

The background of the cover page is a photograph of a park. In the foreground, there are green bushes and a small tree with yellowing leaves. In the middle ground, there are large grey rocks and a body of water. In the background, there are large green trees under a grey sky.

ESSEX STRENGTHENING ADAPTATION & RESILIENCE TO CLIMATE CHANGE

Climate Adaptation Plan Framework

September 2024



Essex County Council

Executive Summary

This plan outlines the immediate and long-term priorities and strategies for climate adaptation in Essex. It describes Essex County Council and community actions to build resilience and adapt to the effects of the climate challenge. The approach taken is flexible, recognising the dynamic nature of the climate challenge and the uncertainties surrounding its long-term consequences.

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1. Introduction

Essex County Council has recognised that there are already notable regional and local climate variations occurring, which differ greatly from the historical averages recorded by the Met Office¹ and we can see this in our changing weather year on year.

CLIMATE

Climate is commonly understood as the typical weather we experience such as rainfall, temperature and humidity over time spanning from months to thousands or millions of years (Intergovernmental Panel on Climate Change, 2018).

WEATHER

Describes what is happening at any point in time, be it, for example: torrential downpours of rain; exceptionally high temperatures; or thunderstorms.

The resources of Local Authorities (LAs) are being strained by the growing unpredictability and disruption of our climate and weather patterns, due to the increasing impacts of climate change ([LGA, Cutting through the Green Tape, 2008](#), UKCIP18). Human activities, principally greenhouse gas emissions, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020². We have already changed our climate and are seeing the impacts of this globally and locally.

CLIMATE CHANGE

The term "climate change" describes long-term changes in our weather pattern and temperature beyond the natural variation of temperatures on land and in the ocean, as well as abnormal trends in the timing of seasons, in rainfall patterns, and in many other systems. These abnormal changes result from *global warming* due to an increased *greenhouse effect* caused by the vast amounts of *greenhouse gases* added to the atmosphere by human activities.³

The UK is committed to global action on climate change and is a signatory to the 2015 Paris Agreement - an international treaty to stem greenhouse gas emissions, limiting global warming to 1.5 degrees. We have a statutory commitment to be a net zero country by 2050. However, the IPCC² reports it is likely that global warming will exceed 1.5°C during the 21st century and countries' current plans make it harder to limit warming below 2°C. July 2023 was the world's warmest month on record and global temperatures temporarily exceeded the 1.5 threshold⁴. We can therefore expect further changes to our climate, with increasing impacts.

¹ <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/u10q3cdwd>

² [IPCC Climate Change Synthesis Report 2023, Summary for Policy Makers](#)

³ [Introduction to Science in the UNFCCC | UNFCCC](#)

⁴ [Climate change insights, families and households, UK - Office for National Statistics \(ons.gov.uk\)](#)

In the UK the average temperature over the most recent decade (2009-2018) has been on average 0.3 °C warmer than the 1981-2010 average and 0.9 °C warmer than the 1961-1990 average. All the top ten warmest years for the UK, in the series from 1884, have occurred since 2002⁵. The most recent decade (2009-2018) was around 1 °C warmer than the pre-industrial period (1850-1900)⁴.

The Met Office note that general climate change trends projected over UK land for the 21st century in UKCP18 are broadly consistent with earlier projections (UKCP09) showing an increased chance of warmer, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes, including significant increases in the intensity of rainfall⁴. The mean sea level around the UK has risen, increasing the risk of coastal flooding ⁶ and Met Office projections indicate that sea level around the UK will continue to rise⁴.

The UK Committee on Climate Change note the impacts from extreme weather in the UK and highlight the urgency of adapting to climate change. The record-breaking temperatures seen in summer 2022 brought unprecedented numbers of heat-related deaths, wildfire incidents and significant infrastructure disruption. The Committee's 2023 review of the National Adaptation Programme notes that UK is not adequately prepared for climate change and calls for a step change in delivery of effective adaptation⁷

ADAPTATION

Climate Change Adaptation refers to actions required to manage the effects of unavoidable expected climate change.⁸ This includes making homes more resilient to extreme heat and cold weather and adapting our landscapes to better cope with flooding or drought events, for example⁹. Adaptation is a crucial component of climate change management and a necessary step in maintaining our community's well-being, as well as the Council's ability to continue to provide services.

The UK's third climate risk assessment identifies 61 climate risks affecting households, businesses and public services. Impacts range from a deterioration in soil health and agricultural productivity to impacts on water availability and thereby our alternative energy supply. For example, unless we take further action, under a 2°C by 2100 warming scenario annual damages from flooding for non-residential properties across the UK is expected to increase by 27% by 2050 and 40% by 2080.¹⁰

With the scale of the change in our weather patterns, timely preparation for these climate related impacts are forecast to cost us substantially less than dealing with the consequences. For only eight of the risks identified by the UK Committee on Climate Change, economic damages by 2050 under 2°C could exceed £1 billion p.a. For thirty-six

⁵ [UK Climate Change Projections, 2022](#)

⁶ [UK Climate Change Projections: Headline Figures](#)

⁷ [Progress in adapting to climate change - 2023 Report to Parliament - Climate Change Committee \(theccc.org.uk\)](#)

⁸ [Climate change adaptation and resilience in the UK, 2024](#)

⁹ [Climate change insights, families and households. UK - Office for National Statistics \(ons.gov.uk\)](#)

¹⁰ [UK Climate Change Risk Assessment 2022 \(publishing.service.gov.uk\)](#)

of the risks, damages could be at least £10 million p.a. Other sources of evidence suggest that, by 2045, the cost of climate change to the UK could be at least 1% of GDP¹¹.

Additionally, there is growing evidence of the negative impacts of a changing climate on communities and people wellbeing ([Climate change: health effects in the UK, UKHSA, 2024](#)). There are direct threats to physical health from heatwaves and flooding as well as effects on mental health from impacts of severe weather events, such as loss of property.

ECC, has been preparing for climate change since, 2008 and in 2011 published its first Adaptation Action Plan. In 2020 ECC, established the Essex Climate Action Commission, an independent body to provide advice and guidance on climate change, the environment and our aim to become a more resilient county. The recommendations for adaptation measures and building resilience are reflected in the Essex Climate Action Commission's [Net Zero: Making Essex Carbon Neutral](#) report (2021). The recommendations were structured around six core themes:



ECC endorsed the report and recommendations in full and in November 2021, published its own Climate Action Plan, in response to these recommendations which included action to improve climate resilience. The Climate Action Plan was updated in 2023. Through the delivery of the ECC Climate Action Plan, our communities, businesses and infrastructure will be better equipped to adjust, develop resilience and flourish in the face of these climatic changes.

We know that the more vulnerable in society, including those in lower socio-economic groups, are at greater risk from climate change and extreme weather events and also face greater challenges when responding to - and recovering from - them¹². There is a need to protect all of our communities across Essex, including the most vulnerable. Our aim is that our organisation's services, our communities and our business can become more resilient as a result of our planning and preparation for extreme weather and climate change.

1.1. Key Drivers

The **UK Climate Change Act (2008)** commits the UK Government to reducing greenhouse gas emission by at least 100% of 1990 levels (net zero) by 2050. This includes setting legally

¹¹ [UK Climate Change Risk Assessment 2022](#)

¹² [Adverse weather and health plan equity review and impact assessment 2024](#)

binding carbon budgets to act as stepping stones towards the 2050 target. A carbon budget is a cap on the amount of greenhouse gas emitted over a 5-year period. Budgets are set 12 years in advance to give enough time for preparation. The Act also requires the UK Government to produce a UK Climate Change Risk Assessment (CCRA) every 5 years and a National Adaptation Programme (NAP)¹³.

The **Environment Act** (2021) requires the UK Government to improve the natural environment. It sets out statutory targets for the recovery of the natural world in four priority areas: air quality, biodiversity, water and waste, and includes an important new target to reverse the decline in species abundance by the end of 2030.





UK Climate Change Risk Assessment (CCRA). In 2022 the UK Government published its third CCRA¹⁴ and considered sixty-one UK-wide climate risks and opportunities. The CCRA3 priorities action on the following eight risk areas:

- risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards.
- risks to soil health from increased flooding and drought.
- risks to natural carbon stores and sequestration from multiple hazards.
- risks to crops, livestock and commercial trees from multiple climate hazards.
- risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks.
- risks to people and the economy from climate-related failure of the power system.
- risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings.
- multiple risks to the UK from climate change impacts overseas.

In 2023 Government launched the third **National Adaptation Programme (NAP)** in July 2013, which sets out a mix of policies and actions that government, local authorities and businesses will take to adapt to climate change impacts (2023-2028)¹⁵.

The independent **Committee on Climate Change (CCC)** published its progress report on the review of the Government's NAP3 and found that the programme fell short of what is required and identified more action was needed (CCC, 2024¹⁶). It recognises the cross-cutting role local government plays in tackling climate change.

Everyone's Essex is ECC's organisation strategy and sets out the authority's commitment to addressing inequalities for residents in Essex, with a focus on four areas where outcomes really matter:

-  the economy
-  the environment
-  children and families
-  promoting health, care and wellbeing for all ages

¹³ [A legal duty to act - Climate Change Committee](#)

¹⁴ [UK Climate Change Risk Assessment 2022 - GOV.UK \(www.gov.uk\)](#)

¹⁵ <https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3>

¹⁶ <https://www.theccc.org.uk/topic/adaptation/>

Everyone's Essex commits to supporting net zero targets; and to help all our communities to enjoy a high-quality environment, by making them more resilient against flooding, heat stress and water shortages, by enhancing our county's green infrastructure and by reducing air pollution.

The Essex Climate Action Commission's (ECAC) publication of the **Net Zero report: Making Essex Carbon Neutral (2021)**¹⁷ sets out clear recommendations for actions to reduce greenhouse gas emissions and build resilience to climate change. ECC endorsed the recommendations in full.

The **ECC Climate Action Plan**¹⁸, first published in 2021 and updated in 2023, sets out ECC's detailed action plan to work with partners and communities to reduce greenhouse gas emissions and build resilience across the county. ECC publishes an Essex Climate Action Annual Report²⁰ to give updates on progress on climate action across Essex.

There are many other drivers which address climate adaptation, set out below.

