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Definitions, Targets & Reporting for FCRM Outcome Measures 1,2 and 3

This document explains the definitions, targets and reporting arrangements for Defra Outcome Measures 1, 2 and 3.

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1 Introduction

What's this document about?

This document explains the definitions, targets and reporting arrangements for the following Defra Outcome Measures for Flood and Coastal Erosion Risk Management (FCERM):

- OM1 Economic Benefits;
 - OM2 Households at Risk;
 - OM3 Households in Deprived Areas.
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Who does this apply to?

This document is of general interest to all external bodies involved in managing and delivering FCERM projects and programmes.

The following groups have a specific need to use this document when appraising, designing and delivering FCERM projects and FCERM programme preparation, monitoring and reporting:

- Local Authorities
- Regional Flood Defence Committees
- Internal Drainage Boards
- Consultants

Measure references NOTE

Three or four figure measure references (e.g. 912, 913T) are for Environment Agency Data Entry System (DES) input which may relate to the overall target figure or to underlying figures used in a formula. Whilst DES references are not directly relevant to external bodies, they are included in this document to clarify calculations.

Background

Defra Outcome Measures (OM) and targets have been agreed as part of the Comprehensive Spending Review 2007 settlement which covers the period from April 2008 to the end of March 2011.

In total there are nine targets and this document provides detailed guidance on the following:

- Outcome Measure 1 – Economic Benefits
- Outcome Measure 2 – Households at risk
- Outcome Measure 3 – Deprived Households at risk

These measures and their targets apply to both flood and coastal erosion risk management delivered through capital Flood Defence Grant in Aid (FDGiA).

Purpose of this document

This document explains which capital investments contribute to the Outcome Measures and how these are calculated. While the calculation is often the same for both flood risk management and coastal erosion risk management projects any differences are explained where appropriate.

Finally the document summarises the roles and responsibilities of the various parties involved in the assessment and reporting of contributions to the targets.

2 OM Definitions, Targets and Reporting

Measure references

Three or four figure measure references (e.g. 912, 913T) are for Environment Agency Data Entry System (DES) input which may relate to the overall target figure or to underlying figures used in a formula. **OM...** references in bold (e.g. **OM1**) are to the overall targets agreed with Defra. Both references are provided in the definitions that follow. Whilst DES references are not directly relevant to external bodies, they are included in this document to clarify calculations.

OM1 Economic Benefits

Definition

Average benefit cost ratio across the capital programme based upon the present value whole life costs and benefits of projects delivering in the CSR07 period.

Target

5 to 1 average benefit cost ratio across the capital programme with all projects having a benefit cost ratio robustly greater than 1.

Reported Data

912B: Programme whole life Present Value Benefits (Prog.PVb)

912C: Programme whole life Present Value Costs (Prog.PVc)

912: Benefit: Cost ratio = (Prog.PVb / PVc) (**OM1**)

OM2 Households at Risk

References 913B and 914B represent total delivery against OM2 and OM2b by all operating authorities, including Environment Agency, Local Authority and Internal Drainage Board schemes, for both flood and coastal erosion. 913T represents the total number of households with reduced probability of flooding. The distinction between 913T and the Outcome Measures is set out in section 6. All information will be input at area level as totals for each type of operating authority. Tables 1 and 2 below demonstrate the new arrangements.

Table 1 Flood Risk Management References

	All Operating Authorities	Defra EA Schemes	Local Authority [FL & CE] schemes	IDB Schemes			
OM2 Number of households moved out of any flood probability category to a lower category	913B	=	913D	+	913F	+	913H
OM2b Number of households moved from the very significant or significant flood probability category to the moderate or low category	914B	=	914D	+	914F	+	914H
Number of households with reduced probability of flooding	913T	=	913V	+	913X	+	913Z

Table 2 Coastal Erosion Risk Management References

	All Operating Authorities	Defra EA Schemes	Local Authority [FL & CE] schemes	IDB			
OM2 Number of households moved out of any coastal erosion probability category to a lower category	913B	=	913D	+	913F	+	913H
OM2b Number of households moved from the short or short/medium term coastal erosion probability category to the medium or long term category	914B	=	914D	+	914F	+	914H
Number of households with reduced probability of coastal erosion	913T	=	913V	+	913X	+	913Z

OM3 Deprived Households at Risk

Definition

Number of households for which the probability of flooding or coastal erosion is reduced from significant or greater through projects benefiting the most deprived 20% of areas.

