

EU Water Framework Directive: Scoping of Economic Impacts and Issues in Transitional and Coastal Waters



Final report prepared by Jan Brooke

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List of acronyms

Acronym	Description
CEDA	Central Dredging Association
CIS	Common Implementation Strategy (relating to the interpretation and common implementation of the WFD at EU level)
CRP	Collaborative Research Programme (relating to the development of economic methodologies for the UK implementation of the WFD)
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DTI	Department of Trade and Industry
EA	Environment Agency
ICE	Institution of Civil Engineers
MCA	Maritime and Coastguard Agency (part of DfT)
MCEU	Marine Consents and Environment Unit (part of Defra)
NGO	Non-Governmental Organisation
ODPM	Office of the Deputy Prime Minister
PIANC	International Navigation Association
PoM	Programme(s) of Measures (required under the WFD)
PRB	Pilot River Basin
RBC	River Basin Characterisation (RBC1 comprised the initial fit-for-purposes review carried out in England and Wales in 2004; RBC2 is the forthcoming refinement exercise during 2005-2008)
RBMP	River Basin Management Plan
TraC	Transitional (estuarine) and coastal WFD water bodies
WFD	Water Framework Directive

Summary

Introduction

This scoping study aimed to investigate some of the emerging issues associated with the implementation of the EU Water Framework Directive (WFD) in transitional (estuarine) and coastal waters and to highlight their potential economic implications. The study, which focussed on implementation within England (and Wales insofar as the Environment Agency is the WFD competent authority), was funded by Defra and the Port of London Authority.

In the spirit of Article 14 of the WFD, which encourages the active involvement of all interested parties, a series of stakeholder workshops formed an important component of the scoping study. These workshops were attended both by organisations with regulatory and/or management responsibilities and by stakeholder groups. The following sectors were represented: ports, harbours and dredging, recreational boating, shipping, aggregate extraction, marine renewables, flood defence and coast protection, fisheries and shellfisheries.

The scoping study report provides a record of these workshops and sets out the issues raised. Following discussions with the Environment Agency, Defra and other key statutory bodies, it also elaborates on the main issues relating to possible economic consequences and associated regulatory and scientific aspects.

The report thus provides essential background information to support the development of economic analysis methodologies under the UK Collaborative Research Programme (CRP) on River Basin Management Planning Economics.

Objectives

The key objectives of the scoping study were to:

- assess the extent to which regulators and key stakeholders operating in TraC waters will be impacted by the WFD (eg. potential economic, financial and regulatory implications)
- assess the extent to which the same are engaged in the WFD implementation process (ie. stakeholder engagement)
- identify and explore potentially significant issues, gaps, etc. relating to WFD implementation in order to support the CRP work in developing economic methodologies, and hence the development and delivery of Programmes of Measures in TraC water bodies (ie. issues for further consideration)
- determine the need for a full-scale TraC case study or ways in which the CRP or other research projects can be adjusted to take account of the issues raised during 2005 and beyond.

Background

The outputs of the 2004 Environment Agency risk assessment carried out as part of the initial river basin characterisation exercise (RBC1), indicated that approximately 85% of coastal water bodies and 98% of transitional water bodies are considered to be

at risk, or probably at risk, of failing to meet good status by 2015. The outputs of Project 1 of the CRP (2005) further highlighted that a wide range of activities takes place in transitional and coastal (TraC) water bodies and that various statutory organisations are responsible for their regulation.

Both the natural environment (physical, chemical and biological) and the regulatory regime are very different in TraC water areas when compared to the freshwater environment. At the present time, however, neither the Ribble Pilot River Basin study nor the other case studies being used to pilot the CRP work on cost-effectiveness analysis extend properly to such areas.

Workshop outcomes

Whilst many issues are discussed in the Workshop Reports (see Appendix 1), workshop participants identified several recurring 'key issues':

- sediment management, historic contamination of sediments (including with TBT); associated dredging and disposal activities
- the introduction of non-indigenous species; management of established alien species communities; issues associated with the technical and economic viability of ballast water exchange mechanisms
- the use of anti-fouling products, notably hull cleaning and the possible impacts of alternative (to TBT) anti-foulants
- the use of towed fishing gear and shellfish dredges
- the possible implications of the WFD for new developments
- the relative lack of data in TraC waters and the need for improved understanding of natural change/fluxes (eg. climate change and sea level rise); also the relative importance of natural vs. man-induced change.

In total, participants identified some 200 combinations of possible measures and delivery mechanisms. Approximately 30% of these are voluntary measures, which would be implemented and typically resourced by the sectors themselves. Examples of voluntary measures include codes of environmental conduct and management (eg. zoning) initiatives. Around 55% of the potential measures identified would be delivered using regulatory provisions - for example constraints on operations, or modifications to proposals to be secured using conditions on licences or consents. However it is of note that only 10% of measures could be implemented by the Environment Agency using its existing powers. The remaining 45% would need to be delivered using the (mostly existing) powers of other regulators. Many such measures would be the responsibility of Defra's Marine Consents and Environment Unit, notably under the provisions of the 1985 Food and Environmental Protection Act (FEPA) but others would fall to the Maritime and Coastguard Agency, to port and harbour authorities, ODPM, DTI, local authorities and others.

The majority of the measures identified by workshop participants were, at least in a generic sense, similar to those identified in Project 1 of the Collaborative Research

Project and subsequently broadly categorised in Project 2. However, there were also some minor differences insofar as participants:

- identified ‘research and development’ as being a measure on the basis that it is a necessary precursor to the development of new solutions
- suggested that measures should include ‘better enforcement of existing regulation’ (this is partly included in Project 2a, as a consideration in determining the effectiveness of a measure), and
- indicated situations in which the provision of compensatory habitat might be considered as a measure.

In addition to identifying possible measures and delivery mechanisms, participants indicated whether the costs of the measures might be minimal, moderate or significant, and who would bear the costs. It appears from the workshops that many of the ‘good practice’ measures in particular could potentially be implemented at minimal to moderate cost. This in turn highlights the importance of ensuring adequate stakeholder engagement in the WFD implementation process if the delivery of these measures is to be ensured. However, workshop participants also concluded that some of the financial and economic implications for sectors operating in TraC waters could be significant. Attention should thus be given to ensuring that the cost-effectiveness and disproportionate cost methodologies developed as part of the Collaborative Research Programme are appropriate to application in TraC waters.

Regardless of the scale of costs involved, it is of note that they would be borne not only by industry but also by various statutory bodies (regulators, or ‘co-deliverers’). Many costs would inevitably then be passed on to consumers and/or taxpayers. Participants also raised issues in respect of retrospective liability and some of the practical difficulties of applying the polluter pays principle.

Economic and financial implications

The sectors operating in TraC waters are typically well-regulated: however, with the exception of flood risk management and coastal defence, most activities are subject neither to formal planning processes nor to associated public sector economic appraisal mechanisms.

In respect of assessing the likely economic and financial implications of WFD implementation in TraC waters, the scoping study identified a number of important issues for which provision has - in principle - already been made in the methodologies developed for CRP projects 2a and 2b. However, it is important to be aware that these methodologies have not yet been tested in the coastal and estuarine environment. These issues include:

- the participation and enforcement costs likely to be incurred by non-Environment Agency regulators (ie. co-deliverers), and the costs that will be incurred by industry, in developing and delivering the Programmes of Measures
- the full range of potential additional costs likely to be associated with promoting new developments or modifications under WFD Article 4(7)

- the wider economic, financial and environmental implications of any WFD-induced change in waterborne transport patterns, including modal shift (eg. from water to road transport)
- consideration of whether suitable compensation and/or compulsory purchase mechanisms exist (eg. associated with achieving good ecological status)

In addition, the scoping study highlighted the following outstanding economic and financial issues for consideration in for the forthcoming work on disproportionate cost analysis (CRP project 3):

- the methodology for determining possibly disproportionate costs needs to be consistent not only in respect of the development of WFD Programmes of Measures, but also in its application to the heavily modified water body designation process (WFD Article 4(3)) and the evaluation of proposed new developments or modifications (Article 4(7))
- ensuring a level playing field between Member States will be important in decisions such as determining disproportionate cost. The Common Implementation Strategy is also important in this regard.
- affordability (ie. the difference between a measure which appears cost-effective at a national or river basin district level, but which is not affordable at an individual or local level) and whether there is a case for public monies being made available in such situations
- the practical and hence financial/economic difficulties associated with applying the polluter pays principle, notably to the historic contamination of sediments and to the microbiological contamination of shellfish waters.

Regulatory issues in TraC waters

The scoping study identified a number of significant regulatory issues relevant to the cost-effective delivery of WFD objectives in transitional and coastal water bodies. The following are of particular importance:

- there are many existing regulators and statutory bodies with relevant licensing and management responsibilities in TraC water areas
- with the exception of flood defence and waste management, very few of the existing regulatory provisions relevant to the delivery of WFD objectives in TraC waters are the responsibility of the Environment Agency
- the existing consenting regime in coastal and estuarine waters is already complex and the need to avoid increasing the regulatory burden was highlighted
- workshop participants felt very strongly that the use of existing regulatory mechanisms through existing regulators would not only be the most cost-effective way of delivering WFD objectives but also the most acceptable to the sectors operating in the marine environment
- there is a relative lack of data, and understanding of the coastal and estuarine environment is often imperfect. There is a real need to improve understanding of the relationships between pressures and

- potential impacts, and to recognise the role of natural as well as anthropogenic change
- effective policy integration is important notably, but not only, between the WFD and the Birds and Habitats Directives, and between the WFD and European transport policy
- valuable lessons can be learnt from the UK's experiences with several important international conventions.

Stakeholder engagement

Across the TraC sectors, existing levels of participation in WFD implementation vary:

- the ports and harbours and recreational boating sectors are already well engaged in the process
- there are a number of existing stakeholder mechanisms, including the PIANC and CEDA-led WFD navigation sector group meetings, in which it would be appropriate for the shipping sector to engage
- representatives of the aggregate extraction industry attend the WFD navigation sector group meetings
- flood risk management is a responsibility of the Environment Agency, however coast protection (currently a local authority responsibility) has been less well-represented
- better engagement of the fish and shellfishery sector is needed if potential impacts are to be assessed and potential benefits realised
- it appears that the WFD will have relatively fewer significant implications for marine renewable energies

Research requirements

In addition to highlighting the key economic and regulatory issues relevant to the delivery of WFD objectives in TraC waters, workshop participants also identified a number of important research areas. In some cases, relevant research may already be ongoing or it may be possible to undertake supplementary work. In others, specific WFD research may be required.

Issues for further consideration

This report identifies five main areas for further consideration. In addition, however, each of the Workshop Reports highlights (often sector-specific) issues that are important to the WFD implementation process. Appendix 1 should therefore be read in conjunction with this section.

- i) Testing the cost-effectiveness and disproportionate cost methodologies in TraC waters

It is clear from the scoping report that the WFD could have some potentially significant economic and financial consequences in TraC waters. Whilst there would be an *a priori* expectation that the methodologies developed by the CRP will be appropriate for application in TraC water bodies, the range of issues and the potential costs highlighted by workshop participants should be subject to specific testing. ***An extension of the current testing work to include a dedicated TraC case study on***

cost effectiveness would therefore be beneficial. Specific TraC testing should be included as part of the design process for later projects.

Such case studies will either provide reassurance to sectors operating in the coastal and estuarine environment that the techniques and methodologies are appropriate and reliable, or they will highlight difficulties and hence provide an early opportunity to rectify any problems well in advance of the preparation of RBMPs.

ii) Preparation of FAQ sheet

It would be useful for Defra and the Environment Agency to consider the preparation of a 'frequently asked questions' (FAQ) paper, or other document, in order to facilitate better understanding of the implications of the WFD for those sectors operating in TraC waters. This should involve representatives of the TraC industries and their regulators as appropriate.

Such a paper would:

- clarify some important points of interpretation and thus improve understanding amongst sector representatives and regulators alike
- reduce uncertainty, build confidence and facilitate well-informed dialogue, and
- provide a sound foundation upon which to start the preparation and evaluation of the Programmes of Measures in TraC water bodies.

iii) Regulatory options for delivery of WFD objectives in TraC waters

In considering how to ensure the cost-effective and reliable delivery of WFD objectives in TraC waters, a way forward would be for *Defra and other bodies to review the advantages and disadvantages of various delivery options highlighted by the scoping study, along with other options if appropriate.*

Such a review could commence with a further assessment of existing regulatory provisions, identify/confirm any significant gaps, better define and evaluate the potential options for delivery, and recommend a preferred solution.

iv) Stakeholder engagement

Whilst some sectors operating in TraC waters are adequately engaged in the WFD implementation process, there are certain notable gaps. It is worth Defra and the Environment Agency (working with other Government departments as appropriate) considering further steps to:

- *actively encourage the shipping industry to participate* in the process. This is important if issues such as ballast water exchange and anti-fouling are to be addressed in an appropriate manner, recognising the global nature of the sector
- *engage local authorities in the WFD implementation process.* This needs to include local authority technical services (eg. coastal defence, transport and recreation) departments as well as land use planners and development control officers, and

- *provide an appropriate mechanism to facilitate the engagement of fisheries and shellfish industry* representatives in the WFD implementation process, possibly by convening a WFD ‘fisheries’ sector group using the model of the navigation sector group.

v) Other specific research issues

In addition to the above research activities and supporting initiatives *Defra, working with the relevant sectors and their regulators, should consider undertaking a review of the following research requirements* identified by workshop participants in order to enable any new (or supplementary) research needs to be defined and funding applications submitted. Many of these may either already be a part of existing research programmes or could be easily integrated into them.

- development and application of economic environmental valuation techniques applicable to the coastal and estuarine environment (via the CRP)
- improved understanding of natural change/fluxes (eg. climate change and sea level rise) and the relative importance of natural vs. man-induced change (via the RBC2 further characterisation process)
- improved understanding of the relationships between pressures and impacts (eg. the physical effects of towed gear; the impacts of the fine-sediment plume associated with dredging and of re-suspended sediments; scour around structures; also habitat and species recovery rates) (also via the RBC2 process)
- development and testing of alternative dredging and disposal and/or dredged material treatment methods, alternative anti-fouling products, ballast water exchange mechanisms, etc. (contributes to development of the Programmes of Measures)
- understanding the respective roles of the do-nothing option and managed realignment in delivering good ecological status (linked to the Environment Agency’s Heavily Modified Water Body initiative).

Section 1 Background

1.1 Overview

This scoping study aimed to investigate some of the emerging issues associated with the implementation of the EU Water Framework Directive (WFD) in transitional (estuarine) and coastal waters and to highlight their potential economic implications. It was funded by Defra and the Port of London Authority.

