



A Summary of Climate Change Risks for South East England

To coincide with the publication of the UK Climate Change Risk Assessment (CCRA) 2012





Introduction

South East England comprises the geographical areas of Berkshire, Buckinghamshire, Hampshire, Isle of Wight, East Sussex, Kent, Oxfordshire, Surrey, and West Sussex, with a total area of just over 19,000 square kilometres. It is the country's most populous region, with 8.2 million people- a figure expected to grow by 64,300 per year to 9.5 million by 2026. The South East has the second largest economy in the country after London, and is also the wealthiest region in terms of median household wealth.

Though more than 80 percent rural and home to one-third of the country's Areas of Outstanding Natural Beauty, the South East also has the largest manufacturing sector in the country, and more than three-quarters of the population live in urban areas. The region also features internationally important transport links such as Gatwick Airport, the Channel Tunnel, and the major ports of Dover and Southampton.

The South East's high population and levels of economic activity put considerable pressure on housing, recreation, and natural resources, and the South East has the greatest ecological footprint of all the UK regions. It also features particular vulnerability to climate change. With 1250 kilometres of coastline featuring dense population,

important infrastructure, and important habitats and species, the South East is especially susceptible to sea level rise and flooding, while recent summers have demonstrated the vulnerability of people, buildings, and infrastructure to drought and overheating. The latest climate projections suggest that these impacts are likely to intensify in coming decades.

South East England demonstrates the dual challenge of climate change: the need to reduce the environmental impact of prosperity and the provision of infrastructure and housing to accommodate it, and the need to address the particular vulnerability of the region in order to ensure resilience. But what challenges the South East also constitutes its greatest asset. As a major center of communications, business, education, and transport, the South East has the potential to lead the country in innovation to prepare for a changing climate and to ensure a healthy environmental legacy for future generations.

[Office of National Statistics: Regional Profiles](#)

UK Climate Change Risk Assessment

The UK Climate Change Risk Assessment (CCRA) is an independent research project, funded by UK Government and Devolved Governments that analyses the main risks and opportunities to the UK, arising from climate change over the coming years. It provides the underpinning evidence to inform discussions on adaptation action needed in such areas as infrastructure, health, environment and business. It will be updated every five years taking account of new climate observations and improved understanding of future climate change and risks.

The CCRA methodology is novel in that it allows for comparison of over 100 risks (prioritised from an initial list of over 700) from a number of disparate sectors based on the magnitude of the impact and confidence in the evidence base. A key strength of the analysis is using a consistent method and set of climate projections to look at current and future risks and opportunities.

The CCRA methodology has been developed through a number of stages involving expert peer review.

The approach developed is a tractable, repeatable methodology that is not dependent on changes in long term plans between the 5 year cycles of the CCRA.

The assessment considered population growth, where relevant, but did not quantify the impacts of other societal changes on future risks, for example due to economic growth, or developments in new technologies, or the full range of planned and potential future Government policies or private sector adaptation investment plans.

Excluding these factors from the analysis provides a more robust 'baseline' against which the effects of different plans and policies can be more easily assessed. However, when utilising the outputs of the CCRA, it is essential to consider that Government and key organisations are already taking action in many areas to minimise climate change risks and these interventions need to be considered when assessing where further action may be best directed or needed.

Key National Messages

Some key findings show why we must act now to prepare ourselves and our businesses for the future impact of climate change. The research reveals that without action we could see:-

- Increases in the frequency of flooding affecting people's homes and wellbeing, especially for vulnerable groups (e.g. those affected by poverty, older people, people in poor health and those with disabilities), and the operation of businesses and critical infrastructure systems. Annual damage to properties in England and Wales, due to flooding from rivers and the sea, rises from £1.2 billion to between £2.1 billion and £12 billion by the 2080s. Without action, a range of important infrastructure such as roads and railways may be affected by a significantly increased risk of flooding based on future population growth and if no adaptive action is taken.
- Summer overheating potentially contributing to heat-related health problems. Premature deaths due to hotter summers are projected to increase (e.g. by between 580 and 5900 by the 2050s). This is likely to place different burdens on National Health Service (NHS), public health and social care services. Other health risks that may increase include problems caused by ground-level ozone and by marine and freshwater pathogens.
- Reductions in water availability, particularly during the summer, leading to more frequent water use restrictions and, in the longer term, water shortages. The gap between demand and availability will potentially widen, impacting homes, businesses, schools and hospitals. By the 2050s, between 27 million and 59 million people in the UK may be living in areas affected by water supply-demand deficits (based on existing population levels). Adaptation action will be needed to increase water efficiency across all sectors and decrease levels of water abstraction in the summer months.

This pack was commissioned to coincide with the publication of the UK's first Climate Change Risk Assessment. While drawing on the CCRA where there is regional or local information (which at times is limited due to lack of data) this pack presents a local perspective of the CCRA risks and opportunities. The pack offers an illustration of what climate change means for people, businesses, community groups, local authorities, and other organisations across key sectors, at the local level, highlighting what is already happening and where there is a strong case for greater local action.

