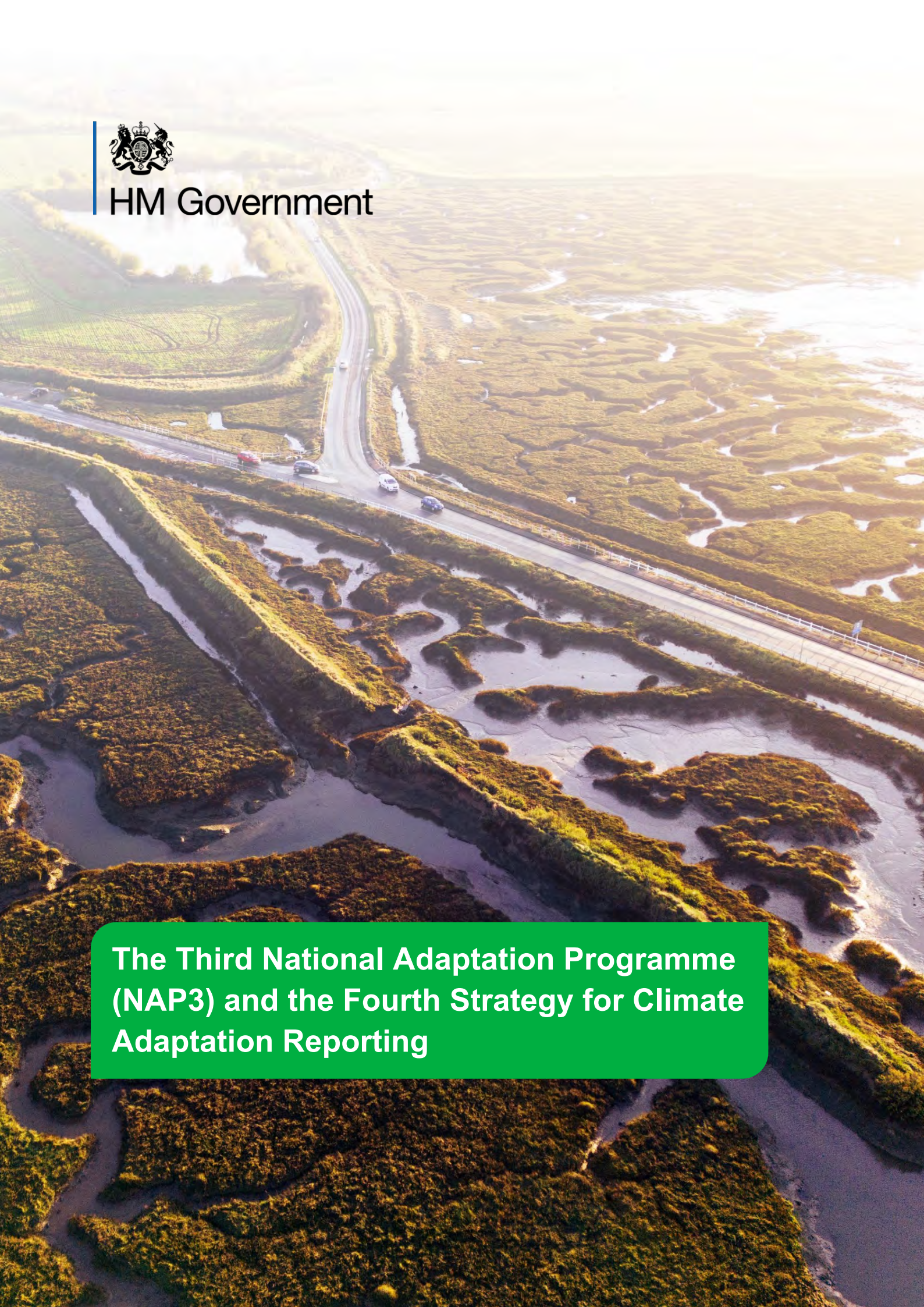

HM Government

The Third National Adaptation Programme (NAP3) and the Fourth Strategy for Climate Adaptation Reporting

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Presented to Parliament pursuant to Section 58 of the Climate Change Act 2008

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Ministerial Foreword

We all felt the impact of climate change during last summer's heat wave, when temperatures exceeded 40°C for the first time in this country. Our National Adaptation Programme sets out more comprehensively than ever before how we will respond to the impacts of a changing climate and strengthen our national resilience.

Climate change will bring more regular drought, rising sea levels and changes in rainfall patterns. This report sets out how we will adapt to these changes to protect critical infrastructure, the built environment, water supply and food production. Our plan will also support the delivery of other government priorities including economic growth and public health.

This programme represents a step change in our approach to managing the risks of climate change, moving us from planning to action. It represents the beginning of a 5-year programme of work across government to build our resilience to climate change.

We have already introduced requirements for new residential buildings to reduce overheating risks, making them more suitable for the warming climate. We are strengthening the resilience of English agriculture through our pioneering Environmental Land Management schemes, supporting farmers and other landowners to make their land more resilient to climate change. Our Plan for Water will require water companies to safeguard water supply through new infrastructure and greater efficiency.

We are protecting the economy too. Our Green Finance Strategy sets out how we will adapt our finance system to climate changes and encourage more private sector investment into climate adaptation and infrastructure projects. Greater resilience to climate shocks will also underpin sustained economic growth and adaptation will generate opportunities in new products and services.

Our plan also includes action to conserve our nature. Climate change is exerting increased pressure on species populations, including some of our most cherished yet threatened wildlife, such as the curlew. Our ambition to recover nature will help wildlife adapt in response to a changing climate. Green Infrastructure is an example of a Nature Based Solution that can help protect homes and communities from extreme heat and surface water flooding, whilst enhancing space for nature. The

national standards in the Green Infrastructure Framework provide a consistent way to set out what good green infrastructure provision looks like and will help increase the amount of green cover in urban residential areas and other places where it can deliver multifunctional benefits.

The UK is driving concerted and coordinated action to respond to international climate risks and their impacts on global supply chains, health, food production and finance networks. We are tripling our international funding for climate adaptation from 2019 to 2025 to help reduce climate change impacts overseas that could affect the UK.

We are continuing to improve the evidence base which helps us to make informed decisions on climate risks, with a new £15 million programme to further develop our world-leading scientific research.

Adapting our country to climate change is not something the government can do alone. Local authorities, infrastructure operators, regulators and arm's length bodies all have an important role to play. We will be expanding the scope of reporting under the Adaptation Reporting Power to invite more infrastructure and public service providers to assess their readiness for climate change, and timing the process better to inform our next Climate Change Risk Assessment. We will work with the Met Office to make climate data accessible to those who are adapting, building on the City Packs and Urban Heat Service to support local adaptation.

In response to the scale of the challenge that climate change poses, the government is setting out decisive action to address the risks to the UK. This 5-year adaptation programme begins now, placing the UK at the forefront of global adaptation efforts.

The Rt Hon Thérèse Coffey MP

Secretary of State for Environment, Food and Rural Affairs

Executive summary

The third National Adaptation Programme

The UK government is committed to taking clear and decisive action to maintain our country's resilience to the impacts of a changing climate. Our third National Adaptation Programme (NAP3) establishes a clear basis for action over the next 5 years, building on and developing the approach from previous rounds since 2012. It recognises and responds to the impacts of climate change already seen in the UK as well as those impacts expected over coming years. It sets out how we will maintain living standards and protect our environment by making sure the country is resilient and can effectively adapt to changes in our climate.

The UK government's vision for adaptation is for a country that effectively plans for and is fully adapted to the changing climate, with resilience against each of the identified climate risks.

This document represents the beginning of the programme of work to deliver this vision.

Through NAP3, the government is driving a step change in ambition from the previous programme (NAP2). We have set out a clear overarching vision that reflects the importance of the need to take adaptation action. We are taking a comprehensive approach, responding to every risk and opportunity in the Climate Change Risk Assessment, and we have provided more detail on how government proposes to address each individual risk in the attached annexes. We have also widened the scope of the NAP, responding to international risks impacting the UK for the first time.

The programme is focussed on 3 main themes: "action", "information" and "coordination". These will combine to ensure we are better-informed, more closely coordinated across government, and more action-focussed in our delivery over the 5-year NAP period.

The UK's national and local government bodies continue to work closely together to tackle climate change at both national and local levels.

Summary of the actions in NAP3

- **Infrastructure**
  - as set out in the new Resilience Framework, the government will deliver a strategic, whole of society approach to resilience, including new commitments on resilience standards
  - the Department for Environment, Food and Rural Affairs will drive £2.2bn of accelerated investment in water quality and resilient supply through the Plan for Water, helping to safeguard our water supply from the risks posed by the changing climate
  - the Department for Transport will consult on a new transport adaptation strategy, which will take a holistic approach to addressing climate risks to transport

- **Natural environment**
  - the Department for Environment, Food and Rural Affairs will take account of climate trends and hazards affecting local areas through Local Nature Recovery Strategies
  - the Department for Environment, Food and Rural Affairs will incorporate climate change adaptation into the design of Environmental Land Management schemes to promote resilient and sustainable land management and farming practices
  - the government launched the second round of Landscape Recovery in May 2023, which are focussed on supporting net zero, protected sites, and wildlife-rich habitats
  - Natural England will launch Six Nature Recovery Projects in 2023 and Defra will work with Nature Recovery Network delivery partners to identify and launch another 13 projects

- **Health, communities and the built environment**
  - the government will protect communities and businesses across England through a £5.2 billion investment in flood and coastal erosion schemes
  - the UK Health Security Agency will continue to deploy the Adverse Weather & Health Plan alongside the UK weather health alerting systems to protect lives and wellbeing
  - the Department for Levelling Up, Housing and Communities will update the National Planning Policy Framework to support both adaptation and mitigation efforts, in addition to recent updates to Building Regulations to reduce excess heat and unwanted solar gains in all new residential buildings

- the government will provide dedicated local climate projections service to each upper tier local authority to support local adaptation planning on hazards such as heatwaves, and short-term, localised heavy rainfall

- **Business and industry**
  - the government will work with industry, regulators and public finance institutions to deliver the Green Finance Strategy 2023, which sets out a range of actions being taken to protect the financial system from climate-driven impacts and to attract private investment into adaptation
  - the Department for Business and Trade will publish a new strategy on supply chains and imports in the autumn, to strengthen our ability to respond to threats to critical imports, such as from climate change
  - the Department for Business and Trade will survey business readiness for climate impacts and work with other departments to provide information and support to businesses on adapting to higher temperatures, water scarcity, storms and flooding

- **International impacts**
  - the government will help adapt and build resilience in vulnerable communities to climate related disasters, including through the tripling of adaptation funding through Official Development Assistance to £1.5bn in 2025, as outlined in the International Climate Finance Strategy
  - the government will continue to drive international action and consensus in negotiations on climate adaptation

- **Adaptation Reporting Power**
  - Chapter 8 presents the government's strategy for the fourth round of climate adaptation reporting and fulfils the requirements set out in the Climate Change Act
  - the government will:
    - make reporting more effective by realigning adaptation reporting with other parts of the government's statutory cycle, ensuring that the valuable evidence contained in these reports is able to inform the government's fourth Climate Change Risk Assessment
    - streamline requirements to minimise the reporting burden whilst balancing the need for reports to provide valuable insights in a shortened timeframe
    - explore targeted scope expansion to include additional reporting on canals and reservoirs, health and social care, and food supply. This will include inviting new bodies, such as the Canal and River Trust, to report, and identifying appropriate new

reporting organisations in the agriculture and food sector. We will also ask existing reporting bodies to cover certain aspects of their remits more fully, for example NHS England's role in social care. We will also pilot an approach to reporting by local authorities.

- Annex 4 sets out the detail of our plans on scope for the next round of reporting.

- **<u>Supporting evidence</u>**

  - Defra will:

    - support world-leading science and evidence, such as the UK Climate Projections
    - jointly fund a forthcoming £15 million UK Research and Innovation /Defra programme to support the research and innovation needed to deliver adaptation action

The NAP3 programme will continue to develop over the 5-year period. It will be underpinned by a programme of capability building and strong governance which will drive effective join-up across government and with our delivery partners, working together to realise our vision.

Chapter 1: Climate adaptation and the need to act

1.1 Introduction

The third National Adaptation Programme (NAP3) has been developed by the UK government, working with stakeholders across all sectors of the economy and levels of government. The programme brings together policies and actions to address the risks and opportunities arising from climate change identified in the third Climate Change Risk Assessment (CCRA3), in accordance with section 58 of the Climate Change Act 2008 (CCA 2008). It covers those areas falling within scope of the UK Government's responsibilities in relation to England, and its non-devolved functions in relation to the rest of the UK.

1.2 The need for action on climate adaptation

Climate change adaptation refers to the adjustments needed in response to changes to our planet's climate. Adapting structures and systems, including critical infrastructure, the built environment, water use and food production, can all help to reduce the impacts of climate change.

We are already seeing climate impacts across the globe, with observed increases in the frequency and intensity of heatwaves, flooding, drought and wildfires (source: Intergovernmental Panel on Climate Change, 2022). The oceans are warming, and glaciers and ice sheets are melting, which is causing sea levels to rise (source: Royal Meteorological Society, 2022).

The UK Climate Projections, produced by the Met Office on behalf of government, is a set of tools and data that show how the UK climate may change in the future.

"Climate change is happening now. The UK Climate Projections show how climate change will be felt differently across the UK.

Rising sea levels will affect all parts of the UK coastline. Sea levels will rise more in the south of the UK due to land movement - up to 1 metre by the end of the 21st century. Hot summers and heatwaves will become more intense and longer lasting, particularly in the south-east of England. Northern Ireland and Scotland will begin to experience summers like those currently felt in the rest of the country. Summer drought conditions will occur more often in the south of the UK, with winter rainfall increasing most in north and west. Heavy rainfall events that can lead to flash flooding are expected to become more frequent and intense across the country.

Summer temperatures above 40ºC, seen for the first time in July 2022, will become more commonplace by the end of the 21st century." (Professor Stephen Belcher, Chief Scientist, Met Office, April 2023).

These climate changes pose a risk to our national security and resilience, from producing food and securing water supplies to maintaining critical infrastructure and supply chains.

That is why the government is taking responsible steps now to manage the impacts of climate change. This report responds to the scale of the challenge that climate change poses by setting out the decisive action needed during this 5-year NAP to address the risks facing the UK.

1.2.1 Costs of climate change and benefits of adaptation

The evidence suggests that without action, the physical impacts of climate change are expected to create costs for households, businesses, and government. They could cost England's economy between 1% and 1.5% of Gross Domestic Product (GDP) per year by 2045, rising to between 2% and 4% per year by the late century (source: CO-designing the Assessment of Climate Change costs (COACCH), 2020).

We are beginning to see these impacts today. For example, the economic losses from flooding in England between November 2019 and March 2020 are estimated to be about £333 million and would have been significantly larger in the absence of flood defences. The 'Monetary Valuation of Risks and Opportunities in CCRA3' report found that around a quarter of the 61 climate risks and opportunities it identified each have the potential to result in economic impacts higher than £1 billion

per year by 2050. For example, major economic risks arise from coastal, river and surface water flooding.

Disruption from climate change also has the potential to reduce government revenues and increase government expenditure, reduce external performance (exports), damage infrastructure assets, increase social costs thereby increasing vulnerability for some population groups, and reduce economic growth (source: World Bank Group, 2020; Inclusive Futures, 2020).

However, early adaptation action can help to reduce future costs and many adaptation actions represent good value for money. The 'Monetary Valuation of Risks and Opportunities in CCRA3' report found that, for a range of early interventions, benefit-cost ratios typically range from 2:1 to 10:1. This means that every £1 invested in these adaptation actions could result in £2 to £10 in net economic benefits.

NAP3 will put the UK at the forefront internationally in responding to climate risks.

1.2.2 Opportunities for economic growth

Adaptation to climate change plays a role in supporting sustained economic growth by making our economy more resilient. Growth and climate change are closely linked as the climate has important impacts on our daily economic activity. Increasing the resilience of the natural environment, businesses, households and infrastructure can support long-term growth.

Adapting to changes in the climate can also provide opportunities for businesses in new markets and can drive innovation of new products and services. These include climate modelling, professional services such as architecture and engineering, and finance and insurance products. In addition, businesses which are well-adapted to climate change are likely to face less disruption and damage costs and will keep their products competitive.

Beyond GDP measures of growth, adaptation actions can also positively impact social welfare such as improving health outcomes and protecting natural capital, to ensure that everyone in society is prepared for the impacts of climate change.

1.2.3 Working in uncertainty

The extent and distribution of future climate impacts in the UK are uncertain. This uncertainty can stifle investment and effective policy making at national and local levels and prevents households and businesses from making informed decisions.

That is why the government is taking decisive action to adapt to climate change now while addressing uncertainties through research and monitoring.

There are likely to be significant variances in the distribution of climate change impacts in the population with low-income households facing the largest relative impacts (source: Joseph Rowntree Foundation, 2016). Climate change is also more likely to negatively impact on some population groups, such as people with disabilities and older people amongst others. Early and inclusive action will reduce these impacts and will support the most vulnerable communities, as well as small businesses that are less equipped to respond to the additional costs of climate change.

A flexible and responsive approach to adaptation is necessary so we can adapt as new information becomes available. NAP3 follows the advice of the Climate Change Committee (CCC) to plan for 2°C of global warming by 2100. We will do this while maintaining our COP26 commitments to keep 1.5 alive.

1.2.4 Encouraging and informing action

Adaptation to climate change requires action from across society. The impacts from climate change will be context and location specific, so each local authority (LA), business or household will be best placed to understand what action may be most appropriate for their circumstances.

The government has a role in supporting adaptation decisions to enable private actors, local government and citizens to adapt effectively. The government and its agencies, including the Office for National Statistics, the Met Office and the Environment Agency, will continue to actively identify, scope and develop relevant sources of climate data and will work with partners to increase the availability, uptake and usage of this data.

1.3 The legislative framework for climate adaptation

The UK is a world leader on climate change and was the first country in the world to enshrine government action on climate adaptation into law under the CCA 2008.

The CCA 2008 requires the government to complete a Climate Change Risk Assessment (CCRA) every 5 years, followed by a NAP setting out how the government will address the risks identified in the CCRA. The government is currently in its third statutory cycle of national risk assessment and adaptation planning under the CCA 2008.

The CCA 2008 also provides Defra's Secretary of State with the power (known as the 'Adaptation Reporting Power' (ARP)) to direct infrastructure operators and public bodies to report to government on how they are addressing current and future climate impacts. The strategy for the next round of adaptation reporting is laid out in Chapter 8.

The CCA 2008 also established the CCC, an independent body responsible for evaluating progress on the adaptation programme every 2 years. The latest 'Progress in Adapting to Climate Change' report was published in March 2023.

There is a whole-government approach to climate adaptation. Defra is the overall lead department for domestic adaptation to climate change, responsible for the adaptation requirements set out in the CCA 2008. Responsibility for risks that apply to specific sectors is the responsibility of relevant government departments.

1.3.1 The UK CCRA

The government published CCRA3 in January 2022, informed by an independent assessment undertaken by the CCC. The technical report for the independent assessment identified 61 climate risks and opportunities impacting multiple sectors of society, including risks to businesses, health and lives, buildings and communities, infrastructure and the natural environment.

For each of the 61 climate risks and opportunities, the urgency of further action was assessed based on global warming scenarios of 2ºC and 4ºC. The 2°C scenario was selected to be consistent with achieving the Paris Agreement goals. That is, to substantially reduce global greenhouse gas emissions to limit global temperature increases to 2ºC, while pursuing efforts to limit to 1.5ºC. The 4°C scenario was selected to be consistent with a scenario of limited global ambition for reducing emissions.

1.3.2 NAP3

This report responds to the 61 risks and opportunities identified in CCRA3, grouped into 5 chapters. Each chapter is supported by an annex that includes objectives for addressing each risk and opportunity (risk reduction goals), and proposals and programmes to achieve those objectives (actions), in accordance with section 58 of the CCA 2008. Timescales for introducing these proposals and policies are set out under individual risk actions.

The CCC's recent progress report on adaptation, produced under section 59 of the CCA 2008, has also been considered in the preparation of this NAP3. Further detail is set out in Annex 2. The government will be responding to the latest progress report by 15 October 2023, as required under section 37 of the CCA 2008.

Addressing climate change requires collaboration with those outside of the UK government. Chapters 7 and 8 set out the work of local government, devolved administrations and others on adaptation.

1.4 Our adaptation vision

The UK government's vision for adaptation is for a country that effectively plans for and is fully adapted to the changing climate, with resilience against each of the identified climate risks.

Achieving this will require the government to take a strategic approach to tackling climate change risks, considering the domestic adaptation and climate security implications to drive UK resilience to climate change. Prevention is always better than cure and this approach will achieve greater readiness to respond to the impacts of climate change, while ensuring that adaptation measures are in place to limit its severity and costs.

This report marks the beginning of a 5-year programme of work to set us on course to realise this vision. The programme will focus on 3 themes.

- **action** - getting the policy framework right, leveraging major government programmes and private investments to build resilience
- **information** - driving improvement in our capability through better evidence and tools
- **coordination** - taking an integrated approach through governance, engagement and coordinated policymaking

These 3 programme themes mark a step-change in the government's work on adaptation, putting in place a programme that will move us from planning to decisive action over the NAP3 period.

Each sector chapter in NAP3 sets out the existing and planned work taking place over the next 5 years against these themes.

1.5 Approach to climate change

1.5.1 Action

1.5.1.1 Leveraging major government programmes

Adaptation actions have co-benefits with other environmental, social and economic goals. This means we need to leverage major plans and programmes to maximise these benefits and build resilience. Each chapter in NAP3 highlights the major programmes and plans delivering adaptation action, including the ELMS, the UK Government Resilience Framework , and the National Planning Policy Framework (NPPF). This section sets out how adaptation has informed the government's wider priorities – whether it is building future homes or delivering new infrastructure.

Climate adaptation will also be essential in achieving other climate goals, including the government's target to reach net zero emissions by 2050, as set out in the March 2023 publication of the Net Zero Growth Plan and Carbon Budget Delivery Plan. For net zero to be possible, mitigation measures need to be resilient to climate risks. This includes planting tree species that can cope with future climate conditions, developing resilient infrastructure that supports increased use of electrified transport, and designing key support mechanisms (such as ELMs) to give land managers the right tools and incentives to make adaptive decisions.

Nature-based solutions are actions to protect, restore and sustainably manage nature to help address social and ecological challenges, such as climate change. Restoring nature has a wide range of potential benefits for helping communities, buildings, infrastructure and wildlife to adapt to climate change, such as natural flood management and cooling. Government action, such as the Green Infrastructure Framework, will mobilise the benefits that nature-based solutions have to offer.

The River Skell in North Yorkshire is flooding more frequently, damaging heritage such as Fountains Abbey. The National Trust is working with local stakeholders upstream to deliver natural flood management, including tree planting, woody debris dams and storage ponds. These nature-based solutions benefit the downstream community of Ripon.

1.5.1.2 Regulation and standards

The government is aligning incentives and requirements for the private sector to provide an effective policy framework for adaptation. This involves setting standards and regulations that support our climate goals and enable the flow of private investment into adaptation. For example, through the Nature Markets Framework, the government will support the development of nature markets, such as water quality or biodiversity, so that the environment, farmers, local communities and the economy all benefit from increased investment in nature and associated adaptation benefits.

The chapters of NAP3 set out the existing and future plans to improve the regulatory environment to support climate adaptation. For example, the Department for Levelling Up, Housing and Communities (DLUHC) has implemented the overheating requirement introduced through the Building Regulations in June 2022 to enhance the resilience of new homes to high temperatures.

