This outcome is supported by others on the need for skills, diversity, inclusivity, and communities to have a say in what happens to our historic environment, as well as the sector's contribution to Scotland's economy, operating within environmental limits, and enabling current and future generations to live well.

Relevant actions include:

- Ensure heritage grant programmes can fund adaptation measures;
- Promote a fabric-first approach to energy-efficiency measures;
- Provide advice, support, and guidance to people who are looking to reduce the emissions of historic buildings, or who are looking to prepare and respond to the changing climate; and
- Revise and expand the Skills Investment Plan for Scotland's historic environment to identify the opportunities and actions needed to create a sustainable skills ecosystem, and to improve the delivery of heritage skills training.

Historic Environment Scotland (HES) is the lead public body set up to investigate, care for and promote Scotland's historic environment. Ensuring Scotland's historic environment is prepared for a future climate is a priority for HES and the wider historic environment sector. To work towards making the organisation and wider sector more prepared for and resilient to changes in our climate, HES will continue to implement its **current Climate Action Plan (CAP)** and other relevant work to:

- increase resilience by mainstreaming climate change risk assessment into policy and operations.
- deliver innovative and exemplary practice in climate change adaptation and be internationally recognised as doing so.
- support emissions reduction, minimise environmental impact, and promote sustainability via adaptation solutions.
- continue to promote maintenance and repair as the first line of defence in combating the impacts of climate change, and underpinning sustainable asset management.
- drive change in the wider historic environment by building climate change actions into our grant schemes.
- provide leadership on how to manage the loss of heritage assets in a way that ensures most benefit whilst accepting the inevitable consequences of climate change impacts.

Climate resilience across Scotland's historic environment is supported by **Historic Environment Scotland and the whole heritage sector** by:

- Ensuring that the sector's knowledge, expertise and experience will support the transformational change that will be necessary if the historic environment sector – and our society as a whole – is to adapt to and mitigate the causes of climate change.
- Promoting Historic Environment Policy for Scotland (HEPS) as a policy statement for decision making for the whole of the historic environment for use at all levels from national to local. All of the policies and principles in HEPS are likely to be relevant to climate change adaptation measures depending on context, with HEP2 and HEP5 highlighting the importance of sustainable decision making.
- Continuing to work with SCAPE (Scotland's Coastal Archaeology and the Problem of Erosion) on the completion of coastal zone assessment surveys, working with coastal communities around Scotland to identify and record threatened archaeological heritage and to build local networks with an active interest in their cultural heritage
- Developing a 'Your Historic Place' lens as a resource to support the use of the Place Standard Tool. It aims to support conversations exploring the connections between people, place, and our historic environment. It will help people to think about their area's buildings, places, and spaces – how its history has shaped the place it is today and can help it to become a successful place for the future. The prompts within the lens will help to draw out connections between the historic environment, climate resilience, and adaptation.
- Rolling out the Climate Vulnerability Index to all Scottish World Heritage Sites.
- Publishing a Historic Environment Skills Investment Plan, which includes skills to repair, maintain, and adapt traditional buildings.

- Updating the HES Climate Action Plan in 2025.

HES' Grants Framework's Grant Priority 4 (of 6) is *Use the historic environment as a catalyst for climate action*. This priority sets out how funded projects can support climate resilience by repairing the effects of climate change on the historic environment, protecting it for the future, and supporting low-carbon interventions to make the historic environment operate more effectively. HES grants provide financial support for the following:

- Repair works for owners of historic buildings or sites to reinstate damage caused by climate change, for example through stonework erosion, flood damage or the impact of sustained changes in weather patterns.
- Upgrading of historic fabric to cope with climate change, for example through increasing the size of rainwater goods, choosing more weather-resistant reed for thatching, heavier gauge lead sheeting.
- Increasing the energy efficiency of historic buildings through the reinstatement or retrofitting of sympathetic energy efficiency measures
- In Stirling, the Traditional Buildings Health Check provides high-quality maintenance and repair advice and financial support to owners of traditional buildings. This is creating a culture of ongoing maintenance and repair that will, over time, reduce the need for large-scale replacement construction works that are more carbon-intensive.
- Conservation Area Regeneration Scheme / Heritage and Place Programme is a key national driver for knowledge dissemination through outreach and training for both homeowners and crafts/professionals, as well as funding repair projects which can include climate adaptation.

Culture

To help build climate resilience of the culture sector and harness the transformational power of culture and creativity to support Scotland's climate adaptation journey, the **Scottish Government** will underline our ongoing commitment in the forthcoming Culture Strategy Action Plan Refresh to advocate for, and make best use of, opportunities to utilise culture's potential to support delivery on climate change priorities, including adaptation. We will do this by:

- Continuing to support and promote the activity of our funded bodies and the wider culture sector to understand the impact of climate change, protect vulnerable collections and archives, and effect positive change in communities across Scotland.
- Continuing to engage with, learn from, and promote the work of the Scottish National Culture for Climate (SNaCC) group, an informal collaborative partnership of national cultural institutions, funders and organisations who, through their individual and collective assets, activities and networks, play a key role in influencing society about climate change mitigation, adaptation. and resilience.

Creative Scotland recognises the powerful role of culture and creativity as agents for change and for influencing society. Creative Scotland will continue to use our work to influence and increase public engagement with climate change by encouraging and empowering the arts, screen, and creative industries in Scotland to become a positive force in the fair and equitable transformation of Scottish Society toward a zero carbon, climate ready nation by:

- Including Environmental Sustainability Funding Criteria within our funding framework.
- Continue to develop adaptation capabilities using the Adaptation Capability Framework.
- Include climate risk within our organisational risk register.
- Collect Environmental Sustainability data from our Regularly Funded/Multi Year Organisations and include the aggregated data within our Public Bodies Climate Change Duties Report.
- Report annually on the progress of our Climate Emergency and Sustainability Plan.
- Contribute to Scottish Government climate mitigation, adaptation, and behaviour change policy development.

To build on work towards making our collections and archives more prepared for and resilient to changes in our climate, our **National Collections** will continue to implement actions and approaches set out in:

- The National Library of Scotland 2023 Climate Action Plan, including development of a Climate Change Adaptation Plan and a Carbon Literacy for Libraries Toolkit.
- The National Galleries of Scotland Environmental Sustainability Report, including: incorporation of adaptation practices into Climate Literacy training for staff; embedding environmental and climate resilience priorities into new developments across NGS sites and; identification of opportunities for nature-based adaptation solutions to help reduce impacts of climate change and improve biodiversity on NGS sites.
- The National Museums Scotland Climate Adaptation Plan, including utilisation of Climate Change Impact Assessments to ensure climate adaptation is considered from the early stages of NMS project design.

Museums Galleries Scotland will:

- Build resilience across the sector through development of a climate network to facilitate sharing of best practice, resources and expertise.

Case Study: Scottish National Culture for Climate group (SNaCC) produced a powerful short film for COP26 in order to highlight the power of culture to change the narrative and urge climate change professionals to work with culture.

Outcome Three: **Public Services and Infrastructure (PS)**

Public services are collaborating in effective, inclusive adaptation action.

Collaboration is essential for a just transition to a climate resilient Scotland. There is no single blueprint for effective climate adaptation partnerships and collaborations; but we know that collaboration on shared outcomes is vital to tackle complex challenges in a way that is equitable, inclusive and builds on the strengths of a place.

The public sector is playing a crucial role in delivering action to enable Scotland to adapt to the impacts of climate change. Adaptation needs to be aligned with a public sector organisation's strategic outcomes and priorities; and with those it contributes to locally. By doing this, adaptation becomes integral to the functions of an organisation and its ability to achieve outcomes. It can also be more efficient, with cost savings made possible when adaptation is delivered as part of business-as-usual rather than an additional activity.

Adaptation is a legal imperative for the public sector and is supported by legislative and policy drivers. The Climate Change (Scotland) Act 2009 requires the Scottish Government to implement a statutory Adaptation Plan. The Public Bodies Climate Change Duties contained within the Act require public sector organisations to act in the way best calculated to implement the Adaptation Plan and report progress annually.

Objective: Public Service providers (PS1)

Providers of public services have the governance, culture, skills and resources and are collaborating in effective, inclusive adaptation action.

Effective leadership, governance arrangements, inclusive planning approaches and working beyond organisation and sectoral silos are of equal importance for successful adaptation.

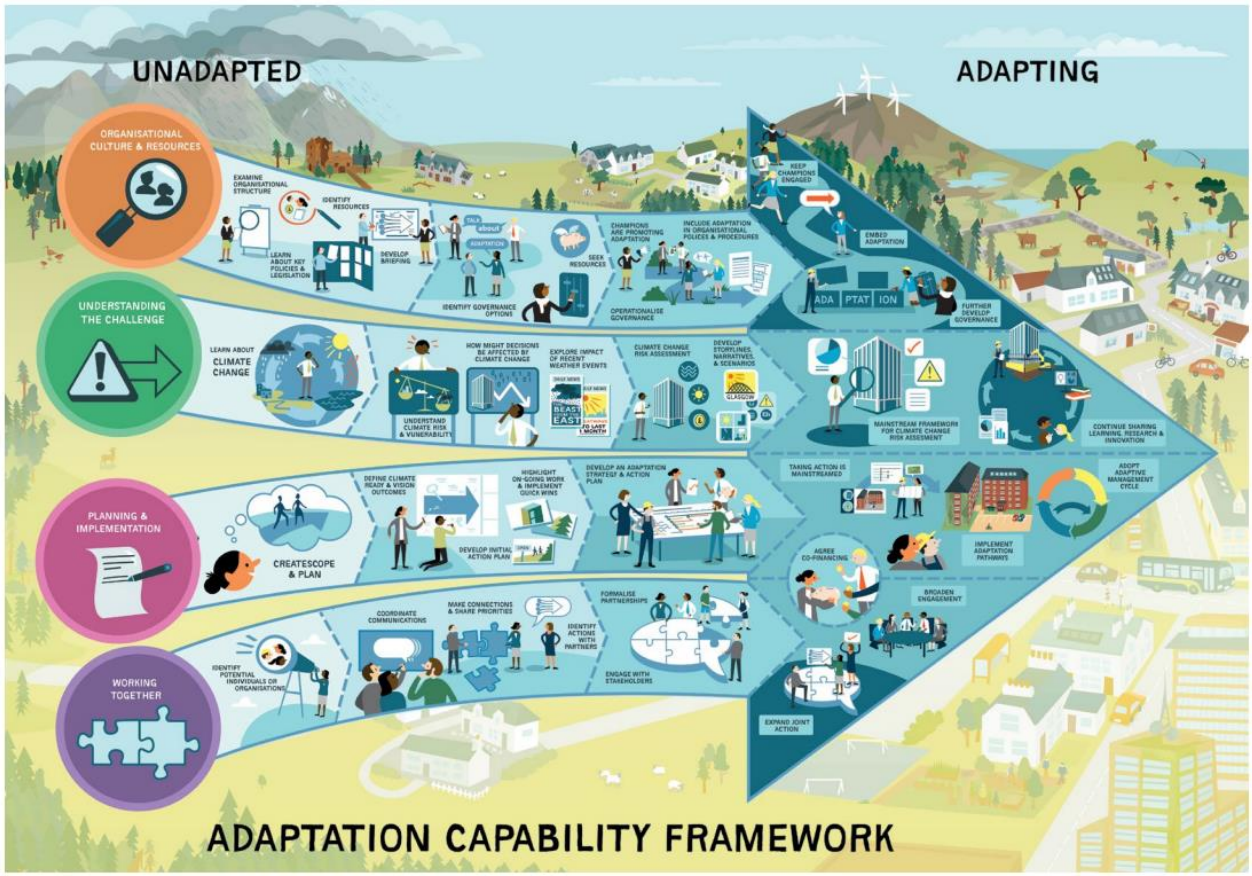
The **Public Bodies Climate Change Duties (PBCCD)** contained within the 2009 Act require public sector organisations to act in the way best calculated to help deliver the statutory Adaptation Programme and to report progress annually.

- **Scottish Government** will work across the public sector to develop and publish **updated statutory guidance** on public bodies climate change duties by March 2025. This will provide guidance on the corporate adaptation actions all public bodies should undertake, to support the public sector in reaching a baseline standard and to support more advanced collaborative action. Case studies will share best practice from across the public sector.
- **All relevant public bodies** will continue to **report annually** on PBCCD, including adaptation action and contributions (where relevant) to delivery of this Adaptation Programme. Annual returns are publicly available.
- **Scottish Government** will increase the use of the **analysis** of PBCCD returns, including in the Adaptation Plan's monitoring framework, in order to continue to share best practice and drive accountability.

In tandem with the legislative drivers of adaptation action, the Scottish Government will continue to support action, collaboration and leadership from across the public sector on effective and inclusive adaptation action. The Scottish Government-funded **Adaptation Scotland** programme, via its public sector leadership cluster, will:

- continue to support public sector organisations to use the **Adaptation Capability Framework (ACF)**. In collaboration with public bodies, develop further resources as part of an updated ACF by 2025 to support **advanced adaptation capabilities**.
- build and strengthen adaptation practitioner networks to share learning and best practice via its **Public Sector Climate Adaptation Network** [formerly benchmarking group]. The group will expand to include up to 60 member organisations by March 2025 and will continue to prioritise major players.

Highlight: Adaptation Capability Framework



A screenshot of the Adaptation Capability Framework for public bodies, which is available in full at https://www.adaptationscotland.org.uk/how-adapt/your-sector/public-sector

Source: Adaptation Scotland :: Public sector

Objective: Accessing Public Services (PS2)

People can access the public services they need - including health, education, social care and infrastructure - by designing, managing and maintaining services, estates and assets to be resilient and equitable in the changing climate.

Actions to deliver this objective are focused on embedding climate adaptation into public service design and operational resilience. Disruptions to public services - such as health or education – will have a greater negative effect on people with vulnerabilities, for example children, older people, people with pre-existing medical problems, or people living on a low income. The impact of climate change risks making existing inequalities wider; but our responses to climate change can protect and improve population health, wellbeing, and reduce inequalities.

This section covers adaptation policies in some key public services, but adaptation action and collaboration is needed across sectors. This will be supported by new statutory guidance for all relevant public bodies in 2025.

Essential Services and Critical Infrastructure in Scotland

Critical infrastructure networks underpin the essential services needed daily by the people of Scotland. While many aspects of our critical infrastructure networks are reserved, an impact in one network can cascade and affect others. To continue to enhance the safeguarding of **Critical Infrastructure in Scotland,** the **Scottish Government** will:

- Continue to cooperate and collaborate with Regional and Local Resilient Partnerships, the Responder Community, Industry, the UK Government and other Devolved Nations.
- work collaboratively with industry to implement the Strategic Framework for Resilient Essential Services - Keeping Scotland Running (KSR). This provides the owners/operators of critical infrastructure and essential services in Scotland with guidance on addressing key risks, including 'Building Resilience to Natural Hazards' and 'Building Resilience to a Changing Climate (Adaptation)'.
- Support the resilience of all public services via the actions set out in PS1.

NHS and Social Care

NHS Scotland is made up of 22 Health Boards – 14 regional health boards, responsible for the protection and the improvement of their populations' health and for the delivery of frontline services, and 8 national health boards including the Public Health Scotland, Scottish Ambulance Service, the Golden Jubilee National Hospital and the State Hospital.

To build climate resilience, **each Health Board** will:

- Continue completing Climate Change Risk Assessments covering all areas of service, ensuring integration with other strategies (including Property and Asset Management Strategy (PAMS)), risk assessments and business continuity plans staff, patients, visitors and contractors.
- Prepare and implement climate change adaptation plans to ensure resilience of service under changing climate conditions.
- Work towards the requirements of ISO 14090: Adaptation to climate change.
- Prioritise passive cooling measures over mechanical cooling wherever possible.
- Establish a programme of monitoring to capture data that will enable a robust assessment of the nature and severity of overheating at in-patient facilities. This will increase understanding of overheating and therefore improve the responses to it.
- Develop and manage greenspace and other green infrastructure such as green roofs and rain gardens to mitigate flood and overheating risks.
- Raise awareness of the potential for overheating, flooding and actions that can be taken by staff, patients, visitors and contractors.
- Assess the risk of flooding for all sites, key transport and access routes, supporting infrastructure and workforce based on current and future projected climate conditions. Enable Health Boards to plan for the various conditions that will be caused by climate change.
- Incorporate water saving measures wherever possible. This will ensure Health Boards are able to cope with any periods of water scarcity, which are likely to become more prevalent in the future.

NHS National Services Scotland provides national solutions to NHS Boards and others to improve the health and wellbeing of the people of Scotland. To build climate resilience across Scotland's health service, **NHS National Services Scotland** will:

- Actively engage national partner organisations to understand the impact of Climate Change across Scotland, the risks to different population groups and opportunities to increase the resilience of our healthcare assets and services and minimise the impact of climate change in our healthcare system.
- Host national sources of data and information which can inform the development of NHS Boards' emergency planning procedures within resilience planning for flooding, major outbreaks of disease and other climate-related risks that are more likely to occur.
- Assess NHS Boards' status against the requirements of ISO 14090: Adaptation to Climate Change.
- Continue to implement Organisational Standards for Resilience. This sets out a standard for Health Boards to identify and ensure preparedness for worsening climate change impacts.
- Continue implementing its web-based Geographic Information System (GIS) Climate Change hazard and vulnerability Mapping Tool. This enables Health Boards to assess risks to sites, key transport and access routes, and supporting infrastructure based on current and projected future climate conditions.

Local Authorities are responsible for delivering **social work and social care services** and play a critical role in responding to the climate emergency. The Scottish Government recognises the need to work with local government to support the social care sector – whether in house or commissioned services - to play its part in tackling climate change as well as on climate change adaptation. Going forward, the introduction of the National Care Service will provide further opportunities to build climate change considerations into the way that social care services are planned, commissioned and delivered.

- Public Health Scotland will work with Scottish Government and COSLA to understand how they can support the social care sector to respond to the climate emergency.
- All registered care services are regulated by the Care Inspectorate in Scotland. The Care Inspectorate is a scrutiny body which supports improvement. To ensure social care services are designed and delivered with resilience to more extreme weather, the Care Inspectorate will share guidance with providers through our information channels.

Education

Scottish Government and Local Authorities will, through the **Learning Estate Investment Programme** (LEIP), continue to build the resilience of school estates. The adaptation of school grounds can reduce heat, cold and wind stress, can create a richer and more resilient biodiversity and landscape, can help manage extremes of drought and flood, improve air quality, reduce energy use, lead to improved health and wellbeing, and encourage community engagement:

- The LEIP supports this approach through engagement with a wide range of stakeholders in the **Learning for Sustainability** network, and facilitates workshops to explore the challenges and opportunities provided by school outdoor environments.

- The requirements of LEIP include criteria for indoor temperature and air quality, including overheating assessments at design stage. These are key parameters to ensure that healthy learning and teaching environments support the wellbeing of all building users. Individual projects are required to be approved by Local Authority Flood Officers with input from SEPA.
- Improving access to outdoor spaces through the provision of covered areas in future projects will further support user wellbeing and their readiness to teach and learn.

Design advice for school estates will be developed by **Architecture & Design Scotland** and **Learning through Landscapes** through the Climate Ready School Grounds project. This is a collaborative approach to designing and creating spaces to reduce Scotland's environmental impact and adapt to the changing climate. It seeks to provide guidance and examples of how to create new spaces, or adapt existing spaces, and to tackle the impacts of the climate emergency (and local climate risks) within the school estate.

The Scottish Funding Council (SFC) is Scotland's national strategic public funding body for tertiary education and research. The SFC's Net Zero Framework sets out how it will support Scotland's colleges and universities as global leaders in accelerating the climate emergency response and Scotland's just transition. This should lead to reduced emissions, system change, and long-term climate resilience.

- In 2023-2024 SFC integrated the first climate measures in its main Outcome Agreement with the tertiary sector which encourages institutions to disclose a summary of their overall climate emergency response.
- SFC is a core sponsor of EAUC Scotland. As part of our Outcome Agreement with EAUC in 2023-2024 they have produced a Climate Risk Register Tool and guidance to help the sector to continuously improve.
- Adaptation is being considered under plans to progress Scotland's College Infrastructure Strategy.

Case Study: Research and Innovation

Research and innovation driven by Scotland's further and higher education institutions is supporting the transition to a more adapted and resilient Scotland across all sectors. Examples include, Scotland's Innovation Centres including BE-ST which is accelerating transition to a zero carbon built environment, SRUC's work on food security, understanding natural capital, or vertical farming. SFC is sponsoring Alliances for Research Challenges including food and energy sustainability challenges. The GALLANT project in Glasgow takes a whole-systems approach to the transition including nature adaptation and community adaptation (including health co-benefits).

