National Audit Office

REPORT BY THE
COMPTROLLER AND
AUDITOR GENERAL

HC 188
SESSION 2010–2011

8 JULY 2010

**Environment Agency**

# Tackling diffuse water pollution in England

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National Audit Office

Environment Agency

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Amyas Morse
Comptroller and
Auditor General

National Audit Office

5 July 2010

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This report can be found on the National Audit Office website at www.nao.org.uk/water-quality-2010

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# Summary

**1** In 2000, the United Kingdom agreed to work towards new standards for water and ecological quality in all water bodies (including rivers, canals, lakes and coastal waters), as set out in the European Water Framework Directive (the Directive), by 2027 at the latest. The Environment Agency (the Agency) has lead responsibility for water quality in England.

**2** Pollution imposes not only environmental costs through its effect on aquatic life, but also financial costs from the treatment of water for drinking. The cumulative cost of water pollution in England and Wales has been estimated at up to £1.3 billion per annum. Pollution derives from two sources: point source pollution, which comes from a single identifiable source such as a factory or sewage treatment works; and diffuse pollution, which comes from multiple dispersed sources, such as agricultural land and road run-off. Identifying which sources of diffuse pollution have the greatest impact on water quality can be difficult due to the variety of sources and the time-lag before improvements are visible. Although each source may have relatively little impact individually, their cumulative effect can be highly damaging.

**3** Historically, the Agency has focused its expenditure on tackling point source pollution. It has been successful in addressing this pollution and thus delivering improvements to the environment. Under the Agency's previous system for classifying water quality, 79 per cent of English rivers achieved good or very good status in 2008, up from 55 per cent in 1990. However, as pollution from point sources has been reduced, the impact of diffuse pollution is becoming more evident. In 2008-09 the Agency spent over £140 million on its water quality work in England, including an estimated £8 million directly on diffuse pollution. Other environmental schemes, such as the England Catchment Sensitive Farming Initiative, also help to tackle diffuse pollution.

**4** In 2009 only 26 per cent of water bodies in England met the required levels of water quality under the Directive's more demanding classification system. The Department for the Environment Food and Rural Affairs (the Department) and the Agency do not expect that all English water bodies will achieve these levels by 2027 as it may be disproportionately costly or not technically feasible for some water bodies. Although the Directive does allow for these reasons, if the European Commission does not accept the case for these particular water bodies, it could take legal action against the Government. If such action were successful and the United Kingdom did not comply with the judgement, there is a possibility that it could face considerable financial penalties.

**5** The National Audit Office examined the Agency's progress in tackling diffuse pollution, focusing on three key issues, whether the Agency:

- has a good understanding of the sources of diffuse pollution and the reasons why the standards are not currently being met, so that it can target its resources at those responsible for the pollution;
- is raising awareness amongst polluters of the problem and of how changes in their behaviour and practices can tackle this; and
- is making good use of incentives and sanctions to change the behaviour and practices of farmers.

## Key findings

### Understanding the causes of diffuse pollution

**6** Although the Agency in recent years has gathered evidence on the causes and sources of diffuse pollution, this work is not complete. It has yet to identify sufficiently the extent to which failure to meet standards is due to this pollution and which sources contribute most to this failure. As a result, we are unable to establish whether the Agency's resources are targeted effectively:

- Establishing the sources of diffuse pollution has proved difficult as these can vary from place to place. The Agency has recently developed a better understanding of the condition of England's rivers through the compilation of River Basin Management Plans in December 2009, but it has found it difficult to measure the full extent to which diffuse pollution is responsible for the failure to meet water quality standards. It believes, based on the professional judgement of its field staff, that 30 per cent are failing to achieve a good status because of diffuse pollution, with a further 34 per cent failing for unknown reasons. The Agency started an extensive programme of investigations in April 2010 to improve its understanding of the reasons behind the failure of this 34 per cent.
- The majority of the Agency's efforts to tackle diffuse pollution have focused on the agricultural sector, as it considers this to be the major contributor to diffuse pollution. However, the Agency's knowledge of other sources of pollution, particularly from urban sources, is less developed.
- The Agency has limited field evidence on the extent to which different aspects of agricultural activity (such as fertiliser spreading or livestock management) contribute to diffuse pollution, and which changes to farming practices are likely to have the greatest impact. It is therefore funding research in Catchment areas, in conjunction with the Department, to collect more evidence on this subject.

## Raising awareness

**7** Despite the Agency's efforts to persuade the farming sector to recognise their responsibilities for diffuse pollution, the sector's awareness of the problem remains low:

- Seventy two per cent of farmers we surveyed considered that agriculture contributed only a little or not at all to diffuse pollution, although 68 per cent stated that they consider the impact of their activities on the water environment a fair amount or a great deal when making decisions on their farm.
- We found several examples of good partnership working at the local level between the Agency and stakeholder bodies to help raise awareness in the farming sector. However, there is scope for improvement in the coordination between the Agency and its stakeholders at a national level and for greater clarity around the roles and responsibilities of various stakeholders.

## Using incentives to change behaviour

**8** Without the widespread commitment of farmers to tackling diffuse pollution or sufficient access to financial incentives, the impact of voluntary initiatives has been piecemeal:

- Training and advice offered under the England Catchment Sensitive Farming Delivery Initiative has led to some farmers making changes to their farming practices that are likely to reduce levels of pollution. By 2009 the number of farmers engaged in the 40 original catchment areas had increased to 25 per cent, although there was considerable variation between areas, with the number of farms engaged ranging from 36 per cent to as little as 6 per cent. This variation could, in part, be due to the targeted nature of the programme, different farm types and sizes, and the variety of methods used to engage with farmers in the different areas.
- The Department's £2.1 billion Environmental Stewardship Initiative offers the opportunity to support water quality improvements through resource protection options. Over 70 per cent of agreements under the Initiative included options that have the potential to improve water quality, but the extent of any impact is unclear. Less than two per cent of agreements under the largest scheme in the Initiative included options for which the primary objective is water quality improvement.
- A lack of flexibility in the allocation of capital grants under the England Catchment Sensitive Farming Delivery Initiative means that, in certain cases, the funding is not being spent on those measures which would deliver the maximum reductions in diffuse pollution at an individual farm level. These grants are administered by Natural England.

### Using sanctions to change behaviour

**9** Sanctions have previously proved relatively ineffective in changing behaviours. The Department and Agency have instigated changes aimed at improving how sanctions can be used, but it has taken a long time for the shortcomings to be identified and addressed:

- The European Nitrates Directive sets strict limits on the quantity and timing of farmers' nitrate fertiliser applications within Nitrate Vulnerable Zones. In 2008 the Agency found breaches in the Directive's requirements in three per cent (69) of the 2,300 farms inspected under the Directive, mainly due to poor record-keeping.
- Although not designed to tackle diffuse pollution specifically, the Agency can issue anti-pollution works notices to prevent, remedy or prohibit activities that contribute to water pollution. It issued seven such notices in 2008-09. Agency staff considered that the complexity of the issuing process, the disproportionate level of evidence required to support the notice, and a lack of management and legal support prevented their wider use. In recognition of the notices' limitations, in 2009 the Agency reviewed how these could be adapted for use for diffuse pollution and has drawn up a plan to streamline their use in 2010.
- The Department has had the power since 1991 to designate areas as Water Protection Zones, where polluters can be forced to change activities. Whilst the original power was designed to tackle point source pollution, the Department amended this power from December 2009 to allow it to be used to tackle diffuse pollution.
- There are weaknesses in the information systems the Agency uses for its regulatory work. Data on its inspection activities are held across multiple databases and are incomplete. The Agency is therefore unable to determine the effectiveness of its inspections or the optimal level of its inspection activity.

## Conclusion on value for money

**10** The Environment Agency's annual expenditure of £8 million has had little impact in reducing diffuse pollution and therefore in mitigating the environmental impacts and financial costs of poor water quality in England. Accordingly we have concluded that the Agency's work to date has not proved value for money because:

- the Agency has lacked sufficient information on the causes of diffuse pollution, and on why some rivers and water bodies are failing quality standards, to target its resources effectively;

- little progress has been made in persuading those causing most diffuse pollution to acknowledge their responsibility, undermining the effectiveness of the Agency's voluntary initiatives to change behaviours;
- it has limited evidence of the effectiveness of its inspection activity; and
- the Agency has been slow to recognise the ineffectiveness of some of the existing sanctions and regulations to tackle diffuse pollution.