The government is leading by example through the Greening Government Commitments 2021 to 2025, which aim to reduce the impact of government

departments and their agencies on the environment. The latest framework, covering the 2021 to 2025 financial years, introduced additional commitments such as the requirement for departments to develop and deliver climate change adaptation strategies.

1.5.1.3 Private finance

Despite the significant public investment underpinning the plans and policies in NAP3, additional investment from the private sector will be required to support adaptation action over the coming decades. Indicative analysis estimates that, for a small group of climate risks facing the UK, adaptation costs and investment needs could amount to around £5 billion per year this decade (source: the CCC, 2023). Across all 61 risks and opportunities identified in CCRA3, this could be as much as £10 billion per year.

The government has committed to support the flow of private finance into adaptation through the 2023 Green Finance Strategy. Government will:

- work with industry partners to improve the approach to climate resilience assessment and disclosure though developing adaptation metrics and guidance
- support private and public collaboration over the next 5 years to address barriers to investment
- work with the CCC to scope research requirements and identify adaptation investment needs and opportunities to inform the fourth CCRA4 in 2027

1.5.2 Information

1.5.2.1 Capacity building

Capacity building activities play an important role in enabling others to act. For instance, to help local authorities (LAs) prepare for the impacts of climate change in their local areas, Defra collaborated with the Local Government Association and Local Partnerships to develop the adaptation toolkit.

The government is also building capability through its Green Book and supplementary guidance on accounting for the effects of climate change. HM Treasury requires all departments to adhere to the Green Book guidance when providing a business case for a policy, programme or project. The guidance supplements the CCRA, to consider current and potential future climate risks and vulnerability to risks of a policy, programme or project. It aims to support analysts and policymakers in ensuring that policies, programmes and projects are resilient to the effects of climate change.

The government is committed to making progress in evaluating and monetising climate risk and adaptation. However, this is inherently more complex than analysing carbon impacts and it will take time to build the required capability across government to do this appropriately and proportionately.

Over the NAP3 period, Defra will review the supplementary guidance and work across government to improve its application and ensure that the effects of climate change are taken into account when developing and appraising policies, projects and programmes.

1.5.2.2 Developing the evidence

Research and information sharing are integral to building capability. Increased awareness of climate risks will improve risk management plans and enable the public, businesses and other organisations to make more informed decisions. This is why the government is supporting and funding a number of innovative research programmes.

The government's CCRA4 will include more economic analysis of climate change and adaptation and will put greater emphasis on assessing the effectiveness of adaptation actions. It will include a spatial assessment which should also provide further data around the location of vulnerable communities to help inform climate change action and provide local-level climate risk data in addition to the national-level assessment.

We are announcing a new £15 million research programme to be implemented from 2024 between Defra and UK Research and Innovation (UKRI), which will help to build the evidence base on effective adaptation action. As part of UK Research and Innovation's 'building a secure and resilient world' and 'building a green future' strategic themes, the programme will identify the skills, standards and data provision needed to increase adaptation capability across government and wider society. This work will complement other UKRI strategic theme programmes such as the Net Zero Transport for a Resilient Future Research Hub.

Government investment in climate services helps to provide information for the public and businesses. Evidence from a range of studies suggests that weather and climate services, including early warning systems, can lead to economic benefit-cost ratios of around 9:1, arising from the information used to improve decision making (source: Monetary valuation of risks and opportunities in CCRA3, 2021). Supported by this investment, the Met Office Hadley Centre delivers world-leading evidence on climate variability to better inform decision-making, including the UK Climate Projections.

1.5.2.3 Monitoring and evaluation

Monitoring and evaluation is an important part of tracking progress and informing future adaptation decisions. A better understanding of which actions work best can help to focus resources more effectively and enable private investment and smarter regulation.

New indicators will form a crucial part of a forthcoming Monitoring and evaluation framework to evaluate the success of NAP3, which will inform the CCC's next progress report in 2025. Annex 3 includes further information about the government's approach to adaptation and plans for a M&E framework.

1.5.2.4 Systems-based evidence

Climate risks are highly interconnected. To support this programme a more systematic approach is being developed, including commissioning a systems-based risk assessment as part of CCRA4. This approach will:

- identify where multiple risks and opportunities identified in CCRA3 can be addressed through coordinated ownership, policy drivers and funding
- consider where adaptation measures will impact multiple risks and opportunities, promoting benefits while minimising negative unintended consequences
- further understand climate impacts on social outcomes and government objectives, across risk and opportunity areas.

1.5.3 Coordination

Over the 5-year programme, we will drive coordinated action on climate adaptation across government. Progress will be robustly monitored to ensure that policymaking is coordinated and supports adaptation goals.

1.5.3.1 Governance

The UK Government Resilience Framework, published in December 2022, set out the government's plan to strengthen the systems and capabilities that underpin collective resilience to all risks, including climate change. It outlines plans to strengthen the assessment and management of risks, as well as the ability of the whole of society to respond to them.

The risks posed by climate change will continue to be considered as part of the government's implementation of the updated Integrated Review Refresh 2023 (IR2023). IR2023 aims to expand the UK's approach to resilience by introducing greater emphasis on strategic vulnerabilities, including risks associated with climate change and environmental damage.

As outlined in the Resilience Framework, the government is establishing a process for identifying and assessing chronic risks. These are the risks which are enduring challenges that gradually erode elements of our economy, society, way of life and national security, such as climate change.

The Cabinet Office and Defra, working with HM Treasury, will also establish a new, senior officials Climate Resilience Board to oversee strategic, cross-cutting climate adaptation and resilience issues and drive further government action to increase UK resilience to climate change. The board will work closely with existing cross-government climate governance, aligning climate adaptation to wider government priorities on net zero and the environment. At ministerial level, this work will continue to be considered, as required, by the relevant Cabinet Committees.

1.5.3.2 Interdependencies

Interactions and interdependencies between individual climate risks are important contributors to the overall level of climate risk and an important part of coordinated adaptation action. As a result of these relationships, a single hazard can trigger knock-on impacts across multiple systems, sectors, and regions, for example, the interrelationship between water supply and energy. In the event of a flood which causes a power outage, a water company's assets may be resilient to flooding but the water supply may still be interrupted due to a loss of power.

Plans which do not account for interactions between risks may result in insufficient adaptation in some instances (i.e., a lack of preparedness for the full extent of the impacts of a hazard) or an inefficient approach to adaptation (i.e., multiple actions delivering the same outcome resulting in little added value).

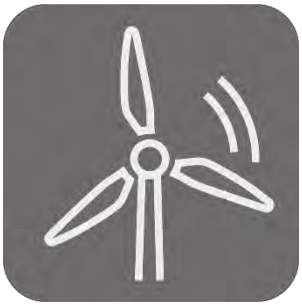
NAP3 sets out and responds to the relationships between risks and how these are addressed in our adaptation plans. Over the NAP3 implementation period, government will continue to build on the way it manages climate risk interdependencies to make sure that the benefits of coordinated action are fully realised. This will include exploring the use of cutting-edge developments in climate and impact modelling, such as environmental digital twins and artificial intelligence.

1.5.4 Contribution to sustainable development

The CCA 2008 includes a requirement that the objectives, proposals and programmes outlined in the NAP must contribute to sustainable development and effective adaptation action to address the risks of climate change. This is fundamental to delivering the government's sustainable development goals and objectives.

NAP3 brings together actions across the environment, social progress and economic growth to maintain and improve the quality of life for people now and for future generations. Sustainable development has been considered and integrated into actions across all critical sectors identified in CCRA3, including education, health, the natural environment, and infrastructure.

In addition to the actions we are taking domestically, sustainable development is at the core of the UK's Official Development Assistance, enabling adaptation and resilience overseas. This not only enhances the resilience of the UK to climate risk, but helps support the sustainable development needs of other countries. The UK International Climate Finance Strategy considers gender equality, disability inclusion and other sustainable development goals, with key performance indicators evaluating the success of UK International Climate Finance, including measurements of sustainable development objectives.



Chapter 2: Infrastructure

2.1 Overview

2.1.1 Introduction

This chapter sets out the government's response to climate risks to infrastructure, which represent 13 of the 61 risks and opportunities identified in the third Climate Change Risk Assessment (CCRA3). It focuses on the infrastructure sectors covered in CCRA3, specifically energy, transport, water, telecoms and data.

Well-functioning infrastructure provides the essential services which underpin our society and economy. The evidence identifies a range of risks to infrastructure including flooding, heavy rainfall, water scarcity, high and low temperatures, and extreme weather events. Recent events such as Storm Arwen in 2021 and the heatwaves of 2022 demonstrate the kinds of impacts these risks can lead to, from power outages to buckling train tracks. The evidence suggests these impacts will get more intense and frequent under any emissions scenario to 2050 (source: CCC 2021).

The government is taking action to ensure that public and private infrastructure operators can continue to deliver services in the face of increasingly severe climate impacts, creating the conditions for long-term sustainable economic growth. This will also limit potential damages which could cost billions of pounds a year if risks are not addressed across all infrastructure sectors (source: CCC 2021). Whilst some costs will be unavoidable, we are building consideration of climate change into the management of infrastructure networks now and over the NAP3 implementation period. This will minimise the costs to society and improve resilience so that we can continue to deliver services despite the impacts of climate change.

2.1.2 Approach

To manage climate risks to infrastructure sectors, the government focuses on:

- ensuring that the regulatory framework is delivering adaptation outcomes
- putting the necessary investment in place
- engaging with infrastructure operators and regulators to improve understanding of and approaches to identifying and managing climate risk

The following levers are used to manage climate risks in infrastructure.

National Infrastructure Strategy

This strategy sets out the government's vision for infrastructure, emphasising the need for continued investment as an enabler of economic growth, alongside long-term planning to support delivery of net zero by 2050 while levelling up the country. The strategy recognises that effective adaptation will be essential to achieving this.

UK Government Resilience Framework

Through this framework the government will deliver a new strategic approach to resilience, improving the systems and capabilities that underpin our resilience planning.

Adaptation Reporting Power (ARP)

The government will invite infrastructure operators to provide up-to-date information on the climate risks that affect them, and how they are managing them, through a fourth round of climate adaptation reporting under ARP. This will include how they collaborate to manage cross-cutting hazards that affect whole systems.

Critical National Infrastructure (CNI)

CNI by definition includes the most critical assets or systems that perform or support the essential functions that underpin UK society. Disruption or failure of these systems would have major detrimental impact resulting in significant loss of life or casualty, significant economic or social impact, and/or a significant impact on national security, national defence or the functioning of the state. The Resilience Framework sets out how Government will work with industry and regulators to improve the security and resilience of UK CNI.

Planning policy

The government will use the National Planning Policy Framework and sector-specific National Policy Statements to provide robust guidance for new infrastructure proposals at both the local authority and government levels. This gives clarity to developers on how they should consider climate risk, supporting adaptation in key infrastructure sectors.

Institutional framework

The government is working with the National Infrastructure Commission, the Infrastructure and Projects Authority and UK Infrastructure Bank to strengthen our understanding of climate risk to infrastructure. This will include producing recommendations on how to improve resilience across sectors, ensuring our major infrastructure projects have climate change at their core, and driving public and private investment into viable adaptation projects.

Sector-specific interventions are set out below for the 5 infrastructure sectors highlighted in CCRA3.

2.2 Water

2.2.1 Introduction

The water system is under greater pressure than ever before as our population grows and our infrastructure ages, including pipes and wastewater treatment plants. Climate change will exacerbate these challenges. Adaptation is essential to help us prepare for impacts like drought and water scarcity which are predicted to become more frequent and severe later in the century.

The Water Services Regulation Authority (Ofwat) regulates the sector to protect the interests of consumers in the absence of a competitive market. The Environment Agency also acts as the environmental regulator, ensuring that companies' water resource management plans (WRMPs) are resilient to climate change.

Defra's strategic policy statement for Ofwat sets out our priorities for Ofwat and the water industry to continue to deliver a resilient and sustainable water supply. Ofwat uses the regulatory framework to ensure water companies invest sufficiently to safeguard current and future access to safe and clean water. They work through 5-year 'Price Review' cycles to set out the cap on prices that companies are permitted to charge consumers and expectations for the performance and investment that companies must deliver. Ofwat's Price Review 2024 (PR24) will be the most important mechanism governing investment over the NAP3 period and will set levels of water investment until 2030. The methodology for PR24 explicitly includes consideration of climate change and will drive investment in infrastructure that will deliver for the long term.

2.2.2 Action

The Plan for Water sets out Defra's commitment to improve water efficiency and invest in water resource infrastructure to deliver a supply of water that is resilient to climate change. A range of measures will incentivise water companies to improve their performance, increase water efficiency and develop new water infrastructure. These include:

- incentivising companies to improve their performance against agreed targets for water quality compliance, leakages and supply interruptions and holding companies to account for the timely delivery of these outcomes and outputs by introducing price control deliverables
- supporting water companies to maintain supply to a nil deficit, implementing water efficiency measures including:
    - making sustainable drainage systems mandatory in new developments through implementing schedule 3 to The Flood and Water Management Act 2010
    - achieving a 50% reduction in leakage rates by 2050 against a 2017/18 baseline and reducing use of the public water supply in England per head by 20% by 2037/38 against a 2019/20 baseline
    - driving innovation through a £100 million Ofwat fund to develop water efficiency projects and introducing new mandatory water efficiency labelling
    - reducing the use of public water supply by 20% by 2038
    - encouraging local authorities to set tighter water efficiency standards, to 110 litres per person per day for new homes, and considering tighter water efficiency standards where there is clear local need, such as in areas of severe water stress
- supporting companies to develop new water infrastructure including:
    - accelerating investment of around £400 million to improve water resilience by increasing water capacity and driving water efficiency
    - advancing the Regulators' Alliance for Progressing Infrastructure Development's work to help water companies deliver water resources infrastructure at pace
    - publishing the National Policy Statement for water resources infrastructure to help streamline the planning consent process for significant water resources infrastructure

Several important assets in the water industry are vulnerable to impacts from river, surface water and flooding events, including both clean water sites and sewage treatment works. Alongside water company investment in resilience through PR24, the Environment Agency's National Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026 includes a clear objective for water companies to make

their infrastructure resilient to flooding and coastal change between now and 2030. As well as these risks to water resources, flooding poses risks to communities and to other important sectors across the economy. Defra and the Environment Agency's risk management plans for flooding and coastal erosion are covered in more detail in Chapter 4.

2.2.3 Information

The government is funding research to improve projections of future water availability for England. This will account for both the changing climate and other pressures on water availability as we transition to net zero through the Climate Services for a Net Zero Resilient World (CS-N0W) programme, which runs to 2025. The outputs of this work will give us a better idea of future water balance and will allow water companies and Ofwat to plan more effectively into the future.

2.2.4 Coordination

Defra, Ofwat and the Environment Agency will support long-term planning in the sector by:

- requiring water companies to produce 5-yearly Water Resources Management Plans (WRMPs) setting out how they will invest in infrastructure and technology to manage supply and demand, taking a proactive approach to adapting to the risks posed by climate change
- requiring water companies to produce 5-yearly drainage and wastewater management plans, looking at current and future capacity, pressures and risks to the network (including climate change) over a 25-year period, the first round of these plans will be published in 2023 and used to inform PR24
- providing guidance for companies to produce 25-year delivery strategies informed by both Ofwat guidance and the Environment Agency's National Framework for Water Resources, representing a move towards long-term strategic, regional planning to better enable government and the water industry to consider water balance at regional and national scale
- informing water company-level plans with 5 regional water resources plans for the first time in 2023 these regional plans are designed to foster collaboration between water companies and bring water companies together with other significant water users, helping to create long-term plans that will factor in the water needed for agriculture and electricity generation, as well as to support thriving and biodiverse ecosystems
- monitoring the sector's progress through regular reporting and holding water companies to account for delivering on their plans, including by taking enforcement action through Ofwat where necessary

2.3 Energy

2.3.1 Introduction

A secure, reliable supply of energy underpins our society and economy. The energy system is under increasing pressure from multiple sources. Climate change-related hazards such as storms, flooding and extreme temperatures will increasingly impact energy assets across the generation, transmission and distribution networks – from power stations, wind and solar farms to power lines, substations, pipelines and cables. As the energy system decarbonises and other infrastructure systems electrify to meet the UK's net zero targets, the exposure of the energy system to climate hazards will change. Continuing to embed climate resilience in both the current and future energy system is therefore essential to securing our energy supply.

The Office of Gas and Electricity Markets (Ofgem) is responsible for promoting competition in gas and electricity energy markets and protecting the interests of consumers, including by upholding high standards on resilience. Ofgem's role includes overseeing the investment that companies make through 'price control' periods under a regulatory framework which ensures that investment is appropriate

for the risk level now and in the future. Other regulators also have important roles to play in supporting the resilience of the energy sector, including the Environment Agency, the Health and Safety Executive (HSE) and the Office for Nuclear Regulation.

2.3.2 Action

The Department for Energy Security and Net Zero (DESNZ) and Ofgem will:

- designate parties responsible now and in the future for the maintenance of energy sector codes and standards with a clear mandate to build climate and weather resilience by 2024
- ensure that licensed network businesses in England comply with the regulatory framework set by Ofgem, as well as with other statutory requirements including the Electricity Act and the Electricity Safety Quality and Continuity Regulations which are overseen by DESNZ and HSE
- drive investment in infrastructure resilience through Ofgem's price control framework, which balances the relationship between investment in the network, company returns and the amount they charge for operating their respective networks
- use clear infrastructure resilience standards through price controls to allow network companies sufficient revenues to invest in the resilience of their sites and assets

2.3.3 Information

Over the NAP3 implementation period, DESNZ and Ofgem will:

- provide advice and support as National Gas reviews its standards and specifications for construction of new assets to ensure climate resilience. National Gas will prioritise sites at greatest risk of climate threat impacts to identify where mitigating interventions and protective action are required

Distribution Network Operators (DNOs) will:

- work with the government and Ofgem through the Energy Emergencies Executive Committee to review and update technical standards identified by the review into Storm Arwen so they are fit for the future
- create an outcome-focused network resilience model to predict the impact of severe weather events locally and nationally. This will be used to set public and government expectations and industry targets and help to guide planning and funding decisions by industry and the regulator

The Environment Agency will continue to work with the power distribution sector to share flood and coastal erosion risk information and explore joint investment opportunities to improve the resilience of power distribution assets.

On research and evidence, DESNZ will:

- fund research through the CS-N0W programme through to 2025 to improve understanding of how climate change is affecting weather hazards that can impact the energy system and on the most appropriate approaches or metrics for gas and electricity network companies to measure their climate resilience and monitor progress in adaptation
- use the outputs from research to inform the government's approach to monitoring and evaluation for the sector throughout the NAP3 period and beyond

2.3.4 Coordination

DESNZ will conduct an internal review of governance arrangements for resilience to climate hazards in the energy system by 2024 so they are fit for the new expanded and more diverse low-carbon system, given the increasing societal reliance on electricity.

Additionally, DESNZ and Ofgem will:

- support energy generation companies as necessary to risk assess assets in the energy generation sector and gauge the climate resilience of power plants including flood resilience, water scarcity and temperature changes
- periodically assess climate resilience for existing plants and assess new plants that qualify as Nationally Significant Infrastructure Projects through the planning application process. Increasingly from 2024 the requirements of the environmental permitting regime will embed climate risk management into relevant sites' management systems
- risk assess the most critical energy sites, systems and assets as identified through HMG's 'Criticalities' process for identifying CNI

2.4 Transport

2.4.1 Introduction

Accessible and functioning transport infrastructure is fundamental to day-to-day life but can face interruptions from climate challenges such as flooding, heat, erosion, subsidence, and extreme weather. As the climate continues to change the severity of these risks is projected to increase, putting additional stresses on transport infrastructure. Transport infrastructure also has a long lifespan, with some rail infrastructure being over 100 years old and some new transport schemes, like HS2, having a planned 120-year lifespan.

By focusing on adaptation now, the government will make sure that the transport network continues to be reliable, minimising costly disruption and loss of service which have significant implications for economic activity, social equity, health and wellbeing. We will embed consideration of climate change risks across all transport operations, including in the management of existing assets and the planning of new assets throughout their lifespans. The transformation in technology required to deliver net zero greenhouse gas emissions in the UK requires both new infrastructure and the retrofitting of existing networks. This provides an opportunity to build adaptation to climate change into new transport schemes and improve existing infrastructure.

The primary modes of transport with infrastructure that is vulnerable to climate impacts are rail, road, ports, and aviation. The risks that climate change poses to the transport sector vary between modes of transport, as do the policy responses. The Department for Transport (DfT) oversees all these sectors.

2.4.2 Across the transport sector

2.4.2.1 Action

As well as driving the resilience of each transport mode, DfT plays a role in leading cross-cutting actions that provide adaptive benefits across the entire transport network. DfT will:

- develop a transport adaptation strategy taking a holistic approach to addressing the transport-related risks in the Climate Change Risk Assessment. We will seek to consult on the strategy by the end of 2023
- expand its programme of research, development, analysis and innovation by the end of 2023 to fill priority evidence gaps and inform effective decision making on climate change adaptation measures across the transport system
- continue to explore how information sharing and collaboration across operators, regions and government can improve the management of climate-related risks to the transport sector
- working through national forums, regional strategic groups and local resilience forums (LRFs) to promote engagement on joint programmes, data gathering, and associated research

2.4.3 Rail

Effective rail transport relies on a vast network of physical infrastructure. Network Rail is a non-departmental public body which manages Britain’s railway infrastructure, including 20,000 miles of track, 30,000 bridges, tunnels and viaducts, and thousands of signals, level crossings and stations. This infrastructure is at risk from slope and embankment failure, flooding and coastal erosion, high temperatures which can cause rail track to warp, and storms or high winds which can cause debris to obstruct or damage tracks.

2.4.3.1 Action

To manage these risks over the NAP3 period, Network Rail will:

- upgrade physical infrastructure by investing in earthworks and drainage systems through the current Control Period 6 plans for 2019 to 2024, and through Control Period 7 plans for 2024 to 2029 which are currently under development

- implement recommendations by 2029 from the Rail Accident Investigation Branch report into the Carmont derailment 2020, and the Mair and Slingo reports following this incident into earthworks management and weather science respectively
- implement recommendations from the extreme heat taskforce reports following the July 2022 heatwave which are due in spring 2023, based on availability of funding
- design regional adaptation pathway strategies by 2029 with implementation ongoing as agreed with funders
- review the opportunities for nature-based solutions to mitigate climate risk by the end of 2023

2.4.3.2 Information

Network Rail's adaptation action is complemented by work of other bodies in the rail sector, including:

- a rail industry-wide 'maturity matrix' project (recently published in 2023) looking at leadership across rail organisations to ensure structures are in place to address climate risks and develop action plans for improvement, increasing adaptive capacity in the industry over the NAP3 period
- Transport for London's Climate Change Adaptation Plan which was published in March 2023 and will implement actions in the period up to 2030

2.4.3.3 Coordination

The rail sector is regulated by the independent Office of Rail and Road (ORR), which has both economic and safety-related duties. The ORR holds Network Rail to account through its network licence that enforces relevant health and safety legislation. The licence requires Network Rail to:

- maintain, renew and enhance assets in a manner which is timely, efficient and in line with best practice
- have written policies and technical standards setting out how it will meet requirements, with which every Network Rail region must demonstrate compliance
- produce weather resilience and climate change adaptation plans since 2013, which set out priorities and high-level approaches for 8 geographical routes covered by Network Rail regions

2.4.4 Roads and highways

Managing the national highway network is the responsibility of a large network of highways authorities. National Highways is responsible for the 'Strategic Road

Network' (SRN) in England, which consists of motorways and major A ('trunk') roads. The operation, maintenance, renewal and enhancement of the strategic road network is delivered through 5-year business plans called 'Road Investment Strategies' (RIS). NAP3 spans 2 RIS periods, RIS2 (2020 to 2025) and RIS3 (2025-2030). Ongoing investment in the road network is essential to make existing and future infrastructure resilient to climate change impacts. Local highway networks are managed by the relevant local authority and some London roads are managed by Transport for London.

