PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL TO REVISE DIRECTIVE 76/160/EEC CONCERNING THE QUALITY OF BATHING WATER
PARTIAL REGULATORY IMPACT ASSESSMENT

1. Title

This Regulatory Impact Assessment (RIA) considers the potential impact of the proposal (COM(2002) 581 final) for a Directive of the European Parliament and of the Council to revise Directive 76/160/EEC concerning the quality of bathing water (hereafter referred to as "the revised Directive"), which the Commission agreed and published on the 24th October 2002.

2. Purpose and intended effect of measure

(i) Objective

The revised Directive updates the existing Bathing Water Directive in order to further protect public health in the EU, by limiting faecal contamination of popular bathing places.

It aims to review and streamline the parameters for setting water quality standards, focussing on fewer microbiological indicators and setting stricter standards. Better information will be also provided to the public, making use of locally and regionally available facilities and the Internet.

The revised Directive aims to be coherent with other EU water related legislation, in particular the Water Framework Directive.

(ii) Background

The 1976 Bathing Water Directive requires Member States to meet quality standards at waters within its scope. The purpose of the quality standards is to reduce the risks of less serious illnesses, such as gastroenteritis and ear and respiratory tract infections arising from accidental ingestion of contaminated water or its contact with the body. These illnesses are caused by organisms, mainly enteric viruses, shed in human and animal faecal matter and therefore present in sewage and agricultural runoff. The concentrations of illness causing organisms in bathing water cannot be measured reliably as a matter of routine. Therefore bacteria, naturally present in the human gut, are used as indicators of faecal contamination.

The 1976 Directive is widely regarded as in need of simplification and updating to take into account experience with its implementation and developments in science and in EC water legislation such as the Urban Wastewater Treatment and Water Framework Directives.

Around 550 designated bathing waters have been identified in the UK, all but 11 in coastal areas. By virtue of the definition of a bathing water the existing Directive does not extend to all locations where bathing takes place. The scope also excludes

locations used for non-bathing water recreation. The definition in the proposal is modified only slightly, to include places where bathing is actively promoted, but no significant change in scope is envisaged. This RIA assumes no significant changes to the existing 550 UK bathing waters.

(iii) Risk Assessment

The current Directive and the proposed revision seek to reduce the risks of minor illnesses, such as gastroenteritis and ear and respiratory tract infections arising from accidental ingestion of contaminated water or its contact with skin. The science underpinning the assessment of health risks is complex and uncertain (see Annex A) but for the purposes of this RIA the Government has adopted the dose/response relationships and methodology developed by the World Health Organisation (WHO) for its draft Guidelines for Recreational Water Quality.

Using the WHO methodology and monitoring results, the risk of gastroenteritis from bathing at beaches in the UK, during the 2001 bathing season was estimated at 4.3% per swim[1]. From information on bather numbers (80 million swims per year) work for Defra[2] suggests that 1.3 million cases of gastroenteritis each year could be associated with bathing in England and Wales. However, UK public health surveillance systems and a detailed study of infectious intestinal disease [IID][3] in England do not detect bathing-related illness and public health professionals regard the issue to be a low public health priority. A possible explanation is that bathing-related illness is mild and short-lived, and causes only minor inconvenience and so goes largely unreported. Estimates for the risks of other mild illnesses such as ear and respiratory tract infections have not been made.

The risk of serious disease from bathing in UK waters is negligible and this is confirmed by the absence of reported cases for many years.

A substantial proportion of the UK population bathes outside the UK on holidays and would benefit from cleaner bathing water. Indeed most UK bathers' exposure may be outside the UK and the reduction in their illnesses may be the main benefit of the revised Directive. However, it is not possible to quantify the potential reduction in illnesses, in the same way as has been done for bathing in the UK above, without information on bathing habits and water quality at holiday destinations.

(iv) Business sectors affected

The proposed revised Directive will affect agriculture, the water industry and tourism.

