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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)

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

Figure 1.1: *Map of River Basin District*

International River Basin Districts (within EU)
International River Basin Districts (outside EU)
National River Basin Districts (within EU)
Countries (outside EU)
Coastal Waters

Source: *WISE , Eurostat (country borders)*

The United Kingdom of Great Britain and Northern Ireland(UK) has a population of 62.44 million[1] inhabitants and an area of 244,820 km^{2}[2].

The United Kingdom shares three international river basin districts with the Republic of Ireland: Neagh Bann, North Western and Shannon. There are five different levels of jurisdiction governing the WFD implementation in the UK: England, Wales, Scotland, Northern Ireland and Gibraltar, as well as a national level. Due to this there are certain differences between the different parts of the UK, ands where relevant, the assessment has been done distinguishing between, England/Wales (same approach) and on the other hand Scotland and Northern Ireland. Gibraltar is a separate RBD, for which no RBMP has yet been reported.

RBD	RBD Name	Size (km^2)[2]	Countries sharing RBD
UK01	Scotland	113920	-
UK02	Solway Tweed	17511	-
UK03	Northumbria	9029	-
UK04	Humber	26109	-
UK05	Anglian	27817	-
UK06	Thames	16175	-
UK07	South East	10195	-
UK08	South West	21201	-
UK09	Severn	21590	-
UK10	Western Wales	16653	-
UK11	Dee	2251	-
UK12	North West	13140	-
UKGBNIIENB	Neagh Bann	8121 (6100 in UK)	IE
UKGBNIIENW	North Western	14793 (4900 in UK)	IE
UKIEGBNISH	Shannon	19452 (2 in UK)	IE
UKGBNINE	North Eastern	4068	-
UKGI17	Gibraltar	58 (33,4 including coastal waters)	-

Table 1.1: *Overview of the UK's River Basin Districts*
Source: *River Basin Management Plans reported to WISE[3]: http://cdr.eionet.europa.eu/uk/eu/wfdart13*

Three international river basin districts are jointly designated between the UK and Ireland, and in some RBDs there is more than one transboundary river basin. Rivers crossing the borders between the different UK regions are not considered Transboundary in the WFD context. No UK only RBMP was reported for the Shannon.

[1] Eurostat, 2011

[2] Area includes coastal waters.

[3] This MS Annex reflects the information reported by the MS to WISE which may have been updated since the adoption of the RBMPs. For this reason there may be some discrepancies between the information reported in the RBMPs and WISE.

Name international river basin	Countries sharing RBD	Co-ordination category		Total 1-4	
		1			
		km²	%	km²	%
Neagh Bann	IE	6125	75.4	6125	75.4
North Western (rivers Erne and Foyle)	IE	4900	39.8	4900	39.8
Shannon	IE	2	<1	6	<1
Total		*11031*		*11031*	

Table 1.2: Transboundary river basins by category (see CSWD section 8.1) and % share in the UK[4]
Category 1: Co-operation agreement, co-operation body, RBMP in place.
Category 2: Co-operation agreement, co-operation body in place.
Category 3: Co-operation agreement in place.
Category 4: No co-operation formalised.
Source: *EC Comparative study of pressures and measures in the major river basin management plans in the EU*

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

RBMPs were reported to the Commission in March 2010; plans for the RBDs in England, Wales and Scotland were reported on March 22nd, those for Northern Ireland on March 19th. The consultation process for the Gibraltar RBD is completed and UK authorities have stated that the Gibraltar RBMP will be submitted to the Commission late 2012. No specific plan for the UK part of the Shannon was reported, due to the small share in the UK.

Updates were provided to WISE in October 2010, April 2011 and May-June 2012.

2.1 Main strengths

- The monitoring network in the UK is extensive, although not all quality elements are monitored. The process for deriving EQSs is clear and compliant with the WFD. The statistical approach used for assessment of confidence in classification of river and lake water bodies is also identified as a strength.
- The Programme of Measures is detailed with information on a waterbody level, although relative few measures are proposed. In Scotland the PoMs detail the steps to be achieved for phased implementation of the measures to ensure achievement by 2015, 2021 and 2027 respectively.
- A good level of coordination between the UK and IE is also shown for the international RBDs.
- There is good information available on water body level in separate factsheets available for England/Wales and Scotland.

[4] Categorisation determined under the EC Comparative study of pressures and measures in the major river basin management plans in the EU (Task 1b: International co-ordination mechanisms).

- There is a clear reference to climate change throughout and a climate check of the programme of measures.

2.2 Main gaps

- The major gaps identified across all RBDs were mostly related to the used of biological quality elements for assessment. In some cases, methodologies for assessment of BQEs have not been developed, in others certain BQEs are not included in surveillance monitoring programmes and in some BQEs are not used for assessment even where they are monitored.
- It is noted that the typologies used have changed since they were first reported for the Article 5 assessment, while types are now more ecologically relevant, no broad WB types are now used, the assessment being based on site and QE specific reference conditions rather than type specific reference conditions. This has led to some uncertainty within the intercalibration process.
- There is limited information on the methodology to identify significant pressures.
- The large uncertainties reported in relation to the status, the pressures and the effect of potential measures, despite the relatively high intensity of monitoring in the UK has been used to justify the inclusion of very few specific new measures.
- Despite agriculture being identified as a significant pressure, no new mandatory measures have been agreed in the plans. Voluntary measures listed rather than mandatory measures. Diffuse pollution from agriculture was for instance identified as a major pressure there appear to be no new additional measures to address this.

3. GOVERNANCE

3.1 Timeline of implementation

Consultations according to article 14(WFD) were held as follows for England, Wales, Scotland and Northern Ireland:

- Work programme, Timetable: 22/12/06 – 22/06/07.
- Summary of Significant Water Management Issues: 24/7/07 – 24/01/08.
- Draft RBMP was held over a six month period from the date of submission: 22/12/2008 - 22/06/2009.

In Northern Ireland, consultation on the Design and Production of an Interactive Web Viewer for River Basin Management Plans was also included alongside the consultation on the draft RBMPs (22/12/2008 – 22/06/2009).

3.2 Administrative arrangements - river basin districts and competent authorities

In England, competencies are shared between Defra and the Environment Agency (EA), and in Wales competencies are shared between the National Assembly for Wales and the Environment Agency(EA). Defra and the National Assembly for Wales acts as the ‘appropriate authorities’, ensuring that the directive is given effect, while the EA acts as the competent authority (referred to in legislation as 'the Agency’, and is responsible for practical implementation of the directive, including reporting, monitoring, establishment of PoMs,

authorisation and regulation of activities and reporting public information and consultation. Similarly in Scotland, competencies are shared between SEPA and the Scottish ministers. In the Solway Tweed RBD, shared between England and Scotland, the Environment Agency and SEPA work jointly to ensure a coordinated approach to river basin planning. In Northern Ireland, the competent authority is the Department of the Environment for Northern Ireland (DOENI).

In general, a national approach to implementation of the WFD is followed, though there are some differences between England, Wales, Scotland and Northern Ireland as these are overseen by different authorities.

3.3 RBMPs - Structure, completeness, legal status

Three RBDs are shared with the Republic of Ireland (Neagh Bann, North Western and Shannon), and although a high-level jointly approved document is available, no final single international RBMP was reported for any of these RBDs. The draft document was referred to for the Neagh Bann and North Western. Only 2 km^2 of the Shannon IRBD is located within the UK. The North-South WFD Coordination Group has been set up to aid international coordination in this area.

The approving authorities for the different regions are: The Secretary of State in England, the National Assembly in Wales, the Scottish Ministers in Scotland and the Government in Northern Ireland. Various actors have the responsibility to delivering different aspects of the RBMPs. In Scotland for instance, the Scottish Ministers may direct the Scottish Environment Protection Agency (SEPA) to prepare and submit to them a RBMP. With regard to the Solway Tweed RBD, which lies partly in Scotland and partly in England, the Water Environment (Water Framework Directive) (Solway Tweed River Basin District) Regulations 2004 give authority to SEPA and the EA to co-ordinate river basin planning in the Solway Tweed RBD. The Solway Tweed RBMP was therefore adopted by SEPA and the EA on 22 December 2009, following its approval by the Scottish Ministers and the Secretary of State.

RBMPs in the UK are high level strategic planning documents. Any actions required to be taken to implement the plans in England and Wales is enforced though the regulatory powers of the Environment Agency. However, the legislation places a general duty on the Environment Agency the Secretary of State and the National Assembly to exercise their "relevant functions" so as to secure compliance with the requirements of the Directive and in each RBD that the achievement of its environmental objectives, and in particular programme of measures, are coordinated for the whole of the RBD. It also requires the competent authorities, the EA and all public bodies to "have regard" to the RBMP in exercising their functions, "so far as affecting a river basin district". Public bodies are any public institution created and financed by the State. There is an obligation to 'have regard' to the RBMPs when taking individual decisions. The requirement under water legislation for appropriate authorities, the Environmental Agency and relevant public bodies to "have regard" to the RBMP will be binding on individual permitting decisions to the extent that such decisions affect a river basin district. The RBMPs are binding on competent authorities.[5]

Equivalent provisions exist in Scotland. Section 2 of the Water Environment and Water Services (Scotland) Act 2003 (WEWS), places a general duty on the Scottish Ministers, SEPA

[5] Pressures and Measures Study, Task 1 Governance.

and the responsible authorities to exercise their functions so as to secure compliance with the requirements of the Directive. Section 16 of the WEWS requires the Scottish Ministers and every public body and office-holder to have regard to the RBMP in exercising their functions.

Equivalent provisions also exist in Northern Ireland. Regulation 3 of Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 ("the 2003 Regulations"), (the 2003 Regulations) place a general duty on the Department, the Department of Agriculture and Rural Development, the Department of Culture, Arts and Leisure and the Department for Regional Development to exercise their functions in a manner which secures compliance with the requirements of the Directive. Regulation 17 of the 2003 Regulations requires the Department and each public body to have regard to the RBMP in exercising their functions so far as these affect the RBD or part of an international RBD falling within Northern Ireland.

3.4 Consultation of the public, engagement of interested parties

Information for public consultation was provided through the media, internet, printed material and invitations to any interested parties. The consultation process took place through face-to-face meetings, written consultation and web-based submissions, and could be accessed through libraries in England & Wales. RBD liaison panels were set up in England & Wales and workshops and meetings with relevant sectors were also held. In Northern Ireland meetings include WFD stakeholder forums and catchment stakeholder forums, and in Scotland a National Advisory Group was set up.

The **stakeholders** involved in the consultation process included water companies, farmers, ports, fisheries, industries, conservation bodies, local and local planning authorities, NGOs, consumer groups and the general public. Energy companies were also involved in the England and Wales, and the Scotland and Solway Tweed RBDs.

In England & Wales, the **impact of the consultation process on the final plans** the consultation resulted in changes to measures and changed information. In Scotland the consultation resulted in some commitment to further research, there is however more information in a document with a digest of concerns available on the relevant webpage, while in Northern Ireland, there was some commitment to research, and in addition there will be some adjustments to measures and the addition of new information.

As regards **continuous involvement** Scotland has set up advisory groups for river basin management planning under the Water Environment Services (see Annex 2 of RBMP's. In England and Wales RBD Liaison Panels are also involved in the implementation.

3.5 International cooperation and coordination

The UK has three international RBDs, Neagh Bann (UKGBNIIENB), North Western (UKGBNIIENW) and Shannon (UKIEGBNISH), although only 2km^2 of Shannon IRBD is within the UK.

Final International RBMPs, in the form of high-level strategic document, have been adopted. These high level strategy documents for each of International RBDs have been agreed between both jurisdictions[6], here placing these IRBDs in "Category 1"[7], as RBDs with

[6] Working Together – Managing our shared waters. Neagh Bann http://www.environ.ie/en/Publications/Environment/Water/FileDownLoad,26909,en.pdf
North Western http://www.environ.ie/en/Publications/Environment/Water/FileDownLoad,26908,en.pdf

international River Basin Management Plans. Separate and coordinated plans have been developed for the parts of the Neagh Bann and North Western IRBDs which are within the UK. A North/South WFD Coordination Group on Water Quality has also been set up. In the three international RBDs, the Department coordinates its actions on river basin planning with the responsible authorities in the Republic of Ireland.

3.6 Integration with other sectors

The RBMP contains links to other sectors such as agriculture, water supply and treatment (Drinking Water Safety Plans), waste management and conservation. These plans include issues such flood protection and climate change.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1 Water categories in the RBD

Each of the 15 assessed RBDs in the United Kingdom contains rivers, lakes and transitional waters. All but the Severn (UK09) and Dee (UK11) RBDs also contain coastal waters. Transitional waters are delineated according to the guidance in the CIS document 'Guidance on typology, reference conditions and classification systems for transitional and coastal waters'.

4.2 Typology of surface waters

For rivers, 48 different types were defined, based on information on geology, altitude and catchment size. However, in practice only 21 of these types are found. For lakes, a tiered typology has been created with a "core typology" based on 3 geology types sub-divided by alkalinity, conductivity and water colour into six geological types and 2 depth types producing 12 lake types. For Transitional and Coastal waters, the same typologies are used as for Ireland, with 6 types of transitional water and 12 types of coastal water. This typology is based on factors including salinity, mixing characteristics and tidal range.

RBD	Rivers	Lakes	Transitional	Coastal
UK01	21	16	4	9
UK02	45	30	9	16
UK03	24	14	5	7
UK04	24	14	5	7
UK05	24	14	5	7
UK06	24	14	5	7
UK07	24	14	5	7
UK08	24	14	5	7
UK09	24	14	5	7
UK10	24	14	5	7
UK11	24	14	5	7
UK12	24	14	5	7

[7] See table 2, and the Pressures and Measures Study, task 1 Governance.

RBD	Rivers	Lakes	Transitional	Coastal
UKGBNIIENB	8	13	6	12
UKGBNIIENW	8	13	6	12
UKGBNINE	8	13	6	12
Total	*45*	*43*	*11*	*19*

Table 4.2.1: *Surface water body types at RBD level*
Source: *WISE*

For RBDs in England, Wales and Scotland, typology for rivers and lakes has been **tested against biological data.** No information is provided for transitional and coastal water bodies. For Northern Ireland, no information is given on validation against biological data.

Type-specific reference conditions have been partly developed for some categories of water bodies. For England, Wales and Scotland, the reference conditions are described in the RBMPs, with further detail with the national guidance. For Northern Ireland, work is on-going to develop reference conditions for BQE in transitional and coastal waters. In England, Wales and Scotland, a combination of spatially based methods and modelling has been used in rivers and lakes, with expert judgement also applied for rivers. For transitional and coastal waters a combination of spatially based methods and expert judgement has been used, and historic data was also used to 'reconstruct' reference conditions.

Northern Ireland have used a combination of spatially based methods and modelling for rivers[8] and lakes[9], with pressure and land use data also used for rivers, and expert judgement used for lakes. For transitional waters expert judgement and historic data were used[10], and for coastal waters, a spatially based methodology was used, along with expert judgement and OSPAR classes. At least one **method** has been developed for each BQE for river, transitional and coastal water bodies, but there are no reference values for these types. For lakes, only one method is available for diatoms, but nothing for the other BQEs.

4.3 Delineation of surface water bodies

Small water bodies (smaller than the size criteria in Annex II) have been included in the RBMPs, but a minimum size threshold has been set for each category of surface water. This threshold was set at a catchment area of 10 km^2 for rivers, and a surface area of 0.5 km^2 for lakes and transitional waters. A minimum length of 1 km is also set for transitional waters. In Northern Ireland, the lower threshold for lakes was set at 0.1-0.5 km^2. Delineation of small water bodies was generally carried out in line with UKTAG guidance and methods developed for earlier EC directives. Aggregation of small water bodies was not used in England, Wales and Scotland, but was used in Northern Ireland for transitional water bodies smaller than 0.5 km^2.

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[8] Rivers: UKTAG Guidance on Typology for Rivers for Scotland, England and Wales http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Rivers%20typology_Final_050603.pdf

[9] Lakes: UKTAG Guidance on Typology for Lakes for the UK http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Lakes%20typology_Final_010604.pdf

[10] T&CW: Guidance on Typology for Coastal & Transitional Waters of the UK and Republic of Ireland http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Marine%20typology_Final_281003.pdf

RBD	Surface Water								Groundwater	
	Rivers		Lakes		Transitional		Coastal			
	Number	*Average Length (km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*
UK01	2013	10	309	3	40	15	449	102	284	243
UK02	526	12	35	1	12	58	8	239	73	215
UK03	380	9	73	0	7	4	7	101	9	950
UK04	968	12	136	0	8	41	1	329	50	488
UK05	757	10	49	1	18	18	11	205	31	539
UK06	483	11	76	1	11	31	1	43	46	223
UK07	340	7	34	1	20	3	16	107	30	212
UK08	938	8	63	0	23	10	25	140	44	367
UK09	791	10	75	1	6	91	0	NaN	40	508
UK10	676	6	62	0	27	5	24	180	25	488
UK11	87	9	21	1	1	109	0	NaN	6	335
UK12	547	11	164	0	12	23	8	189	18	603
UKGBNIIENB	255	26	10	39	2	3	3	76	14	
UKGBNIIENW	208	31	9	17	2	18	1	166	45	
UKGBNINE	111	24	3	1	3	0	16	57	8	
Total	*9080*	*11*	*1119*	*2*	*192*	*19*	*570*	*111*	*656**	*320**

Table 4.3.1: *Surface water bodies, groundwater bodies and their dimensions*
Note: **Total number of groundwater bodies and average area for the UK excludes those for Northern Ireland as area values not reported.*
Source: *WISE*

4.4 Identification of significant pressures and impacts

The following chart indicates the significant pressures seen in the UK. There is some regional variation, for example, much higher proportions of water bodies in the Scotland and Solway Tweed RBDs have "no pressures", and RBDs in England, Wales and Northern Ireland have higher level of water bodies at pressure from point sources, diffuse sources and flow regulation. In Scotland, about 13% of surface waters are subject to morphological pressures like engineering works, and no water bodies in Northern Ireland are under pressure from river management or other morphological changes, compared with around 50% in England and Wales according to the data reported to WISE.

