

# Water for life and livelihoods

## River Basin Management Plan Thames River Basin District



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You can search maps for information related to this plan by using 'What's In Your Backyard'. <http://www.environment-agency.gov.uk/maps>.

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## This plan at a glance

This plan is about the pressures facing the water environment in this river basin district and the actions that will address them. It has been prepared under the Water Framework Directive, and is the first of a series of six-year planning cycles.

**By 2015, 22 per cent of surface waters (rivers, lakes estuaries and coastal waters) are going to improve for at least one biological, chemical or physical element**, measured as part of an assessment of good status according to the Water Framework Directive. This includes an improvement of **1737 km** of the river network in the river basin district, in relation to fish, phosphates, specific pollutants and other elements.

**25 per cent of surface waters will be at good or better ecological status and 17 per cent of groundwater bodies will be at good overall status by 2015.** In combination, 25 per cent of all water bodies will be at good or better status by 2015. The Environment Agency wants to go further and achieve an additional two per cent improvement to surface waters across England and Wales by 2015.

The biological parts of how the water environment is assessed – the plant and animal communities – are key indicators. **At least 30 per cent of assessed surface waters will be at good or better biological quality by 2015.**

The Thames River Basin District is one of the most populated parts of Britain. The district covers both rural and urban environments stretching from the Thames estuary, including London to the limestone hills of the Cotswolds. One of the most iconic rivers in Britain runs through it, the River Thames. Water supports these landscapes and their wildlife, and it is vital to the livelihoods of those who live and work here.

There has been great progress in protecting these natural assets and cleaning up many of the water environment problems people have created in the past. However, a range of challenges still remain.

The key issues include:

- point source pollution from water industry sewage works;
- physical modification of water bodies;
- diffuse pollution from agricultural activities;
- abstraction;
- diffuse pollution from urban sources.

At present, because of these issues, and the higher environmental standards required by the Water Framework Directive, only 23 per cent of surface waters are currently classified as good or better ecological status and 35 per cent of groundwater bodies are at good quantitative status. 28 per cent of assessed surface water bodies are at good biological status, although we expect this to change to 24 per cent when we have assessed all water bodies.

In order to meet these targets, it is important for everyone to play their part now and in the future. River basin management is an opportunity for this generation – for people and organisations to work together to improve the quality of every aspect of the water environment – to create an environment we are all proud of and can enjoy.

# 1 About this plan

This plan focuses on the protection, improvement and sustainable use of the water environment. Many organisations and individuals help to protect and improve the water environment for the benefit of people and wildlife. River basin management is the approach the Environment Agency is using to ensure our combined efforts achieve the improvement needed in the Thames River Basin District.

River basin management is a continuous process of planning and delivery. The Water Framework Directive introduces a formal series of six year cycles. The first cycle will end in 2015 when, following further planning and consultation, this plan will be updated and reissued.

The Thames River Basin District Liaison Panel has been central to helping us manage this process. The panel includes representatives of businesses and industry, planning authorities, environmental organisations, water consumers, navigation, fishing and recreation bodies and central, regional and local government, all with key roles to play in implementing this plan. The Environment Agency has also worked extensively with local stakeholders to identify the actions needed to address the main pressures on the water environment.

This plan has been prepared under the Water Framework Directive, which requires all countries throughout the European Union to manage the water environment to consistent standards. Each country has to:

- prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- aim to achieve at least good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027;
- meet the requirements of Water Framework Directive Protected Areas
- promote sustainable use of water as a natural resource;
- conserve habitats and species that depend directly on water;
- progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants;
- contribute to mitigating the effects of floods and droughts.

The plan describes the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment, and what actions will be taken to address the pressures. It sets out what improvements are possible by 2015 and how the actions will make a difference to the local environment – the catchments, the estuaries and coasts, and the groundwater.

Looking towards implementation, the plan highlights the programme of investigations to be undertaken. This will identify more actions, particularly those associated with diffuse pollution, for delivery during the first cycle. New national measures, made available by government, will also lead to additional improvements. At local level, the Environment Agency will be working closely with a wide variety of organisations and individuals, not only to deliver the commitments contained in the plan, but wherever possible to expand upon them for the benefit of the water environment.

## **Strategic Environmental Assessment**

A Strategic Environmental Assessment of the draft plan was completed to review the effects of the proposals on the wider environment. The assessment enabled us to make sure that this plan represents the most sustainable way of managing the water environment. The Post Adoption Statement and accompanying Statement of Environmental Particulars is available at [www.environment-agency.gov.uk/wfd](http://www.environment-agency.gov.uk/wfd).

## **Habitats Regulations Assessment**

A Habitats Regulations Assessment of this plan has been carried out to consider whether it is likely to have a significant effect on any Natura 2000 sites. The assessment was undertaken by the Environment Agency, in consultation with Natural England.

The assessment concluded that the River Basin Management Plan is unlikely to have any significant negative effects on any Natura 2000 sites. The Plan itself does not require further assessment under the Habitats Regulations. This conclusion is reliant on the fact that before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations. Any plans, project or permissions required to implement the measures must undergo an appropriate assessment if they are likely to have a significant effect.

A copy of the Habitats Regulations Assessment of this plan is available at [www.environment-agency.gov.uk/wfd](http://www.environment-agency.gov.uk/wfd).

## **Impact Assessment**

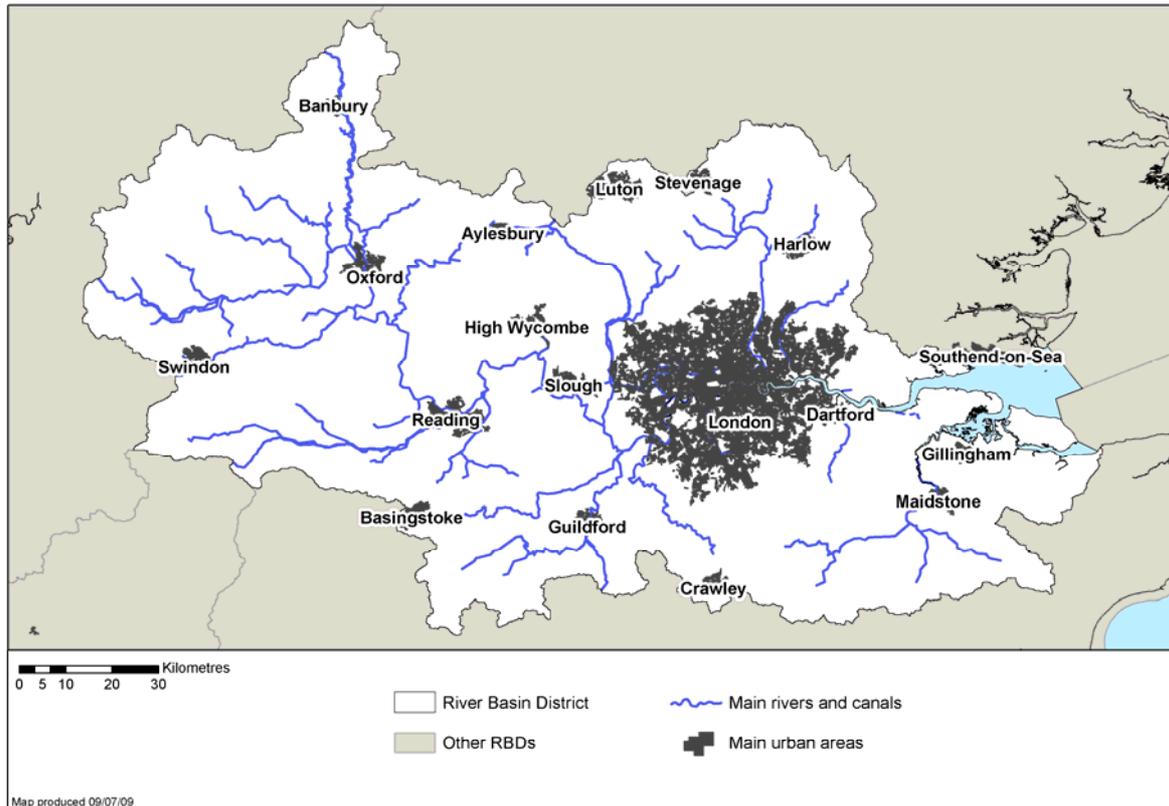
An impact assessment of this plan has been completed. It looks at the costs of a reference case, which includes existing actions and new actions required by existing obligations, and the incremental costs and benefits of implementing the additional new actions required by this plan. The impact assessment also provides a forward look to the costs and benefits of potential action in future cycles (2015 to 2021 and 2021 to 2027).

A copy of the impact assessment is available at [www.environment-agency.gov.uk/wfd](http://www.environment-agency.gov.uk/wfd).

## 2 About the Thames River Basin District

The Thames River Basin District covers an area of 16,133 square kilometres from the source of the River Thames in Gloucestershire through London to the North Sea. Dominated by Greater London, the eastern and northern parts of the river basin district are heavily urbanised whereas the area to the west of London has considerable areas of rural land.

Figure 1 Map of the Thames River Basin District



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The western parts of the catchment are predominantly rural with towns such as Oxford and Swindon concentrated along the M40 and M4 motorway corridors.

The Thames River Basin District is one of the driest in the UK with rainfall levels below the national average. The River Thames is an important water source providing two-thirds of London's drinking water. Groundwater is very important providing around 40 per cent of public water supplies with chalk forming the predominant aquifer. Current assessments show that groundwater is fully used over much of the Thames River Basin District. Therefore it is essential to maintain and improve the quantity and quality of groundwater.

The Government has identified a number of initiatives across the Thames River Basin District that form the focus for targeted housing growth, regeneration and economic development. These include:

- Four Growth Areas - Thames Gateway; Milton Keynes & South Midlands (MKSM); London-Stansted-Cambridge-Peterborough (LSCP); Dacorum, St Albans & Welwyn Hatfield.
- Six Growth Points - Oxford, Swindon, Didcot, Reading, Basingstoke, and Reigate & Banstead.

- Two eco-towns - North West Bicester and Whitehill Bordon. (There is also the potential for a further eco-town in the Thames River Basin District at North East Elsenham.)

Business services make up almost one fifth of the economy in the Thames River Basin District. The transport sector is also important including the ports of London and the Medway that provide deepwater facilities for international marine traffic. The hosting of the 2012 Olympics forms part of this economy and will bring in significant social and financial developments as well as opportunities to the east of London.

Even though the district is one of the most densely populated and urbanised parts of the UK, agriculture is one of the most important industries. In 2004, 35 per cent of the Environment Agency Thames Region was classified as arable, 19 per cent grassland and 11 per cent woodland. Farming varies from intensive fruit and vegetable farming to mechanised arable farming on chalk to dairy and beef farming on grassland. A sustainable agricultural industry is vital to maintaining a high class environment and vibrant rural economy.

### Pressures on the water environment

A great deal is already being done to protect and improve the water environment. However, it will take more time, effort and resources to deal with the pressures that have significantly altered and damaged the environment over the last few hundred years.

There are a number of major challenges:

High population densities and transport networks put pressure on the water environment. **Discharges from sewage works can impact on the quality of water** or the enjoyment of it, and water companies will implement a major programme of work to address this issue.

The Government has identified a need for two million new homes in England by 2016 as the result of a changing population. Approximately 375,000 of these will be in the Thames River Basin District. These will be in the Growth Points identified in the Regional Spatial Strategies and the new eco towns. These areas will experience the largest and most rapid changes to their urban area. Managed well, this **growth and regeneration will be an opportunity** to make improvements to the water environment in a way that enhances people's quality of life.

The way land is managed has given rise to complex pollution and flooding issues. **Diffuse pollution is a major pressure** on the water environment, and can come from urban areas as well as rural areas. Further improvements are needed to farm practices to protect water quality and allow wildlife to thrive.

Rivers and estuaries have been highly modified physically, to facilitate development, flood and coastal risk management or navigation. **Physical modification** needs to be addressed in order to achieve more natural functioning of wetland ecosystems, and protect fish and their habitats into the future.

**Demand for water is extremely high** in the south east of England, leading to concerns over maintaining the water resources available for people and the environment. The Thames River Basin District is one of the driest in the country receiving a quarter less rainfall than the national average. There is less water per person than many Mediterranean countries. The aquifers that supply drinking water also have to provide flow for rivers and wetlands. It is therefore essential to safeguard supplies and the environment by protecting groundwater from pollution, and managing the water resource.

The water environment is constantly under threat from new **invasive non-native species**. These species such as the signal crayfish have an often rapid and adverse affect on the natural fauna and flora. Monitoring and prevention is important as some species can be extremely difficult to eradicate once they have taken hold.

Natural forces such as sea level rise, coupled with climate change, can pose a threat to people, property and coastal habitats.

All these challenges relate to a range of specific pressures that need to be dealt with in this river basin district. These are:

- **abstraction and other artificial flow regulation** – problems related to taking water from rivers, lakes and groundwater;
- **non-native species** - invasive non-native species are plants and animals that have deliberately or accidentally been introduced outside their natural range, and by spreading quickly threaten native wildlife;
- **organic pollution** – an excess of organic matter such as manure or sewage which depletes the oxygen available for wildlife;
- **pesticides** – chemical and biological products used to kill or control pests;
- **phosphate** – a nutrient in sewage and fertiliser that can cause too much algae to grow in rivers when in excess quantities;
- **physical modification** – changes to the structure of water bodies such as for flood defence purposes;
- **sediment** – undissolved particles floating on top of or suspended within water, for example those caused by increased rates of soil erosion from land based activities. Sedimentation can smother river life and spread pollutants from the land into the water environment;
- **urban and transport pollution** – a range of pollutants related to urban areas and the transport network;
- **chemicals (including priority hazardous substances, priority substances and specific pollutants)** - such chemicals that may affect the physiology, growth, development and reproduction of aquatic organisms.

### 3 Water bodies and how they are classified

In the context of the Water Framework Directive, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. For the purpose of river basin management, these waters are divided into units called water bodies, as summarised in Table 1. In addition, this plan aims to protect wetlands that depend on groundwater.

Table 1 **Water body numbers in the Thames River Basin District**

	Water body types					Total
	Rivers, canals and surface water transfers (SWTs)*	Lakes and reservoirs**	Estuaries (transitional)	Coastal	Groundwater	
Natural water bodies	304	7	1	0	46	<b>358</b>
Artificial water bodies	35	50	5	0	n/a	<b>90</b>
Heavily modified water bodies	144	19	5	1	n/a	<b>169</b>
<b>Total</b>	<b>483</b>	<b>76</b>	<b>11</b>	<b>1</b>	<b>46</b>	<b>617</b>

\* The total length of river covered by the Directive in this river basin district is 4,925 kilometres.

\*\* The lake and reservoir category includes 4 ditches that are in Sites of Special Scientific Interest.

The Water Framework Directive sets a target of aiming to achieve at least 'good status' in all water bodies by 2015. However, provided that certain conditions are satisfied, in some cases the achievement of good status may be delayed until 2021 or 2027.

#### Surface waters

For surface waters, good status is a statement of 'overall status', and has an ecological and a chemical component. Good ecological status is measured on the scale high, good, moderate, poor and bad. Chemical status is measured as good or fail.

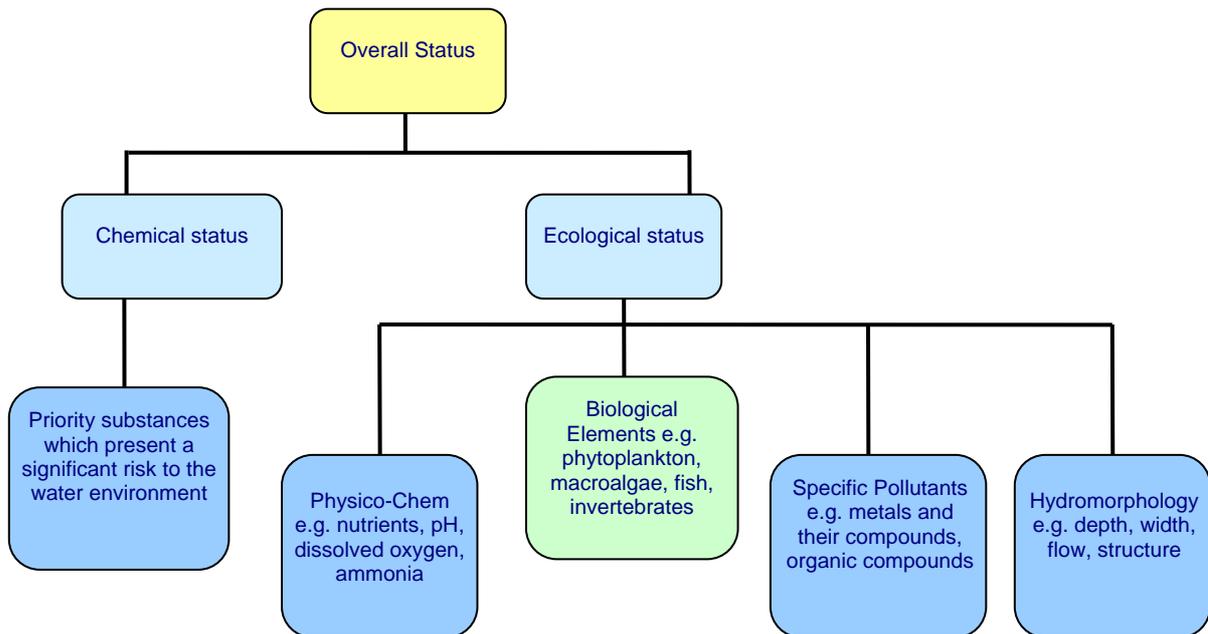
Good ecological status applies to natural water bodies, and is defined as a slight variation from undisturbed natural conditions. Figure 2 below shows how status is determined for surface waters. Each component has several different elements. These are measured against specific standards and targets developed by the Water Framework Directive UK Technical Advisory Group (UKTAG) and the European Union.

To understand the underlying reasons for water body status it is helpful to break down the results. Ecological status could be driven by the presence of a single chemical substance slightly exceeding the required standard. As well as ecological status this plan highlights the results of biological assessments (referred to as biological status) as these are the main indicators of the health of the environment for surface waters.

#### Monitoring and components of overall status

The monitoring programme for river basin management is based on a far wider range of assessments than were carried out in the past. A range of elements are measured in each water body, and a classification is produced based on a 'one out, all out' principle. This uses the poorest individual element result to set the overall classification.

Figure 2 The components of overall status for surface water bodies



The classification of water bodies will improve as new monitoring data are collected and better methods of assessment are developed. Future monitoring will help show where environmental objectives are already being met and where more needs to be done to improve the water environment. Monitoring will also give us some information on the spread of invasive non-native species.

The Water Framework Directive recognises the key role that water resources and habitats play in supporting healthy aquatic ecosystems. It requires that water bodies are managed to protect or improve hydromorphological conditions. Hydromorphology is a term that covers the flow of water in a water body and its physical form. The term encompasses both hydrological and geomorphological characteristics that help support a healthy ecology in rivers, lakes, estuaries and coastal waters.

### Artificial and heavily modified waters

Some surface water bodies are designated as 'artificial' or 'heavily modified'. This is because they may have been created or modified for a particular use such as water supply, flood protection, navigation or urban infrastructure.

By definition, artificial and heavily modified water bodies are not able to achieve natural conditions. Instead the classification and objectives for these water bodies, and the biology they represent, are measured against 'ecological potential' rather than status.

For an artificial or heavily modified water body to achieve good ecological potential, its chemistry must be good. In addition, any modifications to the structural or physical nature of the water body that harm biology must only be those essential for its valid use. All other such modifications must have been altered or managed to reduce or remove their adverse impact, so that there is the potential for biology to be as close as possible to that of a similar natural water body. Often though, the biology will still be impacted and biological status of the water body may be less than good.

## Groundwater

For groundwater, good status has a quantitative and a chemical component. Together these provide a single final classification: good or poor status.

A ground water body will be classified as having poor quantitative status in the following circumstances; where low ground water levels are responsible for an adverse impact on rivers and wetlands normally reliant on ground water; where abstraction of ground water has lead to saline intrusion; where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall.

Poor chemical status occurs if there is widespread diffuse pollution within the groundwater body, the quality of the groundwater is having an adverse impact on wetlands or surface waters, there is saline intrusion due to over abstraction, or the quality of water used for potable supply is deteriorating significantly. There are other objectives for groundwater quality in addition to meeting good status. These are the requirements to prevent or limit the input of pollutants to groundwater and to implement measures to reverse significant and sustained rising trends in pollutants in groundwater.

## Protected areas

Some areas require special protection under European legislation.

The Water Framework Directive brings together the planning processes of a range of other European Directives. These Directives, listed in table 2, establish protected areas to manage water, nutrients, chemicals, economically significant species, and wildlife – and have been brought in line with the planning timescales of the Water Framework Directive. Meeting their requirements will also help achieve Water Framework Directive objectives.

Table 2 **Other Directives and their Water Framework Directive protected areas**

Directive	Protected area	Number of protected areas
Bathing Waters	Recreational waters	15
Birds	Natura 2000 sites (water dependent special protection areas)	5
Drinking Water	Drinking water protected areas	93
Freshwater Fish	Waters for the protection of economically significant aquatic species	433
Shellfish Waters	Waters for the protection of economically significant aquatic species	3
Habitats	Natura 2000 sites (water dependent special areas of conservation (SACs))	11
Nitrates	Nitrate Vulnerable Zones	78% land area
Urban Waste Water Treatment	Sensitive areas	11

Achieving the objectives of these protected areas is a priority for action in this plan. Annex D sets out their objectives and the actions required for Natura 2000 sites and the new Drinking Water Protected Areas required under the Directive. Annex C describes the actions required for all protected areas. In addition, there are two new daughter Directives (Groundwater and Environmental Quality Standards) that will be used to implement specific parts of the Water Framework Directive.

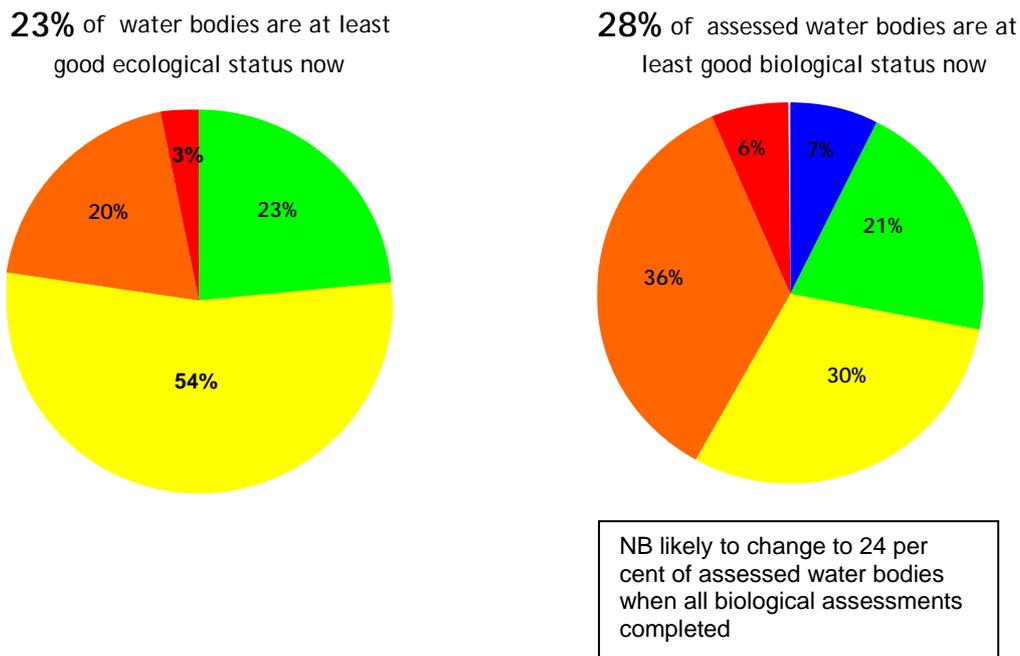
## 4 The state of the water environment now

The current status classification is the baseline from which improvements and the 'no deterioration in status' objective of the Water Framework Directive is measured. The current status classification has been updated since the draft plan. It is different to that presented in the draft plan because:

- the quality of assessments has been improved by refining classification methods;
- the accuracy of individual assessment tools has improved, especially for fish;
- a number of water bodies that were identified as potentially being heavily modified have not been designated as such in this plan because monitoring shows that they currently achieve good status;
- improvements from the water companies' Periodic Review 2004 have now been factored in;
- an additional 28 lakes have been classified that were previously unassessed.

23 per cent of surface waters are at good or better ecological status/potential. 28 per cent of assessed surface waters are at good or better biological status now. 571 surface water bodies have been assessed for ecological status/potential and 362 for biological status. This data is represented in Figure 3.

Figure 3 **Ecological status/potential and biological status of surface water bodies now**



Statistics for both good ecological status or potential and biological status are influenced by the relative number of artificial and heavily modified waters and their classification. In the Thames River Basin District, 26 per cent of 259 artificial and heavily modified surface water bodies are currently classified as at good or better ecological potential, compared to 21 per cent of 312 natural surface water bodies at good or better ecological status. As biological monitoring continues it is likely that the percentage of water bodies at good or better biological status will change from 28 to 24 per cent. This is explained further in the section on Biological status and monitoring.

For groundwater bodies, currently 35 per cent are at good quantitative status and 43 per cent are at good chemical status.

## Reasons for not achieving good status or potential

This section takes a closer look at rivers. The majority of management actions in the first river basin management cycle will be applied to rivers. Reasons for not achieving good status or potential in other surface waters are being developed. The first course of action for lakes, coasts and estuaries is to develop a better understanding of the issues.

To identify what needs to be done to improve the environment, the reasons for not achieving good status need to be understood. The main reasons most frequently identified by Environment Agency staff using monitoring data and their knowledge and experience of individual water bodies are shown in Table 3. Each relates to one or more pressures, which in turn have an impact on elements of the classification.

