



Scottish Government
Riaghaltas na h-Alba

Scottish National Adaptation Plan

2024 – 2029

Actions today, for a climate resilient future.



Epigraph

'What the Clyde said, after COP26'

I keep the heid. I'm cool.
If asked - but you never ask -
I'd answer in tongues
hinting of linns, of Leven,
Nethan, Kelvin, Cart -
but neutral, balancing
both banks equally as I flow...

Do I judge? I mind the hammer-swing,
the welders' flash, the heavy
steel-built hulls I bore downstream
from my city, and maybe
I was a blether-skite then,
a wee bit full of myself,
when we seemed gey near unstoppable...

But how can I stomach any more
of these storm rains? How can I
slip quietly away to meet my lover,
the wide-armed Ocean, knowing
I'm a poisoned chalice
she must drain, drinking
everything you chuck away...

So these days, I'm a listener, aye.
Think of me as a long level
liquid ear gliding slowly by.
I heard the world's words,
the pleas of peoples born
where my ships once sailed,
I heard the beautiful promises...

and, sure, I'm a river,
but I can take a side.
From this day, I'd rather keep afloat,
like wee folded paper boats,
the hopes of the young folk
chanting at my bank,
fear in their spring-bright eyes

so hear this:
fail them, and I will rise.

Ministerial Foreword



The climate is changing globally and Scotland is already feeling tangible effects of this. Despite substantial progress on reducing greenhouse gas emissions in Scotland, we know the planet's temperature is set to increase, with some impacts already locked in for decades to come.

We are experiencing extreme weather events more often. We've seen severe flooding due to intense rainfall that damages homes and livelihoods, as well as disrupting and putting increasing pressure on our public services. On the other hand, we also face periods of drought and have seen recent instances of water scarcity with risks of more, affecting our food producers, households and nature. Nine out of ten of our hottest years have all come in the 21st century. As we adjust to this new reality, how we manage precious resources like water will become ever more important. Nature is one of our greatest and most precious tools at our disposal in building resilience to the impacts of climate change. Yet, climate change threatens the survival of many plants and animals as well as our world-renowned landscapes.

Across the country, the impacts affect us all in different ways. Whether you live in a small island community or a large urban centre, the risks from a changing climate are very real and will affect everyone. From coastal erosion and rising sea levels threatening the safety of our coastal communities, to exposure of key infrastructure to extreme weather like our transport network and the very buildings we work and live in, to biodiversity loss and the impacts of that on our food supply chains and human health and wellbeing: these risks impact lives and livelihoods, and that's why it's important that we take early action.

This Scottish National Adaptation Plan is how the Scottish Government will address these issues. It responds to independent assessment of the risks facing Scotland carried out by the Climate Change Committee – our independent statutory advisors. It also responds to the feedback we received through our [consultation on the draft plan](#) which we published in January 2024. While government has a responsibility to protect citizens and ensure our public services can be delivered for future generations, everyone has a role to play. That is why we will continue to carry out extensive public engagement to raise awareness so that people can take better, more informed adaptation decisions. I am greatly encouraged at the substantial engagement from individuals and groups which has shaped our national response and would like to thank all of those who have contributed. Through our consultation we received almost 250 responses from individuals, community groups, delivery partners and businesses.

Some communities are more vulnerable than others to the impacts of climate change. We also know that certain people and groups – for example, those on lower

incomes, women, minority ethnic communities, older people, and disabled people – often face particular challenges in being able to respond. Our series of nearly 50 workshops and engagements in island, urban and rural places across the country has enabled us to reflect the needs of those communities, ensuring that we are responding to the impacts of climate change in Scotland in ways that are fair and account for the impacts on different parts of society, aligning with our commitment to a just transition to become a net zero society.

The Climate Change Committee's advice is to plan for a global temperature rise of 2°C and assess the risks up to 4°C. While we know it is vital the world comes together to avoid such catastrophic scenarios, early planning and preparation is always better than late response and recovery.

This Adaptation Plan sets out the actions we will take to make our public services, communities, natural environment and Scotland's economy more resilient to the damaging impacts of climate change.

These steps include investing approximately £400 million to make our railways more resilient; developing adaptation plans with all health boards; improving flood warning and preparedness; enhancing coordination at a regional level through adaptation partnerships; taking a strategic approach to adaptation financing; strengthening our Community Climate Action Hubs; and continuing to be committed to the Adaptation Scotland programme.

This Adaptation Plan demonstrates, once more, our commitment to play our part in the global movement to respond to the climate emergency.

Despite the very real impacts of climate change in our society, the steps set out here show that we can build a more climate resilient Scotland now and for generations to come. I look forward to working with communities, local authorities, businesses and our other public bodies to deliver this Plan to ensure we are taking the required adaptation actions today, for a climate resilient future.



Gillian Martin MSP

Acting Cabinet Secretary for Net Zero and Energy

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Executive Summary

Adapting to climate change is at the heart of the Scottish Government's mission to improve the wellbeing of people living in Scotland, now and in the future.

Climate change means that Scotland will be wetter in winters, drier in summers, sea level rise will continue, and our weather will become more variable and unpredictable. Extremes will be more common. However, the impact of climate change is already being felt now both around the world and here at home. Intense, short periods of rainfall are causing increased flooding. Possible extended periods of drought could bring water scarcity. Nine out of ten of our hottest years on record have come this century. Extreme weather events, and the cascading impacts of climate change, are putting more pressure than ever before on lives and livelihoods.

This Scottish National Adaptation Plan sets out actions to build Scotland's resilience to climate change. It does this through support for our communities, businesses, public services and nature to adapt to the changing climate in a way that is fair and inclusive. The Adaptation Plan sets out a long term vision and defines Scotland's priorities for action over the next five years. The Climate Change (Scotland) Act 2009 contains a legal duty across the public sector to help deliver the objectives, and the Adaptation Plan describes how we will support Scots to adapt and continue to live well in Scotland's changing climate.

This Adaptation Plan has been in development since the third the [UK Climate Change Risk Assessment](#) (UKCCRA3) was formally adopted in January 2022, setting out 61 risks and opportunities faced by all four UK nations - [see annex A](#). Ongoing activities are highlighted throughout the document, underlining the Scottish Government's commitment to mitigate the impacts of climate change at every opportunity.

Over the next five years, this Adaptation Plan commits to delivering over 200 policies and actions, including:

- Ensuring all parts of Scotland are building climate resilience through regional partnerships, local action and climate-resilient economies.
- Improving flood warnings for businesses and communities across Scotland, and building rainwater networks in urban areas to manage flash flooding.
- Encouraging behaviour change to help households and communities cope with both too much and too little water.
- Strengthening our new national network of Climate Action Hubs and ensuring that the Hubs are supporting vulnerable communities to adapt.
- Shifting half of all agricultural funding to be conditional on delivering for climate and nature, including climate adaptation.
- Increasing Scotland's railway resilience through investing approximately £400 million over the next five years, with multiple benefits for passengers.

- Developing an investment plan that connects nature finance and adaptation outcomes, including a suite of actions to mobilise public, and responsible private and philanthropic finance supported by an expert taskforce.
- Strengthening the skills and capacity of businesses, communities and organisations to adapt through the Adaptation Scotland programme.
- Establishing the adaptation.scot online hub to help people access tools, resources and advice on adaptation action.
- Delivering a suite of new tools and advice tailored for businesses, including a guide for Small and Medium-sized Enterprises (SMEs) and sector-specific tools to support entities most exposed to climate change impacts.
- Leading the way in climate adaptation monitoring, publishing an adaptation monitoring and evaluation framework, supporting annual reporting to the Scottish Parliament and best practice both nationally and internationally in this emerging work.
- Supporting connectivity and resilience of our island populations through fleet renewal of ferry services, with reducing weather-related disruption as a priority.
- Delivering for international communities disproportionately affected by climate impacts through our £36 million Climate Justice Fund.
- Delivering comprehensive climate resilience actions across NHS Scotland, including greening the NHS estate.
- Working to improve long-term health outcomes for people, including Public Health Scotland delivering the Adverse Weather and Health Plan.
- Protecting our cultural and historic heritage through improved adaptation actions for historic buildings.
- Building the Public Sector Climate Adaptation Network, led by Adaptation Scotland, which provides opportunities for learning and best practice.

Climate change impacts people and places in multiple ways, and communities with less capacity to adapt because of existing inequalities will need support. This Adaptation Plan focuses on actions that are effective and inclusive, as part of Scotland's just transition. An [Easy Read version](#), accompanied by a [Gaelic language translation](#) and a [children's version](#), of the Adaptation Plan have been created.

The Adaptation Plan is structured in five chapters, covering five outcomes to deliver a climate resilient Scotland. Under each outcome are objectives where key policy actions are set out. Climate risks are interconnected and have the potential to cascade, so our response must be just as agile. The outcomes and objectives have been designed to complement each other, and key policies and actions are prioritised to deliver multiple benefits.

Our Vision For A Well-Adapted Scotland

Adapting to climate change is at the heart of the Scottish Government's mission to improve the wellbeing of people living in Scotland, now and in the future.

In 2024, the Scottish Government proposed that **building Scotland's resilience to climate change** becomes a national outcome in Scotland's National Performance Framework. Subject to Parliamentary approval, this change is proposed to drive climate action across Scottish society that aligns with the UN Sustainable Development Goals, and addresses the urgency and scale of the climate crisis which impacts the wellbeing of people and planet.

Our vision is for a resilient, inclusive and well-adapted Scotland as the climate continues to change. The next five years will be critical to setting us on the right path. Our longer term vision, in line with the Adaptation Plan's five outcomes, illustrates a Scotland where:

- **Nature connects across our land, settlements, coasts and seas.** Forests, grasslands, waters and other natural spaces create a rich network where plants and animals forage, feed and move as the climate changes. This network supports biodiversity and provides a shelter from extreme weather and changing conditions. There is no stark urban/rural divide as these networks connect. Parks, verges, coasts and other natural spaces in our towns and cities support physical and mental health, cool our urban areas in summer and help protect our places from heavy rain and floods. Adaptation has helped people connect with nature, and nature makes the places in which we live, work and play beautiful and fulfilling.
- **Communities are creating climate-resilient, healthy and equitable places.** People feel in control of their lives, even as the climate changes. The old and new buildings that form our settlements are safer from flooding and overheating, and communities play a full part in making the places where they live attractive and resilient. Community knowledge and connection are valued, especially where change at our coast will continue to occur, and our history, culture and creativeness support us during change. Adaptation has made Scotland fairer.
- **Public services are collaborating in effective and inclusive adaptation action.** People can reliably access the public services they need, such as health, education and social care. As the climate changes, people's wellbeing is supported by safe and resilient transport, water and other essential infrastructure. Adaptation has created a Scotland where climate actions with multiple benefits for health, wellbeing and equity are delivered, and collaborating on shared challenges is easier.
- **Economies and industries are adapting and realising opportunities in Scotland's Just Transition.** Scotland's economy has become a wellbeing

economy that can adapt to climate shocks and is growing fairly. As the climate changes our lands and seas, Scotland's farming, forestry, fishing and aquaculture businesses are adapting and sustaining livelihoods. Businesses and our public services understand their risks and supply chains for food, medicine and other vital goods are secure, including for Scotland's rural and island communities. Adaptation has helped make Scotland's one of the most innovative small nations in the world.

- **Scotland's international role supports climate justice and enhanced global action on adaptation.** Practical solidarity with countries in the Global South has supported a collective capacity to adapt and build climate resilience. Scotland's role has supported the international cooperation needed to keep global temperatures below 2°C, to halt and reverse nature loss and to deliver climate justice for those who are being affected first and worst by climate change.

Just transition

"The effects of climate change will be felt across all of society, but they will not affect the whole of society equally." [Climate Change Committee, 2022](#)

Achieving our vision for a well-adapted Scotland requires a just transition. This means recognising that some people and places in Scotland will be affected by climate change impacts worse than others. It also means ensuring that our adaptation policies are fair, by meeting the needs of different groups and delivering multiple 'wins' for health, wellbeing, equity and jobs.

Development of this Adaptation Plan included extensive use of impact assessments – [see Annex B](#) - to identify those who may be disproportionately affected or may lack the capacity to adapt. The impact assessments identified people and communities who are more likely to be exposed to climate hazards because of where they live, work or play; and people who require greater support to adapt, because they face additional barriers.

The whole Adaptation Plan aims to build Scotland's resilience to climate change, with a focus on inclusive and place-based adaptation, as well as support for expanding Scotland's network of regional adaptation partnerships. This means supporting people and communities most vulnerable to climate impacts and building resilient, healthy, and equitable places.

Public engagement

Our commitment to engage across Scotland throughout the lifetime of this Adaptation Plan will be central to delivering our vision for a well-adapted Scotland. It will ensure that our national approach remains informed by how people are experiencing the evolving impacts of climate change.

We will deliver this engagement with communities across Scotland over the next five years, in line with the objectives and principles of our [Public Engagement Strategy for Climate Change \(PES\)](#). The PES aims to enable people to actively participate in shaping just, fair and inclusive policies that promote mitigation of and adaptation to climate change. This includes those people most affected. We will work with trusted messengers, communities, and partner organisations to build public understanding of climate risks. We will enable people to participate in our strategies for reducing vulnerability to those risks, and we will support efforts and action to build resilience.

In developing this Adaptation Plan, we consulted on a [draft Plan](#) from January to April 2024, asking people and organisations across Scotland for their views on the proposed national response and whether this supported their priorities. To best capture views across Scotland on the breadth of interventions outlined consultation involved:

- written responses to a [series of questions](#) covering the Adaptation Plan's five outcomes;
- public facing workshops in five locations representative of different Scottish geographies and communities, each facing differing exposure and vulnerability to climate hazards (workshops took place in Annan, Golspie, Montrose, Glasgow City and South Uist); and
- in-depth workshops with stakeholders and key delivery partners, focused on strengthening policy and ambition.

Insights shared in the 240 written responses and by workshop participants have been crucial to shaping this final Adaptation Plan. A [full analysis of consultation responses](#), independently undertaken, identified a number of key themes around:

- **Economic costs and investment:** concern for the adverse economic impacts of climate change, including rising costs and disruptions to key services and supply chains, and the importance of adequate financial support, public and private investment;
- **Infrastructure and public service resilience:** strengthening the resilience of infrastructure and public services, including coastal and flood defences, public transport networks, energy systems and public utilities;
- **Biodiversity:** support for measures to protect Scotland's natural environment and biodiversity as a priority adaptation action, including more trees and green spaces in built-up places and urban nature networks;
- **Collaboration:** enhancing collaboration and multi-stakeholder partnerships among government agencies, businesses, communities, and non-profit organisations;

- **Community empowerment:** empowering communities through resource provision, participatory approaches and inclusion of diverse perspectives to ensure local needs are met;
- **Education and public awareness:** public awareness campaigns and better education on the impacts of climate change in Scotland, including through Scotland's curriculum and professional learning;
- **Prioritising climate vulnerable groups:** recognising the disproportionate impact of climate change on vulnerable groups, including the elderly and low-income households, and participatory approaches to ensure equitable outcomes;
- **Considering health and wellbeing:** concern over the implications of climate change on physical and mental health, and the need for greater integration of health considerations in the Plan, and;
- **Fostering further innovation and research:** supporting the innovation opportunities arising for climate change through education, training and business-to-business knowledge sharing.

These findings have informed policy development in this final Plan including, but not limited to:

- Committing to expand regional adaptation partnerships and to further guidance and support to help public services and infrastructure operators understand future climate scenarios;
- Integrating an increased focus on action to support coastal communities and progressing commitments to support community-led action, in the Plan's outcome on Communities;
- Maintaining an emphasis on action to protect and enhance nature including nature-based solutions, as a key means of supporting resilience, as well integrating action to support landscape scale approaches in the Plan's outcome on 'Nature Connects';
- Increasing educational resources, including through Learning for Sustainability commitments and the development of children's version of the final Adaptation Plan to support learning;
- An increased focus on action to manage supply chain vulnerabilities for food and vital goods, action to mobilise increased responsible private investment, and progressing proposals for business support in the Plan's outcome on Economy, Business and Industry;
- Integrating a greater focus on the relationship between climate and health, including mental health and wellbeing, across the Plan;

- Developing a robust approach to monitoring and evaluating adaptation progress, including new ideas for effective data sources.

Outcomes and objectives for adaptation

Five adaptation outcomes; 23 objectives	
Nature Connects	
Nature connects across our lands, settlements, coasts and seas.	
NC1: Nature-based solutions	NC2: Landscape scale solutions
NC3: Development planning	NC4: Nature networks
NC5: Marine, coastal and the blue economy	NC6: Natural carbon stores and sinks
Communities	
Communities are creating climate-resilient, healthy and equitable place.	
C1: Regional and place-based collaborations	C2: Locally-led adaptation
C3: Community resilience	C4: New and existing buildings
C5: Culture and historic environment	C6: Coastal communities
Public Services & Infrastructure	
Public services are collaborating in effective and inclusive adaptation action.	
PS1: Public body duties and capacity	PS2: Public service and infrastructure resilience
PS3: Scotland's water resources	PS4: Transport system
Economy, Business & Industry	
Economies and industries are adapting and realising opportunities in Scotland's Just Transition.	
B1: Business understanding of climate risk	B2: Support for farming, forestry, fishing and aquaculture sectors
B3: Innovation opportunities	B4: Economic development and supply chains
International Action	
Scotland's international role supports climate justice and enhanced global action.	
IA1: Supporting vulnerable communities globally	IA2: International Advocacy
IA3: Knowledge advocacy	

Figure 1: SNAP3 Outcomes and Objectives

To build Scotland's resilience to climate change and meet our long term adaptation outcomes, the Adaptation Plan's 23 objectives set out priorities for action over the next five years – as shown below, in Figure 1. Our associated [data tool](#) helps users navigate the Adaptation Plan, understand what climate risks are being addressed, and map the cross-cutting nature of adaptation policies. To drive delivery and

accountability, each objective has an owner (or owners) with lead responsibility. We will report on progress annually in line with our transparent Monitoring and Evaluation Framework.

Monitoring and evaluating success

This Adaptation Plan is accompanied by a robust and comprehensive monitoring and evaluation framework that aims to place Scotland at the forefront of best practice in this area.

The existing UK Climate Change Risk Assessment process provides a full and independent measure of Scotland's overall climate resilience every five years; and progress of Scotland's adaptation plans and the actions within them will continue to be independently evaluated twice within every five-year period by the Climate Change Committee. This Adaptation Plan's new monitoring and evaluation framework will support our existing annual reporting to Parliament and provide significantly better data and evidence to inform risk assessments, evaluate policy and understand delivery.

The [monitoring framework](#), which will be reinforced during the lifespan of the Adaptation Plan, already includes:

- **Monitoring maps** which describe the pathways through which we expect our policy and delivery to contribute to building Scotland's climate resilience, and provide a framework for measuring success and understanding change.
- **38 data-ready indicators** to track progress of the Adaptation Plan's five-year objectives and be reported to Parliament annually.
- **16 data-ready indicators** to track higher level trends in resilience and longer term adaptation outcomes. Baseline data is published and will be reported again in 2029.
- Plans for policy evaluation, knowledge exchange and learning.

By May 2026, we will have tested the monitoring framework and have access to the first set of trend data. We will use this to understand how we are progressing on areas we know are important to improving Scotland's climate resilience. This data will inform and be supported by key policy evaluations to further build our evidence base and understanding of how, why and in what ways our policies are leading to improvements in Scotland's resilience. We will also work with stakeholders to better understand data gaps, and what our current monitoring and evaluation framework *cannot* tell us, so that we can consider updates to the indicators for 2027. This will be followed by a new programme of work to explore quantified standards or targets for climate resilience in response to the fourth Climate Change Risk Assessment which is due to be published in 2026.

Supporting All Of Scotland's Priorities

Without adaptation, Scotland's aspirations for economic success, poverty reduction, nature and high-quality public services will be undermined by the effects of climate change. But actions to address climate impacts can deliver multiple co-benefits for health, wellbeing, equity, economic growth, jobs and biodiversity.

Figure 2 maps the Scottish Government plans and strategies critical to delivering inclusive and effective adaptation action during the Adaptation Plan five-year implementation period. Figure 3 outlines the particularly important enabling factors for effective adaptation action.



Figure 2: Scottish Government plans and strategies critical to delivering inclusive and effective adaptation action during the Adaptation Plan five-year implementation period (2024 – 2029)

Enabling adaptation

Without making changes in our daily lives and having the appropriate skills and finance, Scotland will not build resilience to climate change in a way that is fair and equitable. Each of these factors will be instrumental towards successful delivery on the Plan's five outcomes:

- Adaptation finance
- Workforce and skills
- Behaviour change approach

Adaptation finance

Finance will be key to unlocking Scotland's resilience to the impacts of climate change.

Adaptation, and our vision for a more climate resilient Scotland, will require financing a range of actions. Investment will be needed to reduce potential damages from immediate climate hazards and in anticipation of more severe changes to come. This means investment in infrastructure is required to build resilience to the immediate impacts of flooding and coastal change, but also to climate-proof our transport and water systems long-term, to build capacity across sectors and to restore nature and biodiversity.

The scale, breadth and diversity of adaptation action to be financed presents a significant challenge. The Climate Change Committee anticipate that the UK needs to spend between an additional £5 billion and £10 billion per year on adapting to climate change, across both the public and private sector. An early estimate for Scotland suggests that an additional £1.8 billion is required by 2030 ([Climate Emergency Response Group, 2023](#)).

Bridging this adaptation finance gap at the pace required to limit the greatest costs to Scotland, will require efficient use of public funds. It will also require mobilising

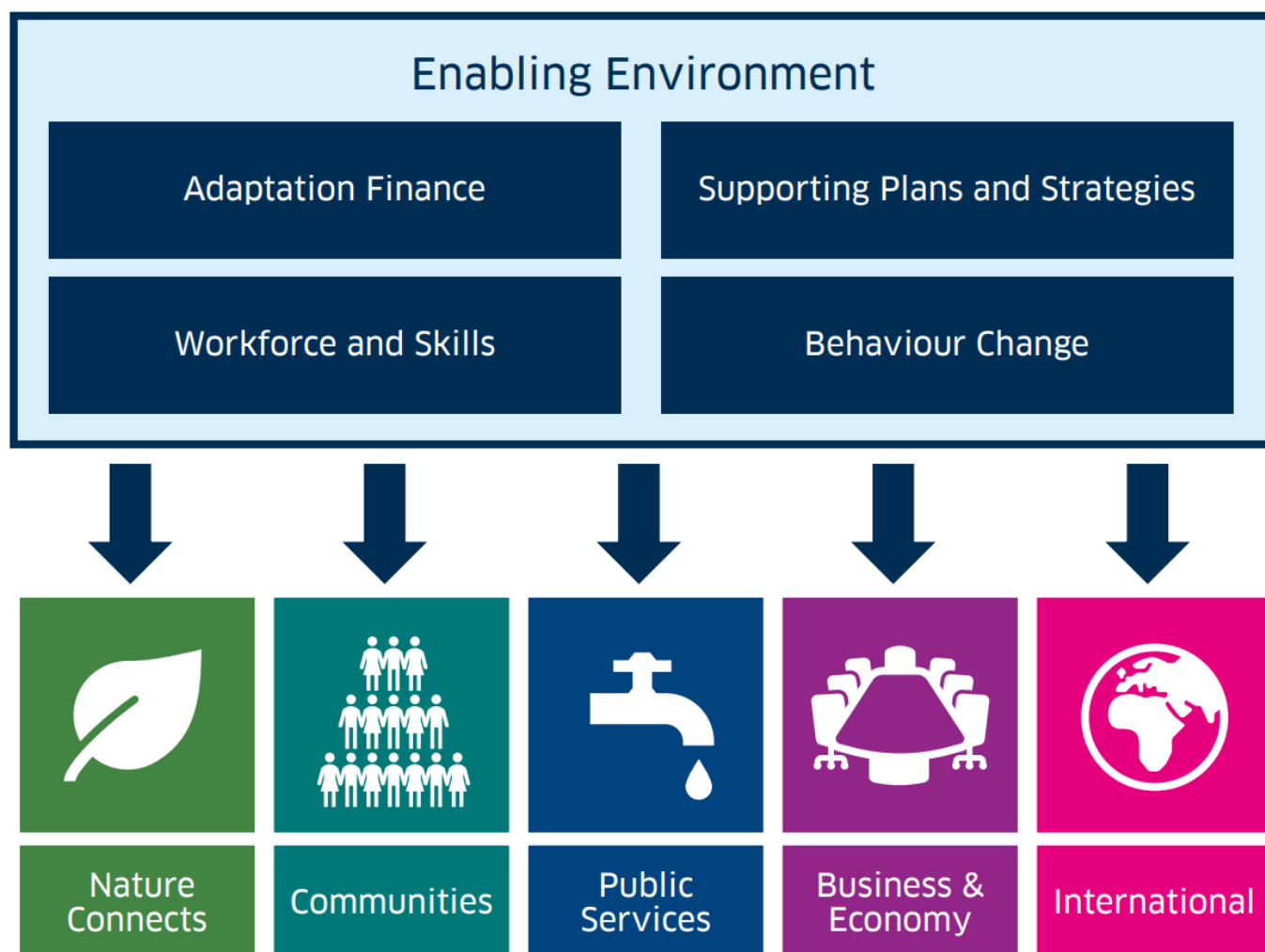


Figure 3: Enabling Environment for achieving SNAP3 outcomes

responsible private investment, including through new financing structures which appropriately blend public and private funding. Policies to support finance strategies over the Adaptation Plan are set out in [Objective B4](#).

Economic analysis has shown that while upfront investments costs may be high, proactive investments in adaptation can save money in the long term and reduce the costs of damage from future climate impacts. For instance, 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](#)).

Our efforts to strengthen our assessment of the investment required for Scotland is also set out in [Objective B4](#). This includes how we will work to understand the economic costs and benefits of adaptation interventions, with a case study on investing to adapt our trunk road network.

Workforce and skills

Our labour market is already shifting in response to the climate emergency (see Figure 4). There are variations in the demand for current skills, and new and emerging green jobs are being created. In order to achieve the outcomes within this Adaptation Plan, we need a system of lifelong education, research and skills, that fosters curiosity, nurtures talent, encourages ambition and enables everyone to fulfil their potential. Where people face insecure work or threats to livelihoods due to climate change, skills development opportunities will be increasingly important.

Scotland's post-school education and skills system plays a key role in supporting individual learners and employers, in all communities, to adapt their skillset to the changing climate. Our transition to a more climate resilient Scotland will also rely on consideration of the principles of community wealth building and fair work first.

Policy detail supporting this can be found in [Outcome 3](#) in relation to Scotland's learning curriculum and learning estates; and in [Outcome 4](#) in relation to private sector capacity building from the Adaptation Scotland programme, fair work and trade union engagement, and community wealth building.

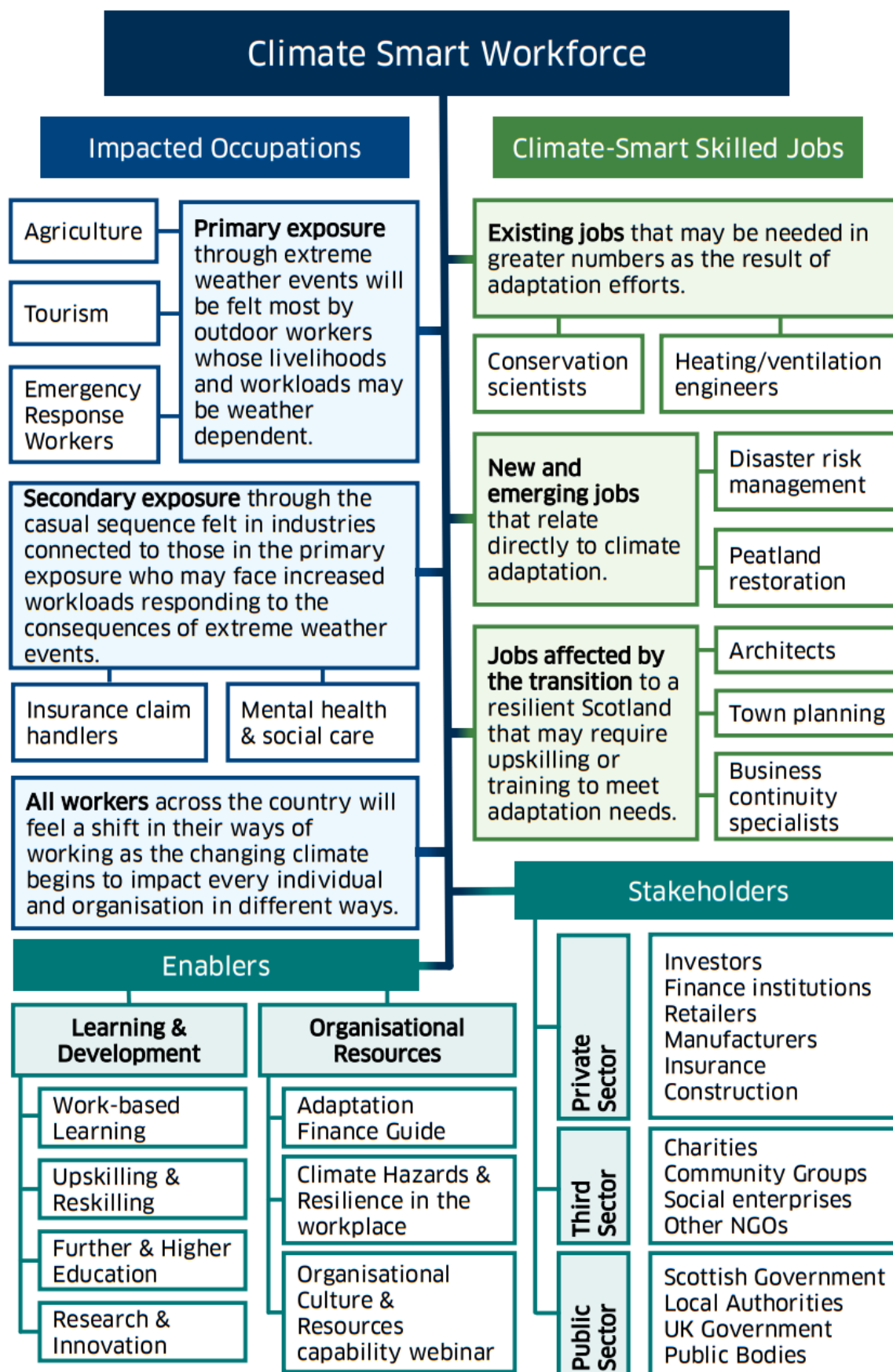


Figure 4: A Climate Smart Workforce

Behaviour change approach

A full behaviour change approach to climate adaptation can be found in [Annex C](#). Instances of adaptation behaviours can be found across the Adaptation Plan, with at least 12 the policies directly relying upon individuals or communities taking action. Examples of behaviours under four of the five outcomes include:

- **Nature Connects:** Individuals planting trees in their local area, or taking part in local restoration activities.
- **Communities:** Communities co-creating adaptation learning programmes; individuals greening their gardens or installing property flood resilience, such as flood covers.
- **Public Services and Infrastructure:** Individuals correctly disposing of household items and of fats, oils and greases rather than flushing them down the toilet
- **Economy, Business and Industry:** Farmers optimising their irrigation methods.

Yet there is low public awareness of why and how people in Scotland need to adapt to a changing climate ([CAST, 2023](#)). Many people are also sceptical as to the impact they can have as an individual, and by the costliness of certain resilience measures (*Ibid*).

In delivering this Adaptation Plan, the Scottish Government will consider people's knowledge, attitudes, and behaviours in relation to adapting to climate change, alongside research capturing communities' lived experiences. This will be analysed through behavioural models such as the COM-B model and the Behaviour Change Wheel ([Michie et al, 2011](#)) to balance the range of policy levers needed to support the uptake of adaptation behaviours. This includes the policy levers which consultation respondents felt would best enable them to take action, namely: resilient infrastructure; guidance and regulation; community engagement and initiatives; and communications.

The Scottish Government will work to improve the public's understanding of climate risks, how to take action, and the impacts of that action. There will be a particular focus on the co-benefits of doing so – if somebody de-paves their garden, for example, it both helps to prevent localised flooding, and offers the wellbeing benefits of being amongst natural green space.

Finally, the Scottish Government will take a place-based approach to adaptation. This will mean exploring opportunities for neighbourhoods to shape and implement interventions, working towards a society where climate resilience is the norm.

Outcome One: Nature Connects (NC)

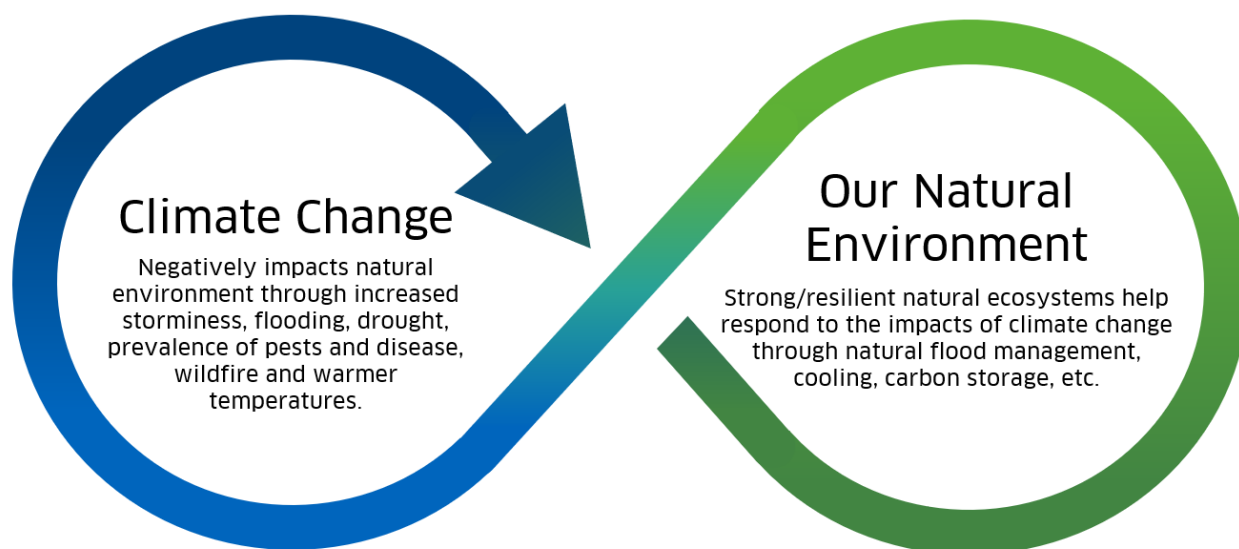
Nature connects across our lands, settlements, coasts and seas.

“When one tugs at a single thing in nature, he finds it attached to the rest of the world.” – John Muir



Our efforts to address the risks posed by climate change, and to ensure a just transition, must have nature at their centre.

This is not only because climate change is degrading our natural environment, which must be protected and restored in its own right, and also for its value as “natural capital”¹. But also because nature is one of the best tools we have to adapt to the changing climate and to reduce our greenhouse gas emissions (see Figure 5 below). We cannot address one without the other. Nature has a place throughout Scotland, from our rural and island communities to our towns, cities, villages and built environment. It also goes beyond terrestrial biodiversity. Our marine environment is harshly impacted by climate change and healthy coasts and seas are essential for responding to the twin crises of climate change and biodiversity loss.



Twin Crises

Figure 5: The twin crises of climate change and nature degradation

Impact of climate change on nature

Climate change is the biggest threat to Scotland’s wildlife and habitats. Changing rainfall patterns, water scarcity, flooding, ocean warming and acidification, extreme

¹ According to NatureScot, Natural Capital is a term for habitats and ecosystems that provide social, environmental and economic benefits to humans. Scotland has a wide range of these habitats and ecosystems - each of which makes a unique contribution to the wellbeing of those who live and work in Scotland.