RBD	No pressures		Point source		Diffuse source		Water abstraction		Water flow regulations and morphological alterations		River management		Transitional and coastal water management		Other morphological alterations		Other pressures	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
UK01	1526	54.29	291	10.35	448	15.94	480	17.08	948	33.72	0	0	0	0	0	0	7	0.25
UK02	229	39.41	76	13.08	226	38.9	59	10.15	205	35.28	44	7.57	0	0	0	0	16	2.75
UK03	74	15.85	187	40.04	313	67.02	43	9.21	202	43.25	202	43.25	0	0	2	0.43	41	8.78
UK04	116	10.42	732	65.77	894	80.32	188	16.89	572	51.39	572	51.39	0	0	0	0	230	20.66
UK05	34	4.07	754	90.3	752	90.06	171	20.48	654	78.32	654	78.32	0	0	5	0.6	271	32.46
UK06	49	8.58	399	69.88	439	76.88	118	20.67	274	47.99	274	47.99	0	0	1	0.18	257	45.01
UK07	11	2.68	259	63.17	343	83.66	88	21.46	248	60.49	248	60.49	0	0	7	1.71	154	37.56
UK08	117	11.15	460	43.85	789	75.21	86	8.2	342	32.6	342	32.6	21	2	6	0.57	303	28.88
UK09	64	7.34	523	59.98	737	84.52	94	10.78	328	37.61	328	37.61	0	0	0	0	187	21.44
UK10	70	8.87	152	19.26	656	83.14	21	2.66	206	26.11	206	26.11	0	0	4	0.51	199	25.22
UK11	5	4.59	27	24.77	92	84.4	8	7.34	51	46.79	51	46.79	0	0	1	0.92	36	33.03
UK12	115	15.73	310	42.41	482	65.94	84	11.49	401	54.86	401	54.86	0	0	4	0.55	164	22.44
UKGBNIIENB	14	5.19	133	49.26	214	79.26	38	14.07	217	80.37	0	0	0	0	0	0	4	1.48
UKGBNIIENW	9	4.09	61	27.73	144	65.45	12	5.45	166	75.45	0	0	0	0	0	0	5	2.27
UKGBNINE	1	0.75	71	53.38	115	86.47	18	13.53	125	93.98	0	0	0	0	0	0	10	7.52
Total	*2434*	*22.21*	*4435*	*40.46*	*6644*	*60.61*	*1508*	*13.76*	*4939*	*45.06*	*3322*	*30.31*	*21*	*0.19*	*30*	*0.27*	*1884*	*17.19*

Table 4.4.1: *Number and percentage of surface water bodies affected by significant pressures*
Source: *WISE*

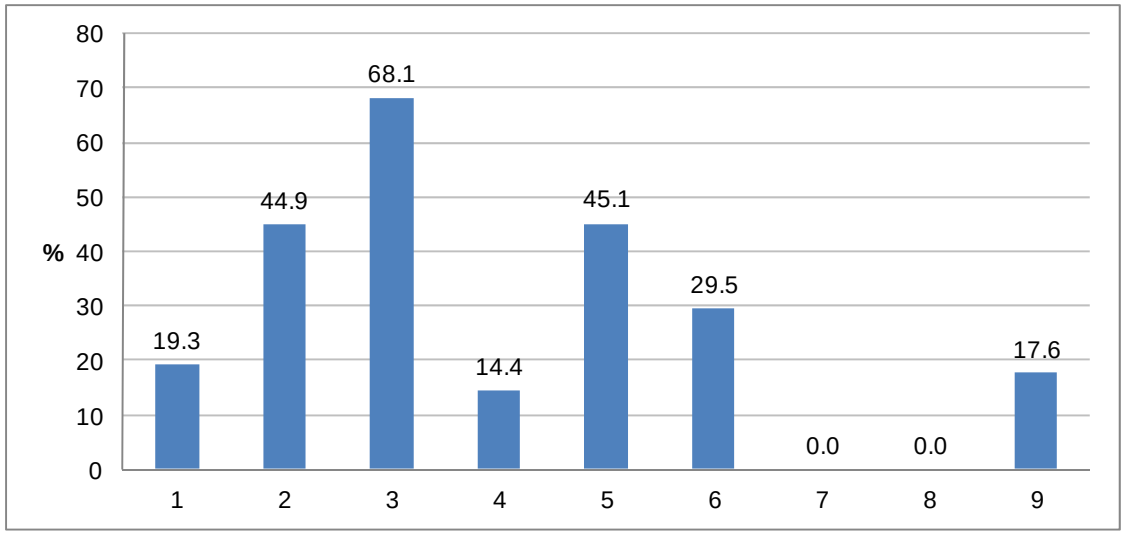


Figure 4.4.1: *Graph of percentage of surface water bodies affected by significant pressures*
1 = No pressures
2 = Point source
3 = Diffuse source
4 = Water abstraction
5 = Water flow regulations and morphological alterations
6 = River management
7 = Transitional and coastal water management
8 = Other morphological alterations
9 = Other pressures
Source: *WISE*

The **methodology used for identification of significant pressures** generally follows a national approach, using a combination of numerical tools and expert judgement.

For **point sources**, discharge permit values were converted to load values for different substances and concentrations were compared to relevant standards to identify risks to WFD compliance. In Northern Ireland, only waste water treatment works with population equivalent (PE) values greater than 250 were assessed. For **diffuse sources**, information on land use cover, agricultural census data and water quality classification was used to provide a risk category. OSPAR procedures for assessing coastal eutrophication issues were also used in Northern Ireland.

For **water abstraction**, models were generated to assess compliance with UK flow condition limits. **Flow regulation** was assessed using expert judgement, along with GIS maps and pressure datasets, including the River Habitat Survey. Other pressures assessed included alien species, which were assessed based on the presence of high impact species.

The sectors which contribute most to **chemical pollution** included: WWTWs, the chemical industry, fish farms and agriculture.

4.5 Protected areas

RBD	Number of PAs										
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates	Shellfish	UWWT
UK01	425										
UK02	102	3	3	1	241	13			16	2	
UK03	34	33	5	6	312	8			20	1	
UK04	167	22	7	21	1273	25			67	1	
UK05	68	37	22	38	447	23			67	22	
UK06	93	17	6	10	433	13			119	3	
UK07	46	79	8	21	222	13			76	26	
UK08	120	187	9	13	954	40			85	33	
UK09	124	4	3	24	906	27			87		
UK10	86	81	11	3	498	59			7	25	
UK11	25	1	2		83	6			11	2	
UK12	156	34	7	16	830	22			18	9	
UKGBNIIENB	36	1	4		198	16			1*	2	3
UKGBNIIENW	61	3	4		178	24				2	4
UKGBNINE	26	20	9		75	13				7	10
Total	*1569*	*522*	*100*	*153*	*6650*	*302*			*574*	*135*	*17*

Table 4.5.1: *Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater.*
Notes : *This information corresponds to the reporting of protected areas under the WFD. More/other information may have been reported under the obligations of other Directives.*
** Northern Ireland has established and applies action programmes in the whole of its territory and therefore, in accordance to article 3.5 of the Nitrates Directive 1991/676/EEC, it is exempted from designation of specific vulnerable zones.*
Source: *WISE*

5. MONITORING

5.1 General description of the monitoring network

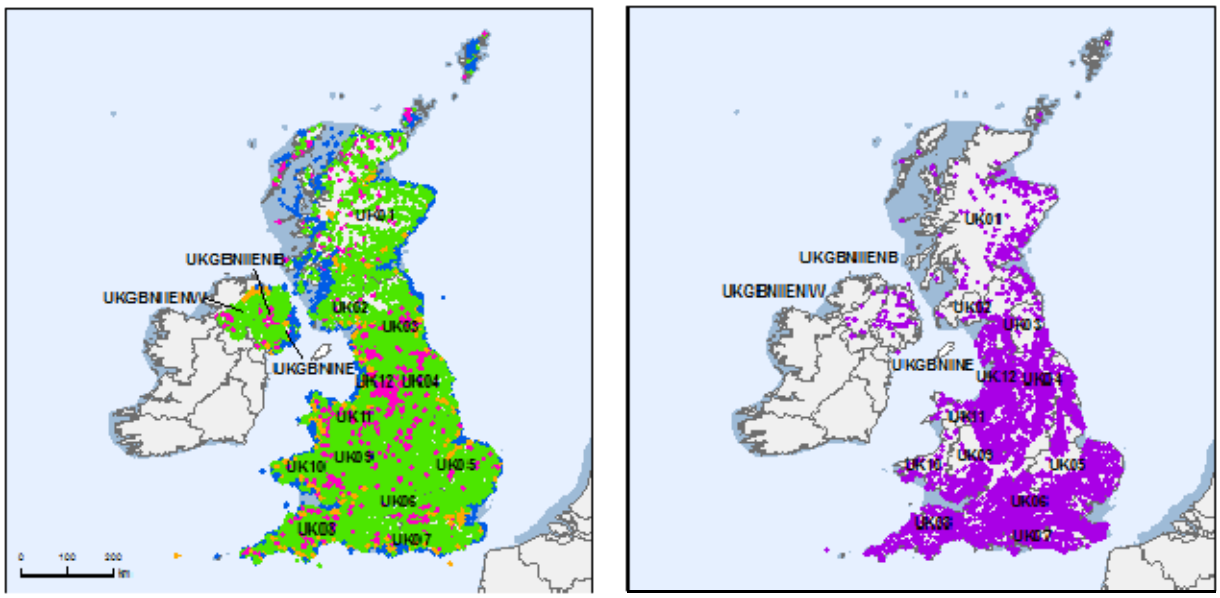


Figure 5.1: *Maps of surface water (left) and groundwater (right) monitoring stations*

- *River monitoring stations*
- *Lake monitoring stations*
- *Transitional water monitoring stations*
- *Coastal water monitoring stations*
- *Unclassified surface water monitoring stations*
- *Groundwater monitoring stations*

Source: *WISE*

There has been a considerable expansion of the surveillance and operational monitoring networks since the WFD implementation report on Article 8 (published in 2009). There are currently a total of 43263 surface water monitoring sites across the two networks (though some may include both surveillance and operational monitoring sites), compared with 12906 in 2009. The RBMPs, include relatively little information about the monitoring networks, however in England and Wales detailed information about the quality elements monitored by water body is included in Annex B. Monitoring networks are also described in the national guidance documents such as UKTAG. In Scotland the monitoring network was expanded to meet the WFD requirements in 2007, and has therefore not changed significantly in the RBMPs.

RBD	Rivers											Lakes										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 on priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
UK01																						
UK02																						
UK03																						
UK04																						
UK05																						
UK06																						
UK07																						
UK08																						
UK09																						
UK10																						
UK11																						
UK12																						
UKGBNIIENB																						
UKGBNIIENW																						
UKGBNINE																						

RBD	Transitional											Coastal										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
UK01																						
UK02																						
UK03														-	-							
UK04																						
UK05																						
UK06																						
UK07																						
UK08																						
UK09												-		-	-	-	-	-	-	-	-	-
UK10																						
UK11												-		-	-	-	-	-	-	-	-	-
UK12																						
UKGBNIIENB																						
UKGBNIIENW																						
UKGBNINE																						

Table 5.1.1: *Quality elements monitored*

QE Monitored

QE Not monitored

\- *Not Relevant*

Source*: WISE*

RBD	Rivers		Lakes		Transitional		Coastal		Groundwater		
	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Quant
UK01	669	1335	73	133	48	146	206	342	251	231	43
UK02	364	980	10	42	33	45	24	37	203	204	29
UK03	445	1621	3	95	120	129	84	111	148	148	16
UK04	484	4293	2	155	131	137	12	13	443	443	194
UK05	613	3469	3	57	229	329	84	110	387	387	175
UK06	291	2332	1	94	194	248	0	1	628	628	278
UK07	346	1628	1	30	141	197	137	176	409	409	206
UK08	919	3794	3	95	277	309	99	178	406	406	78
UK09	311	3871	3	83	159	173	0	0	389	389	124
UK10	559	2547	14	66	191	208	352	429	141	141	24
UK11	83	421	2	22	51	51	0	0	42	42	14
UK12	385	2780	15	182	161	165	34	84	578	578	89
UKGBNIIENB	36	281	15	14	69	0	12	0	25	0	3
UKGBNIIENW	55	229	26	10	123	0	16	0	13	0	8
UKGBNINE	24	121	3	3	44	0	73	0	17	0	8
Total by type of site	*5584*	*29702*	*174*	*1081*	*1971*	*2137*	*1133*	*1481*	*4080*	*4006*	*1289*
Total number of monitoring sites[11]	*29986*		*1155*		*2386*		*1694*		*5342*		

Table 5.1.2: *Number of monitoring sites by water category*
Surv = Surveillance
Op = Operational
Quant = Quantitative
Source: *WISE*

5.2 Monitoring of surface waters

Despite having one of the most intensive monitoring networks, not all of the relevant quality elements are monitored. In England and Wales, there is no monitoring of river continuity, tidal regime in coastal waters or fish in lakes according to the information reported WISE. In addition, there is no monitoring of macroalgae in transitional waters in the Northumbria, South East or Dee RBDs, or in coastal waters in the Humber and Anglian RBDs. There is also no monitoring of angiosperms in coastal waters in the South West RBD[12].

In Northern Ireland, morphological conditions and tidal regimes are not monitored in any transitional or coastal waters. In addition, other aquatic flora are not monitored in transitional waters in Neagh Bann IRBD, and water flow is not monitored in lakes in North Eastern RBD.

In Scotland there is no monitoring of fish in lakes. In addition, there is no monitoring of angiosperms, morphological conditions and tidal regime in transitional and coastal waters, or of phytoplankton in transitional waters. The Solway Tweed RBD is similar, but the only QE missing is river continuity for rivers and benthic invertebrates for transitional waters.

The UK has provided information to WISE on the monitoring of physico-chemical parameters at an aggregate level, and it is not clear which specific QEs are monitored.

[11] Number of sites calculated from data reported at site level. If no data reported at site level, then table supplemented with data reported at programme level.

[12] UK TECHNICAL ADVISORY GROUP ON THE WATER FRAMEWORK DIRECTIVE: Guidance on the Selection of Monitoring Sites and Building Monitoring Networks for Surface Waters and Groundwater, May 2005.

Both **surveillance and operational monitoring programmes** have according to the RBMPs been established, according to the guidance given in the UKTAG. For Northern Ireland no operational monitoring of coastal and transitional waters were reported to WISE. In operational networks, BQEs are monitored for all relevant water categories, except in Northern Ireland, where they are only monitored for rivers. In England and Wales 10% of lakes are part of the surveillance monitoring programme. The BQEs used for operational monitoring are linked to specific priority pressures, and all QEs are said to be monitored for the surveillance monitoring programme.

In England and Wales, **priority substances and other pollutants** are reported to be monitored in river, transitional and coastal waters but not in lakes. UK authorities have clarified that a semi-quantitative method using GC-MS scans is currently used to refine the priority substance monitoring programmes. In 2009 there was no monitoring for sediment and biota. In the Northern Ireland and the Scotland and Solway Tweed RBDs, priority substances are monitored in all water categories. No overview information is reported on how substances have been selected and which individual substances are monitored, as the UK has provided information at an aggregate level. The specific substances monitored are listed in the water body sheets for England and Wales.

In Scotland, **grouping of water bodies** has been applied to all water categories, and a clear explanation is given. In England and Wales, while a methodology for grouping has been developed, it has only been applied in rivers due to the complex range of pressures in lake, transitional and coastal waters. In Northern Ireland, grouping has only been applied to connected river water bodies. All lakes are monitored, so grouping is not required.

In the Neagh Bann and North Western IRBDs, it is stated that a **transboundary surface water monitoring programme** is in place for lakes, river, transitional and coastal water bodies..

5.3 Monitoring of groundwater

A **quantitative groundwater** monitoring programme has been established in all RBDs[13].

Both **surveillance and operational monitoring** programmes are in place. In general, most sites are used for both monitoring programmes. All core parameter and other pollutants are monitored at operational sites, but it is not clear how parameters in the operational monitoring programme have been chosen to detect the existing pressures. The programmes in place for monitoring groundwater chemical status are designed to be able to detect significant and sustained upward trends, the analysis of trends at individual monitoring sites is presented. No operational monitoring is in place in Northern Ireland.

