

News story: Surface water: The biggest flood risk of all

Introduction

I used to be a diplomat. I don't think I was a very good diplomat, because I kept telling people exactly what I thought. And I will do the same for you today. But one thing I did learn during my previous career was that if you want to understand any issue in foreign policy, you only need to know two things: history and the map. And I would suggest that the history, and the map, are equally good guides if you want to understand flooding – and in particular surface water flooding.

What surface water flooding is

I suspect that very few of you signed up to attend this conference on surface water management in order to find out what surface water flooding is. But I'm pretty sure that most the people outside this hall, the general public to whom this speech is also directed, won't. So for them, surface water flooding is what happens when there is too much rain for the drains and the streets fill with water.

This doesn't sound that threatening. Gene Kelly danced through a minor surface water flood in *Singin' in the Rain*. Who doesn't love that?

Why it matters: surface water flooding is a real and growing threat

But the reality of surface water flooding is not nearly as cheerful as the movie. It is a real and growing threat – to life, to property, to the economy, to the country.

Surface water flooding is a risk because of its reach. Of all the flood risks to which our rainy island is subject – from coasts, rivers, groundwater, sewers and surface water – it is surface water flooding which threatens more people and properties than any other form of flood risk. Over 3 million properties in England are at risk of surface water flooding, even more than those at risk from rivers and the sea (2.7 million).

Surface water flooding is a risk because of its effect. It hits not just individual homes and businesses, but the whole infrastructure – road, rail, utilities etc – of a town or city, disrupting pretty much all aspects of modern life.

Surface water flooding is a risk because people don't know it is a risk. If you don't live near a river or the sea, it's not wholly unreasonable to think that you are not at risk of flooding. But reasonableness isn't the point. Leon Trotsky once said: "you may not be interested in war, but war is interested in you". Well, you may not be interested in surface water flooding, but it is interested in you. And people who don't know they are at risk are less well prepared to cope when the risk materialises.

Surface water flooding is a risk that tends to fall particularly on communities that can least afford it. Urban areas are more susceptible, because they have more concrete. Poor urban areas with high density housing are the most susceptible of all, because there are a lot of people and a lot of paved drives and parking spaces which don't absorb the rainwater, not big suburban lawns which do.

Surface water flooding is a risk which doesn't just affect our own country. The flash flood in Majorca last week, which tragically killed two British nationals, was a surface water event. The Dutch, who have been so successful in fighting sea flooding and are rightly regarded as world leaders in the field, are themselves struggling to manage a serious surface water risk building behind their mighty sea walls.

Most important of all, surface water flooding is a risk which is growing. An increasing population means more people are at risk. An increasingly urban population means more people are in cities, where the effects are starker. Development means more concrete, which means fewer places for rainwater to drain safely away. And the more frequent and intense rainfall which climate change is bringing will make flash flooding and overloading of the sewer network more likely and more frequent. That is why the government decided for the first time in 2016 to include surface water flooding on the national risk register.

Imagine this. It's another beautiful hot summer day in the South East. Gradually it turns humid, with thunderclouds building up over central London. Then the clouds burst with astonishing intensity. Within minutes water is overwhelming the drainage system. The underpasses start to fill up and the roads become impassable. The Tube stops running as parts of it flood. The city starts to grind to a halt. Then the power goes out. It's dark, and water starts coming into thousands of homes. It is inches not feet in most places. But in parts of the city it pours into basements, where it's several feet deep, and people start to drown.

This nightmare could happen. London is prone to high intensity thunderstorms and has an ageing Victorian sewer system. A smaller version did happen, in Hampstead in 1975 when in a localised thunderstorm it got more than three months of rain in three hours. Four of London's main-line railway stations were flooded and closed. Much of the Underground was brought to a standstill as tunnels were inundated and the electrics failed. 250 people were made homeless. One day, a much bigger rainfall event than that will happen somewhere in this country. We need to be ready.

