



Third Northern Ireland Climate Change Adaptation Programme (NICCAP3)



Department of
**Agriculture, Environment
and Rural Affairs**
www.daera-ni.gov.uk

An Roinn
**Talmhaíochta, Comhshaoil
agus Gnóthaí Tuaithe**

Depairtment o'
**Fairmin, Environment
an' Kintra Matthers**

A scenic landscape of Northern Ireland. In the foreground, there is a field of tall, dry grass with some yellow wildflowers. Behind this is a well-maintained green golf course. A line of mature trees separates the golf course from a dense forest. In the background, a large, rounded mountain peak rises above the treeline under a blue sky with scattered white clouds. The text "Working towards a climate resilient Northern Ireland" is overlaid in white on the forest area.

**“Working towards
a climate resilient
Northern Ireland”**

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Executive Foreword

Climate change is one of the defining generational issues of our time. In recent years, we have seen the increasing impacts of climate change on a global scale, but we have also experienced firsthand the impacts of climate change locally here in Northern Ireland. From widespread flooding in the North-West in 2017 to more recent flooding events in areas such as Downpatrick and Newry in 2023. We have also seen back-to-back storm events resulting in power outages and damage to IT infrastructure along with record temperatures broken, and significant wildfire events.

The risks identified in the latest UK Climate Change Risk Assessment do not just sit with a single Department to address, but impact upon and cut across the remits of multiple Departments. As such, if we are to successfully address the challenge of climate change, collaboration and partnership working both across Departments and with key stakeholders across wider society is vital. Our Programme for Government 2024 - 2027¹ recognises the cross-cutting nature of the impacts of climate change, such as increased flooding and extreme heat events, and confirms our commitment to providing an effective collaborative response.

While there has been much focus placed on climate mitigation measures concerned with reducing our greenhouse gas emissions, as we work towards achieving Net Zero, we recognise that we must not lose sight of the fact that reducing our emissions is only half of the climate change challenge. Even when emissions are reduced to net zero, we will still have locked in impacts of climate change as a result of historic emissions which we must continue to adapt to and prepare for.

We are committed to a holistic approach when addressing the impacts of climate change by ensuring that there continues to be investment and attention given to climate adaptation measures, whilst we simultaneously continue to progress measures to reduce our emissions. It is critical that we protect our economy, communities and environment from the impacts of climate change that cannot be avoided through emissions reduction measures alone.

Tackling climate change requires a whole society and economy approach. We also recognise the important role our Councils, non-government organisations, businesses, industry and academia play in creating climate resilience.

This Programme sets out our framework and vision for a future where Northern Ireland is well-adapted and resilient to the impacts of climate change and recognises the economic, social, health and environmental benefits that this will bring. We recognise that creating a Northern Ireland that is well adapted and resilient to the impacts of climate change is an ongoing journey which cannot be fully addressed through a single 5-year programme. Only with ongoing investment, and continued collaboration and partnership working can we ensure that through successive adaptation programmes we create a climate resilient Northern Ireland.

¹ <https://www.northernireland.gov.uk/PfG>

Executive Summary

Climate Adaptation

Climate Change is widely accepted as the one of the greatest inter-generational issues of our time. As a result of human activities, global temperatures are rising and driving the increased frequency and severity of extreme weather events ranging from storms and flooding to heatwaves and drought. These changes impact on all sectors and bring challenges to all levels of society. In Northern Ireland, we are seeing these increased, more frequent and extreme weather events causing damage, against a backdrop of hotter, drier summers, and warmer, wetter winters.

The challenge of climate change must be tackled on two fronts. It is imperative that we act to limit increases to global temperatures through the reduction of global greenhouse gas emissions and the achievement of net zero. This is **Climate Change Mitigation** and is a challenge that requires collaborative effort across the globe where each nation plays its part.

The second key aspect of the climate challenge is that of **Climate Change Adaptation**, which recognises that historic emissions have already locked in climate impacts that we must now take action to adapt to so that our environment, society and economy are robust and resilient. We must however recognise that some actions will have both climate change mitigation and climate change adaptation benefits. For example, peatland restoration and afforestation both bring carbon sequestration benefits and flood alleviation benefits through increased water storage during periods of heavy rainfall and increasing the runoff lag time. Similarly, a diverse energy supply system with a mixture of renewable energy sources will both decarbonise our energy sector whilst also providing supply resilience during periods of low wind speed or reduced water flow.

Adaptation is a Legislative Requirement

This is the third Northern Ireland Climate Change Adaptation Programme (NICCAP3) which has been developed as required by section 60 of the Climate Change Act 2008. It provides NI Executive Departments response to the climate risks which have been identified in the UK's third Climate Change Risk Assessment (CCRA3), and which fall within the devolved area of responsibility. It recognises the important role partnership working and collaboration plays in building a climate resilient Northern Ireland and as such also includes details of actions from Councils, Non-Government Organisations, Academia and other key stakeholders.

We recognise that climate change is a rapidly developing policy area and in acknowledgement of this, NICCAP3 will undergo a mid-programme review to coincide with the Climate Change Committee's (CCC) obligation under section 48 of the Climate Change Act (Northern Ireland) 2022 (the 2022 Act) to provide an assessment of the progress made towards implementing the objectives, proposals and policies within the Programme. This will ensure NICCAP3 is a dynamic programme which is able to react to, and take account of, the latest policy and budgetary positions.

To conduct their assessment of NICCAP3, the CCC will use their new adaptation monitoring framework which contextualises a well-adapted UK around the following 13 thematic areas:

- **Nature:** Terrestrial (including on farmland), freshwater and marine habitats.
- **Working lands and seas:** Agriculture, forestry and fisheries.
- **Food security:** Domestic and imported food supply chains, as well as vulnerability of society to climate-related food disruption.
- **Water supply:** Public water system which supplies households and businesses.
- **Energy:** Key energy systems, the electricity system (transmission, distribution, and generation), gas networks and novel sources of energy supply (such as hydrogen) as they develop.
- **Telecoms & ICT:** Communications and ICT infrastructure, including data centres, networks and other critical national infrastructure.
- **Transport:** Road networks (both the national strategic road network and local roads), railways, ports and airports.
- **Towns and cities:** The built environment at a settlement scale, covering flooding, coastal erosion and overheating risks.
- **Buildings:** Individual buildings and their occupants, covering overheating and flooding.
- **Health:** Public health, including mortality and morbidity, as well as climate-sensitive vector-borne diseases and health care delivery.
- **Community preparedness and response:** Preparedness of communities for climate impacts, including the ability to protect cultural heritage, and their ability to effectively respond when climate and weather-related disruptions occur.
- **Business:** Businesses and their function as a commercial entity, including risks to supply chains (both domestic and international), sites and assets, access to capital and productivity impacts.
- **Finance:** Financial system, so that systemic risks from climate change are minimised and it can effectively support the economy in investing in necessary adaptation actions.

Our Approach to developing NICCAP3

NICCAP3 has been structured around these 13 thematic areas to align with the CCC's monitoring framework and provide a direct read across to the assessment they will provide under the 2022 Act. The structure of NICCAP3 is as follows:

Part 1

An introduction to Climate Adaptation in Northern Ireland covering the shared aspect of this responsibility, the legislative basis for adaptation action and the rationale for the structure of NICCAP3.

Parts 2-6

These provide a description of the climate challenge in terms of the 13 thematic areas, grouped into 5 key areas of action - Natural Capital; Food Security; Infrastructure Services; People and the Built Environment; Disruption to Businesses and Supply Chains.

Part 7

This part provides details on how NICCAP3 will be monitored and contains an assessment of the progress made through the previous NICCAP.

Annex

This is the Climate Change Adaptation Delivery Plan (ADP) and sets out details of the actions proposed in response to the risk areas in the CCRA3 which fall within the devolved Northern Ireland Executive area of responsibility. It is composed of two parts, the first displaying risk maps for the 13 thematic areas, using reference numbers to show which actions respond to the risks within a thematic area. The second part of the Annex contains the reference list of all actions put forward from the NI Executive and also from local government, academia, environmental non-government organisations (NGOs) and other key stakeholders.

Case Studies

A number of the chapters contain case studies highlighting current or completed projects which contribute to building climate resilience in Northern Ireland. These have been gathered from across Government Departments and external stakeholders.

Part 1



Part 1: Introduction

The science behind climate change.

The Earth's climate is changing, and we are already seeing its profound and far-reaching impacts here in Northern Ireland and across the globe. Rising global temperatures are driving more frequent and severe weather events such as storms, flooding, droughts, heatwaves and extreme wildfires all of which can impact on all aspects of life and society.

The changes we are seeing are the result of human activities. In its 2023 synthesis report produced as part of the sixth assessment cycle, the United Nations Intergovernmental Panel on Climate Change (IPCC)² placed the human emissions of greenhouse gases as the principal driver of the global surface temperature increase of 1.1°C from pre-industrial levels. This has driven rapid and widespread changes to the Earth's atmosphere, oceans and biosphere which has already led to significant losses and damages to both human society and the natural world.

While it is crucial that work is done to mitigate against further global temperature increases by reducing our emissions to achieve net zero

by 2050, we must also work to reduce our vulnerability to the impacts we are already experiencing. It is paramount that we build resilience for the impacts of climate change which are inevitable due to past and present emissions while mitigation efforts, to reduce emissions, are underway.

What is climate adaptation?

Climate adaptation is focused on addressing the risks from climate impacts, both current and projected, whilst also recognising that there may be opportunities that a changing climate may bring e.g. ability for new varieties of crops to grow in Northern Ireland.

Ensuring effective climate adaptation, including action to ensure that our current infrastructure is fit for purpose, and to also build resilience to the future projected impacts of climate change, is dependent on collaboration across government, business and societies and if done effectively society, ecosystems and economies can be safeguarded against the worst impacts of climate change.

² <https://www.ipcc.ch/report/ar6/syr/>

Chapter 1: Collaborative Working & Shared Ownership - a vision for a well-adapted and climate resilient Northern Ireland



Figure 1-1: Climate Action requires a collaborative approach

The climate challenge is one that faces not just government departments, but public bodies such as Councils and environmental Non-Government Organisations (eNGOs), the private sector and wider society as a whole. It is widely accepted as one of the most important generational issues of our time.

While government may lead the way in areas such as setting policy, it is only by recognising the extent of this challenge and by working in partnership together across departments, society and even borders, will

we be able to fully address and adapt to the changing climate we will all experience.

To capture this message and bring it to the forefront of the third Northern Ireland Climate Change Adaptation Programme (NICCAP3), the Department of Agriculture, Environment and Rural Affairs (DAERA) undertook a co-design process with a range of key stakeholders to develop the following vision for a well-adapted and climate resilient Northern Ireland:

Our NICCAP3 Vision

By working with partners across all aspects of Northern Ireland's environment, economy, health and communities we will take action to build upon and strengthen our resilience to our changing climate as we work towards creating a Northern Ireland that is not only well adapted to current and future climate risks, but also equipped to thrive; protecting our environment, economy, health and communities for both current and future generations.

NI Executive Departments have recognised the need for this collaborative approach between Departments and key stakeholders for some time now. The 'New Decade, New Approach deal' (NDNA), which was published in January 2020 and the Executive's Programme for Government 2024-2027 'Our Plan: Doing What Matters Most'³ both recognised the importance of addressing climate change and the risks that it brings to our communities, businesses and environment from impacts such as increased flooding during severe weather events and extreme heat events.

The Executive's draft Green Growth Strategy recognises the need to tackle and mitigate these impacts whilst also taking the opportunities to change and grow the economy and improve people's quality of life through green jobs and a clean environment.

For over a decade now, to assist with information exchange on climate adaptation between Departments a Cross Departmental Adaptation Group has been in place. Following on from the publication of the NDNA, and the development of the draft Green Growth Strategy, a Climate Change Strategic Oversight Group, which comprises senior official representation from all Departments, and is chaired by the Department of Agriculture, Environment and Rural Affairs (DAERA) Permanent Secretary, was established to provide a forum for discussion and senior level oversight across all Departments on the progression of climate action.



To support Departments in the delivery of action and engagement with key stakeholders, in 2008 the Climate Northern Ireland Project (Climate NI) was established, under contract, by the then Department of the Environment (DoE) to help fulfil its obligations to address climate change impacts following a recommendation from the 2007 DOE/Sniffer report, "Preparing for a Changing Climate in Northern Ireland"⁴.



Figure 1-2: Climate NI Logo (Climate NI)

Climate NI is currently funded by DAERA and is delivered by Northern Ireland Environment Link (NIEL) under contract with a key focus on ensuring collaboration between Government departments and key stakeholder partners through an intersectoral network and a series of working groups which are devoted to increasing understanding of climate change impacts and risks within Northern Ireland and promoting adaptation and the mitigation actions necessary to address these. Climate NI provides a vital link between the voluntary and community sectors, private business sectors, academics and local and central government.

The Climate NI project is governed by a Steering Group composed of organisations from a wide range of sectors including central and local government, the business sector, environmental organisations and academia. Its aims are to share best practice, increase the understanding of the impacts of climate change in Northern Ireland, to share

³ <https://www.northernireland.gov.uk/PfG>

⁴ https://www.ukcip.org.uk/wp-content/PDFs/Preparing_CC_NI.pdf

knowledge, promote action and provide independent advice and support to the sectors with which it engages.

Supported by the steering group, Climate NI works with Local Government in NI to provide training and support to councils to reduce their greenhouse gas emissions and improve their resilience to the impacts of climate change. In 2019, Climate NI established the Local Government Climate Action Network (LGCAN) to develop a cohesive and collaborative regional approach to climate action within local government and to act as a dedicated forum for cross-council support and training on climate adaptation and wider climate action. This work is supported by Climate NI's *NI Adapts Planning Toolkit*⁵ (Figure 1-3), which aims to support organisations to undertake a methodological approach to adaptation planning with the overall aim of enabling NI to build resilience to the current and projected negative impacts of climate change. With this toolkit and the network of contacts the LGCAN provides, councils can work together to share best practice, and with external agencies to develop a strategic regional approach to climate action.



Figure 1-3: NI Adapts logo (Climate NI)

NICCAP2 saw the first contributions from local government to a climate adaptation program in the UK. With NICCAP3 we have again (through Climate NI) collaborated with local

governments, civil society, academia, eNGOs and the private business sector to create a programme which recognises the important work and contributions to climate adaptation that the whole of society can make.

To further increase the collaborative approach to climate adaptation within NI, and to focus a response to recommendations from the Climate Change Committee's (CCC) 2022 review on adaptation progress in NI⁶, a Policy and Research Panel was set up through Climate NI. This panel brings together academics, government and industry to identify, investigate and address data gaps in adaptation progress indicators. Its work will feed into the monitoring and evaluation of NICCAP3, discussed in more detail in Part 7.

As well as working together to address climate change across Northern Ireland, a number of Departments collaborate on a UK and island wide basis through participation and membership of groups such as the Climate Adaptation Research and Innovation Board (CARIB), Climate Change Risk Assessment working groups, the British Irish Council work streams, research centres and the North South Ministerial Council.

CARIB is a UK wide group, which is attended by the DAERA Chief Scientific Advisor, and brings together senior representatives from government departments, non-departmental public bodies and non-ministerial departments to support effective climate adaptation across the UK through the development of a Climate Adaptation Research and Innovation Framework⁷.

⁵ <https://www.niadapt.org.uk/>

⁶ <https://www.theccc.org.uk/publication/adapting-to-climate-change-progress-in-northern-ireland/>

⁷ <https://www.gov.uk/government/groups/climate-adaptation-research-and-innovation-board>

Case Study 1: Co-Centre for Climate + Biodiversity + Water



Co-Centre for Climate + Biodiversity + Water Co-Directors (L-R): Professor Ed Hawkins (University of Reading), Professor Yvonne Buckley (Trinity College Dublin), Professor Mark Emmerson (Queen's University Belfast).

The Co-Centre for Climate + Biodiversity + Water is a cross-jurisdictional programme of research for innovation and policy in the areas of climate, biodiversity and water. Its purpose is to carry out research in Northern Ireland, the Republic of Ireland and Great Britain to support fair transitions to Net Zero while also addressing the interlinked issues of reversing biodiversity loss and restoring water quality for a sustainable economy.

The cross-jurisdictional approach recognises that these challenges know no borders, must be addressed at the international scale and allows for better integration of disciplines and institutions to maximise research impacts.

The programme is funded for six years by Science Foundation Ireland, the Department of Agriculture, Environment & Rural Affairs (DAERA) and UK Research & Innovation (UKRI); and is also supported via UK's International Science Partnerships Fund and the Irish Government's Shared Island initiative.

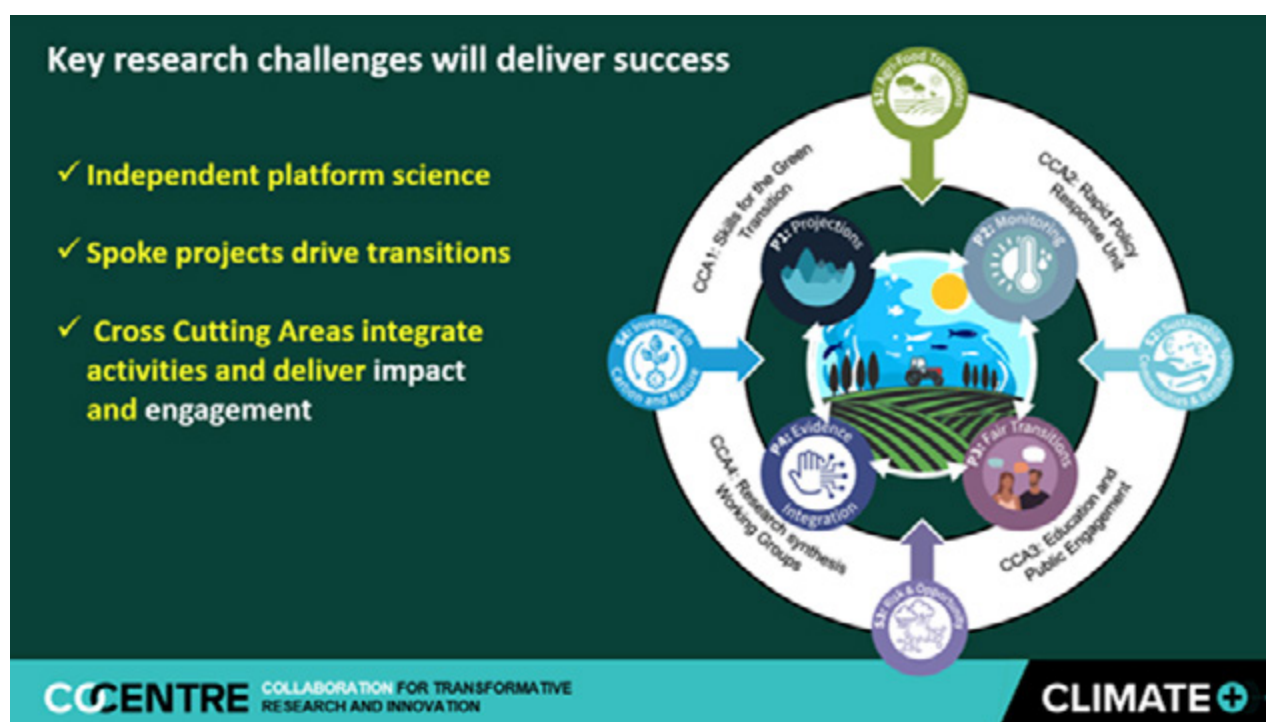
The programmes total budget is €41.3M over 6 years including co-funding from 29 industry partners (€9.25M) with a cross-jurisdictional PhD programme being supported through an additional €1 million donation by the Sunflower Charitable Foundation through Community Foundation Ireland.

The programme has over 60 Principal and Funded Investigators from 14 academic partners across the two islands and intends to recruit over 80 post-doctoral researchers and 25 PhD students.

The Co-Centre Projects will generate research outputs through over 50 projects of fundamental research (Platforms) or more applied industry led research designed to provide answers industry urgently needs to innovate new products and services (Spokes).

Platforms	Spoke
Projections - Model-based projections of future climate, biodiversity and water scenarios	Sustainable Agri-Food Transitions - Achieving a sustainable transition to net zero emissions from agriculture and food systems
Monitoring - Development of a monitoring framework	Sustainable Communities & Livelihoods - including achieving a just transition in rural communities
Enabling Just Transitions - Transition to a low carbon future that is socially inclusive and equitable	Risk & Opportunities - Addressing threats to supply chains, physical infrastructure, natural capital, and communities, including health and livelihoods
Evidence Discovery and Integration - including the application of Artificial Intelligence to the collation and synthesis of evidence	Investing in Carbon & Nature - Investing in nature-based solutions such as peatlands, forests, saltmarshes, and agricultural grasslands and soils

The research projects are supported by a series of cross cutting activities. Notably these include a Policy Response Centre to allow commissioning of policy ready evidence needs that arise during the lifetime of the project and an Education and Public Engagement campaign.



Example Projects Spoke

Spoke 3 - Risk & Opportunities Targeted Projects

This spoke will explore climate, biodiversity and water-related risks, improving our understanding of their present-day drivers and their future evolution, including what can be done to mitigate their impacts. Nature-based solutions will be augmented using digital monitoring, data assimilation, and viewing tools that highlight locations where natural features provide protection from coastal storm surge flooding or erosion risk. Properties of these features will be upscaled, enhanced or translocated as part of regional adaptation strategies and solutions.

Example Spoke 3 Objective

Construct 'adaptation pathways' to support iterative decision-making processes and develop evidence-based recommendations for policies promoting sustainable communities and livelihoods.

Example Spoke 3 Projects

- Nature-based solutions for coastal adaptation
- Understanding hydrological extremes to support water resources planning and adaptation

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Chapter 2: Climate Change Risk Assessment

Legal background



Figure 1-4: The Climate Change Act 2008

In November of 2008, the Climate Change Act 2008⁸ (the 2008 Act) was passed into law. This Act was seen as a landmark piece of legislation at the time, representing the world's first legally binding framework to tackle climate change. The 2008 Act (Figure 1-4) contains a range of policy directions including UK emissions targets, UK carbon budgets and carbon trading schemes.

The 2008 Act also established the Climate Change Committee (CCC) as an independent, statutory body, which formally launched in December 2008, to advise the UK Government and Devolved Governments on matters relating to climate change. To support the work of the Committee an Adaptation Committee, with a remit to provide specific advice about climate adaptation and the steps which government should be taking to build resilience to the impacts of climate change, was also established.



Figure 1-5: Climate Change Committee Logo

The key function of the CCC regarding climate adaptation is under section 57 of the

2008 Act whereby it must provide advice to UK Government on the preparation of a Climate Change Risk Assessment (CCRA), to be laid by the UK Government in the UK Parliament every 5 years under section 56 of the 2008 Act. In fulfilling this requirement, the CCC publish an independent assessment of Climate Risk to the UK on a 5 yearly cycle. This assessment is known as the Climate Change Risk Assessment Independent Assessment (CCRA-IA). This independent assessment and the associated National Summary reports (Figure 1-6) are available at the UK Climate Risk website⁹ which also contains a range of other useful resources.



Figure 1-6: CCRA3 Summary Technical Report for Northern Ireland

The National Summary for Northern Ireland¹⁰ report, which accompanied the CCRA-IA, describes the impacts we are already experiencing in Northern Ireland through impacts such as increases to temperature,

⁸ <https://www.legislation.gov.uk/ukpga/2008/27/contents>

⁹ <https://www.ukclimaterisk.org/>

¹⁰ <https://www.ukclimaterisk.org/publications/summary-for-northern-ireland-ccra3-ia/>

impacts such as increases to temperature, rainfall, weather extremes and sea level rise which are summarised in Figure 1-7 below. The national summary report utilises the

Met Office-produced UK Climate Change Projections data from 2018 (UKCP18)¹³ to describe the further climatic changes we can expect.

Variable	Change in Northern Ireland
Average annual temperature	Increase of 0.7°C from mid-1970s to mid-2010s
Annual mean rainfall	Increase of 6.4% from mid-1970s to mid-2010s
Weather extremes	UK-wide increase in extreme heat events Little evidence yet on changes in extreme rainfall
Sea level rise	UK-wide increase of ~1.4mm per year since 1901(16cm to date)

Figure 1-7: Observed impacts of Climate Change in Northern Ireland from UKCP18

We are now in the third iteration of this statutory cycle, with the most recent CCRA3-IA published by the CCC in June 2021¹¹. The CCRA3-IA was developed at a UK wide level and informed the development of CCRA3, which was laid in Parliament in January 2022¹² (Figure 1-8) and which agreed with the findings of the CCRA3-IA.

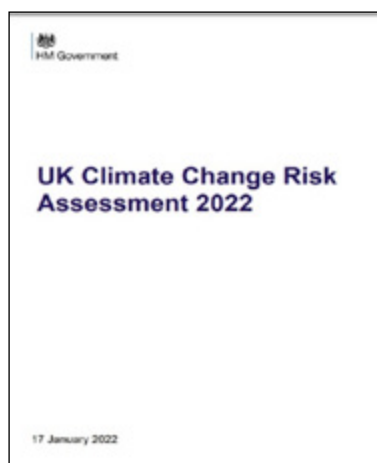


Figure 1-8: Third UK Climate Change Risk Assessment

The CCRA3-IA considered 61 specific risks and opportunities which were assigned an urgency score (Figure 1-9) ranging from 'More action needed' to 'Watching brief' across 5 broad themes covering the Natural Environment and assets; Infrastructure; Health, Communities and the Built Environment; Business and Industry; and International Dimensions.

In considering the 61 risks and opportunities for Northern Ireland, the CCRA3-IA scoring assessment identified:

- 31 requiring more action;
- 19 requiring further investigation;
- 5 sustain current action; and
- 6 watching brief.

This represented a significant increase in risk ratings level from CCRA2-IA.

¹¹ <https://www.ukclimaterisk.org/publications/technical-report-ccra3-ia/>

¹² <https://assets.publishing.service.gov.uk/media/61e54d8f8fa8f505985ef3c7/climate-change-risk-assessment-2022.pdf>

¹³ <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp>

Category	Description
More action needed	New, stronger or different Government action, whether policies, implementation activities or enabling environment for adaptation - over and above those already planned - are beneficial in the next five years to reduce climate risks or take advantage of opportunities. This will include different responses according to the nature of the risks and the type of adaptation: Addressing current and near-term risks or opportunities with low and no-regret options (implementing activities or building capacity). Integrating climate change in near-term decisions with a long life-time or lock-in. Early adaptation for decisions with long lead-times or where early planning is needed as part of adaptive management.
Further investigation	On the basis of available information, it is not known if more action is needed or not. More evidence is urgently needed to fill significant gaps or reduce the uncertainty in the current level of understanding in order to assess the need for additional action. Note the category of 'Research Priority' in CCRA2 has been replaced with 'Further investigation' in CCRA3. This is because of some confusion following CCRA2 that 'research priority' only denoted that more research was needed, when in fact the urgency is to establish the extent to which further adaptation is required.
Sustain current action	Current or planned levels of activity are appropriate, but continued implementation of these policies or plans is needed to ensure that the risk or opportunity continues to be managed in the future.
Watching brief	The evidence in these areas should be kept under review, with continuous monitoring of risk levels and adaptation activity (or the potential for opportunities and adaptation) so that further action can be taken if necessary.

Figure 1-9: CCRA3-IA Urgency Scores Guide (Source: CCC)

The UKCP18, produced by the Met Office, also sets out the latest projected changes in climate for Northern Ireland (Figure 1-10). The UKCP18 analysis highlights that:

- Temperatures are projected to rise producing both warmer summers and winters, with summer months expected to see the greatest increase. Coupled with changes to rainfall depending on the season, this will lead to hotter, drier summers with an increase in extreme heat events.
- We will also see warmer, wetter winters, but this will not exclude extreme cold events such

as severe snowstorms and cold snaps such as the "Beast from the East"¹⁴ in early 2018 which saw temperatures of -11 °C and caused widespread disruption due to ice and snow.

- Sea level is expected to rise by between approximately 23-30cm and 40-65cm by 2050 and 2080 respectively compared to a 1981-2000 baseline. This will bring an increase in the likelihood of flooding and erosion of coastal communities and habitats, impacting upon people, coastal infrastructure and biodiversity.

¹⁴ [2012_12_MOBlog | Met Office UA - Page 5](#)

	2050s RCP2.6 (50th Percentile)	2050s RCP8.5 (50th Percentile)	2080s RCP2.6 (50th Percentile)	2080s RCP8.5 (50th Percentile)
Annual Temperature	+1.0°C	+1.4°C	+2.1°C	+4.6°C
Summer Rainfall	-12%	-12%	-10%	-22%
Winter Rainfall	6%	9%	10%	21%
Sea level rise (Belfast)*	+23cm	+30cm	+40cm	+65cm

Figure 1-10: UKCP18 Climate Projections for Northern Ireland. *Sea level rise taken at the 95th Percentile

Chapter 3: Northern Ireland's third Climate Change Adaptation Programme

The Climate Change Act 2008

The 2008 Act requires that governments from across the UK respond to the climate risks identified in the latest CCRA laid in Parliament. The Scottish Government separately have specific requirements to develop an adaptation programme in response to the latest CCRA under the Climate Change (Scotland) Act 2009.

Specifically, for Northern Ireland, Section 60 of the 2008 Act requires Northern Ireland departments to produce and lay before the Northern Ireland Assembly, programmes of adaptation to climate change which address the risks identified in the most recent Climate Change Risk Assessment laid under Section 56.

As the lead department for cross-cutting climate change legislation and to ensure a co-ordinated approach, which recognises that climate risks may cut across multiple sectors, DAERA has assumed the role of leading on the development of Northern Ireland's Adaptation Programmes to ensure that the requirements of Section 60 are met. In this role DAERA coordinates the input of policies and proposals from across Government departments in response to the CCRA risks into a single Northern Ireland Climate Change Adaptation Programme (NICCAP).

Development of NICCAP3

This is the third programme which builds upon progress made through the two previous NICCAPs, setting out the policies

and proposals from both within government and from across wider society through the inclusion of actions from local councils, eNGOs, academia and the private sector.

In NICCAP3, we recognise a new statutory requirement placed on the Climate Change Committee (CCC) through the Climate Change Act (Northern Ireland) 2022¹⁵ (the 2022 Act) which received Royal Assent in June 2022.

Section 48 of the 2022 Act requires that the CCC provide an assessment of future NICCAPs within 3 years of being laid in the Assembly and so in anticipation of this, and to assist the CCC in delivering this function, we have developed NICCAP3 to align with the adaptation monitoring framework the CCC have developed and to take account of the key priorities, for NICCAP3, identified by the CCC in their independent assessment of NICCAP2¹⁶ as discussed later in this chapter.

The CCC Adaptation Monitoring Framework¹⁷ sets out 13 thematic areas for climate risk and adaptation and allows for the climate risks and opportunities identified in the CCRA to be contextualised within and across the 13 themes. Further details on the monitoring framework and how it will be used can be found in Chapter 17.

The CCC have grouped these 13 themes into 5 key areas which will be impacted by our changing climate. For each of these key areas, DAERA has undergone a

¹⁵ <https://www.legislation.gov.uk/nia/2022/31/contents/enacted>

¹⁶ <https://www.theccc.org.uk/publication/adapting-to-climate-change-progress-in-northern-ireland/>

¹⁷ <https://www.theccc.org.uk/publication/ccc-adaptation-monitoring-framework/#introduction>

co-design process with a range of key stakeholders to develop overarching strategic objectives designed to focus the intent of adaptation in each area. A summary of these objectives, key areas and themes can be found in Figure 1-11. A more detailed discussion on each key area and its themes is contained in the relevant chapter for each, where summaries of the risks and opportunities for each theme can also be found.

