



**Cyfoeth  
Naturiol**  
Cymru  
**Natural  
Resources**  
Wales

# Consultation on updating the Western Wales River Basin Management Plan

**Our purpose is to ensure that the natural resources of Wales are sustainably maintained, used and enhanced, now and in the future. We will work for the communities of Wales to protect people and their homes as much as possible from environmental incidents like flooding and pollution. We will provide opportunities for them to learn, use and benefit from Wales' natural resources**

**We will work for Wales' economy and enable the sustainable use of natural resources to support jobs and enterprise. We will help businesses and developers to understand and consider environmental limits when they make important decisions.**

**We will work to maintain and improve the quality of the environment for everyone. We will work towards making the environment and natural resources more resilient to climate change and other pressures.**

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Figure 1. The Western Wales River Basin District



# 1. Planning for the future

Over the next year, Natural Resources Wales will be updating the river basin management plans that will set objectives for Wales' rivers, lakes, estuaries, coastal and ground waters to cover the period 2015 – 2021. Though we are responsible for developing the plans; the outcomes and the actions needed to achieve them are for everybody. This plan will outline the actions needed to improve the environment, the benefits they could achieve and who is best placed to deliver them.

Welsh Government and Natural Resources Wales have agreed that we will work towards integrated natural resource management and the ecosystem approach in all of our work. The ecosystem approach is about managing the environment so that its different components are considered together, including its natural systems and the benefits that people get from it. Most importantly, it emphasises that people themselves are part of ecosystems and so should be involved in decision making. This complements the advice from previous Water Framework Directive consultations that we should take a catchment based approach which provides a clear understanding of the issues in the catchment and involves local communities in decision-making. We want to hear what you have to say on the pressures on our water environment and the actions we should all be taking to address them.

We aim to improve the environment through more ambitious river basin management plans and greater collective action. There are already many good examples of partnership working and we need to build on these. Responses to this consultation will help to set the strategic direction of the plans and prioritise the actions needed. We need to ensure that the objectives for river basin plans are integrated in other plans and policies. In particular this must involve our natural resource planning programme, Flood Risk Management Plans and the Wales Rural Development Programme.

We recognise that a changing climate will potentially have an impact on the benefits our environment provides. Working in partnership, we aim to develop our understanding of local impacts and build climate resilience and regulation into river basin management.

In the Challenges and Choices consultation in 2013 our partners agreed that the river basin management plans should deliver a healthy water environment to benefit society, the economy and the wider environment. To do this we need to integrate action using a mixture of proven and innovative solutions which will deliver benefits, such as:

- Maintaining water supply to our homes, for public health and for manufacturing
- Farming – including maintaining water supply for crops and animals
- Industry, business and civic use – producing energy, mining, amenity
- Waste disposal and treatment of waste sewage and industrial effluent
- Transport of people and goods
- Commercial fishing, fish farms and shellfish
- Wellbeing, enjoying landscapes and wildlife, active leisure, boating, canoeing, angling, surfing, swimming
- Wildlife diversity of plants, fish, animals through maintaining and enhancing habitats
- increasing resilience to the impacts of a changing climate
- Reducing the impact of floods and droughts on people and the economy

## What has been achieved so far

The Western Wales river basin district has benefited from a huge investment over the past thirty years and beyond which has delivered vast improvements. Since 2009 we have improved our understanding of the pressures on the water environment allowing us to target actions to manage them. The majority of actions published in the river basin management plan have been started or completed.

In the first plan the aim was to get 36% of water bodies to good status by 2015. This target was supplemented by an ambition to achieve 50% good ecological status in surface water across Wales. In 2009, 30% of surface water bodies were in good condition. The 2013 interim classification indicates that 36% of all water bodies achieved good or better status. We expect to see further improvements as the environment responds realising the benefits of actions. Many organisations have worked together across the river basin district on a range of projects.

### Case study

An innovative approach to regulation has helped the dairy industry in West Wales and protected the local environment.

First Milk, owner of Haverfordwest Creamery, plans to open a new water treatment plant in 2014 to deal with the effluent from its cheese production. This will mean discharging treated waste water into the Western Cleddau, a protected area due to its wide range of species, habitats and aquatic plants.

The new treatment plant will meet strict environmental standards, but the discharge will still add nutrients to the river. So in order to offset the extra nutrients getting into the water Natural Resources Wales and First Milk are developing a scheme to reduce the environmental impact of local farming practices.

A group of more than 40 farms which supply the creamery with milk have committed to take part in the scheme.

## Who manages the Western Wales River Basin District?

Natural Resources Wales is responsible for producing the river basin management plans. There are, however, lots of organisations which are responsible for managing the river basin district. These organisations are often grouped in to sectors such as agriculture, fisheries, etc. Table 1 below summarises those sectors.

Table 1. Sector groups involved in river basin planning

Sector	Examples of members
<b>Agriculture and rural land management</b>	Includes arable, intensive livestock, forestry and horticulture.
<b>Angling and Conservation</b>	Includes angling and conservation groups
<b>Central government</b>	Includes UK and Welsh Government and devolved government bodies (including Natural Resources Wales)
<b>Domestic/General public</b>	



<b>Industry, Manufacturing and other Business</b>	Includes chemicals, construction, food and drink, paper and textiles and metals
<b>Local government</b>	Includes Councils
<b>Mining and Quarrying</b>	Includes coal mining, non coal mining and quarrying
<b>Navigation</b>	Includes inland water ways, port and harbour authorities
<b>Non Governmental Organisations (NGOs)</b>	Includes environmental non-governmental organisations and other non-governmental organisations
<b>Recreation</b>	Includes ramblers, canoeists and amenity groups
<b>Urban and Transport</b>	Includes air, road, railways and urban
<b>Waste treatment, transfer, storage and disposal</b>	Includes landfill, biowaste, waste treatment and transfer
<b>Water Industry</b>	Includes water supply, water and sewage treatment

The Western Wales River Basin is overseen by a liaison panel that represents those sectors. Its role is to:

- Contribute evidence to enable decision making and reporting on river basin management plans
- Devise and track measures and projects as part of a programme of work to prevent deterioration and improve the environment
- Work together to develop river basin management plans and other documents required
- Liaise between members and their sectors so as to ensure a broad base for decision making and communication.

Managing the water environment is not always best coordinated at the river basin district scale. In Wales we are committed to integrated natural resource management and an ecosystems approach reflected on a catchment scale. Our objectives are

- To work towards integrated natural resource management
- To achieve positive and sustained results 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 planning and delivering activities to improve the water environment.

This approach will help develop more locally-informed river basin management plans by providing a platform for engagement, discussion and decisions with much wider benefits.

Natural Resources Wales plays a central role in the effective working of the ecosystem approach by supporting catchment based activities with evidence, expertise, advice and guidance. We are able to make some significant improvements through our own activities for example:

- Managing the Welsh Government Woodland Estate,

- Operating flood management and hydrometry assets,
- Managing national nature reserves

We are a regulator, ensuring that legislation to protect the environment is applied fairly in accordance with our regulatory principles. We also work with local and national partners to deliver projects and initiatives to improve the water environment. Examples of this are

- Developing approach to natural resources planning
- The fisheries Agenda for Change
- The Metal Mines Strategy for Wales
- Diffuse Pollution Strategy

## Natural resource management, the ecosystem approach and river basin management planning

Integrated natural resource management is a key element of the Welsh Government's legislative programme. The 2011 Welsh Government *Programme for Government* emphasises the importance of managing our natural resources, on land and sea, in a more integrated way, in line with its commitment to use sustainable development as its central organising principle. The Environment Bill, together with the Wales National Marine Plan, sets out a new statutory framework and integrated natural resource management for the sustainable management of natural resources.

This new framework for managing natural resources, will build on the UN ecosystem approach, defined as 'an integrated strategy for the management of natural resources'. Therefore the Environment Bill will legislate for a more joined-up management process, focused on delivering a healthier, more resilient Wales through economic, social and environmental benefits.

This starts by introducing a new planning process - to identify and characterise the key challenges and opportunities for the sustainable management of natural resources in a specific area. By recognising these, the tools used to safeguard and deliver environmental benefits (of which river basin management plans are one) can be applied in ways that ensure those challenges are tackled in a more integrated way – better reflecting the needs of that place. The approach is being trialled in three areas in Wales, the Dyfi, Tawe and Rhondda catchments.

The natural resource management framework is still being developed in Wales but the river basin management plans reflect the essential elements of the new approach in the following ways:

### **Be area based.**

The river basin management plans encompass all of the issues and pressures on the water environment and the actions to manage them at a river basin scale. We are developing a catchment approach for delivery of actions which will focus at a scale more relevant to communities and other stakeholders.

By looking at a catchment, rather than individual issues or sectors, we can move beyond addressing issues reactively and in isolation. This will enable an integrated, proactive approach, addressing opportunities and constraints in a whole system, cross-sectoral way.

### **Involve stakeholder engagement throughout.**

Natural Resources Wales is the appropriate authority for the Water Framework Directive but only manages a relatively small percentage of Wales itself. It is essential that we involve stakeholders, including local authorities, communities, developers and industry, throughout the process of drawing up and implementing the river basin management plans.



### **Plan and present at the most appropriate scale.**

The natural processes we are working with, and the management processes we are aiming to influence, tend to work at different scales. The area based natural resources management process should reflect this and aim to manage ecosystem services at the most appropriate scale, whilst taking into account the best management mechanisms for doing so. The Water Framework Directive requires that we produce and review management plans at the river basin scale. But many of the problems facing the water environment are best understood and tackled at the catchment scale. This will help to tackle local issues such as pollution from diffuse sources which is a significant pressure across Wales.

### **Plan for the long term.**

To create a sustainable Wales we need to consider the opportunities and constraints Wales will face in the long term. River basin management plans consider long term objectives for improvement and are reviewed every six years.

### **Plan to deliver multiple benefits.**

The new approach will need to plan to deliver multiple, longer term benefits for the environment and also for the economy and society – reflecting long-term well-being goals for Wales. Ensuring the resilience of the supporting ecosystems and their functioning will be key to the long term sustainability of the services and benefits they can provide.

The actions proposed in this river basin management plan can deliver multiple benefits, for example improving land management in the uplands can have significant benefits in climate change resilience, carbon capture, flood storage and improved downstream water quality.

### **Be evidence based.**

To inform the development of the area based approach we need to use the best available evidence from a range of sources, building on both our knowledge and that of our stakeholders and local communities. We will take a pragmatic approach to evidence and apply the principle of collect once, use many times.

The contents of this river basin management plan are the result of a significant evidence base, collected through our monitoring programmes, investigations and economic assessments.

### **People focussed.**

The natural resource planning process will need to reflect the principles of co-production and stakeholder engagement. It will need to aim to deliver outcomes that are equitably distributed and focus on delivering benefits for the people of Wales.

By working with others in catchments the aim is to:

- Understand the issues in the catchment and how they interact
- Understand how the issues are affecting the current local benefits and future uses of water
- Involve local people, communities, organisations and businesses in making decisions by sharing evidence.
- Identify which issues to tackle as a priority

## 2. This consultation

### Why this consultation matters

This consultation is an important step in shaping Wales' waters and provides everyone with the opportunity to consider the issues and the current and possible future actions to protect and improve our water environment. The feedback from this consultation will be used to shape the updated River Basin Management Plans. These will be signed off by Welsh Ministers for publication in December 2015 as required by the Water Framework Directive.

It will not be possible to deliver everything but by working in partnership we can ensure the best combination of actions is identified and set out in the updated plan.

### How this consultation works

This document together with the supporting Planning overview annex forms the river basin management plan. It describes the current condition of the river basin district, what we have achieved since 2009 and our objectives for improving it by 2021. You can respond to the consultation questions by reading the information in this main document. But to help you consider your response more fully the following supporting information is available on our web site and includes

#### **The river basin management planning overview annex**

The planning overview annex provides the detail behind the decision making which has shaped the main document. The document refers to a number of supporting documents for more technical information enabling the reader to access the level of detail desired to respond to this consultation.

#### **Strategic Environmental Assessment report (SEA)**

This sets out the results of the strategic environmental assessment and looks at the wider context of the river basin management plan

Included in this document is a review of our own and other organisations' plans that are related to the river basin management plan. The SEA Regulations require that consideration is given to the relationship with other plans and programmes and environmental objectives set at an international, (European) community or national level.

Given the geographical scale of this plan, only policies, plans, strategies and legislation relevant to the river basin district have been considered as part of this review. The purpose of this is to identify where the update to the river basin management plan should take into account other policies and plans in considering the benefits for the wider environment and any adverse effects. This includes an annex that lists the plans that have been reviewed and provides a table of the main themes of policy and programmes of measures that relate to the river basin management plan under the following headings:

- Water and flood management
- Biodiversity and landscape
- Marine and coasts
- Land use planning and heritage
- Climate, energy and waste management

#### **Management Catchment Summaries**

These provide more local detail reflecting both actions that can be taken and opportunities for partnerships. The summaries are intended to be a practical guide to aid the delivery of locally targeted actions and partnerships. The documents have been shaped by the

outputs of the catchment workshops which were held earlier this year. We have flexibility to update these documents to ensure they are both useful and relevant at the management catchment scale.

### **Water Watch Wales**

The Management Catchment Summaries work together with Water Watch Wales which is an interactive spatial web based tool that provides supporting information and data to assist partners. It enables the user to navigate to their area of interest and review the available information about that specific area. A user's guide for Water Watch Wales is included in the Management Catchment Summary documents.

### **Data and maps**

Much of the information referred to in this document is best presented in map format. A river basin specific file containing data and maps is available to download. The maps are provided as GeoPDFs. These allow the user to see and change different layers of information within the map. A user guide is included in the download file.

The maps have been developed by the Environment Agency and are hosted on their Sharefile platform. A link to the river basin specific file is available on Natural Resources Wales' consultation website.

## **Consultation Questions**

### **River Basin Management Plan Consultation Questions**

#### **Consultation Question 1**

Do you have any comments on the consultation document including suggestions on how we could improve this?

- a.** Are the Management Catchment Summary documents helpful? Please provide us with comments on how we could improve them.
- b.** Does Water Watch Wales work for you? Do you have any suggestions for further improvements?

#### **Consultation Question 2**

In section 3 we have set out changes in how we assess and report on the water environment.

Do you agree with the proposed changes to the management catchment and water body boundaries?

- a.** Would you like to see lakes that are designated as Sites of Special Scientific Interest included within the second cycle?

#### **Consultation Question 3**

In section 4 we have set out proposals for new national measures. A list of all measures can be found in the planning overview annex.

Do you agree with the proposed measures?

- a.** Are there national measures you would like to see included, please tell us why and provide any further information to inform the measures.
- b.** What do you consider to be the local priorities for actions?

- c. What measures can you deliver to help improve the water environment? Please provide information on what these would be, where they could happen and how they would deliver improvement.