The reasons for failure include point source discharges from water industry sewage works, diffuse source pollution from agriculture, abstraction and a range of reasons due to physical modifications. The actions in this plan will increase the number of waters achieving good status or potential, for example through significant investment in improving discharges from sewage works and changes to land management practices. Even if good status is not completely achieved, they will also lead to improvements to the key elements affected.

**Table 3 Main reasons (where known) for not achieving good ecological status or potential in rivers**

Reason for failure	Key elements affected
Point source water industry sewage works	diatoms, invertebrates, phosphate
Physical modification flood protection and coastal erosion protection	mitigation measures for morphology
Diffuse source agricultural	diatoms, invertebrates, phosphate
Physical modification urbanisation	fish, invertebrates, mitigation measures for morphology
Physical modification wider environment	fish, invertebrates, mitigation measures for morphology
Abstraction	hydrology
Physical modification land drainage	fish, invertebrates, mitigation measures for morphology
Physical modification barriers to fish migration	fish
Diffuse source mixed urban run-off	ammonia, dissolved oxygen, fish, invertebrates, phosphate,
Physical modification water storage and supply	fish, invertebrates, mitigation measures for morphology

It is important to note that because classification involves a wider range of elements than previous monitoring schemes, and many of the key pressures are complex and occur in combination, we often do not know the reason for a failure. For many water bodies either, the reasons for failure are unknown, or it is uncertain whether there is a failure or whether pressures really are causing an impact. In these cases we will need to investigate, as discussed in Section 6, Investigations – improving outcomes for 2015.

For groundwater quality, the main reasons for poor status are high or rising nitrate concentrations, with some failures for pesticides and other chemicals. The main reason for poor quantitative status is that abstraction levels – mainly for drinking water – exceed the rate at which aquifers recharge. The plan identifies a range of actions to prevent deterioration

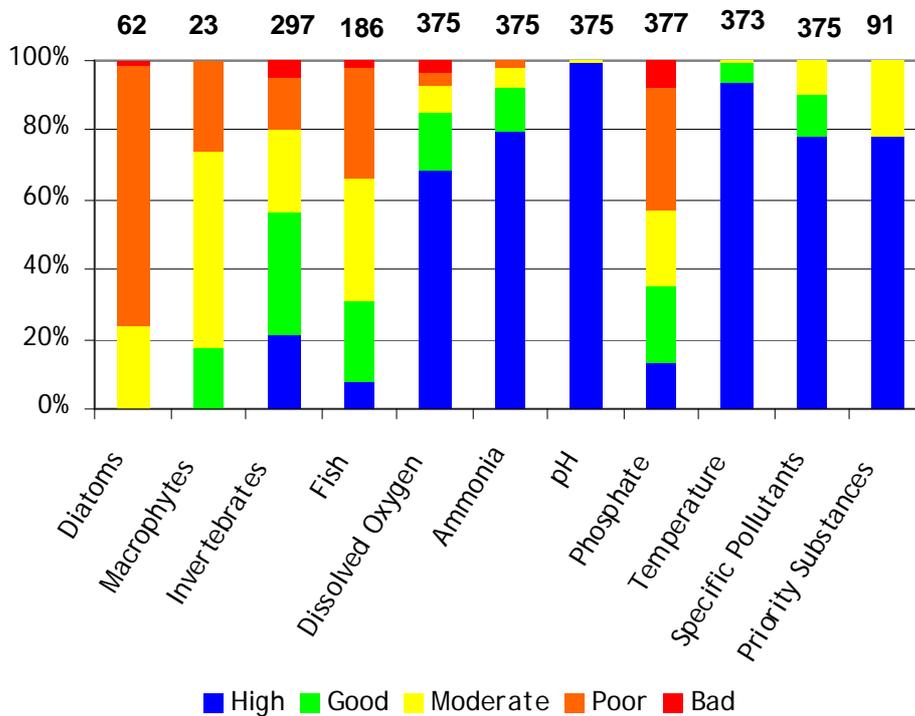
and improve groundwater elements, as well as investigations to improve the confidence in groundwater classification.

### Classification of individual elements

For rivers, which comprise the majority of water bodies in the river basin district, the main elements indicating that the standards for good ecological status are not being achieved are diatoms, macrophytes, fish, phosphate and invertebrates. This is shown in Figure 4.

The results for macrophytes (aquatic plants) and diatoms (microscopic algae) are from relatively fewer water body assessments based on a new (2007) risk based monitoring programme. However, as would be expected, the results for these elements confirm the presence of pressures on biology in many of the assessed water bodies.

Figure 4 **Proportion of assessed river water bodies in each status class, by element** (numbers above bars indicate total number of water bodies assessed for each element)



Excessive sediment is a possible cause for biology not being good in a number of water bodies. At present however, standards are not available to identify clearly where sedimentation is excessive. The Environment Agency will be developing techniques to assess the impact of sedimentation as one of the actions in this plan

### Case study 1: **Making room for fish**



Barriers to fish passage are one of the big issues affecting the ecology of rivers in the Thames River Basin District. This River Basin Management Plan has a Fish Pass Programme which will make room for fish, by addressing five priority structures in the Medway and Darent. Together they will contribute to the ecological health of 100 km of river.

A recent success has been the creation of the Porters Lock canoe and fish pass, which is the first of its type in the country.

### **Biological status and monitoring**

New monitoring programmes for the Water Framework Directive since 2007 focus on locations where the Environment Agency suspects there may be a problem caused by pressures on the water environment. The Environment Agency does not yet have biological assessments for all relevant water bodies. In this river basin district 63 per cent of water bodies have an assessment for at least one biological element. The number of water bodies covered by biological monitoring is set to increase over the next three years. As new information becomes available it is likely that some water bodies currently labelled as good biological status will be shown to have a lower quality.

For instance, from the chemical monitoring the Environment Agency is now clear that there is a link between high levels of phosphate in surface waters and biological failures in the main river type (lowland alkaline rivers). The assessment of reasons for failure that we have started to undertake shows that across England and Wales 22 per cent of river water bodies are failing to achieve good status/potential because of excessive levels of phosphate. In this river basin district phosphate results show that it is likely that the percentage of water bodies at good or better biological status will change from 28 to 24 per cent when additional water bodies are assessed for diatoms and/or macrophytes. This same analysis points to discharges from sewage treatment works and releases from agriculture being responsible for the majority of this. Rather than wait for the results of more biological assessments, we need to ensure corrective action is started in the first plan cycle.

Through the Water Services Regulation Authority's (Ofwat's) determination of the water industry periodic review of investment, the water industry will continue their investment programme targeted at addressing their contribution to phosphate pollution. It is important that agriculture also makes a contribution in the first cycle improvements.

The Environment Agency is now working with the main farming groups to understand better the main ways in which phosphate from land enters and is transported in water bodies. Farming groups have agreed to use this information to encourage individual farmers to take action to reduce their contribution to water pollution. We will trial this new approach in the Anglian River Basin District and through the Campaign for Farmed Environment. We will also look at what the advice and incentives available through agri-environment schemes and the England Catchment Sensitive Farming Delivery Initiative can do to reduce phosphate pollution of water and wetlands.

In parallel with this approach, the Environment Agency will continue to develop work on regulatory measures, such as piloting Water Protection Zones (WPZs) so that if voluntary

approaches are shown not to work in a particular area, or where higher environmental standards are needed in for example protected areas, we are ready and able to ensure progress is made before 2015. The work to identify the ways in which phosphate enters water bodies and the means of reducing this will inform the measures that might be applied in WPZs. WPZs will only be effective if the means of control have been clearly identified.

## 5 Actions to improve the water environment by 2015

The following gives an overview of the key contributions from sectors and organisations that the Environment Agency will work with to implement this plan.

[All sectors](#)

[Agriculture and rural land management](#)

[Angling, fisheries and conservation](#)

[Central government](#)

[Environment Agency](#)

[Industry manufacturing and other business](#)

[Local and regional government](#)

[Mining and quarrying](#)

[Navigation](#)

[Urban and transport](#)

[Water industry](#)

[Individuals and communities](#)

**These actions are summarised versions of the full programme of actions that can be found in Annex C.**

The lead and partner organisations for each action is given in Annex C. Note that many actions will involve more than one sector and need to be implemented in partnership. Actions in Annex C are therefore duplicated across the relevant sectors. Sectors are encouraged to put further actions forward during the implementation of this plan.

After the action tables there are sections on:

[Actions to protect drinking water](#)

[The costs of action in this plan](#)

[Taking action in a changing climate](#)

[Working with other plans and programmes](#)

### All sectors

All sectors must comply with the range of existing regulations, codes of practice and controls on the use of certain substances.

The Environment Agency and partner organisations where appropriate, will carry out investigations to establish the extent and source of pressures and to identify any further actions that are technically feasible and not disproportionately costly. These actions will be carried out during this or future management cycles.

Investigations and actions will also be carried out in drinking water protected areas (where necessary focused in safeguard zones) to reduce the risk of deterioration in raw water quality and therefore reduce the need for additional treatment to meet drinking water standards.

A small number of candidate Water Protection Zones (WPZs) will be promoted nationally early in the first plan cycle, where there is clear evidence that voluntary mechanisms such as the England Catchment Sensitive Farming Delivery Initiative and pollution prevention campaigns are not sufficient by themselves to achieve the required environmental objectives. The candidate WPZs will be used to establish the usefulness of the concept, but as we have said earlier in describing the results of the biological monitoring, this in turn relies on a clear understanding of the practices causing problems and the techniques to avoid them.

## Agriculture and rural land management

This sector has a big role in looking after and improving the quality of the rural environment. Even though the Thames River Basin District is one of the most densely populated and urbanised parts of the UK, agriculture is one of the most important industries. In 2004, 65 per cent of the Environment Agency Thames Region was classified as arable, grassland and woodland. Farming systems include intensive fruit and vegetable, mechanised arable farming and dairy and beef farming. A sustainable agricultural industry is vital to maintaining a high class environment and vibrant rural economy.

A combination of incentive, advisory and regulatory measures have been in place for a number of years to help farmers and other land managers protect the environment. For instance the Code of Good Agricultural Practice and agri-environmental schemes, such as Entry Level Stewardship and Higher Level Stewardship. Wise stewardship of resources such as soil, nutrients, water and energy helps to cut costs while maintaining or improving the productivity of land and livestock.

Nevertheless, the way in which land is managed is still having a negative impact on natural resources and further action is needed to address diffuse pollution and other key pressures in rural areas. Government will consider introducing further restrictions of activities and restrictions on chemicals where there is evidence that voluntary actions failed to deliver.

Example actions
<p><b>Continue Cross-Compliance</b> – to help farmers comply with a range of Directives to reduce pollution from agriculture at farms receiving subsidies (all land managers).</p> <ul style="list-style-type: none"> <li>• Across the river basin district</li> </ul>
<p>Encourage uptake of <b>Voluntary Initiative best practice on pesticide use</b> by land managers within the agricultural and amenity sectors (Voluntary Initiative, Environment Agency)</p> <ul style="list-style-type: none"> <li>• Across the river basin district</li> </ul>
<p>Maintain a nationally funded advice-led partnership under the England <b>Catchment Sensitive Farming</b> Delivery Initiative (Natural England, Environment Agency) to reduce diffuse water pollution from agriculture in priority areas.</p> <ul style="list-style-type: none"> <li>• Kennet and Lambourn, Upper Roding and River Beult river catchments</li> </ul>
<p>Establish and enforce <b>Nitrate Vulnerable Zones</b> in catchments at high risk from nitrate pollution (Environment Agency) to reduce the amount of nitrate and other pollutants entering water from farmland.</p> <ul style="list-style-type: none"> <li>• Across the river basin district</li> </ul>
<p>Work with Natural England to target <b>Catchment Sensitive Farming type activities and agri-environment schemes</b> (Natural England, Environment Agency) to ensure adoption of best farming practice and reduce diffuse pollution from agriculture.</p> <ul style="list-style-type: none"> <li>• Priority water bodies as specified in Annex C</li> </ul>
<p>Designate and enforce <b>Water Protection Zones</b> and apply appropriate measures to control high risk activities (Environment Agency, Defra). The Zones will provide a regulatory tool to control diffuse pollution to water or physical pressures in high risk areas where existing mechanisms will not meet Water Framework Directive objectives.</p> <ul style="list-style-type: none"> <li>• Candidate pilot in the River Cherwell catchment. Initially around eight Zones in locations to be decided across England.</li> </ul>
<p>Promote “<b>Best Farming Practice</b>”, including the use of soil and nutrient management plans.</p> <ul style="list-style-type: none"> <li>• Across Thames River Basin District</li> </ul>
<p>Promote the importance of <b>soil quality</b>, structure and organic matter.</p> <ul style="list-style-type: none"> <li>• Across Thames River Basin District</li> </ul>

## Case Study 2: Loddon farm advice project

The Environment Agency is working in partnership with the Hampshire and Isle of Wight Wildlife Trust to support the Loddon Farm Advice Project. The upper Loddon has a number of sensitive chalk streams, such as the River Lyde, Whitewater and Hart. They are classified as salmonid rivers and protected under the Freshwater Fish Rivers Directive 78/659/EEC. Many of the water bodies within the Loddon catchment have been classified as poor ecological status under Water Framework Directive, with agriculture being one sector contributing to the pollution problem. The Loddon Farm Advice Project offers land owners free best farming practice advice to help reduce diffuse sediment and diffuse phosphate pollution.

## Angling and conservation

The angling and conservation sector has a large role to play in delivering local 'on the ground' improvements to the water environment as well as working to establish new mechanisms. It engages communities and individuals, building on their skills and experience and actively involves them in making these improvements. Angling is a popular past time that can provide local intelligence on environmental quality – over 232,000 rod licences were sold in 2008 in the Environment Agency Thames Region.

Many environmental organisations can influence environmental quality through the land they own or manage. Riparian owners have specific responsibility for the management of their watercourses so their support, involvement and investment in implementing the actions is crucial.

Example actions
Develop a <b>regional fish passage strategy</b> which will identify and prioritise opportunities to improve fish migration. <ul style="list-style-type: none"><li>• Across Thames River Basin District</li></ul>
Establish <b>invasive non-native species forum</b> to coordinate action across Thames River Basin District and produce a non-native species management plan. <ul style="list-style-type: none"><li>• Across Thames River Basin District</li></ul>
Work with anglers, fishing clubs, boat users and riparian owners to <b>identify areas of bankside erosion</b> and the associated impacts.
Set up a strategic, robust and reliable <b>network of volunteer 'spotters'</b> to assist with managing invasive non-native species.

### Case Study 3: Taking opportunities to restore habitat

Improving marginal habitats is recognised as being necessary for heavily modified water bodies to reach good ecological potential.

Throughout the Olympic Park about 1km of river bank has been converted from vertical sheet piled walls which provided little habitat, to vegetated and reed fringed sloping banks.

These new naturalised banks will provide fish with good spawning habitat and help to increase the survival of juvenile fish. Marginal plants provide refuge for fish from predators, high flood flows and provide habitat for the invertebrates on which fish feed.



Artist's impression of the new reed beds on the lower River Lee within the Olympic Park

A good fish population is an indicator of a healthy river and angling is an inclusive sport with proven social and economic benefits.

By delivering the aims of the Water Framework Directive this work will help ensure that the historic fishery of the River Lee will have a bright future throughout the Olympic legacy.

### Central Government

Government will continue to influence the development of European legislation to help bring forward initiatives that protect and improve the water environment, and that are technically feasible and not disproportionately costly. Defra are considering further policy options to help improve ambition in achieving objectives in this first plan cycle. These include controls on phosphate in detergents, tackling mis-connections, general binding rules, code of practice on septic tanks and options to increase the use of sustainable drainage systems to reduce risks of flooding and pollution of ground and surface waters during periods of high rainfall.

The Environment Agency, Forestry Commission, Natural England and the Marine and Fisheries Agency (to become the Marine Management Organisation) are the key government agencies for this plan. The agencies will work together on relevant actions.

#### Example actions

Enhanced capital allowance scheme is a government incentive giving tax relief for the purchase of water efficient plant and machinery to business that pay income or corporation tax. See [www.eca-water.gov.uk](http://www.eca-water.gov.uk) (Defra/Government).

- National

Implement the water related actions of the **Invasive Non-native Species Framework** Action Plan for Great Britain (Defra, Environment Agency).

- National

Disseminate and develop **species identification guides** and train key groups, to improve early detection of invasive non-native species (Natural England)

- National

## Environment Agency

The Environment Agency is the Government's lead agency for implementing the Water Framework Directive. We will continue to monitor, provide advice and manage improvements to the water environment. We regulate discharges to and abstraction from the water environment by issuing and enforcing environmental permits and licences. Where necessary we take enforcement action against those who act illegally and damage or put at risk the water environment. We also have responsibility to make sure there is enough water to meet the needs of industry, agriculture and wider society in the future.

We will work closely with all sectors to learn from them, build on existing knowledge and to develop a shared commitment to implementing environmental improvements.

Example actions
Continue to develop a <b>monitoring programme</b> , to maintain our understanding of the state of the water environment (Environment Agency). <ul style="list-style-type: none"><li>• Across the river basin district</li></ul>
<b>Run local pollution prevention campaigns</b> (Environment Agency) to raise awareness of the need for responsible handling and disposal of chemicals, oil and other pollutants. <ul style="list-style-type: none"><li>• Specified water bodies identified at risk, such as safeguard zones</li></ul>
Action to <b>reduce the physical impacts of flood risk management</b> activities in artificial or heavily modified water bodies (Environment Agency). <ul style="list-style-type: none"><li>• Waters specified in Annex C</li></ul>
Action to <b>reduce the physical impacts of flood risk management</b> activities in artificial or heavily modified water bodies and ensure new waterside developments do not compromise the water body's status. <ul style="list-style-type: none"><li>• Artificial and heavily modified water bodies are in Annex B</li></ul>
Action via the <b>Restoring Sustainable Abstraction programme</b> to investigate sites at risk due to abstraction pressures. <ul style="list-style-type: none"><li>• Across the Thames River Basin District</li></ul>
Continue to develop <b>and implement a programme of river habitat improvement</b> works to improve ecology by addressing physical morphology and flow pressures (including culverts, closed watercourses, pinch points and in-channel structures). <ul style="list-style-type: none"><li>• Across the Thames River Basin District</li></ul>

## Industry, manufacturing and other business

Whilst there is a relatively low incidence of large scale manufacturing in the Thames Region, the sector retains strategic importance both regionally and nationally. The ports of London and the Medway form part of this economy providing deepwater facilities for international marine traffic. The strong emphasis on high tech industries means that manufacturing output in the South East is now in excess of £20 billion per annum, higher than in any other UK region.

Pressure on water environment from industry and business is intense, both in terms of the release of pollutants and the abstraction of limited resources. The challenge for the Thames River Basin District is to ensure that it maintains its competitive advantage without compromising the enhancement of its natural environment.

Most relevant actions in this plan are already underway or are part of the existing regulatory system. However, some actions are new, and will help reduce nutrients such as phosphate and will help meet tighter standards on ammonia and 40 other priority substances and pollutants in the river basin district. Where appropriate, industry will participate in pollution prevention campaigns and in investigations to establish the extent and source of pressures to define any further actions required for this and future cycles.

Example actions
<p><b>Comply with regulations</b> such as Environmental Permitting, Environmental Damage and Groundwater, to limit environmental damage and help prevent land contamination, pollution and deterioration of waters.</p> <ul style="list-style-type: none"> <li>Nationally</li> </ul>
<p>Voluntary <b>pollution prevention and remediation</b> of existing land contamination, to bring land back into beneficial use and remove potential sources of groundwater contamination.</p> <ul style="list-style-type: none"> <li>Sites contributing to potential environmental quality standard failure</li> </ul>
<p>Run <b>pollution prevention advice and campaigns</b> to provide targeted advice and enforcement (Environment Agency) to reduce contaminants being released to groundwater from industrial estates, petrol stations and other sources.</p> <ul style="list-style-type: none"> <li>High risk areas such as safeguard zones</li> </ul>

## Local and regional government

Local and regional government have a major role in implementing this plan. The sector has a far reaching influence on businesses, local communities and leisure and tourism sectors. The 15 counties, 98 district, city and borough councils and the 13 unitary authorities also have duties and powers in relation to planning, waste and minerals, regeneration, highways, transportation, emergency planning, countryside management and other activities. Town and parish councils exist at the local level across the whole of the river basin district.

Many of the actions identified in the plan form part of this sector's normal work. The Environment Agency and others will work with local authorities to ensure that all relevant actions are identified, prioritised, resourced and implemented.

Example actions
<p>Ensure that <b>planning policies and spatial planning documents</b> take into account the objectives of the Thames River Basin Management Plan, including Local Development Documents and Sustainable Community Strategies ( local authorities).</p> <ul style="list-style-type: none"> <li>Across the Thames River Basin District</li> </ul>
<p>Action to <b>reduce the physical impacts of urban development</b> in artificial or heavily modified waters, to help waters reach good ecological potential (local authorities).</p> <ul style="list-style-type: none"> <li>Waters specified in Annex C</li> </ul>
<p>Promote the use of <b>sustainable drainage systems</b> in new urban and rural development where appropriate, and retrofit in priority areas including highways where possible (Environment Agency, local authorities).</p> <ul style="list-style-type: none"> <li>Across the Thames River Basin District</li> </ul>
<p>Produce <b>guidance and training for planning authorities</b> in partnership with Royal Town Planning Institute (Environment Agency), to support this plan.</p> <ul style="list-style-type: none"> <li>Across the Thames River Basin District</li> </ul>
<p><b>Water efficiency and new development.</b> When making planning decisions, planning authorities should use evidence relating to 'priority water bodies'(see Annex C), alongside other relevant evidence, to seek the use of water efficiency standards.</p> <ul style="list-style-type: none"> <li>Across the Thames River Basin District</li> </ul>
<p><b>Sustainable Community Strategy (SCS) and Local Area Agreement (LAA)</b> - Local Strategic Partnerships should use evidence relating to 'priority water bodies'(see Annex C) in the Thames River Basin Management Plan, alongside other relevant evidence, to include the water environment as a priority for action in the SCS.</p> <ul style="list-style-type: none"> <li>Across the Thames River Basin District</li> </ul>

## Mining and quarrying

This sector has few current operations in this river basin district. However water quality can be undermined by the silting of watercourses from mining and quarrying operations by discharges of mine water, and workings below the water table can disrupt groundwater quality and quantity.

#### Example actions

Investigate emissions from working sites and **appraise options of best practice controls** at mines and quarries to ensure environmental quality standards are met (Operators).

- Sites contributing to potential environmental quality standard failure

## Navigation

Ports, harbours and marinas are essential for economic prosperity. Many navigation and port authorities have already done a great deal to help improve ecology and water quality and some harbours are home to internationally important wildlife. Careful planning will be needed to ensure that waters remain navigable whilst at the same time water quality is protected and improved.

Proposals to build new ports or expand existing ones need to take sustainable water management goals into account. Physical changes are permitted to waters for navigation but only if certain conditions are met.

The Thames River Basin District is also popular with recreational boaters. We want to encourage recreation whilst taking action to minimise any environmental impacts. Port and Navigation Authorities are major partners in the management and protection of the estuarine, river and canal water environment. This is through their duties to conserve the natural environment and powers to authorise works in the river and dredging activities in estuaries.

#### Example actions

**Ban Tributyltin (TBT) use** on ship hulls unless there is a coating to prevent leaching of underlying TBT anti-foulants, to prevent or limit pollution in marine waters (Marine and Fisheries Agency, others).

- Nationally

**Develop a dredging and disposal framework** (Ports sector), which will provide guidance to all those undertaking or permitting navigation dredging and dredged material disposal activities to assist in achieving the statutory objectives of the Water Framework Directive and related Environmental Quality Standards Directive (2008/105/EEC).

- Nationally (England)

## Urban and transport

Development and regeneration is a major opportunity to improve the water environment. However, when poorly planned or designed, urban and transport infrastructure can have an adverse affect on water quality or water resources. The Environment Agency and others want to work with the urban and transport sector to achieve an urban water environment rich in wildlife that local communities can benefit from and enjoy.

A good quality water environment has the potential to help economic regeneration and to enhance the economic and social amenity value of developments, and improve the quality of life in cities, towns and villages.

Spatial planning and design for urban development and infrastructure should aim to reduce surface water run off; protect and restore habitats; improve the quality of rivers, coastal waters and groundwater and so protect drinking water supplies and bathing areas. The release of toxic pollutants that harm the water environment also need to be reduced.

#### Example actions

Encourage uptake of **Voluntary Initiative best practice on pesticide use** by land managers within the urban and transport sectors (Voluntary Initiative, Environment Agency)

- Across the Thames River Basin District

<p>Action to <b>reduce the physical impacts of urban development</b> in artificial or heavily modified water bodies, to help waters reach good ecological potential (local authorities).</p> <ul style="list-style-type: none"> <li>• Waters specified in Annex C</li> </ul>
<p>Designate and enforce <b>Water Protection Zones</b> and apply appropriate measures to control high risk activities (Environment Agency, Defra). The Zones will provide a regulatory tool to control diffuse pollution in water or physical pressures in high risk areas where existing mechanisms will not meet Water Framework Directive objectives.</p> <ul style="list-style-type: none"> <li>• Initially around eight Zones in locations to be decided across England</li> </ul>
<p>Follow <b>pesticides statutory code of practice</b> advice for operators on control of plant protection products, to prevent or limit pollution of waters (all operators)</p> <ul style="list-style-type: none"> <li>• Across the Thames River Basin District</li> </ul>
<p>Support to <b>investigate emissions from sites and pollution</b> from contaminated land to reduce uncertainty and provide additional information (Industry)</p> <ul style="list-style-type: none"> <li>• Sites contributing to potential environmental quality standard failure</li> </ul>
<p>WFD <b>mitigation measures manual</b> for flood and coastal erosion risk management and land drainage activities. This manual will set out best practice options for measures to mitigate against the impacts of such activities upon ecology. This will be used to ensure that new and existing schemes and management activities will take into consideration WFD requirements and will results in minimal ecological damage.</p> <ul style="list-style-type: none"> <li>• Across the Thames River Basin District</li> </ul>

## Water industry

Water companies are major partners in the management and protection of the water environment. The Environment Agency works with companies, consumers and government to ensure that the sector's environmental work is planned and implemented in a way that is affordable for the public.