2.4.4.1 Action

Over RIS2 and RIS3, National Highways will:

- reduce the risk of flooding by improving the drainage network associated with the strategic road network, prioritising maintenance and renewal activity in areas where there are known flooding issues
- implement the actions set out in their report under the third ARP round to mitigate the risks posed by other climate-related hazards including high temperatures, storms, subsidence, and scour risk (where water erodes the sediments that surround the base or support structures for bridges, roads, and other man-made buildings). This includes monitoring the condition of pavements; roads and earthworks; integrating climate change into shrink-swell susceptibility ratings; and identifying effective adaptation measures
- implement commitments in the Environmental Sustainability Strategy published in May 2023, setting out how National Highways will integrate climate risk with other concerns, which include employing nature-based solutions such as natural flood management to improve climate resilience of the network and neighbouring communities

To support adaptation on the local roads network, DfT will:

- work with the UK Roads Leadership Group to devise a framework for local authorities to implement the extreme weather recommendations from recent incident reports by the end of 2024
- publish expectations on adaptation in the forthcoming consultation on the local transport plan guidance refresh by the end of 2024, which will set out the need to adapt and improve the climate resilience of transport networks and to reflect this in local transport plans and alongside its programme of interventions

Local highway authorities will work towards improving asset management plans within the NAP3 period to improve understanding of vulnerabilities, completing initial risk assessments by end of 2024.

2.4.4.2 Information

National Highways will continue to ensure that technical guidance encourages appropriate consideration of climate change, including by updating the drainage metric they use so that it more accurately reflects climate risk and relevant guidance.

2.4.4.3 Coordination

National Highways is monitored and held to account by the ORR for their performance, in delivering better environmental outcomes and having a well maintained and resilient network. This is done through a set of key performance indicators, including susceptibility to flooding of the carriageway.

The ORR will use its monitoring and enforcement activity to ensure National Highways delivers its functions under the terms of its licence as set out in RIS2 and RIS3. This includes overseeing weather resilience and climate change adaptation.

Case study: National Highways Natural Flood Management Fund

Natural flood management involves working across the landscape to protect and restore natural hydrological processes that slow or store water. Nature-based solutions have a central role in delivering National Highway's ambition for a thriving environment, one of the primary focus areas within its Environmental Sustainability Strategy. The National Highways Natural Flood Management Fund was established in 2020/21 to explore the benefits of using nature-based solutions to reduce flood risk as an alternative to conventional hard engineered solutions on motorway and trunk roads.

Through the fund, National Highways identified a pilot project seeking to use nature-based solutions as a tool to reduce surface water flooding on motorways and trunk roads associated with the Little Don and Irwell catchments. The pilot was unique as it was a catchment partnership between National Highways, the local Rivers Trusts, and the owners of the land where the natural flood management measures would be implemented. In addition, the fund used a novel bidding platform and a natural flood management modelling tool to rank bids from landowners with proposed measures during a live auction, supported by the Rivers Trust.

Under the pilot 116 natural flood management interventions were implemented to hold back and temporarily store rainfall, successfully reducing flood risk and increasing the resilience of the road network. The interventions created additional storage of 6354m^3 across the Irwell and Don catchments. Benefits from 'avoided disruption costs' associated with flooding were estimated at over £11 million for a 25-year evaluation period (source: National Highways, 2023 (internal)).

Alongside flood risk reduction, the interventions benefitted other ecosystem services such as increased biodiversity (an additional 12 units), carbon sequestration and greenhouse gas avoided emissions (an additional 22 tCO2e year), and co-benefits to air quality, water supply and water quality. These additional co-benefits were estimated to be worth over £200,000 for a 25-year evaluation period (source: National Highways, 2023 (internal)).

The pilot project demonstrated the value that natural flood management interventions can have for delivering infrastructure resilience, and the benefits of partnership working. Lessons learnt from the pilot will be used to inform further similar initiatives by National Highways ensuring better social and environmental outcomes for communities and developing new strategies for adaptation to climate change.

2.4.5 Ports

UK ports operate in a competitive market, servicing and supporting specific customers. Their success as businesses is dependent on them being able to respond and adapt to a changing economic and environmental landscape. They provide a crucial entry and exit point for goods and people arriving in or leaving the country so their resilience is particularly important for the integrity of supply chains and transportation of critical goods across the UK. Given their location, ports can be exposed to significant risk of coastal flooding, particularly along the east coast, which can disrupt not only the ports themselves but also the nearby road and rail networks used for onward transport of goods. High winds can also lead to the suspension of port and vessel operations. Adaptation can help to protect our ports from climate-related disruption.

2.4.5.1 Information

DfT will:

- work with the ports sector to develop a regular monitoring survey to gather information on the frequency of disruption to port operations from weather, trialling this over the NAP3 implementation period
- work with the ports sector including the British Ports Association, UK Major Ports Group and the UK Harbour Masters Association, to support their members to undertake the climate impact risk assessments and to embed their findings into business planning and operating procedures ahead of the fourth round of adaptation reporting

2.4.5.2 Coordination

Alongside other transport service operators across modes, port authorities are Category 2 responders under the Civil Contingencies Act 2004, so must cooperate and share information with other Category 1 and Category 2 authorities for the purposes of resilience and emergency response planning. DfT will continue to encourage ports to engage with LRFs effectively, to better understand how actions in response to the changing climate can support and benefit coastal communities, local economies, and the port.

2.4.6 Aviation

The UK's aviation sector operates in the private sector. Airports and airlines are diverse in their operations, each having their own business model to service and support specific customers. Their success as businesses is dependent on them being able to respond and adapt to a changing economic and environmental landscape. Climate change poses a range of risks to aviation, including runway

conditions, working conditions for ground staff facing heatwaves or storms, and the handling of aircraft by air traffic control. Understanding and responding to these risks can help to reduce disruption from climate change.

2.4.6.1 Information

DfT will:

- work closely with the aviation sector including airports and National Air Traffic Services (NATS) (who provide en-route air traffic control services within the UK) to encourage them to undertake climate impact risk assessments and to embed their findings into business planning and operating procedures ahead of the fourth round of adaptation reporting in 2024

Commercial airports and NATS will:

- undertake regular monitoring programmes, which includes regular maintenance schedules of infrastructure and assets, and regular reviews of contingency and response plans to ensure the sector is resilient, continuing throughout the NAP3 period

2.4.6.2 Coordination

DfT will support airports to coordinate with local stakeholders including LRFs, ground-handlers, airlines, NATS and the Civil Aviation Authority to build aligned plans for responding to emerging and current climate risks to the infrastructure and surrounding communities.

2.5 Data

2.5.1 Introduction

Data centres are important facilities that underpin our modern economy by processing, managing, storing and transacting digital data. Data centres enable retailers and banks to process financial payments, supermarkets to resupply, delivery companies to manage logistics and public authorities to deliver services and messaging. They depend on reliable power and water supply to maintain operations. While resilience-by-design is central to data centres' business models, as this sector and the reliance of the wider economy on it grows so does its exposure to climate risk. This makes resilience of data infrastructure increasingly important.

There are around 200 large sites run by commercial operators who provide data centre services to third parties. Within these sites, customers usually lease space for their own IT hardware which is located alongside the servers of other customers.

These sites are geographically clustered, with around 70% of the UK market in and around the M25, concentrating the exposure of the sector to climate hazards.

Some companies also run their own data centres (rather than using a third-party operator). This section does not include those in scope.

2.5.2 Action

The Department for Science, Innovation and Technology (DSIT) will develop a stronger risk management framework for the sector and will consult industry on this before the end of 2023, including consideration of the potential adverse effects from a range of hazards. DSIT will contribute to implementing commitments in the UK Government Resilience Framework, including the role of regulation and resilience standards.

2.5.3 Information

DSIT will invite the industry trade body, TechUK, to participate in the fourth round of reporting under the Adaptation Reporting Power. Tech UK runs a dedicated forum for data centre operators and, having reported in the third round of adaptation reporting, the government will invite them to provide an update report in the fourth round of reporting, due 2024. This will be used to inform DSIT's work and the government's CCRA4, as well as supporting the industry with their own consideration of climate risk. DSIT will also continue to engage with other relevant bodies.

As part of its work on risk management, DSIT will consider whether new information gathering mechanisms would enable better information flows between industry, regulators, and the government to support resilience planning.

2.5.4 Coordination

DSIT will continue to engage the data sector including through industry bodies such as TechUK, the Data Centres Council and Data Centres Alliance to promote effective resilience and contingency planning measures. DSIT will work with industry and with the Cabinet Office, the National Cyber Security Centre and the National Protective Security Authority to establish a thorough, shared understanding of risks and their implications with the sector over the NAP3 period, based on robust, science-based advice.

2.6 Telecoms

2.6.1 Introduction

Telecommunications, or telecoms, is a critical enabling sector that underpins the UK economy and society. DSIT is the lead government department for the telecoms sector and leads on security and resilience policy for the sector.

Telecoms assets and network architecture are inherently designed to be resilient to a range of hazards including flooding. Telecoms providers continue to make technological advancements in network architecture and infrastructure to improve resilience and reliability, with mitigations built into the network to prevent single points of failure. The sector is made up of private sector Communication Providers on which the government places duties through legislation.

The Office of Communications (Ofcom) is the independent regulator and competition authority for the UK communications sector. It oversees the security and resilience of Communications Providers using powers under the Communications Act 2003 (as amended by the Telecommunications (Security) Act 2021) alongside recently updated Ofcom Security Guidance (published 2022). Ofcom's guidance to Communications Providers on resilience requirements under the Communications Act effectively requires that Communications Providers:

- take appropriate and proportionate measures to identify and reduce the risks of Resilience Incidents occurring
- take appropriate and proportionate measures to prevent the adverse effects on the network or service arising from Resilience Incidents
- take appropriate and proportionate measures to remedy or mitigate the adverse effects resulting from Resilience Incidents
- report Resilience Incidents to Ofcom, including anything comprising the availability, performance or functionality of the network or service

Ofcom can require Communications Providers to undergo an assessment of their measures to comply with their security duties. It can also use its powers to investigate, rectify and penalise operators for not meeting their security duties. This framework helps drive resilience to climate change risks.

2.6.2 Action

Through the existing legislative and regulatory framework, Ofcom will work with the sector throughout the NAP3 implementation period to identify and close resilience gaps through promotion of best practice and issuing of relevant guidance. Ofcom will

continue to ensure operators are managing their risks and monitoring resilience in line with their duties.

DSIT, alongside Ofcom, will continue to assess the need for further action or intervention to drive climate resilience across the telecoms sector throughout the NAP3 implementation period. This will include reviewing the current regulatory landscape to ensure it remains effective in strengthening the sector's resilience to climate change, in the context of wider developments such as technological advancements.

2.6.3 Information

The main mechanism for engagement with the telecoms industry on resilience is the Electronic Communications Resilience and Response Group (EC-RRG). This is a telecoms industry forum with government representation whose aim is to ensure the telecoms sector remains resilient to threats and risks to services. Its focus is prevention, preparation, response and recovery to impacts from cascading risks and severe weather is central to its remit.

Throughout the NAP3 implementation period, DSIT will work with Ofcom and the telecommunications industry through the EC-RRG to disseminate best practice and policy advice to further enhance the sector's resilience by:

- reviewing lessons learned from previous severe weather incidents to drive work to improve resilience to similar events in future, through the EC-RRG and its Severe Storms Post-Incident Report Action Plan
- inviting specialist expertise on climate change to deliver information and guidance that will help telecoms companies tackle risks. Recently this has included the Environment Agency, the Geospatial Commission, the Met Office and National Highways, covering flood preparedness, scour management, vulnerability monitoring and drought
- supporting intensified collaboration with key external groups such as Ofgem, DNOs and the National Grid. This engagement will be targeted to explore the costs and challenges of making the mobile network more resilient to power outages, as well as improving cross-sector communications during outage incidents and recovery
- exploring options to ensure broad industry representation in the fourth round of reporting under the Adaptation Reporting Power
- encouraging telecoms operators to implement asset-level interventions for key sites where appropriate (building on the mitigations implemented at 304 vulnerable sites already identified as part of the 2016 National Flood Resilience Review)

By the end of 2023, Building Digital UK, an executive agency of DSIT, will also introduce a single reference point for environmental requirements and resources for broadband suppliers and mobile operators (and their subcontractors and agents) relating to digital infrastructure delivery by the end of 2023. This will provide initial support to the sector on scaling up environmental awareness, including climate adaptation, enabling operators to deliver infrastructure with limited disruption to survey, design and build.

2.6.4 Coordination

DSIT will continue to work with industry on the government's Criticalities Process to build an accurate, shared understanding of the most critical telecoms infrastructure in the UK and its interdependencies across sectors. This will enable the sector to better mitigate risk, including cascading risks which may impact the essential functions of the UK.

2.7 Cascading failures

2.7.1 Introduction

Infrastructure networks are highly interconnected. No infrastructure sector can fully tackle climate change alone. When hazards such as river flooding impact one sector the resulting failures can 'cascade' and cause problems elsewhere. CCRA3 found that the risk of cascading failures arising from the interconnected nature of infrastructure networks has been significantly underestimated in the past, suggesting that infrastructure networks may be unprepared for the full extent of current and future hazards.

In response to this risk, the government will continue to assure the resilience of some of our most important infrastructure assets but will also ensure that infrastructure operators can work together to address cascading risks, removing barriers to adaptation where these exist.

2.7.2 Action

All infrastructure sectors are incentivised to build climate resilience into their business plans, investment and service delivery. In many cases, regulators set explicit resilience expectations which operators must meet.

As set out in the Resilience Framework, government departments will work with regulators and infrastructure operators to:

- ensure existing regulatory regimes on resilience are fit for purpose
- introduce standards on resilience and develop an action plan to deliver these across the private sector where they do not currently exist. The government recognises the need for standards to also account for unique sector landscapes, priorities, needs, and interlinkages between sectors

2.7.3 Information

Defra and the Cabinet Office will improve the ability of infrastructure owners and operators to access and use relevant climate information by:

- working collaboratively with government agencies and infrastructure operators to better understand the potential impacts of climate change and inform resilience measures
- invite reporting organisations during the fourth ARP round to set out their approach to identifying and managing interdependencies with other sectors, helping to build government's evidence base and inform sharing of best practice between operators
- maximising use of the Met Office and Office for National Statistics resources by making high-quality climate data available, accessible and actionable. This is important to ensure that operators are all working from the same underlying climate projections, tailored to suit the specific needs of their sectors

The government will use the CNI Knowledge Base, a bespoke CNI mapping tool, to identify risks and interdependencies across and within sectors, working with infrastructure owners and operators. When used with other analytical and data modelling tools, it will help to identify areas of acute risk, as well as the impacts of cascading risks, including from climate change. It will also ensure data driven risk analysis is used to inform policy decisions within government and by infrastructure operators.

2.7.4 Coordination

To improve coordination and support the consideration of interdependencies across infrastructure sectors, Defra will:

- work with CO to strengthen governance arrangements overseeing the implementation of NAP3 which better take infrastructure sector interdependencies into account, ensuring these arrangements work alongside existing governance and collaboration forums on resilience, including the UK Resilience Forum, National Security Council subcommittee on resilience and the industry-led Infrastructure Operators Adaptation Forum
- work with CO, the Environment Agency, CCC and member organisations to strengthen the role of the Infrastructure Operators Adaptation Forum in driving forward best practice on managing sector interdependencies including the risk of cascading failures

The government and LRFs will continue to conduct resilience exercises and stress tests for specific extreme weather and climate change related risks. Lead government departments, which retain responsibility for specific risks and the plans and capabilities required to respond to them, are required to identify CNI operators, where possible, when setting the scope and objectives of each exercise, to test those plans and capabilities. The Cabinet Office will also coordinate a programme of exercises through the reinvigoration of the national exercise programme as per the National Resilience Framework and as aligned to the National Security Risk Assessment (NSRA), which articulate the risk of extreme weather events and the wider consequences of climate change. This exercise programme will include local and regional actors and will clarify and communicate roles and responsibilities at a national, regional and local level. The Cabinet Office will continue to work closely with DLUHC and other government departments to share good practice guidance for the delivery of exercises at the regional and local level through robust governance structures.

Chapter 3: Natural environment

3.1 Overview

3.1.1 Introduction

This chapter covers the government's response to climate risks to the natural environment, which represent 18 of the 61 risks and opportunities identified in third Climate Change Risk Assessment (CCRA3).

Climate risks across the natural environment are highly connected, as ecosystems do not function in isolation. There are many interactions between climate change impacts to different terrestrial, freshwater, coastal and marine habitats. For example, projected trends of warmer wetter winters will increase instances of water flowing over land and into habitats such as rivers, lakes, wetlands and estuaries. These flows of water can carry nutrients, agri-chemicals, seeds and other material with them, promoting the spread of pollution, invasive non-native species (INNS), pests and diseases across habitats (source: CCC, 2021).

Supporting our natural systems to adapt to climate change will be instrumental to achieving our legal biodiversity, water quality and tree planting targets. This includes integrating a clear understanding of how our climate is changing into the development and delivery of our policies, so we can maximise the impact of our actions to protect and enhance the natural environment.

The health of our natural systems also determines our ability to produce food, access clean water and meet demand from sectors such as medicine, industry and energy for natural resources. Nature-based solutions to climate change, both for mitigation and adaptation, restore habitats such as woodlands, peatlands and salt marsh to absorb carbon from the atmosphere and provide a natural defence against impacts like flooding and coastal erosion (source: Smith and Chausson, 2021). Using nature-based solutions will reduce society's vulnerability to climate risk and contribute to species recovery by providing more high-quality habitat for wildlife.

New legislation and supporting delivery programmes are addressing climate risks and supporting the natural environment to adapt, these include:

- Agriculture Act (2020) – provides the powers for the new Environmental Land Management schemes (ELMs), which support farmers to deliver 'public goods' such as clean water and biodiversity-rich habitats. These in turn support the foundations of food production in the long term, as set out in the

Food Strategy, which describes our ambition to maintain production at current levels, where we produce domestically 60% by value of all the food we need. The government backs British farmers and has committed to maintain the farming budget at an average £2.4 billion per year (in England) over the life of this Parliament. Through support, including ELM schemes and the Water Management Grant under the Farming Investment Fund, Defra will support adaptation actions such as: incentivising farmers to use sustainable agriculture methods; supporting agroforestry and integrated pest management; and managing risks to agriculture such as drought through in-farm water storage

- Fisheries Act (2020) – includes aims for sustainable fisheries, precautionary harvesting of fish stocks, and reducing the impacts of, and adapt to, climate change to ensure a productive and resilient fisheries sector for the future. The first six fisheries management plans cover species such as crab, lobster, and seabass. The Joint Fisheries Statement commits the government to publish five of the plans by the end of 2023, and a sixth in 2024.

- Environment Act (2021) – provides a framework for the development of long-term, legally binding environmental targets, including those set out in the government's Environmental Improvement Plan (EIP) 2023, to:

    - halt the decline in species abundance by 2030 and reverse that decline by 2042, reduce the risk of species extinction by 2042 and restore or create over 500,000 hectares of wildlife-rich habitat, outside of protected areas, by 2042
    - increase tree and woodland cover to 16.5% of total land area in England by 2050
    - reduce nutrient and sediment pollution by 40% by 2038 and reduce phosphorus loadings from treated wastewater by 80% by 2038
    - protect our Marine Protected Areas (MPAs) by delivering our new statutory target for 70% of the designated features in the MPA network to be in favourable condition and the rest in recoverable condition by 2042

Included in the Environment Act (2021) are 5 Environmental Principles to guide decision making towards opportunities for enhancement and to prevent environmental damage. These have been set out in a legally binding policy statement, published in 2022.

3.1.2 Approach

The government is taking an integrated approach to agriculture, fisheries and the restoration and management of the natural environment in the face of climate change. Where possible this will include the use of climate change data within spatial targeting to maximise adaptive benefits. Spatial targeting can include planting trees alongside water bodies for shading and flood management, or strategic restoration of coastal habitats to make space for nature and reduce the risk of sea level rise and coastal erosion.

Land Use Framework

One of the key considerations in the development of the Land Use Framework, to be published in 2023, is that land use should be suitable for future climate conditions and should contribute to adaptation.

Local Nature Recovery Strategies

Local Nature Recovery Strategies (LNRS) are flagship new measures set out in the Environment Act (2021). They are spatial strategies that will bring together communities and local decision makers to plan and prioritise nature's recovery.

The strategies present an opportunity to implement locally specific adaptation actions, based on the hazards and climate trends affecting that area, and the interplay with other decisions for businesses, people and food production. By taking a spatial approach LNRS can prioritise the restoration of climate vulnerable habitat, or connect habitat to help species move and adapt, as well as reducing the impact of hazards such as flooding which require actions at a catchment scale.

The statutory guidance and direct support from Natural England, Environment Agency and Forestry Commission experts will include adaptation advice, data and evidence to help responsible authorities make informed, climate-resilient decisions. This will include helping to identify how the strategies could support species and habitats as their ranges change in response to climate change. LNRS will have to be reviewed at least every 10 years, providing an opportunity for climate impacts to be monitored as part of the strategy implementation, and for actions to be adapted to further reduce climate risks.

Environmental Land Management schemes

Government support for farmers and land managers to take adaptation actions will come primarily through the ELMs. Climate adaptation is a priority and is being built into all Farming and Countryside Programme policy design.

Without effective consideration of a changing climate, public investments and farmer efforts through ELMs will be less effective. We are designing policy in line with the Supplementary Green Book Guidance so that farming schemes are resilient to the effects of climate change, and that such effects are taken into account. This will support the cost-effectiveness of farming schemes in the long-term. We will climate-proof the Farming and Countryside Programme's offer and continue to develop specific offers to improve climate resilience, on and off-farm. For example, we will incentivise actions in places where they can maximise adaptation benefits, and increase resilience to flooding and drought through nature-based solutions such as natural flood management.

We have designed the actions in the Sustainable Farming Incentive (SFI) standards to contribute to adapting to climate change, as set out in the ELMs update. For example, we want to improve the health and functionality of our soil on arable land to provide additional benefits for climate change adaptation and support flood risk reduction. We have also designed the actions in Countryside Stewardship to deliver significant and important outcomes for the climate and environment. For example, we want to establish new woodlands and expand existing woodlands that are resilient to climate change across England in a way that reduces flood risk, by slowing the flow of water. This approach has already been in use in the programme's Landscape Recovery scheme projects which have a long-term focus on significant habitat restoration, alongside food production. For example, these projects require proposals to demonstrate that actions which will be paid for will not result in outcomes that become inappropriate over time, and do not increase the vulnerability of the surrounding area to climate change risks. We are monitoring and evaluating the progress of climate adaptation so that the projects are delivering value for money, maximising benefits and helping to support resilience in agriculture and rural communities.

The ELMs update sets out in more detail how uptake of our offer can positively contribute to environmental benefits such as climate adaptation.

Natural Capital and Ecosystem Assessment

This will collect data on the extent, condition and change over time of England's ecosystems and natural capital. This will help to integrate data, address critical evidence gaps and improve decision-making. This will allow some impacts of climate change to be measured; for example, it could be used to support habitat restoration

where pressures, including climate change, are causing deterioration and greater vulnerability to climate impacts.

3.2 Terrestrial and freshwater habitats and species

3.2.1 Introduction

Risks to terrestrial and freshwater species, habitats and landscapes from climate change impacts include changes in average temperature, flooding, wildfires and drought (source: CCC, 2021). A study of 402 species in England, from plants to insects to birds, found that climate change may contribute to 36% of these species seeing a decline in their distribution (source: CCC, 2021). Climate change may be contributing to the decline of bird species such as golden plovers and curlew (source: CCC, 2021). However, there are also opportunities. Some species may expand their distribution due to climate change, contributing to nature's adaptation (source: CCC, 2021). Climate change resilience is therefore central to the restoration of our precious natural environment.