#### **Consultation Question 4**

In section 4 we have summarised the number of water bodies where we propose an extended deadline or less stringent objective is appropriate. A list of water bodies and justifications can be found in the planning overview annex alongside our approach.

Do you have any further information to inform where we have proposed an alternative objective?

#### **Consultation Question 5**

In section 4 we explain that we need to develop a prioritised programme for delivery during the second cycle.

Do you agree that measures should be prioritised on the basis of statutory objectives (i.e. prevent deterioration and deliver protected area objectives) and evidence of the costs and benefits of outcomes?

#### **Consultation Question 6**

In section 4 we have modelled the costs and benefits of delivering improvements under four scenarios.

Are the scenarios and economic assessment we have provided as part of this plan helpful?

### **Strategic Environmental Assessment Consultation Questions**

#### **Consultation Question 7**

Do you agree that we have sufficiently assessed the significant effects of the Western Wales River Basin Management Plan? Please describe any further aspects we should consider.

#### **Consultation Question 8**

Do you have concerns about the environmental effects of the river basin management plan that are not covered by this assessment? Please describe what they are.

#### **Consultation Question 9**

Are there other mitigation or opportunities that we should consider delivering with the proposed measures?

### **How to respond**

This consultation runs from October 2014 to April 2015 and we would like you to let us know what you think. Please record your response on the 'Written Consultation response' proforma which is available on our consultation web page and email or post to us at the following addresses.

**Email:** [westernwalesrbd@naturalresourceswales.gov.uk](mailto:westernwalesrbd@naturalresourceswales.gov.uk)

#### **Post**

Jill Brown  
Natural Resources Wales,  
Ty Cambria,  
29 Newport Road,  
Cardiff,  
CF24 0TP

We will issue a response document in Summer 2015. This will summarise the comments we received and what will happen as a result.

For more information on responding to this consultation refer to Natural Resources Wales' consultation web pages

### How will Natural Resources Wales use your information?

We will use the responses from this consultation to shape the review and update the River Basin Management Plans. Our staff dealing with this consultation will see all responses in full. Other staff may also see the responses to help them plan future work.

After the consultation has closed, a summary of the responses will be published on the Natural Resources Wales 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.

If you provide an email address, you will receive an acknowledgement of your response.

Under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, Natural Resources Wales 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. **Should you not wish your response to be included please ensure that this is stated clearly on the front of the proforma.** This includes comments received, by email or post, 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 have any questions or complaints about the way this consultation has been carried out, please contact our customer care centre on 0300 065 3000.

### How the plans will be updated

River basin management planning is a continual process and Natural Resources Wales and its partners are constantly building upon the evidence base to help improve the water environment. This document is a snapshot of the current evidence for consultation. Throughout the consultation period we expect new information and evidence to become available that will affect the final river basin management plan.

The river basin management plans are reviewed and updated on a 6 yearly cycle. The proposed objectives are set out in this draft plan. The plan was first published in 2009. The first update in 2015, of which this is a draft, will cover the period from 2015 to 2021. This will then be reviewed again in 2020, and a second update to the plan will cover the period 2021-2027.

The responses to this consultation and advice from government on affordability will be used to determine which of the proposed objectives can be met by 2021 and which by 2027 or beyond in the updated plan. The update to the river basin management plan will set out the affordable measures that will be implemented in the planning cycle 2015 - 2021. The effect of current measures, new measures that have been agreed and funded and any voluntary measures that are identified through this consultation will also be taken into account as will the time it takes for biology or groundwater chemistry to recover after measures have been implemented.

The timetable for updating the plan is summarised below.

- October 2014 – April 2015. Consultation period on the updated river basin management plan. A number of engagement events aimed at sectors and communities affected by the plan.
- May-July 2015 – Natural Resources Wales will meet with Welsh Government officials to ensure that the proposed measures and objectives being developed in the updated plan are in line with government policy
- 22 September 2015 – Natural Resources Wales submits a final update of the river basin management plans to ministers for their consideration
- 22 December 2015 - ministers publish the updated river basin management plans, incorporating the latest classification data and other changes they have required when considering the proposals put forward by Natural Resources Wales in September



### 3. The Western Wales river basin district

The Western Wales River Basin District covers an area of 16,653 square kilometres. It extends across the entire western half of Wales, from the Vale of Glamorgan in the south to Denbighshire in the north.

The main centres of population are restricted to the coastal strip and the westernmost part of the South Wales valleys. The main urban centres are Swansea, Bridgend and Neath in the south, Aberystwyth in the centre on the coast and Bangor in the north. The river basin district is primarily rural, with land mainly used for agriculture and forestry. Thriving marine, oil and gas industries are critical economic activities, along with heavy industry such as the steel works at Port Talbot and commercial fisheries and tourism around the Welsh coastline.

The lakes, rivers and coastal waters of the district are renowned for their fishing. Seventy per cent of the District's coastline is designated (under European Union Directives and UK law) for its environmental quality, including many world class bathing beaches and internationally important conservation sites.

There are large and valuable cockle beds at Traeth Lavan in the north and The Burry inlet in the south. Mussels are harvested from natural beds in the Conwy and Dyfi and farmed in the Menai Strait on some of the most productive mussel beds in Europe. Much of the upland is given over to livestock farming and forestry. Dairy farming is dominant in the lowlands, particularly in Pembrokeshire and Carmarthenshire. The milder climate of South Pembrokeshire also allows for significant arable production.

The dramatic coast and the proximity of significant population also helps explain the importance of the coastal tourism industry which contributes over £350 million each year to the Welsh economy.

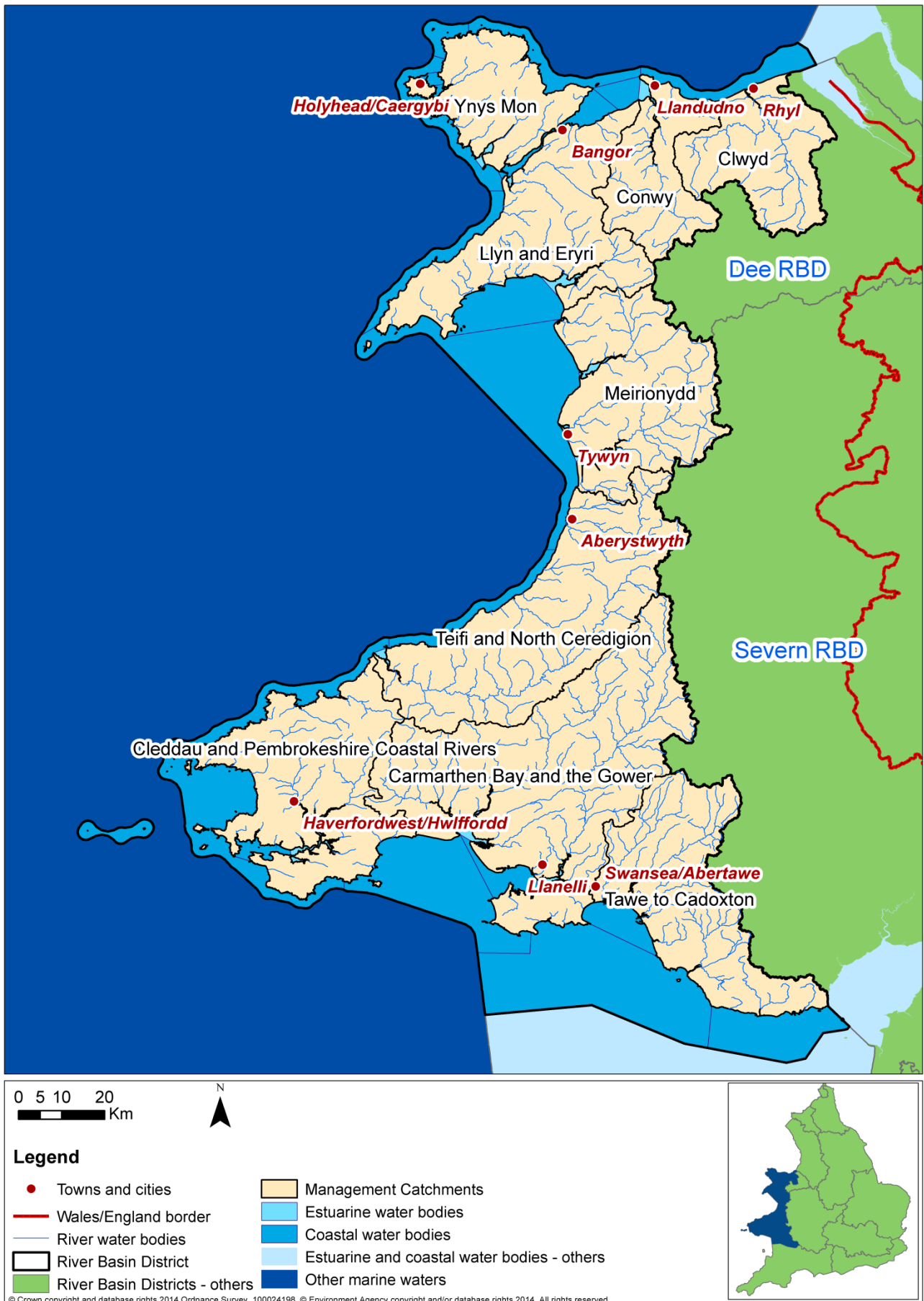
#### Catchments in the Western Wales river basin district

Many of the problems facing our water environments are best understood and tackled at a catchment level.

We have reviewed the number and the boundaries of the management catchments. They now better reflect the boundaries of our Catchment Abstraction Management Strategies and Flood Risk Management Plans. The Western Wales River Basin District is now divided into nine management catchments:

- Clwyd
- Conwy
- Ynys Môn
- Llyn and Eryri
- Meirionnydd
- Teifi and North Ceredigion
- Cleddau and Pembrokeshire Coastal Rivers
- Carmarthen Bay and Gower
- Tawe to Cadoxton

Figure 2. The Western Wales River Basin District catchments



## Current state of the water environment

Throughout each cycle of the river basin management plans we collate all the evidence, historic and current, and produce a 'baseline classification'. This classification, and information on the pressures and risks to waters, is the basis for planning for the next cycle. In this section we describe the current state of the water environment compared to the baseline set in 2009. The updated river basin plan will set a new baseline for 2015. The data in this consultation is based on the 2013 interim classification and will be updated for the river basin management plans to be published in 2015. Some of the systems we use to set that baseline and to describe the health of the water environment are changing and a new baseline reflecting those changes will be set in the plans. Those changes and the resulting baseline classification are described at the end of this section and in the planning overview annex.

### How we determine the current condition

We use the term water bodies to help understand and manage the water environment. A water body is part, or the whole, of a river, lake, ground water or coastal water. The Water Framework Directive covers all water in a river basin district, not just the water bodies that are shown on the maps. Water bodies are reporting units and are indicators of the health of the wider water environment. We assess the condition of these water bodies through monitoring which produces an annual classification. The number and type of water bodies is shown in table 2 below.

Table 2 Number and type of water bodies in the Western Wales river basin district

Water body category	Natural	Artificial	Heavily Modified	Total
River*	607	8	61	676
Lake	21	2	39	62
Coastal	18		6	24
Estuarine	16		11	27
Groundwater	25			25
<b>Total</b>	<b>687</b>	<b>10</b>	<b>117</b>	<b>814</b>

\*River water bodies includes canals and surface water transfers

### Surface waters

For rivers, lakes, canals, estuaries and coastal waters the classification is based on the ecological and chemical condition of the water body. We collect biological and chemical data, which are combined to give an **overall status** of high, good, moderate, poor or bad, based on the lowest reported class from the different elements monitored.

**Ecological status** is determined from a combination of data for biological, physico-chemical and specific pollutants.

**Chemical status** is assessed by compliance with environmental standards for chemicals defined as priority substances or priority hazardous substances in the Environmental Quality Standards Directive (2008/105/EC).

### Artificial and heavily modified waters

Many of our waters have been changed by human activity for a specific use such as navigation, flood management or water storage. In some cases this change may mean that it is impossible to achieve good ecological status. In these cases we aim to achieve good ecological potential. This is a measure of the best the water body could achieve given the constraints required by the modification.

## Groundwaters

For groundwater the quantitative and chemical status are combined to provide a single final classification: good or poor status. A groundwater is at poor quantitative status if there could be adverse impacts on rivers and wetlands or it is not certain that the amount of groundwater taken will 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.

## Protected areas

There are many areas in the Western Wales River Basin District where the water environment is particularly important. Known as protected areas they are given particular legal protection. Protected areas usually have different objectives, reflecting their special protection. Where the standards required for doing this are more stringent than those required to achieve good ecological status we must endeavour to achieve those more stringent standards. The number, type and compliance of relevant protected areas are shown in table 4 below

## Current condition – Surface waters

There are 786 surface water bodies in the Western Wales River Basin District, including rivers, canals, lakes, estuaries and coastal waters. Table 3 below shows the number of water bodies in each status class in the 2013 interim ecological and chemical classification.

Table 3 2013 Interim ecological and chemical classification

Water body category	Ecological status				Chemical status		
	Bad	Poor	Moderate	Good	Fail	Good	Does not require assessment
River		23	414	227	24	68	576
Canal				2			2
Surface Water Transfer				6			6
Lake		12	33	17	1	13	48
Coastal			9	15		15	9
Estuarine	1	1	13	12	1	12	14
<b>Total</b>	<b>1</b>	<b>36</b>	<b>469</b>	<b>279</b>	<b>26</b>	<b>108</b>	<b>655</b>

The figures below shows the interim status of the different quality elements which are combined to give the overall status of our rivers.

