

# Cornwall Climate Change Risk Assessment



# This report summarises the findings of the **Cornwall Climate Change Risk Assessment**



[www.cornwall.gov.uk/climate-report](http://www.cornwall.gov.uk/climate-report)

Produced by



Want to find out more how climate change is projected to affect Cornwall after reading this summary report? Click the cover images to open each Climate Change Risk Assessment document to read the full reports.

“ With climate change we've got to get used to a more extreme and less benign climate than we've been accustomed to, and that will bring lots of challenges which we must face.

One of the challenges will be how to understand what the future climate is going to look like, how to respond to extreme climates and how to make Cornwall and its populations and ecosystems more resilient. ”

- **Professor Stephan Harrison**  
Director of Climate Change Risk Management

# Cornwall's changing climate

The UK Climate Change Risk Assessment (2022)<sup>1</sup> published by the Committee on Climate Change acknowledges that climate change is happening now. It is one of the biggest challenges of our generation and has already begun to cause irreversible damage to our planet and way of life.

Research completed as part of Cornwall's Climate Change Risk Assessment (2022)<sup>2,3</sup> has identified that the atmosphere over Cornwall has been warming since the 19th Century and the sea level around the coast of Cornwall has also been increasing for at least the past 100 years.

As recognised by the Cornwall Council climate emergency declaration the extent and impacts of climate change will be dependent on how successful we are as a society at reducing carbon emissions over the coming decades. Whilst carbon emissions continue to rise, Cornwall's climate will also continue to change. The extent of this change will have potentially far-reaching consequences for our towns, communities and the natural environment.

<sup>1</sup> Committee on Climate Change Third Technical Report (CCRA3) 2021

<https://www.ukclimaterisk.org/independent-assessment-ccra3/technical-report/>

<sup>2</sup> Intergovernmental Panel on Climate Change Sixth Assessment Report Working Group I 2021

[https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Full\\_Report.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf)

<sup>3</sup> Met Office Hadley Centre (2018): UKCP18 Probabilistic Climate Projections. Centre for Environmental Data Analysis, 2021 <http://catalogue.ceda.ac.uk/uuid/9842e395f2d04f48a177c3550756bf98>

# Why we need to assess the risks presented by climate change

Climate change will affect all of us. Along with continuing to reduce our carbon emissions we need to consider how we will respond and adapt to climate change.

## The Cornwall Climate Change Risk assessment sets out the necessary evidence to:

- Inform the public sector, private sector and Cornwall's communities how we will need to adapt to Cornwall's changing climate effectively;
- Assess trends in Cornwall's climate and provide informed projections as to how Cornwall's climate might change by 2100;
- Outline likely impacts resulting from climate change including floods, coastal erosion, drought, storms and wildfire;
- Identify gaps in our current knowledge; and,
- Inform future governance functions and decision making related to climate change adaptation.

This document provides an overview of the key findings and next steps relating to the Cornwall Climate Change Risk assessment. The complete report is available at

 [www.cornwall.gov.uk/climate-report](http://www.cornwall.gov.uk/climate-report)



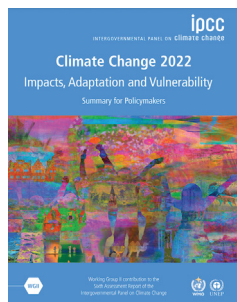
**Note:** The Cornwall Climate Change Risk Assessment is a high-level overview of some of the range of issues that Cornwall may face in future. The numerical modelling undertaken in the report makes assumptions concerning the scale and nature of the processes under consideration and requires simplified scenarios to be adopted. Consequently, the results must be viewed within the lens of model of uncertainty<sup>4</sup>.

<sup>4</sup> Model uncertainty is the incomplete knowledge about the climate system, quantified with the help of a large number of climate models that simulate the future climate for the same emission scenario.

# Establishing Cornwall's Climate Change Risk Assessment

The Cornwall Climate Change Risk Assessment provides a climate profile for Cornwall to 2100 and an evidence-based report to help better understand the impacts, climate risks<sup>5</sup> and opportunities presented by climate change to Cornwall. The full report is based on international and national climate change data.