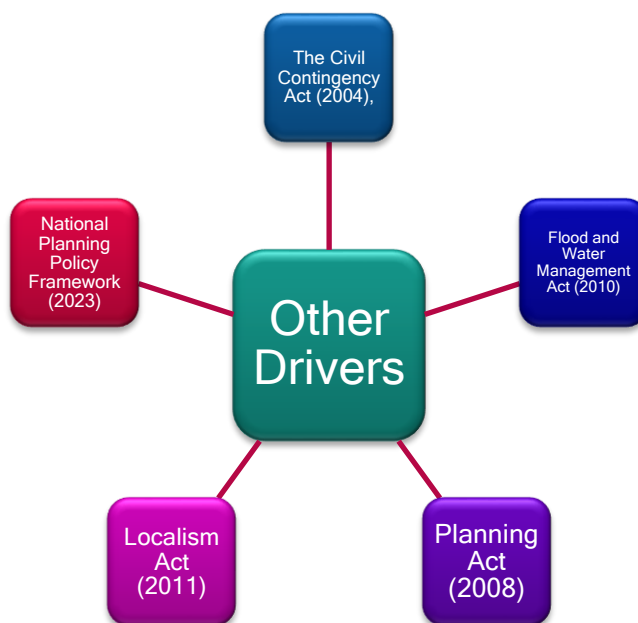


Figure 1: Other key legislation, policy and strategies that support the delivery of adaptation actions.

1.2. Local Authorities' Role on Adaptation

In 2008 the Government included a set of National Indicators within the local performance framework, which included NI 188 'Planning to Adapt to Climate Change'. NI 188 was a qualitative indicator which enabled local authorities to monitor effective adaptation over 5 levels, ranging from assessing and addressing the risks to the local authorities' service

¹⁷ [ECAC Commission Report](#)

¹⁸ [Climate Action | Essex County Council](#)

delivery to “identifying priority areas and developing and monitoring an adaptation plan”.¹⁹ ECC and the Essex Partnership (as part of a Local Area Agreement (2008-11)) achieved level 3 of the Government’s National Indicator 188 by 2011. Its adoption helped local authorities prepare their management of the risks posed by a changing climate. Local authorities looked at the potential impacts to their service delivery, local communities and businesses, as well as how to make the most of new opportunities.

Government, through NAP3 recognises that Local Authorities, as providers of important services and as community leaders can play a pivotal role in leading, supporting and driving delivery adaptation. Local Authorities and other public bodies are required to take responsibility for finding the best solutions against climate risks to their sector (Defra, 2013, NAP3, 2023). For the fourth reporting round under the Adaptation Reporting Power (ARP4), from 2023, the government intends to pilot climate adaptation reporting by local authorities.

The local authority also has responsibility for directly managing specific risks, for example Essex County Council (ECC) is the Lead Local Flood Authority for Essex leading on managing local flood risks. Equally ECC has a responsibility to manage climate risks through delivery of its other statutory functions and services, for example highways, transport and public health.

1.3. Action Plan Purpose

ECC's approach to climate adaptation is outlined in this document, the Climate Adaptation Plan Framework, for the forthcoming years. This adaptation plan outlines the impacts from our changing climate that ECC and the county of Essex may encounter and possible impacts these may have on our services, residents and businesses. It sets out actions for ECC to ensure local priorities and policies have regard to climate adaptation and resilience. This plan is intended to be updated in the future as new data, information, technology, and potentially Government legislation, develop and no later than 5 years after last publication.

For an effective adaptation framework, the focuses are:



¹⁹ LRAP, Adapting to Climate Change: Guidance notes for NI 188, Local & Regional Adaptation Partnership (Version 1.6), 2008

ECC's approach to improving resilience to extreme weather events and adjusting to a changing climate is outlined below. The focus is to support business continuity and service delivery to residents of Essex.

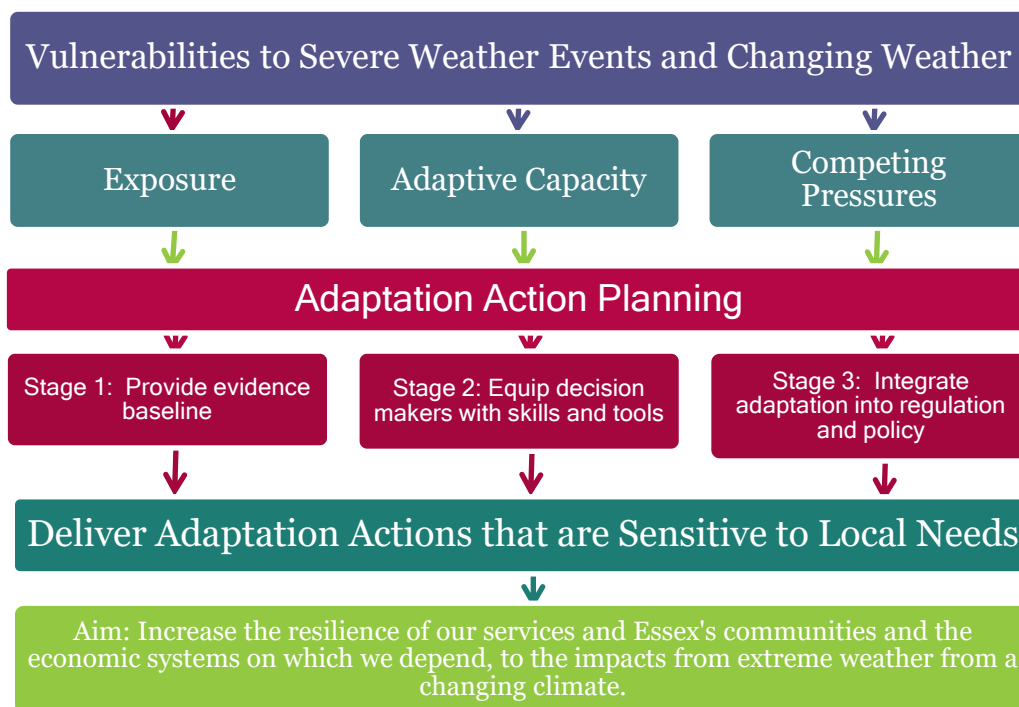


Figure 2: The flow chart of the Adaptation Action planning approach

2. Summary of Essex

With a land area of about 345,842 hectares and a population of about 1.504 million in 2021, Essex is one of the largest counties in the UK (Office for National Statistics, 2022). There are strong pressures for both residential and commercial development throughout the county, particularly in the Thames Estuary region and London to Stansted corridors. In 2017 Essex identified the need for the construction of additional 180,000 new homes by 2036, in addition to 40-50 new schools and other supporting infrastructure ([Greater Essex Growth and Infrastructure Framework 2016 - 2036](#), (2017)).

Essex is served by a significant road and rail network and is home to crucial transport hubs supporting significant freight and people movement to and from ports and airports. Although, according to Office for National Statistics (2021), the majority of Essex residents since COVID-19 pandemic continue to work from home, the county is home to over 100,000 residents who commute to London to work²⁰.

There are 4.7% of Essex residents who are classified as having very bad or bad health.²¹ The impacts from climate change, increase the pressure on people's health and wellbeing, making both the natural and built environments more vulnerable. There are significant economic inequalities across the county: of the 95 wards in Essex, 22% rank in the highest 10% nationally on key measures of community need. Some 10% of residents live in areas ranked among the most deprived 20% in England²¹.

²⁰[Facts about the Greater Essex population, 2024](#)

²¹[2021 Census Profile](#)

Essex boasts a rich and diverse historic and natural landscape, with 65.7% being open farmland, woodland and meadows ([Essex GI Strategy, 2020](#)). It also has an extensive network of inland waterways, and 350 miles of coastline, the second longest coastline in England, much of which is internationally significant for wildlife, encompasses ecologically important mudflats and salt marshes. ([Essex GI Strategy, 2020](#), Draft LNRS, 2024). The coastline has contributed much to the county's prosperity, which is home to major international ports and is an attractive tourist attraction. It is also known for its varied biodiversity, including numerous bird species and seals. The coastline sustains a renowned number of shellfisheries and numerous coastal communities.

3. Essex Climate Projections

3.1. Background

The number of weather-related incidents in Essex was highlighted in a Local Climate Impact Profile (LCLIP) study conducted in 2010, as part of the preliminary evidence base for the Essex Adaptation Action Plan, which was published in 2011. Between January 2004 and December 2009, over 160 severe weather-related incidents had an impact on communities, businesses, and services provided by Local Authorities in Essex. These incidents included damage and disruptions to roads and trains; demand on public sector services; building damage from falling trees and flooding; power outages; environmental risk; and health issues for vulnerable individuals (Calder, 2010; Colbeck, 2012).

3.2. Projections

In order to identify the risks and determine what adaptation measures we can take it is critical to comprehend the potential changes in our climate. UK Climate Projections 2018 (UKCP18) includes a comprehensive set of observations regarding weather and climate across the UK. It provides an overview of the climate projections, as summarised in Figure 3, which generally predicts an increase in Essex's vulnerability to natural disasters like floods, droughts, and extreme temperatures. Although these projections provide an indication of possible future impacts, they should not be interpreted as definitive forecasts.

A 2023 briefing note by the University of East Anglia and the Tyndall Centre for Climate Change Research described the East of England as the UK's most vulnerable region in terms of the potential impacts of climate change. As such, adaptation is needed as a result of these high risks. The region has the lowest average rainfall and highest average temperatures in England. Around 20% of the region is below sea-level and, in some areas, up to 25% of properties are at risk of flooding²⁴. Some 61,719 properties are at risk of coastal and river flooding. Essex is also vulnerable to surface water flooding, especially during summer thunderstorms. On Canvey Island the Environment Agency estimated that about a million cubic metres of water fell in four hours on 20 July 2014, flooding between 500 and 1000 properties. There are 36,000 properties in Essex considered to be at risk from surface water flooding²².