Detailed results from the CCRA are presented in:

- An extensive and comprehensive UK CCRA Evidence Report;
- A suite of technical reports on 11 key sectors.
- The UK CCRA: Government Report, which highlights actions already in place to manage the risk identified in the CCRA, and outlines UK Government plans for the future.

To read these publications, please visit: <http://www.defra.gov.uk/environment/climate/government/>



Key Risks and Implications

Some Key Regional Climate Implications



Business

- Flooding poses a major risk to South East businesses, causing damage to assets, stock, premises, and business continuity. Possible uninsurability and reputational damage represent significant threats.
- Loss of productivity due to overheating has been identified as a significant risk, possibly tripling in some industries by the 2050s.
- Industries that rely to some degree on weather, such as agriculture and tourism, may see opportunities. However, these must be managed properly and balanced against risks such as water scarcity.

- Climate change represents a potentially significant issue for all UK business sectors.
- Main climate challenges to businesses include flooding and coastal erosion, increased competition for water, and disruption of transport and communication links.
- The degree to which individual organisations are affected depends upon their level of vulnerability and adaptive capacity.
- There are potentially significant commercial and competitive advantages to be gained for those businesses taking on the challenge.



Business



Health and Wellbeing

- The South East is one of the healthiest regions of the UK, but wide variation in life expectancy reflects areas of significant deprivation and health inequality. With exceptions, these tend to be largely concentrated along the coast, often combining social vulnerability with high flood risk.
- Along with London, the South East suffers the highest risk of excess deaths due to heat in the country.
- Extreme weather events in the region have already demonstrated a risk of strain on healthcare and emergency services. Flooding, heatwaves, and storms can disrupt provision of healthcare as they do any other business or service.

- Climate change could have significant implications for the health and wellbeing of the UK population.
- Implications affect public health, the continuity of health and social care services both within the NHS and beyond, the resilience of local emergency services, and the most socially vulnerable.
- There may be some welcome benefits, but there are likely to be outweighed by a range of negative effects.



Health and Wellbeing



Buildings and Infrastructure

- About 25 percent of properties in the South East are at risk of some kind of flooding (Environment Agency).
- Even minor incidents test the capacity of infrastructure during peak periods. Climate change is likely to exacerbate that situation.
- Extreme weather is very much a current issue for buildings and infrastructure; it should not be seen as a future problem.

- The built environment and infrastructure are already vulnerable to extreme weather such as flooding, storms, heatwaves, and droughts.
- Most of today's buildings were designed for the climate that existed when they were built and are not necessarily equipped to cope with current and future climates.
- Around 70% of buildings that will be in use in the 2050s already exist, but there may be opportunities for innovative building services and urban planning in the UK and overseas.
- The government has already prioritised the need to improve the long-term resilience of new and existing infrastructure networks in the energy, ICT, transport and water sectors.



Buildings and Infrastructure



Agriculture and Forestry

- The South East is the most wooded region of England, and has the highest concentration of ancient woodlands in the country. It also incurs the greatest risk of forest species losses in the country due to climate change.
- Water scarcity is considered a major threat to agriculture, particularly for areas which rely on high levels of irrigation.
- Opportunities may stem from warmer and longer growing seasons in southern England, which could enable growth of more "continental" crops such as grape vines and sunflowers. The South East would also be a more suitable area for certain types of biomass crops, including switch grass.

- Agriculture and forestry are sensitive to climatic conditions; changes in climate have a profound impact on productivity and economic viability.
- Climate change may alter the impact that agriculture and forestry have on the natural environment and the value of the ecosystem services provided.
- Warmer temperatures and carbon fertilisation may present some opportunities to increase yields, in the short term.
- Low water availability in the summer, increased flooding and coastal erosion, increased prevalence of pests diseases, and frequent wildfires may limit opportunities in the longer term.



Agriculture and Forestry



Natural Environment

- The South East is rich in wildlife and habitats existing alongside high-density populations. This biodiversity is valued for the services and products it provides, as well as for its intrinsic value.
- Recent modeling has provided a picture of sensitivity to climate change and the capacity of habitats and species to adapt. This work can help decision-makers identify and prioritize local action to protect and enhance biodiversity.

- Climate change may exacerbate and/or alter the pressures placed on the natural environment, especially those caused by human activity.
- Heightened impacts may in turn affect the way humans are able to use the environment – for example growing crops or obtaining high quality drinking water.
- The natural environment is crucial to our ability to adapt, reducing flood risk, cooling cities and storing water.



Natural Environment

Business



Home to around 750,000 businesses and providing more than 4 million jobs, the South East has the largest economy in the UK after London. More than 99 percent of businesses in the South East are small- and medium-sized enterprises (SMEs), which employ fewer than 250 people.

With a third of the country's areas of outstanding natural beauty (AONBs) and a high concentration of natural heritage sites, the South East has a flourishing tourism sector, notably along its coastline. Climate change poses a particular threat to coastal businesses and the communities in which they operate.