Improvement of continuous and intermittent sewage effluent discharges and of water resources management will be carried out as part of the ongoing water industry asset management programme.

The companies' programme of work arising from the periodic review of water industry investment in 2009 will make a large contribution to meeting the objectives in this plan. This includes investigations and specific improvement schemes to address water quality or water resources.

In addition, specific actions will be carried out in drinking water protected areas to help safeguard drinking water supplies.

<p><b>Example actions</b></p>
<p><b>Reduce leakage</b> through active leakage control and customer supply pipe repair policies to help ensure sufficient water for people and wildlife (water companies).</p> <ul style="list-style-type: none"> <li>• Across the Thames River Basin District</li> </ul>
<p>Complete the <b>current round of water company asset investment</b> to deliver water quality improvements and reduce the impact of abstraction (water companies).</p> <ul style="list-style-type: none"> <li>• Rivers, coasts, estuaries and groundwater bodies across the river basin district</li> </ul>
<p><b>Improvements to water company assets</b> under the next round of company investment (Asset Management Programme – AMP5), to deliver water quality improvements and continue to reduce the impact of abstraction under a range of environmental Directives (water companies).</p> <ul style="list-style-type: none"> <li>• Rivers, coasts, estuaries and groundwater bodies across the river basin district</li> </ul>

## Individuals and communities

Everyone can help protect and improve the water environment. Actions people can take include the following.

## **To save water**

### *In houses or offices*

- Turn off the tap when brushing teeth, and take short showers rather than baths.
- Wash fruit and vegetables in a bowl rather than under the running tap - and use the remainder on plants.
- Install a 'hippo' or 'save-a-flush' in toilet cisterns.
- Run dishwashers or washing machines with a full load on an economy setting, and boil the minimum amount of water needed in kettles or saucepans.
- Purchase low energy and low water use appliances.
- Hand wash cars.
- Ask water companies to fit a meter. This can reduce household water consumption.
- Install a low-flush toilet, put flow regulators on taps and showers, and install waterless urinals at work.
- Consider installing grey-water recycling systems in homes or workplaces. This can save one third of domestic mains water usage.

### *In gardens*

- Choose plants that tolerate dry conditions. To help lawns through dry periods, don't cut them too short.
- To save water in gardens, collect rain in a water-butt, water at the beginning or end of the day, mulch plants, and use watering cans where possible instead of sprinklers or hosepipes.
- Fix dripping taps, and lag pipes to avoid them bursting in freezing weather.

## **To prevent pollution**

- Use kitchen, bathroom and car cleaning products that don't harm the environment, such as phosphate-free laundry detergents, and use as little as possible. This helps prevent pollution.
- Take waste oil and chemicals such as white spirit to a municipal recycling facility: don't pour them down the sink or outside drains.
- Check that household appliances are connected to the foul sewer, not the surface water drain.
- Ensure septic tanks or private sewage treatment plants are well maintained and working effectively.
- Ensure household oil storage is in good condition, with an up-to-date inspection record.
- Report pollution or fly-tipping to the Environment Agency on 0800 807060.

## **To protect water dependent wildlife**

- Put cotton buds and other litter in the bin, not down the toilet. It may end up in the sea where it can harm wildlife.
- Eat fish from sustainable sources, caught using fishing methods that don't cause damage to marine wildlife and habitats.
- Eliminate invasive non-native species from gardens, disposing of them responsibly.
- Adopt-a-beach to help keep beaches clean of litter than can harm wildlife and cause pollution.
- Join a river group to spot pollution, invasive non-native species, and take part in practical tasks.

## **Actions to protect drinking water**

Drinking water supplied to households by water companies is of high quality and complies with strict standards enforced by the Drinking Water Inspectorate. Where water is abstracted

from a water body for human consumption, the water body is designated as a Drinking Water Protected Area (DrWPA). Additional objectives apply and where necessary, additional action is put in place to protect the quality of the raw water abstracted.

Where we are reasonably confident that the DrWPA objective is at high risk of not being complied with, a Safeguard Zone has been identified. In the Safeguard Zone additional actions will take place. These may include voluntary agreements, pollution prevention campaigns and targeted enforcement action of existing legislation. Additional monitoring is taking place to assess whether those DrWPAs currently not assessed at high risk, need a Safeguard Zone and additional action taken.

In parallel with this approach, the Environment Agency will continue to develop work on regulatory measures, such as piloting Water Protection Zones in England. If voluntary approaches are shown not to work in a Safeguard Zone, we are ready and able to ensure progress is made before 2015.

### The costs of action in this plan

Overall the Environment Agency estimates that the cost for implementing the actions in the Thames River Basin Management Plan will be £232 million annually. A significant proportion of this cost relates to existing measures. The existing measures are mainly required to fulfil the requirements of earlier EC Directives and are defined as the Reference Case in the Impact Assessment

There are new measures in the plan which we estimate to cost £26 million with a benefit of £43 million. Investigations will be carried out that will help to identify the additional measures necessary in future planning cycles. The new measures are defined as the Policy Option in the Impact Assessment.

Further information on the approach used to assess the costs and benefits is contained in the Impact Assessment.

### Taking action in a changing climate

The UK's Climate Projections (UKCP09) shows that this region is likely to experience hotter drier summers, warmer wetter winters and rising sea levels. This is likely to have a significant effect on environmental conditions and will increase the impact of human activity on the water environment. Table 4 shows the likely effects of climate change on known pressures and the risk they pose on the water environment in the River Basin District.

It is essential that the actions in this plan take account of the likely effects of climate change. What is done now must not make it harder to deal with problems in the future.

Most actions in this plan will remain valid as the climate changes. Others can be adapted to accommodate climate change.

**Table 4 Qualitative assessment of increased risk from climate change by 2050 and beyond**

Pressure	Increased risk
Abstraction and other artificial flow regulation	Very high
Nutrients (nitrate and phosphate)	High
Sediment	High
Physical modification	Medium
Biological (invasive non-native species)	Medium
Microbiology (including faecal indicator organisms)	Medium

Organic pollution (sanitary determinands)	Medium
Biological (fisheries management)	Low/Medium
Salinity	Medium
Acidification	Low for freshwater Medium/High for marine waters
Priority hazardous substances, priority substance and specific pollutants, such as pesticides	Low
Temperature of point source discharges	Low

It is important to assess the carbon implications of the plans to avoid adding unnecessary carbon dioxide burdens that could increase the problem of climate change.

The carbon costs associated with actions in the water industry Periodic Review 2009 (PR09) have been quantified. This is where the most significant carbon impacts will occur as the actions will require additional water treatment, construction of new works or upgrades to existing sites.

The approximate operational carbon implications of PR09 measures in England and Wales is approximately 4,722,000 tonnes per year at the start of the PR09 cycle (2009-10) and 4,564,200 tonnes per year at the end of the PR09 cycle (2014-2015). This does not include the carbon implications of constructing the schemes. These figures are from the water company plans and result from schemes to satisfy a number of existing drivers such as Urban Waste Water Directive and Bathing Waters Directive as well as the Water Framework Directive.

In this river basin district, the operational carbon component driven by the additional requirement to meet good status under the Water Framework Directive is estimated, at this time, to be 15 tonnes per year. In the majority of cases this will be balanced by reductions elsewhere as part of the CRC Energy Efficiency Scheme (formally known as the Carbon Reduction Commitment).

The CRC Energy Efficiency Scheme is a legally binding scheme, which covers large business and public sector organisations, and is intended to promote energy efficiency and help reduce carbon emissions. See [www.decc.gov.uk](http://www.decc.gov.uk) for further information.

The majority of other actions are likely to have low impact as they are investigations, partnerships or encouraging best practice management. The potential impact of these can be assessed as the work is progressed.

No organisation has sole responsibility for ensuring that society adapts successfully to the effects of climate change on the water environment. Most will be achieved by working together and in partnership. This River Basin Management process provides an excellent framework to help focus and co-ordinate activities. In particular it will allow action to be taken on existing pressures at sites that are at risk and where appropriate restore the natural characteristics of catchments to protect water quality, maintain water resources and reduce the risks of floods and droughts thus building resilience to the further impacts of climate change.

### **Working with other plans and programmes**

A wide range of planning processes help ensure more sustainable management of the water environment. They are briefly described here.

## **Development planning**

Development planning plays a key role in sustainable development and the Environment Agency will continue to work closely with planning authorities. We aim to ensure that planners understand the objectives of the Water Framework Directive and are able to translate them into planning policy.

There are many planning processes and provisions involved. They include:

- national guidance;
- Regional Spatial Strategies
- Local Development Documents;
- local guidance (for example Supplementary Planning Documents)

In the Environment Agency Thames Region, there is planned growth for approximately 375,000 new homes until 2016. The housing numbers will be delivered across the Thames River Basin District, but growth will be concentrated in Growth Areas, Growth Points and other regional and local designations (for example areas for intensification in London and Regional Hubs in the south east of England). In addition there will be one of the new agreed eco-towns in the Thames River Basin District, at North West Bicester in Oxfordshire. This future development will place additional demands on social, transport and environmental infrastructure, which in some areas is already under pressure.

## **Flood risk, coastal erosion planning**

There is a separate planning process for flood and coastal erosion risk management introduced by the new European Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks). This requires that the environmental objectives of the Water Framework Directive are taken into account in flood and coastal erosion plans. Implementation of the Floods Directive in England and Wales will be co-ordinated with the Water Framework Directive. The delivery plans and timescales for the two directives will be closely aligned.

Catchment Flood Management Plans (prepared by the Environment Agency) and Shoreline Management Plans (prepared by local coastal authorities and the Environment Agency) set out long term policies for flood risk management. The delivery of the policies from these long term plans will help to achieve the objectives of this and subsequent River Basin Management Plans.

The Environment Agency plans its flood and coastal risk management capital investment through the 'Medium Term Plan', which is a rolling five-year investment plan. Using this, we have identified flood and coastal risk management activities that will deliver one or more restoration or mitigation measures included in this plan. Although these activities will be carried out for flood risk management purposes, they will be carried out in such a way to ensure any impacts are minimised and that the ecology is protected. Activities will not lower water body status unless fully justified under Article 4.7 of the Water Framework Directive.

## **Marine Planning**

The Marine Strategy Framework Directive is closely linked with the Water Framework Directive and their application overlap in estuaries and coasts. The Environment Agency is working with Defra, the Welsh Assembly Government and others to ensure that the implementation of both Directives is fully integrated.

## **Managing new physical modifications**

In specific circumstances the Water Framework Directive provides a defence for when, as a result of a new physical modification, good ecological status or potential cannot be achieved or where deterioration in status occurs. This is covered under Article 4.7 of the Directive.

Although protecting the water environment is a priority, some new modifications may provide important benefits to human health, human safety and/or sustainable development. Such benefits can include:

- public water supply;
- flood defence/alleviation;
- hydropower generation;
- navigation.

It is often impossible to undertake such activities without causing deterioration of status to the water body. The benefits that such developments can bring need to be balanced against the social and economic benefits gained by maintaining the status of the water environment in England and Wales.

The Environment Agency has developed a process for applying the tests and justifications required for such new modifications (Article 4.7) and will work with stakeholders to ensure these provisions are met during the first cycle of river basin management.

### **Other planning processes**

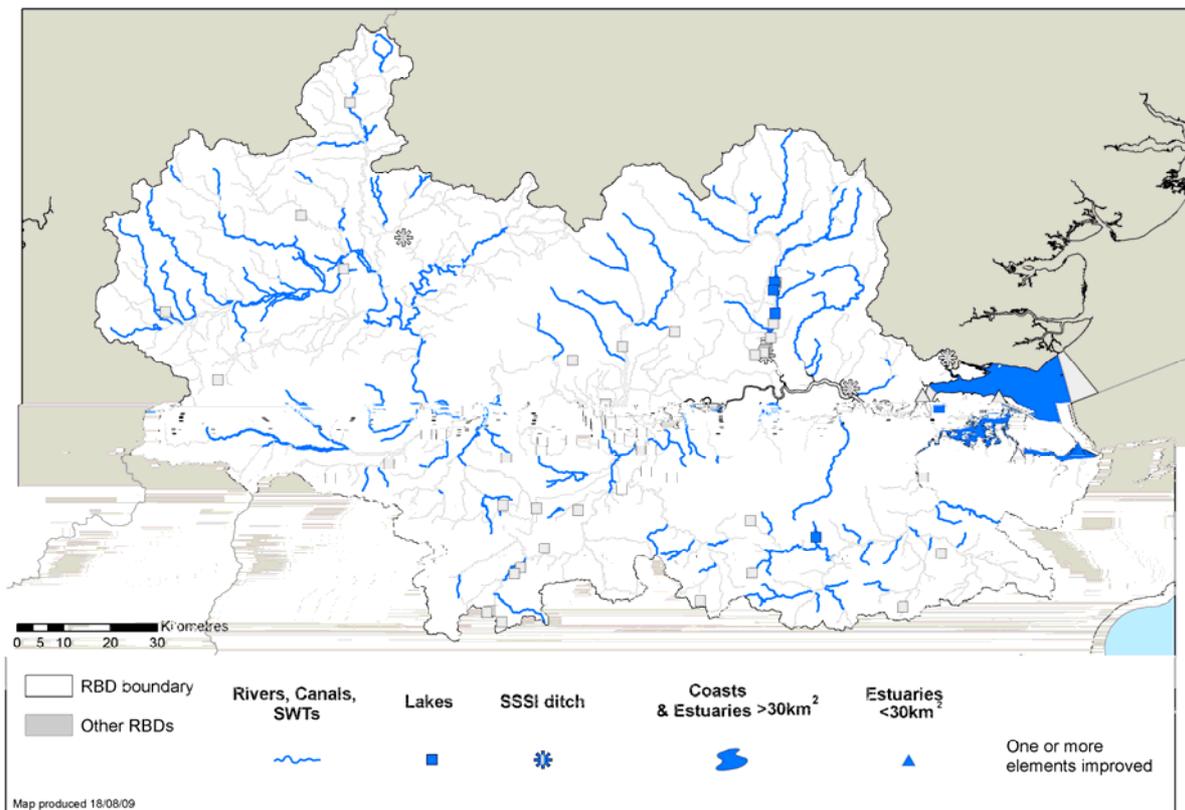
The Environment Agency is also working to align planning processes in other areas. These include water resources and water quality, agriculture and rural development and natural heritage. Annex J provides further information about other planning processes.

## 6 The state of the water environment in 2015

One of the objectives of the Water Framework Directive is to aim to achieve good status in water bodies by 2015. However, for 75 per cent of surface water bodies this target cannot be met by this date. Greater improvement in status is limited by the current understanding of pressures on the water environment, their sources, and the action required to tackle them.

By 2015, 22 per cent of surface waters – 126 water bodies – will show an improvement by 2015 for one or more of the elements measured. This translates to 1,737 kilometres of river or canal improved, and is illustrated in Figure 5.

Figure 5 **Surface water bodies showing an improvement for one or more elements**

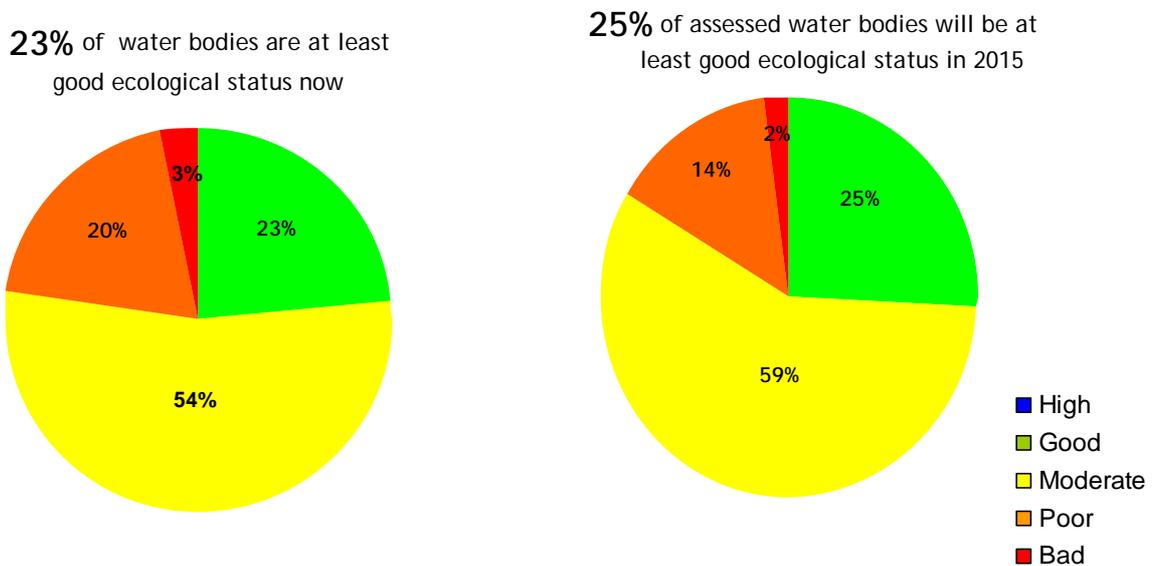


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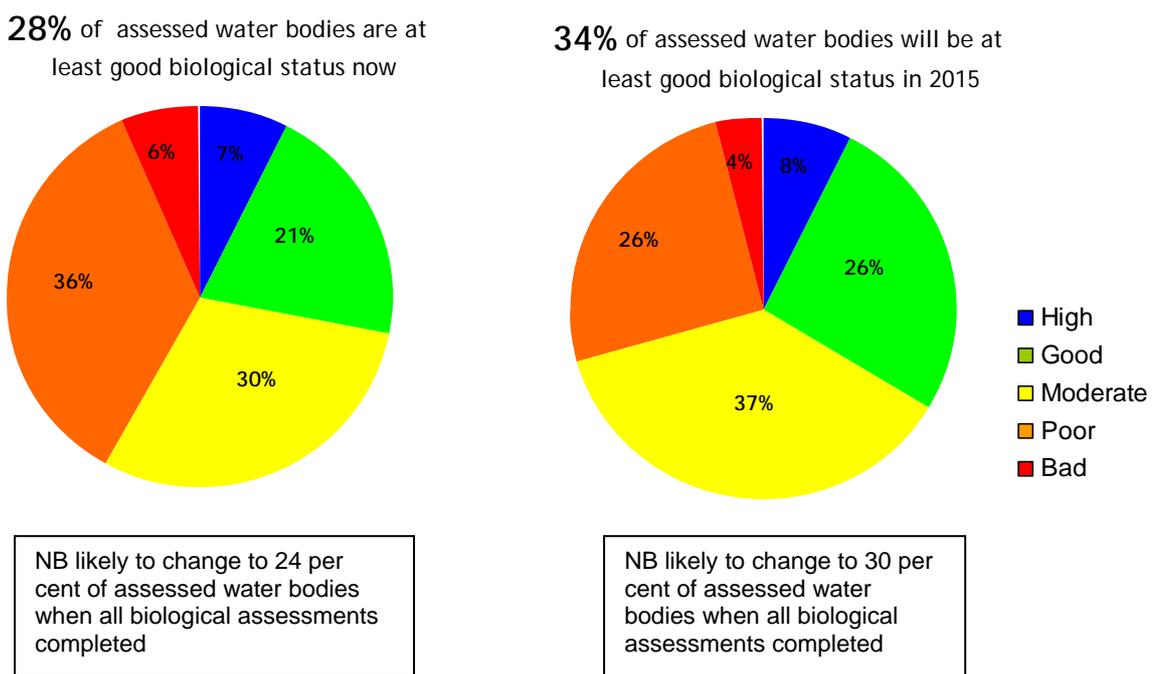
There will be tangible benefits from meeting these objectives. For example, major investment in the water industry will continue to address problems such as the high levels of nutrients in sewage effluent.

Figures 6 and 7 show what ecological and biological status will be in 2015 compared to now. By 2015, 25 per cent of surface water bodies will be in at least good ecological status/potential and 34 per cent of surface waters will be in at least good biological status. A map showing predicted status/potential for surface water bodies in 2015 is provided in figure 9.

**Figure 6 Ecological status/potential of surface water bodies now and in 2015**

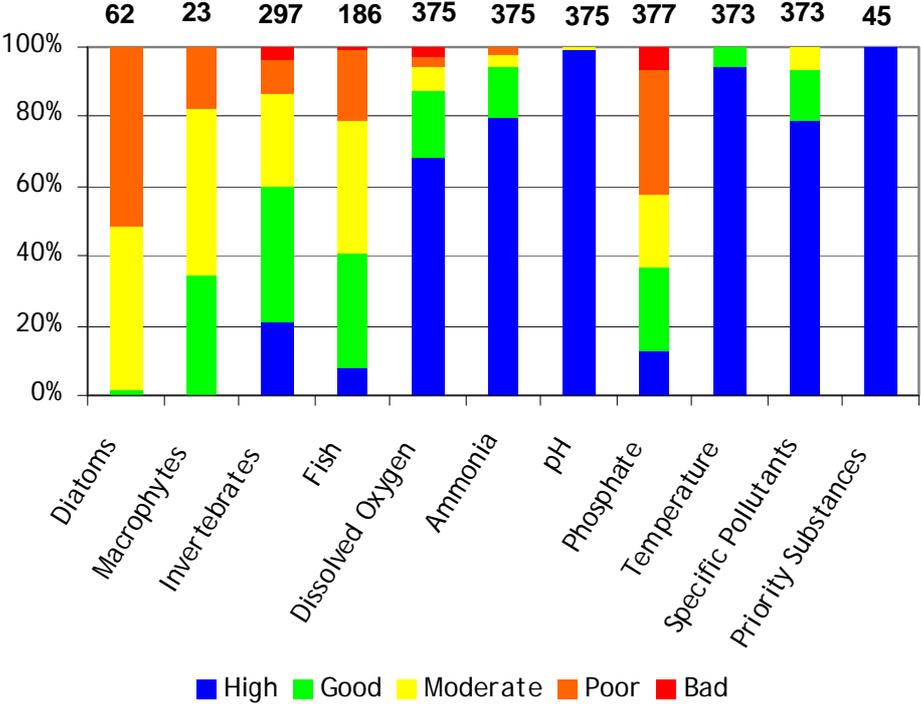


**Figure 7 Biological status of surface water bodies now and in 2015**



For the 259 artificial and heavily modified water bodies, 27 per cent will be in at least good ecological potential in 2015, compared to 24 per cent of 312 natural surface water bodies at good or better ecological status.

Figure 8 Predicted proportion of river water bodies in each status class, by element, for 2015 (numbers above bars indicate total number of water bodies assessed)



For many estuaries, coasts and lakes it is unlikely that an improvement in the number of water bodies at 'good' status/potential can be achieved by 2015. The biological tools and monitoring data needed to classify these types of water bodies have only recently been developed. There is limited knowledge about the pressures that affect many of these water bodies and how their biology responds to changes in these pressures. It has therefore not been possible to identify many additional cost effective and proportionate measures. In many cases though there will be improvements to some key elements as the result of actions in this plan and there will be investigations to help find technically feasible actions that are not disproportionately costly. The Environment Agency wants these waters to achieve good overall status or potential by 2021 or 2027.

There will be no deterioration in groundwater status by 2015, but improvement will take place over longer timescales. Figures 10 and 11 show the predicted quantitative status and chemical status for groundwater in 2015.

Looking at overall status, the combination of ecological status and chemical status, 25 per cent of surface water bodies are expected to meet good overall status by 2015.

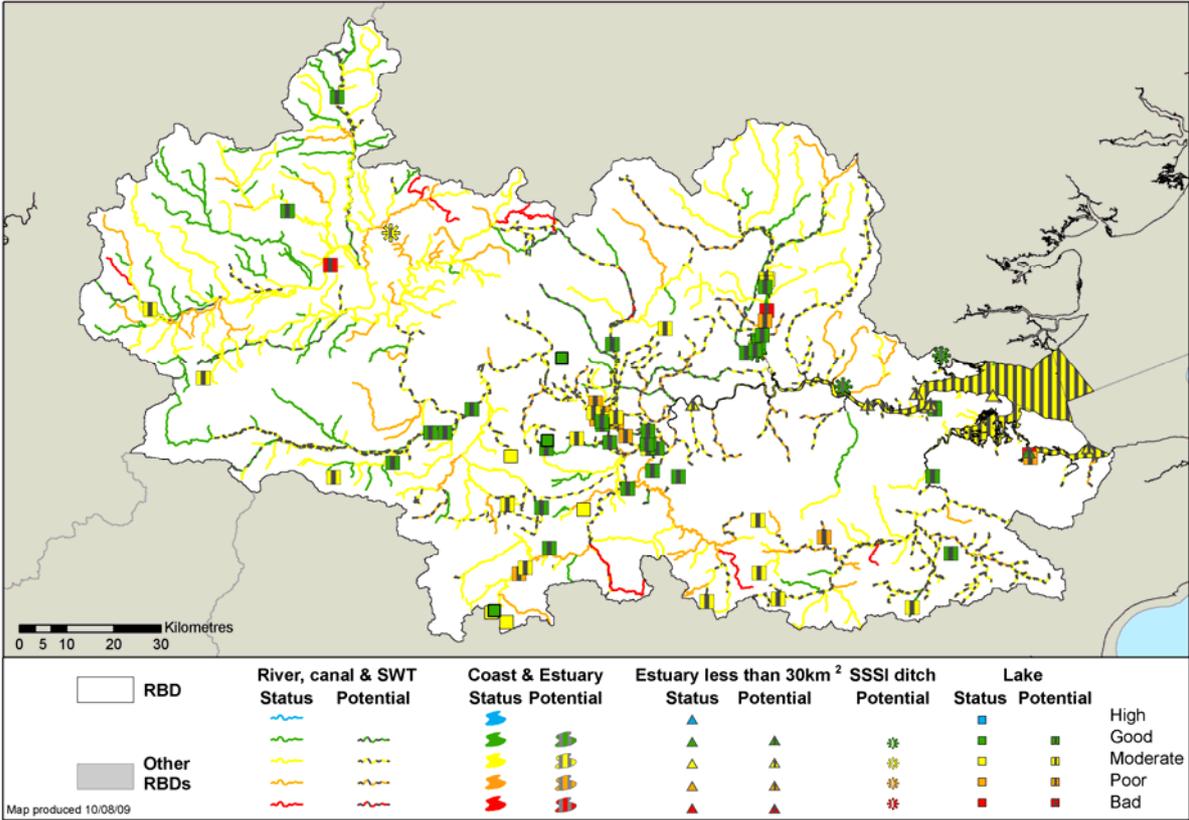
**Investigations – improving outcomes for 2015**

In many cases we are not able to identify appropriate status actions for water bodies that are currently not achieving good ecological status. Sometimes this is because the cause of the problem and its sources are not yet known. Sometimes this will involve gaining corroborative evidence of biological problems to justify expenditure where there is low confidence of failure of chemical standards. In other cases the most appropriate solution to the problem needs to be researched. Investigations into these types of issues will be an important measure during the first cycle.

