Executive summary

Welcome to the Thames Catchment Flood Management Plan. In this document we give an overview of the Thames catchment, the current flood risk and the possible future flood risk. We then set out our preferred plan for sustainable flood risk management over the next 50 to 100 years.

Introduction

We have prepared this Catchment Flood Management Plan (CFMP) for Thames region to help in working with others to develop an integrated and sustainable approach to flood risk management.

The Thames CFMP covers almost the entire area of the Environment Agency Thames region. This is made up of the River Thames basin and its tributaries, most notably the River Lee. The River Thames consists of a non-tidal and a tidal part (the tideway and the estuary). However, the Thames CFMP only covers the fluvial and non-tidal part of Thames region. Our Thames Estuary 2100 (TE2100) project is looking at the long-term flood management policies for the tidal part of the River Thames.

Characteristics of the region, current and future flood risk

The physical and land use features of the region are diverse, but it is useful to draw out some general characteristics that are most important in our management of flood risk. Towards the west of the region the Thames and its tributaries flow through a rural landscape with the rolling hills and wide, flat river floodplains. The rivers generally flow in a natural earth channel and there are extensive areas of rich floodplain habitat, many of which are internationally important. Some of the most notable are in the Kennet catchment and on the floodplain of the River Thames near Oxford. The hydrological response of the Thames to rainfall is slow, and the response of the tributaries is more variable depending mainly upon the size of the catchment, geology, gradient and land use. Towards the east, the region is more urban in character. Outside of London most of the rivers are still in a natural state; within London most have been modified. There are nine major tributaries of the Thames in London. The catchments are small, quite steep and respond very quickly to rainfall; they have been modified to convey water efficiently through articial and straightend river channels and most of the floodplain is urban.

The main sources of flood risk for people, property, land and infrastructure is fluvial flooding from the rivers, surface water and sewer flooding from the drainage system, groundwater flooding and combined tidal and fluvial flooding. Over 200,000 properties in Thames region are at risk from a 1%

AEP[1] fluvial flood. In general, outside of London, the major rivers in the region are able to accommodate flows that would be expected during a 20% AEP flood event. Beyond this water spills out of the banks of the river and starts flooding farm land and a small number of properties. Approximately 10,000 properties are at risk from a 20% AEP fluvial flood event. When flows that would be expected during a 5% AEP flood occur, more widespread and serious flooding of property happens. At this scale of event, most settlements on a major river in Thames region would experience flooding to property and serious flooding to hundreds of properties would happen in places such as Hertford, Watford, Oxford, the Lower Thames towns of Datchet, Wraysbury and Staines and also Byfleet, Weybridge and Guildford. In general, apart from at the headwaters of some rivers, there is adequate time to provide a flood warning when flooding is predicted to occur.a

The tributaries of the Thames in London have been modified to convey flows that would be expected to occur during a 5% to 2% AEP flood event. However these urban rivers are very susceptible to flooding from blockages associated with pinch-points along the rivers such culverts and bridges. There is also a serious and growing risk from surface water flooding following intense storms. In the very urban catchments in London water run-off over hard surfaces is very rapid and this can lead to surface water flooding, either directly, or flooding from rivers being unable to accommodate and convey the fluvial flows combined with the run-off. The characteristics of flooding in London from surface water sources and pinch points along rivers are also typical of new towns or growth areas, which are mainly located towards the headwaters of major rivers or on smaller and fast respnding rivers in the region. Examples include Swindon, Basingstoke, Bracknell, towns in the upper Mole valley such as Crawley, Stevenage and the M11 corridor. This type of flooding occurs somewhere in the region most years and often there is not enough time to provide an adequate flood warning that people can respond to.

Climate change will have a major effect on the extent and frequency of future flooding. As already discussed, widespread flooding of property will occur in most areas of the region when a 5% AEP fluvial flood event happens. Increased winter rainfall could result in this type of flooding happening more regularly. Many of our urban areas are very susceptible to flooding from intense storms. Warmer summers are likely to trigger more regular and more intense thunderstorms. This could be the most immediate impact of climate change on flood risk. We have also considered the possible impacts of changes in rural land management, but these effects were found to have only a small effect at a catchment scale.

