

Brussels, 26.2.2019
SWD(2019) 41 final

COMMISSION STAFF WORKING DOCUMENT

Second River Basin Management Plans - Member State: Germany

Accompanying the document

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

**on the implementation of the Water Framework Directive (2000/60/EC) and the Floods
Directive (2007/60/EC)
Second River Basin Management Plans
First Flood Risk Management Plans**

{COM(2019) 95 final} - {SWD(2019) 30 final} - {SWD(2019) 31 final} -
{SWD(2019) 32 final} - {SWD(2019) 33 final} - {SWD(2019) 34 final} -
{SWD(2019) 35 final} - {SWD(2019) 36 final} - {SWD(2019) 37 final} -
{SWD(2019) 38 final} - {SWD(2019) 39 final} - {SWD(2019) 40 final} -
{SWD(2019) 42 final} - {SWD(2019) 43 final} - {SWD(2019) 44 final} -
{SWD(2019) 45 final} - {SWD(2019) 46 final} - {SWD(2019) 47 final} -
{SWD(2019) 48 final} - {SWD(2019) 49 final} - {SWD(2019) 50 final} -
{SWD(2019) 51 final} - {SWD(2019) 52 final} - {SWD(2019) 53 final} -
{SWD(2019) 54 final} - {SWD(2019) 55 final} - {SWD(2019) 56 final} -
{SWD(2019) 57 final} - {SWD(2019) 58 final} - {SWD(2019) 59 final} -
{SWD(2019) 60 final} - {SWD(2019) 61 final} - {SWD(2019) 62 final} -
{SWD(2019) 63 final} - {SWD(2019) 64 final} - {SWD(2019) 65 final} -
{SWD(2019) 66 final} - {SWD(2019) 67 final} - {SWD(2019) 68 final} -
{SWD(2019) 69 final} - {SWD(2019) 70 final} - {SWD(2019) 71 final} -
{SWD(2019) 72 final} - {SWD(2019) 73 final} - {SWD(2019) 74 final} -
{SWD(2019) 75 final} - {SWD(2019) 76 final} - {SWD(2019) 77 final} -
{SWD(2019) 78 final} - {SWD(2019) 79 final} - {SWD(2019) 80 final} -

Table of contents

<i>Acronyms and definitions</i>	4
<i>Foreword</i>	5
<i>General Information</i>	6
<i>Status of second river basin management plan reporting</i>	9
<i>Key strengths, improvements and weaknesses of the second River Basin Management Plan(s)</i>	10
<i>Recommendations</i>	17
<i>Topic 1 Governance and public participation</i>	20
1.1 Assessment of implementation and compliance with the WFD requirements in the second cycle.....	20
1.2 Progress with Commission recommendations.....	23
<i>Topic 2 Characterisation of the River Basin District</i>	25
2.1 Assessment of implementation and compliance with the WFD requirements in the second cycle.....	25
2.2 Main changes in implementation and compliance since the first cycle	40
2.3 Progress with the Commission recommendations.....	40
<i>Topic 3 Monitoring, assessment and classification of ecological status in surface water bodies</i>	42
3.1. Assessment of implementation and compliance with the WFD requirements in second RBMPs.....	42
3.2. Main changes in implementation and compliance since the first RBMPs	63
3.3. Progress with Commission recommendations.....	66
<i>Topic 4 Monitoring, assessment and classification of chemical status in surface water bodies</i>	68
4.1. Assessment of implementation and compliance with WFD requirements in second cycle	68
4.2. Main changes in implementation and compliance since first cycle	81
4.3. Progress with Commission recommendations.....	82
<i>Topic 5 Monitoring, assessment and classification of quantitative status of groundwater bodies</i>	84
5.1. Assessment of implementation and compliance with the WFD requirements in the second cycle.....	84
5.2. Main changes in implementation and compliance since the first cycle	92
5.3. Progress with Commission recommendations.....	93
<i>Topic 6 Monitoring, assessment and classification of chemical status of groundwater bodies</i>	94

6.1. Assessment of implementation and compliance with WFD requirements in the second cycle	94
6.2. Main changes in implementation and compliance since the first cycle	101
6.3. Progress with Commission recommendations.....	102
<i>Topic 7 Designation of Heavily Modified and Artificial Water Bodies and definition of Good Ecological Potential.....</i>	<i>103</i>
7.1. Assessment of implementation and compliance with WFD requirements in the second cycle for designation.....	103
7.2. Main changes in implementation and compliance since the first cycle	107
7.3. Progress with Commission recommendations.....	108
<i>Topic 8 Environmental objectives and exemptions.....</i>	<i>110</i>
8.1. Assessment of implementation and compliance with the WFD requirements in the second cycle.....	110
8.2. Main changes in implementation and compliance since the first cycle	118
8.3. Progress with Commission recommendations.....	118
<i>Topic 9 Programme of measures</i>	<i>120</i>
9.1. Assessment of implementation and compliance with the WFD requirements in the second cycle.....	120
9.2. Main changes in implementation and compliance since the first cycle	132
9.3. Progress with Commission recommendations.....	133
<i>Topic 10 Measures related to abstractions and water scarcity.....</i>	<i>136</i>
10.1. Assessment of implementation and compliance with the WFD requirements in the second cycle.....	136
10.2. Main changes in implementation and compliance since the first cycle	137
10.3. Progress with Commission recommendations	137
<i>Topic 11 Measures related to pollution from agriculture</i>	<i>138</i>
11.1. Assessment of implementation and compliance with the WFD requirements in the second cycle.....	138
11.2. Main changes in implementation and compliance since the first cycle	139
11.3. Progress with Commission recommendations	139
<i>Topic 12 Measures related to pollution from sectors other than agriculture.....</i>	<i>144</i>
12.1. Assessment of implementation and compliance with WFD requirements in the second cycle.....	144
12.2. Main changes in implementation and compliance since the first cycle	145
12.3. Progress with Commission recommendations	146
<i>Topic 13 Measures related to hydromorphology.....</i>	<i>148</i>

13.1.	Assessment of implementation and compliance with the WFD requirements in the second cycle.....	148
13.2.	Main changes in implementation and compliance since the first cycle	150
13.3.	Progress with Commission recommendations	150
<i>Topic 14 Economic analysis and water pricing policies</i>		<i>152</i>
14.1.	Assessment of implementation and compliance with the WFD requirements in the second cycle and main changes in implementation and compliance.....	152
14.2.	Progress with Commission recommendations	152
<i>Topic 15 Considerations specific to Protected Areas (identification, monitoring, objectives and measures).....</i>		<i>156</i>
15.1.	Assessment of implementation and compliance with the WFD requirements in the second cycle.....	156
15.2.	Main changes in implementation and compliance since the first cycle	160
15.3.	Progress with Commission recommendations	160
<i>Topic 16 Adaptation to drought and climate change.....</i>		<i>161</i>
16.1.	Assessment of implementation and compliance with the WFD requirements in the second cycle.....	161
16.2.	Main changes in implementation and compliance since the first cycle	162
16.3.	Progress with Commission recommendations	162

Acronyms and definitions

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

Foreword

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

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

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

General Information

Map A Map of River Basin Districts



Source: WISE, Eurostat (country borders)

- International River Basin Districts (within European Union)
- International River Basin Districts (outside European Union)
- National River Basin Districts (within European Union)
- Countries (outside European Union)
- Coastal Waters

The information on areas of the national RBDs including sharing countries is provided in the following table:

Table A Overview of Germany's River Basin Districts

RBD	Name	Size ¹ (km ²)	% share of total basin in DE	Countries sharing RBD
DE1000	Danube	56262	7	AT, BA, BG, CH, CZ, HR, HU, IT, MD, ME, MK, PL, RO, RS, SI, SK, UA, AL
DE2000	Rhine	105455	54	AT, BE, CH, FR, IT, LI, LU, NL
DE3000	Ems	17391	84	NL
DE4000	Weser	49060	100	-
DE5000	Elbe	99544 (96 269)	65.5	AT, CZ, PL
DE6000	Odra	9692	7.7	CZ, PL
DE7000	Meuse	3976	11.6	BE, FR, LU, NL
DE9500	Eider	9344 ²	-	DK
DE9610	Schlei/Trave	9214 ³	99.95	DK
DE9650	Warnow/Peene	21094	100	

Source: River Basin Management Plans reported to WISE

Germany subsequently corrected some of the reported information (in brackets)

The share of Germany in the respective international RBDs is 7 % (Danube), 54 % (Rhine), 84% (Ems), 65.5 % (Elbe), 7.7 % (Odra), 11.6 % (Meuse), 19 % (Vidaa/Wiedau), 99 % (Jardelund Groeft/Jardelunder Graben/Bongsieler Kanal) and 26 % (Krusaa/Krusau).

Table B Transboundary river basins by category and % share in Germany

Name of the international river basin	National RBD	Countries sharing RBD	Co-ordination category			
			1		3	
			km ²	%	km ²	%
Danube	DE1000	AT, BA, BG, CH, CZ, HR, HU, IT, MD, ME, MK, PL, RO, RS, SI, SK, UA, AL	56262	7.0		
Rhine	DE2000	AT, BE, CH, FR, IT, LI, LU, NL	105455	54.0		

¹ Area includes coastal waters (up to 12 nautical miles from the baseline)

² Total size not possible to determine as the Danish section is part of a larger river basin.

³ Total size not possible to determine as the Danish section is part of a larger river basin.

Name of the international river basin	National RBD	Countries sharing RBD	Co-ordination category			
			1		3	
			km ²	%	km ²	%
Ems	DE3000	NL	17391	84.0		
Elbe	DE5000	AT, CZ, PL	99730	65.5		
Odra	DE6000	CZ, PL	9602	7.7		
Meuse	DE7000	BE, FR, LU, NL	3977	11.6		
Vidaa/Wiedau (Rudboel Soe/Ruttebüller See)	DE9500	DK			261	19.0
Jardelund Groeft/Jardelunder Graben/Bongsieler Kanal	DE9500	DK			732	99.0
Krusaa/Krusau	DE9610	DK			6	26

Source: WISE electronic reports

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

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

Category 3: International agreement in place.

Category 4: No co-operation formalised.

Status of second river basin management plan reporting

A total of nine RBMPs in Germany (Danube, Rhine, Ems, Elbe, Odra, Meuse, Eider, Schlei/Trave, Warnow/Peene) were published on 22 December 2015, with the RBMP for the Weser RBD being published on 22 March 2016. Documents are available from the European Environment Agency (EEA) EIONET Central Data Repository <https://cdr.eionet.europa.eu/>.

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

The main strengths and shortcomings of the second RBMPs of Germany are as follows:

- **Governance and public consultation**
 - A broad range of stakeholders were actively involved in the preparation of all RBMPs, via a range of mechanisms, including advisory groups.
 - Germany's RBMPs were coordinated with its FRMPs, and consultations for these two types of plans were conducted in parallel.
 - Germany has strong cooperation with other European countries across six international RBDs where international cooperation is taking place in the frame of international agreements, permanent co-operation bodies and international RBMPs and PoMs.
 - One of Germany's RBMPs, for the Weser RBD (DE4000) was not published in accordance with the timetable in the Water Framework Directive.
- **Characterisation of the RBD**
 - There are still some gaps in the establishment of reference conditions.
 - Germany reported inventories for all of its RBDs. The number of substances in the inventories ranged from nine to all 41 substances. According to the information subsequently provided by Germany a national methodological approach was published on the inventory and assessment of all priority substances and was used by all RBDs in the preparation of the RBMPs. It seems however that the RBMP for the Elbe clearly acknowledges that the inventory is incomplete. For substances deemed not relevant at RBD level, Tier 2 of the methodology (riverine loads) was implemented. For substances relevant at RBD level, either Tier 3 (pathway oriented approach) or a combination of Tiers 1 and 2 (point source + riverine loads) were implemented. This is in line with the Guidance Document.

- **Monitoring, assessment and classification of ecological status**
 - Overall, since the first RBMPs there was an increase in the number of sites used for surveillance monitoring in all four water categories. However, some quality elements which were monitored for the first RBMPs, such as hydromorphological quality elements in coastal waters, and benthic invertebrates and fish in lakes, were not monitored now.
 - There was a significant increase in the number of monitoring sites and proportion of water bodies in all four water categories monitored for operational purposes.
 - Expert judgement was frequently used to classify lakes and rivers in terms of the hydromorphological quality elements, which might indicate some weakness in the monitoring and assessment methods. The supporting physicochemical quality elements are monitored but not classified in the vast majority of water bodies, as Germany reported that it understands the WFD as requiring classification of ecological status/potential only for biological quality elements. This applies in particular to nutrients in all water categories.
 - Benthic invertebrates are still not used for classification in lakes.
 - The number of surface water bodies in good or better ecological status/potential shows a slight decrease since the first RBMPs. However, it should be noted that the number of surface water bodies in bad status has also decreased and that the classification of status is now based on more extensive monitoring than was the case previously.
 - Many heavily modified and artificial water bodies are still reported as having unknown ecological potential.
 - The one-out-all-out principle has not been applied to the supporting quality elements.
- **Monitoring, assessment and classification of chemical status in surface water bodies**
 - All water bodies have been classified as failing to achieve good chemical status. This is due in particular to the consideration of mercury in biota, in accordance with the Environmental Quality Standards Directive: the widespread exceedances found in monitored water bodies have been extrapolated to non-monitored water bodies. Germany has also used the revised, more stringent standards from Directive

2013/39/EU to assess status, so a direct comparison with the first RBMP is not possible.

- Overall 80 % of surface water bodies in Germany were classified for chemical status with high confidence, 18 % with medium confidence and only 2 % with low confidence.
- According to WISE, territorial waters have not been monitored or assessed for chemical status in any RBD. However the Ems RBD clarified that they monitored territorial waters and assessed their chemical status.
- Germany mentioned that monitoring sites were only reported to WISE if a priority substance was exceeding its standard at that site. The information reported to WISE is summarized below, however it may not fully reflect the monitoring performed.
- Between the two RBMPs, there was a net increase in monitoring sites and surface water bodies monitored for chemicals for operational and surveillance purposes.
- Between 31 and 41 Priority Substances are reported to be monitored in water across the ten RBDs in Germany for status assessment. Germany clarified that all relevant discharged substances are monitored. Mercury, hexachlorobenzene and hexachlorobutadiene were reported to be monitored in biota for status assessment in 6 RBDs. Monitoring frequencies in water and biota met the recommended minimum frequencies at most sites. At the remainder of the sites, these frequencies were not achieved. Germany subsequently clarified that expert judgement has been used to decide on the appropriate frequency.
- Between 1 and 14 Priority Substances are monitored in sediment / biota for trend assessment depending on the RBD. The spatial extent in terms of monitoring sites is variable and the monitoring frequencies met the recommended minimum frequency at some sites. Germany subsequently clarified that expert judgement had been used to decide the appropriate frequency in accordance with the provisions of the WFD.
- **Monitoring, assessment and classification of quantitative status of groundwater bodies**
 - The number of monitored groundwater bodies increased as well as the number of monitoring sites. However, there are still some groundwater bodies that are not monitored for quantitative status.

- **Monitoring, assessment and classification of chemical status of groundwater bodies**
 - Monitoring is required by the German groundwater ordinance (Grundwasserverordnung 2010⁴). According to the data reported in WISE, not all groundwater bodies are subject to surveillance and not all groundwater bodies at risk are subject to operational monitoring. The information on grouping of groundwater bodies is not fully clear for some of the river basin districts in Germany.
- **Designation of Heavily Modified and Artificial Water Bodies and definition of Good Ecological Potential**
 - The methodology for heavily modified water bodies designation is explained for all RBMPs and includes all key aspects of the heavily modified water bodies designation method. Specific information on the outcome of the assessment of significant adverse effects and better environmental options is not documented in the RBMPs on the water body level. However, according to information provided subsequently by Germany, some Federal States provided such additional information through background documents.
 - For the second RBMPs, a new harmonised method for defining good ecological potential has been developed at national level, which refers to improvements in the assessment methodologies related to fish and benthic fauna. Good ecological potential is defined in terms of biology using assessment methods for ecological status. Mitigation measures for defining good ecological potential have also been reported for all 10 RBDs, but no explicit information could be found on how the ecological benefits of the mitigation measures are assessed.
- **Environmental objectives and exemptions**
 - Environmental objectives for ecological and chemical status of surface water bodies have been reported in all RBDs as well as for chemical and quantitative status of groundwater. Information is also provided on when the objectives will be achieved.
 - The application of exemptions under Article 4(4) and Article 4(5) is described in the RBMPs and their background documents (including reference to agreed LAWA documents), in particular for the justifications for the application of each type of

⁴ https://www.gesetze-im-internet.de/grwv_2010/GrwV.pdf

exemption. However, the information reported into WISE mainly refers to the text in the Common Implementation Strategy reporting guidance.

- **Programme of Measures**

- Very limited progress has been made with addressing the European Commission's recommendations from the first RBMPs. No comprehensive summary of progress was provided for some RBDs.
- Although a number of measures addressing significant pressures have been reported as operational there are a number of significant pressures causing failure of objectives for which operational measures have not been identified.
- Measures are in place in most RBDs for the control of some River Basin Specific Pollutants. However, not all substances reported as responsible for the failure of surface water bodies to be in good status are specifically addressed by these measures. For Priority Substances, KTM are in place but they do not appear to address all substances causing failure of the objectives.
- The RBMPs and Flood Risk Management Plans were coordinated and joint consultation has been carried out and win-win measures identified. Measures in the Floods Directive have been adapted to take account of WFD objectives. Article 9(4) of the WFD has not been applied.

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

- Some river basin districts have more than 10 % of groundwater bodies in bad quantitative status (Odra and Warnow/Peene) or more than 20 % of surface water bodies face significant abstraction and flow diversion pressures (Danube). Information on the Water Exploitation Index + has not been provided.
- The river basin management plans do not include a water resource allocation and management plan.
- There is a concession, authorisation, and/or permitting regime to control surface and groundwater abstractions and water impoundment.

- **Measures related to pollution from agriculture**
 - There is a clear link between agricultural pressures and agricultural measures.
 - Management objectives for nutrient pollution and a gap assessment for nutrients have been established for all RBDs.
 - Implementation of basic measures under Article 11(3)(h) for the control of diffuse pollution from agriculture at source is ensured in all RBDs where the same rules apply across the whole RBD.
 - Supplementary measures for reducing pollution from agriculture are reported as well as measures to reduce sedimentation from soil erosion and surface runoff.
 - The cost of the measures is not reported.
 - The Programmes of Measures heavily rely on voluntary measures.
 - Drinking Water Protected Areas have been established to protect water resources from agricultural pollution.
- **Measures related to pollution from sectors other than agriculture**
 - Germany has made progress on tackling nutrients from non-agricultural sources by implementing supplementary measures in the context of urban waste water treatment, such as improving the treatment technology.
 - Further to the observation above in relation to Programmes of Measures, it seems that the Programmes do not always explicitly link measures to individual substances causing failure.
- **Measures related to hydromorphology**
 - Significant hydromorphological pressures and operational KTMs to address these pressures are reported for all RBDs. However, there is still a significant number of water bodies where the sector/driver behind significant hydromorphological pressures is unknown/obsolete or indicated as "other" (not specified as one of the key sectors in the WISE reporting).

- In terms of ecological flows, work is in progress and there are still some gaps in the implementation. In the majority of RBDs, ecological flows are partly derived and implemented, but the overall work is still ongoing. Only in a few RBDs, where it was considered not to be a significant issue due to the small size of water courses ecological flows have not been derived for the relevant water bodies and there are no plans to do so during the second cycle.
- **Economic analysis and water pricing policies**
 - Whether environment and resource costs are calculated or internalised is not clearly described.
 - No detailed information was reported on the application of the polluter pays principle.
 - A narrow definition of water services has been used. There is no link between water status-pressure/impact analysis and the water service definition.
- **Considerations specific to Protected Areas (identification, monitoring, objectives and measures)**
 - Very few Protected Areas have a specific objective defined in the RBMPs. For those designated under the Habitats and Birds Directives, this is because the needs of water dependent interest features are not known.
 - The reported monitoring of water bodies associated with Protected Areas is very limited and missing for some types of Protected Area and in some RBDs.
- **Adaptation to drought and climate change**
 - Climate change was considered in various ways in all river basin districts. The plan for the Danube, which had not addressed climate change in the first cycle, does so in the second cycle. The plans for all basins have indicated climate change signals.

Recommendations

- Work with the other countries in the international RBDs to improve international cooperation should continue, including efforts to coordinate the assessments of the technical aspects of the WFD. This would include ensuring a harmonized approach for status assessment and a coordinated PoM, to ensure the timely achievement of the WFD objectives.
- Germany needs to complete its work on the establishment of reference conditions, in particular on biological, hydromorphological and physico-chemical quality elements in lakes.
- Germany also needs to complete the inventories of emissions, discharges and losses of chemical substances.
- In groundwater bodies shared by different Länder, coordinated methodologies and measures should be better described. The way national guidance is used should be explained in the different RBMPs.
- Germany should further improve the monitoring of surface waters by covering all relevant quality elements in all water categories.
- Germany should complete the ecological status assessment for all water categories and quality elements. In particular, benthic invertebrates should be used for classification of lakes, and supporting quality elements should be used for classification of all water bodies, applying the one out all out principle. The classification of heavily modified and artificial water bodies should be completed.
- Germany should ensure that nutrient thresholds are sufficiently protective for good ecological status.
- Germany should further improve the confidence in the assessment for all water categories (including territorial waters, whose chemical status should be assessed). Germany should make sure all priority substances are monitored in the relevant matrix and that this information is fully reported. If reduced monitoring frequencies or a different matrix are used, it should make sure to provide the corresponding explanations, as required by the Directive.
- Germany should further improve trend monitoring for all relevant substances, in a way that provides sufficient temporal resolution and spatial coverage, in all RBDs.

- Germany should make sure it reports about groundwater bodies at risk (and the related parameters) as this is an important element in the status assessment and in the PoM.
- Germany should continue to progress on the designation of HMWBs by specifying information on the outcome of the assessment of significant adverse effects of restoration measures and better environmental options at water body level in all RBDs.
- The application of exemptions under Article 4(4) and Article 4(5) should be justified in more detail in the RBMPs and in the WISE reported information. In particular the reported justification on disproportionate costs is lacking details as it mainly refers to the text in the Common Implementation Strategy reporting guidance.
- Germany should provide better information on how measures are selected and targeted towards a water body; in particular, it should ensure that the RBMPs clearly identify the gap to good status and that the PoM is designed and implemented to close that gap.
- Germany should report operational KTMs against all the significant identified pressures, for all RBDs.
- Comprehensive information regarding the scope, the timing and the funding of the measures to be implemented should be included in the PoM so that the approach to achieve the objectives is clear.
- In the third RBMPs, a comprehensive gap assessment for diffuse pollutant loads from agriculture (nutrients, agri-chemicals, sediment, organic matter) across all waters in all RBDs should be completed and linked directly to mitigation measures in the third RBMPs (as per WFD Article 11(3)(h)), to facilitate the achievement of WFD objectives.
- The strategy for the delivery of WFD objectives should continue to be reviewed and developed further, in cooperation with the farming community and German CAP delivery authorities, to ensure the third RBMP is technically feasible and all relevant policies and instruments (e.g. RDP, CAP Pillar 1, ND etc.) contribute significantly to RBMPs. Additional actions are needed to prevent pollution induced by nitrates from agricultural pressures.

- Measures to address agricultural hydromorphological pressures that have been successful in some länder should be extended across all the lander. Additional actions are needed to prevent pollution induced by nitrates from agricultural pressures.
- Germany should continue to work towards the achievement of a correct balance between basic and supplementary measures and between mandatory and voluntary measures. Sources of funding (e.g. CAP Pillar 1, RDP) should be identified to facilitate the successful implementation of these measures. Germany should ensure that the actual and modelling impacts of specific measures are reported in WISE and that the new Nitrates Action Programme includes controls on phosphorus applications.
- In the next plans, individual substances should be explicitly linked to KTMs and specific measures to combat pollution, keeping in mind the principle of reducing pollution at source and distinguishing between the substances affecting surface and groundwater; furthermore, a gap analysis should be systematically performed to assess whether the planned measures are sufficient.
- Germany should continue the efforts to ensure an appropriate implementation of ecological flows in all RBDs.
- Germany should continue enhancing, where appropriate according to local/regional circumstances and conditions, the use of green infrastructure and/or natural water retention measures that provide a range of environmental (improvements in water quality, flood protection, habitat conservation etc.), social and economic benefits which can be in many cases more cost-effective than grey infrastructure.
- Germany should recover costs for water use activities having a significant impact on water bodies. Any exemption should be justified using Article 9(4). Germany should also present in a transparent manner how financial, environmental and resource costs have been calculated and how the adequate contribution of the different users is ensured. The water-pricing policy should be set out in a transparent fashion and a clear overview of estimated investments and investment needs should be provided.
- Germany should consider developing drought management plans for areas more at risk of drought, particularly in light of the fact that abstraction is identified as a significant pressure for groundwater bodies in the country.

Topic 1 Governance and public participation

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

1.1.1 Administrative arrangements – river basin districts

Germany has designated 10 river basin districts (RBDs). In Germany, the Federal States (Länder) play a key role in implementing the Water Framework Directive.

All but two of Germany's 10 RBDs are reported as being part of an international RBD (the exceptions being Weser and Warnow/Peene).

1.1.2 Administrative arrangements – competent authorities

Germany has listed 16 competent authorities for its 10 RBDs: one Competent Authority for each of the Federal States (Länder).

1.1.3 River Basin Management plans – structure (sub-plans, Strategic Environmental Assessment)

Germany reported sub-plans for one RBMP, the Weser, where sub-plans address increased salinity of the Rivers Werra and Weser due to potash mining.