Through a combination of regulation; public funding; support for the development of private funding; evidence and guidance; the government is acting to restore nature across and within landscapes and support the processes and functions nature needs to respond to a changing climate.

3.2.2 Action

Large-scale habitat creation, restoration and management will help restore ecosystem functions. When properly targeted it can provide areas for species to take refuge during long-term periods of extreme or unfavourable climatic conditions. It will also provide ecological networks for species to move in response to a changing climate.

As set out in the EIP, the government has committed to halting the decline of species abundance by 2030 and protecting 30% of land and of seas in England for nature by 2030. It is important to do so in a way which recognises and responds to climate change risks. This includes:

- restoring or creating over 500,000 hectares of wildlife-rich habitat outside of Protected Sites, by the end of 2042
- identifying and launching 6 Nature Recovery Projects, building on the 6 already launched and work with Nature Recovery Network delivery partners to launch another 13 projects by 2025

- the Landscape Recovery scheme, which took on 22 large-scale projects focusing on species recovery and river restoration through the first round in 2022, and is now looking for up to 25 projects of at least 500 hectares targeting net zero, Protected Sites and wildlife-rich habitat for the second round
- restoring 75% of Protected Sites to a favourable condition by 2042
- Defra's new 'Species Survival Fund', which will result in a range of habitat creation and restoration over the next 2 years
- Natural England launching 6 pioneering projects across England in February 2023, covering over 500 hectares each, and investing £4.3 million into creating and restoring nature- and carbon-rich habitats such as grasslands, forests, wetlands and hedgerows

Preventing or minimising non-climatic pressures will mean habitats and species are more able to withstand climate change related pressures. Measures to protect aquatic habitats include:

- reducing pressures on freshwater habitats and species from agrichemicals, nutrient loading, wastewater, physical modification and other pollution, through policies such as Catchment Sensitive Farming, contributing to the achievement of Good Ecological Status at 75% of water bodies by 2027
- improving water efficiency, conserving more for the resilience of freshwater ecosystems during heatwaves and drought - this includes targets to reduce household consumption to 110 litres per head per day, and non-household water consumption, by 15% by 2050
- keeping our freshwater habitats cool in the face of climate change, such as by investing £2 million through Defra's 4-year Woodlands for Water Programme
- encouraging tree planting along rivers through the England Woodland Creation Offer and enabling private investment for woodland creation through developing the Woodland Water Code
- investment from the new Water Restoration Fund to remove redundant physical modifications and restore natural processes

Defra will also take action to benefit species and habitats which are particularly vulnerable to climate change impacts, and to address specific climate change hazards. For example:

- Countryside Stewardship is funding targeted actions relating to specific locations, features and habitats. Defra will explore how this can most effectively benefit climate change vulnerable species and habitats
- Defra, its agencies, the National Park Authorities (NPAs) and Areas of Outstanding Natural Beauty (AONB) Partnership and Conservation Boards will also reduce the impact of climate hazards on habitats and species, such

as by supporting the development of up-to-date wildfire management plans for 20,000 hectares of habitats (including forestry and peatland) by 2025

3.2.3 Information

Defra, Natural England and the Environment Agency will carry out actions to inform and improve our response to climate impacts, including:

- commission wildfire research, including an England wildfire risk map and defining effective wildfire risk reduction measures
- update Long-Term Investment Scenarios to improve national understanding of the costs, benefits, and potential for natural flood management to provide ecosystem services
- commission evidence to understand the impacts of climate change on landscape character, as well as people's emotional connection to the outdoors and their reactions to future change to their landscapes - this will inform decision-making, raising awareness and generating collective action on managing climate change impacts on landscape character
- use our M&E programme to assess the impact of our agri-environment schemes on climate adaptation, feeding learning back into improved policy design

Ensuring all our designated sites and surrounding habitats are relevant to the wider context of climate change will support the creation of a resilient and dynamic network of nature recovery. Defra will:

- work with Natural England to adapt Protected Site designation and management so that it keeps pace with a changing climate. For example, Natural England is developing case studies on Sites of Special Scientific Interest with habitats particularly vulnerable to climate change, assessing climate change impacts on site condition, and using this to understand adaptive management requirements. Climate change risks to Sites of Special Scientific Interest will also be incorporated into future condition monitoring

Defra will also integrate climate change data into spatial targeting to maximise the adaptive benefits delivered through our funded actions. It will:

- incorporate climate-informed spatial prioritisation (including climate data where available) into the preparation of LNRS, which will support the creation of a Nature Recovery Network, and Plan for Water
- explore the potential to incorporate projected climate data and increased spatial targeting and prioritisation into ELMs, including through LNRS.
- enhance information on climate change impacts in all Natural England's Natural Character Area Profiles by 2026

Monitoring and surveillance of species populations is also essential to inform adaptive action. For example, it can help to inform a proactive approach to managing pests, pathogens and invasive non-native species. Defra, the Animal and Plant Health Agency, and the Centre for Environment, Fisheries and Aquaculture Science will:

- identify aquatic pathogens and INNS which are likely to establish self-sustaining populations or increase in distribution and/or impact due to climate change or are likely to exacerbate climate-related pressures
- continue to develop biosecurity, contingency and rapid response plans to support the prevention, rapid eradication, management and control of priority pathogens and INNS, such as actions under the Great Britain INNS Strategy 2023-2030 on monitoring, surveillance and horizon scanning
- develop and use Pathway Action Plans for priority pathways to guide actions with stakeholders and user groups to limit the spread of INNS. Pathways are the routes and mechanisms for the introduction and spread of INNS. Some pathways are ranked as higher risk as they have the potential to introduce greater numbers of high-impact INNS

This will inform:

- the continued improvement of biosecurity, contingency and rapid response plans for priority climate-assisted aquatic pests, pathogens and INNS
- the regular updating of the list of species of special concern established by the retained Invasive Alien Species Regulation, keeping strict regulations and restrictions on their breeding, transport, sale, use or exchange up to date

3.2.4 Coordination

The government and its agencies will provide the governance structures, guidance, and plans to coordinate and align actions for nature recovery. For example:

- Defra will explore options to establish appropriate governance arrangements so that the Environment Act biodiversity targets are delivered in a way that considers a changing climate
- LNRS will support public, private and voluntary sector organisations to work together on identifying collective priorities for restoring nature and improving climate resilience
- As set out in the Plan for Water, Defra and the Environment Agency will integrate water management by delivering catchment action plans backed up with new funding to improve all water bodies in England. This will target actions where they will deliver the greatest impact for water quality, drought and flood management, and nature recovery
- Defra, its agencies, the NPAs and AONBs partnerships will support the Home Office, the lead government department for wildfire, in scoping out the Wildfire Strategy and Action Plan by mid-2024, across all themes in NAP3

NPA and AONB partnerships cover nearly a quarter of land in England and play a fundamental role in conserving and enhancing landscape character. The range of habitat types and land uses present in Protected Landscapes make them central to managing England's landscape in an integrated and collaborative way. Defra and Natural England will:

- work with all NPA and AONB partnerships to facilitate the production of a Climate Adaptation Management Plan, which will be embedded in or linked with their management plans by 2028 and in all future plans and will include specific, measurable, achievable, realistic and timely actions and objectives designed to adapt to climate change
- update Natural England's guidance on Landscape Character Assessments to require an assessment of current and projected climate change impacts in all new local-scale Landscape Character Assessments

Case study: Royal Society for the Protection of Birds (RSPB) Lakenheath Fen - adapting in the long-term

Since 1995, the RSPB has taken extensive anticipatory action to provide freshwater reedbed habitat inland to help offset the inevitable loss of coastal freshwater reedbeds resulting from coastal flooding. This has been to prevent the loss of some reedbed-dependent species, such as Eurasian bittern.

A bittern flying across water at RSPB Lakenheath Fen

An example of this habitat creation is at RSPB Lakenheath Fen nature reserve in Suffolk. This area was once arable land but the RSPB has transformed it into a large reedbed and other wetland habitats. The reserve forms part of an ecological network with other fenland nature reserves nearby which helps improve connectivity throughout the landscape, helping species dispersal where necessary.

Alongside supporting nationally important numbers of breeding bitterns, the site also provides habitat for breeding marsh harriers, as well as bearded tits and Cetti's warblers. The reserve was also the first place in the Fens where common cranes successfully bred in over 400 years.

Overall, this long-term work to create inland reedbed habitats has been immensely successful in its core aim of increasing the UK bittern population, with the majority of their breeding population now in reedbeds safe from increased coastal flooding. The RSPB has plans to make the wetland reserves bigger, which should help them be more resilient to climate change impacts. As a result of the location and management of this habitat, the RSPB is helping secure a better future for wildlife.

3.3 Coastal and marine habitats and species

3.3.1 Introduction

Sea level is likely to rise by up to 1 metre by 2100 in England, depending on global temperature rise, and the shelf-seas around England are projected to warm by 0.2°C and 0.4°C per decade (source: CCC, 2021). As a result, coastal species will suffer from flooding, erosion and loss of habitat. For example, around 72% of the intertidal flats and marshes in England are at risk of coastal squeeze because of the presence of landward sea defences (source: CCC, 2021). Increased carbon concentrations in the atmosphere leads to more dissolved carbon dioxide in the sea. This in turn leads to ocean acidification, making it inhospitable for some shell forming organisms. Rapid range shifts are projected for fisheries over the next century, including the northward movement of non-native species, habitats and fisheries, but this also brings opportunities for new fisheries and biodiversity (source: CCC, 2021).

The government is putting in place measures to help reduce the vulnerability of coastal and marine habitats and species to climate change. This includes reducing pressures on marine resources; funding research to better understand the impacts of climate change; and supporting better coordination of adaptation actions at a local scale.

3.3.2 Action

Habitat restoration and management to reduce non-climate pressures will help coastal and marine habitats and species adapt to climate change. Defra will:

- support the creation, restoration and enhancement of estuarine, coastal and marine habitats through the ELMs, Dynamic Dunescapes, Shoreline Management Plans (SMP), the Habitat Compensation and Restoration Programme, and the Restoring Meadows Marsh and Reef initiative, which aims to restore at least 15% of the 3 priority habitats; seagrass meadows, saltmarsh and native oyster reefs by 2043. ELMs will not only provide support directly to farms in coastal areas to restore coastal habitats, but also includes offers to support upstream improvements, such as water quality, which will also aid restoration in coastal regions
- develop an approach for marine net gain which, when implemented with work to maximise the opportunities from the Offshore Wind Environmental Improvement Package, will result in improved and expanded marine habitats

One of the major resilience challenges facing marine ecosystems is from human pressures such as pollution, destruction of habitats through development, and fishing. Defra will:

- protect our MPAs from damaging fishing activity by the end of 2024, and deliver our new statutory target for 70% of the designated features in the MPA network to be in favourable condition by 2042
- explore more sites following the designation of the first 3 Highly Protected Marine Areas in English waters
- reduce the pollution of marine habitats from transitional (freshwater) and coastal water bodies through the Water Environment Regulations objective to achieve Good Ecological Status for 75% of water bodies by 2027
- develop and implement 16 Fisheries Management Plans to restore or maintain fish stocks to sustainable levels in the context of present and future climate change, which are being developed between 2023 and 2028 to cover English waters

The actions summarised in the terrestrial and freshwater habitats and species section relating to management of pests, pathogens and INNS are also relevant to this section.

3.3.3 Information

Defra will fund research to understand:

- how to address climate risks to blue carbon habitats
- the climate change impacts on fisheries and fish stocks and integrate findings into future Fisheries Management Plans to support climate adaptive management across English and Welsh fisheries. Defra will continue to fund research across this area to address the evidence gaps and where evidence is lacking, the precautionary objective may apply
- the risks to the aquaculture industry from pathogens that are likely to establish, spread or increase in impact as a result of climate change
- the risks from INNS under 2°C and 4°C degree global warming scenarios

Monitoring and surveillance activities are important for not only filling evidence gaps, but also informing an effective adaptive management, or dynamic, approach to managing marine and coastal habitats. This will improve our understanding of how climate change is impacting marine ecosystems, helping to mitigate risks, but also support migrating species to maximise new opportunities. Defra will:

- continue actions under the Great Britain INNS Strategy 2023 to 2030 on monitoring, surveillance and horizon scanning to facilitate prevention, rapid eradication and management of priority INNS
- gather evidence to support the development of climate specific targets and actions and consider them for inclusion in the next update to UK Marine Strategy, due at the end of 2024

- improve our understanding of climate change impacts through the marine Natural Capital and Ecosystem Assessment programme (2022 to 2025), and the Marine Climate Change Impacts Partnership's evidence reports that will be published by the end of 2023

3.3.4 Coordination

The government will provide the guidance, platforms and opportunities to coordinate and align actions for an integrated approach to coastal, marine and fisheries management. This includes:

- working with local authorities to facilitate natural processes and prioritise nature-based solutions where possible through flood and coastal erosion risk management strategies and plans. For example, through updates to SMPs and the National Coastal Erosion Risk Map, which will better inform local authority approaches to managing the coast
- supporting investment in skills, equipment and data collection which will help commercial fisheries and aquaculture to take advantage of opportunities created by climate change, such as warm-water species moving into UK waters, through the UK Seafood Scheme and England's Fisheries and Seafood Scheme. Funding for this scheme, is available to March 2025
- leading a cross-government marine spatial prioritisation programme to understand the future demands on the marine environment, optimise how our seas are used and maximise the opportunities for users to co-exist

3.4 Forests and peatlands

3.4.1 Introduction

Peatlands and forests capture and store carbon dioxide from the atmosphere and are referred to as 'carbon stores'. Carbon stores are at risk from the effects of climate change, especially drought and wildfire which are predicted to increase (source: CCC, 2021). Some of England's peatlands are already degraded, so they act as a net carbon source (with high carbon emissions) rather than a carbon sink (source: CCC, 2021).

Actions to restore peatlands, manage woodlands and increase tree planting will reduce net carbon dioxide emissions and help achieve England's net zero goals. There are also opportunities with a changing climate, where timber and forestry productivity could benefit from the planting of a wider range of species (source: CCC, 2021).

3.4.2 Action

Restoring England's peatlands and forests will help safeguard our carbon stores and their resilience to current and future climatic conditions. It will also have more widespread adaptation benefits. For example, increasing tree and woodland cover can help reduce flooding and provide cooler, shadier freshwater environments. Defra will:

- restore over 35,000 hectares of peat in England by 2025 and 280,000 hectares by 2050
- develop the Peatland Restoration Roadmap setting out a detailed trajectory for peatland restoration to 2050
- introduce a Peatland Restoration Register cataloguing key data, including end goals for the site, current restoration status, greenhouse gas emissions abatement, restoration plans, issues and actions
- improve our understanding of the lowland peat water challenge and transform the way we use water in these landscapes by developing infrastructure pilot projects from 2023 to 2025
- increase tree canopy and woodland cover in England by 34,000 hectares by 2028 and to 16.5% of England's land area by 2050
- set out plans to increase adaptive woodland management in the updated Tree Health Resilience Strategy in 2024

Peatland restoration and increased tree cover will be supported by government funding, such as the £750 million Nature for Climate Fund and ELMs. The government also recognises the need to support the development of private finance markets to stimulate growth in this sector, through mechanisms such as the Peatland Code and Woodland Carbon Code. In addition, Defra published a Nature Markets Framework earlier in 2023 to help attract private finance, including for carbon, to support woodland expansion and peatland restoration.

Several peatland and woodland risk management actions are centred around reducing damaging activity, which will enhance their resilience to climate change and enable the restoration process to continue. Defra will:

- ban the sale of peat for use in the amateur gardening sector by 2024
- work closely with the professional horticulture sector on speeding up their transition to peat-free alternatives ahead of a complete ban for the professional sector by 2030. This will protect peatland from further damaging activities. These measures will be brought forward when parliamentary time allows
- review the Heather and Grass Burning etc. (England) Regulations 2021 by 2025 to consider extending protections against burning on peat
- publish a revised Tree Health Resilience Strategy in 2024, setting out how we will protect our existing trees and woodlands, and drive the long-term changes needed to adapt to pressures such as climatic change, pests and diseases

Wildfire, pests, pathogens and INNS are a significant source of risk to forests, woodlands and peatlands, and could affect their ability to capture and store carbon and increase vulnerability to climate change (source: CCC, 2021). To mitigate this, Defra will:

- develop a framework to regulate the planting of 'emerging forestry species' from 2023
- introduce a bio-secure procurement requirement from 2025 on all government funded tree planting
- publish the Deer Management Strategy to reduce grazing pressures, promoting regeneration of existing woodlands and evolutionary adaptation (due in 2023)
- run a wildfire risk programme (2023-2027) so that land management is adapted for this risk

3.4.3 Information

To create resilient, healthy peatland and forests, further research and development is required to support actions and inform the approach.

For peatlands, Defra will:

- develop research on agriculture and water in the lowlands, such as the £6.6 million Lowland Peat Research and Development Programme, to explore opportunities, challenges, costs and benefits of sustainable lowland management and inform policy

In forestry, Defra will:

- support external research programmes such as the £15.6 million Future of UK Treescapes Programme to translate their multidisciplinary research projects into policy making
- provide up to £22.1 million funding to support high quality woodland creation and public good delivery through the Nature for Climate Research and Development programme

The information gathered through research and monitoring will be used to develop products and plans, build capacity, and help stakeholders and government make better informed decisions. These include:

- the new England Peat Map, which will be published by 2024, and the Peat Restoration Register, will mean our actions are based on up-to-date data
- ensuring woodland creation and management plans consider climate projections by 2028 based on recommended actions from Forest Research's Climate Change Hub
- using climate risk forecasts to inform tree planting policies and develop post-England Tree Action Plan policies
- work with the Forestry Climate Change Partnership to increase the forestry sector's wildfire knowledge and skills through accredited training and improve understanding of the impacts of climate change and how to mitigate or limit them

3.4.4 Coordination

Defra will engage stakeholders to provide the necessary guidance and funding and collaborate with teams across government. This will allow us to align actions and effectively implement adaptation measures for forestry and peatland.

For forestry, Defra will:

- invest up to £17.1 million by 2025 through the Nature for Climate Fund Sector Capacity Project to enhance quality, quantity and diversity of tree planting stock

Defra will also explore the opportunity to increase forestry productivity and the use of sustainable home-grown timber through:

- a Timber in Construction Road Map in 2023 (in collaboration with DESNZ, the Department for Business and Trade (DBT), DLUHC and DSIT)
- a consultation on Whole Life Carbon assessments in the construction sector in 2023 (DLUHC)

- a review of the Timber Procurement Policy in 2023

For peatlands, rewetting improves the condition of peat, making it more resilient to climate change and enabling sustainable farming, particularly in the lowlands. Defra will:

- build on the recommendations of the Lowland Agricultural Peat Task Force, which advises on how to safely and sustainably rewet our lowlands while supporting productive agriculture

3.5 Agriculture and soils

3.5.1 Introduction

Climate change is the biggest medium to long term risk to the UK's domestic food production (source: UK food security report 2021). Future projections indicate that climate change will make hazards, such as heavy rainfall and drought, more frequent. Drought leads to loss of soil moisture and makes it more vulnerable to erosion from wind and rainfall. Agricultural productivity could be at risk from soil erosion, extreme heat, flooding, drought, sea level rise, or a greater number of pests, pathogens and INNS under future climate scenarios (source: CCC, 2021). The record temperatures of July 2022 caused many crops to fail, from berries to lettuce. However, the changing climate also provides opportunities for growing new crops that will be better suited and more resilient. Backing British farmers and our rural communities is at the heart of the government's manifesto, which is why it has committed to maintaining the £2.4 billion annual farming budget (in England), which will support farmers to become more productive and profitable. The government's new farming policies ensure sustainable food production and environmental protection go hand-in-hand with something on offer for every type of farmer. This has been welcomed by farmers and farming organisations.

ELMs will strengthen our food security by reducing environmental threats to domestic food production. For example, restoring soil health can help to reduce the impact of drought and flooding. Healthy soil in England underpins a range of ecosystem services and outcomes. ELMs and government grant payments will create an incentive for land managers to adopt sustainable farming practices, which will provide benefits for agricultural productivity, biodiversity and the environment. We will support farmers and land managers in establishing their own soil health baseline so they can best manage the health of their soil. The government is also reducing the financial and regulatory barriers associated with new technologies such as precision breeding so more resilient varieties of crops and animals can be produced.

3.5.2 Action

Improving and protecting soil health requires sustainable management. The government has set a target for at least 70% of farmers and farmland to be in ELMs, and to have at least 40% of England's agricultural soils under sustainable management through ELMs by 2028, increasing this to up to 60% by 2030. Through support, including ELMs and the Water Management Grant under the Farming Investment Fund, Defra will:

- incentivise farmers and landowners to use sustainable agricultural methods such as covering soil through multi-species cover crops to protect soil health
- support increased agroforestry by paying for the establishment and maintenance of silvoarable and silvopastoral agroforestry systems in 2024 to protect crops and livestock from harsher weather conditions
- introduce the integrated pest management standard, as part of the SFI 2023, to manage INNS in a way that reduces the need for expensive chemicals which can have detrimental consequences for soil health and water quality
- support farmers and land managers to provide natural flood management through ELMs to protect themselves and other farm businesses in the catchment
- improve existing ELMs actions where possible on creating inter-tidal and saline habitat on arable land or on intensive grassland, or by non-intervention, to protect farmland further inland from coastal erosion and flooding
- invest £10 million in, and review planning barriers to, on-farm reservoirs and irrigation infrastructure to maintain food production when there is reduced access to water. Defra aims to increase water storage used by the agriculture and horticulture sectors by 66% by 2050 compared to 2024

3.5.3 Information

Having effective policy responses that are an efficient use of resources will depend on understanding the way climate change will affect soil health and agricultural productivity in the future. Defra will:

- establish a healthy soil indicator under the 25 Year Environment Plan Outcome Indicator Framework, which will be used to build a robust baseline and inform land management actions that increase climate resilience
- establish a method for incorporating the impact of climate change into crop health pest risk analyses by 2025 and develop new tools for assessing the impact of extreme weather events and to project the influence of climate change on non-native plant pests and pathogens by 2026. Information gathered from this will inform future responses to outbreaks

- further develop links between the Met Office Hadley Centre's agri-food resilience service and Defra's major crop breeding research programme the Genetic Improvement Networks (GINs) – this will enable exploration of the use of climate projections to better target crop breeding in response to climate pressures. The current round of GINs will run until 2024
- increase breeding efficiency and enhance climate resilience. On 16 May 2023, at the Farm to Fork Summit in No.10 Downing Street, Defra announced up to around £30 million investment in breeding research which will unlock the potential of precision breeding following royal assent of the Genetic Technology (Precision Breeding) Act on 23 March 2023
- explore the potential for new or less used crops which may become easier to grow in the future as the UK's climate continues to change
- provide a methodology and tools to collect consistent information about the health of the soil under all land uses and continue to research new technologies and innovations that could help improve the climate resilience of all soil and prevent future soil contamination
- support farmer- and grower-led innovation projects that promote sustainable and resilient productivity – at the Farm to Fork Summit, Defra opened a specific call for research and development projects to incentivise sustainable and resilient farming as part of the £270 million Farming Innovation Programme spending over the Agricultural Transition to 2028/29

3.5.4 Coordination

Leaving the European Union has given the government the opportunity to adopt a more proportionate science-based approach to regulating organisms produced by precision breeding technologies such as gene editing. The Genetic Technology (Precision Breeding) Act will enable greater research and innovation to help deliver drought and disease resistant crops, reductions in agricultural greenhouse gas emissions, and reduced agri-chemical use.

