

## **Planning to adapt to climate change**

### **A Headline Summary**

This headline summary provides you with information on:

- Details of the key findings of future projected climate change for the city
- The potential impacts of future climate change projections for the city
- The impacts and experiences of similar past extreme weather events

This information pack allows services to plan to adapt to the potential impacts of future projected climate change. It should be used in conjunction with the risk assessment database that you will have been provided with, in order to make an informed decision on whether elements of future projected climate change could pose a threat or an opportunity to your service.

The climate change projections have been sought using the latest information available from the UKCP09 scenarios, and are specific to Portsmouth. If you would like to look in more detail at the data, the [key findings report provides regional climate information](#), or contact the [Strategy Unit](#).

### **The Key Findings**

The key findings from the projected climate change scenarios show that in Portsmouth:

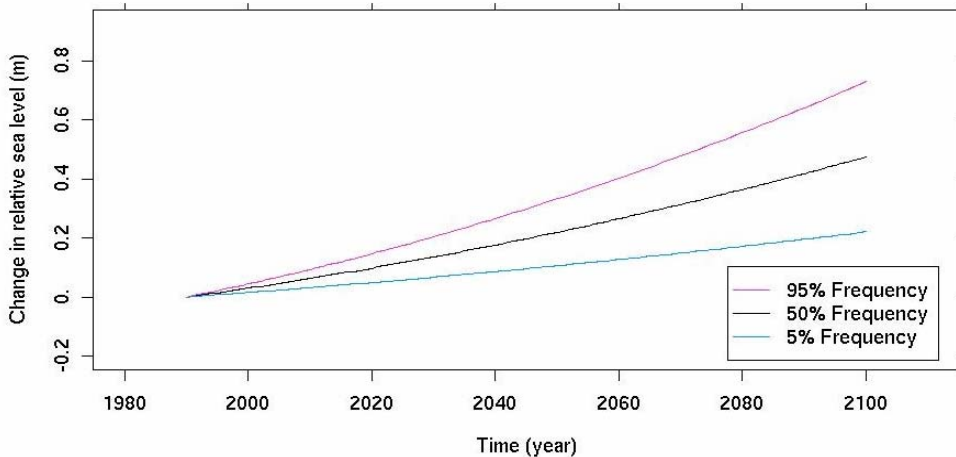
1. The sea level is likely to rise, and extreme sea levels will be experienced more frequently
2. Summer mean temperatures will increase, and higher summer temperatures will become more frequent. Summers may become drier everywhere
3. Winter mean temperatures are likely to increase, and there is likely to be an increase in heavy winter precipitation (rain, sleet, snow)
4. There is likely to be increased variability in weather events, particularly storminess (including wind & lightening)

## The key findings and the potential impacts

The following sections will look at each of the above key findings in more detail, along with the potential impacts for Portsmouth in the future.

### 1. The sea level is likely to rise, and extreme sea levels will be experienced more frequently

In the next 70 years, climate change projections suggest that it is likely that the sea level around Portsmouth will **rise by 70 cm<sup>1</sup>**. The plot below shows the variations across all time periods.



- However, the High++ scenario<sup>2</sup> shows that sea level could rise by **up to 190cm** around Portsmouth's coasts in the next century.
- For some coastal locations, extreme sea levels are expected to be experienced more frequently, and by 2100 storm surge events could occur up to 20 times more frequently for some emission scenarios (UKCIP02 key findings).
- Storm surge events are those which result due to numerous factors such as unusually high spring tides, increased rainfall and sea level rise, happening at the same time. This has a cumulative impact and creates extreme sea levels.

#### What are the potential impacts?

- A greater risk of coastal flooding, which can cause travel disruption, damage to property and in the long-term limited availability of land for building
- Travel disruption
- As areas of Portsmouth have been classified as being at risk of a 1 in 200 year flooding event (Flood Zone 2 – medium risk) or a 1 in 1000 year flooding event (Flood Zone 3 – low risk) any projected increases in sea level rise could affect the flood risk zone boundaries

#### How has Portsmouth been impacted by coastal flooding in the past?

Portsmouth frequently experiences high tides, due to combinations of high spring tides, heavy rainfall and storm surges.

In March 2008, the tide reached **5.53 metres** (2.8 metres above sea level). It was the highest tide in Portsmouth since December 1989, and caused flooding in Clarence Parade, Southsea. The town quay was also flooded, and 60cm water was recorded opposite the East Street slipway.

The Isle of Wight hovercraft was also cancelled, which prevented people from reaching the mainland.

