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Enhancing Ex-Post Evaluation of Flood and Coastal Erosion Risk Management Strategies and Schemes



**Final Report –
Phases 1 and 2**

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**Collingwood Environmental
Planning Limited**

**in partnership with
Middlesex University FHRC,
HR Wallingford and Ruth
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Lead contractor:	<p>Collingwood Environmental Planning Limited</p> <p>Address: 1E The Chandlery, 50 Westminster Bridge Road, London, SE1 7QY, UK</p> <p>Contacts: Clare Twigger-Ross (Project Director) c.twigger-ross@cep.co.uk</p> <p>Tel. 020 7407 8700</p> <p>Fax. 020 7928 6950</p> <p>Website: www.cep.co.uk</p>
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Executive Summary

Aim

To investigate the practice of, and barriers to, ex-post evaluation (EPE) of flood and coastal erosion risk management (FCERM) Strategy Plans and Schemes and to consider how evaluation practice could be enhanced, including through guidance to Risk Management Authority practitioners.

Phase 1 Objectives

- a) To review evaluation practice in respect of strategies and schemes and how this compares with good practice.
- b) To highlight individual examples of good practice.
- c) To identify existing barriers to good evaluation practice, including institutional and cultural issues, adequacy of guidance, and those to do with methodological and evidence challenges, including adequacy of monitoring arrangements and data collection.
- d) To consider how evaluation practice could realistically be improved within existing institutional arrangements, and taking due account of proportionality (getting the biggest improvement for the least burden on Risk Management Authorities (RMAs)).
- e) To identify any specific potential improvements in terms of project planning and management arrangements, monitoring and data arrangements and methodology.
- f) To consider the extent to which evaluation practice could be enhanced through updated guidance to practitioners, issued either by Defra, the Environment Agency or others, taking account of the Government's "Smarter Guidance" agenda.

Phase 2 objectives

Phase 2 objectives were revised in the light of the results of Phase 1. The revised objectives for the Phase 2 work were:

- a) to develop outline methods and approaches for undertaking EPE
- b) to discuss 'light touch' approaches to EPE
- c) to prepare a shortlist of four schemes suitable for case studies on EPE
- d) to take forward two of the shortlisted schemes as full case studies using the methods developed for EPE
- e) to investigate how existing data and approaches (quantitative and qualitative) could be used within EPE and what new data or approaches might be needed going forward
- f) to reflect on lessons arising from EPE and consider how learning can be taken forward.

Approach

To address the aim and research questions the project took the following approach:

- 1) desk research: Phase 1: to review current practice in EPE in FCERM, relevant research and current guidance on EPE; Phase 2: to review specific documents for the Case Studies.
- 2) stakeholder engagement – Phase 1: telephone interviews with 26 stakeholders from Environment Agency (EA), Defra, Local Authorities, Natural England (NE), Internal Drainage Boards (IDBs), Regional Flood and Coastal Committees (RFCCs), National Flood Forum (NFF) together with a workshop for stakeholders and steering group members; Phase 2:

telephone/Skype interviews with 9 stakeholders for the Upton case study and 7 stakeholders for the Shaldon and Ringmore case study

- 3) expert panel – the project team included a number of experts on FCERM and economic evaluation who inputted through the project.

Data analysis

Phase 1: Information from the desk research, stakeholder interviews and the workshop was analysed and integrated into this report. Documents examined were managed via an excel spreadsheet. Notes taken during the interviews were analysed for key themes using an excel spreadsheet to manage the answers from across the interviewees for all the questions.

Phase 2: Information from the desk research, and stakeholder interviews was analysed and integrated into the full case study report (Annex 1). Summaries and excerpts from that report have been included here as appropriate.

Summary of findings

From our research it is clear that EPE of strategies and schemes in FCERM is not being carried out in any systematic, pre-planned way in the sense of our working definition or those definitions given in the Green and Magenta Books. There are Environment Agency Post Project Appraisals (PPAs), which focus on whether or not the scheme meets its objectives and are carried out at the end of the strategy / scheme, but they do not focus on the realisation of benefits, especially wider benefits which are likely to take place at a later date. Claims for some of these wider benefits may be made in appraisals but this is not tested in current PPA type reviews. There are also some informal reviews carried out such as those by the Thames RFCC and annual tours carried out by the IDB in Lincolnshire, but we have not found evidence of systematic EPE practice amongst any of the RMAs. Interestingly, the Project Closure Report for Shaldon and Ringmore (case study) was carried out at a later stage than is usual and was able to reflect on some of the benefits, but again this is an exception rather than the norm.

Although there is a lack of practice in EPE, there is recognition of the wider benefits of schemes, with interviewees giving some examples. The evidence of the realisation of these benefits is not available in any systematic or replicable form. The case study research showed that it is possible to gather some of that data through the “light touch” approach used, that is, the combination of desk review and stakeholder interviews, however, there is a case for developing more formal approaches to collect data on wider benefits.

In terms of barriers to carrying out EPE, the main barrier mentioned by interviewees was cost and / or a source of funding to do it. The second most raised barrier was ownership or responsibility for doing EPE, particularly as ownership will change over the life of the project and the impetus to look at benefits could be lost. Currently, there is no direct requirement from Defra to carry out EPE and no other incentives for it to be carried out. Finally, there are cultural issues around why EPE might be needed with some seeing the benefit as focussed on whether the flood defence works as a structure, rather than considering the wider benefits of that flood risk reduction. All of these barriers were discussed within the interviews and the workshop indicating that all are of significance to stakeholders. Further it was clear that these barriers are interrelated and would all need to be addressed to some degree for EPE practice to happen. The case studies provided some evidence for these barriers. Specifically, because there is no current process and ownership of projects is passed on once the scheme has been built it meant there was no specific location for reports and finding the relevant project manager and stakeholders was not straightforward.

In terms of whether EPE should be carried out or not, we would suggest that there are strong drivers and examples from other areas (e.g. transport), together with the wider perspective of partnership funding, giving the steer for the way ahead. However, whilst many interviewed thought EPE a good

idea, others wondered what would be gained from it and how it would be used; this was also reflected at the workshop. The case studies did show that useful information could be gathered using a “light touch” qualitative approach that has potential to be embedded within existing processes. However, organisational barriers would still need to be addressed.

Good practice EPE suggests that it is built in from the beginning of the strategy / scheme process, that it has a clear feedback process in terms of how it is used, and that it is done at a time in line with when benefits are likely to be realised. The review of the case studies against the good practice principles showed what would be needed to improve that approach for it to better meet the good practice principles. Table i shows those suggestions.

Table i: Suggestions on the way forward for EPE with respect to Good Practice Principles

Good Practice Principles	Suggestions based on research
GPP1: Evaluation planned in from the outset	The PAR needs to include the requirements for future EPE. This could be done in an additional section or appendix to the Business Case and needs to cover the recommendations for GPPs 2-11.
GPP2: Clear expression of the purpose of the EPE	The purpose for EPE needs to be defined in the Business Case. This would take account of GPP4 – i.e. the audience(s) and its needs. For example, the project engineer’s needs may be different (more focused on construction outcomes) than the Area Flood Risk Manager or Local Authority (who may be interested in wider long-term community benefits).
GPP3: Defined EPE strategy / scheme objectives and outcomes	Objectives need to be defined for the preferred option within the PAR.
GPP4: Defined audience and needs from EPE	This would need to be covered in the Business Case and refined during the detailed design and construction phases. See GPP2. Different business cases may imply different audiences and evaluation needs. Some audiences (e.g. Defra) may not need evaluation in every case, but for a sample over a programme. Others (e.g. project engineers) may need light-touch, narrowly focused evaluation in every case (e.g. to check project delivery).
GPP5: Identified evaluation questions and outcomes, checked against objectives and outcomes of the strategy / scheme (based on use of a logic model, which might mean that EPE could be undertaken in stages depending on when particular outcomes and impacts are anticipated / realised)	Evaluation questions should be developed up-front at the Business Case stage. Desired outcomes and impacts should also be identified at this stage through a logic model approach. It would be helpful for logic model to be developed as part of the Business Case and refined during detail design, to provide the framework for future evaluation and also for reporting at the end of the project.
GPP6: Clearly chosen evaluation approach (e.g. quantitative, qualitative), confirmed data requirements and measurability including counterfactual and an approach to capturing unintended impacts	The evaluation approach taken in the case studies would be suitable for retrospective EPEs for [say something about the audience – Area Flood Risk Managers, Local Authority partners?]. However, it should be noted that this approach only provides a qualitative assessment. Integral to it are interviews with non-RMA stakeholders to gain wider perspectives on the benefits and disbenefits arising from schemes. The approach with modification to incorporate quantitative as well as qualitative assessments of benefits could be used for EPE suitable for audiences interested in verifying economic appraisal assumptions and developing the evidence base on quantified costs and benefits (e.g. Defra). This might not be suitable in

Good Practice Principles	Suggestions based on research
	every case but for a sample across a programme.
GPP7: Plan for resources and governance in place, including engagement with partners and / or stakeholders	Planning for resources would need to be built in.
GPP8: Monitoring of outputs, outcomes and impacts in place throughout the strategy / scheme	<p>Planning for EPE at the stage of the PAR will require monitoring needs to be identified. These would then be refined and tightened during the detailed design phase.</p> <p>Production of a project closure report (End Project Report or Post Project Review) is useful for helping to understand the impacts of the processes undertaken in delivering the scheme. This may be sufficient for some audiences (e.g. project managers or engineers). This can then be used in any wider EPE as a 'stepping-off' point for looking at the short and medium term impacts. To give a full perspective of the impacts it needs to honestly reflect multiple perspectives not just those of the responsible RMA.</p>
GPP9: Clear and robust evaluation and analysis of data	Relevant documents for evaluation and analysis of data would include the project closure report plus any monitoring data and reports produced before and after scheme completion. These would need to be made available to reviewers undertaking any wider EPE (if identified in the original business case and depending on audience).
GPP10: Clarity on use and dissemination of findings	This needs to be planned for at the PAR stage but developed during detailed design and will evolve during the lifetime of the project up to the point of and with the findings of the evaluation. Clarity at the outset is required to ensure the objectives are robust and planned for.
GPP11: Timeframe relevant to benefits realisation	This will be specific to the benefit and objective being measured. As a guide between three to six years after completion. However, EPE needs to also link into and incorporate feedback from existing on-going procedures such as post-event analysis, community engagement and maintenance inspections to get a full picture. The testing of schemes during events (at any time point) is likely to provide a rich evidence base and should be capitalised upon.

In terms of existing guidance, the former unpublished FCDPAG6 and the current FCERM-AG have limitations and would need to be developed in order to provide the rationale and a clear process for carrying out EPE, focussing clearly on different audiences, their incentives and needs. Any further guidance needs to be practical, flexible and devised in collaboration with the RMAs for it to be useful and followed. It also needs to fit with the Government's Smarter Guidance agenda. Any guidance would need to be supported by training and a clear mandate to do EPE for the required change in mind-set and practice to happen. In Section 5 there is a suggested approach to integrating EPE into the current FCERM-AG.

Suggested options for improvement

A case for action: the pros and cons of a decision to take measures to ensure that EPE in flood management projects is undertaken in the future

OBJECTIVE 1: To determine whether to proceed with EPE

The pros and cons of undertaking EPE have been extracted from the research undertaken and listed in Table i.

Tableii: Pros and cons of undertaking EPE

Pros	Cons
<ul style="list-style-type: none"> • Learning to feed back into strategies and schemes. • To enable community understanding. • To aid investment and spending decisions at national and local level. • To provide transparency and accountability. • To validate the initial plan and claimed benefits. • To gain understanding of the wider benefits. • To capture lessons learned, share knowledge and inform future planning. • To re-connect schemes and benefits. • To enable access to funding. • To get partners on board • To use current data and join up a range of processes that collect relevant data e.g. EIA, • To enhance and use current processes • To add value over what happens currently • Useful information can be gained from a “light touch” qualitative approach that could be tailored for different scale of schemes 	<ul style="list-style-type: none"> • Questionable need for EPE if a scheme substantially meets the outcomes expected in the appraisal and flood defence objectives delivered. • Cost / lack of funding. • Need for responsibility ownership. • No direct requirement. • Lack of confidence (skills). • Cultural difficulties – focus is on the scheme working and not on the wider benefits. • Uncertainty on use of the results. • Time required to undertake EPE. • PPAs already pick up on a range of points to determine whether or not a scheme was successful. • Current lack of guidance. • Need for additional data together with new approaches to collecting wider benefits data • Need to ensure that EPE is integrated fully into existing processes a and ensure that cultural difficulties are addressed

Taking the Phase 1 and Phase 2 findings together we would suggest there is a strong case for taking EPE forward in the first place by:

- 1) Strengthening existing processes within the Environment Agency FCERM project management cycle, including the appraisal process and
- 2) Collecting more data retrospectively from existing schemes and
- 3) Purposively choosing new schemes for which EPE will be a priority

These suggested options are outlined in Suggested Options 1 – 9.

Further development of EPE in terms of links with appraisal of, and evaluation of wider and local benefits and the development of a toolkit form Suggested Options 10 -

Laying the ground for EPE: if it is agreed that EPE should be undertaken, what would be the best way to secure this? What could be done in the short-term (e.g. within 1 year)

We would suggest that the Environment Agency could address the following objectives in the near future:

OBJECTIVE 2: To improve project management of FCERM scheme

SUGGESTED OPTION 1: Ensure that EPE is embedded into existing project management processes from the outset i.e. the business case stage within Gateway 1. Logic models could be very usefully developed at the business case stage. Draw out the requirement to consider benefits realisation that is part of the Management Case in the Five Case Model, and ensure it is part of the process. A proportionate approach should be taken to the extent of EPE needed for each scheme, but given that Benefits Realisation is an integral part to the project management process there should be clear documentation on how that is to be delivered within a project.

SUGGESTED OPTION 2: Highlight the need for a benefits realisation plan within Gateway 6: Project Closure and ensure it is followed up.

SUGGESTED OPTION 3: Use the opportunity of linking EPE with the Gateways (Suggested Option 1) to streamline some of the reporting requirements where there is potential overlap e.g. PPAs and PPRs

SUGGESTED OPTION 4: Update the current FCERM-AG to include guidance on EPE as suggested in the full report p 48-50.

OBJECTIVE 3: To address the lack of requirement or incentive to carry out EPE

SUGGESTED OPTION 5: Consider ways to incentivise the process e.g. making it a requirement that a part of the GiA is spent on evaluation

SUGGESTED OPTION 6: Make evaluation including EPE an approval criteria for projects to pass through gateways i.e. make it a business case requirement to show how it will be planned for and linked to showing the benefits realisation predicted as part of the appraisal and make project closure dependent on a clear plan for carrying out or not carrying out EPE. This could be linked to the needs of different interests – e.g. technical approval would only be granted if a project closure report was planned for, and Grant in Aid approval would only be granted if plans were in place should, for example, the scheme be selected to be part of a sample of more in-depth evaluations, etc.

OBJECTIVE 4: To address the lack of funding for EPE

SUGGESTED OPTION 7: Develop approaches to EPE that are part of current processes so that part of the funding for the scheme could be allocated to the EPE, this links to Suggested Option 6.

The research showed a clear lack of EPE across all the RMAs. Whilst the above suggested options focus on current EA processes and what could be improved in the existing processes, evidence from those EPEs won't appear for some years. Given this, there are other suggested options that focus further on improving that evidence base in the short term.

OBJECTIVE 5: To assess the real-life value for money from FCERM schemes to inform future investment and funding decisions

SUGGESTED OPTION 8: Defra to build on the method used in the Case Studies in Phase 2 by re-visiting some key schemes, sampling across the range of types of scheme (structural and non-structural) to further understand what benefits can be assessed in places where EPE has not been planned in from the start. This would provide more information on what benefits have been realised together with an understanding of what information would need to be planned for and recorded so that realisation of benefits can be examined in detail.

SUGGESTED OPTION 9: Clearly put in place EPE into a number of schemes that are currently being developed ensuring that the sample represents the types of schemes and the types of benefits that are typical of those schemes. We would suggest that each year a percentage of schemes are chosen by Defra or the EA for EPE and a report is produced each year on the findings of those EPEs as they become available. This is different from Suggested Option 1 because that focusses on strengthening existing processes and making the consideration of EPE the norm. This suggested option would be to focus on those schemes where EPE would be worth carrying out. . The findings from these two approaches could feed into the ongoing development of a toolkit (**SUGGESTED OPTION 11**).

OBJECTIVE 6: To provide evidence of the wider benefits of FCERM

SUGGESTED OPTION 10: Building on the Case Study approach work up a series of retrospective case studies across schemes and benefit types e.g. social / economic / environmental showing how they have been realised. This would build on existing Case Study approach and is likely to be qualitative but would show in more detail the types of benefits that exist. This would also help address the cultural barrier of staff tending to focus solely on engineering benefits. This could be linked to work under Suggested Options 8 and 9 but the focus would be on wider benefits.

SUGGESTED OPTION 11: Encourage the use of newer research into the assessment of social and environmental benefits and local economy benefits at the appraisal stage so that they can be followed up through the EPE. The recent Defra/Vivid Wider Economy toolkit and the eftec EVEC handbook could be used to inform appraisal which in turn would enable better assessment of wider benefits through an EPE. .

Delivery of EPE: who would be best placed to do it?

OBJECTIVE 7: To determine who would be most appropriate to undertake EPE

The general view, from the research undertaken, was that EPE should be carried out independently – separately from those who carried out the strategy / scheme.

Delivery of EPE: what tools, training, guidance, etc would facilitate it (perhaps with some suggestions on who is best placed to provide this)?

OBJECTIVE 8: To develop a practical toolkit

SUGGESTED OPTION 12: Development of a practical toolkit for EPE of FCERM

From our research a key identified need is for the development of advice and support on how to carry out EPE for FCERM that

- a) shows how predicted benefits have been realised
- b) shows how wider benefits can be evaluated

Fundamentally, systematic reporting on these two aspects will be the building block of any strategy for EPE going forward. To meet this need we suggest that a practical toolkit is developed by Defra / Environment Agency in collaboration with practitioners from the other RMAs. We would strongly

suggest a collaborative approach is taken between practitioners from a range of RMAs and Defra policy staff to ensure that any advice is practical and owned by a range of stakeholders. This would provide a flexible approach to EPE that could be used by a range of RMAs. It would include setting out:

- I. Good Practice Principles (GPP) for EPE - these would build on and refine those developed through this project
- II. a process for carrying out different levels of EPE using different methods of data collection e.g. light touch overview using a collaborative, qualitative approach through to a more detailed quantitative approach linked into existing project management approaches (e.g. Environment Agency Gateways)
- III. advice on choosing the level of EPE needed e.g. a set of questions around objectives, resources, and timings
- IV. advice, methods and examples on how to collect data on wider benefits e.g. social and environmental
- V. case studies of good practice
- VI. practitioner training – this would address the issue of lack of skills to carry out EPE which was raised by the research.

Some aspects of this toolkit would take time to develop and require further research. Specifically, around methods for collecting data on wider benefits and this is reflected in PROPOSAL 2.

OBJECTIVE 9: To learn from existing FCERM strategies and schemes for future developments

SUGGESTED OPTION 13: Create a web-space to put examples and case studies – linked to the toolkit. Develop a learning network across RMAs and stakeholders to come together to share practice both what is working and what is not working. Put in place space for reviewing benefits realised and wider benefits within higher level document reviews. Defra would need to scope out who would maintain and manage this network and look into possibly making it a requirement that people put info on the network after they have carried out an EPE.

OBJECTIVE 10: To encourage partnership in FCERM strategies and schemes

SUGGESTED OPTION 14: If the learning network and resources were in place (Suggested Option 13) then this could be used in discussions with potential partners. However, it might also be useful to visit a scheme that has been identified as having specific wider benefits to show potential partners what might be possible and to hear from stakeholders their views on the benefits. Ways of carrying out this light touch collaborative approach would be detailed in the toolkit.

OBJECTIVE 11: To increase confidence of staff in methods, and findings of EPE

SUGGESTED OPTION 15: Develop skills of staff – capacity building in evaluation and EPE for FCERM staff.

OBJECTIVE 12: To provide transparency and democratic accountability

SUGGESTED OPTION 16: If clear processes are put in place then that provides the basis for addressing this objective, together with openness about the findings e.g. published on GOV.UK. In addition, discussion of benefits and what has / hasn't been achieved should be carried out with members of the public in areas with FCERM strategies or schemes.

OBJECTIVE 13: To develop clear ownership of EPE

SUGGESTED OPTION 17: Ensure that there is clear ownership of EPE process throughout the life of the project and with each change of responsibility (from client to appraisal to delivery and back to client) e.g. by ensuring that evaluation has been planned for and is owned before the project closes or have independent evaluators from the outset to work with the projects.

OBJECTIVE 14: To develop a culture of openness, learning and critical evaluation with respect to EPE in FCERM

SUGGESTED OPTION 18: Include discussions of what did not work across the learning network and within EPEs ensuring the support of senior staff and carried out with the focus on learning rather than apportioning blame. Encourage individual project teams or RMAs to have informal “lessons learned” exercises (e.g. on site visits) in advance of any more formal evaluation.

1. Introduction

This project on *Enhancing EPE of Flood and Coastal Erosion Risk Management Plans and Schemes* was commissioned to identify the extent of practice in EPE and to explore how best to build on current practice.

The project was split into two phases:

- Phase 1 – a review of the extent to which EPE is undertaken, highlighting examples of good practice and barriers to EPE, and consideration of how evaluation practice could be improved.
- Phase 2 – development of case studies to help provide Defra with evidence to inform possible approaches to EPE of FCERM strategies and schemes.

Existing practice

There is strong practice within flood and coastal erosion risk management (FCERM) of strategy and scheme appraisal, or the ex-ante (before) assessment of the rationale, options and value for money. Before undertaking this project, the extent of evaluation, or the ex-post (after) assessment of how the project (or intervention) worked and whether expected costs and benefits were achieved, was less well understood. While Post Project Appraisals (PPAs) are undertaken by the Environment Agency to assess strategy and scheme management and delivery, assessment of the direct (reduced flood risk) and wider social, environmental and economic benefits and impacts were not thought to be undertaken on a regular basis.

The potential gap in EPE within FCERM has led Defra to be concerned that the planning cycle may not be building and acting on evidence of good practice and feeding this into new strategies and schemes. There was also concern about whether the outcomes and benefits identified in the appraisal were being verified and whether lessons were being learned.

Written guidance for FCERM contains limited information on evaluation of strategies and schemes. Draft guidance on *Flood and Coastal Defence Project Appraisal Guidance 6: Performance Evaluation* (FCDPAG6) (Defra, unpublished) was prepared in 2003 to complement other appraisal documents in the series but was never published.

Definition of ‘EPE’

EPE is an ‘after’ assessment of how an intervention worked and whether its expected costs and benefits (as identified during the appraisal¹ stage) were achieved. While this is the starting point, an evaluation is not limited by this, for example, it may include unanticipated impacts that may not have been captured in the appraisal. Various other terms are also used when referring to an ‘after’ assessment (Appendix 1).

Within the Green Book², evaluation is described quite generally as: *“Evaluation is similar in technique to appraisal, although it obviously uses historic (actual or estimated) rather than forecast data, and takes place after the event. Its main purpose is to ensure that lessons are widely learned, communicated and applied when assessing a new proposal”* (HM Treasury, 2011b p.5). The focus is on looking at what has happened after the policy has been implemented, with the purpose of learning lessons for the assessment of new proposals.

¹ Appraisals provide an assessment of whether a proposal is worthwhile and include option appraisal and analysis of costs and benefits.

² HM Treasury guidance on: ‘Appraisal and Evaluation in Central Government’.

The Magenta Book³ enlarges on the Green Book description of evaluation providing more detail of its purpose: *“Evaluation examines the actual implementation and impacts of a policy⁴ to assess whether the anticipated effects, costs and benefits were in fact realised. Evaluation findings can identify “what works”, where problems arise, highlight good practice, identify unintended consequences or unanticipated results and demonstrate value for money, and hence can be fed back into the appraisal process to improve future decision-making”* (HM Treasury 2011b, p.7).

While the Green and Magenta Books provide descriptions of ‘evaluation’ they do not provide a precise definition of ‘EPE’. From our review of relevant literature we have found a useful definition of EPE provided by the United Nations Development Programme (UNDP, 2011) which states: *‘EPE is a type of summative evaluation of an initiative after it has been completed; usually conducted two years or more after completion. Its purpose is to study how well the initiative (programme or project) served its aims, to assess sustainability of results and impacts and to draw conclusions for similar initiatives in the future.’*

This definition adds a final aspect which is of time, suggesting that the evaluation is to be carried out two or more years after completion. This is a key aspect when discussing EPE of FCERM as often benefits will be realised at different points over time, and are likely to be realised some years after completion. For the purpose of this project we are using the UNDP definition of EPE as a working definition as it captures all the key aspects of EPE discussed through the project. Those key aspects can be summarised as:

1. Carried out after completion of the scheme, two or more years
2. Focussed on realisation of anticipated benefits and costs as forecast
3. Focussed on realisation of any unintended benefits and costs
4. Carried out in a timely manner relating to when benefits are realised
5. Emphasising lessons learnt that feed forward to new developments
6. Planned from outset

These six aspects are used in Table 2 to compare approaches that have emerged during the research.

The introduction of this definition does not tie FCERM to using this definition in the future. The definition is reviewed in the final section of this report.

External drivers for EPE

The benefits of evaluation are described in the UK’s cross-government guidance on evaluation, the Magenta Book which notes that, *“Good evaluation, and the reliable evidence it can generate, provides direct benefits in terms of policy performance and effectiveness, but is also fundamental to the principles of good government, supports democratic accountability and is key to achieving appropriate returns from taxpayers’ resources. A good evaluation is therefore a normal and natural part of policy making and effective government and is a powerful tool available to the policy maker.”*

Government departments are under pressure to: a) demonstrate value for money and ensure that constrained public finances are spent ever more wisely; and b) to be able to evidence ‘what works’ and use this to inform policy making (in the context of addressing the gaps between policy

³ HM Treasury ‘Guidance for evaluation’.

⁴ It should be noted that “The primary focus of the Magenta Book is on policy evaluation which examines how a policy or other intervention was designed and carried out and with what results.” (s.1.2, p.11). In addition, whilst the Magenta Book generally uses the term ‘policy evaluation’, this is used to “refer to evaluations covering projects, policies and programmes” (p.11).

development and implementation). Good EPE not only provides evidence to inform these two points but also enables learning, assists in risk management and assesses impacts of activities.

In recent years, many government departments have been upgrading their evaluation processes to ensure that they are fit for purpose in the context of the increased scrutiny of past performance, the robust challenge given to new spending proposals and the underlying need to ensure best value is obtained from scarce resources. A What Works Network has been established to improve the use of robust evidence. Six ‘What Works’ evidence centres, launched by the Cabinet Office and HM Treasury in March 2013, will produce and disseminate research to local decision-makers, in order to help them invest in services that deliver the best outcomes for citizens and value for money for taxpayers.

Defra’s Capability Action Plan, published in April 2012 (Defra 2012a), recognised that more needs to be done to improve policy evaluation so that lessons learnt from delivery are fed back to inform policymaking in the Department. Outside Defra, the Government’s Open Public Services White Paper has stimulated much interest across Whitehall in demonstrating robust evidence of ‘what works’ in policy design and delivery. The publication of the Civil Service Reform Plan in July 2012 added strength to this interest (HM Government, 2012b, p.16).

Defra has stated its intention to improve its evaluation procedures and evidence base. To date this work has been centred on a Policy Evaluation Board and Network subgroup, which aim to ensure that Defra and the wider Defra family are making policy decisions informed by robust policy evaluation evidence. Defra’s Policy Evaluation Board has set out the need for a programme of proportionate, high quality, and value for money policy impact evaluation, especially for high profile and high impact Defra policies. HM Treasury’s Magenta Book (2011b) is the recommended central government guidance on policy evaluation. Defra has been promoting the messages within the Magenta Book and supplementary guidance to increase the quantity and quality of policy evaluation evidence.

Drivers for EPE of FCERM strategies and schemes

As noted in the preceding section, there is, currently, a general push within Government for greater policy evaluation. The Defra family, as well as other delivery agents are expected to do more of their own evaluation, including contributing to policy level evaluations.

The need for effective EPE of FCERM strategies and schemes was highlighted during the project Inception Meeting. Understanding the benefits realised over time, the wider impacts of schemes (including psychological and transformative impacts on communities) as well as testing the assumptions made in the original appraisal and whether expectations had been met, were identified as important.

The role of the Environment Agency in EPE of FCERM strategies and schemes links with the following:

- the Environment Agency’s Capital Grant Memorandum (Environment Agency, 2013, para 23.1). Whilst it doesn’t make specific reference to the term ‘EPE’, it does indicate that grant-funded projects and authorities may be selected for post project evaluation. This takes place at the end of the construction of the project and authorities selected must make relevant information available.
- the Environment Agency’s role in the new partnership funding. A key part of this approach is providing guidance and tools to Lead Local Flood Authorities (LLFAs) and other operating authorities, to help them meet their new responsibilities. A recent evaluation of the partnership funding approach (JBA Consulting on behalf of Defra, 2014) emphasised the importance of guidance and capacity building (pps.54–55). There is a risk that without

effective EPE to provide good evidence of how far objectives have been achieved and the real costs and benefits of interventions, it will be difficult to ensure continuous learning and improvement.

The timing of this project has been informed by experience, within Defra and the Environment Agency, of recent high profile flood events, the National Audit Office Strategic Flood Risk Management report (NAO, 2014) and discussion with MPs and the Office for National Statistics on outcome data in flood management.

Scope of the research

Project focus

The project focus has been at the level of FCERM strategies (which embodies the previously used term ‘strategy plan’⁵) and schemes. Strategies and schemes sit at the bottom of an established hierarchy of documents (Appendix 2). These take the high level risk management decision set out in the Catchment Flood Management Plan (CFMP) or Shoreline Management Plan (SMP) – for example, to ‘hold the line’ at the coast – and translate it into a more specific target and activities for an area. Risk management approaches that are identified at the catchment or coastal cell scale as being particularly appropriate and sustainable in the long-term should feed down and inform more detailed plans, helping to identify viable opportunities for working with natural processes, developing collaborative projects, and streamlining the planning process. The strategic approach should also be the basis for apportioning impacts (benefits and costs) that are realised or incurred over the geographic area or period of time being considered.

The research explored EPE of a range of types of flood and coastal schemes across England and Wales, and carried out two case studies on schemes to assess the viability of a possible EPE method. In general, the research focused on: the impacts of strategies and schemes, rather than management processes; and on EPEs undertaken a few years after a strategy / scheme had been completed and once all or part of the strategy / scheme has been implemented.

⁵ The term ‘strategy plan’ was the official term used by Defra in the former FCDPAG2 guidance (MAFF, 2001) to describe a document setting out proposed policy interventions for strategic areas that sit below the CFMP and / or SMP geography. A strategy plan provides information on how the CFMP or SMP is to be implemented within a specific part of the catchment or coastal cell and may contain a suite of proposed schemes. In practice, the term ‘strategy plan’ has not been widely used and instead this type of document has been known simply as a ‘strategy’.

2. Research approach

The overall aim of the project was:

To investigate the practice of, and barriers to, EPE of FCERM Strategy Plans and Schemes and to consider how evaluation practice could be enhanced, including through guidance to Risk Management Authority practitioners.

A set of objectives and research questions were included within the specification and these were used to guide the research.