Achieving the specified water quality standards will require action to limit the discharge of effluents containing faecal indicators by the sewerage undertakers and owners of private sewage treatment works and septic tanks. Action by farmers to reduce the spread of faecal indicators from animal waste will also be required. Most

[1] Eftec (2002) Valuation of Benefits to England and Wales of a Revised Bathing Water Quality Directive and Other Beach Characteristics Using the Choice Experiment Methodology.
[2] Eftec(2002) Valuation of Benefits to England and Wales of a Revised Bathing Water Quality Directive and Other Beach Characteristics Using the Choice Experiment Methodology.
[3] FSA (2001) Report of the Study of Infectious Intestinal Disease in England.

farms can be classified as small or medium enterprises, and measures developed to implement a revised Directive would need to take this into account.

Businesses potentially benefiting from a revised Directive are those in the tourism sector servicing the needs of bathers. These benefits will only arise if beaches are compliant with the required standards of the existing or revised Directive, and satisfy the criteria for associated schemes such as international Blue Flag or UK Seaside Awards.

The Commission asserts that improving bathing water quality will lead to a reduction in "human health treatment costs" (para 6.2 of EM). Information from the epidemiological studies on which the WHO methodology would suggest that this is not the case as illnesses caused no increase in visits to doctors, hospitals or days off work.

(v) Issues of equity and fairness

The measures necessary to limit faecal pollution of bathing waters will vary from place to place. Faecal indicators are transported by water and the effect of a source on the quality of a bathing water will depend mainly on its size and distance taking into account dispersion, mixing and decay of the indicator organisms during the water transport process. Tertiary treatment, for example UV disinfection, is normally required for sewage discharges close to bathing waters while secondary treatment (the normal standard in the UK) may suffice elsewhere.

Similarly, it may be necessary for livestock farmers close to rivers flowing into bathing waters to modify their farm management practices to a greater degree than a more remote livestock farmer or an arable farmer. Diffuse pollution from agriculture is already recognised as affecting compliance with the existing bathing water standards in some places. The more stringent bathing water standards proposed for the revised Directive will require modification of farm management practices over wider areas. It is difficult to quantify the increase reliably given the complexities of the transport processes but estimates were undertaken as part of the cost study REF 4.

3. Options

Option 1: Business as usual

The first option is to do nothing, that is the existing Bathing Water Directive remains in force. This would involve some further investment in bathing water quality for two reasons. First, because although UK compliance with the mandatory standards is considerably improved (98% in 2002) and the risk of infraction action significantly reduced, there remains a minority of bathing waters where there is a high risk of non-compliance. Further action to improve sewerage infrastructure and to address diffuse agricultural pollution would be required to improve UK compliance with both the mandatory standards and the more stringent, but discretionary, guideline standards. Secondly, because compliance with the guideline standards is increasingly recognised as being desirable and this is a requirement for the international Blue Flag award of excellence, Government policy has been to raise compliance with the guideline

standards. It is worth noting that UK guideline compliance is well below the European average.

Option 2a: Adopting a Revised Bathing Water Directive as currently proposed by the Commission

Option 2a entails both the tightening of water quality standards to "good" quality and the provision of more information on water quality to the public.

Tighter quality standards

Compliance with the proposed terms of the revised Directive will require additional measures to improve bathing water quality. The proposed "good quality" bathing water standard (200 intestinal enterococci per 100ml and 500 E.Coli per 100ml at 95 percentile compliance) is more stringent and roughly equal to the "guideline" standard in the existing Directive. In 2002 (Blue Flag) guideline standards were achieved at 68% of coastal bathing waters in the UK. On estimates based of year 2002 data, 28% of bathing waters in the UK would fail the proposed 'good' standard compared with only 2% under the existing Directive. Improvements in hand might reduce the failure rate to 27% by the time the revised Directive is in force.