**11** Looking forward, the development of River Basin Management Plans by the Agency has generated a better understanding of the challenge in meeting the EU targets and the substantial work still to be done. These plans now offer the Agency an opportunity to achieve value for money going forward through a set of co-ordinated activities to target actions by itself and others to raise awareness and change behaviour.

## Recommendations

### On understanding diffuse pollution

**a** **There are currently gaps in the Agency's knowledge on diffuse pollution.** The Agency should improve its evidence base on the extent to which the different sources of diffuse pollution impact on water quality through targeted local level monitoring, with information used to direct and support the Agency's future interventions. (Paragraphs 1.14-1.15)

### On raising awareness

**b** **While the England Catchment Sensitive Farming Delivery Initiative has had some positive impact on changing behaviours, many farmers remain unconvinced of their contribution to the problem.** The Agency should intensify its efforts to raise awareness and change behaviours amongst the farming community by:

- developing a greater understanding of how best to influence farmers, including who is best placed to deliver the required messages; and
- providing a more compelling case for farmers by building on the evidence base linking farming to diffuse pollution and clearly demonstrating the benefits of mitigation measures. (Paragraph 2.3)

**c** **There is scope for improving how the Agency coordinates its activities with stakeholders.** It should consider developing more formalised agreements with stakeholders for tackling diffuse pollution at a River Basin level. (Paragraphs 2.4-2.6)

## On providing incentives to encourage changes in farming practices

d **The impact of incentive schemes on diffuse pollution has been piecemeal.** The Department should improve the targeting of options under Environmental Stewardship schemes to increase their contribution towards reducing the impact of diffuse pollution. The Department should also consider introducing more flexibility in the method used for assessing applications for grants under the England Catchment Sensitive Farming Initiative to ensure that it funds activities on individual farms that will prove to have the greatest impact on diffuse pollution. (Paragraphs 2.21-2.23)

## On enforcing the legal responsibilities of farmers

e **The Agency has a number of databases to record information on its inspection activities and is unable to provide a complete record of all inspection activity.** The Agency should ensure that information is consistently managed and recorded across these databases, and properly integrated. (Paragraph 3.10)

f **The Agency does not consistently follow up on inspections and has not determined the value of the outcomes achieved by its regulatory inspection activity.** In view of the recent changes to the rules governing Nitrate Vulnerable Zones, the Agency should assess the value of its regulatory visits and determine the optimum number of inspections required to achieve desired outcomes. (Paragraphs 3.13-3.14)

g **It has taken a long time for the shortcomings identified in the sanctions available to the Agency to be addressed.** The Agency should act quickly to adapt the use of anti-pollution works notices to diffuse pollution, streamlining the issuing process, developing clear guidance, and providing staff with training and greater management support. (Paragraphs 3.20-3.21)

# Part One

## Introduction

**1.1** The Environment Agency (the Agency) is the executive non-departmental public body sponsored by the Department for the Environment, Food and Rural Affairs (the Department) with lead responsibility for water quality in England.

### England has agreed to work towards new demanding standards for water quality

**1.2** In 2000, the United Kingdom agreed to work towards new standards for water and ecological quality in all water bodies (including rivers, canals, lakes and coastal waters), as set out in the European Water Framework Directive (the Directive). According to the assessment criteria specified in the Directive, in 2009 26 per cent of water bodies in England were achieving the required levels of water quality. This compares to 60 per cent in Scotland, 29 per cent in Wales, and less than 5 per cent in the Netherlands which has a similar level of pressure in terms of population density on its land use to large parts of England, although both have different landscapes. Under the Agency's previous classification system, which was less demanding than that in the Directive (**Figure 1**), 79 per cent of English rivers achieved good or very good status in 2008, up from 55 per cent in 1990.

**Figure 1**
The Agency's approach to water quality monitoring and classification

The Water Framework Directive has introduced a new system for monitoring the quality of water bodies in Europe. The new system was introduced in England in January 2007 and will be running in parallel with the Agency's existing General Quality Assessment programme until the end of 2010. The new system involves a more sophisticated way of measuring the water environment across a far wider range of factors. The key differences between the two monitoring programmes are outlined below:

**General Quality Assessment**

- Measures water quality in terms of chemistry and biology (invertebrates)
- Using this measure, the percentage of rivers in England achieving good or very good chemical status has increased from 55 per cent in 1990 to nearly eighty per cent in 2008

**Water Framework Directive**

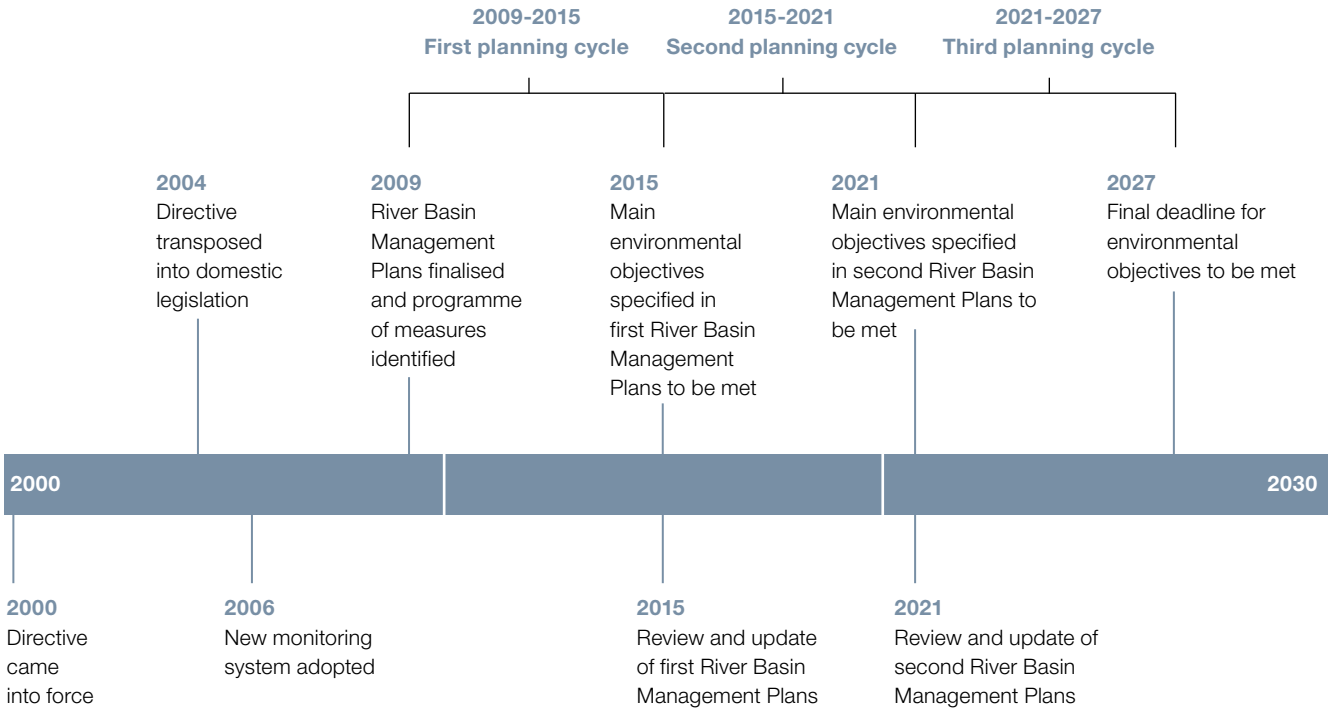
- Measures each water body against up to thirty indicators such as fish, invertebrates, plants, phosphates and acidity, with the lowest assessment of any of these individual indicators determining overall compliance
- Using this measure, 27 per cent of water bodies in England are currently achieving the required standards

*Source: Environment Agency*

**1.3** The Directive requires Member States to aim to achieve 'good status'[1] in all natural water bodies by 2015. States can, however, set alternative objectives, such as a longer delivery time and/or less stringent objectives, where delivering the required improvements by 2015 is considered disproportionately expensive or technologically infeasible. The Directive specifies a final deadline of 2027 (**Figure 2**).

**1.4** In December 2009 the Department and Agency, as required by the Directive, published ten River Basin Management Plans, which set out the current status of England's water bodies, targets for improvements up to 2015, and the range of actions to be taken by various stakeholders to address existing pressures on the water environment. According to the European Commission website[2] as at March 2010, 12 of the 27 Member States had yet to publish their Plans.

## Figure 2
Water Framework Directive delivery timeline




*Source: Water Framework Directive Information Centre*

1 Member states are required to achieve a "good ecological status" for their surface water bodies. In the case of ground water, the objective is to achieve "good groundwater status" and "good quantitative status".
2 http://ec.europa.eu/environment/water/participation/map_mc/map.htm.