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 which means that climate impacts can cascade across landscapes and affect lives and livelihoods at scale.

Nature as a climate adaptation tool

Healthy, resilient, 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.

“Nature-based solutions are actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human wellbeing and biodiversity benefits” (International Union for Conservation of Nature).

The consultation on the draft Adaptation Plan found that the majority of written responses supported enhancing green spaces, restoring natural habitats such as forests and peatlands, and improving waterway management to address risks and enhance climate resilience. Both written responses and public workshops supported proactive measures by the Scottish Government, including nature-based solutions to reduce environmental degradation and promote biodiversity.

Biodiversity is essential for human life. Spending time connecting in and with nature, in green and blue spaces, is good for physical and mental health and wellbeing ([Lovell et. Al, 2020](#)). 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](#)).

A range of physical and mental health and wellbeing co-benefits of nature-based solutions can be realised through different pathways. These include protecting health by reducing exposure to environmental harms such as air pollution; creating environments that promote healthy behaviours including outdoor play, physical activity and active travel; creating spaces for social connection building social cohesion; and supporting skills and capacity development ([Marselle et. al 2021](#)) ([Public Health England, 2020](#)). Greater health benefits are experienced by

disadvantaged groups with potential to reduce inequalities ([Public Health England, 2020](#)).

Case Study: [Cumbernauld Living Landscape \(CLL\)](#) - Creating Natural Connections



Figure 6: Ravenswood Local Nature Reserve

CLL, established in 2013, has been working to improve Cumbernauld's green spaces for both people and wildlife with a focus on helping everyone in the community to connect with the nature on their doorstep. The most recent project delivering the CLL vision was Creating Natural Connections (CNC), which was a partnership between the Scottish Wildlife Trust, North Lanarkshire Council, Sanctuary Scotland, the James Hutton Institute and The Conservation Volunteers.

One of the key objectives of CNC was to "improve green health and wellbeing". Through this programme, over 200 people at risk of poor mental health were able to develop skills, using nature to manage their mental health. An evaluation conducted by the James Hutton Institute on CNC found that many people expressed that being outdoors made them feel better, highlighting a range of benefits for themselves and for the communities they work with. One participant suggested that getting outdoors with a CLL walking group was directly responsible for improvements in the mental health of the young people from a support group they worked with ([JHI, 2023](#)).

Next steps: In February 2024, CLL was awarded a National Lottery Heritage Fund grant to begin a one-year development programme of Nurturing Natural Connections. During this development phase, Cumbernauld Living Landscape project staff will work with partners, local communities, groups and organisations to develop a 5-year project that will create transformational change for our green and blue spaces, while connecting people with nature and improving resilience to the changing climate.

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 across all landscapes help to reinforce the importance of place in adapting to climate change, encouraging people and communities to connect in and with nature. Nature Networks are a key way in which we can improve connectivity. Broadly summarised, the theory of Nature Networks involves a cycle of improving condition and biodiversity, expansion of natural areas, and then connection with other areas.

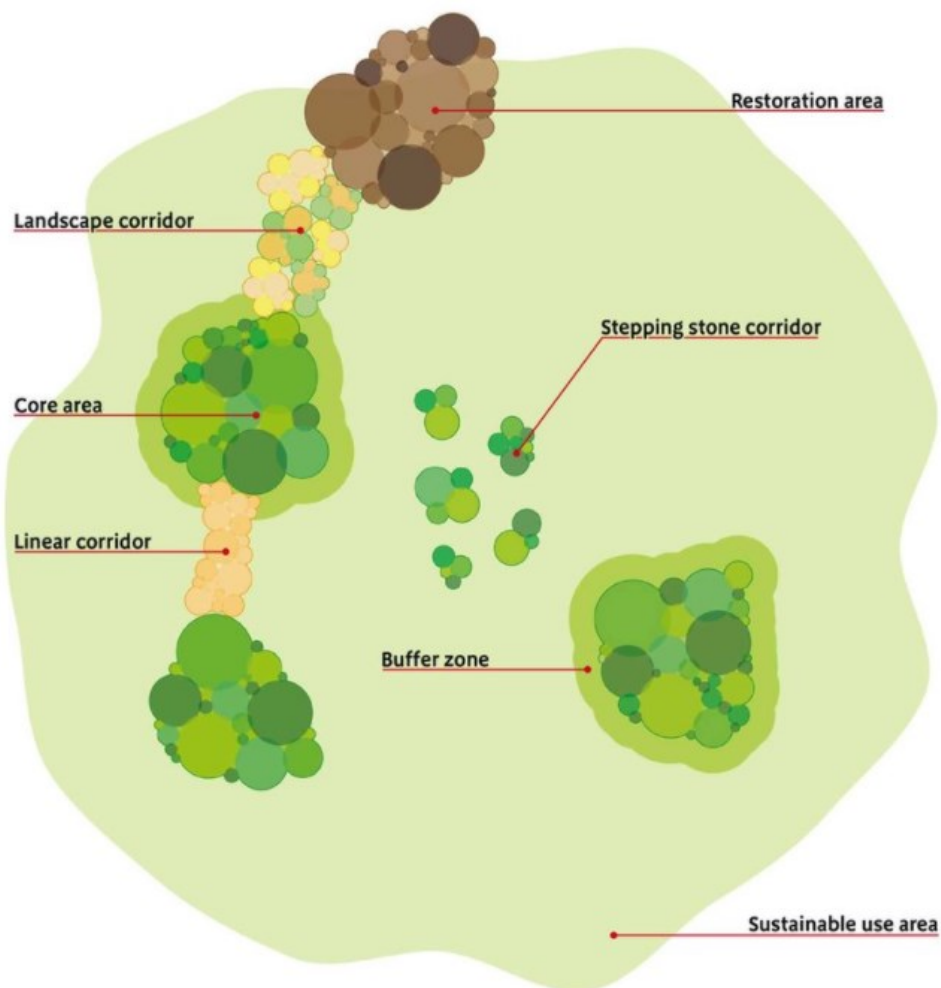


Figure 7: Typical components of a terrestrial ecological network (Lawton et al., 2010)

A Nature Network connects together nature-rich sites including restoration areas and other environmental projects. This will include nationally important sites contributing towards Scotland's 30x30 target (the commitment to protect 30% of our land and seas for nature by 2030) alongside areas that are of local importance for biodiversity and people. These ecological networks as depicted in Figure 7 may be in the form of nature corridors (linear corridors directly connect areas of similar habitat, while landscape corridors are broader with a range of different biodiverse habitats) or stepping stones (indirect connections which are important for biodiversity and which allow movement between sites). They might overlap with green spaces that are also important for people, such as local conservation areas, parks, or active travel networks.

Ensuring habitats and ecosystems are healthy and resilient, alongside not introducing pests and diseases, is the best way to reduce the risks and impacts of invasive non-native species. Where connectivity is being improved between sites where there are known to be invasive non-native species, management may be needed to remove these pressures first. Further measures to reduce INNS are explored in this outcome.

Nature Networks are key pillars in the within National Planning Framework 4 (NPF4) and the Scottish Biodiversity Strategy (SBS). NatureScot has published a [draft Framework for Nature Networks in Scotland](#), which was part of the public consultation on the first [Delivery Plan](#) for the SBS. It sets out guiding principles for implementing Nature Networks across Scotland, and will be published later this year. The Nature Connects objectives are all likely to contribute to gaining complete and functioning Nature Networks across Scotland.

Ecological 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 (SBS) to 2045. It set out our clear ambition for Scotland to be nature positive, with restored and regenerated biodiversity across both land and sea, by 2045. The first five-year Delivery Plan of the Scottish Biodiversity Strategy (SBS DP) is closely aligned with this Adaptation Plan, and with the Scottish Government's principles for ensuring a just transition to net zero. Like other cross-cutting strategies and documents which help inform this 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.

Any policies in this Adaptation Plan marked as "SBS DP" should be cross-referenced with the Scottish Biodiversity Strategy Delivery Plan (SBS DP) on publication, with that final document retaining authority for any final wording.

Objective: Nature-based solutions (NC1)

Nature-based solutions (NBS) are protected, enhanced and connected to enable healthier, cooler, water resilient and nature-rich places.

Scottish Government (SG) Directorate lead: ENFOR

Action to increase resilience to the impacts of climate change is delivered through nature-based solutions including street trees, parks, raingardens, green roofs, improved walking, wheeling and cycling and water ways. Water resource planning to support drought and flooding resilience, improve water quality and quantity, and protect biodiversity is a key part of improving NBS.

Compared to technology-based solutions to climate challenges, nature-based solutions are often more cost-effective, longer lasting, realise multiple benefits and contribute to the aims of a just transition:

- 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
- Creating more resilient and more enjoyable places to live, work and play

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 the natural environment.

- 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 oceans, rivers, lochs, burns, wetlands, floodplains, 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

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.

- **Water, wastewater and drainage** - The [Water, wastewater and drainage public consultation](#) explored how to adapt our water, sewerage and drainage services in the face of climate change. The Scottish Government is committed to undertaking a review of water industry policy, and continuing to assess how water, sewerage and drainage services can adapt to the impacts of climate change to avoid water scarcity through future legislation (See [Objective PS3](#))
- **Scottish Biodiversity Strategy Delivery Plan (SBS DP)** – the draft SBS DP also lists actions aimed at increasing resilience in coastal and marine systems through NBS by reducing key pressures and safeguarding space for coastal habitat change (see [Objective C6](#))
- **Flood Resilience Strategy (FRS)** - the Scottish Government’s FRS will set out what we need to do to make Scotland’s places more resilient to warmer, wetter winters and increased instances of storms and flash flooding. The FRS will encourage delivery partners to take a whole catchment approach and support interventions to increase resilience to river, coastal and surface water flooding. The FRS sets out a role for NBS in helping to create flood resilient places.

Blue-green Infrastructure Investment

Public sector and responsible private sector investment, as well as collaboration with the third sector and communities is crucial to enable delivery of blue-green infrastructure at scale. It is also vital to ensuring that local communities feel the benefits of these kinds of changes. That aim is central to our planning for a just transition in Scotland. Key commitments here include:

- **Nature investment and adaptation** - See [Outcome B4](#) for integration with the Biodiversity Investment Plan, recognising that action which supports nature recovery is also key to supporting our resilience to climate change.
- **SBS DP Facility for Investment Ready Nature in Scotland (FIRNS)** – the Scottish Government document [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 £3.6 million has already been distributed to nature projects across Scotland to help test nature finance mechanisms, scale up conservation work and ensure the benefits are shared with local communities and opportunities for further investment will be secured in future.
 - In 2024-24 eight projects spanning agricultural, fishery, woodland, and urban and rural nature restoration will receive a share of over £1 million.
 - In 2023, 27 diverse projects shared 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 were 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.
- **SBS DP Open source platform for blue-green infrastructure** – we 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.
- **SBS DP Nature Restoration Fund** – as part of driving increased investment in Biodiversity and Nature Restoration, the Scottish Government, supported by NatureScot will maintain and seek to increase investment in nature restoration through our £65 million Nature Restoration Fund.
- **Scottish Marine Environmental Enhancement Fund (SMEEF)** – managed by NatureScot, SG Marine Directorate and Crown Estate Scotland, SMEEF is an innovative nature finance mechanism that facilitates investment in marine and coastal nature enhancement in Scotland. For further detail, see [Objective NC4](#).

Case Study: Water Environment Fund (WEF)

The Scottish Government and SEPA annually fund the WEF for direct investment in transformative placemaking projects. Over a period of 10 years, £10 million has been invested through WEF to bring nature back into the heart of Scotland's towns and cities including Sandhills, Barrhead, Kilsyth, Shotts, Dunfermline and Leven. Further projects are currently being designed and considered for more locations across Scotland. These river restoration projects are creating attractive blue-green corridors through damaged, contaminated industrial land, as well as driving positive behaviour changes that will help Scotland adapt to the changing climate as well as create infrastructure that will support ecological and community resilience.

Levern Water Restoration

Funded partly by the WEF, a £2.8 million investment has transformed the Levern Water and the surrounding area which had previously been derelict for decades, reclaiming the space for local communities and native wildlife. Now complete - a wider, more natural river channel has been restored to the Levern Water running through Barrhead, with the ability to better absorb flooding and support for endangered species such as Atlantic salmon to recolonise restored habitat after being locked out for centuries. An attractive riverside greenspace and path network has been created for locals to enjoy in Carlibar Park, connecting to the shops and amenities in Barrhead town centre. The project was delivered by East Renfrewshire Council in partnership with SEPA, the Green Action Trust, Clyde River Foundation with support from the WEF, Scottish Government Vacant and Derelict land funding and the European Open Rivers Programme. The local school, Carlibar Primary School, was involved in monitoring the local area and invoking Citizens Science as part of the curriculum. In 2024, following the removal of two weirs, salmon have been found in the lower reaches of the Levern Water for the first time in over 100 years.



Figure 8: Lavern Water Restoration - Before and after restoration works (AmcoGriffen, 2024)

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 species such as wild Atlantic salmon and their habitats at risk.

"The Atlantic salmon is one of the most magnificent animals in the rich and vibrant tapestry of nature in Scotland. The revival of sustainable salmon populations is key for many parts of the rural economy."

The Cabinet Secretary for Rural Affairs, Land Reform and Islands ([2022](#))

Conservation and restoration work will provide the level of ecological resilience essential to keep the level of ecosystem services provision that these habitats provide. The River Basin Management Plan for Scotland 2021-2027 (RBMP) and the Nature Conservation (Scotland) Act 2004 provide some of the tools that SEPA and NatureScot will use, on behalf of Scottish Government, to improve the quantity and quality of habitat available – supporting vulnerable freshwater plant, invertebrate, fish, bird and mammal species. Key activity includes:

- **SBS DP 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.
- **Barrier Removal** - work by Scotland's agencies, river trusts and businesses to remove obstacles in our rivers has opened up hundreds of kilometres of habitat for iconic and endangered migratory fish, including Atlantic salmon,

sea trout and European eel. Projects to remove redundant structures in our rivers, such as dams and weirs which are no longer in active use, provide fish with more habitats to grow and feed and have resulted in the reestablishment of fish passages often for the first time since the industrial revolution. Access to these cooler upland streams will be of critical importance as water temperatures continue to rise as a result of climate change. Agencies such as SEPA and NatureScot, using tools such as the RBMP, will continue to find nature-based solutions capable of supporting the resilience and integrity of freshwater habitats, to the benefit of these culturally and economically important species.

Objective: Landscape scale approaches (NC2)

Landscape scale solutions are implemented for sustainable and collaborative land use, including protecting and enhancing Scotland's soils.

SG Directorate lead: ENFOR/ARE

Working for climate resilience at a landscape scale involves land management. It involves bringing together interested actors working at a large scale, often around a catchment, estuary or other recognisable landscape unit. This is a scale at which natural systems tend to work best and where there is often most opportunity to deliver real and lasting benefits. In this way, it is possible to deliver environmental, social and economic benefits that are more difficult to achieve by managing small sites individually. Collaborating across landscapes means land managers (public, private or third sector) can achieve greater success than working in isolation.

Scotland's soils are at increasing risk from the impacts of climate change, including flooding and drought. As soils are found across different landscapes performing multiple ecosystem functions, a landscape scale approach to improving soil condition and quality is needed.

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. Commitments include:

- **SBS DP Landscape restoration** – by 2025, Scottish Government and NatureScot will identify, prioritise and facilitate partnership projects for six large scale landscape restoration areas with significant woodland components. By the end of 2026, we will have engaged with communities and

developed deliverable action plans, funding and, where appropriate, private finance to deliver the outcomes required by 2030 and beyond.

- **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 Scottish Government 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.
- **Regional Land Use Partnerships (RLUPS)** – a three-year pilot programme of five regions entered its final year in 2023/24. It tested approaches to partnership governance that best suit local situations and priorities, whilst working towards the development of a bespoke Regional Land Use Framework (RLUF). Following on from this experience, the Scottish Government has committed to transitioning four of the pilot RLUPS (Cairngorms National Park, Loch Lomond and the Trossachs National Park, and South of Scotland (Dumfries and Galloway and Scottish Borders Councils) to a formal initiative. We seek to continue developing our understanding of how partnership work can help to optimise land use, in a fair and inclusive way – meeting local and national objectives and supporting Scotland's just transition to net-zero.
- **Land Use and Agriculture Just Transition Plan (LAJTP)** – the LAJTP will focus on the livelihoods, skills, health, and wellbeing of those whose lives and livelihoods rely on Scotland's land and agricultural sector. It will also focus on maintaining and supporting thriving rural, island and coastal communities. 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. On behalf of the Scottish Government, SEPA is working closely with public sector partners, businesses, land managers, voluntary groups and organisations towards ambitious statutory objectives at local and regional levels, to restore the natural form and function of our rivers and deliver climate adaptation on the ground including through the work of the Water Environment Fund.

- **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. In 2023, the Scottish Government published its response to the land-based learning review and is committed to take forward those recommendations accepted.

Case Study: River Nith Restoration

There are places where adaptation projects will need to be delivered at the landscape scale in order to effect the level of change required to meet the twin challenges of climate change and the collapse of Scotland's natural environment. An example of what can be done when organisations and individuals work collaboratively is the River Nith Restoration Project near New Cumnock. The historical attempts to protect farmland from flood water with bunds (barriers) along the water's edge are common to much of the River Nith and are replicated across Scotland.

The landowners engaged on this project are recognising the value of a different approach that provides space for the river, in exchange for reduced maintenance and repair costs, and improved flood management. The concept is to set back embankments from the water's edge, restore floodplain habitats and natural river processes, and plant riparian woodland which has seen dramatic changes. Wherever the restoration work has been done, the pressure to dredge is reduced, nature has been quick to colonise and biodiversity has skyrocketed. Local communities and businesses have become more resilient to the increasing frequency and intensity of floods. Through these outcomes, the project is delivering improved climate resilience for both the environment and the community. The work has also provided opportunities for learning and education, as well as community participation in habitat restoration.



Figure 9: Before and after - River Nith Restoration (WEF)

Works have been delivered by individual landowners and co-ordinated by the Tweed Forum with support from SEPA and investment from the Water Environment Fund, the Scottish Rural Development Programme and the East Ayrshire Renewable Energy Fund, totalling £2 million. Through future collaborations with the Glasgow and Southern Ayrshire Biosphere, the project aims to enlarge the new habitat network to 50 hectares. It will be extending across the River Nith valley, helping businesses and the environment adapt to the future.

Soil health

Scottish soils are at the heart of all life, and underpin much of our social and economic activity. Healthy soils are more resilient to the impacts of climate change and so lessen the effects on communities, businesses and the wider environment. Scotland's soils provide many benefits including growing food and trees, protecting water, reducing flood risk, storing carbon and supporting biodiversity. Healthy soils also preserve our cultural and archaeological heritage, and provide a platform for buildings and roads. However, soils are at high risk of damage through compaction, erosion, and organic matter depletion – and these risks are exacerbated by the impacts of climate change, such as changing rainfall patterns and increasing temperatures. This can lead to flooding, landslides and droughts with impacts which can be difficult to reverse. Responsibility for soils spans across the Scottish Government and, recognising the cross-cutting nature of the topic, the Scottish Government will develop a route map aimed at improving soil governance and delivery in Scotland.

In 2024, the Centre of Expertise for Waters (CREW) published a study assessing the socio-economic impacts of soil degradation on Scotland's water environment. It found that compacted soils can cost farmers £15 - £209 per hectare in extra fuel use; and the compaction of soils and sealing by infrastructure could lead to a 1% increase in flooding, with insurance claims of up to £76,000 per property flood event. It concludes that policies to protect soils from degradation create economic benefits ([CREW, 2024](#)).

There are a number of ongoing actions to protect our soils, including through peatland protection, management and restoration, sustainable forest management and the promotion of regenerative agriculture practices. This means reducing the disturbance of soils to conserve stored carbon, as well as addressing soils in poor condition. [National Planning Framework 4](#) (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; and soils are healthy and provide essential ecosystem services for nature, people and our economy. Areas for progress here include:

- **Strategic Research Programme** – the 'Healthy Soils' project (2022 to 2027) will deliver evidence to maintain soil health and support the protection of soil

from loss and degradation. The research, funded under the Scottish Government's Environment Natural Resources and Agriculture Strategic Research Programme and led by the James Hutton Institute, is focusing on identifying new ways of managing soils under threat from changes in climate, land use and land management. Work underway includes the design and testing of indicators and metrics to support the monitoring of Scotland's soil health. Once completed, this work should support and inform the development of mitigation and adaptation interventions.

- **Research Fellowship** – through ClimateXChange, one of our Centres of Expertise, Scottish Government has employed a post-doctoral soil research expert until financial year end 2024/25 to bring together policy interests on soils across Scottish Government and externally identify targeted areas for action. These actions will be identified by March 2025 with a delivery Soil Routemap agreed and published shortly thereafter.
- **Scottish Soil Framework** – The [2009 Scottish Soils Framework](#) sets out the vision for soil protection in Scotland, and formally acknowledges the important services soils provide to society. A refresh of the Scottish Soil Framework will be considered as part of the delivery Soil Routemap mentioned above.
- **Engagement at UK level** – once established, the Scottish Government and NatureScot will play an active role in the Four Countries Soil Policy Group. This is being set up by the Joint Nature Conservation Committee (JNCC) to support national governments and key public sector bodies to take action to improve soils. Scottish Government will also engage with research and development partners – via the UK Research and Innovation (UKRI) Land Use for Net Zero Hub (LUNZ-Hub), and the European Joint Project on the Soils UK National Hub – to ensure that all actions and policies are informed by the best available evidence.
- **SBS DP** – 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 will be finalised later in 2024, but include:
 - 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 and 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; and
- Set up monitoring frameworks to assess change in soil health, based on evidence from the Strategic Research Programme (2022-27).

Objective: Development planning (NC3)

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.

SG Directorate lead: PARD

Adopted in 2023, [National Planning Framework 4](#) (NPF4) sets out the 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 change and nature loss at the front of our thinking. 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. NPF4 forms part of the statutory development plan, along with the Local Delivery Plan applicable to the area at that time.

- **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 planning authorities and are applicable to their local area. In their preparation, planning authorities must take into account the National Planning Framework 4.

Decisions on planning applications must be made in accordance with the LDP, unless material considerations indicate otherwise. Regional Spatial Strategies (RSSs), Coastal Change Adaptation Plans (CCAPs) and Local Place Plans (LPPs) – while not part of the statutory development plan – complete the spatial framework for decision making that will support the delivery of a wide range of strategic priorities.

Delivering on all of the ambitions of NPF4 will be challenging, and needs a commitment from all sectors who have an interest in creating sustainable places. NPF4 is a comprehensive document that should be read and implemented as a whole, however this section highlights the key aspects of NPF4 policies and actions that are vital in preparing for current and future climate change. NPF'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 relevant policy on climate mitigation and adaptation (NPF4 [Policy 2](#)) that seeks an outcome of our places being more resilient to climate change impacts. Additionally, action on adaptation is supported via the following NPF4 policies:

- 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 (SEPA) and Local Development Plans (LDPs)** – SEPA has a statutory duty to cooperate in the preparation of LDPs. This includes involvement in the preparation of Evidence Reports. SEPA's evidence is critical in planning for climate resilient places. 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 LDP spatial strategy through an infrastructure-first approach to blue and green infrastructure. This 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 (OSS). An OSS 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 considers appropriate – including areas of forestry or woodland and

areas for play. Draft OSS regulations (regarding the preparation and content of OSS) were consulted on in 2021/22 and comments received will be taken into consideration when finalising the regulations. OSS can also contribute to the development of Nature Networks, where these align to the implementation of the Nature Network Framework.

- **SBS DP New transport infrastructure** – every new transport and active travel infrastructure project should incorporate elements of blue-green infrastructure, and seek opportunities for enhancing or expanding blue-green infrastructure, by 2030.
- **Evidence reports and geospatial climate risk data** – research to identify geospatial data relating to climate risks, funded by ClimateXChange, is underway. The research will map the needs of planning authorities in relation to preparation of their LDP evidence reports, and identify any barriers to accessing the necessary information.

Objective: Nature Networks (NC4)

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.

SG Directorate lead: ENFOR

As noted in the outcome introduction, Nature Networks are an effective tool for improving nature restoration, biodiversity, climate resilience and mitigating climate change, by improving ecological connectivity between habitats. Such connected ecosystems are inherently more resilient, and offer a place for nature to adapt and thrive. The creation of improved areas for nature will also help to overcome rural/urban boundaries, connect green and blue space, and promote a myriad of health and social benefits.

Nature Networks can deliver multiple positive outcomes for climate, the environment and health. However, nature-based solutions can sometimes have health trade-offs. For example, in the context of climate change, they may create habitats that are more suitable for vectors - such as mosquitos or ticks – that can transit disease to humans. The UK Health Security Agency (HSA) recommend that nature-based solutions are assessed on a case by case basis to ensure that health benefits are maximised and potential harms minimised. Tools such as NPF4 policies, the Place Standard Tool, Strategic Environmental Assessments and Health Impact Assessments can help to assess potential impacts on key populations and health determinants, within a local context. To recognise this, this chapter covers both our approach to building Nature Networks, and our response to direct climate risks from Invasive Non-Native Species (INNS) and vector borne diseases.

Case Study: The Glasgow and Clyde Valley Green Network Partnership

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. The aim was 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". ([Green Cities Europe](#))

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 these 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; [Forest Research UK](#));
- Active travel routes (more opportunities to walk, cycle and wheel away from busy roads).

Nature Networks

- **SBS DP Key action on Nature Networks** – the SBS DP identifies one key action to "[identify, expand and enhance Nature Networks and ecological connectivity](#)"

The five sub-policies are as follows:

- **Nature Networks in all local authority areas** – the Scottish Government will work with local authorities to ensure spatially defined nature networks are being implemented in every local authority area. These will

provide connectivity between important places for biodiversity, deliver local priorities and contribute to strategic priorities at regional and national scales by 2030.

- **Mapping of opportunities** – the Scottish Government will support local authorities to undertake mapping of opportunities for creating local authority-wide nature networks. These should connect locally important areas for biodiversity, provide linkage to the 30x30 network, and address local and regional priorities for climate and nature.
- **Mainstreaming** – the Scottish Government will continue to incorporate and embed Nature Networks into relevant national policy frameworks, including this Adaptation Plan, National Planning Framework and others, encouraging Nature Network implementation via local and regional decision-making processes, following the Nature Network Framework.
- **Nature Network Toolbox** – NatureScot has developed a [Nature Network toolbox](#) containing resources such as guidance, case studies, and mapping tools, which will support local authorities and other land managers in delivering, and contributing to, Nature Networks. The final Nature Network Framework will be published in 2024.

Case Study: Edinburgh's Strategic Green Blue Network - Edinburgh Living Landscapes

Edinburgh's Strategic Green Blue Network aims to deliver a network of beautiful, biodiverse, connected places that are climate resilient and help improve flood resilience and regulate extreme temperatures. AtkinsRealis has undertaken work on behalf of the City of Edinburgh Council to develop the strategic network, which first appeared in the Council's Proposed City Plan 2030 (the next Local Development Plan). It helped to support the strategy of the City Plan and to inform its Green Blue Network proposals. AtkinsRealis have subsequently refined this work, with a view to this feeding into other documents, such as future iterations of the Edinburgh Design Guidance.

Figure 10 shows the overall strategic Green Blue Network, including areas and routes important for recreation, biodiversity and water management. It also shows how the network serves Edinburgh's most deprived areas. Although the mapping identified the key strategic components, it should be recognized that green-blue networks exist at a local scale also.

This map is supported by more detailed maps focusing specifically on the issues of biodiversity, water management and recreation. Their key elements are brought together to create the strategic, combined map.

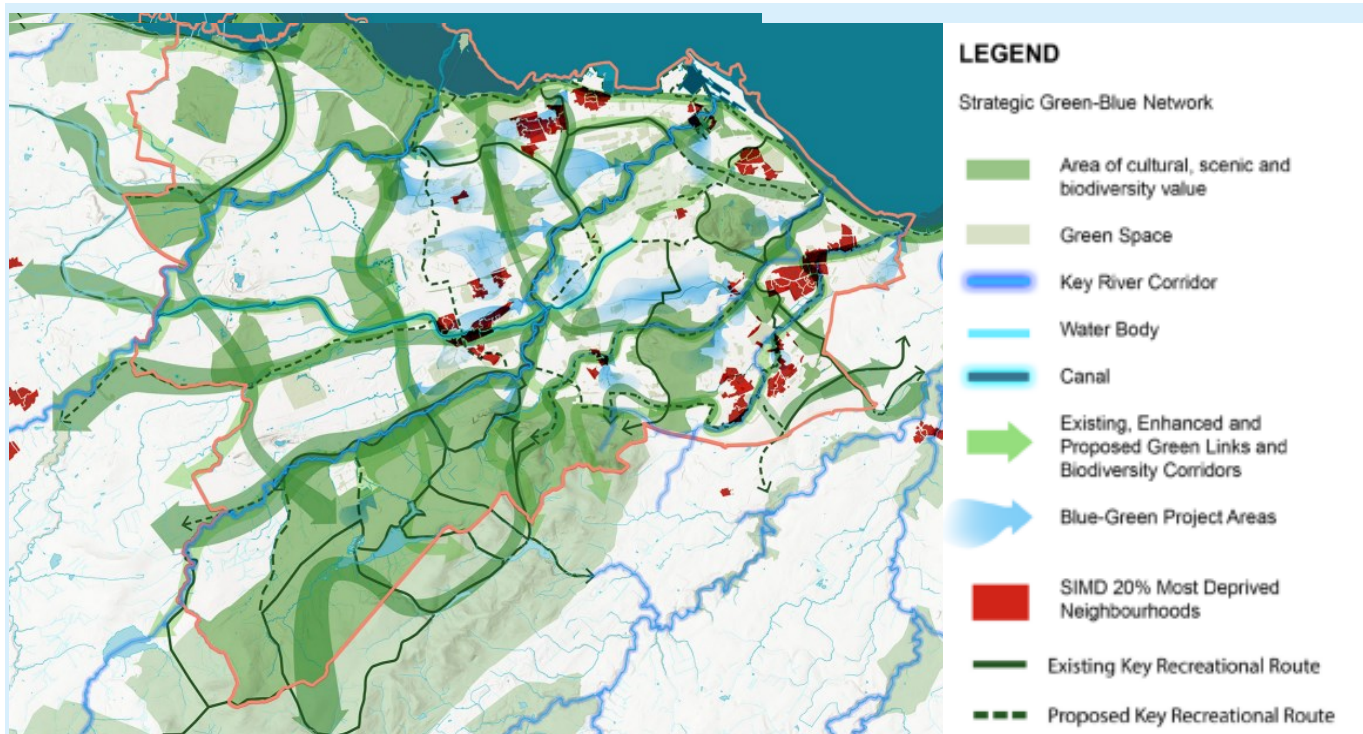


Figure 10: Edinburgh's Strategic Green Blue Network (in-development draft), (AtkinsRealis 2024)

Green Blue Neighbourhoods - The first Green Blue Neighbourhood to be taken forward is the Drylaw, Craighleith and Inverleith area of Edinburgh. Flood modelling and more detailed townscape studies have built on green blue network information. This has allowed a list of projects within this area to be prioritised. This is now being taken forward by a multi-disciplinary design team.

This neighbourhood work is known as 'Climate Ready Edinburgh' and, along with Edinburgh's Green Blue Network, won the 'Excellence in climate, environment, and social outcomes' class, in the Landscape Institute Awards 2023.

Invasive Non-Native Species (INNS)

Invasive Non-Native Species (INNS) are continuing to establish in Scotland at unprecedented rates. INNS are considered amongst the top four global threats to biodiversity ([Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019](#)). In many cases INNS outcompete native species, disrupt ecosystem function and introduce novel pathogens and diseases. Whilst the transport and introduction of INNS is facilitated mainly by indirect economic drivers, there are also direct drivers which facilitate the establishment and spread of invasive alien species. In particular, this includes land- and sea-use change, and climate change. Fragmented and disturbed ecosystems are more vulnerable to invasive alien species, and climate change will increase the opportunities for INNS to become established in new areas.

The impacts of INNS can also amplify the impacts of climate change. For example, invasive plants growing on riverbanks die back in winter, making the banks more vulnerable to flood erosion. The magnitude of the future threat from INNS is difficult

to predict, because of complex interactions between the drivers of change in nature. Outcomes can be improved by integrating INNS prevention and control into actions aimed at enhancing ecosystem function and resilience – such as through nature restoration and Nature Networks. Long-term monitoring of restoration sites is necessary to ensure early detection of INNS, so that management actions can be taken at an early stage.

Progress will be delivered through:

- **SBS DP Scottish Plan for INNS** – the Scottish Government will develop and implement a Scottish Plan for INNS surveillance, prevention and control, and secure wider support measures to enable effective INNS management. In partnership with agencies, environment Non-Governmental Organisations (eNGOs) and other stakeholders, both in Scotland and the United Kingdom, we aim to reduce the rate of establishment of known or potential INNS by at least 50% by 2030 compared to 2020 level. We also aim to detect priority INNS through increased inspections and vigilance of citizen scientists, ensuring they are eradicated or contained before they become established and spread.
- **SBS DP Priority sites** – we will develop and implement a pipeline of strategic INNS projects in the terrestrial environment to coordinate the control of priority INNS at scale, with the aim of eliminating or reducing the impacts of INNS in at least 30% of priority sites by 2030.
- **SBS DP Public awareness and biosecurity** – we will raise public awareness of the impacts of INNS. By 2030, we will also embed INNS biosecurity practice across those industries and recreational activities linked to the most important pathways of introduction and spread.
- **SBS DP 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, thereby protecting native marine species and habitats, allowing them to better 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 2026. Guidelines will ensure that processes and actions carried out during restoration activities do not introduce marine INNS, ensuring resilience.
 - Complete feasibility studies for management of island INNS by 2026. Where appropriate, develop and implement a rolling programme of island INNS management thereafter, focussed on the targeted removal of predators impacting on nesting seabirds.
 - At the UK level, Angling and Boating Pathway Action Plans have been developed with Scottish input. The Scottish Angling Pathway Action Plan has been developed to engage directly with targeted stakeholders and

manage additional pathways of INNS introduction and spread. Programmes are also underway to develop monitoring tools and methods in the marine environment, utilising partnership approaches, that allows a better understanding of marine INNS.

Vector borne disease

Related to INNS management, 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 like 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** – the 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 testing for tick borne infections, as well as technical and clinical advice to healthcare staff. In collaboration with Public Health Scotland (PHS), SLDTRL provides epidemiological data on Lyme disease in Scotland, and maintains close links with the UKHSA Rare and Imported Pathogens Laboratory (RIPL). Scottish Government and PHS will work with RIPL to ensure it offers comprehensive testing.
- **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 not previously seen in Scotland.
- **Veterinary Advisory Service** – the Scottish Government will continue to fund the Veterinary Advisory Service, to help practicing vets to (i) identify, treat and

prevent tick- borne disease in animals; (ii) conduct 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 this Adaptation Plan, action includes:

- **Risk mapping** – PHS will work with Scottish Government and other stakeholders to map the risk of emergent vector-borne disease due to climate change, in order to anticipate future changes to this risk.
- **Research on enhanced surveillance** – PHS and Scottish Government 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** – we will explore opportunities for utilising whole genome sequencing data to enhance vector borne disease surveillance programmes.
- **Contingency planning** – the Scottish Government and our partners will review vector borne disease contingency plans in England. We will scope out their adoption in Scotland, with appropriate modifications, including communication and planning with operational partners.
- **Horizon scanning** – the Scottish Government and our 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 (NC5)

Evidence-informed planning and management improves ecosystem health, values our marine environment and supports our Blue Economy.

