Cyfoeth Naturiol Cymru
Natural Resources Wales

River Basin Management Plan

Technical Annex Wales

November 2026

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Contents

1. Cyflwyniad i'r ddogfen hon 3
1.1 Beth mae'r ddogfen hon yn ei gwmpasu 3
1. Introduction to this document 5
1.1 What this document covers 5
2. Managing the water environment 7
2.1 Water – a vital resource 7
2.2 Managing the water environment in Wales 7
2.3 NRW's role in managing the water environment 20
3. The WFD Regulations 2017 (WFDR) 22
3.1 WFDR aims and objectives 22
3.2 River basin management planning 31
3.3 Working with others 31
3.4 Working at the catchment scale and integrated natural resources management 34
3.5 River basin management planning timetable 36
3.6 Economic analysis of water use 36
3.7 Impact assessments of the river basin management plans 37
3.8 Competent authorities for river basin management planning 38
4. Defining and describing the water environment 38
4.1 River basin districts, catchments and water bodies 38
4.2 Assessing the current state of the water environment 42
4.3 Water body changes for cycle 4 49
4.4 Significant water management issues 51
5. Objectives 62
5.1 The environmental objectives of the WFDR 62
6. Programme of Measures 66
6.2 Updating the Programme of Measures 68
7. Summary of engagement 70
7.1 Public access to information 71
7.2 Consultations and working with others 71
8. River Basin Management Plan requirements 73
9. Glossary 78
Appendix A. Changes to the water body network 93
Appendix B. Chemical narratives 100

1. Cyflwyniad i'r ddogfen hon

Mae Rheoliadau'r Amgylchedd Dŵr (Y Gyfarwyddeb Fframwaith Dŵr) (Cymru a Lloegr) 2017 (y cyfeirir atynt fel WFDR) yn darparu'r prif fframwaith ar gyfer rheoli'r amgylchedd dŵr yng Nghymru. Mae'r WFDR yn annog dull sy'n seiliedig ar ecosystem a dalgylch wrth ddiogelu, gwella ac adfer cyrff dŵr er mwyn cyflawni eu hamcanion. Mae hyn yn golygu bod grwpiau sydd â diddordeb yn gweithio gyda'i gilydd i ddylunio a gweithredu gwelliannau, gan ddilyn dull cyfannol ac integredig o reoli'r amgylchedd dŵr.

O dan WFDR, rhaid paratoi Cynllun Rheoli Basn Afon (RBMP) ar gyfer pob Ardal Basn Afon (RBD). Mae'r cynllun hwn yn nodi mesurau sydd eu hangen i gyflawni amcanion corff dŵr.

Rhaid adolygu'r cynlluniau, ynghyd â'r amcanion a'r mesurau a ddisgrifir ynddynt, a'u diweddaru bob chwe blynedd. Mae Cyfoeth Naturiol Cymru (CNC) yn arwain ar gyhoeddi RBMPs Gorllewin Cymru ac afon Dyfrdwy, tra bod Asiantaeth yr Amgylchedd yn arwain ar gyhoeddi RBMP afon Hafren. Mae'r WFDR yn nodi bod rhaid cynnal ymgynghoriad cyhoeddus ar RBMPs drafft am 6 mis.

Mae'r ddogfen hon yn nodi manylion technegol y tu ôl i'r penderfyniadau sydd wedi siapio RBMPs cylch 4 i Gymru. Mae'n cysylltu â gwybodaeth fanylach lle bo'n briodol.

Gwybodaeth ategol

Mae llawer o'r data sy'n cefnogi'r cynllun hwn ar gael ar gyfer pob corff dŵr yng Nghymru ar **Arsylwi Dyfroedd Cymru** gan gynnwys:

- Canlyniadau dosbarthu
- Rhesymau dros beidio â chyflawni statws/potensial da (RNAGs)
- Amcanion corff dŵr
- Rhesymau dros amcanion statws amgen
- Rhwydweithiau monitro
- Rhaglen o fesurau sydd eu hangen i wella cyrff dŵr i statws da
- Cyrff Dŵr wedi'u Haddasu'n Drwm
- Targedau ansawdd dŵr afonydd a llynnoedd Ardal Cadwraeth Arbennig (ACA)

1.1 Beth mae'r ddogfen hon yn ei gwmpasu

Mae **rheoli'r amgylchedd dŵr** (adran 2) yn disgrifio pam mae dŵr yn adnodd mor bwysig ac yn crynhoi deddfwriaeth a pholisïau sy'n llunio rheolaeth o'r amgylchedd dŵr yng Nghymru. Mae'n cwmpasu bioamrywiaeth a gwydnwch ecosystemau, rhaglenni cyflawni a chynlluniau rheoli llysywod. Mae crynodeb o'r risgiau, cyfleoedd a goblygiadau newid yn yr hinsawdd a ragwelir hefyd wedi'u cynnwys.

Mae **Rheoliadau WFD 2017 (WFDR)** (adran 3) yn disgrifio nodau ac amcanion yr WFDR gan gynnwys cymhwyso eithriadau. Disgrifir y broses gynllunio rheoli basn afonydd a ddefnyddir yng Nghymru, gan gynnwys sut mae CNC yn gweithio gydag eraill. Mae'r adran hon hefyd yn rhoi cefndir i'r Asesiad Amgylcheddol Strategol, Asesiad Rheoliadau Cynefinoedd ac Asesiad o'r Effaith ar Iechyd.

Mae **diffinio a disgrifio'r amgylchedd dŵr** (adran 4) yn disgrifio sut mae'r amgylchedd dŵr yn cael ei rannu a'i nodweddu at ddibenion gweithredu'r WFDR. Mae'n nodi sut mae'r amgylchedd yn cael ei fonitro, a chanlyniadau'r monitro hwnnw a ddefnyddir i asesu statws yr amgylchedd dŵr ac adrodd arno. Mae rhan olaf yr adran yn disgrifio'r prif heriau sy'n effeithio ar reoli'r amgylchedd dŵr yng Nghymru, sut y mae risgiau yn y dyfodol wedi'u hasesu ac achosion presennol y problemau a nodwyd.

Mae **amcanion** (adran 5) yn nodi'r broses gyffredinol a ddefnyddir ar gyfer pennu amcanion amgylcheddol, gan gynnwys amcanion statws corff dŵr. Mae hefyd yn disgrifio'r broses a ddefnyddir i sgrinio am gost anghymesur.

Mae **Rhaglen o Fesurau** (adran 6) yn disgrifio'r Rhaglen o Fesurau ac yn cynnwys y dull a ddilynir yn y brose o ddatblygu mesur. Mae hefyd yn disgrifio'r hyn a wnaed yn wahanol ar gyfer cylch 4.

Mae **crynodeb o ymgysylltu** (adran 7) yn edrych ar y gwaith ymgysylltu rydym wedi'i wneud gan gynnwys mynediad y cyhoedd at wybodaeth, ymgynghoriadau ac edrych i'r dyfodol.

Mae **gofynion Cynllun Rheoli Basn Afon** (adran 8) yn nodi'r gofynion o dan Reoliad WFD 27 (2) (d) ac yn dangos lle y gellir dod o hyd i'r wybodaeth honno.

Mae **Geirfa** (adran 9) yn rhestr gynhwysfawr o'r holl derminoleg dechnegol a ddefnyddir drwy gydol y ddogfen.

1. Introduction to this document

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (referred to as WFDR) provides the main framework for managing the water environment in Wales. The WFDR encourage an ecosystem and catchment-based approach to protect, enhance and restore water bodies to achieve their objectives. This involves interested groups working together to design and implement improvements, taking a holistic and integrated approach to managing the water environment.

Under the WFDR, a River Basin Management Plan (RBMP) must be developed for each River Basin District (RBD). This plan identifies measures required to achieve water body objectives.

The plans, together with the objectives and measures described within them, must be reviewed and updated every six years. Natural Resources Wales (NRW) leads on publishing the Western Wales and Dee RBMPs, whereas the Environment Agency leads on publishing the Severn RBMP. The WFDR specify that there must be a public consultation on draft RBMPs for 6 months.

This document sets out technical detail behind the decision making which has shaped the cycle 4 RBMPs for Wales. It links to more detailed information where appropriate.

Supporting information

Much of the data which supports this plan is available for every water body in Wales on **Water Watch Wales** including:

- Classification results
- Reasons for not achieving good status (RNAGs)
- Water body objectives
- Reasons for alternative status objectives
- Monitoring networks
- Programme of measures required to improve water bodies to good status
- Heavily Modified Water Bodies
- Special Area of Conservation (SAC) river and lake water quality targets

1.1 What this document covers

Managing the water environment (section 2) describes why water is such an important resource and summarises legislation and policies which shape management of the water environment in Wales. It covers biodiversity and ecosystem resilience, delivery programmes and eel management plans. A summary of the predicted climate change risks, opportunities and implications is also included.

The WFD Regulations 2017 (WFDR) (section 3) describes the aims and objectives of the WFDR including the application of exemptions. The river basin management planning process used in Wales is described, including how NRW is working with others. This section also provides background on the Strategic Environmental Assessment, Habitat Regulations Assessment and Health Impact Assessment.

Defining and describing the water environment (section 4) describes how the water environment is divided up and characterised for the purposes of implementing the WFDR. It sets out how the environment is monitored and the results of that monitoring used to assess and report on the status of the water environment. The latter part of the section describes the main challenges affecting management of the water environment in Wales, how future risks have been assessed and current causes of problems identified.

Objectives (section 5) sets out the overall process used for determining environmental objectives, including water body status objectives. It also describes the process used to screen for disproportionate cost.

Programme of Measures (section 6) describes the Programme of Measures and includes the approach used in the measure development process. It also describes what was done differently for cycle 4.

Summary of engagement (section 7) looks at the engagement work we have done including public access to information, consultations and a forward look.

River Basin Management Plan requirements (section 8) set out the requirements under WFD Regulation 27(2)(d) and show where that information can be found.

Glossary (section 9) a comprehensive list of all technical terminology used throughout the document.

2. Managing the water environment

Summary of this section

This section introduces the management of the water environment, describes why water is such a valuable resource and the policies that shape how the water environment is managed in Wales.

Topics covered

Importance of water management; policy and legislative context; NRW's role.

2.1 Water – a vital resource

Water is a vital natural resource for the environment and people. Water creates and sustains the ecosystems upon which all life depends. It is vital to the economy, for health and is used to generate power, run industries and grow food.

The average person in Wales uses about 176 litres of water every day in their home. If you include all the water used in growing and manufacturing the things people use or consume, the figure is much greater.

Rivers, lakes, estuaries, coastal areas, wetlands and groundwater provide many different benefits to society, from supplying drinking water and supporting fisheries to providing an essential resource for business and agriculture, transport routes and opportunities for leisure that promote well-being such as physical and mental health.

Healthy water environments also help protect the nation from floods and droughts and regulate the quality of the air and the climate.

It is essential that these activities are managed in a sustainable way. This will ensure that the natural environment, business and economic growth will be protected and the long-term benefits to health and well-being improved.

2.2 Managing the water environment in Wales

Much of the policy relating to water management is driven by Regulations that have been introduced over the last 40 years. Some relate to the water quality required for different uses of water such as drinking water, bathing waters and shell fisheries. Some set the requirements to protect wildlife such as the Regulations on habitats and birds. Others concern the control of pollution from chemicals such as hazardous substances.

There is also legislation that sets standards for the performance of sewerage systems and wastewater treatment and emissions from industrial processes. These have been important in driving investment by water companies and others. They have led to major improvements in the water environment.

Over recent years there has been a move to introduce a more strategic approach to water management policy. The WFDR (see section 3) provides a major overarching framework for river basin management. As competent authority for implementing this legislation NRW has a key role in coordinating the implementation in Wales (see section 2.3).

Welsh Government is responsible for policy on water management in Wales, this includes provision of River Basin Management Planning Guidance. There are a

number of legislative and policy initiatives that are important in shaping the future of water management in Wales, including: The Environment (Wales) Act 2016, Planning (Wales) Act 2015, National Strategy for Flood and Coastal Erosion Risk Management in Wales, Marine and Fisheries Strategic Action Plan, Rural Development Programme, Well-being of Future Generations (Wales) Act 2015, Wales National Marine Plan 2019, the Control of Agricultural Pollution (Wales) Regulations 2021 and the Environment (Principles, Governance and Biodiversity Targets) (Wales) Act 2026.

The Environment (Wales) Act 2016, together with the Wales National Marine Plan 2019, set out a statutory framework and integrated natural resource management for the Sustainable Management of Natural Resources (SMNR).

This framework for managing natural resources, builds on the United Nations ecosystem approach, defined as ‘an integrated strategy for the management of natural resources. Therefore, the Environment (Wales) Act 2016 legislates for a more joined-up management process, focused on delivering a healthier, more resilient and sustainable Wales through economic, social and environmental benefits.

The vision of the Water Strategy for Wales is to ensure that Wales continues to have a thriving water environment which is sustainably managed to support healthy communities, flourishing businesses and the environment.

The strategy is set within the context of the long-term policy direction to improve natural resource management and covers a broad range of matters relating to the management of our water systems, including all inland waters, estuaries and coastal waters. The aim is that policies will contribute to wider Welsh Government priorities and well-being goals, including promoting green growth, resource efficiency and tackling poverty.

2.2.1 Flood Risk Management

We published our second cycle Flood Risk Management Plan (FRMPs) in Autumn 2023. The plan sets out how we will manage flood risk in six regions across Wales between 2023 and 2029.

The Flood Risk Regulations 2009 that placed a requirement on NRW and Lead Local Flood Authorities to produce and update Flood Risk Management Plans were revoked in late 2023. This means that there will not be a third cycle of the Flood Risk Regulations. We are currently working to determine what our catchment-based approach will look like for flood risk management in future years.

Despite the revocation of the Flood Risk Regulations 2009, we continue to seek opportunities for close working between the work of flood risk management and the RBMPs.

2.2.2 Estuarine and coastal waters and other marine policies

UK Marine Strategy

The UK Marine Strategy establishes an integrated policy for the protection of the marine environment aiming to progress towards achievement of 'good environmental status' in marine waters. The scope of the UK Marine Strategy is broader than that of the WFDR, covering a greater range of biodiversity components and indicators. However, there are some significant areas of overlap with good ecological and chemical status for the WFDR, particularly in relation to chemical quality, eutrophication and aspects of ecological and hydromorphological quality; these targets and indicators are aligned wherever possible. While both apply in coastal waters (WFDR only applies in estuarine waters), the UK Marine Strategy additionally covers other pressures such as noise and litter.

Marine Area Statement

NRW published its first Marine Area Statement in March 2020. Engagement with our partners highlighted a range of issues and opportunities relevant to RBMPs. They stressed the need to improve the quality of water quality in the marine environment in order to increase the resilience of marine ecosystems and focus on implementing nature-based solutions at the coast that work with natural processes. To a large extent, addressing water quality issues in our marine and coastal water bodies is reliant on improved management on land. In driving forwards the Marine Area Statement, we will raise awareness of how land management affects the marine environment; target effort through opportunity catchments; and influence terrestrial management processes, including the Sustainable Farming Scheme, to improve the outcomes for the marine environment.

Marine Spatial Plans

The Welsh National Marine Plan (WNMP) contains plans and policies which:

- support our vision for clean, healthy, safe and diverse seas
- guide future sustainable development
- support the growth of marine space and natural resources ('blue growth')

The WNMP has general policies on water quality and sector policies on surface water and wastewater treatment and disposal. The RBMP directly supports these specific policies set out in the WNMP and supports many of the other policies indirectly.

Given the strong links between the UK Marine Strategy, WNMP and the RBMPs it is important for marine stakeholders to engage in river basin management planning to ensure that a source to sea approach to management is implemented and that integration between marine policies is realised.

2.2.3 Biodiversity and Ecosystem resilience

Nature in Wales is in decline. The evidence is clear and consistent. The State of Natural Resources Report (SoNaRR) 2025 Biodiversity Assessment shows long-term losses across land, freshwater and marine environments. On the 30 June 2021 Welsh Government declared a nature emergency in Wales. The Senedd is one of the first parliaments in the world to declare such an emergency.

The latest report on the state of nature in Wales (2023) details the scale of nature loss across the country. Welsh wildlife has decreased on average by 20% since 1994 and one in six Welsh species are threatened with extinction. A step change is required to meet global and domestic biodiversity commitments. Renewed focus, pace, coordination and resource are needed to address biodiversity decline and strengthen nature against climate change and other pressures. At the heart of nature recovery is a need for spatial areas that are protected and managed for nature and connected as a network across Wales. Protecting what exists today is not enough. Ecosystems must be restored so they can recover, adapt and thrive, especially as climate change and other pressures intensify. This means building resilience, improving connections between sites and supporting nature's ability to change over time.

Along with governments across the world, the Welsh Government has committed to halt and reverse the loss of nature by 2030. This means protecting and effectively managing 30% of our land and sea for nature by 2030 (known as '30 by 30').

In 2026 Welsh Government introduced the Environment (Principles, Governance and Biodiversity Targets) (Wales) Act, which amends the Environment (Wales) Act 2016, to establish a biodiversity target setting framework aimed at halting and reversing the decline in biodiversity in Wales, as well as imposing a duty on the Welsh Ministers to promote awareness in Wales of the importance of and the threats to, biodiversity.

Improving the water environment through implementation of the WFDR will be a core contribution to achieving Welsh Government's nature conservation and biodiversity obligations and outcomes. Part of this contribution comes from the fact that it includes specific requirements to meet conservation objectives for European sites (protected areas). For the purposes of the RBMP water dependent SACs, Special Protection Areas (SPAs) and Ramsar sites have been called European sites.

The cycle 4 RBMPs will have a key role in supporting the delivery of Welsh Government, UK and global biodiversity commitments by contributing to improving habitat quality, habitat creation and restoration outcomes for water dependent habitats and species including the marine environment.

Although the WFDR statutory requirements only apply to protected areas and water bodies, delivering other measures for water quality and resources or invasive non-native species for example will also be key contributions to improving biodiversity and ecosystem resilience. It is the Welsh Governments' policy that the environment should be managed in an integrated way, and the river basin management planning process helps with this by taking into account and contributing to the delivery of objectives of relevant European sites. RBMPs also provide an opportunity to integrate other biodiversity and ecosystem resilience improvement drivers, e.g. National Peatlands Programme.

Habitat restoration and creation activity needs to focus towards strengthening the protected sites network, implementing larger-scale schemes, restoring resilient ecological networks in the most appropriate places. In the case of wetlands for example, targeting restoration activities toward sites with the greatest potential to become wetland habitat as part of a nature-based solutions approach will deliver wider ecosystem benefits as well as supporting the Governments' biodiversity outcomes. Restoring functioning floodplains will provide multiple benefits including better flood storage, mitigating diffuse pollution, establishing more natural

hydrological regimes, storing carbon and protecting groundwater and wetlands as well as benefiting biodiversity more generally.

Supporting information

The Well-being of Future Generations (Wales) Act 2015 changed the focus of NRW's planning, governance and delivery to ensure we maximise our contribution to the seven Well-being Goals for Wales and implement its five ways of working when undertaking our duties. The Act focuses on improving the social, economic, environmental and cultural well-being of Wales. Public Service Boards were established and are required to put together Well-being Assessments to help implement action to improve well-being. Well-being Indicators will be used to measure the success of actions, including Well-being objective 45 (the percentage of water bodies at good).

The introduction of the Environment (Wales) Act 2016 changed NRW's core purpose and commitment to applying the nine principles of SMNR in all our work. Strengthening our duty to act for nature, to seek to maintain and enhance biodiversity wherever possible when carrying out our work. Shifting focus away from delivering many individual statutory functions in isolation towards addressing the pressures and drivers of ecosystem change.

Halting and reversing the loss of biodiversity on land and in the sea is integral to the SMNR objectives.

In 2019 statutory guidance to implement the Environment (Wales) Act included a clear framework for embedding the objective and principles of SMNR in our work and shows that Sustainable Development (as defined in the Well-being of Future Generations (Wales) Act 2015) is in practice implemented at the same time.

NRW is one of over 200 public authorities defined in Section 6 of the Environment (Wales) Act, 2016, all having a duty to seek to maintain and enhance biodiversity and promote the resilience of ecosystems. Whilst our protected sites (including European sites protected areas under WFDR) and species are important, the Section 6 duty is also about taking steps to protect nature in our towns, cities, public places and wider landscape, both through practical action on the ground and in the way all public functions are carried out. The Section 6 duty is a key legislative driver to maximise the contribution from the public sector towards achieving Wales' national commitment to halting and reversing biodiversity decline under the International Convention on Biological Diversity.

We are also working with others to develop a shared 2050 vision for Wales' natural environment.

The challenge going forward into cycle 4 will be to continue to highlight the links between the delivery of measures for WFDR with biodiversity recovery and re-connecting people with nature.

2.2.4 River Restoration and Sustainable Fisheries Programmes

The Water Capital Programme comprises the Water Quality, Metal Mines and Fisheries capital programmes within the Nature and Climate Emergencies portfolio.

The purpose of the Welsh Government funding and the aim of the Water Capital Programme is to undertake a program of capital works to deliver improvements for water and nature to improve compliance with the WFDR and other legislation which will drive water quality improvements. These may also include metal mine remediation and a program of works to improve spatial distribution of breeding fish populations.

The programme of works will put in place interventions that will help increase the resilience of ecosystems, so that the water environment can, over time, respond to pressures by resisting, recovering and adapting to change, whilst continuing to provide multiple benefits to society. The works should aim to enhance the attractiveness of areas, thus improving quality of life and bringing wider well-being and health benefits.

To focus delivery against these aims, the Water Capital Programme will:

- Tackle the significant water management issues in water bodies failing under the WFDR via Opportunity Catchments and River Restoration work e.g. physical modifications, diffuse / urban / sewage pollution etc.)

- Improve resilience to water quality pressures within freshwater ecosystems and maximising opportunities to achieve SMNR for water and contribute to the well-being goals

- Water quality improvements within WFDR protected areas (e.g. Bathing Waters, European designated sites including SAC Rivers)

- Deliver all Wales scale delivery for the water environment (e.g. within Marine ecosystems)

River Restoration Programme

The River Restoration Programme's Vision is to restore rivers, floodplains and catchments for habitats, wildlife and current and future generations. The River Restoration Programme prioritises projects that deliver for protected freshwater habitats and species and WFDR objectives by adopting a catchment-scale approach, seeking to work collaboratively to maximise environmental outcomes and deliver integrated solutions. Projects focus on restoring natural river processes, reconnecting rivers with their floodplains, slowing water within catchments and improving connectivity by removing or reducing barriers. These actions enhance habitat quality and resilience to climate change while supporting wider ecosystem benefits. The Programme also promotes knowledge sharing, best practice and transparency through annual River Restoration Seminars in Wales.

Sustainable Fisheries Programme

The sustainable fisheries concept was driven originally by the declining status of fish populations, particularly migratory fish populations, across Wales and the statutory duties set out in the Salmon and Freshwater Fisheries Act 1975 (as amended) and the Environment Act 1995. The details of work driven by this programme is contained within NRW's Salmon and sea trout plan of action for Wales 2020: areas for action, a plan required by the Minister for Environment, Energy and Rural Affairs.

The programme is based principally on restoration of river habitats and therefore delivers wider benefits for all aquatic flora and fauna including other species of fish.

The Sustainable Fisheries Programme is not a published plan but a programme of activities that will continue to be developed based on evidence, priorities delivered at the project-level based on available funding to enhance and protect the fish stocks and fisheries and rivers across Wales. The location and nature of projects is continually reviewed based on budget availability and technical and environmental constraints and opportunities.

River Restoration and Fisheries Habitat restoration plans

Various plans have been produced as part of the River Restoration Programme as described above. In addition, NRW has commissioned Fisheries Habitat Restoration Plans for all important migratory salmonid rivers in Wales. These reports compile catchment-scale information on key pressures and produce unconstrained opportunities for action.

Supporting information

To access the completed Fisheries Habitat and River Restoration Plans, either go to Natural Resources Wales / Research and reports or for those reports not published on our website contact NRW's Customer Hub who will retrieve the reports from the Reports Archive.

2.2.5 Eel management plans

The European eel *(Anguilla anguilla*) population has declined by as much as 95% across Europe since the 1980s. In 2007, the European Union (EU) adopted a new regulation establishing measures for the recovery of the eel stock. In 2009 the UK and other member states produced an eel management plan (EMP) for each of their RBDs.

These plans aim to achieve an increase in escapement of adult silver eel to the sea to spawn. The objective is to achieve at least 40% of pristine escapement levels in the long term. These plans address the causes of the decline by implementing management actions which are achievable.

Responsibility for the management of eel, including human impacts and the delivery of EMPs rests with NRW in Wales – the Environment Agency leads on the cross-border Severn EMP whereas NRW leads on the Dee EMP. The main focus of EMP delivery in Wales is on improving habitat and removing barriers to migration. Since the England and Wales Eel Regulations (2009) were introduced, NRW and have invested many millions of pounds across Wales on constructing eel passes (e.g. NRW gauging weirs) and retrofitting screens on water and power company abstractions.

All fishing for eel in England and Wales requires authorisation, which is subject to standard conditions that control seasons, methods and apply geographic restrictions and other measures to protect bycatch species. NRW has recently suspended all eel fishing in Wales due to ongoing concerns about the status of eel stock and local populations as well as international advice about reducing anthropogenic impacts.