Objectives

There were two Phases for the project each with objectives which are presented here.

Phase 1 Objectives

- a) To review evaluation practice in respect of strategies and schemes and how this compares with good practice.
- b) To highlight individual examples of good practice.
- c) To identify existing barriers to good evaluation practice, including institutional and cultural issues, adequacy of guidance, and those to do with methodological and evidence challenges, including adequacy of monitoring arrangements and data collection.
- d) To consider how evaluation practice could realistically be improved within existing institutional arrangements, and taking due account of proportionality (getting the biggest improvement for the least burden on RMAs). To identify any specific potential improvements in terms of project planning and management arrangements, monitoring and data arrangements and methodology.
- e) To consider the extent to which evaluation practice could be enhanced through updated guidance to practitioners, issued either by Defra, the Environment Agency or others, taking account of the Government's "Smarter Guidance" agenda.

Phase 2 objectives

Phase 2 objectives were revised in the light of the results of Phase 1. The revised objectives for the Phase 2 work were:

- g) to develop outline methods and approaches for undertaking EPE
- h) to discuss 'light touch' approaches to EPE
- i) to prepare a shortlist of four schemes suitable for case studies on EPE
- j) to take forward two of the shortlisted schemes as full case studies using the methods developed for EPE
- k) to investigate how existing data and approaches (quantitative and qualitative) could be used within EPE and what new data or approaches might be needed going forward
- l) to reflect on lessons arising from EPE and consider how learning can be taken forward.

Research Questions

As well as a set of objectives Phase 1 of the project had seven research questions, set by Defra and Phase 2 had a further five that were set in consultation with the Steering Group.

Phase 1 research questions

1. To what extent is coherent EPE of strategies and schemes carried out currently by RMAs, including the Environment Agency, Coastal Groups, Maritime Local Authorities, other Local Authorities and Internal Drainage Boards (or partnerships of these bodies)?
2. What aspects of plans and schemes does current EPE cover? (e.g. financial outturns, effectiveness of measures, acceptability of measures, process issues, stakeholder engagement and satisfaction, performance of measures against design, benefits compared with the expected counterfactual etc.)
3. Overall, how does current practice compare with best practice? If there are deficiencies, which are the most significant? Overall, is adequate evidence of “what works” feeding back into planning and scheme design and appraisal?
4. If practice is deficient, why is this? (Possible lines of enquiry: Is this due to the way planning and appraisal projects are set up and managed? Is it due to institutional separation between funders and operators, including a lack of scrutiny from Defra or others on outturn performance? Is it due to methodological challenges, especially with the counterfactual, or data issues? Or other factors?)
5. Does the rise of partnership working and funding in FCERM imply a greater need for good EPE of plans, strategies and schemes?
6. What would make the biggest difference in terms of improving evaluation practice and enhancing planning and appraisal through capturing better information on how past initiatives have played out in practice?
7. To what extent is current guidance (such as the draft FCDPAG6 Performance Evaluation) adequate and current, given developments since it was drafted?

Phase 2 research questions

8. To what extent can existing data and approaches be used within EPE?
9. What are the gaps and what new data might be needed going forward?
10. To what extent were benefits realised as predicted in the appraisals and what are the unanticipated outcomes?
11. To what extent has the EPE provided added value over what would have happened anyway?
12. To what extent could EPE sit within existing processes?

Relationship between project objectives and research questions

The relationship between the project objectives and the research questions (which provide a means of helping to deliver against the objectives) is shown in Table 9.

The research questions have been used to structure the Research Findings (Section 4).

Table 1: Relationship between Phase 1 and 2 project objectives and the research questions

Objectives	Research Questions
Phase 1	
<p>a) To review evaluation practice in respect of strategies and schemes and how this compares with good practice.</p> <p>b) To highlight individual examples of good practice.</p>	<p>1. To what extent is coherent EPE of strategies and schemes carried out currently by RMAs, including the Environment Agency, Coastal Groups, Maritime Local Authorities, other Local Authorities and Internal Drainage Boards (or partnerships of these bodies)?</p> <p>2. What aspects of plans and schemes does current EPE cover? (e.g. financial outturns, effectiveness of measures, acceptability of measures, process issues, stakeholder engagement and satisfaction, performance of measures against design, benefits compared with the expected counterfactual etc.)</p> <p>3. Overall, how does current practice compare with best practice? If there are deficiencies, which are the most significant? Overall, is adequate evidence of “what works” feeding back into planning and scheme design and appraisal?</p>
<p>c) To identify existing barriers to good evaluation practice, including institutional and cultural issues, adequacy of guidance, and those to do with methodological and evidence challenges, including adequacy of monitoring arrangements and data collection.</p>	<p>4. If practice is deficient, why is this? (Possible lines of enquiry: Is this due to the way planning and appraisal projects are set up and managed? Is it due to institutional separation between funders and operators, including a lack of scrutiny from Defra or others on outturn performance? Is it due to methodological challenges, especially with the counterfactual, or data issues? Or other factors?)</p>
	<p>5. Does the rise of partnership working and funding in FCERM imply a greater need for good EPE of plans, strategies and schemes?</p>
<p>d) To consider how evaluation practice could realistically be improved within existing institutional arrangements, and taking due account of proportionality (getting the biggest improvement for the least burden on RMAs). To identify any specific potential improvements in terms of project planning and management arrangements, monitoring and data arrangements and methodology.</p>	<p>6. What would make the biggest difference in terms of improving evaluation practice and enhancing planning and appraisal through capturing better information on how past initiatives have played out in practice?</p>
<p>e) To consider the extent to which evaluation practice could be enhanced through updated guidance to practitioners, issued either by Defra, the Environment Agency or others, taking account of the government’s “Smarter Guidance” agenda.</p>	<p>7. To what extent is current guidance (such as the draft FCDPAG6 Performance Evaluation) adequate and current, given developments since it was drafted?</p>
Phase 2	
<p>f) To develop outline methods and approaches for undertaking EPE.</p>	<p>8. To what extent can existing data and approaches be used within EPE?</p> <p>9. What are the gaps and what new data might be</p>

Objectives	Research Questions
	needed going forward? 12. To what extent could EPE sit within existing processes?
g) To discuss 'light touch' approaches to EPE.	8. To what extent can existing data and approaches be used within EPE? 9. What are the gaps and what new data might be needed going forward? 12. To what extent could EPE sit within existing processes?
h) To prepare a shortlist of four schemes suitable for case studies on EPE.	<i>Covered by the case studies</i>
i) To take forward two of the shortlisted schemes as full case studies using the methods developed for EPE.	<i>Covered by the case studies</i>
j) To investigate how existing data and approaches (quantitative and qualitative) could be used within EPE and what new data or approaches might be needed going forward.	8. To what extent can existing data and approaches be used within EPE? 9. What are the gaps and what new data might be needed going forward?
k) To reflect on lessons arising from EPE and consider how learning can be taken forward.	10. To what extent were benefits realised as predicted in the appraisals and what are the unanticipated outcomes? 11. To what extent has the EPE provided added value over what would have happened anyway? 12. To what extent could EPE sit within existing processes?

Phase 1 Research Methods

Desk research

The desk research has examined the following with regard to EPE:

- current and good practice in FCERM;
- relevant research; and
- current guidance.

Stakeholder engagement

Semi-structured interviews were carried out with:

- nine key informants – who were chosen on the basis of their ability to provide an overview of strategies and projects as well as their potential EPE experience; and
- 17 stakeholders – who were chosen because of their involvement with specific schemes and potential EPE experience.

The interviews were carried out by phone or Skype. Following an introduction to the purpose of the project and EPE, interviewees were asked a set of standard prompts to guide discussions as appropriate.

Workshop

A stakeholder workshop was held on 5th March 2015 to discuss the initial findings from the stakeholder engagement interviews and to explore the way forward for EPE practice within FCERM. 23 participants including 10 stakeholders, six Steering Group members and seven members of the project team attended the workshop.

Expert panel

The project team included a number of experts on FCERM and economic evaluation: David Ramsbottom (HRW); Prof. Dennis Parker (MFHRC); Dr. Simon McCarthy (MFHRC) and Dr. Bill Sheate (CEP). They provided input via a team brainstorm, the workshop and the synthesis of the evidence.

Data analysis

Information from the desk research, stakeholder interviews and the workshop has been analysed and integrated into this report. Documents examined have been managed via an excel spreadsheet. Notes taken during the interviews have been analysed for key themes using an excel spreadsheet to manage the answers from across the interviewees for all the questions. The two types of information sources (desk research and structured engagement with a range of stakeholders) have been synthesised in this report. In addition, key themes from the workshop have also been integrated into the document. Quotes used in this document have been extracted from our notes of the interviews and are anonymous.

Phase 2 Research approach and methods

EPE case study approach

The core of Phase 2 was using the case studies to investigate approaches to EPE, that is, to see what could be done in practice with what data already exists and in retrospect.

The case studies assessed two related but different objectives for EPE:

- the extent to which benefits assessed in the appraisal are realised (framed as damages avoided)
- the extent of wider benefits (e.g. regeneration) which may or may not have been assessed in the appraisal.

The proposed method for the EPE was based on guidance in the Magenta Book⁶.

The case studies endeavoured to cover key elements of the Good Practice Principles (GPP) for EPE developed in Phase 1 (see Section 4, pp 59-60). This was, however, limited by the case studies being undertaken on schemes where EPE had not been planned in from the start. Lessons from undertaking the case studies are reported in Section 5 with the full case studies available as Annex 1.

Short list of schemes for case studies

Potential case studies were drawn from research undertaken in Phase 1 and proposals from the Steering Group. Strategies were excluded from the final list as the benefits were too long ranging with no immediate impact on local communities.

Schemes were shortlisted on the basis of covering a range of criteria:

- structural and non-structural schemes
- inland and coastal schemes
- schemes that have flooded and not flooded since development

⁶ HM Treasury (2011b) *The Magenta Book – Guidance for Evaluation*. The Magenta Book sets out principles and processes to improve the design and utilisation of evaluation across Government: <https://www.gov.uk/government/publications/the-magenta-book>

- a mixture of Environment Agency and non-Environment Agency schemes
- availability of existing information
- previous contacts from Phase 1
- date of completion.

Two case studies were selected plus four back-up cases (in case information was lacking for the two selected or if it was decided to take forward two further case studies). Two schemes were selected, one tidal and one fluvial, to take forward as case studies. These were:

- Shaldon and Ringmore Tidal Defence Scheme
- Upton upon Severn Flood Alleviation Scheme.

Each case study covered:

- the purpose and nature of the FCERM scheme
- the benefits identified in the appraisal
- the benefits realised and over what timescale
- any unexpected outcomes (positive and negative)
- the data used, including its suitability and availability
- the potential use of the EPE information.

Further detail on the approach taken with the EPE case studies is described in Annex 1.

Desk research

Review of available documents relating to the scheme for information on benefits including:

- Project Appraisal Report (both case studies)
- Project Closure Report (Shaldon and Ringmore only)

Internet searches for information involved searching for information using the key words and phrases:

- Shaldon and Ringmore Tidal Defence Scheme, Flooding in Shaldon
- Upton upon Severn Flood Alleviation Scheme, Flooding in Upton (2014, 2012)

Stakeholder interviews

A range of stakeholders were identified and interviewed by telephone or Skype, nine for Upton and seven for Shaldon and Ringmore. A semi-structured approach was taken with interviews, following an introduction to the purpose the case study and EPE, interviewees were asked about the benefits of the scheme from their perspective and involvement in the project. A set of standard prompts were used to guide discussions as appropriate.

Data analysis

Information from the desk research, and stakeholder interviews has been analysed and integrated into the full case study report (Annex 1). Summaries and excerpts from that report have been included here as appropriate.

3. Guidance and procedures

The purpose of this section is to establish how EPE fits in with wider evaluation processes, both conceptually (i.e. as shown in guidance documents) and in terms of current flood and coastal erosion risk management practice (existing organisational procedures). The section also draws on the literature to explore the characteristics of good practice EPE.

Guidance on good practice in evaluation

With respect to evaluation within UK Government two documents are important to introduce: The Treasury Green Book (HM Treasury, 2011a), and the Magenta Book (HM Treasury, 2011b). The Treasury Green Book focuses on appraisal and evaluation within government and describes how the economic, financial, social and environmental assessments of a policy, programme or project should be combined.

The Green and Magenta Books also illustrate how evaluation fits into the policy cycle referred to as the ROAMEF (Rationale, Objectives, Appraisal, Monitoring, Evaluation and Feedback) cycle (Figure 1).

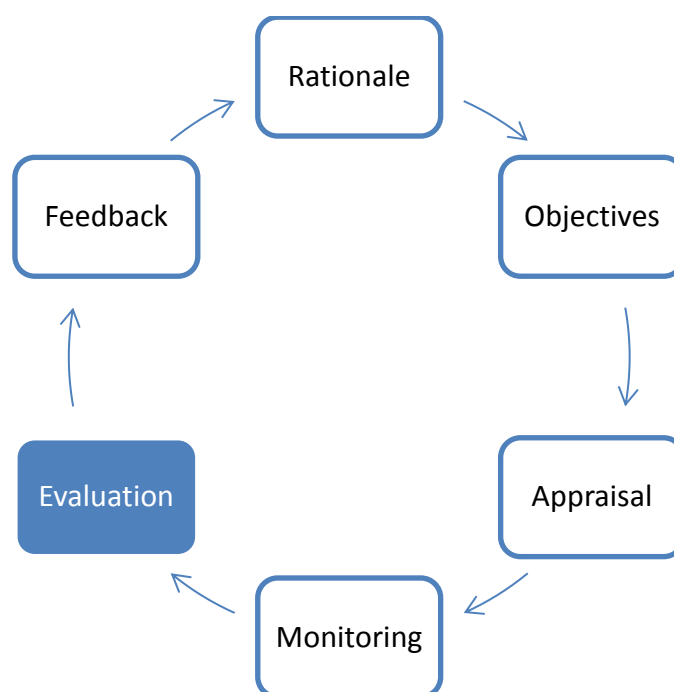


Figure 1: ROAMEF Cycle

Further information on the ROAMEF cycle and the added value of good evaluation as part of a logic model is illustrated in Appendix 3.

Green Book guidance on evaluation

Box 1 below gives an introduction to how evaluation is described in the Green Book.

Box 1: The Green Book: Introduction to Chapter 7: Evaluation

When any policy, programme or project is completed or has advanced to a pre-determined degree, it should undergo a comprehensive evaluation. **Major or on-going programmes, involving a series of smaller capital projects, must also be subject to EPEs.**

7.2 Evaluation examines the outturn of a policy, programme or project against what was expected, and is designed to ensure that the lessons learned are fed back into the decision-making process. This ensures government action is continually refined to reflect what best achieves objectives and promotes the public interest.

7.3 Evaluation comprises a robust analysis, conducted in the same manner as an economic appraisal, and to which almost identical procedures apply. It focuses on conducting a cost benefit analysis, in the knowledge of what actually occurred rather than what is forecast to happen.

7.4 In preparing for an evaluation, it is usually helpful to start with an outline plan, setting out the general boundaries of the proposed evaluation, including:

- Questions which it seeks to answer;
- Staff and other resources available;
- Provisional timing and cost; and
- Who should be consulted

Evaluation Process

7.5 The evaluation itself would normally follow this sequence:

1. Establish exactly what is to be evaluated and how past outturns can be measured.
2. Choose alternative states of the world and/or alternative management decisions as counterfactuals.
3. Compare the outturn with the target outturn, and with the effects of the chosen alternative states of the world and/or management decisions.
4. Present the results and recommendations.
5. Disseminate and use the results and recommendations. (HM Treasury, 2011a, p.45).

Interestingly, it does seem to imply a requirement to carry out EPE on the types of programmes of work that FCERM undertake. There is some general guidance on the stages of the evaluation which are helpful.

Magenta Book guidance on evaluation

The Magenta Book (HM Treasury, 2011b) provides important guidance on the factors to be considered in evaluation (Box 2). Robust evidence about effectiveness is based on testing the extent to which a policy, project or intervention was responsible for observable changes in outcomes by estimating what would have happened in its absence (the counterfactual, see Box 2). Where

possible, the comparative assessment should include a control group that hasn't been exposed to the policy, project or intervention. This comparison is fundamental to HM Treasury's model to assess effectiveness and is a requirement in the Magenta Book (HM Treasury, 2011b) of a full impact evaluation. However, there are difficulties with applying the Magenta Book to complex projects such as FCERM making it important to tailor EPE advice and guidance to the specific policy area.

Box 2: The Magenta Book: guiding evaluation across the UK Government

Published in 2011, the Magenta Book is the UK Government's guide to evaluation (HM Treasury, 2011b), setting out principles and processes to improve the design and utilisation of evaluation across Government.

The Magenta Book recognises each evaluation requires a different approach but it introduces some common elements and a number of tools that are considered relevant to most circumstances. One such element it suggests should be common to all evaluations is an 'evaluation framework'. The Magenta Book is not methodologically prescriptive, but it does state that *"evaluation of an intervention requires a framework within which the evaluation can be designed, data analysed and results interpreted"* (p.53). It also states that evaluations should include an understanding of the interventions 'logic model' which describes the intervention and the mechanisms that are expected to lead to the desired outcomes and impacts.

The Magenta Book also makes statements about when the evaluation should be considered. It is felt that preferably the evaluation framework (and logic model) will be developed alongside the intervention as *"the design and implementation of a policy affects how reliably it can be evaluated"* (p.25). This means that effective evaluation needs to be built into the policy, or in the context of this report, strategy or scheme from an early stage.

The Magenta Book also indicates that evaluations with a summative or impact focus (i.e. those that want to understand the effect of the intervention) need to obtain a reliable assessment of what would have happened anyway; this is referred to as the counterfactual. Developing the counterfactual is considered to be the most challenging aspect of an evaluation, and Supplementary Guidance 'quality in policy impact evaluation' - referred to as QPIE (HM Treasury, 2012) - has been published alongside the Magenta Book to provide additional support.

In relation to FCERM strategies and schemes the relevant option for establishing the counterfactual would seem to be *"predicted vs actual. Outcomes of interest are compared to expected or predicted outcomes (often constructed / modelled at the appraisal stage) of what would be expected if no action was taken (i.e. in the absence of the policy). Outcomes are only monitored for those experiencing the policy. Such designs only "predict" a counterfactual, rather than directly measure it, so might provide an indication of whether there has been an effect, but may not be able to provide a precise statistical estimate of its size. A long time series before and after can help improve reliability"* (HM Treasury, 2012).

Draft Flood and Coastal Defence Project Appraisal Guidance: Performance Evaluation (FCDPAG6)

FCDPAG6 (Defra, unpublished) was originally conceived as a guide on post-project evaluation; however, during the course of its preparation its scope widened to include: monitoring of flood and coastal erosion risk management initiatives; and the evaluation of the performance of policies and plans as well as scheme implementation (Box 3).

Box 3: Draft FCDPAG6 – Performance Evaluation

The draft FCDPAG6 sets out to provide guidance on performance evaluation of plans, policies and projects in order to determine their effectiveness and efficiency in the delivery of their original aims and objectives. It also gives guidance on: the monitoring and information requirements for evaluation; and how the outputs from performance evaluation might be applied to the future management of the policy, plan or asset. It also recognises the need to draw out lessons learned from past problems.

Performance Evaluation is defined in the guide as *“a formal and periodic review of performance with the aim of demonstrating value for money (e.g. Best Value) and providing lessons for future management of the process under consideration”*.

The guidance presents the aims of performance evaluation as:

- assessment of the performance of policies, plans and schemes against their original aims and objectives – as a means of auditing investment and assessing the quality of the decision making process
- provision of insights for effective future management of the system being evaluated – whether further intervention is required following asset inspections
- identification of lessons learned for future practice in similar situations – to feed back to the practitioner community.

The guidance identifies the need to plan for the performance evaluation from the start, at the appraisal stage, and the need for monitoring and collection and analysis of data.

As the focus of the guidance is on performance evaluation it does not cover the broad aspects of EPE in terms of assessing the longer term and wider benefits (outcomes and impacts) of policies, plans, (strategies), or schemes.

Appraisal guidance

Two important documents in appraisal of FCERM strategies and schemes are: FCERM-AG (Environment Agency, 2010), which provides the technical guidance for preparing appraisals; and the Multi-Coloured Manual (FHRC, 2013), which provides data and information for the estimation of flood damage and benefits.

Ex-ante appraisal practice within FCERM

The ex-ante appraisal process within FCERM is well developed and established (Box 4). Planning for EPE at this stage (at the beginning of a project) is important to ensure that the relevant data is collected during the course of strategy or scheme implementation and operation. Furthermore, within the appraisal process there is potential for establishing the counterfactual through the do-nothing option, which would be developed as part of the appraisal process.

Box 4: Ex-ante appraisal practice within FCERM

Flood and coastal erosion are natural processes with highly variable impacts across the country (Defra 2009). Flood and coastal erosion risk management is a permissive power in England so there is no right to protection or a set standard of protection. “To take account of this variability and the permissive nature of its investment, Government promotes nationally consistent approaches to the assessment and management of flood and coastal erosion risk, rather than to set national standards for protection which would be inappropriate and unaffordable in some areas. Appraisal provides a structured approach for assessing the risk from flooding and coastal erosion in a given location, area or region, and for determining the most appropriate way of managing and ultimately reducing it.” (Defra 2009)

Appraisal should be carried out in accordance with the following guidance FCERM-AG (Environment Agency, 2010), HM Treasury’s Green Book (HM Treasury 2011a) and taking into account the Magenta Book (HM Treasury 2011b) and Multi-Coloured Manual (MCM) (FHRC 2013) on flood damage and benefits assessment. It should be proportionate to the complexity of the problem and information required to make a decision.

Stages in the appraisal process	
1: Define the issue	Define the issue and consider the case for government intervention. Set SMART objectives if there is a case.
2: Develop, Describe and Value	Develop a full range of possible options, describe the options, and then value the positive and negative impacts of each of the options.
3: Compare and Select	Compare options in a systematic way and select the most effective and deliverable solution

The appraisal guidance aims to:

- work with natural processes;
- adapt to future risk and changes (for example, due to climate change);
- work with others to deliver better, more sustainable solutions which can deliver wider objectives and maximise benefits for people, businesses and the environment.

Project appraisal determines whether the benefits of flood and coastal erosion risk management outweigh the costs and, hence, if it is worthwhile spending the money from the taxpayers’ perspective. It identifies the most cost beneficial solution to the problem and the justification for the most appropriate and preferred option using a risk- based approach. This means that both the probability (likelihood) and the consequences (positive and negative impacts) of flooding and erosion are taken into account. It requires the approach taken to be proportional to the amount of information needed to choose a preferred option. This will depend on the project (including whether it is a strategy or a scheme), its size and complexity.

Project appraisal should be undertaken within the hierarchy of higher level policy and strategic directions, including shoreline management plans (SMPs), catchment flood management plans (CFMPs) and strategies (where they exist). SMPs and CFMPs set high level policy; strategies take a more detailed perspective of how policy can be delivered locally; and schemes or on-going maintenance aim to deliver this on the ground. Each SMP / CFMP can lead to a number of strategies and, potentially, directly to schemes. Similarly, a number of schemes may be derived from any one strategy. Within this hierarchy, decisions or the implication of higher level decisions have to be made or examined. It is essential to link the problem back to the policy as defined in the

SMP or CFMP (and for schemes, to the description of the strategy, where available) to ensure continuity is not lost.

Post-appraisal evaluation, which verifies that the appraisal meets pre-set quality criteria, is an important part of assessing the appraisal phase. Its role is twofold:

1. to assess how well the appraisal objectives have been achieved, identify positive and negative lessons that have affected the achievement; and
2. to provide information to inform business management processes such as CFMPs, SMPs and strategic plans or set the stage for future evaluations.

(Environment Agency, 2010).

EPE within FCERM should build on the appraisal process, that is, from the appraisal it will be clear what benefits are expected to be realised by the scheme being proposed. Going back to that appraisal and seeing to what extent the benefits have been realised would be a very useful approach for EPE. However, there are still some limitations with the current appraisal system around two areas which mean that EPE should look beyond the appraisal when evaluating what benefits have occurred as a result the scheme. Those two areas are:

- a) the evaluation of benefits associated with non-structural schemes: Clarke *et al* (2015) suggests that “*While the benefits of flood defences and related responses are well understood and readily quantifiable through established approaches, those of other responses are more difficult to assess and quantify. This could lead to an over-emphasis on expensive structural solutions and underinvestment in other responses that may be more cost-effective.*” (Clark *et al*, 2015). Whilst there has been considerable work examining the benefits of flood warning, property level protection and floodplain development control it still needs to be clearly shown within the appraisal process.
- b) the evaluation of some more intangible benefits e.g. social cohesion.

Data collected through any EPE of FCERM could help to inform work in these two areas.

The Multi-Coloured Manual

The Multi-Coloured Manual⁷ (Box 5), produced by the Flood Hazard Research Centre at Middlesex University in collaboration with the Environment Agency and Defra, provides data and methods for use in the assessment of policies, strategies and schemes. The MCM is designed for use in strategy and scheme appraisal. It provides a step-by-step guide that allows the user to carry out economic appraisals for the majority of flood and coastal erosion risk management schemes. Key to the MCM is the damage data relating to retail, commercial, industrial and residential sectors which is derived from analysis of flood events. In addition, in the most recent updates (MCM, 2013) new data on flood impacts such as evacuation costs and vehicle damage has been added. These data, derived from research can then be used within the appraisal process to estimate what benefits would accrue from different schemes and it ensures that evidence from floods on damages is fed back into the development of schemes. Obviously, any appraisal of a specific scheme will draw on the general data available in the MCM. EPE could be used to understand how those estimates worked in practice for a specific scheme.

⁷ <http://www.mdx.ac.uk/our-research/centres/flood-hazard/flood-hazard-research-centre-publications>

Box 5: The Multi-Coloured Manual (MCM) and MCM-Online: guiding the evaluation of the benefits of flood risk management

The MCM published in 2013 is the latest update of a series of manuals on flood damage and benefit assessment that date back to 1977 (i.e. the 1977 Blue, 1987 Red, the 1992 Yellow and the 2005 Multi-Coloured Manuals). The manuals are all based on research undertaken by the Flood Hazard Research Centre and sponsored by the Environment Agency, MAFF the forerunner of Defra and the Natural Environment Research Council. The MCM provides the principal practical approach to benefit assessment in the UK. Since 2014 the MCM has been accompanied by MCM-Online through which annual updates and additions are made available to licensed users. For example, guidance on local economic benefit assessment that will be useful in partnership funding has recently been added.

The MCM provides the user with a range of techniques and data that can be used in a practical way to assess the benefits of fluvial and coastal flood risk management. It also provides guidance on how to undertake a benefit assessment and generally aims to raise the quality of such assessments and to reduce the scope for error. The manual sets the techniques and data, which it provides within the context of guidance and advice on benefit-cost analyses and making better evaluations. Proportionality is important in benefit assessment and the manual provides advice on the approaches, methods and data that should be used in national or high level assessments, meso-scale assessments and more detailed appraisals.

The 2013 MCM update provides standard residential and non-residential data presented in the form of depth-damage-duration data. Utility, transportation, school, hospital and other losses, as well as the costs of emergency services are all included. Direct and indirect flood damage data are provided as well as data and guidance on how to assess a range of intangible benefits. Techniques and data on the benefits of mitigating flooding to agricultural land and the recreational gains and losses resulting from coastal erosion / flooding and its mitigation are included. The MCM On-line is now the principal vehicle for delivering further updates and method extensions.

Characteristics of good practice

A review of evaluation literature suggests (for example, von Zedtwitz (2002), FLOODsite Consortium (HR Wallingford) (2008), EVA-TREN (2008) and HM Treasury (2011b)) that a key characteristic of good practice EPE is that plans for evaluation should be built in from the start of the strategy or scheme process. Otherwise the information required for the evaluation may not be provided by the data gathered for the baseline and during the lifetime of the strategy or scheme, which can undermine confidence in the control and quality assurance system. Strategy or scheme design should cover the review process and indicate how feedback will be used. Building EPE into the process makes it more likely that a review will be done even if the strategy or scheme fails, ensuring that lessons can be learnt and is likely to be cost effective. Good practice components of EPE are listed in Appendix 4.

Many evaluation frameworks are based on logic models, as these provide valuable support in planning for impact and process evaluations. By ensuring the following elements are included, a logic model can facilitate the identification of a wider range of impacts and benefits.

- Clear objectives.
- Measurable outputs and outcomes.
- Impact evaluation linking outcomes to what difference the intervention made.
- The use of indicators and high quality data.

- Baseline data (including information about conditions that are specific or internal to the project) and counterfactual.
- Objective questions even where the topic is subjective, such as stakeholder perceptions of effectiveness. Different types of questions can be used (causal, critical or explanatory), depending on the focus of the evaluation.

Another important point is that the amount of time and resource spent on the evaluation should be proportional to the scale or profile of the intervention, so that effort gives an equivalent amount of benefit (HM Treasury, 2011b).

Finally, evaluation provides the opportunity for organisational learning through reflection on experience and also learning from experience so that EPE becomes an embedded process within, for example, RMAs.

Organisational procedures

The Environment Agency has operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, and to provide a strategic overview role on the coast, including coastal erosion. In pursuing its role, the Environment Agency has a clearly established project management approach.

Environment Agency approach to project delivery

Project management

The Environment Agency uses the PRINCE2 methodology and a gateway review process for National capital programme management service (ncpms) projects, which sets out a series of seven review gateways (Environment Agency, 2014a). Strategies and schemes occur as projects and would be developed using these procedures. Reference to project in this section applies to both strategies and schemes.

Gateway 1 – Business case review and Financial Scheme of Delegation approval – a two stage point review

Gateway 2 – Detailed project planning – the review checks that the project design has been carried out in accordance with the approved business case

Gateway 3 – Contract award – ensures value for money

Gateway 4 – Readiness for service – construction works completed

Gateway 5 – Contract completion – all defects have been corrected by the contractor

Gateway 6 – Project closure – project is complete and project closure report submitted

Gateway 7 – Benefits realisation and post project appraisal – post project appraisal arranged, if needed

The gateway process allows for independent project review at key decision points throughout the project. These reviews provide a regular check on the business justification and viability, ensuring that projects are progressing successfully and enabling projects that are not viable to be stopped.

Gateways 1, 6 and 7 are where benefits realisation is currently discussed.

Gateway 1

In Gateway 1 the business case is reviewed and sent for approval. It is also the stage at which the appraisal is carried out. It is not clear to us how the business case is developed for Environment Agency strategies and schemes but we are aware that the cross government “Five Case Model” is being referred to as a way of developing business cases for a wide range of strategies, programmes,

and projects. Government departments and the wider public sector use the Five Case Model in the development of business cases. It came out as supplementary guidance to the Treasury Green Book, published in 2013.

The Five Case Model provides a framework for thinking that can be used for the development of policies, strategies, programmes and projects, in terms of how interventions can be best delivered and has five key components.

- The Strategic Case.
- The Economic Case.
- The Commercial Case.
- The Financial Case.
- The Management Case.

Each of these cases is developed through the business case development framework (see Appendix 5). In turn this links in with the Cabinet Office Gateway Review Process.⁸

The requirement for consideration of benefits realisation comes under the Management Case. The purpose of the Management Case is to demonstrate that the preferred option is capable of being delivered successfully and in accordance with good practice. Among other things the Management Case requires that arrangements be in place for delivery of benefits, monitoring during implementation, post implementation evaluation and Gateway reviews.

