A summary of information about the water environment in the Bristol Avon and North Somerset Streams management catchment
We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people’s lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local councils, other agencies, civil society groups and the communities we serve.

Front cover photo provided by Jeremy Taylor, Environment Agency

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Further copies of this report are available on the e-consultation tool:
www.gov.uk/government/consultations/update-to-the-draft-river-basin-management-plans and via our National Customer Contact Centre:
T: 03708 506506
Email: enquiries@environment-agency.gov.uk.
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1 Your views count

Water is essential for life. It allows the natural environment to flourish, and businesses, agriculture and the economy to grow and prosper. The water environment provides many different benefits to society - from supplying drinking water and supporting fisheries to providing an essential resource for business and agriculture, transport routes and a source of recreation that promotes wellbeing. It is critical that this precious resource is managed properly to ensure that the needs of society, the economy and wildlife can be met and maintained in the long-term.

Building on years of progress, the Environment Agency has worked with a range of partners over the past two years to agree what the main problems are, that are stopping there being a healthy water environment in the Bristol Avon and North Somerset Streams, and how it should work with others to address them. The consultations, Working Together and Challenges and choices, have helped inform this final step in updating the river basin management plan for the Severn River Basin District.

The ‘Challenges and choices' consultation set out what the Environment Agency had identified as the significant issues facing the water environment. The significant issues were identified using a broad range of information, including the results of investigations, the agreed “reasons for not achieving good status” (previously called reasons for failure) across each catchment and more. We asked if you agreed with these significant issues. The majority of you did but you also raised additional local issues, which will take time to work through with catchment partnerships, to help shape the final river basin management plan.

This catchment summary is a support document for the consultation on the draft update to the river basin management plan and for the Catchment Partnerships. It will help you to understand progress with the river basin management planning process so far, at a more local scale. This includes some initial economic appraisal to identify what actions are most cost beneficial. By understanding this information and letting the Environment Agency know what you think, you have an opportunity to influence the decisions about what actions will be taken over the next six years, to improve the health of your water environment.

The Catchment Based Approach (CaBA) is a Government policy framework that empowers local action to improve the water environment through community partnerships. A renewed focus on the catchment based approach has led to new Catchment Partnerships being set up to drive local delivery. More information is available in the “Taking action in partnership” section or you can contact the CaBA National Support Group:

- www.catchmentbasedapproach.org
- Email: info@catchmentbasedapproach.org

The partnerships are working on a wide range of issues, including the water environment but also address other concerns that are not directly related to river basin management planning. The information in this document will inform the work of
the Bristol Avon Catchment Partnership in developing their vision, aims and priorities; it is not intended to duplicate or overarch the important local work.

To view the consultation on the update to the Severn River Basin Management Plan, please visit: [https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041](https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041). This is a public consultation and we, the Environment Agency, welcome everyone's views. Figure 2 shows the location of the Bristol Avon and North Somerset Streams management catchment within the Severn River Basin District.

To help you get the most out of the information provided within this catchment summary, we have provided a glossary to explain some of the terms that are used. The glossary can be found on the e-consultation web pages.

There are many ways to respond to this consultation (see How to respond for more details), but if you have any difficulties please call our National Customer Contact Centre on 03708 506 506 or email Severnrbd@environment-agency.gov.uk. This consultation runs from October 2014 to April 2015. We will issue a response document in summer 2015. This will summarise the comments we received and what will happen as a result. The updated Severn river basin management plan will be published in December 2015, following approval by the Secretary of State.
Figure 2 - Map of the Severn river basin district and the management catchments within it
The river basin is encircled by the hills of the Cotswolds, Salisbury Plain and the Mendips. The river runs through gentle pastoral landscapes and old towns such as Bradford and Bath before emerging through the Clifton Gorge at Bristol into the Severn Estuary at Avonmouth. A number of rivers in the catchment drain directly to the Severn Estuary including the Little Avon in Gloucestershire and the North Somerset Streams. The upper reaches of the catchment are very rural with significant arable agricultural activity on the higher ground and livestock more common on the lowland pasture. The main river is a slow moving lowland clay river which has been modified by impoundment, land drainage, flood alleviation engineering and by intensive agriculture in the flood plain.

Avonmouth is a key industrial area and port. Historically the river and many tributaries were impounded to serve the many watermills along its length. The subsequent siltation has resulted in changes to depth and plant communities.

The Severn estuary is an internationally important site for conservation and there are 66 Sites of Special Scientific Interest across the catchment, and 8 of these are directly related to rivers. The catchment supports a diverse fish fauna and is highly regarded as a coarse fishery. There are major potable water supply groundwater abstractions located in the Malmesbury area and from surface waters lower down.
the catchment. Most of the licensed water abstractions in this catchment are for public supply, including several large reservoirs (Blagdon and Chew Valley).

The Bristol Avon and North Somerset Streams management catchment has been divided into 16 operational catchments (the 4 surface water operational catchments are shown in Figure 3). The operational catchments have distinct characteristics and pressures, and require a different mix of measures to achieve long-term objectives for the water environment and reduce the risks of flooding.

Changes:

- we are in the process of migrating to an improved water body network and classification which will include more accurate water body boundaries and improved tools. During this period you will notice some differences between cycle 1 and cycle 2 data.
- we are proposing amending the Bristol Avon and North Somerset Streams Management Catchment boundary so the River Axe will now be included in the South and West Somerset Management Catchment (as part of the ‘Brue and Axe Operational Catchment). Therefore this document does not include references to the Axe catchment.

2.1 Protected areas

There are areas in the catchment where the water environment is recognised as being of particular importance because of the benefits they provide to society. These benefits include rare wildlife habitats, bathing waters or areas around drinking water sources. These areas are known collectively as ‘Protected areas’.

Protected areas are a priority for action and protection to make sure we can all continue to enjoy the benefits they provide into the future, and that the investment that has already been made in protecting them is not wasted.

Whether a particular part of the water environment is protected or not, we still assess its status every year to understand whether it is healthy or not and whether it’s getting better or worse. Some areas require special protection under European legislation. These designations are designed to manage water, nutrients, chemicals, economically significant species, and wildlife. The management of these areas has been integrated into the overall framework of river basin planning.

The table below shows the number of the different types of protected areas in the Bristol Avon and North Somerset Streams catchment and whether they are complying with the standards that are set out for their protection.

<table>
<thead>
<tr>
<th>Protected area type</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing Waters</td>
<td>2</td>
</tr>
<tr>
<td>Drinking Waters</td>
<td>5</td>
</tr>
<tr>
<td>Shellfish Waters</td>
<td>0</td>
</tr>
<tr>
<td>Urban Wastewater Treatment</td>
<td>3</td>
</tr>
</tbody>
</table>
Natural England is responsible for assessing the status of Natura 2000 protected areas (N2KPAs). Information is not gathered at the catchment level, instead they collate information about the Sites of Special Scientific Interest (SSSIs) that make up all N2KPAs. Information about the status of SSSIs in this catchment can be accessed via [http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm](http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm) and through [http://www.magic.gov.uk](http://www.magic.gov.uk)

More information can be found about protected areas, including how compliance is assessed, in the river basin management planning annex: [http://ea.objective.co.uk/file/3078877](http://ea.objective.co.uk/file/3078877)

This consultation is concerned with the health of all the water in the Bristol Avon and North Somerset Streams catchment, both surface water and groundwater. The Bristol Avon contains a number of important principal aquifers. These include the Jurassic and Carboniferous Limestones and Triassic Sandstone. All of these are very important to protect as they provide a large proportion of our drinking water supply in addition to providing baseflow to rivers in the catchment (c70% of all river flows). Groundwater arising within these aquifers provides important features within the catchment such as the Blagdon, Chew and Cheddar Reservoirs.

