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Climate Impacts Assessment for Warwickshire County Council

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Warwickshire County Council

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FOREWARD

Warwickshire County Council declared a climate emergency in 2019 and is actively pressing ahead with the integrated workstreams of climate adaptation and reducing carbon emissions. The Council has been working towards climate adaptation for the last decade and most recently completed an initial stage adaptation report with recommendations adopted and committed to within the Council Plan 2020-25. This study updates and builds on that existing knowledge by providing a local focus tailored to both council and adjacent services affecting the livelihoods of those in Warwickshire. This main report is designed to provide a broad overview of impacts and is intended to act as the basis for more detailed work focused on priority service areas and responses that the Council needs to build into everyday decision making.

In producing this report, we have collected information from a broad range of service areas across the County Council, as well as Warwickshire District and Borough Councils. The report is accompanied by a short technical report and an expanded decision mapping workbook which underpins the tables on pages 8 and 9.

Our thanks go out to Local Partnerships, the UK Climate Impacts Programme (UKCIP) at the University of Oxford and all those that helped us develop this valuable study.

Matt Whitehead,

Programme Manager (Climate Change)

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BACKGROUND AND METHODOLOGY

Background

A rise in global temperature is inevitable. The UK will see hotter drier summers and warmer wetter winters.

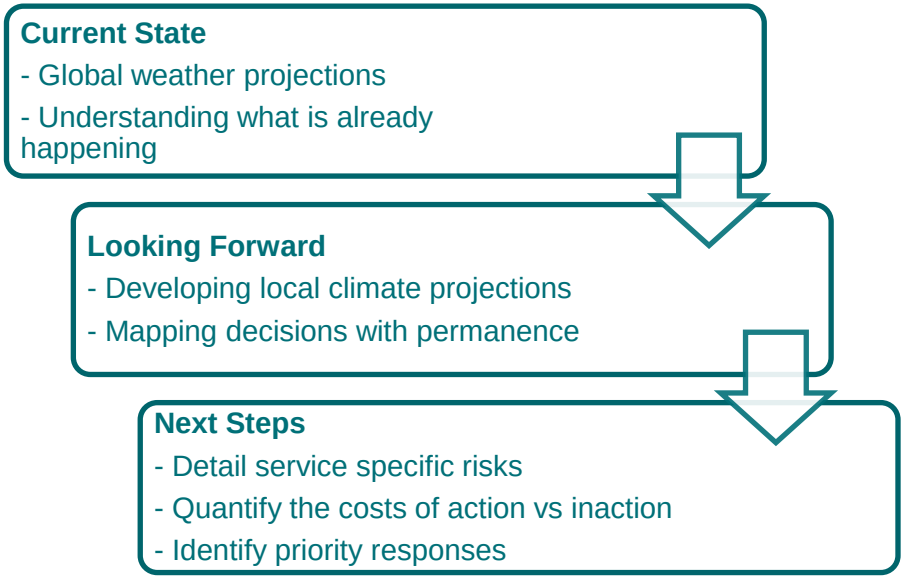
Rainfall will be become more intense and extreme weather events more frequent. The changing conditions will lead to changes in the water table, summer droughts, and introduce new pests and diseases.

The impacts are profound from homes being flooded, infrastructure eroded and vulnerable people being at risk from heat. Aside from this eco systems will be changed with some species unable to flourish and new ones becoming viable. Alongside this there may also be opportunities for tourism and outdoor sports.

We are starting to see an increase in extreme weather events in the UK, but the true extent of the changes take many decades to appear. Decisions taken today which have permanence need to be mindful of those future changes.

Methodology

This report develops the baseline and provides the framework for the forward look. Warwickshire's next steps will develop more detailed plans to address the specific risks identified in this report and identify the costs of action and inaction.



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What have the impacts been so far?

Climate change is a slow onset event, however the associated disruption to weather patterns in the form of extreme weather events can cause the greatest impacts in terms of disruption to service provision, financial reparations and loss of life. For Warwickshire the two classes of events that can be seen to cause the maximum impacts are flooding (surface and river) and heatwaves.

