

Water for life and livelihoods

River Basin Management Plan Thames River Basin District



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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.

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.

Impact Assessment

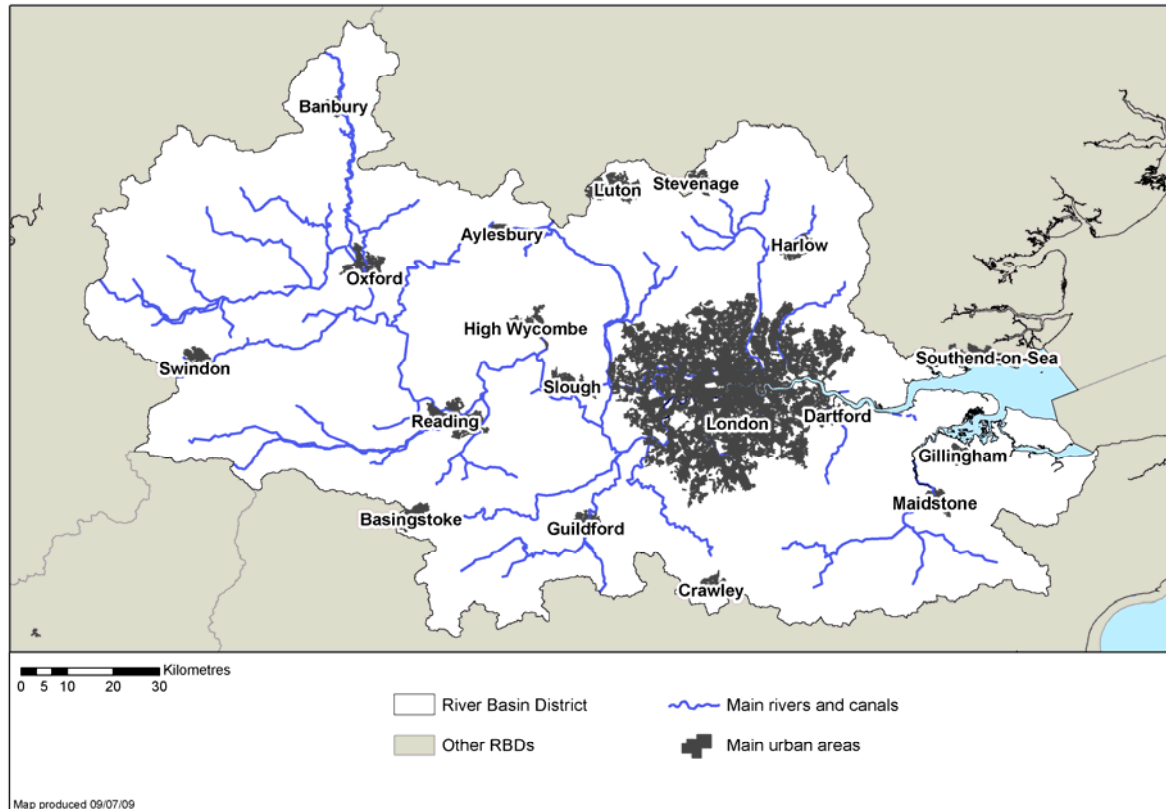
An impact assessment of this plan has been completed. It looks at the costs of a reference case, which includes existing actions and new actions required by existing obligations, and the incremental costs and benefits of implementing the additional new actions required by this plan. The impact assessment 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.

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	358
Artificial water bodies	35	50	5	0	n/a	90
Heavily modified water bodies	144	19	5	1	n/a	169
Total	483	76	11	1	46	617

* 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.