Assessments have identified that these aquifers are impacted both in quality and quantity by human activity. The quality of the groundwater is impacted by high levels of nitrate that is predominately arising from agricultural activities. There is one localised impact identified from historic contamination affecting groundwater quality in the catchment.

Where large groundwater supplies have deteriorating trends in water quality Safeguard Zone action plans have been implemented aiming to reverse these trends. The aim is to reduce point and diffuse pollution by working closely with land owners in the catchment and by farmers implementing all reasonable measures to manage nutrients efficiently. The quantity of groundwater within the Jurassic and Carboniferous Limestones and Triassic Sandstone are also impacted by groundwater abstractions.

Severn Estuary is nationally and internationally recognised for its special habitats (SSSI, SPA and SAC). This includes saltmarsh, mudflat and sandflats, which provide important wintering grounds for large populations of waders and wildfowl. There are 2 designated bathing beaches within this catchment, both are compliant, and 3 estuaries & coastal waters, 2 at moderate and 1 at good.

### 2.2 Status of waters

In 2009 this catchment was divided up into 129 river water bodies, 4 lakes, 3 estuaries & coastal waters and 11 groundwater bodies.

We are proposing some changes to the way the catchment is divided up, which are described in more detail below. In 2009 30% of water bodies were classified at Good
Ecological Status (GES) or better. Additional classification information by water body type can be found here: [http://environment.data.gov.uk/catchment-planning/](http://environment.data.gov.uk/catchment-planning/).

Figure 4 shows the classification for the catchment’s surface waters in 2009, when the first river basin management plan was published, and the most recent (2013) status.

Since 2009 the Environment Agency and partners have actively been working to confirm the causes of less than good status and to take necessary interventions to improve those water bodies which we felt were a priority. Some of the improvements are not yet reflected in the data.

There has been a drop in the number of water bodies meeting GES except in Lower Severn Vale. About 50% of water bodies in the main river catchment still do not meet good status (2013), but in general meet moderate status. Despite signs of improvement in fish status in places, the macrophyte results remained consistent with eutrophic conditions along the length of the main river.

Due to nutrients inputs Chew Valley and Blagdon Lakes remain at poor status (2013) and Barrow Reservoir declined to moderate status (2013), whilst Monkswood Reservoir remains at good.

There are 5 groundwater bodies (GWB) within this catchment which are failing chemical status, these are; the Bristol Airport – Carboniferous Limestone, the Bath Oolite, the Bristol Triassic, Mendips and the Upper Hampshire Avon.
There are 10 groundwater bodies in the catchment that are failing quantitative status (2013), these are: the Bristol Airport – Carboniferous Limestone, the Bath Oolite, the South of Malmesbury, the Bristol Avon Forest Marble, the Upper Hampshire Avon, the Carboniferous Limestone (Alveston), the Bristol Avon Forest Marble, the Bristol Triassic, Bridport Sands and also the new Inferior Oolite.

Note that whilst the Mendips GWB was at good status in both 2009 and 2013, more recent evaluation and correction of monitoring points in this GWB indicates that it is likely to fail for its chemical impact on surface waters.

Review of data suggests some of the reported drop in 2013 status may be explained by improvements in assessment methodology and the addition of new elements. Reasons for not achieving GES is outlined in the section 4.3 below.

### 2.3 Improvements to how water bodies are assessed

Improvements have been made to the way water bodies are defined and classified since the plans were published in 2009. Subject to consultation, the changes will be adopted when the updated plans are published in 2015. You can find more information about these improvements in the ‘river basin management planning Annex’ at [http://ea.objective.co.uk/file/3078877](http://ea.objective.co.uk/file/3078877).

The table below shows the status of the different kinds of water bodies in the management catchment based on these new approaches.

<table>
<thead>
<tr>
<th>Management Catchment</th>
<th>Numbers of water bodies at each status or potential in 2013 (using new building blocks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water body type</td>
<td>High</td>
</tr>
<tr>
<td>Rivers &amp; Canals (including Surface Water Transfers)</td>
<td>0</td>
</tr>
<tr>
<td>Lakes</td>
<td>0</td>
</tr>
<tr>
<td>Estuaries and Coastal waters</td>
<td>0</td>
</tr>
<tr>
<td>Ground waters</td>
<td>-</td>
</tr>
</tbody>
</table>

For more information on the changes since cycle 1, please see section 4.3 ‘Changes since first cycle (new building blocks)’ within Part 2 (technical annex) of the RBMPs. ([http://ea.objective.co.uk/file/3078877](http://ea.objective.co.uk/file/3078877))
2.4 Investigating the water environment in the Bristol Avon and North Somerset Streams management catchment

Since the initial assessment of status was made, the Environment Agency and its partners have been working to understand the reasons for not achieving good status. Since 2009, the Environment Agency has carried out 504 investigations in the Bristol Avon and North Somerset Streams catchment. These have helped to determine the reasons why water bodies are at less than good status and the likely causes.

![Bar chart showing the confirmed reasons for not achieving good status of water bodies in the Avon Bristol and North Somerset Streams catchment](chart)

All reasons for not achieving good status data are available on the catchment data explorer at: [http://environment.data.gov.uk/catchment-planning/](http://environment.data.gov.uk/catchment-planning/).

Modelling shows that 43% of phosphate comes from diffuse sources and 57% from point sources in the Upper Avon. Phosphate removal occurs at all large qualifying sewage treatment works but there is still a need to reduce nutrient inputs further. Good land management is needed to control the movement of soil into rivers where it affects water management options and ecology.

Pollution from surface run-off is an issue in the Avon (Urban) operational catchment due to its highly urbanised nature. The key pressures on surface water drinking water protected areas are pesticides and nutrients, mainly from diffuse sources. Work is ongoing to reduce nutrients in upper Chew catchment (Bristol Water and Avon Wildlife Trust).

There are 43 modified water bodies in the catchment, due to river engineering for land drainage and flood management, and historic impoundments like mill structures.
and weirs. There are 670 obstructions within the river and upper estuary impacting on fish movement, ecology and stopping the natural mixing between fresh and saline waters impacting on the wildlife. The biggest issue in the Severn estuary results from man made changes, mainly for the purpose of flood protection.

Signal Crayfish and in stream invasive plants are present in several locations programmes of awareness and control measures are essential.

The main quality failure of the groundwater bodies (GWB) are from the impact of nitrate and phosphate with the exception of the Bristol Airport – Carboniferous Limestone GWB, which is impacted by a point source failure (historical landfills). For full information on individual failing groundwater bodies, there are Groundwater Body Actions plans – updated February 2014.

2.5 Challenges and choices consultation 2013

In 2013, through the ‘Challenges and choices’ consultation, the Environment Agency asked for your views on:

- The significant issues that are limiting the benefits society obtains from the water environment (the challenges) and
- The best way to address these issues and what should be done first (the choices).

The consultation responses were broadly in agreement with our thinking, and informed us that the main issues in this catchment were

- Pollution from rural areas - sediments in rivers from poor land management
- Pollution from towns, cities and transport
- Pollution from waste water - phosphorus in rivers from treated waste discharge
- Physical modification – alterations such as weirs and bridges
- Negative effects of invasive non-native species (INNS)
- Changes to the flow and level of rivers

It was highlighted that to tackle these issues, catchment partners would need to co-ordinate efforts and work together, using robust evidence to develop a prioritised strategy for delivering improvements.

