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Second River Basin Management Plans – Member State: United Kingdom

Accompanying the document

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**on the implementation of the Water Framework Directive (2000/60/EC) and the Floods
Directive (2007/60/EC)**

**Second River Basin Management Plans
First Flood Risk Management Plans**

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Acronyms and definitions

EQS Directive	Environmental Quality Standards Directive
FD	Floods Directive
Km	Kilometre
km ²	Kilometre squared
KTM	Key Type of Measure
PoM	Programme of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
WFD	Water Framework Directive
WISE	Water Information System for Europe
Annex 0	Member States reported the structured information on the second RBMPs to WISE (<u>Water Information System for Europe</u>). Due to the late availability of the reporting guidance, Member States could include in the reporting an Annex 0, consisting of a short explanatory note identifying what information they were unable to report and the reasons why. This Annex was produced using a template included in the reporting guidance. If Member States reported all the required information, this explanatory note was not necessary.

Foreword

The Water Framework Directive (WFD) (2000/60/EC)¹ requires in its Article 18 that each Member State reports its River Basin Management Plan(s) (RBMPs) to the European Commission. The second RBMPs were due to be adopted by the Member States in December 2015 and reported to the European Commission in March 2016.

This Member State Assessment report was drafted on the basis of information that was reported by Member States through the Water Information System for Europe (WISE) electronic reporting.

The Member State Reports reflect the situation as reported by each Member State to the European Commission in 2016 or 2017 and with reference to River Basin Management Plans (RBMP) prepared earlier. The situation in the Member States may have changed since then.

¹ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

General Information

Map A Map of River Basin Districts



Source: 2012 assessment reports, WISE, Eurostat (country borders)

	<i>International River Basin Districts (within European Union)</i>
	<i>International River Basin Districts (outside European Union)</i>
	<i>National River Basin Districts (within European Union)</i>
	<i>Countries (outside European Union)</i>
	<i>Coastal Waters</i>

The information on areas of the national RBD (Map A), including sharing countries, is provided in Table A.

The share of the United Kingdom in the respective international RBD is 75.4 % (Neagh Bann) and 39.8 % (North Western) as shown in Table B.

Table A: Overview of the United Kingdom's River Basin Districts

RBD	RBD Name	Size (km²)²	Countries sharing RBD
UK01	Scotland	113920	-
UK02	Solway Tweed	17511	-
UK03	Northumbria	9029	-
UK04	Humber	26051	-
UK05	Anglian	27868	-
UK06	Thames	16190	-
UK07	South East	10199	-
UK08	South West	21478	-
UK09	Severn	21300	-
UK10	Western Wales	16647	-
UK11	Dee	2235	-
UK12	North West	13160	-
UKGBNIIENB	Neagh Bann	8289 (6100 in UK)	IE
UKGBNIIENW	North Western	14709 (4900 in UK)	IE
UKGBNINE	North Eastern	3995	-
UKGI17	Gibraltar	33.4 including coastal waters	-

Source: WISE electronic reports

Table B: Transboundary river basins by category and % share in the United Kingdom

Name international river basin	Countries sharing RBD	Co-ordination category		Total 1-4	
		2			
		km²	%	km²	%
Neagh Bann	IE	6125	75.4	6125	75.4
North Western (rivers Erne and Foyle)	IE	4900	39.8	4900	39.8
<i>Total</i>		<i>11031</i>		<i>11031</i>	

Source: WISE electronic reports

Category 1: International agreement, permanent co-operation body and international RBMP in place.

Category 2: International agreement and permanent co-operation body in place.

Category 3: International agreement in place.

Category 4: No co-operation formalised.

² Size includes coastal waters.

Status of second river basin management plan reporting

A total of 15 of the 16 RBMPs of the United Kingdom (Scotland, Solway Tweed, Northumbria, Humber, Anglian, Thames, South East, South West, Severn, Western Wales, Dee, North West, Neagh Bann, North Western, North Eastern) were published between 22 February 2015 and 18 February 2016. A RBMP for Gibraltar has not been published in WISE. Documents are available from the European Environment Agency (EEA) EIONET Central Data Repository <https://cdr.eionet.europa.eu/>.

Key strengths, improvements and weaknesses of the second River Basin Management Plan(s)

The main strengths and shortcomings of the second RBMP of the United Kingdom are as follows:

- **Governance and public consultation**
 - In all of the United Kingdom RBDs stakeholders were involved via a broad range of mechanisms, including advisory groups and (in England and Wales) catchment partnerships.
 - The information available concerning the public consultation of the draft RBMP for Scotland is contradictory, with some documents indicating a 4-month consultation period and others a 6-month period. The WFD requires a minimum of six months for the public consultation on the Plans.
 - The United Kingdom did not adopt and publish all the RBMPs in accordance with the timetable in the Water Framework Directive. The United Kingdom RBMP for Gibraltar was adopted but not reported in WISE.
- **Characterisation of the RBD**
 - Significant efforts appear to have been made for the re-delineation and characterisation of groundwater bodies in the second RBMP. The identification of more groundwater bodies was due to better conceptual understanding of groundwater and an improved risk/ status assessment. Further characterisation work has also included the assessment of linkages with surface water bodies and terrestrial ecosystems.
 - The definition of significance of pressures on surface water was reported to be linked to the potential failure of objectives in all 15 RBDs, whereas significance was defined in terms of thresholds in 12 of the 15 RBDs. For groundwater, the definition of significance of pressures was in terms of thresholds and was linked to the potential failure of objectives in 12 of the 15 RBDs that reported. However, in the second RBMPs the pressure affecting the greatest proportion of surface water bodies in the United Kingdom as a whole was “unknown anthropogenic pressures” (28 % of surface water bodies). In addition, a range of pressures were reported not to have been assessed.

- All RBDs established an inventory of emissions. Only 11 substances were included in an inventory for all 15 RBDs. The RBMPs stated that substances are only included in the inventories if they are assessed as being relevant. The CIS Guidance Document recommends providing basic estimation of emission including for substances of minor relevance, but this does not seem to have been done. Different combinations of Tier 1, Tier 2 and Tier 3 of the methodology were implemented (while the CIS Guidance Document recommends using at least Tier 1+2 for all substances deemed relevant at RBD level. The data quality ranged from good to very uncertain, or was not reported.
- **Monitoring, assessment and classification of ecological status**
 - In the three RBDs in Northern Ireland, there was an increase in the number of monitoring sites in coastal waters, lakes and rivers, while the number of sites in transitional waters decreased.
 - In 12 of the 15 RBDs in Scotland, England and Wales there was a reduction in the number of monitoring sites in all water categories. The largest decreases were generally in transitional waters and coastal waters. The United Kingdom subsequently explained that this reduction is due to better targeting the monitoring effort on the basis of increased knowledge.³
 - The proportion of surface water bodies included in operational monitoring decreased, with respect to the first RBMPs, in 12 of the 15 RBDs.
 - The required biological quality elements are not monitored in any water body included in surveillance monitoring for all water categories.
 - Fish are not monitored in any lake in Scotland, England and Wales but are monitored in lakes in Northern Ireland. River continuity is reported not to be monitored in any of the RBDs.
 - Not all River Basin Specific Pollutants were monitored at the minimum recommended frequency. Environmental Quality Standards have not been established for sediment or biota, while some River Basin Specific Pollutants have been monitored in these matrices

³ There appear to be significant errors in the reporting on monitoring in WISE, which makes it difficult to have a reliable assessment on all aspects of monitoring.

- There is a lack of comprehensive reference conditions for a significant proportion of types in each water category, particularly for hydromorphological quality elements. The United Kingdom subsequently highlighted that this is a consequence of using an alternative method for determining ecological potential, by selection of mitigation measures rather than biological quality elements.
- There is some evolution in the development of assessment methods since the first RBMPs, as there are now developed assessment methods for phytoplankton in transitional waters and angiosperms in coastal waters. However, this is still not the case for fish in lakes, with the exception of the three RBDs in Northern Ireland, nor for hydromorphological quality elements. In Northern Ireland, biological quality element assessment methods are still missing for benthic fauna in lakes and transitional waters, and for macroalgae in transitional waters in one of the three RBDs.
- **Monitoring, assessment and classification of chemical status in surface water bodies**
 - In the UK overall there has been a net reduction in the number of sites and water bodies monitored for chemical status; only 16 %, 2 %, 3 % and 8 % of the total monitoring sites across the RBDs in the UK are used for the monitoring of chemical status in lakes, rivers, transitional and coastal waters respectively. There was no monitoring in territorial waters and their status is not assessed. This reduction can partially be explained by the implementation of a risk based approach (in England, Wales and Scotland) to identify which water bodies require monitoring in order to rationalise the monitoring programme.
 - There was a large increase (from 36 to 96 %) in the proportion of surface water bodies classified as good for the second RBMP compared to the first cycle. There was also a decrease in the proportion with unknown status (from 63 to 2 %).
 - The majority of Priority Substances (ranging from 13 to 41 as monitored) listed across the United Kingdom RBDs are monitored in water for status assessment. Monitoring is undertaken at frequencies that meet the minimum requirements in the Directive at some sites but not at others. Mercury, hexachlorobenzene and hexachlorobutadiene are monitored in biota in most RBDs, at a limited number of sites but at a frequency that meets the requirements of the Directive.
 - Arrangements are in place for the long-term trend analysis of concentrations of those Priority Substances listed in Part A of Annex I of the EQS Directive that tend to

accumulate in sediment and/or biota in most RBDs, not all (10 of the 14) substances are monitored consistently across the RBDs. Monitoring frequencies meet the requirements of the Directive.

- The method of dealing with measurements of Priority Substances lower than the limit of quantification is as specified in the Directive for 12 of the 15 RBDs; three RBDs in Northern Ireland reported the use of a different method.
- The majority of Priority Substances in inventories and discharged are monitored in the UK RBDs. However, a total of 20 Priority Substances were discharged but not monitored in at least one RBD, with more than three Priority Substances discharged but not monitored in the majority of RBDs. The UK, however, suggests this may be a reporting mistake.
- More than 80 % of surface water bodies in the UK were classified for chemical status with low confidence and the remainder with either medium confidence or high confidence. A high proportion of water bodies classified in good status but with low confidence were not monitored but classified on the basis of a risk based approach.
- **Monitoring, assessment and classification of quantitative status of groundwater bodies**
 - A large proportion (73 %) of the groundwater bodies are not subject to monitoring.
 - Quantitative status is assigned to all groundwater bodies but the method for assigning status without monitoring data is unclear.
- **Monitoring, assessment and classification of chemical status of groundwater bodies**
 - Surveillance monitoring is implemented in a limited number of groundwater bodies and operational monitoring does not cover all groundwater bodies at risk.
 - Substances causing risk are not completely covered by operational monitoring.
 - WFD core parameters are not monitored at all in seven river basin districts and ammonium is not monitored in the remaining eight river basin districts.
 - Groundwater associated surface waters have not been considered in status assessment in the Scotland RBD.

- **Designation of Heavily Modified and Artificial Water Bodies and definition of Good Ecological Potential**
- In general, the methodology for heavily modified water bodies' designation is well explained in guidelines and/or appendices to RBMPs for all relevant aspects, including significant adverse effects and better environmental options. However, specific information on the outcomes of the assessment of significant adverse effects and better environmental options is not provided at the water body level. Furthermore, physical alterations are not reported for all water categories designated as heavily modified water bodies in all RBDs. For England and Wales, it was explained that information is not held about the history of water bodies that are now considered heavily modified, therefore data on physical alterations cannot be provided.
- Good ecological potential is defined using the Prague approach (England, Wales and Scotland) or a hybrid approach (Northern Ireland). Good ecological potential has not been defined in terms of biological quality elements for any of the RBDs but on the basis of mitigation measures that must be undertaken to reach good ecological potential. Several mitigation measures for defining GEP are reported in all RBDs but specific assessments of ecological changes expected from taking these measures are not mentioned. However, monitoring is recommended to identify biological changes delivered by the implementation of mitigation measures.
- **Environmental objectives and exemptions**
- Environmental objectives for ecological and chemical status of surface water bodies have been reported in all RBDs as well as for chemical and quantitative status of groundwater bodies. Information is also provided on when the objectives will be achieved.
- Information on drivers, pressures and impacts leading to exemptions was reported.

Still a significant number of exemptions is applied and those related to Article 4(5) have increased. The justifications for exemptions are made more transparent and are provided at the water body level. However, there is still a lack of detail for the justifications and applied criteria in several plans assessed, and those related to Article 4(5) need to be reconsidered.

- **Programme of Measures**

- Progress has been fairly good overall with 7 out of the 15 RBDs stating that all measures included in the first Programme of Measures (PoM) had been completed, three RBDs reporting that some of the planned measures had been completed and five RBDs reporting that all planned measures had been started. Changes in the second RBMP have been made in response to improvements in understanding pressures and impacts, significant management challenges and understanding where to prioritise action.
- Financing of measures has been secured in 12 out of 15 of the RBDs but not for the RBDs in Northern Ireland.
- With respect to coordination with the Floods Directive, joint consultation was carried out in England and Wales. The objectives and requirements of the Floods Directive have been considered in the second RBMP in all RBDs, specific win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and use of Natural Water Retention Measures have been included in the PoM. The design of new and existing structural measures for the Floods Directive have been adapted to take into account WFD Environmental Objectives. The plans are not fully integrated, and a joint consultation has not been carried out in Scotland or Northern Ireland.

- **Measures related to abstractions and water scarcity**

- Five RBDs have reported high values of Water Exploitation Index +, one of them likely beyond sustainability.
- Most of the abstraction pressure is caused by public water supply, usually from both surface water bodies and groundwater bodies.
- There is a concession, authorisation and/or permitting regime to control water impoundment and a register of impoundments (under Article 11(3)(e)).

- **Measures related to pollution from agriculture**

- The link between pressures and measures has been established on a general level and an appraisal of the gaps between pressures and measures has been done.
- The English RBMPs describes whether measures are mandatory or voluntary. For other RBDs it was not clear whether the measures being recommended were entirely

mandatory or voluntary⁴. In many cases measures are based on regulations making them mandatory, but there are a large number of other measures which are likely to be voluntary schemes.

- Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc.) are found in all RBDs except Scotland.
- Financing of agricultural measures is secured in all basins, except those in Northern Ireland and Scotland.
- **Measures related to pollution from sectors other than agriculture**
 - The measures proposed are generic and do not address individual Priority Substances, River Basin Specific Pollutants or Groundwater pollutants.
 - There is no information on funding to tackle any of the surface water or groundwater measures included in the UK's RBMPs.
- **Measures related to hydromorphology**
 - Operational KTM to address hydromorphological pressures and indicators on the gap to be filled for hydromorphological pressures are explicitly reported for the RBDs in Scotland, England and Wales. For the RBDs of Northern Ireland, relevant KTM have been linked to national hydromorphological measures but they have not been reported as tackling specific significant pressures. The RBMP refers to a "prioritisation of issues" such as barriers to fish migration and to co-ordination of river restoration and continuity work by 2020. However, in most RBDs there is no explicit mention of implementing specific technical measures that will address the priority issues.
 - In the RBDs of Scotland, England and Wales, ecological flows have been derived for all relevant water bodies, but have been implemented only in some of the water bodies (work still ongoing). In the RBDs of Northern Ireland, ecological flows have been only derived for some relevant water bodies but have not been implemented yet. There are plans to do so in the second RBMP.
- **Economic analysis and water pricing policies**
 - Cost recovery is explained in general but not transparently presented for all relevant user sectors in all RBDs.
 - Only general information on the application the polluter pays principle was reported.

⁴ The UK subsequently indicated that information on mandatory measures is provided in the section of the RBMPs called – "Information on mechanisms for the Water Framework Directive".

- **Considerations specific to Protected Areas (identification, monitoring, objectives and measures)**
 - For Protected Areas designated under the Birds⁵ and Habitats⁶ Directives (associated with both surface and groundwater), additional objectives have been set for the most part. For a proportion of these, it is noted that work is still ongoing to establish the needs. For a small proportion, mainly associated with Natura 2000 sites, the achievement of the WFD objectives is assessed to be sufficient also to achieve the objectives of the other Directives.
 - For Protected Areas associated with shellfish production, specific objectives are set to be identical to the repealed Directive 2006/113/EC in all but a very small number of Protected Areas in the Scotland RBD.
 - The reported monitoring activities are very limited and this represents a significant change since the first RMBP as there was a significant monitoring programme specifically for protected surface water areas covering all relevant Directives and for most of RBDs. Hence reported monitoring activities in relation to Protected Areas seem to be now very limited and lacking for most RBDs, although the monitoring would be reported through other different instruments.
- **Adaptation to drought and climate change**
 - Climate change was considered in various ways in all RBDs and it is stated that the guidance document on how to adapt to climate change was used.
 - However, not all RBDs have performed a climate proofing of measures, and not all have linked measures to the national adaptation strategy.
 - There is a sub-plan on water scarcity and droughts for the Scotland and Solway Tweed RBDs, and in all RBDs in England but no such sub-plans are reported for the other RBDs where drought and water scarcity are identified as issues related to climate change.

⁵ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>

⁶ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043>

Recommendations

- The United Kingdom needs to ensure that, in the preparation of the next RBMPs, the public is duly consulted taking into account these documents purpose and complexity. The United Kingdom should continue to develop and improve international cooperation in order to ensure the timely achievement of the WFD objectives.
- The United Kingdom needs to provide a more detailed explanation on the way in which the apportionment of pressures among sources is carried out.
- Further work is needed in the assessment of pressures, as a wide range of pressures have not been assessed and no specific reasons could be identified for their exclusion.
- Inventories of emissions, discharges and losses of chemical substances have been established in all RBDs, but not for all Priority Substances and other substances identified in part A of Annex I of the EQS Directive. Complete inventories need to be established.
- The United Kingdom should strengthen monitoring of surface water by covering all relevant quality elements in all water categories for all regions.
- The United Kingdom should complete the development of assessment methods, including reference conditions, for all relevant quality elements, including hydromorphological quality elements. Assessment methods for biological quality elements should be developed for all water categories.
- The monitoring for status assessment to reach sufficient confidence and spatial coverage for all the Priority Substances should be continued (including territorial waters whose status should be also assessed). In particular, monitoring should be performed in a way that provides sufficient temporal resolution and spatial coverage to classify all water bodies, and all priority substances should be considered in the assessment of status, in the relevant matrix. If reduced frequencies or a different matrix are used, the corresponding explanations should be provided, as required by the Directive.
- The United Kingdom should perform trend monitoring to ensure that all the relevant substances specified in Directive 2008/105/EC are monitored in a way that provides sufficient temporal resolution and spatial coverage.

- The United Kingdom should address the large uncertainties reported in relation to the assessment of the status, the pressures and the effect of potential measures for groundwater bodies.
- The monitoring of groundwater networks should also be significantly improved.
- The process to identify heavily modified water bodies and to define good ecological potential needs to be completed. This should be done by providing information on the outcomes of the assessment of significant adverse effects of restoration measures on the use or on the wider environment and the lack of better environmental options at water body level (designation tests according to Articles 4(3)a and 4(3)b) in all RBDs. This will improve the transparency of the designation process. Ecological potential needs to be defined in terms of biology in all RBDs.
- A significant number of exemptions have been applied in the second RBMPs and those related to Article 4(5) have increased. Efforts should continue to further improve justifications for the application of exemptions in relation to Article 4(4) and 4(5) and to make them more transparent in all RBMPs. Particularly the criteria used for the justification of Article 4(5) exemptions need to be reconsidered.
- The United Kingdom should ensure in all RBDs a thorough assessment of any planned new modifications in line with the requirements of the WFD and as further specified by the Judgment of the Court in case C-461/13. The use of exemptions under Article 4(7) needs to be based on a thorough assessment of all the steps as requested by the WFD and made transparent in the RBMPs.
- Although indicators of the gaps to good status for significant pressures on groundwater and surface waters have been reported electronically to WISE across the United Kingdom RBDs, indicators of the level of progress expected in the implementation of measures is less well defined. It should be ensured that the RBMPs clearly identify the gap to good status, and that the Programmes of Measures are designed and implemented to close that gap.
- KTMs should be operational and cover all the pressures causing failure to reach the objectives. In addition, all individual Priority Substances, River Specific Pollutants and Groundwater pollutants identified as causing failure should be associated with KTMs.
- The United Kingdom should ensure that funding for the implementation of measures has been secured for all RBDs and that all the costs are reported.

- The problem of water scarcity and over-abstraction, which are significant pressures in certain RBDs, should be better tackled with targeted measures. The United Kingdom could consider extending controls to all water abstractions, including the smaller ones.
- For all UK RBDs, it should be stated clearly to what extent, in terms of area covered and pollution risk mitigated, basic measures (minimum requirements to be complied with) or supplementary measures (designed to be implemented in addition to basic measures) will contribute to achieving the WFD objectives.
- The UK should ensure the definition and implementation of appropriate measures to address the significant hydromorphological pressures. The prioritisation of issues does not seem to have been translated into specific actions to tackle the relevant pressures.
- The UK should finish the establishment and implementation of ecological flows for all relevant water bodies in all RBDs.
- The United Kingdom should apply cost recovery for water use activities having a significant impact on water bodies or justify any exemptions using Article 9(4). It should transparently present how financial, environmental and resource costs have been calculated and how the adequate contribution of the different users is ensured. The United Kingdom should also transparently present the water-pricing policy, including the use of adequate incentives for users to use water efficiently and provide a transparent overview of estimated investments and investment needs.
- The United Kingdom should extend the establishment of safeguard zones to protect drinking water sources in designated groundwater bodies to all RBDs to ensure that such areas are protected.
- The United Kingdom should clarify if monitoring programmes for relevant Protected Areas covering both groundwater and surface waters in RBDs are being carried out.

Topic 1 Governance and public participation

1.1 Assessment of implementation and compliance with WFD requirements in the second cycle

1.1.1 Administrative arrangements – RBDs

In the United Kingdom, implementation of the WFD is mainly undertaken at the sub-national level: England, Wales, Scotland, Northern Ireland and Gibraltar. The UK has identified 16 RBDs, of which 12 lie in England, Scotland and Wales, three in Northern Ireland and one in Gibraltar.

The United Kingdom did not report a RBMP for Gibraltar in WISE although it was reported to the European Commission as a separate document.

The UK shares two international RBDs with the Republic of Ireland: the Neagh Bann and North Western RBDs.

1.1.2 Administrative arrangements – competent authorities

There are eight authorities reported for the United Kingdom across the five main jurisdictions:

- For Scotland, Scottish Ministers and the Scottish Environment Protection Agency
- For England, the Secretary of State for Environment, Food and Rural Affairs and the Environment Agency
- For Wales, the National Assembly of Wales and Natural Resources Wales (which took over the Environment Agency's role for the WFD in Wales in the first cycle)
- For Northern Ireland, the Department of Agriculture, Environment and Rural Affairs in Northern Ireland;
- And for Gibraltar, the Department of the Environment and Climate Change.

1.1.3 River Basin Management plans – structure and Strategic Environmental Assessment

Sub-plans to the RBMPs were reported only for Scotland and Solway Tweed, where sub-plans cover water scarcity and droughts, invasive non-native species, restoration of physical conditions (hydro-morphology) and fish barriers.

In England, Wales and Northern Ireland, Strategic Environmental Assessments were carried out for the RBMPs; this was not the case for Scotland and Solway Tweed⁷.

1.1.4 Public consultation

For all RBMPs except Scotland, it is reported that documents were available for consultation for the requisite six months. For the Scotland district the consultation opened on 9 December 2014 and closed on 9 April 2015.⁸

In all UK RBDs, stakeholders were actively involved by authorities. This is reported to include stakeholders in the following areas: agriculture, energy, fisheries, industry, navigation (and ports), water supply, mining and quarrying, urban infrastructure and transport industries, consumer groups, NGOs/nature protection and local/regional authorities.

In Scotland, the mechanisms used for active involvement of stakeholders in the development of the RBMPs consisted of advisory groups. In England and Wales, stakeholders were involved via advisory groups, the formation of alliances and involvement in the drafting. In the planning process, authorities engaged with stakeholders using a range of organisations such as catchment partnerships, liaison panels, regional flood and coastal committees, customer challenge groups, and various sector-specific groups such as the estuaries and coasts sub group and the England fisheries group.

In Scotland, the changes that were made in the RBMPs in response to issues raised by stakeholders and impacts on the RBMP included introduction of new information, adjustments to specific measures, changes to the selection of measures and commitment to action in the next RBMP cycle.

In England and Wales, impacts on the RBMP included introduction of new information, adjustments to specific measures, changes to the methodology used, changes to the selection of measures, commitment to action in the next RBMP cycle and commitment to further research. Further specific impacts included the use of plain English and improved signposting to detailed data and information; providing detailed catchment level information in consultation and updated RBMPs; improved linkages between RBMPs and flood plans and describing links with other plans and processes.

⁷ The UK subsequently informed that the first Strategic Environmental Assessments for the Scotland RBMP and Solway Tweed RBMP included a forward look; a screening/scoping exercise was carried out for the second cycle RBMPs.

⁸ Appendix 10 of the River Basin Management Plan for the Scotland RBD, however, indicates that the public consultation was open from 22 December 2014 to 22 May 2015.

Impacts of public participation on the RBMPs are also reported for Northern Ireland: adjustments to specific measures and changes to selection of measures.

1.1.5 Integration with the Floods Directive and the Marine Strategy Framework Directive

In England and Wales, a joint consultation was carried out between the RBMPs and the Flood Risk Management Plans prepared under the Floods Directive⁹. This was not the case in Scotland, Solway Tweed RBD or Northern Ireland.

For RBDs in England and Wales, RBMPs included sections on coordination of measures with the Floods Directive. The Scotland and Solway Tweed RBMPs contain information on links with flood risk management.

For England and Wales, a joint consultation was carried out between the RBMPs and the Marine Strategy Framework Directive¹⁰; in addition, a document was prepared to assist estuarine and coastal stakeholders respond to the consultation on the draft RBMPs in the context of the Marine Strategy Framework Directive.

A review found some references to the Marine Strategy Framework Directive but not to that Directive's objectives. In the RBMP for the South West RBD in England, reference is made to the Marine Strategy Framework Directive as a plan affecting water management, but no specific reference is made to the objectives of the Marine Strategy Framework Directive. There is a link to the Marine Strategy Framework Directive PoM on the RBMP Page of the Defra website¹¹. The RBMP for Neagh Bann in Northern Ireland references the Marine Strategy Framework Directive and notes that the Marine Strategy Framework Directive PoM will complement that for the WFD but does not specifically cite the objectives of the Marine Strategy Framework Directive. The RBMP for Scotland provides a reference to the Marine Scotland Act 2010, though not to the Marine Strategy Framework Directive itself.

1.1.6 International coordination and co-operation

The UK has reported that there is an international agreement and a permanent co-operation body in place with the Republic of Ireland – covering the Neagh Bann and North Western in the United Kingdom (designated as category two cooperation). Joint RBMPs, however, were

⁹ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

¹⁰ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0056>

¹¹ <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

not prepared. The UK reported that there was no international co-ordination on public participation.

Coordination between the United Kingdom (Northern Ireland) and the Republic of Ireland takes place via the Joint North South WFD Coordination group, a working group under the Joint North South Ministerial Council. Areas of coordination include: local management issues, strategic environmental assessment, monitoring programmes, joint funding of transboundary projects, public communication and a joint approach to setting exemptions¹².

1.2 Main changes in implementation and compliance since the first cycle

There are two changes that have been noted in terms of administrative arrangements compared to the first cycle.

In the first cycle, the United Kingdom designated four RBDs in Northern Ireland, including the Shannon international RBD shared with the Republic of Ireland. Only two km² of this international RBD were located in Northern Ireland. In the second cycle the United Kingdom part of this territory is now included in the North Western international RBD.

A change is seen in Wales: in the first cycle, the Environment Agency was a competent authority for RBDs in Wales; Natural Resources Wales has taken over this role in the second cycle.

1.3 Progress with European Commission recommendations

- Recommendation: *River basin management plans for Gibraltar shall be reported.*

Assessment: A RBMP for Gibraltar has been adopted¹³. It has not, however, been reported to WISE¹⁴. Consequently, the United Kingdom has partially fulfilled this recommendation.

¹² Sources include, among others, a joint document from 2008, Working Together: Managing Our Shared Waters, prepared for the North Western International RBD, available at: <https://www.daera-ni.gov.uk/sites/default/files/publications/doe/working-together-managing-our-shared-waters-north-western-2008.PDF>. More recent documents were not found on UK or Republic of Ireland web sites.

¹³ See: https://www.gibraltar.gov.gi/new/sites/default/files/HMGoG_Documents/Gibraltar_River_Basin_Management_Plan_Public_Consultation_Main_Report.pdf

¹⁴ The United Kingdom noted that Gibraltar's second RBMP was attempted to be submitted via the WISE portal. However there are several errors which Gibraltar is working on with the Helpdesk.

Topic 2 **Characterisation of the River Basin District**

2.1 Assessment of implementation and compliance with WFD requirements in the second cycle

2.1.1 Delineation of water bodies

Overall in the United Kingdom, there has been a decrease in the numbers of delineated surface water bodies compared to the first cycle, with the biggest decrease occurring for river water bodies (17 %) (Table 2.1).

There was a decrease in numbers of river water bodies in 14 of the 15 RBDs with a small increase in Scotland. There are big differences among the four regions and the RBDs. For example, there was a 37 % decrease in the number of river water bodies in the South West RBD (England) and the Western Wales RBD (Wales), around 20 % decrease in numbers of river water bodies in Northern Ireland and a small increase (1 %) in Scotland.

For lakes, there was no change in numbers in five RBDs, an increase in one RBD and a decrease in nine RBDs. There was no change between the two cycles in terms of transitional waters in seven RBDs, a decrease in six RBDs and an increase in two RBDs. The regional differences are again highlighted by the fact that there was a small decrease in identified transitional waters in Scotland compared to 15 % increase in the South East RBD (England). Of the 13 RBDs with identified coastal water bodies, there was no change in numbers in six RBDs, an increase in two RBDs and a decrease in five RBDs.

Concerning the reasons for the changes, in the Neagh Bann RBD changes made to river water bodies in the second plans were based on aggregation of water bodies of less than 10km² catchment areas, aggregation of water bodies previously split because they contained more than one monitoring site, or as a result of the review of cross-border water bodies. No changes were reported for lakes. Changes made to transitional and coastal water bodies were due to splitting of water bodies where only part was heavily modified, aggregation of water bodies below the minimum size threshold and changes based on monitoring evidence from the first cycle. Some water bodies with significantly differing quality at different monitoring stations were split. There was also a review of cross-border water bodies which influenced these changes. Similarly, in the Scotland RBD increased understanding of status due to new monitoring data allowed some water bodies to be split where pressures and status varied. In the Severn RBMP, it was explained that the mapping of the network of surface water bodies was updated using a ‘detailed river network’ for the second RBMP. This resulted in a number of very small ‘non-reportable’ water bodies being removed and resolved some errors. No changes

to the methodology were made for transitional or coastal water bodies, though some changes have been made to the delineation on a case-by-case basis. For example, some coastal water bodies were changed to transitional water bodies with a corresponding change in the monitoring networks.

Table 2.2 shows the differences in size distribution of surface water bodies in the United Kingdom between the second and first RBMPs. The minimum sizes largely remained the same but there was an increase overall in the minimum length of rivers, which changed from an average minimum length of 0.12 km in the first RBMPs to 1.02 km in the second RBMPs. The minimum size criteria reported were 10 km² catchment area for rivers and 0.5 km² surface area for lakes.

Table 2.3 summarises the information provided by the United Kingdom on how water bodies have evolved between the two cycles for both surface water and groundwater. For surface water, the largest changes were for river water bodies where there were a significant number of deletions and aggregations of water bodies. This may also account for the increase in minimum river water body length if smaller water bodies were aggregated or removed.

Table 2.1 *Number and area/length of delineated surface water bodies in the United Kingdom for the second and first cycles*

Year	RBD	Rivers		Lakes		Transitional		Coastal	
		Number of water bodies	Total length of water body (km)	Number of water bodies	Total area (km ²) of water bodies	Number of water bodies	Total area (km ²) of water bodies	Number of water bodies	Total area (km ²) of water bodies
2016	UK01	2 028	20 810	309	962	39	605	449	45 868
2016	UK02	505	6 154	35	45	11	390	8	1 913
2016	UK03	315	3 514	45	29	7	25	7	524
2016	UK04	844	11 216	134	42	7	328	2	339
2016	UK05	526	6 664	46	44	18	316	13	2 437
2016	UK06	414	5 320	73	32	10	336	1	43
2016	UK07	220	2 309	28	6	23	121	11	1 646
2016	UK08	590	7 025	61	19	23	235	23	3 498
2016	UK09	681	8 199	68	38	6	546		
2016	UK10	428	3 858	64	26	28	135	23	4 331
2016	UK11	71	730	21	14	1	109		
2016	UK12	434	5 610	163	66	11	279	5	1 511
2016	UKGBNIIENB	199		10	393	2	5	3	227
2016	UKGBNIIENW	162		8	175	2	34	1	166
2016	UKGBNINE	89		3	2	2	1	15	915
2016	Total	7 506	81 409	1 068	1 894	190	3 464	561	63 419
2010	UK01	2 013	20 817	309	961	40	605	449	45 796
2010	UK02	526	6 189	35	45	12	695	8	1 913
2010	UK03	380	3 560	73	29	7	25	7	705
2010	UK04	968	11 179	136	44	8	328	1	329
2010	UK05	757	7 432	49	47	18	328	11	2 256
2010	UK06	483	5 455	76	40	11	336	1	43
2010	UK07	340	2 508	34	47	20	54	16	1 712
2010	UK08	938	7 559	63	27	23	234	25	3 498
2010	UK09	791	8 303	75	43	6	545		
2010	UK10	676	4 224	62	26	27	135	24	4 331
2010	UK11	87	753	21	14	1	109		
2010	UK12	547	6 020	164	66	12	279	8	1 509
2010	UKGBNIIENB	255	6 754	10	394	2	5	3	227
2010	UKGBNIIENW	208	6 383	9	149	2	35	1	166
2010	UKGBNINE	111	2 612	3	2	3	1	16	916
2010	Total	9 080	99 749	1 119	1 933	192	3 715	570	63 400

Source: WISE electronic reports

Table 2.2 *Size distribution of surface water bodies in the United Kingdom in the second and first cycles*

Year	RBD	River length (km)			Lake area (km ²)			Transitional (km ²)			Coastal (km ²)		
		Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average
2016	UK01	0.08	69.66	10.26	0.5	55.34	3.11	0	70.75	15.52	0	4,448.15	102.16
2016	UK02	0.64	78.9	12.19	0.02	8.69	1.28	0.16	305.78	35.43	42.22	653.19	239.16
2016	UK03	1.37	70.77	11.16	0	10.3	0.64	0.45	11.45	3.57	0.19	126.48	74.93
2016	UK04	1.07	102.13	13.29	0	3.13	0.31	0.06	247.94	46.93	158.42	180.58	169.5
2016	UK05	1.17	189.97	12.67	0	12.12	0.97	0.12	133.63	17.58	0.11	1,195.34	187.45
2016	UK06	0.77	69.69	12.85	0	3.09	0.44	0.05	201.01	33.57	42.67	42.67	42.67
2016	UK07	1.48	87.97	10.49	0	0.78	0.22	0.08	30.94	5.24	0.05	449.76	149.63
2016	UK08	1.6	111.6	11.91	0	3.79	0.32	0.1	70.88	10.2	5.14	825.53	152.08
2016	UK09	0.55	78.72	12.04	0	4.65	0.56	2.02	466.27	90.97	0	0	0
2016	UK10	1.02	47.22	9.01	0	4.93	0.4	0.09	22.13	4.83	0.05	899.88	188.32
2016	UK11	1.5	65.11	10.28	0	4.15	0.66	109.34	109.34	109.34			
2016	UK12	1.1	83.06	12.93	0	8.47	0.41	0.1	98.18	25.34	27.88	455.55	302.12
2016	UKGBNIIENB	0	0	0	0.55	381.14	39.28	2.5	2.56	2.53	44.52	122.06	75.75
2016	UKGBNIIENW	0	0	0	0.61	52.79	21.91	13.08	21.42	17.25	166.47	166.47	166.47
2016	UKGBNINE	0	0	0	0.51	0.95	0.7	0.33	0.6	0.46	1.29	162.89	61.01
2010	UK01	0.08	69.61	10.34	0.5	55.33	3.11	0	70.74	15.13	0	4,454.96	102
2010	UK02	0.56	77.64	11.77	0.02	8.68	1.28	0.16	305.68	57.95	42.23	653.19	239.14
2010	UK03	0.21	75.96	9.37	0	10.29	0.4	0.16	11.43	3.51	0.19	257.77	100.66
2010	UK04	0.11	111.22	11.55	0	3.12	0.32	0.06	247	41.01	328.85	328.85	328.85
2010	UK05	0.01	116.54	9.82	0	12.12	0.96	0.12	133.61	18.21	0.11	1,195.91	205.09
2010	UK06	0.06	82.33	11.29	0	4.86	0.52	0.05	201.04	30.56	42.68	42.68	42.68
2010	UK07	0.03	83.41	7.38	0	36.03	1.4	0.08	30.91	2.71	0.05	450.01	107
2010	UK08	0.12	109.91	8.06	0	6.72	0.43	0.23	70.84	10.19	0.02	825.3	139.91
2010	UK09	0	101.65	10.5	0	4.65	0.57	2.02	465.92	90.9	0	0	0

Year	RBD	River length (km)			Lake area (km ²)			Transitional (km ²)			Coastal (km ²)		
		Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average	Mini-mum	Maxi-mum	Average
2010	UK10	0.08	54.03	6.25	0	4.93	0.41	0.09	22.13	4.99	0.05	899.63	180.46
2010	UK11	0.16	65.08	8.66	0	4.15	0.66	109.28	109.28	109.28	0	0	0
2010	UK12	0.1	82.27	11.01	0	14.36	0.4	0.11	98.1	23.27	0.16	451.38	188.61
2010	UKGBNIIENB	0.71	162.78	26.49	0.54	381.79	39.35	2.5	2.56	2.53	44.54	122.09	75.79
2010	UKGBNIIENW	0.65	140.21	30.69	0.56	57.78	16.53	0.77	34.48	17.63	165.73	165.73	165.73
2010	UKGBNINE	1.16	111.69	23.53	0.53	0.88	0.67	0.07	0.59	0.33	1.29	185.73	57.22

Source: WISE electronic reports

Table 2.3 *Type of change in delineation of groundwater and surface water bodies in the United Kingdom between the first and second cycles*

Type of water body change for second cycle	Groundwater Body	Lake Water Body	River Water Body	Coastal Water Body	Transitional Water Body
Aggregation		2	189	3	2
Aggregation and splitting			57	4	
Splitting		9	158	2	4
Change	4	20	804	16	3
Change in code			3		
Extended aea		7	3		1
Reduced area		10	7		
Creation	433	3	82	3	4
Deletion	370	70	2071	21	12
No change	353	1034	6227	542	177
Total water bodies before deletion	1158	1136	9577	582	202
Delineated for second cycle (after deletion from first cycle)	788	1066	7506	561	190

Source: WISE electronic reports

2.1.2 Designation of heavily modified water bodies

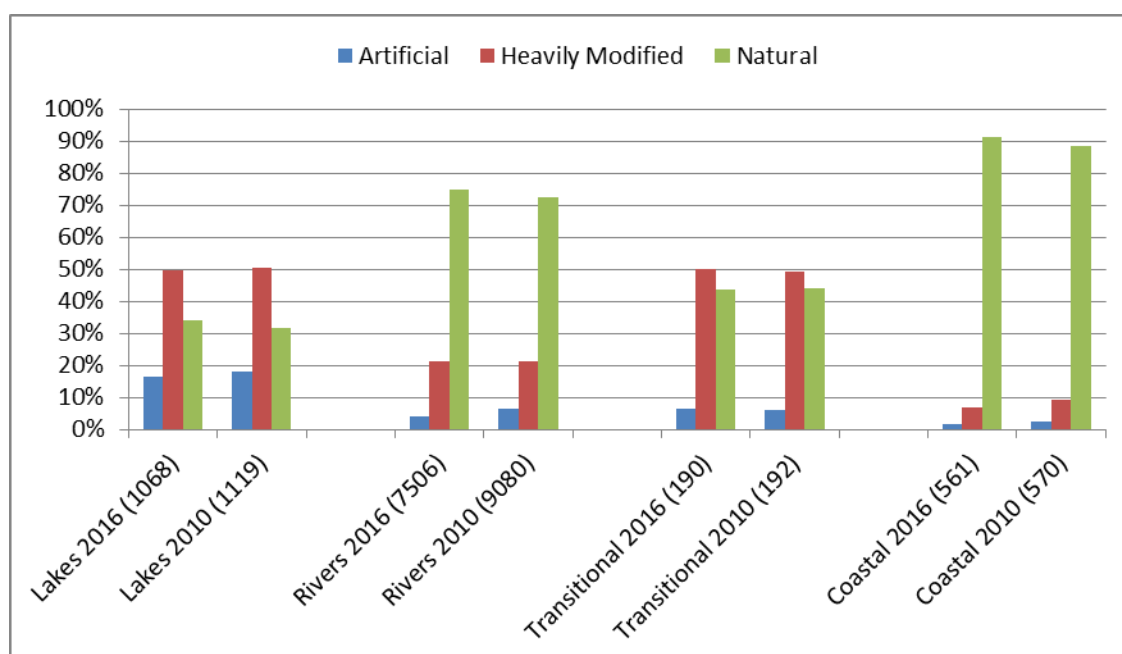
There was a 15 % decrease in the number of delineated surface water bodies between the two cycles. In the second cycle, 70.5 % of surface water bodies in the United Kingdom were natural, 24 % heavily modified and 5.5 % artificial. Overall in the United Kingdom, there was a decrease in the number and proportion of heavily modified water bodies between the two cycles (Figure 2.1), particularly in terms of heavily modified river water bodies where there was a decrease in numbers and proportion in 14 of the 15 RBDs. The exception was for Scotland where there was an increase of 18 % in heavily modified water bodies from the first to the second cycle. Generally fewer artificial water bodies are identified than heavily modified water bodies. 13 UK RBDs identified artificial water bodies, in 10 of these there was a decrease in numbers between the two cycles, in two others (Scotland and Neagh Bann) the number was the same, and in the South West RBD numbers increased in the second cycle.

Of the 11 heavily modified lake water bodies in Northern Ireland, eight are reservoirs where the water body was originally a natural lake, and three were reservoirs where the water body

was originally a river. This information on reservoirs was not reported for most of the other UK RBDs.

Heavily modified water bodies and artificial water bodies are discussed in more detail in Chapter 7.

Figure 2.1 *Proportion of surface water bodies in the United Kingdom designated as artificial, heavily modified and natural for the second and first cycles. Note that the numbers in parenthesis are the numbers of water bodies in each water category*



Source: WISE electronic reports

2.1.3 Delineation of groundwater bodies

Overall in the United Kingdom there was a 20 % increase in numbers of groundwater bodies from the first cycle (Table 2.4). The biggest increase (75 %) occurred in the North Eastern RBD (Northern Ireland). There was a 20 % increase in numbers of groundwater bodies in Scotland¹⁵ and a 5 % decrease in the South West RBD. In three RBDs, the numbers remained the same, in three these decreased and in nine, the number of groundwater bodies increased as compared to the first cycle.

Overall the changes in groundwater body delineation were due to a better understanding of groundwater since the first cycle and an improved risk/status assessment leading to identification of more groundwater bodies. A UK Technical Advisory Group methodology on

¹⁵ The UK subsequently clarified that this was due to the delineation of groundwater bodies as multiple layers or horizons.

groundwater delineation and characterisation was identified for the second cycle, which superseded the methodology set out in UK Technical Advisory Group paper 6(a). All RBDs have used this new methodology and all have updated groundwater bodies delineation. Since the first cycle, groundwater bodies have been delineated using the characteristics of the superficial deposits and soils and the calculation of the long term annual average rate of overall recharge. Effort was also put into distinguishing between different layers, a shallow layer of superficial groundwater bodies, and a deep layer of bedrock groundwater bodies. Superficial groundwater bodies are defined as permeable superficial deposit aquifers with a minimum area of one km², which are subdivided by large surface water catchments, and bedrock groundwater bodies are defined primarily by bedrock aquifer type.

The Neagh Bann RBMP highlighted that there is now better mapping data and information on superficial deposits and information on land use pressures. There are nine superficial groundwater bodies in Northern Ireland (two in Neagh Bann RBD) that were delineated for the first time in the second RBMP. In the Scotland RBMP (Scotland RBD) individual aquifers were subdivided further to reflect differences in pressures on, or vulnerability of, different parts of the aquifers. The South West RBD used improved mapping to update the boundaries of groundwater bodies but full details of how this was done are not given in the RBMP.

Not much information was provided in the RBMPs on the consequences of the changes of water body delineation to groundwater body status and to comparability with the first cycle. However, in the Severn RBMP, a comparison was made of water body status in 2009 and 2015. Groundwater quantitative status has improved, with 91 % of groundwater bodies at good status in 2015 compared to 84 % in 2009, but groundwater chemical status has deteriorated, from 64 % at good status in 2009 to 51 % in 2015. No analysis of how the re-delineation may have influenced this was provided.

Table 2.3 summarises how water bodies have evolved between the two cycles which shows a significant number of deletions and creation of water bodies for groundwater.

Table 2.4 *Number and area of delineated groundwater bodies in the United Kingdom for the second and first cycles*

Year	RBD	Number	Area (km ²)		
			Minimum	Maximum	Average
2016	UK01	344	1.69	9,383.87	206.6
2016	UK02	64	8.71	2,453.50	252.25
2016	UK03	10	269.18	1,824.08	855.51
2016	UK04	51	9.06	1,968.22	479.61
2016	UK05	31	37.11	3,074.49	539.36
2016	UK06	47	7.57	990.95	217.81
2016	UK07	33	10.62	970.35	195.86
2016	UK08	42	2.07	1,817.62	390.88
2016	UK09	42	10.28	2,691.04	480.09
2016	UK10	25	7.42	1,947.81	489.47
2016	UK11	5	96.36	962.61	423.48
2016	UK12	18	22.92	1,514.79	630.17
2016	UKGBNIIENB	16	2.47	916.22	382.21
2016	UKGBNIIENW	46	0.06	887.83	106.06
2016	UKGBNINE	14	7.46	1,250.56	213.3
2016	Total	788	0.06	9,383.87	264.5
2010	UK01	284	2.11	2,742.90	234.39
2010	UK02	73	3.65	1,781.70	214.85
2010	UK03	9	293.01	1,822.74	949.88
2010	UK04	50	9.05	1,967.33	488.14
2010	UK05	31	37.1	3,118.16	539.36
2010	UK06	46	7.57	1,080.29	222.71
2010	UK07	30	10.61	969.67	211.77
2010	UK08	44	1.88	1,817.42	366.65
2010	UK09	40	10.28	4,064.46	507.54
2010	UK10	25	2.57	1,947.43	487.57
2010	UK11	6	30.81	962.13	350.18
2010	UK12	18	22.9	1,396.90	602.52
2010	UKGBNIIENB	14			
2010	UKGBNIIENW	45			
2010	UKGBNINE	8			
2010	Total	723	1.88	4,064.46	283.64

Source: WISE electronic reports

2.1.4 Identification of transboundary water bodies

The only two RBDs in the United Kingdom that are part of international RBDs are in Northern Ireland: both have reported transboundary coastal, transitional and river water bodies, and also

lakes in one RBD (North Western). In the Neagh Bann RBD 16 transboundary groundwater bodies were reported and 46 in the North Western RBD.

