

SCOTTISH CLIMATE CHANGE ADAPTATION PROGRAMME: PROGRESS REPORT 2021

Second annual progress report on the "Climate Ready Scotland: Climate Change Adaptation Programme 2019-2024"

May 2021



Report laid before the Scottish Parliament by the Scottish Ministers under Section 54 of the Climate Change (Scotland) Act 2009, May 2021.

SG/2021/109



Scottish Government
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Summary

Introduction

The twelve month period since the May 2020 annual report was laid in Parliament has been dominated by the COVID-19 pandemic. The pandemic has presented an unprecedented challenge to individuals, communities, and businesses across Scotland. It has also clearly indicated that national conversations about identifying and building resilience to systemic risks are more real and pressing than ever before. During that same month of May 2020, the Scottish Government sought advice from the UK Climate Change Committee (CCC) on a green recovery for Scotland from COVID-19. The CCC advised that increased resilience to the impacts of climate change must be at the centre of a green recovery, alongside an ongoing focus on reducing emissions in a way that is fair and just. The Scottish Government has welcomed this advice and acted upon it.

Both the 2020-21 Programme for Government (PfG) and the 2021-22 Budget have helped to lay the foundations for a green recovery – one in which we will rebuild from COVID-19 to a fairer, stronger and net-zero emissions economy. As a key part of this, we have set out major enhancements to our investments in Scotland’s resilience to the impacts of climate change, with an extra £150 million for flood risk management (in addition to continuing to provide £42 million annually to local authorities) and £12 million for coastal change adaptation.

As Scotland begins to recover from the pandemic, the effects of climate change will continue to be felt and we must be prepared for these to increase over coming years and decades. The Scottish Government funded [Adaptation Scotland programme](#) has recently published a [summary](#) of the most up to date UK Met Office scientific projections of future changes to Scotland’s climate. This indicates that Scotland’s ten warmest years on record have all occurred since 1997 and that our climate is projected to become increasingly wetter and warmer.

While our commitment to reaching net-zero emissions is at the heart of our approach to tackling the global climate emergency, and has been further strengthened by our recently updated [Climate Change Plan](#), we are also continuing to prepare Scotland for the changes which are already locked in. The publication of our draft Public Engagement Strategy for Climate Change alongside the Climate Change Plan Update marked a new chapter in our people-centred approach to climate change policy. It outlines our overarching framework for engaging the public and communities on climate change, ensuring a green recovery from COVID-19. As a key part of this, we consider climate change adaptation alongside mitigation in order to continue to build public understanding of climate risks and encourage action.

We are continuing to deliver the [second Scottish Climate Change Adaptation Programme \(SCCAP2\)](#) which was published in September 2019 and has an implementation period up to 2024. SCCAP2 addresses the priority climate risks for Scotland set out in the [UK Climate Change Risk Assessment 2017](#) and its underpinning Evidence Report for Scotland. A brief summary of key findings from the risk assessment is set out in the Annex.

The Scottish Government has also recently strengthened our legislative framework to support public bodies' leadership role in adapting to climate change. The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020 sets out that public bodies will be required from reporting year 2021-22 to provide in their annual reports, where applicable, what contribution the body has made to help deliver SCCAP2.

Outcomes-based structure to this report

This is the second annual progress report on the SCCAP2 programme. SCCAP2 uses an outcomes-based approach, derived from both the UN Sustainable Development Goals and aligned to Scotland's [National Performance Framework](#). This approach ensures that actions over the next five years to increase the capacity of Scotland's people, communities, businesses and public sector to adapt to climate change will also complement our international ambitions and integrate action on adaptation into wider Scottish Government policy development and service delivery.

There are seven high-level outcomes within SCCAP2, covering Scotland's communities, businesses and natural environment as well as our engagement with international partners. This annual progress report is also split into the same seven chapters. Each chapter provides examples of progress – since the time of the last report in May 2020 – in implementing the policies and proposals that contribute towards that outcome. In some chapters, the examples are further grouped according to the sub-outcomes used within that chapter of SCCAP2. The final chapter of this report summarises progress on the programme of cross-cutting research commitments in SCCAP2.

This report builds on the progress outlined in the first annual report on SCCAP2 as well as that which was achieved under the first Scottish Adaptation Programme, as set out in previous annual reports covering the years 2015 to 2019. Copies of all of those reports can be found on the Scottish Government [website](#).

The role of the Adaptation Scotland programme

The [Adaptation Scotland programme](#) is funded by the Scottish Government to support capacity building and action on adaptation by the public sector, businesses and communities across Scotland. This work includes developing Scotland's pioneering place-based approach to adaptation. The contribution of the programme's activities to delivering the high-level outcomes in SCCAP2 is summarised at the end of each chapter of this report.

Impacts of SEPA cyberattack and COVID-19 on preparation of this report

The Scottish Environment Protection Agency (SEPA) plays a key role in delivering many of the national policies set out in SCCAP2, in particular in relation to flood risk management.

On 24 December 2020, SEPA confirmed that it was responding to a significant cyber-attack affecting its contact centre, internal systems, processes and communication. The attack is (at the time of writing this report) subject to a live criminal investigation. The attack has drastically impacted the organisation and its focus is currently on providing its essential services to protect Scotland's environment and support individuals and businesses. In this context, and given the lost access to email systems, colleagues at SEPA have been unable to contribute directly to the preparation of this year's annual progress report. Where possible, updates on the relevant policies have been provided by the relevant Scottish Government policy teams instead but this cannot cover all elements.

Some other policy areas, in particular those involved in the health-related outcomes in SCCAP2, continue to be heavily impacted by pressures associated with the immediate response to COVID-19. As such, the capacity of those teams to contribute to this year's progress report has remained limited.

Scottish Ministers' assessment of progress towards implementing the objectives, proposals and policies set out in SCCAP2

Whilst the past twelve months have clearly been an exceptional period in many ways, the overall assessment of Scottish Ministers is that good progress continues to be made in implementing SCCAP2.

In particular, the announcements over the past year of enhanced funding commitments for flood risk management and coastal change adaptation will support the accelerated delivery of several of the key SCCAP2 outcomes as part of a green recovery from COVID-19.

Next Steps

The Evidence Reports for the next round of UK Climate Change Risk Assessment (UKCCRA3) are expected to be published by the UK Climate Change Committee (CCC) in June 2021. These will then be followed by the statutory UKCCRA3 document from the UK Government in early 2022. The updated risk assessment information set out across these documents will form the main evidence base for developing the third SCCAP (SCCAP3), which is due to be published no later than September 2024 and will cover the five year period from the point of publication.

Whilst the next SCCAP is being prepared, annual reporting on progress to delivering SCCAP2 will continue each May. Furthermore, the Scottish Government will also be requesting that the CCC prepares two rounds of independent assessment of SCCAP2 which, along with the updated evidence from UKCCRA3, will help to inform our approach to SCCAP3. The first of these independent assessments is expected to be prepared in 2022.

A further area of ongoing work is the development of a monitoring framework for tracking progress to the SCCAP2 outcomes. This is an area where not as much progress has been made since the time of the May 2020 report as we had hoped,

largely due to the wider impacts of COVID-19 and other work. The Scottish Government remains committed to improving the evidence base around progress on adaptation and resilience and we will provide further updates on this work in due course. In the meantime, the SCCAP2 research programme (see Chapter 8 of this report) is making some substantial progress towards addressing some of the specific evidence gaps around monitoring with relevance to adaptation and resilience, specifically with regards to soil vulnerability to climate change.

Another major upcoming milestone for climate change action, across both adaptation and mitigation, will be the COP26 summit hosted in Glasgow in November 2021. The Scottish Government is committed to playing our part to deliver a global deal that sets the world on track to warming of less than 1.5°C and increased resilience to the already changing climate. COP26 is an opportunity to demonstrate and accelerate the world leading climate action we are taking. We have the world's most ambitious legislative framework for emissions reduction and a mature statutory programme for adaptation action, and we are determined to make a Just Transition to net zero by 2045. It is a truly national endeavour where no one can be left behind.

In advance of the summit, the Scottish Government will publish an indicative nationally determined contribution, set out in the spirit of the Paris Agreement. This will include a summary of our approaches to adaptation and resilience, both here in Scotland and internationally. At the summit itself, our key themes of people and just transition will provide ample opportunities for showcasing the innovative approaches to adaptation happening across Scotland.

Chapter 1: Progress toward “our communities being inclusive, empowered, resilient and safe in response to the changing climate”

The communities we live in and places around us have taken on a new importance over the past year and it is therefore apt that SCCAP2 focuses first on community resilience and empowerment. The resilience of our communities in response to the COVID-19 pandemic and the enhanced appreciation of, and comfort in, our local surroundings have all been brought to the fore. As Scotland begins to recover from COVID-19 both socially and economically we must ensure that resilience to climate impacts continues to be both considered and developed.

The 2020-21 Programme for Government announced significantly increased investments in both flood risk management and coastal change adaptation. An extra £150 million for flood risk management (in addition to continuing to provide £42 million annually to local authorities) as well as £12 million for coastal change adaptation were announced to increase the resilience of Scotland’s communities and assets. These investments, which will be spent during the 2021 - 2026 parliamentary term, are putting the resilience of Scotland’s people and places at the centre of our approach to a green recovery from COVID-19.

Placemaking is a central theme across SCCAP2 and particularly under this high-level outcome. This is the idea that a place should be planned, designed and managed to suit the needs of the people who live there and should be shaped by those same communities. This is also a core component of a just transition, which would ensure the development of social consensus through engagement with communities. Updates on progress are set out below.

There are considerable overlaps in terms of policies between this chapter and others within the SCCAP2 format. In particular, updates on progress around the Scottish Flood Forum and flood forecasting and warning services can be found in Chapter 2 of this report.