To assist with future monitoring of NICCAP3 we have also developed the Adaptation

Delivery Plan (ADP), contained in the Annex, to align to the thematic areas and have mapped the actions in the ADP to the relevant CCRA3 risks. However, we recognise that there are a number of actions which do not naturally sit in a specific thematic area, due to their strategic nature, and to reflect this we have included a section to capture these actions which provide significant benefits for adaptation action delivery. All of the actions within the Delivery Plan are either of an ongoing nature or will be commenced within the lifetime of this Adaptation Programme.

Key Area	Objective	Thematic Areas
Natural Capital	We will use nature-based solutions where possible and encourage sustainable practices across the land and water use sectors to halt and reverse the degradation of nature caused by human activities and also build and protect ecologically healthy, well-connected habitats which support increased species abundance and diversity, and improved soil and water quality, which in turn create a climate resilient environment, rich in natural capital that provides the ecosystem services that are so important for human wellbeing and sustainable agricultural, forestry, fisheries, and aquaculture sectors which are so important to the Northern Ireland economy.	Nature Working Land & Seas
Food Security	We will work with local industry stakeholders, producers and consumers to strengthen the resilience, sustainability and prosperity of our local agri-food and fisheries sectors in the creation of a sustainable and self-sufficient local food system that protects and enhances our natural environment, as well as supporting the sectors to invest in systems to assess climate risks and vulnerabilities and plan adaptation throughout their supply chains to ensure we continue to supply safe and sustainable food both at home and abroad.	Food Security
Infrastructure Services	Recognising the degree which infrastructure services rely upon each other to function effectively, we will collaborate across public and private sector organisations to identify vulnerabilities, manage these interdependencies and support the integration of climate adaptation into business planning and operating models to ensure adaptation is delivered effectively and efficiently to ensure system level reliability, security and resilience across our infrastructure services and networks.	Water Energy Telecoms & ICT Transport

Key Area	Objective	Thematic Areas
People and the Built Environment	Recognising how dependent we are upon our built environment and the ability it has to shape and support our health and wellbeing, we will engage with community groups and organisations to increase community understanding of localised climate impacts, and their impact upon their health. By empowering communities to understand their risks and develop innovative solutions through making use of local knowledge and resources, we will build upon their shared experiences to target and address the climate risks specific to them to improve the climate resilience of our communities.	Towns & Cities Buildings Health Community
Disruption to Business and Supply Chains	We will support businesses to understand and embed climate adaptation into their strategies and practices, to identify climate risks and to make the most of existing and emerging opportunities. Through encouraging cost-effective early action to strengthen operating models to the risks and impacts of Northern Ireland's changing climate, we will ensure our supply chains have the resilience needed to support our rich network of businesses for our climate today, and tomorrow.	Business Finance

Figure 1-11: Summary of NICCAP3 Key Areas, Objectives, and Thematic Area

Climate Change Committee assessment of NICCAP2

As outlined earlier in this chapter in developing this Adaptation Programme, whilst structuring it to align to the CCC's adaptation monitoring framework, we have also sought to ensure that we have taken account of the priorities for NICCAP3 identified by the CCC in their independent assessment of NICCAP2.

Ahead of the new legal requirement under section 48 of the 2022 Act commencing, DAERA sought the views and agreement from other Departments to take a proactive approach and commission the CCC to undertake an independent assessment of NICCAP2 in 2022. On 20 April 2023, the CCC published 'Adapting to Climate Change - Progress in Northern Ireland'¹⁸ report.

This independent assessment provided a useful means of gauging the expert opinion

of the CCC at an earlier stage and allowed us to consider their recommendations alongside the CCRA3, in the development of this Programme.

Climate Change Committee's key recommendations for NICCAP3

The CCC's assessment of NICCAP2 outlined their views on the following key priorities for this Programme as being:

i) A refined vision.

NICCAP3 must build on NICCAP2's vision for a well-adapted Northern Ireland. The next programme should link NICCAP actions to climate change objectives. More specific and quantitative targets also need to be established as top-level goals for the programme, linked to identified key performance indicators.

¹⁸ <https://www.theccc.org.uk/publication/adapting-to-climate-change-progress-in-northern-ireland/>

ii) Increased scope.

NICCAP3 should cover the full range of sectors and policy areas which require adaptation, including outcomes, actions and indicators for the energy sector; water supply; telecommunications and ICT; health; buildings; and finance, as well as interdependencies between sectors, which largely fall outside the scope of NICCAP2. These sectors need to be included in the programme to address all the risks identified under the third Climate Change Risk Assessment.

iii) Engagement through the development process.

NICCAP3 is an opportunity to raise awareness and understanding of climate risks across Northern Ireland Government, but departmental policy leads find it challenging to embed adaptation into their areas. NICCAP3 should build on the work of civil society and local government to deliver effective adaptation.

iv) Strengthened monitoring and evaluation.

Monitoring and evaluation need to be strengthened and expanded to assess the effectiveness of adaptation actions. The assessment found it was not possible to evaluate 29 out of 45 outcomes due to data gaps.

Building upon NICCAP2 to go further

Departments, in developing policies and proposals for inclusion in NICCAP3 in response to the CCRA3, have also taken account of the views of the CCC from their assessment of NICCAP2. In particular, in relation to the key priorities as outlined above:

i) NICCAP3 contains a new refined vision and objectives which have been co-designed with a range of stakeholders.

ii) We have worked to ensure that the scope of NICCAP3 brings in all areas under devolved policy with those risk areas which are reserved policy matters (i.e. ICT, international) being dealt with at a UK level through the UK's third National Adaptation Programme (NAP3).

iii) In the development of the NICCAP3 we have gone beyond the legal requirement of the Climate Change Act 2008 and again incorporated delivery actions from key delivery partners including Councils, Academia, NGOs and private sector businesses in recognition of the important role they can play in creating climate resilience. Within Government we are continuing to work to embed climate resilience into other high-level strategies where appropriate including the Programme for Government, Climate Action Plan, and the Environmental Improvement Plan. This is in addition to developing and rolling out training across the NI Civil Service to improve upon climate change awareness and empower civil servants to make positive impacts through their professional and personal lives.

iv) In developing NICCAP3, as detailed in chapter 17, we have sought to develop a suite of indicators to support monitoring and evaluation in partnership with a range of key stakeholders with specific sectoral expertise.

In developing this Adaptation Programme, we have sought to build upon the progress made under NICCAP2 whilst recognising

and accepting that we must go further. Since NICCAP2 was laid in the Assembly in 2019 we have seen local flooding events such as those which occurred in Newry and Downpatrick in 2023, significant wildfires in the Mourne's in April 2021, damage to buildings during storm events such as the damage to the Titanic Visitor Centre roof in April 2024 during Storm Kathleen, record temperatures broken in July 2021 and a series of severe weather events resulting in damage to property and infrastructure.

It is clear from the CCC assessment detailed further in Chapter 18, and these recent climate related events, that NICCAP3 must go further. Whilst there are several actions which will roll over from NICCAP2, given their ongoing nature, we have sought to expand upon and strengthen the responses received from across government and wider society. We have worked towards the goal of ensuring that all risk areas, which are in the devolved areas of responsibility, have actions related to them incorporated. However, some areas still require further attention, and work is ongoing through a range of forums to engage with the appropriate bodies and to support them in bringing forward adaptation actions.

Furthermore, we recognise the dynamic nature of climate change and its impacts, and as outlined in chapter 17 we will be undertaking a comprehensive mid-programme review of the programme which will allow additional actions to be added in and therefore

ensures that NICCAP3 adopts a dynamic and more agile approach to meet the challenges climate change brings.

Furthering the delivery of the Sustainable Development Goals

Section 60(2) of the 2008 Act requires that the objectives, proposals and policies within our adaptation programme must contribute towards sustainable development.

The 2030 Agenda for Sustainable Development¹⁹, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals²⁰ (SDGs), which are an urgent call for action by all countries, developed and developing, in a global partnership. They recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and promote economic growth - all while tackling climate change and working to preserve our oceans and forests.



Figure 1-12: UN Sustainable Development Goals

¹⁹ <https://sdgs.un.org/2030agenda>

²⁰ [THE 17 GOALS | Sustainable Development \(un.org\)](https://www.un.org/sustainabledevelopment/)

It is widely recognised that delivery of climate action can drive forward delivery across multiple SDGs. In his briefing to the UN General Assembly on 6 February 2023²¹ António Guterres, the United Nations Secretary General, stated “Climate Action is the 21st century’s greatest opportunity to drive forward all the Sustainable Development Goals”.

The SDGs include guidelines and targets that UN member states are expected to adopt to frame their agendas and political policies until 2030.

Goal 13 ‘Climate Action’ (SDG 13) specifically sets the following targets relating to climate adaptation:

- strengthen resilience and adaptive capacity to climate-related hazards and natural disasters;
- integrate climate change measures into policies and planning;
- build knowledge and capacity to meet climate change;
- implement the UN Framework Convention on climate change; and
- promote mechanisms for raising capacity for planning and management.

The objectives, policies and proposals within this Adaptation Programme will, in varying ways, contribute towards the furthering of SDG 13 as well as across a number of other SDGs.

²¹ [Secretary-General’s briefing to the General Assembly on Priorities for 2023 \[scroll down for bilingual, as-delivered; all-English and all-French versions\]](#) | [United Nations Secretary-General](#)

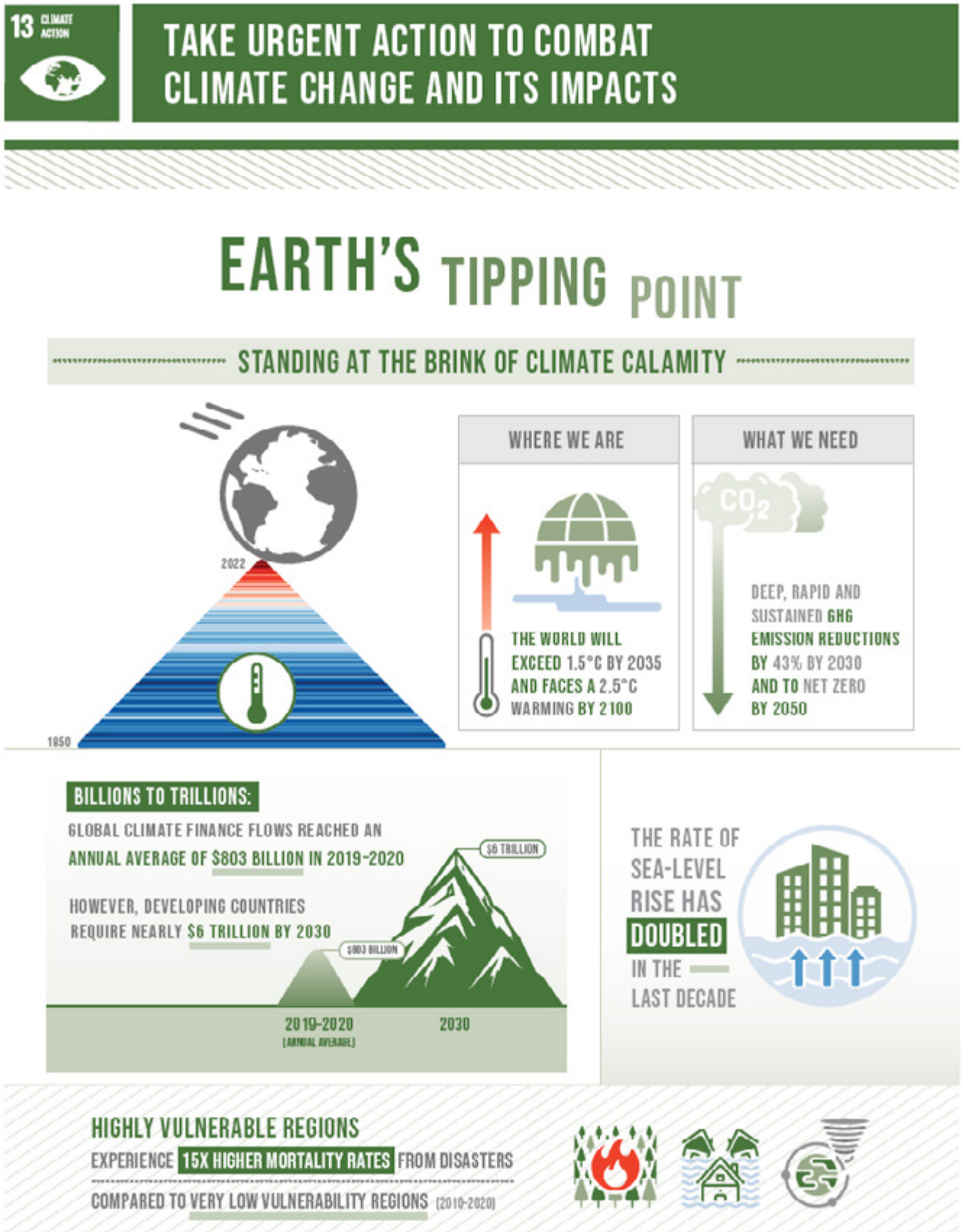


Figure 1-13: The Sustainable Development Goals Report 2023

Case Study 2: Climate Northern Ireland - Enabling collaborative climate adaptation in Northern Ireland



The Climate NI Steering Group hosted the UK Climate Change Committee in May 2024 (Climate NI)

Climate Northern Ireland (Climate NI) is a cross-sectoral network devoted to understanding and enabling adaptation and mitigation actions in NI that can address the climate emergency. The programme is funded under contract by the Department of Agriculture, Environment and Rural Affairs (DAERA), and works in partnership with a wide range of actors and organisations from academia, local and central government, and both the private and NGO sectors. Climate NI has been active in its current form since 2012, and the current iteration of the programme runs from 2023-2026 with an option to extend to 2028. The Climate NI programme aims to:

1. Support development and implementation of climate policy by enabling the exchange of expertise and advice between Government Departments, public bodies, and civil society;
2. Engage the research community to help define and address evidence needs for climate policy and action;
3. Increase co-ordination and awareness on climate change through partnership and clear communication; and
4. Enable delivery of climate action in NI by addressing barriers and building capacity at local, regional and national levels.

One of the primary mechanisms for achieving these aims are the networks and partnerships that Climate NI has established across the various sectors listed above. At its core is the Climate NI Steering Group; comprised of some 20+ member organisations and broken down into key sectoral areas, each guided by a 'Sector Lead'. Other groups convened and facilitated by Climate NI include the Local Government Climate Action Network (LGCAN) and the Climate NI Policy and Research Panel. Other groups are created, expanded and finished throughout the programme, as guided by the Steering Group and the needs of partners.



Climate NI Steering Group Structure (Climate NI)

Climate NI has leveraged these networks and their internal resources to support the development of adaptation policy, including gathering evidence for the Climate Change Risk Assessments (CCRA) and the Northern Ireland Climate Change Adaptation Programmes (NICCAP). For this third NICCAP, Climate NI engaged stakeholders across civil society and local government, collecting 65+ submissions for adaptation actions across NI, and 11 strategic actions endorsed by the Society of Local Authority Chief Executives and Senior Managers (SOLACE) and the Northern Ireland Local Government Association (NILGA). Climate NI has supported ten of eleven councils to begin developing their own adaptation plans through the LGCAN, using their bespoke NI Adapts Planning Toolkit. Four of eleven Councils have now completed a plan.

Climate NI supports various sectors through the development of tools and resources. For example, Climate NI developed a Business Resilience Guide as a first step to help small and medium sized (SME) businesses understand the impacts of a changing climate and how to voluntarily report climate-related risks, increasing understanding of climate risks with a range of business sizes and sectors. This work was supported through collaboration with other members from the Climate NI Steering Group (Business in the Community, Marsh and Invest NI), with the guide published on the 'NIBusinessInfo' website²².

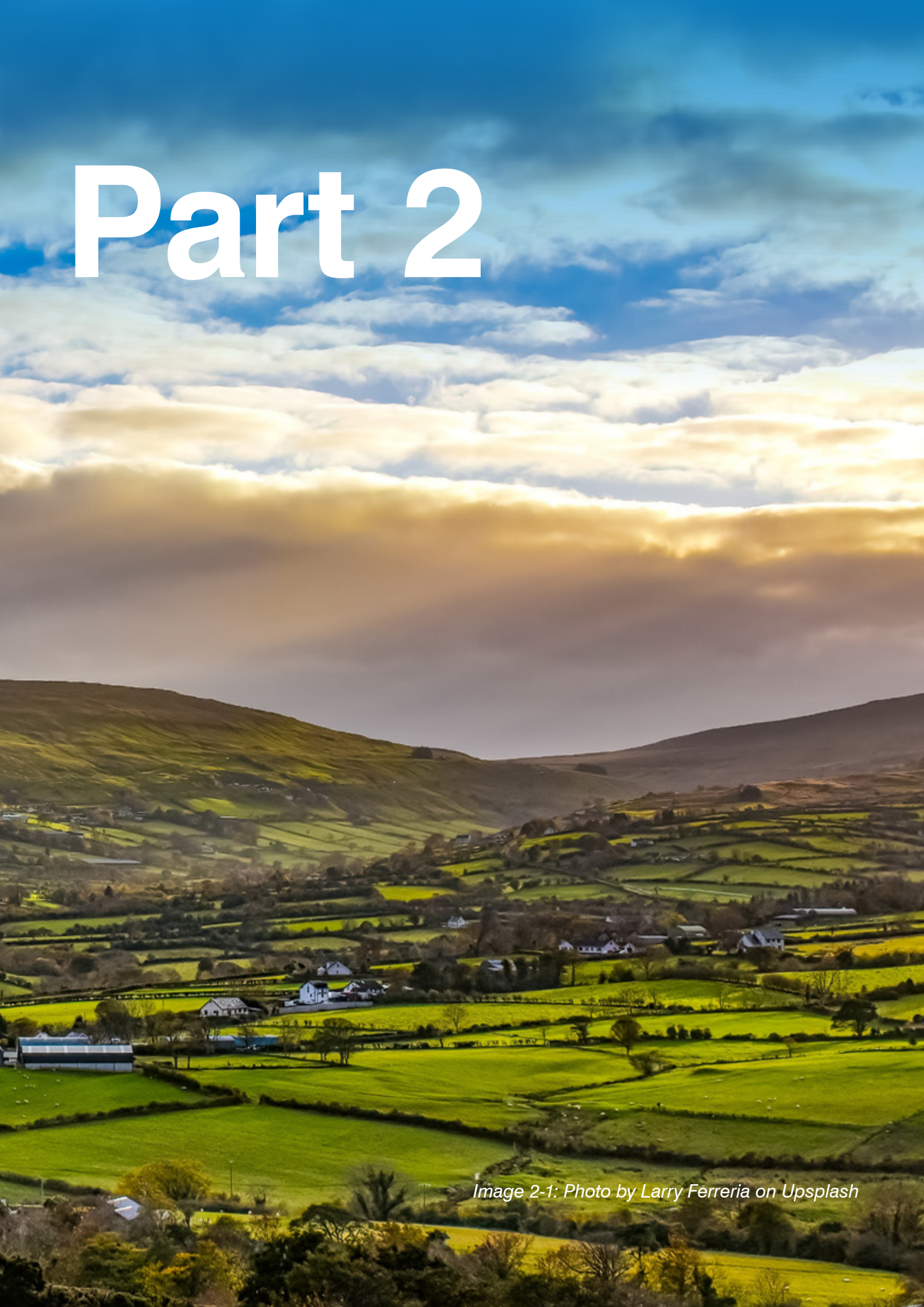
Climate NI utilises a range of media to produce and disseminate climate-related news and information. This includes the creation and circulation of a monthly newsletter, a dedicated website hosting a calendar of local climate events and conferences and climate news stories, in addition to an expanding presence across all major social media platforms.

Climate NI will continue to expand its support to a range of audiences throughout the current work programme. This work includes, providing support to Public Bodies required to report on

²² <https://www.nibusinessinfo.co.uk/content/climate-related-financial-disclosure-reporting-tcfd>

climate adaptation and mitigation through a peer support network; raising awareness of climate change through training; and increasing collaboration between government, practitioners and academia through the Climate NI Policy and Research Panel.

To find out more about Climate NI, see here: climatenorthernireland.org.uk/



Part 2

Image 2-1: Photo by Larry Ferreria on Upsplash

Part 2: Natural Capital

Objective

We will use nature-based solutions where possible and encourage sustainable practices across the land and water use sectors to halt and reverse the degradation of nature caused by human activities and also build and protect ecologically healthy, well-connected habitats which support increased species abundance and diversity, and improved soil and water quality, which in turn create a climate resilient environment, rich in natural capital that provides the ecosystem services that are so important for human wellbeing and sustainable agricultural, forestry, fisheries, and aquaculture sectors which are so important to the Northern Ireland economy.

Northern Ireland is a country rich in natural capital. Through its idyllic coastlines, carbon rich peatlands, forestry, expansive mountain ranges, and tapestry of farmland covering all terrains. Our natural capital provides value and ecosystem services to the lives of everyone who lives, works, or visits here.

Our natural capital plays a critical role in Northern Ireland as it supports our rich diversity of wildlife and provides the ecosystems we rely on for the water we drink, fresh air we breathe, the food we eat, the captivating scenery all around us, and the agricultural industries that help to support our local economy.

Our Adaptation Objective for Natural Capital recognises the vital role that nature can play in creating an environment, society and economy that is resilient to both the current

and projected future impacts of climate change. We understand the role that all the farming sectors have to play in ensuring our natural environment can continue to support the rich diversity of species which underpins the productivity of their sectors. By working with those sectors and supporting them to adapt their methods to ones which place an emphasis on sustainability, we will ensure that the natural capital which brings so many benefits to all of us is protected and enhanced in the face of a changing climate for future generations.

The risks to Natural Capital from climate change have been distilled into two thematic areas, covered in the following chapters:

- Chapter 4 - Nature, and
- Chapter 5 - Working Land and Seas.

Case Study 3: The CANN Project - Saving peatlands and wetlands through the Collaborative Action for the Natura Network (CANN)



Coir Log pools - Lough Atona, Cuilcagh Mountain Park, Co Fermanagh (Photo credit - Simon Gray)

The CANN project was a cross-border environment project which ran from 2017-2022 with an over-arching aim to improve the condition of protected habitats and to support priority species found within Northern Ireland, the Border Region of Ireland and Scotland.

The project which secured over €9.4m of EU Interreg funding consisted of a consortium of 11 partners including researchers, scientists, local authorities, environmental Non-Government Organisations and charities from Ireland, Northern Ireland and Scotland. The consortium was led by Newry, Mourne & Down District Council.

The project took forward action to improve the condition of 25,000 hectares of internationally important wildlife sites across the jurisdictions. Within Northern Ireland the project took forward practical conservation actions to protect and restore blanket and raised bogs such as those at Cuilcagh Mountain in County Fermanagh, Garry Bog in County Antrim, Peatlands Park in County Armagh, and Moneygal in County Tyrone to improve their condition.

Peatlands cover about 18% of Northern Ireland, more than double the area under trees, and store huge amounts of carbon as well as providing clean drinking water sources and storing water to alleviate the potential for flooding.

Actions undertaken on these sites included the removal and control of invasive species such as Rhododendron, enhanced grazing management in upland areas, fencing, drain blocking and wildfire management as well as nest protection for threatened species such as the hen harrier.

Other deliverables of the CANN project included the production of 26 Conservation Action Plans for a range of sites across the jurisdictions which are designated as Special Areas of Conservation (SACs) which accumulatively accounted for over 25,000 hectares of land.

Direct conservation actions identified in these plans were carried out on 3,605 hectares of

these SACs, all with an aim to protect the habitats and species found at these sites towards achieving favourable conservation status to benefit both biodiversity, carbon storage capabilities and resilience to climate change.

The CANN Project was possible through the collaboration of a wide range of stakeholders. Supported by the European Union's INTERREG VA Programme, managed by the Special EU Programmes Body, match funding was provided by the Department of Housing, Local Government and Heritage (DHLGH) in Ireland, by the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland, and by NatureScot in Scotland. The other project partners were Argyll & the Isles Coast & Countryside Trust, Agri-Food and Biosciences Institute (AFBI), Armagh, Banbridge & Craigavon Borough Council, East Border Region, Golden Eagle Trust, the Institute of Technology Sligo, Monaghan County Council, Scottish Natural Heritage, Ulster University and Ulster Wildlife.

For further information on the CANN project and its work please visit

<https://www.newrymournedown.org/the-cann-project>

Chapter 4: Nature

The natural environment is the bedrock for all life in Northern Ireland. It encompasses the terrestrial, freshwater, marine and coastal habitats that provide the living spaces for the rich flora and fauna that do so much for every one of us. Whether it is to ensure we have clean air and water, or to facilitate better connections with the natural world around us through access to the countryside, the importance of ensuring the stability and connectivity of these habitats and the species they support, in the face of our changing climate, cannot be overstated.

Over time wildlife has adapted to its local environmental conditions, and this has created ecosystems that have established themselves in accordance with the stability of their environment. While a degree of tolerance is associated with ecosystems and the species they support, they begin to deteriorate in condition and abundance when put under sustained pressure which pushes the limits of their resilience. Considerable evidence shows that sustained pressure is being applied as we see climatic conditions steadily change in Northern Ireland. We are already experiencing hotter, drier summers where intense wildfires have ravaged large areas of habitat such as in April 2021 when the largest gorse fire Northern Ireland has ever seen damaged approximately 720 acres of habitat in the Mourne.



Image 2-2: Mourne Mountain gorse fire (BBC)

This wildfire also impacted upon and killed large numbers of animals including the common lizard and ground nesting birds,

and left large areas of charred and burnt grassland, heather, and sphagnum mosses uninhabitable.²³

Severe weather events, which are becoming more frequent, are resulting in major flood events and storms. These can have significant impacts on intertidal coastal and riverine habitats as vast quantities of water and wind drive the erosion of river channels and sand dune systems resulting in the redistribution of sediment.

Flooding events can also have negative impacts on water quality as the input of domestic, agricultural and industrial pollution to rivers and lakes can be increased through run off from land as well as the sheer volume of water exceeding the capacity of our wastewater management systems ability to cope during severe weather events.

As increasing global temperatures bring external pressures to ecosystems species respond in a variety of ways. Heat stress forces those which can adapt, to do so by moving into new territories or habitats which in turn increases the pressures they are experiencing due to the changing climate. This has already changed the migration patterns of birds with differences in species composition and numbers being observed in the UK each year.

²³ <https://www.nationaltrust.org.uk/visit/northern-ireland/the-mournes/our-work-to-recover-from-the-fires-in-the-mournes>

The British Trust for Ornithology (BTO) estimates the numbers of wild birds in the British Isles to have fallen by 73 million since 1970 with figures from Defra showing a change in abundance of 130 species to be 86% over the same time period.²⁴ Changes in rainfall equally have critical impacts on our flora and fauna as differences in rainfall at key stages throughout the year result in varying growth of crops and grass for silage as well as flowering rates of wildflowers which our pollinators rely on. The protection and increased resilience of these natural habitats is crucial in supporting our wildlife in adapting to the unavoidable impacts of climate change.



Image 2-3: Garron Plateau peatland bog (DAERA)

It is also important to highlight the important role Nature Based Solutions such as afforestation, blue carbon habitats and peatland restoration can have for both climate mitigation (sequestering carbon) and climate adaptation (resilience). All of these habitat types can both store vast quantities of carbon as well as providing climate adaptation benefits. Afforestation and peatlands through the storage of water can increase rainfall lag time to alleviate flooding. Afforestation can also help to protect our freshwater habitats

through buffer strips along watercourses to trap and prevent sediment from entering them in runoff following heavy rainfall. Blue carbon habitats represent a vital natural tool which plays an important role in the Earth's carbon cycle. They are capable of sequestering carbon at rates up to 4 times that of terrestrial forests²⁵ while also helping to protect coastal habitats and infrastructure from storm events and erosion.



Image 2-4: Blue green algae at Lough Neagh (Google Earth)

Finally, in recent years we have seen the significant impact of blue green algae on a number of our aquatic rivers, lakes and coastal locations, most notably at Lough Neagh. Climate change is resulting in increasing water temperatures which creates both opportunities for new invasive species to arrive and survive here but it also presents an increased risk of the occurrence of blue green algae blooms.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot

²⁴ <https://www.bbc.co.uk/news/science-environment-66858850>

²⁵ <https://www.thebluecarboninitiative.org/about-blue-carbon>

of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

A resilient natural environment is one which is in good ecological health and supportive of a thriving biodiversity, and the Department of Agriculture, Environment and Rural Affairs (DAERA) is the lead department in NI in this area. DAERA is committed to rebuilding and restoring our natural environment, to protect and empower it to stand strong in the face of our changing climate. Actions are being progressed both at land and at sea.

A rolling multi-year Landscape Action Plan (NC4) is being progressed, and targets have been set to complete Conservation Management Plans for all Special Areas of Conservation by 2029 (NC7). Efforts continue to enhance wildlife surveillance (NC5), and the Department is working across borders and boundaries to establish an all-island invasive species management plan (NC6) and share best practice through the UK Programme Board for Non-Native Species (NC14). All of the Department's work depends on sound evidence and key to this in building resilience will be the Nature and Natural Capital Data and Evidence Programme (NC8) and the DAERA and UKRI funded Co-centre for Climate, Biodiversity and Water (NC58).

At sea, actions include implementing the Blue Carbon Action Plan (NC1), which was issued for consultation in 2024, developing

marine invasive species action plans (NC2), and progressing the Northern Ireland Coastal Forum's work with repeated high-resolution coastal surveys (NC3). This will help to identify coastal change and generate an evidence base on which to establish vulnerability assessments for our coastline.

DAERA cannot achieve a resilient environment alone and local councils and eNGOs are engaged in a number of projects such as wildflower meadow creation in Fermanagh and Omagh District Council (NC18), tree and woodland strategies such as in Mid and East Antrim Borough Council area where 160,000 trees will be planted by 2032 (NC19), or the 233,215 trees planted to date as part of the One Million Trees Project in Antrim and Newtownabbey Borough Council (NC20). Restoration of ancient woodlands (NC21), establishment of a NI Species Recovery Partnership (NC22), and acceleration of peatland and blue carbon habitat restoration are also underway through a number of varied projects and initiatives such as through research partners like Queen's University who are assessing pollutants in peatlands, while Ulster Wildlife and others are piloting oyster nurseries and saltmarsh restoration (NC27). These actions are supported by community groups, schools, and cross-border partnerships, ensuring that nature-based solutions are at the heart of climate adaptation.