Aylesbury Vale District Council: Local Climate Impacts Profile, 2008
 Oxfordshire County Council: Local Climate Impacts Profile, 2007-2009
 UK Climate Change Risk Assessment 2012: Evidence Report

The financial risks to the South East's economy due to climate impacts are poorly understood, although a number of local authorities have estimated the costs of particular extreme weather events such as floods. Risks to businesses in the South East include:

- Damage to assets, stock, and premises, and business disruption due to flooding- storms in January 2001 affected 160 businesses in Oxfordshire alone, with 350 employees sent home from one small local area. (Oxfordshire)
- Increased insurance claims and possible uninsurability, reduction in mortgage values due to flooding
- Reputational damage due to loss of business continuity
- Loss of productivity due to overheating – CCRA evidence has this possibly tripling by 2050s (for financial and insurance industries).
- Increased energy costs for summer cooling
- Reduced availability of water
- Many local councils noted threats to their own provision of services to constituents, especially as weather events lead to increased calls upon those services.

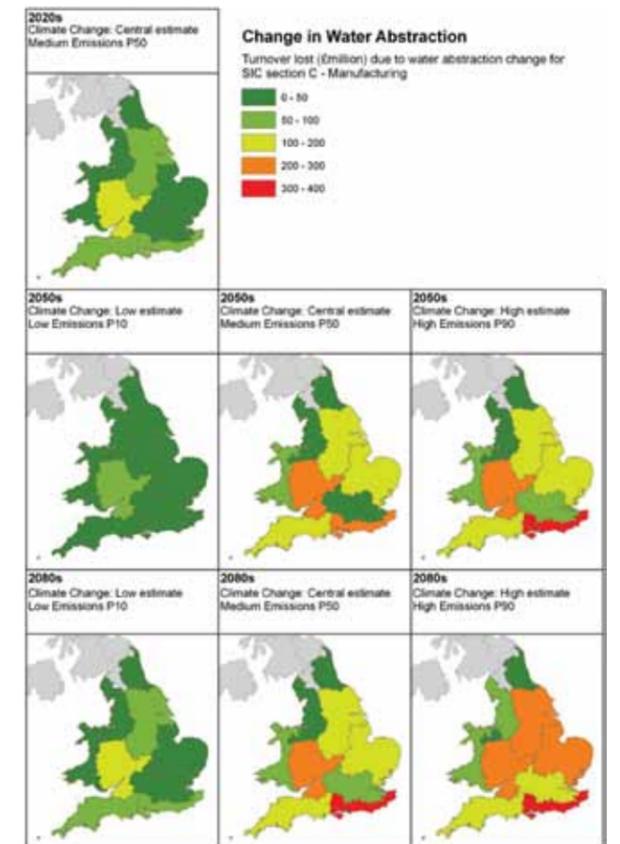


Opportunities may also exist for South East businesses:

- Increased agricultural yields, longer growing seasons
- Longer tourist seasons, potentially more visitors due to warmer weather. Leisure centers could also benefit: Aylesbury Vale District Council reported that swimming and fitness centers saw much higher visitor numbers during the warmer summer of 2006 than in 2007. (AVDC)
- Reduced heating costs

It will be important, however, to balance these opportunities against risks such as flooding and reduced availability of water.

Regional variation of the turnover equivalent (£million) to the loss of water abstraction for manufacturing and for the various climate scenarios. (UK CCRA 2012)



Health and Well-being



The South East is considered one of the healthiest regions of the UK, with significantly higher life expectancy than the national average. However, there is wide variation in life expectancy, reflecting significant deprivation and health inequality in particular areas. These tend to be largely concentrated along the coast (with notable exceptions in Oxford, Reading, Slough, and Milton Keynes), thus often combining social vulnerability with high flood risk. (SEPHO)

Climate change is likely to have the greatest impact on the most vulnerable groups in society such as old and young, chronically ill, socially excluded and deprived, and refugees and immigrants, as they may have insufficient means to adapt. (SEPB)

Portsmouth City Council: Planning to adapt to climate change - A Headline Summary

South East Partnership Board: South East England Regional Climate Change Vulnerability Assessment, 2010

South East Regional Public Health Observatory (SEPHO): South East England Health Strategy 2008

UK Climate Change Risk Assessment 2012: Evidence Report

Climate change will pose a number of risks to health and healthcare provision in the South East:

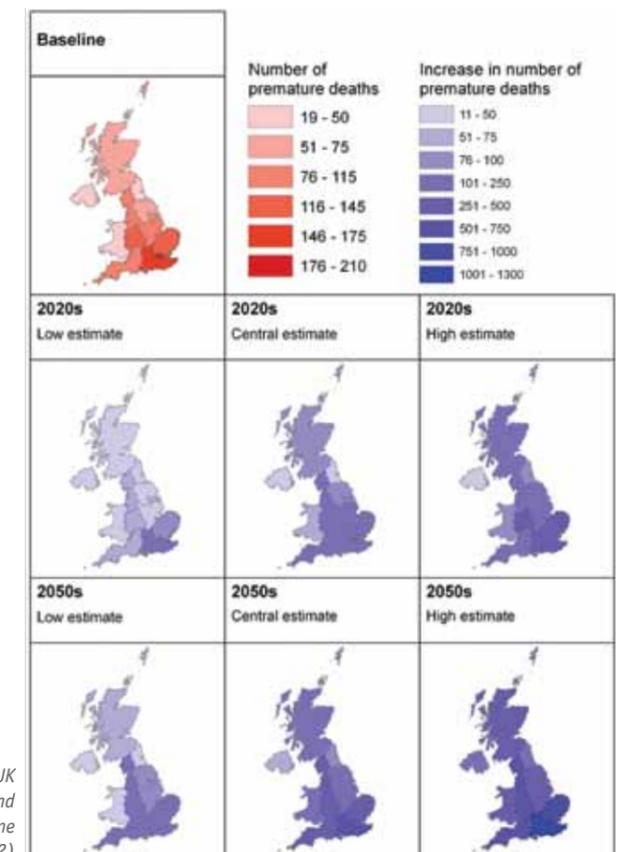
- The CCRA notes that increased flooding may lead to increased number of deaths, injuries, and people suffering from mental health effects due to loss of homes and property and dislocation.
- Impacts such as flooding may exacerbate rural isolation, which is already a significant concern for the region, by impeding access to services, shops, schools, and healthcare.
- In the South East, the greatest potential for urban heat island effect, or uncomfortable urban heat due to a lack of green/blue space, is concentrated in areas bordering London, with other 'hotspots' in Milton Keynes, Oxford, and Portsmouth. (SEPB)
- The CCRA notes that estimates of premature deaths from heat show a large increase relative to current day estimates for the South East and South West. During the August 2003 heatwave there were an estimated 2,000 more deaths in England and Wales than for the same period averaged between 1998 and 2002. Most of these were concentrated in the South East and London, particularly among those over 75 years old.



- Ground-level ozone concentrations and related respiratory illnesses occur with greater frequency in the South East due to the high population density in this region compared to the rest of the country (except for London). More severe and frequent heat could worsen air quality, and therefore asthma, respiratory diseases and allergic reactions. Most of the region's current Air Quality Management Areas are around the M25. (SEPB)

- Cases of melanoma due to UVB exposure may increase with time spent outdoors.
- Extreme weather events also mean more strain on health services. Portsmouth City Council reported that ambulance calls increased by a third during August 2003. Flooding, heatwaves, and storms could disrupt provision of healthcare as they do any other business or service.

Potential benefits include significantly fewer deaths from cold and improvements in health and mental well-being resulting from increased outdoor activity.



Premature deaths (heat) per year for the UK UKCP09 Medium emissions scenario for the 2020s and Low, Medium and High emissions scenarios for the 2050s (current population, baseline period: 1993-2006, no acclimatisation) (UK CCRA 2012)