Examples of progress on cross-cutting policies in support of this outcome

Implementation of the Planning (Scotland) Act 2019 - continues to strengthen the role of adaptation considerations in the planning process by requiring Ministers to have regard to statutory national adaptation programmes (currently SCCAP2) when preparing future iterations of the [National Planning Framework \(NPF\)](#). The Act’s provisions relating to the NPF were among the first to be commenced, in November 2019, enabling work to begin on Scotland’s fourth National Planning Framework (NPF4). The Scottish Government announced in 2020 that publication of the draft NPF4 would be delayed to autumn 2021, given the impact of the COVID-19 emergency. NPF4 will combine the National Planning Framework and Scottish Planning Policy in a single document and will have development plan status for decision-making under the Town and Country Planning (Scotland) Act 1997. The Scottish Government published a [NPF4 Position Statement](#) in autumn 2020 as a discussion document to set out thinking on the direction for NPF4 following consultation earlier in 2020. It sets out four key outcomes for NPF4: net zero

emissions; resilient communities; a wellbeing economy and better, greener places with climate change adaptation aspects throughout the document.

Examples of progress on policies in support of sub-outcome that: “People in Scotland’s diverse communities are informed, empowered and adapting to climate change”

The Place Standard Tool - The improved version of the [Place Standard Tool](#) (PST)¹ will be launched in early summer and will incorporate enhanced content to strengthen the contribution towards engaging communities and stakeholders around climate change at a local level. The improved tool, guidance and resources to support use will be launched on a new Place Website which will also highlight the important relationship between place-based approaches and climate adaptation. A design version of the PST – aimed at architects, spatial planners and development interests specifically to support design & delivery processes - integrates prompts around climate change adaptation and mitigation wherever appropriate. A project to create a “PST with a climate lens” toolkit is underway, this is intended to support projects with a specific climate-action focus to take a place-based, collaborative, and community-led approach.

Community Flood Volunteer Project - The Scottish Government continues to support citizen science through grant funding for The Conservation Volunteers Scotland (TCVS). Through community-led citizen science flood monitoring projects important long term data is gathered for Clackmannanshire and Stirling councils.

Volunteers are trained by TCVS to safely collect data and take photographs at designated sites to monitor the sediment and debris in local river courses. The volunteers then upload this information to the local authority’s website, recording which areas have been inspected and when. This alerts the local authority to the areas where further inspection may be required to help reduce potential flooding. Working with volunteers helps raise awareness of flood risk and the wider climate change agenda at a local level.

Examples of progress on policies in support of sub-outcome that: “Scotland’s buildings and places are adaptable to climate change”

SEPA Flood Risk Maps - SEPA’s flood maps continue to undergo regular update and improvement. A new, public-focussed [online map viewer](#) was launched in November 2020 to improve access to flood risk information. Further development of online tools will support improved and specific access to flood risk data for partners and stakeholders. As part of the new viewer, SEPA published the first climate change maps of Scotland’s rivers and the sea - reflecting the flood hazard in the 2080s for a high global emissions scenario. SEPA is also currently planning the development of a suite of future flood hazard and risk information to reflect a broader range of climate scenarios to 2100 and beyond. As of February 2021, SEPA was tendering for consultant services to support the update of national surface water

¹ The tool was created and updated by a partnership including Public Health Scotland, Architecture and Design Scotland and Glasgow City Council as well as Scottish Government

flood maps. This wholesale development will reflect the most up to date climate information as well as wider updates in rainfall data and developments in mapping.

SEPA Flood Risk Management Strategies - SEPA are progressing the development of the 2021-2026 Flood Risk Management Strategies in partnership with Responsible Authorities. The cyber-attack that SEPA has suffered (see introduction section of report), in conjunction with COVID-19 restrictions, have meant that timescales and the content of the consultation have had to be reviewed leading to a delay to its second phase. The publication date of the Strategies is being continually reviewed.

Property Flood Resilience Action Plan - The Scottish Government continues to work with a range of stakeholders on the Property Flood Resilience Delivery Group to deliver the [Living with Flooding action plan](#). New [research](#) with ClimateXChange (CXC) published in June 2020 estimated that 81,000 properties could benefit from property flood resilience; a third of all properties at risk in Scotland.

Energy Efficient Scotland - Effective installation of energy efficiency measures, such as external wall insulation, can improve the resilience of Scotland's buildings to the increased adverse weather projected as a result of climate change, as well as reducing emissions. The Scottish Government continues to provide support, including grants and low costs loans, to property owners to help them retrofit their properties to make them more energy efficient and convert to zero emission heating. Home Energy Scotland and the Energy Efficiency Business Advice Service continue to offer impartial advice on energy retrofit and energy saving measures. The Scottish Government recently published its draft [Heat in Buildings Strategy](#) which updates the 2018 Energy Efficient Scotland Route Map.

New Housing Standard for Scotland - In the Scottish Government's [Housing to 2040 strategy](#), published in March 2021, the Scottish Government set out its intention to consult on a new Housing Standard for Scotland, which will go beyond a minimum standard to include aspects related to future-proofing and resilience such as being free from serious disrepair, minimum space standards, digital connectivity, accessibility and additional safety standards. We must ensure that works to the fabric of the building and new zero emissions heating systems also serve to increase comfort and affordability for fuel poor households, and that there will be no margins of tolerance, no exemptions and no "acceptable levels" of sub-standard homes. The Scottish Government will consult on a new standard in 2021.

The Scottish Housing Quality Standard (SHQS) and the Energy Efficiency Standard for Social Housing (EESH) - The SHQS requires social housing to be in a reasonable state of repair. EESH is part of SHQS and requires social housing to have a minimum standard of energy efficiency. Landlords are now working towards a second EESH milestone for all social homes to be Energy Performance Certificate (EPC) band B or as energy efficiency as practically possible by 2032. These policies require houses to be in a good physical condition, reducing water penetration and heat loss, all of which increases their resilience to impacts of climate change as well as reducing their emissions. To accelerate the progress in decarbonising social housing, and to draw out lessons for other sectors, Ministers have set up an

independent Zero Emissions Social Housing Task Force (ZEST) from April 2021. The Climate Change Plan Update indicates that the review of EESSH2 will be brought forward to 2023 to make sure that the role of the social housing sector is aligned with our overall aims to deliver net-zero emissions from heat. As part of this review, we will also consider the links to the proposed Housing Standard and the opportunities to combine energy efficiency improvements with other work needed to make homes sustainable.

Historic Environment Scotland's Climate Action Plan 2020-2025 was launched in February 2020. [The Climate Action Plan](#) (CAP) sets out 69 actions across seven strategic themes, including Climate Impacts and Adaptation, which are HES' focus for climate action 2020-2025 and beyond. Despite COVID-19 restrictions, progress has been made in implementing the Climate Impacts and Adaptation and Circular Economy actions. Significant progress has been made with the Climate Ready HES project, including the completion of online staff workshops and climate risk data being embedded in Properties in Care projects. Together with partners, HES has been granted funding by the Arts and Humanities Research Council for its [Climate Vulnerability Index \(CVI\) Africa](#) project, which is now underway. HES was also successful in winning Royal Society of Edinburgh funding for Scottish CVI workshops to run in 2021 and 2022, following on from the [Heart of Neolithic Orkney CVI](#) in order to roll out the methodology across Scottish cultural World Heritage Sites. A steering group has been established and planning is underway for the Old and New Towns of Edinburgh CVI with online workshops to be held in May-June 2021. Historic Environment Scotland also continues to implement Our Place in Time: the Historic Environment Strategy for Scotland and to monitor against its 13 key performance indicators. The most recent [Our Place in Time Annual Report](#) was published in December 2020.

Adapt Northern Heritage project - this Historic Environment Scotland project, as part of the EU Interreg Programme, concluded with an online conference in May 2020. The conference explored impacts of climate change on historic places across the Northern Periphery and Arctic and how adaptation measures can help protect these places or manage their loss. Special themes of the conference were the cultural heritage in Arctic regions and of northern indigenous communities. The recorded proceedings of the conference are available on the Historic Environment Scotland [YouTube channel](#). The toolkit, case studies and adaptation plans developed during the project are available to download from the Adapt Northern Heritage [website](#).

ERDF Green Infrastructure Fund - Led by NatureScot, the Fund has seven Phase 1 projects (around £20 million total investment) across Scotland, of which four are complete. The other three are due to complete in 2021 or 2022, as COVID-19 has caused some delays. Sites selected for projects have been designed to truly benefit the community and provide space for nature. They create nature-based solutions to addressing adaptation and resilience, through flood mitigation, habitat creation, enabling active travel and access to quality greenspace, and community food growing, for example. The completed sites have already attracted heavy use, with resounding positive feedback and have attracted international interest. This provides further evidence of the need for more investment in designing multi-functional

greenspace for adaptation, which delivers for nature and people simultaneously and successfully.

How the Adaptation Scotland programme is supporting this outcome

Despite practical limitations on some modes of engagement during the pandemic, the Adaptation Scotland programme has seen significant progress in driving forward new place-based adaptation initiatives across Scotland during 2020-2021. Examples of instances where the programme has contributed to local and regional planning to manage risks include;

- In the Outer Hebrides, where the programme is working closely with the Community Planning Partnership to develop a new adaptation plan for the Islands, supported by a NatureScot graduate placement. The plan will be shaped by community involvement and closely aligned with the Local Outcomes Improvement Plan. It will also benefit from an innovative new work partnership with the Met Office to develop climate storylines for the Outer Hebrides.
- The programme has supported partners in the Highlands to set up and secure funding for a major new Highland Adapts initiative which will develop a community focused approach to adapting to climate change.
- The programme has supported the new Climate Ready Ken localities project in Dumfries and Galloway.

Adaptation Scotland also continues to champion and support more established regional initiatives including [Climate Ready Clyde](#), Climate Ready Aberdeenshire, Aberdeen Adapts and Edinburgh Adapts, helping to share learning across these initiatives and support development activities including new risk assessments and locality projects. Sharing learning from the Climate Ready Clyde initiative² will be a particular focus of activity during 2021, with the COP26 summit coming to Glasgow. This will include sharing the significant new evidence and learning on systems change, finance and funding and cultural engagement generated through the EU-funded Clyde Rebuilt project over the course of 2020, which has informed the European Commission's thinking for the new EU Adaptation Mission and will be reflected in the first [Glasgow City Region Adaptation Strategy and Action Plan](#), due for publication before COP26.

Adaptation Scotland continues to collaborate closely with Historic Environment Scotland to ensure that heritage and culture are an integral part of Scotland's adaptation response. In January 2021, HES and Sniffer (contract holders for the

² Climate Ready Clyde (CRC) is a cross-sector initiative funded by fifteen member organizations (including North Lanarkshire Council, East Renfrewshire Council, the University of Glasgow, SEPA, West Dunbartonshire Council etc.) and supported by the Scottish Government to create a shared vision, strategy and action plan for an adapting Glasgow City Region.

