



How to model and map catchment processes when flood risk management planning

Background

The Pitt Review after the flooding in summer 2007 concluded that flooding from a range of sources can no longer be managed by building ever higher, lengthier and heavier defences in urban and rural areas. The review emphasised the need to 'work with natural processes' as part of integrated portfolios of responses to flooding and coastal erosion. Working with natural processes means:

'taking action to manage fluvial and coastal flood and coastal erosion risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts'.

Why was the study needed?

While there are many different tools and levels of approximation that can be used to model the movement of water through a catchment, the models, data and tools available for this alternative form of flood and coastal erosion risk management have not been benchmarked. This means it can be hard to select tools that help to understand the potential benefits of adopting working with natural processes measures within a catchment.

The purpose of this project was to review existing modelling software, mapping techniques and data to establish how they could be used to assess a wide range of catchment processes to help develop flood and coastal erosion risk management projects that work with natural processes to reduce flood risk. The review focused on models that have been used to assess:

- run-off generation
- sediment processes
- in-channel barriers
- river floodplain barriers
- diffuse pollution

What were the key products?

The project developed:

- a **catchment process flow chart** to help understand how a catchment works and to identify potential data,

tools and models to use when undertaking a working with natural processes scheme in a catchment

- an **electronic library of tools** which provides a detailed summary of a range of tools, data and models to help select the right tools for a catchment; its purpose is to provide practitioners with as much information as possible about different approaches, since availability of existing models and data and user-experience often dictates the software that can be used
- a **detailed summary of models, tools and data** to help understand how different tools can be used to assist planning from flood source to flood scheme
- a series of **20 case studies** which provide examples of how different models have been used to model a range of catchment processes across the UK

How will these products be used?

A 3-step process has been developed to help select the right models, data and tools to use in a catchment study:

Step 1 involves using the Microsoft® Excel based model library to help select suitable models, data and tools which are the most relevant to a study. This library was compiled through a literature review, an expert workshop and the experience of the project team.

Step 2 allows practitioners to find out more about the models, data and tools selected from the model library. The detailed review of these provided in the report introduces a range of data, data analysis tools and models which can be used to assess a range of catchment processes. For each process, details are given of the key functionality of a range of tools.

Step 3 involves using the 20 detailed case study examples to explore whether the models, data and tools a practitioner has selected are appropriate for use in their catchment.

This summary relates to information from project SC120015, reported in detail in the following output(s):

Report: SC120015 Technical Report

Title: How to model catchment processes to reduce flood risk

Spreadsheet: SC120015 Model library

Title: How to model catchment processes to reduce flood risk

Case studies: SC120015 20 Case studies

Title: How to model catchment processes to reduce flood risk

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