In the spirit of Article 14 of the WFD, which encourages the active involvement of all interested parties, a series of stakeholder workshops formed a vital component of the scoping study. This report provides a record of these workshops and sets out the issues raised. It also elaborates on some of the main points identified by stakeholders, relating to possible economic consequences and associated regulatory and scientific aspects.

The scoping study focussed on WFD implementation within England (and Wales insofar as the Environment Agency (EA) is the competent authority). However, some of the outcomes - particularly those relating to economics and data issues - may also be useful to those responsible for implementation in Scotland and Northern Ireland.

This report provides essential background information to support the development of economic analysis methodologies under the UK Collaborative Research Programme (CRP) on River Basin Management Planning Economics .

1.2 Background

Recent months have highlighted a number of emerging issues relating to the practical challenges of delivering EU Water Framework Directive objectives in transitional and coastal (TraC) waters in England and Wales.

The outputs of the Environment Agency risk assessment, which was carried out as part of their initial river basin characterisation exercise (RBC1), indicated that approximately 85% of coastal water bodies and 98% of transitional water bodies are considered to be at risk, or probably at risk, of failing to meet good status by 2015. The outputs of Project 1 of the CRP further highlighted the wide range of activities taking place in TraC water bodies and the statutory organisations responsible for their regulation.

As illustrated by the standards put forward in the 2004 'non paper' draft text of a daughter Directive dealing with priority substances and priority hazardous substances (as required by the WFD Article 16), difficulties may arise when methodologies are developed and tested predominantly in the freshwater environment. Both the natural environment (physical, chemical and biological) and, in England and Wales at least, the regulatory regime are very different in transitional and coastal water areas when compared to those in the freshwater environment. At the present time, however, neither the Ribble Pilot River Basin study nor the other case studies being used to pilot the CRP work on cost-effectiveness analysis extend properly to such areas.

In order to examine the emerging issues in more detail, and in particular to identify any potentially significant gaps and/or implications of the WFD which are not being dealt with in the various existing projects, Defra and the Port of London Authority funded a transitional and coastal waters 'scoping study'. A key objective of this work was to identify the main economic impacts and issues arising so as to better inform the economic analysis and thereby the process leading to the development of the draft Programmes of Measures and River Basin Management Plans.

Previous discussions had identified that the Thames Estuary, particularly the outer estuary with its wide range of uses and activities, provides examples of many of the issues of concern. Further, the Port of London Authority as a Trust Port represents an example of a "third party regulator" that will necessarily be involved in implementing the Directive. The Thames Estuary was therefore used as a geographic case study. However, the scoping study also extended to potentially important issues and concerns that were not represented on the Thames.

1.3 Scoping study objectives

The key objectives of the scoping study were to:

- assess the extent to which regulators and key stakeholders operating in TraC waters will be impacted by the WFD
- assess the extent to which the same are engaged in the WFD implementation process, in particular in regard to potentially relevant planning processes (*c.f.* Project 1 of the CRP on River Basin Management Plan Economics)
- identify and explore potentially significant issues, gaps, etc. relating to WFD implementation in order to support the CRP work in developing economic methodologies/economic analysis (and hence the development and delivery of Programmes of Measures in TraC water bodies)
- determine the need for, and scope of, a full-scale TraC case study or ways in which the CRP or other research projects can be adjusted to take account of the issues raised during 2005 and beyond.

1.4 Approach

As indicated above, it is intended that the results of this scoping study will feed into ongoing and planned CRP projects, in particular Projects 2a/2b and Project 3. The study was thus designed to ensure that the fullest possible range of potentially significant issues in transitional and coastal waters would be identified. A series of facilitated workshops involving a range of representatives formed an important component of the scoping study. Each workshop followed the same general format (see Section 2.1) resulting *inter alia* in the identification of activities that may affect water status and hence may require measures to be included in the WFD Programmes of Measures.

Organisations with regulatory and/or management responsibilities (ie. those who may have a role in the delivery of measures) and representative stakeholder groups (ranging from professional bodies and trade associations to individual water users) attended the workshops.

In addition to organising the workshops, post-workshop discussions were held with the key statutory bodies that are likely to be responsible for delivering the WFD Programmes of Measures in transitional and coastal waters. The purpose of these discussions was to help clarify and elaborate on some of the issues associated with the delivery of WFD objectives.

1.5 Report structure and contents

As had been anticipated, the scoping study identified a wide range of potential pressures, impacts, and issues. An important part of the assessment of the workshop outputs was therefore the evaluation and distillation of these issues, identifying in particular those aspects with likely economic consequences. This report focuses on potentially significant and/or typical issues, rather than attempting to catalogue and evaluate every (often site-specific) measure dealing with every activity that may contribute to deterioration or failure to meet good status. The detailed comments made by workshop participants are, however, recorded in the Workshop Reports (Appendix 1).

Section 2 of this report presents a summary of the workshop outputs, including potentially significant activities and associated measures, costs, etc. Sections 3 and 4 then deal with the potential implications of the WFD for regulators and key stakeholders. Section 3 focuses specifically on the economic and financial concerns expressed by workshop participants. After discussion of the issues raised in the workshop, a brief commentary has been provided by RPA (the consultants undertaking CRP Project 2b and participating in CRP Project 2a) to illustrate the extent to which that concern is already being (or could be in the future) addressed through the work of the CRP.

Sections 4 and 5 of this report deal respectively with the regulatory and data/science issues raised by participants. Whilst aspects with possible economic and/or financial implications are highlighted, other issues considered important by workshop participants are also discussed. Section 6 summarises the key findings of the scoping study (including existing levels of stakeholder engagement, gaps in information, etc.) and recommends possible future actions.

Sections 3 to 6 draw on and reflect not only the workshop outcomes, but also the post-workshop discussions with key statutory bodies.

Section 2 Workshop outcomes

2.1 Introduction

During March and April 2005, a series of seven stakeholder workshops took place in London. The outer Thames estuary was used as a case study to provide a focus for discussion. Workshops were organised for the following ‘sectors’, each of which operates within the defined WFD coastal/transitional water area, and each of which is represented on the Thames:

- ports, harbours and dredging
- shipping
- recreational boating
- marine resources (aggregate extraction, renewable energies)
- coastal flood risk management and coastal defence
- fish and shellfisheries

Attendees at the workshops included representatives of regulators, other statutory bodies, industry, operators, professional and trade organisations, and environmental NGOs.

The workshops followed a common format. After an introductory presentation and informal discussion about the objectives and components of the WFD, workshop participants were asked to identify the range of possible issues associated with delivering the WFD targets. For activities that could potentially affect water status (either generally or only on a local, site-specific basis), participants typically developed a series of criteria which they used to identify ‘key issues’ and, for these key issues, possible measures which might be considered for inclusion in the WFD ‘Programmes of Measures’ were discussed. Where a measure could have more than one delivery mechanism (eg. regulatory or voluntary) this was highlighted. Participants went on to identify the anticipated order-of-magnitude costs of such measures, including determining who was likely to bear the cost and whether some or all of the cost could be ‘passed on’. Other issues (eg. economic or regulatory principles, science limitations, data availability considerations) of concern to participants were also documented.

The Workshop Reports are appended to this report as Appendix 1. These reports have been made available for comment to all who participated in the workshop as well as others who expressed an interest in the workshops but were unable to attend. Several participants subsequently provided comments and these comments have been taken into account as long as they did not materially change the conclusions agreed at the workshop. It is also important to be clear that the Workshop Reports simply record the observations and concerns of workshop participants: it would neither be in the spirit of the workshops, nor the objectives of this scoping report, to significantly add to or modify the agreed workshop outputs.

This section of the scoping study report (ie. Section 2) presents the main outcomes of the workshops relating to the identification of activities which could potentially affect water status in TraC water bodies, possible ‘measures’ and their associated delivery mechanisms and costs. The remaining sections of the report then discuss the wider issues of relevance to WFD implementation which were raised either by workshop

participants and/or by statutory bodies such as the Environment Agency, Defra's Marine Consents and Environment Unit, and the Maritime and Coastguard Agency. *Comments and observations on the draft of this report made by the Environment Agency are included in Section 2 and elsewhere, and are shown in italics and underlined for ease of reference.*

2.2 Characteristics of sectors operating in TraC waters

The sectors represented at the workshops share a number of characteristics, but differ (sometimes significantly) in others. Of particular relevance to this scoping study, very few activities (with the notable exception of flood and coastal defence) are subject to formal planning mechanisms. Further, where voluntary plans do exist (eg. estuary management plans), these are not subject to economic appraisal. Planning processes and associated economic appraisal procedures are discussed further in Section 4.3. It is also important to note that (again with the exception of flood and coastal defence), economic activity in TraC waters is typically privately financed and that the Treasury Green Book is not necessarily relevant to investment decisions.

Workshop participants stressed that the majority of activities in TraC waters are already well-regulated. This is particularly the case for renewable energies, flood and coastal defence, and most port, recreational boating, dredging, and aggregate extraction activities. Shipping has also been subject to increasing regulation over recent years. The main regulatory authorities identified by workshop participants as having relevant existing responsibilities are Defra's Marine Consents and Environment Unit (MCEU). However, depending on the particular activity, the Maritime and Coastguard Agency (MCA), the departments for Trade and Industry (DTI) and Transport (DfT), the Office of the Deputy Prime Minister (ODPM), the Port, Harbour and Conservancy Authorities, the Environment Agency and/or Local Authorities all have a role.

2.3 Assumptions

Following a brainstorming session during which workshop participants identified and discussed a wide range of possible implications of the WFD for the activities of their sector, participants at most workshops developed criteria to help differentiate between probable 'key issues' and 'not important' issues. In each case, these assumptions were based on participants' understanding of what the WFD is aiming to achieve. Issues were then typically divided between those felt likely to be 'significant' (ie. may require measures in many instances), and those which would probably require measures only at a local (ie. catchment- or water body-specific) level.

The Workshop Reports (see Appendix 1) set out in detail the assumptions made by the representatives of each sector (or the reasons why assumptions were not deemed appropriate). However, the main outcomes of this process can be summarised as follows:

- there was wide agreement on the need to stress that not all 'materials in suspension' are contaminants. Participants assumed that the important natural role of sediments in many TraC ecosystems would be recognised and that WFD implementation would take proper account of background suspended sediment levels and natural variations therein

..... EA comment: as the competent authority, the Environment Agency's interpretation of WFD Annex VIII "Other Pollutants" items 10-12 are interpreted as cross referencing directly to the supporting physico-chemical elements in the normative definitions in Annex V (transparency, nutrients and dissolved oxygen). Due to the natural variability of transparency, particularly in transitional waters, the UK competent authorities are not deriving supporting standards for this element for implementation in the first round of River Basin Management Plans

- related to the above, it was assumed that the importance of effective sediment management and its interrelationship with water management in TraC waters will be recognised by those responsible for WFD implementation
- participants felt strongly that the spirit of the WFD is such that it is not intended to be concerned with short-term temporary impacts unless they have a measurable medium-long term consequence. In particular, it was felt that the WFD should not be concerned with the temporary resuspension of (clean) sediments as a result of dredging or vessel passage unless this causes either a significant increase in the bioavailability of contaminants or medium/long term ecological impacts - for example the smothering of sensitive receptors

..... EA comment: since the Shellfish Waters Directive (SWD) will be repealed in 2013, WFD standards will be required that are at least as stringent as those already applied by the SWD to fixed point discharges in protected shellfish areas. The SWD requires increases in suspended sediments in the water column to be no greater than 30% above background levels. This standard will therefore be the minimum that will apply. It is expected that at least for Protected Areas the WFD will be concerned with temporary resuspension of sediments

- it was assumed that, where the activities of a particular sector are not specified in WFD Article 4(3)(a)(ii), they will nonetheless be treated as either an integral part of another activity (eg. dredging, shipping, mooring) or as an 'equally important sustainable human development activities' (eg. cables, fishing activity, aggregate extraction, etc.)
- it was also assumed that that activities such as shipping, the presence (or management) of historically contaminated sediment, commercial fishing activity and, in some cases, moorings, are likely to be identified as additional pressures in their own right

..... EA comment: the Environment Agency is considering what additional pressures to include within the further characterisation exercise, RBC2. Shipping activities such as ballast water treatment, historically contaminated sediment, and boat moorings will all be considered alongside the further characterisation of all other significant pressures on a priority basis to be determined by Policy leads within the EA, the devolved administrations and Defra

- the vital links between riverine/fresh water and transitional/estuarine water bodies were stressed: participants assumed that there would be adequate integration in developing the Programmes of Measures in respect of such inter-relationships (eg. the movement of sediments from upstream in the catchment out into the estuary, migratory fish requirements, etc.)

- finally, participants noted the sensitivity of the 2004 (RBC1) risk assessment outputs to water body size. However, they assumed that the RBC2 risk assessment exercise will use improved datasets to determine whether a water body is at risk of failing to meet good status rather than using thresholds that were perceived as often being somewhat arbitrary. The need for sufficient evaluation to identify actual impacts rather than just ‘theoretical’ pressures was also stressed.
..... EA comment: the latter point will be dealt with through implementation of the WFD monitoring programmes and possible work through further engagement with key stakeholders and/or additional case study work leading up to the implementation of the monitoring programme.

Most of these assumptions are important in determining whether or not an activity is likely to affect water status and/or the likely significance of any such effect. Participants stressed that clarity on such issues will be vital because the number of potentially ‘significant’ (ie. material) effects on water status - and hence the magnitude of the economic implications of the WFD - will vary accordingly.

2.4 Key issues

Workshop participants identified a wide range of activities with the potential to affect water status, for example cause deterioration or contribute to failure to achieve good status. In some cases (eg. new development, use of anti-fouling products, navigation dredging) issues were raised at several workshops. In others (eg. the legacy of past use of refuse as an infill material for the construction of some seawalls), issues were sector-specific.

Table 2.1 summaries the activities identified by workshop participants as having the potential to affect water status, either as a general rule, or depending on site-specific conditions.

Table 2.1: Activities potentially affecting water status in TraC waters

Broad description	Examples ¹ of activities/consequences with the potential to affect water status
New development as defined under Article 4(7)	Construction; reclamation; beach nourishment; capital dredging; disposal/treatment of dredged material; aggregate extraction
Maintenance or management activities	Maintenance dredging and disposal/treatment of dredged material; use of anti-fouling products
Operations potentially causing a direct effect	Sediment management; ballast water management; towed (fishing) gear; anchoring; lock operation; vessel movement;
Potential indirect effects of operations and activities	Boat wash; fishing bycatch; hull fouling; run-off (from facilities, cargo-handling, etc.); noise; electro-magnetic frequency effects
Residual or legacy effects	Historic contamination of sediments; established communities of non-indigenous species; landfill or other (eg. mining) waste sites on eroding coasts;
Presence of existing facilities or infrastructure	Flood defences including sea walls constructed from refuse; moorings; quay walls; breakwaters, groynes, training walls, etc.

