

1 Introduction

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AIM AND PURPOSE OF THE HANDBOOK

This Handbook is intended to be a stand-alone “How to do it” guide to assessing the benefits of flood and coastal erosion risk management (FCERM). When combined with knowledge of the costs of the plans and schemes required in that risk management, the user can assess the relationship between the benefits and the costs of investment decisions. This comparison should enable the users to identify those risk management plans and schemes which maximise the economic return to the nation (England and Wales) and therefore represent “best value for money” by being economically efficient.

The term ‘**scheme**’ here is not meant to imply an engineering scheme but includes both structural engineering ways to reduce flood or erosion risk and non-structural alternatives (flood warning; emergency response; land use planning; etc). The term ‘scheme’ is used hereafter for simplicity.

Since the 2005 MCM, there has been an important shift in the governance arrangements in England and Wales for FCERM, and hence in the appraisal of investment. This has meant that:

- Defra (2004, 2005) has been more focused on policy development, with *Making Space for Water*, and on appraisal policy in the form of its *Policy Statement on Appraisal of Flood and Coastal Erosion Risk Management* (Defra, 2020);
- The Environment Agency (EA) has taken over from Defra the role of providing detailed guidance on evaluating investment in FCERM schemes. The latest version of its *FCERM appraisal guidance* (FCERM-AG) can be found at <https://www.gov.uk/guidance/fcerm-appraisal-guidance>.

Reflecting these changes, the EA commissioned the Flood Hazard Research Centre at Middlesex University to update this Handbook and their MCM database. In Phase 1 (2009-10) the updating has been fairly straightforward, resulting in the **2010 edition** of the Handbook/CD. Phase 2 (2010 to 2013) has been more fundamental, including a complete revision of the non-residential flood damage data (Chapter 5), a new investigation of losses related to breaks in communication links and utility services (Chapter 6), and some significant modifications to the methods advocated to assess agricultural benefits (Chapter 9). Other changes have been the addition of data on park homes and damage to vehicles affected by flooding (Chapter 4). All these new data are now supplied through MCM-Online.

THIS HANDBOOK AND THE ‘MANUAL’

This Handbook will allow the user to carry out economic appraisal with the minimum of effort for the majority of flood and coastal erosion risk management schemes to be assessed. However, assessments are not always straightforward and therefore this Handbook is complemented by a much more extensive Manual, colloquially termed the *Multi-Coloured Manual* or, hereinafter, as the MCM or the Manual (Penning-Rowsell et al., 2013).

The Handbook is designed to be more straightforward to use than the Manual, because that also reports the research undertaken at Middlesex University on which this Handbook and the MCM are based. The Manual also discusses the kind of complications in the appraisal of flood risk management

options that can occur when the assessment is not straightforward, and provides suggestions and methods to apply in those circumstances.

Those using this Handbook should therefore appreciate the connection with the full MCM. To help this, the MCM chapters correspond with those in the Handbook and, additionally, the MCM provides further detail on the rationale behind our approaches described here. **Most values in this Handbook and its accompanying MCM-Online data sets have been updated using an appropriate and agreed annual average CPI value (from March 2023 - February 2024), unless otherwise indicated.**

HOW TO USE THE HANDBOOK

This Handbook is aimed at guiding those undertaking Flood and Coastal Erosion Risk Management (FCERM) project appraisals. It offers a step-by-step 'how-to do-it' commentary on the many types of benefits to be assessed, which are a feature of FCERM appraisal.

The Handbook seeks to develop and improve existing approaches, without compromising the principles that underpin current Defra (2020) and HM Treasury guidance (2022).

In the meantime, we believe that the majority (say 75%) of flood and coastal erosion risk management schemes can have their economic benefit assessments undertaken using the guidance provided here. In particular, the Handbook applies to:

- Those undertaking strategy studies who want a 'first cut' assessment of potential benefits;
- Those undertaking initial studies, who should use the methods described for this level of analysis, as covered herein;
- Those undertaking detailed scheme studies, who should generally use the more detailed methods described here and in the MCM.

Importantly, appraisers should always, in cases of doubt, seek guidance or refer to the over-riding policy framework in the Treasury 'Green Book' and the associated Defra and Environment Agency guidance (Table 1.1).

HANDBOOK STRUCTURE

The Handbook is structured to reflect three considerations:

1. The type of scheme, that is to say whether it is aimed at:
 - Flood risk management (**Chapters 2, 3, 4, 5 and 6**);
 - Delaying erosion at the coast (**Chapter 7**);
 - Providing an enhanced flooding and drainage regime for agriculture (**Chapter 9**).
2. In the case of flood alleviation, which economic sectors are under consideration, e.g.:
 - Residential and non-residential properties (**Chapters 4 and 5**);
 - Road disruption etc (**Chapter 6**);
 - Emergency services (**Chapter 6**).
3. Some chapters address both coastal erosion and flood risk management:
 - Recreational impacts (**Chapter 8**);
 - Environmental impacts (**Chapter 10**).

This structure is also followed in the MCM, thereby assisting cross-referencing.