Germany's RBMPs are divided into the following A- B- and C-level plans:

- International RBMPs (referred to as A-level plans in Germany)
- RBMPs at the level of national RBDs or related basins (referred to as B-level plans)
- RBMPs prepared at the level of the Federal States (Länder) for their portions of RBDs (C-level plans)

As an example, for Germany's portion of the Elbe international RBD, there is the international RBMP (the A-level plan), a national RBMP⁵ (at B-level) and further plans at Federal State level (C-level plans for Lower Saxony and Schleswig-Holstein). A similar structure is seen for the Danube, Rhine, Ems and Weser, except that the latter is not part of an international RBD.

⁵ Der Bewirtschaftungsplan zum nationalen Anteil an der Flussgebietseinheit Elbe

The Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry (LAWA⁶), a long-standing body, has prepared guidelines and recommendations to promote a common approach. Moreover, the Länder have used standard text coordinated within LAW A for parts of their RBMPs.

Germany reported that a strategic environmental assessment was carried out for each of its RBMPs' PoM at national level⁷.

1.1.4 Public consultation

For all the RBMPs, documents were available for public consultation for the required six months. The public and interested parties were informed by: internet, printed material, invitations to stakeholders and meetings in all RBDs; by local authorities in all but one RBD; by media (papers, TV, radio) in six RBDs; and by direct mailing in four RBDs.

The consultation was carried out by: internet, in all the RBDs; direct invitation, in eight RBDs; direct involvement in drafting the RBMPs, in seven RBDs (see also active involvement); and exhibitions, in two RBDs. For all RBDs, the consultation documents were available for download and paper copies were available in municipal buildings.

Stakeholder groups were actively involved in all 10 RBDs. The mechanisms used for active involvement were: involvement in drafting in eight RBDs; establishment of advisory groups in seven RBDs; formation of alliances in five RBDs and regular exhibitions in four RBDs. In addition, the RBDs used a range of informational events at regional and local levels, including round tables, conferences and, in one RBD, an information portal on measures. Two RBDs (Eider and Schlei/Trave) cited advisory councils at the river basin level. The stakeholders that were actively involved in all RBDs were: agriculture/farmers, fisheries/aquaculture, local/regional authorities, NGOs/nature protection and water supply and sanitation. Stakeholders for energy/hydropower, industry and navigation/ports were actively involved in seven RBDs; and consumer groups in four RBDs.

Public consultation was reported to have had an impact in all 10 RBMPs. The impacts of the public consultation were: addition of new information, for all RBMPs; commitment to further research in eight RBMPs; adjustment to specific measures and commitment to action in the next cycle, in seven RBMPs; and changes to the selection of measures in six RBMPs.

⁶ www.lawa.de/index.php?a=2

⁷ Germany informed that, according to German legislation, strategic environmental assessments have to be carried out for the Programme of Measures, not for the RBMPs as such.

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

In each of Germany's RBDs, the RBMP was coordinated with the Flood Risk Management Plan (FRMP) and the consultation of the RBMP and FRMP was conducted in parallel.

Germany informed that the results of the WFD's implementation steps have been integrated in the implementation of the MSFD.

1.1.6 International coordination and co-operation

Six of Germany's 10 RBDs are part of an international RBD with international agreement, permanent co-operation body and international RBMPs in place (designated as category 1 cooperation): an international RBMP and a PoM were prepared, and explicit links to the national RBMPs are made within the international RBMP. These six RBDs are: Danube, Rhine, Ems, Elbe, Oder and Maas/Meuse⁸. For these six RBMPs, there was international co-ordination on public participation (for further information see the reports on international coordination on the Water Framework Directive).

In two RBDs, Eider and Schlei/Trave, there are international agreements on water management in place but without coordination body nor an international RBMP in the first cycle (designated as Category 3 cooperation): both these RBDs are shared with Denmark⁹. No international co-ordination on public participation was reported for these two RBMPs.

For all the international RBDs of which Germany is a part, the agreements listed in the 2012 Pressures and Measures study¹⁰ are still valid. Further developments in international coordination were seen in three of the international RBDs of which Germany is a part. In the Rhine, the 1996 Convention on the collection, deposit and reception of waste produced during navigation on the Rhine and Inland Waterways entered into force in 2009. For the Ems, a German-Dutch working group on silt was set up in 2015. For the Elbe, ad-hoc expert groups on sediment management, surface waters for shipping and water quantity management were established: their results were used in the second international RBMP.

Further information on international cooperation with respect to measures is provided in Chapter 9 of this report.

⁸ Germany informed that a joint RBMP was prepared with the Netherlands for the Ems international RBD and separate national Programme of Measures.

⁹ Germany informed that coordination took place between relevant authorities.

¹⁰ Comparative Study of Pressures and Measures in the Major River Basin Management Plans <http://ec.europa.eu/environment/archives/water/implrep2007/pdf/Governance-Pressures%20and%20measures.pdf>

1.2 Progress with Commission recommendations

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

- Recommendation: *Germany should ensure the coordinated implementation of the Directive both at international level, as well as for the national parts of each of the RBDs. The implementation of the Directive should be coordinated across the RBDs, to ensure the achievement of the environmental objectives established under Article 4. In particular all PoMs are to be coordinated for the whole of the river basin district, including within a Member State.*
- *Further harmonisation of several aspects such as methodologies, design of measures considerations, terminology, reporting formats and measurement frequencies would contribute to a more streamlined approach across RBDs and Länder.*

Assessment: Germany has continued to follow a complex system with RBMPs at the level of both RBDs and Federal States (Länder). The Working Group on water issues of the Federal States and the Federal Government (LAWA) has prepared or updated guidance in several areas, including surface water monitoring and heavily modified and artificial water bodies. LAWA also developed a common catalogue that identifies categories of measures for the WFD¹¹, the Floods Directive¹² and the Marine Strategy Framework Directive¹³. Moreover, the Länder have used standard text coordinated within LAWA for parts of their RBMPs.

It can be noted that in the second cycle, a common inter-Länder plan (a B-level plan) was prepared for the German portions of the Danube and Rhine¹⁴: in contrast, a common RBD plan was not prepared in the first RBMP for the German parts of these two major international RBDs. The preparation of these B-level plans should contribute to a higher level of harmonisation. On the other hand, a common, B-level plan was not prepared for Ems or Weser

¹¹ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

¹² Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

¹³ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0056>

¹⁴ For the Rhine, 2 B-level plans were prepared, one for the Rhine and the other for the Mosel-Saar.

RBDs in the second cycle; however, a common plan was prepared for the Weser in the first RBMP (but not for the Ems)¹⁵.

The further guidance prepared by LAWA is expected to have improved the harmonisation of methods and to have strengthened coordination among the Länder. The development of B-level plans for the Rhine and Danube RBDs also suggested greater coordination among the Länder.

This recommendation is partially fulfilled.

¹⁵ Germany informed that the different approaches are in line with Article 13 of the WFD and are justified by the coordination approaches agreed in the different RBDs.

Topic 2 Characterisation of the River Basin District

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

2.1.1 Delineation of water bodies and designation of heavily modified and artificial water bodies

There was a small increase since the first RBMPs in the numbers of coastal (74 to 75) and lake (712 to 730) water bodies and a small decrease (9069 to 8998) in the number of river water bodies delineated (Table 2.1). The reasons for these changes provided in the RBMPs were better data and understanding of local morphological conditions, a revision of the understanding of the typology and the restoration of lakes. In RBD Warnow/Peene, the extra coastal water body was delineated by splitting in two the original water body due to its inhomogeneity. The RBMPs explain that the change in delineation makes the classification results difficult to compare in many cases. There was no change in the number of transitional water bodies overall.

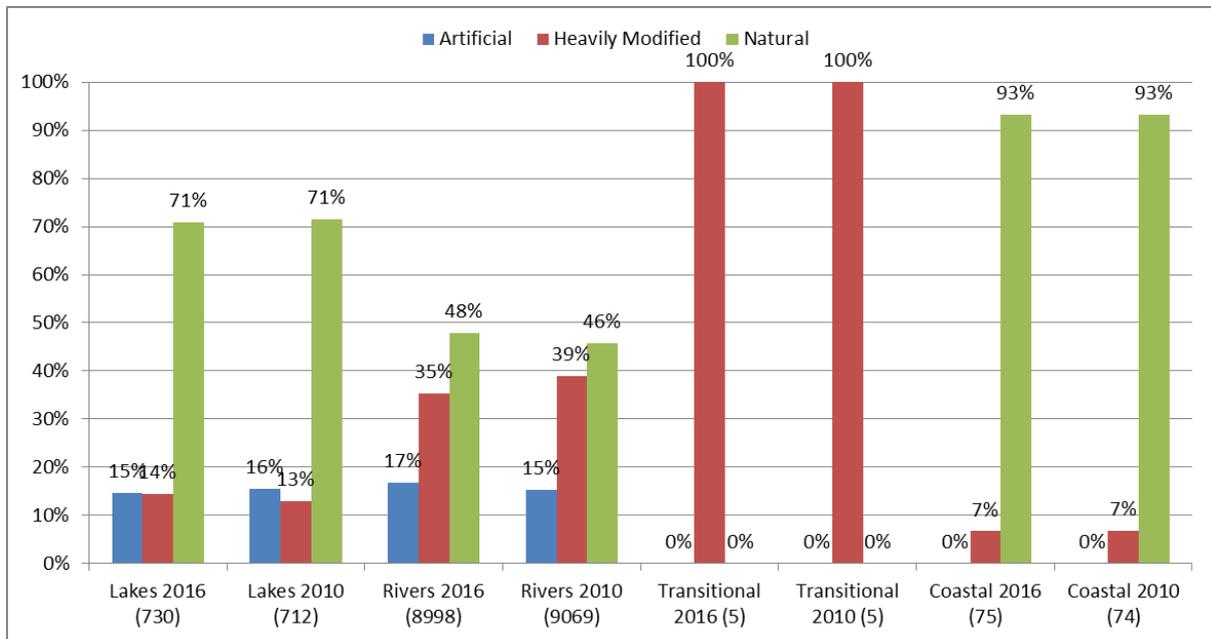
In Germany as a whole, there was a reduction in the number and proportion of river water bodies designated as heavily modified between the two cycles (Figure 2.1). In the first RBMPs there were 3531 heavily modified river water bodies and in the second RBMPs, 3178. This is a reduction from 39 % to 35 % of the total of river water bodies. At the same time there was an increase in number of natural and artificial river water bodies in the second RBMPs, and a reduction of total river water bodies in the second RBMPs compared to the first RBMPs. It is apparent that some heavily modified river water bodies in the first RBMPs may have been re-designated as natural or artificial, accompanied by an overall decrease in number of river water bodies. In contrast, more lakes were designated as heavily modified in the second RBMPs (105 or 14 % of all lakes) than in the first RBMPs (92 or 13 %) (Figure 2.1). This was accompanied by a decrease of four in the number of artificial lakes and an increase of nine in the number of natural lakes: overall the total number of lakes increased from 712 in the first RBMPs to 730 in the second RBMPs. All transitional water bodies (five) were designated as heavily modified in both the first and second RBMPs. The one new coastal water body was designated as a natural water body, as shown in Figure 2.1.

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

Year	RBD	Lakes		Rivers		Transitional		Coastal	
		Number of water bodies	Total area (km ²) of water bodies	Number of water bodies	Total length of water body (km)	Number of water bodies	Total area (km ²) of water bodies	Number of water bodies	Total area (km ²) of water bodies
2016	DE1000	43	285	678	21,438				
2016	DE2000	90	628	2,079	42,710				
2016	DE3000	6	13	481	5,912	2	208	6	3,128
2016	DE4000	26	74	1,405	18,060	1	209	6	1,588
2016	DE5000	361	931	2,779	35,522	1	400	5	2,558
2016	DE6000	48	101	452	3,534			1	288
2016	DE7000	7	14	222	1,567				
2016	DE9500	16	27	135	1,715	1	18	11	4,610
2016	DE9610	51	148	272	2,106			25	3,118
2016	DE9650	82	195	495	4,597			21	7,639
2016	<i>Total</i>	<i>730</i>	<i>2,415</i>	<i>8,998</i>	<i>137,160</i>	<i>5</i>	<i>835</i>	<i>75</i>	<i>22,929</i>
2010	DE1000	50	301	621	19,528				
2010	DE2000	71	577	2,205	38,881				
2010	DE3000	6	14	502	5,606	2	195	6	3,105
2010	DE4000	27	76	1,380	16,583	1	208	6	1,581
2010	DE5000	359	957	2,773	32,549	1	395	5	2,555
2010	DE6000	49	101	453	3,351			1	288
2010	DE7000	1	1	227	1,508				
2010	DE9500	16	29	135	1,684	1	16	11	4,593
2010	DE9610	51	149	274	1,978			25	3,106
2010	DE9650	82	195	499	4,478			20	7,615
2010	<i>Total</i>	<i>712</i>	<i>2,399</i>	<i>9,069</i>	<i>126,147</i>	<i>5</i>	<i>814</i>	<i>74</i>	<i>22,843</i>

Source: WISE electronic reports

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



Source: WISE electronic reports

Table 2.2 shows the differences in size distribution of surface water bodies in Germany between the second and first cycles. There was a slight increase overall in the minimum length of rivers, which changed from an average minimum length of 0.67 km in the first RBMPs to 0.81 km in the second RBMPs, which likely relates to the aggregation of small water bodies shown in Table 2.4. The minimum size criteria reported were 10 km² catchment area for rivers and 0.5 km² surface area for lakes.

Four of the 10 RBDs in Germany reported an increased number of groundwater bodies in the second RBMPs, as compared to the first. Overall for Germany, there was a 19 % increase in the number of groundwater bodies between the two cycles (Table 2.3). The reasons for these changes were described in the RBMPs to be due to better data availability related to pressures and hydrogeology. The largest increase was in the Danube RBD where 46 groundwater bodies had been delineated in the first RBMP and 170 (176)¹⁶ in the second RBMP.

¹⁶ Germany subsequently clarified that, contrary to the reporting in WISE, there are 176 groundwater bodies in the Danube RBD.

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

Year	RBD	Lake area (km ²)			River length (km)			Transitional (km ²)			Coastal (km ²)		
		Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
2016	DE1000	0.54	77.04	6.64	2.11	204.29	31.62						
2016	DE2000	0.15	400.55	6.97	0	239.96	20.54						
2016	DE3000	0.85	5.41	2.2	0.95	92.37	12.29	11.5	196.77	104.14	141.2	1,825.74	521.26
2016	DE4000	0.42	27.7	2.83	0.32	147.56	12.85	209.25	209.25	209.25	70.56	419.5	264.71
2016	DE5000	0.5	102.04	2.58	0.03	232.1	12.78	399.93	399.93	399.93	34.64	1,998.66	511.58
2016	DE6000	0.35	10.29	2.1	0.27	87.08	7.82				288.15	288.15	288.15
2016	DE7000	0.6	5.69	1.93	1	28.4	7.06						
2016	DE9500	0.57	6.01	1.68	2.28	111.02	12.7	17.93	17.93	17.93	48.26	2,136.54	419.11
2016	DE9610	0.48	29.58	2.89	0.08	37.03	7.74				1.01	2,071.92	124.72
2016	DE9650	0.5	32.37	2.38	1.02	40.31	9.29				1.26	4,769.82	363.76
2010	DE1000	0.36	76.26	6.02	1.61	223.08	31.45						
2010	DE2000	0.15	394.76	8.13	0.54	222.53	17.63						
2010	DE3000	0.94	5.37	2.32	0.21	111.85	11.17	10.28	184.78	97.53	125.76	1,824.73	517.57
2010	DE4000	0.37	28.45	2.82	0.28	131.4	12.02	207.84	207.84	207.84	68.6	417.69	263.48
2010	DE5000	0.32	102.43	2.67	0.15	233.17	11.74	395.09	395.09	395.09	34.52	1,998.71	511
2010	DE6000	0.33	10.36	2.06	0.11	86.93	7.4				287.57	287.57	287.57
2010	DE7000	0.6	0.6	0.6	0.91	26.74	6.64						
2010	DE9500	0.54	7.86	1.8	2.27	109.65	12.47	16.36	16.36	16.36	52.2	2,151.71	417.52
2010	DE9610	0.48	29.24	2.92	0.08	34.26	7.22				0.85	2,071.59	124.26
2010	DE9650	0.46	32.42	2.37	0.55	39.16	8.97				1.54	4,772.49	380.77

Source: WISE electronic reports

Table 2.3 *Number and area of delineated groundwater bodies in Germany for the second and first cycles*

Year	RBD	Number	Area (km ²)		
			Minimum	Maximum	Average
2016	DE1000	170 (176)	30.75	4 306.79	356.46
2016	DE2000	457	0.01	5 910.01	231.14
2016	DE3000	40	6.32	1 420.90	348.78
2016	DE4000	144	0.91	1 398.37	328.07
2016	DE5000	228	5.71	3 669.54	437.88
2016	DE6000	25	19.19	2 752.83	385.45
2016	DE7000	32	0.55	356.69	124.53
2016	DE9500	23	5.79	921.35	232.55
2016	DE9610	19	17.98	1 261.36	428.48
2016	DE9650	39	0.64	959.78	359.29
2016	<i>Total</i>	<i>1 177</i>			
2010	DE1000	46	174.81	4 701.03	1 318.16
2010	DE2000	399	0.01	5 577.09	264.19
2010	DE3000	40	6.32	1 435.31	350.58
2010	DE4000	144	0.91	1 422.16	328.18
2010	DE5000	224	5.7	3 431.29	444.77
2010	DE6000	23	27.61	2 551.88	412.18
2010	DE7000	32	0.63	356.5	124.55
2010	DE9500	23	5.46	923.7	226.97
2010	DE9610	19	17.51	1 261.44	425.7
2010	DE9650	39	0.64	959.81	359.3
2010	<i>Total</i>	<i>989</i>			

Source: WISE electronic reports Note that the number in brackets were subsequently reported by Germany but do not match the numbers reported to WISE.

Table 2.4 summarises the information provided by Germany on how water bodies have evolved between the two cycles. The largest changes were for the codes of lake and river water bodies but there were also aggregation, creation and deletion of water bodies especially for river water bodies and groundwater bodies.

Table 2.4 *Type of change in delineation of groundwater and surface water bodies in Germany between the second and first cycles*

Type of water body change for second cycle	Ground-water	Lake	River	Transitional	Coastal
Aggregation			204		
Aggregation and splitting			140		
Change to code	4	1 283	8 006		20
Change	5				
Creation	261	37	287		2
Deletion	74	22	302	21	
Extended Area	1				
No change	904			5	53
Splitting	2	4	424		
Total water bodies before deletion	1 251	1 346	9 363	26	75
Delineated for second cycle (after deletion from first cycle)	1 177	1 324	9 061	5	75

Source: WISE electronic reports

99 river water bodies from four RBDs and two lake water bodies from one RBD were reported by Germany as transboundary water bodies. Only one transboundary groundwater body was reported by Germany, in the Danube RBD.

2.1.2 Typology of surface water bodies

At the national level, Germany reported the same number of types for coastal, lakes and transitional waters in both the first and second RBMPs, and there was one fewer river type in the second RBMPs than in the first RBMPs. Generally, there were small increases or decreases in the river and lake types reported by the RBDs in the second RBMPs compared to the first RBMPs: there were also RBDs with no changes (Table 2.5). For example, the RBD with the most river types (26) in the second RBMP was the Elbe: this was two more than in the first RBMP. The Rhine RBD reported 13 lake types in the second RBMP, four more than in the first RBMP. There were no changes in the number of transitional and coastal water types reported by the RBDs between the two cycles.

Sixteen different type codes were reported for lakes in Germany. Fifty-one percent of the 775 lake water bodies in Germany had types that have been intercalibrated. There are examples where for the same type code an equivalent intercalibration type is reported and also "not

applicable" is reported¹⁷. In RBD Schlei/Trave, lakes of type 88 were reported to have a "not applicable" intercalibration type and for other RBDs LW-L-CB1 or LW-L-CB2 were reported. These two were classified as special types by Germany. For these two types, the typology has not been made biologically relevant. For the other 14 lake types information is provided for all four biological quality elements.

Table 2.5 *Number of surface water body types at RBD level in Germany for the first and second RBMPs*

RBD	Rivers		Lakes		Transitional		Coastal	
	first	second	first	second	first	second	first	second
DE1000	21	22	8	7	0	0	0	0
DE2000	25	25	9	13	0	0	0	0
DE3000	15	14	3	2	1	1	5	5
DE4000	24	25	10	9	1	1	5	5
DE5000 ¹⁸	24	26	11	12	1	1	4	4
DE6000	13	15	6	6	0	0	1	1
DE7000	11	12	1	3	0	0	0	0
DE9500	6	6	3	3	1	1	5	5
DE9610	9	7	6	6	0	0	4	4
DE9650	8	8	5	4	0	0	4	4
Total		39		16		2		10

Source: WISE electronic reports Note that the total is not the sum of the types in each RBD as some types are shared by RBDs. The "null" types reported are included in the totals shown.

Thirty-six different type codes were reported for rivers in Germany plus one "null" type. The typology is reported to have been made biologically relevant for all river types in Germany. As for lakes, there are examples where the same national type code is reported to be intercalibrated against more than one common intercalibration type and "not applicable" was also reported for the same type. For example, for national river type 12, three intercalibration types were reported (RW-R-C1, RW-R-C4, RW-R-C5) and also "not applicable"¹⁹. All four options were reported in four RBDs. Also it should be noted that lake intercalibration types

¹⁷ Germany subsequently highlighted that although lake typology is primarily based on geographic, geological, physical and chemical criteria the biological assessment methodologies applied for lakes refer to reference conditions. Information can be found in the LAWA Lake Type Descriptions (LAWA-Steckbriefe Seentypen (<https://www.umweltbundesamt.de/themen/wasser/seen#textpart-5>))

¹⁸ Germany subsequently stated that for Elbe RBD the data are different from those in the table, which are those reported in WISE

¹⁹ Germany subsequently clarified that rivers do have more than one intercalibration type and that further improvement of the methodology is planned.

were reported against some river types both for natural and heavily modified water bodies. Around 30 % of river water bodies in Germany were reported not to have an equivalent intercalibration type.

Germany reported 10 coastal water types plus a "null" type covering the 75 coastal water bodies. 43 % of the coastal water bodies had an equivalent intercalibration type. Two transitional types were reported for Germany and both were intercalibrated against TW-NEA11. For transitional and coastal water bodies it was explained in the RBMPs that the types have been developed based on system A, but no further information on the biological relevance was found.

2.1.3 Establishment of reference conditions for surface water bodies

Table 2.6 shows the percentage of surface water body types in Germany with reference conditions established for the first and second RBMPs. Reference conditions were developed for some but not all hydromorphological and physicochemical quality elements in all types²⁰. The "null" type was reported as none for each group of quality elements.

Table 2.6 *Percentage of surface water body types in Germany with reference conditions established for all, some and none of the biological, hydromorphological and physicochemical quality elements. Numbers in parenthesis are the number of types in each category*

Water Category	Water types	Biological quality elements	Hydromorphological quality elements	Physicochemical quality elements
Lakes (16)	All			
	Some	100%	100%	100%
	None			
Rivers (39)	All	90%		
	Some	8%	97%	97%
	None	2%	3%	3%
Coastal (10)	All	40%		
	Some	50%	90%	90%
	None	10%	10%	10%
Transitional (2)	All	100%		
	Some		100%	100%
	None			

Source: WISE electronic reports

Germany reported on the establishment of reference conditions for 39 river types. Reference conditions have been established for all relevant biological quality elements for 35 of the 39

²⁰ Germany subsequently highlighted that close to all biological assessment methods are formally intercalibrated and contain reference conditions. They stated that for supporting physicochemical quality elements reference values are defined in the Surface Water Ordinance 2016 (but not all reported) and for hydromorphology, assessment methods do exist but are not yet regulated in the Surface Water Ordinance.

river types. They have been established for some biological quality elements for three of the remaining types and for none of them for one type. Reference conditions have been established for some hydromorphological and for some physicochemical quality elements for 38 types. For the remaining types reference conditions have not been established for any quality element.

The state of development of reference conditions for all 16 lake types was reported to be "some" for the biological, hydromorphological and physicochemical quality elements.

The two transitional water body types have reference conditions established for all biological quality elements, and for some hydromorphological and physicochemical quality elements.

For coastal water bodies, for four types reference conditions have been developed for all biological quality elements, for one there were no reference conditions for biological quality elements and for the remaining types reference conditions were developed for some biological quality elements.