In the Neagh Bann and North Western IRBDs, a coordinated monitoring programme has been set up with Ireland.

The quantitative monitoring programme has changed little since 2009. The surveillance and operational monitoring programmes have been expanded by around 10%.

[13] UKTAG Task 12(a) Guidance on Monitoring Groundwater http://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Groundwater%20monitoring_Draft_010807.pdf

5.4 Monitoring of protected areas

In England and Wales, all groundwater bodies are designated as drinking water protected areas (DWPAs). As such, while there is a specific monitoring programme for groundwater DWPAs, but it is not separate in the surveillance and operational programmes. In Northern Ireland there is no specific monitoring programme for DWPAs. A drinking water monitoring programme is in place for surface and groundwater in Scotland. For surface waters, no monitoring sites are listed under DWPAs in the WISE summary.

Numbers of monitoring sites in protected areas are only reported in the Scotland and Solway Tweed RBDs. No information available on sites in groundwater protected areas. In these RBDs, numbers of sites have increased by between 10 and 100%, with the largest increases seen in nitrate and urban wastewater protected areas. No specific monitoring network is reported to WISE concerning other protected areas for England and Wales.

RBD	Surface water monitoring stations in protected areas									Groundwater monitoring stations in protected areas
	Article 7 Abstraction for drinking water**	Drinking Water Directive	Bathing	Birds	Fish	Habitats	Nitrates	Shellfish	UWWT	Article 7 Abstraction for drinking water
UK01	0	0	214	703	1246	876	600	273	372	0
UK02	0	0	31	70	309	178	101	34	69	146***
UK03	0	0	0	0	0	0	0	0	0	114***
UK04	0	0	0	0	0	0	0	0	0	406***
UK05	0	0	0	0	0	0	0	0	0	214***
UK06	0	0	0	0	0	0	0	0	0	796***
UK07	0	0	0	0	0	0	0	0	0	752***
UK08	0	0	0	0	0	0	0	0	0	590***
UK09	0	0	0	0	0	0	0	0	0	446***
UK10	0	0	0	0	0	0	0	0	0	164***
UK11	0	0	0	0	0	0	0	0	0	54***
UK12	0	0	0	0	0	0	0	0	0	482***
UKGBNIIENB*	0	0	0	0	0	0	0	0	0	0
UKGBNIIENW*	0	0	0	0	0	0	0	0	0	0
UKGBNINE*	0	0	0	0	0	0	0	0	0	0
Total	*0*	*0*	*245*	*773*	*1555*	*1054*	*701*	*307*	*441*	*4164*

Table 5.4.1: *Number of monitoring sites in protected areas.*
Note: *Number of sites calculated from data reported at site level. If no data reported at site level, then table supplemented with data reported at programme level.*The equivalent table in the Art 8 WFD implementation report shows more detail on monitoring stations in Northern Ireland. ** England and Wales do not publish drinking water sites for security reasons (critical infrastructure). *** Number of monitoring sites reported at programme level.*
Source: *WISE*

6. OVERVIEW OF STATUS (ECOLOGICAL, CHEMICAL, GROUNDWATER)

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
UK01	2398	421	17.6	1159	48.3	423	17.6	262	10.9	133	5.5	0	0
UK02	501	10	2.0	226	45.1	187	37.3	63	12.6	15	3.0	0	0
UK03	285	2	0.7	103	36.1	124	43.5	47	16.5	9	3.2	0	0
UK04	508	0	0	117	23.0	273	53.7	97	19.1	21	4.1	0	0
UK05	251	0	0	58	23.1	161	64.1	28	11.2	4	1.6	0	0
UK06	312	0	0	64	20.5	162	51.9	73	23.4	13	4.2	0	0
UK07	212	0	0	57	26.9	120	56.6	30	14.2	5	2.4	0	0
UK08	823	0	0	273	33.2	456	55.4	83	10.1	11	1.3	0	0
UK09	633	0	0	169	26.7	322	50.9	125	19.7	17	2.7	0	0
UK10	657	1	0.2	186	28.3	424	64.5	45	6.8	1	0.2	0	0
UK11	60	0	0	20	33.3	30	50.0	10	16.7	0	0	0	0
UK12	333	1	0.3	112	33.6	152	45.6	51	15.3	17	5.1	0	0
UKGBNIIENB	235	1	0.4	38	16.2	113	48.1	71	30.2	12	5.1	0	0
UKGBNIIENW	205	1	0.5	66	32.2	109	53.2	29	14.1	0	0	0	0
UKGBNINE	108	2	1.9	18	16.7	61	56.5	23	21.3	4	3.7	0	0
Total	*7521*	*439*	*5.8*	*2666*	*35.4*	*3117*	*41.4*	*1037*	*13.8*	*262*	*3.5*	*0*	*0*

***Table 6.1**: Ecological status of natural surface water bodies*
***Source:** WISE*

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
UK01	413	2	0.5	203	49.2	65	15.7	78	18.9	65	15.7	0	0
UK02	80	0	0	25	31.3	37	46.3	6	7.5	12	15.0	0	0
UK03	182	0	0	95	52.2	77	42.3	10	5.5	0	0	0	0
UK04	605	0	0	78	12.9	472	78.0	47	7.8	8	1.3	0	0
UK05	584	0	0	95	16.3	435	74.5	51	8.7	3	0.5	0	0
UK06	259	0	0	68	26.3	146	56.4	40	15.4	5	1.9	0	0
UK07	198	0	0	19	9.6	159	80.3	19	9.6	1	0.5	0	0
UK08	226	0	0	76	33.6	137	60.6	12	5.3	1	0.4	0	0
UK09	239	0	0	84	35.1	140	58.6	13	5.4	2	0.8	0	0
UK10	132	0	0	44	33.3	83	62.9	4	3.0	1	0.8	0	0
UK11	49	0	0	11	22.4	37	75.5	1	2.0	0	0	0	0
UK12	398	0	0	106	26.6	275	69.1	12	3.0	5	1.3	0	0
UKGBNIIENB	35	0	0	1	2.9	13	37.1	17	48.6	4	11.4	0	0
UKGBNIIENW	15	0	0	0	0	11	73.3	4	26.7	0	0	0	0
UKGBNINE	25	0	0	2	8.0	12	48.0	5	20.0	6	24.0	0	0
Total	*3440*	*2*	*0.1*	*907*	*26.4*	*2099*	*61.0*	*319*	*9.3*	*113*	*3.3*	*0*	*0*

***Table 6.2:** Ecological potential of artificial and heavily modified water bodies*

Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
UK01	2398	2387	99.5	11	0.5	0	0
UK02	501	387	77.2	4	0.8	110	22.0
UK03	285	2	0.7	3	1.1	280	98.2
UK04	508	28	5.5	5	1.0	475	93.5
UK05	251	11	4.4	1	0.4	239	95.2
UK06	312	42	13.5	5	1.6	265	84.9
UK07	212	21	9.9	2	0.9	189	89.2
UK08	823	27	3.3	9	1.1	787	95.6
UK09	633	48	7.6	10	1.6	575	90.8
UK10	657	28	4.3	5	0.8	624	95.0
UK11	60	5	8.3	1	1.7	54	90.0
UK12	333	23	6.9	3	0.9	307	92.2
UKGBNIIENB	235	31	13.2	0	0	204	86.8
UKGBNIIENW	205	42	20.7	0	0	161	79.3
UKGBNINE	108	27	25.0	0	0	81	75.0
Total	*7521*	*3109*	*41.3*	*59*	*0.8*	*4351*	*57.9*

Table 6.3: *Chemical status of natural surface water bodies*
Source: WISE

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
UK01	413	407	98.5	6	1.5	0	0
UK02	80	38	47.5	1	1.3	41	51.3
UK03	182	10	5.5	9	4.9	163	89.6
UK04	605	83	13.7	28	4.6	494	81.7
UK05	584	74	12.7	14	2.4	496	84.9
UK06	259	30	11.6	19	7.3	210	81.1
UK07	198	25	12.6	4	2.0	169	85.4
UK08	226	24	10.6	6	2.7	196	86.7
UK09	239	23	9.6	10	4.2	206	86.2
UK10	132	19	14.4	5	3.8	108	81.8
UK11	49	4	8.2	2	4.1	43	87.8
UK12	398	26	6.5	18	4.5	354	88.9
UKGBNIIENB	35	13	37.1	0	0	22	62.9
UKGBNIIENW	15	11	73.3	0	0	4	26.7
UKGBNINE	25	12	48.0	0	0	13	52.0
Total	*3440*	*799*	*23.2*	*122*	*3.6*	*2519*	*73.2*

Table 6.4: *Chemical status of artificial and heavily modified water bodies*
Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
UK01	284	226	79.6	58	20.4	0	0
UK02	357	65	89	8	11	0	0
UK03	9	3	33.3	6	66.7	0	0
UK04	50	27	54	23	46	0	0
UK05	31	20	64.5	11	35.5	0	0
UK06	46	20	43.5	26	56.5	0	0
UK07	30	19	63.3	11	36.7	0	0
UK08	44	28	63.6	16	36.4	0	0
UK09	40	31	77.5	9	22.5	0	0
UK10	25	16	64	9	36	0	0
UK11	6	5	83.3	1	16.7	0	0
UK12	18	8	44.4	10	55.6	0	0
UKGBNIIENB	14	13	92.9	1	7.1	0	0
UKGBNIIENW	45	45	100	0	0	0	0
UKGBNINE	8	7	87.5	1	12.5	0	0
Total	*1007*	*533*	*73.7*	*190*	*26.3*	*0*	*0*

Table 6.5: *Chemical status of groundwater bodies*
Source: *WISE*

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
UK01	284	250	88	34	12	0	0
UK02	357	63	86.3	10	13.7	0	0
UK03	9	8	88.9	1	11.1	0	0
UK04	50	30	60	20	40	0	0
UK05	31	20	64.5	11	35.5	0	0
UK06	46	16	34.8	30	65.2	0	0
UK07	30	13	43.3	17	56.7	0	0
UK08	44	37	84.1	7	15.9	0	0
UK09	40	30	75	10	25	0	0
UK10	25	24	96	1	4	0	0
UK11	6	5	83.3	1	16.7	0	0
UK12	18	11	61.1	7	38.9	0	0
UKGBNIIENB	14	14	100	0	0	0	0
UKGBNIIENW	45	45	100	0	0	0	0
UKGBNINE	8	7	87.5	1	12.5	0	0
Total	*1007*	*573*	*79.3*	*150*	*20.7*	*0*	*0*

Table 6.6: *Quantitative status of groundwater bodies*
Source: *WISE*

RBD	Total	Global status (ecological and chemical)					Good ecological status 2021		Good chemical status 2021		Good ecological status 2027**		Good chemical status 2027		Global exemptions 2009 (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 - 2015									Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	No.	%	No.	%	%	%	%	%
UK01	2811	1784	63.5	1965	69.9	6.4			2797				2811		30	0	0	0
UK02	581	189	32.5	221	38	5.5									48	0	0	0
UK03	467	3	0.6	3	0.6	0									52	0	0	0
UK04	1113	11	1	13	1.2	0.2	224				1113				81	0	0	0
UK05	835	2	0.2	4	0.5	0.2	162				835				81	0	0	0
UK06	571	1	0.2	4	0.7	0.5	145				145				75	0	0	0
UK07	410	6	1.5	10	2.4	1	92				410				78	0	0	0
UK08	1049	2	0.2	13	1.2	1	456				1049				58	0	0	0
UK09	872	13	1.5	18	2.1	0.6	296				872				66	0	0	0
UK10	789	10	1.3	13	1.6	0.4	282				789				64	0	0	0
UK11	109	1	0.9	2	1.8	0.9	40				109				63	0	0	0
UK12	731	5	0.7	8	1.1	0.4	243				731				67	0	0	0
UKGBNIIENB	270	2	0.7	13	4.8	4.1									54	0	0	0
UKGBNIIENW	220	10	4.5	32	14.5	10									31	0	0	0
UKGBNINE	133	11	8.3	14	10.5	2.3									53	0	0	0
Total	*10961*	*2050*	*18.7*	*2333*	*21.3*	*2.6*									*57*	*0*	*0*	*0*

Table 6.7: *Surface water bodies: overview of status in 2009 and expected status in 2015, 2021 and 2027**

Notes : ** Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs. ** Natural surface water bodies only.*

Waterbodies with good status in 2009 fall into the following category:

1. Ecological status is high or good and the chemical status is good, exemptions are not considered

Waterbodies expected to achieve good status in 2015 fall into the following categories:

1. Ecological status is high or good and the chemical status is good, exemptions are not considered

2. Chemical status is good, and the ecological status is moderate or below but no ecological exemptions

3. Ecological status is high or good, and the chemical status is failing to achieve good but there are no chemical exemptions

4. Ecological status is moderate or below, and chemical status is failing to achieve good but there are no ecological nor chemical exemptions

Waterbodies with unknown/unclassified/Not applicable in either ecological or chemical status are not considered

Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Ecological status					Good ecological status 2021		Good ecological status 2027		Ecological exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	2398	1580	65.9	1726	72.0	6.1	1870		2334		28.3	0	0	0
UK02	501	236	47.1	274	54.7	7.6	323		465		45.1	0	0	0
UK03	285	105	36.8	125	43.9	7.0	124		285		56.1	0	0	0
UK04	508	117	23.0	129	25.4	2.4	143		508		74.6	0	0	0
UK05	251	58	23.1	65	25.9	2.8	65		251		74.1	0	0	0
UK06	312	64	20.5	76	24.4	3.8	76		76		75.6	0	0	0
UK07	212	57	26.9	72	34.0	7.1	72		212		66.0	0	0	0
UK08	823	273	33.2	367	44.6	11.4	378		821		55.4	0	0	0
UK09	633	169	26.7	210	33.2	6.5	210		642		66.8	0	0	0
UK10	657	187	28.5	238	36.2	7.8	237		657		63.6	0	0	0
UK11	60	20	33.3	25	41.7	8.3	25		60		58.3	0	0	0
UK12	333	113	33.9	137	41.1	7.2	137		333		58.9	0	0	0
UKGBNIIENB	235	39	16.6	117	49.8	33.2	226		232		50.2	0	0	0
UKGBNIIENW	205	67	32.7	147	71.7	39.0	198		198		28.3	0	0	0
UKGBNINE	108	20	18.5	58	53.7	35.2	97		108		46.3	0	0	0
Total	*7521*	*3105*	*41.3*	*3766*	*50.1*	*8.8*					*50.0*	*0*	*0*	*0*

Table 6.8: *Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2021 and 2027**
Note : ** Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	2398	2387	99.5	2393	99.8	0.3					0.4	0	0	0
UK02	501	387	77.2	387	77.2	0					1.0	0	0	0
UK03	285	2	0.7	2	0.7	0					1.1	0	0	0
UK04	508	28	5.5	28	5.5	0					1.0	0	0	0
UK05	251	11	4.4	12	4.8	0.4					0	0	0	0
UK06	312	42	13.5	43	13.8	0.3					1.3	0	0	0
UK07	212	21	9.9	21	9.9	0					0.9	0	0	0
UK08	823	27	3.3	27	3.3	0					1.1	0	0	0
UK09	633	48	7.6	50	7.9	0.3					1.3	0	0	0
UK10	657	28	4.3	28	4.3	0					0.8	0	0	0
UK11	60	5	8.3	5	8.3	0					1.7	0	0	0
UK12	333	23	6.9	23	6.9	0					0.9	0	0	0
UKGBNIIENB	235	31	13.2	31	13.2	0					0	0	0	0
UKGBNIIENW	205	44	21.5	44	21.5	0					0	0	0	0
UKGBNINE	108	27	25.0	27	25.0	0					0	0	0	0
Total	*7521*	*3111*	*41.4*	*3121*	*41.5*	*0.1*					*0.7*	*0*	*0*	*0*

Table 6.9: *Natural surface water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027**

Note: ** Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*

Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	GW chemical status					Good chemical status 2021		Good chemical status 2027		GW chemical exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	284	226	79.6	263	92.6	13.0	265		267		7	0	0	0
UK02	73	65	89.0	66	90.4	1.4	63		68		10	0	0	0
UK03	9	3	33.3	3	33.3	0					44	22	0	0
UK04	50	27	54.0	27	54.0	0	17		50		46	0	0	0
UK05	31	20	64.5	20	64.5	0					35	0	0	0
UK06	46	20	43.5	21	45.7	2.2					54	0	0	0
UK07	30	19	63.3	19	63.3	0					37	0	0	0
UK08	44	28	63.6	28	63.6	0					36	0	0	0
UK09	40	31	77.5	31	77.5	0					23	0	0	0
UK10	25	16	64.0	16	64.0	0	15		25		36	0	0	0
UK11	6	5	83.3	5	83.3	0					17	0	0	0
UK12	18	8	44.4	9	50	5.6					33	17	0	0
UKGBNIIENB	14	13	92.9	13	92.9	0	14		14		7	0	0	0
UKGBNIIENW	45	45	100	45	100	0	45		45		0	0	0	0
UKGBNINE	8	7	87.5	7	87.5	0	7		8		13	0	0	0
Total	*723*	*533*	*73.7*	*573*	*79.3*	*5.5*					*20*	*1*	*0*	*0*