Target

9,000 of the 45,000 households referred to in OM2

Reported Data

Flood Risk Management:

- 915B: Number of households in deprived areas for which the probability of flooding is reduced from the very significant or significant flood probability category to the moderate or low category (OM3)

Coastal Erosion Risk Management:

- 915B: Number of households in deprived areas for which the probability of coastal erosion is reduced from the short or short/medium term probability category to the medium or long term category (OM3)
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3 Which projects contribute towards OM targets?

Projects that contribute

Projects that contribute towards the Defra Outcome Measures 1,2 and 3 must be funded by *capital* Flood Defence Grant in Aid (capital FDGiA) and deliver benefits during the period from 1st April 2008 to the 31st March 2011.

In addition projects must provide either a discrete step reduction in probability of flood or coastal erosion risk (Improved Defences project) or the outcome avoids a significant increase in probability of flood or coastal erosion risk (Capital Maintenance/Replacement project). In the FCERM Medium Term Plan these projects are designated as either Type DEF or Type CM.

Projects that don't contribute

DEF or CM Type projects delivered using alternative sources of capital funds such as FRM Local Levy do not contribute towards the formal OM targets. However their outcomes should be quantified in the same way as they will be used to demonstrate benefits from wider investments in FCERM. Projects delivered using Revenue based expenditure do not contribute towards the current OM targets.

Other projects and activities, for example emergency response, asset maintenance, planning and development control, catchment management planning are all part of effective flood and coastal erosion risk management, but they do not contribute to OMs 1, 2 or 3.

4 Principles and key definitions

Calculation methods

The following apply to the calculation methods for OMs 1, 2 & 3:

- **Timing** – A contribution to an OM only counts towards the target on completion of the works and when the flood or erosion risk is reduced recognising that this may be prior to overall completion of the whole project, that is before surface finishes are complete or outstanding compensation issues etc.
- **Double-counting** – Double-counting must generally be avoided and households can only be counted once in the CSR period.

The following apply to OM's 2 and 3:

- **Definition of Households** – Households qualifying against the target are those that would have incurred direct economic damages as a consequence of flooding or coastal erosion had the works not been undertaken but includes those households in multiple dwelling buildings where they are above those directly affected.
- **Risk Probability Categories** – Table 3 below gives the risk probability categories for both flood and coastal erosion risk management.

The following applies to OM3:

Definition of Deprived Households – a household which falls in the lowest 20% of Super Output Areas (SOA) when ranked by Indices of Multiple Deprivation. There are 32,482 SOAs where the area ranked 1 is the most deprived. Households qualifying for this measure are those that fall in the Areas ranked 1 to 6,496

Table 3 Risk Probability Categories for OM2 and OM3

Flood Risk Management		Coastal Erosion Risk Management	
Very Significant	>5%	Short Term	<10 years
Significant	<=5% but >1.33%	Short/Med. Term	10 - 20 years
Moderate	<=1.33% but >0.5%	Medium Term	20 - 50 years
Low	<=0.5%	Long Term	50 – 200 years

Identifying Households in Deprived Areas

As explained above households that fall in the lowest 20% of Super Output Areas (SOA) when ranked by Indices of Multiple Deprivation ie Areas ranked 1 to 6,496, contribute to OM3.

The following arrangements will enable practitioners to identify whether any Deprived Areas, or parts thereof, coincide with the areas benefiting from their FCERM project. A comparison of the two areas will allow practitioners to identify the number of households that fall in both areas and thus contribute towards OM3.

Select this link to take you to the [Super Output Areas and Deprivation](#) web page from the Office of National Statistics.

- On this page, enter post code, select type of area as Super Output Area and tick “Search” button.
- Click on heading “Indices of Deprivation and Classification (27 data sets)” (11 on list).
- Click on heading “Indices of Deprivation 2007 for Super Output Areas (2007)” (17 on list).
- Look up ranking under “Indices of Deprivation 2007 for Super Output Areas, Rank of IMD Score (Areas)” (second on list).
- Check all Super Output Areas within Project Benefit Area.

Alternatively if you already know the SOAs in the benefit area of your project then this [link](#) gives you a zipped list of the 2007 indices for all 32,482 SOAs.

These two links enable you to look up the [geographical SOAs](#) and to [order CDs](#) if required.

Apportioning outcomes across a discrete compartment or frontage

When a project delivers a step reduction in flood or coastal erosion risk to the whole of a discrete frontage or flood compartment then contributions to Outcome Measures should be based directly on the whole benefit area.

Typically such projects would be of the ‘Improved Defences’ type and include examples such as:

- A new defence is constructed reducing the probability of flood risk in the whole compartment from 25% to 1%;
- New erosion protection is provided reducing risk of cliff failure to the frontage as a whole.

