NIAdapts
Planning Toolkit

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Step One

Getting Started

What is climate change and how does it impact Northern Ireland?

What is Climate Change?

Climate change is the long-term shift in average weather patterns across the world. Humans have contributed to the release of carbon dioxide and other greenhouse gases since the mid-1800s. This causes global temperatures to rise, resulting in long-term changes to the climate.

Average global temperatures have already risen by around 1°C since the industrial revolution.

Climate impacts

Some greenhouse gases stay in our atmosphere for hundreds of years. This means that the emissions we have released into our atmosphere are effectively locked in and will contribute to increasing temperatures. Even if we stop all emissions tomorrow, we cannot avoid some level of warming. The extent of warming, beyond what we have already caused, depends on the changes we make.

If we continue to burn fossil fuels and cut down forests at the same rate, the planet could warm by more than 4°C by 2100[1]. This warming could fundamentally change life on earth, with potentially significant consequences.

Projected changes to the global climate include[2]:

- **Rising ocean levels -** Rising temperatures are causing glaciers and ice sheets to melt, adding more water to the oceans and causing the ocean level to rise. Oceans absorb 90% of the extra heat from global warming: warmer water expands, and so our oceans are taking up more space.

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- **Ocean acidification –** Ocean acidification occurs when the ocean absorbs carbon dioxide and becomes more acidic.

- **Extreme weather events –** Climate change is causing many extreme weather events to become more intense and frequent, such as heatwaves, droughts, and floods.

- **Flooding of coastal regions –** Coastal cities (e.g. Belfast) are at risk from flooding as sea levels continue to rise

- **Food insecurity –** High temperatures, extreme weather events, flooding, and droughts damage farmland. This makes it difficult for farmers to grow crops and means that their yield of crops each year is uncertain.

- **Conflict and climate migrants –** Climate change can exacerbate existing problems, such as lack of food or shelter. This may cause global conflict over resources (food, water, and shelter) and cause others to migrate in large numbers.

- **Damage to marine ecosystems –** Rising ocean temperatures, ocean acidification, and ocean anoxia (lack of oxygen) are damaging to marine life such as fish and coral reefs.

What impact will climate change have on Northern Ireland?

Observed changes in our climate

Headlines

- Northern Ireland's climate is changing in line with the global average temperature.

- Temperatures are rising across all seasons.

- Sea levels are rising.

- The frequency and intensity of extreme weather events is changing.

Northern Ireland is already experiencing rising average temperatures, with measured warming of around 1°C above pre-industrial levels[3]. This trend is in line with global average temperature trends. All the top 10 warmest years for the UK in the series from 1884 have occurred since 2002[4].

- The average temperature of the decade 2009-2018 was 0.9°C warmer than the 1961-1990 average[3].

- Winters in the UK during the same decade (2009-2018), have been on average 12% wetter than 1961-1990.

- In the UK overall, total rainfall from extremely wet days increased by around 17% in the decade 2008-2017, compared to 1961-1990.

- Mean sea level around the UK has risen by about 17 cm since the start of the 20th century (when corrected for land movement)[4]. In Belfast, sea level rise is 3mm per year.

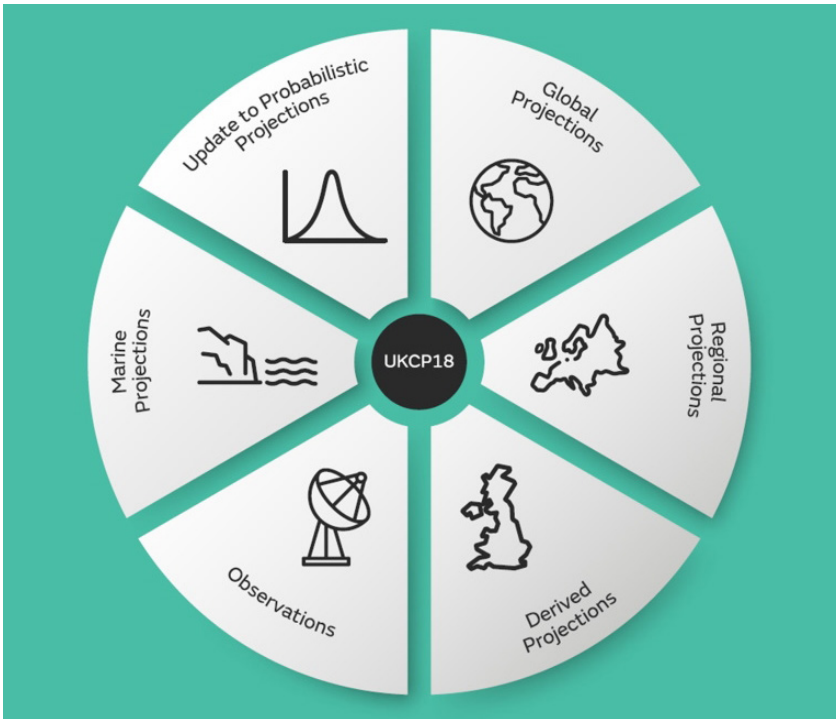
Extreme Weather Events experienced across NI

The consequences of climate change in Northern Ireland will include flooding, extreme storm surges, heat waves, wildfires and drought. Extreme events are already impacting on our society, communities, economy and natural environment.

A timeline of past extreme weather events in Northern Ireland is available on the Climate NI Extreme Weather Timeline.

Projected changes in NI's climate

Headlines[5]
Headline Result: "an increased chance of warmer, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes."