Flooding

Both flooding from prolonged heavy rainfall leading to saturated ground and heavy downpours caused by convective summer storms have caused issues.
Damage has included flooding of residential and business properties, damage to bridges highways, and damage to parks and local eco systems. Flood water is often cross contaminated with sewage leading to further issues and requiring costly clean up. Flooding impacts the mental health of the local population, leads to loss of business, loss of amenity and additional expenses such as delays to construction contracts and increased premiums for buildings insurance.

Heatwaves

Persistently high night-time temperatures leading to heat stress affecting older and vulnerable groups, whilst persistent maximum daily temperatures will lead to roads melting. Warwickshire has seen a significant number of grass and wildfires in recent years due to prolonged hot and dry conditions. Buildings are likely to require adaptation and longer term some may be unsuitable and require replacement.

During the summer of 2018 Warwickshire Fire and Rescue Service tackled 197 grass and wild fires.

Flooding in the centre of Stratford in November 2019 and Marton December 2020

How will the global climate change?

Regardless of any mitigation targets that might be achieved, locally, regionally, nationally or globally temperatures have risen and will continue to rise. This does not negate the importance of reducing greenhouse gas emissions, in particular carbon dioxide, but it does mean that we need to accept that we need to adapt to the impacts that a changing climate will bring.

Figure 1 illustrates the levels of uncertainty attached to the Paris Agreement target of 1.5ºC increase in global temperature above pre-industrial levels. To follow the future 1.5 ºC pathway requires an immediate reduction of global emissions, reaching zero in 2055 (IPCC, 2018). The extent of green on the graph shading shows the range of likely future temperatures with the darker shading representing higher probability.

Figure 1 suggests that global temperatures could start to fall after 2045. This is a modelled scenario and relies on CO_2 being removed from the atmosphere, by technology that is not currently proven at industrial scale. It is more likely that if this technology is successfully deployed it will be in the latter half of the century when much of the damage will already have been done.