Replacing components or sections

Some works are required to replace worn out components or specific sections of existing FCRM assets. Such works would normally flow from an approved strategy that provided a justified programme for the various interventions over the life of the strategy. In these cases it would not normally be appropriate for contributions to the Outcome Measures to be directly based upon the whole benefit area as this could lead to significant double-counting in the short term and significant overstatement of outcomes from any programme of investment.

Typical projects would be of the 'Capital Maintenance' type and include examples such as:

- Replacement of worn out revetment over a significant section of a sea wall
- Replacing discrete sections of a river or tidal wall as each reaches the end of its life
- Major refurbishment of parts of a sluice that is only one component of a much larger flood defence to an area

For these ongoing programmes of work contributions will be determined on a pro rata basis as follows:

Step 1: Determine the contributions to OMs 1, 2 and 3 for the whole benefit area

Step 2: For each project in the programme multiply the contribution from step 1 by:

$$\frac{\text{Project Capital cost (£)}}{\text{PV Whole life CAPITAL cost (£)}}$$

Note: Costs should be gross of any contributions.

Assessing probability of flooding for 'Capital Maintenance' projects

The rationale for replacing worn out components or specific sections of existing FCRM assets is that the asset has deteriorated such that it falls short of its design Standard of Service, and as a result the probability of flooding has increased.

Rather than attempt to calculate the effective probability of flooding based on asset deterioration, it should be assumed that capital maintenance projects move households by **one** category back to the probability category inferred from the design standard (i.e. from 'moderate' to 'low' or 'significant' to 'moderate'.)

5 Data requirements

OM1

The data requirements to calculate the contribution a project makes to OM1 at programme level simply uses the whole life present value benefits (PVb) and costs (PVc) from the individual projects. These are readily available from the projects appraisal.

The values provided in the appraisal should be for the most timely investment such as replacement at end of current asset life. If the timing of a project is changed, that is a project is brought forward to achieve delivery efficiency or delayed to better integrate with other projects, then the PVb and PVc may need to be modified by updating the discount period to avoid any significant adverse impact on reporting contributions.

OM 2 and 3

For OMs 2 and 3 it is necessary for projects to have specific data relating to how the probability category of flooding or coastal erosion risk has changed as a result of the FDGiA funded project and how many households are involved including separately identifying those in deprived areas.

This data also flows from the projects appraisal where overall numbers of households, knowledge of those in deprived areas and damage probability data are key components of the economic assessment.

Similar approaches are taken to calculating the contributions to OM2 and 3 for both flood risk management and coastal erosion risk management projects. However as the probability category descriptions are different it is necessary to present the data requirements separately. Tables are provided below which assist the presentation of underlying data and explanation of the associated formula. OM contributions are calculated by adding or subtracting the data in the tables using the formula provided.

Table 4 Data Requirements for OM2 and OM3

		Risk Probability Category Without project				
		Very Significant >5%	Significant <=5% but >1.3%	Moderate <=1.3% but >0.5%	Low <=0.5%	
		Short Term Within next 10 years	Short / Med Term 10 - 20 years	Medium Term 20 – 50 years	Long Term 50-200 years	
Flood Risk Management	Coastal Erosion Risk Management					
Risk Probability Category With project	Very Significant >5%	Short Term Within next 10 years	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households
	Significant <=5% but >1.3%	Short/Med Term 10 - 20 years	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households
	Moderate <=1.3% but >0.5%	Medium Term 20 – 50 years	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households
	Low <=0.5%	Long Term 50-200 years	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households	Total Households nr Nr Deprived Households

Note – project circumstances may mean that a zero entry is made in some cells as appropriate.

6 Calculating Contributions

OM1 Economic Benefits

The calculation of overall programme benefit/cost ratio will be undertaken centrally using the following formula:

912: Programme Benefit: Cost ratio = (Prog.PVb / Prog.PVc) (OM1)

Where:

- 912B: (Prog.PVb) = Programme whole life Present Value Benefit
Project 1 PVb + Project 2 PVb + Project 3 PVb
- 912C: (Prog.PVc) = Programme whole life Present Value Cost
Project 1 PVC + Project 2 PVC + Project 3 PVC.....

For Outcome Measure purposes projects will only be required to identify their present value benefits and costs. The unit for all Present Value calculations is £k

OM2 Households at Risk

Reference should be made to data for 'Total number of households' in Table 4.