Table 6.10: *Groundwater bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027**

Note : ** Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*

Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total	Groundwater quantitative status					Good quantitative status 2021		Good quantitative status 2027		GW quantitative exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	284	250	88.0	257	90.5	2.5	263		284		10	0	0	0
UK02	73	63	86.3	63	86.3	0	63		68		14	0	0	0
UK03	9	8	88.9	8	88.9	0					11	0	0	0
UK04	50	30	60.0	30	60.0	0	17		50		40	0	0	0
UK05	31	20	64.5	20	64.5	0					35	0	0	0
UK06	46	16	34.8	16	34.8	0					65	0	0	0
UK07	30	13	43.3	13	43.3	0					57	0	0	0
UK08	44	37	84.1	37	84.1	0					16	0	0	0
UK09	40	30	75.0	30	75.0	0					25	0	0	0
UK10	25	24	96.0	24	96.0	0	15		25		4	0	0	0
UK11	6	5	83.3	5	83.3	0					17	0	0	0
UK12	18	11	61.1	11	61.1	0					22	17	0	0
UKGBNIIENB	14	14	100	14	100	0					0	0	0	0
UKGBNIIENW	45	45	100	45	100	0					0	0	0	0
UKGBNINE	8	7	87.5	7	87.5	0					13	0	0	0
Total	*723*	*573*	*79.2*	*580*	*80.2*	*1.0*					*20*	*0.4*	*0*	*0*

Table 6.11: *Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2021 and 2027**
Note : ** Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total HMWB and AWB	Ecological potential					Good ecological potential 2021		Good ecological potential 2027		Ecological exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	413	205	49.6	241	58.4	8.7	264		410		42.1	0	0	0
UK02	80	25	31.3	31	38.8	7.5	41		85		61.3	0	0	0
UK03	182	95	52.2	103	56.6	4.4	102		182		43.4	0	0	0
UK04	605	78	12.9	81	13.4	0.5	81		605		86.6	0	0	0
UK05	584	95	16.3	97	16.6	0.3	97		584		83.4	0	0	0
UK06	259	68	26.3	69	26.6	0.4	69		69		73.4	0	0	0
UK07	198	19	9.6	20	10.1	0.5	20		198		89.9	0	0	0
UK08	226	76	33.6	78	34.5	0.9	78		228		65.5	0	0	0
UK09	239	84	35.1	89	37.2	2.1	88		239		62.8	0	0	0
UK10	132	44	33.3	46	34.8	1.5	45		132		65.2	0	0	0
UK11	49	11	22.4	16	32.7	10.2	15		49		67.3	0	0	0
UK12	398	106	26.6	107	26.9	0.3	106		398		73.1	0	0	0
UKGBNIIENB	35	1	2.9	8	22.9	20.0	30		34		77.1	0	0	0
UKGBNIIENW	15	0	0	6	40.0	40.0	13		15		60.0	0	0	0
UKGBNINE	25	2	8.0	4	16.0	8.0	9		25		84.0	0	0	0
Total	*3440*	*909*	*26.4*	*996*	*29.0*	*2.6*					*71.1*	*0*	*0*	*0*

Table 6.12: *Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2021 and 2027**
Note *: Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source*: WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

RBD	Total HMWB and AWB	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
UK01	413	407	98.5	408	98.8	0.2					1.5	0	0	0
UK02	80	38	47.5	38	47.5	0					1.3	0	0	0
UK03	182	10	5.5	11	6.0	0.5					4.4	0	0	0
UK04	605	83	13.7	85	14.0	0.3					4.3	0	0	0
UK05	584	74	12.7	81	13.9	1.2					1.2	0	0	0
UK06	259	30	11.6	35	13.5	1.9					5.4	0	0	0
UK07	198	25	12.6	25	12.6	0					2.0	0	0	0
UK08	226	24	10.6	24	10.6	0					2.7	0	0	0
UK09	239	23	9.6	23	9.6	0					4.2	0	0	0
UK10	132	19	14.4	19	14.4	0					3.8	0	0	0
UK11	49	4	8.2	4	8.2	0					4.1	0	0	0
UK12	398	26	6.5	27	6.8	0.3					4.3	0	0	0
UKGBNIIENB	35	13	37.1	13	37.1	0					0	0	0	0
UKGBNIIENW	15	11	73.3	11	73.3	0					0	0	0	0
UKGBNINE	25	12	48.0	12	48.0	0					0	0	0	0
Total	*3440*	*799*	*23.2*	*816*	*23.7*	*0.5*					*3.1*	*0*	*0*	*0*

Table 6.13: *Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027**
Note : * *Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.*
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

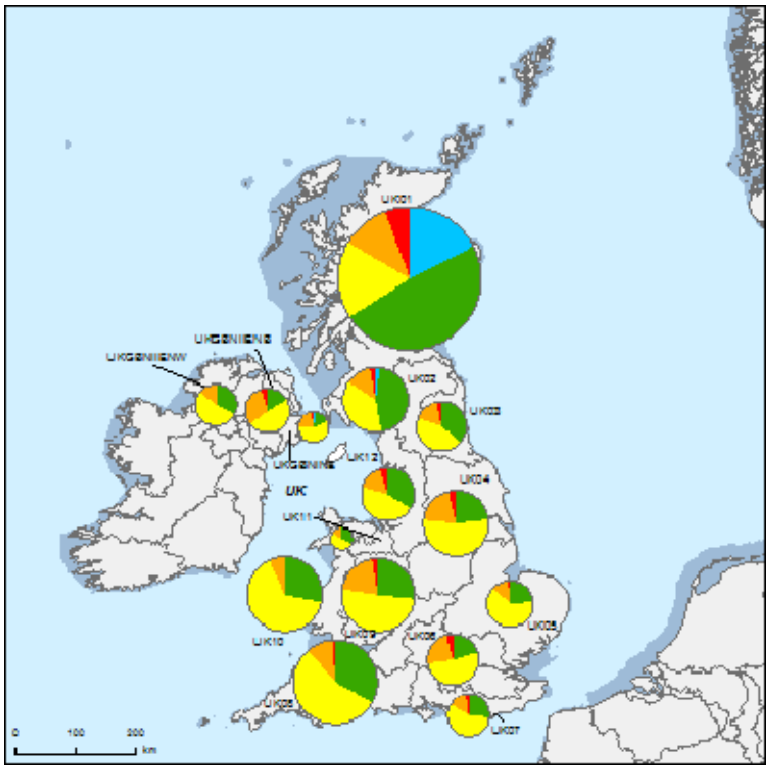


Figure 6.1: *Map of ecological status of natural surface water bodies 2009*

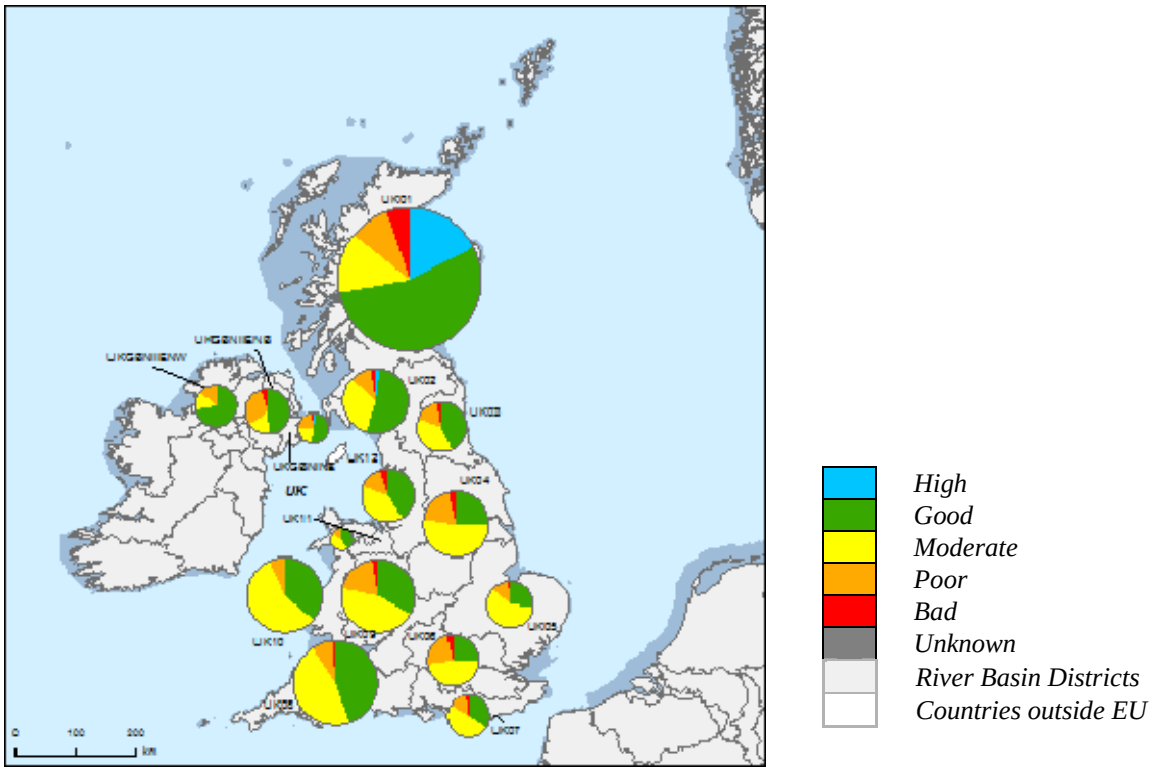


Figure 6.2: *Map of ecological status of natural surface water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.2(i).*
Source: *WISE, Eurostat (country borders)*

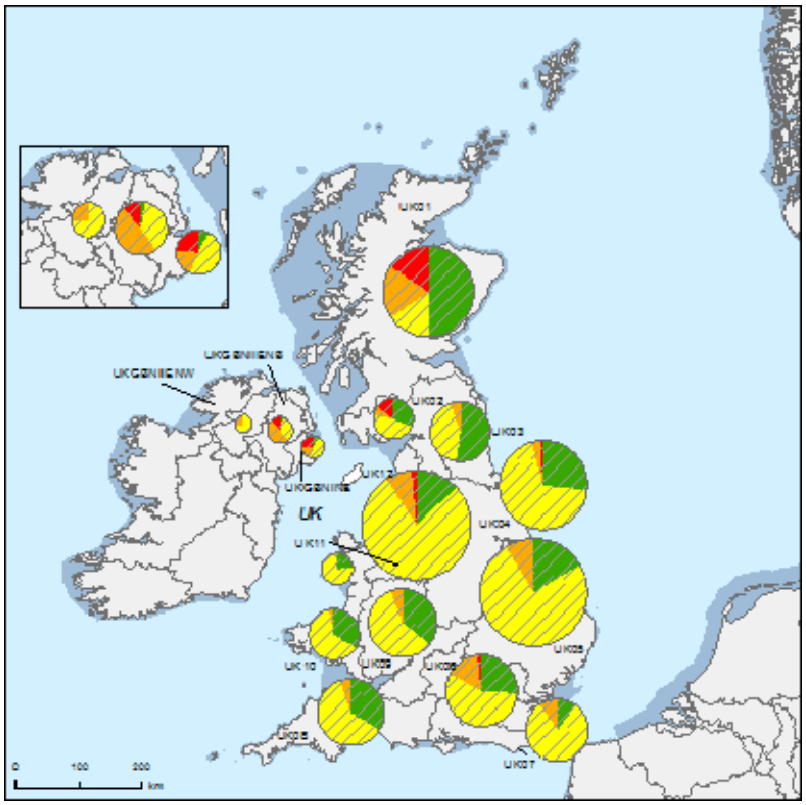


Figure 6.3: *Map of ecological potential of artificial and heavily modified water bodies 2009*

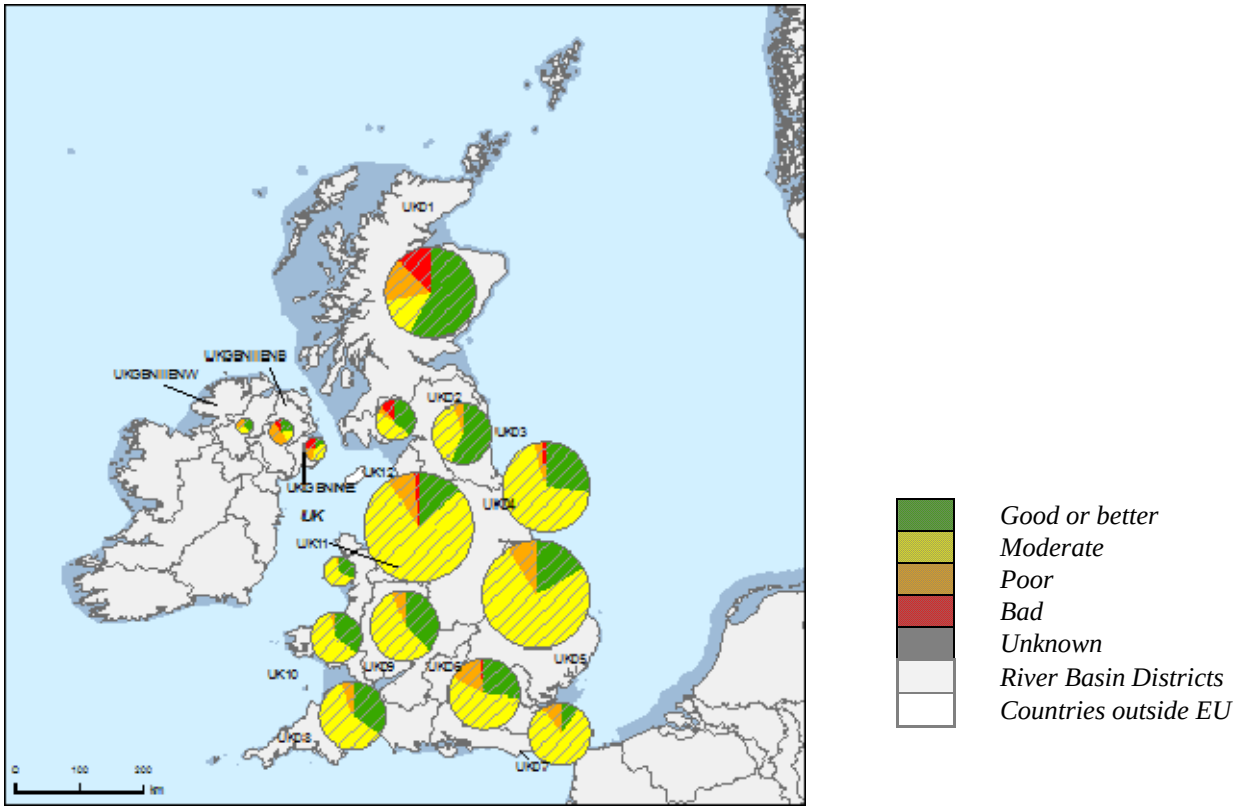


Figure 6.4: *Map of ecological potential of artificial and heavily modified water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.2(ii).*
Source: *WISE, Eurostat (country borders)*

