

Context

Northern Ireland's population of just under 1.8 million makes it the smallest of the UK's Devolved Administrations. Physically separate from the rest of the UK, its distinctiveness is reinforced by its predominantly rural character, a geologically highly diverse landscape and the presence of a land border with the Republic of Ireland.

Largely as a result of this distinctiveness, Northern Ireland's potential vulnerability to climate change differs in a number of respects from that affecting England, Wales and Scotland. In particular, threats posed by a changing climate may be exacerbated by:

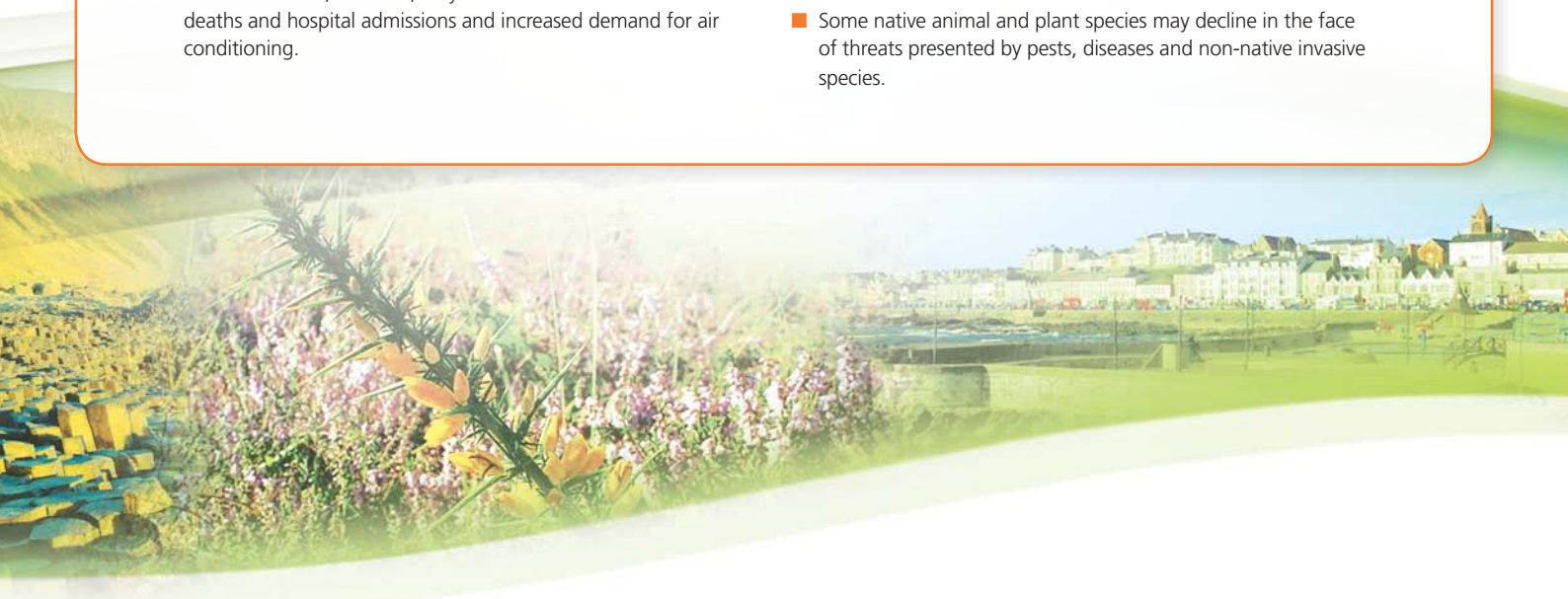
- Northern Ireland's relative isolation, heightening its exposure to any disruption of supply routes occurring as a result of extreme weather (which may become more frequent as the climate changes).
- Northern Ireland's relatively high levels of social deprivation, with many socially deprived areas in places that are also at high risk from extreme weather events.

In addition, a changing climate may amplify the pressures on the region's fragmented, extremely varied landscape that are already being exerted by conflicting land-use demands.

Northern Ireland's current climate is characterised by relatively mild winters, cool summers and periods of more extreme weather. During the 21st Century Northern Ireland is projected to experience increasing average temperatures throughout the year, an increase in average rainfall in winter, a decrease in average rainfall in summer and rising sea levels (UK Climate Projections 2009, UKCP09). The Climate Change Risk Assessment (CCRA) has considered the main opportunities and threats for Northern Ireland that may result from these changes in climate.