Gateway 6

Gateway 6: Project Closure is an important point in the process as this is where the FCERM project finishes and there is a change in personnel from those who have been developing the project to those who will be operating the scheme. Within the Operating Instructions for this Gateway there is a discussion of benefits realisation (see Box 6). What is interesting is that it does discuss how to approach benefits that have not yet been realised (see highlighted text) and also mentions unanticipated benefits, which is something that we would want to see evaluated as part of EPE. The operating instruction also shows who is responsible for each stage with the responsibility for confirming benefits realisation and benefits ownership on the Project Executive rather than the Project Manager. Further, it says that many projects will need to complete a post implementation review (PIR), but it is not clear how many actually do complete a PIR and how they are selected for the full PIR or Cabinet Office OGC Gateway 5.

⁸ The Cabinet Office OGC Gateway Process examines programmes and projects at key points in their lifecycle. It looks ahead to provide assurance that they can progress successfully to the next stage. There are 5 Gateways.

Box 6: Benefits realisation point in Gateway 6 (EA Operational instruction 303_04: Closing a Project 9 v6, 2013, p. 6)

Confirm benefits realisation and benefits ownership

You need to gather data on what benefits have already been realised and what benefits will be realised after the project has been closed. You need to refer to the benefits set out in your business case. **For those benefits that are still to be realised you need to confirm ownership, ensure you are clear on the benefits values / targets and confirm how you will measure and monitor each benefit. This is often a lengthy process, so make sure you plan in sufficient time.** Information on benefits realisation should be captured in the End Project Report (EPR).

Many projects will need to complete a post implementation review (PIR). This may include a full post implementation review or a Cabinet Office Gateway 5 Review. Where relevant, a benefits review will be instigated by the project sponsor and must be undertaken by the business / users. It will look at:

- is benefits realisation on track?
- how is the changed business performing?
- have the business owners taken on responsibility?
- are any changes needed to ensure benefits delivery?
- are there any unanticipated benefits and if so how will they be monitored?

As can be seen from Box 6, the Cabinet Office OGC Gateway 5 Review is mentioned in the project closure document. The Purposes of Gateway Review 5 are listed in the Box 7.

Box 7: Purposes of the OGC Gateway 5 Review (OGC Gateway Review 5, Office of Government Commerce, 2007, p. 7)

- Assess whether the Business Case justification for the project at OGC Gateway Review 3: Investment Decision was realistic.
- Confirm that there is still a business need for the investment.
- **Assess whether the benefits anticipated at this stage are actually being delivered.**
- Assess the effectiveness of the ongoing contract management processes.
- Confirm that the client side continues to have the necessary resources to manage the contract successfully.
- Confirm continuity of key personnel involved in contract management / 'intelligent customer' roles.
- Where changes have been agreed, check that they do not compromise the original delivery strategy.
- Assess the ongoing requirement for the contract to meet business need. Ensure that if circumstances have changed, the service delivery and contract are adapting to the new situation. Changing circumstances could affect: partner management; relationship management; service management; change management; contract management; benefits management and performance management.
- Check that there is ongoing contract development to improve value for money.
- Confirm that there are plans to manage the contract to its conclusion.
- Where applicable, confirm the validity of exit strategy and arrangements for re-competition.
- Evaluation of actions taken to implement recommendations made in any earlier assessment of deliverability.

As can be seen there is a requirement to assess whether the benefits anticipated are actually being delivered. Another useful aspect of Gateway 5 Review is it *will typically occur several times over the life of the operational service*". This is especially important because benefits will be realised at different timescales. As part of the process of closing a project (Gateway 6) information is gathered and evaluated (Environment Agency, 2013b). Data is collected on: expenditure; whether the work has been delivered to time and meets quality and cost criteria in the business case; and benefits (identified in the business case) that have already been realised and the benefits to be realised after the project has been closed. This information, along with lessons learnt during the life of the project, is captured in the 'End Project Report' at Gateway 6.

Gateway 7

Gateway 7 is where the project sponsor identifies the need for and arranges a PPA. The purpose of the PPA is to examine project management and benefits realisation. Some projects undergo a 'Post Implementation Review' or 'Post Project Review' at Gateway 7 (which may include a benefits review) and may also undergo PPA (see section below on 'evaluation once a project has been completed'). It highlights that this should be pre-planned: *If the project team need to prepare anything at this stage, the project manager should have identified it early in the project and included it in the scope, approval and planning.* Operational Instruction 209_07: Gateway Process for ncpms p6

Evaluation once a project has been completed

The main type of evaluation undertaken by the Environment Agency once strategies and schemes have been completed is the PPA. About 20 projects (strategies and schemes) a year are selected for PPA. *'The principal aim of post-project appraisal is to provide feedback on completed projects in order to improve the performance of future projects and the planning process'* (Thompson *et al*, 1991).

PPAs consider various aspects of project management and delivery including compliance with objectives, financial issues, process issues and performance of measures against design. They are used to identify good practice and lessons learned.

While PPAs are generally undertaken approximately one year after project completion there is recognition within the work instruction for PPA⁹ to look at benefits realisation over the time relevant to the nature of the benefits and there are examples of some that are carried out some years after project completion (such as those reviewed in Thompson *et al*, 1991). However, PPAs do not cover the more subtle aspects of stakeholder satisfaction and acceptability of measures.

A similar type of evaluation to PPA, is the Post Project Review (PPR) undertaken by the project manager soon after completion (about one year) of a project. The Post Project Review covers similar aspects to the PPA, i.e. project processes, aspects of construction, lessons learned, good practice derived from the project, and whether the project delivered against the objectives and business case. These reviews also test the success of a scheme from an engineering point of view.

The main differences between PPAs and PPRs are PPRs are undertaken on all ncpms projects by the project manager (as part of project closure) while PPAs are undertaken on a selection of projects by independent reviewers and focus on a particular theme, such as partnership working (Environment Agency, 2012 / 2013).

⁹*"The second area that a post project appraisal may be concerned with is the realisation of benefits. This will establish whether the benefits are or have actually been realised. The timing of this type of post project appraisal will be dependent upon the nature of the benefits."* (PPA Work Instruction)

Table 2: Comparison of approaches

Type of document/approach	Characteristics of EPE emphasised						Currently used in FCERM	Potential for use in FCERM	Linked to specific processes	Owners
	Carried out after completion	Examines all anticipated benefits/costs	Examines unanticipated benefits/costs	Carried out in a timely manner relating to when benefits will be realised	Emphasises lessons learnt	Planned at outset of scheme				
Treasury Green Book guidance	✓	✓	✓		✓	✓		✓	Appraisal and evaluation of policies, plans and projects	Treasury – cross govt guidance
Magenta Book guidance on evaluation	✓	✓			✓	✓		✓	Evaluation of policies	Cross govt guidance
Performance Evaluation	✓	✓		✓		✓		✓	PAG- Performance Evaluation (Draft PAG6)	Defra
Post Approval Evaluations	✓					✓	✓ – a sample are looked at			Defra
End Project Report/Post Project Review ¹⁰ (PPR)	✓	✓		If benefits have not been realised then the EPR should show how they will be measured	✓	✓	✓ but benefits realisation appears weak	✓	Project management Gateways process specifically Gateway 6: Project Closure	Environment Agency

¹⁰ Our research suggests these terms are used interchangeably

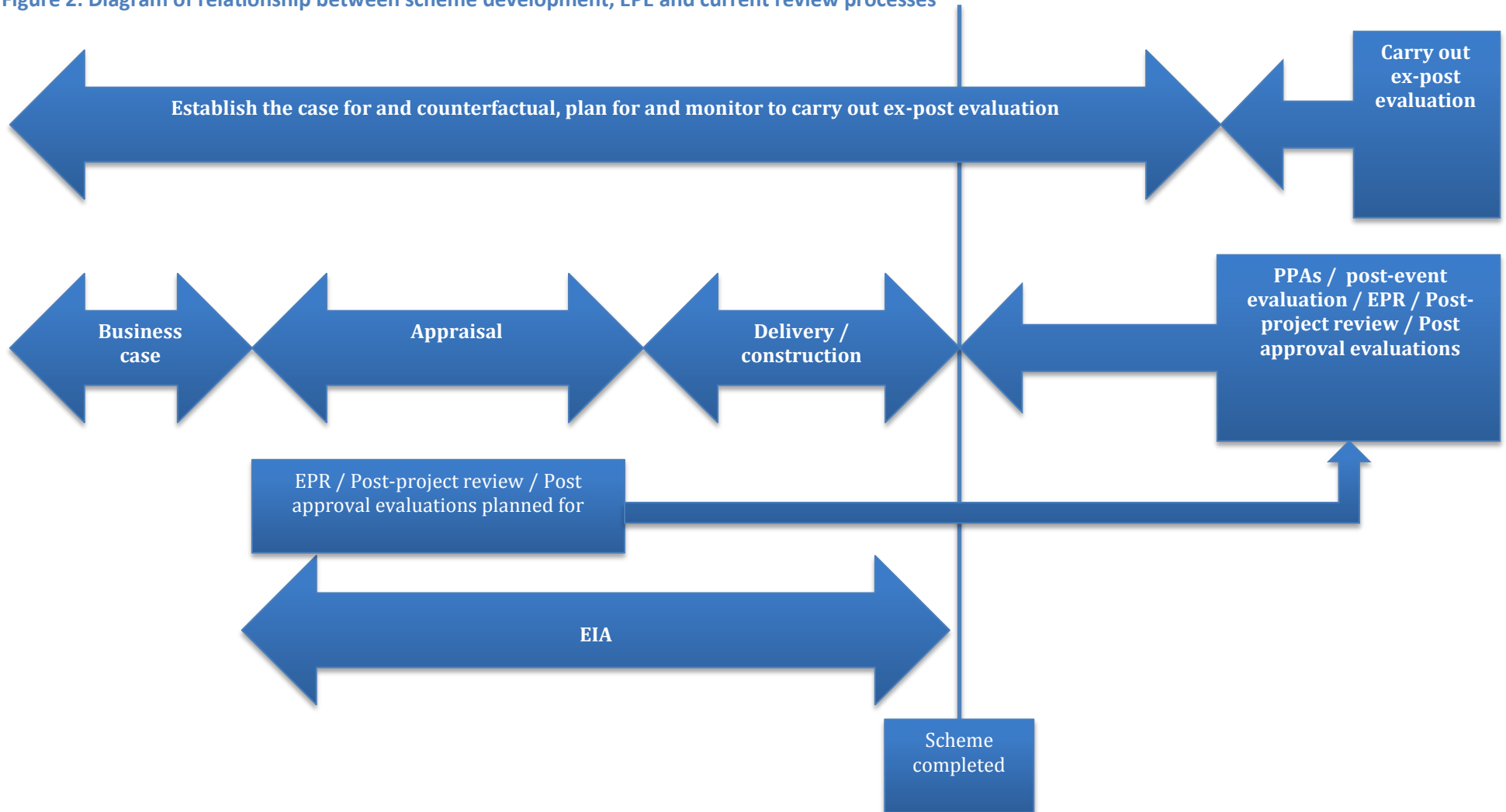
				and evaluate in future.						
Cabinet Office OGC Gateway 5 ¹¹	✓	✓		✓	✓	✓	Unclear	✓	Mentioned in EA Gateway 6: Project Closure as a possibility	Cabinet Office
Post Project Appraisal (PPA)	✓	✓ - but often focusses on a specific type of benefit	✓	✓	✓	Unclear	✓ – a sample from across schemes is taken each year	✓	Mentioned as optional part of EA Gateway 7: Benefits Realisation and Post Project Appraisal	Environment Agency
Post Event Evaluation	✓				✓		✓	✓		Risk Management Authorities

¹¹ In Project Closure there is also reference to Post Implementation Review but we were not able to find out anything more about that process. In the OGC Gateway 5 note it states that: *The Post Implementation Review is an internal project assurance for the SRO, to confirm that the investment in the Business Case was justified and that lessons learned have been captured. The OGC Gateway Review 5 is an external peer review that includes the Post Implementation Review as a major input to its investigation, but it is not clear if this is how the EA uses the term.*

Table 2 presents the types of review process found through the desk review and the interviews. The aim is to provide an overview of what each review process brings in terms of EPE. What can be seen is whilst none completely cover all the aspects of EPE there are a number of opportunities that can be built upon and this is discuss further under Research Question 12.

As well as this table it was considered useful to illustrate the relationship between the range of review processes and the lifecycle of a FCERM scheme. This is presented in Figure 2.

Figure 2: Diagram of relationship between scheme development, EPE and current review processes



4. Phase 1 - Research findings

The findings from the desk research and stakeholder engagement have been set out in response to the seven Phase 1 research questions.

Research Question 1

To what extent is coherent EPE of strategy plans and schemes carried out currently by Risk Management Authorities, including the Environment Agency, Coastal Groups, Maritime Local Authorities, other Local Authorities and Internal Drainage Boards (or partnerships of these bodies)?

The response to this question also covers the first part of Objective a) to review evaluation practice in respect of strategies and schemes and how this compares with good practice.

Research Question 1: Main findings

- EPE of strategies and schemes is not undertaken on a systematic and regular basis by any of the RMAs.
- The Environment Agency and Defra have a number of processes in place for the review of strategies and schemes after completion, but these are not comprehensive and do not appear to provide feedback or evidence for learning.
- Most of the reviews carried out after completion, are of schemes, rather than the higher level strategies.
- The Environment Agency has a systematic process for carrying out Post Project Appraisal on a sample of FCERM strategies and schemes. However in many cases evaluations after completion are prompted if expectations are not met, rather than being planned from the start.
- While the initial appraisal of the strategy or scheme should form the basis for evaluation and provide criteria for success, research with stakeholders suggested that the majority of assessments focus on process (timely delivery and coming in on budget), engineering and flood risk reduction outcomes. This means that less attention is paid to social, economic and environmental outcomes.
- Stakeholder comments reveal an ‘engineering fix’ mind-set on the part of many of those involved in FCERM which does not necessarily reflect the full breadth of FCERM policy. If evaluation practices are allowing this kind of attitude to be perpetuated, this may be an aspect that should be picked up by any new approach to EPE. Or it could be reflecting the time lag between schemes that could have been evaluated having been planned under the previous FCERM policy stance.

Evaluating the evidence

This research question was explored during interviews with RMAs (Environment Agency, Local Authorities, Coastal Groups, Regional Flood and Coastal Committees (RFCC) and Internal Drainage Boards (IDBs)) and other stakeholders, through the literature review and in the stakeholder workshop.

None of the stakeholder interviews produced evidence of systematic or regular practice of EPE of strategies or schemes, although a few examples of reviews were mentioned¹². Although PPAs are carried out, they are only for a sample of schemes and they can focus on one type of benefit, and are not built in from the outset. Whilst EPRs/PPRs have the potential to incorporate benefits realisation they are carried out soon after the completion of the scheme and therefore before some benefits will be realised and no clear examples were identified through our research. It can therefore be concluded that EPE of strategies and schemes is not undertaken on a systematic and regular basis by any of the RMAs. Nor has any EPE of completed schemes been found through the desk research. The literature review did find two examples of reviews being undertaken once a scheme was completed: Shaldon and Ringmore Tidal Defence Scheme, where intertidal habitats were created within the build specification and a review was undertaken to see if the habitat creation had worked; and Freiston managed realignment, where research was undertaken on the habitat creation resulting from the coastal realignment. In both cases the reviews focused on non-engineering aspects of schemes.

The types of review that are carried out in FCERM once a strategy / scheme has been completed are described in relation to Research Question 2.

Wider aspects covered in exploring the extent to which EPE is undertaken

1. Perceptions and understanding of EPE

The majority of interviewees were not familiar with the term EPE. One of the few who were aware of the term provided the following understanding of the elements included in EPE:

- preparatory work at the initial stages of a scheme to set the criteria that will later form the baseline for the EPE
- a review of what the scheme or strategy has achieved against its initial objectives
- an attempt to quantify the actual costs and benefits (and compare it with expected costs and benefits)
- identification of problems and barriers along the way.

When provided with a definition of the term and the type of work it may entail, people were able to give examples (see above) of reviews after the completion of projects or schemes¹³. These were mainly around schemes and individual projects, rather than higher level strategies and plans. As one respondent pointed out:

“I am not aware of any review studies at the strategy plan level. The focus is always on the scheme rather than the plan.” (Interviewee 1)

One example is the Humber Flood Risk Management Strategy, where no PPA of the strategy was undertaken but there were multiple PPAs on individual schemes that are part of this strategy. At the higher level a review of the strategy was also undertaken with an overarching aim of informing and updating the strategy and future schemes resulting from it.

A range of ‘reviews’ may be undertaken once a strategy / scheme is completed, however these reviews mainly focus on strategy / scheme processes and management rather than longer term

¹² Examples mentioned included: ‘some’ review of the Teignmouth scheme and a review of the Humber Flood Risk Management Strategy.

¹³ Some examples were: PPR of Banbury Flood Alleviation Scheme, Waltham Abbey Scheme (1980s), Post Project Evaluations undertaken by Defra / MAFF 10+ years ago, review and update process for Humber Flood Risk Management Strategy, Freiston managed realignment project, the Shaldon and Ringmore Tidal Defence Scheme.

benefits (outcomes and impacts). Some of the most common references, in descending order of frequency, were:

- Post Project Appraisals (PPAs) or undertaken by the Environment Agency
- Post Project Reviews (PPRs), undertaken by the project manager
- Post Approval Evaluations undertaken by Defra
- Post-event evaluation, undertaken by the RMAs
-

The most commonly mentioned categories above are further explored in relation to Research Question 2.

2. Exploring ‘when’ EPE should take place

The decision about when to carry out EPE appears to be primarily dependent on its purpose. A review after a strategy / scheme’s completion may also be prompted if expectations are not met, for example in terms of the strategy / scheme’s design, levels of performance or cost.

An important element of EPE, by definition, is timing. As one of the interviewees noted, *“the clue is in ‘post’”* (Interviewee 8), indicating it should take place after a scheme’s completion. Yet, there was no general agreement on the appropriate timing. Instead, the majority of respondents argued that timing would be dictated by the purpose of the review:

“So you have to know why you are doing the evaluation. There are benefits in all forms of evaluation. There is no golden rule on when you have to do the evaluation. There are different reasons to do EPE and you have to work out what time in relation to the reason for the evaluation.” (Interviewee 24)

“The timing of the ex-post depends on what is appropriate for the things you are looking for. Not too long - no point of doing it after 20 years when all the details are forgotten - but not too soon either (avoid the ‘noise’ (e.g. contractual issues)). Between these limits but certainly after a project is completed and handed over. Sooner if you are looking at tactical issues – later if you are looking at strategic issues.” (Interviewee 8)

Based on ‘what’ is being evaluated and ‘why’, a distinction emerged between three types of reviews carried out after completion and their timing:

- a review that takes place shortly (within a few months) after the scheme’s completion and is focused on *“the tactical issues of delivery”* (Interviewee 8), evaluating delivery, contract management, cost escalation etc. (process evaluation);
- a review carried out much later (years after the scheme’s completion) with a critical focus on whether the scheme has delivered its initial objectives, including an evaluation of its manifested costs and benefits in the longer term; and
- a review instigated by a flood event which allows a flood defence or management scheme to be evaluated in terms of its performance under stress and its ability to deliver protection (post-event evaluation).

Only the second type could be considered EPE as described in section 1 above.

3. Coherence of drivers for reviews after strategy / scheme completion

Respondents mentioned a number of different reasons why a review might be undertaken after a strategy or scheme is completed.

- A few respondents argued that currently reviews were more likely to be prompted by problems in the engineering structure and / or local concerns:

“A review is only undertaken when negative issues arise e.g. where a community has unresolved issues and so the client comes back to the consultant.” (Interviewee 17)

- One respondent commented that in the past a review had been made of community perceptions after the implementation of a flood scheme:

“Years ago, reviews were undertaken of people’s perceptions before a scheme (put in place in the 80s) and then of their after thoughts once the scheme was in place. Now thinking of doing that type of review again.” (Interviewee 10)

- Some IDBs and local authorities suggested that rather than an EPE there is continuous monitoring and review in place, which was considered as *“just a different way of looking at it”* (Interviewee 20). If there was a case where monitoring revealed that a scheme was underperforming or not achieving the objectives then it would be reviewed. Nevertheless, there seems to be no specific process in place nor was this considered a priority:

“...there is no methodology for doing that and it is part of a long list of things that need to be done but not near the top.” (Interviewee 20)

Some of the respondents from these organisations suggested that they have close links with people on the ground and hence relied on local community feedback to raise concerns, though no formal engagement process was in place:

“With IDBs and Local Authorities, if a scheme is not quite right then they are told by people on the ground.” (Interviewee 13)

- Review of the environmental benefits of schemes may involve Natural England. They are legal advisors and may be brought in to advise on evaluation, but this appears to be on an occasional basis, for example to evaluate and suggest alternative approaches for protecting biodiversity. Respondents suggested that more of this kind of review is needed because there is a lack of clear evidence about whether environmental outcomes are being achieved.

4. Assessment of a strategy / scheme’s success in the absence of EPE

The generally agreed lack of review after a strategy / scheme’s completion raises the question of how a strategy or scheme is assessed as being successful or not. The starting point for assessment is clearly the initial appraisal of the strategy or scheme, which will establish success criteria, the baseline and counterfactual by looking at the ‘do-nothing’ option. Nevertheless, research with stakeholders suggested that the majority of assessments focus on operational success, which included some (or all) of the following factors: **timely** delivery of a **robust** engineering structure, **within budget**, that delivers **mitigation of flood risk** as a result. Comments in support of this approach included:

“In general, look at over or supplementary expenditure and consider the budget given to the project and the approval limit.” (Interviewee 5)

“Whether it works or not and stands up to an event. Just consider engineering benefits.” (Interviewee 6)

“A scheme is successful if it substantially meets the outcomes the scheme was set up to deliver.” (Interviewee 8)

“Shaldon and Teignmouth Tidal Defence Schemes withstood high tidal events and stormy events (...) and no flooding events occurred (...). So the schemes are successful as the flood defence objectives were delivered. There has been no reported flooding.” (Interviewee 13)

These comments suggest an ‘engineering fix’ mind-set which does not necessarily reflect the full breadth of FCERM policy. If current assessment practices are allowing this kind of attitude to be perpetuated, this may be an aspect that should be picked up by any new approach to EPE. However,

it is only within the last five years that more attention has been given to a range of non-engineering responses to flood risk as alternatives to engineering schemes, and so this may not have been reflected in the responses to interview questions.

Clearly, FCERM strategies and schemes can have benefits other than flood risk mitigation, but the stakeholders interviewed did not deem those important in evaluating success. Only two stakeholders mentioned such additional benefits with reference to success. One pointed out this approach might be more relevant to *“success as it is viewed by the public eye”*. Those elements cited included environmental, social and economic benefits, as well as political recognition.

Three stakeholders mentioned community reactions as a success factor, often manifested in *“the absence of criticism”* (Interviewee 24).

“There has been no reported flooding and the Flood Resilience Teams have a relationship with the communities. If there were issues these would have been fed back.” (Interviewee 13)

Research Question 2

What aspects of plans and schemes does current EPE cover? (e.g. financial outturns, effectiveness of measures, acceptability of measures, process issues, stakeholder engagement and satisfaction, performance of measures against design, benefits compared with the expected counterfactual etc.)

The response to this question also covers the first part of Objective a) to review evaluation practice in respect of strategies and schemes and how this compares with good practice.

Research Question 2: Main findings

- No practice was found that constitutes pre-planned, EPE as defined earlier.
- Many different types of post-implementation review are carried out, which each cover some *aspects of* EPE, e.g. financial outturns, acceptability of measures, process issues, stakeholder engagement and satisfaction, performance of measures against design.
- There is no evidence of measurement of benefits against an expected counterfactual.
- It appears that flexibility is the norm in determining the timing of post-implementation reviews. More systematic EPE should identify where practice on the ground does not reflect the national strategy.

Evaluating the evidence

Given the lack of detailed evidence or guidance on EPE, the following reflections draw on guidance and documents on impact evaluation produced by BIS (Department of Business Innovation and Skills, 2011) and DFID (Department for International Development, 2012).

The DFID document quotes OECD’s definition of impacts as: *‘positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended’* (p.6).

For the BIS guidance, a central feature of impact evaluation, and what distinguishes it from outcome evaluation, is the consideration of the extent to which the intervention caused the outcomes or whether these might have happened anyway, that is, the counterfactual.

Outcome or summative **evaluations** seek to measure whether the policy outcomes or targets were achieved. **Impact** evaluation goes a step further and is structured to answer the question of whether the outcomes observed were the result of the policy or the observed

outcomes would have happened anyway (Department of Business Innovation and Skills, 2011, p. 6).

The few examples that were found of reviews after completion of a scheme focussed on specific aspects, such as monitoring sediment accretion and vegetative growth in a managed realignment scheme and evaluation of community engagement (Shaldon and Ringmore Tidal Defence Scheme) (Straw, Colbourne 2009). While these reviews took account of the original objectives of the schemes, they did not look at whether the scheme had met all of its objectives and therefore do not constitute systematic EPEs. Furthermore, the counterfactual (what would have happened without the scheme) does not appear to have been considered in the examples reviewed.

This section focuses on what aspects of schemes are covered by these current reviews, in order to establish the extent to which elements of EPE are being carried out at present, how good this practice is and where the main gaps and weaknesses are. One finding was that it appears that flexibility in the timetable for conducting reviews is the norm.

Note that: the findings for Research Question 1 describe the different types of review after strategy / scheme completion while Research Question 2 focuses on the content of those reviews.

Some examples of current practice relating to the review of completed strategies or schemes

While most of the practitioners, who have contributed to this research, were unfamiliar with the term 'EPE', several came up with examples of reviews of completed schemes that might be similar to EPE. An important finding was that there are very few reviews of strategies carried out after completion. The one example that was provided is the review of the Humber Flood Risk Management Strategy, which was intended to inform the strategy and future schemes resulting from it.

1. Post Project Appraisals (PPAs)

In general PPAs, at the time of strategy / scheme completion, appear to focus on the initial scheme design and delivery processes and how they have differed from what was planned. While PPAs are generally conducted a year after strategy / scheme completion, in reality it seems that their timing is relatively flexible, to take account of the focus of the PPA and hence, when it should take place.

A summary of the process for developing a PPA includes the following steps.

1. Initial discussions within the Environment Agency's team on the purpose of the evaluation.
2. Agreement on a programme of review.
3. Identification of experienced engineers to carry out the appraisal.
4. Contact with the local operational team.
5. Agreement of what will be included in the report.
6. Investigation by the engineer on the site and local area.
7. Consultation meeting to agree final report.

As one Environment Agency stakeholder pointed out, there is also flexibility within this process, as part of the engineer's investigation may include discussions with the operational team on issues that might have emerged, as well as engaging with the local community to get a sense of the acceptability of the scheme and any emergent concerns. In the absence of a clearly structured / prescriptive EPE process, a great deal is reliant on the understanding and experience of the dedicated team. Directly related to this is the importance of having experienced personnel. This will be further explored with regards to deficiencies in practices, resources and dissemination of learning (see Research Question 4).

The results of the PPAs are fed back into the organisation that has undertaken the review. However, it is not clear how these lessons are then used by the organisation itself or taken forward by other related organisations.

An example of a PPA is presented in Appendix 6, for the Yarm Flood Alleviation Scheme. This is discussed further in relation to good practice in the next section.

2. Form G – for obtaining additional budget

Some Environment Agency stakeholders said that the process for obtaining additional budget for a scheme (Form G) tends to be the only method for flagging lessons learnt when the justification for additional expenditure is needed. Completing the Form G therefore requires a review of the process and decisions made so far, in order to understand why the expected expenditure has been exceeded and to estimate the risk with any additional expenditure. In this case, the lessons emerging from the review are therefore directly linked to financial aspects because of the need to justify further spending.

3. Post-event evaluations

Post-event evaluations have been undertaken to review the performance of schemes after a flood and, in particular, why things went wrong (e.g. Jubilee River¹⁴ and the original Yarm scheme¹⁵).

The reviews carried out by the Environment Agency after major flood events were also mentioned. One post-event evaluation was described by a participant as:

“a spreadsheet approach (...) about not investing in the wrong things. So the questions were: what properties need protecting? What is the long term policy? And what is the justification for the decisions? Had to ask quick questions and relied on information available at area level regarding properties and infrastructure and relied on databases that area staff interrogated i.e. the Systems Asset Management Plans (SAMPs) where all assets are recorded on a database.” (Interviewee 5)

From this description, it would appear that post-event evaluations do not constitute reviews of strategies or schemes as they look at the performance of the overall flood risk management system, which might involve investments in a number of different types of measure over a period of time prior to the flood event. However, they are seen by many stakeholders as providing valuable information about the performance of assets.

4. Post Approval Evaluations

Defra undertake a periodic exercise called “Post Approval Evaluation” to check that the (ex-ante) decision making is robust and in line with guidance (albeit without evaluating realised impacts). This is not a review in the sense of an EPE but is focussed on decision making processes. In the Executive Summary of the 2011 review it states that *“The purpose of this post approval evaluation (PAE) is to allow Defra’s risk associated with delegation of approval to the Environment Agency (EA) to be monitored and managed. The evaluation looked for evidence that EA’s appraisal and approval procedures are in line with the appropriate policies and guidance. The study was not commissioned to assess whether particular investment decisions made by the Environment Agency were justified or not”* (Defra, 2011)

5. IDB tours of inspections

¹⁴ See: <https://www.gov.uk/government/publications/jubilee-river-flood-alleviation-scheme/jubilee-river-flood-alleviation-scheme>

¹⁵ Appendix 4

IDBs have local accountability for schemes and undertake annual inspections of works. This helps the IDBs to assess what is working (and what is not). If problems are identified a committee of board members and local people is set up to resolve the issue.

6. MAFF Post Project Evaluations

Previously, the Ministry of Agriculture Fisheries and Food (MAFF)¹⁶ undertook Post Project Evaluations within a couple of years of strategy / scheme completion (but also those that had been in place for several, e.g. five, years), to check whether the strategy / scheme was working as designed. These Post Project Evaluations, of river and coastal schemes, covered: costs, (whether the strategy / scheme was within budget) benefits and benefit / cost ratio; the lessons to be learned; performance issues, such as standard of protection; any effects on the environment of the strategy / scheme; and, to some degree, public and user perceptions of the schemes.

Aspects included in current post-completion reviews

This section summarises the various aspects covered in one or more of the cases reviewed and examples provided by the stakeholders.

1. Stakeholder perceptions and lessons learned

One RFCC (Thames) member reported on how the Committee looks back at the previous years' programme of schemes in March of each year to identify lessons learned for the next years' programme. This informal 'review' is based on perceptions of how a strategy / scheme had performed. Its importance is in having a process in place to use information despite its non-systematic format.

The Dawlish Warren Beach Management Scheme is also an interesting example as it is one of the first schemes that comes under the requirements of the Flood Risk Regulations 2009 which transposed the requirements of the EU Floods Directive, specifically those for improved public participation in flood risk management. It has a prescriptive form of review; starting from appraisal to scheme design, and then thinking about post project monitoring of performance. This type of review is looking at lessons learned on completion of schemes. Community engagement at Dawlish Warren has involved sharing proposals for the scheme at a public exhibition¹⁷.

Nonetheless, neither of these schemes have formal stakeholder engagement as part of the review process, which is representative of the vast majority of EPEs. This issue is further explored as a process deficiency under Research Question 3.