²² <https://www.essexdesignguide.co.uk/SuDS/surface-water-management-plans/>

By their nature, coastal communities are vulnerable to various natural hazards, including coastal erosion, which also poses a threat to agricultural and recreational land (Essex Rural Strategy, 2016-2020)²³. Vulnerability to coastal flooding is increasing as the Essex coastline is eroding rapidly.²⁴ There are 61,719 properties at risk from river and sea flooding.²⁵ ([Risk of Flooding from Rivers and Sea](#))

Maps and data by the British Geological Survey (BGS) show that Essex is one of the worst areas in terms of subsidence risk. There are approximately 562,635 residential properties in the county that are at risk²⁶ of subsidence, along with 22,793 commercial properties, 309 heritage sites and 4,502 other land uses²⁷. This risk is increasing over time²⁸

Essex is a water-stressed area and only three fifths of the drinking water consumed here comes from the county itself. The other two fifths is pumped into the county, primarily via the canal network from the north. Apart from domestic use, water is needed by business sectors, such as agriculture and horticulture, food processing, power and leisure. It is estimated that by 2050 the East of England will experience a public water supply shortage of around 730 million litres of water per day equal to over a third of the predicted future need.²⁹

The seas around the UK will continue to rise over the next three decades to 2050. By 2050, sea levels could be around 10-30 cm higher than over 1981-2000.³⁰ This change will be accompanied by associated coastal flooding and erosion, posing significant risk to people, communities, businesses and the built environment. According to UK CCRA3, aquifers located near the coast could also be at greater risk from saltwater intrusion due to sea level rises, though the assessment suggests this risk is being managed.³¹

Metrics for heavy rainfall generally show an increase in very wet days across the UK³². The CCRA3 notes that although summers are expected to be drier on average, the intensity of rainfall when it does rain is expected to increase significantly in summer, with the possibility of intense localised rainfall extending into the autumn - raising the risks of flash flooding and extending the duration of the year in which it could occur.

The likelihood of cold conditions is also impacted, with at least 10 fewer days per year where temperatures fall below 0.0°C at a 1.5°C level of warming, and up to 49 fewer days per year at a 4°C level of warming ([Future changes to high impact weather in the UK](#), 2021). This would mean less cold-weather disruption due to lower than normal chance of ice and snow. However, future UK winter climate will still be variable year to year, so severe cold winters

²³ <https://www.essexruralpartnership.org.uk/essex-rural-strategy>

²⁴ [Briefing for the East of England All Party Parliamentary Group Meeting](#)

²⁵ [Risk of Flooding from Rivers and Sea](#)

²⁶ Each type of property that is at risk of subsidence is counted according to the total that is either probably or possibly at risk.

²⁷ Other Land uses include: Military, Land, Dual Uses, Parent Shell, Other unclassified.

²⁸ [GeoClimate UKCP09 and UKCP18 - British Geological Survey](#)

²⁹ [Water Strategy For Essex 2024](#)

³⁰ [Independent Assessment of UK Climate Risk 2021](#)

³¹ [UK CCRA3](#)

³² Kendon, M. et al. (2020) State of the UK Climate 2019. International Journal of Climatology

are still likely to occur - just less often - so it is important to remain resilient to severe winters when they do occur.³³

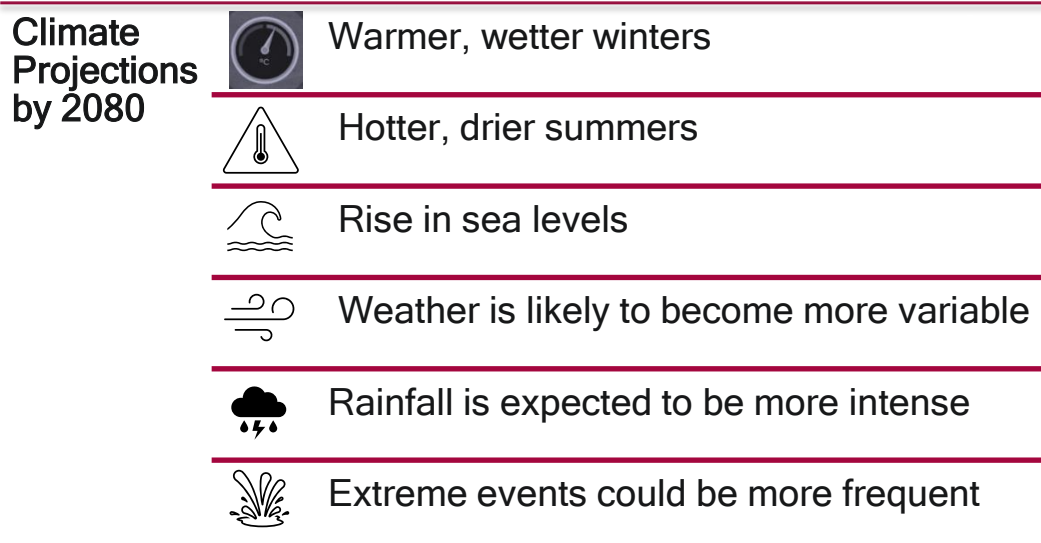


Figure 3: UKCP18 headline climate projections for Essex

The medium emission scenario for Essex (comparing the 50th and 95th percentile) shows that by:

- 2070 – winters could be 11% to 33 % wetter and summers – 15% to 20% drier;
- 2079 – winters could be up to 1.9°C (50th) to 3.3°C (90th) warmer and summers could be up to 2.3°C to 3.3°C hotter; and
- 2090 – sea levels in Essex could rise by up to 33 cm to 73 cm.³⁴
- 2100 - heavy rainfall could increase by up to 20%

Appendix 9.2 provides a summary of the potential projections based on the UCIP18 high emissions scenario.

4. Summary of Key Climate Risk Findings

The current projections show Essex is at significant risk of

- flooding (surface water, riverine and coastal)
- water shortages
- overheating
- subsidence
- threats for natural capital and agricultural production
- disruptions in the food supply chain
- poor health and well-being
- and an increase in emerging diseases

Our businesses, communities, infrastructure, and services are likely to be impacted, and the cost of adaptation is expected rise sharply.

³³ [Future changes to high impact weather in the UK 2021](#)

³⁴ Sea level rise could even reach up to 97cm predicted from the high emission scenario.

There is abundant evidence that certain groups are disproportionately affected as set out below. This document captures the key risks affecting the general population but also highlights specific risks to groups that are likely to be worst affected.

Those living in socioeconomically deprived areas are known to be at greater risk from flooding, and to be less likely to have insurance cover and other forms of protection to reduce the impact of flooding events³⁵

For cold weather, fuel poverty is an important cause of cold homes, and the [AWHP Supporting Evidence Document](#) details the range and breadth of resulting effects. Analysis published by the Institute for Health Equity and Public Health England previously suggests that up to 10% of excess winter deaths may be attributable to fuel poverty, and 21.5% to cold homes.³⁶

Extreme weather events including heatwaves and cold spells have been shown to play an important role in asthma, increasing the risk of morbidity and mortality among those with this condition. Extreme weather events can also exacerbate asthma symptoms and increase the likelihood of asthma-related hospital attendances and admissions³⁷.

There is consensus in the literature that older people, generally defined as those over 65 years of age, are at high risk from heat- and cold-related mortality because of social factors and because of their physiology.³⁸ 30% of the resident population in small seaside towns were aged over 65 years old in 2018 compared with 22% in small non-coastal towns.³⁹

People living with disabilities are at greater risk from adverse weather events than others because they face systemic challenges in addition to physical and/or mental ones⁴⁰. These include a lack of accessible communications during and after a weather event, difficulties in accessing medications, interruptions in healthcare provision and a lack of safe and accessible emergency shelters and housing.⁴¹

Evidence on risks among Gypsy, Roma and Traveller communities is very limited. There is a small body of qualitative work suggesting that these populations are at greater risk of health effects from heat and cold exposure because of living and outdoor working conditions.⁴²

There is very little published evidence from the UK on sex-related differences in mortality or morbidity from adverse weather. International evidence from high income settings suggests increased risk of mortality from heat exposure for females relative to males especially in

³⁵ [Social deprivation and the likelihood of flooding: Chief Scientist's Group Report](#)

³⁶ [Fuel poverty and cold home-related health problems](#)

³⁷ ['Extreme weather and asthma: a systematic review and meta-analysis'](#)

³⁸ ['The Impact of Heatwaves on Mortality and Morbidity and the Associated Vulnerability Factors: A Systematic Review'](#)

³⁹ [Coastal towns in England and Wales: October 2020](#)

⁴⁰ ['The impact of climate change related extreme weather events on people with pre-existing disabilities and chronic conditions: a scoping review'](#)

⁴¹ ['The impact of climate change related extreme weather events on people with pre-existing disabilities and chronic conditions: a scoping review'](#)

⁴² ['Gypsies' and Travellers' lived experiences, health, England and Wales: 2022'](#)

older age groups but with variable effect sizes reported between studies.⁴³ Data from the UK point to a higher probability that women report psychological distress and post-traumatic stress disorder following home flooding than men.⁴⁴

It is also well recognised that levels of socioeconomic deprivation are higher among most ethnic minority groups than in the general population⁴⁵. This is partly reflection in dwelling location: ethnic minority populations in the UK are often concentrated in urban areas and are therefore at high risk of poor health outcomes from the urban heat island effect and fluvial flooding.^{46 47}

While these groups are, as everybody else, susceptible to most of the climate risks listed below, they are particularly vulnerable to extreme heat and flooding. There is substantial research and data that links flooding to a range of negative outcomes:

Adjusted odds of probable psychological morbidity were six to seven times higher for flooded than unaffected participants and 1.5-2.0 times higher for disrupted participants⁴⁸

The English National Study of Flooding and Health highlights a number of impacts⁴⁹:

- Evacuation and displacement, particularly without warning, increases the risk of anxiety and post-traumatic stress disorder (pg.5)
- 3 years after flooding psychological problems remained higher in the flooded group compared to the unaffected group, although a significant reduction in prevalence for all probable mental health outcomes was observed in the flooded group - overall, 5.7% had symptoms of probable depression, 8.1% of probable anxiety and 11.8% of probable PTSD' (pg.9)
- Two years after floods, people whose homes were flooded and did not have household insurance at the time were significantly more likely to experience symptoms of probable depression, anxiety and PTSD than those who did have such insurance
- These 'secondary stressors [e.g. the loss of personal items or financial losses, and difficulties with insurance and compensation] were associated with symptoms of probable depression, anxiety and PTSD in the aftermath of flooding' (pgs.14-15)

The Chief Scientist's Group report highlighted that there is an inequality in terms of social deprivation and flood risk exposure from all sources of flooding. In other words, people from areas classed as more deprived disproportionately face more flood risk than those living in less deprived areas. This is the case when taking into account nearby flood defences. It also notes that Deprived coastal communities still experience significant inequalities for high and

⁴³ ['Temperature-related mortality: a systematic review and investigation of effect modifiers](#)

⁴⁴ ['Effect of Extreme Weather Events on Mental Health: A Narrative Synthesis and Meta-Analysis for the UK'](#)

⁴⁵ ['The health of people from ethnic minority groups in England. London: The King's Fund'](#)

⁴⁶ ['Flood risk and inequalities between ethnic groups in the floodplains of England and Wales](#)

⁴⁷ ['Systematic exploration of heat wave impact on mortality and urban heat island: A review from 2000 to 2022'](#)

