

## **pCEA Synthesis Report**

### **Chapter 3: Assumptions & Approach**

#### **Introduction**

The pCEA forms part of the implementation process of the Water Framework Directive. It has been carried out by DEFRA with technical inputs from the Environment Agency (EA) and significant stakeholder involvement, starting in autumn 2006 and continuing until summer 2007. The pCEA aims to identify the most cost effective package of measures across sectors that will achieve the requirements of the WFD, taking into account the level of uncertainty associated with the different packages, their distributional and affordability implications and the potential for phasing implementation over the three river basin planning rounds, from 2009-2027.

The pCEA provides supporting evidence for Ministerial Guidance and guidance to the Environment Agency on delivery of the WFD for the first round of River Basin Management Planning and inputs into the revision of the overall WFD Regulatory Impact Assessment.

The pCEA builds on the EA's Strategic Assessment report which constituted a first assessment of the work that would need to be done to meet WFD objectives.

#### **Methodology**

Information for the pCEA was collected through a number of sector groups, led by DEFRA with broad representation from stakeholders. The following groups were established: Water Industry, Agriculture, Industry, Navigation & Ports, Flood Defence & Planning, Non-Agricultural Diffuse, and Fisheries, Alien Species & Biodiversity Benefits.

A matrix of pressures and sectors was developed to ensure that all sector groups were addressing all pressures on water quality to which that sector contributes. The matrix was developed for the pCEA by the EA based on technical expertise and is presented in Figure 1.

#### ***Identifying the Environmental Gap***

The first step for each group was to identify the gap between the expected situation in 2009 and the WFD objectives in terms of environmental quality. All groups were faced with considerable uncertainties in establishing the gap. These uncertainties included:

- Standards
- Designations
- Level of risk of failing to meet ecological objectives
- Underlying trends
- Non-WFD policy drivers
- Apportionment

Environmental standards for the WFD are being developed by UKTAG. Not all these standards had been set at the time that information was being collected for the pCEA. Groups were therefore asked to base costings on the first tranche of UKTAG standards and assumptions were developed for the second tranche of standards. Details of the assumptions are given in Figure 2. In addition, groups recognised the different nature of some of the WFD standards, notably the status of water resources and morphology as 'supporting standards' or triggers for investigation. These issues are discussed in more detail in the relevant pressure chapters.

Water-body specific standards were not available. As the pCEA is a national-level exercise, working groups were asked to estimate national averages or ranges as appropriate.

Information on the designation of water bodies as Heavily Modified Water Bodies was not available. Groups therefore developed costs on a unit basis where possible, e.g. cost of modifying an in-river structure, and applied different multipliers to these costs to provide a range of total costs that would encompass different possible designations of HMWBs. Other designations relating to the WFD Daughter Directives and related Directives are discussed in the Chapter on non-WFD policy drivers, below.

The Article 7 risk maps prepared by the Environment Agency were in the process of being updated during the period in which information was collected for the pCEA. Groups used the existing Article 7 maps and provided a range of costs to account for possible recharacterisation of areas. In the synthesis, it has been possible to use new information on risk characterisation to refine the cost estimates.

In addition to the uncertainty about existing risk levels, there is also uncertainty about how underlying trends will affect these pressures up to 2009, when the implementation of the WFD Programmes of Measures will begin. Groups based their assessments of the likely impact of trends on the 2006 DEFRA Report<sup>1</sup> Water Framework Directive (WFD) Economic Analysis: Information on trends to improve the baseline scenarios and provided their own commentary on the conclusions of this report.

The extent of risks to meeting WFD ‘internal objectives’ will also depend on what is achieved under other policy drivers (including WFD ‘external objectives’ to meet requirements under the Daughter Directives and other related Directives). Groups developed cost estimates assuming a low reference case which included only measures that were currently agreed and funded. Issues relating to the likely achievement of WFD objectives as a result of these policy drivers is discussed in detail in Chapter 2 of this report.

There is ongoing uncertainty over the contribution of different sectors to particular pressures. Groups drew on various sources to inform their estimates including DEFRA research and the Environment Agency’s Strategic Assessment. Details of the sources are given in the relevant pressures chapters. In order to manage this uncertainty, groups developed costs where possible based on estimated discharge quantities in standard units, rather than proportional reductions. This made it possible to reconsider apportionment assessments at the synthesis stage. Groups also provided costs for doing more and less than their ‘share’ in addressing a pressure.

### ***Identifying Cost Effective Measures***

Each group identified measures that their sector would need to implement in order to meet WFD objectives and collected information on the costs and expected impact of those measures, in order to identify which measures would be likely to be most cost effective. Groups also had to deal with uncertainty with regard to establishing costs and effectiveness. These included:

- Effectiveness of tried and tested measures on ecology
- Effectiveness of innovative measures on water quality and ecology

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<sup>1</sup> Water Framework Directive (WFD) Economic Analysis: Information on trends to improve the baseline scenarios August 2006, WRc Ref: DEFRA 7242

- Location-specific issues

WFD's ecology-based standards are fundamentally different from existing water quality standards. In many cases, our understanding of the impact of measures on ecological impacts is limited and further research will need to be conducted. The pCEA has drawn on ongoing efforts to model the impact of reductions in discharges of pollutants by different sectors on in-river pollutant concentrations of nutrients. The findings of the pCEA will need to be updated as this modelling work progresses.