2.1.5 Typology of surface water bodies

There has been an increase in the number of reported river types, from 45 in the first RBMPs to 57 in the second RBMPs (Table 2.5). In the second RBMPs, there were 36 lake and 10 transitional water types compared to 43 and 11, respectively, in the first RBMPs. For both cycles 19 coastal water types were reported. The biggest decrease in numbers of surface water types between the two cycles was for the Solway Tweed RBD. This RBD had the most types in the first RBMP. Solway Tweed is shared between the English and Scottish Competent Authorities, it is likely that typology codes have been harmonised in this shared RBD for the second cycle resulting in fewer type codes overall¹⁶. Type codes have been reported for all surface water bodies in the United Kingdom, including artificial and heavily modified water bodies.

It should be noted that more types were reported for each category in the WISE methodological schema than in the WISE surface water body schema. The reasons for this are not known but could relate to different types being assigned to one water body. For example in the Severn RBMP, it was reported that the lakes typology was adjusted to include three depth categories rather than two.

Member States were asked to report ‘Not applicable’ in WISE if there is no corresponding intercalibration type for national types¹⁷. Overall in the United Kingdom, five of the 19 coastal water types did not have corresponding intercalibration types. In summary, 16 of the 36 reported lake types in the United Kingdom did not have corresponding intercalibration types, representing 67 % of lake water bodies. Similarly for rivers, 29 of the 57 river types did not have corresponding intercalibration types, representing 19 % of river water bodies and for transitional waters 3 of the 10 transitional water types did not have corresponding intercalibration types, representing 14 % of transitional water bodies.

Around 76 % of artificial water bodies, 30 % of heavily modified water bodies and 21 % of natural water bodies in the United Kingdom were reported not to have corresponding

¹⁶ The United Kingdom subsequently clarified that the Environment Agency in England reviewed and changed their water body network which resulted in small water bodies being taken out.

¹⁷ The United Kingdom subsequently clarified that the Environment Agency in England intercalibrated those types that were common with other Member States and used exactly the same methodology to derive class boundaries for non-intercalibrated types, therefore providing the same level of ambition.

intercalibration types¹⁸. It should be noted that all except four of the 9325 surface water bodies in the United Kingdom had a reported ecological status or potential.

In conclusion, there is some uncertainty on the comparability of the ecological status/potential for a significant proportion of lake water bodies and artificial water bodies in the United Kingdom.

Table 2.5 *Number of surface water body types at RBD level for the first and second cycles. Note that the total is not the sum of the types in each RBD as some types are shared by RBDs.*

RBD	Rivers		Lakes		Transitional		Coastal	
	1 st	2 nd	1 st	2 nd	1 st	2 nd	1 st	2 nd
UK01	21	20	16	16	4	3	9	8
UK02	45	24	30	15	9	3	16	3
UK03	24	16	14	7	5	1	7	4
UK04	24	16	14	9	5	3	7	2
UK05	24	10	14	3	5	4	7	4
UK06	24	11	14	7	5	2	7	1
UK07	24	8	14	3	5	3	7	3
UK08	24	15	14	6	5	5	7	6
UK09	24	17	14	7	5	2	7	0
UK10	24	13	14	9	5	4	7	7
UK11	24	9	14	7	5	1	7	0
UK12	24	22	14	9	5	1	7	1
UKGBNIIENB	8	9	13	5	6	1	12	3
UKGBNIIENW	8	10	13	4	6	1	12	1
UKGBNINE	8	6	13	3	6	1	12	3
Total	45	57	43	36	11	10	19	19

Source: WISE electronic reports

2.1.6 Establishment of reference conditions for surface water bodies

Table 2.6 shows the number of surface water body types at RBD level in the United Kingdom for which reference conditions were established, for the first and second cycles. Reference conditions have not been established for all biological quality elements for all types in any of the four water categories in the United Kingdom. Over 82 % of types in each category have not had hydromorphological reference conditions established¹⁹. The situation for physicochemical quality elements is in-between the biological quality elements and hydromorphological quality

¹⁸ The United Kingdom subsequently highlighted that the intercalibration activity continues for hydromorphology in ECOSTAT.

¹⁹ The United Kingdom subsequently highlighted that this is a consequence of using an alternative method for determining ecological potential, by selection of mitigation measures rather than biological quality elements.

elements, where reference conditions have been established for some quality elements in most types.

In terms of each water category, reference conditions have been established for all relevant biological quality elements in 40 % of transitional waters types, 26 % of coastal waters types, 17 % of lake water types and 16 % of river water types. In terms of hydromorphological quality elements, there are no types in any category where reference conditions have been established for all relevant quality elements, and for 100 % of transitional waters, 96 % of coastal waters, 83 % of lake waters and 82 % of river waters types, reference conditions have not been established for any relevant quality element. In terms of physicochemical quality elements, there are no types in any category where reference conditions have been established for all relevant quality elements. However, there are some reference conditions for some of the relevant physicochemical quality elements for all types in lake, river and transitional water bodies, and for 96 % of coastal water types.

In conclusion, the lack of comprehensive reference conditions for a significant proportion of types in each water category, casts doubt on the validity of ecological assessment methods in the United Kingdom²⁰.

Table 2.6 *Percentage of surface water body types in the United Kingdom with reference conditions established for all, some and none of the biological, hydromorphological and physicochemical quality elements.*

Water category	Water types	Biological quality elements	Hydromorphological quality elements	Physicochemical quality elements
Lakes	All	17 %		
	Some	78 %	17 %	100 %
	None	5 %	83	
Rivers	All	16 %		
	Some	60 %	18 %	100 %
	None	24 %	82 %	
Transitional	All	40 %		
	Some	40 %		100 %
	None	20 %	100 %	
Coastal	All	26 %		
	Some	70 %	4 %	96 %
	None	4 %	96 %	4 %

Source: WISE electronic reports

2.1.7 Characteristics of groundwater bodies

The reported information included the geological formation of the aquifer types in which groundwater bodies reside and details of whether groundwater bodies are layered. Linkage of

²⁰ The United Kingdom highlighted that they believe the methodology used is in line with CIS guidance.

water bodies to surface water bodies and terrestrial ecosystems has been reported for all RBDs. In the first RBMPs, information on whether a groundwater body was layered or not, and links to surface water bodies, had only been reported for the 11 England and Wales RBDs but not for the RBDs in Scotland and Northern Ireland. No information on links to terrestrial ecosystems and on the geological formation of aquifers was reported for any UK RBDs in the first cycle. Overall there seems to have been progress in further characterisation of groundwater bodies in the United Kingdom between the two cycles.

2.1.8 Significant pressures on water bodies

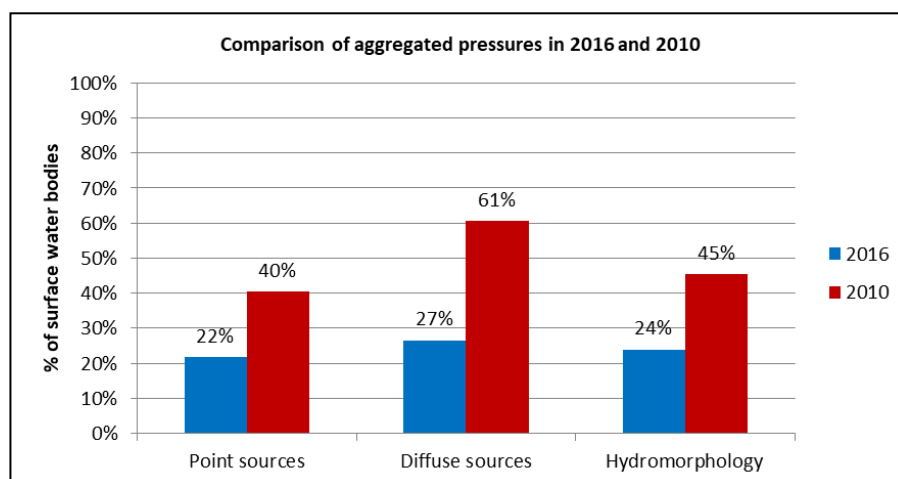
It is difficult to compare the number and proportion of water bodies affected by significant pressures because of the changes introduced to the types of pressures reported for the second cycle and because the United Kingdom only reported pressures at the aggregated level in the first RBMPs, while disaggregated pressures were reported in the second RBMPs. In addition, the United Kingdom re-delineated its surface and groundwater bodies for the second cycle meaning that there were often fewer water bodies in the second RBMPs. Figure 2.3 shows that there is an apparent decrease in diffuse, point and hydromorphological pressure types. Figure 2.4 shows that the most significant pressures on surface waters in the United Kingdom were reported to be anthropogenic unknown (28 %), followed by diffuse agricultural (20 %) and physical alteration of channel/bed/riparian area/shore – other (20 %). These pressures vary across regions in the UK.

In the first RBMP, the Scotland RBD reported significant proportions of its surface water bodies to be affected by point source, diffuse source, water abstraction and water flow regulations and morphological alteration pressures. In the second RBMP for the Scotland RBD, most of the surface water reported to be affected by pressures were by unknown anthropogenic pressures (42 % of surface water bodies). In other RBDs, there are some striking differences between the two cycles irrespective of the changes in water body delineation and definition of pressure types for reporting. For example, in the Anglian RBD in the first RBMP, 715 river water bodies (94 %) were affected by point source pressures and in the second RBMP, 302 river water bodies (57 %). Similarly, in the South West RBD in the first RBMP, 722 (80 %) river water bodies were affected by diffuse source pressures, and in the second RBMP, 325 (55 %).

Twenty one different pressure types are reported to affect groundwater bodies, although one type (Physical alteration of channel/bed/riparian area/shore - Agriculture) may be a reporting error. Diffuse agricultural pressures were the most significant pressure in terms of the proportion of affected groundwater bodies in seven of the 12 UK RBDs reporting this pressure. Mining pressures are also significant in nine RBDs and abstraction or flow diversion pressures were reported in seven RBDs.

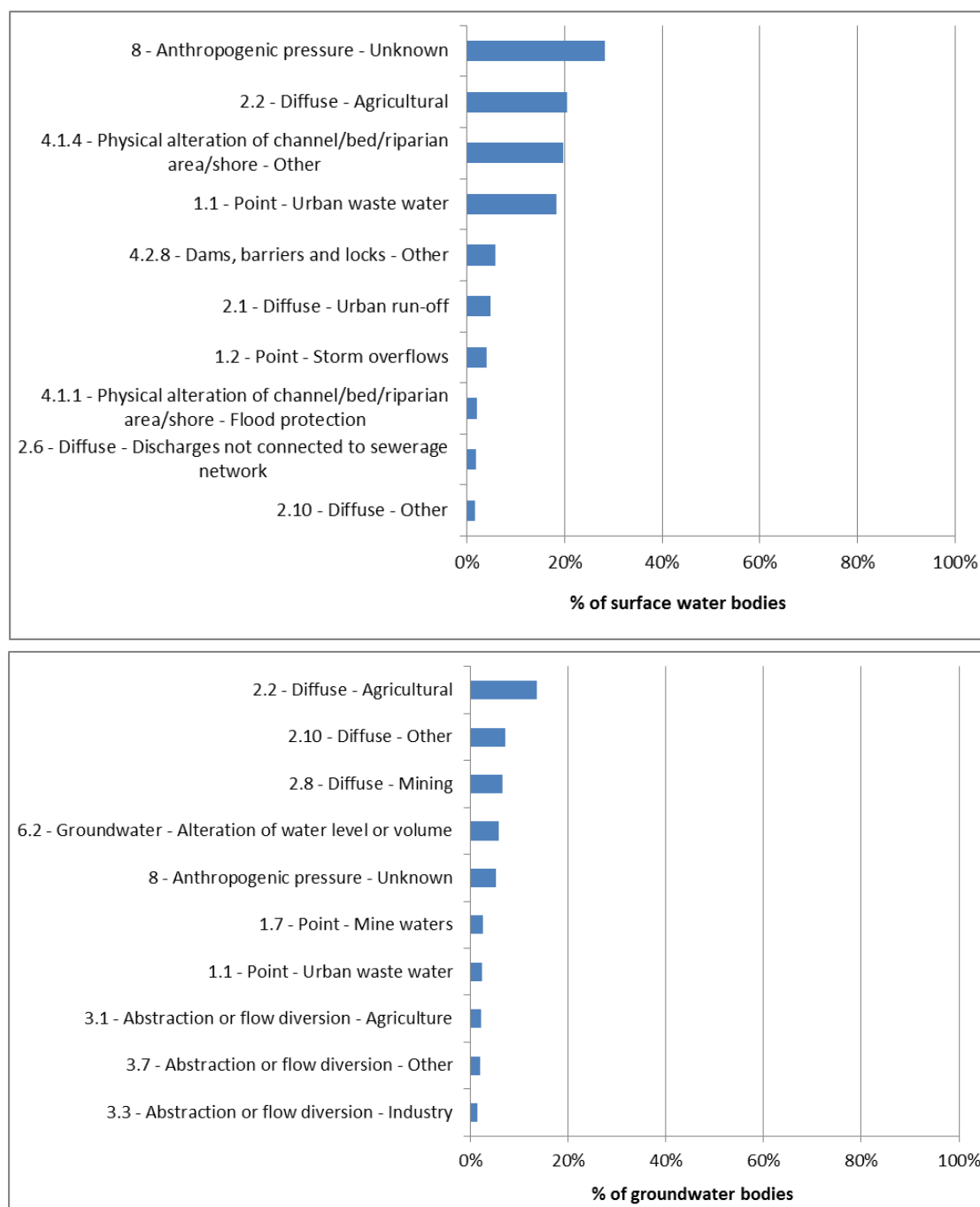
A range of pressures have not been assessed in surface water, for example 19 pressure types in Solway Tweed RBD and South West RBD (e.g. physical alteration, dams, barriers and lock, hydrological alteration, hydromorphological alteration, exploitation or removal of animal/plants, litter, anthropogenic pressures), and 34 in the Neagh Bann RBD (e.g. abstraction or flow diversion for agriculture and dams, barriers and locks for irrigation). However, no specific reasons could be identified in the RBMPs for the exclusion of these pressures from the assessment.

Figure 2.3 *Comparison of pressures on surface water bodies in the first and second cycles. Pressures presented at the aggregated level. Note there were 9325 identified surface water bodies for the second cycle and 10961 for the first cycle.*



Source: WISE electronic reports

Figure 2.4 *The 10 most significant pressures on surface water bodies and groundwater bodies in the United Kingdom for the second cycle*



Source: WISE electronic reports

2.1.9 Definition and assessment of significant pressures on surface and groundwater

The definition of significance of pressures on surface water was reported to be linked to the potential failure of objectives in all 15 RBDs, whereas significance was defined in terms of thresholds in 12 of the 15 RBDs: the three exceptions were the three RBDs in Northern Ireland²¹. For example the Scotland RBMP describes that pressures are identified as significant where they have contributed to a breach of an environmental standard for good status or are contributing to a risk that an environmental standard will be breached (e.g. contributing to an upward trend in the concentration of pollutants).

For surface water, a combination of both expert judgment and numerical tools have been used in all 15 UK RBDs to assess significance of both point source, diffuse source and water flow regulation and morphological alteration pressures.

For groundwater, a combination of both expert judgment and numerical tools were used in 12 RBDs for point source pressures: these pressures were reported not to be assessed in three Northern Ireland RBDs²². Artificial recharge to groundwater pressures was not assessed in three RBDs (Scotland, two in Northern Ireland)²³.

The definition of significance of pressures on groundwater was determined based on thresholds and was linked to the potential failure of objectives in 12 of the 15 RBDs. In the three Northern Irish RBDs, the significance of pressures on groundwater was not determined on the basis of thresholds nor linked to the potential failure of objectives.

Since the first RBMPs there has been further data gathered, but no specific changes in the methodology for the second RBMPs were identified. Information from the South West RBMP shows that more than 1,900 investigations have been carried out to identify the reasons (pressures and sources of pressures) why good status and protected area objectives have not been achieved, but the methodology documents behind these investigations and other risk assessments are not accessible. For Scotland, it is stated that ‘Over the period 2009 to 2015, we have improved our understanding of pressures and their impacts on bodies of surface waters. Among the reasons for this was the availability of a further six years of targeted environmental monitoring and developments in scientific knowledge of the environmental standards needed

²¹ The United Kingdom subsequently clarified that at the time of reporting, in the absence of a common definition, Northern Ireland’s interpretation of significant was based on those pressures occurring most widely.

²² The United Kingdom subsequently clarified that expert judgement was used in Northern Ireland to assess point source pressures in groundwater for all three RBDs. Expert judgement was also used to assess water abstraction pressures in two of the three Northern Ireland RBDs.

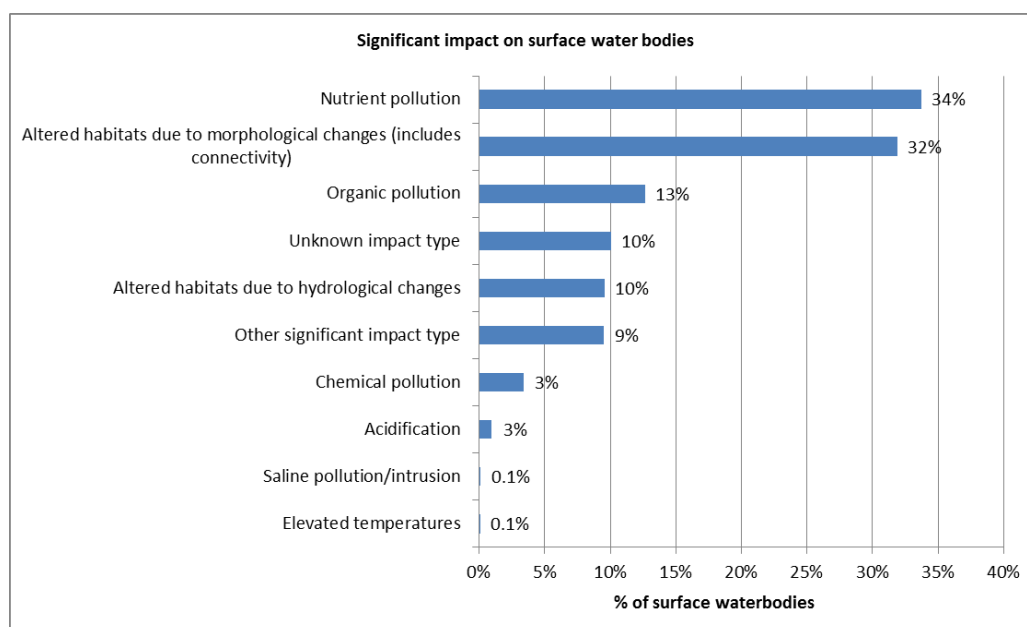
²³ The United Kingdom subsequently clarified that no artificial recharge to groundwater is taking place in any groundwater bodies in Northern Ireland.

to protect aquatic plant and animals.’ However, a detailed description of the methodology used and changes since 2009 is not given in the RBMP²⁴.

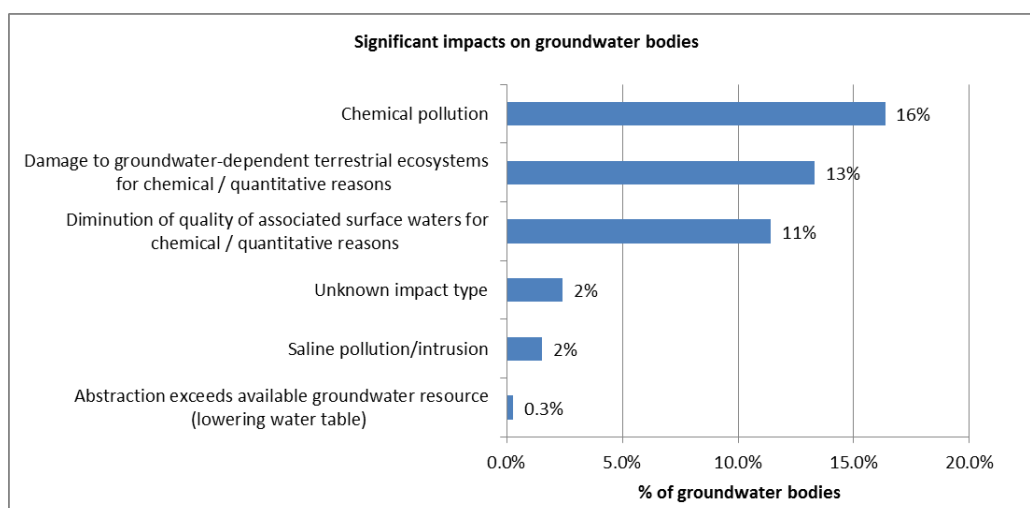
2.1.10 Significant impacts on water bodies

Nutrient pollution (34 % of surface water bodies), altered habitats due to morphological change (32 % of surface water bodies) and organic pollution (13 % of surface water bodies) were the three most common impacts reported by the United Kingdom in the second RBMPs (Figure 2.5). The UK reported six impact types on groundwater (Figure 2.5). The most significant in terms of the proportion of affected water bodies was chemical pollution (16 % of groundwater bodies) followed by damage to groundwater-dependent terrestrial ecosystems for chemical / quantitative reasons (13 %) and diminution of quality of associated surface waters for chemical / quantitative reasons (11 %). The other impacts were relatively minor.

Figure 2.5 *Significant impacts on surface water and groundwater bodies in the United Kingdom for the second cycle. Percentages of numbers of water bodies*



²⁴ The United Kingdom subsequently highlighted that this information is available in annual classification reports and in the UKTAG methods and Standards documents (which have not been reported) and that significant water management issues are pressures where a step change in action/regulation/tools is required to see environmental improvements.



Source: WISE electronic reports

As for comparing significant pressures between the two cycles, it is also difficult to compare significant impacts because of changes in delineation of water bodies and in the definition of impact types between the cycles. Overall in the United Kingdom, there has been a 15 % decrease in the numbers of surface water bodies between cycles. However, a number of impact types have stayed the same between the two cycles: nutrient enrichment; organic enrichment, acidification and saline intrusion. In addition, for the first cycle an impact was "Contamination by Priority Substances or other specific pollutants". For the second cycle "chemical pollution" was the relevant impact type, which would also include River Basin Specific Pollutants thereby making the two types not strictly comparable. For most of the United Kingdom RBDs, there was a reported decrease in the percentage of surface water bodies impacted by nutrient enrichment and organic enrichment with the biggest decrease of 45 % in the Western Wales RBD for nutrient enrichment. A striking observation is that in the first cycle 3067 (28 %) surface water bodies in UK were reported to be impacted by "Contamination by Priority Substances". Using the broader definition of chemical pollution for the second cycle, only 314 (3 % surface water bodies) were affected. Irrespective of the changes in the delineation of water bodies and impact definitions between the two cycles, this seems to be a very significant change.

2.1.11 Groundwater bodies at risk of not meeting good status

Overall in the United Kingdom, 38.5 % of groundwater bodies were at risk of failing to be in good chemical status, with the greatest proportion in the North West RBD (100 %) and the smallest in Scotland (1.7 %). This information was not reported in the first RBMPs. 53 pollutants were identified as causing a risk of failure in groundwater bodies in the United Kingdom as a whole. 18 pollutants were causing a risk in groundwater bodies in 10 or more of

the 15 RBDs, with nitrate being reported in all 15 RBDs (this suggests that nitrate was included as chemical pollution rather than nutrient enrichment in the reporting of impacts). Cadmium and its compounds and Nickel and its compounds were causing a risk in groundwater bodies in 11 RBDs, fluoranthene, benzo(a)pyrene and naphthalene in 10 RBDs. At the United Kingdom level, nitrate was causing a risk in the most groundwater bodies (32 %), followed by lead (22 % of groundwater bodies) and copper (18 % of groundwater bodies).

Overall in the United Kingdom, 36 % of groundwater bodies were at risk of failing good quantitative status. All water bodies in the North West RBD were at quantitative risk with the fewest groundwater bodies at risk in Scotland (2.6 %). The reasons for the risk on quantitative status in the United Kingdom were significant damage to groundwater dependent terrestrial ecosystems resulting from an anthropogenic water level alteration in 27 % of groundwater bodies; significant diminution of the status of surface waters resulting from anthropogenic water level alteration or change in flow conditions in 16 % of groundwater bodies; exceedance of available groundwater resource by long-term annual average rate of abstraction that may result in a decrease of groundwater levels in 14 % of groundwater bodies; and saline or other intrusions in 8 % of groundwater bodies.

2.1.12 Quantification and apportionment of pressures

Member States report, for each significant pressure type, the quantitative indicators of the scale of the pressures in terms of the gap required to be filled for the achievement of the Environmental Objectives and the Key Types of Measure to address the reported gap: these are hereafter called "pressures for which measures are reported".

For the United Kingdom as a whole 35 different surface water pressure types were reported. Diffuse agricultural pressures were reported for 14 out of the 15 UK RBDs, the next most reported was 'unknown anthropogenic pressures' in 13 RBDs and the least common was 'abstraction or flow diversion for agriculture' in one RBD. The activities/sectors that are contributing significantly to the different impacts that are causing failure of good ecological status/potential and good chemical status are only reported for some RBDs. For example, the South West RBD identified that agriculture was the sector affecting most water bodies, followed by the water industry. Almost a third of the sectors could not be categorised and were classified as unknown.

A comparison of the surface water pressures for which measures have been reported against those reported at the water body level (WISE surface water bodies schema) indicates that there are a number for which measures have not reported in some RBDs²⁵. These include, for

²⁵ The United Kingdom subsequently clarified that for England the risk assessment did not always take into account risk of deterioration, therefore measures could not be targeted.

example Physical alteration of channel/bed/riparian area/shore - Unknown or obsolete in Scotland and Solway Tweed RBDs and Point - Aquaculture in the Neagh Bann and North Eastern RBDs.

Conversely, abstraction or flow diversion pressures in general were reported to be tackled by Key Types of Measure in the Scotland and Solway Tweed RBDs even though these pressures had not been reported at the surface water body level.

Measures were reported for 21 different pressures on groundwater in the United Kingdom as a whole, though two (Physical alteration of channel/bed/riparian area/shore - Other and Hydromorphological alteration - Other) may have been reported for groundwater in error. As for surface water, diffuse agricultural pressures were reported by the most RBDs (14), followed by Groundwater - Alteration of water level or volume pressures in 10 RBDs. The least common pressure reported was diffuse transport pressures in one RBD.

At the United Kingdom level, measures were reported for groundwater for a number of pressures for which the pressure was not reported at the groundwater body level. These were: Point - Other, Diffuse - Transport, Physical alteration of channel/bed/riparian area/shore - Other, Hydromorphological alteration - Other, Introduced species and diseases and Anthropogenic pressure – Unknown.

Conversely, a number of pressures were reported at the groundwater body level but not in terms of planned measures. These are: Abstraction or flow diversion – Agriculture; Abstraction or flow diversion - Public water supply; Abstraction or flow diversion – Industry and Physical alteration of channel/bed/riparian area/shore – Agriculture. As described previously the hydromorphological pressure types and pressures arising from introduced species and diseases may be a reporting error as these pressure types would not be expected to be relevant for groundwater.

No information was found in the RBMPs about which activities/sectors are contributing significantly to the different impacts that are causing poor status in groundwater bodies.

2.1.13 Quantification of gap to be filled for pressures causing failure of status objectives

In groundwater, 30 individual chemical substances and six ‘other’ chemical substances, including metaldehyde, were reported (in terms of measures to be taken) to be causing failure of good chemical status in groundwater. Measures are also planned to tackle nitrate in 10 of the 15 UK RBDs, ammonia in six and chemicals arising from mining in six.

In surface waters 23 chemical substances, including some Priority Substances such as mercury and benzo(a)pyrene, and River Basin Specific Pollutants, such as dichlorvos and copper, were

reported to have measures planned. The chemicals in surface waters for which measures are planned in the most RBDs in the UK were lead, zinc (nine RBDs each), nickel and copper (in seven RBDs each). There are a number of Priority Substances causing failure of good chemical status in surface waters for which specific measures are not reported. These are: endosulfan; di(2-ethylhexyl)phthalate (DEHP), tributyltin, DDT, hexachlorocyclohexane, trichloroethylene, cyclodiene pesticides, Total benzo(b)fluor-anthene +benzo(k)fluor-anthene, total benzo(g,h,i)-perylene + indeno(1,2,3-cd)-pyrene.

2.1.14 Inventories of emissions, discharges and losses of chemical substances

Article 5 of the Environmental Quality Standards Directive (EQS Directive²⁶) requires Member States to establish an inventory of emissions, discharges and losses of all Priority Substances and the eight other pollutants listed in Part A of Annex I of the EQS Directive for each RBD, or part thereof, lying within their territory. This inventory should allow Member States to further target measures to tackle pollution from priority substances. It should also inform the review of the monitoring networks, and allow the assessment of progress made in reducing (or suppressing) emissions, discharges and losses for priority substances.

All 15 RBDs have reported an inventory of emissions, but not all substances were included in these inventories. The RBMPs stated that substances are only included in the inventories if they are assessed as being relevant, the relevance criteria are discussed in Chapter 4.

11 substances appeared consistently in all inventories for all 15 RBDs. For 14 of the 15 RBDs, total point and total diffuse sources are included in the inventories, while for the North Western RBD only total diffuse sources are included.

The two-step approach from the Common Implementation Strategy Guidance Document n°28²⁷ has been followed for all substances included in the inventories in 13 of the 15 RBDs. Different combinations of Tier 1, Tier 2 and Tier 3 of the methodology were implemented. The data quality was assessed as good, uncertain or very uncertain, or not reported.

2.2 Main changes in implementation and compliance since the first cycle

Overall in the United Kingdom there has been a 15 % decrease in the numbers of delineated surface water bodies compared to the first cycle, with the biggest decrease occurring for river

²⁶ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0105-20130913>

²⁷ CIS Guidance N° 28 - Preparation of Priority Substances Emissions Inventory
http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

water bodies (17 %). There are big differences among the four regions and the RBDs. For example, there was a 37 % decrease in river water bodies in the South West RBD (England) and the Western Wales RBD (Wales), around 20 % decrease in numbers of river water bodies in Northern Ireland and a small increase (1 %) in Scotland.

In the second RBMPs, 70.5 % of surface water bodies in the United Kingdom were natural, 24 % heavily modified and 5.5 % artificial. Overall in the United Kingdom, there was a decrease in the number and proportion of heavily modified water bodies between the two cycles, particularly in terms of heavily modified river water bodies where there was a decrease in numbers and proportion in 14 of the 15 RBDs. The exception was for Scotland where there was an increase of 18 % in heavily modified water bodies from the first to the second cycle.

There has been an increase in the number of reported river types, from 45 in the first RBMPs to 57 in the second RBMPs. In the second RBMPs, there were 36 lake and 10 transitional water types compared to 43 and 11, respectively, in the first RBMPs. For both cycles 19 coastal water types were reported.

In the first RBMP, Scotland reported significant proportions of its surface water bodies to be affected by point source, diffuse source, water abstraction and water flow regulations and morphological alteration pressures. In the second RBMP for the Scotland RBD, most of the surface water reported to be affected by pressures were by unknown anthropogenic pressures (42 % of surface water bodies). In other RBDs, there are some striking differences between the two cycles irrespective of the changes in water body delineation and definition of pressure types for reporting. For example in the Anglian RBD in the first RBMP, 715 river water bodies (94 %) were affected by point source pressures and in the second RBMP, 302 river water bodies (57 %). Similarly, in the South West RBD in the first RBMP, 722 (80 %) river water bodies were affected by diffuse source pressures, and in the second RBMP 325 (55 %).

For most of the United Kingdom RBDs, there was a reported decrease in the percentage of surface water bodies impacted by nutrient enrichment and organic enrichment with the biggest decrease of 45 % in the Western Wales RBD for nutrient enrichment.

In the first cycle, only an inventory performed under the European Pollutant Release and Transfer Register (E-PRTR) existed. For the second RBMPs much more detailed information has been reported to fulfil the requirements of the EQS Directive.

2.3 Progress with Commission recommendations

- Recommendation: *Provide a more transparent approach where there is a quantitative apportionment of pressures between all the contributory sources with the respective contributions they are expected to make to the achievement of WFD objectives.*

Assessment: In the United Kingdom, for the first RBMPs a quantitative source apportionment was undertaken for some impacts and their main pressures. For other pressures a more qualitative apportionment was performed, where sources were identified but their relative contribution to impacts and pressures on water bodies were not assessed or quantified. There were also differences between the four regions in the United Kingdom. In the second RBMPs, the United Kingdom reported indicators of the gaps to be filled for a number of significant pressures (e.g. for diffuse agricultural pressures). For all pressures these are in terms of numbers of water bodies, and length and areas of water bodies failing WFD objectives, and no indicators on loads of pollutants needing to be reduced or barriers that require action to achieve objectives have been reported. From this information it is not clear what progress has been made. The recommendation has not been fulfilled, and more information on source apportionment is needed.

- Recommendation: *Address the large uncertainties reported in the first RBMPs in relation to the assessment of the status, the pressures and the effect of potential measures.*

Assessment: In terms of the assessment of pressures, there is no evidence of progress in the information reported to WISE: 28 % of surface water bodies in the United Kingdom were reported to be affected by unknown anthropogenic pressures and no further information was found in the RBMPs. The recommendation has not been fulfilled.

- Recommendation: *More information needs to be included in the RBMPs on the methodology used to identify significant pressures and how this analysis feeds into the development of monitoring programmes and how the measures defined address the significant pressures.*

Assessment: In terms of characterisation, the United Kingdom reported to WISE on the tools used to assess significant pressures indicating some progress. As recorded above, the United Kingdom reported many different significant pressures (including unknown anthropogenic pressures, which requires further investigation) and has reported Key Types of Measures for some but not for all pressures. Since the first RBMPs there has been further data gathered but no specific changes in the methodology for the second

cycle of RBMP were identified. There is therefore no evidence that this recommendation has been fulfilled.

Topic 3 Monitoring, assessment and classification of ecological status in surface water bodies

3.1 Assessment of implementation and compliance with WFD requirements in the second RBMPs

3.1.1 Monitoring of ecological status/potential

Monitoring programmes

Article 8.1 of the WFD requires Member States to establish monitoring programmes for the assessment of the status of surface water and of groundwater in order to provide a coherent and comprehensive overview of water status within each RBD.

Monitoring programmes are reported for all 15 RBDs and include all the expected water categories and purposes (surveillance and operational).

Monitoring sites and monitored water bodies used for surveillance and operational monitoring

Table 3.1 compares the number of monitoring sites used for surveillance and operational purposes between the first and second RBMPs, and Table 3.2 gives the number of sites used for different purposes for the second RBMPs. Figure 3.1 shows the proportion of water bodies subject to surveillance and operational monitoring.

In 12 of the 15 RBDs in the United Kingdom, there has been a reduction in the number of monitoring sites in all applicable water categories from the first to the second RBMPs. The largest decreases were generally in transitional waters and coastal waters; for example, there was an 88 % reduction in transitional water sites in the Anglian RBD and in coastal water sites in the South East RBD. In contrast, in the three RBDs in Northern Ireland, there was an increase in numbers of sites in coastal waters, lakes and rivers, while the number of sites in transitional waters decreased.

In general, in the second RBMPs more sites are used for operational monitoring than for surveillance monitoring: for example, 21316 and 2634 sites in rivers, respectively, in the United Kingdom. Overall, there was a reduction in the numbers of sites used in rivers for surveillance for the second RBMPs (2634) compared to the first RBMPs (5584) and the same is true for operational monitoring (29702 for the first plans and 21316 for the second).

Table 3.1 *Number of sites used for surveillance and operational monitoring in the United Kingdom for the second and first RBMPs. Note that for reasons of comparability with data reported in the first RBMPs, data for the second RBMPs does not take into account whether sites are used for ecological and/or chemical monitoring*

	Rivers		Lakes		Transitional		Coastal	
	Surv.	Op	Surv.	Op	Surv.	Op	Surv.	Op
second RBMP								
UK_01	365	1 104	68	113	62	83	179	69
UK_02	167	736	16	25	14	15	17	7
UK_03	190	1 062	14	25	11	14	11	21
UK_04	215	3 388	11	32	22	24	2	8
UK_05	158	2 715	10	33	16	33	14	20
UK_06	131	2 153	6	39	17	27	0	0
UK_07	119	1 197	4	9	18	41	16	19
UK_08	316	2 654	11	29	52	46	27	31
UK_09	222	2 403	14	30	18	29	0	0
UK_10	410	1 225	21	21	70	99	59	70
UK_11	59	176	5	9	15	0	0	0
UK_12	162	1 826	48	83	19	35	11	21
UK_GBNIIENB	39	299	92	0	68	7	43	12
UK_GBNIIENW	56	246	119	0	86	5	28	3
UK_GBNINE	25	132	24	0	25	4	270	44
<i>Total by type of site</i>	<i>2 634</i>	<i>21 316</i>	<i>463</i>	<i>448</i>	<i>513</i>	<i>462</i>	<i>677</i>	<i>325</i>
<i>Total number of monitoring sites used for surveillance and/or operational monitoring</i>	<i>22 474</i>		<i>844</i>		<i>811</i>		<i>813</i>	
first RBMP								
UK_01	669	1 335	73	133	48	146	206	342
UK_02	364	980	10	42	33	45	24	37
UK_03	445	1 621	3	95	120	129	84	111
UK_04	484	4 293	2	155	131	137	12	13
UK_05	613	3 469	3	57	229	329	84	110
UK_06	291	2 332	1	94	194	248		1
UK_07	346	1 628	1	30	141	197	137	176
UK_08	919	3 794	3	95	277	309	99	178
UK_09	311	3 871	3	83	159	173		
UK_10	559	2 547	14	66	191	208	352	429
UK_11	83	421	2	22	51	51		

	Rivers		Lakes		Transitional		Coastal	
	Surv.	Op	Surv.	Op	Surv.	Op	Surv.	Op
UK_12	385	2 780	15	182	161	165	34	84
UK_GBNIENB	36	281	15	14	69		12	
UK_GBNIENW	55	229	26	10	123		16	
UK_GBNINE	24	121	3	3	44		73	
<i>Total by type of site</i>	<i>5 584</i>	<i>29 702</i>	<i>174</i>	<i>1 081</i>	<i>1 971</i>	<i>2 137</i>	<i>1 133</i>	<i>1 481</i>
<i>Total number of monitoring sites used for surveillance and/or operational monitoring</i>	<i>29 986</i>		<i>1 155</i>		<i>2 386</i>		<i>1 694</i>	

Source: Member States electronic reports to WISE

Table 3.2 *Number of monitoring sites in relevant water categories used for different purposes in the United Kingdom²⁸*

Monitoring Purpose	Lakes	Rivers	Transitional	Coastal
CHE - Chemical status	139	532	25	63
ECO - Ecological status	394	2 007	287	546
NID - Nutrient sensitive area under the Nitrates Directive ²⁹ - WFD Annex IV.1.iv	201	526	15	92
OPE - Operational monitoring	448	21 316	462	325
SEA - International network of a sea convention		11	1	8
SHE - Shellfish designated waters - WFD Annex IV.1.ii				27
SOE - EIONET State of Environment monitoring	221	104		
SUR - Surveillance monitoring	463	2 634	513	677
UWW - Nutrient sensitive area under the Urban Waste Water Treatment Directive ³⁰ - WFD Annex IV.1.iv	201	637	15	94
Total sites irrespective of purpose	845	22 484	811	813

Source: WISE electronic reports

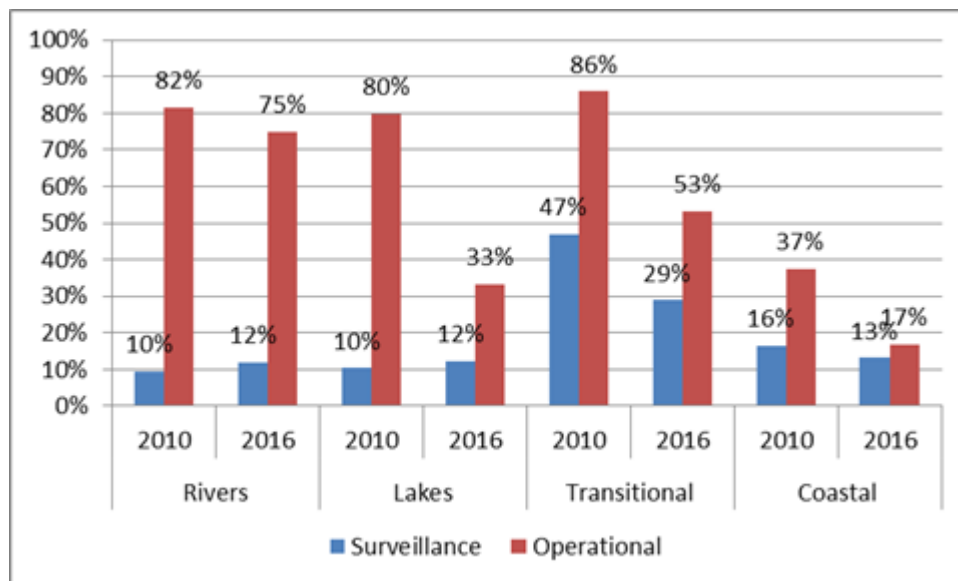
²⁸ It should be noted that while operational and surveillance monitoring purposes were reported by all RBDs, and chemical status and ecological status were reported by two of the twelve RBDs in Great Britain, only the three RBDs in Northern Ireland reported on other monitoring purposes.

²⁹ Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:31991L0676>

³⁰ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271>

Figure 3.1 *Percentage of water bodies included in surveillance and operational monitoring in the United Kingdom for the first RBMPs (2010) and second RBMPs (2016). Note no differentiation is made between water bodies included in ecological and/or chemical monitoring*



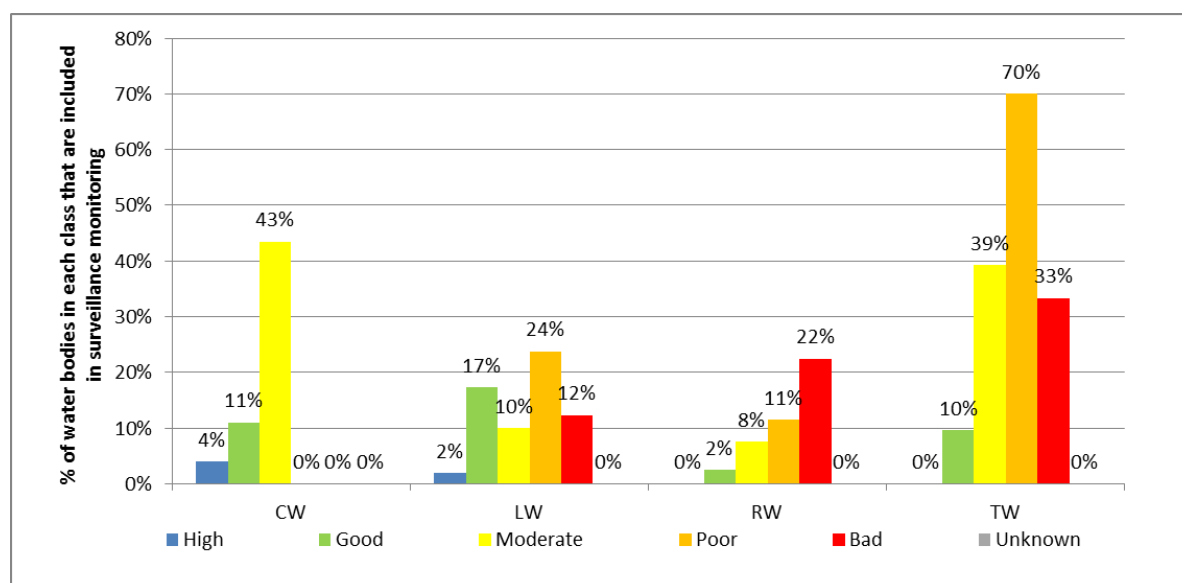
Source: WISE electronic reports

In all except one RBD (Scotland), there was an increase in the numbers of sites used for the surveillance monitoring of lakes. In the North Eastern RBD there was an eight-fold increase (3 to 24 sites) and in the Thames RBD a six-fold increase (one to six sites). There was also an increase in the numbers of sites used for surveillance and operational monitoring of rivers, and surveillance sites in coastal waters in the three RBDs in Northern Ireland.

Otherwise there were significant decreases in the numbers of sites used to monitor rivers, transitional waters and coastal waters in the 12 RBDs in Scotland, England and Wales for surveillance purposes (except transitional waters in the Scotland RBD) and for operational purposes. For example, for surveillance monitoring in rivers in the Anglian RBD, there was a reduction from 613 sites for the first RBMP to 158 sites for the second while for operational monitoring the reduction was from 3469 sites for the first RBMP to 2715 for the second.

Figure 3.2 shows the proportion of water bodies subject to surveillance monitoring in each ecological status/class.

Figure 3.2 *Proportion of water bodies in each ecological status/potential class that are included in surveillance monitoring in the United Kingdom. Note: Standard colours and class descriptors for ecological status based on WFD Annex V, Article 1(4)2(I) used for illustration purposes.*



Source: WISE electronic reports

A differentiated presentation between ecological status and potential and including all types of quality element can be viewed here - https://tableau.discomap.eea.europa.eu/t/Wateronline/views/WISE_SOW_QualityElement_Status_Compare/SWB_QualityElement_Group?iframeSizedToWindow=true&:embed=y&:display_count=no&:showAppBanner=false&:showVizHome=no

Transboundary surface water body monitoring

Of the 15 RBDs in the United Kingdom only the three located in Northern Ireland reported that some of their monitoring sites were part of international networks. Some of the sites in coastal, transitional and river water bodies were part of a sea convention network.

Quality elements monitored (excluding River Basin Specific Pollutants)

Table 3.3 illustrates the quality elements used for the monitoring of all relevant water categories for the second RBMPs: no differentiation is made between purposes of monitoring.

No general physicochemical quality elements have been reported to be monitored in any water category in the RBDs entirely within England or the English parts of the RBDs shared with Scotland and Wales. The United Kingdom has clarified that this is due to a reporting error.

Table 3.3 *Quality elements monitored for the second RBMPs in the United Kingdom (excluding River Basin Specific Pollutants). Note: quality element may be used for surveillance and/or operational monitoring*

Biological quality elements										Hydromorphological quality elements		
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Angiosperms	Macroalgae	Other aquatic flora	Other species	Hydrological or tidal regime	Continuity conditions	Morphological conditions
Lakes	Yes	Yes	Yes	Yes	Yes			No	Yes	Yes		Yes
Rivers	Yes	Yes	Yes	Yes	Yes			No	Yes	No	No	Yes
Transitional	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No		No		Yes
Coastal	Yes		Yes	Yes		Yes	Yes	No		No		No

General physicochemical quality elements									
	Transparency conditions	Thermal conditions	Oxygenation conditions	Salinity conditions	Acidification status	Nitrogen conditions	Phosphorus Conditions	Silicate	Other determinant for nutrient conditions
Lakes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Rivers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transitional	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coastal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: WISE electronic reports. The United Kingdom subsequently indicated that in England hydrological regime is monitored in rivers and that the freshwater flow into most transitional waters is monitored and modelled and results are subsequently reported.

Fish are not monitored in any lake in all RBDs in Scotland, England and Wales, but are monitored in lakes in Northern Ireland. Fish were also not reported for some RBDs with transitional waters in England, where they had been monitored for the first plan.