Buildings and Infrastructure



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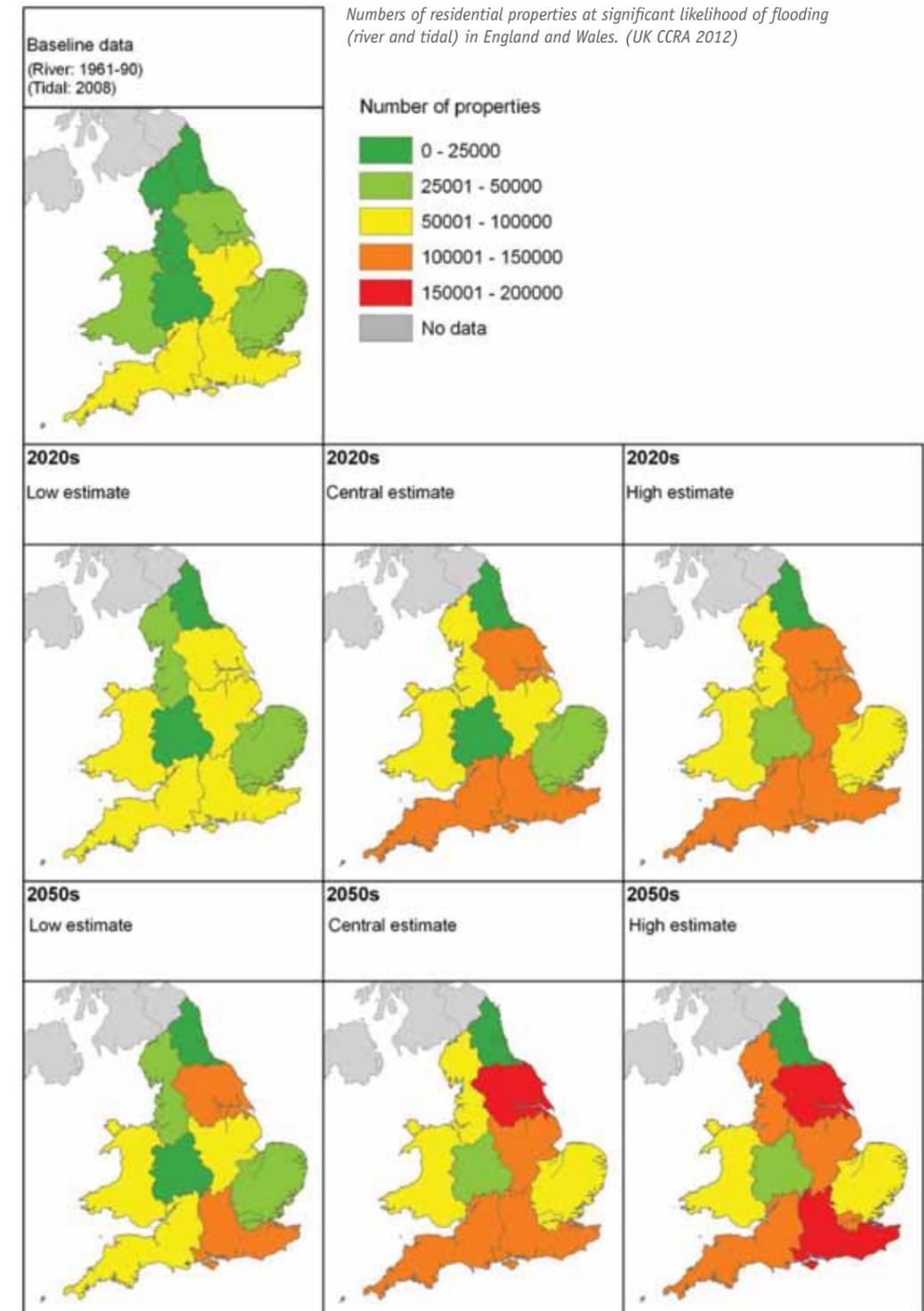
According to the Environment Agency, 403,000 properties in South East England are at risk from coastal and river flooding, while an estimated 668,900 are at risk from surface water flooding. Climate change will increase this risk, particularly in urban areas such as South Hampshire and the Thames Gateway. Rising sea levels and storms will also put pressure on coastal flood defenses. The South East Regional Climate Change Vulnerability Assessment (RVA) found that Portsmouth, Eastbourne, and urban areas in the north west of Surrey, as well as the rural coastal authorities of Swale, Arun and Shepway, have particularly high numbers of properties in high flood risk areas.

In its State of the Nation 2010 report on the condition of the region's waste, energy, transport, water, and flood risk management infrastructure, the Institution of Civil Engineers (ICE) gave a rating of "C" overall, meaning that all sectors of infrastructure 'require attention:' "Infrastructure is infrequently maintained and requires attention. There is no excess capacity resulting in

deficiencies at peak periods and if there are even minor incidents. Significant investment is required to improve it to meet needs in the next five years." Flood risk management scored lower and is considered to be 'at risk.'

Parts of the region's transport network and several key interchanges lie within Flood Zone 2 (current .1 percent chance of flooding). More frequent flooding and heatwaves and sea level rise are likely to result in increased damage to road and rail infrastructure within such areas and may affect the reliability of the networks and services. (SEPB)

Overheating in the built environment is not as well understood in the South East as flood risk. However, the RVA found that the greatest potential for urban heat island effect, or uncomfortable urban heat due to a lack of green/blue space, is concentrated in areas bordering London, with other 'hotspots' in Milton Keynes, Oxford, and Portsmouth.





A correlation has been found between warmer, drier spring and summer conditions and increased incidents of wildfires. This can have a significant impact where wildfire-prone areas (gorse, heath, grass) are located in close proximity to dense populations and infrastructure, for example in the Thames Basin Heaths, where wildfires have damaged infrastructure and caused major transport disruption and evacuation of nearby homes and workplaces.

Some examples of the effects of extreme weather events in the South East follow:

- Floods in autumn 2000 severely damaged more than 85 roads and two bridges in West Sussex, caused cancellations of flights at Gatwick Airport, and led to electricity failures in 5,200 homes and businesses. Flooding in December 2008 due to heavy rain closed Three Bridges station and the M23, caused numerous automobile breakdowns, and left 1200 homes without power.
- Storms in January 2007 caused structural damage to 14 schools in Oxfordshire.
- Heavy rainfall in Oxfordshire in July 2007 caused road closures and rail cancellations, flooded thousands of homes, and closed at least a dozen schools.
- Heavy rain in September 2000 flooded large parts of Portsmouth and caused a pumping station to fail, leading to sewage escaping into floodwater. Parts of the city were under five feet of water, and residents were evacuated by boat.
- Traffic Signals in Portsmouth have been found to be susceptible to heatwave.
- In the summer of 2006, 15 roads in Buckinghamshire melted due to excessive heat.
- Schools throughout the region have seen closures due to overheating (2002, 2003, 2006) and flooding (2007). Closures often occur when staff are unable to travel to work.