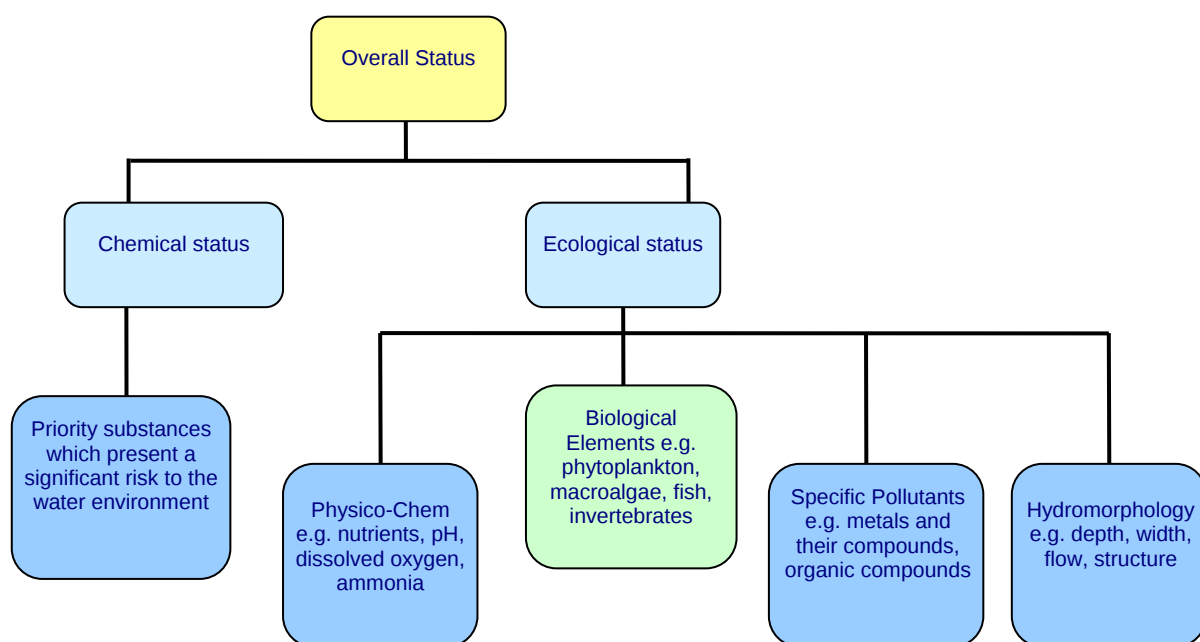
Good ecological status applies to natural water bodies, and is defined as a slight variation from undisturbed natural conditions. Figure 2 below shows how status is determined for surface waters. Each component has several different elements. These are measured against specific standards and targets 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.

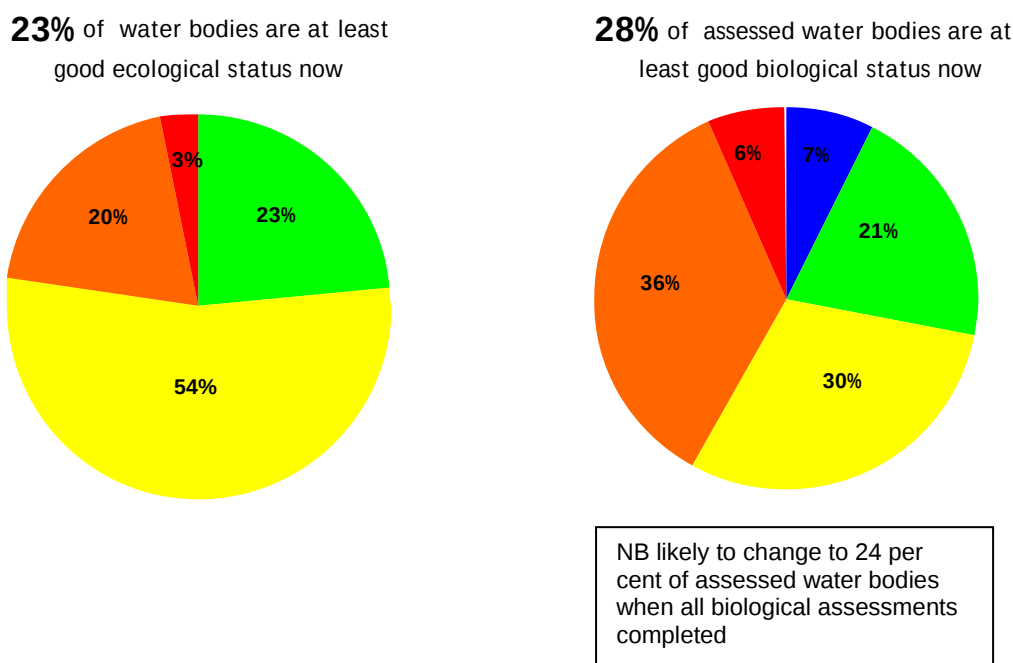
4 The state of the water environment now