## International



**The Intergovernmental Panel on Climate Change (IPCC) current sixth assessment report (IPCC AR6)** is published every six to seven years. The latest report, climate projections and identified risks were published by the IPCC in August 2021

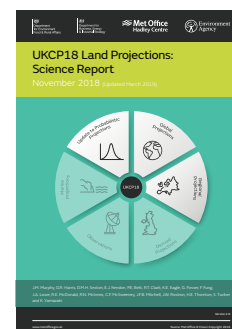
<sup>5</sup> “In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and wellbeing, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species”  
Climate Risk Definition - IPCC AR6 2021

## National

The Climate Change Act (2008) requires the UK Government to produce a **UK Climate Change Risk Assessment (CCRA)** every five years. CCRA3 was published by the Committee on Climate Change in June 2021 and formerly published by national government in January 2022.



**The UK Climate Projections (UKCP)** provides a set of tools and data produced by the UK Met Office that project how the UK climate may change in the future.

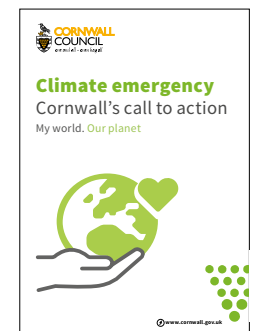


## Local

**The Cornwall Council Climate Change Action Plan** recommended the need for a Cornwall Climate Change Risk Assessment.

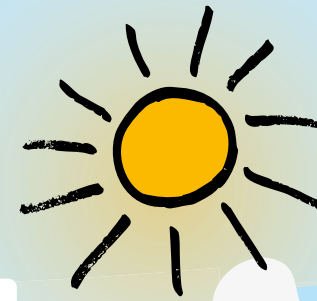
IPCC AR6 and UKCP18 data provide projections on how the climate may change both internationally and nationally in the future. Where possible the data has been used to project a range of bespoke climate scenarios for Cornwall to 2100.

The national risk assessment has been combined with the findings of both AR6 and UKCP to map Cornwall's climate risk and opportunities.



# How climate change is projected to impact Cornwall

See pages 11-14 for more information on climate change impacts



Higher temperatures and more heat waves

Less snow and ice

Changing rain and snow patterns

Stronger storms

More droughts and wildfires

More floods

Increased coastal erosion

Ocean acidification

Rising sea levels

Warmer oceans

# What is the Cornwall Climate Change Risk Assessment?



**Climate Change Risk Management (CCRM)** is a Cornwall-based climate science consultancy working at the forefront of climate change science and policy.

CCRM are made up of scientists and authors who contribute to reports for the Intergovernmental Panel on Climate Change (IPCC).

The documents and information sources collated to provide the assessment of **how climate change will affect Cornwall are principally:**

- The UK Climate Change Risk Assessment No. 3, CCRA3, 2021
- The UK Climate Projections 2018, UKCP18
- The Working Group I Report to the Intergovernmental Panel on Climate Change Assessment Report No. 6, WG1 IPCC AR6, 2021



## Summary of Cornwall Climate Change Risk Assessment projections

The Cornwall Climate Change Risk Assessment has found the potential for higher temperatures, more winter rainfall, more river flooding events in winter, the possibility of more short duration but high impact summer flooding events of the type seen in Boscastle in 2004 and Coverack in 2017, and more coastal flooding and erosion. Full details and supporting evidence are contained within [the main report](#). In summary, the Cornwall Climate Change Risk assessment provides the following projections:

Temperatures will continue to rise

**between 1°C to 5°C**

if carbon emissions are not reduced



**Droughts are likely to become more severe in summer, affecting water supply and farming**



**Heatwaves and associated heat risks**

including wildfires are likely to increase

**Short, torrential rainfall**

such as seen in Boscastle in 2004 and Coverack in 2017 will become more frequent



# Summary of Cornwall Climate Change Risk Assessment projections

## Rainfall patterns will change

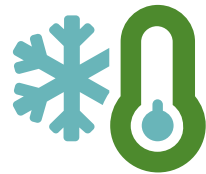
with more rain in winter and less in summer