As it would be a legal obligation compliance with the good quality standards would require greater infrastructure improvements than Option 1. Article 13 of the proposal states that Member States will be given up to three years to comply with the good quality standards but high costs and the difficulties of tracing sources are likely to be a greater problem for securing compliance than any time constraints.

Provision of public information

The proposal also contains new obligations to improve the provision of public information, including bathing water quality data and an assessment of risks and impacts. Member States will be required to use various media including the Internet to provide further information on "water sports activities" and a history of incidents requiring preventative action. Much of this is in line with the practice, which has developed over the last decade in the UK where many local authorities participate in a voluntary scheme to post quality monitoring results at prominent positions at beaches and the environmental agencies place results on web sites. Provision of information is a requirement for the UK Seaside Award scheme and the international Blue Flag scheme, both administered in the UK by ENCAMS. The novel feature in the proposed revised Directive is a requirement to provide an assessment of risks and impacts and information on incidents requiring preventative action. Details are not specified but this could be very technical information and not readily understood by the general public. The proposal requires the use of advisory notices to prevent exposure but use is limited to 3 years. After 3 years, the good standards must be achieved.

Option 2b: Achieving the proposed 'excellent' water quality standards

Option 2b is to meet the 'excellent' standards recommended by the proposal. This means 100 Intestinal Enterococci per 100ml and 250 E.Coli per 100ml at 95%ile compliance. Estimates based on 2002 data indicate that around 54% of UK bathing waters would meet the excellent standard.

Option 3: Tighter quality standards and a management approach

Option 3 is provided as an illustration of the potential merits of a different approach to revising the Bathing Water Directive. It is a general concept, and the detailed requirements necessary to make it part of EU legislation require further consideration. However, it is possible to make a provisional assessment of the costs and benefits.

The costs of ensuring that some bathing waters are always below a certain standard of faecal contamination may be very high. An alternative to enforcing mandatory standards across the board would be to adopt a management approach. This would involve providing a degree of flexibility around an obligation to achieve the specified water quality standard.

Option 3 therefore is to accept the same mandatory standards as in Option 2, but to allow 'discounting'. That is, if the beach manager can demonstrate (i) prior knowledge of potential faecal contamination incidents, and (ii) that reasonable steps have been taken to restrict the occurrence of such incidents, rather than incur disproportionate prevention costs, the manager can provide advisory notices to inform the public with the aim of discouraging bathing during such incidents. Any failing samples taken during the period would be discounted and not used in the compliance calculation.

Very costly investment to contain particular events (usually related to rainfall) either from point or diffuse sources may thus be averted whilst allowing the desired level of health protection. For example, rather than investing heavily in measures to reduce runoff from livestock farms after heavy rainfall, advice not to bathe after rainstorms can be provided. Advice of this kind is commonly provided in N America and in some places within the EU. Similarly, a management approach could be designed to deal with the situation where faecal inputs from wildlife temporarily reduce water quality.

Potential problems with this approach include the accountability of such a system and the ability to consistently predict the contamination events that would be required to implement the beach management actions. The bathing population may also only accept a limited number of events.

Estimation of Costs and Benefits

Where the costs and benefits for the various options are estimated over 25 years discount rate of 3.5% is used.[4]

The benefits given below only estimate the willingness to pay for the reduction in one specific health risk, gastroenteritis. The addition of willingness to pay for the reduction in other health risks, or for environmental benefits may increase the estimated benefits.

In addition, a number of assumptions were made when estimating the risk of gastroenteritis from swimming. Firstly, it was assumed that the WHO draft Guidelines represent the true risk of bathing-related illness. A number of broad assumptions about bathers' behaviour were also made and any immunity effect from repeated exposure was ignored.