River continuity is reported not to be monitored in the United Kingdom. Hydromorphological quality elements are not monitored in coastal waters in the United Kingdom nor in transitional waters in most RBDs. The hydrological/tidal regime is not monitored in any water category or RBD in the United Kingdom, except for lakes in two of the three RBDs in Northern Ireland.³¹

In terms of the quality elements monitored for surveillance purposes, only six of the RBDs in the United Kingdom (Scotland, Solway-Tweed, Western Wales and the three RBDs in Northern Ireland) had any coastal water bodies where all required biological quality elements

³¹ The United Kingdom subsequently noted that river continuity is monitored in England, while in Scotland modelling of the hydromorphological quality elements is carried out rather than monitoring.

were monitored. For lakes, all of the 15 RBDs had no water bodies where all required biological quality elements were monitored. In contrast, 14 of the 15 RBDs had a number of river water bodies where all required biological quality elements were monitored with the fewest being in the Anglian RBD (6 %) and the most in the North Western RBD (95 %). Only the Scotland RBD had none. 12 RBDs had no transitional water bodies where all required biological quality elements were monitored. All required biological quality elements were monitored in at least some transitional water bodies in the Scotland RBD (15 %), in the Western Wales RBD (80 %) and in the Dee RBD (100 %).

Only six of the 15 RBDs (Severn, Western Wales, Dee and the three RBDs in Northern Ireland) reported any hydromorphological quality elements to be included in surveillance monitoring. All the required hydromorphological quality elements were not monitored in any water body in the United Kingdom. Morphological conditions were monitored for surveillance in some water bodies in those six RBDs but hydrological or tidal regime were only monitored in two of the three RBDs in Northern Ireland. River continuity was not reported to be monitored in any river water body in the United Kingdom for any purpose.

Only one river water body included in surveillance monitoring in the United Kingdom is monitored for all expected physicochemical quality elements. Seven of the 15 RBDs did not report any physicochemical quality elements to be monitored; these are all solely in England. The United Kingdom clarified that this was due to a reporting error and that physicochemical quality elements were monitored in those RBDs. All river water bodies included in surveillance monitoring in the remaining eight RBDs included oxygenation and nutrient conditions (phosphorus) and almost all thermal conditions (98 %).

The WFD states that "Operational monitoring shall be carried out for all those bodies of water which, on the basis of either the impact assessment carried out in accordance with Annex II or surveillance monitoring, are identified as being at risk of failing to meet their environmental objectives under Article 4". A comparison of the number of water bodies at less than good ecological status/potential and the number of these that are included in operational monitoring indicates that for a number of RBDs and water categories over 90 % of water bodies at less than good status/potential are included in operational monitoring: coastal waters in five RBDs, transitional waters in four and rivers in ten. For these RBDs and water categories, this is consistent with the reported basis of classification, which for rivers is overwhelmingly based on monitoring. However, for lakes, in general less than 50 % of water bodies at less than good status/potential are included in operational monitoring. For some RBDs in England and Northern Ireland this is not consistent with the reported means of classification which is largely

based on monitoring.³² This raises a question as to how the lakes at less than good status/potential have been classified.

Grouping has been reported to be used in Scotland for some water bodies in all categories.

Annex V of the Water Framework provides guidance on the frequency of monitoring of the different quality elements. Surveillance monitoring should be carried out for each monitoring site for a period of one year during the 6-year period covered by a RBMP. For phytoplankton, this should be done twice during the monitoring year and for the other biological quality elements once during the year. Operational monitoring should take place at intervals not exceeding once every six months for phytoplankton and once every three years during the 6-year cycle for the other biological quality elements. Greater intervals may be justified on the basis of technical knowledge and expert judgement.

89 % of sites used to monitor phytoplankton for surveillance purposes in the United Kingdom were sampled at least at the minimum recommended frequency. All other biological quality elements used for surveillance monitoring were sampled at least at the minimum recommended frequency at all of the sites at which they were monitored.

Of the seven biological quality elements used for operational monitoring only angiosperms were sampled at least at the minimum recommended frequency at all sites where it was monitored, which was only 13 sites. Of the other biological quality elements, the next largest proportion of sites sampled at least at the minimum recommended frequency was macroalgae (99 % of 79 sites), followed by phytobenthos (88 % of 4209 sites), benthic invertebrates (87 % of 6997 sites), macrophytes (80 % of 3886 sites), phytoplankton (71 % of 259 sites) and fish (31 % of 4149 sites).

River Basin Specific Pollutants and matrices monitored

Table 3.4 shows the number of sites used to monitor River Basin Specific Pollutants in the UK as reported in the first and second RBMPs. The three RBDs in Northern Ireland reported monitoring sites at the aggregated quality element level (QE3-3 - River Basin Specific Pollutants). No other River Basin District did so at this aggregated level.

The monitored chemical substances including River Basin Specific Pollutants were also reported at the individual substance level for 15 RBDs in the UK. Reported chemical substances that are not Priority Substances or Certain Other Pollutants are assumed to be River Basin Specific Pollutants, as the explicit reporting of monitored individual River Basin

³² The United Kingdom subsequently indicated that all lakes of more than 50 ha in Northern Ireland are monitored for both surveillance and operational purposes. However, they were only reported in WISE as surveillance sites.

Specific Pollutants was not requested for the reporting of the second RBMPs. On this basis 101 different chemical substances are monitored in the United Kingdom.³³ 60RBSPs are monitored in water in coastal waters, 36 in lakes, 92 in rivers and 72 in transitional waters. 29 substances are monitored in biota and 16 in sediment in coastal waters; 30 in biota and four in sediment in rivers; 29 in biota (unspecified), 22 in biota other than fish and 16 in sediment in transitional waters: none of these substances was monitored in biota or sediment in lakes.

Annex V of the WFD provides guidance on the frequency of monitoring of the different quality elements: once every three months is recommended for “other pollutants”, which are taken here to equate to River Basin Specific Pollutants. Surveillance monitoring should be carried out for each monitoring site for a period of one year during the 6-year period covered by a river basin management plan. For River Basin Specific Pollutants this should be done four times for the surveillance year, and for operational monitoring four times a year for each year of the cycle.

Of the 83 substances included in surveillance monitoring, 35 were monitored at least at the minimum recommended WFD frequency at all sites where they were monitored, and for 16 substances at none of the sites. Of the 99 substances included in operational monitoring, 28 were monitored at least at the minimum recommended WFD frequency at all sites where they were monitored, and for 23 substances at none of the sites.

Annex V, section 1.3.4 of the WFD does not explicitly define the matrices to which the minimum required frequency of monitoring of River Basin Specific Pollutants (“Other Pollutants”) applies. Required monitoring frequencies are specified for Priority Substances in biota and sediment in Article 3(2)(c) of EQS Directive 2008/105/EC: this is once per year for operational and surveillance monitoring purposes. For consistency this frequency of once per year has been applied to the monitoring of River Basin Specific Pollutants in biota/sediment.

40 % and 11 % of the 35 chemical substances monitored in biota were sampled at or greater than the minimum frequency at all and none, respectively, of the sites where they were monitored. 69 % and 6 % of the 16 chemical substances monitored in sediment were sampled at or greater than the minimum frequency at all and none, respectively, of the sites where they were monitored.

³³ The United Kingdom subsequently stated that there are 29 designated River Basin Specific Pollutants in the United Kingdom

Table 3.4 *Number of sites used to monitor River Basin Specific Pollutants reported in the second RBMPs and non-priority specific pollutants and/or other national pollutants reported in the first RBMPs in the United Kingdom. Note the data from both cycles may not be fully comparable as different definitions were used and also not all Member State reported information at the site level meaning that there were no equivalent data for the first RBMPs.*

RBMP		Lakes	Rivers	Transitional	Coastal
second	Sites used to monitor River Basin Specific Pollutants	345	3975	277	230
first	Sites used to monitor non-priority specific pollutants and/or other national pollutants	128	5763	248	244

Source: WISE electronic reports

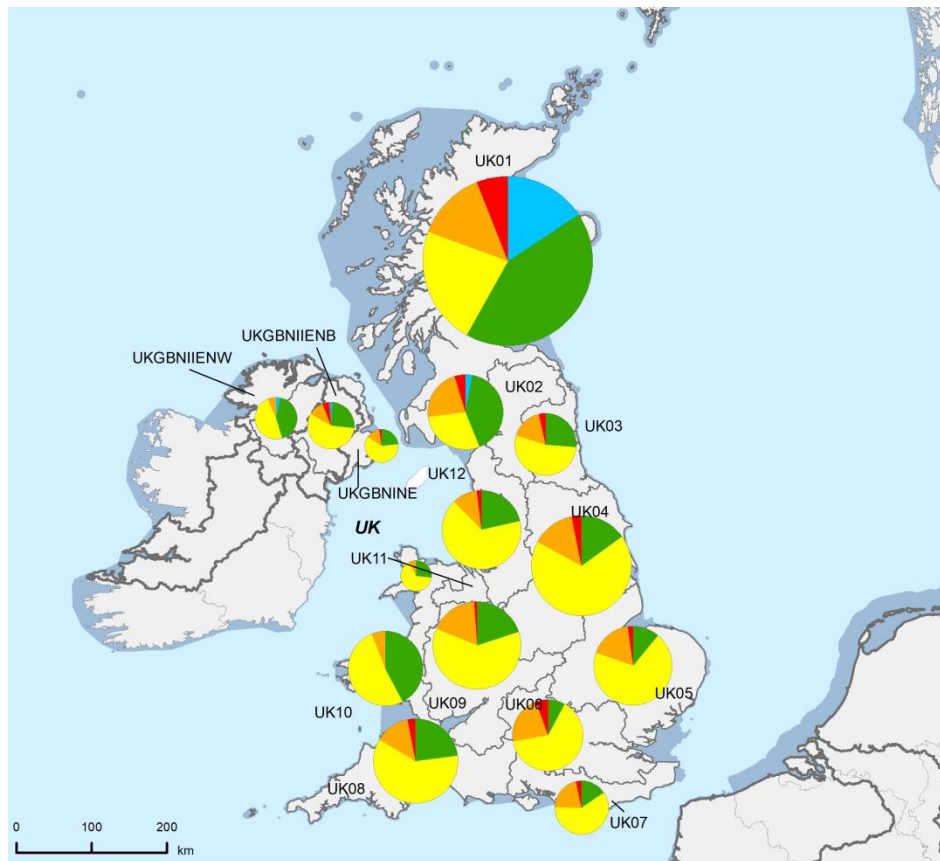
3.1.1. Ecological Status/potential of surface water

The ecological status/potential of surface water bodies in the United Kingdom in the second RBMPs is illustrated on Map 3.1.

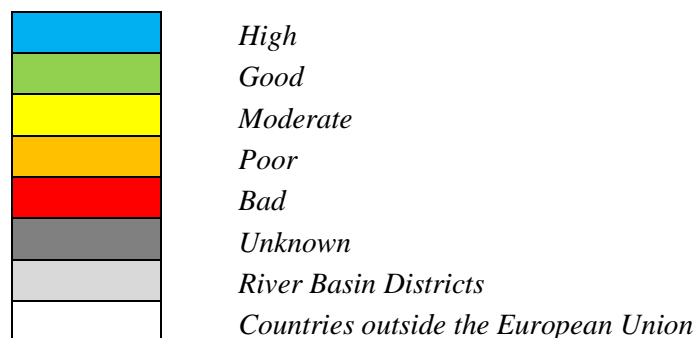
Figure 3.3 shows the confidence in the classification of ecological status/potential.

Figure 3.4 compares the ecological status of surface water bodies in the United Kingdom for the first RBMPs with that for the second and that expected by 2015.

Map 3.1 *Ecological status or potential of surface water bodies in the United Kingdom.*
Note: Standard colours based on WFD Annex V, Article 1.4.2(i)

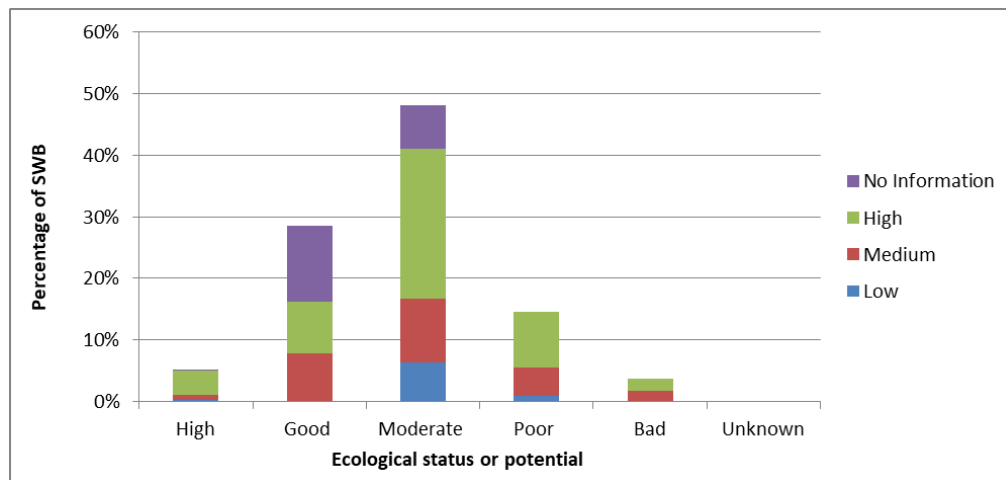


Source: WISE, Eurostat (country borders)



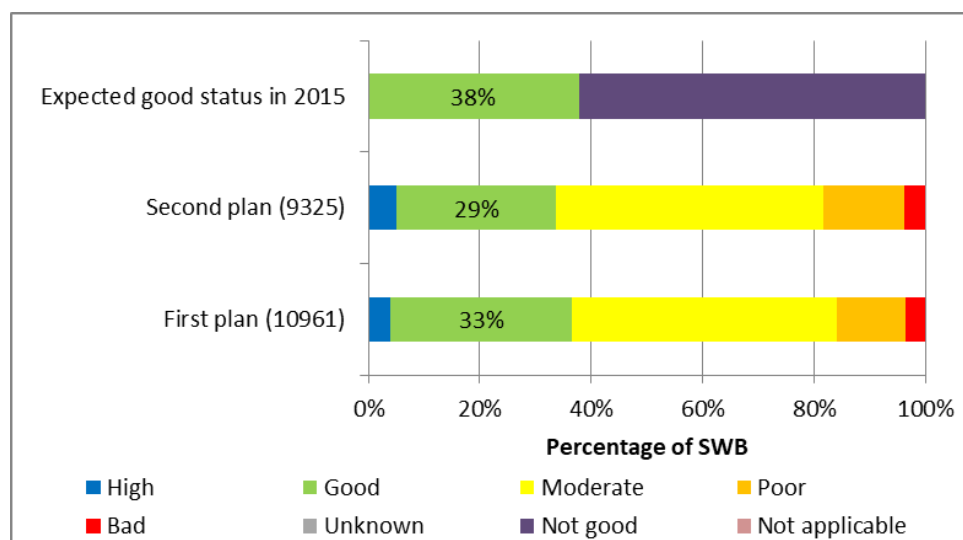
A differentiated presentation of this data between ecological status and potential and including all types of quality element can be viewed here - https://tableau.discomap.eea.europa.eu/t/Wateronline/views/WISE_SOW_QualityElement_Status_Compare/SWB_QualityElement_Group?iframeSizedToWindow=true&:embed=y&:display_count=no&:showAppBanner=false&:showVizHome=no

Figure 3.3 *Confidence in the classification of ecological status or potential of surface water bodies in the United Kingdom based on the most recently assessed status/potential*



Source: WISE electronic reports

Figure 3.4 *Ecological status or potential of surface water bodies in the United Kingdom for the second RBMPs, for the first RBMPs and expected in 2015. The number in parenthesis is the number of surface water bodies for each cycle. Note the period of the assessment of status for the second RBMPs was 2004 to 2015. The year of the assessment of status for the first RBMP is not known*

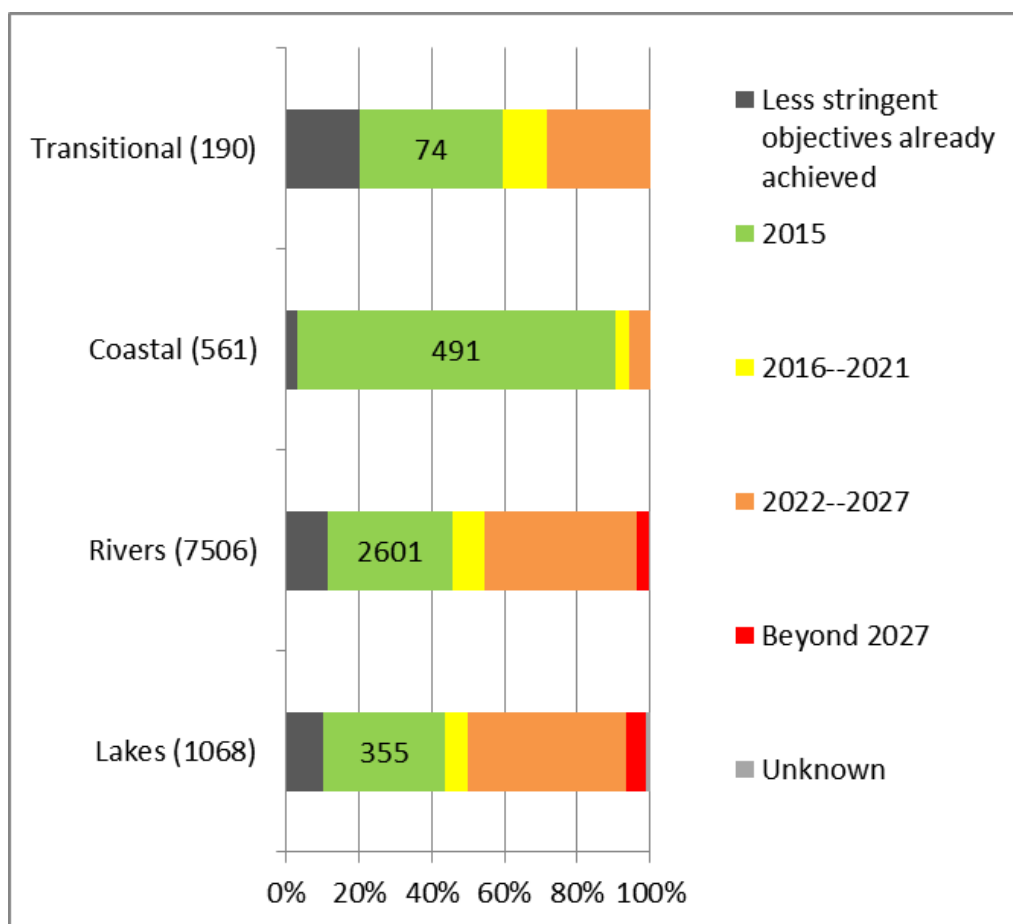


Source: WISE electronic reports

Overall in the United Kingdom for the second RBMPs, ecological status/potential was less than good in two thirds of surface water bodies. In the Scotland RBD, the situation was better, with 41 % of the rivers, 27 % of lakes and 3-6 % of water bodies in the two saline water categories failing good status/potential. There has been very little change since the first RBMPs.

Member States were asked to report the expected date for the achievement of good ecological status/potential. The information for the United Kingdom is shown in Figure 3.5.

Figure 3.5 *Expected date of achievement of good ecological status/potential of surface water bodies in the United Kingdom. The number in parenthesis is the number of water bodies in each category.*

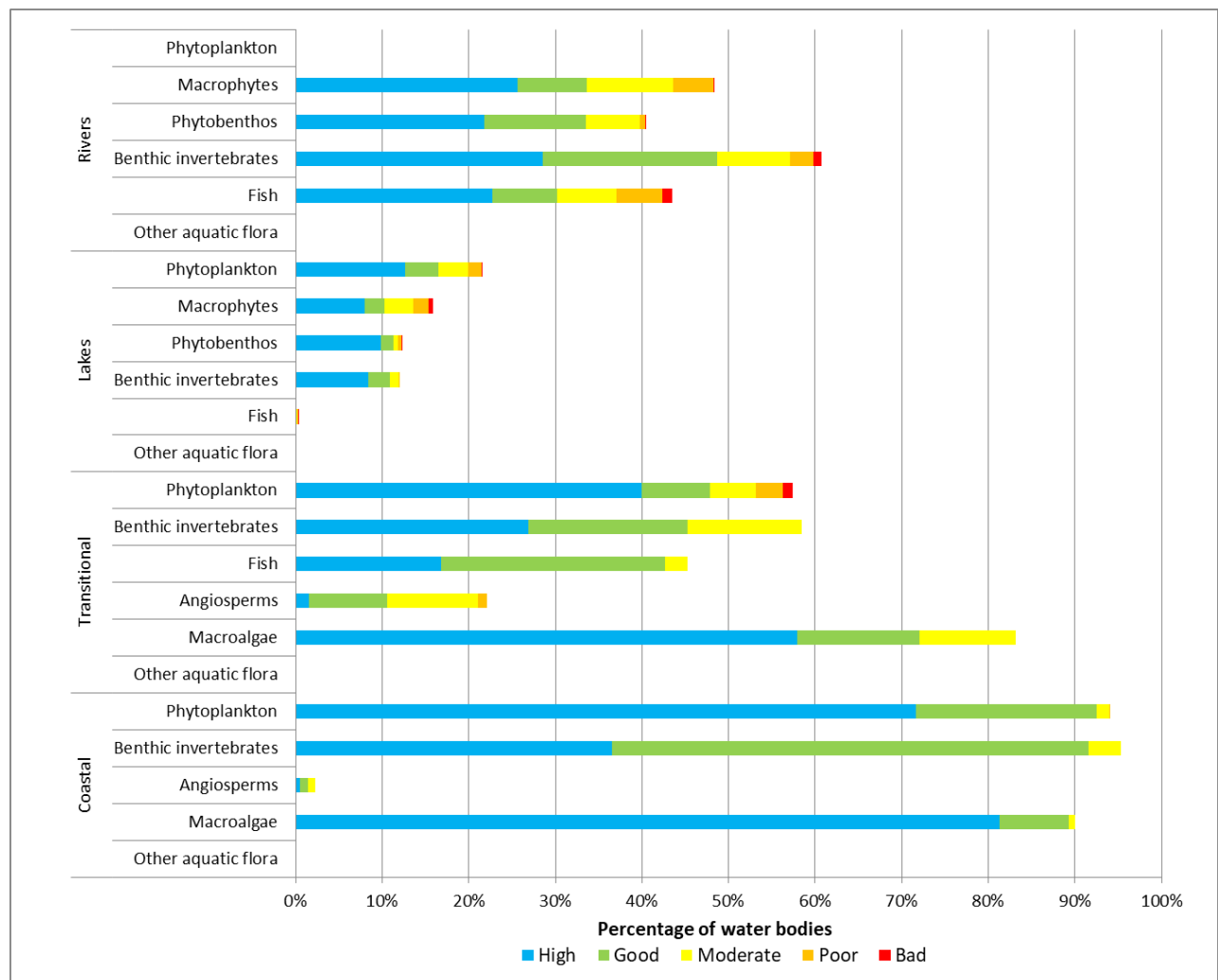


Source: WISE electronic reports

Classification of ecological status in terms of each classified quality element

Figure 3.6 shows the percentage of water bodies in terms of the biological quality elements used for classification.

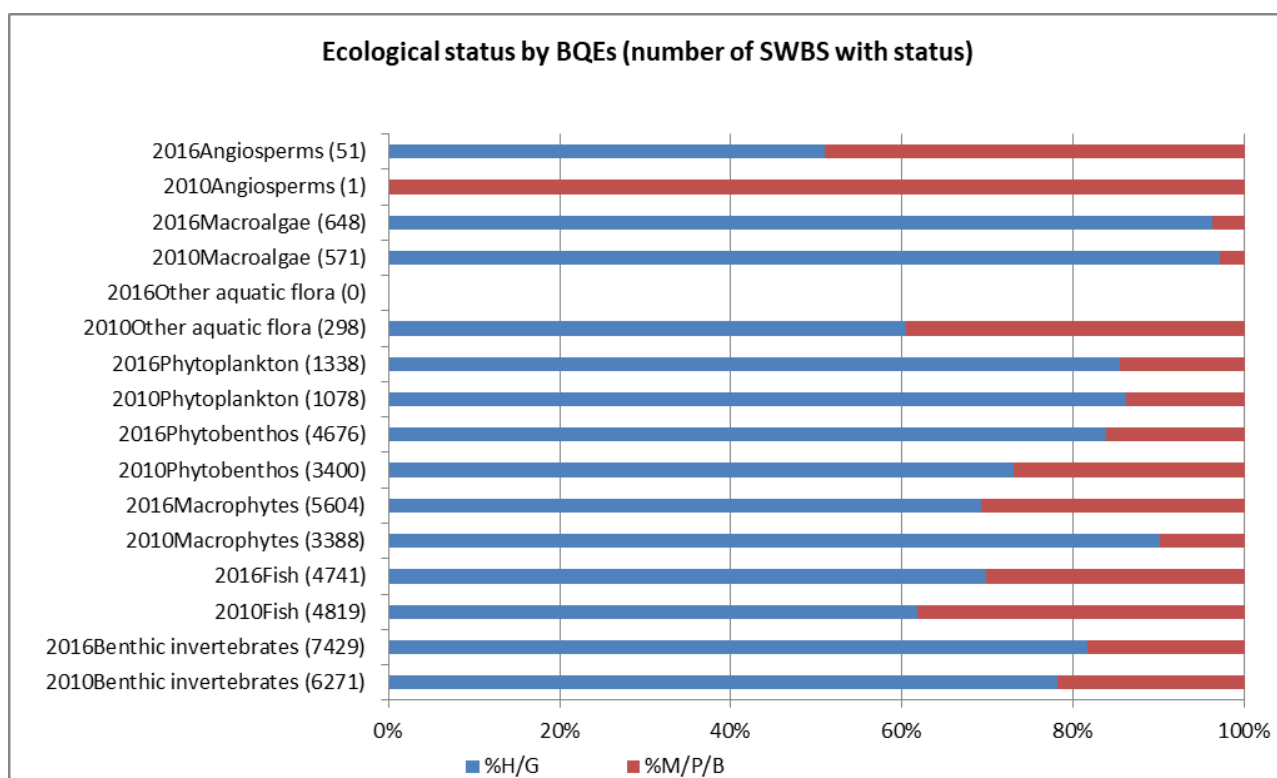
Figure 3.6 *Ecological status/potential of the biological quality elements used in the classification of surface water bodies in the United Kingdom. Note that water bodies with unknown status/potential, and those that are monitored but not classified or not applicable, are not presented.*



Source: WISE electronic reports

Figure 3.7 compares the classification of biological quality elements in terms of ecological status/potential for the first and second RBMPs. It should be noted that this comparison should be treated with caution as there are differences between the numbers of surface water bodies classified for individual elements from the first to the second RBMPs.

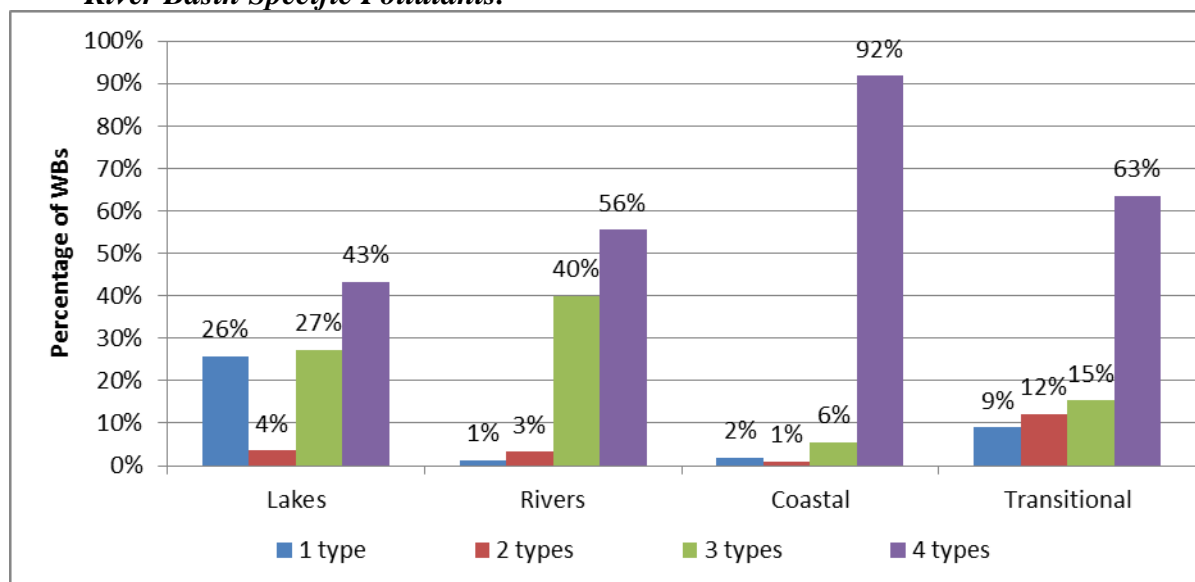
Figure 3.7 *Comparison of ecological status/potential in the United Kingdom according to classified biological quality elements in surface water bodies between the first and second RBMPs*



Source: WISE electronic reports

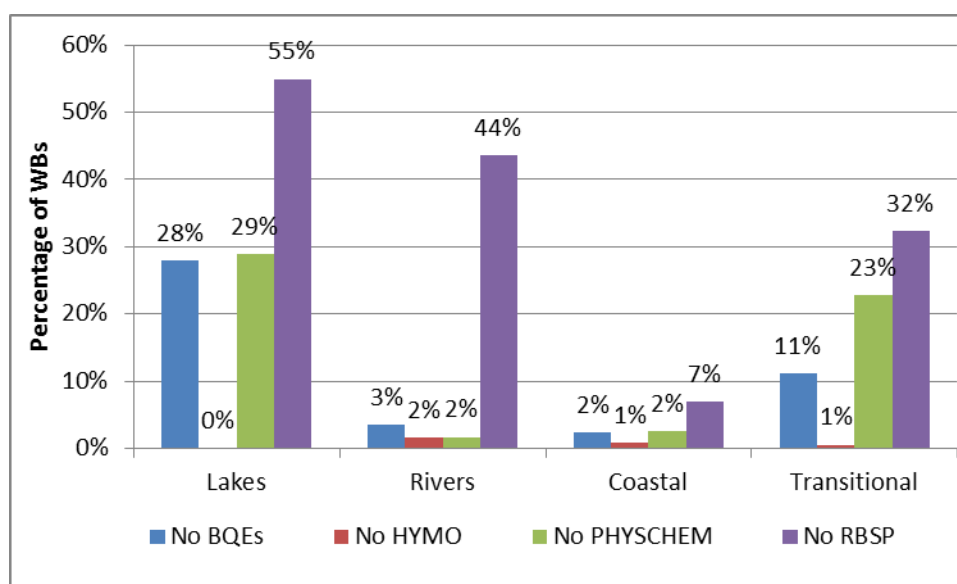
Figure 3.8 and Figure 3.9 illustrate the basis of the classification of ecological status/potential of surface water bodies in the United Kingdom for the second RBMPs.

Figure 3.8 *The classification of the ecological status or potential of surface water bodies in the United Kingdom using 1, 2, 3 or 4 types of quality elements. Note: The 4 types are: biological; hydromorphological, general physicochemical and River Basin Specific Pollutants.*



Source: WISE electronic reports.

Figure 3.9 *The percentage of surface water bodies in the United Kingdom where no biological quality element (BQEs) or no hydromorphological (HYMO) or no general physicochemical (PHYSICHEM) or no River Basin Specific Pollutant (RBSP) has been used in the classification of ecological status or potential*



Source: WISE electronic reports.

The classification of the individual quality elements is illustrated in Figure 3.10.

Water bodies of all categories in each River Basin District have been classified (Figure 3.2) according to hydromorphological quality elements, overwhelmingly based on monitoring results. However, these elements are not reported to be monitored in the WISE Monitoring schema for nearly all water bodies in all categories and RBDs³⁴. Similarly, general physicochemical quality elements have been used to classify water bodies in each category and RBD. All the expected general physicochemical quality elements have been used in the classification of rivers, except for thermal conditions in Northern Ireland³⁵, and nitrogen conditions in Scotland. For lakes, transparency and thermal conditions have not been used in classifying any water bodies, and salinity conditions, acidification and nitrogen have not been used in the Scotland RBD. Oxygenation conditions and nitrogen conditions are the only general physicochemical quality elements used to classify transitional and coastal waters in the United Kingdom. River Basin Specific Pollutants were used in the classification of water bodies in all relevant water categories in all RBDs, overwhelmingly based on the results of monitoring with the exception of a few river water bodies in Northern Ireland where grouping was used.

Grouping and monitoring results are approximately equally used to classify water bodies in the Scotland RBD for some biological quality elements and most general physicochemical quality elements. River Basin Specific Pollutants were solely classified using monitoring results. In the other RBDs, the classification of water bodies in all categories has mainly been based on monitoring results.

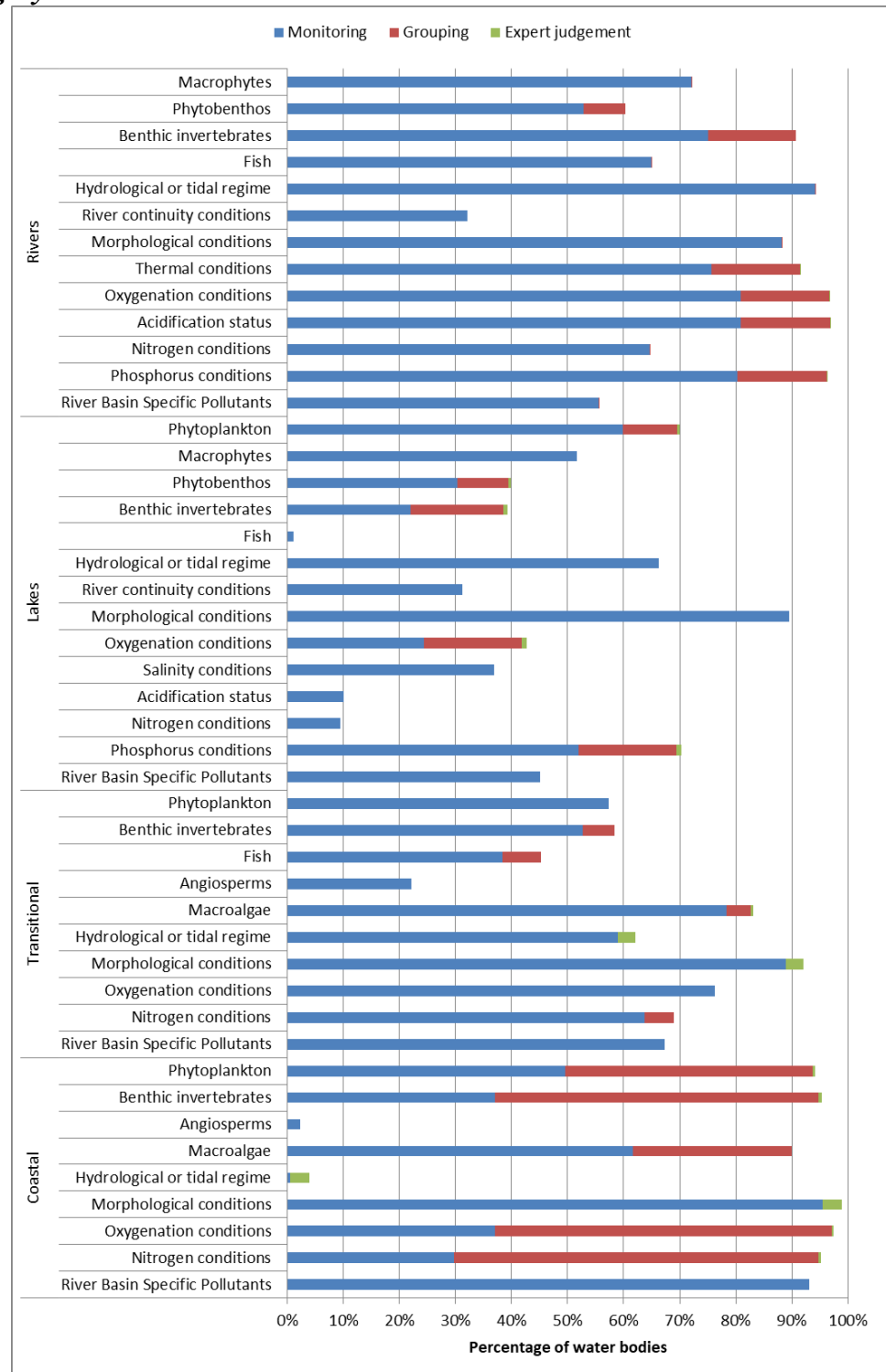
In the South West RBMP (which was taken to be representative of all England RBDs) it is stated that a new Ecological Status Indicator monitoring network has been set up that is a statistically robust approach for operational and surveillance monitoring programmes, as it is designed to achieve a minimum level of 75 % certainty at a water body scale. When pooled together at a national scale, the network will allow reporting the annual change in the number of water bodies that meet good status with 95 % confidence. When the certainty is lower, the English Competent Authority brings all available evidence together from other monitored parameters, bespoke investigations, data from surrounding water bodies within the catchment and information from third parties. No information is provided on what is done specifically when there is no ecological monitoring data.

The reasons for the difference in the number of water bodies monitored for a particular quality element and the number of water bodies that are subsequently classified are not explained in the RBMPs or supporting documents for Scotland and Northern Ireland.

³⁴ The United Kingdom subsequently indicated that in England hydrological regime is monitored in rivers and that the freshwater flow into most transitional waters is monitored and modelled and results are subsequently reported.

³⁵ The United Kingdom subsequently stated that temperature in rivers has been assessed against standards.

Figure 3.10 *Basis of the classification of ecological status/potential in the United Kingdom. The percentages are in terms of the number of waterbodies in each category.*



Source: WISE electronic reports

Assessment methods and classification of biological quality elements

Compared to the first RBMPs, there are now developed assessment methods for phytoplankton in transitional waters and angiosperms in coastal waters, but not for fish in lakes nor for hydromorphological quality elements. In the three RBDs in Northern Ireland, there are still no assessment methods for benthic fauna in lakes³⁶ and transitional waters, and in the Neagh Bann RBD for macroalgae³⁷ in transitional waters. For the second RBMPs for England, Scotland and Wales there were still no developed assessment methods for fish in lakes, while one was reported for Northern Ireland.

Reference conditions are reported not to be established for any biological or physicochemical quality elements³⁸ in coastal and transitional waters in Northern Ireland, and only for some hydromorphological quality elements.

The sensitivity of the biological quality assessment methods to different impacts have been reported and there do not seem to be any particular gaps or inconsistencies.

Intercalibration of biological assessment methods and national classification systems

In the United Kingdom 58 % of surface water body types are linked to common intercalibration types. The water category with most national types linked to common intercalibration types is lakes (77 %) followed by rivers (47 %), coastal waters (41 %) and transitional waters (40 %). No information was required to be reported to WISE on which biological assessment methods have been intercalibrated, and how the class boundaries have been set for national types not linked to the common intercalibration types. There was also no information on how the results from the intercalibrated types have been translated to other national types in the RBMPs or supporting documents.

³⁶ The United Kingdom subsequently explained that they have two assessment methods for benthic fauna in lakes. One is the Lake acidification macroinvertebrate metric (LAMM) which is designed to detect the impact of acidification on the quality element. Acidification has not been identified as a pressure on Northern Ireland lakes. The second is the chironomid pupal exuviae technique (CPET) which is designed to detect the impact of nutrient enrichment on the quality element. In ecoregion 17 it has not been possible to collect chironomid pupal exuviae in sufficient numbers to allow assessment using this method. These two assessment methods are therefore not usable in Northern Ireland.

³⁷ The United Kingdom subsequently stated that the established Rocky Shore Macroalgae Tool (RSL/FSL) was not applied to transitional waters in Northern Ireland due to a lack of suitable substrate which would impede the establishment of macroalgal species. Other tools such as Furoid Extent (FE) were investigated at a NI and UK level but were not formally adopted due to inconsistency of results and unreliable data.

³⁸ The United Kingdom subsequently stated that there are reference conditions for oxygenation and nutrient conditions for transitional and coastal waters. These are based on salinity normalised reference curves, as established by the UK Guidance Technical Standards.

Assessment of hydromorphological quality elements

Hydrological regime was reported to be assessed in terms of ecological status/potential in rivers and lakes in all RBDs and the classification boundaries are related to the class boundaries for the sensitive biological quality elements except for the three RBDs in Northern Ireland. Hydrological or tidal regime was also reported to be assessed in terms of ecological status/potential in transitional and coastal waters in all RBDs except Scotland. The classification boundaries were related to the sensitive biological quality elements in the England and Wales RBDs but not in Northern Ireland.

River continuity was reported to be assessed in terms of ecological status/potential and its classification boundaries related to the sensitive biological quality elements in 12 of the 15 RBDs. The exception was for the three RBDs in Northern Ireland.

Morphological conditions were reported to be assessed in terms of ecological status/potential in all water categories in all RBDs in the United Kingdom, and in the Scotland, England and Wales RBDs their classification was reported to be related to the sensitive biological quality elements. In the three RBDs in Northern Ireland the classification boundaries were reported not to be related to the sensitive biological quality elements.

Classification methods for general physicochemical quality elements

Standards have been reported for many general physicochemical quality elements in many types of water bodies, including tightening of the phosphate standards in rivers. Many are compatible with the Good-moderate status/potential boundaries for sensitive biological quality elements.

Transparency conditions are not assessed in relation to ecological status/potential in any of the RBDs. Thermal conditions are only assessed in rivers in the Scotland, England and Wales RBDs and their classification are only reported to be related to the sensitive biological quality elements in one RBD (Solway Tweed). Thermal conditions are assessed in Northern Ireland only for transitional and coastal waters and the classification boundaries are not related to the sensitive biological quality elements.

Oxygenation conditions are assessed in terms of ecological status/potential in all water categories in all RBDs, with their classification boundaries being related to the sensitive biological quality elements in 12 of the 15 RBDs, the exception being the RBDs in Northern Ireland.

Salinity conditions were not assessed in relation to ecological status/potential in Scotland in any water category. In the England and Wales RBDs the only category where they were

assessed was in lakes and the boundaries were related to sensitive biological quality elements. In Northern Ireland they were assessed only in transitional and coastal waters and the boundaries were not related to the sensitive biological quality elements.

Acidification status was assessed in relation to ecological status/potential only in rivers and lakes in Scotland, England and Wales RBDs and the classification boundaries were related to the sensitive biological quality elements. In Northern Ireland, acidification status was just assessed in transitional and coastal waters and the classification boundaries were not related to the sensitive biological quality elements.

Nutrient conditions were assessed in all water categories and all RBDs in terms of ecological status/potential and were classified in terms of the sensitive biological quality elements in all cases except for all four water categories in the three RBDs in Northern Ireland.

No standards were reported for transparency or salinity conditions in rivers for the whole United Kingdom. Standards were reported for the other general physiochemical quality element types: thermal, nutrient and oxygen conditions and acidification status. All standards were consistent with the good-moderate status boundary of the relevant sensitive biological quality elements.

Standards were reported for four (oxygenation, salinity, acidification and nutrient conditions) of the six groups of physicochemical quality elements in lakes in Scotland, England and Wales. In Northern Ireland standards were only reported for oxygenation and nutrient conditions. There were no reported standards for transparency conditions in lakes. All standards were consistent with the good-moderate status boundary of the relevant sensitive biological quality elements

Only standards for oxygenation and nutrient conditions were reported for transitional and coastal water for all RBDs and the standards are consistent with the good-moderate status boundary of the relevant sensitive biological quality elements.

Selection of River Basin Specific Pollutants and use of Environmental Quality Standards

It is indicated in the RBMPs that the methodology for the selection of specific pollutants is covered in a United Kingdom guidance document on revised standards for the second RBMPs. The initial list of substances included substances covered by existing legislation, which were generally monitored, and substances that have emerged as possible concerns. The substances were ranked in terms of their hazardous properties and likelihood of exposure, following EU guidance.

Environmental Quality Standards are reported for 38 River Basin Specific Pollutants in the United Kingdom. They have only been established for water, and not for sediment or biota. The standards were reported to have been derived in accordance with the Technical Guidance Document No 27³⁹ for 32 substances in all the RBDs where standards had been derived. For four substances the technical guidance was reported as not having been used in any of the RBDs (all in England and Wales) and for two substances (arsenic and iron) the guidance was reported not to have been used in 11 RBDs and to have been used in four RBDs.

The analytical methods used meets the minimum performance criteria laid down in Article 4.1 of the Quality Assurance / Quality Control Directive (2009/90/EC)⁴⁰ for the strictest standards applied for 18 River Basin Specific Pollutants. For seven substances the methods did not meet the minimum performance criteria for any standard and for 13 substances the methods did for some standards but not for others. For all substances and standards where the minimum performance criteria laid down in Article 4.1 were not met, the analytical method complied with the requirements laid down in Article 4.2 of the Quality Assurance / Quality Control Directive for the strictest standard applied.

All RBDs in the United Kingdom reported that River Basin Specific Pollutants were used in the classification of ecological status/potential for all the relevant water categories: monitoring results were used for the classification, with the exception of nine river water bodies in Northern Ireland. In the United Kingdom as a whole five different River Basin Specific Pollutants are reported to be causing failure of good ecological status/potential. Zinc was causing failure in the most surface water bodies (156) followed by copper (85) and cypermethrin (55).

Overall classification of ecological status (one-out, all-out principle)

Overall ecological status/potential has been reported for all water bodies in the second RBMPs, which was also the case for the first RBMPs. The confidence in classification has improved compared to the first RBMPs for all water categories. The classification of ecological status/potential is often based on several quality elements in all water categories.

The one-out-all-out principle was reported to have been used in the classification of the overall status/potential in all RBDs.

In terms of how the spatial extent of any ecological impacts within water bodies have been taken into account when deriving the overall status of a water body, the RBMP for the South

³⁹ <https://circabc.europa.eu/sd/a/0cc3581b-5f65-4b6f-91c6-433a1e947838/TGD-EQS%20CIS-WFD%2027%20EC%202011.pdf>

⁴⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:201:0036:0038:EN:PDF>

West RBD indicated that investigations to confirm the scale and extent of impacts occur after the classification stage. The UK technical guidance methodology provides recommendations for how spatial issues and the use of multiple monitoring stations should be dealt with. For example, if there are only a handful of sites and each monitoring station is representative of a significant proportion of the water body, the entire water body can be classified on the basis of the results for the monitoring station indicating the worst impact. How this recommendation has been implemented is not discussed in the RBMPs.

No information on the methodology for dealing with the non-deterioration objective when classifying water bodies appears to have been reported in the RBMPs or supporting information.

Grouping is used for the classification of some water bodies for 19 (out of 46) quality elements across the four water categories in the United Kingdom. The largest proportion classified by grouping is for nutrient conditions (68 % of water bodies) in coastal waters, followed by oxygenation conditions (62 %) and benthic invertebrates (61 %), also in coastal waters. 42 % of lakes were classified by grouping in terms of benthic invertebrates, 17 % of rivers in terms of benthic invertebrates and 15 % of transitional water in terms of fish.

In information obtained from the Neagh Bann RBMP, the revision of the delineation of river water bodies meant that there was less need for grouping for classification purposes compared with the first RBMP, although it was still needed in a number of places. In total, there were currently 34 river water bodies without monitoring stations in Northern Ireland.

