British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Future Thames: applied geoscience for decision-making in London and the Thames Basin

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Introduction

The Thames Basin is the UK's principal aquifer. It encompasses London, which is Europe's largest megacity, and has an extensive coastal zone. It presents a unique conjunction of geological, hydrogeological, environmental, and socio-economic factors that are intrinsically linked by the effects of environmental change.
The British Geological Survey (BGS) is responding to this challenge through its FutureThames initiative. FutureThames aims to initiate, facilitate and support interdisciplinary and collaborative geoscience research in an attempt to understand the effects of environmental change in the Thames Basin. Such collaboration will assist in providing 'real world' responses to different 'what if' scenarios, such as "What will happen to groundwater if a new housing estate is built here?" Or "How will sea-level rise affect my property?" **Six key environmental challenges** have been identified to provide a framework to focus our research activities in the region.

1 Sustainable use of the subsurface

As population density continues to rise, society is becoming increasingly reliant on underground space to accommodate its growing infrastructure.
The challenge is not simply in understanding what the impact of this increased subsurface engineering will have on the environment but also in how the changing environment will impact on the infrastructure that already exists in the subsurface.



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2 Ground stability and geohazards



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It is essential that we understand how geological materials react to changes in climate. This will ensure that we can sensibly plan for future developments and take account of potential hazards. Shrink-swell behaviour exhibited in clay-rich soils, such as those derived from the London Clay Formation, is the most damaging geohazard in Britain today costing the economy an estimated £3 billion over the past decade. Better understanding of the relationship between ground conditions and climate change will help reduce these costs.

3 Flooding

Environmental change is likely to result in greater flood risk, both from surface flooding and from groundwater flooding. Rising groundwater was a significant causative factor for the summer 2007 floods in Oxford. Adopting an integrated catchment approach to flooding could lead to more accurate flood predictions and better-informed policy on flood-risk management within the Thames Basin.



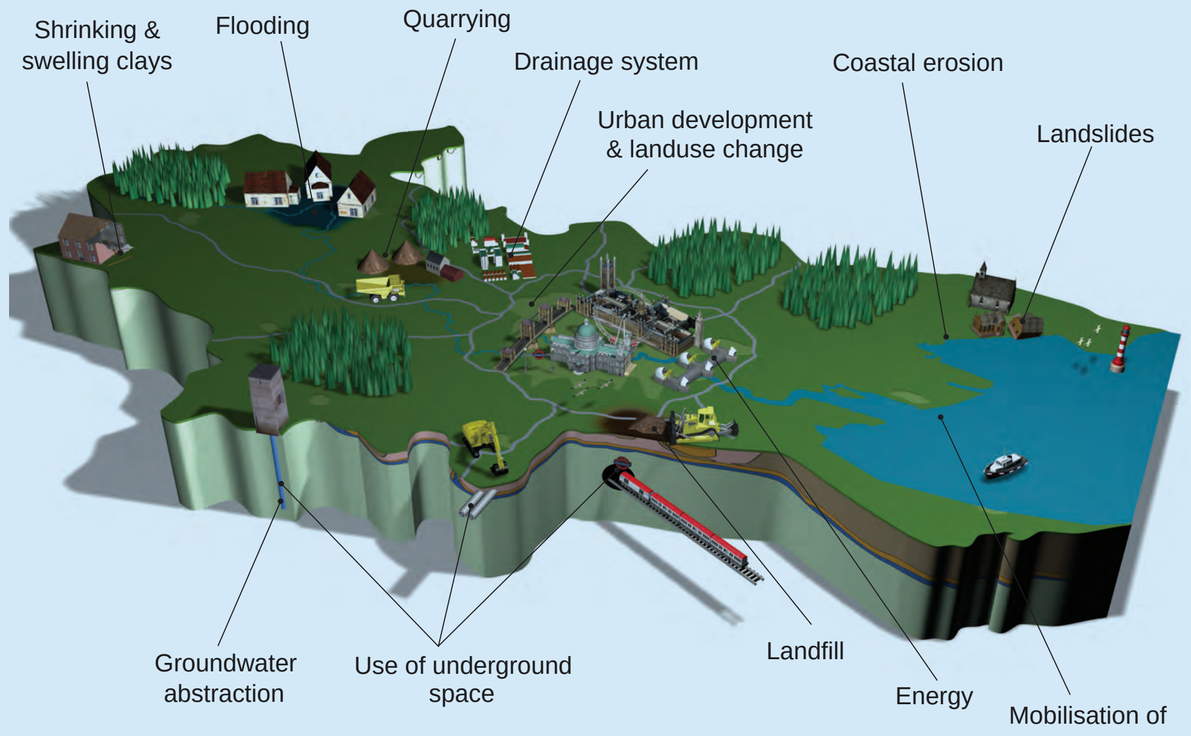
4 Changing land use



Rapidly changing human activity within the Thames Basin can put huge pressures on the natural environment's ability to adapt and cope. Maintaining an ecological balance is essential to ensure that, for example, soils are still able to buffer potential contaminants or ground stability is sufficient for the latest developments placed upon or within it. An enhanced understanding of the legacy of land use has the potential to support predictions and more effective mitigation strategies relating to anthropogenic contamination.