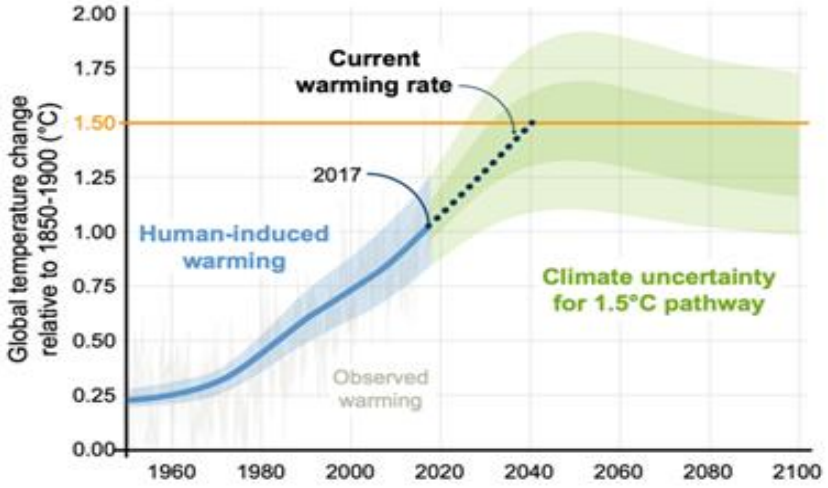


Figure 1 Climate Uncertainty for 1.5ºC Pathway

Global Climate models

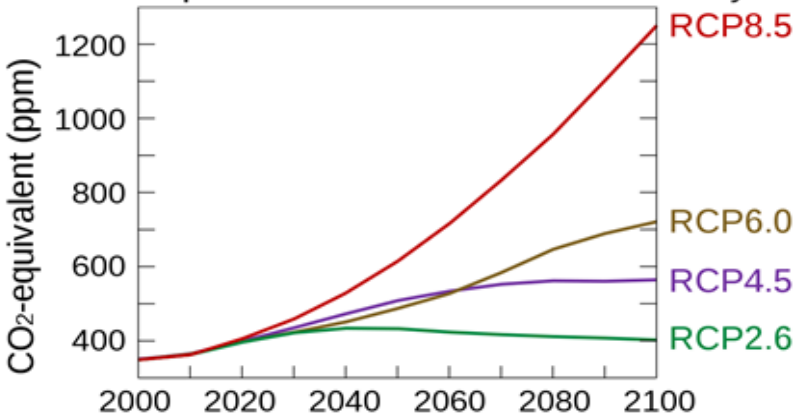
The International Panel on Climate Change (IPCC) has developed a series of different scenarios (called Representative Concentration Pathways or RCPs) which model humanity's success in limiting greenhouse gas emissions (see Figure 2 and the table below).

The most likely scenarios for global heating are RCP 4.5 and RCP 6.0. Rather than adopting a specific global target for warming it is important to look at the specific local impacts.

On a UK scale the Committee on Climate Change presents a biannual report to parliament on the UK's preparedness for dealing with the impacts of climate change. Whilst the report does not set a UK wide target it does provide a useful frame of reference as follows:

"***the UK is committed to working for global action to parallel our own adoption of a net-zero statutory target, it is prudent to plan adaptation strategies for a scenario of 4°C, but there is little evidence of adaptation planning for even 2°C***"

Figure 2: IPCC Representative Concentration Pathways



Scenario	Mean and likely range 2046-2081 (ºC)	Mean and likely range 2081-2100 (ºC)
RCP 2.6	1.0 (0.4 to 1.6)	1.0 (0.3 to 1.7)
RCP 4.5	1.4 (0.9 to 2.0)	1.8 (1.1 to 2.6)
RCP 6.0	1.3 (0.8 to 1.8)	2.2 (1.4 to 3.1)
RCP 8.5	2.0 (1.4 to 2.6)	3.7 (2.6 to 4.8)

https://www.theccc.org.uk/publication/progress-in-preparing-for-climate-change-2019-progress-report-to-parliament/

What will the climate be like in Warwickshire in the future?

Regional Impacts - the continued rise in global temperatures will affect the weather we experience and lead to impacts that we need to adapt to, broadly this change in the UK will be warmer, wetter winters and hotter, drier summers. Figure 3 sets out predictions for central England in 2070.

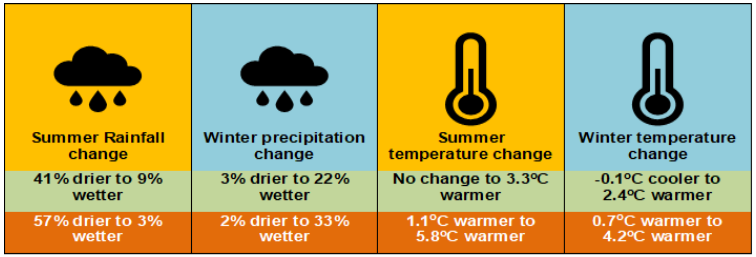


Figure 3 UKCP18 climate predictions, Summer and Winter Changes for central England by the 2070s (source Met Office)
The range is based around the RCP scenarios in Figure 2 on page 5.

Low emission scenario (RCP 2.6)

High emission scenario (RCP 8.5)

Locally to Warwickshire - Low frequency short lived weather events cause the most disruption. The table below considers what the resulting change in summer maximum temperatures and heavy precipitation could be for 2 extreme scenarios: a 1:20 year event, and a 1:100 year event for the area around Warwick and Royal Leamington Spa between 2030 and 2080. Scenario RCP 6.0 has been used to develop these as it represents the worst of the most likely scenarios.

Event	Basis	2030	2050	2080
Maximum summer daytime temperature	Maximum air temperature at three points	35 – 38 ºC	35 – 39 ºC	35 – 42 ºC
Winter average rainfall	5 day total precipitation	63mm - 83mm	64mm – 87mm	65mm – 97mm

How will this impact Council services?