Case Study 4: Soil Nutrient Health Scheme



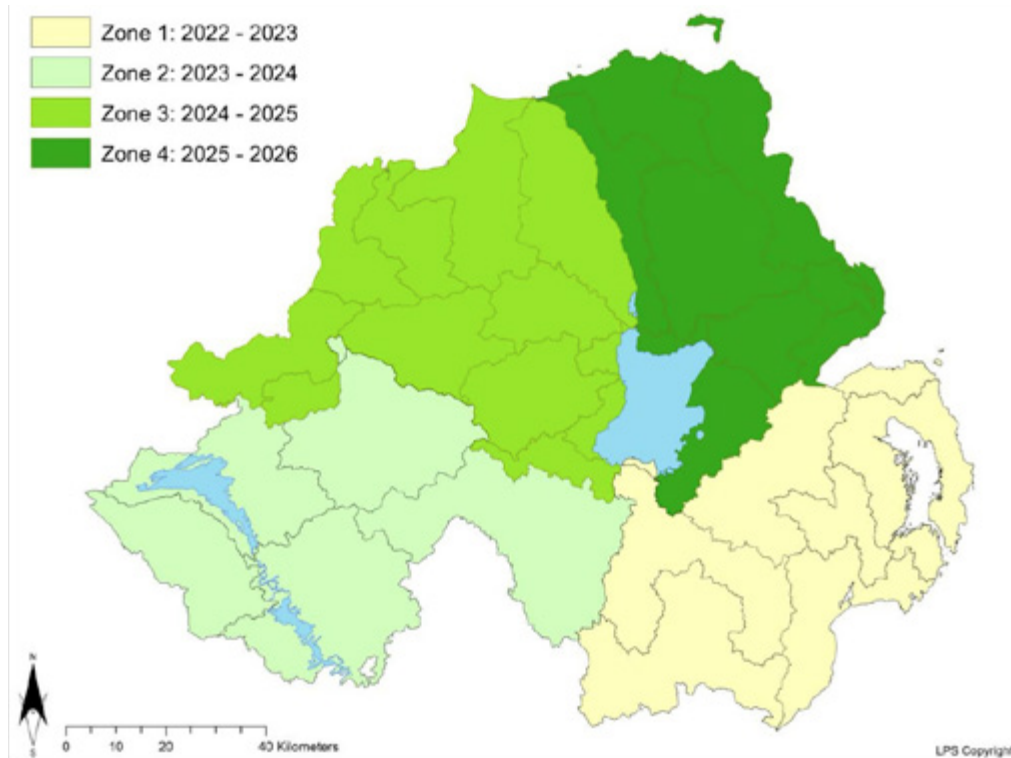
The Soil Nutrient Health Scheme (SNHS) is a comprehensive regional soil sampling and analysis programme that provides Northern Ireland's (NI) farmers with data that can help optimise crop nutrient applications, assess on-farm carbon stocks and build farm resilience. The £37.6m Scheme, which runs from 2022-26, is funded by the Department of Agriculture, Environment and Rural Affairs (DAERA) and managed by the Agri-Food and Biosciences Institute (AFBI)²⁶.

The SNHS is available to every eligible farm business in NI and has the potential to sample approximately 640,000 fields. It provides participating farmers with:

1. Detailed, individualised information on the nutrient status of their soils.
2. LiDAR (Light Detection and Ranging) derived runoff risk maps for nutrient loss to waterbodies for each field sampled.
3. Farm specific estimates of carbon stored in the soil and as above ground biomass.
4. Training (provided by the CAFRE: College of Agriculture Food and Rural Enterprise) on the interpretation of soil nutrient reports, generation of farm nutrient plans and the important role of farm carbon.

The SNHS's scale and complexity necessitates rolling it out over four zones, with the final Zone due to complete in 2026. Maximising participation is key to the Scheme's success, and the response has been very positive with 92.5% of farm businesses joining in each of the three zones opened.

²⁶ <https://www.afbi.gov.uk/articles/soil-nutrient-health-scheme>



*Soil Nutrient Health Scheme Zonal Map (Base map services are provided by
Land and Property Services ©Crown Copyright)*

The involvement of stakeholders from design, through development and finally the roll out of the SNHS is key to its success. Stakeholders include farming, government, environmental, contractors and scientific bodies.

The Scheme is supported by a comprehensive programme of underpinning research led by AFBI and with partners at both Ulster and Leeds Universities. The research is looking in depth at areas including soil phosphorus testing on basaltic soils, understanding relationships between nutrient excess and water quality, soil and above ground biomass carbon stocks and farmer behavioural impacts following receipt of Scheme data.

With CAFRE providing the training associated with the scheme, empowering farmers with individualised SNHS data helps them tailor nutrient application to crop need, improve nutrient use efficiency and reduce the risk of excess loss to waterbodies. This helps increase the return on inputs, builds resilience and improves the environmental sustainability of farm businesses. Survey research carried out by Leeds University during pre-Scheme pilots (2017-2019) evidenced that providing farmers with detailed, individualised soil analysis data led to more informed decision making and positive behavioural change²⁷. This survey work continues in the full SNHS rollout.

When complete, the SNHS will establish independent, verifiable NI datasets of baseline soil nutrients, farm carbon estimates and LiDAR derived runoff risk, and above ground biomass mapping. These baseline datasets will help shape evidence-based policy making and enable change to be assessed as NI agriculture and the wider economy transitions and adapts to a lower carbon future.

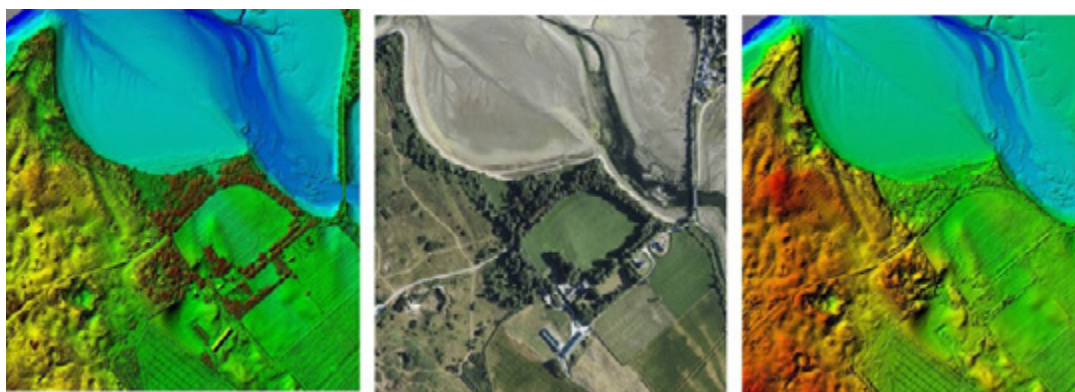
²⁷ The role of experiential learning in the adoption of best land management practices <https://www.sciencedirect.com/science/article/pii/S0264837721001204>

The third Climate Change Risk Assessment climate risks associated with the Nature theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N1. Terrestrial species and habitats	Changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)	RISKS	More action needed
N2. Terrestrial species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N3. Terrestrial species and habitats	New species colonisations	OPPORTUNITIES	Further investigation
N4. Soils	Changing climatic conditions, including seasonal aridity and wetness	RISKS	More action needed
N5. Natural carbon stores, carbon sequestration and GHG emissions	Changing climatic conditions, including temperature change and water scarcity	RISKS & OPPORTUNITIES	More action needed
N8. Forestry	Pests, pathogens and invasive species	RISKS	More action needed
N11. Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	RISKS	More action needed
N12. Freshwater species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N13. Freshwater species and habitats	New species colonisations	OPPORTUNITIES	Sustain current action
N14. Marine species, habitats and fisheries	Changing climatic conditions, including ocean acidification and higher water temperatures	RISKS	More action needed

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N15. Marine species, habitats and fisheries	Changing climatic conditions	OPPORTUNITIES	Further investigation
N16. Marine species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N17. Coastal species and habitats	Coastal flooding, erosion and climate factors	RISKS & OPPORTUNITIES	More action needed
N18. Landscape character	Climate change	RISKS & OPPORTUNITIES	Further investigation
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Case Study 5: Coastal Evidence Gathering in Northern Ireland



Images from the Topographic LiDAR and Orthophotography survey in 2021 (Dundrum Bay)

Northern Ireland's coastline is facing increasing pressure from the impacts of climate change; sea levels are rising, and more frequent and intense storms are impacting the coast. Given the cross-cutting nature of impacts this is creating at the coast, it is important that a collaborative approach is taken to develop solutions for climate resilience. The Northern Ireland Coastal Forum, established in 2015, has enabled collaboration by bringing together Government Departments, Local Authorities and the National Trust, to encourage a more strategic approach to coastal management. Early commitment was made by the Coastal Forum to address the shortfall of scientifically robust data on the Northern Ireland coastline and how it is changing.

As a member of the Coastal Forum, the Department of Agriculture, Environment and Rural Affairs' (DAERA) Marine & Fisheries Division has invested in the region of £2.2m on evidence gathering at the coast since 2021. After significant stakeholder engagement on the evidence requirements, DAERA commissioned projects to be undertaken by private companies, academia and other government departments. The evidence collected so far includes acquisition of high resolution topographic and bathymetric LiDAR (Light Detection and Ranging), orthophotography and satellite-derived bathymetry, as well as historical shoreline analysis from Ordnance Survey maps and aerial photography and coastal geological surveys of both the superficial and bedrock geology.

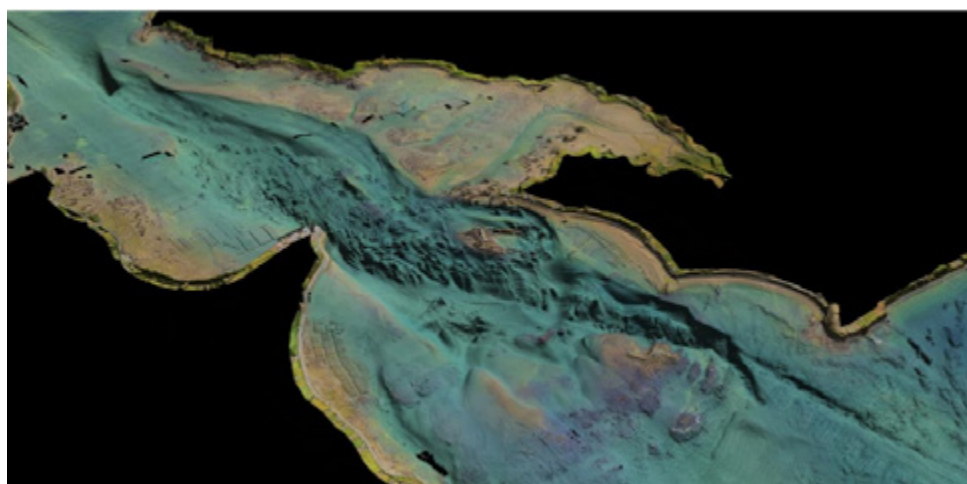


Image from the Bathymetric LiDAR survey in 2023 (Carlingford Lough)

All this evidence gathering has provided scientifically robust data on the coast. The historical data analysis provides a detailed understanding of the coast's position and geometry over annual to decadal time periods, providing a dynamic picture of how the coastline has changed since the start of the early 1800s. Meanwhile, the high-resolution LiDAR and orthophotography provides a detailed baseline of the coast and nearshore environments, that will allow future change to be analysed and quantified from an ongoing programme of repeat surveys.

All data collected is publicly available and free to all for use. To facilitate this, DAERA's Marine & Fisheries Division launched the Northern Ireland Coastal Observatory in October 2023. The Observatory was built using ArcGIS Experience Builder and it is hosted on ArcGIS Online, a platform which enables users to visualise and analyse the coastal datasets and their metadata in 2D and 3D formats on a Map Viewer, as well as via web services. A Coastal Information Tool provides a synopsis of all the evidence collected at 140 points around the coast, outlining how the coast has changed and how it's likely to do so in the future in light of climate change.

The Coastal Observatory provides a platform for stakeholders, accurately detailing how the Northern Ireland coast is changing. It enables a better understanding of the nature and scale of coastal change in Northern Ireland and empowers decision-makers with information that can be used to ensure more sustainable coastal management as we move forward in light of climate change. Work will continue on developing this platform, increasing functionality, expanding datasets and furthering analysis of evidence collected. As more evidence becomes available, Executive Departments and Local Authorities will be better informed to develop policies and plans which will build resilience and inform adaptation to the impacts of climate change on our coastal areas.

Chapter 5: Working Land and Seas



Image 2-5: Co. Antrim (Larry Ferreira, Unsplash)

This thematic area focuses on the importance of our terrestrial, fresh water and marine resources in providing stability to society through the crucial role they provide in the NI economy and also in providing the very food we eat. While the preceding Nature theme was concerned with how our natural capital provides the ecosystems essential to support our local biodiversity, the Working Lands and Seas theme is reflective of how Northern Ireland's natural capital contributes to the human ecosystem all of us rely on.

Whether it be fishing, aquaculture, horticulture, or agriculture, farming on land or at sea is a practice as old as civilization itself. For all this time, the climate has played a fundamental role in the seasonal nature of the sectors with yields and harvests being strengthened or suppressed as a result of fluctuations. Many of us will have heard of the El Niño weather phenomenon: a global climate phenomenon which results from variations in winds and sea surface temperatures over the southern Pacific Ocean.

These events, when they occur, have dramatic consequences on the global climate through their distortion of normal weather patterns and are responsible for far reaching impacts such as bumper anchovy harvests off the Argentine coast and devastating droughts in Australia. Climate projections for Northern Ireland, in the decades ahead, highlight the potential of similarly dramatic impacts both on and off our shores as increased rainfall during winter months, contrasted with hotter drier summers puts further strains on the land and water resources we rely on if we do not take action to reduce our greenhouse emissions and limit global warming.



Image 2-6: Flooded field in Rathfriland (UFU)

We are already seeing wetter winters with increased rainfall and a greater number of wet days overall. The impacts of this are felt across the farming and forestry sectors through impacts on tree growth and stability from waterlogged conditions limiting forestry drainage as well as preventing fields from being ploughed, planted or fertilised by machinery. This has already had significant impacts on yields in the UK affecting both livestock and crops.²⁸



Image 2-7: Example of clinical presentation of bluetongue in sheep (Animal & Plant Health Agency)

Impacts of this increased rainfall, combined with storm events can be felt in the aquaculture sector too as greater runoff into coastal areas may result in higher sediment displacement and loading, causing stress or physical damage to fish and shellfish as well as aquaculture infrastructure. An increased frequency of storm events resulting in flooding could also result in the increased potential for discharge of pollutants which could also impact upon aquaculture health. This would be in addition to what is already

being felt from an increase in sea level, and sea surface temperature, where invasive species are moving into our waters as well as the emergence of new and novel pathogens which may impact on fish stock, health, and viability²⁹.

An example of this in the farming sector is the Bluetongue Virus -BTV-3, which is a viral disease spread by insects and affects all ruminants, mainly sheep and cattle. This virus is spread by certain species of biting midges which have been able to move north from Europe into the UK due to increasing temperatures.

In contrast, to the impacts of wetter winters, our summers are expected to be hotter and drier, bringing with them increased frequencies of extended droughts similar to that seen in the summer of 2022 which coincided with the first issuing of a level 4 heat health alert in the UK since its introduction in 2004³⁰. Prolonged periods of hot, dry weather conditions can have significant impacts on crop growth and in particular grass growth and supply on farms. In the first instance grass is scorched in the fields, removing it as a source of fresh feed for livestock, and also reduces what can be cut and stored for the winter. This can force winter feedstock to be used in the summer as a supplement and as it may not be able to be adequately replaced prior to the winter months it may result in further knock-on impacts to feedstock supply in the winter months.

The CCC in its independent assessment of climate risk to the UK however also recognise that a changing climate may equally bring about opportunities for all sectors of farming

²⁸ <https://www.theguardian.com/environment/2024/apr/10/uk-food-production-down-record-rainfall-farmers>

²⁹ <https://pure.uhi.ac.uk/en/publications/impacts-of-climate-change-on-aquaculture>

³⁰ <https://rmets.onlinelibrary.wiley.com/doi/10.1002/wea.4531>

through the changing conditions allowing for new species of fish, trees or crops which previously would not have been able to survive in our climate to grow and thrive. Early adaptation is essential to both protect against the negative impacts of climate change and to take full advantage of any opportunities which might emerge.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

Working with industry across the farming sectors will be crucial to achieving a resilient Northern Ireland, and the Department of Agriculture, Environment and Rural Affairs (DAERA) is committed to achieving this goal. A key part of this work will be enabled through the new Sustainable Agriculture Programme, which will focus on productivity, environmental sustainability, and resilience (NC34). In addition, the College of Agriculture, Food and Rural Enterprise (CAFRE) leads on investigating and training on innovative solutions to support the sectors in operating in compliance with DAERA's Agricultural Policy and so provide for the improved environmental sustainability of food production in Northern Ireland (NC42).

DAERA's Epizootic Control and Public Health Delivery Division maintains preparedness for animal disease outbreaks (NC35), and

DAERA's Forest Service maintains overarching Emergency Response Plans as well as Specific High Priority Pest Plans (NC41) and ensuring the Plant Health Risk Register is regularly updated (NC37). Disease and pest surveillance is strengthened through contingency planning and annual risk assessments, with DAERA and the Agri-Food and Biosciences Institute (AFBI) leading these efforts (FS3).

Resilience is also being built through work taken forward by non-Government stakeholders, such the Food, Farming and Countryside Commission who use their Growing Innovation Network to share knowledge and inspiration around regenerative agriculture and agroecology (NC49), while woodland expansion and ancient woodland restoration are supported by the Woodland Trust (NC45) and some local councils (NC19, NC93).

Research is key to improving farming strategies and in addition to the work of AFBI, projects like AgriSearch's GrassCheck program, which monitors grass growth and climate impacts (NC51), and the ZeroNsile project which explores silage production without manufactured nitrogen fertilizer (NC52) are two examples of innovations driving solutions to support a resilient sector. Providing additional support to farmers is the Environmental Farming Scheme Group Project, led by Ulster Wildlife (NC47). This Project supports over 500 farmers in delivering nature conservation at scale and directly supports their achievement of Environmental Farming Schemes.

Case Study 6: Ballinderry Rivers Trust - Sustainable Drainage on Farms

Managing farmyard dirty water run-off is a significant environmental challenge that, if handled improperly, has detrimental effects on freshwater ecosystems, and in turn animal and human health. Extreme weather events like heavy rainfall and flooding (2023 being Northern Ireland's third wettest year on record), heightens the risk of slurry overflow, threatening food security as farmers become unable to maintain production while avoiding ecological harm and damages to their own operations. To address these concerns, the Ballinderry Rivers Trust, supported by the Department of Agriculture, Environment and Rural Affairs and the Water Innovation Network, implemented five test sites in the Lough Neagh catchment area between 2020-2022. These trials combined innovative trench drainage systems with nature-based solutions, including Russian comfrey and willow plants, to manage dirty water runoff by slowing, redirecting, and absorbing it before it reached local rivers.



Dam trench system visual inspection by Alan Keys from the Ballinderry Rivers Trust (Climate NI)

The drainage systems piloted have two key components. First, a diversionary structure, comprised of swales (open or pebbled trenches), is installed along field boundaries to slow and control water flow. The main open trenches are designed with “check dams” to prevent overflow in rainy seasons, and act as reservoirs during drier periods, while stoned swales and perforated pipes are added to further redirect and drain excess water when it reaches a certain level in the main swale. Sluice gates and slurry traps are included to further control overflow risks, ensuring that slurry remains contained even during extreme rainfalls.

Second, the system incorporates a planting scheme using Russian comfrey (*Symphytum x uplandicum*), a perennial plant with deep taproots that absorb and lock in nutrients, including carbon, that would otherwise be washed away in groundwater. The comfrey is planted alongside the swales and acts as a “mineral dam,” preventing harmful nutrients from reaching watercourses. The variety used, Bocking 14, does not spread via seed, making it a non-invasive choice for this system. Willow strips are added as an extra safeguard to absorb any residual

runoff. The comfrey also provides additional benefits, producing highly nutritious biomass for livestock feed and fertiliser.

The trials have shown encouraging results. In all but one location, where soil conditions were unsuitable, the systems effectively managed dirty water runoff. Water quality assessments in downstream areas confirmed substantial improvements. The combination of low-tech and nature-based solutions enables farmers to maintain food production without causing environmental harm. Furthermore, the Russian comfrey contributes to a more circular farming system by producing biomass that can be turned into liquid fertiliser or used as protein-rich silage, reducing reliance on ryegrass monocultures and imported feedstocks.

These drainage systems also benefit local biodiversity. The swales create small wetland habitats that function similarly to hedgerows, encouraging wildlife. Additionally, comfrey plants, being pollinator-friendly, support arable production. Despite the benefits, the systems are not universally applicable, as success depends on soil type and careful design to achieve appropriate gradients. Costs are also relatively low, with a recent system implementation priced around £7,000.



Freshwater biotic surveying (Climate NI)

Further evaluation is necessary to assess long-term performance, particularly in less favourable terrains. However, the trials have demonstrated that integrating trench drainage with nature-based solutions holds promise for making Northern Ireland's farms more resilient to extreme weather events and slurry overflows. With continued refinement and broader adoption, this approach could offer a sustainable, scalable solution to the challenge of nutrient and water management in agriculture.

The third Climate Change Risk Assessment climate risks associated with the Working Land & Seas theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N4. Soils	Changing climatic conditions, including seasonal aridity and wetness	RISKS	More action needed
N5. Natural carbon stores, carbon sequestration and GHG emissions	Changing climatic conditions, including temperature change and water scarcity	RISKS & OPPORTUNITIES	More action needed
N6. Agricultural and forestry productivity	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion).	RISKS & OPPORTUNITIES	More action needed
N7. Agriculture	Pests, pathogens and invasive species	RISKS	More action needed
N8. Forestry	Pests, pathogens and invasive species	RISKS	More action needed
N9. Agricultural and forestry productivity	New/alternative species becoming suitable	OPPORTUNITIES	Further investigation
N10. Aquifers and agricultural land	Sea level rise, saltwater intrusion	RISKS	Watching Brief
N11. Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	RISKS	More action needed
N12. Freshwater species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N13. Freshwater species and habitats	New species colonisations	OPPORTUNITIES	Sustain current action
N14. Marine species, habitats and fisheries	Changing climatic conditions, including ocean acidification and higher water temperatures	RISKS	More action needed

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N15. Marine species, habitats and fisheries	Changing climatic conditions	OPPORTUNITIES	Further investigation
N16. Marine species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Part 3



Image 3-1: Food supply (DAERA)

Part 3: Food Security

Objective

We will work with local industry stakeholders, producers and consumers to strengthen the resilience, sustainability and prosperity of our local agri-food and fisheries sectors in the creation of a sustainable and self-sufficient local food system that protects and enhances our natural environment, as well as supporting the sectors to invest in systems to assess climate risks and vulnerabilities and plan adaptation throughout their supply chains to ensure we continue to supply safe and sustainable food both at home and abroad.

While agriculture accounts for 75% of our land use in Northern Ireland³¹, our relationship with the foods we eat is complex. As well as producing food for Northern Ireland, our agrifood and seafood sectors also contribute towards overall UK food production, as well as exporting food and produce to further afield such as to Europe. We however also rely on imported foods, produce and ingredients from other countries.

A variety of stakeholders work closely to ensure the smooth operation of this complex system, ranging from individual farmers, fishers, and traders to distribution network operators, to multinational supermarkets. Food security in Northern Ireland is dependent on the production of high-quality food by our primary producers and the smooth operation of the supply lines that ensure that both locally produced food, and that brought in from Great Britain, or further afield, can reach our shelves in the best, freshest condition with the minimum of waste.

Recent events have seen the UK's food security landscape change significantly, with pressures applied which have stretched and tested its resilience. The UK's departure from the EU, the war in Ukraine and the COVID-19 pandemic have brought aspects of our supply lines and food security areas into the forefront of our thoughts, highlighting both vulnerabilities in the multi-facet system as well as its resilience and flexibility.

While the impact of climate change on local food production and the food supply chain becomes better understood, it is clear there is more work to be done in preparing for the challenges ahead. Industry players must work together to diversify and strengthen local production and supply if we are to make the most of climate opportunities and mitigate the impacts of our changing climate.

³¹ Statistical Review of Northern Ireland Agriculture 2013 <https://library2.nics.gov.uk/pdf/dard/2014/EEUT.pdf>

Chapter 6: Food Security



Image 3-2: Vegetable selection (Hanna Long, Unsplash)

The supply of varied, high-quality, fresh food is something we have grown to expect as a constant in our lives. So much so, that for much of our time we do not have to think about how our food comes to us or whether we will be able to choose from the rich selection of products we are accustomed to when we do our shopping. However, the systems and supply chains which provide this service are highly complex and multifaceted, dependent on a mix of local production and supply chains of varying length and complexity. Food Security is concerned with the protection of these systems and supply chains, and it is true that chains are only as strong as their weakest link. It has become clear from recent events that more work needs to be done to improve the resilience of these supply chains and so strengthen our food security.

Our domestic production and productivity play an important role in Northern Ireland's

food security and in the UK as a whole.

Currently, the UK has a productive agricultural sector and agri-food industry that sees about 54% of the actual food on plates produced in the UK, this includes the majority of grains, meat, dairy and eggs³². The biggest medium to long term risk to this domestic production is from climate change with key impacts on soil degradation, drought, flooding and disease, with long term impacts from climate change likely to have negative consequences for the proportion of high-grade arable farmland available in the UK. We've already seen the impacts of some of these effects such as heavy rainfall and drought in the 2020 growing season which brought on a reduction of 40% of the wheat yield for that year³³. With weather events like these predicted to increase in frequency and severity we can expect similar impacts to our domestic production in the years ahead. Increasing sea temperatures will also have consequences for fish stocks.

³² [United Kingdom Food Security Report 2021: Theme 2: UK Food Supply Sources](#)

³³ <https://assets.publishing.service.gov.uk/media/5fdcc2fad3bf7f3a30ec487f/structure-jun2020final-uk-22dec20.pdf>

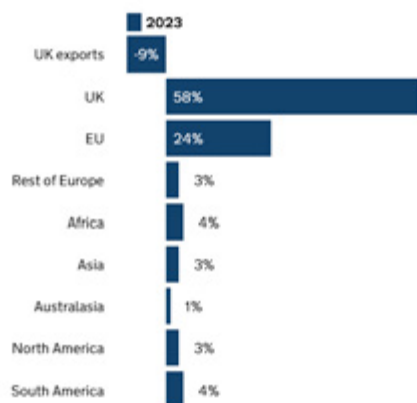


Figure 3-1: Origins of food consumed in UK, 2023 (Defra)

Food imports and exports play a significant role in our food supply. In 2023, 42% of the food on our plates in the UK was imported. Our producers also make use of export supply chains to ensure we can buy products we want while others are exported overseas for profit. Climate change is already impacting on the import and export of foods. Spain, a top producer of fruit and vegetables in the European Union has seen droughts of increasing severity, exacerbated by excessive heat with dramatic impact on its agricultural production. Tomatoes in particular are vulnerable to drought, and in 2023 drought across Spain and Italy helped push the average tomato price up to a 50-year high³⁴.

In October 2024, areas of Spain suffered from severe flooding which was reported as damaging extensive areas of greenhouses, which are used for growing fruit and vegetables, in the Almeria area which threatens food supply across both Spain and throughout wider Europe.



Figure 3-2: Standardised Precipitation Evaporation Index, April 2023 (AEMET)

As well as the vulnerabilities of agricultural production, the supply lines that provide for this international exchange of products are also impacted by climate change. They are dependent on the stability of the environments they move through and increased rainfall, sea levels, temperatures and storm activity can all disrupt this stability and prevent the transport of food into or out of the country. In November 2023, Storm Debi wreaked havoc on Northern Ireland as it brought major disruption from landslides, fallen trees and flooding which led to power cuts, road closures and disruption to transport and distribution routes. Major weather events like this are set to increase in frequency and severity with impacts felt at all stages in a supply chain. All of these impacts to production and supply can have knock on impacts for public health as the disruptions can cause fluctuations in the price point of goods, stretching their affordability as demand outstrips supply.

Locally the changes to the climate could have similar impacts to our ability to farm and produce food in the ways that we have done for generations, with the potential to impact on domestic production in the years ahead.

³⁴ <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/cznj/mm23>

However, a key part of ensuring a resilient level of food security is looking for and seizing opportunities that the changing climate might bring. As conditions change and become less favourable to traditional crops for UK agriculture, they might also allow crops to thrive that have never been grown here before. Likewise, warming seas may provide opportunities for new fisheries associated with warm water stocks. Changes to the natural environment and climate conditions overseas might also bring about new opportunities for trade through other countries growing new crops, or new trade routes opening up. Continued research and investigation are required on these issues if we are to make the most of our adaptation to climate change and maintain the level of food security, we have become accustomed to.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

The Department of Agriculture, Environment and Rural Affairs (DAERA), in partnership with other departments and stakeholders, is strengthening Northern Ireland's food security through a wide range of actions. Led by DAERA, the Northern Ireland Food Strategy Framework (FS2) is a cross Departmental framework which was agreed by the NI Executive in November 2024 and seeks to build a resilient, sustainable food system,

recognising the complexities a global food supply system represents.

To set out the shared long-term direction of travel for food policy in Northern Ireland, in May 2025 the NI Food Strategy Framework Action Plan 2025-2027 was published which complements the Framework and supports its delivery throughout the remainder of the current mandate. This plan sets out details of 39 specific actions structured around three core missions to transform Northern Ireland's food system to be healthier, more sustainable, and economically robust, with a strong focus on reducing inequalities and building a positive food culture for future generations.

DAERA's surveillance of farm animal disease contributes to the evidence base used to protect farms from invasive species (FS3), and the safety of the food produced is enhanced through the mandatory EU surveillance and reporting of antimicrobial resistance by the Food Standards Agency (FS1), while the College of Agriculture, Food and Rural Enterprise delivers the education, training and knowledge transfer programmes to support businesses throughout the food system (FS5), be it on issues around shelf life or the trialling of new crop varieties for our changing climate, and so enable the agri-food industry to stand resilient to the impacts of climate change.

Outside government, community organizations are taking forward actions to strengthen local food production and supply, for example through the Social Farms & Gardens' expansion of their Growing Resilience program (FS7) which supports 96 community gardens to share climate adaptation, food growing and community development skills, all contributing to community resilience and food security.

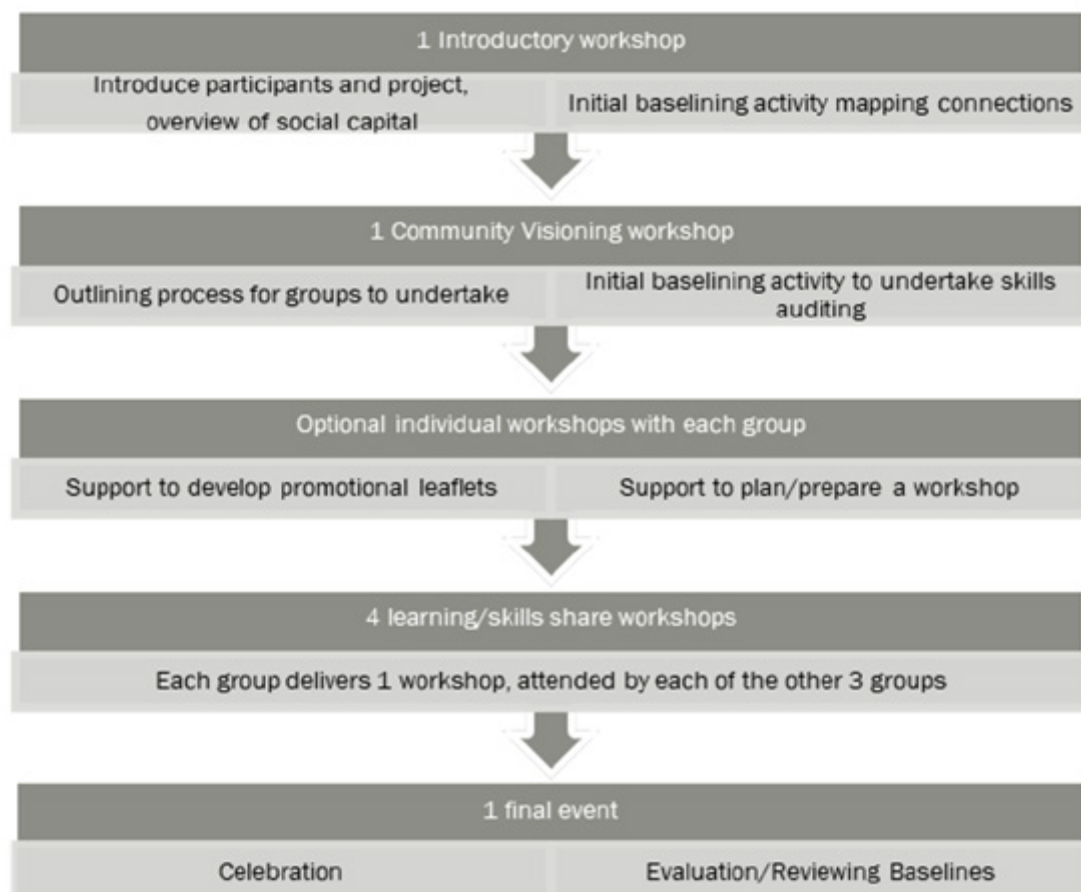
The Belfast Sustainable Food Partnership is developing a Sustainable Food Strategy for the city to be adopted in 2026 (FS20), and projects like Source Grow (FS18) and the Acorn Farm urban food hub (FS27) are promoting local food production and reducing food miles.