NRW monitors and reports on the status of eel populations in Wales. Reporting is undertaken annually to the International Council for the Exploration of the Seas. Progress with delivering EMPs and meeting the 40% Silver eel escapement target is reported every three years to the UK and Welsh Governments (before EU exit reporting was to the European Commission).

Given there are currently no catches of eel in Wales the main source of data to inform assessments is now from annual fully quantitative electrofishing surveys of yellow eel. NRW surveys several index rivers around Wales including the Dee (Dee RBD), Teifi, Mawddach (Western Wales RBD) and the Usk (Severn RBD). Data from a number of semi-quantitative sites is also used to supplement the index river data. Site population estimates are incorporated into a Centre for the Environment, Fisheries and Aquaculture Sciences (CEFAS) model (SMEP2) so that Silver eel production and escapement can be estimated from each EMP. Current escapement is then compared with estimates of escapement before the population crashed around the end of the 1980s. None of the EMPs in Wales are currently meeting the 40% target (and all three are currently <10% of pristine).

The latest annual ICES Advice on fishing opportunities and conservation was published in 2025 and the most up to date Triennial EMP Progress Report was published in 2024.

Supporting information

UK eel management plans

2.2.6 Taking account of climate change

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

- Recognise and where possible contribute to, the UK's greenhouse gas (GHG) emissions reduction targets
- Be adapted, or easily adaptable, to the changes in climate that are occurring now and those projected in the future

Actions to address climate change should be considered right at the outset of any work and not considered as an afterthought.

The Governance and Policy Framework

A combination of UK and Welsh legislation provides the statutory framework for addressing climate change in Wales. The UK Climate Change Act 2008 provides the original underpinning policy on this topic. It legally binds the UK to reducing emissions to achieve a net zero status by 2050 and sets interim 5-yearly UK carbon budgets along the way. It also provides the legal framework for adaptation policy in the UK.

The Environment (Wales) Act (2016) similarly sets a net zero target for Wales by 2050, additionally, in line with the advice from the UK Committee on Climate Change, the Climate Change (Wales) Regulations in 2021 set interim GHG reduction targets for 2030 (63%) and 2040 (89%). In 2019. Welsh Government published the first Low Carbon Delivery Plan for Wales *Prosperity for All: A Low Carbon Wales,* which contained 76 existing policies from across the Welsh Government, UK Government and the EU along with 24 proposals to explore and develop future policy actions. In October 2021, the revised second Low Carbon

Delivery Plan *Net Zero Wales* was published with 123 policies and proposals set out across all sectors. The achievement of decarbonisation across Wales is also implicit within the Well-being of Future Generations Act (2015) and its goals – *A prosperous Wales* and *A globally responsible Wales* include reference to transition to a 'low carbon society' and 'make a positive contribution to global well-being' respectively. The Third Low Carbon Delivery Plan for Carbon Budget 3 is currently under development and due to be published in late 2026.

The Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C published in October 2018 was a landmark report stating that "limiting global warming to 1.5°C with no or limited overshoot, would require rapid and far-reaching transitions […] and imply deep emissions reductions in all sectors". In response to the IPCC report the UK Climate Change Committee (UKCCC) produced advice recommending both a UK and Welsh net-zero GHG target for 2050 that will deliver on the commitment that the UK made by signing the Paris Agreement. The IPCC reinforced the urgency for action to rapidly reduce emissions in its 6th Assessment 2021 report.

In April 2019, the Welsh Government declared a 'Climate Emergency' in Wales with the intention of prompting 'a wave of action at home and internationally from communities, businesses and organisations in Wales to parliaments and governments around the world.' The declaration reiterated the ambition for the Welsh public sector to be carbon neutral by 2030. Most local authorities and many town and community councils in Wales have made similar declarations and often set targets aiming to be carbon neutral by specific dates.

The Climate Change Act requires the UK Government to publish a 5-yearly risk assessment. The UK Climate Change Risk Assessment (CCRA) is a review of both risks and opportunities and the need for further adaptation action to address them. It provides the evidence base for Government-led national adaptation programmes in the UK nations, including Wales. The first and second reports were published in 2012 and 2017 (CCRA2), respectively. The CCRA3 report published in 2021 identified 61 risks and opportunities with more action needed to address 32 of them in Wales, while sustaining current action is only deemed appropriate for five risks. A suite of research projects covering water resources, flood risk, socio-economic dimensions, behaviour change, thresholds in the natural environment and interacting risks were commissioned by the UKCCC to inform the report. The CCRA4 report is now in development, with a Well-adapted UK report due to be published alongside the risk assessment later in 2026.

The climate change adaptation plan for Wales - Prosperity for All: A Climate Conscious Wales was published in late 2019, setting out 32 actions for 2020 - 2025 to achieve a more resilient Wales through increasing knowledge, capacity and resilience. The main risk areas set out in the Plan are largely informed by the CCRA2 that identified risks to people, communities, buildings and infrastructure from flooding; risks to water resources from drought and low river flows; and risks to ecosystems and agriculture from climatic changes as urgent priorities.

A revised assessment led to the publication of the Welsh Adaptation Strategy and 15 sectoral Plans informed by the CCRA3 risks, which was published in 2024.

Future Climate and Climate-related Risks and Opportunities

The Met Office Hadley Centre led UK Climate Projections 18 (UKCP18) provides information on temperature, precipitation, wind, sea level rise, storm surge, snow and weather types. In Wales by 2050 it is projected that:

- summer average temperatures rise by an estimated 1.34ºC
- winter precipitation increases by an estimated 5%
- summer precipitation decreases by an estimated 16%
- sea level rise of an estimated 24 cm (at Cardiff)

The UKCP18 projections are broadly consistent with previous UKCP09 outputs but provide a finer resolution of data down to 2.2 km scale so providing better assessment of fine-scale storm convective processes and consequently rainfall patterns. It remains the case that it is expected that there will be:

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

Natural variability in the weather will continue to be important. The 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".

The Future Flows and Groundwater Levels project provides an assessment of the impact of climate change on river flows across 282 catchments in the UK. The model takes into account different assumptions of possible climate behaviours and feedback to provide an indication of the uncertainty associated with climate projections. Annual low flows (Q95) are expected to decrease under all scenarios and in almost all locations by 2050.

Further information and flow projections from the Future Flows and Groundwater Levels project.

In terms of the CCRA3, 61 risks and opportunities have been identified for Wales. Those that have a high future magnitude score and where more action is required now to address them, after considering any existing adaptation responses, include the following:

- The impacts of climate change on the natural environment, including terrestrial, freshwater, coastal and marine species, forests and agriculture
- An increase in the range, quantities and consequences of pests, pathogens and invasive species, negatively affecting terrestrial, freshwater and marine priority habitats species, forestry and agriculture
- The risk of climate change impacts, especially more frequent flooding and coastal erosion, causing damage to our infrastructure services, including energy, transport, water and Information and Communication Technologies

- The impact of extreme temperatures, high winds and lightning on the transport network
- The impact of increasing high temperatures on people's health and well-being
- Increased severity and frequency of flooding of homes, communities and businesses
- The impact on coastal businesses due to sea level rise, coastal flooding and erosion
- Disruption to the delivery of health and social care services due to a greater frequency of extreme weather
- Damage to our cultural heritage assets as a result of temperature, precipitation, groundwater and landscape changes
- Impacts internationally that may affect the UK, such as risks to food availability, safety and security, risks to international law and governance from climate change that will affect the UK, international trade routes, public health and the multiplication of risks across systems and geographies.

Implications

In terms of GHG emission reductions, the land use, land-use change and forestry sector is the most important of relevance to this report. Depending upon its use and the associated management regime, land can either be a net source of emissions or a net sink. In 2023, in Wales, the sector was a net carbon sink, equivalent to around 2% of total Welsh emissions. The National Atmospheric Emissions Inventory *Mapping Carbon Emissions & Removals for the Land Use, Land-Use Change & Forestry Sector* report provides full details (2025).

In terms of the agriculture sector nitrous oxide arising principally from the application of nitrogenous fertilisers and land cultivation along with methane emitted principally by livestock and by the handling of slurries are the main GHG emissions. These agricultural emissions are significant: in 2023 they contributed 15% of total emissions in Wales.

During 2020, the UKCCC published an assessment of the role of land-use policies required to achieve net zero emissions by 2050 and subsequently updated its recommendations for the 6th UK Carbon Budget report, which identified the following key measures for the UK:

- Increase tree planting – increasing UK forestry cover from 13% to at least 18% by 2050 by planting around 30,000 hectares of broadleaf and conifer woodland each year by 2025 rising to 50,000 hectares by 2035 onwards
- Encourage low-carbon farming practices – such as 'controlled-release' fertilisers, improving livestock health and slurry acidification
- Use around 10% of agricultural land for agroforestry
- Restore peatlands – restoring all upland peat and 60% of lowland peat by 2050

- Encourage bioenergy crops – expand the planting of UK energy crops to around 720,000 hectares by 2050

Turning to adaptation, the first CCRA identified impacts on water as a high risk across each of its five central themes, as shown in table 1 below.

Table 1: High risk impacts on water

Theme	Main risks
Agriculture and Forestry	Drier soils; reducing crop and timber yields, extra demand for water for irrigation; loss of agricultural land for floodplain.
Business	Flooding; increased competition for water; disruption of transport networks and communication links; indirect risks from changes in agriculture and the natural environment.
Health and Well-being	Injury, death and stress / mental health problems due to flooding; increase in water-borne diseases and food poisoning.
Buildings and Infrastructure	Flooding of road, rail, river bridges, water supply and energy infrastructure; performance of buildings in higher temperatures; Urban Heat Island effect.
Natural Environment	Lower summer river and estuarine flows may lead to poor water quality; warmer rivers, lakes, estuaries and coastal waters may suit some species, but others will not thrive; invasive species may gain advantage; native species may not be able to move to track favoured conditions; more rain falling in intense bursts might increase agricultural runoff.

Evidence suggests that the following measures are particularly useful in mitigating these risks:

- Vegetation planting within catchments (including riparian tree planting to provide river shading) to increase habitat connectivity, keep rivers cool and manage run-off

- Increase soil carbon and improve soil structure (including peatland restoration) to manage run-off, improve habitat condition and avoid carbon losses to water and the atmosphere

- Reconnecting rivers with their floodplains and naturalising river channels to increase habitat connectivity and manage episodes of greater rainfall intensity

- Promotion of water efficiency and high flow storage to avoid deterioration in wetland habitats and help agriculture to remain viable in the face of decreasing water resource availability

- Adopting Water Sensitive Urban Design, which brings multiple benefits including reducing flooding; reducing discharges of storm water to watercourses; resilience to drought; and more attractive neighbourhoods with more green space.

This list of adaptation measures is not exhaustive.

More general advice and specific advice on flood risk management and water resources management, can be found in Guidance document No. 24 “River Basin Management in a Changing Climate”, issued under the Common Implementation Strategy. In particular, this guidance advocates that, where feasible ‘no-regret’ or ‘win-win’ measures should be adopted as these yield beneficial outcomes regardless of the eventual outcomes of climate variability and change. Although climate change is not explicitly included in the text of the WFDR, the stepwise and cyclical approach of the river basin management planning process makes it well suited to adaptively manage climate change impacts.

Two further publications are relevant to the UK specifically:

- The Living with Environmental Change Water Report Card 2012-13 presents information on a range of potential climate change impacts and explicitly states the degree of confidence for each projection

- The Centre for Ecology and Hydrology has published a report on Future Flows and Groundwater Levels, which assesses the impact of climate change across 282 catchments in the UK. This can be used to inform planning at the catchment scale.

Blue Carbon Initiative

Carbon storage in woodlands and peatland habitats is well-known. However, marine habitats are also important in storing ’blue carbon’. NRW has commissioned a study that investigates these blue carbon habitats in Wales the study shows that, alongside other mitigation and adaptation measures, marine habitats can play an important part in helping us to increase carbon storage and adapt to the impacts of climate change.

We know that there are likely to be serious and irreversible changes to communities in Wales as a result of climate change. Of all the coastal habitats looked at in the report, saltmarshes were the most efficient at capturing carbon and placing it in long term storage, a process called sequestration. They are also important to mitigate other climate impacts, through defending the coast from storms and reducing coastal flooding. Many blue carbon habitats are already protected through Wales’ extensive marine protected area network. Management of these areas aims to increase the resilience of habitats to future change and protect and enhance their quality.

Some blue carbon habitats in Wales have been impacted by human activities and restoring them to good condition may increase the amount of carbon they can store. NRW is working with partners to restore blue carbon habitat at sites such as Cwm Ivy on the Gower Peninsula, thus helping to increase Wales' resilience to climate impacts.

2.3 NRW's role in managing the water environment

NRW is the lead organisation for water management and environmental regulation in Wales.

Our responsibilities include:

- Managing flood risk to protect people and property
- Strategically planning water resources to ensure adequate water supplies
- Maintaining, improving and developing salmon and freshwater fisheries
- Maximising the social, economic, environmental and heritage benefits of the waterways for which NRW is the navigation authority
- Helping to conserve and enhance the diversity of native wildlife and habitats, the landscape and historic environment
- Promoting the recreational use of inland and coastal waters and associated land
- Protecting, enhancing and restoring the environmental quality of inland and coastal surface water and groundwater
- Protecting important sites that make up 30% of Wales' land and waters – including National Nature Reserves, Marine Nature Reserves, SACs and SPAs, Ramsar sites and Sites of Special Scientific Interest (SSSIs)
- Managing 123,000 hectares of woodlands, 7% of the country's total land area, producing approximately 850,000 tonnes of timber per year

We work within a framework of Government policy and legislation (see section 2.2) that defines our powers and duties and the environmental aims, objectives and standards to which we work.

Managing the water environment involves targeting effort and resources to reduce risks and to sustainably manage our natural resources and support ecosystem resilience. We bring together our different water management functions through a number of iterative activities including:

- Monitoring the environment to understand the state it is in and why
- Planning the action needed to achieve agreed outcomes
- Taking action and working with others to achieve these outcomes

- Checking compliance with standards and permit conditions and carrying out enforcement activities, if necessary, to make sure that the legal requirements are met

3. The WFD Regulations 2017 (WFDR)

Summary of this section

This section introduces the WFDR, its aims and objectives before giving an overview of the approach to river basin management planning used in Wales, including the important role of all stakeholders. The section finishes by setting out the timetable for updating the RBMPs and briefly describes the impact assessments that have been undertaken to support the cycle 4 plans.

Topics covered

WFDR and its objectives; river basin management planning; working with others; catchment approach; river basin management planning timetable; assessments to support the development of the cycle 4 RBMPs.

3.1 WFDR aims and objectives

The WFDR is focused on establishing an integrated approach for the protection and sustainable use of the water environment from catchment to coast. This requires a holistic approach to managing waters, looking at the water within the wider ecosystem and considering the movement of water through the hydrological cycle.

It is implemented through river basin management and planning that involves setting environmental objectives for all groundwaters and surface waters (including estuaries and coastal waters) and devising and implementing programmes of measures (sets of actions) to meet those objectives.

It also requires that other environmental priorities, economic considerations and social issues be considered and taken into account when setting water management objectives.

Aims

- prevent further deterioration and protect, enhance and restore the status of aquatic ecosystems and associated wetlands
- promote the sustainable consumption of water
- reduce pollution of waters from priority substances
- prevent the deterioration in the status and to progressively reduce pollution of groundwaters
- contribute to mitigating the effects of floods and droughts

Environmental objectives

- prevention of deterioration in status of surface waters and groundwater
- achievement of objectives and standards for protected areas

- aim to achieve good status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the WFDR, aim to achieve good status by 2021 or 2027, or set a less than good (less stringent) objective
- aim to achieve good ecological potential and good surface water chemical status for artificial and heavily modified water bodies (A/HMWB)
- reversal of any significant and sustained upward trends in pollutant concentrations in groundwater
- cessation of discharges of priority hazardous substances into surface waters
- progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants

Additional objectives

- reduce level of purification treatment required for drinking water
- the water treatment regime will meet the requirements of the legislation

3.1.1 Preventing deterioration

Deterioration is formally assessed and reported over the six years of a river basin management planning cycle. Any water bodies that show a deterioration in status compared to the 2021 baseline will be investigated further to clarify if the deterioration is a real environmental change and if so, we will ensure that measures are put in place to reverse the deterioration.

The WFDR does not allow any deterioration in status of water bodies, except in specified circumstances. The following are the main aspects of NRW's approach to implementing the no deterioration requirements of the Regulations.

- Deterioration from one status class to a lower one is not permitted.
- While deterioration within a status class does not contravene the requirements of the WFDR, (except for Drinking Water parameters in Drinking Water Protected Areas (DrWPAs) and provided that the objectives and requirements of other domestic legislation as well as the WFDR are complied with, action should be taken to limit within status class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status.
- Where the water body is already in the lowest status class (bad ecological status or potential; fail to achieve good chemical status; poor groundwater chemical status; or poor groundwater quantitative status) no significant further deterioration shall be permitted.
- The no deterioration requirements are to be applied independently to each of the elements that come together to form the water body classification as required by the WFDR.
- For groundwater the no deterioration requirements will be applied to each of the four component tests for quantitative status and the five component tests for chemical status.

Exemptions can be applied to justify deterioration caused by new physical modifications in specific circumstances. As the climate changes there may be fundamental changes to the character of some of our water bodies, for example coastal freshwater water bodies becoming saline due to sea-level rise or streams becoming ephemeral (only flowing in winter). We do not yet know exactly how, when and where these changes will take place, particularly in the shorter term and so we do not intend to proactively change the objectives we will seek to achieve. We need to focus on building a baseline understanding of state of the water bodies and monitor and review the performance of measures (for example fish passes, abstraction changes) to ensure they deliver the benefits and resilience required.

3.1.2. Protected areas

The objectives for WFDR protected areas are governed by:

- the Conservation of Habitats and Species Regulations 2017 (as amended) for SACs and SPAs
- objectives set out in historic EU Directives (e.g. Bathing Waters Directive or Urban Waste Water Treatment Directive), which have become UK Regulations
- objectives as set out in the WFDR itself, for example Drinking Water and Shellfish Water Protected Areas

Part 3 of the WFDR requires NRW to establish a register of protected areas. The types of protected areas that must be included in the register are:

- Areas designated for the abstraction of water for human consumption (DrWPAs)
- Areas designated for the protection of economically significant aquatic species (Shellfish Water Protected Areas)
- Bodies of water designated as recreational waters, including Bathing Waters
- Nutrient-sensitive areas designated as sensitive under Urban Waste Water Treatment (England and Wales) Regulations 1994
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection (European sites)

The protected areas register for Wales will be updated and published as part of the fourth RBMP and maps updated on Water Watch Wales.

The current protected area register can be found at Natural Resources Wales / River Basin Management Plans 2021-2027: protected area register

i. Drinking Water Protected Areas

DrWPAs are designated to protect raw waters used for public supply.

The objectives for DrWPAs are to ensure that:

- Under the water treatment regime applied, the drinking water produced needs to meet the requirements of the Water Supply (Water Quality) Regulations 2018 and the Private Water Supplies (Wales) Regulations 2017. This will be achieved by meeting the requirements of these legislative instruments (including the standards) plus any UK requirements to ensure drinking water is free from contamination.
- The necessary protection to achieve the aim of avoiding deterioration in the water quality in DrWPAs to reduce the level of purification treatment required.

ii. Shellfish Waters

Shellfish Water Protected Areas (SWPAs) are designated under the WFDR as areas designated for the protection of economically significant aquatic species. When waters are designated as SWPAs the aim of the SWPAs is to endeavour to observe the microbial standard in shellfish flesh, to contribute to good quality, edible shellfish.

iii. Bathing Waters

Bathing Waters are bodies of water designated as recreational waters. The Bathing Water (Amendment) (England and Wales) Regulations 2025 came into force during cycle 3. The objective remains to preserve, protect and improve the quality of the environment and to protect human health. This objective is achieved by meeting the sufficient quality standard); and by taking such realistic and proportionate measures considered appropriate with a view to increasing the number of Bathing Waters classified as ‘excellent’ or ‘good’.

Supporting information

Further information on the Bathing Water profile, current quality standard and key information can be found on the NRW website under Bathing Water quality.

iv. Nutrient Sensitive Areas (UWWTR)

An Urban Waste Water Treatment (England and Wales) Regulations 1994 sensitive area (eutrophic) is a water body identified as affected by eutrophication or having a surface water abstraction affected by elevated nitrate concentrations from relevant wastewater treatment works. Designating a sensitive area is a trigger for action to reduce or prevent further pollution caused by nutrients.

The general objective of the UWWTR is to protect the environment from the adverse effects of urban wastewater discharges and wastewater discharges from certain industrial sectors.

This is to be achieved by ensuring that discharges from relevant urban wastewater treatment plants meet the appropriate discharge standards.

During cycle 3 Milford Haven Inner water body was designated as a new UWWTR sensitive area eutrophic, in 2025.

v. European Sites Protected Areas

The Conservation of Habitats and species Regulations 2017 (as amended) (Habitats Regulations) are key legal instruments to protect and enhance biodiversity.

The Habitats Regulations create a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes SACs and SPAs and proposed SACs and SPAs designated under these Regulations.

Maintaining a coherent network of protected sites with overarching conservation objectives is required to fulfil the commitment made by government to maintain environmental protections and continue to meet our international legal obligations, such as the Bern Convention, the Oslo and Paris Conventions (OSPAR), Bonn and Ramsar Conventions.

NRW is the statutory nature conservation body for Wales and works towards ensuring that Wales' unique natural environment including its flora and fauna, land and seascapes, geology and soils is protected and improved. This includes the protection, improvement and management of European sites. NRW has a lead role in ensuring the appropriate management of the sites. It must carry out its own regulatory and land management functions to meet the requirements of the Habitats Regulations as well as provide advice to local authorities, Welsh Government and other bodies to enable them to comply with their obligations under the Regulations.

The network covers more than 2 million hectares of European site protected areas (86 SACs, 20 SPAs and 10 Ramsar) which have water dependent features and are included on the protected area register.

The overall objective for European sites is to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community importance. Meeting site conservation objectives will ensure that the integrity of the European site is maintained or restored as appropriate and ensures that the site contributes to achieving the 'favourable conservation status' of its qualifying features.

The provisions of the WFDR only relate to water dependent habitats and species. The objective is to protect and, where necessary, improve the water environment to work towards achieving the conservation objectives for the water dependent features of the site.

vi. Ramsar sites

Designated Wetlands of International Importance (known as Ramsar sites) do not form part of the national site network. All Ramsar sites in Wales are also European sites (protected areas) and it is likely that only a few additional measures in the majority of these sites will be required to meet their objectives. This is because meeting the conservation objectives for water dependent European sites protected area interest features will also meet the conservation requirements for any overlapping Ramsar features.

For the purposes of the RBMP water dependent SACs, SPAs and Ramsar sites have been called European sites.

Supporting information

Further information on UK protected areas

Further information on types of protected areas of land and sea

vii. Sites of Special Scientific Interest (SSSI)

SSSIs that are not also designated as European sites are not WFDR protected areas. Whilst designation of SSSI is under UK national legislation it should be recognised that many water dependent SSSI (except for some wetlands) are also WFDR water bodies. The attainment of good ecological status for these water bodies, whilst not necessarily directly equivalent to a SSSI achieving favourable condition, is likely to be a key step toward those sites meeting their conservation objectives and contributing to the Welsh Government's objectives for SSSIs.

3.1.3 Artificial and heavily modified water bodies

Some surface water bodies have been physically modified to provide important human needs, or "uses" – including drinking water supply and flood protection. The scale and extent of changes made to natural features and processes in these surface water bodies is substantial, which means they are no longer considered "natural". These water bodies are designated as Artificial or Heavily Modified (A/HMWBs) and this designation applies to 203 (23%) of 895 surface water bodies in Wales. Some of the physical modifications present in A/HMWBs were made centuries ago and provide multiple benefits or "uses" to society. For example, water storage reservoirs supply drinking water and simultaneously provide flood risk benefits for communities downstream; some of them also generate hydro-electric power. The "uses" underpinning the A/HMWB designation are referred to as "designated uses".

The objective of 'good ecological status' does not apply to A/HWMBs because this cannot be achieved without impacting the "uses". A/HMWBs have an alternative objective of good ecological potential. Good ecological potential is the delivery of all mitigation measures required to enable ecology to be the best it can be, but these measures must not have a significant adverse impact on the designated use(s). Measures required to achieve good ecological potential are identified by a 'mitigation measure assessment' which is a classification element for A/HMWBs (section 4.1.2).

Under the WFDR there is a requirement to review A/HMWB designations in each six-yearly planning cycle and report any changes. For cycle 4, several designation changes have been identified. Further detail on these is included in Appendix A.

3.1.4. Exemptions to the environmental objectives (alternative objectives)

The WFDR require that we aim to achieve good overall status for surface and groundwaters by 2027. Alternatives to that objective are allowable which may result in two additional options:

- an objective of less than good by 2027 (less stringent objective) due to technical infeasibility (no known technical solution is available) or disproportionate cost (unfavourable balance of costs and benefits)
- or an extended deadline of good status or potential beyond 2027 for reasons of natural conditions (ecological recovery) or technical infeasibility for a small number of chemicals

Temporary deterioration in status

In certain circumstances a temporary deterioration in status of a water body, caused by exceptional or unforeseen events such as extreme floods, prolonged droughts or accidents, is allowed. The exception does not apply to those effects of extreme floods and prolonged droughts which could reasonably have been planned for and prevented, nor does it apply in the case of accidents which could reasonably have been foreseen.

