

To; Business Committee  
From; Carwyn Jones AM  
Minister for Environment, Planning and Countryside

## **EXPLANATORY MEMORANDUM**

### **The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003**

#### **Summary**

**These Regulations make provision for the purpose of implementing in river basin districts in England and Wales EC Directive 2000/60/EC which established a framework for Community action in the field of water policy. The Regulations are being made by the National Assembly for Wales and the Secretary of State for Environment, Food and Rural Affairs, acting respectively in relation to river basin districts that are wholly in Wales and river basin districts that are wholly in England, and jointly in relation to river basin districts that are partly in Wales and partly in England. In accordance with section 3 of Standing Order 23, the Assembly's approval of the making of these Regulations is being sought.**

#### **Enabling Powers**

1. The Regulations are being made under section 2(2) of the European Communities Act 1972. The Assembly is to be designated for matters relating to water resources by virtue of The European Communities (Designation) (No. 4) Order 2003 which is due to come into force before the Regulations are to be considered by the Assembly in Plenary.
2. A copy of the draft Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 is with this Memorandum.

#### **Effect**

3. In line with the Directive, the Regulations require a new strategic planning process to be established for the purpose of managing, protecting and improving the quality of water resources. That process applies to river basin districts identified by regulation 4. These are river basin districts that are wholly in England, wholly in Wales or partly in England and partly in Wales, but not river basin districts that are partly in Scotland.
4. General responsibility for ensuring that the Directive is given effect in those districts is placed on the "appropriate authority". This means the National Assembly for Wales for river basin districts in Wales, the Secretary of State for such districts in England, and the Assembly and the Secretary of State acting jointly for such districts that are partly in Wales and partly in England. A map of the River Basin Districts has been deposited in the Assembly Library. Related general duties are placed on the National Assembly for Wales and on the Secretary of State and a general duty is also placed on the Environment Agency ("the Agency").

5. The Agency is required to carry out detailed monitoring and analysis in relation to each river basin district and the appropriate authority must ensure that appropriate economic analysis is also carried out. Certain areas used for the abstraction of drinking water must be identified and a register must be established of those waters and certain other protected areas.
6. This analytical and preparatory work must then inform the preparation by the Agency of proposals for environmental objectives and programmes of measures in relation to each river basin district. Those objectives will translate the generic environmental objectives set out in the Directive to the particular situation in each river basin district. The preparation of such proposals must include public involvement, and the proposals themselves are subject to approval by the appropriate authority.
7. The results of the Agency's technical work, the environmental objectives and proposals for programmes of measures must be brought together in the preparation of a river basin management plan for each river basin district. The Agency is to prepare draft plans, after public consultation and participation. Those plans must contain details of the results of the prior technical and planning work that will have been done, along with the environmental objectives and programmes of measures proposed for each district. Plans are subject to approval by the appropriate authority and must be periodically reviewed. The Agency may also prepare supplementary plans, which are not subject to approval by the appropriate authority.
8. The Assembly, the Secretary of State, the Agency and other public bodies are required to have regard to river basin management plans and to any supplementary plans in exercising their functions in relation to river basin districts.
9. The Regulations also make supplementary provision in respect of the publication of information, the provision of information and assistance, and the giving of guidance or directions for the purpose of giving effect to the Directive.

#### **Target Making/Coming Into Force Date**

10. All Member States are required to bring into force laws transposing the Directive by 22 December 2003. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, if approved by the Assembly, will be laid in Parliament on 12 December and come into force on 2 January 2004. The regulations will be subject to the negative resolution procedure in Parliament.

#### **Financial implications**

11. The main additional financial implications for the Assembly arising directly from these regulations relate to the running cost implications of undertaking the roles provided for "the appropriate authority". These include approving environmental objectives, programmes of measures and

river basin management plans. The Environment Agency, an Assembly Sponsored Public Body, will be undertaking the main executive role. It will be responsible for the preparation of river basin management plans, including proposing environmental objectives and programme of measures to achieve those objectives, and the rest of the day to day administration of the regulations. The additional burdens for the Assembly and the Agency arising from these new burdens have largely been anticipated and, in the case of the Agency, have been reflected in the Assembly's Draft Budget allocation for the Environment Agency SEG, which shows an increase from £17,715 million in 2003-2004 to £21,510 million in the Agency's overall grant-in-aid provision for the next three years. Financial Planning Division has been consulted about this Explanatory Memorandum and noted that the implementation of these regulations should not result in any additional financial implications for the Assembly that have not already been addressed.

12. As regards the implications for others, the Directive will impact upon all those who have an interest in the management and use of water in England and Wales including the water industry, all businesses that have discharge consents, trade effluent licences or abstraction licences, navigation authorities and industry and agriculture more generally. A draft Regulatory Impact Assessment covering England and Wales was included in consultation papers that have been published by the Assembly jointly with the Department for Environment, Food and Rural Affairs (Defra) about the implementation of the Water Framework Directive, most recently the consultation paper issued on 4 August 2003. These included estimates of the costs and benefits arising from the implementation of the Directive in England and Wales.
13. These estimates suggest that the annualised costs of mitigating point source pollution to water in England and Wales are likely to range between £192 million to £704 million per year. These figures are likely to be upper estimates as they do not take account of synergies between measures to remove different substances, and because mitigation of point source pollution may not necessarily be the cheapest way to reach the requisite Good Ecological Status. Costs in the agricultural sector are highly uncertain, in part because it is not clear to what extent application of the Codes of Good Agricultural Practice (CoGAP) would be sufficient to address agricultural sources of pollution and to what extent those Codes are currently applied. Annualised costs, including costs of CoGAP measures and measures that go beyond CoGAP, could be £80 million to £209 million per year, over 15 years (of which £29 million to £59 million are costs of measures that go beyond CoGAP). There may also be costs of addressing other forms of diffuse pollution (e.g. run-off from roads). River habitat restoration is estimated at having one off costs of £143 million to £668 million.
14. It is important to note that there is a provision in the Directive for avoiding disproportionate costs. For example, if achieving good status in a particular water body in the timescale laid down in the Directive would

impose 'disproportionate costs' a time or status derogation may be used. However, the extent of the use of derogations will not be known until river basin management plans are developed. It is also important to note that these England and Wales estimates may be misleading for Wales as inland and coastal water quality here generally compares well with that in England.

15. Implementation of the Water Framework Directive should bring benefits in terms of the ecological quality of the water environment and the policy framework for maintaining and improving the water environment. Major benefits of the Directive include an improvement in the quality of raw water, and greater availability of water as a resource; protection and enhancement of aquatic wildlife as the Directive aims to ensure that native aquatic life such as plants and fish can survive and reproduce; and a more coherent Community water legislation gathering together all of the measures that are necessary to manage river catchments and groundwaters and removing unnecessary and outdated requirements.
16. Estimates suggest that improved river quality may provide benefits of between £105 million and £522 million per year, as well as one off amenity benefits of between £1,410 million and £3,508 million. The value of recreational benefits at estuaries (e.g. boating, canoeing and angling) is estimated at £1.5 million a year. Benefits omitted from this estimation include values associated with improved water quality at lakes, wetlands, and in coastal waters, and non-recreational benefits at estuaries.
17. These estimates of costs and benefits will be updated in a final Regulatory Impact Assessment which is due to be published when the Regulations are laid in Parliament, and will be placed in the Assembly Library. No separate estimates of costs or benefits have been produced for Wales. The Water Framework Directive's specific requirements mean that some River Basins Districts, which are the Directive's basic building blocks for managing, protecting and improving the quality of water resources, will be cross-border. The Environment Agency, which will be the main regulator, covers Wales and England. For these reasons, the transposing Regulations are drawn up on an England and Wales basis and thus the costs and benefits associated with the Regulations have been assessed on an equivalent basis.

### **Regulatory Appraisal**

18. This Memorandum fulfils the requirements of standing order 23 (Section 3), applicable to subordinate legislation made together with a UK Department. Estimates of the costs and benefits arising from the Directive's implementation in England and Wales are summarised at paragraphs 11 to 16 of this Memorandum. While there is no requirement for the Assembly to undertake a Regulatory Appraisal in respect of Joint Orders, a copy of the proposed final England and Wales Regulatory Impact Assessment is attached. The original PDF version is available to view at  
<http://www.defra.gov.uk/corporate/consult/waterframe3/consult-append.pdf>

## **Consultation**

### With Stakeholders

19. Implementation of the Directive in England and Wales has been the subject of three separate and extensive consultation exercises, the most recent of which included a draft of the regulations. Summaries of the outcomes of the first two consultation exercises have previously been published within the second and third consultation papers. A summary of responses to the third consultation is being published in December. The proposed RIA reflects changes made as a result of consultations undertaken.

### With Subject Committee

20. These Regulations were included in the list of forthcoming legislation put to the Environment, Planning and Countryside Committee on 16 July 2003 and were not identified for discussion in committee.

## **Recommended Procedure**

21. Subject to the views of the Business Committee, I recommend that the Regulations proceed to Plenary for debate prior to the vote. The Water Framework Directive, and thus these Regulations, will be a major influence on water policy in Wales for many years to come. They will have an impact upon all those who have an interest in the management and use of water in Wales and, as noted earlier in the Memorandum, are likely to have a considerable cost impact. For this reason, therefore, it is considered that Members may want the opportunity to debate the proposed joint Regulations.

## **Compliance/Statutory Cross-Cutting Themes**

22. The power enabling this instrument to be made is referred to in paragraph 2 above.

23. As far as is applicable, the proposed legislation:

- has due regard to the principle of equality of opportunity for all people (Government of Wales Act 1998 Section 120);
- is compatible with the Assembly's scheme for sustainable development (Section 121);
- is compatible with Community law (Section 106);
- is not incompatible with relevant rights under the European Convention on Human Rights (Section 107);
- is compatible with international obligations binding the UK Government and the Assembly (Section 108).

24. This Memorandum has been cleared with the Office of the Counsel General.

25. The policy division contact is Eve Read, Environment Division, Ext 3192.

**Carwyn Jones AM**

**November**

**2003 Minister for Environment, Planning and Countryside**

# **Appendix D: Updated Partial Regulatory Impact Assessment**

## **Partial Regulatory Impact Assessment of the Water Framework**

### **Directive, 2000/60/EC**

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#### **Summary**

## **Introduction**

D1 This partial Regulatory Impact Assessment (RIA) is concerned with the Water Framework Directive (WFD). It updates the initial RIA that was submitted with the first consultation paper on the WFD issued in March 2001 to take into account improved information on water quality, the costs and benefits of measures and the administrative requirements of the WFD. However, this RIA still presents wide ranges of values for costs and benefits reflecting the fact that uncertainty over the measures required still exists (see Costs and Benefits section below for further details).