SG Directorate lead: Marine

Scotland's seas and coastline are famous across the world, and are home to some of our most beautiful plants, animals and marine life. The biodiversity of our marine and coastal environment is crucial to supporting both thriving ecosystems and local economies, and it must be resilient to adapt to the impacts of climate change. Our seas are also vital in helping to mitigate the worst impacts of climate change, but are at risk of losing their ability to regulate climate if we do not protect them. This objective will set out action focused on marine planning, coastal planning, habitat restoration, and biodiversity. This includes further research and evidence gathering, in order to ensure that management of our coasts and seas is based on evidence.

Fisheries and aquaculture will be discussed further in the 'Economy, Business and Industry' outcome.

The risks to our marine and coastal environments from climate change are stark and accelerating. Our sea levels are rising and this is threatening our coastline, with erosion affecting key communities and habitats. 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 £0.8 billion and £1.2 billion of coastal assets in Scotland may be at risk of erosion by 2050. ([Dynamic Coast, 2021](#))
- Together, the cumulative impact of different climate stressors, such as oxygen depletion and ocean warming, will result in future changes in the viable habitat for a number of marine species. This may cause range shifts and or a decline in species population. ([Scotland's Marine Assessment, 2020](#))



As an example of a species at risk: Atlantic puffins are threatened by climate change for a number of reasons, including the availability of their main source of food, sand eels, being very sensitive to ocean warming (Scottish Government, 2023). The British Trust for Ornithologists (BTO) projects a decline of puffin numbers across Britain and Ireland of nearly 90% by 2050 (BTO, 2021).

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 (adopted in 2015) sets out high-level and sector-specific objectives, including on climate change mitigation and adaptation (as required under the Marine (Scotland) Act 2010) 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](#) (2016).
- **National Marine Plan 2** – a new National Marine Plan 2 (NMP2) is under development and the proposed timing for its adoption is by Summer 2027. It aims to help tackle the twin climate and biodiversity crises and support our net zero ambition, by providing a clear decision-making framework to support the management of marine space. The NMP2 will set out specific objectives and associated policies relating to climate change mitigation and adaptation, as required under the Marine (Scotland) Act 2010. It will act as a key delivery mechanism for Scotland's [Blue Economy Vision](#), seeking to strengthen holistic consideration of economy, society, environment and climate mitigation and adaptation in marine decisions. The new NMP2 will also set out an updated monitoring and evaluation framework to better support adaptive management.
- **Regional Marine Plans** – several Regional Marine Plans are under development, which will set out locally-specific planning policies. These will guide decision-making in Scottish marine regions, in conformity with National marine planning policies and objectives (including those on climate change mitigation and adaptation). Once adopted, the plans will support coastal community decision-making to deliver multiple local-scale benefits, including adaptation and mitigation of coastal erosion and flood risk, and protection of blue carbon habitats.

- **Monitoring and assessment of climate change impacts in Scottish seas** – the Marine Directorate will continue to provide the scientific evidence and monitoring data to inform adaptation policy in the marine and freshwater environment. Existing programmes monitoring the environment and ecosystems (such as the Scottish Coastal Observatory), and those monitoring fish and shellfish populations, have already documented the impacts of climate change. Such programmes underpin the high quality evidence and scientific consensus provided by national and international assessments, for example the [Climate Change Risk Assessment](#), the [Marine Climate Change Impacts Partnership](#) and the [Oslo-Paris Commission](#).
- **Climate Vulnerability Assessment (CVA)** - an initial review of CVA methodologies was funded through the ClimateXChange. Building on this work, the Marine Directorate will scope options to deliver an in-depth climate vulnerability assessment of the marine environment and all human related activities, including to identify key species and sectors that are more or less vulnerable to climate change.

Biodiversity and Habitat Restoration

- **SBS DP Scottish Marine Environmental Enhancement Fund (SMEEF)** – SMEEF was launched in May 2022 to invest in marine and coastal restoration throughout Scotland. The fund is hosted by NatureScot, with Scottish Government Marine Directorate and Crown Estate Scotland as Steering Group partners. It has enabled private and public investment to support the health and biodiversity of Scotland's seas through habitat and restoration projects. Over the duration of SNAP3, SMEEF will continue to seek to increase investment and fund projects that recover, restore or enhance the health of marine and coastal habitats, including work to build resilience and adaptation to climate change impacts.
 - To date, SMEEF has secured and distributed £3.8 million, with a mix of public and private investment, into 54 restoration and enhancement projects across Scottish coasts and seas. 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.
 - SMEEF has announced an additional [£2.1 million for seagrass restoration](#) and is anticipating to add circa £2.5 million to its seabird resilience fund over the next 5 years.
- **SBS DP 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, and for protecting 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. To do this Scottish Government will:

- Assess the network of marine protected areas in respect of the resilience of marine biodiversity to climate change, based on a regional assessment by the OSPAR commission, by 2026;
- Introduce fisheries closures to protect Vulnerable Marine Ecosystems in offshore waters between 400-800 metres depth, by 2027;
- Develop and implement an adaptive management framework for the MPA network, by 2028;
- Put in place fisheries management measures for those sites in the MPA network that require them, by 2025, increasing the level of protection to support the recovery and resilience of Scotland's seas;
- Deliver further fisheries management measures for priority marine features (identified as most at risk from bottom-contacting mobile fishing gear outwith MPAs), by 2025.
- **SBS DP Marine nature enhancement** – in the next 2 years, we will develop a marine restoration plan for 2026-45, including prioritising marine habitats and locations suitable for restoration. This supports adaptation by contributing to the recovery of marine habitats and species, restoring ecosystem function, and enhancing biodiversity.
- **SBS DP Safeguarding marine biodiversity** – by 2027, we will work with stakeholders to complete a review of opportunities for increasing community participation in safeguarding marine biodiversity.
- **SBS DP Seabird Conservation Strategy** – by 2025, we will develop and publish a Scottish Seabird Conservation Strategy which will identify actions to conserve and increase the resilience of seabird populations.
- **SBS DP UK Dolphin and Porpoise Conservation Strategy** – by 2025, we will publish the UK Dolphin and Porpoise Conservation Strategy, and begin delivery of actions relevant to Scotland to conserve and manage pressures acting on these species.
- **SBS DP Seals** – by 2026, we will review the approach to and locations of designated seal haul-out sites in relation to the protection of seals.

Objective: Natural Carbon Stores and Sinks (NC6)

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.

SG Directorate lead: ENFOR/Marine/ARE

Scotland's natural carbon stores can be broadly categorised into peatland, forestry and woodland, and blue carbon habitats, such as saltmarsh and seabed sedimentary carbon. Protecting, managing 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, and for their multiple co-benefits such as flood resilience and improved biodiversity.

This objective is split into the following sub-themes:

- Peatlands
- Forestry
- Blue Carbon
- Carbon in agricultural soils

Peatlands

Peatlands cover over two million hectares (or 25%) of Scotland and are of national and global significance. 60% of all UK peatlands are found in Scotland, and our blanket bog represents around 10% of the global total. In good condition, peatlands provide multiple co-benefits: capturing and storing carbon, supporting nature, reducing flood risk, improving water quality, and providing places that can support physical and mental wellbeing.

However, roughly three-quarters of our peatlands are degraded through drainage, extraction, overgrazing, burning, afforestation and development. Degraded peat offers fewer benefits and emits carbon, now accounting for around 15% of Scotland's total net emissions and thus worsening the climate emergency.

Protecting, managing and restoring Scotland's peatlands – through rewetting and other techniques – enhances the resilience of these ecosystems. Strong, protected, biodiverse ecosystems also help people adapt to climate change by providing nature-based solutions to climate-related risks.

Peatland restoration is also a key plank of Scotland's just transition to net zero, supporting Scotland's rural economy by creating economic opportunities and good green jobs. Our significant investment in peatland protection, management and restoration over the coming 10 years will support small and medium size

businesses that deliver restoration works, often in rural areas, as well as the ancillary services that support the industry locally. It will also provide economic opportunities for land owners and land managers, farmers and crofters, and third sector bodies.

Maximising peatlands' dual role – as a nature-based solution for both mitigating and adapting to the linked climate and nature emergencies – underpins our commitment to and investment in their condition. We will take the following action:

- **Peatland restoration** - the Scottish Government has committed £250 million over 10 years to restore 250,000 hectares of degraded peatlands by 2030. We estimate that approximately 75,000 hectares have been restored to date, including more than 10,000 hectares in 2023-24 alone – the highest area in a single year. Restoration is achieved through a range of techniques including drain blocking and bare peat restoration on upland blanket bogs ([Peatland Action Technical Compendium](#)). Working with our peatland restoration delivery partners (NatureScot, Forestry and Land Scotland, Loch Lomond and the Trossachs National Park, Cairngorms National Park, Scottish Water) we will continue to grow delivery capacity and upscale annual rates of restoration towards our current target. We will continue our work to grow responsible private investment in support of this. We will increasingly use scientific evidence and monitoring data to inform where to target investment in restoration, in order to maximise the multiple adaptation benefits peatlands provide for nature and people.
- **SBS DP Peatland monitoring** – by 2027, NatureScot will develop a national peatland monitoring framework that incorporates on-site and remotely sensed assessments of biodiversity indicators, climate resilience and associated functions within the wider landscape, hydrological and ecological network contexts.
- **Horticultural peat sale ban** – in our 2021-22 Programme for Government, the Scottish Government committed to taking forward work to develop and consult on a ban on the sale of peat-related gardening products, as part of our commitment to phase out the use of peat in horticulture. The results of our consultation on 'Ending the Sale of Peat in Scotland' (2023) showed that most hobby gardeners (76%) and professional horticulturalists (58%) supported a peat sales ban. During the remainder of 2024, ongoing stakeholder engagement will help shape the scope and timing of a ban. This ban aims to be ambitious and realistic, tailored to Scotland's specific needs, and designed to avoid unacceptable impacts on non-horticultural users of peat.
- **Peatland protection and management** - alongside restoration and our peat sales ban, Scottish Government will continue to develop a range of other measures, incentives and regulatory approaches to drive responsible stewardship of our peatlands. These include:

- From 2025, new conditions for peatlands and wetlands will be implemented under the Good Agricultural and Environmental Condition (GAEC) 6, to protect vital carbon stores, as part of the changes to agricultural support in Scotland.
- In addition, we are investigating how optimal grazing levels by both wild and farmed herbivores, combined with partial rewetting of peat and peaty soils, could contribute to further emissions reduction.
- We have also established an expert group to advise the government and develop the guidance and tools needed to inform decisions on windfarm development on peat.
- We will continue to explore ways in which fiscal policies can support improved land management outcomes, including the restoration of peatlands. This exploration will include consideration of options for a carbon land tax.
- **Muirburn and moorland management** – the management of upland moor areas for grouse shooting and livestock grazing can include the use of muirburn, which provides new vegetation growth for grouse and livestock to eat. Muirburn undertaken on peatlands can have an adverse impact on carbon sequestration. To address this, the Scottish Government introduced the Wildlife Management and Muirburn (Scotland) Act 2024, the legislation provides vital increased protection for our peatlands by introducing a licensing scheme for muirburn, and bans muirburn on peatland unless for a limited purpose under licence. The licensing scheme will ensure that muirburn is being undertaken in an environmentally sustainable manner.
- **SEPA Land-use planning** - SEPA seek to protect and improve carbon rich soils including peatland through its 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. They should also be included when identifying nature networks in Local Development Plans, to inform spatial strategies of protection and restoration opportunities.

Forestry and Woodland

Woodland and forest covers more than 1.49 million hectares in Scotland (about 19% of our total land area) and around one half (51%) of the total UK forest carbon stock in 2020 is in Scotland (2.0 billion tonnes of carbon dioxide equivalent) ([Forestry Statistics, 2023](#)). Forests are one of the best tools we have to sequester carbon released into the atmosphere. Scotland's forests currently sequester 7.5Mt CO₂ – which is equivalent to around 14% of Scotland's greenhouse gas emissions in 2022. In addition, well-designed forests, managed in line with the principles of sustainable forest management (as outlined in the UK Forest Standard) provide multiple

benefits to society. These benefits include rich biodiversity, a green economy supporting rural jobs, timber products that can substitute for materials that have higher emissions and cannot be easily reused or recycled, healthy and stable soils, improved air and water quality, flood mitigation, shade and shelter that mitigates against temperature extremes, beautiful landscapes that support a diverse tourism economy, increased health and well-being, and places to support rich educational experiences.

[Scotland's Forestry Strategy](#) (SFS) identifies climate change as a key strategic driver and sets out a vision where by 2070 "Scotland's forests and woodlands will be a more resilient adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy and flourishing communities".

In addition to the action below, see further policy on the resilience of the forestry sector under [Objective B2](#).

- **UK Forestry Standard** - [UK Forestry Standard](#) (UKFS), the UK technical standard for sustainable forest management underpins all [Forestry Grant Scheme](#) (FGS) and Felling Permission approvals, and all Forestry Environmental Impact Assessment determinations. Scottish Forestry are supporting the implementation of the updated UKFS (version 5), including training. The updated Standard was reviewed and revised with stakeholders to ensure, amongst other things, that compliance with the Standard increases the resilience of the forest resource. Scottish Forestry approvals will require compliance with the updated Standard from 1 October 2024.
- **Woodland creation** – Scottish Forestry is committed to reaching woodland creation targets set by the Scottish Government of 18,000 hectares of new woodland annually, increasing forestry's contribution to climate change mitigation.
- **Right Tree in the Right Place (RTRP)** – the RTRP 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](#) (2022-25).
- **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](#) support planning authorities in assessing the impact of planning applications on the forestry resource. Together they provide 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.

- **Improving resilience** – one of the three 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 to consider how to best build resilient future forests, and have established a steering group with cross-sector representation to deliver this. A Resilience Action Plan is due to be published in 2024. This will 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.
- **SBS DP Protected woodlands** – NatureScot will establish a programme to enable protected woodlands to be brought into favourable condition with clear targets and a clear framework for decision making by the end of 2028.
- **SBS DP Ancient woodlands** – NatureScot will develop the new Register of Ancient Woodlands, to include locational data, a definition of the required ‘protected and restored’ condition of ancient woodlands, and a process for recording ancient woodlands that reach the required standard.
- **SBS DP Deer cull targets** – The Deer Management Round Table agreed to attain deer cull at level at which habitats and ecosystems can recover and regenerate, and where deer densities are maintained at sustainable levels. This is done by increasing the national cull by 25-30% sustained over several years; achieving densities of 5-8 deer per km² in Cairngorms National Park; and low deer densities of around 2 deer per km² where woodland regeneration is a priority and required to achieve the UKFS.
- **SBS DP Deer management** – by 2027, NatureScot, supported by Scottish Forestry and Forestry and Land Scotland will review the use of mechanisms to support effective and safe deer management in new and existing woodlands.

Blue carbon

Blue carbon refers to the carbon captured and stored in the coastal and marine environment. It is accumulated over long timescales through natural processes, but remains vulnerable to human disturbances and ongoing environmental change. Blue carbon habitats such as saltmarsh, seagrass, and seabed sediments (fjords, coastal and shelf seas) make a significant contribution to Scotland’s overall carbon storage. We currently estimate that there is around 3 Mt (million tonnes) stored in Scotland’s blue carbon habitats, excluding seabed sediment, and a further 357 Mt of organic carbon stored in seabed sediments, though these estimates have a high level of uncertainty.

Climate change threatens Scotland’s blue carbon habitats, particularly the impacts of ocean acidification, warming sea temperatures, changes in rainfall, increases in

extreme weather and, critically, from accelerating sea-level rise. Seabed carbon stores are also vulnerable to disturbance from activities such as bottom trawling. Inter-tidal blue carbon habitats are sensitive to human activities such as development, pollution, and over-grazing of saltmarshes by livestock.

We are working to ensure that consideration of blue carbon habitats is given in the development of wider Marine Directorate policies including in the upcoming NMP2, Scotland's network of MPAs, the marine restoration plan, and the Scottish Biodiversity Strategy Delivery Plan.

The key delivery mechanisms for blue carbon policy in Scotland are:

- **The Scottish Blue Carbon Forum (SBCF)** – the SBCF connects blue carbon science, policy, and delivery experts from the Scottish Government, public bodies, and research institutions in the UK and internationally. The SBCF is supporting the Scottish Government to identify and publish priority evidence needs and actions to enable improved management, protection, enhancement and restoration of blue carbon stores and sequestration habitats. Work is also underway to map the extent and condition of existing habitats and improve estimates of the carbon sequestration and storage rates.
- **The UK Blue Carbon Evidence Partnership (UKBCEP)** – the UKBCEP brings together policy and technical experts from across the UK Administrations. Through the UKBCEP, the Scottish Government will continue to progress actions that require a whole of UK approach – such as working towards the potential inclusion of saltmarsh in the UK Greenhouse Gas inventory, and supporting the development of an implementation plan for its Evidence Needs Statement.
- **Scottish Blue Carbon Action Plan** – we will set out the Scottish Government's priorities in the upcoming Blue Carbon Action Plan. This plan will be informed by advice from the SBCF and our work with the UKBCEP. The focus of the plan will be on both identifying where the Scottish Government can most effectively address the evidence gaps remaining for blue carbon habitats and on progressing actions to support the protection, restoration, and enhancement of these critical habitats.

Case Study: Project Seagrass – Restoration Forth

Launched in 2022, [Restoration Forth](#) is working with local communities to restore seagrass and oyster habitats to the Firth of Forth. The project aims to create a marine restoration toolkit to empower communities to lead on community marine restoration projects across Scotland, and securing by 2030 at least 42 hectares of critical coastal habitat restored in the Firth of Forth.

By the end of 2023, the project restored one hectare of seagrass and deployed the first European flat oysters into the Firth of Forth in 100 years. The project also trained hundreds of local community members in restoration techniques and skills.

The original three-year (2022-2024) programme has been made possible by funding from Aviva, the ScottishPower Foundation, the Moondance Foundation and supported by the Scottish Government's Nature Restoration Fund through Scottish Marine Environmental Enhancement Fund (SMEEF) facilitated grants

Agriculture

Our farmers and crofters play a significant role in protecting and enhancing our carbon stores and sinks. They are key land managers, with peatland, woodland and other natural features on their land. [Objective B2](#) on Farming, Fishing and Forestry 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. The actions set out within the Objective B2 are complemented by the wider actions being taken in support of a just transition for farmers and crofters. The Scottish Government is committed to producing a Land Use and Agriculture Just Transition Plan that will focus on the livelihoods, skills, health, and wellbeing of those who live in and rely on Scotland's land. We are also committed to a focus on maintaining and supporting thriving rural and island communities.

For example, the future support framework will have measures to support our farmers and crofters to maintain and improve their carbon 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. This will be delivered through:

- **Vision for agriculture** – our vision for agriculture is for Scotland to become a global leader in sustainable and regenerative agriculture. Supporting our farmers to manage the land for climate and biodiversity outcomes, as well as for 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 and health through the [Preparing for Sustainable Farming](#) scheme. It offers funding for farmers and crofters to understand their carbon emissions and sequestration, including through carbon audits and soil sampling and analysis.
- **SBS DP 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 analysis, animal health and welfare plans, carbon audits, biodiversity audits and integrated pest management plans.

Outcome Two: Communities (C)



Communities are creating climate-resilient, healthy and equitable places.

The climate emergency will change Scotland's places. Challenges like heatwaves, flooding and accelerating sea level rise are affecting our countryside, towns and cities. These changes will only increase in the future. We know that, without adaptation action, climate change will affect people's health and wellbeing, and widen existing inequalities.

To protect our communities, we need our places to adjust to the effects of climate change. We do this by empowering and invigorating communities and places – one of our central outcomes for ensuring a just transition. Actions to address climate impacts can deliver 'multiple wins' for health, wellbeing and equity.

This Outcome covers how Scotland is building community resilience to flooding, coastal change, wildfire and other extreme events. The aim is to ensure all parts of Scotland are building climate resilience through regional adaptation partnerships and support for locally-led action focused on communities vulnerable to climate impacts. This involves building climate resilient places and realising the power of our culture, heritage and creativity.

Objective: Regional and place-based collaborations (C1)

Regional collaborations are driving inclusive, effective and place-based adaptation action across all of Scotland.

SG Directorate lead: DECC

Responding to the Climate Emergency, and ensuring a just transition, 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.

This objective aims to improve how Scotland agrees its priorities regionally, designs adaptation locally, and takes priority actions at a greater pace and scale.

Partnership working: central and local government

Local authorities are leading collaborations on climate adaptation in Scotland. They are founders and [anchor institutions](#) in all existing adaptation collaborations, and the Climate Change Committee has highlighted these as examples of local excellence.

- **Climate delivery framework** – signed in 2023, the Verity House Agreement sets out how central and local government will work in partnership across three shared priorities covering climate change, poverty and public services. In line with these priorities, COSLA and Scottish Government have established a joint climate delivery framework to foster a new, collaborative way of working. Early priorities for the framework will include climate adaptation.
- **Adaptation partnership roles** - working with multiple stakeholders – including central government, public bodies, local authorities, third sector, business and industry, and communities and individuals – across 2025, the Scottish Government will develop a clearer collective understanding of partnership working roles for climate adaptation action.

Regional adaptation collaborations

Scotland's pioneering regional collaborations on climate adaptation are 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 by the Climate Hebrides Community Interest Company.
- Edinburgh and South East local authorities are collectively embedding climate adaptation into their ambitious economic development plans.

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 to cover the whole of Scotland and broaden out our set of delivery partners.

The Scottish Government, supported by Adaptation Scotland, will work with local partners to identify options for progressing climate adaptation partnerships in the context of local needs and priorities. Partnerships and collaborations will avoid a 'one size fits all' approach. We propose that action at a regional scale includes collaborating on regional risk and opportunity assessment, adaptation priority setting, and long-term planning and investment; taking a place-based approach and including diverse communities as part of action to reduce inequalities. Regional partnership 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. Key actions here are:

- **Expanding regional adaptation partnerships by 2029** – across the period of this Adaptation Programme, the Scottish Government will drive collaboration on adaptation planning and investment with a broader set of partners, covering all of Scotland’s regions. The Scottish Government will work with local government and a broad range of other partners to establish regional adaptation partnerships and collaborations covering all regions in Scotland by 2029.
- **Regional adaptation routemap** – the Scottish Government, working with COSLA and a range of other partners, will develop a route map by 2025 for extending mature regional collaborations on adaptation to all of Scotland by 2029. This routemap will align with and support the development of an approach to Regional Just Transition plans.
- **Regional Marine Plans** – the Scottish Government will support the ongoing development of Regional Marine Plans by Marine Planning Partnerships 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.

Local place-based collaboration

The impacts of climate change will be locally and distinctly felt, so an approach that recognises this and the importance of communities shaping the approach is vital. As a result, we are advocating a place-based approach – this is about understanding the potential of a place and coordinating action to improve outcomes, with collaboration and community participation at the heart of the process. Key to delivery are:

- **Place Principle** – the Place Principle (ourplace.scot) sets the overarching context for place-based working in Scotland and establishes a clear vision for collaboration around place on climate adaptation. COSLA and the Scottish Government will continue to implement the Place Principle, which promotes the need for communities, public organisations and businesses to work collaboratively with the assets and services in a place to achieve better outcomes for people and communities.
- **Place Standard Tool** – the Scottish Government and partners will continue to promote the use of the [Place Standard Tool with a climate lens](#) as a practical tool to support a joined up, collaborative, and participative approach to climate action within a place.
- **Architecture & Design Scotland** – Architecture & Design Scotland (AD&S) is a public body whose role is to promote the design of buildings and places that meet the needs of everyone in 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, A&DS will: support the design and delivery of people centred climate conscious places considering adaptation and resilience to the changing climate in all our place-based work, aligned with its Corporate Plan 2024-27.

- **Public Health Scotland** – place-based actions that prioritise investment in the building blocks of good health and wellbeing in local places can deliver climate, health and equity co-benefits. Public Health Scotland (PHS) will work with national and local government to implement a Health in All Policies approach. This aims to ensure that climate related policies are designed to minimise the health and equity risks posed by a changing climate, maximising the potential health and equity benefits and minimising the harms. This includes scaling up capacity of partners at a local level to use public health principles, tools and approaches such as [Health Impact Assessments and the Place Standard Tool with a climate lens](#). PHS will continue to implement its Climate Change and Sustainability Strategic Approach 2023–2026.
- **Local Place Plans and local living** – the Scottish Government will continue to encourage applying the Place Principle in the planning system through the National Planning Framework 4 and preparation of regional spatial strategies and local place plans (LPPs). LPPs are community-led plans setting out proposals for the development and use of land, and whilst they are not part of the statutory development plan, they have an important role to play in informing Local Development Plans and decision-making. The Scottish Government will also continue to support the application of [Planning Guidance on local living and 20-minute neighbourhoods](#).
- **Place and Wellbeing Outcomes** – Scotland’s Place and Wellbeing Outcomes describe what every place needs to enable those who live, work, and relax there to stay healthy and thrive, including in our changing climate. Crucially, it highlights that to reduce Scotland’s significant inequalities, every sector needs to be working together to take actions that deliver all the Outcomes in every place. Scottish Government will continue to support the use of Scotland’s Place and Wellbeing Outcomes and associated indicators as part of planning and evaluating place-based action, including on climate adaptation.

Objective: Locally-led adaptation (C2)

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

SG Directorate lead: DECC

Every community is unique and so is how climate change impacts them. 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 adapt to the changing climate whilst tackling other local priorities such as housing, getting around, health, skills and jobs.

Through support and resources, this objective aims to enable all communities to build resilience and prepare for climate change and, at the same time, make places healthier, equitable, and more comfortable to live in.

Supporting community climate action

The Scottish Government has established a range of initiatives to support communities to take climate action in their areas.

- **National network of Community Climate Action Hubs** – the Scottish Government will continue to facilitate a national network of Community Climate Action Hubs. The network of Climate Action Hubs will continue to support communities to come together and engage collectively on climate action, whilst supporting the just transition to low carbon and climate resilient, healthy living and driving wider behaviour change. Up to £5.5 million will be invested in 2024-25 enabling community-led climate action through building community capacity, supporting development of local initiatives, strengthening community resilience, climate literacy training, providing seed funding and embedding climate solutions in Local Place Plans.
- **Community Climate Adaptation Route map** – Scotland's [Community Climate Adaptation Route map](#) is a key resource supporting locally-led adaptation. This practical guide for communities to adapt to climate change has been developed by Adaptation Scotland in collaboration with multiple community-facing organisations. Adaptation Scotland will continue to support the national network of Climate Action Hubs to use the Route map and develop updated resources as needs are identified.

Case Study: Adaptation Scotland community resources

The [Community Climate Adaptation Routemap](#) is Adaptation Scotland's practical guide to help communities adapt to climate change. No matter what kind of community you are, there are actions you can take to build resilience, prepare for climate change, and make your area healthier, safer, and more comfortable for people and wildlife. This Routemap offers clear steps for local action groups, community councils, and development trusts to build their resilience to climate change. The Routemap can help you understand and address the impacts of climate change, explore actions to build resilience, invest in your community, carry out simple climate action projects, and learn about funding.



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Figure 12: Community Climate Adaptation Routemap, Adaptation Scotland

Supporting communities vulnerable to climate impacts

The whole Adaptation Plan aims to build Scotland's resilience to climate change, with a focus on inclusive and place-based adaptation. This means supporting people and communities most vulnerable to climate impacts and building resilient, healthy, and equitable places.

People and communities who are more likely to be exposed to climate hazards include: rural, island and coastal communities; communities in areas at risks of flooding; urban communities at risk of the urban 'heat island' effect; people living in deprived areas; some occupational groups such as key workers and outdoor workers; and businesses, individuals and communities whose livelihoods are linked to the land or sea.

Different people within communities will also have varying capacity to adapt to climate change. People who require greater support to adapt, because they face additional barriers, are likely to include: people who are living in poverty or on a low income; disabled people and those with long term medical conditions; people living in some housing tenures such as private rented or social housing; people living in poor quality or temporary housing; homeless people; and displaced people.

Actions across the Adaptation Plan consider vulnerable groups, supported by the plans and policies set out below:

- **Adverse Weather and Health Plan** – the [Adverse Weather and Health Plan 2024-2027](#) sets out how PHS, with support from the Scottish Government and working in partnership with others, will help to protect the health of the population from weather-related harm. The Adverse Weather and Health Plan sets out PHS's commitment to working with partners to help mitigate, prepare for and respond to the potential health risks associated with hot and cold weather, flooding and drought. The Plan aims to help reduce the burden of disease and health inequalities associated with adverse weather events in Scotland and will consider both physical and mental health outcomes.
- **National Islands Plan** – we recognise that our islands are among the communities most exposed to the impacts of climate change in Scotland. Many of these impacts are already being felt – in the form of sea-level rise, coastal flooding and coastal erosion. To support climate adaptation and resilience in Scotland's island communities, the Scottish Government will work with partners to continue to deliver the National Islands Plan, including its recognition of the strengths and vulnerabilities of island communities in relation to climate change. National Islands Plan strategic objective 9 relates to climate mitigation, adaptation and energy. A second National Islands Plan is under development and will be published in 2025. It will continue to set out the island-specific actions that the Scottish Government proposes to take to support islanders in relation to climate mitigation, adaptation and energy transition.
- **Improving islands transport connectivity** – Transport Scotland is aiming to publish the final versions of the Islands Connectivity Plan (ICP) Strategic Approach and the Vessels and Ports Plan by the end of 2024 (see [Objective PS4](#) for further detail). Phases 1 and 2 of the Vessels and Ports Plan 2024-45 cover the period of the Adaptation Plan and include actions to enhance the ferry fleet's resilience and reliability, including in response to changing weather conditions.
- **Digital connectivity** – digital infrastructure is an economic enabler, a key part of plans for resilient economic growth that can help build resilient communities. Through its digital programmes the Scottish Government will continue to invest over £600 million in the broadband networks of the future, through the Reaching 100% (R100) broadband programme. Around 70% of the 113,000 premises expected to be connected through the R100 contracts are in rural Scotland, with around 12,000 of these premises located in island communities. The Scottish Government will play a key role in delivering Project Gigabit procurements in Scotland, leading delivery of local (Type A) and regional (Type B) activity providing opportunities for alternative network suppliers in Scotland. We will also work alongside the UK Government to manage the UK-wide (Type C) framework in Scotland. This will allow us to

align Project Gigabit with our own R100 programme. We have completed rollout of our £28.75 million Scottish 4G Infill (S4GI) programme which has delivered future-proofed 4G infrastructure and services to 55 rural and island areas.

- **Adaptation on the Carbon Neutral Islands** – Scottish Government will 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 to reach carbon neutrality by 2040. Action taken will include climate resilience as well as adaptation. Finance strategies to support the mid to long term project delivery are under development. Such strategies will include consideration of adaptation and resilience related initiatives.
- **Local Coastal Partnerships** – the Scottish Government supports the work of 5 Local Coastal Partnerships (LCPs) based in different areas around the Scottish coast. The LCPs provide a hub of local and community information and expertise, and government funding supports a range of activities and initiatives to deliver local action in line with national priorities, including marine education, monitoring and stakeholder engagement with communities around issues such as climate impacts.
- **Addressing Depopulation Action Plan** – the wide range of actions identified by the [2024 Action Plan to Address Depopulation](#) will support building healthy and equitable places and communities which are resilient to climate change. In turn, places which are resilient to climate change will be well placed to attract and retain populations over the longer term, for the benefit of communities, economies and public services. The actions identified cover housing, transport, digital connectivity, education, access to health and social care, childcare, blue economy, land ownership, crofting and more.
- **Community adaptation learning** - 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. It will empower communities by enabling them to use Adaptation Scotland resources to integrate climate adaptation into wider community priorities.
- **Health Impact Assessment** – Public Health Scotland (PHS) will work with the Scottish Government and key partners to support implementation of recommendations from the Health Impact Assessment Scoping exercise of the draft Adaptation Plan. This will support climate action that realises 'multiple wins' for health and wellbeing, equity and the planet.

Recognition of the differential impacts of climate change will also be reflected in the Scottish Government's Just Transition Plans. These Plans, covering different sectors, sites and regions will set out our approach to ensuring that people and

communities can access the support they need to adapt during change, and that the costs and benefits of addressing climate change are fairly distributed.

How does climate change affect health and wellbeing?

Climate change will have wide ranging effects on our health and wellbeing. These may be direct, for example an increase in injuries due to flooding or deaths from heart disease due to high temperatures. They may be indirect, by reducing access to the building blocks of health and wellbeing in local places. For example, flooding events may cause people to lose their belongings and be displaced from home leaving them unable to connect with friends and family, unable to access school, work or vital goods or services such as healthcare, with profound and lasting impacts on mental health and wellbeing.

Many of the projected climate related risks to health could be prevented or reduced with a rapid global reduction in greenhouse gas emissions now, and effective adaptation. Considering health in climate actions taken across the building blocks of health and wellbeing, including housing, transport, greenspace, food, jobs and the economy, could deliver co-benefits for population health and equity. Wider actions, to address underlying causes of inequalities, such as poverty reduction measures, can increase resilience to climate, and other risks to health.

Building blocks of health and wellbeing

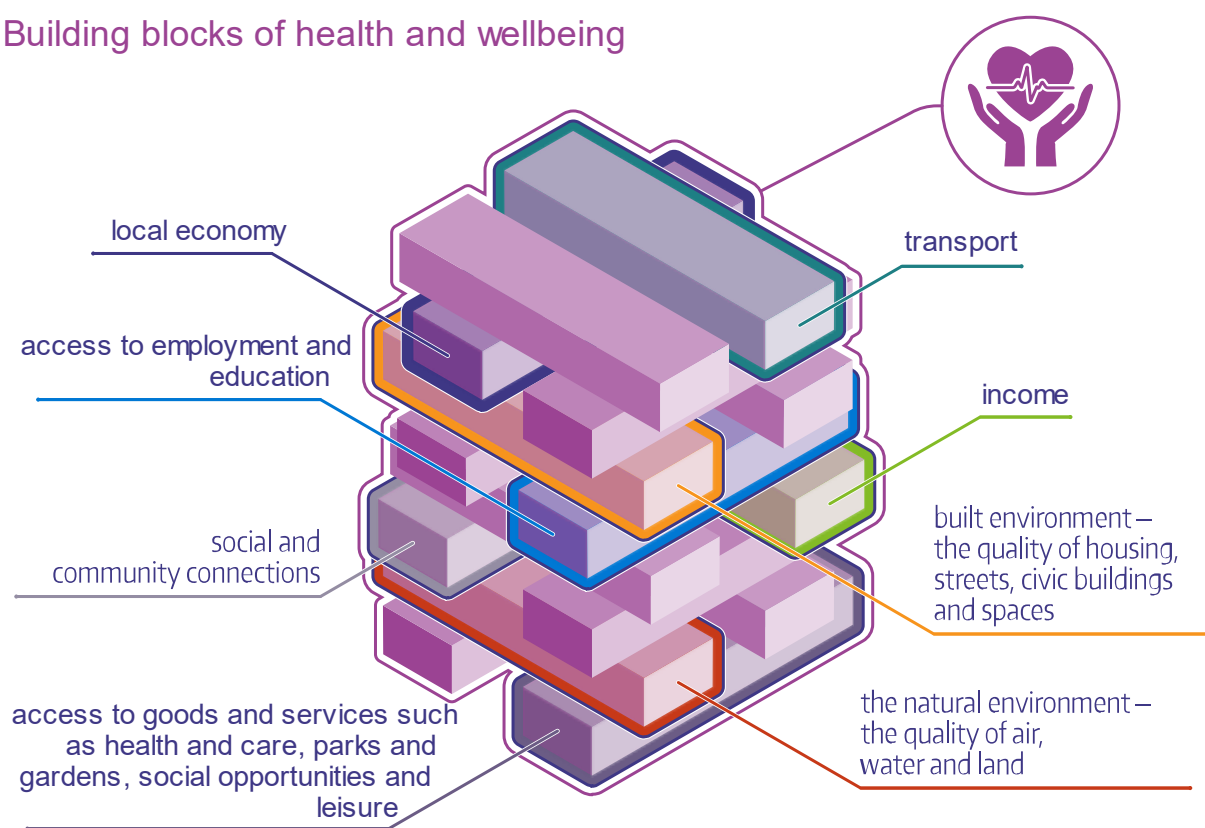


Figure 13: Building blocks of health and wellbeing (Reproduced with kind permission from 'Working together to build climate-resilient, healthy and equitable places: A briefing for local government and partners' © Public Health Scotland 2023)

Climate impacts on mental health and wellbeing

The Intergovernmental Panel on Climate Change (IPCC) and the World Health Organisation (WHO) have both highlighted the risks climate change presents for population mental health and wellbeing and have called for greater understanding of these issues and the integration of considerations of these impacts in national adaptation plans ([IPCC 2022](#), [WHO 2022](#)).

