

Research and Development

Annual/Interim Project Report - Financial Year

2002/2003

(Not to be used for LINK projects)

Section 1 : Project details

1. (a) MAFF Project Code	FD2302		
(b) Project Title	Risk and uncertainty review		
(c) Project start date	24/11/2000	(d) Project end date	30/10/2002
(e) MAFF Project Officer	Mr Peter Allen-Williams		
(f) Name and address of contractor	HR Wallingford Ltd Howbery Park Wallingford Oxon Postcode OX10 8BA		
(g) Contractor's Project Officer	Dr S W Huntington		

Section 2 : Scientific objectives

2. Please list the scientific objectives as set out in CSG 7 (ROAME B). If necessary these can be expressed in an abbreviated form. Indicate where amendments have been agreed with the MAFF Project Officer, giving the date of amendment.

In November 2000, Defra commissioned HR Wallingford under the Theme 5 *Risk Evaluation and Understanding of Uncertainty*, Theme Advisory Group for the joint Defra and Environment Agency research programme to undertake two studies:

- **Risk and uncertainty review** (Commissioned under the Defra/ Environment Agency Risk Evaluation and Understanding of Uncertainty (REUU), sub theme 5.1) – the subject of this CSG 12
- **Performance in the management and design of defences** (Commissioned under the Defra/ Environment Agency Performance Evaluation (REUU), sub theme 5.4).

As the two projects progressed it became clear that the link between understanding the issues of performance and risk was inextricable and the two projects were merged into a single project titled *Risk, performance and uncertainty in flood and coastal defence – A review* to be completed in two volumes: *Volume 1 – A Review* and *Volume 2 – A Research Programme*.

The objectives of the combined study were revised and agreed to be as follows:

Volume 1 – Risk, performance and uncertainty in flood and coastal defence – A Review

Target audience: The Volume 1 report is aimed at the broad flood and coastal defence community. It was recognised that the guide needs to provide the terminology and principles to enable a consistent approach to be adopted in all Theme areas of the joint Defra/ Environment Agency research programme. Therefore, the guide should also be an aid to researchers.

Objectives: The key objectives of the combined Volume 1 are to provide:

- A glossary of consistent terminology relating to performance and risk in order to promote the uptake of risk-based techniques within the flood and coastal defence community.
- A review of existing decision-making, and risk tools and techniques.
- A high-level framework for addressing “performance” and “risk” issues in the design and management of flood and coastal defences.
- A discussion of the findings of on-going and recently completed projects of relevance to the flood and coastal defence community to promote best practice.

Volume 2 - Risk and performance in flood and coastal defence – A forward R&D Plan

Target audience: The Volume 2 report is aimed at the research managers within the Agency and Defra and across the six Thematic areas.

Objectives: The objective of Volume 2 is to set out recent research projects and initiatives funded by a range of funders relevant to the sub-themes 5.1 and 5.4 and develop a programme of research with timescales, outline briefs and topic descriptions for 2002 to 2005 based on the knowledge gaps and user requirements identified in Volume 1.

As the project progressed, a series of workshops were agreed to be given to present the results to different interested groups within the industry.

Section 3 : Summary of progress

3. Please summarise, in layperson's terms, scientific progress since the last report/start of the project and how this relates to policy objectives set out in ROAME A. Please provide information on actual results where possible rather than merely a description of activities.

The review of available methods and recent advances in risk techniques and their application both in the UK and Europe was undertaken through literature review and discussions. Based on this review, a guidance report was produced on consistent terminology of risk, available methodologies and their appropriateness (including considerations of data availability and budget). This report constitutes the Volume 1 report outlined above, delivered in final form in Summer 2002.

In association with the Theme Leader, a strategy for facilitating the implementation of risk and uncertainty in all appropriate Themes and Sub-Themes was developed and discussed in a draft Volume 2. This was extended to provide a suggested outline programme of R&D for the 'Risk' Theme that reflects the need gradually to raise industry awareness of risk and uncertainty techniques by focussing the early R&D programme on key difficulties encountered by practitioners at present. A longer-term 5 year programme of work was also developed that reflects the anticipated increase in industry's confidence in the application of risk and uncertainty techniques and their growing acceptance of risk concepts. This was delivered in final form in Summer 2002.

A series of presentations and workshops were held to discuss and present the results to different groups within the industry. A final workshop remains to be held when the date and detailed agenda are agreed with the client.

Section 4 : Amendments to project

4. Are the current scientific objectives appropriate for the remainder of this project?

YES

If **NO**, explain the reasons for any changes giving the financial, staff and time implications.

Contractors cannot alter scientific objectives without the agreement of the MAFF Project Officer

Section 5 : Progress in relation to targets

5. (a) List the primary milestones for the year/period under report as on CSG 7 (ROAME B).