### **Nature of the WFD and implications for the RIA**

D2 As described in greater detail below, in terms of new provisions, the WFD is about the achievement of good status for water bodies but also about a process of river basin management. This RIA examines both the impacts of (i) regulations to implement the management process and (ii) the impacts of the measures that may be required as identified by the management process. The regulations to implement the management process will affect the Ministers of the Crown, central government departments, the Welsh Assembly Government, local authorities and other persons carrying out functions of public administration with responsibilities in relation to the environment. Although relevant measures are defined in the Directive, the detailed application of measures required is largely undefined at this stage as river basin management planning has not commenced. This RIA provides ranges of the costs and benefits that are likely to arise from these programmes of measures.

D3 It should be noted that through the process of river basin management planning (RBMP) the Environment Agency and the appropriate authority will be undertaking a process similar to, but in many cases more extensive than, an RIA for each programme of measures. Table 1 below compares the appropriate aspects of the regulation with the requirements of an RIA.

**Table 1: Comparison between RIA guidelines and river basin management planning requirements**

RIA guidelines	WFD requirement for RBMP	By date
State objective	Identify what objective means for river basin district based on characterisation	End of 2004
Undertake risk assessment	Characterise river basin district to compare current quality and pressures with objective.	End of 2004
Consider options	Consider cost effective combination of measures to achieve objective	End of 2007
Assess costs and benefits	Consider cost effective combination of measures. Apply derogations e.g. extend timescale for technical reasons, natural conditions or circumstances of disproportionate cost	End of 2008
Equity and fairness	Cost of measures to be met in a manner consistent with the polluter pays principle	End of 2008
Small firms' impact test	Not undertaken explicitly but disproportionate effects on any business sectors should be revealed through stakeholder involvement.	End of 2008
Competition assessment	Partially covered by economic analysis	
Enforcement and sanctions	–	End of 2008
Consultation	Extensive consultation required	
Monitoring and review	Monitoring and review of plans built into RBMP according to implementation regulations.	End of 2008
Summary and recommendation	Plan and programme of measures to be submitted for approval and then published.	2009

## **Purpose and intended effect of measures**

### **Objective**

**D4 The principal objective of the WFD is to ensure that water bodies achieve good status in 2015.**

**This overall objective is to be met through actions at the level of each river basin district according to the process described in the WFD. In its simplest form this process involves:**

- Identifying river basin districts and identifying (by December 2004) water bodies at risk of not meeting good status by 2015.
- Undertaking an economic analysis of water use by December 2004.
- Establishing a register of protected areas in each river basin district by December 2004.
- Establishing a monitoring scheme by December 2006.

- Developing a river basin management plan in consultation with stakeholders and developing a programme of measures required to achieve the objectives for water bodies in the river basin district by December 2009.
- Making measures operational by December 2012.
- Achieving objectives and reviewing measures by 2015.

D5 The WFD will impact upon all those who have an interest in the management and use of water in England and Wales – the water industry, all businesses that have discharge consents, trade effluent licences or abstraction licences, navigation authorities and industry and agriculture more generally.

D6 Implementation of the WFD will bring benefits in terms of the ecological quality of the water environment and the policy framework for maintaining and improving the water environment. The principal benefits can be summarised as follows:

- An improvement in the quality of raw water, and greater availability of water as a resource.
- Protection and enhancement of aquatic wildlife. The Directive aims to ensure that native aquatic life such as plants and fish can survive and reproduce. This in turn will support animals and birds higher up the food chain. Physical improvements in certain water habitats may also be required where this is necessary for the native biology to survive and reproduce. Such improvements in conservation of habitats and species will also increase the amenity value of watercourses.
- It introduces a new definition of surface water status that is concerned with the ecological health of water bodies as well as chemical standards. It also reflects the interactions between groundwater and surface water and the relationship between physical elements such as the structure and flows in the watercourse and the chemical and biological quality.
- More coherent Community water legislation gathering together all of the measures that are necessary to manage river catchments and groundwaters and removing unnecessary and outdated requirements.
- More coherent management of river basin districts, enabling more cost effective strategies to be developed. The Directive requires Member States for the first time to put in place a system of river basin management, with co-ordinated river basin management plans, recognising the links between all waters in a river basin district, including groundwaters and coastal waters.
- Better targeting of water protection measures. The analyses of each river basin district will provide better information, allowing better planning and targeting of measures to areas where there are clear environmental benefits.
- Transparency and accountability. The Directive will require transparency in the river basin management planning process. This will benefit water users as well as Government and competent authorities. Moreover, this greater degree of transparency has allowed accountability at Member State level

to take the place of prescription at EC level. Detailed objective-setting and monitoring strategies can therefore be decided at Member State level, enabling a more targeted use of resources and allowing measures to be set at a level appropriate to the circumstances at national and local level.

## **Background**

D7 The WFD (2000/60/EC) which was adopted in September 2000 establishes a framework for community action in the field of water policy. Member States are required to transpose the Directive into national legislation by 22 December, 2003. In England and Wales transposition will be achieved primarily through secondary legislation (see discussion of Water Bill below).

The Department of Environment, Food and Rural Affairs, and Welsh Assembly Government, which are responsible for transposing the Directive and ensuring effective implementation in England and Wales, have consulted twice on issues pertaining to the WFD, in March 2001 and October 2002. This RIA supports the third consultation paper which proposes the draft regulations that will transpose the Directive into national legislation.

## **The problem**

D8 The first phase of Community water legislation focused on specific waters, setting standards for rivers and lakes used for drinking water abstraction (1975) and bathing water (1976), or to protect freshwater fish (1978) and shellfish (1979). It culminated in binding quality targets for drinking water (1980). The Dangerous Substances Directive (1976) and its daughter Directives were the main legislative measures for controlling emissions. The 1988 Ministerial Seminar on water reviewed the existing Community legislation on water. It identified a number of improvements and gaps to be filled. This resulted in the second phase of water legislation. The Urban Waste Water Treatment Directive (91/271/EEC) and the Nitrates Directive (91/676/EEC) were both adopted in 1991. The former sets out to protect the aquatic environment from the adverse effects of sewage discharges. It lays down minimum standards for sewage treatment from sewage works serving larger towns and cities. The Nitrates Directive addresses water pollution by nitrates from agriculture. At the same time, the Commission also proposed a new Drinking Water Directive (adopted in 1998) and a Directive for Integrated Pollution Prevention and Control (adopted in 1996). A Commission proposal to revise the Bathing Water Directive to adopt higher microbiological standards has now been published.

D9 Waters in the Community remain under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes. The Dobris Assessment (1995) was an extensive report on the state of the pan-European environment prepared by a European Environment Agency Task Force. It identified the condition of European freshwater resources and their management as a prominent environmental problem and perceived the need for more integrated water management to reverse deterioration. The EEA also reported on the quality of European waters in 1995. As part of its report for the review of the Fifth Environmental Action Programme, it identified the need for policies to encourage sustainable water

consumption, as over-exploitation was affecting both the quantity and quality of water resources. The increasing impact of pollution from diffuse sources was also becoming relatively more significant, particularly nitrate and pesticide pollution.

D10 The provisions of the earlier Community water legislation have been integrated into the WFD, allowing the earlier Directives to be repealed in a phased approach. The legislation concerned is listed in article 22 of the Directive. But the Directive is not intended to replace some more recent pieces of legislation and it will complement the Urban Waste Water Treatment Directive, the Nitrates Directive and the Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC). Measures taken under these Directives will in many cases form an important part of the programme of measures in each river basin district.

### Current legislative framework

D11 It should be noted that impacts described within this RIA arise from both new regulations and using existing powers in order to meet the new water objectives set by the Directive. Together these constitute the total impact on England and Wales that can be attributed to the WFD.

D12 The existing framework of primary legislation including the Environmental Protection Act 1990, the Water Resources Act 1991, the Water Industry Act 1991, the Environment Act 1995, and the Pollution Prevention and Control Act 1999, provide many of the powers needed to implement the WFD. For example, the Water Resources Act establishes that the discharge of polluting matter to controlled waters without permission is an offence. This enables the Environment Agency to set standards for discharges. Tighter standards for certain discharge consents might be required to meet the objectives of the WFD. Thus this aspect of the WFD can be met through the setting of revised control measures under existing powers. Local authorities and the Agency also have duties under the Environmental Protection Act 1990 to secure the remediation of contaminated land where its condition is causing pollution of controlled waters such as groundwater. Another example are the Catchment Abstraction Management Strategies, which the Environment Agency now uses on a six-yearly cycle to review the sustainability of licensed water abstractions in England and Wales. These reviews will be used to inform decisions about any need to revoke or modify licences on sustainability grounds. This decision-making process is similar to that which will be required under river basin management plans for water quantity as well as quality.

### New regulations

D13 Regulations on implementation are required for the transposition of the WFD to demonstrate compliance with article 24(1) of the WFD.

D14 In some areas of water quality, most notably diffuse pollution, new regulatory powers are required to implement the provisions of the Directive. Policy proposals for the new powers have been refined in the light of the comments made on the Second Consultation Document, and are summarised

below (although the legal form of the proposed new powers will not be finalised until work to draft the Regulations to implement the proposals has been completed).

D15 It is intended that the Secretary of State, or a person delegated to act on their behalf, could give notice to owners of land, occupiers of land, or others undertaking activities that have the potential to contribute to diffuse pollution, of actions they should take, or precautions that they should observe, for the purpose of preventing or controlling diffuse pollution sufficiently to achieve or maintain the status requirements for water bodies. Also, those undertaking potentially polluting activities could be required to obtain a licence.

D16 Those affected by any notice or licence requirement would have an opportunity to appeal to an independent person against the notice or requirement.

D17 As was explained in the Second Consultation Document these new powers would have no immediate regulatory impact. The extent to which the new powers would be used in the future would be decided in the river basin management plans in the light of what other measures are also available to address diffuse pollution problems and achieve the required water status most cost effectively. However, indicative costs are included in this RIA.

### **Risk assessment**

D18 In the last decade there has been a significant improvement in the chemical and biological quality of classified rivers in England and Wales. Between 1990 and 2000, the percentage of river length classed as below good chemical quality fell from 52% to 32%. Over the same period, the percentage of river length failing to achieve good biological quality declined from 44% to 33%. Table 2 below presents the data on current river quality by river ecosystem (RE) class, showing the percentage of the rivers failing to achieve RE2, which is used as a surrogate for good status in this report.

**Table 2: Current river Quality in England and Wales (2001)**

River quality	Length of river (km)	% of total
Ungraded	138	0.3%
RE1	12,522	31.0%
RE2	14,229	35.2%
RE4	7,257	18.0%
RE3	3,300	8.2%
RE5	2,794	6.9%
Worse	141	0.4%
TOTAL	40,240	

Source: Environment Agency face values, all determinants 2001

D19 Improvements will continue through the next five years, largely as a consequence of the water industry's current investment programme to comply with earlier Directives. However, it remains reasonable to say that a significant number of water bodies will need improvement in order to achieve good status by 2015, but until the technical analysis required by the Directive is carried out, the proper scale and cost of necessary improvements will not be known.