In Scotland, Ipsos Mori found that the majority (82%) of adult people in Scotland polled were either very or fairly concerned about climate change ([CXC, 2022](#)). In polling at a similar time the Mental Health Foundation found that in the UK, more than 2 in 5 young people (41% of those aged 18 to 24) reported that thoughts and feelings about climate change have a negative impact on their mental health ([MHE, 2022](#)). For younger children, BBC Newsround found in 2019 that 62% of 8-16 year olds in Scotland were worried about climate change ([BBC, 2019](#)). The impact on young people, both in terms of worrying about the future of our planet and the degradation of nature, is stark and supported by the findings in our Children's Rights and Wellbeing Impact Assessment [see Annex B](#).

In 2024, the Scottish Government, through ClimateXChange, commissioned an evidence review on "Climate change and mental wellbeing in Scotland" which found that climate change is already having an impact on people's mental health and wellbeing both through the direct effects of climate related events, for example injury or trauma from a flooding event, or indirectly as a result of disruption to livelihood, displacement, access to services or worry about future impacts. These impacts are likely to increase in future. The Scottish Government's Chief Medical Officer recognizes that "more flooding will compound existing inequalities and the greatest health burden associated with flooding is likely to be the long-term mental health impacts" ([CMO, 2024](#)).

As is similar to other climate impacts, the impacts of climate change on population mental health are not distributed evenly and will affect some groups more than others. The research finds that there are three main factors that exacerbate a group's experience of poor mental health outcomes:

- (1) their exposure to climate-change related hazards;
- (2) their wider susceptibility to or experience of poor mental health, and;
- (3) their access to resources and support to help them recover.

The CXC study highlights that "climate change can also impact mental health through the psycho-social response to the awareness of its threats, termed 'eco-distress' or 'eco-anxiety.'" As above, this impact is experienced differently by different groups, with young people and other vulnerable groups (such as ethnic minorities, people from deprived and marginalised communities, and people with

pre-existing health conditions) identified in the report particularly affected. It is particularly associated with a perceived lack of agency to take action. There is currently no consensus on the definition of the concept of climate anxiety, however, the CXC research identifies that it is often associated with feelings of uncertainty, unpredictability, uncontrollability, and being overwhelmed and emotions such as anger, frustration, despair, guilt, shame, and grief are part of this experience. Importantly, the review notes that: “eco-distress is not a pathological condition...[but] a rational and justified response that can also lead to pro-environmental behaviours and thoughts, with some suggesting its potentially adaptive nature.”

At the core of the Scottish Government’s approach to enabling adaptation behaviours is a systematic effort to capture the lived experiences of communities around Scotland, including their experience of climate anxiety/eco distress. This enables us to understand the obstacles that people encounter, and to identify factors likely to facilitate change.

We are taking a number of actions to improve the policy and delivery landscape on this topic:

- **Research** - Before the end of 2024 we will publish the CXC research “Climate Change and Mental Wellbeing in Scotland”
- **Strategic approach** - By end 2025, the Scottish Government, alongside Public Health Scotland, will review the findings of this forthcoming CXC research published and consider how these might help to inform future developments in relation to the Wider Social Determinants of Mental Health programme, which is being taken forward as part of the [Mental Health and Wellbeing Strategy: Delivery Plan 2023-25](#)
- **Communicating on action** - Taking positive climate action can help people to manage feelings of uncertainty, or a lack of agency. In light of this, Scottish Government will consider how to encourage action through our public communications across a range of adaptation behaviours ([see Annex C](#)).
- **Climate Action Hubs** - The Scottish Government will support our Climate Action Hubs through share tools for holding Climate Cafes and mental health conversations related to climate change (see below Case Study)
- **YoungScot resources** – Recognising the rise of climate anxiety in young people, [YoungScot](#) has developed a number of resources through their AyeFeel Hub specific to feelings of anxiety around climate change. Scottish Government will promote this through the new [adaptation.scot](#) web platform.
- **Youth data** – Over the course of the Plan, Scottish Government will explore options for improving the evidence in Scotland about young people’s experience of poor mental health and wellbeing related to climate change
- **Emergency response guidance** - Scottish Government is currently updating the Preparing Scotland Guidance including a Care for People sub-group which

will cover activities that are aimed at providing support to meet the practical, emotional, psychosocial and mental health needs of people affected by emergencies, including emergencies related to climate change.

Case Study: Scottish Borders Climate Action Network (SBCAN) and NHS Borders

Scottish Borders Climate Action Network (SBCAN) is one of a network of Scottish Government Climate Action Hubs. During SBCAN's establishment phase, the team received feedback that climate anxiety was a big concern for a lot of people when discussing climate change and the future. It found that a lot of people who were working or volunteering on climate related projects shared similar concerns. In order to address this SBCAN has taken forward a number of actions:

The SBCAN team participated in a "Work that Reconnects" workshop in early 2024. a set of tools which help people come to terms with fears and worries associated with the climate emergency in a way that supports a collective transition towards a positive and thriving society. The team then ran 2 sessions with Work that Reconnects on climate anxiety at SBCAN's Green Summit event in March 2024. These displayed an appetite for further action in this space and SBCAN have since ran a further event with 2-3 sessions planned in local communities.

Working closely with NHS Borders Public Health Team on health and wellbeing, whilst aiming to reduce climate anxiety - NHS Borders recently published a report on Climate Change Health Impacts in the Scottish Borders. Following this, SBCAN and NHS Borders are at the early stages of developing an approach to how findings from the report can be disseminated with community partners.

SBCAN worked with Change Mental Health to collaborate on a Green Summit event in March 2024 where Change Mental Health ran a well-received session on rural mental health and climate anxiety. Since then, two members of the SBCAN team have taken part in their rural mental health training and are planning a further event in September 2024 to support action on climate anxiety.

Objective: Community resilience (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.

SG Directorate lead: ENFOR/DSD

Building community resilience to extreme weather is increasingly important. When emergencies happen, the best recoveries will involve learning and equip us to deal with future disruptions in a way that is equitable and protects people with more 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, households, communities and organisations take responsibility to prepare for, respond to, and recover from emergencies.

Building community resilience to flooding

Flooding is Scotland’s costliest climate hazard, with sea level rise accelerating and flooding from heavy rain events both increasing in intensity through climate change. People and communities experiencing social and economic disadvantage, and those in areas at risk of flooding may be more vulnerable. This requires Scotland to build greater community resilience to flood events, informed and supported by public sector action, including via:

- **Flood Resilience Strategy** - in tandem with this Adaptation Plan, the Scottish Government is developing the first Flood Resilience Strategy for Scotland. The Flood Resilience Strategy will set out what we need to do in the long term to make our communities and places more flood resilient, focusing on the three key themes of people, places, and processes. The strategy will discuss how we can best engage and empower our communities so that they can be meaningfully involved in decisions made about their places. This will include ensuring that they can access up-to-date information about their current and future flood exposure, and providing the support they need to improve their community resilience. The Strategy will consider how to enable more delivery partners to bring forward a broader range of flood resilience actions to address flooding from all sources. It will promote 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.
- **Scottish Flood Forum** – the Scottish Government will continue to support the [Scottish Flood Forum](#), an independent charity that provides immediate support in the event of flooding to individuals and communities and working with community resilience groups in flood risk areas to help them become more resilient to future flooding events. The Scottish Flood Forum provides practical solutions for householders in making their properties flood resilient, this includes property level flood protection advice and are also able to arrange community exhibitions to show what options are available.
- **Accessible flood resilience resources** – the Scottish Government will work with the Scottish Environment Protection Agency (SEPA), the Scottish Flood Forum and others to ensure that communication materials and advice on

flooding are accessible and tailored to the specific needs of different vulnerable groups.

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 out below.

[SEPA](#) is Scotland's national flood forecasting, flood warning and strategic flood risk management and Hydrometric Monitoring Authority.

- **Hydrology Monitoring Framework** – SEPA will develop a Hydrology Monitoring Framework and review how our Future Hydrometric Design can build evidence around climate change.
- **SEPA flood data and information** – SEPA made [flood map data](#) available to download by the public via its website in 2023. SEPA will continue to make more flood data available to download under open government licence in future.
- **Flood hazard maps** – SEPA will review and update our coastal and surface water flood hazard maps as necessary to include appropriate information including climate change projections.
- **Flood Risk Assessment and Potentially Vulnerable Areas (PVAs)** - SEPA identifies the current and future risk of flooding to communities across Scotland. SEPA will review and publish this data in 2025, to support the flood risk management planning process. SEPA will review and publish areas most at risk within Scotland (Potentially Vulnerable Areas) by December 2024.
- **Flood Risk Management Plans** – SEPA will review and publish flood risk management plans in December 2027, updating objectives and actions to manage flood risk. SEPA will work in partnerships with local authorities and other partners to set out actions that improve community resilience.
- **Supporting flood resilience** – SEPA will work closely with other organisations responsible for supporting flood resilience to ensure that a nationally consistent approach to reducing flood exposure is adopted; provide flood resilience advice to communities and 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, SEPA updated guidance for [climate allowances for flood risk assessment in land use planning](#) for National Planning Framework 4.

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. This is supported through:

- **Local Flood Risk Management Plans** – local authorities, in partnership with SEPA, Scottish Water and others, have updated Local Flood Risk Management Plans covering 2022–28. 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.
- **Funding support** – 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.

To increase flood resilience across Scotland, SEPA will continue to deliver and improve its flood forecasting and warning services. Awareness and alerting to promote adaptation actions around flood events will be delivered through these principal products and services.

- **Scottish Flood Forecast** - every day the [Scottish Flood Forecast](#) is produced by the Scottish Flood Forecasting Service (SFFS), a SEPA and Met Office partnership. It provides a three-day outlook of where flooding is likely to occur, and is published and publicised online, providing communities with the earliest possible indication of when and where flooding is expected, and therefore assist community preparation and response actions.
- **Flood Guidance Statement** – a similar but more detailed daily Flood Guidance Statement is also produced, giving a five-day flood risk outlook, directly to emergency responders, including transport, utilities and recognised community resilience organisations. This is designed to assist preparation and response actions by emergency responders.
- **Floodline** – SEPA delivers [Floodline](#) a direct flood warning service, operated 24/7, issuing messages online and by phone call, text or email, free of charge to anyone. Very specific local flood warnings, available for river or coastal flooding where this is monitored, provide between 3-6 hours' notice that flooding is expected. Regional flood alerts that cover the whole of Scotland, and provide between 2 hours and 2 days' notice of when flooding is possible. These provide a more general indication of flood risk within a wide area where no local flood warnings are available.
- **Improved multi-hazard warning** – behind the scenes, delivery of Scotland's forecasting and warning products will be via SEPA's new Future Flood and Incident Messaging Service (FFIMS). This will improve public accessibility, make it easier for customers to self-manage their communication preferences, and widen the scope of how flood warning information is shared, including popular digital channels. It will also enable

business-friendly developments like the active issuing of water scarcity information.

- **Surface water flood forecasting** – SEPA will continue to progress the actions outlined in the [Flood Warning Development Framework 2022-28](#). These include investigating options for a long-term approach to surface water flood forecasting and potential improvements to established flood warning schemes by 2028.

Managing wildfire risk

The following policies aim to reduce the risk of wildfires across Scotland and provide an effective response to wildfire incidents:

Most wildfires experienced in Scotland occur during late winter and early Spring, with a second smaller peak in late Summer and early Autumn with almost all wildfires in Scotland caused by people either accidentally or deliberately. Over the past ten years the Scottish Fire and Rescue Service (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, we have seen fires covering larger areas, and there is potential in the future for fires to last for longer and exhibit more challenging fire behaviours. Climatic conditions are projected to be warmer and wetter overall with more extreme weather events including periods of water scarcity. The change in weather can impact the creation of the fuel load and fuel moisture content, potentially impacting the wildfire risk throughout the year, as well as additional challenges in putting out fires. Wildfires can lead to large amounts of carbon being released into the atmosphere, contributing further to climate change.

The following policies aim to reduce the risk of wildfires across Scotland and provide an effective response to wildfire incidents:

- **Wildfire risk and land management** – the Wildlife Management and Muirburn (Scotland) Act 2024 will ensure that muirburn is undertaken in an environmentally sustainable manner and the legislation includes provision for muirburn licenses to be issued to help prevent and lower the risk of wildfires. Training will be a mandatory requirement of the muirburn licence. The Muirburn Code is currently being reviewed by a Muirburn Code Working Group representing the key interests in muirburn including SFRS. The Act's muirburn provisions are expected to be brought in to effect in 2025. SFRS will work to further develop a partnership approach with the land management sector to respond safely and effectively to wildfire incidents. SFRS will support the

ongoing promotion of training for anyone who uses fire as a land management tool.

- **Wildfire risk and forests** – Scotland’s national forests and land managed by Forestry and Land Scotland (FLS) is sub-divided into five regional management units, each having a local incident response plan, which include potential wildfires incidents. FLS has guidance in place for staff regarding how to manage wildfires and staff on fire duty during the season to improve response times and liaise effectively with SFRS. Incident response plans for each regional management units are produced in collaboration with SFRS and other agencies and are reviewed annually. As part of wider contingency planning over catastrophic loss of forest areas, the SFRS will seek to strengthen assessment of fire risk linking it to long term forest plans for individual forest areas. SFRS will also identify the most efficient and cost-effective use of aerial assets, both publicly and privately funded, to maximise the utility of these tools.
- **Public information on wildfire risk** - the Scottish Outdoor Access Code (SOAC) sets out the rights and responsibilities of people exercising outdoor access rights.
 - This includes advice on preventing wildfires and the SOAC states “Wherever possible, use a stove rather than light an open fire. If you do wish to light an open fire, keep it small, under control and supervised – fires that get out of control can cause major damage, for which you might be liable. Never light an open fire during prolonged dry periods or in areas such as forests, woods, farmland, or on peaty ground or near to buildings or in cultural heritage sites where damage can be easily caused. Heed all advice at times of high risk. Remove all traces of an open fire before you leave.”
 - Fire messaging for each season is agreed by the national Visitor Management Steering Group and the National Access Forum and in 2024 it emphasised “no fires at any time in forests, woods, farmland, peaty ground or near to buildings or cultural heritage sites” and has included reference to BBQs. Further guidance is currently in development on fires/BBQs and in the context of outdoor access rights and visitor management, it is for access managers, rangers, visitor managers and land managers. VisitScotland and Nature Scot, including working through Scotland’s National Visitor Management Steering Group, will continue to work in partnership with others to promote the SOAC and raise awareness of wildfire prevention.
 - The SFRS will continue to provide good quality information to empower property owners to protect their properties from wildfires.

- **Fire danger information and the Scottish Wildfire Forum** – the SFRS 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”.

Ready Scotland public information

Ready Scotland is a year-round Scottish Government public information campaign which aims to highlight a range of risks including severe weather, and provide relevant 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. It includes:

- **Ready Scotland website** – 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. 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.
- **Ready Scotland marketing campaign** – the Ready Scotland public information marketing campaign 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.
- **Ready Scotland Learn** – 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.

Building community resilience to emergencies

Community resilience is built through 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 will be delivered through:

- **Voluntary Sector Resilience Partnership** – 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;

- **Volunteers and the third sector** - the Scottish Government will 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;
- **Voluntary sector assets** - the Scottish Government will support the Scottish Fire and Rescue Service, together with third sector and statutory responders, through the Voluntary Sector Resilience Partnership, to further develop our understanding of voluntary and community assets at national level, with the aim of improving shared awareness of their potential use during emergencies.
- **Managing emergencies, including severe heat** - the Scottish Government Resilience Room (SGORR) co-ordinates the Scottish Government's response to complex and severe civil contingencies emergencies, including severe heat. SGORR adapts and scales its activities as required to support the Scottish Government's response to the specific incident at hand. The Scottish Government welcomes and supports the development and roll out of new warning systems, including the UK Met Office's heat warning system, which supports responders and the Scottish Government in understanding, preparing for and responding to risks associated with severe heat.

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 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.

Community resilience 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 (including voluntary sector) 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.

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.

SG Directorate lead: LGH

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, sea level rise and higher temperatures.

New Buildings

The following actions aim to ensure new and converted buildings are designed to be adaptable to our future climate.

- **Building regulations: overheating risk** - Scottish building regulations now include measures to address overheating in new homes and some other new residential buildings. Such buildings must be designed and constructed so 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 review of this standard when a suitable sample size of new dwellings have been built to allow analysis to take place.
- **Building regulations: flood risk** – a working group is reviewing and updating the guidance to Standard 3.3 (Flooding and groundwater) within 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.
- **Buildings and wind driven rain** – 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.

- **Climate scenarios in building standards** – the Scottish Government will investigate the extent that British and European standards, which are applied to construction work, 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, including flood and overheating risks. 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 (for further detail on land use policies, including adaptation to extreme temperatures, see [Objective NC2](#)).

Existing 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.

- **Consenting policy for adaptation retrofits** – 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).
- **Property flood resilience** - the Scottish Government will continue to develop policies around property flood resilience (PFR) through the Property Flood Resilience Development Group.
- **Living with Flooding action plan** – 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. This is supported by the Scottish Flood Forum which offers advice and information to individuals to help them protect their homes from flooding or to recover from flooding.
- **Affordable household insurance** – Flood Re is a joint industry and UK Government initiative to help UK households that are at risk of flooding to access affordable insurance, this includes offering householders up to

£10,000 to install property flood resilience measures through their “Build Back Better” scheme. The Scottish Government will continue to engage with Flood Re to ensure that flood insurance remains affordable for those at risk of flooding.

- **Energy efficiency retrofits** – Heat in Buildings is an ambitious retrofit programme to decarbonise heating and remove poor energy efficiency as a driver of fuel poverty. Over the course of this Parliamentary Session we are investing in both energy efficiency and clean heat, and to date have spent over £539 million. Retrofitting energy efficiency measures – such as loft and wall insulation – to our buildings will reduce health risks from cold weather and can help manage internal temperatures during hot weather. A number of our schemes, notably our local authority Led Area Based Schemes and Warmer Homes Scotland, operate in line with PAS 2035 standards, which require consideration of ventilation needs, including extractor systems, trickle vents in glazing and airflow between rooms. Together improved energy efficiency and ventilation can help reduce vulnerability to overheating. We will continue to explore how schemes can be adapted to better support both climate mitigation and adaptation.
- **Heat in Buildings strategy** – Scottish Government will update its Heat in Buildings Strategy. As part of this, we will consider climate adaptation issues such as: exploring how passive cooling measures, such as ventilation and shading, could be applied to buildings during the course of improving their fabric efficiency; the integration of climate adaptation measures for properties into public engagement on energy efficiency; and understanding the need for, and role of, clean heat systems that are capable of also providing cooling, such as reversible heat pumps.
- **Green Public Sector Estate Decarbonisation Scheme** – cooling measures are already part of the eligibility criteria in the decarbonisation funding schemes for public sector bodies. We are preparing new guidance which will require any applicants to the funds to provide an assessment of overheating risks in residential buildings which will include anyone who might be resident even temporarily. This would include care homes, residential schools, hospitals or any other relevant buildings. This assessment will be expected to be informed by the method set out in the section on overheating risks in the Building Standards Non domestic Technical Handbook.
- **Heat in Buildings research** – we will continue to work with the UK Government to look at cooling needs of our building stock, and this will inform future policy development in this area.

Traditional Buildings

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. Key considerations here include:

- **Building maintenance in a changing climate** – in order to support building maintenance as the first line of defence in a changing climate, HES undertakes research on a range of topics. This includes the importance of good practice in repair and maintenance to ensure traditional buildings are able to adapt to a changing climate and the use of traditional materials as a tool for adapting the traditionally constructed built environment, e.g. use of lime coatings and renders. Other topics include appropriate energy efficiency and low emission heating retrofit 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); and change of behaviour and decay tipping points of traditional building materials due to the impact of climate change. HES research also includes 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 the impacts of climate change on earth and turf mortars, buildings and monuments including archaeological remains, and the opportunities these materials present.
- **Support for owners of traditional buildings** – 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. Additionally HES will disseminate 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 to ensure 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.

Case Study: Resilience of Traditional Buildings

Good building maintenance is the first line of defence in a changing climate. In Stirling, the [Traditional Buildings Health Check \(TBHC\)](https://www.traditionalbuildingshealthcheck.org/) provides high-quality maintenance and repair advice and financial support to owners of traditional buildings. Run by the Stirling City Heritage Trust (SCHT), the TBHC is a not-for-profit membership-based maintenance scheme. It aims to promote regular maintenance and good quality, appropriate repairs to traditional buildings which will help build and maintain their resilience to severe weather. The TBHC also aims to promote private investment in the traditional built heritage and generate good, green jobs.

The TBHC was originally run as a pilot project from 2013-2018. It was initiated by Historic Environment Scotland (HES) in partnership with the Construction Industry Training Board (CITB) Scotland. Over the course of the pilot £705,000 was invested in its delivery. In return £1.3 million was invested by members on repairs and £52,000 invested on skills training. Based on the positive results of the pilot, SCHT is continuing to deliver this service in Stirling as part of the core activities of the Trust, funded by HES.

Over the past decade 280 buildings have been inspected around Stirling, Bridge of Allan and Dunblane. 445 property owners have joined the scheme and been supported in the repair and maintenance of their traditional property. In 10 years, the scheme has granted funded 64 completed projects, awarding £340,340 in grant funding, towards total grant funded project costs of over £1 million. This is currently the only such service being delivered in Britain.



Figure 14: Traditional Buildings Health Check

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.

SG Directorate lead: DEAC

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 is 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. While the historic environment is a physical thing, it is 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.

In a wider sense, it is through culture that we consciously or unconsciously express the world as we see it whether through mediums such as art, music and poetry or through our language including the Gaelic and Scots languages which play an integral part of Scotland's heritage and national identity. 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 – can speak to and engage a wide range of people. Through cultural assets, programming, and content and by changing their own behaviours and practices, the culture sector can influence public opinion and enable 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 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. Key policies include:

- **Adaptation support in Our Past, Our Future** – [Our Past, Our Future](#) (OPOF, 2023-28) 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 for the heritage sector include: ensuring heritage grant programmes can fund adaptation measures; promoting a fabric-first approach to energy-efficiency measures; and providing 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.
- **Building heritage sector skills to support adaptation** – the revised [Skills Investment Plan for Scotland's historic environment](#) published April 2024 identifies the opportunities and actions needed to create a sustainable skills system, and to improve the delivery and accessibility of heritage skills training. The Plan identifies "Building skills to support net zero mitigation, adaptation and sustainability" as Action 1 under its Priority Theme 3: Fostering innovation. The historic environment sector will work with key industry stakeholders and across Scottish Government Directorates who have an interest in ensuring the sector has the required skills to maintain traditional buildings, support tourism and the economy, and deliver net zero targets through retrofitting of existing traditional buildings.

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. Progress here will be delivered through:

- **Historic Environment Scotland support for adaptation** – 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 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; and support emissions reduction, minimise environmental impact, and promote sustainability via adaptation solutions. HES will 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; and 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. The HES Climate Action Plan will be updated in 2025.

- **Historic Environment Scotland grants** – 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 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; and increasing the energy efficiency of historic buildings through the reinstatement or retrofitting of sympathetic energy efficiency measures.

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. Action here includes:

- **Historic Environment Policy for Scotland** – HES will continue promoting the 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. [Pointing The Way to the Future](#) is a position statement sitting alongside the HEPS and the HES Regulatory Framework, which explains how HES will undertake its regulatory functions in a way that responds to the climate crisis, including adaptation.

- **Archaeological heritage on the coast** – Historic Environment Scotland will continue 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
- **Climate Vulnerability Index** – Historic Environment Scotland and the wider sector will roll out the Climate Vulnerability Index to all Scottish World Heritage Sites

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 continue to work towards our ongoing commitment in the Culture Strategy Action Plan to advocate for, and make best use of, opportunities to utilise culture's potential to support delivery on climate change priorities, including adaptation. This will be achieved through:

- **Protecting cultural assets and effecting positive changes** – through the [2023 Culture Strategy Action Plan](#), the Scottish Government will continue 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.
- **Working with the Scottish National Culture for Climate group** - the Scottish Government will continue to engage with, learn from, and promote the work of the Scottish National Culture for Climate 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** – 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. It will encourage and empower 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; continuing to develop adaptation capabilities using the Adaptation Capability Framework; collecting environmental sustainability data from our Regularly Funded/Multi Year Organisations and including the aggregated data within our Public Bodies

Climate Change Duties Report; and reporting annually on the progress of our Climate Emergency and Sustainability Plan.

- **National Collections** – to build on work towards making our collections and archives more prepared for and resilient to changes in our climate as well as using our assets and programming to influence society on adaptation, our National Collections will continue to implement actions and approaches set out in their respective climate plans:
 - The National Library of Scotland Climate Action Plan has ‘Adaptation’ as one of its key themes. It includes: a review of Business Continuity Plans; staff awareness training; the development of a Climate Change Risk Assessment for its buildings, and using its collections; and digital resources and programming to help educate individuals and build resilience in communities facing the climate crisis.
 - The National Galleries of Scotland (NGS) Environmental Response Plan includes inspiring and engaging audiences on climate change and incorporating adaptation practices into climate literacy training for staff. It also includes embedding environmental and climate resilience priorities, as well as nature-based adaptation solutions where possible, into building improvements and new developments across NGS sites.
 - The National Museums Scotland (NMS) Strategy for Sustainability includes extensive staff training, delivering a public offer that supports greater engagement and understanding on climate challenges and utilising of Climate Change Impact Assessments to ensure climate and nature-based adaptation is considered from the early stages of NMS project design.
- **Museums Galleries Scotland** – 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: Power of culture in inspiring climate action

Reaching net zero and a world adapted to the changed climate requires transformational changes to society and lifestyles that are, for many, hard to imagine and so difficult to enact. Culture has the power to change the stories by which we live, to inspire, to inform, to engage. Artists, historians, librarians, and curators think differently. They bring different imaginations, skills and experience that can help other professionals think outside the usual boxes. This [powerful short film](#) produced by the Scottish National Culture for Climate group (SNaCC) for COP26 highlights the power of culture to change the narrative and urges climate change professionals to harness the power of culture in achieving their aims.



Figure 15: Screenshot of the [Climate action needs culture](#) film (Scottish National Culture for Climate group, 2021)

Objective: Coastal communities (C6)

Coastal communities are preparing for and adapting to coastal erosion and sea level rise.

SG Directorate lead: ENFOR

Most of Scotland's cities and many of our communities and businesses are located at the coast or on estuaries or rivers with a tidal influence. Important road and rail transport links and water treatment and drainage infrastructure is also located along the coast as well as valued recreational spaces including designated bathing waters and links golf courses. Threats to our coastline have the potential to affect all aspects of society, economy and nature and, like other climate impacts, can cascade across sectors.

Coastal storm impacts, including coastal erosion and flooding, are recognised as some of Scotland's most severe climate risks ([CCC, 2022](#)). Almost half of Scotland's soft (or erodible) shores are currently eroding; and under all emissions scenarios the extent and rate of erosion is expected to increase. Data from Dynamic Coast estimates that up to £1.2 billion of road, rail and residential property is expected to be affected by coastal erosion by 2050 ([Dynamic Coast, 2021](#)). Sea level rise will continue to 2300, even under a low emissions future. Relative sea level rise is expected to reach 1 metre by 2100 though global uncertainty over icesheet and glacial instability means that rises of 2 metres by 2100 cannot be excluded

([IPCC, 2019](#)). Coastal erosion and flood risks are strongly influenced by the local setting, which is why developing local plans which incorporate community aspects is so important. Coastal flood risk in future is also set to increase at a greater rate than historically and coastal erosion will further accelerate the impact and frequency of coastal flooding. erosion will further accelerate the rate at which the frequency and impact of coastal flooding.

Higher sea levels will make it more difficult for water to drain to the sea, probably increasing future flooding from rivers and rainfall at high tides and during storms. For some low-lying areas fair-weather flooding is expected to become more common, where high tides inundate areas even without the influence of storms.

Scottish Government supports the view of the Climate Change Committee that we cannot indefinitely rely on building concrete defences to 'hold the line', but that we must adapt to accommodate future sea level rise is essential and ultimately more sustainable in the longer term. Dynamic adaptive pathways address uncertainty and form the basis of local authority Coastal Change Adaptation Plans.

The consultation analysis found that respondents were supportive of further action on the climate-related impacts at our coast. They also highlighted the need for further data on approaches to address rising sea levels and coastal erosion and coastal management, including through reinforcing natural coastal barriers such as dunes and expressed concern for the impacts of coastal change particularly on island communities. Key action is grouped under the following headings:

Planning

- **National Planning Framework 4** – See section in [Objective NC3](#).
- **Flood Resilience Strategy** – the Scottish Government will publish Scotland's first Flood Resilience Strategy in Autumn 2024, which will set out what we need to do to improve our long-term flood resilience from all sources, including coastal.
- **Coastal Change Adaptation Plans** – the Scottish Government, SEPA and NatureScot are working with local authorities to plan for and act on coastal erosion and coastal flooding. 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](#) and refresh, but goes further promoting a dynamic adaptive pathways approach. This approach identifies community interests and the various options to achieve these in response to how quickly the landscape is changing. It also 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.

- **Coastal Change Adaptation Fund** – in the 2020-21 Programme for Government, the Scottish Government committed £11.7 million of funding to local authorities to develop Coastal Change Adaptation Plans and to undertake resilience and adaptation actions:
 - In 2024-25 £1.65 million has been allocated to 19 coastal local authorities to advance Coastal Change Adaptation work and £1.05 million has been shared in support of local case-studies to help advance our understanding of coastal change adaptation.
 - The remainder of the funding will be issued before the end of this parliament (2026) and Scottish Government and COSLA will explore options for future funding mechanisms and support.

Case Study: Moray Council Coastal Change Adaptation Planning

Moray Council have worked in collaboration with JBA Consulting to develop a series of Coastal Change Adaptation Plans (CCAP) for the Moray local authority area in the North of Scotland. Plans are being developed at two levels: An overarching [Regional Plan](#), covering the entire Moray Council coastline, and 11 Local Plans for community areas (CAs) where adaptation actions are deemed a higher priority. These plans are "living documents" whereby changes in knowledge will trigger reviews and the implementation of defined actions. For the [draft CCAP](#) for the Hopeman to Covesea Coast CA in Moray, the coast of the CA was classified into Coastal Management Units (CMUs) defined by 1) classification of coastal landform type, and 2) risk associated with coastal flooding and erosion. A total of three CMUs were identified, and associated Adaptation Pathways were developed for each.

Four more of the top ten most at risk local authorities are planning on beginning CCAPs in 2024-25 and a number of [case studies](#) have been funded by the Coastal Change Adaptation Fund including in Orkney Island Council ([Dynamic Coast](#)).

Mapping

- **Coastal Erosion Maps** – the Dynamic Coast project provides the evidence of past change and anticipated coastal erosion change if no action is taken, and how this erosion will change with various climate change scenarios. We recognise the importance of updating these maps (and thus, the role of national coastal monitoring) and incorporating the latest changes within risk assessments. Maps of anticipated coastal erosion, and other resources to support coastal change adaptation, are available at DynamicCoast.com.

- **Coastal Flood Maps** - SEPA has a role in providing the evidence for coastal flood risk and how this will increase with climate change. By 2029 SEPA will review and where appropriate update [coastal flood maps](#) as appropriate to include the latest information including climate change projections. National coastal monitoring has a key role to play in the success of the updates. The coastal flood maps are being updated in phases, with review and where appropriate updates for all regions by 2029. SEPA recognises the same processes that cause coastal flooding cause coastal change and that the two are closely linked and should not be considered in isolation from each other. SEPA sits on the Dynamic Coast steering group for Coastal Change Adaptation Plans.
- **Flooding and Coastal Erosion Maps** – 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.

Monitoring

- **To support community flood resilience** (i.e. ability to respond and recover from flooding), the **Scottish Government** will:
 - Continue to support SEPA to invest in flood forecasting and warning services including for coastal flooding (see [Objective C3](#));
 - Explore how coastal storm damage could be better forecast and warned for.
- **Coastal Monitoring** – the Scottish Government will identify the most efficient and effective way to establish a national coastal monitoring programme to ensure that up to date information on coastal change is collected, analysed and made available. This will be led by Chief Scientific advisers within the Scottish Government Coastal monitoring is essential to develop and trigger adaptation actions within CCAPs. It is also essential for the production of accurate Flood Maps and flood/storm warning as well as wider benefits such as information on natural habitats and Blue Carbon.
- **Storm Monitoring** – The Scottish Government will consider the case for establishing a storm impact monitoring programme at the coast allowing the impacts to be quantified to allow for better information to plan for storm events.

Nature-based Solutions

- **SBS DP Scottish Biodiversity Strategy Delivery Plan (SBS DP)** – As explored in [Objective NC1](#), the Scottish Government supports the use of Nature-Based

solutions to increase resilience to climate change. The SBS DP also lists actions aimed at increasing resilience in coastal and marine systems by reducing key pressures and safeguarding space for coastal habitat change:

- By 2026 NatureScot will complete an initial prioritisation exercise identifying accommodation space to be protected for coastal habitat change. This will promote recovery and adaptation, and identify potential future mechanism(s) to deliver recovery and adaptation, including agricultural subsidies.
- NatureScot, supported by the Scottish Government, will identify and address gaps in current evidence on coastal habitats, through research and monitoring as an enabling action for all coastal biodiversity actions (2024-28) and fund research commencing in 2024 into better quantifying the adaptation benefits of coastal landforms and habitats to maximise biodiversity benefits. Collaboration between NatureScot and SEPA (via above Coastal Monitoring Group) is recommended to realise associated flood resilience and adaptation opportunities.

Outcome Three: Public Services and Infrastructure (PS)



Public services are collaborating in effective and inclusive adaptation action.

The climate emergency requires us to collaborate. Without our infrastructure and public services adapting to the challenges of extreme weather and the changing environment, Scotland's other priorities for equality, health and the economy will be harder to achieve.

To tackle climate change in a way that is equitable, inclusive and builds on the strengths of a place, needs leadership and collaboration on shared outcomes. Ensuring people can access the public services they need will involve adaptation action across Scotland's places.