For further information on the responses submitted during the ‘Challenges and choices’ consultation, please see the consultation response document here: https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices
2.6 Taking action in partnership

In June 2013, the Department for Environment, Food and Rural Affairs (Defra) published a policy framework to encourage the wider adoption of an integrated Catchment Based Approach to improving the quality of the water environment, which incorporated findings from the pilot phase. The objectives for the Catchment Based Approach are:

- To deliver positive and sustained outcomes for the water environment by promoting a better understanding of the environment at a local level; and
- To encourage local collaboration and more transparent decision-making when both planning and delivering activities to improve the water environment.

Adopting the approach will promote the development of more appropriate river basin management plans (which underpin the delivery of the objectives of the Water Framework Directive) but will also provide a platform for engagement, discussion and decisions of much wider benefits including tackling diffuse agricultural and urban pollution, and widespread, historical alterations to the natural form of channels.

The Environment Agency is a member of the Bristol Avon Catchment Partnership, who are developing a plan to enhance the catchment. This summary has been informed by the Partnership, both formally through the ‘Challenges and choices’ consultation and through the ongoing work to develop measures to protect and improve the water environment. As well as shaping the updates to the river basin management plan, the results of this consultation will be used to inform the work of the Partnership.

The Bristol Avon Catchment Partnership was established in 2012 to develop a management plan, and has identified several key areas where improvements are needed:

- Sediments and phosphates
- Ecology
- Rural land use
- Data and evidence

The Partnership recognises that many of these issues can be tackled at a catchment scale by understanding the sources of problems, presenting the evidence to support this and recognising the improvement measures which are required across the catchment.

More details on the partnership, its membership and its priorities can be found on its website: (http://barcmp.webnode.com/).

The partnership is now looking to expand and operate strategically across the catchment by linking with Local Nature Partnerships, as well as developing a delivery group who will oversee prioritised action on the ground.

During the first cycle of the river basin management plan, a range of partners have been working to improve and protect the water environment. Projects include:
• The Avon Frome Partnership runs community rivers projects and is a key partner in the Avon Invasive Weeds Forum, a Defra funded project to reduce invasive weeds.

• Avon Wildlife Trust partnership projects within the catchment include a Living Landscape grassland project that has involved survey work and restoration with conservation advice to landowners. The B-Lines project with Buglife, which will map potential wildflower habitat, and Catchment Sensitive farming advice has also been delivered in the Chew Valley, and the Trust are also involved in a Payment for Ecosystems Services pilot in partnership with Eunomia research and consulting, Wessex Water and Bristol Water.

The North Somerset Wetlands Project involved detailed survey work with landowners of the rhynes and ditches in North Somerset.

The South-West Crayfish Project has involved translocation of threatened populations of native crayfish to “ark sites”, as well as a breeding programme and monitoring the spread of invasive Signal Crayfish.

Educational work includes “Trout and About” and “Spawn to be Wild” in partnership with Bristol Water which saw several schools involved in raising and releasing trout and now eels. For more information: http://www.avonwildlifetrust.org.uk/

• Bristol City Council is leading a sustainable drainage scheme on the River Trym in Southmead to tackle the issue of surface water flooding, through a series of community led, sustainable drainage projects which will also benefit water quality.

Discover Brislington Brook Project was a successful community engagement project in Brislington, Bristol 2012-14 using the brook as an asset for learning, raising awareness and delivering conservation.

The ‘Get on Board’ campaign is a pollution prevention initiative to improve drainage arrangements of boaters in the Floating Harbour. The council also monitors river and Floating Harbour water quality on a weekly basis: http://www.bristol.gov.uk/page/environment/water-and-rivers.

• Wessex Water has carried out a payment for ecosystem services feasibility study on the Little Avon, and is in discussions with the Tortworth Estate with the aim of taking this forward. They have also carried out sustainable phosphorus removal trials and have plans for further phosphorus removal work and investigations pending OFWAT approval. Operation Streamclean, led by Wessex Water, has identified misconnections and ensured remedial action is taken through advice and enforcement: http://www.wessexwater.co.uk/

• Wiltshire Wildlife Trust projects include The Wiltshire Invasive Plants Project. For more information: http://www.wiltshirerwildlife.org/

• Bristol Avon Rivers Trust have several projects to address a number of issues including sediment, habitat and fish passage. For example, The By Brook Project, and the Wellow Brook habitat restoration project. These are both collaborative river restoration projects. For more information: http://www.bristolavriverstrust.org/

• Sustainable Eel Group is a partnership project to improve population and abundance of eels in the Severn Estuary.
There are many other active projects within the catchment at a range of scales from community and schools led initiatives to larger geographical and multi-partner projects.

2.7 Measures that could improve the water environment

Where a failure has been identified, a range of measures have been assessed that would be needed to improve the status of water bodies. The Environment Agency has made an assessment of the measures needed to achieve positive benefits for the water environment and society. The measures have been grouped together to ensure the cumulative ‘catchment’ effect is considered.

Where possible, climate resilient measures have been chosen. However it is considered unlikely that the measures will be sufficient to address all impacts of climate change and we will be assessing the likely gaps before the publication of the final river basin management plans: [https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041](https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041)

As well as the measures needed to improve the status of water bodies, other measures are needed to:
- Protect or improve ‘Protected Areas’ within the operational catchment
- Prevent water bodies deteriorating from their current status.

Some of these measures will benefit more than one water body or catchment and some are very specific. The cumulative effect and benefits of measures for the operational catchment have been considered. The measures proposed for this catchment are:

<table>
<thead>
<tr>
<th>Improve modified physical habitats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Removal or easement of barriers to fish migration</td>
</tr>
<tr>
<td>• Improvement to condition of channel/bed and/or banks/shoreline</td>
</tr>
<tr>
<td>• Improvement to condition of riparian zone and /or wetland habitats</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Managing pollution from waste water</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mitigate/remediate point source impacts on receptor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manage pollution from towns, cities and transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce diffuse pollution at source</td>
</tr>
<tr>
<td>• Reduce diffuse pollution pathways (i.e. control entry to the water environment)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improve the natural flow and level of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Control pattern/timing of abstraction</td>
</tr>
<tr>
<td>• Use alternative source/relocate abstraction or discharge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manage pollution from rural areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce diffuse pollution at source</td>
</tr>
<tr>
<td>• Reduce diffuse pollution pathways (i.e. control entry to water environment)</td>
</tr>
</tbody>
</table>

**National approach for managing Invasive non native species:** INNs are likely to cause drop in the ecological status of many of our water bodies. Their propensity to spread rapidly means that prevention is the most cost-
effective solution. It is critical that we follow the principles of good biosecurity as outlined in the Check, Clean, Dry campaign, work with partners to promote this message. All actions to control and manage INNS should follow the national measures in the RBMP and fit within the GB Invasive Non-Native Species Strategy.

2.8 Economic appraisal and environmental assessment of measures to improve the water environment

The benefits that measures will bring to society, along with the cost and any disbenefits (negative impacts) of implementing them, have been assessed in economic appraisals. The appraisals aim to identify whether the measures needed to improve the water environment are cost beneficial, in other words, the benefits are greater than the costs. The effects of the measures on the wider environment are also considered, which helps to inform the environmental assessment. The results of the appraisals will help to decide if it is economically, environmentally and socially worthwhile to implement the measures.