Objective: Power Assets and the Energy System (PS3)

Power assets and the energy system have reduced vulnerability to the impacts of climate change, and the most vulnerable people are identified and supported during and after instances of power failure.

Scotland's transition to net zero will see a low carbon energy system displacing fossil fuel power. Over the same time, increased climate hazards such as flooding, water shortages,

sea level rise and potential increases in storms, swells and wave heights will disrupt different parts of the energy system.

Our increased reliance on the electricity system for example means that building network and community resilience to electricity system failures is increasingly important. This is especially so for vulnerable households and essential services.

However, security of energy supply is a reserved policy. For example, electricity network resilience requirements are set out in industry codes, standards and in licences. Responsibility for all of which sits with the UK Government, the GB regulator Ofgem and the National Grid Electricity System Operator.

Actions to deliver this objective focus on the role of the Scottish Government within devolved competencies, recognising that the impact of a failure in the energy system is likely to rapidly cascade and directly affect people's wellbeing and the economy.

The **Scottish Government** will:

- Engage with the UK Government through their Review of Electricity Market Arrangements to better design markets and incentives which support the deployment of energy storage assets, maximising renewable assets and reducing the need for generation from unabated fossil fuels to better support a resilient network, as we progress to net zero.
- Update our Energy Strategy and Just Transition Plan to present our vision of storage's role in the energy system to better encourage investors, developers and asset operators.
- Engage with UKG counterparts with a view to securing appropriate SG representation on governance bodies set up to implement the recommendations of the independent electricity network commissioner Nick Winser for accelerating electricity transmission network deployment.

Scottish Government and **local authorities** will roll out the **Persons at Risk Distribution (PARD) system** across Scotland, which helps local authorities and the NHS to identify vulnerable individuals during an emergency, such as an extreme weather event. This is part of the Winter Preparedness Programme which aims to improve public communications and provide welfare checks as part of a wide range of 'care for people' in the event of a power outage caused by a major storm event.

The **Scottish Environment Protection Agency** (SEPA) is a statutory planning consultee and regulates some aspects of the energy infrastructure in Scotland. SEPA's role is to advise, influence, regulate and monitor the effects of electricity, heat and fuel generation, transmission and consumption on the environment, human health and the economy, as outlined in SEPA's Energy Framework.

To assist operators of major accident hazard sites to adapt to climate change, SEPA has several actions planned:

- The GB COMAH Regulations 2015 require operators to include Natural Hazards Triggering Technological Accidents (NaTech) causes for potential Major Accidents.
- In early 2022, SEPA undertook a pilot assessment with 4 operators in Grangemouth on the effectiveness of ISO 14090 (Adaptation to Climate Change – Principles,

Requirements, and Guidance) as an aid to businesses (suitably focused, flexible and proportionate to the risks). The ISO standard forms the basis of guidance being developed by a regulators and industry group (CDOIF, Chemical and Downstream Oil Industries Forum) due to be published by 2024.

- SEPA will develop further guidance in partnership with Sniffer, aimed at the SME sector. An e-learning training package made available to public and private sectors.
- SEPA is currently collecting information from every Control of Major Accident Hazards (COMAH) site in Scotland (about 200 sites) to understand the risk assessments and development of adaptation plans that each operator has undertaken. This will give a snapshot of the identified risks and current preparedness for the most hazardous sites, and enable SEPA to focus regulatory activity on those sites with highest risk or inadequate plans.

Objective: Transport system (PS4)

The transport system is prepared for current and future impacts of climate change and is safe for all users, reliable for everyday journeys and resilient to weather-related disruption.

Scotland's transport infrastructure and networks are fundamental to our nation's communities, businesses and visitors. They offer critical connections between people and places, and are vital in providing access to essential services, such as healthcare. Transport also enables us to access the building blocks of health and wellbeing including education, employment, services, social contact and resources – the things we need in our lives to give us the best chance of being healthy.

The importance of our transport systems cannot be overstated, particularly as they are susceptible to variations in Scotland's weather systems.

Our road, rail, maritime and aviation transport networks are all facing unprecedented vulnerability to the weather-related impacts of climate change, which can contribute to the deterioration of assets, disruption to networks, and potentially hazardous incidents that may cause fatalities or serious injuries. These impacts have serious knock-on consequences across sectors, places and wider infrastructure systems that depend on transport infrastructure for their normal functioning.

By increasing the climate resilience and ability of transport infrastructure to adapt to climate change, we will have a significant influence on Scotland's overall ability to increase resilience and adapt.

Transport Scotland has an ambitious vision for a well-adapted transport system in Scotland which is safe, reliable and resilient in relation to the current and future impacts of climate change. This is set out in its 2023 Approach to Climate Change Adaptation & Resilience (ACCAR) which includes actions for trunk road, rail, aviation and maritime networks. **Transport Scotland** will:

- Embed adaptation and resilience across the Transport Scotland functions through its 2023 Approach to Climate Change Adaptation and Resilience, an internal governance structure for the ACCAR and an appropriate leadership board.

- Continue to share knowledge on climate change adaptation and resilience with transport peers and across sectors at a local, national and international scale.
- Build the resilience and availability of active travel routes associated with the transport networks noted below, for example those adjacent to roads and canals and on shared pathways.

Trunk Roads

Policies and actions in this section aim to deliver the ACCAR outcome: "Trunk roads which are well adapted and resilient to the current, projected and unexpected impacts of climate change."

Transport Scotland will:

- Develop and publish a **Trunk Roads Adaptation Plan** by 2025, based on the most up to date climate change projections (UKCP18) and climate vulnerability and risk assessments building on previous studies undertaken.
- Continue to collaborate with Trunk Road Operating Companies to build network resilience to extreme weather and other climate risks, strengthening contract requirements, where appropriate and building on the work of our Vulnerable Locations Groups.
- Develop a Biodiversity Strategy for the agency by 2025, which will consider how improving biodiversity can support adaptation and resilience on Trunk Roads (e.g. slope stabilisation).

Trunk Road Operating Companies will:

- Continue to manage disruption risk using Transport Scotland's internal Manual for the Management of the Risk of Unplanned Network Disruption provides requirements for Operating Companies (OCs), including the preparation and administration of a Disruption Risk Management Plan (DRMP).
- Regularly review and update high wind, flood and landslide management plans, signed off by Transport Scotland.
- Continue to engage and collaborate with Transport Scotland on Trunk Road adaptation and resilience, delivering schemes that address issues at vulnerable locations and developing innovative solutions.

Rail Network

Policies and actions in this section aim to deliver the ACCAR outcome: "Supporting the delivery of climate change adaptation and resilience for Scotland's Rail network"

Scottish Government will:

- Ensure the High Level Output Specification for Control Period 7 contains up-to-date requirements relating to climate change, including adaptation and resilience.
- Engage with our rail stakeholders and support the development of future specifications and policies that deliver adaptation and improve resilience on Scotland's rail network.

Scotland's railway infrastructure is managed by **Network Rail**, including the delivery of major infrastructure projects and general maintenance. In collaboration with **ScotRail**, both

organisations have developed a joint Climate Ready Plan for Scotland's Railway covering the period 2024 to 2029. This plan has four key intended outcomes:

- The decisions they make are based on a maturing understanding of weather and climate data. This includes improvements to climate risk assessment processes and better integration of climate projection data into decision making processes.
- A long-term climate adaptation and resilience strategy increasingly guides investment. This includes development of adaptation pathways that set out an approach to dealing with climate-related risks at the most vulnerable locations.
- Their assets are made increasingly resilient to acute weather events, as well as longer-term, more chronic changes in climate. This includes delivery of a programme of asset interventions were enhanced weather and climate resilience is achieved.
- They are creating a culture of transparent and competent weather and climate resilience decision making. This includes development of training and routes to competence for staff, and that a robust risk and assurance process underpins decision making.

Detailed delivery plans underpinning these outcomes will be published in 2024.

In addition to the Climate Ready Plan, **Network Rail** will:

- Continue to deliver actions plans associated with recommendations made by the Weather Risk Taskforce - including improved earthworks failure reporting, increased site investigations and improved drainage strategy.

Aviation Network

Aviation is a reserved matter and Scotland's main airports are commercial businesses with their own governance arrangements. Actions in this section are focussed where we have most influence and aim to deliver the ACCAR outcome: *Engaging with aviation stakeholders to support their decision making in relation to climate change adaptation and resilience*.

Highlands and Islands Airports Limited (HIAL) manages and operates 11 regional airports on behalf of the Scottish Ministers. The airports serve some of Scotland's rural and island communities providing a lifeline service to individuals, communities and businesses across the Highlands and Islands. It is essential that HIAL ensures its operations, infrastructure and strategic functions are resilient to climate variability and change.

- In 2023 HIAL completed a Climate Change Adaptation Report and climate vulnerability and risk assessment of its operations, infrastructure, and strategic functions.
- The identified risks were incorporated into HIAL's existing risk management process to allow on-going management, furthermore specific climate risks will be reviewed every two years to ensure that risk scoring and mitigation remains accurate and appropriate.
- Based on this work, a range of actions are planned to monitor flood, coastal erosion and high temperature risk to ensure there is no significant disruption to services.

Maritime Network

Policies and actions in this section aim to deliver the ACCAR outcome: Contributing to safeguarding lifeline ferry services, ports, harbours and canals in response to the threat of climate change.

Transport Scotland maritime responsibility covers legislation, policy, guidance and services relating to **Scotland's ferries**, and will:

- promote awareness of climate science and collaborate on proactive adaptation and resilience interventions and opportunities.
- actively engage with ferry operators, providing information and guidance where appropriate, on services and infrastructure projects through a variety of working and advisory groups.

Lifeline Ferries – Vessels and Ports

Scottish Minister have responsibility for the provision of lifeline Ferry Service on the Clyde and Hebrides and Northern Isles Networks. This includes ownership of vessels and many of the ports that underpin those networks through its asset owning company (Caledonian Maritime Assets Limited – CMAL) as well as working with third party owners where port facilities are vital to delivering these services.

Ministers are committed to mitigating and adapting to the impact of climate change to ensure that ferry services remain resilient through a series of measures related to vessels and port infrastructure. This includes:

- Investment in remote weather monitoring equipment in both CMAL and Non-CMAL owned ports to enable better information to be available to vessel master's to inform decisions around committing to sailings.
- Taking account of sea conditions in relation to hull form and vessel power in relation to the provision of new tonnage for the fleets.
- Consideration of the impact of climate change in relation to the design of replacement or upgrading of port facilities on the lifeline network to ensure safe berthing and operations.

Scottish Minsters are preparing an Islands Connectivity Plan (ICP) that is also an opportunity to reinforce some of these principles

Canals

Climate change has the potential to have a significant impact on Scotland’s canal infrastructure, operations and the important wildlife habitats it supports. The more frequent instances of both flooding and drought in the last ten years have adversely impacted Scottish Canals’ operations and historic assets and will continue to do so without further intervention.

Scottish Canals’ (SC) response, as set out in its Corporate Plan 2023-28, is to deliver opportunities for its team and partners in tackling the impacts of climate change whilst improving canal asset health and protecting natural habitats, flora and fauna to secure biodiversity gain. The outcome of the plan will be a more resilient canal network which actively supports a just transition to a net zero and greener Scotland.

Canals for the future and Explore and Experience are two of the 4 priority themes of the Corporate Plan which set out Scottish Canals' response to mitigating and adapting to climate change risks.

- Investing in Scotland's heritage canal infrastructure to safeguard navigation is a core purpose. Scottish Canals will continue to embrace new research, technology, and innovation to improve water stewardship, support renewable energy production, and transform the network to respond to the global challenges of climate change and biodiversity loss.
- By maintaining and transforming Scotland's canals, Scottish Canals can deliver wide reaching value for Scotland. Scottish Canals will work to monitor, protect, maintain and improve the resilience of over 4,000 heritage canal assets whilst caring for locally and nationally important biodiversity.
- Scottish Canals 140 miles of canals require continuous and planned investment, inspection and management informed by an evidence-based Asset Management Strategy. This requires the cause and effects of climate change to be intrinsic to all corrective maintenance and capital investment decisions, designs and construction methods. This will drive down the carbon emissions that causes climate change and design in resilience of the asset to the effects of climate change. In many situations this will mean replacement of assets on a 'like-for-better' principle rather than 'like-for-like', creating a step change in new assets.
- In addition to maintaining and investing in canal assets, Scottish Canals will embrace new opportunities and partnerships and continue to prioritise water stewardship, renewable energy and adaptive technology in response to more extreme weather events and the impact of climate change.
- Scottish Canals will prioritise water stewardship at catchment level to manage navigation whilst safeguarding water resources.
- Scottish Canals will continue to operate the Glasgow Smart Canal, part of the Metropolitan Glasgow Strategic Drainage Partnership, which alleviates flooding in North Glasgow and unlocks the potential for brownfield development sites linked to the Forth & Clyde Canal via sustainable urban drainage systems. SC has set out in their Corporate Plan 2023-28 that they plan to develop Scotland's second Smart Canal by 2033.
- Scottish Canals will undertake a gap analysis of the physical and social impacts of climate change and begin projects to model and quantify the impact on water resources. By 2028 SC will have developed a Climate Change Resilience Strategy complementary to the Canal Stewardship Action Plan and identified opportunities and begun projects to support resilience work. By 2033 SC anticipate taking action to reach a leading position in terms of both resilience and in leveraging the resilience opportunities at community and regional levels.

Objective: Water, Sewerage and Drainage (PS5)

The management of water, sewerage and drainage services builds resilience to drought and flooding and protects water quality and quantity.

As the climate continues to shift, demand for water will continue to grow as the weather gets warmer and this will affect our crop management and food supply as well as putting pressure on our drinking water supply. More intense storms will increase the risk of flooding in people's homes, businesses and other essential services which will impact the way we live.

We need to adapt the way in which we plan, deliver and use our essential water, sewerage and drainage services to cope with these changes now. This needs to be done alongside building community resilience to flood events, informed and supported by public sector action. This will ensure that drinking water is secured, our environment is protected, and rainwater is managed in a way that reduces the impact on society, for future generations.

Scottish Government is currently developing policy to build community flood resilience and adapt the way in which we plan, deliver and use our essential water, sewerage and drainage services to cope with climate change. In November 2023 Scottish Government published a consultation on proposals for changes in the water industry. The draft Adaptation Programme builds out from water-specific risks, to include holistic action on all climate risks. In tandem, our current engagement on community flood resilience will culminate in a final consultation on a National Flood Resilience Strategy for Scotland in Spring 2024.

Water

Overall, as we adapt to climate change and better protect our environment, we will need to invest more to protect and enhance our water services. The **Water, wastewater and drainage public consultation** (closing 21 February 2024) asks questions exploring how to adapt our water, sewerage and drainage services in the face of climate change, including options for:

- A legal requirement to plan for our water resources to understand how much will be needed, where it will be required and have a system for allocating it fairly.
- Catchment management to reduce pollutants reaching drinking water sources.
- Using less drinking water for general purposes, and a quicker process for responding to water shortages.
- Private water supplies which are particularly vulnerable to the impacts of climate change.
- The need to take a combination of actions, both large and small, to better manage rainwater, and to reduce the risk of flooding and spills from sewer overflows into the water environment.
- Managing rainwater separately to wastewater under a new 'drainage' service to better manage rainwater in our villages, towns and cities, with all households paying at least some drainage charge.
- Networking small blue-green infrastructure into bigger networks, so they can serve a bigger area and manage more rainwater.
- The best approach to addressing identified negative impacts on the environment that overflows can cause.
- Reducing blocked sewer pipes as a result of items incorrectly flushed down the toilet such as wet wipes, cotton buds, nappies and sanitary products, or fats and oils poured down the sink.

The Scottish Government will consider responses to the Water, wastewater and drainage public consultation, with outcomes to be reflected, where relevant, in the final Adaptation Plan.

Flooding

Flooding is Scotland's costliest climate hazard, with sea level rise accelerating and flooding from heavy rain events expected to increase in intensity under climate change. This requires Scotland to build greater community resilience to flood events (see Communities outcome), informed and supported by public sector action.

The Flood Risk Management (Scotland) Act 2009 sets out roles and responsibilities for increasing flood resilience . How these responsibilities (over the next five years) relate to future climate change is set our below.

The **Scottish Environment Protection Agency (SEPA)** is Scotland strategic flood risk management authority and Hydrometric Monitoring Authority. SEPA's role in flood forecasting and warning is covered under the Communities outcome. SEPA will:

- Develop a Hydrology Monitoring Framework and review how our Future Hydrometric Design can build evidence around climate change.
- Update our coastal and surface water flood hazard maps to include the latest information including climate change projections.
- Review and publish areas most at risk within Scotland. This will include a review of Potentially Vulnerable Areas in 2024 and the Flood Risk Assessment Scotland (FRAS) in 2025. FRAS is reviewed every six years and identifies the current and future risk of flooding to communities, businesses and infrastructure.
- work closely with other organisations responsible for increasing flood resilience to ensure that a nationally consistent approach to reducing flood exposure is adopted; provide flood resilienceadvice to land use planning in Scotland when requested; and raise awareness of flooding at a national level through education initiatives, community engagement and campaigns.
- In 2023 we updated our guidance for Climate Allowances for Flood Risk Assessment in Land Use Planning for National Planning Framework 4.

Local authorities, in partnership with SEPA, Scottish Water and others, have updated Local Flood Risk Management Plans covering 2022 – 2028. These plans supplement the Flood Risk Management Plans and detail actions to increase flood resilience , and how they will be delivered, in each potentially vulnerable area.

- In 2016, COSLA and Scottish Ministers agreed a 10 year funding commitment to provide £42 million annually to local authorities for flood resilience through the general capital grant. An additional £150 million was committed in the Local Government capital settlement 2021-22 to 2025-26.
- Local authorities are responsible for the implementation and maintenance of flood protection actions.
- Local authorities also inspect, clear and repair watercourses to reduce flood exposure and routinely maintain road gullies on public roads and highways.
- During severe flooding, local authorities will work with the emergency services and co-ordinate shelter for people evacuated from their homes (see Communities outcome).

Drought / Water Scarcity

Scotland's National Water Scarcity Plan sets out how the **Scottish Environment Protection Agency (SEPA)** will manage water resources prior to and during periods of prolonged dry weather. This is to ensure the correct balance is struck between protecting the environment and providing resource for human and economic activity

- The plan sets out how we will work with water users (authorised abstractors and recreational users) and key organisations, such as Scottish Water, to manage water resources during periods of low rainfall.
- All water users have a role to play to ensure that resources are used sustainably and the potential impact on the environment is reduced.
- Lessons learned in 2022 and 2023 will enable an update of the Water Scarcity Plan to reflect the water usage framework to be implemented by SEPA.

Outcome Four: **Economy, Business and Industry (B)**

Economies and industries are adapting and realising opportunities in Scotland's Just Transition.

Developing greater climate resilience will be crucial to ensure the future security and prosperity of Scotland's economy. We know the costs of climate change are high, and no longer hypothetical. It is estimated climate change already costs the Scottish economy billions of pounds per year. By 2050, the economic costs are estimated at 1.2% to 1.6% of GDP per year. Taking action to respond to current and projected climate change makes economic sense.

With a changing climate there are not just costs, but economic opportunities as well. For example, the growth of sectors, services and products which help us adapt to future climate conditions and build resilience to physical climate-related hazards.

Over the next 5 years, The Scottish Government and the private sector can take action to minimise the scale of the long-term economic costs, invest in measures to generate value and harness the market opportunities presented by changes in climate. The National Strategy for Economic Transformation (NSET) sets out a new culture of delivery where partners come together as 'Team Scotland' to deliver the actions needed to transform the Scottish economy. This includes ensuring that businesses and communities are involved in the pursuit of the strategy's ambition of a fairer, wealthier and greener country – a wellbeing economy.

This chapter sets out four objectives (B1, B2, B3 and B4) that collectively focus on how Scotland can build resilience to the economic impacts of a changing climate and maximise the economic opportunities. The policies as part of this chapter support Scotland's just transition to a climate resilient, net-zero economy and the NSET vision.

Objective: Increasing business awareness of climate risks (B1)

Businesses are supported to embed the risks of climate change into governance, investment and operations, and are collaborating in effective, inclusive adaptation action.