Research is crucial to securing a resilient food system and DAERA is engaged both with international markets through the market intelligence provided by the Agriculture and

Horticulture Development Board (FS6), as well as on research through the DAERA and UKRI funded SUREFOOD Co-centre (FS10). This Co-centre leads on research into a wide variety of food security issues including resilient cropping systems (FS11), circular livestock production (FS12), and food systems modelling (FS17), all of which will ensure the evidence and knowledge is in place to secure Northern Ireland's food security against climate impacts.

Case Study 7: Social Farms and Gardens - Growing Resilience: Digging Deeper

The Growing Resilience project, launched in 2015, aims to enhance food security and community preparedness in Northern Ireland by connecting community growing groups. This initiative fosters collaboration, sharing of agricultural skills, and builds social capital to help communities prepare for food systems shocks that are expected to increase due to climate change. According to the UN Food and Agricultural Organisation, these shocks will likely worsen by 2050 due to increasingly extreme weather events, heat, and consequent crop failures³⁵. Led by Social Farms and Gardens NI, a charity that promotes community farming and growing across the UK, the project has received funding from the Big Lottery Fund, with the last phase running from July 2019 - July 2024.



Project Structure (Social Farms and Gardens)

The project focuses on strengthening community growing groups, which often face challenges such as disconnection, underfunding and a lack of representation in broader agricultural discussions. By creating a network of clusters across Northern Ireland, Growing Resilience aims to connect these groups with local councils, environmental Non-Government Organisations and decision-makers. These groups are not just beneficiaries but key partners

³⁵ <https://www.bbc.co.uk/news/science-environment-33910552>

in the project's success. A central aspect of the initiative is hospitality and food-sharing, which helps establish the strong bonds needed for effective collaboration. Participants are treated as whole individuals, with respect for more than just their contributions to the project.

While Social Farms and Gardens cannot fully sustain all the cluster networks alone due to limited resources, the project is structured so that these groups can eventually function independently. Several groups have successfully engaged with local councils and influenced policy. For example, the Belfast-based group "Reclaim the Commons" has released a manifesto, "9ft in Common," and influenced Belfast City Council policy through their recommendations, some of which were adopted.



Social Capital and Resilience Model (Social Farms and Gardens)

The project's key benefit lies in developing social capital within community growing groups, enabling them to share crucial skills and knowledge about local food production. This is particularly important in Northern Ireland, where many people lack the ability to grow food for themselves or their families. The global food system's reliance on complex supply chains, as seen during crises like COVID-19 and the Ukraine War, makes it more vulnerable to disruptions. Climate change further threatens food systems through shifting weather patterns and more frequent extreme events. Growing Resilience addresses these challenges by promoting adaptive methods such as permaculture, regenerative farming, and no-dig farming, while also fostering mutual aid networks that can be mobilised during emergencies.

The project's success is measured largely through qualitative indicators, with evaluations reporting



Food and Hospitality Provided at Workshop (Social Farms & Gardens)

positive outcomes in terms of skill development, connection, and the fostering of “warm” social capital. Participants not only gain practical skills but also form supportive networks that can be crucial in times of crisis.

In conclusion, Growing Resilience empowers individuals with the skills needed to grow their own food and the social capital to mobilize collective resources and influence local governance. By building stronger, more connected communities, the project strengthens long-term food security and enhances resilience against future shocks from climate change.

Find out more here: <https://www.farmgarden.org.uk/projects/growing-resilience-digging-deeper>

The third Climate Change Risk Assessment climate risks associated with the Food Security theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N4. Soils	Changing climatic conditions, including seasonal aridity and wetness	RISKS	More action needed
N6. Agricultural and forestry productivity	Extreme events and changing climatic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion).	RISKS & OPPORTUNITIES	More action needed
N7. Agriculture	Pests, pathogens and invasive species	RISKS	More action needed
N9. Agricultural and forestry productivity	New/alternative species becoming suitable	OPPORTUNITIES	Further investigation
N10. Aquifers and agricultural land	Sea level rise, saltwater intrusion	RISKS	Watching Brief
N11. Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	RISKS	More action needed
N12. Freshwater species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N13. Freshwater species and habitats	New species colonisations	OPPORTUNITIES	Sustain current action
N14. Marine species, habitats and fisheries	Changing climatic conditions, including ocean acidification and higher water temperatures	RISKS	More action needed
N15. Marine species, habitats and fisheries	Changing climatic conditions	OPPORTUNITIES	Further investigation
N16. Marine species and habitats	Pests, pathogens and invasive species	RISKS	More action needed

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
B6. Disruption to business supply chains and distribution networks	Extreme weather	RISKS	More action needed
H9. Food safety and food security	Higher temperatures (food safety) and extreme weather (food security)	RISKS	Further investigation
ID1. Food availability, safety, and quality	Decreasing yields from rising temperatures, water scarcity and ocean changes globally	RISKS	More action needed
ID2. UK food availability and exports	Increases in productivity and areas suitable for agriculture overseas	OPPORTUNITIES	Watching brief
ID6. Increased trade for the UK	Arctic ice melt opening up new trading routes	OPPORTUNITIES	Watching brief
ID7. International trade routes	Climate hazards affecting supply chains	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Part 4



Image Belfast City - Adobe Stock

Part 4: Infrastructure Services



Figure 4 1: NI regional strategic transport infrastructure network (Department for Infrastructure)

Objective

Recognising the degree which infrastructure services rely upon each other to function effectively, we will collaborate across public and private sector organisations to identify vulnerabilities, manage these interdependencies and support the integration of climate adaptation into business planning and operating models to ensure adaptation is delivered effectively and efficiently to ensure system level reliability, security and resilience across our infrastructure services and networks.

Our Infrastructure Services play a critical role in Northern Ireland as they are a key enabler of the economy and underpin key activities in day-to-day life. Infrastructure Services, such as transport, water and energy are very much interconnected and therefore any risk in one area of this theme can then have a knock-on impact on others.

Infrastructure Services will also have a major impact on Northern Ireland meeting Net Zero emissions targets. For example, encouraging

green investment in infrastructure that will increase sustainability can be key to an effective green transition by delivering long term economic, social and environmental benefits and a reduction in carbon. The Energy and Transport sectors play a major role in contributing towards the achievement of net zero and therefore it is critical that these sectors are resilient to the current and future impacts of climate change.

Our Adaptation Objective for Infrastructure Services recognises the vital role that infrastructure services contribute to ensuring an environment that is resilient to both current and future climate changes. We understand the multidimensional aspects to infrastructure services and the many contributors to this theme. We aim to work with stakeholders within this sector to deliver and encourage adaptation measures that will deliver reliable and resilient infrastructure services and take advantage of the economic benefits adaptation to climate change can offer.

Within this Adaptation Program, the risks associated with infrastructure services from climate change have been distilled into the 4 thematic areas detailed in the following chapters:

- Chapter 7 - Water Supply,
- Chapter 8 - Energy,
- Chapter 9 - Telecommunications & ICT, and
- Chapter 10 - Transport.

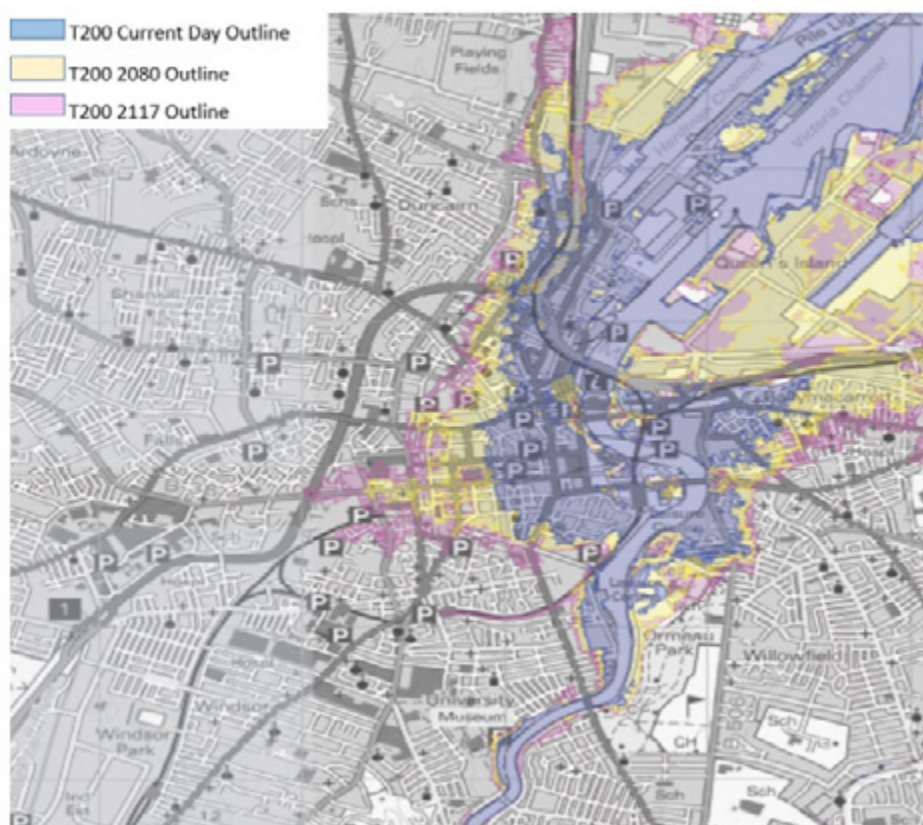
Case Study 8: Belfast Tidal Flood Alleviation Scheme (BTFAS)

The Department for Infrastructure's (DfI's) Belfast Tidal Flood Alleviation Scheme aims to provide a long-term approach to tidal flood risk management for Belfast.

This £33 million scheme comprises flood defences through five flood cells along the tidal reach of the River Lagan, including Lockview/Stranmillis, Ormeau, Ravenhill, Sydenham/East Belfast and Belfast Harbour/City Centre. Construction of the scheme commenced in July 2022 and was completed in December 2024.

It is estimated that there are currently over 1,500 properties within Belfast at risk of tidal flooding. With the impact of climate change causing sea level rise, this risk is predicted to increase to over 3,900 properties by 2080 (3023 residential and 902 commercial) and to over 7,300 properties by 2117 (5,865 residential and 1,466 commercial). The scheme is designed to the projected 2080 tidal flood level but includes future adaptability within the permanent concrete floodwalls to allow for any changes in projections.

As much of Belfast City Centre is between 1m to 2m below extreme tide levels, an extreme event would cause serious disruption to commercial premises, transportation networks, residential properties and the social fabric of the city. Additionally, any significant depth of tidal flooding within the city centre would be likely to drain away slowly as the capacity of the drainage network is exceeded which would also increase the risk of contamination of flood waters with foul sewage with increased clean-up and recovery consequences.



Map showing outline of T200 flood events and their extent (DfI).

The design of the project considered the UK Climate Projections 2018³⁶ (UKCP 18) the DfI “Technical Flood Risk Guidance in Relation to Allowances for Climate Change in Northern Ireland³⁷” in consideration of projected sea level rise and defining design flood levels.



DfI Technical Flood Risk Guidance in relation to Allowances for Climate Change in Northern Ireland.



Glass Flood Wall installation at Donegall Quay May 2024 (DfI).

The scheme involved the design and construction of approximately 7.9km of defences including permanent reinforced concrete flood walls, an earthen embankment, glass flood defences, flood gates, demountable post and plank barriers, stoplogs and temporary K frame defences.

The scheme adopted an integrated approach, including:

- Reducing tidal flood risk to Belfast City Centre and parts of South and East Belfast.
- Alleviating risk of serious disruption to commerce and the transportation network due to tidal flooding.
- Reducing likelihood of contamination as tidal flooding overwhelms and mixes with existing drainage / foul sewerage system.
- Avoiding major disruption due to increased clean-up and recovery.
- Maintaining riverside amenity by the positioning and type of flood defense structure.
- Tree replanting programme and stone-cladding floodwalls to blend in with existing surroundings.
- Scheme designed to minimise in-river working to mitigate potential environmental impacts.
- The scheme is designed with future adaptability within the permanent concrete floodwalls to allow for any increase in changes in climate change projections.

³⁶ <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index>

³⁷ <https://www.infrastructure-ni.gov.uk/publications/technical-flood-risk-guidance-relation-allowances-climate-change-northern-ireland>



Stoplogs being deployed at Clarendon Dock August 2024 (DfI).

The properties identified at risk include both commercial and residential at different locations along the River Lagan including vulnerable groups.

The scheme ultimately delivers enhanced protection for over 3000 homes and businesses from tidal flooding and maintained a healthy cost to benefit ratio.

Using standard flood damage analysis, over the 100-year life of the scheme the level of flood risk was estimated to cause damages valued today in excess of £168 million. This value excludes the additional impacts as a consequence of long duration flooding and surcharge of the foul sewer system in the commercial centre of Belfast. It also excludes the impact on the local economy as a result of unproductive employment and loss of access which is estimated at an additional £87 million (in accordance with current economic national appraisal guidance).

DfI Rivers - Flood Alleviation Schemes

DfI Rivers each year takes forward capital works, including flood alleviation schemes with an approximate annual investment of over £20m.

Photo: Glenbrook Flood Alleviation Scheme (Completed)



Further information on the scheme is available at the following links:

<https://www.infrastructure-ni.gov.uk/articles/belfast-tidal-fas>

<https://storymaps.arcgis.com/stories/13d6d528e0a14dd993bdf9d837c09ea3>

Information on other flood alleviation schemes is available at:

<https://storymaps.arcgis.com/stories/32cb28e2dc744243bd2d2c48e7245008>

Chapter 7: Water Supply



Image 4-1: Spelga Dam, June 2020 -3.3m below top water level (BBC)

Sufficient water supply is essential for many aspects of life in Northern Ireland including energy, industry, agriculture, natural environment and public use. Because of this wide dependency, climate change could have significant impacts if there is not the necessary investment in adaptation action centred on this vital service.

While Northern Ireland is not expected to face water supply shortages, as severe as in other parts of the UK, it is still important to include consideration of climate risks in water supply plans³⁸ as highlighted in the Climate Change Committee's (CCC) review of the second Northern Ireland Climate Change Adaptation Programme (NICCAP2).

We have already seen the impact of climate change through increased frequency of flooding, storm events, prolonged periods with no rainfall, as well as more frequent periods of intense rainfall. All of these factors put pressure on, and so create challenges to, our

water supply. These challenges were acutely felt during May 2020, when NI experienced a heat wave which saw an increased demand for water of 120 million litres. While supply had seen a reduction from 677 million litres per day in 2012³⁹ to 570 million litres per day during this period, this increase caused the reserves in impounding reservoirs to drop to levels which hadn't been seen since 1995. July 2021 saw a similar stress applied to our water supply when the average water usage went from 570 million litres per day to 750 million litres due to Northern Ireland experiencing its highest ever temperature.⁴⁰

Unlike other parts of the UK, private households in Northern Ireland do not pay separate water charges. As usage is not metered there are no metrics for per capita consumption, individual household usage, or real-time demands on water supply. Therefore, this creates a data and monitoring issue as current indicators only target overall demand of both domestic and non-domestic usage.

³⁸ [Adapting to climate change - Progress in Northern Ireland](#)

³⁹ [niwater.com/sitefiles/resources/pdf/2020/wrm/waterresourcesupplyresilienceplan-mainreport.pdf](https://www.niwater.com/sitefiles/resources/pdf/2020/wrm/waterresourcesupplyresilienceplan-mainreport.pdf)

⁴⁰ [NI Water \(2022\) Annual Integrated Report & Accounts 2021/22, NIWAnnualReportweb.pdf \(niwater.com\)](#)

The impacts of flooding on water supply must also be considered. Surface water flooding (flooding directly from a rainfall event prior to the generated run-off reaching an established river or drainage channel) is a much higher risk than fluvial (where a river bursts its banks), or coastal flooding with 694 sites at some level of risk, particularly those with conventional piped sewer systems in dense urban areas. This is compared to 207 sites at risk from fluvial flooding and 26 at risk from coastal flooding. There is also evidence which suggests that this risk will increase due to climate change.⁴¹



Figure 4 2: NI Water Climate Change Strategy Infographic (NI Water)

NI Water is a government owned company that provides water and sewerage services in Northern Ireland. They have various plans and policies in place with regards to meeting water demand. Northern Ireland Water's 25 year 'Our Strategy 2021-2046' has an aim to improve the resilience of the infrastructure of the public water supply.⁴² They also published

their Water Resource and Supply Resilience Plan⁴³ on 8th April 2025 to ensure there is sufficient water to meet future demand.

The thematic area of 'Water Supply' is crosscutting in nature and climate risks and their impacts in this area will also impact on other themes such as nature, health and business. Therefore, when producing adaptation measures in this thematic area we must also consider any knock-on effects to these cross-cutting areas to ensure they are not negatively impacted.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

Northern Ireland Water (NI Water), the Department for Infrastructure (DfI), and the Department of Agriculture, Environment and Rural Affairs (DAERA) are securing our water supply through a range of actions including infrastructure investment (IS1), efficiency programs (IS2), and nature-based solutions (IS9, IS39). DfI and NI Water are implementing projects within the Living With Water in Belfast Plan (IS1) as normal business at a scale and pace achievable within available budgets rather than through a structured programme. The Plan focuses

41 Sayers, PB., Horritt, M, Carr, S, Kay, A, Mauz, J., Lamb R, and Penning-Rowsell E (2020) Third UK Climate Change Risk Assessment (CCRA3): Future flood risk. Research undertaken by Sayers and Partners for the Committee on Climate Change. Published by Committee on Climate Change, London.

42 [Our Strategy - Northern Ireland Water \(niwater.com\)](https://www.niwater.com/our-strategy)

43 <https://www.niwater.com/about-your-water/managing-northern-irelands-water-resources>

on integrated, catchment-based solutions to inform significant investment in wastewater and drainage networks across the city, this work will initially be in Belfast, but the principles within it will be used to inform future drainage investment across Northern Ireland, with a plan also developed for Derry City (IS37).

As Northern Ireland's sole water and sewage provider, NI Water has a critical role to play in building resilience in this sector. In April 2025, it published its Resource and Supply Resilience Plan (IS3) and is using this as a strategic framework for water supply over the next 50 years. Along with this, NI Water is developing proposals for water and wastewater investment needs as part of the preparation for the Utility Regulator's Price Control determination in 2028 (IS2), as well as developing models for sewer risk and capacity mapping (IS46).

As water is a natural resource, DAERA also has a role to play in securing its resilience and the Land and Groundwater Team routinely

sample and test groundwater (IS7), while its Water Management Unit have been working to develop a River Basin Management Plan (IS8) and carry out reviews of extraction licences to ensure they take account of potential seasonal or climate vulnerabilities (IS10).

Nature based solutions play an important role in this sector and DfI is progressing a Transformation Proof of Concept Pilot for nature-based drainage and flood management solutions (SuDS & NFM) (IS39) as well as bringing forward regulations for Sustainable Drainage Systems (SuDS) for new housing developments (IS38). Outside of government, the National Trust is working with partners to improve water catchment resilience at Divis and the Black Mountain, through peatland rewetting and tree planting (IS9). These actions will provide valuable steps to ensure reliable, clean water for all in Northern Ireland.

The third Climate Change Risk Assessment climate risks associated with the Water Supply theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
N10. Aquifers and agricultural land	Sea level rise, saltwater intrusion	RISKS	Watching Brief
N11. Freshwater species and habitats	Changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts	RISKS	More action needed
N12. Freshwater species and habitats	Pests, pathogens and invasive species	RISKS	More action needed
N13. Freshwater species and habitats	New species colonisations	OPPORTUNITIES	Sustain current action
I1. Infrastructure networks (water, energy, transport, ICT)	Cascading failures	RISKS	More action needed
I2. Infrastructure services	River, surface water and groundwater flooding	RISKS	More action needed
I3. Infrastructure services	Coastal flooding and erosion	RISKS	Further Investigation
I4. Bridges and pipelines	Flooding and erosion	RISKS	Further investigation
I7. Subterranean and surface infrastructure	Subsidence	RISKS	Further Investigation
I8. Public water supplies	Reduced water availability	RISKS	Sustain current action
H10. Health	Water quality and household water supply	RISKS	Further Investigation
B3. Business production processes	Water scarcity	RISKS	Further investigation
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

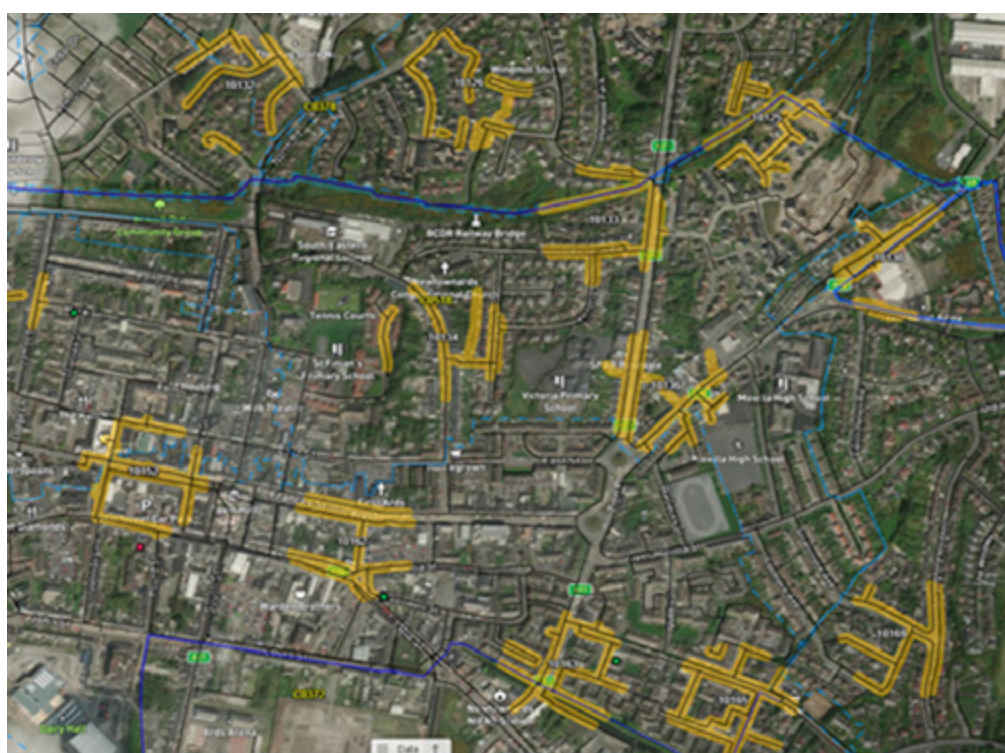
Case Study 9: NI Water - Satellite Leak Detection Technology



NI Water is open to new innovative ideas/opportunities in leakage detection, particularly with undetectable leakage from traditional methods, with the aim of reducing background leakage.

Satellite Imagery provides comprehensive, accurate and non-destructive remote sensing solutions for locating leaks in any potable water network. It provides full coverage of any type of terrain, plain or hilly, sparsely housed or densely populated high-rises by extracting information from Synthetic Aperture Radar (SAR) images taken above the ground. These are then converted into data points of underground water leaks (Points of Interest, POI).

The main objective of this project was to utilise Satellite Imagery to generate specific points of interest within NI Water's supply zones (including Distribution and Trunk Mains) for leakage investigations and detection surveys and assist NIW in achieving leakage reduction targets.



Costings

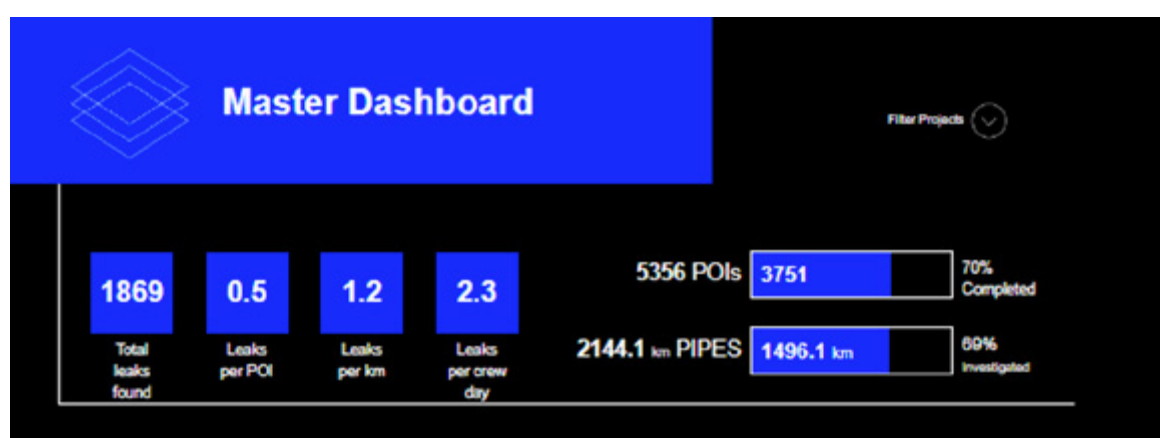
The total contract costs are estimated to be up to £2M over 4 years.

Benefits

- Increased leakage detection efficiency
- Increasing the chance of finding undetectable leaks to reduce background leakage.
- Improve leak detection performance in urban and rural areas and trunk mains.

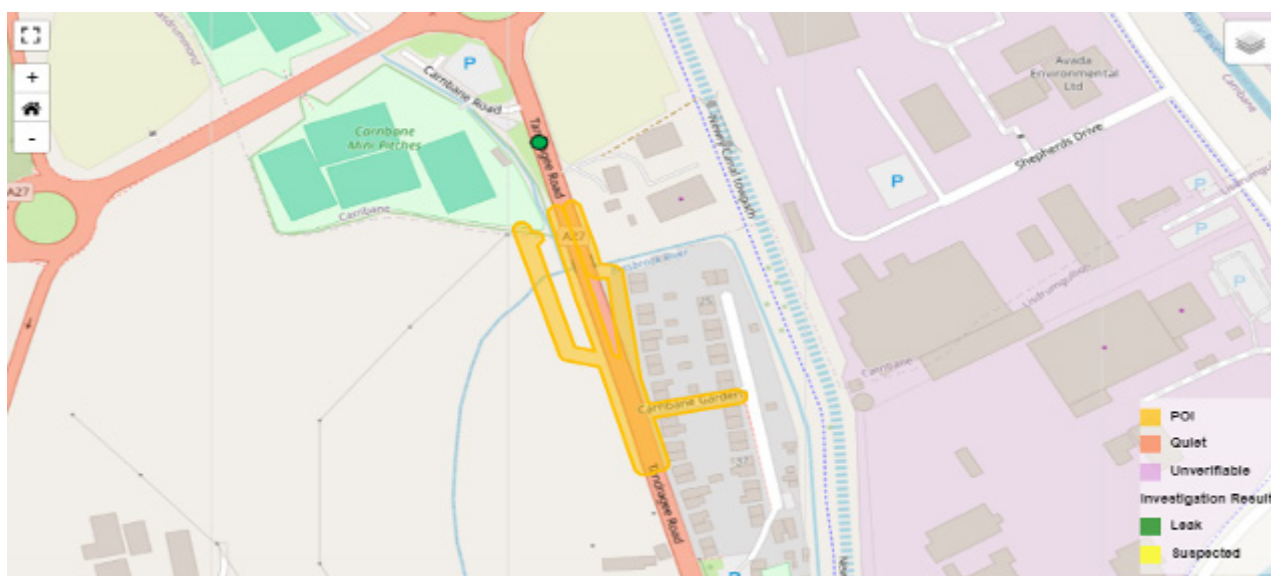
Results

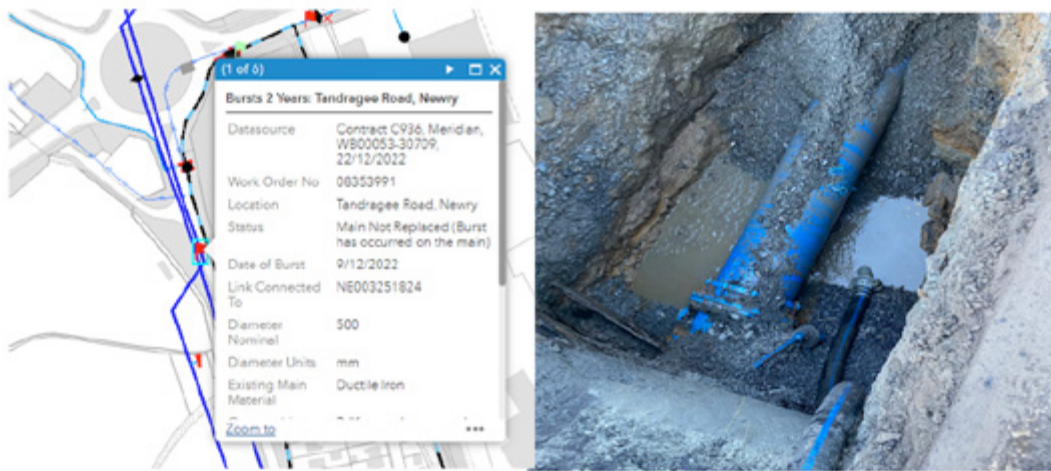
On average over 50% of points of interest have returned leaks.



Point of Interest Highlighted Example

Satellite Imagery had highlighted an area (shown in orange below) for investigation, which led to the identification of a substantial leak on a 500mm Ductile Trunk Main, estimated at 2-3ltr/s. No visual indications of leakage were present as the water main is approx. 2.5 meters beneath the carriageway with a deep layer of asphalt preventing any water from rising.





In conclusion, the Satellite Leak Detection project has demonstrated significant advancements in identifying and addressing previously undetectable leaks within NI Water's supply zones. By leveraging cutting-edge satellite imagery technology, the project has improved leak detection efficiency and contributed to substantial water conservation efforts. With over 50% of identified points of interest resulting in confirmed leaks, the initiative underscores the potential of innovative solutions in enhancing infrastructure management and sustainability. The successful implementation and promising results pave the way for continued exploration and future adoption of such technologies.