**1.5** As a result of the River Basin Management Plans, the Department and Agency consider that all required improvements cannot be achieved by 2015. They estimate that the percentage of water bodies achieving "good status" will increase from 26 per cent to 30 per cent by 2015 and to 60 per cent by 2021. Although they expect more than 60 per cent of England's water to meet the standard by 2027, they consider that it will not be possible to achieve "good status" in all water bodies by that date using only current technologies. Unless it can be demonstrated to the European Commission that the 2015 and 2027 deadlines are not technically feasible or are disproportionately expensive, there is a risk that the Commission could take legal action against the United Kingdom Government. If this action were successful and if the Government did not take action to comply with the judgement, there is a risk that the Government could face financial penalties. It is too early to estimate the likelihood and value of any penalties as, according to the Department, the method of calculating penalties is currently under review by the Commission. However, the existing method suggests that the sums could range between zero and £250 million a year. Both the Department and Agency consider that they are on track to comply with the Directive's requirements, although they will continue to monitor the situation closely. According to the Department, no Member State was expecting to meet the aim of good status in all water bodies by 2015.

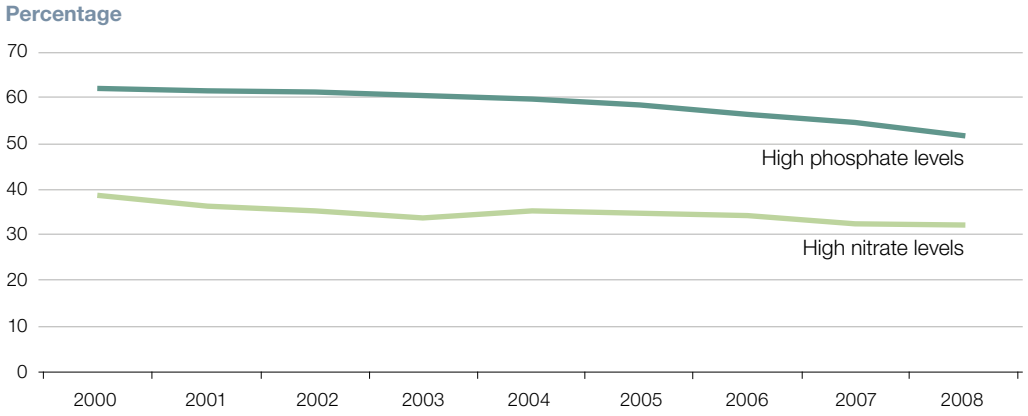
## Diffuse pollution is now recognised as a significant threat to water quality

**1.6** The Agency has identified pollution as a major threat to water quality and a significant reason why water bodies are not currently meeting European standards. The Department has estimated the cost of water pollution in England and Wales to be between £700 million and £1.3 billion per annum. Pollution can come from point sources (single identifiable sources such as a factory or sewage treatment works) and diffuse sources (multiple dispersed sources, such as agricultural land and roads). Historically, the Agency has focused its expenditure on tackling point source pollution. Where it has been able to identify specific incidences of point source pollution, it has been successful in addressing these. Thus, the proportion of river lengths with unacceptably high levels of nitrates and phosphates has fallen since 2000 (**Figure 3**). However, as pollution from point sources has been reduced, the impact of diffuse pollution is becoming more evident.

**1.7** Diffuse pollution occurs when potentially-polluting substances enter water as a result of rainfall, soil infiltration and surface run-off. Diffuse pollution can be caused by excessive or improper use of fertilisers, poor management of waste or livestock on farms, the run-off of chemicals from light industry, or wrongly connected domestic or commercial drainage systems (**Figure 4** on page 14). Identifying which sources of diffuse pollution have the greatest impact on water quality can be difficult due to the variety of sources and the time-lag before improvements are visible. Although each source of diffuse pollution may have relatively little impact individually, their cumulative effect can be highly damaging.

## Figure 3
Nitrates and phosphates levels in English rivers

**Percentage of total river length with high average concentrations of nitrates and phosphates**




**NOTE**

1 Levels of phosphates are high when there is over 0.1 milligrams of phosphate per litre of water, and nitrates when there is over 30 milligrams per litre.

*Source: Environment Agency*

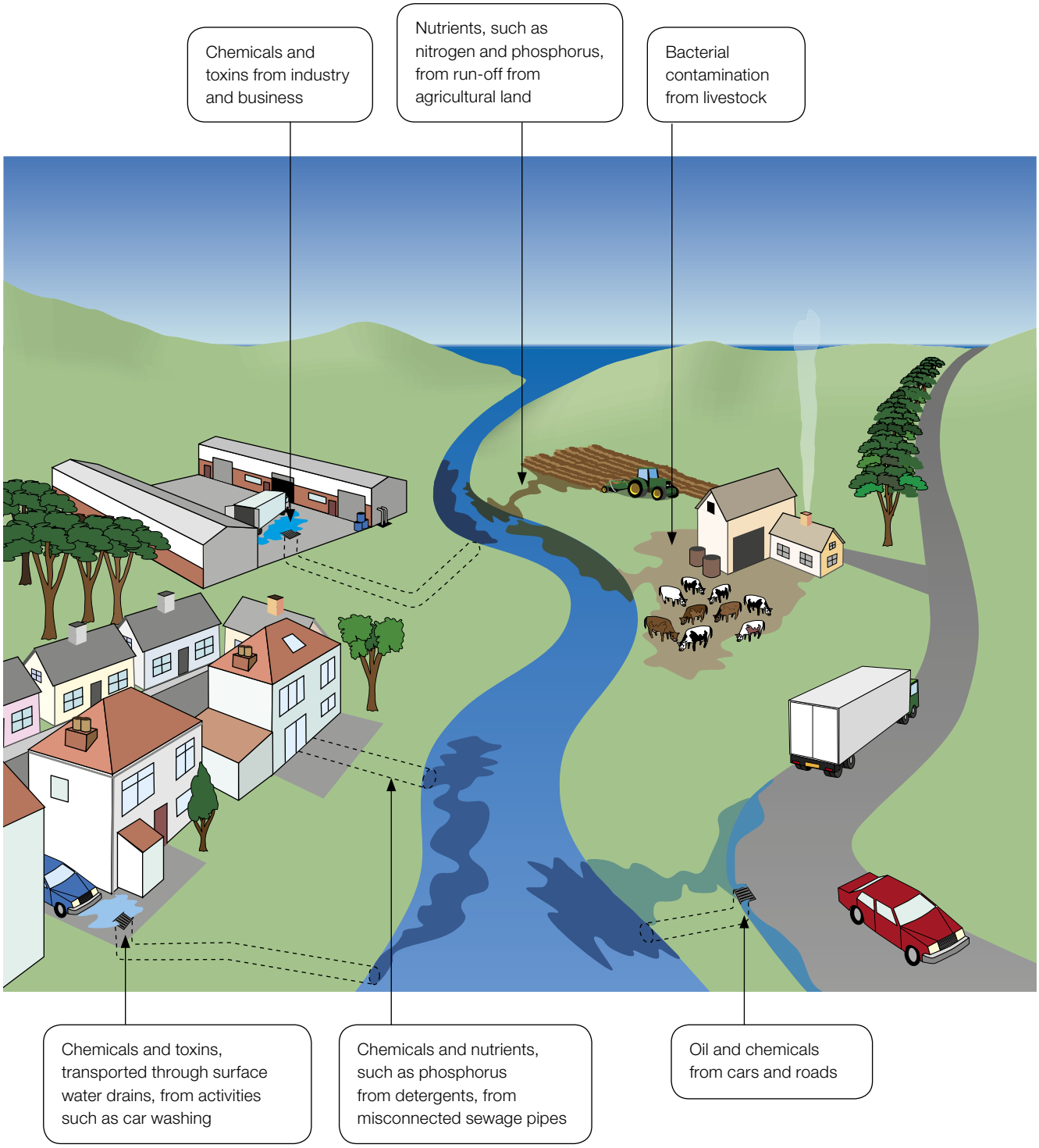
**1.8** Diffuse pollution has a direct financial cost for water companies, which are required by law to provide drinking water with strict limits on the levels of nitrates and pesticides. Between 2004-05 and 2008-09, water companies in England spent some £189 million removing nitrates and £92 million removing pesticides from their water supplies. Water companies also face unquantified costs relating to the removal of bacterial contamination from water supplies, as a result of diffuse pollutants.