[1] AEP = Annual Exceedance Probability (This is the likelihood of a particular flood event occurring over a period of one year, expressed as a percentage)

Policies and approaches to manage future flood risk

Through the CFMP we have recommend broad policies and approaches for the current and future management of flood risk. We have divided the Thames region up into 43 geographical areas called policy units. For each policy unit we have proposed a broad flood risk management policy and identified a range of approaches to deliver the selected policy. The range of broad policy options are:

1. No active intervention (including flood warning and maintenance). Continue to monitor and advise.
2. Reduce existing flood risk management actions (accepting that flood risk will increase over time).
3. Continue with existing or alternative actions to manage flood risk at the current level (accepting that flood risk will increase overtime from this baseline).
4. Take further action to sustain current scale of flood risk into the future (responding to potential increases in flood risk from urban development, land use change, and climate change).
5. Take further action to reduce the risk of flooding (now and/or in the future).
6. Take action to increase the frequency of flooding to deliver benefits locally or elsewhere, which may constitute an overall flood risk reduction (for example local habitat inundation).

The table below shows the distribution of the selected policies across the 43 policy units with in the Thames CFMP.

Policy Selection	**1**	**2**	**3**	**4**	**5**	**6**
Number of Units	0	1	6	17	8	11

Table i. The range of policies selected in the Thames CFMP

Figure i shows where each of the policy units are located. Each policy unit is colour coded according to the policy we have selected.

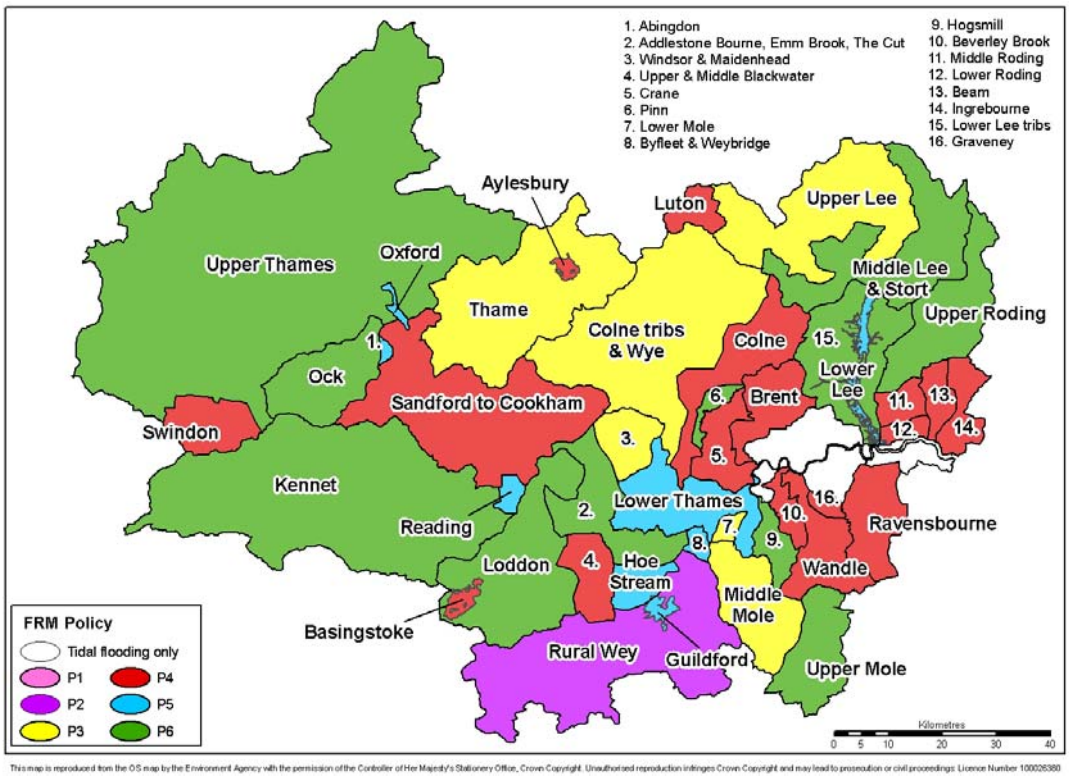

Figure i. The 43 policy units within the Thames CFMP and their selected policies

In recommending these policies, we have looked at opportunities and constraints within the catchment. Opportunities include the potential development of new controlled floodplain storage sites to reduce downstream flood risk. Storage sites can be developed as part of new wildlife habitats or recreation facilities. There are also opportunities to influence the location, layout and design of buildings on redevelopment sites in the floodplain, to reduce future flood risk, give more space for floodwater and re-create more natural river systems.