3.2 Main changes in implementation and compliance since the first Cycle

There was a small increase in the proportion of surface water bodies included in surveillance monitoring between the first and the second RBMPs in 14 of the 15 RBDs, with a small decrease in the Scotland RBD. The biggest increase in the proportion of surface water bodies included in surveillance monitoring was in the North Western RBD, where 80 % were monitored for the first RBMP and 87 % for the second. It must be borne in mind that the surface water bodies were re-delineated between the first and second RBMPs with 10961 surface water bodies being delineated for the first RBMPs and 9325 for the second, a 15 % decrease in numbers overall in the United Kingdom. Any comparisons therefore need to be taken with caution.

In terms of surveillance monitoring only six of the RBDs in the United Kingdom (Scotland, Solway-Tweed, Western Wales and the three RBDs in Northern Ireland) had any coastal water bodies where all required biological quality elements were monitored. For lakes, all of the 15 RBDs in the United Kingdom had no water bodies where all required biological quality

elements were monitored. In contrast 14 of the 15 RBDs had a number of river water bodies where all required biological quality elements were monitored with the fewest being in the Anglian (6 %) and the most in the North Western RBD (95 %). Only the Scotland RBD had none. Fish were not monitored in any of the water bodies included in surveillance monitoring. Furthermore, 12 RBDs had no transitional water bodies where all required biological quality elements were monitored for surveillance purposes.

All required biological quality elements were monitored in at least some transitional water bodies in the Scotland RBD (15 %), in the Western Wales RBD (80 %) and in the Dee RBD (100 %).

Overall, there was a decrease in the proportion of surface water bodies included in operational monitoring between the first RBMPs and the second in 12 of the 15 RBDs, with the largest decrease being in the Dee RBD where for the first RBMP 100 % of surface water bodies were included in operational monitoring and this decreased to 67 % for the second. There were small increases in the proportion of water bodies operationally monitored in all three RBDs in Northern Ireland between the first RBMPs and the second.

In general, more sites may be required in a water body being monitored for surveillance purposes than in water bodies included only in operational monitoring. This is because surveillance monitoring may require the monitoring of more quality elements with different sites required for different quality elements (to be indicative of all potential pressures and impacts), while operational monitoring often focuses on monitoring the effects of specific pressures, which may require fewer quality elements depending on the nature of the impacts. As examples, for the first RBMPs, on average in the United Kingdom there were around 12 monitoring sites in each coastal and 22 sites in each transitional water body used for surveillance monitoring, and around 7 and 13 sites respectively for operational monitoring. For the second RBMPs, these average figures for coastal and transitional water bodies had decreased to around nine sites per water body for surveillance monitoring in each of these two categories, and to around three and five sites for operational monitoring in coastal and transitional waters, respectively. There were similar decreases in the number of sites per river water body used for surveillance monitoring, from around six in the first RBMPs to around three for the second. However, for lakes there was an increase in the numbers of sites per water body used for surveillance monitoring from around two in the first RBMPs to four in the second. These increases happened in 14 of the 15 RBDs. The general decrease in the number of sites per water body in rivers, coastal and transitional waters may help to explain the decreases in the numbers of monitoring sites used between the first RBMPs and the second, which may seem contradictory with the increase in the proportion of water bodies which are monitored.

For the first plans fish were reported not to be monitored in lakes but to be monitored in rivers and transitional waters. For the second plans, fish were reported to be monitored in lakes only in the three Northern Ireland RBDs but not in Scotland, England and Wales. There is therefore still a gap in the monitoring of this element in lakes. Fish were also not reported for some RBDs with transitional waters in England, where they had been monitored for the first plan.

In the first RBMPs hydrological regime was reported to be monitored in rivers and lakes and tidal regime in transitional waters but not in coastal waters. In the second RBMPs hydrological/tidal regime was only reported as being monitored for lakes in two Northern Ireland RBDs. This is a significant change from the first RBMP.

For the first plans, morphological conditions were reported to be monitored in all water categories only in the England and Wales RBDs but river continuity was not reported for any RBD in the UK. In the second RBMP morphological conditions were not reported for Scotland for any of the four water categories and they were not reported for any RBD in terms of coastal waters, for five of the 15 RBDs for lakes, for four of 15 RBDs for rivers and for 9 of the 13 RBDs for transitional waters. There appears to have been a significant decrease in the monitoring of morphological conditions, particularly in the RBDs in England. There is also still a significant gap in the monitoring of these elements in Scotland. River continuity was not reported for the first nor for the second RBMPs.

The UK has reported to WISE on the monitoring of physicochemical parameters at an aggregate level for the first RBMPs, and it was not clear which specific quality elements were being monitored. For the second plans, nutrient conditions were not reported to be monitored in any of the England RBDs, which the United Kingdom explained was due to a reporting error.

The ecological status/potential has not improved significantly in the United Kingdom since the first RBMPs, and the status/potential changes reported at the quality element-level are mostly reported as not consistent, but due to changes in monitoring and assessment methods. The large majority of water bodies in the United Kingdom are still in less than good ecological status/potential.

3.3 Progress with European Commission recommendations

- Recommendation: *Address the large uncertainties reported in the first RBMPs in relation to the assessment of the status, the pressures and the effect of potential measures.*

Assessment: To address the uncertainties, the United Kingdom would need to have fully WFD compliant monitoring programmes in place covering all the required quality elements. This is not the case, as there are still big gaps in the monitoring programmes.

However, the confidence in the classification of ecological status/potential has improved for the United Kingdom as a whole, both in terms of information on confidence for a larger proportion of water bodies (increasing from 52 % to 73 %), as well as an increased proportion of water bodies with high or medium confidence (from 51 % to 72 % for rivers and lakes and from 63 % to 85 % for transitional and coastal waters).

Also the biological quality element assessment methods missing for the first RBMPs have now been developed: these are phytoplankton in transitional waters for the whole United Kingdom, and angiosperms in coastal waters for Northern Ireland. Also fish methods for river and lakes, as well as angiosperms in transitional and coastal waters and benthic fauna in coastal waters have been developed in Northern Ireland. The United Kingdom subsequently clarified that the assessment methods for benthic fauna in Northern Ireland are common to the whole United Kingdom.

In conclusion, there has been progress on this recommendation though there are still some significant gaps remaining. The recommendation has been partially fulfilled.

- Recommendation: *The monitoring network needs to be reviewed to ensure that the gaps in the quality elements that are monitored are filled. Further clarification regarding the identification of and monitoring of chemical pollutants is needed, where this is missing. In particular, chemical pollutants should be monitored in all categories of water body in all regions of the UK.*

Assessment: The gaps reported for the first RBMPs have largely not been filled for the second, for example on river continuity and morphological conditions in Scotland. Furthermore, for some quality elements the reported data shows a deterioration, for example the monitoring of hydrological/tidal regime in rivers, lakes and transitional waters, but the United Kingdom subsequently clarified that this was due to errors in reporting.

Progress has been made for River Basin Specific Pollutants in all RBDs, as 17 % of the total reported monitoring sites are used to monitor at least one River Basin Specific Pollutant.

In conclusion, there has not been sufficient progress on this recommendation and it is not fulfilled.

- Recommendation: *The identification of River Basin Specific Pollutants needs to be more transparent, with clear information on how pollutants were selected, how and where they were monitored, where there are exceedances and how such exceedances have been taken into account in the assessment of ecological status. It is important that there is an ambitious approach to combating chemical pollution from River Basin Specific Pollutants and that adequate measures are put in place. United Kingdom needs to provide clearer reporting on the methodologies used to set the Environmental Quality Standard values for national specific pollutants.*

Assessment: The RBMP have information on how River Basin Specific Pollutants have been selected. In terms of how and when River Basin Specific Pollutants are monitored, this part of the recommendation has been met as detailed information on the monitored substances has been reported for all RBDs and relevant water categories.

Another improvement is that the methods used to set the Environmental Quality Standards for River Basin Specific Pollutants are reported for most substances to be in accordance with the Technical Guidance Document No 27, in contrast to the first RBMPs, when there was no information on how the standards had been set.

All RBDs in the United Kingdom reported that River Basin Specific Pollutants were used in the classification of ecological status/potential for all the relevant water categories. Five different River Basin Specific Pollutants are reported to be causing failure of good ecological status/potential in the United Kingdom as a whole.

In conclusion, there has been progress on this recommendation and it is considered as fulfilled.

- Recommendation: *Improve the monitoring of impacts in the second RBMPs. Further investigations in that regard need to be translated into increased confidence in the impact of pressures and status assessment”. “In the first plans there was a focus on the more traditional quality elements for operational monitoring with benthic invertebrates and physicochemical quality elements being monitored in the most water bodies included in operational monitoring. It would be expected that as assessment methods are developed for the other biological quality elements that more of them would be monitored for operational purposes in relation to the ambient pressures on the water bodies”. In Northern Ireland there was no operational monitoring for coastal and transitional waters and for lakes only water flow was reported to be monitored”.*

”There should be a clear description of how monitoring has been improved in the second plan and how that has increased confidence in the assessment of pressures and status for example by having a longer period of monitoring results available for the second cycle which should increase the level of confidence in the classification of status.

Assessment: The RBDs in England have not reported any biological quality elements (or any other quality elements) that are being monitored in coastal waters, but the United Kingdom subsequently clarified that this was a reporting error. Some RBDs in England have also not reported relevant information for transitional waters.

Note that there has been a re-delineation of water bodies after the first RBMPs which may have affected the proportion of water bodies affected by each type of significant pressures and hence the selection of the most sensitive biological quality elements for operational monitoring. Comparisons between the first and second RBMPs should be treated with caution. Also note that the comparisons between the first and second RBMPs are based on 12 RBDs in England, Scotland and Wales, as the three RBDs in Northern Ireland had not reported information in the required format in the first RBMPs.

All four relevant biological quality elements were used in operational monitoring in coastal waters for the first RBMPs, though the predominant biological quality element used was phytoplankton followed by benthic invertebrates. Based on the information from only four RBDs with reported information, phytoplankton and macroalgae were the biological quality elements which were predominately used for operational monitoring for the second RBMPs, though angiosperms, phytobenthos (not an expected biological quality elements for coastal waters) and benthic invertebrates were also used.

There seems to have been an increased used of macroalgae in coastal waters and a decrease in the proportion of water bodies where phytoplankton and benthic invertebrates are monitored.

Four of the five relevant biological quality elements were used in operational monitoring in lakes for the first RBMPs, while fish were not monitored in lakes in all RBDs for the second RBMPs. The biological quality elements which were predominately used for the first RBMPs were phytoplankton followed by benthic invertebrates. The biological quality elements which were predominately used for the operational monitoring of lakes for the second RBMPs were again phytoplankton followed by macrophytes and benthic invertebrates; fish were again not monitored in

any lake. The relative use of the different biological quality elements remains roughly the same in the second as in the first RBMPs.

All four relevant biological quality elements were used in operational monitoring in rivers for the first RBMPs, though the biological quality element that was predominately used was benthic invertebrates (in around 90 % of river water bodies), followed by fish. The use of fish in operational monitoring in rivers appears to have remained roughly the same as for the first RBMPs, but there was a noticeable increase in the proportion of rivers where macrophytes, phytobenthos and benthic invertebrates were monitored.

For the first RBMPs, all five of the relevant biological quality elements were used in operational monitoring in transitional water, the biological quality element which was predominately used was phytoplankton, followed by benthic invertebrates. In the second RBMPs, three RBDs (Humber, Thames and Dee) did not report on which biological quality elements were monitored for operational purposes in transitional waters. In the other nine RBDs in England, Wales and Scotland, the biological quality element that was predominately used for the second RBMPs was benthic invertebrates, though all other biological quality elements were reported in at least one RBD, including macrophytes and phytobenthos which might not be expected to be used in transitional waters. Notably, Scotland used fish in 91 % of transitional water bodies for operational purposes. Comparison between the first and second RBMPs seems unreliable based on the lack of reporting for transitional waters in the second RBMPs in some RBDs.

In terms of the recommendation to use more and different biological quality elements for operational monitoring as methods are developed, progress seems to have been made particularly in terms of coastal waters and rivers.

It is difficult to make a quantitative comparison of the relative levels of confidence achieved in the classification of ecological status/potential between the first and second RBMPs because of the significant re-delineation of water bodies. However, an approximate comparison shows that overall in the UK, the proportion of water bodies classified as either high or good with high confidence, increased from 11 % in the first RBMPs to 13 % in the second for lakes and from 6 % to 11 % for rivers. In terms of coastal and transitional waters the proportion classified as high or good at high status with high confidence decreased. The improvement in the confidence of classification of high and good status river and lake water bodies may reflect the improvement in assessment methods in these water categories, while for transitional and coastal water

the reverse may be indicated. There may also be other factors affecting the level of confidence, such as the frequency of monitoring of the quality elements in the respective water categories.

In conclusion, there has been progress on this recommendation and it is fulfilled.

Topic 4 **Monitoring, assessment and classification of chemical status in surface water bodies**

4.1 Assessment of implementation and compliance with WFD requirements in the second RBMP

4.1.1 Monitoring of chemical status in surface waters

Monitoring sites and monitored water bodies used for monitoring of chemical status

Member States have to implement surveillance and operational monitoring programmes in accordance with the requirements of the WFD and of the EQS Directive, for the assessment of ecological status/potential and chemical status.

Surveillance monitoring programmes should allow Member States to supplement and validate the impact assessment procedure (see chapter 2), to efficiently and effectively review the design of their monitoring programmes, and to assess the long-term changes in natural conditions and those resulting from widespread anthropogenic activity. For operational purposes, monitoring is required to establish the status of waterbodies identified as being at risk of failing to meet their environmental objectives, and to assess any changes in the status of such waterbodies resulting from the PoM.

Section 3.1.1 of this report summarises the characteristics of the surveillance and operational monitoring programmes in the United Kingdom for the second RBMP.

Figure 4.1 summarises the proportion of sites used for the monitoring of chemical status in surface waters for the second RBMP. In this figure, no distinction is made between sites used for surveillance and/or operational purposes. More detailed information can be found on the website of the European Environment Agency⁴¹.

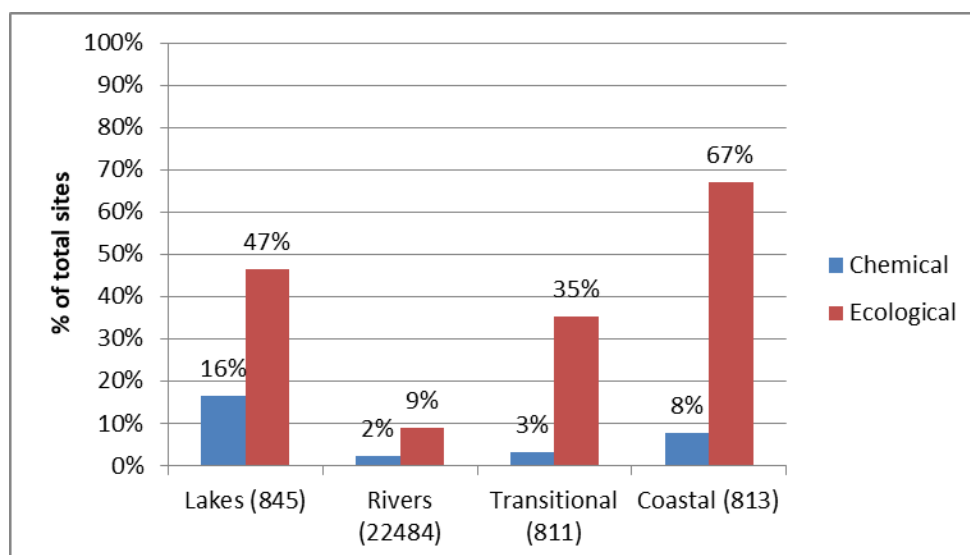
Figure 4.1 shows that only 16 %, 2 %, 3 % and 8 % of the total monitoring sites are used for the monitoring of chemical status in lakes, rivers, transitional and coastal waters respectively. No territorial waters have been monitored and assessed for chemical status in the UK. Significantly more sites were used for monitoring of ecological status.

For the second RBMP, across all RBDs in the UK and for all water categories, a similar proportion of monitoring sites for chemical status are included in the operational (12 %) and surveillance (11.9 %) monitoring programmes. There is some variation between UK administrative regions with respect to water category and monitoring purpose. For operational

⁴¹ <https://www.eea.europa.eu/publications/state-of-water>

monitoring, a higher proportion of coastal water sites (>67 %) are monitored in England than in Scotland (Scotland and Solway Tweed RBDs) (>12 %), Wales (the Western Wales RBD) (23 %) and Northern Ireland (<9.3 %); a similar pattern is apparent for transitional waters; in lake water body sites, no operational monitoring for priority substances is undertaken in Northern Ireland but the proportion of monitoring sites is similar in Scotland, England and Wales (27 – 65 %); and in river water bodies, the proportion of monitoring sites is in the same order (10-30 %) in all jurisdictions. For surveillance monitoring, a higher proportion of coastal water sites (<25 %) are monitored in England than in Scotland (Scotland and Solway Tweed RBDs) (12 – 15 %), Wales (the Western Wales RBD) (23 %) and Northern Ireland (5-9 %); a similar pattern is apparent for transitional waters; in lake water body sites, a similar proportion is monitored in England, Wales and Northern Ireland (2-18 %) with a greater proportion in Scotland (the Scotland RBD) (24 %); in rivers, a low proportion of sites are included in England (0.1 to 2 %) and Wales (2 – 9 %) with higher proportions in two of the Northern Ireland RBDs (15-17 %) and in Scotland (the Scotland RBD) (19 %).

Figure 4.1 *Proportion of sites used for monitoring of chemical status and, for comparison, ecological status, in the United Kingdom. The number in parenthesis next to the category is the total number of monitoring sites irrespective of their purpose*



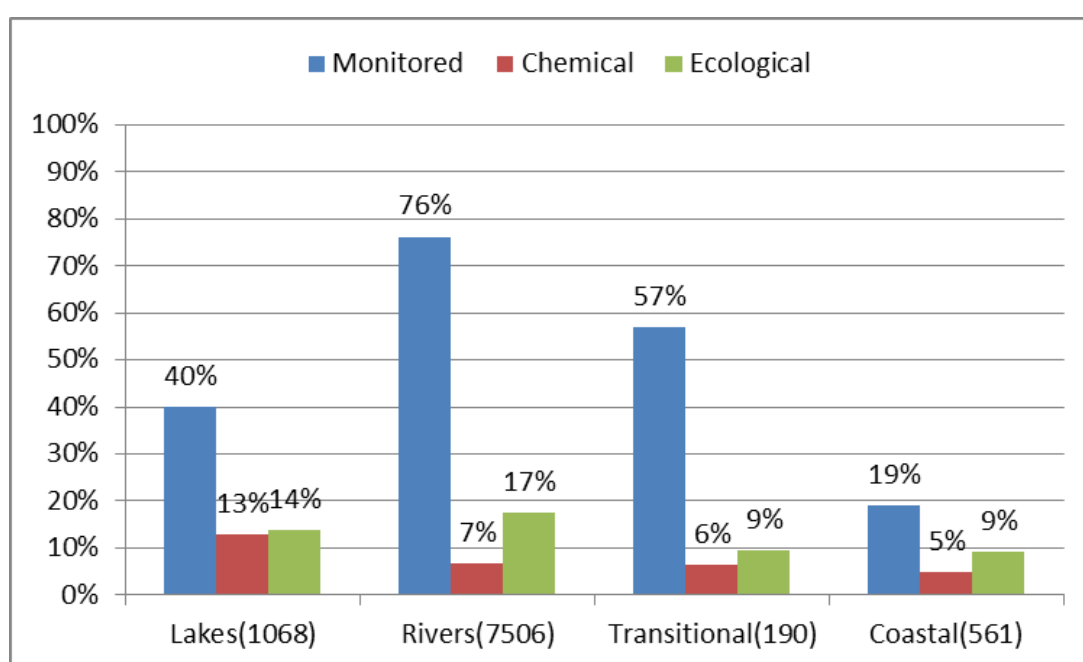
Source: WISE electronic reporting

Figure 4.2 summarises the proportion of water bodies monitored for chemical status in the different water body types for the second RBMP. In this figure, no distinction is made between sites used for surveillance and/or operational purposes. Also given is the proportion of water bodies monitored for any purpose and, for comparative purposes, those for ecological status.

Up to 13 % of lake water bodies, 7 % of river water bodies, 6 % of transitional waters and 5 % of coastal water bodies were monitored for chemical status in the second RBMP. A greater proportion of water bodies were monitored for ecological status although the percentages were still relatively low.

The majority of surface water bodies at poor chemical status are monitored for Priority Substances as part of the operational monitoring programme. However, in some cases surface water bodies failing to achieve good chemical status are reported not to be monitored.

Figure 4.2 *Proportion of total water bodies in each category which are monitored for chemical status and for ecological status, in the United Kingdom. The number in parenthesis next to the category is the total number of water bodies in that category*



Source: WISE electronic reporting

Long-term trend monitoring and monitoring of Priority Substances in water, sediment and biota for status assessment

Monitoring for status assessment

Requirements

Article 8.1 of the WFD requires Member States to establish monitoring programmes in order to provide inter alia a coherent and comprehensive overview of water status within each RBD. The amount of monitoring undertaken in terms of priority substances, frequency and numbers

of sites should be sufficient to obtain a reliable and robust assessment of status. According to the EQS Directive (version in force in 2009), mercury, hexachlorobenzene and hexachlorobutadiene have to be monitored in biota for status assessment, unless Member States derived a standard for another matrix, which is at least as protective as the biota standard.

Spatial coverage

In nine of the RBDs in the UK, more than 40 % of coastal water bodies were not monitored for priority substances with the highest proportions in Scotland (UK01 and UK02 RBDs) (>75 %) where the number of coastal water bodies is greatest (440) but in RBDs with coastal waters in England, Wales and Northern Ireland the largest proportions are monitored for six or more substances (though the number of coastal water bodies is much fewer). In 12 of the RBDs, more than 33 % of transitional water bodies were not monitored for priority substances with the highest proportions in Scotland (UK01 and 02) (>80 %) where the number of transitional water bodies is greatest (41); the majority of the remaining water bodies are monitored for six or more priority substances. For 13 of the 15 RBDs, the majority of lake water bodies were not monitored for priority substances (>90 %) with the exception of Northern Ireland where the majority of the small number of lake water bodies was monitored for six or more priority substances. In each of the RBDs in the UK, more than 40 % (40-83 %) of river water bodies were not monitored for priority substances with the remainder monitored for three or more priority substances.

Across the 15 UK RBDs, the number of Priority Substances that are monitored in water for status assessment ranges from 13 (Dee RBD) to 41 (for all three Northern Ireland RBDs) with only three RBDs monitoring for less than 25 Priority Substances.

Mercury, hexachlorobenzene and hexachlorobutadiene are monitored in biota in 13 of the 15 RBDs; not reported to be monitored in the Scotland RBD and one of the Northern Ireland RBDs (North Eastern RBD).⁴² Monitoring is undertaken at less than 10 sites in each relevant RBD and generally in more sites in coastal and transitional waters than in lakes and rivers. However, UK subsequently clarified that the results of this monitoring is not included in the assessment of chemical status, with the exception of mercury in Wales.

⁴² The United Kingdom subsequently clarified that in Northern Ireland monitoring of hexachlorobenzene and hexachlorobutadiene ceased in 2012 on the basis of the risk assessment and the lack of detection of these pollutants in biota over a number of years.

Frequencies

The WFD indicates that, for the surveillance and operational monitoring of Priority Substances in water, the frequency of monitoring should be at least monthly for one year during the RBMP cycle and at least monthly every year, respectively. Monitoring in biota for status assessment should take place at least once every year according to the EQS Directive. In all cases greater intervals can be applied by Member States if justified on the basis of technical knowledge and expert judgement.

Overall in the UK, all of the 41 Priority Substances was monitored in water for status assessment at some sites at frequencies of 12 times per year and at least once in the cycle meeting the minimum guidelines for surveillance monitoring. The RBDs in Northern Ireland monitored all substances at these frequencies but fewer substances met these requirements in the other RBDs in the UK. For operational monitoring, the minimum guidelines frequencies were met for 36 of the 41 substances in the UK overall at some sites. These guidelines were not met for any substance in the Northern Ireland RBDs but were met for some substances in the other RBDs of the UK.

The monitoring frequency for mercury, hexachlorobenzene and hexachlorobutadiene in biota for status assessment of once every year was met in those RBDs where monitoring was undertaken with the exception of those in Northern Ireland. Monitoring was reported to be undertaken once per cycle with future frequencies to be determined.

Monitoring for long-term trend assessment

Requirements

Article 3.3 of the EQS Directive (version in force in 2009) requires Member States to monitor 14 priority substances⁴³ that tend to accumulate in sediment and/or biota, for the purpose of long-term trend assessment. Monitoring should take place at least once every three years, unless technical knowledge and expert judgment justify another interval.

Spatial coverage

Arrangements were reported to be in place for the long-term trend analysis in sediment and/or biota in 12 of the RBDs in UK with no information available for RBDs in Northern Ireland.

⁴³ Anthracene, brominated diphenylether, cadmium, C10-13 chloroalkanes, DEHP, fluoranthene, hexachlorobenzene, hexabutadiene, hexachlorocyclohexane, lead, mercury, pentachlorobenzene, PAH, Tributyltin.

Overall in the UK, 10 of the 14 Priority Substances (chloroalkanes, di(2-ethylhexyl)phthalate, hexachlorocyclohexane and pentachlorobenzene were not reported as being monitored) are monitored in sediment and/or biota for trend assessment. All of these are monitored in RBDs in England with only three in RBDs in Scotland (sediment only) and none in RBDs in Wales⁴⁴ and Northern Ireland.⁴⁵ With regards to water category, coastal and transitional waters are monitored for all ten substances and nine in rivers in those RBDs where monitoring for trend assessment occurs. There is no monitoring of sediment and/or biota in lakes for trend assessment in the UK. Monitoring for trend assessment was undertaken at less than 10 sites in each relevant RBD across all water categories.

Frequencies

The sampling frequency is at least once every three years for all reported RBDs which meets the guideline in the Directive.

Monitoring of Priority Substances that are discharged in a RBD

Annex V of the WFD states, in Section 1.3.1 (Design of surveillance monitoring), that “Surveillance monitoring shall be carried out for each monitoring site for a period of one year during the period covered by a river basin management plan for [*inter alia*]: priority list pollutants which are discharged into the river basin or sub-basin.” Section 1.3.2 (Design of operational monitoring) of the Directive states that “In order to assess the magnitude of the pressure to which bodies of surface water are subject Member States shall monitor for those quality elements which are indicative of the pressures to which the body or bodies are subject. In order to assess the impact of these pressures, Member States shall monitor as relevant [*inter alia*]: all priority substances discharged, and other pollutants discharged in significant quantities.”

Member States are therefore required to monitor all Priority Substances which are discharged into the river basin or sub-basin.

The majority of Priority Substances in inventories are discharged and monitored in the UK RBDs. However, a total of 20 Priority Substances were discharged but not monitored in at least

⁴⁴ The UK clarified that mercury, the polycyclic aromatic hydrocarbons, the brominated diphenylethers and several other priority substances are monitored in sediment for trend assessment in Wales. This must have been a reporting error.

⁴⁵ UK mentioned that in Northern Ireland there is insufficient monitoring data available for trend assessments to be carried out though relevant data is used for status assessment. Some monitoring for trend is carried out in Northern Ireland in the context of Ospar, however it is unclear whether this is performed in accordance with the requirements of the WFD, and it is not performed in all relevant WFD water categories.

one RBD, with more than three Priority Substances discharged but not monitored in all RBDs. The UK highlighted this may be a reporting mistake.

Performance of analytical methods used

In the United Kingdom for a majority of Priority Substances (19 in England and Wales; 25 in Scotland and 35 in Northern Ireland), the analytical methods used meet the minimum performance criteria laid down in Article 4.1 of the Technical specifications for chemical analysis and monitoring of water status Directive⁴⁶ for the strictest standard applied. For the remaining ones (22 in England and Wales; 16 in Scotland and seven in Northern Ireland), the analytical methods complied with the requirements laid down in Article 4.2 of Technical specifications for chemical analysis and monitoring of water status Directive for the strictest standard applied.

The method of dealing with measurements of Priority Substances lower than the limit of quantification is as specified in Article 5 of the Technical specifications for chemical analysis and monitoring of water status Directive for 12 of the 15 RBDs; three RBDs in Northern Ireland reported the use of a different method.

4.1.2 Chemical Status of surface water bodies

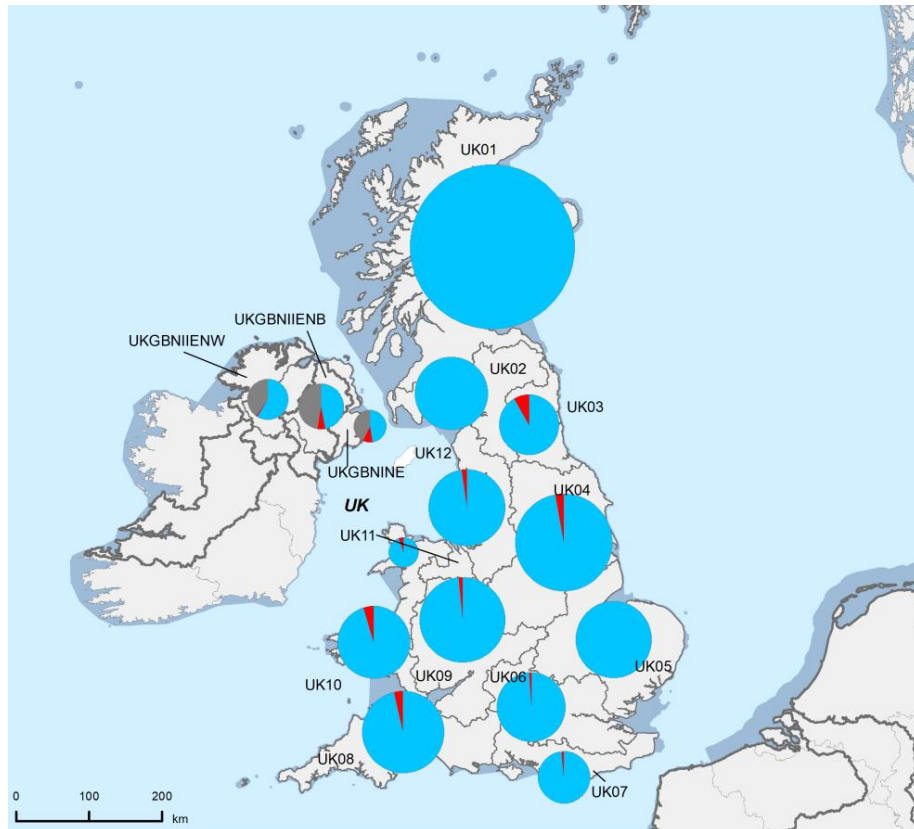
Member States are required to report the year on which the assessment of chemical status is based. This may be the year that the surface water body was monitored. In case of grouping this may be the year in which monitoring took place in the surface water bodies within a group that are used to extrapolate results to non-monitored surface water bodies within the same group. For the majority of water bodies, the assessment of chemical status was undertaken between 2013 and 2015. The most recent assessment year was 2015 for RBDs in England, 2014 for Scotland and Wales (Western Wales and Dee RBDs) and for the three RBDs in Northern Ireland.

The chemical status of surface water bodies in the United Kingdom for the second RBMP is illustrated in Map 4.1. This is based on the most recent assessment of status.

The chemical status of surface water bodies in all relevant water categories in the United Kingdom for the first and second RBMPs is given in Table 4.1.

⁴⁶ Directive 2009/90/EC of 31 July 2009 laying down, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, technical specifications for chemical analysis and monitoring of water status <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1524565750309&uri=CELEX:32009L0090>

Map 4.1 *Chemical status of surface water bodies in the United Kingdom based on the most recently assessed status of the surface water bodies. Note: Standard colours based on WFD Annex V, Article 1(4)3.*



Source: WISE, Eurostat (country borders)

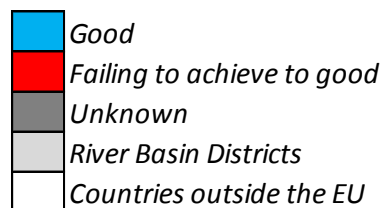


Table 4.1 *Chemical status of surface water bodies in the United Kingdom for the second and first RBMP. Note: the number in parenthesis next to the water category is the number of water bodies. Note: Chemical status assessment is based on the standards laid down in EQS Directive 2008/105/EC (version in force on 13 January 2009). Some Member States did not implement the Directive in the first RBMPs as the transposition deadline was in July 2010, after the adoption of the first RBMPs.*

Category	Good		Failing to achieve good		Unknown	
	Number	%	Number	%	Number	%
second RBMP						
Rivers (7506)	7 132	95 %	165	2 %	209	3 %
Lakes (1068)	1 067	99.9 %	1	0.09 %		
Transitional (190)	179	94 %	10	5 %	1	0.50 %
Coastal (561)	542	97 %	11	2 %	8	1 %
<i>Total</i>	<i>8920</i>	<i>96 %</i>	<i>187</i>	<i>2 %</i>	<i>218</i>	<i>2 %</i>
first RBMP						
Rivers (9080)	2 948	32 %	161	2 %	5 971	66 %
Lakes (1119)	363	32 %	1	1 %	755	67 %
Transitional (192)	93	48 %	16	8 %	83	43 %
Coastal (570)	506	89 %	3	1 %	61	11 %
<i>Total</i>	<i>3910</i>	<i>36 %</i>	<i>181</i>	<i>2 %</i>	<i>6870</i>	<i>63 %</i>

Source: WISE electronic reporting

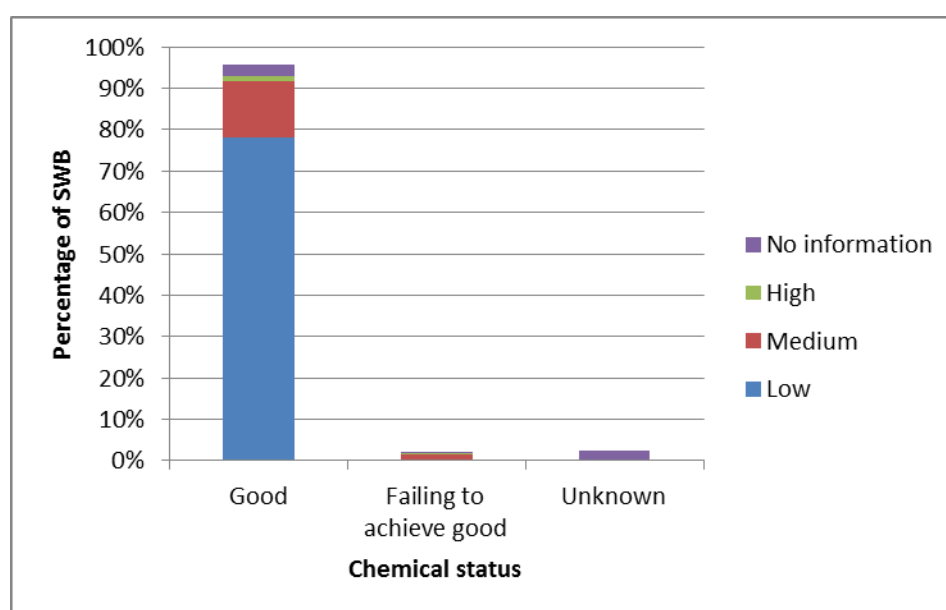
Figure 4.3 shows the confidence in the classification of chemical status for the second RBMP. Overall 83 % of surface water bodies in the UK (excluding Northern Ireland) were classified for chemical status with low confidence, 16 % with medium confidence and only 1.4 % with high confidence. For lakes, 8 % were classified with medium confidence and 92 % with low confidence. For rivers, only 1.7 % were classified with high confidence, 17 % with medium confidence and 81 % with low confidence. In transitional waters, only two water bodies (1 %) were classified with high confidence, 38 % with medium confidence and 61 % with low confidence. In coastal water, 9 % were classified with medium confidence and the remainder (91 %) with low confidence. No information on the confidence in the classification of chemical status was reported for RBDs in Northern Ireland.⁴⁷

The UK subsequently clarified that, in England, Scotland and Wales, water bodies have been classified as in good chemical status with low confidence where a risk assessment has been

⁴⁷ The United Kingdom subsequently clarified that in Northern Ireland all chemical classification confidence levels on published status information was reported as low confidence based on the statistical requirements to meet the increasing confidence limits and the low density of evidence.

undertaken and has identified no predicted risks from Priority Substances. Risk assessments may have included investigatory monitoring and modelling. These water bodies have not been monitored as part of the monitoring programmes reported in the second RBMP. The UK also clarified that this approach has not been implemented in Northern Ireland where unmonitored water bodies were classified as unknown status.

Figure 4.3 *Confidence in the classification of chemical status of surface water bodies in the United Kingdom based on the most recently assessed status/potential*



Source: WISE electronic reporting

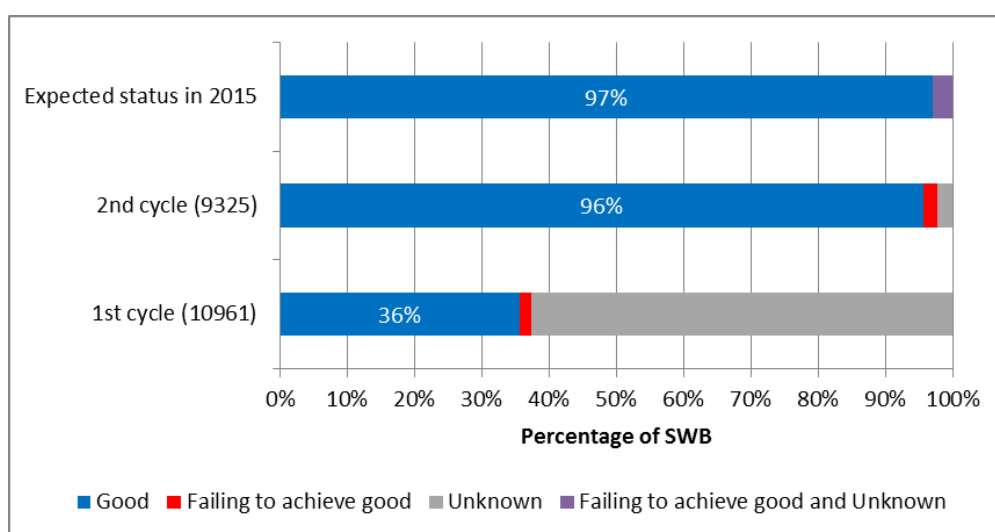
Classification of chemical status is intended to be assessed according the ‘one-out-all-out’ principle such that the failure of one Priority Substance Environmental Quality Standard in a water body results in failure to achieve good status classification for that water body. No explicit reference to the application of the ‘one-out-all-out’ principle with respect to chemical status was made in the UK RBMPs.

Figure 4.4 compares the chemical status of surface water bodies in the United Kingdom for the first RBMP with that for the second RBMP (based on the most recent assessment of status) and that expected by 2015. There was a large increase in the proportion of surface water bodies classified as good for the second RBMP compared to the first (as explained by the risk based approach described above); the majority of these were classified as unknown in the first RBMP. There was a small increase from 96 % at good chemical status for the second RBMP to 97 % expected by the end of 2015.

The assessment of chemical status for the second RBMP was expected to be based on the standards laid down in EQS Directive 2008/105/EC (version in force on 13 January 2009⁴⁸). Some Member States did not implement the Directive in the first RBMPs as the transposition deadline was in July 2010, after the adoption of the first RBMPs.

Directive 2013/39/EU amended the EQS Directive. In particular, it sets more stringent environmental quality standards for seven substances⁴⁹. Member States were asked to report whether the new standards caused the status of the surface water body to appear to deteriorate. This was the case for less than 1 % of surface water bodies, because of lead, nickel and benzo(a)pyrene in the United Kingdom as a whole.

Figure 4.4 *Chemical status of surface water bodies in the United Kingdom for the second RBMP, for the first RBMP and expected in 2015. The number in the parenthesis is the number of surface water bodies for both cycles.*



Source: WISE electronic reporting

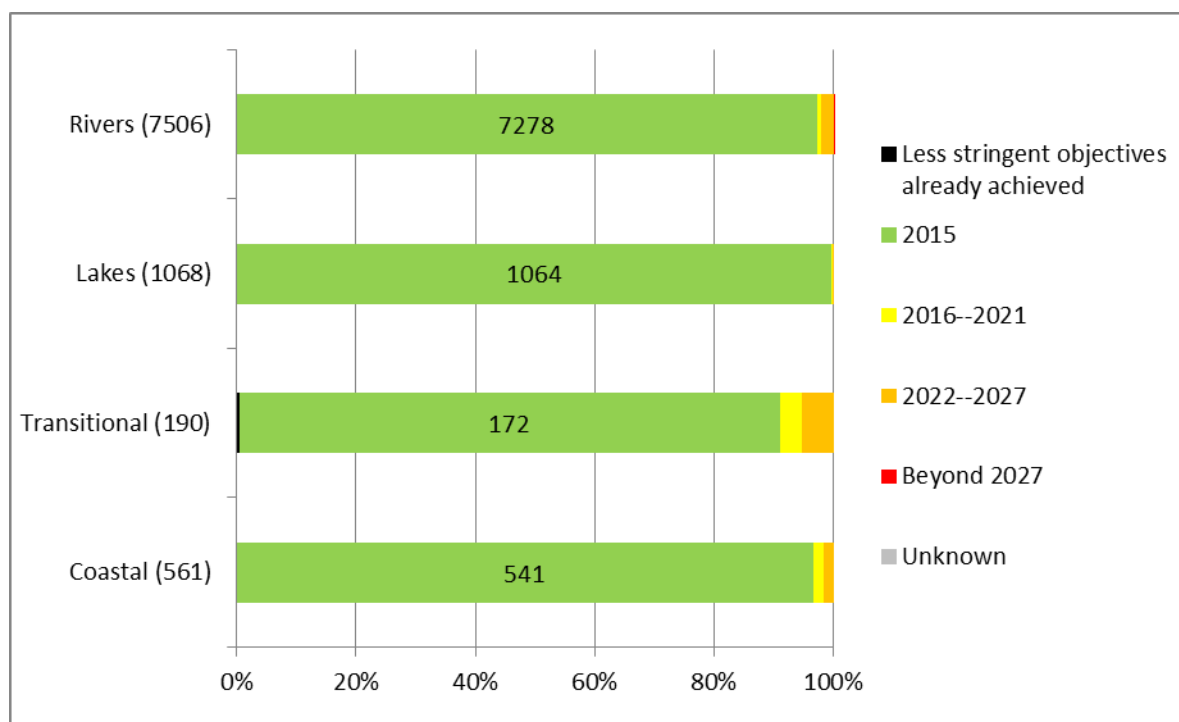
Good chemical status should be reached by 2021 in relation to the revised environmental quality standards, unless Member States apply exemptions under WFD Article 4(4) and/or less stringent objectives under WFD Article 4(5).

Member States were asked to report the expected date for the achievement of good chemical status. The information for the United Kingdom is shown in Figure 4.5 and shows that more than 90 % of the water bodies were expected to be at good chemical status by the end of 2015. However, 10 % of rivers are not expected to achieve good chemical status until beyond 2027.

⁴⁸ Please note that Directive 2013/39/European Union, which amended the Environmental Quality Standards Directive, introduced a less stringent annual average environmental quality standard for naphthalene in transitional and coastal waters. This less stringent environmental quality standard should be taken into account for the determination of surface water chemical status by the 2015 deadline laid down in Article 4 of the WFD.

⁴⁹ Anthracene, Brominated diphenylether, Fluoranthene, Lead and its compounds, Naphthalene, Nickel and its compounds, Polyaromatic hydrocarbons (PAH)

Figure 4.5 *Expected date of achievement of good chemical of surface water bodies in the United Kingdom. The number in the parenthesis is the number of water bodies in each category*



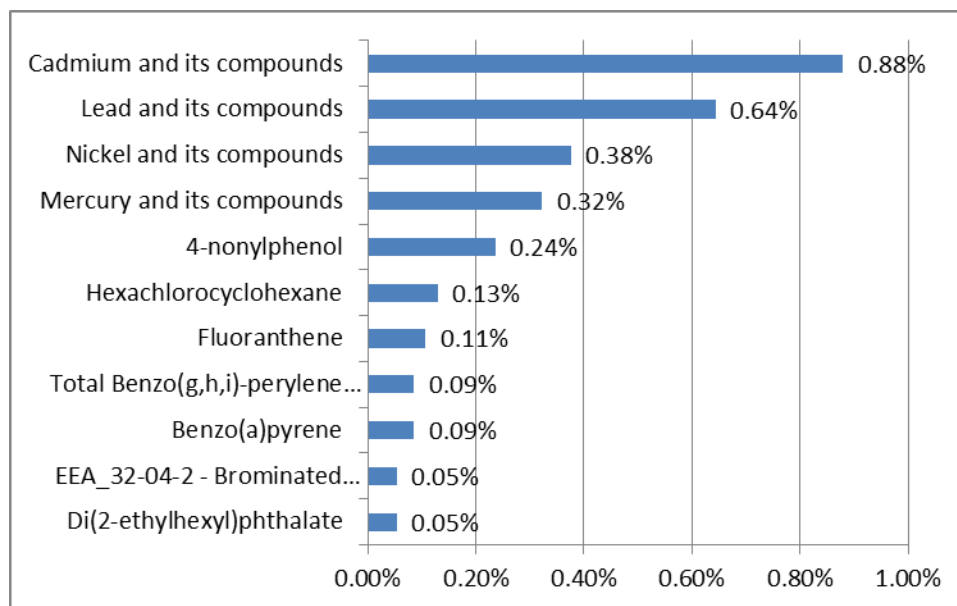
Source: WISE electronic reporting

Priority Substances causing the failure of good chemical status

Member States were expected to report exceedances for individual substances on the basis of the most relevant Environmental Quality Standard for each substance. For the seven Priority Substances with more stringent 2013 Environmental Quality Standards, exceedance of either or both of the 2008 and 2013 standards (as appropriate) should have been reported (see above).

There were 19 Priority Substances reported to be causing failure to achieve good chemical status in surface water bodies in the United Kingdom. The “top-10” in terms of the proportion of water bodies failing because of the substance is shown in Figure 4.6.

Figure 4.6 *The top-10 Priority Substances causing failure to achieve good chemical status in surface water bodies in the United Kingdom (please note 11 substances are shown due to a tie).*



Source: WISE electronic reporting

Overall for surface water bodies in the United Kingdom, the largest proportion of exceedances were for the annual average environmental quality standard for cadmium (27 %), lead (20 %), nickel (11 %) and mercury (10 %) and 4-nonylphenol (7 %). Exceedances of maximum allowable concentration environmental quality standards were rare and only occurred in Northern Ireland for hexachlorocyclohexane and total benzo(b)fluor-anthene + benzo(k)fluor-anthene⁵⁰. Only endosulfan was reported to have exceeded both types of environmental quality standard again in Northern Ireland⁵¹.

Ubiquitous persistent, bioaccumulative and toxic Priority Substances

According to Article 8(a) of the EQS Directive⁵², eight priority substances and groups of priority substances are behaving like ubiquitous, persistent, bioaccumulative and toxic substances⁵³. These substances are generally expected to cause widespread exceedances, and their emissions can be challenging to tackle (e.g. due to long-range atmospheric transport and

⁵⁰ The United Kingdom subsequently clarified that the environmental quality standard for total benzo(b)fluor-anthene + benzo(k)fluor-anthene is listed as an annual average concentration environmental quality standard, and that there is no applicable maximum allowable concentration environmental quality standard.