Key Findings

- Grass and wheat yields and forestry productivity are projected to increase significantly as a result of increased temperatures, creating potentially valuable opportunities for agriculture and forestry (assuming water or nutrient availability do not act as limiting factors).
- Milder winters are projected to lead to fewer deaths and hospital admissions due to cold weather, as well as a reduction in winter energy demand.
- Hotter summers, however, may lead to a rise in heat-related deaths and hospital admissions and increased demand for air conditioning.
- Hotter summers may boost tourist numbers, while warmer temperatures in general may extend the tourist season.
- Less summer rainfall may lead to a reduction in river flows, affecting public water supplies and increasing the risk of pollution, and a reduction in soil moisture, potentially damaging natural ecosystems and increasing the need for irrigation of some crops.
- Flooding may pose an increasing threat to people, property, critical infrastructure and important natural habitats.
- Some native animal and plant species may decline in the face of threats presented by pests, diseases and non-native invasive species.



Northern Ireland

The results presented here do not take account of changes in society (e.g. population growth, economic growth and developments in new technologies); nor do they take account of responses to climate risks (e.g. future or planned Government policies or private adaptation investment plans).

Focus on... the Natural Environment

Northern Ireland has a remarkable diversity of species and habitats. However, some are already in decline, with almost 500 species currently on Northern Ireland's Priority Species List. Climate change may increase the vulnerability of terrestrial, freshwater, coastal and marine environments, presenting risks to species, habitats and the services that natural ecosystems provide (e.g. water purification and crop pollination).

A number of species such as the skylark and song thrush are projected to experience significant losses in their 'climate space' (areas where the climate is suited to them), although others such as the marsh fritillary butterfly may enjoy significant gains. Drier soils resulting from reduced summer rainfall may pose a particular threat to species and habitats, with local extinctions of some important species in blanket bogs, for instance, anticipated by the 2050s.

Changing climatic conditions may increase the threat from pests and diseases, as well as from invasive non-native species, some of which are already presenting problems. Peat soils (an important carbon store), grassland and woodland may face an increased threat from wildfires.

Reduced summer river flows and higher water temperatures are projected to adversely affect the freshwater environments that are a particular feature of Northern Ireland, including increasing the risk of water pollution. In coastal and marine environments, tidal flooding and coastal erosion could potentially endanger intertidal habitats and grazing marshes, impacting coastal species and migration patterns.

Confidence

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Increased risk of wildfires: between 10% and 30% by the 2080s.

Focus on... Agriculture & Forestry

Warmer temperatures may present Northern Ireland's agriculture and forestry sectors with greater opportunities than other parts of the UK, as restricted water availability in summer may not be as severe in Northern Ireland. While potato yields may decline, both wheat and grass productivity could potentially increase. An important consequence of a rise in grass yields would be the extension of the grazing season for livestock.

Although agriculture in Northern Ireland may also face a range of climate-related threats, it may not suffer any particularly severe negative consequences, with the possible exception of an increased likelihood of flooding. However, there might be substantial local variations in the scale and extent of the positive and negative impacts that climate change has on agricultural operations.

With respect to forestry, warmer temperatures may lead to an increase in yields of Sitka spruce (the predominant tree species in Northern Ireland's commercial plantations), although this may be offset to some degree by the effects of reduced summer rainfall. The biggest risk could potentially come from pests and diseases, which are already posing an increasing threat. By the 2050s, red band needle blight may affect a significant proportion of Northern Ireland's forests.

Confidence

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Increase in grass growth: between around 10% and 30% by the 2020s, rising to between around 20% and 50% by the 2050s and 2080s (baseline: 1960-1991).

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Increase in wheat yields: between around 20% and 65% by the 2020s, between around 30% and 115% by the 2050s and between around 40% and 180% by the 2080s (baseline: 1960-1991).

Focus on... Business

Climate change may result in an increase in existing weather-related risks to businesses in Northern Ireland. These risks are already significant. 98% of Northern Ireland's businesses employ fewer than 500 people – a significantly higher proportion than in the rest of the UK. This may have important implications in terms of climate impacts as smaller businesses tend to be less likely to have adequate insurance and may lack the resources to recover rapidly from extreme weather events.