Figure 3. Rivers. Interim chemical and ecological classification, 2013

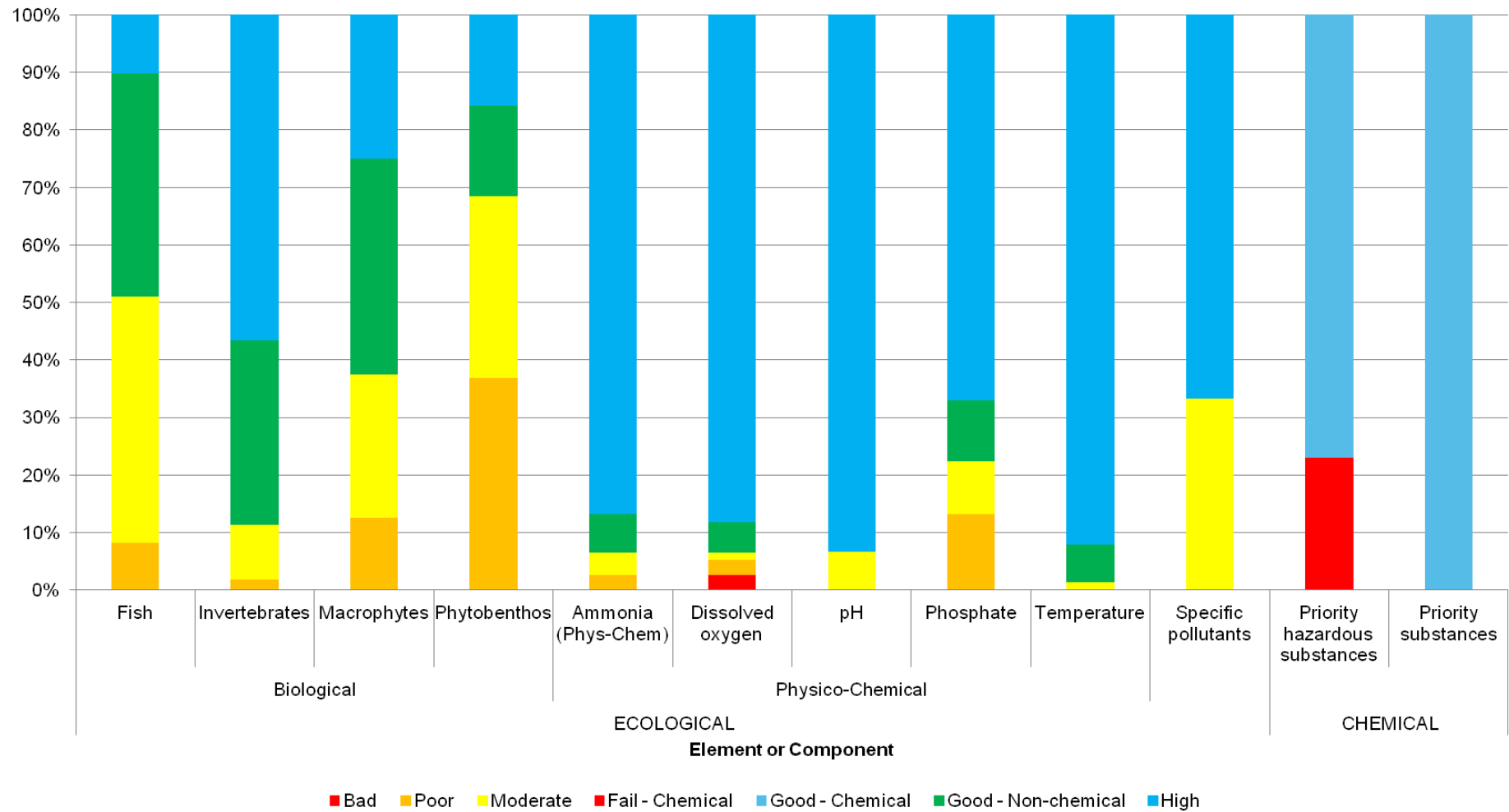


Figure 4. Lakes. Interim chemical and ecological classification 2013

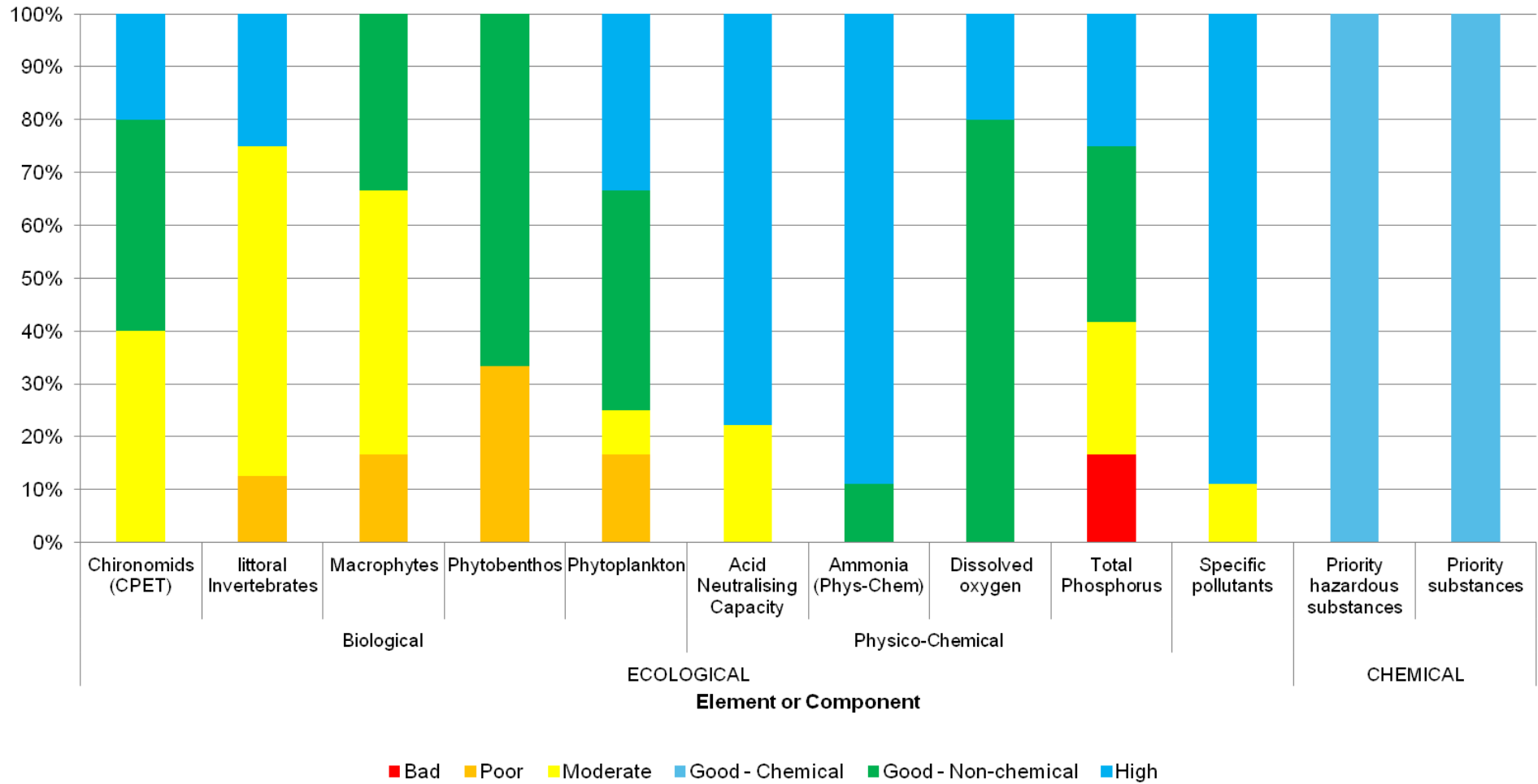
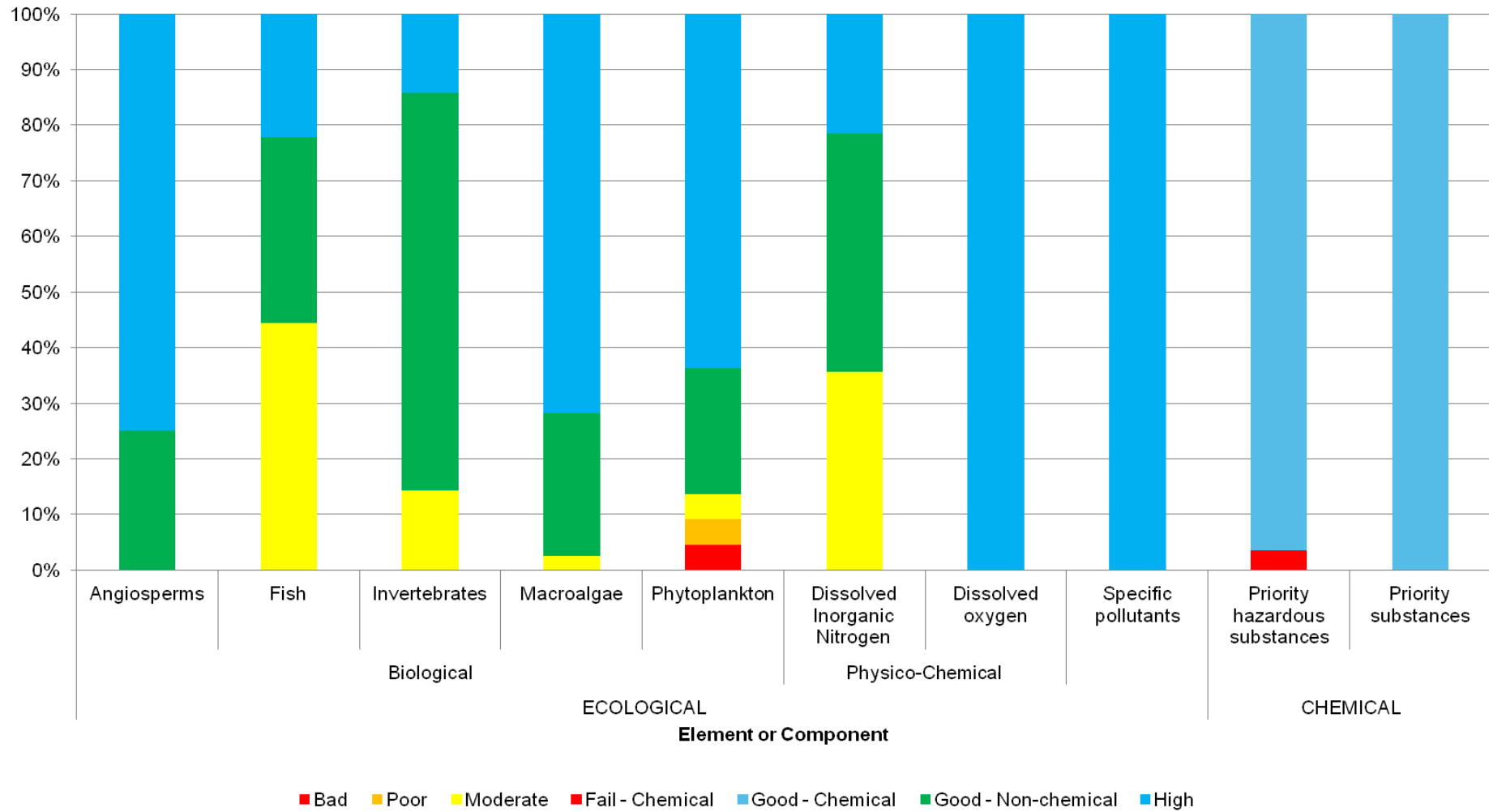




Figure 5. Coastal and estuarine waters, interim classification, 2013



### Current condition – Groundwater

Of the 25 groundwater bodies in Western Wales 12 are in good status overall. All achieve good quantitative status and twelve achieve good chemical status.

### Current condition – protected areas

Protected areas need to meet standards that are relevant to their particular use. These are often more stringent than the standards used to assess ecological or chemical status.

Table 4 shows the type number and compliance of protected areas in the Western Wales River Basin district.

Table 4. Protected areas in the Western Wales river basin district

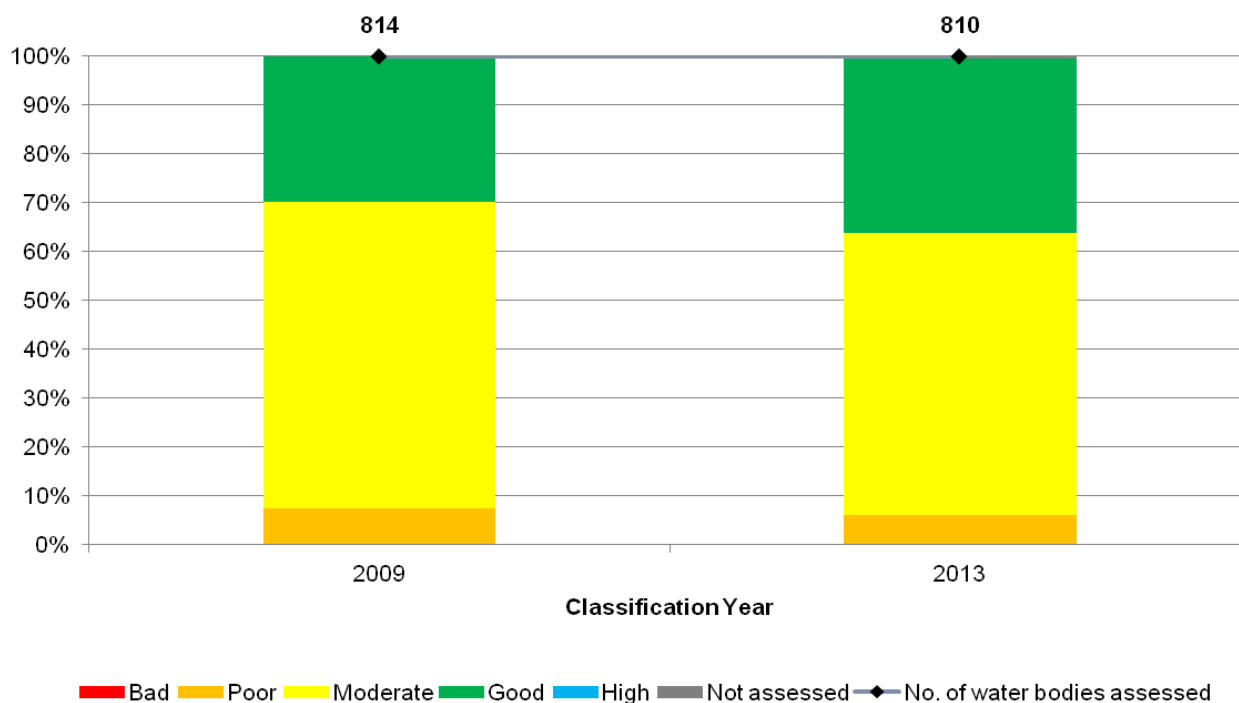
Protected Area	Number (or area – NVZ)	% not compliant
Bathing Waters	102	1
Shellfish Waters	21	57
Water dependent Special Areas of Conservation (SACs)	59	To be confirmed
Water dependent Special Protection Areas for Wild Birds (SPAs)	13	To be confirmed
Drinking Water Protected Areas - surface water	62	To be confirmed
Drinking Water Protected Areas - groundwater	25	12
Nitrate Vulnerable Zones	1% (16894 Ha)	n/a
Sensitive areas	3	0

### Impact of actions from the current plan

The first river basin management plan put in place a programme of measures to improve the water environment from the 2009 baseline classification. A lot of improvements have been undertaken in addition to these measures by many organisations and individuals.

In 2009 30% of water bodies in the Western Wales river basin district achieved good or better status. We predicted that this would rise to 36% for surface waters by 2015, but set an overall ambition of achieving 50% good or better status across Wales. The 2013 interim classification results indicate that 36% of all water bodies achieved good or better status. Improvement in status is limited by the current understanding of pressures on the water environment, their sources, and the action required to tackle them. Viewed at an element level it is clear that there have been some significant improvements, for example of the total of assessed water bodies 45% were good or better for fish populations, in 2013 that figure rose to 78%.