Where possible, investigations will take place before 2013 so that the results are known in time for the formal review of this plan by 2015. The Environment Agency has identified a number of surface water bodies that require investigations in this plan. A proportion of these will lead to actions that should be straightforward to put in place before 2015. The outcome of our detailed planning work is that we have confidence that 25 per cent of surface waters will be in good or better ecological status or potential by 2015. This is our formal target for this plan.

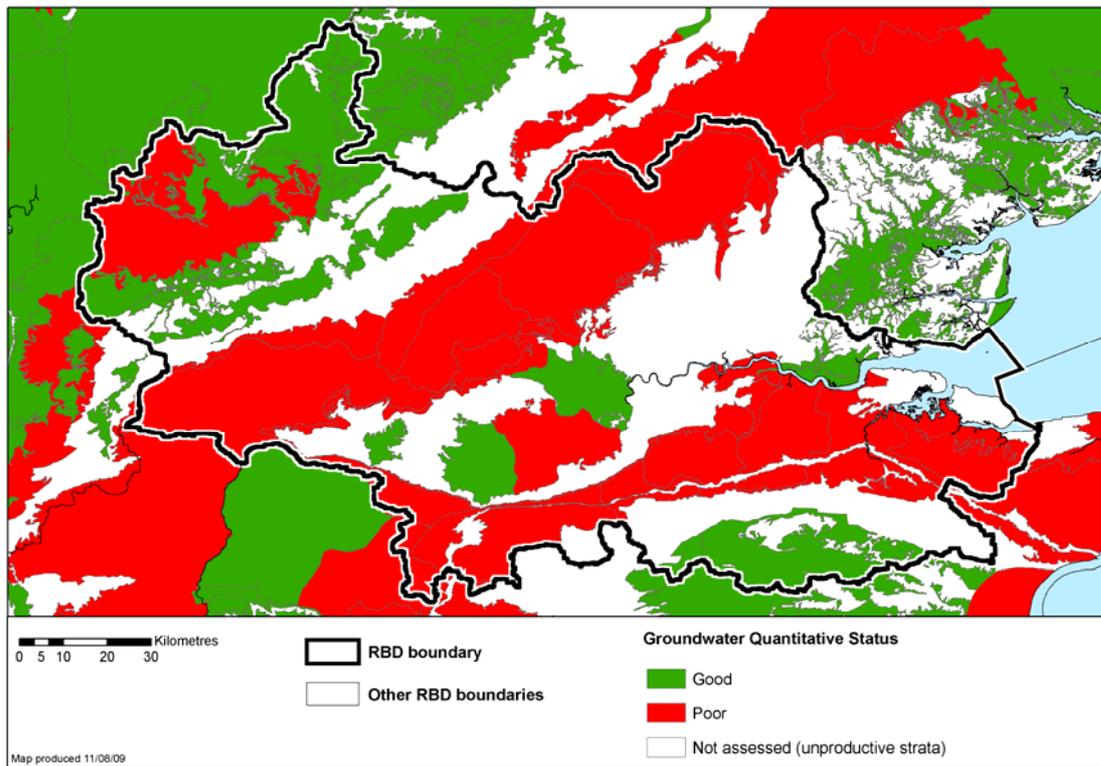
Across England and Wales we have a formal target of achieving 31 per cent of surface waters in good or better ecological status or potential by 2015. Improvement to the water environment has to be managed as a continuum, not in isolated six year cycles. We are already confident in this river basin district that 22 per cent of surface waters will be improved for at least one element by 2015. We are also confident that a proportion of investigations will lead to action that we can put in place before 2015. We will work hard to ensure that the Thames River Basin District makes its contribution to a goal of achieving up to 33 per cent of surface waters across England and Wales at good ecological status or potential by 2015.

**Figure 9 Predicted ecological status and potential for surface water bodies in 2015**



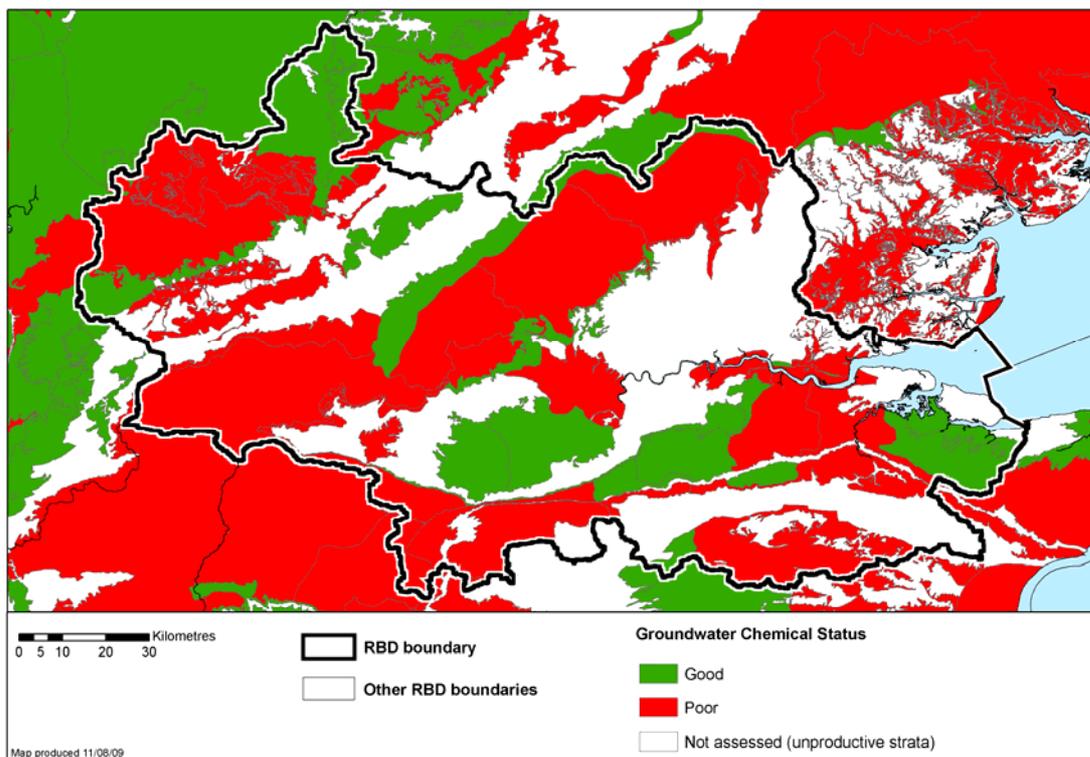
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Figure 10 Predicted quantitative status for groundwater in 2015



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Figure 11 Predicted chemical status for groundwater in 2015



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## 7 Targets for subsequent cycles

There are three river basin management cycles: 2009-2015, 2015-2021 and 2021-2027. Achieving good status in all water bodies by 2027 is a significant challenge.

The information gained from investigations during the first cycle will help to accelerate improvement to known issues using both traditional and novel techniques in both second and third cycles. New issues will arise though.

This plan sets out where good status cannot be achieved by 2015. This relates to 78 per cent of rivers, 51 per cent of lakes, 100 per cent of estuaries, 100 per cent of coastal waters and 83 per cent of groundwater (based on quantitative status).

In these cases where, an alternative objective of good status or potential by 2021 or 2027 is set (see Annex E).

Over the period to 2027, the pressures on the water environment will change, particularly because of climate change. It is not known in detail how the water environment will respond to this.

The population in the river basin district will continue to increase, with further urbanisation. Agriculture will respond to the changed climate both here and abroad, market conditions, financial incentives and regulatory pressures. Technology and other solutions to address the pressures will improve, but the rate at which some new solutions can be introduced will depend on the economic climate.

The Environment Agency believes that achieving good status in all water bodies by 2027 will not be possible using only current technologies. Even achieving 75 per cent good status will require marked changes in land use and water infrastructure, such as a major programme to separate foul and surface water sewers across most of the river basin district. By current standards, such changes are extremely unlikely to be economically or socially acceptable. For some waters therefore, achieving good status by 2027 could be disproportionately costly or not technically feasible.

The Environment Agency wants to work with others to find and implement additional actions to improve the environment, with the aspiration of achieving good status in at least 60 per cent of waters by 2021 and in as many waters as possible by 2027.

The water environment now and objectives for 2015 are described further in the Section 8 [Thames River Basin District Catchments in 2015](#). A summary of the key statistics for the Thames River Basin District is provided in Section 10.

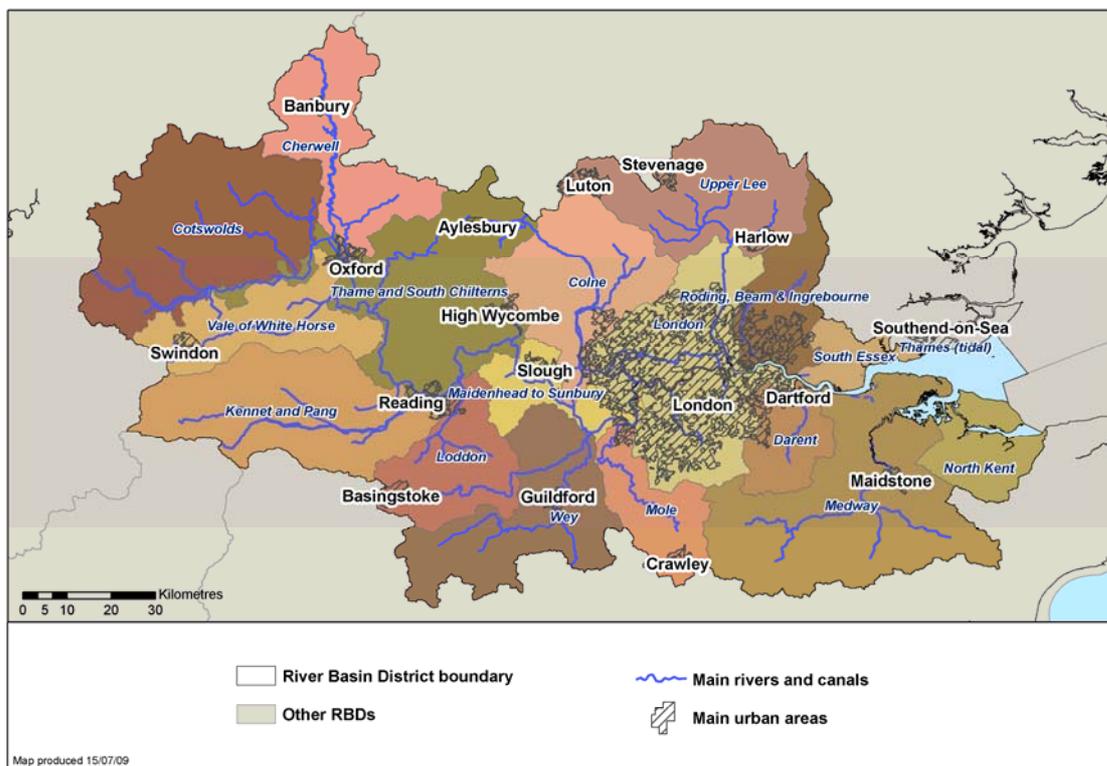
## 8 Thames River Basin District catchments

This section summarises information about the status of waters in the different parts of the Thames River Basin District, their objectives and some of the actions for them. Rivers and lakes are grouped by catchment. There are 17 river catchments as well as the coastal and estuarine and groundwater catchments presented here. These are shown in figure 12 below.

- [Cherwell catchment](#)
- [Colne catchment](#)
- [Cotswolds catchment](#)
- [Darent and Cray catchments](#)
- [Kennet and Pang catchments](#)
- [Loddon catchment](#)
- [London catchment](#)
- [Medway catchment](#)
- [Mole catchment](#)
- [North Kent](#)
- [Roding, Beam and Ingrebourne catchments](#)
- [South West Essex catchment](#)
- [Thame catchment](#)
- [Thames \(Maidenhead to Sunbury\) catchment](#)
- [Upper Lee catchment](#)
- [Vale of White Horse catchment](#)
- [Wey catchment](#)

There are also separate sections for [estuaries and coastal waters](#), and [groundwater](#).

Figure 12 Thames River Basin District catchments



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## Cherwell catchment



### Catchment summary

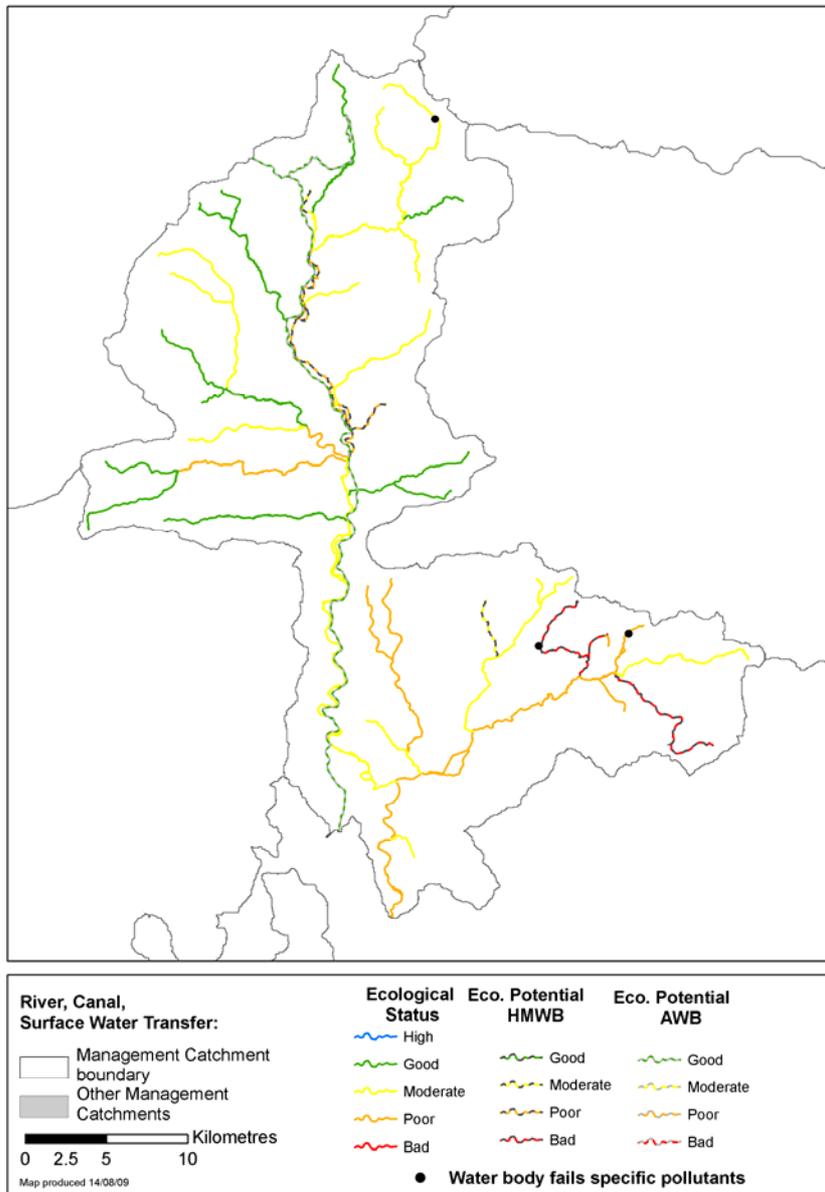
This Cherwell catchment is predominantly rural with some urban areas including the towns of Banbury and Oxford. The river flows south and joins the River Thames at Oxford, but for part of the way it shares a channel with the Oxford Canal.

Surface water quality in most of the catchment is generally good with the River Ray having the poorest water quality. Phosphates, however, show high concentrations across most of the catchment due to diffuse and point source inputs. The catchment also suffers from degraded physical habitat, localised low flows and diffuse pollution.

The impact of water abstraction varies significantly across the catchment, with very little abstraction, for instance, from the Ray catchment. The Upper Cherwell catchment supports abstractions for public water supply at Banbury and from the Sor Brook at Adderbury. There are also a number of licensed abstractions for agriculture. There is concern that the flows in the Cherwell upstream of the Sor Brook confluence are unnaturally low due to abstractions at Banbury and those used to support the Oxford Canal. Some action has been taken with the water company to mitigate these impacts during low flows. Further proposed measures to tackle this include promoting water efficiency measures and liaising with British Waterways.

Physical habitat restoration may also be required to achieve good ecological status on sections of the Cherwell and Ray. Opportunities will be pursued with landowners and other organisations to restore habitat quality. River restoration may also help to restore floodplain habitat, with associated benefits for flood risk management and water quality.

Figure 13 Map showing the current status/potential of river water bodies in the Cherwell catchment



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Table 5 Key statistics for the catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	30	32
% assessed at good or high biological status (27 water bodies assessed)	48	48
% assessed at good chemical status (4 water bodies assessed)	75	75
<b>% at good status overall (chemical and ecological)</b>	30	32
% improving for one or more element in rivers		14

There are 36 river water bodies and one lake in the catchment. Four are artificial or heavily modified. 28 per cent of rivers currently achieve good or better ecological status/potential, including Sor brook, High furlong brook and Upper Swere. 48 per cent of rivers assessed for biology are at good or high biological status now, with 30 per cent at poor biological status, and seven per cent of assessed river water bodies at bad biological status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 14 per cent of rivers in the Cherwell catchment will improve for at least one element (biological, chemical or physical) by 2015.

### **Some key actions for this catchment**

- Encourage uptake of Voluntary Initiative best practice advice by farmers and agronomists.
- Target high-risk farms and undertake regulatory farm visits using pollution prevention notices and advisory letters where necessary.
- River Ray Landscape Restoration Project.
- Further investigations to improve understanding of (the scale of) habitat restoration required to achieve Good Ecological Status. Improve understanding of the scale of habitat restoration required to achieve Good Ecological Status / Good Ecological Potential.

### **Colne catchment**



### **Catchment summary**

The Colne catchment is dominated by its chalk streams and rivers. Many of these streams emerge from the areas surrounding the Chilterns Hills, which is designated an Area of Outstanding Natural Beauty (AONB).

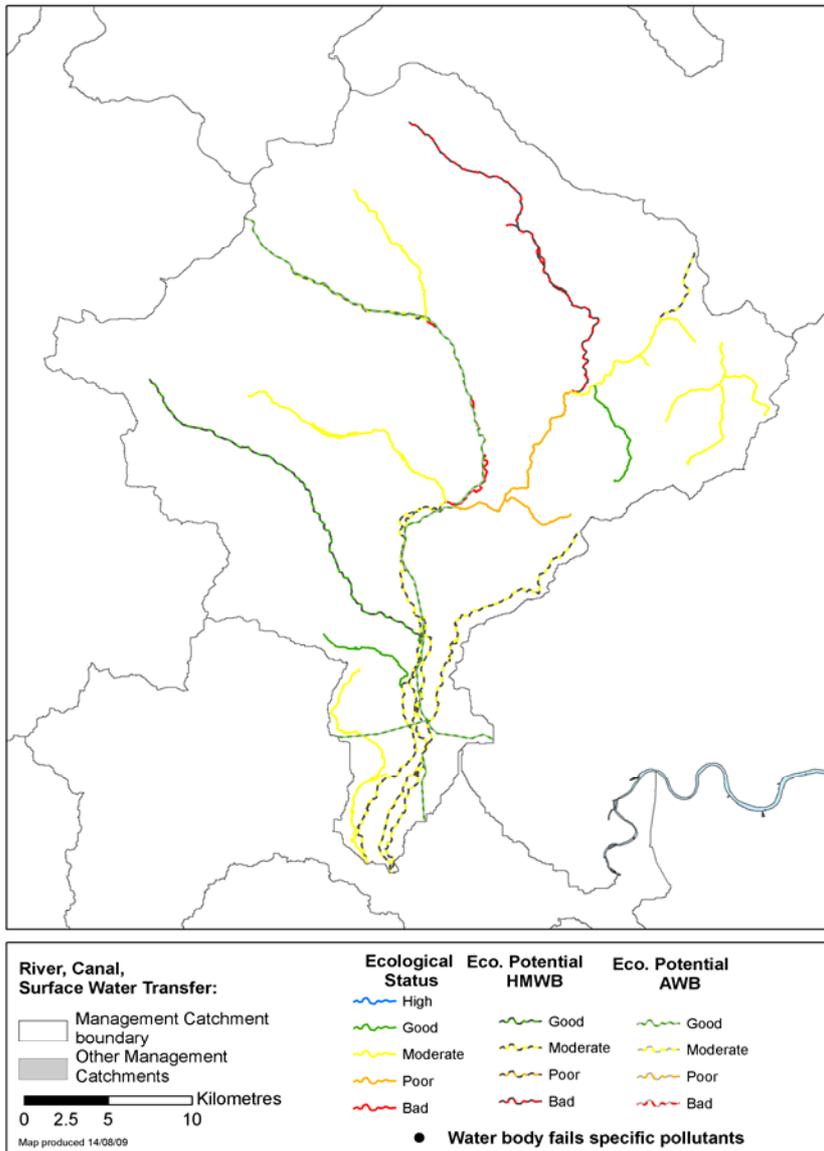
The wetland resource of the Colne Valley is recognised at both European and national level by the South West London Water Bodies Special Protection Area (SPA) and the Mid Colne Valley Site of Special Scientific Interest. These provide important sites for the feeding and roosting of wintering wildfowl.

The Grand Union Canal interacts with the Rivers Bulbourne, Gade and Colne and leads to stretches of these watercourses being considered as heavily modified.

Generally, water quality is moderate but can be influenced by factors such as rural and agricultural run-off, interactions with the canal network and pollution incidents. River modifications including over-widening, channel and bank engineering works and poor maintenance have also affected water quality. These issues have all had an impact on fish species and other wildlife currently found.

Climate change and future demands for water will almost certainly increase the pressure on water resources in these chalk streams and rivers. Low flows continue to be an issue which is exacerbated by abstraction pressures. This has influenced the diversity of the plants and invertebrates found.

Figure 14 **Map showing the current status/potential of river water bodies in the Colne catchment**



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Table 6 **Key statistics for the Colne catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	18	23
% assessed at good or high biological status (17 water bodies assessed)	20	30
% assessed at good chemical status (7 water bodies assessed)	71	71
<b>% at good status overall (chemical and ecological)</b>	18	23
% improving for one or more element in rivers		35

There are 17 river water bodies and five lakes in the catchment. Twelve are artificial or heavily modified. 12 per cent of rivers currently achieve good or better ecological status/potential, including the Alderbourne and Tykeswater. 20 per cent of rivers assessed for biology are at good or high biological status now, with 25 per cent at poor biological status, and 15 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 35 per cent of rivers in the Colne will improve for at least one element by 2015.

### **Some key actions for this catchment**

- Three Valleys Water will identify further options for improving flows in the River Misbourne.
- The Environment Agency will develop a groundwater model to investigate the relationship between abstraction rates and flow levels in the River Ver.
- The Environment Agency will establish river flow objectives for the Rivers Misbourne and Ver based on ecological species classification.
- The Environment Agency will work with the Farming Wildlife Advisory Group to promote soil and nutrient management plans to local farmers.
- The Environment Agency will work with partners to create reed bed and wetland scrapes on the River Colne at Watford.
- The Environment Agency will carry out pollution prevention work on the Mimmshall Brook.
- The Environment Agency will work with partners to assess improvements for fish passage on the River Colne at Denham Country Park.

### **Cotswolds catchment**



### **Catchment summary**

The Cotswolds are designated as an Area of Outstanding Natural Beauty (AONB), and represent one of the most charismatic landscapes in Britain characterised by rolling limestone hills, dry stone walls and calcareous rivers.

Agricultural land use is predominant but some gravel abstraction is undertaken. The resulting gravel pits have led to the creation of the Cotswolds Water Park which includes a bathing water beach and a Site of Special Scientific Interest (SSSI) lake and is a key area for water sports.

Surface water quality is generally good. Most rivers have shown improvements over the last few years. However, phosphate concentrations are a concern on the Rivers Evenlode, Glyme and Ampney Brook.