A key purpose of the pCEA was to consider the effectiveness of innovative measures against tried and tested measures. For example, the NADWP group considered the implementation of General Binding Rules to reduce urban diffuse pollutants. Due to their innovative nature, there is no existing evidence base on which assessments of effectiveness can be based. Efforts were made to develop alternative estimates of effectiveness but were constrained by the availability of information on the impact on ecological status. In the chapters that follow, authors have sought to consider these innovative measures within these constraints.

The pCEA is a national level exercise seeking to identify national level measures needed to meet WFD objectives as well as national frameworks for measures that will be implemented at the local level. However, for many pressures, costs will be driven by location-specific attributes. Groups were therefore asked to establish a range of cost estimates that would encompass this local variation. These cost estimates will have to be refined in river basin plans and are likely to require further research and investigations. These issues are discussed in particular in the chapter on morphology pressures.

Local variation may be also relevant to effectiveness. For example, taking measures to address morphological pressures will not have a significant impact on ecology if water quality is poor in that location. It has not been possible in most cases to take this into account in the measures and cost estimates covered in the pCEA, but these issues are highlighted in the relevant chapters in the qualitative discussion. These kinds of interactions will need to be covered in greater depth as the river basin level.

There were considerable differences in the access of groups to financial and technical information but all were able to identify measures, drawing on expert advice where necessary. The sector reports have formed the basis of the synthesis process. Teams of DEFRA and EA authors have drawn on these reports in order to write pressure-based chapters, which follow in Section 4 of this report.

### **Scenarios**

The synthesis of the pCEA identifies alternative packages of measures or 'scenarios' to tackle pressures on ecological status. All the scenarios address ways of closing the gap between the low reference case and WFD requirements, but consider variations on two dimensions:

- The scope for phasing implementation based on considerations of affordability;
- The degree of certainty about achieving objectives that would be required.

In terms of phasing, authors were asked to develop packages of measures and associated costs for doing all technically feasible measures in the first round, and for phasing in measures across the three river basin planning rounds. For uncertainty, authors were asked to consider a low and high uncertainty threshold. A high threshold would imply that it would be acceptable to use more innovative measures and to rely to some extent on the contribution of underlying

trends to meet objectives and technological developments to close the gap. A low threshold would imply a reliance on tried and tested measures and a degree of over-planning.

The synthesis also considers the distributional consequences of the different scenarios. Where it is possible to increase or decrease the contribution of sectors to tackling a pressure, alternative scenarios and funding mechanisms were identified. The main areas in which it was expected that this kind of balancing could occur were: nitrogen, phosphorus, ammonia, sediment and water resources.

Table 1 describes these dimensions and how measures would be expected to fit into them.

Table 1: pCEA Scenarios

	<b>Uncertainty</b>	
<b>Phasing</b>	<b>No</b> “higher certainty of achieving outcomes”	<b>Yes</b> “lower certainty of achieving outcomes”
<b>No</b> “do all technically feasible measures as soon as possible”	<b>1</b> Include measures which will ensure that WFD objectives will be met by 2015. To include: - Only measures for implementation in RBMP1 - Only tried and tested measures - Some over-programming so that objectives can be met if effectiveness is lower than expected - No reliance on uncertain trends - <i>Implications for affordability</i>	<b>3</b> To include: - Only measures for implementation in RBMP1 - Innovative measures - No over-programming to compensate from uncertainty about the effectiveness of measures - Some reliance on uncertain trends - <i>Implications for affordability</i>
<b>Yes</b> “do what is reasonable as soon as possible”	<b>2</b> To include: - Tried and tested measures implemented over a longer time-scale (2009-2027), <i>justified on the basis of affordability</i> - Some over-programming so that objectives can be met if effectiveness is lower than expected - No reliance on uncertain trends	<b>4</b> To include: - Innovative measures implemented over a longer time-scale (2009-2027), <i>justified on the basis of affordability</i> - Measures to reduce uncertainty (research, pilot programmes etc) in RBMP1 with implementation of innovative measures in 2015-2027. - No over-programming to compensate from uncertainty about the effectiveness of measures - Some reliance on uncertain trends

### **Costs for Wales and England**

Throughout the pCEA, costs have been collected for Wales and England separately and together, where possible. In some areas, costs for Wales are being developed on a slightly different timescale from those for England and it has not been possible to integrate all input for agriculture, forestry and minewaters for Wales into this version of the pCEA synthesis report. In other cases, chapters include information for Wales, which is the subject of ongoing review and refinement.