913T: Number of households with reduced probability of flood or coastal erosion risk

- Blue cells + Yellow cell + Red cells + Pink cell – Green cells

913B: Number of households moved out of any Risk Probability Category to a lower Risk Probability Category (**OM2**)

- Yellow cell + Red cells + Pink cell

For Flood Risk Management:

914B: Number of households moved from the very significant or significant flood probability category to the moderate or low category (**OM2b**)

- Red cells

For Coastal Erosion Risk Management:

914B: Number of households moved from the Short or Short/Medium Term coastal erosion probability category to the Medium or Long Term category (**OM2b**)

- Red cells
-

OM3 Deprived Households at Risk

Reference should be made to data for 'Number of deprived households' in Table 4.

For Flood Risk Management:

915B: Number of deprived households moved from the very significant or significant flood probability category to the moderate or low category (**OM3**)

- Red cells

For Coastal Erosion Risk Management:

915B: Number of deprived households moved from the Short or Short/Medium Term coastal erosion probability category to the Medium or Long Term (**OM3**)

- Red cells
-

7 Responsibilities for assessing and Reporting OMs

Non- Environment Agency Projects

OA's must submit the following as part of the MTP Forward Planning exercise:

- Best estimates of forecast OM contributions and timings for each project

OA's must submit the following data as part of their FDGiA Financial Monitoring updates:

- Periodic update to or confirmation of OMs forecasts
- Actual OM contributions when the projects is substantially complete

Prior to the completion of a full appraisal (PAR or Strategy) practitioners should use their best available information to forecast the data needed for OMs. Once the project appraisal stage is complete it should generally be the case that data reported for the Outcome Measures, and used in the Project Ranking and Programme Moderation processes, links back to the projects Project Appraisal Report (PAR) or Strategy.

If changes occur during subsequent project design and construction then an audit trail should be kept by the project that explains any variance against the original forecast. Significant changes may require a project to submit a Variation Report (non Environment Agency projects) or Form G (Environment Agency projects). The submission thresholds for these are provided for Environment Agency projects in the Project Management Procedures and for non Environment Agency projects details are provided on the FDGiA internet page.

8 Worked Examples

Example 1 Project to deliver a step reduction in risk in a discrete compartment

While based upon a flood risk scenario this example could equally apply to a project delivering a step reduction in coastal erosion risk through the provision of new erosion controls.

A FRM project delivers direct economic benefits to 800 households in a single flood compartment. Before the project flood risk varied with the onset of flood damage occurring with a 10% probability. The project will provide a new defence to a 1% SoP in year 1. The distribution of households in the flood risk area is shown in Table 3 below.

The project has whole life Present Value Benefits of £37,600k and whole life Present Value Costs of £6,450k giving a project B:C ratio of 5.83.

Works start date 25/05/09, that is financial year 2009/10

Works substantially complete (watertight) 18/12/09, that is financial year 2009/10

Works final completion 16/06/10, that is financial year 2010/11

Table 5 **Example 1**
Data Requirements for OM2 & 3

		Risk Probability Category without Project			
		Very Significant >5%	Significant <=5% but >1.3%	Moderate <=1.3% but >0.5%	Low <=0.5%
Risk Probability Category WITH project	Very Significant >5%	0	0	0	0
	Significant <=5% but >1.3%	0	0	0	0
	Moderate <=1.3% but >0.5%	140 Total 65 Deprived	580 Total 140 Deprived	80 0 Deprived	0
	Low <=0.5%	0	0	0	0

Calculations: Example 1

OM1 Economic Benefits

$$912B = PVb = £37,600k$$

$$912C = PVc = £6,450k$$

OM2 Households at Risk

$$\begin{aligned} 913T &= \text{Number of households with reduced probability of flooding} \\ &= \text{Blue cells} + \text{Yellow cell} + \text{Red cells} + \text{Pink cell} - \text{Green cells} \\ &= 80 + 0 + (140+580) + 0 - 0 \\ &= \underline{800 \text{ households}} \end{aligned}$$

$$\begin{aligned} 913B &= \text{Number of households moved out of any flood probability category to a lower category (OM2)} \\ &= \text{Yellow cell} + \text{Red cells} + \text{Pink cell} \\ &= 0 + 0 + (140+580) + 0 \\ &= \underline{720 \text{ households}} \end{aligned}$$

$$\begin{aligned} 914B &= \text{Number of households moved from the very significant or significant flood probability category to the moderate or low category (OM2b)} \\ &= \text{Red cells} \\ &= 140 + 580 \\ &= \underline{720 \text{ households}} \end{aligned}$$

915 Deprived Households

$$\begin{aligned} &= \text{Number of deprived households moved from the very significant or significant flood probability category to the moderate or low category (OM3)} \\ &= \text{Red cells} \\ &= 65 + 140 \\ &= \underline{205 \text{ households}} \end{aligned}$$

Timing of Contribution

The households will realise the benefit of the new defence when the works are watertight and substantially complete on 18/12/09. Thus the project contributes to the Outcome Measures in financial year 2009/10.