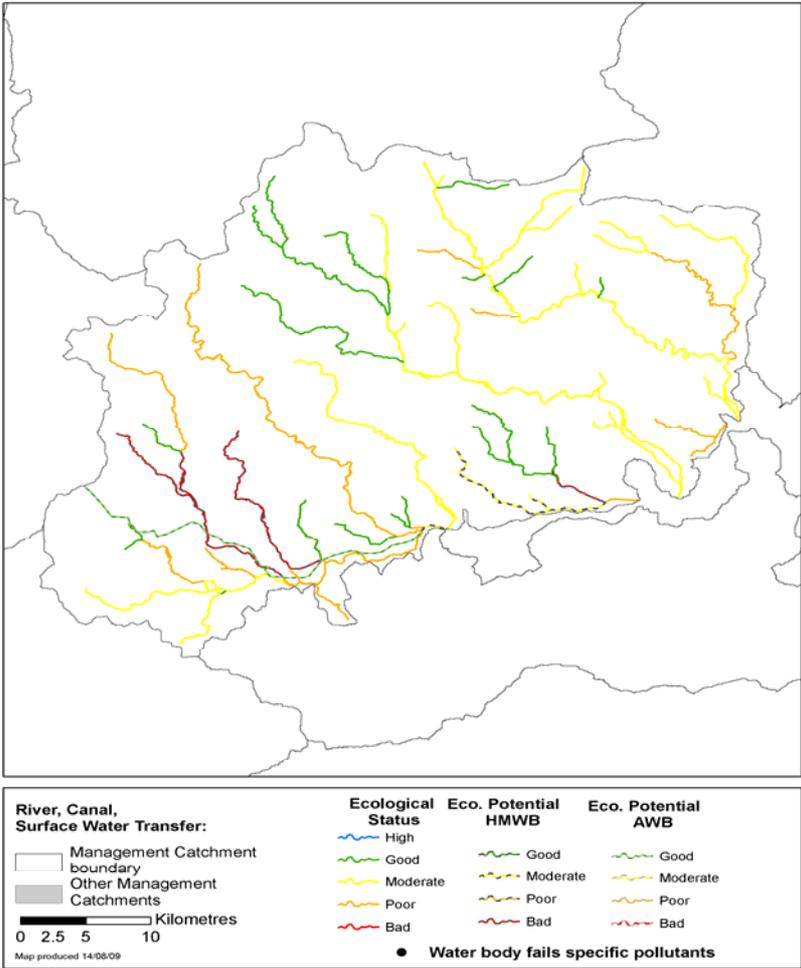
Much of the catchment experiences periodic low flows, which in some locations have been exacerbated by abstraction for public water supply. Previous investigations have resulted in reducing abstraction at a number of locations. Flow and ecological monitoring is being undertaken to assess the benefits of reduced abstraction to rivers such as the Churn and Ampney Brook. Other licences are currently being investigated, such as in the Upper Windrush Valley. Where these are

shown to be damaging to river ecology modifications to existing licences will be secured to address this. Other local measures aimed at reducing demand for water will be centred on working in partnerships to promote and encourage water efficiency through campaigns and advice.

Signal crayfish are now common in many rivers within the catchment. Further investigations are required to understand how their impacts on invertebrate communities may be affecting the likelihood of achieving good ecological status. Measures to control or eradicate them result of from current ongoing research, need to be applied.

Physical habitat restoration may also be required to achieve good ecological status in parts of the Cotswolds where channels have been heavily degraded, such as on certain reaches of the Evenlode. Nevertheless, an improvement of around 60km of river for fish is expected by 2015. Opportunities will be looked into with landowners and other organisations to restore habitat quality.

Figure 15 Map showing the current status/potential of river water bodies in this catchment



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Table 7 **Key statistics for the Cotswolds catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	38	47
% assessed at good or high biological status (39 water bodies assessed)	28	43
% assessed at good chemical status (4 water bodies assessed)	100	100
<b>% at good status overall (chemical and ecological)</b>	38	47
% improving for one or more element in rivers		31

There are 51 river water bodies and two lakes in the catchment. Four are artificial or heavily modified. 37 per cent of rivers currently achieve good or better ecological status/potential, including the Shill brook and Kencot brook and Serbourne brook. 28 per cent of rivers assessed for biology are at good or high biological status now, with 30 per cent at poor biological status, and 10 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 31 per cent of rivers in the Cotswolds will improve for at least one element by 2015.

### Some key actions for this catchment

- Contribute to achieving favourable condition on Cotswold Water Park Sites of Special Scientific Interest by implementing invasive species control programme.
- Investigate impact of sediments on ecological status.
- Contribute to achieving favourable condition on Cotswold Water Park Site of Special Scientific Interest by planning permission - enforcement/revocation.
- Apply national guidance framework on disposal of dredging to refine local measures as appropriate (where not disproportionately costly or technically infeasible).

### Darent and Cray catchment



### Catchment Summary

The River Cray is the largest tributary of the Darent, which joins the River Darent at Crayford. As with the River Darent the tidal limit is just upstream of the confluence and is controlled by a weir at Barnes Cray. The River Shuttle is the Cray's largest tributary, draining approximately 30 per cent of the sub-catchment. The Cray and Shuttle are very urbanised so the Darent has associated ecological pressures from river modification and contamination issues.

The River Darent is unusual for a moderate sized river as there are virtually no discharges into the river and consequently the water quality is generally good. The river is fed from the chalk aquifers as well as some spring flow from the large Lower Greensand Beds to the south of the upper catchment.

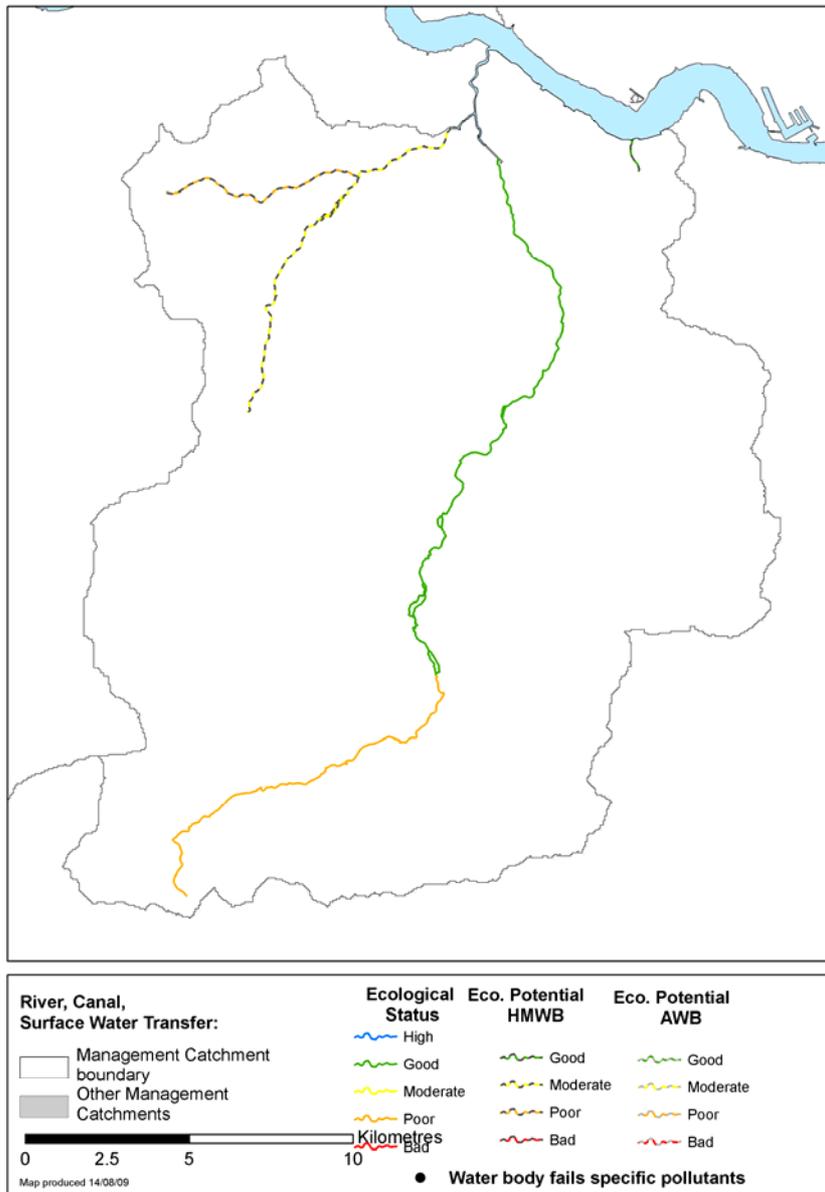
The impact of low flows upon the River Darent has significantly affected the invertebrate fauna. Several species came close to extinction from this catchment and the observed re-colonisation rates of several species have been extremely slow. Although the middle section of the river was observed to experience the greatest impact from low flows, it is known that Otford (a site situated further up the catchment) is also adversely affected by low flows.

The Darent Action Plan has seen reductions in abstraction from the underlying chalk aquifer. This benefits many species in particular fish populations such as brown trout, invertebrates such as river limpet, as well as aquatic plant species. The ecology in the mid Darent still suffers in dry years. The final stage of the Darent Action Plan is required to sustain minimum flows in these periods. This will also reduce dependency on the flow augmentation provided by adjacent chalk boreholes.

There is still concern about the impact of low flows on ecology. In dry years, the flows still need to be supported by augmentation boreholes. In addition, the channel shape is still a limiting factor. Water quality in the more urbanised area of the Cray and in particular, the Shuttle, is particularly influenced by urban runoff.

The groundwater quality within this catchment is at risk from inputs from nitrates, pesticides, solvents and hydrocarbons. The impacts relate to the land-uses so the agricultural areas show high levels of nitrates and the industrial areas in the low-lying valleys are also impacted by solvents and hydrocarbons. The groundwater quality is likely to interact with the surface water in some areas, impacting on the ecology of the surface water bodies.

Figure 16 Map showing the current status/potential of rivers in the Darent and Cray catchment



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Table 8 Key statistics for the Darent & Cray catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	33	33
% assessed at good or high biological status (5 water bodies assessed)	40	40
% assessed at good chemical status (2 water bodies assessed)	50	50
<b>% at good status overall (chemical and ecological)</b>	33	33
% improving for one or more element in rivers		33

There are six river water bodies and no lakes in the catchment. Two are artificial or heavily modified. 33 per cent of rivers currently achieve good or better ecological status/potential, including the Mid Darent and Upper Cray. 40 per cent of rivers assessed for biology are at good or high biological status now, with 40 per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 33 per cent of rivers in the Darent and Cray catchment will improve for at least one element by 2015.

### **Some key actions for this catchment**

- The Environment Agency will investigate the reasons for low ecological quality.
- Thames Water and the Environment Agency will investigate sewage misconnections the Darent and Cray.
- Thames Water and the Environment Agency will seek to fulfil the Darent Action Plan to secure sustainable abstraction in the Darent between Otford and Hawley.
- Thames Water will assess options for improving groundwater abstraction in the Upper Cray once approved in the Periodic Review.
- The Environment Agency will investigate sources of hydrocarbons and solvents in Crayford and Dartford and undertake pollution prevention visits at priority sites such as Westerham.
- The Environment Agency will work with landowners to address barriers to fish passage at sites including Vitbe Mill and Wellcomme's structure at Dartford.
- The Environment Agency will carry out investigative monitoring and field work into the origins of, causes of and solutions to pollution.
- The Environment Agency will establish a 'Regional Better Rivers Programme' to improve habitat and ecology in a first round of waters.
- The Environment Agency will carry out investigative monitoring and field work into the origins, causes and solutions to sedimentation.
- The angling club which controls the fishing at Preston Farm will have an enhancement plan that endeavours to improve the fish habitat. It will provide challenging and varied fly fishing, by installing flow deflectors, where it is deemed necessary.
- Pollution prevention campaigns around groundwater abstractions to decrease the inputs of nitrates, pesticides, hydrocarbons and solvents.

### **Kennet and Pang catchment**



### **Catchment summary**

The Rivers Kennet, Pang and Lambourn are chalk streams which flow through the Marlborough downs. They are home to wild brown trout and are characterised by chalkstream aquatic plant species such as *rununculus*. Although the upper stretches of the Kennet are mainly rural the river passes through Marlborough, Hungerford, Newbury and Reading before reaching the River Thames.

Surface water quality in the catchment is generally good, although Tributyltin compounds are causing a current failure in the Foudry Brook.

The Kennet has experienced considerable turbidity issues which can effect the gravels and the aquatic vegetation making it less suitable for fish communities and aquatic insects. Part of the source of this sedimentation is the numerous small streams which enter the River Kennet and Kennet and Avon canal as well as land practices. Runoff from land is connected to the river by tracks, roads, and the footpath network through road side drains and gulleys.

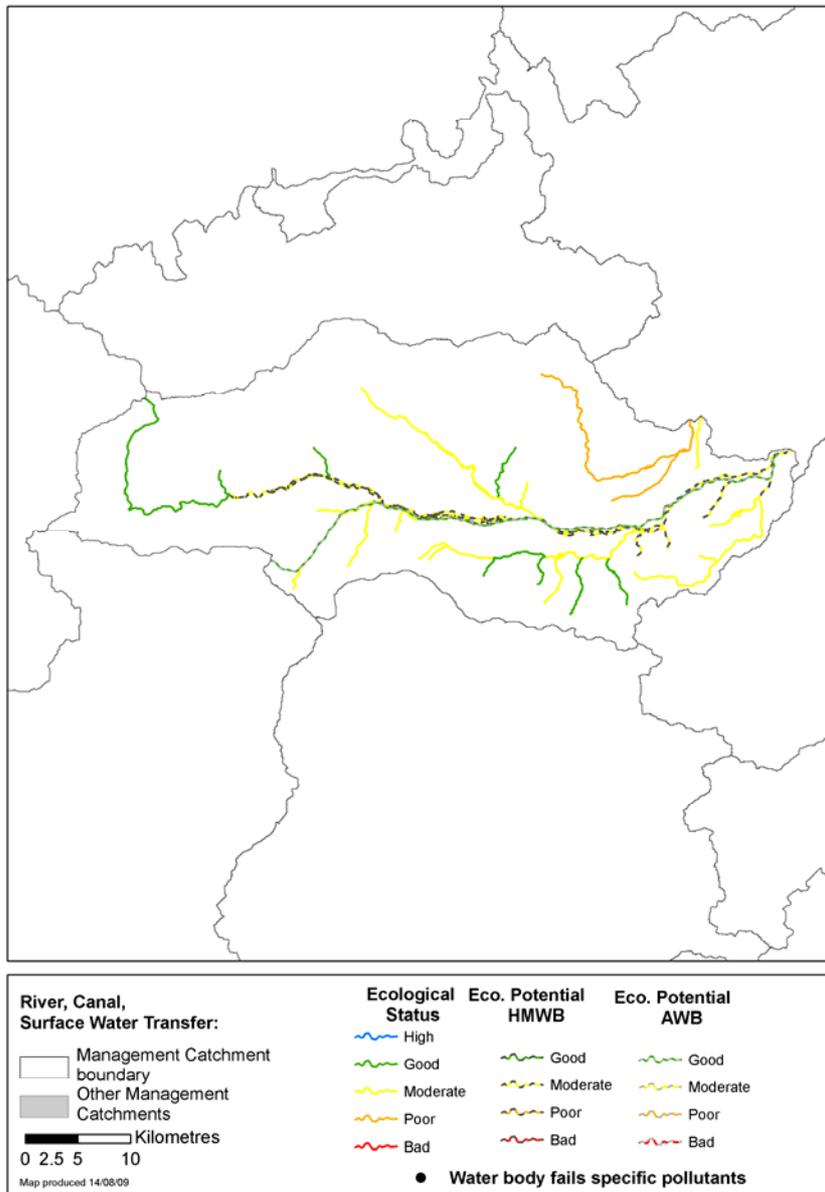
The catchment has several abstractions predominantly from groundwater sources, for supplying water to urban areas outside of the catchment. A number of abstraction licences have been investigated to assess their impacts on ecology. Actions have been put in place or are planned to reduce these impacts where they have been established as unacceptable (for example. at Axford on the Kennet). Further investigations are underway on other licences such as at Ogbourne and Pangbourne. Other local measures aimed at reducing demand for water will be centred on working in partnership to promote and encourage water efficiency through campaigns and advice.

Measures to mitigate against diffuse pollution include promotion of Codes of Good Agricultural Practice (CoGAP) and the use of soil and nutrient management plans. Some of this will be delivered through the English Catchment Sensitive Farming Delivery Initiative and associated projects. Work will continue to investigate the adverse impacts on river quality due to the interaction between the River Kennet and the Kennet and Avon Canal.

Point source pollution will be dealt with through investigation into the impacts of emissions from Kintbury and Chilton Foliat Sewage Treatment Works, and the collection of water quality and ecological data from up and downstream of a number of smaller sewage treatment works. There is also a need to. This will provide information for future actions (for instance for future asset management programme (AMP) schemes).

Physical habitat restoration is needed at a number of locations to address the problems of past engineering and the impacts of control structures where these are severely limiting the ecological potential of the catchment. Some of this work will be done under a programme to restore the River Kennet and River Lambourn Sites of Special Scientific Interest, but additional works are required for degraded reaches elsewhere.

Figure 17 **Map showing the current status/potential of rivers in the Kennet and Pang catchment**



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Table 9 **Key statistics for the Kennet & Pang catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	34	40
% assessed at good or high biological status (26 water bodies assessed)	43	50
% assessed at good chemical status (8 water bodies assessed)	88	100
<b>% at good status overall (chemical and ecological)</b>	34	40
% improving for one or more element in rivers		29

There are 31 river water bodies and four lakes in the catchment. Eight are artificial or heavily modified. 29 per cent of rivers currently achieve good or better ecological status/potential, including the Boughurst brook and Foudry brook. 38 per cent of rivers assessed for biology are at good or high biological status now, with only four per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 29 per cent of rivers in the Kennet and Pang will improve for at least one element by 2015.

### **Some key actions for this catchment**

- Contribute to achieving favourable condition on River Kennet Site of Special Scientific Interest (SSSI) by revoking or amending abstraction licences.
- Contribute to achieving favourable condition on River Kennet SSSI by implementing appropriate dredging programme.
- Contribute to achieving favourable condition on River Kennet SSSI by regulation of boat movements.
- The Environment Agency will investigate the impact of sediments on ecological status.
- The Environment Agency will work with local authority and local stakeholders to develop methods to tackle diffuse rural and urban pollution and river restoration through the Kennet Chalkstream Restoration Project.
- Implementation of mitigation scheme to reduce risk to site from Berkshire Groundwater Scheme: Kennet & Lambourn Floodplain candidate Special Area of Conservation.
- The Environment Agency will work towards removing obsolete structures.
- Collect water quality and ecological monitoring samples from up and downstream of a number of smaller sewage treatment works to provide information for potential future actions (for instance future asset management programme (AMP) schemes).

### **Loddon catchment**



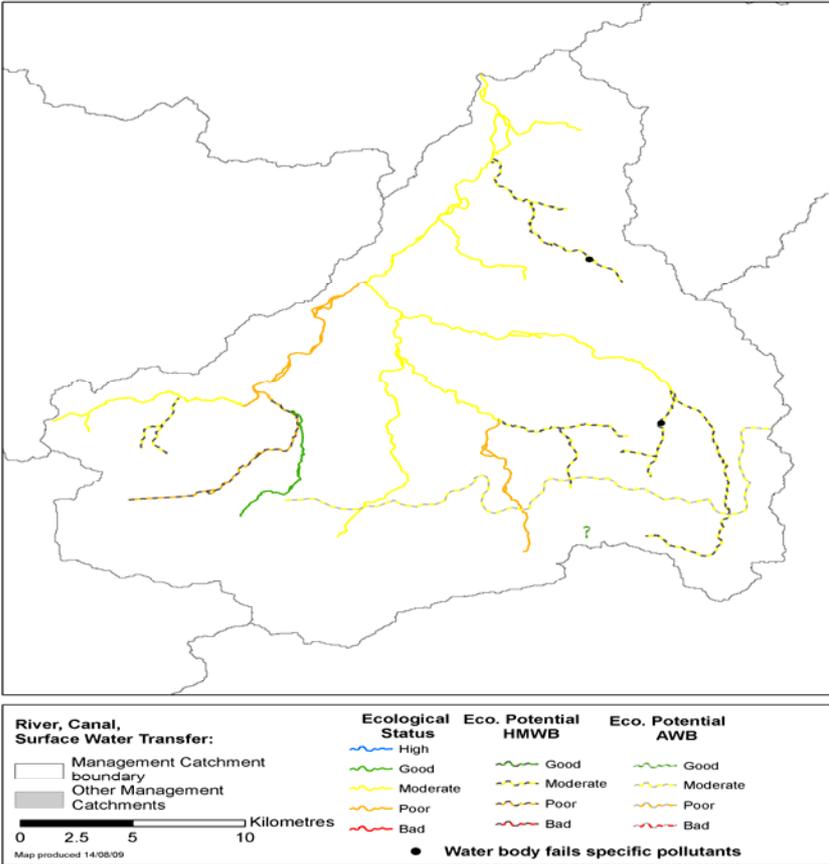
### **Catchment summary**

This catchment is predominantly rural with some urban areas including the towns of Basingstoke, Aldershot and Wokingham. The main River Loddon is fed by a number of tributaries including the Rivers Whitewater, Hart and Blackwater as well as the Emm Brook. The Basingstoke Canal cuts across the southern part of the catchment. This catchment also includes Fleet Pond, Heath Lake and Mytchett Lake Sites of Special Scientific Interest (SSSI).

Phosphate levels are high in a number of rivers for example the River Blackwater. High levels of nutrients in rivers can lead to excessive plant growth and in turn affect the river's wildlife. Sources of nutrients in this catchment include effluent from sewage treatment works and agricultural pollution. Substantial urban development, which will increase the volume of treated effluent as well as demand for water supply, is also planned for this catchment.

Some rivers in this catchment are designated heavily modified. Modification of these rivers including in-stream structures has led to loss of habitat diversity and the creation of barriers for fish migration. These issues and the presence of pollutants give rise to poor water quality for a number of rivers, as well as varied biological quality throughout the catchment.

Figure 18 Map showing the current status/potential of rivers in the Loddon catchment



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Table 10 Key statistics for the Loddon catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	9	9
% assessed at good or high biological status (17 water bodies assessed)	41	47
% assessed at good chemical status (6 water bodies assessed)	83	83
% at good status overall (chemical and ecological)	9	9
% improving for one or more element in rivers		32

There are 19 river water bodies and three lakes in the catchment. Nine are artificial or heavily modified. Five per cent of rivers currently achieve good or better ecological status/potential, including the Lyde. 41 per cent of rivers assessed for biology are at good or high biological status now, with 41 per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 32 per cent of rivers in the Loddon will improve for at least one element by 2015.

### Some key actions for this catchment

- In support of the Loddon Farm Advice Project, the Hants and Isle of Wight Wildlife Trust will promote the use of soil and nutrient management plans and raise awareness of Codes of Good Agricultural Practice and Best Farming Practice.
- The Environment Agency will undertake farm visits and work with farmers to provide pollution prevention advice and information to ensure farming activities are not causing a detrimental impact on the environment.
- The Environment Agency will investigate the potential for improvements to sewage treatment works that could be included in the programme of work under the 2014 periodic review..
- The Environment Agency, in partnership with Thames Water and local landowners, will carry out modifications and improvements at Arborfield that will improve the habitat of the river in this area and allow fish to migrate upstream. This will improve the status of fish populations in the River Loddon (Swallowfield to River Thames confluence), and in other water bodies upstream.
- Throughout the catchment, there is a requirement for further monitoring and investigation is required to allow targeting of additional actions to improve the status of this catchment.

### London catchment



### Catchment summary

The London catchment is comprised of the non tidal urban tributaries of the Thames Tideway. This includes the lower River Lee and its main tributaries, Pymmes, Salmon and Cobbins Brooks, and the Rivers Brent and Crane to the north of London. To the south of London, rivers include the Hogsmill, Beverly Brook, Wandle and Ravensbourne. The Tidal River Thames and its creeks are discussed in the Estuaries and Coastal Waters Catchment.

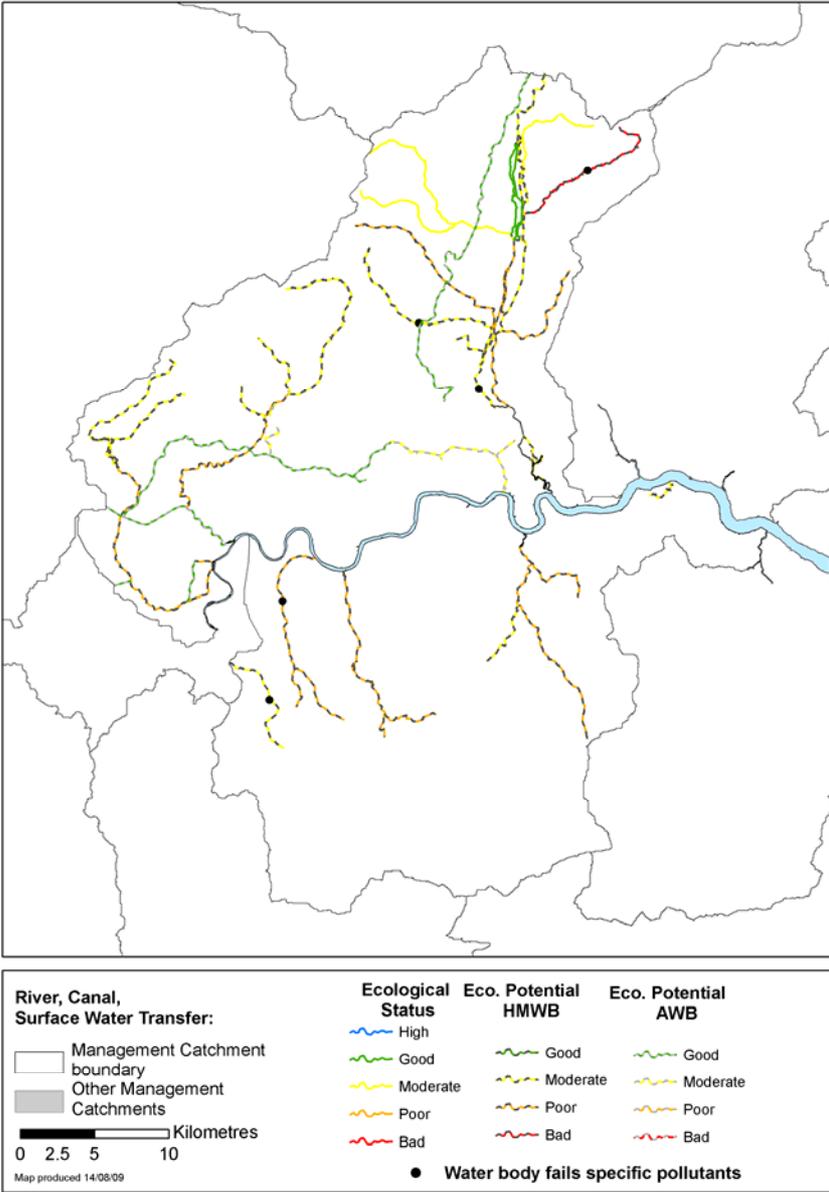
This catchment is highly urbanised with Greater London situated at its heart. The majority of rivers are designated heavily modified and there is a distinct lack of natural river processes throughout the catchment. The modification of rivers including in-stream structures has led to loss of habitat diversity and the creation of barriers for fish migration. Examples include in-stream structures in the Lee Navigation and Lee Flood Relief Channel and extensive concrete lined and culverted reaches of the River Wandle.