Changes to the climate pose a growing risk to businesses across Scotland. The increasing of frequency of extreme weather events and slow-onset climate changes, such as sea-level rise, bear potential financial impacts. This can include physical damage to business premises or assets through flooding, disruption to supply chains, reduced access to finance or increased insurance costs.

Adapting to external conditions is not new but a core function of successful businesses. Preparing for, rather than reacting to climate impacts, makes good business sense. Long-term cost saving, business continuity, reducing disruption, increasing productivity, competitive and reputational advantages can be achieved by building better climate resilience and preparedness. As such, planning ahead to consider climate risks should be seen as part of a wider approach to business continuity and business growth.

While there is a role for business to consider climate risks, and take necessary action to build preparedness, the Scottish Government and its partners will raise awareness of climate risks to businesses and offer evidence-led support and advice to inform decision-making. This in turn, aims to support wider economic resilience.

Increasing awareness of climate risk

Ensuring businesses across Scotland are aware of the risks climate change may pose to their operations, premises, staff and supply chains will be crucial to building a more climate-resilient economy.

Our Small and Medium Sized Enterprises (SMEs) are a critical to Scotland's long-term economic prosperity. As of March 2022, 99.4% of all private sector businesses in Scotland were SMEs and represented 56% of GDP. Yet recent insights show only 21% of SMEs currently monitor climate related risks (BICS, 2023).

The Scottish Government will raise awareness of climate-related risk and ensure it maintains a strong understanding of how climate-events are impacting our businesses of all sizes and sectors. This will ensure guidance and support is informed by and meets industry needs. Specifically, the Scottish Government will:

- Increase businesses awareness of climate risk through our work with Adaptation Scotland and the established business networks of industry bodies and business support services. We will extend the reach of climate adaptation guidance, through Find Business Support.gov.scot, which serves as the single-entry point for Scotland's public sector support options.
- establish an annual assessment of Scottish business awareness of climate-related risk from 2024 onwards. The Scottish Government will expand the ONS Business Insights and Conditions Survey (BICs) to include a standardised question set which will provide insights on businesses preparedness and the business impacts resulting from climate change.
- continue to deliver a public engagement campaign through Ready Scotland. Ready Scotland communications, both via social media and Ready.Scot raise awareness of how to build preparedness to emergencies including severe weather events which are increasing in frequency because of climate change. As part of this, Ready Scotland guidance is made available to support businesses to plan and protect their businesses and staff from weather-related emergencies.

Supporting climate adaptation action and investment at scale across Scotland's industries requires different types of leadership from people working in and alongside SMEs and larger businesses.

To amplify awareness of climate-related risk and facilitate business-to-business knowledge exchange through the Adaptation Scotland Programme, as well as work with business representatives and industry bodies, we will consider establishing a **network of private-sector adaptation leaders** to champion adaptation by 2027. Through this network, Adaptation Scotland will support frontrunner businesses, industry leaders and organisations, to take a leadership role on adaptation, driving forward change in their respective sectors and collectively in Scotland.

Support and Advice

To remain profitable, businesses must be able to assess climate risks and to adapt in response. The Scottish Government will give businesses support and advice to enable them to respond to climate risks.

The Scottish Government currently supports businesses through the Adaptation Scotland Programme, which delivers free, practical guidance and advice to help businesses prepare for, and build resilience to climate-related hazards. Adaptation Scotland's current support includes Climate Ready Business tools and resources, finance guide, business cases and resources for workers. To date, Adaptation Scotland's guidance *'Is Your Business Climate Ready?'* has been downloaded more than 7,000 times.

Adaptation Scotland

The Scottish Government through the Adaptation Scotland Programme, will support businesses in sectors most vulnerable to climate change to better assess climate risks and to identify practical adaptation measures they can take to build resilience by:

- co-developing an enhanced suite of Climate Ready Business tools and resources for SMEs by 2024, though engagement with Scotland's Enterprise Agencies, industry bodies and private sector networks.
- supporting capacity building by delivering tailored training for business support services, including Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise, to ensure support services are sufficiently equipped to support SMEs across a range of sectors and locations most affected by climate change impacts. This will enable the support to SMEs to be sustained and scaled over the 5-year Adaptation Plan.

Enterprise Agencies

Scotland's Enterprise Agencies play a crucial role in supporting business resilience and facilitating sustainable economic development in Scotland. To support business preparedness and resilience to climate-related risks Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will:

- integrate an enhanced adaptation focus into existing advice on business development, supply chain resilience and business sustainability. This will build synergies between support and guidance on net-zero, to maximise impact and relevance to businesses including SMEs.

Adaptation is an important priority addressed in Scottish Enterprise's Net Zero Framework for Action where its ambition is to lead, influence and create opportunities for Scotland's just transition to net zero. Scottish Enterprise will support more companies to take adaptation action through:

- its Net Zero Accelerator tool which encourages businesses to develop climate change plans which consider both mitigation and adaptation goals.
- by explicitly linking its grant funding to the development of net zero plans or (for grants under £10,000) to the completion of its Net Zero Accelerator tool.
- internal project appraisal processes which ensure climate adaptation is considered in project development so that infrastructure and investments supported by Scottish Enterprise today will be climate-resilient over the coming decades.

CASE STUDY – Scottish Enterprise Net Zero Accelerator Tool

Scottish Enterprise's **Net Zero Accelerator diagnostic tool** is a benchmarking tool designed to support companies to identify actions that can form a climate change roadmap or plan. It comprises a question set grouped into distinct sections, one of which is dedicated to climate change and market trends. It specifically asks businesses if they have assessed the risk of climate change on their operations, products and services, and if they have developed an action plan and implemented measures to address climate risks. The reports generated for businesses highlight areas of strength and opportunities for improvement and make targeted recommendations including links to Adaptation Scotland and other sources of support.

Based on their responses to the questions the Net Zero Accelerator tool makes recommendations to businesses on how they can develop a practical, data-led and people-focused net zero road map. The tool helps businesses to understand the impact of their operations on the environment to start to set net zero targets; and to identify opportunities to adapt and innovate to reduce their climate impact while also focussing on their people, leadership and staff engagement.

Companies using the tool receive a high-level action plan at the end of the diagnostic process that will allow them to prioritise their net zero activities. With over 400 registrations to date it has acted as a mechanism to help stimulate awareness and action on climate change. The findings from these assessments are able to be shared with Adaptation Scotland to inform their business-focused tools and resources.

Scottish Enterprise has also launched its **Net Zero Academy**, a workshop-based process that helps cohorts of companies to develop net zero plans (covering emissions reduction, resource efficiency, adaptation and voluntary biodiversity improvement). The Academy includes case study exercises for delegates on the impacts of climate change on an example but realistic business, which has suffered from the effects of severe weather events including both drought and flooding.

Source: Scottish Enterprise Net Zero Accelerator Tool

Business and Flooding

Exposure to flooding is likely to pose an increasing risk to business assets, functions and operations in Scotland as climate change brings both increased rainfall and sea level rise.

Recognising flooding as the costliest climate-related risk to businesses, and the higher costs of responding to a flooding event than investing in early adaptation action, the Scottish Government and SEPA will support businesses by:

- Publishing Scotland's first National Flood Resilience Strategy by the end of 2024 for which the Scottish Government will engage with all sectors, businesses included. The Strategy will initiate transformational change, bringing in a collaborative, place-based approach to build community flood resilience. It will engage a wide range of partners, enabling a broader range of flood management actions and flood resilient design contributions to be delivered. This strategy will be followed by delivery plans to translate our ambition into actions as we prepare Scotland for increased exposure to flooding.
- Continuing to invest in SEPA's Scottish Flood Forecasting and warning services to ensure flood-risk information is available to businesses across Scotland. SEPA's Floodline Business page will continue to provide advice on how to prepare for business flooding and 'Live Flood Updates' warn of active flood-risks for an individual's business. SEPA will launch a Future Flood and Incident Messaging Service (FIMMS) in 2024 to expand messaging channels beyond text messaging, including email and X, as well as improving how alerts and warnings are issued.
- Scottish Government Ready Scotland communications and advice. If flooding does occur during severe weather, the Scottish Government works closely with the Met Office, SEPA and partners to activate paid-for digital and local radio campaigns in the areas affected so that businesses and communities receive up to date, accurate and critical flooding information. This information is carried on Ready Scotland, main Scottish Government and also various partner channels and platforms. The Ready Scotland website has specific information about how to prepare for, manage and recover from flooding incidents and signposts to key information from partner organisations and agencies. Specifically, the Business Emergency Resilience Group's 10 Minute Plan outlines steps designed to help small to medium-sized businesses prepare for, respond to and recover from flooding.

- SEPA's review of Potentially Vulnerable Areas in 2024 and the Flood Risk Assessment Scotland (FRAS) in 2025, which will help to identify the businesses, communities and infrastructure at risk of flooding under a number of different scenarios.
- embedding the recommendations made in the Water Resilient Places Policy Framework published in 2021 into relevant policies. A number of the recommendations have been included in the Fourth National Planning Framework and others are being included in water policy development currently underway as part of Scotland's water industry's response to the climate emergency.

Business and Coastal Erosion

The Dynamic Coast project has demonstrated that at least £20 billion of assets, including road, rail business and residential property, lie within 50 metres of Scotland's coastline. With natural defences protecting some £14.5 billion of these assets, maintaining our natural coastal defences must be a key part of our resilience and adaptation strategies.

While the landowner is responsible for protecting their property from coastal erosion, local authorities have powers, but not obligations, under the Coast Protection Act 1949 to protect land from the sea.

The Scottish Government has developed guidance to support local authorities in the preparation of Coastal Change Adaptation Plans (CCAPs). These plans attempt to go further than Shoreline Management Plans, by considering the adaptation required to safeguard our coastal communities and assets as our climate and coast continues to change.

The guidance for CCAPs encourages businesses:

- as well as local communities, to be involved in the process of producing local authority wide CCAPs.
- to engage with the relevant local authority for further information. A landowner can also draft their adaptation plan, based on the information provided by Dynamic Coast to assess the coastal erosion risk.
- to consider coastal erosion risks when moving or extending business premises

Business and Water Scarcity

Access to water is crucial to many core business functions – not least ensuring worker's access to water and for sanitary purposes. Some business sectors rely more heavily on water – including manufacturing and its sub-sectors including paper and food and drinks. However, changes in Scotland's climate could reduce resource availability, and increase the likelihood of water scarcity.

There are business benefits to be had for managing water more effectively, including cost saving, ensuring drought preparedness and reducing carbon emissions from water heating.

To support the long-term water supply for businesses in Scotland the Scottish Government will:

- build on our £170m investment in Scotland's water and sewerage services and review of water industry policy, and continue to assess how water, sewerage and drainage services can adapt to the impacts of climate change to avoid water scarcity through future legislation.

Objective: Farming, Fishing and Forestry (B2)

Farming, fishing and forestry businesses are supported to adapt production and operations in a way that benefits livelihoods, resilience and the economy in a changing climate.

Scotland's agriculture, forestry, fishing, and aquaculture sectors are central to our nation's identity, and our economy. Combined, these industries contribute around £2.6 billion a year to the Scottish economy.

As these sectors rely on natural resources they are particularly vulnerable to climate change. Increased rainfall, changes in temperature and new pests and diseases may leave crop yields, livestock productivity, forestry health and fish stocks vulnerable or subject to change. There may also be opportunities relating to productivity in forestry and agriculture, with future changes in climate offering potential improvements in crop suitability or growing seasons.

Adaptation action by these industries is needed to maintain business productivity and viability, over the next 5 years. The Scottish Government will work to ensure farming, fishing and forestry are adequately supported to ensure these crucial industries can transition towards practices which are responsive to Scotland's changing climate and support both business productivity and viability.

Farming and the wider Agriculture sector

Farming, crofting and land management will continue to play an important role in maintaining thriving rural and island communities. Agriculture is vital for rural employment, accounting for between 12 and 15% of employment in rural areas and 2% of total employment in Scotland.

The sector accounts for around 1% of Scotland's economy in terms of value added and underpins other large Scottish industries such as food manufacturing, retail and tourism.

Land management in Scotland will change as we tackle the twin climate and biodiversity crises which will present both challenges and opportunities for farmers and crofters, building on their traditional leadership role in land management and stewardship. We know that agriculture is one of the sectors most exposed to the impacts of climate change while also being well placed to take adaptation actions, which also support climate mitigation for example through riparian planting or hedgerow creation.

Advice, Skills and Funding

Climate change adaptation plays a key role in the Scottish Government's agricultural policy.

As set out in the Vision for Agriculture, the Scottish Government will transform how we support farming and food production in Scotland to become a **global leader in sustainable and regenerative agriculture.**

The Agriculture and Rural Communities Bill aims to provide Scotland with a future framework that will support farmers and crofters to meet more of our food needs sustainably and to farm and croft with nature and will assist in efforts to meet our climate change targets. As set out in the Agriculture Reform Route Map future framework will comprise four tiers. Tier 1 Base and Tier 2 Enhanced will be universal payments for

undertaking agricultural activity while meeting essential standards and for further nature and climate activities respectively. Tier 3 Elective will offer non-universal payment for targeted actions and undertakings on particular habitats, and for defined species. Tier 4 Complementary will support Continuing Professional Development (CPD), advice, knowledge exchange and linkages to wider land management support.

To **support** Scottish agriculture to take action on climate adaptation, Scottish Government will:

- from 2025, shift half of all agricultural funding to be conditional on delivering for climate and nature, including climate adaptation. We published a draft list of measures to offer examples to farmers and crofters of the types of activities they may be expected to undertake in future to receive agriculture support.
- continue to provide financial support for farmers and crofters to adapt to climate change including through the Agri-Environment Climate Scheme (subject to budgets) which is expected to continue to 2026, until the new Elective and Complementary Support is implemented. The Forestry Grant Scheme (FGS) is expected to continue to support tree planting throughout the lifetime of the Adaptation Plan.

To support farmers and crofters to develop the **skills and knowledge** to understand climate risks and adapt their businesses to ensure their sustainability, resilience and profitability, the Scottish Government and its partners will:

- Continue to deliver training, skills development, advice and guidance to farmers and crofters that support them to adapt to climate change. This is currently delivered by the Farm Advisory Service, which provides guidance and advice on climate risks and adaptation action through varied approaches including high quality practical guides, group events and bespoke advice as well as the Scottish Government supported SRUC's Farming For a Better Climate programme. The Farming for a Better Climate programme offers guidance and advice on climate adaptation and tests on-farm activities that support our climate ambitions, in order to better understand and enable their uptake in a Scottish context.
- From 1 April 2027, as part of Complementary support of the Vision of Agriculture Support Package Beyond 2025, the Scottish Government will deliver a new, Agricultural Knowledge and Innovation System (AKIS) which will provide opportunities for training, education, and innovation. The AKIS will support continued professional development for farmers, and land managers, with the specifics informed by stakeholder consultation. Our Just Transition Plan for Land Use and Agriculture will also help to outline how the Scottish Government will work to ensure re-skilling opportunities required for sustainable farming methods.
- Continue to update and refresh guidance and advice as research develops, and as the climate changes. For example, where relevant, advice will develop to include issues such as changing crop management for new climate-resilient varieties.
- Facilitate peer to peer engagement on activities that support climate adaptation through a range of initiatives, for example the joint Scottish Government and Scottish Forestry Integrating Trees Network.

Agriculture Opportunities Research

To continue to develop the sector's resilience to climate change, the Scottish Government will continue to support the development of innovative solutions and research on agriculture and climate adaptation.

The Scottish Government's Rural and Environment Science and Analytical Service (RESAS) invests almost £50 million annually on a 'Strategic Research Programme' to ensure that Scotland maintains its position at the very cutting edge of advances in agriculture, natural resources, and the environment.

The RESAS Strategy for Environment, Natural Resources and Agriculture Research 2022-2027 recognises that research and development is required to support the industry to evolve practices and explore the opportunities posed by Scotland's changing climate.

By 2027 RESAS will invest in a programme of innovative research on Crop and Livestock Improvement for resilient agricultural production, as part of a wider theme on Sustainable Food System Supply. This work will include:

- research on important Scottish crops, to produce varieties which are resilient to a combination of environmental stresses and use resources more efficiently. It will also develop novel crops and cropping systems for increased agricultural adaptability.
- Livestock research to support the development of feeding and breeding strategies for climate adaptable and resilient livestock, along with data driven innovations for improved sustainability.

The research will also develop approaches to influence farmer adoption of best practices, leading to a more productive and less vulnerable sector overall.

Pests and Agriculture

Warmer temperatures, and in particular milder winters are expected to exacerbate pests and disease in crops, including potato crops.

The Scottish Government, and its partners will work to support the sector from the threat to productivity from pests and disease.

The Scottish Plant Health Strategy sets out our approach to protect the health of plants including agricultural and horticultural crops, in Scotland. The Scottish Strategy aims to work collectively with stakeholders to minimise the impact of plant pests and diseases. To prevent the introduction and spread of harmful organisms the Scottish Government carries out the following activities:

- regular surveillance to guard against outbreaks of specific pests
- ensuring compliance with controls on the movement of plants and plant products within the EU (including within Scotland and the UK), and
- inspecting plants and plant products entering Scotland from countries outside the EU, or being exported to those countries

Over the period of the Adaptation Plan:

- Science and Advice for Scottish Agriculture (SASA) will continue to develop approaches to support potato growers with Potato Cyst Nematode (PCN) and aphid viruses, including IPM planning.

- RESAS will continue to fund research into the impact of climate change and extreme weather events (such as drought and waterlogging) on pests and pathogens of economically important crops. RESAS also supports by delivering integrated and sustainable crop protection strategies and providing rapid diagnostic technologies for identifying threats and models the impacts of climate change.
- The Plant Health Centre, a virtual centre of expertise, will continue to enhance Scotland's capacity and capability to respond to plant health threats and assembles scientific evidence to inform policy. As part of their work, the Plant Health Centre has recently published a report on the Impact of Climate Change on the Spread of Pests and Diseases in Scotland.

Water and Agriculture Studies have highlighted that the risk of water scarcity across Scotland is increasing due to the changing climate, especially in eastern areas where drier summers are expected and demand for irrigation of arable is highest. Beyond crops, water scarcity can impact on livestock farming through extra costs for livestock feed when grass growth is reduced.

SEPAs Scotland's National Water Scarcity Plan will outline how SEPA will manage water resources during periods of low rainfall. As part of this:

- SEPA will liaise with the farming community and their representatives on how to manage periods of water scarcity resulting from future changes in climate.

RESAS researchers will continue to collaborate with SEPA to refine the monitoring of water scarcity used to trigger voluntary and regulatory actions (under the Water Scarcity Plan), including the management of abstraction licenses for crop irrigation.

Recognising this as area where further research can support, over the period of our Adaptation Plan the RESAS research Programme is:

- Developing models which will improve forecasting of water scarcity and highlight vulnerabilities within the agricultural sector, to help farmers plan for and adapt to periods of water scarcity.
- Examining how land use and management which slows the flow of water through and over land during wet weather (natural flood management), can also help to store water and mitigate the impact of dry weather.
- Exploring the development of crops which require less water and/or are more resistant to water stress.

Flooding across Scotland is becoming more frequent as the climate changes, and also poses risks to agriculture through loss of crops and stock, infrastructure damage and negative impacts on soils.

Adaptation actions across Scotland (as set out in objectives **B1 and PS5**) will support the agriculture sector to minimise the impacts of flooding. As land managers, farmers and crofters will also play an important role in reducing flooding through on-farm actions like tree planting.

Forestry Sector

Forestry in Scotland is worth almost £1 billion per year to the Scottish economy and supports more than 25,000 jobs. Growing and processing of trees often takes place in rural Scotland, with the industry making an important contribution to Scotland's rural economy.

Scotland's Forestry Strategy 2019–2029 sets the long-term framework for the expansion and sustainable management of Scotland's forests and woodland. Increasing the adaptability and resilience of forests and woodlands, is one of the strategy's priorities.

The threat to forests and woodlands from extreme weather events and wildfires is expected to rise. Given the changing climate and greater globalisation of trade and travel, it is also anticipated that the threat to trees from pests and diseases will continue to grow.