D20 As part of the process of characterising water bodies, the current quality and pressures that will affect the achievement of good status are taken into account. Thus a comprehensive risk assessment will be undertaken for each water body by December 2004 as part of the WFD implementation process. The assessments will be further refined, including applying monitoring systems capable of monitoring the parameters required by the Directive by December 2006. The extent to which measures will then be required will be determined by this risk assessment thus ensuring that the magnitude of any problem and the appropriate solution is identified at the local level.

## Options

D21 Guidance from the Cabinet Office requires that RIAs consider alternatives to legislation as well as the 'do nothing' option.

### Do nothing

D22 Failure to give legal effect to the Directive would result in the Government facing infraction proceedings from the EU. It could be the case, though it is very unlikely, that water bodies all achieve good status or good ecological potential by 2015 in which case only the monitoring, participation and reporting activities required by the Directive would need to be carried out.

### Preferred option

D23 New regulations are being proposed to:

- Require the Environment Agency to fulfil the role of 'competent authority' with regards to river basin characterisation, maintaining a protected areas register, consultation and the development of the river basin management

plan and coordination of programmes of measures, as well as monitoring of water quality and other tasks.

- Give duties to the appropriate authority to undertake the economic analysis of river basin districts.
- Require parties responsible for diffuse pollution (principally from agriculture or urban run-off) to take measures to mitigate the effects of this pollution.

D24 The Government is not proposing to introduce new regulations where there are already suitable regulations in place that would provide a basis for measures required to achieve the environmental objectives of the Directive. For example, where there are existing regulatory powers controlling direct discharges, these will be used to set tighter standards for discharge consents. The regulatory impact occurs because of a tightening of the standards set using existing legislation, rather than because of a new regulation.

D25 There may be alternatives to regulation, such as economic instruments or voluntary measures that could form part of the programme of measures to deliver the environmental objectives of the Directive. The extent to which economic or other types of policy instrument are used will be considered nationally and at river basin district level, as part of the implementation process. Decisions on the use of such instruments is not required for transposition.

## **Costs and benefits**

### **Uncertainty over costs and benefits**

D26 Implementation of the WFD will give rise to costs and benefits from both the RBMP process and from the programmes of measures identified through this process. It is very difficult to estimate the costs and benefits of the programmes of measures on current information as such costs will only be established following the iterative technical and economic work the Directive requires. In particular, it depends on the findings of the river basin characterisation analysis on the extent of the risks of failures to achieve good status, and their causes, and hence, the identification of effective options to be costed. It also depends on the intercalibration exercise which will help define the good/moderate boundary (2006) across Europe. Hence for the purposes of this RIA the costs and benefits presented are given with a broad range, reflecting the uncertainty over exactly what measures will be required.

D27 As the implementation process progresses uncertainty over measures will reduce. In 2007 the Environment Agency is required to produce an interim overview of the significant water management issues in each river basin district. This information will provide an indication of the scale of action required and the business sectors most likely to be affected. Draft RBMPs are to be published for consultation in 2008. These will include a summary of the proposed programmes of measures. Complete certainty over measures will be obtained in 2009 when proposed measures must be finalised.

D28 A further source of uncertainty that will affect both costs and benefits is the extent to which derogations are used. For example, when achieving good

status on a particular water body in the timescale available would impose 'disproportionate costs', a time derogation or status derogation may be used, subject to the tests specified in the Directive. However, the use of derogations will not be known until river basin management plans are appraised, developed and consulted on. As derogations allow measures which entail disproportionate costs to be delayed or modified, it is possible that not considering them in this analysis, has led to overestimates of the costs of meeting water quality standards. However, the extent of this effect is uncertain at this stage.

D29 A further consideration is that many water bodies have been heavily modified (for example, river straightening or the addition of flood defence measures) or are man made (canals and reservoirs). In these circumstances, and subject to the tests specified in the Directive, a different objective to 'good status' applies. But measures will still be needed where necessary to meet the alternate objective for such bodies of 'good ecological potential'.

### Baseline for measurement of costs and benefits

D30 The guidance for the production of RIAs states that the RIA is trying to assess the *extra* costs and benefits associated with the proposal under consideration. It is indicated that related or overlapping regulations that already affect organisations likely to be affected by the proposal should be discussed in the RIA.

D31 For the purposes of the WFD, this RIA therefore addresses the additional costs and benefits of the WFD and excludes costs and benefits associated with the measures required under existing directives identified in Annex VI of the WFD. For ease of reference the existing directives are listed at Annex 1. Cumulative costs to the water industry of water quality improvements are available: Ofwat publish figures for past water company capital investment<sup>2</sup>. On the benefits side, the Environment Agency have estimated environmental benefits for water quality improvements from AMP4<sup>3</sup>.

D32 The WFD also will give rise to 'daughter' directives on priority list substances and groundwater. The costs and benefits of any measures in the daughter directives that go further than WFD are attributable to those daughter directives. The identification of costs and benefits of groundwater and priority substances objectives are dealt with in separate RIAs<sup>4</sup>. The costs and benefits of those measures relating to groundwater and priority list substances which are set in the WFD rather than in the daughter directives are attributable to the WFD (unless they would already have been required by the existing Groundwater Directive).

D33 Where identified through the planning process, the WFD requires that measures be established by 2009 and operational by 2012 at the latest to achieve the objective of good status for water bodies by 2015. The processes of river basin characterisation and risk assessment will have the aim of identifying those water bodies where there is a risk of failing to achieve good status by 2015 (and beyond up to 2027). The assessment of this risk will take into account the forecast impacts and pressures on water bodies and the

impact of measures anticipated through earlier directives (the so-called 'business as usual' baseline). Where river basin plans identify a need for measures over and above that required for earlier directives, the cost of those additional measures will represent the extra cost of achieving the objectives of the WFD. This RIA is only concerned with these additional costs. For consistency, the assessment of benefits should similarly consider any additional benefits over and above the 'business as usual' baseline. RIAs may have been undertaken for these existing directives at an earlier date<sup>5</sup>.

D34 An RIA for the Water Bill was also published in February 2003. The Bill is not intended to transpose the Directive although it will help deliver elements of the Directive's requirements in relation to articles 11(3)(c) and (e).

D35 Article 11(3)(c) of the Directive requires measures to promote an efficient and sustainable water use, in order to avoid compromising the achievement of the Directive's environmental objectives. Water undertakers will be placed under an enforceable duty to conserve water in carrying out their functions. The main activity is for leakage reduction and control, but in addition, companies will need to use water more efficiently in water and waste water treatment plants. The duty may also ensure that companies take advantage of the opportunities available to them under the Water Industry Act 1999 to install water meters.

<sup>2</sup> Ofwat (2003) Water and Regulation: Facts and Figures.

([http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/water\\_regfacts\\_figs.doc/\\$FILE/water\\_regfacts\\_figs.doc](http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/water_regfacts_figs.doc/$FILE/water_regfacts_figs.doc))

<sup>3</sup> Fisher J, Sunman H, Tambe N, (2003) The Environmental Benefits Of The Environmental Programme In The Periodic Review Of The Water Industry (PRO4) Environment Agency.

<sup>4</sup> An initial analysis of the regulatory impacts of proposals for Priority List of Substances is presented on the Defra website:

<http://www.defra.gov.uk/environment/water/wfd/art16-ria/index.htm>. For information on the Groundwater Directive, please contact

[wq.enquiries@defra.gsi.gov.uk](mailto:wq.enquiries@defra.gsi.gov.uk)

<sup>5</sup> For details, please see the DEFRA website: <http://www.defra.gov.uk/environment/water/quality/index.htm>

D36 Article 11(3)(e) of the Directive requires prior authorisation for abstraction and impoundment. The licensing requirements of the Water Resources Act largely implement this requirement, and proposals in the Bill will complete implementation of this article of the Directive by ending nearly all exemptions by purpose, and establishing three types of licences (full, transfer and temporary).

### Implications of the baseline for costs and benefits

D37 The level of water quality that would be achieved in the absence of efforts to implement the WFD sets the 'business as usual' baseline for assessing the costs and benefits of the WFD. At this stage, the baseline is unknown; it will be assessed as part of river basin characterisation. For the purposes of this RIA, assumptions are made about the baseline, in order to show the range of possible costs and benefits.

D38 There is significant uncertainty over the expected status of water bodies as the benefits of recent environment driven expenditure have not fed through as yet. In addition the increase in monitoring required may identify

environmental issues that were not previously known. If the estimated baseline water status is high and sustainable, then very little extra improvement will be required to ensure good status by 2015. If little improvement is required then the cost of the measures required to achieve good status will also be low. Hence a high and sustainable position will mean that both the costs and the benefits of achieving good status are low. Conversely, if baseline water quality in England and Wales is a long way from achieving good status in 2015 then the costs of achieving good status will be high but so will the additional benefits.

D39 In this RIA, benefits and costs are presented as a range with low end estimates of benefits reflecting a high status baseline from which little extra improvement is required. Low end estimates of benefits should therefore be compared with low end estimates of costs because the cost of achieving the extra improvement will also be low. Similarly, high end estimates of benefits should be compared with high end estimates of costs.

### **Business sectors affected**

D40 The following two subsections identify the business sectors that may be affected either directly or indirectly from the WFD, and which thus may experience additional costs or benefits arising from implementation.

#### **Directly affected**

- Businesses that abstract water for the purposes of public supply, industrial processes or irrigation – such businesses could experience greater costs if less water was available for abstraction, but would also benefit from improvements in raw water quality.
- Businesses that discharge to water either at identifiable points or as a consequence of diffuse run off, for example sewage treatment plants, industrial effluent discharges, agricultural run-off.
- Businesses that use water bodies in ways that may generate an environmental impact, such as navigation or shellfish farming.
- Businesses that provide services that depend on the quality of water bodies, such as canoeing centres.
- Businesses liable for the contaminated condition of land where water pollution is being caused (for example because they caused or knowingly permitted the land to be in that condition).

#### **Indirectly affected**

D41 In the event that the above mentioned businesses experience additional costs, these costs may be passed through to their customers. For example, (i) businesses purchasing inputs from industries with tighter regulations may have to pay higher prices, or (ii) the allowance in the Water Industry Act for water and sewerage companies to recover reasonably incurred costs means that if these companies have to meet higher standards, businesses discharging effluent through the public system (amongst others) will have to pay higher prices.

## **Benefits**

### **Do nothing**

D42 As indicated above, the Government would face infraction proceedings from the EU in the event that it did not implement the WFD. In terms of the value of the benefits of this, the 'do nothing' scenario actually forms the 2009 'business as usual' baseline from which measures, and therefore costs and benefits are assessed.

### **Preferred option**

D43 The benefits from implementing the WFD divide into two components:

1. The informational and administrative benefit from increased monitoring and comprehensive planning, and
2. The improvement in ecological status, from the baseline of ecological quality without the WFD, to good status.

D43 Benefits of the first type are easier to assess (qualitatively) as the activity that gives rise to the benefits is known. Benefits from improved ecological status will depend on the amount of improvement that is required in order to reach good status, which will not be known until around 2008.