Defra recognises that some groups will need support to adapt their business. Through various schemes such as the Future Farming Resilience Fund and the Adaptation Reporting Power (ARP), Defra will:

- provide free advice to help farmers to take adaptation actions for their businesses
- support farmers to protect animal health and welfare
- increase domestic food security with grants to fund high health and welfare infrastructure projects and equipment, helping farmers adapt to rising temperatures

- work with water companies so that they have comprehensive planning to mitigate the risk to water supply in the event of sea level rise and saltwater intrusion
- explore inviting public bodies in the agriculture and horticulture sector to report under ARP to drive action on adaptation and increase government's understanding of the agri-food sector's preparedness for climate impacts

Farmer Andrew Blenkiron amongst wildflowers on the Euston Estate. Andrew has increased water storage and soil resilience. Farming in one of the driest areas of England, he uses technology to manage irrigation, while adding organic matter and using cover crops to improve the soil, but sourcing water for food remains a concern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Chapter 4: Health, communities, and the built environment

4.1 Overview

4.1.1 Introduction

This chapter covers the government's response to climate risks and opportunities to health, communities, and the built environment. This represents 13 of the 61 risks and opportunities identified by CCRA3.

This chapter sets out the steps government is taking to protect public health, maintain access to critical services, and sustain both recreational and cultural activities in the face of climate change.

Providing resilience in this area means ensuring that health and social care services and education continue to be delivered in the event of more extreme weather. It also requires the buildings in which we live and work remain safe and comfortable in a changing climate, and our historic buildings to be preserved for future generations.

Risks to air quality and water quality, and the maintenance of a safe and secure food supply are also addressed in this chapter.

4.1.2 Approach

The government's approach to addressing risks related to health, communities, and the built environment will focus on targeted capital investment, for example to address flood risks, and an improved regulatory framework and effective guidance to enhance the resilience of new buildings and the existing building stock. The government will encourage innovation in developing building resilience to climate change through targeted approaches. For example, the Coastal Transition Accelerator Programme will support innovation to help several communities along the coast adapt to climate change. We will use relevant governance structures to drive the effective use of standards and guidance and maximise the potential of the government's analytical capabilities.

The government will address the risks posed by climate change to health, communities and the built environment through the following.

The National Planning Policy Framework

The NPPF is developed by DLUHC and sets out how national planning policies should be applied, guiding locally prepared plans for housing and other development. Guided by this Framework, plans should take a proactive approach to adapting to climate change. The '*Levelling-up and Regeneration Bill: reforms to national planning policy'* consultation (which closed March 2023) sought views on the proposed approach to updating the NPPF. The government will carry out a fuller review of the NPPF following Royal Assent of the Bill, to maximise its contribution to both climate change mitigation and adaptation.

Building Regulations

Building Regulations are set by DLUHC and contain minimum standards for the design and construction of new buildings and alterations to existing buildings to protect the health and welfare of building occupants. Approved Document O was added to the buildings regulations in December 2021 and took effect in June 2022. The new requirement seeks to limit new residential buildings' exposure to excess heat and unwanted solar gains. For non-residential buildings, overheating is generally managed through established strategies, including mechanical ventilation and air conditioning, which are covered by the existing Approved Documents.

Flood and Coastal Erosion Risk Management Strategy, Policy Statement and Roadmap

The Policy Statement outlines the government's policies to increase resilience to flooding and coastal erosion. The Strategy forms part of the statutory duty of the Environment Agency under the Flood and Water Management Act 2010, and provides a framework to guide activities of flood risk management authorities and asset owners in FCERM on the ground. The Roadmap sets out the practical actions that a wide range of organisations, including infrastructure providers, environmental and farming groups, will complete by 2026 towards the strategy's 2100 vision.

Adverse Weather and Health Plan

The Plan, launched by UKHSA in April 2023, aims to protect individuals and communities from the health effects of adverse weather and to build community resilience. It will bring together and improve existing guidance on weather and health, underpinned by scientific evidence collection, guidance, and weather-health alerts, and will support the uptake of this information by the National Health Service (NHS) and social care organisations.

TrustMark and the Publicly Available Specification 2030-2035
Energy efficiency measures installed under current government schemes require installers to be Trustmark registered and measures must also be installed in accordance to the Publicly Available Specification (PAS) 2030 and PAS 2035 standards. This ensures installations are done to the highest quality, protecting the consumer against poor workmanship. PAS 2035/2030 requires a whole house approach to home retrofit projects and ensures that the risks of unintended consequences, such as mould and condensation due to poor ventilation, are minimised. TrustMark is a government endorsed quality mark for home improvement. To become TrustMark registered, businesses must register with a TrustMark approved scheme provider and commit to the TrustMark Code of Conduct and Customer Charter, as well as the codes of practice relevant to their industry.

4.2 Health and wellbeing

4.2.1 Introduction

The main climate risks to health and wellbeing in the UK are those resulting from high temperatures, changes to air quality, and flooding. These directly impact on people's health and wellbeing as well as on the delivery of health and social care services. These risks also impact on food safety, water quality and water supplies, and an increased likelihood of vector-borne disease in the UK. These are also more likely to negatively impact on some members of the population, including people with disabilities and older people. Of the UK population, 38% of disabled people are 65 and older (source: UK Disability Survey research report, June 2021).

The government is taking an active role in addressing these risks, including by fulfilling legal duties such as on air quality and addressing information gaps, including by raising awareness among key actors and citizens, especially those more disproportionately likely to be impacted.

4.2.2 Action

Tackling public health risks from overheating is a key priority for government. There were 2,803 excess deaths among those 65 and over following the heatwaves of 2022 (source: Excess mortality during heat-periods - Office for National Statistics (ons.gov.uk)). The government is using regulation to help drive action to address overheating risk. To enhance buildings' resilience to high temperatures and their thermal efficiency across different building types:

- DLUHC implemented the Approved document O of the Building Regulations in June 2022 to limit excess heat and solar gains across all new residential buildings. DLUHC and the Building Safety Regulator will investigate overheating risk in homes that have been created through a material change of use in 2022-24
- DLUHC will use recommendations from the Housing Health and Safety Rating System review to support the effective enforcement of quality and safety standards in all tenures of residential accommodation, including standards related to excess heat by 2030

To support the government's effort to address overheating risks:

- DESNZ will develop measures that deliver the government's effort to deliver net zero retrofit to existing homes and non-domestic buildings and will retrofit existing buildings alongside net zero commitments in ways that appropriately consider how to minimise climate risks to buildings such as from overheating
- Defra will work with the Drinking Water Inspectorate to continue to meet our high water quality standards under the Water Supply (Water Quality) Regulations 2016. Defra will also support the review of companies' drought plans every 5 years to protect household and business water supply

Guidance to build resilience in both infrastructure and service delivery in the health and social care sectors includes actions carried out by the Department for Health and Social Care (DHSC), NHS England, and UKHSA who will:

- implement the Adverse Weather and Health Plan, which was published in April 2023, to support local and national organisations to prepare, build and respond to future adverse weather events to protect lives and promote health and wellbeing
- review and update NHS' standards for facilities' resilience planning by 2025
- support NHS Trusts and Integrated Care Boards in incorporating climate change adaptation within their Green Plans by 2027
- include adaptation measures in the NHS Standard Contract for NHS buildings and services from 2023

4.2.3 Information

The government is developing its understanding of the climate risks to health and wellbeing through research, risk assessments, and horizon-scanning activities.

To determine risk and guide interventions related to overheating and air pollution:

- DLUHC, DESNZ, DHSC and UKHSA will conduct targeted research through the NAP3 implementation period from 2023 to 2028 into which building types, tenures and groups are most at risk and likely to be impacted. This will be in

addition to raising public awareness of the risks and adaptation actions citizens can take
- Defra and UKHSA will make access to the Air Quality and Health Information and Government Web Services available to the public and vulnerable groups by 2024
- DLUHC, DESNZ, DHSC and UKHSA will commission research to close evidence gaps identifying the buildings most vulnerable to extreme heat and where these are located, as well as appropriate adaptation solutions. This will include:
    - the Climate Services for a Net-Zero resilient World programme which will report by 2025 on modelled overheating scenarios in existing homes
    - analysis of overheating in existing homes using Energy Follow Up Survey with report to be published in 2023
    - maintaining close links with academic and other studies, e.g. membership of advisory boards, sponsorship of PhDs

To address the potential health and safety implications for learners, prisoners, and prison and education staff of high temperatures and floods and maintain high levels of safety:

- the Department for Education (DfE) will conduct annual climate risk assessments from 2023 to identify the highest-risk settings and provide guidance on how to reduce the risk. Individual settings will be able to develop Climate Action Plans to protect learners from climate risks
- DfE will prioritise nature-based solutions by 2025, including sustainable drainage systems such as rain gardens, and natural shading for outdoor spaces, which will protect learners from flooding and overheating while maximising usable outdoor space. This will be written into the guidance and standards used by contractors who build and refurbish schools
- the Ministry of Justice (MoJ) will undertake research to better understand the interdependencies between climate, staff and prisoner behaviour, nature, health and wellbeing and then pilot interventions by 2027

Health and social care services also face potential disruptions due to climate change. Extreme weather conditions may damage buildings in which services are being delivered including hospitals, care homes and people's private homes. Disruptions such as flooding will also impact people's ability to access these services. To keep our health and social care services open and accessible to all those who need them:

- DHSC and UKHSA will work with social care providers to better understand how to adapt social care infrastructure and raise awareness of the health consequences of climate change

- NHS England will work to adapt NHS infrastructure to extreme weather events and overheating risks through the NHS Standard Contract and building standards from 2023, as mentioned above
- NHS England will raise awareness of climate impacts and responses amongst NHS staff
- NHS England will develop an interactive tool by 2025 for Trusts and Integrated Care Boards to identify local climate risks on NHS sites to inform adaptation planning

Climate change is expected to cause an increase in extreme weather events, which could have an effect on the occurrence of bacteria, viruses, parasites, harmful algae and fungi, potentially increasing the risk of foodborne illnesses. To address climate risks to health and wellbeing and maintain our high food safety standards, the Food Standards Agency (FSA) is:

- undertaking horizon-scanning, monitoring and surveillance, and support and advice activities to help manage risks in food from increased levels of pathogens and other hazards and toxic substances, due to climate change
- carrying out monitoring and surveillance with partners including Local Authority Food Liaison Groups, and Food Hygiene Local Authority Groups

4.2.4 Coordination

Recognising the far-reaching impacts of climate risks to health and wellbeing, the government is establishing and using the right structures to deliver its actions in a joined-up manner. The government is doing this in numerous ways, including by:

- establishing the Building Safety Regulator with statutory responsibility of overseeing safety and standards of all buildings, including consideration of the resilience of buildings to climate risks
- the Food Standards Agency investing £250,000 in the new UK Food Safety Network (with additional co-funding provided by UKRI-Biotechnology and Biological Sciences Research Council to bring total investment in the network to £1.6 million), which will coordinate UK food producers, scientific researchers and food policy makers to take robust actions towards improving food safety

DESNZ is working to grow the supply chain of skilled, competent retrofit installers, including those who are Trustmark and PAS2035 certified, by investing in skills and training. The department launched the £9.2 million Home Decarbonisation Skills Training Competition in 2022 to fund a range of suppliers to deliver accredited training at scale and followed the previous competition which resulted in almost 7,000 training opportunities in England.

4.3 The built environment

4.3.1 Introduction

The building stock in the UK will need to be improved to maintain safe and comfortable temperatures as summers become hotter due to climate change. The government is also working to address climate impacts on building fabric such as increased risks from moisture, wind, subsidence and wildfire.

The government will address the impacts of climate change on the built environment within the development of its net zero policy framework. This is reflected in the Heat and Building Strategy which will seek to minimise the risk of overheating and the increasing demands of energy associated with active cooling.

4.3.2 Action

Approved document O of the Building Regulations will reduce the risk of overheating in new homes. The introduction of Part O in 2021 required, for the first time, housebuilders to mitigate the risk of overheating in new homes.

The government is taking the lead with its own estate with a commitment to develop and deliver Climate Change Adaptation Strategies through the 2021 to 2025 Greening Government Commitments Framework for Government estates by Cabinet Office's Office of Government Property. In addition, DESNZ will undertake research between 2023 and 2028 to fill evidence gaps, including those highlighted by the CCC, in our understanding of the existing building stock's vulnerability to climate hazards. Ongoing research suggests that energy efficiency retrofits are unlikely to increase the risk of overheating in the near-term; however, they are likely to increase the importance of ensuring adequate ventilation is provided. Research will help identify which building types may require adaptation measures to mitigate the risk of overheating.

MoJ and DfE are acting specifically on prisons and education settings:

- MoJ is building new prisons, targeting an 'Excellent' Building Research Establishment Environmental Assessment Method (BREEAM) rating as a minimum, with mandatory credits aligned to delivering climate change adaptation benefits, by 2027
- DfE requires all new schools (not already under contract) to be ready for 2°C of global warming and adaptable to 4°C, through a strategic approach to site selection and the adoption of design guidance based on the latest evidence
- MoJ and DfE will deploy the latest evidence to inform updates to the building specifications used for refurbishment and building programmes of prisons and education settings

Case Study: Resilient new prisons and prison expansions

The MoJ is creating 20,000 modern and innovative prison places through its prison expansion programme. These will provide the right conditions for prisoner rehabilitation.

Prisons will be designed adopting a 'fabric first' approach and must comply with MoJ BREEAM Policy. The BREEAM standard is an independent scheme which assesses the sustainability of infrastructure projects. It can be used to challenge project teams to design impacts of climate change including flooding and extreme weather events. The impacts of hazards on prisons will be evaluated using robust evidence, with plans put in place to manage the risks. How buildings are oriented and modelled for overheating will be carefully considered and appropriate solutions identified. For example, Air Handling Units have capacity for cooling coils where overheating risks have been identified.

Alongside measures to adapt to climate risk, and as the government works towards net-zero by 2050, the new prisons being built in England will also incorporate measures to reduce energy demand. These measures include the use of heat pumps, efficient lighting systems, and solar panels.

4.3.3 Information

The government is working to improve the understanding of the scale and variation of the impact of climate risks to the UK's built environment. To do this, the government and LAs will work together to gather and collate evidence to quantify these impacts. In addition, government will enhance its evidence base on the potential effectiveness of different measures and strategies to inform future solutions.

Across the entire UK building stock:

- DLUHC, DESNZ, DHSC, and UKSHA will conduct research between 2023 and 2028 to further their existing knowledge of the most vulnerable building tenures, dwelling types, locations or groups from extreme heat. This will help identify the homes and buildings that are most at risk of overheating, the proportionate interventions to address this risk, and priorities for action
- DESNZ will carry out research to determine the specific adaptation measures required to retrofit existing building stock. This will be done in addition to work to understand how much energy would be required to cool buildings under different future climate and retrofit scenarios

- DESNZ is managing research on mapping out climate risks relevant to buildings at local scale including extreme wind and wind-driven rain to highlight areas where specific building types may be at greater risk of damage
- UKHSA will increase the awareness of the public to the potential risks posed by high temperatures and associated indoor air quality. This will enable communities to act where possible to protect themselves and those who are vulnerable

More specific research across parts of prisons and the education estate is being carried out to support effective adaptation. By 2027, MoJ will have:

- used Environment Agency and Met Office expertise to update its CCRA to reflect greater details on risks posed by overheating and flooding to prisons. It will use this information to support decisions on interventions and future investments and towards a broader understanding of how these hazards impact its operations under different warming scenarios
- undertaken specific research into overheating in prisons to determine what monitoring techniques, metrics and potential interventions should be considered

DfE is:

- publishing annual risk assessments for flooding, overheating, and water scarcity, to inform decisions on how education settings are then adapted
- engaging with education settings by 2025 to enable individual settings to nominate sustainability leads, who will own and implement Climate Action Plans, facilitating local action and building capacity to protect learners and staff from the effects of climate change
- engaging with education settings to raise awareness of overheating and encourage behaviour change to reduce risks to cognitive performance, health and wellbeing
- developing climate risk models of the education estate, initially for overheating risk by 2023 but with a view to including flood risk in future. Individual settings will have access to the data to inform decision-making and will be able to share data and best practice via the National Education Nature Park Platform

4.3.5 Coordination

The government is ensuring that there is clear oversight of organisations responsible for the resilience of our buildings to help them address climate risks, including through:

- the Building Safety Regulator having a statutory role in overseeing the safety and standards of all buildings, including consideration to the resilience of buildings to climate risks
- engaging with education settings to support locally led action. Enabling individual settings to nominate sustainability leads in schools and colleges will help to implement Climate Action Plans mentioned above
- DBT ensuring climate resilience and risk to building fabric from the impact of climate change are being considered in work to support sustainable construction standards and guidelines between 2023-2028

4.4 Communities and cultural heritage

4.4.1 Introduction

Climate change impacts our cultural heritage including historic buildings, museums, heritage sites, and archives. Climate change will increase the risk of flooding to more properties and areas. Areas already prone to flooding may experience an increase in frequency and severity. Heritage assets on the coast are particularly vulnerable where severe weather and sea level rise can combine to exacerbate the impacts on already vulnerable coastlines.

Temperature change and extreme heat can impact the health and comfort of occupants of historic buildings, but they can also cause building materials to expand and contract which could shorten their life expectancy and increase the need for maintenance and replacement. Temperature changes can impact soil condition which impacts built structures and archaeology through subsidence, heave, and structural deformation. Temperature fluctuations can also provide favourable conditions for invasive species, pests and diseases which can impact historic landscapes, archives and collections.

Intangible cultural heritage, such as knowledge, traditions, and folklore may also be affected by climate change. This derives from the risk of communities and groups of people being displaced and the associated impact on their traditions and customs. Resilience to climate change can therefore protect both UK's tangible and intangible cultural heritage, which in turn has associated benefits, including benefits to the UK's economy through heritage-related tourism, and wider heritage-related socio-economic benefits including contributing to wellbeing and enhancing communities' pride in place.

Protecting our cultural heritage can present opportunities to adapt to climate change, for example through exemplifying how cultural heritage is already taking steps to adapt to the climate challenge. The cultural heritage sector has a strong role to play in demonstrating that protecting our heritage and climate adaptation can go hand in hand, by helping to explain the science and changes needed, and through ensuring the continued provision of valued places to live, work and spend time.

Adaptation measures can ensure our heritage and cultural assets are preserved and continue to thrive. Resilience to climate change can protect both UK traditions and the economy, as the UK's tourism industry is linked to its cultural heritage. Protecting our cultural heritage can contribute to community wellbeing through provision of valued places to live, work and spend time.

In managing these risks, the government is taking an active role ensuring collaboration between public and private actors that manage areas such as flood related risks and coastal erosion. This includes further addressing knowledge gaps and developing shared aims, research priorities and methodologies for assessing risk and developing appropriate adaptation.

4.4.2 Action

To address climate risks to communities and the UK's cultural heritage, the government is providing significant investment to protect people and their communities at risk. Defra and the Environment Agency are:

- better protecting communities through the £5.2 billion investment in flood and coastal erosion schemes in England by 2027. This includes a £100 million Frequently Flooded Allowance to support communities where 10 or more properties have flooded twice or more in the last 10 years
- providing support for local areas to help them utilise innovative ways to build resilience through the £200 million Flood and Coastal Innovation Fund - 25 local projects will benefit from this fund between 2021 and 2027

The government is delivering several wider actions to support our goal to be more resilient to future flood and coastal erosion risk. Defra, DLUHC and the Environment Agency will:

- update the NPPF as part of a wider review following passage of the Levelling Up and Regeneration Bill to maximise its contribution to both climate change mitigation and adaptation
- work with partners to deliver actions that will build resilience to flooding and coastal change through the National FCERM Strategy Roadmap by 2026
- help reduce surface water flooding risk by standardising sustainable drainage systems in new developments through the implementation of Schedule 3 to the Flood and Water Management Act 2010, subject to scope and threshold. This will help protect against impact of heavy rainfall on the water system
- refresh Shoreline Management Plans by the end of 2024 so that they remain current and relevant, using the most up to date available information
- help UK households that are at risk of flooding to access affordable insurance through the Flood Re scheme

4.4.3 Information

The government is committed to ensuring communities have the information they need to understand, manage and prepare for flood and coastal erosion risk. Defra and the Environment Agency will:

- improve the National Coastal Erosion Map to provide an updated assessment of properties and infrastructure at risk from erosion in a changing climate. This will provide better evidence to inform decision making on adapting the coast. This work will commence in 2023
- improve the capability of forecasting floods in higher risk areas to improve surface water flood risk information which will in turn improve communication of forecasts to those responding locally

The Department for Digital, Culture, Media and Sport and Historic England are working with partners to understand the threats, impacts and adaptation actions needed to respond to flooding and coastal erosion on cultural heritage.

Historic England will:

- develop capacity and capability to model long-term impacts of climate change on cultural heritage, including in-combination effects by 2025
- work with partners to develop technical guidance which will provide information on appropriate approaches for adapting historic and traditionally constructed buildings to flooding and other impacts for decision makers in the planning process, such as building owners, occupiers and managers, architects and contractors by 2025

Historic England in consultation with DCMS will:

- work with partners to identify research needs to develop methods to assess the vulnerability of intangible cultural heritage to climate hazards from 2024, using approaches developed for tangible heritage in the UK and overseas. The approaches to developing an evidence base will be improved to inform CCRA4 development in 2026

4.5.4 Coordination

Government is coordinating its actions with partners within and outside government to ensure that the country is prepared to protect our cultural heritage from climate risk. To do this, DCMS will:

- work with its arm's-length bodies where appropriate, to develop (2023/4) and implement (ongoing) an engagement plan to raise awareness across government and relevant public bodies of the critical role that cultural heritage can play in supporting climate change adaptation in the UK and overseas, covering the full spectrum of cultural heritage, including museum buildings and collections

Historic England in consultation with DCMS will:

- develop (2024) and deliver (ongoing) an action plan with partners to understand and communicate the threat to cultural heritage from flooding and coastal erosion to inform future adaptation and decision-making

Chapter 5: Business and industry

5.1 Overview

5.1.1 Introduction

This chapter covers the government's response to climate risks and opportunities to business and industry, which represent 7 of the 61 risks and opportunities identified in the third Climate Change Risk Assessment (CCRA3).

Nearly all businesses are subject to climate change risk, from their workforces to business sites and their ability to reliably provide goods and services. The Technical Report of CCRA3 identifies physical risks to businesses from flooding, coastal change, extreme weather, water scarcity and high temperatures. Businesses are also affected by the resulting impacts on transport and distribution networks, and access to finance, investment and insurance that businesses rely on. The evidence suggests that impacts from these risks – such as increased damages from flooding and decreased employee productivity from high temperatures – will become more severe under most warming scenarios.

To remain successful, businesses must be able to assess climate risk and adapt. The government is supporting adaptation by identifying and addressing risks to the financial system and improving our understanding of the types of risks businesses of all kinds face. The government is also providing businesses with more accessible climate risk information to support their actions and delivering investment in resilience measures to tackle flooding and coastal erosion.

5.1.2 Approach

The government will address climate risks to business and industry through a combination of macro-economic policy, investment in resilience, evidence gathering and business engagement. The following levers are central to the government's approach:

Fiscal events
As set out in the 2023 Spring Budget, the government is committed to delivering economic growth through creating a stable environment for businesses. The government has sought to reduce burdens on businesses so they can invest and grow, recognising the essential role that businesses play in transitioning to a more sustainable, 'green' economy.

Green Finance Strategy (GFS) 2023
The GFS 2023 sets out action being taken to protect the financial system from climate-driven impacts and attract investment into adaptation. This includes developing financial reporting for adaptation, stronger evidence to understand adaptation investment need, and incorporating adaptation into the government's green finance policy framework.