There are a number of reasons why the cost estimates must be treated with caution. Firstly, in the absence of reliable data, the results of one study in Ayrshire in Scotland were used in the Cascade study to estimate costs to agriculture of the revised Directive. However, the study notes that these costings are based on unsupported assumptions and do not incorporate sound economic analysis to establish least cost solutions. In addition, the Ayrshire catchment is likely to have more acute problems than many in England and Wales, given that there have been recognised faecal contamination events at the coastal bathing water sites. Extrapolation of the data from this site where there are a high number of rainfall events is more likely to overestimate the actual costs for agricultural diffuse pollution abatement. Thus the estimates for agricultural costs, which form the bulk of the cost estimates under Option 2 and 3 are likely to be overestimates and should be treated with extreme caution.

Secondly, given improvements in water quality required by other EU legislation such as the Water Framework Directive, the Urban Wastewater Directive and the Nitrates Directive, the extra improvements required by the revised Bathing Water Directive are not clear. The marginal cost of making the improvements necessary to meet the requirements of the new Bathing Water Directive may actually be lower than if each Directive is considered separately.

It should also be noted that while the proposed revised Directive measures water quality using 2 microbiological parameters (Intestinal Enterococci (IE) and Escherischia) the Cascade study bases its costings only on levels of IE. The risk of contracting gastroenteritis used in the Eftec benefit study is also only based on levels of IE.

The calculation of benefits and costs in section 5, have been based on bathing waters in England and Wales because the costs and benefits studies considered only these bathing waters. Proportionate adjustments could be made to the benefits and costs figures to cover the UK but the overall conclusions would not be affected.

[4] See Annex B for a summary table of costs and benefits over 25 years using a discount rate of 6%.

4. Benefits

Option 1: Business as usual

Maintaining the existing mandatory standards entails accepting current levels of risk of minor illness, due to faecal pollution of bathing water. Using the WHO methodology, it is estimated that the risk of gastroenteritis from bathing at beaches in the 2001 season was 4.3% per swim.

Option 2a: Adopting a Revised Bathing Water Directive as currently proposed by the Commission

The benefits of the revised Bathing Water Directive, as currently envisaged, include a reduction in health risk and possible environmental benefits.

It is claimed by the Commission that tighter bathing water quality standards will contribute to improved health protection of bathers, and thus reduced costs to the individual and the economy. Epidemiological studies show that bathing-related illness is generally mild and does not cause increased visits to doctors, hospitals or days off work.

Assuming all English and Welsh bathing waters are compliant with the proposed standards in the revised Directive, it is estimated that the risk of gastroenteritis from bathing would be fall from 4.3% to 2% per swim. A study for Defra[5][6] estimated people's willingness to pay to reduce the risk of gastroenteritis to the level afforded by the expected new standard. According to this study, full compliance with the expected bathing water quality standards of the revised Directive would bring between £1 and 1.8 billion of benefits over 25 years to England and Wales.

Under Option 2a, advisory notes will only be provided for those bathing waters that fail to meet the proposed mandatory standards, and this information will only be provided over a three-year period. After this period, bathing waters should either reach the 'good' standards or be regarded as non-compliant. Approximately 27% of bathing waters in England and Wales are expected to fail to meet the proposed 'good' standards in 2005[7]. Dividing total willingness to pay for an advisory note system in England and Wales, by the proportion of beaches for which the advisory note system will be provided, gives a very rough estimate of the benefits of increased information under Option 2a[8]. The net present value of providing advisory notes for 27% of bathing waters for three years is estimated to be £103 million.

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[5] [5]Eftec(2002) Valuation of Benefits to England and Wales of a Revised Bathing Water Quality Directive and Other Beach Characteristics Using the Choice Experiment Methodology.

[6] This study assumes that benefits accrue from the *end* of year one, although there may be a slight delay in the case of risk reduction benefits.

[7] Cascade (2002) Costing of the Revision to the Bathing Water Directive.

[8] This is only a rough estimate as respondents to the willingness to pay study were not asked about their willingness to pay for an advisory note system on a per bathing water basis, or only for bathing waters which were failing to meet standards, rather they were asked for their willingness to pay for an advisory note system for all bathing waters in England and Wales.

