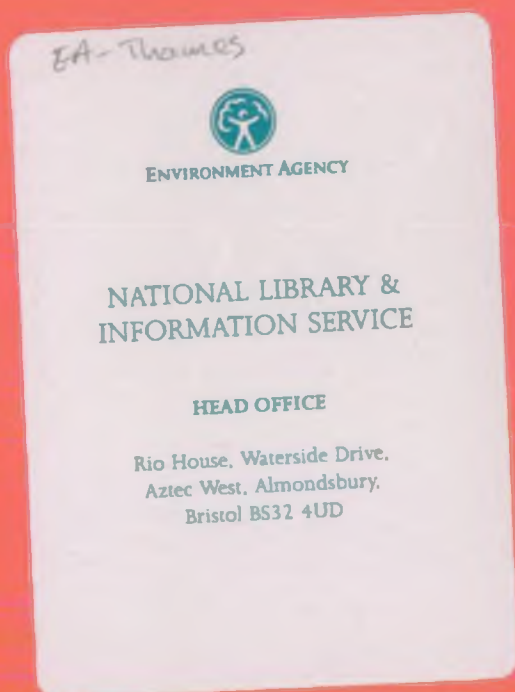


# Running with the tide



Reconciling  
development pressures  
with flood risk and the  
environment



ENVIRONMENT  
AGENCY



# Introduction

The coastline of Europe is changing. The rate of change is slow but accelerating, driven by climate change induced sea level rise as well as the more normal effects of tides and currents. In the past the changes were inconvenient; sometimes life threatening. In the future the developed nature of our coastlines poses more serious risks.

Holding the defence line is not a sustainable option, except in special circumstances. The economic and environmental costs are too high. However, the alternative of allowing natural processes to work by abandoning or retreating defences raises social as well as economic and environmental issues. It is imperative that we find the balance soon and avoid committing ourselves to policies and measures that compromise future flexibility of response or commit us to costs we discover we cannot afford. At the same time protection will be the only realistic approach for some locations.

The United Kingdom faces these issues as much as anywhere. National survival may not be at stake, as is the case for some oceanic island states, but the southern British Isles are very crowded and the source of a significant proportion of national wealth. This results also in a natural environment under great pressure. In addition, the developed environment has a rich cultural heritage.

## Background

London and the estuary of the River Thames epitomise the issues that have to be faced; managing flood risk, preserving and promoting biodiversity, supporting sustainable development and urban regeneration and protecting water resources in an area where the greatest use in the UK is made of available natural water. These are the issues being addressed by the Environment Agency (the Agency). The Agency has both regulatory and operational responsibilities in England and Wales for a wide range of activities that have an impact on the environment. Amongst these are flood risk management and providing advice on development and land use.

The Thames Estuary (the Estuary) is one of the UK's great natural assets. It is also the most densely urbanised estuary in the country. Over £30bn of the flood risk property value of England and Wales lies within the Thames tidal flood plain. Further development is planned which could expose even more property to unacceptable risk or oblige us to strengthen flood defences. The Estuary also provides a highly complex and rich wildlife habitat for 116 species of fish and 350 species of invertebrate. Each year it is host to hundreds of thousands of visiting wildfowl and waders.

London and the Estuary currently have one of the best tidal defence systems in the world but the effects of climate change present an unwelcome picture of the flood risk for future generations. We believe that radical changes need to be made to the way in which we manage flood defence and urban planning. The time is now right to start planning the next generation of tidal defences for the Estuary. In doing this, the Agency has extended its planning horizon by 70 years to the year 2100. With over a million people at risk this is both essential and prudent.

In order to plan the next generation of tidal defences, we need to understand the physical processes and natural habitat of the Estuary both now and in the recent geological past.

## The Future Challenge

Sea level relative to land is expected to rise by 60 to 120 cm over the next 100 years in this part of the country. Part of that is due to natural geological processes and natural climate change but an increase is likely due to global warming and the consequent expansion of the water in the





Oceans. Other features such as the changed “resonance” of the coastline under higher sea levels will further increase the uncertainty of the amount of sea level rise and severity of tidal storm surges.