CCRA evidence suggests a number of risks for the built environment in the South East:

- The risk of wildfires in the UK could increase by between 10 and 50 percent by the 2080s. This increased risk varies across the UK, with the greatest increase occurring in the South East of England.
- Power stations and major sub-stations in the region are at significant risk of flooding.
- The South East of England currently has the highest Expected Annual Damages for residential properties at risk from flooding. The value of residential properties at risk of being uninsurable or unmortgageable due to climate change-caused flooding could increase significantly (see table)
- Wales, the South West, and South East of England have the greatest length of roads and railways at significant likelihood of river and tidal flooding.
- Non-domestic buildings could overheat for 11 extra days per year under a medium emissions scenario in 2020s, 27 in 2050s, and 48 in 2080s.
- The amount of energy needed to cool a home or business is projected to increase significantly during the 21st century, especially in southern England. Increasing demand for air conditioning was highlighted by some local councils as a significant risk.
- The number of domestic subsidence incidents per year could increase significantly in London and the South East, where clay soils with high potential to shrink and swell underlie densely populated areas.
- Maintaining water supplies in the 2050s will be particularly challenging in South East England and the Midlands. Deficits may develop across England by the 2050s due to climate change alone; these would be exacerbated by population growth. The largest water supply/demand deficits are projected to occur in the Thames river basin region.



[Buckinghamshire County Council: Climate Change Risk Assessment, AEA, 2010](#)

[Environment Agency: State of the Environment Report- South East England February 2010](#)

[Institution of Civil Engineers: South East England Infrastructure 2010: State of the Nation report](#)

[Oxfordshire County Council: Local Climate Impacts Profile 2007-2009](#)

[South East of England Regional Wildfire Group, Home Counties Operational Wildfire Group: Building our resilience to wildfires: preparation and prevention for 2012, April 2010](#)

[South East Partnership Board: South East England Regional Climate Change Vulnerability Assessment, 2010](#)

[West Sussex County Council: Local Climate Impacts Profile 2009 UK CCRA 2012](#)

Agriculture and Forestry



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Ten percent of UK farms are in the South East, with the main farming types being arable farming and horticulture. Of particular note are Kent's orchards, Surrey's plant nurseries, the glass houses of the West Sussex coastal plain, and the salad growers of the Isle of Wight. The South East coast has a mild, maritime climate with high winter light levels which are ideal for the production of crops under glass, while Surrey and the South Downs produce wines that earn international acclaim. Agriculture and horticulture employ around 50,000 people in the South East. (NFU)

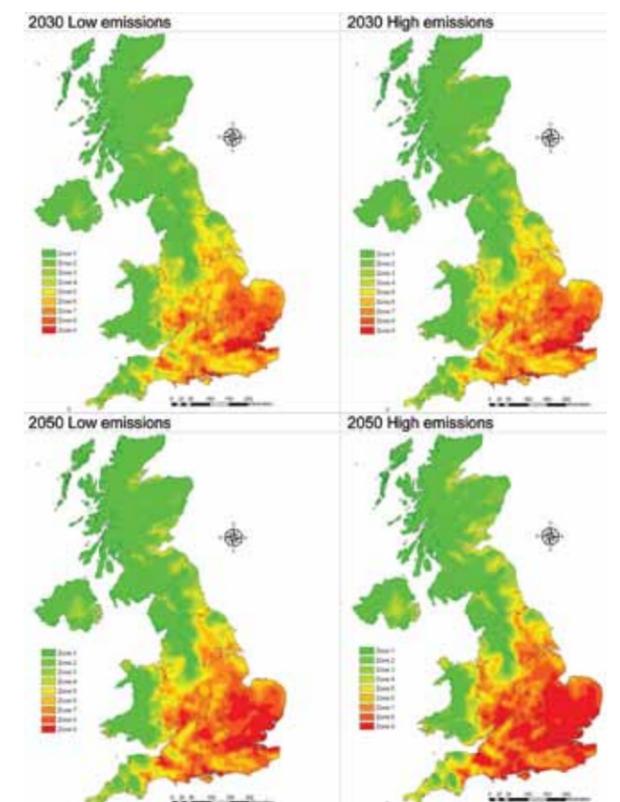
The South East is the most wooded region of England; some 270,000 hectares of woodlands cover more than 14 percent of the region's land area. The region also has the highest concentration of ancient woodlands in the country. Studies looking at the public benefits of the South East's woodlands put their value at more than £1 billion. (Forestry Commission)

[Forestry Commission: South East Forestry and Woodlands Framework](#)
[National Farmers Union: South East web page](#)
[UK Climate Change Risk Assessment 2012: Evidence Report](#)



