Developing a prototype tool for mapping flooding from all sources Phase 1: Scoping and conceptual method development

Project Summary SC080050/S1

Maps of many different sources of flood risk are being developed rapidly by the Environment Agency and by others in response to the 2007 floods, the Pitt Review and the Floods Directive. At the moment we can only look at these different sources of flood risk individually; information on how they might combine and interact is missing. This is the first phase of a project to explore how we consider all sources of flooding collectively.

The Environment Agency is responsible for mapping flooding from rivers, sea and reservoirs, and for providing tools, techniques and guidance to help local authorities with local flood mapping.

The Environment Agency commissioned Halcrow to develop a prototype computer tool for mapping flooding from all sources. The purpose of the tool would be to combine information on flooding from different sources (such as rivers, coastal waters, surface water and so on) into a single map showing the probability of flooding.

The project is split into two phases. Phase 1 aimed to review current methods, models and datasets that would be useful for building the tool, along with consulting potential users of the tool. Phase 1 has then developed a concept, design and specification for the prototype tool. Phase 2 will now finalise the design, and develop and test the prototype software tool.

This report covers Phase 1 of the project and will be of most interest to Environment Agency staff and technical experts who need to understand the proposed method.

The report outlines the project requirements, consultation and literature review, along with a review of sources of flooding, method development and prototype software tool specification. Its findings are as follows.

Existing datasets for fluvial (river), coastal, estuarine, surface water and reservoir inundation sources are currently suitable for use in a map of all sources of flooding. However, the current status of datasets for other sources is such that inclusion in an 'all sources' map for all England and Wales is unlikely to be feasible at this time, as either the necessary datasets, or the underlying science required to produce them, are not available for these sources at this time... However, data already exist for some local sources of flooding in some areas, and the methods developed in this work are flexible enough to incorporate such datasets as they develop more widely in the future.

The report proposes a method to generate a probabilistic flood map showing the probability of flooding resulting from all sources considered, and the relative contributions to that probability of flooding from the different sources. The method focuses on the use of pre-existing flood map data which are combined into 'all sources' flood mapping. The proposed method therefore relies on the availability of pre-calculated flood inundation data from individual or previously combined sources. By considering the interaction between sources and the uncertainty in the available data, the method will also enable users to identify situations in which new, local, integrated (flooding from several sources) modelling is required. Understanding the overall uncertainty in the data will help guide the use of the model outputs. The method is show pictorially in figure 1 overleaf.

The method is generic and can be used for national and local mapping. The method is consistent with RASP (Risk Assessment of Flood and Coastal Defence for Strategic Planning) concepts of a system-based, risk-based hierarchical approach and is compatible with RASP-related products such as NaFRA and MDSF2. These tools are commonly used by Environment Agency staff working in flood risk management. The method is not constrained – any source of flooding can be included where suitable data exist.

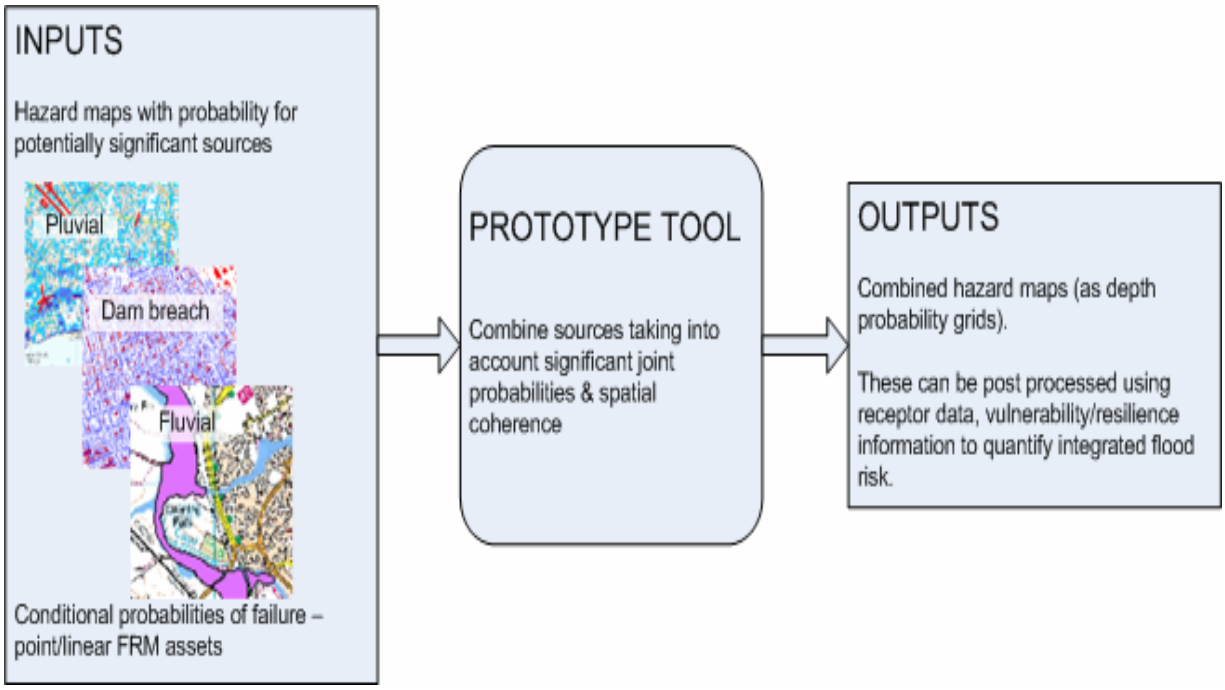

Figure 1: Schematic representation of the process of Mapping All Sources of Flood Risk.

This summary relates to information from project SC080050, reported in detail in the following output(s):

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