Discharges, emissions and waste	Discharges from vessels (ballast waters, sewage, fuel (also bunkering), bilge); garbage; cargo handling
Other	Recreational boating events; accidents and incidents; use of medicines in aquaculture
Activities of third parties	Combined storm-sewer outfalls; abstraction; microbiological contamination (sewage discharges, livestock farming, houseboats)

¹ It is acknowledged that some activities may fit well under more than one heading.

2.5 Possible measures and delivery mechanisms

In considering how any effects on water status associated with the above activities might be dealt with, workshop participants identified a wide range of possible ‘measures’. These represented actions which might be considered in developing the cost-effective ‘Programmes of Measures’ required by Article 11 of the WFD. Broadly speaking, these measures included:

- improving planning, management initiatives and/or better enforcement
- modifying, restricting or constraining the existing (or proposed) activity in some way
- prohibiting the activity or refusing a consent/licence
- imposing removal or restoration requirements
- changing products/developing new products
- improving understanding via research and monitoring
- introducing taxes on certain activities

The majority of these measures, at least in a generic sense, are thus similar to those identified in Project 1 of the Collaborative Research Project (under the headings ‘direct uses of the water environment’ and ‘heavily modified water bodies’), and subsequently broadly categorised in Project 2. However, there are also a few subtle differences:

- i) Project 1 did not identify ‘research and development’ as being a measure insofar as it is a necessary precursor to the development of possible new solutions (eg. where existing methods are known to cause damage but where alternatives do not yet exist or where the existing alternatives are prohibitively costly)
- ii) Project 1 does not explicitly include the possibility of better enforcement of existing regulation, although this is included in Project 2a as a consideration in determining the effectiveness of a measure. Whilst the enforcement of regulation in the marine environment can often be difficult and/or expensive, the workshops identified a number of aspects in which better enforcement may help to achieve WFD targets
- iii) Providing compensatory habitat, etc. is similarly not explicitly included in Project 1. However, restoration and remediation initiatives are considered in both Projects 1 and 2. The main difference between restoration and compensation is that the latter accepts a loss and seeks to create an (at least) equivalent resource elsewhere.

RPA comment (see also Section 3 introduction): The latest version of the CRP Project 2b costs methodology includes a specific measure for research and adds re-creation

within the measures for ‘remediation/restoration/re-creation’. Better enforcement should be picked up by the effectiveness methodology (ie. CRP Project 2a).

In addition to identifying potential measures, participants discussed possible delivery mechanisms. These discussions focused on identifying who might be responsible for ensuring that the WFD targets are achieved and the means for so-doing. Participants also considered whether or not potential delivery mechanisms already exist and, if so, whether their enforcement is currently adequate. In a number of instances, two or more possible delivery mechanisms for a single measure were identified - for example, constraints on an activity could be delivered through a good practice guide or they could be imposed as a regulatory requirement.

In total, more than 200 possible ‘measures’ were identified by workshop participants when options for delivery are also considered (ie. the same action may be delivered via different mechanisms). It is acknowledged that participants at two or more workshops may have identified the same or very similar measures and that there may therefore be some ‘double-counting’, however the detailed figures are not of relevance here. Rather, the purpose of this intentionally very broad assessment is to illustrate some of the main characteristics of the possible measures and delivery mechanisms.

2.5.1 Possible voluntary measures

Of these 200 or so possible measures, approximately 30% can be described as voluntary (or incentive-driven) actions. Participants felt that, in many such cases, self-regulation via the promotion or adoption of existing good/best practice and recent or developing codes of conduct, could help to deliver many of the WFD objectives. Examples cited included:

- the British Marine Federation, Environment Agency and Royal Yachting Association ‘Environmental code of practice’
- the principles set out in the UK Marine SACs Project ‘Good practice guidelines for ports and harbours operating within or near UK European marine sites’ and the evolving Defra/English Nature/industry ‘maintenance dredging protocol’
- various PIANC and CEDA technical publications on environmental good practice

The development of voluntary (management) agreements was also suggested in a number of cases.

Such measures would typically be taken by the operators themselves and, in many cases, could be implemented at minimal cost (see Section 2.6). Where an ‘incentive’ arrangement was cited, the main suggestions made by participants related to (improved) enforcement, say of byelaws, with the threat of fines or other penalties being imposed by Harbour or Conservancy Authorities, Local Authorities or others. The role of the EU Environmental Liability Directive in delivering the WFD Programmes of Measures (ie. in placing financial responsibility for pollution prevention or remediation on the operator) was also seen as a likely future incentive to apply good/best practice principles to operations and activities. Other incentives mentioned included the availability (or otherwise) of insurance cover, and relevant planning policies.

2.5.2 Possible measures using regulatory delivery mechanisms

For around 55% of the measures, participants identified delivery mechanisms which relate to (mostly existing) regulatory provisions. When this figure is broken down into areas of current responsibility, participants suggested that around 10% of the 200 plus possible measures could potentially be delivered using the existing powers of the Environment Agency (ie. the WFD competent authority). Many of these related to flood risk management measures, whilst others dealt primarily with waste management and similar issues.

Participants identified that the remaining 45% or so of the 200 plus measures could only be delivered by other regulators - notably Defra's Marine Consents and Environment Unit. However, other regulators with important relevant responsibilities included the Maritime and Coastguard Agency, Port, Harbour or Conservancy authorities under local Acts, the Crown Estate/ODPM, DTI, Sea Fisheries Committees, local authorities and others.

It was felt that the majority of such measures (35% of 45%) could be delivered using existing regulatory provisions. However, for a handful of measures participants suggested a variety of possible new regulatory requirements. These included international legislation on anti-fouling products, the anticipated Marine Bill and/or EU Marine Framework Directive, new byelaws, etc. and, in a few (unlikely) cases where prohibition of a certain activity might be considered, the need for new Statutory Instruments.

2.5.3 Other possible measures

The remaining 10-15% of potential measures comprised a mixture of possible new policies or guidelines, a number of suggestions for research and monitoring, a few fiscal measures (taxes, subsidies, etc.), and a couple of measures which participants felt could not be delivered because they are 'not technically viable' (eg. eradication of established communities of non-indigenous species).

2.6 Likely costs of measures

2.6.1 Order of magnitude costs

As a key part of the workshops, participants were asked to consider the possible order-of-magnitude costs associated with the measures they had identified, and also who would bear the cost (both in the first instance and as a result of cost pass-on). In order to ensure that this exercise was achievable within the context of the workshop (ie. detailed cost estimates would not have been appropriate), three possible cost categories were suggested to workshop participants:

- minimal: likely to be broadly acceptable in most cases
- moderate: likely to generate debate about acceptability, who pays, etc.
- significant: could trigger discussion about exemptions due to disproportionate cost

In all cases, participants were asked to consider the *additional* costs resulting from the potential WFD measures and to assume, unless otherwise agreed, that it is already

reasonable to expect good environmental practice from the sector. Thus the cost estimates for the WFD measures should represent the anticipated costs over and above those currently incurred.

In many cases, participants indicated a range of possible costs (eg. 'minimal to moderate', 'moderate to significant'). Nonetheless, participants concluded that more than a third of the possible measures identified could either be achieved at minimal cost, or gave 'minimal cost' as the starting point for the given range of possible costs.

Measures which might be achievable at minimum cost typically included the development or application of codes of good practice, better enforcement of (often existing) local regulation, some zoning initiatives, and various research initiatives. Given the nature of these measures, the particular characteristics of the sectors operating in TraC waters, and the high percentages of TraC water bodies identified in RBC1 as being at risk of failing to meet good status (see Section 1.2), this finding reinforces the importance of adequate stakeholder involvement in identifying the most cost-effective Programmes of Measures.

Potential measures involving anticipated moderate costs (ie. neither minimal nor necessarily significant) included some research initiatives, required modifications (whether to plant, gear or working methods) and/or certain types of constraints imposed on activities by regulatory bodies (for example some seasonal restrictions or constraints on working methods).

At the other end of the scale, workshop participants felt that the costs of around 25% of the possible measures would, or could, be shown to be significant. For example, the costs of eradicating established communities of non-indigenous species in TraC waters (even if this can be shown to be technically viable) are likely to be prohibitive. The same would apply to dredged material disposal costs if current sea disposal practices were to be significantly constrained, leading to a requirement for widespread land disposal or full treatment as an alternative. Depending on the detail, measures prohibiting certain activities or working methods (eg. certain dredging techniques, fishing methods, etc.) may also be shown to be disproportionately costly, particularly if the full range of consequential costs is considered in the disproportionate cost analysis. Disproportionate cost and affordability issues are discussed further in Section 3.5 of this report.

Whilst not insignificant, it is also clear from the workshop outputs that this percentage (25%) of potentially significantly costly measures is sufficiently low to provide confidence that cost-effective solutions to many issues should be achievable.

2.6.2 Who bears the costs?

As demonstrated by the tables in the Workshop Reports (Appendix 1), participants felt that the costs of possible measures would necessarily be borne by a wide range of organisations and individuals - from statutory bodies' licensing and enforcement procedures or Government-funded research, through to the private sector/industry and individual vessel owners and operators. They also identified that, in many cases, costs could - and would - be passed on. The options for so-doing varied from the costs to the taxpayer of enforcement, etc. and to the general public if the price of

imported consumer goods, aggregates and/or fish products were to rise as a result of WFD implementation, through to the additional costs incurred by private sector organisations (such as port and harbour authorities, wind farm developers and others) and passed onto their customers. In other cases, however, it was felt that costs would be borne by individuals: for example fishermen, recreational water users or vessel operators.

It is clear from the tables in the Workshop Reports that careful attention to the question of who pays (whether in the first instance, or once costs have been passed on) will be vital if the WFD Programmes of Measures are to be delivered in an even-handed manner both between and within sectors.

Finally, workshop participants highlighted a range of other issues relating to the economic and financial implications of the WFD. The key points thus raised are discussed in Section 3 of this report.

2.7 Potential benefits of WFD implementation

In addition to the measures for which representatives of their own sectors would have responsibility (either the operators themselves or their regulators), workshop participants also identified a number of areas where they felt their sector could benefit from WFD implementation but where achieving such benefits was outwith their control. In such cases, delivery would be the responsibility of third party (non-TraC) regulators or other organisations/individuals.

Table 2.2 outlines some of the key concerns highlighted in this respect, and indicates the sectors upon which any measures (actions) might fall if the identified potential benefits are to be realised.

Table 2.2: Potential benefits of WFD implementation requiring action by non-TraC organisations

Benefit/associated activity(ies)	Effect on water status and on economic activities
<u>Reductions in microbiological contamination levels.</u> Microbiological contamination of water bodies currently occurs due to sewage discharge (including from combined storm-sewer overflows on the Thames) and from vessels (commercial and recreational craft and also residential houseboats). Also runoff from livestock farming	Implications for microbiological deterioration and failure to meet good status for protected areas (bathing and shellfish waters). Effects on shellfisheries (leading to increased depuration costs) and occasionally recreational users (potentially causing gastro-enteritis), etc.
<u>Reductions in diffuse and point source contamination</u> from industry and agriculture. Current sources of contamination include nutrients and chemicals from agriculture; discharges from water treatment works and from industrial installations	Failure to achieve good water status (chemical, ecological and protected areas); accumulation of contaminants in sediment leading to increased costs of dredging and disposal; also issues associated with re-mobilisation and bioavailability

<p><u>Consistent water temperature.</u> Thermal influences include increased water temperature due to discharge from power stations</p>	<p>Implications for ecological deterioration and failure to meet good water status (ecological and protected areas). Possible consequences for fish and shellfish interests</p>
<p><u>Reduced entrainment rates.</u> Cooling water intakes for power stations can cause entrainment</p>	<p>Implications for ecological deterioration and failure to meet good water status (ecological and protected areas). Entrainment of (juvenile) fish on screens with possible implications for fish stocks/fishing interests</p>

Section 3 Economic and financial issues

Workshop participants raised a number of issues relating to the potential economic and/or financial consequences of WFD implementation. Common concerns, together with potentially significant sector-specific concerns, are summarised in the following sub-sections. However, reference should be made to the appended Workshop Reports (Appendix 1) for the full details of other individual sector-specific concerns.

One of the objectives of this scoping study was to ensure that the economic methodologies being developed as part of the Collaborative Research Programme (for example, the cost-effectiveness analysis (CEA)) will be suitable for application in TraC waters, and that there will be no significant gaps or omissions. In each of the following sub-sections, RPA² have therefore commented on whether, and how, the issues identified are being dealt with (or can be dealt with) as part of the ongoing CRP work. *RPA's comments are presented in italics for ease of reference. Supplementary comments by the Environment Agency are similarly presented in italics but are also underlined.*

3.1 Economic importance of industries in the maritime and coastal environment

Participants at many workshops were concerned to ensure that the true economic and financial value of their sector's activities will be properly reflected in the WFD economic analyses. This is relevant not only to the analyses to be carried out as part of the development of the WFD Programmes of Measures, but also in the process of designating heavily modified water bodies and, in due course, to proposals for new physical modifications and/or other forms of development when Article 4(7) of the WFD is applied.

RPA comment: this reinforces the need for full stakeholder participation and involvement in determining the costs of measures and highlights the need for the relevant sectors both to provide data when it is required during the assessments and, subsequently, to comment on the measures proposed and costing of those measures.

In many cases, participants stressed the value to the nation of their industries. For example, ports handle approximately 95% of UK trade in tonnage terms. In 2003, the value of goods imported through UK ports was estimated at £173 billion while exports were approximately £141 billion. The recreational boating sector similarly highlighted the economic importance of the sector. In 2003, recreational boating and associated activities contributed £1,800 million revenue and nearly £800 million in exports to the economy.

² RPA (Risk & Policy Analysts Ltd), together with a consortium of sub-consultants, are responsible for developing the methodologies to identify the costs of WFD implementation as Project 2b of the Collaborative Research Programme. RPA are also involved in Project 2a, which is determining the effectiveness of the proposed WFD measures.

RPA comment: the assessment of wider economic costs should take into consideration aggregated impacts across a number of waterbodies, particularly where the aggregated effects occur across different River Basins. This aggregation issue is picked up in the proposed approach to assessing wider economic costs (Project 2b). Where a measure would significantly affect the level of activity taking place within the UK and thus impact on whole markets/sectors, then this would trigger the need for consideration of macro-economic effects. The appraisal would move to the second stage for wider economic effects where such impacts would be taken into account.

The disproportionate costs analysis (to be developed as Project 3) will need to take into account the key economic and financial characteristics of the affected sectors.