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

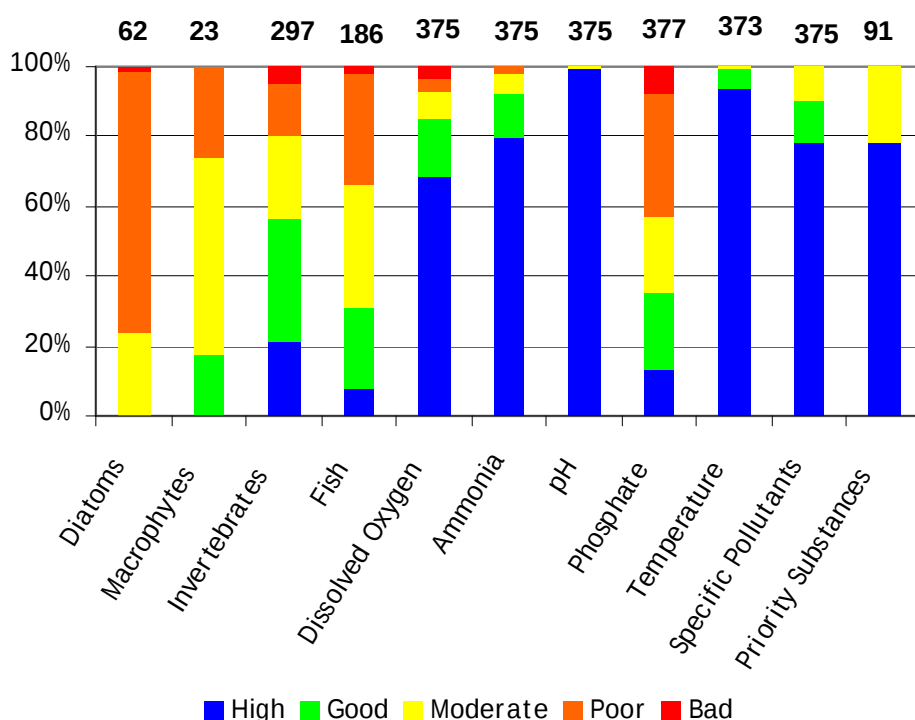
and improve groundwater elements, as well as investigations to improve the confidence in groundwater classification.

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
Continue Cross-Compliance – to help farmers comply with a range of Directives to reduce pollution from agriculture at farms receiving subsidies (all land managers). • Across the river basin district
Encourage uptake of Voluntary Initiative best practice on pesticide use by land managers within the agricultural and amenity sectors (Voluntary Initiative, Environment Agency) • Across the river basin district
Maintain a nationally funded advice-led partnership under the England Catchment Sensitive Farming Delivery Initiative (Natural England, Environment Agency) to reduce diffuse water pollution from agriculture in priority areas. • Kennet and Lambourn, Upper Roding and River Beult river catchments
Establish and enforce Nitrate Vulnerable Zones in catchments at high risk from nitrate pollution (Environment Agency) to reduce the amount of nitrate and other pollutants entering water from farmland. • Across the river basin district
Work with Natural England to target Catchment Sensitive Farming type activities and agri-environment schemes (Natural England, Environment Agency) to ensure adoption of best farming practice and reduce diffuse pollution from agriculture. • Priority water bodies as specified in Annex C
Designate and enforce Water Protection Zones 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. • Candidate pilot in the River Cherwell catchment. Initially around eight Zones in locations to be decided across England.
Promote “Best Farming Practice”, including the use of soil and nutrient management plans. • Across Thames River Basin District
Promote the importance of soil quality, structure and organic matter. • Across Thames River Basin District

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 regional fish passage strategy which will identify and prioritise opportunities to improve fish migration. • Across Thames River Basin District
Establish invasive non-native species forum to coordinate action across Thames River Basin District and produce a non-native species management plan. • Across Thames River Basin District
Work with anglers, fishing clubs, boat users and riparian owners to identify areas of bankside erosion and the associated impacts.
Set up a strategic, robust and reliable network of volunteer 'spotters' 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 (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 monitoring programme , to maintain our understanding of the state of the water environment (Environment Agency). • Across the river basin district
Run local pollution prevention campaigns (Environment Agency) to raise awareness of the need for responsible handling and disposal of chemicals, oil and other pollutants. • Specified water bodies identified at risk, such as safeguard zones
Action to reduce the physical impacts of flood risk management activities in artificial or heavily modified water bodies (Environment Agency). • Waters specified in Annex C
Action to reduce the physical impacts of flood risk management activities in artificial or heavily modified water bodies and ensure new waterside developments do not compromise the water body's status. • Artificial and heavily modified water bodies are in Annex B
Action via the Restoring Sustainable Abstraction programme to investigate sites at risk due to abstraction pressures. • Across the Thames River Basin District
Continue to develop and implement a programme of river habitat improvement works to improve ecology by addressing physical morphology and flow pressures (including culverts, closed watercourses, pinch points and in-channel structures). • Across the Thames River Basin District