Green Jobs Taskforce
In responding to the recommendations of the 2020 Green Jobs Taskforce, the government will identify the skills needed for the UK to transition to net zero whilst strengthening adaptation to climate change.

Bank of England regulation
The Bank of England will continue to put climate change at the heart of its prudential, financial stability and monetary policy objectives, focusing on both the physical risks and transition risks of climate change as we move towards net zero. This work builds on the outcomes of the 2021 Climate Biennial Exploratory Scenario.

Flood and Coastal Erosion Risk Management Strategy
The government will continue to deliver on our strategy for a nation that is ready for and resilient to flooding and coastal change to the year 2100.

Business reporting on adaptation
Through existing statutory reporting under the Adaptation Reporting Power, and Task Force on Climate-Related Financial Disclosure-aligned reporting by large companies and a range of financial market participants, the government is improving our understanding of current awareness of climate risk, adaptive capacity, and adaptive action.

5.2 People

5.2.1 Introduction

The risks and responses in this section each relate to the ability of people to fulfil their roles in the workplace. Climate hazards such as flooding and heavy rainfall can disrupt transport networks and halt power supply, limiting people's ability to get to work and be productive once there. Workers can be subject to high temperatures and water restrictions during heatwaves. Alongside the impacts to human health and wellbeing, this can lead to productivity losses.

Businesses operate in competitive markets so face inherent incentives to minimise costs of disruption from climate change. However, the evidence in CCRA3 suggests

that businesses face several barriers to action which the government has a role in addressing. We will improve our understanding of businesses' awareness of climate risk and readiness to support businesses' capability to identify and manage risks.

5.2.2 Action

The Cabinet Office will support the development of the UK Resilience Academy to increase provision of professional training to businesses on resilience, including resilience to climate change risks. The academy will be built out of the Emergency Planning College and will act as a one-stop learning and development hub for resilience.

5.2.3 Information

There are currently knowledge gaps about business awareness and readiness levels, including adaptive action being taken in response to climate effects.

To address these gaps, DBT will:

- engage with UK businesses to understand awareness levels and readiness for climate change incidents, including through use of surveys and existing engagement through forums such as sector councils
- use evidence from surveying to inform ongoing policy development, to target the government's engagement with businesses on specific adaptation measures

The evidence in CCRA3 suggests business awareness of climate risk is low – particularly among Small and medium-sized enterprises (SMEs). Communication to businesses is critical in ensuring they are well-equipped to deal with climate risk. As such:

- DBT is working with Defra and other government departments to provide factsheets for businesses on dealing with risks from higher temperatures, water scarcity, storms and flooding. These will be published online and circulated among businesses. Climate adaptation information and guidance for businesses on the SME Climate Hub will be increased, including use of the hub to host the climate risk factsheets. Increased awareness is intended to lead to increased adoption of adaptation measures, particularly for those businesses most at risk
- the Health and Safety Executive has issued advice for employers on heat warnings, advising employers to take effective adaptation action
- DBT will work with the Met Office to review provision of accessible climate risk data to businesses by the end of 2023

5.3 Physical assets

5.3.1 Introduction

The risks and responses in this section each relate to physical assets owned or used by businesses primarily from flooding, coastal change and extreme weather events. Physical assets generally include property – land, office buildings, factories – equipment – such as machinery – and inventory. Whilst businesses are incentivised to protect their physical assets from climate hazards, there are barriers to individual businesses in adapting sufficiently to flooding, coastal change and extreme weather events.

Businesses benefit from government investment in flood and coastal defences. However, to limit future impacts it is important for businesses to understand the risks of damage and disruption caused by flooding and coastal change and to take action to limit potential impacts. This is why the government will continue to raise awareness, so businesses know what risks they face and understand how to respond.

5.3.2 Action

Investment is key to tackling flood and coastal erosion risk – many effective solutions, such as building flood defences, cost money to implement.

The government has committed to:

- better protect communities across England through a £5.2 billion investment in flood and coastal erosion schemes
- review national planning policy to ensure it is sufficiently robust to keep future developments safe from floods and to not increase risk elsewhere. This includes reviewing the planning policy approach for areas at the coast in managing and adapting to coastal change and sea level rise
- deliver the National Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026, which sets out the practical actions the government, the Environment Agency and a range of local implementation partners will take to tackle the growing threat of flooding

Defra and the Environment Agency are also improving flood forecasting capabilities in higher-risk areas, making sustainable drainage systems mandatory in new developments, and updating Shoreline Management Plans (SMPs) by the end of 2024 to ensure continued relevancy.

5.3.3 Information

There are currently knowledge gaps on business awareness and readiness levels concerning climate risk.

To address gaps for business and the government:

- the Environment Agency will update the National Coastal Erosion Risk Map and its assessment of properties and infrastructure at risk from erosion in 2023 which will provide better evidence to inform coastal decision making
- the Environment Agency will update the National Flood Risk Assessment by 2024 to provide better data to support flood risk mapping and improved ways of measuring changes in risk, as well as future investment choices
- the Environment Agency will develop updated investment scenarios by 2025 to inform future policy and investment choices on flood and coastal erosion risk management
- as mentioned in the People subsection, DBT will survey businesses to provide better information on businesses' readiness to address climate risk – including flood and coastal erosion risk. This will enable the government to measure progress over time, and data gathered will be used to feed back to future policy development, such as the potential role of public-private partnerships and financial incentives to overcome financial barriers to adaptation

The government provides advice to individuals, communities, and businesses on flood and coastal-erosion risk, much of which is delivered by the Environment Agency. For example, the Environment Agency provides flood risk alerts, an active flood checker and flooding guidance, the long-term flood risk checking service, and advice on flood risk information for planning applications.

5.4 Business operations

5.4.1 Introduction

Risks to business operations affect businesses' ability to provide goods and services. These include water scarcity, finance impacts (including both systemic financial risks and specific issues relating to insurance and access to capital), and disruption to supply chains. Opportunities for business from changes in demand for goods and services are also captured in this section.

The role for government in addressing these risks varies by sector. Private businesses are responsible for investing in the resilience of their specific commercial sites and their supply chains, but the government has a vital role in ensuring businesses have the information they need, as well as a constructive regulatory environment.

Across the economy as a whole, financial markets will be increasingly exposed to climate risks through their investments, presenting potential risks to economic

stability. The government will continue to regulate financial markets to make sure that climate risk is factored into financial institutions' decision-making.

5.4.2 Action

The government is acting to ensure the regulatory environment encourages adaptation and that funding is available where the private sector cannot act. To achieve this, the government aims to provide financial market participants with high-quality information on sustainability risks and opportunities to create greater transparency, ensuring that financial decisions can take climate and environment into account. A mix of government policy, legislation and regulatory action will be used, including from engagement with the Financial Conduct Authority, Prudential Regulation Authority, the Pensions Regulator and the Financial Reporting Council. This will also include implementation of Sustainability Disclosure Requirements for businesses and investment products.

HM Treasury will continue to help create the conditions for sufficient access to private sector finance for projects that can help improve our resilience. The UK Infrastructure Bank is already addressing this with infrastructure finance to aid climate resilience and help to achieve net zero.

In the water sector, the government has unlocked almost £500 million of additional investment in new infrastructure to tackle water scarcity, is requiring water companies to produce plans to meet increasing water demands and is providing water audits for businesses to consider how best to maximise their water efficiency. This will help in meeting ambitious targets to reduce leakage by 37% and non-household water use by 9% by 2038, safeguarding future water availability for businesses (source: Plan for Water, 2023).

The government is incorporating climate resilience into its sectoral, economic and security plans and strategies, most recently including Powering Up Britain. This will help to protect the country's energy sector, safeguarding the provision of goods and services from climate-related disruption. The impact of climate change on supply chains will also be included as part of the new strategy on supply chains and imports. The government is building resilience knowledge among businesses through a new UK Resilience Academy to provide professional training in the form of a one-stop learning and development hub for resilience.

On supply chain risks, DBT has:

- developed the Supply Chains Resilience Framework which guides businesses on options to reduce dependencies in supply chains, including diversification,

working with international partners, stockpiling and surge capacity, onshoring, and demand management
- published a Safeguarding Supply toolkit to encourage businesses to take collective and coordinated action to help reduce and overcome future shocks to their supply chains
- committed to publishing a new strategy on supply chains and imports in autumn 2023, to strengthen our collective ability to respond to threats to critical imports, such as climate change

5.4.3 Information

The government has done significant work to improve the information and planning for business around climate-related financial risks, through the introduction of mandatory reporting against the Task Force on Climate-Related Financial Disclosure framework. The government is addressing information gaps to further enable the development of adaptive actions in response to climate risks:

- Financial regulators and HM Treasury are continuing to monitor climate risk in insurance markets, engaging with industry and key stakeholders to ensure continued government awareness of how climate change is affecting insurance
- The Transition Plan Taskforce is expected to publish its disclosure framework and implementation guidance for transition plans by the end of 2023. The Taskforce will further consider how transition plans can incorporate climate adaptation
- DBT is undertaking further research into business sectors and business capacity to identify future climate-related opportunities, including sales of new consumer goods which are more suited to future changes in climate. Opportunities also include capitalising on the UK's leading position in a range of sectors to support major capital projects domestically and internationally
- DBT is engaging with business on supply chain risk management, providing specific information and guidance in response to climate threats which could affect critical imports for the UK. This includes encouraging relevant information sharing to better anticipate supply chain issues relating to climate change and other risks
- Through ongoing engagement with industry, DBT is gathering supply chain business intelligence on climate-related issues, as well as the adaptive actions industry are pursuing. This insight will inform the government's approach to supply chain policy so that the government can provide effective responses in maintaining critical goods supply into the UK

5.4.4 Coordination

The government is coordinating with partners within and outside of government to ensure that businesses understand and are prepared to manage climate risk. DBT and other government departments will:

- work with arms-length bodies and relevant public authorities to help to promote and disseminate climate-related information and guidance to businesses across the UK and across sectors
- engage with trade bodies, and professional bodies and other business organisations to provide information and guidance to their members

Case study: Environment Agency Rea Catchment Partnership

The Rea Catchment Partnership was created in 2016 to bring together organisations from all sectors to maximise opportunities to attract the required funding needed to deliver improvements for communities across south Birmingham. The initial focus of the Partnership has been on delivering flood risk improvements. One of the first projects to be completed in 2019 was the Selly Park North flood risk management scheme.

At inception the Environment Agency facilitated workshops with businesses, non-governmental organisations, LAs and local community representatives to identify and align preferred outcomes and opportunities with potential funding streams. Stakeholder engagement facilitated through local community groups was essential in developing the scheme design and securing buy-in, ensuring the project's outcomes aligned with the needs of the local community.

Funding for the scheme was secured through an innovative public-private partnership model. Birmingham City Council and Calthorpe Estates, a private landowner and developer, were able to provide land and partnership funding. To secure the private funding stream, the Environment Agency acted as scheme contractor alongside Calthorpe Estates as scheme designer, with the scheme and future site development determined as a single hybrid planning application. Around 50% of the £4 million scheme was secured through Calthorpe Estates with the remainder via the government’s Flood Defence Grant in Aid.

The scheme delivered a standard of protection to 150 homes and businesses up to a 1-in-100-year flood event, including consideration of current and future climate change. The work involved deepening and widening an existing flood water storage area owned by Birmingham City Council, during which a new wetland wildlife habitat was created, aspects of the river corridor were re-naturalised and local cycling infrastructure improved. The major part of the works is a 2.4-metre-diameter, 227-metre-long bypass culvert running underneath Birmingham’s arterial Pershore Road. This tunnel will take water away from properties to safely flow into the river downstream.

As a result of this work, existing established service and retail businesses benefited from increased resilience, security over operating capability, business continuity during flood events and lower insurance rates. Access to these premises within the benefit area, as well as the improved resilience for work-related traffic passing through the area, has strengthened the immediate and wider economic community against disruption and associated costs. As a further co-benefit, the scheme opened 3 acres of developable land for Calthorpe Estates, enabling development of student accommodation, a drive-through coffee shop and a large commercial development.

Chapter 6: International dimensions

6.1 Overview

6.1.1 Introduction

This chapter covers the government's response to international climate risks to the UK, which represent 10 of the 61 risks and opportunities identified in CCRA3.

These risks can impact across borders and affect supply to UK sectors, including energy and food. CCRA3 highlighted the potential security implications from climate change, such as impacts on global supply chains that cross international boundaries and exacerbation of violent conflict and migration. Some of the anticipated impacts from these risks are greater than previously assessed in the second CCRA. This is the first time that the NAP has dedicated a chapter to addressing them. The response aligns with the government's wider strategic approach to climate security and resilience.

We live in an increasingly globalised world and climate change requires a collective and international response. Flows of people, goods and capital are becoming more exposed to climate impacts, with potentially significant implications for our society and economy. While the resilience of UK critical sectors remains strong, recognising these challenges and taking early action will reduce climate risk, boosting our resilience and safeguarding our national security.

Climate change has the potential to have disruptive and cascading impacts on the UK and global systems. The recently published document, Powering Up Britain, outlined how the UK will build our domestic energy resilience in the face of external threats, while also demonstrating our ability to react to complex international challenges.

Effective adaptation in this area involves better understanding how international climate risks expose different parts of the UK economy and society and using that understanding to inform our policymaking. The UK's coordination of international adaptation action, sharing expertise and establishing common frameworks are significantly enhancing the overall effectiveness of climate resilience efforts.

We are acting now to reduce costs in the future. Without adequate action, international climate risks to the UK could cost the UK over £1 billion per year from 2050 (CCC 2021), rising further under scenarios of greater global temperature rises. International food price shocks have already been felt by UK consumers and

producers, which is why the government is working with industry actors to reduce these long-term impacts. The Bank of England's 2021 Climate Biennial Exploratory Scenario projected a range of cost impacts for UK banks and insurers, including over £300 billion in a severe physical risk scenario with no additional action by governments around the world to respond to climate change. In response, the government has initiated significant action to ensure mandatory assessing and disclosing of climate related risks, helping companies to prepare for the impacts of climate change and helping investors make informed decisions.

6.1.2 Approach

To address the international dimensions of climate risk, the government will continue to provide adaptation finance to those most vulnerable and will deploy its evidence and analytical capabilities to improve our understanding of these risks. Government will also continue to provide the UK's international climate leadership and engage with domestic industry partners where they have levers to act. The government will deliver this through a range of levers which are set out below.

Integrated Review 2021 and Integrated Review Refresh 2023

NAP3 aligns with the direction set out in the Integrated Review 2021 (IR2021), and the updated refresh published earlier this year (IR2023). These documents set out the UK's overarching national security and international strategy. IR2023 reflects the pace at which global trends have accelerated over the past 2 years and sets out that the government will continue to strengthen the UK's resilience to the range of interlinked risks, including those associated with climate change and biodiversity loss.

2030 Strategic Framework for International Climate and Nature Action

The UK's 2030 Strategic Framework for International Climate and Nature Action defines the government's vision for our long-term role in the world tackling climate change and biodiversity loss. The framework sets out an integrated approach to climate change mitigation, adaptation and resilience, and the protection, conservation and restoration of nature.

National Security Risk Assessment

This focuses on acute risks such as major flooding. The government is establishing a new process for identifying and assessing chronic risks, which are enduring challenges that gradually erode elements of our economy, society, way of life and national security, for example, climate change. The National Risk Register is the public-facing version of the National Security Risk Assessment (NSRA).

Green Finance Strategy

The 2023 update to the UK's Green Finance Strategy sets out how the UK will continue to lead on green finance and mobilise the investment needed to meet climate and nature targets. Within the strategy, government lays out a framework to help the financial sector to manage risks from climate change.

International Climate Finance Strategy

This outlines how the UK will spend and deliver on its £11.6 billion International Climate Finance commitment, including by targeting priority regions and sectors to enhance locally led adaptation, and supporting governments overseas to be resilient to climate change.

Supply Chains Resilience Framework

IR2021 highlighted the importance of strong and resilient supply chains for the UK’s economic and national security. As a result, DBT published the UK’s Supply Chains Resilience Framework. This highlights 5 options to strengthen long-term supply chain resilience against identified vulnerabilities, such as the risks posed by climate change.

6.2 Trade

6.2.1 Introduction

Without adaptive action, climate change poses risks to global supply chains which are essential to the reliable supply of food, critical minerals, energy, and manufactured and traded goods to the UK. Disruption from increasing extreme weather events can affect the UK’s critical services, imports and exports, harming economic growth and jeopardising national security.

Global supply chains have become increasingly efficient and lean, but this has increased their fragility; and this has been exacerbated by more frequent and severe climate hazards which have led to an increased systemic risk to supply chains. It is

critical that supply chain planning is agile and considers long-term risks. The government recognises its role in supporting and coordinating with businesses to develop a better understanding of vulnerabilities and solutions.

The UK is also at the forefront of international efforts to improve supply chain resilience, using our bilateral and multilateral engagement channels to drive action-oriented collaboration and discussion on supply chains. At the G7 and G20 summits, the UK continues to demonstrate thought-leadership, supporting incumbent presidents to set and uphold commitments to ambitious supply chain agendas. This year we have also increased engagement with the Organisation for Economic Co-operation and Development (OECD). We have led discussions on responsible business conduct in supply chains and facilitated ambitious discussions on trade policies to build resilient supply chains as chair of the OECD ministerial council meeting. We will continue to collaborate internationally by sharing expertise and developing effective responses to evolving challenges. In this way, we can improve the UK's resilience to overseas climate impacts.

6.2.2 Action

DBT will continue to provide guidance to industry partners to support supply chains resilience and work with other government departments to develop effective sector responses to risks. Climate change is one of several hazards that makes supply chain resilience a complex issue. The government is therefore looking holistically at threats, including by better understanding climate risks to inform government actions.

DBT has:

- developed the Supply Chains Resilience Framework which guides businesses on options to reduce dependencies in supply chains, including diversification, working with international partners, stockpiling and surge capacity, onshoring, and demand management
- published a Safeguarding Supply toolkit in 2022 to encourage businesses to take collective and coordinated action to help reduce and overcome future shocks to their supply chains
- committed to publishing a new strategy on supply chains and imports in autumn 2023, to drive specific government and business action to strengthen our collective ability to respond to threats such as climate change to critical imports

6.2.3 Information

To support businesses in integrating effective adaptation into their supply chains, the government is working to better understand how UK businesses source their critical

imports and share these findings with relevant partners, including in industry. To enable this, DBT is working to develop a better, shared understanding of trade-related climate risks by:

- producing and sharing insights and analysis through bespoke analytical frameworks. This will identify vulnerabilities and opportunities in supply chains underpinned by a robust evidence base, improving government and business understanding of climate risks to critical supply chains throughout and beyond 2023. For example, the Global Supply Chains Intelligence Programme will support policy and operational priorities by improving visibility of supply chain risk

6.2.4 Coordination

Government will work closely with industry partners to manage potential disruption to supply chains due to climate impacts. To enable this integrated approach, DBT will:

- partner with industry and the UK knowledge sector to understand best practices in building supply chain resilience. This will include incorporating climate change into relevant critical supply chain stress tests by the end of 2024, and supporting remedial action
- assemble the UK's Business of Resilience Taskforce, which uses private sector expertise in insurance, infrastructure, engineering, and cyber security to develop a novel, combined approach to managing increased risk due to climate change and other external shocks. This includes helping develop insurance solutions to increase protection against climate impacts and building resilience into the design of infrastructure systems throughout 2022 to 2024

6.3 Food

6.3.1 Introduction

Domestic and overseas food production is subject to unpredictable weather events, which will continue to be exacerbated by climate change. UK food security and resilience depends on a diverse range of supply from within and outside the UK. In 2021, the UK imported 42% of the food we consumed.

As the UK sources food both domestically and internationally, the government is building the UK's resilience to overseas climate impacts on food, as well as helping to capitalise on opportunities for the UK food industry to export new products and to new markets. The UK currently has a highly resilient food supply chain, as demonstrated throughout the COVID-19 response. It is built on supply from diverse sources, strong domestic production and imports through stable trade routes, producing 60% by value of all the food we need. Increasing the long-term resilience of global supply chains will help to maintain the current resilience and security of supply.

Levers to enhance the resilience of the food industry sit largely with industry actors, which have the capability and expertise to respond to disruption. The government is actively coordinating work across the food supply chain to strengthen resilience planning which will help supply chains respond to climate and other emerging risks.

6.3.2 Action

Government has worked to incentivise adaptation amongst food suppliers and sources and continues to support contingency planning processes resulting from the

identification of interdependencies and acute risks with other sectors. Considering this, Defra will:

- provide funding for the Waste and Resources Action Plan's Courtauld 2030 Water Roadmap which addresses water scarcity and pollution through better water stewardship at catchment level, in collaboration with industry partners. The roadmap will target priority food sourcing areas facing the most significant risks in the UK and internationally, for example those most likely to be under water stress
- continue to fund and support research via the multi-annual Met Office Hadley Centre Food Farming and Natural Environment Service until March 2025, subject to funding availability

6.3.3 Information

Defra will continue to identify and address research and evidence gaps related to food security, accessibility, and access. This will provide government with an improved understanding of where to focus action and includes:

- publishing the next triannual food security report in 2024, which will cover 5 key themes and shape future policy recommendations on areas including global food availability, UK food sources, UK food chains, household food security, and consumer safety and confidence
- Defra's commitment to continue supporting research on food supply resilience in relation to climate change and adaptation measures through the work of the Met Office's Climate Service and Hadley Centre, and the Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM) until March 2025
- incorporating climate scenario analysis into trade models by 2025

6.3.4 Coordination

The risks impacting the food sector require close and ongoing engagement with partners outside of government. Defra will:

- continue to collaborate with other government departments to enhance food sector security and resilience plans. Market data will support industry-led preparedness and inform government contingency planning, and risk and assurance processes
- partner with industry through the Food and Drink Sector Council to support measures to reduce risks to supply in the agri-food sector, with scoping work taking place in summer 2023

Case study: Group on Earth Observations Global Agricultural Monitoring Initiative

Supported by the UK's official development assistance since 2019, GEOGLAM strengthens vulnerable nations' ability to use early warning systems to improve food security within the agricultural sector.

GEOGLAM builds national capacity through Earth observations, innovative technology, and public-private partnerships. It also develops monitoring systems for food security that allow detection, early warning, and early action on crop productivity. The initiative shares information on agricultural conditions at national, regional, and global scales, helping to advance country-owned and country-driven action.

The UK's contributions have been featured in climate adaptation guidance issued by the United Nations Framework Convention on Climate Change in 2022. The guidance provides practical knowledge and skills on how to use Earth observation within agricultural monitoring, with the aim to strengthen NAPs or plans, particularly across Africa.

6.4 Human mobility and violent conflict

6.4.1 Introduction

Climate change can be an amplifier of migration, human displacement, and violent conflict, especially when it interacts with socio-economic, political, or environmental challenges. Migration can also be an adaptive response to climate change.

The climate-related impacts of migration and violent conflict have the potential to affect the UK, including the UK's economic, diplomatic, and military interests.

Climate action and interlinkages with instability was a focus of the UK's IR2021 and has continued to be a focus in IR2023. Climate change and biodiversity are recognised as drivers of risk which can overlap with other global challenges, potentially leading to instability. The government, particularly the Foreign

Commonwealth and Development Office (FCDO) and the Home Office, will continue to support other countries to address the potential impacts of climate-related migration and violent conflict.

6.4.2 Action

The government will continue to build the capacity of fragile states to reduce the climate-related risks of violent conflict. This will involve helping other nation-states adapt to climate change through providing funding and sharing adaptation policy expertise.