This table is extracted from a more detailed assessment and highlights key areas of concern for the Council.

Service Area	Key Impacts
Adult Services and public health	Excess deaths due to heatwaves, mental health issues due to flooding, new or more infectious diseases affecting the population.
Emergency planning, civil contingencies and Fire	Increased frequency and diversity of events including fires on open ground, flooding, damage to major local infrastructure, increasing anti social behaviour during hot weather. Overall population resilience to repeated events may be eroded.
Transport and Highways	Existing structures not sufficient to manage flood waters. Damage to infrastructure due to heat and excess rainfall and the need to increase and maintain drainage. Increased risk from trees. Potential need to re-route longer term to avoid flood zones. Air quality, especially during hot, still weather affecting public health.
Children's Services and schools	Suitability of existing buildings to provide a comfortable learning environment in the longer term this includes could include location and building design/adaptations
The natural environment, parks, farms and open spaces	Changes to eco systems and the viability of flora and fauna. Drought conditions impacting tenanted farms. Flooding of country parks and impact on business activities. Damage to trees through repeated cycles of drought and wet weather.
Waste disposal	Rising water tables could impact landfill sites and lead to leeching of contaminants. Higher temperatures leading to odours, pests and public nuisance.
Corporate	Increased costs such as insurance for buildings or construction contracts Loss of productivity for example due to overheating or resources being diverted to flood investigations. Suitability of existing buildings to provide a comfortable working environment in the longer term

How will this impact other services locally?

Local services are provided by a range of organisations and companies. The impact of climate change on their activities will have a profound impact on the lives of those who live in Warwickshire. Examples of key impacts are in the table below.

Service	Responsibility	Key Impacts
Utilities	Utility companies (water, wastewater, electricity, gas and communications)	Infrastructure damaged by extreme weather (most likely flooding) leading to service disruption and public health issues. Speedy recovery from any incidents is important due to the disruption caused and public health impacts.
Drainage and watercourses	Landowners, drainage boards, canal trust	Capacity, replacement and maintenance of facilities. Managing the flow of flood waters is essential to ensuring that damage and disruption is minimised.
Planning	District and Borough Councils	Location of new settlements and facilities to avoid flood plains etc. Management of surface water through sustainable drainage systems. Ability of built structures to withstand heat and provide a comfortable environment. Preservation of water resources. Sustainable landscaping.
Sport/leisure	District and Borough Councils and private operators	Swimming pools may be difficult to fill during drought. Long term suitability of grass pitches or allotments in some locations.
Waste	Councils	Disruption to collections due to weather.
Health	Health Boards	Increasing patient numbers due to extreme heat or flooding. New infectious diseases. Rising water tables can impact existing burial grounds.
Transport	Network Rail, train operators, Highways England	Damage to infrastructure due to extreme weather. Long term suitability of existing routes.

Next Steps

The Council is already dealing with regular incidents caused by extreme weather events. Warwickshire has been working towards climate adaptation for the last decade and into the future it will be necessary to build on existing strengths and partnerships to deal with an increasing number of more extreme events as well as the longer term impacts of a changing climate such as a rising water table or an increase in infectious diseases.

In its next phase of work the Council needs to:

1. Build its existing network to engage a wider range of stakeholders in planning for climate change.
2. Develop its data management to ensure a comprehensive register of incidents and costs is complied which will help in interpreting trends and patterns and in providing financial information and impact analysis for business case development.
3. Identify the priority responses the council needs to develop in relation to the local risks and build risk assessments and develop adaptation options.
4. Quantify the costs of investment required and identify (using historical data and other sources) the costs of inaction to develop a business case for investment. This will necessitate developing non financial measures for impacts as well as financial impacts.

Transport disruption includes carriageway cracking due to low water tables-subsoil shrinkage, impassable roads due to flood water and damage to bridge from debris in flood water and scour to bridge footings.

Deployment of flood barriers is becoming an increasingly frequent event. These are in Stratford in 2019. Used sandbags need to be disposed of as contaminated waste.

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