As noted above, there may also be other benefits that we have not been able to quantify or value, such as the benefits of avoidance of other illnesses. There would also be ecological benefits because measures to reduce faecal pollution from agriculture could also reduce nutrient and BOD loadings of runoff. The extent to which non-use benefits would increase the benefits figure is difficult to estimate since there is not always a link between microbiological and aesthetic quality of water. There may be some local economic impacts such as tourism benefits, if compliance is achieved. However, these are likely to be displaced from other areas.

Option 2b: Achieving the proposed 'excellent' water quality standards

At this time, we are not certain what 'excellent' standards mean in terms of reduction in risk of stomach upset from bathing, but based on the information in the Commission's explanatory memorandum, it may entail a risk reduction of between 3-4% per swim over the current mandatory standards. This would imply benefits of between £1.3 and 3.2 billion over 25 years in England and Wales in terms of willingness to pay for a reduction in the risk of contracting gastroenteritis. The other unquantified benefits such as avoidance of other illnesses and environmental benefits are likely to be greater than under Option 2a. The net present value of increased information provision under Option 2b would be in the region of £333 million if all beaches that did not meet the excellent standards were provided with an advisory note system for 3 years.

Option 3: Tighter quality standards and a management approach

The flexibility of the management approach may allow the public health to be protected more than in Option 1 and at least to the same level as Option 2a if advisory notices are provided for all events when water quality is likely to be jeopardised.

The benefits from increased information provision are likely to be very high. Based on the Defra willingness to pay study[9], it is estimated that an advisory notice system to advise against swimming on days when the water quality is worse than the average would bring minimum benefits of £2.2 billion over 25 years to the population of England and Wales.

5. Costs for Business, Charities, and Voluntary Organisations.

Policy and Implementation Costs

Implementation costs arise from inspection and monitoring arrangements, from familiarisation and from adjustments made to facilitate compliance. In this RIA, monitoring and beach management costs, prescribed by the revised Directive have been classified as implementation costs. These costs would accrue to the Environment Agency and Local Authorities. Policy costs are those costs that arise from prescribed changes to achieve policy goals, such as pollution abatement costs to agriculture and the water industry.

[9] Eftec (2002) Valuation of Benefits to England and Wales of a Revised Bathing Water Quality Directive and Other Beach Characteristics Using the Choice Experiment Methodology.

Option 1: Business as Usual

Implementation costs

Implementation costs would be unlikely to change.

Policy costs

To achieve full compliance with current mandatory standards would require some further investment in measures to reduce pollution of bathing water. Estimated costs for reaching a faecal streptococci level roughly equivalent to the current mandatory standards are presented below.[10] Costs to achieve the current guideline standards are not considered here.

Costs to the Water Industry in England and Wales

	Upper	Central	Lower
Capital costs (£ million)	3	2	1
Annual recurring costs (£ million/year)	0	0	0
NPV of recurring costs (£ million)	0	0	0
Total NPV (£ million, over 25 years)	3	2	1

Costs to Agriculture in England and Wales

	Upper	Central	Lower
Capital costs (£ million)	<1	<1	<1
Annual recurring costs (£ million/year)	<1	<1	<1
NPV of recurring costs (£ million)	10	9	7
Total NPV (£ million, over 25 years)	11	9	7

Option 2a: Adopting a Revised Bathing Water Directive as currently proposed by the Commission

Implementation Costs

The Commission argues that proposed revision of the Directive will increase monitoring and management costs in the short term, but in the longer term will lead to a small reduction in the monitoring costs as polluted bathing sites are cleaned and monitoring frequency reduced.

