

Flood risk and the UK



In early December, parts of the UK were devastated by record-breaking levels of rainfall as a result of Storm Desmond. In fact, five out of the six wettest years documented in UK history have occurred since the year 2000. But despite investment, flood defence barriers are not adequately maintained.

Climate change is set to make summer floods much more frequent by the end of the century, and to raise sea levels. By 2080, five million Britons are projected to be exposed to flood risk, a more than five-fold increase.

Record-breaking weather

The winter of 2013/14 was the [wettest winter since records](#) began in 1910. [Five out of the six](#) wettest years have occurred since 2000.

In 2013, [Scotland had its wettest December since 1910](#). In southern England, January 2014 was the wettest month recorded.

The December 2015 rainfall from Storm Desmond also broke records; Honister, Cumbria, received [341mm \(13.4 in\) within 24 hours](#), breaking the November 2009 record of 316.4mm.

Heavy rains are becoming more common: according to the Met Office, a heavy rainfall that would have occurred once in every 125 days back in the 1960s and 1970s is now expected [once in every 85 days](#).

Since 1870, [winter storms have become more frequent and more intense in the North Atlantic](#) [pdf link].

In 2013, severe weather was the [leading cause of disruption](#) to organisations across the UK for the fourth consecutive year [pdf link].



The Thames Barrier was closed more than 50 times in the 2013/14 winter - comfortably a record. Image: Chris Wheal, Creative Commons licence

Flooding projections

Climate change has made the devastating floods of Autumn 2000, which cost £3.5 billion, between [two and three times more likely to happen](#) again, according to research from Oxford University.

It used to be impossible to link climate change to specific extreme weather events. However, with [detailed climate models and regional maps of the UK](#), researchers are able to calculate the likely contribution of climate change to episodes of extreme heat or rain.

The Met Office forecasts that [serious flash flooding could become much more frequent](#) by the end of the century as a result of more frequent downpours. Research published in [Nature](#) found that we can expect almost five times more events where rainfall exceeds 28mm in an hour than currently.

With the December 2015 Cumbria floods, researchers from Oxford University and the Royal Netherlands Meteorological Institute used three analytical methods to work out how much more likely the floods were with global warming. They found that climate change had made the flooding event [40% more likely](#), with a possible range of 5% to 80%.

The UK's first [Climate Change Risk Assessment](#), in 2012, found that increased river flow resulting from extreme rainfall, plus sea level rise, will increase flood risk.

[One in six properties](#) in the UK is currently at risk to some degree. Of these, 560,000 are exposed to significant likelihood of flooding (370,000 residential and 190,000 non-residential). Most properties at risk are on floodplains.

By the 2080s, up to [five million people](#) could be exposed to a significant likelihood of flooding (compared with around 900,000 people today).

Along the English Channel coast, the sea level has already risen by about 12cm in the last 100 years. With the warming we are already committed to over the next few decades, [we can expect a further 11-16cm of sea level rise by 2030](#). This equates to 23-27cm of total sea level rise since 1900.

Flooding already poses a risk to vital infrastructure such as roads, fresh water supplies, sewage treatment plants, hospitals, schools and energy supplies, and the risk is projected to rise. By the 2080s, [up to 1,800 schools](#) could be exposed to 'significant likelihood' of flooding (a greater than 1 in 75 annual chance).

By the 2020s, [35,000 hectares of high-quality horticultural and arable land](#) are likely to be flooded at least once every three years. By the 2080s this will reach 130,000 hectares of high quality land – an area larger than Greater Manchester.

Additional flood protection measures could reduce the flood risk to homes, infrastructure and farms – but deterioration of flood defences, or more building on flood plains, could increase it further.