⁵¹ The United Kingdom subsequently clarified that the maximum allowable concentration environmental quality standard for endosulfan was not exceeded and that the annual average concentration for endosulfan was reported as a failure in the RBMP as a precaution and that it was not a true breach of the environmental quality standard.

⁵² Amended by Directive 2013/39/EU

⁵³ Brominated diphenylether, Mercury and its compounds, Polyaromatic hydrocarbons (PAH), Tributyltin, PFOS, dioxins, hexabromocyclodecane and heptachlor

deposition). In order to show the progress made in tackling other priority substances, Member States have the possibility to present the information related to chemical status separately for these substances.

The influence of ubiquitous persistent, bioaccumulative and toxic Priority Substances on the assessment of chemical status in the UK is limited. Overall 2 % of surface water bodies fail to achieve good status; while mercury, tributyltin, PAH and brominated diphenylethers are among the Priority Substances causing failure, when these substances are removed from the assessment of chemical status the proportion of water bodies failing good status remains unchanged at 2 %. This is illustrated in the 2018 State of Water report of the European Environment Agency⁵⁴.

However, the true extent of the influence of these substances cannot be fully determined because a large proportion of surface water bodies have been assigned good status with low confidence on the basis of a risk assessment or have been assigned an unknown status class because they have not been monitored. The extent to which pressures in relation to ubiquitous persistent, bioaccumulative and toxic Priority Substances have been included in the risk assessment has not been determined as part of the assessment of the second RBMPs.

Priority Substances used in the assessment of chemical status compared to those monitored

The majority of Priority Substances monitored are used in the assessment of chemical status. Across the whole of the UK there are only four RBDs where not all priority substances are used in the assessment of status. In the Scotland RBD, dichlorodiphenyltrichloroethane, endosulfan, di(2-ethylhexyl)phthalate and tributyltin are not monitored but are reported as being used in the assessment of chemical status. Of the group of Priority Substances, Total cyclodiene pesticides (aldrin + dieldrin + endrin + isodrin), brominated diphenylethers and Total Benzo(g,h,i)-perylene + Indeno(1,2,3-cd)-pyrene are reported as not used in the assessment of chemical status whereas Total DDT is reported as being used but neither this parameter nor its components are monitored.

For RBDs in England⁵⁵ and Wales (Solway Tweed, Northumbria, Humber, Anglian, Thames, South East, South West, Severn, Western Wales⁵⁶, Dee and North West), the following 21

⁵⁴ <https://www.eea.europa.eu/publications/state-of-water> (p40-41 of the report). Also available in a more interactive format at : https://tableau.discomap.eea.europa.eu/t/Wateronline/views/WISE_SOW_SWB_Chemical_Status_Maps/SWB_Failing_Good_Chemical_Status_RBD?iframeSizedToWindow=true&:embed=y&:showAppBanner=false&:display_count=no&:showVizHome=no

⁵⁵ The UK clarified that there have been reporting mistakes for England.

⁵⁶ The UK confirmed these substances were monitored and used in the assessment of status in Wales. This must have been a reporting mistake.

Priority Substances are reported as being used in the assessment of chemical status but not monitored: trichloroethylene; 1,2-dichloroethane; endosulfan; di(2-ethylhexyl)phthalate; simazine; tetrachloroethylene; chlorfenvinphos; hexachlorocyclohexane; trifluralin; atrazine; chlorpyrifos; alachlor; total DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p'); total benzo(b)fluor-anthene + Benzo(k)fluor-anthene; 4-nonylphenol; 1,2-dichloroethane; octylphenol (4-(1,1',3,3'-tetramethylbutyl)-phenol); trichlorobenzenes (all isomers); chloroalkanes C10-13; total benzo(g,h,i)-perylene + indeno(1,2,3-cd)-pyrene. brominatedB diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154) is reported as being monitored but not used the assessment of chemical status.

For RBDs in Northern Ireland, the following Priority Substances are monitored but are not used in the assessment of chemical status: hexachlorobutadiene; hexachlorobenzene; mercury and its compounds.

As stated previously, surface water bodies not monitored for chemical status are reported as good status except for RBDs in Northern Ireland where they are reported as unknown status.

Application of alternative environmental quality standards for water, biota and sediment

According to the EQS Directive, Member States may opt to apply environmental quality standards for another matrix than the one specified in the Directive for a given substance. If they do so, they have to ensure the environmental quality standard they set in the other matrix (or matrices) offers at least the same level of protection as the standard established in the Directive.

No alternative and/or additional standards were reported for the RBDs in the UK.

Use of mixing zones

Article 4 of the EQS Directive provides Member States with the option of designating mixing zones adjacent to points of discharge in surface waters. Concentrations of priority substances may exceed the relevant environmental quality standard within such mixing zones if they do not affect the compliance of the rest of the surface water body with those standards. Member States that designate mixing zones are required to include within their RBMPs a description of the approaches and methodologies applied to define such zones, and a description of the measures taken to reduce the extent of the mixing zones in the future.

According to WISE, mixing zones have not been designated in the United Kingdom, but a possible reporting mistake was then pointed out by the UK.

Background Concentrations and Bioavailability

The EQS Directive stipulates that Member States have the possibility, when assessing the monitoring results against the environmental quality standard, to take into account:

- (a) natural background concentrations for metals and their compounds, if they prevent compliance with the environmental quality standard, and;
- (b) hardness, pH or other water quality parameters that affect the bioavailability of metals.

Natural background concentrations for metals and their compounds are taken into consideration where such concentrations prevent compliance with the relevant environmental quality standard in all 15 RBDs of UK. The application of water quality parameters that affect the bioavailability of metals when assessing monitoring results against relevant environmental quality standards have been taken into account in all 15 RBDs in UK.

4.2 Main changes in implementation and compliance in the first cycle

There has been a significant reduction in the number of sites and water bodies monitored in operational monitoring programmes for Priority Substances in RBDs in England and Wales. This is explained by the risk based approach taken by the Environment Agency in England and Wales (noting that Wales is now covered by Natural Resources Wales, which became operational in 2013) to identify which water bodies require monitoring. Water bodies at lower risk were identified as being at Good Status, with low confidence without further monitoring.

In England and Wales, a large increase in the number of surface water bodies classified as good chemical status has been reported with a large decrease in the number reported as unknown chemical status. RBDs in England, Wales and Scotland are reporting that unmonitored surface water bodies are classified as good chemical status where the risk assessment has identified a low risk of failing good status for all Priority Substances. This approach is not adopted in Northern Ireland where unmonitored water bodies are classified as unknown status.

There has therefore been a reduction in the number of monitoring sites and water bodies monitored for operational purposes for chemical status in the second cycle in England and Wales.

In the UK, new standards for chemicals were developed as part of a UK-wide collaboration and have been widely consulted upon. However, it is unclear from the RBMPs and background

documents the extent to which the new standards developed applied to Priority Substances. The details are described in selected RBMPs were as follows:

- In the Humber RBD the changes over the first cycle are described which relates to a growth in the quantity and quality of the evidence available. In England, an additional £1.5m pounds invested in chemical monitoring technology. The environmental assessment criteria have been improved with new standards for additional chemical substances. A full description of changes to environmental standards is described in the UKTAG website (<http://www.wfduk.org/>).
- In the Western Wales RBMP Overview Annex document describes the methodological changes that have been introduced for the second cycle. These include updated standards for some chemical substances.
- In the Neagh Bann (Northern Ireland) RBMP the main changes are described. The classification tools and standards used for WFD classification in 2015 have changed during the first river basin cycle. UKTAG undertook a technical review of the tools and standards. New or revised water quality standards for a wide range of pollutants in surface waters have been adopted. The standards incorporate the latest understanding of the risk posed for example, taking into account the natural background of metals and their bioavailability. In the Northern Ireland Environment Agency (NIEA) Surface Water Monitoring and Classification Methodology it was described that for the second cycle: further substances have been introduced, more substances are to be assessed by biota standards, and some water EQSs have been tightened (i.e. become more restrictive).

Overall in the United Kingdom, there are 23 Priority Substances that were reported to have improved from poor to good chemical status since the first RBMP. The number of surface water bodies affected was very small representing less than 1 % of the total surface water bodies in the United Kingdom.

4.3 Progress with European Commission recommendations

- Recommendation: *Address the large uncertainties reported in the first RBMPs in relation to the assessment of the status, the pressures and the effect of potential measures.*

Assessment: With specific reference to the chemical status of surface waters, uncertainties in the assessment of status arise from the extent of monitoring for Priority Substances in surface water bodies: whether the full range of Priority Substances are

monitored at the appropriate frequency and the approach adopted to the classification of status based on this information. With respect to the extent of monitoring for Priority Substances, in most of the RBDs in the United Kingdom, between more than 33 and 40 % of coastal, transitional and river water bodies and more than 90 % of lake water bodies were not monitored for Priority Substances. The remainder were monitored for the majority of Priority Substances in water at frequencies that met the requirements of the Directive for surveillance and operational monitoring at some, but not all, sites. Mercury, hexachlorobenzene and hexachlorobutadiene were monitored in biota in 12 of the 14 RBDs in a limited number of water bodies and at the frequency required by the Directive. However, the results of the monitoring in biota was not used in the status assessment, with the exception of mercury in Wales. With respect to monitoring of surface water bodies failing to achieve good chemical status as part of the operational monitoring programme, the majority of surface water bodies are monitored for Priority Substances.

Overall most of surface water bodies in the UK were classified for chemical status with low confidence. The main reason for this in England, Wales and Scotland was the use of a risk assessment approach to identify surface water bodies not at risk from Priority Substances and to classify these as in good chemical status with low confidence. The use of this approach accounts for the significant reduction in the number of water bodies in unknown status from the first RBMP. The risk assessment approach has not been assessed in detail as part of the assessment of the second RBMPs. In Northern Ireland, low confidence was assigned to chemical status classifications due to data limitations and unmonitored water bodies were assigned unknown status. In conclusion, there has been progress on this recommendation and it has therefore been partially fulfilled.

- Recommendation: *More information needs to be included in the RBMPs on the methodology used to identify significant pressures and how this analysis feeds into the development of monitoring programmes and how the measures defined address the significant pressures.*

Assessment: With respect to monitoring programmes in general, the supporting documents for the RBMPs in England indicate that the monitoring has moved to a risk-based approach based on significant pressures to target monitoring efforts effectively. The risk-based approach determined the majority of the operational monitoring but surveillance monitoring is driven more by the need to include a subset of water bodies representing a range of physical conditions, pressures and status classes to assess long-term environmental trends. This is most evident in the application in England, Wales

and Scotland of the risk assessment results in relation to Priority Substances to justify not monitoring water bodies identified as not at risk and to classify them as in good status but with a low confidence. There is progress with respect to the linking of significant pressures to the development of monitoring programmes. This recommendation is partially fulfilled.

- Recommendation: *Further clarification regarding the identification of and monitoring of chemical pollutants is needed, where this is missing. In particular, chemical pollutants should be monitored in all categories of water body in all regions of the United Kingdom.*

Assessment: With respect to Priority Substances, monitoring is undertaken in all water categories including lakes though no operational monitoring for Priority Substances is reported for lakes in Northern Ireland. Monitoring in sediment is undertaken in 10 of the 15 RBDs. Sediment monitoring is not undertaken in Northern Ireland for WFD purposes in any water category and is not undertaken in lakes in the United Kingdom. Monitoring in biota is reported to be undertaken in 13 of the 15 RBDs. No biota monitoring is undertaken in Scotland⁵⁷. Biota monitoring is undertaken predominantly in coastal and transitional waters with some undertaken in rivers and lakes). Gaps remain in the extent of sediment and biota monitoring in the United Kingdom. Information on Priority Substances monitored has been provided by the United Kingdom as part of the second cycle reporting in all RBDs and relevant water categories. In conclusion, there has been progress on this recommendation and it has therefore been partially fulfilled.

- Recommendation: *The biota standards for mercury, hexachlorobenzene and hexachlorobutadiene in the EQS Directive, or standards providing an equivalent level of protection, should be applied where not already used. Trend monitoring in sediment or biota as specified for several Priority Substances in Directive 2008/105/EC Article 3(3) will also need to be reflected in the next RBMPs.*

Assessment: Mercury, hexachlorobenzene and hexachlorobutadiene are monitored in biota in 12 of the 14 RBDs for status assessment; not monitored in the Scotland RBD and one of the Northern Ireland RBDs (North Eastern RBD)⁵⁸. Monitoring is undertaken at less than 10 sites in each relevant RBD and generally in more sites in

⁵⁷ The United Kingdom subsequently clarified that monitoring of biota in Scotland has been undertaken but not reported to WISE.

⁵⁸ The United Kingdom clarified that in Northern Ireland monitoring of hexachlorobenzene and hexachlorobutadiene ceased in 2012 on the basis of the risk assessment and the lack of detection of these pollutants in biota over a number of years.

coastal and transitional waters than in lakes and rivers. The monitoring frequency for mercury, hexachlorobenzene and hexachlorobutadiene in biota for status assessment of once every year was met in those RBDs where monitoring was undertaken with the exception of those in Northern Ireland. However, UK subsequently clarified that the results of this monitoring are not included in the assessment of chemical status in any RBD, with the exception of mercury in Wales.

Arrangements are in place for the long-term trend analysis of concentrations of those Priority Substances listed in Part A of Annex I of the EQS Directive that tend to accumulate in sediment and/or biota in 12 of the RBDs in UK with no information available for RBDs in Northern Ireland⁵⁹. Overall in the UK, 10 of the 14 Priority Substances are monitored in sediment and/or biota for trend assessment. All of these are monitored in RBDs in England with only three in RBDs in Scotland (sediment only) and none in RBDs in Wales⁶⁰ and Northern Ireland. With regards to water category, coastal and transitional waters are monitored for all ten substances and nine in rivers in those RBDs where monitoring for trend assessment occurs. There is no monitoring of sediment and/or biota in lakes for trend assessment in the UK. Monitoring for trend assessment was undertaken at less than 10 sites in each relevant RBD across all water categories. The sampling frequency is at least once every three years for all reported RBDs which meets the every three year guideline in the Directive. In conclusion, there has been progress on this recommendation and therefore it has been partially fulfilled.

- Recommendation: *Improve the monitoring of impacts in the second RBMPs. Further investigations in that regard need to be translated into increased confidence in the impact of pressures and status assessment.*

Assessment: A majority of water bodies failing to achieve good chemical status were monitored. With regard to confidence in status assessment, more than 80 % of surface water bodies in the UK were classified for chemical status with low confidence and the remainder with either medium confidence or high confidence. A high proportion of water bodies classified in good status but with low confidence were not monitored but classified on the basis of a risk based approach. However, it is not clear whether the risk was assessed for all substances taking into account the relevant matrix. Therefore, the recommendation has been partially fulfilled.

⁵⁹ See related section for more details on the clarifications provided by the UK.

⁶⁰ The UK pointed towards a possible reporting mistake: see clarifications in the related section.

Topic 5 Monitoring, assessment and classification of quantitative status of groundwater bodies

5.1 Assessment of implementation and compliance with WFD requirements in the second cycle

5.1.1 Monitoring of quantitative status in groundwater

The total number of groundwater bodies in the United Kingdom is 788 (Table 2.3). 576 groundwater bodies are not subject to monitoring for quantitative status (Table 5.1). This means that 73 % of groundwater bodies are not monitored. Between 5 % and 72 % of the groundwater bodies in the river basin districts are subject to monitoring for quantitative status as shown in Table 5.3.⁶¹

The number of groundwater bodies increased by 9 % from 723 in the first cycle to 788 in the second cycle and the total groundwater body area slightly increased. 353 groundwater bodies remained unchanged since the first cycle.

The number of monitored groundwater bodies increased from 183 in the first cycle to 212 in the second cycle. The number of monitoring sites for quantitative status is listed in Table 5.3 and shows a slight increase from 1289 in the first cycle to 1462 in the second cycle.

Almost all of the groundwater bodies (786 of 788) are identified as Drinking Water Protected Areas, allocated in all 15 river basin districts.

There is no evidence in the data reported to WISE or in the RBMPs that grouping has been applied for the purpose of monitoring. In the Scotland RBD, grouping was applied for classification of status with respect to nitrate levels. However, no indication is given that grouping of groundwater bodies for quantitative status assessment was undertaken. Also for the South West and Neagh Bann river basin districts, no indication was found that grouping was applied to the assessment of groundwater quantitative status.

The assessments of the RBMPs did not find further explanations for the lack of quantitative monitoring⁶²:

⁶¹ United Kingdom subsequently clarified, that a risk-based monitoring is performed. Monitoring is mostly done in those areas at risk of pressures/downgrades. Where groundwater bodies are impacted by similar pressures, they are grouped and only some of the groundwater bodies will be monitored, but the classification applied across the whole group of groundwater bodies.

⁶² United Kingdom subsequently clarified that the UK Technical Advisory Group report concluded that groundwater availability is preferred to a groundwater level trend analysis. To meet the requirements of Annex 2.1.2, in England the quantitative status of all groundwater bodies is based on the groundwater availability, calculated through either conceptualisation or groundwater modelling to confirm recharge, environmental

- In Scotland (e.g. the Scotland RBD) only 18 out of 344 groundwater bodies (5.2 % or 5.6 % by area) are monitored for quantitative status. 43 % of groundwater bodies are assessed as probably or definitely not at risk under the 2005 characterisation process. No further detail can be found for the lack of quantitative monitoring. RBMP appendices state that the monitoring programme for quantitative status is in place but does not give details except to indicate that the network will be amended during the period 2015 to 2021 in order to assess changes resulting from the PoM established in the current plan.
- In England (e.g. the South West RBMP) 16 out of 42 groundwater bodies (38.1 % or 39.3 % by area) are monitored for quantitative status. No further detail could be found around the reasons why some groundwater bodies were not monitored. The UK Technical Advisory Group⁶³ Task 12(a) Guidance on Monitoring Groundwater provides national guidelines that state: “For quantitative monitoring, representative monitoring points should be reflective of the conceptual model of risk and be representative of groundwater conditions within the monitored groundwater body, lying outside the immediate hydraulic influence of abstraction pressures such that day-to-day variations in pumping will not adversely influence the data”.
- In Northern Ireland (e.g. the Neagh Bann RBMP) two out of 16 groundwater bodies (12.5 % or 27.7 % by area) are monitored for quantitative status. Northern Ireland Water does not use groundwater for public water supply, so monitoring of groundwater sources relies largely on third party boreholes and the cooperation of landowners to continue monitoring, meaning that the network can change frequently. The network consists mainly of industrial boreholes where groundwater is utilised for manufacturing or food/ drinks production. A small number of springs or boreholes installed by Northern Ireland Environment Agency, which are purged prior to sampling, are also monitored. The selection of monitoring stations to date has been based on a pressure-pathway assessment of the groundwater bodies and the availability of potential monitoring points.⁶⁴

needs and abstraction pressure. Changes in groundwater availability are equivalent to changes in levels of groundwater. The report highlights the South West RBD as an area of concern regarding monitoring. This is an area of complex and fractured geology and any groundwater level monitoring would not be representative of the aquifer conditions. This is also an area of low rates of abstraction and low abstraction pressure, therefore, a groundwater availability approach is more representative of several groundwater bodies in the South West RBD.

⁶³ UK Technical Advisory Group on the Water Framework Directive. <https://www.wfduk.org/>

⁶⁴ United Kingdom (Northern Ireland) subsequently clarified that the classification methodology for quantitative status relies on water balance (groundwater recharge, abstractions) and less on groundwater levels. The abstracted volumes are monitored through compliance returns.

Table 5.1 *Number of water bodies in the United Kingdom directly monitored and the purpose of monitoring*

European Union RBD Code	Total ground-water bodies directly monitored	Monitoring Purpose							
		CHE - Chemical status	DWD - Drinking water - WFD Annex IV.1.i	NID - Nutrient sensitive area under the Nitrates Directive - WFD Annex IV.1.iv	OPE – Operational monitoring	QUA – Quantitative status	SOE - EIONET State of Environment monitoring	SUR – Surveillance monitoring	TRE – Chemical trend assessment
UK01	85	82	0	0	66	18	0	76	0
UK02	28	23	0	0	21	8	0	20	0
UK03	4	0	0	0	1	4	0	0	0
UK04	46	0	0	0	36	29	0	0	0
UK05	28	0	0	0	25	18	0	0	0
UK06	35	0	0	0	13	31	0	0	0
UK07	23	0	0	0	1	23	0	0	0
UK08	22	0	0	0	12	16	0	0	0
UK09	32	0	0	0	22	23	0	0	0
UK10	23	0	0	0	20	18	0	0	0
UK11	4	0	0	0	4	3	0	0	0
UK12	18	0	0	0	18	9	0	0	0
UKGBNIIENB	9	9	9	0	0	2	9	9	7
UKGBNIIENW	13	11	11	0	0	5	11	13	7
UKGBNINE	10	9	9	0	4	5	9	9	7

Source: WISE electronic reporting

Table 5.2 *Number of groundwater monitoring sites in the United Kingdom and their purpose*

European Union RBD Code	Total ground-water monitoring sites	Monitoring Purpose						
		CHE – Chemical status	DWD – Drinking water - WFD Annex IV.1.i	OPE – Operational monitoring	QUA – Quantitative status	SOE - EIONET State of Environment monitoring	SUR – Surveillance monitoring	TRE - Chemical trend assessment
UK01	218	198	0	161	45	0	146	0
UK02	177	53	0	143	35	0	29	0
UK03	51	0	0	1	50	0	0	0
UK04	370	0	0	186	184	0	0	0
UK05	414	0	0	249	165	0	0	0
UK06	338	0	0	68	270	0	0	0
UK07	190	0	0	1	189	0	0	0
UK08	239	0	0	100	139	0	0	0
UK09	355	0	0	199	156	0	0	0
UK10	227	0	0	110	117	0	0	0
UK11	28	0	0	16	12	0	0	0
UK12	448	0	0	366	82	0	0	0
UKGBNIIIE NB	40	38	38	0	2	38	40	15
UKGBNIIIE NW	20	15	15	0	6	15	20	9
UKGBNINE	37	27	27	9	10	27	31	18

Source: WISE electronic reporting

Table 5.3 *Proportion of groundwater bodies in the United Kingdom monitored for quantitative status*

European Union RBD Code	No of groundwater bodies with quantitative monitoring	Total No. groundwater bodies	% of total groundwater bodies monitored for quantitative status
UK01	18	344	5.23 %
UK02	8	64	12.50 %
UK03	4	10	40.00 %
UK04	29	51	56.86 %
UK05	18	31	58.06 %
UK06	31	47	65.96 %
UK07	23	33	69.70 %
UK08	16	42	38.10 %
UK09	23	42	54.76 %
UK10	18	25	72.00 %
UK11	3	5	60.00 %
UK12	9	18	50.00 %
UKGBNIIEN B	2	16	12.50 %
UKGBNIIEN W	5	46	10.87 %
UKGBNINE	5	14	35.71 %

Source: WISE electronic reporting

5.1.2 Assessment and classification of quantitative status for groundwater

Map 5.1 displays the most recently assessed quantitative status of groundwater bodies. It shows that 666 of 788 groundwater bodies (85 %) were of good quantitative status, 121 (15 %) are failing good status and one groundwater body is of unknown status (Figure 5.1). In terms of area, this means that about 16 % are failing good quantitative status. Figure 5.2 shows the confidence in status classification⁶⁵. The number of groundwater bodies of unknown status increased from zero in the first cycle to one in the second RBMP.⁶⁶

The total number of groundwater bodies failing good quantitative status decreased significantly by 20 % from 150 groundwater bodies in the first RBMP to 121 in the second

⁶⁵ United Kingdom subsequently clarified that the fact that for 29 % of the groundwater bodies the confidence in the status results is unknown is a reporting error.

⁶⁶ United Kingdom (Northern Ireland) subsequently clarified that the groundwater body with unknown quantitative status is Kiltyclogher in the North-Western International River Basin District. Only 0.6 km² of its total 24.7 km² area is located within Northern Ireland. Therefore, no input data for the Low Flow Enterprise model or water balance test are available in the Northern Irish part to conduct the quantitative status test.

RBMP (from 18.7 % to 16.3 % of the total groundwater body area). However, in four river basin districts (Anglian, Neagh Bann, North Western and North Eastern) the number of groundwater bodies of poor status increased. The RBDs Scotland, South West and Neagh Bann did not show significant changes and no reasons for changes were mentioned. In total, about 36 % of the groundwater bodies are at risk of failing good quantitative status.

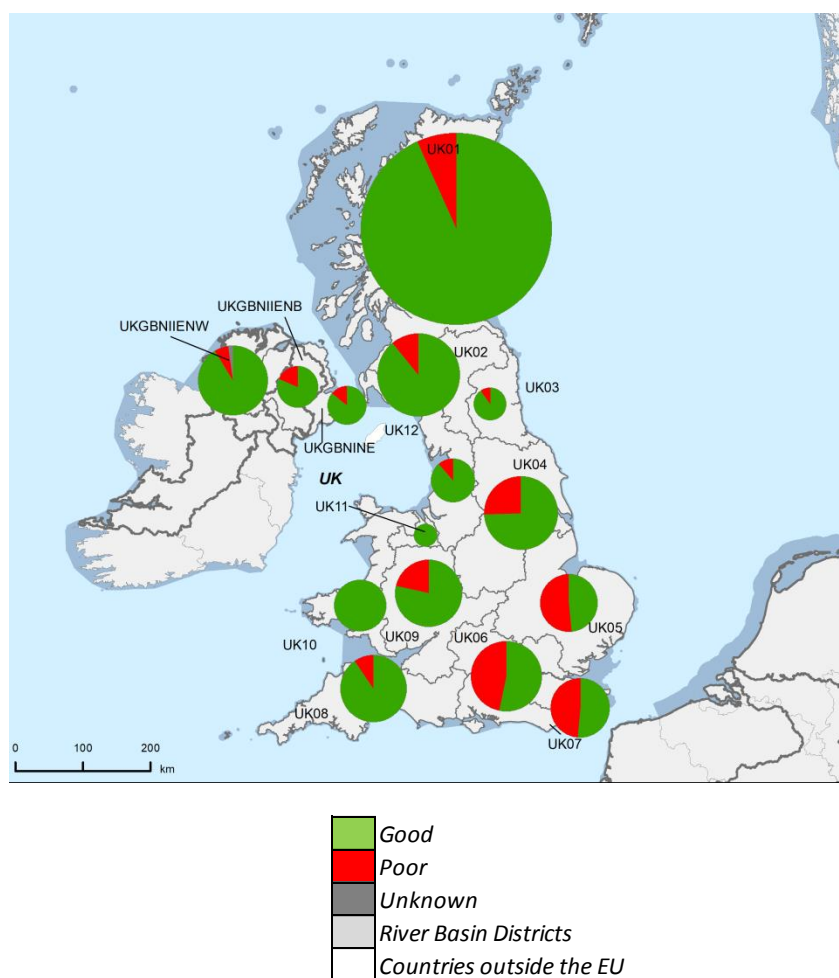
In all 15 river basin districts the water balance was assessed by a comparison of annual average groundwater abstraction against the ‘available groundwater resource’ for every groundwater body (backed by a modelling approach).

The reasons for the failure of good quantitative status of groundwater bodies are shown in Figure 5.3. There are 93 groundwater bodies failing good status due to diminution of the status of groundwater associated aquatic ecosystems, 59 groundwater bodies failing good status due to failing the water balance test, which means that the long-term annual average rate of groundwater abstraction is exceeding the available groundwater resource, eleven groundwater bodies are failing due to saline intrusion and eight groundwater bodies due to damage to groundwater dependent terrestrial ecosystems. The expected date of achievement of good quantitative status in the United Kingdom is shown in Figure 5.4.

In all river basin districts the criterion of ‘available groundwater resource’ has been fully applied in accordance with WFD Article 2(27). In all RBDs all environmental objectives were considered in status assessment.

In total 280 of 788 groundwater bodies are at risk of failing good quantitative status. 211 groundwater bodies are at risk of failing good quantitative status due to damage to groundwater dependent terrestrial ecosystems, 124 due to diminution of the status of groundwater associated aquatic ecosystems, 111 groundwater bodies are at risk of failing good quantitative status due to failing the water balance test and 61 due to saline intrusion.

Map 5.1 *Map of the most recently assessed quantitative status of groundwater bodies.*



Note: Standard colours based on WFD Annex V, Article 2(2)(4).

Source: WISE, Eurostat (country borders)

5.1.3 Consideration of groundwater associated surface waters and/or groundwater dependent ecosystems

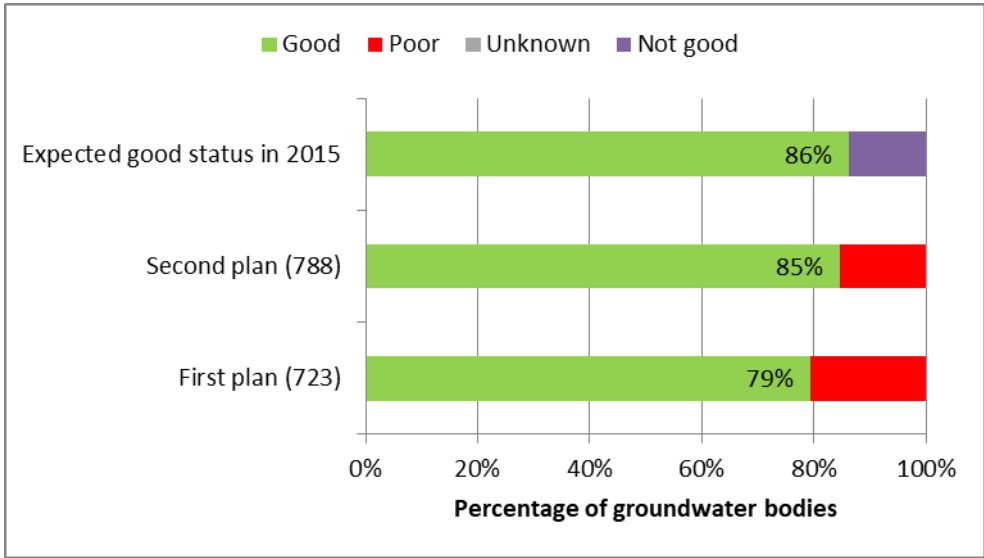
For 687 groundwater bodies, in all river basin districts, groundwater associated surface waters were reported. A considerable number of them are related to a risk. In all river basin districts groundwater associated surface waters were considered for status assessment.

Except for the Scotland and Western Wales⁶⁷ RBDs, groundwater dependent terrestrial ecosystems are reported in all river basin districts. A considerable number of these ecosystems are related to a risk. In all river basin districts with groundwater bodies connected

⁶⁷ United Kingdom subsequently clarified that Western Wales does have GWDTEs, but due to difficulties, this information was not reported to WISE.

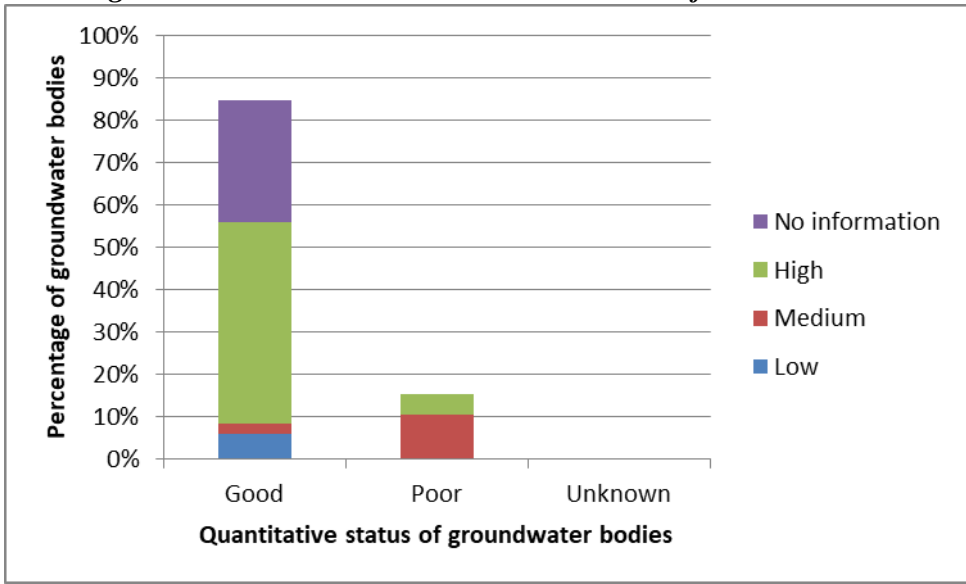
to groundwater dependent terrestrial ecosystems these were considered in status assessment and their needs were assessed.

Figure 5.1 *Quantitative status of groundwater bodies in the United Kingdom for the second RBMP, for the first RBMP and expected in 2015. The number in parenthesis is the number of groundwater bodies for each cycle. Note the period of the assessment of status for the second plan was 2009 to 2015. The year of the assessment of status for the first plan is not known.*



Source: WISE electronic reporting

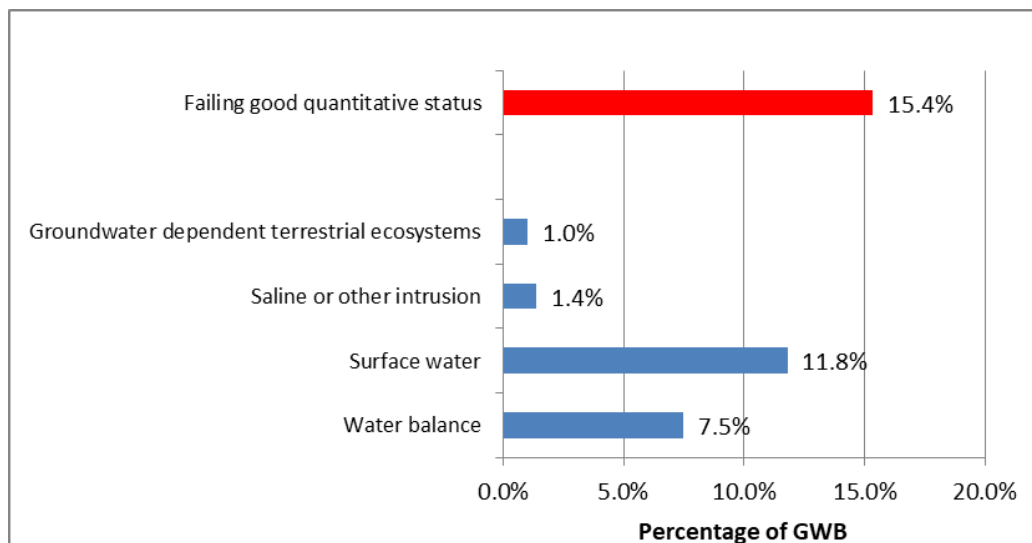
Figure 5.2 *Confidence in the classification of quantitative status of groundwater bodies in the United Kingdom based on the most recent assessment of status⁶⁸*



Source: WISE electronic reporting

⁶⁸ United Kingdom subsequently clarified that the fact that for 29 % of the groundwater bodies, the confidence in the status results is unknown, is a reporting error.

Figure 5.3 *Reasons for the failure of good quantitative status of groundwater in the United Kingdom based on the most recent assessment of status*



Notes: 'Water balance' = long-term annual average rate of abstraction exceeds the available groundwater resource which may result in a decrease of groundwater levels.

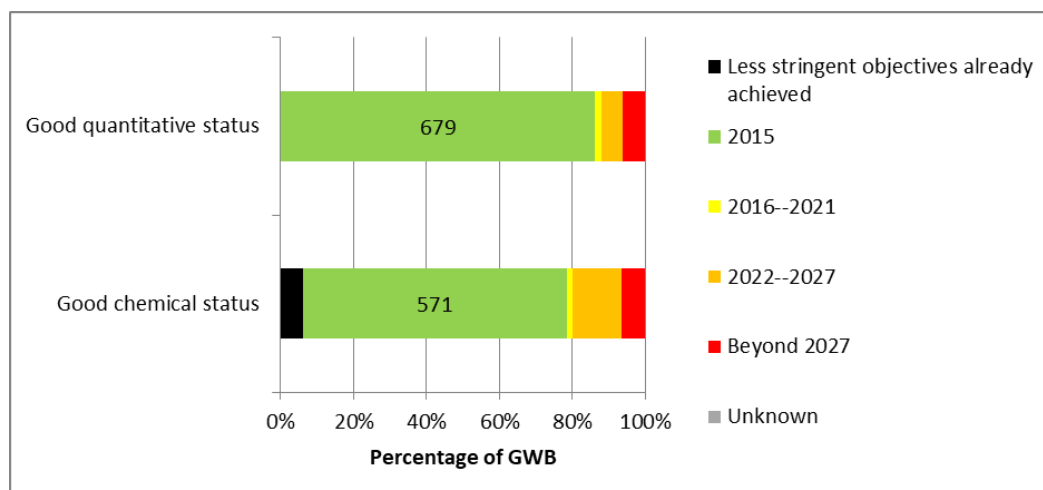
'Surface water' = Failure to achieve Environmental Objectives (Article 4 WFD) for associated surface water bodies resulting from anthropogenic water level alteration or change in flow conditions; significant diminution of the status of surface waters resulting from anthropogenic water level alteration or change in flow conditions.

'Groundwater dependent terrestrial ecosystems' = Significant damage to groundwater dependent terrestrial ecosystems resulting from an anthropogenic water level alteration.

'Saline or other intrusion' = Regional saline or other intrusions resulting from anthropogenically induced sustained changes in flow direction.

Source: WISE electronic reporting

Figure 5.4 *Expected date of achievement of good quantitative and good chemical status of groundwater bodies in the United Kingdom. 788 groundwater bodies delineated for the second RBMP.*



Source: WISE electronic reporting

5.2 Main changes in implementation and compliance since the first cycle

For 357 of 788 groundwater bodies, there were no changes since the first RBMP.

The monitoring situation slightly improved. The overall number of groundwater bodies increased although the total groundwater body area remained nearly the same. The number of monitored groundwater bodies increased from 183 in the first cycle to 212 in the second cycle. The number of monitoring sites for quantitative status shows a slight increase from 1289 in the first cycle to 1462 in the second cycle

The overall status situation improved: the total number of groundwater bodies failing good quantitative status decreased significantly by 20 % from 150 groundwater bodies in the first RBMP to 121 in the second RBMP (from 18.7 % to 16.3 % of the total groundwater body area). However, in four river basin districts (Anglian, Neagh Bann, North Western and North Eastern) the number groundwater bodies of poor status increased.

Assessments identified that there is a summary of changes or updates for this Topic in some, but not all RBMPs. For example, summaries for Scotland, South West and Neagh Bann RBDs were found.

- Scotland: the RBMP states that the location and boundaries of groundwater bodies were substantially reviewed and revised to take account of the latest understanding of the characteristics of groundwater. The revisions resulted in an increase in the number of groundwater bodies in the RBD from 284 to 344. Classifications for all groundwater bodies were reviewed using the new thresholds and classification methodology. Numbers of groundwater bodies monitored for quantitative status have not changed between the first and the second RBMP.

- South West: the RBMP includes a good summary of changes since the first RBMP in monitoring programmes and quality and quantity of evidence, but no specifics for groundwater quantity are listed. There has been no deterioration in quantitative status for groundwater bodies. The number of groundwater bodies monitored for quantitative status has increased from 12 to 16 between the first and the second cycle.
- - Neagh Bann: a general summary of the changes to classification methods is provided in the RBMP, but no changes are noted for groundwater quantitative status. However, it is noted that new information has become available, which has enabled more detailed assessments for saline intrusion and groundwater dependent ecosystems. Therefore, there are changes affecting status resulting from monitoring and assessment

methods, as well as real impacts on the water environment. The number of groundwater bodies monitored for quantitative status has decreased from three to two between the first and the second cycle⁶⁹.

5.3 Progress with European Commission recommendations

- Recommendation: *Improve the monitoring of impacts in the second RBMPs. Further investigations in that regard need to be translated into increased confidence in the impact of pressures and status assessment.*

Assessment: The recommendation on improvement of monitoring is not fulfilled. Still 73 % of the groundwater bodies are not covered by monitoring. United Kingdom subsequently clarified that the unknown confidence in the status assessment is caused by a reporting error.

⁶⁹ United Kingdom (Northern Ireland) subsequently clarified that quantitative status is assessed by a number of tests including the surface water chemical tests, which were conducted for the first time for the second cycle classification. Since this test element was not conducted for the first cycle classification, no comparison to establish true deterioration is possible.

Topic 6 Monitoring, assessment and classification of chemical status of groundwater bodies

6.1 Assessment of implementation and compliance with WFD requirements in the second cycle

6.1.1 Monitoring of chemical status in groundwater

The total number of groundwater bodies in the United Kingdom is 788 (Table 2.4). In total 661 groundwater bodies are not subject to surveillance monitoring (Table 5.1). About 38 % of the groundwater bodies are at risk and not all of them are subject to operational monitoring. The assessment found no indication that grouping of groundwater bodies for monitoring and assessment of chemical status was applied in the assessed RBMPs⁷⁰.

The number of groundwater bodies increased by 9 % from 725 in the first cycle to 788 in the second cycle and the total groundwater body area slightly increased. 353 groundwater bodies remained unchanged since the first cycle. There had been substantial changes in the number of groundwater bodies in different RBDs.

The number of groundwater bodies with surveillance monitoring dropped significantly from 409 in the first cycle to 127 (16 %, in five of 15 RBDs) in the second cycle. The number of monitoring sites is listed in Table 5.2 and Table 5.3 shows that the number of surveillance monitoring sites has dropped significantly from 4080 in the first cycle to 266 in the second cycle. The number of operational monitoring sites has been decreased significantly since the first cycle, from 4006 to 1609. Except for the Scotland and Solway Tweed RBDs, the number of groundwater bodies at risk is higher (303 groundwater bodies) than those covered by operational monitoring (243 groundwater bodies).

Monitoring is very limited. Not all substances at risk of causing deterioration in chemical status are subject to surveillance and operational monitoring. The assessment found no further information which could explain why some substances which were recorded as posing a risk were not monitored. For example, in the Scotland RBD, four substances are causing risk but only one (nitrate) was included in operational monitoring; in the South West RBD 32 substances are causing risk and only 24 are included in operational monitoring.

The WFD core parameters nitrate, ammonium, electrical conductivity, oxygen and pH were not reported to be monitored at all in seven RBDs (Northumbria, Humber, Anglian, Thames,

⁷⁰ United Kingdom subsequently clarified that all groundwater quality monitoring sites in Wales are used for both operational and surveillance monitoring but were only reported in WISE once (under operational).

South East, South West and North West) and there is no monitoring of ammonium in the remaining RBDs⁷¹.

6.1.2 Assessment and classification of chemical status in groundwater

Map 6.1 and Figure 6.1 display the chemical status of groundwater bodies for the most recently assessed status. It shows that 546 of 788 groundwater bodies (69 %) were of good chemical status, and the remaining 242 groundwater bodies (31 %) are failing good chemical status. In terms of area, this means that about 49 % are failing good chemical status. Figure 6.2 shows the confidence in status classifications. All groundwater bodies had and still have a clear status, in the first and in the second RBMPs.

The total number of groundwater bodies failing good status increased since the first cycle from 190 (26 %) to 242 (31 %) groundwater bodies (Figure 6.1). In 13 RBDs, the number of groundwater bodies in poor status increased, in the Thames RBD it decreased and in the Dee RBD, it remained the same. In terms of groundwater body area, the percentage of total groundwater body area at poor status has increased from 41 % in the first RBMP to 49 % in the second cycle; in the Scotland, Solway Tweed, Northumbria, Humber and Thames RBDs the area in poor status decreased. The expected date of achievement of good chemical status in United Kingdom is shown in Figure 6.2.

The reasons for the failure of good chemical status of groundwater bodies are shown in Figure 6.3. For 140 groundwater bodies, the general assessment of the chemical status for the groundwater body as a whole failed. This assessment considers the significant environmental risk from pollutants across a groundwater body and a significant impairment of the ability to support human uses. 85 groundwater bodies are failing the drinking water test which means that the requirements of drinking water protected areas have not been met. 75 groundwater bodies are failing the groundwater associated surface water test which means that there is diminution of the status of groundwater associated surface water. Seven groundwater bodies are failing the groundwater dependent terrestrial ecosystem test which means that there is damage to groundwater dependent terrestrial ecosystems and 12 groundwater bodies are failing good chemical status due to saline or other intrusion. Figure 6.4 shows the top 10 pollutants causing failure of status and Figure 6.5 shows the top 10 causing a sustained upward trend.

The calculation of the extent of exceedance of a groundwater quality standard or a groundwater threshold value is in 11 RBDs based on the groundwater body area. For four

⁷¹ United Kingdom clarified, that total ammonia (which includes ammonium and ammonia) is monitored at all Northern Irish groundwater chemical monitoring stations and ammonium is monitored at all Welsh sites.

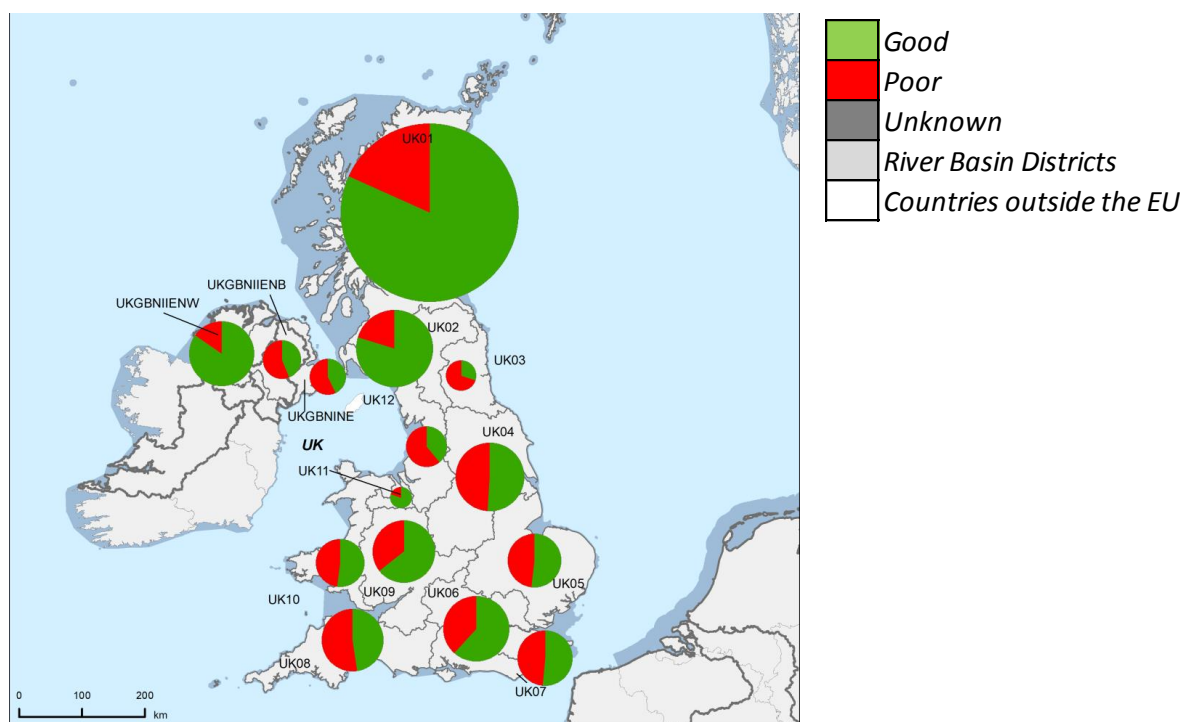
RBDs, it is not clear how the extent of exceedance of a groundwater quality standard or a groundwater threshold value was calculated as 'other' method was reported⁷².