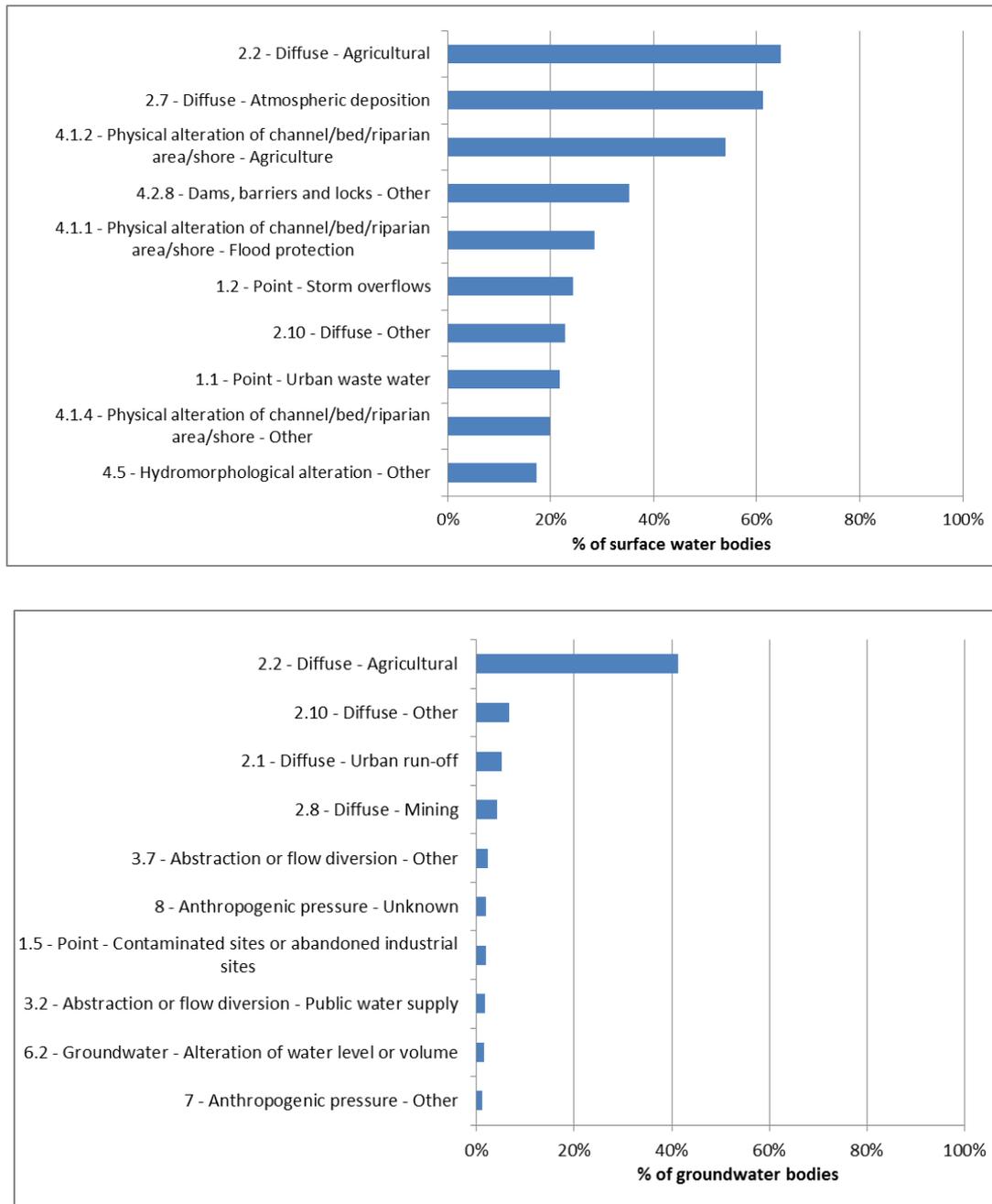
2.1.4 Characteristics of groundwater bodies

The main geological formation of the aquifer type was reported for 71 % of groundwater bodies, but there was no information for 29 %, as explained in the Annex 0 from Germany. There was also no information for 82 % of groundwater bodies in terms of whether they are layered or not. All groundwater bodies were reported not to be linked to surface water bodies and 81 % were linked to terrestrial ecosystems. The Annex 0 for Germany explains that this will be reported correctly in 2021.

2.1.5 Significant pressures on water bodies

Figure 2.2 shows the 10 most significant pressures on surface water bodies. For Germany as a whole, 11 significant pressure types were reported for coastal waters: the two most significant types were diffuse atmospheric (100 % of coastal water bodies affected) and diffuse agriculture (92 % of coastal water bodies). 35 different significant pressure types were reported to be affecting lakes in Germany. 63 % were affected by diffuse atmospheric pressures, 53 % diffuse agriculture pressures and 17 % by point source storm overflows. Rivers were reported to be affected by the highest number of significant pressure categories (53) with the most significant being diffuse agriculture (65 % of river water bodies affected), diffuse atmospheric deposition (61 %), pressures arising from the physical alteration of channel/bed/riparian area/shore because of agriculture (39 %) and because of flood protection (31 %). Point source pressures from urban waste water affected 23 % of river water bodies and pressures from storm overflows affected 25 %. Transitional water bodies were affected by 11 different pressure types with diffuse agricultural pressures, diffuse atmospheric deposition and physical alteration of channel/bed/riparian area/shore because of flood protection affecting all five transitional water bodies.

Figure 2.2 *The 10 most significant pressures on surface water bodies and groundwater bodies in Germany for the second cycle*

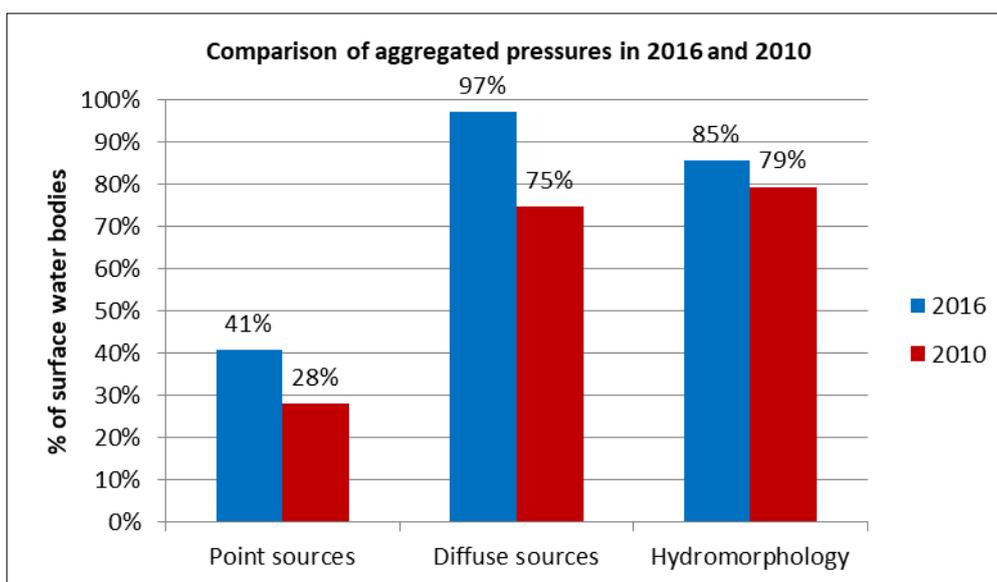


Source: WISE electronic reports

It is difficult to compare the significance of pressures between the two cycles because of changes in the definition of pressures types, in the data used and in the delineation of surface water bodies. In the first RBMPs, Germany reported pressures only at an aggregated level (e.g. diffuse source). The data for the second RBMPs have been aggregated to this level for some tentative comparisons and are shown in Figure 2.3. In the first RBMPs, 92 % and 0 % of

coastal water bodies were reported to be affected by diffuse and point source pressures, respectively. In the second RBMPs, this had increased to 100 % and 5 %, respectively. There were similar increases between the two cycles for diffuse source pressures on river water bodies (76 % in the first RBMPs, 98 % in the second RBMPs), and on lake water bodies (56 % in the first RBMPs, 100 % in the second RBMPs). In terms of point source pressures, there was an increase in the proportion affected in lakes from 19 % in the first RBMPs to 21 % in the second RBMPs, and in rivers from 29% in the first RBMPs to 43 % in the second RBMPs.

Figure2.3 *Comparison of pressures on surface water bodies in Germany in the first and second cycles. Pressures are presented at the aggregated level. NB - there were 9,808 identified surface water bodies for the second cycle and 9,860 for the first cycle*



Source: WISE electronic reports

Overwhelmingly, the most significant pressures on groundwater bodies in the second RBMPs in Germany were diffuse pressures from agriculture, which were reported to affect 41 % (Figure 2.3). The most significant point source pressure was from contaminated sites which only affected 2 % of groundwater bodies. There has been a significant increase in the number of groundwater bodies between the two cycles (989 to 1177) and also a change in the definition of pressure types. Bearing these changes in mind, there was an apparent decrease in percentage of groundwater bodies affected by point source pressures between the two cycles (6 % in the first RBMPs, 3 % in the second RBMPs) and an increase in the percentage affected by diffuse source pressures (36 % in the first RBMPs, 51 % in the second RBMPs).

A combination of numerical tools and expert judgement were reported to be used to assess the significance of all types of pressures assessed on surface and groundwater. The definition of

significance has been defined in terms of thresholds and is linked to the potential failure to meet objectives in all RBDs in Germany.

The RBMPs state that the harmonisation process within Germany for the criteria for identification of pressures has been further developed. This led to a more detailed list of criteria for defining pressures, which also makes a direct comparison between the first and the second cycle not possible. The LAWA document "Produktdatenblatt 2.1.2 - Überprüfung und Aktualisierung der Bestandsaufnahme nach Wasserrahmenrichtlinie bis Ende 2013 -Kriterien zur Ermittlung signifikanter anthropogener Belastungen in Oberflächengewässern, Beurteilung ihrer Auswirkungen und Abschätzung der Zielerreichung bis 2021" explains that these changes are required due to new legal requirements and to implement the comments of the European Commission on the first RBMPs. The overall aim was to have one guidance document for all authorities in Germany. The document also explains the detailed changes in the methodology and lists the new criteria which should be applied across Germany. In most cases it appears that a significant increase in pressures was due to the new methodology being applied.

2.1.6 Significant impacts on water bodies

The most widespread and significant impact on surface water bodies reported in Germany in the second RBMPs is chemical pollution. Germany applied an approach in all RBDs based on the assumption that all surface waters are affected by ubiquitous substances and that all surface waters are failing to achieve good chemical status due to not meeting the EQS for those substances, in particular for mercury.

Altered habitats due to morphological changes impacted all transitional, 93 % of river and 35 % of lake water bodies. All transitional water bodies were also impacted by nutrient pollution as were 92 % of coastal waters, 78 % of rivers and 75 % of lake water bodies.

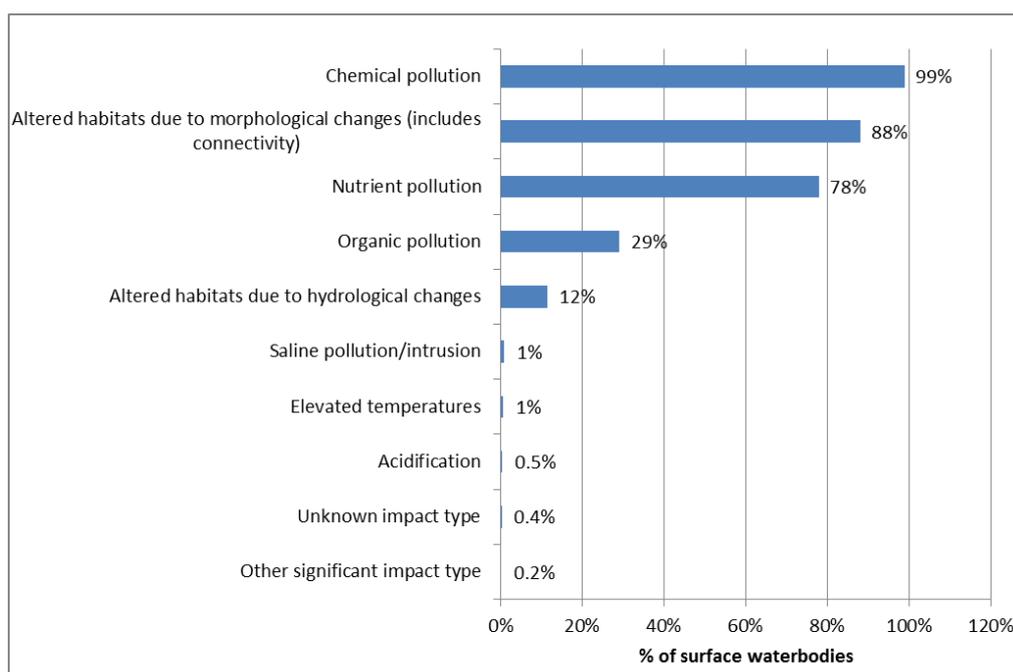
It is difficult to compare the reported impacts for the two cycles because of changes in the definition of impacts and re-delineation of water bodies. However, in terms of altered habitats, 71 % of river water bodies were impacted in the first RBMPs and 93 % in the second RBMPs. Nutrient enrichment impacted all transitional, 92 % of coastal, 55 % of river and 53 % of lake water bodies in the first RBMPs. In the second RBMPs, nutrient pollution impacted all transitional, 92 % of coastal, 78 % of rivers and 75 % of lake water bodies. The most striking difference was in terms of chemical pollution. In the second RBMPs almost all surface water bodies (99 %) were impacted by chemical pollution while in the first RBMPs only 12 % were reported to be contaminated by Priority Substances²¹. In the second RBMPs it was reported

²¹ Germany subsequently highlighted that the quality standards of Directive 2013/39/EU were already used for the assessment. Considering the standards of Directive 2008/105/EC for the assessment of chemical pollution would have resulted in lower impacts.

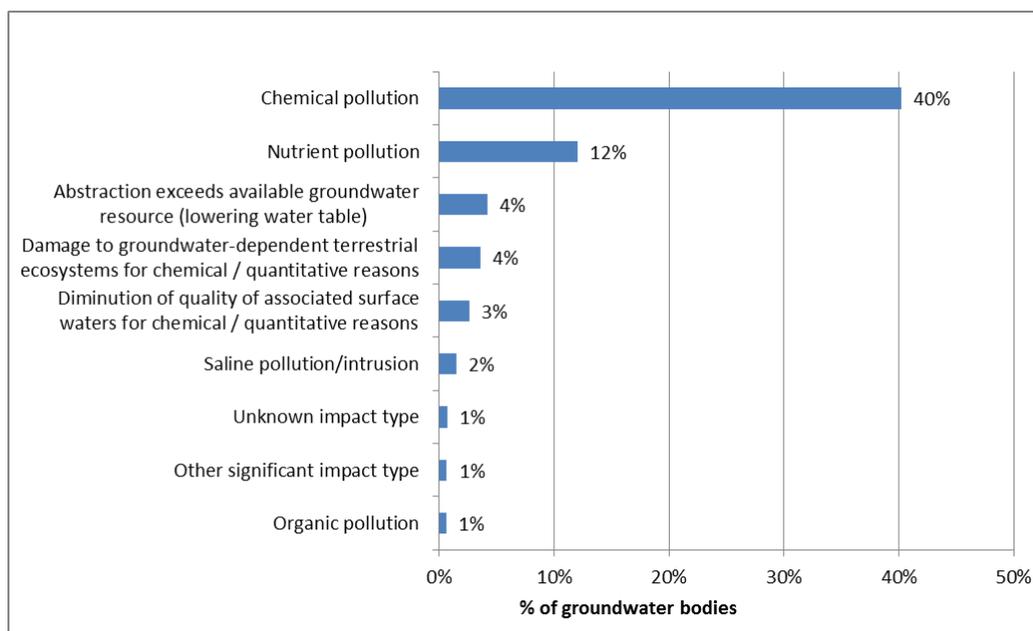
that diffuse atmospheric deposition was a significant pressure and a possible source of chemical pollutants.

In terms of impacts on groundwater bodies in Germany, chemical pollution impacted the largest number of water bodies, at 40 % (across nine RBDs), followed by nutrient pollution (12 % of groundwater bodies across eight RBDs) and abstractions exceeding groundwater resources (4 % of groundwater bodies across five RBDs) (Figure 2.4). The reported impact types are not comparable between the two cycles.

Figure 2.4 *Significant impacts on surface water and groundwater bodies in Germany for the second cycle. Percentages of numbers of water bodies.*²²



²² Germany subsequently clarified that the percentages extracted from WISE are not correct, as all surface water bodies are considered to be failing to achieve good chemical status



Source: WISE electronic reports

2.1.7 Groundwater bodies at risk of not meeting good status

In Germany as a whole, 46 % of groundwater bodies were reported to be at risk of failing good chemical status. 46 different groundwater pollutants were reported to be causing a risk. Overwhelmingly, nitrate was the pollutant responsible for the greatest risk, with 25 % of groundwater bodies in Germany being at risk, followed by ammonium and sulphate, with 5 % of groundwater bodies being at risk.

8 % of groundwater bodies in Germany are at risk of failing good quantitative status with water balance being the cause of the risk in the largest proportion of groundwater bodies (7 %), followed by impacts on groundwater dependent terrestrial ecosystems (4 %), saline intrusions (1 %) and impacts on surface water (0.3 %).

2.1.8 Quantification and apportionment of pressures

Germany reported comprehensive information on the apportionment of pressure types (e.g. diffuse source pressures) among responsible sectors and activities, with the gaps that need to be filled to achieve objectives in groundwater and surface waters. For example, point source pressures have been apportioned with gaps for urban waste water (10 RBDs), storm overflows (nine RBDs), non-industrial emissions directive plants (seven RBDs), industrial emissions directive plants (six RBDs), aquaculture (five RBDs), contaminated sites or abandoned industrial sites (four RBDs), mine waters (four RBDs) and waste disposal sites (three RBDs). Diffuse source pressures have been apportioned among agriculture (10 RBDs), atmospheric deposition (seven RBDs), contaminated sites or abandoned industrial sites (five RBDs), mining (five RBDs), discharges not connected to sewerage network (four RBDs), transport (four

RBDs), aquaculture (three RBDs), urban run-off (three RBDs) and forestry (two RBDs). Abstraction or flow diversion pressures have been apportioned among six sectors, pressures arising from physical alteration of channel/bed/riparian area/shore among four sectors/activities and pressures arising from dams, barriers and locks among seven sectors/activities.

Gaps to be filled to achieve environmental objectives in groundwater were reported for seven chemical substances. The substance most commonly reported with a gap was cadmium in four RBDs. For surface waters, 16 chemical substances causing failure of objectives in surface waters were reported with gaps that had to be filled to achieve the objectives. Mercury was reported by all RBDs.

2.1.9 Inventories of emissions, discharges and losses of chemical substances

Article 5 of the Environmental Quality Standards Directive (EQS Directive)²³ requires Member States to establish an inventory of emissions, discharges and losses of all Priority Substances and other pollutants listed in Part A of Annex I of the EQS Directive for each RBD, or part thereof lying within their territory. This inventory should allow Member States to further target measures to tackle pollution from priority substances. It should also inform the review of the monitoring networks, and allow the assessment of progress made in reducing (or suppressing) emissions, discharges and losses for priority substances.

Germany reported inventories for all of its RBDs. Two of the 10 RBDs reported an inventory for all 41 Priority and other Substances. Four RBDs had one missing substance, one had two missing substances and one had four missing substances. The Danube RBD had 11 missing substances and the Warnow/Peene RBD had an inventory for only nine substances. The substance that appeared in the fewest inventories (two RBDs) was chloroalkanes C10-13. Germany explained that in all RBDs Substances were not included in the inventories if no discharge was expected.

The two-step approach from the Common Implementation Strategy Guidance Document n°28 has been followed for all substances considered in the inventories. For substances deemed not relevant at RBD level, Tier 2 of the methodology (riverine loads) was implemented. For substances relevant at RBD level, either Tier 3 (pathway oriented approach) or a combination of Tiers 1 and 2 (point source + riverine loads) were implemented. This is in line with the

²³ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0105-20130913>

Guidance Document n°28, which recommends using higher tiers of the methodology for substances relevant at RBD level. The data quality was not reported.

2.2 Main changes in implementation and compliance since the first cycle

The main changes between the first and the second cycle were that four of the 10 RBDs in Germany reported an increased number of groundwater bodies for the second cycle compared to the first. The largest increase was in the Danube RBD where 46 groundwater bodies had been delineated in the first RBMP and 170 (176²⁴) in the second RBMP. Overall for Germany there was a 19 % increase in the number of groundwater bodies. Proportionally there was a small increase in the numbers of delineated coastal (74 to 75) and lake (712 to 730) water bodies and a small decrease (9069 to 8998) in the number of river water bodies delineated. There was no change in the number of transitional waters (5).

In Germany as a whole, there was a reduction in the number and proportion of river water bodies designated as heavily modified between the two cycles. In the first RBMPs, there were 3531 heavily modified river water bodies (39 % of total river water bodies) and in the second RBMPs, 3178 (35 % of total river water bodies).

There were similar increases between the two cycles for diffuse source pressures on river water bodies (76 % in the first RBMPs, 98 % in the second RBMPs), and on lake water bodies (56 % in the first RBMPs, 100 % in the second RBMPs). In terms of point source pressures there was an increase in the proportion of affected lakes from 19% in the first RBMPs to 21 % in the second RBMPs, and in rivers from 29 % in the first RBMPs to 43 % in the second RBMPs. There has been a significant increase in the number of groundwater bodies between the two cycles (989 to 1177) and also a change in the definition of pressure types. These changes make any direct comparison impossible, but it appears that there was a decrease in the percentage of groundwater bodies affected by point source pressures between the two cycles (6 % in the first RBMPs, 3 % in the second RBMPs) and an increase in the percentage affected by diffuse source pressures (36 % in the first RBMPs, 51 % in the second RBMPs).

2.3 Progress with the Commission recommendations

- Recommendation: *Fill existing gaps regarding lacking reference conditions.*
- Assessment: There are still gaps in the establishment of reference conditions for all types in all water categories for the different groups of the required quality elements²⁵.

²⁴ Germany subsequently clarified that, contrary to the reporting in WISE, there are 176 groundwater bodies in the Danube RBD.

²⁵ Germany subsequently highlighted that almost all biological assessment methods are formally intercalibrated and contain reference conditions. They stated that for supporting physicochemical quality elements reference

In particular reference conditions have only been established for some (not all) hydromorphological and physicochemical quality elements for all types in rivers, lakes, transitional and coastal waters. 13 of the 14 river types in the Ems RBD, 22 of the 25 river types in the Weser RBD, 14 of the 15 river types in the Oder, and all 12 river types in the Maas RBD now have reference conditions established for all relevant biological quality elements. In terms of coastal waters, two of the three types in the Elbe RBD now have reference conditions for all relevant biological quality elements but for one coastal water type in the Oder RBD, reference conditions have only been established for some biological quality elements. All six lake types in the Oder RBD only had reference conditions for some biological quality elements. In summary, there has been some progress with this recommendation, particularly for the biological quality elements in rivers, but there are still gaps in all water categories and all three different groups of quality elements. As such, progress has been made in addressing this recommendation, which is partially fulfilled.

- Recommendation: *Provide more transparent information regarding how waters were classified in order to avoid gaps (e.g. why no transitional water bodies have been identified).*
- Assessment: The three RBDs to which this recommendation applies have not reported any transitional water bodies in the second RBMPs. Transitional water bodies have not been defined in the Schlei/Trave RBD because there are no waters which contain the adequate levels of salinity. The reason why no transitional water bodies were defined by Germany in the Baltic Sea is that the inner coastal waters of the Baltic Sea have been categorised as coastal waters, as they are not under tidal influence but have wind-driven current dynamics, usual for coastal waters. Given the information provided, this recommendation has been considered as fulfilled.
- Recommendation: *Refine the significance of the pressures by quantifying those which are likely to prevent the achievement of environmental objectives.*

Assessment: Germany reported a wide range of different pressures. Only one pressure (diffuse-other) was reported as not being assessed for surface waters, while all pressures were assessed for groundwater. The significance of pressures has been defined in terms of thresholds and is linked to the potential failure of objectives for both surface waters and groundwater in all 10 German RBDs. It was reported that the assessment methods for the biological quality elements are generally sensitive to all impacts in all water categories: the information is generally consistent across Germany. Progress has therefore been made on this recommendation.

values are defined in the Surface Water Ordinance 2016 (but not all reported) and for hydromorphology, assessment methods do exist but are not yet regulated in the Surface Water Ordinance.

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

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

3.1.1. Monitoring of ecological status/potential

Monitoring programmes

Article 8(1) of the WFD requires Member States to establish monitoring programmes for the assessment of the status and potential of surface water and of groundwater in order to provide a coherent and comprehensive overview of water status within each RBD.

Germany reported separate monitoring programmes for groundwater and surface waters. The surface water programmes covered the categories of water identified in each of the RBDs.

Monitoring sites

Table 3.1 compares the number of monitoring sites used for surveillance and operational purposes in each cycle, and Table 3.2 gives the number of sites used for different purposes for the second RBMPs. Figure 3.1 shows the proportion of surface water bodies included in surveillance and operational monitoring in Germany for the first and second RBMPs.

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

	Rivers		Lakes		Transitional		Coastal	
	Surv.	Op.	Surv.	Op.	Surv.	Op.	Surv.	Op.
second RBMP								
DE1000	38	1155	11	30	0	0	0	0
DE2000	110	4 887	42	64	0	0	0	0
DE3000	9	(577)	0	9	19	5	24	17
DE4000	48	2 004	2	21	18	7	20	14
DE5000	60	2 853	81	430	3	2	9	8
DE6000	4	211	6	40	0	0	1	1
DE7000	3	284	5	6	0	0	0	0
DE9500	6	207	0	4	3	1	7	8
DE9610	21	396	6	35	0	0	10	16
DE9650	7	552	9	77	0	0	4	34
Total by type of site	306	13 106	162	716	43	15	75	98
Total number of monitoring sites for surveillance and/or operational purposes	13 317		824		56		151	
first RBMP								
DE1000	54	948	12	37	0	0	0	0
DE2000	102	3388	5	35	0	0	0	0
DE3000	9	137	0	8	1	10	3	17
DE4000	43	880	2	(25)	1	6	2	19
DE5000	48	2321	28	246	2	4	5	5
DE6000	8	328	6	34	0	0	1	1
DE7000	4	89	0	1	0	0	0	0

	Rivers		Lakes		Transitional		Coastal	
	Surv.	Op.	Surv.	Op.	Surv.	Op.	Surv.	Op.
DE9500	3	62	0	4	1		7	8
DE9610	9	105	6	33	0	0	10	16
DE9650	7	90	8	26	0	0	4	34
Total by type of site	287	8 348	67	482	5	20	32	100
Total number of monitoring sites for surveillance and/or operational purposes	8 561		516		24		117	

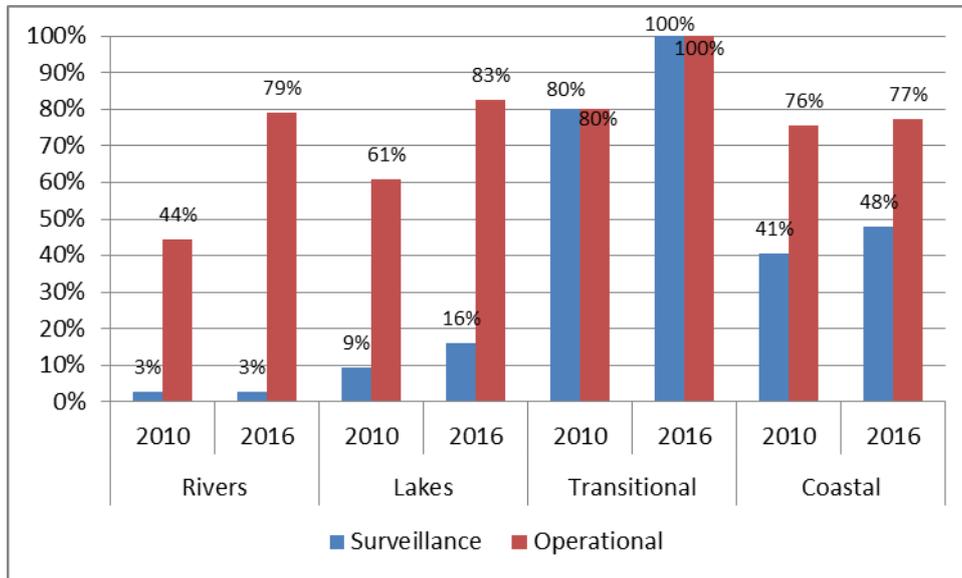
Sources: Member States electronic reports to WISE in first and second RBMPs. The numbers in parenthesis were subsequently communicated by Germany.