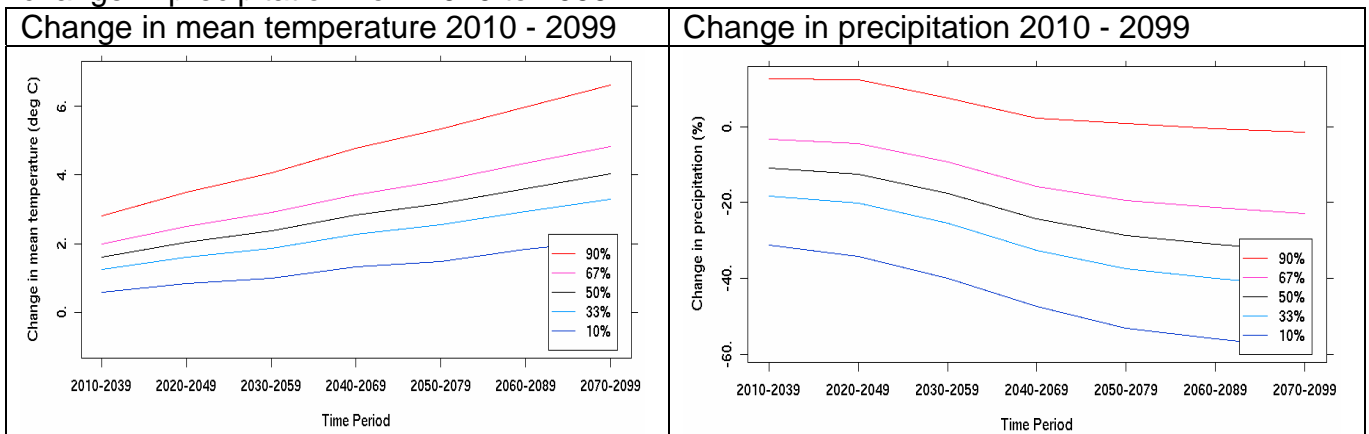
<sup>1</sup> PCC currently works towards a future sea level rise of approx. 1.1m, which is stated in DEFRA policy guidance. Until the information in the guidance is updated, this will be the level to which the authority works towards.

<sup>2</sup> The extra sea level rise in the H++ scenario results from faster melting of ice sheets. The scenario is intended to provide an extreme but physically plausible range of change for users wishing to investigate contingency planning.

## 2. Summer mean temperatures will increase, and higher summer temperatures will become more frequent. Summers may become drier everywhere

- Over the next century, it is likely that the mean temperature in the summer could increase by **up to 7°C**, but in the short-term the temperature is likely to increase up to 2.9°C.
- The maximum daily temperature could increase by up to 8.8°C, which is an **average of 29°C**.
- The biggest change in climate for the summer though is the likelihood that summer precipitation will decrease. Climate change projections suggest that for Portsmouth, the mean summer rainfall could decrease by 31% by the end of the 2030s. By the end of the 2060s, summer rainfall could decrease by 48% and by the 2090s this figure could be **as much as 58%**.

The plots below show the likely ranges<sup>3</sup> (10%-90%) of change in mean temperature and change in precipitation from 2010 to 2099.



### What are the potential impacts?

With a likely increase in temperature teamed with a likely decrease in rainfall, the impacts on Portsmouth could be wide-ranging. The list below shows some of the potential impacts:

- Increase in urban heat island effect<sup>4</sup>
- Heat-related health impacts
- Higher internal and external temperatures – greater difficulty in controlling temperatures/ventilation
- Increased tourism, which could lead to more traffic congestion in and out of the city
- The likelihood of short-term summer droughts could increase, which could lead to potential water shortages
- There could a potential increased risk of fires, both within urban areas and in the suburbs off the island

### What impact have heat waves had on the city?

In August 2003, temperatures reached **36.3°C** in some areas across the city & county. Some schools closed early or all day on the hottest day, & ambulance calls increased by a third due to an increase in heat-related health impacts.

In July 2006 temperatures reached between **30-32°C**. Again. Schools closed early including Northern Parade & Waterside, & approx 40 children were ill with heat-related illnesses.

<sup>3</sup> The scale of ranges from 10%-90% has an equal probability of occurring, and represents the likelihood of a certain projection occurring. E.g. it is very likely (10%) that the temperature will be **more than** x°C (10%), and it is very likely that the temperature will **less than** x°C (90%).