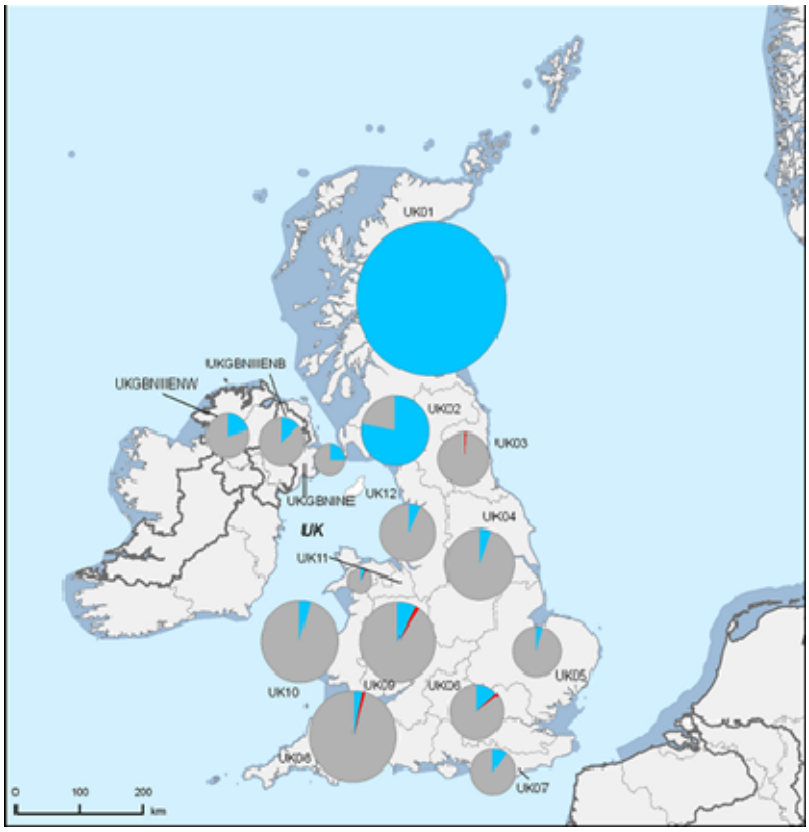
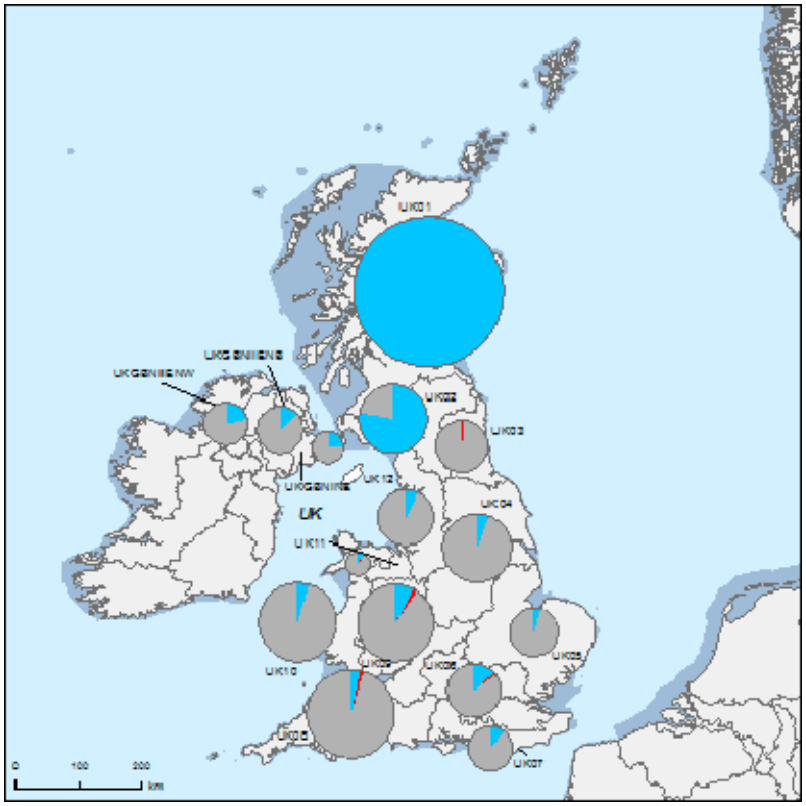


Figure 6.5: *Map of chemical status of natural surface water bodies 2009*



Good
Failing to achieve good
Unknown
River Basin Districts
Countries outside EU

Figure 6.6: *Map of chemical status of natural surface water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.3.*
Source: *WISE, Eurostat (country borders)*

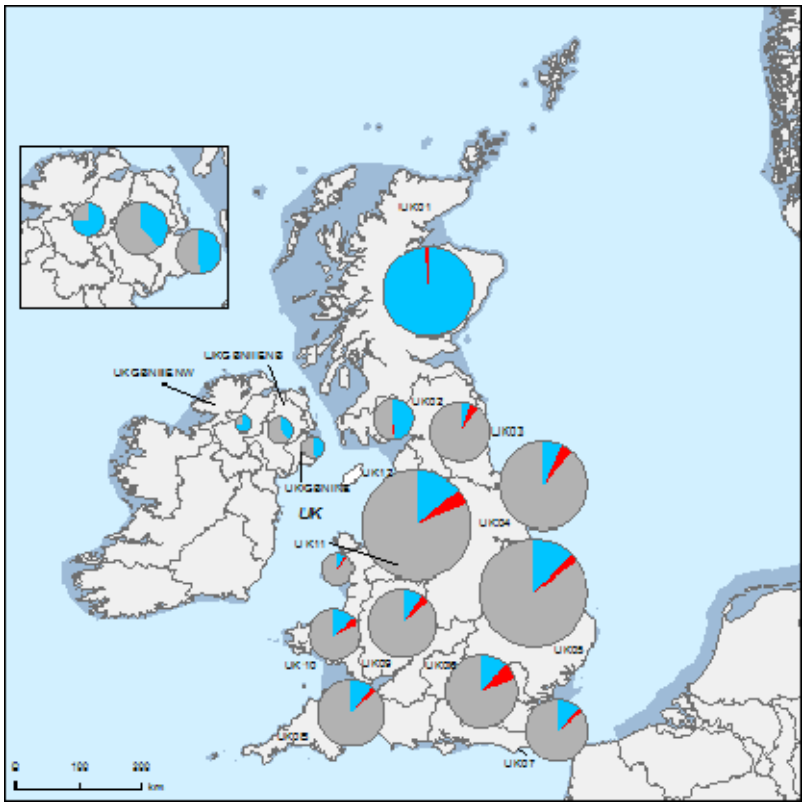
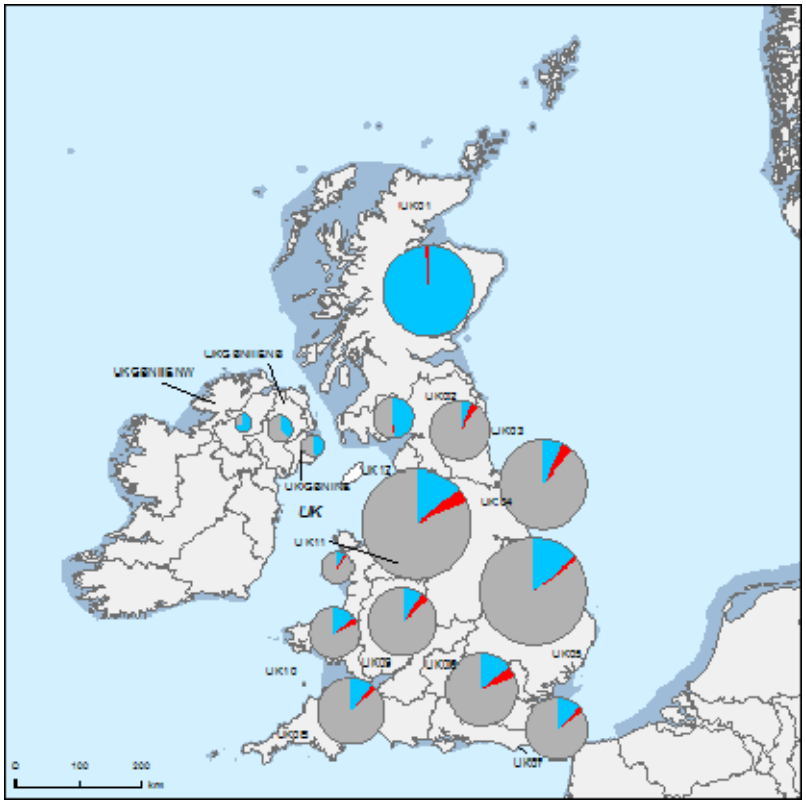


Figure 6.7: *Map of chemical status of artificial and heavily modified water bodies 2009*



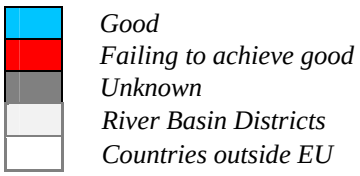


Figure 6.8: *Map of chemical status of artificial and heavily modified water bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 1.4.3.*
Source: *WISE, Eurostat (country borders)*

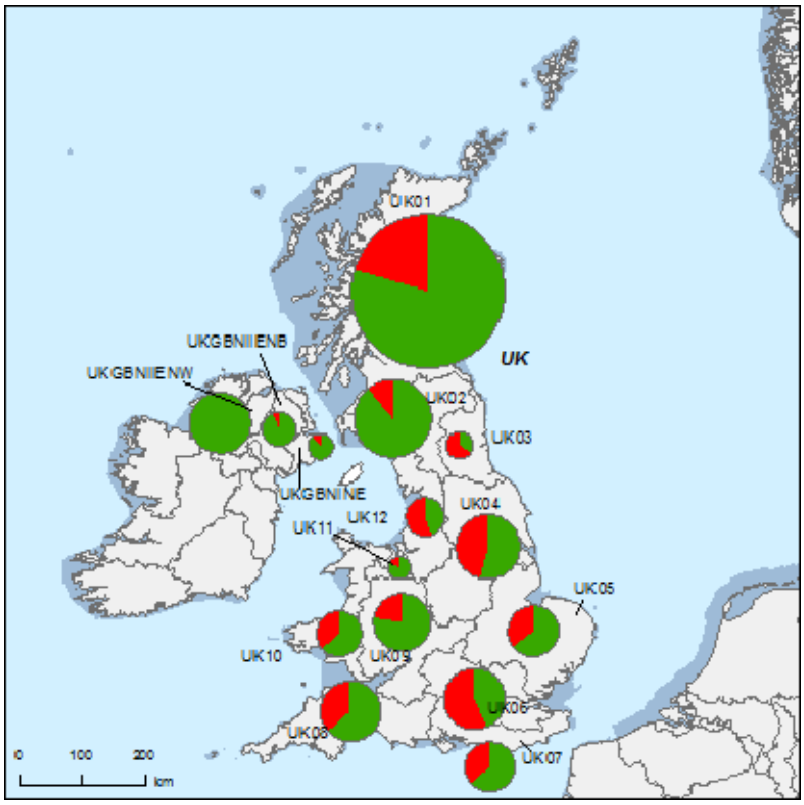


Figure 6.9: *Map of chemical status of groundwater bodies 2009*

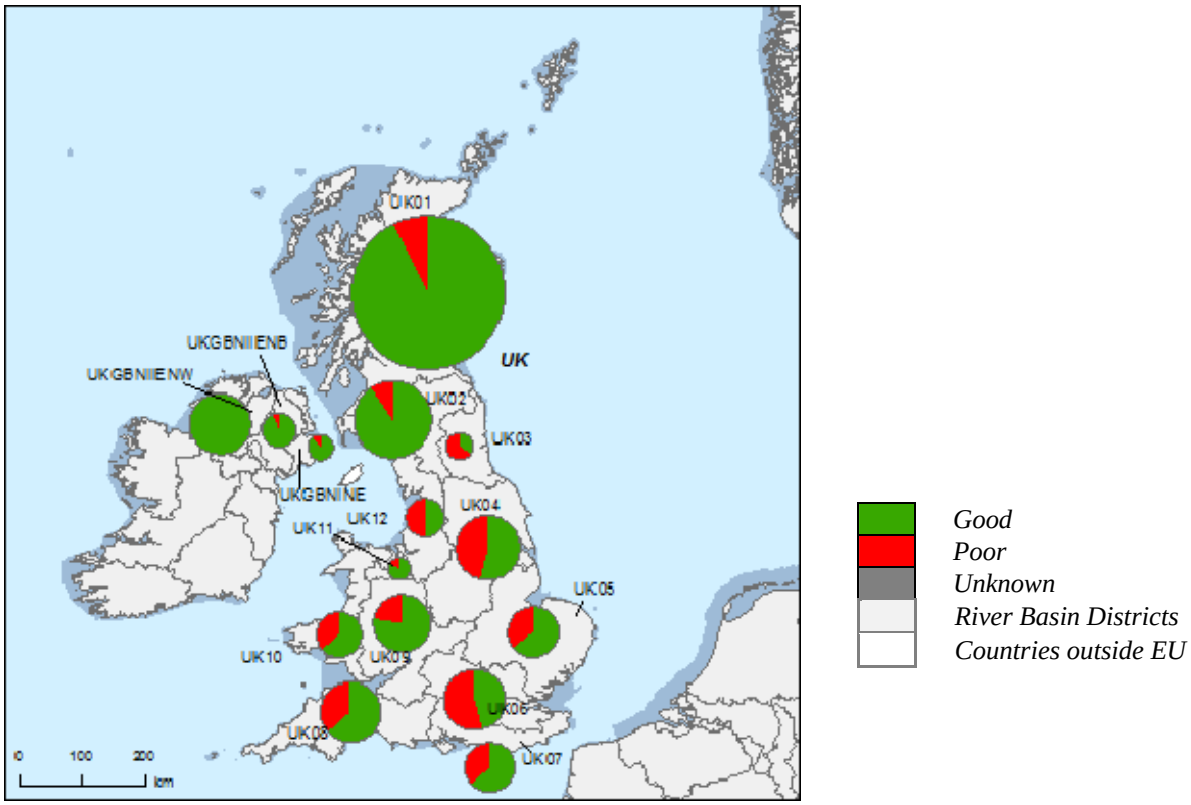


Figure 6.10: *Map of chemical status of groundwater bodies 2015*
Note: *Standard colours based on WFD Annex V, Article 2.4.5.*
Source: *WISE, Eurostat (country borders)*

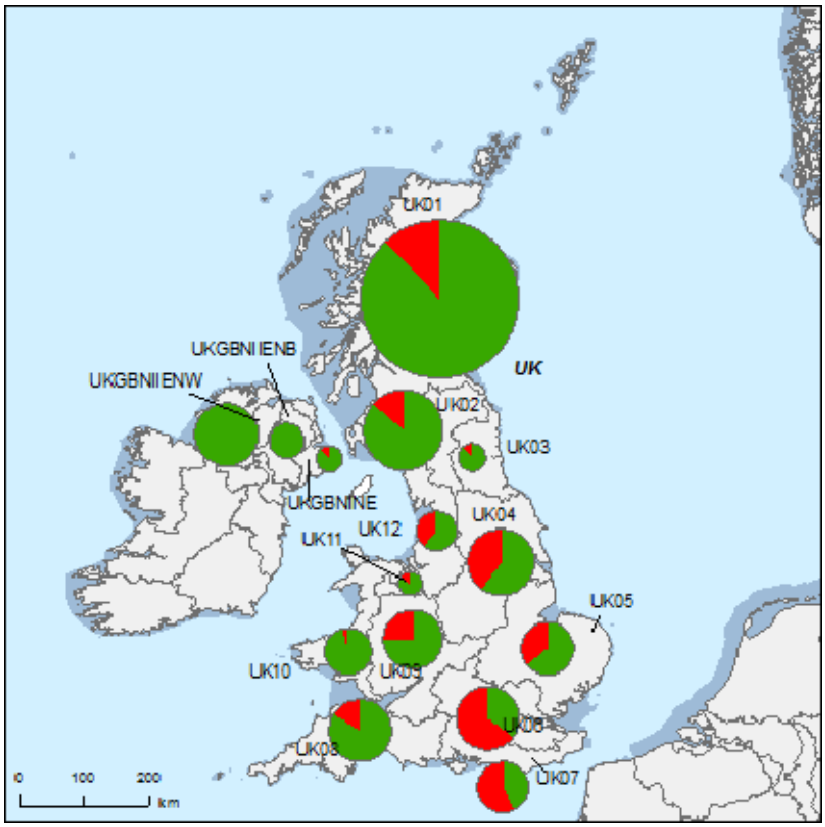


Figure 6.11: *Map of quantitative status of groundwater bodies 2009*

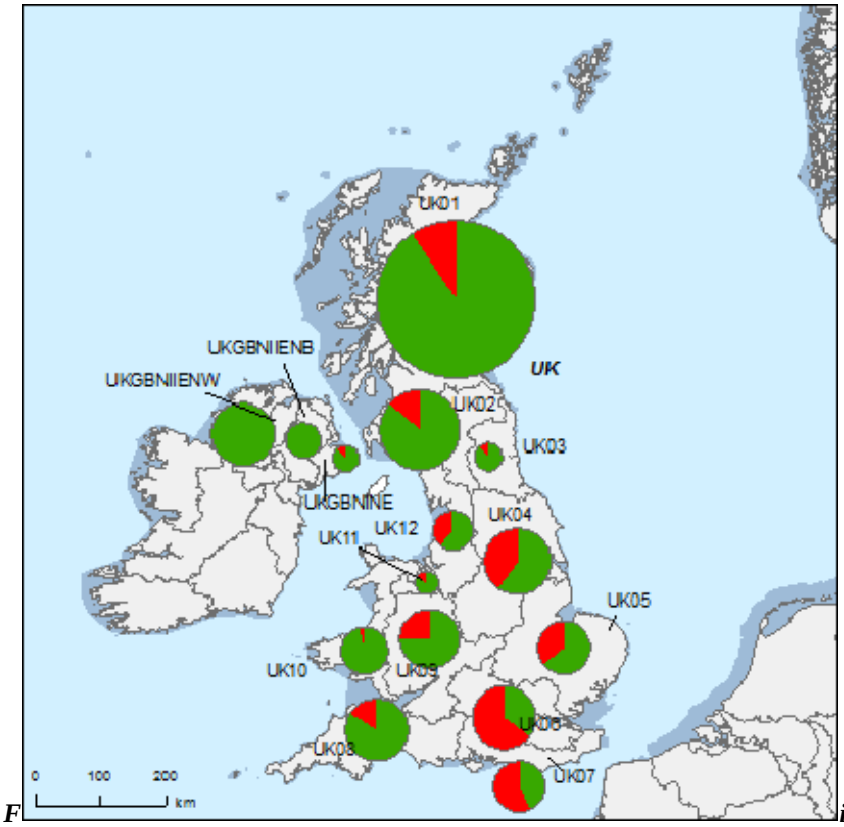


Figure 6.12: *Map of quantitative status of groundwater bodies 2015*

Note: *Standard colours based on WFD Annex V, Article 2.2.4.*

Source: *WISE, Eurostat (country borders)*

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

The approach for assessment of ecological status of surface waters generally follows a national approach, with some differences in Scotland and Northern Ireland.