Figure 6 Comparison of the overall baseline classification in 2009 with the interim 2013 classification



Some of the change reflects the number of sites monitored. In 2009 not all water bodies were monitored for every element. We suspected that in some cases, water bodies that were classed as good were actually at lower status. We have put in place additional monitoring. For example in 2009 we only monitored seven lakes for macrophytes, in 2013 that increased to 24, of which only six met the required standard. Thus much of the change indicates a better understanding of the pressures affecting the environment rather than an actual change in quality. We will reassess improvements and deterioration from the 2009 baseline in the updated river basin management plans against the 2014 classification. Apparent deterioration will be investigated to understand if it is due to a real change in quality of the environment or the reasons explained above.

### Measures delivered since 2009

Natural Resources Wales and our partners; including water companies, local authorities and the Coal Authority have delivered the measures that were planned. In addition, Welsh Government initiated a fund to support voluntary partnership projects which delivered improvements to the water environment. This fund was matched in 2012 and 2013 by Dŵr Cymru for projects which contributed to improvements in the water environment particularly where that related to their assets. These funds have been able to draw in match funding from other sources increasing their value. It is estimated that the £140,000 Welsh Government fund in 2013/2014 generated an additional £450,000 in match funding, thus realising much greater benefit to the water environment.

With the Welsh Government funds and other resources from across Natural Resources Wales, partnerships have been developed with over 100 partners including landowners, farming unions, rivers trusts, wildlife trusts, wildlife charities and educational trusts. Between 2011 and 2013 those partnerships delivered projects worth £4.4million which

contributed to improvements in 152 water bodies; created or restored 400ha of habitat and enhanced or restored 370km of river.

- Tree planting
- Removal of barriers to migration
- Completion of river surveys
- Upland habitat management – ditch blocking, self seeded conifer removal
- Invasive species removal
- River clean ups
- Removal of across upland bog habitats
- School visits and adult education projects
- Riparian management
- Catchment restoration
- Development of a river restoration national vocational qualification

## Updates to classification information

The data and information used in the management of the water environment is regularly reviewed and improved. We use a set of *building blocks* that help us complete the classification. These are:

- The water body network
- Monitoring networks
- Environmental standards
- Classification tools, for example biological monitoring methods or statistical analysis tools

For the updated river basin management plans the building blocks have been reviewed based on improved science, better understanding of the environment, policy and directions from UK or European government. This includes:

- Revised water body boundaries for rivers, canals, groundwaters, lakes, transitional and coastal waters
- Upgraded classification tools based on advice from UKTAG (the UK Technical Advice Group for WFD), in particular classification tools have been derived and improved for estuarine and coastal water bodies.
- Revised environmental standards consulted on by UKTAG and government.

Although these changes will provide a better picture of the water environment, they make comparison with the data from the first plan complex to present. In the preceding section the current condition of the water environment has been presented using the original building blocks. This has enabled progress against the objectives set in the first river basin management plans to be reported including checks for any potential deterioration. The new building blocks will be used as the baseline for the updated river basin plan, thus all information in section 4 of this plan reflecting implementation and planning for improvements is based on the new building blocks.

### **Proposed new water body network and boundaries changes**

In 2013 a revised water body network and an enhanced river monitoring network was introduced. Many of the changes are based on feedback from stakeholders. This proposed new network of water bodies and monitoring sites is part of the new building blocks classification system and will allow a reassessment of the baseline for the second cycle river basin management plans.

The revised water body boundaries may lead to a greater proportion of river water bodies achieving good status due to the removal of small water bodies around the coastal fringes. Where removal of small water bodies is proposed, this is in line with European guidance on minimum sizes of water bodies to ensure the Water Framework Directive is implemented proportionately. Irrespective of whether a brook or stream is formally a WFD water body, they are protected by domestic legislation, as it applies to all controlled waters.

There have also been revisions to the heavily modified water body (HMWB) designations, with some HMWBs being de-designated. There will now be more water bodies aiming to achieve good ecological status rather than good ecological potential.

These changes will make a difference to the number of water bodies we report as being in high, good, moderate, poor and bad ecological status. The numbers of water bodies and the 2013 interim classification based on the new building blocks are summarised in the table, chart and map below.

Natural Resources Wales expect to review the boundaries of estuarine and coastal water bodies in the next cycle to increase consistency with marine Natura 2000 sites and management catchments. We are considering including a number of lakes important for nature conservation, but not Natura 2000 sites, as protected areas, in order to better integrate freshwater conservation.

Table 5. New building blocks, numbers of water bodies

Number of water bodies	Natural	Artificial	Heavily Modified	Total
<b>River*</b>	<b>377</b>	<b>2</b>	<b>48</b>	<b>427</b>
<b>Lake</b>	<b>21</b>	<b>2</b>	<b>41</b>	<b>64</b>
<b>Coastal</b>	<b>17</b>		<b>6</b>	<b>23</b>
<b>Estuarine</b>	<b>16</b>		<b>11</b>	<b>27</b>
<b>Groundwater</b>	<b>25</b>			<b>25</b>
<b>Total</b>	<b>480</b>	<b>4</b>	<b>106</b>	<b>566</b>

Figure 7. Overall status of cycle 2 water bodies, interim 2013 classification

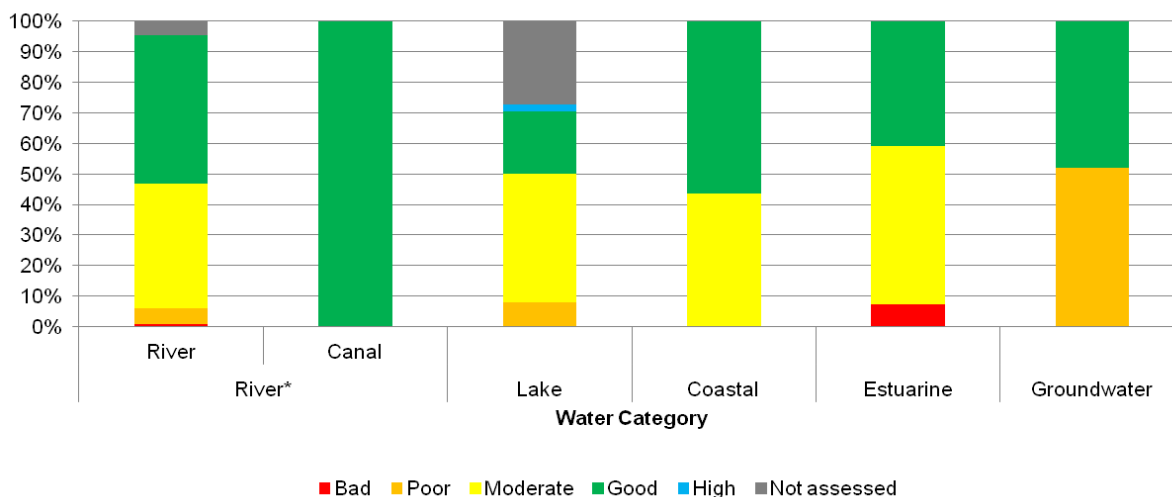
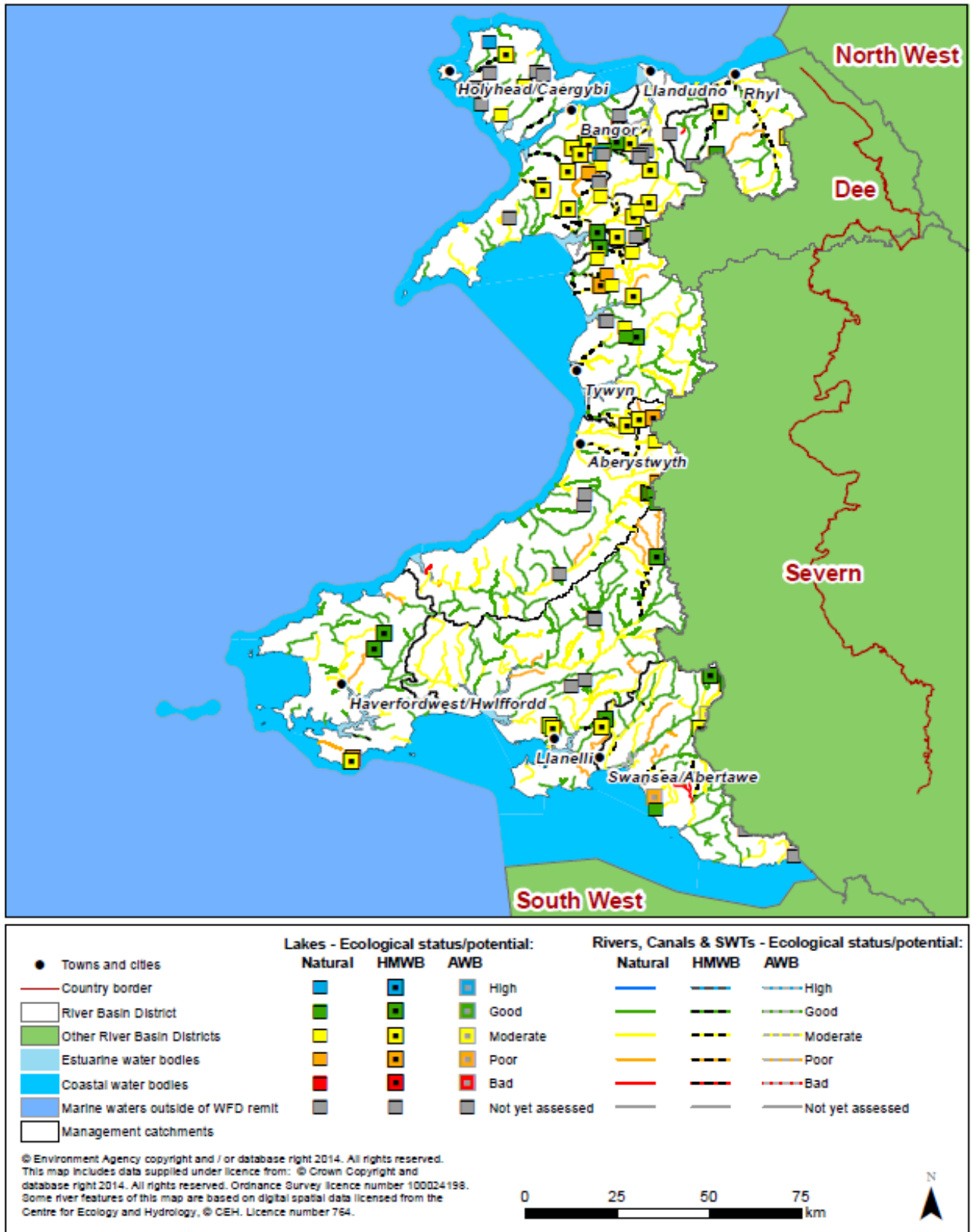


Figure 8. Overall status of cycle 2 water bodies, interim 2013 classification





## Challenges in the river basin

Since the first river basin management plan was published in 2009 we have improved our understanding of the pressures, impacts and risks that the water environment faces. We have:

- Investigated failures to achieve standards to identify the underlying reason for failure
- Assessed the risk of deterioration or of failing to achieve standards in this and future plans
- Consulted the public on our findings (Challenges and Choices, risk assessments)

We have reviewed the list of the most important issues we believe threaten the current and potential future uses of the water environment. We have grouped the pressures under a number of issue headings. (Please note that these are not in order of priority). We have focused on those issues where more action is needed.

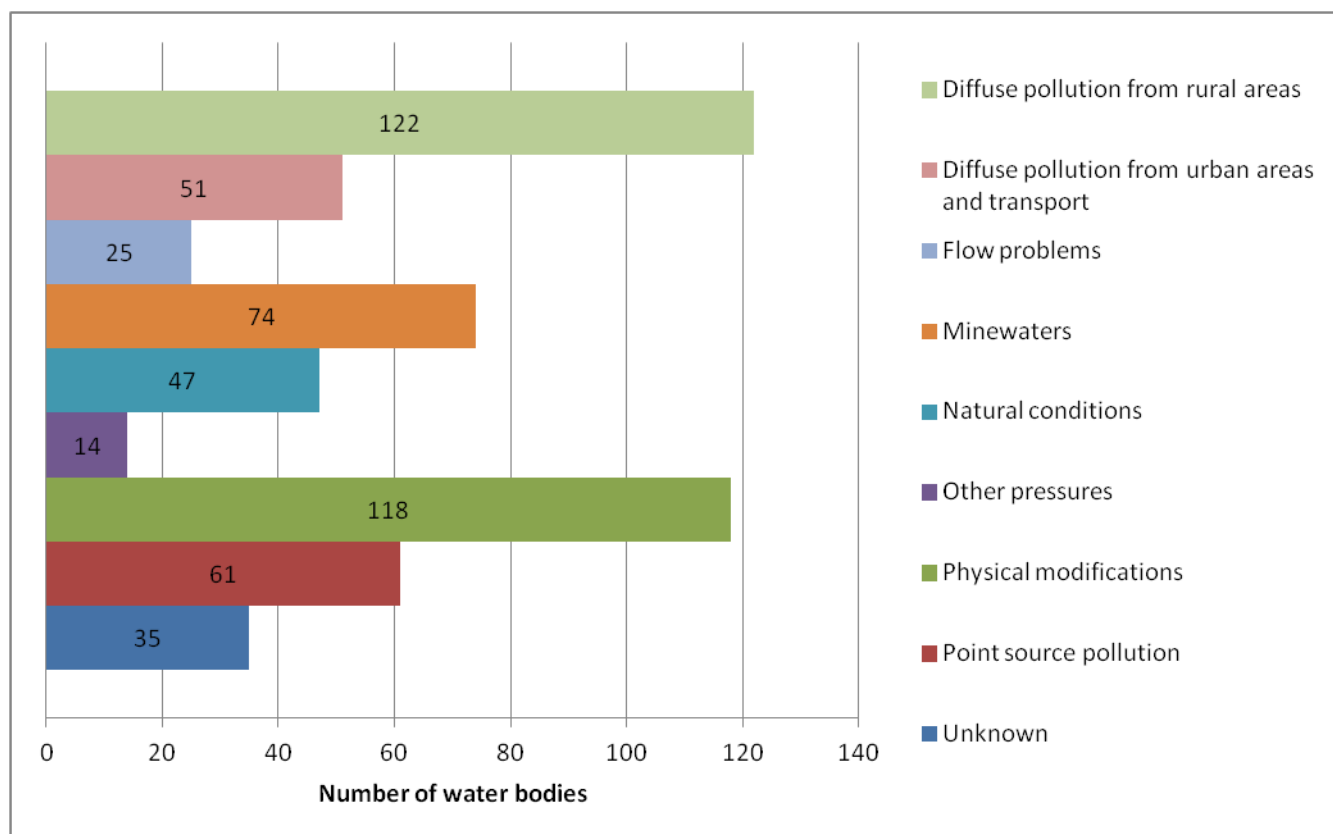
- **Physical modifications.** Man made changes to the natural habitat, for example poorly designed or redundant flood defences and weirs, and changes to the natural river channels for land drainage and navigation and shellfisheries on estuaries and in coastal waters. These modifications can cause changes to natural flow levels, excessive build up of sediment, and the loss of the habitat that wildlife needs to thrive.
- **Pollution from sewage and waste water.** Waste water can contain large amounts of nutrients (such as phosphorus and nitrates), ammonia, bacteria and other damaging substances
- **Pollution from towns, cities and transport.** Rainwater running over manmade surfaces and carrying pollutants into waters, toxic substances from contaminated land, atmospheric pollution causing acidification and sewage from houses 'misconnected' to surface water drains rather than sewers.
- **Pollution from rural areas.** Poor agricultural practice and forestry can result in nutrients and sediments affecting the water environment (also known as 'diffuse rural pollution').
- **Pollution from mines.** Contaminated water draining from mines, most of which are now abandoned.
- **Invasive Non-Native Species.** The presence of invasive non-native plants and animals in our watercourses poses a threat to biodiversity, increases flood risk, affects the state of our water environment and costs the economy billions per annum.