This exemption requires responsible authorities to demonstrate that:

- all practicable steps were taken to prevent further deterioration in status
- the measures to be taken under exceptional circumstances are included in the Programme of Measures and will not compromise the recovery of the quality of the body of water once the circumstances are over
- all practicable measures are taken to restore the body of water to its status prior to the effects of those circumstances as soon as reasonably practicable and
- a summary of the effects of the circumstances and the measures taken are included in the next update of the RBMP.

Prolonged droughts

In Wales, the main bodies responsible for managing water resources are NRW, water companies and the Welsh Government. These bodies have a role in drought management. Water companies prepare for droughts by producing Drought Plans detailing the actions that will be taken if a drought occurs.

NRW is responsible for securing the proper use of water resources in Wales and making sure there is enough water available for all needs including the environment. We achieve this by regulating the abstraction of water, monitoring the environment and working closely with the water industry and other abstractors to manage resources. During droughts we monitor and report on the impacts on the environment, monitor water company actions to confirm they are following their drought plans and determine drought permit applications.

Water companies are responsible for developing and maintaining an efficient and economical system for public water supply in their area, without damaging the environment or affecting the needs of other water users. During a drought they will take actions to maintain public water supplies, as set out in their drought plans, whilst minimising any impacts on the environment.

The Welsh Government is responsible for the policies relating to water resources in Wales. They ensure the legislative framework for water resource management is fit for purpose. They direct water companies on the development and content of their water resource management plans and drought plans. During a drought they will confirm that water companies are taking appropriate actions and determine drought order applications.

Defining and then monitoring indicators (often called drought triggers) helps NRW and water companies decide when a drought is happening and determine what actions to take. The decision to take action will be based on a range of factors, including present and forecast weather conditions and how effective the action

would be. The sequence of actions will not always be the same as all drought events are different and need to be managed on an individual basis.

Prolonged and severe droughts may impact water body status through reduced river flows, damage to or loss of habitat, alterations to bio-chemical composition of the river and detrimental impact to water dependent species. A drought is a natural, unpredictable phenomenon and it is not always possible, even with the implementation of appropriate mitigation measures, to avoid the impacts of drought or prevent temporary deterioration in water body status throughout a prolonged drought.

Drought plans set out the actions that will be taken to minimise environmental impacts and maximise available supplies during a drought, without causing deterioration where possible. These plans set out how the environment will be monitored and the possible mitigation measures that can be implemented to prevent as much environmental harm as possible during a drought. Effective monitoring of environmental indicators also helps to differentiate the natural impacts of drought and impacts caused by human activity such as the implementation of drought permits and orders. This is important to show any temporary deterioration resulted from the natural impacts of the drought.

If the impacts of a drought event temporarily cause deterioration to water body status and all the criteria can be met, this exemption can be used after a drought event as a justification as to why an objective which was set in a RBMP has not been met. This is always done on a case-by-case basis and should be detailed in the update of the RBMP.

Supporting information

More information on drought management can be found on our website drought management in Wales.

Extreme floods

NRW is responsible for providing flood forecasting and warnings to the public in Wales. This involves monitoring rainfall, river levels and sea conditions. Combined with weather data and tidal reports NRW provides local area forecasts on the possibility of flooding and its likely severity.

There are four levels of flood warning: three of the codes indicate the severity of the warning (Flood Watch, Flood Warning and Severe Flood Warning) and a fourth is an ‘All Clear’ meaning the threat has passed.

Severe floods may impact on water body status through effects such as the loss of habitat (scouring of sediments and in stream vegetation), the physical displacement of species or increased inputs of pollutants including sediment. These impacts may be localised and of insufficient magnitude to affect the status of an entire water body. Water bodies are classified on an annual basis and therefore any deterioration in status due to a severe flood may not be detected until up to a year after the event.

Accidents

The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 and the Environmental Damage (Prevention and Remediation) (Wales) (Amendment) (EU Exit) Regulations 2019 bring environmental liability into effect in

Wales. Under these Regulations, environmental damage of either surface water or groundwater is defined as damage causing a change of water body status.

This means either a deterioration of water status overall, for example the water body as a whole would now be classified as poor rather than good or a deterioration of any of the individual elements or parameters such that the value of that element or parameter is now consistent with a lower status than before. This applies even if the water body is not reclassified as being of lower status. Adverse effects that are short-term or limited in their geographical extent are unlikely to amount to environmental damage.

When environmental damage is confirmed, the Regulations include a remediation objective of achieving the same level of natural resources or services that would have existed if the damage had not occurred.

New modifications or sustainable development

New modifications or new sustainable human development activities may be permitted even though they might compromise the achievement of certain WFDR objectives. Certain new developments provide extremely valuable benefits to society that outweigh the environmental or societal benefits of achieving the objectives. Such benefits may include those provided by activities, for example:

- Public water supply
- Flood defence
- Navigation and transport
- Urban development
- Rural land management

Any physical modifications or activities that are considered likely to compromise the objectives must undergo a detailed technical assessment to inform a decision on whether or not they can be permitted using the exemptions in Part 5 of the WFDR. It must also be clear that protected area requirements are not going to be compromised as a result of the proposed activities. The assessment must provide evidence to satisfy the following are true:

- All practicable steps are taken to mitigate adverse impact(s) associated with the proposed activity, such that there is no deterioration in the status of the water body
- The benefits to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development outweigh the benefits of achieving WFDR objectives and/or the activity is of overriding public interest
- There are no other means of providing the services offered by the proposed activity that are technically feasible or of a proportionate cost and provides a significantly better environmental option

In addition, the reasons for the modifications or activities are specifically explained in the RBMP and relevant objectives are reviewed every six years.

NRW works with public bodies, developers and its own operational functions to ensure WFDR objectives (including the correct application of Part 4 regulation 19

defence) are met. NRW uses regulatory advice/guidance to ensure the specific requirements of the exemption are achieved.

3.2 River basin management planning

River basin management planning is a cyclical process that is punctuated at intervals by consultation and reporting required by the WFDR. The ongoing planning process can be broken down into four main stages as shown below:

Stage 1 – identify whether there is an environmental problem

A problem could be the failure of a protected area or water body to achieve its objective, or a deterioration in status over time.

The condition of protected areas and water bodies is assessed by NRW. The current status of water bodies is assessed through the process of classification and comparison of these results over time will indicate whether any deterioration in that status is occurring. Classification results can indicate whether there is an environmental problem in a water body but other information, including information from stakeholders, can also be used (see also section 4).

Stage 2 – identify the cause(s) of the environmental problem

The cause of the problem must be determined in order to identify appropriate solutions.

In order to understand the causes of problems, NRW has completed a large number of investigations. These have greatly improved our understanding of the reasons why water bodies are not at good status. Investigations will continue where they are required to understand new failures and where deterioration is detected. (see also section 4)

Stage 3 – identify and assess measures to resolve the environmental problem

Water body measures may be needed to reduce the impact of current problems or prevent future problems such as deterioration in status.

All of the measures required to fully resolve the problem are identified, where more than one technically feasible measure is available options should be assessed (including use of cost-benefit).

3.3 Working with others

Working with others is at the heart of a successful river basin management planning process. Protecting and improving the water environment needs action from all parts of society. By working effectively with others, we agree better solutions and protect the things that matter most to people.

The WFDR include legal obligations on consultation. This includes encouraging the active involvement of all interested parties in the implementation of the Regulations, in particular in the production, review and updating of the RBMPs.

Many different groups work towards improving and protecting the water environment. NRW welcome the opportunity to work more closely with all sectors and interested parties who have an interest in improving the water environment, through the RBMP consultation many individuals and organisations offered their assistance by working collaboratively with us to improve the water environment.

There are many organisations that are responsible for managing the RBDs in Wales. These organisations are often grouped into sectors and are summarised in table 2.

Table 2: Sector groups involved in river basin management

Sector	**Examples**
Agriculture and rural land management	Includes arable, livestock, forestry and horticulture.
Angling and Conservation	Includes angling and conservation groups
Central Government	Includes UK and Welsh Government and arms-length bodies (including NRW and the Environment Agency)
Domestic/General public	Includes individuals and community groups
Energy	Includes renewables and hydropower groups
Health	Includes Public Health Wales
Industry, Manufacturing and other Business	Includes chemicals, construction, food and drink, paper, textiles and metals
Local Government	Includes Local Authorities and National Park Authorities
Mining and Quarrying	Includes coal mining, non-coal mining and quarrying
Navigation	Includes inland water ways groups, port and harbour authorities
Non-Governmental Organisations	Includes environmental non-governmental organisations (including wildlife and river trusts) and others
Recreation	Includes ramblers, canoeists and amenity groups
Universities	Includes evidence gathering and interpretation
Urban and Transport	Includes air, road, railways and urban

Sector	Examples
Waste treatment, transfer, storage and disposal	Includes landfill, biowaste, waste treatment and transfer
Water Industry	Includes water supply, water and wastewater treatment

3.3.1 Wales Water Management Forum

The purpose of the Forum is to provide an opportunity for NRW and the Wales Water Management Forum (WWMF) membership organisations to share evidence and explore opportunities for working together to achieve the sustainable management of water from source to sea.

The Forum works with the Wales Land Management Forum (WLMF), Wales Fisheries Forum and the Wales Marine Advisory and Action Group.

The forum will:

- Work collaboratively to develop and deliver plans to protect Wales' water environment, to ensure ecosystem resilience is improved and that water resources are managed to ensure that there is enough good quality water for people and the environment.
- Provide strategic advice to inform NRW and Welsh Government on water related policy and strategy.
- Address the major pressures on the water environment by developing a common understanding of the potential barriers to sustainable outcomes and long-term challenges, such as climate change, population growth and development.
- Influence the management of water from source to sea, taking a whole catchment approach, liaising with relevant marine forums in relation to management and impacts in the marine environment.
- Actively collaborate for the planning and delivery of river basin management planning in accordance with the requirements of the WFDR, including cross border working. The WWMF will act as the RBDs Liaison Panel for the Western Wales, the Dee and the Welsh part of the Severn RBD.
- Support and promote integrated planning, with improved linkages between plans affecting the water environment and streamlining these.
- Identify opportunities and support the development of experimental trials or innovative approaches and nature-based solutions to tackle pressures on the water environment.

- Share expertise, knowledge and relevant evidence relating to water management, including joint work on the evidence base within the State of Natural Resources report to understand the pressures on Wales' natural water resources.

- Work together to facilitate the implementation of Welsh Ministers priorities for Wales' natural water resources set in the Natural Resources Policy published by Welsh Government and NRW's related Area Statements.

- Communicate best practice and identify relevant projects or measures for co-delivery.

- Promote the principles of SMNR in managing the water environment and reporting the effectiveness of approaches. Influence NRW and sectoral investment and explore alternative funding environmental improvements including developing an agreed approach to payment for ecosystem services, to maximise opportunities to deliver multiple benefits.

The WWMF is also supported by the River Basin Planning Task and Finish Group, this group has been actively involved with the development of the draft RBMPs with a focus on the consultation steps and also work to review the cycle 3 RBMP progress which was published in 2025.

3.4 Working at the catchment scale and integrated natural resources management

Engagement and involvement at a local level around the water environment have been integrated into the Area Statement engagement process, which was central to the selection of the Opportunity Catchments. The Area Statement process was designed with the principles of SMNR at its core. Representative groups such as environmental non-governmental organisations, farming unions, angling associations and large industry were included.

The Act is a key element of the Welsh Government's legislative programme. The natural resource management policy framework is still being developed in Wales but the RBMPs reflect the essential principles of SMNR in the following ways:

Manage adaptively, by planning, monitoring and reviewing action

The river basin management process promotes adaptive management. The condition of water bodies and progress towards achieving good or better status are regularly monitored. The RBMPs are reviewed and updated every six years. The programme of measures is also reviewed and updated where appropriate as part of this planning process.

Consider the appropriate spatial scale for action

The RBMPs encompass all the significant issues and pressures on the water environment and the measures to manage them at a river basin scale. By looking at a catchment scale, rather than individual issues or sectors, we can move beyond addressing issues reactively and in isolation. The natural processes we are working

with and the management processes we are aiming to influence, tend to work at different scales. Ecosystem services should be managed at the most appropriate scale, whilst considering the best delivery mechanisms for doing so. The WFDR requires that we produce and review management plans at the river basin scale, however 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 and take action to prevent damage to ecosystems.

Promote and engage in collaboration and co-operation

It is essential that we work with stakeholders, including local authorities, communities, the third sector, developers and industry, throughout the process of drawing up and implementing the RBMPs.

Take account of all the relevant evidence and gather evidence in respect of uncertainties

The contents of the RBMP are the result of a significant evidence base, collected through our monitoring programmes, investigations and economic assessments.

Take account of the benefits and intrinsic value of natural resources and ecosystems

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 the ways in which water and hydrological systems provide benefits to people, business and support and sustain the wider environment
- 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

Take account of the short, medium- and long-term consequences of measures

To create a sustainable Wales, we need to consider the opportunities and constraints Wales will face in the long term. This was considered as part of the Strategic Environmental Assessment along with consequences on the wider environment and cumulative/indirect effects. RBMPs consider long term objectives for improvement and are reviewed every six years.

Take account of the resilience of ecosystems

A resilient ecosystem is one that is healthy and functions in a way that is able to address pressures and demands placed on it and is able to deliver benefits over the long term to meet current and future social, economic and environmental needs. 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 that actions contribute to 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 programme of measures and Opportunity Catchment actions proposed in this draft RBMP can take account of ecosystem resilience and 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.

3.5 River basin management planning timetable

Although most of the river basin management planning activities are continual and iterative there are defined points at which consultation and reporting take place as part of developing and updating RBMPs. The timetable for these steps is set by the WFDR and shown below.

- Working Together consultation between May 2024 and December 2024
- Challenges and Choices consultation on our Significant Water Management Issues between October 2025 and April 2026
- Consultation on the draft Western Wales and Dee RBMPs between November 2026 and May 2027 and the draft Severn RBMP consultation will be published by the Environment Agency in December 2026
- Publish the final RBMPs 2027

3.6 Economic analysis of water use

In preparation for the first RBMPs, a wide-ranging economic analysis was carried out and reported through a collaborative research programme overseen by UK authorities (in Wales this was undertaken by Defra and Welsh Government) and stakeholder organisations. A summary of the economic analysis reports was included in Annex K of the 2009 RBMPs. No update has been received from Welsh Government.

Water and sewerage services in Wales are wholly privatised. Therefore, over the long term, the financial costs of water and sewerage services are recovered in full from service users. This includes the internalised environmental and resource costs.

The economic analysis included a local assessment of the most cost-effective programmes of measures to prevent deterioration, achieve protected area objectives and achieve good status where technically feasible. The analysis was informed by the database of costs of measures, which has been maintained and

developed since the plans were published and supplemented where appropriate by local and stakeholder information.

3.7 Impact assessments of the river basin management plans

3.7.1 Strategic Environmental Assessment (SEA)

River Basin Management Plans are subject to the requirements of the Environmental Assessment of Plans and Programmes Regulations (Wales) 2004 (SI 1656/04).

NRW, as Responsible Authority for the Dee and Western Wales RBMP's has undertaken a Strategic Environmental Assessment (SEA) of the cycle 4 plans to inform the plans development. A formal consultation on NRW's SEA scoping report was undertaken as part of the Challenges and Choices consultation. Environmental reports are being consulted on as part of the draft plan consultation.

The Environment Agency, as Responsible Authority for the Severn RBMP will lead on the SEA and has undertaken consultation on their SEA scoping report. An Environmental report for the Severn RBD (Wales and England) will be consulted on as part of the Environment Agency's draft plan consultation and will be published on Gov.UK.

3.7.2 Habitats Regulations Assessment (HRA)

NRW, in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended), undertakes a Habitats Regulations Assessment (HRA) of the draft Western Wales and Dee RBMP's and consults on draft HRA's alongside the draft plans. The HRA's consider whether the draft plans are likely to have a significant effect on any European site alone or in-combination. The HRA's will be undertaken iteratively alongside the development of the Programme of Measures.

The Environment Agency will consult on the draft HRA for the draft Severn RBMP, which will be published on Gov.UK.

3.7.3 Health Impact Assessment (HIA)

NRW has undertaken a Health Impact Assessment (HIA) to support the SEA of the RBMPs for the Western Wales RBD and the Welsh parts of the Dee and Severn RBD's. The HIA identifies health risks and benefits, both direct and indirect, with an additional focus on vulnerable population groups.

While HIA is not yet a legal requirement in Wales, it will become mandatory under the Public Health (Wales) Act 2017 once Regulations take effect in 2027. Conducting a HIA now reflects best practice and aligns with recommendations from the Independent Water Commission to embed public health in water sector planning.

Using a range of methods, HIA has considered how the RBMPs may affect (positively and negatively) physical, mental and social well-being, taking into

account broader determinants such as income, housing and the environment etc. The RBMPs are expected to influence these factors, making it vital to integrate health considerations into decision-making.

3.8 Competent authorities for river basin management planning

In Wales the appropriate authority for the implementation of the WFDR is Welsh Government. The appropriate authority has general responsibility for ensuring that the legislation is given effect. The appropriate authority also has specific responsibilities for ensuring that appropriate economic analysis is carried out, approving proposals for environmental objectives and programmes of measures and approving RBMPs. The appropriate authority may also give guidance or directions to NRW and any other public body, on the practical implementation.

NRW is the competent authority for producing and updating RBMPs in Wales. NRW is responsible for carrying out the analysis required for characterisation, monitoring, identifying waters used for the abstraction of drinking water and establishing a register of those waters and other protected areas. It must prepare proposals for environmental objectives and programmes of measures for each RBD and publish RBMPs. NRW must also ensure public participation in preparation of the RBMPs and make certain information required under the WFDR accessible to the public.

4. Defining and describing the water environment

Summary of this section

This section describes how the water environment is divided up and characterised to support implementation and reporting. It explains how the water environment is monitored and its condition assessed and reported. The section then describes the main challenges affecting management of the water environment in Wales, how future risks have been assessed and causes of current problems identified.

Topics covered

RBDs and water bodies; typology; designation of A/HMWBs; protected areas; monitoring networks; classification methodologies; recent changes in the water body network and the way classification is derived; significant water management issues; risk assessments; RNAG status.

4.1 River basin districts, catchments and water bodies

The WFDR cover all waters, including inland surface waters, groundwater, estuaries and coastal waters, independent of size and characteristics. For example, ‘inland water’ is defined as “all standing or flowing water on the surface of the land”.

For the purpose of implementing the Regulations, all waters were assigned to geographical or administrative units, namely the river basin, RBD and water body.

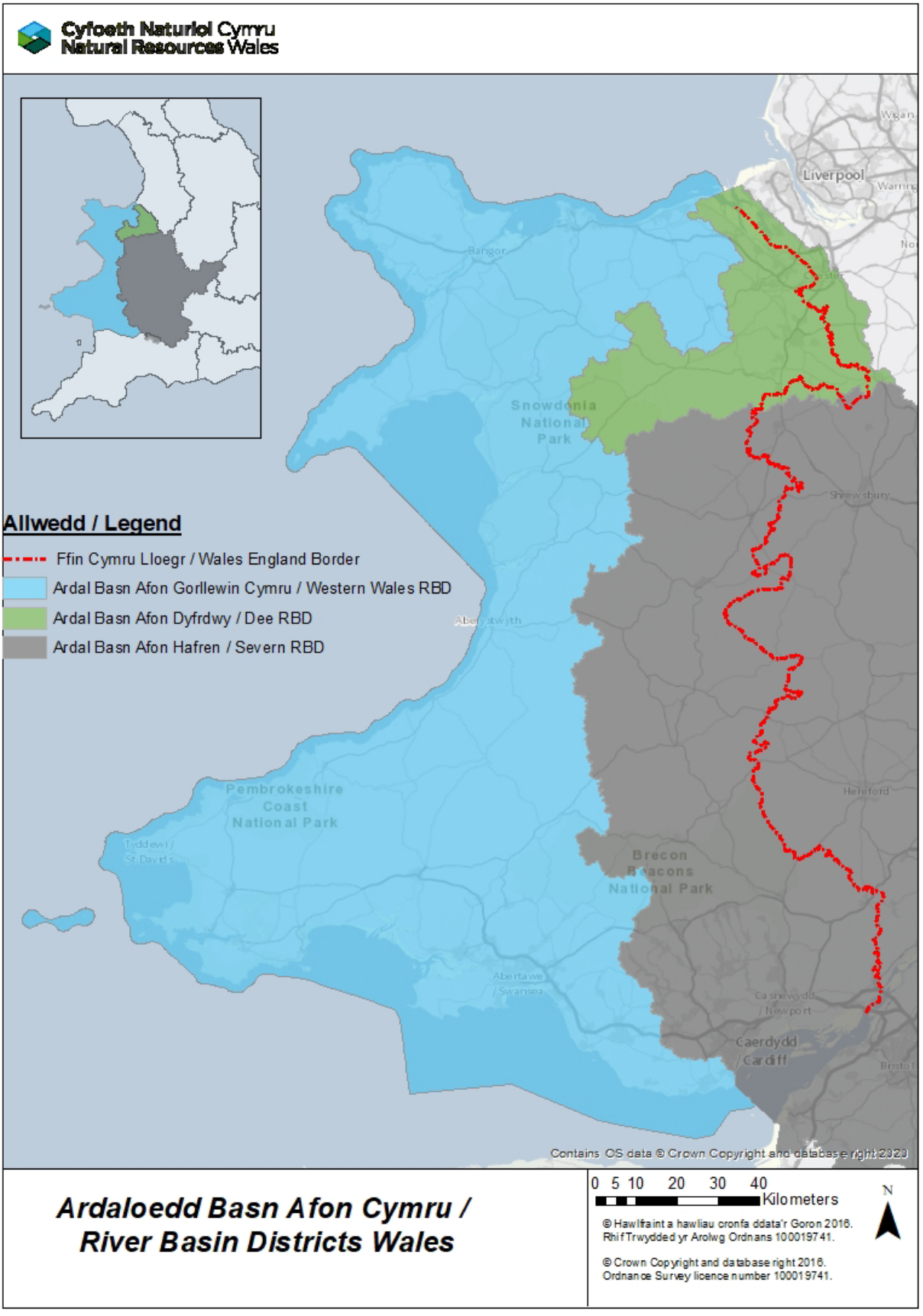
The river basin is the geographical area from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth or estuary.

The RBD is the main unit for management of river basins under the WFDR. An RBD can consist of one or more river basins. Management catchments are units that sit underneath each RBD. These catchments are amalgamated up to RBDs for reporting purposes. The RBDs in Wales and those that are cross border with England are shown on the map below (Figure 1).

Water bodies are the units used for reporting and assessing compliance with the Regulations principal environmental objectives. The environmental objectives apply to water bodies and so the main purpose of identifying water bodies is to enable status to be accurately described and compared to the environmental objectives.

The WFDR define a surface water body as a “discrete and significant element” of surface water such as a lake or reservoir or entire (or part) stream, river or canal, estuary or stretch of coastal water (out to 1 nautical mile and for chemical status only this extends to the limit of territorial waters which may extend up to 12 nautical miles). A groundwater body is a distinct volume of groundwater within one or more aquifers. Water bodies in Wales were identified as part of a characterisation process.

Figure 1: River Basin Districts (RBDs) in Wales



Most water body categories, such as groundwater or coastal waters, are delineated as a discrete area and are shown as this total area for reporting purposes.

Whilst each river water body also has a defined catchment area, river water bodies are reported (for example in the RBMPs) using a river line within that catchment. For the first cycle of river basin management planning this river line (often referred to as the 'blue line') was derived from the 1:50,000 scale river network, which was subsequently updated using the 'Detailed River Network' for cycle 2. This river line is purely a reporting network, and it is this river line which appears on maps in the cycle 4 RBMPs.

4.1.1 Surface water body types and reference conditions

Because the sorts of animals and plants found in upland, rocky, fast-flowing streams are very different to those found in lowland, slow flowing, meandering rivers, rivers, lakes, estuaries and coastal water bodies are grouped into different types according to their physical and chemical characteristics. The types dictate, in very general terms, the sorts of plants and animals likely to be present in water bodies of that type.

Reference condition descriptions covering the sorts of plants and animals expected to be found in the different types of water bodies in undisturbed conditions have been produced for each type or group of types (see supporting info below). These types are the ones that have been used in the initial characterisation of each RBD. In some cases, there are no examples of reference condition in the UK and descriptions are based on similar types in other Countries, or extrapolation from modelling studies, or historic data.

Reference conditions and the conditions found in high status waters are the same. For example, if a classification tool shows that the diatom community in a water body is at high status, then the species composition and abundance of diatoms in that type of water body are what would be expected under reference or undisturbed conditions. The Ministerial Directions on Environmental Standards give the values for high status for both biological and physicochemical elements and include screening approaches for high status hydrology and morphology. It is important to understand that for a water body to classify at high status overall, it must comply with high status criteria for all classification elements including high status hydrological and morphological conditions.

Supporting information

For more detail on how reference values have been determined for each of the biological elements see the UK Technical Advisory Group (UKTAG) Assessment Methodologies can be found on the WFDUK website.