## Higher wind speeds are possible

with more winter storms arriving in closer succession

## Higher risks of river and surface water flooding

caused by short and intensive rainfall



## Cold spells will become less severe and infrequent

as average temperatures increase

## Snowfall will decrease as temperatures rise



## Marine heatwaves will become more frequent, severe and longer, impacting Cornwall's ocean and coastal ecology and activities such as fishing

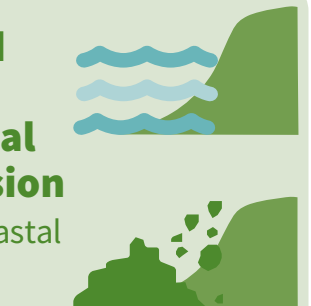
Relative sea level around Cornwall has risen by

## 15cm over the past 100 years

Cornwall will see amongst the highest of the likely future increases around the UK, in the range 20cm to 1m by the end of the century depending on emissions levels. This could potentially be higher dependent on the loss of the Antarctic Ice Sheet.

## Storm surges and higher tides will cause more coastal flooding and erosion




with the potential of coastal land loss up to 100m







Marine heatwaves are more extensive in size and time than those occurring in the atmosphere.



## Table 1. Projected Cornwall Climate Change Profile to 2100

	Area of impact	Projected trend to 2100			Certainty
		INCREASING	DECREASING	VARIABLE	
<b>Heat and cold</b> 	Mean air temperature	▲			Confident
	Extreme heat	▲			Confident
	Cold spell		▼		Confident
	Frost		▼		Confident
<b>Wet and dry</b> 	Mean precipitation			◊	Tentative
	River flood	▲			Confident
	Heavy precipitation and pluvial flood	▲			Confident
	Landside	▲			Moderate
	Aridity	▲			Moderate
	Hydrological drought	▲			Confident
	Agricultural and ecological drought	▲			Confident
	Fire weather	▲			Confident
<b>Wind</b> 	Mean wind speed			◊	Uncertain
	Severe windstorm			◊	Uncertain
	Tropical cyclone	▲			Uncertain

## Table 1. Projected Cornwall Climate Change Profile to 2100

	Area of impact	Projected trend to 2100			Certainty
		INCREASING	DECREASING	VARIABLE	
<b>Snow and ice</b> 	Snow		▼		Confident
	Heavy snowfall and ice storm		▼		Confident
	Hail	▲			Confident
<b>Other</b> 	Air pollution			◄►	Uncertain
	Atmospheric CO <sup>2</sup> at surface	▲			Confident
	Radiation at surface	▲			Confident
<b>Coastal</b> 	Relative sea level	▲			Confident
	Coastal flood	▲			Confident
	Coastal erosion	▲			Confident
<b>Open ocean</b> 	Mean ocean temperature	▲			Confident
	Marine heat wave	▲			Moderate
	Ocean acidity	▲			Confident
	Ocean salinity	▲			Confident
	Dissolved oxygen	▲			Confident

# Cornwall climate change opportunities / impacts

The changing climate has and will continue to have an impact on Cornwall. [The Cornwall Climate Change Risk Assessment](#) includes a range of studies that explore the complexity, opportunities and potential impacts presented by climate change, a summary of which are provided in the following tables.



## Health and wellbeing

### Opportunities

- **Develop policies to promote access to green and blue space and encourage safe outdoor recreation.**
- **Develop greater public education on the dangers of excess heat or exposure to UV (sun light).**
- **Improved early warning through heat alerts could help people to prepare for periods of prolonged hot weather.**
- **The trend towards a reduction in cold spells and increasing mean temperatures have the potential to reduce current problems and diseases linked to the current heating seasons.**
- **Develop collaborative working across all health and care providers, the voluntary sector and local government to build resilience and develop emergency-response plans.**

### Impacts

- Heat.** Extreme heat is an acute health hazard for those over 65, people with existing health conditions and populations in urban environments.
- Cold / damp.** Cold and damp can lead to problems and diseases from increased blood pressure and common colds, to heart attacks and pneumonia.
- Flooding / coastal flooding, short term.** Flooding associated with heavy rain in river catchments, coastal flooding and from storm surges at the coast come with a range of profound impacts on health and wellbeing over the short and long term.
- Flooding / coastal flooding, long-term.** Health impacts of flooding include the psychological trauma of damage to homes and property, loss of livelihood and fear of recurrence. At most risk are those who already experience health inequalities.
- Coastal erosion.** Immediate risks to health and wellbeing include the potential for death and serious injury. Coastal erosion can also result in the loss of health and wellbeing amenities including recreational ground and coastal walking paths. The long-term threat of coastal erosion and loss of property can lead to long term health and mental health impacts.
- Wind / storms.** Immediate risks to health and wellbeing include damage to infrastructure, facilities and members of the public injured by flying debris. Roads blocked by fallen trees delaying the emergency services.