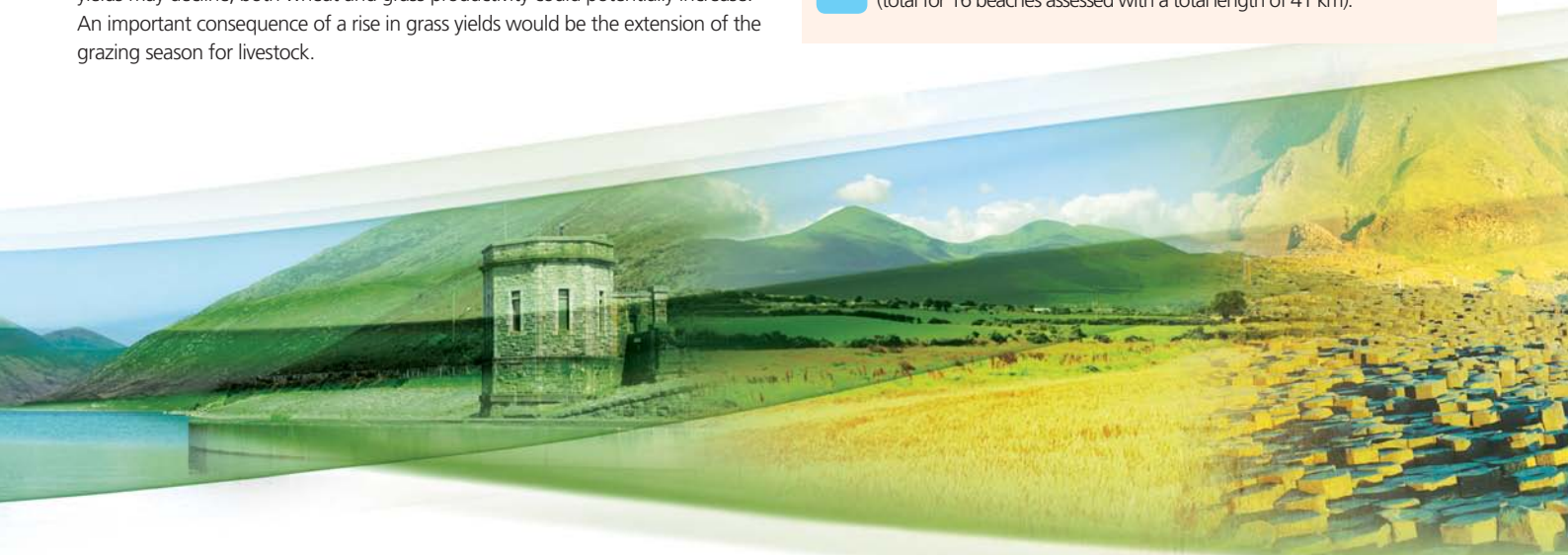
Increased likelihood of flooding might represent the biggest climate risk to Northern Ireland's business sector. While warmer temperatures and a possible extension of the tourist season may create opportunities for Northern Ireland, tourism may be adversely affected by coastal and river flooding, as well as by coastal erosion. Beaches, other natural assets and tourist facilities may all be at increasing risk.

Northern Ireland's ports may benefit from growth in container traffic if climate change opens up Arctic shipping routes due to increased melting of sea ice.

Confidence

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Beach area loss due to sea level rise: up to 100 ha by the 2080s (total for 16 beaches assessed with a total length of 41 km).



Focus on... Buildings & Infrastructure

While partially offset by a potential rise in energy demand for cooling in the summer, a reduction in energy needed for winter heating is projected to be an important benefit of climate change. There may, however, be an increased risk of flooding affecting buildings and key infrastructure across Northern Ireland, although flood risk in general may be less severe in Northern Ireland than in other parts of the UK.

A potentially serious threat might develop if the amount of water available for public supply reduces due to lower summer rainfall. By the 2050s, around 1.5 million people in Northern Ireland may be living in areas affected by occasional water shortages.

Northern Ireland is one of the UK's cooler regions. Although overheating of buildings might become more prevalent in summer, the Urban Heat Island effect (where night-time temperatures in urban areas stay appreciably higher than in the surrounding countryside) may not pose a major threat to Northern Ireland's relatively small cities.

Confidence

M Decrease in water available for public supply: around 10% by the 2050s, equivalent to 104 Ml/day (present day baseline: 758 Ml/day).

While increased ground-level ozone might affect air quality in summer, leading to a rise in the number of deaths and illnesses among people with existing respiratory conditions, air pollution and its associated health impacts may decrease in winter.

Flooding may pose a growing threat to health and wellbeing in Northern Ireland, with deaths, injuries and cases of mental illness among some flood victims increasing. A rise in the frequency and intensity of floods, wildfires and similar events could potentially lead to a significant increase in the workload of the emergency services.

Confidence

L Reduction in cold-related deaths per year (based on current population figures): between 160 and 240 by the 2050s, rising to between 240 and 360 by the 2080s (context: in 2009, the total number of deaths in Northern Ireland from all causes was 14,000).