Scottish Forestry will work with partners to protect productivity in the commercial forest industry from the threat of increasing pests, pathogens and invasive species resulting from climate change by:

- Delivering a Resilience Action Plan in 2024, informed by stakeholder insights and research, which will outline actions to increase the resilience of the forest resource to these increasing threats.
- Continuing to invest more than £650k in yearly surveillance of 1.5 million hectares of woodland through Scottish Forestry's Tree Health Service, with survey levels reviewed in line with climate change and changing risks. Statutory Plant Health Notices (SPHNs) will continue to be issued as required.
- Continue to develop the Climate Change Hub website as a developing a forest resilience resource to provide the sector with the latest evidence on risks and approaches to improving forest resilience. Adaptation content will continue to be developed (e.g., the creation of a new biosecurity page) and mitigation content will be added.
- Close work with industry through the Scottish Tree Health Advisory Group to ensure tree health risks, and mitigations, are communicated with industry
- Support Tree Alert (Forest Research) and Observatree which gives the ability for members of the public to report concerns. This is monitored by Forest Research and any reports of concern are passed to Tree Health Team to follow up as part of wider surveillance network.
- Forestry Grant Scheme Tree Health options which help facilitate the management of diseased trees and suitable replanting.

Scottish Forestry will also work with partners to *incentivise and support* the forestry industry to identify climate risks, opportunities and take adaptation action. This includes:

- Working with the cross-sector Adaptation and Resilience steering group to prioritise actions to address the barriers faced by the industry in relation to climate adaptation.
- Strengthening assessment of species suitability for Forestry Grant Scheme woodland creation applications to select the best species for their site, under climate change predictions
- Offering a higher grant rate of the Forestry Grant Scheme for riparian woodlands for multiple benefits such as water quality and biodiversity.

- Reviewing woods for water Forestry Grant Scheme options to ensure effective targeting of woodland creation as part of the wider catchment for adaption purposes
- Supporting training and implementation of the updated UK Forestry Standard (UKFS) General Forestry Practice Guideline. The new version (to be implemented on 1 October 2025) includes a specific measure on adaptation, reducing the maximum percentage of any one species planted in a forest management unit to reduce risks associated with over reliance on one species.
- Ensuring UKFS standards underpin all Forestry Grant Schemes, Felling Permission and Environmental Impact Assessment approvals.

In addition, Forest Research aims to increase the quality of commercially grown species and provide the evidence base so that that stock of the most appropriate genetic origin is used in forest establishment. To improve performance, resilience and quality of species, the Conifer Breeding Cooperative and the Future Trees Trust are undertaking research on future productive conifer and broadleaved species.

Fishing and Aquaculture Sector

Fishing and aquaculture are central to Scotland's culture, identity and economy. The Scottish aquaculture sector and its supply chain combined supports an estimated 11,700 jobs, generating £362 million GVA in 2020. In 2022, 4,117 fishers were working on Scottish vessels, with fishing generating £284 million GVA in 2020. In 2022, Scotland exported £1.04 billion worth of fish and shellfish, accounting for just over 60% of total UK fish and shellfish.

Climate related changes in seas include a warming trend and a decrease in pH, known as acidification. The CCRA3 outlines that these climate-relate changes will affect distribution and abundance of species, including plankton, shellfish, finfish, marine birds, and marine mammals.

It is essential that our aquaculture and fisheries are able to adapt to climate change and the Scottish Government policies support adaptation. The Scottish Government's Blue Economy Vision for Scotland is, by 2045, for marine, and inter-linked freshwater and coastal environments to be restored, adapted and resilient to climate change and sustainably managed.

The Scottish Government will ensure our approach to support the aquaculture and fishing sector is underpinned by the best available science and research, in light of climate-related impacts. The Scottish Government will:

- Ahead of the Adaptation Plan, undertake a ClimateXChange research project on the risks and opportunities relating to climate change and commercial fisheries in Scotland. The research outcome seek to support policy decision-making, by identify whether changes will be required in fisheries policy as a result of ocean acidification. This project will act as an intermediate step in our ambition to conduct a climate vulnerability assessment of marine species that are either commercially important or that are a priority for conservation in Scotland.
- work with academics and stakeholders both within and out with Scotland, to develop our data and knowledge base to support understanding of how policies and fishing practices may need to adapt in the future enable the sector to remain resilient to climate change. This is not something the Scottish Government can or will do in

isolation, we will take a co-management approach to identifying and implementing the right solutions.

In order to support the ongoing resilience of our fish stocks and the fishing fleets which rely on them, the Scottish Government continues to set fishing limits that are informed by the best available scientific advice. Underpinning this approach we will:

- in line with the Fisheries Act 2020 and set out in the UK Joint Fisheries Statement, work with the other UK fisheries administrations to jointly develop 21 Fisheries Management Plans by the end of 2024, which will support us to increase or maintain sustainability of fish stocks and respond to changes in the status of stocks.
- to deliver more sustainable and responsible sea fisheries management, we will develop and implement a suite of technical and spatial measures to reduce levels of discarding of 'unwanted' fish catch alongside measures to reduce bycatch of sensitive marine species to ensure sustainable fisheries, with implementation by 2026.
- develop a package of measures to help ensure that inshore fishing activity is managed responsibly. We will also enhance our management capabilities and build our knowledge and understanding through the introduction of appropriate tracking and monitoring technology for all Scottish under 12m vessels by 2026, building on the measures already in place for vessels 12m and over in length.
- we will work through the UK Benthic Impacts Working Group to focus on identifying practical, achievable actions to reduce pressure on habitats most at risk or most extensively impacted by 2028. This will be supported by the introduction of appropriate fisheries management measures in Marine Protected Areas (MPAs).

The Scottish Government's Vision for Sustainable Aquaculture sets out how the sector can contribute to our Blue Economy and Net Zero ambitions, while being globally recognised as innovative, productive, and sustainable. The Vision is supporting the sector to continue to thrive whilst placing a renewed emphasis on environmental protection and community benefit. It sets the future direction for the sector where it can reach net zero and adapt to the challenges arising from climate change.

The Scottish Government will deliver this Vision with stakeholders including local authorities and regulators. In implementation, key adaptation action will include:

- supporting the aquaculture sector to put in place climate resilience plans to manage the risks and opportunities of climate change, by 2029.
- increasing awareness of the changing environment, to enable effective adaptation action on challenges such as warming seas, storms and fish health issues.

The Vision also commits to the following, which support adaptation through reductions in marine pressures:

- delivering emissions reductions in line with Scotland's Net Zero targets
- producing more seafood, whilst working to reduce waste discharge below regulatory limits and capturing more organic waste for the circular economy.

- partnering with innovators to explore further opportunities for the best use of aquaculture by-products, including processing waste, organic waste, mortalities and harvested cleaner fish
- using 100% responsibly sourced marine and vegetable ingredients in finfish feeds, identifying opportunities to use a greater quantity of novel ingredients, trimmings and other by-products
- taking all reasonable efforts in the design and use of equipment to prevent the loss of marine debris and to coordinate recovery and recycling of debris and end of life equipment
- increasing adoption of new and innovative technologies which achieve both positive environmental and health and welfare outcomes, including exploring the potential use of semi and closed containment systems.

The Farmed Fish Health Framework including its Climate Change and Ocean Acidification subgroup, plays an integral part in shaping the future climate change adaptation strategy of the aquaculture sector. The subgroup is currently refreshing its aims to offer improved strategic support for the sector in adapting to the impacts of climate change.

Case Study: Sustainable Aquaculture Innovation Centre

The Sustainable Aquaculture Innovation Centre and the Sustainable Aquaculture Forum enable knowledge exchange and promote collaboration that can continue to support the development of crucial research, development and innovation capacity in Scottish Aquaculture.

New technology and approaches, underpinned by sound science, have the potential to unlock opportunities in productivity, improve health and welfare and reductions in adverse environmental impact.

Innovation can find solutions that deliver across these priorities and promote solutions that move away from historic trade-offs. The innovation process must be effective to produce solutions to sector challenges. It must be supported by cooperative and multi-disciplinary research undertaken by parties such as Scotland's research institutes, innovative businesses and public bodies.

Objective: Adaptation Innovation (B3)

Scotland is an innovation hub for adaptation solutions and opportunities.

Addressing climate challenges brings opportunities for businesses, sectors and regions to innovate, and explore products and services that can help Scotland adapt and support the transition to a climate-resilient, net-zero economy.

The Scottish Government's Innovation Strategy sets the vision for Scotland to be one of the most innovative small nations in the world – with our strong natural assets and excellence across academic and business communities providing the basis.

While understanding of the innovation opportunities associated with supporting the transition to net-zero are recognised globally, the Adaptation and Resilience Economy (opportunities arising for adaptation to physical risk) is less-explored. This presents an

opportunity for Scottish businesses to position themselves as innovators and gain competitive advantage.

kMatrix identified that the sales relating to climate adaptation and resilience were £604m for Scotland in 2016/17. The increased demand for products and services due to climate change could promote market growth over-time, as sales of businesses in the sectors increase. The CCRA3 notes sector-specific opportunities include sustainable agriculture, aquaculture, forestry, marine, shipping, seafood, construction, retail, tourism, climate advisory, consulting, accounting services finance and heritage.

Policies in this objective will support greater exploration of the opportunities posed by the adaptation economy and develop Scotland as a destination for developing innovative adaptation solutions, and as a hub for expertise and knowledge on adaptation and resilience practices.

Adaptation and Resilience Economy - Evidence and Innovation Support

Recognising this as an emerging area which requires further research, the Scottish Government will develop the evidence base to improve understanding of the business opportunities arising from adaptation to climate risks, and the goods and services needed to support a more resilient economy.

We want to help businesses, sectors and regions identify opportunities that may arise from a changing climate. In 2024 The Scottish Government will work with Scotland's Enterprise Agencies to commission research to identify market opportunities, increased demand for goods and services businesses which support climate adaptation, and current barriers preventing businesses from realising these opportunities.

The evidence gained from analysing the emerging market opportunities from climate adaptation goods and services will be shared with businesses, both by the enterprise agencies and wider Business Support Partnership. The specific support offered by Scotland's innovation system – business support organisations, enterprise agencies, HE and FE institutions, innovation centres and others – will then be able to integrate detail on opportunities for climate-resilient products and services.

CivTech

Responding to the risks of climate change will require entrepreneurial thought to be encouraged and incentivised. The Scottish Government's CivTech programme offers opportunities to develop innovate solutions, and create sustainable, high growth potential businesses.

CivTech brings public, private and third sectors together to develop innovation solutions to 'Challenges' or, problems faced by a public or third sector organisation, for which there is no readily available solution on the market.

Through collaborative working, solutions to Challenges are developed in novel ways, using systems, methodologies and practices common in the private tech sector but rare in the public sector. These include open challenge systems, and tech accelerators – the methodologies that have transformed almost every sector in the world. CivTech has taken these systems and adapted them so they produce beneficial products and services for public sector and citizen use.

Innovate for Nature

Innovate for Nature is a joint initiative between CivTech and NatureScot which aims to identify and deliver a range of innovation projects which address both the biodiversity and wider climate crises. Missions for Innovate for Nature include:

Mission 4 which is focussed on **living with climate change**. Challenges under this mission focus on the role of nature-based solutions in towns and settlements, especially on coasts and rivers, to build resilience to the effects of climate change, and how nature can help us to live in a warming world and manage climate risks. There are examples of CivTech Challenges, past and present, which are supporting in developing innovative adaptation solutions:

- SEPA's challenge to develop a flood warning system for local communities, was addressed by the solution RiverTrack (**see detail in below case study**)
- CivTech 9 includes a current Innovate for Nature Challenge focussed on technology solutions to support the early detection of pests and diseases in trees and wild plants.

Case Study: CivTech Challenge RiverTrack Flooding Technology

In Scotland there are flood warning systems which can be used for cities and towns, however SEPA recognised a need for technology which could be used my smaller communities, to reduce exposure to flooding. In 2016 SEPA posed the CivTech Challenge: **How can we develop an effective hyper-local systems to warn people of flooding, and give them the time to prepare?**

The solution to this challenge was developed by Gary Martin, founder of RiverTrack. The RiverTrack solution is a robust, low-maintenance river level monitoring and alarm system which incorporates, cost effective components and innovative design. Acoustic sensors measure river level changes and feed information to display units, which function independently of any communications infrastructure. It enables users to get almost real-time information regarding water levels in their area.

CivTech®

RiverTrack®

Source: CivTech, RiverTrack

Innovative Research

World Leading Research

Scotland's academic institutions are amongst the best in the world and are regarded globally for climate change research. Our universities and research institutes play an important role for our society, environment and economy in creating new knowledge, supporting high-quality innovation, and promoting innovative start- up businesses. Newly published research commissioned by the Scottish Funding Council, highlights the important contribution of Scottish university research in delivering positive environmental impacts, including net-zero goals locally and internationally. The Scottish research base has directly benefitted this agenda by developing and implementing new tools to measure emissions, developing climate policy across the UK and internationally – including net-zero target setting – and informing change across agricultural, construction and energy sectors, among others.

Scottish Government investment, delivered through the Scottish Funding Council, in strategic investments such as the Innovation Centre Programme and Alliances for Research Challenges, have pulled together leading academic and industry expertise to help deliver on Scottish Government ambition in key priority areas – including advancing net zero goals. For example, the innovation centre BE-ST is accelerating transition to a zero carbon built environment, and two of the four new Alliance for Research Challenge will pull together industry, business, policy, and community partners to deliver positive and impactful results in energy and sustainable food systems.

To harness this strength and the contribution our academic institutions can make to adaptation innovation the Scottish Government will:

- establish a forum on adaptation which will bring together key academics from Scottish institutions, to explore how we can mobilise Scotland's strengths in scientific and technological innovation around adaptation goods and services. This will include consideration of how we can support commercialisation of end-products of innovation.

Rural and Environment Science and Analytical Services (RESAS)

As outlined in **objective B2**, the Scottish Government's RESAS 'Strategic Research Programme' ensures that Scotland maintains its position at the cutting edge of advances in agriculture, natural resources and the environment – including research relating to climate adaptation opportunities.

RESAS funds five centres of expertise in areas of high policy importance: water, climate change, animal disease outbreaks, plant health and knowledge exchange. These are virtual centres that bring together expertise across the publicly funded research sector. Currently, the Scottish Government funded Knowledge Transfer and Innovation Fund also supports sector driven projects to offer innovative solutions and knowledge transfer regarding climate change adaptation and biodiversity improvement.

Financial Innovation

Over the period of the Adaptation Plan, the Scottish Government will help create conditions for access to responsible private sector finance for projects and activities that are adaptation focussed, or have co-benefits for emissions reduction and resilience.

Nature Finance and Adaptation

Nature based solutions are an indispensable tool in helping Scotland adapt to climate change. Healthy environments are better equipped to withstand and recover from extreme climate-weather related events – including drought and flooding.

Investment in nature requires innovation in market-based approaches, to unlock the scale and size of investment needed.

As outlined in NSET, the Scottish Government is establishing a values-led, high-integrity market for responsible private investment in natural capital building on the existing Woodland Carbon Code and Peatland Code. The Scottish Government will:

- take forward our distinctive market vision in Scotland to support and promote responsible private investment in natural capital, publishing proposals for a market framework to help meet our climate change and biodiversity goals, support communities, and align with a just transition. This Natural Capital Markets Framework will strengthen our existing Interim Principles for Responsible Investment in Natural Capital and set out our approach to using public spending more effectively to leverage responsible private capital. This will be supported by a national project pipeline for nature-based solutions.

As one of the practical steps the Government is taking to build capacity and overcome barriers to scaling responsible private investment in natural capital, Scottish Ministers have launched The Facility for Investment Ready Nature in Scotland (FIRNS). FIRNS is co-funded by the National Lottery Heritage Fund and delivered in partnership with NatureScot with the support of the Green Finance Institute. Through FIRNS, grants of up to £160,000 are offered to organisations and partnerships, alongside technical advice and support, to help develop a viable business case and financial models to attract private investment in projects that can restore and improve the natural environment.

In its first year (2023/24) FIRNS awarded 27 diverse projects a share of over £3.6 million. These projects are located across Scotland: from the Solway Firth to Shetland, Fife, across central Scotland, and the middle of Edinburgh to the Hebrides. These range from those seeking to restore saltmarshes on Scotland's coasts, to iconic Atlantic rainforests, peatlands, rivers, lochs, farmland biodiversity and green spaces for nature and people.

Objective: Economic Development (B4)

Economic development is informed by climate risks and opportunities to support resilient, healthy and equitable places.

The policies outlined in Objective B4 support the alignment of economic development policy with the delivery of a more climate resilient, sustainable and inclusive economy.

For example, resilient supply chains are crucial for economic growth ensuring the vital flow of goods and services. Evidence underpinning the CCRA3 reflects the need to address the resilience of supply chains, both at a domestic and international level, as an area of increasing priority. There is specific relevance for sectors such as the food industry as well transport infrastructure. The policies and proposals laid out below under Objective B4 speak to these multiple aspects of how we will increase supply chain resilience in Scotland in the face of a changing climate.

Financial

Changes in Scotland's climate could impact access to funding and the affordability or availability of insurance, particularly for those in areas exposed to flooding and/or coastal change. Ensuring financial flows that are considerate of climate risks and opportunities will be a key part of ensuring long-term financial stability in Scotland.

The financial services sector have an important role in supporting the transition to a climate resilient, net-zero economy – by effectively assessing climate-related risks and by helping individuals and communities adapt to the effects of climate change through how they invest, lend and insure businesses.

The regulation of financial services is a matter reserved to the UK Government. In order to support economy-wide resilience to climate-related shocks and minimise the potential risks to financial stability, the Scottish Government will:

- support the roll out of mandatory climate risk-disclosure for large and listed private sector organisations in Scotland, aligned with the Task Force on Climate-Related Financial Disclosures (TFCD) framework and monitored by the International Sustainability Standards Board. This will encourage climate-resilient decision-making by investors, lenders and insurers, with organisations publicly disclosing how they are assessing climate-risks, and opportunities and factoring these into long-term decisions. This increased transparency and visibility of material risks of climate, should support a shift in investment away areas where there is a high risk posed by climate change.
- work with the UK Government, to ensure adaptation is integrated into the UK Green Taxonomy as per the Green Technical Advisory Group (GTAGs) advice, noting the substantial contribution sectors are making to ensuring a resilient economy. For example, we are supportive of the principle-based approach to undue harm outlined with relation to adaptation activity and the UK Green Taxonomy, noting that while adapting to climate change can bring with it opportunities to support the transition to a climate-resilient economy, activities must not hinder net-zero or nature ambitions, or prompt maladaptation. We will also seek to ensure the UK Green Taxonomy includes reference to the Climate Change Committee's Risk Assessment to serve as the framework to define climate risk.

The Scottish Government regularly engages with the Financial and Professional Services sector in Scotland and refreshed the Financial Services Growth and Development Board (FiSGAD) in 2022 to act as the main forum for engagement, to foster greater collaboration and communication. Through FiSGAD and directly at an organisation level, the Scottish Government will:

- continue to engage with the financial services sector on key issues and opportunities facing the sector, including those related to climate risk and the transition to net zero, with a clear focus on identifying appropriate action to be taken by the sector and/or government.

Following COP26, the Scottish Government established the industry-led Scottish Taskforce for Green and Sustainable Financial Services which reports directly to FiSGAD. The Taskforce was set up to bring together the Scottish financial sector, professional services firms, academia and regulatory bodies to develop the steps we must take to establish Scotland as

a leading centre of green and sustainable finance. The Taskforce for Green and Sustainable Financial Services will:

- develop an action plan which will aim to provide sector leadership and look at new and innovative ways to mobilise green finance and investment to support our Net Zero goals and wellbeing economy. Final recommendations will be provided in Spring 2024.

Scottish National Investment Bank

Established by the Scottish Government in 2020 as the UK's first mission-oriented investment bank, the Scottish National Investment Bank (the Bank) delivers capital to businesses and projects which support a fairer, more sustainable economy. The Bank offers patient finance (over 10 to 15 years) to projects which support its three strategic missions set by Scottish Ministers - net zero, to improve places and communities and harness innovation.

The Bank invests in line with these missions and considers climate risk across all their investments. The considerations within the Bank's Climate Risk Assessment (CRA) form the basis for incorporating climate change risk and opportunities considerations into the investment evaluation and due diligence process. The Bank's CRA seeks to:

- identify, understand, prioritise, and alleviate risks posed by a changing climate, including transition and physical risks, and
- provide evidence and support to inform decision-making.

The Bank's CRA is aligned with internal and external climate reporting, including through the adoption of the Task Force on Climate-related Financial Disclosures framework.