2. Delivery of a strategy / scheme's outcomes

Another type of review reported by interviewees is the End of Project Reports (EPR), as undertaken by Natural Resources Wales (NRW) but also indicated as a key part of the Project Closure process for Environment Agency schemes (Gateway 6). These are focused on whether the outcomes of a project have been achieved; the lessons learned; the costs; and how any issues identified can be addressed. For large projects the EPR is usually undertaken soon after completion of works on site, while with small projects this is done at Gateway 6, at the same time as financial closure. Benefits realisation is part of this process though it unclear how detailed it is in practice.

3. Innovative approaches: outcome and wider benefits

Reviews are occasionally carried out in the context of research projects; for example, Freiston managed realignment (Freiss *et al*, 2008). Here ecosystem restoration for the purpose of coastal flood risk reduction and habitat creation by managed realignment was evaluated. It is important to note that this review was carried out as a case study written for a ProAct Network report. The work looked beyond evaluating the process of decision-making and delivery, which is generally cost-focused. Findings about the additional benefits of the work were that the scheme had:

¹⁶ The Ministry of Agriculture, Fisheries and Food existed prior to the creation of Defra in 2001.

¹⁷ See: <https://www.gov.uk/government/publications/dawlish-warren-and-exmouth-beach-management/dawlish-warren-and-exmouth-beach-management>

- created an important fish nursery area
- contributed to tourism through walking and bird watching attracting over 57,000 visitors 2003 / 04 adding £150,000 to the local economy, and
- established vegetation with the "*species present characterised by increased biomass and surface area so better able to act as a buffer to incoming wave energy.*"

Public perception of the managed realignment was also covered as well as how to incentivise the creation of more intertidal areas via managed realignment and financial comparisons of do nothing, do something and managed realignment (cheapest). However, it was "*difficult to quantify the financial benefits of nature conservation and ecosystem services associated with managed realignment at Freiston shore.*"

This raises an important issue that reviews may focus primarily on those things that can be quantified readily (and in financial terms), even though some of the longer term benefits may be more difficult to so quantify financially.

It is worth noting that Defra's Making Space for Water FCERM strategy (2004) represented a major paradigm shift that emphasised the virtues of non-structural measures in innovative combination with structural measures for flood and coastal risk management. However, much practice seems to have remained rooted in an engineering mind-set. More systematic EPE should identify where practice on the ground does not reflect the national strategy.

Research Question 3

Overall, how does current practice compare with best practice? If there are deficiencies, which are the most significant? Overall, is adequate evidence of "what works" feeding back into planning and scheme design and appraisal?

The response to this question also covers: the second part of Objective a) to review evaluation practice in respect of strategies and schemes and how this compares with good practice; and Objective b) to highlight individual examples of good practice.

The three parts of this research question have been dealt with separately.

Overall, how does current practice compare with best practice?

Research Question 3: Part 1: Main Findings

- Three current practice examples showed that most principles of good practice were covered where some sort of review does actually happen .
- Good practice exists in the transport sector, which could be used as a model for FCERM.

Evaluating the evidence

An assessment of current practice in EPE (using the examples of Freiston managed realignment, Shaldon and Ringmore Tidal Defence Scheme and the Yarm Flood Alleviation Scheme) in relation to good practice (Appendix 7) shows that most of the principles of good practice are covered by these examples.

Examples of current good practice in FCERM

Based on their perceptions of good practice interviewees were asked to provide examples of good evaluations carried out after strategies and schemes had been developed. There were only a few responses received. This tends to suggest that the issue is more the fact evaluation does not happen, rather than poor practice when it does.

1. MAFF evaluations

MAFF evaluations are an example where a set budget was provided for post project evaluation to be undertaken shortly (within a couple of years) after the strategy / scheme delivery:

“Evaluation covered: cost and whether in budget and the lessons to be learned; any effects on the environment of the project; and how well it stood up to wave action.” (Interviewee 4)

2. Natura 2000 compensation scheme evaluations

NATURA 2000 compensation scheme evaluations refer to a review of the effectiveness of the compensation provided. They are essentially habitat creation schemes, hence the output of the process is a number of recommendations and an action plan to make sure these recommendations are delivered and best practice is adopted. According to the interviewee (24), these were very helpful in learning lessons for the future, which included:

“One of the key lessons that we learned from it is making sure that we provide an audit trail. What they found in these evaluations of the older schemes is that there wasn’t a clear record of what the objectives of the scheme were and the monitoring work that was undertaken. It was quite a struggle to go back and try to establish what the objectives were in order to check whether they have now been met. One of the recommendations would be to have a clear and transparent process of storing and archiving information that you may need in 15 years’ time.” (Interviewee 24)

3. Humber Strategy

Another ‘good practice’ example was the Humber Flood Risk Management Strategy (see Appendix 8). Though more a ‘review’, rather than EPE, this is one of the few examples demonstrating formal and structured stakeholder engagement, with extensive working with stakeholders throughout development and implementation stages of the review:

“The update of the strategy has principally involved working with local authorities. There has been a senior officers’ group of representatives of all Local Authorities and also an elective members’ forum bringing together elected members from all six Local Authorities. It fed back in a very detailed way – there is now detailed modelling.” (Interviewee 19)

Despite the successful engagement it was considered a challenge achieving agreement across organisations (Interviewee 19).

Comparative examples of current good practice outside FCERM

1. Transport

One sector that is taking the lead on EPE is transport, with this being led by the Highways Agency with its requirement for Post Opening Project Evaluation (POPE) for all major trunk road schemes (cost >£10m) and a large number of smaller schemes (Highways Agency 2012). The POPE model is illustrated in Appendix 9. POPE collects pre-opening baseline data and data at one and five years post-opening. This process has identified a number of inconsistencies between ex-ante and EPE, providing recommendations including that ‘risk analysis of traffic forecasts should be undertaken, similar to that usually associated with cost forecasts’ (Atkins, 2009; Kelly, 2015). The reviews recommended major changes, without which, ‘spending on new roads will remain a very expensive gamble’ (Campaign for Better Transport, 2010). Transferable lessons that could apply to FCERM include: being consistent in the undertaking of evaluation; the timing of EPE at one and five years after completion; and the use of a proportional approach as to which projects undergo evaluation, which for POPE is road schemes costing >£10m. Nonetheless, it is important to ensure that any process of FCERM EPE also has the flexibility to undertake post-event evaluation.

2. Securing European Funding

Finally there is a requirement for monitoring and review as part of securing European funding. An example, from one of the interviews is the Cleveleys - Wyre Borough Council (based at Fleetwood) scheme evaluation. The £20million scheme aimed to reconstruct hard sea defences and improve the frontage. A European grant was attained for the work, but prescribed the measurement of benefits. Indeed the scheme was successful in putting in place robust defences and encouraged wider access (e.g. disabled access). Following the improvement work tourism benefits increased by 20% (Interviewee 5).

Again thresholds are set for the level of project that requires monitoring and review, although some sources of funding (ERDF) always have this requirement. Monitoring is required for the running of the project and reporting (including interim reporting stages). The review is focussed on ensuring the investment is appropriate but does include learning from previous projects, monitoring (including outputs and results) plus impacts beyond the immediate result of the investment.

Developing good practice principles

Results from the stakeholder engagement (interviews and workshop) showed that the main emphasis in developing good practice in EPE was the need for clarity on:

- Why – the purpose of the evaluation
- What – the focus and spatial scale of the evaluation
- When – timing of the evaluation after strategy / scheme completion
- Who – who will be leading it (ownership) and who will be involved (engagement)
- How – will this be built in the existing process
- For whom – who will be the receptor / audience of the evaluation report
- Against which criteria – baseline data, regional or EU standards etc.
- Policy and operational delivery and the extent to which that forms part of the evaluation.

Selectivity and proportionality were also discussed in the workshop with a number of participants arguing that it is not feasible, nor indeed desirable, to require an EPE for all schemes:

“..it's not worth doing [EPE] on everything, so it is important how we choose.”

“Need to look at criteria for selection.”

This led to suggestions on the use of a filter or a value limit so that not every scheme will need to be evaluated, though these ideas were not developed or discussed further. Proportionality was later revisited with reference to a consideration that small, yet innovative strategies / schemes, which could be particularly interesting to evaluate, might slip through the net if a filter is applied. Overall, participants seemed to agree on a tailored, customised approach.

“Needs a framework that works for FCERM and says that all projects must be set up in a way that could allow EPE but not all will be evaluated. This would require clarity of what the process might do or involve so that the ability to do ex-post is there if required.”

A few workshop participants argued that a simple process is much more likely to be implemented.

“Simple is quick and cheap and likely to happen.”

If there are deficiencies, which are the most significant?

Research Question 3: Part 2: Main Findings

- The main deficiency with current practice in FCERM is that EPE it is not carried out as a matter of general practice, despite there being ‘hooks’ in the current system.

Evaluating the evidence

Deficiencies with current EPE were difficult to identify due to the lack of practice, however significant deficiencies are listed below.

1. Lack of current EPE practice

The main deficiency with current EPE practice in FCERM is that very little is undertaken. While there are ‘hooks’ in the current processes in place for the Environment Agency and other RMAs to undertake EPE, it is not carried out as a matter of general practice. This indicates that for EPE to occur there is a need for drivers and incentives.

2. Lack of EPE being built into strategy / scheme processes

There is no evidence that EPE is being built into the FCERM strategy / scheme processes currently. The use of EPE after FCERM strategy / schemes have been completed and have been operating for some time is reactive rather than planned: it happens if a strategy / scheme fails to perform as expected, but is not carried out as a standard practice.

“It would be useful to see whether delivery has achieved what we thought it should achieve or whether it has cost more than expected. This is only done where a project runs over budget and so get[s] a retrospective review.” (Interviewee 1)

An example of this is Burringham Flood Alleviation Scheme where underestimating the amount of rock needed led to overspend.

Interestingly, as noted earlier, the Gateway review process does allow for benefits realisation to be undertaken, does mention unanticipated benefits and PPAs can be undertaken at times that are appropriate to the realisation of specific benefits thereby fulfilling many of the criteria for EPE. However, they are not being used to provide this evidence and some of the factors as to why this is happening are discussed under Research Question 4.

3. Lack of stakeholder involvement

Lack of involvement of stakeholders was considered to be a deficiency with reviews such as PPAs. One interviewee who is not from a Risk Management Authority (RMA) mentioned being aware that PPA is undertaken but they were not being included in these activities. This interviewee felt that there was a failure to make good use of key stakeholders who might provide valuable contributions, for example in identifying different perceptions on the strategy / scheme.

Good practice EPE involves stakeholders including RMAs, recognising that the nature and scale of impacts may not be the same for everyone. In many cases, it will be feasible to measure impacts in terms of quantitative indicators, but elsewhere it may be more appropriate to use qualitative information, for example about perceptions of the impacts of the strategy / scheme.

Overall, is adequate evidence of “what works” feeding back into planning and scheme design and appraisal

Research Question 3: Part 3: Main Findings

- It appears that lessons learned are not feeding back into planning appraisals and scheme design beyond the immediate project team.

Evaluating the evidence

Lessons learned are covered by the examples of EPE reviewed (Appendix 7), and are also covered in PPAs. The intention is that these lessons should feed back into the processes and design of new schemes. However, there is some debate as to the effectiveness of feeding back the lessons learned and embedding the learning in future practice (see Question 6).

1. Lessons from PPAs

A positive aspect of the PPA process is that it focuses on learning both from what worked and what did not. It looks for lessons from strategy / scheme implementation about what might be done better in the future; this is illustrated in the example of the Yarm Flood Alleviation Scheme (Environment Agency, 2013c) in Appendix 6. It is worth noting that a post-event evaluation of the original Yarm scheme, when it came close to over-topping, drove the requirement for the new scheme that has undergone PPA. The Yarm PPA was an unusual example as it was undertaken 10 years after the scheme was put in place whereas typically PPAs are carried out within two years of the scheme being developed.

PPAs do make it possible to look at lessons about the scheme design (appraisal) process and construction (delivery) process at the time of project completion and to feed these back into the organisation that has undertaken the review. However, it is not clear how these lessons are then used, except in conference papers, and how they are embedded or taken forward by other related organisations.

2. Lack of EPE to learn from

The lack of EPE practice means that currently there is little to learn from. One interviewee expressed concern that there had been no process of ‘looking back’ at previous practice before the approval of the 2015-25 Thames Estuary Strategy, even though there have been a number of aspects which could have been evaluated.

Research Question 4:

If practice is deficient, why is this? (Possible lines of enquiry: Is this due to the way planning and appraisal projects are set up and managed? Is it due to institutional separation between funders and operators, including a lack of scrutiny from Defra or others on outturn performance? Is it due to methodological challenges, especially with the counterfactual, or data issues? Or other factors?)

The response to this question also covers Objective c) to identify existing barriers to good EPE practice, including institutional and cultural issues, adequacy of guidance, and those to do with methodological and evidence challenges, including adequacy of monitoring arrangements and data collection.

Research Question 4: Main findings

- The main deficiencies identified were:
 - management issues
 - lack of requirement
 - lack of confidence
 - cultural issues
 - uncertainty on use of results
 - lack of funding
 - timing.
- Some of the points raised by interviewees coincided with reasons for deficiencies identified in the literature, namely: concerns on outcome and use of the evaluation; lack of skills; past focus; costs and timing.

Evaluating the evidence

The reasons emerging for why EPE practice is deficient that were identified in the literature and raised by interviewees, are discussed below.

1. Management issues

Within the Environment Agency, there are a number of issues in the way that FCERM investment projects are set up and run that act as barriers to EPE.

a. Momentum for EPE

Projects tend to take a long time from start to finish and effort tends to be concentrated on getting the work started and completed, with those involved moving on quickly to other work. This means that it is difficult to keep up momentum for work as the driving force for action has disappeared.

b. Linking with project Gateways

Although FCERM project Gateways allow for EPE (through benefits realisation at Gateway 7, Environment Agency, 2014a), in practice this is not being done.

c. Responsibility for EPE

The project team may not necessarily see themselves as responsible for the evaluation (as would be implied by the PRINCE2 system and Gateways); this could be seen as coming under the responsibility of the asset owners (Area and Asset Managers). Specifically, with respect to the Environment Agency's project management process, responsibility for confirming benefits realisation and benefits ownership is that of the Project Executive rather than the Project Manager.

One interviewee commented that in the Environment Agency, Area Managers are responsible for strategies. They will only review a strategy if there is seen to be a change in the flood risk, such as a hydraulic change in the catchment or if the suggested strategy proved to be too costly.

Points raised by interviewees on the matter of ownership of an EPE:

"Who does it?" (Interviewee 3)

“Need to think where ownership of evaluation is placed. It could be considered to be largely the project team’s role because of use of PRINCE2 and the Gateways. But more practically it may be for the Area and Asset Managers i.e. the asset owners.”
(Interviewee 5)

In resolving this dilemma of who should undertake EPE it should be noted that, in general, evaluators are required to be independent of the project; there would be a conflict of interests if the project manager or owner undertook the EPE.

d. Allocating funds for EPE

The financial cost of EPE was perceived to be a drawback, particularly in the context of pressure on resources for delivery: *“The more evaluation that is done the less you are able to deliver.”* (Interviewee 3). This was a concern for many interviewees and is further discussed under the ‘Lack of funding’. It should be noted, while interviewees understood the benefits of EPE, and some would welcome the opportunity for EPE to be undertaken, pressures on funds and time precluded this from happening.

2. Lack of requirement for EPE (including top-down incentives)

There is a lack of clear instructions from above. Government does not require the Environment Agency or other RMAs to report on longer-term impacts but focuses on a simple target ‘about the here and now’ (the number of houses protected from flooding). Several interviewees commented that for EPEs to be done, this would need to start with action at the highest levels. The fact that grant-in-aid funding isn’t used to pay for EPE was seen as sending out a message that this kind of review is not seen as a priority, as well as representing a practical barrier for RMAs who are juggling budgets.

“Need a driver - obligation needs to be on people who drive the project” (Interviewee 21)

3. Lack of confidence (methodological challenges and stakeholder perceptions)

EPE is often represented as a difficult process requiring considerable resources. This may be partly due to the general lack of familiarity with it, with many FCERM practitioners saying that they are not aware of reviews being undertaken after projects have been completed. Strategies are seen as being more difficult to evaluate than schemes because they are more broad-based and are delivered over a longer timeframe, which makes it harder to evaluate change. The focus for reviews is usually on schemes rather than on strategies, although strategies, as they are long term documents, generally include review dates.

Another argument associated with the ‘difficulty’ of EPE is that FCERM strategies / schemes tend to change over the course of their implementation, so the impacts evaluated at the end may not bear much relation to the initial objectives the scheme:

“So there may be changes to the scope of the project and the appraisal. In the end have we designed what we said we would do? The project gets changed in order to get it finished.”
(Interviewee 5)

This view suggests a wider lack of confidence in EPE, which comes through in a number of comments.

- Lack of expertise and guidance in EPE: *“an economist is needed...”, “Don’t have a template for an evaluation.”*
- Lack of methodological guidance and perceived difficulties in quantifying and assigning monetary values to benefits and shortcomings: *“...this information may be more qualitative than quantitative [so] evaluation would need to be qualitative.”* (Interviewee 4)

- Complexity in assessing individual results / benefits from multiple interventions in an area: *“the detail and the granularity is very important and at the same time adds complexity.”* (Interviewee 16)
- Perception of unreliability of results giving *“a false sense of comfort”*, seen as *“time-consuming”* and *“a waste of time.”*
- Opportunity cost: *“The cost of an evaluation could be spent on a new scheme.”* (Interviewee 13)
- Importance of place and geography in reviewing of FCERM interventions – lack of confidence that the learning could be transferred to other situations or contexts.

Within the desk research, the lack of skills and poor EPE practice is reflected in a number of issues such as:

- errors and biases relating to data collection resulting in spurious accuracy;
- claims of causality when only associations are observed;
- lack of acknowledgment of the possible weaknesses of the methodology applied;
- lack of or inconsistent explanation of the technical assumptions used in EPEs which makes comparison between schemes difficult;
- lack of clarity on when the evaluation stops / how it fits with on-going monitoring.

All these factors combine to create a generally observed lack of confidence in the feasibility, reliability and use of EPE. Naturally, there are counterarguments to some of these deficiencies linked to the weaknesses of the business-as-usual scenario; where the lack of post scheme review allows uncertainty to build over the appropriate and efficient use of financial resources.

4. Cultural issues

Some interviewees did not see the need to evaluate the wider benefits of flood schemes. For some, this was because their focus was on the engineering benefits.

“Just consider engineering benefits. Just get on with the next job. Community benefits are intangible benefits and don’t deal with them, don’t have time. Main benefit is to stop land and property flooding.” (Interviewee 6)

There was some scepticism as to whether the input on the EPE would justify the return. Moreover, it was argued that if the outcome of a scheme is to protect properties and since there has been no reported flooding, then the scheme has been successful, in which case it is questionable whether an EPE would show more than this. It was also questioned as to how far doing EPE would help the delivery of greater benefits. Unless it was clearly part of the whole process, there could be a danger that people could just follow the process and not carry the learning through into future schemes.

“You need people with the will to make a difference and to see that it is embedded and really make it work - otherwise it is just another report.” (Interviewee 16)

Others argued that potential benefits are fully explored during the initial stages through stakeholder engagement. According to one interviewee, stakeholders are extensively advised at the design stage and thus it is not deemed necessary to repeat the process ex-post:

“There is so much public consultation at the strategy and scheme level so what gets built is well received by 90% of the public and businesses. There have been only minor problems, that’s all.” (Interviewee 4)

The lack of problems and complaints after a scheme’s implementation is interpreted as acceptance and satisfaction, which according to this interviewee is attributed to earlier engagement. This links

back to the assessment of a scheme's success in the absence of EPE, already discussed under Research Question 1.

Five interviewees directly echoed the literature in relation to the lack of willingness to talk about or take responsibility for failures.

"If something hadn't worked then it would be buried or not admitted. That might happen. Don't want to broadcast failures." (Interviewee 6)

"..if you do the assessment process you may find that it's unsuccessful." (Interviewee 6)

"[There is a] fear of finding that a scheme is not successful." (Interviewee 6)

"People may not wish to undertake EPE as they will feel that they are being held to account. As coastal projects have critics the weaknesses are frowned upon." (Interviewee 12)

Further, during the workshop a participant expressed a concern over the fear of overspend and failure, potentially leading to a risk of budget overestimations. The latter argument may have political implications, which was also raised by some stakeholders. On the contrary, there were those who were keen to see transparency reinstated in review processes:

"If we want to stimulate learning, we need to create a culture that says it's ok to question"

"The problem is that the agency [Environment Agency] now both develops and approves schemes; [as a result] ...there is nothing very transparent about post scheme evaluation, where they evaluate on the ground the effectiveness of schemes – whether they are on budget, whether they are good value for money, whether they delivered all the objectives for which they claimed in the CBA. So there needs to be a clear and transparent process, with a clear steer from the agency that a number of projects, preferably chosen randomly, should be evaluated." (Interviewee 24)

5. Uncertainty on use of the results

There was also uncertainty amongst interviewees on how the results are going to be interpreted and used. For instance many were concerned that the EPE might be rigid in judging the success or failure of a scheme, hence missing, for example, secondary benefits that may be equally important.

"There is a dilemma, in any framework that we create, in assessing this: it can give a false sense of comfort; or there is the risk that it is seen as a waste of time. For example, with a scheme designed to reduce sewage flooding, there may still be flooding but it would not include sewage."(Interviewee 2)

Others focused on the aftermath of a negative EPE and what the consequences would be in terms of the original funding provided.

"If benefits do not meet expected then what happens to the original grant? With IDB and Local Authorities, the grant covers the majority of the scheme costs. If a grant had to be handed back because the scheme did not meet expectations then that would result in problems." (Interviewee 22)

These views reflect evidence from our desk research that those in charge of projects are sometimes unwilling to be accountable for their decisions or their work. They may also worry that if the EPE finds that the level of protection achieved is not as high as expected, this could create anxiety among people in the area.

6. Lack of funding

Lack of funding emerged as the main concern of local authority stakeholders. The main concern was that a requirement for EPE will be incorporated without corresponding funding. Funding was

deemed crucial to avoid putting a strain on already limited resources, as costs were identified for both gathering the necessary information and conducting the EPE.

“Funding for studies is required. What the Environment Agency can do is different to what the Local Authority can do. Elected people would not want to spend money on evaluation. Needs to be part of a grant funded project.” (Interviewee 12)

“Would require a significant investment in money and we don’t have that...if EPE enabled access to further funding then could see the benefit of it.” (Interviewee 20)

“Most work is undertaken for the LLFAs or Environment Agency which have allocated funds for specific tasks. Don’t see how they would get funding for EPE.” (Interviewee 17)

Within the literature reviewed, as well as the costs of obtaining data, defining the counterfactual and institutional memory loss were often cited as barriers to undertaking EPE. However, if monitoring frameworks are put in place at the start and maintained after opening, these costs could be minimised.

7. Timing

Timing was one of the practical issues discussed both with interviewees and workshop participants. Many raised the issue of the time lag between a scheme’s conception and its review. Some mentioned that resources and energy dissipate during the scheme’s delivery. Furthermore, once completed, people with the knowledge and details of the scheme are likely to move on:

“people disappear...it is difficult to keep momentum going” (Interviewee 5)

“..the knowledge and detail of the scheme is lost” (Interviewee 10)

“Teams move on after projects.” (Workshop participant)

This issue of moving onto future strategies / schemes contrasts with EPE, which looks back at the past, and this barrier was discussed in the literature. It is not just an institutional or cultural issue of staff not wanting to reflect on past practice, it is also a practical problem as the time lapse from ex-ante through to post-project and then ex-post stages result in changes in the ownership of the work. Careful documentation and planning for all tasks from ex-ante to ex-post is key. The increase in partnership work will have the added dimension of accessing stakeholder memory over time.

Participants at the workshop further concentrated on the disparities that time lags may cause in the use of terminology, standards, data use and measurement.

“How do you compare the era for when something was built for the era you are evaluating in?”

“Any evaluation done five+ years down the line needs to take account of the rules at the time the project / scheme was carried out.”

Finally, while any review, such as a PPA, undertaken one or two years after scheme completion, may be sufficient for assessing shorter-term impacts, it does not allow effective review of impacts on the local economy and environment (Atkins & AECOM, 2014).

Research Question 5

Does the rise of partnership working and funding in FCERM imply a greater need for good EPE of plans, strategies and schemes?

This research question does not directly link with any of the objectives.

Research Question 5: Main findings

- A rise in partnership working and funding has indicated a need for EPE of strategies and schemes to demonstrate the wider benefits of FCERM as a means of securing wider partnership funding.
- Different partners would have different needs and expectations of a scheme, beyond reducing flood risk, which could be taken into account in EPE.
- As partnership working and funding adds a new level of complexity with regard to needs for, and expected outcomes from, schemes it therefore increases the argument in favour of EPE.

Evaluating the evidence

The interviews and workshop identified that a rise in partnership working and funding did indicate a need for EPE of strategies and schemes. This need centred around demonstrating the wider benefits of FCERM (environmental, social and local economic benefits) in order to secure wider partnership funding. Interviewees and workshop participants also recognised that different partners would have different needs and expectations of a scheme, including benefits stemming from reduced flooding risk, and that this would need to be taken into account in EPE.

The existing literature from organisations that are carrying out most of their work through partnerships provides strong endorsement of the value of EPE. Partners will wish to know the impact of their contributions and will want to see how their aspirations have been realised and the effect of certain measures over time. Organised knowledge sharing is the basis of competence building.

“The more complex projects become, the less we can afford to start from square one in managing subsequent projects, and the more systematic inter-project learning becomes a tool for competitive advantage.” (von Zedtwitz, 2002)

Partnership working and funding is a new level of complexity and therefore increases the argument in favour of EPE coupled with a systematic approach to learning from the EPE and building this into subsequent work. “Working through partners leads to multi-stage indirect causal chains” (DFID, 2012): these will need to be evaluated in order to provide knowledge and learning to shape future work.

Several points arose in discussion with interviewees in relation to the question on partnership working and funding.

1. Accountability

Carrying out a review once a strategy / scheme has been completed demonstrates that the implementing authority is willing to take responsibility for the intervention and its impacts. In the case of partnership projects it could be argued that this would also demonstrate partners' accountability. This could build trust between partners, improve the effectiveness of partnership working and increase the likelihood of funding being agreed for future projects.

2. Changes to approach in appraisal

For the Environment Agency, Partnership Funding has changed the approach to appraising flood investments, as evidence is needed of the impacts (and the economic benefits in particular) of previous strategy / schemes, in order to secure wider funding.

“Now using a beneficiary case principle – so we have got to pay more attention to value and benefits and so need to demonstrate benefits.” (Interviewee 5)

3. Community understanding

Some interviewees also mentioned that Partnership Funding was changing the understanding in the wider community of what flood schemes will and will not achieve. One participant to the workshop also mentioned the importance of *“having feedback loops for partnership funding and for larger strategies e.g. Humber and Thames”*.

One interviewee suggested that there is still some way to go in involving stakeholders fully in FCERM programme delivery: there is a transition to involving stakeholders more in funding, but the full benefits of this change will only be seen when they have a fuller role in delivery as well. This interviewee saw the Environment Agency’s tendency to emphasise the technical side of the delivery of FCERM strategy / schemes as a barrier to greater involvement by stakeholders. It also limits their involvement in any review process and raises the question of who owns that process. If all partners own the review, this could take the pressure off the Environment Agency or other RMAs. Another Environment Agency stakeholder also emphasised the benefits in terms of social cohesion, it was felt that people involved are then more likely to volunteer for other things in the future.

The increasing involvement of communities in prioritising investments and shaping design means that there is a greater need for these processes to be informed by evidence from a review process.

“Be honest about the difference a scheme can and can’t make and what success may look like and be in tune with the reality that flood has on people’s lives (it’s not about setting up false expectations).” (Interviewee 2)

4. Demonstrating wider impacts

Several interviewees said that evaluating the wider impacts of flood interventions would be beneficial in terms of supporting more investment, for example by potentially helping LLFAs to get schemes approved. Interviewees suggested that there is currently a failure to recognise the outcomes of strategy / schemes *for different stakeholders* and the achievement of wider benefits beyond reducing flood risk, such as environmental enhancement and economic opportunities. From a slightly different perspective, an Environment Agency interviewee held that, if EPE could improve the way that wider benefits are taken into account in FCERM, it would be worth doing. This observation suggests the lack of benefits realisation processes undertaken.

Research Question 6

What would make the biggest difference in terms of improving evaluation practice and enhancing planning and appraisal through capturing better information on how past initiatives have played out in practice?

The response to this question also covers Objective d) to consider how evaluation practice could realistically be improved within existing institutional arrangements, and taking due account of proportionality (getting the biggest improvement for the least burden on RMAs).

Research Question 6: Main findings

- Factors that would make a difference to enabling / driving EPE practice were identified as:
 - a driver from Defra saying that EPE must be done;
 - a clear account of the value and benefits of EPE, complemented by supporting evidence;
 - funding and resources specifically for EPE;
 - plans for EPE being built in from the start of a strategy / scheme;
 - appropriate data and evidence collected and available, when required, to support the EPE.
- Fully understanding the barriers and drivers / incentives for action would help to ensure that future requirements for EPE were robust.
- Suggestions made by stakeholders for improving practice in EPE covered:
 - making it a mandatory requirement
 - planning for EPE from the strategy / scheme initiation / appraisal stage
 - having an independent assessor
 - building on existing processes
 - dedicated funding.

Evaluating the evidence

Given the lack of EPE practice for FCERM at present, it is difficult to answer this question. Fully understanding the barriers and drivers / incentives for action can help to ensure that future requirements for EPE are robust.

Several factors that would make a difference to enabling / driving EPE practice were identified through the interviews and the workshop and these are presented in the box above together with the suggested mechanisms for enhancing planning and appraisal processes.

A list of options for improving and enhancing practice was produced at the workshop and these were included in the discussion of the way forward and are presented in Appendix 10.

What also becomes important as a question is how the benefits or drawbacks of carrying out EPE are regarded. The reasons people gave in answer to whether they thought EPE needed to be done fell into a number of different areas.

Value and benefits of undertaking EPE

Overall the majority of interviewees suggested that EPE needed to happen, even if only for a selection of schemes. The reasons for and benefits of undertaking EPE, as identified through semi-structured interviews, can be summarised in the following.

1. To aid investment and spending decisions at national and local level

The results of EPE would be useful in informing central government decisions on funding of schemes that are proven to yield significant benefits. Further, it can inform local decisions on the best use of resources.

“Why government should be investing in a scheme and how much.” (Interviewee 2)

In some cases, it may even be deemed necessary as a means of reviewing and adjusting a long-term strategy to changing conditions, whether those are legislative (as in the Humber Flood Risk Management Strategy, Appendix 8) or a result of geomorphological / climatic changes.

2. To provide transparency and accountability

There is a trust benefit towards the Government that is associated with transparency. Demonstrating that everyone works to the same rules and that grant application is distributed fairly increases trust but requires recognition of success as well as failures (workshop feedback).

3. To validate the initial plan and claimed benefits

EPE can describe the changes that occurred and the benefits realised *“to see if they [appraisals] have done what they said they should do”* (Interviewee 22). Many interviewees and participants in the workshop agreed that often the results of the schemes remain unknown.