### **Administration, monitoring and planning benefits**

D44 The broad coverage of the WFD should give a more integrated approach to river basin planning. A high level of co-ordination and communication will be facilitated which should ensure fully informed policy making. The consultation requirements are likely to generate new ideas and make available new information on the local environment, thus ensuring that the correct measures are implemented and advantage taken of synergies.

D45 Some respondents to the second consultation have also made the point that there is potential for higher environmental standards to bring benefits through greater resource productivity and through driving innovation.

### **Benefits from ecological improvement**

D46 A quantitative assessment of the benefits of the WFD was undertaken by WRc in 1999<sup>6</sup>. This uses the standard approach of identifying different groups of people that value environmental benefits and estimating the value to them of the expected change. Given the difficulty and expense of undertaking a benefits study for each river basin district, benefits have been estimated by transferring values estimated for environmental quality on similar water bodies. For certain water bodies, particularly lakes, there have been no previous relevant benefits studies, so benefits estimates are not available. In this section we briefly outline the methodology for quantifying the various benefits, provide estimates of these benefits and highlight any limitations or omissions.

### **River quality**

D47 Improvements in river quality benefit a range of river users. Improvements are also appreciated by those that value the existence of certain environments and species even if these people never actually visit the area in question.

D48 The change in river quality arising from the WFD was assessed using different scenarios for the 'business as usual' baseline level of environmental quality, one where a 'small gap' in environmental quality would need to be bridged to achieve Good Ecological Status, and one where a 'large gap' would need to be bridged:

- Small gap – The baseline from which measures would be required was set by taking the river quality in 1995 and projecting the expected river quality in 2010 based on a 7% improvement in quality per 5 years until the commencement of the programme of measures. Good Ecological Status was assumed to be equivalent to River Ecosystem Class 3 (RE3).
- Large gap – The baseline from which measures would be required was set by taking the river quality in 1995 and projecting the expected river quality in 2010 based on a 3.3% improvement in quality per 5 years until the commencement of the programme of measures. Good Ecological Status was assumed to be equivalent to River Ecosystem Class 2 (RE2).

D49 The use of RE2 or RE3 for good water status is the best approximation from the data available. However, good water status could be above RE2 in some locations, thus achieving good water status might require further measures to be taken and might yield greater environmental benefits than quantified in this RIA.

D50 The value associated with the improvement of this length of river was estimated based on the values of improved recreation, fishery and amenity multiplied by the numbers of people who were expected to benefit based on the National Visitors Survey of visits to canals and rivers. Annual and one-off<sup>7</sup> benefits that were quantified and valued are presented in Table 3.

<sup>6</sup>Potential costs and benefits of implementing the proposed water resources framework directive, January 1999.

<sup>7</sup> Amenity benefits are shown as one-off benefits because they are quantified on the basis of changes to property values, which represent a capitalized stream of benefits.

<b>Table 3: Annual and one-off benefits of improved river quality</b>		
	<b>Benefits £ million per year</b>	
	<b>'Small Gap' scenario</b>	<b>'Large Gap' scenario</b>
Angling	25	85
Non-use	58	145
Informal Recreation	22	42
Low flow	0	250
<b>TOTAL</b>	<b>105</b>	<b>522</b>
	<b>One-off benefits £ million</b>	
	<b>'Small Gap' scenario</b>	<b>'Large Gap' scenario</b>
Amenity	1,410	3,508

D51 There are a number of limitations to this approach. Given the current level of knowledge about benefits we are unable to provide alternative values

but we can, in some cases, indicate the potential impact on values of these limitations.

- Visitor numbers: estimates assume that the number of visitors stays the same but the value of a visit rises. It is likely that the number of people visiting canals and rivers will increase, thus leading to greater benefits.
- River Ecology: RE values are based on physico-chemical parameters that do not fully capture the characteristics that will be enhanced by the WFD. Thus estimating values of an RE2 or RE3 river may understate benefits.
- Flood risk amelioration: where land management solutions are adopted to manage water quality problems there may be benefits in terms of flood mitigation. The benefit of this is difficult to estimate in advance and hence has not been included here.
- Controls on pollutants may lead to reductions in the instance of pesticides in raw water, although such controls will fall to be considered largely in relation to the development of Priority List Daughter Directives. To the extent that this enables water companies to reduce treatment costs (which will depend on the condition then prevailing in raw water and the treatment processes of existing assets) there may be an additional benefit.
- Population multiplier: the study assumed that the population within the water company area would have a constant amenity value for all water body improvements. At present there is no research into how household amenity value for river quality changes with any increase in the river stretches improving. Amenity benefits are captured here by the premium market value of properties within 600m of a watercourse.

## Quality of lakes

D52 Very little information is available on the current status of water quality in lakes, nor is there any straightforward way of assessing good status, thus WRc were unable to estimate the benefits that would be associated with improving the ecological status of lakes. It may be assumed that the nature of these benefits would be in terms of increased recreational opportunities both for boating and bankside activities and increased angling as well as non use values.

## Estuary water quality

D53 A classification system exists that awards points for certain characteristics of estuaries. WRc (1999) assumed that Class A was a reasonable approximation for good status. Based on 2000 data, 815km of estuary was below Class A and hence benefits would flow from improvements to these areas. WRc assumed that estuarine recreations were similar to those of rivers (i.e. including boating, canoeing and angling) and that the values of recreation and the visitors per km would be similar. Thus the recreational benefit to estuary improvement was estimated to be **£1.5 million** per year.

D54 There are a number of limitations with this approach, including:

- The assumption that there would be no change in the length of Class A estuaries between 2000 and 2010 is unlikely to be correct given the recent

water company investments required by the Urban Waste Water Treatment Directive.

- The assumed similarity between estuary visits and river visits in terms of activity value and numbers of people.
- No additional value for particular habitats in estuarine areas that would benefit from greater protection of the surrounding area.
- The value to fisheries of improved water quality in estuaries has not been quantified. Estuaries are important breeding areas for fish in the UK.
- It does not include angling, amenity and non use values.

### Coastal water quality

D55 WRc (1999) assumed there would be no significant change to coastal water quality required for the WFD once the effects of the Urban Waste Water Treatment Directive had fed through. The reasonableness of this assumption will only be revealed once monitoring in terms of the parameters required by the WFD is undertaken in coastal areas.

### Groundwater quality

D56 Benefits due to improvements in groundwater quality arise depending on the use of the groundwater in question. Improvements to groundwater that is abstracted for drinking water purposes may reduce the need for treatment of this water, and thus reduce costs of treatment to water companies. Improvements to groundwater that is abstracted for irrigation may increase agricultural yields. Improvements to groundwater that supports surface water features (such as wetlands) may enhance or prevent deterioration in the ecological quality of the feature. It is difficult to estimate the magnitude of these effects as the change required to groundwater is currently unknown and the links between groundwater and its different uses vary between sites.

### Benefits summary

D57 The potential benefits associated with the WFD are presented in Table 4 below. It is clear from this table that many potential benefits (e.g. benefits to bathing waters, and some ecological and natural habitat benefits) could not be quantified at the time of this study.

<b>Table 4 Summary of benefits of ecological improvement (discounted over 42 years at 6%)</b>		
<b>Benefit</b>	<b>'Small Gap' scenario</b>	<b>'Large Gap' scenario</b>
Improved river quality and quantity and improved estuary quality (not all benefits quantified and valued)	£1, 643 million	£6, 165 million
Improved Lake quality	Not quantified, but there are likely to be significant recreational and non-use benefits	
Improved coastal quality	Not quantified, and may not be significant if changes to coastal water quality is small	
Improved ground water quality	Not quantified, but there may be large benefits to water companies and agriculture, as well as ecological benefits	

D58 Improved water quality is also likely to lead to indirect benefits to wetlands. There are likely to be significant recreational and non-use benefits, however these have not been quantified.

## **Costs**

### **Do nothing**

D59 In the event that the Government did not implement these regulations the UK would not incur compliance or policy costs. However, it would incur significant fines for infraction and be required again to take action, and subsequent rushed action might be more costly than a well ordered programme of measures under RBMPs.

### **Preferred option**

D60 The costs from implementing the WFD can be broken into three components:

1. Administration, planning and monitoring costs;
2. Information costs which might include, for example, a business providing estimates of the costs it would incur if it invested in new technology to reduce its impact on water bodies or the cost to a farmer of demonstrating that he/she was utilising best practice with regard to potential water pollutants; and
3. Compliance costs, that is, the costs of the measures that might need to be taken.

D61 Information costs have not been estimated as yet; it is expected that they will be small relative to the costs noted at 1 and 3 above. Compliance costs can only be quantified after 2004 when the process of river basin characterisation will have identified all the significant environmental impacts of human activities on water in each river basin district. This will enable preliminary work to begin identifying options for achieving GES that will need to be costed.

### **Administration, planning and monitoring costs**

D62 The Directive specifies that Member States must appoint a competent authority, transpose the Directive into national law and provide copies of RBMPs and other documentation to the Commission. The Government has recognised the need to allow for the drafting of guidance to follow on from the transposing regulations covering issues such as RBMPs. Costs relating to these activities are not separately identifiable in the overall cost estimate of administration, planning and monitoring.

D63 The planning requirements of the WFD are more substantial than those of many other directives. The WFD requires that river basin districts are identified and that RBMPs are developed for each of these, utilising results of characterisation of river basins, economic analysis of water uses, information on the costs of the available measures to achieve good status and stakeholder participation. The planning process will therefore require a high degree of skill as well as significant time inputs.

D64 This partial RIA can only report the estimates from the earlier WRc study (1999), which will be different from the actual costs. WRc are currently deriving better estimates for the cost for administration, implementation, planning and monitoring. These improved estimates will be reported in the final RIA which Defra will provide towards the end of the year when the WFD regulations are laid before parliament.

D65 WRc (1999) estimated the costs of the planning process for England and Wales by estimating the numbers of plans and analyses required and estimating the costs of these based on the costs of comparable pieces of work and by considering the man-hours of effort that would be required to complete the process. It was estimated that initial one- off costs of planning and consultation would be around **£2 to £3 million** and that recurring costs would be approximately **£8 to £10 million** per planning review (every six years).

D66 The monitoring of the WFD will also add significant obligations to the Environment Agency who will need to monitor parameters as specified in the Directive and coordinate measures in the programme. The Environment Agency are currently undertaking a review of monitoring and EMCAR have been tasked with coming up with a view of the extra costs, which depend on the initial risk assessment and understanding of pressures in river basin characterisation. Validation of the risk assessment might mean that in addition to monitoring of status, the Agency has to collect more information on pressures.

D67 WRc (1999) examined the extent of monitoring taking place at the current time for national objectives or compliance under other directives, and assessed the additional monitoring effort required in terms of geographical distribution of samples, frequency of sampling and parameters sampled. A summary of their findings is presented below.

### River monitoring

D68 In England and Wales, 40,000km of river is surveyed with regularity for physicochemical and biological parameters. Whilst this is already extensive, it is anticipated that greater monitoring will be required for physical characteristics of rivers, such as geomorphology, river bed structure and riparian vegetation and for other parameters such as macrophytes. WRc (1999) estimated the cost of this at around **£0.14 million** per year. However, the Environment Agency have indicated that monitoring for fish could add to this cost.