7.1 Ecological status assessment methods

In England and Wales, **assessment methods for the classification of ecological status** are fully developed for all biological quality elements in river and coastal waters, but are not developed for fish in lakes. Phytoplankton has not been developed for transitional waters across the UK. UK methods for angiosperms and macroalgae exists for transitional waters in the UK but are not applicable to all typologies. In Northern Ireland, BQEs without fully developed methods are: fish in rivers and lakes, benthic fauna in lake, transitional and coastal waters, and angiosperms in coastal waters. In Scotland and Solway Tweed, there are no developed methods for fish in lakes, phytoplankton and angiosperms in transitional waters and angiosperms in coastal waters. In addition, no method has been developed for benthic fauna in transitional waters in the Solway Tweed RBD.

RBD	Rivers							Lakes							Transitional							Coastal					
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Physico-Chemical	Hydromorphological
UK01																											
UK02																											
UK03																											
UK04																											
UK05																											
UK06																											
UK07																											
UK08																											
UK09																						-	-	-	-	-	-
UK10																											
UK11																						-	-	-	-	-	-
UK12																											
GBNIIENB																											
GBNIIENW																											
GBNINE																											

Table 7.1.1: *Availability of biological assessment methods*

Assessment methods fully developed for all BQEs

Assessment methods partially developed or under development for all or some BQEs

Assessment methods not developed for BQEs, no information provided on the assessment methods, unclear information provided

\- *Water category not relevant*

Source: *RBMPs*

The assessment shows that the biological assessment methods used are able to detect all major **pressures.**

Standards have been set for many, but not all, **physico-chemical and hydromorphological** QEs in support of the biological assessment. In England and Wales, the physico-chemical parameters without set standards are salinity/conductivity in rivers, transitional and coastal and thermal conditions in lakes, transitional and coastal waters, and transparency in lake, transitional and coastal waters. Thermal pollution is said not to be an issue in the UK. In Northern Ireland, temperature was assessed but not used for classification in rivers and lakes, while salinity was not assessed directly, but is calculated from measurements of temperature and conductivity. In transitional and coastal waters, only oxygenation and nutrient conditions were assessed. In the Scotland and Solway Tweed RBDs, the missing parameters were: salinity in river, transitional and coastal water bodies and thermal conditions and transparency in lake, transitional and coastal water bodies. In the Solway Tweed RBD, thermal conditions in rivers and dissolved oxygen in lake, transitional and coastal water bodes were also missing. For salinity, no standards are set as there are no identified pressures. Thermal conditions in lakes are stated to be too complex to set standards. For transparency, no reliable reference condition could be identified.

The **hydromorphologica**l parameters without standards were: connection to groundwaters from rivers and lakes in all RBDs, and river continuity in England, Wales and Northern Ireland.

Standards have been set for **specific pollutants** in all RBDs. The methods used are clear and transparent. The UK authorities have clarified that the EQS are under review. The **one-out-all-out** principle has been applied to derive the overall ecological status in all cases.

Confidence and precision of the biological assessment has been assessed for rivers and lakes in England, Wales and Northern Ireland and transitional and coastal waters in England and Wales. It is unclear if the process has been repeated for transitional and coastal waters in Northern Ireland. In England and Wales, a statistical approach to confidence has been taken for rivers and lakes, and for transitional and coastal water bodies confidence is based on the amount and quality of data available. For rivers in Northern Ireland, the methodology involves assessing the confidence in class for each pressure in each water body. Confidence in class is considered routinely in Scotland and Solway Tweed RBDs and information is provided in the water body specific sheets(part of the RBMPs).

It is unclear whether ecological status assessment methods have been developed for **all** national surface water body types in England and Wales. No information is provided in Scotland and Northern Ireland[14].

In England, Wales and Scotland, all **class boundaries** for ecological status assessment are consistent with the intercalibration decision. In Northern Ireland, the class boundaries for rivers are consistent with the intercalibration boundaries, but limits for lakes and coastal waters are partly consistent. The intercalibrated limits for macrophytes in lakes and phytoplankton and angiosperms in transitional and coastal waters have not been used.

[14] Method statement for the classification of surface water bodies, December 2008 http://www.environment-agency.gov.uk/research/planning/33260.aspx

7.2 Application of methods and ecological status results

For all water categories in England and Wales, it is noted that **all relevant BQEs are used in both surveillance and operational monitoring**, but not all supporting elements are used. In addition, angiosperms appear to be monitored in some transitional waters, but not used for classification.

In Scotland, most sensitive BQEs and other relevant QEs are used for classification in surveillance and operational monitoring, but angiosperms in transitional and coastal waters and phytoplankton in transitional waters are not monitored or classified and fish are not monitored or classified in lakes. Physico-chemical QEs and non-priority substances are monitored and classified in all categories. For operational monitoring, fish are monitored and classified in rivers, t classified.

In Northern Ireland, all QEs are included in surveillance monitoring for rivers and lakes except salinity, although the coverage of phytobenthos and fish in rivers is limited. No hydromorphological QEs are monitored on transitional and coastal waters. For operational monitoring, all QEs are monitored in rivers, but only water flow is monitored in lakes. No information was found for transitional and coastal waters.

In England, Wales and Scotland, the operational monitoring programme is designed to respond to significant pressures and an explanation is provided on how the BQEs selected are chosen to respond to different pressures for all water categories. In Northern Ireland, this process is clear for rivers, but there is no operational monitoring of lake, transitional or coastal water bodies.

In England and Wales, research is on-going to develop a tool to assess **confidence** of classification in transitional and coastal waters. In Scotland, confidence in the assessment of each element is reported in water body information sheets in the RBMPs. No information is provided for RBDs in Northern Ireland, except for lakes, where the methodology for assessment of confidence follows UKTAG guidance.

7.3 River basin specific pollutants

The **main pollutants** causing failure of good status in England and Wales are Copper, Zinc, Ammonia, Cypermethrine and Total Phosphate. In addition, in some RBDs the pollutants Chlorine, Iron, Permethrin, Phenol, Diazinon, and 2,4 dichlorophenoxyacetic acid are also reported. Phosphate affects the highest numbers of rivers, causing pollution in between 10 and 67% in each RBD, while other pollutants generally affect lower numbers, around 1 to 25%.

In Scotland, the main pollutants reported are Phosphorus, Ammonia which are causing failures in rivers and lakes. In the Scotland RBD, dissolved inorganic nitrogen in estuaries and other toxic pollutants were also reported, while in the Solway Tweed RBD, specific pollutants were listed as an issue in rivers and lakes, but were not itemised. Failures rates were generally much lower than in England and Wales, at around 5%, although phosphorus caused failure in 43% of lochs in Solway Tweed RBD. In Northern Ireland no specific pollutants causing a failure of ecological status were reported.

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
UK01		Ammonia - rivers	2.3
UK01		Dissolved inorganic nitrogen - estuaries	8.3
UK01		Dissolved oxygen	2.1
UK01		Dissolved oxygen - coastal waters	0.3
UK01		Dissolved oxygen - estuaries	8
UK01		Other synthetic and non-synthetic toxic pollutants (including ammonium)	1.6
UK01		pH - rivers	0.8
UK01		Phosphorus - rivers	7.2
UK01		Total phosphorus - lochs	16
UK02		Acid neutralising capacity – lakes	3.7
UK02		Ammonia - rivers	1.8
UK02		Dissolved oxygen - rivers	3.1
UK02		pH - rivers	6.3
UK02		Phosphorus - rivers	4.8
UK02		Specific pollutants – lakes	0
UK02		Specific pollutants - rivers	2.6
UK02		Total phosphorus - lochs	43
UK03		Ammonia	7
UK03	7440-50-8	Copper	
UK03	52315-07-8	Cypermethrin	
UK03		Dissolved oxygen	2
UK03	7439-89-6	Iron	
UK03		pH	2
UK03	64743=03-9	Phenol	
UK03		Phosphate	15
UK03		Temperature	
UK03		Total phosphorus	
UK03	7440-66-6	Zinc	

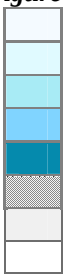
RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
UK04		2,4 dichlorophenoxyacetic acid	
UK04		Ammonia	13
UK04	7440-50-8	Copper	
UK04	52315-07-8	Cypermethrin	
UK04		Diazinon	
UK04		Dissolved oxygen	12
UK04		Permethrin	
UK04		pH	3
UK04		Phosphate	48
UK04		Temperature	1
UK04		Total phosphorus	
UK04	7440-66-6	Zinc	
UK05		Ammonia	9
UK05		Dissolved oxygen	28
UK05		Phosphate	67
UK05		Total phosphorus	
UK06		Ammonia	8
UK06	7440-50-8	Copper	
UK06	52315-07-8	Cypermethrin	
UK06		Dissolved oxygen	15
UK06	7439-89-6	Iron	
UK06		pH	1
UK06		Phosphate	66
UK06		Temperature	1
UK06		Total phosphorus	
UK06	7440-66-6	Zinc	
UK07		Ammonia	7
UK07	7440-50-8	Copper	
UK07	52315-07-8	Cypermethrin	
UK07		Dissolved oxygen	21
UK07	7439-89-6	Iron	
UK07		pH	1
UK07		Phosphate	49
UK07		Temperature	1
UK07		Total phosphorus	
UK08		Ammonia	5
UK08	7440-50-8	Copper	
UK08	52315-07-8	Cypermethrin	
UK08		Dissolved oxygen	7
UK08		pH	5
UK08		Phosphate	35
UK08		Temperature	
UK08		total phosphorus	
UK08	7440-66-6	Zinc	
UK09		Ammonia	3
UK09	7440-50-8	Copper	
UK09	52315-07-8	Cypermethrin	
UK09		Dissolved oxygen	6
UK09		pH	1
UK09		Phosphate	45
UK09		Total phosphorus	
UK09	7440-66-6	Zinc	
UK10		Ammonia	1
UK10		Chlorine	
UK10	7440-50-8	Copper	

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
UK10	52315-07-8	Cypermethrin	
UK10		Dissolved oxygen	3
UK10		pH	6
UK10		Phosphate	9
UK10		Total phosphorus	
UK10	7440-66-6	Zinc	
UK11		Ammonia	4
UK11	7440-50-8	Copper	
UK11		Dissolved oxygen	6
UK11		pH	6
UK11		Phosphate	25
UK11		Total phosphorus	
UK11	7440-66-6	Zinc	
UK12		Ammonia	22
UK12	7440-50-8	Copper	
UK12	52315-07-8	Cypermethrin	
UK12		Dissolved oxygen	10
UK12		pH	5
UK12		Phosphate	38
UK12		Temperature	1
UK12		Total phosphorus	
UK12	7440-66-6	Zinc	
GBNIIENB			
GBNIIENW			
GBNINE			

Table 7.3.1: *River basin specific pollutants*
Source: *WISE*

8. DESIGNATION OF HEAVILY MODIFIED WATER BODIES (HMWB) AND ASSESSMENT OF GOOD ECOLOGICAL POTENTIAL

Figure 8.1: *Map of percentage Heavily Modified and Artificial waterbodies by River Basin District*



0 – 5 %
5 – 20 %
20 – 40 %
40 – 60%
60 – 100 %
No data reported
River Basin Districts
Countries outside EU

Source: *WISE, Eurostat (country borders)*

The Article 5(WFD) analysis, based on reports submitted in 2005, indicated that in the UK, a total of around 37% of water bodies were (preliminary) identified as Heavily Modified or Artificial. In some areas this is more than 50%.

In the 2009 RBMPs, there are 2503 rivers (28% of total rivers), 765 lakes (68%), 107 transitional waters (56%) and 65 coastal waters (11%) which are designated as Heavily Modified or Artificial water bodies. This makes up 31% of all water bodies.

8.1 Designation of HMWBs

The RBMPs state the water uses which have led to water bodies being designated as heavily modified or artificial. **Water uses** include: navigation, storage for drinking water, water regulation, flood protection and wider environment in all RBDs. In England and Wales, the following additional water uses are listed: recreation, storage for power generation, storage for irrigation and land drainage. Types of physical modification which are considered for designation include dredging and land reclamation. Physical modifications such as navigation, storage for drinking water and flood protection was for Northern Ireland.

The **methodology** used for designation of HMWBs has followed the stepwise approach of the CIS Guidance nº4. There seems to be different approaches. In England and Wales, the national UKTAG guidance was used in all water bodies for rapid classification, and in more difficult cases (where the rapid method resulted in an inconclusive designation) more detailed approach was followed. In Scotland UKTAG guidance was followed. In Northern Ireland the rapid designation approach was used for screening, and more detailed approach for the identified preliminary HMWBs. Background document are available with the information on the Northern Ireland webpages.

There is no explicit mention of **uncertainty** in designation, but a quality check of the results of the designation process is described, which was followed by a liaison panel review. No information was found on uncertainty in Scotland or Northern Ireland[15].

8.2 Methodology for setting good ecological potential (GEP)

GEP has been defined, but not in all cases based on biological factors. The approach used was the **mitigation measures (Prague) approach.** Not all steps of the approach appear to have been considered, notably the identification of both maximum and good ecological

[15] RBMP Annex I: Designating artificial and heavily modified water bodies December 2009. UKTAG Criteria and guidance on the designation of heavily modified water bodies, March 2008. http://www.wfduk.org/sites/default/files/Media/Setting%20objectives%20in%20the%20water%20environment/HMWB%20rapid-case%20designation%20tool_Final_010308.pdf

potential. Although all **mitigation measures** have been identified, it is not clear if biological QEs have been considered in the process. It is not clear which specific measures will deliver ecological benefits in the relevant waterbodies, although a default list of mitigation measures in the UKTAG guidance provides some information. The measures which are predicted to deliver on a slight improvement have not been excluded from the process. This method only leads to the classification of HMWBs as 'good or better' or moderate or worse' potential. In Scotland, the methodology used allowed full classification of ecological potential, in line with CIS guidance.

No information was found on the use of biological data in the assessment. Plans are in place for suitable biological tools to be developed in the future.

8.3 Results of ecological potential assessment in HMWB and AWB

The results of the assessment of Good Ecological Potential show that 22% of rivers, 40% of lakes, 15% of transitional waters and 40% of coastal waters meet the requirements of good potential.

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

9.1 Methodological approach to the assessment

Standards are applied for all priority substances listed in Annex 1 to the EQSD, including standards for mercury and compounds, hexachlorobenzene and hexachlorobutadiene in biota. However, standards in biota are not currently used for classification in England and Wales, and a project is in place to look at how these should be implemented. In Scotland, mercury in mussels is used for assessment, but not hexachlorobenzene and hexachlorobutadiene since there are no known sources of those substances. The standards which are used match those listed in Annex 1 of the EQSD. Priority substances are reported to be widely monitored, although status assessment has not been carried out in all locations. No other standards are applied in biota and sediment.

No methodology is supplied for dealing with **background concentrations** in surface waters, although a methodology is given for groundwaters. No explanation is given for how bioavailability factors of metals are taken into account.

Little information is supplied on the standards applied in Northern Ireland, although UK authorities have clarified that standards were published in 2011. Where standards are applied which are different to the EQSs set in Annex 1 of the EQSD, they are more stringent.

In Scotland, all priority substances seem to have been taken into account, however no maximum allowable concentration (MAC) standard has been applied for Cadmium in coastal waters, which is as it is linked to water hardness. However, the annual mean standard has been applied. In Northern Ireland, chemical standards were assessed using annual averages and no standards were applied in sediments or biota. Chemical status was assessed in all water bodies with available data.

9.2 Substances causing exceedances

In England, Wales and Northern Ireland, a high proportion of water bodies have unknown chemical status, as monitoring in England and Wales for instance, is only undertaken where it

is known that priority substances are discharged. All other sites 'do not require assessment' and are by default classified as good chemical status.

The substances causing water bodies to fail good chemical status are shown in the table below. No priority substances caused the failure of chemical status in Northern Ireland.

Substance	Number of water bodies failing good chemical status
Benzo(g,h,i)perylene	80
Indeno(1,2,3-cd)pyrene	80
Tributyltin	79
Cadmium	18
Diuron	11
Nickel	9
Mercury	8
Benzo(k)flouranthene	7
Trichloroethylene	7
Nonylphenol	6
Lead	5
DEHP	5
Hexacholocyclohexane	5
Isoproturon	5
Benzo(b)flouranthene	3
Trichloromethane	2
Flouranthene	2
DEHP	1
Naphthalene	1
Aldrin	1
Dieldrin	1
Endrin	1
Isodrin	1

Table 9.2.1: *Substances causing exceedance of EQS*
Source: *WISE*

10. ASSESSMENT OF GROUNDWATER STATUS

The RBMPs for England, Wales and Northern Ireland provide little information on groundwater status assessment, however UK authorities have clarified that the information is included in background documents. The assessment of groundwater status generally follows a regional approach, with separate methodologies in England and Wales, Scotland and Northern Ireland. The approaches are based on a series of tests which include testing of saline or other intrusions, of the impact of groundwater on surface water ecology and of pollutant concentrations.