⁴⁸ ['The English national cohort study of flooding and health: cross-sectional analysis of mental health outcomes at year one](#)

⁴⁹ ['The English National Study of Flooding and Health](#)

medium likelihood of flooding. These inequalities within coastal communities are more pronounced than in inland ones.⁵⁰

With the 10 warmest years on record in the UK occurring after 2003⁵¹, there is an increased heat-related risk to a number of vulnerable communities. Overheating was found to occur disproportionately in households with vulnerable occupants. There is also good evidence that older persons and persons with pre-existing conditions are most at risk of heat-related mortality. Heat risks are very high for persons in residential care. Additionally, these groups of people tend to spend more time in their homes, possibly with reduced capacity to adapt their circumstances and their environment in order to become more comfortable.⁵²

People in some neighbourhoods are more vulnerable than others to the same level of heat. This can be for many reasons, such as a person's sensitivity to heat stress and dehydration because of age or ill-health. Neighbourhoods with a high proportion of elderly people or toddlers are therefore more vulnerable. Additional environmental factors can heat up or cool down local areas too. For instance, neighbourhoods which are less green tend to be hotter, and have fewer green spaces in which to shelter (gardens and parks). The type of people's housing also matters. Friends of the Earth has married the data analysis carried out by the University of Manchester with research carried out by Leeds University into the carbon footprints of neighbourhoods. They found that high-risk neighbourhoods for heat have lower carbon footprints than average.⁵³

The document builds on the Managing the risks from weather extremes - Adaptation in Action (2016) report⁵⁴. Through organisation-wide participation the report identified key climate risks affecting service delivery. A different, broader approach had to be taken for this document as it captures risks that affect not just ECC but the county of Essex as a whole. Following a comprehensive review of available evidence^{55,56,57}, engaging in discussions with relevant Service Areas and utilising local knowledge, the key risks for Essex are set out in the tables below. The risk assessment was developed using the latest available datasets and sources such as Met Office's UK Climate Projections 2018 and the Independent Assessment of UK Climate Risk 2021 by the Climate Change Committee.

⁵⁰ [Social deprivation and the likelihood of flooding](#)

⁵¹ [2023 was second warmest year on record for UK](#)

⁵² [Technical report \(CCRA3-IA\)](#)

⁵³ [Who suffers most from heatwaves in the UK?](#)

⁵⁴ ECC. (2016). Essex Adapting to Climate Change/ Adaptation Action Plan: 2011-2016, Essex County Council

⁵⁵ [UK Climate Projections 2018 \(UKCP18\)](#)

⁵⁶ [UK Climate Change Risk Assessment 2022](#)

⁵⁷ [Independent Assessment of UK Climate Risk 2021](#)

4.1. Urban heating (Extreme summer temperatures)

Asset/Service	Risk
Built Environment/ Infrastructure	Risk for key infrastructure and systems failure due to overheating (e.g. IT systems)
	Risk of impact on the energy demand of towns and cities
	Risk of transport infrastructure damage
	Risk of road, rail and bridge melting and buckling
	Risk of overheating in residential and commercial buildings, hospitals, care homes and schools
Health and Wellbeing	Risks to human health, wellbeing and productivity from increased exposure to heat in homes, schools, other public and commercial buildings and outside. Overheating can affect the productivity of workers and the educational attainment of students, both directly impacting productivity through discomfort and heat stress in the workplace or educational facilities, and indirectly through sleep disruption associated with domestic overheating.
	Urban heat can lead to a rise in heat-related illnesses, such as heatstroke and heat exhaustion, which can be especially dangerous for the elderly and those with pre-existing health conditions
	Kidney disease and mental illness linked to urban heat, affecting vulnerable populations such as the elderly and people with reduced mobility who are most likely to be concentrated in areas affected by urban heat.
	Risk to low-income populations from heat-related illnesses due to lack of green spaces and tree cover in low-income neighbourhoods. This is exacerbated by lack of means to afford air conditioning.
	Risk to children and babies who are especially vulnerable to heat due to being unable to effectively protect themselves from the heat without assistance.
Natural Environment	Overheating, coupled with periods of drought, can lead to habitat degradation in all urban habitats but especially wetlands and rivers
Water	Risk of water shortages and drought measures for residents, public sector and businesses. Low summer river flows, and increase in river water temperatures can lead to reduction in water quality and habitat degradation
Agriculture	n/a

Historic & Leisure	As a result of climate change, there is a risk of heritage assets being impacted by extreme temperatures as they were designed with significantly different temperatures and climate conditions in mind. The result would be deterioration of asset / asset value, safety risks and a reputational risk to ECC. (CGS0016)
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4.2. Surface water flooding

Asset/Service	Risk
Built Environment/ Infrastructure	<p>Increased risk of flooding events on the 'Essex Road' network and adjacent properties due to insufficient funding for drainage assets (HAT0010)</p> <p>Increased risk of flooding on highway</p> <p>Increased risk of property flooding: residential, commercial and public sector including hospitals and schools.</p>
Health and Wellbeing	<p>Increased risk to health and mental wellbeing for residents that have properties affected by flooding. Financial stress resulting from flood impacts adds to long term mental health impacts.</p> <p>Risk to low-income households living in areas of greater flood risk due to greater financial challenges to install property-level flood protection measures</p> <p>Risk to people who face a language barrier are less likely to receive flood alerts and warnings and, therefore, to be adequately prepared for a flood event.</p> <p>Risk to Those who are homeless may be less aware of flood risk and less able to access services designed to support residents following a flood.</p>
	<p>Risk to vulnerable people who require care or essential medicines and services due to disruption of access</p>
Natural Environment	<p>Risk of habitat failures due to pollution, and loss of soil and habitat as these are washed away</p>
Water (management: flood reduction assets)	<p>Risk the Lead Local Flood Authority cannot deliver Capital Flood Prevention Programme due to: technical solutions being unavailable or too expensive; landowners disputes/inability to obtain land; adoption & maintenance restrictions and/or project management capacity issues. This would result in negative financial impacts on households and reputational impacts on ECC. (SAR0001)</p> <p>Risk that flood reduction investment is inadequate to meet increased flood risk.</p> <p>Risk landowners do not maintain flood defences or flood management infrastructure (e. g. ditches) impacts their own and neighbouring land and property.</p>

	Risk that ECC fails to maintain flood defences present on land it owns, impacting on the surrounding land owned by others. (PPH0040)
Agriculture	Loss of agricultural productivity due to flooded agricultural land and ongoing soil degradation.
Historic & Leisure	Structural risk to historic assets
	Loss of income due to restricted access and decreased footfall

4.3. Water supply

Asset/Service	Risk
Built Environment/ Infrastructure	Risk to disruption to infrastructure that is dependent on water supply for operation e.g. energy production
Health and Wellbeing	A risk of disruption to domestic water supply can have negative impacts on human health and wellbeing.
	Risk to low-income households and marginalized communities as they may be disproportionately affected by water scarcity due to limited access to alternative water sources and financial constraints to cope with water shortages.
Natural Environment	Pollution from historic inland landfills: Due to the effects of climate change, including ground water level variations, as well as both increased surface water in some areas, and lack of surface water in others, there is a risk of increased levels of gas and leachate polluting the environment at historic inland landfill sites across Essex. Potential risks include: the killing of vegetation and crops (resulting in fines); underground fires; increased release of powerful greenhouse gases; and the contamination of ground and surface water. The impact to ECC would be environmental, financial and reputational. (ECA0024)
	Reduced rainfall with periods of drought, can lead to habitat degradation in all habitats but especially wetlands and rivers
Water	
Agriculture	Risk for decreased agricultural productivity due to inability to irrigate crops.
	Risk that certain water dependant crops cannot be grown in Essex in the future
Historic & Leisure	Four of the ECC Country parks have designed historic lakes and these are at risk of drying out

4.4. Severe weather events

Asset/Service	Risk
Built Environment/ Infrastructure	Increased risk of key infrastructure / assets / property loss across Essex due to increased

	<p>number and intensity of storms, high winds and extreme weather:</p> <p>There is a risk of structural damage to and financial loss to asset owners across the county and to ECC as a landowner. This includes, but is not limited to storm damage and flooding of roads and buildings.</p> <p>This would have financial implications for asset loss, repairs, re-siting and re-building, insurance costs plus health and safety risks and impacts.</p>
	Reduced generation, transmission and efficiency of distribution of electricity due to extreme heat
	Electricity supply disruption due to high winds and damage to infrastructure
	Risk of road closures and road damage due to flooding / infrastructure damage
	Risks to bridges/pipelines from flooding and erosion
	Damage to property from flooding and extreme weather
	Increased damp and mould due to heavy rain, flooding and extreme weather
	Mobile telephone base station power failure because of extreme weather including high winds and lightning
	Problems keeping IT infrastructure e.g. data centres, cool in extreme heat
Health and Wellbeing	Severe weather events, such as flooding, can impact and then cut off access for help to vulnerable people
	Long term and severe impacts on mental health and wellbeing from flooding
	Stress & anxiety caused by extreme weather events impacting on family & communities
	Increased health risk to those low-income households with limited access to adequate heating and warm clothing, especially during extreme cold temperatures
	Risk to frontline and outdoor workers during heatwaves
	Increased risk to babies and children during heatwaves and cold snaps
Natural Environment	Risk of habitat failure or degradation due to extreme weather events
	Risk of significant coastal erosion
Water	Potential increased risk of contamination of drinking water through increased runoff and flooding events that overwhelm current water treatment approaches

Agriculture	Soil erosion and soil loss from flooding and heavy rain
	Drought can lead to reduced soil moisture and reduced crop yields
	Reduced agricultural productivity due to extreme heat
Historic & Leisure	Risk of damage to properties from flooding

4.5. Subsidence

Asset/Service	Risk
Built Environment/ Infrastructure	Risks to subterranean and surface infrastructure from subsidence.
	Risks of damage to built environment
	Risks of increased repair costs
	Risk of increased insurance overheads
	562,635 residential properties in Essex are at risk of subsidence
	22,793 commercial properties in Essex are at risk of subsidence
Health and Wellbeing	309 heritage sites in Essex are at risk of subsidence
	Damage to properties due to subsidence can cause harm to occupant health and wellbeing and create significant repair costs where financial stress impacts mental health.
Natural Environment	Subsidence investigations regularly lead to felling of nearby trees due to often unsubstantiated claims that the tree roots are affect the building foundations
	Risk of loss cooling and flood prevention capacity delivered by green infrastructure(e.g. trees)
Water	Risk to water pipelines, with damage potentially becoming more frequent in future due to subsidence
	Risk to reduction of aquifer storage
Agriculture	
Historic & Leisure	Historic buildings at risks of subsidence

