



# Adapting to climate change

## Water and infrastructure management

Halcrow is helping clients around the world to plan responses to the potential effects of climate change, planning ahead to deliver cost-effective adaptation.

In the past ten years, we have led and participated in innovative projects like the ground-breaking climate change adaptation studies Foresight and Futurecoast in the UK. More recently, clients in the UK and USA have sought out our experience, for a wide range of adaptation advice in the water sector.

### Our approach

We work to deliver robust, risk-based adaptive solutions to help deal with the increasing impacts of climate change on society, the economy and the environment.

We have key experience in developing sustainable strategic approaches to flood risk management and water resources planning, taking into account climate and socio-economic change.

Halcrow works with government departments, agencies and municipalities to address the effects of flooding, coastal erosion, extreme weather events and water security. With our thorough understanding of climate projections, we help clients understand and deal with the potential risks and opportunities of climate change and the associated uncertainty.

We apply international best practice to offer sound and practical advice on integrated solutions for climate change mitigation and adaptation in water management systems. Our teams work closely with each client to identify which tools and data can help make the right decisions.

We understand how to interpret data from climate models and translate outputs into practical solutions. We continue to offer our clients the latest insight into climate change analysis by maintaining close connections with international climate modelling centres.

Much of our work supports research and policy organisations such as the Environment Agency of England and Wales, the UK's Department of Environment Food and Rural Affairs, UK Water Industry Research and the Engineering and Physical Sciences Research Council, as well as the Louisiana Department of Natural Resources, the New York City Department of Environmental Protection, and the North Carolina Division of Emergency Management.

### Our services

- scientific understanding of UKCP09 and other global climate model information
- vulnerability and impact assessments
- adaptation program development
- risk-based technical and policy decision support
- coastal management planning
- wave climate assessment
- storm-surge analysis

## Delivering value – case studies

### ■ New York City sewer and wastewater systems

Halcrow was appointed by the City of New York to develop an adaptation and optimisation strategy for addressing increased demand and minimising the effects of climate change on the city's drainage and wastewater management systems. The US\$3.5 million study will quantify a range of possible outcomes, and identify critical system thresholds and areas of vulnerability.

### ■ Alternative approaches for the use of UKCP09 in flood risk management

In this project, Halcrow is providing high-level policy advice to the Department of Environment, Food and Rural Affairs on how new climate-change scenarios may be used in flood risk management activities in the UK. The study is considering key concepts, such as adaptive approaches, risk-based approaches and appropriate levels of precaution.

### ■ Climate risk assessment – West Midlands

Halcrow is undertaking a comprehensive climate risk analysis for Advantage West Midlands (the area's regional development agency). We are working with the business community in the region to examine adaptation options and constraints to adaptation.

### ■ European spatial planning: adapting to climate events

As part of the European Union ESPACE programme, Halcrow has contributed to the development of decision-support tools and frameworks for climate adaptation planning. Projects include reviews of international approaches, decision-tool testing, pilot adaptation studies, and producing guidance on climate change decision making in spatial planning.

### ■ North Carolina sea level risk management

Halcrow is assisting Dewberry Inc in leading a US\$5 million, two-year risk assessment study of rising sea levels and coastal flooding for North Carolina. Raised sea-level scenarios resulting from climate change will be defined, including the effect of storms, and modelled to determine coastal landform change, flooding and erosion hazards, and the influence on human and natural systems. The study will inform recommendations for adaptation strategies.

### ■ Thames Estuary 2100 early conceptual options

The TE2100 strategic flood risk management initiative responds to climate change and socio-economic development pressures. Halcrow evaluated flood risks and responses now and under a series of future scenarios, developing a toolkit of models, data and methods. These included the development of an uncertainty analysis framework and decision-making techniques to inform the development of an integrated flood-risk management strategy for the Thames Estuary. More information from: [www.environment-agency.gov.uk/te2100/](http://www.environment-agency.gov.uk/te2100/)

### ■ Master plan for a sustainable coastline, Louisiana

A Halcrow team was integral to the development of Louisiana's first comprehensive plan for hurricane protection and coastal ecosystem restoration, in response to hurricanes Katrina and Rita. The plan's goal was to deliver natural sustainability within the system, taking into account the effects of climate change.

### ■ Foresight Future Flooding, UK

Halcrow specialists worked within a team of industry and academic experts to undertake this groundbreaking study of how flood and erosion risks are affected by climate change. The study considered four socio-economic 'futures' to help appraise potential adaptation policies. Our input included coastal and fluvial analysis, developing a risk-management analysis framework, and using a national GIS database to calculate flood risk and economic damage.

### ■ The effect of climate change on UK water quality

Halcrow was commissioned by UKWIR to study mechanisms by which climate change could reduce background water quality in the 21st century, examining the implications of these changes for wastewater disposal and water resources. The project looked specifically at issues surrounding algal growth and water-quality modelling in the River Thames.

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