In general we are opting for long-term adaptation of the urban environment in floodplains. Getting redevelopment of floodplains right will achieve more than anything else we can do to reduce risk. We need to change our approach to this work as the potential gains are far higher than previously assumed. In continuous urban areas such as London, we want to resist the short-term push to improve the existing defences that only rely on conveyance and achieve a better balance of attenuation and conveyance. This will take longer to achieve than maintaining what is there already, but it will be more sustainable in the long-run. Elsewhere we will be looking to get more attenuation out of the natural floodplain in the long-term, but maintain conveyance through towns and villages. If there is a gradual public and institutional acceptance of risk, then flood warning and resilience will become increasingly important in those areas where the risk is more dispersed. Surface water flooding will get more serious and will become increasingly difficult to manage. Resilience and resistance tools will really help. Many of the current flood risk management targets and service levels compromise implementation of the Thames CFMP and this requires national consideration.

Some important strategic views or decisions have been made about flood risk management in Thames region through this CFMP. The following decisions need to be understood at a national level since they will drive our view of future investment needs. They are:

1. **Land Use Planning.** We can achieve the biggest reductions in flood risk and largely offset the impacts of climate change by making redevelopment in floodplains compatible with their location in a floodplain. This represents a real paradigm shift in our thinking on what can be achieved and demands a serious review of the way we try to achieve this. Our current view (which does need to be refined) is that we need a more flexible, disciplined and strategic approach in our work with Planning Authorities. We have to understand the needs of Planning Authorities to be able to exercise this flexibility appropriately. Far more resource is needed at the very early stages of planning even if this means less at the application stage. PPS25 provides all the tools that are needed, but they way we apply PPS25 needs to become more sophisticated. Without all of this happening the Thames CFMP cannot be implemented and sustainable management of the flood risk will not happen.
2. **Sustainable approaches in dense urban areas.** In most fluvial catchments in London we have boxed ourselves in and are now stuck with systems that will be increasingly ineffective against the impacts of climate change. We will plan in each of these catchments how we can adapt to meet future needs through redevelopment, use of existing open space and river corridors. We want to invest less in what is there already and more in preparing for a different management of the catchment. This will challenge existing investment criteria, but it is essential if we are to face up in a realistic way to the challenge of climate change.
3. **Role of the natural floodplain.** The natural floodplain in Thames region is, on the whole, performing its function to retain water. There are no major defences protecting agricultural land for example. This is good; however it does mean that there are limitations in rural areas in our ability to adapt to climate change by using the floodplain more effectively. Significantly increasing the capacity of the natural floodplain in Thames to store more water will require engineered solutions.
4. **Flood defences.** Over a 100 year period, providing we get the approaches to land use planning right, a lot of what is in the floodplain should have been adapted to be compatible with their location in the floodplain. There will be fairly widespread risk reduction. Capital investment in the near future will reduce risk more immediately to some communities.
5. **Resilience and reducing the consequences of flooding.** Flood defence schemes have to be prioritised on a risk basis and can only ever address part of the problem. Resilience and resistance as well as other approaches to manage the consequences of flooding will be important, especially in areas where the flood risk is dispersed.

Conclusion

This CFMP presents the way in which we will manage flood risk now and into the future. It proposes the use of new approaches and required new partnerships. It identifies and enables us to target our effort in the areas where we will have the most impact in terms of reduction of flood risk. It presents considerable challenges both in terms of how we and the general public perceive flood risk and its management as well as how we as an organisation structure ourselves to deliver effective flood risk management. Sucessful delivery will be dependent on many partners working together to achieve our overall goal which is the sustainable management of flood risk in the Thames region.