## The Agency's work to date has focused primarily on the agricultural sector

**1.9** The Directive explicitly requires Member States to introduce, among other things, controls on diffuse pollution, where such measures are required to meet environmental objectives. The Agency's work has focused on reducing the impact of diffuse pollution from agriculture, through encouraging the voluntary uptake of better farming practices and the application of existing regulatory powers. This report therefore examines whether the Agency:

- has a good understanding of the sources of diffuse pollution and the reasons why the standards are not currently being met so that it can target its resources at those responsible for the pollution;
- has succeeded in raising farmer awareness and encouraging the voluntary uptake of better farming practices; and
- has made good use of existing regulations within the farming industry.

## Figure 4
Sources of diffuse pollution




*Source: National Audit Office*

**1.10** This report assesses the cost-effectiveness of these measures in England. Activities in Wales are funded by the Welsh Assembly Government, while, in Scotland, the Scottish Environmental Protection Agency is responsible for water quality. This report does not examine the quality of drinking water directly, but the quality of surface and groundwater does affect the amount and type of treatment required to make water fit for human consumption. Appendix 1 summarises the approach we used for our examination.

## The Agency commits limited resources to tackling diffuse pollution

**1.11** The Agency does not fully cost its local level activities. Due to the diverse nature of its work and its integrated approach to environmental management, it is very difficult for the Agency to identify how much staff time is devoted exclusively to diffuse pollution. It has estimated that approximately 350 of its 1,300 Environment Officers undertake some work on the issue. In 2008-09 the Agency spent over £140 million on water quality in England (**Figure 5**). Its diffuse pollution activities are funded through grant-in-aid as it cannot recover the costs of these by levying charges. Under Treasury guidance, any charges levied must relate to a direct service to the charge payer, while tackling diffuse pollution is considered to be of benefit to society as a whole. In 2008-09, the Agency spent an estimated £8 million, 12 per cent of its grant funding, directly on diffuse pollution, with an unquantifiable amount of its remaining expenditure, particularly its spending on monitoring water quality, also likely to contribute to its work in this area.

### Figure 5
Agency expenditure on water quality activities in 2008-09

| | £ million |
|---|---|
| Diffuse pollution | 8.0 |
| Environmental permitting | 40.0 |
| Monitoring | 49.0 |
| Incidents and emergencies | 12.5 |
| Enforcement and prosecutions | 10.0 |
| Water quality planning | 6.5 |
| Other | 15.6 |
| Total | 141.6 |

**NOTE**

1 A relatively similar amount was spent by the Agency in the previous three financial years. Costs include staff time, senior management time and overheads.

*Source: Environment Agency*

**1.12** The Agency planned to spend an additional £32.3 million[3], on top of its existing expenditure on water quality, over the next six years (2009-2015) delivering actions set out in the River Basin Management Plans. In addition, water companies plan to spend some £279.5 million over the same period, with £12.8 million being spent by other organisations. The majority of expenditure, however, continues to go to tackling point source pollution, with £277.6 million being spent on addressing this, compared with £13.3 million assigned to address diffuse pollution and £33.8 million for other environmental pressures.

**1.13** In addition to the Agency's expenditure on diffuse pollution, there are other environmental schemes funded by the Department, such as the England Catchment Sensitive Farming Initiative, administered by Natural England and the Agency, which also help to tackle diffuse pollution.

## The Agency's understanding of the sources and impacts of diffuse pollution needs improvement

**1.14** The Agency does not yet fully understand the extent to which diffuse pollution impacts on water quality. The Agency believes that 30 per cent of rivers are currently failing because of diffuse pollution. Its evidence on the sources of diffuse pollution at a local level is still developing and its assessment of the reasons for failure is primarily based on the professional judgement of its local field staff (**Figure 6**). The Agency and its field staff cannot identify why 34 per cent of rivers are currently failing to meet the required standards. In line with the requirements of the River Basin Management Plans, it started a programme of investigations in April 2010 to improve its understanding of the reasons for these failures.

### Figure 6
Environment Agency's assessment of reasons for failure

| Reason for failure | Number of water bodies failing | Failing water bodies as a percentage of all bodies in England (%) |
|---|---|---|
| Physical modification | 2,592 | 45 |
| Unknown | 1,981 | 34 |
| Diffuse source | 1,726 | 30 |
| Point source | 1,375 | 24 |
| Abstraction | 347 | 6 |
| Other | 297 | 5 |

**NOTE**

1 The figures for the percentages of water bodies failing total more than 100 per cent as each individual water body can fail for more than one reason.

*Source: Opinion of Environment Agency staff involved in preparation of River basin Management Plans*

3 These and other figures in this paragraph have been discounted to 2008 present values.

**1.15** The Department considers agricultural activity as the major cause of diffuse pollution, with the application of fertilisers contributing 60 per cent of the nitrates found in water. It estimates that agricultural activity contributes approximately 25 per cent of phosphates and 70 per cent of sediments. In addition, with farms using 90 per cent of pesticides in England, they are likely to be the primary source of these chemicals found in water. Despite research by the Department and Agency, evidence of causation remains limited on the extent to which different aspects of agricultural activity (such as fertiliser spreading or livestock management) contribute to the overall problem. The Agency is therefore funding further research in Catchment areas, in conjunction with the Department, to collect more evidence.

# Part Two

## Voluntary take-up of practices to reduce diffuse pollution from farms

**2.1** Encouraging farmers to alter the way they farm depends upon raising awareness of the causes and impacts of diffuse pollution coming from agriculture; offering alternative practices that could be employed; and ensuring incentives are made available to farmers to deliver solutions.

**2.2** The Agency's most significant targeted programme of work to address these issues is the England Catchment Sensitive Farming Initiative (the Initiative), delivered jointly with Natural England. Costing around £13 million in 2008-09, the Initiative targets advice and guidance to farms within target areas in 50 English catchments (**Figure 7**).

### Figure 7
The England Catchment Sensitive Farming Delivery Initiative

The Initiative was rolled out in 40 catchment areas in April 2006, with a further 10 catchments added in October 2008 (Appendix 2). The total coverage of the Initiative is now approximately 40 per cent of the agricultural land of England. The Initiative targets specific areas within each catchment which, together, cover 13 per cent of agricultural land in England. The Initiative has three key objectives: increasing awareness of diffuse pollution amongst rural land managers and stakeholders; improving soil and land management practices; and reducing the pollution of water caused by farming. The Initiative is delivered through 47 Catchment Sensitive Farming Officers, and nine Regional Coordinators, utilising a range of measures, such as:

- group events, including farm workshops, meetings, farm walks, and on-farm demonstrations;
- individual advice and support, including farm appraisals and soil testing, to encourage more efficient and effective use of fertiliser;
- written guidance for farmers, including business benefit case studies; and
- advocacy of key messages about diffuse pollution and its mitigation to farmers and land managers.

The Initiative also has a capital grant scheme that funds small scale infrastructural changes to help address diffuse pollution.

*Source: Environment Agency*

## The Agency has had limited success in raising awareness of diffuse pollution

**2.3** Although 68 per cent of the farmers we surveyed stated that they consider the impact of their activities on the water environment a fair amount or a great deal when making decisions on their farm, 85 per cent felt that diffuse pollution was not a significant problem. We also found that farmers were not convinced that agriculture is one of the major causes of pollution, with 72 per cent stating that agriculture contributed only a little or not at all to it. Additionally, of the 441 farmers surveyed who had made a change to their practices in the previous 12 months, improving biodiversity (26 per cent) and financial savings (16 per cent) were more important factors than improving water quality (13 per cent). Even in areas where the use of nitrate fertiliser on farms is controlled by law, awareness amongst farmers of the rules governing these practices is not fully understood, with only 50 per cent of the farmers we surveyed in these areas recalling receiving any guidance from the Department[4] on how these rules applied to their farm.

**2.4** The Agency has a wide range of partners at a national level it must work with in order to raise awareness of diffuse pollution and reach particular target groups. We identified approximately 50 organisations that have a role to play in delivering water quality improvements, of which seven have a central role in helping to tackle diffuse pollution (**Figure 8** overleaf). These include organisations that directly advise farmers, such as the National Farmers Union and the Farming and Wildlife Advisory Group, and Government bodies, such as Natural England, Communities and Local Government and Ofwat. At present the Agency has few formal agreements in place with these national bodies which specifically cover tackling diffuse pollutions. As a result, roles and responsibilities are not clearly set out or understood, and coordination between the Agency and these stakeholders could be improved.

**2.5** Three of the 11 stakeholders we interviewed considered engagement with the Agency was good, with the remaining partners indicating that engagement could be improved at both local and national level. Partners consulted as part of an Agency evaluation of stakeholder engagement considered that the Agency's partnership work would benefit from having greater clarity on the roles and responsibilities of the Agency, consultation on issues being undertaken at an earlier stage, and having a better focus on environmental outcomes.