Adaptation Scotland programme) announced a formal [Memorandum of Understanding for Mutual Collaboration](#). Some highlights from this work have been noted above but a further example is that the programme has worked with Historic Environment Scotland to provide input to Scotland's Climate Assembly on the role that heritage can play in supporting resilience and enabling society to adapt to climate change.

Chapter 2: Progress towards “the people in Scotland who are most vulnerable to climate change being able to adapt and climate justice being embedded in climate adaptation policy”

The second chapter of SCCAP2 includes policies to ensure that adaptation is focused directly on empowering the people who are more vulnerable to climate change and that adaptation actions are just and put people first. This approach to building resilience forms part of the Scottish Government’s wider commitment to a just transition to a net-zero emissions society, as reflected in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

Our people-centric approach recognises that those who are already vulnerable are more at risk of the adverse effects of climate change and may not have the tools they need to be able to adapt. Vulnerable people – those who are socially disadvantaged, older, very young, experiencing chronic health problems, or who live in poor housing or in areas prone to flooding, for example – are all more likely to experience both immediate and long term negative impacts of climate.

There are parallels which can be drawn between vulnerability to climate change and what has occurred during the COVID-19 pandemic. While both have and will affect all of us, the impacts are not felt evenly across society. This thinking supports our whole systems approach to building climate change resilience and the need for a green economic recovery from the pandemic which does not leave anyone behind.

Progress towards policies in support of the sub-outcome that “the most vulnerable to climate change in Scotland are engaged, empowered and able to adapt to climate change”

Scottish Flood Forum - The Scottish Government continues to grant fund the Scottish Flood Forum to work with communities at flood risk. The grant was increased to £193,000 in 2020-21 to enable the Forum to support and build resilience in communities at flood risk and manage the work of the Property Flood Resilience Delivery Group.

Flood forecasting and warning services - A Flood Guidance Statement is issued daily to all of Scotland’s emergency response, utility and transport organisations 365 days a year. The [Floodline](#) service continues to provide information to registered users on when flooding is likely in their area. Both services remain operational during the pandemic response. Furthermore, in 2020, SEPA launched two new flood warning schemes for Aberfoyle and the Outer Hebrides and Local Authorities are continuing to work in partnership and with SEPA to develop the 2022 -2027 Local Flood Risk Management Plans.

ERDF Green Infrastructure Community Engagement Fund - Led by NatureScot, the Fund chose eleven projects and, in 2020, all completed their work. One project, led by Central Scotland Green Network Trust, co-designed a rain garden which will be incorporated into one of the Phase 2 Green Infrastructure Fund projects. Another, the Forest College initiative at Newbattle Community Forest, was winner in the Youth & Education category of the Nature of Scotland awards.

Progress towards policies in support of the sub-outcome that “Scotland’s health and social care is ready and responding to changing demands as a result of the changing climate”

Our Natural Health Service Programme: This cross-sectoral collaboration, led by NatureScot and with area health boards and local authorities as key stakeholders, has seen four Green Health Partnerships (GHPs) progressed as demonstrators in Lanarkshire, Dundee, North Ayrshire and Highland. They use the natural environment as a local resource, connecting people and nature to deliver physical, mental and social health outcomes. The contribution of GHPs to adaptation outcomes was recognised in climate action plans in Dundee and North Lanarkshire. The Programme includes the NHS Greenspace Demonstration Project whereby greenspace around healthcare facilities has been improved, to contribute to health, biodiversity and climate change outcomes. The achievements and key learning points were published in April 2020 in the report [“Unlocking the Potential of NHS Greenspace for Health and Wellbeing.”](#)

Supporting Active Travel - The past year has seen a significant increase in active travel investment, particularly in walking and cycling infrastructure. As well as public health and emissions reduction benefits, investment in active travel increases the options for travel so that communities can stay connected when climate change impacts roads or public transport. The Scottish Government budget for 2020-21 increased the overall active travel budget to £100.5 million from £80 million in 2018-19 and 2019-20. Specific recent investments include:

- In 2020-21, £3.7 million funding was allocated to extend and improve the National Cycling Network. Since 2010, SusTrans have managed the ‘Places for Everyone’ fund, which invited local authorities to bid for over £50 million of funding to develop walking and cycling infrastructure.
- In 2020-21 the Scottish Government invested £94.2 million capital budget on ambitious on and off-road segregated walking and cycling routes, safer junctions and improved place design.
- In 2020-21, a £0.9 million ‘E-bike Grant Fund’ assisted local authorities, public sector agencies, education institutions, active travel hubs and community

groups to adopt e-bikes, adaptive and cargo bikes as more sustainable alternatives to car journeys and for last mile delivery.

- In 2019 the Scottish Government launched the £1.3 million 'Social Housing Fund' for improved walking and cycling facilities to encourage active travel within communities, particularly those in areas of multiple deprivation. A further £0.3 million has then been invested in 2020-21.

Scottish Fire and Rescue Service 'Safe and Well' Programme - The Scottish Fire and Rescue Service (SFRS) is working in collaboration with partners and communities to ensure collective resources jointly tackle issues related to inequality and protect those citizens at greatest risk. This is particularly important as individuals with pre-existing vulnerabilities are also most at risk from climate change impacts. As part of the SFRS Change Portfolio Programme, the Service is developing its 'Safe and Well' project, which will see an expansion of the Home Fire Safety Visit programme to incorporate wider health and social care considerations. Working with a range of partners, both internal and external, the project will include the development of bespoke ICT systems to record activity and provide referrals directly to partners. Safe and Well is progressing for roll out in 2021, but this may be impacted by COVID-19.

Preparing for a warmer climate: Water Refill Locations - Scottish Water has now installed 38 refill points across Scotland. The growing network has already saved the equivalent of 300,000 single use plastic bottles since the first tap went live outside Holyrood on 27 September 2018. Every refill tap is fitted with a monitor which records how much tap water is used and in December 2020 total use passed the milestone 100,000 litre mark.

New Cleaner Air for Scotland Strategy: A Scottish Government consultation on a draft new air quality strategy, Cleaner Air for Scotland Strategy 2 concluded in January 2021. The consultation paper puts forward an integrated policy approach as one of the general themes to ensure that policies for climate change adaptation and mitigation, placemaking and other related policies should be closely coordinate and aligned with air quality policies to maximise co-benefits. The final strategy, taking into account consultation responses, will be published later in 2021.

Electric Vehicle Charging Network - The use of electric vehicles helps to improve local air quality and therefore increases public health, wellbeing and wider community resilience. The ChargePlace Scotland network now has over 1200 publically available charge points, an increase of over 350 since 2019. Other achievements to improve accessibility of electric vehicles include:

- Since 2015, providing over 2500 interest free loans issued to households and businesses over the lifetime of the loan to support the purchase of an ultra-low emission vehicle;

- Since 2018/19, providing 28 electric car clubs to Scottish communities through our Plugged in Communities Programme
- Since 2014, supporting the procurement of over 2400 zero and ultra-low emission vehicles in public sector fleets.

How the Adaptation Scotland Programme is supporting progress towards this outcome

The Adaptation Scotland programme continues to collaborate with Public Health Scotland to increase awareness of the links between health inequalities, climate change adaptation and climate justice.

The [Adaptation Capability Framework](#) developed through the programme continues to provide Health Boards with guidance on how to develop their work to adapt to climate change. The Framework is endorsed by NHS National Services Scotland and complements their specialist climate change risk assessment resources.

Adaptation Scotland is also continuing to support development of the “Place Standard with a climate lens” toolkit (see chapter 1), and is developing and testing new climate change content as part of a newly established working group. Adaptation Scotland is also drawing learning from the Social Impact Assessment completed as part of the development process for the [Climate Ready Clyde Adaptation Strategy and Action Plan](#) as well as their emerging concept of ‘Just Resilience’ and will use these to inform development processes for adaptation planning across place-based initiatives.

Chapter 3: Progress towards “our inclusive and sustainable economy being flexible, adaptable and responsive to the changing climate”

A green recovery for Scotland’s economy from the impacts of COVID-19 is central to the Scottish Government’s approach. As set out in the introduction, such a recovery must include building resilience to the impacts of climate change.

This chapter relates to progress towards SCCAP2 policies which aim to increase adaptive capacity for businesses directly using natural resources, such as farming and forestry, and for the wider economy, ensuring that businesses are prepared for the impacts of climate change and that new opportunities for innovation are harnessed.

A recent [report](#) by Scotland’s Rural College (SRUC) found that in 2018, the natural economy contributed £29 billion to the Scottish economy. Ensuring that this economy is sustainable and resilient to the changing climate is vital to managing Scotland’s natural resources and providing jobs and business opportunities. It is also important for adaptation and risk management itself. For example, the management and creation of woodland in Scotland is informed by decision support tools based on the latest scientific evidence, and target mapping that helps promote the use of tree species suited to future climate. This supports improvements to the long-term resilience of timber supply and helps ensure that woodlands provide wider environmental benefits such as contributing to natural flood management and enhancing biodiversity.

Good, green jobs will be central to Scotland’s green recovery. A recent [report](#) by NatureScot suggests a huge opportunity for nature-based jobs to secure a green economic recovery and support the transition to net zero. The Scottish Government has announced a £100 million Green Jobs fund, investing capital in businesses, organisations and supply chains over the next five years to support new and increased opportunities for green job creation across Scotland. We have also committed to boosting youth employment opportunities in nature and land-based jobs by expanding apprenticeship and undergraduate schemes in public agencies, including Scottish Forestry, Forestry and Land Scotland and NatureScot.

Policies covering the marine economy can also be found in Chapter 6.

Examples of progress on policies in support of sub-outcome that “Scotland’s businesses based on natural resources are informed and adaptable to climate change”

Farming for a Better Climate - This Scottish Government supported [initiative](#) continues to promote practical and cost effective climate change mitigation and

adaptation measures to farmers and land managers, alongside real time findings from the [Farming for a Better Climate Soil Regenerative Agriculture Group](#). Messages are promoted via a project webpage, social media accounts, a regular podcast and other press and promotional material. The farmer-led soil regenerative agriculture network continues to focus on positive actions that can be taken on Scottish farms to support, enhance and protect their soils. The group have trialled new approaches to allow them to improve production whilst delivering wider benefits such as building soil resilience, improving water retention, storing carbon and enhancing bio-diversity.