The costs to the Environment Agency in England and Wales of management measures requiring officers to monitor bathing waters and react to incidents is estimated at £0.7 million per year. An upper estimate of £2.4 million per year has been given for the costs to local authorities in England and Wales of the beach management and public information provisions of the revised Bathing Water Directive. These figures are based on the assumption that 14 new Environment Agency officers would be required

[10] Cascade 2002, Costing of the Revision to the Bathing Water Directive, Phase 3 Studies, Final Report. The costs in this report are assumed to accrue from the *beginning* of year one.

to police bathing waters and that one local authority staff member would need to be allocated per 5 bathing waters to look after provision of information. However, these estimates are made without knowledge of the details of the actual management regime that may be required by the proposed revised Directive, and so must be treated with caution. The net present value of monitoring costs over 25 years has an upper estimate of £53 million.

Policy costs

Viewing the Bathing Water Directive in isolation, the costs of achieving the proposed minimum revised bathing water quality standard are estimated to be between £3.1 and 4.8 billion over 25 years for England and Wales.

The businesses affected would be those engaged in the sewage treatment sector, including the regional UK water companies. Agriculture would also be affected.

Water Companies

The cost to all of the water industry in England and Wales is estimated to be between £80 and 131 million over 25 years. There will be capital costs to the water industry of between £49 and 93 million, and annual recurring costs of £1.8 to 2.2 million. The spread of costs across water companies is not expected to be equal, with a range of costs from between £2 to 3 million and between £26 to 47 million over 25 years, depending on the water company concerned. Costs will be passed on to water consumers, thus a regional imbalance of costs is expected. The table below gives the breakdown of costs to the water industry.

Table: Policy costs to the water industry in England and Wales

	Upper	**Central**	**Lower**
Capital costs (£ million)	93	73	49
Annual recurring costs (£ million/year)	2	2	2
NPV of recurring costs (£ million)	38	34	31
Total NPV (£ million, over 25 years)	131	107	80

A total of 17% of all bathing waters in England and Wales have £600 million of planned improvements under AMP3 (Asset Management Plan) from 2000 to 2005 which will improve compliance with the proposed minimum standard. Some of these bathing waters already achieve intermittent compliance with the proposed minimum revised bathing water quality standard, but require further investment in infrastructure to improve reliability of compliance.

Agriculture

The cost of the Bathing Water Directive to all agriculture is estimated to be between £3.3 and 4.7 billion over 25 years in England and Wales. The spread of costs per farm will depend amongst other things on land area, soil type, land gradient and any pre-existing farm management practices.

Table: Policy costs to agriculture in England and Wales

	Upper	Central	Lower
Capital costs (£ million)	280	210	160
Annual recurring costs (£ million/year)	260	230	160
NPV of recurring costs (£ million)	4397	3889	2869
Total NPV (£ million, over 25 years)	4674	4096	3030

Analysis of the bathing water improvement measures identified in the Cascade report shows that about 12% of all bathing waters would fail the proposed good standards primarily due to agricultural diffuse pollution. Diffuse pollution abatement measures, required to achieve tighter standards at these bathing waters, are estimated to cost around £4.1 billion over 25 years in England and Wales. There is some uncertainty about the measures and costs required to address these cases of non-compliance.

Option 2b: Achieving the proposed 'excellent' water quality standards

Implementation Costs

It is assumed the monitoring and management costs to the Environment Agency and Local Authorities would be the same as under Option 2a. The net present value of this over 25 years would be £53million. This is a very rough estimate and should be treated with caution.

Policy Costs

A very rough estimate of the costs for achieving excellent standards can be taken from the work in the Cascade study. From a line of best fit between the estimates for capital and recurring costs at IE levels of 500, 200 and 40, the NPV of the cost to achieving the 'excellent' standard of 100IE was estimated at between 4.9 and 7.8 billion over 25 years. This does not include costs for upgrading some CSO systems, which would be necessary and is thus likely to be an underestimate of the costs to the water industry. However, costs to agriculture make up the bulk of these figures, and as noted above these are likely to be an overestimate.