Table 3.2 *Number of monitoring sites in relevant water categories used for different purposes in Germany*

Monitoring Purpose	Lakes	Rivers	Coastal	Transitional
BWD - Recreational or bathing water - WFD Annex IV.1.iii	8	1		
CHE - Chemical status	(618)	(666)	101	11
DWD - Drinking water - WFD Annex IV.1.i	4	76		
ECO - Ecological status	(793)	(14177)	111	44
HAB - Protection of habitats or species depending on water - WFD Annex IV.1.v	0	19		
INT - International network of other international convention	16	9		
INV - Investigative monitoring	26	1 250		
NID - Nutrient sensitive area under the Nitrates Directive - WFD Annex IV.1.iv	22	530		
OPE - Operational monitoring	716	13 371	98	15
REF - Reference network monitoring site	6	40		
RIV - International network of a river convention (including bilateral agreements)	0	78		
SOE - EIONET State of Environment monitoring	25	166		
SUR - Surveillance monitoring	162	308	75	43
TRE - Chemical trend assessment	15	478	12	
UWW - Nutrient sensitive area under the Urban Wastewater Treatment Directive - WFD Annex IV.1.iv	22	456	158	56
Total sites irrespective of purpose	947	15 717	158	56

Source: WISE electronic reports

Figure 3.1 *Percentage of water bodies included in surveillance and operational monitoring in Germany for the first and second RBMPs. NB - no differentiation is made between water bodies included in ecological and/or chemical monitoring.*



Source: WISE electronic reports

Overall in Germany there was an increase in the number of sites used for surveillance monitoring from the first to the second RBMPs. Proportionally, the largest increase was in transitional waters (5 for the first to 43 for the second RBMPs) followed by lake (67 to 162 sites) and coastal (32 to 75 sites) water bodies. There was a relatively small increase in river sites from 287 for the first RBMPs to 306 for the second. At the RBD level, there were decreases in three RBDs in terms of river sites and in terms of lake sites in one RBD. In all other RBDs and water categories there were either increases or no changes in the number of surveillance sites.

According to the reporting in WISE, in Germany overall there were considerably more operational (~13000) than surveillance (~300) monitoring sites in rivers. There were also more operational than surveillance sites in lakes and coastal waters. The reverse was the case in transitional waters where 15 sites were used for operational purposes and 43 for surveillance.

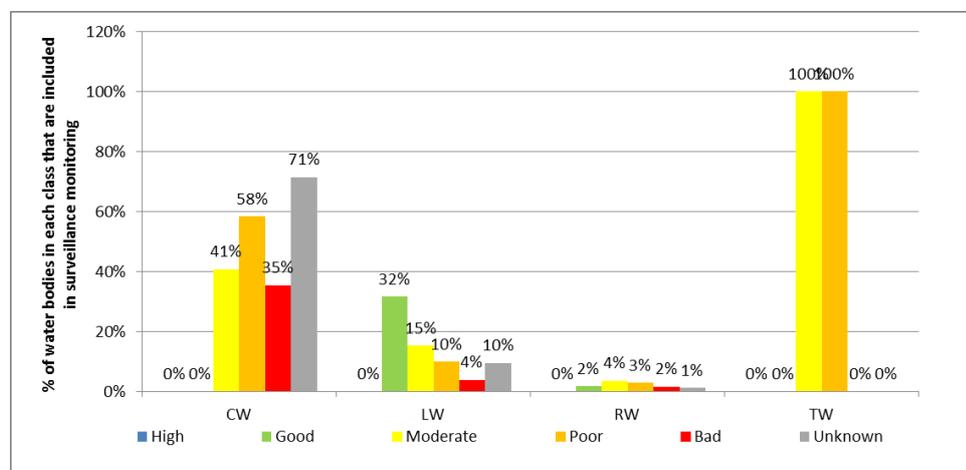
There was a small decrease in the number of operational monitoring sites in coastal waters from the first to the second RBMPs (100 to 98) with a proportionally larger decrease in transitional waters (20 to 15). In contrast there was a 1.6 fold increase in operational monitoring sites in rivers and lakes. There were increases in nine of the 10 RBDs in the number of river monitoring sites with a decrease in the other RBD. For lakes there was an

increase in numbers of operational sites in seven RBDs, no changes in one and a decrease in the other two.

Information provided in the documents supporting the electronic reports indicated that the LAWA had developed a national guidance document "RaKon Monitoring und Bewertung von Oberflächengewässern" which addressed the surface water monitoring programme for the second RBMPs. Changes with respect to the programme of the first RBMPs were due to the experience gained and also to reflect the European Commission's recommendations. However, that document does not show explicitly the changes made since the first RBMPs. Generally the reasons for changes in the number of monitoring sites were not provided.

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

Figure 3.2 *Proportion of water bodies in each ecological status/potential class that is included in surveillance monitoring in Germany.*



Source: WISE electronic reports

There was only a small change in the number of delineated coastal water bodies from the first to the second RBMPs, with one more being identified for the second compared to the first. There was an increase in the numbers and proportion of coastal water bodies monitored for all three required biological quality elements in the second RBMPs (irrespective of monitoring purpose). The most commonly used biological quality element for the second RBMPs was benthic invertebrates, which was monitored in 73 % of coastal water bodies.

In terms of lakes, there was also a small increase in the number of delineated water bodies for the second RBMPs (730) compared to the first (712). However, whilst there was a significant increase in the numbers and proportion of lake water bodies monitored for phytoplankton (from 61 % for the first RBMPs to 90 % for the second) there were significant decreases in the

number and proportion monitored for benthic invertebrates (25 % for the first to 3 % for the second) and for fish (25 % for the first to 3 % for the second).

In the case of rivers, there was a small reduction (<1 %) in the number of water bodies from the first to the second RBMPs. There was a significant increase in the number and proportion of water bodies monitored for each of the required biological quality elements.

The same number (five) of transitional water bodies was identified for both cycles. There were only small or no differences in the number of transitional water bodies monitored for other aquatic flora, benthic invertebrates and fish but two transitional water bodies were reported to be monitored for phytoplankton in the second RBMPs compared to only one for the first.

In Germany as a whole, there was a considerable increase from the first to the second RBMPs in the number (4026 for the first RBMPs to 7122 for the second) and proportion (44 % to 79 %) of river water bodies monitored for operational purpose. There were also increases in the number and proportion of lakes, coastal and transitional water bodies included in operational monitoring.

Three biological quality elements were reported to be used in the operational monitoring of coastal waters for the second RBMPs. Benthic invertebrates were used in 88 % of coastal water bodies included in operational monitoring, phytoplankton in 83 % and other aquatic flora in 55 %. In terms of the biological quality elements used in the operational monitoring of lakes, phytoplankton was the most commonly used (93 % of lakes included in operational monitoring), followed by other aquatic flora (50 %), fish (5 %) and benthic invertebrates (3 %). The predominant biological quality elements used in the operational monitoring of rivers was benthic invertebrates (90 % of river water bodies included in operational monitoring), followed by other aquatic flora (71 %) and fish (65 %). All four relevant biological quality elements were monitored in transitional waters for operational purposes. Benthic invertebrates were monitored in four of the five transitional water bodies included in operational monitoring and the other three biological quality elements in one water body each.

Transboundary surface water body monitoring

Germany reported 99 transboundary river water bodies from four RBDs and two transboundary lake water bodies from one RBD. In total Germany reported 78 river monitoring sites from four RBDs that are part of the international network of a river convention and 16 lake and nine river monitoring sites from four RBDs that are part of international networks of other international conventions.

Quality elements monitored (excluding River Basin Specific Pollutants)

Table 3.3 illustrates the quality elements used for monitoring of surface waters for the second plan: no differentiation is made between purposes of monitoring.

Table 3.3 Quality elements monitored for the second RBMPs in Germany (excluding River Basin Specific Pollutants). NB - Quality element may be used for surveillance and/or operational monitoring

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

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

Source: WISE electronic reports - Germany subsequently stated that macroalgae was monitored in coastal and transitional waters in some RBDs, this might be a reporting error.

In terms of the quality elements monitored, the Ems RBD did not report any quality element for the monitoring of coastal waters in the first RBMP but reported three biological quality elements, hydromorphological and physicochemical quality elements for the second RBMP, which indicates clear progress. All the expected quality elements were monitored in five of the seven RBDs with identified coastal waters for the second RBMPs. However, in two RBDs (Oder and Warnow/Peene) hydromorphological quality elements were not reported to be

monitored for the second RBMPs but had been monitored in the first, indicating some deterioration in the scope of monitoring²⁶.

For lakes, all 10 RBDs reported the monitoring of phytoplankton and other aquatic flora for both cycles, while only two RBDs reported benthic invertebrates and five RBDs fish for the second RBMPs, compared to nine and 10 RBDs, respectively, for the first RBMPs, again indicating some deterioration in the scope of monitoring. There was also a decrease in the number of RBDs who reported monitoring hydromorphological quality elements, from eight in the first RBMPs to five in the second. Physicochemical quality elements were reported not be monitored in the Warnow/Peene RBD for both cycles²⁷.

All required biological quality elements were reported to be monitored in rivers for both cycles. Hydromorphological quality elements were monitored in all 10 RBDs for the first RBMPs but this was reduced to eight RBDs for the second.

There were gaps in the monitoring of the required biological quality elements in transitional waters for both cycles. Phytoplankton was not reported to be monitored in three RBDs for the first RBMPs and two for the second. Benthic invertebrates were reported for four RBDs for the first RBMPs and three RBDs for the second. Hydromorphological quality elements were reported for the four RBDs with transitional waters for the first RBMPs but only for three RBDs for the second.

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

Germany sampled 11 of the 19 biological quality elements used for the surveillance monitoring of surface water bodies at the minimum recommended frequency at all sites in which they were monitored. The lowest rate of alignment with the recommended frequencies was for phytoplankton in transitional waters (50 % of sites). In comparison, only two of the 11

²⁶ Germany subsequently explained that the hydromorphological quality elements for coastal waters of the Warnow/Peene RBD were assessed for the first RBMP. No significant changes have taken place during the second cycle and thus no new assessment was carried out.

²⁷ Germany subsequently noted that physicochemical quality elements were monitored for all lake water bodies in Warnow/Peene RBD, even if this was not reported to WISE.

biological quality elements used for operational monitoring of surface water bodies were sampled at the minimum recommended frequency at all of the sites where they were monitored. The lowest rate of alignment with the recommended frequencies was for phytoplankton in transitional waters (no sites).

River Basin Specific Pollutants and matrices monitored

In Germany as a whole, 309 different chemical substances were reported as River Basin Specific Pollutants for the second RBMPs, 300 being monitored in water, 84 in suspended sediment, 82 in settled sediment, 60 in sediment, 11 in other biota and seven in fish. In addition, 702 "other" chemical substances were also reported to be monitored in water, sediment and biota. However, it should be noted that the value of 702 is an over-estimation because there was no standardised way of reporting these substances, leading to substances with the same numerical identifier being reported a number of times slightly differently by the different RBDs.

Germany reported 5802 monitoring sites as monitoring River Basin Specific Pollutants (Table 3.4): this represents 35 % of the total reported surface water monitoring sites in Germany. Most sites were in the Elbe RBD (43 %) and the fewest in the Danube RBD (1.7 %): all 10 RBDs reported some sites monitoring River Basin Specific Pollutants. Of the 5802 sites, 98 % were used to monitor River Basin Specific Pollutants in water, 39 % in sediment and 0.4 % in biota. Sediment and biota were monitored in coastal waters, rivers and transitional waters. In lakes, River Basin Specific Pollutants were monitored in water and sediment.

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

RBMP		Lakes	Rivers	Transitional	Coastal
second	Sites used to monitor River Basin Specific Pollutants	321	5380	11	90
first	Sites used to monitor non-priority specific pollutants and/or other national pollutants	108	2473	6	30

Sources: WISE electronic reports

Annex V of the WFD provides guidance on the frequency of monitoring of the different quality elements: once every three months is recommended for “other pollutants” which are taken here to equate to river basin specific pollutants. Surveillance monitoring should be carried out for each monitoring site for a period of one year during the period covered by a

river basin management plan i.e. six years. For river basin specific pollutants this should be done four times for the surveillance year; and for operational monitoring four times a year for each year of the cycle.

Of the 298 substances included in surveillance monitoring, 11 % were monitored at least at the minimum recommended frequency at all of the sites where they were monitored, and for 20 substances at none of the sites. Of the 263 substances included in operational monitoring, 0.8 % were monitored at least at the minimum recommended frequency at all of the sites where they were monitored, and for 48 % at none of the sites.

Germany subsequently commented that only 162 pollutants are identified in the 2011 Surface Water Ordinance as River Basin Specific Pollutants (monitored for the first RBMPs). The 2016 Surface Water Ordinance lists 67 River Basin Specific Pollutants for the next RBMPs.

Use of monitoring results for classification

Member States are required to report the basis of the status classification for each of the quality elements used. For coastal waters, monitoring results are predominantly used for classifying phytoplankton, benthic invertebrates, hydromorphological conditions and physicochemical quality elements. However, expert judgement is predominantly used for angiosperms, although monitoring results and grouping are also used. Grouping is also used for the other quality elements used for classification, as is expert judgement except for benthic invertebrates. This implies that the assessment method for angiosperms is not as robust as those used for the other biological quality elements.

Grouping has not been used for any biological, hydromorphological or physicochemical quality element used to classify lakes: it is used to a small extent for River Basin Specific Pollutants. Expert judgement is overwhelmingly used (97 % of classified lake water bodies) to classify lakes in terms of the hydromorphological quality elements (perhaps indicating some weaknesses in the monitoring and assessment methods). Expert judgement was also used to classify 72 % of lake water bodies classified for River Basin Specific Pollutants, 25 % using monitoring data and 3 % by grouping. The results from monitoring biological quality elements and physicochemical quality elements were mainly used to classify lakes.

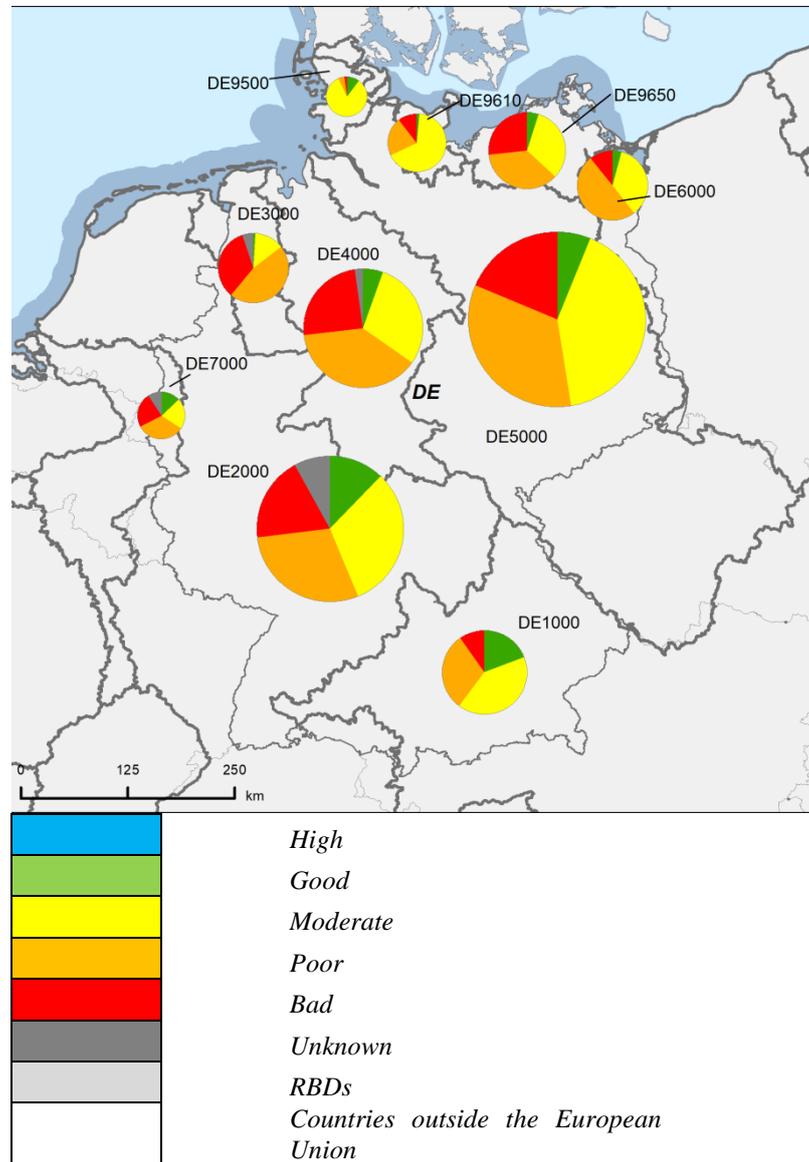
The classification of the biological and physicochemical quality elements for rivers was mainly based on monitoring results, but grouping and expert judgement were also used. Where the hydromorphological conditions were used to classify river water bodies, this was mainly based on expert judgment (52 % of classified river water bodies), with 41 % based on monitoring results and 7 % on grouping. For River Basin Specific Pollutants, expert judgement and monitoring results were equally used, with grouping used to a lesser extent. The classification of the quality elements for transitional waters was only based on monitoring results.

3.1.2. Ecological Status/potential of surface water

The ecological status/potential of surface water bodies in Germany in the second plans is illustrated on Map 3.1.

Map 3.1 *Ecological status or potential of surface water bodies in Germany*

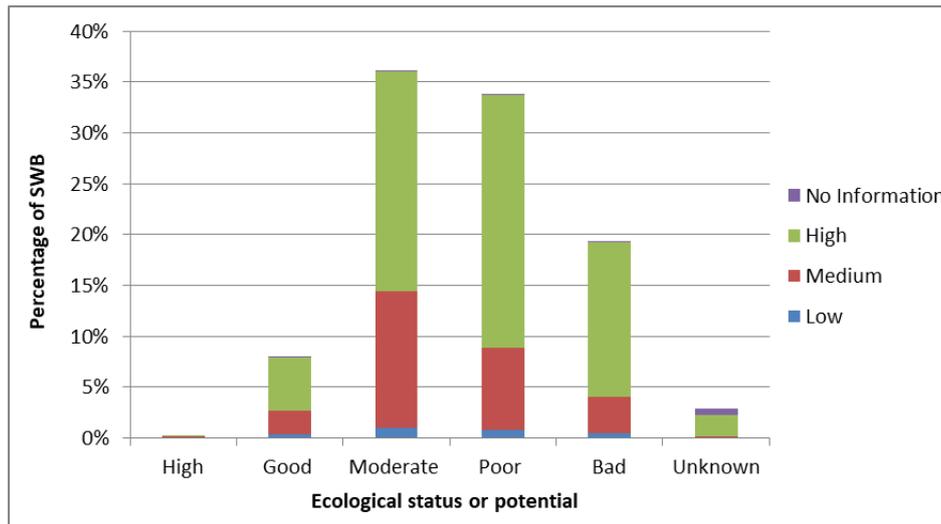
Note: Standard colours based on WFD Annex V, Article 1.4.2(i).



Source: WISE, Eurostat (country borders)

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

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

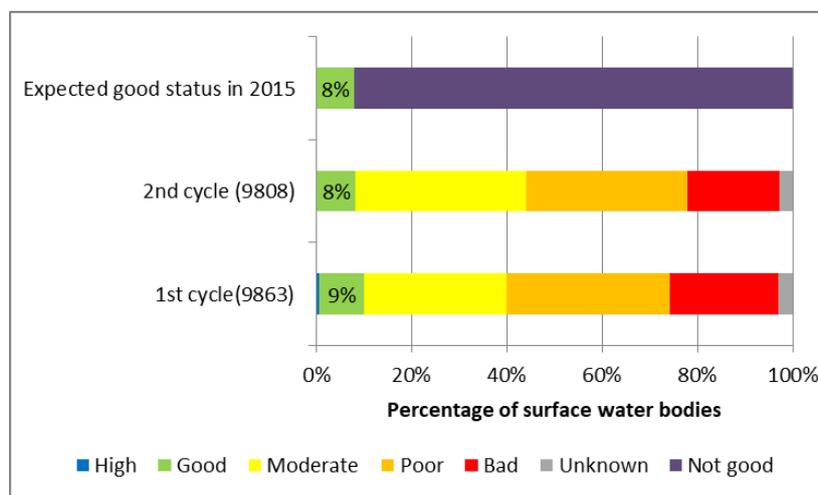


Source: WISE electronic reports

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

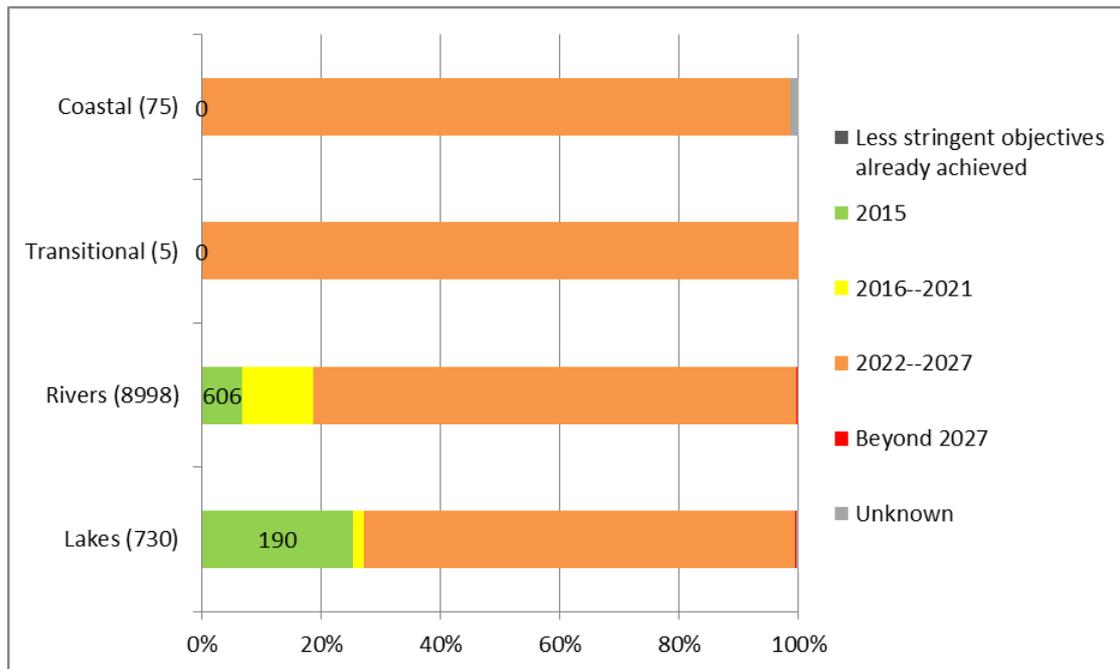
Member States were asked to report the expected date for the achievement of good ecological status/potential. The information for Germany is shown in Figure 3.5.

Figure 3.4 Ecological status or potential of surface water bodies in Germany for the second RBMPs, for the first RBMPs and expected in 2015. The number in parenthesis is the number of surface water bodies for both cycles. NB - The period of the assessment of status for the second RBMPs was 2012 to 2013. The year of the assessment of status for the first RBMPs is not known.



Source: WISE electronic reports

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



Source: WISE electronic reports

Overall around 90 % of surface water bodies were in less than good ecological status/potential for the second RBMPs. However, in several RBDs (Danube, Elbe, Oder, Warnow/Peene) there are a few lakes (less than 10 % of all classified natural lakes in Germany), as well as a few natural rivers in the Danube and Rhine RBDs (0.5 % of all classified natural rivers in Germany) that are also reported as good or higher. There are also still several water bodies with unknown ecological status/potential, in particular artificial and heavily modified lakes and rivers in the Rhine, Weser and Elbe RBDs.