Integrating Trees Network - this jointly facilitated [project](#) between Scottish Forestry and the Scottish Government, is a farmer-led demonstrator network of farms, crofts and estates, hosting events and promoting the benefits to landowners of new woodland creation. Planting trees can help land-based businesses to adapt by providing shelter for livestock, habitat for wildlife, diversification opportunities for future income, and a contribution to flood prevention of flooding. Two introductory events have already taken place in March 2021, with further hosts and events to be announced summer 2021. It is hoped that on-site demonstration events will take place in 2022. An online community forum is also being developed to share information and experiences relating to woodland creation and tree planting.

Monitor Farm Scotland - In February 2020, the Scottish Government announced that a new [Monitor Farm Legacy Project](#) for 2020-21 would be introduced with an estimated budget of £100,000. This project will offer an evidence based evaluation of a past Monitor Farm Programme but would also include climate change and environmental factors not previously addressed. The project will act as a transition in advance of a new 2021-24 Monitor Farm Programme with the groups involved also acting as sounding boards for future delivery. On a practical level this will involve six legacy farms each meeting four times over the course of the year and delivering associated Integrated Land Management Plans, Carbon Audits, Environmental Audits and case studies.

Farm Advisory Service - Scotland's existing [Farm Advisory Service](#) has been extended until the end of 2021, after which a new contract will be procured. The Advisory Service has developed a mature concept which is well-placed to provide advice aligned to priorities on climate change adaptation, as well as emissions reduction and biodiversity.

Farming with Nature - This Soil Association Scotland led project completed in 2020 and has encouraged and enabled more of Scotland's farmers to adopt nature-friendly farming and land management practices which are productive and profitable. Over 590 farmers and crofters were given advice and support and the results overall present a positive picture in terms of motivation and intention to adopt sustainable practices and change in attitudes towards sustainable practices; especially in relation

to farming and biodiversity, climate change and low input farming. The [final report](#) was published in August 2020.

Resilience of our natural resources: timber in construction - Subject to durability requirements, wood fibre can substitute for non-renewable comparable construction materials, such as concrete and steel, to achieve substantial benefits when accounting for whole-life carbon. Over the last year, Scottish Forestry has continued to promote the use of wood fibre in construction and supported research and innovation in this area. For example, Scottish Forestry has partnered with Edinburgh Napier University and the Construction Scotland Innovation Centre to obtain a better understanding of the timber properties of domestically grown timber and the use of Scottish timber in engineered timber products and wood fibre insulation, as well as working to improving the design software used by architects so that designing houses made from domestic timber becomes easier.

Youth engagement in Scotland's rural economy - This year, Scottish Forestry worked with Young Scot to develop and deliver a campaign designed by young people, for young people, to raise the profile of forestry in delivering environmental, social and economic benefits plus the associated opportunities for employment. As a result, Young Scot are currently developing an online resource, as well as TikTok and Instagram videos, which will be launched in the summer. These resources will provide young people with information on a range of forestry-related subjects, including trees and climate change.

Examples of progress on policies in support of sub-outcome that "Scotland's economy is innovative and harnesses the opportunities created as a result of climate change"

Making Things Last: A Circular Economy Strategy for Scotland - The Strategy focusses on innovation, seeking new ways to reduce consumption of natural resources and keep materials flowing through the economy at high value for as long as possible. The opportunities from a more circular economy are fundamental to tackling the greenhouse gas emissions that arise from the consumption of goods, thereby also preserving natural capital and building a more resilient economy. Underpinning the circular economy is the idea of sustainable resource management, through reuse, repair and remanufacturing. This extends to both natural and manufactured materials. Reducing consumption of natural materials can help to reduce pressure on the natural environment, leaving increased space and capacity for it to adapt.

Digital solutions to climate change challenges -The Scottish Government's [CivTech programme](#) encourages business and innovators to develop innovative technical solutions. The 2020 Accelerator (CivTech 5) prioritised the Scottish

Government environmental agenda and culminated in a Demo Week in February 2021. Examples of challenges explored as part of CivTech 5 include a collaboration with Forestry and Land Scotland to improve the management of timber forests timber to improve sustainability and profitability thus improving the resilience of the woodland economy ([Challenge 1](#)) and a project with NatureScot which aims to use digital technology to help farmers improve the environment under their stewardship and monitor and evaluate this improvement ([Challenge 3](#)). This aims to empower farmers to analyse the data in order to improve climate change actions and increase biodiversity on their farmland. CivTech also continues to work on challenges from previous Accelerators such as [RiverTrack](#) (started in 2016 and continues to operate with support from SEPA, Scottish Flood Forum, EU Horizon 2020 research and innovation grants). RiverTrack is a local flood alerting tool that can be used by communities without a formal SEPA flood warning scheme. The Scottish Government is encouraging more communities to consider the RiverTrack system which can alert home and business owners to take action prior to a flood event. This includes deploying flood guards and moving possessions upstairs which helps to reduce flood damage.

How the Adaptation Scotland Programme is supporting progress towards this outcome

Adaptation Scotland continues to promote its climate ready business guidance and support others to develop sector specific guidance; for example, the programme contributed to [new climate change adaptation guidance](#) for agriculture developed by SRUC. Adaptation Scotland also continues to work closely with Forestry and Land Scotland who are leading work to implement the [Adaptation Capability Framework](#) and to share their experience with others.

The Adaptation Scotland Programme established a new Climate Finance Working Group during 2020 to identify and address barriers to increasing financial flows into adaptation. This group has attracted involvement from UK and Scottish finance experts and institutions. New adaptation guidance is being developed along with a financing directory that will signpost users to different forms of adaptation funding and finance. Example business cases for financing adaptation will be developed during 2021 in partnership with organisations selected through a competitive process, with the learning from this shared widely.

Some forms of direct business engagement through the programme has been severely impacted by the COVID-19 pandemic. The programme has, nonetheless, championed online business engagement including through supporting the organisers of the [CAN-DO innovation summit](#) to develop a resilience theme to their event which targeted around 800 SMEs.

Chapter 4: Progress towards “our society’s supporting systems being resilient to climate change”

Communities across Scotland are reliant on strong and resilient infrastructure networks which include vital supply networks, digital communications, transport networks and also support our health, government and emergency services.

As part of a green recovery from COVID-19, the role of our transport and critical infrastructure will be key for supporting this recovery. In the Climate Change Committee’s [2020 annual progress report](#) to the Scottish Parliament on progress in reducing emissions, it also advised that the Scottish Government “accelerate investments in low-carbon and climate adaptation infrastructure to stimulate Scotland’s economy, build long-term productive capacity and improve climate resilience”. The Scottish Government is committed to investing in these key areas, as evidenced in the [2020/21 Budget](#) which announced a £2 billion Low Carbon Fund, the first £165 million of which includes £25 million for bus priority infrastructure and £15 million for zero emissions buses.

As well as Scotland’s infrastructure being central to the transition towards net-zero, making sure infrastructure is resilient to the effects of climate change and extreme weather is also crucial for keeping Scotland running and keeping its citizens connected, especially those who live in remote parts of the country. In a year where working from home has increased and travel has been restricted as part of the COVID-19 public health initiatives, digital connection has been vital for keeping Scotland running and combatting loneliness and isolation.

The COVID-19 pandemic has reinforced that good quality digital connectivity is more vital than ever. Households, educational establishments and businesses across Scotland have been forced to do more and more online – leading to an increased demand for the digital infrastructure that supports people to connect, study and work from home effectively.

In Scotland, some parts of infrastructure are devolved to the Scottish Government, while some remain reserved to the UK Government. The present update covers progress in both areas.

Examples of progress on cross-cutting policies in support of this outcome

The Infrastructure Investment Plan - [The Infrastructure Investment Plan 2021/22, – 2025/26](#) was published by the Scottish Government in February 2021, alongside a [Capital Spending Review for 2021-22 to 2025-26](#) and taking account of the recommendations of the Infrastructure Commission for Scotland and the feedback from the consultation of the draft Plan in Autumn 2020. The Plan outlines a coherent,

and strategic approach to delivering our National Infrastructure Mission. It demonstrates the vital role infrastructure has to play in helping businesses and communities to adapt and recover from the COVID-19 pandemic and highlights the importance of adapting current and future assets to the impacts of climate change. Key investments featured in the Plan include the confirmation of £150 million additional funding for flood risk management, £12 million to help us adapt to the threat of sea level rises (see chapter 1) and £60 million to support climate adaptation and resilience in our trunk road network.

The Grangemouth Future Industry Board - Announced in the 2020-2021 Programme for Government, the Grangemouth Future Industry Board has been established with a focus on Scotland's largest manufacturing cluster (home to a number of key infrastructure assets). The Board will strengthen alignment and coordinate activity ensuring that the significant opportunities for low carbon economic growth are maximised at Grangemouth. The Board brings together key decision makers, organising public sector initiatives and workstreams in order to unlock potential investment that boosts the economic development, innovation, longevity and competitiveness of the sites – with decarbonisation woven through all aspects of its work. Futureproofing this vital industrial hub will help support a long-term, sustainable future for Grangemouth, and the Board will work to advance the infrastructure necessary to support the cluster, including activity to bolster transport infrastructure, resilience planning and the planning of flood defences.

The National Transport Strategy - Following on from the publication of the second National Transport Strategy (NTS2) in February 2020, the first annual [Delivery Plan for the National Transport Strategy](#) was published in December 2020. This brings together, for the first time, the actions Scottish Government will take to deliver the priorities in the Strategy, namely reducing inequalities, taking climate action (towards both adaptation and emissions reduction outcomes), helping to deliver inclusive economic growth and improving health and wellbeing. Further information on how the implementation of the strategy is supporting adaptation can be found below.