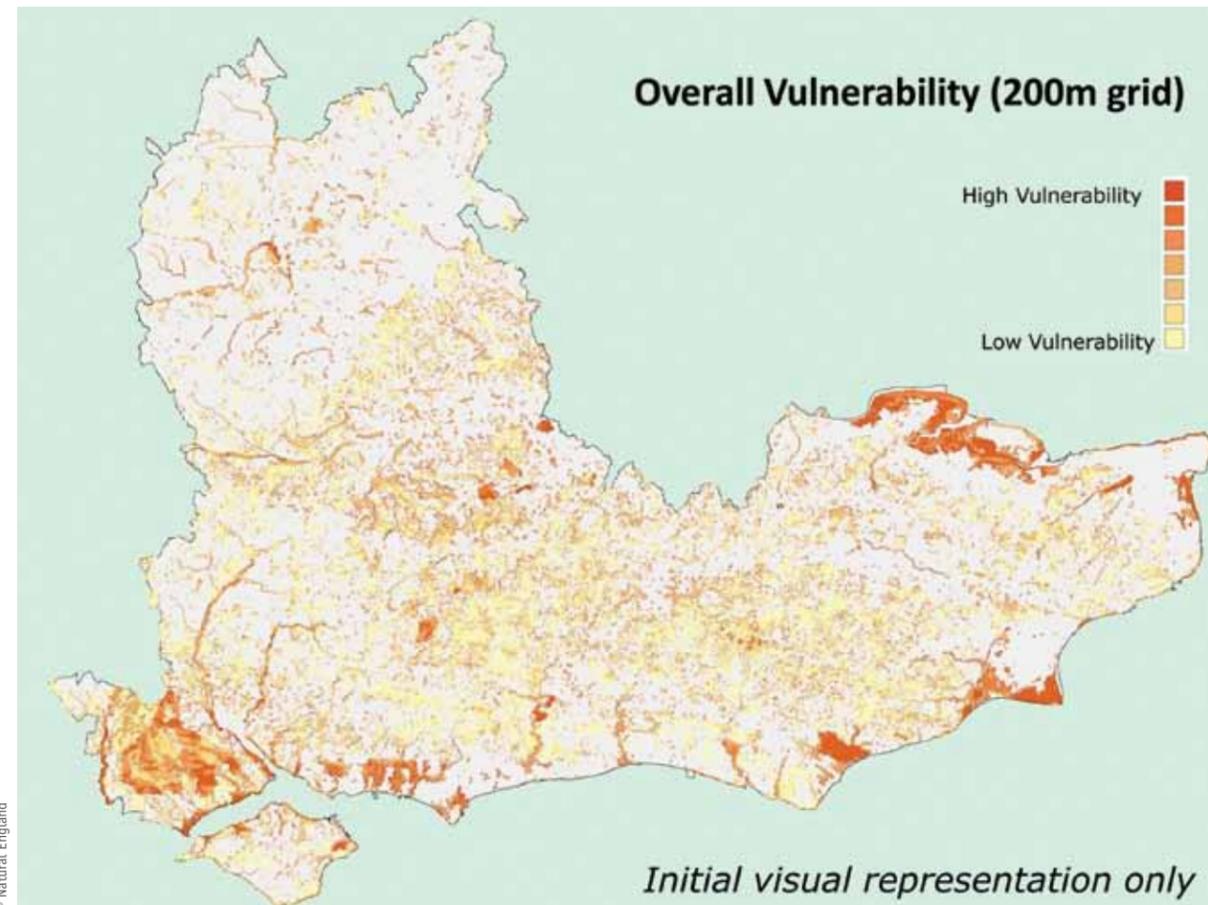
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- The CCRA shows the greatest increases in risk of river and tidal flooding affecting high-quality agricultural land occurring in the South and East. Local climate impacts studies found that flooding, like that which occurred in July 2007, causes damage to crops and to farmers' animals, which have to be moved from flooded fields.
- Areas which rely on particularly high levels of irrigation are likely to find the reliability and availability of water resources for agriculture under severe pressure. Water scarcity was highlighted as a major threat to agriculture in impacts studies across the region.
- South East England could be hit hardest of all regions by forestry species losses, with many species, including major canopy trees, losing climate space from 2050. Drought may cause 12-26 percent forest yield loss by the 2080s.
- Projections show an increase in the risk of forest fires due to warmer and drier spring and summer conditions.
- Opportunities may stem from warmer and longer growing seasons in southern England, which could enable growth of more "continental" crops such as grape vines and sunflowers. The South East would also be a more suitable area for certain types of biomass crops, including switch grass.