In all RBDs, groundwater threshold values have been established for all pollutants or indicators of pollution causing a risk of failure of good chemical status including some Groundwater Directive⁷³ Annex II substances. There are differences in the list of substances with threshold values between RBMPs and no indication that all Groundwater Directive Annex II substances have been considered in the establishment of threshold values was found⁷⁴.

In 14 RBDs, natural background levels have been considered in the groundwater threshold value establishment, while in the Scotland RBD they have not been considered. There was no explanation for this approach.

A trend methodology is available and assessments have been performed in all RBDs. Trend reversal assessment has been performed in some RBDs.

Map 6.1 *Map of chemical status of groundwater bodies in the United Kingdom based on the most recently assessed status of the groundwater water bodies. Note: Standard colours based on WFD Annex V, Article 2.4.5.*



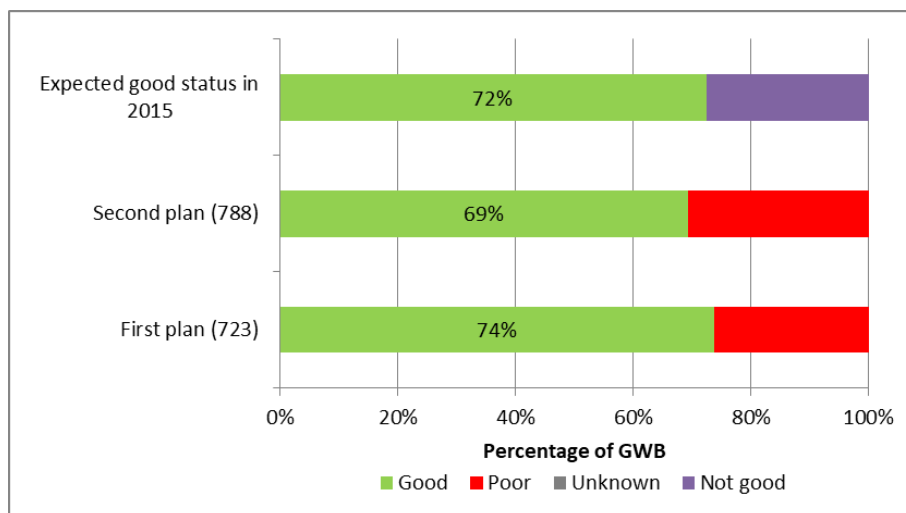
Source: WISE, Eurostat (country borders)

⁷² The United Kingdom subsequently clarified that the "other" method was reported previously to the Commission <http://ec.europa.eu/environment/water/water-framework/groundwater/reports.htm>

⁷³ Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0118-20140711>

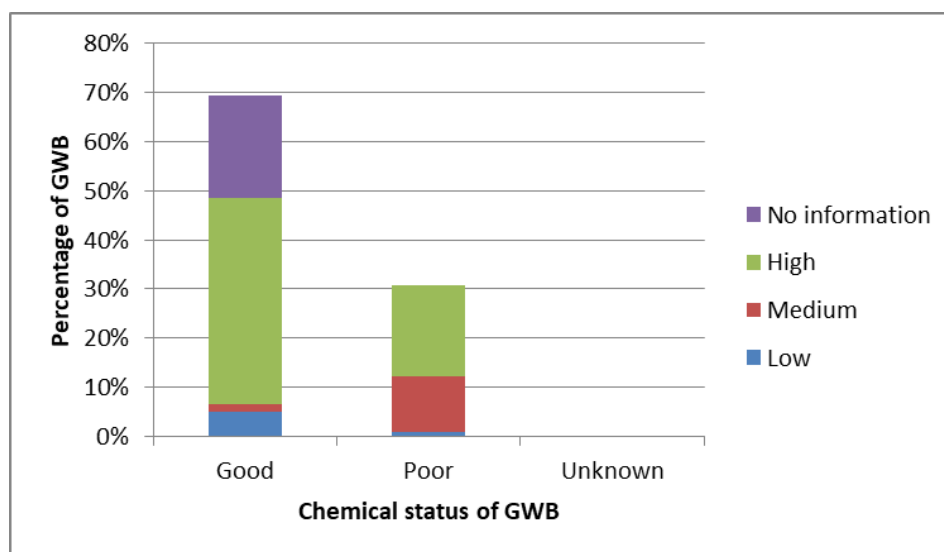
⁷⁴ United Kingdom clarified, that for all RBDs in Northern Ireland (North Eastern, Neagh Bann, North Western) all Groundwater Directive Annex II substances have been considered in threshold values establishment.

Figure 6.1 *Chemical status of groundwater bodies in the United Kingdom for the second RBMP, for the first RBMP and expected in 2015. The number in the parenthesis is the number of groundwater bodies for each cycle. Note the period of the assessment of status for the second RBMP was 2007 to 2012. The year of the assessment of status for first RBMP is not known.*



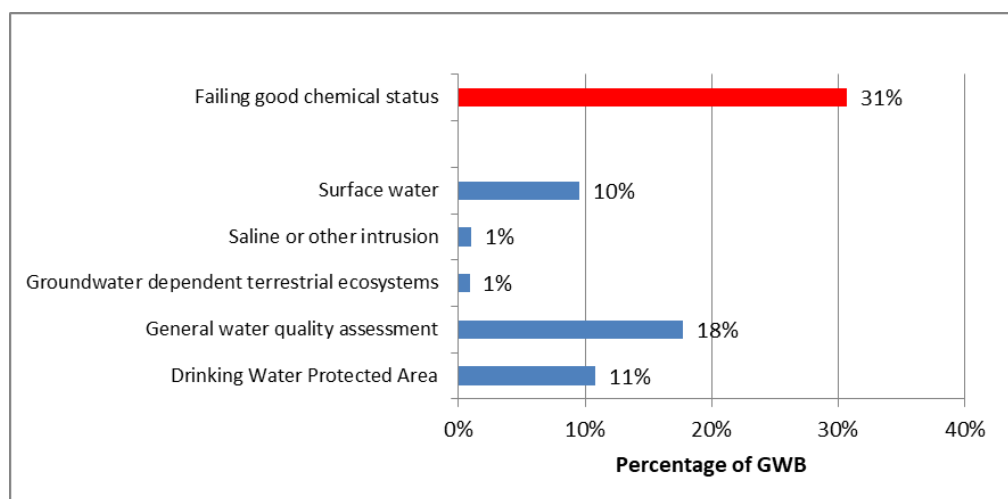
Source: WISE electronic reporting

Figure 6.2 *Confidence in the classification of chemical status of groundwater bodies in the United Kingdom based on the most recent assessment of status.*



Source: WISE electronic reporting

Figure 6.3 *Reasons for failing good chemical status in the United Kingdom for the most recent assessment of status*



Source: WISE electronic reporting

Notes: 'Surface water' = Failure to achieve Environmental Objectives (Article 4 WFD) in associated surface water bodies or significant diminution of the ecological or chemical status of such surface water bodies.

'Groundwater dependent terrestrial ecosystems' = Significant damage to terrestrial ecosystems which depend directly on the groundwater body.

'Saline or other intrusion' = Regional saline or other intrusions resulting from anthropogenically induced sustained changes in flow direction.

'Drinking Water Protected Area' = Deterioration in quality of waters for human consumption.

'General water quality assessment' = Significant impairment of human uses; significant environmental risk from pollutants across the groundwater body.

6.1.3 Consideration of groundwater associated surface waters and/ or groundwater dependent ecosystems

For a total of 687 groundwater bodies, in all RBDs, groundwater associated surface waters were reported. A considerable number of them in all RBDs are related to risk and 75 groundwater bodies are failing good chemical status. In all RBDs, except the Scotland RBD (with 250 groundwater bodies with associated surface waters⁷⁵), groundwater associated surface waters were reported as having been considered in the status assessment. Figure 6.6 shows the percentage of groundwater bodies at risk of failing good chemical status and good quantitative status.

Except for the Scotland and Western Wales RBDs⁷⁶, a total of 249 groundwater bodies with groundwater dependent terrestrial ecosystems were reported. A considerable number of these ecosystems in all these RBDs are related to a risk and seven groundwater bodies are failing good chemical status. In all RBDs with groundwater bodies connected to groundwater dependent terrestrial ecosystems they were considered in status assessment.

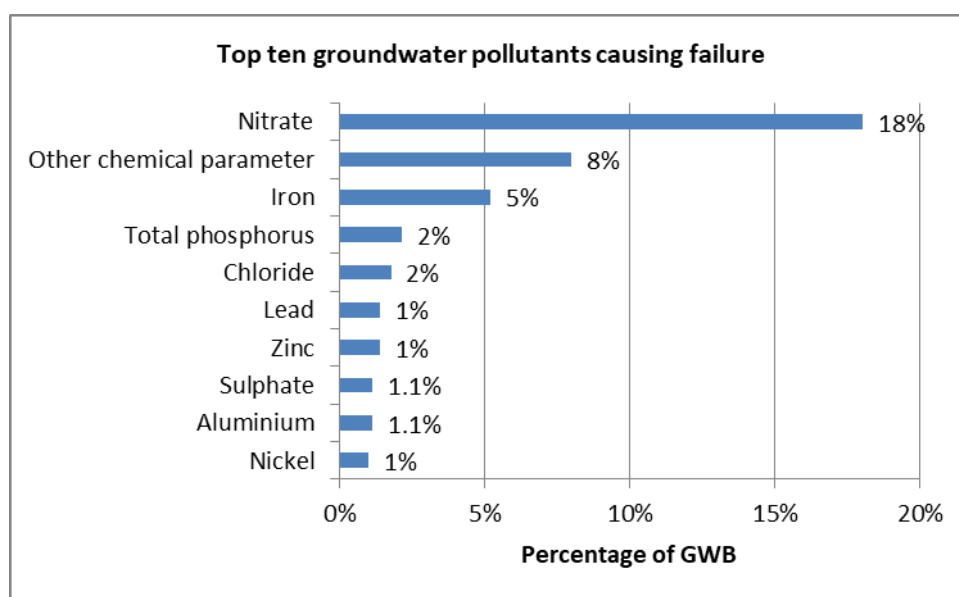
⁷⁵ United Kingdom clarified, that they have been considered in the second cycle for water quality and irrigation (Saline intrusion).

⁷⁶ United Kingdom subsequently clarified that Western Wales does have groundwater dependent terrestrial ecosystems but due to difficulties this was not reported in the WISE electronic submission.

Groundwater associated aquatic ecosystems and groundwater dependent terrestrial ecosystems have been considered in the establishment of groundwater threshold values in all RBDs.

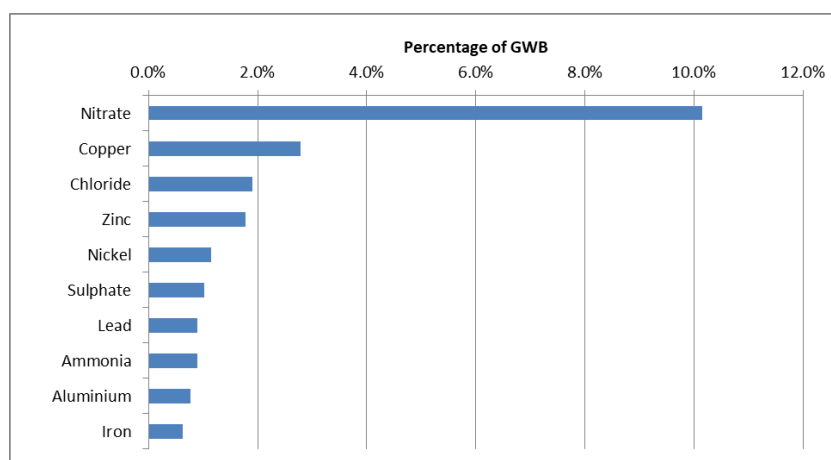
The consideration of ecosystems follows UK Technical Advisory Group⁷⁷ Paper 11b(i) upon the Groundwater Chemical Classification for the purposes of the WFD and the Groundwater Directive. It applies to all assessed groundwater bodies and includes methodologies for the assessment of diminution of surface water chemistry and ecology and assessment of groundwater dependent terrestrial ecosystems.

Figure 6.4 *Top 10 groundwater pollutants causing failure of good chemical status in the United Kingdom*



Source: WISE electronic reporting

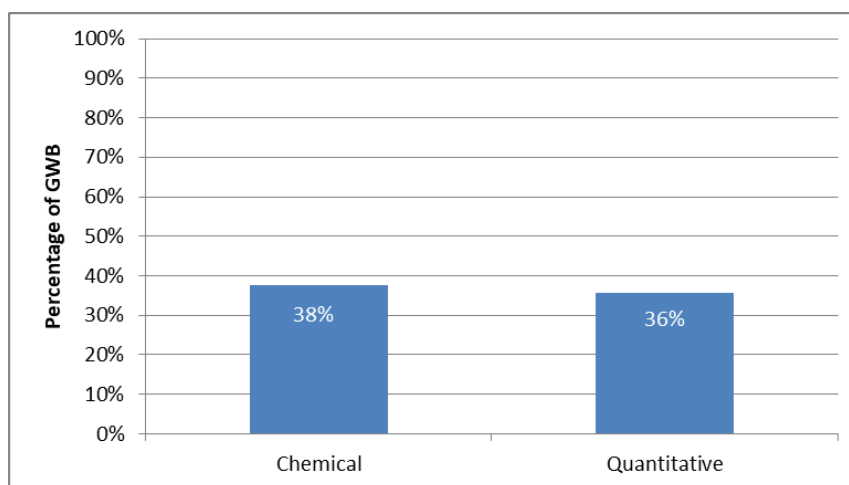
Figure 6.5 *Top 10 pollutants with upward trends in groundwater bodies in the United Kingdom*



Source: WISE electronic reporting

⁷⁷ UK Technical Advisory Group on the Water Framework Directive. <https://www.wfduk.org/>

Figure 6.6 *Percentage of groundwater bodies in the United Kingdom at risk of failing good chemical status and good quantitative status for the second plan*



Source: WISE electronic reporting

6.2 Main changes in implementation and compliance since the first cycle

There is a summary of changes or updates for this Topic in all the RBMPs assessed, although the extent of the information is limited.

The number of groundwater bodies increased by 9 % from 725 in the first cycle to 788 in the second cycle and the total groundwater body area slightly increased. 353 groundwater bodies remained unchanged since the first cycle. There had been substantial changes in the number of groundwater bodies in different RBDs.

The monitoring situation deteriorated. Only 125 out of 788 groundwater bodies (16 %) in five of 15 RBDs are covered by monitoring. The number of surveillance monitoring sites has dropped significantly from 4080 in the first cycle to 255 in the second cycle. Also the number of operational monitoring sites has been decreased significantly since the first cycle, from 4006 to 1603 sites. However, the UK subsequently clarified that all groundwater quality monitoring sites in Wales are used for both operational and surveillance monitoring but were only reported in WISE once (under operational).

The status situation deteriorated: the total number of groundwater bodies failing good status increased since the first cycle from 190 (26 %) to 242 (31 %) groundwater bodies. In terms of groundwater body area, there was an increase from 41 % in the first cycle to 49 % in the second cycle.

The reasons for changes in chemical status in some assessed RBMPs are: re-delineation of groundwater bodies, splitting and merging of groundwater bodies, additional pressures, changed groundwater threshold values and (in Scotland) increased understanding of natural

groundwater body characteristics and pressures. The following more detailed changes were found:

- Scotland (the Scotland RBD): the number of groundwater bodies increased from 284 to 344 but ‘Good’ chemical status remained broadly the same. Threshold values were reviewed and updated in 2014. The location and boundaries of groundwater bodies were reviewed and substantially revised to take account of the latest understanding of the characteristics of groundwater. These revisions resulted in a significant increase in the number of groundwater bodies.
- England (e.g. the South West RBD): the number of groundwater bodies decreased from 44 to 42. New quality standards have been introduced as a result of the 2013 amendments of the Environment Quality Standards Directive. There were only minor changes to groundwater body boundaries.
- Northern Ireland (e.g. the North Eastern RBD): the number of groundwater bodies increased from 8 to 14. Improved mapping led to changes of boundaries, splitting of groundwater bodies and the creation of new superficial groundwater bodies.

6.3 Progress with European Commission recommendations

- Recommendation: *address the large uncertainties reported in the first RBMPs in relation to the assessment of the status, the pressures and the effect of potential measures.*

Assessment: the number of surveillance monitoring sites dropped significantly from 4080 to 255 sites. Only 16 % of the groundwater bodies are subject to surveillance monitoring. Operational monitoring sites had been reduced as well, from 4006 to 1603 sites and in 10 of 15 RBDs, not all groundwater bodies at risk are subject to operational monitoring. There is no indication that grouping of groundwater bodies for monitoring and assessment of chemical status was applied in the assessed RBMPs. There is no monitoring of the WFD core parameters nitrate, ammonium, electrical conductivity, oxygen and pH in seven RBDs (Northumbria, Humber, Anglian, Thames, South East, South West and North West) and there is no monitoring of ammonium in the remaining RBDs. The UK subsequently clarified that total ammonia (which includes ammonium and ammonia) is monitored at all northern Irish groundwater chemical monitoring stations and also ammonia in Wales. The recommendation to establish fully WFD compliant monitoring programmes is not fulfilled.

- Recommendation: *improve the monitoring of impacts in the second RBMPs. Further investigations in that regard need to be translated into increased confidence in the impact of pressures and status assessment.*

Assessment: the recommendation on improvement of monitoring to increase confidence is not fulfilled as noted in the recommendation above.

Topic 7 Designation of Heavily Modified and Artificial Water Bodies and definition of Good Ecological Potential

7.1 Assessment of implementation and compliance with WFD requirements in the second cycle for designation

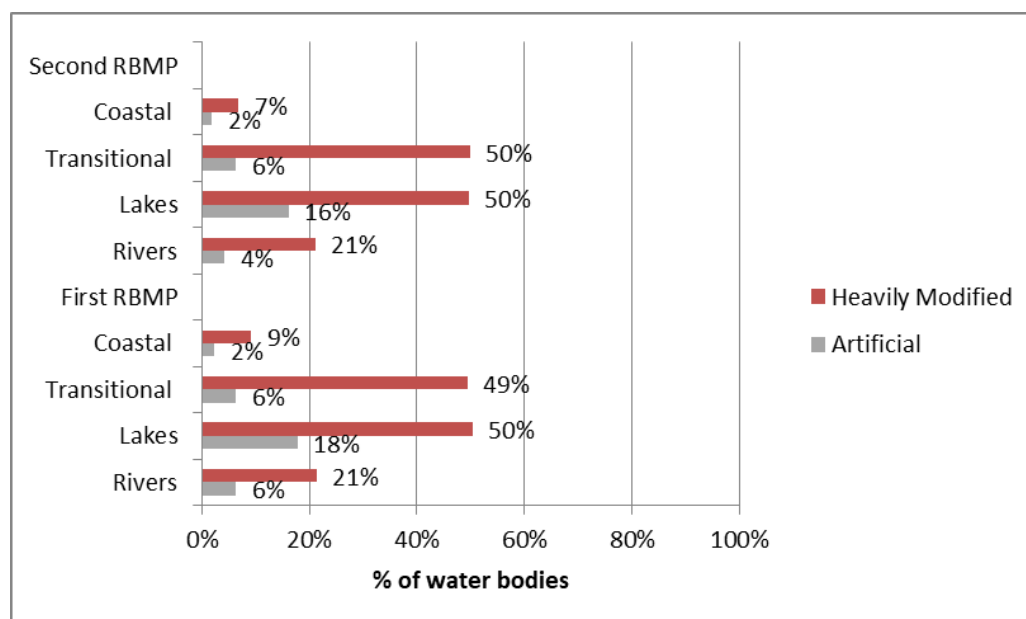
7.1.1 Designation of Heavily Modified and Artificial Water Bodies

Although the overall proportion of total water bodies designated as heavily modified and artificial is similar between the first and second RBMPs (Figure 7.1), in some RBDs there is a significant reduction in this proportion since the first RBMPs. In specific, in the Solway Tweed, Northumbria, Humber, Severn and North West RBDs, the share of rivers (in Northumbria also of lakes) designated as artificial has been notably reduced. In the Anglian RBD, the share of river water bodies designated as artificial has been reduced by almost half. Also the absolute number of river water bodies designated as heavily modified has been reduced (by ca. 100 water bodies), but the percentage of river water bodies designated as heavily modified water bodies in total has slightly increased. In the South West RBD, the percentage of heavily modified water bodies in coastal waters, lakes and rivers has been reduced, but at the same time, more lakes are designated as artificial water bodies.

Information on whether reservoirs were originally rivers or lakes has been reported only for the lake water bodies of the three RBDs of Northern Ireland. In Northern Ireland, three lake heavily modified water bodies are reservoirs which were originally rivers. According to the Common Implementation Strategy guidance on this issue, it is recommended to designate such water bodies as river heavily modified water bodies. Another eight lake heavily modified water bodies are reservoirs which were originally lakes. In Scotland, England and Wales, data on whether reservoirs were originally lakes or rivers are not held.

The main water uses for which river water bodies are designated as heavily modified water bodies are flood protection and urban development. Energy from hydropower is a main use of designated heavily modified water bodies in Scotland and land drainage for agriculture in the Anglian RBD. For lake water bodies, the main water uses for designation as heavily modified water bodies are urban development as well as the wider environment. In Scotland, also energy from hydropower plays an important role. For coastal water bodies, the main water uses for heavily modified water bodies designation are flood protection, transport (navigation/ports) and the wider environment, while for transitional waters the uses are flood protection and transport.

Figure 7.1 *Proportion of total water bodies in each category in the United Kingdom that has been designated as heavily modified or artificial*



Source: WISE electronic reports

Physical alterations are not reported for all water categories designated as heavily modified water bodies in all RBDs; gaps have been identified in several RBDs in England and Wales (Northumbria, Humber, South East, South West, Severn, Western Wales (no alterations reported), Dee (no alterations reported) and North West). According to the reporting, in England and Wales, information is not held about the history of water bodies that are now considered heavily modified, therefore data on physical alterations cannot be provided.

In general, the methodology for heavily modified water bodies designation is well explained for all the relevant aspects (criteria for substantial changes in character, types of water uses and physical alterations of the designated heavily modified water bodies, criteria for assessing significant adverse effects and explanation of how WFD Article 4(3)b has been applied (better environmental option)). Specific guidance (UK Technical Advisory Group) is applied in all RBDs. The methodological documents for England include separate sections for freshwater and estuarine/coastal waters. In Northern Ireland, there are separate documents for rivers, lakes and transitional/coastal waters.

Information on how the significant adverse effects of restoration measures on the use and the wider environment (Article 4(3)a) have been defined is found in methodological documents (guide documents and/or appendices to RBMPs) for some but not all RBDs. For the RBDs of Scotland, appendices to the RBMP refer to the criteria for designating heavily modified if restoring the conditions needed to achieve good ecological status would have a significant adverse effect on the benefits served by the modifications (e.g. flood protection, navigation,

etc.). The documents of the RBMPs of England, Wales and Northern Ireland do not give details of how adverse effects were defined but the RBMPs include references to national UK Technical Advisory Group guidance, which contains details on where significant adverse effects may apply.

The second RBMPs also provide evidence of checking whether the beneficial objectives served by the modifications of the heavily modified water bodies can be achieved by “other means”, which are a significantly better environmental option, technically feasible and not disproportionately costly (Article 4(3)b). For the RBDs of Scotland, background documents provide an overview of the criteria applied to determine the benefits served by the modified characteristics that cannot, for reasons of technical feasibility or disproportionate costs, be achieved by other means which are a significantly better option. The background documents of the RBMPs of England, Wales and Northern Ireland do not give details on how beneficial objectives can be achieved by other means but the RBMPs are assumed to have followed national UK Technical Advisory Group guidance, which contains details on this assessment.

However, specific information on the outcomes of the assessment of significant adverse effects and of better environmental options (designation tests according to Articles 4(3)a and 4(3)b) is not provided at water body level.

7.1.2 Definition of Good Ecological Potential for Heavily Modified and Artificial Water Bodies

Good ecological potential is reported as defined in all RBDs. In England, Wales and Scotland, the Prague approach is used for defining good ecological potential, which bases the definition on the identification of mitigation measures. For the RBDs in Northern Ireland, it is reported that a hybrid approach combining elements of the Prague approach and the Common Implementation Strategy approach (approach based on biological quality elements as illustrated in Common Implementation Strategy Guidance No 4) is applied. In all RBDs, good ecological potential is defined at water body level.

All RBDs follow national guidance (UK Technical Advisory Group) on the classification of ecological potential. This takes into account regional variations, for example taking particular account of sediment management in Scotland. The developed method addresses all water categories and several specific uses, including agricultural drainage, hydropower, flood protection, navigation/ports and drinking water supply.

Good ecological potential has not been defined in terms of biological quality elements for any of the RBDs but on the basis of mitigation measures that must be undertaken to reach good ecological potential. The UK Technical Advisory Group guidance recommends that only biological quality element assessment tools that are little affected by hydromorphological

alterations are used to assess pollution of heavily modified water bodies and artificial water bodies. If the results from such tools indicate "moderate status", the water body would be classed as moderate ecological potential.

Some biological quality elements assessment methods in use for rivers are reported as sensitive to hydrological and morphological changes in RBDs of England and Wales. This concerns methods for assessing fish and phytobenthos, which are sensitive to hydrology and morphology, as well as methods for assessing benthic invertebrates and macrophytes, which are sensitive to morphological changes only. For lakes, only one method for assessing macrophytes (LEAFPACS2) is reported as sensitive to morphological changes in England and Wales. In two RBDs (Scotland and Solway Tweed), this method is reported as sensitive to both hydrological and morphological changes. For coastal waters, two methods for assessing angiosperms (SKIPPER and Intertidal Seagrass Tool) are reported as sensitive to hydrological and morphological changes. Another method for assessing angiosperms (SAILOR) is reported as sensitive to morphological changes. In Scotland and Solway Tweed, the Intertidal Seagrass Tool is also reported as sensitive to morphological changes when assessing macroalgae. The method Infaunal Quality Index - Soft Sediment for assessing benthic invertebrates is reported as sensitive to hydrological changes. For transitional waters, one method for assessing fish in Northern Ireland (Estuarine Multimethod Fish Index) is reported as sensitive to hydrological and morphological changes. Another method for assessing fish in England, Wales and Scotland (Transitional Fish Classification Index 2) is reported as sensitive only to hydrological changes.

Several mitigation measures have been reported in all RBDs but specific assessments of ecological changes are not mentioned. However, monitoring is recommended to identify biological changes delivered by the implementation of mitigation measures.

A comparison between good ecological potential and good ecological status has not been undertaken in any of the RBDs⁷⁸.

7.2 Main changes in implementation and compliance since the first cycle

As described above, there have been modifications in the extent of designation of water bodies as heavily modified or artificial in several RBDs since the first RBMPs.

The reasons for changes in the numbers or size/area of water bodies designated as heavily modified water bodies and artificial water bodies since the first cycle are explained. In Scotland, the designations were based on a review of the characterisation of surface water

⁷⁸ According to the WFD Reporting Guidance 2016, on the comparability between GEP and GES, see conclusions of the 2010 CIS HMWB workshop, paragraph 60A: <https://circabc.europa.eu/sd/a/cd419883-ff4d-4d43-a82b-aef3d33e04ed/Conclusions%20HMWB%20workshop%20Brussels%20March%202009.pdf>

body types and the reasons for designation of those water bodies designated as heavily modified or artificial in the first RBMP. The review considered updated data on pressures and impacts, changes in the uses of water bodies, including as a result of new developments that have been permitted since the first RBMP was published, and whether any other means have become available that could provide equivalent benefits to those served by the modifications to the water bodies. In England, designations have been continually reviewed and changes made if designations from the first RBMP were applied incorrectly, due to water body boundary changes and because of new "uses". In the RBDs of Northern Ireland, some changes in designations have been made as a result of improved evidence. For example, since lake heavily modified water bodies were designated, lake habitat surveys have been carried out and lakes have been classified using the lake MImAS method and hydrology standards; this information has been taken into account in the second cycle designations.

Explicit descriptions of changes made to the heavily modified water bodies designation methodology since the first cycle are given for some, but not all, the RBMPs assessed. For the RBDs of Scotland and Northern Ireland, the overall designation methodology is provided but methodological changes since the first cycle are not explicitly described. For the RBDs of England, it is explained how the Environment Agency has built upon and improved the original artificial water bodies and heavily modified water bodies designations published in the first RBMPs in 2009, on the basis of specific assessment criteria. In addition, in 2013 the non-specific water use was removed from the approved list of uses for designation, and any designations related to such uses were reviewed. For transitional and coastal waters, there have been no methodological revisions to heavily modified water bodies designations since the first RBMPs.

There have been no changes in the methodology for defining good ecological potential, as the relevant background document is the same as the one used in the first RBMPs.

7.3 Progress with European Commission recommendations

- Recommendation 10: *the process to identify heavily modified water bodies and to identify good ecological potential needs to be completed. The designation of heavily modified water bodies should comply with all the requirements of Article 4(3). The assessment of significant adverse effects on their use or the environment and the lack of significantly better environmental options should be specifically mentioned in the RBMPs. This is needed to ensure transparency of the designation process.*

Assessment: in general, the methodology for heavily modified water bodies designation is well explained for all the relevant aspects (criteria for substantial changes in character, types of water uses and physical alterations of the designated

heavily modified water bodies, criteria for assessing significant adverse effects and explanation of how WFD Article 4(3)b has been applied (better environmental option).

Information on the application of the designation tests according to Articles 4(3)a and 4(3)b is found in methodological documents for some but not all RBDs. For the RBDs of Scotland, background documents outline the criteria for the assessment of significant adverse effects and for assessing better environmental options. The background documents of the RBMPs of England, Wales and Northern Ireland do not give details on these aspects but the RBMPs are assumed to have followed the national UK Technical Advisory Group guidance, which contains relevant details on these types of assessments. However, specific information on the outcomes of the assessment of significant adverse effects and of better environmental options (designation tests according to Articles 4(3)a and 4(3)b) is not provided on water body level.

There have been no changes in the methodology for defining good ecological potential, as the relevant background document is the same as the one used in the first RBMPs. A major gap is that good ecological potential has not been defined in terms of biology (biological quality elements) for any of the RBDs but only on the basis of mitigation measures that must be undertaken to reach good ecological potential. Several mitigation measures have been reported in all RBDs but specific assessments of ecological changes are not mentioned. However, monitoring is recommended to identify biological changes delivered by the implementation of mitigation measures.

Therefore, this recommendation has been partially fulfilled

Topic 8 **Environmental objectives and exemptions**

8.1 Assessment of implementation and compliance with WFD requirements in the second cycle

8.1.1 Environmental objectives

The environmental objectives are defined in Article 4 of the WFD. The aim is long-term sustainable water management based on a high level of protection of the aquatic environment. Article 4(1) defines the WFD general objective to be achieved in all surface and groundwater bodies, i.e. good status by 2015. Within that general objective, specific environmental objectives are defined for heavily modified water bodies (good ecological potential and good chemical status by 2015⁷⁹), groundwater (good chemical and quantitative status by 2015) and for Protected Areas (achievement of the objectives of the associated Directive by 2015 unless otherwise specified).

Environmental objectives for surface water ecological and chemical status have been reported in all RBDs, as well as for quantitative and chemical status for groundwater. Information is also provided on when the objectives will be achieved.

For the second cycle plans, Member States are required to report the date when they expect each surface and groundwater body to meet its environmental objective. This information is summarised for the United Kingdom elsewhere in this report: for ecological status/potential of surface waters (Chapter 3); chemical status of surface waters (Chapter 4); quantitative status of groundwater bodies (Chapter 5); chemical status of groundwater bodies (Chapter 6).

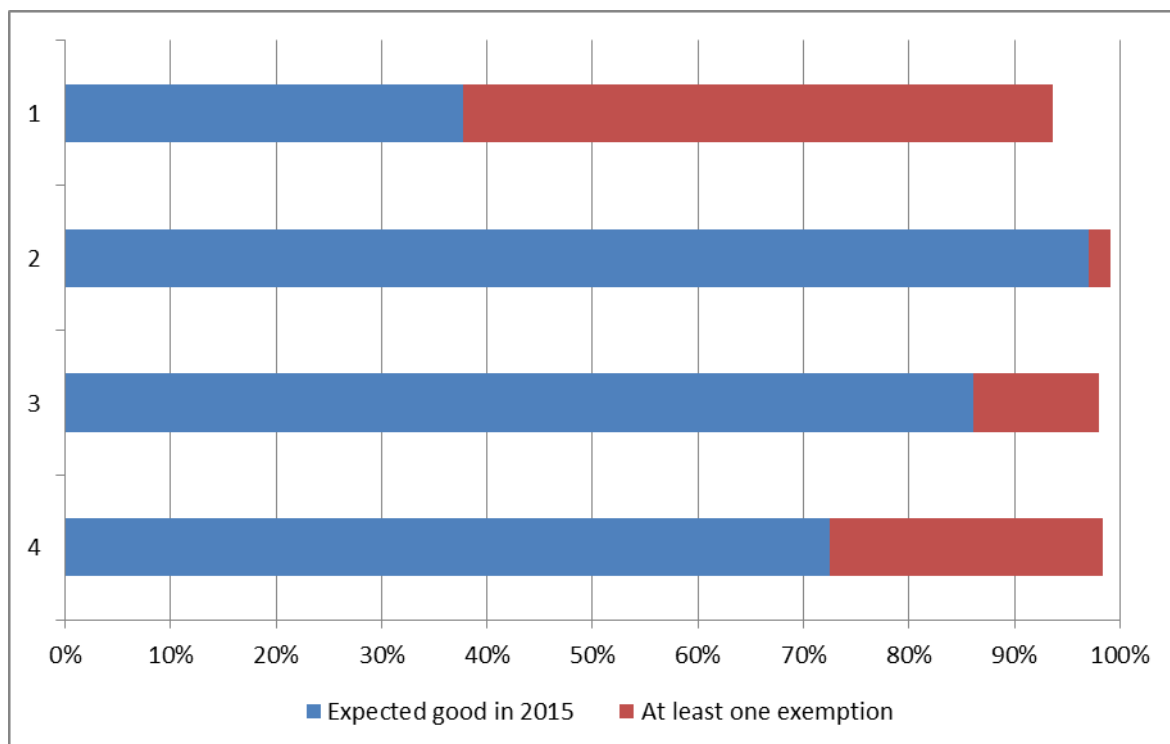
8.2 Exemptions

Where environmental objectives are not yet achieved exemptions can be applied in case the respective conditions are met and the required justifications are explained in the RBMP.

Figure 8.1 summarises the percentage of water bodies expected to be at least in good status in 2015 and the use of at least one exemption in the United Kingdom for the four main sets of environmental objectives.

⁷⁹ For priority substances newly introduced by Directive 2013/39/EU, good status should be reached by 2027, and for the 2008 priority substances, for which the Environmental Quality Standards were revised by Directive 2013/39/EU, good status should be reached in 2021.

Figure 8.1 *Water bodies in the United Kingdom expected to be in at least good status in 2015 and use of exemptions. 1 = Surface water body ecological status/potential; 2 = Surface water body chemical status; 3 = Groundwater body quantitative status; 4 = Groundwater body chemical status*



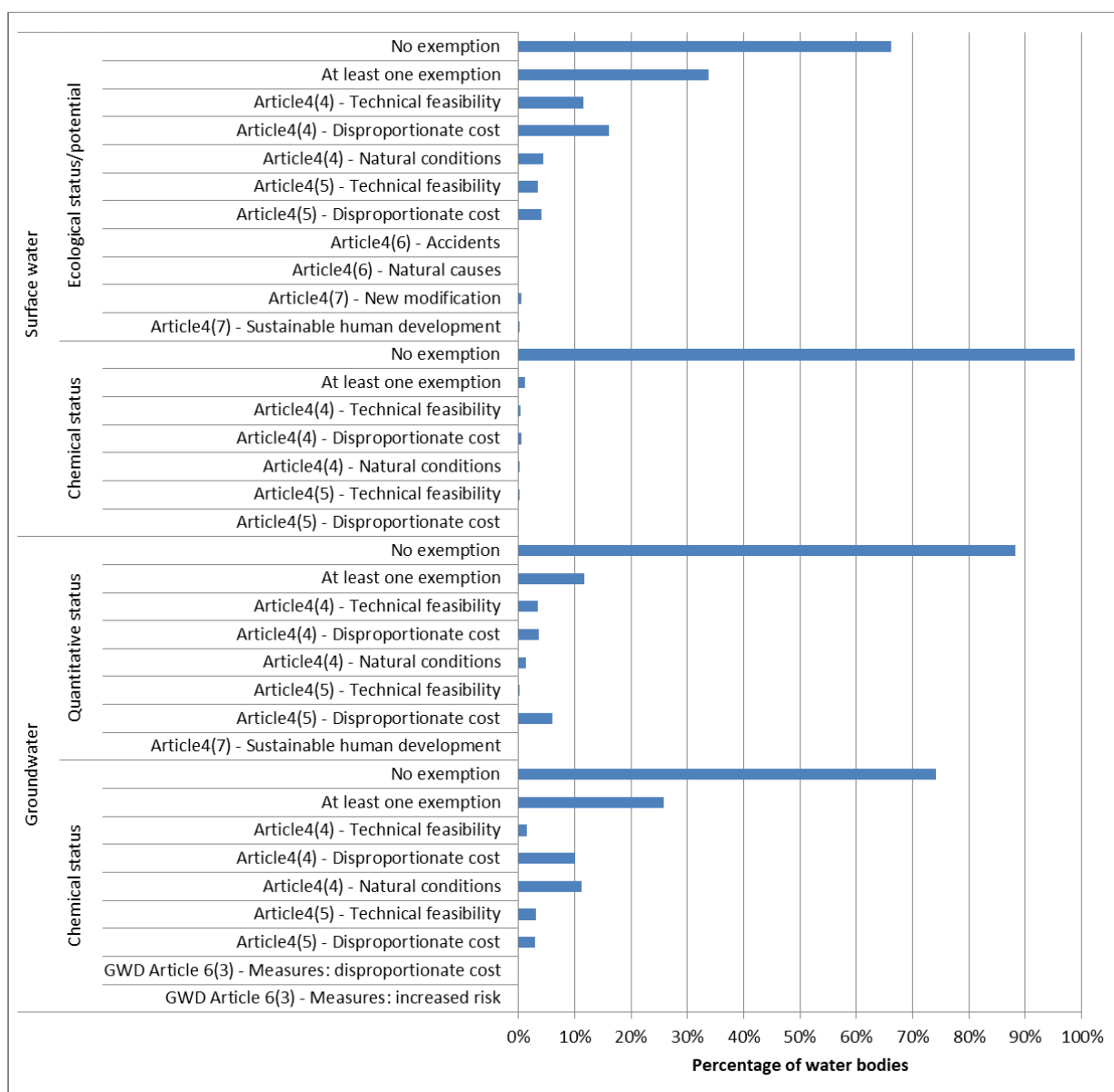
Source: WISE electronic reports. For some water bodies the date for achievement of the objectives is unknown.

Article 4 of the WFD allows under certain conditions for different exemptions to the objectives. The exemptions under WFD Article 4 include the provisions in Article 4(4) - extension of deadline beyond 2015, Article 4(5) - lower objectives, Article 4(6) - temporary deterioration and Article 4(7) - new modifications / new sustainable human development activities. Article 4(4) exemptions may be justified by: disproportionate cost, technical feasibility or natural conditions, and Article 4(5) by disproportionate cost or technical feasibility.

In addition, Article 6(3) of the Groundwater Directive allows Member States to exempt inputs of pollutants to groundwater under certain specified circumstances.

Figure 8.2 summarises the percentage of water bodies subject to each type of exemption (and reason) in relation to the four types of environmental objective in the United Kingdom.

Figure 8.2 *Type of exemptions applied to surface water and groundwater bodies for the second plan in the United Kingdom. Note: Ecological status and groundwater quantitative status exemptions are reported at the water body level. Chemical exemptions for groundwater are reported at the level of each pollutant causing failure of good chemical status, and for surface waters for each Priority Substances that is causing failure of good chemical status*



Source: WISE electronic reports

Application of Article 4(4)

In surface waters the number of exemptions applied under Article 4(4) has changed in all RBDs. Even if a full comparison to the first cycle is not possible there is evidence that in some RBDs the number increased. The justifications for the use of exemption under Articles

4(4) are provided for all RBDs and refer to technical feasibility, natural conditions, and disproportionate costs.

In groundwaters, the number of exemptions applied under Article 4(4) has changed in all RBDs. In all RBDs except Anglian, Neagh Bann and North Western the number of exemptions decreased, but at the same time Article 4(5) increased in the RBDs in England. The justification on the use of Article 4(4) exemption relates to technical feasibility in the Scotland, Solway Tweed, Northumbria, Humber, Thames, South East and North West RBDs. Disproportionate costs were used for justification in the Anglian, Thames, South East, South West and Severn RBDs and natural conditions in the Northumbria, Thames, South East, Neagh Bann, North Western and North Eastern RBDs.

Exemptions due to technical feasibility under Article 4(4) are defined in all RBMPs.

In the case of the Thames RBD, which was subject to a more detailed assessment, 263 water bodies have had alternative objectives set because of technical infeasibility, under both Articles 4(4) and 4(5). Six Natura 2000 Protected Areas and on Shellfish Water also have this justification. The RBMP describes what "technically unfeasible" covers. It also sets out the general circumstances under which each justification has been applied and also, where relevant, gives more specific circumstances for particular elements. Examples of justification include: no known technical solution is available, cause of adverse impact unknown where a solution cannot feasibly be identified, practical constraints of a technical nature prevent implementation of the measure by an earlier deadline and finally the problem cannot be addressed because of lack of action by other countries. Some of the circumstances include that for established invasive alien species, such as American signal crayfish, there is no known technical solution to eradicate them.

In the North Eastern RBD (another RBMP assessed in more detail), exemptions under Article 4(4) are justified by being technically unfeasible rather than disproportionately expensive. Extended deadlines have been set in preference to less stringent objectives. Details at the water body level are signposted via the relevant website and further details to define "technically unfeasible" are given in the background documents.

The reasons for applying Article 4(4) on the basis of disproportionate costs vary among the RBDs and are mainly justified (with different levels of detail) by arguments such as affordability, cost benefit analyses, benefit assessments, distribution of costs and social and sectorial impacts.

For example, in Scotland, the RBMP describes water bodies where achieving good status would be disproportionately expensive. The plan lists 64 water bodies where the condition of water plants and animals appear to be good even though concentrations of nutrients are

elevated and further action would be disproportionately expensive. However, no detail on what constitutes disproportionate expense is provided.

In the Thames RBD, which was assessed in more depth, 343 water bodies have alternative objectives on the grounds of disproportionate costs. The RBMP describes circumstances under which exemptions to the environmental objectives have been applied in accordance with Article 4(4). The document describes the general approach for applying disproportionate costs, but also in specific situations (e.g. hydrological regime is impacted, nutrient pollution, groundwater status). However, it remains unclear how this approach has been applied on the water body level (e.g. assessment on how costs of implementing the measures have been weighted against benefits in a specific case).

Exemptions due to natural conditions are justified in all RBMPs assessed but with different degrees of information. For example, while natural conditions are reported in WISE for the Scotland RBMP the appendices do not refer to natural conditions as a justification for not achieving objectives. The Thames and North Eastern RBMPs and their background documents describe the national guidance on this: these exemptions have been applied where it is expected that it will take time before the biological quality of the water body recovers, due to the time taken for the plants and animals to re-colonise and become established after the hydromorphological, chemical and physicochemical conditions have been restored to 'good'; or the time taken for the habitat conditions to stabilise after improvement works. Further natural background levels of substances are used as a justification not to meet WFD objectives and to apply an exemption, whereas the adaptation of the reference conditions is not indicated as an option.

The main drivers causing exemptions under Article 4(4) in surface waters are urban development, transport, industry, agriculture and unknown - other. In the Scotland and Solway Tweed RBDs also energy, tourism and recreation and forestry is mentioned. The Solway Tweed RBD also mentioned climate change. Northern Ireland also refers to flood protection, forestry, fisheries and aquaculture and energy. The main drivers causing exemptions under Article 4(4) in groundwater in England, Wales and Scotland are Urban development, Transport, Industry, Agriculture and Unknown - other. For Northern Ireland the main drivers are agriculture and industry.

The pressures responsible for exemptions under Article 4(4) in surface water come from a broad range of activities including urbanisation, industry, agriculture, mining, atmospheric deposition and activities causing changes in hydromorphology (Table 8.1). For groundwater the main pressures are point and diffuse pollution from atmospheric deposition, mining, settlements and agriculture as well as water abstraction for industry and agriculture (Table 8.2).

Table 8.1 *Pressures on surface water bodies responsible for failing to achieve good chemical status in surface water and for which exemptions have been applied*

Significant pressure on surface water bodies	Failing Priority Substances	Article 4(4) Technical feasibility exemptions	Article 4(4) Disproportionate cost exemptions	Article 4(4) Natural conditions exemptions	Article 4(5) Technical feasibility exemptions	Article 4(5) Technical feasibility exemptions
	Number	Number	Number	Number	Number	Number
1.1 - Point - Urban waste water	3	4	2	0	0	0
1.2 - Point - Storm overflows	1	3	0	0	0	0
1.3 - Point - IED plants	3	2	1	0	0	0
1.4 - Point - Non IED plants	5	0	2	5	0	0
1.5 - Point - Contaminated sites or abandoned industrial sites	4	2	0	3	0	0
1.7 - Point - Mine waters	3	2	51	0	0	2
1.9 - Point - Other	1		1	0	0	0
2.1 - Diffuse - Urban run-off	4	5	3	0	12	0
2.10 - Diffuse - Other	5	3	2	0	1	0
2.2 - Diffuse - Agricultural	4	10	0	6	0	0
2.4 - Diffuse - Transport	1	1	0	0	0	0
2.5 - Diffuse - Contaminated sites or abandoned industrial sites	3	5	5	0	1	0
2.6 - Diffuse - Discharges not connected to sewerage network	1	0	2	0	0	0
2.7 - Diffuse - Atmospheric deposition	3	0	0	7	12	0
2.8 - Diffuse - Mining	3	8	50		0	2
4.1.5 - Physical alteration of channel/bed/riparian area/shore - Unknown or obsolete	2	2	0	0	0	0
4.2.8 - Dams, barriers and locks - Other	1	1	0	0	0	0
4.2.9 - Dams, barriers and locks - Unknown or obsolete	1	1	0	0	0	0
8 - Anthropogenic pressure - Unknown	12	41	34	2	0	2

Source: WISE electronic reports

Table 8.2 *Pressure responsible for pollutants in the United Kingdom failing to achieve good chemical status in groundwater and for which exemptions have been applied*

Significant pressure on groundwater	Number of failing pollutants	Number of exemptions				
		Article 4(4) - Technical feasibility	Article 4(4) - Disproportionate cost	Article 4(4) - Natural conditions	Article 4(5) - Technical feasibility	Article 4(5) - Disproportionate cost
1.1 - Point - Urban waste water	12		26			2
1.2 - Point - Storm overflows	1					1
1.3 - Point - IED plants	4		4			
1.4 - Point - Non IED plants	7		7			
1.5 - Point - Contaminated sites or abandoned industrial sites	6	1	5	3		
1.6 - Point - Waste disposal sites	4		3	2		
1.7 - Point - Mine waters	8	2	8	1	20	3
1.9 - Point - Other	5		6			
2.1 - Diffuse - Urban run-off	3	1				5
2.10 - Diffuse - Other	13	1	45	12	2	
2.2 - Diffuse - Agricultural	19	2	60	50		21
2.5 - Diffuse - Contaminated sites or abandoned industrial sites	5		6			
2.6 - Diffuse - Discharges not connected to sewerage network	5		6			5
2.8 - Diffuse - Mining	8	7	5	29	26	1
3.3 - Abstraction or flow diversion - Industry	2			3		
3.7 - Abstraction or flow diversion - Other	3	1	4			
6.2 - Groundwater - Alteration of water level or volume	16	1	34	4		13
8 - Anthropogenic pressure - Unknown	15	6	26	10	4	3

Source: WISE electronic reports

Application of Article 4(5)

The number of RBDs in which Article 4(5) has been applied in surface water has increased between the first and the second cycle. Article 4(5) is applied in all RBDs except the ones in Northern Ireland. The reasons are technical feasibility and disproportionate costs. Article 4(5) in relation to groundwater has also increased. In the first cycle Article 4(5) was only applied in Northumbria and North West. Now it is also applied in Humber, Anglian, Thames; South East; South West, Severn, Western Wales and Dee. The reasons are technical feasibility and/or disproportionate costs, which were defined.