## Reasons for not achieving good status

Since 2009, Natural Resources Wales have carried out over 600 investigations in the Western Wales River Basin District to increase our understanding of the issues affecting water bodies. As a result, we are now in a better position to work with our partners to deliver sustainable improvements.

Figure 9 below provides an indication of the types of pressures acting on our water bodies, which in turn highlight the issues or challenges preventing water bodies achieving good status or good potential in the Western Wales River Basin District.

Figure 9. Reasons for not achieving good status



### Challenges and Choices consultation

The 'Challenges and choices' consultation ran from June 2013 to December 2013. The consultation gave communities and our partners the opportunity to tell us what they thought the most significant issues were with the water environment, the best way to tackle these issues, and what the priorities should be.

Overall, the majority of respondents agreed that we had identified the main issues in each river basin district. This included how we described the significant issues affecting both the water environment and the local community. These were diffuse pollution from rural and urban sources; pollution from sewage and waste water; physical modification such as barriers to migration, lack of dredging and flooding and hydro-electric schemes; invasive non-native species and changes in natural level and flow of water.

Other issues considered significant were the decline of migratory fish; including exploitation/predation and stocking policy and some considered that more mention should have been made on the promotion of recreational activities and access to water. It was also felt that coastal waters and estuaries were lagging behind freshwaters; that financial constraints on Natural Resources Wales would have an impact on our ability to tackle issues and that disposal of litter and climate change were significant issues.

Many of the respondents recognised the need for a multi-agency approach with all mechanisms being delivered in an integrated way. It was also recognised that we need to implement measures at a catchment scale. This would ensure local buy-in, partnership working and improve funding opportunities. Some felt that a cultural change was needed and measures should be aimed at changing the public's long term behaviour.

There was mention of a need for more awareness raising on the impact of rural pollution. Others, however, wanted more emphasis on incentivising better solutions through permitting regulations or greater control through extending nitrate vulnerable zones. Many commented that there is a need to improve flood defences and remove blockages caused by trees. Half of the responses related to a single hydro-electric power schemes. Those respondents felt that subsidies should be removed and abstraction licences refused on those schemes affecting main rivers, sites of special scientific interest, areas of outstanding natural beauty and national parks.

It was thought that greater consideration should also be given to how the water management aspects of Glastir could be integrated into the river basin management plans.

You can view the Challenges and Choices consultation documents, supporting information and summary statistics on our website. For more detail regarding the significant issues, and how responses to the Challenges and Choices consultation have shaped our approach see the challenges and issues section of the river basin management planning overview annex.

### Risk assessments

We reviewed the significant pressures to:

- Collect information on the type and magnitude of the significant pressures on the surface water bodies in the river basin district
- Assess how susceptible water bodies are to those pressures
- Assess the likelihood that water bodies will fail to meet their environmental quality objectives or deteriorate from their current condition

The methodology for each risk assessment was tailored to the pressure but in general it was an assessment of the scale of the pressure and the sensitivity of the water body. The pressures which have been subject to reviewed risk assessment are as follows:

Table 6. Risk assessments

Environmental pressure	Water category
Phosphorus and eutrophication	Rivers, lakes
Chemicals and metals	Rivers, lakes, groundwater, estuarine and coastal waters
Sediments	Rivers
Sanitary Pollutants (ammonia and dissolved oxygen)	Rivers
Faecal indicator organisms	Bathing and Shellfish Waters
Acidification	Lakes, rivers
Abstraction and flow	Rivers, groundwater
Physical modification	Rivers, lakes
Invasive non-native species	Rivers, lakes, estuarine and coastal waters

We will use the reviewed risk assessments to:

- Develop our monitoring strategy

- Classify water bodies where we do not have sufficient data
- Determine local and national programmes of measures

### Considering climate change

To be sustainable, any action in the river basin should:

- Recognise, and ideally contribute to, the UK's greenhouse gas (GHG) emissions reduction targets.
- Be adapted, or easily adaptable, to the changes in climate that are now inevitable given past global emissions.

Actions to address climate change should be considered right at the outset of any work, and not bolted on as an afterthought. The most recent climate change projections for the UK are the UKCP09 projections (June 2009). In Wales we can expect:

- More intense rainfall events.
- More flooding of low-lying coastal areas
- Hotter, drier summers.
- More extremely warm days.
- Milder, wetter winters.
- Less snowfall and frost.
- Lower groundwater levels.

While the direction of travel is clear, the rate of change is still uncertain. The weather will also continue to vary from year to year. The recent Met Office report "Too hot, too cold, too wet, too dry" (March 2014) confirmed the underlying UKCP09 trends but also stated "new analysis suggests that we should also plan to be resilient to wet summers and to cold winters throughout this century".

As far as GHG emissions are concerned, land use and agriculture are the most important sectors in relation to the Water Framework Directive. Depending upon its use and the associated management regime, land can be either a net source of emissions or a net sink. In 2012, GHG fluxes (predominantly carbon dioxide) from the Land Use, Land Use Change and Forestry Sector in Wales represented a net carbon sink, absorbing around 1% of Welsh emissions. Agriculture emits two potent greenhouse gases. Nitrous oxide arises from the application of nitrogenous fertilisers. Methane is emitted directly by livestock, and by the handling of slurries. These agricultural emissions are significant: in 2012 they contributed some 13% of total emissions in Wales – the same figure as for transport.

Guidance on how to adapt to climate change, and how to reduce emissions, is provided in the technical planning overview annex accompanying this draft river basin management plan.

## 4. Objectives, measures and ambition

This section outlines what we are aiming to achieve, the proposed new measures that need to be put in place, and what we think could be achieved by 2021. We aim to develop a single integrated programme of measures by 2021 that meets Water Framework Directive objectives which:

### **Prevent deterioration in status**

Water body status will not be allowed to deteriorate from the current reported status.

### **Achieve the objectives for protected areas**

Achieve the standards set by the relevant directive under which they were designated. For water dependent Natura 2000 sites we will aim to achieve conservation objectives, achieving good status by 2021 is a milestone towards this objective.

### **Aim to achieve good overall status for surface and ground waters**

Implement measures to achieve good overall status where they are technically feasible and not disproportionately costly.

To do this will require combinations of measures which are delivered across many sectors as well as by the general public – we all have a role to play.

## Proposed measures

The challenges that threaten current and future uses of the water environment are managed by measures to maintain and enhance the water environment. The river basin management plans are a tool for developing and consulting on these measures.

Within this consultation measures are divided into two groups. National measures apply to the whole of Wales, or the United Kingdom. In general these set the legislative, policy or strategic approach. Examples include a national ban on using a particular chemical or a national strategy for prioritising and funding the remediation of abandoned mines. Local measures are specific to the river basin district or a part of it. For example, the removal of invasive plants along a length of designated river or a local campaign targeting misconnections across an industrial estate. Many of the actions listed will also have multiple benefits. For example, sustainable urban drainage (SUDS) schemes help to reduce urban pollution, sewage pollution and changes to water levels.

This section summarises all of the proposed new national measures for each of the significant issues and some of the existing measures that were set out in the first river basin management plan and an overview of the local measures that could be developed. A list of all national measures, both new and existing, and the local measures are detailed on Water Watch Wales and in the catchment summaries. If you know about any others or want to suggest new measures, please tell us in your response to this consultation. The river basin management plan will become a statutory document hence the importance of ensuring that the correct measures are identified through this consultation.

## Protected Areas

### **What do we want to achieve?**

We want to ensure that Protected Sites meet the standards that apply to them. Some of these standards will be met by the use of measures described in this section. Other projects and measures have been developed specifically for protected areas not currently meeting their objectives are summarised in the table below. These other plans or measures will support the objectives we want to achieve through the Water Framework

Directive. Additional information on the measures and objectives for Natura 2000 sites can be found in the core management plans and the marine equivalent.

**Who needs to be involved?**

Welsh Government, Natural Resources Wales, Water Industry, Agriculture and rural land management, Local Authorities, Defra, Food Standards Agency, NGOs through partnerships and campaigns, Wales Biodiversity Partnership (Outcome 21 Group), UK Nature Conservation Agencies (Natural England, Scottish Natural Heritage, Northern Ireland Environment Agency, Joint Nature Conservation Committee), Relevant Authority Groups for European marine Sites.

Table 7. Summary of measures for Protected Areas

Protected Area	Programme
Drinking Water Protected Areas - surface water and groundwater	At risk DrWPAs (and all upstream Waterbodies) have been taken forward as 'candidate' Safeguard Zones for funded AMP Investigations to assess the sources of the raw water failure and to identify viable catchment solutions. Where catchment solutions are found to be possible, and stakeholder agreement can be assured, Safeguard Zones will be formally designated for funded improvement measures.
Economically significant species (Shellfish Waters)	Plans are in place to deliver a better understanding of improvements required to achieve Shellfish Water Protected Area objectives and information to support cost benefits analysis. This will lead to updating Shellfish Water Action Plans to detail measures proposed to achieve compliance with relevant objectives.
Recreational Waters (Bathing Waters)	Bathing Water profiles have been produced for all designated sites. They include details of the measures needed to achieve compliance with the revised standards that come into force in 2015.
Nutrient Sensitive Areas (Urban Waste Water Treatment Directive)	Measures have been identified to ensure that all relevant discharges from waste water treatment plants within the sensitive area have appropriate phosphorus or nitrogen emission standards.
Nutrient Sensitive Areas (Nitrate Vulnerable Zones)	Nitrate Vulnerable Zones have been designated and can be designated in areas where water quality is affected by nitrates from agricultural sources. Measures to reduce nitrate concentrations within NVZs include establishing a voluntary code of good agricultural practice and developing action programmes to reduce agricultural nitrate losses.
Natura 2000: Water dependent Special Areas of Conservation (SACs) and Special Protection Areas for Wild Birds (SPAs)	As part of the LIFE Natura 2000 Programme for Wales Natural Resources Wales is developing Prioritised Improvement Plans (PIPs) for all Natura 2000 sites that are not currently in favourable condition (including water dependant sites/features). Thematic Plans will also be developed as part of the programme to address key strategic issues to Natura 2000 sites. Information from both PIPs and the Thematic Plans will contribute to



Protected Area	Programme
	<p>achieving objectives under the Water Framework Directive.</p> <p>On cross-border sites with England, a single, cross-border plan (known as a Site Improvement Plan (SIP)) will be produced by the LIFE Natura 2000 Programme for Wales, in collaboration with its sister project the Improvement Programme for England's Natura 2000 Sites (IPENS).</p>
Freshwater Protected Sites Common Standards Guidance	In collaboration with other UK Agencies, we are updating existing guidance to ensure that this is based on the latest evidence base and improve consistency.
Natura 2000: Water dependent Special Areas of Conservation (SACs) and Special Protection Areas for Wild Birds (SPAs)	Natural Resources Wales is reviewing its Core Management Plans for Natura 2000 sites to ensure that the targets are accurate and reflect the latest knowledge.
Lake Sites of Special Scientific Interest (SSSIs)	We are treating these as Protected Areas in the River Basin Management Plan and supports our national and international conservation and biodiversity obligations.

## Physical Modifications

### What do we want to achieve?

- We want to restore the natural shape and form of water bodies, in order to improve habitat and fish passage.
- Where modifications to the water environment are essential to society, for example public water supply or flood management, we want to mitigate harmful impacts as far as possible.
- We want to ensure future modifications do not cause deterioration.
- We want to increase the extent of buffer zones and river side corridors alongside inland waters in order to make them more resilient to other pressures, including climate change.

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Owners of the barriers to fish passage, Local Authorities, NGOs – through partnerships and campaigns, River Restoration Centre, Wales Biodiversity Partnership, UKTAG.