**2.6** We found examples of good partnership working at local level, such as the Bassenthwaite Lake Restoration Programme (**Figure 9** overleaf). In the absence of nationally agreed protocols, however, locally-based Agency staff needed to invest considerable time identifying and engaging with representatives of national bodies, often agreeing their own terms of reference with individuals locally. Through the River Basin Management planning process, the Agency has now agreed actions that stakeholders need to take to help improve water quality more generally.

4 Although the Agency is responsible for monitoring compliance with regulations, the Department is responsible for ensuring that changes to policies are communicated to those affected by the change.

## Figure 8
Key stakeholders in tackling diffuse pollution

| Organisation | Role in tackling diffuse pollution |
|---|---|
| National Farmers Union | Reaching farmers and encouraging changes in practices. |
| Farming Wildlife and Advisory Group | Reaching farmers and encouraging changes in practices. |
| Water UK/ water companies | Tackling a wide range of water quality issues, such as pollution incident prevention and misconnections. |
| Communities and Local Government | Ensuring greater usage and uptake of sustainable drainage systems and other pollution prevention measures in the urban and rural planning process. |
| Local authorities | Ensuring greater usage and uptake of sustainable drainage systems and other pollution prevention measures in the urban and rural planning process. |
| Ofwat | Setting agenda for water companies' approach to diffuse pollution, through periodic price review process. |
| Natural England | Key partner in reaching farmers and encouraging changes in practices. |

*Source: Environment Agency*

## Figure 9
Bassenthwaite Lake Restoration Programme

The Bassenthwaite Lake Restoration Programme is a partnership project of eight organisations each of which have a statutory or non-statutory responsibility or interest in Bassenthwaite Lake and the surrounding area. The partnership has benefited from gaining buy-in from a range of stakeholders including the Agency, Natural England, United Utilities, Cumbria County Council, and the National Trust. The partnership has also benefited from having a clear vision, including setting measurable targets for reducing levels of phosphates and sediment by 2022.

*Source: Environment Agency*

## Advice provided by the Agency has had limited impact on changing farm practices

**2.7** The Agency and Department produce a range of guidance material on good environmental practice for farmers, including how to protect soils, water and air and make environmental improvements on farms. Although the Agency has carried out assessments of individual pieces of guidance, it has not carried out an assessment of its guidance as a whole to identify the extent to which information is delivered to farmers in the correct format or is helping to change farm practices to prevent diffuse pollution across the estimated 107,000 farm holdings in England. The Agency is now working on a draft communications plan specifically aimed at increasing awareness amongst farmers of the impact of diffuse pollution.

**2.8** To achieve behavioural change the Agency needs to ensure that messages are both clear and come from trusted sources. Approximately half of the farmers we surveyed received some advice and guidance relating to water quality in the previous 12 months, with farmers indicating that advice was received through agronomists or farm consultants (25 per cent), the Agency (22 per cent) or the Department (21 per cent).

**2.9** The Agency's most direct guidance aimed at reducing diffuse pollution from the application of fertiliser is provided in its ThinkSoils manual, which seeks to encourage better land management. This manual has not been designed to be distributed to farmers as it was intended, instead, to be used to raise awareness as part of training courses for the agricultural sector. Up to March 2009, 2,500 copies of the manual had been requested by Agency regions in England and 850 copies had been purchased from the Agency. Complementary copies have been sent to interested organisations including, Natural England, RSPB, National Trust, Farming and Wildlife Advisory Group, and Water UK.

**2.10** Feedback to the Agency from 82 users of the manual, and anecdotal evidence from our case studies, suggests farmers and advisors found the manual useful. A third of farmers had undertaken a soil assessment, to inform the amount of fertiliser they applied, or intended to apply, as a result of receiving the guidance. In response to feedback from farmers that the manual was too long and not solution focused, the Agency is considering producing a version specifically for farmers.

**2.11** More direct advice and guidance has been provided to farmers through the England Catchment Sensitive Farming Initiative, which provides advice to farmers on issues including the proper management of fertiliser, livestock, soil, and agricultural waste. As at March 2010, 9,276 farms had received some form of advice through the Initiative, representing 17 per cent of all farm holdings within the Initiative's 50 priority areas and around 9 per cent of the 107,000 farm holdings in England. This advice has been delivered through 9,090 one-to-one advice visits, 1,057 group events and 319 farm clinics.

**2.12** There are considerable differences in the delivery methods used in each catchment. The methods used are determined by each catchment officer and are dependent on the catchment's size, characteristics and level of sensitivity. The number of one-to-one advice visits in the original 40 catchments ranged from 37 to 454 visits, which may include multiple visits to a single farm. Over 66 per cent (211) of farm clinics were delivered in the Peak District Dales catchment. In December 2008, a survey conducted by the Agency found that, of those farmers who had received one-to-one advice, 69 per cent rated the advice as useful or very useful, compared to 74 per cent following farmer meetings, and 32 per cent for farm clinics.

**2.13** The number of farmers engaged in the 40 original Initiative catchments has increased from 16 per cent in 2007 to 25 per cent in 2009, but there is significant variation across catchments, with numbers engaged in individual catchments ranging from 36 per cent to as little as 6 per cent. According to the Agency and Natural England, this variation could, in part, be due to the targeted nature of the programme, different farm types and sizes, the different methods used in each catchment to engage with farmers, and differences in the nature of the catchments themselves. However, it is unclear to what extent the variation was also due to resource constraints or a lack of interest on the behalf of local farmers.

**2.14** The Initiative's annual surveys suggest that farmers that have been engaged are more likely to have made changes to reduce water pollution. Our survey of farmers did not, however, find significant differences in the attitudes of farmers in or outside of Initiative areas. Within Initiative target areas only slightly more farmers (15 per cent) made the changes to improve water quality compared to those outside the Initiative (12 per cent).

## Financial constraints remain the biggest barrier to changing farm practices

**2.15** Our survey of farmers found that 62 per cent considered financial constraints as the biggest barrier to tackling diffuse pollution on their farms. To get farmers to voluntarily change practices the Agency must either demonstrate that up-front investment will result in subsequent financial savings or ensure farmers have access to financial incentives to support and encourage change.

**2.16** When we accompanied catchment officers on visits to farms, we found that one of the most valuable elements of support offered through the Initiative was the initiation of soil testing to advise farmers on the existing nutrient content of their land. This enabled them to apply correct amounts of fertiliser, potentially achieving a reduction in potential nitrogen and phosphorous pollution and ultimately saving the farmer money. The Initiative is now drawing up further case studies to help catchment officers make a more convincing economic case for up-front investment by farmers.

**2.17** Other countries have used wider mechanisms to encourage changes in farm practices. Farm certification schemes are widely used by supermarkets to encourage farmers' to change their practices and assure customers that certain standards have been maintained in the production process. Membership of these schemes can help farmers obtain higher prices for their produce to compensate for the additional costs associated with better environmental management. Over 78,000 farmers and growers in the UK are members of such schemes, accounting for between 65 and 90 per cent of output. The Agency has made some use of farm certification schemes to encourage better farm practices. The Ferti-Mieux scheme in France offers a model of how these schemes can be used to effectively target diffuse pollution issues and help farmers obtain a price premium on their produce (**Figure 10**).

## Financial incentives available to farmers are not being effectively used to tackle diffuse pollution

**2.18** Through the England Catchment Sensitive Farming Delivery Initiative's grant scheme, catchment officers have access to around £4.9 million (2009-10) to part-fund infrastructural improvements on farms to reduce diffuse pollution. Natural England is responsible for administering the grant application process and paid out grants to 670 farms in 2009-10, with the average grant being approximately £7,300 (**Figure 11** overleaf). Applications are assessed against funding priority statements set for each of the 50 catchments, with each statement listing up to 20 capital items that can be partially funded through the scheme in order of their expected impact on the overall catchment (including, for example, roofing for livestock gathering areas, yard improvements and riverside fencing).

### Figure 10
Produce assurance schemes in France

The **Ferti-Mieux** (improved fertiliser) scheme aims to encourage livestock and arable farmers to adopt practices that reduce nutrient pollution. Those meeting the required standards received a **Ferti-Mieux** label for their products, which thereby obtain a price premium. By 2000, the programme involved 22,000 farmers and 1.3 million hectares of farm land. It had successfully reduced pollution from fertilisers and animals at two-thirds of sites involved.