Reported Data

912B	PVb = £37,600k
912C	PVc = £6,450k
913T	800 households
913B / OM2	720 households
914B / OM2b	720 households
915B / OM3	205 households
Timing of contributions	18/11/09

Example 2

Timing

All details are the same as Example 1 but the project timings are as follows:

- Works start date 25/10/10, that is financial year 2010/11
- Works substantially complete (watertight) 18/06/11, that is financial year 2011/12
- Works final completion 16/10/11, that is financial year 2011/12

While delivering significant benefits to households and businesses in the flood risk area this project **will not** contribute to the CSR07 OM targets as substantial completion is after 31/03/2011 and beyond the CSR07 period. Outcomes should still be calculated in accordance with this document but will contribute to performance measures in the next CSR period.

Example 3

Projects within an ongoing Programme of Works

A hold the line policy is being implemented as part of an approved Strategy for a coastal frontage. The existing sea wall will ultimately be replaced under the strategy, the timing of replacement for different sections of the wall is largely based upon existing condition and residual life.

The overall Strategy for the frontage has whole life Present Value Benefits of £124,800k and whole life Present Value Costs of £18,620k giving a project B:C ratio of 6.7. The whole life present value *capital* costs are £14,900k. The distribution of households in the risk area is shown in Table 6 below.

Works to two discrete sections of sea wall will be completed over the current 3-year CSR period with substantial completion on 25/03/2009 and 01/02/2011 respectively.

Table 6

Example 3

Data Requirements for OM2 & 3

		Risk Probability Category Without project			
		Short Term <10 years	Short/Med Term 10-20 years	Medium Term 20-50 years	Long Term 50-100 years
Risk Probability Category WITH project	Short Term <10 years	0	0	0	0
	Short/Med Term 10-20 years	0	0	0	0
	Medium Term 20-50 years	0	0	0	0
	Long Term 50-100 years	68 Total 23 Deprived	120 Total 86 Deprived 0	59 8 Deprived	90 0 Deprived

Calculations: Outcome Measure contributions are calculated for the whole frontage as follows:
Example 3

OM1 Economic Benefits

$$912B = PVb = \text{£}124,800k \quad 912C = PVc = \text{£}18,620k$$

OM2 Households at Risk

$$\begin{aligned} 913T: &= \text{Number of households with reduced probability of flooding} \\ &= \text{Blue cells} + \text{Yellow cell} + \text{Red cells} + \text{Pink cell} - \text{Green cells} \\ &= 90 + 0 + (68+120) + 59 - 0 \\ &= \underline{337 \text{ households}} \end{aligned}$$

$$\begin{aligned} 913B &= \text{Number of households moved out of any flood probability category to a lower category (OM2)} \\ &= \text{Yellow cell} + \text{Red cells} + \text{Pink cell} \\ &= 0 + (68+120) + 59 \\ &= \underline{247 \text{ households}} \end{aligned}$$

$$\begin{aligned} 914B &= \text{Number of households moved from the very significant or significant flood probability category to the moderate or low category (OM2b)} \\ &= \text{Red cells} \\ &= 68 + 120 \\ &= \underline{188 \text{ households}} \end{aligned}$$

$$\begin{aligned} 915B \text{ Deprived Households} &= \text{Number of deprived households moved from the very significant or significant flood probability category to the moderate or low category (OM3)} \\ &= \text{Red cells} \\ &= 23 + 86 \\ &= \underline{109 \text{ households}} \end{aligned}$$

Having established the OM contributions for the whole frontage we now determine the apportionment for each project using the pro rata arrangement as follows:

	PV Capital WLC for Strategy	Project Capital Coast (£K)	OM Apportionment <small>$\frac{\text{Project Cost}}{\text{PV Capital WLC}}$</small>
Project 1	£14,900K	£2,600K	0.17
Project 2	£14,900K	£3,400K	0.23

The outcomes for the strategy can now be apportioned to determine the OM contributions and data to be reported for each projects. Note that the combined project contributions are less than the overall total as the remainder is delivered through future projects.

	912B	912C	913T	913B/OM2	914B/OM2b	915B/OM4
OM Whole Frontage	124,800	18,620	337	247	188	109
Reported Data – Pro Rata OM Contributions						
Project 1	£21,216K	£3,165K	57	42	32	19
Project 2	£28,704K	£4,283K	78	57	43	25