Classification of ecological status in terms of each classified quality element

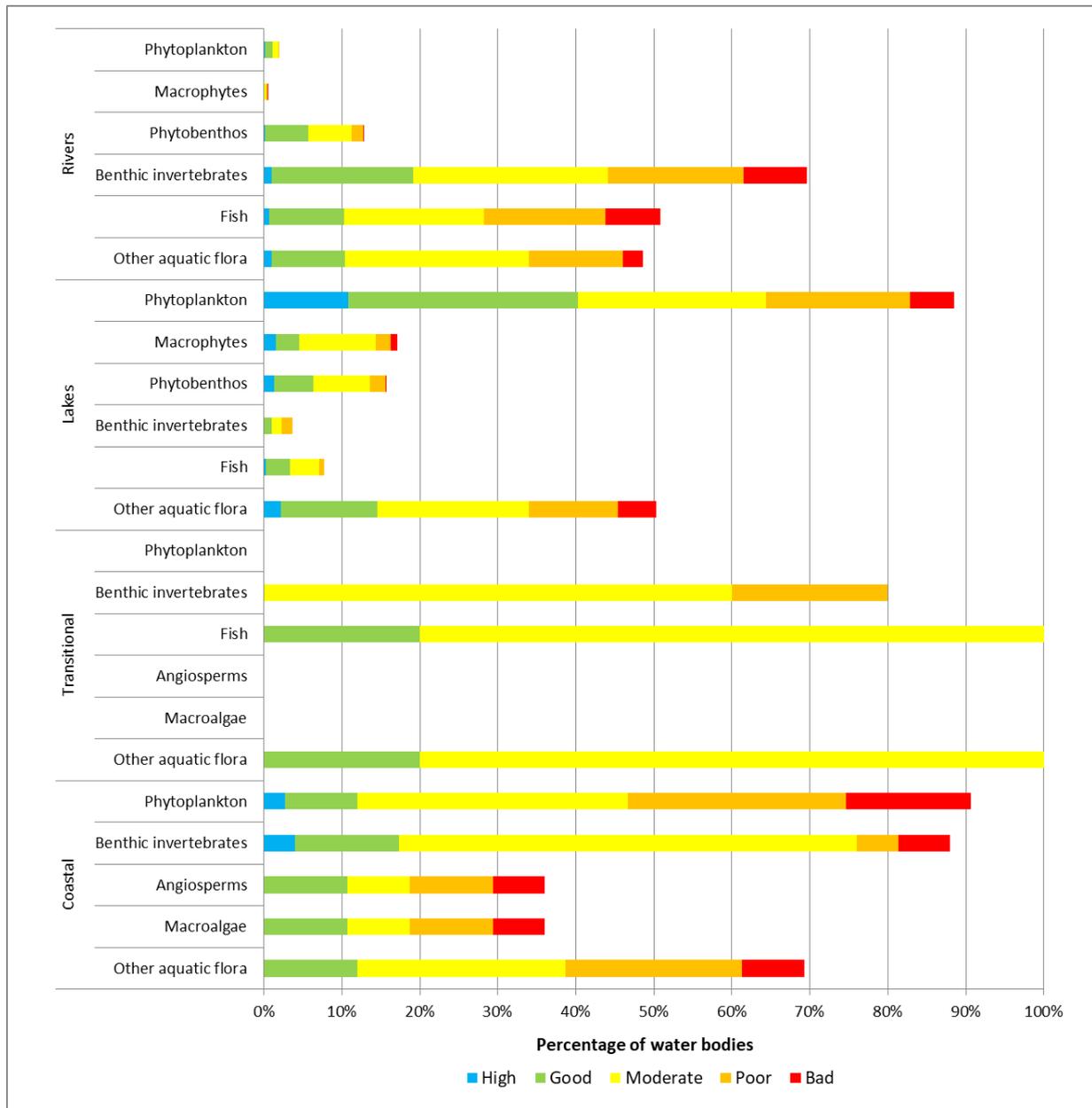
The supporting general physicochemical quality elements are monitored but not classified in the vast majority of water bodies. This applies in particular to nutrients in all water categories. Furthermore, there are still very few lake water bodies classified for benthic invertebrates.

Figure 3.6 shows the percentage of water bodies in terms of the biological quality element used for classification. Figure 3.7 compares the classification of biological quality elements in terms of ecological status/potential for the first and second RBMPs. This comparison should be treated with caution as there are differences between the numbers of surface water bodies classified for individual elements and differences in methodologies from the first to the second RBMPs.

Figure 3.8 and Figure 3.9 illustrate the basis of the classification of ecological status/potential of rivers and lakes in Germany for the second RBMPs.

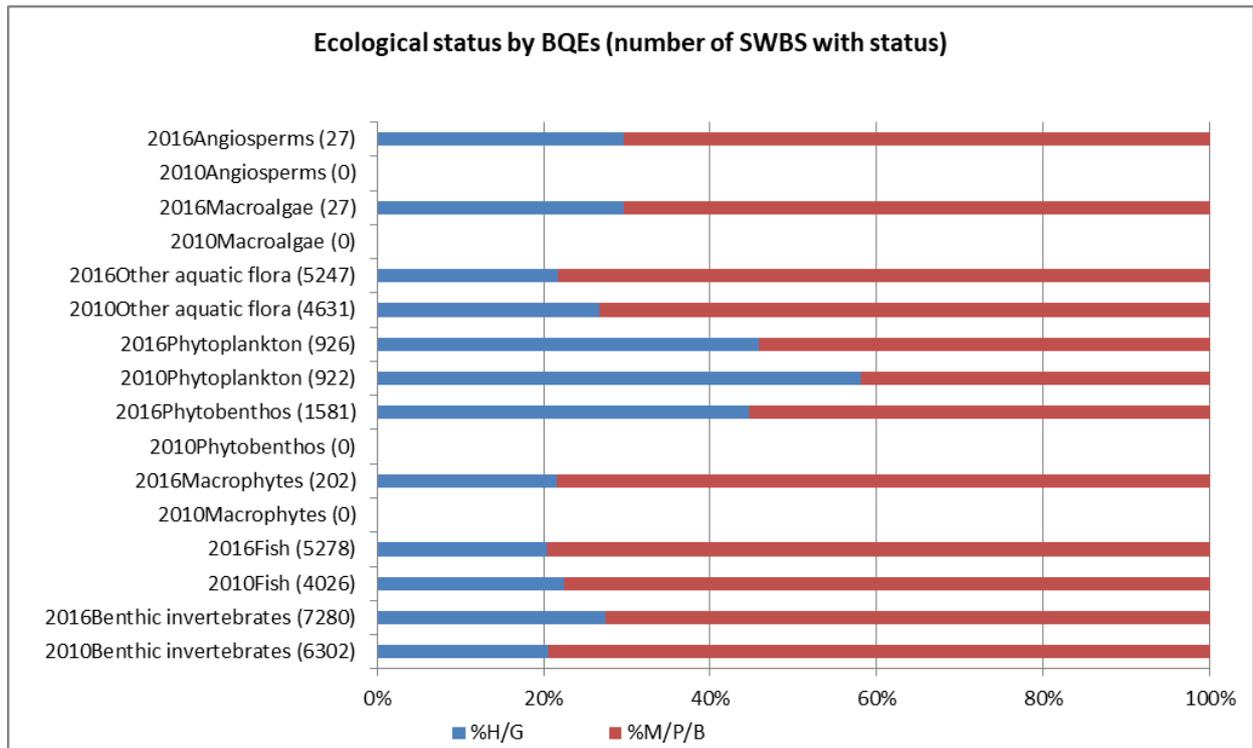
The classification of the individual quality elements is illustrated in Figure 3.10.

Figure 3.6 *Ecological status/potential of the biological quality elements used in the classification of lakes and rivers in Germany. NN - water bodies with unknown status/potential have been excluded from the presentation*



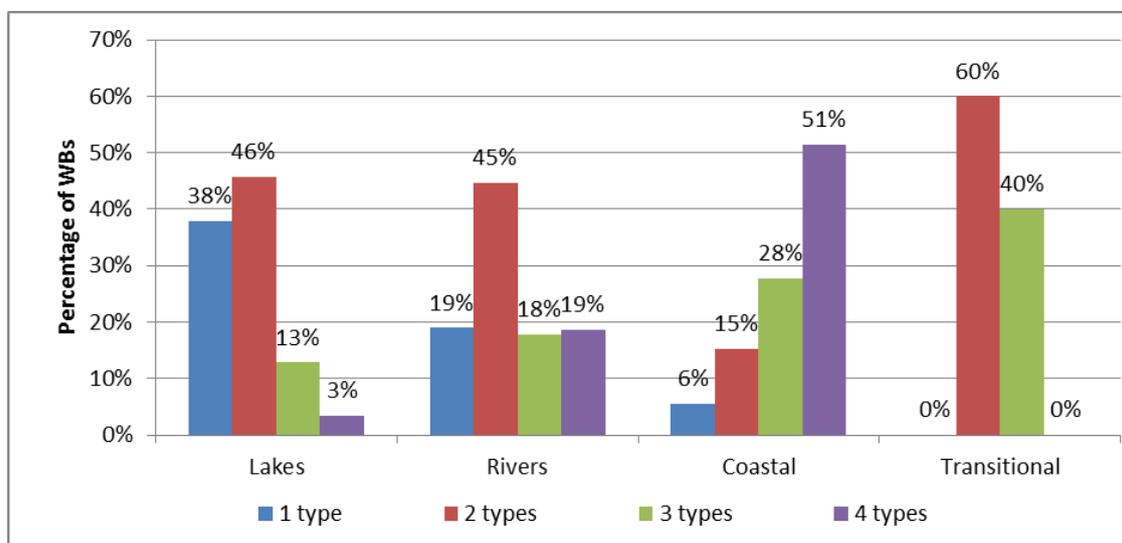
Source: WISE electronic reports

Figure 3.7 Comparison of ecological status/potential in Germany according to classified biological quality elements in rivers and lakes between the two cycles



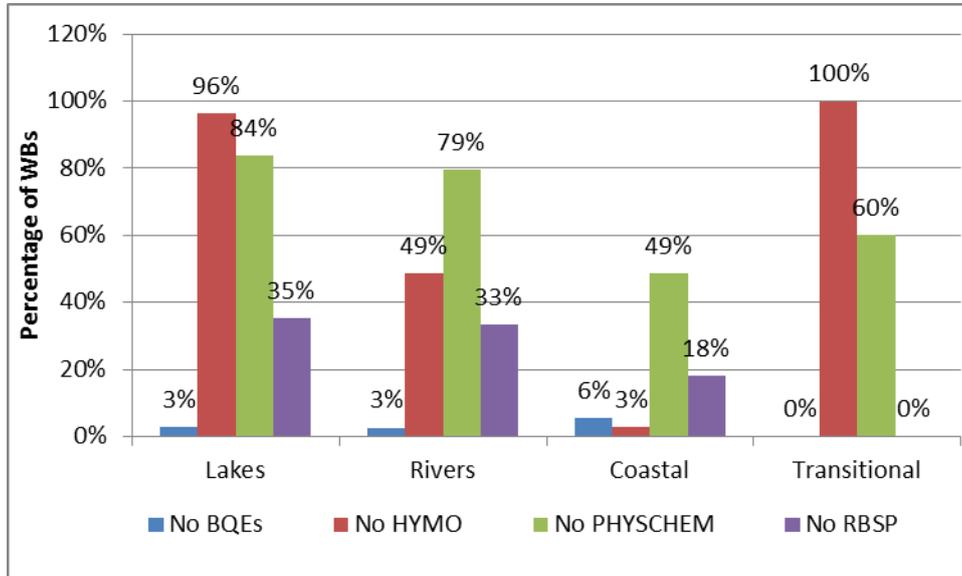
Source: WISE electronic reports

Figure 3.8 The classification of the ecological status or potential of rivers and lakes in Germany using one, two, three or four types of quality element. NB - The four types are biological; hydromorphological, general physicochemical and River Basin Specific Pollutants.



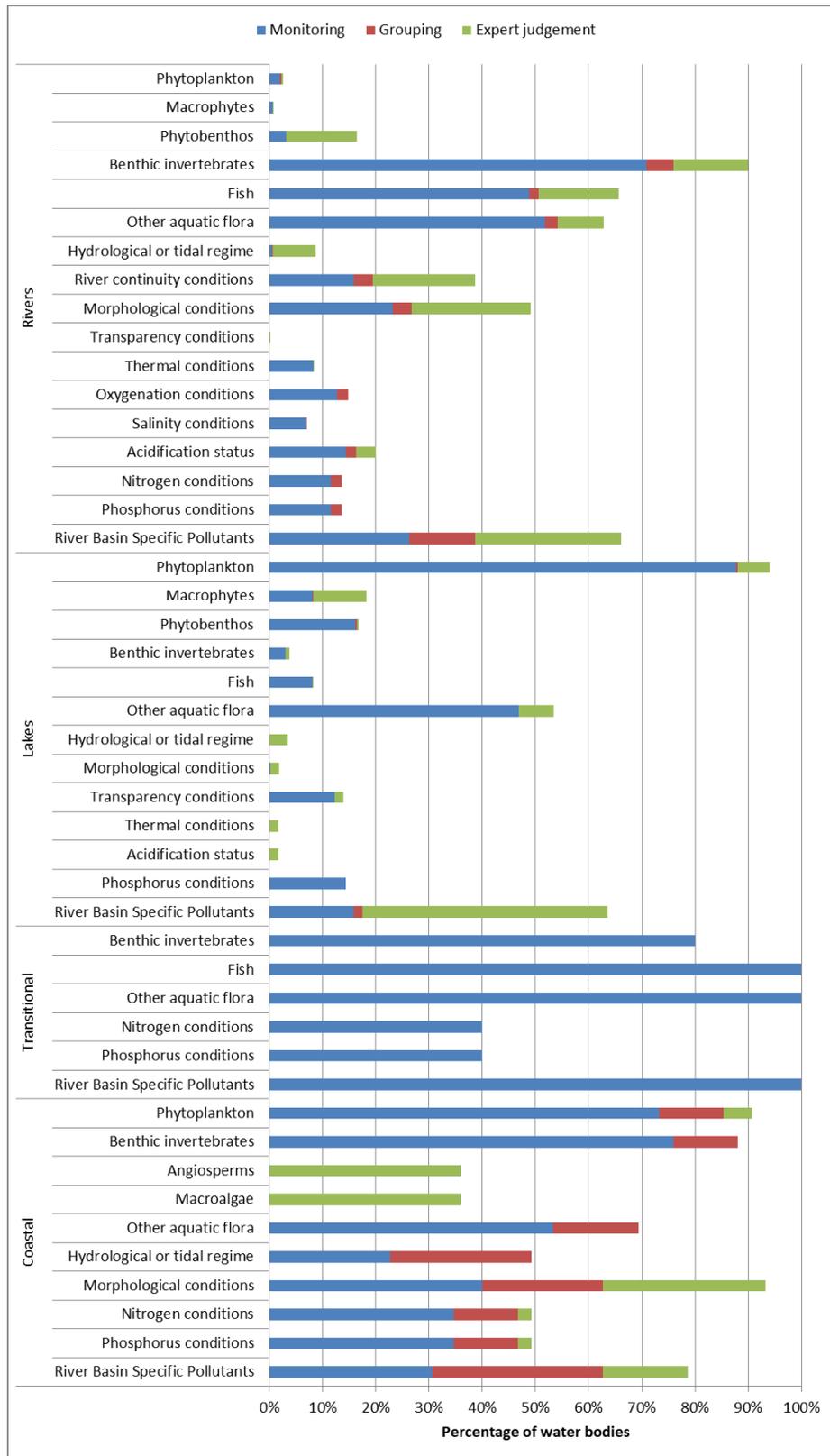
Source: WISE electronic reports

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



Source: WISE electronic reports

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



Source: WISE electronic reports

No improvements have been seen overall in ecological status since the first RBMPs. The number of rivers in good or high status shows an apparent slight deterioration in many RBDs due, as explained below, mainly to better data and methodological changes. Many heavily modified and artificial water bodies are reported as having unknown ecological status in most RBDs. For natural water bodies, there are very few water bodies with unknown ecological status.

Member States were asked to summarise the main changes in ecological status/potential between the two cycles in their second RBMPs. In the case of the Elbe, Warnow/Peene, Schlei/Trave and Oder RBDs the RBMPs give a list of reasons why there are changes in the ecological status/potential status of surface water bodies between the first and second RBMPs. These are:

- better and more monitoring data has become available;
- methodological changes in the assessment methods;
- natural variations in the biological quality elements;
- the effects of the PoM in place.

In the RBMP for the Land North-Rhine Westphalia within the Rhine RBD, the Eider and Schlei/Trave RBDs, the reasons given are:

- the water bodies are only comparable to a limited extent, the delineation and location of the water body may differ significantly;
- the types of water bodies have been changed;
- assessment procedures have changed;
- the monitoring results from the second monitoring cycle (2009-2011);
- in the second monitoring cycle, phytobenthos are monitored at significantly more measuring sites: this has in some cases resulted in degraded classifications;
- so far, the biocenosis has not had enough time to adapt to the changes based on the measures implemented. In addition there is a natural variation of biological quality elements.

It is stated that no big changes could be found between the first and second RBMPs in a detailed assessment.

Member States were requested to report whether any change between the first and second RBMPs in status/potential for each quality element was considered to be a real change or due to changes to monitoring and assessment methods. For Germany, the change in ecological status/potential at the quality level is reported as unknown for the large majority of water bodies, but is given for some water bodies in all RBDs for all the quality elements that have been used for classification. The changes go in both directions, and no obvious pattern is visible. The reason for the changes is also given in these cases. Some changes are reported to be real and some are due to changes in methodologies. For natural water bodies most of the inconsistent changes are due to monitoring changes, while for the heavily modified and artificial water bodies these are also due to changes in assessment methods.

Assessment methods and classification of biological quality elements

Germany reported biological assessment methods for all the relevant biological quality elements in all water categories. The assessment methods are sensitive for all relevant impacts (nutrients, organic, acidification, hydromorphological).

LAWA developed a national guidance document "RaKon Monitoring und Bewertung von Oberflächengewässern" which addressed surface water assessment methods for the second RBMPs. Changes in relation to the first RBMPs are due to the experience gained, reflect the European Commission's recommendations on the first RBMPs, but are also intended to close gaps in the assessment methods. However, the document does not show explicitly the changes made since the first RBMPs.

Intercalibration of biological assessment methods and national classification systems

Most national water body types are linked to common intercalibration types in all RBDs. Some national types (e.g. type 12) are used for both lakes and rivers with related typology factors in terms of altitude and geology. A few national types (e.g. type 12) overlap several intercalibration types, but the class boundaries used could still be based on the actual typology factors for each water body within the national type, choosing the intercalibration type that best matches each water body. Some national types do not match any common intercalibration type, so information on class boundaries is not available in the WISE reporting.

For non intercalibrated national water body types, for example for stream waters, the RBMPs indicate that all multimetric indices for benthic invertebrate assessment and their reference

values were derived for all water types according to the same principles on the basis of comparable stress gradients. As only a few minor adjustments were required to the German watercourse procedures, it is assumed that there is no need for adjustment even for non-intercalibrated river types.

Assessment methods for hydromorphological quality elements

All relevant hydromorphological quality elements in all water categories were reported to be assessed in terms of ecological status/potential and their classification boundaries are related to the class boundaries for the sensitive biological quality elements.

Assessment methods for general physicochemical quality elements

All relevant general physicochemical quality elements in all water categories were reported to be assessed in terms of ecological status/potential and their classification boundaries are related to the class boundaries for the sensitive biological quality elements.

Standard values for the physicochemical quality elements equivalent to the good-moderate status/potential boundaries were not reported for lakes²⁸ or transitional waters²⁹. Standards for rivers and coastal waters were only reported for three (oxygenation, salinity and nutrient conditions) of the six general types of general physicochemical quality elements. Standards for nitrite and non-ionised ammonia in rivers and for nutrients in coastal waters were reported. No standards were reported for phosphorus conditions in rivers. Germany subsequently stated that nutrient standards have been developed and used for all water categories for the second RBMPs. The standards were published by the Government in the latest revision of the surface water ordinance in 2016³⁰. The standards for rivers are reported to be consistent with the good-moderate status/potential boundary for the relevant sensitive biological quality elements, but not those for coastal waters. The standard for total nitrogen in coastal waters was reported with much lower values than had previously been provided by the German Authorities to the European Commission.

The RBMPs indicate that the LAWA guidance documents state that the general physicochemical conditions are used to help in the assessment of the "high" and "good"

²⁸ Germany subsequently stated that there are standard values for the general physicochemical quality elements for 14 German lake types. The high/good status and the good/moderate status/potential boundaries have been defined by total phosphorus and secchi depth.

²⁹ Germany subsequently stated that standards are available for lakes, rivers, transitional and coastal waters. They were published by LAWA and used in the assessment of the monitoring data in the second plans.

³⁰ Verordnung zum Schutz der Oberflächengewässer, 20th June 2016; BGBl. I S.1373

ecological status. The derivation of ecologically relevant values was checked and updated in the corresponding working papers associated with the guidance.

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

Environmental Quality Standards were reported in WISE for 162 River Basin Specific Pollutants, 158 in water (many persistent organic pollutants and metals), and 14 in suspended sediment (metals and polychlorinated biphenyls). Standards were reported for all four water categories. The Environmental Quality Standards have been derived in accordance with the Common Implementation Strategy Technical Guidance Document No 27³¹. No information was reported by Germany as to whether the analytical methods used for the River Basin Specific Pollutants meet the minimum performance criteria laid down in Article 4(1) or Article 4(2) of Directive 2009/90/EC³² for the strictest standard applied.

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

The one-out all-out principle has been used in all RBDs for the biological quality elements but was not applied to the physico-chemical quality elements in deriving the overall classification of the ecological status of a water body.

The background document "Teil A: Eckpunkte zum Monitoring und zur Bewertung von Oberflächengewässern und Grundwasser" explains the approach used for applying the one-out-all-out principle in more detail. It states that the biological quality element with the lowest class defines the overall status. There is a diagram showing that supporting quality elements are also relevant in the assessment, but it is unclear how these are considered. It is further stated that if the environmental quality standards for River Basin Specific Pollutants are not met the water body can only be classified as having moderate status.

3.2. Main changes in implementation and compliance since the first RBMPs

There was an increase in the number of sites used for surveillance monitoring between the two cycles in Germany as a whole. Proportionally, the largest increase was in transitional waters (five in the first RBMPs to 43 in the second) followed by lake (67 to 162 sites) and coastal (32 to 75 sites³³) water bodies. There was a relatively small increase in river monitoring sites, from

³¹ https://circabc.europa.eu/sd/a/0cc3581b-5f65-4b6f-91c6-433a1e947838/TGD-EQS_%20CIS-WFD_%2027%20EC%202011.pdf

³² Commission Directive 2009/90/EC of 31 July 2009 laying down, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, technical specifications for chemical analysis and monitoring of water status <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0090>

³³ Germany subsequently stated that the increase in coastal waters is a consequence of the new data model where depth profiles are now split into different sites.

287 in the first RBMPs to 306 in the second. There were decreases in three RBDs in terms of river sites and in one RBD for lake sites. In all other RBDs and water categories there were either increases or no changes in the number of surveillance sites from the first to the second RBMPs.

There was a small decrease from the first to the second RBMPs in the number of operational monitoring sites in coastal waters (100 to 98) and a proportionally larger decrease in transitional waters (20 to 15). In contrast there was a 1.6 fold increase in operational monitoring sites in rivers and lakes.

The Ems RBD did not report any quality element for the monitoring of coastal waters in the first RBMP but reported three biological quality elements, hydromorphological and physicochemical quality elements for the second RBMP, which indicates clear progress. All the expected quality elements were monitored in five of the seven RBDs with identified coastal waters for the second RBMPs. However, in two RBDs (Oder and Warnow/Peene) hydromorphological quality elements were not reported to be monitored for the second RBMPs but had been monitored in the first, indicating some deterioration in the scope of monitoring³⁴.

For lakes, all 10 RBDs reported the monitoring of phytoplankton and other aquatic flora for both cycles, while only two RBDs reported benthic invertebrates and five RBDs reported fish for the second RBMPs, compared to nine and 10 RBDs, respectively, for the first RBMPs, again indicating some deterioration in the scope of monitoring. There was also a decrease in the number of RBDs who reported monitoring hydromorphological quality elements, from eight in the first RBMPs to five in the second. Physicochemical quality elements were reported not be monitored in the Warnow/Peene RBD for both cycles³⁵.

Hydromorphological quality elements were monitored in rivers in all 10 RBDs for the first RBMPs but this was reduced to eight RBDs for the second.

There were gaps in the monitoring of the required biological quality elements in transitional waters for both cycles. Phytoplankton was not reported to be monitored in three RBDs for the first RBMPs and two for the second. Benthic invertebrates were reported for four RBDs for the first RBMPs and three RBDs for the second. Hydromorphological quality elements were

³⁴ Germany subsequently explained that the hydromorphological quality elements for coastal waters of the Warnow/Peene RBD were assessed for the first RBMP. No significant changes have taken place during the second cycle and thus no new assessment was carried out.

³⁵ Germany subsequently noted that physicochemical quality elements were monitored all lake water bodies in Warnow/Peene RBD, even if this was not reported to WISE.

reported for the four RBDs with transitional waters for the first RBMPs but only three RBDs for the second.

There was only a small change in the number of delineated coastal water bodies from the first to the second RBMPs, with one more being identified for the second compared to the first. There was an increase in the number and proportion of coastal water bodies monitored for all three required biological quality elements in the second RBMPs (irrespective of monitoring purpose). The most commonly used biological quality element for the second RBMPs was benthic invertebrates, which was monitored in 73 % of coastal water bodies.

In terms of lakes, there was also a small increase in the number of delineated water bodies for the second RBMPs (730) compared to the first (712). However, whilst there was a significant increase in the numbers and proportion of lake water bodies monitored for phytoplankton (from 61 % for the first RBMPs to 90 % for the second) there were significant decreases in the number and proportion of lake water bodies monitored for benthic invertebrates (25 % for the first to 3 % for the second) and for fish (25 % for the first to 3 % for the second).

In the case of rivers, there was a small reduction (<1 %) in the numbers of water bodies between the two cycles.

The same number (five) of transitional water bodies was identified for both cycles. There were only small or no differences in the number of transitional water bodies monitored for other aquatic flora, benthic invertebrates and fish but two transitional water bodies were reported to be monitored for phytoplankton in the second RBMPs compared to only one for the first.

In Germany as a whole, there was a considerable increase from the first to the second RBMPs in the number (4026 for the first RBMPs to 7122 for the second) and proportion (44 % to 79 %) of river water bodies monitored for operational purpose. There were also increases in the number and proportion of lakes, coastal and transitional water bodies included in operational monitoring.