# Residential properties and critical infrastructure

## Opportunities

- **Early engagement of the voluntary and community sector in planning for emergency response.**
- **Housing retrofit to include installation of passive cooling measures through retrofit sufficient to address overheating risks.**
- **Developing and building in resilience by design into new housing estates, eco-communities and infrastructure.**

## Impacts

**Heat / cold.** Projected increase in the frequency of heatwaves will have a range of impacts on homes, communities and critical infrastructure. New houses which have very high levels of energy efficiency can be susceptible to overheating by 'keeping the heat in'. Meanwhile, houses which are poorly insulated are very hard to heat, causing cold and damp conditions.

**Flooding / coastal flooding / storm surges / drought.** Present a threat to property and communities, with the potential for both immediate and long-term damage including structural damage from the force of water, subsidence or persistent damp.

**Flooding / coastal flooding / storm surges / drought.** Present risks to dwellings and critical infrastructure across Cornwall, including water treatment plants and electrical sub-stations and the contamination of domestic water supplies, whilst drought can cause water shortages.

**Coastal erosion.** Presents a threat to property and communities with the risk of immediate and long-term damage from subsidence including property and critical infrastructure including communications, water electricity and roads. In addition to physical damage, coastal areas at risk of erosion can face a disproportionate challenges in securing development investment and /or insurance.

**Wind / storms.** Present the risk of damage to dwellings and power cuts during extreme effects, while wind-driven rain can cause changes to the outer surface of buildings will lead to more moisture.

**Other.** Climate change is likely to provide a greater potential for instability of both natural slopes (cliffs and hillsides) and engineered slopes (spoil heaps, tips, embankments) leading to more landslides and increased cliff erosion.



## Priority habitats in Cornwall

### Opportunities

- **The early implementation of the Cornwall Nature Recovery Plan led by Cornwall Council sets out priorities for biodiversity and nature-based solutions, along with spatial opportunities for nature recovery.**

### Impacts

**The majority of Cornwall's priority habitats are likely to be subject to multiple climate change stressors.** For example, changes in hydrology, novel or invasive pests, a squeeze in available coastal land, changes in agricultural management. In many cases the responses to these stressors will be a loss of habitat condition, rather than a net loss of area.



## Agriculture

### Opportunities

- **Grassland productivity is likely to benefit from a longer growing season caused by warmer temperatures and possible drier summer conditions in Cornwall.**
- **Increased temperatures and a longer growing season are likely to generally increase yields of root crops and leafy vegetables.**
- **The changing climate will provide opportunities to adapt by introducing new varieties and breeds of livestock along with novel crops and the chance to adapt current management practices.**

### Impacts

**Agricultural drought** may become more frequent, with implications for drought-sensitive crops and the requirement to store water in the future.

**The increased frequency of drought, heat stress and waterlogging** have the potential to increase the incidence of future novel pest outbreaks and disease.

**Wetter winters** can potentially constrain the use of heavy machinery and land-management operations. Whilst high intensity rainfall events may cause soil erosion and loss of topsoil.

**Increasing summer temperatures**, in addition to increased heat waves, may impact the health of livestock.

**Increased flooding** may lead to locally lower arable and grassland production in low-lying and coastal areas.



## Forestry

### Opportunities

- **With rising temperatures and longer growing seasons commercial timber growing can increase**

### Impacts

**Changes in seasonal precipitation patterns** have the potential to impact drought intolerant commercial tree species such as Sitka spruce.

**Increases in extreme weather events**, including drought, heat waves, and intense rainfall, may increase forest damage.

Although trees can be used to help reduce erosion, **increased rainfall may result in localised erosion and landslides** that could damage trees and an increase in winter storms potentially exposes trees to the risk of wind-throw.