L Increase in heat-related deaths per year (based on current population figures): around 30 by the 2050s, rising to around 60 by the 2080s.

Focus on... Health & Wellbeing

The number of deaths and hospital admissions attributable to cold weather is projected to decline as winters become milder. This may more than outweigh the potential increase in heat-related deaths and hospital admissions caused by hotter summers. Overall, the risk to health posed by heat may be less severe in Northern Ireland than in some other parts of the UK (e.g. south-east England).

A selection of opportunities and threats for Northern Ireland

The diagram below outlines a selection of potential opportunities and threats for Northern Ireland that could arise as a result of climate change, as identified by the CCRA and based on projections for the Medium emissions scenario (central estimate). The full list of opportunities and threats assessed for Northern Ireland are given in the full CCRA Report on Northern Ireland.



The Challenge of Adaptation

For Northern Ireland, lack of data combines with the intrinsic uncertainty surrounding a range of climate risks to make it particularly difficult to predict the potential impacts of climate change with either precision or confidence. Addressing the limitations in information currently available will be essential if adaptation actions designed to address the effects of climate change are to be evidence-based and effective.

Specific gaps in knowledge currently include, for example:

- The number of hospitals and other infrastructure components (roads, railways, sewage treatment works, electricity substations etc.) in Northern Ireland that may be at risk from flooding and the extent to which this may increase in the future.
- Cultural heritage at risk from coastal flooding and erosion.
- The potential impact of climate change on the ability of industry in Northern Ireland to abstract water (which may become a particularly pressing issue towards the middle of the century).

Progress is already being made, however, in many important aspects. For instance, in the key sphere of flooding, a Preliminary Flood Risk Assessment for Northern Ireland was published in December 2011, enabling flood risks up to the year 2030 to be assessed.

At a policy level, the Northern Ireland Executive is responsible for adaptation to climate change (in all policy areas transferred to the Executive under the terms of the Northern Ireland Act 1998). In addition, the UK Climate Change Act

2008 requires Northern Ireland Departments to prepare adaptation programmes as soon as is reasonably practicable after the production of the UK CCRA and to review these every five years.

A Cross Departmental Working Group on Climate Change (CDWG CC) has been established by the Northern Ireland Executive. This has convened an Adaptation Sub Group, whose key responsibilities include the following:

- Evaluation of the risks to and opportunities for Northern Ireland arising from climate change.
- Preparation and delivery of a cross-departmental adaptation programme.
- Annual reviews of cross-departmental action on adaptation.
- Reporting to the CDWG CC on adaptation progress.
- Making recommendations and/or taking decisions on wider climate change adaptation issues.

Policy-level initiatives like these are designed to provide a secure platform that will facilitate effective action on adaptation across all spheres of Northern Ireland's economy and society in the years and decades ahead.

Where to Get Further Information

For a copy of the full CCRA Report on Northern Ireland, the CCRA Evidence Report or the CCRA Sector Reports, please visit www.defra.gov.uk/environment/climate/government/

For details of adaptation planning work now being undertaken in Northern Ireland, please visit www.doeni.gov.uk/index/protect_the_environment/climate_change.htm

How the CCRA was conducted

The CCRA reviewed the evidence for more than 700 potential climate change impacts on the UK economy, society and environment. Over 100 of these impacts across 11 sectors were taken forward for more detailed analysis at UK-wide scale, having been selected on the basis of likelihood, potential consequences and how urgently adaptation action may be needed to address them.

A list of the most important impacts for Northern Ireland was subsequently developed through a process of consultation with stakeholders. This took into account the impacts considered to be the most important for the UK as a whole, together with particular features and issues relevant to Northern Ireland.

A plausible range of climate change scenarios was used in the analysis. Some aspects of socio-economic change (e.g. population growth) were also taken into consideration. Adaptation policies that are planned for the future were generally not considered, so that the underlying level of risk could first be compared across sectors.

The results presented here are based on the UKCP09 Medium emissions scenario for the 2020s (2010-2039) and the Low, Medium and High emissions scenarios for the 2050s (2040-2069) and the 2080s (2070-2099). In all cases, a range of probabilities from 10% to 90% was considered, to provide an indication of the uncertainty associated with these projections.

The CCRA categorised risks as low, medium or high based on their economic, social and environmental consequences. Findings are also categorised as having low, medium or high confidence, to illustrate the strength of evidence and consensus related to the direction and magnitude of different risks and opportunities.

Further information on how to interpret the CCRA results is presented in the full CCRA Report on Northern Ireland available at www.defra.gov.uk/environment/climate/government/