The FCDO will continue to:

- provide official development assistance funding to support communities in climate vulnerable and fragile countries to adapt and build resilience to the current and future impacts of climate change to reduce the risk of conflict
- foster security in fragile states through the new UK Integrated Security Fund which will combine the existing Conflict, Stability, and Security Fund and additional funding from other programming to channel almost £1 billion in 2022 to 2023, to projects that tackle complex security challenges abroad. The fund is designed to integrate into our evolving national security architecture that takes into consideration risks from climate change
- donate to the UN's Migration Multi-Partner Trust Fund which supports the implementation of the Global Compact for Safe, Orderly and Regular Migration and support the development of policies throughout 2023 and 2024 for safe, orderly, and regular climate-related migration

FCDO and the Home Office will also continue to:

- work with nation-states that receive migrants from 2023 to 2025 by, for example, continuing to improve labour migration governance in the East and Horn of Africa through programmes such as Better Regional Migration Management phase 2, from July 2022 to March 2025

FCDO and the Cabinet Office will also continue to:

- work globally with partners to integrate climate issues into wider co-operation on international security, embedding issues within key national security documents such as the Strategic Framework for International Climate and Nature Action. This includes consideration of climate, conflict and vulnerability

6.4.3 Information

FCDO, the Cabinet Office and the Ministry of Defence will continue to identify and address research and evidence gaps related to climate-related conflict risks. These departments will strengthen the evidence base on links between climate, conflict, and fragility, and specifically explore the effects of climate change on UK national security through the development of the NSRA and chronic risks work. The Ministry of Defence has recently commissioned a study by the Global Strategic Partnership led by RAND Europe exploring the implications of climate change related developments on UK defence and security, including aggravation of conflict and mass migration. This will help to inform practical interventions to better prepare the UK for future climate change induced defence and security dilemmas.

FCDO is also providing direct disaster risk support and funding for early warning systems. This will enable at-risk countries to act ahead of predicted climate disasters and crises, for example through £4 million of funding for the Risk-informed Early Action Partnership between 2023 and 2025.

6.4.4 Coordination

FCDO will continue to influence multilateral peacebuilding agendas through UN peacebuilding work to address drivers of conflict, including climate change. FCDO will continue to work with non-governmental organisations to revitalise global efforts on conflict prevention and drive long-term environment and climate resilience thinking into humanitarian, peacebuilding and conflict programmes which also align with the Paris Agreement.

6.5 Law and governance

6.5.1 Introduction

Climate change and the response to it poses a potential risk to international law and governance with the potential to weaken international frameworks and the rules-based international system. This could be exacerbated by increasing competition for resources as a result of changes in the climate. Disagreements between nations about the division of responsibility in both mitigating and adapting to climate change could also affect international relationships and agreements. The government will focus on ensuring that international law is not undermined by climate change, compliance with international climate frameworks, and that nation-states continue to cooperate to protect those most vulnerable to climate impacts.

The government will also continue to deliver on domestic climate ambition, reinforcing the UK's credibility and legitimacy as a global leader. In addition to the UK's domestic adaptation efforts, delivering on net zero will continue to underpin climate adaptation ambition and action.

6.5.2 Action

FCDO, DESNZ and Defra will continue improving access to finance for low-income countries and small island developing states through implementing policies that prevent the risk of sovereign defaults and improve climate resilience. Finance will support countries in building back after climate crises. Initiatives will include offering climate resilient debt clauses, such as those offered through UK Export Finance in 2021.

The UK played a significant and proactive role in negotiations on an International Instrument under the UN Convention on the Law of the Sea for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Agreement). This is a historic agreement for biodiversity and will mean much greater protection for the two-thirds of the global ocean that lies beyond national jurisdictions. We will work with global partners to ensure it is implemented quickly and effectively and will work to ratify the Agreement as soon as possible.

6.5.3 Coordination

The government will continue to seek international consensus on climate change policies. We will do this through fora such as the UN Framework Convention on Climate Change so that the rules-based international system delivers for the UK, including in terms of minimising related climate risks to the country. This work will be carried out primarily through the UK's activities in international governmental organisations. In 2023, the UK co-sponsored a resolution on climate change initially proposed by Vanuatu, requesting an advisory opinion on climate change obligations from the International Court of Justice. The FCDO will continue to:

- lead the UK's international engagement on climate change issues, including those that may impact on human rights
- lobby and support UN negotiations through climate attachés and negotiators and drive consensus that leads to positive climate change action and outcomes
- support agreements such as the Glasgow Climate Pact established at COP26 in 2021. This established the 2-year Glasgow and Sharm el-Sheikh work programme on the Global Goal on Adaptation, which aims to reduce

vulnerability, strengthen resilience and increase capacity to adapt to climate impacts

6.6 International financial sector

6.6.1 Introduction

Finance is a global business and climate change is not limited by national borders. The UK finance sector is directly and indirectly exposed to climate risks from overseas. That is why the UK strongly supports the development of global standards on sustainable finance to align approaches and data across jurisdictions.

The true extent of the interconnectedness between UK and global financial sectors and the relevant climate risks is complex, which means that the overall magnitude of the risk to the UK may be underestimated. Given the size of the UK financial sector relative to the economy and its international linkages, risks to the global financial sector due to climate change impacts overseas have a significant impact on the UK's headline economic output, which is why we are undertaking the steps set out below.

6.6.2 Action

International standards, such as the global baseline standards being developed by the International Financial Reporting Standards' International Sustainability Standards Board, can support the global financial sector. They provide the basis for assessment and response that is appropriate to climate risks and reduce participants' exposure to these risks before they can cause systemic impacts to the global financial system and the UK. Government is encouraging uptake of these new standards by:

- advancing the goal of agreeing a global minimum baseline in sustainability standards through agreements in international fora such as the G7 and G20
- supporting the Financial Stability Board to coordinate regulators internationally, helping to set standards for central banks

The UK already requires mandatory reporting of climate-risk through its implementation of the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD), which aims to improve and increase reporting of climate-related financial information globally. Through mandatory reporting requirements that apply across the economy, certain businesses and financial institutions are obliged to disclose their climate-related risks, impacts and

opportunities and their governance and strategies for managing these issues. The government will continue to:

- build on TCFD rules with Sustainability Disclosure Requirements (SDR) as set out in the updated Green Finance Strategy
- support the work of the International Sustainability Standards Board and set up a framework to assess the suitability of their standards for adoption in the UK
- push for international adoption of the International Financial Reporting Standards Sustainability Disclosure Standards and support a shared understanding through knowledge sharing and capacity building
- support the work of the Taskforce for Nature-related Financial Disclosures, which has been set up to create a risk management and disclosure framework due for publication in September 2023, for organisations to report and act on evolving nature-related risks and opportunities

6.6.3 Information

Given the impact that climate change could have on the financial system, it is important that monitoring mechanisms oversee the risks posed to the UK overall. UK financial firms also need to have the appropriate and latest information available to manage exposure to physical, liability, and transition risks of climate change. HM Treasury is:

- using the Bank of England's comprehensive stress-tests, including in the Climate Biennial Exploratory Scenario, which determines exposure of the largest UK banks and insurers under various climate scenarios, to improve government's understanding of climate risks to the financial sector
- conducting research with the Network for Greening the Financial System that is conducting advanced scenario work to fill in the data gaps and analysis needed to assess climate-related financial risks

6.6.4 Coordination

Recognising that the impacts of risks to the financial sector demand coordinated responses across borders and sectors, HMT will:

- engage other jurisdictions to seek their public support for the work of the International Sustainability Standards Board
- engage with insurers and regulators to monitor the availability and affordability of different lines of insurance to maintain our awareness of climate change impacts on insurance markets

6.7 Health

6.7.1 Introduction

The COVID-19 pandemic highlighted how diseases and viruses can cascade across borders, with devastating health-related, social, and economic impacts. It led to millions of excess deaths in 2020 and 2021 and caused trillions of dollars in lost global economic output (source: WHO, 2022; IMF, 2020). The impacts of COVID-19 demonstrate the importance of monitoring and managing the impacts of overseas health-related risks, including the spread of new diseases due to climate change. Informed by this, the government is developing solutions to better mitigate against future pandemics and build resilient and robust systems. The UK Biological Security Strategy, published in June 2023, will enhance the UK's ability to understand, prevent, detect and respond to the biological risks that we face, including those induced by climate change. It recognises the interdependencies between environmental, plant, animal and human health through a 'one health' and climate focused approach to biological security.

Overseas climate change impacts can increase the presence of diseases within the UK, including through changes to vector and disease distribution and travel patterns, leading to a potential increase in exposure risk. The movement of humans and animals across borders can increase health risks, such as new diseases and vectors spreading through overseas travel and trade. Ecological changes combined with changes in human activity can lead to people having increased contact with species not previously encountered. Also, temperature and condition changes mean that the UK climate is also becoming increasingly suitable for vectors acting as a host to new diseases. By building resilience to overseas climate impacts, we are establishing the basis for the UK to bounce back from future pandemics.

6.7.2 Information

The government is monitoring the occurrence of vector-borne diseases (VBDs), including the number and size of outbreaks, to improve our understanding of the changing distribution and human cases to manage impacts. To do this, UKHSA and DHSC will:

- enhance the surveillance and monitoring of overseas health risks from 2023 to 2028 through UKHSA's epidemic intelligence reports
- undertake horizon-scanning and conduct research to identify changes in the distribution of VBDs in the UK and worldwide from 2023 to 2028. This action will be reviewed as required

Building the capacity and capability of those working in the sector and those travelling overseas is vital to reduce the spread of new vector-borne diseases. To address this, UKHSA and DHSC will:

- continue to raise awareness for travellers of the need to prevent new diseases to the UK from climate change overseas through the National Travel Health Network and Centre and country-specific travel advice on GOV.UK from 2023 to 2028
- train healthcare professionals to recognise cases of suspected VBDs to increase detection of cases, limit spread and improve patient outcomes from 2023 to 2028

6.7.3 Coordination

The government will improve the surveillance of vector-borne diseases which can be exacerbated by climate change. We will achieve this by enabling collaboration with NHS specialist tropical disease centres in Liverpool and London through joint medical staff appointments, the imported fever service and the sharing of official data.

6.8 Cascading risks

6.8.1 Introduction

Many of the international climate risks facing the UK are closely related, and other domestic risks and can have cascading effects across borders and sectors.

Each risk covered in this chapter has the potential to cascade across borders. Russia's illegal invasion of Ukraine provides an example of this. It continues to have far-reaching effects on the supply of fertiliser, food and energy to the UK. If risks do cascade, impacts can create problems in other countries and sectors, potentially then affecting the UK.

The UK's vulnerability to cascading and systemic risks is likely to increase due to increasing climate risks, increased exposure due to our embedding into growing global networks, and changes in global politics. By building the UK's resilience we will be less vulnerable to both climate risks originating overseas and to other systemic disruptions.

Better understanding risk cascades will enable the government to target policy and respond more readily, delivering outcomes that could reduce overseas climate risk risks and target investment more effectively on certain sectors or assets.

6.8.2 Action

The government is strengthening decision-making systems, structures, and capabilities to improve the UK's resilience to all climate risks, including those yet to emerge. FCDO is:

- supporting the Cabinet Office to implement the Resilience Framework, published in December 2022. The Framework will strengthen the identification and management of risks, allowing Government to anticipate threats and increase climate resilience effectively by 2030
- helping vulnerable countries to enhance their resilience to reduce the likelihood of emerging risks cascading to the UK by delivering on our commitment to spend £11.6 billion on International Climate Finance and supporting those who are experiencing the worst impacts of climate change. As part of the UK's wider ICF spending, government is tripling the UK's funding for adaptation from £500 million in 2019 to £1.5 billion in 2025

An example of a programme supported by this funding is:

- the Least Developed Countries Initiative for Effective Adaptation and Resilience, which has been allocated £10 million in funding

6.8.3 Information

By rapidly identifying emerging climate risks, the UK will be better placed to respond appropriately to specific risks and determine whether they have the potential to cascade or interact significantly with others. FCDO is:

- working alongside CO in the implementation of the Resilience Framework by 2030
- supporting CO as it builds a process to account for chronic risks and vulnerabilities facing the UK, such as climate change

In addition, Defra is:

- engaging in research with international partners on adaptation such as the Organisation for Economic Co-operation and Development, including in their work on the measurement of progress on adaptation

6.8.4 Coordination

Addressing potentially cascading risks requires not only an improved understanding of those risks through government action to build capability and address evidence gaps, but also coordination across and between governments through strong governance structures. In addition to the new Climate Resilience Steering Board driving further government action to increase UK resilience to climate change, the FCDO and the Cabinet Office will:

- use government's extensive network of overseas posts, researchers, and international relationships to identify emerging risks and escalating, where necessary, cascading risks through government's existing risk management governance structures, and risk assessment products such as the NSRA
- continue to co-chair the Adaptation Research Alliance, a coalition of researchers, funders, policymakers and community-based organisation, that seek to increase investment and opportunities to develop better adaptation solutions

Chapter 7: Working together

7.1 Overview

The challenges of a changing climate are not limited to a particular country, region or locality, but the impacts are specific to each place. We are already experiencing these impacts, and it is only through engaging all parts of central government, including arm's-length bodies, local government and society that we will be able to adapt successfully. Arm's-length bodies play a key role in the strategic delivery of actions to adapt the UK to a changing climate.

7.2 Local government

7.2.1 Context

7.2.1.1 Role of local government

Local government plays a vital role in climate change adaptation, both proactively through strategic planning, and reactively through resilience and recovery. Local authorities combine strong local expertise, core decision-making powers and strategic responsibilities with the ability to convene local partners from communities and businesses. Therefore, they are crucially positioned to drive forward climate adaptation actions tailored to their unique local circumstances.

Local authorities are at the forefront of local action to protect communities and businesses and need to adapt to minimise climate change risks in their areas. They act as:

- **public infrastructure managers:** managing highways, green spaces, and key environmental services; delivering statutory responsibilities; managing water resource availability; and managing public buildings
- **'placemakers':** working with communities to develop local plans, strategies and supplementary planning guidance, as well as, overseeing development,

building control and planning approvals in line with community priorities and sustainability considerations

- **suppliers of critical community support services:** across adult social care, children's services, public health and more
- **listening and supporting partners to local communities:** identifying areas of local need; building capacity and partnerships with small voluntary organisations; advising people on risks and preparedness, and gathering community input and perspectives to inform local solution
- **convenors:** convening cross-sector local stakeholders for discussions and collaboration; licencing, support and development for local businesses, and; influencing local economies through spending power alongside other anchor institutions
- **partners in local resilience:** preparing for and responding to climate risks, working in partnership with other agencies through local resilience forums (LRFs)

7.2.1.2 Climate change risks

Many of the risks and associated actions will directly involve the role of local authorities. This section highlights climate change actions that local authorities are already taking place, and sets out further actions needed by them and the UK government.

7.2.2 Action underway

7.2.2.1 Recent adaptation actions

Progress is being made across a number of local authorities to drive more transformational change on climate adaptation. For example, over 300 local authorities have declared climate emergencies, which means they are preparing local strategies and developing and delivering local action plans.

To support local authorities in developing their adaptation plans, Defra worked with the Local Government Association and Local Partnerships (LP) to develop the Local Partnerships Adaptation Toolkit. This outlines a 5-step process to help local authorities prepare for the impacts that climate risks could have on their areas. Another resource, the Local Authority Good Practice Guidance was produced by the Local Adaptation Advisory Panel (LAAP) and the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) in 2019.

An example of local authority action is the West Midlands Combined Authority which is developing its adaptation knowledge and capacity to integrate with regional and local governance plans, policies, investments, and decision making. It is integrating

adaptation into retrofit programmes, focusing on overheating, flood risk and water efficiency.

The West Midlands Combined Authority is also trialling community-led approaches to tackling climate change through its new Community Environment Fund, as well as developing an adaptation investment pipeline, to align with its Defra-funded Local Investment in Natural Capital (LINC) Programme.

7.2.2.2 UK government and local government engagement

UK government departments work closely with local partners on climate adaptation issues. Defra coordinates the Local Adaptation Advisory Panel, a forum for dialogue on climate adaptation between central and local government, which includes some local authorities and several UK government departments.

Departments also work closely with the Local Government Association (LGA) and through its governance structures. For example, Defra has collaborated with the LGA and LP on their 2022 project to investigate, understand and capture the good practice work of local authorities. This work also explores how local government and the UK government can collaborate in creating the framework and support to lead local adaptation.

Through the close working relationships and ongoing engagement on adaptation the UK government and its local partners have identified 3 areas to focus efforts during the NAP3 period to support the overall adaptation vision. These are **local government and UK government collaboration, access to information and data, and empowering local government**.

7.2.3 Action needed

7.2.3.1 Local government and UK government collaboration

Collaboration between the UK government, local government, and local partners is critical to making adaptation work locally. Departments need to identify how climate risks set out in UK-wide CCRAs will relate to those areas where the UK is most vulnerable. To enable this, the UK government requires a better understanding of local adaptation activity.

- **Emergency response:** an increase in the severity and frequency of extreme weather conditions across the UK will have an impact on emergency services, local responders and communities. The Civil Contingencies Act 2004 provides a framework for responder agencies to deliver appropriate emergency planning, response and recovery. The Cabinet Office's Community resilience development framework helps emergency planners ensure communities are central to emergency planning, response and recovery
- The CO also hosts webinars with local emergency responders to highlight free educational resources so children and young people can learn lifesaving safety information, available through StayWise. StayWise supports teachers and community safety practitioners in delivering essential safety messages. The resources can also be used to support locally-delivered safety and emergency-focused programmes. There is also the UK Government Resilience Framework, This focuses on the UK's ability to anticipate, assess, prevent, mitigate, respond to, and recover from all types of civil contingency risks
- **Adaptation Reporting Power (ARP):** the UK government will work with a group of local authorities to test the costs and benefits to the sector of adaptation reporting under the Adaptation Reporting Power. This will take the form of a pilot, starting in 2023, involving 35 local authorities to co-develop the process for reporting in round 4. It is informed by the government's engagement with the sector and recommendations by the CCC's independent evaluation of the third round of adaptation reporting
- **Local Adaptation Advisory Panel (LAAP):** the UK government will continue to work with local authority partners to coordinate the LAAP, bringing technical experts from government and outside together with local authority representatives to share best practice and test policies on adaptation. The government will continue to work with the panel chair to further enhance the panel's structure and operation

7.2.3.2 Access to information and data

Local and UK government recognise that good quality information and data is key to supporting meaningful outcomes for climate adaptation in different local areas. While there are some sources of information and data on climate change available for this purpose, it is not consistently available at all local authority levels. Local and UK government have a shared interest in developing this, building on the significant efforts of many local authorities and other local partners.

- **UK Climate Projections**: these provide climate information that can support local decision making to address climate risks. The projections include information on hazards such as heatwaves, and short-term, localised heavy rainfall that can lead to flash flooding. There are benefits of providing even more specific information to the local government sector to inform adaptation decisions. This can help the UK Government build on examples of good practice
- **climate risks data:** CCRA4, due for publication in 2027, will include data identifying how climate risks map onto specific places in the UK. This will support more effective local-level risk assessment
- **Local authority climate service:** the UK government will carry out a one-year pilot for the provision of more specific projections to local areas. This will build on previous Met Office-led work, including 'city packs' developed through UK Research and Innovation, and will give all local authorities and LRFs access to critical data to inform adaptation decision-making in local areas

7.2.3.3 Empowering Local Government

As well as access to information and data, local authorities need the means to design and deliver adaptation action in their areas. The UK government has an important role in enabling the sector to mainstream local adaptation.

- **devolution:** the government announced the biggest ever transfer of powers away from Westminster in the levelling up white paper. We remain committed to seeing more empowered and accountable local leaders who can respond to the specific challenges and needs of their areas, including those related to climate change. Local leaders are already playing a key role and adaptation is a crucial part of the 'trailblazer' deeper devolution deals with the Greater Manchester and West Midlands Combined Authorities. For example, Greater Manchester will be a testbed to explore and develop options for how flood risk management, as well as other adaptation activities, can best be addressed and accelerated at the local level. Through devolution deals, the government

remains committed to giving local leaders the policy levers they need to successfully meet the challenges presented by climate change at a local level

- **Local Nature Recovery Strategies appointment and funding of responsible authorities:** Local Nature Recovery Strategies were introduced in the Environment Act 2021 to help boost nature recovery in England. There will be 48 Local Nature Recovery Strategies areas across England, with no gaps or overlaps. Defra has appointed a "responsible authority" to lead preparation of the strategy in each area. The government has announced £14 million of funding to be distributed to the responsible authorities over the next two years
- **UK Shared Prosperity Fund**: this is a £2.6 billion fund that empowers local authorities to fund interventions based on local need. They can use their UK Shared Prosperity Fund allocation to fund projects that improve green spaces and tackling climate change
- **Local Investment in Natural Capital (LINC) Programme funding:** the UK government is providing up to £1 million each to 4 local authority areas - Cornwall, West Midlands Combined Authority, Borderlands (Cumbria, Carlisle and Northumberland), and York and North Yorkshire. The LINC Programme will enable an integrated approach to place-based nature recovery needs and provide investment for local climate adaptation plans and ambitions. Funding will support the aim to build lasting capacity and capability to attract longer term private investment at scale
- **Strengthening Local Resilience Forums (LRFs):** as set out in the 2022 UK Government Resilience Framework. The government will launch pilot programmes in 2024, which will inform a national programme of strengthening to be delivered by 2030. Stronger LRFs will deliver dynamic local risk management, including preparing for climate change-related risks, whilst seeking to adopt a broader remit to increase community resilience and integrate resilience into local policy making. DLUHC and Defra will identify how stronger LRFs can take a role in supporting the delivery of NAP3, and planning for climate risks across local areas

7.3 Devolved administrations

NAP3 contains UK government policy and action on adaptation. However, as climate adaptation is a devolved matter, Northern Ireland, Scotland and Wales also produce their own adaptation plans. The legislative framework for each country's action on adaptation is set out in the CCA 2008 for England, Wales, and Northern Ireland, and the Climate Change (Scotland) Act 2009 for Scotland.

Some of the risks identified in CCRA3 cover reserved matters, for example risks relating to international violent conflict arising from climate change. In these instances, the policy response set out in NAP3 refers to actions for the whole of the UK. The UK government is committed to working closely with the devolved administrations to support climate adaptation across the UK.

7.3.1 Northern Ireland Executive

7.3.1.1 Statutory duties and approach

Northern Ireland's legal framework for climate adaptation is set out in section 60 of the CCA 2008. The relevant Northern Ireland department must produce an adaptation programme that responds to the risks of climate change as identified in the most recent UK CCRA. The Climate Change Act (Northern Ireland) 2022 contains requirements for climate change action plans to be climate resilient, and a duty on the CCC to undertake a mid-term assessment of progress and provide recommendations for future Northern Ireland Climate Change Adaptation Programmes (NICCAPs).

The second Northern Ireland Climate Change Adaptation Programme (NICCAP2) was published by the Department of Agriculture, Environment and Rural Affairs in September 2019. It is the cross-departmental response to the risks identified in the second CCRA. Work is continuing to implement the actions contained in NICCAP2. The next NICCAP is due to be published in 2024 and will respond to the risks set out in CCRA3.

7.3.1.2 Strategic intentions and priorities

Given the critical role that local authorities play in delivering effective adaptation measures, engagement with local councils and civil society have been an important part of NICCAPs. To improve links between national and local adaptation planning, NICCAP2 contained a specific chapter to capture adaptation action by local councils and civil society.

To support engagement with local authorities, the Department of Agriculture, Environment and Rural Affairs funds the Climate Northern Ireland Project. Part of this project has been to establish a Local Government Climate Action Network, which 10 of the 11 councils of Northern Ireland have committed to participate in. The Climate Northern Ireland Project team have also developed a toolkit called 'NI Adapts' to provide useful information to inform the development of climate adaptation plans.