Chapter 8: Energy



Image 4-2: Slieve Kirk Wind Farm (SSE Renewables)

The Climate Change Committee's (CCC) independent review of NICCAP2 highlighted that further action is required in relation to energy supply in Northern Ireland to meet future adaptation needs.

To meet renewable energy consumption and emissions reduction targets, energy systems are currently undergoing a large-scale transformation to increase renewable energy production and move away from a reliance on fossil fuels. This transformation requires major investment in energy assets and networks but there is also an opportunity to build improved resilience to climate change in the energy system.⁴⁴

A resilient, renewable energy system supplied from a diverse mix of sources, including wind, solar, hydroelectric, and biomethane, combined with resilient network infrastructure will ensure a reliable energy supply that limits the potential for power outages to occur during severe weather events and will ensure that essential infrastructure and critical

services are maintained. This will help to insulate us from impacts such as those seen during recent severe weather events such as storms Franklin and Dudley in February 2022, and Storm Éowyn in January 2025 which caused major power outages throughout Northern Ireland. Future climate change projections highlight that severe weather events, such as these, will become more frequent and further highlight the need for the energy system to be climate resilient in its design, supply diversity and storage capacity to ensure that energy generation and supply can also continue during periods of low rainfall (which may impact upon hydroelectric production), periods of low wind speeds (which will impact upon wind generation) and periods of poor weather which may impact upon solar generation.

The Department for Infrastructure's Flood Risk Management Plan has stated that there are some energy infrastructures in Northern Ireland currently at risk from flooding.

⁴⁴ [Adapting to climate change - Progress in Northern Ireland](#)

3233 Northern Ireland Electricity Networks substations are at noteworthy risk from possible flooding.⁴⁵ This could have a major impact on electricity supply going forward during prolonged periods of heavy rainfall. Projected rises in summer temperatures could also affect the generation of electricity in the future with potential overheating of infrastructure during extreme heat events.



Image 4-3: Dale Farm's solar farm at Dunman, Cookstown (Dale Farm)

Renewable energy sources in Northern Ireland have improved from 14.8% annual average of electricity consumption coming from renewable sources in 2013 to 43.1% for the 12-month period July 2024 to June 2025. At present there is a high level of reliance on onshore wind as a renewable energy source in this area. From July 2024 to June 2025, wind accounted for 81.7% of all renewable electricity generated within Northern Ireland. This compares to 82.3% for the previous 12-month period (July 2023 to June 2024).⁴⁶ A greater diversity of renewable energy supply will help build resilience to variations in the weather and conditions which generate it.

The Energy thematic area is one which requires partnership on an East-West and North-South basis due to the grid and supply

inter-connections which make up the energy system in Northern Ireland. North-South partnership takes an all-island approach by looking at the balance between supply and demand for an all-island electricity capacity market through projects such as the North/South Interconnector. The All-Island Generation Capacity Statement is issued annually by Soni Ltd, the System Operator Northern Ireland, and EirGrid Plc, the System Transmission Operator in Ireland, with the latest being published January 2024.⁴⁷ However, in February 2024 businesses called for a refocused all-island approach to energy policy and climate challenges⁴⁸ and the Shared Energy Futures report⁴⁹ reiterated that a lack of co-ordination would impact progress in these areas. In terms of East-West collaboration, a 500-megawatt interconnector between Scotland and Northern Ireland has been in place since 2001 and is operated by Mutual Energy, and in May 2023 plans were announced to build a new electricity link between Scotland and Northern Ireland by Transmission Investment.⁵⁰

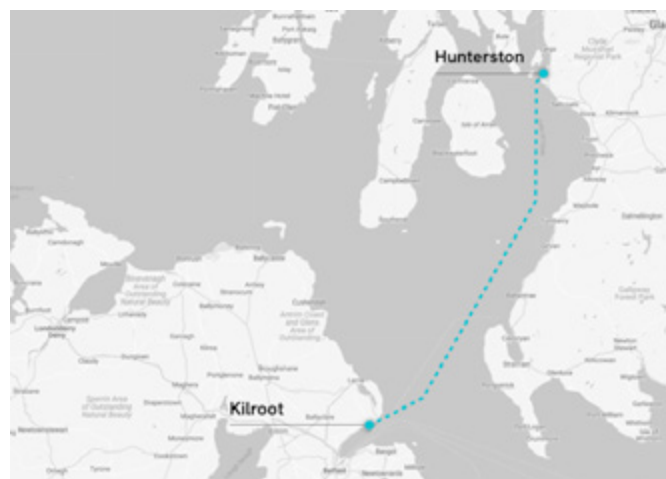


Figure 4-3: Transmission Investment LirC Interconnector Project

45 2nd Cycle - Flood Risk Management Plan 2021-2027 | Department for Infrastructure (infrastructure-ni.gov.uk)

46 <https://www.economy-ni.gov.uk/articles/electricity-consumption-and-renewable-generation-statistics>

47 EirGrid SONI GCS 2023-2032

48 Climate change: Business groups want all-island energy strategy - BBC News

49 <https://cdn.ibec.ie/-/media/documents/ibec-campaigns/shared-energy-futures-report.pdf?rev=a9d820cc7b1c436881261ea770ad252e>

50 Plans to build electricity link between Scotland and NI - BBC News

The crosscutting nature of the Energy thematic area means the risks and their impacts in this area will also impact on other themes. Therefore, adaptation measures in this thematic area must also consider how they will impact these cross-cutting areas to ensure resilience is embedded throughout.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

The Department for the Economy (DfE) leads on building a resilient, low-carbon energy system for Northern Ireland, with support from various partners. Northern Ireland Electricity (NIE) has responsibility for the network infrastructure across Northern Ireland. DfE and NIE are working to collate and utilise information on outages to support energy policy development and ensure a reliable energy supply in the transition to net zero

(IS27). Part of this resilience will be delivered by the infrastructure itself and actions such as the Geological Survey of Northern Ireland (GSNI) research into peat landslides and their impacts on infrastructure will be key (IS43). To support their adaptation priorities and develop new adaptation policies within their remit, DfE has established a new Adaptation Working group (ST27).

Many councils are also taking action within their local areas such as Antrim and Newtownabbey Council's Property Energy Strategy (IS11), supported by their Capital Energy Fund which will secure effective and efficient operation of council systems and assets. Projects within the Strategy include biomass system upgrades and solar panel installations planned over the next five years. Alternative energy sources require ongoing research and projects such as Queen's University's AgriTherm is designed to provide a comprehensive understanding of the availability of geothermal energy resources across the UK (NC50). With a view to supporting the UK agri-food sector through agricultural applications, projects such as this will help inform energy resilience options for wider application.

The third Climate Change Risk Assessment climate risks associated with the Energy theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
I1. Infrastructure networks (water, energy, transport, ICT)	Cascading failures	RISKS	More action needed
I2. Infrastructure services	River, surface water and groundwater flooding	RISKS	More action needed
I3. Infrastructure services	Coastal flooding and erosion	RISKS	Further Investigation
I4. Bridges and pipelines	Flooding and erosion	RISKS	Further Investigation
I6. Hydroelectric generation	Low or high river flows	RISKS	Watching brief
I7. Subterranean and surface infrastructure	Subsidence	RISKS	Further Investigation
I9. Energy generation	Reduced water availability	RISKS	Watching brief
I10. Energy	High and low temperatures, high winds, lightning	RISKS	Further investigation
I11. Offshore infrastructure	Storms and high waves	RISKS	Sustain current action
H6. Household energy demand	Summer and winter temperature changes	RISKS & OPPORTUNITIES	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 9: Telecommunications & ICT

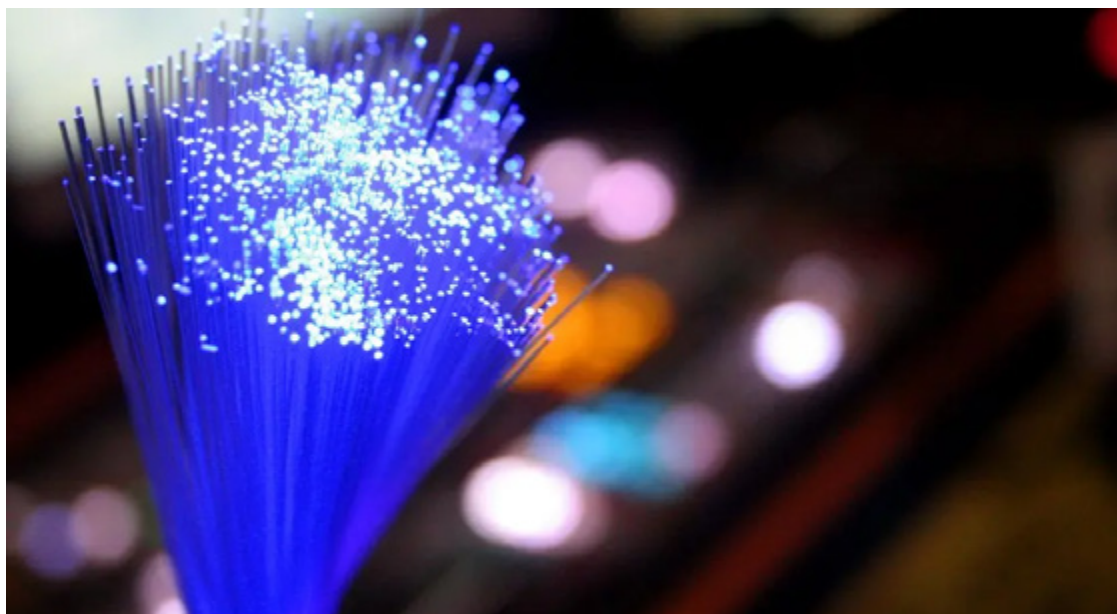


Image 4-4: Optical fibre cables used in high-speed internet connections (BBC)

The Climate Change Committee's (CCC) review of NICCAP2 highlighted gaps in plans to ensure telecommunications and Information and Communication Technology (ICT) infrastructure are resilient to climate risks. Given the growing reliance on these types of infrastructure, and the extent to which other types of infrastructure depend upon them, they recommended that this is a key gap which should be addressed in NICCAP3.⁵¹

Extreme weather, including flooding, storms, and heatwaves will have an impact on the provision of telecommunications and ICT, and it is predicted that significant events of this nature will occur more frequently over the coming years. The third Climate Change Risk Assessment (CCRA3) highlighted some of these risks:

- Failure of telecommunications leading to reduced capacity in a wide range of other essential services.
- Mobile base station power failure because of extreme weather.
- Local outages, given consumer reliability on digital technology today.
- Ground shrinkage can lead to failure of electricity, gas and water pipes, thereby damaging co-sited ICT infrastructure.
- High summer temperatures, as well as rapid fluctuations in temperature and humidity, pose challenges to data centres, which need to be kept cool to operate.
- Poorer performance of radio systems due to heavy rainfall.
- Greater international communication disruption due to increase sea temperature.⁵²

⁵¹ [Adapting to climate change - Progress in Northern Ireland](#)

⁵² [CCRA-Evidence-Report-Northern-Ireland-Summary-Final.pdf \(ukclimaterisk.org\)](#)

Consideration also must be given to the increasing digitalisation of societal functions such as online banking, healthcare and benefit services. The move to digitalisation has seen 27% of the total NI bank branch network close by January 2023. These closures have been reported to impact on 25% of people living in rural areas and of those, 53% stated it had a major impact on their local community.⁵³ While increased digitalisation and branch closures are generally market driven, it leaves people living in rural areas particularly vulnerable to ICT related climate risks due to their greater dependence on digital services. In recent years, progress has been made in connecting those in rural areas to reliable, high-speed internet through Project Stratum. This is a joint project sponsored by the Department of Agriculture, Environment and Rural Affairs (DAERA), the Department for the Economy (DfE), and the UK Government, and was delivered by Fibrus Networks following a procurement process⁵⁴.

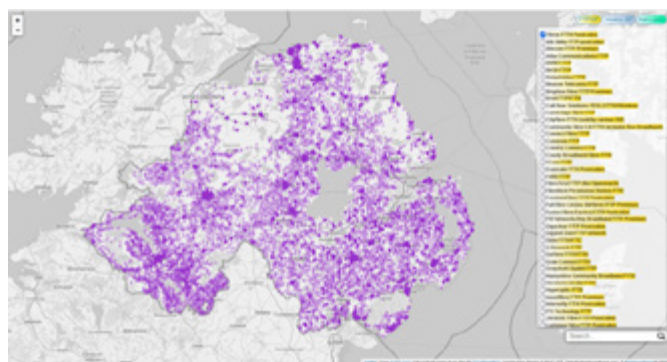


Figure 4 4: Postcodes in Northern Ireland where Fibrus network connections are available (Thinkbroadband)

Telecommunications and ICT networks are a reserved policy matter and therefore are dealt with at a UK level by the UK Government Department for Digital, Culture, Media, and Sport (DCMS). Digital infrastructure in Northern Ireland is privately owned and

operated, and these processes are regulated by Ofcom. This means there is limited data available to the DfE to assess how the risks highlighted in CCRA3 are being dealt with by suppliers. We will however continue to engage with DCMS who are addressing similar risks in the UK's third National Adaptation Programme through groups such as Electronic Communications Resilience & Response Group, which is a cross government and telecoms industry forum.

The thematic area of Telecommunications and ICT is crosscutting in nature and climate risks and their impacts in this area will also impact on other themes such as water supply, energy, transport, food security, businesses, buildings, towns and cities, community preparedness and response and finance which all, to varying degrees, require digital services. Therefore, when adaptation measures are being considered, knock-on effects to these cross-cutting areas must be considered to ensure they are not negatively impacted.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

As a reserved policy area, Government action is led on by the UK Government, however the Department for the Economy (DfE), the Department of Agriculture, Environment and

⁵³ <https://www.consumerCouncil.org.uk/news/vulnerable-consumers-and-those-rural-areas-most-impacted-27-bank-branches-northern-ireland>

⁵⁴ <https://www.economy-ni.gov.uk/articles/project-stratum-introduction>

Rural Affairs (DAERA), and private sector partners are taking action within their levels of authority to ensure Northern Ireland remains connected and its digital infrastructure is robust and resilient.

DfE is developing a stakeholder engagement plan to highlight climate adaptation issues in the telecoms sector and is working with the UK Government's Department for Science Innovation and Technology as well as Building Digital UK to advocate for resilience standards to be introduced for the highly privatised sector (IS28). To increase connectivity, Project Stratum, led by DfE and delivered by Fibrus Networks, aims to extend gigabit-capable broadband to 81,000 rural premises (IS12) across Northern Ireland.

To build resilience across transport communications, Translink is implementing upgrades to signal and telecoms

infrastructure, reducing vulnerability to extreme weather (IS17). Other ongoing actions to support transport infrastructure, such as enhanced drainage resilience (IS14) and scour protection (IS20), also deliver additional benefits for ICT. Mid and East Antrim Council's ArcGIS-Pro based Climate Project (BE16) focuses on developing a spatial layerset for assets at risk from flooding, storms, and extreme temperatures, however its findings will also be informative for decisions around improving the resilience of Telecoms and ICT within their council area. For initiatives like this in single council areas, forums such as Climate NI's Public Body Climate Action Network (PBCAN) (ST21) will be key in sharing knowledge and best practice across the public sector.

The third Climate Change Risk Assessment climate risks associated with the Telecommunications and ICT theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
I1. Infrastructure networks (water, energy, transport, ICT)	Cascading failures	RISKS	More action needed
I2. Infrastructure services	River, surface water and groundwater flooding	RISKS	More action needed
I3. Infrastructure services	Coastal flooding and erosion	RISKS	Further Investigation
I4. Bridges and pipelines	Flooding and erosion	RISKS	Further investigation
I7. Subterranean and surface infrastructure	Subsidence	RISKS	Further investigation
I13. Digital	High and low temperatures, high winds, lightning	RISKS	Further Investigation
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 10: Transport

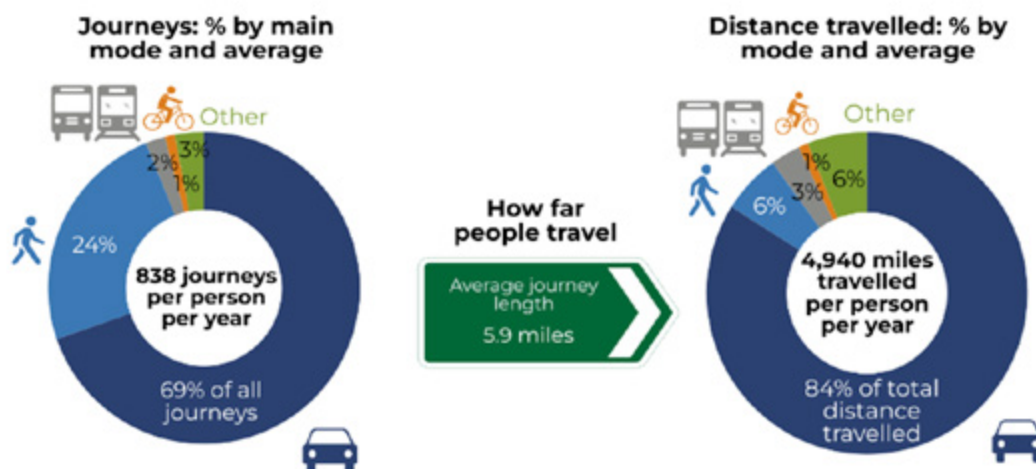


Figure 4-5: 2021 Travel Survey for NI (NISRA)

Transport in Northern Ireland is composed of a mix of modes of travel much like the rest of the UK. In Northern Ireland in 2021, car usage was the main mode of transport, representing 69% of all journeys made and accounting for 84% of the total distance travelled. This is more prevalent in rural areas with 90% of rural workers being more likely to use their own transport to commute to work compared to 82% in urban areas.⁵⁵

Public transport (including bus and rail) in comparison only makes up 2% of total travel and 3% of the distance travelled⁵⁶. This activity takes place over 25,790 kilometres of public road⁵⁷ and 354 kilometres of railway track⁵⁸. While Northern Ireland's size makes air travel unnecessary within the province, in the first quarter of 2024, 1,889,856 passengers moved through our airports, which is an increase of 25% when compared with the same period in 2023⁵⁹. We do of course make use of foot and pedal powered transport with 25% of

all journeys taken on foot or by bike, but this figure only accounts for 7% of the total distance travelled.

Transport, and the infrastructure it requires is affected by various elements of climate change:

- Heavy rainfall, flooding, and storms
- Severe weather resulting in delays
- Extreme heat events
- Sea level rises

The effects of these factors have been seen in Northern Ireland in recent years with road, bus and rail services being disrupted by flooding and storm conditions causing issues such as fallen trees and closure of exposed bridges due to high wind speeds. Storms can also have an impact on ports and airports with complications coming from both snow and heatwave events.

⁵⁵ [Key Rural Issues 2023 Publication | Department of Agriculture, Environment and Rural Affairs](#)

⁵⁶ <https://www.infrastructure-ni.gov.uk/system/files/publications/infrastructure/tsni-headline-report-2021.pdf>

⁵⁷ <https://www.infrastructure-ni.gov.uk/system/files/publications/infrastructure/ni-transport-statistics-2020-2021.pdf>

⁵⁸ <https://www.data.gov.uk/dataset/0297b4a0-5cea-4c22-97cc-346c76df33ed/northern-ireland-railways-nir-railway-network>

⁵⁹ <https://flyinginireland.com/2024/06/northern-irelands-airports-statistics-for-q1-2024/>

In January 2024 Storm Isha resulted in widescale disruption to the road network as well as bridge closures, and the cancellation of flights and ferries.⁶⁰ This was followed closely by Storm Jocelyn which struck only a few days later and resulted in more disruption across the road network as a result of heavy winds and fallen trees which also impacted rail and air travel, including causing the main road to the Belfast International Airport to be closed to traffic as a result of a fallen tree.⁶¹

Climate change projections highlight that we will see an increase in the severity and frequency of extreme weather events and in April of 2024, we also saw Storm Kathleen bring disruption to NI transport as its strong winds and heavy rain impacted on road, sea and air travel⁶².



Image 4-5: Train damage from fallen trees (Translink)

The impact of these severe weather events can have knock-on consequences for transport infrastructure that have impacts that persist after the storm event itself. Stresses like this put added pressures on the condition of transport infrastructure, which reduces its resilience for dealing with subsequent weather events.

In Northern Ireland the Department for Infrastructure (DfI) has responsibility for transport policy along with their Arm's Length Body: Translink, who is Northern Ireland's main public transport provider. They collectively develop and deliver policies for roads and public transport infrastructure provision and the provision of bus and rail services.

The risks included in the transport theme also contain reserved policy matters relating to aviation and shipping which are dealt with at a UK level by the Department of Transport and the Civil Aviation Authority, while the airports and ports within Northern Ireland are mainly owned and operated by private companies. Devolved powers in these areas solely relate to land use planning and airport surface access issues.



Image 4-6: Damaged lorries on Larne - Cairnryan ferry due to extreme weather during the crossing (BBC)

When producing adaptation measures in the thematic area of Transport we must also consider any knock-on effects as it is crosscutting in nature and climate risks and their impacts, will also impact on other themes such as food security, business, community preparedness and response, towns and cities and health.

⁶⁰ [Storm Isha: Power cuts and travel disruption across Northern Ireland - BBC News](#)

⁶¹ [NI weather: Storm Jocelyn causes 'major disruption' to road network - BBC News](#)

⁶² <https://www.bbc.co.uk/news/uk-northern-ireland-68746898>

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

The Department for Infrastructure (DfI), together with its Arm's Length Body, Translink, takes the lead in protecting and maintaining our transport networks. To provide strategic oversight for their actions, Translink are developing a Climate Change Adaption Action Plan (IS13) to bring together current initiatives include upgrading drainage (IS14, IS15, IS21) and coastal defences (IS19), as well as work to assess and strengthen the earthworks around infrastructure installations (IS21, IS22). Nature based solutions feature in Translink's approach to adaptation planning as directed by their Biodiversity Strategy and Action Plan (IS18).

DfI are taking action to secure the road network through its Resilient Road Network Plan (IS36), as well as actions to survey roadside trees (IS45), build resilience into its bridges (IS31, IS32, IS34), and utilise Lidar surveys to assess the impacts of coastal erosion on the transport network (IS30).

In addition, the draft Transport Strategy 2035 (IS24) has recently undergone public consultation. It aims to promote sustainable transport, reduce emissions, and establish a strategic framework for transport policies. These policies will be implemented through individual transport plans currently being developed for each council area, such as the Eastern Transport Plan. While their Active Travel Delivery Plan for NI (BE50) will complement other active travel initiatives to provide a firm basis for the delivery of active travel across villages, towns and cities.

Actions are also being taken forward outside of Government through local councils and public bodies such as the Belfast Harbour Commissioners who are using Lidar modelling of the harbour to inform adaptation planning (IS25). In Belfast, the council has adopted a Climate Action Plan (BE54) to address 71 actions including actions to address impacts on transportation and supply chains.

Research into transport impacts and solutions is being progressed through a number of projects from the DAERA and UKRI funded Co-Centre for Climate, Biodiversity and Water (NC69, NC79, NC80, NC81), as well as through Queen's University who are looking at the development of system-orientated interventions to reduce car dependency in Belfast (BE31).

The third Climate Change Risk Assessment climate risks associated with the Transport theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
I1. Infrastructure networks (water, energy, transport, ICT)	Cascading failures	RISKS	More action needed
I2. Infrastructure services	River, surface water and groundwater flooding	RISKS	More action needed
I3. Infrastructure services	Coastal flooding and erosion	RISKS	Further Investigation
I4. Bridges and pipelines	Flooding and erosion	RISKS	Further investigation
I5. Transport networks	Slope and embankment failure	RISKS	More action needed
I7. Subterranean and surface infrastructure	Subsidence	RISKS	Further Investigation
I12. Transport	High and low temperatures, high winds, lightning	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Part 5



Image Belfast City - Adobe Stock

Part 5: People and the Built Environment



Image 5-1: Belfast 3D aerial (Google Earth)

Objective

Recognising how dependent we are upon our built environment and the ability it has to shape and support our health and wellbeing, we will engage with community groups and organisations to increase community understanding of localised climate impacts, and their impact upon their health. By empowering communities to understand their risks and develop innovative solutions through making use of local knowledge and resources, we will build upon their shared experiences to target and address the climate risks specific to them to improve the climate resilience of our communities.

Climate related risks to people and the built environment are changing all the time. Increasing levels of rainfall, changing weather patterns, increased air temperatures and rising water levels are having a negative effect on our community's health, the buildings and the essential infrastructure needed for the wellbeing of the population.

The third Climate Change Risk Assessment (CCRA3) states that the economic impacts of climate change, including damage to buildings and healthcare services, are higher in Northern Ireland and other devolved regions compared to England. Extreme weather events disrupt hospitals and can

affect people's health and well-being. Heatwaves and extreme rainfall in NI have already caused disruptions to daily activities and services.

The effect of the climate changes we are already seeing presents new challenges to those in health and social care, planning, water and flood risk management, emergency management and community resilience.

Communities will also play a vital role in meeting adaptation targets. Often, they are the first responder in dealing with the aftermath of climate related events. They are usually the eyewitnesses as to how events

unfold and therefore are a great source of information that can provide insights into emergency responses and allow for lessons learned. By engaging with local organisations in all adaptation solutions we can ensure that solutions will be community focused for that area.

Our objective for People and the Built Environment intends to explore and tap into the experiences of our communities, the skills of our built environment and climate professionals, to develop strategies and solutions to make our towns and cities more resilient to the predicted effects of climate change. The importance of collaboration and

the sharing of information and data on land and building-use, infrastructure, knowledge and skills cannot be overstated as we work towards achieving this objective.

There are four thematic areas containing the risks to People and the Built Environment, described in the following chapters:

- Chapter 11 - Towns & Cities,
- Chapter 12 - Buildings,
- Chapter 13 - Health, and
- Chapter 14 - Community Preparedness & Response.

Chapter 11: Towns and Cities



Image 5-2: Mill Street, Cushendall, County Antrim (Causeway Coast & Glens)

In Northern Ireland 60% of the population lives in an urban area. However, Population growth in rural areas from 2001-20 has outstripped that in urban areas by a factor of almost 3 to 1 (20% to 7%).⁶³

Our towns and cities are complex spaces relying on heavily used and interconnected infrastructure. As our population increases overall and is expected to reach its peak of 1.95 million in mid-2033⁶⁴, this places further pressures on our buildings, transportation networks, communications networks, as well as key utility services such as power, water and sewage.

As well as providing homes for an increasing population, our towns and cities are rich with cultural heritage provided by the historic buildings, architectural landmarks and iconic greenspaces and features that make them up. They are places alive with activity, providing locations for over 40% of businesses⁶⁵

in addition to the people they support, and so the role they play in a vibrant and healthy population and economy cannot be overstated.

As an important provider of employment, food and transport, many of our towns and cities are built near water sources, either coastal or inland due to the natural resource benefits they provided. The safety and security this has traditionally provided is however under threat as climate change has seen increased rainfall and a rise in sea levels which has highlighted the need for, and importance of, effective flood communication, prevention, and alleviation systems, and storm water management systems.

The Northern Ireland Flood Risk Assessment 2018⁶⁶ showed that 5% of all buildings in Northern Ireland are at risk of flooding and projected that climate change would see this number rise to 6.7% by 2080. As well as

⁶³ [Key Rural Issues 2023 Publication | Department of Agriculture, Environment and Rural Affairs](#)

⁶⁴ [Statistical Bulletin - 2022-based Population Projections for Northern Ireland_1.pdf](#)

⁶⁵ <https://www.nisra.gov.uk/publications/current-publication-and-idbr-tables-1>

⁶⁶ <https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/northern-ireland-flood-risk-assessment-report-2018-updated-may2019.pdf>

increasing the number of buildings at risk, the 2018 UK Climate Change Projections from the Met Office⁶⁷ forecast an increase in flooding events due to increased rainfall, sea level rise and increased frequency of extreme rainfall events. An example of such events are the storms which led to flooding in areas including Newry, Downpatrick, Portadown, Killyleagh and Ballyholme in October/ November 2023. These had a devastating impact on homes, business and livelihoods which the government made support funding (including one-off grants and rate relief available to effected businesses⁶⁸) in response to the flooding events.



Image 5-3: Flooding in Downpatrick, November 2023 (BBC)

Progress has been made in monitoring properties at risk and coastal defence assets, as well as in planning for river and coastal flooding. The Department for Infrastructure (DfI) develops and maintains flood alleviation schemes aimed at reducing the impact of flooding from rivers and the sea⁶⁹.

In recent years extensive LiDAR (Light Detection and Ranging) survey work has been undertaken around the Northern Ireland coastline to improve the evidence base and awareness of coastal change and the impacts of our changing climate. The data gathered through this work has been made available on the Northern Ireland Coastal Observatory⁷⁰ and is covered in more detail in Case Study 5: Coastal Evidence Gathering in Northern Ireland, and in Case Study 12: Belfast Harbour - LiDAR Modelling to Map Risk and Response.

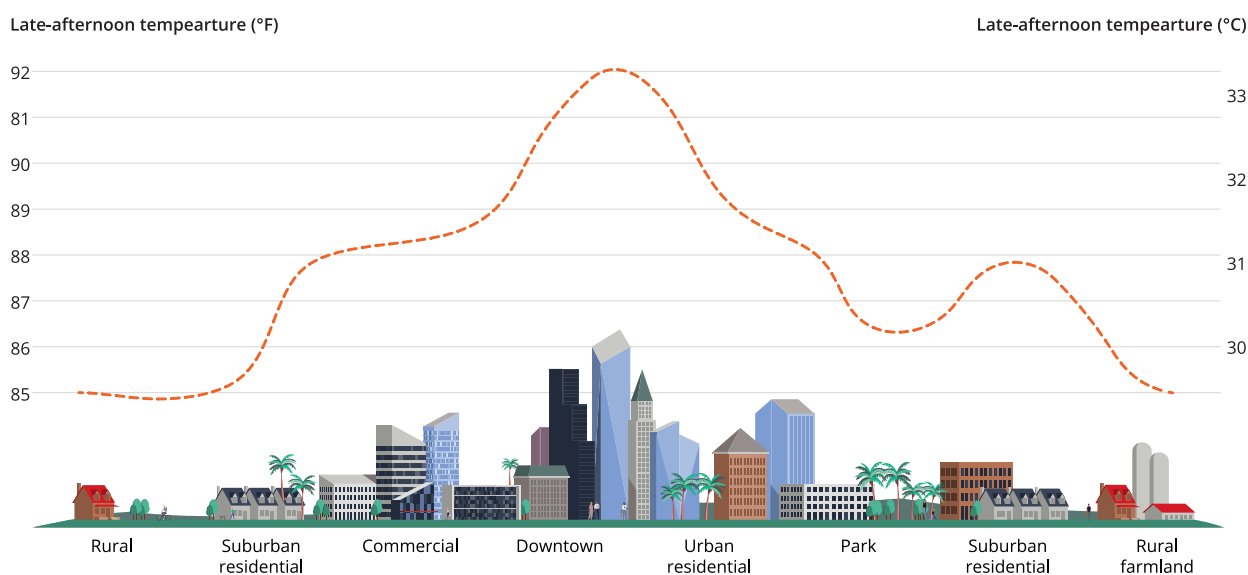


Image 5-4: Urban Heat Island Effect (World Meteorological Organisation) November 2023 (BBC)

67 <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp>

68 <https://www.executiveoffice-ni.gov.uk/news/further-financial-support-flooded-businesses-announced>

69 <https://www.infrastructure-ni.gov.uk/articles/flood-alleviation-projects>

70 <https://experience.arcgis.com/experience/b8454f3d62164518817e4c581b5555c8>

Climate change impacts for our cities and towns doesn't just stop at flooding. Our cities and towns are also faced with challenges from the urban heat island effect⁷¹ which is produced through the higher concentration of people, vehicles and concentrated heat sink environments such as tarmacked roads, footpaths and carparks.