Environmental and socio-economic benefits and disbenefits (negative impacts) are considered in the economic appraisals. A monetary value has been assigned to some benefits. For surface waters, this is based on society’s willingness to pay for improvements in the water environment\textsuperscript{1}. For ground waters, values used have been ‘transferred’ from other detailed economic studies\textsuperscript{2}. Other benefits and disbenefits which have not been monetised have been identified and form part of the overall appraisal results.

The majority of the costs of measures, assessed in the economic appraisals carried out, are estimates. Costs are from local and national sources, and are based on previous experience of implementing similar measures. Where more accurate, local cost information is available, this has been used in place of national estimates.

The economic appraisals have been carried out at the operational catchment scale. If the group of measures to improve all water bodies in the catchment to good status is not considered to be cost beneficial (so the cost outweighs the benefits), or would have significant adverse effects on the wider environment, an alternative group of measures to achieve the most for the water environment has been appraised.

Assessing the costs and benefits of improving our water environment is an ongoing process and economic appraisals will need to be updated as new and better information becomes available. Your responses to this consultation will help us gather more and better information about the costs and benefits of the measures needed. The economic appraisals we’ve carried out will be refined before the updated Severn river basin management plan is published.

For more information on the approach taken for catchment economic appraisals and environmental assessment, please see the draft update to the Severn river basin

\textsuperscript{1}Willingness to pay values used are from The Environment Agency’s National Water Environment Benefits Survey (2007, updated 2012).

\textsuperscript{2} ‘Benefits transfer’ is a recognised way of using benefit values from existing academic studies and surveys. Other benefits which have not been monetised have been identified and form part of the overall economic appraisal results.
management plan: https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041

2.9 Proposed long term objectives

In the consultation, we ask for your views on the proposed long term objectives for the water environment, based on preventing a drop in status and delivering all improvements which are technically feasible and worthwhile, based on economic appraisal. This will allow resources to be targeted where they will deliver the most benefits and provide you with a degree of certainty over the long-term quality of your local water environment. In certain circumstances we will be proposing less stringent objectives.

In the following operational catchment sections, we look at the possible scale of improvement which could happen in the second cycle, based on current knowledge of plans and actions.

2.10 Links to other management plans

Achieving the long term objectives for the water environment will require a coordinated approach to making improvements across a number of different planning processes. The Strategic Environmental Assessment Environment Report considers the full range of plans that are relevant to the Severn River Basin District and its catchments. To see this report go to: http://ea.objective.co.uk/file/3078967.

One of the most important links relates to the way flood risks are managed in the catchment. Over the next two years, the Environment Agency will be undertaking considerable planning work, culminating in the publication of the updated river basin management plans (RBMPs) and the flood risk management plans (FRMPs). Together, these plans will shape important decisions, direct considerable investment and action, and deliver significant benefits to society and the environment.

The two planning processes are working to common river basin district (RBD) boundaries and many key stakeholders have an interest in both. As the plans themselves and the supporting documents/data-sets are complex, we have decided not to integrate them into a single set of consultation documents. Instead we will coordinate the engagement around the planning processes, promoting them together, cross-referencing, and explaining how they relate to each other. We believe this is the best way to make it easy for you to participate in either, or both, consultations.

The flood risk management plan consultation coincides with the launch of this consultation. It includes the measures proposed to manage flood risk, and can be found at: www.gov.uk/government/consultations/draft-flood-risk-management-plans

Flood risk management plans give an overview of flood risk and identify measures to reduce these risks. The environmental objectives are: to work with natural
processes to achieve Water Framework Directive (WFD) objectives; to improve the water environment, hydromorphology, create habitat through flood risk management and to minimise impacts of flooding on areas of environmental importance. Improving existing flood defences was the measure identified which gives the best opportunity to deliver river basin management plans. Further measures are expected to be proposed for this management catchment.
3 Operational catchments

The following sections give an overview of the current state of the water environment in each of the operational catchments; the reasons for not achieving good status; and the measures being proposed to protect and improve the health of the water.

- Bristol Avon Rural
- Bristol Avon Urban
- Lower Severn Vale
- North Somerset Streams

3.1 Bristol Avon Rural Operational Catchment

The main Bristol Avon river flows from its source upstream of Malmesbury before flowing into the Severn Estuary. This Operational Catchment covers the majority of the catchment area except for the urbanised corridor that runs from Trowbridge through Bath before reaching Bristol. Land use is mainly agricultural with arable farming with some sheep grazing (upper catchment) and dairy and beef (lower catchment). Land drainage schemes have significantly altered the catchment in order to intensify agriculture. River control structures, private weirs and historical mill structures have significantly impacted on river continuity. There are many statutory designations within the catchment including Chew Valley Lake which is a Special Area of Conservation and Special Protected Area (SPA/SAC). The catchment includes parts of the Cotswolds, Cranborne Chase & West Wiltshire Downs, Mendip Hills and North Wessex Downs Areas of Outstanding Natural Beauty.

We are in the process of migrating to an improved water body network and classification which will include more accurate water body boundaries and improved tools. During this period you will notice some differences between cycle 1 and cycle 2 data.
There are 93 river water bodies, 3 lake water bodies, 1 estuarine water body and 10 groundwater bodies in this catchment. The status (health) of the water environment in 2009 was assessed as being generally moderate. In 2014, the status of the water environment had deteriorated. It can take 5 to 10 years for the positive benefits of actions to be reflected in the ecological status. Our current analysis suggests that 82% of the water bodies in the Bristol Avon Rural catchment should have a long term objective of achieving good status, as shown in Figure 9.
Figure 8 - Chart showing the classification of all water bodies in the Bristol Avon Rural catchment in cycle 1

For more information on the changes since cycle 1, please see section 4.3 'Changes since first cycle (new building blocks)' within Part 2 (technical annex) of the RBMPs. (http://ea.objective.co.uk/file/3078877)
Since 2009, investigations in this catchment have helped to determine the reasons why water bodies are not achieving good status, and the likely causes. These are shown in Figure 10 below.
Measures to improve the water environment have been assessed. Some of these measures will benefit more than one water body or catchment and some are very specific. The cumulative effect and benefits of measures for the operational catchment have been considered. The measures proposed for this catchment are shown in the table below.

### Improve modified physical habitats
- Removal or easement of barriers to fish migration
- Improvement to condition of channel/bed and/or banks/shoreline

### Managing pollution from waste water
- Mitigate/remediate point source impacts on receptor

### Manage pollution from towns, cities and transport
- Reduce diffuse pollution at source
- Reduce diffuse pollution pathways (i.e. control entry to the water environment)

### Improve the natural flow and level of water
- Control pattern/timing of abstraction
- Use alternative source/relocate abstraction or discharge

### Manage pollution from rural areas
- Reduce diffuse pollution at source
- Reduce diffuse pollution pathways (i.e. control entry to the water environment)
National approach for managing invasive non native species: INNs are likely to cause a drop in the ecological status of many of our water bodies. Their propensity to spread rapidly means that prevention is the most cost-effective solution. It is critical that we follow the principles of good biosecurity as outlined in the Check, Clean, Dry campaign, work with partners to promote this message. All actions to control and manage INNS should follow the national measures in the RBMP and fit within the GB Invasive Non-Native Species Strategy.

There is a range of measures proposed aimed at reducing impacts on both surface and groundwater bodies from rural diffuse pollution, urbanisation, point sources, abstractions and improving modified watercourses a more natural state (for example river restoration and/or enhancing fish passage). These measures will contribute to programmes of work to investigate and protect important conservation areas and groundwater drinking water supply sources.

All of these measures are considered to be needed to improve the water environment to as near to good status as practicable. The costs and benefits of the measures have been considered in the catchment economic appraisal, results of which are shown below.