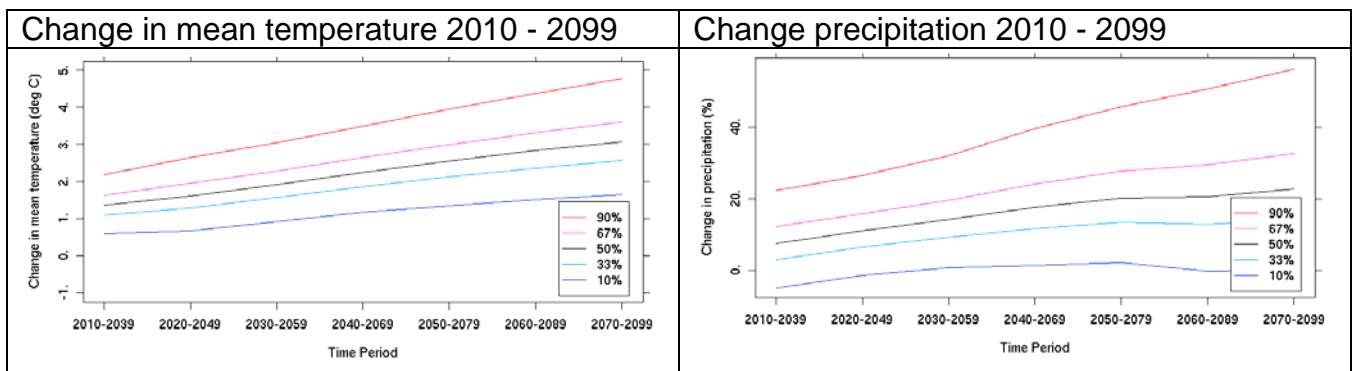
<sup>4</sup> Urban areas tend to have a higher temperature (during the summer and winter, compared to surrounding rural areas) due to a higher density of buildings that retain heat, and the production of heat from energy usage e.g. electricity and car usage, from a bigger population.

### **3. Winter mean temperatures are likely to increase, and there is likely to be an increase in heavy winter precipitation (rain, sleet, snow)**

The projected climate change scenarios suggest that in the future, Portsmouth is likely to have warmer, wetter winters. By the 2080s, the mean winter temperature is likely to increase **by up to 4.8°C**, with **over a 50% increase** in the amount of precipitation.

In the short-term, Portsmouth could be impacted by a 2.2°C increase in mean temperature, with precipitation increasing by a fifth of what we currently experience, and in 40 years time these figures could have risen to a 3.4°C increase in temperature with a 39.8% increase in precipitation.

The plots below show the likely ranges of change in mean temperature and change in precipitation from 2010 to 2099.



#### **What impacts has increased rainfall had on Portsmouth in the past?**

In September 2000, large parts of Portsmouth flooded as a result of heavy rainfall. In **3 hours, 60 mm** of rain fell (the average for the whole month), and as a result Eastney pumping station failed. This caused sewage to escape into floodwater from the city's drains.

There was citywide flooding, including many parts of Southsea, and many people were evacuated from their homes. PCC had to evacuate its offices when floods cut off power to the Civic offices. Approx £300,000 was claimed in insurance from the authority on the day of the floods.

21 streets in Southsea and 114 properties were affected. Some areas were under 5 feet of water, and many residents were evacuated by boat.

#### **What are the potential impacts?**

The biggest impact to Portsmouth is the increased risk of flooding<sup>5</sup>, particularly when judged in terms of the capacity of the pumping station (see potential impacts in the case study to the left). However, Portsmouth is at risk of a number of other impacts from warmer, wetter winters as well as the cumulative impacts of flooding:

- Infrastructure damage
- Travel disruption
- Loss of staff (due to travel disruption)
- Loss of facilities (e.g. the flooding of buildings)
- Air borne diseases/germs not dying out
- New germs surviving in milder winter conditions

<sup>5</sup> The types of flooding that Portsmouth could be affected by are: groundwater flooding, urban pluvial flooding (e.g. sewage capacity overrun, surface water flooding) and coastal flooding.

#### **4. Increased variability in weather events, particularly storminess (including wind & lightning)**

By 2010, information should be available to help local authorities look in more detail at the variability, intensity and length of weather events such as the frequency of storms or the intensity of wind speeds, in specific localities.

However, current research available suggests that:

- There is likely to be more variability in weather events (time and intensity)
- There is likely to be a greater intensity of rainfall in shorter timeframes
- There is likely to be greater wind variability in speed and strength

In the past, Portsmouth has been subject to a number of such weather events, particularly with regard to high winds and storms, and the case study below details some of those impacts. In the future these impacts could be intensified, and include:

- Infrastructure damage
- Flooding (all types)
- Increasing staff resource – more pressure on staff
- Other impacts that have already been detailed under key findings 1, 2 and 3

##### **How has Portsmouth been impacted in the past by extreme weather events?**

In the last 9 years, Portsmouth has been subject to over 6 events of “severe weather,” typified here by ‘storms and gales’. These events have caused extensive damage to buildings across the city, including schools, residential properties and the Civic Offices. They have cost the authority approximately £460,000 in insurance claims between 2000 and 2008. (However, this excludes the major flooding event from the 2000 floods).

Portsmouth also experiences episodes of high wind speeds (such as in March 2008 where wind speeds reached **70-80 m.p.h**), which damages property and causes disruption to channel crossings.

In October 2002, wind speeds reached up to **70 m.p.h** around the area, and a tornado was reported in Portchester, where 20 properties were damaged, and 100 properties were affected. In Southsea, £15,245 of damage was caused as a result of these storm force winds.