Option 3: Tighter quality standards and a management approach

Implementation costs

As the details of the management measures required to implement an advisory note system are not currently defined, the implementation costs of Option 3 are not known. However, given the extra information requirements and the more pro-active approach they are likely to be greater than the implementation costs for Options 1 and 2. For the purposes of the RIA, we have made the assumption that annual monitoring and management costs would be double that of under the Option 2. This would entail a net present value of £106 million over 25 years.

Policy costs

The key area of cost in meeting the proposed new mandatory standards identified by the Cascade study is abating agricultural diffuse pollution. If a discounting system is

employed it may not be necessary to undertake such wide ranging agricultural diffuse pollution abatement measures. Where rainfall run-off events leading to faecal contamination of the bathing waters occurs relatively infrequently it may be possible to argue that discounting during these events is acceptable.

As a very rough approximation, the scale of cost saving was estimated by Cascade, using compliance rates and data from Defra. They estimated that approximately 20% of the costs would be saved with one discounted event (Option 3a) and 50% with 3 discounted events (Option 3b), as compared with the costs associated with Option 2. Thus, with 1 discounted incident the total NPV of the costs would be between 2.4 and 3.7 billion and the total NPV of the costs with 3 discounted incidents would be 1.5 and 2.3 billion.[11] Although these costs are a rough estimate, they do give some feel to the very significant cost saving that could be afforded, whilst maintaining public health protection.

6. Consultation with small business

The National Farmers' Union and the Country, Land and Business Association have been involved in consultations, and have been made aware of the potential costs to farmers from the revised Bathing Water Directive.

7. Competition assessment

We have no evidence that the proposed revised Directive would have a significant effect on competition. However as noted above, the costs of tighter water quality standards will not be borne equally across agriculture and across the water industry, and this may have some effect on competitiveness.

8. Enforcement and sanctions

Member States will be under an absolute obligation to meet standards set by the revised Bathing Water Directive. Incomplete compliance with the Directive could risk infraction action by the Commission in the European Court of Justice (ECJ), and/or adverse public reaction. Action has been taken by the ECJ against the UK and other Member States under the existing Directive, but the risk of action will be greater given the difficulties of achieving the tighter standards under the revised Bathing Water Directive. If this risk were judged to be too high then discouraging bathing and subsequent de-identification of bathing waters may be judged to be necessary, with the potential for local political difficulties.

It is currently anticipated that:

- The Environmental Regulators will use their discharge consent powers etc to achieve standards.
- The Environmental Regulators will monitor water quality

[11] Discounting would imply cost savings to the water industry as well as to agriculture. The cost saving to the water industry would be in terms of the avoided capital cost to upgrade some CSOs to one spill per bathing season. However, no data were available to assess the costs to improve CSOs to 1 spill per bathing season, and were therefore not included in the costings. We also do not know what proportion of CSOs would need to be upgraded. Therefore the savings was only estimated in terms of the savings in agriculture.

- LAs and HAs would be involved in any beach management and provision of health advice to the public.

9. Monitoring and review

It will not be possible to assess the effectiveness of the revised Directive in reducing illness other than be very comprehensive and expensive epidemiological studies before and after implementation and even this may not produce clear results given all the uncertainties of such studies.

10. Consultation

i) Within Government

Defra has established a working group to consider the proposal comprising representatives from DH, DCMS, HMT, FCO and the administrations in Scotland, Wales and Northern Ireland including the principle regulators.

ii) Public Consultation

A consultation was held in February 2001 on the Commission's December 2000 Communication. The fourteen following stakeholders attended:

- OFWAT
- Water UK
- South West Water
- Anglian Water
- North West Water
- Yorkshire Water
- Southern Water
- Surfers Against Sewage
- Public Health Laboratory Service
- English Tourism Council
- National Farmers' Union
- Environment Agency
- Scottish Environment Protection Agency
- Tidy Britain Group (now ENCAMS)
- Marine Conservation Society