“It would be very helpful if we could get a fuller picture of the benefits that are realised in return for the government investment in flood and coastal erosion risk management. At the moment we rely on prior appraisals of the benefits before a scheme is implemented. Although this is done systematically, we never get to verify the values that we assume. This may understate what is finally achieved. Better data on the benefits actually realised would inform future appraisals and the value of investment.

However, we would need to think carefully about how to incentivising risk management authorities to do EPE. Appraisals are required to make the business case to access government grants; what could we do motivate authorities to do EPE? One suggestion was that a small percentage of the grant could be withheld until an evaluation was complete. However, benefits may take many years to be realised and EPE is mostly likely to capture the value of a scheme several years after the project is complete. So this may not work. An alternative could be to commission independent evaluations of a representative sample of schemes at suitable periods after the project has been implemented”. (Interviewee 7)

4. To gain an understanding of wider benefits

Many of those interviewed provide anecdotal evidence of the ‘wider benefits’ associated with FCERM strategies and schemes, some of which have been evaluated but many have not (see Box 8). There was a feeling that it is important to verify the wider gain in terms of growth, social factors, and avoided damages. One interviewee commented that whilst a lot of effort is put into appraisal, similar effort has not gone into any review processes. It was further suggested that it would be beneficial to move away from traditional models of assessment and develop a new hybrid assessment that incorporates the less tangible social and economic benefits along with the technical aspects. There are methods for doing this, specifically Multi Criteria Analysis (MCA), which are mentioned within the current policy statement (Defra, 2009) on appraisal being described as *“techniques used to support decision making when there are a number of non-monetised or other impacts to be included in the cost-benefit analysis”* (p 46). Within the appraisal guidance (Environment Agency, 2010) there is use of multi criteria techniques which, *“such as weighting and scoring, should be used to aid the systematic comparison of options where all of the impacts have not been captured in monetary terms. This is not an alternative to cost benefit analysis but an extension of it, to ensure that non-monetised impacts are adequately considered in the appraisal processes”* (p.29-30). Further there is advice, specifically for environmental benefits on how they can be accounted for within the appraisal process. In addition, to MCA which allows comparison of options, where not all the benefits have been monetised, techniques are needed to assess these less tangible benefits, and whilst there has been progress over the past decade more work is needed. These benefits could then be examined within an EPE process. It would be useful to get a wider understanding of flood management and capture, for example, psychological impacts. Reduction in

stress once a scheme is in place was considered to be interesting to measure, for example in a coastal area where coastal protection is a big issue and relevant to people's homes.

"What would be useful coming out of the Multi-coloured Manual¹⁸ (FHRC, 2013) would be to look at non tangible benefits of flood protection and how you put tangible benefits on it." (Interviewee 17)

Box 8: Wider benefits

In general, evidence on the wider benefits arising from strategy / schemes tends to be anecdotal. However, a review of the cost effectiveness of Property Level Protection (PLP) Schemes commissioned by Defra (JBA Consulting, 2012) included consideration of wider health and well-being benefits to communities; it reported that PLP measures have resulted in greater 'peace of mind' amongst residents. Below are some of the benefits mentioned by interviewees (in this project).

Environmental benefits

- Godmanchester: enhancement of the local area, including enhancements to individual properties, environmental enhancements and improvement of the town centre that are encouraging tourism.
- Wales: *"A scheme can also have environmental enhancements. These wider benefits are not evaluated at present."*
- Humber: *"Environmental benefits are very important. There are habitat compensating schemes as well as habitat defence schemes within a designated Natura 2000 site. Also benefits from carbon sequestration through to WFD benefits."*

Economic benefits (increased confidence of business sector)

- Banbury: one company moved and sold land for development.
- Carlisle: increased business confidence: *"Now businesses are more confident to locate themselves to the industrial estate and large businesses have invested more there."* Also housing development.
- Redcar: there used to be a run-down sea front but now there has been regeneration of the town.
- Lyme Regis: business rates have gone up by 22% on completion of the 2nd phase of the scheme construction. There has been greater footfall and access on promenade and so greater turnover in businesses.
- The Herne Bay breakwater: replacement of a high sea wall coastal defence with a shore linked breakwater (with brick face rather than concrete). The scheme:

"..enabled the sea wall to be lowered so that people could see the sea. Businesses and houses benefited. No formal evaluation but members and public at Herne Bay have said it has benefited them. Run-down 3-4 storey buildings have since been done up so that it is now a smart sea front."(Interviewee 4)
- Margate coast protection: replacement of a high level sea wall to a stepped revetment where people sit in front of the sea wall.

"The scheme is less than two years old but already there is regeneration of buildings

¹⁸ See text on the Multi-Coloured Manual in Section 3.

behind.” (Interviewee 4)

Social benefits:

- Teignmouth: health benefits, benefits from reduction in anxiety about flooding, reduced road congestion - none of these things are generally evaluated.
- Wales: *“many schemes are in deprived areas and so a scheme can have knock on benefits... These wider benefits are not evaluated at present.”*
- Humber covers the following benefits: *“protection of farmland, property, businesses and people as well as wider economic and social benefits of delivering and managing improvements and managing defences.”* Environmental benefits are very important. Also benefits from carbon sequestration through to WFD benefits and the standard economic benefits from the individual schemes as recognised by the Treasury and Green Book.

Though examples of reviews including social benefits were limited many participants identified their increasing importance along with the risk.

“Would be interesting to look at the psychological impacts and stress of people at risk of coastal erosion. People living on an eroding cliff worry about losing their entire home. Stress decreases with a scheme in place and it would be interesting to measure the impact of this on health. The borough of Scarborough has a long thin coast and there is not much room for rollback¹⁹. Within 20 years a house may be lost. Coast protection is at the top of the list of what people want to happen in the borough.” (Interviewee 12)

5. To capture lessons learned, share knowledge and inform future planning

Developing an understanding of what didn't work and why, was deemed equally valuable to forward planning, by both interviewees and participants in the workshop. Capturing lessons emerging from past mistakes was felt to be useful in ensuring these mistakes were avoided in the future. Securing realisation of this benefit would also require embedding that understanding into future scheme and strategy design. It was suggested that EPE could provide a platform for communicating the lessons learnt and good practice, especially when working with partners. This platform could demonstrate the benefits of knowledge sharing and transfer between schemes or strategies and showcase what a reduction in flood risk could do for a community. One interviewee suggested that it would be useful to have a library of experience that could be drawn upon when future bids are being made.

“It would be good to record the key lessons learned. Nothing is written down. When ‘old’ engineers leave the organisation you lose knowledge. It would be helpful to have a national library of experience. This would be useful when making a funding bid.”

Current practice is lacking in encouraging the dissemination of knowledge. For instance, PPAs are summarised into a report that is circulated as a best practice document. Nonetheless, this report is usually not circulated further than the area where the scheme takes place.

“I am not entirely convinced that is an effective way to disseminate information. More to do to embed the learning.” (Interviewee 8)

“It can be very useful and particularly if it is tied into dissemination of the lessons that come out of it and not only dissemination but engagement with that community in discussing how that can be taken forward.” (Interviewee 16)

¹⁹ Rollback is the physical movement of assets inland away from the threat posed by coastal change (Defra, 2012b)

Another interviewee suggested that it would be worth doing EPE on a selection of schemes again for learning purposes.

“Not for every scheme but for a selection of schemes. It is useful to find out what has worked well and disseminate for good practice. Without the project evaluation then may continue with not such good practice.” (Interviewee 15)

Training and / or guidance may have a role in facilitating the dissemination of learning. This is further explored in Research Question 7.

6. To re-connect schemes and benefits

“The Environment Agency policy has been to develop upstream flood storage to take the work away from the town centres. When you take work away from people (and the town centre) you lose people seeing that you are doing work for them, so they don’t see the connection between doing the work and the benefits to the community.” (Interviewee 10)

The value of EPE in this case would be to show people how the scheme, which they may not be able to see or have contact with, is benefitting them in their local area.

7. To enable access to funding

A few stakeholders saw the commercial benefit in conducting EPEs as a way of demonstrating benefits with the final aim of accessing additional funds for future schemes.

“We are now in the arena where every scheme is linked to wider benefits. If benefits are small in relation to flooding then need more of other benefits. Local Enterprise Partnerships may be generating funds and therefore seeking other benefits. Now using a beneficiary case principle – so have got to pay more attention to value and benefits and so need to demonstrate benefits.” (Interviewee 5)

8. To get partners on board

It was considered that EPE could be a helpful mechanism to ensure approval for future schemes, by providing evidence on the wider benefits of a scheme (e.g. regeneration). One interviewee suggested that it would enable the Environment Agency to show what it could do for other partners, e.g. to reduce flood risk in order to enable growth in an area. It was thought that it might be able to help people to see the benefits of a seawall beyond the direct function i.e. the effects of having the seawall on enabling a town to flourish. One interviewee suggested that people don’t see those interconnections. It was also considered that having a record would help future schemes since at the moment little is recorded and people move on so the learning is limited.

“Ex-post gives a platform for the lessons learned and best practice especially when working with partners. It’s about showcasing the benefits from one scheme to another and in doing so helping to get partners on board. So it’s good to showcase what reduction in flood risk cases can do for a community.” (Interviewee 11)

Opportunities for improving practice in EPE

In the stakeholder interviews, interviewees were asked about what the opportunities for improving practice in EPE were and what would make the biggest difference in terms of improving that practice.

In response to this several themes emerged.

1. Mandatory requirement

EPE needs to be embedded in policies and procedures so it becomes a requirement and gains importance as part of the strategy / scheme. *“If it is an option then people won’t do it”* (Interviewee 10). The need to create a culture that incentivises the delivery of good quality monitoring and

evaluation was also identified as a critical success factor for the DfT Monitoring and Evaluation Strategy (2013).

2. Planning for EPE from the strategy / scheme initiation / appraisal stage

EPE needs to be built in from the beginning and part of the whole framework of implementing strategies and schemes, with funding. One such process is the ROAMEF cycle (see Section 3) that provides a structure for making better decisions and receiving evidence of whether change programmes are achieving their aims and objectives. This was a key factor highlighted by the desk research *“the EPE of projects needs to be factored in extremely early in the design of these projects: any sound project should offer some ways of being meaningfully assessed ex-post.”* (Department for Transport, 2014).

3. Independent evaluators

EPE could be carried out independently – separately from those who carry out the strategy / scheme, provided full access to the data and processes was possible and thorough data recording and archiving occurred throughout the life of the strategy / scheme.

4. Build on existing processes

EPE could build on existing processes, for instance, the PPAs that were thought to pick up a lot of issues. PPAs were thought to be sufficient, by some workshop participants, in terms of identifying whether the process (including timing and costs) of putting the scheme in place was successful or not, and could be used as a basis for developing the wider EPE. From our examination of the Gateways process together with the Operating Instructions for PPA there does seem to be space in which EPE could be developed (see Section 3) and this is followed up on in the proposals (Section 5).

Despite the identification of potential benefits there were a few interviewees who expressed their concerns with regards to additional workload and overlap / duplication of work within existing processes.

“Would have thought the PPA would pick up most things – how the project went, successes, were properties protected. Those processes (the PPA on Teignmouth) should be sufficient to identify whether it was successful or not. At the closure of the project you record lessons learnt and feed back to the business case. Within the project team there is a lessons learnt element. New teams should consult similar teams to identify the lessons.” (Interviewee 13)

“Processes are already in place...it is better to improve those processes rather than introduce another.” (Interviewee 13)

5. Funding

Funding to support the process of EPE is critical to it happening; a conclusion also reached by the Department for Transport in their report on Transport Investment and Economic Performance: Peer Reviews (2014). The majority of respondents also referred to funding provided either separately for the EPE or added to the strategy / scheme budget. As one interviewee (17) pointed out *“within the industry there is the desire for evaluation, what is missing is the mechanism for funding”*.

Research Question 7

To what extent is current guidance (such as the draft FCDPAG6 volume Performance Evaluation) adequate and current, given developments since it was drafted?

The response to this question also covers Objective e) To consider the extent to which evaluation practice could be enhanced through updated guidance to practitioners, issued either by Defra, the Environment Agency or others, taking account of the Government’s “Smarter Guidance” agenda.

Research Question 7: Main findings

- While the draft FCDPAG6 provides background principles, it is also dated and so new guidance on EPE would be required based on the findings of this research.
- Two main issues identified with FCDPAG6 are:
 - it does not clearly position the need to plan for EPE from the outset of the work.
 - it is written from the perspective of the problem owner and is not clear about the need to incorporate / value the perspectives of stakeholders.
- FCERM-AG (2010) refers to some types of review as being desirable but does not reflect the need for EPE.

Evaluating the evidence

Overall, whilst FCDPAG6 provides some background principles for that relate to EPE it is dated, focuses on the evaluation of risk and would require reviewing to both make it compatible with FCERM-AG and to ensure that the requirement for review including EPE, reflects current good practice, needs of stakeholders and the Smarter Guidance agenda²⁰. Under the Smarter Guidance agenda, guidance should be simple and clear to understand and use. Any new FCERM evaluation guidance should be designed around user needs (i.e. the needs of the person using the guidance – the evaluator) and based on the tasks that need to be undertaken (the EPE).

As there is no suitable guidance at present, there would need to be some instruction to assist with the EPE process. We would suggest a collaborative, bottom-up approach to developing practical guidance with practitioners. This would enable the needs of the users to be addressed with a focus on the activities to be undertaken in EPE.

Review of existing FCERM guidance on evaluation

1. FCDPAG6

Two main issues were identified with FCDPAG6:

- It does not clearly position the need to plan for a review from the outset of the work. Therefore the default could be to set the review criteria once the option has been selected i.e. at the end of the appraisal phase (or even at the end of delivery) therefore missing out on the opportunity to establish data requirements / monitoring / baseline as part of the appraisal process (including Environmental Impact Assessment - EIA) which could be cost effective. It would also miss out on the opportunity to look for a counterfactual, which is considered to be a major challenge to effective EPE. It does not talk about “EPE” but rather “performance review” which would suggest more of a focus on how the asset performed rather than assessment of wider benefits.
- It is written from the perspective of the problem owner and is not clear about the need to incorporate / value the perspectives of others particularly when assessing the softer indicators and impacts realisation. 'What has been the public response?' could be broadened to look at ex-ante concerns / expectations / impacts / outcomes promised and what stakeholders think about the realisation of these or not ex-post.

2. FCERM-AG

FCERM-AG (2010) includes the following 'as desirable':

²⁰ See: <http://guidanceanddata.defra.gov.uk/smarter-guidance/>

- post-appraisal evaluation to verify that the appraisal meets pre-set quality criteria;
- post-implementation evaluation to assess the accuracy and robustness of the risks, costs and benefits predicted in the appraisal;
- monitoring associated with consents and licences and to inform future risk management activities through managed adaptive processes; and
- feedback of information to other processes, policies and strategies so they can be updated or maintained.

It also covers some of FCDPAG6 but neither go far enough for defining the additional benefits of EPE, the requirement to do it, the process to achieve it or define the learning / feedback to make the best use of it.

Good practice on guidance

Good practice on guidance suggests that it *“needs to consider the whole cycle covering project appraisal and ex-post as a continuous process with different stages. Within such comprehensive an approach, the EPE of already completed projects shall enable the appraisal procedure to be fine-tuned through an on-going feedback process between the operating results of the existing infrastructures and the assumptions used to evaluate new capital expenditure decisions”* (EVA-TREN, 2008).

Any new evaluation guidance for FCERM would need to take this approach into account along with the requirements for Government’s Digital Service standards for GOV.UK²¹.

Need for guidance

The overwhelming majority of interviewees (13 out of 17) agreed that some form of guidance would be useful, but that was linked to the wider issues of getting the practice into a clear process. Considering EPE was widely viewed as a new practice, a few stakeholders argued that while written guidance should be in place as a starting point, it would not be sufficient.

“It would also help to have people explain, through a presentation or web based conference, the reasons why EPE is important and what it is looking to achieve – rather than just telling people what to do”. (Interviewee 10)

“Guidance would be best in written form to start but it would be useful to follow up with e.g. a seminar.” (Interviewee 4)

Participants at the workshop discussed current practice with reference to existing guidance on good evaluation practice. As one of the participants explained, there is not a lot of familiarity with EPE processes.

“..we don’t understand it very well – not even using all of the Green Book benefits – especially indirect consequential benefits.”

It was felt that the lack of clear guidance would allow people to follow different routes in evaluating. Therefore, it was deemed important for any guidance to offer national consistency between documents to enable comparisons and show people how to undertake EPE. A few respondents mentioned it would be useful to have some examples and also explore what the EPE was going to be used for.

²¹ <https://www.gov.uk/government/publications/govuk-proposition/govuk-proposition>

“Would be useful if some evaluations got underway and the feedback from those undertaking the evaluations passed back to those starting out. This would be helpful as it is good to talk things through with colleagues as part of the learning.”(Interviewee 4)

“...not just identifying how a scheme works and the benefits but also good practice and identify any benefits not forecasted would help with future schemes. Along with guidance, examples of EPEs are good to have.” (Interviewee 10)

Different options for guidance were also explored with interviewees, though media did not appear to be important. Instead this line of questioning reaffirmed the main concern and the importance of ensuring clarity in the process, scope and purpose of the EPE..

“Media doesn’t matter... you can develop all sorts of complexity but that does not always help. You just need a clear set of instructions which people will be comfortable with on how to undertake this and what to do with the result.” (Interviewee 20)

“Getting the scope right is the priority. If you get that right - scope of evaluation and questions - everything else follows.” (Interviewee 16)

Stakeholders from NGOs discussed the use of webinars or short videos though these would probably be more appropriate as an additional feature instead of an alternative to written guidance, due to the higher risk or participants forgetting the information provided. On the contrary, written guidance can be revisited while it can also reach a wider audience of practitioners and stakeholders.

Caution was also expressed that whilst guidance is useful it *“can also become an industry on its own”* (Interviewee 16), so a need was expressed for it to remain modest. It was also suggested that it could be incorporated into existing guidance. One of the proposals was inserting it into the Gateway process in project development together with some training so that everyone who goes through the assessment of a major programme would have to do the training for that. Another stakeholder from Natural England envisaged a formal, rigorous EPE process adapted from the Environment Agency for FCERM plans, which would also include *“a protocol and supporting guidance to help them do it”* (Interviewee 24).

Stakeholders from the commercial sector highlighted an additional aspect of guidance with regards to it demonstrating the value of EPE and enabling the assessment of the wider benefits emerging from schemes.

“Guidance would be needed, but more so if you move away from lessons learned and analysis of the project, and in particular if you look at the wider benefits. Need guidance on wider benefits.” (Interviewee 18)

“How you do evaluation – this needs thinking about, a template is needed.” (Interviewee 6)

“Need to know what data would be of value e.g. link impact on human health and how build that into priority scoring.” (Interviewee 17)

One respondent also argued that there is not a single approach, but rather guidance should be dependent on location, circumstances and stakeholders involved.

Summary of Phase 1 research findings and implications for Phase 2

The findings from Phase 1 led to the development of the Phase 2 case studies. The key findings showed that:

- EPE of strategies and schemes in FCERM is not being carried out in any systematic, pre-planned way in the sense of our working definition or those definitions given in the Green and Magenta Books.

- Environment Agency Post Project Appraisals focus on whether or not the scheme meets its objectives rather than the realisation of benefits, especially wider benefits which are likely to take place at a later date.
- there are some informal reviews carried out such as those by the Thames Regional Flood and Coastal Committees (RFCC) and annual tours carried out by the Internal Drainage Boards (IDB) in Lincolnshire but no evidence of systematic EPE practice amongst any of RMAs was found.
- there is a recognition of the wider benefits of schemes but evidence of the realisation of these benefits is not available in any systematic or replicable form.
- the barriers to not carrying out EPE mentioned by interviewees were
 - cost and / or a source of funding to do it.
 - lack of clear ownership or responsibility for doing EPE
 - cultural issues around why EPE might be needed with some seeing the benefit as focussed on whether the flood defence works as a structure, rather than considering the wider benefits of that flood risk reduction
- there are strong drivers and examples from other areas for EPE (e.g. transport), together with the wider perspective of partnership funding, giving the steer that it is the way ahead. However, whilst many interviewed thought EPE a good idea, others wondered what would be gained from it and how it would be used; this was also reflected at the workshop.
- the current draft *Flood and Coastal Defence Project Appraisal Guidance 6: Performance Evaluation* (FCDPAG6) and the *Flood and Coastal Erosion Risk Management Appraisal Guidance* (FCERM-AG) have limitations and would need to be developed in order to provide the rationale and a clear process for carrying out EPE.

In addition, a set of draft Good Practice Principles for EPE were developed through an analysis of good practice from research together with views from stakeholders collected in Phase 1 of the project in the interviews and workshop.

GPP1: EPE planned in from the outset

GPP2: Clear expression of the purpose of the EPE

GPP3: Defined EPE strategy / scheme objectives and outcomes

GPP4: Defined audience and needs from EPE

GPP5: Identified evaluation questions and outcomes, checked against objectives and outcomes of the strategy / scheme (based on use of a logic model, which might mean that EPE could be undertaken in stages depending on when particular outcomes and impacts are anticipated / realised)

GPP6: Clearly chosen approach (e.g. quantitative, qualitative), confirmed data requirements and measurability including counterfactual and an approach to capturing unintended impacts

GPP7: Plan for resources and governance in place, including engagement with partners and / or stakeholders

GPP8: Monitoring of outputs, outcomes and impacts in place throughout the strategy / scheme

GPP9: Clear and robust evaluation and analysis of data

GPP10: Clarity on use and dissemination of findings

GPP11: Timeframe relevant to benefits realisation

Given that there was no real practice for the research to investigate further work was needed to examine the following research questions:

1. To what extent can existing data and approaches be used within EPE?
2. What are the gaps and what new data might be needed going forward?
3. To what extent were benefits realised as predicted in the appraisals and what are the unanticipated outcomes?
4. To what extent has the EPE provided added value over what would have happened anyway?
5. To what extent could EPE sit within existing processes?

Phase 2 used the case studies to examine these research questions and also looked at the method taken against the Good Practice Principles. The findings are reported in Section 5.

5. Phase 2 - Research findings

In this section the findings from the case studies have been set out:

- in response to the five Phase 2 research questions (Research Questions 8 – 12) and,
- in relation to the Good Practice Principles from Phase 1

Research Question 8

To what extent can existing data and approaches be used within EPE?

The EPE methodology used in the case studies was predominantly a qualitative approach and appropriate for retrospective EPE. In terms of data, both case studies used the Project Appraisal Report (PAR) as the basis for the evaluation. This enabled the construction of retrospective logic models thereby facilitating the review of what happened in practice. Within the logic model there is some quantitative data on outputs and outcomes. The logic model for Shaldon and Ringmore is presented in Table 2 to give an idea of the sort of information it was possible to obtain about the project from the PAR.

In terms of other existing data that could be used, it is possible that useful information is available within the Project Closure Report. This was available only for the Shaldon and Ringmore scheme. Interestingly it had been carried out in 2015 (some years after scheme completion) and so provided useful information on realisation of benefits, but again not at a detailed quantitative level. However, with more forward planning it should be possible to use quantitative approaches and put in place monitoring against key indicators. For example, environmental impacts assessed via the EIA may require mitigation for the potential impact on a protected habitat or species. Building this into the EPE would allow appropriate baseline data collection, monitoring and an assessment of the success of the mitigation at the ex-post phase. It is not clear how this is currently covered from the two case studies that were undertaken, as they did not impact on protected habitats or species.

With respect to other data collected through Internet searches, this had some value as it provided a perspective on the scheme beyond that of the RMA, the Environment Agency. For example, in the Upton Case study, a quote from the local vice-chair of the flood forum and landlord, in the newspaper provided information on how far the scheme had improved business confidence in the town. Ideally, this type of anecdotal data would be able to be backed up with more quantitative data, and this is discussed below. The interviews with stakeholders provided this as well but of course they were carried out as part of the EPE and were not existing data. These were quite a “light touch” way of gathering data and found to be effective for what was required of the case studies.

Stakeholder interviews could be planned for at different stages of the project (project appraisal, on scheme completion, two years after scheme completion and at intervals thereafter as appropriate) which would provide an extremely useful and relatively simple way of collecting data on benefits. They could include the RMA as a stakeholder as well as others involved in or affected by the project.

Existing data and approaches can be the framework for EPE but a specific set of prompts and questions with linked guidance needs to be embedded in the structure. This is needed to ensure that EPE is planned for, realistic, comparable, completed and useful. It will need to be comprehensive so that it is not solely the RMAs tool / perspective and for their benefit. EPE parameters should be developed in partnership to be of value to all partners and stakeholders, and so that the impacts and consequences of the EPE of the project are owned and acted on by all.

By embedding EPE and its ethos within the FCERM processes further links to existing data and processes will be possible. For example the EIA process, Systems Asset Management Plans (SAMPs) and post-event data collection; could all feed into EPE both for setting the baseline, defining the

counterfactual and evaluating the benefits of the investment in the scheme. By making the links and showing the relationship between the existing data that is collected and EPE, the logic model could then be used to bring the information together to carry out EPE.

Table 2: Logic model for Shaldon and Ringmore FAS case study

Context	Inputs	Activities	Outputs	Outcomes	Impacts
The Issue addressed and the context in which it is located	What is invested	The tasks and works undertaken	What has been produced?	Short and medium term outcomes	Long-term and wider outcomes
<p>Manage flood risk to property and people in the villages of Shaldon and Ringmore</p> <p>Understand how the tidal FAS has impacted on the local community</p> <p>Minimise adverse environmental impacts</p> <p>Minimise impact on the existing landscape and visual amenity of the area, in terms of built and natural environment.</p> <p>Minimise the impact of the scheme on the commercial and recreational viability of the area</p> <p>Maximise sustainability</p>	<p>Time and money</p> <p>£8,288K</p> <p>£50K from Teignbridge District Council from a developer contribution for the Shoreside development</p>	<p>Project Appraisal</p> <p>Detailed design and construction</p> <p>Extensive and thorough community and stakeholder engagement</p> <p>Environmental Impact Assessment</p> <p>Landscape design resulting in local stone cladding of walls, use of local materials</p> <p>Innovative works for reinforcing existing walls, resin injection into existing foundations,</p> <p>Niche habitat creation</p> <p>Siting of works compound over the river in Teignmouth</p> <p>Rationalising of existing openings to form a functional FAS structure yet maintaining access and</p>	<p>A tidal FAS including and resulting in:</p> <ol style="list-style-type: none"> i. 940m of existing wall raising and 470m of new build wall; ii. strengthening of existing windows to ten properties on the defence line; iii. eight new telemetry linked flood gates and five sets of access steps; iv. reinstatement of 40 gardens; v. drainage works with new flapped surface water outfalls; vi. community flood wardens and ownership of the flood risk including the closure of the eight (public) gates during 	<p><u>Technical</u></p> <p>Immediate reduction in flood risk from 6% to 0.33% SoP to Shaldon & Ringmore</p> <p>Managed intervention will increase SoP in years 40 and 70 to cater for sea level rise impacts</p> <p><u>Economic</u></p> <p>Option 2h: Benefit £114,558k; Cost £12,474k; B/C Ratio: 9.2; Incr. B/C: 1.4</p> <p>Substantial decrease in the residual risk of flooding to properties (more so than Option 1)</p> <p><u>Health & Safety</u></p> <p>All wall heights sufficient not to be a trip hazard</p> <p><u>Environmental</u></p> <p>Visual enhancement of the foreshore area</p>	<p><u>Technical</u></p> <p>Significant construction works during delivery period and future construction periods in years 40 and 70</p> <p><u>Economic</u></p> <p>Considerable initial capital outlay and future capital outlay</p> <p><u>Environmental</u></p> <p>Raised walls result in loss of sight lines and estuarine views</p>

		<p>functionality for community use</p> <p>Use of locally sourced materials.</p> <p>Consideration of all sources of flood risk not just tidal.</p> <p>Designed to allow height increase at year 40 to manage risk from climate change</p>	<p>times of flood risk and the maintenance and use of the visual enhancements such as planters and seating.</p> <p>vii. niche habitats within the wall structure.</p> <p>viii. reduced surface water flood risk.</p>		
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Research Question 9

What are the gaps and what new data might be needed going forward?

Clearly there are a number of gaps within the existing processes in terms of data that could be used for EPE and links that are not being used to their full potential. The gaps / links relate to:

- clearly defining the preferred option objectives and expected outputs, outcomes and impacts so that the EPE and data collection is appropriate. The case studies had to derive the preferred option objective from the PAR.
- joining up existing data collection with the EPE process so that it can be fed in, for example the niche habitat monitoring at Shaldon was for research purposes but planning it and funding it for longer for EPE could have created a statistically viable data set for quantitative analysis of benefits rather than a qualitative assessment
- gaining sufficient stakeholder input upfront to ensure their needs and impacts can be monitored and evaluated
- valuing the need to do EPE so that the appraisal / business case data and methods are available for reassessment of benefits and costs at the ex-post stage
- consideration and identification of the ‘softer’ and ‘knock on’ impacts that could happen so that they are evaluated for example, local investment to create economic gain at the Clipper Café in Shaldon
- collecting relevant data to be able to assess those wider, softer and stakeholder benefits in the EPE collecting better data on those benefits that have been identified in the appraisal process and ensuring appropriate data collection for quantifiable benefits to be evaluated, which could include collecting data over a longer period. Additional or new data collection may be required to evaluate:
 - Economic impact, such as:
 - Information on the economic benefits from avoiding flood damage following scheme completion to compare with anticipated benefits at the appraisal stage. This might require re-running of hydraulic and flood risk models taking account of the new hydraulic conditions post-scheme and any new hydrological and property data.
 - Data on any upturn in the local economy such as tourism, economic and regeneration benefits. For example in relation to the Upton case study this might be the number of new businesses and increased turnover or opening hours of businesses located close to the river (where gains might be attributed to the scheme (e.g. improved outdoor seating area, access, views, aesthetics of the area)).
 - The counterfactual. This needs to be established at the Project Appraisal Stage and included in a section/appendix as part of the planned EPE. The “do nothing” cases are discussed as part of the appraisal process and it would be important to see what gaps might need filling in order for these to be useful as the counterfactual.
 - People’s perceptions and the psychological impacts of a scheme could be assessed through before and after surveys of the local community. This would provide valuable qualitative information on non-technical benefits of a scheme and the consequential feelings of safety and well-being that can result.

Research Question 10

To what extent were benefits realised as predicted in the appraisals and what are the unanticipated outcomes?

For Shaldon, due to the upfront community engagement and continued relationship with the community for the operation of the scheme floodgates, the ‘hard’ benefits realised were as predicted in the appraisal. However, benefits such as the feel good factor, removal of blight and creation of confidence in investment and house purchasing, were not documented but were an impact of the scheme. Some of these could have been contemplated but they would not have necessarily added to the PAR to justify the scheme and investment. This may be why they were not there. This is why the EPE cannot be solely focussed on the RMAs needs, as partners needs may be less quantifiable but equally valid. It is also the reason why the audience for the evaluation and data requirements may evolve over time. However, there will need to be clarity and boundaries to ensure that EPE can be completed and is used.

Table 3 presents the findings of the EPE for Shaldon and Ringmore with respect to one of the nine EPE objectives that focuses on the core objective of managing flood risk.

Table 3: Evaluation of the effectiveness of the Shaldon and Ringmore FAS in managing flood risk to property and people identified in the case study.