### Monitoring of lakes

D69 For lakes a similar level of monitoring effort will be required as for rivers. However, to date the monitoring of lakes has been considerably less extensive hence WRc (1999) put the expected cost of monitoring lakes at around **£0.3 million** per year.

### Monitoring estuaries and coastal waters

D70 Much of the current monitoring of estuarine and coastal sites is for specific purposes or in specific areas. For example bathing waters are monitored for bacteria and National Marine Monitoring programme sites, which are monitored for a range of parameters, only constitute a sample of coastal waters. The lack of extensive monitoring means there is much uncertainty in estimating costs for these water bodies. However, WRc (1999) estimated that the cost of additional monitoring and assessment in estuaries and coastal waters could be **£7.6 million** per year.

## Groundwater monitoring

D71 A wide range of chemical pollutants are tested for at the groundwater monitoring stations in the UK. From 1999 the Environment Agency has been allocated an extra **£1.5 million** a year, in grant in aid for groundwater monitoring driven by the WFD, rising to **£4.4 million** a year in 2004/5.

## Information costs

D72 As indicated above, it is not currently possible to estimate information costs of the WFD as it is not known what sort of information businesses might need to provide to assist with developing the programme of measures. However, where measures to implement the Directive are more stringent targets under existing regulations, the additional compliance cost should be low as companies will have administrative systems to deal with the existing compliance requirements. Other public bodies such as Ofwat, central government departments and local planning authorities may also incur costs associated with river basin management planning, as they may need to provide information and respond to EA consultation. Ofwat and Defra will incur costs associated with development of an 'economic analysis of water use' required to underpin river basin management planning and reporting on compliance with article 9 (on water pricing).

## Cost of measures

D73 Based on the river basin management plan process, a programme of measures must be implemented. As stated previously it is not currently possible to say exactly what these measures will be as they will depend on the amount of improvement required to achieve good quality and the assessment of which of the measures available are most cost effective.

D74 Not only is there uncertainty over the scale of effort required to achieve good status from the water quality status in 2015, but costs will also depend on assumptions about which measures will be required. At present these assumptions have been made at a macro-level which would tend to identify higher cost solutions. For example, the macro cost estimation approach will implicitly assume that the measures involve changes to water company discharges or agricultural practices, whereas lower cost measures may actually be available in some areas, such as the construction of a wetland. Furthermore, any assessment of costs at this stage can only deploy unit costs that reflect average values that in practice will vary from site to site, or that might exhibit economies or diseconomies of scale.

D75 For the purpose of identifying potential regulatory impacts, it is necessary to make assumptions about the extent to which different sectors would need to take action and bear the costs of that action. In practice, decisions regarding the allocation of costs between sectors will be informed by cost-effectiveness analysis required to assemble cost-effective programmes of measures as part of the river basin management planning process. The methodology and information to support this cost-effectiveness analysis has not yet been developed – it is part of the work that needs to be completed on 'Economic Analysis of Water Use' by the end of 2004. Costs provided in this RIA are not the outcome of a crosssectoral cost-effectiveness analysis, nor are they informed by local information that could help to identify the most cost-effective solutions.

**D76 Costs provided in this RIA should therefore be viewed as indicative of the costs of the potential range of measures in different sectors, rather than relied upon as estimates of the eventual costs.**

D77 The contents of the rest of this section are as follows:

- Potential cost of measures to reduce point source pollution in rivers.
- Potential cost of measures to restore physical quality in rivers.
- Potential cost of measures to reduce diffuse pollution from agriculture.
- Potential cost of measures to reduce diffuse pollution from other sources.
- Costs that have not been quantified.

### Measures to reduce point source pollution in rivers

D78 The potential costs of measures in this section are taken from the 1999 WRc report. As described above, the change in river quality arising from the WFD was assessed using different scenarios for the 'business as usual' baseline level of environmental quality, one where a 'small gap' in environmental quality would need to be bridged to achieve Good Ecological Status, and one where a 'large gap' would need to be bridged. WRc are currently reviewing the 'business as usual' baseline level of environmental quality, and updated costs may be presented in the final RIA.

### Methodology

D79 WRc (1999) estimated the costs of measures through a top-down process. Their methodology was as follows:

- Consider current physico chemical water quality based on 1995 General Quality Assessment (GQA) information for Biological Oxygen Demand (BOD), Ammonia (NH<sub>3</sub>) and dissolved oxygen for rivers and estuaries.
- Consider current nutrient quality based on the 1995 GQA for nutrients (phosphorus) and the proportion of this attributable to point sources.
- Using typical values for the dilutions of BOD, ammonia and phosphorus (P) that are associated with RE2 and RE3 status compared with the dilutions in rivers and estuaries of lower quality and an estimate of the volume of water in the river lengths whose status is below RE2 or RE3, the volume of abatement required for each parameter was estimated.

- The total cost of measures was estimated by multiplying the cost of removing 1kg of a parameter by the total reduction of that parameter required.
- Costs were allocated back amongst industrial sectors based on the proportion of discharge they were responsible for.

D80 It is noted that WRc are reviewing the change in environmental baseline since their report was published in 1999. This will have an effect on cost estimates and revised cost estimates will be included in the final RIA.

## Estimated costs

D81 Table 5 presents the annual estimated costs of removing point source pollution from rivers to achieve the required standards.

Table 5: Annualised costs of Biological Oxygen Demand (BOD), ammonia (NH3), phosphorus (P) and nitrogen (N) removal (1997 prices)							
'Small gap' scenario				'Large gap' scenario			
Costs £ million per year				Costs £ million per year			
Industry sectors	BOD	NH3	P	BOD	P	NH3	N(from estuaries and coastal waters)
Food Processing	4	2	1	11	1	4	7
Textiles	3	12	3	9	3	20	34
Chemicals	3	6	1	8	2	10	16
Pulp and paper	2	8	2	5	2	13	22
Municipal WWT	26	96	23	73	28	161	275
Sub total	38	124	30	106	36	208	354
<b>TOTAL</b>	<b>190</b>			<b>703</b>			

<sup>9</sup>UKWIR (2003) The economics of achieving good water status with water industry measures: An assessment of the scale and scope of potential costs associated with the Water Framework Directive. Research Report RG 07/02.

## Assumptions and omissions

D82 The methodology described above assumes that the cost of treating these substances is independent of the level at which removal is being undertaken. Evidence from the water industry suggests that once the dilution of these substances is below a certain level it is increasingly expensive to improve discharges further and hence costs may rise in a way not captured by the WRc (1999) methodology. However, there are synergies between the treatment processes required to remove these substances so, assuming dischargers are required to remove a combination of substances, the total cost may equally be lower than indicated here.

D83 A bottom-up costing analysis for the water industry has been undertaken by Stone & Webster Consultants on behalf of UK Water Industry Research (UKWIR)<sup>9</sup> which looks at the types of measures that water companies could implement to allow the good status objectives to be met and estimates the

associated costs. This analysis highlights that water company measures may not necessarily be the most cost effective option for achieving good status, but also identifies a number of areas where measures might be required that were not considered in WRc (1999).

D84 The main factors omitted here are the costs of removing nitrates and other pollutants in sewage effluents at point sources. Nitrate removal has been undertaken by some water companies that discharge into Sensitive Areas, as designated under the Urban Waste Water Treatment Directive. The cost of nitrate removal can be high and the treatment processes are energy intensive (which itself has a negative environmental impact). Existing legislation is available to deal at source with the discharge of pollutants to the sewerage system, but pollution can also occur through urban run-off containing pollutants from vehicle emissions. Sewage treatment works therefore sometimes have the capacity to treat such pollutants but, if tighter requirements are placed due to the WFD, further improvements may be required.

D85 Combined sewer overflows and storm-tanks, generally owned and operated by water companies, are a further source of various types of pollution including BOD and ammonia. Both of these tend only to release high amounts of pollutants following heavy rain when the capacity of the sewage treatment system is reached. Depending on the sensitivity of a water body it may be necessary to take measures to reduce such intermittent releases. Typically increased capacity of sewers and sewage treatment works will achieve this (though screening may be possible at combined sewer overflows) and the associated cost will vary significantly between works depending on the current size of the works and the land available for expansion.

D86 In addition to the parameters noted above there are a significant number of other parameters in rivers that will be monitored for the first time, such as fish and plants. If monitoring indicates that the state of these indicators is indicative of water quality below good status, further measures may be required. At this stage it is difficult to project the likelihood that these parameters are below the required level or estimate measures required additional to those quantified above.

D87 There may be a need to reduce emissions of substances other than those listed in Table 5, which are also not part of the 'Priority List' of substances. It may not be possible to identify what substances need to be controlled and where, until draft RBMPs are drawn up.

### **Potential costs to improve physical quality in rivers**

D88 Based on the River Habitats Survey by the Environment Agency, WRc (1999) estimated the length of river that might require improvement. The costs per kilometre of improvement were obtained from river rehabilitation projects undertaken by the Environment Agency. These costs were divided into costs for remediation of obviously modified, extensively modified and heavily and extensively modified water bodies. The results are shown in Table 6 below:

**Table 6: Potential one-off costs of river habitat restoration**

	Shortest length requiring action	Longest length requiring action	'Small gap' scenario Cost £ million	'Large gap' scenario Cost £ million
Obviously modified	5,463km	7,500km	38	52
Extensively modified	1,168km	7,900km	91	616
Heavily and extensively modified	27km	0km	14	0
<b>TOTAL</b>			<b>143</b>	<b>668</b>

D89 The high cost estimate presented here is based on information and remediation in accordance with the River Habitats Survey. This survey does not examine the state of physical quality to the extent required by the WFD. With the more thorough monitoring that will be undertaken as part of implementation of the WFD, it is possible that additional river lengths might be identified as requiring measures.

D90 In addition to river rehabilitation, low flows may be having an adverse impact on river quality. River flow is maintained through active flow regulation and abstraction licensing by the Environment Agency. In estimating the cost of maintaining river flows, WRc (1999) only took into account the cost of river regulation schemes. The impact of regulating abstraction licences is more difficult to quantify as the cost to the abstractor depends on the proximity and quality of an alternative source, and the nature of investment that is required to abstract from that source. The potential costs of low flow alleviation schemes are indicated in Table 7 below.

**Table 7: Potential one-off costs of low flow amelioration**

	'Small gap' scenario	'Large gap' scenario
Number of sites	0	107
Unit cost per site (£ million)	4	4
<b>Total cost (£ million)</b>	<b>0</b>	<b>375</b>

<sup>10</sup> The 42-year period is based on a 12-year planning and implementation period and a 30-year asset life. 6% was the Treasury discount rate at the time WRc did the work for their 1999 report.

<sup>11</sup> RPA (2003) Water Framework Directive – Indicative Costs of Agricultural Measures.

## Potential cost of measures to reduce diffuse pollution from agriculture

D91 WRc (1999) estimated costs of reducing phosphorous and nitrogen emissions from agriculture at £63 to £287 million per year, which is £0.6 billion to £2.9 billion over 42 years discounted at 6%<sup>10</sup>.