- A greater chance of more rainfall in the winter but less rainfall in the summer
- A greater chance of higher average temperatures across both summer and winter
- At least 11cm of sea-level increase 'locked-in' by 2100 regardless of emissions reduction

Cold snaps, drier winters and wet summers will still occur. This means we must be prepared for a greater range of extremes.

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Sea Level Rise

Northern Ireland is locked in to at least 11cm sea-level rise by 2100, but unless global emissions decline, that number could be as much as 94cm[5].

It is expected that there will be an increase in both the frequency, and magnitude of, extreme water levels around our coastlines[3].

How much will sea levels rise in the UK?

Projected sea level rise projections at four UK capital cities by 2100 relative to 1981-2000. The range for a low emission scenario (blue) and high emission scenario (red) are shown below*: (For reference, UK sea levels have risen by 16 cm since the start of the 20th century.)

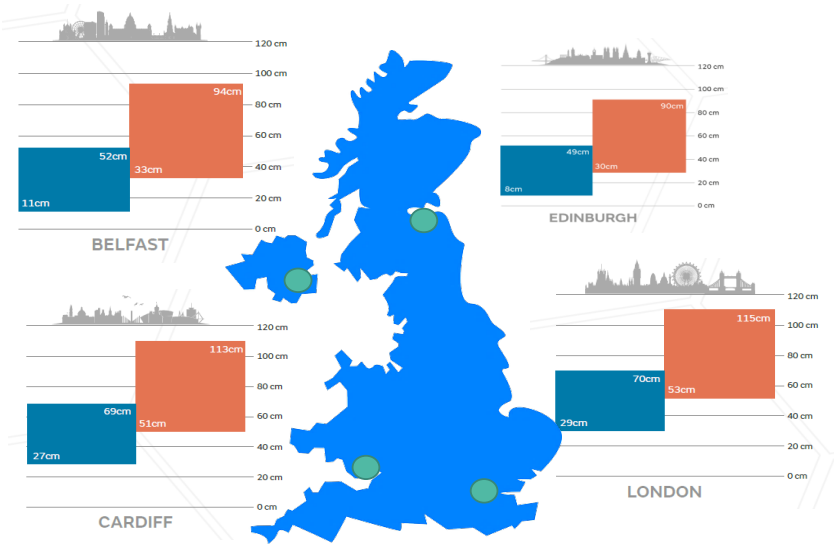

Image: Met Office, UKCP18 National Climate Projections, 2021[6]

*RCP2.6 and RCP8.5 are the low and high emission scenarios used, as in IPCC AR5. The range is very likely (5th-95th percentile). (UKCP18,2018)

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Increasing Frequency of Extreme Weather

UK projections anticipate increases in extreme weather events with higher intensity rainfall events, storm events and increased flood risk[5].

Increasingly Hot Summer Days

Hot summer day temperatures are expected to increase by between 3.7 °C to 6.8 °C by the 2070s, along with an increase in the frequency of hot spells (two or more consecutive days over 30 °C)[5].

A summer heatwave like summer 2018 is expected to happen in one in every two years by 2050 and the likeliness is around 90% by the end of the century[5].

More Intense Summer Rainfall Events

Despite the trend towards drier summers, future increases in the intensity of heavy summer rainfall events are projected. For example, rainfall associated with an event that occurs typically once every 2 years increases by 25%[5]. For urban areas particularly, this will impact on the frequency and severity of surface water flooding.

Fewer Winter Cold Snaps

Cold snaps like -18.7°C at Castlederg in 2010 will still occur as a result of natural variations in the climate system, but are projected to be less frequent as winters become warmer on average.

Wetter Winters

Average precipitation is likely to increase by up to 10% by mid-century[5].

For more information about the climate risks facing Northern Ireland over the next five years, see the UK Climate Change Risk Assessment 2017 (NI summary). For example, there are many risks facing people and our built environment:

Climate hazards facing people and the built environment in the UK.

	Communities & settlements	Buildings	Health & social care system	Population health
Heatwaves	Heatwaves urban heat island, air pollution	Overheating	Overheating risks to patients, social care, occupational risks, energy use	Heatwave risks to populations, mortality, injury etc.
Floods	Flooded communities, resilience, relocation, blight/economic effects	Flood damage, damp, mould	Flood risk to NHS assets, service disruption	Flood impact on mental health, deaths and injuries
Drought	Risk to water supply, drought	Subsidence	Service disruption	Water supply failure, risks to public health
Cold	Risk from extreme weather	Damp homes, cold homes	Service disruption	Cold risks to mortality and morbidity

Image: Committee on Climate Change, UKCCRA, 2017[7].

References

1. Met Office (2019) 'What is Climate Change?' Available online: https://www.metoffice.gov.uk/weather/climate/index Accessed November 2019

2. Met Office (2019) 'UK Climate Projections: Headline Findings'. Available online at https://www.metoffice.gov.uk/weather/climate/index Accessed on Nov 2019.

3. DAERA (2019) Northern Ireland Climate Change Adaptation Programme 2019-2024. Available online: https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme-2019-2024 Accessed February 2023.

4. Met Office and Royal Meteorological Society (2018) 'State of the UK Climate Report'. Available online: https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/joc.6213 Assessed November 2019.

5. Met Office (2022) 'UK Climate Projections: Headline Findings'. Available online: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_headline_findings_v4_aug22.pdf Accessed February 2023.

6. Met Office (2021) 'UKCP18 National Climate Projections'. Available online: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-overview-slidepack-march21.pdf Accessed February 2023.

7. Committee on Climate Change (2017) 'UK Climate Change Risk Assessment 2017 Evidence Report.' Available at: https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/ Accessed November 2019.