Examples of progress on policies in support of sub-outcome that: “Scotland's Scotland's devolved supporting systems are resilient to climate change”

Strategic Transport Projects Review - In early 2019, Transport Scotland started the [second Strategic Transport Projects Review \(STPR2\)](#) process to help inform transport investment in Scotland over the next 20 years. STPR2 is helping to deliver the vision, priorities and outcomes for transport set out in the National Transport Strategy (NTS2), in alignment to other strategic frameworks such as the new National Planning Framework, Climate Change Plan and Infrastructure Investment Plan. The [STPR2 Update and Phase 1 Recommendations](#) report was published in February 2021 and recommends 20 interventions against eight themes and provides

key analysis of transport trends throughout the COVID-19 pandemic. The key interventions include a range of actions with relevance to building climate resilience – such as influencing travel choices, contributing to placemaking principles in neighbourhoods and reallocation of road space for active travel. Phase 2 of STPR2 is expected to report in autumn 2021.

Resilience of Scotland's Road Network to Landslides - The review of recommendations from the [Implementation Report](#) is currently being revisited in light of the landslide events at A83 Rest and Be Thankful during autumn 2020, with a final report due later in 2021. In the meantime, a programme of planting on the slope above the Rest and Be Thankful to stabilise the soils has been agreed with Forestry and Land Scotland (FLS), with preparatory works started in February 2021. Transport Scotland and FLS have agreed a comprehensive monitoring strategy for the project, encompassing a range of approaches to assess soil/ground movement and saturation, and to monitor the establishment and impact of the woodland. It is anticipated this impact will extend beyond the potential stabilisation of the slope and regulation of surface water flow, and include enhanced habitat connectivity through the glen with increased opportunities for improved biodiversity. In recognition of the continued landslide vulnerability at this location, a [strategic study](#) of potential road routes to Argyll has also begun. Furthermore, to improve the evidence base around landslides, a range of research publications have been issued – including: [Managing Hazardous Slopes: Innovative Monitoring Strategies for Managing Hazardous Slopes](#) (August 2020).

Landscape management around trunk roads -Transport Scotland has recently re-tendered the term contracts for the management and maintenance of the two southern trunk road units. As part of this process, the agency took the opportunity to review and revise many of the current contract requirements, including those related to the management of the trunk road landscape resource – the soft estate. Areas identified for improvement included the processes for tree management across the trunk road corridors. This was largely influenced by a recognition of the impact of climate change on native species and the related spread of non-native species and the increasing occurrences and severity of pathogens and diseases. New and robust procedures have been introduced for the survey, recording, inspection and management of all vegetation types across the network.

Managing the impacts of extreme weather events on the transport network - As part of regular reviews of the [Transport Scotland High Wind Strategy and National Wind Management Guidelines](#), the Met Office have undertaken a bespoke project on behalf of Transport Scotland to produce a new dataset of wind modelling over a thirty year period. The new modelling incorporates all Trunk and A Class roads and any climatic changes from the previous dataset. This data will serve to inform the

strategy and associated guidance as well as a providing a source of reference for Operating Companies for their own high wind management plans.

Tools for managing wider risks to the transport network - The [Transport Scotland Manual for the Management of the Risk of Unplanned Network Disruption](#) has been updated to include the requirements of Transport Scotland's Network Management Contract, as well as the 4th Generation Operating Company Contracts. The 2021 revision of the Manual will include increased Flooding, Landslide and Wind Management Plan requirements. The Manual provides direction to Operating Companies on managing and mitigating the effects of disruptive events, such as those caused by weather events. The Operating Companies also continue to develop and implement disruption risk processes which are informed by the formal recording of all previous events. Furthermore, the Manual includes a Disruption Risk Assessment Tool, which provides a robust and objective framework within which to analyse patterns of events, and their locations, in order to support decision-making and identify particularly vulnerable locations and assets.

Resilience of the rail network - Use of Scotland's rail network has been heavily impacted by the COVID-19 pandemic. Nonetheless, planning for future resilience and development of the network continues. In September 2020, Network Rail published its updated [Weather Resilience and Climate Change Adaptation Plan for Control Period 6 \(2019-2024\)](#). This was published shortly following the tragic train derailment following intense rainfall at Stonehaven. In 2020, ScotRail also published on its website a high level [Climate Change Adaptation Strategy](#). These developments are in-keeping with the Team Scotland approach of working collaboratively with Network Rail and Transport Scotland to ensure resilience of the network and identify adaptation interventions. Across climate change action more widely, the [Rail Service Decarbonisation Action Plan](#) was published by Transport Scotland in July 2020 and sets out the high level strategy to decarbonise domestic passenger services by 2035. This will be achieved through a rolling programme of electrification but also utilisation of alternative traction technology rolling stock on specific routes.

Developing Water Resilient Places - In February 2021, the Scottish Government published a new [Water Resilient Places policy framework](#). The framework reviews the Scottish Government approach to blue-green cities, brings forward proposals to support Scottish Water's increased use of natural, blue-green infrastructure to manage surface water away from homes and businesses, and to help create great places to live. The framework has been drafted in the context of the global climate emergency with input from key stakeholders with an interest in flood risk management, drainage, blue-green infrastructure, land-use planning and place-making. It aims to improve the management of surface water flooding by complementing and supporting existing policy and organisational responsibilities as

set out in the Flood Risk Management (Scotland) Act 2009. The policy objectives aim to make surface water management relevant to all sectors and make it a core consideration in designing for climate adaptation, sustainable place-making and delivering great blue-green places to live.

Other ongoing developments in surface water policy - In June 2018, Scottish Water signed a Sustainable Growth Agreement with SEPA, under the terms of which they will work together to explore new and innovative ways to manage resilience in rural and urban drainage catchments – including in the context of the changing climate. Scottish Water have joined with SEPA, the Scottish Government and Local Authorities to form the Metropolitan Glasgow Strategic Drainage Partnership and the Edinburgh and Lothians Strategic Drainage Partnership to develop innovative and integrated solutions to manage rainwater, flooding, flood risk and growth. Further Partnerships are expected to follow. As Scottish Water enter a new investment period (2021-2027) there will be a far greater emphasis on blue-green solutions.

Research to support a HydroNation: Scotland’s Centre of Expertise for Waters (CREW) has completed a range of research with relevance to climate change adaptation over the last year, all of which can be found on its [website](#) and which includes:

- The design of catchment monitoring systems to evaluate the effectiveness of Natural Flood Management measures.
- Post-flood studies to identify impacts upon people and communities, and recommendations for support and advice needed at different stages of recovery from flooding.
- The potential impacts of climate change upon private water supplies, and the resilience of these supplies in Scotland.
- A conference for scientists, engineers, planners and managers to share their observations, experiences, research outcomes, and innovative ideas on building resilience and adapting to low flows and drought conditions.
- Ongoing studies on the effects of climate change upon coastal erosion and flooding, assessment of vulnerability, and adaptation measures.

Examples of progress on policies in support of sub-outcome that “Scotland’s reserved supporting systems are resilient to climate change

Resilient broadband connections through the Reaching 100% Programme - Despite telecoms being reserved to the UK Parliament, the Scottish Government’s £600 million investment through the [Reaching 100% \(R100\) programme](#) will continue to deliver future-proofed and resilient broadband infrastructure in some of the most rural areas of Scotland. These networks will be transformational – in the short term, enabling faster broadband speeds and the growth of 4G and 5G; while, over time,

underpinning the growth of data-driven, connectivity-enabled technologies across Scotland.

Scottish 4G Infill Programme - A [progress update](#) on the Scottish Government's £25m Scottish 4G infill programme was published in February 2021. The programme aims to improve Scotland's connectivity by addressing up to 46 mobile 'notspots' (areas where no mobile coverage is available) in remote communities, from the Scottish Borders to Shetland and Orkney. Following a pause in build and site activities at most sites during the COVID-19 lockdown of spring 2020, work has now resumed following current COVID-19 guidelines. As of March 2021, 11 sites are now live and delivering 4G services, with a pipeline of further site activations to follow over 2021 through to 2023.

How the Adaptation Scotland Programme is supporting this outcome

In September 2020, the [Adaptation Capability Framework](#) (ACF) developed by the Adaptation Scotland programme was awarded the Institute for Environmental Management and Assessment (IEMA) Sustainability Impact Award. The ACF was co-developed with a range of major organisations, including infrastructure operators and is currently being used by bodies such as Scottish Water and Transport Scotland to develop, monitor and evaluate their work to adapt to climate change.

Adaptation Scotland continues to provide one to one advice and capacity building support to enable organisations to use the ACF, track their progress and set aims, objectives and targets for their adaptation activities. The programme also supports peer to peer learning and collaboration, enabling organisations to work across sectors to identify and overcome shared challenges.

Chapter 5: Natural Environment: Progress towards “our natural environment being valued, enjoyed, protected and enhanced and having increased resilience to climate change”

Scotland’s world-renowned natural environment supports a wide and diverse range of species and consists of rich and varied habitats. From peatlands to woodlands and urban greenspace to rivers, the natural environment is one of Scotland’s greatest assets and has been all the more appreciated by Scotland’s citizens during the COVID-19 lockdowns.

In February 2021, NatureScot published a report assessing Scotland’s current progress towards meeting the international Convention on Biological Diversity’s Aichi Targets. The report finds that while Scotland is progressing well with mainstreaming biodiversity and increasing public engagement, there is still much more to do to meet the targets related to invasive species and the increasing pressure of climate change.

In order to both meet these targets and recover from COVID-19 we will need to reimagine how we use our land and natural assets. The dual challenges posed by climate change and biodiversity loss will be central to a green recovery. In recognition of this an extra £500 million investment in Scotland’s natural economy was announced in the 2020/21 Programme for Government.

The fifth and sixth chapters of SCCAP2 set out policies to protect and improve the resilience of our natural environment in the face of the challenges presented by climate change. The present chapter relates mainly to the terrestrial environment, whereas chapter six relates mainly to the marine and coastal environment.

An update on the National Planning Framework, which is also relevant to these matters, can be found in Chapter 1.

Examples of progress on cross-cutting policies in support of this outcome

A new Land Use Strategy - The Scottish Government’s [Third Land Use Strategy](#) (LUS3), published March 2021, sets out the long term vision for sustainable land use in Scotland, the main objectives and key policies that can help deliver this. Through the publication of the Strategy the Scottish Government has taken the opportunity to reset its focus on to the integrated nature of land use at a landscape scale. This approach allows the Strategy to showcase the wide range of demands we place upon and the benefits we seek from our land in a manner that is relatable to the landscapes that the people of Scotland live and work in. By understanding these interdependencies and sometimes conflicting relationship, the fine balance of sustainable land use in aid of our long term national priorities can be secured.