Some participants representing the marine/coastal fishery and shellfishery industry expressed concern about the methods to be used to assess the value of the sector. They were concerned that the 'true value' of fish can be as high as 3 to 15 times the 'first sale' value depending on whether it is sold on within the retail sector, processed and sold on, or sold as part of a restaurant meal. Related to this, participants were keen to ensure both that employment in sectors such as fish processing and hotels/catering is properly taken into account, and that consideration is given to the cultural and aesthetic value of fishing harbours in supporting tourism in many small coastal towns and villages.

RPA comment: the comments relate to the 'added value' attributable to fisheries and shellfisheries as their product moves down the supply chain. As indicated above, where a measure would significantly affect the supply of fish to the UK market, then this would trigger the need for consideration of macro-economic effects. The appraisal would then move to the second stage for wider economic effects where such impacts would be taken into account.

The recreational boating sector expressed similar concerns: in particular that the 'added value' of tourism associated with recreational water use should be considered. They also highlighted the economic dependence of the boat manufacturing sector on the availability of suitable moorings (see below).

RPA comment: see above. However, it is also important to note that in cases where detrimental effects on recreational boating (or associated tourism) on one waterbody result in increases in activity on another waterbody elsewhere in the UK, there may not be a net national loss of activity but rather a transfer of activity. In such cases, the Treasury Green Book would require that a national perspective is adopted and only net national losses are considered. However, there may be potential for such regional considerations to be picked up in the disproportionate costs analysis (Project 3).

Finally, it was suggested that a useful reference in terms of assessing the value of marine-related activities in the UK is provided in IACMST information document No. 10 by Pugh and Skinner (2002).

3.2 A level playing field

Based on their experiences with the EU Birds and Habitats Directives, many workshop participants expressed significant concern that the implementation of the WFD should not result in UK industry being placed at a competitive disadvantage.

RPA comment: this is not strictly speaking an issue for the CEA component of the analysis (CRP Project 2), unless there is concern that the nature of the analysis to be applied in the UK is significantly different from that in other EU Member States and, as a result of this, UK companies would be placed at a disadvantage. Issues surrounding impacts on competitiveness are more importantly the type of issue that should be picked up in Project 3 (the disproportionate costs analysis).

In the case of the ports/harbours and shipping sectors, many such concerns relate to the ways in which heavily modified water bodies will be identified and good ecological potential (GEP) targets set, whilst others focus on how the requirements of Article 16 will to be delivered. Unless all Member States are equally rigorous in selecting the criteria to be used and determining how they will be applied, there is potential for other Member States to designate more water bodies as HMWBs and for GEP to be set sufficiently low so as not to constrain activities such as dredging. The costs incurred by ports and hence shipping operating in the latter areas could then be substantially lower than those incurred in Member States where a more rigorous approach is taken. This could be a particular problem in the UK where the costs of the 'measures' borne by the sector will fall on individual (privately-owned and operated) ports rather than by public bodies as in most other Member States - thus potentially leaving UK ports at a competitive disadvantage.

RPA comment: considering the costs and effectiveness on a sliding scale (costs vs. effectiveness) should help to determine the economically most efficient way of implementing measures (i.e. extent to which a measure is implemented). This could be used to take into account approaches used in other Member States, where these are known. Furthermore, the implication of costs falling onto private firms in the UK and onto public bodies in other Member States could be picked up in the disproportionate costs assessment (Project 3).

This concern highlights the importance of all EU Member States following the CIS guidance, for example in the designation of HMWBs.

Participants at the recreational boating workshop shared the concerns of the port sector representatives in respect of the possible costs of any additional constraints on activities such as dredging. However, they also highlighted the possible wider economic implications of any constraints on new development that may result from the implementation of Article 4(7). Specifically, recent experience indicates a growing number of instances where manufacturers have been unable to conclude the sale of a vessel until there is certainty that a berth will be available. At the present time in some areas of the UK (eg. around the Solent), demand - particularly for marina berths - already outstrips supply. British Marine Federation is concerned that any additional burden on development imposed as a result of the WFD could exacerbate this situation, leading to an increasing number of vessel owners both purchasing vessels, and berthing them, in other Member States.

RPA comment: taking into account the costs of potential future impacts is likely to be very difficult. Constraints on future development, unless they are already planned/agreed, are not normally taken into account in economic analysis. The WFD River Basin Planning cycle is six yearly so any changes/future development requirements could be picked up in analyses once they have been planned/agreed.

In cases where it can be shown that there would be a loss to the UK economy, this would either be dealt with via the disproportionate cost analysis (Project 3) or, if the loss is significant, by the macro-economic methodology.

Level playing field issues were also raised by participants in the other workshops, viz:

- those working with the aggregate extraction sector highlighted the potential implications (ie. in terms of possible additional costs of constraints or mitigation measures) for companies extracting aggregate within the area covered by the WFD, given that they have to compete with companies operating outside the WFD offshore boundary

... .. RPA comment: there is an equity and 'polluter pays principle' issue here. If aggregate extraction further offshore does not have to take action to reduce its impact, then those extracting within the WFD area would be penalised. However, the methodology cannot take this into account unless the offshore industries are also captured (i.e. even-handedness). Again, this is an issue that should be addressed by Project 3 in developing the disproportionate costs analysis rather than the CEA.

- those responsible for flood defence and coast protection raised concerns about the relative 'value for money' of flood defence expenditure compared to the situation in other Member States. In particular, questions were asked about the proportion of a given budget allocated to survey/data collection, modelling and investigations, mitigation, compensation, etc. compared to that spent on engineering works, flood warning, flood management and other practical measures

3.3 Modal shift

Related to the anticipated potentially significant direct and indirect costs of certain constraints on activities such as dredging and disposal (and even, in certain situations, on vessel movement) participants at the ports and harbours and shipping workshops highlighted the vital requirement for policy integration (see Section 4.5). Despite the widespread acknowledgment that water-borne transport is the most sustainable form of long-distance transport for many types of goods, participants stressed that failure to adequately consider the important contribution made by navigation to sustainable transport policy could potentially lead to a shift away from water-borne transport. In the first instance, concern was expressed that constraints on development (eg. dredging or disposal) resulting from WFD implementation could make it difficult or impossible to cater for the largest container vessels at UK ports. In this case, it was assumed that these large vessels would instead call at other EU ports such as Rotterdam, Le Havre or Antwerp. Containers bound for the UK could then either be transferred to short-sea vessels, with associated increased costs in respect of double handling, etc., or they could be brought to the UK by land (road or rail) transport.

RPA comment: these concerns highlight the need for consideration of the total costs of any measure which can be captured through the non-water environment costs and benefits as part of Project 2b. It will be important that the guidance to accompany the methodologies recognises the need to consider costs that go beyond the measure itself where there may be significant impacts. This may need to be linked to those occasions where the wider economic effects are to be assessed, such that costs associated with any modal shift can be fully addressed.

If the constraints imposed on development (dredging, disposal) and/or navigation were to increase costs such that water-borne freight were to switch to land, particularly road transport, there would be a wide range of potentially significant associated economic costs. Participants highlighted not only the increased costs associated with alternative forms of transport (*cf.* double handling, fuel consumption, etc.) but also the potentially significant non-water environmental costs associated with deterioration in air quality, implications for human health, increased congestion, noise, safety and so on.

RPA comment: again, these costs should be picked up in the non-water environment costs by the methodologies being developed as part of Project 2b, and should be relatively straightforward to quantify in money terms.

As with many of the issues identified in this Section, workshop participants highlighted the importance of the economic methodologies being developed for cost-effectiveness, etc. being able to take such concerns into account.

3.4 Increased costs associated with promoting new development

Participants at several of the workshops expressed concern about the likely effects of Article 4(7) on future development. Some of the concerns related to the increased regulatory burden of meeting the requirements of this Article and any associated delays in the decision making process (see also Section 4). Participants also cited experience with the EU Birds and Habitats Directives and suggested that increased costs associated with data collection, investigations and modelling, mitigation and compensation, and also legal fees might be anticipated. In the case of port and harbour development, for example, it has been suggested that complying with the Birds and Habitats Directives can typically add 5%-20% to the costs of developing a new facility.

RPA comment: this concern reflects participants' experiences of the additional costs of developing in/adjacent to existing designated areas under the precautionary principle, including where there is a need to show that the development has 'overriding public interest'. Extension of these requirements to all water bodies and, hence, to all potential developments affecting water status further emphasises the importance that these monitoring, etc. costs are picked up in the assessment of costs of measures under recurring costs (e.g. $C_{semi-variable}$). They are currently included in the list of relevant cost items in Project 2b. The need to consider additional development costs should also be included in the guidance.

In relation to the costs arising from delays in decision making, these are more difficult to capture. However, they could be included as one-off costs associated with

a loss in turnover. Alternatively, decision analysis based techniques could be used to illustrate the increased costs associated with a delay in decision making compared to making a decision more quickly. Both of these are allowed for in the Project 2b methodology.

3.5 Cost of measures and affordability

Workshop participants highlighted both the scientific uncertainties and, in many cases, the likely substantial costs of developing and applying viable technical solutions to some of the issues identified. For example, participants at the shipping workshop identified the potentially very high costs of some ballast water exchange systems. Those at the ports, harbours and recreational boating workshops similarly stressed the potentially significant cost increases associated with any requirements to dispose of large quantities of dredged material to land and, particularly, the likely excessive costs of treating large quantities of material. The tables in the Workshop Reports (Appendix 1) illustrate many other potentially significantly costly measures.

RPA comment: where there is considerable uncertainty over the costs, it is important that the relevant sector is able to demonstrate this when providing cost data - for example in the form of a wide range (low to high) and use of the lower accuracy bands. It is also important that the non-water environment costs are highlighted. The ability to include such uncertainties and costs is already provided for in the methodology developed as part of Project 2b: for example, there is the ability to include the energy and other costs associated with treating dredged material, disposal costs, etc.

Related to the above, and of greater concern at individual operator level, 'affordability' was identified as a key issue. Participants at the recreational boating, shipping, fishing, and ports/harbours workshops expressed serious concerns that whilst certain measures may be assessed as being 'cost effective' or 'not disproportionately costly' at a national or regional (eg. River Basin District) level, individual owners or operators may simply not be able to afford to implement them. Examples provided by participants included:

- new anti-fouling measures and/or ballast water management requirements
- investments in new (eg. fishing) gear, and
- the proportionate increase in the cost of developing and/or operating small ports, marina facilities, etc. if WFD requirements introduce costly constraints and/or mitigation requirements

RPA comment: the RPA et al (2004) report on Cost-Effectiveness Analysis prepared for Defra proposed that the disproportionate costs assessment be carried out at the level where the implications of the costs are considered against the organisation that is required to pay for them (ie. affordability issues). Otherwise, the assessment of disproportionate costs would not be appropriate. There may also be the potential for screening out those measures early on in the CEA where the costs would obviously be disproportionately high, such that a measure is considered 'unreasonable' in the first planning round, until additional research has been undertaken or other (less expensive) measures have been assessed and found to be ineffective.

The possibility of public funding for measures deemed ‘desirable and cost-effective’ at national level but not affordable at individual level is not included within the CEA. This is because it would require a cost benefit assessment to determine if the benefits to society would outweigh the costs, and whether the incremental value of these benefits over the costs would result in such an option being preferred over others. However, this type of analysis could potentially be included in the disproportionate costs assessment (Project 3).

Finally, whilst the issues have been well-documented elsewhere, participants confirmed that the potential economic consequences of Article 16 and the proposed daughter Directive on environmental quality standards and emission controls in the field of water policy are of significant concern to all of those with an interest in dredging, disposal and navigation.

3.6 Applying the ‘polluter pays’ principle

Workshop participants highlighted various potential difficulties in applying the ‘polluter pays’ principle and associated retrospective liability issues. The most widespread concern related to the dredging of contaminated sediments, but issues were also raised with respect to microbiological contamination and the delivery of the Shellfish Waters Directive objectives, and the funding required to enable good ecological status to be achieved in situations where it is no longer economically viable to maintain a flood defence structure.

RPA comment: the RPA (2004) Cost-Effectiveness report for Defra included an approach for considering the distribution of costs according to the impacts caused by sectors. Such an approach will need to be further developed in the disproportionate costs analysis (ie. by Project 3) when considering distributional issues to encourage application of the polluter pays principle.

3.6.1 Contaminated sediments

On the issue of contaminated sediments, participants acknowledged that improvements in source control (ie. reductions in point source and/or diffuse source pollution) under the WFD could have positive implications for certain maintenance dredging operations where there is a current source of contamination. However, the issue of historic contaminants was of greater concern. Specifically, there were fears that the constraints on dredging and disposal activity that could potentially result from the WFD (and in particular the proposed ‘priority substances’ Directive which would implement the requirements of Article 16 of the WFD) could have significant financial and economic consequences.

RPA comment: there are numerous points within the Project 2 CEA methodology and the (to be fully developed) distributional costs assessments that could be used to highlight such concerns. Costs of treating and disposing of dredged material should be included in the non-water environment costs, as should lost benefits from the use of dredged materials for other (beneficial) uses (ie. benefits that would have occurred but will not because of the change in policy). The distributional costs assessment should pick up issues with one sector paying for historic pollution (polluter pays

principle and distributional issues) and with the very large costs compared to the potential benefits.

By its very nature, dredging disturbs sediment, whether as a result of drag head action or overflow from the dredger as an 'economic load' is dredged. Sea disposal (ie. aquatic placement, whether to a dispersive or retentive site) of sediments, which are considered 'clean' based on existing guidance, is an economic and environmentally acceptable method of disposal. Contaminated sediments may be disposed to land or to a suitable confined site.

It appears likely that the forthcoming 'priority substances' daughter directive will propose tighter environmental quality standards for surface water, for some substances, than those currently in existence in the UK. It is possible that the way in which these standards are implemented may constrain certain dredging and disposal activities. The distinct WFD objective of aiming to phase-out or cease discharges, emissions and losses of Priority Hazardous Substances may also have an impact on disposal of dredged material, if sea disposal were to be interpreted as a discharge, emission or loss. Such an interpretation might necessitate full treatment of dredged material, which would generate a significant increase in the cost of dredging activities. These concerns are discussed further in ABP Mer (2004).

To date, the cost of dealing with contaminated sediments has typically been met by the port, harbour or navigation authority or marina operator for whom the dredging has been carried out. However, most of the contaminants in sediments are derived from the activities of third parties - either via licensed discharges or diffuse pollution. Further, many contaminants have been present in the sediments for many years, sometimes for decades.

Workshop participants thus stressed that the application of the polluter pays principle to the dredging of contaminated sediments will require careful and thorough consideration, both in terms of identifying the polluter(s) and in developing mechanisms whereby they may be required to pay.