4.6. Coastal erosion and flooding

Asset/Service	Risk
Built Environment/ Infrastructure	Damage to infrastructure: roads and railways; energy generation; hospitals, schools and other public services.
	Properties at risk from increased levels of flooding and erosion
	Damage to sewage treatment works (water recycling centres)
	Risk to Essex stretch of the England Coast Path – coastal erosion leading to path falling into the sea and cracking of footpath can cause degradation of path surface
	Risk to water infrastructure such as pipes

Health and Wellbeing	Stress & anxiety caused by extreme weather events and coastal erosion impacting on family & communities.
	Risk to immediate safety for costal residents.
Natural Environment	<p>Breach of waste filled sea wall: to the effects of climate change include rising sea levels, coastal erosion and storm surges. This poses the risk of a full breach of a sea wall or flood defence, causing potentially hazardous waste to enter the sea. The impact on any breach could encompass polluting the biosphere and flora and fauna, as well as potential financial penalties due to damage to protected fisheries and huge reputational damage to ECC. (ECA0022)</p> <p>Risk to designated freshwater habitats behind sea walls, which could be at risk from both erosion and flood risk. Many habitats behind the seawall are designated and their loss may lead to a requirement for replacement elsewhere or fines.</p>
Water	Salt water flooding into water bodies or rivers used for freshwater abstraction for agriculture or environmental areas.
Agriculture	If sea levels rise relative to fresh groundwater levels, saltwater can enter the aquifer and increase salinity in agricultural land
Historic & Leisure	As a result of climate change, there is a risk of heritage assets being impacted by coastal erosion and/or extreme temperatures as they were designed considering significantly different temperatures and climate conditions. The result would be deterioration of asset / asset value, safety risks and a reputational risk to ECC. (CGS0016)

5. Action Plan Process

Adaptive measures to tackle climate change and improve the environment were identified for each of the Function areas of the council. Functions assume responsibility and are accountable for actions and ongoing reviews. Under the current structure, ECC's functions are:

- Chief Executive's Office
- Corporate Services, Finance & Technology
- People, Policy, Economy and Public Health
- Climate, Environment & Customer Services
- Children and Families
- Adult Social Care

Functions can action any updates to current, new, or amended actions guaranteeing that the action plan stays pertinent to the provision of ECC services. Since this action plan is mostly strategic in nature, each Function should, if at all feasible, include its activities in its own performance plans. This will help to ensure that this action plan is implemented.

The risks and actions identified in this document summarise existing and emerging adaptation plans, developed and adopted by different Service Areas. ECC is undertaking a range of mitigation measures as part of service delivery.

ECC recognises that the effects of climate change impact different groups differently and vulnerable populations, including those with pre-existing conditions, the elderly, and underprivileged communities, are likely to be worst affected. Over the years we have delivered a number of projects to build resilience within these communities and to help them be better prepared for the impacts of climate change.

ECC has a formal risk management process: Our [risk management strategy](#) sets out the steps we take to minimise risks to the council.

The ECC Business Continuity Plan aims to allow the council to continue delivering essential services, even when faced with unexpected disruptions, including from natural disasters. ECC is also part of the [Essex Resilience Forum](#), a multi-agency partnership made up of local councils, emergency services, health providers, the voluntary sector and many more organisations - working together to plan and prepare for a multi-agency response to any major emergency in the county.

Numerous ECC strategies, plans and guide make reference to climate adaptation and have separate actions. A number of the most relevant are listed below.

Strategies & Plans

Essex County Council (ECC) has a statutory responsibility as the Lead Local Flood Authority for Essex leading on managing local flood risks. ECC authors the [Local Flood Risk Management Strategy](#) (2018) and this sets out our aims and actions to reduce the impact of local flooding to communities. It has nine objectives, including ensuring that the flood impact of developments is considered, the emergency plans and responses to flood incidents are

effective and that communities and businesses can make decisions about how they manage flood risk.

Essex County Council does not have direct responsibility for managing (coastal) flooding on the coast, however, we have been a key partner in the development of the [Essex and South Suffolk Shoreline Management Plan](#) which provides a strategic approach to coastal management through to 2105.

The [ECC Climate Action Plan](#) (2023) sets ambitious green infrastructure targets for the county that will help accelerate carbon sequestration rates, improve biodiversity and reduce risks from flooding, overheating and water shortages, helping the county adapt to extreme weather events and the impacts of a changing climate. The key ECC targets are:

- ensuring 30% of all land in Essex is natural green infrastructure by 2040 (rural and urban)
- all farmland is under sustainable land stewardship by 2050

The [Essex Green Infrastructure \(GI\) Strategy](#) takes a positive approach to enhance, protect and create an inclusive and integrated network of high-quality green infrastructure in Greater Essex, to create a county-wide understanding of green infrastructure - its functions and values, and to identify opportunities for delivering green infrastructure. The Strategy recognises the importance of green infrastructure and nature-based solutions to adapting to the impacts of a changing climate and champions the delivery of multi-functional green spaces across Essex.

The [Essex Local Nature Recovery Strategy \(LNRS\)](#) is to provide a county-wide, practical solution to driving action for nature recovery on the ground. The [Essex LNRS](#) (Draft for public consultation 2024) identifies where new habitats can be created, such as woodlands, grasslands, freshwater areas, river buffers, coastal and marine zones, and urban habitats. Opportunity maps highlight these areas and suggest actions for nature recovery within them. These actions will help connect and expand important natural areas. The Essex LNRS provides guidance for organizations and individuals on where to focus their efforts, what actions to take, and how to incentivize these actions to achieve nature recovery.

The [Water Strategy for Essex](#) (2024) highlights some of the work partners in Essex are already implementing to deal with water resources and water quality issues and aims to provide an important starting point for more conversations around the risks and opportunities in Essex.

The [Essex Highways Annual Plan for 24/25](#) includes the commitment to reduce our carbon footprint and adapt to climate change. In 2024 Essex Highways has produced two key climate strategies: The [Essex Highways Decarbonisation Strategy](#) and The [Essex County Council Essex Highways Strategy for managing its Green Estate](#) sets out how actions may be identified and implemented to improve green infrastructure and biodiversity, help restore local nature, alleviate flood risk, and manage water resources better. Essex Highways has undertaken a provisional climate change risk evaluation assessment for each highways network infrastructure asset of material value and is developing an adaptation plan bringing together recommendations for climate change risk mitigation.

[ECC's Property Strategy](#) includes commitments to net zero and to improve resilience, noting flood risk, and commitments to tree planting, building with nature and water management. ECC's [Tree Management Plan \(2023\)](#) was developed to set the vision for our tree stock, our aim and objectives used in the management of existing trees and the planting of new trees in all parts of the ECC estate. The Plan advocates for the protection and management of existing tree to maximise their benefits as well as the planting of more trees on ECC's estate, particularly along roads.

The [Joint Health and Wellbeing Strategy \(2022 - 2026\)](#) includes commitment to adopt policies and behaviours that are aligned to our wider commitments around climate change.

The [Essex Sector Development Strategy](#), setting our priorities for a stronger, more sustainable economy, reflects the need change to instil climate resilience.

Guidance for Housing Developers

The [Essex Design Guide](#) is used as a reference guide to help create high quality places with an identity specific to its Essex context. Currently within the Essex Design Guide, there are a series of sections which make reference to climate change either as part of a specific intervention or as recommended best practice. These include SuDS and flooding, design of multi-functional green spaces and overheating.

The [Essex Green Infrastructure Standards \(2019\)](#) report outlines nine principles and standards for the protection, enhancement, creation, and management of GI in Essex. The application of these principles and standards through development management and planning policy will ensure the delivery of multifunctional, accessible high-quality GI.

Delivery of Resilience Measures

ECC's Capital Flood Programme is aimed at reducing surface water flood risk to the communities of Essex. The current programme aims for 75% of flood resilience schemes to include integrated water management and natural flood management by 2050 and has been highlighted as a priority up to 2024/25. The projects delivered through the capital programme will not only reduce surface water flood risk, but they will incorporate Natural Flood Management and Green Infrastructure measures that will provide environmental benefits such as habitat creation, carbon reduction/sequestration and health & wellbeing. The Programme is a part-funded by ECC and match funded by external grants, mainly from the Environment Agency. To date the programme has protected over 2,000 homes. The total amount invested by ECC since the commencement of the capital programme (2015) is £18.4m and this has been match funded by £7.5m of external funding bringing the total investment in flood prevention to £25.8m over the 9-year period to end of 2023/24.

ECC delivers a grant programme. 100% funded by the Environment agency, to flood proof individual homes who have suffered or are at risk of flooding. To date, 432 Property Flood Resilience installations have been completed.

ECC provides SuDS guidance to developers for schemes with more than 10 homes or over 0.5 hectares. In 2023/ 24 this advice covered 80,262 new homes.

ECC has been working with communities and partners to deliver a number of Sustainable Drainage Systems (SuDS) schemes on our roads and we have worked with the Department for Education to deliver 12 SuDS schemes at Essex schools.

The [Essex Forest Initiative](#) is a 5-year programme that is helping deliver some of ECC's GI targets as well as increasing climate resilience across the county. ECC committed to planting 375,000 trees over 5 years. The initiative has exceeded its targets for the first 4 years, planting a total of 412,503 trees. ECC is also working with public sector partners to increase the tree planting across Essex. The Essex Forest Partnership is a partnership of local authorities working together to plant 870,000 trees.

The [Essex Climate Focus Area](#) (CFA) covering the Colne and Blackwater rivers catchments, or around 30% of Essex, was created as a demonstration site for best practice in sustainable land use management. The CFA has an accelerated targets of creating 30% natural GI and 100% sustainable land stewardship by 2030. It is a concept proposed by ECC, but delivery of its targets is a mixture of public and private projects and programmes. To date, ECC provided £20,000 match funding towards the creation of a farm cluster in the CFA which currently covers over 20,000ha of farmland. Additionally, ECC co-funded a newly established farm cluster in Tendring. ECC has been working with 4 private landowners in the area to develop investment cases in nature-based projects to accelerate the delivery of over 500ha of natural GI. The CFA team has also worked with 3 communities and parish councils to help them create local nature plans for their areas.

