



HR Wallingford
Working with water

Floods research into practice

Delivering innovation to meet industry needs



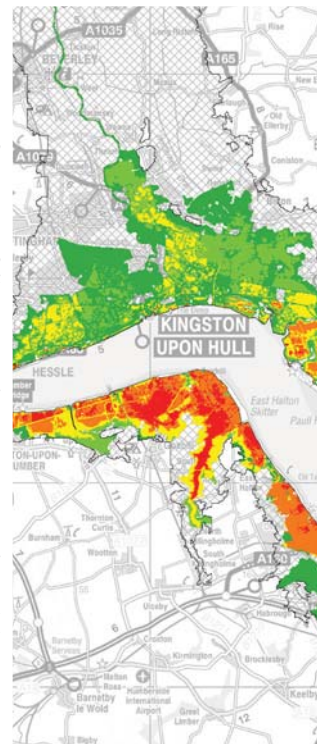
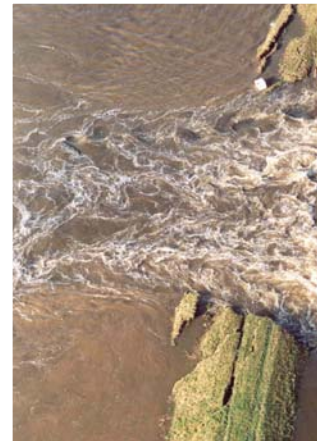
Why undertake floods related research?

To manage floods and flood risk effectively, we must better understand the physical processes that occur during a flood, the consequences of flooding on society and how we respond and react. This includes understanding effective preparedness, event planning, event management and evacuation. Concepts, methods and models for flood risk analysis are constantly evolving; by participating with and driving forward programmes of research at an international level, our clients receive world leading, cost effective solutions for flood related projects.

Research into practice

HR Wallingford funds a substantial annual programme of research and development, allowing staff to build from the research undertaken nationally and internationally so that flood risk analysis and management models, methods and procedures can be developed from research concepts and prototypes through to industry ready applications. Some example flood risk management models and methods that are developing through integrated programmes of research:

- > **HR BREACH** Predicts breach growth through earth flood embankments and dams.
- > **Life Safety Model** Simulates human response under emergency flood conditions, providing impact estimates (potential loss of life) and supporting emergency plan generation and testing.
- > **HR RELIABLE** Analysis of the performance reliability of a flood defence structure.
- > **FRE** The Flood Risk Estimator is a modelling framework and modules for system risk analysis, allowing optimisation of asset management.
- > **Rapid Flood Spreading Model (RFSM)** A collection of hydraulic models using a sub-grid technology that enables a complete representation of the topography at any scale. Performs very fast simulations of floodplain or catchment inundation.
- > **CONVRT-IM** A simplified probabilistic tool that estimates the benefits a particular maintenance activity has on channel conveyance.
- > **RESSASS** Simulates the movement and deposition of sediment in reservoirs. The reproduction of historic patterns and the prediction of future ones supports the planning of operation policies and sedimentation management strategies.
- > **RAFT** A simplified probabilistic tool that quantifies the benefits of asset maintenance activities. It assists operational staff in determining the importance of an asset in terms of its contribution to risk without the use of more complex modelling.
- > **GTI-Floodplain** GIS tools that can be combined with other software (e.g. InfoWorks RS, Conveyance Estimation System) to rapidly build 1D river models to explore different aspects of flood hazard and risk at broad scales.
- > **SEAMaT** GIS to integrate wave, sediment transport and beach/cliff models with coastal flood risk models. Used to explore the interaction between natural processes and management of the coast, and how this may influence coastal erosion and flood risk.



Which research programmes?

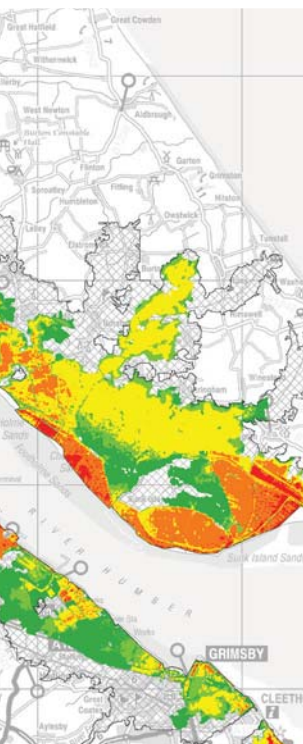
We carry out research at all levels, from individual technical projects, through company and university collaboration to national and international programmes of research. Some examples of research collaboration and programmes are given below.

- > Flood and Coastal Erosion Risk Management (FCERM) research programme (UK Government)
- > Flood Risk Management Research Consortium (FRMRC1 and FRMRC2) (UK National)
- > EPSRC and NERC research programmes (National academic programmes)
- > European Union Funded Research (EU Framework programmes (FP4, FP5, FP6, FP7, Interreg, Marie Curie, etc.))
- > HR Wallingford Fluid Earth Portal and programme (Direct university and research organisation collaboration)
- > International collaboration with government agencies (e.g. via European CRUE programme; direct with US Army Corps Engineers, US Bureau Reclamation, US Dept for Homeland Security etc.)
- > Independent research programmes (e.g. CEATI facilitated Dam Safety Interest Group research programme).
- > Supervision of research projects, including MSc and PhD students. HR Wallingford is registered as a Sponsoring Establishment with the Open University allowing students to be supervised at Wallingford as they undertake collaborative research projects

Some key research projects underpinning our consultancy in flood risk analysis and management:

FLOODsite	An integrated project funded by the European Union with a total value of over €15 million. Flood risk and management issues for rivers, estuaries and the coast.	www.floodsite.net
RIBAMOD	Concerted action on river basin modelling, management and flood mitigation	
CADAM	Concerted action on dambreak	
ACTIF	Achieving technological innovation in flood forecasting	www.actif-ec.net
IMPACT	Investigation of extreme flood processes and uncertainty	www.impact-project.net
FIM FRAME	A framework for improvement in flood incident management	www.fimframe.net
URBANFLOOD	Technologies for early warning, real time emergency management and routine asset management	www.urbanflood.eu
FloodProBE	Technologies for the cost effective flood protection of the built environment	www.floodprobe.eu
FRMRC	Delivery of tools and techniques to support more accurate flood forecasting and warning, improvements to flood management infrastructure and reduction of flood risk to people, property and the environment.	www.floodrisk.org.uk
Fluid Earth	Bringing together academic research centres to encourage the development of integrated modelling initiatives	www.fluidearth.net

Image courtesy Environment Agency





HR Wallingford is an independent engineering and environmental hydraulics organisation. We deliver practical solutions to the complex water-related challenges faced by our international clients. A dynamic research programme underpins all that we do and keeps us at the leading edge. Our unique mix of know-how, assets and facilities includes state of the art physical modelling laboratories, a full range of numerical modelling tools and, above all, enthusiastic people with world-renowned skills and expertise.