This Outcome focuses on building the capacity of all Scotland's public services and infrastructure networks to understand climate risks, adapt as organisations and act collaboratively with others in a place. The Outcome applies to all public services and infrastructure networks, with specific objectives for two key devolved infrastructure networks – water and transport – which support people's health and connectivity.

Objective: Public body duties and capacity (PS1)

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

SG Directorate lead: DECC

The Climate Change (Scotland) Act 2009 requires the Scottish Government to implement a statutory Adaptation Plan every five years. Public bodies play a critical role in delivering the plan due to the nature of the services they provide and their legislative duties.

This objective aims to support effective leadership and governance arrangements for adaptation, alongside inclusive planning approaches and working beyond organisation and sectoral silos through:

Legislative framework

- **Public Bodies Climate Change Duties** – the Public Bodies Climate Change Duties (PBCCD) contained within the Climate Change (Scotland) Act 2009

require listed public sector organisations to act in the way best calculated to help deliver the statutory Adaptation Programme and to report progress annually. This is a key mechanism which makes climate adaptation a legal imperative for public bodies in Scotland.

- **Guidance on climate adaptation duties** – the Scottish Government will work across the public sector to develop and consult on updated statutory guidance on public bodies climate change duties in the wake of proposed revised climate change legislation in Parliament. 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.
- **PBCCD reporting and analysis** – all relevant public bodies will continue to report annually on the PBCCD, including adaptation action and contributions (where relevant) to delivery of this Adaptation Plan. Annual returns are publicly available. The Scottish Government will increase the use of the analysis of PBCCD returns, including via the Adaptation Plan’s monitoring framework, in order to continue to share best practice and drive accountability.

Support for providers of public services

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.

- **Adaptation Capability Framework** – the Adaptation Capability Framework (ACF) is a core resource for public sector organisations. The ACF identifies four capabilities needed for an organisation’s adaptation journey. It describes a number of tasks to develop these capabilities over four stages from starting to mature. Adaptation Scotland, in collaboration with public bodies, will update the ACF by 2025 with resources and updated tasks to support mature adaptation capabilities.
- **Public Sector Climate Adaptation Network** – the Adaptation Scotland led Public Sector Climate Adaptation Network (PSCAN) will build and strengthen adaptation practitioner networks to share learning and best practice. The group will expand to include up to 60 member organisations by March 2025 and will continue to prioritise bodies with large estates and/or staff numbers, high impact and influence, large expenditure, or an auditing or regulatory function.
- **Future climate in today’s decisions** – to support future-proofed plans and strategic decision making, the Scottish Government will develop a climate scenario decision tool for the public sector. This will be informed by a ClimateXChange research project to be published in Spring 2025.

- **Leaders' Climate Emergency Checklist** – the [Leaders' Climate Emergency Checklist](#) is designed to enable senior leaders in the public sector to assess their organisation's maturity and capability in tackling the climate and nature emergencies.
- **Sustainable Scotland Network** – the Sustainable Scotland Network (SSN) is Scotland's public sector climate change and sustainability network. SSN shares knowledge, builds capacity, and enables the public sector to collaborate effectively to achieve Scotland's climate change and sustainability commitments. SSN is supported by the Scottish Government, Scotland's local authorities, and other public sector bodies.

SPOTLIGHT: Adaptation Capability Framework

The [Adaptation Capability Framework](#) is an award-winning resource that identifies four capabilities that every public organisation will need to adapt to climate change, providing step by step tasks to guide your adaptation journey. Organisations will have different levels of maturity, and the Framework allows you to identify where you are on your adaptation journey, and how you can develop each capability. The Framework is easy to navigate, allowing you to tailor your approach to your organisation's unique circumstances.

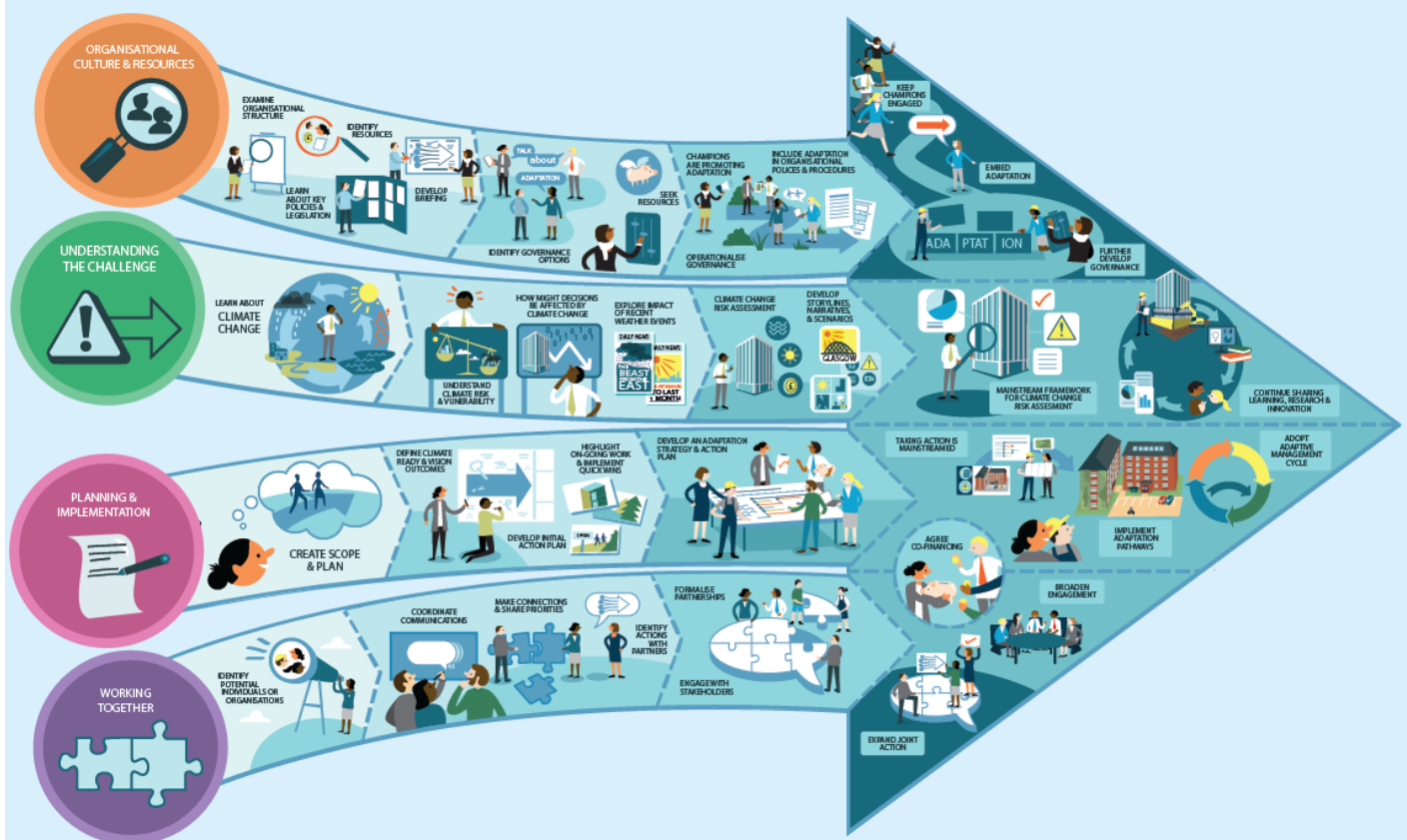


Figure 16: Adaptation Capability Framework

Objective: Public service and infrastructure resilience (PS2)

People can access the public services they need; and critical assets, systems and networks are resilient to the impacts of the changing climate.

SG Directorate lead: DECC

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 objective aims to embed climate adaptation into public service design and operational resilience. It covers adaptation policies in key public services, but adaptation action and collaboration is needed across all sectors. This will be supported by new statutory guidance for all relevant public bodies in 2026.

Essential Services and Critical Infrastructure in Scotland

Critical infrastructure underpins the essential services needed daily by the people of Scotland. Some Critical Infrastructure Sectors are reserved to the UK Government (e.g. Energy, Telecoms, Civil Nuclear) whilst others are devolved (e.g. Water, Food, Health) and the responsibility of Scottish Ministers. An impact in one sector could cascade and disrupt others, and the essential services which they support. This will be addressed through:

- **Critical Infrastructure Resilience** - the Scottish Government will continue to work collaboratively with Regional and Local Resilience Partnerships, Technical Authorities (e.g. National Cyber Security Centre and the National Protective Security Agency), regulators (e.g. Ofcom and Ofgem), the Responder Community, Industry, the UK Government and other Devolved Nations to ensure the Critical Infrastructure risk landscape is understood and that appropriate planning and response arrangements are in place to remove, reduce or mitigate the impacts which could disrupt our essential services.
- **Criticalities Process** - the Scottish Government will continue to work closely and collaboratively with the UK Government's Criticalities Process. This process provides the opportunity for a shared understanding of the most critical infrastructure in the UK, which will enable government to better understand and manage the risks to our Critical National Infrastructure. Scottish Government is particularly focused on devolved Critical National Infrastructure sectors where we have devolved responsibilities.

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 Public Health Scotland, Scottish Ambulance Service, the Golden Jubilee National Hospital and NHS Education for Scotland.

Storms, heavy rain, landslides and heatwaves can all affect infrastructure (transport routes, power, ICT and water supply) with failures resulting in disruption affecting access to health facilities for patients, staff and suppliers. Such disruption also causes difficulties for medical staff, including paramedics, to reach people in their own homes and elsewhere. Action here includes:

- **NHS Risk Assessments** – all Health Boards will continue completing Climate Change Risk Assessments covering all areas of service. These will ensure integration with other strategies (including Property and Asset Management Strategy), risk assessments and business continuity plans for staff, patients, visitors and contractors. Alongside other climate risks, Boards will 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.
- **NHS Adaptation Plans** - all Health Boards will prepare and implement climate change adaptation plans to ensure resilience of service under changing climate conditions. This will include work towards the requirements of ISO 14090: Adaptation to climate change. Plans will include actions to raise awareness of the potential for overheating, flooding and actions that can be taken by staff, patients, visitors and contractors.; and incorporate water saving measures wherever possible to ensure Health Boards are able to cope with any periods of water scarcity.
- **Sustainable temperature management** - all Health Boards will 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. Passive cooling measures will be prioritised over mechanical cooling wherever possible.
- **NHS green infrastructure** – all Health Boards will develop and manage greenspace and other green infrastructure such as green roofs and rain gardens to mitigate flood and overheating risks.

NHS National Services Scotland (NSS) 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 stakeholder engagement** - NHS NSS 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.
- **Support for NHS resilience planning** - NHS NSS will 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.
- **Standards for NHS resilience** - NHS NSS will 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. It will assess NHS Boards' status against the requirements of ISO 14090: Adaptation to Climate Change.
- **Climate Mapping Tool for the NHS** - NHS NSS will continue implementing its web-based Geographic Information System (GIS) NHSScotland Climate 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. We will:

- **PHS support to social care sector** - Public Health Scotland (PHS) will work with the Scottish Government and COSLA to understand how they can support the social care sector to respond to the climate emergency. Additionally, the PHS Adverse Weather and Health Plan sets out PHS's commitment to working with partners to help mitigate, prepare for and respond to the potential health risks associated with hot and cold weather, flooding and drought. The Adverse Weather and Health Plan sets out a number of action areas for delivery between 2024 and 2027, including an area that will explore the training and development of health and social care staff in the health implications of adverse weather events, and on how they can support people through these events.
- **Care Inspectorate** - all registered care services are regulated by the Care Inspectorate in Scotland. The Care Inspectorate is a scrutiny body which supports improvement. To strengthen the resilience of social care services' systems and policies to more extreme weather, the Care Inspectorate will

share guidance (from Scottish Government and Public Health Scotland) with providers through our information channels.

- **Social care adaptation resources** – working with social care provider networks, including Scottish Care and the Coalition of Care and Support Providers in Scotland, Scottish Government will support the social care sector to develop sector-specific guidance and strengthened climate adaptation capabilities by 2027.

Schools, colleges and universities

The adaptation of school grounds and education estates can reduce heat, cold and wind stress, and create a richer and more resilient biodiversity and landscape. It can help manage extremes of drought and flood, improve air quality, reduce energy use, lead to improved health and wellbeing, and encourage community engagement. Key initiatives include:

- **Learning Estate Investment Programme** – the Scottish Government and local authorities will, through the £2 billion Learning Estate Investment Programme (LEIP), continue to build the resilience of school estates. 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.
- **Learning for Sustainability Action Plan 2023-30** – the Scottish Government has committed to continue embedding Learning for Sustainability into the Curriculum for Excellence. In partnership with Learning for Sustainability, we will work to strengthen and update the current materials on climate adaptation available to educators. This will increase the depth and quality of understanding for practitioners in primary schools and also learners in primary and secondary schools undertaking project work on climate change.
- **Climate Ready School Grounds** – design advice for school estates has been developed by Architecture & Design Scotland (A&DS) and Learning through Landscapes via 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 provides 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.
- **Co-Designing Sustainable Learning Settings** - A&DS will support embedding the delivery of the Learning for Sustainability policy in places and

communities, by co-designing sustainable learning settings through pilots in varied school contexts such as urban, rural and town settings. Through this project, A&DS will increase understanding of climate risks and opportunities to act on them across the school estate, and share learning to inform policy, resources and methodologies to enable more adaptable and resilient uses of the school estate.

- **The Scottish Funding Council Net Zero Framework** – the Scottish Funding Council (SFC) is Scotland’s national strategic public funding body for tertiary education and research. The SFC’s Net Zero and Sustainability Framework sets out how it will support Scotland’s colleges and universities to be global leaders in accelerating the climate emergency response and the just transition in Scotland. This should lead to reduced emissions, system change, and long-term climate resilience for the sector. In 2023-24 the SFC integrated the first climate measures in its main Outcome Agreement with the tertiary sector and the sector’s net zero and climate emergency response will be highlighted throughout the strategic themes in the SFC’s new Outcomes Framework and Assurance Model.
- **EAUC Scotland climate risk tool** – the SFC is a core funder of EAUC Scotland. As part of our Outcome Agreement with EAUC in 2023-24 they have produced a Climate Risk Register Tool and guidance to help the sector to continuously improve.
- **College Infrastructure Strategy** - adaptation is being considered under plans to progress Scotland’s College Infrastructure Strategy. The strategy gives priority to life-cycle maintenance needs of existing property and recognises that investment will be required in estates which are carbon neutral and which can flex to cope with climate change.

Energy networks

Our increased reliance on the electricity system 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. They are:

- **Energy Strategy and Just Transition Plan** – the forthcoming Energy Strategy and Just Transition Plan (ESJTP) will set out our vision for a future net zero energy system that delivers affordable, secure and clean energy and provide

high quality jobs and economic opportunities. It will also set out policies to support a managed transition from fossil fuels in line with the Scottish Government's climate change goals. The forthcoming ESJTP will define a set of outcomes that will drive Scotland's future energy system including reducing vulnerability to the impacts of climate change.

- **SEPA Energy Framework** - 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 and regulate the effects of electricity, heat and fuel generation, transmission and consumption on the environment and human health, as outlined in SEPA's Energy Framework.
- **Adaptation guidance for Control of Major Accident Hazards sites** - 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.
- **COMAH site climate risk assessments and regulatory activity** - 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.
- **Energy storage for resilience** – security of electricity supply is a reserved matter and is operationalised by Electricity System Operator (ESO) across the whole of Great Britain under regulation from Ofgem and policies set by Governments. As we move towards a net zero energy system, we will need increasing levels of storage and flexibility to support greater diversity of demand and greater proportions of renewable and geographically distributed electricity generation. In some specific cases, energy storage may help increase supply resilience in localised parts of the network for short durations. This could support reduced power outages and increase security of supply in response to the sort of weather events that are becoming more frequent due to climate change.

Emergency Services – Police, Fire and Ambulance

Our emergency services respond to emergency incidents, including those caused by severe weather. To continue to deliver this vital public service, Scotland's blue light services need to build their resilience to climate change and contribute to wider community resilience. This will be achieved through:

- **Fire and Rescue Framework** – the 'Fire and Rescue Framework for Scotland 2022' sets out Scottish Ministers' expectations of the Scottish Fire and Rescue Service (SFRS). Strategic Priority 4, 'Climate Change', sets out an expectation that the SFRS should continue working with other public sector partners and communities to support action to address the climate emergency, including the challenges of more extreme weather events such as wildfires and flooding in particular. The SFRS should continue to strategically place specialist resources in flood risk areas and ensure firefighters are prepared, fully equipped and ready to support and protect communities, whatever the weather. In response to wildfire risk, the SFRS should continue to invest its response, make use of local assets, technological advancements and forward thinking operational practices, whilst continuing to place a strong emphasis on partnership working.
- **Scottish Fire and Rescue Service** – the SFRS Strategic Asset Management Plan for property across 2023-28, outlines how the SFRS aims to achieve a modern and fit for purpose estate that supports the effective delivery of services across the whole organisation. One of the key strategic outcomes is "we respond to the impacts of climate change in Scotland and reduce our own carbon emissions". Our ongoing Strategic Service Review Programme (SSRP) is considering how we can evolve to meet Scotland's changing climate. Our current wildfire strategy considers the increased risk of wildfire and changing climate in Scotland. The strategy includes the roll-out of new equipment and Personal Protective Equipment (PPE) on a phased and risk assessed basis, as well as developing a number of pilot projects to test an enhanced response to wildfires. Community Safety messaging is carried out through Thematic Action Plans, these are produced seasonally (spring, summer, winter, autumn) and are continuously reviewed based on incident data and partner feedback where there is an increasing focus on climate related messaging.
- **Police Scotland** – Police Scotland is committed to safeguarding its operations and contributing to a more sustainable future. The Police Scotland Adaptation Strategy for 2024-2034 sets strategic outcomes and includes an Action Plan and Estates Adaptation Framework and Assessment Tool. Actions include: upgrading and maintaining its estates to meet resilience standards, withstand climate impacts, and improve energy efficiency; targeted climate literacy training programmes; embedding adaptation measures in key documents including Business Continuity Plans; and new approaches to address the

health and wellbeing impacts of climate change on officers (e.g. new trouser types to reduce the risk of lime disease from ticks in rural areas and hydration vessels to tackle heat stress).

- **Scottish Ambulance Service** – the Scottish Ambulance Service has a clear Climate Emergency and Sustainability Organisational and Governance Structure. It uses this to foster sustainable practices, provide direction and influence behaviours/cultures. The National Vehicle Design & Equipment Group will consider climate risks in the design and procurement of new vehicles, including any associated driver training requirements needed as temperatures and weather patterns change. It will continue to review and assess “at risk” locations, the placement of critical infrastructure and estates, whilst ensuring appropriate business continuity plans are in place.

Objective: Managing Scotland's water resources (PS3)

Partnerships for water resource planning and rainwater drainage networks are active in prioritised catchments to support drought resilience, flood resilience and climate resilient places.

SG Directorate lead: DECC/ENFOR

Water is a precious resource – it is essential for life. It supports our lives, agriculture and businesses (including distilleries and manufacturing, etc), provides drinking water supplies which are essential for public health and supports Scotland’s environment.

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 sewer and surface water 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 water resources and drinking water is secured, our environment is protected, and rainwater is managed in a way that reduces the impact on society, for future generations.

The 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. The Scottish Government has consulted on proposals for changes in the water industry ([Water, Wastewater and drainage consultation analysis, July 2024](#)) this Adaptation Plan

covering action to address all climate risks (January 2024); and a Flood Resilience Strategy to set out what we need to do in the long term to create a flood resilient Scotland (May 2024).

Scottish Water

Scottish Water is responsible for Scotland's public drinking water and wastewater services and is focussed on ensuring it can continue to deliver service in a changing climate. In 2021, Scottish Water's [Strategic Plan](#) for the 2021-27 investment period committed Scottish Water to adapting its services and assets and identified actions to help Scotland achieve its [shared Vision for the water sector](#). In discharging its actions and commitments on climate change Scottish Water has outlined the following actions in its [Climate Change Adaptation Plan](#) published in 2024.

- **Scottish Water, Climate adaptation planning** - a Climate Change Risk Assessment has been completed using the 2 and 4 degree emission pathways to the 2080s, reflecting the longevity of Scottish Water assets. This informed Scottish Water's [Climate Change Adaptation Plan](#) published in 2024. The plan sets out the risks, impacts to service, responses and strategy for adaptation, and sets out key activities to support service resilience. It also identifies interdependent risks with other sectors and supply chains that need to be managed. It estimates that an additional £2-5 billion will need to be invested by 2050 to sustain current service levels and manage climate change related impacts. This will inform Scottish Water's 2027-33 strategic business plan for agreement with government, regulators and stakeholders.
- **Maintaining drinking water quality** - climate change will impact the quality of Scotland's water resources, presenting challenges to Scottish Water's ability to treat and deliver high quality drinking water for customers. To adapt to the risks presented by climate change and to maintain current service to customers, Scottish Water will: assess climate risks to source water quality and treatment capabilities; improve water quality monitoring and intelligence; make water catchments more resilient to climate change; and adapt our water treatment works to ensure they continue to deliver high quality drinking water for customers.
- **Adapting the sewer network** - to adapt to the risks presented by climate change and to maintain current service to customers and the environment, Scottish Water will: focus on supporting customers vulnerable to flooding whilst it develops and delivers longer term solutions to address flood risk; increase monitoring of the sewer network to better understand performance with the aim to avoid flooding and pollution incidents; partner with local authorities and developers to remove rainfall from sewers; and transform urban landscapes with blue-green infrastructure, delivering its stormwater

strategy of “no more in, what’s in out” to reduce climate change flood risk and pollution.

- **Managing water asset flooding and coastal erosion** - flooding of assets and coastal erosion caused by climate change will present major challenges to Scottish Water’s assets that could impact their ability to provide water and wastewater services. To adapt and to maintain current service to customers and the environment, Scottish Water will: update water and wastewater operational resilience plans to ensure it can maintain service; embed weather and flood projections in system and asset planning; and progressively increase resilience through its repair, refurbish and replacement of ageing assets programme. On coastal flooding Scottish Water will work with local authorities and other stakeholders to understand how future coastal change will be managed and build this into service and asset resilience plans.
- **Preventing sewer and drain blockages** - adapting to heavier rainfall events can be supported by preventing blockages in sewer systems that lead to spills and overflows. 80% of current sewer blockages are caused by flushing inappropriate items down the toilet, or pouring fats, oil and grease down the sink. Disposing household items in bins, such as wet wipes, cotton buds, sanitary products etc. rather than flushing them down toilets can support climate adaptation. Scottish Water’s high profile ‘Nature Calls. Bin the Wipes’ campaign promotes positive behaviour change in the bathroom and kitchen. Scottish Water will continue to work with others in the sector, and with government and industry to end plastic pollution and find alternatives to items that can block sewers.
- **Waste water treatment** - climate change will present major challenges to Scottish Water’s wastewater treatment works that could impact environmental performance and impact river water quality. To adapt and to maintain current service to customers and the environment, Scottish Water will assess the capability of our wastewater treatment works and networks to deal with the expected increase and variability of flows entering the system due to climate change and adapt assets to cope with the wider range of conditions they may expect.
- **Scottish Water operational resilience** – long term service and asset planning by Scottish Water will support a more resilient asset base. However, climate and weather extremes will continue to present challenges to service that require operational responses to support customers and prevent disruption. Scottish Water will keep operational resilience plans under review and work with Scottish Government and other partners through resilience partnerships to respond effectively to weather related disruption. Climate risks to national and global supply chains will be assessed and include in supply chain and procurement strategies.

Water, Wastewater and Drainage Policy Development

In 2023, Scotland witnessed the impacts of both drought and storms in short succession. Extreme weather events that damaged critical infrastructure impacting on the ability to supply essential drinking water and wastewater services.

Legislation on our water services was put in place when climate change was not recognised or anticipated. It is, therefore, imperative that Scotland implements adaptation measures to protect our vital water, wastewater and drainage services upon which we all depend. This should include measures on planning the use of water resources, protecting drinking water catchments, protecting the environment from the impacts of sewage overflows and recognising drainage as a service.

The [water, wastewater and drainage public consultation](#) explored how to adapt our water, sewerage and drainage services in the face of climate change.

- **Review of water industry policy** - the Scottish Government is committed to undertaking a review of water industry policy, and continuing to assess how water, sewerage and drainage services can adapt to the impacts of climate change to avoid water scarcity through future legislation. Aligning with the EU's recast Drinking Water Directive, which includes provisions on improving and maintaining access to drinking water for all, and the EU's recast Urban Wastewater Treatment Directive, which include provisions on collection and treatment of urban wastewater to further protect human health and the environment is part of this policy development. The [consultation analysis](#) of responses provided overwhelming support on the need for change.

Key policy development areas for the review of water industry policy are set out below.

Water resource and catchment management

Climate projections show there will be changes to rainfall patterns, with extended periods with less or no rain in future. Coupled with higher temperatures and the greater demands we see in warmer weather, the water resources on which we rely will be under greater pressure than they are today.

- **Policy development for water resources** – the need to secure water supplies for both now and for future generations through a collaborative approach has been recognised, supported through the response to the water, wastewater and drainage consultation and discussed at a roundtable in April 2024. Building on that, Scottish Government is developing policy with SEPA, Scottish Water and key sectors to develop a planned-led, partnership approach to manage our water resources, understanding the changing need, future demands and continued availability of water to protect the future of Scotland's environment and economy.

- **Scotland's National Water Scarcity Plan** – Scotland's National Water Scarcity Plan sets out how the 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. The National Water Scarcity Plan was updated in 2023, following lessons learned in 2022 and 2023, to clarify how water will be managed when significant scarcity is reached.

Drinking Water

- **Policy development for drinking water** – the Scottish Government is developing policy to better manage and protect our water resources, including better use of water resources, water efficiency, continued protection of public health and increased resilience of water supplies to climate change. We also need to make sure that the water that reaches our taps remains safe to drink, which requires us to take a national view of catchment risk to help better protect drinking water sources from pollutants.
- **Drinking water supply during drought (Scottish Water)** - current projections suggest that without adaptation there may be a risk of around 240 megalitres per day water deficit during extended low rainfall by 2050. To adapt to the risk of increased drought conditions presented by climate change and to maintain current service to customers Scottish Water will: work with other water users to plan water resources at catchment scale; reduce demand by reducing leakage and consumption; improve operational and asset capability to respond to more frequent drought events; and increase the resilience of water supplies by developing further plans to reduce the number of customers fed from a single water source.
- **Private water supplies** - private water supplies are particularly vulnerable to the impacts of climate change. Prolonged dry weather in the summer months can lead to many private water supplies running dry, with flooding in the winter impacting water quality. In most years since 2018, the Scottish Government have implemented emergency measures to provide bottled water to households affected by water scarcity, and more recently, those negatively affected by winter storms and flooding. Funding has also been allocated to help build long-term resilience to private water supplies by extending the public water network into communities that have been affected by water scarcity. A programme of work is underway to develop further support for

people who rely on private water supplies. Local authorities are the Regulators for private water supplies and play a crucial role in implementing the measures set out by the Scottish Government.

Water saving and behaviour change

In Scotland, the average person uses over 180 litres of tap water every day. This is higher than any other UK country and many European countries. In Germany, for example, the average person uses 125 litres every day. In Denmark they use 105 litres. Climate change will increase dry periods and make water harder to treat. To avoid water shortages, extra costs and to protect the environment, we need to use less water.

- **Water Is Always Worth Saving campaign** – linked to the need to manage water resource risks, Scottish Water’s ‘Water Is Always Worth Saving’ campaign seeks to raise awareness of the value of water and provide water saving advice to households and communities through high profile public campaigns guidance and the distribution of water saving packs. Scottish Water will continue to engage customers in understanding the value of water to change behaviours on water consumption. Scottish Water also plan to pilot smart monitoring to build intelligence on water use and seek to work with industry and relevant authorities to ensure homes and developments are as water efficient as possible.
- **Efficiency of authorised water abstractors** - SEPA will work with authorised water abstractors to ensure water is used efficiently all year round, reducing the impact on the environment, other users and reduce the impacts of prolonged drought periods.

Rainwater drainage networks

There is a growing body of evidence for changes in the intensity of extreme daily rainfall. Extreme rainfall events could be four times as frequent by 2080 compared to the 1980s. This is putting urban drainage systems under extreme pressure, increasing surface water and sewage flooding and increasing sewage spills to the environment.

- **Policy Development for rainwater drainage networks** – the Scottish Government is responding by developing policy to improve the management of rainwater in those urban areas most exposed to this change in our climate. The policy will ensure that rainwater in urban areas is managed through a strategic drainage network designed for now and our future climate. Rainwater drainage networks will bring together below ground piped rainwater drainage systems and above ground blue and green infrastructure, to hold rain close to where it falls and make space for water in our places. This will reduce the amount of rainwater entering combined sewer systems, helping reduce

sewer and surface water flooding and the frequency of sewage spills to the environment. As well as having the potential to create attractive places that enhance public amenity, support greater biodiversity, reduce heat island effects and improve air quality. The policy will ensure that rainwater drainage networks are established as essential components of municipal infrastructure requiring collaborative partnerships across local authorities, Scottish Water, SEPA and other relevant partners to work together to deliver, maintain, enhance and protect them.

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.

SG Directorate lead: Transport Scotland

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.

National transport adaptation policy

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 contains actions for trunk road, rail, aviation and maritime networks including:

- **Embedding adaptation across transport** - Transport Scotland will embed adaptation and resilience across its functions through its 2023 Approach to Climate Change Adaptation and Resilience, an internal governance structure for the ACCAR and an appropriate leadership board.
- **Knowledge exchange** – it will continue to share knowledge on climate change adaptation and resilience with transport peers and across sectors at a local, national and international scale.
- **Resilient active travel routes** – it will 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.
- **Transport Just Transition Plan** –the Scottish Government will publish a draft plan for consultation in late 2024-25, and continue to work with those most likely to be negatively impacted by the sector’s transition as it is finalised. The plan will set out a vision for the sector and it will consider the key risks and opportunities faced by our communities, businesses and workers, including those associated with equity and access. It will set out initial actions to support Just Transition Outcomes for the sector and set the direction for future areas of work.

Trunk Roads

Policies and actions in this section aim to deliver Transport Scotland’s ACCAR outcome: “trunk roads which are well adapted and resilient to the current, projected and unexpected impacts of climate change.” The trunk road and motorway network is over 3,500 km long, carries 35% of all traffic and 60% of heavy goods vehicles, and represents 6% of the total Scottish road network by length. The vast majority of all other roads in Scotland are maintained by local authorities, whom the Scottish Government will continue to work in partnership with to build Scotland’s climate resilience, including for those with a variety of mobility needs.

- **Trunk Roads Adaptation Plan** - 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 to identify locations where future adaptation of the trunk road network will be required.
- **Collaboration** with supply chain partners and stakeholders is essential to take effective steps to protect the trunk road network against the impacts of climate change. Transport Scotland will continue to collaborate with Trunk Road Operating Companies, who manage the network on its behalf, to build network resilience to extreme weather and other climate risks. The Operating

Companies will work to bring adaptation into everything they do, consider innovative solutions and target improvements at known problem locations.

- **Biodiversity Strategy for Transport Scotland** - Transport Scotland will develop a Biodiversity Strategy for the agency by 2026. This is considered a critical activity to help better sustain our natural environment. The strategy will also highlight the cross-cutting benefits of biodiversity and the opportunities it can bring to help build trunk road resilience against the impacts of climate change
- **Manage disruption risk** – TS will continue to respond to real time weather disruption. TS will monitor the performance of our Operating Companies to ensure extreme weather responses are fit for purpose.
- **High wind, flood and landslide management** - TS will also continue to manage our High Wind, Flood and Landslide Management plans to ensure they are adequate and public safety is maintained at all times. We will also continue to collect data on instances and impacts of severe weather, and using that data investigate and where possible deliver targeted improvements at known hot spots.

Case study: A83 Rest and Be Thankful

The A83 Rest and Be Thankful is one of Scotland's most famous and well-travelled roads but the route has become more prone to closures in recent years due to landslips, made more likely by the changing climate. This had led to an almost 100km diversion for many people. The situation is being treated with the seriousness and urgency it deserves, with measures to maintain connectivity on a short, medium and long term basis being implemented. In the short to medium-term, working with Forestry and Land Scotland, tree planting on the slope above the road has progressed to stabilise the soils. In the medium term improvements to the existing Old Military Road through the Glen Core corridor are being made to make it a more resilient diversion route until the long term solution is in place. The preferred route for the permanent, long-term solution consisting of a 1.4km long debris flow shelter on the line of the existing A83, was announced in June 2023. The next step for the permanent solution, which is the detailed design and assessment of the preferred option, is being progressed at pace and will conclude with the publication of draft Orders and an Environment Impact Assessment Report for comment, expected by the end of 2024. Progress following publication of draft Orders will depend on the level and nature of any representations, including objections, to the published draft Orders. The current estimate for the long term preferred route option is between £405 million and £470 million, at 2023 prices. The progress of work can be followed at the [A83 Rest and Be Thankful story map](#).



Figure 17: Artist's impression of the proposal for debris flow shelter at A83 Rest and Be Thankful (Transport Scotland, 2023)

Rail Network

Policies and actions in this section aim to deliver on the ACCAR outcome “Supporting the delivery of climate change adaptation and resilience for Scotland’s Rail network” and requirements set for Network Rail Scotland in the Control Period 7 High-Level Output Specification 2024-29, published by Scottish Ministers in February 2023.

Scotland’s railway infrastructure is managed by Network Rail, including the delivery of major infrastructure projects and asset management. In collaboration with ScotRail, both organisations have developed a joint Climate Ready Plan for Scotland’s Railway covering the period 2024 to 2029:

- **Scotland’s Railway: understanding climate risk** – the Climate Ready Plan for Scotland’s Railway outcome 1 is “Decisions taken are based on a maturing understanding of climate-related risk”. This includes actions to enhance approaches to undertaking climate risk assessment, and better integrating climate and natural hazard data into decision-making processes.
- **Scotland’s Railway: climate ready planning** – the Climate Ready Plan for Scotland’s Railway outcome 2 is “A long-term climate adaptation and resilience strategy increasingly guides investment”. This includes actions to develop adaptation pathways which will help to understand the long-term climate adaptation and resilience investment needs of our railway.
- **Scotland’s Railway: climate resilient investment** – the Climate Ready Plan for Scotland’s Railway outcome 3 is “Assets are made increasingly resilient to

acute weather events, as well as longer-term, more chronic changes in climate". This includes actions to improve the resilience of Scotland's railway infrastructure assets against adverse and extreme weather events, as well as longer-term changes in climate. There is approximately £400 million of planned infrastructure interventions in the next five years that will deliver some form of resilience to adverse and extreme weather, and longer-term changes in climate.

- **Scotland's Railway: adaptation governance** – the Climate Ready Plan for Scotland's Railway outcome 4 is "The 'climate ready journey' is underpinned by a maturing level of risk, assurance, competence, and data insights". This includes actions to better integrate considerations of longer-term climate risk into corporate risk management processes and creating new training resources and opportunities for our people.
- **Weather Risk Taskforce** - 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.
- **Collaboration on rail adaptation** – the Scottish Government will 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.

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 focused 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.

- **HIAL risk management** - 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.

- **HIAL adaptation actions** - based on its climate risk management work, a number of actions and projects have already been completed to ensure there is no significant disruption to services including drainage works at Inverness, coastal defences at Stornoway, cladding replacement to reduce heat absorption at Benbecula and regular ongoing review of processes and procedures. In line with our two year review cycle any future adaptation requirements will be assessed using a risk based approach and presented to the Board for approval.

Ferries and Ports

Scottish Ministers 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. 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”.