The reference conditions descriptions for rivers, lakes, estuarine and coastal waters.

4.1.2 Designation of Artificial/Heavily Modified Water Bodies

Prior to publication of the first RBMPs we designated water bodies with relevant use(s) based on the extent of and impacts associated with physical modifications needed to provide the use(s) at that point in time.

For cycle 4, some heavily modified water body designations and use(s) have changed. For example, if a water body was designated for a water resources use and the license has been revoked because the abstraction is no longer required, the designation has been removed to reflect the use is no longer present in the water body. Other designation changes have been made to resolve errors identified as our knowledge and understanding has improved. All HMWB changes for cycle 4 are detailed in Appendix A.

4.2 Assessing the current state of the water environment

4.2.1 Protected areas status

Protected areas are parts of the environment that have been designated as requiring special protection under Community legislation for the protection of their surface water and groundwater or for the protection of habitats and species directly depending on water.

NRW has routine monitoring programmes in place or sources data from other agencies for assessing compliance for Bathing Waters, SACs/SPAs, DrWPAs and SWPAs.

DrWPAs are those water bodies that supply more than 10m^3/day or serves more than 50 people. DrWPAs are subject to meeting the requirements of the Water Supply (Water Quality) Regulations 2018 and the Private Water Supplies (Wales) Regulations 2017 (regulated by the Drinking Water Inspectorate (DWI)), information on this can be found on the DWI website (www.dwi.gov.uk).

There are currently 125 DrWPAs (Surface) and 39 DrWPAs (Groundwater) in Wales.

The WFDR also requires that there is no deterioration in the quality of raw drinking waters, DrWPAs at risk of deterioration are identified by assessing if:

- Drinking water standards are breached
- If the raw water quality is getting worse
- If there a need for additional treatment now or in the future

Water Companies operating within Political Wales, have identified ‘at risk’ DrWPAs where there was evidence of failure, or risk of failure, of the DWI targets with upward trend. Dŵr Cymru/Welsh Water (DCWW) have carried out additional catchment investigations to investigate where catchment schemes may be beneficial and identify DrWPAs at risk of failing the objectives.

Assessment of the risk status covers parameters such as pesticide levels, organic chemicals, taste and odour of the water (MIB (Methylisoborneol) and Geosim, compounds produced by blue green algae and bacteria), nutrients, metals, sediment, algae and bacterial levels.

These ‘at risk‘ DrWPAs have been taken forward as Safeguard Zones (SgZs) with the intention of implementing catchment management led by DCWW with the

support of stakeholders including NRW. The SgZ describe the extent of the agreed measure and may be designated to cover a part of a water bodies, a complete water body, group of water bodies or even a whole catchment – depending on the extent at which the improvement measures are applied. While the SgZ assessment process is statutory, once designated SgZ do not bring any additional statutory powers. Improvements within SgZs rely on stakeholder buy-in and NRW extant regulatory powers.

Details of the risk status of the DrWPAs can be found on Water Watch Wales.

Bathing Water Protected Areas are assessed annually against the following classifications:

- Excellent – the highest, cleanest class
- Good – generally good water quality
- Sufficient – the water quality meets the minimum standard
- Poor – the water quality has not met the minimum standard

There are 115 Bathing Waters in Wales and 2 in the English part of the Dee RBD, including new inland bathing waters. Up to date status information for all Bathing Water Protected Areas in Wales is available on our website, with historic data available for each site and includes a 24-hour water quality prediction. For Bathing Waters in England see Check the quality of beach and bathing water in England - GOV.UK

Bathing waters are monitored and classified under the Bathing Water Regulations 2013 and Bathing Water (Amendment) Regulations 2025, which cover England and Wales.

Shellfish Water Protected Areas (SWPAs) are assessed against the microbial standard in shellfish flesh each year. To allow consideration of inter annual variation a broader timeframe of 10 years is considered for compliance. If a SWPA has met the microbial standard in 8 out of the last 10 years, it is considered to be a consistent achievement of the standard and ensuring no deterioration is considered the priority objective for those SWPAs. Data collected for the Food Hygiene Regulations implemented by the Food Standards Agency is used in the SWPA compliance and deterioration assessments.

Welsh Government conducted a review of SWPAs in Wales in 2022 resulting in 7 being declassified, 15 being retained and 1 new Shellfish Water being designated for the first time (Lower Cleddau). A further review is expected to be completed in 2027.

European Sites Protected Areas

In Wales the condition of designated habitats and species features in SAC and SPAs for the Habitats Regulations are reported every six years. In 2026, NRW produced Wales' first country-level assessment under Regulation 9A of the Habitats Regulations. The report, Natural Resources Wales / Habitats Regulations 9A Report for Wales 2019-2024 prepared on behalf of the Welsh Government, integrates information on habitats, non-bird species and birds. The report provides a comprehensive account of their trends, pressures and conservation measures.

In June 2025, NRW published the condition assessments for the Welsh European Marine sites (SAC's and SPAs).

In 2024 NRW published an updated SAC River Water Quality compliance assessment alongside the WFDR interim classification. Providing an updated picture to that reported in the January 2021 report.

For cycle 4, in the Western Wales RBMP there are further updates to the phosphorus targets for two river water bodies on the Afonydd Cleddau SAC and one additional water body has been added to the Afon Teifi SAC. The water bodies on the Afonydd Cleddau are the Cleddau North - H'waters to conf with W. Cled GB110061038680 where the phosphorus target is changed from 40 µg/l to 34 µg/l and the Nant y Bugail - headwaters to conf with Cleddau N. GB110061038660 where the phosphorus target is changed from 40 µg/l to 28 µg/l. These two changes are due to improved data. The additional water body on the Afon Teifi SAC is the Berwyn/Brennig - headwaters to confluence with Teifi GB110062043470. This water body was inadvertently missed in the original target setting exercise.

Updated water quality assessments for all the SAC rivers in Wales will be published alongside the WFDR cycle 4 final classification, in 2027.

Aligning water quality objectives for SAC rivers

Under Regulation 13 of the WFDR it states that where more than one objective relates to a given body of water, the most stringent objective will apply. NRW has interpreted the term 'objective' to mean water quality standards/targets.

Under WFDR water quality standards are derived in the statutory WFD (Standards and Classification) Directions (England and Wales) 2015. Under the Habitats Regulations, standards for Special Area of Conservation (SACs) designated rivers are set via the Joint Nature Conservation Committee Common Standards Monitoring guidance. Then, in Wales, applied when published in a Core Management Plan for each site. To access these plans please visit the Natural Resources Wales / Find protected areas of land and sea area of our website, search for the river water body of interest e.g. River Wye and check the designation type as SAC, the core management plan will be listed underneath.

We have continued to review water quality parameters in SAC river water bodies that have standards/targets under both WFDR and Habitats Regulations to ascertain which is the most stringent. These are available on the Water Watch Wales menu. Note that the Common Standards Monitoring standards will not be used in classification of river water bodies under the WFDR.

As part of the draft cycle 4 RBMP consultation, we have also included information on changes in the water quality targets for SAC lakes, available on the Water Watch Wales menu.

4.2.2 Water body status monitoring networks

A network of monitoring sites is used to establish the actual condition of all water bodies within each RBD in terms of their ecology, water chemistry, flow and groundwater level.

For rivers and lakes, a network of monitoring sites is used to classify all water bodies according to the priority pressures acting on the environment. In coastal and estuarine waters our operational programme is focussed on the priority pressures. A smaller network of surveillance sites is used across all surface waters to provide information on long-term natural and anthropogenic trends and to inform development of the assessment tools and design of future monitoring programmes.

For groundwater two monitoring networks are used to provide classifications. A groundwater quality monitoring network meets the surveillance and operational monitoring requirements for chemical status and trend assessment, and a groundwater level monitoring network is used to meet the requirements of quantitative status assessment.

Supporting information

You can find maps showing the monitoring networks on Water Watch Wales.

4.2.3. Assessment of water body status

The WFDR requires the status of water bodies to be assessed. This assessment is created by classifying data from the monitoring network. For a particular point in time a classification will show us whether the quality of the environment is good, or where it may need improvement.

Classification is just one part of the evidence base that helps to focus efforts on those water bodies where a difference needs to be made. Additional information is sometimes required to assess whether a classification result is indicative of an environmental problem. Additional evidence may also indicate where problems exist that are not apparent through classification results alone. NRW's approach to assessing environmental problems is described in more detail in section 4.2.4.

For surface waters there are two separate classifications for water bodies, ecological and chemical. For a water body to be in overall good status both ecological and chemical status must be at least good.

For groundwater there are two separate classifications for groundwater bodies: chemical status and quantitative status. Each must be reported in addition to the overall groundwater body status. For a groundwater body to be at good status overall, both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating due to pollution, and which may lead to a deterioration in status in the future.

i. Ecological status

Ecological classification consists of:

- The condition of biological elements, for example fish
- Concentrations of supporting physicochemical elements, for example the oxygen or ammonia levels
- Concentrations of specific pollutants, for example copper
- Totally or nearly totally undisturbed conditions for high status hydromorphology (hydrological regime and morphology combined)

Ecological status is recorded on the scale of high, good, moderate, poor or bad. High status denotes largely undisturbed conditions while the other classes represent increasing deviation from this reference condition. The classification of ecological status for the water body and the confidence in this, is determined by the worst scoring quality element.

Only biological elements are currently recorded on the full scale, high to bad. Supporting physicochemical elements are not reported below moderate status. However, the UKTAG, the UK-wide collaboration to develop best practice, has produced standards that distinguish between moderate, poor and bad for physicochemical elements. NRW uses this information as part of our evidence base as well.

Hydromorphological elements (hydrological regime and morphology) are supporting elements of ecological status and are classified as “high” or “not high”. Hydromorphological elements and the absence of invasive species are used to define and classify high ecological status.

ii. Surface water chemical status

Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the Environmental Quality Standards Directive as transposed into the WFD (Standards and Classification) Directions (England and Wales) 2015 (referred to as EQSD). Chemical status is recorded as either good or fail. The chemical status classification, including certainty, for the water body is determined by the worst scoring chemical. Assessment of chemical status has been based on monitoring data from within the water body.

Classification of ubiquitous, persistent, bioaccumulative and toxic chemicals (uPBT). Because of the bioaccumulative nature of uPBTs we are now directed to monitor these chemicals in the tissue of fish and shellfish. We cannot sample the environment for these chemicals as widely as we do with water samples and we will only sample fish and shellfish when we are confident that we are not impacting on natural populations. This limits the number of water bodies we assess for these kinds of chemicals in Wales and so NRW is actively investigating other methods and techniques to assess the risk to higher trophic levels that uPBTs pose. For this reason, we have only reported uPBTs in water bodies we have monitored whilst we research and collate the evidence required to report uPBTs on a wider scale in the future. The chemical narratives (Appendix B) show the wider risk that these uPBT chemicals pose.

iii. Groundwater status - chemical and quantitative

The achievement of good status in groundwater involves meeting a series of conditions which are defined in the WFDR. To assess whether these conditions are being met, a series of tests has been designed for each of the quality elements defining good (chemical and quantitative) groundwater status.

There are five chemical and four quantitative tests. Each test is applied independently and the results combined to give an overall assessment of groundwater body chemical and quantitative status. The worst-case classification from the relevant chemical status tests is reported as the overall chemical status for the groundwater body and the worst-case classification of the quantitative tests reported as the overall quantitative status for the groundwater body. The worst result of these two is reported as the overall groundwater body status. Groundwater bodies are classified as either at good or poor status.

iv. Groundwater trend assessment

For groundwater bodies that have been identified as being at risk of failing to meet their environmental objectives for groundwater quality, there is a requirement to identify any significant and sustained upward trends in pollutant concentrations. A significant trend is one that could lead to a groundwater body failing to meet its environmental objectives before 2027 if measures are not put in place to reverse the trend.

v. Ecological potential

For water bodies that have been designated as heavily modified or artificial, NRW must classify according to their ecological potential rather than status. UKTAG have adopted the ‘mitigation measures approach’ and the mitigation measure assessment is a classification element for A/HMWBs.

This approach first assesses whether measures required to mitigate impacts associated with physical modifications necessary to provide the designated use(s) are in place. If it can be demonstrated that mitigation measures are likely to have a significant adverse impact on the use, these are not required. Guidelines for significance are assessed individually for each designated use, and it is recognised they will vary between sectors.

If all required mitigation is in place, the water body is classified as achieving good ecological potential. If all required mitigation is not in place, the water body is classified at moderate ecological potential.

Before classification of overall ecological potential for an A/HMWB can be produced the second step is to cross-check results of the mitigation measure assessment with biological and physicochemical classification data.

Where biological classification elements indicate impacts of additional pressures that are not physical modifications, ecological potential is classified to reflect this. For example, if the diatom or phytoplankton status is ‘poor’ because of nutrient pressures and the mitigation measure assessment classification element is at ‘good’, the overall potential classification will reflect the failing ecological elements. This also applies if physicochemical quality elements classify at less than good. As with diatoms, physicochemical elements can reflect combined impacts in addition to physical modification pressures and must also be reflected in the overall ecological potential classification.

Where the hydrological regime classification element is “not high” (for example, due to over-abstraction) the mitigation measure assessment element is overridden so that biological classification elements set overall ecological potential. Doing this avoids misrepresenting the potential of a water body where, despite all mitigation measures being taken to address the physical pressures, ecology is less than good because of e.g. over-abstraction.

There may be HMWBs in which morphologically sensitive biological elements are at ‘good’ status, suggesting the physical modifications are not having an impact. For these HMWBs we have reviewed the biological evidence and where there is high confidence of no long-term impact on the biological receptors, the heavily modified water body designation will be removed (see Appendix A).

Supporting information

The latest assessments of status for water bodies in Wales can be found on Water Watch Wales

4.2.4. Considering wider evidence of an environmental problem

As noted earlier, classification is just one part of the evidence available on the state of the water environment and additional information is sometimes required to assess whether a classification result is indicative of an environmental problem in a water body.

For surface waters the certainty that an element or water body is at less than good status is expressed using the three categories of very certain, quite certain and uncertain. These definitions are based on statistical certainty from analysis of the monitoring data used to derive the classification results (very certain ≥95%, quite certain ≥75% <95%, uncertain >50% <75%).

The level of certainty we need to have that an element really is at less than good status will be influenced by the actions required to resolve the environmental problem. If costly or targeted regulatory measures are required, then a high degree of certainty that there is a problem is usually required to justify the action. However, for some low cost, voluntary type measures action may be justified where there is much less certainty in the classification result.

Classification and statistical certainty derived from operational monitoring may be unable, on their own, to provide the certainty needed to justify the actions that may be required, particularly if the failure is caused by pollution from diffuse or intermittent sources. In these cases, additional evidence is used to make a pragmatic, qualitative judgement of the certainty that there is a problem to solve. This additional evidence could come from, for example, pollution incident or investigative monitoring data.

The classification results provide part of that evidence, but it is important to note that the additional evidence to improve certainty that there is, or is not, a problem to solve does not over-ride the formal classification result.

Assessments of eutrophication

Eutrophication is when there are too many nutrients in water, causing algae and plants to grow excessively. This affects the quality of the water and how it can be used, as well as damaging the local wildlife.

To assess nutrient impacts on biological status, classification results are considered alongside wider evidence in eutrophication assessments. These assessments do not affect element-level classification but help target nutrient reduction measures. Failures are investigated to identify their causes.

Nutrient standards are based on the relationship between nutrient concentrations and the biological effects of eutrophication. However, because predicting impacts in individual water bodies is uncertain, exceedance of a nutrient standard alone is not considered sufficient evidence of biological impact. Additional evidence is therefore used to inform the targeting and prioritisation of measures.

Where available, wider evidence, including investigation findings, is used to increase confidence in eutrophication assessments. While this does not affect classification outcomes, it supports decisions on subsequent actions, particularly where costly regulatory measures may be required. This approach links standards, classification, investigation and management measures.

Citizen Science

In recent years, there has been growing interest from citizen scientists in collecting information to support improvements in water quality and the wider environment. While citizen science is well established in species recording, water quality monitoring is still developing. Where citizen science data are relevant and appropriately designed, NRW may use water quality data as supporting evidence. Although citizen science data are unlikely to be used directly in WFDR classification, they can provide supplementary evidence to help identify problem areas. NRW aims to work with citizen science to explore how data can help address evidence gaps and improve understanding of local environmental conditions. Groups wishing to collaborate with NRW are recommended to submit a Citizen Science Collaboration Request through Citizen Space.

4.3 Water body changes for cycle 4

All proposed water body changes are summarised in Appendix A. The types of water body changes proposed are:

- Heavily modified water body designations
- Naming and geographical boundary mapping changes
- Splitting and merging of cycle 3 water body boundaries

In the Western Wales RBD two individual river water bodies will be merged. In the Dee RBD one would be split into two.

The existing Dee – Chester Weir to Ceiriog (GB111067057080) river water body is over 65km long. It's the longest river water body in Wales and crosses the border between Wales and England. The water body is part of the River Dee and Bala Lake SAC and designated as a DrWPA.

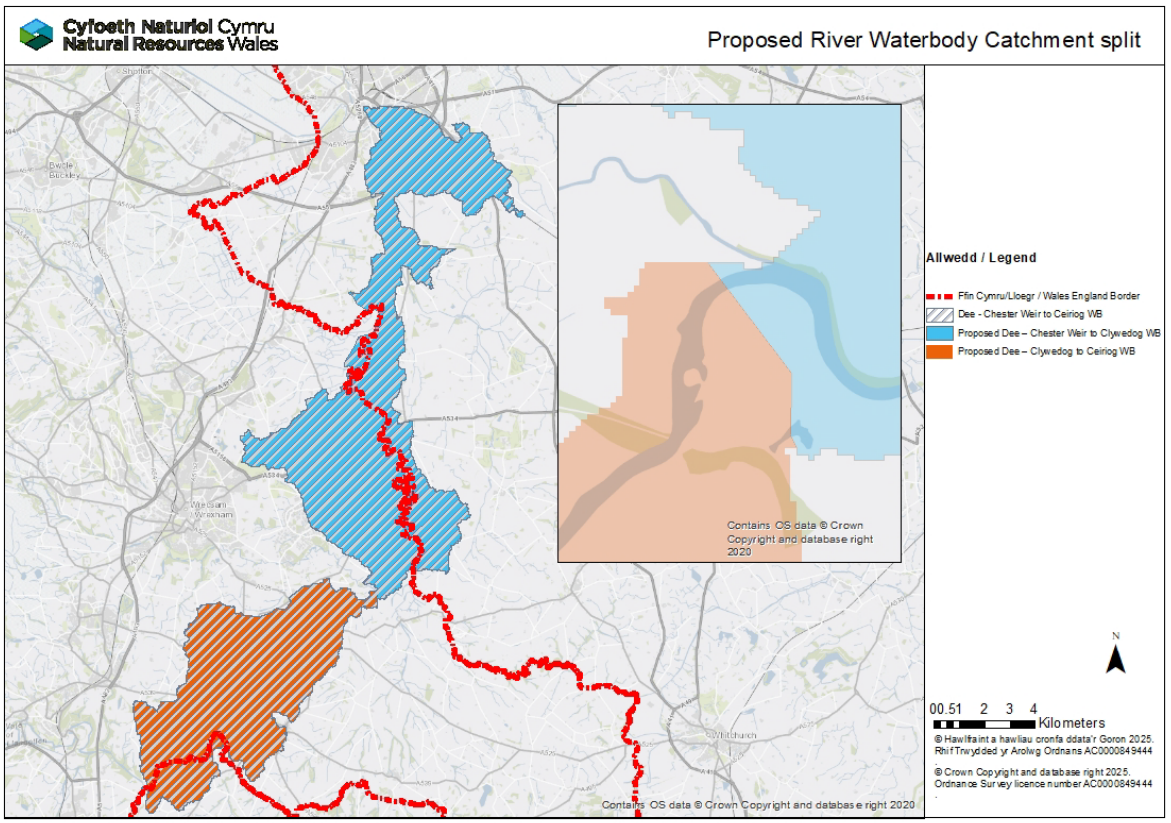
The upper part of the water body, around Bangor-on-Dee supports the Critically Endangered scarce yellow sally stonefly (Isogenus nubecula) and is the main spawning and nursery area for sea lamprey in the SAC.

There is an evidence base that demonstrates that the water body is too long with significant ecological variation along its length. This is reflected in data from sample points down the river, which indicate large differences in water quality. Consequently, making it difficult to correctly classify under the WFDR. Current water quality standards, for the whole water body are not necessarily protective of key nature conservation features.

We are recommending that the water body be split into two separate water bodies (Figure 2 below), 50m upstream of the confluence with the Clywedog. The proposed split will be upstream of the discharge location from the Five Fords wastewater

treatment works (see Map). The Clywedog has been selected as it marks the approximate point where the river transitions from a relatively nutrient poor, upland influenced river to a more slow-flowing nutrient-rich river. The new river water bodies would be called Dee – Chester Weir to Clywedog and Dee – Clywedog to Ceiriog, creating two river water bodies of approximately 30 and 35km, respectively.

Figure 2: Proposed split of Dee – Chester Weir to Ceiriog (GB111067057080) river water body



If accepted (subject to the outcome of draft RBMP consultation), the proposal would result in a tightening of the phosphorus standard from 50 ug L-1 to 20 ug L-1 in the upstream water body (Dee – Clywedog to Ceiriog). This would then be incorporated into NRW's Dee SAC Core Management Plan, Planning and Permitting Advice and Periodic Review 29 planning. The phosphorus standard in the downstream water body (Dee – Chester Weir to Clywedog) would remain unchanged. There would also be a minor tightening of the ammonia standard.

The current Dee – Chester Weir to Ceiriog DrWPA will also be split into two. The current DrWPA is "at risk" for bacteria and pesticides (2021) and has safeguard zones associated with it, in both Wales (Safeguard Zone 23) and England (SWSGZ3200).

4.4 Significant water management issues

4.4.1 Reasons for not achieving good status and reasons for deterioration

Where an element is classified as being at less than good status an assessment is needed of the actions that could be taken to improve the status to good. In order to identify appropriate actions, it is first necessary to understand the cause of the failure. The cause is recorded using a defined set of reasons. Where a biological element, for example fish or invertebrates, is at less than good status the pressure, for example ammonia or sediments, causing the failure is also identified.

In addition to identifying the pressure responsible for not achieving good status we also identify the type and source of the problem. This consists of three pieces or tiers of information.

- Tier 1 = significant water management issue, for example ‘diffuse source’, ‘point source’ or ‘physical modification’
- Tier 2 = more detailed activity or source, for example ‘arable field’, ‘sewage discharge (continuous)’ or ‘flood protection structures’
- Tier 3 = category and sector, for example ‘agriculture and rural land management’, ‘water industry’ or ‘NRW’

If more than one reason for not achieving good (RNAG) status is identified for a failing element (or for a pressure affecting a biological element) then the source apportionment of each reason is also recorded. For example, if there are two sources of ammonia, a diffuse source and a point source, then the relative contribution of each source to the overall ammonia problem is recorded.

A level of certainty (suspected, probable, or confirmed) is also assigned to each RNAG, based on a weight of evidence approach:

- Suspected
    - There is some information that points to a possible RNAG status
    - Further investigations are required before site specific measures can be identified
    - Part of the source-pathway-receptor linkage is missing, for example a probable source and receptor has been identified but the pathway is not established
- Probable
    - There is reasonable evidence that points to the RNAG status.
    - Further investigations are required before site specific regulatory or expensive measures can be considered

    - The source-pathway-receptor linkage has been established with reasonable certainty. There is reasonable evidence which generally give a consistent (that is, not contradictory) picture

- Confirmed
    - There is compelling evidence for the RNAG status. The available evidence should demonstrate cause and effect in a way that would be compelling to all stakeholders
    - No further investigations into the RNAG status are required before site specific regulatory or expensive measures can be justified
    - The source-pathway-receptor linkage has been established. There is good evidence which gives a consistent (that is, not contradictory) picture

Defining the problem in this way supports the appraisal of appropriate actions or measures to address the problem. The source apportionment information informs the targeting of effort and the analysis of the costs and benefits of any actions. The same approach is used for recording reasons for deterioration where a change in status class is detected.

As a result of the programme of investigations, the certainty associated with the reasons for failure data has improved.

Supporting information

You can find the RNAG data for water bodies in Wales on Water Watch Wales.

4.4.2 Significant water management issues

In 2025 using the RNAG dataset, NRW consulted on what are considered to be the most important issues that challenge the current and potential future uses and benefits of the water environment in each RBD. These Significant Water Management Issues are described in the RBMP documents as follows:

- **Physical modifications** – these involve artificial changes to natural forms and processes (morphology) including the continuity of rivers, lakes, estuaries and coastal waters. Modifying natural forms and processes can remove or reduce physical habitat and therefore ecosystem resilience.
- **Pollution from rural areas** – poor land management practices can result in nutrients, chemicals and sediment affecting the water environment. This is due to runoff from fields, farm infrastructure, sheep dipping and trampling of land (known as poaching) as well as forestry activities.
- **Pollution from towns, cities and transport** – Towns, cities and transport are sources of combustion by-products such as road transport and domestic fires such as wood burners. Emissions of hydrocarbons to the air from road transport have reduced since the 1990s, however in recent years increasing popularity of domestic wood fires have slowed this decline. These are released to the air and reach our waters via atmospheric deposition and runoff from hard surfaces such as roads and roofs. Historically air pollution from urban areas in Wales and abroad has also contributed to acidification of

our uplands, the effects of this continue to be felt. Industrial discharges releasing chemicals, metals and nutrients, contaminates sediment and harms fish and invertebrates.