7.3.1.3 Recent adaptation achievements and actions

Work is underway to improve the research and evidence base around climate change risks and impacts. For example, a baseline coastal survey is currently being undertaken and will improve the knowledge base and understanding of the coastal environment. It will provide departments with the data to model potential coastal erosion and flooding impacts and in turn develop policies and plans which build resilience to these impacts.

Northern Ireland departments recognise the role that nature-based solutions will have for both climate change mitigation and adaptation. There are several strategies in development and programmes underway aimed at improving the condition of our natural environment. These include the Peatland Strategy, Environment Strategy, Biodiversity Strategy, several marine strategies and the over-arching Northern Ireland Executive Green Growth Strategy. Separately, programmes of work such as Forests for Our Future, which aims to plant 18 million trees by 2030, are progressing.

In November 2022, the Northern Ireland Housing Executive launched its Corporate Sustainable Development Strategy and Action Plan (2022 to 2027). As part of this, the Northern Ireland Environment Link have been commissioned to facilitate the delivery of a Climate Adaptation Plan over an 18-month period, identifying key climate risks for the organisation and targeted and effective adaptation measures.

7.3.2 Scottish Government

7.3.2.1 Statutory duties and approach

The Climate Change (Scotland) Act 2009 sets the statutory framework for Scotland to adapt to climate change. The legislation requires a programme of policies and proposals for climate change adaptation to be set out every 5 years. These programmes must address risks identified in the statutory CCRA.

The current programme, Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme, was published in September 2019. It sets out over 170 policies and proposals (and an associated research programme) to respond over the period 2019 to 2024 to the risks for Scotland identified in the second CCRA.

The second Scottish Climate Change Adaptation Programme (SCCAP2) takes an outcomes-based approach and is designed to integrate action on adaptation into wider Scottish Government policy and service delivery. There are 7 high-level outcomes that cover Scotland's communities, businesses and natural environment as well as engagement with international partners.

7.3.2.2 Strategic intentions and priorities

Action on adaptation and resilience, alongside reducing emissions to net zero, is at the heart of Scotland's just transition approach. The Scottish Government is continuing to deliver the actions of its current programme while developing its next statutory climate change adaptation programme. While progress on climate adaptation continues to be made, it is also clear that more needs to be done to build further resilience.

The next statutory programme for Scotland will respond to the climate risks identified for Scotland in CCRA3 and will be published in autumn 2024. To further support Scotland's climate resilience, the Scottish Government will consult on a new National Flood Resilience Strategy for Scotland, publish dynamic 5-year delivery plans to support the new Scottish Biodiversity Strategy and are co-developing a series of just transition plans.

7.3.2.3 Recent adaptation achievements and actions

Examples of building climate resilience under SSCAP2 include:

- providing Scottish local authorities with £42 million annually for flood protection measures and committing to invest an extra £150 million in flood risk management over this Scottish Parliament – representing a 70% increase in the flooding budget. £12 million has also been allocated for coastal change adaptation, informed by the Dynamic Coast project over the years 2022-23 to 2025-26
- investing £250 million over 10 years on peatland restoration, which supports the co-benefits of carbon sequestration, improved natura and tackling biodiversity loss
- the new Scottish Biodiversity Strategy, which sets out our ambition for halting biodiversity loss by 2030 and reversing declines by 2045, is supported by a flexible delivery plan and a new Natural Environment Bill

7.3.3 Welsh Government

7.3.3.1 Statutory duties and approach

The current arrangements for national climate adaptation planning in Wales align to the overall statutory cycle set out in part 4 of the CCA 2008 and Wales' national plan is informed by the CCC's Climate Risk Independent Assessment. The Welsh Government's current 5-year national adaptation plan, Prosperity for All: A Climate Conscious Wales, was published in December 2019. The next plan is due to be published in autumn 2024.

Adaptation planning in Wales is supported by the Wellbeing of Future Generations Act 2015. The Environment (Wales) Act 2016 also includes provisions for the sustainable management of natural resources and flood and coastal erosion management.

7.3.3.2 Strategic intentions and priorities

The Welsh Government's 2021 programme for government commits to embedding the response to the climate and nature emergencies into everything it does. A climate change Ministerial portfolio has been created to oversee this commitment.

The Welsh Government recognises the need to engage all sectors of society in climate adaptation and is developing a 5-year Strategy for Public Engagement and Action on Climate Change. This strategy will outline how to involve people in climate policies that affect them. It will also set out how to work with trusted messengers, reaching different groups in society to enable and support public action at a local and regional level.

The Welsh Government's strategic approach to developing the next national adaptation plan includes consideration of further measures to address the areas highlighted by the CCC's 2021 advice and their recommended principles for good adaptation. It will use updated methodological approaches for mapping and monitoring of pathways towards good adaptation outcomes. This includes whole system perspectives for addressing different areas of climate risk and considering the implications of cascading impacts and interrelationships. A 'Team Wales' approach will enable broader consideration for the actions needed across the Welsh public sector, stakeholders and society.

7.3.3.3 Recent adaptation achievements and actions

In December 2022 the Welsh Government published a progress report on its current national adaptation plan. In addition to reporting on actions being taken across policy areas, the report includes an indication of additional steps to be taken in response to the updated evidence highlighted by the CCC's third Climate Risk Independent Assessment. The Welsh Government has also commissioned an independent assessment by the CCC in relation to climate adaptation progress and future priorities in Wales, which is due to be published in September 2023.

Recent key policy developments helping to drive climate adaptation in Wales include the publication in 2020 of new Water Resource Management Plans by water companies, Area Statements by Natural Resources Wales, the Flooding and Coastal Erosion Management strategy, as well as the launch of the National Peatland Action Programme. In 2022, the Welsh Government published an outline of its proposed new Welsh Sustainable Farming Scheme, aiming for the final scheme to be phased

in from 2025. An update to the Building Regulations was published in November 2022 to address overheating and indoor air quality in new homes and in building work to existing homes.

Chapter 8: Strategy for the fourth round of climate adaptation reporting

This chapter sets out the government's strategy for the fourth round of climate adaptation reporting under the Adaptation Reporting Power (ARP). It is presented to Parliament pursuant to section 65 of the CCA 2008. This follows the statutory consultation on our proposed approach to the fourth round of reporting, which ran from February to April 2023. A summary of consultation responses, with more detailed information about stakeholders' views, has been published alongside this document.

8.1 Summary

ARP was introduced under the CCA 2008. It gives the Secretary of State the power to direct organisations with functions of a public nature and statutory undertakers to produce reports detailing:

- the current and future projected impacts of climate change on their organisation
- proposals for adapting to climate change
- an assessment of progress towards implementing the policies and proposals set out in previous reports

Successive rounds of reporting have shown that it helps organisations make climate risk management a leadership priority and integrate it into their risk management governance. It supports them to assess their exposure and take action to reduce their vulnerability. It raises the profile of climate resilience work within the organisation and beyond – raising awareness, building capacity, and making examples of good practice publicly available. It also provides vital information to the government on the readiness of important sectors for climate change.

Reporting is usually undertaken in a 5-yearly cycle. Following strong support for the proposals in our consultation, the fourth round of reporting will be undertaken to a different timescale than previous rounds. This will improve the alignment of adaptation reporting with other elements of the statutory framework for climate change adaptation. The closing date for the next round will therefore be brought forward to late 2024 (from 2026). After this, reporting will return to its 5-yearly cycle.

In recognition of the fact that this change means that the reporting window for round 4 will be shorter than in previous rounds, most other elements of the reporting strategy are broadly consistent with round 3. Reporting will minimise burden,

focusing where possible on updates since round 3. Guidance and templates will be issued to facilitate participation, particularly among those who have not reported before.

As in previous rounds, reports will be invited from bodies in the energy, water, transport, health, heritage, environment and financial sectors. There will be some targeted scope expansion, in line with recommendations made by the CCC. Reporting will be on a voluntary basis, building on the collaborative approach of the previous 2 rounds.

A comprehensive review of adaptation reporting will be undertaken ahead of round 5. This will consider the ways that reporting drives adaptation outcomes, the role of the process in the context of the evolving landscape for climate risk reporting by businesses and public bodies, and how the power can be used to greatest effect in future. The desired outcome is a process that remains fit for purpose in driving action on adaptation and informing the government on the climate change preparedness of infrastructure sectors.

8.2 Objectives for the fourth round of reporting

Consistent with the previous round, the objectives of this round will be to:

1. support the integration of climate change risk management into the work of reporting organisations

2. build understanding of the level of preparedness of key sectors to climate change, at a sectoral and national level, and inform other parts of the government's statutory cycle for climate adaptation, including CCRAs and NAPs

To better support the second objective, round 4 will operate on a shorter timescale than previous rounds, allowing around one year for the preparation of reports, rather than approximately 3 years as before. As such, the closing date for the fourth cycle of reporting will be brought forward to late 2024 (from 2026). After this, reporting will return to its 5-yearly cycle. This will allow adaptation reports to be included in the analysis for the CCC's independent risk advice to government, ahead of the publication of CCRA4.

Reporting requirements will seek to facilitate reporting in this reduced time frame. We do not anticipate organisations' risk profiles to have changed significantly since round 3, which closed at the end of 2021.

Reporting will focus primarily on what has changed since round 3. Updates to risk assessments can be submitted where there have been significant changes.

However, the focus will be on progress with the actions taken in response to the risks identified in round 3 reports, any changes to risk governance, and any new action needed.

In support of the above objectives, as for round 3, the following principles for reporting will apply:

1. reporting should be proportionate, risk-based and streamlined to minimise burdens or duplication

2. reporting should build on previous rounds of reporting to improve report quality where appropriate, and participation

8.3 The requirement to report

Section 62 of the CCA 2008 gives the Secretary of State the power to direct reporting authorities to provide reports. A reporting authority is defined as ‘a person or body with functions of a public nature’ or ‘a person who is or is deemed to be a statutory undertaker’ under the Town and Country Planning Act 1990 (or the relevant planning legislation in Scotland and Northern Ireland). Ministers of the Crown, the Houses of Parliament, devolved authorities and devolved legislatures are specifically excluded from the scope.

Whilst the Secretary of State has the power to allow the government to mandate reporting, this has not been used since the first round of reporting. The previous 2 rounds have been built on a collaborative relationship between government and industry, where eligible organisations were invited to report voluntarily. Take-up has not varied significantly between voluntary and mandatory rounds, with round 3 seeing more organisations than ever taking part, albeit a growing proportion of them reporting collectively.

We consulted on whether reporting should remain voluntary or be made mandatory in round 4. There were 68 responses to this question, with no clear majority on either side. The largest number of responses (33, representing 48.5% of the total) were in favour of mandatory reporting, either outright, or in principle. 16 (23.5%) said it should remain voluntary (including 2 joint responses which would otherwise boost this number by 3), and 19 (28%) were non-committal. However, many of those in favour of mandatory reporting caveated their responses. They cited practical challenges for both the government and industry to achieving mandatory reporting in a shortened timeline for round 4, and the need for such an approach to be proportionate and complementary to other regulatory requirements.

The consensus view that has emerged from the consultation is that ARP reporting should be kept voluntary in round 4 but made mandatory in round 5. A number of responses suggested that this is the sensible approach that balances the urgency of taking action to address climate risk against the practicalities and reporting burden, in the context of a shorter reporting round.

Therefore, given the proposed changes to the reporting timeline, reporting will remain voluntary in round 4. We will only invite organisations which are deemed to be in scope of the legal power (although this will not preclude others from reporting). We will review this position again ahead of round 5.

The CCC highlighted some gaps in coverage in certain infrastructure sectors. For example, we have an incomplete picture of how resilient some strategically important transport hubs are. We will work with the relevant industry associations and operators to determine how best to encourage an uptake in reporting where there are gaps. Consultation responses from relevant organisations were supportive of this approach. They were happy to engage with the government and their members on this basis.

We will also seek feedback from individual non-reporting organisations to find out more about the barriers they faced to reporting in round 3, and what can be done to support them to report voluntarily in round 4. This will build on the range of suggestions made by respondents to the consultation. Please read ‘Guidance and templates’ below for more information on what support we propose to make available in round 4.

8.4 Other reporting regimes

Since ARP was introduced through the CCA 2008, the adaptation policy landscape has changed significantly. There are a range of other climate risk reporting requirements which have the potential to overlap with reporting requirements under ARP. Most notably in recent years, this includes disclosures aligned with the recommendations of the Task Force on Climate-related Financial Disclosure (TCFD).

The regulations require certain companies to report climate-related financial information in their strategic report, including scenario analysis – a powerful tool to help them assess climate-related risks and opportunities, which will support better resilience against climate risks.

The global sustainability disclosures landscape continues to evolve. In June 2023 the International Sustainability Standards Board published 2 sustainability disclosure standards, which build on the TCFD recommendations and will help to set a global

baseline for disclosure requirements. The government will set up a framework to assess the suitability of their standards for adoption in the UK.

A key principle of ARP reporting is that it should gather the necessary information whilst minimising reporting burden and duplication. We recognise the potential for adaptation reporting to duplicate wider requirements for climate risk disclosures, now and in the future.

Our position for this reporting round is that there is still a valuable role for ARP. Not all reporting organisations fall within the scope of TCFD. For those that do, TCFD does not yet provide the breadth and depth of information provided under ARP, including the detailed risk assessments and action plans.

This position was supported by the organisations that responded to the CCC's evaluation of round 3, and strongly supported in the consultation feedback. No organisation in scope of TCFD expressed the view that it entirely fulfils the objectives of ARP. A range of gaps and differences were cited. The consensus among respondents was that although there are some overlaps, ARP currently complements other reporting, and remains a useful tool.

We will keep this position under review for future rounds of ARP and as the sustainability disclosures landscape continues to evolve.

8.5 Sectoral approaches

The third round of reporting included more consolidation into summary reports than in previous rounds. This approach was taken to streamline the reporting burden, particularly where target sectors were made up of numerous small organisations. Including such organisations as reporting authorities was deemed to be disproportionate. Instead, certain umbrella organisations were invited to report on behalf of their members. Determining proportionality occurred on a case-by-case basis, and government did not define a specific threshold. The voluntary approach taken in round 3 meant that there was scope for discussion with government to ensure that the reporting process was proportionate and beneficial.

We acknowledge concerns raised by the CCC about the level of detail in some of the sectoral overview reports. We also recognise the value that sectoral reporting can bring by providing insights about a sector's overall risk profile and exposing potential vulnerabilities within interconnected systems.

We consulted on whether to maintain the case-by-case approach to sectoral reporting in round 4. This approach was supported by the majority of respondents (62%), compared to 10% against and 28% undecided. Respondents in favour

supported an approach that minimises burdens on small organisations and provides leadership and coordination for sectors. Those against were concerned about consistency and a lack of granular detail.

We are engaging with those sectors that reported collectively in round 3. In some of these cases, we may establish a proportionate request for individual reporting. Where sectoral reports remain the most appropriate solution, we will work with industry representatives to find ways to improve the reports and the information they provide. Please read ‘Scope’ below for further detail.

We will also work with sectoral bodies to improve the consistency of individual reporting across sectors. Please read ‘Guidance and templates’ below for further detail.

In addition, further information on our stakeholders views on sectoral approaches is available in the aforementioned consultation summary.

8.6 Reporting by regulators

5 regulators submitted reports in round 3: the Financial Conduct Authority, the Pensions Regulator, the Prudential Regulation Authority, the Environment Agency and Ofwat. 3 invited regulators did not submit a report (Ofcom, Ofgem and the Financial Reporting Council).

The regulators’ reports typically present a summary view of climate risks to their sector and information on the actions the regulator is taking to drive action on adaptation in the sector. This is appropriate to their remits. The CCC recommended that we consider whether reports by regulators should follow a different format to those by infrastructure operators, in recognition of their roles in oversight and assurance, rather than infrastructure delivery. A detailed risk assessment and programme of adaptation measures is typically not relevant, as the regulators don’t own or manage the assets themselves, and this information is already provided by the sector reports.

47 (of 76) consultation respondents made comments highlighting the important role played by regulators in building the picture of climate resilience across the regulated industries, and in providing leadership, challenge and assurance to those they oversee. On this basis, we will continue to invite reports from regulators and will issue guidance on what their reports should include. Annex 4 lists the regulators we intend to invite. This list may be extended subject to further engagement.

8.7 Reporting on interdependencies and cascading risks

Interacting risks pose one of the biggest challenges when assessing climate risks. System resilience to climate change goes beyond individual risks, as all infrastructure sectors are connected. Vulnerabilities on one network can cause problems for others, and impacts can ‘cascade’ beyond the primary infrastructure asset, affecting the economy, health and wellbeing. Given the wide-ranging nature of the linkages within and across sectors, it is difficult to get a full understanding of the impacts of cascading failures. The vulnerability of interconnected systems may be significantly underestimated.

Adaptation reporting has the potential to be an important lever in addressing interdependencies and the potential of ‘cascading failures’, both by helping organisations to consider their own interdependency risks and by informing the national CCRA

Many respondents to our consultation acknowledged the significance of interdependent and cascading risks. Many said they will report on them but would welcome guidance and further support. Some have the capacity to report on these risks but are only able to identify a small range of interdependencies in their area. Some find identifying owners of these risks to be a challenge. Those who stated they are unable to report on such risks identified a lack of resources and understanding as barriers.

Respondents noted the value of reporting on interdependent risks in driving progress by facilitating collaboration within and across sectors. 64 respondents wanted to see the government take a more active role (through knowledge sharing, regulatory measures, funding or facilitation) in bringing relevant authorities together to build capacity.

In round 4, we will guide reporting organisations to explain their approach to identifying and managing interdependencies. We will provide guidance on the inclusion of appropriate and proportionate details of interdependencies in risk assessments and action plans, recognising that levels of maturity and capacity will vary between organisations and sectors. Given the compressed reporting timeline, reporting on interdependencies will be voluntary. We will encourage and facilitate cross-sectoral working and welcome any joint reports that come forward as a result. This flexible approach will lay the ground for future work in this evolving area. The position will be reviewed again ahead of round 5.

8.8 Guidance and templates

In previous rounds of adaptation reporting, the government produced a range of guidance materials to support reporting organisations. In the third round, a template and frequently asked questions document set out the key components of reports. Organisations were given flexibility on how they wished to structure their reports and were not obliged to report in the exact format of the template. Feedback from reporting organisations has shown that the template was useful in highlighting the areas that reports should cover.

Our proposal to develop a template to facilitate reporting in a shorter fourth round, whilst being flexible about its use, was met with widespread support in the consultation. Respondents noted that this would set the standard for good practice by demonstrating the minimum requirements for reporting, help organisations structure their reports, and enable consistency and comparison among organisations within sectors.

We will develop a round 4 reporting template which balances the need for reports to cover certain areas whilst minimising the reporting burden. The template will cover the three tenets of reporting:

1. Information about an organisation's corporate governance
2. A climate change risk assessment (noting that the risk landscape may not have changed in the last few years for organisations who reported in round 3)
3. An action plan setting out measures to address the risks identified

We will provide supplementary versions of the template for use by different types of reporting organisation, such as regulators and trade associations. We will tailor our guidance to both those who have reported before and those who will be reporting for the first time. We will not compel organisations to report in the format of these templates, but they should serve as a guide for content of adaptation reports.

We will work with sectoral bodies to test the content of templates and enable approaches that work best for different sectors, supporting improvement where necessary.

8.9 Evidence and risk assessment

To date, organisations have been given flexibility on the climate models and emissions scenarios to use for their risk assessments. This system has worked well because of the wide range of organisations and needs represented. Most consultation respondents (69%) supported a standardised approach to risk assessments and mandating the use of specific climate scenarios. However, there

were strong arguments both for and against standardisation. Many respondents qualified their choice in some way, for example, supporting standardisation but not mandated scenarios, advocating for a blended approach or bespoke approaches for different sectors, or deferring until round 5. On this basis, we will maintain a flexible approach for round 4, with guidance on the application of climate projections and scenarios according to the needs of different sectors and organisations.

67% of respondents also agreed that organisations that reported in the third round should be free to submit an update to their risk assessment, rather than a full new one. However, many noted the importance of updating their risk assessment proportionally with changes to their respective risk landscape.

A primary objective of adaptation reporting remains to support organisations' own risk management work, so the flexibility in the current system is highly valued. Therefore, for round 4, we will invite organisations that have reported previously to submit updates on their risk assessments and governance arrangements if appropriate. However, the primary focus of reporting will be on progress updates to the action plans set out in response to the round 3 risk assessments. For organisations that did not report in the third round, we will ask for a climate change risk assessment, but will provide guidance as to how this can be carried out to minimise reporting burden.

8.10 Devolved and reserved matters

The CCA 2008 provides for reports to be sought on reserved matters. The Secretary of State has the power to issue directions to report to organisations in devolved administrations but cannot give directions relating to a reporting organisation's devolved functions.

The section 62 reporting power can therefore only be used on organisations whose functions are in England or are outside England and relate to reserved matters in Scotland, non-devolved matters in Wales and excepted or reserved matters in Northern Ireland.

Some of the functions exercised by these organisations in the devolved administrations relate to matters which are not fully devolved. The devolved administration still has some joint or concurrent control over these functions with a minister of the Crown, or there are requirements for consent or consultation.

The voluntary approach we are taking to round 4, whereby the government will not be issuing directions to reporting organisations, will not conflict with the devolved administrations' corresponding powers over reserved, non-devolved or excepted

matters. Respondents commented that the same approach worked well in previous rounds and aligns with organisations' existing practices.

In round 3, 9 reports were received from organisations with activities in the territorial extent of one or more of the devolved administrations (from airports and power companies). For round 4, we will work with the relevant devolved administrations on our approach to increasing coverage of sectors where gaps have been identified, as necessary, on reserved, non-devolved or excepted matters only.

We did not receive any objections to this approach as set out in the consultation.

8.11 Scope

The government will invite all those who reported in previous rounds to provide an update report. Some new organisations will also be asked to report, particularly where the CCC has identified gaps in the current system.

We will minimise the reporting burden as much as possible for both existing and new reporting bodies, with appropriate guidance. The table in Annex 4 provides a summary of our approach to reporting among the target sectors, including those where the CCC has recommended expansion. This has been informed by responses to the consultation and other engagement since 2021. It reflects the split between devolved and reserved matters described above. In some cases, our approach remains subject to ongoing discussion with relevant stakeholders. In addition to those sectors detailed in the summary, we will also consider the potential for reporting by the Space sector and other Critical National Infrastructure sectors not currently represented.

There is a balance to be struck between proportionality and recognition of the pros and cons of sectoral overview reporting, as well as whether organisations fall within the scope of the legal definition for the use of the power. We will not invite organisations outside of the scope of the legal definition to report. We will take a case-by-case approach to determining proportionality, as what is appropriate for one sector may not make sense for another.

The approach to all sectors will be reviewed ahead of the fifth round of reporting. Other bodies can come forward to report voluntarily should they wish.

8.12 Local government

The CCC has also recommended including Local Authorities (LAs) in the scope of adaptation reporting. This is in view of their responsibilities for local transport, planning and local resilience in particular, although their remits extend beyond these into many areas that will be impacted by the changing climate.

There was strong support for our consultation proposal to undertake a pilot of reporting among a group of LAs, to test its costs and benefits. Around 40 LAs have signalled their interest in taking part.

We will co-design the pilot with a group of these volunteers, to ensure the process will complement existing risk management practices and drive adaptation action in a non-duplicative way. This will need to take account of existing duties on LAs and differing scales of responsibility to manage climate risks and report, including the reforms to improve how Local Resilience Forums operate. It will also need to add value in raising the profile of climate adaptation and building capacity at the local level.

After the reporting window closes at the end of 2024, we will evaluate the pilot to explore how well it worked and what value it brought at the various levels of local government involved. This will inform future considerations of the case for wider roll-out across the sector in later rounds of adaptation reporting.

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