Ferry users and island communities report that the most important thing about ferries is that they are reliable. Reducing breakdowns, improving weather reliability, and increasing network resilience is, therefore, the first priority and will support overall island transport connectivity. 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.

- **Building ferry network resilience** - when designing and buying replacement vessels, features that will reduce the risk of disruption, in particular from weather, will be among the priorities for CMAL and operators when considering options on behalf of the Scottish Government. Resilience of services can be improved by having spare ferries available in case of breakdowns and by increasing the number of vessels that can work from different ports including by having the same, or similar, designs. The Islands Connectivity Plan sets out plans to reduce the average age of the fleet to around 15 years by the end of the decade and retain a major CHFS vessel to provide resilience.
- **Performance measures** – the Scottish Government will work with operators and communities to develop performance measures for reliability that reflect lived experience, to ensure Transport Scotland, CMAL and operators have good information on disruption and long-term reliability issues and trends.
- **Collaboration and flexibility** – the Scottish Government will encourage collaboration between freight operators, hauliers and businesses for greater forward planning, including management of future capacity, demand, and

weather-related strains. The Scottish Government will also ensure future ferry service contracts are flexible and can respond to short and long-term changes during the contract, including responding to weather-related disruption to services.

- **Port investment** - 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. The Scottish Government fully supports 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.
- **Knowledge sharing in marine transport** - Transport Scotland will promote awareness of climate science and collaborate on proactive adaptation and resilience interventions and opportunities; and actively engage with ferry operators, providing information and guidance where appropriate, on services and infrastructure projects through a variety of working and advisory groups.

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.

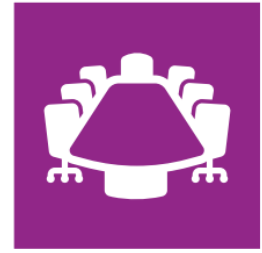
Scottish Canals' response, as set out in its Corporate Plan 2023-28, is to deliver opportunities for its team and partners in tackling the impacts of climate change whilst improving canal asset health and protecting natural habitats, flora and fauna to secure biodiversity gain. The outcome of the plan 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. Key actions include:

- **Water stewardship** - 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.
- **Smart Canals** - 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. Scottish Canals has set out in their Corporate Plan 2023-28 that they plan to develop Scotland's second Smart Canal by 2033.

- **Climate resilience strategy for canals** - 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 Scottish Canals 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 Scottish Canals anticipate taking action to reach a leading position in terms of both resilience and in leveraging the resilience opportunities at community and regional levels.

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



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

Climate change poses profound risks to our economy. The costs to the Scottish economy, resulting from climate change, are no longer hypothetical. The Climate Change Committee have estimated the impacts of climate change already cost the Scottish economy billions of pounds per year². By 2050, research led by the European Union, estimates the economic costs at potentially being between 1.2% to 1.6% of GDP per year. Taking action to build greater resilience to climate risks, will be crucial to ensuring the long term security and prosperity of Scotland's economy.

With a changing climate there are not just costs, however, but also innovation and economic opportunities. These come, for example, from the growth of sectors, new services and products which help Scotland, and the rest of the world, adapt to future climate conditions and build resilience. The opportunities emerging from an increase in peat restoration activity (highlighted in Outcome 1) are a prime example.

Over the next 5 years, The Scottish Government and the private sector can take action to minimise the scale of the costs, invest in measures to generate value, and harness innovation opportunities. The [National Strategy for Economic Transformation \(NSET\)](#) sets out our commitment to 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 more prosperous, fairer, wealthier, and greener country – a wellbeing economy.

This chapter sets out four objectives that collectively focus on how Scotland can build resilience to the economic impacts of a changing climate and maximise the innovation opportunities for businesses, people, and communities. The policies in this chapter support Scotland's just transition to a climate resilient, net-zero economy.

² The CCC estimated the broad cost of each risk as part of its supporting research to their third Climate Change Risk Assessment: [Monetary Valuation of Risks and Opportunities in CCRA3 - UK Climate Risk](#)

Objective: Increasing business understanding of climate risks and adaptation action (B1)

Businesses understand the risks posed by climate change and are supported to embed climate risks into governance, investment, and operations, and are collaborating on effective adaptation action.

SG Directorate lead: DECC/DED

Scotland's changing climate poses growing risks to businesses across Scotland. This can include through physical damage to business premises or assets, health and safety risks to employees and customers, disruption to supply chains, reduced access to finance or insurance coverage and increased risks to employee health and safety.

Adapting to external conditions is not new – it is already a core function of successful businesses. Preparing for, rather than reacting to climate impacts, makes good business sense. Long-term cost saving, greater business continuity, reduced disruption, increased productivity, and employee safety can be achieved by building better climate resilience and preparedness. There are further competitive advantages to be had by businesses who can support in delivering innovative adaptation solutions. As such, consideration of climate risks and opportunities must become part of wider business planning to ensure we can deliver the green economic growth required to support Scotland's Just Transition.

Businesses must consider their own climate risks and take action. There is a role for the Scottish Government and its partners to raise understanding of adaptation and climate risks amongst businesses. This includes through delivering support and advice for businesses on what action to take. This in turn, aims to support Scotland's wider economic resilience.

This objective details policy to:

- Support increased business understanding of climate risk;
- Publicly available advice and support for businesses on what to do about climate risks; and
- Support for businesses and workers on managing multiple climate risks – including flooding, coastal change, and water access.

Increasing business understanding of climate risk

Ensuring businesses understand the risks posed by climate change, and action they can take to build resilience, will be key to building a more climate-resilient economy.

Our Small and Medium Sized Enterprises (SMEs) are critical to a thriving Scottish economy, representing 99.3% of all private sector business and supporting an estimated 1.2 million jobs ([Businesses in Scotland, 2023](#)). The Climate Change Committee emphasise that SMEs are, however, both most vulnerable to climate-impacts and have least capacity to adapt. Recent insights show, that at present only 21% of SMEs are aware of and monitor climate-related risks to their business ([BICS, 2023](#)).

Action to support increased understanding of the climate-related risks for businesses in Scotland, including our SMEs will involve:

- **Trusted partner business networks** - the Scottish Government funded [Adaptation Scotland](#) programme, will work with and through Scotland's existing ecosystem of business support services to promote understanding of climate risk and of adaptation action. This will include working in partnership with our Enterprise Agencies, trade unions and industry bodies, as an effective means of reaching businesses at scale across Scotland, by drawing on their established business networks and members. Action will include learning and webinars tailored to specific support services.
- **Promotion of advice through business support channels** - the Scottish Government will integrate dedicated Adaptation Scotland advice for businesses, including guidance on climate risk and actions to take, on [Find Business Support.gov.scot](#) from 2024. As the single-entry point for public sector business support in Scotland and a key resource for SMEs, Find Business Support will expand the reach of adaptation advice to a wider audience, and support greater mainstreaming of climate-risk in wider business planning and decision-making.
- **Communications campaigns to build preparedness for severe weather events** - the Scottish Government will continue to deliver public engagement campaigns through [Ready Scotland](#). Ready Scotland communications, both via social media and [Ready.Scot](#), will raise awareness of the need to build preparedness for emergencies, including severe weather events, which are increasing in frequency due to climate change, and how businesses can work together with their local community to build greater preparedness. As part of public engagement campaigns, Ready Scotland guidance is available to support businesses to plan and protect their businesses and staff from weather-related emergencies. Specifically, the Business Emergency Resilience Group's [10 Minute Plan](#) outlines steps designed to help SMEs prepare for, respond to, and recover from flooding.

Economy-wide adaptation action and investment will also require leaders of different types to collaborate and drive progress across sectors and places in Scotland. This includes leadership from larger private sector business and

enterprises. To strengthen understanding of climate-related risk across our economy, facilitate business-to-business knowledge exchange and private-sector collaboration:

- **Private-sector leaders' network** - the Scottish Government, through Adaptation Scotland, will explore the establishment of a network of private-sector adaptation leaders to champion adaptation by 2027. Through this network, Adaptation Scotland would look to 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.

To assess the effectiveness of action to increase understanding of climate risks and adaptation considerations amongst the private sector:

- **Addressing data gaps on business risk monitoring** - The Scottish Government, with the Office for National Statistics, will expand the established Business Insights and Conditions Survey (BICs) to include a standardised question set on adaptation. This will provide insights on how businesses of different sizes and sectors are monitoring climate risks, on preparedness and any impacts on businesses resulting from climate change.

Advice and support for private enterprises

To remain profitable, businesses must be able to assess climate risks and to adapt in advance. The Scottish Government will offer businesses in Scotland support and advice to aid their effective response to climate change.

The Scottish Government delivers support to businesses through its investment in the Adaptation Scotland programme which provides free, practical guidance and advice to help businesses prepare for, and build resilience to climate-related hazards. Adaptation Scotland's support includes Climate Ready Business tools and resources, finance guide, business cases and resources for workers. For example, on publication of this Adaptation Plan, Adaptation Scotland's guidance [‘Is Your Business Climate Ready?’](#) has been downloaded more than 7,000 times.

To support businesses, including in sectors most vulnerable, to better assess climate risks and to identify practical adaptation measures they can take to build climate resilience:

- **Simple tools for SMEs** – the Adaptation Scotland programme will publish an enhanced suite of Climate Ready Business tools and resources for SMEs, co-developed through engagement with Scotland's Enterprise Agencies, industry bodies and private sector networks in Autumn 2024. These tools will be made accessible through adaptation.scot and promoted via [Find Business Support](#) and through business support organisations.
- **Sector specific support** - the Adaptation Scotland programme will, by spring 2025, deliver industry-specific adaptation capacity-building workshops for

SMEs in five industries identified as particularly climate vulnerable, to inform the development of tailored, industry-specific resources that will benefit workers and businesses. These will be developed by 2025, and cover the following sectors: agriculture and horticulture, Scotch whisky, wholesale and goods distribution, construction and built environment services. Adaptation Scotland will aim to work with relevant business support services, industry representative bodies and trade unions, where relevant, to design and deliver the industry-specific workshops.

- **Building adaptation capacity of existing business support services** – the Adaptation Scotland programme will support adaptation capacity building by delivering tailored training for business support services, including Scottish Enterprise and South of Scotland Enterprise, to ensure support services are sufficiently equipped to support private sector businesses, across a range of sectors and locations most affected by climate change impacts. This will enable the support to businesses, including SMEs, to be sustained and scaled over the 5-year Adaptation Plan.
- **Using data to inform support needs** - the Scottish Government will use business insights from the [ONS BICS survey](#) to ensure a strong Government understanding of how climate change is impacting our businesses of differing sizes and sectors. This will ensure guidance and support, delivered by Adaptation Scotland programme, is informed by and meets industry needs.

Case Study: Adaptation Scotland Programme support to deliver a climate resilient Dunfermline Learning Campus

On their work to construct a new, flagship building at Dunfermline Learning Campus for Fife College, Balfour Beatty and partners worked with the Adaptation Scotland programme advice and support to consider the current and potential future climate hazards facing the campus and its users.

The College campus spans over 20,000m², and is an innovative venture from Fife College, it is part of a state of the art, sustainable shared learning campus for Dunfermline (Dunfermline College Campus, St Columba's RC High School, and Woodmill High School). The new Dunfermline Learning Campus is also the largest pathfinder project for the Scottish Government's Net Zero Public Sector Buildings Standard in Scotland, which has established to drive net zero outcomes for new buildings and major refurbishments within the public sector. Fife College is the first project to explicitly include adaptation planning as part of the Standard in its design and delivery.

Resilience to climate change was identified as an important but equally new, and complex consideration for Fife College and Balfour Beatty, given the campus would need to withstand the increasing frequency and intensity of climate hazards such as heat, increased rainfall and windstorms over its long lifetime.

To best consider climate adaptation, Fife College and Balfour Beatty worked with the Adaptation Scotland programme, using the [A Changing Climate for Development](#) tool kit to assess the climate resilience of the new campus, and explored the climate-driven hazards during the construction

phase, using the Adaptation Scotland programme's [Climate Hazards in the Workplace](#) tool kit. The workshop explored the recent and projected changes to the climate in the Fife area, and how these climate-driven hazards would likely impact the structure and use of the new campus. The Adaptation Scotland programme team also supported participants to jointly identify potential adaptation actions, illustrated by case studies, and to prioritise those that could be implemented at this stage of construction.

From this work Balfour Beatty and its partners were able to identify actions to improve resilience including;

- Considering landscape design with climate resilient planting in mind – for instance, drought resistant plants, and more green space to provide cool areas during heat extremes;
- Considering prevailing wind directions and storm directions when designing rotating/automatic doors;
- Strategies for working during extreme weather, at the college, in design offices and on a construction site. When would people not be expected to travel into the facility and when could offices offer more comfortable alternatives to homes;
- The location of critical infrastructure such as IT servers, ensuring these are away from areas potentially more at risk from extreme weather conditions such as flooding.

With the advice and support of the Adaptation Scotland programme, Balfour Beatty, its partners and Fife College have been able to identify and implement practical measures that will be critical to ensuring a safe learning environment at the new Dunfermline Campus as the climate evolves.

A detailed case study of this work can also be found via the [Adaptation Scotland programme website](#).



Figure 18: Dunfermline Learning Campus - [Fife College 2024](#)

Scotland's Enterprise Agencies, which includes Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise, have a central role in driving economic development across Scotland.

As a vital source of business advice and support in Scotland;

- **Mainstreaming adaptation in Enterprise Agency Net Zero support for businesses** - our Enterprise Agencies will integrate an enhanced adaptation focus into existing advice on business development, supply chain resilience and business sustainability. This will build synergies with existing Enterprise Agency support and guidance on net-zero, to maximize relevance to businesses, including SMEs, and increase opportunities for efficiencies in business planning.

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.

To support more businesses to take adaptation action:

- **Scottish Enterprise Net Zero Accelerator Tool** – Scottish Enterprise will continue to develop and promote the [Net Zero Accelerator tool](#) which encourages businesses to develop climate change plans which consider both adaptation and mitigation goals.
- **Scottish Enterprise conditional grant funding** – Scottish Enterprise will continue to explicitly link 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. Scottish Enterprise encourages the integration of adaptation measures as part of the development of these plans.

Case Study: Scottish Enterprise Net Zero Accelerator Tool and Net Zero Academy

Scottish Enterprise's [Net Zero Accelerator tool](#) is a benchmarking tool designed to support companies to identify actions that can form a climate change roadmap or plan. The tool specifically asks businesses if they have assessed the risk of climate change on their operations, products, and services, 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 makes targeted recommendations, including links to Adaptation Scotland and other sources of support.

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. 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. The tool is focused on those companies taking their first steps towards developing their own net zero transition plan. Companies have access to this tool when a Scottish Enterprise supported project is initiated.

In addition to this tool, Scottish Enterprise's **Net Zero Academy**, launched in 2023, supports cohorts of Scottish companies with expert advice and guidance on how to develop their own net zero plans. The first two cohorts successfully delivered in 2023, supported 26 companies.

Through five half day workshops that include presentations, videos, and interactive exercises, the academy provides delegates with globally recognised continual professional development through accreditation with the [Institute of Environmental Management and Assessment \(IEMA\)](#). One of the interactive exercises includes a worked example for delegates on the impacts of climate change, on a fictional but realistic business, which has suffered from the effects of severe weather events including both drought and flooding. Beyond the programme the Scottish Enterprise team of sustainability specialists are available to provide support and advice to support participants on their net zero and climate adaptation journey.

Supporting workers and businesses to manage multiple climate risks

Climate hazards and workplace safety

All workers, whether they work indoors, outdoors, offshore or travel for a living, will be increasingly vulnerable to disruption and potential injury from climate change impacts such as storms, flooding, and heatwaves.

Insights from [Scotland's Trade Union Centre's \(STUC\) severe weather](#) survey during Storm Isha and Jocelyn highlighted that many workers were expected to travel to work when they felt it was unsafe to do so.

As extreme weather events become more frequent due to climate change, workplace resilience and adequate protections will be increasingly important to ensuring worker safety and for security of pay. This is central to ensuring a just transition for workers.

To protect workers from increasing climate hazards will require:

- **Adaptation Scotland Resources for employers, unions and workers** – Adaptation Scotland will promote the [Climate Hazards & Resilience in the Workplace resources](#), which identify the hazards that climate change could bring to a range of different workplaces and how employers, employees and unions can take action to protect workplace health and safety. The resources are designed to help workers and trade union representatives have a central voice in building workplace resilience and championing adaptation solutions which also tackle inequality and social justice. While the resources were developed in partnership with the trade union movement, they are applicable in all workplaces regardless of union status and offer valuable advice on no and low cost adaptation actions to increase resilience and improve workplace health and safety.
- **Fair work, severe weather and trade union engagement** - in line with the Scottish Government's memorandum of understanding with the STUC, the Scottish Government will continue to engage with trade unions to help build workplace resilience to climate change. This will include exploring whether the principles within the [Fair Work Charter for Severe Weather](#) could act as a framework for managing climate hazards in the workplace.

- **Further Research on Occupational Health and Safety Considerations** - over the lifetime of the Adaptation Plan, the Scottish Government will commission research to establish the likely occupational health and safety considerations in different sectors that will contribute to a climate resilient workforce, and what measures need to be in place to protect workers and their rights.

Flooding and business sites

Exposure to flooding will pose an increasing and significant risk to business assets and core operations in Scotland as climate change brings both increased rainfall and sea level rise.

SEPA's 2018 National Flood Risk Assessment shows that around 10,000 buildings of businesses and industry faced a high likelihood of flood risk, with this increasing under both 2°C and 4°C warming scenarios. This bears significant financial implications for many businesses.

Recognising there are higher costs involved in responding to a flooding event than investing in early business adaptation action:

- the Scottish Government and SEPA will support businesses to build preparedness through measures including the Scottish Government's National Flood Resilience Strategy, SEPA Flood Forecasting alerts, SEPA's review of Potentially Vulnerable Areas and the Flood Risk Assessment Scotland (FRAS) which are outlined under [Objective C3](#) of this Plan.

Policy relating to the control of major accident hazards (COMAH) sites can be found detailed in [Objective PS2](#).

Coastal Change

The Dynamic Coast project has demonstrated that at least £20 billion of assets, including businesses, rail, and road, lie within 50 metres of Scotland's coastline. Predicted sea level rise will also impact on businesses at the coast and on tidal rivers.

The Scottish Government has developed guidance to support local authorities in the preparation of Coastal Change Adaptation Plans (CCAPs). The guidance sets out how to assess and plan for coastal change. CCAPs will also feed into Local Development Plans which set out where development can take place.

Detail of policy commitments in relation to CCAPs can be found within [Objective C6](#) of this Plan. Specifically, guidance for CCAPs encourages businesses to:

- be involved in the process of producing local authority wide CCAPs;
- consider coastal change (coastal erosion and sea level rise) when moving or extending business premises; and

- engage with the relevant local authority for further information. A landowner can also draft their adaptation plan, based on the CCAPs guidance and information provided by Dynamic Coast and SEPA flood maps.

Water scarcity

Access to water is crucial to many core business functions – not least ensuring workers’ 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 quality, and increase the likelihood of water scarcity.

There are business benefits to be had from 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:

- **Policy development for managing Scotland's water resources** - the Scottish Government is developing policy with SEPA, Scottish Water and key sectors to develop a partnership approach to manage our water resources, understand the changing needs, future demands and continued availability of water to protect the future of Scotland’s environment and economy.

Objective: Agriculture, forestry, fishing, and aquaculture sector support (B2)

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

SG Directorate lead: ARE/ENFOR/MARINE

Scotland’s agriculture, forestry, fishing, and aquaculture sectors are central to our nation’s identity, and our economy. Combined, these industries contributed £2.4 billion to the Scottish economy in 2023 ([GDP National Accounts, 2024](#)). For many rural and island communities, the sustainability of the local community is inextricably linked to the agriculture, fishing and forestry, and aquaculture sectors.

These sectors rely on natural resources and as a result are particularly vulnerable to climate change and biodiversity loss. As outlined in Outcome 1, protecting our natural capital that these industries rely on is a key adaptation action. Increased rainfall, droughts, 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 however be opportunities relating to productivity in

forestry, fishing, and agriculture, with future changes in climate offering potential improvements in crop suitability, growing seasons and for new fish species.

Adaptation action by these industries is needed to maintain business productivity and viability, over the next 5 years. The policies outlined, and locally tailored interventions, to support these sectors will also be of importance to increasing community resilience, supporting population retention and attracting new populations to rural and island communities, as set out within the Scottish Government's [Addressing Depopulation Action Plan](#).

The Scottish Government will work to ensure a just transition for farming, fishing and forestry, so that these industries can move towards practices which are responsive to Scotland's changing climate and which support both business productivity and viability.

Agriculture sector support

As we transition to a net-zero and climate resilient economy 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 simultaneously being well placed to take adaptation actions, which also support climate mitigation – for example through riparian planting or hedgerow creation.

Scotland's farmers and crofters can support adaptation at the farm, landscape, and national levels. Farmers will need to change their practices to ensure their business resilience as the climate changes but their actions will also enable wider benefits such as reducing the risk of downstream flooding and for Scotland's food security.

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

- **Vision for Agriculture** - 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.

- **Agriculture and Rural Communities (Scotland) Act** - the Agriculture and Rural Communities (Scotland) Act represents a hugely important step in reforming our agricultural and rural support systems and the Government will continue to work closely with industry and stakeholders to realise our ambition to make our nation fairer and greener and to enable us to produce more of our own food more sustainably.

To support Scottish farmers and crofters to take action on climate adaptation:

- **Agricultural financial support for adaptation** - the 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. As set out in the [Agriculture Reform Route Map](#), the future framework will comprise four tiers.
- **ARP and support for climate hazards** - through the Agriculture Reform Programme (ARP), we will explore funding options to support farmers and crofters to reduce their exposure to climate hazards including flooding and drought.
- **Cross compliance conditions in agricultural support** - the Scottish Government will maintain existing cross compliance conditions as a minimum in the new support framework across all tiers. The conditions are being reviewed to identify ways to make them more impactful in the delivery of future policy outcomes.
- **Good Agricultural and Environmental Condition (GAEC)** - the Scottish Government will introduce new peatland and wetland standards to the existing GAEC 6. This condition aims to maintain soil organic matter by prohibiting a range of activities on peatland and wetland areas and requiring any new tree planting, which could impact peatlands and wetland, to follow the UK Forestry Standards.
- **Whole Farm Plan** - the Scottish Government will introduce from 2025 the first Whole Farm Plan conditions which require farmers and crofters to complete two baselining activities from a list of options including carbon audits, biodiversity audits, soil analysis, the creation of animal health and welfare plans or integrated pest management plans.
- **Supporting landscape-scale collaboration** - the Scottish Government will actively consider how landscape-scale collaboration could be supported within the future agricultural support framework, including helping rural communities to become climate-resilient and engage in natural capital projects. We will continue to engage with landowners and stakeholders,

adopting the farmer-led design approach of the new future support framework.

- **Agri-Environment Climate Scheme** - the Scottish Government will continue to maintain financial support for farmers and crofters to adapt to climate change 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. AECS currently provides funding for key adaptation actions on farms, for example the creation of irrigation lagoons which can reduce water scarcity risks and biodiversity actions which support adaptation across the landscape. 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 in developing the knowledge and understanding of climate risks as well as the skills needed to adapt their business to ensure sustainability, resilience, and profitability;

- **Farm Advisory Service Support** - the Scottish Government will continue to deliver training, skills development, advice and guidance to farmers and crofters on how 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.
- **Agricultural Knowledge and Innovation System** - 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. Support on climate adaptation will consider how best to enable farmers to understand the risks and opportunities posed by climate change and communicate the benefits of adaptation actions.
- **Land Use and Agriculture Just Transition Plan** - the Scottish Government is committed to publishing a Just Transition Plan for Land Use and Agriculture which 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.
- **Research informed guidance for agriculture** - the Scottish Government will continue to update and refresh guidance and advice as research develops, and as the impacts of climate change continue to evolve. For example, where relevant, advice offerings may evolve to include detail on new climate-resilient

varieties and technical innovations which can contribute to climate adaptation.

- **Organic food research** - we will continue to provide financial support, guidance and advice on the uptake of organic approaches, including their incorporation into non-organic farming systems, in alignment with the findings from the ClimateXChange [rapid evidence review](#). This found that organic farming practices such as the use of cover crops and intercropping can support the resilience of agricultural systems against the impacts of climate change.
- **Farmer and crofter peer-to-peer support** - the Scottish Government will continue to 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 which won the 2024 Chartered Institute of Ecology and Environmental award for best practice in knowledge sharing.

As outlined in [Outcome 1: Nature Connects](#) there is an increasing risk of crop pest and disease incidence along with potential spread of Invasive Non-Native Species (INNS) associated with climate change. Climate change poses an increasing risk to crops from temperature (high and low) and water extremes (drought and flooding).

The [Scottish Plant Health Strategy](#) sets out our approach to protect plant health 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, to support the sector from the threat to productivity from pests and disease we will:

- **RESAS research on crop pests and diseases** - RESAS research on the Scottish Government's Rural and Environment Science and Analytical Services Division (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 will also support by delivering integrated and sustainable crop protection strategies, by better understanding disease epidemiology, developing rapid diagnostic

technologies, investigating alternative control measures including improved crop breeding and modelling the impacts of climate change.

- **Scotland Plant Health Centre** - [Scotland's Plant Health Centre](#), a virtual Centre of expertise funded through the RESAS Strategic Research Programme, will continue to enhance Scotland's capacity and capability to respond to plant health threats posed by climate change and will assemble scientific evidence to inform policy. The Plant Health Centre will continue to facilitate interaction with industry and Government to establish areas of priority research and communicate findings. As part of their work, the Plant Health Centre work across plant sectors including forestry, natural environment, agriculture, and horticulture to ensure that action to support against pests and disease can be extended across sectors.
- **SASA response to PCN and aphid transmitted viruses** - Science and Advice for Scottish Agriculture (SASA) will continue to develop approaches to support potato growers with Potato Cyst Nematode (PCN) and aphid transmitted viruses, including IPM planning.

Agriculture water management

Flooding and water shortages, caused by climate change, pose an immediate challenge to farmers and crofters. Flooding across Scotland is becoming more frequent and poses risks to agriculture through loss of crops and stock, infrastructure damage and negative impacts on soils.

Scottish Government and partner action across Scotland as set out in [objectives B1](#) and [PS3](#) 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 flood exposure through on-farm actions like tree planting.

The risk of water scarcity for farmers and crofters is also increasing due to the changing climate, especially in eastern areas where drier summers are expected and demand for irrigation of arable land is highest. Beyond crops, water scarcity can impact on livestock farming through extra costs for livestock feed when grass growth is reduced.

To support farmers and crofters against the immediate and increasing risk of water shortage;

- **SEPA engagement with farmer and crofters** - 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. 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 research on water scarcity** - the Scottish Government's 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 an area where further research is needed the RESAS Strategic 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.

Agriculture opportunities

To continue to support the sector's long-term profitability, the Scottish Government will continue to support the development of innovative solutions and research on agriculture opportunities.

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 have invested 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 includes:

- Research on important Scottish crops, to establish varieties which can manage a combination of environmental stresses and use resources more efficiently. We will explore the development of 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 development of approaches to increase adoption of best practices for adaptation and resilience, leading to a more productive and less vulnerable sector overall.

Forestry sector support

Forestry in Scotland is worth £1.1 billion per year to the Scottish economy and supports more than 34,000 jobs from direct forest management, timber processing and supply chain activities to forest based recreation and tourism. The sector is growing and has positive local impacts, especially for our rural communities.

Alongside their important economic value, forests have a crucial role to play in mitigating against climate change, tackling nature loss and in supporting the well-being of the people of Scotland.

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.

Scotland has a highly successful industry based mainly around a single principal species. This principal species, Sitka spruce, makes up 43% of the forestry area in Scotland. This high dependence on one principal species is a considerable risk to the industry. As such, species choice has been identified as a key factor for building climate resilience.

[Scotland's Forestry Strategy 2019–2029](#) identifies climate change as a key strategic driver and sets out a vision where by 2070 'Scotland's forests and woodlands will be a more resilient adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy and flourishing communities'.

Increasing the adaptability and resilience of forests and woodlands, is one of the strategy's 6 priority areas for action. The second [Forestry Strategy Implementation Plan \(2022-2025\)](#), reaffirmed that the resilience of Scotland's forests remains a key strategic driver.

Forests and woodland are long lived and cannot be changed quickly, so we aim to set the direction for managed progressive change, that builds resistance, increases adaptation and supports rapid and effective response and recovery when climate change events occur and have a negative impact on the resource.

To protect the productivity and increase the resilience of the forest resource and industry, [Scottish Forestry](#), as the Scottish Government agency responsible for forestry policy, support and regulations will:

- **Forestry Resilience Action Plan:** Scottish Forestry will deliver a Resilience Action Plan in 2024, informed by stakeholder insights, research and a cross-sector Adaptation and Resilience Steering Group, which will outline actions to increase the resilience of the forest resource and industry. The delivery of these actions will be based on a cross industry collaborative approach, with potential delivery partners identified for each action.

- **UKFS 5 alignment in forestry approvals:** Scottish Forestry will ensure compliance with the revised [UK Forestry Standard \(UKFS\)](#) for all forestry approvals, from October 2024. UKFS is the Government's reference standard for sustainable forest management. The standard was reviewed and revised with stakeholders, in 2023, to ensure that compliance with the standard, increases resilience.
- **UKFS 5 training and support–** Scottish Forestry will support the provision of training on the implementation of the new UKFS.
- **Forestry Grant Scheme:** Scottish Forestry will continue to develop [the Forestry Grant Scheme](#) (FGS) to support Government priorities.
- **Forest Planning support:** Scottish Forestry will continue support for the Forest Planning process. Forest plans are one of the principal tools used to manage the long-term changes to build resilience and increase adaptation action. As part of this, forest plans must demonstrate compliance with the UKFS.
- **Scottish Forestry Tree Health Surveillance:** Scottish Forestry will continue an annual surveillance programme of the forest resource, with survey levels reviewed through appropriate risk assessments. Statutory Plant Health Notices (SPHNs) will continue to be issued as required for notifiable pests and diseases.
- **Industry wide communication on tree health risks:** Scottish Forestry will maintain the Scottish Tree Health Advisory Group to ensure tree health risks, and mitigations, are communicated with industry.
- **Tree Alert and Observatree:** Scottish Forestry will support Tree Alert (Forest Research) and Observatree which allow members of the public to report tree health concerns. This is monitored by Forest Research and any reports of concern are passed to Scottish Forestry's Tree Health Team to follow up as part of its wider surveillance work (as previously outlined).
- **Climate Change Hub for forestry-** Scottish Forestry will work with partners to continue to develop the [Climate Change Hub website](#) as a trusted resource for the sector on forest resilience and climate risks.

Fishing and aquaculture sector support

Fishing and aquaculture are central to Scotland's culture, identity, and economy. In 2021, the Scottish aquaculture sector directly employed 2,300 people, generating £472 million Gross Value Added (GVA) and 4,241 fishers were working on Scottish vessels, with fishing generating £321 million GVA. In 2022, Scotland exported £1.04 billion worth of fish and shellfish, accounting for just over 60% of total UK fish and shellfish³.

³ [Scotland's Marine Economic Statistics 2021 - gov.scot \(www.gov.scot\)](#)

The Scottish marine ecosystem and the fisheries it sustains face a dynamic and uncertain future due to a changing climate. Climate change will lead to a warming trend and a decrease in pH, known as ocean acidification, for our seas. These changes will affect the distribution and abundance of marine species, including plankton, shellfish, finfish, marine birds, and marine mammals.

It is essential that our aquaculture and fisheries sectors are able to adapt to the impacts of climate change and that Scottish Government policies support this response. Environmental protection is a key tool for adaptation for these sectors.

The Scottish Government's [Blue Economy Vision for Scotland](#) is that, by 2045, marine, and inter-linked freshwater and coastal environments are restored, adapted and resilient to climate change and are sustainably managed. The following commitments support achieving this vision for adaptation across both aquaculture and fishing:

- **Sector and coastal community engagement** - through the lifetime of the Adaptation Plan the Scottish Government will work in partnership with marine sectors and coastal communities to support an effective Just Transition, and ensure a sustainable future for Scotland's seas for the benefit of all.
- **Evidence on climate impacts on the sector** - the Scottish Government will ensure our approach to support the aquaculture and fishing sector to adapt, to climate-related impacts, is informed by the best available science and research. We will continue to identify and fill priority knowledge gaps, building on work already undertaken in this area, including recent [ClimateXChange research](#).

To inform policy development over the lifetime of the Adaptation Plan, in 2024, the Scottish Government [commissioned research through ClimateXChange](#) to support our understanding of climate impacts on target fish stocks. This is of critical importance to supporting and future-proofing the fishing industry and marine economy.

- **Implementing CXC research on fisheries policy** - the Scottish Government will take a co-management approach to identifying and implementing the right solutions as explored by this initial ClimateXChange research, recognising the findings cannot be effectively implemented by the Scottish Government alone, but will require industry-wide and government collaboration.

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 are:

- **Fisheries Management Plans** - the Scottish Government, in line with the Fisheries Act 2020, are working with the other UK fisheries administrations to jointly develop 22 Fisheries Management Plans, which will support us to

increase or maintain sustainability of fish stocks and respond to changes in the status of stocks.

- **Measures to reduce fish discarding** - to deliver more sustainable and responsible sea fisheries management, the Scottish Government will develop and implement a suite of technical and spatial measures to both reduce levels of discarding of 'unwanted' fish catch and, reduce bycatch of sensitive marine species to ensure sustainable fisheries, with implementation by 2026.
- **Vessel tracking and monitoring technology** - the Scottish Government will develop and consult on a package of measures to help ensure that inshore fishing activity is managed responsibly. We will also enhance our management capabilities through the introduction of appropriate tracking and monitoring technology for all Scottish vessels under 12m by 2026, building on the measures already in place for vessels 12m and over in length.

Farmed salmon is a key sector of the marine economy. To promote an informed and collective response to the challenges posed by climate change to farmed salmon;

- **Farmed Fish Health Framework** - the Scottish Government's [Farmed Fish Health Framework](#) includes a focus on understanding and adapting to climate change in order to help support the sector with aspects of its approach to adaptation (within the remit of the Framework). The Farmed Fish Framework promotes collaboration across the sector – between farmed fish producers, fish vets, innovation centres, regulators, and government to address key challenges to fish health in support of welfare and economic performance.

The Scottish Government's [Vision for Sustainable Aquaculture](#) to 2045 sets out how the sector can contribute to our Blue Economy and Net Zero ambitions, while remaining 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, industry, and regulators. In implementation, key adaptation actions will include:

- **Aquaculture Climate Resilience Plans** - the Scottish Government, with partners, will support the aquaculture sector to put in place climate resilience plans to manage the risks and opportunities of climate change by 2029.
- **Increasing aquaculture sector understanding of climate adaptation** - the Scottish Government and key partners will work to increase sector awareness and understanding of the changing environment, to enable effective adaptation action on challenges such as warming seas, increased storm frequency and severity and fish health issues.

- **The Sustainable Aquaculture Innovation Centre and the Sustainable Aquaculture Forum** - the Scottish Government funded Aquaculture Innovation Centre promotes collaboration that can support Scottish aquaculture to respond to challenges related to climate change, including adverse impacts on fish health.

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

- delivering emissions reductions in line with Scotland's Net Zero targets;
- partnering with innovators to explore further opportunities for the best use of aquaculture by-products; and
- 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.

Objective: Innovation and business opportunities (B3)

Scotland is a hub for innovative adaptation solutions and opportunities.