- **Pollution from wastewater** – Wastewater includes treated water from wastewater treatment works, untreated intermittent discharges from storm overflows, sewage from houses misconnected to surface water drains rather than sewers and septic tanks. It can contain large amounts of nutrients (such as phosphorus and nitrogen), ammonia, metals and other damaging substances including viruses and bacteria. These can have a detrimental effect on habitats and a significant impact on our use of water, particularly the recreational use of bathing waters and shellfish waters. Unregulated discharges to ground and leaking subsurface sewers can cause point source and diffuse pollution of groundwater.

- **Pollution from abandoned mines** – Water draining from historic coal and metal mines is often contaminated with dissolved metals such as iron, lead, copper, zinc and cadmium. Affecting groundwater, rivers and subsequently discharging to estuarine and coastal waters. This can harm the river ecology, reducing fish populations and the diversity of invertebrate life.

- **Changes to the natural flow and level of water** –Water is essential for people and ecosystem resilience. Water supports all domestic human needs including drinking water, agriculture, industry, business uses, recreation, energy production including hydropower, navigation and recreational activities. These human uses of water mean that natural flows and levels of water in surface waters and groundwater aquifers, have been artificially changed. Rivers have been impounded by water storage reservoirs and weirs have been built to raise water levels to enable abstractions for a range of purposes. When too much water is abstracted or removed from our surface waters and groundwater, this can be harmful to ecosystems and reduces the water available for human uses and water dependent habitats and species which depend on it.

- **Invasive non-native species** – the effect on the health of the natural environment of plants and animals from outside the UK introduced to UK waters

4.4.3 Pressures

Some of the issues described above relate to a single pressure and others are more complex and involve a range of different pressures. Pressures can come from one or more sources or activities. These pressures are described below in more detail.

i. Abstraction and flow

Abstraction is the removal of water, permanently or temporarily, from surface waters (rivers, lakes, wetlands, canals and reservoirs) or from groundwater. Abstracting too much water has detrimental impacts on all water users and water dependent habitats and species. Impacts associated with abstraction depend on the quantity of water abstracted, the timing and location of the abstraction and whether any water is returned to the source after it has been used. The WFDR that abstraction and any associated impacts must not deteriorate the ecological status of surface and ground

waters and flows and levels required to support water dependent habitats and species protected by other legislation.

To avoid detrimental impacts and deterioration in ecological status, we manage water abstraction through a regulatory framework. We consider the needs of people and nature to determine abstraction licence applications. We assess and, where appropriate, apply conditions (such as restricting the quantity of water that can be abstracted) to protect the rights of other water users and nature. We review time-limited abstraction licences (to ensure continued environmental sustainability, justification of need and efficient use) and we monitor and assess abstraction license compliance. Together, these processes help to ensure sustainable water abstraction and manage any potential impacts.

Increasing human demands for water, due to population growth, warmer, drier summers and growth in agriculture and industry means abstraction from our rivers, lakes, wetlands, groundwater aquifers and estuaries will increase in the future. If abstraction continues at current and increased rates our natural surface and ground water resources will become depleted and current impacts on rivers, lakes, wetlands, groundwater aquifers and estuaries will be magnified, making ecosystems less resilient. Water company water resource zones covering 70% of the population in Wales could be in water deficit by 2050 under 1 in 500-year drought, unless leakage control, water efficiency measures and other operational changes are implemented. Water supplies will become increasingly vulnerable during prolonged dry and drought periods.

The CCRA (2026) recommends that to ensure safe and reliable water resource delivery, we should be designing and delivering actions for a 2050 climate now, using the following targets:

- By 2040 water supply should be resilient to a 1:500-year drought
- By 2050 all water bodies should achieve sustainable abstraction criteria

ii. Chemicals and emerging contaminants

Chemicals

Harmful chemicals from human activity can enter the environment by sources such as road runoff, wastewater, deposition from polluted air and agricultural activities. RBMPs include chemical quality parameters based on a comprehensive system that account for over 150 substances with well-established knowledge of possible risk to the environment.

A vast range of chemicals are used every day, both at home and at work, some of which can adversely affect the environment. Many of these chemicals come from using products in homes or businesses and get into the water environment via wastewater treatment works. Other sources of chemicals include industry and agriculture. For some substances, as well as current emissions from industry and wastewater treatment works, there are significant legacy issues. Some substances are already widespread in the environment as a result of past use which has contaminated water body bed sediment and land. In addition, historic industrial activity such as mining has led to significant transfer of metals from under the ground into the water environment.

Some chemicals can threaten the long-term sustainability of drinking water sources and lead to increased costs of treatment. They may also hinder the transfer of water from areas with abundant supplies to those where supplies are scarce.

There are major challenges to achieving objectives for some designated chemicals under the WFDR. For example, brominated flame retardants were banned in 2006 but are still present in many home furnishings like sofas and remain in the environment bound to sediments. These types of chemicals which are banned or controlled present particular difficulties to achieve relevant standards due to the legacy amount present in the catchment. For some common persistent toxic substances that can accumulate in the environment, the majority of waters may be at risk of not meeting Environmental Quality Standards (EQS), which are set to protect the environment.

For more information on chemicals see chemical narratives in Appendix B.

Under the WFDR there is a requirement to publish an inventory of emissions, discharges and losses of priority substances for each RBD. The inventory will be compiled for the final RBMP using environmental monitoring and point source effluent discharge data. In the longer term the inventory is intended to track the effectiveness of control measures on priority substance discharges at a national level.

Emerging contaminants

Anthropogenic pollution from chemicals is constantly changing as new substances are produced, used and discharged into the environment following the constant evolution of human society. As a result, in addition to the well-established list of substances in existing legislation, there is a need to assess a wider range of chemicals in the environment. These include, for example, pharmaceuticals, cosmetics, plasticisers, recreational drugs, biocides.

Passive samplers have been deployed in river and estuary sites across Wales since 2018 with the key object to screen for organic chemicals and identify potential emerging contaminants. 12 sites are monitored each year on a rotational basis. 2550 compounds have been screened with over 600 compounded detected.

Passive sampling is a method of monitoring which is designed to assess the presence and concentration of chemicals of interest over a period of time. The accumulation of contaminants over time by passive sampling allows for a longer period of monitoring than when using traditional spot or composite sampling, as well as allowing for detection of compounds which are typically present in the dissolved phase below method detection limits.

iii. Bacteria

Waters designated as Bathing Waters and SWPAs are monitored and protected. Certain bacteria, such as E. Coli and intestinal enterococci, present in waters can affect recreational users such as swimmers. It can also affect the quality of shellfish causing illness when consumed by people and increase risk levels to our drinking water sources. We must reduce the number of bacteria entering these waters where there are too many and maintain or improve levels where we are meeting relevant standards.

The bacteria typically come from faeces, either animal or human. Sources include wastewater discharges from the water industry and private sewage treatment works and agriculture. Small, private drinking water supplies can be at particular risk of bacterial pollution. We are working with the DWI and Local Authorities to see how we can manage the need for purification treatment at private supplies.

iv. Excess fine sediment

Soil erosion and soil compaction increases the amount and supply of fine sediment to water courses. Excessive amounts of fine sediment in rivers and lakes is a problem for freshwater ecosystem resilience because it can smother habitats and species. It can also increase flood risk, cause turbid water and reduce water quality – with associated impacts of increasing water treatment necessary for drinking water supply. These impacts may worsen with warmer wetter winter weather. Improved soil management can reduce the multiple impacts associated with excessive amounts of fine sediment by preventing and reducing soil production, supply and run-off.

v. Invasive non-native species

An invasive non-native species (INNS) is any non-native animal or plant that can spread causing damage to the environment, the economy, our health and the way we live.

INNS are one leading threat to global biodiversity; they can negatively affect the health of our water environment and are a direct threat to the ecological objectives we want to achieve through the WFDR.

INNS cost Wales an estimated £343 million a year (£147 million excluding the cost of fungi). This figure covers control and eradication costs only and excludes wider impacts such as structural damage, blocked infrastructure and production losses, meaning the true economic cost is substantially higher.

INNS management often reflects the Convention on Biological Diversity 3-tiered hierarchal approach to managing INNS which prioritises prevention, followed by early intervention and then containment/long-term control.

This approach underpins the GB INNS Strategy and INNS legislation, recognising that effective biosecurity and early intervention are the most effective and cost-efficient means of reducing the impacts of INNS. Once established, INNS can be difficult or impossible to eradicate.

The pressure and risks from INNS are increasing because of the continuing spread of established INNS and the likelihood of others being introduced due to increasing international trade and travel. Climate change may also increase the survival, proliferation and spread of INNS.

Many of our designated sites are affected by INNS and managing INNS on these sites will help them achieving and maintaining favourable condition.

We therefore need to develop and implement measures to reduce this pressure, the risks INNS pose to water body ecological status and to also minimise the risk of undermining all the other associated WFD Regulation improvement actions we are looking to undertake.

vi. Nutrients

Phosphorus and Nitrogen are essential nutrients for plants and animals. In natural conditions, they are released slowly and at low levels. In groundwaters excess nutrients can put DrWPAs at risk of requiring additional treatment and have negative effects on sensitive groundwater dependent terrestrial ecosystems. In freshwater and marine water bodies excess nutrients can lead to an accelerated growth of algae and undesirable disturbance to the ecosystem in a process termed eutrophication. This means we may see evidence of algal mats and changes to ecosystem structure.

Nitrogen is the main nutrient which can lead to eutrophication of estuaries and coastal waters and is one of the main issues for these waters in Wales. Recent science indicates that nitrogen may also play a role in eutrophication of freshwaters, particularly lakes. Increased temperatures and lower water levels under a changing climate are likely to exacerbate this.

In rivers, phosphorus is main nutrient that can lead to eutrophication. The main sources of phosphorus in our freshwaters are wastewater effluent and agricultural drainage. There are several sources of phosphorus within wastewater, notably human metabolic wastes, food additives, detergents and the dosing of drinking waters with phosphorus to control lead levels.

Human activity is responsible for the release of nutrients into the environment above natural levels. These nutrients can enter our water bodies through the way we manage land, such as the use of fertilisers, animal feed and manures as well as wastewater discharges.

vii. Physical modification

The most common challenge facing Welsh water bodies is **physical modification**. This refers to the *unnatural* condition of physical forms and processes due to at least one, but typically a combination of several different pressures.
Natural physical forms and processes are fundamental for ecosystem resilience – they create and sustain physical habitat and species that depend on good habitat condition and therefore, achievement of good" (or better) ecological status objectives.

Pressures that cause physical modification include:

- *Barriers to fish migration and natural channel continuity*. 'Barriers' is a general reference to structures including weirs, culverts, sluice gates and dams which create water storage reservoirs for drinking water supply and water regulation. Barriers prevent or restrict the up and downstream movement of fish and other mobile species, which is a problem because migration is crucial for their life cycle and supporting future populations. Barriers also restrict or prevent the downstream movement of coarse sediment and natural physical processes, which is problematic because they create and sustain physical habitat for different ecological needs.

- *Flood defence structures*, which protect people and property from flooding and coastal erosion. Examples include hard engineered riverbanks, out-of-channel adjacent embankments, groynes, sea walls and offshore breakwaters. These structures constrain the space rivers and estuaries need to move naturally and cause coastal squeeze. To protect people and

property, flood defence structures prevent the inundation of water in adjacent riparian, floodplain and coastal margins, which means that ecosystems depending on this natural inundation are fragmented and disconnected.

- *Urbanisation*. Built development changes the natural hydrology (flows and levels of water) in a catchment, including the routing of water to a watercourse. Impermeable surfaces can accelerate the supply of sediments and pollutants to a water course. Where built development has been inappropriately sited, it can also restrict the space needed for a river to move naturally.

- *Land Drainage*. Artificial channels which accelerate the drainage of water and sediment from land to downstream river areas have removed, reduced and disturbed natural channel forms and processes and therefore physical habitats. Artificial channels require ongoing management and maintenance to retain the capacity for their purpose of drainage, which causes ongoing disturbance to habitats and species that live in the channel.

Substantial changes to natural forms and processes made to provide important human needs such as drinking water supply or flood protection means they are designated as Artificial or Heavily Modified (A/HMWBs). Further information on A/HMWBs is provided in section 3.1.3.

viii. Plastics and microplastics

Plastics and microplastics are recognised as a widespread problem and they are having a harmful effect on nature and humans. Plastics are slow to break down in the environment and living organisms can be harmed as they become entangled in, or eat, plastic objects. Microplastics, are released into the environment as small particles or created as larger plastic objects break down. Microplastics are found in the rivers, lakes and seas of Wales as well as in wildlife. Chemicals found in microplastics as well as toxic contaminants accumulated onto them can impact organisms that live in our waters.

Further breakdown of particles leads to the even smaller nano-plastics which are able to break into the cell wall in any organisms and lead to further impact. Currently NRW does not monitor for microplastics as is it not a legislative requirement, other research has identified microplastics present in Welsh aquatic habitats and the wildlife that live there.

The UK along with other Commonwealth countries have pledged to eliminate avoidable single use plastics and other avoidable plastic waste under the 'Commonwealth Clean Oceans Alliance', this agreement aims to call on all countries to pledge action on plastics and take steps to stop plastics entering the water environment in the first place. Welsh Government brought in The Environmental Protection (Single-use Plastic Products) (Wales) Act 2023

ix. Climate Emergency

A climate emergency was declared in Wales by the Welsh Government in 2019. We are beginning to see some of the effects of a changing climate, including higher annual temperatures and more sunshine hours, with summer drought and increases in winter rainfall. The impacts of climate change are expected to worsen, with predictions of higher temperatures and more extreme weather events.

More frequent intense rainfall events can increase runoff of water and sediment from land, bringing associated pollutants into freshwater and an increased risk of flooding.

More frequent storms and rising sea levels may lead to damage and loss of some intertidal marine habitats. Decreases in summer rainfall will lead to longer periods of water scarcity. Lower flows may increase concentrations of pollutants.

Higher temperatures and lower flows have negative impacts on our ecosystems, affecting migration, spawning success and increasing fish mortality. Higher temperatures also lead to more frequent incidences of algal blooms. In marine ecosystems increasing temperatures have been shown to change ecosystems including plankton and rates of fish growth and maturation. Higher temperatures could lead to marine heatwaves and exposure to high temperatures during low tide periods. Increasing levels of carbon dioxide in the atmosphere lead to increased levels of carbon dioxide in sea water making it more acidic.

Section 2.2.7 of this document provides details of the governance, policy framework and future climate predictions.

x. Nature Emergency

Wales is rich in nature and home to valuable and unique wildlife. However, there has been a significant loss of biodiversity and ecosystem resilience over the last 50 years. In response to this the Welsh Government declared a nature emergency in Wales in 2021. Species such as Atlantic Salmon and Curlew have suffered critical declines and 18% of our species are at risk of extinction from Wales including Fen Orchid and Water Vole.

Improving and protecting the water environment from source to sea provides a significant contribution to achieving the Welsh Government's nature conservation and biodiversity obligations and ambitious goal of the Global Biodiversity Framework, protecting 30% of our land, freshwater and seas by 2030.

4.4.4. Issues affecting protected areas

Protected areas are a priority for action. The same pressures that affect water bodies achieving good status frequently also affect protected areas achieving their objectives.

i. Drinking Water Protected Areas

There are 125 surface water (lakes and river catchment) DrWPAs in Wales and all 38 ground waters in Wales are designated DrWPAs. The main issues affecting surface water DrWPAs are pesticides (either individual pesticides that are hard to treat or low levels of a number of pesticides that lead to a cumulative risk to the drinking water standard), increasing nutrient levels (ammonia, nitrate, nitrite and phosphate), taste and odour (MIB Methylisoborneol and Geosmin) compounds produced by blue green algae and bacteria from organic compounds found in upland areas.

ii. Shellfish Water Protected Areas

Of the 16 SWPAs designated. Three were not actively farmed in 2023 or monitored, with one only having one monitoring result. Two complied with the microbial standard in shellfish flesh.

Microbial pollution of SWPAs originates from multiple point and diffuse sources including wastewater treatment works, storm overflows, rural land use and urban surface water runoff.

NRW has undertaken shellfish water action plans to investigate issues and identify interventions required. The investigations completed by DCWW in Asset Management Plans (AMP) 6 and 7, combined with a disproportionate cost assessment, identified improvements to wastewater discharges in Menai Strait East and Burry Inlet North. Improvements were undertaken in AMP 7 and further improvements are due in AMP 8.

iii. Recreational Waters (Bathing Waters)

Tougher standards were applied to Bathing Waters from 2015. In 2025 110 of the 112 designated Bathing Waters in Wales met the minimum water quality standards: 78 achieved the highest classification of excellent, 26 achieved good, 6 achieved sufficient and 2 failed to achieve the standard. The most significant sources of pollution affecting Bathing Water compliance are from wastewater treatment works or storm overflows; faeces from grazing animals; urban run-off which contains dog and bird faeces; or from birds and animals on the beach (for example seagulls, pigeons, dogs, horses and donkeys). The proportions of these multiple sources of microbial pollution vary from site to site and in response to weather patterns. Identifying the source of microbial pollution can be very difficult.

iv. Nutrient Sensitive Areas (UWWTR)

Under the Urban Waste Water Treatment (England and Wales) Regulations 1994 there are 4 freshwater and 3 estuarine water bodies designated as sensitive areas (eutrophic). NRW continues to work with the water industry to identify and review what is needed to maintain and improve treatment at wastewater treatment works to control levels of nutrients and improve unsatisfactory intermittent discharges.

v. European sites

For all SAC habitats across Wales, mixed source pollution is the most widespread and most significant pressure (Habitats Regulations report for Wales 2019-2024). Agriculture related practices are a major pressure, impacting 52 habitats, particularly heaths, wetlands, grasslands, uplands and freshwater habitats. Climate change, urban and infrastructure development and alien and problematic species are also frequent pressures across habitat types.

Some of Wales' most vulnerable species (species in peril) are found within water dependant European sites. Including species that have declined to near extinction and species found nowhere else in the UK. NRW is developing a prioritised action plan focussing on the declining species and species where Wales has global responsibility. Key threats include tree loss, vegetation succession and hydrological change.

One of the key issues affecting water dependant European sites is excess nutrients. Some of the SAC Rivers in Wales continue to fail to meet nutrient targets, mainly due to pressures from agricultural sources and wastewater discharges. NRW has carried out investigations of the water bodies failing to meet the more stringent SAC River water quality targets and identified water body measures. Welsh Government have funded the establishment of a number of SAC River nutrient management boards. SAC river nutrient management plans have been produced by a range of organisations. Sewage discharges have been identified for investment in phosphorous improvements by 2030 and a number have new phosphorous back stop limits to limit the risk of deterioration.

In 2025, NRW published the condition assessments for the Welsh European Marine sites (SACs and SPAs). The main issues commonly affecting marine SAC feature condition are water quality pressures, physical disturbance of habitats, changes to coastal and estuarine processes, disturbance to protected species including impacts to migratory fish species and cumulative impacts from multiple human activities.

Some marine SACs are failing to meet their dissolved inorganic nitrogen targets. As a result, Welsh Government commissioned independent practical advice and assistance to support development planning, particularly the delivery of affordable housing, affected by the condition assessments for marine protected Special Areas of Conservation. This is published on the Welsh Government website. An integrated approach was considered as an alternative to the nutrient neutrality approach to mitigation. Catchment Nutrient Recovery Plans are a key requirement for the implementation of an integrated approach.

NRW is currently developing the Catchment Nutrient Recovery Plans for the riverine catchments flowing into the Milford Haven Inner (Nitrogen and Phosphorous) and the Burry Inlet Inner (Nitrogen only) water bodies, in the first instance. The plans will need to be integrated with other delivery and management plans e.g. nutrient management plans and any implementation mechanisms / approaches developed by Local Planning Authorities to use these plans in their assessment of plans and projects under the Habitats Regulations and decision-making processes.

NRW is also exploring options for nitrogen permitting and the Welsh Government have commissioned consultants to undertake a nutrient trading pilot scheme.

The NRW designated sites database (Safle) is the principal source for determining required actions, supplemented by reference to published Conservation Objectives in Core Management Plans for European sites.

Supporting information

Protected sites and features

Natural Resources Wales / Find protected areas of land and sea

Habitats Regulations 9A Report for Wales 2019-2024

Terrestrial and Freshwater Species in Peril in Wales

2024 Water Quality compliance assessments in river SACs

2025 Marine Protected Area condition assessment

Natural Resources Wales / Advice to planning authorities for planning applications affecting nutrient sensitive Special Areas of Conservation

4.4.5 Assessing risk

The WFDR require us to periodically review and, where necessary, revise our understanding of specific pressures on the status of water bodies in each RBD by producing risk assessments. Risk assessments developed for previous RBMPs were reviewed and updated as required. Where appropriate, previous assessments were carried forward, while others were updated using new data and evidence.

The WFDR requires the risk assessments to be used to optimise the design of the monitoring programmes (Regulation 11) and the programmes of measures (Regulation 20). Many aspects of catchment scale planning will, in part, be informed by the water body risk assessments. The risk assessments may also be used to;

- Report projected future risk to the environmental objectives with associated reasons and apportionment of sources
- Inform whether failure to achieve an objective is due to an environmental problem
- Inform designing future investigations and programmes of measures
- Inform strategic environmental planning to future proof actions and measures and maximise cost effectiveness and benefits into the future
- Inform Area Statements

Supporting information

Maps will be produced for the final RBMP on Water Watch Wales

5. Objectives

Summary of this section

This section sets out the overall process for determining water body objectives.

Topics covered

Environmental objectives rules and disproportionate cost.

5.1 The environmental objectives of the WFDR

5.1.1 Setting water body objectives

This plan sets out what we intend to achieve by 2033 to meet the statutory objectives:

- **Prevent deterioration in status** - Water body status will not be allowed to deteriorate

- **Achieve the objectives for Protected Areas** - Achieve the standards set by the relevant legislation under which they were designated. For water dependent European sites, we will continue to work towards achieving conservation objectives

- **Aim to achieve good overall status/potential for surface waters and ground waters** - Implement measures to achieve good overall status where they are technically feasible and not disproportionately costly

This is identified by setting an objective for each water body and quality element. The detailed outcomes of this information can be accessed at, Water Watch Wales and a summary is provided in the draft Summary RBMP**.**

As required under WFDR we aim to implement measures to achieve good overall status/potential for surface and groundwaters by 2027. Alternatives to that objective are allowable which may result in two additional options:

- an objective of less than good by 2033 (less stringent objective) due to technical infeasibility (no known technical solution is available) or disproportionate cost (unfavourable balance of costs and benefits)

- or an extended deadline of good status/potential to, or beyond 2033 for reasons of natural conditions (ecological recovery) or technical infeasibility for a small number of chemicals

Where possible we have derived objectives using existing evidence (e.g. RNAGs, classification) however we have also used local judgement to identify those elements that are likely to improve over the next cycle or further in the future as a result of measures taken already or planned in the next cycle. Local judgement has also been used to identify water bodies where it may be considered technically infeasible to achieve good status.

Objectives are derived for each element and then combined to provide an overall objective for each water body. When combining objectives, the 'lowest' objective of all element objectives is given to each water body. These are available to download from Water Watch Wales. A summary of the application of alternative objectives for those water bodies that are not at good or high status are given below in Table 3.

Table 3: Rules used to apply objectives

Rule No.	Rule	Objective	Reason for alternative objective
1	Locally identified water bodies that measures will be in place and the water body will meet good by 2033	Good by 2033	N/A
2	Locally identified water bodies that measures will be in place but will not improve by 2033	Extended objective of good status to year defined by expert judgement	Natural Conditions

Rule No.	Rule	Objective	Reason for alternative objective
3	Chemical failures for the following: Flouranthene (PS 15); Polyaromatic Hydrocarbons (PS 28); Mercury (PS 21); Dioxin and Dioxin like compounds (PS 37)	Extended objective, good/high by 2033	Natural Conditions
4	Use RNAGs to identify those water bodies that fail for acidification	Extended objective, good/high by 2033	Natural Conditions
5	Use RNAGs to identify water bodies where there is insufficient evidence of issue	Good by 2027	N/A
6	Use mitigation measures assessment to identify where mitigation measure is 'Not in place - technically infeasible'	Less than good 2033	Technical Infeasibility
7	Chemical failures for the following: Brominated diphenylethers; Hexachloro-benzene; Hexachloro-butadiene	Less than good 2033	Technical Infeasibility
8	Chemical failures for the following: Dicofol; Perfluorooctane sulfonic acid and its derivatives (PFOS); Cypermethrin; Hexabromocyclododecane (HBCDD); Heptachlor and heptachlor epoxide	Extended, good/high by 2033	Technical Infeasibility
9	Use metal mine report to identify those mines where further investigation is required before a solution can be found	Less than good 2033	Technical Infeasibility
10	Locally identified water bodies that are for other reasons technically infeasible	Less than good 2033	Technical Infeasibility
11	Water bodies that are not cost beneficial to improve	Less than good 2033	Disproportionate Cost
12	Any water body at less than good status to which none of the above rules apply	Good by 2027	N/A

Rule No.	Rule	Objective	Reason for alternative objective
13	European sites. Any water body with European site geographically related water dependent features which has been set with an objective of less than good	Good by 2027	N/A

5.1.2 Screening for disproportionate cost

The valuation of environmental costs and benefits is an evolving and developing field. Knowing that the benefits are likely to justify the costs of implementing an intervention ensures that public finances are used appropriately and effectively.