Costs and benefits

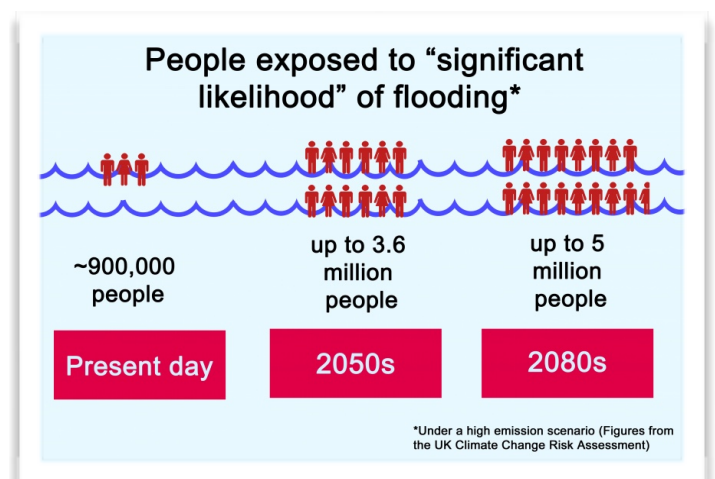
The economic loss and damage from flooding in the UK is projected to increase.

Flood damage currently costs the UK around £1.3 billion each year; the cost of the flooding caused by Storm Desmond alone is estimated to be around [£500m in damages](#), according to PwC.

There is a [10% chance of a catastrophic flood happening in England within the next two decades](#) [pdf link], causing in excess of £10 billion in damage. Such a flood would cause 10 times more flood damage than the combined impact of the tidal surge and storms in winter 2013/14, and 3 to 4 times more damage than in 2007.

Under a scenario with high global emissions, flooding could cost the UK around [£27 billion](#) per year by the 2080s. Cutting emissions would be expected to lower the cost of flooding by reducing the extent of sea level rise and changes to weather patterns.

Flooding also has an impact on human health, including mental health. After the floods in the summer of 2007, research found that the prevalence of all mental health symptoms was [two to five times higher among individuals affected by flood water in the home](#).



Is the UK prepared?

In the Somerset Levels in the 2013/14 winter, more than 600 homes and 17,000 acres of farmland were inundated. Almost a year later, half of the residents who were forced to leave their homes [were still not yet able to return](#).



Floods affect wildlife as well as people. Image: James West, Creative Commons licence

In November 2014, the National Audit Office reported evidence of under-investment in flood defences as a result of [budget cuts](#). It said: '[Current spending is insufficient](#) to meet many of the maintenance needs the Agency has identified for its flood defences'.

The Committee on Climate Change [concluded](#) in June 2014: 'Three-quarters of existing flood defence structures are not being adequately maintained.

'The resilience of transport networks, homes, hospitals and water supplies in England need to be enhanced to counter the more frequent and severe flooding and heatwaves that can be expected in future.'

Following the 2015 Cumbrian floods, the Committee highlighted the [need for improved flood defences](#), noting that 'defences that might historically have provided protection against a 1 in 100 year flood will, with climate change, provide a much lower level of protection and be overtopped more frequently'.

The Committee urged the government to implement regulations to reduce surface water flooding caused by new development, as recommended by [the 2008 Pitt Review](#).

The Government announced 1,400 flood defence projects across the country, investing [£2.3 billion](#). However, campaigners have pointed out this is not new money, and will not keep pace with climate change.

The NAO argues that investing in flood defences is highly cost-effective, concluding that [each £1 not invested means communities will suffer up to £8 in unnecessary flood damage](#).

The Thames Barrier & risks to London

In 2014, the Thames Barrier closed [48 times before the middle of March – a record for a single year](#). More than a quarter of the total closures in the Barrier's 32-year history occurred in the 2013/14 winter.

In the Thames tidal floodplain, some [1.25 million people would be vulnerable to flooding](#) if current defences failed or were overtaken by climate-induced sea level rise; £200 billion worth of property is also at risk.

The Environment Agency's TE2100 Plan highlights that [without effective mitigation](#) of global greenhouse gas emissions, the Thames estuary may have to deal with sea level rise that exceeds the Barrier's capacity.

High-quality farmland likely to be flooded at least every 3 years

Currently:

~30,000 hectares

Equivalent to roughly the size of:

Barnsley, Yorkshire



By the 2080's...

~130,000 hectares

Greater Manchester



Source: UK's Climate Change Risk Assessment

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