The story so far: Pitt and after

The 2007 summer floods were a wake up call for all of us. They left 13 people dead, 44,600 homes flooded and £3bn damage. The rescue effort was the biggest in peacetime Britain. That event led to the 2008 Pitt Review, which concluded that much of the flooding had arisen not from rivers over-topping but from surface water pouring off the land.

The Pitt review led to the Flood and Water Management Act (2010), which

provided clarity on the roles and responsibilities of the Environment Agency, local authorities, water and sewerage companies and others who manage flood risks. It gave the EA responsibility for the strategic overview of flood and coastal erosion in England and powers to manage that risk, which we exercise with our direct responsibility for managing the risk of coastal and main river flooding. And it established Lead Local Flood Authorities (the unitary authority or county council), responsible for managing flood risk from surface water, groundwater, and ordinary watercourses in their areas.

The Environment Agency has made many changes in the light of the Pitt review:

We now give people better information so they can see whether they are at risk. In 2008, we produced the first map of areas at higher risk from surface water flooding. In 2013 we produced the Risk of Flooding from Surface Water maps. Check out whether your own house is at risk online.

We have improved how we forecast flooding. In 2009 the Environment Agency and Met Office jointly established the Flood Forecasting Centre. It provides a 24/7 flood forecasting service to the Environment Agency, the Government and the emergency responders.

We have completely overhauled how we warn and inform people of an imminent flood risk. Over 1.4 million people can now receive direct warnings from our flood warning service. We automatically register properties with landlines and mobile operators.

We've upgraded how we respond when flooding threatens, to deploy more people more quickly to more places to help. We've invested in new kit, including 40km of temporary flood barriers, 250 high volume pumps, and 4 incident response vehicles. We now have 6,500 staff trained to respond to incidents. And we regularly exercise with the military to ensure that we can call on their support when required.

And by the way, in responding to a flooding incident we don't distinguish between surface water flooding (the local authorities' responsibility) and river flooding (ours). To the public it is all water, and there is anyway often a mix of both kinds of flooding when it rains. So we will turn out to help local authorities with significant surface water flooding if they need us.

We are making record levels of investment in flood defence construction projects: £2.6 billion to better protect 300,000 homes by 2021.

We've changed how we deliver those flood defence projects. We now work in partnership with local authorities, businesses, the water companies, and local people to design and deliver the schemes that work for those local communities.

That includes schemes which reduce surface water flood risk. For example, the £14m Willerby and Derringham Flood Alleviation Scheme completed in 2016, led by East Riding of Yorkshire Council and Hull City Council. It better protects approximately 8,000 homes and 200 businesses from surface water flooding through a series of lagoons for rainwater storage. These lagoons resemble

flat pasture and for the majority of the time will remain dry, only to be filled during severe wet weather.

We've also taken up the Pitt Review recommendation that we improve the way we work with natural processes. Using nature to help manage flood risk, and adopting greener approaches to engineering, can help us to achieve better reduction of flood risk and create better habitats for wildlife and greater beauty for people.

The future: the challenges and how to meet them

So things are better than they were. But we cannot afford complacency. Because as all of us seek to improve our performance, the future challenges are growing. The challenge of climate change, which will bring more extreme rainfall. The challenge of development, which requires us to build more houses, all of which have potential to increase the risk of surface water flooding. The challenge of constructing modern infrastructure which does not increase the risk of surface water flooding and is more resilient to it when it happens.

How do we meet those challenges? By pressing all the buttons that are available to us, and by doing it together.

Pressing all the buttons means several things:

It means improving how we manage surface water now. Defra's Surface Water Management Action Plan (published in July 2018) seeks to strengthen the current arrangements by improving our collective understanding of the risks and helping those responsible to manage them effectively. It promotes better partnership working across all the flood risk management authorities, better risk assessments, better data sharing, and better guidance. We in the Environment Agency will help take this forward by leading work to produce a national picture of skills and capability in our risk management authorities, by giving guidance on asset registers, and by putting in place mechanisms to allow better sharing of data and communication of forecasts.