ADAPTIVE MEASURES CATEGORY

Effective measures addressing each climate related risk were identified and are categorised as either:

- ❖ **Building adaptive capacity** – gathering and sharing information; creating supportive institutional framework.
- ❖ **Delivering adaptation actions** – accepting the impacts and bearing the losses; exploiting new opportunities (renewable); preventing effects or reducing risks (building resilience) (UKCIP, 2021).

TIMEFRAME

The timeframe for the implementation of the action plan has been set for 2024-2029.

Adaptation measures identified in this plan are expected to fall into one of the following categories:

Current/Act Now	Actions that will be initiated/implemented within the first two years of the action plan.
Short-Term	Aim to have implementation within the short-term, from the near future to 5 years.
Monitor	Monitor the situation and review actions or implement actions as required.
Plan Ahead	Longer-term planning for implementation within 10 + years.
Ongoing	Actions that have already been initiated and will be implemented through the course of this action plan term and beyond.

6. Monitoring and Review of Actions

ECC is committed to building resilience to tackle the effects of climate change, emphasising the need for urgent and timely action.

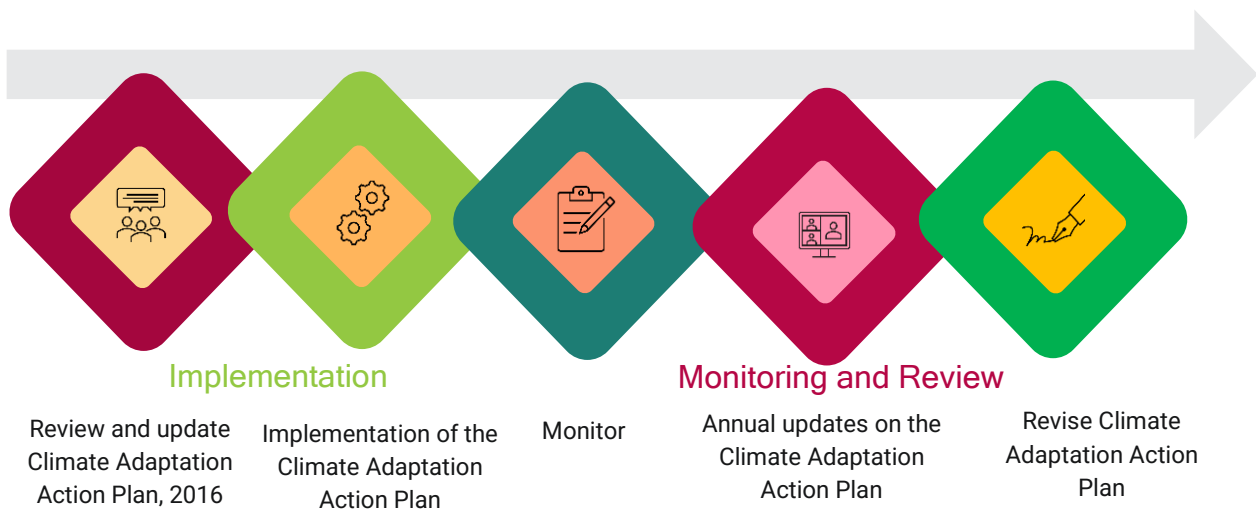


Figure 4: Implementation and monitoring plan

Monitoring progress is crucial for ensuring climate readiness and business continuity. Keeping track of implemented actions allows ECC to assess progress against the adaptation action plan and plan for future actions. This action plan will also be updated to take into account any new data on the risks and effects associated with climate change and weather. We will continue to publish our [Essex Climate Action Annual Report](#), which highlights initiatives that have been actioned and implemented across Essex, including at ECC and those developed with partners for the benefit of our communities and businesses. The report will also provide an opportunity to identify any challenges or future improvements.

In 2023 ECC published the updated [Climate Action Plan](#) which outlines ECC's strategy to drive progress against the ECAC's recommendations. The updated Climate Action Plan takes stock of what has been achieved and what is still to come.

It is worth mentioning that a number of actions from the Climate Action Plan are being implemented, including new and current work programmes. However, specific initiatives to address and mitigate future climatic risks may not be implemented immediately due to the uncertainty surrounding such events. Additionally, some measures addressing current risks may not be appropriate in the future. Therefore, due to these variables, it will be necessary

to monitor these risks, apply a level of flexibility and, in some cases, planning before any measures are taken.

This document should not be seen in isolation or as a definitive list of climate risks faced by Essex County Council and the county of Essex: this will need to be kept under review.

The Climate Adaptation report references and depends on the numerous and varied strategies of ECC.



7. Action Plan Assessment

This section sets out the adaptation measures/actions against the five core climate risks. In response to the Essex Climate Action Commission's recommendations, officers have developed a £250 million climate action plan that is now in delivery, which takes steps to reduce carbon emissions and adapt to climate change. These include investing in green infrastructure schemes such as tree planting, natural flood management, sustainable drainage projects, an Essex Water Strategy, the Climate Focus Area and other climate adaptation projects across a broad agenda.

A number of these actions are delivered in areas that are known to have a high proportion of residents that might be disproportionately affected by extreme weather events, flooding and urban heating. Some examples of projects that directly support the elderly, low-income households, outdoor workers, children, vulnerable health groups and minority communities include:

- Rain gardens on Springfield Road and Park Avenue, Canvey Island
- Jaywick Flood Risk Education Project
- Jaywick and District Energy Hub
- The Home Upgrade Grant programme
- Urban Street Tree Planting programme
- SuDS In Schools programme
- The Essex Energy Switch
- SPONGE2020 (retrofit of the Basildon Cardiothoracic Centre with SuDS)

7.1 Urban Heating (Extreme Summer Temperatures)

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date	Output (as at end 2023/24)
Essex GI Strategy	Public Realm green infrastructure improved to reduce heat island effect	DAA	Plan Ahead	Ongoing	Tree Management Plan adopted.	3,785 street trees replaced. The street trees will

	and improve character and sense of place.				Essex Forest Initiative - 5-year plan which has delivered 412,503 trees by March 2024	provide shading and will particularly benefit outdoor workers, the elderly and children. In the first 4 years, planting a total of 412,503 trees.
	Support the development of comprehensive and multi-functional green infrastructure in all new developments, including Garden Communities, with best practice guidance on its design and management for multiple benefits.	BAC	Ongoing	Ongoing	GI Standards published and awarded Building with Nature Policy Accreditation. Accompanying introduction/ training video made available for planners and developers. Trialled GI Planners to establish templates to help with the reviewing and responding to planning applications.	174 Planning applications reviewed, and GI response provided. 12 Local Plans and 2 Unitary Local plan reviewed for GI content.
	Use planning policy to secure multi-functional green spaces within and beyond development site boundaries	BAC	Ongoing	Ongoing		
Essex Flood Strategy	In responding to planning applications, we want to ensure that the increased risk of surface water flooding is lessened by promoting sustainable drainage (SuDS) within the development	BAC	Ongoing	Ongoing	SuDS Design Guide published.	The ECC SuDS team provided (2023/4) SuDS advice on 1092 planning applications which results in 80,262 properties receiving flood reduction expertise

Essex Forest Initiative	375,000 trees planned over 5 years. Target exceeded by planted 412,503 trees over 4 years	DAA	Current/Act Now	In progress	<p>Up to the end of 2023/24, the Essex Forest Initiative has attracted a total of £3.8 million. Planting partners: Woodland Trust, Forestry Commission, The Big Green Internet, Thames Chase Community Forest, One Tree Planted, Silverton Aggregates, Ground Control, Mitie. Grant funders - England Woodland Creation Offer, Local Authority Treescape Fund, Urban Tree Challenge Fund and partnership with One Tree Planted. £399,727 grant funding - England Woodland Creation Offer.</p> <p>In 2023 ECC approved the Tree Management Plan and Tree Statements (2024), specifically to protect the existing ECC tree stock and plant more trees on the ECC estate.</p>	412,503 trees planted 2020-2024
Essex Water Strategy (2024)	The Water Strategy for Essex sets out the three solutions to address water	DAA	Current/Act Now	In progress	Essex Water Strategy published in March 2024.	

	<p>challenges, which relate to the urban built environment:</p> <p>reduce our demand for water (fix leaks, use less and fit water efficient devices)</p> <p>change land use for water (create new urban wildlife and woodlands, wetlands and sustainable drainage to store and treat our water)</p> <p>alternative water supplies (installing water butts, SuDS features and water recycling)</p>					
ECC Essex Climate Action Plan (2021-5)	The ECC Essex Climate Action Plan (2021-5) recommended 30% natural green infrastructure cover by 2040 and 100% sustainable land use cover by 2050. This will support climate resilience and nature recovery	DAA	Ongoing	In progress	The ECC Climate Action Plan also recommended an action to go further and faster on climate action in a defined Climate Focus Area (CFA). We are developing a work programme around this which is progressing well at a number of locations around north Essex, with other projects in the pipeline. In summary, the £300,000 ECC funding for delivery between 2021 - 2024	To promote sustainable farming, ECC has supported the North Essex Farm Cluster. The CFA programme has included a community consultation with 30 groups and set up a Knowledge Hub to allow community cooperation. In addition, three

					helped unlock £138,000 grant funding directly to ECC and £2,916,000 partner funding generated following ECC contribution. In addition, a further £2,500,000 funding for nature restoration in the CFA has been brought by partners who did not rely on ECC support for accessing the funding.	detailed Nature Plans consultations have also taken place in May 2023. Furthermore, the CFA brand has been created and a Comms Strategy has now been developed.
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7.2 Flooding

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date (Outputs)	Output (as at end 2023/24)
Essex Local Flood Risk Management Strategy (2018)	Planning for future flood reduction	BAC & DAA	Ongoing	In progress	Modelling of possible scenarios. Delivery of Property Flood Resilience programme	
	Delivery of a Property Flood Resilience (PFR) Programme	DAA	Ongoing	Ongoing	Grants of up to £8,000 provided to residents to fund PFR measures in their properties	432 PFR installations complete.
	Annual Floods programme currently valued at £4.5	DAA	Ongoing	Ongoing		Over the last 8 years c. 2000