*Source: National Audit Office*

## Figure 11
Allocation of capital grant scheme funding

| | Applications received | | Grants paid | |
|---|---|---|---|---|
| Year | Number | Value of grants applied for (£m) | Number | Value of grants paid out (£m) |
| 2007-08 | 1,147 | 6.9 | 654 | 4.8 |
| 2008-09 | 1,379 | 11.1 | 626 | 5.5 |
| 2009-10 | 1,553 | 14.4 | 670 | 4.9 |

*Source: Environment Agency and Natural England*

**2.19** High demand for this funding means that only the top two capital items on the funding priority statements are generally funded. While the priority statements reflect the major issues at catchment level, they do not necessarily reflect the key issues on individual farms. Priorities for arable farms, for example, are likely to be different than those for dairy farmers, but, if an arable farmer is within a predominantly dairy area, their issues are unlikely to be reflected on priority lists. As a consequence, the majority of Catchment Sensitive Farming Officers believe that grants are not delivering the maximum reductions in diffuse pollution and improvements on individual farms.

**2.20** The Department provides funds via Natural England to assist farmers to take steps to encourage environment protection and better land management. Environmental Stewardship schemes are designed to compensate farmers for managing their land in ways that conserve wildlife and biodiversity, protect natural resources and maintain and enhance the quality of the landscape. These schemes have a budget of £2.1 billion between 2007 and 2013. At October 2009 there were 39,881 live stewardship agreements, covering approximately 5.3 million hectares (57 per cent) of agricultural land in England.

**2.21** While over 70 per cent of agreements under the schemes included land management options for farmers, such as taking land out of production and installing buffer strips near water courses, which can help reduce diffuse pollution, there is, in practice, limited take-up of options which are only or primarily for water quality.[5] As at September 2009, less than two per cent of the Entry Level Scheme agreements in place, the largest of three Environmental Stewardship schemes, contained options which had resource protection as their primary objective (**Figure 12**).

**2.22** Many resource protection options under the schemes are primarily for biodiversity benefit, but can also reduce diffuse pollution if targeted effectively. Hedgerow management, for example, could help reduce soil run-off, and therefore diffuse pollution, but only where this option is used near water bodies. To date, however, there has been a narrow uptake of options primarily aimed at resource protection options by farmers.

5 National Audit Office *Defra's organic agri-environment scheme*, March 2010.

## Figure 12

Uptake of options primarily aimed at resource protection and biodiversity options under the Entry Level Scheme

| Options | Number of agreements which include relevant options | Area managed under relevant options (hectares) |
|---|---|---|
| Resource protection | 733 | 19,428 |
| Biodiversity | 36,920 | 989,035 |
| **Total** | **37,653** | **1,008,463** |

**NOTE**

1 Not all land under Environmental Stewardship will have land management options attached to them. As such, while 5.3 million hectares are part of Environmental Stewardship, only about 1 million hectares have associated land management options. The 37,653 agreements only include those under the Entry Level Stewardship Scheme and do not include the other Environmental Stewardship schemes available.

*Source: Natural England*

**2.23** The Department and its delivery bodies are taking a number of steps to enhance the contribution that Environmental Stewardship schemes make towards meeting water quality objectives. In January 2010 the Department and Natural England initiated a Training and Information Programme which is aimed at encouraging farmers whose scheme agreements are coming up for renewal over the next three years to take up specific options that benefit local water quality. While participation is voluntary, the Department hopes that the extra training will encourage farmers to take up the more demanding water options where they are needed. The Department also intends to carry out an evaluation in 2010 to better quantify the impact of Environmental Stewardship schemes on water quality.

**2.24** In addition, in July 2009 an Industry led campaign, Campaign for the Farmed Environment, was launched with the backing of the Department and the Agency, recognising the need for a more holistic approach to land management. The campaign brings together key organisations in the farming sector to promote good environment practice and resources protection, including through the use of incentive mechanisms such as Environmental Stewardship, which could reduce the causes of diffuse pollution.

# Part Three

## Ensuring compliance with environmental legislation

**3.1** The Agency has a limited number of regulatory tools available to it to address diffuse pollution. The European Nitrates Directive is the main regulatory mechanism through which the Agency can tackle nitrogen pollution from agriculture. Historically, there has been no equivalent policy mechanism used by the Agency for tackling pollution from phosphorous used in agriculture. Whilst the Water Framework Directive provides the Department with the power to impose greater controls on nitrogen and phosphorous, where the presence of these nutrients compromises achievement of environmental objectives, these powers have yet to be tested.

**3.2** Compliance with the Nitrates Directive is assessed by the Agency through farm inspections. Farmers are required to comply with a range of European regulations and requirements relating to their farms' environmental condition. This includes conditions that may reduce diffuse pollution, including requirements relating to soil management and overgrazing. Failure to do so can result in farmers losing part, or all, of their single farm payment.

**3.3** In addition to the Nitrates Directive, the Agency can also enforce good environmental practice through issuing anti-pollution works notices, where polluters are required to carry out remedial action to address a potential source of water pollution.

### Applying the European Nitrates Directive in England

**3.4** Under the Nitrates Directive the Department has designated those lands that drain into waters which contain, or could contain, over 50mg/litre of nitrate as Nitrate Vulnerable Zones. Farms within these areas are subject to regulations on the storage and application of nitrate fertilisers. Agency staff carry out inspections to ensure farm records demonstrate compliance with limits on nitrate application, the timing of such application, and the provision of adequate fertiliser storage.

**3.5** The Department has a legal obligation to implement the Nitrates Directive and in 2002 designated approximately 55 per cent of the land of England within Nitrate Vulnerable Zones. In 2007 a review by the Department found that nitrate pollution had increased in some areas and the current programme of work had not had a significant impact on nitrate pollution. At the same time, the European Commission, through legal proceedings, raised concerns about the adequacy of the UK's implementation of the Directive. Some other EU member states, such as Germany and the Netherlands, and Northern Ireland have designated their entire countries as Nitrate Vulnerable Zones.

**3.6** In 2009, the Department extended Nitrate Vulnerable Zones to cover 68 per cent of England[6], and an additional 31,000 farms, reporting that taking a whole territory approach would impose financial burdens on farmers in areas where action would generate little environmental benefit. A more geographically-targeted approach does, however, have associated administrative costs, including mapping zone boundaries and running appeals processes. During the Department's consultation on the extension of Nitrate Vulnerable Zones in 2008, total costs of monitoring compliance, mapping boundaries and advice to farmers was estimated to be between £2.4 million and £3.4 million. Within this, annual costs to the Agency of employing and training staff to undertake inspections were estimated by the Department at between £1.2 million and £1.9 million. As each farm inspection may check compliance against a range of regulations, it is not possible to precisely estimate the costs of Nitrates Directive related activity. Based on an average of 15 hours staff time per visit, the Agency estimates that planning, travel and on-site activity during 2008 cost approximately £450 for each Nitrate visit or £1 million in total.

**3.7** A geographically-targeted approach also places a greater emphasis on the Department providing clear targeted guidance and information to farmers included in these zones. Our survey of farmers found that almost one third of those farmers who believed that their holdings did not fall within these zones were, in fact, mistaken, while a further one in five farmers incorrectly believed that their farms were located within these zones.

## Tougher rules on nitrate application require financial investment by farmers

**3.8** In January 2009, alongside the extended Nitrate Vulnerable Zones, the Department introduced new tighter rules for farms within zones, including:

- further limiting the amount of farm manure applied to land;
- new periods prohibiting the application of high nitrogen organic manures and manufactured nitrogen fertilisers;
- the need for increased facilities to store manure on site;
- greater restrictions on spreading techniques and locations; and
- further record keeping requirements.

**3.9** The Department estimates that the costs to the agricultural sector of complying with these tougher rules will be between £44 million and £65 million per annum. Dairy farms in particular are likely to have to invest heavily in infrastructure improvements, such as increased storage facilities, to meet the revised rules. Although some financial assistance is available through the Rural Development Programme for England, the Programme does not, unlike funds available in Scotland, include funding for all items. Farmers in England are unable to get grant funding to increase storage facilities, whereas farmers in Scotland can access grants to fund up to 40 per cent of the costs of these investments.

6 Following an independent appeals process, in May 2010 the Nitrate Vulnerable Zones were reduced to cover 62 per cent of England.

## The Agency data on farm inspection activity are limited

**3.10** The Agency does not have a single integrated system that accurately records all its regulatory inspection activities, and is unable to produce accurate records of these. Information is currently recorded on multiple databases and is incomplete. The Agency, for example, when asked in 2009, could only provide information on around 600 of the 1,500 groundwater inspections it believed it had conducted, limiting its ability to determine whether it had fulfilled its responsibilities completely and to evaluate the effectiveness of this work.