10.1 Groundwater quantitative status

Around 20% of the GWBs in the United Kingdom are in poor quantitative status.

Surface waters associated to groundwater and GW dependent terrestrial ecosystems have been considered in the assessment of quantitative status. The impacts of abstractions have also been considered by looking at the balance between the long term annual average rate of abstraction compared with the available groundwater resource. Saline or other intrusions were also included in the assessment.

10.2 Groundwater chemical status

The information reported on the risks of groundwater bodies with respect to **chemical pollution** showed that, in England and Wales, 78 groundwater bodies are at risk from nitrate pollution. Significant areas are at risk because of abstraction and flow regulation as well as of mining and chemicals. 53 water bodies are at risk because of pesticides. No information was reported in Northern Ireland. Groundwater chemical status and trend data associated with concentrations of pollutants is shown in the RBMP and results are also available in water body sheets.

Surface waters associated to groundwater and GW dependent terrestrial ecosystems have been considered in the assessment of chemical status.

It is not clear from the RBMPs that all substances listed in Annex II Part B of the GWD have been considered in the establishment of threshold values of pollutants. However, it is stated that all pollutants posing risk have been considered. Protection of aquatic ecosystems, uses and functions of groundwater and saline or other intrusions were also considered in setting of **threshold values**. No information was provided on the coordination of transboundary elements.

Background levels have been considered in the establishment of threshold values. Trends in groundwater pollutants are assessed. Starting points for trend reversal are defined at 75% of the GW-QS and threshold value. No methodology for assessing trend reversal has been established yet, this is planned for the 2nd RBMP cycle

10.3 Protected areas

RBD	Good	Failing to achieve good	Unknown
UK01	282	2	
UK02	71	2	
UK03	8	1	
UK04	40	10	
UK05	27	4	
UK06	34	12	
UK07	23	7	
UK08	36	8	
UK09	32	8	
UK10	25		
UK11	6		
UK12	16	2	
UKGBNIIENB*			13
UKGBNIIENW*			45
UKGBNINE*			8
Total	*600*	*56*	*66*

***Table 10.3.1**: Status of groundwater drinking protected areas*
***Note:** *Groundwater is not used for drinking water in Northern Ireland*
***Source:** WISE*

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

11.1 Additional objectives in protected areas

In England and Wales, objectives for protected areas are set based on WFD and the other respective Directives. Regarding shellfish waters the objectives set aim to meet the mandatory standards and the guideline standards of the Shellfish Directive which should ensure that once the Directive is repealed these waters are afforded at least the same level of protection as given by the Shellfish Directive.

In Northern Ireland, it is not clear whether additional objectives have been defined for protected areas. In relation to shellfish waters, even if not explicitly mentioned in the RBMPs[16] protected areas have been established under national legislative instruments with their own associated objectives/standards. In circumstances where both protected area and WFD objectives/standards apply then the more stringent objective/standard applies.

In Scotland and Solway Tweed, additional objectives have been defined for Bathing and Natura 2000 protected areas, as well as for drinking water protected areas. In Scotland, additional objectives have also been defined for Shellfish protected areas.

11.2 Exemptions according to Article 4(4) and 4(5)

Article 4(4) exemptions are applied to a large proportion of water bodies, with 60 % of river water bodies, 54% of lakes, 68% of transitional waters, 14% of coastal waters and 31% of groundwaters are subject to such time derogations. A high proportion of water bodies are subject to exemptions in England and Wales under Article 4(4), around 70%, whilst in Scotland (UK1) the number is lower 30%, and in Northern Ireland article 4.4 was applied in 45% of the water bodies. This difference seems to be linked to uncertainty on status and effect of measures in England and Wales, despite extensive monitoring programmes. Scotland has applied article 4(5) to about 1 % of its water bodies, mainly due to long-term recovery of groundwater, flood protection and invasive species.

The **justifications** for the use of exemption under Article 4(4) and 4(5) are disproportionate costs, technical feasibility and natural conditions.

Costs are estimated in a number of ways: by looking at the costs for specific measures, costs for all measures combined, and administrative costs. In England and Wales, the assessment of **disproportionate costs** was carried out by comparing costs of a specific measure with benefits at water body level, and by comparing the costs of the total PoM with the benefits of the programme. However, benefits only occur when water body status changes. UK authorities have clarified that current uncertainty on if a specific waterbody actually fails good status or not, means that it would be disproportionately expensive to take measures(see also other comments on the large number of uncertain assessments, despite an extensive monitoring network, and the resulting extensive absence of specific new measures in the first cycle). In Scotland, the reason for applying exemptions and ensuring phased achievement of

[16] Information extracted from 'EC Comparative Study of Pressures and Measures in the major river basin management plans in the EU'.

objectives, and thereby avoiding disproportionate costs[17]. The methodology for identifying measures for which costs are disproportionate is not fully clear from the RBMP in Scotland. The costs of basic measures are excluded from the assessment. Dis-proportionate costs were not used as a justification for exemptions in Northern Ireland.

Measures are **technically infeasible** if a problem takes longer to fix than there is time available, if no technical solution is available, or if there is no information on the cause of the problem. Water bodies are exempt due to **natural conditions** if the ecological recovery time for surface waters is too long.

It is not clear if the objectives and exemptions have been coordinated between the UK and Ireland in the IRBDs. A report has been produced for the international RBDs, but no detail is provided on exactly how the coordination was carried out. Only 5 water bodies, all of which are groundwaters in the Northwest RBD, are subject to less stringent objectives under Article 4(5) exemptions.

RBD	Global*					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
UK01	20	0	810	0	51	-
UK02	65	0	225	0	51	-
UK03	199	0	144	0	1	-
UK04	723	0	659	0	1	-
UK05	501	0	559	0	0	-
UK06	303	0	349	0	0	-
UK07	248	0	255	0	0	-
UK08	476	0	481	0	5	-
UK09	389	0	436	0	0	-
UK10	464	0	320	0	1	-
UK11	56	0	48	0	0	-
UK12	432	0	353	0	2	-
UKGBNIIENB	122	0	0	0	35	-
UKGBNIIENW	60	0	0	0	17	-
UKGBNINE	40	0	0	0	50	-
Total	*4098*	*0*	*4639*	*0*	*214*	-

Table 11.2.1: *Numbers of Article 4(4) and 4(5) exemptions*
Note : Exemptions are combined for ecological and chemical status. Article 4(5) is staid to be used for 1% of Scottish water bodies, but this is not apparent from the reporting to WISE.
Source: *WISE*

[17] RBMP Scotland Chapter 2, section 4.

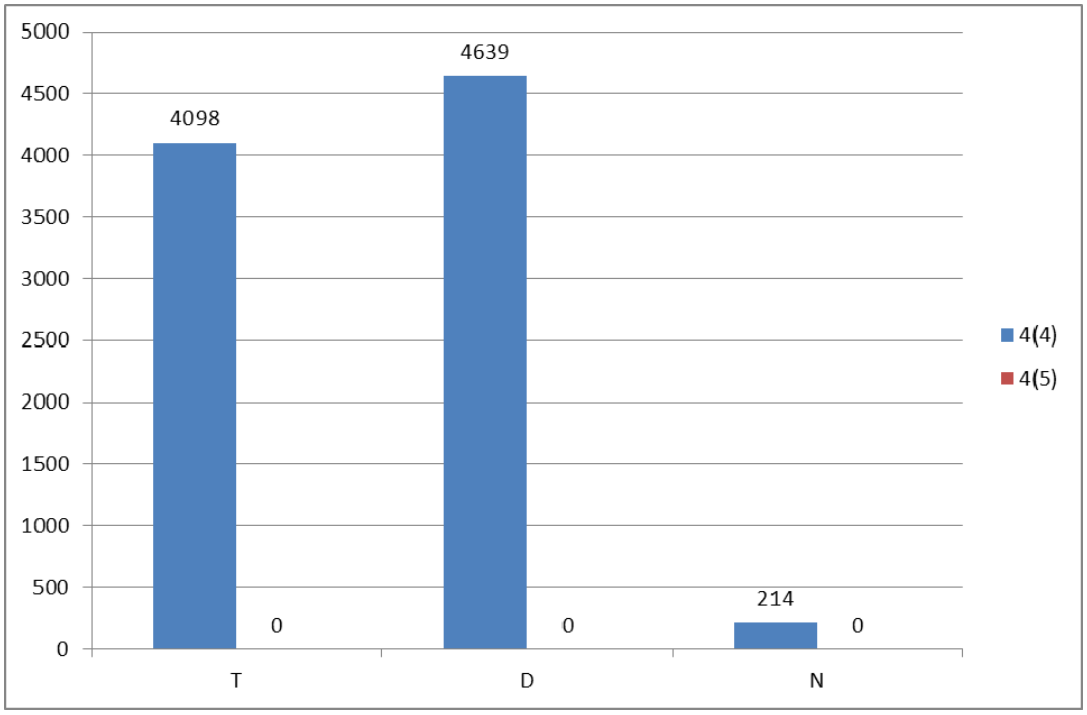


Figure 11.2.1: Numbers of Article 4(4) and 4(5) exemptions
T = Technical feasibility
D = Disproportionate costs
N = Natural conditions
Blue = Article 4(4) exemptions
Red = Article 4(5) exemptions
Source: *WISE*

11.3 Exemptions according to Article 4(6)

Article 4(6) has not been applied.

11.4 Exemptions according to Article 4(7)

Article 4(7) has not been applied in most RBDs, however, there are some cases where it has been used: In Western Wales RBD, two river water bodies have been exempted based on the construction of a new weir for hydrological monitoring. In Humber RBD, a flood alleviation scheme has led to an exemption. No information is provided on the impact of the scheme on water status. In Solway Tweed RBD it is stated that exemptions are applied but no details are provided. In Scotland RBD, article 4(7) exemptions are applied for 29 water bodies for flood protection, hydropower and impoundment schemes; a full Environmental Impact Assessment has taken place in each case. It should be noted that in which, as stated in the RBMPs is said to be incorrect.

11.5 Exemptions to Groundwater Directive

No information was supplied on the use of exemptions to the Groundwater Directive in Northern Ireland and Scotland. In England and Wales, exemptions according to article 6 (GWD) are not applied. The only reason applied for exemptions relating to groundwater pollutants was ‘Incapable for technical reasons of being prevented or limited without disproportionately costly measures’. However, no inventory of pollutants has been completed.

In England and Wales, the percentage of water bodies with groundwater exemptions was between 33 and 83%, with the highest number in Thames RBD. In Scotland, 15 to 18% of groundwater bodies were subject to exemptions, and in Northern Ireland, the figures were between 0 and 13%.

12. PROGRAMMES OF MEASURES

12.1 Programme of measures – general

According to Annex VII of the WFD, the RBMPs should contain a summary of the programmes of measures (PoM), including the ways in which Member States expect to achieve the objectives of Article 4 WFD. The programmes should have been established by 2009, but are required to become operational only by December 2012. The assessment in this section is based on the PoM as summarised by the Member State in its RBMP, and the compliance of this with the requirements of Article 11 and Annex VII of the WFD.

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)[18] on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

In England and Wales, the measures are based entirely or partly on ecological, chemical and quantitative status assessments for all water bodies. In Scotland, the PoM is partially based on status assessments and in Northern Ireland, proposed measures have been based on the status classification. Despite an extensive monitoring network, there seems to be an extensive lack of certainty of the pressures, the status of the water bodies and the impact of potential measures, which has led to few new specific measures being presented in the RBMPs. This assessment applies across the board of topics outlined below.

There has been **coordination b**etween the UK and Ireland in the international RBDs, although a specific international RBMP has not been produced.

In Scotland, information on the **geographical scope** of the measures is provided at a national, sub-basin or water body level. In England and Wales, measures available at RBD level are listed. In general, measures in Northern Ireland apply across all three RBD, but there is no specific information on the scope of implementation.

National authorities have been responsible for the majority of measures. Some measures, for example agricultural measures, will have shared responsibility, being led by national authorities, but implemented by farmers and enterprises. There is a relatively strong emphasis on voluntary measures in England and Wales, rather than statutory measures in the plans. UK authorities have clarified that statutory measures are available if voluntary measures fail, and that the approach will be reviewed for the second cycle, also taking into account potential disproportionate costs of statutory measures. In Scotland, the statutory measures are

[18] These are the minimum requirements to be complied with and include the measures required under other Community legislation as well as measures to achieve the requirements of other WFD Articles and to ensure appropriate controls on different activities affecting water management.

emphasised, and post-WFD adopted reforms of regulatory framework introduced permitting structure.

In England, Wales and Scotland**, costs** have been calculated and broken down by sector and pressure. The full programme of measures is not included in the overall costs as reported; basic measures, measures already in place and local measures are not included in these estimates. There is evidence for a financial commitment to the PoM, although this is not explicitly mentioned. The costs, for Solway Tweed RBD were presented in an impact assessment early 2009, but not referred to in the RBMP. In Northern Ireland, the total costs of measures have been calculated, but not broken down by sector, pressure or water category. There are signs of a financial commitment to implement the measures, but the sources of funding are not completely clear.

In England, Wales and Northern Ireland, the PoM will be **operational** from 2012 or before, with a small number of exceptions which will be come operational by 2013, 2014 or 2015. In Scotland, in addition to the regulatory framework of basic measures already in force, Scottish authorities have clarified that PoM became operational upon publication. The Scottish plans also include extensive information on how the implementation will be phased by 2015, 2021 and 2027, with details per measure and water body.

12.2 Measures related to agriculture

Agriculture is assessed as leading to pressures on water quality, water quantity, eutrophication, and soil erosion in all RBDs except Scotland RBD where soil erosion is not an issue and Northumbria RBD where abstraction is not an issue. Pressure on the hydromorphology is also listed in all RBDs in Northern Ireland.

In Scotland a Diffuse Pollution Management Advisory Group was established to aid selection of measures, along with eight area advisory groups and a rural diffuse management advisory group. In England and Wales, RBD Liaison Panels were set up to provide a forum for co-deliverers to discuss and influence the development of the RBMP. In most cases, this panel involved representation from farming unions. In Northern Ireland stakeholder involvement was more basic, with agricultural representatives being involved in Catchment Stakeholder Groups.

A combination of technical measures, economic instruments and non-technical measures have been selected to address the pressures from agriculture in England, Wales and Scotland. Economic instruments are not used in Northern Ireland. A large proportion of the measures proposed in England and Wales are voluntary, rather than statutory.

In England and Wales, some measures are delivered at RBD scale, while others are targeted at specific sensitive catchments. Additionally, in England, some measures are targeted only at farms which have entered agri-environmental schemes such as Environmental Stewardship. In In Northern Ireland no geographically disaggregated information is given. In Scotland information on specific measures regarding diffuse pollution are given by waterbody(in the waterbody sheets on the GIS platform), and some priority catchments for measures are identified in Scotland.

Rural Development Programmes are in place in England, Wales, Scotland and Northern Ireland to fund agricultural measures and agri-environment schemes. However details regarding the funding of the measures are missing in the PoM.

In England, Wales and Northern Ireland many of the listed measures have already been implemented. Measures relating to WFD objectives have implementation dates of 2010, 2012

or 2013 in England and Wales, and 2009, 2010, 2011 or 2012 in Northern Ireland. In Scotland timetable for implementation of individual measures are set out in the water body sheets (part of the RBMPs).

In England and Wales, the Environment Agency will use its monitoring programme to review whether work on the ground is achieving environmental objectives. In Scotland, SEPA will gather evidence to assess measures as part of its six yearly review, and in Northern Ireland monitoring of progress against objectives will take place during implementation and through the remainder of the river basin planning cycle.

Measures	UK01	UK02	UK03	UK04	UK05	UK06	UK07	UK08	UK09	UK10	UK11	UK12	GBNIIENB	GBNIIENW	GBNIINE
Technical measures															
Reduction/modification of fertiliser application	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reduction/modification of pesticide application	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Change to low-input farming (e.g. organic farming practices)															
Hydromorphological measures leading to changes in farming practices	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measures against soil erosion	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Technical measures for water saving in agriculture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Economic instruments															
Compensation for land cover	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Co-operative agreements			✓	✓	✓	✓	✓	✓	✓		✓	✓			
Water pricing specifications for irrigators	✓	✓													
Nutrient trading															
Fertiliser taxation															
Non-technical measures															
Additions regarding the implementation and enforcement of existing EU legislation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Institutional changes															
Codes of agricultural	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Measures	UK01	UK02	UK03	UK04	UK05	UK06	UK07	UK08	UK09	UK10	UK11	UK12	GBNIIENB	GBNIIENW	GBNIINE
practice															
Farm advice and training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Raising awareness of farmers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measures to increase knowledge for improved decision-making		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Certification schemes												✓			
Zoning (e.g. designating land use based on GIS maps)															
Specific action plans/programmes		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Land use planning			✓	✓	✓	✓	✓	✓	✓	✓	✓				
Technical standards													✓	✓	✓
Specific projects related to agriculture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental permitting and licensing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 12.2.1: *Types of WFD measures addressing agricultural pressures, as described in the PoM*
Source: *RBMPs*

12.3 Measures related to hydromorphology

In Scotland many hydromorphological measures are identified on a waterbody specific level, with a stepwise prioritisation for implemented in the three RBMPS cycles considered. The majority of measures are scheduled in the latter cycles, often due to disproportionate costs. In England and Wales as well as in Northern Ireland many of the measures are related to further investigations and research.

