Broad Scale Modelling Scoping – a Vision for Flood Modelling and Risk Science

Technical Summary: FD2118

Joint Defra / EA Flood and Coastal Erosion Risk Management R&D programme

Background to R&D project

There is an important national need to provide decision-support systems for the strategic assessment of flood risk and for flood management. This R & D Programme has been supporting the development of new methodologies and Decision Support Systems within a framework of Broad-Scale Modelling (BSM). An earlier R&D project identified that there were unresolved strategic issues concerning the feasible scope of BSM and that a blueprint was needed to provide the focus and goals for delivery of a next generation Decision Support System. This project enables Defra/EA to look beyond their current policy and business needs and anticipate the potential of science within Modelling And Risk (MAR) Theme to aid their future aims.

The management of flooding in the UK has evolved from a focus on local assessment of hard flood defences to a more holistic approach to flood risk management, as recently set out in Making Space for Water. In response to these changes, there is a need to develop a science vision for Broad Scale Modelling and Risk Assessment, recognising common issues across the physical systems including socio-economic aspects, and the potential benefits of an integrated decision support system to the planning and management of flood risk.

The purpose of the project was to develop a medium-term and longer term vision of integrated decision support systems to provide strategic direction and focus to the Modelling and Risk Thematic Programme by addressing the following issues:

- The extent to which an integrated modelling system of the physical environment is feasible and desirable, given the specific individual requirements of fluvial, estuarial and coastal flood management.
- How current developments such as continuous rainfall and runoff simulation and risk-based flood impact modelling may be assembled into a coherent set of tools, useable by the FRM community.
- How such a set of catchment tools would interface with similar sets of tools currently being developed for the estuarial and coastal areas.
- The extent to which broader issues of environmental management such as socio-economic aspects can be integrated with the physical systems model(s).

Results of R&D project

FD2118 has brought together leading UK research expertise in flood risk assessment and modelling related to catchments, estuaries and coasts, and to socio-economic issues. The panel has carried out consultations and produced a review of the state-of-the-art in the relevant aspects

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and 5 year and 10 year visions for the future, and hence has identified a set of research needs and priorities. This vision for Broad Scale Modelling was developed within a DPSIR (Drivers-Pressures-States-Impacts-Responses) framework and is supported by proposals for an integrating research programme. Moving beyond consideration of the purely physical systems, socio-economic issues have been highlighted as fundamental to the assessment of the consequences of flooding, with respect to both the impacts on receptors, and the assessment of response effectiveness. The vision of the future also considers significant developments in computing systems and in the availability of data.

Essential integrating research to achieve these objectives is presented as a phased 5 year programme. This is aimed to deliver:

- A DPSIR-BSM framework in 3 years, based on 2 integrating case study applications, and largely current technology
- Enabling technology to support the next generation of DPSIR-BSM decision support system, in the areas of model integration and socio-economics
- A strategic review of data and modelling aspects to underpin the 10-year vision of models of everywhere
- New research on national assessment of risks from extreme extremes

R&D Outputs and their Use

A technical report on scoping the vision and a project record with Supplementary information for Flood Modelling and Risk Science have been produced. The Technical Report presents the vision for Broad Scale Modelling within a DPSIR (Drivers-Pressures-States-Impacts-Responses) framework, a summary of technical developments and future vision for component areas, and an outline programme of integrating research. It includes a number of recommendations for a phased research programme to achieve the development of a new DRSPIR-BSM framework for decision support, and provide the underpinning generic developments to support its progressive development. More detailed information on individual topics and further recommendations for topic-specific research can be found in the Project Record.

These outputs can be used by funders for Flood and Coastal Erosion Risk Management Research, research managers, researchers and the users of Flood and Coastal Erosion Research.

This R&D Technical Summary relates to R&D Project FD2118 and the following R&D outputs:

- **R&D Technical Report FD2118/TR – Broad Scale Modelling Scoping – a Vision for Flood Modelling and Risk Science.** Published August 2008.
- **R&D Project Record FD2118/PR – Broad Scale Modelling Scoping – Supplementary information for Flood Modelling and Risk Science**, Published August 2008.

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The above outputs may be downloaded from the Defra/EA Joint R&D FCERM Programme website (www.defra.gov.uk/environ/fcd/research).

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