**3.11** In 2008 the Agency started to take a more risk-based approach to its regulatory farm visits. Farms are now selected for regulatory visits based on their location, emissions levels, pollution potential, and operator performance. Although this is helping to target inspections, its effectiveness is limited by the Agency's lack of access to data the Department holds on farms. According to the Department, there are data protection and confidentiality issues surrounding the release of this data and the data itself may not be suitable for the Agency's purposes. However, access to this would enable the Agency to update its own data, which was originally collected in 2005. In addition, Agency staff told us that they can spend up to 45 minutes during each inspection collecting data that the Department already holds. This is a waste of Agency resources and a source of annoyance to farmers who assume that this information is already shared between the Department and its agencies. While Agency staff also routinely provide general pollution management advice during inspection visits, this information is not recorded.

**3.12** Access to information is also a wider issue amongst the Department's delivery bodies, with the Agency and Natural England not always sharing information. The Agency and Natural England do not currently share information on what farms they visit or the information and advice provided on these visits, in part due to data compatability issues. This risks duplicating effort, impacting on consistency of messages and reducing the number of groups reached by their work. Our surveys of Agency staff also indicated that they would benefit from improvements in the way data is shared between partner organisations. The Agency explained that it is now encouraging the sharing of data at a local level between its staff and those of Natural England, but such data-sharing continues to be piecemeal and ad hoc in nature.

**3.13** While the Nitrates Directive places no specific requirement on the number of farms the Agency must visit, the Department is required to deliver an acceptable level of compliance inspections to avoid legal proceedings by the European Union. Under European cross compliance regulations, which includes the Nitrates Directive, the Agency is required to inspect compliance on a minimum of 1,100 farms, or 1 per cent of the total farms in receipt of the Single Farm Payment. Beyond this requirement it is up to the Department to determine what it considers as an acceptable or optimal level of compliance inspections.

**3.14** In 2009 the Agency carried out almost 3,620 inspections of farm businesses, of which 2,725 assessed compliance with the Nitrates Directive. As such, the Agency assessed over 1,600 more farms than was specifically required under the Directive. Since April 2010 the Agency has reduced the number of inspections to 1 per cent of agricultural holdings a year, approximately 1,100 farms.

## Few farms are found to be failing nitrate directive regulations

**3.15** Although the Department has started to report reductions in the level of nitrates entering surface waters, there is currently no evidence that the Nitrates Directive, or the Agency's associated regulatory inspection activity, has contributed to this. This lack of evidence could be because of the long lead time between the taking of corrective action and its impact.

**3.16** The Agency believes that the potential to tackle nitrate pollution through the regulations is limited. In 2008, 3 per cent (69) of the 2,300 farms inspected under the Nitrates Directive in 2008 were failed (**Figure 13**). Few of the failures directly relate to excessive use of nitrates, instead relating to record keeping. The Agency cites a number of potential reasons for the low failure rates, including: the limited scope of the Nitrates Regulations; the fact that these are one-off inspections and do not necessarily provide an indication of typical farming practice; and the Agency's preference for taking a more advisory approach to issues they consider to be minor, in line with the Government's policy for better regulation. Even where farmers are fully complaint with the Nitrates Directive, they may still be contributing to the level of nitrates found in water. This may be a result of factors outside of their control, such as sudden unexpected rainfall washing fertiliser into local rivers.

**Figure 13**
Reasons for failure of Nitrates Regulations in 2008

| | |
|---|---|
| Insufficient records | 43 |
| Nitrogen in excess of crop requirement | 13 |
| Fertiliser applied inappropriately | 5 |
| Excess of organic manure field limit | 3 |
| Whole farm nitrogen limit exceeded | 3 |
| Insufficient manure storage for closed period | 1 |
| Fertiliser applied in closed period | 1 |
| **Total** | **69** |

*Source: Environment Agency*

**3.17** Failure to comply with European regulations can result in farmers losing all or part of their single farm payment. Of the 69 Nitrate Directive failures, 47 had payments reduced by between 1 and 3 per cent.

## The Agency has limited enforcement powers to tackle diffuse pollution

**3.18** In addition to farms losing single farm payments for non-compliance with European regulations, the Agency has a number of mechanisms by which it can take reactive enforcement action against polluters: anti-pollution works notices, leading ultimately to the prosecution of polluters for contravention of these notices; direct prosecution for pollution under Environmental Permitting Regulations, the latest set of which was issued in April 2010; enforcement through permitting regimes; and enforcement under Nitrate Pollution Prevention Regulations. None of the measures in their current form appear very effective at tackling diffuse pollution. Seventy-four per cent of Agency operational staff and 80 per cent of managerial staff we surveyed felt that the Agency should take more enforcement action against those causing diffuse pollution.

**3.19** The Water Resources Act 1991 gives the Agency the power to prosecute those knowingly polluting water bodies. The nature of diffuse pollution, however, makes it difficult for the Agency to gather evidence to prosecute individuals and businesses. In 2008-09 the Agency prosecuted 631 individuals and organisations under this Act. The Agency does not categorise recorded pollution incidents as point source or diffuse but few of these are likely to relate to diffuse pollution because of the difficulty of obtaining sufficiently detailed supporting evidence.

**3.20** Anti-pollution works notices can be issued to prevent, remedy or prohibit any activities which have led, or could lead to, water pollution (such as inadequate storage of manure, silage and pesticides). The Agency may also carry out work it feels necessary to mitigate any threat and to recover the costs incurred from the person or business responsible using these notices. Although works notices were not originally designed to deal with the chronic and low level impacts that typify diffuse pollution, they have been identified in the River Basin Management Plans as an important tool for tackling this type of pollution in the future.

**3.21** In 2008-09 seven works notices were issued (**Figure 14**). On average the Agency has served around 11 notices annually since 2004-05 and some Regions have issued only one notice. Agency staff consider that the complexity of the issuing process, the disproportionate level of evidence required to support the notice and a lack of management and legal support is preventing them from using these notices more widely. The Agency believes that the threat of issuing a works notice is a deterrent and facilitates behavioural change. However, there is a risk that the deterrent effect will diminish unless offenders see notices being issued more frequently. In 2009 the Agency reviewed how these notices could be adapted for use for diffuse pollution and has drawn up a plan to streamline their use in 2010.

**Figure 14**
Anti-pollution works notices issued by the Agency

| 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
|---|---|---|---|---|
| 14 | 7 | 20 | 10 | 7 |

*Source: Environment Agency*

**3.22** Under the Water Resources Act 1991, the Agency may ask the Secretary of State to designate areas of England as a Water Protection Zone. In these areas the Agency can enforce changes in polluter behaviour through a variety of regulatory techniques where voluntary initiatives have been unsuccessful. To date one Water Protection Zone has been designated on a stretch of the River Dee in 1999. Whilst the original order was designed to tackle point source pollution, the Department has been slow in recognising the potential to use these powers to tackle diffuse pollution. In December 2009 the Department amended the power to designate these Zones to make them more suitable for addressing diffuse pollution. Detailed guidance on the use of this power is yet to be produced and, as at June 2010, the Department could not confirm when it would be available. The guidance will form part of a wider approach to addressing diffuse pollution and its development has already included several discussions with stakeholders.

**3.23** There has been a recent increase in the regulatory powers available to the Agency. The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (amended 1997) provide the Agency with powers to require farmers to improve the facilities for storing these substances where there was a significant risk of pollution. These regulations were remade in April 2010 to correct a technical fault which made some of their technical provisions invalid.