Projected changes in agroclimate (PSMDmax) in the UK for selected UKCP09 emissions scenarios (low, high) for the 2030s and 2080s. (UK CCRA)

Natural Environment



This is a preliminary visual representation only, taken from the biodiversity climate change vulnerability model pilot project carried out in the South East. It is not for use in decision making in this form as the project is currently under development. Up to date results from the model and derived GIS layers will be available for use in 2012

The South East is rich in wildlife and habitats existing alongside high-density populations who use and value this resource. More than 19,000 square kilometres of varied landscapes and geology support habitats including chalk rivers, ancient woodland, lowland wood pastures, lowland calcareous grasslands, lowland heath, and a variety of coastal habitats, many of which are of national or international importance. This biodiversity is valued for the services and products it provides to society—such as pollination, access opportunities, flood management, and carbon sequestration—as well as for its intrinsic value. According to the South East England Biodiversity Forum, the South East holds:

- More than 30 percent of England's broadleaved, mixed and yew woodland;

- More than 40 percent of the ancient woodland in England;
- More than 40 percent of England's lowland heath;
- More than 10 percent of the lowland calcareous grassland resource;
- More than 60 percent of England's vegetated shingle resource;
- More than 10 percent of the intertidal mudflats;
- 16 percent of coastal lagoons;
- More than 15 percent of coastal and floodplain grazing marsh;
- More than 40 percent of Europe's offshore chalk exposure;
- 36 national nature reserves covering 6700 hectares

- 682 Sites of Special Scientific Interest - (SSSIs - amounting to more than 134,000 hectares) many of which are internationally important (86 international SPA, SAC, RAMSAR designations) (SEEBF)

A biodiversity climate change vulnerability model which aimed to assess the relative vulnerability of Biodiversity Action Plan (BAP) habitats was piloted in the South East. The overall results give information on climate change sensitivity and measures of adaptive capacity such as habitat connectivity. The results can be used to identify the relatively most vulnerable geographic areas and outputs from the model can be used to prioritise local adaptation action for biodiversity. More information can be found here: <http://www.naturalengland.org.uk/ourwork/climateandenergy/climatechange/vulnerability/nationalvulnerabilityassessment.aspx>

An unpublished 2010 study in the South Downs National Park area suggested that key habitats may be highly vulnerable to projected climate change impacts:

- Chalk grassland is vulnerable to drought and increased winter rainfall, leading to changes in species composition, parching and erosion of soils, and increased fire risk.
- Woodland is likely to experience changes in species, with possible increases in pests and disease, and will be vulnerable to drought. Beech trees and woodlands on well-drained, south-facing slopes are likely to be most affected.
- Chalk rivers and streams will be vulnerable to drought, potentially leading to drying out, migration of stream heads, and changes in flow. This can lead to destabilisation of banks, an increase in sedimentation, concentration of pollution, reductions in habitat area, and reduction in the effectiveness of flood storage services.

A similar unpublished 2010 study in the North Kent area suggested that coastal habitats are the most vulnerable to projected climate change impacts. Both studies identified a wide range of adaptation actions. More information on these studies and others can be found on Natural England's website.

The CCRA noted a number of risks to the South East's natural environment as well:

- Extreme high water from rising sea levels combined with storm surge and large waves could lead to a higher risk of a breach in low-lying areas of the coast and reorganisation of coastal ecosystems. This risk is particularly apparent in East and South England.
- Coastal erosion would threaten coastal habitats.
- Beech woodland in southern England could be particularly vulnerable to habitat loss by the 2050s.
- The risk of wildfires in the UK could increase by between 10 and 50 percent by the 2080s, with the greatest increase occurring in the South East of England—the New Forest and South Downs national parks in particular.

Where wildfire-prone areas (gorse, heath, grass) are located in close proximity to dense populations and infrastructure, the impacts of wildfires can be significant, for example in the Thames Basin Heaths, where wildfires have damaged internationally-recognized protected bird and other species habitats (see case study).

The South East Regional Climate Change Vulnerability Assessment (RVA) noted that water quality could be affected by more frequent droughts during summer, which lead to low river flows. Aylesbury Vale's local climate impacts profile found that the 2003 and 2006 summers dried up village ponds and rivers, causing toxicity of water with effects on ducks, fish, and birds and possibly causing a 2006 botulism outbreak which severely affected the duck population. The risk of flooding of contaminated sites and waste management sites is another potentially increasing threat to water quality. The RVA shows that Portsmouth, Southampton, Swale, and Medway have the highest number of such sites in areas of flood risk.

[Aylesbury Vale District Council: Local Climate Impacts Profile, 2008](#)
[Natural England: Development of a national scale biodiversity climate change vulnerability assessment](#)

[Natural England: Natural England's Character Area Climate Change Project](#)

[South East England Biodiversity Forum web pages](#)

[South East Partnership Board: South East England Regional Climate Change Vulnerability Assessment, 2010](#)

[UK Climate Change Risk Assessment 2012: Evidence Report](#)

Where next?

Climate South East brings together stakeholders from across the South East to tackle the causes and effects of climate change. We will build on the local and regional work, as well as this first national Climate Change Risk Assessment, to understand the risks, possible impacts and adaptive responses required to build resilience in the South East. We look forward to working with Government on the development of the National Adaptation Plan, which will provide a key opportunity to influence decision makers at all levels to ensure that stakeholders' aspirations for sustainable and resilient South East are realised.

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