It means thinking about how we should manage surface water flood risk in future. Michael Gove recently commissioned a review of the Multi Agency Flood Plans produced by the Local Resilience Forums. Major General Tim Cross led that review and reported this summer. He underlined the need for the Environment Agency, the local authorities and the emergency responders to work even more closely together in the Local Resilience Forums to plan for and respond to surface water flooding and other local flood events. We in the EA agree with that, and will redouble our efforts over the coming months.

It means improving our forecasting, so that communities get more accurate and earlier warning when flooding threatens. Our flood forecasting is now much better than it was even a few years ago. We can usually predict coastal flooding like an East Coast storm surge 2-5 days before it arrives; and river flooding 12-48 hours before. But surface water flooding is the hardest of all to predict, and at present is sometimes just not possible at all. We can predict that there will be thunderstorms in a particular area. But precisely where the rain will fall, the duration and the effect on the ground often

can't be predicted until it's happened. Getting better at this is a huge technical challenge. But we are working with our partners to make progress. It means designing resilience into our towns and cities. Part of this is about Sustainable Drainage Systems, which can make communities more resilient to surface water flooding and deliver a host of other benefits – public spaces with more green and blue; more beautiful surroundings in which people can live, work and play; enhanced habitat for wildlife, greater biodiversity, improved water quality, and so on. The EA is working with developers, local authorities and the water companies to support the integration of SUDs into as many locations as possible, and I have seen some great examples.

One of my favourites is Slough Salthill Park SUDs, a project which the EA supported with the local school, the local authority and Thames Water. Together we turned part of an inner city school's playing field into a sustainable drainage lake, filled with plants and animals. It was a win for everyone. It reduced flood risk to Slough. It helped Thames Water: like other water companies, they don't want any more water than necessary going into the main drains, because that risks flooding and/or sewage contamination. Most of all, it gave those schoolchildren a first hand and now permanent experience of nature.

But designing in resilience is about a lot more than SUDs. It means starting far upstream in the planning process so that new developments are themselves laid out in ways which reduce surface water and other risks. Milton Keynes is a good example – a city that was planned to be decentralised, without high concentrations of concrete in one centre with the attendant risks, with green and blue spaces designed in where they already existed and new ones created where not. All over the country now we are working with developers and local authorities to seek to emulate that.

It means innovation and new technology. Engineers, inventors, housebuilders, the construction companies, those who design utilities and all the other things which contribute to or can suffer from surface water flooding, all have a part to play.

It means recognising that some of the causes of surface water flooding are neither urban nor to do with concrete. The wrong kind of farming in the wrong place can cause significant surface water flooding. Example: Maize. There has been a dramatic increase in maize production over the last few years, primarily to feed Anaerobic Digestion plants. The problem with maize is that it's harvested in late autumn, when the ground is wet. This, combined with the use of heavy harvesting machinery, tends to compact the soil. And compacted soil can't absorb rainwater, which causes surface water runoff, which in turn can cause local flooding and pollute watercourses.

It means mitigating climate change. There is a direct connection between chaos on the streets of Birmingham or Newcastle, both of which have been affected by major surface water flooding events in recent years, and man-made climate change. This is not a speech about climate change. (That was last month, if you are interested). But the more we can stop the activities that cause climate change, the easier we will make it to tackle the greater flood risk it will otherwise generate.

Finally, there is one more button we need to press if we are to tackle the surface water flooding issue: public awareness. If people know they are at risk they are more likely to do something about it, whether that means ensuring they put in property level protection in their own house, or encouraging their local council to ensure that the risks are mitigated. So just talking about surface water flooding, letting people know it exists and has consequences, as we are doing today, is an important part of the mitigation.

Conclusion

A wise environmentalist once said to me: "The thing about water is that it gets everywhere". This is a simple but profound truth. Water does get everywhere, and when it gets where it's going there are always consequences, good or bad.

So if there is somewhere you don't want water to be, like people's houses or the local supermarket, a community centre, a power station, a railway line, an underpass or a road, you'd better make sure that you have the right measures to stop it going where it wants to go.

Today's event, and the debate I'm sure it will launch, is an important step in thinking through together how we can ensure water only goes where we want it. I wish you all well in your deliberations. Because this really, really matters.