Biodiversity Strategy and Routemap - In December 2020, the Scottish Government published a [Statement of Intent](#) on the Scottish Biodiversity Strategy

post 2020. The Statement sets out the Scottish Government's priorities for tackling biodiversity loss. Currently, 22.7% of terrestrial land is protected and the Statement commits to increasing protection on land to 30% by 2030 and examining options to extend this even further. During 2020, ecosystem restoration has shown increased progress and collaboration, with the consolidation of the landscape-scale [Cairngorms Connect](#), the largest restoration project in Europe, covering 600km². Green network expansion has been achieved through numerous projects including the International Union for Conservation of Nature river restoration and biodiversity project, plus the Green Infrastructure Fund and related Community Engagement Fund (see chapter 1 and chapter 2 respectively). Large utilities companies in central Scotland are also following Crown Estate Scotland's lead in using the Natural Capital Protocol to prioritise new investment in green infrastructure.

Forestry Strategy - In June 2020, the Scottish Government published [Scotland's Forestry Strategy Implementation Plan 2020 - 2022](#). Although this may require updating in response to changing priorities due to the pandemic, it provides the baseline for the initial delivery of the objectives of [Scotland's Forestry Strategy 2019-2029](#), including those relating to adaptation and improving resilience. Priority will be given to the actions that best support the forest sector restart following the COVID-19 emergency. The first report to Parliament on delivery of the Strategy is due by the end of 2022.

Examples of progress on policies in support of sub-outcome that: "Scotland's biodiversity, ecosystems and landscapes are adaptable to the changing climate"

Restoring Scottish peatlands - Peatland restoration has a key role to play in responding to the twin challenges of the climate emergency and biodiversity loss, and by supporting jobs in rural areas is also a key component of a green economic recovery. As outlined in the 2020-21 Programme for Government and the December 2020 Climate Change Plan update, the Scottish Government is committed to significantly increasing the rate of peatland restoration as one of the transformative changes needed to meet Scotland's national emissions reduction targets. These actions will also have significant benefits in building resilience to the impacts of climate change, in relation to biodiversity, flood risk management and improvement of water quality. In the 2020-21 budget the Scottish Government announced funding of £20 million for peatland restoration with a commitment to invest more than £250 million over 10 years, to support restoration of 20,000 hectares of Scottish peatland annually towards a total of 250,000 hectares by 2030.

Standards for the Sustainable Management and Expansion of Forests and Woodlands - The four administrations of the UK have begun work on the review of the UK Forestry Standard (UKFS). The review takes place every five years and the

aim is to update and publish the next version by the end of 2022. The Standard includes good practice requirements to enhance the resilience of forests and woodlands to mitigate the risks posed to their sustainability by the effects of climate change or impacts of pests and diseases. The Standard provides the basis for Scottish Government support for sustainable woodland creation and management. Advice and information is available to help forest managers implement the UKFS requirements to enhance forest resilience and the potential of forests to protect communities and the environment from the effects of climate change. Further guidance is being developed in the form of a UK Forestry Standard Practice Guide on adapting forest and woodland management for the changing climate.

Certified woodland in the UK has been independently audited against the UK Woodland Assurance Standard (UKWAS). In 2019/20, 59% of the total wooded area in Scotland was UKWAS certified, the same amount as the previous year. However, it should also be noted that woodland that is not certified may also be managed sustainably.

Expanding the Area of Forests and Woodlands - In 2019-20 the Scottish Government increased total woodland cover in Scotland to 18.8%, planting more than 11,000 hectares of new woodland, over 40% of which was native woodland. This means that around 22 million trees were planted in one year and accounted for over 80% of all woodland created in the UK. The updated Climate Change Plan details the Scottish Government's ambition to further increase and accelerate woodland creation, aiming to plant 18,000 hectares a year by 2024-25. As noted above, woodland creation also offers a range of adaptation benefits – such as providing natural flood defences and promoting biodiversity resilience.

Ensuring new woodlands are resilient to the future impacts of climate change is embedded in the international principles of sustainable forest management, supported by the Scottish Government and applied through the UKFS. Information is available to support decisions on woodland design and tree species choice. For example, the [Ecological Site Classification](#) decision support tool incorporates future climate change projections and provides users with information on future suitability of tree species. Woodland creation also offers a range of adaptation benefits to society – such as providing natural flood defences and promoting biodiversity resilience.

Monitoring the resilience of Scottish forests and woodlands - The global COVID-19 pandemic has meant that Scottish Forestry's typical programme of helicopter-based tree-health surveillance was severely modified. However a single survey across Scotland was successfully completed. Scottish Forestry is currently reviewing and updating all of its contingency plans, taking on board new research evidence and information on the likelihood of pest and disease incursion from outside of the UK. Scottish Forestry has also commissioned work on drought risk to Scottish forests and woodlands due to climate change, and work on a series of best

practice case studies looking at a range of forests and woodland types and exploring the different adaptation measures they have introduced.

Separately, in February 2020, a [study](#) into woodland ecological condition was published by the National Forest Inventory as Official Statistics. This is the largest and most in-depth assessment of the ecological condition of any habitat in the UK. The study found that all woodland can make a valuable ecological contribution with almost 80% of native woodlands found to be in 'favourable' or 'intermediate' ecological condition and only 6% of non-native woodlands in 'unfavourable' ecological condition.

Finally, Scottish Forestry has been working with the other UK administrations and Forest Research to produce a UK Forestry Standard Practice Guide on designing and managing woodlands and forests to reduce flood risk, to be published later in 2021.

NatureScot Pollinator Strategy for Scotland 2017-2027 - During 2020-21 there was activity across all five main objectives of the Strategy, as set out in the [2020 Progress Report](#). For example, surveys funded by NatureScot showed that farms benefiting from Scotland's Agri-Environment Climate Scheme had a higher number and diversity of pollinators due to habitat improvements. This positive impact can be seen across over 55,000 ha with a funding commitment of over £20 million. Furthermore, 2020 saw a range of pollinator habitat creation and enhancement projects including Buglife's 'Central Scotland B-Lines' mapping project and the RSPB's 'Enhance, Create and Pollinate', both of which received Biodiversity Challenge Fund support (see below). Evidence-based monitoring has also continued through the UK Pollinator Monitoring Scheme, which is financially supported by Scottish Government and secured a further two-year period of funding in partnership with Defra, Welsh Government and the Joint Nature Conservation Committee. Alongside this, pollinator-friendly management practices have been applied to a range of public spaces managed by local authorities, notably in East Dunbartonshire, Falkirk, Stirling, Glasgow, South Lanarkshire and Angus.

NatureScot Biodiversity Challenge Fund - During 2020, 16 projects addressing biodiversity and the impacts of climate change were funded. Examples of the projects include work to restore natural river processes; efforts addressing invasive species; boosting the resilience of pollinators by connecting their habitats; and riparian tree-planting to ameliorate rising in-stream temperatures. Overall, funding of £4.4 million has now been offered to 37 projects in two rounds of the fund. Ten of these are complete, many are now in their final stages, and only a limited number have identified the need for delays due to COVID-19 restrictions.

National Monitoring Strategy for Biological Diversity - In April 2020, NatureScot and partners, with other international experts, submitted advice to the Convention on Biological Diversity on the role of genetics in nature's resilience to climate change. This work has attracted international interest, particularly with potential partners in Europe and North Africa. Also during 2020, NatureScot completed an [assessment](#) of progress against the CBD Aichi targets up to 2019, including climate change impacts on biodiversity.

Protecting and improving Scotland's water environment - The River Basin Management Plans (RBMPs) set out how the Scottish Government, SEPA, other responsible authorities and partners work together to protect and improve the water environment in Scotland. The plans aim to prevent deterioration and improve the quality of the water environment to at least good condition. SEPA is currently consulting on the draft RBMPs for 2021 to 2027 with the consultation closing on 22 June 2021. The draft plans are structured around how RBMPs can help deliver Scotland's environment strategy, contributing to a net-zero emissions and circular economy. The plan takes a whole systems approach to dealing with the climate emergency and the biodiversity crisis and is focussed on the following themes: healthier and more resilient communities; water supply and wastewater infrastructure; sustainable and resilient rural land-use; and removing man-made barriers to fish migration.

Environmental Protected Areas - During 2020, the NatureScot Protected Areas Committee, mandated by the NatureScot Board, oversaw a review of protected areas in Scotland. Alongside issues such as resourcing, public perceptions and addressing site condition, the review covers both the implications of climate change and how protected areas can contribute to adaptation (as well as mitigation) outcomes. The review identified protected areas as biodiversity hot-spots for creating nature-based solutions. This depends on them becoming better integrated into nature-rich ecological networks, delivering on the Vision for Protected Areas signed off for the Scottish Biodiversity Strategy in 2020. A sub-investigation of monitoring concluded that to properly understand the inevitable effects of climate change on Scotland's nature, requires a transition to more holistic measurement of ecosystem function, both within and around protected areas.

Examples of progress on policies in support of sub-outcome that "Scotland's natural environment and its contribution to wider societal adaptation is enjoyed, valued and maintained"

Public engagement in Forestry and Woodlands - Due to the COVID-19 pandemic, supporting opportunities for children to play and learn in woods has been delivered through the online provision of training for childcare and learning providers such as teachers and nursery staff. This included: webinars for early

learning and childcare staff on woodland ecology; webinars on STEM teaching and learning in nature, in tree and forest settings for teachers.

NatureScot's People and Nature Survey 2017/18 found that 116.6 million visits were made to forests and woodlands in Scotland between May 2017 and April 2018, these included activities such as walking, cycling/mountain biking and picnicking. The survey is conducted every two to three years and when the [survey](#) was repeated in 2019/20 (concluding just before restrictions were imposed due to the COVID-19 pandemic) it was estimated that 123.4 million visits took place. This was an increase of almost 6% over the previous reporting period and would likely have been higher still had the survey covered a full 12 (rather than 11) month period. [Research](#) carried out by NatureScot in 2020 showing a big rise in the number of people visiting the outdoors to enjoy nature. The proportion of people visiting the outdoors at least once a week rose from 64% in August 2019 to 71% during the initial lockdown from March to May, and 80% between August and September. Almost three-quarters (70%) of people felt spending time outdoors in nature this year helped them to de-stress, relax and unwind and 56% agreed that it improved their physical health.

