

Based on this information, the maintenance regime can be adjusted with the aim of gradually moving towards the target SoS, subject to environmental constraints. As channel regimes respond to changes in maintenance practice, the SoS actual scores and the benefit-cost ratios respond accordingly. Annual review of HE scores and maintenance costs allows this response to be monitored, and priorities adjusted, over time.

For periodic maintenance (e.g. repairs to structures, etc), a visual assessment system has been developed which prioritises according to the condition of the components of an asset using a weighted scoring system.

Asset Management Planning

The purpose of this project is to improve methods of recording, registering and assessing the condition of flood defences. The first phase of the study has involved the development of a method for recording asset details and grading asset condition by visual inspection. This is supported by a comprehensive set of photographs which will help to provide a consistent approach to grading. Building on this work, a project is currently being undertaken to provide guidelines for a more comprehensive assessment of asset condition than that based on visual condition alone.

Best Maintenance Practice

As part of the drive towards setting standards, research is also being carried out into best maintenance practice. There are three projects in this area: review of existing practices for fluvial maintenance; grass management and aquatic weed control. The first project comprises a survey of fluvial maintenance practices throughout the NRA with the aim of identifying best practices, shortcomings and future needs. The second project aims to produce guidance on best practice for riverbank grass management,

taking account of environmental, amenity and economic factors. The third project is to develop appropriate, cost effective and environmentally acceptable methods for the control of aquatic weeds in rivers, canals and drains.

Evaluation of Alternative River Maintenance Strategies

This project aims to develop a methodology which assesses the benefits associated with alternative river maintenance strategies in rural catchments. The project involves monitoring at twelve sites over three years to determine the effect of different maintenance strategies on channel performance and the benefits to the adjacent land users and the NRA.

Overall Framework

There are close linkages between the above projects and a common thread running through them. The results of several of them have been brought together in a User Manual which provides a systematic guide to data collection and analysis for SoS, asset survey and prioritisation of capital and maintenance work. The Manual is modular in form to simplify updating.

Implementation

Research and development cannot exist in isolation from actual practice. The projects described above have set the direction for the task of improving the efficiency and effectiveness of operational management. The rewards for this effort are now being realised as these systems are adopted as common practice within the NRA.

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Improving Efficiency and Effectiveness in Flood Defence Operational Management

Review of R&D
(1990 - 1993)

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NRA

National Rivers Authority



The National Rivers Authority (NRA) is the Guardian of the Water Environment and has responsibilities for the management of rivers, coastal and other waters. As part of its function, it aims to provide defence against flooding from rivers and the sea.

In order to improve the efficiency and effectiveness of its activities, the NRA each year funds a substantial programme of Research and Development (R&D). This leaflet summarises the R&D projects carried out under Topic Area C4 - Operational Management - of the Flood Defence Commission.

Substantial resources are needed for Flood Defence which accounts for the highest expenditure of all the NRA functions. Half of the NRA's personnel, including many skilled operatives, are engaged on Flood Defence activities. It is essential that these activities are carried out economically, efficiently and effectively.

The initial focus of the R&D strategy has been to develop nationally consistent planning and management systems, the objective being to ensure that Flood Defence operations throughout the NRA are consistent, prioritised, adequately justified and cost effective.

Standards of Service (SoS)

This project developed a system for the definition and monitoring of SoS. SoS are defined as the degree to which customers should benefit from defence against flooding or provision of land drainage through capital works, maintenance works and operation of control structures. They define the desired outcome of the various works undertaken, this outcome being expressed in terms of an incidence of damage that is considered unacceptable for the land use in the areas at risk. There is of course no correct Standard of Service: it is a judgement based on consideration of policy criteria, public and professional perceptions and available resources.

NRA practice has, in the past, involved a significant degree of subjectivity in decision making and substantial variation in approach between Regions. This has made it difficult to justify the need for a particular level of resourcing as there was no clear link between resource allocation and the resultant SoS.

A unit termed the House Equivalent (HE), has been derived to standardise the recording of land use and facilitate objective comparison. One HE is defined as the average cost of flood damage to the average house. It is applied to all forms of land use through the use of standard multipliers.

The intensity of land use in a defined area can be assessed by totalling the HE values and dividing by the length of river or coastal frontage to which the area abuts. The range of values thus derived has been subdivided into five land use bands. From these, it is possible to define an incidence of damage due to flooding or impeded drainage that is unacceptable. This can be expressed in terms of target scores for each land use band with units of HEs per km per year.

The damage from historic or likely future flooding and impeded drainage can also be assessed and expressed in terms of HEs affected per km per year. This actual score indicates the current SoS.

Comparison of the actual score with the target score allows an assessment of whether the service being provided is appropriate for the current land use of that area. Where an inappropriate Standard of Service is identified, there may need to be enhancements or reductions in current activities. Clearly, in some cases, environmental considerations may take precedence over flood defence or land drainage interests and may constrain the provision of higher SoS. Once changes have been identified, it will then become necessary to assess priorities and programme the work required.

Prioritisation and Programming

The objective of this project was to develop an approach to prioritising and programming capital and maintenance work.

For capital works, the framework for the system developed is a matrix which compares work items (schemes) on one axis against a number of criteria on the other using a pre-defined scoring system. The principal criteria adopted for priority ranking are economic, social, urgency and purpose. Other, supplementary criteria (environment, heritage and implementation) are used as an aid to decision making and programming.

Schemes are scored using ratings developed for each of the principal criteria. These scores are then combined to develop an overall score which is used to prioritise the schemes. The supplementary criteria do not contribute to the score, but provide the decision maker with information which may affect the programming of the work. The result is a ranked list of schemes. In principle, the top ranked schemes would be expected to be implemented first. However, in practice, the implementation programme may need to be modified to take account of any constraints identified by the supplementary criteria.

For routine maintenance of channels, flood banks, etc, initial priority grouping is derived from land use band data (representing economic and social criteria) and a rating based on the SoS actual score. The SoS actual score can also be treated as a proxy benefit of flood defence and land drainage provision. Thus, knowing the cost of maintenance to achieve the current channel regime, a proxy benefit-cost ratio can be derived as a supplementary tool to refine the ranking order within priority groups and to ensure works are economically justified.