Evaluation objectives	Findings	Impact evaluation
<p>1) To determine whether the scheme was effective in managing flood risk to property and people in the villages of Shaldon and Ringmore?</p> <ul style="list-style-type: none"> Has flood risk been reduced to the optimum economic level? How has the interaction with the community, FWD, Parish Flood Plan, operation of the eight (public) floodgates and the new local tide gauge worked? 	<p><u>Economic</u></p> <ul style="list-style-type: none"> Actual final cost was £7,371000, this was £1,158000 less than the original FSoD approved cost (£8,529000)²². <p><u>Technical</u></p> <ul style="list-style-type: none"> Scheme has been installed as per the design and has been tested by floods and proved successful, but not tested to its design limit. [Interviewee S&R 1, 2 & 6²³]. 2014 a wave dominated event and it held up to that pretty well, it has been tested. Caused some steps to be undermined and they have now been removed (at the seaward end of the scheme) [Interviewee S&R 2]. The community have successfully operated the gates and therefore ensured the FAS has been functional and the level of protection has been in place during times of flood risk [Interviewee S&R 2 & 6]. The PCR notes some issues with gate telemetry and this has been rectified and the learning to involve Hydrometry and Telemetry staff more during design and construction. This has been done, to the benefit of the Teignmouth FAS [Interviewee S&R 1]. The new local tide gauge was not installed as part of the scheme, nor as part of the Teignmouth scheme on the opposite bank. However, the required telemetry appears to be working with the gates being closed by the community flood wardens prior to any potential flood. The community have been happy with the gate closure warnings received so this has not been needed [Interviewee S&R 6] FWD has continued to be provided (now an opt out scheme) [Interviewee S&R 6]. <p><u>Social</u></p> <ul style="list-style-type: none"> Community support for and ownership of the tidal FAS and greater understanding of the risk 	<p>The scheme has been shown to manage flood risk to people and property in Shaldon and Ringmore. However, it has yet to be tested to its design standard.</p> <p>It has reduced flood risk in line with the PAR [Ref 1] and therefore it can be assumed the optimum economic level. Due to the cost savings it may have delivered a higher cost : benefit ratio.</p> <p>Whilst the wall height is not the maximum that could be economically justified (1 in 1000 year 0.1% SoP), it is still economically viable and additionally was supported by the community and Planning Authority.</p> <p>Due to the level and quality of the community engagement from the outset of considering what to do about tidal flood risk in Shaldon and Ringmore the interaction with the community, FWD and operation of the floodgates has worked. Not installing a new local</p>

²² Environment Agency (9 September 2015) Shaldon and Ringmore Tidal Defence Scheme End Project report v2

²³ This refers to those interviewed for the EPE case study: Interviewee S&R [Shaldon and Ringmore] 1 [number of interviewee]

Evaluation objectives	Findings	Impact evaluation
	<p>[Interviewee S&R 1, 2 and 6]</p> <ul style="list-style-type: none"> • Awareness of and conversations about the flood risk are now more open and out there [Interviewee S&R 4]. • Positive feedback initially after completion and up to a year after completion [Interviewee S&R 1]. • Owners with flood windows and doors have a duty to shut them. They have a landowners pack that is kept with the deeds of the property so should be passed on to help reduce the risk of non-closure [Interviewee S&R 2]. • Better protection gives the community a sense of wellbeing [Interviewee S&R 6]. • Managed to get a wall built to a sensible height and taking a sensible approach to be able to add to the height in the future [Interviewee S&R 7]. • There is an increased understanding of the risk and that it is from the tide [Interviewee S&R 6]. • The dedication of the Flood Wardens has been exemplary, to the extent that the co-ordinator who has only recently stepped down (but who was involved from the original community engagement during the PAR stage) has been put forward for a Queen’s Award by the Environment Agency [Interviewee S&R 6]. • A fully integrated team working on the scheme during design and construction delivered multiple benefits including: <ul style="list-style-type: none"> ○ whole team buy-in to solutions was obtained with early value engineering reducing both cost and the construction programme. ○ ensuring all design requirements were seamlessly incorporated into the finished works ○ focussing on value engineering opportunity and to achieve rapid turnaround of design modifications where the historic infrastructure resulted in some interesting unforeseen challenges – such as sections of original wall built directly on sand with next to no 	<p>tide gauge has not affected this.</p> <p>The community engagement has also raised awareness, brought the issue out into the open and achieved a sense of wellbeing.</p> <p>The quality and level of engagement and the ethos behind the approach also delivered benefits to the stakeholders and authorities involved such as the Environment Agency. Notably the integrated team approach that contributed to reduced cost and construction time.</p> <p><u>Timescale</u></p> <p>Benefit realised on completion of scheme.</p>

Evaluation objectives	Findings	Impact evaluation
	foundation ○ supplier focussed value engineering ²⁴ .	

²⁴ *ibid*

For Upton, the benefits as stated in the appraisal were realised. Although the community was split on the proposed defences at the time of the PAR, good consultation with local residents and businesses resulted in a scheme that gained majority support on completion. Most of the scheme benefits highlighted by interviewees were planned at the scheme design stage. However there were a few unanticipated benefits (Table 4) such as the creation of an auditorium around the playing field caused by the bund, the use of the wall outside pubs as a focal point for social engagement, and the feeling of safety from having the scheme in place.

Table 4: Evaluation of unexpected benefits identified for Upton on Severn FAS in the case study

Evaluation objectives	Findings	Impact evaluation
<p>7) To determine whether any unexpected benefits have arisen from the scheme (e.g. technical, economic, environmental, social, and psychological).</p>	<p><u>Economic</u></p> <ul style="list-style-type: none"> • The Swan pub was against a wall as they thought it would ruin their view of the river. However, the road that previously ran in front of the pub has been pedestrianised and now they enjoy additional outside space (Interviewees U3 & U5²⁵). • There has been no impact on being able to change buildings insurance companies so insurance is still an issue (Interviewee U3). • Visitors to Upton are interested in the flooding – it becomes a tourist attraction (Interviewee U6). <p><u>Social</u></p> <ul style="list-style-type: none"> • A time capsule was placed into the flood wall in the Waterside area of the town on 27 April 2012 to mark the construction of the new flood defences. The time capsule contained artefacts from the Kings Head pub, drawings and letters from children at Upton Primary School and other items provided by the local community (Source E & Interviewee U8). • Some people who were against the scheme have since said that the scheme is better than anticipated and have complimented the scheme (Interviewees U3 & U4). Only one person said that the scheme should not have been done (interviewee U4). • The bund around the playing field has created an auditorium for people playing and watching football or cricket. The bund provides a place to sit (Interviewee U3). • The wall along the river front (with the glass panels on top) is wide enough to sit on and put beer glasses on, so provides a focal point (Interviewees U3 & U4). • Everyone is waiting for the water to come up to the glass to see the fish! (Interviewee U4). • People come to view when a flood comes up (interviewee U4). 	<p><u>Economic</u></p> <ul style="list-style-type: none"> • Economic benefits have been accrued by businesses operating along the river. <p><u>Social</u></p> <ul style="list-style-type: none"> • A time capsule was buried by local school children to mark the construction of the defences. This would not have happened without the scheme. • Careful design resulted in the majority of people being in favour of the scheme compared to when the scheme was being proposed. • An unexpected effect and benefit of the bund was that it created an auditorium around the playing field. • The wall with the glass panels has provided a feature for sitting on or resting beer glasses. <p><u>Timescale</u></p> <ul style="list-style-type: none"> • Some of the benefits were realised on completion of the scheme (e.g. the time capsule). Other benefits have been realised since (e.g. use of the bund around the playing field as a sitting area to view sport).

²⁵ Same notation as previously: Interviewee U [Upton] 1 [number of interviewee]

Research Question 11

To what extent has the EPE provided added value over what would have happened anyway?

There were no plans for further review of either of the two schemes looked at as case studies. Overall, then, doing the EPE case studies has allowed an investigation into whether and how benefits of the schemes have been realised which would not have happened otherwise. The case studies provide useful insights into the types of benefits realised as well as those unanticipated benefits.

For Shaldon, the Project Closure Report had made a good review of the scheme and its effect, and had done so later than typically such a report is carried out, which meant there was more time for benefits to be realised than would be the case with usual Project Closure Reports. The added value of doing a form of EPE was to understand the perspective of other stakeholders and it highlighted the value of the community engagement process that was carried out there. The community engagement process ensured that the investment realised the benefits wanted by the community but also had wider benefits because the learning from it benefitted future investment in other schemes such as Teignmouth. It also highlighted the value of capturing perspectives in addition to the RMA. For example the contrasting opinions around whether or not the Clipper Café and beach hut investments benefitted from the scheme, the RMA thought it had but community stakeholders thought it would have happened anyway.

The EPE provided a means of reflecting on whether or not the scheme delivered what was said in the Project Appraisal Report. For Upton this included the opportunity to reflect on issues of concern such as the operation of the scheme, the visual and aesthetic impact of the scheme over time, and whether or not the scheme enhanced the built and natural environment. Without the case study these issues would not have been investigated.

Research Question 12

To what extent could EPE sit within existing processes?

Within the project the team researched the existing project management and review processes that a FCERM scheme has to go through to see if there were existing places with hooks for EPE that could be further developed. In Section 3 (see above) under Organisational Procedures, the two key processes relevant to the Environment Agency are detailed:

- 1) the Environment Agency project management process and Gateway Reviews including the Five Case approach to business planning.
- 2) the FCERM Appraisal Process.

There are hooks within each of those processes for EPE to build upon. In Table 5 the project stage and EPE tasks are linked to the Gateway review stages with reference to the explicit mentions of benefits realisation / evaluation. This shows how EPE could be integrated into existing processes.

Table 5: Links between EPE and existing project management processes

Project stage	EPE tasks	Link with Environment Agency Gateway Reviews	Explicit mentions of benefits realisation or review ²⁶
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²⁶ For more detail on these aspects go to Section 3.

Project stage	EPE tasks	Link with Environment Agency Gateway Reviews	Explicit mentions of benefits realisation or review ²⁶
Project appraisal	Include a plan for EPE that covers: <ul style="list-style-type: none"> • The objectives of the preferred option • EPE objectives and questions • Logic model covering identified outcomes and impacts of the preferred option • Planned monitoring and reporting • Governance arrangements including who is likely to undertake the EPE (in-house or external consultant) • The counterfactual 	<i>Gateway 1 – Business case review and Financial Scheme of Delegation approval</i> <i>FCERM appraisal</i>	<i>Five Case model</i> <i>FCERM Appraisal process</i>
Project planning	Detailed planning of monitoring requirements.	<i>Gateway 2 – Detailed project planning</i>	
Project delivery	Monitoring requirements identified in the PAR for the EPE.	The period between <i>Gateway 3 – Contract award – ensures value for money</i> and <i>Gateway 4 – Readiness for service & Gateway 5 – Contract completion</i>	
Project completion	Prepare project closure report covering evaluation of the process of delivering the project and evaluation of the benefits on completion.	<i>Gateway 6 – Project closure</i>	<i>Benefits Realisation point in Gateway 6</i> <i>OGC Gateway Review</i>
Three to six years after project completion	Carry out EPE – suggest using a mixture of quantitative and qualitative data and to include some stakeholder interviews	<i>Gateway 7 – Benefits realisation and post project appraisal (PPA)</i>	<i>Post Project Appraisal</i>

As the table shows there are places in current processes where explicit mention is made of benefits realisation or review and these should be focussed on as places to embed the EPE process. One key area is within the cross government Five Case Model²⁷ for developing project business cases. The five key components of the model are:

- the Strategic Case
- the Economic Case
- the Commercial Case
- the Financial Case
- the Management Case.

The Strategic Case looks at why the intervention is required and what outcomes (benefits) are to be achieved. The Management Case is where benefits realisation is considered and requires that arrangements be in place for delivery of benefits, monitoring during implementation, post implementation evaluation and Gateway reviews.

The other key process is the appraisal process and the following section provides a suggested approach to integrating guidance on EPE into the appraisal process based on the current appraisal guidance.

A suggested approach to integrating guidance on EPE into the appraisal process and guidance

A set of prompts and questions with linked guidance that fits within the FCERM-AG format is required to integrate EPE into the existing appraisal process. Whilst this could be supplementary guidance, the key links and prompts will need to be embedded in FCERM-AG to give it the same status as the appraisal process, making it part of the core process not an add-on. It would need to be built in from the ‘Define’ stage of the appraisal process model, developed at the ‘Develop, describe and value’ phase and then revised at the ‘Compare and select’ phase when the preferred option is chosen and refined (Figure 3).

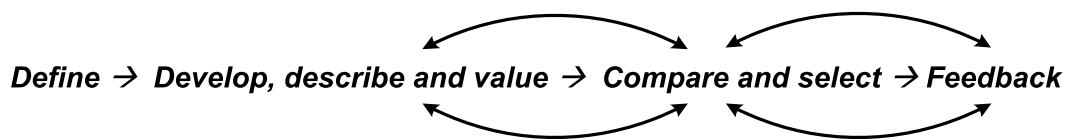


Figure 3: Appraisal process model

Source: Environment Agency (2010) FCERM-AG

Education of practitioners and partners would also be required so that they value the benefits of doing EPE and can adapt their existing approach, to the appraisal and delivery of strategies and schemes, to make the inclusion of EPE valuable, not burdensome and bought into by all relevant partners / stakeholders. Critical to this will be the feedback / learning loop mechanism that will have to be created / reinforced so that the purpose of EPE, to learn and improve, is clear and carried out. This ethos is already central to the FCERM-AG process as illustrated by Figure 4.

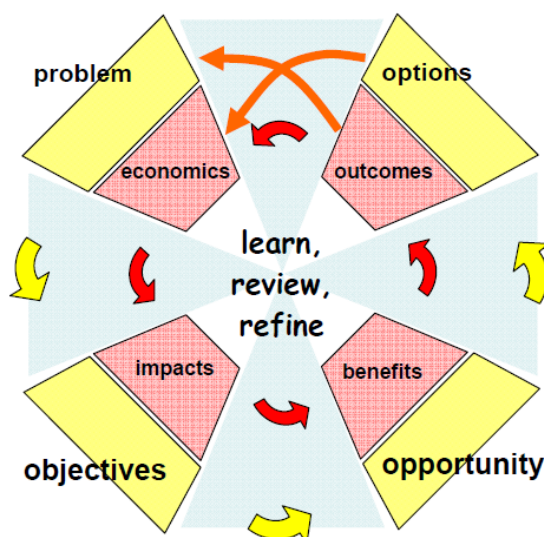


Figure 4: The process of learning, reviewing and refining

Source: Environment Agency (2010) FCERM-AG

Project appraisal is an iterative process involving development, review and refining of options until a robust and sustainable preferred option can be selected. Building EPE requirements into this iterative process will allow the ex-post requirements to be developed, reviewed and refined equally. In turn, thinking about EPE will add a new and valuable dimension to the testing already required to inform the appraisal process decision making. If you can't evaluate the impact of the preferred option how will you know it has achieved the things you have assumed to justify it? A key stage will be incorporating EPE requirements in to the objective setting stage of the appraisal (FCERM-AG Chapter 4) and this will add a level of robustness testing to the objectives that are set. This is also prior to the baseline setting so will allow data, monitoring and counterfactual requirements to be considered. It will also allow the requirements to be included in any Environmental Impact Assessment required.

The next stage of the appraisal process up to selection of the preferred option would allow the EPE requirements to be refined and finalised (FCERM-AG Chapter 6 identify, develop and short-list options; Chapter 7 describe, quantify and value costs and benefits; Chapter 8 compare and select preferred option). EPE requirements could then be included in the appraisal report and PAR template, and costed for as part of the overall process (FCERM-AG Chapter 9).

The FCERM-AG iterative approach already allows for new information to be taken into account, so it should be able to accommodate the ex-post requirements. The level of EPE could be tailored. As an outline the requirements could be shaped around the five types of project already identified in the FCERM-AG (see Chapter 2 page 33).

Currently the FCERM-AG mentions evaluation in Chapter 10, stating that 'the points at which project evaluation are desirable include:

- **post-appraisal evaluation** to verify that the appraisal process meets pre-set quality criteria;
- **post-implementation evaluation** to assess the accuracy and robustness of the risks, costs and benefits predicted in the appraisal;
- **monitoring** associated with consent and licenses to inform future risk management activities through managed adaptive processes; and
- **feedback of information** to other processes, policies and strategies so they can be updated or maintained.'

These are all linked to the overall evaluation picture that is needed. In particular the first, post-appraisal evaluation makes links to monitoring and evaluation 'based on the assumptions and decisions made in the appraisal, to see if they turn out to be correct and the benefits are realised'. In addition, post-implementation evaluation is a product of this and looks to learn lessons for the future and evaluates the extent to which a solution for FCERM provides the benefits predicted in the options appraisal.

In conclusion the essence of EPE is in current guidance but it does not appear as a core to the process but as an add-on. Embedding it should make it more cost-effective and useful, proved the learning loop is also built in and its findings acted on.

Lessons from undertaking the case studies with respect to Good Practice Principles

From the case study review against the GPP from Phase 1, it can be seen that whilst it was possible to carry out a “light touch” EPE retrospectively there are key principles that could not be met (Table 6). These stem largely from the lack of consideration and planning for EPE at the beginning of the scheme development process.

Table 6: Lessons from undertaking the case studies with respect to Good Practice Principles

Good Practice Principles	Lessons from Shaldon & Ringmore	Lessons from Upton
GPP1: Evaluation planned in from the outset	Community engagement process evaluation was planned in and continuous for the appraisal stage and detailed design. After which it was a way of working rather than a separate process. The niche habitat evaluation was planned in at the detailed design stage, not from the outset, but as a research project rather than EPE. EPE was undertaken retrospectively.	N/A – undertaken retrospectively
GPP2: Clear expression of the purpose of the EPE	As this was a retrospective case study it was not covered in the PAR, however it was defined for the case study. However, due their pilot nature the purpose of the community engagement and niche habitat work was clear.	As this was a retrospective case study it was not covered in the PAR, however it was defined for the case study.
GPP3: Defined EPE strategy / scheme objectives and outcomes	Objectives for the appraisal were defined in the PAR. Objectives for the preferred scheme were determined from section 2.7 of the PAR. Due to their pilot nature, objectives were defined for the community engagement and niche habitat work.	Objectives for the appraisal were defined in the PAR. Objectives for the preferred option were determined from section 2.7 of the PAR.
GPP4: Defined audience and needs from EPE	Not defined for EPE. It was defined for the community engagement and niche habitat work. The audience for the case study is Defra, the Environment Agency and other RMAs.	Not defined. The audience for the case study is Defra, the Environment Agency and other RMAs.
GPP5: Identified evaluation questions and outcomes, checked against objectives and outcomes of the strategy / scheme (based on use of a logic model, which might mean that EPE could be undertaken in stages depending on when particular outcomes and impacts are anticipated / realised)	Evaluation questions were developed in relation to the evaluation objectives for the preferred option. A retrospective logic model was prepared based on the information in the PAR. The outcome and impacts were taken from the benefits identified for the preferred option. Due to their pilot nature they were defined for the community engagement and niche habitat work.	Evaluation questions were developed in relation to the evaluation objectives for the preferred option. A retrospective logic model was prepared based on the information in the PAR. The outcome and impacts were taken from the benefits identified for the preferred option.

Good Practice Principles	Lessons from Shaldon & Ringmore	Lessons from Upton
GPP6: Clearly chosen evaluation approach (e.g. quantitative, qualitative), confirmed data requirements and measurability including counterfactual and an approach to capturing unintended impacts	<p>This was in place for the niche habitats but as a research project rather than directly linked to the scheme. Case studies for the community engagement, innovative construction approaches (resin injection and flood windows) and for the quality of the scheme and approach have also been undertaken retrospectively but were not planned for.</p> <p>For the ex-post case study the evaluation approach (theoretical using theory of change and realist evaluation) was chosen on the basis of this being a retrospective evaluation.</p>	The evaluation approach (theoretical using theory of change and realist evaluation) was chosen on the basis of this being a retrospective evaluation.
GPP7: Plan for resources and governance in place, including engagement with partners and / or stakeholders	Defined for the community engagement and niche habitats but there was no plan for resources for EPE at the start of the scheme.	There was no plan for resources for EPE at the start of the schemes.
GPP8: Monitoring of outputs, outcomes and impacts in place throughout the strategy / scheme	Due to the strong links with the community and their responsibility for operating the floodgates, there has been on-going monitoring and feedback from the Parish Council. This has not been for the evaluation of the scheme but for the on-going operation of it. However, it has provided some wider but not quantified feedback. With regard to the niche habitats, these were monitored for 18 months post-scheme completion and have shown a positive result. Longer term monitoring would be need for statistically viable data. Otherwise available documentation and interviews were used to identify the outputs / outcomes / impacts.	No monitoring or reporting of potential impacts arising from the scheme had been undertaken. These had to be identified from available documents and information available online.
GPP9: Clear and robust evaluation and analysis of data	The evaluation and analysis of data was based on documents available and interviews held. It was not thorough or comprehensive as it was not possible to obtain all documents that might be relevant to the study. For the community engagement and niche habitats research this had been planned for.	The evaluation and analysis of data was based on documents available and interviews held. It was not thorough or comprehensive as it was not possible to obtain all documents that might be relevant to the study.
GPP10: Clarity on use and dissemination of findings	Project Closure Report has been completed. It is not clear how widely this will be shared beyond those with a responsibility to the scheme.	The EPE case study is for use by Defra and the Environment Agency with wider dissemination at their discretion.

Good Practice Principles	Lessons from Shaldon & Ringmore	Lessons from Upton
GPP11: Timeframe relevant to benefits realisation	Project Closure Report has been conducted later than anticipated but by being completed four years after the scheme was completed, it has been able to reflect on wider aspects such as the interaction with the community for the operation of the flood gates.	The EPE case study was undertaken two and a half years after scheme completion. In this time most benefits appear to have been realised.

6. Summary, and suggestions for improvement

Summary of findings

From our research it is clear that EPE of strategies and schemes in FCERM is not being carried out in any systematic, pre-planned way in the sense of our working definition or those definitions given in the Green and Magenta Books. There are Environment Agency Post Project Appraisals (PPAs), which focus on whether or not the scheme meets its objectives and are carried out at the end of the strategy / scheme, but they do not focus on the realisation of benefits, especially wider benefits which are likely to take place at a later date. Claims for some of these wider benefits may be made in appraisals but this is not tested in current PPA type reviews. There are also some informal reviews carried out such as those by the Thames RFCC and annual tours carried out by the IDB in Lincolnshire, but we have not found evidence of systematic EPE practice amongst any of the RMAs. Interestingly, the Project Closure Report for Shaldon and Ringmore (case study) was carried out at a later stage than is usual and was able to reflect on some of the benefits, but again this is an exception rather than the norm.

Although there is a lack of practice in EPE, there is recognition of the wider benefits of schemes, with interviewees giving some examples. The evidence of the realisation of these benefits is not available in any systematic or replicable form. The case study research showed that it is possible to gather some of that data through the “light touch” approach used, that is, the combination of desk review and stakeholder interviews, however, there is a case for developing more formal approaches to collect data on wider benefits.

In terms of barriers to carrying out EPE, the main barrier mentioned by interviewees was cost and / or a source of funding to do it. The second most raised barrier was ownership or responsibility for doing EPE, particularly as ownership will change over the life of the project and the impetus to look at benefits could be lost. Currently, there is no direct requirement from Defra to carry out EPE and no other incentives for it to be carried out. Finally, there are cultural issues around why EPE might be needed with some seeing the benefit as focussed on whether the flood defence works as a structure, rather than considering the wider benefits of that flood risk reduction. All of these barriers were discussed within the interviews and the workshop indicating that all are of significance to stakeholders. Further it was clear that these barriers are interrelated and would all need to be addressed to some degree for EPE practice to happen. The case studies provided some evidence for these barriers. Specifically, because there is no current process and ownership of projects is passed on once the scheme has been built it meant there was no specific location for reports and finding the relevant project manager and stakeholders was not straightforward.

In terms of whether EPE should be carried out or not, we would suggest that there are strong drivers and examples from other areas (e.g. transport), together with the wider perspective of partnership funding, giving the steer for the way ahead. However, whilst many interviewed thought EPE a good idea, others wondered what would be gained from it and how it would be used; this was also reflected at the workshop. The case studies did show that useful information could be gathered using a “light touch” qualitative approach that has potential to be embedded within existing processes. However, organisational barriers would still need to be addressed.

Good practice EPE suggests that it is built in from the beginning of the strategy / scheme process, that it has a clear feedback process in terms of how it is used, and that it is done at a time in line with when benefits are likely to be realised. The review of the case studies against the good practice principles showed what would be needed to improve that approach for it to better meet the good practice principles. Table 6 shows those suggestions.

Table 6: Suggestions on the way forward for EPE with respect to Good Practice Principles

Good Practice Principles	Suggestions based on research
GPP1: Evaluation planned in from the outset	The PAR needs to include the requirements for future EPE. This could be done in an additional section or appendix to the Business Case and needs to cover the recommendations for GPPs 2-11.
GPP2: Clear expression of the purpose of the EPE	The purpose for EPE needs to be defined in the Business Case. This would take account of GPP4 – i.e. the audience(s) and its needs. For example, the project engineer’s needs may be different (more focused on construction outcomes) than the Area Flood Risk Manager or Local Authority (who may be interested in wider long-term community benefits).
GPP3: Defined EPE strategy / scheme objectives and outcomes	Objectives need to be defined for the preferred option within the PAR.
GPP4: Defined audience and needs from EPE	This would need to be covered in the Business Case and refined during the detailed design and construction phases. See GPP2. Different business cases may imply different audiences and evaluation needs. Some audiences (e.g. Defra) may not need evaluation in every case, but for a sample over a programme. Others (e.g. project engineers) may need light-touch, narrowly focused evaluation in every case (e.g. to check project delivery).
GPP5: Identified evaluation questions and outcomes, checked against objectives and outcomes of the strategy / scheme (based on use of a logic model, which might mean that EPE could be undertaken in stages depending on when particular outcomes and impacts are anticipated / realised)	<p>Evaluation questions should be developed up-front at the Business Case stage. Desired outcomes and impacts should also be identified at this stage through a logic model approach.</p> <p>It would be helpful for logic model to be developed as part of the Business Case and refined during detail design, to provide the framework for future evaluation and also for reporting at the end of the project.</p>
GPP6: Clearly chosen evaluation approach (e.g. quantitative, qualitative), confirmed data requirements and measurability including counterfactual and an approach to capturing unintended impacts	<p>The evaluation approach taken in the case studies would be suitable for retrospective EPEs for [say something about the audience – Area Flood Risk Managers, Local Authority partners?]. However, it should be noted that this approach only provides a qualitative assessment. Integral to it are interviews with non-RMA stakeholders to gain wider perspectives on the benefits and disbenefits arising from schemes.</p> <p>The approach with modification to incorporate quantitative as well as qualitative assessments of benefits could be used for EPE suitable for audiences interested in verifying economic appraisal assumptions and developing the evidence base on quantified costs and benefits (e.g. Defra). This might not be suitable in every case but for a sample across a programme.</p>
GPP7: Plan for resources and governance in place, including engagement with partners and / or stakeholders	Planning for resources would need to be built in.
GPP8: Monitoring of outputs, outcomes and impacts in place throughout the strategy / scheme	<p>Planning for EPE at the stage of the PAR will require monitoring needs to be identified. These would then be refined and tightened during the detailed design phase.</p> <p>Production of a project closure report (End Project Report or</p>

Good Practice Principles	Suggestions based on research
	Post Project Review) is useful for helping to understand the impacts of the processes undertaken in delivering the scheme. This may be sufficient for some audiences (e.g. project managers or engineers). This can then be used in any wider EPE as a 'stepping-off' point for looking at the short and medium term impacts. To give a full perspective of the impacts it needs to honestly reflect multiple perspectives not just those of the responsible RMA.
GPP9: Clear and robust evaluation and analysis of data	Relevant documents for evaluation and analysis of data would include the project closure report plus any monitoring data and reports produced before and after scheme completion. These would need to be made available to reviewers undertaking any wider EPE (if identified in the original business case and depending on audience).
GPP10: Clarity on use and dissemination of findings	This needs to be planned for at the PAR stage but developed during detailed design and will evolve during the lifetime of the project up to the point of and with the findings of the evaluation. Clarity at the outset is required to ensure the objectives are robust and planned for.
GPP11: Timeframe relevant to benefits realisation	This will be specific to the benefit and objective being measured. As a guide between three to six years after completion. However, EPE needs to also link into and incorporate feedback from existing on-going procedures such as post-event analysis, community engagement and maintenance inspections to get a full picture. The testing of schemes during events (at any time point) is likely to provide a rich evidence base and should be capitalised upon.

In terms of existing guidance, the former unpublished FCDPAG6 and the current FCERM-AG have limitations and would need to be developed in order to provide the rationale and a clear process for carrying out EPE, focussing clearly on different audiences, their incentives and needs. Any further guidance needs to be practical, flexible and devised in collaboration with the RMAs for it to be useful and followed. It also needs to fit with the Government's Smarter Guidance agenda. Any guidance would need to be supported by training and a clear mandate to do EPE for the required change in mind-set and practice to happen.

Finally, having carried out this research and reflected on current definitions we suggest the following definition of EPE in the context of FCERM:

"In the context of FCERM EPE is defined as a process, planned for up front but carried out after a scheme has been completed. It assesses:

- a) *the extent to which the benefits stated in the appraisal have been realised together with an account of why or why not*
- b) *the extent to which any unanticipated benefits have occurred.*

It takes place at a time relevant to the realisation of benefits and is proportionate to the size and nature of the scheme and findings are fed back into the business and action taken as required to improve future decision-making."

Suggested options for improvement

This section is structured around a series of steps for considering whether and how to proceed with EPE of FCERM strategies and schemes. Each step includes suggested strategic objectives for EPE, along with the relevant audiences (who), the current gap in this area, followed by suggested options to achieve that objective.

The suggested options have been developed in order to take forward specific strategic objectives of EPE that have been highlighted by the stakeholders within this research project, as well as addressing systemic and organisational barriers to carrying out EPE.

A case for action: the pros and cons of a decision to take measures to ensure that EPE in flood management projects is undertaken in the future

OBJECTIVE 1: To determine whether to proceed with EPE

The pros and cons of undertaking EPE have been extracted from the research undertaken and listed in Table 7.

Pros identified from:

- the benefits of feeding back learning into planning, scheme appraisal and design (Research Question 3)
- the need identified due to the rise in partnership working (Research Question 5)
- values and benefits of undertaking EPE (Research Question 6)
- the extent that existing data and approaches can be used within EPE (Research Question 8)
- the extent to which EPE could sit within existing processes (Research Question 12)
- to add value over current practice (Research Question 11)

Cons identified from:

- current approaches to assessment of strategies and schemes (Research Question 1)
- the deficiencies in, and barriers, to EPE (Research Question 4)
- building on existing processes (Research Question 6)
- need for guidance (Research Question 7)
- gaps and new data needed going forward (Research Question 9)

Table 7: Pros and cons of undertaking EPE

Pros	Cons
<ul style="list-style-type: none"> • Learning to feed back into strategies and schemes. • To enable community understanding. • To aid investment and spending decisions at national and local level. • To provide transparency and accountability. • To validate the initial plan and claimed benefits. • To gain understanding of the wider benefits. • To capture lessons learned, share 	<ul style="list-style-type: none"> • Questionable need for EPE if a scheme substantially meets the outcomes expected in the appraisal and flood defence objectives delivered. • Cost / lack of funding. • Need for responsibility ownership. • No direct requirement. • Lack of confidence (skills). • Cultural difficulties – focus is on the scheme working and not on the wider benefits. • Uncertainty on use of the results.