Examples of the natural cycle of sea level fluctuations are seen further down the Estuary where there is evidence of past human occupation in places which are now up to 5 metres below water.

During the design of the current tidal defences for the Estuary in the 1970s, an estimate of 8mm per year sea level rise was used. Thus today we have a flood defence standard of about 1:2000 years. With sea level rise this will gradually decline, as planned, to a 1:1000 year risk by the year 2030. Thereafter, if improvements are not made the defence standard will continue to fall. Preliminary estimates of the cost of providing 1:1000 standard to the year 2100 show that a major investment in the flood defences infrastructure of the order of £4000 million may be required within the next 40 years.



Understanding the effect of climate change on the Estuary is fundamental to the decision making process of this project. A

significant issue is uncertainty about the increase in storminess predicted under climate change. This will effect both severity of river flooding and critically for the Estuary, of North Sea tidal storm surges.

The Agency is committed to the reduction of greenhouse gas emissions, but we recognise that even if these emissions ceased today, the thermal inertia in the oceans means that sea level will continue to rise for several hundred years. Adaptation to climate change and preparation for further change is therefore essential, through two routes:-

- Planning for flood risk management in the Estuary;
- Planning for more appropriate and sustainable urban development.

The Agency is already working on influencing sustainable urban development by:

- Promoting the restoration of river banks, coastal areas and wetlands to more natural (and sustainable) state;
- Acting as the lead authority for the Countryside Stewardship Scheme, which looks at natural habitat creation and preservation;
- Working hard to influence local authorities to use their planning powers to protect (and restore) natural floodplains;
- Promoting Sustainable Urban Drainage Systems (SUDS) (soakaways and retention ponds/wetlands) to improve water quality and reduce flash flooding from built-up areas.

The environmental impacts of sea level rise cannot be ignored. As the sea level rises it inevitably floods and erodes the existing tidal mudflats and marshes that lie in front of our defences. These are being squeezed out of existence.

Planning for flood risk management in the Thames Estuary, 5 metre flood contour



This loss of habitat also threatens the stability of the tidal defences. To counter this we need to consider and pursue managed retreat to restore the functionality of the natural flood plain and compensate for habitat loss.





## Prospects for action and partnership

It is evident that there are a range of issues that confront the Agency and which need to be addressed and resolved if an economically and environmentally acceptable solution is to be achieved. Sea level rise, urban regeneration, flood protection and environmental conservation present potential conflicts, all of which impact on the Thames estuary. Inevitably there will be social consequences which will have to be accommodated as we plan for the future.

That plan will have to provide for :-

- Adaptation to climate change
- Reduction of flood risk
- Sustainable use of natural resources
- Protection and improvement of coastal waters
- A sustainable environment for wildlife
- A better quality of life for people

The range of issues that need to be addressed through research, studies or shared practice and experience include:-

### *Technical issues*

- The effects of climate change on flood risk
- Understanding the physical processes in the estuary

### *Environmental issues*

- Understanding the ecology of the estuary
- The effects of coastal squeeze and their mitigation

### *Spatial Planning issues*

- Economic development and urban regeneration
- Maintaining defence line or retreating
- Defence standards
- Planning for and living with uncertainty and flood risk
- Scenario planning and testing

### *Social issues*

- Recording, measuring and influencing public opinion

The Agency had a key role to play in taking forward actions that will lead to a plan for sustainable flood risk management. It will involve working in partnership with other organisations, both public and private to achieve an approach that supports sustainable economic development compatible with social equity and a flourishing natural environment.



[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

ENVIRONMENT AGENCY  
GENERAL ENQUIRY LINE

**0845 933 3111**

ENVIRONMENT AGENCY  
FLOODLINE

**0845 988 1188**

ENVIRONMENT AGENCY  
EMERGENCY HOTLINE

**0800 80 70 60**

REGIONAL OFFICE  
Environment Agency  
Kings Meadow House  
Kings Meadow Road  
Reading  
Berkshire RG1 8DQ  
Tel: 0118 953 5000  
Fax: 0118 950 0388



**ENVIRONMENT  
AGENCY**