There is an apparent slight deterioration of ecological status of rivers from the first to the second RBMPs in several RBDs and also for lakes in at least two RBDs (Elbe³⁶ and Oder). The change in ecological status/potential at the quality level is reported as unknown for the large majority of water bodies, but is given for some water bodies in all RBDs for all the

³⁶ Germany subsequently indicated that in the Elbe RBD this is because of modified methodologies; for lakes between the two RBMPs. For the first plan the lakes were assessed by expert judgment and for the second by monitoring of phytoplankton.

quality elements that have been used for classification. The changes go in both directions, and no obvious pattern is visible. The reason for the changes is also given in these cases. Some changes are reported to be real and some are due to changes in methodologies. For natural water bodies most of the inconsistent changes are due to monitoring changes, while for the heavily modified and artificial water bodies these are also due to changes in assessment methods.

3.3. Progress with Commission recommendations

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

- Recommendation: *“The ecological status assessment should be completed in a coherent way for all water categories and quality elements, providing a fully transparent picture on the selection of most sensitive biological quality elements for pressure/impact assessment and aligning the assessment results to the intercalibration class boundaries of the European Commission Intercalibration Commission Decision in a transparent way”*.

Assessment: Despite the progress on methodologies, there were still some gaps in implementation for some water categories (e.g. lakes) and biological quality elements (e.g. macroinvertebrates). There are examples where there has been an increase in the number of quality elements used for monitoring of ecological status/potential in surface waters in Germany (filling gaps identified in the first RBMPs) but equally there are examples where there has been a decrease indicating a deterioration of the extent of monitoring in some RBDs for some quality elements. In summary, whilst there has been some progress in some RBDs in Germany there has been deterioration in others: overall no progress made. There are still very few water bodies, often none, that are classified for macroinvertebrates in lakes, although a classification method has been developed and intercalibrated³⁷.

This recommendation is partially fulfilled.

- Recommendation: *“Check that their nutrient standards are consistent with biological requirements for the achievement of good status and set out a more coherent strategy in the second RBMPs. Due to the lack of understanding on how standards for nitrogen are set in relation to biological quality elements under the WFD, Germany agreed in*

³⁷ Germany subsequently stated that they consider that phytoplankton is the most sensitive biological quality element for the assessment of lakes, and that there is no need to use macroinvertebrate for status assessment.

the bilateral meeting with the European Commission that by the end of 2013 they would provide information on what standards are needed for nitrogen to fulfil WFD requirements. There should be clear standards for all relevant waterbody types for nitrogen and phosphorus defined in the RBMP or supporting documents”.

Assessment: Total nitrogen and total phosphorus standards were reported for coastal waters, but were not consistent with the good-moderate status boundary of the relevant sensitive biological quality elements. In rivers, nitrite and non-ionised ammonia standards were reported that were consistent with the good-moderate status boundary of the relevant sensitive biological quality elements for all 42 reported river types. Standards were not reported in all water categories though Germany subsequently stated that there are standards in the latest (2016) Ordinance and these were used for the second RBMPs. It is not known whether the standards used are related to the class boundaries for the sensitive biological quality elements.

Standards for total phosphorus have been developed for rivers and lakes. However, those for rivers are not very stringent (for example, for the 95-percentile of nutrient concentrations in good status/potential water bodies), and will not support good ecological status/potential for the sensitive biological quality elements in more than 5 % of water bodies.

This recommendation is partially fulfilled.

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

4.1. Assessment of implementation and compliance with WFD requirements in second cycle

4.1.1. Monitoring of chemical status in surface waters

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

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

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

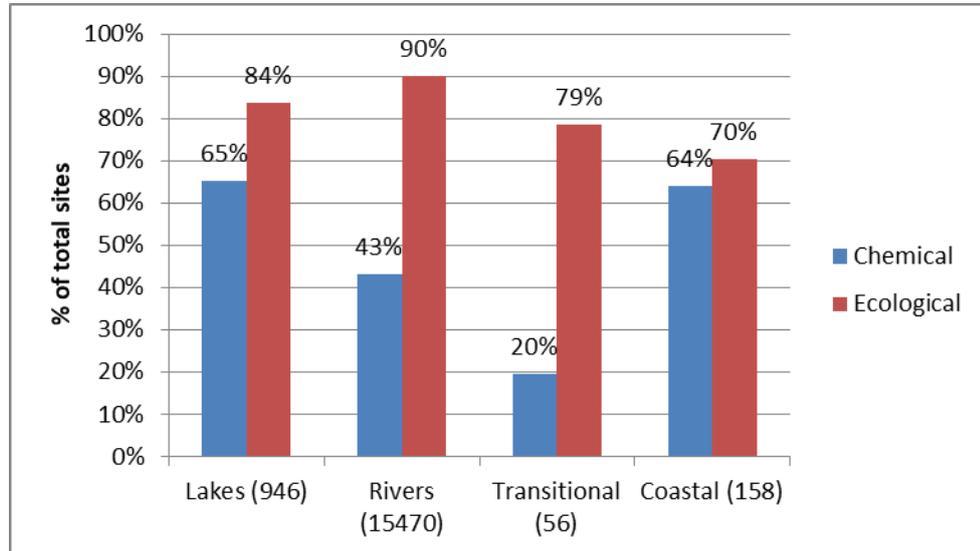
Section 3.1.1 of this report summarises the characteristics of the surveillance and operational monitoring programmes in Germany for the second RBMP.

Figure 4.1 summarises the proportion of sites used for the monitoring of chemical status in surface freshwaters for the second RBMP. In this figure, no distinction is made between sites used for surveillance and/or operational purposes. More detailed information can be found on the website of the European Environment Agency³⁸.

Territorial waters have not been monitored or assessed for chemical status. Please note that Germany subsequently clarified that they reported monitoring sites and substances only where an exceedance of environmental quality standard occurred. The number below therefore cannot be understood as describing the complete monitoring programme.

³⁸ <https://www.eea.europa.eu/publications/state-of-water>

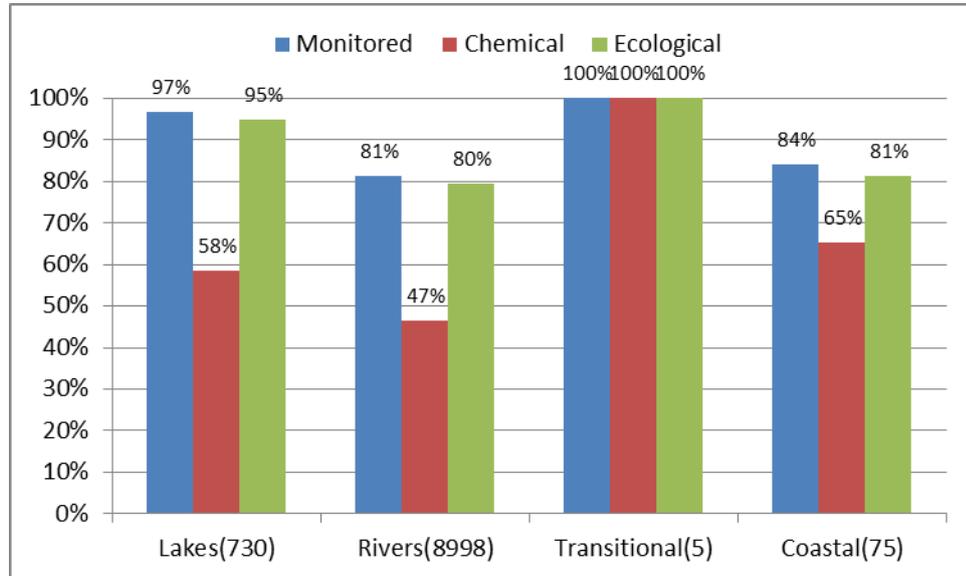
Figure 4.1 *Proportion of sites used for monitoring of chemical status and, for comparison, ecological status, in Germany. The number in parenthesis next to the category is the total number of monitoring sites irrespective of their purpose.*



Source: WISE electronic reports

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

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



Source: WISE electronic reporting

46% of water bodies failing to achieve good chemical status were reported to be monitored for operational purposes.

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

Monitoring for status assessment

Requirements

Article 8(1) of the WFD requires Member States to establish monitoring programmes in order to provide *inter alia* a coherent and comprehensive overview of water status within each RBD. The amount of monitoring undertaken in terms of priority substances, frequency and number of sites should be sufficient to obtain a reliable and robust assessment of status. According to the EQS Directive (version in force in 2009), mercury, hexachlorobenzene and hexachlorobutadiene have to be monitored in biota for status assessment, unless Member States derived a standard for another matrix, which is at least as protective as the biota standard.

Spatial coverage

Between 31 and 41 Priority Substances are reported to be monitored depending on the RBD. All of these substances are monitored in water for status assessment.

Mercury, hexachlorobenzene and hexachlorobutadiene were reported to be monitored in biota for status assessment in six RBDs, only mercury was monitored in a further three RBDs and one RBD reported no monitoring of these substances. No such monitoring was reported for transitional waters, only mercury was monitored in coastal and lake water bodies and all three substances were monitored in rivers. Overall in Germany monitoring for hexachlorobenzene and hexachlorobutadiene was reported at 65 sites and for mercury at 751 sites.

Germany subsequently clarified that only monitoring relating to Priority Substances contributing to the failure of good status has been reported³⁹ and therefore the full spatial extent of monitoring may not be reflected in data reported to WISE.

Frequencies

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

The recommended minimum frequencies for surveillance and / or operational monitoring are met at some but not all sites. Germany subsequently clarified that expert judgement has been used to decide what the appropriate frequency is. In some cases the planned frequency of 12 per year has not been achieved due to operational reasons.

According to WISE, the recommended minimum frequency for monitoring in biota was met for all three substances in five RBDs, for mercury alone in three RBDs and for none of the substances in the one remaining RBD where monitoring was undertaken. However Germany subsequently clarified that the frequency of the sediment and biota monitoring is once a year, in accordance with the requirements of German legislation⁴⁰.

³⁹ Germany clarified that according to Annex 8 of the German Surface Water Ordinance, compliance with the Environmental Quality Standard is to be monitored if there are discharges or inputs of substances in the catchment of a monitoring site representative for the surface water body.

⁴⁰ Verordnung zum Schutz der Oberflächengewässer, 20th June 2016; BGBl. I S.1373, Annex 10, paragraph 4 and Table “Überwachungsfrequenzen und Überwachungsintervalle”

Monitoring for long-term trend assessment

Requirements

Article 3(3) of the EQS Directive (version in force in 2009) requires Member States to monitor 14 priority substances⁴¹ that tend to accumulate in sediment and/or biota, for the purpose of long-term trend assessment. Monitoring should take place at least once every three years, unless technical knowledge and expert judgment justify another interval.

Spatial coverage

In Germany as a whole, each of the 14 relevant Priority Substances are monitored in sediment and/or biota, and the number of substances monitored in each RBD vary from 1 to 14. The spatial extent of monitoring is variable (between 1 and 844 sites depending on the RBD).

Frequencies

According to WISE, trend monitoring is performed at or above the recommended minimum frequency at some but not all sites. Germany subsequently clarified that expert judgement had been used to decide the appropriate frequency in accordance with the provisions of the WFD.

Monitoring of Priority Substances that are discharged in a RBD

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

Member States are therefore required to monitor all Priority Substances which are discharged into the river basin or sub-basin.⁴²

⁴¹Anthracene, brominated diphenylether, cadmium, C10-13 chloroalkanes, DEHP, fluoranthene, hexachlorobenzene, hexabutadiene, hexachlorocyclohexane, lead, mercury, pentachlorobenzene, PAH, Tributyltin.

⁴²Germany subsequently clarified that the inventory used data from the federal states for the calculation of loads; however, when measurements are below the environmental quality standard they were not reported because the target is not failed.

According to WISE, all substances discharged were monitored in 5 out of 10 RDBs (Danube, Rhine, Weser, Elbe and Warnow/Peene). In the other RDBs, most but not all substances were reported as monitored in WISE.

Germany clarified however that according to Annex 8 of the German Surface Water Ordinance, compliance with the environmental quality standard is to be monitored if there are discharges or inputs of substances in the catchment of a monitoring site representative for the surface water body.

Performance of analytical methods used

Germany reported that the relevant information on the performance of the analytical methods used could not be provided uniformly across German RDBs, due to differences in laboratories, methodologies, reference periods, etc.

Germany stated that the method of dealing with measurements of Priority Substances lower than the limit of quantification is as specified in Article 5 of the QA/QC Directive (2009/90/EC) for all RDBs.

4.1.2. Chemical Status of surface water bodies

Member States are required to report the year on which the assessment of chemical status is based. This may be the year that the surface water body was monitored. In case of grouping this may be the year in which monitoring took place in the surface water bodies within a group that are used to extrapolate results to non-monitored surface water bodies within the same group.

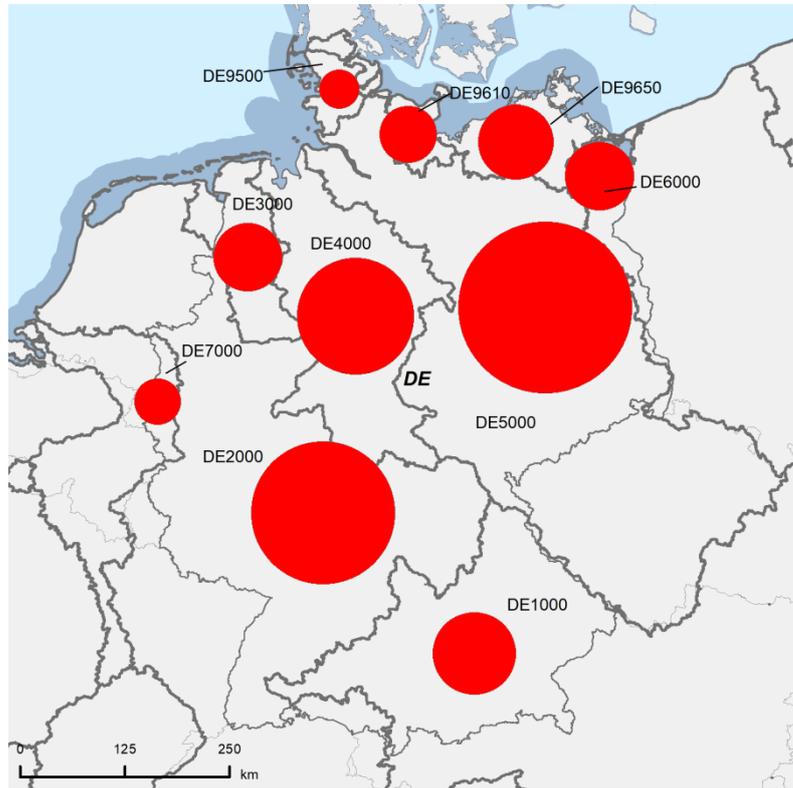
For most surface water bodies across the RDBs in Germany, the assessment of chemical status was undertaken between 2012 and 2013. The most recent assessment year was 2015 but with far fewer samples taken than in previous years.

The chemical status of surface water bodies in Germany for the second RBMP is illustrated on Map 4.1. This is based on the most recent assessment of status. All water bodies have been classified as failing to achieve good chemical status. Germany subsequently clarified that all surface waterbodies are considered as failing to achieve good chemical status due to the widespread exceedance of the environmental quality standard for mercury (widespread exceedances found in monitored water bodies are extrapolated to non monitored water bodies).⁴³

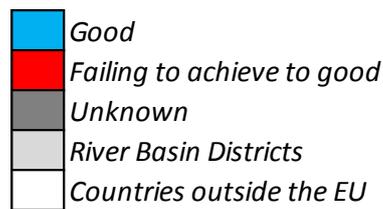
⁴³See as background information:

http://www.wasserblick.net/servlet/is/142651/WRRL_2.1.5_Textbaustein_Quecksilber_final.pdf?command=downloadContent&filename=WRRL_2.1.5_Textbaustein_Quecksilber_final.pdf.

Map 4.1 *Chemical status of surface water bodies in Germany based on the most recently assessed status of the surface water bodies Note: Standard colours based on WFD Annex V, Article 1.4.3.*



Source: WISE, Eurostat (country borders)



The chemical status of surface waters in Germany for the first and second RBMPs is given in Table 4.1.

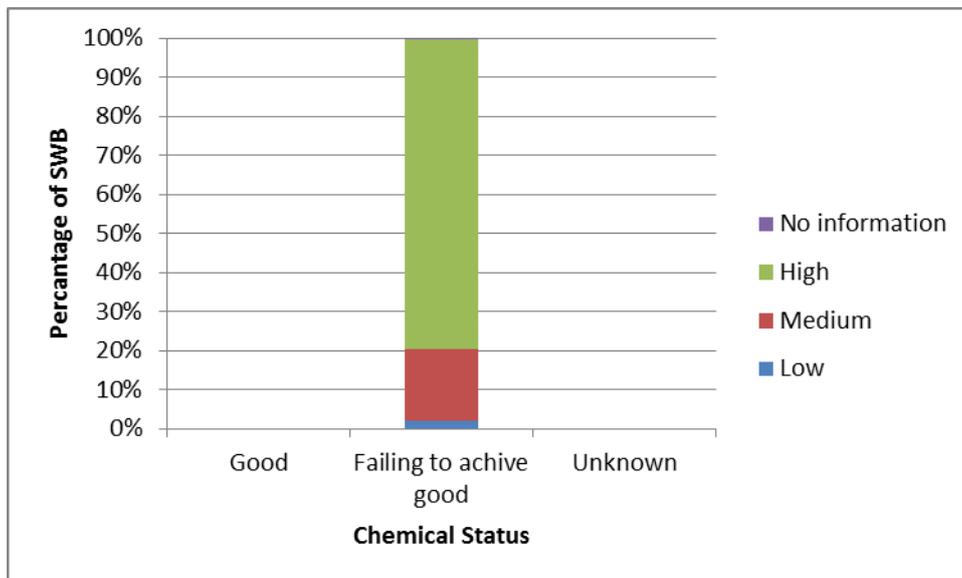
Table 4.1 *Chemical status of surface water bodies in Germany for the second and first RBMPs. Note: the number in parenthesis next to the water category is the number of water bodies. Note: Chemical status assessment is based on the revised standards laid down in the EQS Directive amended by Directive 2013/39/EU. Some Member States did not implement the Directive in the first RBMPs as the transposition deadline was in July 2010, after the adoption of the first RBMPs*

Category	Good		Failing to achieve good		Unknown	
	Number	%	Number	%	Number	%
second RBMP						
Rivers (8998)			8998	100%		
Lakes (730)			730	100%		
Transitional (5)			5	100%		
Coastal (75)			75	100%		
<i>Total (9808)</i>			9808	100%		
first RBMP						
Rivers (9069)	7968	88%	784	9%	317	3%
Lakes (712)	652	92%	23	3%	37	5%
Transitional (5)	2	40%	3	60%		
Coastal (74)	73	99%	1	1%		
<i>Total (9860)</i>	8695	88%	811	8%	354	4%

Source: WISE electronic reporting

Figure 4.3 shows the confidence in the classification of chemical status for the second RBMPs. Overall 80 % of surface water bodies in Germany were classified for chemical status with high confidence, 18 % with medium confidence and 2 % with low confidence. Confidence in the classification of chemical status for the first RBMPs was not reported.

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



Source: WISE electronic reporting

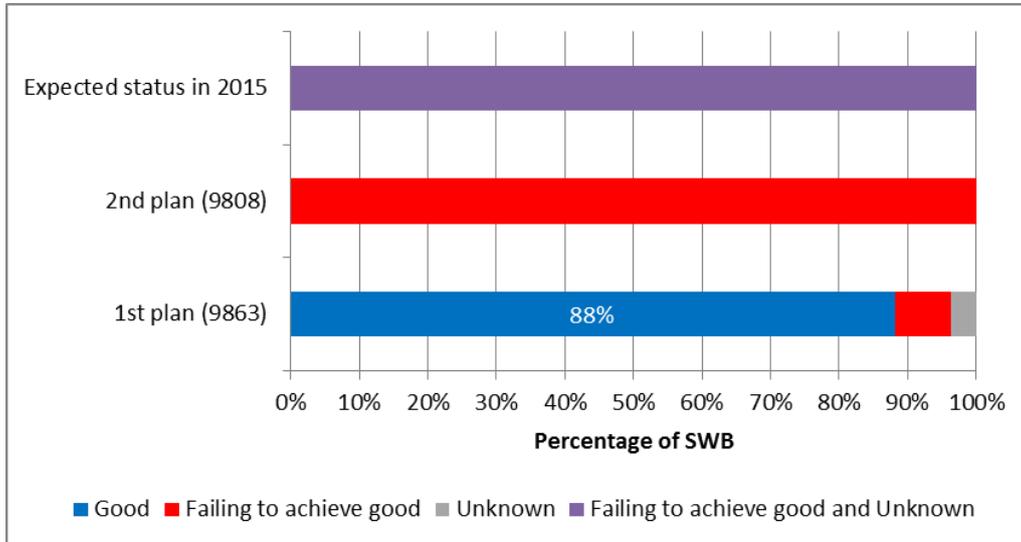
Figure 4.4 compares the chemical status of surface water bodies in Germany for the first RBMP with that for the second RBMP (based on the most recent assessment of status) and that expected by 2015. Between the two RBMPs there was a large decrease in the proportion of surface water bodies in Germany as a whole with good chemical status from 88 to 0 % and a significant increase in the proportion failing to achieve good status from 8 to 100 %. This pattern occurred across all RBDs and Natural/Heavily Modified/Artificial water body categories. Overall the chemical assessments were carried out in the period 2012-2013 in all RBDs.

The assessment of chemical status for the second RBMP was expected to be based on the standards laid down in EQS Directive (version in force on 13 January 2009⁴⁴). However Germany clarified they have used the revised, more stringent standards from Directive 2013/39/EU. Some Member States did not implement the Directive in the first RBMPs as the transposition deadline was in July 2010, after the adoption of the first RBMPs.

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

⁴⁴ Please note that following the directive 2013/39/EU, which amended the EQS Directive, introduced a less stringent annual average environmental quality standard for naphthalene in transitional waters. This less stringent environmental quality standard should be taken into account for the determination of surface water chemical status by the 2015 deadline laid down in Article 4 of the WFD.

the number of surface water bodies for both cycles. Note the period of the assessment of status for the second plan was 2012 to 2013. The year of the assessment of status for first plan is not known



Source: WISE electronic reporting

Directive 2013/39/EU amended the EQS Directive. In particular, it sets more stringent environmental quality standards for seven substances⁴⁵. Member States were asked to report whether the new standards caused the status of the surface water body to appear to deteriorate. This was the case for 11 % of surface water bodies for benzo(a)pyrene, and for 5 and 4 % of surface water bodies respectively for fluoranthene and Total benzo(g,h,i)-perylene + indeno(1,2,3-cd)-pyrene.

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

Member States were asked to report the expected date for the achievement of good chemical status. However, no information was reported by Germany. Germany clarified that their difficulties in assessing the date of achievement of good status was linked to the presence of the ubiquitous substance mercury in all water bodies.

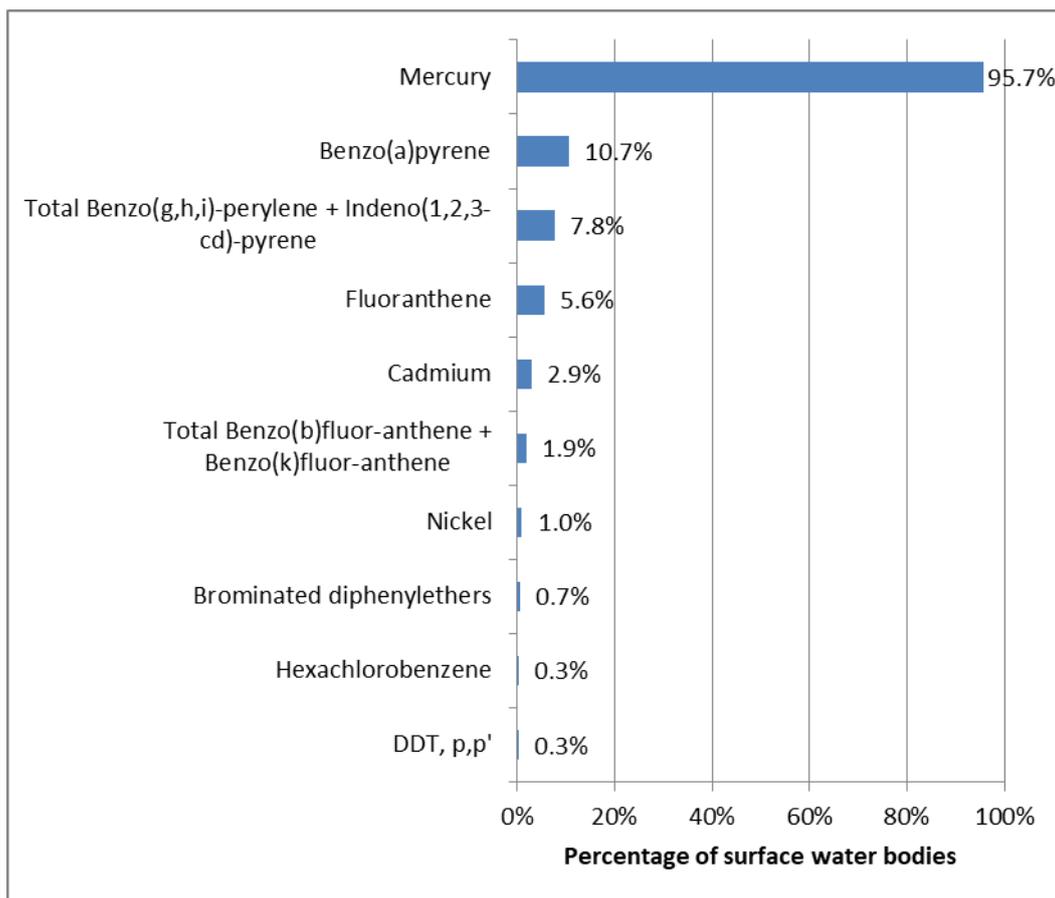
⁴⁵ Anthracene, Brominated diphenylether, Fluoranthene, Lead and its compounds, Naphthalene, Nickel and its compounds, Polyaromatic hydrocarbons (PAH)

Priority Substances causing the failure of good chemical status

Member States were expected to report exceedances for individual substances on the basis of the revised, more stringent standards from directive 2013/39/EU.