Indicative costs have been assembled to support screening for disproportionate cost and wider economic analysis within the River Basin Management Plans. The cost information is intended to provide a strategic and proportionate indication of the scale and relative cost of measures that may be required to address pressures on the water environment. It is not intended to represent detailed investment programmes or delivery-ready cost estimates. Costs should therefore be regarded as a first-pass assessment, recognising uncertainties associated with factors such as the extent of water bodies affected, local delivery requirements and benefits that may not be fully captured through national valuation evidence.

The assessment is based on updated cost information originally developed through the 2018 WFD Cost Analysis Methodology and subsequently reviewed and updated in 2026 where improved evidence was available. Cost estimates were developed for a shortlist of ten priority measures associated with the most common and well-understood RNAGs. Costing was restricted to river water bodies and included only RNAGs classified as Confirmed or Probable. Water bodies and measures were not costed where there was insufficient evidence to identify an appropriate intervention, where robust cost information was unavailable, or where pressures fell outside the scope of the methodology. As a result, not all measures or water bodies have associated costs and the overall costs of achieving environmental objectives are likely to be underestimated.

The measures included within the assessment are:

- Upland restoration
- Forestry management
- Improve fish passage or habitat
- Manage INNS
- Mine water remediation
- Reduce impacts of flood and erosion risk management structures
- Reduce pollution from sewage discharges
- Reduce pollution from septic tanks
- Reduce agricultural pollution
- Tackle misconnections

The benefits component of the Cost Benefit Analysis was focused entirely on valuations of water environments from the National Water Environment Benefits Survey. This is a stated preference survey examining how people value the water environment. When undertaken (and, more recently, updated) it produced estimates of the non-market benefits generated from improving the ecological quality of all water body types (rivers, lakes, estuaries and coastal waters). This has allowed NRW to quantify the benefits of improving overall quality from, say, moderate to good or poor to good in different catchment areas. It should also be noted that potentially benefits are most probably under-estimated in our model.

Costs and benefits have been discounted over a 40-year appraisal period in accordance with HM Treasury Green Book guidance, applying discount rates of 3.5% for years 0 to 30 and 3.0% for years 31 to 40. Water bodies with a benefit-cost ratio of less than one has been identified through the screening process as potentially disproportionately costly to improve unless it is geographically related to a protected area.

Since publication of the second RBMP, the Environment Act and Future Well-Being of Generations Act allow us to consider benefits of improvement in water quality that the benefits valuation for the WFDR may not include such as using mine water remediation to heat local homes. For this reason, measures in water bodies that are calculated to be disproportionately costly for the WFDR may be progressed if it is demonstrated that there are wider and significant SMNR values that would be accrued.

6. Programme of Measures

Summary of this section

This section sets out the overall approach to the cycle 4 Programme of Measures.

Topics covered

National and water body measures

6.1 Approach taken for cycle 4

The requirement to produce Programme of Measures and the content of that programme, is set out in the WFDR. Programme of Measures deliver the WFDR statutory objectives and within the RBMP these are organised by Significant Water Management Issue.

The updated Programme of Measures has been informed by information and evidence developed during previous cycles. For cycle 4, the RBMPs will now include measures for individual water bodies, which is a requirement clarified by the Court of Appeal judgement (Costa Beck judicial review).

The national measures and Opportunity Catchment actions (set out in the current cycle 3 RBMPs) were reviewed following an assessment of progress in 2025. Many of these are ongoing and will continue into cycle 4. The cycle 3 progress review has supported development of the cycle 4 Programme of Measures.

For the draft cycle 4 RBMP the most recent classification data has been used to identify measures for water bodies with (i) elements at less than good status/potential (e.g. fish, phosphate, mitigation measures assessment) and (ii) elements that have deteriorated. Water body measures included in the Programme of Measures address reasons for not achieving good status (RNAGs) and reasons for deterioration (RfD) assigned to each failing element as identified from our investigations programme.

Detailed actions are site-specific interventions to deliver water body measures. Further work to collate information on detailed actions has started and will continue throughout cycle 4. Many detailed actions have already been delivered and / or delivery is in progress within water bodies. However, in some water bodies the detailed actions required to achieve the water body objective may not yet be in place. Actions may not be in place yet for various reasons including funding availability, delivery mechanism, or the detailed action requirements may be uncertain.

Delivery of cycle 4 water body measures depends in part on partnership working. NRW is not responsible for addressing all water body failures and cannot deliver all required measures everywhere. NRW may not be the appropriate party to deliver the measures and actions required. Water body measures identify the sector responsible for the element failure.

Where SAC river water quality condition assessments (2024) (2021) have reported failure to comply with the SAC river water quality standards, NRW began a series of investigations. The SAC River water quality investigations followed the model of the WFDR investigations. For each water body and failing SAC water quality attribute, the investigations reviewed the available data to confirm the failure. Water body level measures were then identified. Using the investigation reports, water body level measures required to meet the more stringent SAC river water quality standard, were extracted and included in the Programme of Measures. NRW's protected sites database will be the repository for these measures.

The cycle 4 Programme of Measures does not include all measures required for all WFDR protected areas in Wales to meet their objectives at a water body scale. Even for SAC rivers, measures have not been included for all failing SAC attributes, just some water quality failing attributes (to meet the most stringent standards). For all water dependant European sites, actions required to restore and maintain favourable conservation status are held within NRW's special sites database, Safle and have not been duplicated in the cycle 4 Programme of Measures.

For some WFDR protected areas, like "at risk" Drinking Water Protected Areas, measures required to meet their objectives are identified by the Water Companies and held within their own systems, so are also not duplicated in the cycle 4 Programme of Measures.

The Programme of Measures can be delivered through a variety of different mechanisms, from regulatory interventions (e.g. permitting and enforcement) to non-legislative approaches (e.g. providing advice and guidance), these are often used in combination.

Many of the measures have multiple benefits, following the principles of SMNR. For example, sustainable drainage systems can help to reduce diffuse pollution, reduce surface run-off and flood risk and deliver biodiversity through green infrastructure

rather than hard engineering. A source to sea approach should be taken to integrate these programmes to maximise the opportunities and benefits.

6.1.1 Types of measures

The Programme of Measures includes national and water body measures:

National measures - These usually apply to the whole of Wales, England and Wales, or the United Kingdom. In general, these set the legislative, policy or strategic approach and support, or are critical to, local delivery and environmental outcomes. They also include some of the main delivery programmes. For example, a national ban on using a particular chemical or a national strategy for prioritising and funding the remediation of abandoned mines.

Water body measures – These apply to a specific water body and directly address a reason for not achieving good status/potential (RNAGs) or reason for deterioration (RfD). Water body measures also include investigations where a failure and RNAG / RfD is yet to be confirmed.

Supporting information

Programme of measures Power BI.

Cycle 4 Programme of Measures on Water Watch Wales.

6.2 Updating the Programme of Measures

This section sets out specific changes to the draft Programme of Measures for cycle 4 since cycle 3.

National measures and OpC actions have been updated using findings from the 2025 review of progress in implementing the measures established for the 2021 RBMP (2021- 2027). Each national measure and OpC action was assigned a progress status and this was used to inform a relevant update on those measures. This information is available on Water Watch Wales.

The progress of each national and OpC action is categorised as below. With the exception of completed and removed actions, all actions have been reviewed and where appropriate carried forward into the cycle 4 Programme of Measures.

Status	Description
Complete	The National measure / OpC action has been delivered. These are not included in the cycle 4 programme of measures
Green	Work to deliver the required measure / action(s) has started. They are ongoing

Status	Description
Amber	Delivery work has started; however, it has been delayed, or progress has fallen short of what was expected
Red	Delivery work has stalled. These National measures / OpC actions are unlikely to achieve the required deadlines
Not started	Work is yet to commence, and delivery date has not passed
Stopped	Delivery work has stopped for specific reasons
Review	National measure / OpC action wording requires review to ensure it accurately describes the requirement
Close	National measure / OpC action is no longer required because the requirement will be delivered by another. These have been removed from the updated Programme of Measures

Delivery mechanisms have been reviewed and updated to clarify the join-up and 'line of sight' between national measures and water body measures. More information about the supporting legislation to implement measures is available Legislation.gov.uk.

For Cycle 4 the national measures have been grouped by significant water management issue and the following delivery mechanisms:

Delivery Mechanism	Example
Regulation (legislative mechanisms)	Implement the Urban Waste Water Treatment (England and Wales) Regulations 1994 sensitive areas review
Strategic plans	Deliver the strategic outcomes of the Climate Resilient Fisheries Strategy for the sustainable management of migratory and freshwater fisheries of Wales

Delivery Mechanism	Example
Financial incentives	Welsh Government target Woodland Management incentives to deliver improvements to the water environment
Partnerships	Working with other organisations to protect and improve the water environment through NRWs Forums, in particular the Wales Water Management Forum
Investigations	Prioritise investigations to tackle water body failures due to abstraction
Water company investment (National Environment Programme)	Investigate, identify and deliver a range of catchment measures to achieve and maintain the bathing water standard in all designated bathing waters
Research, demonstration projects or pilots	Support research into effective control, eradication and monitoring methods for INNS (marine, terrestrial and freshwater).
General education, advice, campaign or scheme	Advise small and medium sized businesses on pollution prevention

Measures have been included for individual water bodies as clarified by the Court of Appeal judgement (Costa Beck judicial review). The approach for this work has been set out in this section and is new for the Cycle 4 RBMPs.

Additional national measures have been included, including new national measures for Bathing Water Protected Areas and Marine Protected Areas.

7. Summary of engagement

Summary of this section

This section looks at the engagement work we have done including public access to information and consultations.

An important principle of the WFDR is the engagement and involvement of a wide range of partners and stakeholders. As a first step to raise awareness and help secure this, stakeholders and the public need access to the information for the cycle 3 plans.

External groups/organisations are absolute key to the success of the WFDR. A significant amount of progress has already been made but we need to continue to build on maintaining these relationships to secure delivery of improvements to the water environment. Key stakeholders are represented on the WWMF. It is important that we develop strong relationships with wider sectors and work together to achieve wider benefits.

In the cross-border catchments, NRW is committed to working with the Environment Agency, Natural England and our partners in England.

7.1 Public access to information

Information has been made available to stakeholder and the general public through the following:

NRW Website

- Documents include the publication of the RBMPs, supporting information on objections, classification
- Contact details for the mailbox
- Information about the WWMF
- Link to the gov.uk for Environment Agency information on the Severn RBD

Water Watch Wales

The NRW Water Watch Wales is a collection of web maps, data and information related to the WFDR in Wales.

Other methods that we have used to communicate include

- Stakeholder mail outs
- Presentations
- Social Media
- Newspaper advertising for consultations

7.2 Consultations and working with others

There were two statutory consultations leading up to the fourth draft RBMPs, the Working Together consultation in 2024 and Challenges and Choices consultation in 2025, both of these were open for the statutory 6-month consultation period as required by the WFDR.

The promotion of both consultations followed a similar format. We used social media, namely Facebook and LinkedIn to promote the consultation. Notices of the consultation were published in the Western Mail, The Leader and the London Gazette as required by the WFDR. The press release was picked up by some other local newspapers. We also worked with the Environment Agency to support cross

border working. Awareness of the consultation was raised internally within NRW to encourage staff to promote to their external network of contacts.

Working Together: 22 June 2024 to 22 December 2024

We sought views on how stakeholders use RBMPs and what information is difficult to find. We asked how we can collaborate, which organisations, plans or strategies should be included in RBMPs and how we can make better links with protected areas. We also shared our timetable to update the Cycle 4 RBMPs. The consultation for the Dee and Western Wales was published on our Citizen Space Page https://ymgynghori.cyfoethnaturiol.cymru/water-planning/wt/. The consultation for the Severn was published on the Environment Agency's Citizen Space page https://consult.environment-agency.gov.uk/environment-and-business/working-together-2024/ .

We received 34 responses to the consultation from environmental charities, National Parks, water companies, NRW and land management groups. Through these respondents suggested organisations we should work with as well as plans and strategies to integrate into RBMPs. They suggested that the published River Basin Management Plans are complex, technical and difficult to digest and that timescales feel long. The value of local narrative that is more specific to local water bodies was highlighted. There was some concern that information on protected areas is hard to find and that this should be presented more consistently as well as closer links to Special Areas of Conservation (SAC) Core Management Plans. We need to make it easier to find data about protected areas, provide and present the data in a more consistent way. Respondents told us the Nutrient Management Boards in Wales work for the SAC Rivers is important. Respondents were concerned about the gaps in evidence and the need to integrate Protected Area actions in the Programme of Measures. There was also feedback relating to monitoring, data, evidence and governance.

Further information was published on 5 August 2025, please see our website - https://ymgynghori.cyfoethnaturiol.cymru/water-planning/wt/ .

Challenges and Choices: 21 October 2025 to 21 April 2026

We sought views on how we should track, evaluate and report progress. We shared the significant water management issues and asked whether stakeholders agreed with these. We shared our SEA and HIA and asked whether you agree with the assessment criteria and whether there is any additional information that should be included. We asked about the supporting ArcGIS StoryMap and whether respondents found it useful.

The consultation documents for the Dee and Western Wales were published on our Citizen Space page - https://ymgynghori.cyfoethnaturiol.cymru/water-planning/challenges-and-choices/ and the Severn on the Environment Agency's website https://consult.environment-agency.gov.uk/environment-and-business/swmi/; hard copies were also available on request.

A total of 54 responses were received that included a range of sectors including, land management, angling, water companies, public health, heritage and the environmental sector. Respondents wished to see tracking and reporting of measures at a water body scale. Most respondents agreed with the significant water management issues we identified but noted that there are interlinkages between

some of the issues. Stakeholders responded with support for the proposed SEA framework and that SEA and HIA are being undertaken. The ArcGIS StoryMap developed to complement the consultation was well received but could be strengthened. A summary was published on 21 July 2026. This included a summary of the comments received and an analysis of the main themes raised by respondents. These responses have informed the draft RBMP.

8. River Basin Management Plan requirements

The WFD Regulations 27(2)(d) set out the requirements for the RBMPs, this section provides information on where they can be found in the RBMPs.

WFD Regulation 27(2)(d) requirement	**Location within plan**
1. a general description of the characteristics of the River Basin District required under the legislation. This shall include:	RBMP summary section 1.1
1.1 for surface waters:	Details below
- mapping of the location and boundaries of water bodies	Water Watch Wales - Cycle 3 (2024) view for the map, we are not publishing Cycle 4 view for the draft plan, these will be updated for final plan as Cycle 4 (2027) and these will include the updated boundaries being consulted on in the draft RBMP
- mapping of the ecoregions and surface water body types within the river basin	Water Watch Wales – River Basin District map, Wales is within the England, Scotland and Wales ecoregion for the purpose of the WFD
- identification of reference conditions for the surface water body types	Technical Annex section 4.1.1, includes reference to UK Tag documents
1.2 for groundwaters:	Narrative in the RBMP summary section 2.1.4
- mapping of the location and boundaries of water bodies	Water Watch Wales - Cycle 3 (2024) view for the map

WFD Regulation 27(2)(d) requirement	Location within plan
2. a summary of significant pressures and impact of human activity on the status of surface water and groundwater, including:	Narrative in the RBMP summary section 2.2; Technical Annex section 4.4
- estimation of point source pollution	RBMP summary section 2; Technical Annex section 4.4
- estimation of diffuse source pollution, including summary of land use	RBMP summary section 2; Technical Annex section 4.4
- estimation of pressures on the quantitative status of water including abstractions	RBMP summary section 2; Technical Annex section 4.4
- analysis of other impacts of human activity on the status of water	RBMP summary section 2; Technical Annex section 4.4
3. identification and mapping of Protected Areas	Narrative in the RBMP summary section 1 and the Technical Annex 4.2.1; Water Watch Wales - Cycle 3 (2024) view for the map and web based protected area register which is linked from the RBMP landing page
4. a map of the monitoring networks established and a presentation in map form of the results of the monitoring programmes carried out under those provisions for the status of:	Maps on Water Watch Wales
4.1 surface water (ecological and chemical)	Water Watch Wales - Cycle 3 (2024) view for the map for surface water monitoring networks, includes chemistry flow and ecology. For the results add on the water body status labels
4.2 groundwater (chemical and quantitative)	Water Watch Wales - groundwater layer for chemical and quantitative
4.3 Protected Areas	Water Watch Wales - Cycle 3 (2024) view for the map, protected areas layer

WFD Regulation 27(2)(d) requirement	Location within plan
5. a list of the environmental objectives for surface waters, groundwaters and Protected Areas, including in particular identification of instances where use has been made of Part 5 exemptions and the associated information required	Narrative in the Summary RBMP section 3.1; Technical Annex section 6; Water Watch Wales - more data and information and new spreadsheet for daft cycle 4 objectives
6. a summary of the economic analysis of water use	Narrative in the Technical Annex section 3.6 and C1 RBMP Annex K
7. a summary of the programme or programmes of measures adopted Part 5, including the ways in which the objectives are achieved	Narrative in the Summary RBMP section 3.2 programme of measures; Technical Annex section 6; Water Watch Wales - more data and information Draft Cycle 4 Measures; Programme of Measures Power BI
7.1 a summary of the measures required to implement Community legislation for the protection of water	Narrative in the Summary RBMP section 3.2 programme of measures; Technical Annex section 6; Water Watch Wales - more data and information Draft Cycle 4 Measures; Programme of Measures Power BI
7.2 a report on the practical steps and measures taken to apply the principle of recovery of the costs of water use	Narrative in the Technical Annex section 3.6 and C1 Annex K (covering economic analysis of water use)
7.3 a summary of the measures taken	Information to be presented in the Final RBMP, interim progress review summary included in the Summary RBMP section 1.3
7.4 a summary of the controls on abstraction and impoundment of water, including reference to the registers and identification of the cases where exemptions have been made	RBMP summary and Technical Annex
7.5 a summary of the controls adopted for point source discharges and other activities with an impact on the status of water	RBMP summary and Technical Annex

WFD Regulation 27(2)(d) requirement	Location within plan
7.6 an identification of the cases where direct discharges to groundwater have been authorised	N/A
7.7 a summary of the measures taken on priority substances	RBMP summary and Technical Annex Appendix B
7.8 a summary of the measures taken to prevent or reduce the impact of accidental pollution incidents	RBMP summary and Technical Annex
7.9 a summary of the measures taken for bodies of water which are unlikely to achieve the objectives	RBMP summary and Technical Annex
7.10 details of the supplementary measures identified as necessary in order to meet the environmental objectives established	N/A
7.11 details of the measures taken to avoid increase in pollution of marine waters	RBMP summary and Technical Annex
8. a register of any more detailed programmes and management plans for the river basin district dealing with particular sub-basins, sectors, issues or water types, together with a summary of their contents.	Table of other plans and programmes available on Citizen Space
9. a summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence	Narrative in the Technical Annex section 7; Citizen Space You Said We did for each consultation
10. a list of competent authorities	Technical Annex section 3.8
11. the contact points and procedures for obtaining the background documentation and information referred to in Regulation 3 and in particular details of the control measures adopted in accordance with Regulation 20 and of the actual monitoring data gathered in accordance with Regulation 11	Monitoring data (Reg 11) available on Water Watch Wales as per section 4 in this table; Controls/ Measures (Reg 20) as per section 7 in this table; All information available on the NRW webpage, Water Watch Wales and the Programme of Measures Power Bi

WFD Regulation 27(2)(d) requirement	Location within plan
The first update of the RBMP and all subsequent updates shall also include:	Details below
1. a summary of any changes or updates since the publication of the previous version of the RBMP, including a summary of reviews to be carried out	RBMP summary section 1; Technical Annex section 4.3
2. an assessment of the progress made towards the achievement of the environmental objectives, including presentation of the monitoring results for the period of the previous plan in map form and an explanation for any environmental objectives which have not been reached	Will be presented in the final RBMP
3. a summary of and an explanation for, any measures foreseen in the earlier version of the RBMP which have not been undertaken	Water Watch Wales - more data and information Draft Cycle 4 Measures
4. a summary of any additional interim measures adopted since the publication of the previous version of the RBMP	No additional interim measures adopted

9. Glossary

The following list aims to provide brief explanations of many of the words, phrases and acronyms relating to river basin management.

Table 4: Glossary of terms

Term	Explanation
Alternative objectives	We aim to implement measures to achieve good overall status for surface and groundwaters by 2027. Alternatives to that objective are allowable which may result in either: • an objective of less than good by 2027 (less stringent objective) due to technical infeasibility (no known technical solution is available) or disproportionate cost (unfavourable balance of costs and benefits). or • an extended deadline of good status or potential beyond 2027 for reasons of natural conditions (ecological recovery) or technical infeasibility for a small number of chemicals.
Angiosperms	The flowering plants. In transitional and coastal waters, they include sea grasses and the flowering plants found in salt marshes.
Area Statement	The Environment (Wales) Act 2016 specifies that statements for the purpose of facilitating the implementation of the national natural resources policy must be prepared and published by NRW. Each statement will correspond to a specific area of Wales and include reference to natural resources in the area, the benefits they provide and the priorities, risks and opportunities for sustainable management that need to be addressed.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Artificial Water Body	A man-made surface water body, rather than a modified natural water body, which supports important aquatic ecosystems. It includes canals, some docks and some man-made reservoirs.
Asset Management Plan	See Periodic Review.

Term	Explanation
Bathing Water Regulations 2013	The overall objective of the Bathing Water Regulations 2013 is the protection of public health, but it also offers an opportunity to improve management practices at Bathing Waters and to standardise the information offered to bathers. It introduces a new classification system with more stringent water quality standards and puts an emphasis on providing information to the public. There has been a partial amendment to the Bathing Water Regulations 2013 with the Bathing Water (Amendment) Regulations 2025.
Biological element	A collective term for a particular characteristic group of animals or plants present in an aquatic ecosystem (for example phytoplankton, benthic invertebrates, phytobenthos, macrophytes, macroalgae, angiosperms and fish).
Biological indicators	A parameter that can be monitored to estimate the value of a biological quality element. Indicators may include the presence or absence of a particularly sensitive species.
Biological quality element	A characteristic or property of a biological element that is specifically listed in Regulation 6 of the WFDR for the definition of the ecological status of a water body (for example composition of invertebrates; abundance of angiosperms; age structure of fish).
Catchment	The area from which precipitation contributes to the flow from a borehole spring, river or lake. For rivers and lakes this includes tributaries and the areas they drain.
Characterisation (of water bodies)	A two-stage assessment of water bodies under the WFDR. Stage 1 identifies water bodies and describes their natural characteristics. Stage 2 assesses the pressures and impacts from human activities on the water environment. The assessment identifies those water bodies that are at risk of not achieving the environmental objectives set out in the WFDR. The results are used to prioritise both environmental monitoring and further investigations to identify those water bodies where improvement action is required.
Chemical Status (surface waters)	The classification status for the surface water body. This is assessed by compliance with the environmental standards for chemicals that are listed in the EQSD, which include priority substances, priority hazardous substances and other pollutants. Chemical status is recorded as good or fail.

Term	Explanation
Chemical Status (groundwater)	An expression of the overall quality of the groundwater body. The classification status for a groundwater body against the environmental criteria set out in the WFDR, as set out in Common Implementation Strategy guidance document No 18 and UKTAG guidance Paper 11b(i): Groundwater Chemical Classification for the purposes of the WFDR. All five of the component tests for chemical status must be assessed as good or poor and the overall chemical status.
Classification	This is the method for distinguishing the environmental condition or status of water bodies and putting them into one status category or another e.g. good, moderate.
Competent Authority	An authority or authorities identified in the WFDR. The Competent Authority will be responsible for the application of the rules of the legislation within each RBD lying within its territory.
Conservation Objective	Under the Conservation of Habitats and Species Regulations 2017 (as amended): it is the target for the species and/ or habitats for which a site is designated, for it to contribute to maintaining or reaching Favourable Conservation Status (see below) at the biogeographical level.
Cost effective	In the context of the WFDR, it describes the least cost option for meeting an objective. For example, where there are a number of potential actions that could be implemented to achieve good ecological Status for a water body, Cost Effectiveness Analysis is used to compare each of the options and identify which option delivers the objective for the least overall cost.
Detailed action	Site-specific intervention to deliver a water body measure.
Diffuse pollution	Pollution resulting from scattering or dispersed sources that are collectively significant but to which effects are difficult to attribute individually.
Disproportionate cost	The determination of disproportionate cost requires a decision-making procedure that assesses whether the benefits of meeting good status in a water body are outweighed by the costs.
Water Supply (Water Quality) Regulations 2018 and the Private Water Supplies (Wales) Regulations 2017	This relates to the quality of water intended for human consumption and covers both public and private supplies, setting standards for quality and monitoring

Term	Explanation
Drinking Water Inspectorate	The DWI is the independent regulator of drinking water in Wales and England. Their role is to ensure that water companies supply safe drinking water that is acceptable to consumers and meets standards set down in law. In addition, the chief Inspector of Drinking Water publishes annual reports about the quality of private and public drinking water in Wales.
Drinking Water Protected Areas	Bodies of water that are used or could be used in the future for the abstraction of water intended for human consumption.
Ecological potential	The status of an artificial or heavily modified water body (A/HMWB) measured against the maximum ecological quality it could achieve, given the constraints imposed by physical modifications in place to provide the designated use(s).
Ecological status	Ecological status applies to surface water bodies and is based on the following quality elements: biological quality, general chemical and physicochemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic) and hydromorphological quality. There are five classes of ecological status (high, good, moderate, poor or bad). Ecological status and chemical status together define the overall status of a surface water body.
Ecosystem	An ecosystem is made up of living organisms (plants, animals and micro-organisms) in conjunction with their non-living environment (air, water, minerals and soil) and all the diverse and complex interactions that take place between them.
Ecosystem Approach	An ecosystem approach focuses on the collective management of all resources – maintaining ecological integrity whilst allowing resource extraction/use – rather than managing multiple resources independently. This approach seeks to ensure the co-existence and development of healthy, fully functioning ecosystems and human communities. The term ecosystem approach originally comes from the Convention on Biological Diversity, where it is described as “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way”
Effluent	A liquid discharged as waste, as from an industrial plant or wastewater treatment works.
Environment Agency	The Environment Agency is a non-departmental public body sponsored by the United Kingdom government's Department for Environment, Food and Rural Affairs (Defra). The Agency's overall responsibility is the protection and enhancement of the environment in England.