You can find out more detail on the status and long term objectives by using the Catchment Data Explorer tool at: http://environment.data.gov.uk/catchment-planning/.

3.1.1 Bristol Avon Rural catchment economic appraisal and environmental assessment

3.1.2 Results and recommendation

Measures proposed to improve the water environment to good status (where it is considered to be potentially achievable) in this catchment are cost beneficial; the benefits are greater than the costs.

The results of the economic appraisal are shown below.

3.1.3 Monetised costs and benefits of implementing the measures proposed for this catchment\(^3\)

\[\begin{align*}
\text{Net present value} & \quad \text{Benefit cost ratio} & \quad \text{Present value benefits} & \quad \text{Present value costs} \\
£100.8\text{ million} & \quad 1.6 & \quad £262.1\text{ million} & \quad £162.2\text{ million}
\end{align*}\]

\(^3\) The benefits and costs are shown in ‘Present Value’ terms, which is a way of expressing the value of costs and benefits that will happen in the future in today’s money. We apply a ‘discount’ rate and benefits to reflect people’s preference for receiving goods and services now rather than later.
This means that for every pound that is spent towards improving the water environment in this catchment, you could expect to receive £1.6 of benefits.

### 3.1.4 Benefits and costs of implementing the measures proposed for this catchment

<table>
<thead>
<tr>
<th>Ecosystem service</th>
<th>Positive or negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>^^^: very positive</td>
</tr>
<tr>
<td></td>
<td>^: positive</td>
</tr>
<tr>
<td></td>
<td>0: neutral</td>
</tr>
<tr>
<td></td>
<td>v: negative</td>
</tr>
<tr>
<td></td>
<td>vvv: very negative</td>
</tr>
<tr>
<td>Fresh water</td>
<td>^^^</td>
</tr>
<tr>
<td>Food (e.g. crops, fruit, fish etc.)</td>
<td>^</td>
</tr>
<tr>
<td>Water regulation (timing and scale of run-off, flooding, etc.),</td>
<td>^</td>
</tr>
<tr>
<td>Erosion regulation</td>
<td>^</td>
</tr>
<tr>
<td>Water purification and waste treatment</td>
<td>^^^</td>
</tr>
<tr>
<td>Cultural heritage</td>
<td>v</td>
</tr>
<tr>
<td>Recreation and tourism</td>
<td>^</td>
</tr>
<tr>
<td>Soil formation</td>
<td>^</td>
</tr>
<tr>
<td>Provision of habitat</td>
<td>^</td>
</tr>
</tbody>
</table>

Impacts on the freshwater and water Purification and waste Treatment ecosystem services are particularly important in the results of this economic appraisal. The impacts will significantly benefit society and although they have not been valued and monetised as part of this economic appraisal, further support the proposed measures for this catchment.

The Final Appraisal Report and associated documents provide a more detailed summary of these results. This can be requested at: southwestenquiries@environment-agency.gov.uk

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4 Improving the water environment has wider benefits than those we have been able to monetise in the appraisals. We have identified these using ecosystem services. An ecosystem service is a ‘service’ that the natural environment provides that improves our quality of life.
3.1.5 Possible scale of improvement for the Bristol Avon Rural operational catchment

The information presented so far has focused on the proposed long term objectives for the water environment, based on preventing deterioration and delivering all improvements which are technically feasible and worthwhile. This section focuses on the possible scale of improvement which could happen in the period to 2021, based on current knowledge of plans and actions. The table below indicates what is currently known about the availability of some key mechanisms to deliver improvements by 2021.

<table>
<thead>
<tr>
<th>In this operational catchment:</th>
<th>Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have measures been implemented (or are secured for 2014-15) that will deliver improvements that have not yet been reflected in classification results? E.g. Catchment Sensitive Farming, Catchment Restoration Fund Projects</td>
<td>Yes</td>
</tr>
<tr>
<td>Are there measures planned to deliver Protected Area objectives that will also contribute to improvements in water body status?</td>
<td>Yes</td>
</tr>
<tr>
<td>Has this operational catchment been identified in water company draft business plans as an area for improvement?</td>
<td>Yes</td>
</tr>
<tr>
<td>Has this operational catchment been identified as a priority for action under the new environmental land management schemes (NELMS)?</td>
<td>Yes</td>
</tr>
<tr>
<td>Have the local catchment partnership identified measures they are likely to secure funding for, which will bring about improvement within the 2nd cycle?</td>
<td>No</td>
</tr>
<tr>
<td>Are any additional improvement measures included in Environment Agency or other statutory plans?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The Catchment Partnership felt unable at this time to confirm their level confidence in this operational catchment seeing an improvement towards meeting the proposed long term objectives by 2021. The cost benefit analysis information provided by the Environment Agency is something the group is keen to understand in more detail before it is able to answer or comment.
3.2 Bristol Avon Urban Operational Catchment

The Bristol Avon is a predominantly rural agricultural catchment, however the Bristol Avon Urban Operational Catchment comprises of an urbanised corridor from Trowbridge in the south east, through Bradford-on-Avon, Bath and Keynsham before reaching Bristol. The highly urbanised nature of the catchment results in pollution from surface run-off. Also the many physical modifications such as flood protection, impoundments and urban development infrastructure can cause barriers to fish and affect fish habitats.

There is only 1 protected area, a Special Areas of Conservation (SAC) at Avon Gorge Woodlands, but the catchment includes Bath, a World Heritage Site and part of the Cotswolds AONB.

We are in the process of migrating to an improved water body network and classification which will include more accurate water body boundaries and improved tools. During this period you will notice some differences between cycle 1 and cycle 2 data.
There are 12 river water bodies, no lakes, 1 estuarine water body, 2 canals and 8 groundwater bodies in this catchment. The status (health) of the water environment in 2009 was assessed as being generally moderate. In 2014, the status of the water environment had not deteriorated and was showing encouraging signs of improvement. It can take 5 to 10 years for the positive benefits of actions to be reflected in the ecological status. Our current analysis suggests that 100% of the water bodies in the Bristol Avon Urban catchment should have a long term objective of achieving good status, as shown in Figure 14.
Figure 13 - Chart showing the classification of all water bodies in the Bristol Avon Urban catchment in cycle 1

For more information on the changes since cycle 1, please see section 4.3 ‘Changes since first cycle (new building blocks)’ within Part 2 (technical annex) of the RBMPs. (http://ea.objective.co.uk/file/3078877)

Figure 14 - Chart showing the classification and long term objectives of all water bodies in the Bristol Avon Urban catchment in cycle 2(revised boundaries and classifications/standards)
Since 2009, investigations in this catchment have helped to determine the reasons why water bodies are not achieving good status, and the likely causes. These are shown in Figure 15 below.

Figure 15 - Chart showing the confirmed reasons for not achieving good status of water bodies in the Bristol Avon Urban catchment by type and source sector

Measures to improve the water environment have been assessed. Some of these measures will benefit more than one water body or catchment and some are very specific. The cumulative effect and benefits of measures for the operational catchment have been considered. The measures proposed for this catchment are shown in the table below.