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
Comply with regulations such as Environmental Permitting, Environmental Damage and Groundwater, to limit environmental damage and help prevent land contamination, pollution and deterioration of waters.
Nationally
Voluntary pollution prevention and remediation of existing land contamination, to bring land back into beneficial use and remove potential sources of groundwater contamination.
Sites contributing to potential environmental quality standard failure
Run pollution prevention advice and campaigns to provide targeted advice and enforcement (Environment Agency) to reduce contaminants being released to groundwater from industrial estates, petrol stations and other sources.
High risk areas such as safeguard zones

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
Ensure that planning policies and spatial planning documents take into account the objectives of the Thames River Basin Management Plan, including Local Development Documents and Sustainable Community Strategies (local authorities).
Across the Thames River Basin District
Action to reduce the physical impacts of urban development in artificial or heavily modified waters, to help waters reach good ecological potential (local authorities).
Waters specified in Annex C
Promote the use of sustainable drainage systems in new urban and rural development where appropriate, and retrofit in priority areas including highways where possible (Environment Agency, local authorities).
Across the Thames River Basin District
Produce guidance and training for planning authorities in partnership with Royal Town Planning Institute (Environment Agency), to support this plan.
Across the Thames River Basin District
Water efficiency and new development. 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.
Across the Thames River Basin District
Sustainable Community Strategy (SCS) and Local Area Agreement (LAA) - 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.
Across the Thames River Basin District

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

Action to reduce the physical impacts of urban development in artificial or heavily modified water bodies, to help waters reach good ecological potential (local authorities).
Waters specified in Annex C
Designate and enforce Water Protection Zones 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.
Initially around eight Zones in locations to be decided across England
Follow pesticides statutory code of practice advice for operators on control of plant protection products, to prevent or limit pollution of waters (all operators)
Across the Thames River Basin District
Support to investigate emissions from sites and pollution from contaminated land to reduce uncertainty and provide additional information (Industry)
Sites contributing to potential environmental quality standard failure
WFD mitigation measures manual 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.
Across the Thames River Basin District

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.

Example actions
Reduce leakage through active leakage control and customer supply pipe repair policies to help ensure sufficient water for people and wildlife (water companies).
Across the Thames River Basin District
Complete the current round of water company asset investment to deliver water quality improvements and reduce the impact of abstraction (water companies).
Rivers, coasts, estuaries and groundwater bodies across the river basin district
Improvements to water company assets 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).
Rivers, coasts, estuaries and groundwater bodies across the river basin district

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 that 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 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