SG Directorate lead: DECC

The Scottish Government's National [Innovation Strategy 2023-2033](#) 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. Innovation creates jobs, develops fresh, exciting opportunities and supports economic and productivity growth.

The transition to a more climate resilient Scotland is, not only a necessity, but can also be seen as offering innovation opportunities. In 2016/17 the value of the Adaptation and Resilience to Climate Change sector for Scotland was £604m ([Adaptation Economy of Glasgow City Region Report, 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, that can help Scotland adapt.

While the innovation opportunities of the energy transition are recognised globally, the opportunities of the Adaptation and Resilience Economy are less-explored. This presents an opportunity for Scottish businesses to position themselves as innovators and gain competitive advantage. 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 to climate change.

The private sector, and its investment, can be catalytic for ensuring Scotland is at the forefront of this innovation.

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

This objective includes sub-themes of:

- Adaptation and resilience economy evidence base
- Innovation support
- World leading research

Evidence base on the adaptation and resilience economy

The innovation and business opportunities resulting from climate change remain an underexplored and emerging area. Our plan to help businesses, sectors and regions identify the innovation and business opportunities arising from a changing climate, while also maintaining consideration of maladaptation, includes;

- **Building our understanding of innovation opportunities** - the Scottish Government will, over the period of the Adaptation Plan, grow a robust and evolving evidence base on the Scotland specific economic opportunities arising from adaptation, and the goods and services needed to support a more resilient economy. We will work to increase business awareness of these opportunities. This will include through adaptation advice and support outlined in Objective B1.
- **Sector specific innovation opportunities** - the Scottish Government and Enterprise Agencies will collaborate on specific research to identify market opportunities, the sectors where Scotland's can show a first mover advantage in developing adaptation solutions, and current barriers preventing businesses in Scotland from realising these opportunities by 2025.

Innovation Support

In Scotland, public sector support for innovation is provided by our enterprise and skills agencies – [Scottish Enterprise](#)(SE), [Highlands and Islands Enterprise](#)(HIE), [Skills Development Scotland](#)(SDS), the [Scottish Funding Council](#)(SFC) and [South of Scotland Enterprise](#) (SOSE).

To specifically encourage innovative and entrepreneurial solutions which support adaptation and climate resilience:

- **Integration of adaptation insights in business innovation support** - the Scottish Government will work with Enterprise Agencies and the wider

Business Support Partnership to share insights (as outlined above) on emerging innovation opportunities arising from climate adaptation with growth businesses.

- **CivTech** - the Scottish Government will work to explore specific CivTech challenge needs with relation to adaptation and fostering greater climate-resilience in Scotland, over the course of the Adaptation Plan. 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. Currently, [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, of which Mission 4 focuses on living with climate change and the role of nature-based solutions in building resilience to the impacts of climate change on our coasts and settlements. SEPA's challenge to develop a flood warning system for local communities, was addressed by the solution RiverTrack (see detail in the below CivTech case study).
- **FIRNS** - to build capacity and overcome barriers to scaling responsible private investment in natural capital the Scottish Government launched The [Facility for Investment Ready Nature in Scotland](#) (FIRNS). Alongside technical advice and support, FIRNS aims to help develop a viable business case and financial models to attract private investment in projects that can restore and improve the natural environment and as such support wider climate resilience.

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 by smaller communities, to reduce exposure to flooding. In 2016 SEPA posed the CivTech Challenge: *How can we develop an effective hyper-local system 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.



Figure 19: (Left) A RiverTrack sensor underneath a bridge (Rivertrack.org)

Figure 20: (Right) A river level display monitor (Rivertrack.org)

Innovative Research

Scotland is globally renowned for its research excellence. Our universities and research institutes play an important role in driving economic growth and supporting the innovation process. As part of this, climate change research is a specific area where Scotland's academic institutions excel and are well regarded globally. [Recent research](#), commissioned by the Scottish Funding Council, has highlighted the important contribution Scottish university research has made to delivering positive environmental impacts, including net-zero goals both domestically and internationally.

Research and development (R&D), alongside collaboration with academia, is vital to exchange knowledge, experience, and ideas to develop new products and services.

To harness this strength and the contribution our academic institutions can make in specifically supporting innovative adaptation solutions:

- **Academic Knowledge Exchange Network** - the Scottish Government will explore establishment of 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.
- **Scottish Funding Council Support** - the Scottish Government, through the Scottish Funding Council continues to provide flexible funding that supports institutions to build their underpinning capacity to develop a breadth of world-leading research, and help deliver on Scottish Government ambition in priority areas, including advancing climate change goals. In addition, the Scottish Funding Council continues to fund a network of Innovation Centres and strategic initiatives such as the Alliance for Research Challenges which deliver

positive and impactful results for adaptation in areas such as sustainable food systems and energy.

As outlined in [objective B2](#), the Scottish Government's annual investment of £50 million in the RESAS '[Strategic Research Programme](#)' which includes research and innovation relating to climate adaptation opportunities.

- **RESAS Centres for Expertise** - the Scottish Government, through 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. As part of this, 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.
- **Strategic Research Programme [2027–2032]** - in developing the next RESAS Strategic Research Programme for 2027 onwards the Scottish Government will ensure consideration of adaptation research needs. Based on industry needs, this could include exploring how climate change will impact land use and grassland and arable systems, the ways technological innovations (AI and robotics) and molecular breeding could contribute to climate adaptation, as well as the opportunities to utilise improved season and annual variability forecasting.

Case Study: Adaptation research and development to support our whisky industry

Scotland is known internationally for the quality of its natural produce. A cornerstone of this reputation is its world-famous Scotch Whisky. Exported to more than 180 global markets, the whisky sector supports over 66,000 jobs across the UK, and in Scotland underpins the maintenance of vibrant rural communities. Having seen a 31% increase in export growth between 2018 and 2022, whisky now accounts for 77% of Scottish and 26% of all UK food and drink exports, valued at £7.1Bn GVA to the UK economy. High quality 'malting' barley is the key ingredient to whisky. Around 95% of the barley used to make a single malt Scotch Whisky, almost 1 million tons, is grown on Scottish farms. Demand from the whisky sector results in barley being Scotland's most widely grown and most important agricultural crop, and by some measure. However, as with all agricultural commodities grown on farms today, barley production in Scotland is under threat by long term climate change. In anticipation, research at the James Hutton Institute (JHI) in Dundee and Aberdeen, funded by Scottish Government alongside other agencies and organisations, has focused for several years on understanding the likely impacts of climate change and the challenges that will be faced by farmers as they strive to maintain both yield and quality of the barley crop.

Innovative research at JHI has identified the best chance we have to respond appropriately to the impacts of the climate emergency and support our valuable whisky sector lies in the diverse genetics that exists within the barley crop itself. Barley has adapted to different environments since its domestication some 10,000 years ago. Some of the environments to which barley adapted closely mimic those we will undoubtedly face as a result of climate change in Scotland.

Current research focuses on understanding the role of genetics in adaptation. Practical outcomes include the characterisation of germplasm containing climate relevant traits, and the molecular information and tools required to allow desirable progenies to be identified in the laboratories of commercial plant breeding programs which can help avoid years of testing in the field.

In partnership with industry JHI aim to streamline the production of new, climate adapted barley cultivars that meet the demands of farmers operating in the 'uniquely Scottish' premium end use sector.

Objective: Climate resilient economic development and supply chains (B4)

Economic development is informed by climate risks and opportunities including identifying and managing supply chain vulnerabilities for vital food and goods.

SG Directorate lead: DECC/DED/DITI/ARE

Climate change will have impacts across our whole economy, including upon workers, critical infrastructure, business productivity, for how we invest, for insurance and crucially upon access and the costs of many vital goods and services. Disruption to supply chains, resulting from an increasingly volatile climate, is among factors threatening sustained access and the costs of food and goods that are essential to sustaining our economy and public health. As part of this we know that a healthy population, is key to maintaining a thriving economy.

Given the scale of impacts it is crucial that economic development efforts, at both a national and regional level, encompass consideration of climate risks, include action to support resilience and explore opportunities. Action to manage vulnerabilities and build resilience of supply chains for vital food, medical goods and the critical raw materials needed to support our energy transition will be key, and will involve both industry and the public sector.

As earlier set out, investing in adaptation action is the only way we can minimise the costs to our economy and society. We will need to act to close the adaptation finance gap, and support public and responsible private investment in adaptation. The financial sector will also need to understand and disclose the climate risks in their portfolios.

To support an economy which can adapt to and thrive amidst climate change this objectives sets out;

- National economic development, including international trade;
- Economic analysis to support adaptation;
- Regional approaches to support climate-resilient economies;
- Financing adaptation and engagement with the financial sector;
- Public procurement;

- Supporting the safety and supply of food, vital goods including medical supplies and critical raw materials required for our energy transition.

National economic development

The Scottish Government's National Strategy for Economic Transformation (NSET) sets our vision for a wellbeing economy – thriving across economic, social, and environmental dimensions.

This sub-theme captures work to support national economic development, with integral work to support regional economic development also captured later within this objective.

At a national level, policies to innovate, build new markets and create new employment are underpinned by the Scottish Government's vision for a wellbeing economy as set out in NSET. This includes embedding the principles of Community Wealth Building (CWB) and Fair Work First across everything we do.

- **Community Wealth Building (CWB):** The Scottish Government has embraced the internationally recognised CWB policy and approach to economic development as a key tool to build the Scottish economy; and to ensure our economy creates the prosperity that is necessary to support our people and communities and to protect against economic shocks, including those resulting from climate change. CWB acts as a framework for activity across five interlinked pillars that support economic activity: Land and Property, Spending, Inclusive Ownership, Workforce and Finance.

Scotland's economic development is supported by the availability of high-quality, appropriately skilled people. Our education and skills system is already adapting to climate change with institutions like colleges and universities acting as key anchor points for driving innovation (as outlined in [Objective B3](#)).

- **Skilled workforce for our economic transition:** Significant work is progressing to reform the education and skills system so that it can become even more responsive to our needs and ambitions. The Scottish Government will continue to invest in that system and the infrastructure that supports it, including schools, colleges, universities, apprenticeships and our Innovation Centres to support our response to climate change.

The Scottish Government also allocated over £307 million to Enterprise Agencies in 2024-25 to help drive economic development. Our agencies focus on building a strong and diverse economy, which facilitates the transition to net zero. They provide a range of support for communities and businesses to help in their transition and to understand the climate risks and opportunities they face (as also set out in [Objective B1](#)).

In delivering their economic development remit Scotland's Enterprise Agencies will support consideration of climate risks and opportunities:

- **Enterprise Agency corporate planning** - Enterprise Agencies will incorporate an enhanced focus on adaptation in all forthcoming corporate plans as part of their wider approach to support the transition to a resilient, net zero economy. For instance, adaptation is an important priority addressed in Scottish Enterprise's [Net Zero Framework for Action](#).
- **Collaboration with adaptation partnerships** - Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will continue to play a valuable role as part of relevant, regional adaptation partnerships. As set out in [Objective C1](#), regional adaptation partnerships drive collaboration on adaptation planning and investment with a broad set of partners involved.
- **Enterprise Agency business support** – Enterprise Agencies will mainstream action adaptation into their wider net zero and sustainability advice (as set out in [Objective B1](#)), including in relation to supply chain resilience and business innovation opportunities (and [Objective B3](#)).

As Scotland's national economic development agency, Scottish Enterprise is central to a dynamic and innovative Scottish economy. To support more businesses to take adaptation action:

- **Scottish Enterprise conditional grant funding** – Scottish Enterprise will continue to explicitly link 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. Scottish Enterprise encourages the integration of adaptation measures as part of the development of these plans.
- **Scottish Enterprise infrastructure investments** - Scottish Enterprise's internal project appraisal processes will 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.

International trade is essential to ensuring Scotland has a globally competitive, flourishing economy. [Scotland's Vision for Trade](#), is our strategic approach to trade and sets out the principles which underpin our trade decisions and relationships. This strategy identifies the key interactions between climate and trade policies. Additionally, the Scottish Government's national export growth plan, [A Trading Nation](#), is our 10 year rolling programme that seeks to boost Scottish exports, particularly in areas of strength such as net zero technologies.

Climate change poses risk to the functioning of the strong, global supply chains and international trade routes that we rely on. This includes through increased exposure to climate hazards in key transportation channels, often known as maritime chokepoints, and causing disruption to the delivery of goods.

Recognising the importance of supporting climate-resilient trade to a thriving Scottish economy:

- **Free Trade Agreements** - 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 (FTA).
- **UK Government and International collaboration to improve global resilience of trade routes:** the Scottish Government will continue to pursue strong UK and International engagement on matters of trade and supply chain resilience. The Scottish Government recognises that a collaborative approach, based on strong multilateral and bilateral partnerships, will be key in responding to the evolving risks from climate change and to maximising opportunities to improve global trade resilience.

National economic analysis

Within the Adaptation Plan we have outlined the vision for a well-adapted Scotland, and policies which will take us towards this. As part of policy design, we have sought to understand the economic costs and benefits of our adaptation interventions. Quantifying the costs and benefits of adaptation interventions is a challenge faced not just by Scottish Government but globally. This is because:

- There is a high degree of uncertainty about the scale of future climate risks and thus the level of adaptation needed;
- The estimates of future adaptation costs and benefits vary given different future warming scenarios and the sectors and risks included.

It is widely accepted that adaptation action generally has near-term costs with benefits often expected to occur over the longer-term. In the below case study, of Scotland's trunk road network, we have explored this in more detail.

The Scottish Government will take a strategic approach to building the economic evidence for adaptation. This will support wider understanding not only of the losses avoided through adaptation intervention, but of the wide ranging economic, social, and environmental benefits for Scotland. We will conduct policy, cost and investment focused economic analysis:

- **Policy focused economic analysis** - we will undertake further analysis of the costs and benefits of adaptation interventions as detailed in the Adaptation Plan, with the aim of improving the degree of appraisal using Green Book methodologies where possible.
- **Cost focused economic analysis** - we will undertake analysis focused upon the costs of specific climate change risks, alongside the costs of climate change to specific sectors in Scotland.

- **Investment focused economic analysis** - to drive efficiency in the use of public funds, we will undertake mapping of current public sector spending on adaptation. This will act as the basis to identify interventions which require public, responsible private and blended finance.

Case Study: Cost benefit analysis - towards a well-adapted trunk road network

The Vulnerable Locations Operational Group scheme, which was set up to improve adaptation of our trunk road network, delivered six cost-effective actions in 2022/23. These actions are spread across Scotland with:

- A78 Seamill: upgrading of drainage system including upsizing eight pipes
- A76 West Polquhirter/ Brunton Farm: new filter drain system
- A75 Barlae: verge and filter drain works
- M80 River Carron to Haggs: drainage improvement scheme
- A889 Dalwhinnie
- A83 Rest and Be Thankful: Hillside watercourse realignment

Investment into a co-ordinated programme for adaptation of trunk roads is critical to protect the gross asset value of £27.6 billion.⁴ The delivery of adaptation schemes on the trunk road network has a budget of £6.1 million in 2024/25. With all adaptation measures there are upfront costs but these come with wide-ranging benefits including sustaining economic activity and, in the case of physical infrastructure, avoidance of future maintenance costs. Trunk Roads are crucial to the Scottish economy representing 6% of the total Scottish road network; 35% of all traffic and 60% of heavy good vehicles. Sustaining the quality of our trunk roads prevents damages caused by identified risks such as flooding, landslides, scour, high winds, high temperatures and coastal erosion.

Effective adaptation of the road network prevents indirect costs of supply-chain disruption for both businesses and households, whilst supporting wider sustainable transport programmes such as the Road Safety Framework and investment in active travel and bus prioritisation.

Financing adaptation actions

Supporting an economy which is not only capable of managing the impacts of climate change but one which is growing in an inclusive and sustainable way, will require financing lots of different types of adaptation action. This will include investment in measures to respond to immediate impacts, and to protect against future, anticipated climate changes.

In line with our [NSET](#) Team Scotland approach, building a more climate-resilient economy will require contributions from multiple actors. Ensuring public,

⁴ Transport Scotland Annual Report and Accounts 2022-23

responsible private and philanthropic investment and appropriately blending funding from these sources, will be crucial if we are to deliver the pace and scale of action required to support Scotland's climate resilience, economic growth, and a thriving society.

[Insights work](#) funded by the Scottish Government, and delivered by Adaptation Scotland, scoped opportunities to overcome well-recognised barriers to financing adaptation. This included identifying pathways to mobilise greater responsible, private investment in adaptation.

Transparency and scrutiny of the Scottish Government's public investment in adaptation action will be supported through the annual Climate Change Assessment of the Scottish Budget, an outcome of the Scottish Government and Parliament's Joint Review of the Budget on matters as they relate to climate.

To support the development of Scottish adaptation investment strategies over the lifetime of this Adaptation Plan the Scottish Government will:

- **Expert taskforce** - the Scottish Government will establish a short-life adaptation finance taskforce to bring together experts, recognising that closing the finance gap and successfully financing adaptation projects in Scotland will be accelerated by drawing on specialist knowledge and skills. This short-life taskforce will focus on focus on implementation opportunities of key actions identified in our adaptation finance [insights work](#).
- **Maximising synergies between nature finance and adaptation outcomes:** the Scottish Government's commitment to develop a Biodiversity Investment Plan for Scotland, which supports the delivery of the Scottish Biodiversity Strategy, will extend to encompass support for the Adaptation Plan. The Biodiversity Investment Plan will set out a suite of actions which will aim to mobilise public, private, and philanthropic finance. This work recognises that action which supports nature recovery is also key to supporting our resilience to climate change.
- **Mainstreaming of adaptation in existing and emerging codes** - the Scottish Government will explore opportunities to mainstream adaptation into existing market codes and standards, to support the grounds for adaptation outcomes to be identified and monetised. This will include integration of adaptation outcomes into existing codes and standards for nature and biodiversity markets, including the [Principles for Responsible Investment in Natural Capital in Scotland](#) and forthcoming initiatives including the Natural Capital Market Framework.
- **Develop high integrity, values-led adaptation markets** - recognising adaptation responses extend beyond nature-based approaches, the Scottish Government will consult with investors on the establishment of distinct

adaptation market codes and standards, as a means of supporting values-led engagement between project developers and the private sector.

- **Blended finance for adaptation projects** - to drive efficiency in the use of public funds and encourage partnership in the development of projects designed to deliver transformative change, the Scottish Government will explore how blended finance models could be used to support adaptation action. Blended finance model involves combining public and private capital for projects, with public funds used strategically to encourage this co-investment from private sources. This has been demonstrated conceptually through the [Adaptation Scotland, Craigleith Retail Park case study](#).
- **Grant funds for project development** – to maximise adaptation finance opportunities, the Scottish Government will explore how existing grant funding schemes could integrate a focus on measuring and delivering adaptation outcomes, including in any future rounds of [The Facility for Investment Ready Nature in Scotland \(FIRNS\) scheme](#), as a means encouraging responsible, private investment. This will support understanding for future grant schemes on how technical assistance can best support in moving projects with an adaptation benefit, from a concept to an investable business model - and if this can support increased confidence for potential private finance providers.
- **Infrastructure Investment Plan** – The Scottish Government's [Infrastructure Investment Plan 2021-22 to 2025-26](#) sets out our long term vision for infrastructure in Scotland, which supports the transition to net zero emissions, drives inclusive economic growth and builds resilient and sustainable places. It recognises in response to climate change, we need to adapt current infrastructure and design future assets to be more resilient, that we need to invest in natural infrastructure and nature-based solutions to climate change, which also help to tackle biodiversity loss and create wider socioeconomic benefits.

The Scottish financial services sector has a critical role to play in supporting Scotland's transition to a greener, fairer and growing economy. The financial services sector can show leadership on adaptation, and exert positive influence, through consideration of climate risks and opportunities in how they chose to lend, invest and insure.

To support the conditions for climate-resilient decision-making by investors and businesses action will include;

- **Climate Risk Disclosures** - the Scottish Government will engage with UK Government on work to further improve reporting via climate related financial disclosures. The largest businesses in Scotland are now required to disclose climate risks as part of the UK's Sustainability Disclosure Requirements, and as previously outlined by the [Task Force on Climate-Related Financial](#)

[Disclosures](#) (TFCD) framework. The Scottish Government recognise climate risk disclosures are a key lever for raising awareness among private sector organisations, particularly financial institutions, of climate change risks to assets and operations. Increased visibility of disclosure information over the lifetime of the Adaptation Plan, may also act to encourage businesses to develop adequate plans to minimise their exposure and sensitivity to climate risks.

- **UK Green Taxonomy** - as part of providing investors with clarity on the sectors, and activities, that make a substantial contribution to climate change, the Scottish Government will work with the UK Government to ensure adaptation is effectively integrated into the UK Green Taxonomy, as set out in the UK Government's Green Finance Strategy. We are supportive of the principle-based approach to undue harm, noting that activities, must not hinder net-zero or nature ambitions, or prompt maladaptation.
- **SNIB climate risk assessments** - the Scottish National Investment Bank (SNIB), established by the Scottish Government as the UK's first mission-oriented investment bank in 2020, invests in line with its net-zero mission and will continue to consider climate risk across all their investments. The Bank invests in line with its three missions and considers climate risk across all of its investments. This consideration forms the basis for incorporating climate change risk and opportunities into the Bank's investment evaluation and due diligence process. Through its due diligence process the Bank;
 - 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.
 - aligns with internal and external climate reporting, including through the adoption of the Task Force on Climate-related Financial Disclosures framework.

To foster greater collaboration and communication with the sector on adaptation and climate resilience, including discussion on adaptation finance and insurance we will take the following steps;

- **FiSGAD engagement on adaptation finance and climate risk** - the Scottish Government, through the Financial Services Growth and Development Board (FiSGAD), will engage with the Scottish financial sector on adaptation finance and climate risk, as part of our continued engagement on key issues and opportunities facing the sector. As the Scottish Government's main forum for engagement with the sector FiSGAD, discussions will focus on identifying appropriate action to be taken by the sector and/or government with regards to adaptation finance and climate risk.

- **Engagement with UK public financial institutions** -the Scottish Government will pursue engagement with the UK public financial institutes, including the UK Infrastructure Bank, on adaptation finance.

Public Procurement

Public sector organisations play an important role in economic development and community wealth building as employers, commissioners but also importantly as purchasers of goods, services, and infrastructure. The Scottish public sector spends £16 billion a year buying goods, services and works.

Sustainable procurement can act as a lever for the Scottish Government and the public sector to drive resilience and adaptation action. This includes through action to support the resilience of supply chains for vital goods procured by the public sector and ensuring procurement on long-term investments, for instance around infrastructure, consider future climate scenarios and 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. All public bodies in Scotland must publish an organisational procurement strategy setting out how it will comply with the duty.

To support greater consideration of adaptation in public procurement activity, including the resilience of public sector supply chains from climate risks:

- **Sustainable Procurement Tools for the public sector** - the Scottish Government will continue to maintain and promote the [Sustainable Procurement Tools](#), including Climate Literacy and Circular economy eLearning and guidance, 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 adaptation and mitigation in their procurements.
- **Analysis of climate risks to national collaboration frameworks** – building on risk management exercises that were conducted relating to previous supply chain shocks, the Scottish Government will recommence work to map climate risks to [national collaborative frameworks](#) to establish potential vulnerabilities by 2025.
- **Implementation of Public Procurement Strategy** - the Scottish public sector will continue to implement the [Public Procurement Strategy for Scotland](#), its focus is 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.

- **Climate and Procurement Forum** - the Scottish Government will work collaboratively through the cross-sectoral Climate and Procurement Forum, to provide leadership on addressing climate challenges through procurement.

Regional economic development

While national economic development approaches were previously set out under this objective, the Scottish Government recognises the impacts of climate change will be felt differently across our regional economies. It is therefore vital that we support effective regional action and do so in ways that fairly respond to the needs of communities.

A just transition means becoming a net zero, climate resilient economy in a way that seeks to tackle inequality and injustice. This includes ensuring economic development and growth is supported in all of Scotland:

- **Regional Just Transition Plans** - the Scottish Government will develop an approach to Regional Just Transition plans over the course of 2025. It will outline challenges and opportunities faced by regions and identify appropriate action to both mitigate and realise these. We will work with key partners, including the Just Transition Commission, existing regional partnerships, and local authorities, to explore options.
- **Rural Delivery Plan** - the Scottish Government will publish a Rural Delivery Plan within the lifetime of the current parliament. The Rural Delivery Plan will set out the actions that the Scottish Government is and will be taking which impact rural communities, placing a new focus on rural delivery.

A complimentary approach is Community Wealth Building which aims to create the conditions that supports our entrepreneurs and businesses to thrive, grow and create wealth that improves not only their business resilience and viability but that of our local economies, and supports sustainable local supply chains.

Case Study: Community Wealth Building, North Tolsta (Tolastadh bho Thuath) Wind Turbine

North Tolsta on the east side of the Isle of Lewis derives revenue from a community owned wind turbine. This supports several local jobs and important community organisations. Tolsta Power Ltd owns and operates a 900kW Enercon E44 wind turbine. It has been supplying power to the grid since 2013. The land where the turbine is sited is owned by The Stornoway Trust, the democratically elected community landlord. Comhairle nan Eilean Siar officials cite this enterprise as a CWB success. It may have happened without the policy. However, adoption of the policy has an aggregator effect that can scale up activity like this across the Highlands and Islands. Profits from the turbine support:

- community purchase of the local shop and post office and providing revenue assistance with on-going running costs
- establishing a community polytunnel to provide fresh vegetables to the community shop

- supporting fuel poverty interventions including support payments to every household in the community
- supporting housing minor works scheme (replacing windows, doors etc.)
- providing student bursaries and supporting driving lessons
- supporting local village organisations including the Tolsta Youth Club, children's playpark, Church summer club and Tolsta Cemetery Trust.

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.

- **Regional Climate Economic Opportunity Assessments** – the Scottish Government will explore support for regional adaptation partnerships to undertake regional climate change economic risk and opportunity assessments over the period of the Adaptation Plan. This will help identify implications for sectors of regional importance, and ensure the opportunities associated with adaptation can be realised and action.

Regional and City Region strategies sit across NSET, and are vital to inclusive, economic development and will be key to delivering a more climate resilient economy through:

- **Regional Economic Partnerships** - Scotland's Regional Economic Partnerships (REPs) bring together key economic actors to enhance regional interests, focus and align resources, and 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.
- **City Region and Growth Deals** – the Scottish Government invests in City Region and Growth Deals as a core part of our work to grow regional economies. Each deal is tailored to its region, reflecting its individual economic strengths and weaknesses, and comprises a programme of interventions to support positive, transformative change. The Scottish Government encourages all deal projects to apply a Community Wealth Building lens to investment and spending activity.

The below case study sets out how adaptation action is considered in regional economic strategies.

Case Study – Regional Economic Partnership and City and Region Deals

Regional economic strategies recognise 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:

- Climate adaptation and resilience is embedded within the [Glasgow City Region Economic Strategy](#), and the region's wider approach to economic development. One of the three missions of the Strategy is that by 2030, "the Region will have the most advanced city-region economy in the UK in the race to net zero and climate resilience". This commitment is reflected in the programmes being taken forward through the [Regional Economic Strategy Action Plan](#). This includes Clyde Mission, a place based mission to make the River Clyde an engine of economic success. A strategic masterplan is underway to help form and guide an investment and implementation programme which will embed climate resilience and adaptation. Climate resilience also features strongly within the Glasgow City Region's [Sustainable Procurement Strategy](#), which aims to encourage resilience within the supply chain to ensure businesses can deal with vulnerabilities caused by climate change. This approach to economic development reflects the close alignment between the City Region's Economic Strategy, and the [Climate Ready Clyde Adaptation Strategy](#). It also responds to the regional [Climate Risk and Opportunity Assessment](#), which highlighted the potential for climate change to pose annual economic costs to the region of several hundred £million/year by the 2050s without adaptation action.
- An ambition for South of Scotland is 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 Inclusive Growth Deal 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 region's natural capital, focussing on the marine, agriculture, and forestry sectors. The dairy sector plays an important role in the South of Scotland and work is underway to establish a new Dairy Innovation Centre that will drive transformational research and innovation to decarbonise the dairy sector and move it towards a circular bioeconomy.
- A number of opportunities are being explored by Edinburgh and South East Scotland to support adaptation and the transition to a zero-carbon emission region. These include exploring sustainable modern methods of construction, utilising 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.
- The North East of Scotland aim 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 in their strategy. Ayrshire intend to better understand the natural capital that exists across the region and to develop a regional energy masterplan.

Food Security

Climate change poses an increasing risk to food production, safety and affordability, in Scotland and around the world.

The loss of resilience for food imports is an increasing risk in Scotland, as climate impacts intensify internationally. Many countries, including those in Europe, are already struggling with the effects of climate change. As such, the international food sources we have always assumed are available may not continue to be so. This has resulted in the weather-related fresh produce shortages we have seen in supermarkets in recent years, and can have implications upon the costs of nutritious food in Scotland. Affordability is a barrier to being able to eat a healthy and balanced diet. When the price of fresh, healthy produce increases due to climate induced supply shocks, it can disproportionately affect lower-income households and widen health inequalities.

Work is underway in Scotland to try to improve food security and preparedness including from climate-related shocks:

- **Food security unit** –following a recommendation from the Short-life Food Security and Supply Taskforce, that Scottish Ministers established together with industry in the immediate wake of the Ukraine conflict, a new, dedicated Food Security Unit has been established in the Scottish Government. The Food Security Unit will ensure food security is considered in the development of wider Scottish Government policy.
- **Food security monitoring** – the Scottish Government’s Food Security Unit is developing an evidence-based system to monitor risks or threats to the supply chain to help mitigate future shocks and impacts on food security.
- **Food security research** - the Scottish Government will continue to draw on new insights from the [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, while minimising the increasing threat from pests and disease, to support the food and drink industry.
- **International collaboration on food security** – the Scottish Government will strengthen its 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. This includes for example via the International Food Summit held in Scotland in June 2024.
- **Promoting local food** - the Scottish Government [Local Food Strategy](#) brings together strands of work that support the local food agenda via three pillars: connecting people with food; connecting Scottish producers with buyers; and harnessing public sector procurement. The strategy outlines current action to support locally-based production and circular supply chains, cut food miles

and enable more people to grow and eat food locally, which offers benefits for adaptation, sustainability, equality and health outcomes.

- **Community food organisations:** As set out in [Scotland's Diet and Weight Delivery Plan](#) the Scottish Government continues to invest in community food organisations, which supports those facing food insecurity to access healthy food in a dignified way. Community food organisations are an important asset during times of rising food prices, can help increase local food production and improve access to fresh healthy food for all.
- **Good Food Nation** – Under the [Good Food Nation \(Scotland\) Act 2022](#) Scottish Ministers, health boards, and local authorities, are required to prepare Good Food Nation Plans. The importance of: sustainable food systems; resilient supply chains; and availability of high quality, nutritious and culturally appropriate food are principles that require to be taken into account as part of this.
- **Scottish Government statement on food security** – the [Agriculture and Rural Communities \(Scotland\) Act 2024](#) introduces a requirement for the Scottish Ministers to, prepare and lay before the Scottish Parliament a statement on food security in Scotland, not less than once in every period of 3 years. It also requires Scottish Ministers to have regard for the need for sustainable food systems and supply chains in delivering food security, when preparing or amending a rural support plan.
- **Critical National Infrastructure (CNI) and food** – the Scottish Government is working closely with the other UK nations to build more structure and formality to support UK-wide working on emergency food planning and resilience. The Scottish Government is also working to better understand critical inputs that may impact food security in Scotland.

Food Safety

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 takes account of these impacts.

To protect the safety of food produced and sold in Scotland from the impacts of climate change:

- **Ensure businesses understand the risks and comply with food safety laws** – FSS will continue to work with local authorities to implement official controls that ensure food is produced safely; providing support to businesses through specific guidance on the control of food safety risks. This includes bacterial pathogens and natural toxins that are impacted by weather events.
- **Strengthen horizon scanning and surveillance of the food chain** – FSS will continue to invest in horizon scanning and surveillance activities to help identify and understand new and emerging risks to domestically produced and imported foods, including those which may arise due to the impacts of climate change.
- **Monitor trends in foodborne illness** – FSS will continue to work with Public Health Scotland (PHS) to monitor trends in reported foodborne illnesses, such as Campylobacter and Salmonella infections; including work to understand associations with changes in weather patterns and adverse weather events, to support measures which help to protect the public from exposure risks.
- **Collaboration on food safety research needs** – FSS will continue to collaborate with the [RESAS Strategic Research Programme](#), the Food Standards Agency, 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.
- **Support innovative approaches for strengthening the resilience of Scotland's food chain** – FSS will continue to work with the Food Standards Agency to assess the safety of novel food and animal feed products, production systems and packaging innovations which help to promote sustainable, secure supply chains and reduce the environmental impacts of food production; enabling them to be placed on the market.

Medical supply chain resilience

A healthy, thriving population is key to our economy. Alongside other major geopolitical risks, such as conflicts, inflation, and global instability, climate change presents a major potential risk to NHS supply chains that has to be kept under review.

Climate change presents significant risks to supply, as global temperatures and increasing severe weather, can prevent transportation, change manufacturing conditions and affect the whole chain of many vital medical goods.

To ensure a continuous supply of vital medical equipment, and to assess any risks that may disrupt this supply:

- **Surveillance of medical supply chains** – NHS National Procurement will continue to routinely monitor supply chain resilience to ensure there is a

continuous supply of vital medical equipment and to assess any risks that may disrupt this supply, including from climate hazards. All potential suppliers have to undergo stringent assessments of their capability to maintain supply, in the event of any disruption before being awarded a place on national procurement frameworks. This assessment incorporates an assessment of climate risks.

- **Diversity of medical stocks and supply** – NHS National Procurement will collaborate with suppliers to continue to identify potential risks, including emerging threats posed by climate change, with risks prioritised based on severity and likelihood. NHS National Procurement maintain stock levels that consider identified risks and allow for disruptions within a certain timeframe (contingent timescales). This helps to buffer against short-term supply chain issues. The product portfolio is tracked by country of origin, allowing for quick identification of potential problems based on geographical factors.
- **Sustainable Procurement Tools and guidance** – as outlined in the [NHS Scotland Climate Emergency Strategy](#), the Scottish Government has provided tools and guidance to assist all public bodies, including NHS Scotland, in fulfilling sustainable procurement duties. Both the Scottish Government and the NHS will continue to work together, not only to make sure that supply chains are not disrupted due to the impacts of climate change, but to ensure their own supply chains reduce carbon emissions as much as possible.

Food and drink industry supply chain resilience

Risks to agricultural production, distribution networks and food safety mean Scotland's important food and drink industry is particularly exposed to the impacts of climate change.

The industry is of significant economic value to Scotland - representing £5.4 billion in Gross Value Added (GVA) and is Scotland's third largest sector employing some 129,000 people, many in our rural and island communities.

Enhancing the resilience of the food industry from climate impacts will require both industry-led action and Scottish Government support.

To support the resilience of the food and drink industry from climate impacts;

- **Scotland Food & Drink Industry Strategy** – Scotland Food & Drink's industry strategy '[Sustaining Scotland, Supplying the World](#)' recognises resilience as an overarching mission over the next ten years. As part of the strategy activity, a cross-Partnership team has been created to provide practical interventions to support the sector in making a just transition to net zero, helping to ensure that it has the resources and expertise required to sustain prime environmental credentials.

- **Scotland Food & Drink supply chain security work** – Scotland Food & Drink will take forward a Supply Chain Security programme of work 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 includes conducting an ongoing assessment of industry wide resilience and food security, undertaking research and pathfinder work on factors such as logistics and processing and developing an import substitution initiative.
- **Investment in Scotland Food & Drink Strategy** – the Scottish Government will support investment in delivery of the Scotland Food and Drink Partnership’s industry strategy, including the specific Supply Chain Security programme of work. To date the Scottish Government has invested £10 million (Year 1 - £5 million and Year 2 - £5 million) of funding to support the delivery of the strategy.