<table>
<thead>
<tr>
<th>Improve modified physical habitats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Removal or easement of barriers to fish migration</td>
</tr>
<tr>
<td>• Improvement to condition of channel/bed and/or banks/shoreline</td>
</tr>
<tr>
<td>• Improvement to condition of riparian zone and/or wetland habitats</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Managing pollution from waste water</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mitigate/remediate point source impacts on receptor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manage pollution from towns, cities and transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce diffuse pollution at source</td>
</tr>
<tr>
<td>• Reduce diffuse pollution pathways (i.e. control entry to the water environment)</td>
</tr>
</tbody>
</table>
Manage pollution from rural areas

- Reduce diffuse pollution at source
- Reduce diffuse pollution pathways (i.e. control entry to water environment)

**National approach for managing Invasive non native species:** INNs are likely to cause a drop in the ecological status of many of our water bodies. Their propensity to spread rapidly means that prevention is the most cost-effective solution. It is critical that we follow the principles of good biosecurity as outlined in the [Check, Clean, Dry](https://www.gov.uk/government/collections/check-clean-dry) campaign and work with partners to promote this message. All actions to control and manage INNS should follow the national measures in the RBMP and fit within the [GB Invasive Non-Native Species Strategy](https://www.gov.uk/government/collections/invasive-non-native-species).

There are a range of measures proposed aimed at reducing the impact on both surface and ground waterbodies from; rural diffuse pollution, urbanisation, point source pollution and improving modified watercourses to a more natural state (for example river restoration and/or enhancing fish passage). Several partnership projects notably Bath Riverside and Weston (Bath) Flood Alleviation Scheme include river restoration and habitat creation to help mitigate the impacts of urbanisation. These measures will contribute to programmes of work to protect important protected area’s and groundwater drinking water supply sources.

All of these measures are considered to be needed to improve the water environment to as near to good status as practicable. The costs and benefits of the measures have been considered in the catchment economic appraisal, results of which are shown below.

You can find out more detail on the status and long term objectives by using the Catchment Data Explorer tool at: [http://environment.data.gov.uk/catchment-planning/](http://environment.data.gov.uk/catchment-planning/).

### 3.2.1 Bristol Avon Urban catchment economic appraisal and environmental assessment

### 3.2.2 Results and recommendation

Measures proposed to improve the water environment to good status (where it is considered to be potentially achievable) in this catchment are cost beneficial; the benefits are greater than the costs.

The results of the economic appraisal are shown below.
3.2.1 **Monetised costs and benefits of implementing the measures proposed for this catchment**

<table>
<thead>
<tr>
<th>Net present value</th>
<th>Benefit cost ratio</th>
<th>Present value benefits</th>
<th>Present value costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>£4.4 million</td>
<td>1.1</td>
<td>£38.6 million</td>
<td>£34.3 million</td>
</tr>
</tbody>
</table>

This means that for every pound that is spent towards improving the water environment in this catchment, you could expect to receive £1.1 of benefits.

3.2.2 **Benefits and costs of implementing the measures proposed for this catchment**

<table>
<thead>
<tr>
<th>Ecosystem service</th>
<th>Positive or negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>^^</td>
</tr>
<tr>
<td>Food (e.g. crops, fruit, fish etc.)</td>
<td>^</td>
</tr>
<tr>
<td>Fibre and fuel (e.g. timber, wool, etc.)</td>
<td>^</td>
</tr>
<tr>
<td>Water for non-consumptive use</td>
<td>^</td>
</tr>
<tr>
<td>Climate regulation (local temperature/ precipitation, greenhouse gas sequestration)</td>
<td>^</td>
</tr>
<tr>
<td>Water regulation (timing and scale of run-off, flooding, etc.)</td>
<td>^</td>
</tr>
<tr>
<td>Erosion regulation</td>
<td>^^</td>
</tr>
<tr>
<td>Water purification and waste treatment</td>
<td>^</td>
</tr>
</tbody>
</table>

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5 The benefits and costs are shown in ‘Present Value’ terms, which is a way of expressing the value of costs and benefits that will happen in the future in today’s money. We apply a ‘discount’ rate and benefits to reflect people’s preference for receiving goods and services now rather than later.

6 Improving the water environment has wider benefits than those we have been able to monetise in the appraisals. We have identified these using ecosystem services. An ecosystem service is a ‘service’ that the natural environment provides that improves our quality of life.
Impacts on the freshwater and erosion regulation ecosystem services are particularly important in the results of this economic appraisal. The impacts will significantly benefit society and although they have not been valued and monetised as part of this economic appraisal, further support the proposed measures for this catchment.

The Final Appraisal Report and associated documents provide a more detailed summary of these results. This can be requested at southwestenquiries@environment-agency.gov.uk

### 3.2.3 Possible scale of improvement for the Bristol Avon Urban operational catchment

The information presented so far has focused on the proposed long term objectives for the water environment, based on preventing deterioration and delivering all improvements which are technically feasible and worthwhile. This section focuses on the possible scale of improvement which could happen in the period to 2021, based on current knowledge of plans and actions. The table below indicates what is currently known about the availability of some key mechanisms to deliver improvements by 2021.
The Catchment Partnership felt unable at this time to confirm their level of confidence that this operational catchment would see an improvement towards meeting the proposed long term objectives by 2021. The cost benefit analysis information provided by the Environment Agency is something the group is keen to understand in more detail before it is able to answer or comment.
3.3 Lower Severn Vale Operational Catchment

The Lower Severn Vale consists of the Bristol North Rhynes (draining west to the Severn Estuary) and the Little Avon Catchment. Little Avon rises from its source in the arable and grassland uplands of the Cotswold escarpment, flowing through the open flat flood plains of the Berkeley Vale, and discharging to the Severn Estuary via Berkeley Pill. The catchment is predominantly rural with agriculture, some forestry and little industry. The drainage system for Avonmouth is highly modified to support the extensive development for industrial use. The main statutory designation is for the adjacent Severn Estuary which is a Special Area of Conservation (SAC), Special Protection Area (SPA) and a SSSI.

We are in the process of migrating to an improved water body network and classification which will include more accurate water body boundaries and improved tools. During this period you will notice some differences between cycle 1 and cycle 2 data.
There are 12 river water bodies, no lake water bodies, 1 estuarine water body and 6 groundwater bodies in this catchment. The status (health) of the water environment in 2009 was assessed as being generally moderate. In 2014, the overall status of the water environment had not deteriorated and was showing encouraging signs of improvement. It can take 5 to 10 years for the positive benefits of actions to be reflected in the ecological status. Our current analysis suggests that 37% of the water bodies in the Lower Severn Vale catchment should have a long term objective of achieving good status, as shown in Figure 19.
Figure 18 - Chart showing the classification of all water bodies in the Lower Severn Vale catchment in cycle 1

For more information on the changes since cycle 1, please see section 4.3 ‘Changes since first cycle (new building blocks)’ within Part 2 (technical annex) of the RBMPs. (http://ea.objective.co.uk/file/3078877)

Figure 19 - Chart showing the classification and long term objectives of all water bodies in the Lower Severn Vale catchment in cycle 2 (revised boundaries and classifications/standards)
Since 2009, investigations in this catchment have helped to determine the reasons why water bodies are not achieving good status, and the likely causes. These are shown in Figure 20 below.

Measures to improve the water environment have been assessed. Some of these measures will benefit more than one water body or catchment and some are very specific. The cumulative effect and benefits of measures for the operational catchment have been considered. The measures proposed for this catchment are shown in the table below.

<table>
<thead>
<tr>
<th>Improve modified physical habitats</th>
<th>Managing pollution from waste water</th>
<th>Manage pollution from rural areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Removal or easement of barriers to fish migration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Improvement to condition of channel/bed and/or banks/shoreline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Improvement to condition of riparian zone and/or wetland habitats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Mitigate/remediate point source impacts on receptor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reduce diffuse pollution at source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Reduce diffuse pollution pathways (i.e. control entry to water environment)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
National approach for managing Invasive non native species: INNs are likely to cause a drop in the ecological status of many of our water bodies. Their propensity to spread rapidly means that prevention is the most cost-effective solution. It is critical that we follow the principles of good biosecurity as outlined in the Check, Clean, Dry campaign and work with partners to promote this message. All actions to control and manage INNS should follow the national measures in the RBMP and fit within the GB Invasive Non-Native Species Strategy.