RPA comment: the identification of measures for assessment will need to consider measures that can act on the sources of both historic and ongoing contamination of sediment. The CEA methodology (Project 2) proposes that measures be considered in the source-activity-pressure-impact hierarchy, which should encourage identification of measures that can be applied to reduce inputs of contaminated sediments. If the most cost-effective measures would have costs that significantly outweigh their benefits, then this should be picked up in the disproportionate costs assessment (Project 3).

If the historic polluter can be identified then the disproportionate costs assessment will address whether or not the costs to that polluter are reasonable or not. If the historic polluter cannot be identified, then it is likely that a public body will have to meet the costs of implementing measures. Again, the disproportionate cost assessment through the use of cost-benefit analysis will need to determine whether the measure is worthwhile from a societal and taxpayer's perspective.

3.6.2 Microbiological contamination and shellfisheries

Those representing shellfish interests at the workshop raised a long-standing concern about the inequities associated with pollution of coastal and estuarine shellfish waters with microbiological contaminants (notably from sewage treatment works, but also from livestock farming and/or sewage from vessels).

Before any molluscan shellfish can be offered for sale, the shellfish must be tested for faecal coliform contamination and, if necessary, purified in an approved depuration plant. Whilst problems associated with contamination by faecal coliforms, bacteria or viruses are not caused by the shellfish sector, it is the shellfish growers who must cover the (often significant) costs of depuration. Participants felt that, under the polluter pays principle, these costs should be met by the water companies and the other 'polluting' sectors.

Were WFD implementation to deliver significant improvements in microbiological standards, this would clearly be a major benefit to the shellfish industry. However, given *inter alia* the perceived failure of the Shellfish Waters Directive to deliver good water quality, and the apparent lack of attention to microbiological parameters in the WFD (see Section 5.2), workshop participants felt it most likely that they would continue having to meet these costs. Indeed, some participants suggested scenarios in which they felt the situation could get markedly worse.

Overall, in respect of shellfishery interests, workshop participants highlighted the importance of the economic methodologies being developed for cost-effectiveness, etc. being able to take such concerns into account.

RPA comment: the WFD focuses on the ecological status of waters and improving quality such that the impacts on habitats and species are reduced. This does not directly cover human health issues. It is unclear to what extent microbiological contaminants would affect the ecological quality of a waterbody as defined by the WFD. As a result, it is difficult to determine whether measures required to return the waterbody to good status would address microbiological issues.

The cost-effectiveness methodology would only address such issues should microbiological parameters be included under the definition of good status - in which case measures aimed at reducing contamination would be assessed. In these cases, the benefits of reduced depuration, re-laying, etc. to shellfisheries would be identified (although these may only be picked up in the disproportionate costs assessment as they are water-related (as opposed to non-water) benefits).

EA comment: the Environment Agency is currently reviewing the Shellfish Waters Directive alongside the development of the WFD ecological, supporting physico-chemical and chemical standards. The issue of how microbiological standards will be included is to be considered.

3.6.3 Other 'polluter pays' issues

The flood risk management and coastal defence workshop highlighted the scenario whereby a defence has previously been provided to an area of land under the

respective authority's permissive powers, but where the (economic) justification for maintaining the defence no longer exists. In this case, questions were raised as to who is the 'polluter' (presumably the authority under whose auspices the defence was constructed?) and who will 'pay' for its removal if realignment is required to deliver good ecological status?

RPA comment: if a defence has to be removed, then it is presumed that taxpayers would have to pay for the removal. However, unless such action could be taken within existing flood risk management and coastal defence budgetary provisions, there may in turn be a requirement to develop a new policy.

Finally, many workshop participants noted that, in most cases, the extra costs incurred by those operating in the coastal and estuarine sector will be passed on to the user and/or to society as a whole. Consumers will thus pay more for their food and electrical goods if navigation and dredging costs increase; for houses and other development if aggregate extraction costs rise; and for their leisure activities if those undertaking recreational boating activities incur extra charges. Similarly, taxpayers will ultimately have to 'foot the bill' for the participation of public bodies in the implementation process and, in many instances, to meet the costs of enforcement.

3.7 Compensation and compulsory purchase

The flood risk management and coastal defence workshop raised issues in respect of both compensation and compulsory purchase and, related to this, about possible sources of funding to deliver WFD targets. These issues of compulsory purchase and compensation arise here because of the largely permissive nature of flood protection powers. Of particular concern to participants was the situation in which maintaining a flood defence is no longer (economically) justified and/or there is another defined need to remove or set back the defence in order to achieve good ecological status.

In some such cases, workshop participants felt that there may be a case for paying compensation to the landowner; in others there may be a need to compulsorily purchase the land. In either situation, participants felt that there is no existing obvious funding stream and/or mechanism.

Participants at the fish and shellfishery workshop also highlighted the issue of compensation in relation to any requirement to constrain/limit fishing activity in order to achieve WFD objectives.

RPA comment: the presence/absence of an existing mechanism for recovering costs is one of the attributes that is considered when assessing the effectiveness of measures. Therefore, the Project 2a methodology would ensure that a lack of an obvious funding mechanism was highlighted both during the assessment and at the decision-making stage. There are limited circumstances in which the purchase or long-term lease of land is a legitimate cost which can be borne by flood defence budgets. However, compensation might be available from other budgets, for example to manage the transition from agriculture to intertidal or wetland habitat.

3.8 Participation and enforcement costs

Representatives of most regulators with responsibilities in the coastal and estuarine environment, along with various other statutory bodies, attended one or more of the various WFD TraC scoping study workshops (ie. the Environment Agency, Defra Marine and Waterways Division, Defra Marine Consents and Environment Unit (MCEU), Defra Flood Management Division, The Crown Estate, the Port of London Authority, Department for Transport Ports Division, ODPM, DTI, Sea Fisheries Committees, London Port Health Authority, Canterbury Council, English Nature, Maritime and Coastguard Agency, Harwich Haven Authority, Port of Tilbury, and Medway Port Authority). At each workshop, and notwithstanding that the Environment Agency is identified in the WFD implementing Regulations as the sole ‘competent authority’, participants expressed concerns about the possibility (or ‘likelihood’) of WFD implementation leading to increased costs. Two main issues were identified in this respect:

- the perceived high cost of participation in the WFD implementation process, not only in the various stakeholder groups, etc. at a national level, but also in the preparation of the forthcoming river basin management plans: in particular the resource commitment necessary to participate in the development of cost-effective Programmes of Measures was stressed
- the costs of ensuring delivery of the Programmes of Measures and preventing deterioration/achieving good status (or potential): such costs were anticipated by participants to include not only the regulatory procedure but also, in many cases, enforcement, monitoring and review processes.

RPA comment: the Project 2b costs methodology divides the assessment of the costs of a measure into a number of individual cost elements. This should help ensure that all of the costs associated with a measure are taken into account, not just capital and recurring costs (which include monitoring) but costs to regulators, the influence of any cost savings and transfers, plus the inclusion of non-water environment costs and benefits and wider economic costs.

3.9 Economic appraisal tools

In the light of the type of concerns discussed in this Section, and also the more detailed concerns set out in the appended Workshop Reports (see Appendix 1), workshop participants stressed the vital importance of ‘developing the right tools for the job’. In particular, questions were asked about the ability of the methodologies to take into account the following:

- the range of possible increased costs incurred by operators in respect of both day-to day activities and new development proposals and, in particular, the affordability of measures (Section 3.4)
- non-water costs and benefits including (but not limited to) the possible wider economic and environmental implications of modal shift (Section 3.5), potential human health consequences (eg. associated with microbiological contamination in shellfish, the effects on recreational users of CSO events, etc.), and any requirement to achieve

- good ecological status in areas which were previously defended against flooding (eg. Section 3.7)
- the wider socio-economic implications of WFD measures (eg. in respect of direct employment (say, fisheries), indirect employment (say, boat manufacturing), flood defence (where it is no longer economically justifiable to maintain a defence), and so on). Again, the tables in the appended Workshop Reports provide a wide range of such examples
- *RPA comment: the approach to estimating costs (Project 2b) is based around a generic formula that splits costs into different elements. These elements are designed to be comprehensive so that all costs associated with a measure (either directly related to implementation of that measure including enforcement, or occurring as a result of knock-on effects) can be included. The potential for simplifying the assessment process without losing the ability to include all of the significant costs is being tested in a series of pilot trials.*

Because of difficulties in placing money values on certain environmental costs and benefits, participants at the flood risk management and coastal defence workshop also highlighted the importance of considering non-monetary measures, for example ecosystem based approaches (carbon, nutrients, etc.).

RPA comment: the Project 2b costs methodology recognises that not all cost data can be represented in money terms and requires qualitative description of cost elements, particularly for the non-water environment costs and benefits and the wider economic costs. The approach to decision-making requires all of the key qualitative costs and benefits to be recorded alongside the monetised costs. This means that non-monetary costs and benefits should be taken into account during decision-making.

Workshop participants also stressed both the need to ensure consistency (within and between sectors in the UK) in developing and applying economic methodologies, and also the vital importance to many of those operating in the coastal and transitional water sector of aiming for a level playing field with other EU member states.

RPA comment: consistency is vital and will be encouraged by the development of guidance to accompany the cost-effectiveness methodology and the use of proformas for recording of information (Project 2). Consultation with stakeholders will also form an important step in terms of Quality Assurance. Consistency with other Member States cannot, however, be controlled by the methodology, the guidance or Quality Assurance.

Section 4 Regulatory issues and the responsibilities of statutory bodies

Participants at all the workshops highlighted issues relating to the existing regulatory regime in transitional and coastal waters (notably in England), and raised concerns about various aspects of WFD implementation ‘in practice’. Whereas many regulatory issues were common (ie. were raised at several different workshops), others were sector-specific.

The following sub-sections set out the main issues raised. Sections 4.1 to 4.3 inclusive deal with aspects of the WFD that workshop participants felt require interpretation or clarification, notably with regard to their practical application. Sections 4.4 to 4.8 go on to deal with the relationship between the WFD and the existing regulatory system, including relevant international requirements.

In the light of the discussion in the preceding sub-sections, Section 4.9 then considers possible delivery mechanisms for WFD targets in TraC waters.

Finally, it should be noted that participants also raised other points of detail and reference should therefore be made to the Workshop Reports (Appendix 1) to understand the full range of issues discussed.

4.1 Need for interpretation and clarification

Participants at all the workshops highlighted aspects of the WFD that they felt require clarification and/or further interpretation. The following statements and questions represent the main issues raised with regard to the WFD regulations and their interpretation/implementation, but others are discussed in the Workshop Reports (Appendix 1):

- does the WFD really intend that ‘high status’ is equivalent to unmodified natural conditions, and how realistic is this?
- the UK has a wide diversity of coasts and estuaries. Considering the regulatory significance of achieving ‘good status’ (and depending on its relationship with ‘high status’), what reassurances can be provided that the derivation of good status will be scientifically meaningful?
- can written clarification be provided that ‘no deterioration’ applies only to deterioration between (ie. not within) status classes?

EA comment: ‘no deterioration’ applies to deterioration between status classes and not status within a class. Changes in status will not be declared unless there is significant confidence in change in class

- what will constitute an ‘effect on water status’, and who will judge this?
- EA comment: an effect on water status will be either a deterioration or an improvement from one status class to another or failure to achieve protected area objectives in a water body
- under the provisions of Article 4(7), who will determine whether an environmentally better option exists, whether it is disproportionately costly, and whether there are reasons of overriding public interest?
 - how will the baseline be determined when activities such as reclamation have been going on for centuries and certain non-indigenous species have become ‘part of the ecology’?
 - how have economically significant aquatic species been defined?

- how will 'significant' be interpreted in the context of the WFD?
- how will issues which are not specified in the WFD or in the implementing regulations, but which are nonetheless of potentially vital importance to its effective implementation (eg. sediment management) be dealt with?
- what will be the status of 'good practice' examples or guidance in achieving WFD targets (eg. if these are cited in the RBMPs)?

In citing their experiences with the EU Habitats Directive and its implementing Habitats Regulations, participants at several of the workshops stressed the importance of ensuring consistency and transparency of interpretation. They also stressed the need for clear written communication and for dissemination of the interpretation and/or clarification outcomes, not only at national level but also down to the level of local officers in the Environment Agency and other relevant organisations.

4.2 Boundary issues

4.2.1 Offshore WFD boundary

Workshop participants questioned how the offshore boundary for the WFD had been derived. The Environment Agency has confirmed that the definitions in the WFD (ie. surface water on the landward side of a line, every point of which is at a distance of 1nm on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured) has been followed, and that the UK's legally defined baseline as provided by the Hydrographic Office had been used. Nonetheless, workshop participants raised specific queries as to the derivation of the offshore boundary around the outer Thames estuary and off eastern Kent.

As illustrated in Section 3.2 above, industries such as aggregate extraction, marine renewables and shipping operate both within and outside the WFD offshore boundary, and concerns were expressed about the possible competition consequences of any constraints on operations and activities arising from WFD implementation. Against this background, participants felt both that clarity on exactly how the boundary had been derived, and ensuring consistency (not only around the UK but also with other EU Member States) will be vital.

EA comment: the main activities in these areas of concern relate to morphological alteration of the sea bed. Any such morphological alterations will be considered in relation to their impact upon the biological elements and the possible associated need for designation as heavily modified water bodies.

4.2.2 Relationship between WFD boundary and other offshore areas of jurisdiction in England (and Wales)

It was acknowledged by workshop participants that there is already great variation in the spatial extent of jurisdiction of the various statutory bodies with responsibilities in TraC waters. However, participants at the fish and shellfishery workshop in particular felt that the apparent extension of the WFD area beyond both the 6 nautical mile and 12 nautical mile fishery limits in areas such as the Outer Thames Estuary could cause significant practical and administrative difficulties, not only in respect of regulation and enforcement, but also with regard to economic and competition considerations.

4.2.3 Water bodies in outer estuarine areas

Workshop participants recognised that the WFD aims to develop an integrated, holistic system of water planning and management. However, against this background, various issues arising from the division of outer estuarine areas such as the Thames Estuary and Severn Estuary/Bristol Channel between three different River Basin Districts were highlighted. Not only is there a lack of clarity in the rationale here, but it is likely to cause enormous practical and resourcing difficulties to organisations such as the Port of London Authority who operate throughout the wider estuarine area.

4.2.4 Boundaries between coastal water bodies

Clarity was similarly requested on the decision not to use the boundaries derived for the development of Shoreline Management Plans when WFD coastal water bodies were delineated. As these boundaries were derived to reflect sediment movement characteristics, and as many of the issues of concern to the WFD - at least on the open coast - are hydromorphological in nature, it appeared to participants that the use of the same boundaries would be logical.

EA comment: it was not possible to use the SMP boundaries as their means of derivation did not comply with the mandatory parameters required to derive the physical typology required as the building block in Article V characterisation for delineating water bodies.