The substance causing the greatest proportion of water bodies in Germany to fail good chemical status was mercury (95.7 %) ⁴⁶. The “top-ten” Priority Substances are shown in Figure 4.5.

Figure 4.5 *The top-ten Priority Substances causing failure to achieve good chemical status in surface water bodies in Germany*



Source: WISE electronic reporting

Germany however subsequently clarified that according to their calculations, the top ten substances include : mercury, benzo(a)pyrene, Total Benzo(g,h,i)-perylene (CAS_191-24-2) + Indeno(1,2,3-cd)-pyrene (CAS_193-39-5), fluoranthene, cadmium, tributyltin-cation, Total

⁴⁶ Germany subsequently clarified that mercury causes 100% of water body failures due to the extrapolation of results from water bodies where mercury was monitored in biota.

Benzo(b)fluor-anthene (CAS_205-99-2) + Benzo(k)fluor-anthene (CAS_207-08-9), nickel, inated diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154) and isoproturon⁴⁷.

Overall for surface water bodies in Germany, the largest proportion of exceedances were for the annual-average environmental quality standards for mercury (40%) and benzo(a)pyrene (7%). Exceedances of the maximum allowable concentration environmental quality standards were largest for mercury (21 %). In terms of exceedance of both types of standard, the largest proportion was also mercury (11 %).

Ubiquitous persistent, bioaccumulative and toxic Priority Substances

According to article 8(a) of the EQS Directive⁴⁸, eight priority substances and groups of priority substances are behaving like ubiquitous, persistent, bioaccumulative and toxic substances⁴⁹. These substances are generally expected to cause widespread exceedances, and their emissions can be challenging to tackle (e.g. due to long-range atmospheric transport and deposition). In order to show the progress made in tackling other priority substances, Member States have the possibility to present the information related to chemical status separately for these substances.

All water bodies are failing to achieve good chemical status when all priority substances are considered in the assessment of status, but only slightly less than 10 % are still failing to when the ubiquitous, persistent, bioaccumulative and toxic priority substances are omitted. This shows the very large influence of these substances. This is illustrated in the 2018 State of Water report of the European Environment Agency⁵⁰.

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

In all RBDs in Germany, all substances are taken into account in the assessment of status. Depending on the RBD, between 31 and 41 substances are reported as monitored.

The status of surface water bodies not monitored for chemical status has been derived or extrapolated from monitoring available for comparable water bodies (grouping). 25-80 % of surface water bodies are reported not to be monitored across the 10 RBDs.

⁴⁷ The percentages of water bodies failing are the same as in the graph above for the substances already appearing in the graph. The percentages of water bodies failing because of tributyltin cation is 1.9% and isoproturon 0.6%.

⁴⁸ Amended by Directive 2013/39/EU

⁴⁹ Brominated diphenylether, Mercury and its compounds, Polyaromatic hydrocarbons (PAH), Tributyltin, PFOS, dioxins, hexabromocyclodecane and heptachlor

⁵⁰ <https://www.eea.europa.eu/publications/state-of-water> (p40-41 of the report). Also available in a more interactive format at :

https://tableau.discomap.eea.europa.eu/t/Wateronline/views/WISE_SOW_SWB_Chemical_Status_Maps/SWB_Failing_Good_Chemical_Status_RBD?iframeSizedToWindow=true&:embed=y&:showAppBanner=false&:display_count=no&:showVizHome=no

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

Germany reported that 34 of the 41 environmental quality standards laid down in Part A of Annex I of the Directive 2008/105/EC for assessment of the chemical status of bodies of surface water had been applied and used in the assessment of chemical status. For seven substances, namely anthracene, fluoranthene, benzo(a)pyrene, lead and its compounds, nickel and its compounds, naphthalene and brominated diphenylethers (congener numbers 28, 47, 99, 100, 153 and 154) the revised standards from Directive 2013/39/EU were applied.

Use of mixing zones

Article 4 of the EQS Directive¹³ provides Member States with the option of designating mixing zones adjacent to points of discharge in surface waters. Concentrations of priority substances may exceed the relevant environmental quality standard within such mixing zones if they do not affect the compliance of the rest of the surface water body with those standards. Member States that designate mixing zones are required to include within their RBMPs a description of the approaches and methodologies applied to define such zones, and a description of the measures taken to reduce the extent of the mixing zones in the future.

Mixing zones have not been designated under Article 4 of the EQS Directive for any of the 10 RBDs in Germany.

Background Concentrations and Bioavailability

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

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

Natural background concentrations for metals and their compounds are taken into consideration where such concentrations prevent compliance with the relevant environmental quality standards only in three RBDs (Weser, Elbe and Odra). No background concentrations were taken into account for the remaining 7 RBDs in Germany.

The bioavailability of metals has been taken into account when assessing compliance with the standards in eight of the 10 RBDs. No information was reported for the Eider and Schlei/Trave RBDs. Germany subsequently clarified that the bioavailability was not taken into account in

these RBDs because there was no exceedance of the environmental quality standards for any metal.

4.2. Main changes in implementation and compliance since first cycle

In comparing the number of sites and water bodies monitored for operational and surveillance purposes for chemical monitoring between the first and second RBMPs, there appears to be a net increase (from the first to second cycle) in monitoring sites and surface water bodies monitored for operational purposes (an increase of 5038 sites and 3270 water bodies) both due to a relatively large increase in river monitoring. For surveillance monitoring the number of sites has increased by 195 and the number of water bodies has increased by 57 since the first cycle. Germany subsequently clarified that the spatial extent and the frequency of monitoring is determined by expert judgement in the light of the widespread exceedance of the mercury environmental quality standard.

Overall between the two RBMPs, there was a significant decrease in the proportion of surface water bodies with good chemical status from 88 % to 0 % and a significant increase in the proportion failing to achieve good status from 8 % to 100 %. This pattern occurred across all RBDs and Natural/Heavily Modified/Artificial water body categories. The principal reason for this is that all monitoring samples showed levels of mercury that do not meet the relevant environmental quality standard and therefore the assessment 'failing to achieve good' has been extrapolated to all surface water bodies. In the second RBMPs, Germany also used the more stringent standards introduced in the revised EQS Directive.

Information on Priority Substances causing failure of good chemical status for the first cycle was not systematically reported contributing to the difficulties in making a comparison with the second cycle. However, some aggregated information was collated and indicated that in the first RBMP heavy metals as a whole were responsible for 2.51 % of surface water bodies that fail to achieve good status for Germany as a whole. The influence of mercury on the chemical status of surface waters has been established as a result of monitoring reported in the second RBMP.

Overall in Germany, 15 Priority Substances were reported to have caused the improvement of water bodies from failing to achieve good status in the previous cycle, to be at good chemical status since the first RBMP. For example, improvements were reported for DDT, p,p' (1.4 % of surface water bodies), cadmium (1.4 %), Total DDT (DDT, p,p' + DDT, o,p' + DDE, p,p' + DDD, p,p') (1.4%) and tributyltin-cation (1%). The improvements predominantly occurred in river water bodies.

4.3. Progress with Commission recommendations

- Recommendation: *The frequency of chemical monitoring should be harmonised across the "Länder"/RBMPs" according to the requirements of the WFD. Different frequencies of chemical monitoring were applied in the first cycle.*

Assessment

In Germany as a whole, each of the 41 Priority Substances monitored in water for status assessment is monitored 12 times per year or more and in every year in the cycle at some monitoring sites; this meets the recommended minimum frequencies for operational and surveillance monitoring. At the remainder of the sites, these frequencies are not achieved. Germany subsequently clarified that expert judgement has been used to decide the appropriate frequency in order to explain and act on exceedances in accordance with the provisions of the WFD. In some cases the planned frequency of 12 per year has not been achieved due to operational reasons. Monitoring of biota for status assessment is undertaken every year in Germany as a whole. Germany subsequently clarified that the frequency of the sediment and biota monitoring (once a year) is in accordance with the requirements of German legislation

For the purpose of long-term trend assessment in sediment and/or biota, monitoring should take place at least once every three years, unless technical knowledge and expert judgment justify another interval. Monitoring of biota for trend assessment is undertaken every three years in Germany as a whole. Germany subsequently clarified that expert judgement has been used to decide the appropriate frequency in accordance with the provisions of the WFD.

With regard to the frequency of monitoring for status assessment and long-term trend analysis, Germany reports a range of frequencies. For the majority of Priority Substances and at the majority of sampling sites, the reported frequencies meet the recommended minimum frequencies in the relevant Directives. Where the frequencies are lower, Germany has clarified that expert judgement has been used to determine the appropriate frequency in accordance with national legislation.

With the information available it was not possible to assess whether the recommendation was fulfilled (no assessment has been possible of the basis for the expert judgment).

- Recommendation: *Mercury, hexachlorobenzene and hexachlorobutadiene are not the only priority substances for which monitoring in a non-water matrix (biota in these three instances) is appropriate. The requirement for trend monitoring in sediment or biota as specified for several substances in Directive 2008/105/EC Article 3(3) will also need to be reflected in the next RBMP.*

Assessment: Mercury, hexachlorobenzene and hexachlorobutadiene were reported to be monitored in biota for status assessment in some but not all RBDs, and in some but not all water categories. However Germany mentioned that they reported only priority substances exceeding their standards, and not all priority substances monitored so no conclusion can be made on the basis of the information reported. Germany clarified that monitoring was performed at the recommended minimum frequency.

According to WISE, the number of substances monitored in sediment and/ or biota for trend assessment varied between 1 and 14 depending on the RBD. Trend monitoring is performed at or above the recommended minimum frequency at some but not all sites. Germany subsequently clarified that expert judgement had been used to decide the appropriate frequency in accordance with the provisions of the WFD.

This recommendation is only partially fulfilled (in particular because not all relevant substances are monitored for trend assessment in all RBDs).

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

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

5.1.1. Monitoring of quantitative status in groundwater

The total number of groundwater bodies in Germany is 1177 (Table 2.3). 151 groundwater bodies are not subject to monitoring for quantitative status (Table 5.1). This means that 13 % of groundwater bodies are not monitored. Assessment of the RBMPs and background documents found that some but not all RBDs reported that grouping was applied.

The number of groundwater bodies increased by 19 % from 989 in the first RBMP to 1177 in the second RBMP but the total groundwater body area remained nearly the same. 913 groundwater bodies remained unchanged since the first RBMP.

The number of monitored groundwater bodies increased from 881 in the first RBMP to 1026 in the second RBMP. The number of monitoring sites for quantitative status is listed in Table 5.3.

Table 5.1 Number of water bodies in Germany directly monitored and the purpose of monitoring

RBD	Total groundwater bodies directly monitored	Monitoring Purpose												
		AGR - Ground water abstraction site for irrigation	CHE – Chemical status	DRI – Ground -water abstraction site for human consumption	DWD - Drinking water - WFD Annex IV.1.i	IND – Ground water abstraction site for industrial supply	INT – International network of other international convention	NID - Nutrient sensitive area under the Nitrates Directive - WFD Annex IV.1.iv	OPE – Operational monitoring	QUA - Quantitative status	REF - Reference network monitoring site	SOE - EIONET State of Environment monitoring	SUR – Surveillance monitoring	TRE - Chemical trend assessment
DE1000	162	0	154	115	84	7	67	6	54	143	0	6	152	146
DE2000	433	10	425	51	77	16	30	81	254	372	0	77	369	153
DE3000	38	0	38	0	0	0	0	0	26	34	0	9	38	24
DE4000	139	0	139	0	7	0	0	53	79	130	0	30	106	123
DE5000	224	0	224	0	20	0	2	5	132	221	22	54	197	185
DE6000	24	0	22	0	4	0	0	0	10	24	0	8	20	10
DE7000	29	0	27	0	0	0	0	0	23	29	0	13	27	0
DE9500	18	0	18	0	0	0	0	0	10	18	16	6	18	18
DE9610	19	0	16	0	0	0	0	0	6	19	17	6	16	16
DE9650	36	0	35	0	0	0	0	0	31	36	0	0	32	36

Source: WISE electronic reporting.

Table 5.2 *Proportion of groundwater bodies in Germany monitored for quantitative status*

European Union RBD Code	No of groundwater bodies with quantitative monitoring	Total No. groundwater bodies	% of total groundwater bodies monitored for quantitative status
DE1000	143	170	84.12%
DE2000	372	457	81.4%
DE3000	34	40	85%
DE4000	130	144	90.28%
DE5000	221	228	96.93%
DE6000	24	25	96%
DE7000	29	32	90.63%
DE9500	18	23	78.26%
DE9610	19	19	100%
DE9650	36	39	92.31%

Source: WISE electronic reporting

Table 5.3 Number of groundwater monitoring sites in Germany and their purpose

RBD	Total groundwater bodies directly monitored	Monitoring Purpose												
		AGR - Ground water abstraction site for irrigation	CHE – Chemical status	DRI – Ground -water abstraction site for human consumption	DWD - Drinking water - WFD Annex IV.1.i	IND – Ground water abstraction site for industrial supply	INT – International network of other international convention	NID - Nutrient sensitive area under the Nitrates Directive - WFD Annex IV.1.iv	OPE – Operational monitoring	QUA - Quantitative status	REF - Reference network monitoring site	SOE - EIONET State of Environment monitoring	SUR – Surveillance monitoring	TRE - Chemical trend assessment
DE1000	719	0	434	221	142	7	84	15	143	316	0	28	367	367
DE2000	3,007	12	2,026	109	181	19	38	297	1,273	1,381	0	156	1,304	579
DE3000	712	0	445	0	0	0	0	0	377	482	0	18	369	250
DE4000	1,624	0	1,255	0	9	0	0	173	758	959	0	38	1,119	1,197
DE5000	5,269	0	2,310	0	34	0	2	5	1,414	3,927	199	117	1,429	1,867
DE6000	896	0	223	0	8	0	0	0	109	847	0	14	165	94
DE7000	443	0	228	0	0	0	0	0	206	236	0	19	124	0
DE9500	244	0	84	0	0	0	0	0	61	212	42	15	84	84
DE9610	477	0	80	0	0	0	0	0	27	451	82	8	79	93
DE9650	338	0	149	0	0	0	0	0	72	317	0	0	266	338

Source: WISE electronic reporting

5.1.2. Assessment and classification of quantitative status for groundwater

Map 5.1 displays the most recently assessed quantitative status of groundwater bodies. It shows that 1126 of 1177 groundwater bodies (96 %) were in good quantitative status and 51 (4 %) were failing good status (Figure 5.1). In terms of area this means that about 3.5 % were failing good quantitative status. Figure 5.2 shows that, with the exception of three groundwater bodies, there is high confidence in status classification. All groundwater bodies had and still have a known status, in the first and in the second RBMP. The total number of groundwater bodies failing good quantitative status increased significantly from 38 groundwater bodies in the first RBMP to 51 in the second RBMP (from 2.7 % to 3.5 % of the total groundwater body area).

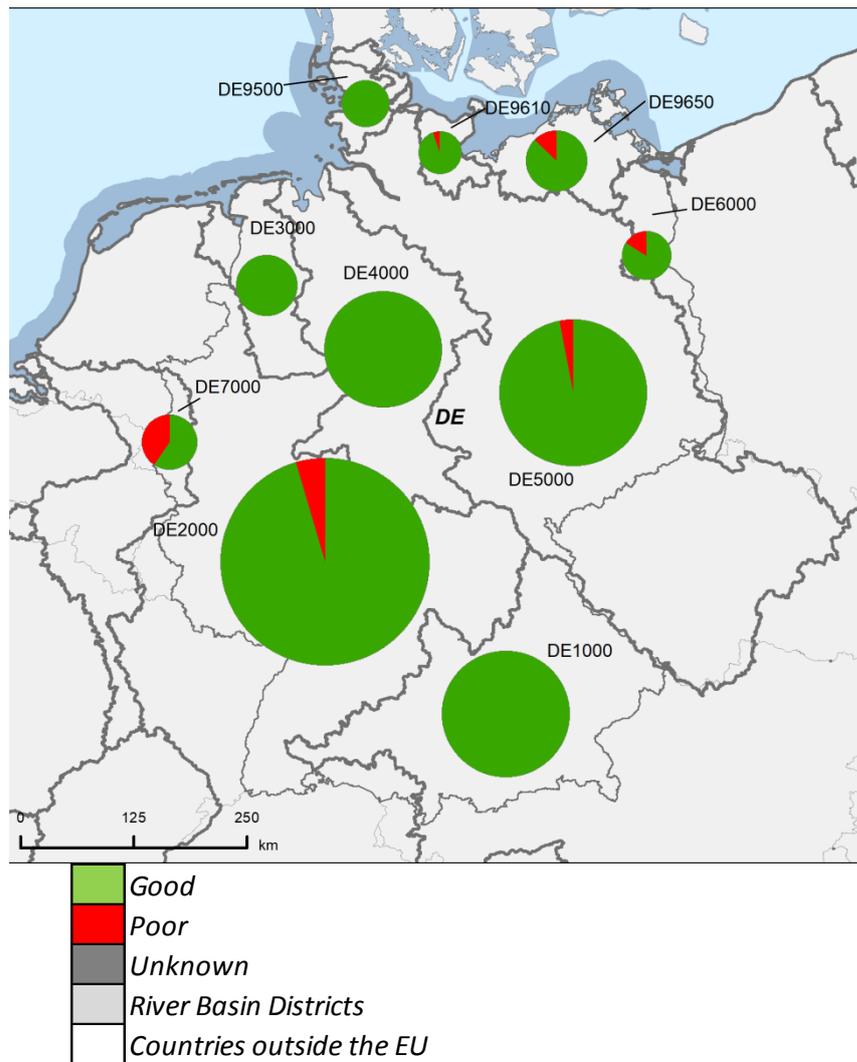
In all 10 RBDs water balance was assessed by using reliable information on groundwater levels across the groundwater body.

The reasons for the failure of good quantitative status of groundwater bodies are shown in Figure 5.3. 35 groundwater bodies are failing good status due to the water balance test which means that the long-term annual average rate of groundwater abstraction is exceeding the available groundwater resource, 33 groundwater bodies are failing due to damage to groundwater dependent terrestrial ecosystems, 25 groundwater bodies are failing due to deterioration of the status of groundwater associated aquatic ecosystems, and seven groundwater bodies are failing due to saline intrusion. The expected date of achievement of good quantitative status in Germany is shown in Figure 5.4.

In all RBDs, the criterion of 'available groundwater resource' has been fully applied in accordance with WFD Article 2(27). In all RBDs all environmental objectives have been considered in status assessment.

In total, 94 groundwater bodies are at risk of failing good quantitative status. 80 groundwater bodies are at risk of failing good quantitative status due to failing the water balance test, 47 due to damage to groundwater dependent terrestrial ecosystems, four due to deterioration of the status of groundwater associated aquatic ecosystems and six due to saline intrusion.

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



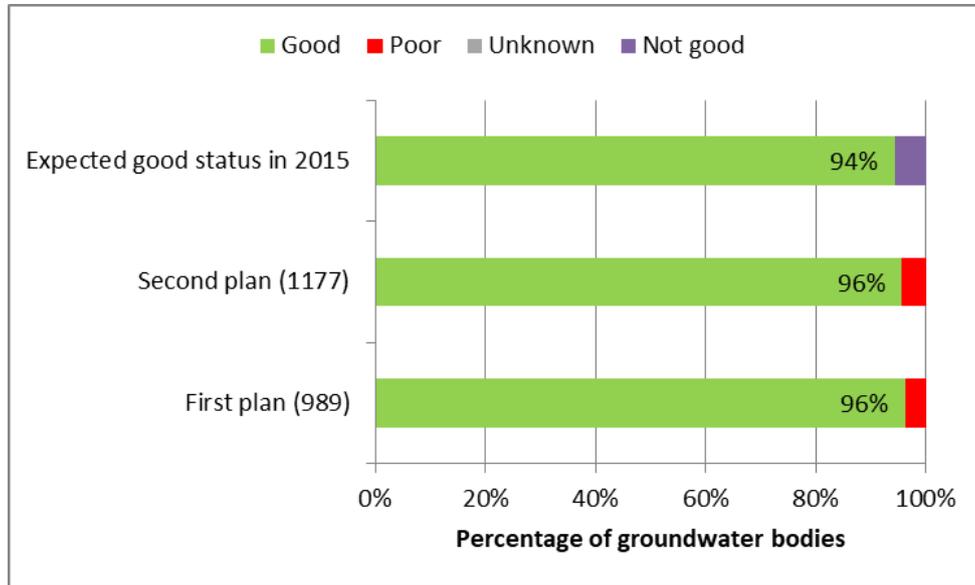
*Note: Standard colours based on WFD Annex V, Article 2.2.4.
Source: WISE, Eurostat (country borders)*

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

Groundwater associated surface waters were not reported as indicated by Annex 0, but have been considered in status assessment in all RBDs. For four groundwater bodies (in two RBDs), diminution of the status of associated surface waters is causing risk of failure.

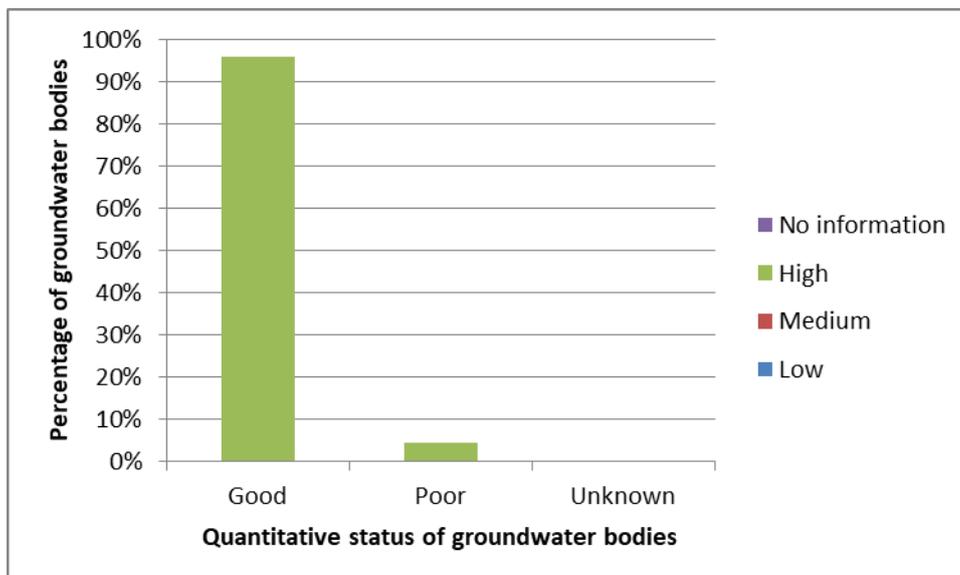
The vast majority of groundwater bodies are linked with groundwater dependent terrestrial ecosystems. Groundwater dependent terrestrial ecosystems have been considered in status assessment in all RBDs. For 47 groundwater bodies, damage to groundwater dependent terrestrial ecosystems is causing risk of failure. The needs of terrestrial ecosystems have been considered in status assessment in all RBDs.

Figure 5.1 *Quantitative status of groundwater bodies in Germany for the second RBMP, for the first RBMP and expected in 2015. The number in parenthesis is the number of groundwater bodies for each cycle. NB - the period of the assessment of status for the second plan was 2008 to 2015. The year of the assessment of status for the first plan is not known*



Source: WISE electronic reports

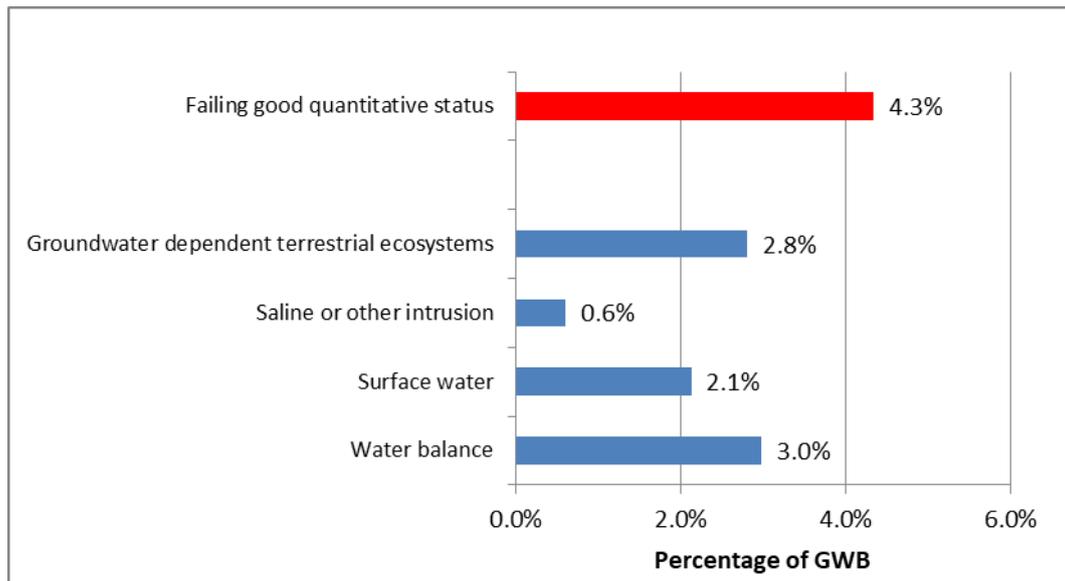
Figure 5.2 *Confidence in the classification of quantitative status of groundwater bodies in Germany based on the most recent assessment of status*



Source: WISE electronic reporting

5.3

Reasons for the failure of good quantitative status of groundwater in Germany based on the most recent assessment of status



Source: WISE electronic reporting

Notes:

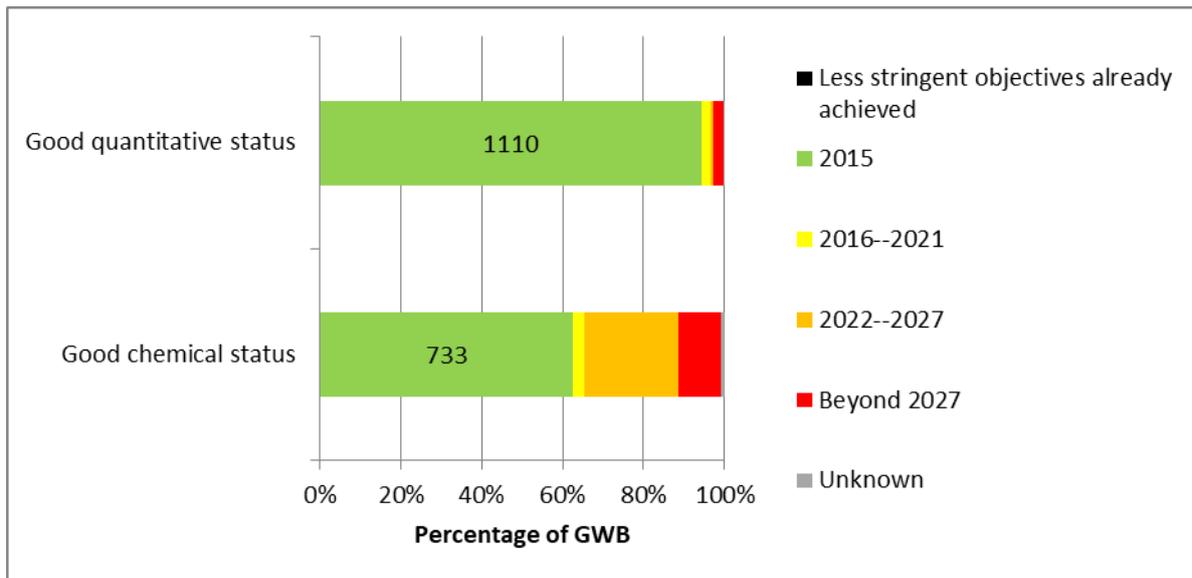
‘Water balance’ = long-term annual average rate of abstraction exceeds the available groundwater resource which may result in a decrease of groundwater levels.