Outdoor Learning in Nature - The NatureScot [Learning in Local Greenspace project](#) had, by December 2020, exceeded the target of 100 green spaces being regularly used for outdoor learning and play, improving the greenspaces where necessary to allow this to happen. The project has engaged 115 schools from 12 local authorities. All the schools have received their project resources and were supported by Outdoor Learning in Nature partners and others, including staff training on outdoor learning. In addition, NatureScot, ran a wildlife camera-trap competition and developed a webinar to support schools.

National Nature Reserves (NNR) - In 2020, NatureScot completed an internal review of how National Nature Reserves contribute to climate adaptation and mitigation, identifying a wide range of potential new measures. NNR management can be optimised to boost the resilience of habitats, which in turn supports work with neighbouring land managers to help wildlife affected by climate change move across wider landscapes. NatureScot also began developing follow-on arrangements to track the natural capital value of its landholdings, as it set out in its 2019 [report](#).

How the Adaptation Scotland Programme is supporting this outcome

Adaptation Scotland collaborates closely with NatureScot to support and champion the importance of nature-based solutions to tackling climate change. For example, NatureScot is a key partner in the programme's work to support place-based adaptation in the Highlands and Islands (see chapter 1) and is actively engaged in using the [Adaptation Capability Framework](#).

Chapter 6: Progress towards “our coastal and marine environment being valued, enjoyed, protected and enhanced and having increased resilience to climate change”

Scotland’s diverse marine environment is home to a wide range of habitats and species which continue to provide economic benefits for people, industry and society. Iconic Scottish landscapes can be found on its coasts which stretch for over 11,000 miles. Aside from being a tourist attraction and asset in and of itself, the marine and coastal environment offers a sizeable contribution to the economy with Scottish waters covering 62% of the UK’s domestic exclusive economic zone.

Scotland’s coastal waters are in good ecological conditions and over 37% of our seas have been designated as protected areas, well over the current target of 10% as defined by the Convention on Biological Diversity’s Aichi targets and exceeding the new targets of 30% by 2030 (which are still under negotiation). However, as the impacts of climate change increase and place pressure on our coastal and marine environments, it is crucial to keep building resilience to ensure that this good ecological status is maintained for future generations.

Examples of progress on cross-cutting policies in support of this outcome

National Marine Plan (NMP) - Marine industries and the marine environment have an important role to play in achieving Scotland’s climate change ambitions. The [NMP](#) contains a general policy requirement that planners and decision makers act in the way best calculated to mitigate, and adapt to, climate change. Consideration of mitigation and adaptation measures is also woven throughout the policies and objectives of the sectoral chapters. A review of the NMP was published on 23 March 2021. It concluded that whilst the current NMP provides for consideration of climate change impacts throughout its policies and objectives, over the last two years a new level of urgency and intensity has developed around the need to tackle what is now recognised as a global climate emergency. This is required to respond to “the transformational impact of the climate emergency on the marine space” and help ensure that the marine planning framework can best address the challenges cause by these impacts. Ministers will make a decision later in 2021 on whether to amend or replace the National Marine Plan.

Biodiversity Strategy - A new deep sea marine reserve was designated in addition to four in-shore Marine Protected Areas and 12 Special Protection Areas, resulting in 37% of Scottish seas designated for nature conservation. For more information on the Scottish Biodiversity Strategy see Chapter 5.

Examples of progress on policies in support of sub-outcome that: “Scotland’s coastal and marine biodiversity, ecosystems and landscapes are adaptable to the changing climate

Dynamic Coast -The Dynamic Coast project provides a national evidence base on coastal erosion in Scotland, helping to support planning decisions on the coast and promoting coastal change adaptation.

Dynamic Coast 1 (DC1), published in 2017, provided businesses and communities with readily interpretable evidence and modelling of anticipated erosion. It showed that since the 1970s there has been a 39% increase in the extent of shores eroding landwards, and a doubling of the average erosion rate to 1 m/yr. This coastal response is consistent with climate change and is expected to quicken as sea levels continue to rise.

Dynamic Coast 2 (DC2) project will launch in 2021. It will assess the impacts of sea level rise on already increasing erosion rates helping us to become ‘sea level wise’ by planning and adapting now for our changing climate. With data updates and new tidal surveys DC2 will show how erosion is affecting more shores than was the case in DC1 and anticipate how erosion will further impact the soft coast by 2100.

Marine Litter Strategy - Work progresses under the original Strategy published in 2014, delivering policies and legislation to promote behaviour change, reduce sources of marine and coastal litter, improve marine litter monitoring and strengthen national and international co-ordination. Significant progress has been made to address plastic pollution at a macro and micro level in conjunction with work under the terrestrial [National Litter Strategy](#). Both strategies are under review with refreshed versions expected in 2021. Furthermore, Marine Scotland funds Local Coastal Partnerships around Scotland’s coastline which all have a role to play in supporting beach cleans and other efforts to reduce marine litter and Marine Scotland Science is collecting a range of marine litter data on MSS trawlers. Further policies to reduce marine litter can be found on the Marine Scotland [website](#).

Scotland's Future Fisheries Management Strategy - The [Future Fisheries Management Strategy](#) (FFMS), covering the period to 2030, was published in December 2020 and details Scotland’s vision for being a world-class fishing nation which delivers responsible and sustainable fisheries management. Protecting our natural assets is a fundamental part of FFMS and the strategy reflects the Scottish Government’s commitment to taking positive collaborative steps to address the issues around climate change (both adaptation and mitigation). As part of the FFMS we set out a series of actions to help develop our understanding of the potential changes that climate change will bring and the impacts those changes will have on our fishing activities, and also to understand the contributions that the fisheries sector itself makes to climate change and what we can do to reduce its impact.

Examples of progress on policies in support of sub-outcome that: “Scotland’s coastal and marine environment and its contribution to wider societal adaptation is enjoyed, valued and maintained

Scotland’s Marine Assessment - Marine Scotland continue to monitor Scotland's marine and freshwater ecosystems to document the impacts of climate change. [Scotland's Marine Assessment 2020](#) (an update of Scotland's Marine Atlas 2011) was published in December 2020. It is now available to access as an [online portal](#). One of the headline messages from the assessment is that “climate change is the most critical factor affecting the marine environment”. The assessment includes a dedicated chapter with further information on how the effects of climate change are already evident in the marine environment and how the marine environment is likely to change in future. These impacts include changes to the microscopic life forms that form the base of the marine food web, distributional shifts in the range of many species, and changes in abundance and body size of fish species (including several commercially important species).

Monitoring Climate Change Impacts in Scottish Seas - Marine Scotland Science’s monitoring of the environment and ecosystem in Scotland’s coastal and oceanic marine zone continued in the past 12 months, although data collection of many monitoring programmes was reduced due to the COVID-19 pandemic. A highlight in 2020 was the deployment of a new near-real-time monitoring buoy at the Scottish Coastal Observatory (SCObs) site in Loch Ewe (funded through the COMPASS Interreg project) to collect information on the environmental conditions. Measurements of ocean acidification (a reduction in pH due to the ocean’s uptake of excess atmospheric carbon dioxide) are sparse in coastal environments, and the SCObs programme has expanded its discrete water sampling and sensor data collection programme to address this.

Marine Climate Change Impacts Partnership (MCCIP) - Marine Scotland has continued to support the work of the MCCIP. MCCIP published its latest [report card](#) in January 2020, which states, among other key findings, that warming seas, reduced oxygen and ocean acidification are already affecting UK coasts and seas. The report card and its scientific background papers contributed significantly to the scientific evidence base informing Scotland’s Marine Assessment 2020 Climate Change chapter (see above). The publication of the report card concluded MCCIP’s reporting cycle, and an analysis of research gaps to improve information for the next report card is now in progress. The MCCIP [business plan 2020-2025](#) was launched in April 2020, and will drive the partnership’s activities in the next 5 years.

Crown Estate Scotland Climate Change Action Plan - In February 2021, Crown Estate Scotland published its [2021-23 Climate Change Action Plan](#) which includes

actions to contribute to, as well as report on, climate change adaptation. For example, the Plan commits to a new approach to considering financial and wider value benefits in decision-making. This approach will use indicators for monitoring progress on actions to increase resilience and reduce risk in the face of climate change.

How the Adaptation Scotland Programme is supporting this outcome

Adaptation Scotland is a partner in the Dynamic Coast project and is involved in developing and promoting the outputs from its second phase (see above).

Chapter 7: Progress towards “our international networks being adaptable to climate change”

The COVID-19 pandemic has been a stark example of the need for international cooperation on tackling cross-border issues such as climate change. It has also highlighted that while large system stressors such as a pandemic or extreme weather affect everyone they do not affect everyone equally. The Scottish Government champions a climate justice approach to building climate change resilience, recognising that the most vulnerable in society will be impacted more by climate change yet have often done the least to contribute to its cause.

The January 2021 [Climate Adaptation Summit](#) saw global heads of state come together to support accelerated action on adaptation. The Summit launched a number of initiatives such as the Adaptation Action Agenda. The next major milestone will be COP26 in Glasgow in November 2021, which will be a key opportunity to review progress to the aims of the 2015 Paris Agreement in terms of both emissions reductions and adaptation.

Ahead of COP26, the Scottish Government will publish its indicative nationally determined contribution in the spirit of the Paris Agreement. Nationally Determined Contributions (NDCs) are at the heart of the Paris Agreement, and embody efforts by each country to reduce national emissions and adapt to the impacts of climate change³. As part of the Scottish Government’s commitment to engaging with and raising global climate ambition ahead of COP26, the indicative nationally determined contribution will set out Scotland’s ambitious approach to tackling climate change. The document will include a specific section in the style of an Adaptation Communication which sets out Scotland’s innovative programme for climate change adaptation including its people-centric and place-based approaches and the climate justice thread which runs through Scotland’s domestic and international adaptation actions. The Scottish Government, along with the other Devolved Administrations, inputted into the UK’s NDC which was formally submitted to the UNFCCC in December 2020.

Whilst not covered in detail in this year’s report, the Scottish Government also continues to seek to minimise the impacts of the UK’s Exit from the European Union on our approaches to collaborative action on global issues such as climate change.