Enterprise Agencies

In delivering their economic development remit Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will:

- each incorporate adaptation in all forthcoming corporate plans as part of a wider approach to support the transition to a resilient, net zero economy which delivers on the ambitions of the National Strategy for Economic Transformation
- will support action that businesses can take to adapt to climate change including consideration of supply chain resilience (as covered in **Objective B1**) and innovation opportunities (and **Objective B3**).
- continue to work with key regional partnership initiatives that support adaptation
- support research to identify the international supply chain risks and implications for global trade routes, resulting from a changing climate.

Regional Economic Development

As outlined in **Objective C1** the Scottish Government will work in partnership with local government and a broad range of others to facilitate mature regional adaptation partnerships and collaborations covering all regions in Scotland by 2029.

Across Scotland the impacts of climate change on regional economies will be felt differently.

The Scottish Government will explore support for these regional adaptation initiatives and wider partners to deliver regional Climate Change Risk and Opportunity assessments over

the period of the Adaptation Plan, in order to identify priority sectors and ensure the opportunities associated with adaptation can be realised and addressed.

Regional Economic Partnerships

Regional strategies sit across NSET, and are vital to inclusive, economic development. Scotland's Regional Economic Partnerships (REPs) bring together key economic actors to enhance regional interests, focus and align resources, share knowledge and expertise.

REPs in Scotland are increasingly recognising the importance of climate adaptation in their strategies and activities. Specific actions and strategies vary from one regional economic partnership to another based on local priorities and needs.

Case Study: Regional Economic Partnerships (REPS) and Climate Contributions

There are 7 published Regional Economic Strategies. Strategies acknowledge the climate emergency and set out projects aimed at reaching the region's climate ambitions, including on climate resilience. Examples of how the changing climate is integrated into strategic priorities include:

A number of opportunities are being explored by **Edinburgh and South East Scotland** to allow it to adapt to climate change and transition to a zero-carbon emission region. These include exploring sustainable modern methods of construction, utilise the existing energy assets within the region to transition to a low carbon economy; and a programme of work to identify projects that will help the region adapt to and build resilience to future climate changes.

Glasgow City Region have a mission to have the most advanced city-region economy in the UK in the race to net zero and climate resilience by 2030. The region aims to improve the number of green jobs by 8000 minimum and lower CO2 emissions per capita. There is also a significant programme of work being developed by the region to retrofit the housing stock to reach their zero emissions targets.

The **North East** have actions to deliver stronger advice to employers to help them transition to net zero and contribute to climate resilience. Climate Ready Aberdeenshire is currently creating a climate change adaptation and mitigation strategy. The region is currently working with partners such as the UK MET Office, ScottishWater, SEPA, NatureScot and others to better understand local climate and nature challenges and develop investable, place based, blue and green network infrastructure plans, integrated with enhanced active travel networks for the benefits of people and nature.

Ayrshire recognises the fundamental importance of rising to the challenge of climate change and doing all that is possible to restore and enhance the natural capital within the region. This was the motivation for including natural capital as a priority theme. They intend to better understand the natural capital that exists across the region and to develop a regional energy masterplan and support a just transition to net zero.

An ambition by **South of Scotland** to create a low carbon society that is increasingly resilient to the effects of climate change. Both Dumfries and Galloway and Scottish Borders Councils have declared climate change emergencies with Borderlands funding a regional energy

masterplan with an ambition to establish a regional energy investment company. The region is actively exploring and piloting nature-based solutions utilising the regions Natural Capital.

Regional Just Transition Plans

A just transition means becoming a net zero, climate resilient economy in a way that seeks to tackle inequality and injustice. It means making a rapid transformation in the way we live, work and do business in a manner that involves and supports our communities, workers and businesses across Scotland.

The National Just Transition Planning Framework, published in 2021, outlines the Scottish Government approach to just transition planning. This underlines that our work in tackling the climate emergency must not exacerbate existing inequalities and must actively seek to improve them.

The Scottish Government will develop our approach to regional just transition plans in 2024. We will initially be working with key partners, including the Just Transition Commission, existing regional partnerships and Local Authorities, to explore options. The goal will be to learn from areas (such as the North East, Glasgow and Edinburgh) where net zero plans are already more developed, to design an approach that can best enhance existing work.

Regional just transition plans will aim to:

- outline challenges and opportunities faced by regions and identify appropriate action to both mitigate and realise these;
- be underpinned by a commitment to wide engagement and co-design, ensuring that those who stand to be most impacted by the transition, including communities, businesses and workers are engaged throughout the process.

Supply Chains and International Trade

Both domestic and international supply chains play vital roles in the functioning of Scotland's economy – ensuring access to vital foods, goods and services. The increasing complexity of supply chains risks are emphasised by the CCC who note changes in climate can stress supply chains causing price rises, disruptions, delays and even failures in the supply of goods and services.

Ensuring access to vital goods, foods and services through our supply chains will include consideration of international trade, food safety and security, transportation and public procurement.

International Trade and Global Supply Chains

In the globalised world, economies are interconnected. International trade is essential to ensure Scotland has a globally competitive, prosperous economy – ensuring we can import and export valuable and essential goods and services. The CCC emphasises climate change poses risks to global supply chains as well as international trade routes.

Recognising the importance of climate-resilient trade to a thriving economy, the Scottish Government will:

- press the UK Government to consider climate resilience and vulnerabilities in supply chains as part of their impact assessment for each new Free Trade Agreement (FTAs), as well as include measures to support adaptation in the environmental section of its negotiating mandate for future FTAs.
- explore further research on the implications of a changing climate for global trade routes and to identify risks to Scotland's key international supply chain, in order to establish the resilience of Scotland's international trade routes.

Food Safety and Food Security

Changes in climate have implications for both food safety, and future food security in Scotland.

With regards to food safety, increases in extreme weather and changes in annual temperature are among factors which can lead to increasing occurrences of bacteria, viruses and parasites in crops and livestock which can be harmful for human health.

Food Standards Scotland (FSS) is responsible for implementing and monitoring food safety regulations for Scotland. FSS's strategy for 2021-26 recognises the potential impacts of climate change on food safety, and commits to ensuring its work to protect Scotland's population from foodborne illness adapts to take account of these impacts. FSS will protect the safety of food produced and sold in Scotland from the impacts of climate change by:

- Working with Local Authorities to ensure on-going implementation, under The Food (Scotland) Act 2015 and Assimilated Food Safety Law, of official controls which verify the measures applied by food businesses in Scotland to ensure the safety of our food chain. These controls play a critical role in assessing the risks associated with bacterial pathogens and natural toxins in food (including those which may be weather related) and ensuring appropriate measures are applied to protect public health.
- Investing in horizon scanning and nationally co-ordinated food sampling programmes which enable on-going surveillance of new and emerging risks to domestically produced and imported foods in Scotland, including those which may arise due to the impacts of climate change.
- Working closely with Public Health Scotland (PHS) to monitor trends in reported foodborne illnesses, such as Campylobacter and Salmonella infections, providing a means of identifying trends and patterns which may be associated with changes in climate, and measures which help to protect the public from exposure risks.
- Collaborating with UK Food Standards Agency, UK Government and UK Research and Innovation (UKRI) to identify evidence gaps and commission research which improves our understanding of the potential impacts of climate change on food safety risks, and supports the development of interventions for mitigating these risks.
- Continuing to deliver industry specific guidance to assist in the identification and control of food safety risks, and maintaining this guidance in line with new and emerging risks that may arise as a result of changes in climate.
- Working with the Scottish Government to assess and authorise new novel food products, production systems and packaging innovations which help to promote sustainable, secure supply chains and reduce the environmental impacts of food production whilst ensuring consumers are protected from safety risks.

Extreme weather-events and long-term changes in climate patterns could damage food production and supplies, in Scotland and around the world. The Scottish Government will work to improve Scotland's domestic and international food security, including preparedness for climate-related shocks, through:

- the work of the Scottish Government's new, dedicated Food Security unit. The Unit will ensure food security is considered in the development of wider Scottish Government policy.
- the Unit's development of an evidence-based system to monitor risks or threats to the supply chain to help mitigate future shocks and impacts on food security. The monitoring work, already underway, is being used on a trial basis during its development and is expected to include both ongoing monitoring and an annual review.
- insights from RESAS Strategic Research Programme 2022 to 2027 which focus on sustainable food systems and supply; as well as developing resilient, high-quality crops and livestock to support the food and drink industry.
- establishing a collaborative approach with the UK Government, the EU and other international food security actors, such as the Food and Agriculture Organisation of the United Nations on international food supply and security issues, including those resulting from climate change.

Food and Drink Industry Supply Chain Resilience

The food and drink industry is a major contributor to Scotland's economy, generating an annual turnover of around £15 billion and adding close to £5.4 billion in Gross Value Added (GVA) in 2020. The sector is made up of over 17,000 businesses, which employ around 129,000 people, many in remote, rural and island communities.

The industry is reliant on agriculture which (as outlined in objective **B2**) is particularly exposed to disruption from extreme climate-related events and long distribution networks.

Levers to enhance the resilience of the food industry sit largely with industry actors. Scotland Food & Drink's new industry strategy 'Sustaining Scotland, Supplying the World' outlines the sector's aims and ambitions over the next 10 years and has resilience as an overarching mission. As part of this mission the Scottish Government will:

- build supply resilience to mitigate risks associated with climate change and improving supply chain efficiency.

The Scottish Government will work with Scotland Food and Drink Partnership and is providing £5m of funding to support the delivery of the strategy, which has a specific Supply Chain Security programme of work. This aims to create the right conditions for businesses to operate successfully and optimise national food security, so we can respond to supply chain shocks and volatility, including those resulting from climate change. Action underway include:

- conducting an ongoing assessment of industry wide resilience and food security
- Undertaking research and pathfinder work, looking at elements such as logistics and processing
- providing rapid response research and development for supply chain interventions
- developing an import substitution initiative.

Public Sector Procurement and Supply Chains

The Scottish public sector spends more than £14.5 billion a year buying goods, services and works.

As such, the Scottish Government and the public sector have a role to drive resilience and effectively deliver public goods and services, through procurement practices which are considerate of climate risks. This includes promoting the resilience of public sector supply chains. It is also important that long-term investments, including procurement decisions, are made in a manner that reflects future climate scenarios and climate risks.

The Sustainable Procurement Duty within the Procurement Reform (Scotland) Act 2014 requires publicly funded bodies to consider and act on opportunities to improve the economic, social, and environmental well-being of their constituency. A public body must publish an organisational procurement strategy setting out how it will comply with the sustainable procurement duty and an annual procurement report describing how it has complied with its strategy.

The Scottish Government will continue to support greater resilience in public sector supply chains, and consideration of adaptation in public procurement activity by:

- continuing to implement the Public Procurement Strategy, its focus on supply chain resilience, the climate crisis and environment. Public bodies' individual Procurement Strategies and Annual Procurement reports should reflect alignment with the aims of the strategy.
- working collaboratively through the cross-sectoral Climate and Procurement Forum, to provide leadership on addressing climate challenges through procurement.
- maintaining and promoting a suite of Sustainable Procurement Tools, including Climate Literacy and Circular economy eLearning, to support public sector procurers to adjust to a more resource-efficient and sustainable procurement practice. These tools underpin the Sustainable Procurement Duty and provide a practical methodology to steer public bodies on opportunities to address mitigation and adaptation in their procurements.
- Publishing policy, guidance and support, as appropriate, clarifying expectations on public bodies with respect to climate adaptation, mitigation and circular economy considerations
- Building on risk management exercises that were conducted relating to previous supply chain shocks (Brexit, COVID and the war in Ukraine), in 2024 we will undertake an exercise to map climate risks to national collaborative frameworks to establish potential vulnerabilities.

Supply Chains Transportation and Distribution

Transport networks are key to driving economic activity and sustaining our society – facilitating international trade, and ensuring goods, foods and vital supplies are accessible.

The Climate Change Committee note Scotland is exposed to increasing weather related supply chain risks due to dependencies on transport networks, and a limited number of transport hubs.

Transport Scotland (TS) will help to manage risks to business distribution networks from climate-related events by:

- implementing their Approach to Climate Change Adaptation and Resilience (TS ACCAR) and the vision for a transport system that is resilient to weather related disruption. Ongoing monitoring and governance of the outcomes associated with this strategy will sit with TS and will be delivered through an internal governance group. This will include working and engaging with partners for those areas where TS does not have direct control over specific infrastructure networks (including Network Rail, Highlands and Islands Airport).
- developing a Trunk Road Adaptation Plan. An assessment of the Trunk Road Network (TRN), based on latest climate projections, will be carried out to identify areas of the TRN vulnerable to the impacts of climate change and a programme of interventions will be developed to address these, including to alleviate the impact of flooding. Completion of the assessment that will underpin the plan and publication of the plan will sit with TS and any subsequent interventions will be delivered through the Transport Scotland Trunk Road Network Operating Companies
- current work to develop and test a methodology for measuring the natural capital of the trunk road asset, to inform TS decision making over the period of the Adaptation Plan.

Outcome Five: **International Action (IA)**

Scotland's international role supports climate justice and enhanced global action on climate adaptation.

Climate impacts do not recognise or respect national borders. 2022 saw records broken for the hottest and driest summers, unprecedented flooding and damage and lives lost due to weather extremes. No single community will be left untouched by the effects of climate change. Some communities however will be disproportionately affected, and it is usually those who are least able to adapt who are the most impacted.

Scotland is a small country, but it is an open and outward looking nation which aims to put people at the heart of its international climate action. We act in solidarity with the Global South to build their capacity to adapt to the impacts of climate change. And not just to survive, but to thrive. We have a voice in international institutions, and we can use that voice to share knowledge and to provide a platform for our partners in the Global South and other states and regions. This will put pressure on national governments to keep to the commitments set out in the Paris Agreement and the United Nations Convention on Biological Diversity Global Biodiversity Framework. Scotland is also taking strides forward in research and innovation on climate adaptation and strengthening the policy-academia dialogue. However, we also have a lot to learn about adaptation from communities hardest hit across the world and those facing similar challenges to us here in Scotland.

Finally, the measures to manage the international risks in the UKCCRA fall in many cases to policy areas reserved to the UK Government. However, the Scottish Government is committed to taking all actions within its devolved competency to increase international action and improve domestic resilience to shocks and cascading failures and avoid

maladaptation. The actions set out in this chapter, combined with those focused on Scotland domestically, will improve our resilience to climate change.

A note on definitions for international action:

There is a need to reflect the nuance of the language in the international climate discourse and the following definitions aim to help guide you through the objectives and policies in this chapter. Under the Paris Climate Agreement, countries recognised the importance of 'averting, minimising and addressing' loss and damage.

Loss and damage can be 'averted' by **curbing greenhouse gas emissions** (**mitigation**). It can be 'minimised' by **taking pre-emptive action to protect communities** from the consequences of climate change (**adaptation**).

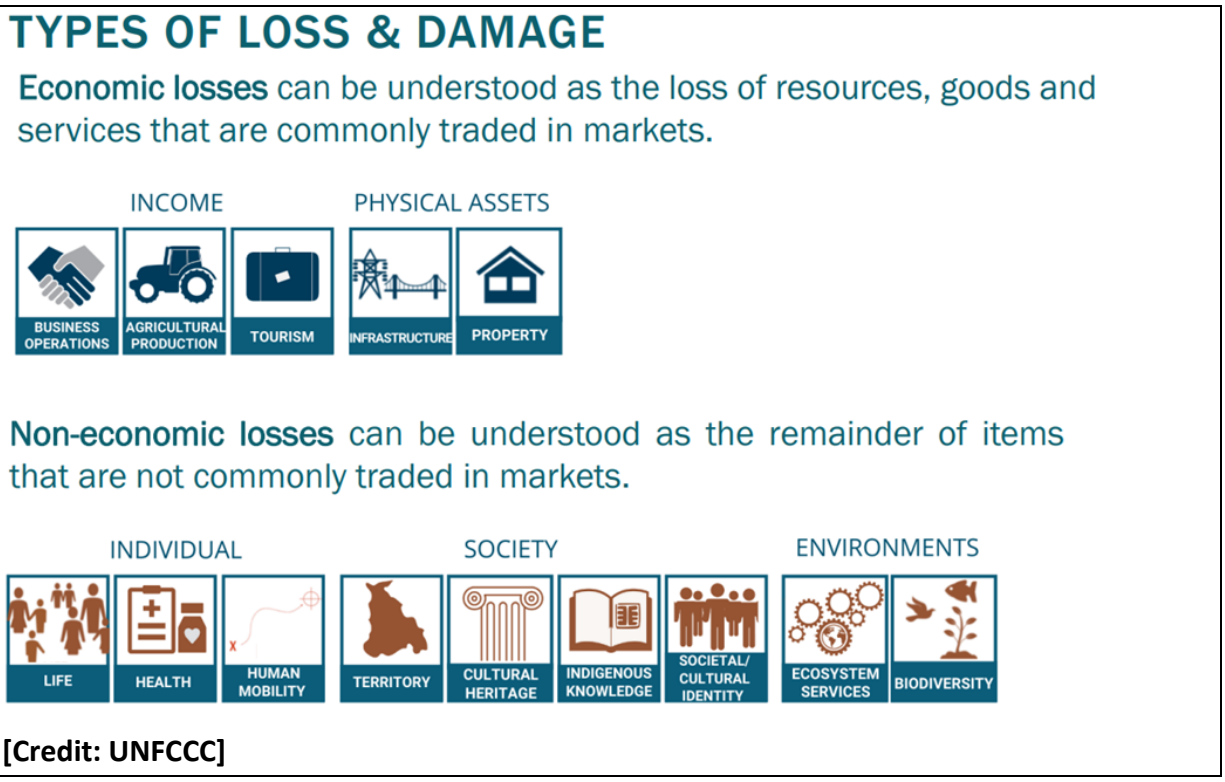
'Addressing' loss and damage is the third pillar of climate action: helping people **after they have experienced climate-related impacts**. It is this third area on addressing loss and damage which this section focuses on.

Loss and Damage: This refers to United Nations Framework Convention on Climate Change (UNFCCC) decisions and processes. The UNFCCC recognises the need for finance to respond to loss and damage associated with the catastrophic effects of climate change. At UNFCCC 27th Conference of the Parties (COP27) in Egypt, Parties agreed to establish a fund for Loss and Damage. The Scottish Government is not a party to the UNFCCC, however, it was the first global north country to commit funding to address loss and damage.

loss and damage: this refers to the wider phenomenon of loss (an impact that is unrecoverable (whether economic of non-economic) for example loss of life, habitat, culture, land) and damage (an impact that is recoverable) from climate change impacts, not necessarily related to the UNFCCC processes or membership.

losses and damages: what has been experienced and is happening in terms of observed impacts and projected risks from climate change.

Non-economic loss and damage: Damaging impacts of climate change where it is difficult or infeasible to attach a monetary value to. This may include harm to individuals (including to life itself, health and mobility); societies (e.g. loss of territory, cultural heritage, Indigenous and local knowledge, and certain untraded ecosystem services); and the natural environment (e.g. loss of and damage to biodiversity and habitats). At New York Climate Week 2023, the First Minister announced a new £5m programme on non-economic loss and damage.



[Credit: UNFCCC]

Climate justice: Climate justice is a people-centred, human rights-based approach that aims to share the benefits of equitable global development. It recognises that those who are being affected first and worst by climate change have often done little or nothing to cause the problem. Moreover, the voices of those communities – including in the Global South – are too infrequently heard.

Following an independent evaluation of the Climate Justice Fund, the Scottish Government set a future approach for action on climate justice, targeting funding at those most affected, particularly women and youth, and delivering against the three pillars of climate justice:

- **Distributive Justice:** relates to equal access to and sharing of resources and benefits and is used in climate justice definitions to include both access to resources and benefits, and equitable sharing of costs of responding to climate change;
- **Procedural Justice** relates to transparent, fair and equitable decision-making processes;
- **Transformative Justic**e relates to structural inequities and focuses on mainstreaming understanding of climate justice issues, as well as building capacity.

Objective: Vulnerable Communities (IA1)

Scotland's international programmes support communities vulnerable to the impacts of climate change to adapt and thrive.

This objective focuses on the Scottish Government's commitment to deliver climate justice for partners in the Global South. As detailed in the definition of climate justice at the start of this outcome, a climate justice approach recognises that those most affected by climate change are least able to adapt and have done the least historically to contribute to global warming. Scotland's climate justice work aims to increase the capacity of our partner communities to prepare for and adapt to the impacts of climate change.

The programmes and interventions put those most affected at their heart and ensure that the views and needs of those typically marginalised, including women and young people, in such communities are at the centre of future climate justice interventions in the Global South.

