Applied geoscience has a vital role in understanding and mitigating the effects of environmental change in those places it can have most impact — cities, catchments and coasts — say **Jon Ford, Simon Price, Kate Royse, Andrew Hughes** and **Chris Jackson.**

Battlegrounds of environmental change

The Thames catchment encompasses one of Europe's largest cities, the UK's principal aquifer, an extensive zone of coastal interaction and much else. It presents a unique conjunction of geological, hydrogeological, environmental and socio-economic factors that are intrinsically linked by the effects of environmental change and the pressures of development.

We are responding to these challenges through the *FutureThames* initiative. This focused interdisciplinary and collaborative project will bring together a range of activities to provide a unified geoscientific knowledge base upon which the environmental, engineering, social science and economics communities can build to improve decision-making.

The knowledge base, incorporating observation, mapping, and modelling will underpin the development of applied 3D geological models that describe the physical properties and processes of the subsurface. In conjunction with models developed by the wider environmental science community, *FutureThames* aims to contribute to predictions of the impact of environmental change in the region.

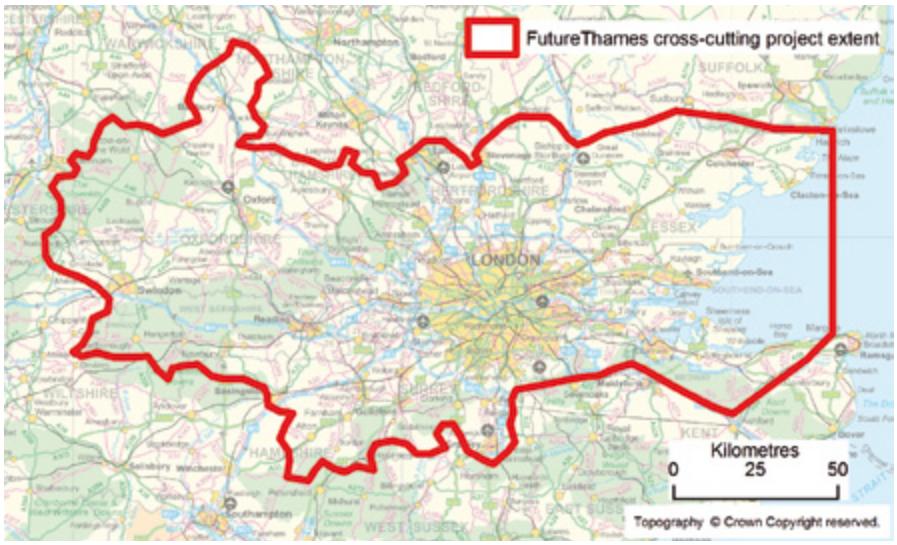
Challenges

Applied geoscience plays an essential role in addressing many of the challenges facing the region, from informing engineers and developers on ground conditions, to supporting the sustainable management of natural resources including water. *FutureThames* will focus on the areas where collaborative BGS science has the potential for greatest impact:

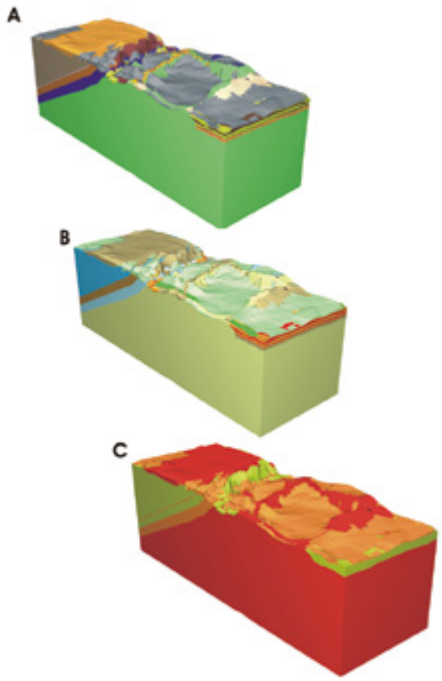
- sustainable use of the subsurface
- ground stability and geohazards
- flooding
- changing land use
- water security
- protecting coastal communities and habitats.