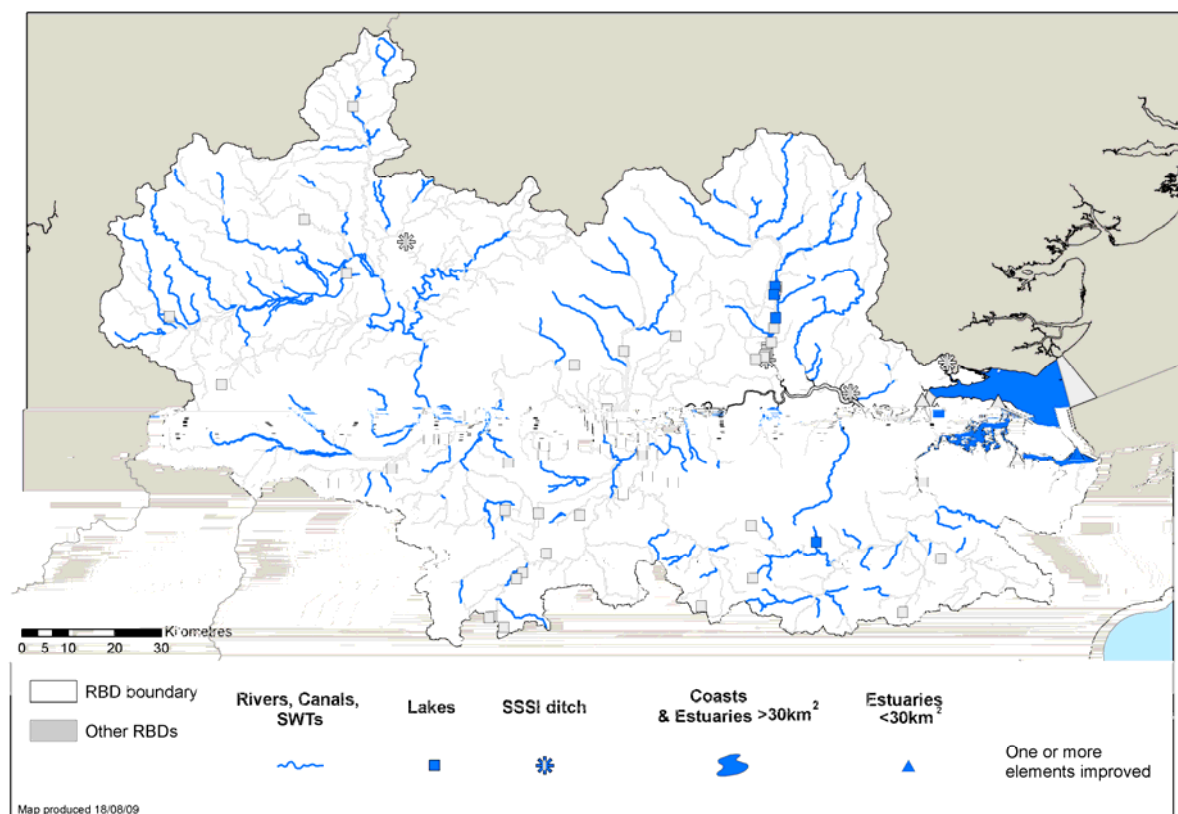
The Environment Agency is also working to align planning processes in other areas. These include water resources and water quality, agriculture and rural development and natural heritage. Annex J provides further information about other planning processes.