Climate change **could also increase the occurrence of insect pests and pathogens** that could damage trees and crops.



## Business

### Opportunities

- **The emergence of new markets for existing products and services in addition to the development of new products and services that respond to climate change. Solutions can be technological and nature-based.**

### Impacts

**Heat.** Increases in mean air temperature and increased frequency of heatwaves will have a range of impacts on businesses. This includes:

- impacts on employees such as heat exhaustion and heat stroke
- impact on stock and inventory (spoiled goods)
- the knock-on impact of these affects within the wider supply chain

**Flooding.** Increased winter rainfall, more river flooding events in winter, potential for more short duration but high impact summer flooding events (e.g. Boscastle in 2004 and Coverack in 2017) could limit access to goods and services impacting customers, business productivity and supply chains.

**Wind/Storms.** The increasing frequency and intensity of wind and storms will cause premises damage, power cuts, supply chain and distribution network disruption from blocked roads and railways could impact employee access.

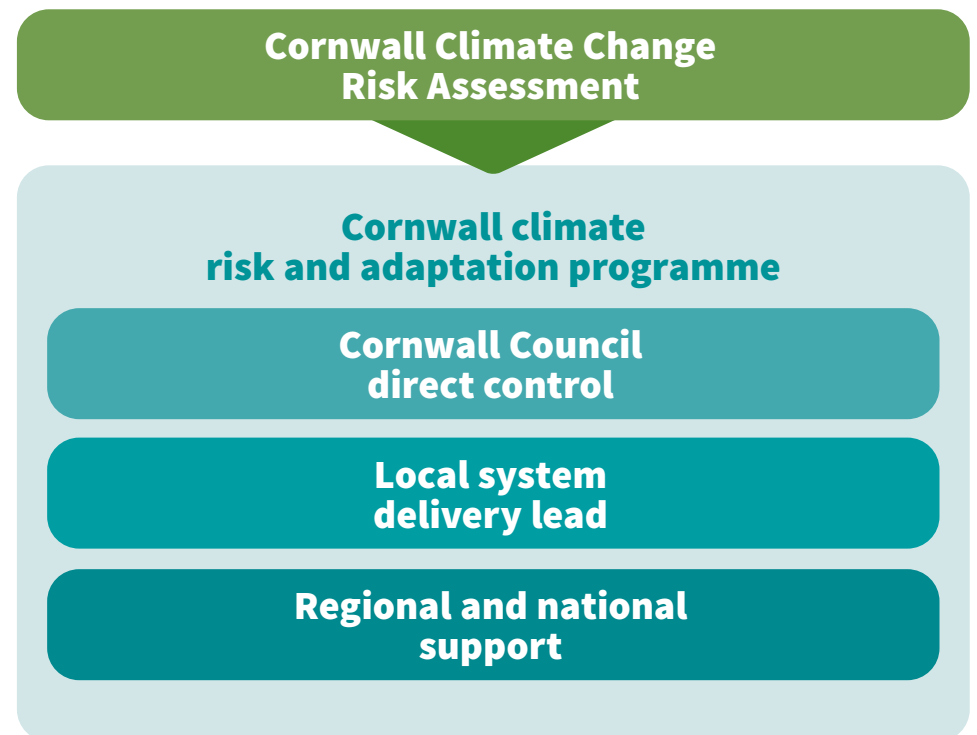
**Other.** Potential for increased insurance premiums.

# How will the findings of the Climate Change Risk Assessment be used?

The outputs of the climate risk assessment will help the Council, residents, businesses and communities to better prepare for the changes we will see as a result of climate change and understand the role of our environment in developing our responses.

Through the development of the climate risk and adaptation programme we will also continue our work with partners, communities and government to develop a strategy showing **how we will need to adapt to the changes we are experiencing including:**

- Describing how we can help everyone to act in response to our changing climate.
- Describe who is responsible for different elements of adaptation planning.
- Signpost to information communities can use to develop their own adaptation plans.
- Establish governance for delivery; and,
- Identify suitable ways of monitoring, reporting and communicating climate and adaptation impacts.



**If you would like this information in another format  
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