D92 In order to gain a better understanding of actual farm practices that could contribute to achieving Good Ecological Status, Defra commissioned RPA to

lead on a project to identify and present indicative costs of agricultural measures relevant to different agricultural sectors. This work is presented in a report available on the Defra website<sup>11</sup>, and provides information on types of measure that may be applicable to farm businesses engaged in dairy, sheep or arable farming. It uses unit costs to indicate the potential costs of each type of measure. In practice, costs of measures will vary from farm to farm. The extent to which any individual farm business might need to adopt such measures would depend on the extent to which they already apply measures set out in the Codes of Good Agricultural Practice (CoGAP). CoGAP are voluntary codes that set out steps farmers can take for dealing with potential environmental problems (separate codes address impacts to water, soil and air). There is no obligation on farmers to comply with Good Agricultural Practice (GAP), although until 1989 it was a statutory defence for a farmer charged with water pollution to show that he/she had complied with (GAP). CoGAPs were written as a practical guide to help farmers and growers avoid causing pollution. It is used by farmers in this way, as a guide to what steps they might take when a problem occurs. On any individual farm there are only certain aspects which will be of concern, and solutions will be individual to the farm and may not always be those included in the code. It is noted that the WFD is not the only policy driver in train which might lead to CoGAP. For example other Directives such as the Habitats Directive and the Bathing Water Directive may have similar implications for farming, to varying degrees. This leads to further uncertainty about the environmental baseline.

D93 Not all potentially cost-effective measures are part of CoGAP, and in some places, the severity of local pollution problems and risks could mean that measures that go beyond CoGAP may be required.

D94 These indicative costs were used to build up a picture of possible regional and national costs, grossing up on the basis of numbers of farm holdings and area farmed. It should be recognised that this is a crude method of grossing up costs; they are provided for illustrative purpose only and should not be viewed as estimates of expected costs. Future patterns of types of agricultural production may be different from current patterns – changes in the structure of the industry may occur in response to market pressures and CAP reform. The baseline may also be influenced by changes in cross compliance under CAP reform. This analysis does not attempt to anticipate such changes.

D95 Uncertainties were highlighted by formulating scenarios with different assumptions regarding:

- Percentage of farms currently implementing CoGAP,
- Percentage of farms already implementing measures that go beyond CoGAP, and
- Area of farming land at risk that required measures to be taken.

D96 The assumptions made in these scenarios are set out in Table 8. Results of the 'Low' and 'High' cost scenarios are set out in Table 9. Land at high risk from phosphorus and soil loss would be characterised by higher slopes, soil with high sand or silt content, and high rainfall. High risk crops for soil and phosphorus loss include potatoes and other root crops, forage maize and late

drilled winter cereals. Land at high risk from nitrate loss will tend to have sandy or shallow soil, a drier climate, and be intensively farmed. High risk crops for nitrate loss include potatoes, leafy vegetables and intensively grazed grass.

**Table 8: Scenarios for extrapolating farm-level costs to provide an indication of national costs of agricultural measures**

		Scenario definition		
	Assumption	High cost	Medium Cost	Low Cost
Arable	High risk land = % Already adopting CoGAP measures = % Already adopting additional measures =	25% 0% 0%	15% 20% 5%	10% 40% 10%
Sheep	High risk land = % Already adopting CoGAP measures = % Already adopting additional measures =	40% 0% 0%	35% 20% 5%	25% 40% 10%
Dairy	High risk land = % Already adopting CoGAP measures = % Already adopting additional measures =	55% 0% 0%	45% 20% 5%	35% 40% 10%

**Table 9: Indicative costs of agricultural measures for England and Wales**

Total costs, £ million				
	Low cost scenario		High cost scenario	
Capital expenditure (capex), operating expenditure (opex)	All measures (CoGAP and beyond CoGAP)	Only measures that go beyond CoGAP	All measures (CoGAP and beyond CoGAP)	Only measures that go beyond CoGAP
Arable opex	13	3	49	9
Sheep opex	11	0	30	0
Dairy opex	12	2	30	3
Total opex	37	5	108	13
Arable capex	73	63	217	174
Sheep capex	133	0	356	0
Dairy capex	293	206	587	360
Total capex	499	269	1,160	534
Annualised capex*	43	23	101	46
Annualised costs (capex + opex)	80	29	209	59
NPV*	938	333	2,452	688

At a discount rate 3.5% over 15 years. It is noted that WRc discounted benefits at 6% over 42 years so the NPVs are not directly comparable.

D97 The analysis indicates annual costs of **£80 million to £209 million** (capital costs annualised over 15 years at a discount rate of 3.5%) of which £29 million to £59 million are costs of measures that go beyond CoGAP. It should be noted that these costs do not include costs for horticulture, beef and other livestock sectors – only arable, sheep and dairy.

D98 This is made up of one-off/capital costs of £499 million to £1,160 million (of which £269 million to £534 million are costs of measures that go beyond CoGAP) and recurring/ operating costs of £37 million to £108 million each year (of which £5 million to £13 million are costs of measures that go beyond CoGAP).

D99 Expressed in terms of present value (discounted over 15 years at a rate of 3.5%), this gives a total cost of **£938 million to £2,452 million** (of which £333 million to £688 million are costs of measures that go beyond CoGAP).

## Potential costs of measures to reduce diffuse pollution from other sources

D100 Urban activity is a major source of water pollution in industrialised countries, and particularly in the UK as the main centres of population are very dense. The main types of pollution originate from the following activities: residential, commercial, light industrial, transportation corridors (road, rail, canals, airports) and general urban land. The potential pollutants arising from urban stormwater run-off include sediment, nutrients, pathogens, organic material, heavy metals, oils and hydrocarbons and pesticides.

D101 The Government is currently researching the extent of this type of pollution and investigating the types of measure that might be successful in controlling it. Hence this is highlighted as a potential area of cost but not one that can be readily quantified at this stage.

### **Costs that have not been quantified**

D102 Until the programmes of cost-effective measures are developed there will be uncertainty over a number of the costs associated with the Directive. These costs are difficult to estimate at a macro level because either there is little information on the scale of measures that might be required or because the costs of measures are highly location-specific. Although not quantified, these costs may be important. This section describes the cost areas and gives an indication of the types of measure available.

## Lakes

D103 At present there is very little information on the status of lakes and hence it is difficult to project the scale of activity that might be required to bring lakes to good status. The measures to reduce diffuse pollution, described above, will contribute to improving the quality of lakes. However, additional measures on point sources may be required.

## Estuaries

D104 There is some classification of the nutrient status of estuaries reported in WRc (1999). However, it is not clear how responsive the water status of estuaries is to improvements upstream and hence it is difficult to anticipate the scale of activity required to improve physico chemical and nutrient status in estuaries. As before, reductions in diffuse pollution will improve the water quality in estuaries.

D105 In many estuaries physical modifications have been undertaken for navigational purposes. Navigational dredging is already licensed and requires assessment of the environmental impact of the activity. Depending on the designation of 'highly modified' water bodies for each estuary and the impact of dredging on water quality, measures to encourage recolonisation might be required. The need for this, and the cost, would vary between estuaries and hence it has not been possible to quantify the overall cost.

D106 63% of dredged material is disposed of either in estuaries, or at less than 1 nautical mile from the territorial baseline. Disposal sites are licensed

and dredged material is monitored for the presence of priority substances, but without further research into the quality of water in estuaries, it is not possible to say whether this activity has an adverse impact on water quality. In the event that disposal of dredged materials does cause deterioration, measures such as the use of sites further off shore, might be required. The costs of this would depend on the availability of alternative sites, and the times and distances to transport dredged materials to these.

### Heavily modified and artificial water bodies

D107 For water bodies that are designated as highly modified or artificial, the objective under the WFD is good ecological potential and good chemical status. The potential for and impact of such designations has not as yet been quantified. Costs at navigational waters may be associated with changed practice needed to comply with the WFD, such as undertaking dredging navigation works on shorter lengths and phase, removing contaminated sediments, more frequent work on aquatic plant management and mitigation measures to minimise the impacts of additional boat traffic.

### Coastal waters

D108 As indicated in the section on monitoring, information on the ecological status of coastal waters is limited. Under the WFD it may be necessary for those undertaking activities in coastal waters, or those discharging from land to coastal waters, to take measures to contribute towards meeting good status. As well as dredging and the disposal of dredged materials this could require measures from those engaged in shellfish farming and fishing . However, the environmental impacts of these activities are already controlled to some extent, and it is not possible to say at present what additional costs of the WFD would impose. Based on current information, there is unlikely to be an impact on aggregates dredging, windfarms and oil and gas exploration, as these take place beyond the 1 nautical mile limit. Most sea outfalls belonging to water companies now treat their discharge to the standard of secondary treatment under the Urban Waste Water Treatment Directive.

### Wetlands

D109 The Directive does not set objectives for wetlands but it does include provisions which will assist the protection of wetlands in relation to compliance with groundwater objectives.

D110 The creation and restoration of wetlands may be implemented as a cost effective supplementary measure under the Directive. Wetlands have the capacity to absorb nitrates and phosphates that might otherwise contribute to eutrophication of water bodies. Where practicable and cost effective such measures would achieve wider environmental benefits than end of pipe solutions.

### Groundwater

D111 Costs relating to groundwater will arise from: the requirement to protect, enhance and restore all groundwater bodies, and to reverse significant and

upward trends of pollutants (articles 4, 11 and 17); the establishment of protected areas (articles 6 and 7) (in particular with respect to protection relating to abstraction for drinking water), and the establishment of monitoring programmes to cover chemical and qualitative status (article 8). These costs will need to be refined, and possibly augmented, by the expected Groundwater 'Daughter' Directive and will therefore need to be considered in a separate RIA for that Directive. For the purposes of this RIA, an estimate has not been attempted for costs which may arise irrespective of the Daughter Directive.

### **Contaminated land**

D112 A substantial amount of water pollution arises from 'historic' contamination in, on or under land, often dating from past industrial activity. Since April 2000, local authorities in England (2001 in Wales) have had a duty to identify 'contaminated land', including cases of water pollution. It is not yet possible to quantify the amount of such land nor the costs of remediation which may be required.

### **Costs to a typical business**

D113 Due to the range of sectors potentially affected by the WFD, it is difficult to specify what a 'typical business' might be. In addition, businesses in different locations of different environmental sensitivity may be required to take different measures, hence the costs to businesses in the same sector will vary considerably. Thus estimating the costs to a typical business is unlikely to provide useful information to businesses that will be affected by the Directive.

D114 From the information presented in the RPA report (2003) it may be possible for farmers to estimate their potential costs from implementation based on whether they currently apply measures in the Codes of Good Agricultural Practice and whether they are in an area of the country that is particularly sensitive to agricultural pollution.

