

R&D Technical Summary W5B-030/TS

Risk Assessment for Flood and Coastal Defence for Strategic Planning (RASP)

Background to R&D project

It has long been recognised that flood risk cannot be eliminated completely and that understanding risk is key to improving risk management. In particular, this means deciding on actions such as:

- construction of new defences where they are most needed;
- maintaining and operating defences and defence systems to minimise risk;
- flood forecasting and warning to minimise the consequences in the event of flooding;
- restricting development in flood and erosion-prone areas to control the impacts.

The need for improved risk assessment methodologies to support better flood risk management has therefore been the primary driver in support of the RASP project. The methods that have been developed through the RASP project will help the Environment Agency and Defra to understand more about how flood defences, and investment in flood management, influence flood risk. In particular, they provide a significantly improved ability to predict the spatial distribution of both the probability and consequences of flooding taking defence performance into account.

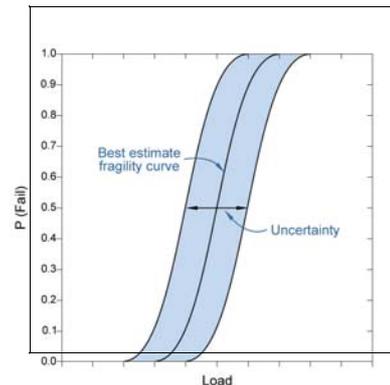
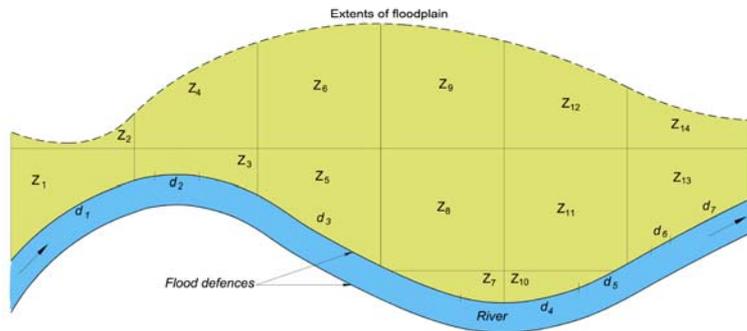
Results of R&D project

The RASP methods enact the basic cross-government framework for environmental risk assessment and risk management as well as addressing the specific needs presented by flood risk management. By enacting these frameworks within a generalised hierarchical methodology RASP enables *sources* (including a wide range of extreme wave and water level combinations), *pathways* (including the performance of multiple defences expressed in terms of a fragility curve) and *receptors* (including people and property) of risk to be combined. As such RASP provides an important step towards an improved ability to manage flood risk in an integrated way.

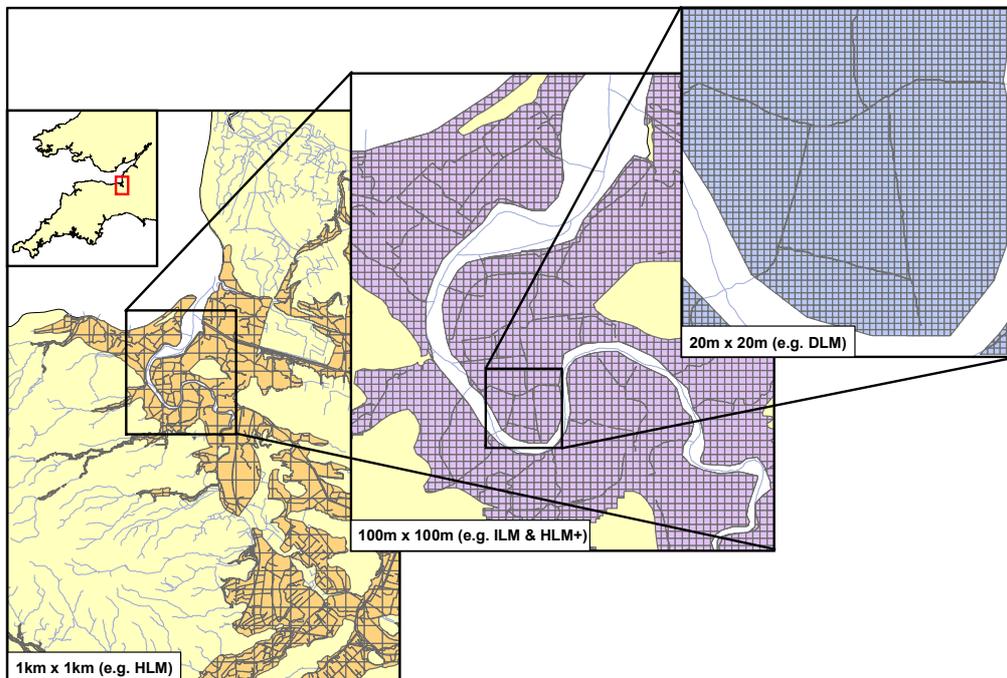
The RASP methods have been shown to provide a rational risk-based framework for the development of flood management policy, allocation of resources and monitoring the performance of flood mitigation activities at national regional and local scales; addressing strategic and overarching issues directly, such as:

- what is the probability and consequence of flooding, and how do they vary within the flood plain?
- what is the appropriate level of spending on flood and coastal defence to ensure risk is reduced, including the possible effects of climate change?
- what combination of risk management measures provides the best value?
- what is the 'residual risk' remaining after all risk management measures, and is this acceptable?

In particular, RASP provides a hierarchy of methods to support the assessment of flood risk at a range of scales (national, regional, local) and levels of detail. At each scale the RASP methods are focused on understanding the probability of flooding at a particular location within the floodplain taking account of the protection afforded by defences. The notion of a system-based analysis (considering sources, pathways and receptors) is therefore fundamental to RASP. Equally important, and implicit within the RASP approach, is the concept of appropriateness; where the complexity of the analysis reflects the availability of data and the nature of the decision being made.



Fundamental building blocks of RASP – Defence systems, defence fragility and impact zones



Example of the spatial hierarchy of Impact Zones utilised in RASP

The utility of the RASP approach has been demonstrated through both case study and theoretical reasoning. To ensure the exploitation of these methods in the context of Integrated Flood Risk Management however, future work (research, development and operational) will be required and key recommendations are made.

R&D Outputs and their Use

The Technical Report W5B-030/TR presents the key R&D findings, summaries of the methods developed, and recommendations and conclusions. It is a technical report but does not include full technical details of all of the methods developed during the Project.

The Project Record comprises detailed technical reports, computer code, and documentation describing the project and outputs in detail. It is intended for use by specialists, and by those involved in further development and application of RASP or related methods.

This R&D Technical Summary relates to R&D Project W5B0030 and the following R&D outputs:

- **R&D Technical Report W5B-030/TR, *Risk Assessment for Flood and Coastal Defence for Strategic Planning*** Published November 2004
- **R&D Project Record W3-030/PR *Risk Assessment for Flood and Coastal Defence for Strategic Planning*** Published November 2004

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The above outputs are available under the Flood Forecasting & Warning Theme on the Environment Agency website www.environment-agency.gov.uk/floodresearch. Copies of these documents can be obtained from the Environment Agency's National Customer Contact Centre by emailing enquiries@environment-agency.gov.uk or by telephoning 08708 506506.

The Project Record is available on request from Ian Meadowcroft, REUU Theme Leader, Environment Agency.

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