Supply of critical raw materials for Scotland’s energy transition

Our transition to a net-zero and climate-resilient economy will rely on the secure and adequate supply of critical raw materials (minerals and metals) and technologies which form the basis of many industrial supply chains.

Insights from Scottish Enterprise have shown materials Scotland requires to support our energy transition and economic growth are experiencing supply security risks –including from exposure to climate hazards and related supply chain disruption. For instance, copper and lithium, which are of high importance to wind energy, EVs and battery storage, are particularly vulnerable to water stress, given their high water requirements. Over 50% of today’s lithium and copper production is concentrated in areas of the world with high water stress levels, which will increase under climate change. To increase resilience:

- **Green Industrial Strategy** – Scottish Government strategies supporting our economic transition to net-zero will recognise supply chain vulnerabilities for critical raw materials and the need to support resilience, including the Green Industrial Strategy. The Green Industrial Strategy forms a core part of our [National Strategy for Economic Transformation](#), and sets out economic opportunity areas for Scotland from the global transition to net zero.
- **Circular economy** – the Scottish Government will explore how best to build supply chain resilience through recycling and remanufacturing to help deliver a Circular Economy. This will include supporting remanufacturing, recovery, reuse, and recycling to support economic resilience and mitigate risks associated with critical raw material and technology access.
- **Supply chain vulnerabilities research and mapping** - over the course of this Adaptation Plan the Scottish Government will take a continued and collaborative approach to research, working with partners including Enterprise

Agencies, UK Government and our research institutes, to better assess the implications of different climate scenarios on our supply chains for vital goods and materials. Through this work we will support opportunities to share relevant analysis and insights with businesses.

- **UKG and International collaboration** – the Scottish Government will engage with the UK Government and international partners on supply chain resilience, recognising a collaborative approach is required to respond to global challenges and in order to identify opportunities to improve global supply chain resilience.

Transportation and Distribution

Transportation and distribution are key to sustaining economic activity, as demonstrated in the [case study of costs benefit analysis of adaptation action on our trunk road networks](#). Our transport networks ensure goods, foods and vital supplies can move across Scotland and support international exports.

As detailed in [Objective PS4](#) climate change will continue to place our transportation and distribution networks, under strain. This has implications for economic growth, stability and ensuring equal access to essential goods.

Detail to support a more climate-resilient transport and distribution systems, can be found in [Objective PS4](#). Support in managing risks to distribution networks from climate impacts includes:

- **ACCAR** - Transport Scotland (TS) will implement their [Approach to Climate Change Adaptation and Resilience](#) (TS ACCAR) and the vision for a transport system that is resilient to weather related disruption.
- **Trunk Road Adaptation Plan** – Transport Scotland will develop a Trunk Road Adaptation Plan, which identifies areas of the trunk road network vulnerable to the impacts of climate change and a programme of interventions.

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. Over the past few years, the world has seen records consistently broken for the hottest and driest summers, widespread and 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, with those who are least able to adapt and the most impacted.

Scotland is a small country, but we are an open and outward looking nation which aims to put people at the heart of our international climate action. We act in solidarity with the Global South to build their capacity to adapt to the impacts of climate change not just to survive, but to thrive. We hold leadership roles in international networks and coalitions, and we use these to drive ambition and action on adaptation, strengthen networks to share knowledge and expertise, and to provide a platform for our partners in the Global South and other states and regions. This supports efforts to adapt to a changing climate, demonstrating the action taking place at the subnational level, while putting pressure on national governments to keep to their commitments set out in the United Nations Paris Agreement, the UAE Framework for Global Climate Resilience 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. We have much to share to support our partners on their own journeys in building their climate resilience. However, we know we have a lot to learn from other governments to inform our own policy making and delivery, particularly from communities experiencing the worst of the climate crisis facing similar challenges to us here in Scotland. We strongly believe that only through international cooperation, with climate justice at the heart of that climate action, will we successfully secure a climate resilient future.

Our response to the changing climate is aligned with the UN Sustainable Development Goals, 17 goals providing a blueprint for peace and prosperity for people and planet both now and into the future. The 2030 Agenda for Sustainable Development was adopted by all UN member states in 2015. The figure below indicates how the Adaptation Plan outcomes contribute to these goals.



Figure 21: UNSDGs and SNAP3 Outcomes

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.

There is a great deal of nuance required when discussing climate adaptation, climate justice and loss and damage in the international sphere. For a note on definitions, please see [Annex D](#).

Objective: Vulnerable communities (IA1)

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

SG Directorate lead: DECC/DEAC

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 often 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. We will deliver through:

- **Scotland's Climate Justice Fund (CJF)** – the world's first such fund and recently trebled to £36 million fund, this 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 \(CJC\) 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 (CJRF) 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 have been supported 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 helped to protect and address their rights and needs. During COP27, an additional £5 million was pledged to specifically 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. We are committed to creating gender-responsive policies and programmes which centre the rights of women and girls.

Case Study: Pacific Islands

As part of the original £1 million of loss and damage funding awarded to CJRF, a \$225,000 grant was provided to the [Unitarian Universalist Service Committee \(UUSC\)](#) between 2021 and 2023 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 organization undertook through subgrants from UUSC. Design activities include youth organizing 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.

Case Study: Malawi – rebuilding resiliently after Cyclone Ana

As part of the original £1m of loss and damage funding awarded to CJRF, a \$200,000 grant was provided to Churches Action in Relief and Development (CARD) in 2022 to support the communities in the Chikwawa district in Malawi devastated by Cyclone Ana. 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 a first round of goats which are supported by veterinary services and livestock insurance. Offspring are then passed on to a predetermined second set of families. These interventions were identified by community members during a community-level assessment of the loss and damage they experienced after Cyclone Ana.

Objective: International advocacy (IA2)

Scotland is a committed advocate in international fora for those most affected by climate change and with the smallest capacity to adapt, and for increased international ambition on adaptation and biodiversity loss.

SG Directorate lead: DECC/DEAC

The Scottish Government is committed to using its influence as an international actor to raise global ambition on addressing climate risks and biodiversity loss globally. We are a key voice in sub-national fora, such as the Regions4 Network and

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.

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 taking place - is recognised, with further inclusion for non-party governments in UN processes. The Scottish Government will 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; and
- **Ensure that adaptation is a key outcome** for all international engagement before, during and after COPs.
- **Alignment with international adaptation goals and related strategies** – Scotland will, where possible, ensure we are aligned with global adaptation and biodiversity frameworks, for example:
- **UNFCCC** – Scotland will continue to have regard to the UNFCCC when setting our emissions reduction pathway, and align with adaptation commitments set out in the Paris Agreement.
- [UAE Framework from Global Climate Resilience](#) – Agreed at COP28 in Dubai, the UAE Framework positions climate adaptation as a top priority for all nations. It expands the Global Goal on Adaptation to present a comprehensive approach to enhance adaptive capacity, strengthen resilience and reduce vulnerability. SNAP3 aligns well with key sectors prioritized in the framework (water, food and agriculture, infrastructure, health, ecosystems, livelihoods and cultural heritage) and in its goals for a developed monitoring and evaluation system. Scottish Government will continue to align with the Framework as much as possible through the delivery of SNAP3.
- **Locally-Led Adaptation Principles** (see [Annex C](#)) – the Scottish Government will endorse and support the 2021 Locally Led Adaptation Principles developed by the World Resources Institute and the International Institute for Environment and Development.

- **EU Strategy on Adaptation to Climate Change** – in line with Scottish Government’s ambition to collaborate on a number of issues on the EU agenda, where possible, Scottish Government will align with the [2021 EU Strategy on Adaptation to Climate Change “Forging a Climate-resilient Europe”](#) and engagement with the associated Climate-Adapt platform.
- **Carbon Disclosure Project** - annual transparency reporting feeding into the CDP report, with the data utilised by the [UNFCCC’s Global Climate Action Portal](#) which recognises 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 a dedicated Decision and renewed Plan of Action on Subnational Governments, ensured that the voices of all levels of government – sub-state, regional and local - are embedded within the Global Biodiversity Framework (GBF), and signalled a step up in global ambition. We continue to engage with the CBD through our membership of their Advisory Committee on Subnational Governments. We will 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 Scottish Biodiversity Strategy and Delivery Plan.

International engagement

Scotland will use our leadership position within the international climate community to influence and engage with international counterparts, including national governments, to drive multilevel action on climate change adaptation and mitigation.

Understanding that ambitious climate action and implementation is often taken by devolved, state and regional governments and that we have much to learn from one another, Scotland will continue to place a strong emphasis on knowledge sharing and capacity building between states and regions, via our membership of international coalitions. The Regions4 Network and the Under2 Coalition form the two key pillars of Scotland’s international capacity building engagement.

- **Regions4 Sustainable Development Network** - Scotland was elected President of Regions4 in 2024 and will serve until at least 2026. Regions4 is an international network of subnational governments committed to halting biodiversity loss, pioneering climate change adaptation, and fostering

sustainable development at a regional level. Scotland's Presidency is focused on delivering strong political leadership to maximise devolved state and regional government's role and influence within international fora. This will be achieved, in part through strengthening the network's policy offer to support knowledge exchange and capacity building, developing substantive policy and advocacy positions for international engagement, and effectively representing the priorities of our members.

- The Regions4 position paper "*The Rio Declaration*", ratified at Scotland's first Regions4 General Assembly as President, details the network's advocacy and engagement approach to progressing international action on adaptation, nature and biodiversity.
- As a member, Scotland sat on the Steering Committee and 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.
- Throughout the lifetime of the Plan, we will continue to work and develop the Network's adaptation action
- We will leverage our reputation as a leader within the devolved and subnational climate action movement, and the wealth of lessons from our co-chairing of the Under2 Coalition to ensure our Presidency is as effective and influential as possible
- **The Under2 Coalition** - Scotland is currently in its second term as the European co-chair of the Under2 Coalition (2022-24), an international coalition of 178 climate ambitious state and regional governments from the Global North and South. As Co-Chair, Scotland is responsible for the strategic direction of the region as well as high level engagement with other regions' Co-Chairs on Coalition priorities and policy focus. Over our two terms, we have driven climate ambition across the Coalition, leading on a number of new projects, such as:
 - an updated 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.
 - The establishment the coalition's Net Zero Future's Policy Forum, which we co-chair with New South Wales.
 - Establishing the annual European Ministerial meeting, hosted at the Scottish Government hub in Brussels.
 - Partnering with the Coalition's Future Fund to financial support Global South attendance at international climate events.
 - In our third term as European co-chair, we will seek to build upon our existing legacy to deliver upon some of the following ambitions:

- Continuing to push for the inclusion of devolve, state and regional government's role and influence, including by more closely aligning Under2 and Regions4 to strengthen a collective subnational voice
- Advocating for key governments to produce Nationally Determined Contributions for COP30
- Driving forward work on the just transition from fossil fuels, and on climate finance.
- **Local Governments and Municipal Authorities (LGMA) Constituency** - the LGMA is a constituency within the UNFCCC, representing the voice of subnational and local governments. 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 positions 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 was considered as part of the development of the UAE Consensus document.
- **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 has helped grassroots and indigenous women leaders to access funding to scale up climate solutions in Global South countries.

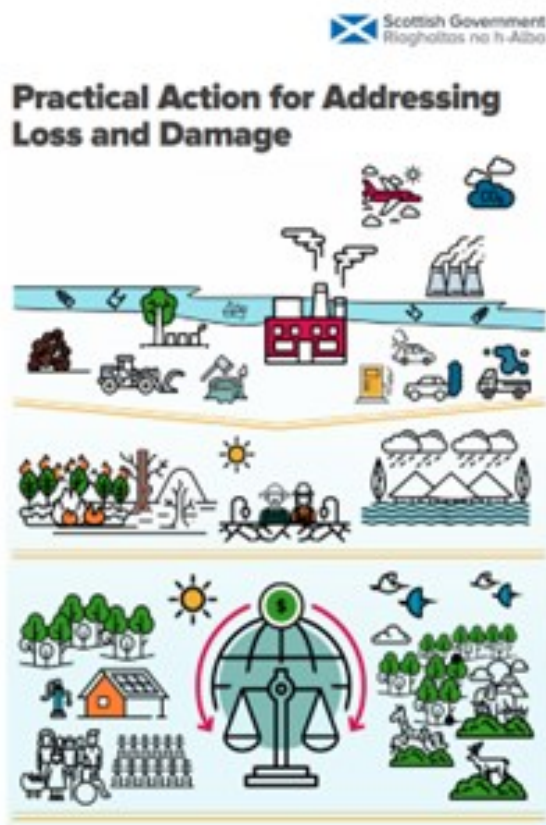
Objective: A global hub for adaptation research (IA3)

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.

SG Directorate lead: DECC/DEAC

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.



Case Study: Best practice for Addressing on Loss and Damage

Ahead of hosting COP26, the Scottish Government 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. The report was produced by the Scottish Government in collaboration with IIED. In March 2024, Scottish Government hosted an international workshop with partners SLYCAN Trust, to discuss how best to advance equitable access to climate finance and loss and damage funding.

Figure 22: Front cover of Practical Action for Addressing Loss and Damage report (SG, 2023)

Research Expertise

- **Expert network** – the Scottish Government will establish a network of adaptation experts across Scotland and map links to international institutions and research networks.
- **Research consortium** - the Scottish Government and relevant partners will host an international adaptation research consortium event to share Scottish research expertise and good practices from international counterparts.
- **Centres of Expertise** – The Scottish Government funds five centres of expertise in areas of high policy importance and relevance to the adaptation agenda: 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. In 2024/25 £7 million is provided in total to the five centres. The Centre of Expertise for climate change – ClimateXChange (CXC) - 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. Examples of CXC research include:

- A scoping study on international climate justice, conflict and gender ([CXC, 2022](#))
- An assessment of options for adapting Scottish agriculture to a changing climate ([CXC, 2023](#))
- Examining the impact of climate change and ocean acidification on target fish stocks to inform fisheries policy ([CXC, 2024](#))
- **Science Evidence Data and Digital (Marine Directorate) and the Marine Alliance for Science and Technology Scotland (MASTS)** - the Science, Evidence, Data and Digital portfolio of Marine Directorate has over one hundred years' experience delivering high quality science and advice on Scotland's rivers and seas. Marine Directorate collaborates closely with experts across academia and research organisations. Within Scotland, 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 decision making.
- **James Hutton Institute (JHI)** – 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, community resilience and water resilience 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 evidence base** - Over the period of the Plan, 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.

Annexes

Annex A – UKCCRA3 climate risks and opportunities

The following climate risks and opportunities are identified by the [UK Climate Change Risk Assessment 2022](#). In line with section 53 of the Climate Change (Scotland) Act 2009, the Scottish National Adaptation Plan 2024-29 sets Scottish Ministers objectives in relation to adaptation to climate change and a programme of policies which address these risks.

Risks scored “more action needed”:

- N1: Risks to terrestrial species and habitats from changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)
- N2: Risks to terrestrial species and habitats from pests, pathogens and invasive species
- N4: Risk to soils from changing climatic conditions, including seasonal aridity and wetness.
- N5: Risks to natural carbon stores and sequestration from changing climatic conditions, including temperature change and water scarcity.
- N6: Risks to and opportunities for agricultural and forestry productivity from extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion).
- N7: Risks to agriculture from pests, pathogens and invasive species
- N8: Risks to forestry from pests, pathogens and invasive species
- N11: Risks to freshwater species and habitats from changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts.
- N12: Risks to freshwater species and habitats from pests, pathogens and invasive species
- N14: Risks to marine species, habitats and fisheries from changing climatic conditions, including ocean acidification and higher water temperatures.
- N16: Risks to marine species and habitats from pests, pathogens and invasive species
- N17: Risks and opportunities to coastal species and habitats due to coastal flooding, erosion and climate factors
- I1: Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures
- I2: Risks to infrastructure services from river, surface water and groundwater flooding

- I5: Risks to transport networks from slope and embankment failure
- I12: Risks to transport from high and low temperatures, high winds, lightning
- H1: Risks to health and wellbeing from high temperatures
- H3: Risks to people, communities and buildings from flooding
- H4: Risks to people, communities and buildings from sea level rise
- H6: Risks and opportunities from summer and winter household energy demand
- H11: Risks to cultural heritage
- H12: Risks to health and social care delivery
- H13: Risks to education and prison services
- B1: Risks to business sites from flooding
- B2: Risks to business locations and infrastructure from coastal change from erosion, flooding and extreme weather events
- B6: Risks to business from disruption to supply chains and distribution networks
- ID1: Risks to UK food availability, safety, and quality from climate change overseas
- ID4: Risks to the UK from international violent conflict resulting from climate change on the UK
- ID5: Risks to international law and governance from climate change overseas that will impact the UK
- ID9: Risk to UK public health from climate change overseas
- ID7: Risks from climate change on international trade routes
- ID10: Risk multiplication from the interactions and cascades of named risks across systems and geographies

Risks scored “further investigation”:

- N18: Risks and opportunities from climate change to landscape character
- I3: Risks to infrastructure services from coastal flooding and erosion
- I4: Risks to bridges and pipelines from flooding and erosion
- I6: Risks to hydroelectric generation from low or high river flows
- I7: Risks to subterranean and surface infrastructure from subsidence
- I10: Risks to energy from high and low temperatures, high winds, lightning
- I13: Risks to digital from high and low temperatures, high winds, lightning
- H5: Risks to building fabric
- H7: Risks to health and wellbeing from changes in air quality
- H8: Risks to health from vector-borne diseases
- H9: Risks to food safety and food security
- H10: Risks to health from water quality and household water supply
- B3: Risks to businesses from water scarcity

- B5: Risks to business from reduced employee productivity due to infrastructure disruption and higher temperatures in working environments
- Risks scored “Watching brief” or “Sustain current action”:
- N10: Risks to aquifers and agricultural land from sea level rise, saltwater intrusion
- I9: Risks to energy generation from reduced water availability
- I11: Risks to offshore infrastructure from storms and high waves
- I8: Risks to public water supplies from reduced water availability
- B4: Risks to finance, investment and insurance including access to capital for businesses
- ID8: Risk to the UK finance sector from climate change overseas
- ID3: Risks to the UK from climate-related international human mobility

CCRA3 opportunities regardless of urgency scoring:

- N3: Opportunities from new species colonisations in terrestrial habitats
- N9: Opportunities for agricultural and forestry productivity from new/alternative species becoming suitable
- N13: Opportunities to freshwater species and habitats from new species colonisations
- N15: Opportunities to marine species, habitats and fisheries from changing climatic conditions
- H2: Opportunities for health and wellbeing from higher temperatures
- B7: Opportunities for business from changes in demand for goods and services
- ID2: Opportunities for UK food availability and exports from climate impacts overseas
- ID6: Opportunities from climate change (including arctic ice melt) on international trade routes

Annex B – Impact Assessments

Introduction

- Not a single area of Scotland will remain unimpacted by the effects of climate change.
- As a nation, we must adapt. However, we must ensure we do so in a way that considers the impact of the plan on all areas of our society. From our environment to our economy to our people, we must ensure everyone is considered and included in this journey to help shape climate-resilient places.
- As part of the preparation of SNAP3, a number of impact assessments have been carried out to identify potential impacts of the Adaptation Plan on a wide range of areas. These were also consulted on as part of the 12-week consultation on the Adaptation Plan which took place in January-April 2024. The assessments include a Strategic Environmental Assessment, [Joint Equalities Impact and Fairer Scotland Duty Assessment](#), [Island Communities Impact Assessment](#) and [Business and Regulatory Impact Assessment](#). The assessments consider positive, negative and neutral impacts the Adaptation Plan may have, intentionally or consequentially and how the Plan fits into the wider Scottish, UK and international landscape. The EQIA, FSDA, ICIA, CRWIA and BRIA provide revisions of the draft impact assessments based on pre-existing evidence to integrate the consultation findings into a comprehensive picture of the impacts of the Adaptation Plan. Where feasible, recommendations from the draft impact assessments and consultation responses relating to the impact assessments have been actioned. The links to each Impact Assessment can be found at the end of this Annex.
- As a first, and recognising the impacts of climate change on health and wellbeing, Public Health Scotland also conducted a Health Impact Assessment of SNAP3 which will be published on their website [link].
- Climate change has the potential to exacerbate existing inequalities, damage our natural environment and impact the viability of our businesses. By conducting these impact assessments and integrating that the responses are as far as possible into the final Plan, we ensure that our efforts to mitigate the impacts of climate are done so in a way which actively improves our natural environment and the places and people which make up Scotland.

What is Strategic Environmental Assessment?

- In Scotland, public bodies and private companies operating in a public character, such as utility companies, are required to assess, consult on, and monitor the likely impacts their plans, programmes and strategies will have on the environment. This process is known as Strategic Environmental Assessment (SEA).

- SEA helps to better protect the environment, aims to ensure that any development is sustainable and increases opportunities for public participation in decision-making. It ensures that expert views are sought at various points in the preparation process from the public and the Consultation Authorities. The Consultation Authorities include the following bodies:
 - NatureScot
 - Scottish Environmental Protection Agency
 - Historic Environment Scotland

What is an Equalities Impact Assessment?

- The Equality Act 2010 harmonised existing equalities legislation and includes a public sector duty ('the Duty') which requires public authorities to pay due regard to the need to:
 - Eliminate discrimination, harassment, or any other prohibited conduct
 - Advance equality of opportunity
 - Foster good relations between different groups – by tackling prejudice and promoting understanding
- The Duty requires the Scottish Government to assess the impact of applying proposed new legislation. Equality legislation covers the characteristics of age, disability, gender reassignment, sex including pregnancy and maternity, race, religion and belief, and sexual orientation.
- An Equalities Impact Assessment (EQIA) aims to consider how a policy may impact, either positively or negatively, on different sectors of the population in different ways. A policy can cover activities, functions, strategies, programmes, and services or processes.

What is the Fairer Scotland Duty Assessment?

- The Fairer Scotland Duty (FSD) is set out in legislation as Part 1 of the Equality Act 2010 and came into force in Scotland from April 2018. The aim of the FSD is to help the public sector to make better policy decisions and deliver fairer outcomes. The duty focuses on socio-economic inequality issues such as low income, low wealth, and area deprivation. The Fairer Scotland Duty applies to 'decisions of a strategic nature' – these are the key, high-level choices or plans that the public sector makes.

What is a Child Rights and Wellbeing Impact Assessment?

- The Child Rights and Wellbeing Impact Assessment (CRWIA) is used to identify, research, analyse and record the impact of a proposed policy on children's human rights and wellbeing. CRWIA helps the Scottish Government consider whether it is: advancing the rights of children in Scotland; and protecting and promoting the wellbeing of children and young people.

- CRWIA is a Ministerial duty under the Children and Young People (Scotland) Act 2014. The United Nations Convention on the Rights of the Child (UNCRC) (Incorporation) (Scotland) Bill was first passed by the Scottish Parliament unanimously on 16 March 2021. An amended bill was then passed by the Scottish Parliament on 7 December 2023 which came into force on 16 July 2024. The UNCRC Act requires public authorities to protect children's human rights in their decision-making when delivering functions conferred by Acts of the Scottish Parliament.

What is an Island Communities Impact Assessment?

- An Island Community Impact Assessment (ICIA) tests any new policy, strategy or service which is likely to have an effect on an island community which is significantly different from the effect on other communities. This became a legal duty in December 2020 under the Islands (Scotland) Act 2018.

What is a Health Impact Assessment?

- Health impact assessment (HIA) is a practical way to systematically consider the potential, and sometimes unintended, effects a policy, strategy or service plan may have on the health of a population. It is particularly useful for considering effects on vulnerable or disadvantaged groups and was used to identify the potential health impacts, positive and negative, intended and unintended, of the proposals in SNAP3.
- In March 2024, Public Health Scotland (PHS) carried out a health impact assessment scoping exercise, facilitating a workshop on each of the SNAP 3 outcomes related to domestic adaptation policy (outcomes 1, 2, 3 and 4). In total seventy stakeholders took part in one or more virtual workshops. A health impacts checklist was used in a facilitated discussion to consider the key populations and health determinants that could be impacted by the package of policies and actions to deliver each outcome.
- The HIA will be published by PHS later this year.

What is a Business and Regulatory Impact Assessment?

- A Business and Regulatory Impact Assessment (BRIA) looks at the likely costs, benefits, and risks of any proposed primary or secondary legislation. It also covers voluntary regulation, codes of practice, guidance or policy changes that may have an impact on the public, private or third sector.
- The BRIA explains:
 - the reason why the Scottish Government is proposing to intervene
 - options the Scottish Government is considering, and which one is preferred

- how and to what extent new policies may impact on Scottish Government, business and on Scotland's competitiveness internationally
- the estimated costs and benefits of proposed measures

Where can I find the impact assessments?

- [Joint Equalities Impact and Fairer Scotland Duty Assessment](#)
- [Island Communities Impact Assessment](#)
- [Business and Regulatory Impact Assessment](#)
- [Health Impact Assessment](#)
- The Strategic Environmental Assessment can be obtained on request by emailing climatechangeadaptation@gov.scot

Annex C – Approach to climate adaptation behaviours

What are adaptation behaviours?

Climate adaptation requires a change in how people and communities act now, to avoid damaging consequences in the future. These actions, or ‘adaptation behaviours’, are undertaken by actors across society, including individuals and their households, communities, and businesses. Critically, adaptation behaviours do not rely solely on individual actions: to adapt to a changing climate, Scotland needs localised, collective action.

Adaptation behaviours typically serve four purposes ([CCC, 2020](#)):

- hazard reduction or avoidance – such as housing developers avoiding construction on flood prone areas;
- vulnerability reduction – such as farmers planting drought-resilient crops;
- preparedness for response – such as homeowners preparing a household emergency kit;
- preparedness for recovery – such as businesses purchasing flood insurance.

‘Coping during crisis’ can also be regarded as a type of adaptation behaviour – such as evacuating during times of extreme rainfall. As can ‘democratic involvement or civic action’ – such as volunteering to maintain a community garden, or participating in a townhall meeting about a Local Place Plan.

The factors which have been found to be most influential on an individual’s uptake of adaptation behaviours are: their sense of self-efficacy; their sense of the action’s outcome efficacy; the social norms they live within; and their direct past experience of extreme weather events ([Valkengoed and Steg, 2019](#)).

Why is it important to target adaptation behaviours?

Behavioural change plays a critical role in enabling the uptake of actions that can protect individuals and businesses from direct threats such as floods, droughts, heatwaves, or other natural disasters ([CAST, 2023](#)) as well as building collective resilience to climate change. For example, by assessing the factors influencing people’s behaviours in relation to heat risks, we can design heat risk management approaches that can more effectively target better change behaviour and attitudes ([McLaughlin et al., 2023](#)).

Research shows that most people in Scotland had either already taken, or are likely to take, at least one action to help adapt to climate change impacts in future ([Ipsos, 2022](#)). However, the actions most likely to be taken relate to supporting and helping other people, rather than making physical changes to properties. For instance, installing flood resilience measures represent climate-adaption actions that people are least likely to take (Ibid.).

It is important that the policies in the Adaptation Plan focus on adaptation behaviours in order to address the barriers to their uptake. These barriers cannot be overcome through infrastructure investments or service provision alone.

They require nuanced behavioural interventions at a neighbourhood level, which earn public buy-in and trust.

The behavioural barriers of particular importance include low awareness, limited self-efficacy, and prohibitive costs:

- Low awareness: We know that awareness of climate adaptation, and of the actions needed to be taken, are low across the Scottish public ([CAST, 2023](#)). Despite the threat of extreme weather events, these risks can still seem abstract and lower priority – as demonstrated in the Adaptation Plan consultation -resulting in the perception that they will have limited personal impact. There is further confusion (also observed in the consultation) between climate change adaptation and mitigation, and the respective demands of each.
- Limited self-efficacy: Many respondents to the draft Adaptation Plan consultation were sceptical that individual adaptation efforts would have any impact – particularly against the backdrop of other countries' inaction on climate mitigation. Others believed that they were already doing all they can.
- Prohibitive costs: The draft Adaptation Plan consultation shows that financial barriers are significant and inhibiting action to make, for example, property modifications.

It is also important that policies in the Adaptation Plan work to counter maladaptive behaviours: that is, adaptation actions which may provide benefits for one household or organisation, but which have negative impacts on others. This is a crucial issue of social justice.

Alongside these challenges, there is also positive momentum to build on through the Adaptation Plan. The Adaptation Plan consultation illuminated willingness among respondents to consider sustainable solutions to upgrade and protect housing, for example, and to improve garden spaces. Respondents were also interested in community solutions to motivate adaptation efforts, such as community projects, volunteering, and knowledge exchanges.

Finally, there are opportunities to leverage the co-benefits of adaptation action. The UK's third Climate Change Risk Assessment highlights the co-benefits of responding to key risks through behaviour change – for example, creating and maintaining a climate-resilient garden which contributes to reducing the risk of localised flooding offers people the opportunity to increase their wellbeing by spending more time outside with nature. The Scottish Government will aim to raise awareness of these behavioural co-benefits, and thus to spark action.

How will Scottish Government target adaptation behaviours through the Adaptation Plan?

Research and insights

At the core of the Scottish Government's approach to enabling adaptation behaviours is a systematic effort to capture the lived experiences of communities around Scotland. This enables us to understand the obstacles that people encounter, and to identify factors likely to facilitate change.

Behavioural models

The Scottish Government uses behavioural science to apply these insights to the design of policy interventions. We use two behavioural models in particular:

- The 'COM-B' model ([Michie et al, 2011](#)), to dissect the 'Capability, Opportunity, and Motivation' barriers and enablers to the uptake of each adaptation behaviour;
- The Behaviour Change Wheel ([Michie et al, 2011](#)), to appraise the policy levers available to target each adaptation behaviour, and to evaluate the balance of levers we are using to target that behaviour.

In this way, we take a people-centred approach to adaptation: combining the principles of behaviour change with behavioural insights from individuals and communities across Scotland.

Adaptation Plan Commitments

The Adaptation Plan commits Scottish Government and other key players to actively encourage and create the enabling environment for Scotland's successful adaptation to the changing climate. However, a number of these commitments will rely to some extent on individuals and communities across Scotland making positive changes to their behaviour. Below, is a non-exhaustive summary of commitments within the Adaptation Plan that have been identified as requiring an element of individual and/or community behaviour change, alongside the associated change.

It is worth noting that the policy levers which consultation respondents felt would best enable them to take action were: resilient infrastructure; guidance and regulation (especially on building resilient homes); community engagement and initiatives; and communications to raise awareness and boost motivation to act. On the latter, Scottish Government will continue to deliver on the vision set out in the Public Engagement Strategy for Climate Change, that people actively participate in shaping just, fair and inclusive policies that promote mitigation of and adaptation to climate change.

Focus on neighbourhood

The benefits of targeting behavioural interventions at neighbourhoods are numerous. A focus on neighbourhood helps to localise adaptation behaviours, and so to counter the “not my place” attitude where people feel detached from the immediacy of the climate emergency. Motivation to adopt adaptation behaviours is also intensified by community feeling, which can improve people’s self-efficacy and outcome-efficacy. For some marginalised groups – such as people with disabilities, or in minority ethnic groups – engaging with communities of identity, rather than place, is important for supporting their efficacy.

Giving space for community voices is important for building trust, and creating governance which is inclusive, transparent and accountable. Community engagement can illuminate local knowledge about problematic areas in a given neighbourhood, creating the capacity to turn that knowledge into actionable data and strategies.

In appraising the policy levers available to drive adaptation behaviours, Scottish Government will systematically explore opportunities for neighbourhoods to shape and implement interventions. We will seek to empower neighbourhoods, working towards a society where climate resilience is the norm.

Annex D – Definitions (Outcome 5 - International Action)

There is a need to reflect the nuance of the language in the international climate discourse and the following definitions aim to act as a guide to the objectives and policies in Outcome 5 International Action.

- **Paris Agreement** - The 2015 Paris Climate Agreement is a legally binding international treaty adopted by 196 parties at the United Nations Climate Change Conference (COP21) in Paris. The goal of the agreement is to hold “the increase in global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” Under the agreement, countries recognised the importance of ‘averting, minimising and addressing’ loss and damage.
- **UAE Framework for Global Climate Resilience** - At COP28 in the United Arab Emirates, Parties agreed to the UAE [Framework for Global Climate Resilience](#) which aims to guide the achievement of the Global Goal on Adaptation and review overall progress in adapting to climate change. It presents an approach to “enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change”.
- **Subnational governments** - administrations at the devolved, state and regional level that, through power-sharing or constitutional devolution of powers, are responsible for the development and implementation of law, policies and programmes such as environment, energy, transport and land use relating to the climate crisis. While not Parties to the UNFCCC, subnational governments are an integral part of achieving the goals of the Paris Agreement, with up to 80% of climate action taking place at devolved, state and regional government level.
- **Mitigation, adaptation and 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.
- **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 government to commit funding to address loss and damage at COP26.

- **loss and damage** - this refers to the wider phenomenon of loss (an impact that is unrecoverable (whether economic or 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 then First Minister Humza Yousaf announced a new £5m programme on non-economic loss and damage.



Figure 22: Types of Loss and Damage (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 Justice** relates to structural inequities and focuses on mainstreaming understanding of climate justice issues, as well as building capacity.
- **Principles for locally led adaptation** - Eight principles for locally led adaptation have been developed by the International Institute for Environment and Development (IIED) and the World Resources Institute (WRI) to help ensure that local communities are empowered to lead sustainable and effective adaptation to climate change at the local level:

1. Devolving decision making to the lowest appropriate level
 - a. Giving local institutions and communities more direct access to finance and decision-making power over how adaptation actions are defined, prioritised, designed and implemented; how progress is monitored; and how success is evaluated.
2. Addressing structural inequalities faced by women, youth, children, disabled and displaced people, Indigenous Peoples and marginalised ethnic groups
 - a. Integrating gender-based, economic and political inequalities that are root causes of vulnerability into the core of adaptation action and encouraging vulnerable and marginalised individuals to meaningfully participate in and lead adaptation decisions.
3. Providing patient and predictable funding that can be accessed more easily
 - a. Supporting long-term development of local governance processes, capacity, and institutions through simpler access modalities and longer term and more predictable funding horizons, to ensure that communities can effectively implement adaptation actions.
4. Investing in local capabilities to leave an institutional legacy
 - a. Improving the capabilities of local institutions to ensure they can understand climate risks and uncertainties, generate solutions and facilitate and manage adaptation initiatives over the long term without being dependent on project-based donor funding.
5. Building a robust understanding of climate risk and uncertainty

- a. Informing adaptation decisions through a combination of local, Indigenous and scientific knowledge that can enable resilience under a range of future climate scenarios.
- 6. Flexible programming and learning
 - a. Enabling adaptive management to address the inherent uncertainty in adaptation, especially through robust monitoring and learning systems, flexible finance and flexible programming.
- 7. Ensuring transparency and accountability
 - a. Making processes of financing, designing and delivering programmes more transparent and accountable downward to local stakeholders.
- 8. Collaborative action and investment
 - a. Collaboration across sectors, initiatives and levels to ensure that different initiatives and different sources of funding (humanitarian assistance, development, disaster risk reduction, green recovery funds and so on) support one another, and their activities avoid duplication, to enhance efficiencies and good practice.



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The Scottish Government
St Andrew's House
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EH1 3DG

ISBN: 978-1-83601-729-5 (web only)

Published by The Scottish Government, September 2024

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS1494758 (09/24)

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