## What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Continue to implement the Hydropower guidelines including the production of a design and siting guide for developers of hydropower schemes. <b>(Natural Resources Wales)</b>	Yes
NEW	Deliver our statutory duties to Protect, Improve and Develop fisheries. <b>(Natural Resources Wales)</b>	No
NEW	Give strategic direction for fisheries work in Wales as set out in The Agenda For Change for Fisheries. <b>(Natural Resources Wales)</b>	No
NEW	Removal of barriers to fish migration through the sustainable fisheries programme in Wales. <b>(Natural Resources Wales)</b>	Yes
NEW	Develop and implement a prioritised programme of mitigation measures for Natural Resources Wales and Welsh Government owned assets (e.g. flood risk modifications). <b>(Natural Resources Wales and Welsh Government)</b>	Yes
NEW	Implement innovative solutions, and work with the natural environment to reduce flood risk. Learn from existing approaches such as Pontbren. <b>(Natural Resources Wales)</b>	No
NEW	Contribute to research and development to identify best practice for managing hydromorphological pressures in the water environment. <b>(Natural Resources Wales)</b>	No
NEW	Use our regulatory role to identify opportunities to improve the water environment <b>(Natural Resources Wales)</b>	No
NEW	Undertake a National Habitat Creation Programme <b>(Natural Resources Wales)</b>	No
NEW	Identify opportunities to improve the water environment through existing programmes of maintenance and scheme designs for Flood Risk Management. <b>(Natural Resources Wales)</b>	No
NEW	Revise Clearing the Waters guidance for dredging and disposal activities in coastal and estuarine waters <b>(Natural Resources Wales)</b>	Yes
NEW	Instigate a national Water Body Morphological Restoration programme to restore the natural functioning of prioritised rivers, lakes and TRaC water bodies where hydromorphology and / or habitat structure is a significant impediment to reaching environmental and social objectives. <b>(Natural Resources Wales)</b>	No

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
Existing	Investigation into the impact of commercial shell and fin fisheries to improve the risk assessment of the impact of these activities on ecology and to identify appropriate measures. <b>(Natural Resources Wales and Environment Agency)</b>	Yes
Existing	Promote fish passage improvements. <b>(Natural Resources Wales)</b>	No

### Local Actions

1. **Appropriate coastal process and sediment management** – Measures to protect and restore integrity of dune systems.
2. **Dredging and silt management** – Includes reducing siltation at source through land management, and implementing sustainable dredging and silt disposal regimes.
3. **Improve fish passage and habitat** - Remove or modify barrier to fish passage.
4. **Mitigate impacts of flood and coastal defences** - Reduce impacts of flood defence structures and operations - improve connectivity, habitat, and morphology by implementing options through capital and maintenance programmes, such as soft engineering, opening culverts, upgrading tidal flaps, changing dredging and vegetation management.
5. **Mitigate impacts of shipping, navigation and dredging** - Assess and implement options for adapting dredging regimes and reducing the impacts of physical modifications.
6. **Reduce impacts from other physical modifications** - Improve connectivity, habitat and morphology through soft engineering and restoration techniques.
7. **Sustainable aggregate extraction** – Reduce and mitigate impacts of extraction industries.
8. **Sustainable marine development** - Includes off-shore energy developments, such as oil and gas exploration and tidal energy.
9. **Sustainable fisheries management** - Includes measures for both freshwater and marine fisheries to reduce and mitigate impacts.
10. **Other sustainable land and marine management practices** - Includes measures to mitigate impacts from construction and maintenance of infrastructure, including within military training sites.
11. **Complete first cycle investigations** – All ongoing WFD investigations from first cycle programme.

## Manage pollution from sewage and waste water

### What do we want to achieve?

- All sewerage systems are maintained and, where necessary, improved so they operate effectively and their impacts on the water environment are minimised.
- Solutions to combined sewage overflow problems that deliver multiple benefits are embedded in planning and development across Wales (e.g. water sensitive urban design, sustainable drainage schemes).

- Increase public awareness of the impacts of misconnections and disposal of harmful substances into sewerage systems (e.g. paint, oil, fats and garden chemicals).

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Water Industry, Local Authorities, General public.

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Natural Resources Wales to work with water companies to develop a programme of investigations and improvements to sewage discharges (i.e. PR14) in order to support delivery of WFD and protected area objectives. <b>(Natural Resources Wales and Water Industry)</b>	Yes
NEW	Participate in UK National Misconnections Group. <b>(Natural Resources Wales and Water Industry)</b>	No
NEW	Work with Welsh Government on the introduction of Fuel and Oil Regulations in Wales. <b>(Natural Resources Wales)</b>	No
NEW	National trials at sewage treatment works for removal of Phosphorus towards 0.1mg/l P. For good status measures and Natura 2000. <b>(Water Industry)</b>	No
NEW	Welsh Government to develop a regulatory framework that encourages sustainable, innovative solutions to waste water management. <b>(Welsh Government)</b>	No
NEW	Water companies develop and deliver catchment management options that improve water quality and deliver additional ecosystem services. <b>(Water Industry)</b>	Yes
Existing	Actions under PR09 (AMP5) Water Industry Investment programme. <b>(Water Industry)</b>	Yes
Existing	Investigation of sewage discharges. <b>(Water Industry)</b>	Yes
Existing	Targeted campaigns including visits, education and awareness to improve operation of septic tanks and rural sewerage management. <b>(Natural Resources Wales and Water Industry)</b>	Yes
Existing	Reducing disposal of fat, oil and grease to sewers – Awareness campaign to influence behaviour with leaflets, information packs. <b>(Water Industry)</b>	Yes
Existing	Provide advice to small and medium sized businesses on obligations in relation to priority substances, priority	Yes

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
	hazardous substances and specific pollutants through Gov.uk Environment and countryside website. <b>(Natural Resources Wales and Water Industry)</b>	

## Local Actions

- 1. Reduce pollution from other waste water discharges** - Reduce pollution from other (non-sewage) point sources, both regulated and unregulated. Investigate and implement basic pollution prevention measures, including provision of up to date advice and guidance, such as correct handling and storage of chemicals and waste, management of trade effluent, and regulation.
- 2. Reduce pollution from septic tanks** - Target actions to ensure septic tanks are maintained correctly. Where necessary issue formal works notices to owners to relocate or replace tanks and soakaways.
- 3. Reduce pollution from sewage discharges** - Reducing pollution from continuous and intermittent discharges, includes additional treatment at sewage treatment works (e.g. phosphate stripping), investigating and tackling sewer blockages, and implementing sustainable drainage to reduce surface water drainage to sewers.
- 4. Address point source pollution** – Investigate and regulate pollution from point sources. Overlaps with "reduce pollution from sewage discharges" and "other waste water discharges".
- 5. New investigation** - This draft programme includes investigations for all new failures, deterioration, and drinking water protected areas.
- 6. Tackle misconnections and urban diffuse pollution (local action can also be applied to rural areas)** - Investigate and solve misconnections to surface water drains (at residential and commercial properties) and implement sustainable drainage schemes (SUDS) to reduce diffuse pollution.
- 7. Complete first cycle investigations** – All ongoing WFD investigations from first cycle programme.

## Manage pollution from towns, cities and transport

### What do we want to achieve?

- We want to minimise the negative impact of historic and future development on the water environment.
- We want to put the ecosystem approach and ecosystem services at the centre of urban design and planning. By using sustainable urban drainage (SUDS), restoring the areas around rivers including the river banks and floodplain, providing public green spaces, raising awareness and changing behaviour to improve the quality of life in the urban areas of Wales.

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Water Industry, Local Authorities, SUDs Approving Bodies, Industry, Manufacturing and other Business, NGOs through partnerships and campaigns, Maritime and Coastguard Agency, relevant Authority Groups for European Marine sites, General public.

## What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Natural Resources Wales working with Welsh Government and others to promote and embed the use of Water sensitive Urban design (WSUD) into planning policy and devolved building regulations. <b>(Welsh Government, Natural Resources Wales)</b>	No
NEW	The development of SUDs Approving Bodies to provide consistent advice for planning activities and maintenance of schemes. <b>(Welsh Government)</b>	No
NEW	Welsh Government to review legislative framework surrounding urban diffuse pollution. <b>(Welsh Government)</b>	No
NEW	Promote the implementation of SUDs in new developments to gain environmental, water quality, social and flood risk benefits. <b>(Natural Resources Wales)</b>	No
NEW	Influence planning authorities to require and enforce the use of SuDS and contribute to the implementation of appropriate SuDS technology. Seek to influence existing land use practices to ensure that run-off is lowered, water is retained in the catchment so that peak runoff rates are reduced and base flows are maintained and encourage the use of rainwater harvesting, water use and SuDs. <b>(Natural Resources Wales)</b>	Yes
NEW	Deliver Actions set out in Natural Resources Wales' Diffuse Water Pollution Plan Priorities. <b>(Natural Resources Wales)</b>	Yes
NEW	Work in partnership to investigate misconceptions including the targeting of hotspots. Include outreach work to increase public/community awareness and engagement. <b>(Natural Resources Wales, Water Industry)</b>	Yes
New	Use UK Government's ePIMS property asset system to identify publicly owned industrial estates and depots within failing WFD water-bodies and work with Welsh Government and Local Authorities to resolve issues such that these sites become exemplars of best practice. <b>(Natural Resources Wales, Welsh Government, Local Authorities)</b>	Yes



New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Assess the environmental impacts and reduce contamination from historic industrial and waste sites. <b>(Natural Resources Wales, Local Authorities)</b>	Yes
Existing	Diffuse pollution action plans (for example stretch walks and pollution prevention campaigns) carried out in accordance with the Bathing Waters Diffuse Pollution Project. <b>(Natural Resources Wales)</b>	Yes
Existing	Implementation of Network Rail Pesticide protocol. <b>(Natural Resources Wales and the Environment Agency)</b>	No
Existing	Advice and campaigns on the correct disposal practices for waste oils and fats. <b>(Natural Resources Wales and Water Industry)</b>	Yes
Existing	Reduce pollution through campaigns on industrial estates. Look at recent pollution incidents and sources to target pollution reduction activity. <b>(Natural Resources Wales and Water Industry)</b>	Yes

### Local Actions

1. **Address point source pollution** – Investigate and regulate pollution from point sources. Overlaps with "reduce pollution from sewage discharges" and "other waste water discharges".
2. **New investigation** - This draft programme includes investigations for all new failures, deterioration, and drinking water protected areas.
3. **Tackle misconnections and urban diffuse pollution (local action can also be applied to rural areas)** - Investigate and solve misconnections to surface water drains (at residential and commercial properties) and implement sustainable drainage schemes (SUDS) to reduce diffuse pollution.
4. **Waste management** - Includes appropriate management of spoil and sludge, illegal fly-tipping and litter.
5. **Mine water and contaminated land remediation** - Coal and metal mine, and contaminated land remediation - including passive and active mine water treatment, capping of spoil, removal of wastes to landfill, and channel diversion
6. **Complete first cycle investigations** – All ongoing WFD investigations from first cycle programme.



## Changes to natural flow and levels of water

### What do we want to achieve?

- We want to ensure current and future abstraction licences protect the water environment.
- We want to encourage sustainable land use patterns in urban and rural environments that reduce runoff from rainfall.
- We want to deliver interventions such as in-channel habitat improvement that mitigate the impacts of abstraction on the water environment.
- We want to improve water use efficiency to reduce the need for additional abstraction in the future.

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Water Industry, Industry, Manufacturing and other Business, Agriculture and rural land management, NGOs through partnerships and campaigns, Wales Biodiversity Partnership, UKTAG, General public

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Welsh Government to review the abstraction licensing system to inform future policy in relation to water resource management. <b>(Welsh Government)</b>	No
NEW	Natural Resources Wales working with Welsh Government, NGOs and other partner organizations to implement strategic ditch and drain blocking programmes with the aim of restoring Natura 2000 and other nationally important wetlands and conferring societal and ecological benefits downstream by reducing hydrological extremes. <b>(Natural Resources Wales)</b>	Yes
NEW	Bring currently exempt water abstraction within licence (New Authorisations) <b>(Welsh Government and Natural Resources Wales)</b>	Yes
NEW	Investigations to assess the environmental impacts of impoundments and possible mitigation measures. <b>(Natural Resources Wales)</b>	Yes
NEW	Prioritise solutions to tackle water body failures due to abstraction. <b>(Natural Resources Wales)</b>	Yes
NEW	In line with the Welsh Government's Water Strategy for Wales, seek ways to reduce waste and improve water efficiency. <b>(Natural Resources Wales)</b>	Yes

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
Existing	Investigations under PR09 (AMP5) Water Industry Investment programme (2015- 2020) - rogramme of investigation of ecological impacts of managed flows in HMWBs with Water supply use. <b>(Natural Resources Wales and Water Industry)</b>	Yes
Existing	Promote water recycling and rainwater harvesting where cost-effective, appropriate and used together with other demand management measures. <b>(Natural Resources Wales)</b>	Yes

### Local Actions

1. **Drainage and water level management** – Investigate and implement changes to land drainage regimes and structures to restore water levels
2. **Improve flows and water levels** - Reduce impacts of regulated flows and abstractions, restore more natural flow regimes, implement options to improve water levels, such as water efficiency and recycling measures, alternative sources and supplies.
3. **Mitigate impacts of water resource impoundments** - Assess and implement options for improving fish passage and habitat.
4. **Sustainable access and recreation management** - Reduce the impacts of both water-based and terrestrial activities, including tackling illegal off-roading.
5. **Complete first cycle investigations** –. All ongoing WFD investigations from first cycle programme

## Managing invasive non-native species (INNS)

### What do we want to achieve?

- Invasive non-native species (INNS) are plants or animals originating outside the UK that are introduced and subsequently have negative effects on the health of the water environment and native plants and animals. They are a direct threat to the ecological objectives we want to achieve through the Water Framework Directive.
- We need to develop and implement measures to reduce this pressure, the risks INNS pose to water body ecological status and to minimise the risk of undermining the other WFD improvement actions we are looking to undertake.
- INNS have a wide range of negative impacts including making river banks unstable impoverishing native ecology, diminishing fisheries, increasing flood risk and interfering with leisure activities such as water sports. They can also have significant operational costs associated with controlling and managing them with zebra mussels for example blocking pipes or intakes and fouling other structures. The total annual cost of INNS to the Welsh economy is currently estimated at over £125 million with their indirect costs estimated to be much more.
- We want to prioritise actions to slow down or prevent the spread of existing species and eradicate these or new introductions where possible to do so.

- We also want to minimise the risk posed by INNS generally through improved biosecurity and improved local information on INNS distribution and impact. .

### Who needs to be involved?

Dealing with INNS is a collective responsibility involving all sectors including Welsh Government, Natural Resources Wales, Industry, Manufacturing and other Business including relevant retailers, Navigation, Agriculture and rural land management, NGOs through partnerships and campaigns, Academia, UKTAG, GB Non-Native Species Secretariat (GBNNS), Welsh local records centres, Wales Biodiversity Partnership (Invasive Non-Native Group), General public.

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Continue to improve knowledge of species distributions and improve public awareness of new and established INNS, including using mechanisms such as online and smart phone recording systems. <b>(Government, GBNSS, Natural Resources Wales and the Environment Agency)</b>	No
NEW	Support implementation of the EU regulation on Invasive Alien Species (implementation planned for January 2015) and Marine Strategy Framework Directive to improve the coordination of measures and create stronger controls on pathways of entry for the most damaging species, especially those arriving in estuarine and coastal water bodies. <b>(Government, Natural Resources Wales and the Environment Agency)</b>	No
NEW	Implement the updated GB strategy on invasive species when this becomes available (expected late 2014). <b>( All )</b>	No
Existing	Undertake risk assessments to identify priority invasive non-native species for mitigation and control action at GB and national levels. <b>(Government, GBNSS)</b>	No
Existing	Develop and implement codes of practice to reduce the spread of invasive non-native species. <b>(ALL)</b>	Yes

### Local Actions

1. **Manage invasive non-native species** - Eradication and/or management of invasive non-native species in line with current national invasive species Action Plans.
2. **Improve understanding and awareness about INNS including promoting and implementing biosecurity good practice** - Where there is no technically feasible eradication method people can help control INNS and slow their spread by

promoting and applying biosecurity good practice including ‘Check, Clean, Dry’ and ‘Be Plantwise’.

3. **Seek innovation solutions** – to improve our ability to control non-native species.
4. **Complete first cycle investigations** – All ongoing WFD investigations from first cycle programme.