Solutions

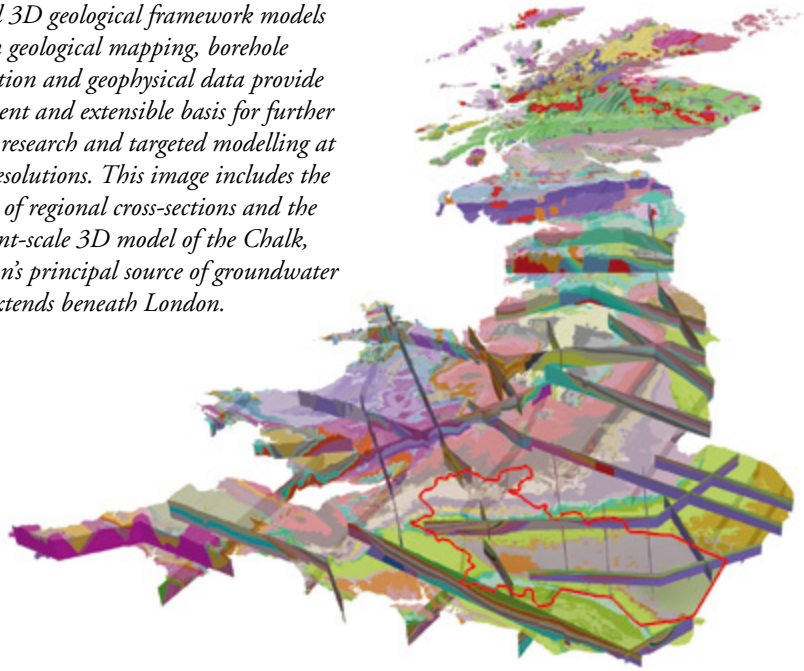
We are responding to these challenges by providing a relevant and accessible



The geography of FutureThames*, encompassing the 'battlegrounds of environmental change' — the rural catchment, urban conurbations and the coastline of the Thames estuary.*



3D model of the West Thurrock area, London showing A) high-resolution geological model, B) engineering conditions, C) permeability. Application of this information helps to reduce the likelihood of encountering ground stability problems, minimise the impact of pollution and reduce susceptibility to flooding.



Regional 3D geological framework models based on geological mapping, borehole information and geophysical data provide a consistent and extensible basis for further directed research and targeted modelling at higher resolutions. This image includes the network of regional cross-sections and the catchment-scale 3D model of the Chalk, the region's principal source of groundwater which extends beneath London.

geoscientific knowledge base and a consistent suite of multiscale, fit-for-purpose 3D models. These models are underpinned by a co-ordinated programme of geoscientific survey, monitoring and research that is designed to establish a strategic understanding of the subsurface. Increasingly, these models will incorporate data on physical and chemical properties and an understanding of the dynamic processes that operate in the subsurface.

In conjunction with the Open Environmental Modelling Platform, the collaborative *FutureThames* initiative will interface directly with models and data developed by external partners. This exchange of knowledge and data will underpin national capability in predictive environmental modelling and provide quantifiable knowledge to inform decision-making and UK policy.

Through *FutureThames* and equivalent cross-cutting projects, including the Clyde Urban Super Project, we are meeting the highest priority national drivers for geoscientific knowledge and developing capability that is relevant throughout the UK.

Stakeholder event

Responding to the challenges facing the Thames Basin requires a whole-systems approach. The *FutureThames* launch will take place in spring 2011. This will bring together the stakeholder community, including researchers, planners, industry and regulators, with a view to developing collaboration and solutions.

For further information, contact:

Jon Ford, BGS Keyworth
Tel: +44(0)115 936 3036
e-mail: jford@bgs.ac.uk

The highest-resolution modelling will meet the challenge of the sustainable use of underground subsurface in urban environments and support predictions of the resilience of urban infrastructure and resources to future environmental change. The urban subsurface is a congested space and its sustainable use requires careful management to ensure that it provides the services on which we depend.