



R&D W5A-064/TS

Impact of 2000/01 floods on channel morphology and physical habitat using RHS re-survey

Background to R&D project

A re-survey of selected River Habitat Survey sites was undertaken to establish what impact the Autumn 2000 / 2001 flooding had on channel geomorphology and physical habitat. An additional survey methodology the 'Geomorphological Audit' was also undertaken. Sites were selected according to four criteria: semi-natural sites, engineered sites, and sites within these categories that had experienced severe or less-severe flooding. All sites selected were in close proximity to gauging stations.

Results of R&D project

Data from 108 sites was analysed. Some 40% of these had experienced some form of detectable morphological change in one of three categories: frequency of eroding earth cliffs, frequency of unvegetated depositional features, and percentage substrate classes.

The morphological changes observed at engineered sites was broadly similar to those observed at semi-natural sites, although there was more bank erosion in the case of the latter. Sites experiencing severe floods had more erosion recorded. Semi-natural sites experiencing severe flooding recorded more change overall. Engineered channels experiencing severe flooding recorded less change overall, possibly due to their greater resilience.

On the whole, the response of rivers to the Autumn 2000 Floods has been localised and unpredictable. Bank erosion has increased generally, but was severe at relatively few sites. The majority of sites appear to have had minor changes below the level of reliable detection using RHS. Therefore the conclusion may be drawn that river channels were relatively resilient to morphological change from high flows in the 2000 floods.

A more detailed assessment of the 'effectiveness' of the Autumn 2000 Floods can be made using the data collected in this study. Effectiveness can be defined by the ratio of the peak flood discharge to the catchment area upstream of a site. The more 'effective' a flood event the more likely it is to undertake morphological change at a site, i.e. the higher the peak discharge in relation to the catchment area, the greater the likelihood of substantial morphological change.

In terms of the physical habitat data, the information is encouraging. No major difference was reported between modified and semi-natural sites in any of the measures of physical habitat diversity. Although there is limited evidence to suggest that heavily engineered sites have less diverse physical habitats, particularly those related to erosion processes that reflect the geotechnical instability of the banks.

This project has produced a check-list of suggested modifications to the RHS methods that may improve future repeat survey studies and Flood Defence applications. These suggestions will be developed in the ongoing R & D project '*A refined geomorphological and floodplain module to the River Habitats Survey*'. The check-list includes:

- The importance of undertaking re-survey during the same season as the original survey. (This was not the case in this study because of delays in commencing the project as a result of the Foot and Mouth Disease [FMD] which lasted nationally over the Spring-Summer period of 2001).

- Re-surveys should be undertaken at similar flow levels to the original survey, (this was not the case in this study due largely to the autumn-winter survey reason necessitated by the FMD restrictions). Further assessment of this variation on the recording of key features will be undertaken.
- Re-locating RHS reaches is difficult and prone to uncertainty. Errors in survey offset may be large and significantly affect the interpretation of change. An improved method for site location is required, e.g. using GPS survey techniques and a protocol for defining reach limits.
- RHS photography as it stands, is not robust enough to be used to assess change. A standard protocol for photographic recording that emphasises accurate location would improve this aspect.

R&D Outputs and their Use

The technical report forms the output from this project. It provided supporting information on the scale of the impact of the Autumn 2000 floods on river channels - themselves an important part of Flood Defence infrastructure. It also provides information for specialists involved in developing the use of RHS methods for Flood Defence management.

 This R&D report relates to R&D Project WA5-064 and the following R&D outputs:

- **R&D Technical Report W5A-064/TR** - Impact of 2000 Floods on channel morphology and physical habitat using RHS re-survey. Published June 2002.

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The output is available on the Environment Agency www.environment-agency.gov.uk/floodresearch. Copies are held by all EA Regional Information Centres and can be purchased from the EA's R&D Dissemination Centre, c/o WRc, Frankland Road, Blagrove, Swindon, Wiltshire SN5 8YF (Tel: (+44) 1793-865012; Fax: (+44) 1793-514562; email: publications@wreplc.co.uk).

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