### **Summary of costs**

D115 Implementation of the WFD will give rise to costs from both the RBMP process and from the programmes of measures identified through this process. It is very difficult to estimate the costs and benefits of the programmes of measures on current information as such costs will only be established following the iterative technical and economic work the Directive requires. Hence for the purposes of this RIA the costs and benefits presented are given with a broad range, reflecting the uncertainty over exactly what measures will be required. For a summary of the costs, see tables 10 and 11.

D116 The change in river quality arising from the WFD was assessed using different scenarios for the 'business as usual' baseline level of environmental quality, one where a 'small gap' in environmental quality would need to be bridged to achieve Good Ecological Status, and one where a 'large gap' would need to be bridged:

- Small gap – The baseline from which measures would be required was set by taking the river quality in 1995 and projecting the expected river quality in 2010 based on a 7% improvement in quality per 5 years until the commencement of the programme of measures. Good Ecological Status was assumed to be equivalent to River Ecosystem Class 3 (RE3).
- Large gap – The baseline from which measures would be required was set by taking the river quality in 1995 and projecting the expected river quality in 2010 based on a 3.3% improvement in quality per 5 years until the commencement of the programme of measures. Good Ecological Status was assumed to be equivalent to River Ecosystem Class 2 (RE2).

D117 WRc are currently reviewing the ‘business as usual’ baseline level of environmental quality, in order to provide updated costs in the final RIA.

D118 Not only is there uncertainty over the scale of effort required to achieve good status from the water quality status in 2015, but costs will also depend on assumptions about which measures will be required. At present these assumptions have been made at a macro-level, which would tend to identify higher cost solutions. For example, the macro cost estimation approach will implicitly assume that the measures involve changes to water company discharges or agricultural practices, whereas lower cost measures may actually be available in some areas, such as the construction of a wetland. Furthermore, any assessment of costs at this stage can only deploy unit costs that reflect average values that in practice will vary from site to site, or that might exhibit economies or diseconomies of scale.

D119 It is also necessary to make assumptions about the extent to which different sectors would need to take action and bear the costs of that action. In practice, decisions regarding the allocation of costs between sectors will be informed by cost-effectiveness analysis required to assemble cost-effective programmes of measures as part of the river basin management planning process. Costs provided in this RIA are not the outcome of a cross-sectoral costeffectiveness analysis, nor are they informed by local information that could help to identify the most cost-effective solutions.

D120 There may be a need to reduce emissions of substances other than those listed in Table 5, which are also not part of the ‘Priority List’ of substances. It may not be possible to identify what substances need to be controlled and where until draft river basin management plans are drawn up.

**D121 Costs provided in this RIA should therefore be viewed as indicative of the costs of the potential range of measures in different sectors, rather than relied upon as estimates of the eventual costs.**

D122 Costs of ‘priority list’ and groundwater objectives are examined in separate RIAs.

Costs	Costs £ million per year	
	'Small Gap' scenario	'Large Gap' scenario
<b>Administrative costs</b>		
EA Administration and planning	2 initial one off cost, 8 annual	3 initial one off cost, 10 annual
EA Monitoring and assessment	12 annual	12 annual
Information costs	?	?
<b>Costs of measures</b>		
Point source municipal	145 annualised	537 annualised
Point source industrial	47 annualised	167 annualised
Diffuse urban	?	?
River habitat restoration	143 one-off	668 one-off
Low flow alleviation	0	375 one-off
Lakes, navigational, highly modified and artificial waters, contaminated land	?	?

<sup>12</sup> These cost estimates are based on WRc's 1999 study. As noted above, there is a large degree of uncertainty associated with these figures.

WRc are currently deriving revised estimates which will be provided for the final RIA.

<sup>13</sup> The 42-year period is based on a 12-year planning and implementation period and a 30-year asset life. 6% was the Treasury discount rate at the time WRc did the work for their 1999 report.

<sup>14</sup> The initial RIA presented cost estimates from WRc(1999) including costs of agricultural measures, which took the discounted costs to £1.3 billion ('Small gap' scenario) to £6.2 billion ('Large gap' scenario).

D123 Discounted at 6% over 42 years<sup>13</sup>, this gives a total cost of **£1.3 billion** ('Small gap' scenario) to **£6.2 billion** ('Large gap' scenario)<sup>14</sup>.

D124 Indicative costs of addressing pollution from agricultural sources are summarised in Table 11. It should be noted that these costs are very rough and highly uncertain, and do not include costs for horticulture, beef and other livestock sectors – only arable, sheep and dairy. The analysis does not attempt to anticipate changes in the structure of the agricultural sector that may occur in response to market pressures, CAP reform, etc. Uncertainties were highlighted by formulating scenarios with different assumptions regarding:

- Percentage of farms currently implementing CoGAP.
- Percentage of farms already implementing measures that go beyond CoGAP.
- Area of farming land at risk that required measures to be taken.

**Table 11: Summary of England & Wales recurring and one-off costs from RPA (2003)**

Costs	Costs £ million	
	'Low Cost' scenario	'High Cost' scenario
<b>Costs of measures</b>		
Diffuse agriculture (arable, sheep & dairy)	499 capital (of which 267 for measures that go beyond CoGAP) 37 annual (of which 6 for	1,160 capital (of which 534 for measures that go beyond CoGAP) 108 annual (of which 13

	measures that go beyond CoGAP)	for measures that go beyond CoGAP)
Annualised cost	80 (of which 29 for measures that go beyond CoGAP)	209 (of which 60 for measures that go beyond CoGAP)

D125 Discounted at 3.5% over 15 years, this gives a total cost of **£938 million** for the 'Low cost' scenario (of which £333 million for measures that go beyond CoGAP) and **£2,452 million** for the 'High cost' scenario (of which £688 million for measures that go beyond CoGAP). An alternative estimate from WRc (1999) is £63 to £287 million per year, or £0.6 to £2.9 billion over 42 years discounted at 6%. It is important to note that the RPA and WRc figures are not directly comparable due to differing assumptions about timing and discount rates used.

### **Equity and fairness**

D126 Article 9 of the WFD requires Member States to take into account the principle of the recovery of costs of water services and the polluter pays principle. This gives rise to a degree of fairness in implementation as it requires those who receive water services to make an adequate contribution. In addition, the Directive requires a careful analysis of the human activities that are compromising water quality and the design of measures which tackle them most effectively. For example, this would mitigate against point source measures to be applied where significant environmental pressures came from diffuse sources.

D127 Whilst it should be possible to identify the business sector responsible for pollution, it may be difficult in practice to ensure that individual polluters within that sector are required to pay fairly. This is particularly true of diffuse pollution where the volume of pollution from diffuse sources may be identifiable, but the task of identifying the proportion of pollution arising from each farm or combined sewer overflow may be almost impossible. In this situation application of the WFD would still be 'fair' by imposing the same conditions on each business in the sector operating in the river basin district.

### **Impact on small firms**

D128 It was not practicable to consult 'typical' small businesses on the possible impact of the regulations, since the precise measures that may apply to them were still some years from being decided (see Section 4 on uncertainty for further details). Responses to the first two consultations indicated that some small businesses, particularly in the agriculture sector, had some concerns about the effects of further regulation and would welcome further consultation. This would be most useful when the measures required to meet the objectives of the WFD are being decided on.

D129 The Environment Agency will be consulting with Small Business on the river basin management plans. The transposing regulations require the Environment Agency to consult with representatives of businesses that would

be affected and require the Environment Agency to take into account representations that are received within a specified time. Duties are specified with regards to publishing draft plans. Hence small businesses are given considerable opportunities to contribute to the process at a point in time when there is greater clarity over the requirements that might be placed on them.

D130 In general terms it is possible to anticipate that the following kinds of small business will be affected: those that discharge directly to watercourses, those that discharge to sewers, those that make abstractions from surface or groundwaters, and small agricultural holdings (which may be abstractors and/or sources of diffuse pollution). Estimated costs to farm businesses are presented in Table 11 above.

**D131 As far as small dischargers are concerned the consenting regimes are unlikely to alter significantly from those currently in existence. The stringency of the requirements may however change.**

D132 It is also noted below that discharge treatment may be subject to economies of scale, with the implication that small firms may bear higher average costs for some measures.

## **Competition assessment**

### **Uncertainty over compliance costs and competition effects**

D133 Since the programme of measures to be developed will only be set out in 2009, there is still a high degree of uncertainty about compliance costs and their effects on market structure and competition.

D134 However, it should be noted that through the process of RBMP, the appropriate authority will undertake an economic analysis for each river basin district. These economic analyses will contain enough information to make the relevant calculations necessary for taking into account under article 9 the principle of recovery of the cost of water services, and make judgements about the most cost-effective combination of measures in respect of water uses based on estimates of the potential costs of such measures. These assessments will give an indication of the businesses affected and potential competition impacts. For these reasons, it is not practicable in the present circumstances to apply the competition filter test that is recommended in the Cabinet Office Guidelines, to the implementation of the WFD. Nevertheless, it is possible to identify broadly the markets that are likely to be affected, and the likely effects that the implementation of the WFD could have on their competitive structure.

### **Possible effects**

#### **Relevant markets**

D135 The wide-ranging nature of the WFD implies that in principle any business sector could be affected, depending entirely on local circumstances (ie the physical features of the river basin district and the type and level of impacts of business on the water bodies within it). In Table 12 below, we

distinguish between the main types of water uses, and the sectors that are the main sources of the pollution.

**Table 12: Sources of water pollution**

Type of water use/ Pressure	Examples of sources
Point source discharge	Waste water treatment Other industries: food processing, textiles, chemicals, pulp and paper
Diffuse pollution	Agriculture Run off from roads and urban development
Abstraction	Water services Agriculture
Other uses	Navigation Recreational uses

## Potential effect on competition

### **Point source discharges**

D136 The implementation of the WFD is unlikely to have any significant effect on the competitive structure of the market for water and waste water services. This sector is already monopolistic in nature and thereby tightly regulated by public authorities. The additional costs to waste water companies may be passed through to customers in price reviews.

D137 As for other industrial discharges, the main effects of the WFD are likely to be the requirement to undertake measures to reduce impacts of loads discharged to water bodies. Several comments can be made about the competitive impact of these requirements:

- Costs of compliance may vary geographically, depending on the level and nature of standards set at river basin district level. This may mean that similar firms are faced with different costs depending on their location, which may have a particularly significant effect on firms operating in highly concentrated markets. Due to uncertainty at this stage about the measures which will be required in each river basin district, we do not know the scale of this effect at present.
- Discharge treatment may be subject to economies of scale, with the implication that small firms may bear higher average costs. For example, the first consultation paper indicates that the long run average costs of removing a ton of BOD varies with the volume of flow through a works, and hence obligations for such measures may be more onerous for small firms. As noted above, the Environment Agency will be consulting with Small Business on the RBMPs.
- Depending on how the WFD is implemented, there could be barriers to new entrants if it is not possible for them to obtain discharge consents. Alternatively, additional costs could be borne both by existing firms and by potential new entrants, thus avoiding additional barriers to entry. This, however, is contingent upon existing firms being required to implement changes immediately, rather than having a lengthy period in which to meet new standards.