4.3 Relationship between River Basin Management Plans and existing regulatory system

4.3.1 Lack of existing plans in marine areas

Participants accepted that there are many types of plan relating to the coastal zone (eg. SMPs, estuary management plans, Habitats Regulations' schemes of management, etc.). However, they drew attention to the relative paucity of such plans in outer estuarine and marine areas, at least until such time as a Marine Bill and/or an EU Marine Framework Directive introduces a system of Marine Spatial Planning.

Whilst the workshops did not specifically address the question of whether or not planning processes would apply to each of the individual potential measures, at a sector level it was clear that formal planning mechanisms exist only for the flood risk management and coastal defence sector (eg. via Shoreline Management Plans, which are in turn subject to economic appraisal). There are no such formal planning mechanisms for the other sectors covered at the workshop (fish and shellfisheries, marine resources, ports and navigation dredging, recreational boating, or shipping).

4.3.2 Lack of economic appraisal processes

Participants urged caution in considering the use of voluntary plans such as estuary management plans to inform the River Basin Management Planning process. Voluntary plans tend to be variable in their content and consistency. The extent to

which they have genuine ‘buy-in’ from stakeholders similarly varies and, most importantly in this context, they are not subject to any form of economic appraisal process. Rather, they rely on the availability of research funding and/or grants and/or the goodwill of participating organisations, to take forward any of their policies and recommendations and, in many cases, little or no action results.

There was also concern over the relationship between statutory RBMPs and other non-statutory plans. Specifically concern was expressed that the inclusion in the statutory RBMP of a policy from a non-statutory plan would implicitly give the latter a status above that for which it was intended (ie. it would imply a level of legal expectation beyond that associated with the plan in its original format).

Both the paucity of existing plans in TraC waters and the lack of consistent economic appraisal methodologies have been acknowledged in Project 1 of the Collaborative Research Programme work. Indeed, the proposed CRP Project 1b is designed to examine consistency in the economic appraisal processes employed during WFD implementation. Such work should help to ensure that an even-handed approach across sectors - including those organisations operating in TraC waters - is taken to the development of cost-effective WFD Programmes of Measures.

4.4 Existing regulatory regime in transitional and coastal waters in England

Workshop participants acknowledged that potentially significant changes may occur as the result of any Marine Bill and/or EU Marine Framework Directive. In the meantime, however, activities in transitional and coastal waters are managed by many different agencies. Representatives from many of these existing statutory and/or regulatory bodies participated in the workshops (see Section 3.8).

In respect of the existing regulatory regime, the 1985 Food and Environment Protection Act (administered by Defra’s Marine Consents and Environment Unit, MCEU), was the regulatory mechanism most frequently cited by workshop participants. However, they also drew attention to the requirements of the 1949 Coast Protection Act (Department for Transport but now administered by MCEU), the 2004 Energy Act (Department of Trade and Industry), the very many port, harbour and conservancy ‘local’ Acts, and the other international conventions and EU Directives applicable to the marine environment.

The various responsibilities of the Maritime and Coastguard Agency in implementing the UK’s international obligations with respect to navigation and shipping were discussed at the shipping, ports/harbours, and recreational boating workshops. Fish and shellfishery workshop participants assessed the likely adequacy of the powers of the Sea Fisheries Committees, and participants at the flood risk management and coastal defence workshop highlighted the respective roles of the Environment Agency, local authorities and Defra’s Flood Management Division in flood defence and coast protection planning and approval. The role of the Environment Agency and/or local authorities was also cited in respect of waste disposal and management regulation and also some controls on activities such as run-off, reclamation/realignment, impoundment, and moorings.

In the context of this wide range of existing regulatory mechanisms and responsible bodies, workshop participants also identified that - in practice - the Environment Agency has only a limited current role in the regulation and management of activities in TraC waters. Further, the role of the Environment Agency appears to diminish as distance offshore increases. This conclusion is supported by the analysis in Section 2.5 and by the tables in the Workshop Reports (Appendix 1).

EA comment: the Environment Agency is the competent authority for England and Wales for the implementation of the WFD. All other public bodies who potentially, in their operational duties, may affect the achievement of WFD objectives must have due regard to the achievement of those objectives. The onus is on all public bodies to work together through a process of dialogue and information exchange and to work towards the common objectives that the WFD will set (through the River Basin Management Plans and consequently through the implementation of Programmes of Measures). Programmes of Measures are not exclusively administered and regulated by the Agency. Other public bodies will be expected to administer and regulate with their own powers where appropriate to do so in order to achieve WFD objectives.

4.5 Policy integration

Workshop participants highlighted a wide range of (often-interrelated) policy concerns, and stressed the vital need to ensure proper integration between the WFD and other EU and related UK policy initiatives. It was felt that WFD implementation must therefore actively consider these requirements, and involve those responsible for their delivery in the river basin planning process.

4.5.1 Birds and Habitats Directive

The relationship between the WFD and the EU Birds and Habitats Directives was cited by participants as being of particular importance in transitional and coastal waters for a various reasons, including the following:

- from a navigation and port operations perspective, there will be a need to balance the nature conservation desirability of retaining dredged sediment within the system (eg. to ensure an adequate supply to intertidal areas), with the need to achieve good ecological and chemical status;
- there are well-documented concerns about the potential implications for dredging and disposal of Article 16 and the draft 'priority substances' daughter Directive (see PIANC et al, 2004 and ABP Mer, also 2004);
- from a flood defence perspective, the potential difficulties in both achieving good ecological status (which may indicate a need for managed realignment) and ensuring protection of existing designated sites (SPA, SAC, etc.). Also, related to this, the problems caused by coastal squeeze

Reference was made by participants at the ports and harbours workshop to the outcomes of a WFD workshop organised by the Port of London Authority and English Nature, and also attended by various other statutory port and harbour authorities, the Environment Agency, Defra and DfT (English Nature et al, 2005). This workshop highlighted the importance of ensuring that WFD implementation (including the Article 16 requirements) does not compromise existing dredging practices and disposal programmes to the detriment of designated estuarine and

coastal nature conservation sites which rely on effective sediment management for their maintenance. Participants at the English Nature workshop identified that the concept of sustainable sediment management, including the ability to place or retain dredged sediment within the marine environment, is vital to effective coastal management. Further, given the existing close interrelationships between sustainable sediment management and maintenance dredging, it was stressed that that WFD implementation must not compromise the successful delivery of English Nature's maritime strategy 'Our coasts and seas' (2005).

4.5.2 Shellfish Waters Directive

Participants at the fish and shellfishery workshop expressed serious concerns that the WFD will be unlikely and/or unable to deliver the microbiological water quality necessary for cost-effective shellfish production. Two main reasons were cited in this respect:

- the apparent lack of a parallel provision in the WFD to the minimum microbiological standards used as guidelines to achieve the objectives of the Shellfish Waters Directive (SWD): it was suggested that the WFD should include a mandatory microbiological standard; and
- the failure to date of the SWD to deliver its objectives in certain cases because of the differences in monitoring requirements and the lack of data integration between the SWD as implemented by the Environment Agency and the Shellfish Hygiene Directive, the implementation of which is the responsibility of the local authorities or, within port limits, Port Health Authorities

As is discussed further in Section 5.2, workshop participants felt that urgent action is needed to rectify these shortcomings, both in respect of any regulatory measures to ensure adequate transposition of the SWD into the WFD, and the integration of the data collected by Local Authorities or Port Health Authorities into the Environment Agency's data collation and review procedures.

4.5.3 Bathing Waters Directive

Some workshop participants also raised questions as to the relationship between the (new) EU Bathing Waters Directive and the WFD. Clarification was sought both as to the status of the new BWD within the WFD, and also the role of the WFD in delivering the microbiological requirements of the BWD. In response to suggestions that the BWD had been in some way 'left out' of the WFD, the Environment Agency clarified that this was not the case since such areas would become 'bathing water protected areas' under the WFD. The revised BWD will then run alongside the WFD (ie. unlike the SWD it will not be repealed by the WFD).

4.5.4 Transport policy

Participants in the ports and harbours workshops stressed the importance of WFD implementation taking full account of relevant EU transport policies. As recognised by the European Commission's White Paper 'European Transport Policy for 2010: Time to Decide', ports make a major contribution to improving the environment in Europe. If WFD implementation leads to constraints on activities associated with initiatives such as TEN-T, 'motorways of the sea' and short-sea shipping, this could

lead to increased costs, which in turn trigger modal shift (see Section 3.3). Any shift of freight to land, especially road transport would be counter to the EU and UK policies on freight transport, and undesirable not only from a policy but also from an environmental point of view.

4.5.5 Making Space for Water

Workshop participants in the flood risk management and coastal defence workshop drew attention to the possible need to realign flood defences to achieve good ecological status, and associated issues of liability if a structure is removed. Such considerations emphasise the importance of ensuring that, when the new Government strategy for flood and coastal erosion risk management in England is finalised, it takes into account the requirements of the WFD and recognises the challenges and opportunities posed by the latter.

4.5.6 Landfill and Waste Directives

Workshop participants identified a number of issues which highlight the need for proper integration between the WFD and the EU Landfill and Waste Directives. In particular, the following concerns were discussed by participants at the ports and harbours and flood risk management workshops:

- the need to reconcile the constraints on the disposal of dredged material to land under the Landfill Directive implementing regulations, with the anticipated requirements of Article 16 of the WFD which seem likely to constrain sea disposal options (see PIANC et al, 2004 and ABP Mer, 2004)
- the questions arising in relation to the continued protection (against erosion) of landfill sites and/or of defence structures constructed using refuse or other waste materials

4.5.7 Environmental Liability Directive

Workshop participants acknowledged the important future role of the EU Environmental Liability Directive in ensuring the delivery of the WFD objectives, in particular the ‘no deterioration’ requirement. However, the many unknowns as to how this Directive would work in practice were also stressed, and participants sought reassurances that stakeholders operating in TraC waters will have adequate opportunity to input to the implementing regulations as they evolve.

4.6 Relevant international conventions

There are many established international initiatives in place in the marine environment that are directly relevant to WFD implementation. The UK is a signatory to many of the applicable conventions and various government agencies already have responsibility for ensuring compliance. WFD implementation must therefore involve the statutory bodies with responsibility for the delivery of these conventions.

4.6.1 Ballast water issues

Participants in the shipping, ports/harbours, and recreational boating workshops all identified ballast water management and the associated potential for the introduction of non-indigenous (alien) species as a major challenge to be faced as part of WFD implementation. In all cases, however, they also highlighted the vast amount of work already carried out on the topic both in the UK and internationally, *inter alia*, leading to the adoption in 2004 of the International Convention for the Control and Management of Ships' Ballast Waters and Sediments.

It was stressed by participants at the shipping workshop that the implementation of WFD measures affecting shipping must reflect the global nature of the industry and must seek to achieve effective implementation of internationally agreed actions. Further, concern was expressed that any attempt to impose measures on shipping on a (unilateral) UK or even European basis carried the risk that environmental deterioration might be exacerbated. This is because 'in shipping terms, the EU is just a region' and, if (potentially onerous) measures are applied only to UK or even EU flagged vessels, the WFD could become an incentive for vessels to 'flag out' (ie. to another country which does not impose such additional requirements). Not only would this be counter to UK/EU policy to encourage European flagging of vessels, it could also lead to further environmental degradation as it would reduce rather than increase the UK's ability to exert control over vessel discharges, ballast water exchange, etc.

As is demonstrated further in the workshop report, participants identified many reasons why international legislation, enforced at port state/flag state level, represents the only effective way to deliver the requirements of the WFD in relation to many shipping issues. It was suggested that a proposed national report, to be prepared by the MCA as the output of an ongoing OSPAR/MCA scoping study, could provide useful national-level input to inform and guide WFD decisions (on measures, etc) at River Basin District level. However, in this regard, it also seems likely that Article 12 of the WFD (issues which cannot be dealt with at Member State level) will need to be applied.

Finally, it is worth noting that those attending the shipping workshop felt that the ballast water issue provides a good example (although by no means the only example) of why the implementation of the WFD in TraC waters needs to take explicit account both of the activities of those responsible for the implementation of international conventions, and the lessons they have learned.

4.6.2 OSPAR and London Conventions

Participants at several of the workshops cited the significant progress made in regulating the activities covered by international conventions such as the OSPAR and London Conventions. The 1992 OSPAR Convention guides international cooperation on the protection of the marine environment of the North-East Atlantic based on an ecosystem approach to the management of human activities; the purpose of the 1972 London Convention is to control all sources of marine pollution and prevent pollution of the sea through the regulation of dumping into the sea of waste materials.

In particular, the disposal of dredged material at sea is already subject to strict, environmentally-driven regulation, both in respect of sediment quality and potential environmental effects. Those involved in the implementation of these conventions have amassed considerable expertise in the use of risk-based approaches to decision making, and have highlighted some of the difficulties associated with attempting to apply fixed quality standards to certain parameters in the marine environment.

Noting the requirements of Article 16 of the WFD for Environmental Quality Standards (EQS) to be developed, workshop participants urged those responsible for its implementation (both at UK and EU levels) to pay due regard to this extensive international experience.

4.6.3 Other relevant international conventions

In addition to the ballast water and regional seas conventions, workshop participants highlighted the potential relevance of the following international conventions and the need for WFD implementation to consider the requirements therein, to learn from the experiences gained in their implementation, and therefore to save the cost of potentially duplicative work:

- The 1982 Convention on the Law of the Sea (UNCLOS) assigns the fundamental obligation and responsibility for protecting and preserving the marine environment to signatory States, and requires them to adopt and enforce national laws and international standards to prevent, reduce and control ocean pollution.
- The MARPOL Convention (1973/78) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. Annexes cover pollution from oil, chemicals, harmful substances carried in packaged form, sewage and garbage.
- The International Convention on the Control of Harmful Anti-fouling Systems on Ships, adopted in October 2001, will prohibit the use of harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems.
- The main objective of the 1974 Safety of Life at Sea (SOLAS) Convention is to specify minimum standards for the construction, equipment and operation of ships. Flag states are responsible for ensuring that ships under their flag comply with its requirements and control provisions allow contracting Governments to inspect ships of other contracting States under a procedure known as Port state control.

4.7 'Rights'

Workshop participants highlighted the wide range of 'rights' applying in transitional and coastal waters that are codified in UNCLOS. The 'right of innocent passage', 'freedom of navigation', anchoring and moorings rights, and fishing rights were all raised. Participants raised questions about how the WFD Programmes of Measures would deal with such activities if the characterisation 'refinement exercise' were to conclude that any one or more was causing an effect on water status (eg. deterioration or failure to meet good status). However it is worth noting that, in many cases, such activities are already constrained by legislation and byelaws, etc.