HANDBOOK CONTENTS

The chapters of this Handbook each generally contain:

1. Step-by-step guidance on benefit assessments: “How to do it”
2. Data collection needs, methods and key issues
3. Methods on benefit calculation, including the relevant formulae, separated in some instances into strategic methods, initial and detailed appraisals
4. Guidance as to interpreting the results
5. Details of other relevant aspects to benefit assessment *not* discussed in this Handbook but outlined in the MCM

Because it is designed for ‘work-a-day’ situations, the Handbook includes no consideration of the complexity of the economic theory behind benefit-cost analysis which is dealt with in the MCM, Chapter 2 (Penning-Rowsell *et al.*, 2013), or of the theory of risk management. But the MCM-Online, of which this Handbook is now part, contains the MCM database on flood impacts and other relevant data.

Table 1.1: *Sources of guidance on appraising flood and coastal erosion risk management schemes and plans*

Source reference	Document	Purpose
HM Treasury 2022	The ‘Green Book’ ¹	Identifies the preferred approach to public sector investment appraisal
Environment Agency 2022	Flood and Coastal Erosion Risk Management appraisal guidance (FCERM-AG)	How a project appraisal and CBA should be completed for flood and coastal erosion risk management projects
Environment Agency 2023	Partnership funding supporting documents and Transition arrangements	Provides guidance for setting up partnerships for FCERM
Flood Hazard Research Centre and the Environment Agency 2013	The new ‘Multi-Coloured Manual’ (MCM)	Gives details of relevant research and detailed guidance on benefit assessment methods and data – some of the methodologies and data have been updated since its publication. Look to the most recent version of the Handbook for details.
http://www.mcm-online.co.uk http://www.fhrc.mdx.ac.uk	Middlesex University FHRC MCM-Online	Provides data and other information (including questionnaires) for the support of flood and coastal erosion risk management project appraisals

¹ From 1 November 2023, Ministers of the Crown have a legal duty to have due regard to the environmental principles policy statement when making policy. Where the duty applies, it is relevant for appraisals and evaluations that are conducted in line with the Green Book. This duty will be reflected in the Green Book when the document is next updated. Further information can also be found in the guidance on Enabling a Natural Capital Approach. The Green Book also contains details of the other statutory duties with which appraisals must comply.

KEY ACTIVITIES IN ASSESSMENTS

This Handbook is intended to allow appraisals of flood and coastal erosion risk management schemes to be undertaken with the minimum of effort. One important dimension of this is judging the time and resources allocated to those parts of the benefit assessment process that are most important. This importance is gauged in two ways:

- Concentrating on those components of total benefits which are the largest compared with the effort expended on assessing them (e.g. non-residential property where there is a mix of non-residential and residential property at risk, because non-residential damage per unit area is generally far higher than residential damages);
- Ensuring that the data on which the benefit assessment depends is most accurate (or least inaccurate) where it has most effect on the final results (e.g. for coastal erosion, making sure projected erosion rates are as soundly based as possible; in the flooding field ensuring flood probabilities and depths are accurately assessed).

Applying these two principles will be different for different scheme types and in different economic sectors, so that each chapter of this Handbook addresses this issue in its own subject area.

In general, applying such judgement will mean ignoring sources of small amounts of benefit (e.g. road traffic disruption on minor roads) and accepting that some data will be less accurate than others. Sensitivity analysis can be used to test how the decisions that flow from these principles affect particular appraisals.

THE POLICY CONTEXT

This Handbook and the MCM have been designed to support the Defra/ODPM/HM Treasury policy on “Making Space for Water” (Defra, 2004; 2005, 2020). This stresses holistic policies and integrated appraisal, commensurate with sustainable development.

Neither the Handbook nor the MCM explicitly includes the appraisal of urban drainage but could be used in this field. Both recognise the current moves away from narrow benefit-cost analysis (BCA) towards Multi-Criteria Analysis (MCA): see Chapter 10.

This Handbook aligns with the latest Treasury ‘Green Book’ guidance² on investment in public sector projects including, for example, the use of weightings to assess and correct for distributional impacts, optimism bias considerations when assessing project costs, and variable discount rates for projects with long lives.

They also build on Defra’s series of Project Appraisal Guidance series (e.g. PAG3) and their replacement by the Environment Agency’s Flood and Coastal Erosion Risk Management Appraisal Guidance (FCERM-AG). ‘Making Space for Water’ (Defra, 2005) has led to updating Defra’s guidance, separating policy guidelines/statements issued by Defra from Environment Agency best practice implementation guidance.

² Although all efforts have been made to align with current English Government policy, it is important for users of these data and methodologies to check the relevant national appraisal policy guidelines for any recent updates.

In summary, supplementary guidance now comprises:

- Defra (2020): 'Flood and coastal erosion risk management: Policy Statement';
- Environment Agency (2022): the 'Flood and Coastal Erosion Risk Management Appraisal Guidance (FCERM-AG).

In this respect appraisers of FCERM schemes should be aware of the types of risk management expenditure that Defra currently funds, not least because some benefits might not be supported in this way. Those benefits (e.g. major recreational benefits) might currently need the support of other funding streams where they are not fundamental to the relevant scheme.

Notwithstanding the above, the contents of both the Handbook and the Manual remain the responsibility of Middlesex University (FHRC) and the Environment Agency.

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