Scotland's Climate Justice Fund (CJF) – the world's first such fund and recently trebled to £36 million fund - is the primary source of funding for Scotland's international climate action. It is fully financially committed until the end of this parliament (2026). There are several programmes funded by the CJF spanning this chapter.

- **Climate Just Communities Programme** - CJC is a £24 million, three year programme that will take a participatory approach to support more resilient and inclusive communities across Malawi, Rwanda and Zambia. The programme will particularly ensure that the priorities and participation of the most marginalised within communities are central to the development and implementation of climate justice interventions.
- **Climate Justice Resilience Fund** - Of the £2 million committed by the Scottish Government during COP26, £1 million was awarded to the Climate Justice Resilience Fund to help some of the world's most vulnerable communities prepare for and adapt to climate change, tackle structural inequalities and recover from climate induced loss and damage. As a result, communities in Bangladesh, Malawi and the Pacific are able to re-build livelihoods, for example through skills development opportunities, as well as repair homes and infrastructure damaged by climate change. Activities included supporting communities to make informed decisions on migration and use remittances to build resilience. For those forcibly displaced, the provision of safe shelter is helping protect and address their rights and needs. In order to address the non-economic societal changes induced by the climate crisis, such as impacts on cultural identity, projects are utilising methods such as storytelling and intergenerational dialogue to preserve traditional knowledge. During COP27, an additional £5 million was pledged to tackle non-economic loss and damage. This funding has now been allocated and will run until March 2026
- **Feminist Action for Climate Justice** - Scotland has also announced our intention to become a commitment maker under the Feminist Action for Climate Justice theme through the UN Women's Generation Equality Campaign, and we are in the process of finalising these with the UN now. We know that women and girls will be disproportionately affected by climate change. So we are committed to creating gender-responsive policies and programmes which centre the rights of women and girls.

Case Study: Pacific Islands

A $225,000 grant was provided to the Unitarian Universalist Service Committee (UUSC) to support partners across the Pacific Islands to collaboratively assess and address climate-induced losses and damages being faced in their communities.

Partners co-designed the range of activities that each organisation undertook through subgrants from UUSC. Design activities include youth organising to map out what is being lost or damaged and community-led strategy development to seek resources for rebuilding or relocation. Other activities include protection of traditional knowledge through

storytelling; preservation of traditional knowledge through intergenerational dialogue; and litigation at the regional and international levels. UUSC is also engaging in participatory monitoring, evaluation, and learning in this grant in a deliberative and consultative manner.

Objective: International advocacy (IA2)

Scotland is an advocate in international fora for those most affected by climate change and least able to adapt. Through membership of international organisations it pushes states and international bodies to increase ambition on adaptation and biodiversity loss.

The Scottish Government is committed to using its influence as an international actor to raise ambition on addressing climate risks and biodiversity loss globally. We are a key voice in sub-national fora, such as the Under2Coalition, and we use our unique position as a devolved national government to collaborate at multiple levels – with subnational, regional and national governments as well as with international bodies like the United Nations.

Case study: Malawi – rebuilding resiliently after Cyclone Ana

A $200,000 grant was provided to Churches Action in Relief and Development (CARD) to support the communities in Chikwawa district in Malawi, which was devastated by Cyclone Ana in January 2022.

The project provided support to rebuild houses destroyed by the cyclone, using resilient building materials and local artisans. It has a livelihood component in the form of a livestock pass-on scheme, in which one set of families receive the first round of goats, which are supported by veterinary services and livestock insurance. Once the goats reproduce, the first set of families pass on the offspring to a predetermined second set of families. **T**hese interventions were identified and selected by community members during a community-level assessment of the loss and damage they experienced after Cyclone Ana.

International conventions

- **Participation at United Nations Framework for the Convention on Climate Change Conferences of the Parties (UNFCCC COPs or Climate COPs) -** Scotland will continue to participate at future COPs to ensure that progress towards meeting the goals of the Paris Agreement and associated international commitments continues to be made and that the role of non-party governments– at which level ambitious climate action is often taking place - is recognised, with further inclusion for non-party governments in UN processes**.** The Scottish Government will continue to play a bridging role, ensuring the voice of women, young people and the Global South influence debate and action at COP28. This is not limited to influencing efforts to limit global warming to 1.5 degrees but also increase international cooperation and finance for adaptation. Over the course of the Adaptation Plan the Scottish Government will:
    - Work with key stakeholders to hold a diverse range of events at COP with high level ministerial engagement and engagement with a wide range of relevant stakeholders
    - Ensure that there is at least one adaptation-focused event organised fully or in part by Scottish Government at each attended COP

Alignment with international adaptation goals and related strategies – Scotland will ensure we are aligned with global adaptation and biodiversity frameworks, for example:

- **UNFCCC –** Scotland will continue to mitigate to 1.5 degrees and align with adaptation commitments set out in the Paris Agreement.
- **Carbon Disclosure Project** - annual reporting feeding into the CDP report, with the data utilised by the UNFCCC's Global Climate Action Portal which recognizes climate actions and commitments made by actors around the globe, as well as feeding into Race to Resilience and Race to Zero Campaigns on the progress of regions in their commitments towards net-zero, building resilience, and adapting to impacts of climate change.
- **Global Biodiversity Framework -** Through the Edinburgh Process for Biodiversity, the Scottish Government led a global sub-state coalition to ensure a 'whole of government' approach to addressing the global biodiversity crisis. The adoption at United Nations Convention on Biological Diversity (UN CBD) COP15, of all levels of government – sub-state, regional and local - within the Global Biodiversity Framework (GBF) signalled a step up in global ambition. The UN CBD is the first environmental convention to include all levels of government approach. We continue to engage with the CBD through our membership of their Advisory Committee on Subnational Governments, and work with our global partners through various other fora to enable implementation of the Global Biodiversity Framework across all global regions, sharing our knowledge and expertise, learning from others and working to deliver our own National Biodiversity Strategy and Action Plan through the Scottish Biodiversity Framework.

International engagement

Scotland will use our platform as an international climate leader to influence and engage with international counterparts, including national governments, on climate change adaptation and mitigation.

Recognising that ambitious climate action and implementation is often taken by states and regions, Scotland will continue to place a strong emphasis on forums for knowledge sharing and capacity building between states and regions, via international coalitions. Under2 and Regions4 form the two key pillars of Scotland's states and regions engagement.

- **Under2 -** Scotland is currently European co-chair of the Under2Coalition (2022-2024), an international coalition of climate ambitious state and regional governments from the Global North and South. At COP26, Scotland led efforts to update the Under2 Coalition's Memorandum of Understanding, committing signatories to meet net zero individually as quickly as possible and collectively as a Coalition by 2050, in line with the goals of the Paris Agreement. Key actions include:
    - In our role as European co-chair, Scottish Government hosted the European ministerial meeting in Brussels in 2023. Thirteen states and regions attended and shared the challenges and successes they have experienced implementing ambitious climate policies.

    - Scottish Government participates annually as part of the Under2Coalition's Future Fund Secondment. In 2023, Scottish Government participated in two days of knowledge exchange with the Government of Antioquia in Colombia with Adaptation Scotland and Scottish Government delivering a workshop on our approach to climate change adaptation in Scotland.
- **Regions4** - The Scottish Government also sits on the Steering Committee of Regions, a global network of subnational governments in the fields of sustainable development, climate change and biodiversity. Scotland is an active member of the RegionsAdapt Initiative, aimed at inspiring and supporting regional governments to take concrete action, collaborate and report on climate adaptation.
    - Scotland will continue to play an active role in Regions4, contributing annually to the running of RegionsAdapt and seeking opportunities to support Regions4 projects that include an emphasis on adaptation.
    - By 2029 we will have worked with the networks on adaptation action and contribute anually to running of RegionsAdapt.
- **Local Governments and Municipal Authorities (LGMA) Constituency** - The LGMA represents the voice of subnational governments within the UNFCCC and Scotland is a member by virtue of its leadership roles of the Under2 Coalition and Regions4. As part of this, the Scottish Government has fed into the drafting of key messaging around climate action and papers in response to the UNFCCC Global Stocktake, with adaptation a key focus – most recently the position paper *#multilevelactiondelivers in action*. This paper and associated messaging form key parts of the UNFCCC process and will be considered at the COP8 summit in 2023.
- **Women's Environment and Development Organisation (WEDO)** - For the last five years the Scottish Government has supported WEDO to address gender equality in climate action in the Global South by directly supporting women delegates to attend COPs and represent their own respective interests. Funding also assists grassroots and indigenous women leaders to access funding to scale up climate solutions in Global South countries.
- **British-Irish Council** - The British-Irish Council (BIC) was one of the institutions created under the 1998 Good Friday Agreement, with the goal of further promoting positive, practical relationships among the people of the islands; and to provide a forum for consultation and co-operation on matters of mutual interest within the competence of the relevant administration. The BIC member administrations include the Irish and UK governments, the Northern Ireland Executive, Scottish Government, Welsh Government, Guernsey, the Isle of Man Government, the Government of Guernsey and the Government of Jersey.
    - The climate adaptation sub group is one of four sub-groups that come under the umbrella of the BIC Environment work sector, along with marine environment, marine litter, and Invasive Non-Native Species (INNS). Each sub group has its own membership drawn from the eight BIC Member Administrations who then feed into the main BIC Environment work Sectors.
    - The Scottish Government will engage with the climate adaptation sub group to facilitate knowledge sharing, cooperation and shared learning on adaptation action best practice.

Objective: A global hub for adaptation research (IA3)

Scotland is a global knowledge hub for research and innovation on climate adaptation, loss and damage and climate justice and facilitates knowledge sharing between Global South/Global North.

Scottish universities and research centres have a long tradition of producing world-class climate mitigation and adaptation research, with expertise stretching across the environmental sciences, agriculture, marine science and others. International collaboration and knowledge exchange are integral to the success of Scotland's universities and colleges.

Scotland can be even more closely involved in international multi-disciplinary research that addresses climate adaptation and to expand our research and innovation networks beyond our borders.

Proposed policy options for consideration against this objective include:

- By 2029 establish a network of adaptation experts across Scotland and map links to international institutions and research networks.
- Before the end of the Adaptation Plan host an international adaptation research consortium event to share Scottish research expertise and good practices from international counterparts.

Research Expertise

- **ClimateXChange (CXC)** – Our centre of expertise on climate change works with Scottish Government policymakers to commission research and analysis to support policy development for adapting to the changing climate and transitioning to net zero. CXC then guides researchers in planning their work to meet policy timelines, helping prioritise scientific resources in line with society's priorities and create new partnerships with research institutes and universities. The Scottish Government will continue to fund CXC over the period of the Adaptation Plan. Examples of CXC research include:
    - Adapting Scottish agriculture to a changing climate (climatexchange.org.uk)
    - International climate justice, conflict and gender (climatexchange.org.uk)
- **SAMS/MASTS (Marine Scotland Science) –** SAMS is the UK's oldest independent marine science organisation delivering research, education and enterprise for a sustainable marine environment working with the Scottish Government to inform blue economy policy. The Marine Alliance for Science and Technology for Scotland supports this as a consortium of 18 organisations engaged in marine science helping inform Scottish Government policymaking.
- **James Hutton Institute (Hutton) –** At the forefront of innovative and transformative science for sustainable management of land, crop and natural resources, the institute is the first of its type in Europe. Their research aims to make major contributions to the understanding of key global issues, such as food, water, energy, environmental security and rural development which helps inform policy development.
- **National Centre for Resilience (NCR) –** Launched in 2016, Scotland's NCR is a cross sector partnership, spanning Scottish universities, the Scottish Government and responder organisations. The NCR supports a network that connects researchers,

policy makers and responders, and works to improve our understanding of the impacts of natural hazards in Scotland. The NCR is an academic research hub, and commissions new projects to address real life issues related to natural hazards in Scotland.

Loss and damage

The Scottish Government has an established leadership position on Loss and Damage. Ahead of hosting COP26, Scotland brought together international representatives and practitioners to articulate best practice on addressing loss and damage at Scotland's conference *Addressing Loss and Damage*. The resulting synthesis was launched in March 2023.

- By 2029, we will continue to support the development of the global evidence base on addressing non-economic and slow-onset loss and damage, in a way that is gender-responsive.
- We will also work with our partners to build momentum from non-state actors, using our position as European co-chair of the Under 2 Coalition and on the steering group of Regions 4 to understand how best to unlock loss and damage finance at a subnational level.

Annex B: **Cross-cutting Policy Proposals**

Adaptation links with other areas

The impacts of climate change are pervasive and the associated risks cascade across a wide range of policy areas. Effective and inclusive adaptation action requires coordination, with delivery against a large number of complementary policy areas. This means that, wherever possible, adaptation action reinforces steps being taken to reduce emissions, deliver a just transition, rebuild biodiversity, support agriculture, deliver effective planning and improve public health.

This section highlights the most critical areas where adaptation action plays into other headline Scottish Government plans and strategies.

Climate Change Plan

The Adaptation Plan sits closely alongside Scotland's updated Climate Change Plan which sets out the policies and proposals required in order to drive delivery in our journey towards net zero. It sets out a detailed and ambitious package of which adaptation and resilience are key components. Both the Adaptation Plan and the updated Climate Change Plan share common nature-based solutions which help to achieve the outcomes desired in both climate change mitigation and adaptation plans.

The next Climate Change Plan, which is due to be published in its final format in 2025, will seek to further strengthen and reinforce the co-benefits and interdependencies integral to this partnership.

Just Transition Plans

Scotland's Just Transition Planning Framework sets out our long-term vision to deliver a fairer, greener future for all by 2045 across sectors on Scotland's journey to a net zero and climate resilient economy. Identifying key risks from climate change and setting out actions to build resilience to these risks is one of the Scottish Government's fundamental National Just Transition Outcomes. This recognises that a transition to net zero cannot be truly just if those most vulnerable in society are still experiencing the adverse effects of climate change. In particular, the Scottish Government's just transition policy will need to address a fair distribution of the costs and benefits associated with climate resilience measures. Those least able to pay will need to be supported to make necessary changes. As lower-income households are more vulnerable to the impacts of climate change, it is imperative to reduce these inequalities in addressing both climate resilience and mitigation measures. This also reads across to the Scottish Government's commitments to tackle child poverty through its consideration of the drivers of child poverty.

Through our individual sector Plans, aimed at high-emitting industries (Land Use and Agriculture, Transport, and the Built Environment and Construction), we will ensure the just transition actions and principles are aligned with the Adaptation Plan. The independent Just Transition Commission is advising and scrutinising the Scottish Government on its Just Transition Plans, and has also committed to reviewing the SNAP as part of the work to incorporate climate resilience into Scottish Government's focus on just transition.

The Scottish Government has also committed to regional Just Transition Plans, and we will develop our approach in 2024. We will initially be working with key partners, including the

Just Transition Commission, existing regional partnerships and Local Authorities, including the Regional Adaptation Partnerships, to explore options that can best enhance relevant ongoing collaboration.

National Planning Framework 4

National Planning Framework 4 (NPF4) sets out the Scottish Ministers' policies and proposals for the development and use of land. It details a long-term plan looking to 2045 that guides spatial development, sets out national planning policies, designates national developments and highlights regional spatial priorities.

NPF4 and the relevant Local Development Plan(s) (LDP) form the statutory development plan for any given area of Scotland. Along with Regional Spatial Strategies (RSSs) and Local Place Plans (LPPs) this creates a spatial framework for decision making that will support the delivery of a wide range of strategic priorities. NPF4 gives priority to the climate emergency and nature crisis, whilst establishing six spatial principles to apply in planning our places to support the delivery of: sustainable places, where we reduce emissions, restore and better connect biodiversity; liveable places, where we can all live better, healthier lives; and productive places, where we have a greener, fairer and more inclusive wellbeing economy. The planning system in Scotland is plan-led and decisions on planning applications must be made in accordance with the development plan, unless material considerations indicate otherwise.

Flood Resilience Strategy

Our new National Flood Resilience Strategy will form an integral part of shaping a climate resilient Scotland. The Strategy will initiate transformational change bringing in a collaborative, place-based approach to building community flood resilience. It will engage a wide range of partners enabling a broader range of flood management actions and flood resilient design contributions to be delivered. It will also consider how we use land across catchments and call for more use of blue and green infrastructure to help reduce flood impacts. This strategy, scheduled for finalisation by the end of 2024, will be followed by delivery plans to translate our ambition into actions as we prepare Scotland for increased exposure to flooding.

Biodiversity Strategy

One of the biggest opportunities Scotland has to adapt to climate change is through regenerating and restoring nature. Our Scottish Biodiversity Strategy sets out a clear goal to halt biodiversity loss by 2030 and a strategic vision to 2045 in which our natural environment, our habitats, ecosystems and species, will be diverse, thriving, resilient and adapting to climate change. The Strategy's outcomes capture how our land and seascapes will need to evolve and contribute to creating a resilient natural environment. Dynamic, rolling delivery plans will outline the actions needed to deliver our vision.

Delivery of our Strategic outcomes will be further supported by a framework for statutory nature restoration targets which will be set out in a new Natural Environment Bill. These statutory targets will be binding on the Scottish Government, forming a key element of accountability for delivering the biodiversity framework and ensuring our natural environment is resilient for the future. While nature-based solutions are embedded throughout all our overarching outcomes, the link between biodiversity and adaptation is

explored in most detail in Outcome 1: Nature connects our land, settlements, coasts and seas.

Transport Scotland

The Approach to Climate Change Adaptation & Resilience by Transport Scotland sets out an ambitious vision for a well-adapted transport system in Scotland which is safe, reliable and resilient in relation to the current and future impacts of climate change. The approach outlines an Adaptation and Resilience Framework including high level Strategic Outcomes for Trunk Roads, Rail, Aviation and Maritime transport networks.

Scotland's transport infrastructure and networks provide critical connections between people and places, and are vital in providing access to essential services, such as healthcare. Read more about how our transport system is increasing their resilience and adapting to the impacts of climate change in Outcome 3: Public Services and Infrastructure.

Climate, health, and equity

The World Health Organisation defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Health is a basic human right. Health inequalities are unfair and avoidable differences in health outcomes between groups of people. They are caused by the unequal distribution of income, power and wealth which influence access to the building blocks of health and wellbeing, leading to poverty and marginalisation. The building blocks of health and wellbeing include affordable quality housing; accessible and affordable transport; biodiversity and high-quality blue, green and civic spaces; affordable, sustainably produced healthy food; education and fair work; health and social care services; and connected and empowered communities.

Climate impacts, such as increased temperatures, flooding, coastal change, damage to buildings and infrastructure, and changes to our natural environment and habitats, will have wide-ranging effects on population health and wellbeing, even if greenhouse gas emissions are rapidly reduced now. Health effects of climate change may be direct, for example an increase in injuries due to flooding or excess deaths from stroke, heart, or lung disease due to high temperatures. They may be indirect, for example undermining access to the building blocks of health and wellbeing in local places.

Some people and communities will be more likely to be exposed to and less able to prepare for, respond to and recover from climate impacts. In Scotland, this may include children, older people, people with health conditions or disabilities and people experiencing social and economic disadvantage. For people and communities who experience multiple disadvantages, these factors act as risk multipliers, increasing their risk of health impacts from climate change, and widening inequalities.

Climate actions are opportunities to deliver 'triple wins' for climate, population health and wellbeing, and inequalities. Through the just transition and our adaptation responses, we can redefine our physical, social, and economic environment, delivering population health, wellbeing, and equity co-benefits toward a healthier, fairer, greener Scotland.

Public Health Scotland

As Scotland's national public health agency, Public Health Scotland (PHS) has a dual role in ensuring health and equity are embedded in climate change action while also embedding climate and sustainability into our work to address Scotland's population health challenges.

This requires implementation of a rights-based, public health approach as outlined in PHS' Climate Change and Sustainability Strategic Approach 2023-2026. This will contribute to building climate-resilient, healthy and equitable places.

PHS will fulfil its role in achieving climate-resilient, healthy and equitable places through:

Leadership: PHS has a lead role to play in shaping the narrative on the risks and opportunities that climate change, and our collective response to it brings, in generating health benefits, minimising health harms and addressing health inequalities. For example, PHS is developing an Adverse Weather Health Protection Response Plan.

Collaboration: A whole system approach is required to tackle climate change impacts and simultaneously build climate-resilient, healthy and equitable communities. PHS will work closely with a range of intersectoral partners and stakeholders to achieve this.

Insights: PHS' role includes describing the direct and indirect impacts of climate change and adaptation actions on population health, wellbeing and equity. PHS will provide timely, accurate and actionable public health knowledge, intelligence and evidence to underpin adaptation planning and decision-making. This will in turn provide a platform for future monitoring and evaluation of actions.