## Manage pollution from rural areas

### What do we want to achieve?

- We want to strengthen regulatory, financial and operational mechanisms to support a sustainable agricultural sector that protects the water environment and helps deliver the full range of ecosystem services that provide financial, social and ecological benefits to Wales.
- Appropriate forestry management that benefits the water environment, people through outdoor recreation and delivers ecosystem services such as reduced diffuse pollution, reduced flood flows, clean drinking water, habitat for fish and wildlife, and shade to mitigate the impacts of climate change.

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Water Industry, Industry, Manufacturing and other Business, Agriculture and rural land management, NGOs through partnerships and campaigns, Academia, Local Authorities, Relevant Authorities Groups for European Marine Sites, Wales Biodiversity Partnership, General public.

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Welsh Government to review legislative framework surrounding rural diffuse pollution. (Welsh Government)	No
NEW	Natural Resources Wales and Welsh Government identify interventions that will allow the next Rural Development Plan to support sustainable agriculture and improve ecological quality in the water environment. <b>(Welsh Government and Natural Resources Wales)</b>	No
NEW	Natural Resources Wales working with Farm Assurance and key buyers to develop Environmental Management Systems (EMS) for farms. <b>(Natural Resources Wales)</b>	Yes
NEW	Natural Resources Wales and farming unions develop and deliver targeted advice and guidance to land managers to minimise the impacts of inappropriate land use and management including soil erosion, farm tracks and livestock poaching. Preventative measures to address infrastructure issues should be included. <b>(Agriculture and rural land management and Natural Resources Wales)</b>	Yes

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Natural Resources Wales deliver a prioritised programme of forestry work to support delivery of WFD and protected area objectives. <b>(Natural Resources Wales)</b>	Yes
NEW	Apply Forest & Water Guidelines, including the practice guide for managing forestry in acid sensitive catchments. <b>(Natural Resources Wales)</b>	Yes
NEW	Develop a Strategy which includes monitoring the effectiveness of the approach with the forestry sector for managing the 5 principle risks - acidification, sedimentation, pesticides, barriers to fish migration and inappropriate riparian management. <b>(Natural Resources Wales)</b>	No
NEW	Welsh Government target Glastir Woodland Management incentives to deliver improvements to the water environment. <b>(Welsh Government)</b>	Yes
NEW	Natural Resources Wales deliver the Forests and Woodlands Education Programme. <b>(Natural Resources Wales)</b>	Yes
NEW	Welsh Government implement the Nitrates Directive as appropriate. <b>(Welsh Government and Natural Resources Wales)</b>	Yes
NEW	Assess the environmental impacts and identify suitable measures to address the impacts of deforestation and afforestation on water quality. <b>(Natural Resources Wales)</b>	Yes
NEW	Implement targeted landscape scale riparian habitat restoration partnership programmes to benefit N2K conservation status – reducing run-off, soil loss, siltation, lowering water temperature, increasing biodiversity. <b>(Natural Resources Wales)</b>	Yes
Existing	Work with land managers on the 'Stop Every Drop Campaign' and support this with a strategic approach to gather evidence on sheep dip purchase, usage and authorised sites for disposal of spent dip. Target visits at farms that are purchasing dip but do not hold groundwater authorisations for disposal. <b>(Agriculture and rural land management and Natural Resources Wales)</b>	Yes
Existing	Target land management measures through Glastir agri-environment scheme and Section 15 agreements to mitigate diffuse pollution from agriculture and reduce impact of drainage to enhance biodiversity and achieve favourable conservation status. <b>(Natural Resources Wales)</b>	Yes

## Local Actions

1. **Address point source pollution** - Investigate and regulate pollution from point sources. Overlaps with "reduce pollution from sewage discharges" and "other waste water discharges".
2. **New investigation** - This draft programme includes investigations for all new failures, deterioration, and drinking water protected areas.
3. **Sustainable agricultural practices** - Implement basic and additional measures such as correct management of slurry, silage, fuel oil, and agricultural chemicals; clean and dirty water separation; nutrient management planning; buffer strips and riparian fencing; cover crops and soil management. In N2k sites changes to grazing regimes may be required, includes scrub management. Within NVZs comply with storage and spreading regulations.
4. **Sustainable woodland and forestry management** - Restore the riparian zone, disconnect forest drains, monitor the effectiveness of the 5 principle risks associated with forestry and use forestry and woodland to reduce diffuse pollution.
5. **Tackle misconnections and urban diffuse pollution (local action can also be applied to rural areas)** - Investigate and solve misconnections to surface water drains (at residential and commercial properties) and implement sustainable drainage schemes (SUDS) to reduce diffuse pollution.
6. **Complete first cycle investigations** –. All ongoing WFD investigations from first cycle programme.

## Managing pollution from mines

### What do we want to achieve?

- We want to mitigate the impacts of abandoned mines on the water environment through a strategic work programme across Wales. It will take decades to address all the issues and we will prioritise actions that deliver the best ecological, social and economic outcomes for society's investment.

### Who needs to be involved?

Welsh Government, Coal Authority, Natural Resources Wales, Local Authorities, Landowners, NGOs through partnerships and campaigns, Academia.

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	A programme to deliver appropriate treatment at a small number of high priority, high benefit metal mines identified under the Metal Mine Strategy for Wales. <b>(Natural Resources Wales and The Coal Authority)</b>	Yes
NEW	Research programme to look at the remediation of spoil heaps (coal) using woodland and habitat creation. <b>(Natural Resources Wales)</b>	Yes
Existing	Coal Authority minewater preventative and remediation programme. <b>(The Coal Authority)</b>	Yes



Existing	Implementation of best practice controls and remediation at abandoned coal mines. DECC funded prioritised (phased) programme. <b>(The Coal Authority)</b>	Yes
Existing	Implementation of best practice controls and remediation at abandoned metal mines. <b>(Natural Resources Wales and The Coal Authority)</b>	Yes
Existing	Continue to investigate minewater impact and develop remediation plans in accordance with the Metal Mines Strategy for Wales. <b>(Natural Resources Wales and The Coal Authority)</b>	Yes

### Local Actions

- 1. Mine water and contaminated land remediation** - Coal and metal mine, and contaminated land remediation - including passive and active mine water treatment, capping of spoil, removal of wastes to landfill, and channel diversion.
- 2. Complete first cycle investigations** – All ongoing WFD investigations from first cycle programme.

## Manage the impacts of acidification

### What do we want to achieve?

- We want land use practices to contribute to sustainable, long term increases in water pH in areas where natural ecological processes are compromised by acidification. We will continue to regulate emissions of acidifying pollutants to allow the water environment to recover.

### Who needs to be involved?

Welsh Government, Natural Resources Wales, Industry, Manufacturing and other Business, Agriculture and rural land management, NGOs through partnerships and campaigns, Academia.

### What needs to be done?

New or existing national measure	Description and who leads	Is there a locally targeted version of this measure?
NEW	Apply Forest & Water Guidelines, including the practice guide for managing forestry in acid sensitive catchments. <b>(Natural Resources Wales)</b>	Yes
NEW	Work with researchers to collect, interpret and communicate relevant evidence and potential solutions to identify and fill evidence gaps. <b>(Natural Resources Wales)</b>	No
NEW	Natural Resources Wales delivers a prioritised programme of forestry work to support delivery of WFD and protected area objectives. <b>(Natural Resources Wales)</b>	Yes



## Local Actions

- 1. Acidification restoration** – Emissions controls and upland restoration: blocking drainage, restoring blanket bog, within forestry plantation blocking forest drains and establishing native trees with the riparian zone, liming options. Some overlap with 'address air pollution'.
- 2. Address air pollution** – Emissions controls to reduce nitrogen and acidic deposition. Some overlap with 'acidification restoration'.
- 3. Complete first cycle investigations** –. All ongoing WFD investigations from first cycle programme

## Deciding what will be delivered, where and when

The river basin management planning process is about using our evidence base to develop a programme of measures and understanding what this means in terms of achieving Water Framework Directive objectives within the planning timeframe. In line with guidance from government we have set objectives and identified measures for every water body. This information can be accessed at Water Watch Wales and a more detailed description of our approach is provided in the planning overview annex .

### Alternative objectives

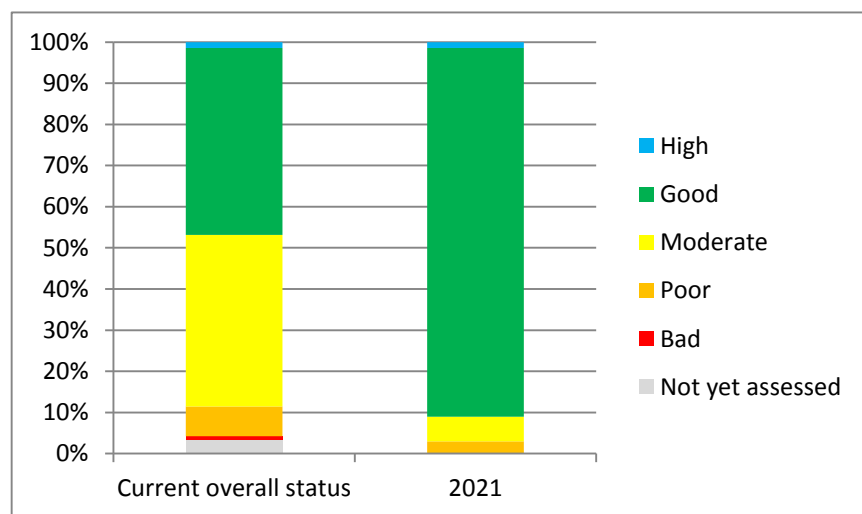
We have used a screening process to identify where an alternative objective is appropriate. The justifications are that achieving the objective is :

- technically infeasible
- disproportionately costly (costs significantly exceed benefits)
- or that natural conditions will require longer to recover.

Measures to prevent deterioration and protected area objectives set under other European legislation are considered statutory, and are not subject to alternative objectives of the WFD. Where no alternative objective is appropriate it is assumed that it is possible to achieve good overall status by 2021

Figure 10 shows current overall status and the outcomes which we believe to be achievable if all feasible and cost-beneficial measures are put in place.

Figure 10. Current overall status and 2021 achievable outcomes



There are 50 water bodies for which we are proposing an alternative objective (i.e. other than good by 2021). The justifications for these alternative objectives are provided in Table 8 below.

Table 8 proposed alternative objectives and justifications

Alternative objective	Justifications	Number of water bodies
Extended deadline	Natural conditions – recovery time from acidification	26
Extended deadline	Technically infeasible - transitional or coastal water failure requiring investigation	3
Less stringent objective	Natural conditions – natural background conditions	2
Less stringent objective	Disproportionately costly – costs significantly exceed benefits	2
Less stringent objective	Technically infeasible – failure caused by complex minewater pollution	9
Less stringent objective	Technically infeasible – chemical failures due to ubiquitous and persistent substances	8

### Ambition

Natural Resources Wales has developed four scenarios to help explain and describe at the river basin district scale the outcomes that are achievable by 2021; the overall costs and benefits; apportionment of costs across the types of intervention and relative cost-effectiveness. The four scenarios represent different levels of ambition as follows:

- **A** Long term aspiration. Achieve no deterioration, protected areas objectives and good overall status in all water bodies, except those where alternative objectives are appropriate.
- **B** Statutory objectives. Achieve no deterioration and protected areas objectives. That is target all water bodies linked to Natura 2000 sites to achieve good overall status.
- **C** Short term opportunities. Target improvements to good overall status by 2021 where Natural Resources Wales has a reasonable level of evidence that a short term outcome is achievable.
- **D** Possible outcomes. Target improvements to good overall status by 2021 in water bodies where there is a greater certainty of funding and delivery through existing mechanisms (for example water company, Coal Authority and Natural Resources Wales forestry programmes).

These scenarios do not consider:

- the affordability of measures in line with Welsh Government’s guidance.
- the effectiveness of mechanisms to deliver measures. For example, measures to improve riparian habitat are largely voluntary, and reliant on uptake by individual landowners within a catchment.
- any predicted improvements from local programmes of work already underway or planned to happen.

Scenarios C and D, if delivered in isolation would not meet the statutory objectives of the Water framework Directive, but are presented as examples of different approaches to setting a level of ambition

## Economic appraisal

We have carried out a high level assessment of the costs and benefits of delivering environmental improvements under each scenario.

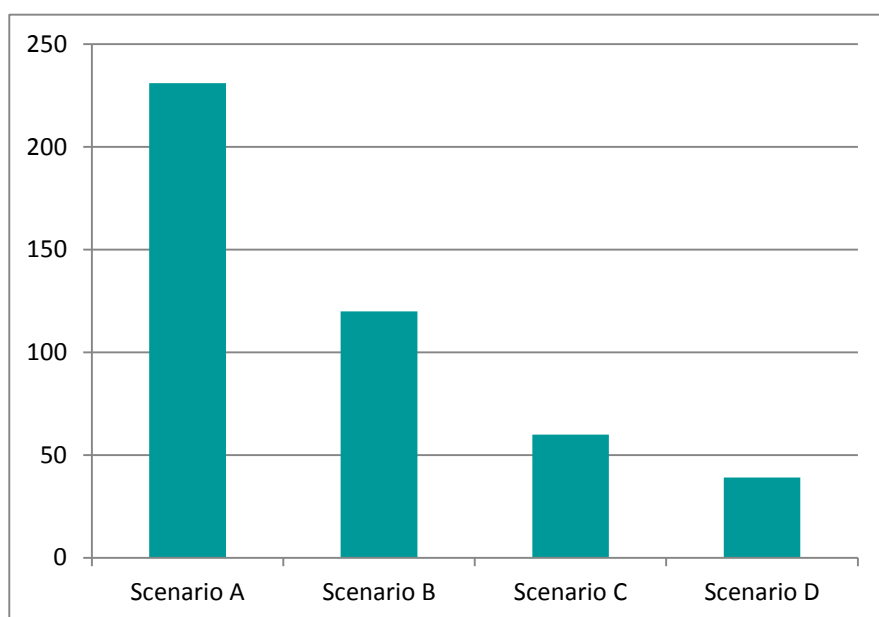
Where we have identified the reason for failure and the measures that are required to achieve good overall status by 2021 we have applied indicative costs for those measures. Where more accurate costs are available (for example water company schemes) we have used this information.

To calculate benefits we have used monetised values (£ per km or km<sup>2</sup>) for different standards (i.e. Good, Moderate, Poor, Bad) of water body based upon the National Water Environment Benefit Survey (NWEBS). The net value of improvement between standards has been calculated and multiplied by the length of water body or area.

### Outcomes under scenarios A, B, C and D

Each scenario will deliver a different scale of environmental improvement and hence requires a different level of investment. The number of water bodies which would be improved to good status or potential by 2021 under each scenario is presented in figure 11 below.

