Surface Water Flood Warning Scoping Project

Project Summary SC080034/S

Researchers from the Flood Hazard Research Centre and HR Wallingford have recently suggested that the Environment Agency and Met Office should begin to progressively develop a pilot surface water flood warning service targeted at, and in consultation with, its professional partners. The suggestion is one of seventeen related suggestions arising from a scoping study of surface water flood warnings which follows the floods of 2007 and the Pitt Review into these floods which called for warnings for all sources of flooding.

The main initiative investigated as part of this project is the Extreme Rainfall Alert (ERA) service. This is a service delivered by the Met Office and Environment Agency's joint Flood Forecasting Centre and which has provided alerts for heavy rainfall to professional partners since July 2008. The research explored responses to this service and the requirements of professional partners in relation to it, as well as attempting to verify the relationship between ERAs and surface water flooding.

The research found that, although many professional partners take some action in response to ERAs, effective action is currently limited by insufficient information. Professional partners want more specific and more certain information and are currently limited by the difficulty of translating ERAs into likely flooding consequences – specifically the likely location and extent of surface water flooding.

Verification of ERA and surface water flooding relationships is currently limited by a lack of data recording of surface water flooding. Even so results from three ERA case study areas (South Wales, South West England and Cumbria), indicate that the intensities of rainfall that are associated with surface water flooding may be lower than expected and that the current national thresholds used in the ERA service are not appropriate for all situations.

Despite these current shortcomings, the research results indicate that there is potential to develop the existing ERA service into a surface water flood warning service. However, to do so effectively requires a strong linkage to be made between rainfall and flood impacts in terms of the likely location and extent of flooding. Currently responders are generally positive about the ERA service and its potential. It should be maintained and continued to be provided to professional partners at least until it is replaced by a more targeted surface water flood warning service.

Internationally, surface water flood warning services may be described as 'emergent' and remain largely untested. Although precipitation forecasting has advanced significantly in recent years, its use to provide forecasts or warnings of surface water floods as a distinct and separable component of flooding is currently uncommon. Examples of such services operating at different levels of specificity are to be found in France, the USA and England. The latter include several local surface water flood warning systems serving small communities established mainly since the summer 2007 floods.

Initially a sliding scale of seventeen options for the introduction of a surface water flood warning service was examined. Through an evaluation process, these options were reduced for trialling purposes to three: (a) rainfall-based alerts with either national or local rainfall thresholds, (b) rainfall-based alerts utilising locally specific runoff thresholds, and (c) flood warnings linked to runoff and local drainage. These options were subsequently examined in two further case study areas (three communities on the edge of Rotherham and Wealdstone Brook, Brent, in North London) through the medium of professional partner workshops and public focus groups, undertaken in the Autumn of 2009. Apart from considering the three options, the workshops and focus groups also considered the potential for providing alerts or warnings for professional responders and for members of the public.

A rainfall alert-based service was considered to be the preferred option (this is similar to the ERA service) by professional partners, although they also believed that such a service would need to be tailored to local circumstances. In particular, the rainfall thresholds at which an alert or warning is provided should be developed with the local circumstances in mind. Despite one of the options being preferred by the majority of professionals, it was recognised at the workshops that different areas have different requirements and therefore

any service may be required to recognise these different contexts.

As indicated by the focus group outcomes, members of the public were more sceptical about the potential for a surface water flood warning service. In particular, there were significant concerns about whether a warning would be sufficiently accurate and reliable and have a sufficient lead time for any effective response. This was the opinion particularly of those members of the public who had recently experienced flooding. Of great concern to the public was also a consideration of who would assist them following flooding and allocation of individual (i.e. public) and professional partner responsibilities for surface water flooding.

The results of this scoping study have a number of implications including:

- the need to learn more about the public's mental constructions of surface water flood risk;
- future public understanding of, and trust in, credible sources of flood warnings given that the Flood and Water Management Bill proposes both the Environment Agency and local authorities have flood warning and informing roles in future;
- the need to build confidence in warnings for surface water flooding;
- the potential for making greater use of local knowledge about surface water flooding; and
- the need to examine the economic efficiency of surface water flooding warnings and response.

Apart from the principal suggestion referred to in the first paragraph of this summary the report makes further suggestions to both the Environment Agency and the Flood Forecasting Centre. These are in three categories (a) suggestions on surface water flood warning, (b) suggestions for the Extreme Rainfall Alert service and (c) generic flood warning suggestions. Each should be considered when developing a surface water flood warning service for England and Wales. The suggestions include the following:

- a programme should be developed to identify local rainfall thresholds linking these as closely as possible to local flood impacts;

- careful consideration should be given to ways of determining the levels or scales of surface water flooding for which warnings will and will not be provided;

- the Environment Agency should carefully consider the effects of integrating surface water flood warnings with other flood warnings with which there may be comparatively higher level of experience and confidence;

- with notable exceptions where services already exist (or new areas are identified and justified on a case-by-case basis), it may not be feasible to provide surface water flood warnings directly to the public in terms of an 'individual sign-up service', at least in the short term. With development of a surface water flood warning service for professionals and greater accumulation of experience with surface water flood warnings in future, conditions may shift in the medium term to make the introduction of public warnings more feasible; and

- the Environment Agency should continue to strongly reinforce the message to the public and also to professional partners, that it is the lead organisation for flood warnings, including those which may become available for surface water flooding.

This summary relates to information from Project SC080034, reported in detail in the following output(s):

SC080034/SR1
Title: Surface Water Flood Warning Scoping Project – Final Report

SC080034/SR2
Title: An assessment of current experiences of the Extreme Rainfall Alert (ERA) service

August 2011

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This project was commissioned by the Environment Agency's Evidence Directorate, as part of the joint Environment Agency/Defra Flood and Coastal Erosion Risk Management Research and Development Programme.

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