Term	Explanation
Element	This is the term used under WFDR for a component of classification e.g. fish, macrophytes.
Estuarine	For our purposes by estuarine we mean transitional (see definition).
Exemptions	The environmental objectives of the WFDR are set out in Part 5. These include the general objective of aiming to achieve good status in all water bodies by 2015 and the principle of preventing any further deterioration in status. There are also a number of exemptions to the general objectives that allow for less stringent objectives, extension of deadline beyond 2015 or the implementation of new projects. Common to all these exemptions are strict conditions that must be met and a justification must be included in the RBMP. The conditions and process in which the exemptions can be applied are set out in Part 5.
Extended deadline	Under certain circumstances and subject to the detailed conditions in Part 5, the WFDR allows the deadline for achieving objectives to be extended. Extended deadlines can apply to water bodies where achievement of objectives by an earlier date would be technically infeasible or disproportionately expensive or not possible because of natural recovery time.
Eutrophication	The enrichment of waters by inorganic plant nutrients that results in increased production of algae and/or other aquatic plants, which can affect the quality of the water and disturb the balance of organisms present within it.
Favourable Conservation Status	The Conservation Status is the result of influences which include the present state of the habitat, together with current environmental and human influences (both positive and negative), that may influence its long-term survival. Favourable Conservation Status will typically be achieved when populations, ranges and extents are stable or increasing and when structures and functions necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
Flood Risk Regulations 2009	The purpose is to establish a framework for the assessment and management of flood risks aiming at the reduction of the adverse consequences on human health, the environment, cultural heritage and economic activity associated with floods in the Community. It requires member states to undertake flood risk assessments, flood risk mapping and produce FRMPs.
Good chemical status (surface waters)	Means that concentrations of chemicals in the water body do not exceed the environmental standards specified in the WFDR. These chemicals include Priority Substances, Priority Hazardous Substances and other pollutants.

Term	Explanation
Good chemical status (groundwater)	Means the concentrations of pollutants in the groundwater body do not exceed the criteria set out in the WFDR.
Good ecological potential	Surface waters that are designated as A/HMWBs must achieve 'good ecological potential'. Good ecological status cannot be achieved in these water bodies due to physical modifications present. Good ecological potential involves delivery of all measures required to mitigate impacts caused by physical modifications.
Good ecological status	The objective for a surface water body to have biological, structural and chemical characteristics similar to those expected under nearly undisturbed conditions.
Good quantitative status (groundwater)	See quantitative status (groundwater). Means the level of groundwater in the groundwater body meets the criteria set out in the WFDR.
Good status	Is a term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, when both its quantitative status and chemical status are at good status.
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Conservation of Habitats and Species Regulations 2017 (as amended)	Conservation of Habitats and Species Regulations 2017 (as amended) This legislation forms the cornerstone of nature conservation policy, built around two pillars, the Natura 2000 network of protected sites and species protection. The Conservation of Habitats and Species Regulations 2017 (as amended) protects over 1,000 animals and plant species and over 200 so called habitat types (e.g. special types of forests, wetlands, etc.) of importance.
Hazardous substances	Substances or groups of substances that are toxic, persistent and liable to bioaccumulate and other substances or groups of substances which give rise to an equivalent level of concern.
Heavily Modified Water Body	A surface water body in which natural river forms and processes have been substantially physically modified to provide human uses, such as drinking water supply and flood protection.
High ecological status	In a surface water body, hydromorphological, physicochemical and biological quality elements correspond to conditions totally, or nearly totally undisturbed by anthropogenic activities.

Term	Explanation
Hydromorphology	Hydromorphology is a supporting element in classification. It combines hydrological regime and morphology, which are separate classification elements. Hydromorphology describes hydrological and morphological forms and processes of surface water bodies. For rivers this includes the quantity and dynamics of flow, connection to groundwater, river continuity, river channel width and depth variation, structure and substrate of the river channel bed and structure of the riparian zone.
Invasive non-native species	Invasive and non-native species. Many species of plants and animals have been introduced to this country since Roman times. Several of these non-native species are invasive and have been causing serious problems to the aquatic and riverine ecology and environment. Problems include detrimental effects on our native species, deoxygenation of water causing fish mortalities, blocking of rivers and drainage channels, predation and competition with our native species and in some cases pose health risks to the public or livestock.
Management Catchment	RBDs are divided into a number of management catchments. In Wales there are 14 management catchments across three RBDs.
Mechanisms	The policy, legal and financial tools which are used to bring about actions (measures). Mechanisms include for example: legislation, economic instruments; codes of good practice; negotiated agreements; promotion of water efficiency; educational projects; research; development and demonstration projects.
Misconnections	Misconnections of sewage into surface water drains are a significant source of urban diffuse pollution in those areas where a separate drainage system is used. Misconnections happen when domestic plumbing has been connected into surface water drains instead of the foul sewer. This means untreated dirty water goes directly into rivers/waterways without receiving treatment.
Morphology	Describes physical forms and processes in a surface water body. For example, in rivers this includes channel width and depth variation; structure and substrate of the channel bed; continuity; and structure of the riparian zone.
National measure	These usually apply to the whole of Wales, England and Wales, or the United Kingdom. In general, these set the legislative, policy or strategic approach and support, or are critical to, local delivery and environmental outcomes. They also include some of the main delivery programmes.

Term	Explanation
Natural England	The government-funded body whose purpose is to promote the conservation of England's wildlife and natural features. The previously existing organisations English Nature, the Countryside Agency and Rural Development Service were merged to form Natural England.
Natural Resources	The living and non-living components of ecosystems.
Natural Resource Management	An approach to maintaining or restoring the composition, structure, function and delivery of services of natural and modified ecosystems for the goal of achieving sustainability. Based on an adaptive vision for future conditions taking ecology, socioeconomics and cultural needs into account.
Natural Resources Wales	NRW is the Competent Authority for implementing WFDR in Wales.
No deterioration (in water body status)	None of the quality elements used in the classification of water body status deteriorates to the extent that the overall status is reduced.
Objective (surface waters)	Each water body has three different status objectives: • Overall status objective; • Ecological status or potential objective; and • Chemical status objective. All three objectives have timescales in which they must be achieved. **Ecological status (or potential) objectives** are derived from the predicted outcomes for biological and physicochemical classification elements; and any Reason for Not Achieving Good status or potential (RNAG). **Chemical status objectives** are derived from the predicted outcomes for the chemical elements and any RNAG chemical status. **Overall status objectives** are derived from the ecological status and chemical status objectives.

Term	Explanation
Objective (groundwater)	Each groundwater body has three status objectives: • Overall status objective; • Quantitative status objective; and • Chemical status objective All three objectives have timescales in which they must be achieved **Overall status objectives** are derived from the quantitative status and chemical status objectives. In addition to status objectives, groundwater bodies have objectives to: • Prevent deterioration of status; • Prevent or limit the inputs of pollutants to groundwater; and • Reverse any significant and sustained upward trends in pollutant concentrations.
Periodic Review	This is the process, carried out every five years by Ofwat (the Water Services Regulation Authority), to assess the strategic plans for water company spending and investment. The plans include environmental improvements. The investment will often affect water customer charges and incorporates water company business plans (called Asset Management Plans).
Phytobenthos	Bottom-dwelling multi-cellular and unicellular aquatic plants such as some species of diatom.
Phytoplankton	Unicellular algae and cyanobacteria, both solitary and colonial that live, at least for part of their lifecycle, in the water column.
Point source pollution	Pollution arising from an identifiable and localised area, structure or facility, such as a discharge pipe or landfill.
Pollutant	Any substance liable to cause pollution.
Pollution	The direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which: (i) may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems; (ii) result in damage to material property; or (iii) impair or interfere with amenities and other legitimate uses of the environment.
Predicted outcome	The future status of a quality element or water body based on groups of practical and justified measures and the date when this status will be achieved.

Term	Explanation
Pressures	Human activities such as abstraction, effluent discharges or physical modifications which can have adverse effects on the water environment.
Priority substances	A pollutant, or group of pollutants, presenting a significant risk to or via the aquatic (surface water) environment that has been identified at Community level under the WFDR. They include priority hazardous substances.
Programme of Measures	A Programme of Measures, as used in the WFDR, is a group of actions designed to improve the environment in an RBD and meet the objectives of the Regulations. For the purpose of the third cycle RBMPs this will include new and existing measures.
Protected Areas	Areas that have been designated as requiring special protection under legislation for the protection of their surface water and groundwater under Schedule 3 of the WFDR.
Quality element	A feature of an aquatic (surface water) ecosystem that can be described as a number for the purposes of calculating an ecological quality ratio, such as the concentration of a pollutant; the number of species of a type of plant.
Quantitative status (groundwater)	An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. The classification status for a groundwater body against the environmental criteria set out in the WFDR and as set out in Common Implementation Strategy Guidance Document No 18. All four of the component tests for quantitative status must be assessed as good or poor and the overall quantitative status and the confidence in this (high or low) is determined by the worst test result.
Ramsar site	A wetland area designated for its conservation value under the 1971 Convention on Wetlands of International Importance, especially as Waterfowl Habitat. The Ramsar Convention seeks to promote the conservation of listed wetlands and their wise use.
Reference conditions	The benchmark against which the condition can be measured and reported in the relevant classification scheme. For waters not designated as A/HMWBs, the reference conditions are synonymous with the high ecological status class. For waters designated A/HMWBs, they are synonymous with the maximum ecological potential class, unless the site is designated as a Natura 2000 site.
Resilience	(of ecosystems) The capacity of ecosystems to deal with disturbances, either by resisting them, recovering from them, or adapting to them, whilst retaining their ability to deliver services and benefits now and in the future.

Term	Explanation
Risk assessment	Analysis of the likelihood that a water body is at significant risk of failing to achieve one or more of the WFD Regulation objectives.
River basin	A river basin is the area of land from which all surface run-off and spring water flows through a sequence of streams, lakes and rivers into the sea at a single river mouth, estuary or delta. It comprises one or more individual catchments.
River Basin District	A river basin or several river basins, together with associated coastal waters. Each basin is divided into a number of management catchments.
River Basin Management Plan	For each RBD, the WFDR requires a RBMP to be published. These are plans that set out the environmental objectives for all the water bodies within the RBD and how they will be achieved. The plans will be based upon a detailed analysis of the pressures on the water bodies and an assessment of their impacts. The plans must be reviewed and updated every six years.
Safeguard zone	A catchment or other defined zone around a point where the water is abstracted for potable use and where actions may be taken to protect raw water quality and prevent deterioration, so minimising the need for purification treatment. For groundwater they are likely to be based on source protection zones under the Groundwater Protection Policy.
Saturation zone	Subsurface rock or other geological strata within which the pore spaces between the particles of rock or other strata and the cracks in those strata are filled with water and for which a water table may be determined.
Septic Tank	These provide only primary treatment of sewage, retaining solids and allowing an overflow of partially treated sewage to discharge into land, where further treatment occurs in the soakaway system. The effluent from such systems may not be discharged into watercourses. As with wastewater treatment works, the discharge will require a registered exemption from NRW, for which there is no charge. Where the discharge could affect a sensitive site (such as an abstraction borehole or a SSSI), an environmental permit may be required, for which there is a one-off charge.
Shellfish Water Protected Area	An area of estuarine or coastal water designated under the WFDR for the protection of significant aquatic species.
Significant and sustained upward trend	A statistically significant trend in pollutant concentrations in groundwater that could lead to a future failure of one or more of the environmental objectives for groundwater unless it is reversed.

Term	Explanation
Site of Special Scientific Interest	An area of land notified under the Wildlife and Countryside Act 1981 by the appropriate nature conservation body (NRW in Wales) as being of special interest by virtue of its flora and fauna, geological or physio geographical features.
Source Protection Zone	A zone around a well, borehole or spring where groundwater is abstracted for human consumption (for example drinking water or food production).
Special Area of Conservation	Sites that are designated under the Conservation of Habitats and Species Regulations 2017 (as amended)
Special Protection Area	Sites that are designated under the Conservation of Habitats and Species Regulations 2017 (as amended).
Specific Pollutant	A substance considered as being discharged to the aquatic environment in significant quantities at the national level and for which Environmental Quality Standards have been established. As part of the ecological classification criteria and in places where these pollutants are monitored, these standards must be met, in order for a surface water body to be classified as good ecological status.
Stakeholder	Individuals or groups that are or could become interested in, involved in or affected by our policies and activities. Our stakeholders include regulators, statutory bodies, professional organisations, local organisations and members of the public.
Stakeholder forum	A group of interested parties to guide and advice on river basin planning and management. This forum is led by Welsh Government.
Strategic Environmental Assessment Regulations 2004 (SI 1656/04)	Legislation which requires an ‘environmental assessment’ to be carried out for certain plans and programmes whose formal preparation began after 21 July 2004 (or are prepared but not adopted or submitted by a legislative procedure by 21 July 2006) and which are considered likely to have significant effects on the environment. The term ‘Strategic Environmental Assessment’ is used in United Kingdom guidance to mean an environmental assessment under these Regulations.
Summary of significant water management issues	This is a report referred to as ‘Challenges and Choices’ on each RBD that highlights significant water management issues in that RBD which will need to be addressed to achieve environmental objectives.

Term	Explanation
Sustainable Management of Natural Resources (SMNR)	Using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide, in doing so, meet the needs of current generations without compromising the ability of future generations to meet their needs and contribute to the achievement of the well-being goals set out in the Well-being of Future Generations Act. Also referred to as sustainable management.
Technical feasibility	Is determined through the assessment of whether the implementation of a measure or Programme of Measures, designed to achieve the statutory objectives, is technically possible either at the national and local level and includes the consideration of uncertainty as well as environmental and socio-economic feasibility. Technical feasibility depends upon the availability of a technical solution and information on the cause of the problem and hence the identification of the solution.
Transitional water	A term used for waters that are intermediate between fresh and marine water. Transitional waters include estuaries.
Typology	The means by which the WFDR requires surface water bodies to be differentiated according to their physical and physicochemical characteristics.
Wales Fisheries Forum	The Wales Fisheries Forum involves a wide range of stakeholders working together to share ideas and act as ambassadors for Welsh fisheries. The goal is to ensure that freshwater and migratory fish stocks are protected for future generations.
Wales Land Management Forum	The Wales Land Management Forum (WLMF) provides an opportunity for NRW and other WLMF membership organisations to share information, identify common interests and work together in a collaborative way on strategic land management issues.
Wales Water Management Forum	The Wales Water Management Forum (WWMF) provides an opportunity for the organisations to share evidence and explore opportunities for working together to achieve the sustainable management of water in Wales. The WWMF also explores opportunities to develop, support and communicate shared messages and recommendations on the SMNR.
Water body	A manageable unit of surface water, being the whole (or part) of a stream, river or canal, lake or reservoir, transitional water (estuary) or stretch of coastal water. A ‘body of groundwater’ is a distinct volume of groundwater within an aquifer or aquifers.

Term	Explanation
Water body measure	Water body measures apply to a specific water body and directly address a reason for not achieving good status / potential (RNAGs) or reason for deterioration (RfD). Water body measures also include investigations where a failure and RNAG / RfD is yet to be confirmed.
Water Framework Directive	European Union legislation – WFD (2000/60/EC) – a framework for European Community action in the field of water policy.
Water Framework Directive Regulations	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, EU WFD transposed into UK law
Statutory objectives	The objectives set out in Part 5 the WFDR and which are required to be met.
Water Sensitive Urban Design	Water Sensitive Urban Design is a land planning and engineering design approach which integrates the urban water cycle, including storm water, groundwater and wastewater management and water supply into urban design to minimise environmental degradation and improve aesthetic and recreational appeal.
Water Watch Wales	An interactive web-based mapping tool that provides supporting information and data which can assist partners to deliver actions.
Weight of evidence	A weight of evidence approach integrates results or evidence from several data sources, weighted appropriately, to make risk-based decisions.

Table 5: Table of acronyms

Acronym	Meaning
AMP	Asset Management Plan
A/HMWB	Artificial and Heavily Modified Water Bodies
CCRA	Climate Change Risk Assessment
DCWW	Dŵr Cymru/Welsh Water
DrWPA	Drinking Water Protected Area
DWI	Drinking Water Inspectorate
EMP	Eel Management Plan
EQS	Environmental Quality Standards
EQSD	Environmental Quality Standards Directive
EU	European Union
FRMPs	Flood Risk Management Plans
GHG	Greenhouse Gas
HIA	Health Impact Assessment
HRA	Habitats Regulations Assessment
INNS	Invasive non-native species
IPCC	Intergovernmental Panel on Climate Change
NEP	National Environment Programme
NRW	Natural Resources Wales
PAH	Polycyclic aromatic hydrocarbons
PBDE	Polybrominated diphenyl ether
PCB	Polychlorinated biphenyls
PDB	Polychlorinated biphenyl
PFAS	Perfluoroalkyl and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
RBD	River Basin District
RBMP	River Basin Management Plan
RNAG	Reason for Not Achieving Good
RfD	Reason for deterioration
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SMNR	Sustainable Management of Natural Resources
SWPAs	Shellfish Water Protected Areas
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWPA	Shellfish Water Protected Area
TBT	Tributyltin
TraC	Transitional and Coastal
UKCP	UK Climate Projections
UKCCC	UK Climate Change Committee
UKTAG	United Kingdom Technical Advisory Group
uPBT	Ubiquitous, persistent, bioaccumulative and toxic
WB	Water Body
WFD	Water Framework Directive
WNMP	Welsh National Marine Plan
WWMF	Wales Water Management Forum

Appendix A. Changes to the water body network

The types of water body changes proposed for Cycle 4 are categorised into three groups:

1. Artificial and heavily modified water body (A/HMWB) designations (Table A1)

2. Naming and geographical boundary mapping changes (Table A2)

3. Splitting and merging of cycle 3 water body boundaries (Table A3)

Table A1. Proposed changes to A/HMWB designations for Cycle 4.

WB ID	WB NAME	RBD	WB Type	Change Required
GB110058026100	Ffrwd Wyllt - headwaters to tidal limit	Western Wales	River	Remove navigation use. De-designate as HMWB. Retain WB.
GB31133854	Llyn Bran	Dee	Lake	De-designate as HMWB. Retain WB.
GB30940429	Upper Neuadd Reservoir	Severn	Lake	Remove “drinking water supply” use. De-designate as HMWB. Remove WB. The WB will become part of GB109057033160.
GB110064054620	Crawcwellt South	Western Wales	River	Designate as HMWB for “power generation” use.
GB109056033000	Caerfanell - source to conf R Usk	Severn	River	Remove "wider environment" designated use. Retain as HMWB.
GB30940365	Talybont Reservoir	Severn	River	Add "wider environment" designated use. Retain as HMWB.
GB31042079	Eglwys Nunydd	Western Wales	Lake	Remove "drinking water supply" use. Add "water regulation" use.
GB110066054850	Llugwy - Conwy to Nant gwryd	Western Wales	River	Remove "drinking water supply" use. De-designate HMWB.
GB31038398	Pond y Gwaith	Western Wales	Lake	Designate as HMWB for "drinking water supply" use.
GB111067057060	Y Garth	Dee	River	Remove “other human sustainable development” use. De-designate HMWB. Retain WB.
GB511006315000	YSTWYTH / RHEIDOL	Western Wales	Transitional	Remove “coastal protection” use. Add “flood protection” use.

Table A2. Proposed changes to WB names and geographical boundaries for Cycle 4.

WB ID	WB NAME	WB Type	RBD	Change Required
GB109054044900	Tributary - source to conf R Severn	River	Severn	Llandyssil Bk - source to conf R Severn
GB109054049550	Tributary - source to conf Afon Banwy	River	Severn	Cyfronydd Bk - source to conf Afon Banwy
GB109054049851	Afon Banwy	River	Severn	Afon Banwy - conf Afon Gam to conf Afon Vrynwy
GB109055022830	Tintern Bk - source to conf R Wye	River	Severn	Angidy – source to conf Wye estuary
GB109055036910	Ennig - source to conf Afon Llynfi	River	Severn	Mapping - Revise catchment boundary
GB109055036990	Scithwen Bk – source to conf R Wye	River	Severn	Scithwen Bk – source to conf R Wye
GB109055037115	Wye – conf R Irfon to Scithwen Bk	River	Severn	Wye – conf R Irfon to Sgithwen Bk
GB109055037116	Wye - Scithwen Bk to Brewardine Br	River	Severn	Wye - Scithwen Bk to Bredwardine Br
GB109055042170	Gwenlas Bk - source to conf R Ithon	River	Severn	Mapping - Revise catchment boundary

WB ID	WB NAME	WB Type	RBD	Change Required
GB109055042280	Wye - conf to conf Afon Marteg to conf Afon Elan	River	Severn	Wye - conf Afon Marteg to conf Afon Elan
GB109056026770	Rhosog Fach Reen - source to Seven Estuary	River	Severn	Correct "Seven" to "Severn"
GB110058026170	Kenfig - headwaters to tidal	River	Western Wales	Kenfig - headwaters to tidal limit
GB110058026250	Ewenny - conf with Ewenny Fach to tidal limts	River	Western Wales	Ewenny - conf with Ewenny Fach to tidal limit
GB110058026350	Baglan Brook - headwaters to conf with River Neath	River	Western Wales	Mapping: Revise blue line and catchment boundary
GB110060029061	Gwendraeth Fawr - headwaters Afan Goch	River	Western Wales	Gwendraeth Fawr - headwaters to Afon Goch confl.
GB110060029062	Gwendraeth Fawr - Afan Goch to tidal limit	River	Western Wales	Gwendraeth Fawr - Afon Goch confl. to tidal limit
GB110060029320	Tawelon - headwaters to tidal limit	River	Western Wales	Tawelan Brook - headwaters to tidal limit

WB ID	WB NAME	WB Type	RBD	Change Required
GB110061025050	Pembroke - headwaters to tidal limit	River	Western Wales	Pembroke River - headwaters to tidal limit
GB110061030660	Narbeth Brook - headwaters to conf with E. Cleddau	River	Western Wales	Narberth Brook - headwaters to conf with E. Cleddau
GB110061031260	Westfield Pilll - headwaters to tidal limit	River	Western Wales	Westfield Pill - headwaters to tidal limit
GB110061038500	Unnamed - HW to tidal limit, Aberbach, nr Abermawr	River	Western Wales	Aberbach Stream, nr Abermawr - headwaters to tidal limit
GB110061038630	Nyfer - conf with Nant Duad to tidal limit	River	Western Wales	Nyfer - conf with Brynberian to tidal limit
GB110063041710	Ystywyth - confluence with the Nant Cell to tidal limit	River	Western Wales	Ystwyth - confluence with the Nant Cell to tidal limit
GB110064048260	Dulas South - middle	River	Western Wales	Dulas South - lower
GB110064048450	Nant Cwm	River	Western Wales	WB name change from Nant Cwm to Clegyrnant
GB111067052220	Wych Lower (Worthenbury middle)	River	Dee	Wych Lower
GB111067052090	Worthenbury Brook (Worthenbury lower)	River	Dee	Worthenbury Brook *(reported by England)*

WB ID	WB NAME	WB Type	RBD	Change Required
GB111067052200	Wych Upper (Worthenbury upper)	River	Dee	Wych Upper *(reported by England)*
GB31041203	Cwm Llied Reservoir	lake	Western Wales	Cwm Lliedi Reservoir
GB31047015	Bosherston Lily Ponds (West Arm and Central)	lake	Western Wales	Bosherston Lily Ponds (West Arm)
GB31134451	Pencaye Bottom Reservoir	lake	Dee	Pen-Y-Cae bottom reservoir
GB31134454	Pencaye Top Reservoir	lake	Dee	Pen-Y-Cae top reservoir
GB530905415401	Severn Lower	TraC	Severn	Remove WB from Wye Management Catchment TraC boundary.
GB530905415404	Usk	TraC	Severn	Mapping – revise TraC boundary
GB541005815300	Ogmore Estuary	TraC	Western Wales	Mapping – revise TraC boundary
GB611008590001	Bristol Channel Outer North	TraC	Western Wales	Mapping – revise TraC boundary
GB70910006	Whitchurch Canal nr Cardiff	Canal	Severn	Glamorgan Canal (Whitchurch, Cardiff)
GB30941175	Cwmsychan Reservoir	Lake	Severn	Mapping – revise WB location

Table A3. Proposed WB merge and split for Cycle 4.