Water quality remains a significant issue in this catchment. The highly urbanised nature exacerbates the pollution pressures particularly through increased surface water run-off, storm sewage overflows and misconnections, alongside effluent from sewage treatment works. These issues, the presence of invasive species and physical modification pressures, give rise to poor water quality and habitat diversity for a number of rivers, as well as varied biological quality throughout the catchment.

The wetland resource of the Lee Valley is recognised at both European and National level by the Lee Valley Special Protection Area (SPA) and there are a number of Sites of Special Scientific Interest (SSSI) in the catchment.

The construction works for the 2012 Olympics and associated legacy developments will provide the single biggest opportunity to improve the lower reaches of the River Lee and its backwaters.

Figure 19 Map showing the current status/potential of rivers in the London catchment



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Table 11 Key statistics for the London catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	18	20
% assessed at good or high biological status (21 water bodies assessed)	23	23
% assessed at good chemical status (9 water bodies assessed)	44	67
% at good status overall (chemical and ecological)	18	20
% improving for one or more element in rivers		32

There are 28 river water bodies and 17 lakes in the catchment. 41 are artificial or heavily modified. 4 per cent of rivers currently achieve good or better ecological status/potential, including the small River Lee (and tributaries). 10 per cent of rivers assessed for biology are at good or high biological status now, with 57 per cent at poor biological status, and 13 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 32 per cent of rivers in London will improve for at least one element by 2015.

### Some key actions for this catchment

- The Environment Agency will undertake pollution prevention projects on Pymmes Brook, Brimsdown Ditch and the River Wandle.
- The Environment Agency will investigate the causes of urban diffuse pollution on the Ravensbourne.
- Thames Water will construct the Lee Tunnel. This will reduce the number of storm discharges into the River Lee.
- Thames Water have planned improvements at their Deephams waste water treatment works.
- The Environment Agency will work with partners at Cranebank to put the river back on its original meandering course and improve fish populations..
- The Environment Agency and Natural England will work together to continue to develop and implement the London Rivers Action Plan to improve ecology through habitat creation and enhancement.
- Physical habitat pressures will be considered through the delivery of proposed flood risk management work, for example at Ashlone Wharf and Worcester Park on the Beverley Brook.

### Case study 4: **Dredging of the River Lee Navigation, to improve water quality**

Historic poor urban water quality and low levels of dissolved oxygen has been shown to be due in part to the accumulation of contaminated sediment in the canalised River Lee Navigation.



The Environment Agency funded a dredging programme which was completed in early 2009. The task to remove urban sediment and other matter from the canal over a distance of 3.2kms was completed over a 3 month period at a cost of £2million. As a result of the initiative over 30,000 m<sup>3</sup> of sediment was removed in addition to 3 tonnes of tyres, 3 cars, 40 motorbikes and 120 shopping trolleys.

The sediment was initially identified as hazardous and non-hazardous waste following extensive sampling. The hazardous material was transferred to a waste bioremediation centre in West London for subsequent use as landfill engineering cover.

As part of the overall aims of the programme, sediment was used to create bankside enhancement by depositing material behind wooden piling in combination with geotextile membrane to form soft vegetated margins. Over time the improved bankside habitat will help to improve biodiversity and aesthetics along the canal.

## Thames (Maidenhead to Sunbury) catchment



### Catchment summary

The non-tidal Lower River Thames is a prime recreation and leisure resource used for canoeing, rowing, fishing, walking and cruising. The Thames Path National Trail runs its entire length and also forms part of a national cycleway.

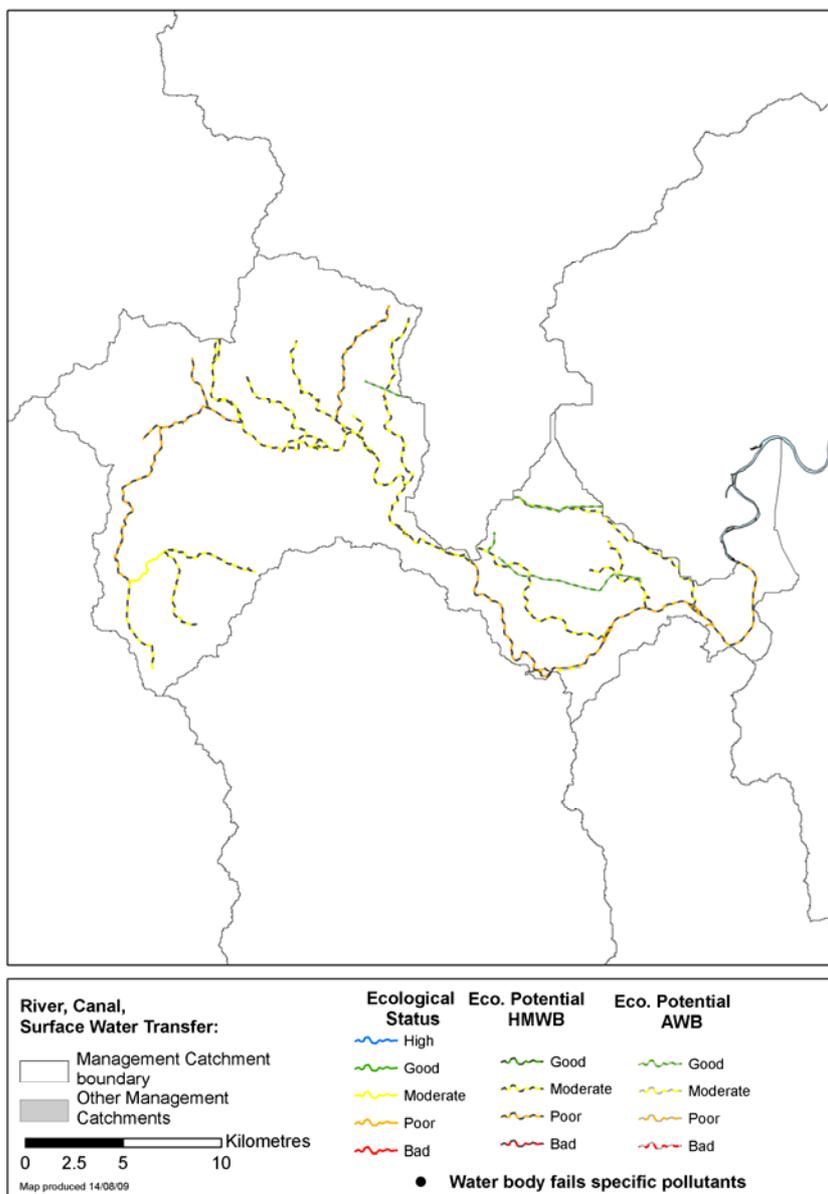
The catchment includes the Lower River Thames and a number of its tributaries including the Cut, Maidenhead, Boveney and Chalvey Ditches, the Salthill Stream and Datchet Common Brook. It includes Bessborough, Knight and Queen Elizabeth II Storage Reservoirs as well as Englemere Pond and Littleworth Ponds Sites of Special Scientific Interest. The majority of these rivers are designated heavily modified for navigation, flood risk management and abstraction purposes. The catchment is further characterised by urban development and includes the towns of Bracknell, Maidenhead, Windsor, Slough and Staines.

Phosphate levels are high in a number of rivers. High levels of nutrients in rivers can lead to excessive plant growth and in turn affect the river's wildlife. Sources of nutrients in this catchment include effluent from sewage treatment works.

Modification of these water bodies including in-stream structures has led to loss of habitat diversity and the creation of barriers for fish migration. Considerable water abstraction requires the flow on the main River Thames to be closely managed through the Lower Thames Operating Agreement with Thames Water.

The above issues and the presence of pollutants give rise to poor water quality and habitat diversity on a number rivers, as well as varied biological quality throughout the catchment.

Figure 20 **Map showing the current status/potential of rivers in the Maidenhead to Sunbury catchment**



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Table 12 **Key statistics for the Maidenhead to Sunbury catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	23	23
% assessed at good or high biological status (11 water bodies assessed)	35	35
% assessed at good chemical status (6 water bodies assessed)	83	100
<b>% at good status overall (chemical and ecological)</b>	23	23
% improving for one or more element in rivers		7

There are 14 river water bodies and 12 lakes in the catchment. 23 are artificial or heavily modified. None of the catchment currently achieves good or better ecological status/potential. 45 per cent of rivers assessed for biology are at good or high biological status now, with 41 per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. Seven per cent of rivers in the Thames (Maidenhead to Sunbury) will improve for at least one element by 2015.

### **Some key actions for this catchment**

- The Environment Agency will investigate improvements to sewage treatment works that could be included in the programme of work under the 2014 periodic review.
- The Environment Agency will install an elver (juvenile eel) ladder at Teddington weir, which will allow more elvers to migrate upstream into the freshwater River Thames (Egham to Teddington) and improve populations of this important, threatened, and declining species.
- The Environment Agency and Thames Water will undertake an investigation to assess the impact of abstraction on the ecology, recreation and navigation of the Lower Thames..
- Throughout the catchment, there is a requirement for further monitoring and investigation to allow targeting of additional measures to improve the status of this catchment.

### **Medway catchment**



### **Catchment summary**

The Medway catchment contains three main rivers; the Medway itself which has its source in the Hastings Beds in the south of the catchment, the river Eden, a more flashy catchment flowing from the west and and the river Beult; a Weald Clay dominated river which flows from the East. The three rivers join at Yalding and flow through Maidstone to the Thames Estuary at Rochester and Chatham. Most of the catchment area is lies between 150 and 200m above sea level.

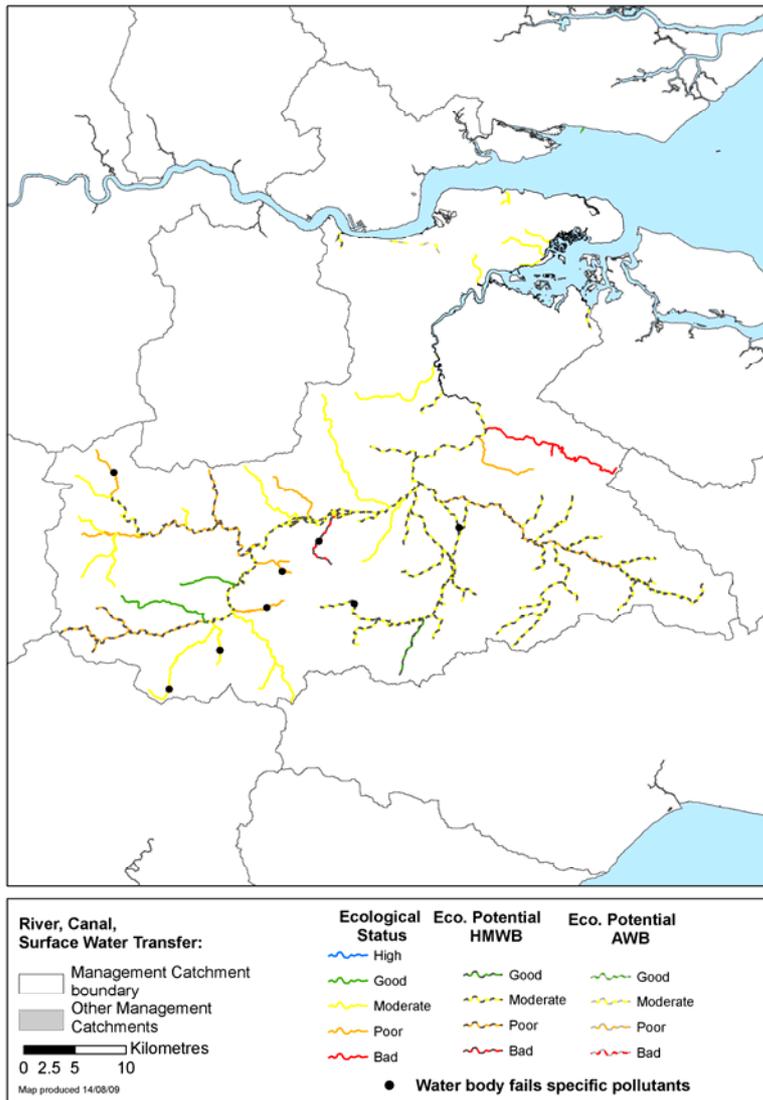
Whilst downstream of Maidstone the river flows through urban settlements and receives discharges from industry, upstream of Maidstone the area is predominately agricultural. Agriculture in the upper reaches of these areas tends to be mixed, whilst arable farming dominants areas of flatter land, particularly on the floodplains east of Tonbridge and on the lower reaches of the Beult. There remains a concentration of orchards and hops in the lowlands between Maidstone, Sevenoaks and Royal Tunbridge Wells.

The Medway is heavily engineered to manage flood risk and for navigation requirements. The Medway towns have a long history of river based industry and a series of locks exist between Maidstone and Leigh (near Tonbridge) to ensure that a large proportion of the river is navigable. Many of these locks form barriers to fish migration and as such one of the challenges for the Medway is to ensure that fish passes are fitted to these structures. The fish pass structures also

incorporate canoe passes so that both ecological and recreational benefits are gained. This is particularly relevant in the Medway which enjoys high levels of recreational and angling interest.

Nearly three quarters of the Medway catchment is protected by landscape designations. The Kent Downs Area of Outstanding Natural Beauty (AONB) covers the Chalk downland of the North Downs and significant stretches of the Medway valley. This area is noted for its Chalk scarp, Chalk downland pastures and ancient woodland. The High Weald AONB covers the high well-wooded ground of the Hastings Beds sandstones and clays in the south of the catchment. In addition there are large areas of freshwater grazing marsh along the North Kent coast and on fragments of the habitat inland, particularly above Maidstone. This area supports internationally important populations of wildfowl and migratory birds.

Figure 21 Map showing the current status/potential of rivers in the Medway catchment



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Table 13 Key statistics for the Medway catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	10	10
% assessed at good or high biological status (40 water bodies assessed)	35	42
% assessed at good chemical status (12 water bodies assessed)	92	92
% at good status overall (chemical and ecological)	10	10
% improving for one or more element in rivers		28

There are 60 river water bodies and 9 lakes in the catchment. 41 are artificial or heavily modified. Five per cent of rivers currently achieve good or better ecological status/potential. 38 per cent of rivers assessed for biology are at good or high biological status now, with 26 per cent at poor biological status, and five per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 28 per cent of rivers in the Medway will improve for at least one element by 2015.

### **Some key actions for this catchment**

- Southern Water will improve sewage works at five locations to reduce inputs of nutrients including phosphate and improve shellfish waters.
- The Environment Agency will promote good practice to avoid pollution from construction sites in the Loose and Somerhill stream.
- South East Water will investigate abstraction from the Greensand Sources in the Leybourne and Bourne in the Periodic Review process.
- The Environment Agency will educate and raise awareness of the impact that small discharges to ground and surface water have on water quality of the receiving waters, This is with a view to advising residents of the need to connect to the mains sewer system across many of the rivers including the Barden Mill Stream, Teise, Eden, and Medway between the Eden, Crowborough and Yalding.
- The Environment Agency will identify and improve private discharges in rivers such as Eden at Bough Beech, Len and the Loose.
- The Environment Agency will carry out additional investigative monitoring and field work into the origins of, causes of and solutions to sedimentation in rivers including Somerhill Stream, Hammer Stream and the Medway at Weir Wood.
- The Environment Agency will carry out investigative monitoring and field work into the origins of, causes of and solutions to pollution where we need to improve certainty in many water bodies such as the river Bourne, Eridge Stream, Pippingford Brook and the Beult.
- The Environment Agency will establish a 'Regional Better Rivers Programme' to improve habitat and ecology in a first round of waters in rivers such as the Beult, Len and Loose Stream.
- The Environment Agency will work with landowners to address barriers to fish passage at sites including Allington and East Farleigh.
- The Environment Agency will re-survey of the upper reaches of the river Grom to establish current ecological quality, after improvements to the existing combine sewer outfall system.
- Pollution prevention campaigns around groundwater abstractions to decrease the inputs of nitrates, pesticides, hydrocarbons and solvents.

### **Mole catchment**



### **Catchment summary**

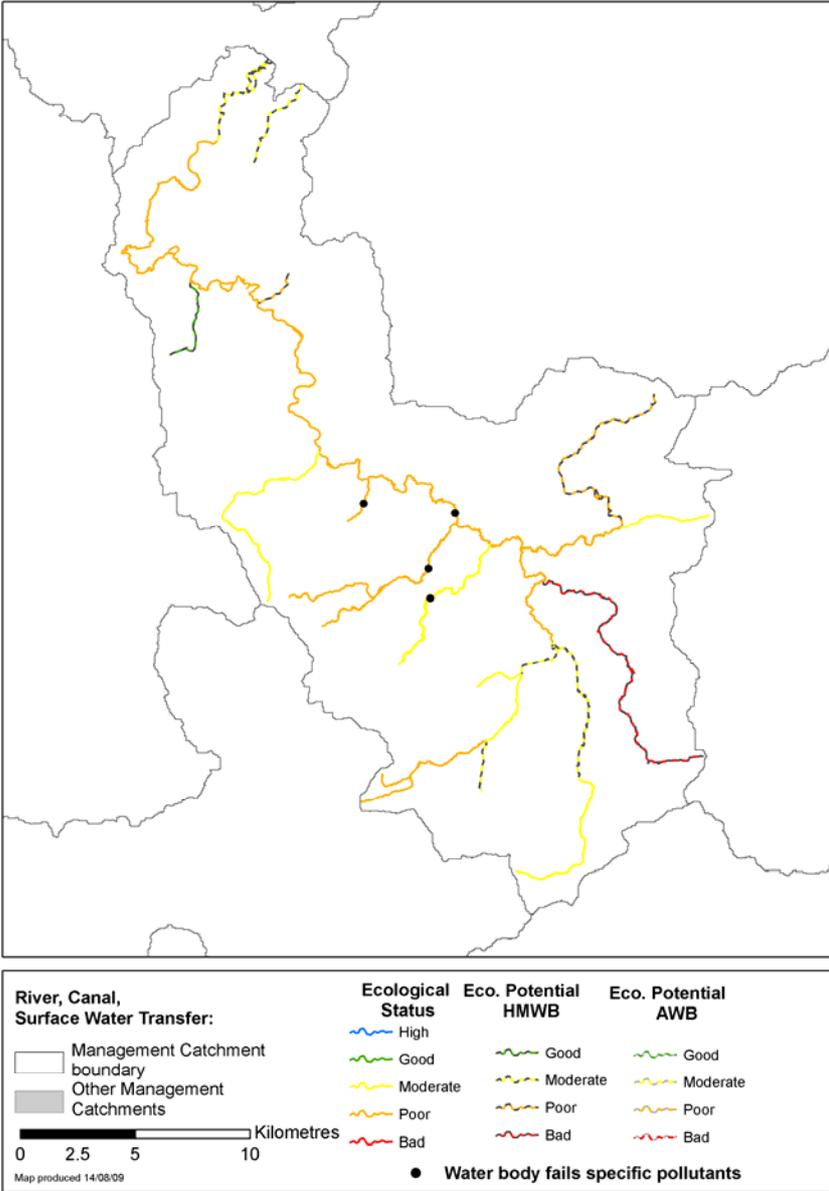
This catchment is characterised by urban development and agricultural land use. It includes the towns of Crawley, Leatherhead and Reigate and a large number of rural villages, particularly in the upper catchment; as well as Gatwick Airport. The main River Mole is fed by a number of tributaries including the Gatwick Stream, Redhill Brook and the Salfords Stream. This catchment also includes Island Barn Reservoir, and Black Pond and Douster Pond Sites of Special Scientific Interest (SSSI).

Phosphate and Ammonia levels are high in a number of rivers. High levels of nutrients in rivers can lead to excessive plant growth that in turn affect the river's wildlife. Sources of nutrients in this

catchment include effluent from sewage treatment works. In addition, the clay characteristics of the upper catchment exacerbate surface water run-off and some canalised and shaded reaches suffer low dissolved oxygen in times of low flow. Sudden decreases in dissolved oxygen has a detrimental affect on fish and may damage other wildlife. Substantial urban development, which will increase the volume of treated effluent as well as demand for water supply, is also planned for this catchment.

Some rivers in this catchment are designated heavily modified. Modification of these rivers including in-stream structures has led to loss of habitat diversity and the creation of barriers for fish migration. These issues and the presence of pollutants give rise to poor water quality for a number rivers, as well as varied biological quality throughout the catchment.

Figure 22 **Map showing the current status/potential of rivers in the Mole catchment**



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Table 14 **Key statistics for the Medway catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	13	13
% assessed at good or high biological status (18 water bodies assessed)	11	17
% assessed at good chemical status (3 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	13	13
% improving for one or more element in rivers		25

There are 20 river water bodies and three lakes in the catchment. 11 are artificial or heavily modified. Five per cent of rivers currently achieve good or better ecological status/potential, including the Downside Ditches and Bookham Brook. 11 per cent of rivers assessed for biology are at good or high biological status now, with 44 per cent at poor biological status, and 11 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 25 per cent of rivers in the Mole will improve for at least one element by 2015.

### Some key actions for this catchment

- The Environment Agency will undertake farm visits and work with farmers to provide pollution prevention advice and information to ensure farming activities are not causing a detrimental impact on the environment.
- The Environment Agency will investigate improvements to sewage treatment works that could be included in the programme of work under the 2014 periodic review..
- The Environment Agency will install an elver (juvenile eel) ladder at Teddington weir on the River Thames and at Mole Ember weir on the River Mole. This will allow the upstream migration of eel, improving populations of this important, threatened and declining species, in the River Mole (Hersham to the River Thames confluence at East Molesey).
- Throughout the catchment, there is a requirement for further monitoring and investigation to allow targeting of additional measures to improve the status of this catchment.

### North Kent catchment



### Catchment summary

The North Kent catchment area extends along the North Kent coast between Gillingham in the west and Herne Bay in the east.

The area is made up of the chalk North Downs and due to the permeable nature of the geology, surface watercourses do not cover a large proportion of the landscape. The existing water features have experienced many pressures. During the 1960s major drainage works were undertaken within the enclosed marshes and this led to the creation of large arable fields and a loss of grazing marshes. Urbanisation has resulted in channel modification notably around Sittingbourne,

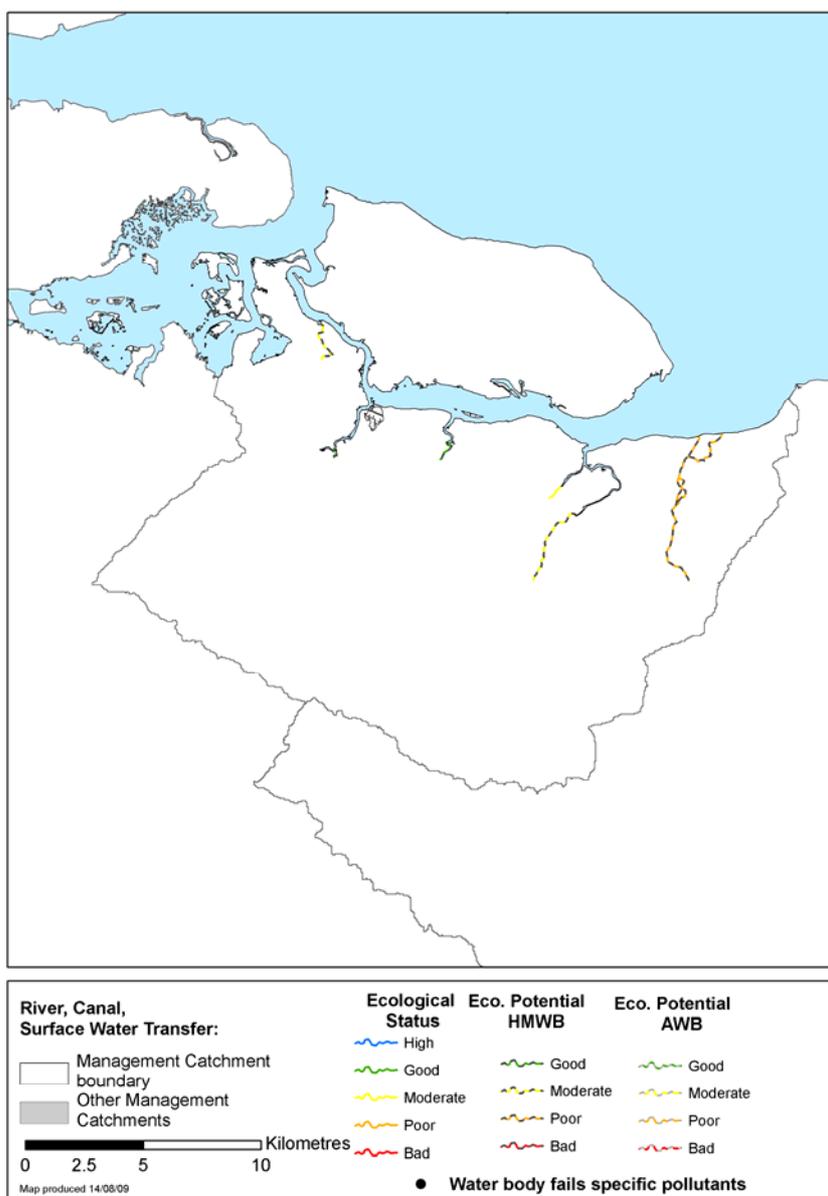
Faversham, Whitstable and Herne Bay. Associated sewage treatment works have all limited the ecology of the chalk springs.