This effect is exacerbated by the hotter drier summers projected for Northern Ireland, and from the heat-wave events we have seen in recent years. July 2021 saw the hottest recorded temperature for Northern Ireland when 31.3°C was recorded, and we have consistently seen periods of hotter weather including heatwave events occurring in early Autumn, such as September 2023⁷². The stresses these kinds of heat events can place on towns and cities can have impacts on the health of the people that reside in them, the buildings they inhabit and the infrastructure services they rely on.

It is important to recognise the important role that green spaces can play within our urban environment in mitigating the impacts of both heat and rain events. Nature based solutions such as planting trees and increasing vegetation have an inherent benefit to nature through their impacts on biodiversity, but additionally they can have multiple benefits for adaptation through the cooling effects they produce, by providing shade, and disrupting the concentration of heat sink environments such as roads and footpaths; and also through increasing the lag time between rainfall and its entry to the waterways through water absorption and storage.

Current and projected climate risks should be the basis of adaptation measures for our

towns and cities. This thematic area will focus the efforts of government, local authorities and key stakeholders in building resilience into the urban environments many of us live in and work in.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

The Department for Communities (DfC), the Department for Infrastructure (DfI), and local councils, all have leading roles to play in providing for climate resilient towns and cities. A review of DfC's Architecture and Built Environment Policy will provide for high quality design with improvements to environmental impact and climate resilience (BE1), and work is underway to examine the feasibility of greenspace targets to combat urban heat (BE2). DfI are taking forward actions to reduce flood risk through delivery of objectives and measures in the 2nd Cycle NI Flood Risk Management Plan (BE3) including taking account of DfI's Climate Change Technical Flood Risk Guidance document (BE4). This guidance is currently being reviewed to take account of the latest UK climate change projections.

Ards and North Down Borough Council, have efforts underway to combat urban heat with a target of planting 160,000 trees by 2032

⁷¹ <https://ukgbc.org/news/how-the-urban-heat-island-effect-makes-cities-vulnerable-to-climate-change/>

⁷² <https://www.bbc.co.uk/news/uk-northern-ireland-66727497>

(BE6) and Belfast City Council's Greening the City program is promoting stakeholder engagement and green health maps (BE7). Belfast City Council are also building resilience through their Climate Action Plan (BE54) and their cross-sectoral Our Planet Board, whose goal is to create a sustainable, nature-positive city (BE55).

eNGOs are also playing an active part in protecting towns and cities through actions such as Belfast Healthy Cities' Greening the City which contributes elements of the WHO European Healthy Cities Network framework (BE7), or the Eastside Partnership which is building on the success of the Connswater Community Greenway to influence and explore the potential for a wider network of Greenways across east Belfast (BE8). Along the Causeway Coast, a Climate Vulnerability Index assessment for the Giant's Causeway and Causeway Coast UNESCO

World Heritage Site is being taken forward by the Causeway Coast and Glens Heritage Trust on behalf of the World Heritage Sites Steering Group (BE56). Again, forums such as Climate NI's Public Body Climate Action Network (PBCAN) (ST21) will be key in sharing knowledge and best practice learned from initiatives such as these more widely across the public sector.

Academia has a keen interest in the climate resilience of towns and cities and Queens University has research projects aimed at testing nature based solutions in urban settings through their UPSURGE project (BE59) as well as their SPACE project which looks at the association between climate-related factors and healthy ageing, to inform climate mitigation and adaptation interventions and policies for climate vulnerable populations such as older people (BE30).

The third Climate Change Risk Assessment climate risks associated with the Towns and Cities theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
H1. Health and wellbeing	High temperatures	RISKS	More action needed
H3. People, communities and buildings	Flooding	RISKS	More action needed
H4. Viability of coastal communities	Sea level rise	RISKS	Further investigation
I2. Infrastructure services	River, surface water and groundwater flooding	RISKS	More action needed
I3. Infrastructure services	Coastal flooding and erosion	RISKS	Further investigation
I12. Transport	High and low temperatures, high winds, lightning	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 12: Buildings



Image 5-5: The Peace Bridge and Guild Hall in Londonderry / Derry - Adobe Stock

Northern Ireland has a diverse range of buildings of varying age, cultural and historical significance, and usage. These include our homes, businesses, schools, hospitals, visitor attractions, prisons, leisure facilities and cultural and historic buildings as well as State Care Monuments. Our buildings play such a fundamental part of our society, that their presence in our lives is often taken for granted. The significance they hold in our lives cannot be overstated and so a key presumption in the path to climate resilience is that our existing building stock should be retained and appropriately upgraded to improve energy efficiency, while new building stock will have resilience built into its design.

We have over 828,000 dwellings,⁷³ more than 8,900 listed buildings⁷⁴ and in excess of 75,000 non-domestic properties⁷⁵. Our usage and interactions with all of them can play a role in contributing to, adapting to, or mitigating, climate change.

The increased temperatures we have been seeing during the summer months, especially the extreme heat events we have been experiencing with increased frequency,⁷⁶ is the first challenge that climate change brings to our building stock. As Northern Ireland's climate has been traditionally cooler, our building design has been concerned primarily with heat conservation, and in recent years steps have been taken to improve insulation and energy efficiency. While progress in this area is a positive step towards a well-adapted building stock, it is important to also recognise that effective heat dissipation by measures such as passive cooling will become increasingly important as overheating of buildings has consequences for the structures of the buildings themselves, and the health of their occupants.

This is particularly important for more vulnerable members of our society with underlying health conditions who may be

⁷³ <https://www.communities-ni.gov.uk/publications/northern-ireland-housing-statistics-2022-23>

⁷⁴ <https://www.communities-ni.gov.uk/articles/listed-buildings>

⁷⁵ <https://www.finance-ni.gov.uk/articles/ni-reval2026-frequently-asked-questions>

⁷⁶ <https://www.bbc.co.uk/news/articles/c2v0elxywedo>

less able to adjust, withstand and cope with higher temperatures. Additionally, heat retention can have impacts on the productivity of workplaces, and so this consequence of climate change also has direct impacts on the health of our economy.

As well as higher temperatures, we are also experiencing more frequent, and prolonged cold snaps⁷⁷. Despite improvements to energy efficiency and insulation, older buildings in particular often lack adequate insulation making them inefficient, and particularly vulnerable during periods of cold weather. Retrofitting these buildings will help to reduce this vulnerability and help to improve the energy efficiency of all our building stock which will mitigate the impacts of both low and high temperatures.

At present more than 60% of Northern Ireland households use oil boilers as their main source of heating⁷⁸. Prolonged cold snaps requiring more heating usage not only leads to higher greenhouse gas emissions but is also increasingly dependent on the resilience of global supply chains for its supply and delivery of fuel (discussed further in Part 6). However, progress in this sector is being made as new building stock moves away from using fossil fuels as the standard go-to for home heating sources.

Our buildings can also be impacted by the increased rainfall and frequency of storm events that Northern Ireland is experiencing as a result of climate change. High wind speeds can directly impact building structures, in particular those in areas with trees nearby, while heavy, persistent driving rain can put added stresses on guttering and building

fabric potentially leading to water ingress which may cause damage and issues with damp which in turn may lead to mould growth which can cause serious health issues.

The stresses and impacts of these, projected more frequent and severe storm events, can have a cumulative negative impact on tree safety and building structures, gradually weakening them until they reach breaking point.



Image 5-6: Impact of subsidence on a residential property (Claim Management Group)

Flooding from increased rainfall can cause further problems for our buildings where it can cause long term structural damage, including to the foundations. Erosion of the earth from around the foundations due to flooding and heavy rainfall, concentrated from broken guttering or downpipes and drains reaching capacity may in severe cases lead to subsidence of the building, which has serious consequences for building integrity, even when only part of the foundations are affected.

This sort of erosion to the earth is of particular concern to coastal areas where rising sea levels and increased wave action, as a result of ocean warming⁷⁹, can have dramatic effects

⁷⁷ <https://climatenorthernireland.org.uk/the-climate-challenge/extreme-weather-events-in-northern-ireland/>

⁷⁸ <https://www.nisra.gov.uk/system/files/statistics/census-2021-main-statistics-for-northern-ireland-phase-2-statistical-bulletin-household-spaces-and-accommodation.pdf>

⁷⁹ <https://www.nature.com/articles/s41467-018-08066-0>

on the coastline and flooding events there. A technical summary report produced by the Climate Change Committee (CCC), as part of the third Climate Change Risk Assessment, focuses on the risks of flooding and coastal change, and found that 2,720 domestic properties on the coastline of Northern Ireland, as well as 19.5% of the coast is at risk of erosion and flooding. It goes further to warn that the largest increase in risk in Northern Ireland is related to coastal flooding, which is projected to increase by 550% by the 2080s in a high population scenario and with 4°C global warming at 2100⁸⁰.



Image 5-7: Scrabo Tower, Newtownards (Department for Communities)

Many of Northern Ireland's most famous and iconic State Care Monuments are in exposed or coastal locations as they were purposely built in these locations for defence, transport of goods or as a strategic lookout. These include attractions such as Dunluce Castle, Scrabo Tower and Carrickfergus Castle amongst many other famous sites. Historic buildings are often susceptible to accelerated decay, and some of these sites have already experienced water ingress issues through the building fabric such as Scrabo Tower whilst others such as Dunluce Castle have required works to stabilise the very rocks on which they are built.

Adapting buildings to the impacts of climate change and ensuring our new building stock is designed to take account of it is imperative for Northern Ireland's climate resilience.

The impacts from climate change can carry significant expense to remedy, and in severe cases repair is often impossible. Embedding climate resilience into our buildings will mitigate against these impacts and will have benefits to the health of our society and economy. It will require collaboration between the NI Executive Departments, local government, the private sector and communities themselves who will be crucial in implementing effective adaptation strategies and mitigating the adverse effects of climate change on Northern Ireland's buildings.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

There are a number of interventions being taken forward by government departments, local councils, and eNGOs to create safe, efficient, and resilient buildings across Northern Ireland.

The Department for Communities (DfC) are currently reviewing and updating the Architecture and Built Environment Policy (BE1) for Northern Ireland to outline how high-quality design can improve environment impacts and climate resilience. In addition

⁸⁰ <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Technical-Report-The-Third-Climate-Change-Risk-Assessment.pdf>

to developing a new NI Historic Environment Policy to embed climate considerations into the Historic Environment, they are also carrying out the Grey Abbey Climate Change Pilot Study (BE11) and conducting an Annual Programme of Condition Surveys at State Care Monuments (BE12) to flag maintenance and structural issues. In the private rented sector DfC are developing Minimum Energy Efficiency Standards (BE13) and are working alongside DfE to increase awareness of adaptation as part of current and future policy development for energy efficiency programmes that aid mitigation towards Net-Zero (BE47).

To improve the resilience of schools and prisons, DE and DoJ are incorporating Building Energy Management Systems (BE43, BE42). In addition, DE also carry out flood risk assessments (BE44) for new school buildings. DoJ have also developed a Climate Action Plan (BE41) which considers future risks such as flooding, storms and drought and ensures all new build accommodation is designed in compliance with BREEAM.

Across the wider public sector organisations are making significant progress within their areas of responsibility with the Northern Ireland Housing Executive developing its first internal Climate Adaptation Plan (BE61) to provide information on, and to guide actions in response to climate change impacts. Sport NI has commitments in its Corporate Plan to reduce its environmental footprint and is delivering a capital grants program for environmental improvements in sports facilities (BE14), and Translink is incorporating climate resilience into new building designs through Building Design Minimum Standards (BE15).

Further actions include the Passive House Association of Ireland's research on Passivhaus in a Changing Climate (BE17), and Libraries NI are developing the design and refurbishment of 5 buildings to EnerPhit standard subject to funding, so they are resilient to climatic impacts (BE10).

Case Study 10: Hall Black Douglas Architects - Adaptive Restoration of the Bank Buildings, Belfast



Restored Clock Dormer. Mervyn Black (Hall Black Douglas Architects)

The Bank Buildings, a historic landmark in Belfast city centre, suffered severe damage in a 2018 fire that destroyed its interior while leaving parts of the masonry façade intact. Owned by Primark since 1979, it was decided to restore the building to its original appearance, with significant adaptive measures to improve resilience against future climate impacts. Completed in October 2022, the project combined conservation principles with sustainability strategies to mitigate climate change impacts. The restoration involved two parallel projects: HBD Architects focused on restoring the historic façade, while JCA Architects created a new internal superstructure. A conservation-first approach was taken, following guidelines from the ICOMOS Charter and BS 7913:2013. Surviving masonry elements were carefully recorded, cleaned, and reused, with replacements made only when necessary. This allowed for maximum retention of the original masonry walls while improving its resilience.

BANK BUILDINGS BELFAST
ELEVATIONS

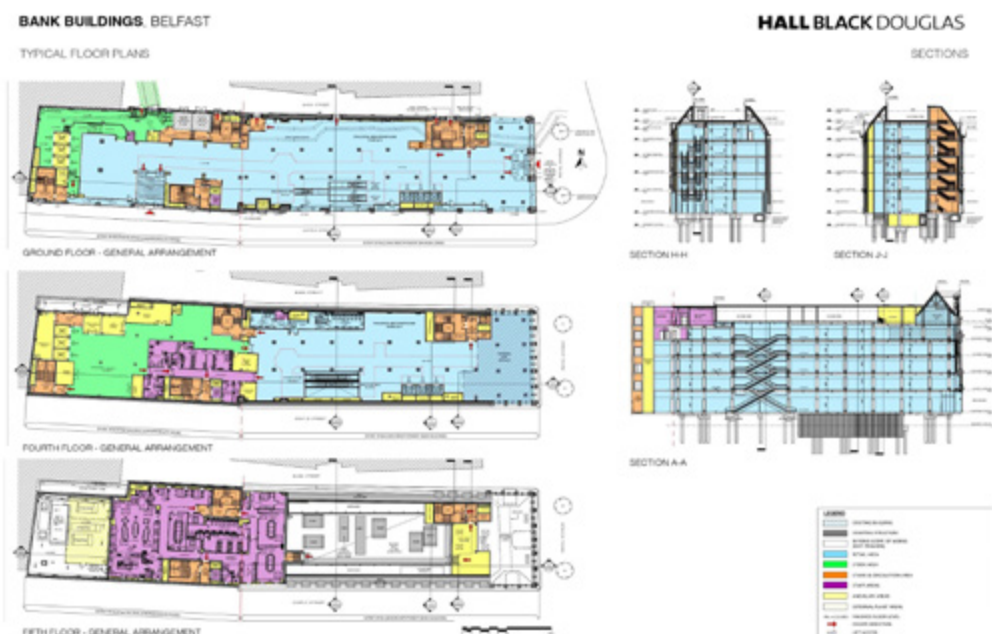
HALL BLACK DOUGLAS



Exterior elevation (HBD Architects)

Given its location above a culverted river in a high flood-risk zone, climate adaptation was essential. Flood risk scenarios were assessed up to 2080, and a waterproof plinth was incorporated into the façade to prevent water ingress from severe flooding. To manage modern rainfall, extensive lead and zinc weatherings were introduced to manage increasing rainfall and to protect the building from water damage and vegetation growth. The new cantilevered roof structure was also designed to work integrally with the building's new superstructure to prevent stresses affecting the existing masonry, thus preserving the structural integrity of the original façades. Energy-efficient insulation, smart energy systems, and advanced fire protection measures, including basement sprinkler tanks, were installed to ensure resilience to both climate extremes and fire risks. BREEAM and BRUKL standards were also applied throughout, enhancing the building's sustainability credentials. The project also highlighted the durability of traditional materials, for instance, the original Victorian masonry proved to be very adaptable to restoration and compatible with modern materials such as concrete and steel, confirming the value of incorporating both historical and modern materials in climate adaptation strategies.

The restoration achieved multiple benefits. The new roof design and autonomous superstructure reduced the need for future maintenance and removed the risk of structural stresses on the façade. Energy efficiency improvements led to a 30% boost in thermal performance, with savings of approximately 2,900 MWh and a carbon reduction of 500,000 kgCO₂. This project serves as a model for adaptive conservation, demonstrating how historic buildings can be modernised for climate resilience while retaining their heritage value. The techniques used have been recognised with awards and the lessons learned have been applied to similar projects, such as at the St. Comgall's restoration. Beyond its technical achievements, the restoration preserved an iconic part of Belfast's cultural heritage. As one of the city's most recognisable landmarks, the Bank Buildings holds significant social memory for its citizens. The successful blend of architectural conservation and climate change preparedness ensures that this restored building will endure for future generations.



Floor plan sections (HBD Architects)

The project was highly complex, involving numerous stakeholders and navigating the building's unstable condition after the fire. A temporary support structure was installed to stabilise the building, and collaboration between Belfast City Council, Historic Environment Division, and other local bodies ensured compliance with conservation best practice and safety standards. The two architectural teams worked in parallel, with HBD Architects focusing on the exterior and interfaces with the interior fit-out by JCA Architects. Regular coordination meetings and a structured master programme helped keep the project on track. After completion, a one-year defect monitoring period ensured any remaining issues were resolved.

The restoration of the Bank Buildings is a landmark example of adaptive conservation, successfully blending heritage preservation with modern climate change resilience. The project demonstrates how traditional materials and innovative design strategies can protect historic structures from climate risks, setting a benchmark for future restoration projects.

More details on the Bank Buildings restoration can be found here:

<https://www.hallblackdouglas.com/projects/39/bank-buildings>

The third Climate Change Risk Assessment climate risks associated with the Buildings theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
H1. Health and wellbeing	High temperatures	RISKS	More action needed
H3. People, communities and buildings	Flooding	RISKS	More action needed
H5. Building fabric	Moisture, wind and driving rain	RISKS	Further investigation
H6. Household energy demand	Summer and winter temperature changes	RISKS & OPPORTUNITIES	More action needed
H11. Cultural heritage	Changes in temperature, precipitation, groundwater, land, ocean and coastal change	RISKS	More action needed
H12. Health and social care delivery	Extreme weather	RISKS	More action needed
H13. Education and prison services	Extreme weather	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 13: Health

The changing climate in Northern Ireland, as in many regions around the world, can have a range of impacts on our health. Increased temperatures or prolonged periods of cold weather and more frequent extreme weather events such as flooding and storms can

all have consequences for our health, both physical and mental. This can be either directly from the elements and weather itself through the dangers severe weather events can create, or indirectly from the impacts of climate change on the world around us.



Figure 5-1: Health effects of climate change evidence summary⁸¹ (UK Health Security Agency)

81 <https://assets.publishing.service.gov.uk/media/659ff6a93308d200131f78/HECC-report-2023-overview.pdf>

As we have seen, with increasing frequency in recent years, flooding and storm damage caused by more severe and frequent extreme rainfall events can have severe consequences for those it impacts upon. Not only can floods cause immediate injuries, as it sweeps up debris of all manner in its path, but also by washing through sewage systems it can also increase the risk of waterborne diseases being washed into flooded homes and businesses as well as risking contaminating water supplies and entering our watercourses. For this reason, the clean-up required after flooding can also be just as hazardous for public health as the impact on the homes and businesses being damaged or destroyed can have a devastating long-term impact on mental health⁸².

The storms that often bring this increased rainfall bring other risks to health from the high wind speeds that can accompany them. These winds can wreak havoc on structures such as bridges, riverside pathways, homes and trees alike. In January 2024, we saw first-hand the devastation this can bring. Storm Isha brought wind speeds of up to 80mph to Northern Ireland as well as widespread destruction and sadly caused the death of an individual when the winds caused a tree to fall across a road in Limavady⁸³.

Due to health and safety concerns these storm events can reduce our opportunity to access open green space due to the risk of injury from falling branches / trees or in coastal locations from wave action washing onto coastal promenades. These impacts can also lead to delays in the response time of our emergency services due to forced road closures.

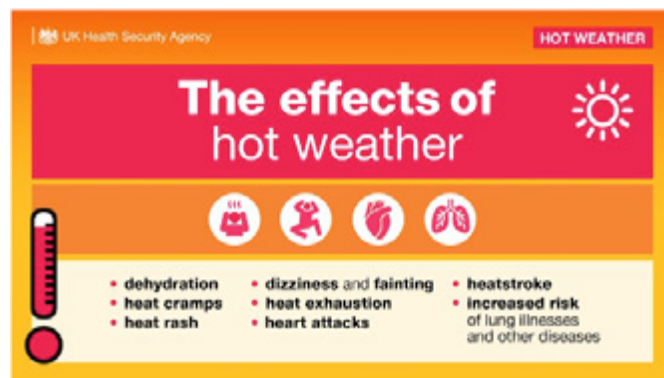


Figure 5-2: Impact of hot weather on health (UK Health Security Agency)

The increased temperatures and heatwave events we are seeing increase the risk of heat-related illnesses such as heatstroke and dehydration, as well as putting pressures on the cardiovascular systems more generally which can exacerbate other underlying health conditions. Vulnerable members of society, such as the elderly and those with pre-existing health conditions, are particularly at risk from these sorts of pressures⁸⁴.

On the flip side, more intense and prolonged cold weather events brings added risks to health, again through risks such as physical injury due to slips on ice as well as affecting vulnerable members of society, in particular the elderly, in a time of living cost increases and in particular increased heating costs.



Image 5-8: Asian tiger mosquito (BBC)

⁸² <https://assets.publishing.service.gov.uk/media/657086ad746930000d488919/HECC-report-2023-chapter-3-flooding.pdf>

⁸³ <https://www.bbc.co.uk/news/uk-northern-ireland-68057253>

⁸⁴ <https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health>

Rising temperatures and changing rain patterns also increases the possibility of being exposed to diseases normally associated with other areas of the world. Insects such as certain species of mosquito, for example the Asian Tiger mosquito pictured above in image 5-8, not normally seen in the UK are becoming better able to survive in our new warmer, wetter climate, and with them they bring the risk of carrying new diseases to our shores^{85,86}. While yet to be documented in the UK, there is a similar risk from fungal infections where increased temperatures and humidity provide the ideal conditions for their growth and survival. Furthermore, fungal spores may be carried in the atmosphere along with pollen and other allergens from the continent.⁸⁷

Many of the other thematic areas link into that of Health as good public health relies on so many interconnected elements ranging from well adapted buildings, resilient supply chains, and a robust emergency response to the availability of clean water, open greenspaces, food security, the use of active transport and a healthy environment. For this reason, effective adaptation across all the thematic areas will impact upon public health and work towards reducing the strain on our healthcare system, which itself will be strained directly by our changing climate and its impact on healthcare buildings and infrastructure.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities,

private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

A climate resilient health sector depends on a resilient health service, and also a healthy population who will be more equipped to tolerate moderate climate variations. The Department of Health (DoH), and the Public Health Agency (PHA), have leading roles in safeguarding our health in a changing climate.

DoH's new health protection legislative framework for NI (BE21) seeks to update the current public health legislation to better respond to health security issues or threats and strengthen our pandemic resilience and preparedness planning. The Department shall routinely monitor reports on overheating on its estate (BE19), and risk assesses the impact of climate change on service delivery allowing for climate related adverse effects to be reported and mitigated (BE18).

Active travel will bring benefits to public health as well as wider benefits to climate action and so the PHA, is working with DfI to develop an Active travel Programme, while DfI also progresses development of its Active Travel Delivery Plan for Northern Ireland (BE50) to complement this and other existing plans including the Belfast Cycling Network Delivery Plan and Strategic Plan for Greenways. Action is also being taken outside government through initiatives such as Outscape's Walking for All programme which is funded through PEACEPLUS Healthy and Inclusive Communities Theme (BE52).

⁸⁵ <https://www.bbc.co.uk/news/articles/cw0721l9183o>

⁸⁶ <https://www.bbc.co.uk/news/health-67654008>

⁸⁷ <https://assets.publishing.service.gov.uk/media/6570509d3831ec0013c7496e/HECC-report-2023-chapter-6-aeroallergens.pdf>

DAERA has a range of actions to support health resilience. Within its estate and public recreation areas, the NI Environment Agency (NIEA) will introduce risk assessments for adverse weather (BE26), and a tree safety policy will be updated to include regular tree safety surveys (BE24). To ensure the safety of the public at its sites, Met Office weather warnings are monitored and communicated via DAERA communication channels (BE25). An Outdoor Recreational Action Plan/Strategy is being developed to introduce climate change considerations (BE23), and in conjunction with other government departments, DAERA is currently developing the first Clean Air Strategy (BE28) which is driven by the need to protect public health.

Research into climate-health links is ongoing through the DAERA and UKRI funded Co-Centre for Climate, Biodiversity and Water through a project linking climate, biodiversity and water quality to human health and well-being. This project aims to describe the impacts of climate change, biodiversity loss and water quality on human health, and identify evidence-based solutions to mitigate these impacts (BE51).

The third Climate Change Risk Assessment climate risks associated with the Health theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
H1. Health and wellbeing	High temperatures	RISKS	More action needed
H2. Health and wellbeing	High temperatures	OPPORTUNITIES	Further investigation
H3. People, communities and buildings	Flooding	RISKS	More action needed
H7. Health and wellbeing	Changes in indoor and outdoor air quality	RISKS	Further investigation
H8. Health	Vector-borne disease	RISKS	Further investigation
H9. Food safety and food security	Higher temperatures (food safety) and extreme weather (food security)	RISKS	Further investigation
H10. Health	Water quality and household water supply	RISKS	Further investigation
H12. Health and social care delivery	Extreme weather	RISKS	More action needed
ID9. UK public health	Increase in vector borne diseases due to climate change	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 14: Community Preparedness and Response

Climate change brings a wide range of significant risks and challenges on a global scale. Although similar effects may be experienced across different regions, the impacts of these effects on individual regions can vary significantly. For example, the impacts of rising seas levels are vastly different for small Pacific Island nations than they are for landlocked, or even large island countries. Even within the UK, the impacts of climate are not felt evenly across the 4 nations and in recognition of this, the Climate Change Committee (CCC) in providing their Third Climate Change Risk Assessment Independent Assessment (CCRA3-IA) prepared national summary reports of their Independent Risk Assessments⁸⁸ to accompany their technical report of overall UK risk to the UK Government.

Countries are frequently made up of varying geographical features and so similar climatic effects are felt differently within countries as well. In this way it is individuals and their communities that are at the front line of climate change, experiencing its impacts first-hand. Northern Ireland is no different in this regard and with its unique geographic and socio-economic context, it faces particular challenges that require tailored responses.



Image 5-9: Flooding in Newry. Autumn 2023 (BBC)

This thematic area focuses on the impacts of climate change at the local level, recognising that a ‘one size fits all’ approach will not be the most effective way to build resilience on the ground. The increased frequency and intensity of extreme weather events such as flooding and storms must be considered through their impacts at this level in terms of their threat to properties, the local economy, our local environment and their direct threats to human health and safety.

A well prepared and resilient community is delivered by equipping local populations with the knowledge, resources and capabilities to effectively respond to these challenges. Prepared communities have an acute understanding of their climate risks and so can reduce vulnerability and recover more quickly from climate-related events. Moreover, community-based approaches ensure that the specific needs and capacities of local populations are considered, promoting inclusive and sustainable adaptation strategies.

Frequently, it is the local people who are the first responders in the event of a climate emergency event. As well as being first on the scene, they are eyewitnesses to an event unfolding and can be best placed to communicate and assist in directing resources to areas most of need and knowing those who may be most vulnerable in their communities. Increasing public understanding of climate change and its impacts, both local and on a wider scale is a key part of preparing the local population for climate emergency events and therefore helping to build localised community climate resilience.

⁸⁸ <https://www.ukclimaterisk.org/publications/type/national-summaries/>

Engagement with local community groups and stakeholders helps embed climate resilience as building networks among communities, local governments, and organisations increases the exchange of knowledge, resources and best practice.

Effective communication channels, before, during and in the aftermath of an event provide opportunities for communities to recover more quickly and mitigate the impact of future events.

This local approach to climate preparation has been recognised in Northern Ireland for some time now and over the course of the second Northern Ireland Climate Change Adaptation Programme (NICCAP2) many local Councils built climate adaptation into their local council planning⁸⁹. This Third Adaptation Programme sees the fruits of the local Councils' adaptation planning cycle being continued to be built upon as we include a range of actions from across the Councils and more strategic actions supported by the Society of Local Authority Chief Executives NI (SOLACE NI), as they utilise their knowledge of local risks to build climate resilience into their local communities. As climate change continues to pose significant challenges, the role of prepared and responsive communities will become increasingly important in safeguarding the well-being and sustainability of Northern Ireland.

In Northern Ireland, emergency planning and civil contingency arrangements are underpinned by the UK Civil Contingencies Act 2004 of which Part 2 applies to Northern Ireland.

In 2021, the first Northern Ireland Civil Contingencies Framework was introduced together with a guide to emergency planning arrangements which set out arrangements and roles and responsibilities for emergency planning.

Following on from these earlier arrangements the Executive Office have published 'Building Resilience Together: NI Civil Contingencies Framework'⁹⁰ (Figure 5-3) which, now in its second iteration (2023), has taken account of previous emergencies that have affected our communities. The framework provides a foundation of response from local level to regional and national events through a "Building Resilience Together" joint working approach.

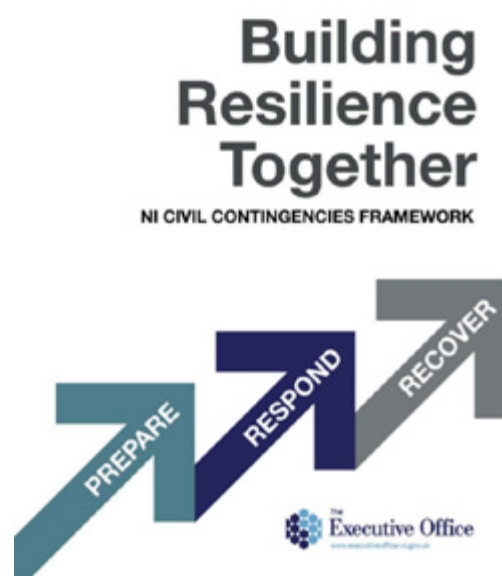


Figure 5-3: NI Executive's Civil Contingencies Framework (TEO)

At the core of working with local communities is the Local Government Civil Contingencies Team who provide project management to the multi-agency emergency preparedness groups in Northern Ireland.

⁸⁹ <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Northern%20Ireland%20Climate%20Change%20Adaptation%20Programme%202019-2024%20Final-Laid.PDF>

⁹⁰ https://www.executiveoffice-ni.gov.uk/sites/default/files/publications/ofmdfm_dev/The%20Northern%20Ireland%20Civil%20Contingencies%20Framework%20%28Revised%202023%29.pdf



Figure 5-4: The Regional Community Resilience Group Logo (RCRG)

In 2013, the Regional Community Resilience Group⁹¹ (Figure 5-4) was formed to help communities prepare for and respond to weather related emergencies by bringing together multi-agency partner organisations from government, utility providers and the voluntary sector to work for and with communities at risk of severe weather. Today the group is actively engaging with over 40 communities across NI to inform and resource them to help prepare for and to deal with the impact of severe weather and climate change in their local areas. This type of community preparedness can also bring wider benefits such as improved social cohesion, wellbeing and empowerment. Please see case study 11 for further information.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

Departments are taking forward actions to build resilience within the thematic area of Community Preparedness & Response. Actions such as implementation of the Department for Infrastructure's (DfI) 2nd Cycle NI Flood Risk Management Plan (BE3) and the Department of Agriculture, Environment and Rural Affairs' (DAERA) adoption and publishment of Wildfires in Northern Ireland Draft Strategic Way Forward (BE34) are two examples of actions intended to inform and support community resilience.