WB IDs and WB Names	WB Type	RBD	Change required
GB110064048440 (Dysynni lower) GB110064048310 (Tywyn main drain)	River	Western Wales	Merge to single WB
GB111067057080 (Dee - Chester Weir to Ceiriog)	River	Dee	Split into two WBs Dee Chester Weir to Clywedog Dee Ceiriog to Clywedog

Appendix B. Chemical narratives

This section includes key facts about chemical substances within the WFDR that could potentially pose some risk to the water environment in Wales, including information about their occurrence, environmental fate, risks and mitigation measures.

Cypermethrin

Background

Cypermethrin is a pyrethroid insecticide used to control a broad spectrum of pests. It is used for plant protection in crops (e.g. cereals, vegetables, grassland and fruits) as well as in forestry and gardens. It is also used as a biocide to control insects in homes, public and commercial buildings and in the food industry, as well as a veterinary medicine for external use to control pests in livestock and pets. Due to the wide range of uses, it can reach the environment form different pathways such as wastewater and runoff from urban and rural areas. Cypermethrin is not very persistent or bioaccumulative, but it is highly toxic to aquatic invertebrates and has the potential to severely disrupt food chains at very low concentrations and short exposure. As a result, it has been subjected to various control mechanisms and its concentration in natural waters is regulated using tight EQS.

Sources

- Plant protection: agricultural crops, forestry, gardens, plant nurseries
- Biocide: pest control and wood treatment in homes, public and commercial buildings, industry (e.g. wool and paper), food storage
- Animal health: control of lice, ticks and flies in livestock and pets

Pathway

- Spray drift, surface runoff from fields and hardstanding areas where the product is handled
- Biocide: via drains and wastewater from wet cleaning and rain on treated surfaces, wash-off / cleaning of treated wood
- Spillage during pouring over animal skin; washing of treated animal skin

Receptor

- Highly toxic to aquatic invertebrates such as insects and crustaceans
- Adverse effects occur at very low concentrations and after short exposure
- Binds strongly to soil and sediment
- Low persistence in water and medium persistence in soils
- Not bioaccumulative.

Risk Assessment

Despite considerable reduction in use, trace levels of cypermethrin are still found in water samples and leading to failures, given the very low EQS, in picograms per litre, or parts per quadrillion. The failures in Wales are mostly from rural areas with strong livestock preponderance, suggesting veterinary uses as a main source.

Control Measures

The key measures to reduce cypermethrin pollution in Wales were the withdrawal of its use for sheep dipping in 2010 and the derogation to spraying in certified forests in 2014. There are many other legal mechanisms, codes of best practice and guidance aimed at the safe use of plant biocides, protection products and veterinary medicines which include cypermethrin.

Future Trends

There was a marked reduction in cypermethrin use since its removal for sheep dipping and pine weevil control. The use in crops has also decreased in the last decade. However, there is no evidence of reduction in its uses as a biocide in domestic and commercial situations and in ‘pour-on’ veterinary applications. New analytical methods with low quantification limits are being applied and trends in water may become detectable in the coming years.

Diazinon

Background

Diazinon is a broad-spectrum organophosphate insecticide historically used in agriculture, horticulture and in sheep dips to control ectoparasites. It is currently the only license product for the dipping of sheep to control scab, with widespread use since the ban of cypermethrin for this purpose in the mid-2010s. Trials to use injections to control scab were unsuccessful, which cemented diazinon’s status as the primary method for scab control.

Sources

- Veterinary treatments, especially sheep dips, which remain one of the main contributors to diazinon entering Welsh watercourses
- Other livestock applications, including control of mites, ticks, lice and biting flies is possible, though unlikely or localised.

Pathways

- Disposal of waste sheep dip to land, which leads to run-off and infiltration into surface waters
- Losses during dipping applications, runoff from hardstanding’s and dripping from animals’ fleece following application.

Receptor

Diazinon is toxic to aquatic organisms, including invertebrates and fish,

Potential groundwater contamination due to slight mobility, despite low leaching risk.

Control Measures

NRW introduced changes in January 2025, after detecting elevated diazinon levels in Welsh rivers:

- NRW will no longer issue new permits allowing disposal of waste sheep dip to land.
- Farmers must now use a registered waste carrier for proper off-site disposal.
- Existing permit holders may continue temporarily, but all land-disposal permits will be phased out.
- Farmers can surrender permits for free, supporting transition to safer disposal practices.

Future Trends

There was a small reduction in WFD failures in the 2024 classification in relation to 2021, but risks are still present in rural areas with high sheep density as long as sheep scab persists. Further monitoring is required to confirm the efficacy of measures and establish a robust trend review.

Dioxins and Dioxin-Like Compounds

Background

Dioxins and Furans are unintentionally formed when organic material is burned in less-than-optimal conditions such as in open fires, building fires, domestic fireplaces and poorly operated or designed solid waste incinerators. As a result, the key pathway into the water environment is atmospheric deposition via contaminated rainfall. Historically, municipal and medical waste incineration was the most important source, together with chlorine bleaching of pulp and paper and engines using leaded fuel.

Within the large group of polychlorinated biphenyls (PCBs), twelve congeners are classified as dioxin-like PCBs due to their similar toxicological properties to dioxins. PCBs were intentionally manufactured for various purposes, such as dielectric and heat transfer fluids, carbonless copy paper and pesticide manufacturing. The widespread occurrence of PCBs in the environment is most likely a result of past releases linked with their production, use and disposal.

Sources

- Dioxins: open fires, building fires, waste incinerators (legacy)
- PCBs: old transformers, capacitors, plasticizers, surface coatings, inks, adhesives, flame retardants, paints and carbonless duplicating paper.

Pathway

- Dioxins: run-off following atmospheric transport and deposition
- PCBs: leaching from contaminated land, old industrial sites and substations. Poorly operated landfills and waste incineration (legacy).

Receptor

- Toxic to humans and wildlife; ingested via the consumption of contaminated fish
- Highly persistent; bioaccumulate through food webs
- High levels of PCBs still found in cetaceans in the UK, affecting their reproduction and immune systems.

Risk Assessment

Dioxins and dioxin-like PCBs occur as complex mixtures of congeners in the environment, each with different degrees of toxicity, so Toxic Equivalents Values are used to express the overall toxicity. Most dioxins and furans were not detected in recent fish samples in Wales. Many PCBs were present in both freshwater fish and marine mussels, but at low concentrations.

Control Measures

Dioxin and PCB emissions have been controlled by the Stockholm Convention and the Waste Incineration and revised Waste (England and Wales) Regulations 2011, as well as more stringent control of open agricultural burning and vehicular emissions. The worst contaminated land sites in Wales have been remediated.

Future Trends

Recorded emissions of dioxins and PCBs to air, land and water have declined in recent decades, but further monitoring is needed to determine a trend in biota. PCB monitoring from the Clean Safe Seas Environmental Monitoring Programme shows either static or decreasing trends for PCB congeners across Wales. Nevertheless, recent studies in otter livers suggested a possible increase in recent years, suggesting that remobilisation of previously contaminated sediment may be a new source. This is under investigations and newer data will confirm if there is a change in the trend.

Hexabromocyclododecane (HBCDD)

Background

HBCDD is a brominated flame retardant used mainly in polystyrene foams in building insulation, as well as upholstered furniture, car seats and insulation, packaging and electric and electronic equipment. It reaches the water environment via runoff from demolition and firefighting sites, likely to flow through drainage systems into wastewater networks, as well as the washing of fabrics treated with flame retardants containing HBCDD. Other sources may include leachates from landfills and recycling plants. It is highly persistent and binds strongly to soils, so contaminated sediments are likely to continue to serve as a source after emissions

have been phased out. It can also be transported through air via contaminated dust. HBCDD is classified as a priority hazardous substance under the WFDR and it is monitored in biota for compliance against EQS.

Sources

- Flame retardants used in polystyrene building insulation
- Treated fabrics in upholstery, car seats, packaging
- Legacy in old electrical and electronic equipment.

Pathway

- Wastewater: runoff from building sites reaching drainage systems and washing of fabrics treated with HBCDD
- Diffuse / runoff: following atmospheric deposition and land application of wastewater sludge.

Receptor

- Toxic to humans and wildlife
- Ingested via consumption of contaminated prey
- Highly persistent
- Bioaccumulate through food webs
- Adhere to soils and sediment.

Risk Assessment

There was no detection of HBCDD in biota samples across Wales representative of different land-use types and geographic areas in the Welsh estuarine and freshwater environments. This is in line with other parts of the UK, where the majority of samples from recent years did not detect the presence of HBCDD.

Control Measures

The production and use of HBCDD was restricted via the Stockholm Convention on Persistent Organic Pollutants and the EU REACH Regulation, which is incorporated into UK law. Current restrictions limit the HBCDD content to 0.01% of materials.

Future Trends

Levels of HBCDD in the environment have reduced in recent years in the UK, based on data from the Water Industry. However, Wales specific trends are not available due to no dictions in biota samples since the current regulations and monitoring approaches have been in place.

Mercury

Background

The environmental impact from mercury and its compounds are mostly linked to historical industrial and domestic sources, such as dental fillings, cosmetics, wood preservatives, textile treatment and antifouling in boats. Burning of fuels containing mercury, such as coal and oil leads to atmospheric emissions which facilitates long distance transport to remote regions. Mercury in contaminated soils and sediment can be converted to methylmercury, a more toxic and bioavailable form, which is easily absorbed and accumulated through food chains, making top predators like otters and large fish and also humans, potentially exposed to high levels via the consumption of contaminated prey. Mercury and its compounds are classified as priority hazardous substances under the WFDR and are monitored in biota for compliance against EQS.

Sources

- Air pollution from coal-fired power plants, cement and metal manufacturing
- Amalgam dental fillings, crematoria being often an important local source to air
- Household products: batteries, cosmetics, wood preservatives, textile treatment and antifouling agents
- Abandoned coal mines

Pathway

- Deposition from air to water and land
- Wastewater from domestic and industrial sources
- Runoff from landfills and soil following aerial deposition wastewater sludge spreading
- Resuspension of contaminated sediment.

Receptor

- Toxic to humans and wildlife
- Main source is consumption of contaminated fish
- Highly persistent
- Bioaccumulate through food webs
- Wildlife at higher risk than humans due to stringent food regulation.

Risk Assessment

Several studies from across the UK and Europe show widespread failures of environ-mental standards for Mercury in marine fish. Data from fish and mussels in the Welsh coast and estuaries confirms that most areas are likely to be at risk of failing the EQS Levels appear to be decreasing, but further monitoring is needed to ensure confidence in the trend. Marine areas with sampling records have been confirmed to be at risk of breaching the standard. Some freshwater locations had results in fish below the EQS.

Control Measures

Mercury emissions from all major sources have been largely restricted since 2005 through Welsh, UK and EU legislation (e.g. Hazardous Waste, REACH, Mercury, Cosmetics and Biocides regulations, Industrial Emissions, the Control of Mercury (Regulations) and the international Minamata convention, with some exemptions for specific uses such as military and space.

Future Trends

Emissions of mercury to air and water have declined considerably in recent decades, particularly with the phasing out of coal fired power stations. but there is no clear trend in mussels within the monitoring sites in Wales. Results from mussels suggest a gradual decrease but still with low confidence due to natural variations. NRW has started monitoring in fish, but further long-term monitoring is needed to increase confidence in our clear trend assessments.

Heavy Metals

Copper, Zinc, Cadmium, Lead, Iron, Manganese and Nickel

Background

High density metals are naturally occurring and most are essential micronutrients for animals and plants, but elevated concentrations are harmful to living organisms. Metals pollution is a common problem in Welsh waters, mainly as a historical legacy from disused metal mines. Other relevant sources are contaminated land and industries such as steel works, oil and gas refineries, papermills, powerplants, mining and quarrying, cement production and manufacturing, as well as runoff from construction sites and infrastructure. Household products such as batteries and DIY materials can also release metals and reach natural waters via wastewater and landfills. Copper, Zinc, Cadmium, Lead, Iron, Manganese and Nickel (as well as mercury, discussed in a separate sheet) are regulated under the WFDR and their concentration in water is monitored for compliance against EQS.

Sources

- Disused metal and coal mines
- Industrial: steel works, oil and gas refineries, papermills, powerplants, mining and quarrying, cement production

- Transport and utilities infrastructure
- Household products (e.g. batteries, electronics, building and DIY materials).

Pathway

- Discharges and runoff from mines
- Deposition from air to water and land
- Wastewater from domestic and industrial sources
- Soil erosion, runoff from contaminated land, buildings, construction sites, landfills, transport infrastructure
- Sediment resuspension.

Receptor

- High concentrations of bioavailable forms of metals in water are toxic to aquatic life
- Bioavailability varies with the water physicochemical properties
- Highly persistent; bioaccumulate through food webs
- Wildlife at higher risk than humans due to stringent food regulation.

Control Measures

NRW is engaged in a long-term programme to tackle pollution from disused metal mines. It investigates the viability of reducing runoff and treating mine discharges and should reduce pollution in the long-term where feasible. Other sources have been tackled by new legislation on the production, use and disposability of products containing heavy metals, emissions through air and water and the gradual replacement of infra-structure such as lead pipes.

Future Trends

Heavy metal emissions from industrial and domestic sources have reduced considerably after their peak in the 1970s and 1980s. However, pollution from abandoned mines, which are the main source of metals in Wales, has remained constant in most areas. For those mines with ongoing remediation, some reduction may be expected in the medium term.

Polycyclic Aromatic Hydrocarbons (PAHs)

Background

The 5 and 6 ring PAHs Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene and Indeno(1,2,3-cd)pyrene are included in the WFDR in response to their potential harmful effects as carcinogenic and endocrine disruptors to humans and wildlife. They are ubiquitous in the environment due a wide variety of sources and ease of transport through the air. Coke, steel and aluminium production, alongside wood preservation are historically

the major sources. Solid fuel combustion, like wood, coal and peat for heating, agricultural and wildfires are the main current sources, as well as particulates from road vehicles (especially diesel), ships, trains and aircrafts. Wear and tear of tyres are also a contributor to PAHs in road runoff. In addition to regular diffuse emissions, accidental spills can be locally relevant and resulting contaminated soils and sediment can continue to be a source in the long term, especially when disturbed during storms and dredging.

Sources

- Coke, steel and aluminium production
- Wood preservation
- Particulates from combustion engines
- Open fires
- Tarmac production and use
- Tyre wear and tear.

Pathway

- Atmospheric deposition
- Road / urban runoff
- Wastewater
- Accidental fuel spillage
- Re-suspension of contaminated sediment.

Receptor

- Ingested via consumption of contaminated fish
- Carcinogenic and endocrine disruptors
- Highly persistent; bioaccumulate through food webs
- Direct impact on benthic organisms due to adsorption to sediment.

Risk Assessment

The environmental quality standards for PAHs are formed by a long-term exposure risk, based on the levels of Benzo-(a)-pyrene in crustaceans and molluscs; and a short-term risk based on peaks of most afore mentioned PAHs in water. Following improvements in NRW's monitoring methods, levels of PAHs in samples with high levels of sediment were detected above the short-term threshold. Sediment is a major carrier of PAHs and this could be a mixture of historical contamination and recent mobilisation of PAHs from the air, particularly form combustion of solid fuel for heating.

Control Measures

The Environmental Permitting Regulations (2013) have largely controlled industrial emissions. Further legislation under REACH restricts the use of PAHs containing products and separate regulations have reduced PAH content in diesel and tyres. The Clean Air Plan for Wales introduce local and national actions to further reduce PAH emissions to air. Stricter rules for commercial firewood are also expected to reduce emissions.

Future Trends

While industrial and road transport emissions of PAHs have reduced in the UK in the last decade, total emissions have increased back to 1990 levels due to higher domestic wood burning and wildfires. Levels in marine mussels have not changed significantly in recent years. Data collated by the Overview of CSEMP and MERMAN show decreasing trends in some locations in the Welsh coast in the last decade.

Polybrominated Diphenyl Ethers (PBDEs)

Background

Polybrominated diphenyl ethers (PBDEs) are a group of organobromine compounds used as flame retardants in consumer products such as electronics, furnishings, motor vehicles, airplanes, plastics, polyurethane foams and textiles. They are highly persistent and mobile in the environment and are even found in remote locations including the Arctic. They bioaccumulate though food chains and are toxic to wildlife and humans. Many PBDE congeners are classified as priority hazardous substances under the WFDR and are monitored in biota for compliance against EQS. Their production and use have been largely reduced, with most sources being a legacy from old domestic products still in use or being disposed of.

Sources

- Flame retardants used in foams, fabrics and plastics
- Peak of use in the 1990s; banned for most uses in 2004
- Legacy from old goods such as furniture, car seats, televisions and computers

Pathway

- Air: long range transport attached to dust and localised via adsorption to clothes
- Wastewater: released via clothes washing
- Diffuse / runoff: following deposition from air and wastewater sludge

Receptor

- Adhere to soils and sediment

- Toxic to humans and wildlife
- Ingested via consumption of contaminated fish
- Bioaccumulate through food webs.

Risk Assessment

Biota samples from a selection of locations representative of different land-use types and geographic areas were considerably higher than the EQS, ranging from nearly 10 times the limit in a reference pristine site at the Mawddach Estuary, to more than 500 times the EQS near urban and industrial areas (e.g. River Rhymney). There is also considerable evidence from other countries that PBDE is ubiquitous and likely to be present above the EQS across the water environment. The EQS failures are based on the risk to human health via the consumption of wild caught fishery products. The standard for the protection of wildlife (top predators) is higher and levels found in Wales do not represent a risk to the natural environment.

Control Measures

The production and use of the most toxic forms of PBDE - penta and octaBDE – were banned in 2004 through the Stockholm Convention. They are also included in the EU REACH Regulation. A special provision allows the use of less toxic deca-PBDE for specific applications but limited to 0.1% by weight.

Future Trends

It is expected that levels of PBDEs in the environment will reduce following the use restrictions, but it is likely to be a slow process as they are very persistent. The Clean Safe Seas Environmental Monitoring Programme detected downward trends for some PBDEs in specific locations.

Perfluorooctane sulfonate (PFOS) and its derivatives

Background

PFOS and its derivatives, such as PFOA (perfluorooctanoic acid) are man-made polyfluorinated compounds (PFCs) belonging to a group called perfluoroalkyl and polyfluoroalkyl substances (PFASs). PFOS and PFOA are fluorosurfactants that were widely used in a number of products, such as fabric protectors, stain repellents and fire-fighting foams. They can still be found in the form of impregnation agents in old textiles, paper and leather; in wax, polishes, paints, varnishes, cleaning products for general use; in metal surfaces and carpets. In 2009, PFOS was included in Annex B of the Stockholm Convention on persistent organic pollutants and it is now banned for nearly all uses. It is classed as one of the persistent, bioaccumulative and toxic chemicals (PBTs) that resist degradation and persist in the environment for long periods, normally accumulated in the fat tissues, bones and brain of organisms. PFOS and PFOA are regulated by the EQSD. The wider PFAS group include more than 4700 chemicals that have raised health concerns in other countries and its regulation is being reviewed at the European level.

Sources

- Old consumer and DIY products like fabrics, paper, paint, leather, stain remover
- Contaminated land from the use of fire-fighting foams
- Legacy from old goods such as furniture, car seats, carpets

Pathway

- Air: long range transport attached to dust and localised via adsorption to clothes
- Wastewater: from clothes / fabric washing
- Diffuse / runoff: following deposition from air and wastewater sludge

Receptor

- Toxic to humans and wildlife
- Ingested via consumption of contaminated fish
- Highly persistent
- Bioaccumulate through food web
- Adhere to soils and sediment, especially in estuaries.

Risk Assessment

Due to its wide-spread sources and long-range transport, PFOS is often detected in natural waters, though at low concentrations unlikely to lead to problem levels in biota. PFOS tend to be higher in areas of high population density and near industrial areas. Data from Welsh fish monitoring sites detected one failing location from a disused industrial site that used firefighting foams with PFOS in the past. Wider water data also suggests that a small number of industrial areas may be at risk of failing the EQS.

Control Measures

The production and use of PFOS is restricted since 2006 and its use is prohibited by the revised persistent organic pollutants Regulation. Current inputs are legacy form old goods still in use and being gradually disposed of, or localised issues with contaminated land from past use.

Future Trends

It is expected that levels of PFOS and related substances in the environment will reduce following the use restrictions, but it is likely to be a slow process as they are very persistent. Given the high numbers of results below the limit of detection, it has not been possible to establish a national trend.

Tributyltin (TBT)

Background

TBT was widely used as a biocide (fungicide, bactericide and insecticide) between the 1950s and the 1990s mainly in antifouling paints applied to boats fishnets and buoys, as well as in the treatment of wood, textiles and leather and as an anti-yellowing agent in clear plastic. It became the most popular anti-fouling treatment by the 1960s and its gradual release made it widely spread in the ocean environment. However, its effects go beyond what it is intended to kill, being highly toxic to a wide range of organisms, such as fungi, bacteria, algae, invertebrates and animals, including top predators and humans. As a lipophilic substance it adsorbs and accumulate in fat tissue of organisms and in sediment, where it can persist for many years and be released back into the water with resuspension. It has been heavily regulated since the 1980s and its concentration in the water environment is subject to specific EQS.

Sources

- Anti-fouling paints in boats, fishnets and buoys
- Fungicide and preservative use in wood, textiles, paper, leather and electrical equipment
- Anti-yellowing agent in clear plastics (e.g. PVC pipes in gutters).

Pathway

- Release from treated surfaces directly into the water
- Resuspension of contaminated sediment
- Release from consumer goods wastewater
- Industrial effluent (e.g. paper and textile industries).

Receptor

- Highly toxic to several organisms
- Endocrine disrupter, immuno-suppressor
- Imposex (male characteristics in females) in snails and bivalves
- Persistent and bioaccumulative
- Binds strongly to soil and sediment.

Risk Assessment

There have been no WFD failures of TBT in Wales, suggesting low risk. After analytical improvements lowering the limits of detection, some locations return positive results, albeit below the threshold, confirming an overall low risk.

Control Measures

TBT was banned from use in small vessels (<25m) and fishing nets in the UK in 1985. It is also controlled by many EU rules and the Inter-national Convention on the Control of Harmful Antifouling Systems on Ships. There are no known uses of TBT within the EU other than as an intermediate chemical following a global ban in 2008.

Future Trends

The use of TBT has decreased drastically in recent decades. Long term monitoring of Imposex in the dogwhelk (*Nucella lapillus)*, used as an impact indicator for high levels of TBT, demonstrated a decreasing trend in all 43 sites in Welsh seas since 1997, reaching low incidence levels in all locations by 2014, data from the Clean Safe Seas Environmental Monitoring Programme.

Triclosan

Background

Triclosan is an antibacterial and antifungal agent developed in the 1960s and added to many consumer products such as toothpaste, soaps, detergents, cosmetics, toys, clothing, kitchenware and surgical cleaning treatments; finding its way to natural waters mainly through domestic wastewater. Laboratory studies linked triclosan with endocrine disruption in invertebrates and fish and potential increased chance of bacterial antibiotic resistance development. It is unclear, however, if the effects would also occur under natural conditions in the open environment. Studies in humans have detected potential links with skin irritation, hormonal imbalances and a higher incidence of osteoporosis in women, also pending further investigation to increase confidence. Triclosan is relatively persistent and does not bioaccumulate. It is a specific pollutant under the WFDR, with a quality standard determined domestically by UK environmental regulators based on ecotoxicological trials.

Sources

- Personal hygiene and cosmetic products such as toothpaste, mouthwash, soaps, deodorants
- Kitchenware, clothing, toys, surgical cleaning treatment in hospitals
- (Legacy) biocidal applications in animal husbandry.

Pathway

- Point source: treated wastewater effluent
- Diffuse: runoff from landfills and fields following wastewater sludge application.

Receptor

- Moderately persistent
- Endocrine disruption in macroinvertebrates and fish

- Potential increase in antimicrobial resistance.

Risk Assessment

Evidence from the water industry suggests that background concentrations in rivers are relatively low in relation to the EQS, but contributions from treated wastewater can be relevant. Concentrations in Welsh rivers were estimated through a model based on typical values in wastewater and accounting for dilution factors across Wales. The results showed all locations with levels below 20% of the limit. Sampled data from elsewhere in the UK show levels in lakes, estuaries and coastal waters lower than in rivers, hence, lower risks. As a result and due to the lack of direct measurements in Wales, all water bodies in the country are defaulted to ‘probably not at risk'.

Control Measures

In addition to the UK environ-mental regulators quality standards, Regulation 358/ 2014/EU specifies a maximum concentration of triclosan in cosmetics. Major personal hygiene and cosmetics manufacturers have voluntarily reduced or eliminated triclosan from products in recent years.

Future Trends

The consumption of triclosan in the EU was reduced by nearly 40% in the period 2011-2015 and further reduction is expected in recent years following EU regulation and voluntary initiatives announced by manufacturers. Monitoring in recent years have been consistently below the limit of detection.