Capital flood programme (2016-25)	million pa. The Programme is a combination of major projects improving flood protection from surface water for Essex Communities and feasibility and optioneering studies for future schemes				Some 60 major flood schemes have taken place across Essex in addition to a Community Flood Programme	residential properties have had increased flood protection.
	Reduce surface water flood risk to properties through NFM and attenuation basins	DAA	Ongoing	Ongoing	An ongoing programme since 2016 with 8 completed schemes to date.	Estimated 401 properties benefiting from 11 attenuation basins
Essex GI Strategy	Creating green spaces which also function as Natural Flood Management and SuDS schemes	DAA	Ongoing	Ongoing	SuDS and GI delivered in schools.	Four retention basins delivered. GI and SuDS delivered to 13 Schools.
					Raingardens delivered in urban areas	5 schemes made up of over 35 sections of raingardens
Map16 software programme	Map16 software has been rolled out to track and manage the gully cleansing service	BAC & DAA	Ongoing	Ongoing	Started in 2019/20 and is ongoing	Map16 should help Essex Highways deliver the most effective service and over two years complete cleansing of the whole gully asset group.
Identification of “At Risk” assets Essex	Identification of all ECC assets with potential for coastal flooding risk	BAC	Current/Act now	In progress	Property Team completed work in July 2023. Next steps being discussed	

Assets “At Risk” Plan / Programme	Establish a plan / programme for all “At Risk” assets as a whole to determine which will be managed realignments and which will require funding to then approach cabinet to request	BAC	Current/Act now	In progress	Property Team is leading this work supported by the flood management team.	
Future development and urgent areas surveys	Any future development on sites needs to take flood risk into account, carrying out flood risk assessments to protect from flood risk.	BAC	Current/Act now	In progress	Building surveys recently conducted.	The surveys will also highlight areas we need to address

7.3 Water Supply

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date (Outputs)	Output (as at end 2023/24)
Essex Water Strategy (2024)	The Essex Water Strategy project considers the water scarcity challenges for this county, along with what actions we collectively need to take. The aim of this work is to ensure that there is a much better understanding of the impact on Essex’s communities,	BAC	Current/Act Now	In progress	The Water Strategy was shared with key stakeholders and was published. The Water Strategy for Essex sets out the three	The strategy provides a sound starting point for water resources planning to become integrated into the services we provide and our wider

	<p>businesses and council services. While water resources are not an issue that the county council has a legal responsibility for, we recognise the consequences of having too little water and that uncertainty of supply can have devastating effects on wellbeing, planning, economic growth and the environment.</p>				<p>solutions to address water challenges:</p> <p>reduce our demand for water (fix leaks, use less and fit water efficient devices)</p> <p>change land use for water (create new woodlands, wetlands and sustainable drainage to store and treat our water)</p> <p>alternative water supplies (building new reservoirs and water recycling)</p>	<p>environmental commitments.</p>
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7.4 Severe Weather Events

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date (Outputs)	Output (as at end 2023/24)

	For Flooding Heat please 7.1					
Essex GI Strategy	Public Realm green infrastructure improved to reduce heat island effect and improve character and sense of place.	DAA	Plan Ahead	Ongoing	Tree Management Plan adopted. Essex Forest Initiative - 5-year plan which has delivered 412,503 trees by March 2024	3,785 trees in urban areas replaced, reducing the heat island effect
The Home Upgrade Grant	The grant is aimed at low-income and hard to heat off gas grid properties	DAA	Ongoing	Ongoing	HUG1 ran until March 2024. 21 homes completed, with capital spend of £328,531	21 residential properties retrofitted
The Jaywick and District Energy Hub	Helping citizens of Jaywick Sands and surrounding areas receive trusted information, advice, and support on energy efficiency.	BAC	Ongoing	Ongoing	The Hub aims to make homes warmer, reduce energy bills, and improve health and wellbeing	
ECO 4 Flex	Government backed grant, administered by Ofgem, and delivered by ECC as a pan-Essex scheme across 12 participating Boroughs and Districts. Opened 07/05/24 and runs until 31/03/26	DAA	Ongoing	Ongoing	Whole- house approach to improving EPC rating by 2 bands of properties D-G. Demographics: low-income households, vulnerable, hard to heat properties, qualifying health conditions. 38 applications received and work is due to commence in September 2024	

7.5 Subsidence

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date (Outputs)	Output (as at end 2023/24)
Essex Tree Management Statement (2023)	Where a tree has been identified as a cause (rather than potential cause) of damage (subsidence), but reduction works/pollarding are deemed sufficient to prevent foreseeable future damage, ongoing maintenance will be continued.	BAC	Ongoing	In progress	Managing existing tree, preventing them from causing subsidence damage on adjacent buildings since September 2023	Retention of existing ECC tree which is often mature and important trees

7.6 Coastal Erosion

Strategy / Programme	Actions/Activity	BAC of DAA (Building Adaptive Capacity or Delivering Adaptation Actions)	Timeframe	Status	Delivery to date (Outputs)	Output (as at end 2023/24)
Essex Shoreline Management Plan (Date)	ECC is a member of the SMP working group. It is an Officer group that replaced the original SMP Client Steering Group. This feeds	BAC	Ongoing	Ongoing	SMP has been refreshed and the interactive SMP Explorer tool is now published online	

	into the Essex Coast Organisation that makes recommendations to organisations in relation to the delivery of the Essex and South Suffolk SMP and the Thames Estuary 2100 Plan. ECC is also the organiser and host of the Coastal Forum					
ECC waste-filled sea wall surveys	Propose ECC carry out an annual survey to map the waste filled sea wall sites (potentially by drone), to monitor changes over time and identify areas where work is needed or further inspections required	BAC	Short term	Proposed		

8. Conclusion

According to the UK Climate Change Risk Assessment (2022), the Essex Local Climate Impact Profile (2011 and 2012), the previous Climate Adaptation Action Plan (2011-2016), the ECC Risk Register (2024), and the ECC assessment of the climate change risk, indicate that extreme weather events have had a significant impact on our communities, businesses, and services in Essex, and they may continue to do so. Climate change has both immediate and long-term harmful effects. To address these issues, ECC, partners, stakeholders, businesses and communities must work together to implement short and long-term mitigation and adaptation strategies. Strategies for adaptation must be implemented at all levels.

ECC already has procedures in place for responding to several of these climatic events, such as business continuity, emergency preparedness, and highway winter maintenance. However, the challenges are to insure against future risks, reduce the vulnerability of our infrastructure and threats to the health and wellbeing of our residents and environment, while creating economic opportunities where possible.

By putting these adaptive measures into practice, the adverse effects of climate change will be reduced based on actual or predicted changes in the climate. As shown in figure 7, it will improve:

- 🌿 our health and well-being outcomes,
- 🌿 develop and maintain our core infrastructure,
- 🌿 safeguard nature and biodiversity,
- 🌿 avoiding costs and making savings,
- 🌿 strengthen the economy, and
- 🌿 increase our resilience to disasters.



Figure 5: The co-benefits of taking adaptive actions.

This action plan was designed to be fluid and adaptive, allowing measures to be modified as our knowledge and understanding of climate change evolves. Priorities for continued development on adaptation should include the following:

- Continue to understand ECC risk threshold by ensuring climate risk assessments are undertaken at least every 5 years.
- Focus on actions that manage and address risks associated with current climate variability and extremes.
- Balance the management of climate and non-climate risks.
- Ensure climate risk management is integrated into ECC decision making, policies and planning, especially in areas responsible for long term assets (such as council buildings, built environment, highways).
- Avoid actions that exclude or limit future adaptation.
- Review the continued effectiveness of adaptation decisions in light of any climatic and organisational changes.

- Work in partnership with key stakeholders, partners and communities (internally and externally) (UKCIP, 2021)⁵⁸.
- Continue to monitor how climate risks affect the most vulnerable in our society and continue delivering actions that will help them adapt.

To achieve the plan's objectives, we must work together to benefit everyone.

⁵⁸ https://localpartnerships.gov.uk/wp-content/uploads/2021/12/Local_Partnerships_Climate_Adaptation_Toolkit_v1.pdf

9. Appendix

9.1. Reference

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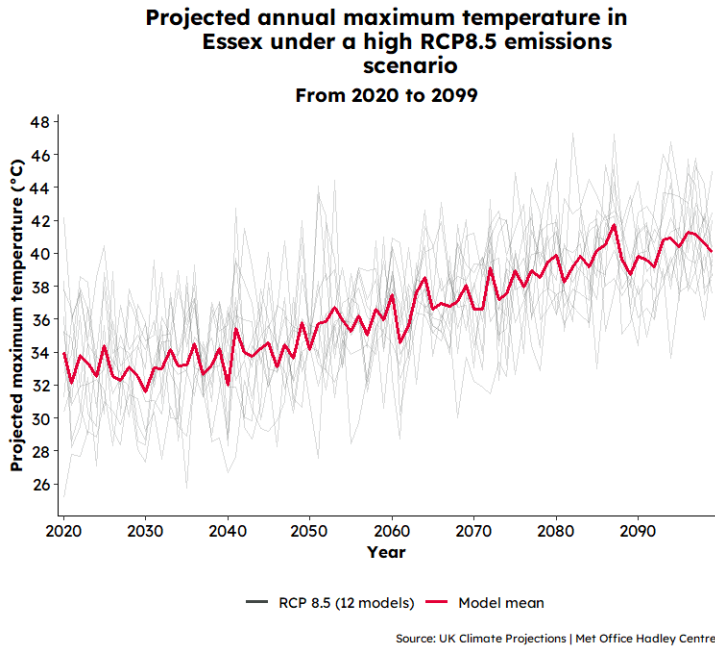
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9.2. Essex Climate Projections (based on High Emission Scenario)

9.2.1. PROJECTED MAXIMUM TEMPERATURE

Assuming continued increases in greenhouse gas emissions under a high RCP8.5 emissions or “business as usual” scenario, Essex can expect a continued upward trend in temperatures, as well as generally...



Hotter summers

12 Models: The highest projected maximum temperature is 47.28 degrees Celsius, which is expected to occur by July 2082.

Ensemble mean: the highest projected maximum temperature is 41.74 degrees Celsius, which is projected to happen by 2087.

Warmer winters

Daily maximum temperatures in the Winter period daily could reach as high as 19 degrees Celsius by 2070.