Background documents⁸⁰ have been assessed in more detail. The assessment reveals evidence that these justifications are not fully in line with the requirements and logic of the WFD. For example, the justification for this exemption is provided as the economic appraisal has determined that the costs of implementing the most cost effective and technically feasible measures needed to reach good status are greater than the benefits to be gained from achieving good status. However according to Common Implementation Guidance Document No. 20⁸¹ disproportionality should not begin at the point where the costs measured simply exceed quantifiable benefits⁸².

Further justifications include that flows in some rivers and streams can vary naturally on a seasonal basis and that these are natural phenomena but can result in a water body being classified at less than good status. In addition natural barriers to fish migration are mentioned which sometimes result in fish being classified at less than good status in a water body. The adaptation and correction of reference conditions may be more appropriate than applying Article 4(5) exemptions.

The drivers and pressures behind the Article 4(5) exemptions are the same as for Article 4(4) (see above).

Application of Article 4(6)

Article 4(6) exemptions are not applied.

⁸⁰See

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/500573/Part_2_River_basin_management_planning_process_overview_and_additional_information.pdf

⁸¹https://circabc.europa.eu/sd/a/2a3ec00a-d0e6-405f-bf66-60e212555db1/Guidance_documentN%C2%B020_Mars09.pdf

⁸² UK subsequently clarified that this was not the case in Wales. Furthermore, it clarified that in England the approach was to make allowance for uncertainty and confidence in the quantified appraisal, to encourage further investigation where the initial estimate of costs was only slightly above benefits, and to include qualitative information on benefits in the judgement of what objective to set.

Application of Article 4(7)

According to WISE, Article 4(7) exemptions have been applied in the Scotland RBD for a number of water bodies. However, there are some discrepancies in the reporting for other RBDs: for example, the North Eastern RBD data reported to WISE states that no Article 4(7) exemptions have been applied, but the background documents state that one development (a hydroelectricity scheme) has been authorised despite the potential of it to result in deterioration. Generally, further clarification is required whether the procedures as set out by the WFD and in Article 4(7) have been followed since no specific information on the assessment of the impact of new modifications on water body status and the assessment of the specific Article 4(7) conditions is provided.

Application of Article 6(3) of the Groundwater Directive

Exemptions to groundwater under Article 6(3) of the Groundwater Directive have not been applied.

8.3 Main changes in implementation and compliance in the first cycle

The number of exemptions applied under Article 4(4) and 4(5) have changed in all RBDs. The number of RBDs for which Article 4(5) has been applied in surface water has increased between the first and the second cycle. The UK subsequently clarified that in England this is in large part because the evidence base is substantially improved and more robust than it was in first cycle and an extensive and robust economic appraisal of measures was taken at the catchment scale. The objectives and justifications for alternatives are based on this vastly improved evidence base and understanding.

Article 4(5) is now applied in all RBDs except the ones in Northern Ireland. The number of Article 4(5) exemptions in relation to groundwater has also increased. In the first cycle it was only applied in the Northumbria and North West RBDs but is now also applied in the Humber, Anglian, Thames, South East, South West, Severn, Western Wales and Dee RBDs.

8.4 Progress with Commission recommendations

The European Commission recommendations based on the first RBMPs and first PoM reports requested action on the following:

- Recommendation: *the UK needs to provide more transparency in the RBMPs on the assessment of environmental objectives and exemptions. A large number of exemptions*

have been applied in this first cycle of RBMPs. While the WFD does provide for exemptions, there are specific criteria that must be fulfilled for their use to be justified. The application of exemptions needs to be more transparent and the reasons for the exemptions should be clearly justified in the plans. The UK should take all necessary measures to bring down the number of exemptions for the next cycle, including the needed improvements in the characterisation process, monitoring networks and status assessment methods, as well as reducing significantly the degree of uncertainties.

Assessment: the number of exemptions has increased in particular those related to Article 4(5). The justifications for exemptions are made more transparent and are given at the water body level, however there is still a lack of details in several plans assessed and criteria need to be reconsidered. The recommendation is therefore partly fulfilled.

- Recommendation: *the use of exemptions under Article 4(7) should be based on a thorough assessment of all the steps as requested by the WFD, in particular an assessment on whether the project is of overriding public interest and whether the benefits to society outweigh the environmental degradation, and regarding the absence of alternatives that would be a better environmental option. Furthermore, these projects may only be carried out when all possible measures are taken to mitigate the adverse impact on the status of the water. All conditions for the application of Article 4(7) in individual projects must be included and justified in the RBMPs as early in the project planning as possible.*

Assessment: improved information for the application of Article 4(7) has been provided in the RBMPs and reported in WISE. Remaining questions for some RBDs include whether the potential effects of planned new modifications on water body status have been assessed at quality element level and whether all the steps as required by Article 4(7) have been followed. The recommendation is therefore partially fulfilled.

Recommendation: *be more transparent in the next cycle in the decision process in terms of the point (ratio) where measures become disproportionately expensive and how this relates to the level of confidence required before decisions to take measures are made.*

Assessment: the justifications have been made more transparent and are given on water body level, but a lack of detail remains. The recommendation is therefore partially fulfilled.

Topic 9 **Programme of measures**

The aim of this chapter is to provide an overview of the PoM reported by Member States; more specific information on measures relating to specific pressures (for example arising from agriculture) is provided in subsequent chapters.

The Key Types of Measure (KTM) referred to in this section are groups of measures identified by Member States in the Programme of Measures, which target the same pressure or purpose. The individual measures included in the Programme of Measures (being part of the RBMP) are grouped into Key Types of Measure for the purpose of reporting. The same individual measure can be part of more than one Key Type of Measure because it may be multi-purpose, but also because the Key Types of Measure are not completely independent silos. Key Types of Measure have been introduced to simplify the reporting of measures and to reduce the very large number of Supplementary Measures reported by some Member States (WFD Reporting Guidance 2016).

A Key Type of Measure may be one national measure but it would typically comprise more than one national measure. The 25 predefined Key Types of Measure are listed in the WFD Reporting Guidance 2016.

The Key Type of Measure should be fully implemented and made operational within the RBMP planning period to address specific pressures or chemical substances and achieve the environmental objectives.

9.1 Assessment of implementation and compliance with WFD requirements in the second cycle

9.1.1 General issues

An indication as to whether or not measures have been fully implemented and made operational is when they have been reported as being planned to tackle significant pressures (at the Key Types of Measure level). Significant pressures are also reported at the water body level. It would therefore be expected that there would be measures planned in the RBMP to tackle all significant pressures. Clear efforts have been made in the United Kingdom in all RBDs to identify pressures at the water body level and to link measures to significant pressures. Significant pressures considered to be causing failure of good status for groundwater

bodies have been reviewed for a selection of the 15 RBDs for which information is provided. In the Scotland RBD, significant pressures causing failure are identified under seven different categories covering point sources, diffuse sources and abstraction or flow diversion whereas Key Types of Measure only relate directly to one of these significant pressures (2.8 Diffuse - Mining). However, Key Types of Measure have been identified for pressures not identified as causing failure of objectives. In the South West RBD, Key Types of Measure cover all significant pressures causing failure but with additional Key Types of Measure covering pressures not reported to be causing failure⁸³. In the Neagh Bann RBD, Key Types of Measure are reported for only one out of seven significant pressures⁸⁴. A similar picture emerges for surface waters (from a review of the Scotland, South West and Neagh Bann RBMPs), with Key Types of Measure not covering all pressures causing failures and Key Types of Measure being reported for pressures not identified as causing failures (e.g. for certain metals and their compounds).

Cost-effectiveness analysis is an appraisal technique that provides a ranking of alternative measures on the basis of their costs and effectiveness, where the most cost-effective has the highest ranking. For the first cycle PoM the United Kingdom used cost-effectiveness analysis as a tool to assess measures for all significant pressures. This has continued for the second cycle PoM where a combination of a qualitative and quantitative cost-effectiveness analysis has been carried out in all 15 RBDs for supporting the selection of measures proposed under the 2015-2021 PoM.

Cost data for both cycles has been comprehensively reported but for a few exceptions. Firstly, no cost data has been reported for the Scotland RBD. The Annex 0 report states that “Costs were not collated at this scale for Scotland”. No further information could be found as part of this assessment. In terms of the sectoral financing of measures, for the Solway Tweed RBD “not applicable” has been stated for every sector indicating that financing has not been secured from any sector which requires further clarification (an explanation for this is not provided in the Annex 0 report). The Northern Ireland RBDs all reported a combined total investment for the 2009-2015 PoM of €340 m. The 11 other RBDs reported investments for Article 11(3)a requirements (measures required to implement Community legislation for the protection of water) for the 2009-2015 PoM ranging from €19.3 m in the Solway Tweed RBD to €1580 m in the Thames RBD. The total investment for Article 11(3)a requirements in all 11 RBDs was

⁸³ The United Kingdom subsequently clarified that this is to prevent future failures and to prevent deterioration.

⁸⁴ The United Kingdom subsequently clarified that Northern Ireland did identify and report a wide range of pressures. In order to rationalise reporting, and in the absence of a common definition, Northern Ireland’s interpretation of significant was based on those pressures occurring most widely. It should be noted that this definition is not in line with CIS Guidance Document 3 which provides clear guidance on the definition of significant pressures.

€5393 m. Investments in measures required by Articles 11(3)b-l, 11(4) and 11(5) (all other measures) in the 2009-2015 PoM were also reported and ranged from €7.8 m in the Solway Tweed RBD to €330 m in the Western Wales RBD⁸⁵. The total investment for Articles 11(3)b-l, 11(4) and 11(5) (all other measures) requirements in the 11 RBDs was €1024 m. Therefore the total investment reported for the 2009-2015 PoM in the United Kingdom was €6757 m.

The capital investment that will be required for the second cycle PoM was reported by 14 of the 15 RBDs, broken down by type of measures. However, the three Northern Ireland RBDs did not report the annual operation and maintenance costs. A total capital investment of €5865 m will be required to implement the planned Article 11(3)a requirements in the 14 RBDs, with investment costs ranging from €14 m in the Northumbria RBD to €1236 m in the Western Wales RBD. €424 m will be required in annual operation and maintenance costs across 11 RBDs for the Article 11(3)a measures, ranging from €0.58 m/year in the Northumbria RBD to €339 m/year in the Western Wales RBD. The total capital investment that is required to implement measures required by Articles 11(3)b-l, 11(4) and 11(5) (all other measures) is reported to be €2894 m for the 14 RBDs who reported this information. The investment required ranges from €25 m in the North Eastern RBD to €562 m in the Humber RBD. 14 RBDs reported the annual operation and maintenance costs for the Articles 11(3)b-l, 11(4) and 11(5) measures, totalling €414 m, and ranging from €1.9 m/year in the North Eastern RBD to €88.6 m/year in the Anglian RBD.

The total capital investment reported for the 2015-2021 PoM is €8759 m, compared to the € 6757 m reported for the 2009-2015 PoM. A lack of finance was reported as an obstacle in all RBDs, except the Humber RBD for the implementation of the 2009-2015 PoM. A clear financial commitment (e.g. approved budget or financial mechanism by the parliament, Ministry of Finance or other financial responsible authority) has been secured for the implementation of the PoM in 12 of the 15 RBDs for which information is reported. The three RBDs in Northern Ireland report not to have secured funding for implementation of the PoM. The other RBDs have all secured cross-sectoral funding (e.g. for measures relating to agriculture, industry, transport, etc.) except for the Scotland RBD and Solway Tweed RBD. For the Scotland RBD, no clear commitment to funding has been secured from any sector. For the Solway Tweed RBD, 'not applicable' has been stated for every sector, implying that sectors are not relevant within this RBD, which is clearly not the case and as it is not explained in the Annex 0 report this requires further clarification.

⁸⁵ UK reported that the significant difference between the investment for Western Wales and other RBDs is most probably a result of the inclusion of water company business investment in the Western Wales figure.

All 15 RBDs reported that some European Union funding had been received for the 2009-2015 PoM, and that European Union funding was expected for the 2015-2021 PoM. The variation in the way the information has been reported for the different RBDs makes it difficult to present a national picture, but it is clear that the level of European Union funding is expected to increase slightly for the second cycle PoM.

National measures, both basic and supplementary, have been mapped against a broad range of Key Types of Measure covering a range of basic and supplementary measures. Supplementary measures have been identified in the majority of the United Kingdom RBDs with often several supplementary measures being mapped to individual Key Types of Measure (for example Key Types of Measure relating to agricultural pollution, urban pollution and hydromorphology). 9 % of the basic measures and 15 % of the supplementary measures are mapped against KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure. 6 % of the basic measures and 18 % of the supplementary measures are mapped against KTM14 - Research, improvement of knowledge base reducing uncertainty. A number of national Key Types of Measure have been introduced to account for basic measures in particular. Basic measures have been reported that fulfil all the requirements of Article 11(3).

In general across RBDs in the United Kingdom, the Key Types of Measure reported for significant pressures map well to those mapped against National measures although there are exceptions. In Northern Ireland (Neagh Bann) only two Key Types of Measure are reported to be tackling significant pressures (KTM 2 “reduce nutrient pollution from agriculture” and KTM 14 “Research, improvement of knowledge base reducing uncertainty”) whereas twenty Key Types of Measure are mapped against national measures⁸⁶. Where information is provided (only two RBDs) on the percentage of water bodies affected by significant pressures that are not expected to achieve good status or potential by 2027 the percentage range is never reported as being above 10 %.

Not all River Basin Specific Pollutants identified as causing failure of good status in surface waters and chemical pollutants causing a failure of good status in groundwaters have an associated Key Type of Measure. For example in the Scotland RBD, ammonium is identified as causing a failure in 31 surface water bodies and yet no corresponding Key Type of Measure is identified. Another example is in the Western Wales RBD, where for groundwater bodies, although pollutants causing failure include nitrate, iron, lead, nickel, cadmium, copper and zinc

⁸⁶ The United Kingdom subsequently clarified that Northern Ireland did identify and report a wide range of pressures. In order to rationalise reporting, and in the absence of a common definition, NI’s interpretation of significant was based on those pressures occurring most widely. It should be noted that this definition is not in line with CIS Guidance Document 3 which provides clear guidance on the definition of significant pressures.

Key Types of Measure are not reported for lead, nickel and cadmium⁸⁷. Furthermore, 11 groundwater pollutants were causing failure of good chemical status and had no reported specific measures (Key Types of Measure). The relevant RBDs were the Scotland RBD, Solway Tweed RBD and Severn RBD. Lead, iron and zinc were such pollutants in two of the three RBDs. No specific measures for groundwater pollutants causing failure were reported for any of the three Northern Ireland RBDs (Neagh Bann, North Western and North Eastern) even though failures were reported at the groundwater body level.

Not all Priority Substances identified as causing a failure in surface waters have an associated Key Types of Measure. For example, in the Humber RBD, out of the eight substances reported as causing a failure only two have an associated Key Type of Measure with substances such as DDT, cadmium and tributyltin-cation not having an associated Key Type of Measure. In the Severn RBD, of the 11 substances identified as causing a failure of objectives in surface waters only three have associated Key Types of Measure. Overall, specific measures (Key Types of Measure) were not reported for 13 chemical substances causing failure of good chemical status or good ecological status/potential in 10 RBDs. The most common chemicals where this occurred were tributyltin in eight RBDs, mercury in seven RBDs and cadmium in six RBDs. A Key Type of Measure was reported for dichlorvos in the Humber RBD even though this substance was not reported to be causing failure of status in the surface water bodies schema. No specific measures for chemicals causing failure in surface waters were reported for any of the three Northern Ireland RBDs even though failures were reported at the surface water body level.

The level of ambition and expected progress resulting from the PoM for the second cycle is poorly defined. Although indicators of the gaps to good status for significant pressures on groundwater and surface waters have been reported electronically to WISE across the United Kingdom RBDs, indicators of the level of progress expected in the implementation of measures is less well defined. Where values are provided these usually show that progress towards the achievement of objectives is expected between 2021 and 2027. Indicators were not set for 2015 so this represents an improvement in implementation. The information relating to indicators for Key Types of Measure, and what level of implementation of measures are less consistently reported throughout the United Kingdom RBDs. Values have been defined for a few Key Types of Measure for 2021 and 2027 but in general values have not been defined.

The England and Wales RBDs (i.e. 10 out of the 15 RBDs reporting this information for the United Kingdom) state that: a joint consultation was carried out on the RBMPs and Marine

⁸⁷ UK reported that this is a function of the groundwater bodies failing for a surface water chemicals and a reporting nuance that the KTM is against the surface water.

Strategy; the preparation of the RBMP and PoM have been coordinated with the implementation of the Marine Strategy Framework Directive, and; the need for additional measures or more stringent measures beyond those required by the WFD in order to contribute to the achievement of the relevant Marine Strategy Framework Directive objectives in coastal and marine environments have been considered in the PoM (but with no need for implementation). For the Scotland RBD, coordination with the Marine Strategy Framework Directive is reported to not have taken place and for the Solway Tweed RBD and the three Northern Ireland RBDs (Neagh Bann, North Western and North Eastern) only during the preparation of the RBMP and PoM. National/RBD specific measures that are relevant to the Marine Strategy Framework Directive (basic measures, their associated Key Types of Measure and the pressures and/or chemical substances that they are tackling to meet WFD objectives) are provided for all RBDs. These include the construction or upgrading of wastewater treatment plants, improving hydromorphological conditions (such as for fish passage), measures for phasing out/reducing emissions of priority hazardous/Priority Substances and reducing agricultural pollution.

The RBMPs and Floods Directive⁸⁸ Flood Risk Management Plans have not been integrated into a single plan⁸⁹. Joint consultations were carried out on the RBMPs and Flood Risk Management Plans in 10 of the 15 RBDs (those in England and Wales). All RBDs report that the objectives and requirements of the Floods Directive have been considered in the second RBMP, that specific win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and use of Natural Water Retention Measures have been included in the PoM and that the design of new and existing structural measures (such as flood defences, storage dams and tidal barriers) have been adapted to take into account WFD Environmental Objectives. For 10 of the 15 RBDs, a clear financial commitment has been secured for the implementation of the PoM in the flood protection sector. However in all RBDs, Article 9(4) has not been applied to impoundments for flood protection and as such it would be an activity/use which should be subject to cost recovery under Article 9.

9.1.2 Measures related to other significant pressures

Indicator gaps (the degree to which a particular pressure needs to be reduced to achieve WFD objectives) for other significant pressures (e.g. Introduced species and diseases, Anthropogenic pressures - Historical pollution) have mostly been reported for the United Kingdom RBDs for 2015, 2021 and 2027 but with some values not reported (i.e. not defined) comprehensively for

⁸⁸ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

⁸⁹ UK reported that exploring how to make information/data from both plans available to stakeholders on the same map based system/website.

several RBDs. As expected, where values are reported these values decrease from 2015 to 2027.

In terms of indicator values for Key Types of Measure, reporting is not as consistent as the reporting of indicator gaps. In Scotland, indicator values for Key Types of Measure relating to Introduced species and diseases and Anthropogenic pressure - Unknown are provided for 2021 and 2027 but no values are given for 2015 (although the values show a decrease between 2021 and 2027). Similarly, for Solway Tweed, values for Key Types of Measure relating to these two pressures are also reported for 2021 and 2027 but not for 2015. No indicator values for Key Types of Measure are reported for RBDs in England and Wales (Northumbria through to North West inclusive) but values are provided for 2015 and 2021 (but not for 2027) for two of the three RBDs in Northern Ireland.

9.1.3 Mapping of national measures to Key Types of Measure

It was expected that Member States would be able to report their PoM by associating their national measures with predefined Key Types of Measure. Key Types of Measure are expected to deliver the bulk of the improvements through reduction in pressures required to achieve WFD Environmental Objectives. A Key Type of Measure may be one national measure but it would typically comprise more than one national measure. Member States are required to report on the national measures associated with the Key Types of Measure, and whether the national measures are basic (Article 11(3)(a) or Article 11(3)(b-l)) or supplementary (Article 11(4)).

Table 9.1 summarises the number of national measures that have been mapped to the relevant Key Types of Measure in the United Kingdom. The number of RBDs for which the Key Type of Measure has been reported is also shown. Table 9.2 then summarises the type of basic measures associated with the national measures mapped against the Key Type of Measure.

Table 9.1 *Mapping of the types of national measures to Key Types of Measure in the United Kingdom*

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
KTM1 - Construction or upgrades of wastewater treatment plants	7	2	15
KTM10 - Water pricing policy measures for the implementation of the recovery of cost of water services from industry	3		10
KTM12 - Advisory services for agriculture	5	5	14

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)	4	6	14
KTM14 - Research, improvement of knowledge base reducing uncertainty	10	27	8
KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances	7	4	14
KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).	3	2	14
KTM17 - Measures to reduce sediment from soil erosion and surface run-off	4	4	6
KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases	10	9	15
KTM19 - Measures to prevent or control the adverse impacts of recreation including angling	1	6	6
KTM2 - Reduce nutrient pollution from agriculture	9	10	14
KTM20 - Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants	1		3
KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	15	23	14
KTM22 - Measures to prevent or control the input of pollution from forestry	6	2	13
KTM23 - Natural water retention measures	1	5	13
KTM25 - Measures to counteract acidification	5		8
KTM3 - Reduce pesticides pollution from agriculture.	7	4	14
KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)	10	1	14
KTM5 - Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams)	3	10	15
KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity	10	14	15
KTM7 - Improvements in flow regime and/or establishment of ecological flows	10	8	15
KTM8 - Water efficiency, technical measures for irrigation, industry, energy and households	5	4	14
KTM99 - Other key type measure reported under PoM - Advise small and medium sized businesses on pollution prevention	1		3
KTM99 - Other key type measure reported under PoM - Bring currently exempt water abstractions within licence (New Authorisations)	1		3
KTM99 - Other key type measure reported under PoM - Continue to implement the Hydropower guidelines including the production of a design and siting guide for developers of	1		3

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
hydropower schemes			
KTM99 - Other key type measure reported under PoM - Contribute to maintenance of, or restoration to, favourable conservation status on Natura 2000 Protected Areas through undertaking review of consents (see Annex D)	1		3
KTM99 - Other key type measure reported under PoM - Develop and deliver a more focussed approach to sewerage and drainage management	1		3
KTM99 - Other key type measure reported under PoM - Develop and implement legislation to support sustainable drainage solutions.	1		3
KTM99 - Other key type measure reported under PoM - Develop evidence base to support management of marine litter and marine litter strategy.	1		3
KTM99 - Other key type measure reported under PoM - Encourage catchment scale community action through area statements developed by Natural Resources Wales and other co-operative groups aiming to improve water quality in their area.	1		3
KTM99 - Other key type measure reported under PoM - Ensure the Rural Development Plan supports sustainable agricultural practices to achieve WFD and protected area objectives	1		3
KTM99 - Other key type measure reported under PoM - Give strategic direction for fisheries work in Wales as set out in The Agenda For Change for Fisheries	1		3
KTM99 - Other key type measure reported under PoM - Implement revised methodology for assessment of hazardous pollutants within surface water discharges	1		3
KTM99 - Other key type measure reported under PoM - Implementation of SuDS (sustainable drainage systems) Code of Practice. Comply with published advice for operators on sustainable drainage systems	1		3
KTM99 - Other key type measure reported under PoM - Influence planning authorities to require the use of SuDS and contribute to the implementation of appropriate SuDS technology.	1		3
KTM99 - Other key type measure reported under PoM - KTM99_S005	1		2
KTM99 - Other key type measure reported under PoM - KTM99_S006	1		2
KTM99 - Other key type measure reported under PoM - KTM99_S007	1		1
KTM99 - Other key type measure reported under PoM - KTM99_S009	1		2
KTM99 - Other key type measure reported under PoM - KTM99_S-012		1	1

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
KTM99 - Other key type measure reported under PoM - Natural Resources Wales working with Welsh Government and others to promote and embed the use of Water Sensitive Urban Design (WSUD) into planning policy and devolved building regulations	1		3
KTM99 - Other key type measure reported under PoM - New Authorisations (licensing of historically exempt abstractions)	1		3
KTM99 - Other key type measure reported under PoM - NEW MS KTM Measures to prevent or control diffuse source discharges from mines.		1	6
KTM99 - Other key type measure reported under PoM - NEW MS KTM. Measures to prevent or control point source discharges from mines.		1	6
KTM99 - Other key type measure reported under PoM - Prioritise solutions to tackle water body failures due to abstraction	1		3
KTM99 - Other key type measure reported under PoM - Promote the implementation of SuDS (sustainable drainage systems) in new and existing developments, in both urban and rural areas to gain environmental, water quality, social and flood risk benefits	1		3
KTM99 - Other key type measure reported under PoM - Raise awareness of correct installation and operation of private sewage treatment systems	1		3
KTM99 - Other key type measure reported under PoM - Raise awareness of the benefits and successes of managing surface water run-off through SuDs (sustainable drainage systems) and rainwater harvesting in order to mitigate flooding and pollution.	1		3
KTM99 - Other key type measure reported under PoM - Reducing disposal of fat, oil and grease to sewers – awareness campaign to influence behaviour with leaflets, information packs	1		3
KTM99 - Other key type measure reported under PoM - Review and strengthen the effectiveness and enforcement of relevant legislation and policy (gap analysis) to improve its ability to deal with diffuse water pollution	1		3
KTM99 - Other key type measure reported under PoM - Review the implementation of Statutory Management Requirements (SMR) and Good Agricultural Environmental Condition (GAEC) to strengthen the drivers for best agricultural practice - ensure that there is parity in terms of the monitoring for and consequence	1		3
KTM99 - Other key type measure reported under PoM - Strengthen links between agri-environment options and N2K objectives on farms within catchments which are currently impacting on N2K sites	1		3
KTM99 - Other key type measure reported under PoM - The development of SuDS Approval Bodies to provide consistent advice for planning activities and maintenance of schemes	1		3

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
KTM99 - Other key type measure reported under PoM - Water companies develop and deliver catchment management options that improve water quality and deliver additional ecosystem services	1		3
KTM99 - Other key type measure reported under PoM - We will consult on and implement revised guidance for sewerage schemes for rural communities under Section 101A of the Water Industry Act 1991 and consider legislating to simplify the process.	1		3
KTM99 - Other key type measure reported under PoM - We will look at options to implement Schedule 3 of the Flood and Water Management Act 2010, which requires new developments to include SuDS features that comply with national standards.	1		3
KTM99 - Other key type measure reported under PoM - We will publish interim national standards on an advisory basis until we commence Schedule 3 of the Flood and Water Management Act 2010.	1		3
KTM99 - Other key type measure reported under PoM - Welsh Government to develop a regulatory framework that encourages sustainable, innovative solutions to waste water management	1		3
KTM99 - Other key type measure reported under PoM - Welsh Government to review legislative framework surrounding rural diffuse pollution	1		3
KTM99 - Other key type measure reported under PoM - Welsh Government to review the abstraction licensing system to inform future policy in relation to water resource management	1		3
Total number of Mapped Measures	171	149	15

Source: Member States reports to WISE

Table 9.2 *Type of basic measure mapped to Key Type of Measures in the United Kingdom*

Key Type of Measure	Basic Measure Type															
	Accidental pollution	Controls water abstraction	Cost recovery water services	Efficient water use	Habitats or Birds	Hydromorphology	IPPC IED	Nitrates	Other	Point source discharges	Pollutants diffuse	Pollutants direct groundwater	Protection water abstraction	Recharge augmentation groundwaters	Surface Priority Substances	Urban Waste Water
KTM1 - Construction or upgrades of wastewater treatment plants										5						5
KTM10 - Water pricing policy measures for the implementation of the recovery of cost of water services from industry			3													
KTM12 - Advisory services for agriculture											5					
KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)													4			
KTM14 - Research, improvement of knowledge base reducing uncertainty	1				1	3				2	3				1	1
KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances							1			1		1			4	
KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).							1			1						1
KTM17 - Measures to reduce sediment from soil erosion and surface run-off											4					
KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases	1				9											
KTM19 - Measures to prevent or control the adverse impacts of recreation including angling					1											
KTM2 - Reduce nutrient pollution from agriculture	1				1			4			3					2
KTM20 - Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants					1											
KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	1									3	11					
KTM22 - Measures to prevent or control the input of pollution from forestry											6					

KTM23 - Natural water retention measures						1										
KTM25 - Measures to counteract acidification										1	5					
KTM3 - Reduce pesticides pollution from agriculture.	2				1						6					
KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)											9	1				
KTM5 - Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams)						3										
KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity						10										
KTM7 - Improvements in flow regime and/or establishment of ecological flows		2		4		1								3		
KTM8 - Water efficiency, technical measures for irrigation, industry, energy and households				5												
KTM99 - Other key type measure reported under PoM		4			2	4		2	1	3	18				4	4

Source: Member States reports to WISE

Key:

‘Accidental pollution’ = Article 11(3)(l): Any measures required to prevent significant losses of pollutants from technical installations and to prevent and/or reduce the impact of accidental pollution incidents.
‘Controls water abstraction’ = Article 11(3)(e): Controls over the abstraction of fresh surface water and groundwater and impoundment of fresh surface waters including a register or registers of water abstractions and a requirement for prior authorisation of abstraction and impoundment.
‘Cost recovery water services’ = Article 11(3)(b): Measures for the recovery of cost of water services (Article 9).
‘Efficient water use’ = Article 11(3)(c): Measures to promote efficient and sustainable water use.
‘Habitats or Birds’ = Habitats Directive (92/43/EEC) or Birds Directive (2009/147/EC)
‘Hydromorphology’ = Article 11(3)(i): Measures to control any other significant adverse impact on the status of water, and in particular hydromorphological impacts.
‘IPPC IED’ = Integrated Pollution Prevention Control Directive (96/61/EC) and the Industrial Emissions Directive (2010/75/EU) .
‘Nitrates’ = Nitrates Directive (91/676/EEC).
‘Other’ = Other Directives mentioned in Part A of Annex VI of the WFD.
‘Point source discharges’ = Article 11(3)(g): Requirement for prior regulation of point source discharges liable to cause pollution.
‘Pollutants diffuse’ = Article 11(3)(h): Measures to prevent or control the input of pollutants from diffuse sources liable to cause pollution.
‘Pollutants direct groundwater’ = Article 11(3)(j): Prohibition of direct discharge of pollutants into groundwater.
‘Protection water abstraction’ = Article 11(3)(d): Measures for the protection of water abstracted for drinking water (Article 7) including those to reduce the level of purification required for the production of drinking water.
‘Recharge augmentation groundwaters’ = Article 11(3)(f): Controls, including a requirement for prior authorisation of artificial recharge or augmentation of groundwater bodies.
‘Surface Priority Substances’ = Article 11(3)(k): Measures to eliminate pollution of surface waters by Priority Substances and to reduce pollution from other substances that would otherwise prevent the achievement of the objectives laid down in Article 4.
‘Urban Waste Water’ = Urban Waste Water Treatment Directive (91/271/EEC).

9.1.4 Pressures for which gaps to be filled to achieve WFD objectives and the Key Types of Measure planned to achieve objectives

Member States are required to report the gaps that need to be filled to achieve the WFD Environmental Objectives in terms of all significant pressures on surface waters and groundwaters, in terms of Priority Substances causing failure of good chemical status and in terms of River Basin Specific Pollutants causing failure of good ecological status/potential. Member States were asked to report predefined indicators of the gaps to be filled or other indicators where relevant. Values for the gap indicators were required for 2015 and 2021, and were optional for 2027.

The information reported in WISE on the gaps to fulfil to achieve good ecological status include detailed data on the significant pressures on surface and groundwaters that may cause failure on the environmental objectives. For chemical status, the Member States reported the specific chemical substances causing failure.

This information is reported at the sub-unit level. Sub-units are smaller geographic areas within particular RBDs identified by Member States. Not all Member States have defined and reported sub-units.

Member States were required to report which KTMs are to be made operational to reduce the gaps to levels compatible with the achievement of WFD environmental objectives. A number of indicators were predefined for each KTM. Values of the indicators for the second and subsequent planning cycles were also to be reported to give an indication of the expected progress and achievements: the values for 2027 could be optionally reported. This means that the value of the indicator will be reduced with time as measures are implemented. A value of zero is comparable with 100 % good ecological status or potential or good chemical status.

This information was reported at sub-unit level, or at RBDs level if sub-units have not been reported by the Member State.

9.2 Main changes in implementation and compliance in the first cycle

In general, the amount and quality of readily available information has improved between the two cycles as a result of the revised reporting schema. Therefore, there is often no equivalent information for the first cycle and it is difficult to make direct comparisons between the two cycles on what has changed significantly. However, there does appear to be a greater range of River Basin Specific Pollutants reported for the second cycle compared to the first, even though measures may not be in place to address the failures they cause. Progress has been

fairly good overall with seven out of the 15 RBDs stating that all measures had been completed, three RBDs reporting that some of the planned measures had been completed and five RBDs reporting that all planned measures had been started. Obstacles reported to have affected implementation include lack of finance which was identified for the majority of RBDs and lack of a mechanism for implementation as well as measures not being cost-effective. Lack of available measures was identified but to a lesser extent.

All of the United Kingdom RBDs provided a summary document on the main changes that have taken place between the two cycles. Information from the RBMP for Scotland (Scotland RBD) highlights the work of Scottish Environment Protection Agency, Scottish Water and the Scottish Government alongside other general measures. More detail is given in the background documents, related to work in collecting more information about water bodies, developing and refining methods and standards, and refining water body boundaries. 179 water bodies reached their improvement target with 47 needing further improvement to meet the objective. Reasons why targets were not reached include unfeasibility of measures and disproportionate expense. Deterioration occurred in 3.3 % of water bodies, where modifications were permitted to enable increased hydropower or to secure drinking water supplies. Water quality was protected in all drinking water protected areas but targets were not met in other protected areas. Changes in the second plan have been made in response to improvements in understanding pressures and impacts, significant management challenges and understanding where to prioritise action.

Further information was sourced from the RBMPs in England (e.g. South West RBD) which has a separate chapter detailing changes from 2009 to 2015: i) Improvements in evidence: for example, classification has been based on more monitoring results; investigations have been carried out to identify why objectives have not been met; classification methods have been improved; and there is better mapping of the water body network; ii) Most of the measures summarised in the 2009 plans have been completed. A small number (19) of measures were not completed, either because they were no longer needed, not funded or there was no mechanism to implement it. Around 140 additional measures are under way in the South West RBD. Most measures have resulted in improvements to the water environment, but some did not and 15 water bodies (all surface water and not included exemptions) have deteriorated since 2009. Reasons for this are explained, including additional pressures, the effect of one-out-all-out, standards not being tight enough and measures not being as effective as predicted.

Information obtained from Northern Ireland (e.g. the Neagh Bann RBMP) outlines changes made to classification as part of a UK Technical Advisory Group technical review. This includes revisions to ecological assessment methods, water quality standards and standards for

river flow and lake levels. A few water bodies have deteriorated and these will be investigated to determine the reason why and put measures in place to reverse the trend.

New legislation or regulations were required to implement the PoM in the first cycle in all 15 RBDs reported.

9.3 Progress with European Commission recommendations

- Recommendation: *address the large uncertainties reported in the first RBMPs in relation to the assessment of the status, the pressures and the effect of potential measures.*

Assessment: the information reported for this topic demonstrates that some progress has been made in relation to reducing uncertainty in terms of both pressures and the effect of potential measures. Reported indicators of the gaps to be filled for significant pressures on groundwater and surface waters are reported across RBDs and where values are provided these usually show a decrease from 2015 through to 2027 as expected. The information relating to indicator values for the level of progress expected in the implementation of the Key Types of Measure are less consistently reported throughout the United Kingdom RBDs. The values reported for several years indicate that a value has not been defined. Indicator gaps (the degree to which a particular pressure needs to be reduced to achieve WFD objectives) for other significant pressures (e.g. Introduced species and diseases, Anthropogenic pressures - Historical pollution) have mostly been reported for the United Kingdom RBDs for 2015, 2021 and 2027 but with some values not reported (i.e. not defined) comprehensively for several RBDs. As expected, where values are reported these values decrease from 2015 to 2027. In terms of indicator values for KTM, reporting is not as consistent as the reporting of indicator gaps relating to pressures. This recommendation is partially fulfilled.

- Recommendation: *more information needs to be included in the RBMPs on the methodology used to identify significant pressures and how this analysis feeds into the development of monitoring programmes and how the measures defined address the significant pressures.*

Assessment: the information presented for this Topic relates to the latter part of the recommendation in terms of how the measures defined address the significant pressures. The information provided demonstrates that progress has been made as KTMs have been made operational (i.e. measures have been adopted, implemented and

being used/planned to be used) to address significant pressures for which gaps to reach good status have been defined (although not for all pressures and across all RBDs, for example, in the Scotland RBD significant pressures causing failure are identified under seven different categories covering point sources, diffuse sources and abstraction or flow diversion whereas Key Types of Measure only relate directly to one of these significant pressures - 2.8 - Mining). This recommendation is partially fulfilled.

- Recommendation: *be more transparent in the next cycle in the decision process in terms of the point (ratio) where measures become disproportionately expensive and how this relates to the level of confidence required before decisions to take measures are made.*

Assessment: progress has been demonstrated through application of a modified approach (e.g. as outlined in the part two of the RBMPs for England and Wales - "overview and additional information") and through the use of catchment economic appraisals. Disproportionate costs are made on a judgement based on costs, benefits (i.e. due to an unfavourable balance of costs and benefits), affordability and resource availability. This recommendation is fulfilled.

- Recommendation: *increase the focus on verifying the effectiveness in the second RBMPs cycle of current basic measures (checking whether they are properly enforced).*

Assessment: progress has been made on verifying effectiveness as information is provided on the gaps to be filled for significant pressures on surface waters and groundwaters although, as mentioned above, the information is sporadic within and between RBDs but where reported often shows an appropriate decrease in the gap from 2015 through to 2027 which implies enforcement. This recommendation is partially fulfilled.

- Recommendation: *ensure that the RBMPs clearly identify the gap to good status, and that the Programme of Measures are designed and implemented to close that gap (this is particularly relevant to assess the effectiveness of the existing measures in relation to significant pressures such as agriculture and hydromorphology and which additional measures are needed to close the gap).*

Assessment: progress is demonstrated through the reported indicator gaps which show decreases from 2015 to 2027 in most UK RBDs for significant pressures from both agricultural and hydromorphological pressures. For the Scotland RBD, information on indicator gaps is lacking for measures associated with agricultural diffuse pollution and

similarly in the Northern Ireland RBDs for hydromorphological pressures. However, development of the indicator values of the level of progress of implementation of measures to close the gaps to good status is less well advanced. This recommendation is partially fulfilled.

- Recommendation: *ensure that basic (mandatory) measures required under the WFD are implemented. In addition, the United Kingdom should highlight clearly the contribution that supplementary measures are expected to make towards the achievement of WFD objectives in the second RBMP. There should be a re-focus to “harder regulation” and more enforceable supplementary measures that might make these measures more effective.*

Assessment: progress has been made in that national measures have been mapped against Key Types of Measure covering a range of basic and supplementary measures. Supplementary measures have been identified in the majority of the United Kingdom RBDs with often several supplementary measures being mapped to individual Key Types of Measure (for example Key Types of Measure relating to agricultural pollution, urban pollution and hydromorphology). From the information provided on the measures it is not possible to distinguish whether the basic and supplementary measures are mandatory or voluntary. This recommendation is partially fulfilled

Topic 10 Measures related to abstractions and water scarcity

10.1 Assessment of implementation and compliance with WFD requirements in the second cycle

10.1.1 Water exploitation and trends

In the United Kingdom, there is one RBD (Thames) with a Water Exploitation Index + of very high level, indicating unsustainability; and several other RBDs (Northumbria, Humber, Anglian, South-East and Dee) with high levels (32-35 %) close to unsustainability. Managing water abstraction pressures in these RBDs appears important to achieve the WFD objectives and avoid water scarcity situations with negative effects on the environment or water users.

There is no clear trend on water abstractions. For example, in the Thames RBD, latest estimates of direct abstraction of water from non-tidal surface and groundwater in England show an increase of 2 % from 2014. There had been a gradual decline in estimated abstractions between 2000 and 2011. Following a 13 % increase in 2012, abstraction has remained at around nine billion cubic metres a year for the past three years. Since 2011, total abstraction has increased by 14 % to 9.4 billion cubic metres.

No information on trends for the Scotland RBD or RBDs in Northern Ireland was available in the reported data or the RBMPs and their appendices.

10.1.2 Main uses for water consumption

Most of the abstraction pressure is caused by public water supply, usually from both surface water bodies and groundwater bodies. One RBD (North West) has also significant industrial water abstractions. Since 2011, total abstraction in the Thames RBD has increased driven mostly by abstraction for electricity generation, which increased from 1.4 billion cubic metres in 2011 to 2.5 billion cubic metres in 2015.

10.1.3 Measures related to abstractions and water scarcity

Within the Basic Measures reported, all groundwater and surface water abstractions are registered, and all significant abstractions require a permit. Small abstractions⁹⁰ do not require a permit. There is a concession, authorisation and/or permitting regime to control water impoundment and a register of impoundments (under Article 11(3)e). In particular for RBDs with high abstraction levels and Water Exploitation Index + (e.g. Thames, Northumbria,

⁹⁰ Member State United Kingdom subsequently clarified that such a threshold is set based on scientific evidence.

Humber, Anglian, Dee), it might be relevant to consider extending controls to all water abstractions in the RBD, including the smaller ones.

Under the United Kingdom Water Resources Act 1991, a licence must be applied for if more than 20 m³ per day is to be abstracted and all new licences are subject to a time limit and should be reviewed upon renewal. When the Environment Agency (in England) grants a licence to abstract water for the first time, it is likely to be for between six and 18 years. When a licence is renewed it will normally be for another 12 years. They may also grant short duration licences where there may be issues with the licence or water availability in the longer term, or if you only need it for a short time. In certain circumstances, the Environment Agency (in England) will consider granting licences with a longer duration time limit as long as certain conditions explained in the guidance document are met. These licences will be considered individually and they will last for no longer than 24 years. This allows for flexibility and adaptation of licences upon review; not necessarily matching the timeline of the RBMP cycles.

In Scotland, abstractions are regulated by the Water Environment (Controlled Activities) (Scotland) Regulations 2011; an authorisation may be granted for a limited period only and will be reviewed by Scottish Environment Protection Agency when deemed necessary, but at least once every four years.

In Northern Ireland, abstractions are controlled by the Water Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006. The guidance document for these regulations states that Licences issued for both abstractions and impoundments may be reviewed, modified or revoked at the request of the licence holder or if the Department of Agriculture, Environment and Rural Affairs in Northern Ireland considers it is necessary to prevent significant or serious damage to the natural environment, but does not give specific time frames for reviews.

The Environment Agency (in England) will take action to curtail time-limited licences that are not sustainable in order to protect the environment from actual or potential damage under the Water Resources Act 1991. Replacement licences are granted on a sustainable basis in line with water body objectives. The Environment Agency (in England) also implements the Restoring Sustainable Abstraction programme. This programme identified, investigated and is solving environmental risks or problems caused by unsustainable licensed water abstraction, and can curtail abstraction licences that have been identified as causing an environmental problem. The Environment Agency (in England) also has the power to revoke or amend abstraction licences to reduce any unacceptable impacts of abstraction on Natura 2000 nature conservation sites as well as Ramsar sites under the Conservation of Habitats and Species

Regulations 2010. In the consultation response document for Thames it was noted that there was general support for the new abstraction authorisation system, but any new licensing system should be based on an in-depth knowledge of the link between flows and good ecological condition and status.

In Northern Ireland, small abstractions must comply with Permitted Controlled Activities conditions, while larger permits must have a licence. Licences may be refused if the application does not meet the terms and conditions considered necessary or expedient for the purpose of protecting the water environment. Licences may be revoked if the Department of Agriculture, Environment and Rural Affairs in Northern Ireland is satisfied that the revocation is necessary in order to protect the water environment from serious damage; and the damage cannot be avoided by modifying the conditions of the licence, according to the Water Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006.

In Scotland, all water users undertaking a controlled activity have a duty to take all reasonable steps to secure efficient and sustainable water use. The Scottish Environment Protection Agency is responsible for enforcing the Regulations and therefore needs to ensure that the quantities being applied for are consistent with the efficient and sustainable use of the water required and where significant variations from these conditions arise, a better understanding of any local factors contributing to the difference must be obtained. Operators are expected to uphold the conditions of their registration or licence and the Scottish Environment Protection Agency has powers to withdraw any authorisation where its conditions are not met.

Measures promoting efficient and sustainable water use and measures for the prior authorisation of artificial recharge or augmentation of groundwater bodies were implemented in previous cycle, but no new measures or significant changes are planned.

All RBDs implement measures associated to KTM7 - Improvements in flow regime and/or establishment of ecological flows, and most of them (except Scotland) measures included in KTM8 - Water efficiency, technical measures for irrigation, industry, energy and households. Measures associated to other KTM are not foreseen to reduce water abstraction pressures.

Such measures are brought through a range of policy, legal or financial mechanisms. These include: legislation, economic instruments, codes of good practice, negotiated agreements, promotion of good practice and education.

Measures in England are implemented through a range of programmes, mainly: Water company investment programmes; Countryside Stewardship; Highways England's environment fund; flood risk management investment programme; catchment level

government funded improvements and water resources sustainability measures. It should be noted that measures of this type were implemented in the previous cycle, and no new measures or significant changes are planned in any of the second RBMPs.

In Scotland, measures to protect and improve water flows and levels are delivered through: controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water under the Water Environment (Controlled Activities) (Scotland) Regulations 2011; economic instruments under the Quality and Standards Programme (a publicly funded programme of investment by Scottish Water) and the Scottish Rural Development Programme (funding support for storage ponds for irrigation) and educational projects like the Guidance for developers of run-of-river hydropower schemes run by Scottish Environment Protection Agency.

In Northern Ireland, measures are implemented through a wide range of mechanisms, from leakage reduction targets and development of Drinking Water Safety Plans led by Northern Ireland Water to monitoring of abstractions and research programmes led by the Northern Ireland Environment Agency. A range of supplementary measures has been added to the 2015 RBMP on top of those in the first RBMP, including catchment projects, investigation programmes and new working groups.