4.8 Regulatory burden

Irrespective of who has responsibility for WFD implementation in transitional and coastal waters, participants felt that there was a real risk of a significantly increased regulatory burden, with extra bureaucracy, delays and uncertainties, and substantial associated cost increases. In respect of the latter, in addition to costs borne by the industry, the statutory bodies represented at the workshops stressed that consideration will need to be given to the increased effort likely to be associated with the development and delivery of the Programmes of Measures (including enforcement) and how such activities would be resourced. Such concerns were expressed with regard to both ongoing ‘routine’ activities (eg. maintenance dredging, cleaning operations, etc.) and, particularly, to the consenting procedure for new developments and modifications to the physical characteristics of a water body under WFD Article 4(7).

Many participants felt that the existing regulatory burden (not only the wide range of consents required for development below high water, but also the additional requirements for developments falling within the scope of the Habitats Regulations) is already unreasonable in many cases.

4.9 Practical issues associated with the delivery of WFD objectives by ‘third party’ regulators (co-deliverers) in England (and Wales)

Sections 4.4 to 4.8 discuss the existing regulatory regime in TraC waters and highlight the wide range of statutory bodies involved. Meanwhile, the WFD implementing Regulations (HMSO, 2003) identify the Environment Agency as the sole competent authority with responsibility for implementing the WFD in England and Wales. Under Regulation 17, other public bodies in exercising their functions are required to ‘have regard to’ the relevant river basin management plan and any relevant supplementary plan(s).

4.9.1 Key considerations

It is clear both from the workshop outputs and from subsequent discussions with key statutory bodies that a number of important points will need to be considered when assessing the options for delivery of WFD targets in TraC waters in England and Wales:

- the WFD will have implications not only for new developments and modifications (ie. under Article 4(7)), but also for many ongoing operations and activities (eg. shipping and navigation, recreational boating, fishing)
- the RBC1 risk assessment exercise identified a very high percentage of coastal and estuarine waters bodies as being ‘at risk’ or ‘probably at risk’ of failing to meet good status. ‘Measures’ will therefore be required at least in some situations: workshop participants identified a wide range of possible WFD measures
- there are currently many statutory bodies with relevant regulatory responsibilities in TraC waters. Of the 200 plus possible measures identified, workshop participants suggested that only 10% could potentially be delivered by the Environment Agency. Conversely, 45% could potentially be delivered by other statutory bodies, mostly using their existing powers. Many of the

remaining measures comprised voluntary initiatives (ie. to be delivered by the sectors themselves)

- there is already an urgent need for the rationalisation of regulatory processes in the marine environment. Until such time as there is a consolidating Marine Bill or EU Marine Framework Directive, any addition to the regulatory burden facing agencies and organisations with interests in TraC waters would be extremely unpopular.

Overall, workshop participants felt that the use of existing regulatory mechanisms via existing regulators would both be the most cost-effective way of delivering WFD objectives and the most acceptable to the sectors operating in the marine environment. There are two important reasons for this:

- (i) the sectors operating in TraC water bodies are already familiar with the regulatory processes, and
- (ii) the regulators understand both the marine environment and the characteristics of the sectors operating there.

However, given the points noted above, several workshop participants questioned the adequacy of the 'have regard to' provision. This was felt to be a particular issue in situations where statutory bodies must also 'have regard to' other, potentially conflicting objectives (eg. protecting property from coastal erosion; preventing planning blight).

Similar concerns were expressed by participants about the likely effectiveness of the 'voluntary partnership' approach promulgated in the Environment Agency's River Basin Planning Strategy consultation documents.

Attention was drawn to the requirements of the 1994 Habitats Regulations. These regulations require all statutory bodies, in making their decisions on consents, applications, etc. to consider the possible need for an 'appropriate assessment'. This well-structured procedure involves a decision (by the responsible statutory body) on whether there is likely to be a significant effect on the features for which the site is designated. If so, there is a requirement for the statutory body to undertake an appropriate assessment in line with the advice of the statutory nature conservation body and, where an adverse effect on integrity is demonstrated, the consideration of alternatives, the existence of imperative reasons of overriding public interest and the provision of compensation.

These provisions apply both to new developments and to the review of existing consents. They also enable relevant authorities (ie. those with management responsibilities) to develop a management scheme in respect of ongoing operations and activities. In all cases, the statutory nature conservation organisation is responsible for setting site objectives and advising on situations where it has been established that a 'likely significant effect' on the features of the protected site is anticipated. Further if a competent authority, having established that there will be a 'likely significant effect' on the features for which a site is designated, fails to take the advice of the statutory nature conservation organisation, that authority must defend its decision to the Secretary of State.

By comparison, the 2003 England and Wales regulations implementing the WFD make no such explicit provisions - whether in terms of providing a clear decision making structure or in setting out the specific responsibilities of third party regulators. Neither do they set out the procedure whereby to requirement to 'have regard to' will be enforced. (It is of note in this respect that the Scottish implementing legislation makes express provision for the role of third party regulators in delivering WFD objectives (Scottish Executive, 2005)).

4.9.2 Options for ensuring delivery of WFD objectives

In the light of the considerations set out in Section 4.9.1, and further to discussions with key statutory bodies, three main options for ensuring the delivery of WFD objectives in TraC waters have been suggested as being worthy of further investigation in the light of the points set out early in Section 4.9.1:

- (i) the provision of guidance by Defra to third party regulators: such guidance (which would presumably be separate to Defra's guidance to the Environment Agency), could be relatively cost-effective to prepare and produce, but questions were asked as to whether it would carry sufficient weight when the numerous other requirements on statutory bodies are considered. Issues were also raised with regard to which organisation would have responsibility for making key decisions (eg. would the Environment Agency or the statutory body that is responsible for issuing the licence or consent determine whether or not an activity would affect water status, or whether or not reasons of overriding public interest exist).
- (ii) amending the WFD implementing regulations in some way to introduce a clear and structured provision equivalent to the Appropriate Assessment requirements: this approach would formalise decision making responsibilities and (if effected in the same way as the Habitats Regulations) would place certain responsibilities on other statutory authorities, probably with a requirement to consult the Environment Agency as the WFD competent authority in given circumstances. Such an approach would have the advantage of familiarity and the benefit of regulatory clarity, but some may feel it is more than is needed if the 'guidance' option can overcome such difficulties.
- (iii) whilst it is probably not a realistic option for the first RBP cycle because of the WFD deadlines (specifically the preparation of draft River Basin Management Plans by the end of 2008), an EU Marine Framework Directive and/or a UK Marine Bill. The potential advantages of this approach assume that the Marine Bill consolidates regulatory requirements, and is administered by a fully representative, multi-sectoral Marine Agency, with a clear marine rather than freshwater remit. In the event of an EU Marine Framework Directive, the requirements of the WFD in TraC waters could transfer to become the responsibility of such a Marine Agency.

These and possibly other options appear to merit early consideration if WFD objectives are to be delivered in TraC waters in the first River Basin Planning cycle.

Section 5 **Data, characterisation issues and research requirements**

Workshop participants raised a number of issues relating both to the availability and use of data thus far in the river basin characterisation process (ie. RBC1), and to future data collection and evaluation. Many concerns were common across sectors, although a number of potentially significant, sector-specific questions were also highlighted. Whilst the following sub-sections set out the main issues identified, it is recommended that reference should also be made to the appended Workshop Reports to ensure that all points raised can be adequately dealt with during the forthcoming refinement (RBC2) exercise.

5.1 Baseline data

Workshop participants highlighted a wide range of issues relating to the availability and reliability of data in transitional and coastal waters. These concerns relate both to the physical, ecological and chemical characteristics of water bodies, and also to water-related activities and water uses. Participants stressed their relevance not only to the derivation of the baseline from which the 2004 pressures and impacts assessment was carried out, but also to the RBC2 refinement exercise and, indeed, to future monitoring.

Whereas a full record of data issues is provided in the Workshop Reports, the main concerns discussed by workshop participants can be summarised as follows:

- there are significant gaps in terms of data and understanding in the coastal and estuarine environment (the ‘science base’)
- understanding of the cumulative and in-combination effects of different activities is often particularly poor
- careful consideration needs to be given to how data collection, evaluation and monitoring in transitional and coastal waters will take into account uncertainties, for example the potential implications of climate change
- the costs of collecting data, carrying out investigations, undertaking modelling, and monitoring in the marine environment can be very significant: data collection must therefore be carefully focussed to achieve specified outcomes

5.1.1 Need for realism

In determining baseline conditions, workshop participants urged that full and proper consideration be given to such gaps in data and understanding. They highlighted on the one hand that decisions (eg. on the need for measures which may, in turn, have significant economic consequences) need to be well-informed and scientifically and technically robust, but also recognised that it will not usually be possible to achieve a perfect understanding. Thus adequate communication about what can be realistically achieved will be essential and the expectations of third parties will need to be carefully managed.

In respect of developing the baseline conditions for RBC2 and, indeed, for the River Basin Management Planning process, participants questioned how realistic it was for the WFD to use reference conditions reflecting the natural, unmodified condition of

the water body. They also indicated that certain non-indigenous species were introduced so long ago that they have become ‘part of the ecology’, and highlighted that physical modification of water bodies has been taking place in some areas over many hundreds of years.

5.1.2 Data collection costs

The costs of collecting data, carrying out investigations, and undertaking modelling of the marine environment can be very high. Participants questioned who would bear the costs of collecting such data (the competent authority (or other regulators) and/or water users), and re-emphasised the need for realism in what can be achieved (see above).

5.2 Data sharing

Participants at the flood risk management and fish and shellfishery workshops highlighted specific issues relating to data management and, in particular, the need for:

- improved co-ordination and management of data (databases, etc.) preferably at a national level, and
- improvements in data sharing (a specific example in this respect is the need for the Environment Agency to refer to data collected by local authorities or Port Health Authorities under the EU Shellfish Hygiene Directive when determining the adequacy of microbiological water quality for shellfish production).

Such improvements in data sharing were considered to be vital not only to be able to demonstrate compliance (or otherwise) with WFD requirements, but also to optimise the cost-effectiveness of data collection and use.

5.3 Pressures and impacts assessment

In addition to the collection and use of baseline data (see Section 5.1), workshop participants identified various issues relating to the pressures and impacts assessment itself.

5.3.1 Relationship between pressures and impacts (RBC2)

In the first instance, participants felt it will be vital to gather sufficient data to facilitate a proper evaluation of whether a ‘pressure’ actually causes an impact. Various examples were cited on this point. Those attending the marine resources workshop highlighted that whilst an aggregate dredging licence may exist for a particular area, the area may not actually be dredged. Where aggregate extraction does take place, only a proportion of the licensed area is likely to be dredged. Further, it is worth noting that many aggregate extraction licences are subject to conditions requiring careful monitoring; thus data on their environmental effects often exist. In this example, the site-specific extent of the actual activity rather than simply the existence of a licence, together with any available monitoring data will need to be considered in determining whether there is an ‘effect on water status; and hence whether or not measures are required.

5.3.2 Pressures and impacts in transitional and coastal waters

As noted earlier, workshop participants identified several potential ‘pressures’ which were not highlighted in the fit-for-purpose (RBC1) risk assessment but which may affect water status. These issues, which will require adequate data to ensure an informed assessment as part of the RBC2 process, include historic contamination of sediment, shipping (ballast and bilge waters, antifouling, etc.), commercial fishing and, in some circumstances, moorings. Those attending the shipping workshop also noted the important differences between the impacts caused by the presence of already established non-indigenous species; the challenges associated with preventing established species from spreading into other areas; and the need to prevent the introduction of new species into UK waters.

5.4 **Standards vs. risk based approach**

As indicated earlier, on the issue of establishing fixed standards (for example with respect to the implementation of the requirements of Article 16 of the WFD), participants felt that current scientific knowledge did not support such an approach and that important lessons should be learned from relevant international experience (eg. from the OSPAR Convention). In this regard, there was strong support for taking a risk-based approach to target setting in coastal and estuarine waters (see PIANC et al, 2004).

5.5 **Water body delineation**

Also as discussed elsewhere, workshop participants expressed various concerns over the delineation both of transitional and coastal water bodies, and of the WFD offshore boundaries.

On the whole, participants agreed that any approach to water body delineation must recognise the characteristics of the (whole) physical system as far as possible and that ‘salami slicing’ to create large numbers of small water bodies would not be a preferred approach. However, they also drew attention to the respective roles of existing data and scientific understanding in deriving the offshore WFD boundary (Sections 4.2.1 and 4.2.2), the boundaries between coastal water bodies (Section 4.2.4) and the impracticalities of dividing outer estuarine water areas between two or three River Basin Districts (see Section 4.2.3)

Participants further highlighted the sensitivity of the pressures and impacts risk assessment outputs to water body size. For example, dredging 100ha in a water body of 500ha will have a proportionally much greater effect on ecological status than dredging the same area (ie. 100ha) in a water body which is 500,000ha in size.

EA comment: the Marine Task Team (MTT) operating under the auspices of the WFD UK Technical Advisory Group are considering ways to eliminate the size dependency of the initial characterisation. An impact of 100ha should be considered the same no matter where it occurs (providing, in the case of the above example, that the magnitude, frequency and duration of the operation, the characteristics of the dredging operation itself (e.g. equipment), and the habitat in which the operations are being undertaken are the same). This will rarely be the case and the MTT are

considering how to take account of site specificity in the development of classification tools to assess ecological status.

5.6 Research requirements

Workshop participants identified a number of areas in which new, targeted research may be beneficial or (more likely) where steps may be required to ensure that relevant ongoing research activity is properly considering the implications of the WFD. Whilst reference should be made to the Workshop Reports (Appendix 1) in respect of the full range of research needs suggested, the primary requirements appear to be:

- development and application of environmental valuation techniques to assist in determining the cost-effectiveness of potential measures in the coastal and estuarine environment
- improved understanding of natural change/fluxes (eg. climate change and sea level rise, and associated implications for hydromorphology and ecology); also the relative importance of natural vs. man-induced change
- improved understanding of the relationships between pressures and impacts (eg. the actual impacts of fishing activities, including the physical effects of towed gear; the actual impacts of the fine-sediment plume associated with dredging and of re-suspended sediments including the impacts of agitation dredging; scour around structures; and habitat and species recovery rates following disturbance)
- further development of alternative dredging and disposal and/or dredged material treatment methods, etc.
- development and testing of alternative anti-fouling products, ballast water exchange mechanisms, etc.
- improved understanding of whether the do-nothing option will deliver good ecological status in the case of uneconomic flood defences and also the role of managed realignment, recharge options, etc. in delivering GES.

EA comment: the Environment Agency fully supports the range of research needs suggested above and is actively engaged with stakeholders and the research community to further define these needs.