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**

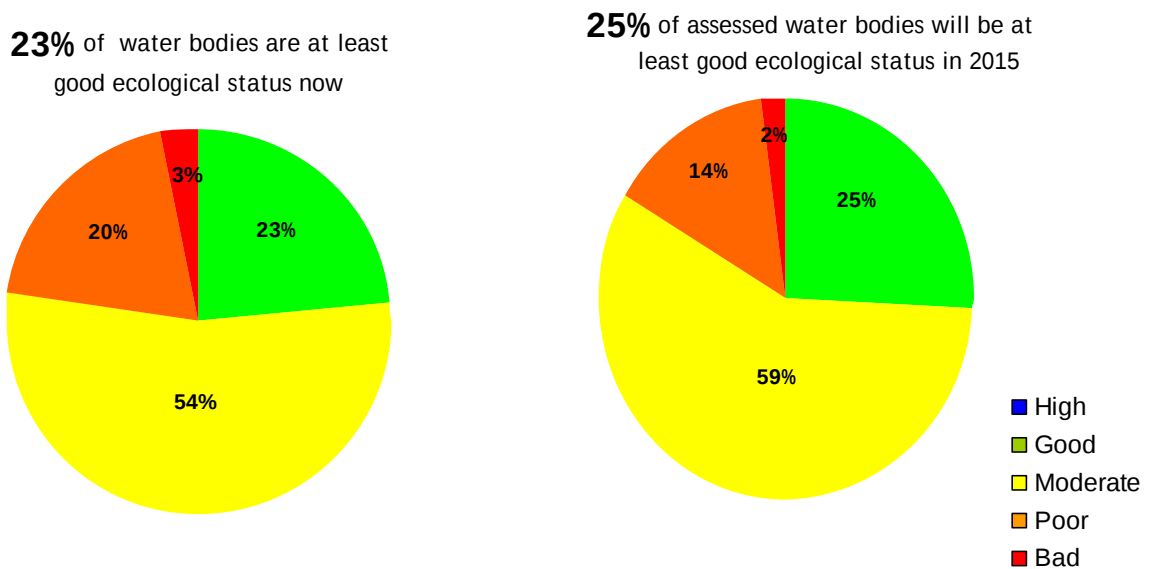
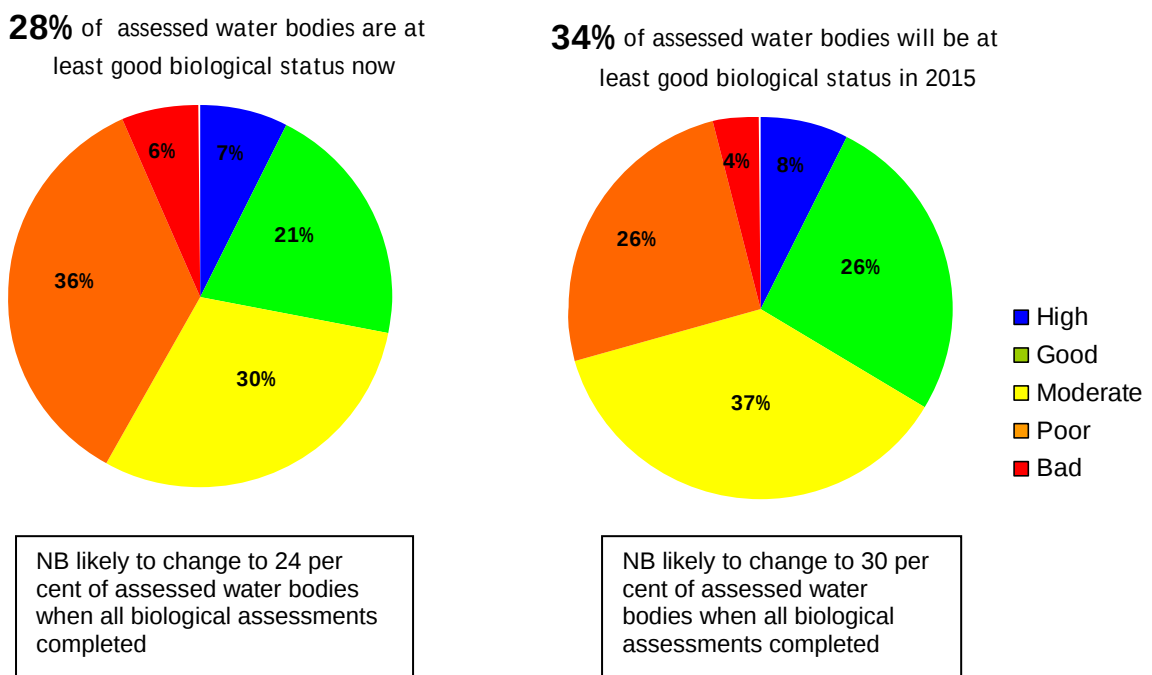
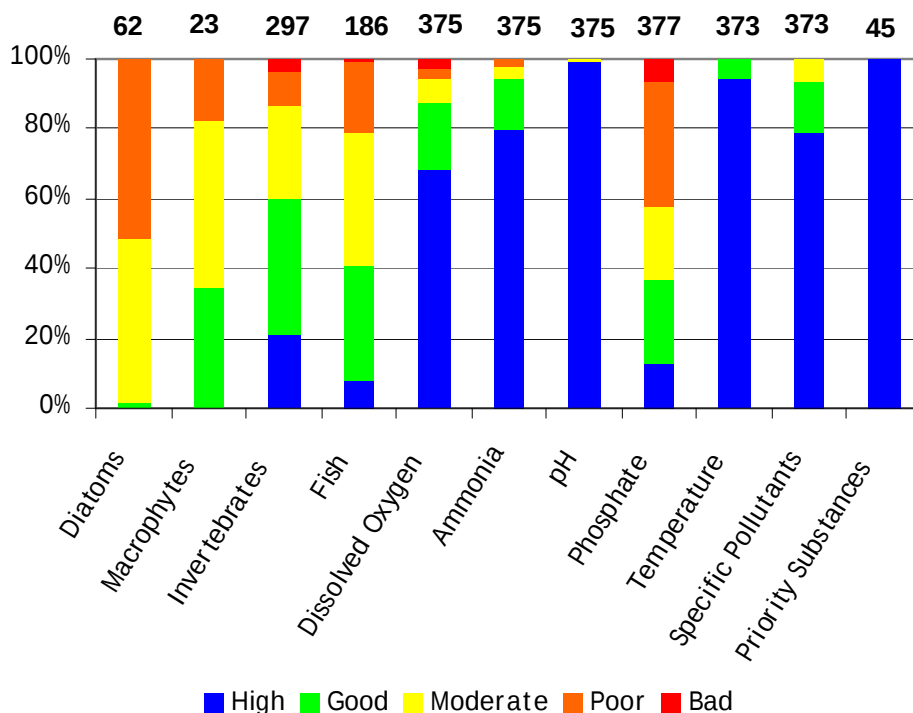


Figure 7 **Biological status of surface water bodies now and in 2015**



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.