Following the consultation, written responses were received from the thirteen following organisations:

- OFWAT
- South West Water
- Anglian Water
- Southern Water
- North West Water
- Surfers Against Sewage
- Environment Agency
- Scottish Environment Protection Agency
- Marine Conservation Society
- British Resorts Association
- North Sea Action Group
- European Environmental Bureau
- EUREAU

Consultation with interested stakeholders has been ongoing and further written comments have been received from the following:

- British Resorts Association
- New Forest District Council
- Duchy of Cornwall

- Chartered Institute of Environmental Health

Further consultation with stakeholders on the proposal will take place in December 2002.

11. Summary and recommendation

As noted in the text there are uncertainties associated with all the estimates of benefits and costs in this analysis and, in particular, the costs of abating diffuse agricultural pollution are probably overestimates. However a number of conclusions can be drawn with a high degree of confidence. They are:

- The costs of Option 1 (business as usual) are small if the aim is to meet the minimum mandatory obligations of the current Bathing Water Directive.
- The current Directive permits choices about the level and location of investment to meet the guideline standards enabling action to be targeted on maximising benefits. Full compliance with the guideline standards would bring much the same costs and benefits as option 2a given that the proposed 'good' standard is broadly equivalent to the existing guideline standard.
- For Option 2a (adopting the revision as proposed) costs are 2-3 times the benefits. Most of the costs are associated with abating diffuse pollution from agriculture at around 15% of bathing waters. The cost benefit ratio is more adverse for Option 2b (achieving the proposed 'excellent' standards).
- Although precise details have still to be considered the active management/discounting approach investigated in Options 3a and 3b shows considerable potential for reducing costs and maintaining benefits. The additional costs of operating such a system cannot be calculated until its details are elaborated but they are likely to be insignificant compared to the potential savings in costs.

A Summary of Total Costs (millions of £) over 25 years of Alternative Options for England and Wales with a 3.5% discount rate.

	NPV of total benefits	NPV of total costs
Option 1	0	9-14
Option 2a	1104-1923	3163-4858
Option 2b	1638 -3497	4999-7818
Option 3a	2215	2530-3846
Option 3b	2215	1621-2443

Subject to the outcome of discussion of this assessment it is recommended that further analysis should concentrate on refining the estimates of the costs to agriculture and the water industry and devising and costing practical measures to implement the active management approach in Option 3.

DEFRA NOVEMBER 2002

Annex A: Estimating risk of minor illness from bathing

Although the general association between faecal contamination of bathing waters and minor and self-limiting illnesses is well recognised, the relationship between indicator concentrations and illness risk is complex and influenced by very many factors. This complicates the choice of water quality standard. The main uncertainties include:

- the ratio between numbers of indicator bacteria and infectious organisms. This will depend on the state of health of the population in the sewage system catchment area and the contribution of indicators from animal sources:
- the exposure of bathers to the water. This will depend on the kinds of bathing activity undertaken, when, where and for how long;
- the resistance of the bather to infection. The human body develops immunity to infection so an individual's resistance will depend on previous exposure to the infectious organisms from bathing or any other source.

These complications mean that science to support water quality standard setting has developed slowly and remains contentious. A dose/response relationship derived from a small-scale epidemiological study in the UK and a method for calculating risk factors has been incorporated in the World Health Organisation (WHO) Draft Guidelines for Safe Recreational-water Environments. This work has been used by the Commission to justify the proposed water quality standards in the revised Directive.

Annex B: Summary of Costs and Benefits with a 6% discount rate

Total Costs (millions of £) over 25 years of Alternative Options for England and Wales

	NPV of total benefits	NPV of total costs
Option 1	0	7-12
Option 2a	875-1510	2542-3942
Option 2b	1432-2772	4041-6333
Option 3a	1718	2026-3108
Option 3b	1718	1297-1974