There is a range of measures proposed including tackling agricultural and urban diffuse pollution, reducing point source inputs of nutrients in waste water and improving modified watercourses a more natural state (for example river restoration and/or enhancing fish passage). These measures will contribute to programmes of work to protect drinking waters, important conservation areas, and groundwater supply sources.

All of these measures are considered to be needed to improve the water environment to as near to good status as practicable. The costs and benefits of the measures have been considered in the catchment economic appraisal, results of which are shown below.

You can find out more detail on the status and long term objectives by using the Catchment Data Explorer tool at: http://environment.data.gov.uk/catchment-planning/.

3.3.1 Lower Severn Vale catchment economic appraisal and environmental assessment

3.3.2 Results and recommendation

Measures proposed to improve the water environment to good status (where it is considered to be potentially achievable) in this catchment are cost beneficial; the benefits are greater than the costs.

The results of the economic appraisal are shown below.

3.3.3 Monetised costs and benefits of implementing the measures proposed for this catchment

<table>
<thead>
<tr>
<th>Net present value</th>
<th>Benefit cost ratio</th>
<th>Present value benefits</th>
<th>Present value costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>£2.3 million</td>
<td>1.1</td>
<td>£21.2 million</td>
<td>£28.9 million</td>
</tr>
</tbody>
</table>

7 The benefits and costs are shown in ‘Present Value’ terms, which is a way of expressing the value of costs and benefits that will happen in the future in today’s money. We apply a ‘discount’ rate and benefits to reflect people’s preference for receiving goods and services now rather than later.
This means that for every pound that is spent towards improving the water environment in this catchment, you could expect to receive £1.1 of benefits.

### 3.3.4 Benefits and costs of implementing the measures proposed for this catchment

<table>
<thead>
<tr>
<th>Ecosystem service</th>
<th>Positive or negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>^^-: very positive</td>
</tr>
<tr>
<td></td>
<td>^: positive</td>
</tr>
<tr>
<td></td>
<td>0: neutral</td>
</tr>
<tr>
<td></td>
<td>v: negative</td>
</tr>
<tr>
<td></td>
<td>v^-: very negative</td>
</tr>
<tr>
<td>Fresh water</td>
<td>^^-</td>
</tr>
<tr>
<td>Water for non-consumptive use</td>
<td>^</td>
</tr>
<tr>
<td>Climate regulation (local temperature/ precipitation, greenhouse gas sequestration)</td>
<td>^</td>
</tr>
<tr>
<td>Water regulation (timing and scale of run-off, flooding, etc.)</td>
<td>^</td>
</tr>
<tr>
<td>Erosion regulation</td>
<td>^</td>
</tr>
<tr>
<td>Water purification and waste treatment</td>
<td>^</td>
</tr>
<tr>
<td>Provision of habitat</td>
<td>^</td>
</tr>
</tbody>
</table>

Impacts on the freshwater ecosystem service are particularly important in the results of this economic appraisal. The impacts will significantly benefit society and although they have not been valued and monetised as part of this economic appraisal, further support the proposed measures for this catchment.

The Final Appraisal Report and associated documents provide a more detailed summary of these results. This can be requested at southwestenquiries@environment-agency.gov.uk

### 3.3.5 Possible scale of improvement for the Lower Severn Vale operational catchment

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8 Improving the water environment has wider benefits than those we have been able to monetise in the appraisals. We have identified these using ecosystem services. An ecosystem service is a 'service' that the natural environment provides that improves our quality of life.
The information presented so far has focused on the proposed long term objectives for the water environment, based on preventing drop in status and delivering all improvements which are technically feasible and worthwhile. This section focuses on the possible scale of improvement which could happen in the period to 2021, based on current knowledge of plans and actions. The table below indicates what is currently known about the availability of some key mechanisms to deliver improvements by 2021.

<table>
<thead>
<tr>
<th>In this operational catchment:</th>
<th>Yes or No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have measures been implemented (or are secured for 2014-15) that will deliver improvements that have not yet been reflected in classification results? E.g. Catchment Sensitive Farming, Catchment Restoration Fund Projects</td>
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<tr>
<td>Are there measures planned to deliver Protected Area objectives that will also contribute to improvements in water body status?</td>
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<td>Has this operational catchment been identified in water company draft business plans as an area for improvement?</td>
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<tr>
<td>Has this operational catchment been identified as a priority for action under the new environmental land management schemes (NELMS)?</td>
<td>No</td>
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<tr>
<td>Have the local catchment partnership identified measures they are likely to secure funding for, which will bring about improvement within the 2nd cycle?</td>
<td>No</td>
</tr>
<tr>
<td>Are any additional improvement measures included in Environment Agency or other statutory plans?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The Bristol Avon Catchment Partnership did not at this time feel able to provide a level of confidence as to whether this operational catchment will see an improvement towards meeting the proposed long term objectives by 2021. The cost benefit analysis information provided by the Environment Agency is something the group is keen to understand in more detail before it is able to answer or comment.
3.4 North Somerset Streams Operational Catchment

North Somerset Streams operational catchment starts at Brean Down in the south and to just beyond Blagdon Lake and then north to the mouth of the Avon. The rivers have short upland and long lowland reaches with very low gradients. Half the area is low-lying levels and moors. Approximately one third of the catchment is at risk from flooding requiring flood alleviation defences. The majority of the catchment is agricultural land, predominantly cattle farming. There are many statutory designations within the catchment; 6 water related SSSIs, 2 Special Areas of Conservation and 1 Special Protected Area. The catchment includes the Mendips AONB.

We are in the process of migrating to an improved water body network and classification which will include more accurate water body boundaries and improved tools. During this period you will notice some differences between cycle 1 and cycle 2 data.
There are 12 river water bodies, 1 lake water body, 1 estuarine water body and 5 groundwater bodies in this catchment. The status (health) of the water environment in 2009 was assessed as being generally moderate. In 2014, the status of the water environment had deteriorated. It can take 5 to 10 years for the positive benefits of actions to be reflected in the ecological status. Our current analysis suggests that 81% of the water bodies in the North Somerset Streams catchment should have a long term objective of achieving good status, as shown in Figure 24.
For more information on the changes since cycle 1, please see section 4.3 ‘Changes since first cycle (new building blocks)’ within Part 2 (technical annex) of the RBMPs. (http://ea.objective.co.uk/file/3078877)
Since 2009, investigations in this catchment have helped to determine the reasons why water bodies are not achieving good status, and the likely causes. These are shown in Figure 25 below.

![Figure 25 - Chart showing the confirmed reasons for not achieving good status of water bodies in the North Somerset Streams catchment by type and source sector](image)

Measures to improve the water environment have been assessed. Some of these measures will benefit more than one water body or catchment and some are very specific. The cumulative effect and benefits of measures for the operational catchment have been considered. The measures proposed for this catchment are shown in the table below. The Table below indicates what is currently known about the availability of some key mechanisms to deliver improvements by 2021.