Section 6 Conclusions and issues requiring further consideration

6.1 Conclusions

6.1.1 Overview of workshop outcomes

A series of stakeholder workshops played an important part in this scoping study to identify economic impacts and other issues associated with the implementation of the EU Water Framework Directive in transitional and coastal waters. Participants representing shipping, recreational boating, fishing and shellfishing, aggregate extraction, renewable energy, ports and harbours, and flood and coastal defence interests attended the workshops, highlighting the wide range of activities that take place in coastal and transitional water areas such as the outer Thames estuary.

All of these activities could potentially subject to measures under the WFD. However, workshop participants identified several recurring 'key issues':

- sediment management, historic contamination of sediments (including with TBT); associated dredging and disposal activities
- the introduction of non-indigenous species; management of established alien species communities; issues associated with the technical and economic viability of ballast water exchange mechanisms
- the use of anti-fouling products, notably hull cleaning issues and the possible impacts of alternative (to TBT) anti-foulants
- the use of towed fishing gear and shellfish dredges
- the possible implications of the WFD for new developments
- the relative lack of data in TraC waters and the need for improved understanding of natural change/fluxes (eg. climate change and sea level rise); also the relative importance of natural vs. man-induced change

Many other issues are discussed in the Workshop Reports (Appendix 1). These range from primarily local or regional problems (such as the impacts of sewage from houseboats, and the effects of hydromorphological modifications including moorings), to national issues such as the possible knock-on implications for boat manufacture in the UK of any significant WFD-induced constraints on the development of marinas or the provision of berths for recreational vessels. Other issues are international - for example the global nature of the shipping industry needs to be recognised and measures need to be developed accordingly, probably using Article 12 of the WFD.

In total, workshop participants identified some 200 combinations of possible measures and delivery mechanisms. Approximately 30% of these are voluntary measures, which would be implemented and typically resourced by the sectors themselves. Examples of voluntary measures include codes of environmental conduct and management (eg. zoning) initiatives. Around 55% of the potential measures would be delivered using regulatory provisions - for example constraints on operations or activities, or modifications to proposals to be secured using conditions on licences or consents. However it is of note that only 10% of measures could be implemented by the Environment Agency using its existing powers. The remaining

45% would need to be delivered using the (mostly existing) powers of other regulators. Many such measures would be the responsibility of Defra's Marine Consents and Environment Unit, but others would fall to the Maritime and Coastguard Agency, to port and harbour authorities, ODPM, DTI, local authorities and others.

The majority of the measures identified by workshop participants were, at least in a generic sense, similar to those identified in Project 1 of the Collaborative Research Project and subsequently broadly categorised in Project 2. However, there were also some minor differences insofar as participants:

- identified 'research and development' as being a measure on the basis that it is a necessary precursor to the development of new solutions
- suggested measures should include 'better enforcement of existing regulation' (although this is included in Project 2a as a consideration in determining the effectiveness of a measure), and
- indicated situations in which the provision of compensatory habitat might be considered as a measure.

In addition to identifying possible measures and delivery mechanisms, participants indicated whether the costs of the measures might be minimal, moderate or significant, and who would bear the costs. It appears from the workshops that many of the 'good practice' measures in particular could potentially be implemented at minimal to moderate cost. This in turn highlights the importance of ensuring adequate stakeholder engagement in the WFD implementation process if the delivery of these measures is to be ensured. However, workshop participants also concluded that some of the financial and economic implications for sectors operating in TraC waters could be significant. It is thus essential to ensure that the cost-effectiveness and disproportionate cost methodologies developed as part of the Collaborative Research Programme are appropriate to application in TraC waters.

Regardless of the scale of costs involved, it is of note that they would be borne not only by industry but also by various statutory bodies (regulators, or 'co-deliverers'). Many costs would inevitably then be passed on to consumers and/or taxpayers. Participants also raised issues in respect of retrospective liability and some of the practical difficulties of applying the polluter pays principle.

6.1.2 Potential economic and financial implications of WFD implementation in TraC waters

The sectors operating in TraC waters are typically well-regulated: however, with the exception of flood risk management and coastal defence, most activities are subject neither to formal planning processes nor to associated public sector economic appraisal mechanisms. The development and application of the cost-effectiveness and disproportionate cost methodologies under projects 2 and 3 of the Collaborative Research Programme is not restricted to public sector economic appraisal and should therefore be able to take these characteristics into account.

In respect of assessing the likely economic and financial implications of WFD implementation in TraC waters, the scoping study identified a number of important issues for which provision has - in principle - already been made in the methodologies

developed for CRP projects 2a and 2b. However, it is important to be aware that these methodologies have not yet been tested in the coastal and estuarine environment. These issues include:

- the participation and enforcement costs likely to be incurred by non-Environment Agency regulators (ie. co-deliverers), and the costs that will be incurred by industry, in developing and delivering the Programmes of Measures
- the full range of potential additional costs likely to be associated with promoting new developments or modifications under WFD Article 4(7)
- the wider economic, financial and environmental implications of any WFD-induced change in waterborne transport patterns, including modal shift (eg. from water to road transport)
- consideration of whether suitable compensation and/or compulsory purchase mechanisms exist (eg. associated with achieving good ecological status)

In addition, the scoping study highlighted the following outstanding economic and financial issues which, according to RPA, are issues to be considered in the forthcoming CRP work on disproportionate cost analysis (project 3):

- consistency: the methodology for determining possibly disproportionate costs needs to be consistent not only in respect of the development of WFD Programmes of Measures, but also in its application to the heavily modified water body designation process (WFD Article 4(3)) and the evaluation of proposed new developments or modifications (Article 4(7))
- a level playing field: related to the above is the issue of ensuring a level playing field between Member States in respect of important decisions such as determining disproportionate cost. Aspects of this will be relevant to the gathering of evidence for the assessment of disproportionate costs, but the Common Implementation Strategy is also important in this regard.
- affordability: the need to consider issues of affordability (ie. in the sense of there being a difference between a measure which appears cost-effective at a national or RBD level, but which is not affordable at an individual or local level) and whether there is a case for public monies being made available in such situations
- polluter pays: the need to consider the practical - and hence financial and economic - difficulties associated with applying the polluter pays principle, notably to the historic contamination of sediments and to the microbiological contamination of shellfish waters.

6.1.3 Regulatory issues associated with the delivery of WFD objectives in TraC waters

The scoping study identified a number of significant regulatory issues relevant to the cost-effective delivery of WFD objectives in transitional and coastal water bodies. The following are of particular importance:

- there are many existing regulators and statutory bodies with relevant licensing and management responsibilities in TraC water areas

- with the exception of flood defence and waste management, very few of the existing regulatory provisions relevant to the delivery of WFD objectives in TraC waters are the responsibility of the Environment Agency
- the existing consenting regime in coastal and estuarine waters is already complex and the need to avoid increasing the regulatory burden was highlighted
- workshop participants felt very strongly that the use of existing regulatory mechanisms through existing regulators would not only be the most cost-effective way of delivering WFD objectives but also the most acceptable to the sectors operating in the marine environment
- there is a relative lack of data, and understanding of the coastal and estuarine environment is often imperfect. There is a real need to improve understanding of the relationships between pressures and potential impacts, and to recognise the role of natural as well as anthropogenic change
- there is a crucial need for effective policy integration notably, but not only, between the WFD and the Birds and Habitats Directives, and between the WFD and European transport policy
- valuable lessons can be learnt from the UK's experiences with several important international conventions

6.1.4 Stakeholder engagement

The characteristics of the sectors operating in transitional and coastal waters, and the regulatory framework within which they operate, both serve to emphasise the usefulness of effective stakeholder dialogue and engagement to the delivery of WFD objectives in an economically efficient manner.

Several TraC sectors, notably the ports and harbours and recreational boating sectors, are already well engaged in the WFD implementation process. Whilst the shipping industry has not, to date, been so obviously involved, there are a number of existing stakeholder mechanisms, including the PIANC and CEDA-led WFD navigation sector group meetings, in which it would be appropriate for the shipping sector to engage.

Flood risk management is a responsibility of the Environment Agency (ie. the WFD competent authority). Coast protection (currently a local authority responsibility), meanwhile, has been less well-represented. Indeed, engagement in the WFD implementation process has been limited across all local authority departments, not only with regard to TraC water issues.

Representatives of the aggregate extraction industry attend the WFD navigation sector group meetings (CEDA membership extends to aggregate as well as navigation dredging). For the other marine resource interests (specifically renewable energies), it appears that the WFD will have relatively fewer key implications (although scour around structures was identified as contributing to morphological change).

For the fish and shellfishery sector, however, the scoping study identified that there are several potentially important issues, which require better engagement of their representatives in the process.. Whilst concern has been expressed over the potential

effects of commercial fishing activities (specifically the use of certain types of towed gear and dredges), WFD implementation could also have potential benefits for the industry (for example with regard to the improvement of fish nursery habitat and the reduction of microbiological contamination of shellfish beds). Improved engagement of the fish and shellfishery sector is therefore an important issue if potential impacts are to be assessed and potential benefits realised.

6.1.5 Research requirements

In addition to highlighting the key economic and regulatory issues relevant to the delivery of WFD objectives in TraC waters, workshop participants also identified a number of important research areas. In some cases, relevant research may already be ongoing or it may be possible to undertake supplementary work. In others, specific WFD research may be required.

6.2 Issues for further consideration

This report identifies five main areas for further consideration. In addition, however, each of the Workshop Reports in Appendix 1 highlights (often sector-specific) issues that are important to the WFD implementation process. Appendix 1 should therefore be read in conjunction with this section.

6.2.1 Testing of the cost-effectiveness and disproportionate cost methodologies in TraC waters

To date, there has been only limited opportunity to test the economic assessment methodologies developed under the CRP in transitional and coastal water bodies. This scoping report has not only demonstrated the range of activities that may need to be subject to measures in the WFD Programmes of Measures (and the nature and scale of some of those measures), but it has also highlighted the distinct characteristics of many of the sectors operating in TraC waters.

It is clear from the scoping report that the WFD could have some potentially significant economic and financial consequences. Whilst there would be an *a priori* expectation that the methodologies developed by the CRP will be appropriate for application in TraC water bodies, the range of issues and the potential costs highlighted by workshop participants should be subject to specific testing. **An extension of the current testing work to undertake a dedicated TraC case study on cost effectiveness would therefore be beneficial. Specific TraC testing should be included as part of the design process for later projects.**

Such case studies will either provide reassurance to sectors operating in the coastal and estuarine environment that the techniques and methodologies are appropriate and reliable, or they will highlight difficulties and hence provide an early opportunity to rectify any problems well in advance of the preparation of RBMPs. Given that the initial river basin characterisation identifies some 85% of coastal water bodies and 98% of transitional water bodies as being at risk or probably at risk of failing to meet good status, either outcome will be important.

6.2.2 Preparation of FAQ sheet

The scoping study has identified aspects of WFD implementation (both to date and into the future) that require interpretation and/or clarification. Some but not all of these questions are specific to TraC waters and to those responsible for their regulation.

It would be useful for Defra and the Environment Agency to consider the preparation of a ‘frequently asked questions’ (FAQ) paper, or other document, in order to facilitate better understanding of the implications of the WFD for those sectors operating in TraC waters. This should involve representatives of the TraC industries and their regulators as appropriate.

Such a paper would be useful for a variety of reasons:

- it will help to clarify some important points of interpretation and thus develop an improved understanding amongst sector representatives and regulators alike
- by reducing uncertainty and building confidence, it will facilitate well-informed dialogue between the sector representatives, their regulators and the competent authority, including the necessary exchange of technical, financial and economic information, and
- it will thus provide a sound foundation upon which to start the preparation and evaluation of the Programmes of Measures in TraC water bodies.

6.2.3 Consideration of regulatory options to ensure cost-effective delivery of WFD objectives in TraC waters

The scoping study drew attention to a number of important points for further consideration in determining how best to ensure the identification of cost-effective delivery options for WFD objectives in coastal and estuarine areas. In particular, whereas it appears that mechanisms to deliver many potential WFD measures already exist, a significant majority of such powers are vested in organisations other than the Environment Agency. With such high percentages of TraC water bodies identified as being at risk or probably at risk of failing to meet good status, the role of these third party regulators (or ‘co-delivers’) will be critical to the delivery of WFD objectives.

A way forward would be for Defra and other bodies to review the advantages and disadvantages of the three delivery options highlighted by the scoping study (Section 4.9.2) along with other options if appropriate in order to identify the most cost-effective and reliable way of achieving WFD objectives in TraC waters.

Such a review could commence with a further assessment of existing regulatory provisions, identify/confirm any significant gaps, better define and evaluate the potential options for delivery, and recommend a preferred solution.

6.2.4 Stakeholder engagement

Whilst some sectors operating in TraC waters are adequately engaged in the WFD implementation process, there are certain notable gaps. It is worth Defra and the

Environment Agency (working with other Government departments as appropriate) considering further steps to:

- **actively encourage the shipping industry to participate** in the process. This is important if issues such as ballast water exchange and anti-fouling are to be addressed in an appropriate manner, recognising the global nature of the sector and possibly utilising Article 12 of the WFD
- **engage local authorities in the WFD implementation process.** This needs to include local authority technical services (eg. coastal defence, transport and recreation) departments as well as land use planners and development control officers, and
- **provide an appropriate mechanism to facilitate the engagement of fisheries and shellfish industry representatives** in the WFD implementation process. Consideration should be given to convening a WFD ‘fisheries’ sector group using the model of the navigation sector group, in order to raise awareness of the Directive and thus help to promote better engagement of the sector

6.2.5 Other specific research issues

In addition to the above research activities and supporting initiatives **Defra, working with the relevant TraC sectors and their regulators, should consider undertaking a review of the following research requirements identified by workshop participants** in order to enable any new (or supplementary) research needs to be defined and funding applications submitted. It is anticipated that many of these will either already be a part of existing research programmes or could be easily integrated into them.

- development and application of **economic environmental valuation techniques** applicable to the coastal and estuarine environment (this is planned as part of the CRP)
- improved **understanding of natural change/fluxes** (eg. climate change and sea level rise) and the relative importance of natural vs. man-induced change (this is linked to the RBC2 further characterisation process)
- improved understanding of the **relationships between pressures and impacts** (eg. the physical effects of towed gear; the impacts of the fine-sediment plume associated with dredging and of re-suspended sediments; scour around structures; also habitat and species recovery rates) (this is also related to the RBC2 process)
- development and testing of **alternative** dredging and disposal and/or dredged material treatment **methods**, alternative anti-fouling **products**, ballast water exchange **mechanisms**, etc. (such work will contribute to the development of the Programmes of Measures)
- understanding the respective roles of the **do-nothing** option and **managed realignment in delivering good ecological status** (this could be linked to the Environment Agency’s proposed Heavily Modified Water Body initiative).

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