

science summary



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Understanding of and response to severe flash flooding: Literature Review Science Summary SC070021

The Environment Agency has published a new report looking at how the public understand and respond to incidents of severe flash flooding. This report focuses on a review of existing literature carried out in 2008.

The research was carried out by the Halcrow Group, Ben Cave Associates and the Flood Hazard Research Centre at Middlesex University.

Flash floods are characterised by very short periods of time between rainfall and subsequent flooding, which makes effective preparation and response very difficult. The sudden rise in water level, the large volume of water involved, the speed at which the water moves and debris carried along by the flood can be very dangerous, posing a threat to life, property and local infrastructure.

The aim of this research project was to understand people's perceptions of severe flash flooding and what their needs are in order to make an appropriate and effective response. This work forms part of the *Making Space for Water* project RF7 (Rapid Response Catchments) and the combined flood action plans.

At present there is no national warning system in place for flash flooding, though the Environment Agency is currently defining rapid response catchment areas that are at particular risk. With research by the Intergovernmental Panel on Climate Change and others indicating that flash flooding is likely to become more frequent and more dangerous in the years to come, understanding the public's perceptions of severe flash flooding and clarifying what is needed for them to be able to make an effective and appropriate response is very important.

This part of the research project focuses on a review of existing literature, with a subsequent report focusing on findings from focus groups with the public and professional partners and telephone interviews (this report is available separately).

The primary purposes of the overall project are:

- To allow the Environment Agency to tailor its awareness message to suit people's needs.
- To form part of the Environment Agency's investigation into the feasibility of a warning service for severe flash flooding.
- To understand the measures the Environment Agency and other agencies can take to prepare in advance for severe flash flooding.

The literature review has four specific aims:

- To discover what is currently known in this field.
- To highlight gaps in the literature where further research is needed.
- To provide a foundation for the second stage of the research project by identifying topics for inclusion in focus groups, interviews with professional partners and telephone interviews.
- To update the Environment Agency on progress with the research project and emerging issues.

Key findings of the report fell into five broad categories: understanding of the term 'flash flooding'; appropriate and effective responses before and during flooding; getting those at risk to realise and respond to this type of flood risk; false alarms; and lead times for warnings.

The researchers found much to help shed light on the public's understanding and response to flash flooding, and inform decision makers in the development of flood warning messages in the future. Examples of the findings include:

- Flash flooding may need to be re-conceptualised to make it clear that it is qualitatively different from other types of flooding.
- Promoting public understanding of the impacts of flash flooding is crucial to improving response.

- Mortality and injury depend on individual flood characteristics. However, messages must include warnings to avoid risky behaviour such as walking and driving through floods, and to climb to higher ground.
- The vulnerability of drivers and how to warn them needs particular attention.
- Evacuation is not always the most appropriate course of action.
- Warning messages must be consistent, clear, timely, accurate, simple, convey confidence in its validity, and say what people should do.
- Public information messages need to be targeted and different methods used to target different groups.
- Whatever the source of a warning, the more times it is heard the more likely it is to be believed.
- Reliance on newer technologies may exclude more vulnerable groups.
- Limited evidence from operational settings indicates that professional partners prefer to be put on standby earlier, even if they are subsequently stood down.
- Limited evidence suggests that longer lead times for flood warnings may result in increased benefits for health and reduced damage.

The report authors also highlight a number of gaps in the research which should be addressed to gain a clearer picture of the current situation. These include research into how private companies behave in response to warnings, how tourist facility managers understand their responsibilities regarding visitors and natural hazards, how the UK media disseminates warning messages, and the experiences of people from ethnic minorities in responding to natural hazards.

This summary relates to information from Science Project SC070021, reported in detail in the following output(s):

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