Geological contribution

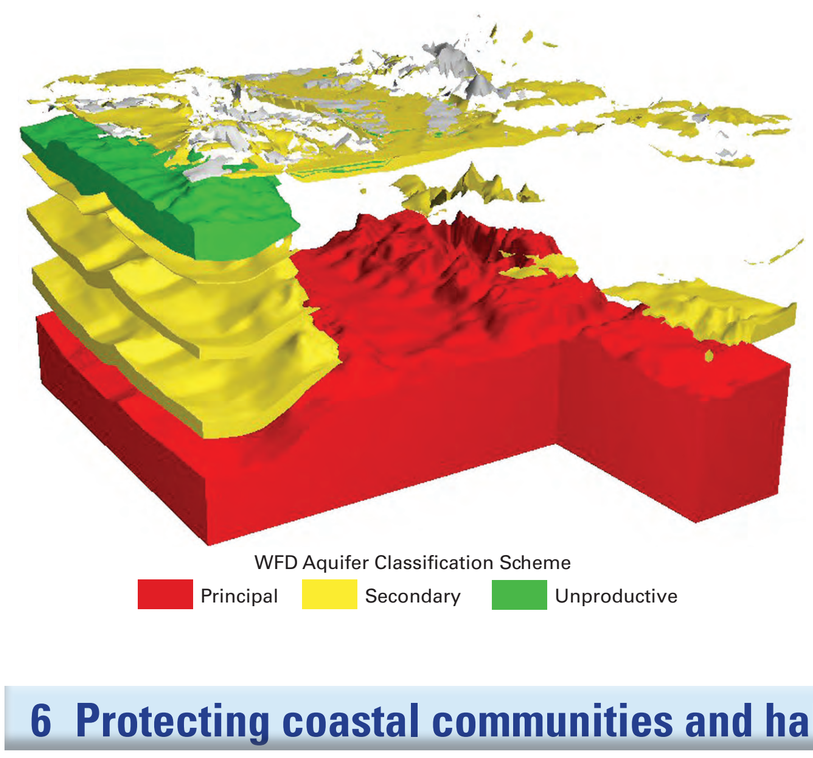
Understanding the geology of the UK is essential for the economic and social development which improves our quality of life. It is necessary for protection of the natural environment, the quality and character of the countryside, the built environment and communities. It is important for using and protecting agriculture, forestry, water and mineral resources and soils. It also improves our understanding of environmental change. Nearly everything we use in daily life, from roads to computers and toothpaste, originate from components of rocks, or of plant material relying on the minerals in the rock for growth. Geological understanding is vital in meeting the environmental and development challenges we face in the Thames Basin.



A schematic representation of some of the geoscience challenges within the Thames Basin.

5 Water security

One of the major geological units beneath the Thames Basin is the Chalk, which represents one of the most extensive aquifers within the UK. This Chalk aquifer is an essential water resource for the Thames region. It not only provides the water resources for public and commercial use, but it also plays a major contribution to river flow and wetland habitats within the catchment.



An image showing an exploded 3D Geological model of the Chalk beneath the Thames Gateway, attributed to aquifer properties. The Chalk aquifer, supports 70% of public water supplies and sustains many rivers and wetlands.

6 Protecting coastal communities and habitats

The Thames estuary provides a focal point for waterfront development and supports many unique and internationally significant habitats for wildlife. These communities and habitats face particular threats from environmental change, including sea-level rise, flooding and storms as well as diminishing sediment quality due to sustained urban and industrial pollution. The BGS has developed a methodology to help track human-induced environmental change over time in coastal and fluvial systems.



Contact information

FutureThames would like to hear from any organisations interested in collaborating on research within the Thames Basin.

www.bgs.ac.uk/FutureThames/ or FutureThames@bgs.ac.uk

Please download the FutureThames brochure which accompanies this poster from www.bgs.ac.uk/FutureThames/