Skills: PHS support building capacity and capability in the use of public health tools and approaches. This includes using health impact assessments to understand who will benefit from, and who might be disadvantaged by, actions and integrating health into all policies, to ensure national and local adaptation programmes include outcomes related to health and equity.

NHS Scotland climate emergency and sustainability strategy: 2022-2026 and Social Care delivery

Climate change has consequences for both the healthcare estate and for the delivery of clinical services. A dedicated programme of work (the NHS Scotland Sustainability Action Programme) has been established to support the NHS Scotland to become a net zero and climate resilient organisation by 2040. The programme is underpinned by the NHS Scotland climate emergency and sustainability strategy: 2022-2026. The initial focus for adaptation is to support the development by Health Boards of Climate Change Risk Assessments and Adaptation Plans. As with many elements of the strategy, successful implementation of adaptation measures will require working with partners such as local authorities.

Local Authorities are responsible for delivering social work and social care services and play a critical role in responding to the climate emergency. The Scottish Government recognises the need to work with local government to support the social care sector – whether in house or commissioned services - to play its part in tackling climate change as well as on climate change adaptation. Public Health Scotland will work with Scottish Government and COSLA to understand how they can support the social care sector to respond to the climate emergency. Going forward, the introduction of the National Care Service will provide further opportunities to build climate change considerations into the way that social care services are planned, commissioned and delivered.

Vision for Agriculture

Scotland has made a commitment to transform the way we look at farming and food production in Scotland through our Vision for Agriculture which features climate change adaptation and mitigation a key outcome. The Agriculture and Rural Communities Bill aims to provide Scotland with a future framework that will support farmers and crofters to meet more of our food needs sustainably and to farm and croft with nature, and will assist in efforts to meet our climate change targets and adapt to climate change.

Land management in Scotland will change as we tackle the twin climate and biodiversity crises which will present challenges and opportunities for farmers and crofters, building on their traditional leadership role in land management and stewardship. We will also aim to ensure our farmers, crofters and land managers have access to the benefits, both economic and social, that the changing climate will bring.

Land Use Strategy

Scotland's third Land Use Strategy sets out our long-term vision for sustainable land use in Scotland, our objectives and key policies for delivery. As part of strengthening our climate resilience, we need to change the way we use, manage and live on our land. For example, adapting our landscape to the impacts of climate change through nature-based solutions such as afforestation and peatland restoration.

National Strategy for Economic Transformation

Our National Strategy for Economic Transformation (NSET) sets out our priorities for Scotland's economy (including those referenced in our Climate-Smart Skills section) as well as the actions needed to maximise the opportunities of the next decade to achieve our vision of a wellbeing economy such as nature-based solutions to adaptation. NSET aims to establish a new measure of economy resilience and identify climate adaptation actions required to future-proof the productivity of Scotland's economy over the long term.

NSET also sets out our priorities for Scotland's economy (including those referenced in our Climate-Smart Skills enabler section) as well as the actions needed to maximise the opportunities of the next decade to achieve our vision of a wellbeing economy such as nature-based solutions to adaptation. The nature-based sector is already expanding rapidly and there is strong potential for future growth in areas such as sustainable land and marine management. Rebuilding Scotland's natural capital is key to the long-term productivity of the many sectors of our economy which rely on the resources and services nature provides. NSET includes a plan to establish a new measure of economy resilience and identifying climate adaptation actions required to future-proof the productivity of Scotland's economy over the long term.

Within our Programme for Government we have outlined our intention to develop a Green Industrial Strategy that will set out how the Scottish Government will help businesses and investors realise the enormous economic opportunities of the global transition to net zero and create good, well-paid jobs across Scotland in sectors such as offshore wind and hydrogen. This delivers on a commitment made in NSET and supports the development of sectoral Just Transition Plans.

Understanding and Enabling Adaptation Behaviour

'Behaviour' refers to the millions of actions we all take, every day. These are measurable and have an impact on the world around us, for example choosing to cycle to work or turn the thermostat down, and they are also influenced by our environment and personal values.

The Scottish Government has established a cross-sectoral programme of work applying insights from behavioural science to climate policymaking with the aim of sparking climate action and leveraging its co-benefits, focussing on creating an environment that enables and encourages climate-positive choices. We know that behaviour change across society by individuals, households, communities and businesses is critical for reducing around 60% of our greenhouse gas emissions to lessen further impacts on the global climate. Equally, Scotland is already feeling the effects of a changing climate, so individual and community behaviour (alongside large-scale action by national and local governments) sits at the core of our collective ability to adapt to those unavoidable impacts.

Adaptation is fundamentally about changing how we act now to avoid costly damages later, for example most people accept that more extreme weather is a result of climate change and agree that we need prepare our homes and communities.

People are constantly adapting to changing environments and social norms. However, there is an urgent need for us all - communities and individuals, businesses, public and third sector - to learn more about climate change risks, how to prepare for them; and to adopt behaviours which will enable us, individually and collectively, to build resilience at pace. The UK's independent Climate Committee Change has highlighted behavioural change as a crucial category of adaptation action and CCRA3 highlights the potential co-benefits of responding to key risks through behaviour change.

The Scottish Government is therefore committed to supporting everyone by utilising all policy levers available to create and shape the conditions necessary for climate-resilient behaviours to flourish. It is both effective and fair to focus on creating enabling environments for change. The principles, insights and tools of behaviour change as a practice are ideally equipped to ensuring a people-centred approach to adaptation. They will allow us to capture people's lived experiences, a core feature of this Adaptation Plan, as a basis for understanding the influence of human behavioural factors on climate change risks affecting people (e.g. flooding, water scarcity, hot weather), and the ways to enable more climate-resilient behaviours. As part of this consultation, and through our research partnerships, we will ensure that behavioural insights from communities, individuals and households, inform policies in the next Adaptation Plan for Scotland.

Workforce and Skills

The transition to a climate-smart Scotland requires a fundamental transformation of our workforce and of the sectors that facilitate the supply of skills needed for this transition. The transition to net zero and the adaptation of our economy, environment and public services requires the education and skills system to become adaptable and flexible in order to provide the skills that individuals and employers need. The labour market is already shifting in response to the Climate Emergency with variations in the demand of current skills as well as the creation of 'new and emerging' green jobs. It is critical that the right people with the right skills are in the right place at the right time to ensure our vision for a climate resilient Scotland is met. This enabling chapter will cover the wider skills policy context, the occupations most likely to be impacted by the changing climate and the climate-smart jobs needed to achieve the overarching vision and outcomes within this programme.

Understanding current and future skills for a changing climate

Our upcoming Green Industrial Strategy will set out our plans to help businesses and investors to realise the enormous economic opportunities of the global transition to net zero and create good, well-paid jobs across Scotland. In connection, our National Strategy for Economic Transformation (NSET) sets out our desire to ensure people have the skills they need to meet the demands of the ever-changing economy and society and that employers invest in the skills they need to grow their business. The sectoral Just Transition Plans (JTPs) enhance these strategies by focusing in on high-emitting industries: energy, transport, built environment and construction, and land use and agriculture. By aligning these overarching strategies and commitments, Scotland will move towards a skills economy that offers equal opportunities to all while maximising our international competitive advantage.

This strategy further advances the policies laid out in the Scottish Government's Climate Emergency Skills Action Plan (CESAP), published in December 2020, which sets out a clear direction for the reorientation of our skills systems to aid the just transition to a net zero economy. This plan largely focused on the skills that will assist Scotland in meeting its ambitious climate charge targets and recognises the need for skills to adapt to the effects of climate change.

In 2020, the Green Jobs Taskforce was launched by the UK Government to set the direction for the future green job market. Climate adaptation was amongst the prioritised sectors examined in their research, including: flood defences; retrofitting of buildings to be resilient to extreme weather; nature-based solutions to reduce climate impacts; and civil and mechanical engineering for infrastructure adaptation. The taskforce found that the climate resilience market is rapidly growing, with sectors such as housing and construction, water, infrastructure, local government, and nature conservation, among others, requiring adaptation skills. This is an important opportunity for the Scottish Government to capture the economic opportunities of adaptation as well as allowing us to be at the global forefront of climate resilience. The ongoing coordination and commitment from the Scottish Government and its agencies, stakeholders and employers will be critical in ensuring the successful delivery of climate-smart skills. Everyone from investors to charities has a stake and a role to play in developing a workforce that is tailored to the future. The transition to a climate smart workforce will involve considerable investment from the private sector, and

government and its agencies to establish the skills opportunities needed to handle the climate emergency.

Our Adaptation Scotland programme provides support to organisations on their adaptation journey in the context of their local needs and priorities. This includes designing tools and resources to enable the public sector, businesses and communities to build their 'adaptive capacity' by incorporating the range of skills needed to implement adaptation actions.

Scotland's people and their unique skills, talents and abilities underpin every part of what makes Scotland a successful nation and enables us to play our full role as a good global citizen; where workers face insecure work due to climate change, reskilling individuals to sectors where there is employment growth is an important tactic to protect against income losses[1]. To support this, we need a lifelong education, research and skills system that fosters curiosity, nurtures talent, encourages ambition and enables everyone to fulfil their potential. Scotland's post-school education and skills system (a range of bodies involved in skills planning and provision) plays a key role to play in supporting individual learners and employers, in all communities, to adapt their skillset to the changing climate.

Impacted occupations

The impacts of climate change will have implications for occupations across Scotland's economy. As employers adjust their models of operation to the changing climate, their resourcing strategy will need to be altered, from recruitment of a climate smart workforce to internal training subject matter. These impacts may be more direct, for example through training staff on how to handle extreme weather events in outdoor industries, or indirect, through increased workloads for certain sectors such as home insurance and construction.

Most sectors will require specific upskilling or retraining to ensure their market offering remains viable in cases of potential damage to business assets, transport and industrial infrastructure. All jobs will likely require higher levels of climate resilience awareness within their Health and Safety training, as well as due consideration of adjustments to working practices, personal protective equipment and physical workspaces, in light of potential local climate risks such as loss of working hours due to heat stress.

Some of the upskilling needed to become a climate-smart workforce is already taking place. For example, businesses have adapted their business models throughout the pandemic to improve their wider resilience include promoting working from home where possible and the uptake of flexible working arrangements. A recent ONS survey (2023) found that roughly half of individuals in work based in Scotland were able to homework or hybrid work in the week preceding. These practices will enable continued productivity when extreme weather conditions prevent or delay commuters from reaching their scheduled place of work. However, these practices have required an increase in the quantity and quality of digital skills previously available on the job market. The Scottish Council for Voluntary Organisations estimates that nearly 1 in 5 adults in Scotland do not have the skills to make full use of digital technology at home or at work, while 1 in 10, particularly older people, have no digital skills at all.

[1] International Labor Organization: The employment impact of climate change adaptation, 2018

The Scottish Government is working to close this digital skills gaps to ensure our economy is resilient to worker displacement in the event of weather disruption where possible. The Digital Participation Charter has been signed by 712 organisations, each of which has committed to supporting their employees and people across Scotland to develop essential digital skills. Connecting Scotland, a collaboration between Scottish Government, local government and the third sector, developed in response to the pandemic, also aims to provide everyone in Scotland with the opportunity to confidently access devices, connectivity, skills and support.

Case Study: Soil Regeneration Skills

Agricultural crops will face a higher incidence of heavy precipitation and and/or extreme heat that will result in damage to agricultural crops if not correctly mitigated. The farmer-led soil regenerative agriculture network, supported by Farming for a Better Climate, enables farmers to work together to show how best to support, enhance and protect their farm soils. The group has trialled novel approaches to allow them to improve production whilst building soil resilience amongst wider benefits.

Climate-Smart Jobs

To ensure that everyone is able to engage with the transition to a climate resilient economy, it is important that we are able to define what we mean by a 'climate-smart' job; this will allow us to articulate the skills that will underpin those jobs. Our Climate Smart jobs refers to those specific jobs that actively contribute to achieving the overarching vision and outcomes within this programme. As part of aligning the Adaptation Plan with our Just Transition Plan, the climate-smart jobs follow the same categorisation as the green jobs identified in the Climate Emergency Skills Action Plan.

Higher Demand of Existing Jobs

Many of the jobs and skills that will directly enable our transition to a climate resilient Scotland already exist; however, demand for these jobs is expected to increase significantly. Certain industries that feature adaptation skills heavily, such as STEM (science, technology, engineering and mathematics) fields, will likely face an increase in the employment demand. It is critical that we anticipate resource gaps in these areas and protect and increase the training opportunities available in these sectors. These industries should also recognise that adaptation plans usually require employment in a wide range of expertise and competencies, for example general labourers for the retrofitting trade to complement the skilled staff.

Jobs Affected by the Just Transition to Net Zero and Climate Resilience

A significant number of jobs will retain the same core purpose however require significant change to the work and worker requirements. This will therefore result in changes to the knowledge, skills and associated qualifications in order to adjust to the transition to a resilient Scotland. For example, town planners strengthening their natural flood resilience knowledge when designing local development plans. This type of upskilling will ensure an increase in their communities' effective resilience to the current and future impacts of climate change.

New and Emerging Jobs

New and emerging occupations that relate directly to climate adaptation are likely to continue being created as new risks and opportunities resulting from climate change

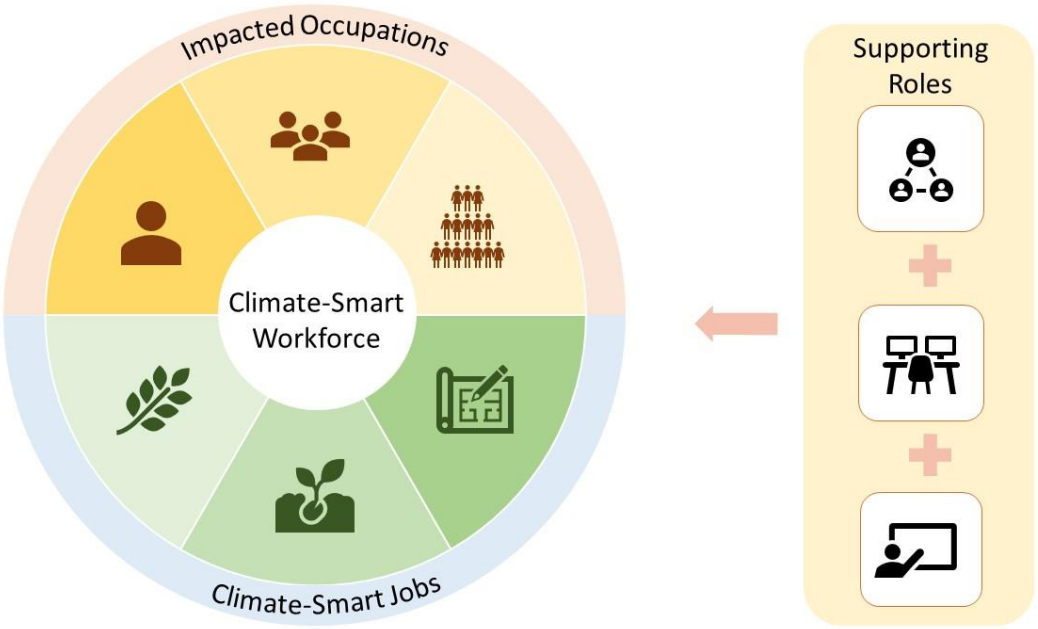
emerge. By ensuring Scotland's workforce is flexible and adaptable to meet the climate resilience sector's needs and timelines, we can ensure Scotland's businesses are at the growing forefront of the climate smart market. For example, as the benefits of riparian woodlands are increasingly recognised in regulating critical water temperatures and mitigating extreme events like flooding, the demand for new occupations highly skilled in riparian woodland design and management will also increase.

Case Study: Peatland Restoration Skills

Scotland's first National Peatland Plan provides a framework for assembling the skills needed to improve the condition of damaged or degraded peatlands. A range of specialist and technical jobs will be needed to carry out peatland restoration including hydrologists, satellite data analysts, surveyors, ornithologists, ecologists and project managers. However, there is still a shortage of people with skills in peatland restoration on the ground level with the fast-growing sector requiring an additional 1500 skilled people by 2025 to meet Scotland's ambitious climate targets.

In 2022, Scotland's Rural College (SRUC), in partnership with NatureScot Peatland ACTION, launched a new short course designed to address this shortage by teaching an overview of peatland ecology and hydrology and an understanding of the causes of peatland degradation. The Peatland Assessment and Restoration course will allow participants to develop their skills in mapping and surveying peatland before designing effective interventions for the restoration of the site. Participants will cover all stages of planning, funding and delivering a restoration scheme during the short course.

Peatland ACTION project officer from NatureScot Ndurie Abah discusses the project with Colin Morrison of Angus Davidson Ltd. Source: ©Swift Films / Peatland ACTION – NatureScot.



Primary exposure through extreme weather events will be felt most by outdoor workers whose livelihoods and workloads may be weather dependent – e.g. agriculture, tourism, and emergency response workers.

Secondary exposure through the casual sequence will be felt in industries connected to those in the primary exposure who may face increased workloads responding to the consequences of extreme weather events e.g. insurance claim handlers and mental health professionals.

Workers across the country will feel a shift in their ways of working as the changing climates begin to impact every individual and organisation in different forms.

Existing jobs that may be needed in greater numbers as the result of adaptation efforts e.g. conservation scientists, natural flood management practitioners, and heating and ventilation engineers.

New and emerging jobs that relate directly to climate adaptation e.g. peatland restoration practitioners, disaster risk managers and Riparian woodland designers.

Jobs affected by the transition to a resilient Scotland e.g. architects, business continuity specialists, and town planners.

Stakeholders

- Private Sector e.g. investors, producers, retailers, building sector, insurances, financing institutions
- Third sector e.g. NGOs, community organisations, academia, volunteers
- Public sector e.g. Scottish Government, UK Government, local authority

Organisational Resources

- Adaptation Finance Guide
- Climate Hazards & Resilience in the Workplace
- Organisational Culture and Resources capability webinar

Learning & Development

- Work-based Learning
- Upskilling & Reskilling
- Further & Higher Education
- Research & Innovation

Culture as a resource for tackling climate change

The United Nations Educational, Scientific and Cultural Organization (UNESCO) describes culture as the "ultimate renewable resource to tackle climate change", a key resource for climate mitigation and adaptation. Through it's natural World Heritage sites, 190 million tons of CO2 is absorbed each year by forests in 257 sites, and its non-natural sites are a valuable resource in learning about the past and protecting the future.

UNESCO also states: "Cultural heritage throughout the world is increasingly affected by emergency situations, including conflicts and disasters caused by natural and human-induced hazards ('natural disasters'). These situations include threats to the transmission and viability of intangible cultural heritage, which provide a foundation for the identity and well-being of communities […] The safeguarding of intangible cultural heritage has a dual role to play in the context of emergencies: on the one hand, intangible cultural heritage can be directly threatened by emergencies, and on the other hand, it can effectively help communities to prepare for, respond to and recover from emergencies."

What we often term 'culture' in a narrower sense – the arts, museums, film, TV, design, rap, cartoons, street dance and more – are the ways in which we consciously and unconsciously express that wider culture and an important way our lived experience is shaped, disseminated and changed. Therefore, not only does this narrower culture have huge potential to support the transformations and transitions in society that are needed to live well in a different climate, it is essential that it is empowered to do so.

Crucially, the cultural sector in Scotland also has a unique ability to imagine and experiment with alternative futures, question the status quo, see the world differently and explore the future with audiences and participants.

Case Study: "Historic Environment Scotland: We asked students to imagine ways in which Scotland might build structures to cope with extreme flooding. Wynne McLeish suggested attaching a series of floating piers to the Forth Rail Bridge. In her futuristic design, energy would be supplied through wind and wave generators to enable a small population living in the piers to thrive in an inhospitable climate."

Private Investment for Adaptation

Climate change poses profound risks to our economy and financial stability. The costs to both the global and the Scottish economy from climate risks are no longer hypothetical.

The Climate Change Committee suggests climate change impacts cost the UK economy billions of pounds every year. Globally, sea-level rising, flooding and lower crop-yields are among the main drivers of the economic impacts and long-term GDP losses. In Scotland, of all the climate risks impacting the economy, flooding damage to property is highest, at an estimated £200m to £250m per year. In a future where global warming exceeds 2oC, the

economic damage across all climate risks would be far more severe, increasing interconnected domestic and international economic risks in areas such as supply chain resilience.