The principal water dependent habitats in this area are the grazing marshes and inter-tidal mud flats. The habitat value of the grazing marsh depends largely on careful surface water management. This area has been designated a Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) in recognition of the bird population which is supported by the inter-tidal mud flats and the grazing marshes.

The springs which feature on the north side flow into the Thames Estuary along very modified channels. Much of the action in this area will be to improve the groundwater quality through addressing diffuse and point source pollution. Water quality has been recognised as a problem and action will be taken in the Periodic Review to improve sewage discharges in the Swale, Froggal Drain, Faversham Creek and Milton Creek.

Improvements in the surface water bodies will also be targeted at reducing physical pressures such as culverts, sluices and concrete banks for example in the Milton, Faversham and Oare Creeks. Many of these surface water bodies require additional biology monitoring to increase confidence in the derived ecological status.

Figure 23 Map showing the current status/potential of rivers in the North Kent catchment



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Table 15 Key statistics for the North Kent catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	14	14
% assessed at good or high biological status (1 water bodies assessed)	0	0
% assessed at good chemical status (0 water bodies assessed)	0	0
<b>% at good status overall (chemical and ecological)</b>	14	14
% improving for one or more element in rivers		0

There are five river water bodies and two lakes in the catchment. Six are artificial or heavily modified. 20 per cent of rivers currently achieve good or better ecological status/potential. None of

the rivers assessed for biology are at good or high biological status now, with 67 per cent at poor biological status and 33 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. It is unlikely that any of the rivers in the North Kent catchment will improve to good status by 2015.

### **Some key actions for this catchment**

- Southern Water will improve sewage works at nine locations to reduce inputs of nutrients including phosphate and improve shellfish waters.
- The Environment Agency will undertake pollution prevention campaigns and visits around groundwater abstractions to decrease the inputs of nitrates, pesticides, hydrocarbons and solvent. Priority sites include Throwley and Gore.
- Local authorities will aim to reduce the physical impact of urbanisation in artificial or heavily modified water bodies to help waters reach Good Ecological Potential. These water bodies are specified in Annex B.

### **Roding, Beam and Ingrebourne catchment**



### **Catchment summary**

The Roding, Beam and Ingrebourne catchment is located in west Essex and east London. All three river systems rise in rural areas and flow through contrasting rural / agricultural and urban environments which include the towns of Ilford, Barking, Romford, Brentwood, Loughton and Chipping Ongar.

The Roding, Beam and Ingrebourne Rivers are subject to a relatively high degree of environmental stress. The upper reaches receive agricultural run-off, and are at risk from diffuse and point source agricultural pollution, over abstraction and reduced dilution. The lower stretches are strongly influenced by their urban constraints.

The River Roding rises at Molehill Green, east of Stanstead Airport and flows south before its confluence with the Thames at Barking. The geology of the catchment is essentially London clay.

There are numerous surface water agricultural abstractions from the Upper Roding and Cripsey Brook. These abstractions seek to take advantage of the high flows that can occur in the winter months. Nutrient levels in the river can be high due to the flash flow regime that occurs after rainfall events.

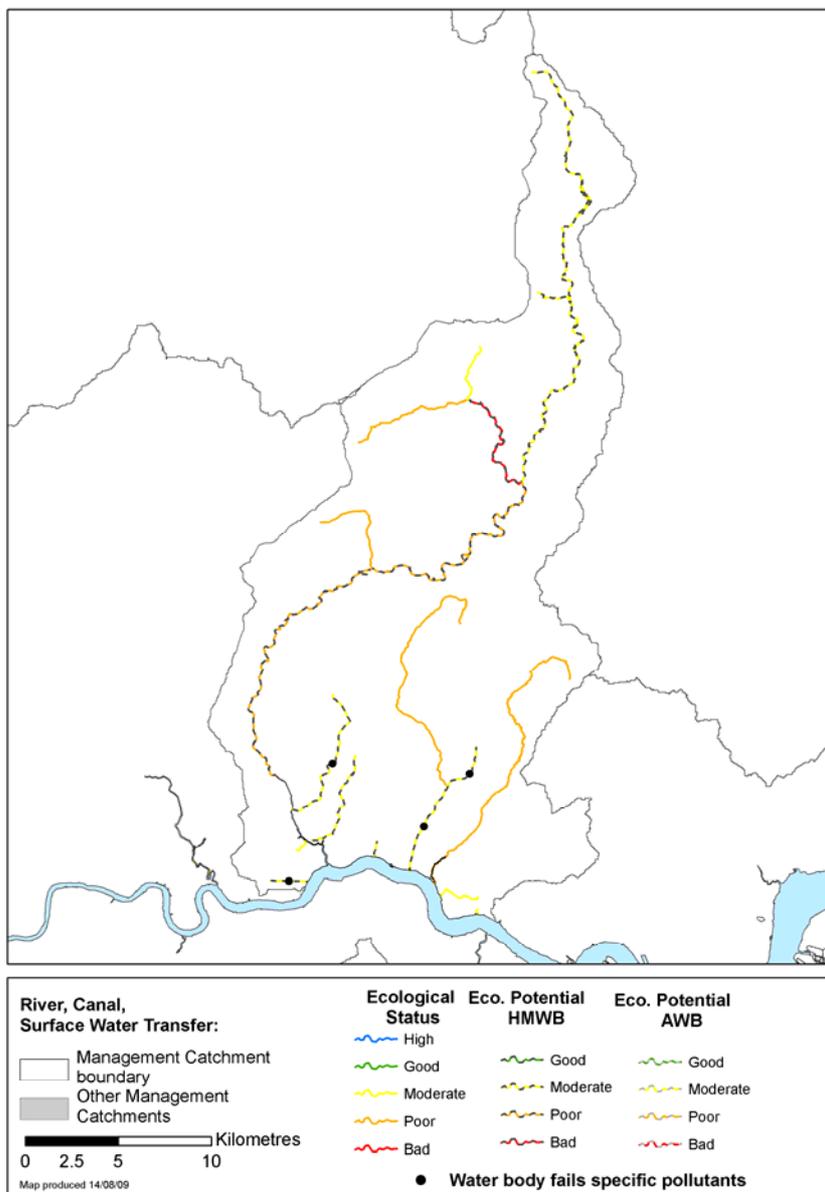
Water quality in the Middle and Lower Roding is influenced by misconceptions and urban run-off discharges. Pollution tolerant aquatic species have become more frequent due to these water quality issues.

The Beam is predominantly an urban watercourse, which has been heavily modified by the use of culverts and concrete banks.

The Ingrebourne consists of two distinct river environments separated by the discharge from the Brentwood STW. Water quality is generally moderate and impacts are split between agricultural and urban diffuse pollution. Downstream of the STW the water quality is generally poor and diversity of fish species are limited.

All these rivers are tidal in their lowest reaches and include significant flood defence structures designed to protect against abnormal high tides and associated flooding.

Figure 24 **Map showing the current status/potential of rivers in the Roding, Beam and Ingrebourne catchment**



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Table 16 **Key statistics for the Roding, Beam and Ingreborne catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	0	0
% assessed at good or high biological status (9 water bodies assessed)	0	0
% assessed at good chemical status (4 water bodies assessed)	50	75
<b>% at good status overall (chemical and ecological)</b>	0	0
% improving for one or more element in rivers		31

There are 16 river water bodies and no lakes in the catchment. Seven are artificial or heavily modified. None of the rivers currently achieve good or better ecological or biological status/potential now, with 67 per cent at poor biological status, and 11 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 31 per cent of rivers in the Roding, Beam and Ingrebourne will improve for at least one element by 2015.

### Some key actions for this catchment

- The Environment Agency will investigate current levels of abstraction in the Upper Roding.
- The Environment Agency will work with partners to re-meander the Mayes Brook through Mayesbrook Park and improve water quality from urban diffuse pollution.
- The Environment Agency will work with partners to re-naturalise the River Ravensbourne through Harrow Lodge Park.
- The Environment Agency will work with partners to restore the Wantz Stream and the Beam through the Dagenham Washlands Flood Storage Area.
- The Environment Agency will investigate methods for improving fish passages through the tidal sluices.

### South West Essex catchment



### Catchment summary

The Mardyke catchment is generally low-lying with low channel gradients and flows south from the Langdon Hills to the Thames estuary, where its outflow is controlled by a tidal sluice. The catchment is predominantly agricultural with clay soils giving a flashy flow regime with low baseflows.

There are some small water-dependant Sites of Special Scientific Interest (SSSIs) in the headwaters of the Mardyke, at Grays Chalk Pit and West Thurrock Lagoon and Marshes. The Mardyke Valley Project is a multi-partner project working towards improvements to the conservation value of the Mardyke catchment.

Issues in the Mardyke include significant physical modifications to facilitate flood conveyance and land drainage. The junction with the Thames estuary is modified by the tidal sluice. There is also a large sewage treatment works at Upminster. Abstraction occurs from a number of surface water and

shallow ground-water locations but the catchment has been assessed as 'water available' under the Catchment Abstraction Management Strategy.

A number of very small water bodies drain the coastal strip to the east of the Mardyke mouth. These mostly flow through grazing marshes but significant urban and industrial areas exist in their catchments. Thames Estuary and Marshes Special Protection Area (SPA) borders the far east of the area occupied by the smaller waterbodies. These waterbodies are also significantly modified (being marsh drains) with controlled outflows. No other issues are known as they are not routinely sampled.

Figure 25 **Map showing the current status/potential of rivers in the South West Essex catchment**



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**Table 17 Key statistics for the South West Essex catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	9	9
% assessed at good or high biological status (3 water bodies assessed)	0	0
% assessed at good chemical status (2 water bodies assessed)	100	100
<b>% at good status overall (chemical and ecological)</b>	9	9
% improving for one or more element in rivers		18

There are 11 river water bodies and no lakes in the catchment. Four are artificial or heavily modified. 9 per cent of rivers currently achieve good or better ecological status/potential, including the Pitsea Hall Fleet. None of the rivers assessed for biology are at good or high biological status now, with 100 per cent at poor biological status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 18 per cent of rivers in South West Essex will improve for at least one element by 2015.

### Thame catchment



### Catchment summary

The Thame catchment is predominately rural in character and is the predominant land use is agricultural. This catchment area also includes part of the Chilterns which includes extensive beech woodland. The River Thame and the River Wye are the principal rivers. The Grand Union Canal and its Wendover and Aylesbury Arms provide amenity benefit. There are several water-dependent sites of nature conservation importance, with Tring reservoirs Site of Special Scientific Interest (SSSI) being the largest. The River Wye is designated a salmonid fishery and is a partly urbanised chalk stream. The major urban areas of Aylesbury, Thame and High Wycombe are experiencing significant growth and development, increasing the demand for water resources across the catchment.

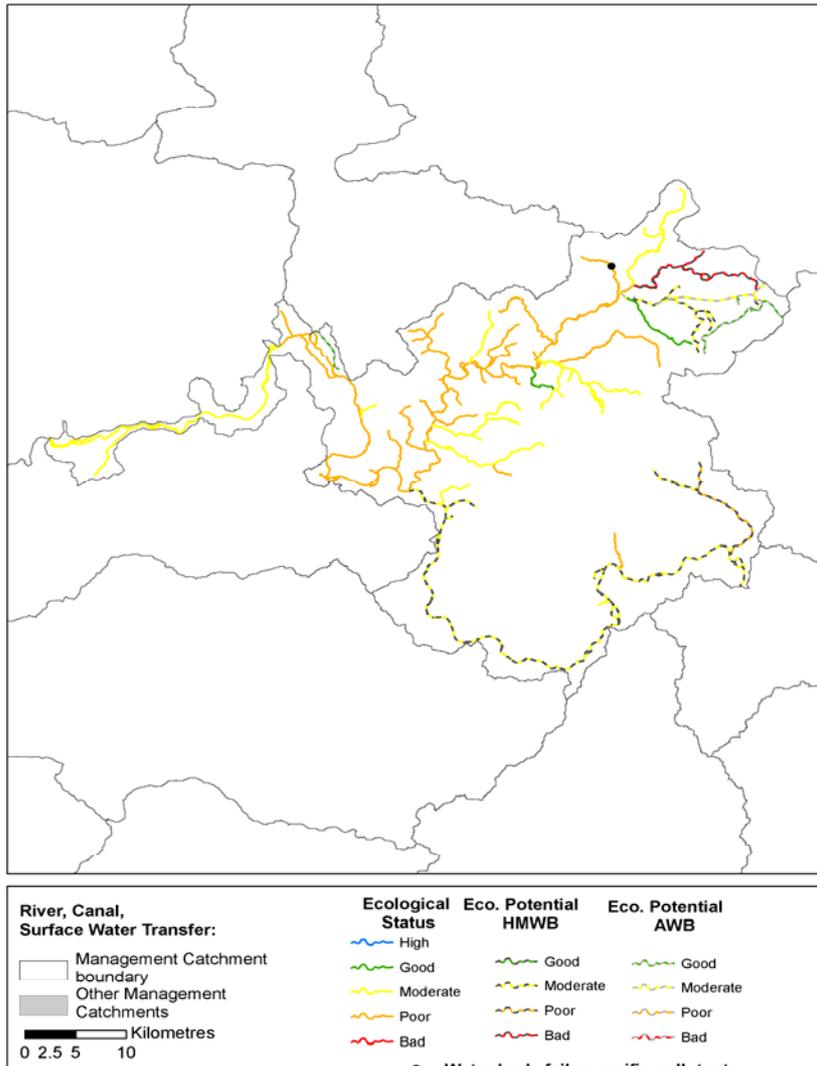
The water quality in the catchment is generally good. However, the Thame has high phosphate concentrations and is at high risk from both diffuse and point source pollution. Phosphates are also a problem for the rest of the catchment with most water bodies currently at risk of failing.

The impact of abstraction varies significantly across this catchment area, and this is connected to the underlying geology. The north part of the catchment is reliant on surface water runoff as the dominant flow to watercourses, whereas the south (Wye) relies on groundwater flows. The River Wye and its tributary, the Hughenden Stream are dependent on groundwater from chalk aquifers and have historically suffered from problems of low flow and drying. Such stresses commonly occur naturally in chalk streams but can also be the result of abstraction. Measures to tackle these issues include providing alternative abstraction licence strategies, promoting water efficiency measures,

sustainable urban drainage systems (SuDS) and rainwater harvesting. Lead partners such as water companies, local authorities and the Environment Agency will work together on these..

Physical habitat restoration will be pursued through partnerships with landowners and other organisations. AN example of this is the recently completed restoration of the Thame at Eythrope working with the local water company, landowners and angling groups. Restoration of degraded habitat will also be pursued through the planning process, for example through continuing to work with Wycombe District Council to achieve improvements to the River Wye through High Wycombe, and through influencing the policies in Local Development Frameworks.

Figure 26 **Map showing the current status/potential of rivers in the Thame catchment**



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Table 18 **Key statistics for the Thame catchment at a glance**

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	8	8
% assessed at good or high biological status (29 water bodies assessed)	13	16
% assessed at good chemical status (6 water bodies assessed)	83	83
<b>% at good status overall (chemical and ecological)</b>	8	8
% improving for one or more element in rivers		22

There are 37 river water bodies and two lakes in the catchment. 10 are artificial or heavily modified. Five per cent of rivers currently achieve good or better ecological status/potential, including the Stoke Brook. Ten per cent of rivers assessed for biology are at good or high biological status now, with 45 per cent at poor biological status, and 10 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 22 per cent of rivers in the Thame catchment will improve for at least one element by 2015.

### Some key actions for this catchment

- Actively promote the use of storage reservoirs for non-potable water uses (e.g. irrigation storage reservoirs).
- Promote "Best Farming Practice", including the use of soil and nutrient management plans.
- Ensure the need for Water Cycle Studies are included in policies in regional strategies and local development frameworks where appropriate, particularly in growth and/or high risk areas.
- Further investigations to improve understanding of (the scale of) habitat restoration required to achieve GES / GEP.

### Case study 5: Restoring habitats in the Thame catchment

Poor habitats and threats from pollution events are a major problem for fish communities. The Upper Thame Restoration Project was set up to address these pressures for the River Thame. Some aims of the project were to improve the habitat of the Thame, restore flows to a natural channel and help fish communities improve.

The project has been a success by enhancing 3 km of riverine habitat, improving the oxygenation of the watercourse, creating a refuge for fish during flood and pollution events and creating the first upstream fish migration in 120 years.

Lessons learnt on project partnership and habitat restoration will be carried forward to future Water Framework Directive projects aimed to improve biological status.



## Upper Lee catchment



### Catchment summary

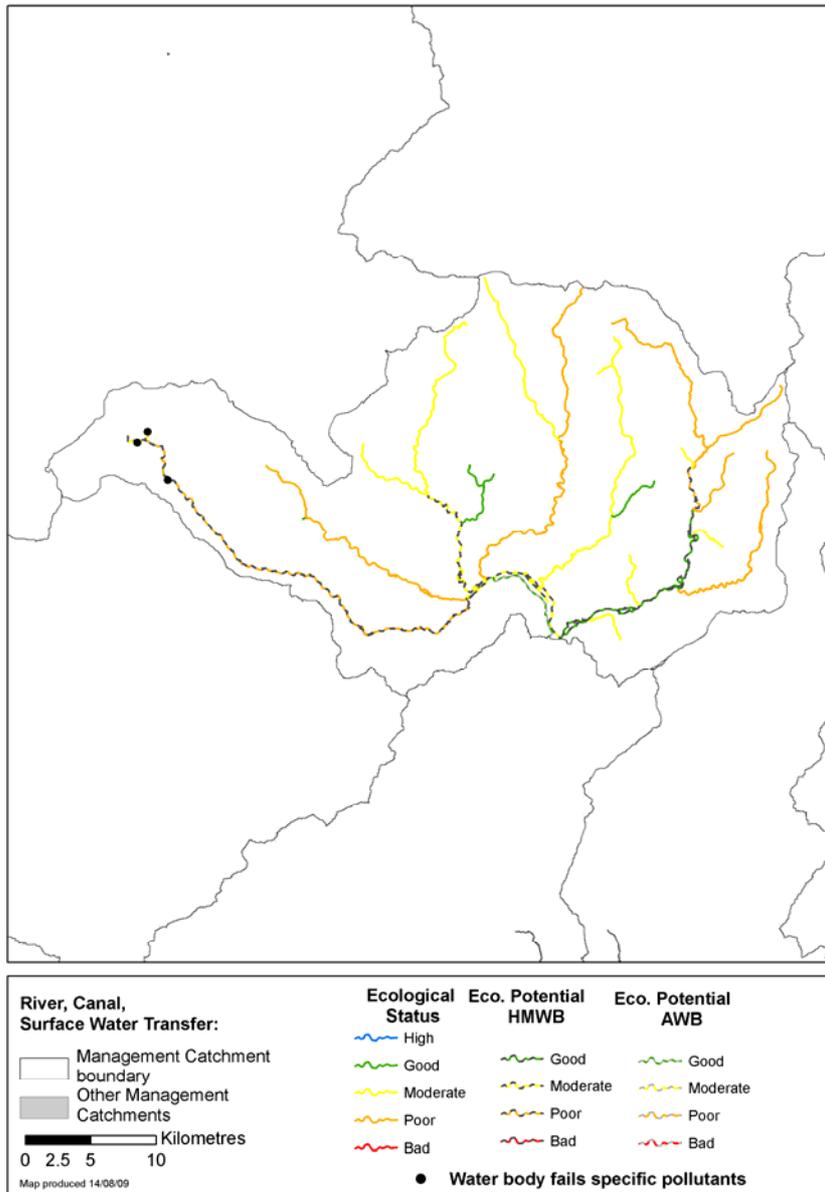
The area is dominated by the upper chalk formation, which serves as an important water supply source and base flow for many local streams and rivers. The increased demand for water has compounded many low flow issues, most noticeably on the rivers Mimram, Beane and the back loops of the Lee and Stort navigations. This has influenced the diversity of plant, invertebrate and fish species currently found.

Groundwater quality is variable with large areas of the lower catchment being affected by a significant contaminated site. River water quality is generally good. The Stort and Lee Navigations, along with discharges from Stansted Airport and urban diffuse pollution have affected water quality in some of the eastern watercourses. Urban run-off can also lead to a deterioration in water quality. This is particularly noticeable within the Stevenage Brook and the River Lee through Luton.

The main land use in the Upper Lee catchment is predominantly arable agriculture, bringing pressure from diffuse rural pollution. The catchment has been designated a Nitrate Vulnerable Zone as land management practices have led to many of the watercourses reaching high nitrate and phosphate levels.

The use of in-river structures and unsympathetic management of river channels has also compromised the value of some watercourses. Many of these structures are used to maintain water levels but equally restrict fish passage.

Figure 27 Map showing the current status/potential of rivers in the Upper Lee catchment



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Table 19 Key statistics for the Upper Lee catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	16	19
% assessed at good or high biological status (21 water bodies assessed)	10	14
% assessed at good chemical status (6 water bodies assessed)	67	67
% at good status overall (chemical and ecological)	16	19
% improving for one or more element in rivers		44

There are 32 river water bodies and no lakes in the catchment. Nine are artificial or heavily modified. 16 per cent of rivers currently achieve good or better ecological status/potential, including the Stort navigation. 10 per cent of rivers assessed for biology are at good or high biological status now, with 62 per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 44 per cent of rivers in the Upper Lee will improve for at least one element by 2015.

### **Some key actions for this catchment**

- Three Valleys Water will progress investigative boreholes on the Rivers Mimram and Beane.
- The Environment Agency will work with partners to restore the flood plain grazing marsh at Hartham Common.
- The Environment Agency will remove Easneye weir on the River Ash to improve fish passage.
- The Environment Agency will work with the Farming Wildlife Advisory Group to promote soil and nutrient management plans to local farmers.
- The Environment Agency will establish river flow objectives for the Rivers Mimram and Beane based on ecological species classification.
- The Environment Agency in partnership with Thames Water have planned to investigate urban diffuse pollution issues in Bishop's Stortford and Luton.

### **Vale of White Horse catchment**



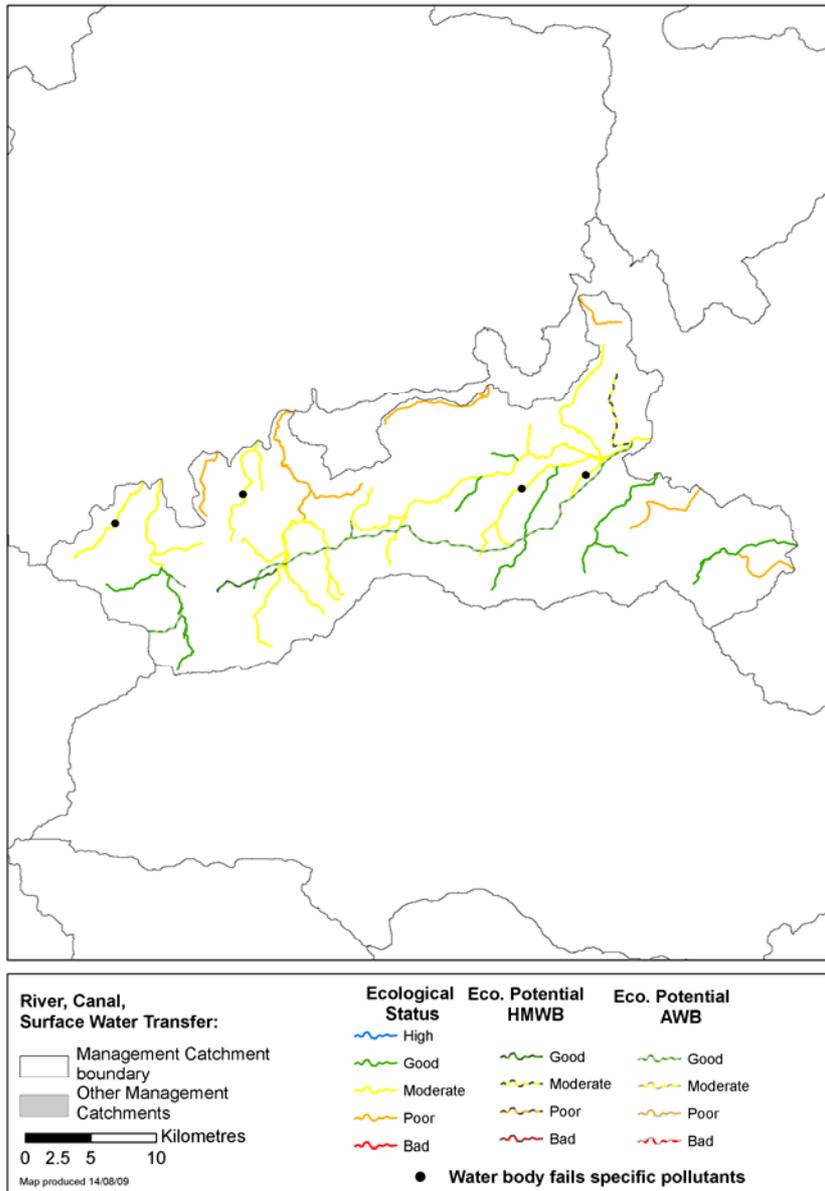
### **Catchment summary**

The Vale of White Horse catchment is predominantly rural in character but contains the major centres of Swindon, Abingdon and Didcot which are all experiencing significant growth and development. The catchment includes the Rivers Ray, Cole, Ock and Ginge and Mill Brooks. There are a number of water-dependent Sites of Scientific Interest (SSSIs) in the area, designated in the main for their fen and meadow communities. The internationally important Cothill Fen is a Special Area of Conservation (SAC), designated because of its outstanding calcareous fen.