Local Councils play a key role in this thematic area and work closely with partners to deliver effective actions. The Regional Community Resilience Group (RCRG), which is co-chaired by DfI and Local Government, is engaging with over 40 communities through their Community Resilience Tools (BE63) and has delivered pilot projects entitled Prepare, Adapt Strengthen, in various council areas across the North of Ireland. The group has developed accessible toolkits alongside the Red Cross (ST6) which have proved to be key resources in raising awareness and building local resilience. This work is now being expanded to ensure closer integration between emergency response and proactive climate action through emergency planning (ST13), community planning (ST18), and spatial planning (ST15). This expansion of RCRG activities and the delivery of training programs will be vital to communities and their ability to respond to the impacts of climate change.

Awareness and education are key in empowering actions within this thematic area, and a range of initiatives are being progressed to this end. To raise awareness of climate adaptation and its impacts, to

91 <https://www.infrastructure-ni.gov.uk/articles/regional-community-resilience-group>

enable action to address climate change across all sectors of society Climate NI have updated their Communications and Stakeholder Engagement Strategy (ST22). As well as this, Keep Northern Ireland Beautiful is implementing a Climate Ready Project which improves knowledge and awareness about adaption and how community resilience projects can contribute to both mitigation and

adaptation (BE38). With a focus on supporting local government, the NI Local Government Association provides training workshops as part of the regional Elected Member Development Programme (ST7) which aim to build an understanding of the roles and requirements of councillors during emergency events and what resources and support is available.

Case Study 11: Regional Community Resilience Group Pilots: ‘Prepare, Adapt, Strengthen’



DCSDC Community Workshop Group (DCSDC)

The NI Regional Community Resilience Group (RCRG), established in 2013 by the Department for Infrastructure, brings together statutory and voluntary partners for emergency planning. Initially focused on flood response, the RCRG has since expanded its efforts, working with over 40 communities to enhance local resilience against the growing threat of flooding and extreme weather. These risks are expected to worsen as climate change progresses, making it essential to prepare communities for future challenges.

From January to July 2024, the RCRG funded two Community Resilience Group (CRG) pilot projects, led by Derry City and Strabane District Council (DCSDC) and Mid and East Antrim Borough Council (MEABC). These pilots aimed to address a broader range of risks and resilience strategies beyond flooding, while advocating for increased budgetary provision for community resilience. Both councils worked closely with existing local resilience groups, engaging communities in a collaborative, co-creative process.

The two pilots, though employing slightly different methodologies, shared the same goals: promoting a wider resilience agenda, coordinating resilience and emergency responses, and pushing for long-term budget allocations. Both pilots emphasized the importance of interactive, community-led engagement to ensure that local populations were active participants in the development of their resilience strategies.

In DCSDC, a scoping exercise involving eight local groups set the baseline for understanding community risk and resilience through a questionnaire. Two workshops followed: the first with community members to create a response protocol for local risks, and the second with council officers to integrate these findings into council workstreams.

In MEABC, interviews were conducted with representatives from two rural communities to gather insights into what resilience meant locally. A question-and-answer session helped

identify specific issues and resilience sources, which were later discussed with council officers. Using this input, a “resilience toolbox” was developed to equip communities with the necessary information to respond to identified risks.



MEABC Community Workshop (MEABC)

The results from both pilots were consolidated and recommendations were submitted to, and approved by, the RCRG. These included the creation of a regional resilience portal, securing a permanent place for community resilience within central government, and establishing a dedicated funding stream. To conclude the pilots, two workshops were held to share the lessons learned with the participating communities.

The CRG pilots have begun connecting existing resilience groups with each other and with local government. More broadly, they are key to the RCRG’s business case for central coordination, expanding resilience efforts, and securing consistent funding. Strong community resilience networks and well-defined protocols have proven to significantly mitigate the impacts of severe weather and improve recovery efforts. These pilots provide valuable models for a coordinated response to climate change impacts in Northern Ireland, demonstrating how bottom-up community efforts can work in tandem with top-down government support.

More details about RCRG can be found here: <https://www.infrastructure-ni.gov.uk/articles/regional-community-resilience-group>.

The third Climate Change Risk Assessment climate risks associated with the Community Preparedness and Response theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
H1. Health and wellbeing	High temperatures	RISKS	More action needed
H2. Health and wellbeing	High temperatures	OPPORTUNITIES	Further investigation
H3. People, communities and buildings	Flooding	RISKS	More action needed
H4. Viability of coastal communities	Sea level rise	RISKS	Further investigation
H11. Cultural heritage	Changes in temperature, precipitation, groundwater, land, ocean and coastal change	RISKS	More action needed
H12. Health and social care delivery	Extreme weather	RISKS	More action needed
H13. Education and prison services	Extreme weather	RISKS	More action needed
N18. Landscape character	Climate change	RISKS & OPPORTUNITIES	Further investigation
ID3. Migration to the UK and effects on the UK's interests overseas	Climate-related international human mobility	RISKS & OPPORTUNITIES	Watching brief
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Part 6



Image 6-1: Warrenpoint Port, Co Down (Warrenpoint Port Authority)

Part 6: Disruption to Businesses & Supply Chains

Objective

We will support businesses to understand and embed climate adaptation into their strategies and practices, to identify climate risks and to make the most of existing and emerging opportunities. Through encouraging cost-effective early action to strengthen operating models to the risks and impacts of Northern Ireland's changing climate, we will ensure our supply chains have the resilience needed to support our rich network of businesses for our climate today, and tomorrow.

Our Adaptation Objective for Disruption to Business & Supply Chains recognises that Northern Ireland businesses already have and will continue to feel the effects of climate change, particularly extreme weather events. We want to ensure that businesses not only adapt and strengthen their business practices to reduce or prevent the effects of these events, but also have the capacity to benefit from any opportunities that may emerge from climate impacts through timely adaptation.

The importance in making these adaptation changes as early as possible is clear. Whether it be to mitigate against impacts or seize new opportunities, such as the opening up of new

trade routes or changes in demand for goods and services, it will be economically more beneficial to take early action and investment. Furthermore, by taking early adaptation steps, and being proactive in building operating model resilience, a wider breadth of opportunities could be realised.

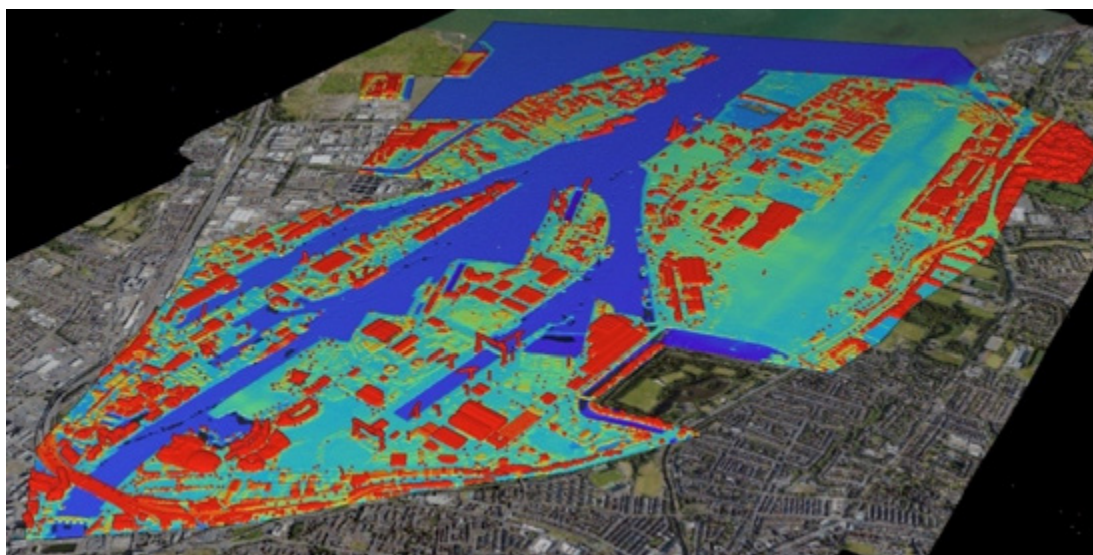
Within this adaptation program, the risks to 'Disruption to Business & Supply Chains' from climate change have been distilled into the following thematic areas and discussed in the following chapters:

- Chapter 15 - Business, and
- Chapter 16 - Finance.

Case Study 12: Belfast Harbour - LiDAR Modelling to Map Risk and Response

Belfast Harbour, occupying around one fifth of the city's landmass, plays a critical role in Northern Ireland's maritime trade and is one of the island's major ports. The harbour is situated on mostly reclaimed land at the mouth of the River Lagan, making it inherently vulnerable to rising sea levels and severe storm surges, risks that are expected to worsen due to climate change. As part of a long-term strategy to address these challenges, the harbour has employed Light Detection and Ranging (LiDAR) technology, paired with a digital twin, to better understand its assets, terrain, and risks. The first survey was completed in June 2023, with the data being used now to plan for future adaptation efforts.

LiDAR technology uses laser sensors from aircraft to create detailed 3-D models of the ground, gathering 25 points of data for every square metre of surface area, with an accuracy of 5cm. This allows for precise modelling of the harbour's estate and offers insights for various applications. Building on earlier hydrographic models used to assess sedimentation risks, this project integrates marine and land-based data to provide a comprehensive view of the port's ecosystem. The data has already been used to create surface, vegetation mass, and 3-D building models. The next step is developing an advanced topographical model of the harbour, which will be updated every 2-3 years to maintain accuracy. This data is incorporated into a "Digital Twin"—a virtual replica used to simulate future scenarios and assess how infrastructure might be affected by climate scenarios. This will allow Belfast Harbour to plan more effectively for both immediate and long-term climate challenges.



LiDAR Elevation (Belfast Harbour)

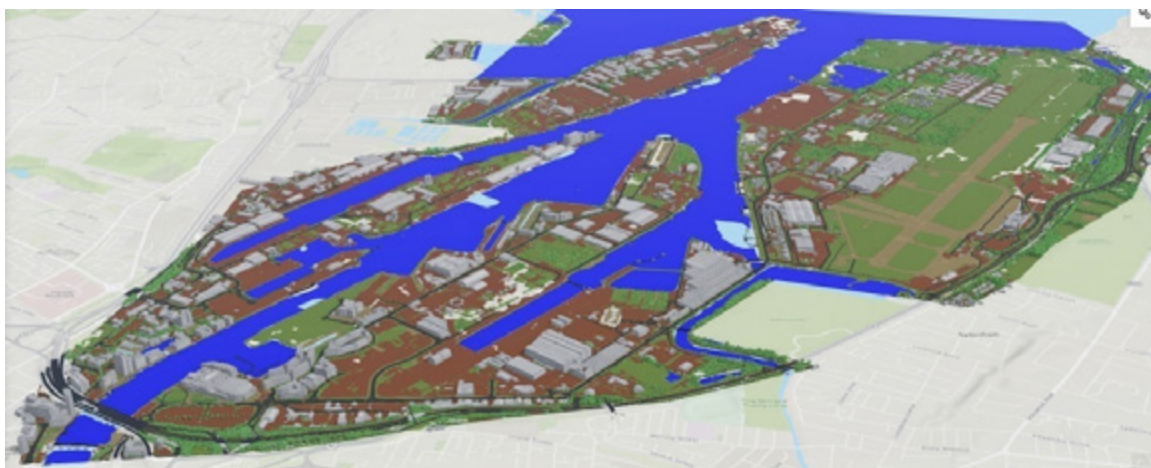
Given the technical nature of the project, third-party involvement was essential. The data was collected by Blue Sky International and hosted by ESRI, but the project was primarily managed by the harbour's marine, environment and biodiversity lead, reporting to the head of sustainability. While voluntary climate adaptation reporting in the port sector follows UK National Policy, Belfast Harbour aims to exceed basic requirements, using the percentage of

buildings impacted by extreme weather as its primary adaptation progress indicator. The LiDAR and digital twin initiative will be featured in upcoming ESG reports and the Port Masterplan, which will outline the port's strategic direction for the next 20-30 years.



Topography example - Harbour Office (Belfast Harbour)

As the harbour has already developed modern infrastructure, it is well-protected against short- and medium-term risks, but this initiative focuses on preparing for the longer-term impacts of climate change. In addition to enhancing resilience, the LiDAR data has other benefits, such as evaluating the harbour's carbon storage potential and contributing to biodiversity enhancement projects. This makes it a cross-cutting investment that supports broader sustainability goals, including the port's Net Zero targets. The initiative also serves as a "thought leadership" project, demonstrating how LiDAR technology can be effectively used for climate adaptation. Belfast Harbour aims to set an example for other organisations by showcasing the practical applications of this technology in resilience planning and providing a model for best practices.



Wireframe Building Model (Belfast Harbour)

Belfast Harbour's LiDAR and digital twin project represents a forward-looking approach to climate adaptation. By leveraging advanced technology, the harbour is better equipped to manage risks from rising sea levels and extreme weather, while supporting wider sustainability goals. This initiative not only strengthens the port's long-term resilience but also positions it as a leader in innovative climate adaptation within the port sector.

Chapter 15: Business

The Climate Change Committee's (CCC) Third Climate Change Risk Assessment Independent Assessment for Northern Ireland (CCRA3-IA) highlighted that the greatest climate change risks to businesses in NI now, and in the future, are risks arising from flooding and extreme weather events resulting in damage to assets such as to the physical business premises and goods within it. The CCRA3-IA advised that *'the expected direct*

annual damages for non-residential properties in Northern Ireland at present is £42m, comprising of 6% of total UK damages'.

The CCC also highlighted significant risks associated with disruption to business operations such as distribution to infrastructure networks and digital services impacting upon transport and sale of goods.

IN THE PAST FIVE YEARS, HAVE YOU OBSERVED ANY DIRECT OR INDIRECT IMPACTS OF EXTREME WEATHER OR CLIMATE CHANGE ON YOUR BUSINESS?

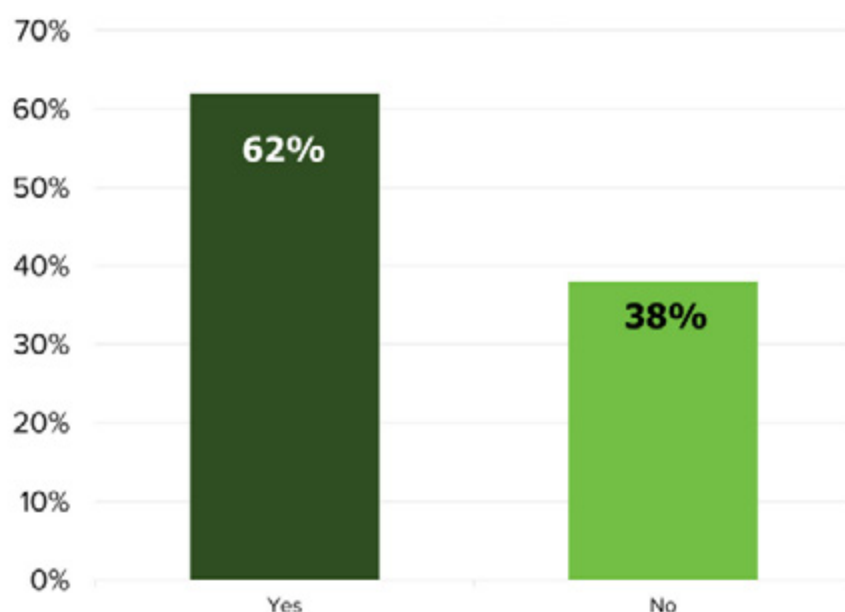


Figure 6-1: Observed impacts of climate change on Northern Ireland businesses over last 5 years (Business in the Community Northern Ireland 2024)

Many NI businesses have experienced first-hand the direct impacts of severe weather events on their premises, operations and supply chains. As seen in figure 6-1, in the Business in the Community Northern Ireland's Environmental Benchmarking Survey 2024⁹², 62% of respondents who took part in the

survey reported that in the past 5 years, their business had observed direct or indirect impacts of extreme weather events. Impacts experienced by businesses can include flooding during severe weather events and the associated disruption caused to infrastructure, on which they rely such as road and rail

⁹² https://www.bitcni.org.uk/wp-content/uploads/2024/11/241108_NIEBS-Report-2024.pdf

networks, information and communication technology and electricity supply. A prime recent example of this is the flooding experienced in Downpatrick and Newry in Autumn 2023 which impacted severely on a number of business premises, and the loss of broadband services to thousands of customers for several days in Fermanagh due to damage caused to infrastructure during storms Isha and Jocelyn in January 2024.

These risks of physical impacts damaging businesses property or goods is highlighted as also having the potential to impact upon access to finance, investment and insurance which is covered in more detail in the finance section.

Other impacts highlighted include reduced customer access to premises, reduced staff productivity and staff absences due to infrastructure disruption and higher temperatures in working environments.

Some NI businesses are also exposed to the indirect impacts of climate change due to their dependence upon wider European and global supply chains such as food produce and manufacturing parts which may be impacted by climate change in their country of origin.

Northern Ireland's business sector is mainly made up of small and medium-sized enterprises (SMEs) which account for 63% of businesses, which is higher than the UK level of 51% as a whole.⁹³ Smaller businesses are considered to be more vulnerable to the impacts of climate change due to their ability to recover in the short term being lesser than larger businesses with multiple operating premises i.e. should their sole operating

premises be impacted they may not have alternative premises to continue to operate from.



Image 6-2: Flooding impact on Downpatrick high street in 2023 (Liam McBurney)

The CCRA3-IA highlights that these issues are expected to worsen in coming years without sufficient adaptation action as flooding and coastal change risk to businesses is expected to move from medium risk to high risk. Water scarcity is stated to be low risk to business production processes now, but this could rise to a medium or high-level risk in future with periods of hot weather putting pressure on supplies.

The risks included in the business area also contain reserved matters relating to impacts on international trade routes and UK food availability through impacts to international imports which are dealt with at a UK level through the National Adaptation Programme⁹⁴ (NAP).

As local domestic food production and manufacturing are however devolved policy areas in NI the resilience of the food system in NI also depends on UK-wide policies which may impact on international supply of certain goods and services.

⁹³ [Business population estimates 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/business-population-estimates-2022)

⁹⁴ <https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3>



Image 6-3: Belfast port (Belfast Telegraph)

As outlined in the third UK National Adaptation Programme (NAP3) the UK Government's Department for Business and Trade published a new Critical imports and supply chains strategy⁹⁵ in January 2024 to strengthen the UK's ability to respond to threats to critical imports, such as from climate change.

As has been highlighted earlier in this Programme the 2018 UK Climate Change Projections⁹⁶ advise that Northern Ireland will experience wetter winters and hotter drier summers. These variables can impact upon agricultural production through the impact on ground conditions and in turn impact upon agricultural practices such as the planting of crops and growing of silage / hay. By way of an example, the prolonged period of wet weather experienced over the winter and early spring of 2023/24 which resulted in waterlogged fields impacted on the ability of farm businesses to plant seed potatoes in February / March 2024 which would have knock on implications to availability and prices.

The CCRA3-IA also recognises that there could be future opportunities through changes in supply and demand for particular

goods and services.

The thematic area of Business is crosscutting in nature and climate risks and their impacts in this area will also impact on the following key areas:

- Natural capital.
- Food security.
- Infrastructure services.
- People and the Built environment.

Therefore, when producing adaptation measures in this area we must also consider any knock-on effects to these cross-cutting areas to ensure they are not negatively impacted.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

To inform, support and build resilience in the Business sector, Invest NI and the Department for the Economy (DfE) take a leading role.

As DfE's key delivery partner, Invest NI provides guidance and resources to local businesses on adaptation to climate risks, challenges and opportunities through their website (DB7), and their Supply Chain Solutions support (DB8) aims to help businesses improve their supply chain

⁹⁵ <https://www.gov.uk/government/publications/uk-critical-imports-and-supply-chains-strategy/critical-imports-and-supply-chains-strategy-html-version>

⁹⁶ <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp>

resilience and competitiveness. They provide advice to help businesses develop competitive advantages through their Operational Excellence Solutions support (DB5), and their Green Economy Development Team (DB6) is promoting opportunities in green markets.

Funded by the Department of Agriculture, Environment and Rural Affairs (DAERA), Business In The Community's (BITC) Climate Action Pledge (DB3) provides further training and knowledge sharing to the business

community through an online platform hosting a series of information, training resources and access to climate advisors. It aims to prepare businesses for the effects of climate change while also guiding them to assist in reducing emissions. Over 100 business organisations have signed the pledge to date and BITC continue to promote resilience guidance on its Climate Action Hub, and support the development of workshops, webinars, and case studies on business climate adaptation in Northern Ireland (ST24).

The third Climate Change Risk Assessment climate risks associated with the Business theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
B1. Flooding of business sites	Increase in flood risk	RISKS	More action needed
B2. Coastal business locations and infrastructure	Coastal flooding, extreme weather, erosion and sea level rise	RISKS	More action needed
B3. Business production processes	Water scarcity	RISKS	Further investigation
B5. Reduced employee productivity in businesses	Infrastructure disruption and higher temperatures in working environments	RISKS	Further investigation
B6. Disruption to business supply chains and distribution networks	Extreme weather	RISKS	More action needed
B7. Changes in demand for goods and services	Long term climate change	OPPORTUNITIES	Further investigation
ID1. Food availability, safety, and quality	Decreasing yields from rising temperatures, water scarcity and ocean changes globally	RISKS	More action needed
ID2. UK food availability and exports	Increases in productivity and areas suitable for agriculture overseas	OPPORTUNITIES	Watching brief
ID6. Increased trade for the UK	Arctic ice melt opening up new trading routes	OPPORTUNITIES	Watching brief
ID7. International trade routes	Climate hazards affecting supply chains	RISKS	More action needed
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Chapter 16: Finance



Image 6-4: Belfast financial district (Queens University Belfast)

The financial system is a highly connected network of financial institutions such as insurance companies, stock exchanges, and investment banks that work together to exchange and transfer capital from one place to another. Through the financial system, investors receive capital to fund projects and receive a return on their investments.

According to the Department for the Economy (2021) 'Mapping the Northern Ireland Financial Services Sector' report there are approximately 24,000 people employed in financial services in Northern Ireland. The key sub sectors are banking, insurance, fintech, credit providers, outsourced solutions, and financial advisors.⁹⁷ The insurance industry in Northern Ireland is made up of a number of UK based and internationally owned providers as well as a large number of insurance brokers.

This thematic area recognises the impacts of climate change on the availability and access to insurance, mortgages and investment stemming from access to finance to implement adaptation measures to climate

risks such as flooding or wildfires for both households and businesses. A key example of this has been seen internationally recently where insurers have been declining to provide cover in high-risk areas, leaving communities financially vulnerable to the worst impacts of climate change⁹⁸.

This risk is becoming more relevant with increasing frequency of storms and flooding incidents as highlighted by the CCC in their assessment of the second Northern Ireland Climate Change Adaptation Programme⁹⁹.

The financial risks contained in the third Climate Change Risk Assessment (CCRA3) are mainly reserved matters which are dealt with at a UK level. Financial institutions in Northern Ireland follow the same legal and regulatory system as the UK. The Bank of England is responsible for maintaining overall financial stability by monitoring and responding to risks including climate change. The UK Government in the NAP3 have set out that they will work with industry, regulators and public finance institutions to deliver the Green Finance Strategy 2023¹⁰⁰, which sets

⁹⁷ [Mapping NI's financial services sector | Department for the Economy \(economy-ni.gov.uk\)](https://www.dfe.gov.uk/what-we-do/our-work/financial-services-sector)

⁹⁸ <https://www.cbsnews.com/news/fires-california-palisades-fire-homeowners-insurance-state-farm-fair-losses/>

⁹⁹ [Adapting to climate change - Progress in Northern Ireland](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1149690/mobilising-green-investment-2023-green-finance-strategy.pdf)

¹⁰⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1149690/mobilising-green-investment-2023-green-finance-strategy.pdf

out a range of actions being taken to protect the financial system from climate-driven impacts and to attract private investment into adaptation.

The thematic area of Finance is cross-cutting in nature and climate risks and their impacts in this area will also impact on other themes such as Business, therefore, when producing adaptation measures in this thematic area we must also consider any knock-on effects to these cross-cutting areas to ensure they are not negatively impacted.

What we are doing

There are many actions happening across Northern Ireland, led on by Government departments, local authorities and the wider public sector as well as by eNGOs, the community and voluntary sector, charities, private business and academia. This summary narrative provides an illustrative snapshot of some of the actions in this area. The full list of actions can be viewed at the Annex - NICCAP3 Adaptation Delivery Plan.

As a reserved policy area, Government action is led on by the UK Government, however NI departments, Local councils and eNGOs are working to progress action where they can within their level of responsibility.

The Department for the Economy's (DfE) key deliver partner Invest NI operate their Operational Excellence Solutions support

(DB5) which can help businesses develop competitive advantage by facilitating improvements to productivity. They also have the Green Economy Development Team (DB6) which focuses on identifying and promoting opportunities in existing and emerging green economy markets, sectors and supply chains.

The Department of Agriculture, Environment and Rural Affairs (DAERA) delivers a 5-year grant programme to contribute to Environmental Policy Priority areas including Nature and Climate Recovery: Building Ecological and Climate Resilience (NC17), while DfE's newly established Adaptation Working Group works to proactively identify and act on the economic risks and opportunities presented by Climate Change in Northern Ireland (ST27).

Collaboration with UK regulators and industry is ongoing to manage systemic risks, and the Maximising UK Adaptation to Climate Change (MACC) hub (ST29) is supporting knowledge sharing to address critical gaps in adaptation planning, implementation and capacity-building. This systemic approach is also supported through the Met Office's information gathering of non-financial impacts of weather events and local councils' complementary action to create a baseline of financial impacts on council business operations from severe weather events (ST12).

The third Climate Change Risk Assessment climate risks associated with the Finance theme are detailed in the following table:

Risk number and Receptor	Nature of risk/opportunity		Urgency Score
B4. Business access to finance, investment and insurance	Extreme weather	RISKS	Sustain current action
ID8. Economic loss to the UK	Climate driven resource governance pressures and financial exposure	RISKS	Sustain current action
ID10. Risk multiplication to the UK	Interactions and cascades of named risks across systems and geographies	RISKS	More action needed

Part 7



Part 7: Implementation Monitoring & Evaluation

Chapter 17: Implementation Monitoring

Implementation

The Northern Ireland Climate Change Adaptation Programme (NICCAP) is a statutory document produced under the Climate Change Act 2008. It is developed in response to the latest UK Climate Change Risk Assessment (CCRA) on a 5-yearly cycle as required by section 60 of the Climate Change Act 2008 (the 2008 Act).

In line with the requirements of the 2008 Act all Northern Ireland Executive Departments are responsible for the progression and delivery of policies and proposals for their respective risk areas of responsibility. The Adaptation Delivery Plan contained in the Annex of this Programme sets out specific action delivery leads and partners. As outlined in Chapter 1, given the important role key stakeholders play in delivering climate adaptation action, the actions contained within the Adaptation Delivery Plan are not solely limited to Departments, but include actions put forward from Councils, Academia, environmental Non-Government Organisations (eNGOs) and the private sector.

Monitoring oversight

To assist with monitoring the progress of delivery of this Programme, the Department for Agriculture, Environment and Rural Affairs (DAERA), with the support of the Climate Northern Ireland project (Climate NI), will lead on collating progress updates from action delivery owners on an annual basis. This information will be used to assist with ongoing internal monitoring of progress, in assisting

the Climate Change Committee (CCC) in their statutory independent assessment of the Programme as required by the Climate Change Act (Northern Ireland) 2022 (the 2022 Act), and in the DAERA undertaking an end of Programme evaluation for incorporation in NICCAP4.

To ensure that ongoing delivery of the Programme continues to be implemented and monitored across Departments the Climate Change Strategic Oversight Group, which comprises senior officials from all Departments, will provide the senior governance oversight for the Programme.

Mid-term review

In advance of Year 3 of the Programme a comprehensive mid-term review will be initiated by DAERA.

This review stage will allow for a comprehensive stocktake of delivery progress as well as providing an opportunity for Departments and stakeholders to propose new actions to be included within the Programme.

In recognition of the rapidly developing policy landscape for climate change it will also allow an opportunity to amend existing actions where required, to reflect any position changes. For example, advances in scientific understanding; or the completion of research projects allowing for progression to the implementation stage of any recommendations; or a move from policy being developed to being implemented. This approach will ensure that the Programme can

be built upon and not treated as static during its lifespan.

The mid-term review, once completed, will be published on the DAERA website.

Climate Change Committee's Adaptation monitoring framework

To support their role in reviewing climate adaptation progress across the UK, the CCC have recently developed an adaptation monitoring framework¹⁰¹ which is aligned to 13 thematic areas for adaptation action as shown in Figure 7-1 below:

Box 1

Thematic areas for adaptation action

The thirteen themes for assessment in the monitoring framework focus on adaptation required to reduce the risks from climate change to:

- **Nature:** Terrestrial (including on farmland), freshwater and marine habitats.
- **Working lands and seas:** Agriculture, forestry and fisheries.
- **Food security:** Domestic and imported food supply chains, as well as vulnerability of society to climate-related food disruption.
- **Water supply:** Public water system which supplies households and businesses.
- **Energy:** Key energy systems, the electricity system (transmission, distribution, and generation), gas networks and novel sources of energy supply (such as hydrogen) as they develop.
- **Telecoms & ICT:** Communications and ICT infrastructure, including data centres, networks and other critical national infrastructure.
- **Transport:** Road networks (both the national strategic road network and local roads), railways, ports and airports.
- **Towns and cities:** The built environment at a settlement scale, covering flooding, coastal erosion and overheating risks.
- **Buildings:** Individual buildings and their occupants, covering overheating and flooding.
- **Health:** Public health, including mortality and morbidity, as well climate-sensitive vector-borne diseases and health care delivery.
- **Community preparedness and response:** Preparedness of communities for climate impacts, including the ability to protect cultural heritage, and their ability to effectively respond when climate and weather-related disruptions occur.
- **Business:** Businesses and their function as a commercial entity, including risks to supply chains (both domestic and international), sites and assets, access to capital and productivity impacts.
- **Finance:** Financial system, so that systemic risks from climate change are minimised and it can effectively support the economy in investing in necessary adaptation actions.

Figure 7-1: Thematic areas for adaptation action

¹⁰¹ <https://www.theccc.org.uk/publication/ccc-adaptation-monitoring-framework/>

Each thematic area has its own bespoke monitoring map detailing several different metrics and indicators to score adaption

within a given area. An example is provided below in Figure 7-2 for the Nature thematic area.