It is the responsibility of the contractor to check fully that ALL primary milestones have been met and to provide a detailed explanation if this has not proved possible

Milestones		Target date	Milestones met?	
Number	Title		in full	on time
	Issue final versions of Volume 1 and Volume 2	31/10/2002	YES	NO

Section 5 : Progress in relation to targets (continued)

5. (b) Do the remaining primary milestones look realistic?

YES

(c) If you have answered **NO** at (a) or (b), please provide an explanation.

A number of reasons why the project has not been delivered on time:

The project was commissioned later than originally expected.

The discussions involved in combining two projects into a single deliverable, was necessarily detailed to ensure maximum usefulness of the final outputs.

The level of interest in the project and its role as a defining study meant that discussion and consultation were more extensive than expected with the need for extended review.

The extra time spent has delivered a better product than would have been possible within the original schedule.

The project has still not been formally closed, as there is one remaining workshop to be held with invitees from industry, when a date is set by the client.

Section 6 : Project costs and staffing input

6. In this reporting period, what was:

(a) the approved expenditure?

£24,000

(b) the actual expenditure?

£24,000

(c) * the approved staff input?

0.300

(d) * the actual staff input?

0.300

* staff years of direct science effort

Section 7 : Publications and other outputs

7. (a) Please give details of any outputs, e.g. published papers/presentations during this reporting period.

Reports

Volume 1

- Risk, performance and uncertainty – A review. HR Wallingford SR 587, issued in final form Summer 2002.

Volume 2

- Risk, performance and uncertainty – A forward R&D plan, issued in final form Summer 2002

Articles and papers

- Risk, performance and uncertainty – Article in the DEFRA newsletter
- Towards risk-based flood hazard management in the UK – Paper Proceedings of the ICE – Special Edition May 2002 Vol 150
- Risk, performance and uncertainty – A defining review – Paper at Defra Conference 2002

Workshops

- Workshop with Agency Operation and maintenance teams
- Workshop with Agency Flood warning teams
- Workshop (industry invites) date to be agreed, at HR Wallingford

Presentations

Various presentation to aim uptake of common terminology and approaches, including:

- Presentation to 'River Conveyance' project team
- Presentation to 'Overtopping' Project team
- Presentation to 'Afflux' Project Team

Section 7 : Publications and other outputs (continued)

7. (b) Have oppportunities for exploiting Intellectual Property arising out of this work been identified ?
If you have answered **YES**, please give details.

NO

- (c) Has any other action been taken to initiate Technology Transfer?
If you have answered **YES**, please give details.

YES

Workshop (industry invites) date to be agreed, at HR Wallingford.

Section 8 : Future work

8. Please comment briefly on any new scientific opportunities which may arise from the project.

Risk-based approaches provide a subtle and adaptable framework for supporting decision-makers in addressing difficulties and uncertainties. The aim is not to replace the judgement and expertise of decision-makers by prescribing preferred options, but to make sense of some of the complexities and uncertainties outlined above, in appropriate ways, that reflect the needs of specific decision problems. The concept of appropriateness (finding the balance between uninformed decision-making and paralysis by analysis, depending on the circumstances and consequences of any particular decision) is well established in risk management. Within flood management, this concept is will need to be translated into a tiered risk assessment methodology.

Such an approach supports more integrated risk management and is founded on a number of principles:

1. *A broad definition of the flooding and erosion system and scope of impacts.* (Where arbitrary sub-division of the flooding system, for example due to geographical boundaries or administrative divisions, is avoided.)
2. *Continuous management of system performance.* (Where consideration of one or a few ‘design events’ is replaced by consideration of a whole range of system behaviours, and temporal and spatial interactions in system performance are accounted for.)
3. *Tiered analysis and decision-making.* (Where the risk management process cascades from high-level policy decisions, based on outline analysis, to detailed designs and projects, which require more detailed analysis.)
4. *Consideration of the widest possible set of management actions that may have some impact on flood or erosion risk.* (Where measures to reduce the probability and measures to reduce consequence are both considered.)
5. *Development of integrated strategies that combine a range of flood and erosion risk management actions and implements them in a programmed way.* (Where management strategies are developed following consideration of both effectiveness, in terms of risk reduction, and cost with co-ordinated activities across stakeholder organisations.)
6. *Evolving with and influencing the future policy framework.* (Where future policy is influenced by changing management techniques.)

As well as reviewing the use of risk, uncertainty and performance in ‘everyday’ decisions, this report also therefore points the way to the development of more integrated risk management approaches.

Section 9 : Declaration

9. I declare that the information I have given is correct to the best of my knowledge and belief.
I understand that the information contained in this form may be held on a computer system.

Signature		Name	Paul Sayers
Date	11/06/2003	Position in Organisation	Group Manager