No clear **links** are made between hydromorphological pressures and measures. In the Scottish RBMPs engineering modifications refers to a variety of purposes, including flood defence, land draining, navigation, urban development, and the description of the specific measures relate to such pressures.

No assessment has been made of the **expected effects of the specific measures** in England, Wales and Northern Ireland. For England and Wales, the waterbody specific sheets contain the classification results for each element monitored, and status predicted in 2015 as a result of pressures and measures based on an integrated assessment, and not the assessment of individual measures. At the same time, the absence of information on the effects of measures is used as a justification for delaying measures. In Scotland the only assessment is of water bodies affected by hydropower schemes, where the impact of measures on status is assessed in 2015, 2021 and 2027.

Hydro-morphological measures are to be implemented in HMWBs in all RBDs. In England and Wales, planned measures are presented at a water body level.

Guidelines on an **ecological flow regime** are in place, and in addition to permitting of new abstractions, some specific schemes are in place to ensure to ensure environmental flow indicators for Natural 2000 sites.

Measures	UK01	UK02	UK03	UK04	UK05	UK06	UK07	UK08	UK09	UK10	UK11	UK12	GBNIIENB	GBNIIENW	GBNIINE
Fish ladders	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bypass channels						✓									
Habitat restoration, building spawning and breeding areas		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sediment/debris management			✓	✓	✓	✓	✓	✓							
Removal of structures: weirs, barriers, bank reinforcement	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Reconnection of meander bends or side arms															
Lowering of river banks															
Restoration of bank structure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			
Setting minimum ecological flow requirements															
Operational modifications for hydropeaking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			
Inundation of flood plains		✓	✓	✓	✓							✓			
Construction of retention basins								✓							
Reduction or modification of dredging	✓					✓	✓		✓				✓	✓	✓
Restoration of degraded bed structure	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Re-meandering of formerly straightened water courses	✓														

Table 12.3.1: *Types of WFD measures addressing hydromorphological pressures, as described in the PoM*
Source: *RBMPs*

12.4 Measures related to groundwater

It is noted that both basic and supplementary measures are implemented in order to tackle groundwater over-exploitation, and to prevent inputs of any harmful substances which would affect groundwater quality. It is however also noticeable that very little improvement is foreseen to both chemical and quantitative status of groundwater in the RBDs in England, Wales and Scotland. All but one GWBs are in good status in Northern Ireland.

The basic measures implemented to address groundwater over-exploitation include controls over abstraction and artificial recharge through the Groundwater Regulations in England and Wales, and the Water Environment (Controlled Activities) Regulations in Scotland. Supplementary measures include investigations to identify high risk source catchments, improve confidence in quantitative status assessment and determine cost effective actions to support good status and actions to improve stakeholder awareness. Supplementary measures were not used in Scotland and Northern Ireland as groundwater exploitation is not considered an important issue.

The basic measures implemented to prevent and limit inputs of pollution to groundwater include regulatory controls on point source discharges, diffuse pollution and artificial recharge to groundwater, accident prevention measures, measures to address diffuse nitrate pollution under the Nitrates Directive, agree voluntary pollution prevention measures and remediation of contaminated land and investigation of groundwater dependent terrestrial ecosystems. Supplementary measures include economic incentives for restoration of groundwater, priority catchment measures for diffuse sources and support local authorities to bring polluted land back into use. Supplementary measures are not used in North Western and Neagh Bann international RBDs as they are not needed.

All groundwater bodies which are shared between the UK and Ireland are reported to be in good quantitative and chemical status. Measures would be coordinated between the two MSs, if necessary..

12.5 Measures related to chemical pollution

There is no mentioning in the RBMPs of i**nventories** of pollution sources for the purpose of the WFD, however the E-PRTR inventory is referred to. This inventory includes priority substances and other pollutants, non priority specific pollutants, deoxygenating substances and nutrients. It is not specified whether diffuse sources of these pollutants are included.

Measures implemented to tackle chemical pollution include:

- Industrial emissions – Enforcement of compliance with permitted standards for industrial discharges, voluntary pollution prevention programmes and contaminated land remediation, increase regulatory control over contaminated sites;
- Waste deposits to land/fields – Enforcement of Sludge Regulations on sewage sludge disposal to land;
- Households – Encourage householders to use less harmful cleaning products, and promotion of good practice with regards to household chemicals; and
- Others – Implementation of national contaminated land and groundwater regulations, cleaning up of abandoned mines, banning the use of some substances, such as TBT, use of sustainable drainage systems in new developments, enforcement of compliance with WWTW discharge consents reduce pesticide input from forestry, restrict use of manufacturing chemicals under REACH regulations.

In Solway Tweed RBD measures included: suspended use of Cypermethrin sheep-dip, restrict use of PAH content in oil for tyre manufacture and a ban on TBT containing products.

In England and Wales, a number of measures were found in addition to these, including: Adopt best farming practice to reduce cadmium pollution from fertiliser, bans or restrictions on the use of substances including isoproturon, trichloroethylene, mercury, asulam, pesticides

including metaldehyde, diuron, atrazine, and simazine, and investigations into substances including dalapon, mecoprop, linuron, glyphosate, arsenic, iron and propyzamide. Actions were also taken under the Catchment Sensitive Farming programme on substances including bentazone, clopyralid.

No information was found on substance specific measures in Northern Ireland or Scotland RBD. UK authorities have clarified that work on development of the inventories of pollution sources has not been finalised yet.

12.6 Measures related to Article 9 (water pricing policies)

The **definition of water services** is narrow and only includes water supply and wastewater collection and treatment. Abstraction, self-services, impoundments, engineering, treatment and distribution of surface water or groundwater and discharges from waste water treatment facilities are identified in some RBDs, but these are not subject to article 9.

Water uses identified for the overall application of the Directive includes abstraction, agriculture, industry, and households, along with hydropower, navigation, dredging, flood protection, cooling water uses, and irrigation in some RBDs.

Cost recovery rates are only calculated for water companies providing water supply and sewerage services. Cost recovery is calculated at the RBD level. The calculation of contribution of different water uses disaggregated into at least households, agriculture and industry to cost recovery of water services is not clear.

Cost recovery calculations include financial costs such as capital costs, depreciation, operational and maintenance costs, and administrative costs. Subsidies have been included into the calculation at an RBD level. Environmental and resource costs have been estimated at a national level. In Scotland and Northern Ireland, it is not clear whether financial costs, subsidies and environmental and resource costs have been included.

Use of the **polluter-pays principle** has been reported, but taking into account that adequate contribution of different water uses to cost recovery of water services is not ensured and that in most cases environmental and resource costs are not calculated and recovered, the implementation of the principle is questionable.

Water pricing policy provides **adequate incentives** for users to use resources efficiently. These incentives include volumetric charging and water metering in some areas, and will include site area based charges for surface water drainage in future. In Northern Ireland, there is no metering or volumetric charging of domestic customers. In Scotland, only metering of households is used, but a control regime is also in place to encourage efficient use of water across the whole water environment.

It is not clear whether **flexibility** provision or provisions of art 9(4) has been used in England, Wales and Northern Ireland. In Scotland, a general explanation on the use of flexibility provisions is given, although flexibility is not explicitly mentioned. UK authorities confirmed the use of social tariffs in England (from 2013) and Scotland.

It is reported that there has been coordination between RBDs within the UK. No international coordination mechanisms are mentioned.

12.7 Additional measures in protected areas

In England Wales and Scotland, the water bodies and protected areas needing additional measures are clearly identified, and additional measures have also been listed. In Northern

Ireland, there has been no identification of water bodies where additional measures are needed, and no additional measures have been foreseen.

Additional measures have been identified to aid compliance with the Habitats and Birds Directives, and for Freshwater fish, Shellfish, Bathing water and Drinking water protected areas in England and Wales, and the Habitats, Birds, Freshwater Fish and Bathing Water Directives in Scotland.

In England and Wales, both safeguard zones and additional measures are implemented to protect drinking water quality. Measures include investigations and measures in the action plan for the safeguard zone, and are specific to a particular issue, for example a pesticide. No measures are listed for groundwater safeguard zones. No measures are reported in Northumbria RBD. Regarding shellfish waters, information in England and Wales on the measures in place for the maintenance and enhancement of these waters were not provided explicitly although objectives associated with Shellfish Directive have been set. However the number of protected areas and production areas are very similar which may provide a high level of protection to these areas.

In Scotland, additional measures to safeguard drinking water quality have been established, although no safeguard zones are in place, as they are not considered to be necessary. Actions include investigations to characterise the risks to DWPAs and actions to prevent further deterioration, such as measures to tackle Metaldehyde contamination. In Northern Ireland, it is reported that measures are implemented, but no details are given. Shellfish protected areas have been identified but the RBMPs only provided the names and no further additional information. In addition, despite the objectives for the protection and enhancement, the measures required for these to be achieved were not provided. However, these may be inferred from the pollution reduction plans.

Regarding shellfish waters in Northern Ireland, despite objectives, the actions required for these to be achieved were not provided. The number of shellfish protected waters and production areas are very similar in each of the Northern Ireland RBDs which should provide protection of shellfish waters.

13. WATER SCARCITY AND DROUGHTS, FLOOD RISK MANAGEMENT AND CLIMATE CHANGE ADAPTATION

13.1 Water Scarcity and Droughts

Water scarcity and drought are not thought to be relevant for the Solway Tweed, Northumbria, North West, West Wales and Dee RBDs, as well as for the three RBDs in Northern Ireland. In the Humber, South West and Severn RBDs local or sub-basin water scarcity may be an issue but droughts are not said to be relevant. In Scotland local or sub-basin scale water scarcity and drought may occur, while in Anglian RBD these are thought to be an issue at local and RBD-wide scales. Thames and South East RBDs note that RBD-wide water scarcity may be an issue but that drought is not thought to be relevant.

No data on future water demand and availability or trend scenarios were available for the Scotland, Solway Tweed, Neagh Bann, North Western and North Eastern RBDs. For RBDs in England and Wales, it is predicted that agricultural irrigation use will increase by ~20%, and summer flows will decrease by 11% on average by the 2020s.

The main measures identified to combat water scarcity and droughts following the production of Water Resources Management Plans were:

- Improve efficiency of water use in businesses and households through metering;
- Increase supply capacity by integration of use of different sources;
- Match irrigation to crop needs;
- Reduction of demand through labelling of water efficient products and specification of water efficient fittings in new and refurbished homes;
- Change timing of agricultural abstractions and construct storage ponds.

These main measures are for the reduction of abstraction pressures. RBDs in England and Wales are encouraging farmers to build winter storage reservoirs and extend abstractions to improve previously exempt areas. Stronger water efficiency policies will also be included in spatial strategies and local development plans. RBDs in Northern Ireland also plan to enhance governance of water, relating to the NI Water resources strategy for 2002-2030.

Water scarcity and drought are not considered to be relevant in the international RBDs.

13.2 Flood Risk Management

Floods are mentioned in a number of places in the RBMPs. Flood protection is listed as a reason for designation of HMWBs, and increased flooding is listed as a risk under climate change scenarios. However, flooding is not listed as a pressure related to hydromorphological measures. Exemptions are applied under article 4(7) for flood alleviation and protection schemes in Humber and Scotland RBDs.

13.3 Adaptation to Climate Change

The UK Climate Impacts Programme (UKCIP) has been developed as a national strategy. The UK Climate Projections 2009 is used as the source of future climate projections. The Plan recognises that some areas may experience hotter drier summers, warmer wetter winters and rising sea levels and that action is needed from many stakeholders to adapt to changing climate. It suggests that the RBMP will provide a framework within which to focus and co-ordinate activities but does not provide specific details on how/what will be done.

There is no information concerning a national climate strategy for the Scotland and Solway Tweed RBDs. The RBMPs for these RBDs include information on the state of the water environment, along with impacts of climate change on aspects such as pollution of surface waters. Where changes in pressures are identified, measures are recommended to address these.

In England and Wales, the impact of programmes of actions on greenhouse gas emissions and future climate change are considered in the strategic environmental assessment reports and the methodology used to include the cost of carbon in the economic appraisal process is detailed. The impacts of climate change on certain pressures are also assessed, and this information will be used to prioritise adaptation actions. For each pressure, the impact, severity of the impact and the ability of the proposed or current actions taken to perform under climate change are described.

In Northern Ireland, the RBMP contains background information about climate change, details about the impacts of climate change in relation to certain main pressures (abstraction

and flow regulation, diffuse and point source pollution, changes to morphology, invasive alien species) and a summary of the relevant measures. These have been identified on the basis that Northern Ireland is expected to experience warmer and wetter winters, hotter and drier summers and heavier rainfall. In addition, the Northern Ireland Climate Change Impacts Partnership (NICCIP) was established to widen the understanding of the impacts of climate change within Northern Ireland.

In England, Wales and Scotland, a climate check of the recommended measures has been carried out. Each action has been designated an adaptation option of win-win, no regrets, low regrets, flexible adaption or regrets. An assessment of the ability of actions to perform under future climate is provided for each of the major pressures, which include: water quality, water flows and levels, pressures on the condition of the beds, banks and shores of surface waters, and barriers to fish migrations. For each pressure, the actions, co-ordination required, plan for implementation and specific number of water bodies that should receive an improvement in status are described in detail, as well as climate checks for each action. The climate check did not lead to immediate action though, the effect of the climate check is expected from the 2nd RBMP cycle.

In Northern Ireland, a climate check of the Programme of Measures has not been undertaken. However, a number of measures have been identified which address the impacts of climate change, which were updated following a workshop in 2009 which examined the impacts of climate change on the implementation of the RBMP. It is also stated that a risk assessment will be undertaken and an adaptation programme will be developed.

Some specific measures related to adaptation to climate change are listed for RBDs in England and Wales. In Scotland, actions are suggested to reduce urban diffuse pollution, including installation of sustainable urban drainage systems and actions to reduce pollution from diffuse agricultural sources through interception and storage treatment of run-off. In the Solway Tweed RBD, measures are recommended in terms of greenhouse gas emissions, preparedness for future climate, and continued effectiveness under predicted future climate.

In Northern Ireland, there are generic measures required to address the impacts of climate change on the main pressures (abstraction and flow regulation, diffuse and point source pollution, changes to morphology, invasive alien species) together with the mechanisms that need to be put in place.

For RBDs in England, Wales and Scotland, no specific information is provided on how climate change will be taken up in future cycles. For RBDs in Northern Ireland, it has been stated that climate change needs to be taken into account in the characterisation and objective-setting process for the second cycle but there is no information regarding the methodology or time-frame.

14. RECOMMENDATIONS

Following the steps of river basin planning as set out in the WFD should ensure that water management is based on a better understanding of the main risks and pressures in a river basin and as a result, interventions are cost effective and ensure the long term sustainable supply of water for people, business and nature.

To deliver successful water management requires linking these different steps. Information on **pressures** and risks should feed into the development of **monitoring programmes**, information from the monitoring programmes and the **economic analysis** should lead to the identification of **cost effective programmes of measures** and justifications for exemptions.

Transparency on this whole process within a clear governance structure will encourage **public participation** in both the development and delivery of necessary measures to deliver sustainable water management.

To complete the 1st river basin management cycle, and in preparing for the second cycle of the WFD, it is recommended that:

- River basin management plans for Gibraltar shall be reported.
- 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.
- Where there are currently high uncertainties in the characterisation of the RBDs, identification of pressures, and assessment of status, these need to be addressed in the current cycle, to ensure that adequate measures can be put in place before the next cycle. This includes the definition of reference conditions and ensuring typologies are tested against biological data.
- 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.
- The remaining uncertainty in the application of the intercalibration process needs to be addressed.
- Methodologies for assessment of BQEs need to be developed. In some cases certain BQEs are not used for assessment even where they are monitored.
- 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. UK needs to provide clearer reporting on the methodologies used to set the EQS values for national specific pollutants.
- The process to identify heavily modified water bodies and to identify good ecological potential needs to be completed. The designation of HMWBs 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.
- The biota standards for mercury, hexachlorobenzene and hexachlorobutadiene in the EQSD, 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.

- The large uncertainties reported in relation to the assessment of the status, the pressures and the effect of potential measures, need to be addressed. The UK (mainly EN/WA) has included in the POMs a lot of investigations to resolve this uncertainty and the results of these investigations need to feed into the development of the second cycle and more clearly defined measures to achieve objectives.
- 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.
- 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.
- Agriculture is indicated as exerting a significant pressure on the water resource in all UK RBDs. This should be translated into a clear strategy that defines the basic/mandatory measures that all farmers should adhere to and the additional supplementary measures that can be financed. This should be developed with the farmers' community to ensure technical feasibility and acceptance. There needs to be a very clear baseline so that any farmer knows the rules this can be adequately advised and enforced and so that the authorities in charge of the CAP funds can adequately set up Rural Development programmes and cross compliance water requirements.
- 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.