Figure 11. Number of water bodies improved to good under each scenario



Apportionment of the total costs across sectors is shown below in figure 12.

Figure 12. Apportionment of costs between sectors per scenarios A-D

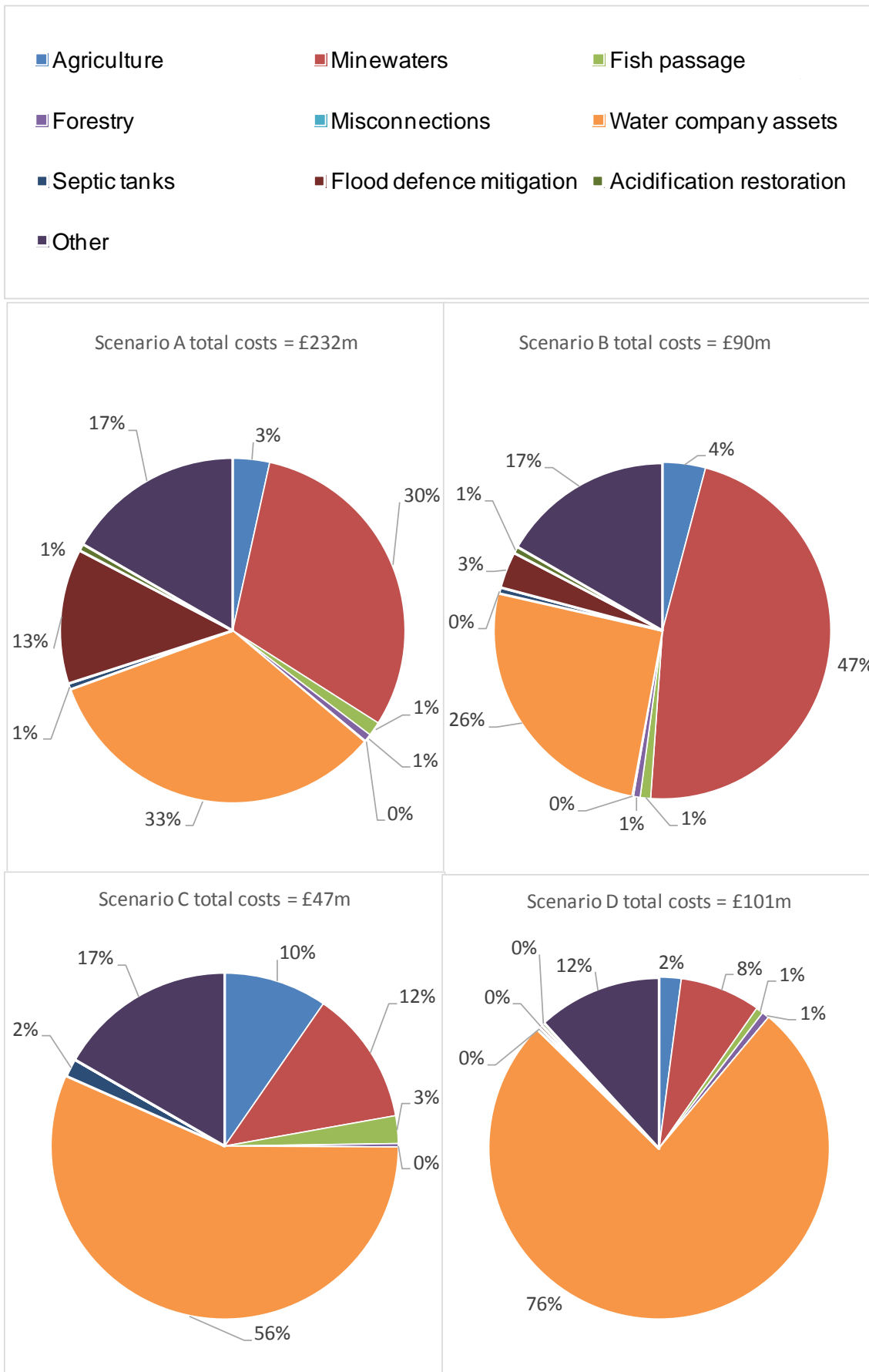


Figure 13. The net present value (NPV) of each scenario

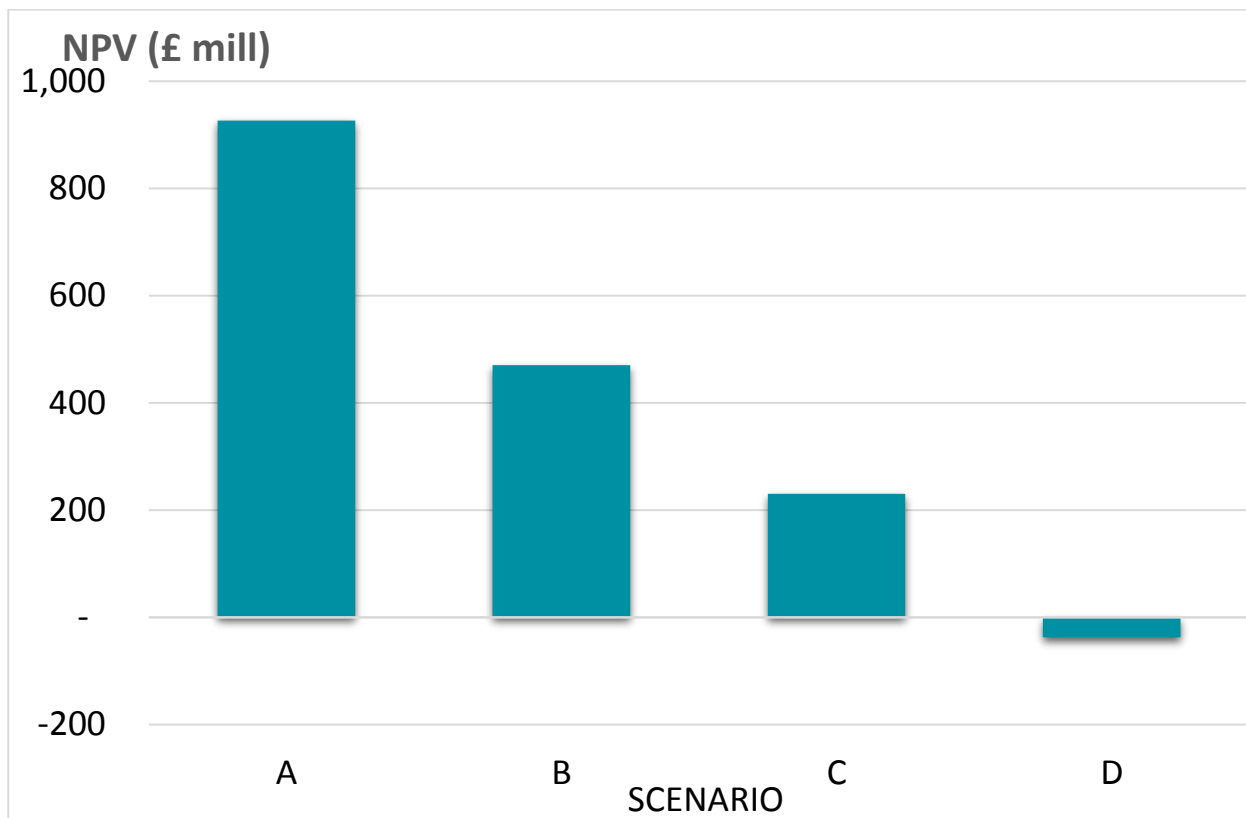
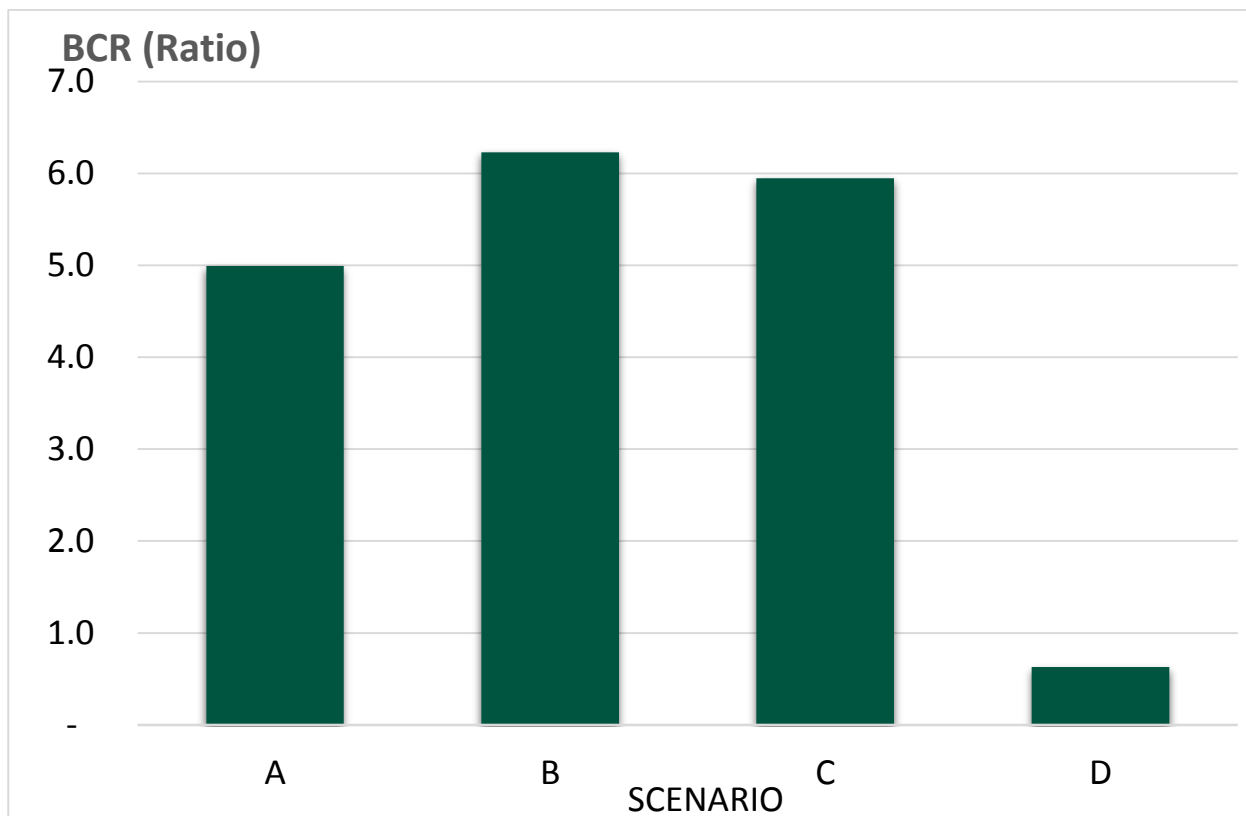


Figure 14. The benefit to cost ratio (BCR) of each scenario.



### Next steps – developing our ambition and programme of measures

The overall ambition of the updated river basin management plan depends upon a number of factors including (amongst other things):

- funding levels from both public and private budgets;
- commitment to delivery;
- availability of delivery mechanisms.

The four scenarios which have been modelled illustrate the challenges we face in terms of developing an affordable, cost-beneficial programme of measures which delivers sustainable improvements to our water environment.

The scenarios show that protecting and improving our water environment is, in general, cost-beneficial and can deliver *significant* benefits. However, *how* and *what* interventions are prioritised will determine the strength of benefits returned from investment. In terms of using funds efficiently we should aim ideally for the most cost-beneficial programme of measures that is affordable. This means prioritising those measures with the highest Benefit-Cost Ratios (BCR) where practical. In reality, some of the most economically efficient measures have greater uncertainty over effectiveness. For example changing land management practice is relatively cheap but requires the commitment of many individuals to make a difference. Where that commitment is gained the benefits are considerable.

During this consultation we will continue to work with you to develop an effective programme of measures, and agree a realistic but ambitious set of priorities for the second cycle. Those priorities will be reflected in an updated river basin management plan presented to Welsh Government ministers in September 2015. Ministers will make a decision on affordability and overall ambition which will be published in the updated River Basin Management Plan in December 2015.

## Practical actions that we can all take

### Prevent pollution to our rivers, lakes, groundwater and sea

- Check that household appliances are connected to the foul sewer, not the surface water drain.
- Adopt-a-beach to help keep beaches clean and stop litter at source.
- Ensure household oil storage is in good condition, with an up-to-date inspection record.
- Ensure septic tanks or private sewage treatment plants are well maintained and working effectively and are registered as appropriate.
- Put cotton buds and other litter in the bin, not down the toilet. It may end up in the sea or on your local beach where it can harm wildlife.
- Take waste oil and chemicals such as white spirit to a municipal recycling facility: don't pour them down the sink or outside drains.
- 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 at source.
- When you see pollution or fly-tipping, report it on 0800 807060.
- Eat fish from sustainable sources, caught using fishing methods that don't cause damage to marine wildlife and habitats.

### Save water in your garden

- 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

### Save water in your house or office

- Purchase low energy and low water use appliances
- Ask water companies to fit a meter. On average, this can reduce household water consumption.
- Fix dripping taps, and lag pipes to avoid them bursting in freezing weather.
- Hand wash cars
- Consider installing rainwater harvesting systems in your home, block or workplace. This can save one third of domestic mains water usage.
- Install a 'hippo' or 'save-a-flush' in toilet cisterns.
- Install a low-flush toilet, put flow regulators on your taps and showers, and install waterless urinals at work.
- Run dishwashers or washing machines with a full load on economy setting, and boil the minimum amount of water needed in kettles or saucepans.
- 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.
- Ensure extensions or conservatories have their roof water draining into a soakaway or sustainable drainage system and are not connected to the combined sewer.
- Ensure that any off-road parking or patio around the house use permeable materials so rain can soak into the soil.



## Help tackle the threat of Invasive Non Native Species (INNS)

- Have a look at the GB non native species website to get a better understanding of the risks INNS pose and things you can do to help:
- You can take immediate action to help control spread by promoting and applying 'Check, Clean, Dry' to all water related activities and by 'being plant wise'. Find out more about these campaigns on the Non native species forum website
- Seek expert advice about eliminating invasive non-native species from gardens and other places and how to dispose of them legally and responsibly.
- Do not buy, plant or release invasive non-native species.
- You can help track and report the spread of INNS. If you spot any suspected INNS plants you can record them on the 'PlantTracker' website or via their free to download PlantTracker 'phone app.

If you see any suspected aquatic INNS animals then use the 'Aqua Invaders' website for a free download of their 'phone app.

(These websites and free 'phone apps have been specifically developed to help people identify and report suspected INNS. The information is fed into a national database that can be used to help target actions to combat the spread),

- Join a local environmental or other activity group to help with spotting and reporting, invasive non-native species and taking part in practical INNS management or eradication actions or projects.



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