10.2 Main changes in implementation and compliance since the first cycle

In England, water licence reviews have been increasingly carried out over the past years to adapt abstractions to sustainable levels. This is a positive evolution; however, its results in terms of achieving good water body status cannot be judged yet.

10.3 Progress with European Commission recommendations

There were no recommendations made for this topic.

Topic 11 Measures related to pollution from agriculture

11.1 Assessment of implementation and compliance with WFD requirements in the second cycle

The link between pressures and measures has been established on a general level and an appraisal of the gaps between pressures and measures has been undertaken; however due to the limited detail reported on the pressure assessment it is not clear if the measures are sufficient.

Measures to address these pressures or impacts are reported in all RBDs except the Scotland RBD: KTM3 - Reduce pesticides pollution from agriculture, KTM2 - Reduce nutrient pollution from agriculture, and KTM12 - Advisory services for agriculture, KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc). KTM23 - Natural water retention measures is found in all RBDs except Scotland and Solway Tweed. KTM17 – “Measures to reduce sediment from soil erosion and surface run-off”, is applied in the Severn, Western Wales, Dee, Neagh Bann, North Western, North Eastern RBDs. Basic measures to control pollution from agriculture are applied in Western Wales (e.g. Nitrate Action Plan, Code of good agricultural practice, Slurry, silage and agricultural fuel oil regulations [SSAFO]). The same rules apply across the whole RBD in Scotland and the three Northern Ireland RBDs. Differentiated rules are found in the Solway Tweed RBD. All other RBDs apply the rule only in Nitrate Vulnerable Zones. In all RBDs except the Western Wales RBD, the rules cover nitrates. In the three Northern Ireland RBDs, phosphorus and pesticides are also covered.

It was not clear in any RBDs whether the measures being recommended were entirely mandatory or voluntary. In many cases measures are based on regulations making them mandatory, but there are many other measures which are likely to be voluntary schemes. RBMPs contain, or have links to, a summary of measures, but it was not clear in these documents whether measures are mandatory or voluntary⁹¹. For Scotland, the measures were not linked to the Key Types of Measure. In most cases, more detail on the measures used is available in background documents.

In England, the Catchment Based Approach framework was set up to establish independently-led, voluntary partnerships in each management catchment to engage local communities and encourage wider participation in identifying the local pressures, agreeing priorities and

⁹¹ The UK subsequently indicated that, in England the mandatory measures to control pollution from agriculture are listed on pages 36 to 38 of the part of the RBMP called, “Information on mechanisms for the Water Framework Directive”.

planning on-going actions to tackle the priorities. The United Kingdom government has provided upwards of £9m of funding and operational support for projects delivered via Catchment Partnerships with more than 1,500 organisations in England. It is not clear how funding is split between different funds and how much of the costs for measure implementation are borne by the farmers.

Farmers and Farmers' Unions have been consulted under the Public Consultation process in all basins.

Financing of agricultural measures is secured in all basins, except those in Northern Ireland and Scotland. The source of funding to be mainly national funds such as:

- In England national sources include: Catchment Partnership action funds, Environment Agency Environment Programme, Water Company Investment programmes (National Environment Programme).
- In Scotland projects which help to achieve RBMP objectives can be eligible for assistance grant funding from the Water Environment Fund, and other schemes such as the Scottish rural development programme, but it is not clear how much funding has been allocated to agricultural projects and how much is funded by farmers.
- In Northern Ireland both public and private funds have been identified. Public funds include European Union Rural Development Programme, Catchment Partnerships, Partnerships between government and NGOs. In Northern Ireland, there are nine measures linked to agriculture, with both Northern Ireland Environment Agency and the Department of Agriculture, Environment and Rural Affairs (previously the Department of Agriculture and Rural Affairs) responsible for implementation. Funding has been secured for three of these measures. The Department of Agriculture and Rural Affairs estimated that funding from the Environmental Farming Scheme (a key element of the Rural Development Programme 2014-2020) linked to water quality, ranges from £15 m-£30 m and, therefore, the mid-point of this was assumed. However, it is important to note that a large portion of this will be funded by the European Union, estimated to be around 60 %. Table 4.1 of the document 'Economic Analysis Paper' gives funding splits between public and private sector for these measures.
- In Wales sources of funding include: the Rural Development Programme 2014-2020; Natural Resources Wales WFD funding; Natural Resources Wales Environment funding.

Information for the investments for agricultural measures between 2009 and 2015 is provided.

It remains unclear if the application of the polluter pays principle in the agricultural sector has been fully implemented.

11.2 Main changes in implementation and compliance since the first cycle

The types of pressures from agriculture have not changed and the types of measures applied seem to be the same. A gap assessment was missing in the first cycle but has been carried out as part of the measures appraisal in the second cycle.

11.3 Progress with European Commission recommendations

The Commission recommendation based on the first RBMPs and PoM requested action on the following:

- Recommendation: *provide a clear strategy that defines the basic/mandatory measures that all farmers should adhere to and the additional supplementary measures that can be financed because the United Kingdom is a country where agriculture is indicated as exerting a significant pressure on the water resource in all RBDs. This strategy should aim at solving the problem of pollution from N, P, organic pollution, sediment, and pesticides. It should involve the implementation of WFD basic measures (including the Nitrates Directive) and supplementary measures at a level that will ensure the achievement of WFD good status.*

Assessment: further information obtained from the RBMP of the Anglian RBD, shows that the effectiveness of measures implemented prior to the RBMP (both those included in the 2009 plans and any additional measures) is assessed on a qualitative basis. A full quantitative assessment of all programmes was not possible. In the Scotland RBD, the RBMP includes details of what programmes have previously been implemented but does not provide an assessment of their effectiveness. In the Northern Ireland RBDs, the reasons for failure to reach the required standards are discussed but not specifically in relation to agricultural issues or the Nitrates Directive. General binding rules are used in all RBDs. In these areas most measures not covered under the Nitrates Directive are on a voluntary basis. In Scotland, basic measures are also implemented under the Water Environment (Controlled Activities) (Scotland) Regulations 2011, and other relevant legislation. Detailed descriptions of Programmes of Measures are given in the RBMPs, including the voluntary Countryside Stewardship programme for which funding comes from Common

Agricultural Policy monies. Supplementary measures for agricultural pollution are not specifically discussed, but it is assumed that these will be implemented through voluntary schemes such as Countryside Stewardship. In Scotland, most supplementary measures are on a voluntary basis, with measures including education programmes and codes of practice. Some funding is supplied through the Scottish Rural Development Programme which, in some cases, is linked to the General Binding Rules. No information is given on their expected effectiveness. Northern Ireland uses a whole territory designation approach for the Nitrates Directives, so all areas are covered by statutory regulations. Supplementary measures are listed in the RBMP; all appear to be on a voluntary basis. Specific funding routes for agricultural measures include funds from the Rural Development Programme, with remaining monies coming from both public and private sources. Overall, it appears that the recommendations have been partially fulfilled.

Topic 12 Measures related to pollution from sectors other than agriculture

12.1 Assessment of implementation and compliance with WFD requirements in the second cycle

In the context of this topic, pollution is considered in terms of nutrients, organic matter, sediment, saline discharges and chemicals (priority substances, river basin specific pollutants, groundwater pollutants and other physico-chemical parameters) arising from all sectors and sources apart from agriculture. KTM are groups of measures identified by Member States in their Programmes of Measures which target the same pressure or purpose. A KTM could be one national measure but would typically comprise more than one national measure. The same individual measure can also be part of more than one KTM because it may be multipurpose, but also because the KTMs are not completely independent of one another.

Key Types of Measure relevant to non-agricultural sources of pressures causing failure of WFD objectives have been reported for all RBDs in the United Kingdom. These Key Types of Measure reported are:

- KTM1 – Construction or upgrades of wastewater treatment plants.
- KTM4 – Remediation of contaminated sites.
- KTM6 – Improving hydromorphological conditions of water bodies other than longitudinal continuity.
- KTM10 - Water pricing policy measures for the implementation of the recovery of cost of water services from industry
- KTM12 – Advisory services for agriculture (addressing forestry).
- KTM 14 – Research, improvement of knowledge base reducing uncertainty.
- KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances.

- KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).
- KTM17- Measures to reduce sediment from soil erosion and surface run-off.
- KTM21 – Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure.
- KTM22 – Measures to prevent or control the input of pollution from forestry.
- KTM25 – Measures to counteract acidification.
- KTM99 – Other key types of measure reported under PoM, principally measures to prevent or control diffuse and point source discharges from mines.

The WFD specifies that the PoM shall include, as a minimum, “basic measures” and, where necessary to achieve objectives, “supplementary measures” when basic measures are not enough to address specific significant pressures. Quantitative information (number of measures per KTM) on basic and supplementary measures used to tackle pollution from non-agricultural sources is provided in all RBMPs in the United Kingdom.

The RBMPs in the United Kingdom provided more targeted information on basic measures required under Article 11(3)(c to k) as follows. Use of an authorisation and/or permitting regime to control waste water point source discharges (Basic measures Article 11(3)(g)) was reported for all RBDs in the United Kingdom for surface waters and groundwaters. A register of waste water discharges (Basic measures Article 11(3)(g)) is available in all RBDs in the United Kingdom for surface waters and groundwaters.

Small waste water discharges do not require permits but are required to be registered in 10 RBDs in the United Kingdom. Small waste water discharges are reported to be exempted from controls in the Solway Tweed RBD. There are no thresholds below which waste water discharges do not require permits in the four RBDs in Scotland and Northern Ireland. In Scotland all direct discharges to groundwater are prohibited. Some direct discharges to groundwater are authorised in accordance with Article 11(3)(j) in all other RBDs in the United Kingdom.

The UK reported that measures to eliminate or reduce pollution from Priority Substances and other substances (Basic measures Article 11(3)(k)) are in place in all RBDs in the United Kingdom.

Concerning measures for Priority Substances causing failure, the Neagh Bann RBD reported six Priority Substances causing non-achievement of good status. Reduction of these Priority Substances is a supplementary measure addressing diffuse and point source pollution of surface and groundwaters from chemicals. The actions proposed are generic (e.g. implementation of European Union Registration, Evaluation, Authorisation and Restriction of Chemicals regulations) and do not address specific Priority Substances. The delivery mechanism and lead agencies are outlined in the plan. There is no information on funding for the measures. The Scotland RBD identified five Priority Substances causing failure. There are generic measures in the summary of the PoM which cover the control of Priority Substances from point sources and urban diffuse sources liable to cause pollution and measures to secure compliance. However, no substance specific measures were found. No specific measures were found in the RBMPs in England or appendices relating to Priority Substances.

As far as measures for River Basin Specific Pollutants causing failure in Northern Ireland are concerned, reduction in pollution is a generic measure under several pressure types including mining and urban. The measures and actions do not appear to be specific to River Basin Specific Pollutants. The delivery mechanism and lead agencies are outlined. There is no information on funding for the measures. In the Scotland RBMP, there are generic measures in the summary of the PoM which cover the control on point and diffuse sources liable to cause pollution. The measures do not appear to be specific to River Basin Specific Pollutants and implementation of other basic measures for diffuse sources is reported. No substance specific measures were found in the RBMPs in England or appendices relating to specific pollutants. In Northern Ireland, reduction in pollution is a generic measure under several pressure types including mining and urban. The delivery mechanism and lead agencies are outlined. There is no information on funding for the measures.

Similarly, as for surface waters, the Programmes of Measures for groundwater do not link single substances or pollutants to measures. In the Scotland RBMP, there are generic measures in the summary of the PoM which cover the control on point and diffuse sources liable to cause pollution. The measures are not specific to pollutants causing failure of good chemical status in groundwater, implementation of other basic measures for diffuse sources is reported. No specific measures were found in the RBMPs in England or appendices relating to specific pollutants causing failure of good chemical status in groundwater.

12.2 Main changes in implementation and compliance in the first cycle

In the first RBMP no information was found on substance-specific measures in Northern Ireland or Scotland but some was found for English and Welsh RBDs. The reported data for the second cycle indicates that for Scotland KTMs have been reported for all Priority Substances and other substances causing non-compliance. No substance-specific measures were found for the Northern Ireland RBMPs.

12.3 Progress with European Commission recommendations

The Commission made one recommendation relevant to this topic based on the first RBMPs and first Programmes of Measures, as follows:

- Recommendation: *the identification of river basin specific pollutants needs to be more transparent, with clear information on how pollutants were selected, how and where they were monitored, where there are exceedances and how such exceedances have been taken into account in the assessment of ecological status.] It is important to take an ambitious approach to combatting chemical pollution and that adequate measures are put in place.*

Assessment: although the UK reported that measures to eliminate or reduce pollution from Priority Substances and other substances are in place in all RBDs in the United Kingdom, the measures are generic, i.e. they do not address individual substances.

Topic 13 Measures related to hydromorphology

13.1 Assessment of implementation and compliance with WFD requirements in the second cycle

Significant hydromorphological pressures are identified in all 15 reported RBDs. For the 12 RBDs in Scotland, England and Wales, operational Key Types of Measure to address hydromorphological pressures are reported in WISE. The RBMP for Scotland describes how barriers will be removed, either by creating fish passes or physically removing barriers such as abandoned weirs. The RBMPs for England and Wales describe local measures to be taken in each management catchment. The measures vary between the catchments but overall measures include restoration of continuity, removal of weirs and habitat restoration.

The main Key Types of Measure made operational to reduce hydromorphological pressures are KTM5, 6, 7 (for abstraction pressures) and KTM99-other measures.

For the three RBDs in Northern Ireland, relevant Key Types of Measure (KTM5, KTM6, KTM7) are reported as mapped against national measures but have not been reported in WISE as tackling specific significant pressures on hydromorphology. The RBMP refers to a "prioritisation of issues" such as barriers to fish migration and to co-ordination of river restoration and continuity work by 2020. However, there is no reference to the implementation of specific technical measures to address the prioritised issues. Although hydromorphological pressures are recognised, in most RBDs the actions included to tackle these in the second RBMPs are of a preparatory nature⁹².

For the majority of water bodies reported to have significant hydromorphological pressures (mainly physical alterations and dams/barriers and locks), the related sectors are not specified as one of the key sectors indicated in the WISE reporting. The only sector clearly associated to significant physical alterations is flood protection⁹³.

There is an authorisation and/or permitting regime in place to control physical modifications according to WFD Article 11(3)i, which covers changes to the riparian area of water bodies, in all RBDs. However, a register of physical modifications of water bodies is in place only in two of the 15 reported RBDs (Scotland and Solway Tweed).

⁹² UK subsequently informed the Commission that in England, indicators to support KTM6 (hydromorphology) are currently implemented for Flood Risk Management activities - across all RBDs. Our 'kilometres enhanced' metric also supports the KTM6 measures to tackle hydromorphological pressures.

⁹³ UK subsequently clarified that in England, sectoral analysis is undertaken for our pressures as part of our investigation into pressures and in developing programmes of measures. Water body action plans are used to inform sectoral plans (e.g. Water Company programmes).

Quantitative management objectives in terms of river continuity have been set in two out of the 15 reported RBDs (Scotland and Solway Tweed). At the same time, KTM5 (Improving longitudinal continuity) is reported for all RBDs in Scotland, England and Wales. As mentioned above, the RBMP of Scotland includes specific actions to improve access for fish migration. Also in the RBDs for England and Wales, specific measures to restore continuity are planned in several management catchments.

Concerning the link between hydromorphological measures and the revision of permits, for the Scotland RBD, there is reference to the introduction of regulatory controls enabling the regulating authority to work with operators of dams and weirs to ensure steps necessary for fish migration. In the RBMPs for England, Wales and Northern Ireland, there is reference to provisions of new licences and permits to ensure fish passes, but not to revisions of existing permits. However, the RBMPs include statements on identifying measures to mitigate adverse impacts from physical modifications.

Win-win measures in terms of achieving the objectives of the WFD and Floods Directive⁹⁴, drought management and use of Natural Water Retention Measures are reported to be included in the PoM of all RBDs. The RBMPs for England and Wales make general reference to Natural Water Retention Measures, for example with regard to wetland creation, coastal realignment and creation of buffer strips next to watercourses.

The specific KTM23 on Natural Water Retention Measures is applied in 10 RBDs but mainly associated to addressing diffuse pollution pressures related to agriculture. Furthermore, the design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, is reported to have been adapted to take into account the WFD objectives in all RBDs.

In the RBDs of Scotland, England and Wales, ecological flows have been derived for all relevant water bodies, but have been implemented only in some of the water bodies (work is reporting to be still ongoing). In Scotland, the RBMP identifies the water bodies which are adversely affected by pressures on water flows and levels. Approximately a third of these are affected by hydroelectricity schemes that do not involve water storage in reservoirs. Their permits already require that the impact from pressures on flow is minimised, therefore no further action is envisaged. Further work is scheduled to improve water flows and levels in a number of water bodies, while for others, more evidence will be gathered to confirm if action is needed. The RBMPs for England and Wales include general information on planned measures to address changes to the natural flow and level of water in terms of changes in

⁹⁴ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

abstraction licences and implementation of demand management and water efficiency techniques. A factsheet on the 'Environmental Flow Indicators' states that these indicators are used to indicate where abstraction pressures may start to cause an undesirable effect on river habitats and species. There is no indication where the environment is damaged from abstraction. The indicator on the compliance with the environmental flows helps to indicate where flow may or may not support good ecological status. In Catchment Abstraction Management Strategies, these indicators help to indicate where water may be available for future abstraction without causing unacceptable risk to the environment.

In the three RBDs of Northern Ireland, ecological flows have been only derived for some relevant water bodies but have not been implemented yet. There are plans to do so in the second cycle and the PoM states that Northern Ireland will consider the Common Implementation Strategy guidance on ecological flows during the next review of the United Kingdom Technical Advisory Group Environmental Flow Standards.

Indicators on the gap to be filled for hydromorphological pressures are reported for the RBDs in Scotland, England and Wales but not for Northern Ireland.⁹⁵ In some cases, the baseline values of the indicators for 2015 are missing, which does not allow an assessment of the ambition in reducing the gap between 2015 and 2021. Where information given is consistent, the level of ambition in closing the gap by 2021 is different between RBDs but overall not very high. There will be certain reduction of either the number or the area of water bodies affected by physical alterations by 2021. According to the reported indicators, the level of ambition to close the remaining gap between 2021 and 2027 seems very high. There is the intention to have a reduction of several hundreds of water bodies affected by significant hydromorphological pressures from 2021 until 2027.

13.2 Main changes in implementation and compliance in the first cycle

Significant changes compared to the first RBMPs are noted only for some RBDs in relation to hydromorphological measures. In the first RBMPs, no clear links were identified between hydromorphological pressures and measures. In the second RBMPs and due to the more detailed reporting, operational Key Types of Measure to address hydromorphological pressures are explicitly reported for the RBDs in Scotland, England and Wales.

⁹⁵ The authorities of Northern Ireland subsequently informed that, at the time of reporting, Northern Ireland identified and reported a wide range of pressures. In order to rationalise the reporting, and in the absence of a common definition, Northern Ireland's interpretation of significant was based on those pressures occurring most widely. Hydromorphological pressures did not fall into this category and therefore indicators and gaps were not reported.

The second RBMPs for Scotland, England and Wales summarise achievements between 2009 and 2015, also in respect of measures targeting physical modifications. General comments are made on the effectiveness of measures implemented and improvements in the evidence basis are explained. However, there is no explicit comparison of the first and second cycle measures.

13.3 Progress with European Commission recommendations

The Commission recommendations based on the first RBMPs and first cycle PoM requested action on the following:

- Recommendation: *ensure that the RBMPs clearly identify the gap to good status, and that the Programme of Measures are designed and implemented to close that gap (this is particularly relevant to assess the effectiveness of the existing measures in relation to significant pressures such as agriculture and hydromorphology and which additional measures are needed to close the gap).*

Assessment: overall, in the second RBMPs, operational Key Types of Measure to address hydromorphological pressures are explicitly reported for the RBDs in Scotland, England and Wales. Indicators on the gap to be filled for hydromorphological pressures are reported for the RBDs in Scotland, England and Wales but not for Northern Ireland. Indicators on the Key Types of Measure to tackle hydromorphological pressures are only reported for the Scotland and Solway Tweed RBD⁹⁶. In some cases, the baseline values of the indicators for 2015 are missing, which does not allow an assessment of the ambition in reducing the gap between 2015 and 2021.

Therefore, this recommendation has been partially fulfilled.

- Recommendation: *consider and prioritise the use of green infrastructure and/or natural water retention measures that provide a range of environmental (improvements in water quality, increase water infiltration and thus aquifer recharge, flood protection, habitat conservation etc.), social and economic benefits which can be in many cases more cost-effective than grey infrastructure.*

Assessment: win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and use of Natural Water Retention Measures are included in the PoM of all RBDs. The RBMPs for England and Wales make general reference to Natural Water Retention Measures, for example with regard to wetland creation, coastal realignment and creation of buffer strips next to watercourses. In the

⁹⁶ UK subsequently clarified that in England, indicators to support KTM6 (hydromorphology) are currently implemented for Flood Risk Management activities - across all RBDs.

RBMPs of Scotland and Northern Ireland, there is reference to educational measures and awareness around sustainable drainage systems, but there is no information on whether or not Natural Water Retention Measures are prioritised over grey infrastructure. The RBMPs for England and Wales refer to local government incorporating green and blue infrastructure into regeneration schemes where possible.

Therefore, based on the information available, this recommendation is fulfilled.

Topic 14 **Economic analysis and water pricing policies**

14.1 Assessment of implementation and compliance with WFD requirements in the second cycle and main changes in implementation and compliance since the first cycle

Cost recovery is explained for water supply and sewage services, generally not for broader services (e.g. self-services and navigation). For the Scotland and Solway Tweed RBDs, additional information is given for where also infrastructure for flood protection, infrastructure for navigation, irrigation water abstraction, treatment and distribution, and self-abstraction. But it is not clear in all cases from the information provided whether cost recovery is applied or not for every specific water service/use (there also are differences regarding the use of Article 9(4) in the different RBDs).

Cost recovery is explained in general but not transparently presented for all relevant user sectors in all RBDs.

Environmental and resource costs are not calculated or internalised in the second cycle.

For the RBDs in England, the economic analysis of water use was reviewed in accordance with WFD Article 5(2) and new estimates of the costs and benefits of measures were made at local level (in more than 300 local appraisals) in accordance with WFD annex III subparagraph (b). The new estimates were summarised at length in the RBMPs. The updated analysis of costs represents the environmental and resource costs to be internalised in line with the polluter pays principle and estimated by the cost-based approach. The updated analysis of benefits of all technically feasible measures represents the external environmental and resource costs as estimated by the benefit-based approach⁹⁷.

Measures taken to ensure efficient use of water are explained in the RBMPs. No charges are applied to users for water in Northern Ireland.

As in the first cycle, the use of the polluter pays principle was reported.

The economic analysis has been reported as updated for some RBDs, for others partially, while for the Western Wales RBD it was not updated.

⁹⁷ Based on “Assessment of Environmental and Resource Costs in the Water Framework Directive. Information sheet prepared by Drafting Group ECO2 Common Implementation Strategy, Working Group 2B. June 2004”

Due to the limited modifications in comparison to the first cycle, no major improvements in implementation are noted.

14.2 Progress with European Commission recommendations

The Commission recommendations based on the first RBMPs and PoM requested action on the following:

- Recommendation: *the cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are "self-services", for instance self-abstraction for agriculture. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs shall be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.*

Assessment: water services are managed differently in the United Kingdom RBDs, because of different national laws and water utilities. Cost recovery rates are presented only for water supply and sewage services combined (and not for all RBDs).

The data reported to WISE show that Scotland defines water services as water supply and waste water services, infrastructure for flood protection, infrastructure for navigation, irrigation water abstraction, treatment and distribution, and self-abstraction. Northern Ireland defines water services as drinking water abstraction (surface and/or groundwater), treatment and distribution and sewage collection and wastewater treatment. This is reiterated in the RBMPs but not described in further detail. In England, water services are described as drinking water abstraction (surface and/or groundwater), treatment and distribution and sewage collection and wastewater treatment (when considered together). This is reiterated in the RBMPs but not described in any further detail.

According to the data reported in WISE, Article 9(4) is applied in Northern Ireland (all three RBDs) and the RBD Scotland for drinking water. Regarding wastewater, it is applied in Northern Ireland (all three RBDs), the RBD Scotland and the Solway Tweed RBD. It is not applied in any of the RBDs in England and Wales.

Not all activities that are related to a significant pressure and are not exempted under Article 9(4), have been defined as a water service. For example, "Abstraction or flow diversion - Agriculture" in Scotland is mentioned as a pressure but is not a water service, as well as "Physical alteration of channel/bed/riparian area/shore - Flood protection" in Northern Ireland and diffuse agricultural pollution in all RBDs.

It is not clear from the information provided whether cost recovery is applied or not for a water service (or whether Article 9(4) is used) while there is an important pressure linked with this activity.

Cost recovery rates are based on a narrow definition of water services in most RBDs (except Scotland and Solway Tweed RBDs) and the calculation of cost recovery rates is provided only for water supply and sewage services combined. A calculation and presentation of cost recovery contributions from water uses is indicated as "not done" on WISE, while it indicates that households, agriculture and industry benefit from the water services of drinking water/sewage in all RBDs. However, it is also reported that the economic analysis does not include calculations relating to the contribution of each of the water uses to the cost recovery of water services, except for the three Northern Ireland RBDs, where the updated Article 5 report provides the detail and statistics on each of the key sectors which are the biggest users in terms of water. No further information on cost recovery was provided in the respective RBMPs.

The English RBMPs have a section which discusses the contributions made by various water uses to the cost recovery for water services and discusses economic regulation and water metering at a general level, but there is no specific information about whether the contribution of different water uses (disaggregated into at least households, agriculture and industry) to cost recovery of water services has been calculated.

Overall, only slight progress regarding this recommendation has been made for the second RBMPs and consequently this recommendation is not fulfilled.

- Recommendation: *take measures on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water (for example, in Northern Ireland, there is no metering or volumetric charging of domestic customers). Information on how the polluter pays principle has been taken into account should be provided in the second RBMPs.*

Assessment: the following issues have been identified:

Scotland reported that the metering of non-households ensures that an adequate contribution to water services is provided by industry and agricultural users and to improve implementation of the polluter pays principle. The Scottish Environmental Protection Agency has proposed a new charging scheme that was meant to come into effect in April 2016 for discharges to the environment and abstractions. The risk-based control regime, together with the risk-based charging scheme, is reported to make a significant contribution to the delivery of the stated environmental objectives by providing adequate incentives to ensure efficient water use, and to minimise resource and environmental costs. Therefore, cost recovery is described in the RBMPs and relevant documentation.

Northern Ireland reports that the Water and Sewerage Services Order 2006 provides the regulatory and financial framework for the water and sewerage industry. It sets out the framework for funding of water and sewerage services to be met by consumers. It is stated that water pricing is in place for agriculture and industry and trade effluent charges are also in place. Households make a contribution through the domestic regional rate. The relative contributions made by different sectors were considered in terms of Gross Value Added to the economy and employment. Also here, cost recovery is not transparently presented for all relevant user sectors.

No major advances on "adequate incentives" were reported in the RBMPs.

In Scotland, households are reported to be charged on a flat rate basis linked to local taxation. This is justified by the fact that because Scotland is a water rich country, the lack of direct incentives to conserve water will not compromise the achievement of the objectives of the WFD. All non-household customers (including industry and agriculture operators) are reported to be metered where it is practicable. Scotland also reported that in April 2008 retail competition was introduced for all non-household water customers. The separation of the retail activities from wholesale is reported to have sharpened the incentives for water retailers to find solutions for their customers that minimise water use and the discharges to sewers. National publicity campaigns encourage households to conserve water are carried out regularly through press and television advertising, and the Climate Change (Scotland) Act places a duty on Scottish Water to promote water efficiency. Metering trials were reported to be underway to gain a better understanding of water usage in the home so that water efficiency measures can be better targeted. The Scottish Environmental Protection Agency has proposed a new charging scheme that was meant to come into effect in April 2016 for discharges to the environment and abstractions. The risk-based control regime, together

with the risk-based charging scheme, is reported to make a significant contribution to the delivery of the stated environmental objectives by providing adequate incentives to ensure efficient water use, and to minimise resource and environmental costs. The scheme builds on the existing scheme by adding a number of further incentives and stronger penalties:

1. The annual charges for operators will be determined by the size of the environmental footprint of the activity.
2. Charging for discharges is determined by the pollutants discharged over the previous three years, so that those discharging more pay more.
3. Abstraction charges are determined by the net loss of water from the environment, so those using more pay more.
4. Impoundment charges are determined by volume.
5. Engineering charges are determined so that higher risk activities pay more.

Northern Ireland considers the water pricing policy for households to meet the conditions set out in Article 9(4) of the WFD, but the justification should be bolstered and there is no report of improvements. They reported, however, that Northern Ireland Water currently runs an extensive programme for promoting and improving water efficiency and conservation, with measures aiming at reducing leakage and demand. Water pricing is in place for agriculture and industry through predominately metered water charges.

In England current meter penetration is over 50 % and this is expected to rise to 66 % by 2020 and 82 % by 2040 (as reported in the water companies' water resources management plans).

Almost no new measures have been taken in the second cycle to ensure efficient use of water. The key issue in Northern Ireland (no charges for water) is not being tackled.

Information on how the polluter pays principle has been taken into account differs from region to region, but in no region it is comprehensively provided.

Scotland requires operators to take any action necessary for the delivery of environmental objectives, in line with the impact of their activity on the environment, which is said to reflect the Polluter Pays Principle. This regime is stated to be the key tool for delivering the PoM. The Scottish Environmental Protection Agency has put in place a charging scheme which is said to reflect the Polluter Pays Principle as follows:

- 1) It aims to allocate costs fairly across all water users, including industry, water service providers, and agriculture.
- 2) It focuses upon activities that are likely to have the greatest impact on the water environment.
- 3) It provides an exemption from charging for those delivering an environmental service.

Northern Ireland reports that the water pricing arrangements for the agriculture and industrial sectors are metered and charged according to usage which promotes the Polluter Pays Principle.

In England, the costs of measures are said to be broadly allocated to the sectors whose activities cause the problems, and that this is line with the polluter pays principle. However, there might be changes in the payment regime, which might impact the application of the polluter pays principle as well. Hence, a clear description of the application of the polluter pays principle is not provided.

In summary, only limited progress has been made against the recommendations and they are partly fulfilled.

Topic 15 Considerations specific to Protected Areas (identification, monitoring, objectives and measures)

15.1 Assessment of implementation and compliance with WFD requirements in the second cycle

The United Kingdom has reported Protected Areas designated under all relevant Directives in the second cycle of River Basin Management Plans (Table 15.1). However, there are some differences in the reported information among River Basin Districts. For example, Protected Areas according to the Habitat Directive and dependent on groundwater are reported only for the Severn, Western Wales and Dee RBDs and the three RBDs in Northern Ireland. No such Protected Areas are reported for the Scotland, Solway Tweed, Northumbria, Humber, Anglian, Thames, South East and South West River Basin Districts, although it seems unlikely that there are no groundwater dependent habitat areas in these basins. Birds Protected Areas dependent on groundwater are reported for only two RBDs (Western Wales and the Dee).

Table 15.1 *Number of water bodies in all RBDs of the United Kingdom associated with Protected Areas, for surface and groundwater*

Protected Area Type	Number of water bodies associated ⁹⁸				
	Rivers	Lakes	Transitional	Coastal	Groundwater
Abstraction of water intended for human consumption under Article 7	386	464	2		778
Recreational waters, including areas designated as bathing waters under Directive 76/160/EEC	49	8	67	557	
Protection of species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 79/409/EEC (Birds)	137	62	66	126	4
Protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (Habitats)	401	98	65	163	27
Nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC (Nitrates Directive) and areas	794	157	123	34	116

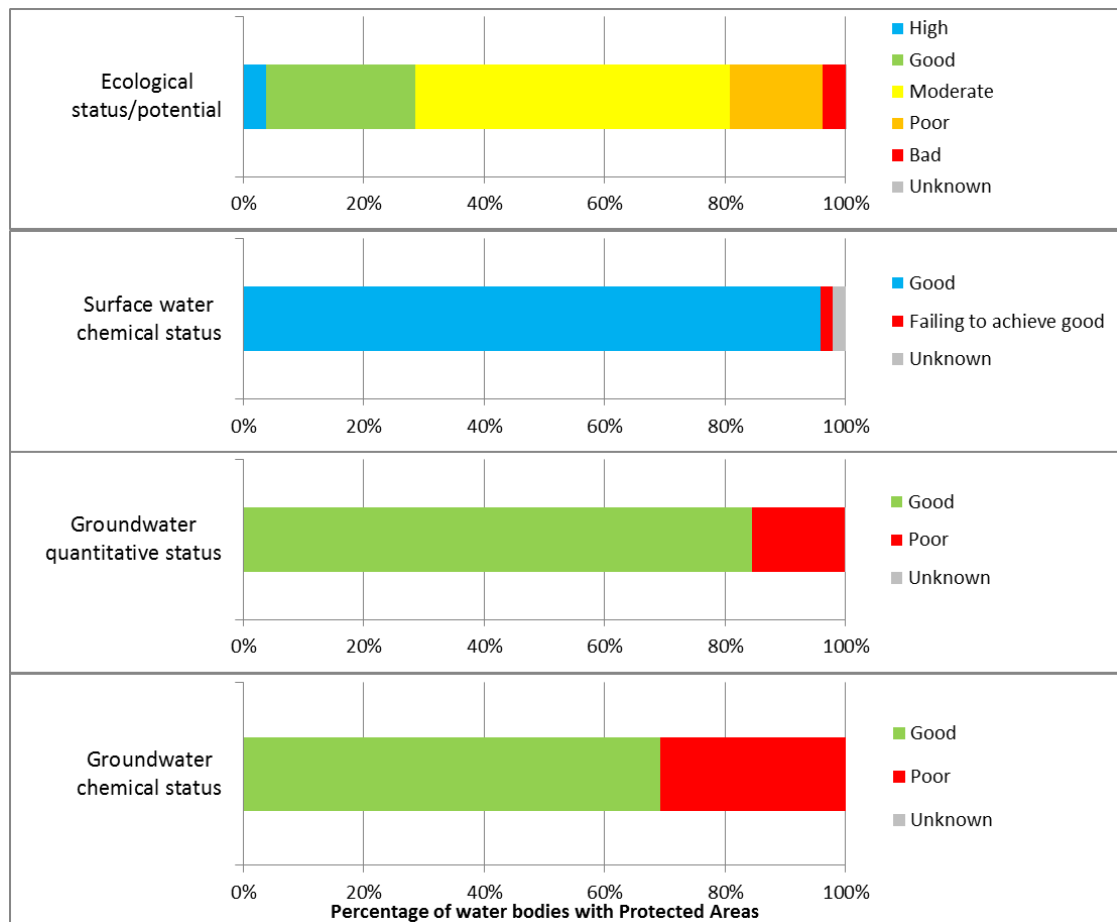
⁹⁸ UK subsequently stated that there may have been an error in the information reported to WISE

Protected Area Type	Number of water bodies associated ⁹⁸				
	Rivers	Lakes	Transitional	Coastal	Groundwater
designated as sensitive areas under Directive 91/271/EEC (Urban Wastewater Treatment Directive)					
Areas designated for the protection of economically significant aquatic species (fish and shellfish)	469	20	84	163	

Source: Member States reports to WISE

A good overview of the status (chemical and ecological and for groundwater also quantitative) of water bodies associated with Protected Areas is reported (Figure 15.1). Both the status assessment and the application of exemptions are made at water body level.

Figure 15.1 Status of water bodies associated with the Protected Areas reported for the United Kingdom. Note: based on status/potential aggregated for all water bodies associated with all Protected Areas



Source: WISE electronic reports

The United Kingdom clearly reported the number of Protected Areas (by types) where an additional objective has been set and where not.

In general, for Drinking Water Protected Areas (associated with surface and groundwater), no specific standards have been set. Where water bodies are deemed to be at risk, safeguard zones have been established with the aim of meeting the Drinking Water Protected Area objectives of Article 7 of the WFD. In a few RBDs, there is the aim to make some investigations.

For Protected Areas designated under the Birds and Habitats Directives (associated with both surface and groundwater), additional objectives have been set for the most part. For a proportion of these, it is noted that work is still ongoing to establish the needs. For a small proportion (mainly in Northern Ireland) the achievement of the WFD objective is assessed to be sufficient also to achieve the objective in the other Directives.

For Protected Areas associated with shellfish production, specific objectives are set to be identical to the repealed Directive 2006/113/EC⁹⁹ in all but a very small number of Protected Areas in the Scotland RBD. In Scottish Shellfish water Protected Areas more stringent standards have been applied than those used in the first cycle of River Basin Management Plans.

Overall, the individual water bodies have been assessed and the objective set according to the specific conditions has been reported as being met or not. Only for a small proportion of the water bodies associated with Natura 2000 sites, it has been reported that good status is sufficient also to achieve the objective in the Habitats Directive.

Monitoring sites of surface and groundwater associated with Protected Areas are only reported for those under the Article 7 of the WFD, the Nitrates and Urban Waste Water¹⁰⁰ Directives and shellfish waters (Table 15.2). No specific monitoring sites are reported as associated with other Protected Areas (those designated under Bathing, Habitats or Birds Directives)¹⁰¹. No data are reported on monitoring sites of groundwater associated with Protected Areas, except for under Article 7 of the WFD. Further information on the purpose of monitoring sites for surface water and groundwater status assessment can be found in Chapters 3 and 4 (ecological

⁹⁹ Directive 2006/113/EC of the European Parliament and of the Council of 12 December 2006 on the quality required of shellfish waters (codified version)

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006L0113>

¹⁰⁰ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271>

¹⁰¹ The UK subsequently clarified that this information is reported via other mechanisms, to avoid a duplication of reporting.

and chemical status of surface waters) and Chapters 5 and 6 (quantitative and chemical status of groundwaters) of this report¹⁰².

Monitoring activities are only reported for the three Northern Ireland RBDs and only related to the Nitrates, Shellfish¹⁰³ and Urban Waste Water Treatment Directives. The monitoring activity in Northern Ireland has increased, as there is a significant higher number of monitoring points related to the Urban Waste Water Treatment and Nitrate Directives.

Chemical status in surface water and quantitative status of groundwater is based mainly on data with a low confidence (or no data) indicating a significant need for monitoring data. The Scotland, Solway Tweed and Northumbria RBDs differ for quantitative groundwater status, as the data is reported as having high confidence. Chemical status of groundwater is mainly based on data with high/medium confidence - though for a good proportion of those, no information has been reported. Ecological status is based mainly on data with high or medium confidence.

Table 15.2 *Number of monitoring sites associated with Protected Areas in the United Kingdom*

Protected Area type	Number of monitoring sites associated with Protected Areas in				
	Rivers	Lakes	Transitional	Coastal	Groundwater
Abstraction of water intended for human consumption under Article 7					80
Nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC (Nitrates Directive) and areas designated as sensitive areas under Directive 91/271/EEC (Urban	526	201	15	92	

¹⁰² Northern Ireland subsequently clarified that the chemical groundwater monitoring network is an integrated and holistic network, therefore data from the network are utilized for assessments relating to groundwater dependant terrestrial ecosystems.

¹⁰³ Directive 2006/113/EC of the European Parliament and of the Council of 12 December 2006 on the quality required of shellfish waters (codified version)
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32006L0113>

Protected Area type	Number of monitoring sites associated with Protected Areas in				
	Rivers	Lakes	Transitional	Coastal	Groundwater
Wastewater Treatment Directive)					
Areas designated as sensitive areas under Directive 91/271/EEC (Urban Wastewater Treatment Directive)	637	201	15	94	
Areas designated for the protection of economically significant aquatic species				27	

Source: WISE electronic reports

High or medium confidence of the status assessment will require monitoring data. The significant part of the assessment based on information with high or medium confidence does not fit to the very limited monitoring program specifically for Protected Areas, which has been reported.

The description of the measures needed to reach the objective is different between the River Basin Districts.

In some of the River Basin Management Plans, the description is very detailed and includes a table titled “Summary of measures for Protected Areas”, which details measures for all relevant Protected Areas. The plans contain links to supporting information with a detailed placement of the measures. Other plans are much less detailed with a summary of how the pressures will be addressed and no detailed list of measures.

For most River Basin Management Plans, the measures needed are listed but not quantified in terms of the extent to which they are applied, meaning that there is no justification that the objectives will be met.

The additional measures needed to achieve the objectives are mainly administrative.

The situation regarding safeguard zones for the protection of drinking water differs across the United Kingdom. In two RBDs, there are no safeguard zones and no plans to establish them. In 10 RBDs, there are safeguard zones in place and for the remaining three RBDs, there are no safeguard zones but there are plans to implement them as a result of this RBMP.

15.2 Main changes in implementation and compliance since the first cycle

For a number of types of Protected Area, there seem to be large changes since the first cycle. For example, in the first cycle 6650 Protected Areas for economically significant aquatic species (related to fish)¹⁰⁴ were reported, while in the second cycle only a few are reported and only in Northern Ireland. .

The reported monitoring activities are very limited as they are only reported for the three RBD in Northern Ireland and restricted to Protected Areas designated under the Nitrates, Shellfish and Urban Waste Water Treatment Directives. This is a change since the first cycle as there was a significant monitoring programme specifically for protected surface water areas covering all relevant Directives but only for Scotland RBD and Solway Tweed RBD.

For groundwater, drinking water areas a significant monitoring program was reported in the first RBMP for all RBDs except for Northern Ireland and Scotland. In the second RBMP, a monitoring program for groundwater and drinking water was only reported for Northern Ireland.

15.3 Progress with European Commission recommendations

There were no recommendations for this topic.

¹⁰⁴ The UK later clarified that these protected areas were designated under the old Freshwater Fish Directive, now repealed by the WFD. An equivalent level of protection is provided under the water body objectives set in the RBMPs.

Topic 16 **Adaptation to drought and climate change**

16.1 Assessment of implementation and compliance with WFD requirements in the second cycle

Climate change was considered in various ways in all RBDs and it is stated that the guidance on how to adapt to climate change (Common Implementation Strategy Guidance Document No. 24) was used. In the Scotland and Solway Tweed RBDs, climate change was considered only for drought management¹⁰⁵ when dealing with water scarcity and water availability issues. All other UK RBDs considered climate change when setting objectives, when selecting robust adaptation measures, for forecasting the economics of water supply and demand, in flood risk management and when assessing direct and indirect climate pressures. The Northumbria, Humber, Anglian, Thames, South East, South West, Severn, Dee and North West RBDs also considered climate change in the context of maximisation of cross-sectoral benefits and minimisation of negative effects across sectors. Projected climate change has also been assessed and taken into account in the second RBMP and PoM for all assessed RBDs.

KTM24 (climate change adaptation measures) is not made operational to address significant pressures in any of the RBDs¹⁰⁶. For the three Northern Ireland RBDs, Table 9.2 lists some of the planned measures to address the relevant impacts of climate change on the water environment as identified in the Northern Ireland Climate Change Risk Assessment. The Anglian RBMP lists the following projects as being used to assist climate change related decision making relevant to river basin planning: UK Climate Change Risk Assessment; Living with Environmental Change water and biodiversity report cards; Future Flows and Groundwater Levels projects. It states that "Climate change has been taken into account in the design of the PoM" but does not directly list the methods which have been used. However, no maladaptation measures were identified.

For the Anglian (i.e. RBD in England), Neagh Bann and North Western RBDs, climate proofing of measures has been undertaken. For the Anglian RBD, there is no methodology described¹⁰⁷, but for the Neagh Bann and North Western RBDs such methodology is available.

¹⁰⁵ United Kingdom subsequently clarified that in Scotland climate change and resilience of measures were considered.

¹⁰⁶ United Kingdom subsequently clarified that KTM24 was operationalised but no water bodies were identified as failing because of climate change. Therefore no specific KTM24 measures have been assigned.

¹⁰⁷ United Kingdom subsequently clarified that in all RBDs in England, details of the methodology on how climate change has been factored into the RBMPs can be found.

No specific sub-plans addressing climate change are reported for UK. All the RBMPs for the RBDs in England, including the Anglian RBMP Part 1¹⁰⁸ contain reference to UK National Climate Adaptation Strategy and Adaptation Plan. RBMPs for the Neagh Bann and North Western RBDs, reference the Northern Ireland Climate Change Adaptation Programme and Northern Ireland Climate Change Risk Assessment. No reference is made to an international climate change strategy within the RBMPs for the Neagh Bann and North Western RBDs, but both RBDs are almost entirely within Northern Ireland so an international strategy may have been considered unnecessary. Shannon RBD is largely within the Republic of Ireland so its RBMP will be developed alongside those for Ireland which have not yet been submitted. The Anglian and North Eastern RBDs are not international RBDs.

Even though there is no legal obligation to prepare Drought Management Plans, many Member States have prepared them in order to cope with droughts. "Droughts and water scarcity" are among the climate change relevant aspects considered in the second RBMPs for the Scotland, Solway Tweed, Dee, Neagh Bann, North Western and North Eastern RBDs.

There is a sub-plan on water scarcity and droughts for the Scotland and Solway Tweed RBDs but no such sub-plans are reported for the other RBDs¹⁰⁹ where drought and water scarcity is identified as an issue related to climate change (Dee, Neagh Bann, North Western and North Eastern RBDs)¹¹⁰.

A number of measures has been included in the Programmes of Measures in relation to drought, namely for the Anglian RBD - increased controls, the revocation of unused and unreasonable abstraction licences, and improved abstraction licensing strategies to better manage water resources. Furthermore, the RBMP promotes water industry drought plans; and increased water efficiency measures in new homes, industry and agriculture. Awareness raising includes education and encouragement of water efficient strategies by the water industry.

For the Northern Ireland RBDs, stakeholder events will be held to raise awareness of the importance of water efficiency and saving, and drought management plans will be developed to promote sustainable development of public water supply. No detail is provided on whether they have yet been applied.

¹⁰⁸ United Kingdom subsequently clarified RBMPs (Part 2) also contain references to UK National Climate Adaptation Strategy and Adaptation Plan. RBMPs indicate that for all England RBDs additional strategies and plans are an integral part of water company planning being an essential part of assessing scheme options.

¹⁰⁹ United Kingdom subsequently clarified that for each RBD in England there is a reference to water industry drought plans.

¹¹⁰ In Northern Ireland the impacts of climate change are considered within 'Sustainable Water – A Long-term Water Strategy for Northern Ireland (2015-2040)'. Short term reductions in water availability due to low rainfall may lead to low river flows and water scarcity at a local level.

16.2 Main changes in implementation and compliance since the first cycle

Climate proofing of measures has been carried out in some RBDs.

Regarding drought, in a previous assessment¹¹¹, the Anglian RBD was considered by the United Kingdom authorities to face drought situations at a sub-basin scale, whilst none of the other RBDs was considered to face such problems. This has changed for several RBDs now considered and for the Anglian RBD, which is no longer considered. According to a previous study¹¹² all UK RBDs in England, Scotland and Wales had drought management plans developed, whilst none in Northern Ireland had. This has significantly changed in the second cycle, with Northern Ireland RBDs also developing drought management plans, which is a positive development.

16.3 Progress with European Commission recommendations

There was no recommendation arising from the first RBMPs and PoM on this topic.

¹¹¹ <http://ec.europa.eu/environment/water/quantity/pdf/Assessment%20WSD.pdf>

¹¹² <http://ec.europa.eu/environment/archives/water/implrep2007/pdf/Water%20abstraction%20and%20use%20-%20Drought%20management%20Plans.pdf>