Pros	Cons
<p>knowledge and inform future planning.</p> <ul style="list-style-type: none"> • To re-connect schemes and benefits. • To enable access to funding. • To get partners on board • To use current data and join up a range of processes that collect relevant data e.g. EIA, • To enhance and use current processes • To add value over what happens currently • Useful information can be gained from a “light touch” qualitative approach that could be tailored for different scale of schemes 	<ul style="list-style-type: none"> • Time required to undertake EPE. • PPAs already pick up on a range of points to determine whether or not a scheme was successful. • Current lack of guidance. • Need for additional data together with new approaches to collecting wider benefits data • Need to ensure that EPE is integrated fully into existing processes and ensure that cultural difficulties are addressed

Taking the Phase 1 and Phase 2 findings together we would suggest there is a strong case for taking EPE forward in the first place by:

- 4) Strengthening existing processes within the Environment Agency FCERM project management cycle, including the appraisal process and
- 5) Collecting more data retrospectively from existing schemes and
- 6) Purposively choosing new schemes for which EPE will be a priority

These suggested options are outlined in Suggested Options 1 – 9.

Further development of EPE in terms of links with appraisal of, and evaluation of wider and local benefits and the development of a toolkit form Suggested Options 10 -

Laying the ground for EPE: if it is agreed that EPE should be undertaken, what would be the best way to secure this? What could be done in the short-term (e.g. within 1 year)

We would suggest that the Environment Agency could address the following objectives in the near future:

OBJECTIVE 2: To improve project management of FCERM scheme

WHO: Defra and Environment Agency

GAP: This refers to the current organisational focus on future delivery and getting the job done within FCERM processes, rather than looking back at what has happened in a project.

SUGGESTED OPTION 1: Ensure that EPE is embedded into existing project management processes from the outset i.e. the business case stage within Gateway 1. Logic models could be very usefully developed at the business case stage. Draw out the requirement to consider benefits realisation that is part of the Management Case in the Five Case Model, and ensure it is part of the process. A proportionate approach should be taken to the extent of EPE needed for each scheme, but given that Benefits Realisation is an integral part to the project management process there should be clear documentation on how that is to be delivered within a project.

SUGGESTED OPTION 2: Highlight the need for a benefits realisation plan within Gateway 6: Project Closure and ensure it is followed up.

SUGGESTED OPTION 3: Use the opportunity of linking EPE with the Gateways (Suggested Option 1) to streamline some of the reporting requirements where there is potential overlap e.g. PPAs and PPRs

SUGGESTED OPTION 4: Update the current FCERM-AG to include guidance on EPE as suggested in the report.

OBJECTIVE 3: To address the lack of requirement or incentive to carry out EPE

WHO: Defra and Environment Agency

GAP: EPE is not currently required by either the project management procedures of the RMAs or by the key guidance FCERM-AG which states evaluation ‘is desirable’ rather than required. With respect to the Environment Agency, Benefits realisation is part of the Gateway review process, specifically within Gateway 7 where the project sponsor identifies the need for and arranges a post-project appraisal (PPA). However, it is not mandatory.

SUGGESTED OPTION 5: Consider ways to incentivise the process e.g. making it a requirement that a part of the GiA is spent on evaluation

SUGGESTED OPTION 6: Make evaluation including ex-post an approval criteria for projects to pass through gateways i.e. make it a business case requirement to show how it will be planned for and linked to showing the benefits realisation predicted as part of the appraisal and make project closure dependent on a clear plan for carrying out or not carrying out EPE. This could be linked to the needs of different interests – e.g technical approval would only be granted if a project closure report was planned for, and Grant in Aid approval would only be granted if plans were in place should, for example, the scheme be selected to be part of a sample of more in-depth evaluations, etc.

OBJECTIVE 4: To address the lack of funding for EPE

WHO: Defra

GAP: This was an issue not just for the Environment Agency staff but for other RMAs, that there is currently no funding for EPE in FCERM. This is unsurprising given that it is not part of any formal process. “Light touch” approaches would be developed as part of the toolkit which are likely to be lower cost than a more detailed approach.

SUGGESTED OPTION 7: Develop approaches to EPE that are part of current processes so that part of the funding for the scheme could be allocated to the EPE, this links to Suggested Option 6.

The research showed a clear lack of EPE across all the RMAs. Whilst the above suggested options focus on current EA processes and what could be improved in the existing processes, evidence from those EPEs won’t appear for some years. Given this, there are other suggested options that focus further on improving that evidence base in the short term.

OBJECTIVE 5: To assess the real-life value for money from FCERM schemes to inform future investment and funding decisions

WHO: Defra

GAP: Currently no systematic approach to collecting, collating or assessing the data needed to be able to do this. Suggest a dual approach – Suggested Options 8 and 9

SUGGESTED OPTION 8: Defra to build on the method used in the Case Studies in Phase 2 by re-visiting some key schemes, sampling across the range of types of scheme (structural and non-structural) to further understand what benefits can be assessed in places where EPE has not been planned in from the start. This would provide more information on what benefits have been realised together with an understanding of what information would need to be planned for and recorded so that realisation of benefits can be examined in detail.

SUGGESTED OPTION 9: Clearly put in place EPE into a number of schemes that are currently being developed ensuring that the sample represents the types of schemes and the types of benefits that are typical of those schemes. We would suggest that each year a percentage of schemes are chosen by Defra or the EA for EPE and a report is produced each year on the findings of those EPEs as they become available. This is different from Suggested Option 1 because that focusses on strengthening existing processes and making the consideration of EPE the norm. This suggested option would be to focus on those schemes where EPE would be worth carrying out. The findings from these two approaches could feed into the ongoing development of a toolkit (**SUGGESTED OPTION 12**).

OBJECTIVE 6: To provide evidence of the wider benefits of FCERM

WHO: Environment Agency, Local Authorities, other RMAs

GAP: At present we only have anecdotal evidence for wider benefits, yet recognition that there are valuable benefits especially at the local level that accrue from reducing flood risk. In addition, many of these benefits are not easy to measure and at present there is a lack of good methods for doing so. Social and general health benefits of flood schemes which lead to social and economic regeneration have implications for the measurement of benefits both ex-ante and ex-post. Methods need to be explored now to understand better and gauge or measure some of these benefits, although some data and methods are already available (e.g. toolkit for the assessment of benefits of FCERM to the wider economy (Defra, 2014).

SUGGESTED OPTION 10: Building on the Case Study approach work up a series of retrospective case studies across schemes and benefit types e.g. social / economic / environmental showing how they have been realised. This would build on existing Case Study approach and is likely to be qualitative but would show in more detail the types of benefits that exist. This would also help address the cultural barrier that means staff tend to focus solely on engineering benefits. This could be linked to work under Suggested Options 8 and 9 but the focus would be on wider benefits.

SUGGESTED OPTON 11: Encourage the use of newer research into the assessment of social and environmental benefits and local economy benefits at the appraisal stage so that they can be followed up through the EPE. The recent Defra/Vivid Wider Economy toolkit and the etec EVEC handbook could be used to inform appraisal which in turn would enable better assessment of wider benefits through an EPE.

Delivery of EPE: who would be best placed to do it?

OBJECTIVE 7: To determine who would be most appropriate to undertake EPE

The general view, from the research undertaken, was that EPE should be carried out independently – separately from those who carried out the strategy / scheme.

Delivery of EPE: what tools, training, guidance, etc would facilitate it (perhaps with some suggestions on who is best placed to provide this)?

OBJECTIVE 8: To develop a practical toolkit

WHO: Defra & Environment Agency

GAP: Lack of current guidance and out dated FCDPAG6.

SUGGESTED OPTION 12 Development of a practical toolkit for EPE of FCERM

From our research a key identified need is for the development of advice and support on how to carry out EPE for FCERM that

- c) shows how predicted benefits have been realised
- d) shows how wider benefits can be evaluated

Fundamentally, systematic reporting on these two aspects will be the building block of any strategy for EPE going forward. To meet this need we suggest that a practical toolkit is developed by Defra / Environment Agency in collaboration with practitioners from the other RMAs. We would strongly suggest a collaborative approach is taken between practitioners from a range of RMAs and Defra policy staff to ensure that any advice is practical and owned by a range of stakeholders. This would provide a flexible approach to EPE that could be used by a range of RMAs. It would include setting out:

- VII. Good Practice Principles (GPP) for EPE - these would build on and refine those developed through this project
- VIII. a process for carrying out different levels of EPE using different methods of data collection e.g. light touch overview using a collaborative, qualitative approach through to a more detailed quantitative approach linked into existing project management approaches (e.g. Environment Agency Gateways)
- IX. advice on choosing the level of EPE needed e.g. a set of questions around objectives, resources, and timings
- X. advice, methods and examples on how to collect data on wider benefits e.g. social and environmental
- XI. case studies of good practice
- XII. practitioner training – this would address the issue of lack of skills to carry out EPE which was raised by the research.

Some aspects of this toolkit would take time to develop and require further research. Specifically, around methods for collecting data on wider benefits and this is reflected in PROPOSAL 2.

OBJECTIVE 9: To learn from existing FCERM strategies and schemes for future developments

WHO: Environment Agency, Local Authorities and other RMAs

GAP: Currently, there is no way of systematically capturing practice and learning with respect to FCERM strategies and schemes and feeding it back into the process to enable improvements, e.g. lessons in project and contract management, construction work, environmental enhancements, and stakeholder engagement. This includes feeding back on how policy documents (e.g. CFMPs, SMPs and LFRMs) should evolve, i.e. has the right approach been chosen, should there be a change from structural to non-structural?

SUGGESTED OPTION 13: Create a web-space to put examples and case studies – linked to the toolkit. Develop a learning network across RMAs and stakeholders to come together to share practice both what is working and what is not working. Put in place space for reviewing benefits realised and wider benefits within higher level document reviews. Defra would need to scope out who would maintain and manage this network and look into possibly making it a requirement that people put info on the network after they have carried out an EPE.

OBJECTIVE 10: To encourage partnership in FCERM strategies and schemes

WHO: Environment Agency, Local Authorities and other RMAs

GAP: Currently, there is no way of systematically capturing practice and learning with respect to FCERM strategies and schemes and feeding it back into the process to enable improvements, e.g. lessons in project and contract management, construction work, environmental enhancements, and stakeholder engagement. This includes feeding back on how policy documents (e.g. CFMPs, SMPs and LFRMs) should evolve, i.e. has the right approach been chosen, should there be a change from structural to non-structural?

SUGGESTED OPTION 14: If the learning network and resources were in place (Suggested Option 13) then this could be used in discussions with potential partners. However, it might also be useful to visit a scheme that has been identified as having specific wider benefits to show potential partners what might be possible and to hear from stakeholders their views on the benefits. Ways of carrying out this light touch collaborative approach would be detailed in the toolkit.

OBJECTIVE 11: To increase confidence of staff in methods, and findings of EPE

WHO: Environment Agency, Local Authorities and other RMAs

GAP: This refers to a number of issues: lack of skills of staff to carry out EPE; lack of methods to carry out EPE; perceptions of EPE as complex and difficult; and lack of confidence in findings given the complexity. This objective would be addressed partly through Proposal 11 – development of the toolkit – as that includes some practitioner training and development of methods. However, we would also suggest some wider capacity building in evaluation generally and EPE for FCERM staff in order to help to develop a culture of reflection and learning.

SUGGESTED OPTION 15: Develop skills of staff – capacity building in evaluation and EPE for FCERM staff.

Activities arising from the desired outcomes: what might success look like?

OBJECTIVE 12: To provide transparency and democratic accountability

WHO: Defra and all RMAs both internally but also publically

GAP: Currently there is a gap in showing members of the public what benefits occur as a result of a FCERM scheme beyond what they may see or experience within their local area, so not in any systematic way. This would also be useful in showing what can and can't be achieved with FCERM schemes as well as ensuring there is clarity on how investments in FCERM are justified.

SUGGESTED OPTION 16: If clear processes are put in place then that provides the basis for addressing this objective, together with openness about the findings e.g. published on GOV.UK. In addition, discussion of benefits and what has / hasn't been achieved should be carried out with

members of the public in areas with FCERM strategies or schemes.

OBJECTIVE 13: To develop clear ownership of EPE

WHO: Environment Agency, Local Authorities and other RMAs

GAP: Within the Environment Agency specifically there a lack of ownership of any EPE process, with the project manager only responsible until the project has finished which does not include any evaluation.

SUGGESTED OPTION 17: Ensure that there is clear ownership of EPE process throughout the life of the project and with each change of responsibility (from client to appraisal to delivery and back to client) e.g. by ensuring that evaluation has been planned for and is owned before the project closes or have independent evaluators from the outset to work with the projects.

OBJECTIVE 14: To develop a culture of openness, learning and critical evaluation with respect to EPE in FCERM

WHO: Environment Agency, Local Authorities and other RMAs

GAP: Concern was expressed that there could be a lack of willingness to discuss any failure or schemes that had not produced the expected benefits or had overspent yet there was also a desire to have a more open culture with the ability to discuss failure and to learn from it.

SUGGESTED OPTION 18: Include discussions of what did not work across the learning network and within EPEs ensuring the support of senior staff and carried out with the focus on learning rather than apportioning blame. Encourage individual project teams or RMAs to have informal “lessons learned” exercises (e.g. on site visits) in advance of any more formal evaluation.

7. References and bibliography

Documents referred to in the report

Atkins (2009) *Post Opening Project Evaluation Meta-Analysis Summary Report*. Report to the Highways Agency, March 2009.

Atkins & AECOM (July 2014) *Meta evaluation of Local Major Schemes: Final Report*. For the Department of Transport.

Campaign for Better Transport (January 2010) *Investing in road building: The Highway's Agency's billion pound traffic gamble*.

Clarke, J., McConkey, A., Samuel, C., and Wicks, J. (2015) *Quantifying the benefits of flood risk management actions and advice. Flood incident management and property level responses Report – SC090039/R Stage 3*. London: Defra.

Defra (2004) *Making space for water. Developing a new Government strategy for flood and coastal erosion risk management in England. A consultation exercise*.

Defra (2009) *Appraisal of flood and coastal erosion risk management: A Defra policy statement, June 2009*.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69419/pb13278-erosion-manage-090619.pdf

Defra (2011) *Post Approval Evaluation of Flood and Coastal Erosion Risk Management Investments Synthesis Report* <http://www.defra.gov.uk/environment/flooding/funding-outcomes-insurance/measuring-performance/>

Defra (2012a) *Department for Environment, Food and Rural Affairs Capability Action Plan*.

Defra (2012b) *Coastal Change Pathfinder Review. Final Report*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69508/pb13720-coastal-pathfinder-review.pdf

Defra (2014) *Flood and coastal erosion risk management and the local economy: toolkit full report*. March 2014.

Defra (unpublished) FCDPAG6: *Flood and Coastal Defence Project Appraisal Guidance – Performance Evaluation DRAFT*.

Department for Business, Innovation and Skills (BIS POPE) (2011) *Guidance on evaluating the impacts of interventions on business*.

Department for International Development (2012) *Working paper 38 Broadening the range of designs and methods for impact evaluations*. Report of a study commissioned by the Department for International Development.

Department for Transport (2013) *Monitoring and Evaluation Strategy*.

Department for Transport (2014) *Transport Investment and Economic Performance: Peer Reviews*.

Dunsford, D., Coombes, M., Naylor, L., Thompson, R. and Jackson, J. (2013) *Enhancing our Water Environment – A Guide to Managing Flood Risk Sustainably: Case Study – Preserve and improve water's edge and bank side habitats, Shaldon Intertidal Habitat Enhancement*.

Environment Agency (2007) *Making Space for Water case study Shaldon Tidal Defence: Managing Flood Risk through people power*.

Environment Agency (2010) *FCERM-AG Flood and Coastal Erosion Risk Management Appraisal Guidance*.

Environment Agency (2013a) *Grant memorandum: Memorandum relating to capital grants for local authorities and Internal Drainage Boards in England under the Flood and Water Management Act, 2010, Coast Protection Act 1949, and Land Drainage Act 1991*.

Environment Agency (2013b) *Closing a project*. Operational instruction 303_04.

Environment Agency (2013c) *Post Project Appraisal Report: Yarm FAS*.

Environment Agency (2012/2013) *Retrospect: Highlights from the post project appraisal programme*

Environment Agency (2014a) *Gateway review process for ncpms*. Operational instruction 209_07.

ESRC (2015) Centre for evaluating complexity across the energy-environment-food nexus. <http://www.esrc.ac.uk/news-and-events/events/33457/centre-for-evaluating-complexity-across-the-energy-environment-food-nexus.aspx>

EVA-TREN (2008) *Improved decision-aid methods and tools to support evaluation of investment for transport and energy network in Europe*. European Commission, Sixth Framework Programme priority 8.1 Policy orientated research.

Flood Hazards Research Centre (FHRC) (2013) *Flood and Coastal Erosion Risk Management A Manual for Economic Appraisal (the Multi-coloured Manual MCM)*. <http://www.mcm-online.co.uk/manual/>

FLOODsite Consortium (HR Wallingford) (2008) *FLOODsite Integrated Flood Risk Analysis and Management Methodologies – Guideline for EPE measures and instruments in flood risk management*.

Friess, D., Moller, I., Spencer, T. – Cambridge Coastal Research Unit (2008) *Managed realignment and the re-establishment of saltmarsh habitat, Freiston Shore, Lincolnshire, United Kingdom. The Role of Environmental Management and Eco-Engineering in Disaster Risk Reduction and Climate Change Adaptation” (ProAct Network 2008)*, www.proactnetwork.org

HM Government (2011) *Open Public services White Paper*. TSO.

HM Government (2012) *The Civil Service Reform Plan*. TSO.

HM Government (2013) *What Works: evidence centres for social policy*. Cabinet Office.

HM Treasury (2011a) *The Green Book, Appraisal and Evaluation in Central Government*. TSO.

HM Treasury (2011b) *The Magenta Book – Guidance for Evaluation*. <https://www.gov.uk/government/publications/the-magenta-book>

HM Treasury (2012) *Quality in policy impact evaluation: understanding the effects of policy from other influences (supplementary Magenta Book guidance)*.

HM Treasury (2013) *Public Sector Business Cases Using the Five Case Model: Green Book Supplementary Guidance on Delivering Public Value from Spending Proposals*.

Institute of Environmental Management and Assessment (2012) *EIA Quality Mark Case Study Shaldon and Ringmore Tidal Defence Scheme*. www.iema.net/qmark

JBA Consulting (2012a) *Establishing the cost effectiveness of property flood protection: FD 2657*. For Defra Available at: <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18119>

JBA Consulting (2012b), *Evaluation of the Defra Property-level Flood Protection Scheme: 25918*. For the Environment Agency.

JBA Consulting on behalf of Defra (2014) *Flood and Coastal Erosion Resilience Partnership Funding Evaluation*, Final Report and appendices. Defra.

Kelly, C., Laird, J., Costantini, S., Richards, P., Carbajo, J., and Nellthorp, J. (2015) *Ex post appraisal: What lessons can be learnt from EU cohesion funded transport projects?* Elsevier.

National Audit Office (2014) *Strategic flood risk management*. NAO. Available at: <http://www.nao.org.uk/wp-content/uploads/2014/11/Strategic-flood-risk-management.pdf>

MAFF (2001) *FCDPAG2. Flood and Coastal Defence Project Appraisal Guidance. Strategic Planning and Appraisal*.

Oxera (2005a) *How should the ex post evaluation of trunk road schemes be enhanced?* Executive summary.

Oxera (2005b) *How should the ex post evaluation of trunk road schemes be enhanced?* Final report.

Tavistock Institute (2010) *Logic mapping: hints and tips for better transport evaluations*. Department for Transport.

Thompson, P.M., Wigg, A.H. and Parker, D.J. (1991) *Urban flood protection post-project appraisal in England and Wales*.

Straw E., and Colbourne, L. (2009) *Evaluation of the use of working with others – Building Trust for the Shaldon flood risk project*.

United Nations Development Programme (2011) *Addendum, Handbook on Planning, Monitoring and Evaluating for Development Results*.

von Zedtwitz, M. (2002) Organizational learning through post-project reviews in R&D. *R&D Management Journal*, 32: 3 255-268.

Documents reviewed in support of this project

Atkins and Halcrow (2012) *Poole and Wareham flood and coastal erosion risk management strategy. The Poole and Wareham Strategy*. For the Environment Agency.

Chubb, R. (2013) *Godmanchester Flood Alleviation Scheme delivering a series of flood defences to protect 560 homes and properties in Godmanchester, Cambridgeshire*. UK Water Projects Online. Available at: http://www.waterprojectsonline.com/case_studies/2013/EA_Godmanchester_2013.pdf

Defra (2010) *Technical report RMP 5357/TR: Policy Evaluation of the first generation catchment management plans (CFMPs)*.

Defra (2014) *Post-Installation Effectiveness of Property Level Flood Protection. Final report FD2668*

Defra (2014) *Synthesis of flood social science evidence for policy decision and delivery improvement Final report FD2671*.

Defra and Environment Agency (2015) *Internal Drainage Board Beneficiaries and Performance Indicators Final report FD2659*.

Defra and Environment Agency (2015) *Internal Drainage Board Beneficiaries and Performance Indicators (Annexes) Final report FD2659*.

Defra and Environment Agency (2015) *Investigating and appraising the involvement of volunteers in achieving FCRM outcomes Project Summary SC120013/S*. Available at: <https://www.gov.uk/government/publications/investigating-and-appraising-the-involvement-of-volunteers-in-achieving-flood-risk-management-outcomes>

Defra, Welsh Government, Environment Agency and Natural Resources Wales (2015) *Flood and Coastal Erosion Risk Management R&D FCERM Research News Issue 26*. <http://evidence.environment-agency.gov.uk/FCERM>

Department for Transport (2013) *Monitoring and Evaluation Programme*.

Department for Transport (2014) *Value for money assessment for the local sustainable transport fund*.

Environment Agency (2008) *Humber Flood Risk Management Strategy, summary document*.

Environment Agency (2010) *Response to Defra Policy Evaluation of the first generation catchment management plans (CFMPs)*.

Environment Agency (2012) *Catchment Flood Management Plans Annual report*.

Environment Agency (2012) *Exe Catchment Flood Management Plan, summary report*.

Environment Agency (2013) *Poole Bay, Poole Harbour and Wareham Flood and Coastal Erosion Risk Management Consultation Report*.

Environment Agency (2013) *Poole Bay, Poole Harbour and Wareham Flood and Coastal Erosion Risk Management Draft strategy*.

Environment Agency (2013) *Post Project Appraisal Report Cleveleys Coast Protection Phases 2&3*.

Environment Agency (2014) *Flood Risk Management in Huntingdonshire presentation*.

Environment Agency (2014) *Thames RFCC – Sub Committee Meeting: Minute, 3RD March 2014*.

Environment Agency (2015) *Carlisle and Cumbria floods 2005 – round up*.

Environment Agency (2015) *Cumbria floods 5 years on infographic*.

Environment Agency (2015) *Infographic for evaluation – Cumbria and Carlisle floods anniversary*.

Environment Agency (2015) *Tenth Anniversary of Cumbria floods 2005 – facts & stats + quote*.

Evans, R. (2007) *Transport for London Congestion Charging: Central London Congestion Charging Scheme: EPE of the quantified impacts of the original scheme*. For Congestion Charging Modelling and Evaluation Team.

Fox, A. (2014) Presentation to Kevin Barnes of Environment Agency on *Communities, institutions and flood risk: mobilising social capital to improve community resilience*.

Halcrow Group (2005) *Cleveleys Promenade Project Appraisal Report*. For Wyre Borough Council.

Highways Agency (2012) *Post Opening Project Evaluation A1 Peterborough to Blyth Grade Separated Junctions: one year after opening*.

Japan International Cooperation Agency Evaluation Department (2014) *JICA Guidelines for operations evaluation*.

JBA Consulting on behalf of Bath and North East Somerset Council (2013) *Chew Magna Property-level Protection Scheme Evaluation, Final Report*.

Aerts, J.C.J.H., Botzen, W.J.W., Emanuel, K., Lin, N., de Moel, H. and Michel-Kerjan, E.O. (2014). Evaluating Flood Resilience Strategies for Coastal Megacities. *Science*, 344(6183), 473-475. Kent County Council (2013) *Local Flood Risk Management Strategy*. www.kent.gov.uk

Lewes Flood Action – *Pressing for action about the Lewes Floods*, website www.lewes-flood-action.org.uk

Ministry for the economy, finance and industry, Directorate General of the Treasury (2011) *EPE of a project to improve the performance and management of the public lighting system in Ho Chi Minh City, Vietnam.*

MHFA England, Northumberland and Tyne and Wear NHS Trust, *Northumberland Pilot Study, Evaluation of Mental Health First Aid Training for Flood Recovery Workers.*

National Audit Office (2014) Evaluation in Government. Available at: <http://www.nao.org.uk/report/evaluation-government/>

Penning-Rowsell, E., Priest, S., Parker, D., Morris, J., Tunstall, S., Viavattene, C., Chatterton J., and Owen, D. (2014) *Multi-coloured Manual, Flood and Coastal Erosion Risk Management Handbook and Data for Economic Appraisal*, MCM online.

ProAct Network (2008) *The role of environmental management and eco-engineering in disaster risk reduction and climate change adaptation.* www.proactnetwork.org

Sustrans, University of Bolton and ITS (2009) *Cycling England: Cycling Demonstration Towns, monitoring project report 2006 to 2009.*

TASM (2011) *What is the impact of transport schemes on economic geography? Summary of position in DfT guidance, and supporting evidence.*

Tavistock Institute in consultation with AECOM (2010) *Guidance for transport impact evaluations. Choosing an evaluation approach to achieve better attribution.*

UK Government (2014) What Works Network. <https://www.gov.uk/what-works-network>

Venables, A.J., Laird, J., Overman, H. (2014) *Transport Investment and Economic Performance (TIEP): Implications for project appraisal.*

Welsh European Funding Office (2008) *Monitoring and evaluation guidance version 1.02.*

Welsh European Funding Office (2009) *Monitoring and evaluation requirements version 1.02.*

Appendix 1: Examples of terms used in EPE

EPE is an ‘after’ assessment of how an intervention worked and whether its expected costs and benefits were achieved. The ‘after’ assessment may focus on different aspects of a project; consequently various terms are used. These terms can be sub-divided as follows:

- a) Types of evaluation used by the evaluation community / practitioners, for example:
 - **Process evaluation** (The Magenta Book, HM Treasury, 2011a): relates to *‘the processes by which the policy was implemented’* (p.18).
 - **Impact evaluation** (The Magenta Book, HM Treasury, 2011a): an effort, *‘to provide a definite answer to the question of whether an intervention was effective in meeting its objectives’* (p.19).
 - **Economic evaluation** (The Magenta Book, HM Treasury, 2011a): considers *‘whether the costs of the policy have been outweighed by the benefits’* (p.20).
- b) Terms that FCERM practitioners use for evaluation and evaluation-like activities:
 - **Post project evaluation** (Flood Appraisal Policy Statement, Defra, 2009): *‘A procedure to review the performance of a project with respect to its original objectives and the manner in which the project was carried out’* (p.46) (In practice these evaluations are referred to as Post Project Appraisals).
 - **Post-implementation evaluation** (FCERM Appraisal Guidance, Environment Agency 2010): a means to, *‘assess the accuracy and robustness of the risks, costs and benefits predicted in the appraisal’* (p.284).

Each of these terms has a specific meaning. As a variety of terms are used in evaluation of interventions, this project may cover the different types of evaluation in each category.

Appendix 2: Hierarchy of FCERM documents

Types of FCERM documents can be split into four levels: National Framework, High Level Policy documents, Delivery documents – strategies and plans, and Delivery documents – schemes. Figure 5 shows the relationships between those documents with the specific documents that fit into each category detailed in the adjacent box.

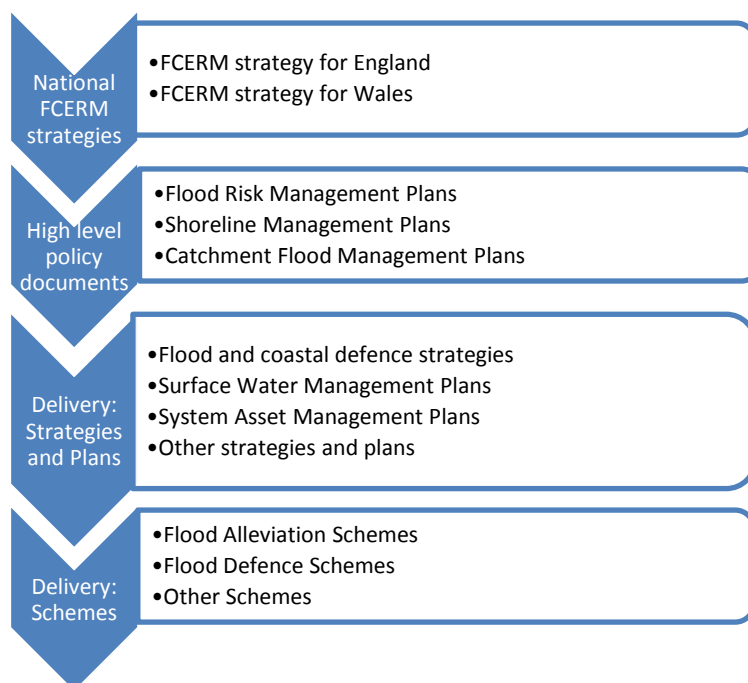


Figure 5: Relationship between the different types of FCERM documents

National framework

- National FCERM strategies for England and Wales – set out the national framework for managing the risk of flooding and coastal erosion.

High level policy documents

- Flood Risk Management Plans – apply to identified high flood risk areas and highlight the hazards and risks of flooding from rivers, the sea, surface water, groundwater and reservoirs. They set out how RMAs work together with communities to manage flood risk.²⁸ FRMPs include proposed measures for managing flood risk and the approach to implementation.
- Shoreline Management Plans – SMPs consider flooding and erosion from the sea and identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the short (0-20 years), medium (20-50 years) and long term (50-100 years)²⁹. The plans prioritise the work needed to manage coastal processes in to the future and are

²⁸ See: <https://www.gov.uk/flood-risk-management-plans-what-they-are-and-whos-responsible-for-them>

²⁹ See: <https://www.gov.uk/government/publications/shoreline-management-plans-smps>

used for decision making on the need for specific flood and erosion risk management schemes and coastal erosion monitoring.

- Catchment Flood Management Plans – consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding³⁰. The catchment scale approach enables consideration of risk holistically and enables systems thinking (and not solely about building localised defences in a town). CFMPs are used to help the Environment Agency and their partners plan and agree the most effective way to manage flood risk in the future at the catchment scale.

Delivery documents – strategies and plans (examples)

- Flood Risk Management Strategies / Flood and Coastal Defence Strategy Plans / Coastal Defence Strategies / Tidal Strategies – consider the various options for protecting fluvial and coastal areas from flooding and provide the detailed implementation for coastal defence identified within a CFMP or SMP.
- Surface Water Management Plans – outline the preferred surface water management option in a given location; surface water flooding takes account of flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall. SWMPs establish long-term action plans to manage surface water.
- System Asset Management Plans – long-term plans for managing a collection of assets that protect a discrete area (or system).