³ See United Nations Framework Convention on Climate Change (UNFCCC) website for information on NDCs: <https://unfccc.int/>

Examples of progress towards achieving the sub-outcome that “Scotland is active in international governance, helping to manage the potential international instability caused by climate change.”

International Governance: The Scottish Government plays our part in international governance through our participation in international fora such as:

- **RegionsAdapt** - As a member of the RegionsAdapt initiative, the Scottish Government has submitted information on our most pressing climate risks, and actions being taken to address them, through the Carbon Disclosure Project platform. This information fed into the [RegionsAdapt Brief Report 2020](#), published in December 2020, which presents the climate adaptation efforts of 28 regional governments for a resilient future. In March 2021, RegionsAdapt was announced as an official partner for the UN Race to Resilience initiative.
- **British-Irish Council** - The Scottish Government continues to engage through the adaptation working group of the British Irish Council. The group hosted a major online symposium in October 2020 to review and discuss approaches to climate resilient infrastructure across Britain and Ireland.

The Scottish Government also supports our developing country partners build more resilient and equal societies.

Climate Justice Fund support for developing countries: The Scottish Government provides support through its world-leading funds:

- **Climate Justice Fund (CJF)** - The Scottish Government has now exceeded its commitment made at COP21 in 2015 to provide an extra £12 Million to support projects in Malawi, Zambia and Rwanda through our world-leading [Climate Justice Fund](#). In March 2021, we commissioned an independent evaluation to look at the CJF. This evaluation will assess the effectiveness of the fund in delivering climate justice objectives and appraise the programme's achievements to date. We are also ensuring that, at its centre, the evaluation be built on the experiences of communities in Malawi, Zambia and Rwanda who have implemented or are supported by CJF projects. The findings will help inform the next phase of the Fund so that it remains influential and at the cutting edge of climate justice work globally.
- **Climate Challenge Programme Malawi (CCPM)** - was launched in 2017 as a £3.2m programme running to 2020 to help vulnerable rural communities in Malawi design their own solutions to the problems resulting from climate change. Activities implemented have been centred upon key themes of food security, water access, renewable energy and community advocacy. In August 2020, the Scottish Government confirmed an additional fourth year of the CCPM to now run until September 2021, with an additional spend of £1.5m, which brings total spending on the CCPM throughout its lifetime to £4.7m.

- **Climate Justice Innovation Fund** - Between 2017-21 The Climate Justice Innovation Fund (CJIF) has supported 15 projects in Malawi, Rwanda and Zambia develop innovative solutions to the problems caused by climate change. Previous projects have ranged from Voluntary Service Overseas Scotland providing sustainable energy for school meals in Malawi to the Malawi Fruits project which aims to address post-harvest losses in northern Malawi (Mzimba) and generate increased farming profit for women farmers and persons with disabilities through combining training with the establishment of a co-operative-owned and solar-powered cold store. More recently CJIF has supported Scottish Environment Protection Agency in empowering women, youth and other vulnerable groups to hold NGOs and other service providers to account for water provision.

Other support for developing countries: The Scottish Government also provides support through a range of other routes, including:

- **Young Malawian Climate Leaders** - Beginning in 2018, Malawi's Climate Leaders, a partnership between the 2050 Climate Group and the Malawi Scotland Partnership, has built a network of young people in Malawi who are active in advocating for action on climate change. The Malawi's Climate Leaders project has recruited and trained 50 young people from thousands of applicants, to be climate leaders. As well as working with young people in Malawi, the project establishes knowledge-sharing relationships with young people working in Scotland to help them build international relationships focused on a shared ambition to tackle the global climate emergency. Events involve young people in both countries building their skills and learning from each other, and deepening peer-to-peer relationships. In September 2020 during New York Climate Week, the First Minister announced £103,012 to fund a third year of the project.
- **Support for Kasisi Agricultural Training Centre** - This project ran from January 2017 to September 2020. The project worked to change agricultural practices in Zambia across six provinces and has led to [Kasisi Agricultural Training Centre](#) becoming a more financially sustainable organisation. Despite the challenges presented by drought and COVID-19, progress was made in areas such as influencing farming practices at government institutions and valuable learning generated for future. A project report is available on the Scottish Government [website](#).
- **International Knowledge Sharing through Hydro Nation** - Hydro Nation supports the Climate Justice Fund Water Futures Programme in Malawi which continues to provide assistance to the Government of Malawi to achieve Sustainable Development Goal 6 through four main work streams: rural water asset analysis and new urban and peri-urban asset analysis; policy support; capacity building; and, research and knowledge exchange. The project will publish its final report in summer 2021. Through the Malawi Scotland Regulatory Partnership, Hydro Nation also supports SEPA knowledge

exchange on regulatory functions related to the management of water resources. SEPA is also helping to establish Malawi's own Environment Protection Agency.

How the Adaptation Scotland Programme is supporting this outcome

Adaptation Scotland collaborates with a range of international partners to share learning on adaptation and ensure that Scotland's own approach is informed by international best practice. One forum for such engagement is the Programme's current participation in the [KE4CAP – Knowledge Exchange Between Climate Adaptation Platforms](#) – project which brings together platforms from around the world to share learning and develop their resilience expertise. For example, through this project the Programme has recently engaged with Natural Resources Canada to share learning on Scotland's approach to developing risk assessment guidance for built environment and adaptation projects.

The [Adaptation Capability Framework](#) (see chapter 1) is recognised by international partners as a leading example of a capability maturity approach to adaptation. The Framework is being used as key source material for such frameworks being developed globally, including a recent resource published by the [Canadian Adaptation Learning Network](#) and a new framework being developed through the Irish and UK Transboundary Adaptation Learning Exchange. It was also included as part of the media library for the global Climate Adaptation Summit in January 2021.

Chapter 8: Research Outcomes

Expanding and improving the evidence base around climate change adaptation through research is vital to help support the implementation of adaptation policy and achieve the high-level outcomes set out in SCCAP2. Across the seven outcomes a number of commitments to undertake research projects were included, some of which build on already completed research. As the research programme develops and the climate change risk and resilience research landscape expands, new opportunities for research which were not included in the original programme but which contribute to the high-level SCCAP2 outcomes will be explored. This programme of work is enhancing our knowledge of climate risk and provide proposals for innovative ways in which Scotland can adapt to the changing climate.

This chapter identifies key areas of progress on the SCCAP2 research programme since its publication in September 2019.

The following pieces of research have been completed and published:

- In June 2020, ClimateXChange (CXC), as part of the delivery of Living with Flooding Action Plan (see Chapter 1), published a [baseline study](#) of **property flood resilience** (PFR) in Scotland. It provides a best estimate of the potential for PFR measures using SEPA flood mapping data and the uptake of the measures in 2019. The study found that an estimated 1,400-1,500 properties are currently protected by PFR across Scotland but that potentially around 81,000 properties may benefit from the uptake of some kind of PFR measure.
- In September 2020, CXC published a [report](#) exploring the **vulnerability of Scottish soils to a changing climate**. The report identified thirteen indicators with potential to measure soil vulnerability to climate change in all soil types. The report found that Scotland has a significant, world-leading soil knowledge base and a broad data resource portfolio but that there were gaps around the dependencies and interactions of the thirteen identified indicators.
- In January 2021, CXC published a [report](#) analysing, on the basis of three case studies, how providers of adult social care support at home in Scotland respond to extreme weather events. The report identified key findings about planning for extreme weather events, the resilience of staff and further learnings which could cut across “system stressor” events.
- In March 2021, CXC published a [report](#) considering the ambition for **20 minute neighbourhoods** in Scotland and highlighting interventions that would support delivery of the concept, supported by findings from the baseline analysis. It found that communities across Scotland have the required services and infrastructure that would allow them to be 20 minute neighbourhoods. A clear plan which is people-centric and owned by local stakeholders is key. This research helps improve the evidence base around placemaking and place-based initiatives.

In terms of next steps on the SCCAP2 research programme, a second phase of the report exploring indicators of soil health vulnerability is currently underway. This phase will look at filling some of the evidence gaps identified in the first report and look at the applicability of the indicators in a practical context. Furthermore, a report exploring indicators for measuring recovery from extreme events is also due to be published this year, having been delayed due to staffing pressures around the COVID-19 response.

The remaining commitments for future research projects highlighted in SCCAP2 will be progressed during the remainder of the five-year implementation period for the programme. In addition, new research priorities will continue to be identified and the findings arising from ongoing and completed projects will be disseminated and incorporated into adaptation policy where appropriate.

Annex: Summary of risk assessment for Scotland from UKCCRA2

The UK Government is required under the 2008 UK Climate Change Act to publish a UK wide Climate Change Risk Assessment (UKCCRA) every five years, assessing the 'risks for the UK from the current and predicted impacts of climate change'. The second UKCCRA was published in 2017.

Prior to this, in 2016, the independent UK Climate Change Committee published its [Evidence Report](#) and Synthesis Report, including a [National Summary for Scotland](#), which provides the underpinning for the UKCCRA. Some actions identified as priorities for other parts of the UK have been shown to have a different urgency category for Scotland.

The Evidence Report used the concept of urgency to summarise the findings of the analysis, variously identifying 'more action needed', 'research priority', 'sustain current action' and 'watching brief' categories. For Scotland, it highlighted:

- The need for more action to address flood risks;
- The potential for water scarcity;
- Heat related impacts on health and wellbeing;
- Risks to the natural environment;
- Risks of food price volatility; and
- New and emerging pest and disease risks, especially for Scotland's forestry.

Table: UK Climate Change Risk Assessment: risks summary

Source - Adaptation Committee (of the Climate Change Committee)

The SCCAP2 programme responds to these priority risks within its outcomes-based framework. A list of the specific identified risks being addressed by the policies in each chapter can be found at the end of each chapter of SCCAP2.

As noted in the introduction to this report, the next statutory cycle of risk assessment and adaptation planning is now imminent. The Climate Change Committee will publish the Evidence Reports to underpin the next (third) UKCCRA in summer 2021, in advance of the UKCCRA in early 2022. That risk assessment will then in turn inform the development of the third Scottish Climate Change Adaptation Programme for publication in 2024.



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This publication is available at www.gov.scot

Any enquiries regarding this publication should be sent to us at
The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-80004-977-2 (web only)

Published by The Scottish Government, May 2021

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS871126 (05/21)

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