



Evaluating MDSF2 for flood risk management strategies

Project Summary SC120062/S

The Environment Agency has evaluated new software to support flood risk management (FRM) catchment strategy development, and compared its performance to traditional modelling approaches.

The Modelling and Decision Support Framework (MDSF2) was created by the Environment Agency to assess flood risk for a wide range of scenarios and flood risk management measures. The software is already used by the Environment Agency to create the national flood risk maps. However, MDSF2 could also be used as a decision support tool by providing evidence on the benefits of applying different strategies in a catchment.

MDSF2 is different from traditional detailed 2D modelling approaches because it uses a simplified flood spreading model. This means that it can explore a large number of scenarios very quickly, making it ideal for probabilistic risk assessments.

The Environment Agency chose four pilot sites to evaluate MDSF2. In each pilot site a strategy had recently been completed using traditional modelling. The pilot sites were Deben Estuary, Emsworth to East Head, Lower Aire and Taw-Torridge Estuary. The project also reviewed lessons learnt from previous work using MDSF2 in the Thames Estuary 2100 and Humber Estuary strategies.

The study shows that MDSF2 has the potential to help users understand the drivers of flood risk and to explore the impact of alternative strategies more efficiently and consistently than traditional modelling.

In particular the study explored three questions:

1. Can MDSF2 be used within the time and resource constraints typical for strategy development?

Once the MDSF2 model is set up, it is quicker at assessing options and sensitivity than traditional approaches. Recent work by the Environment Agency has created ready made MDSF2 models for the whole of England. For many strategies, this means jumping straight to analysis stage with only minimal model setup time. The overall cost saving for a suitable strategy could be 20% or more.

However, creating a MDSF2 model from scratch can take longer than setting up a traditional model. So if, for any reason, the ready made MDSF2 model was unsuitable then the cost savings would be marginal.

The efficiency with which MDSF2 can be used is highly dependent upon the experience of the user. For the experienced user, MDSF2 requires little more effort than that needed to develop a well-structured traditional analysis. However, less experienced users would require intensive guidance and support to successfully use MDSF2 within the development of an FRM strategy.

2. Are the results from MDSF2 accurate enough to make robust strategic choices?

The study reviewed whether the decisions made at a strategic level would be different when using MDSF2 compared to traditional modelling. In most cases, the end decision was no different using either method. Where MDSF2 suggested a different decision, the project consulted local experts. In these cases local experts confirmed that there was a justifiable reason for the difference. This shows that the accuracy of MDSF2 compares satisfactorily against traditional modelling and local knowledge.

3. Does MDSF2 provide added value compared to traditional modelling?

The study identified two key benefits of using MDSF2 over traditional modelling

1. The presentation of flood risk and the ability to attribute risk to individual flood defences. These features offer the decision maker useful insights into the type of strategic options that should be explored leading to better, more efficient strategies.
2. The structured scenario management facility. Structured consideration of the flood system supports clear and transparent thinking, reducing the likelihood of errors and leading to a more streamlined process.

Suggested implementation

MDSF2 could be used to support specific types of FRM strategies now, as long as users understand the current limitations and apply known workarounds. The situations where MDSF2 is currently best suited are for estuarine or coastal flood risk where properties or agriculture are the dominant receptor type.

Only limited new functionality should be added to MDSF2

MDSF2 should focus on its core functionality of calculating and presenting risk, while ensuring that its outcomes can be used as input for other tools as needed.

MDSF2 should be rolled out – but slowly and with specific improvements

The study recommends phases of improvement linked to increasingly wider levels of use. The phased approach means benefits can be reviewed after each stage, allowing the implementation to be stopped or changed if needed. The specific improvements and phases are:

1. Key short-term improvements for use of MDSF2 by a small group of expert users. This phase includes:
 - advice for installing and running MDSF2 on platforms other than the Central Modelling Platform;
 - a better/easier representation of strategic risks through incorporating present value damage capping;
 - a revised better approach to calculation of agricultural damages;
 - present value damages provided at the flood area level.
2. In the medium term, extend the use of MDSF2 to a wider group of internal and external users. This phase includes better and more relevant technical support, and improved features for option development and transparency.

In the medium and long term MDSF2 should be improved to maximise the potential for reuse of data for a wide range of uses. This stage includes closer linking of MDSF2 to relevant databases and systems but could lead to many cost savings for the Environment Agency.

This summary relates to information from the following project:

Report: SC120062/R

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