# Appendix One

## Methodology

The main elements of our fieldwork, which took place between May and July 2009, were:

| Method | Purpose |
|---|---|
| **1 Semi-structured interviews**<br>We conducted semi-structured interviews with a range of Agency staff in both operations and policy. We also interviewed 11 key stakeholder organisations, including government bodies, water industry representatives, conservation bodies, and farming organisations. | To assess the effectiveness of the Agency's:<br>• key programmes and projects, and its implementation of the Directive;<br>• joint working with stakeholders; and<br>• engagement and relationship with polluter groups. |
| **2 Case studies**<br>We selected eight sites in England to assess the Agency's work at a local level. The locations were selected to ensure we covered England Catchment Sensitive Farming Delivery Initiative areas and Nitrate Vulnerable Zones. Case studies involved interviews and workshops with Agency managerial and operational staff and key local stakeholders. | To develop a picture of the work the Agency conducts to tackle diffuse pollution at a local level and how national policy is delivered on the ground. |
| **3 International comparison**<br>We engaged PriceWaterhouseCoopers to conduct an international benchmarking exercise to compare the Agency's work with the following eight comparator countries: Australia, Denmark, France, Germany, Ireland, The Netherlands, New Zealand, and Scotland. | To benchmark the Agency's work internationally by looking at other countries':<br>• balance between regulation, education and incentives;<br>• enforcement powers; and<br>• initiatives and programmes to tackle diffuse water pollution. |

| Method | Purpose |
| --- | --- |
| **4 Survey of farmers**<br><br>We engaged Ipsos Mori to conduct CATI telephone survey of farmers in England. Ipsos Mori conducted 607 interviews from a sample of 3,600 provided by the Department for Environment Food and Rural and Affairs. The survey was conducted over a two-week period in July/August, including a one-day pilot. Further details on the surveys methodology are provided in the longer version of our methodology. | To assess:<br><br>● farmers' awareness, knowledge and interest in diffuse pollution issues;<br><br>● improvements that farmers have already made, or plan to make, to tackle diffuse pollution, and reasons for these changes;<br><br>● types and degrees of engagement with the Agency and farmers' assessment of the Agency's role; and<br><br>● barriers to changing farmers' behaviours and practices. |
| **5 Survey of Agency staff**<br><br>We conducted three e-surveys of Agency and Natural England staff:<br><br>● 84 Environment Officers were randomly selected, from a population of approximately 350 officers estimated to be involved in tackling diffuse pollution.<br><br>● We surveyed all 48 Catchment Sensitive Farming Officers.<br><br>● We surveyed one Agency manager from each of the seven regions and 20 areas (27 in total).<br><br>The response rate for the surveys was between 79 and 100 per cent. | To assess:<br><br>● how local priorities and objectives are set;<br><br>● the work being done to address local issues and pressures;<br><br>● how the Agency works with key stakeholders;<br><br>● the extent to which the Agency has been able to change the behaviours of key polluter groups; and<br><br>● how knowledge is shared between Agency areas and regions. |
| **6 Document review**<br><br>Our review included corporate documents from the Agency and the Department such as strategies, project plans and evaluations, and internal audit reports. We also reviewed a range of technical, scientific and academic documents on various aspects of diffuse pollution. | To inform our understanding of the Agency's and Department's approach and strategy to tackling diffuse pollution and the impact of current programmes and projects. |
| **7 Review of quantitative data**<br><br>We reviewed a range of quantitative data provided by the Agency and third parties, including: water quality data, financial data, water industry costs data, regulatory enforcement data, and farming survey data. | To assess:<br><br>● the current standards of water quality in England;<br><br>● the Agency's expenditure on tackling diffuse pollution;<br><br>● the costs faced by the water industry in managing diffuse pollution;<br><br>● the Agency's use of its enforcement powers; and<br><br>● the impact of the Agency's programmes and projects. |

# Appendix Two

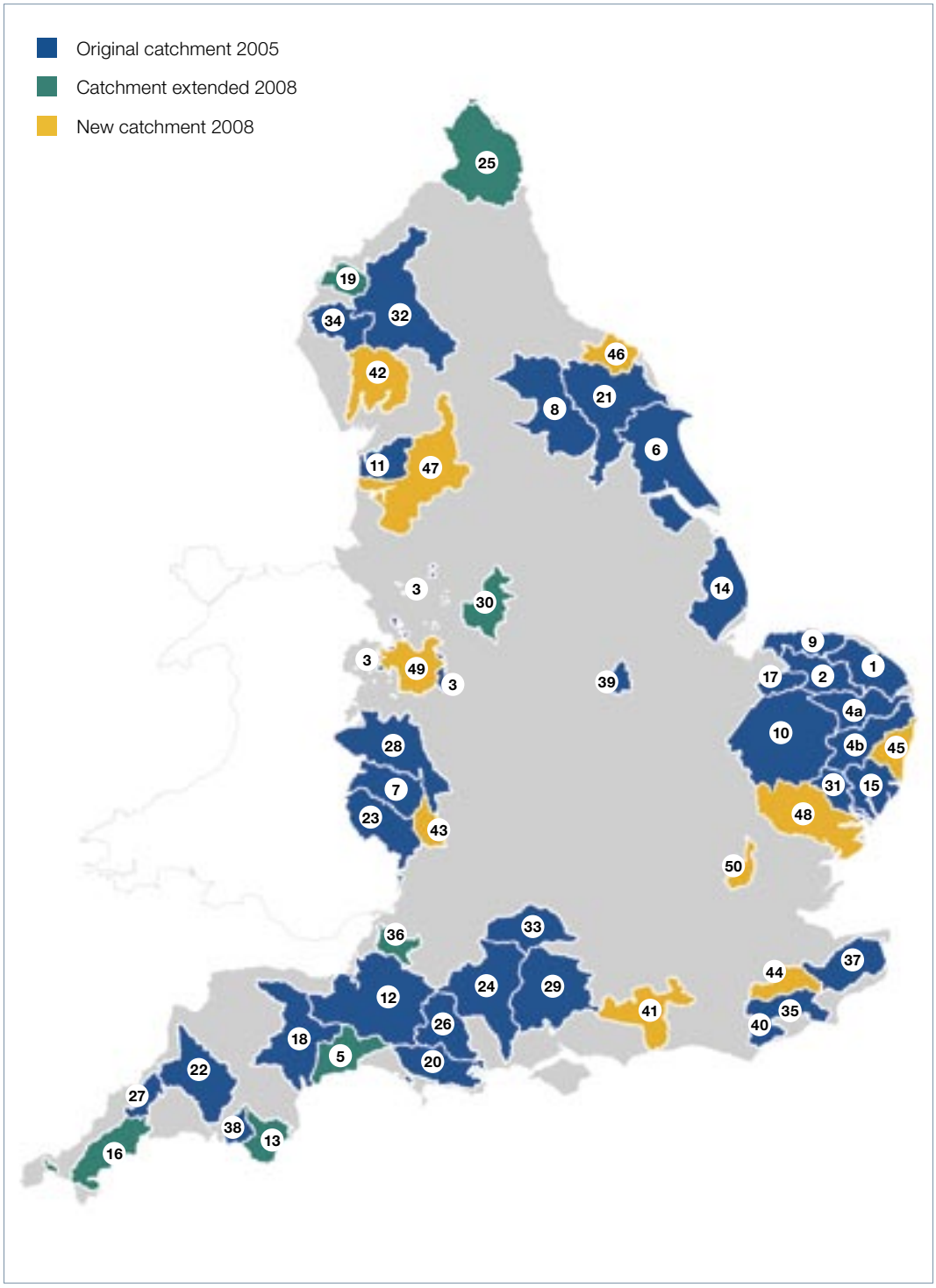
## The Initiative's priority catchments

**Original 40 Priority Catchments**

1 Bure, Ant and Muckfleet
2 River Wensum
3 West Midlands Meres and Mosses
4a Yare
4b Waveney
5 Rivers Axe and Otter
6 East Riding of Yorkshire and North Lincolnshire
7 River Lugg
8 Yorkshire Ouse, Nidd and Swale
9 North Norfolk Rivers
10 Little Ouse (Thetford Ouse)
11 River Wyre
12 Somerset Levels and Moors
13 Slapton Ley, Salcombe to Kingsbridge, Devon Avon and Dart
14 Lincolnshire Coast Rivers
15 Deben, Alde and Ore
16 West Cornwall catchments
17 River Nar
18 River Exe
19 Rivers Waver and Wampool
20 River Piddle, River Frome and Fleet Lagoon
21 Yorkshire Derwent
22 Tamar – Tavy
23 River Wye
24 Hampshire Avon
25 Tweed, Aln, Coquet and Coastal Streams
26 Dorset Stour
27 River Camel Valley and Tributaries
28 River Teme
29 Rivers Test and Itchen
30 Peak District Dales
31 Gipping and Orwell
32 River Eden and Tributaries
33 Rivers Lambourn and Kennet
34 Bassenthwaite Lake
35 East Rother and Walland Marsh
36 North Somerset Moors
37 The Stour
38 Yealm and Erme Estuaries
39 River Eye
40 Pevensey

**New Catchments 2008**

41 Arun and Western Rother
42 Rivers Kent and Leven
43 River Leadon
44 River Beult
45 River Blyth and Surrounding SSSIs
46 River Esk and North Yorkshire Coastal Streams
47 River Ribble
48 Rivers Stour and Colne
49 The Tern and Roden
50 Upper Roding


Original catchment 2005
Catchment extended 2008
New catchment 2008
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