We know Scotland's climate will continue to change. While we must take collective, global action to reduce emissions and stop further irreversible damage, investing in adaptation action is the only way we can reduce the economic damage that will result from the changes that are already locked in to our climate over the immediate decades.

The Adaptation Plan set out how we will continue building a thriving, climate resilient and globally competitive Scottish economy. There is a lot to do – government, industry, business and communities must work together, be ambitious, and drive the change necessary to achieve climate resilience. Responsible private investment in adaptation action is key to this pursuit.

Adaptation investment needs

The economic case for early adaptation action is clear. From flooding to infrastructure resilience, it costs far more to respond to – rather than prepare for - the impacts of climate change. The return on investment for climate adaptation action is high. For example, with regards to flooding it is estimated that for every £1 spent on protecting communities from flooding, around £9 in property damages and wider impacts can be avoided (UK National Audit Office, 2019).

While there are high benefits, taking action to build resilience to climate change in Scotland will demand significant, upfront investment.

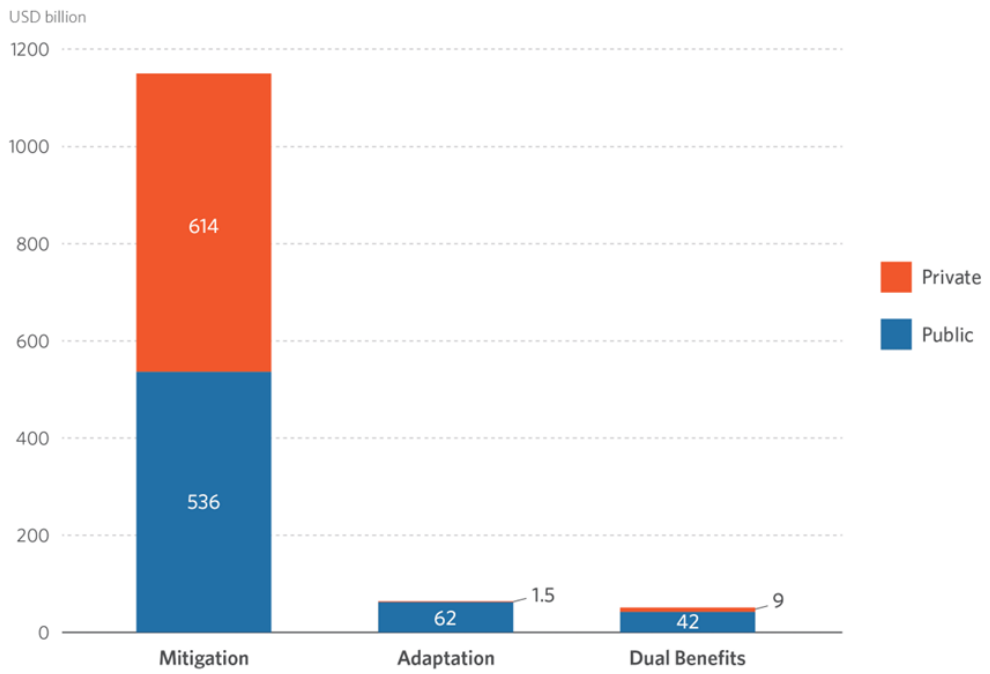
The Climate Change Committee anticipate that the UK needs to spend between an **additional £5bn and £10bn per year** on adapting to climate change, across both the public and private sector.

In Scotland, flood protection, water systems, nature and infrastructure will demand large-scale investment over the forthcoming decades to support our resilience to both the increasing frequency of extreme-weather events, and to the long-term changes in climate patterns. New infrastructure will need to protect communities most vulnerable from more frequent and intense rainfall and sea level-rise, while our transport, water and energy systems may require upgrades to ensure our society can remain productive under future, extreme climate.

This is no small feat. Early estimates from the Climate Emergency Response Group suggest an adaptation financing need of **£1.8bn by 2030** in Scotland (CERG, 2023). The extent to which future costs grow will be determined by our response now and collective, global efforts to limit further global warming beyond 1.5oC.

The scale of the challenge to finance adaptation goes beyond Scotland. Globally, the current finance flowing into adaptation, from public and private sources, is **90% lower than is required to prepare for climate impacts** – representing a critical, global adaptation finance gap (see Figure below). On the advice of the United Nations public and private finance for adaptation must be stepped up urgently in order to respond to both current and oncoming climate risks.

Figure: Climate Finance Spend on Mitigation and Adaptation – Private and Public Spend



Source: Climate Policy Initiative, The Global Landscape of Climate Finance, November 2023

Economic opportunities and climate adaptation

The transition to a more climate resilient Scotland is, however, not only a necessity, but can also be seen as a growth opportunity. In 2016/17 the value of the Adaptation and Resilience to Climate Change sector for Scotland was £604m (kMatrix, 2019). We want our businesses to thrive and for their success to benefit all of society – its central to our vision for a wellbeing economy. As part of this, there are growing opportunities to be captured by our businesses and private sector to develop new, innovative products and services, in areas such as insurance, architecture and engineering, and for new market growth in sectors such as battery storage and agriculture. Overall, like society, the implications of our changing climate impact all businesses; those which are well-informed and have adapted well, are likely to experience less disruption and increase their competitiveness as a result. Collectively these opportunities are a part of preparing for, and build resilience to, the impacts of climate change.

In Scotland, there are examples of businesses delivering innovative adaptation solutions – from civil engineering firms now delivering sustainable drainage solutions, to those developing battery storage to support the resilience of low-carbon energy sources, to those developing plant-varieties which will be needed to deliver nature-based solutions. The private sector, and its investment, can be catalytic for ensuring Scotland is at the forefront of this innovation.

Removing the barriers for responsible private sector investment

In line with our NSET Team Scotland approach, building a climate-resilient Scotland will require contributions from multiple actors.

While large-scale investors are beginning to assess climate risk through climate-related disclosures, more, responsible, private investment in adaptation action will be crucial if we

are to deliver the pace and scale of action required to support Scotland's climate resilience, our economy and society.

As part of providing investors with clarity on the sectors, and activities, that make a substantial contribution to climate change, we are collaborating with the UK Government to ensure that adaptation is integrated into the UK Green Taxonomy.

However, the perceived lack of revenue streams, the emphasis on long-term benefits and difficulties of achieving scale are among barriers that have, until now, constrained private investment in climate resilience and adaptation. This is why the Scottish Government has funded Adaptation Scotland to explore the opportunities to advance climate adaptation finance, and to identify how with innovation we can unlock responsible private investment to support climate resilience.

This work has offered potential pathways to remove barriers and support greater responsible, private investment in adaptation, examples include:

- **Blended finance models** which involve strategic use of public finance to crowd in private investment. One innovative case-study, facilitated by Adaptation Scotland, looks at the retrofit of Craigleith Retail Park in Edinburgh with nature-based solutions to reduce current and future flood exposure, and has developed a business model where private and public capital could be combined. In this model, partially returnable public funding could be used to encourage and facilitate co-investment of returnable finance from the asset owners.
- **Project delivery innovation** which focuses on multiple benefits and monetising several revenue streams, for example from voluntary carbon markets, eco-tourism, sale of products and services,– in order to create 'bankable' adaptation projects.
- **Mainstreaming adaptation in existing market codes** for nature recovery and net-zero to ensure adaptation outcomes are more easily identified and monetised in projects.
- **Grant funding schemes for project development** to support innovative early-stage adaptation projects to attract private investment. This could include mainstreaming adaptation in existing nature and biodiversity grant programmes such as The Facility for Investment Ready Nature in Scotland (FIRNS).
- **Open data platform and industry-led common metrics** specifically for nature-based project and Blended finance models
- Mainstreaming adaptation in existing market codes
- Grant funding schemes
- Open data platform and industry-led common metrics
- Should you want to read a more detailed breakdown of these policy proposals for Private Investment please see here.
- infrastructure solutions, to help overcome barriers to investment around outcome uncertainly, comparability of projects and investments, and the ability to benchmark effectiveness.

We must ensure that the private sector is well informed and engaged on climate adaptation and how Scotland's changing climate is influencing economic competitiveness. Outcome 4 – 'Economy, Business and Industry' presents a range of policies and proposals in this area.

However, it is important the final Adaptation Plan, to be published in Autumn 2024, sets out the need for scaled up private investment to support implementation of policies across each of the five Outcomes.

Climate anxiety and cultural connection

Climate anxiety

Although the physical impacts of climate change are impossible to ignore, the evidence of the impact of climate change on mental health is equally hard to set aside. Ipsos Mori found that 82% of Scots were either very or fairly concerned about climate change (CXC, 2022) and in polling at a similar time the Mental Health Foundation found that in the UK, more than 2 in 5 young people reported that thoughts and feelings about climate change have a negative impact on their mental health (MHF, 2021).

Climate anxiety, put simply, is the chronic state of worry or fear about climate change and its impacts or as the American Psychological Association terms “chronic fear of environmental doom” (ASA, 2020). Although not identified as an explicit risk in the CCRA3, supporting people suffering from climate anxiety and the mental impacts associated with anticipated climate change can form part of an approach to address non-economic loss and damage from climate change.

Working together with colleagues working on health and with Public Health Scotland, we will commission more research into the mental impacts of climate change to inform policy development onto address mental health impacts in the final the Adaptation Plan.

Cultural connection

Around the world, coastal heritage sites are at risk of sea level rise and erosion. UNESCO estimates that of 318 World Heritage cities nearly 1/3 are coastal and are impacted by climate change. In Scotland, we have historic castles, coastal settlements and, perhaps most famously, Skara Brae, the 5000 year old neolithic settlement on Orkney. The measures taken to protect and manage these assets are set out in Outcome 3 Public Services and Infrastructure and specifically objective C5 and are led by our partners at Historic Environment Scotland.

“Throughout history, life in our coastal communities has been shaped by the need to adapt to extremes of weather. We face a new challenge with a predicted rise in sea levels that will require new approaches to living at the land’s edge.” (Scotland’s Coastal Places, Historic Environment Scotland)

The tangible cultural assets are in some ways easier to manage and protect but culture also encompasses language, dance, art and storytelling; community traditions which could also all be impacted by climate change and help us shape and understand our places and our connection to them. These are also often what makes Scotland an attractive place to live, work, visit and study in, thus having a knock-on economic impact.

Across the world, indigenous communities, often living by the coast, are threatened by sea level rise and coastal change, leading to migration and loss or dilution of language and culture. The Gaelic language and traditions are already experiencing decline caused by ageing populations and migration to the mainland from Gaelic island communities

threatened by sea level rise. Recognising this, as part of COP26, the project Living Language Land was commissioned by the British Council under the COP26 Creative Commissions programme. It offers a platform to minority and endangered language-holders to share a word and a story that reflects the relationship to land and nature. Contributions included the word “scrogs” from the Doric word meaning brushwood or undergrowth and the Gaelic word “Aibidil” for alphabet, the Gaelic Aibidil has 18 letters and each letter is represented by a tree.

“This ancient affinity between the Gaelic word and the tree embeds a deep association between language and landscape in the original roots of Gaelic. It gives an ecological substance to the alphabet – the foundation of all literacy – a language we can learn by looking at the landscape.” [living-language-land.org, 2021]

Annex C: **Adaptation Monitoring Framework**

The challenge

While most OECD countries have developed a national adaptation strategy, many struggle to design and set up robust measurement systems to evaluate progress on adaptation. Adaptation does not have a universal, objective, quantifiable measure of success (such as 'net zero' for our mitigation actions).

There are a range of conceptual, methodological, empirical and practical challenges associated with measuring adaptation action and effectiveness at a national scale. Multiple comparative reviews have also shown that there is no single blueprint for national adaptation monitoring and evaluation systems, since each system is tailored to specific conditions and priorities.

The solution

Our aim is for Scotland to have the most developed and transparent adaptation monitoring system in the UK.

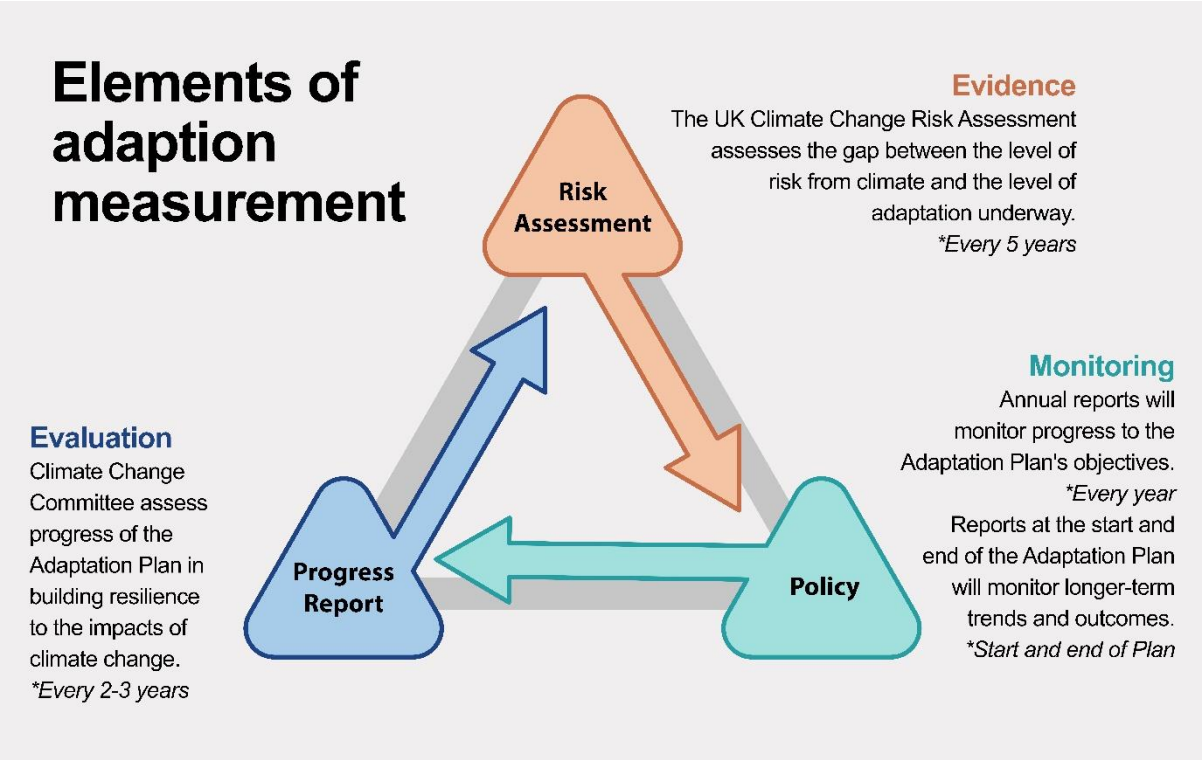
The approach we propose to take is a practical one.

Our proposed approach is that annual reports to the Scottish Parliament will, for the first time, include a set of agreed quantitative indicators to monitor the Adaptation Plan's objectives. To track Scotland's longer-term adaptation outcomes, we plan to publish a baseline at the start and report on progress at the end of the Adaptation Plan's 5-year period to track trends in resilience.

- Our monitoring framework needs to support implementation of the policies and balance robustness with proportionality and feasibility. We will select indicators for SNAP objectives where the data is relevant, available and likely to show changes on an annual timescale. Indicators for SNAP outcomes will track important trends, but those are likely to change on a slower timescale. Many indicators will be proxies because direct measurement of complex inclusive adaptation action is not always possible.
- We propose to define the direction we want to see the indicators track, as opposed to setting targets for all objectives. This is to avoid the perverse incentives that arise from setting targets for indicators that are proxies (as compared with direct measures of resilience).
- We will still publish a monitoring framework even if it does not adequately monitor all SNAP objectives and outcomes at the outset. The framework will be reviewed during the lifetime of the plan and updated if these gaps can be addressed.

The new monitoring system described above is designed to fit into and complement existing evidence and evaluation processes (see Figure A).

The CCRA is the most comprehensive evidence on Scotland's climate resilience available and is updated regularly (every 5 years). The CCC's regular progress reports (every 2-3 years) provide robust independent evaluation. Through the Adaptation Plan's new monitoring framework, we will provide significantly better data to maximise the value of these assessments and improve the overall transparency and effectiveness of adaptation action.



Elements of Adaptation Measurement:

Text of diagram above:

Evidence

The UK Climate Change Risk Assessment assesses the gap between the level of risk from climate and the level of adaptation underway. **Every 5 years*

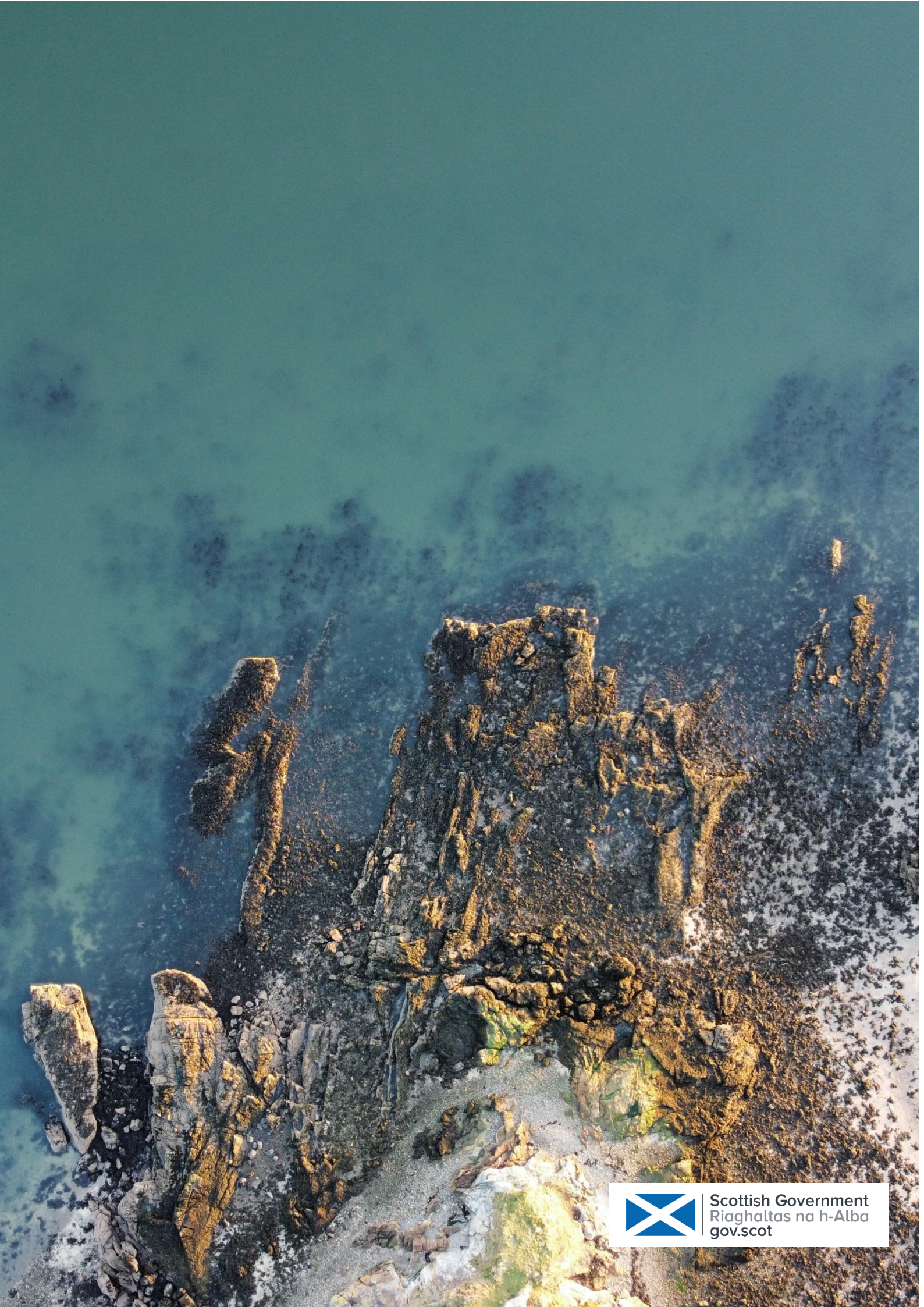
Monitoring

Annual reports will monitor progress to the Adaptation Plan's objectives. **Every year*

Reports at the start and end of the Adaptation Plan will monitor longer-term trends and outcomes. **Start and end of Plan*

Evaluation

Climate Change Committee assess progress of the Adaptation Plan in building resilience to the impacts of climate change. **Every 2-3 years*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