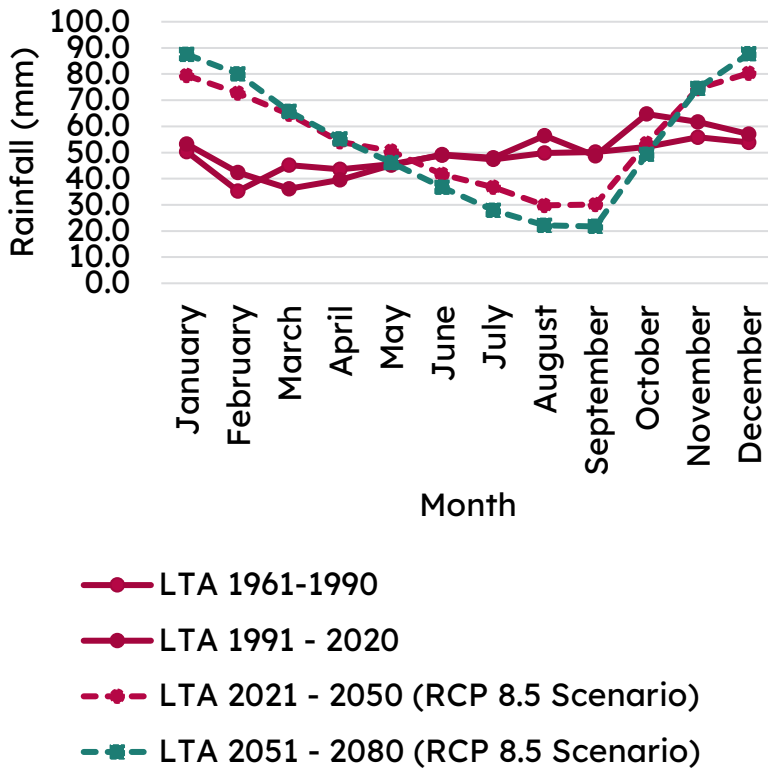
9.2.2. PROJECTED RAINFALL DATA

Assuming continued increases in greenhouse gas emissions under a high RCP8.5 emissions or “business as usual” scenario, Essex can expect...

Drier summers

According to the LTA 1991-2020 summertime rainfall ranged from a low of 48.0mm in July to 56.4mm in August.

Long term average (LTA) historic and projected rainfall for Essex by month



The projected LTA rainfall in 2051-2080 is expected to fall significantly in the summer months to as low as 22.1mm in August.

Wetter winters

The projected LTA rainfall in 2051-2080 is as much as 87mm in January (87.5mm) and December (87.8mm). This is 30mm more than January (53.3mm) and December (57.1mm) in the 1991-2020 LTA.

Data Source: [Met Office Hadley Centre | UKCP](#)

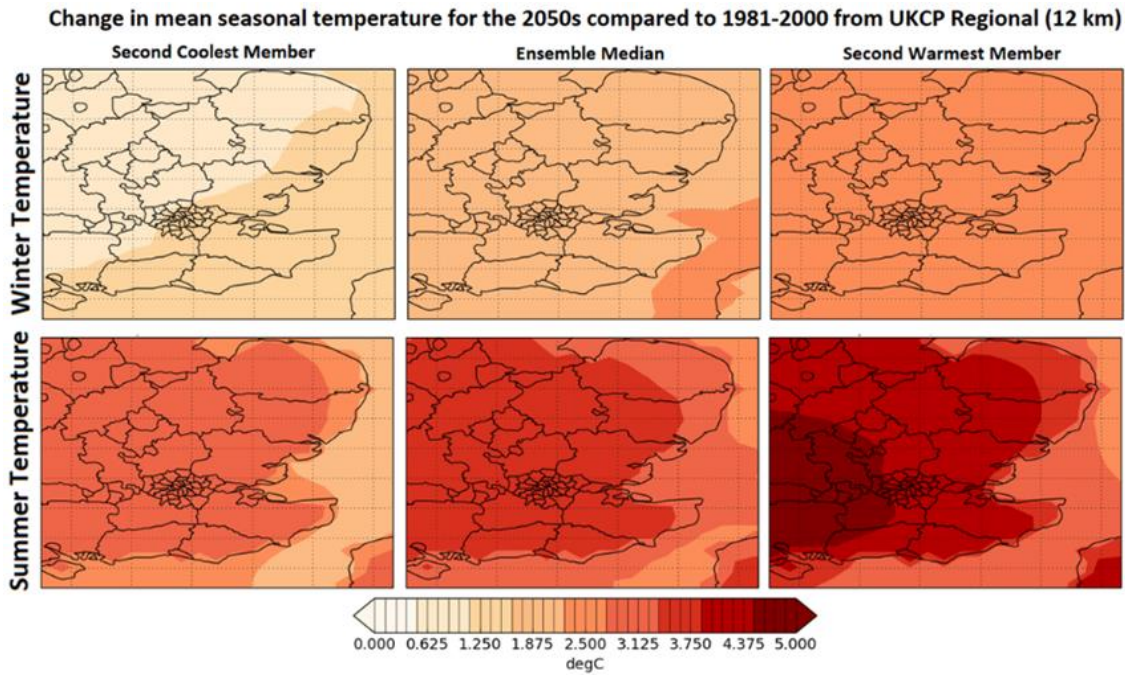


Figure 6: Increasing Temperatures across the region, high - impact scenario (UKCP18)

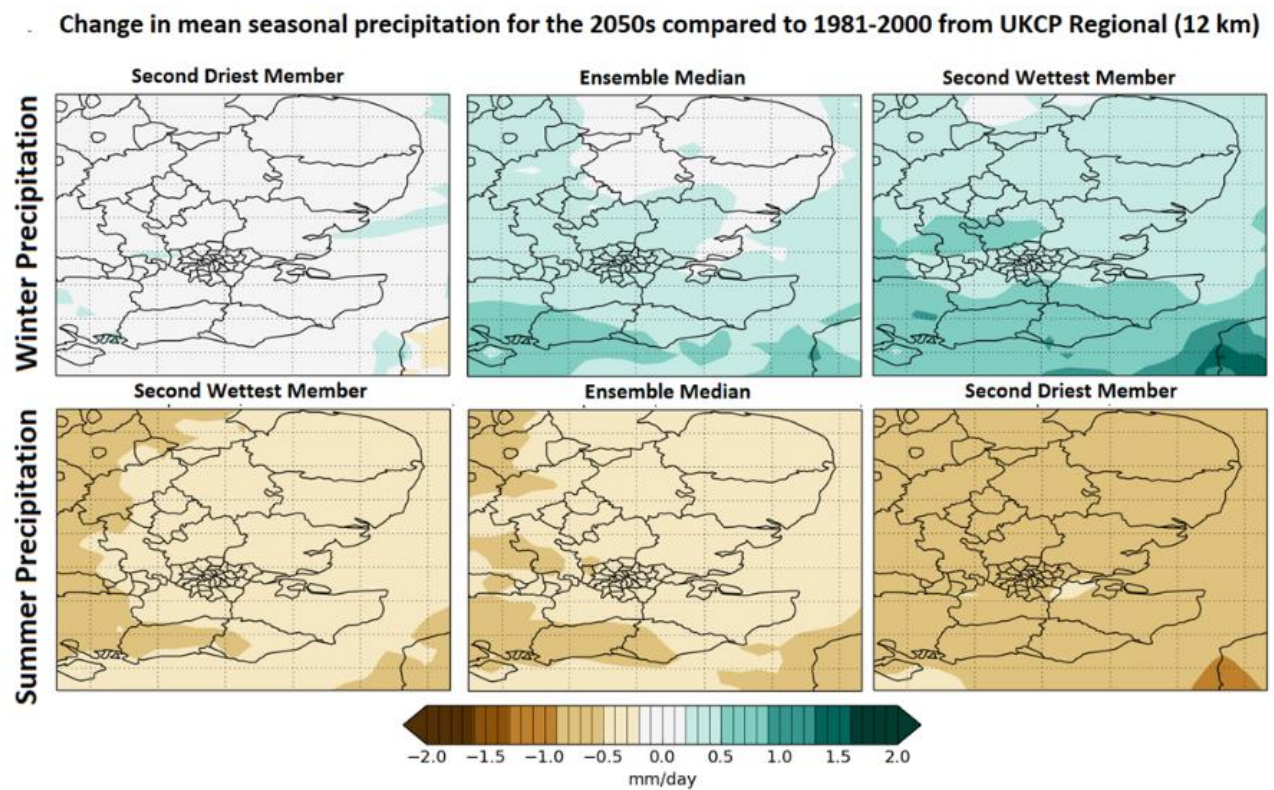


Figure 7: Change in seasonal precipitation (UKCP18)

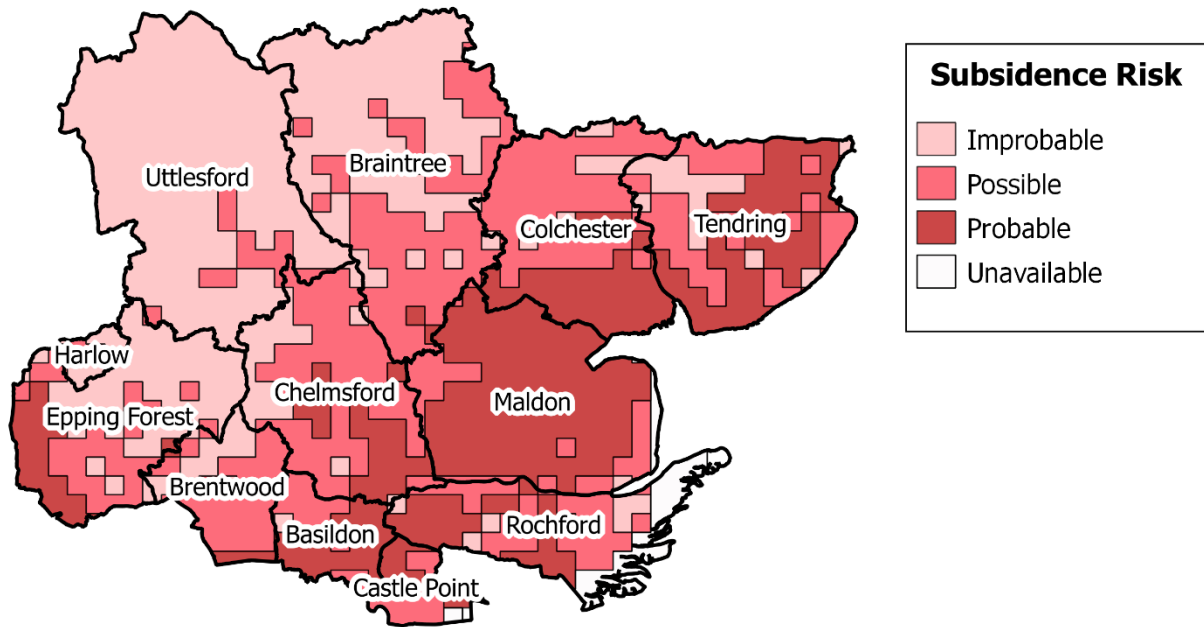


Figure 8: Risk of subsidence in Essex (BGS 2021)