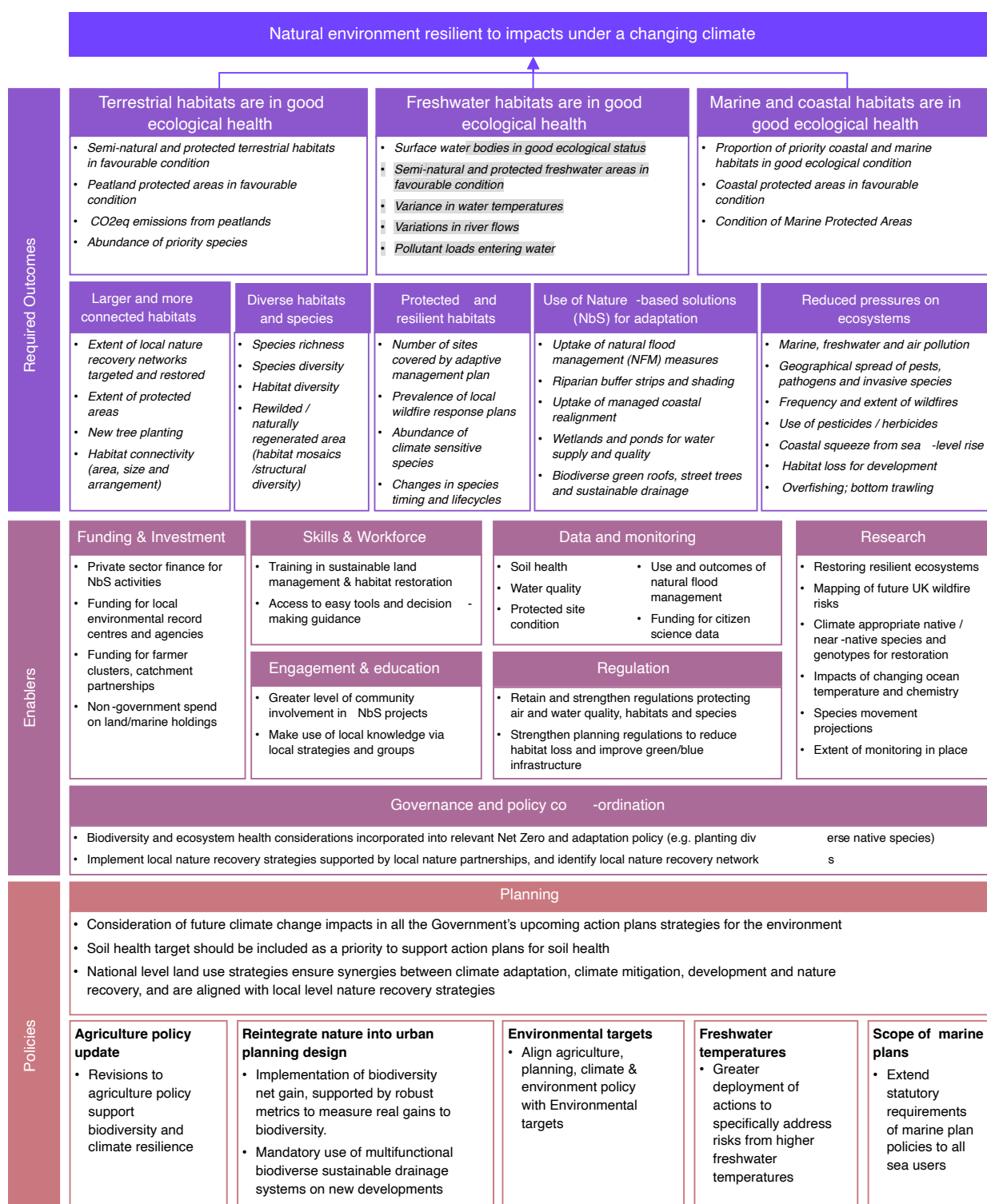


Figure 7-2: Nature thematic area Monitoring map

Thematic areas maps

Each thematic area monitoring map sets out and describes what a well-adapted goal looks like, the required outcomes for delivering those goals, key enabling factors, as well as the underlying policy directions which would be required to support delivery.

As discussed in Chapter 3, we have developed this Programme to align with the CCC's 13 thematic areas in terms of structure and the overarching objectives to assist with the CCC's assessment under section 48 of the 2022 Act.

Indicators

Indicators and supporting datasets play a vital role in monitoring progress to adapt to and increase resilience to both the current and projected impacts of climate change. Indicators provide quantifiable data allowing for the monitoring of performance both good and bad.

In its 2023 assessment of NICCAP2, the CCC identified extensive data gaps which hindered its ability to fully monitor progress which is discussed further in Chapter 18. Whilst this may in part have been due to the Covid 19 pandemic commencing within 6 months of NICCAP2 being laid in the Assembly, it is important that we seek to improve our indicators and supporting data to allow for a more complete assessment to be carried out on the progress achieved by NICCAP3.

To help with this process, the thematic area monitoring maps and available data sets have been used to assist with the identification of a range of suitable indicators for monitoring

progress. These are continuing to be built upon.

To support this work, the Climate NI Network¹⁰² has been utilised to establish a 'Policy and Research Panel' comprising of representatives from academia, eNGOs, the private sector and Government. This panel was established under an initial pilot in 2024 and has helped to identify available datasets and prioritise indicators for further development.

The work of this panel in the development of a suite of supporting indicators will ensure more accurate reporting, the closing of data gaps and a more efficient adaptation implementation monitoring.

These indicators are intended to be used for monitoring of progress both internally and by the CCC, and as work continues to build upon them and identify and source additional supporting datasets, their development is an active ongoing process and so they will not be published with this Programme.

Climate Change Committee Assessment

In June 2022, the Climate Change Act (Northern Ireland) 2022 received Royal Assent. This Act placed a requirement on the CCC under section 48 to undertake an independent assessment of the Programme no later than 3 years after it is laid in the Assembly. This assessment will provide the Committee's assessment on the progress made towards implementing the objectives, proposals and policies, and their recommendations for the next programme (NICCAP4).

¹⁰² <https://climatenorthernireland.org.uk/climate-ni-network/sectors/>

In undertaking this assessment, the CCC will utilise their Adaptation Monitoring Assessment Framework which sets out scoring criteria for assessing:

- i) Delivery and implementation; and
- ii) Policies and plans.

as shown in Figures 7-3 to 7-5 below.

This assessment will be published on the CCC website and a link provided directly from the DAERA website.

Within 6 months of receipt of this report, section 49 of the 2022 Act requires DAERA to lay a response to the points raised in the report at the Assembly with the input of all Departments to which the recommendations made by the CCC are relevant. This response will also be published on the DAERA website.

Table 1 Scoring criteria for delivery and implementation	
Score	Criteria
Good Progress	Indicators are moving in the right direction or being maintained at a high level.
Mixed Progress	Some indicators are moving in the right direction, others are stagnant at a low level or moving in the wrong direction.
Insignificant progress	Indicators are stagnant at a low level or are moving in the wrong direction.
Unable to evaluate	Limited or no available data.

Figure 7-3: CCC scoring criteria for delivery and implementation

Table 2 Scoring criteria for policy and plans	
Score	Criteria
Credible policies and plans	Policy milestones: • are almost entirely achieved or in place. • are comprehensive and appropriately ambitious. • include monitoring and evaluation.
Partial policies and plans	Policy milestones: • are achieved or in place for key milestones but some gaps remain. • cover most important elements, could be more ambitious. • include some monitoring and evaluation.
Limited policies and plans	Policy milestones: • are partially achieved or in place with some key milestones missing. • cover some important elements, could be more ambitious. • include some monitoring and evaluation.
Insufficient policies and plans	Policy milestones: • are mostly not achieved, only minor policies in place. • lack important elements, do not cover key areas or lack ambition. • have minimal monitoring and evaluation.

Figure 7-4: CCC scoring criteria for policies and plans

Delivery and implementation (outer)



Policies and plans (inner)



Figure 7 5: CCC diagrams to demonstrate scoring

Evaluation

In line with the requirement of section 60 (3) of the Climate Change Act 2008 an assessment of progress made towards implementing the objectives, proposals and policies set out in this Programme will be included in NICCAP4.

Whilst not a legal requirement under the 2008 Act a separate report which provides an end of programme delivery position, on the actions contained within the Adaptation Delivery Plan of this Programme, will be published on the DAERA website within 6 months of this Programme's 5-year lifespan being completed.

Chapter 18: Evaluation of NICCAP2

Background

Section 60 of the Climate Change Act 2008 requires that an assessment of progress made towards the implementation of previous Climate Change Adaptation Programmes is to be included in subsequent programmes.

NICCAP1 was published in January 2014, followed by NICCAP2 in September 2019 covering the periods 2014 to 2019 and 2019 to 2024 respectively. An assessment of progress made in NICCAP1 was incorporated into NICCAP2.

The overarching aim of NICCAP2 was:

‘A resilient Northern Ireland which will take timely and well-informed decisions to address the socio-economic and environmental impacts of climate change’.

This aim was underpinned by 5 key priority areas and 7 outcome objectives and visions (figure 7-6). In addition to this, Climate NI supported Local Government to bring forward and develop strategic actions for each of their areas of responsibility. Each Council area put forward actions to develop a Climate Adaptation Plan and take account for Climate Adaptation within their Local Development Plans.

NICCAP2 Key Priority Areas	NICCAP2 Outcome Objectives and Visions
NC Natural Capital, including Terrestrial Coastal/Marine/ Freshwater ecosystems, Soils and Biodiversity. 	- NC1: We will have species, habitats and water bodies that are resilient to the impacts of climate change. - NC2: We have coastal communities, habitats, landforms and infrastructure that are resilient to the impacts of climate change. - NC3: We have soils and woodland that are resilient to the impacts of climate change.
IF Infrastructure Services. 	- IF1: We have Transport & Network Services that are resilient to the impacts of flooding & extreme weather.
P People & Built Environment. 	- P1: We have people, homes, buildings and communities that are resilient to the impacts of flooding & extreme weather.
B Disruption to Businesses & Supply Chains. 	- B1: We have businesses that can adapt to the impacts of climate change & extreme weather.
I Food Security/Global Food Production. 	- I1: We have a food system that is resilient to the impacts of climate change.

Figure 7-6: Priority areas and outcomes of NICCAP2

Delivery of actions within NICCAP2 implementation plan.

In preparation for the end of NICCAP2 an end of programme assessment was commissioned by DAERA, with the support of Climate NI, to establish progress made against the actions contained within the NICCAP2 implementation plan from Departments, Councils, Academia, eNGOs and other key

delivery partners who had actions within the NICCAP2 implementation plan.

This review provides a stocktake of the delivery status against the actions contained within the implementation plan and a short narrative of progress. The stocktake scored each of the actions using the delivery assessment shown in figure 7-7 below.

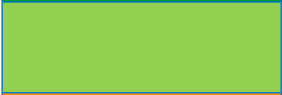
RAG Status Key	Description
	The action was fully achieved within the NICCAP2 lifespan.
	The action showed a good level of progression, in line with expectations, but will require delivery into the next adaptation programme.
	The action was progressed, but not sufficiently to meet expectations. Further work is required to improve delivery progress.
	No progress was made against the action, or the action has been stopped.

Figure 7-7: NICCAP 2 action delivery assessment

Overview of NICCAP2 implementation plan delivery

The end of programme review of action delivery found that of the 137 actions contained within the implementation plan:

- 79 actions were fully achieved within the NICCAP2 lifespan;
- 45 actions were showing a good level of progression but will require delivery into the next programme;
- 10 actions were progressed but not as far as expected with further work required, while
- 3 actions had no, or insufficient progress made against them.

The end of programme review for NICCAP2 containing a position update against each of the actions put forward in its implementation

plan, has been published on the DAERA website.

CCC independent assessment of NICCAP2

As mentioned at chapter 17, DAERA, with the agreement of other Departments, commissioned the CCC, as the independent statutory advisors on climate change, to undertake an independent mid-term assessment of the NICCAP2 which they published on 20 April 2023¹⁰³. In their report, they set out their assessment of progress in adapting to climate change in Northern Ireland, outlining 4 key messages:

- **NICCAP2 has some of the elements required for a vision of a well-adapted Northern Ireland. The current NICCAP objectives envisage a Northern Ireland**

¹⁰³ <https://www.theccc.org.uk/publication/adapting-to-climate-change-progress-in-northern-ireland/>

that is adapted to climate change across seven areas. Most of the seven areas have one or more key performance indicators. This vision centred structure is welcome. Further development of the programme structure is needed to make this vision operational and to drive policy creation and delivery. The seven areas do not span all the aspects of climate change that are critical to Northern Ireland and the current indicators are insufficient to demonstrate how each objective is being delivered.

- **Planning for climate change in Northern Ireland remains at an early stage.** Across key areas of adaptation most of the critical policy and planning milestones that we identify as important for delivering adaptation are not in place. Preparation for climate change in areas falling outside of the scope of NICCAP2 is noticeably poorer than for areas within the programme. There are opportunities to address this, with several key policies currently in development.
- **Despite the critical importance of adapting to climate change, there is only limited evidence of delivery, and data gaps in key areas are unacceptably large.** The absence of relevant data is a key barrier to assessing all aspects relevant to delivery and implementation of adaptation policy. For almost two-thirds of the adaptation outcomes we look at in this report, the lack of relevant indicator data prevents us making a judgement on progress in delivery and implementation. This needs to be addressed with urgency.
- **The next NICCAP must go much further than its predecessor.** It must increase its scope to include the full range of sectors

and policy areas which require adaptation, and critical data gaps need to be closed. The development of the programme is an opportunity to increase understanding and awareness of adaptation needs across government departments, local government, civil society and the public. It should seek to provide a clearer and more compelling link between the actions named in the NICCAP and delivery of the vision of being well-adapted to climate change. It is also an opportunity to embed climate resilience within upcoming plans for Net Zero being developed under the recent Climate Change Act.

Their assessment went on to make 92 recommendations on further action which are available on their website¹⁰⁴.

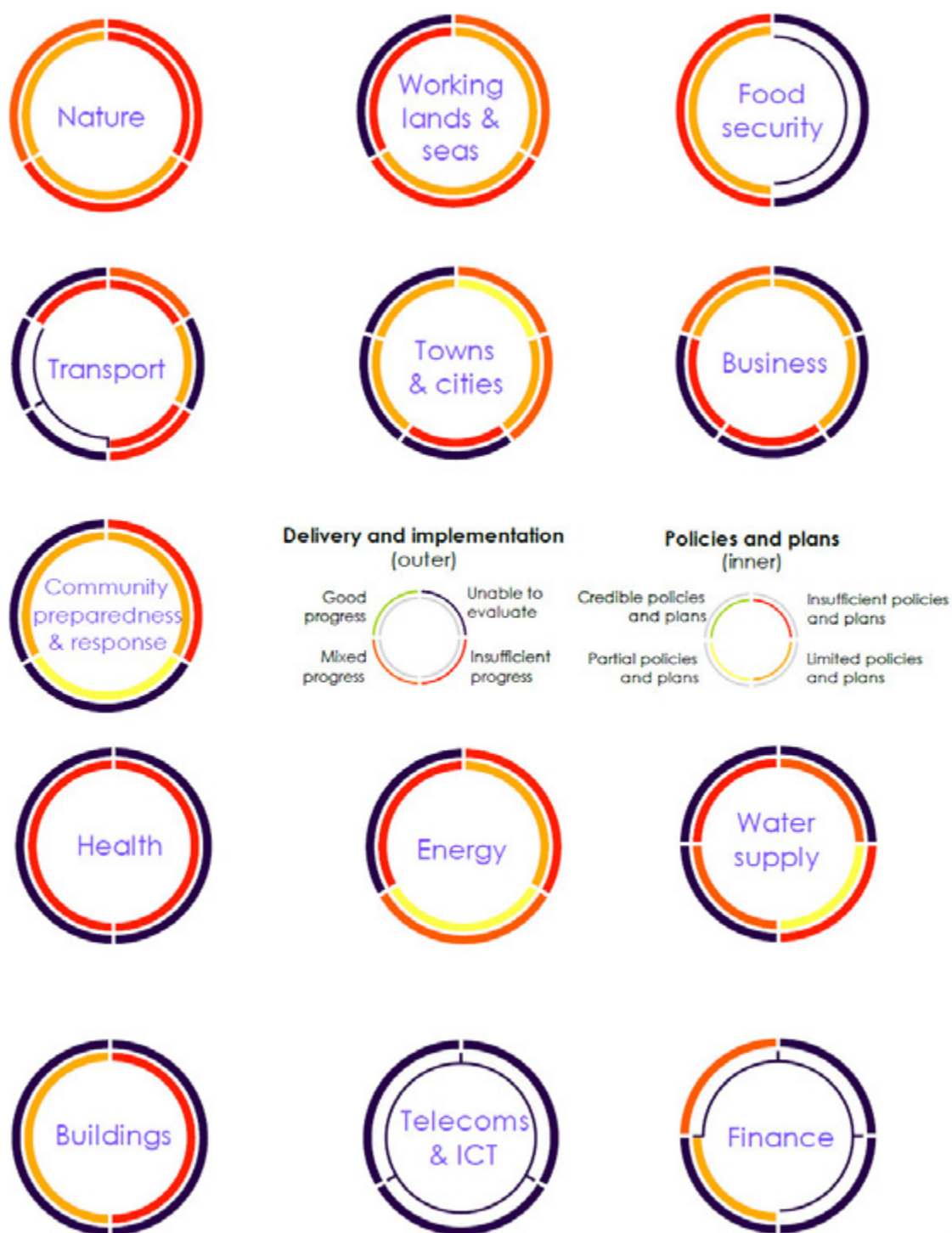
Summary overview of CCC's assessment findings

In chapter 17 we explained that in undertaking their assessment of NICCAP2 the CCC utilised their Adaptation Monitoring Assessment Framework which assesses:

- delivery and implementation; and
- policies and plans.

Figure 7-8 below provides a visual overview of the CCC's assessment findings across the 13 thematic areas in their monitoring framework. While 7 of these areas were used in the development of the 2nd Climate Change Risk Assessment, to which NICCAP2 responded to, the 6 thematic areas of Health, Energy, Water Supply, Buildings, Telecoms & ICT, and Finance were introduced as part of the monitoring framework developed after NICCAP2's publication. As such, NICCAP2 did not address these thematic areas directly.

¹⁰⁴ <https://www.theccc.org.uk/publication/adapting-to-climate-change-progress-in-northern-ireland/>



Source: CCC analysis.

Notes: Each segment of the charts corresponds to an identified climate resilience outcome within our framework. The outer ring assesses delivery and implementation, while the inner ring assesses policies and plans. 'Unable to evaluate' for the delivery and implementation score is used when sufficient relevant indicator datasets are not available, up to date, or do not allow a trend to be robustly estimated. Segments are left white where policy is largely reserved.

Figure 7-8: CCC scoring assessment showing both adaptation areas covered in NICCAP2, and also those 6 areas newly introduced to the CCC's monitoring framework published after NICCAP2. This image and further information can be found in the full report available at <https://www.theccc.org.uk/wp-content/uploads/2023/04/Adapting-to-climate-change-Progress-in-Northern-Ireland-Web.pdf>

The CCC found that for those adaptation outcomes covered under NICCAP2, the credible plans and policies needed to drive forward the delivery of positive outcomes are not yet in place or had not yet been published. In several cases this was due to the lack of an Executive to approve cross cutting plans.

They also found that there was insufficient evidence across all sectors to suggest that climate exposure and vulnerability risk is being managed appropriately. They found that for those thematic areas not covered in NICCAP2 which subsequently had monitoring maps developed for them, planning and delivery was noticeably poorer.

The CCC also found that the absence of relevant data was a key barrier to assessing all aspects relevant to the delivery and implementation of adaptation policy in Northern Ireland. They found that for more than 60% of adaptation outcomes, the lack of relevant indicator data prevented them from making an overall judgement on progress in delivery and implementation.

Assessment of delivery against NICCAP2 objectives

The following is an assessment of the progress made towards the objectives of NICCAP2 through the implementation of the policies and proposals put forward towards each and summarised in Figure 7-9:

Key Priority Area	Total Actions	Fully Achieved	Good Progression	Insufficient Progression	No Progress or Action Stopped
NC Natural Capital, including Terrestrial Coastal/Marine/Freshwater ecosystems, Soils and Biodiversity. 	70	43	21	3	3
IF Infrastructure Services. 	16	8	7	1	0
P People & Built Environment. 	31	14	14	3	0
B Disruption to Businesses & Supply Chains. 	4	4	0	0	0
I Food Security/Global Food Production. 	7	2	4	1	0
Local Government Strategic Actions	22	13	7	2	0

Figure 7-9: Summary of NICCAP2 Actions Progress

NC Natural Capital, including Terrestrial Coastal/Marine/ Freshwater ecosystems, Soils and Biodiversity.	- NC1: We will have species, habitats and water bodies that are resilient to the impacts of climate change. - NC2: We have coastal communities, habitats, landforms and infrastructure that are resilient to the impacts of climate change. - NC3: We have soils and woodland that are resilient to the impacts of climate change.
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Natural Capital

To move towards the achievement of this objective, 70 policies and proposals were put forward. Of which 64 saw significant progress made against them by the end of NICCAP2:

- 43 actions were fully achieved;
- 21 actions were showing a good level of progression but will require delivery into the next programme;
- 3 actions were progressed but not as far as expected with further work required, while
- 3 actions had no, or insufficient progress made against them.

IF Infrastructure Services.	- IF1: We have Transport & Network Services that are resilient to the impacts of flooding & extreme weather.
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Infrastructure Services

This objective also saw significant progress made towards the implementation of the policies and proposal put forward for it. From a total of 16 actions put forward, 15 saw significant progress made during NICCAP2:

- 8 actions were fully achieved;
- 7 actions showed a good level of progression but will require delivery into the next programme; and
- 1 action was progressed but not as far as expected with further work required.

P People & Built Environment.	- P1: We have people, homes, buildings and communities that are resilient to the impacts of flooding & extreme weather.
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People and the Built Environment

A total of 31 policies and proposals were put forward to drive the advancement of this objective through NICCAP2. Of these 28 policies and proposals showed significant progress made through the programme:

- 14 actions were fully achieved;
- 14 actions showed a good level of progression but will require delivery into the next programme; and
- 3 actions were progressed but not as far as expected with further work required.

B Disruption to Businesses & Supply Chains.	- B1: We have businesses that can adapt to the impacts of climate change & extreme weather.
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Disruption to Business

This objective saw each of the 4 policies and proposals put forward under it completed in full during the lifetime of NICCAP2, with no actions being carried over to this programme.

I Food Security/Global Food Production.  	- I1: We have a food system that is resilient to the impacts of climate change.
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Local Government Strategic Actions

Food security

This objective saw 7 policies and proposals put forward, of which 6 saw significant progress made by the end of NICCAP2:

- 2 actions were fully achieved;
- 4 actions showed a good level of progression but will require delivery into the next programme; and
- 1 action was progressed but not as far as expected with further work required.

Local Government

Of the twenty-two strategic actions put forward by each of the 11 Councils, 20 showed significant progress made throughout the programme:

- 13 actions were fully achieved;
- 7 actions showed a good level of progression but will require delivery into the next programme; and
- 2 actions were progressed but not as far as expected with further work required.

The high level of significant progress made towards all the objectives of NICCAP2 is encouraging. However, we recognise that there is still much work to be done in terms of creating a climate resilient Northern Ireland and while several of these policies and proposals have been carried over from NICCAP2 to be built upon, NICCAP3 also contains a significant number of new and emerging policies and proposals to address this significant challenge.

Acronyms & Abbreviations



Image North Coast - Adobe Stock

Acronyms & Abbreviations

Acronym / Abbreviation	Meaning
2008 Act	Climate Change Act 2008
ADP	Adaptation Delivery Plan
AFBI	Agri-Food and Biosciences Institute
AHDB	Agriculture and Horticulture Development Board
AHL	Animal Health Law
AI	Artificial Intelligence
AICBRN	All-Island Climate and Biodiversity Network
AMR	Antimicrobial resistance
ANBC	Antrim and Newtownabbey Borough Council
ANDBC	Ards and North Down Borough Council
AONB	Area of Outstanding Natural Beauty
BBSRC	Biotechnology and Biological Sciences Research Council
BCA	Belfast City Airport
BCAP	Blue Carbon Action Plan
BCC	Belfast City Council
BCP	Business Continuity Plans
BEMS	Building Energy Management Systems
BITC	Business in the Community
BREEAM	Building Research Establishment Environmental Assessment Methodology
BSO	Business Services Organisation
BTFAS	Belfast Tidal Flood Alleviation Scheme
BTO	British Trust for Ornithology
BTV-3	Bluetongue Virus
CAFRE	College of Agriculture Food and Rural Enterprise
CANN	Collaborative Action for the Natura Network
CAP	Climate Action Plan
CARIB	Climate Adaptation Research and Innovation Board

Acronym / Abbreviation	Meaning
CC	Climate Change
CCAAP	Climate Change Adaption Action Plan
CCC	Climate Change Committee
CCEA	Council for the Curriculum, Examinations & Assessment
CCG	Connswater Community Greenway
CCRA	Climate Change Risk Assessment
CCRA-IA	Climate Change Risk Assessment Independent Assessment
CDP	Carbon Disclosure Project
CEDaR	Centre for Environmental Data and Recording
CES	College Estate Strategy
CFI	Coppens Feed Ingredients
Climate NI	Climate Northern Ireland
CO ₂	Carbon Dioxide
CO-ADAPT	Adaptive management of endemic coinfections in ruminant livestock under climate change
CRG	Community Resilience Group
cSAP	concise Species Action Plan
DA	Devolved Administration
DAERA	Department of Agriculture, Environment and Rural Affairs
DAFM	Department of Agriculture, Food and the Marine (Ireland)
DCMS	Department for Digital, Culture, Media, and Sport
DCSDC	Derry City and Strabane District Council
DE	Department of Education
DEFRA	Department for Environment, Food and Rural Affairs
DfC	Department for Communities
DfE	Department for the Economy
DfI	Department for Infrastructure
DHLGH	Department of Housing, Local Government and Heritage (Ireland)
DOE	Department of the Environment
DoF	Department of Finance

Acronym / Abbreviation	Meaning
DoH	Department of Health
DoJ	Department of Justice
DSIT	Department for Science, Innovation and Technology
DSM	Digital Surface Model
DSS	Decision Support System
DTM	Digital Terrain Model
DUGE	Direct-Use Geothermal Energy
EA	Education Authority
EACB	Earthworks Asset Criticality Banding
EB-MSP	Ecosystem-Based Maritime Spatial Planning
EC-RRG	Electronic Communications - Response and Resilience Group
EDR	Earthworks & Drainage Resilience Study
EFS	Environmental Farming Scheme
EIP	Environmental Improvement Plan
EMFG	Environment Marine Fisheries Group
eNGOs	environmental Non-Government Organisations
EPA (ROI)	Environmental Protection Agency (Republic of Ireland)
EPPO	European and Mediterranean Plant Protection Organization
ESRC	Economic and Social Research Council
ESRI	Environmental Systems Research Institute
ETB	Eastern Transport Plan
EU	European Union
FoE	Friends of the Earth
FRA	Flood Risk Assessments
FFRAG	Food, Farming and Rural Affairs Group
FRMP	Flood Risk Management Plan
FSANI	Food Standards Agency in Northern Ireland
GBNNSS	GB Non-Native Species Secretariat
GIS	Geographic Information System
GrowIN	Growing Innovation Network

Acronym / Abbreviation	Meaning
GSNI	Geographical Survey of Northern Ireland
GTEs	Green Transition Ecosystems
ha	Hectares
HBD	Hall Black Douglas Architects
HED	Historic Environment Division
HRA	Habitats Regulations Assessment
HRS	Housing Rights Service
HSC	Health and Social Care
IAS	Invasive Alien Species
ICT	Information and Communication Technology
IGFS	Institute of Global Food Security
INTERREG	Interregional Co-operation Programme
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IWDG	Irish Whale & Dolphin Group
JCA	Jack Coughlan Architects
JNCC	Joint Nature Conservation Committee
KNIB	Keep Northern Ireland Beautiful
LA	Local Authority
LACS	Local Authority Climate Service
LANI	Landlords Association for Northern Ireland
LEEP	Land, Environment, Economics and Policy Institute
LGCAN	Local Government Climate Action Network
LiDAR	Light Detection and Ranging
LMCNI	Livestock and Meat Commission for Northern Ireland
LUNZ	Transforming Land Use for Net Zero, Nature and People
LWW	Living With Water
MCS	Marine Conservation Group
MEABC	Mid and East Antrim Borough Council

Acronym / Abbreviation	Meaning
MarPAMM	Marine Protected Area Management and Monitoring
MOJ	Ministry of Justice
MPA	Marine Protected Area
MRC	Medical Research Council
MSS	Multispecies Sward
MVHR	Mechanical Ventilation with Heat Recovery
NAP	National Adaptation Programme
NBA	Nature Based Solutions
NBS	National Building Specification
NDNA	New Decade, New Approach
NEPD	Natural Environment Policy Division
NFI	Net Feed intake
NGA	Next Generation Access
NGO	Non-Government Organisation
NI	Northern Ireland
NIARP23	Adapting to Climate Change' report on progress in Northern Ireland April 2023
NIAS	Northern Ireland Ambulance Service
NICCAP2	2nd Northern Ireland Climate Change Adaptation Programme
NICCAP3	3rd Northern Ireland Climate Change Adaptation Programme
NICS	Northern Ireland Civil Service
NIE	Northern Ireland Electricity
NIEA	Northern Ireland Environment Agency
NIEL	Northern Ireland Environment Link
NIEN	Northern Ireland Electricity Networks
NIFRA	Northern Ireland Flood Risk Assessment
NIFRS	Northern Ireland Fire and Rescue Service
NIHE	Northern Ireland Housing Executive
NILGA	Northern Ireland Local Government Association
NISRA	Northern Ireland Statistics and Research Agency

Acronym / Abbreviation	Meaning
NIW	Northern Ireland Water
NLHF	National Lottery Heritage Fund
NRS	Nature Recovery Strategy
NT	National Trust
OFCOM	Office of Communications
OHS	Occupational Health Service
OREAP	Offshore Renewable Energy Action Plan
PH	Public Health
PHA	Public Health Agency
PIPES	Pollutants in Peatlands
QUB	Queens University Belfast
RCRG	Regional Community Resilience Group
RDCA	Rathlin Development and Community Association
RPG	Renewable Power Generation
RSPB	Royal Society for Protection of Birds
S&T	Signals and Telecoms
SAC	Special Areas of Conservation
SAPHIRE	Sensor Application to Peatland Hydrology in Remote Environments
SAS	Surfers Against Sewage
SDGs	Sustainable Development Goals
SFI	Science Foundation Ireland
SME	Small and Medium-sized Enterprise
SNHS	Soil Nutrient Health Scheme
SOLACE	Society of Local Authority Chief Executives
SONI	System Operator for Northern Ireland Ltd
SPACE	Supportive Environments for Physical and Social Activity, Healthy Ageing and Cognitive Health
SPARC	Sustainable Parasite Control in Grazing Ruminants
SPPG	Strategic Planning and Performance Group
TALX	Transboundary Adaptation Learning Exchange

Acronym / Abbreviation	Meaning
TCFD	Task Force on Climate-related Financial Disclosures
TRAM	Transport and Road Asset Management
UCL	University College London
UFU	Ulster Farmers Union
UKCP18	UK Climate Change Projections data from 2018
UKRI	UK Research & Innovation
UW	Ulster Wildlife
WAOB	World Agricultural Outlook Board
WDPD	Water and Drainage Policy Division
WHO	World Health Organisation
WWF	World Wildlife Fund for Nature
WWT	Wildfowl and Wetlands Trust



Third Northern Ireland Climate Change Adaptation Programme (NICCAP3)



Department of

**Agriculture, Environment
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An Roinn

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