

CASE STUDY

CUSTOMER

Governments, private sector and the public sector

DELIVERABLE

Models, maps and handbooks for flood prediction

OUTCOMES

Improved flood warning systems saving up to £30 million per year



The Centre for Ecology & Hydrology's long history of research on flood prediction has led to the development and refinement of the Flood Estimation Handbook methods which form the national design standard for estimating flood risk in the UK."

Dr Andy Young

Managing Director,
Wallingford HydroSolutions Ltd



Photo - Heather Lowther, CEH

Forecasting floods to protect the economy

Our decades of experience producing flood models, flood forecasts, and maps of flood risk provide advance warning for the public and safeguard the economy

The challenge

Floods pose a threat to human safety and the economy – the 2007 floods cost the UK £3 billion, and one in six properties in England is at risk of flooding.

The damage from floods is only going to increase, with flood risk to individuals expected to rise more than four-fold by 2090, and floods predicted to be one of the major ways climate change will impact the global economy. Developing more efficient, accurate flood forecasting models is therefore a national priority.

The research

The Centre for Ecology & Hydrology (CEH) has decades of experience producing flood models that span the entire UK, and their approaches are applicable worldwide.

CEH focuses on four major approaches to flooding:

Real-time flood forecasting - CEH expertise in hydrological modelling has led to the development of tools and techniques for forecasting river flows. Our models simulate and forecast river flows for real-time and seasonal flood forecasting and underpin national flood forecasting and warning systems.

Flood risk estimation - CEH has established experience in developing a range of data products, tools and models for estimating rainfall and flood frequency across river networks. Our solutions underpin effective flood protection of houses, businesses and critical infrastructure such as transport networks, bridges, energy and water supply systems and are encapsulated in the Flood Estimation Handbook.





The most significant [project] has been the successful implementation of a fully distributed hydrological model... on the Met Office supercomputer. This good level of coverage means the Environment Agency and Natural Resources Wales can increase its forecasting extent towards those hardest to reach people at risk. This use of Grid-to-Grid, the national forecasting system used by the FFC and developed by the Centre for Ecology and Hydrology, significantly improves the link with the Met Office systems and provides a consistent approach to forecast river flows including those that respond rapidly."

Annual Report, Flood Forecasting Centre
(2014/2015)



Photo - Colin Roberts, CEH

The CEH projects described here have multiple partners across the UK, Europe and worldwide that are too numerous to mention individually. Please visit our website for partner details.

Future flood risk due to **climate change** - CEH's collaborations with the UK's Met Office and others have improved data, models and understanding of the current and future water cycle at national, European and global scales.

Flood risk mapping - in the late 1990s CEH developed the UK's first national flood risk map, and since then we have continued to deliver more accurate updated national flow statistics and models covering hydrological digital terrain, soil moisture, and small catchments.

On a global scale, we coordinated the Integrated Project Water and Global Change (WATCH), assisting governments, multinationals and international organisations in assessing global water-related risks. Twenty-two countries across every continent but Antarctica have downloaded it.

The outcomes

CEH's research on flood systems has saved millions of pounds for government and industry across the UK and Europe while ensuring a safer, better prepared public.

The Flood Estimation Handbook is estimated to have reduced construction costs and flood damages by between £8 million and £30 million per year, respectively, and is now the standard method for estimating flood frequency in the UK.

Our national flood risk mapping models and data are the industry standard used by all UK insurance companies, also driving the flood risk maps on the Scottish Environment Protection Agency's 'What's in your backyard?' website and their Flood Extent Maps website.

The Flood Forecasting Centre, Scottish Flood Forecasting Service and several overseas governments make extensive use of CEH's real time flood forecasting research outputs. The resulting flood forecasts also underpin the email flood alerts sent to the public and businesses by the Environment Agency and the 'Flood Alert' app.

The Met Office's new 'Climate Services' is built upon our work on future flood risk due to climate change, and Defra and the Environment Agency have both used our outputs to underpin guidance on how to incorporate climate change in decision-making.

Recent work with WATCH has highlighted the risks of floods and drought across Europe and the USA, and has prompted the European Commission's Directorate-General for the Environment to launch new initiatives on climate-water related risks.

Our work with flood models forms the foundation of the national flood forecasting systems, providing advanced warning and saving millions of pounds for the country.