## Diffuse pollution

D138 Compliance costs to the agriculture industry are likely to vary greatly, depending primarily on the location of farming businesses and the type of crop cultivated.

D139 As a result of the implementation of the WFD, displacement effects may happen, with farmers shifting from high-risk crops to lower-risk crops depending on the additional costs they face in their respective river basin district. This could lead to market concentration in production of high-risk crops, and higher price differentials between high and low risk crops. However, there is little evidence at present that this is likely to be the case.

D140 It is noted that changes in agricultural practice may also affect related markets such as those for fertilisers – e.g. where a reduction in nitrates requires the phasing out of nitrogen fertilisers or changes in pesticide use. These potential effects can be investigated further at the RBMP stage.

## Abstraction

D141 In the UK, water abstraction is regulated through a licensing system supervised by the Environment Agency. Article 4 and Annex 5 of the WFD stress that Member States shall ensure that a balance is maintained between abstraction and recharge of both surface water and groundwater. Subject to specific environmental conditions in different river basin districts, this provision may imply a reduction in volumes allocated through the licensing system, and/or a tightening of the criteria for allocation.

D142 This effect may force water companies to exploit alternative, more expensive, points of abstraction to supply their network with raw water. However, for the same reasons as mentioned for point source discharges, this is unlikely to alter the competitive structure of the industry, provided that the regulator takes this additional cost into account in price reviews.

D143 By contrast, farming businesses do not always have the option of switching to alternative sources of supply, or passing the cost through to customers. Potential restrictions on licensing may therefore affect certain farms adversely, depending on their location and the composition of their output. Potential consequences include displacement to crops that are less water-intensive, or closure.

## Other uses

D144 Improvements in the ecological status of bodies of surface water may positively impact businesses that exploit these bodies of water for recreational uses (eg sailing/yachting clubs). The allocation of benefits would depend on geographically specific criteria.

D145 Responses to the second consultation indicated that businesses supplying environmental protection technology are also likely to benefit from the implementation of the WFD.

D146 Certain provisions of the WFD (especially relating to river habitat improvement and preservation of the riverbed) may indirectly limit navigation on certain water courses. Businesses in this sector may then be affected, depending on their location.

## **Enforcement and sanctions**

### **Regulations facilitating implementation**

D147 The regulations pertaining to the implementation process are effectively monitored and enforced by the Commission. These regulations follow the requirements of the WFD and the Government is required to send summary reports and copies of RBMPs and updates to the Commission (article 15). If the Commission takes the view that the Government is in breach of its obligation under the Directive, it can begin infractions proceedings, which if successful, can ultimately lead to fines being imposed by the European Court.

### **Regulations on measures required to meet good status**

D148 Most of the regulations that would be used to implement the programme of measures already exist in the UK. The Acts described in section 2.2 provide their enforcing authority with powers to penalise businesses and individuals for non-compliance.

D149 New regulations to place controls on diffuse pollution will treat non-compliance with measures or licensing requirements as an offence.

## **Monitoring and review**

### **Monitoring**

D150 Monitoring is a major part of the implementation of the Directive. The regulations set down the duties on the Environment Agency to establish programmes of monitoring for surface and groundwaters and protected areas. These programmes are to establish a coherent and comprehensive overview of water status within each river basin district.

### **Review**

D151 Comprehensive review of implementation is included in the regulations in line with the requirements of the WFD. The purpose of this review is to assess whether the objectives for water bodies are being achieved and will continue to be achieved into the future, and to review programmes of measures if this is not the case. As part of the review, the public information and consultation provisions of the Directive will apply. This will provide a feedback opportunity to stakeholders. Table 13 describes the review areas and frequencies required by the regulations.

**Table 13: Review requirements in regulations**

Area for review	Frequency (at the latest)
Analysis of characteristics of each river basin district and review of the impact of human activity on the status of surface and groundwater.	6 years (first review 2013)

Economic analysis of water use to make calculations necessary for cost recovery and inform programme of measures.	6 years (first review 2013)
Programme of measures to achieve objectives.	6 years (first review 2015)
River basin management plan.	6 years following approval date or earlier as appropriate authority may direct.
Classification of heavily modified or artificial water bodies.	6 years
Summary of effects and measures to be taken against temporary deteriorations in status of water bodies.	Next update of RBMP
Reasons for modifications of good status objective relating to new sustainable human development activities.	6 years

## Consultation

D152 Within the development of regulations to meet the requirements of the WFD and implementation of the WFD there are many layers of consultation:

- Consultation on the approach to implementing the WFD.
- Consultation on river basin management plans and summary programmes of measures.
- Consultation on the Regulatory Impact Assessment.

These are discussed in turn.

### Consultation on the approach to implementation

D153 Specific stakeholders and the public in general are being actively consulted on the process of implementation.

### Specific stakeholders

D154 Defra set up a forum in June 2001 for key stakeholders to discuss issues relating to the WFD and water policy in general in England. Its membership covers a wide range of interests, including the environment, the water industry, agriculture, the countryside, and industry. The group agreed that it would have three main purposes:

- Provide input to Defra thinking on transposition of the WFD.
- Raise issues of concern to the group relating to implementation of the Directive.
- Provide input into development of a long-term strategy for water.

D155 The organisations currently represented on the Forum are:

- Association of Electricity Producers
- British Water
- Chartered Institution of Water and Environmental Management (CIWEM)
- Confederation of British Industry (CBI)
- Confederation for British Wool and Textiles
- Chemical Industries Association (CIA)
- Country Land & Business Association
- Crop Protection Association

- Defra
- Environment Agency
- Energy Industries Council
- Energy information Centre
- English Nature
- Kaolin & Ball Clay Association
- Local Government Association
- Marine Conservation Society
- National Farmers Union
- Non-Ferrous Alliance
- Pipeline & Plant Construction Group – Environmental Forum
- Royal Society for the Protection of Birds
- Surface Engineering Association
- Surfers Against Sewage
- UK Centre for Economic and Environmental Development (UKCEED)
- UK Major Ports Group Ltd
- UK Steel Association
- Water UK
- WaterVoice
- World Wildlife Fund

## **Appendix D**

### **Public consultation**

D155 The Government has published two consultation documents which set out what the Directive is and how the Government intends to meet the requirements. This RIA will accompany the third consultation document published by Defra and the Welsh Assembly.

D156 **The first** was published in March 2001. It introduced the Directive, published a first estimate of costs and benefits and proposed the administrative arrangements – namely the river basin district structure and role of the Environment Agency as sole competent authority.

D157 **The second** was published in October 2002 and set out how the Directive would be turned into national legislation – mainly through a combination of secondary legislation, existing legislation and some primary legislation.

D158 **The third** consultation paper contains proposed draft transposing regulations, a summary of responses to the second consultation paper with the Government's response, and this revised RIA.

### **Consultation on river basin management plans**

D159 The regulations for implementing the Directive give detailed requirements on the consultation process for developing river basin management plans. These flow directly from the Directive. The RBPM consultation should include a series of options of possible programmes of

measures which could lead to the achievement of good status. In summary, the Environment Agency is required to:

- Publish a statement of the consultation and planning process with details of the timetable in a way that brings it to the attention of people that are likely to be affected.
- Encourage specified stakeholders to participate in the preparation of the plan.
- Make summary or draft plans available and indicate that any person may make representations to the Environment Agency, which it must take into account, within six months of the date of publishing.

### **Consultation on the RIA**

D160 Due to the complexity of the WFD, in order to ensure that this RIA captures all the major impacts on all sectors it is also being consulted upon. This version of the RIA is the outcome of discussions with the Environment Agency, Government departments and agencies and major stakeholders. **Further comment on this version of the RIA is invited as part of the consultation on the draft regulations.** The RIA will then be finalised later this year for publication with the final regulations. In particular, answers to the following consultation questions are welcomed:

Q: Do you agree that this partial revised RIA represents the costs and benefits of the Water Framework Directive – as far as they can be assessed at this stage? If not, please specify which impacts, costs or benefits have not been taken account of and why you hold this view. It would be helpful if you could provide information in particular on which industries, sectors or regional areas you believe need to be taken account of.

- **Business sectors affected**

Q: Do you agree that these are the sectors that will be affected? Are there any other types of business that will be directly affected?

- **Benefits**

Q: Do the assumptions underpinning the scenarios for the environmental baseline seem reasonable?

Q: Do you agree with the range of potential benefits identified?

- **Costs**

Q: Do you agree with the range of potential administration, planning, and monitoring costs identified? Are there any other administrative or information costs that should be included?

Q: Do you agree with the range of measures identified as potentially required to achieve Good Ecological Status? Are there any other potential measures that should be included?

Q: Do you have any information relating to the potential impact on your business or sector?

Q: Do the assumptions for the scenarios used to provide indicative costs of agricultural measures seem reasonable?

- **Competition assessment – Possible effects**

Q: Do you agree with the range of possible effects identified? Are there any other possible effects that should be included?

## **Summary**

D161 This is a significant proposal which will impact on industry, particularly on the water industry and farm businesses. It is important to note that the WFD concerns a long term planning process for river basin districts in order to meet objectives for water quality. It is very difficult at this stage to estimate the costs and benefits associated with the Directive. This information will become available through implementation of the information collection and analysis requirements of the Directive, mainly the detailed information on water status that will be obtained through the monitoring requirements of the Directive (which will provide an estimate of the environmental baseline), and the economic analysis which will determine the most cost-effective measures to meet the objectives. For this reason, it has not been possible to provide a ratio of the total costs and benefits of the WFD. However, the figures below give an indication some of the potential impacts on the main sectors affected.

D162 At this stage, improved river quality may provide estimated benefits of between £105 million and £522 million per year, as well as one off amenity benefits of between £1,410 million and £3,508 million. The value of recreational benefits at estuaries (e.g. boating, canoeing and angling) is estimated at £1.5 million a year. Benefits omitted from this estimation include values associated with improved water quality at lakes, wetlands, and in coastal waters, and non-recreational benefits at estuaries.

D163 Annualised costs of mitigating point source pollution to water, may be £192 million to £704 million per year. These figures are likely to be upper estimates as they do not take account of synergies between measures to remove different substances, and because mitigation of point source pollution may not necessarily be the cheapest way to reach Good Ecological Status. Costs in the agricultural sector are highly uncertain, in part because it is not clear to what extent application of the Codes of Good Agricultural Practice (CoGAP) would be sufficient to address agricultural sources of pollution and to what extent those Codes are currently applied. Annualised costs, including costs of CoGAP measures and measures that go beyond CoGAP, could be £80 million to £209 million per year, over 15 years (of which £29 million to £59 million are costs of measures that go beyond CoGAP). There may also be costs of addressing other forms of diffuse pollution (e.g. run-off from roads). It has not been possible to quantify these at this stage. River habitat restoration is estimated at having one off costs of £143 million to £668 million.

D164 It is important to note that there is a provision in the directive for avoiding disproportionate costs. If achieving good status in a particular water body in the timescale laid down in the Directive would impose 'disproportionate costs' a time or status derogation may be used. However, the use of derogations will not be known until river basin management plans are developed.