Delivery documents – schemes (examples)

- Flood Risk Management Schemes – implementation of flood risk management.
- Flood Alleviation Schemes – implementation of flood defence works.
- Property-level Flood Protection schemes – measures taken to protect homes from flooding.
- Flood Warning Schemes – provision of advance warning of conditions likely to cause flooding to property and a potential risk to life.
- Coastal Defence Schemes – implementation of coast defence works.
- Other plans and schemes (referred to under a variety of names) that cover the implementation of SMPs and CFMPs e.g. reassessment of soft defence schemes such as beach nourishment or creation of a new flood risk management structure such as a wall.

³⁰ See: <https://www.gov.uk/government/collections/catchment-flood-management-plans>

Appendix 3: The role of evaluation in the ROAMEF cycle

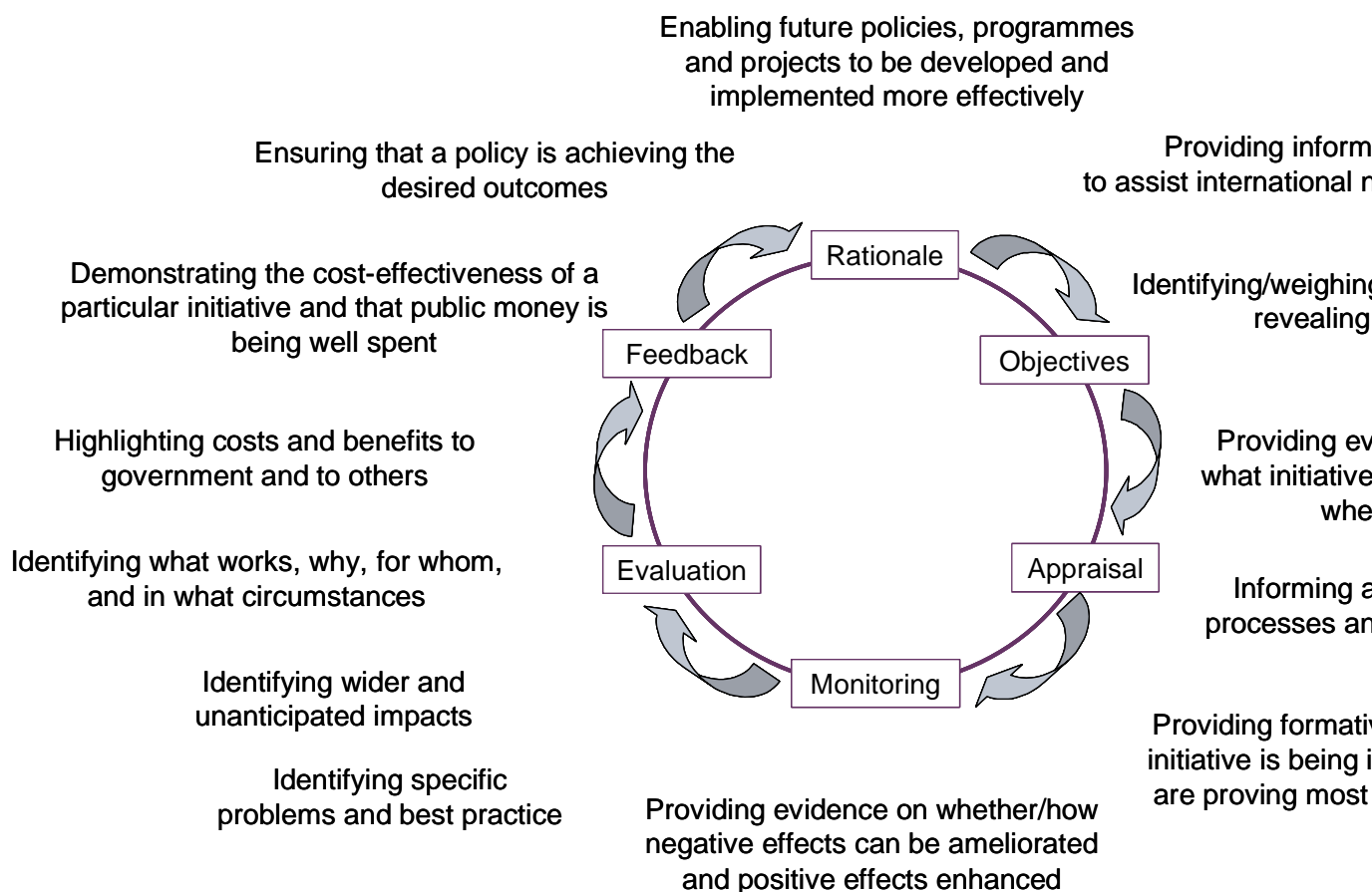


Figure 6: The added value gained from evaluation of use in the ROAMEF planning cycle.

Source: from Oxera (2005b)

Appendix 4: Research findings – what are the good practice components of EPE?

EPE – what is it?

EPE should be:

- A central premise of project management; built in and planned for from the outset
- Proportional to the risks / scale / profile (so that effort gives an equivalent amount of benefit)
- Good quality so that the results can be relied upon
- Robust and repeatable
- Accountable and done even if work fails
- Supported by good internal team communications, that are consistent, relevant and understandable
- Done at appropriate intervals
- Looking at how outcomes were realised, what objectives were achieved and how the objectives were sustained (e.g. level of flood protection) post project completion
- Using an approach that is based on an appropriate underlying theory or logic and stated objectives.

EPE should have:

- Identified target audiences
- Governance structure
- Resources (£), staff, expertise, analytical input, delivery body, peer review, wider stakeholder input)
- QA process
- Clear objectives / outcomes / outputs that are measurable
- Objective questions (causal, critical or explanatory), even where the topic is subjective such as stakeholder perceptions of effectiveness
- Indicators / high quality data (data describing baseline / target / observed states)
- A baseline (including conditions – specific / internal) and counterfactual
- A review process and clarity on how feedback will be used
- Targets in mind, so that they have a purpose.

EPE should analyse:

- Measures and instruments (interventions at project level)
- Design
- Impact (what difference did it make, links outcomes expected to benefits they generated)
- Causality

- Effectiveness
- Efficiency
- Robustness
- Cost (cost effectiveness analysis – cost of implementing delivery)
- Economics
- Benefits (cost benefit analysis – places a monetary value on the change in outcomes achieved)
- Process (process evaluation – essentially descriptive measuring inputs as well as outcomes)
- Sensitivity
- Environmental impact
- Qualitative and quantitative, subjective and objective issues.

Appendix 5: Business case development framework from the Five Case Model

Stage 0 – Determining the strategic context and preparing the Strategic Outline Programme (SOP)

Step 1: ascertaining strategic fit

Gate 0: strategic fit

Stage 1 – Scoping the proposal and preparing the Strategic Outline Case (SOC)

Step 2: making the case for change

Step 3: exploring the preferred way forward

Gate 1: business justification

Stage 2 – Planning the scheme and preparing the Outline Business Case (OBC)

Step 4: determining potential VFM

Step 5: preparing for the potential deal

Step 6: ascertaining affordability and funding requirement

Step 7: planning for successful delivery

Gate 2: delivery strategy

Stage 3 – Procuring the solution and preparing the Full Business Case (FBC)

Step 8: procuring the VFM solution

Step 9: contracting for the deal

Step 10: ensuring successful delivery

Gate 3: investment decision

Stage 4 – Implementation

Gate 4: 'Go Live'

Stage 5 – Evaluation

Gate 5: benefits realisation

Appendix 6: Example of post-project appraisal review –Yarm Flood Alleviation Scheme

Background to the Yarm Flood Alleviation Scheme

Yarm is a densely populated town on the upper tidal reaches of the River Tees. It has an established riverside frontage and is sited within a large natural meander of the river enclosing the town on three sides. Records of flooding in Yarm can be traced back to 1575 with a long history of subsequent flooding including 1947, 1963, 1968, 1972, 1982, 1986 and 1995.

An earlier scheme to protect Yarm against flooding from the River Tees was constructed in 1992. It was designed to protect Yarm against a 1 in 40 year flood plus freeboard and comprised 1.6km of reinforced masonry walls, incorporating floodgates and a short section of earthworks.

The defences protected Yarm from a large flood event in 1995 but in places they came close to overtopping. The Environment Agency re-assessed flood levels using additional information gathered during this flood. The updated analysis showed that flood levels, higher than previously estimated for Yarm, could be expected and that the existing defences were now only providing a 1 in 10 year standard of flood protection. The principal objective of the Yarm Flood Alleviation Scheme was to reinstate the standard of flood protection to 1 in 40 years so far as could be justified, technically, economically and environmentally (Environment Agency, 2013c).

The Post Project Appraisal is illustrated on the next page.

Yarm Flood Alleviation Scheme Post Project Appraisal

Scheme name	Yarm Flood Alleviation Scheme, Stockton-on-Tees, North East
Project Type	Tidal flood risk management including flood gates
Approval value Out-turn cost	£2.7m £2.1m
Key dates	Construction was completed in November 2002
Objectives	To reinstate the standard of flood protection to 1 in 40 years insofar as it could be justified, technically, economically and environmentally
Outcomes	246 residential and 127 commercial properties in Yarm protected to a 1 in 40 year standard of protection

Key success – Effective handover to the operations phase

The scheme was delivered to budget despite being complex with significant mitigation risks. The transfer of project management control was well managed and retained strong leadership from the Environment Agency. The FCRM client was also very supportive and was an effective part of the team working to achieve the desired outcomes.

Key learning point – Long term maintenance costs

There is a high operational cost of ongoing vegetation management to provide access for operation and inspection. This cost increases as the vegetation matures and could have been reduced / mitigated by a different planting scheme. The longer term cost implications of planting regimes need to be considered more thoroughly during the design phase.

Key learning point – Operational risks must be driven down through passive design

The number of gates requiring closure adds to the operational cost and increases the risk of scheme failure. Access provision provided in the earlier scheme was replicated in many cases. Given more time, other options could have been explored with residents that may have reduced the number of gates.

Other things to speak to the team about:

Given the location of the river in relation to the town of Yarm and the need for residents to have access through the defences many of these gates were unavoidable. Some of the mitigation we provided to meet local residents expectations added significantly to the cost and complexity of the works; it is recommended that future similar projects allow more time and resources for early engagement with local residents to discuss and agree pragmatic and cost effective mitigation solutions.

“This scheme provides an example of good practice in collaboration between the project manager and the local operational teams leading to an effective handover of the scheme and subsequent management of operational risks. The operational performance of the scheme has been proven over the past ten years. The project was delivered within the target cost despite some difficult local mitigation and enhancement requirements to satisfy local concerns. The commissioning and hand over of the scheme to operations was particularly well done and the local operational team were involved at an early stage and felt fully enabled to manage the operational risks from the date of handover.” (PPA reviewer)



Appendix 7: Review of examples against good practice principles

EPE good practice principles	Freiston	Shaldon and Ringmore	Yarm
Evaluation planned in from the outset	Yes	Yes	Unclear from Post Project Appraisal conducted.
Clear purpose of the EPE	To monitor processes such as sediment accretion, surface elevation change, vegetation colonisation and invertebrate distribution both inside the site, and on the surrounding intertidal zone.	To understand the overall benefit to the appraisal of a tidal flood defence scheme of engagement good practice.	<ul style="list-style-type: none"> • Raised awareness and shared understanding across project teams of the root causes that underpin lessons to learn to improve future project delivery • Formally agreed actions, clear accountabilities and timescales to implement the changes required • Identified and quantified benefits from implementing the changes • Increased employee involvement in their performance improvement planning and assessment.
Defined project objectives and outcomes	An example of ecosystem restoration for the purpose of coastal flood risk reduction and habitat creation. Managed realignment was originally proposed at Freiston Shore due to increased rates of erosion experienced at the base of the sea wall, and higher repair / maintenance costs as a result. Freiston Shore realignment trial created 66ha of saltmarsh habitat and 15ha of saline lagoon.	Explore the actual and potential benefit-cost of engagement, based on an evaluation of the pilot Building Trust with Communities - Working with Others (BTwC) approach used on the Shaldon and Ringmore Tidal Flood Risk project between 2005 and 2009.	The principal objective of the Yarm Flood Alleviation Scheme was to reinstate the standard of flood protection to 1 in 40 years so far as could be justified, technically, economically and environmentally.
Defined audience and needs	Not detailed in case study	Those at risk of tidal flooding, those affected by tidal flooding but not at risk and any other stakeholders relevant to the tidal flood risk in Shaldon and Ringmore.	PPA is an internal process, so it is assumed that audience was staff.
Identified evaluation questions and outcomes, checked against objectives and	Related to sediment accretion, surface elevation change, vegetation colonisation and invertebrate distribution both inside the site, and on the	What is the cost-benefit ration of doing up-front good practice engagement to flood risk management decisions.	Key project performance indicators such as accurate initial project cost estimates, including use of contingencies, detailed.

EPE good practice principles	Freiston	Shaldon and Ringmore	Yarm
outcomes	surrounding intertidal zone.		
Clearly chosen evaluation approach, confirmed data requirements and measurability including counterfactual	An in depth monitoring programme was set up at Freiston Shore to monitor processes such as sediment accretion, surface elevation change, vegetation colonisation and invertebrate distribution both inside the site, and on the surrounding intertidal zone.	Evaluation through questionnaires and interviews throughout the engagement work, and review as part of the overall evaluation at the end. Cost data collected as part of normal appraisal process and compared with expected.	Post-project appraisal report completed 10 years after completed.
Plan for resources and governance in place (including engagement with partners and / or stakeholders)	Not detailed in case study	Yes, for engagement work.	Not detailed in case study
Monitoring in place	Managed realignment at Freiston Shore can be considered a success, with vegetation establishing more quickly here than at many other realignment trials in the UK. Brown <i>et al.</i> (2007), and analysis of multispectral imagery by CCRU has shown that 86% of the site was vegetated by 2006.	Via on going engagement, evaluation of individual interventions and final evaluation interviews.	Post-event Whilst the scheme has performed well since it was completed in 2002 there are a number of residual risks: the main risk is the number of floodgates that form an integral part of the scheme.
Evaluation and analysis of data	A flexible approach and continued monitoring is key to the success of any such coastal risk reduction scheme. Tourism is also a vital component of the coastal area for activities such as walking and bird watching. The realignment site at Freiston Shore has contributed to this greatly, attracting over 57,000 visitors in 2003 / 04 (compared to 11,000 before realignment), and adding over £150,000 into the local economy in the first year (Nottage and Robertson 2005). Cost estimates for 'do nothing' (no active intervention) was £19million, and £2.06million over	Qualitative analysis of interviews, plus quantitative analysis of questionnaires depending on data collected. The costs of using the Working with Others approach or not (the counterfactual) were assessed against the outcomes of the scheme, flood damages avoided as annual average flood damages. For Shaldon and Ringmore this was about £4million by the scheme reducing the return period from 1:17 to 1:200 years. So by using the Working with Others approach and reducing the time taken to complete a scheme from 10 years (Teignmouth) to 5 years (Shaldon and	It is recommended that future similar projects allow more time and resources for early engagement with local residents to discuss and agree pragmatic mitigation costs. There are valuable lessons and experience that can be taken from this scheme on how to effectively manage difficult contractor relationships. Estimated total scheme whole life benefits of £7.9m.

EPE good practice principles	Freiston	Shaldon and Ringmore	Yarm
	<p>50 years for maintenance of the existing flood defences. The capital costs to implement managed realignment at Freiston Shore were estimated at £1.98million. The Environment Agency (1996b) estimated that, under typical wave conditions, an 80m wide saltmarsh margin could reduce a sea defence height from 12m to 3m, with a financial saving greater than an order of magnitude. In addition to these savings, it is difficult to quantify the financial benefits of nature conservation and ecosystem services associated with realignment at Freiston Shore.</p>	<p>Ringmore) the flood damage avoided equates to £20million compared to £225,000 costs of Working with others. A benefit-cost ratio of 89:1 not including the cost of loss of life.</p> <p>Working with others can also be assessed against wider benefits in the community.</p>	
<p>Clarity on use and dissemination of findings</p>	<p>To achieve maximum benefit from realignment schemes, the continued monitoring of site conditions before, during, and after implementation is critical.</p> <p>The implementation of managed realignment as a strategic ‘soft engineering’ option to coastal flood risk reduction is not just a geomorphological or ecological challenge, but is also influenced by social, political, and land ownership constraints.</p> <p>Freiston Shore illustrates that managed realignment can be a viable and successful strategy to adapt to the impact of sea level rise and / or increased wave action on low-lying coasts. By providing additional flood storage capacity and intertidal surfaces that attenuate incident wave energy, flood risk is reduced, at least in the short to medium term, after the new intertidal surface has become stabilised and vegetated.</p>	<p>Evaluation report, plus how-to guides and dissemination of learning in case study format and through conference papers / links to other research.</p> <p>Learning included the benefits of participating in a decision making process with the sense of empowerment, building social capital and willingness to tackle other community issues, such as litter. Participation may also result in a commitment to implement the decision, critical at Shaldon and Ringmore for the community responsibility of operating the ten floodgates. A win-win at Shaldon and Ringmore where the community wanted gates but the Environment Agency did not have the resource to operate them in a flood. Working with others can also achieve wider benefits by creating the opportunity to resolve or involve others to resolve other issues such as surface water flooding.</p>	<p>The post project appraisal of the project has confirmed that the Yarm FAS project was an efficient and effective project that has delivered the required outcomes. The project was delivered within the target cost, despite some difficult local mitigation and enhancement requirements to satisfy local concerns. The commissioning and hand over of the scheme to operations was particularly well done and the local operational team were involved at an early stage and felt fully enabled to manage the operational risks from the date of handover.</p> <p>Future similar projects should allow more time and resources for early engagement with local residents to discuss and agree pragmatic mitigation costs. The longer-term implications of the planting regime should be discussed with local operations teams to avoid escalating costs as vegetation matures. There are valuable lessons and experience that can be taken from this scheme on how to effectively manage difficult contractor relationships.</p>

EPE good practice principles	Freiston	Shaldon and Ringmore	Yarm
Timeframe relevant to benefits realisation	<p>1978-1983 Latest reclamation of saltmarsh at Freiston Shore by HMP North Camp</p> <p>1996 Publication of the Lincolnshire Shoreline Management Plan (SMP), recommending managed realignment at Freiston Shore</p> <p>1997 Publication of the Wash Banks Strategy, in response to the SMP 2000 Strengthening of secondary sea wall and creation of cross wall</p> <p>Sept 2001 Set up of accretion and vegetation monitoring locations</p> <p>Aug 2002 Breaching of sea defences in three locations</p> <p>Apr 2003 Colonisation by pioneer saltmarsh vegetation</p> <p>Sept 2006 CEH Monitoring programme ends</p> <p>Present Monitoring of surface elevation change by CCRU</p>	<p>2005-2009 Engagement before and during the appraisal phase of the tidal flood risk scheme</p> <p>2010-2011 Followed by on-going engagement including stakeholder / landowner specific engagement during the construction phase</p> <p>2011-present Continued engagement with training and awareness maintenance due to the need for the community to operate the 10 flood gates during a flood</p>	<p>1995 Flood event; post-event study found defences only provided 1 in 10 year protection</p> <p>1999 Scheme received approval for £2727K spend</p> <p>2002 Scheme completed</p> <p>October 2013 PPA</p>
Reference	Freiss <i>et al</i> , 2008	Straw & Colbourne, 2009; Dunsford <i>et al</i> , 2013; Environment Agency, 2007; IEMA 2012	Environment Agency, 2013c

Appendix 8: Humber Flood Risk Management Strategy review

Humber Flood Risk Management Strategy ‘review’

The Humber Flood Risk Management Strategy is the long-term plan for managing flood risk from the Humber Estuary. It sets out the general approach to managing the estuary’s flood defences, but doesn’t make final decisions about the defences in a particular area. Its overall aim is to manage the risk of flooding around the Humber Estuary in ways that are sustainable for the people who live there, the economy and the environment, taking into account natural estuary processes; and future changes in the environment (built or natural), sea levels or the climate.

The process started in 1997 with the development of the long-term strategy for managing flood risk around the Humber Estuary and the lower reaches of its main tributaries, the rivers Ouse and Trent. This led to the production of the Humber Estuary Shoreline Management Plan (HESMP), in 2000. The strategy was then developed from this, drawing up the programme of the work needed to maintain the estuary’s defences for the next 100 years. The consultation draft of the strategy was produced in August 2005. In May 2006 Government approval was sought. In March 2007 approval for the first 25 years’ work at an estimated cost of just under £323 million was received and the strategy was published in 2008. The approval required a complete review by 2020, with modest reviews every 5 years to keep everything on track. However factors, most significantly the December 2013 tidal surge, have meant that the first ‘modest review’ is much more in depth.

Drivers for the in depth review included the funding system and legislation changes that meant the strategy no longer fitted current good practice, but also post-event evaluation that meant the investment choices needed reviewing. The review considered issues such as sustainability and looked at the totality of the work covered by the strategy.

Published in August 2014 the Summary Strategy and Business Case for the Humber sought a commitment from Government for a single settlement of £1.28bn to provide the capital and maintenance costs required to replace and raise estuary-wide flood defences around the Humber Estuary to provide a consistent 0.5% AEP standard of protection to 2057.

A detailed assessment of the costs and benefits of protecting the Estuary to a 0.5% AEP standard indicated potential flood damages of £6.2bn to 2057. Investment of £1.28bn to provide estuary wide protection could avoid £5.9bn of damages over the same period, with a benefit to cost ratio (BCR) of 4.6. These values do not include the benefits of avoiding flood consequences to a number of important nationally critical assets, critical infrastructure or the opportunities for significant growth in the Humber area that are provided by protecting the whole Estuary to a high standard.

The review concluded that current Flood and Coastal Erosion Risk Management budgets would not stretch to providing this requirement and current funding formulas do not sufficiently recognise the benefits of protecting important nationally critical assets and infrastructure, nor do they adequately recognise the opportunity to unlock significant growth that will contribute to the national economy. As such, it would be impossible to unlock the funding required to protect the Humber Estuary under current mechanisms.

Interestingly it raises some issues around when EPE of a strategy might be carried out, which hinges on when a strategy is considered to be finished. Some of the issues raised are presented in **Error! Reference source not found.**Box 9.

Box 9: Issues in EPE of a strategy

When is a strategy finished? When the document receives approval for funding? Or when all the component parts have been delivered? But that could take decades!

And on what do you do the EPE? Can you say what the benefits and impacts are of the decisions detailed in a strategy without having implemented all of the works required by the strategy?

If works have to be completed, are you in effect carrying out a summative EPE of all the schemes that the strategy recommends? Or if the EPE is of the strategy itself, is this in effect a review of the ex-ante appraisal rather than EPE?

Or is this a continual process for a strategy? Strategies are reviewed approximately every five years, therefore a level of EPE should occur every five years of what has been built, lessons learnt and the implications for what has yet to be built.

Appendix 9: Post Project Opening Evaluation (POPE) model

Issues for a successful impact evaluation

Aim of impact evaluation

Establish to what extent the outcomes observed are the result of (caused by) an intervention, or would have happened anyway.

Five stages for selecting an evaluation design

Define these elements as thoroughly as possible:

1. Aims and objectives of the intervention
2. Group or population to be targeted
3. Mechanism through which the objectives will be achieved
4. Feasible impact evaluation models
5. Final assessment including budget, timetable, ethical considerations and likely impact of the evaluation

Logic models

An essential device to develop an evaluation design for an intervention by dividing the process into:

Inputs – Activities – Outputs - Interim outcomes - Final outcomes/impact

Two essential principles behind a successful impact evaluation

Principle #1: Measurement of the counterfactual and capability of proving **causality**. The counterfactual is the most likely outcome in the absence of the intervention. Successful impact evaluations will be judged by their capability of proving causality, measuring the counterfactual and therefore estimate impact. Analysts need to understand difference between causation and association (see section 1.4.)

Principle #2: Evaluation results must be 'robust':

They must be **valid** - measuring what was intended to be measured; and,

They must be **reliable** - repeated measures produce consistent results.

<p>Choice of evaluation model</p>	<p>Randomised control trial or experimental design: most capable of estimating impact. This uses before and after measures; a treatment group and control group; and, random assignment for the treatment and control groups.</p> <p>Stronger quasi-experimental models are also capable of measuring impact.</p> <p>Weaker models: These make it harder to be certain of the causal link between the intervention and the outcome. Models able to measure outcomes but not necessarily impact. Some are able to establish association and correlation between the intervention and the outcome but not causation.</p>
<p>Sources of data</p>	<p>Good administrative data is key to a successful evaluation.</p> <p>Survey methodology is highly technical so an experienced analyst on all stages of survey methodology should be consulted throughout the whole survey process, from inception to reporting.</p>
<p>Threats</p>	<p>These include: spurious accuracy; claims of causality when only associations are observed; challenges to validity and reliability. Threats are often related to budget, timetable, ethical and practical considerations.</p> <p>Evaluators must be open at all times to the possible weaknesses of the methodology used from the outset.</p>
<p>Cost Benefit Analysis</p>	<p>Transparency and clarity over how the costs and benefits of an intervention are calculated are key to ensure that comparisons can be made over time and in some cases across interventions.</p>
<p>The report</p>	<p>The report should contain a clear and transparent methodology section. An audit trail of the methodologies used and assessment of their validity and reliability.</p> <p>Writing and disseminating the report on the evaluation are vital parts of the process of ensuring that lessons are learned from past interventions to inform future decision-making.</p>

Source: Department for Business, Innovation and Skills (BIS POPE) (2011) *Guidance on evaluating the impacts of interventions on business*.

Appendix 10: Workshop discussion on options to progress EPE in FCERM

A key discussion within the workshop was around possible options to take forward in order to move forward with EPE of FCERM. The options generated were a combination of suggestions that came out of the interim report together with suggestions from the participants on the day of the workshop. Statements expressing the Options were put up on flip charts and participants were given three stickers to distribute to show which Options they felt were worth progressing. In addition, they were encouraged to write comments alongside the Options. In the following section we present the Options, comments and “scores” from the workshop – together with some further reflection on how the Options could be progressed.

The Options are not mutually exclusive; indeed it is likely that a combination of Options would be the best way forward. The Options are presented in order of their scores (in brackets) starting with the one which most participants considered worth progressing.

Option 1: Map the needs of different audiences (12)

This Option came out of discussions during the day which made apparent that different audiences e.g. Defra, Environment Agency, Local Authorities, have different needs from EPE, and significantly that one type of evaluation would not meet all of the different needs. The suggestion was to map the needs of different audiences before choosing one or more of the other suggested options. In the comments the issue of how to incentivise people to carry out EPE was raised and incentives were regarded as important.

Option 2: Provide funding specifically to do EPE (7)

This Option came out of a problem discussed during the workshop, that to carry out good EPE would require extra resources. It was recognised that it was very unlikely to come from central government and some suggestions were made: to perhaps withhold some Grant in Aid (GIA) as an incentive to put in place ex- post evaluation, but whether this was too punitive was raised. There was a general call for any innovative ideas on where the money could come from but also a suggestion as to whether there might be some low cost approaches that could be implemented. Further comments in the plenary included suggesting that it could be done now, citing the example of the Environment Agency setting aside money for PPA. It was also suggested that looking at transport and how they fund their evaluations might be of some value.

Option 3: Look at current outputs and identify gaps (6)

This option centred around having a more detailed examination of what data was already being collected from existing processes such as PPAs and making existing data more available (e.g. from post-event reviews etc.) to allow for low-cost evaluations to be carried out. However, there was caution about the use of existing data with it being commented that the data may not be suitable for an evaluation and in the long run it might make the process a more complex one. The key aspect of this option would be to get a better assessment of what data is being collected e.g. for appraisal purposes that might be useable in relation to EPE. Again it was stressed that there may be data being collected that is useful but not being called evaluation.

This links with **Option 11: Build up a picture of the data currently collected and identify new data needs**. Within this it was considered important to consider both programme level data and scheme level data but to be clear about why data and what data would need to be collected to be relevant.

This Option also links with **Option 6: Build on existing processes e.g. Gateway 7(3)**. This Option centred around looking at the existing processes in place, for example, the Environment

Agency's Gateway 7 has a focus on benefits realisation and post project appraisal, and it could be at this stage that EPE is built in to be done at a date appropriate to the nature of the benefits to be realised.

Further, another existing process that was suggested to be built on was that of post-event evaluation: **Option 9: Do EPE post-event in a more structured way.** The comments alongside this option were that the needs of different audiences would have to be considered in terms of the level of detail and the robustness of the data and it was suggested that it should be guidance rather than too structured.

Option 4: Sample across schemes and plans, with possibility of all schemes / plans having to do EPE (4)

This Option drew on some of the comments in the workshop around whether all projects should have to carry out EPE, and if not then how would they be sampled, would all projects have the possibility of being considered? The Option suggested would be that whilst all projects might be chosen for EPE, in reality there would be some sampling. There was a discussion around how that sampling could happen: would it be a range of typical projects and / or a sample of project which might be quite innovative. Both were seen as possible ways of sampling. It was suggested that candidates for EPE for Environment Agency schemes could be identified at Gateway 3 (at the stage of contract award). The timing of the evaluation was also raised as a key issue with the suggestion that different projects might be viewed in different ways at different times and therefore a "living assessment" may be needed over a period of time as different benefits were realised. This option links with **Option 10: All schemes / plans have to do EPE, but proportionate to their size / impacts (1).** It was suggested that this might be appropriate for the larger projects whilst the sampling could be used for lower level projects, but overall there was a feeling that there should be some sort of sampling approach. However, it was commented that if this was a requirement for all schemes it would help in changing the culture overall to consider EPE.

Option 5: Evaluate with partners (4)

A key driver for doing EPE, identified in the research and workshop was the value of being able to demonstrate wider benefits to partners. This Option really just puts a marker down to say that it would be worth consideration carrying out some collaborative evaluation, to enable an assessment from different perspectives of the benefits realised from a strategy or scheme.

Option 6: Build on existing processes e.g. Gateway 7(3) (combined with Option 3)

Option 7: Take a simple and engaging approach: the "minibus approach" (3)

During the workshop participants discussed an example of stakeholders being taken out to see a scheme, to discuss its benefits and learn about its practical operation. The point of this option was to consider how much could be gained from a simple collaborative approach grounded in a site visit. In the comments the simplicity was valued; it was considered a good starting point for more general work and stakeholder feedback. The idea of using methods to engage different types of people in the evaluation was also valued although it was felt that there would need to be work to get the right stakeholders involved. To work, it was felt it would need an output and links to more detailed data but it was considered to be useful in getting a range of partners on board and for examining the wider benefits.

Option 8: Create structured framework for EPE

This Option reflected discussions through the workshop but also from the research, that there needs to be a structured framework for EPE for FCERM as there is not one at present. Having a framework should allow for comparison of data and for the identification of areas for improvement across schemes. However, it was recognised that one size of EPE would not work across all FCERM

schemes and for all the different audiences so care would be needed that a framework would be flexible enough to be enable comparison across evaluations but also to be relevant to specific needs. A simple and clear framework was recommended.

Option 9: Do EPE post-event in a more structured way (combined with Option 3)

Option 10: All schemes / plans have to do EPE, but proportionate to their size / impacts (1) (combined with Option 4)

Option 11: Build up a picture of the data currently collected and identify new data needs (combined with Option 3)

Option 12: Identify a business change manager at an Environment Agency area level to ensure EPE carried out and lessons learned (0)

This final suggestion provides a current potential mechanism for how this could be embedded into Environment Agency structures and processes. For a culture of evaluation to be developed then it will be important to identify key roles that can be used to support that development.