Surface water quality in the catchment is generally good, with the Rivers Ock, Key and Ginge Brook having the poorest water quality in the catchment. Phosphate concentrations due to diffuse pollution are a concern across most of the catchment, with Tributyltin compounds causing a current failure in the River Key. However, we expect the other chemicals monitored under the Directive to achieve good status by 2015, with an overall good ecological status by 2027.

Water abstraction in the area is mainly for public water supply, however, there are a large number of licences that are used for farming and domestic purposes.

Figure 28 Map showing the current status/potential of rivers in the Vale of White Horse catchment



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Table 20 Key statistics for the Vale of White Horse catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	24	24
% assessed at good or high biological status (24 water bodies assessed)	46	50
% assessed at good chemical status (5 water bodies assessed)	100	100
% at good status overall (chemical and ecological)	24	24
% improving for one or more element in rivers		9

There are 33 river water bodies and one lake in the catchment. Three are artificial or heavily modified. 24 per cent of rivers currently achieve good or better ecological status/potential. including

the Cole and Dorcan brook. 46 per cent of rivers assessed for biology are at good or high biological status now, with 29 per cent at poor biological status, and no assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. Nine per cent of rivers in the Vale of White Horse will improve for at least one element by 2015.

### **Some key actions for this catchment**

- Target high risk farms and undertake regulatory farm visits using, pollution prevention notices and advisory letters where necessary.
- Further investigations to improve understanding of habitat restoration required to achieve Good Ecological Status / Good Ecological Potential.

### **Wey catchment**



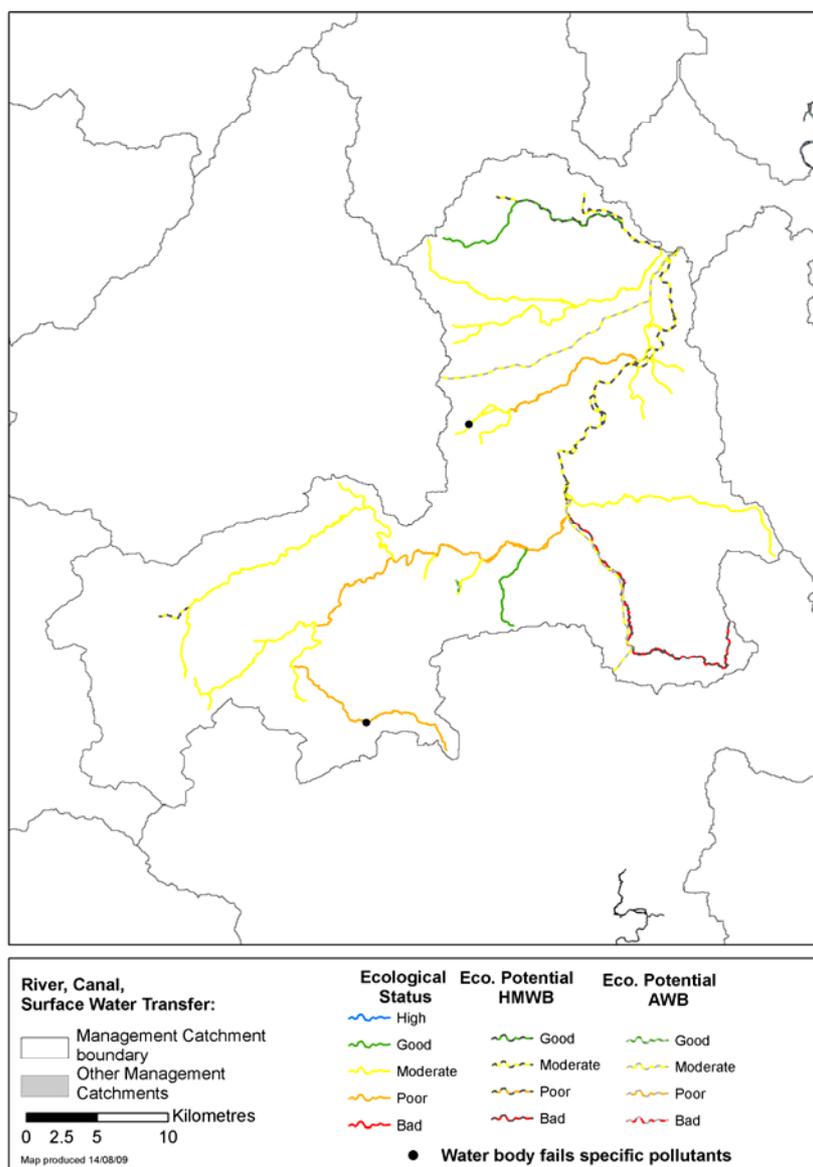
### **Catchment summary**

The upper reaches of this catchment are predominantly rural with the towns of Alton, Farnham, Haslemere and Godalming being the main urban areas. The lower reaches of the catchment are primarily urban and include the major towns of Guildford, Weybridge and Woking. The main River Wey is fed by a number of tributaries including the Cranleigh Waters, Tillingbourne and Hoe Stream. This catchment also includes Frensham Ponds, Virginia Waters and lakes at Thorpe Park, as well as a number of Sites of Special Scientific Interest (SSSI) lakes and ponds. The River Wey Navigation, Basingstoke Canal and the largely disused Wey and Arun Canal are also within this catchment.

Phosphate levels are high in a number of rivers. High levels of nutrients in rivers can lead to excessive plant growth and in turn may affect the rivers' wildlife. Sources of nutrients in this catchment include effluent from sewage treatment works and agricultural pollution.

A considerable number of rivers in this catchment are designated heavily modified. Modification of these rivers including in-stream structures has led to loss of habitat diversity and the creation of barriers for fish migration. These issues and the presence of pollutants give rise to poor water quality for a number rivers, as well as varied biological quality throughout the catchment.

Figure 29 Map showing the current status/potential of rivers in the Wey catchment



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Table 21 Key statistics for the Wey catchment at a glance

River and lake water bodies	Now	2015
<b>% at good ecological status or potential</b>	19	23
% assessed at good or high biological status (17 water bodies assessed)	29	29
% assessed at good chemical status (7 water bodies assessed)	71	71
<b>% at good status overall (chemical and ecological)</b>	19	23
% improving for one or more element in rivers		22

There are 32 river water bodies and 11 lakes in the catchment. 13 are artificial or heavily modified. Nine per cent of rivers currently achieve good or better ecological status/potential, including the Chertsey Bourne (Sunningdale to Virginia Water), Chertsey Bourne (Virginia Water to Chertsey) and

the Ock. 35 per cent of rivers assessed for biology are at good or high biological status now, with 29 per cent at poor biological status, and 5 per cent of assessed river water bodies at bad status.

This plan will address the key pressures in the catchment, and those waters in the worst state will be prioritised. 22 per cent of rivers in the Wey will improve for at least one element by 2015.

### **Some key actions for this catchment**

- The Environment Agency will promote good land management practice amongst the equine community.
- The Environment Agency will undertake farm visits and work with farmers to provide pollution prevention advice and information to ensure farming activities are not causing a detrimental impact on the environment.
- The Environment Agency and Local Authorities will influence stakeholders on the preparation of planning proposals for the eco-town at Bordon to ensure that the most sustainable options are pursued for; flood risk, drainage, water quality and water resources, in line with the eco-towns PPS and any other best practice guidance.
- Throughout the catchment, there is a requirement for further monitoring and investigation to allow targeting of additional measures to improve the status of this catchment.

### **Estuaries and coastal water bodies**



The Thames estuary is one of the most ecologically diverse estuaries in England and Wales, with over 45 species of fish resident at some stage in their lifecycle. Up to 350 benthic invertebrate species have been found during routine monitoring and the estuary plays a major role in supporting North Sea fish stocks. The catchment is also home to a number of invasive non-native species, including Mitten Crab and Zander.

The estuaries and coastline provide varied biodiversity, recreation and industrial opportunities for the people living and working in the Thames River Basin District. But this has led to many environmental pressures being concentrated in this area.

The water quality concerns for the Thames estuary centre around the impacts of storm discharges from the five major sewage works which serve London and from the combined sewer network. These discharge to the estuary frequently, resulting in drops in dissolved oxygen, and increases in aesthetic pollution, risk to health and fish kills.

Improvements to the sewage treatment works along the tidal River Thames and the construction of the London Tideway Tunnels are planned to be delivered by Thames Water over the next two river basin cycles. These major projects represent the primary measures to address point source pollution from the sewerage system and are fundamental to the achievement of good status in this catchment.

The estuaries and coastlines in the Thames River Basin District have been the subject of physical modification over the years. Continued development has been identified as a need within this

catchment, particularly associated with the 'Thames Gateway' growth area. Future development and associated infrastructure including flood defences and provision of drinking water and sewerage, all represents further pressure on the water environment. However if this is managed well, it will also offer opportunities to improve the physical river environment via sustainable methods of planning and development.

Throughout the coming river basin planning cycles, we will continue to work through our own flood defence asset management system and with developers. This will ensure that sustainable construction designs are used and that all available mitigation measures are put in place to enable this catchment to reach its goal of good ecological potential.

Estuaries and coasts in the Thames River Basin District are also physically managed to facilitate navigation to ports and to enable commercial fisheries activities. All of which are important to both the local and national economy. But associated pollution and modifications challenge the success of local wildlife and people's enjoyment of the estuary. We will continue to work with the Port Authorities to ensure that the national framework for dredging and disposal of dredgings is applied appropriately for the Thames and Medway estuaries.

Elevated nutrients and specific pollutants in estuaries area a concern and may have potential impacts on the ecology. Currently there is limited monitoring data available, particularly for the Medway and Swale. To improve our confidence in classifying these waters and to improve our understanding of these pressures; we will be undertaking directed monitoring and investigations. This will provide a more comprehensive picture of these waters, and help relevant organisations to direct action.

There is only one coastal water body (Thames Coastal North) in the Thames River Basin District.

**Table 22 Key statistics for estuaries and coastal waters at a glance**

	Estuaries		Coastal	
	Now	2015	Now	2015
<b>% at good ecological status or potential</b>	0	0	0	0
% assessed at good or high biological status (5 water bodies assessed)	0	50	0	0
% assessed at good chemical status (5 water bodies assessed)	20	40	-	-
% at good status overall (chemical and ecological)	0	0	0	0
% improving for one or more element		27		0

There are 11 estuarine (also called 'transitional') water bodies, Currently only one of the estuarine water bodies is at good or better ecological potential, with none being assessed as poor or bad.

There is one coastal water body in the river basin district which is assessed as moderate ecological potential.

All the estuarine water bodies are currently assessed as moderate for biological status, with 50 per cent predicted to improve to good biological status by 2015.

It is unlikely that the coastal water body will improve by 2015 and will remain at moderate biological potential.

### Some key actions

- Improvements to the London sewerage network to reduce the impact of storm sewage on water quality in the Thames Tideway - Thames and Lee Tunnels.

- Contribute to achievement of favourable condition on West Thurrock Lagoon & Marshes Site of Special Scientific Interest by implementing flood management programme.
- Develop national guidance framework on dredging to inform Programme of Measures to meet WFD objectives.
- Contribute to achievement of favourable condition on West Thurrock Lagoon & Marshes Site of Special Scientific Interest by implementing flood management programme.
- Flood/Coastal Erosion Risk Management Measure - Managed realignment of flood defence.
- Environment Agency to provide tailored advice to key bodies - Regional Development Agencies/Government Offices for Regional Spatial Strategy and local authorities for Local Development Frameworks..

## Groundwater



Groundwater is vital to life and livelihoods in the river basin district. It provides drinking water and supports many of the rivers and wetland habitats. Groundwater quality must be protected and improved, and abstraction should be balanced with the needs of the environment.

A number of groundwater bodies currently fail to achieve good status due to elevated levels of nitrate, pesticides, solvents and other contaminants. Furthermore, groundwater monitoring has highlighted widespread increasing trends in nitrate concentration. These trends are predicted to cause a failure of the Drinking Water Protected Area test by 2015.

In many cases it is not known what activity or activities are causing failure and therefore the initial stage will be to carry out focussed investigation. In other groundwater bodies there are measures which can be undertaken which will improve the groundwater quality. What is not known is how long this will take and whether the measures taken will be sufficient to attain good status.

The quantitative impacts of abstraction have been discussed in the catchment summaries above but over 50 per cent of groundwater also requires treatment before it is put into public supply. In addition, a significant volume of groundwater is no longer abstracted as a direct result of quality problems. For example, 9MI/day is no longer abstracted for supply as a result of the bromate pollution plume which extends for a distance of over 20km across the Mid-Chilterns Chalk and Upper Lee Chalk groundwater bodies.

The most important sources of groundwater are the principal aquifers of the Chalk, the Jurassic Limestones, the Lower Greensand and the Lower Thames Gravels. A large part of the Chalk is 'hidden' under unproductive strata in the London Area. A number of urban areas with a significant industrial past are situated on the Chalk such as Luton, Reading, High Wycombe and Basingstoke. Much of the Chalk aquifer is polluted by nitrates and are already, or are at risk of, exceeding the drinking water standard of 50mg/l particularly in the more rural West Area (Berkshire Downs Chalk and Vale of White Horse Chalk bodies).

Pesticide concentrations show an overall decline, largely as a result of phasing out certain pesticides known to cause a problem in groundwater. However, new cases of groundwater pollution involving pesticides continue to occur.

Other common groundwater pollutants include chlorinated solvents which have been used widely in industry and by dry cleaners. A large chlorinated solvents plume is present within the Vale of White Horse groundwater body. Metals are of concern in a number of bodies across the Thames River Basin District but there is no clear pattern to their distribution.

**Table 23 Key statistics for groundwater bodies at a glance**

Groundwater	Now	2015
<b>% at good quantitative status</b>	35	35
% assessed at good chemical status (46 water bodies assessed)	43	46
% at good status overall	17	17

Overall status is determined by chemical status and quantitative status. Eight out of 46 groundwater bodies in the river basin district are at good status overall; 20 water bodies have been classified at good chemical status, and 16 at good quantitative status. This is not expected to change by 2015.

### Some key actions

- Implement Communities and Local Government (CLG) Planning Policy Guidance Statement 23 (PPS23) on controlling pollution of groundwater that may arise from development of land.
- Local campaign to decrease input of nitrates to groundwater body.
- Pollution and prevention campaigns and advice, particularly targeting industrial premises in the river basin district where copper may be used. Check for use of other metals and hazardous substances. Also investigate possible inflow from river to groundwater at abstraction.
- Re-engineer existing discharges to avoid direct discharges of pollutants to groundwater.

### Case study 6: **West Kent Darent and Cray groundwater**

The West Kent Darent and Cray Chalk groundwater body is subject to considerable pressures from a range of sources both urban and rural sources including nitrates, pesticides, solvents and hydrocarbons.

Groundwater quality campaigns will be run to prevent and limit the input of substances by encouraging safe storage, use and disposal.

The Fawkham abstraction in the West Kent Darent and Cray groundwater body is a typical example:

- The borehole provides a water source and is currently the sole source of potable water for over 10,000 people for Fawkham and Longfield in North Kent.
- Monitoring data shows that the raw water at this abstraction is contaminated by the solvent Tetrachloroethene (PCE) which has been present at low levels since 1996, rising very slowly, but in 2007 the concentrations rose rapidly. It is also at risk from nitrates and pesticides. The water company considered ceasing to use the borehole.
- The high levels of solvents have now dropped but the source of the solvents has yet to be identified. There is concern that the situation could re-occur.
- The area has been prioritised to address the situation. Further actions include
  - Pollution prevention campaigns and further targeted investigations at key sites within the Source Protection Zones and at high risk sites to decrease the present inputs and future risks from solvents and hydrocarbons
  - Awareness raising to prevent future potential impact from pesticides and nitrates associated with the more rural land-uses.

The prioritisation and actions required at other abstractions within the Darent and Cray Chalk groundwater body will depend on substances found, the impact and the risks involved. It is very important that this targeted work starts as soon as possible as once polluted the groundwater takes a long time to clean-up.

## 9 Next steps – implementing this plan

### Diffuse pollution investigation and action

In developing the River Basin Management Plans approximately 8,500 investigations have been identified for England and Wales, including further monitoring. The vast majority of these will be undertaken by the Environment Agency and all of these will be completed by the end of 2012. The investigations will focus on resolving what is causing the problem and what the best method to tackle it is. As a result of the evidence they will provide, we will be able to take further action in the first cycle where practicable.

The remainder of the investigations – including over 100 water company catchment management investigations – will be carried out by co-deliverers across England and Wales during the course of the first delivery cycle. Working with the river basin district liaison panels, the Environment Agency will welcome the input of local data and knowledge from other parties to help drive action at catchment level.

We are confident the investigation programme will lead to actions enabling a further reduction in diffuse pollution and more environmental improvement before 2015. As we have said earlier, the Environment Agency is already committed to delivering, through its own work or through working with others, an additional two per cent improvement towards good status or potential by 2015 across England and Wales

### Additional national measures

In addition to commitments already provided, the UK Government and Welsh Assembly Government will continue to demonstrate their commitment and bring forward significant work starting with;

- banning phosphates in household laundry detergents;
- a new requirement contained within the Flood and Water Management Bill making the right to connect to surface water sewers contingent on Sustainable Drainage Systems (SuDS) being included in new developments. Local authorities will be responsible for adopting and maintaining SuDS that serve multiple properties and the highways authorities will maintain them in all adopted roads;
- general binding rules to tackle diffuse water pollution by targeting abuse of drainage systems, potentially including industrial estates, car washes and construction by 2012;
- transferring the responsibility for misconnections to water companies by 2012;
- the Water Protection Zones Statutory Instrument which will enter into force on 22 December 2009 and will be used to tackle diffuse pollution where voluntary measures are not sufficient;
- more funding for the Catchment Sensitive Farming Delivery Initiative in England from 2010 – a 50% increase in capital grant spend, and evaluation of the initiative to ensure it is achieving maximum effectiveness;
- better targeting of agri-environment schemes for water protection. In Wales, this includes aligning the forthcoming “Glastir” agri-environment scheme to contribute towards meeting Water Framework Directive requirements;
- supporting the farming industry in the Campaign for the Farmed Environment, which has reducing impacts on water quality as one of its priorities;
- encouraging farmers to use buffer strips to reduce diffuse pollution through guidance and advice provided under cross compliance;
- better understanding of the impact of sediment and measures to tackle it as a result of the additional funding announced in June 2009;
- further consideration of the impact of cross compliance and good agricultural and environmental conditions (GAEC) on water quality;
- implementation of the Sustainable Use of Pesticides Directive;

- Environmental Permitting Regulations guidance setting essential standards of location, operation and maintenance for septic tanks.

These and the other actions in the plans will lead towards a greater achievement of good status and improvement within class, with more than a quarter of the length of all rivers improving.

### **Implementing the plans at catchment level**

The Environment Agency has found river basin liaison panels extremely valuable, and will continue to work with them throughout the plan delivery period. The panels will help to encourage river basin district-wide action through their sectors, monitor overall progress and prepare for the second cycle of River Basin Management Planning.

Given that implementation requires activity 'on the ground', it is essential that there is the maximum involvement and action from locally based organisations and people. Innovative ways of working together need to be identified that will deliver more for the environment than has been captured in this plan.

The Environment Agency will adopt a catchment-based approach to implementation that is efficient and cost-effective. This will support the liaison panels, complement existing networks and relationships, and enable better dialogue and more joined up approaches to action.

In some places there will be added value from adopting more detailed catchment plans to help deliver the River Basin Management Plan objectives during the planning cycles. The River Kennet is a case in point where we have set up a pilot group with a range of stakeholders. We will share the knowledge gained with the liaison panels, to help identify other catchments that could benefit from a similar approach.

### **Working with co-deliverers**

This plan sets out in detail the actions required to improve the water environment. All organisations involved must play their part, record their progress and make the information available.

Where the work of a public body affects a river basin district, that body has a general duty to have regard to the River Basin Management Plan. Ministerial guidance states that the Environment Agency should:

- work with other public bodies to develop good links between river basin management planning and other relevant plans and strategies, especially those plans that have a statutory basis such as the Local Development Plans and Wales Spatial Plan;
- encourage public bodies to include Water Framework Directive considerations in their plans, policies, guidance, appraisal systems and casework decisions.

For some, the actions in this plan may be voluntary and for others they will be required under existing legislation. We want to work with you to make these actions happen, and identify new action to create a better place.

### **Reporting on progress**

The Environment Agency will use its environmental monitoring programme and, where appropriate, information from other monitoring programmes, to review whether work on the ground is achieving the environmental objectives. We will update the classification status of water bodies accordingly and review progress annually. At the end of 2012 a formal interim report will be published. This will:

- describe progress in implementing the actions set out in this plan;
- set out any additional actions established since the publication of this plan;
- assess the progress made towards the achievement of the environmental objectives.

Preparations have already begun for the next cycle period 2015 to 2021 and for the subsequent cycle to 2027. If you have proposals for actions that can be included in these future cycles please contact us.

### **River basin management milestones**

The plan builds on a number of other documents and milestones required by the Water Framework Directive. The work to date has ensured a strong evidence base, and a framework for dialogue with interested organisations and individuals. In terms of taking this plan forwards, it helps to understand the major milestones remaining. These future milestones are summarised in the figure below.

Figure 30 River basin management planning milestones to date and to 2015



## 10 Summary statistics for the Thames River Basin District

Table 24 Summary statistics for the Thames River Basin District

	Rivers, Canals and SWT's	Lakes and SSSI ditches	Estuaries	Coastal	Surface Waters Combined	Groundwater
% of water bodies with improvement in any status of any element by 2015	24	7	27	0	22	2
% of water bodies at good ecological status/potential or better now						
For groundwater: % of water bodies at good or better quantitative status now	20	47	0	0	23	35
% of natural water bodies at good ecological status or better now	20	43	0	0	21	35
% of artificial and heavily modified water bodies at good ecological potential or better now	20	48	0	0	26	N/A
% of water bodies at good ecological status/potential or better by 2015.						
For groundwater: % of water bodies at good or better quantitative status 2015	22	49	0	0	25	35
% of natural water bodies at good ecological status or better by 2015	24	43	0	0	24	35
% of artificial and heavily modified water bodies at good ecological potential or better by 2015	20	49	0	0	27	N/A
% of water bodies at good chemical status now	78	0	20	0	75	43
% of water bodies at good chemical status 2015	84	0	40	0	81	46
% of water bodies at good biological status or better now	28	31	0	0	28	N/A
% of water bodies at good biological status or better by 2015	34	34	50	0	34	N/A
% of water bodies with alternative objectives (good status 2021 or 2027)	78	51	100	100	75	83
% of waterbodies deteriorated under Article 4.7	0	0	0	0	0	0
% of all water bodies (surface waters and groundwaters) at good status now	23					
% of all water bodies (surface waters and groundwaters) at good status by 2015	25					

## 11 Further information – the annexes

- Annex A**      **Current state of waters in the Thames River Basin District**  
*What the waters are like now. Information on our network of monitoring stations, the classification status of water bodies and the reference conditions for each of the water body types in the river basin district.*
- Annex B**      **Water body status objectives for the Thames River Basin District**  
*Information on water body status and objectives*
- Annex C**      **Actions to deliver objectives**  
*Details of the actions planned (programmes of measures) for each sector to manage the pressures on the water environment and achieve the objectives of this plan.*
- Annex D**      **Protected area objectives**  
*Details of the location of protected areas, the monitoring network, environmental objectives and the actions required to meet Natura 2000 sites and Drinking Water Protected Area objectives.*
- Annex E**      **Actions appraisal and justifying objectives**  
*Information about how we have set the water body objectives for this plan and how we selected the actions. It also includes justifications for alternative objectives that have been set.*
- Annex F**      **Mechanisms for action**  
*More detail about the mechanisms (i.e. policy, legal, financial tools) that are used to drive actions.*
- Annex G**      **Pressures and risks**  
*Information about the significant pressures and risks resulting from human activities on the status of surface water and groundwater.*
- Annex H**      **Adapting to climate change**  
*Information on how climate change may affect the pressures on the water environment and the ability to meet the objectives.*
- Annex I**      **Designating artificial and heavily modified water bodies**  
*Information about the criteria used to designate waters as artificial or heavily modified water bodies.*
- Annex J**      **Aligning other key processes to river basin management**  
*Aligning planning processes to deliver multiple benefits and sustainable outcomes*
- Annex K**      **Economic analysis of water use**  
*Information about the costs of water services within the river basin district*
- Annex L**      **Record of consultation and engagement**  
*Details of how we have worked with interested parties to develop this plan*
- Annex M**      **Competent authorities**  
*List of the competent authorities responsible for River Basin Management Planning.*
- Annex N**      **Glossary**  
*Explanation of technical terms and abbreviations.*

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