<table>
<thead>
<tr>
<th>Improve modified physical habitats</th>
<th>• Improvement to condition of channel/bed and/or banks/shoreline</th>
<th>• Improvement to condition of riparian zone and/or wetland habitats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing pollution from waste water</td>
<td>• Mitigate/remediate point source impacts on receptor</td>
<td></td>
</tr>
<tr>
<td>Manage pollution from towns, cities and transport</td>
<td>• Reduce diffuse pollution at source</td>
<td>• Reduce diffuse pollution pathways (i.e. control entry to the water environment).</td>
</tr>
<tr>
<td>Manage pollution from rural areas</td>
<td>• Reduce diffuse pollution at source</td>
<td>• Reduce diffuse pollution pathways (i.e. control entry to water environment).</td>
</tr>
</tbody>
</table>
**National approach for managing Invasive non native species:** INNs are likely to cause a drop in the ecological status of many of our water bodies. Their propensity to spread rapidly means that prevention is the most cost-effective solution. It is critical that we follow the principles of good biosecurity as outlined in the Check, Clean, Dry campaign and work with partners to promote this message. All actions to control and manage INNS should follow the national measures in the RBMP and fit within the [GB Invasive Non-Native Species Strategy](#).

There is a range of measures proposed aimed at reducing the impact on both surface and groundwater bodies from rural diffuse pollution, urbanisation, point sources and improving modified watercourses to a more natural state (for example river restoration and/or enhancing fish passage). These measures will contribute to programmes of work to protect important protected areas and groundwater drinking water supply sources.

All of these measures are considered to be needed to improve the water environment to as near to good status as practicable. The costs and benefits of the measures have been considered in the catchment economic appraisal, results of which are shown below.

You can find out more detail on the status and long term objectives by using the Catchment Data Explorer tool at: [http://environment.data.gov.uk/catchment-planning/](http://environment.data.gov.uk/catchment-planning/).

3.4.1 **North Somerset Streams catchment economic appraisal and environmental assessment**

3.4.2 **Results and recommendation**

Measures proposed to improve the water environment to good status (where it is considered to be potentially achievable) in this catchment are cost beneficial; the benefits are greater than the costs.

The results of the economic appraisal are shown below.

3.4.3 **Monetised costs and benefits of implementing the measures proposed for this catchment**

<table>
<thead>
<tr>
<th>Net present value</th>
<th>Benefit cost ratio</th>
<th>Present value benefits</th>
<th>Present value costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>£19.9 million</td>
<td>2.2</td>
<td>£36.9 million</td>
<td>£17 million</td>
</tr>
</tbody>
</table>

---

9 The benefits and costs are shown in ‘Present Value’ terms, which is a way of expressing the value of costs and benefits that will happen in the future in today’s money. We apply a ‘discount’ rate and benefits to reflect people’s preference for receiving goods and services now rather than later.
This means that for every pound that is spent towards improving the water environment in this catchment, you could expect to receive £2.2 of benefits.

3.4.4 Benefits and costs of implementing the measures proposed for this catchment\(^{10}\)

<table>
<thead>
<tr>
<th>Ecosystem service</th>
<th>Positive or negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Water for non-consumptive use</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Water regulation (timing and scale of run-off, flooding, etc.)</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Erosion regulation</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Water purification and waste treatment</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Recreation and tourism</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Existence Values</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Soil formation</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Primary production (in river)</td>
<td>(^\wedge)</td>
</tr>
<tr>
<td>Provision of habitat</td>
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</tr>
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The Final Appraisal Report and associated documents provide a more detailed summary of these results. This can be requested at southwestenquiries@environment-agency.gov.uk

3.4.5 Possible scale of improvement for the North Somerset Streams operational catchment

The information presented so far has focused on the proposed long term objectives for the water environment, based on preventing drop in status and delivering all

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\(^{10}\) Improving the water environment has wider benefits than those we have been able to monetise in the appraisals. We have identified these using ecosystem services. An ecosystem service is a ‘service’ that the natural environment provides that improves our quality of life.
improvements which are technically feasible and worthwhile. This section focuses on the possible scale of improvement which could happen in the period to 2021, based on current knowledge of plans and actions. The table below indicates what is currently known about the availability of some key mechanisms to deliver improvements by 2021.

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The Catchment Partnership felt unable at this time to confirm their level confidence that this operational catchment would see an improvement towards meeting the proposed long term objectives by 2021. The cost benefit analysis information provided by the Environment Agency is something the group is keen to understand in more detail before it is able to answer or comment.
4 What do you think?

In order to produce a river basin management plan and a flood risk management plan, it is important that the people who understand the local area are able to contribute to these plans. The draft update to the river basin management plan provides information on the river basin district and then asks you to consider a number of questions. To help you provide feedback at the level that is most relevant to you, the catchment summaries summarise the river basin planning information at a more local scale.

- To see the full set of consultation questions, please go to: [http://ea.objective.co.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405418101234](http://ea.objective.co.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405418101234)


Your answers to the questions above will help inform the final plans and ensure that the objectives they contain will help drive the protection, enhancement and improvement of the water environment for all its users. For further information on how to provide your answers to these questions, please go to the “How to respond” section below.

Finding out more

- Severn RBD page link - [https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041](https://consult.environment-agency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041)
- Severn SEA doc link – [http://ea.objective.co.uk/file/3078967](http://ea.objective.co.uk/file/3078967)
- River Basin Management plan - Annex [http://ea.objective.co.uk/file/3078877](http://ea.objective.co.uk/file/3078877)
- Joint Nature Conservation Committee
- Natural England
4.1 **How to respond**

The Environment Agency would prefer you to respond online at: [https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices](https://consult.environment-agency.gov.uk/portal/ho/wfd/water/choices). This will allow you to manage your comments more effectively, while helping us to gather and summarise responses quickly and accurately.

Alternatively, there is a Word response form available for each river basin district which you can download and use to write your response before you submit it online, or you can email it to Severnrbd@environment-agency.gov.uk.

You can view the consultation documents and consultation questions online. But, if you would prefer a printed version of the document, please call the Environment Agency's National Customer Contact Centre on 03708 506 506 (local rate). Please return written responses by 10 April 2015.

4.2 **What the Environment Agency will use the responses for**

The Environment Agency will use the responses from this consultation to update the Severn river basin management plan. Environment Agency staff dealing with this consultation will see all responses in full. Other Environment Agency staff may also see the responses to help them plan future consultations. A full summary of the responses will be published on the Environment Agency website.

4.3 **How the Environment Agency will use your information**

The Environment Agency will make all comments (apart from personal information) publicly available on the Environment Agency website. This includes comments received online, by email, post and by fax, unless you have specifically requested that your response be kept confidential. Only names of organisations that respond and not individuals will be published.

If you respond online or provide an email address, you will receive an acknowledgement of your response. After the consultation has closed a summary of the responses will be published on the Environment Agency website. You will be contacted to let you know when this is available. You will also be notified of any forthcoming river basin consultations unless you request otherwise.

Under the Freedom of Information Act 2000, the Environment Agency may be required to publish your response to this consultation, but will not include any personal information. If you have requested your response be kept confidential, it may still be required to provide a summary.

If you have any questions or complaints about the way this consultation has been carried out, please contact:

Cath Beaver, Consultation Co-ordinator

Environment Agency, Horizon House, Deanery Road, Bristol, BS1 5AH

[Cath.beaver@environment-agency.gov.uk](mailto:Cath.beaver@environment-agency.gov.uk)
Would you like to find out more about us or about your environment?

Then call us on
03708 506 506 (Monday to Friday, 8am to 6pm)

email
enquiries@environment-agency.gov.uk

or visit our website

incident hotline 0800 807060 (24 hours)
floodline 0345 988 1188 / 0845 988 1188 (24 hours)

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