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

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

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

Figure 5.4 *Expected date of achievement of good quantitative and good chemical status of groundwater bodies in Germany.*



Source: WISE electronic reporting

5.2. Main changes in implementation and compliance since the first cycle

The number of groundwater bodies increased by 19 %, but the total groundwater body area remained nearly the same. 913 of 1177 groundwater bodies remained unchanged since the first RBMP. Examination of the RBMPs identified that all the RBMPs assessed included a summary of changes or updates. For example:

- In the Oder RBD, the delineation has been adjusted and two groundwater bodies have been split. A new LAWA⁵¹ method for assessing the qualitative status has been developed in 2011, but it remains unclear if it has been applied.
- In the Weser RBD, the number of groundwater bodies has not changed, but the delineation has been adjusted. All steps of the Common Implementation Strategy Guidance 18 are now considered in the improved methodology. The assessment of the relation between groundwater and surface water needs further development of the methodologies.

The status changes show that the total number of groundwater bodies failing good quantitative status increased significantly by 34 % from 38 groundwater bodies in the first RBMP to 51 in the second RBMP (from 2.7 % to 3.5 % of the total groundwater body area). Examination of the RBMPs identified that the main reasons for changes in

⁵¹ The LAWA is the German Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry. www.lawa.de/index.php?a=2

quantitative status are: modified (stricter) status assessment methodology, implementation of effective measures, changes in the monitoring network and subsequent better data.

5.3. Progress with Commission recommendations

Recommendation: In groundwater bodies shared by different Länder, coordinated methodologies and measures should be applied. The way national guidance is used should be explained in the different RBMPs.

Assessment: The assessment did not allow for conclusions to be drawn relating to harmonisation. Germany subsequently clarified that status assessment and classification of quantitative status was based on agreed and harmonised recommendations by LAWA.

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

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

6.1.1. Monitoring of chemical status in groundwater

The total number of groundwater bodies in Germany is 1177 (Table 2.3). Monitoring of chemical status is required by the German groundwater ordinance (Grundwasserverordnung, 2010⁵²): In total 202 (17 %) groundwater bodies are not subject to surveillance monitoring (Table 5.1)⁵³. About 46 % of the groundwater bodies in Germany are at risk and according to the data submitted to WISE, in the Danube and Odra RBDs⁵⁴ not all groundwater bodies at risk are subject to operational monitoring. The assessment of selected RBMPs and background documents found indications in some RBMPs that expert judgement or grouping of groundwater bodies for monitoring and assessment of chemical status was applied. In the Odra and Weser RBDs, no information is provided on whether grouping is applied. In the Weser RBD (North Rhine-Westphalia) grouping is mentioned, but no details are provided.

The number of groundwater bodies increased by 19 % from 989 in the first RBMP to 1177 in the second RBMP but the total groundwater body area remained nearly the same. 913 groundwater bodies remained unchanged since the first RBMP. The change happened only in 4 of 10 RBDs, with the largest increase in the Danube (from 46 to 176 groundwater bodies) and Rhine RBDs.

The number of groundwater bodies with surveillance monitoring increased from 919 in the first RBMP to 975 (83 %) in the second RBMP; considering the total number of groundwater bodies at each planning cycle, the monitoring coverage decreased from 93 % to 83 % of the total groundwater bodies. The number of monitoring sites is listed in Table 5.3 and shows a decrease from 5472 in the first RBMP to 5306 in the second RBMP. The number of operational monitoring sites has been increased since the first RBMP, from 3868 to 4440 (in 625 groundwater bodies).

⁵² https://www.gesetze-im-internet.de/grwv_2010/GrwV.pdf

⁵³ Germany clarified that grouping is applied in those cases. For example, there are remote groundwater bodies on the islands in the North Sea where no chemical monitoring is taking place. Those groundwater bodies (ST08, O1 und O2) were assessed together with hydro-geologically similar groundwater bodies on the mainland where monitoring is carried out.

⁵⁴ Germany clarified that there are several reasons for this: expert judgement necessary because of missing operational monitoring sites, (meanwhile installed) or grouping of groundwater bodies at risk because of forbidden pesticides.

According to their Annex 0, Germany could not report substances causing risk to WISE in the desired format. All WFD⁵⁵ core parameters - nitrate, ammonium, electrical conductivity, oxygen and pH - are monitored in all RBDs

6.1.2. Assessment and classification of chemical status in groundwater

Map 6.1 and Figure 6.1 display the chemical status of groundwater bodies for the most recently assessed status. It shows that 750 of 1177 groundwater bodies (64 %) were of good chemical status, 424 groundwater bodies (36 %) are failing to meet good status and for the remaining three groundwater bodies the status is unknown. In terms of area, this means that about 38 % are failing good chemical status. Figure 6.2 shows the confidence in status classifications which is mainly high and medium. The number of groundwater bodies in unknown status increased from two in the first to three in the second RBMP.

The total number of groundwater bodies failing good chemical status increased since the first RBMP from 367 to 424 groundwater bodies, but in terms of percentage of the total number of groundwater bodies in each cycle, it decreased from 37% to 36% (see Figure 6.1). In terms of groundwater body area failing good status, there was a slight increase from 36.6% to 37.5% of the total groundwater body area. The expected date of achievement of good chemical status in Germany is shown in Figure 5.4.

The reasons for the failure of good chemical status of groundwater bodies are shown in Figure 6.3. For 393 groundwater bodies the general assessment of the chemical status for the groundwater body as a whole failed⁵⁶. This assessment considers the significant environmental risk from pollutants across a groundwater body and a significant impairment of the ability to support human uses. 75 groundwater bodies are failing the drinking water test which means that the requirements of Drinking Water Protected Areas have not been met. 27 groundwater bodies are failing the groundwater associated surface water test which means that there is diminution of the status of groundwater associated surface water. 37 groundwater bodies are failing the groundwater dependent terrestrial ecosystem test which means that there is damage to groundwater dependent terrestrial ecosystems and 7 groundwater bodies are failing good chemical status due to saline or other intrusions. Figure 6.4 shows the top 10 pollutants causing failure of status and the top 10 causing a sustained upward trend.

⁵⁵ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

⁵⁶ Germany subsequently clarified that there could be a reporting error for those groundwater bodies failing the general quality assessment.

In all RBDs, the calculation of the extent of exceedance of a groundwater quality standard or a groundwater threshold value is based on the groundwater body area.

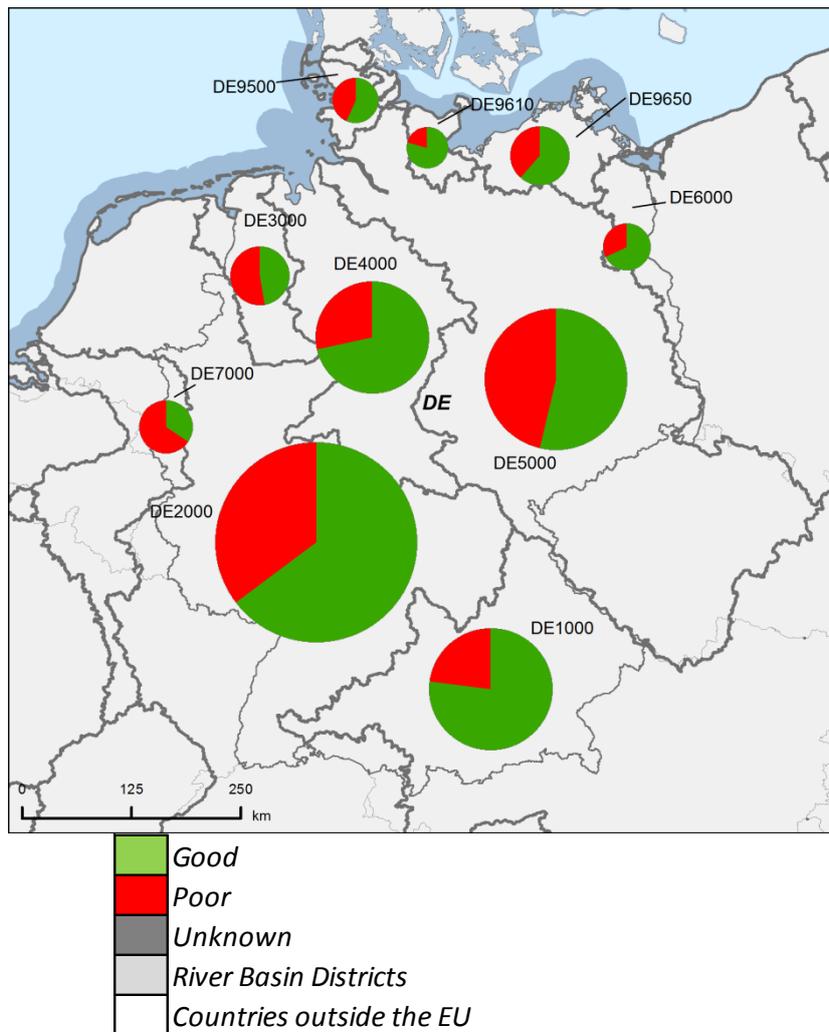
In three RBDs, groundwater threshold values have not been established for all pollutants or indicators of pollution causing a risk of failure of good chemical status.

It is mentioned in the RBMPs that only some Groundwater Directive⁵⁷ Annex II substances were considered. One could also notice differences between the RBMPs assessed. In all RBDs, natural background levels have been considered in the groundwater threshold value establishment.

A trend and trend reversal methodology is available and assessments have been performed in all RBDs.

⁵⁷ Groundwater Directive (GWD): Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration.

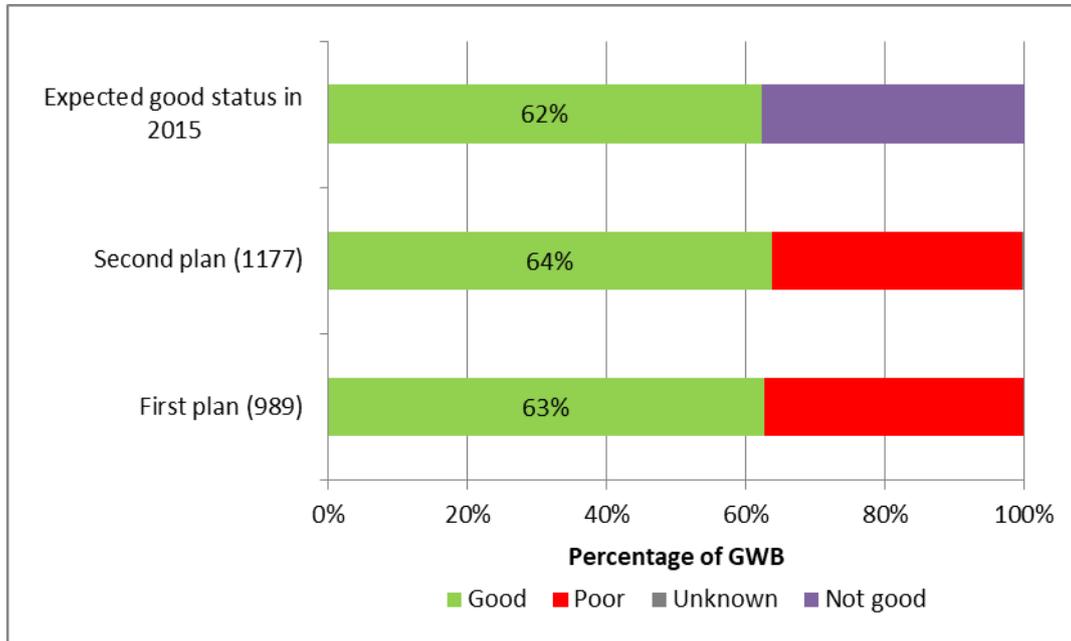
Map 6.1 *Map of chemical status of groundwater bodies in Germany based on the most recently assessed status of the groundwater water bodies*



Note: Standard colours based on WFD Annex V, Article 2.4.5.

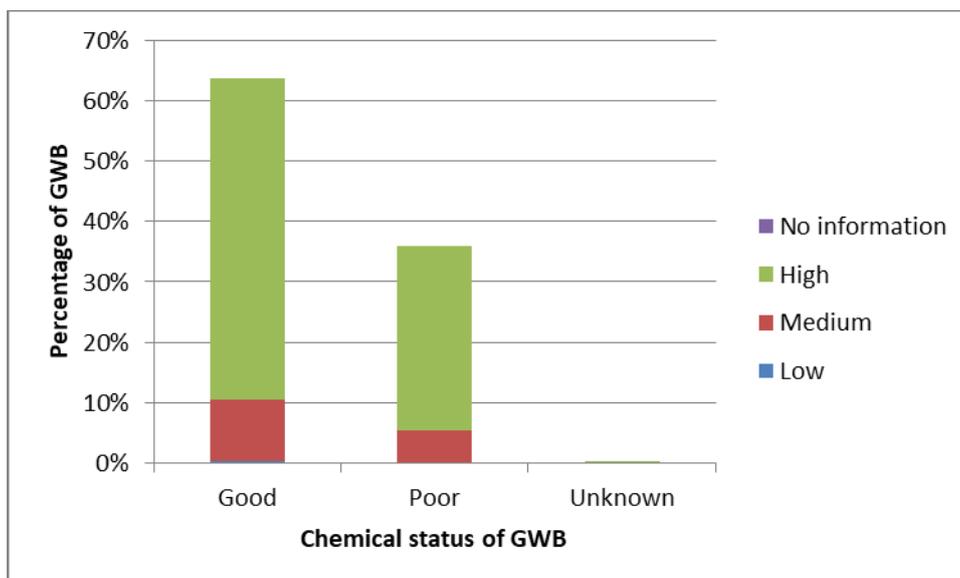
Source: WISE, Eurostat (country borders)

Figure 6.1 *Chemical status of groundwater bodies in Germany for the second RBMPs, for the first RBMPs and expected in 2015. The number in the parenthesis is the number of groundwater bodies for both cycles. Note the period of the assessment of status for the second plan was 2008 to 2015. The year of the assessment of status for the first RBMPs is not known*



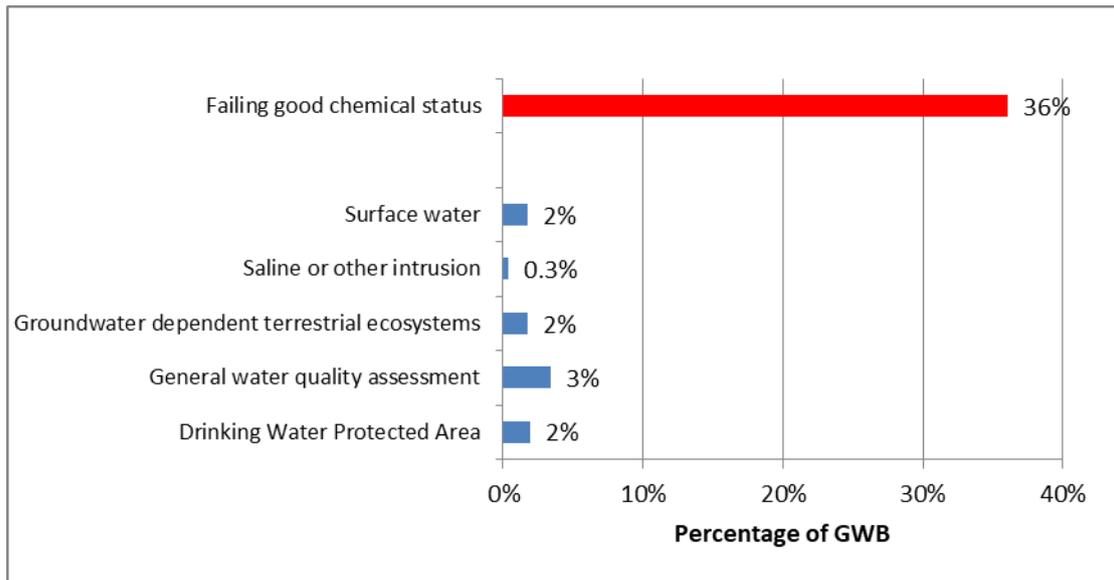
Source: WISE electronic reports

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



Source: WISE electronic reports

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



Source: WISE electronic reports

Notes:

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

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

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

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

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

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

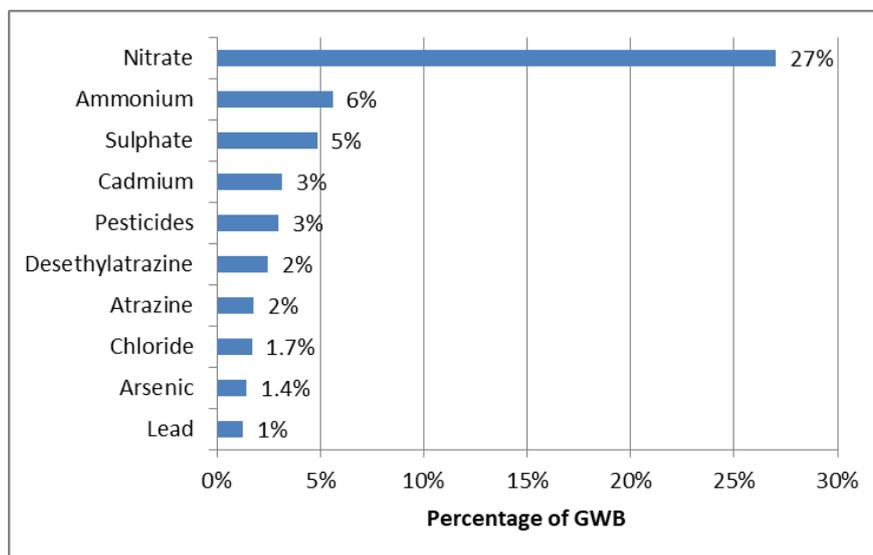
Groundwater associated surface waters were not reported as indicated by Annex 0. 21 groundwater bodies in two RBDs are failing good chemical status due to groundwater associated surface waters and they have been considered in status assessment in all RBDs.

The vast majority of groundwater bodies are linked with groundwater dependent terrestrial ecosystems except in the Warnow/Peene RBDs where no groundwater body is linked to a

terrestrial ecosystem⁵⁸. 21 groundwater bodies in two RBDs are failing good chemical status due to terrestrial ecosystems and they have been considered in status assessment in all RBDs.

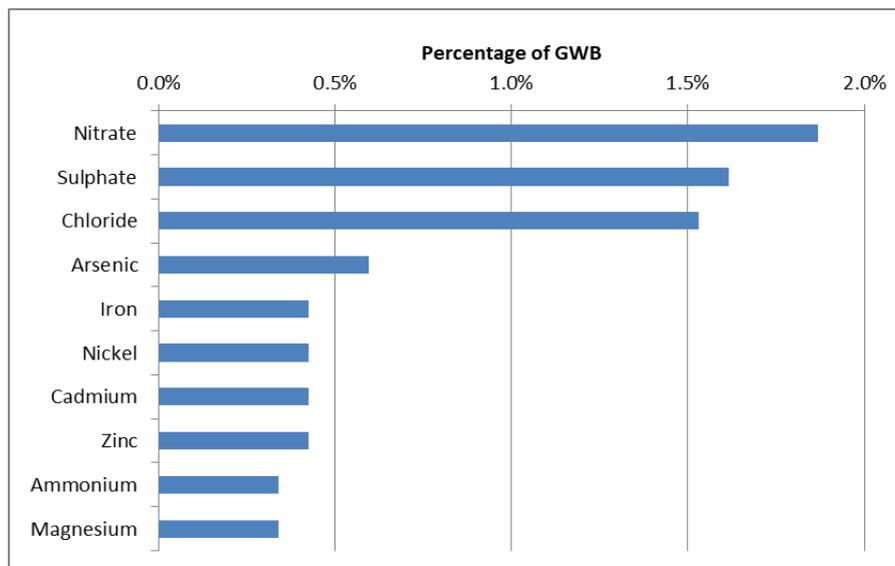
In all RBDs, groundwater dependent terrestrial ecosystems and groundwater associated aquatic ecosystems have been considered in the establishment of groundwater threshold values.

Figure 6.4 *Top ten groundwater pollutants causing failure of good chemical status in Germany*



Source: WISE electronic reports

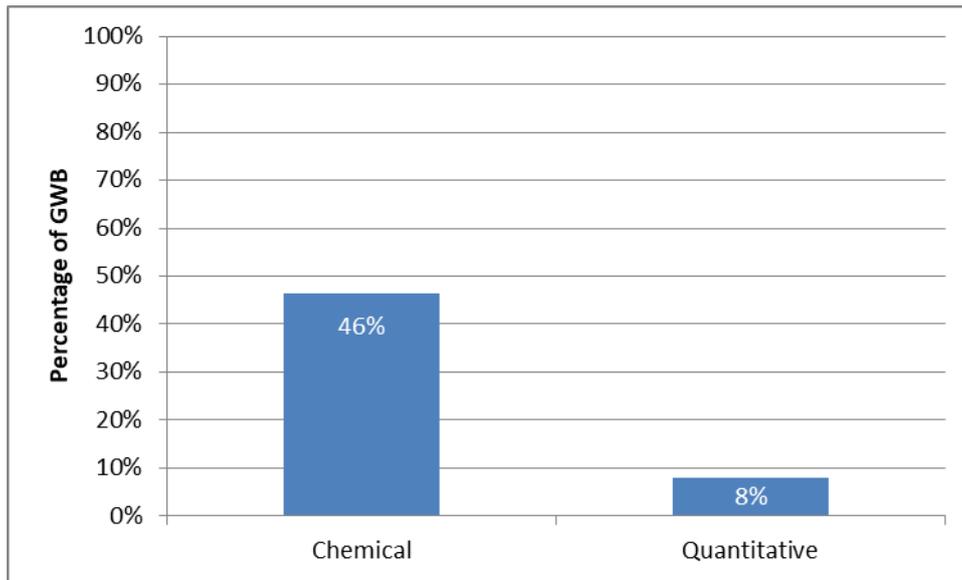
Figure 6.5 *Top ten pollutants with upward trends in groundwater bodies in Germany*



Source: WISE electronic reports

⁵⁸ Germany subsequently clarified that there seems to be a reporting error as all groundwater bodies in the Warnow/Peene RBD are linked to groundwater dependent terrestrial ecosystems.

Figure 6.6 *Percentage of groundwater bodies in Germany at risk of failing good chemical status and good quantitative status for the second RBMP*



Source: WISE electronic reports

6.2. Main changes in implementation and compliance since the first cycle

As described in section 5.2, the number of groundwater bodies increased by 19 % (with the strongest changes in the Danube RBD), but the total groundwater body area remained nearly the same. 913 of 1177 groundwater bodies remained unchanged since the first RBMP.

No conclusion can be derived about whether the monitoring situation has improved or not. In the first RBMP about 93 % of the groundwater bodies (919 of 965) were subject to surveillance monitoring which decreased in the second RBMP to about 82 % coverage. In absolute figures, the number of monitored groundwater bodies as well as the number of surveillance and operational monitoring sites significantly increased. But considering the increase of the total number of groundwater bodies by about 19 %, the coverage of the number of groundwater bodies with surveillance monitoring decreased from about 93 % of groundwater bodies (919 of 965) in the first RBMP to about 82 % in the second RBMP. It is not clear whether all groundwater bodies without monitoring are covered by grouping of groundwater bodies for monitoring purposes.

The status changes between cycles show that the total groundwater body area failing good chemical status increased slightly from 36.6 % to 37.5 % of the total area. Assessment of the RBMPs and background documents identified significant discrepancies in the status results in some RBMPs. The main reasons for changes were: changes to the status assessment methodology, changes in the monitoring network and improvements in data.

6.3. Progress with Commission recommendations

- Recommendation: *Groundwater trend assessment should be carried out as soon as long (sufficiently reliable) time-series are available.*

Assessment: The recommendation is now fulfilled. Trend and trend reversal assessment methodologies are available and assessments have been performed in all RBDs.

- Recommendation: *In groundwater bodies shared by different Länder, coordinated methodologies and measures should be applied. The way the national guidance is used should be explained in the different RBMPs.*

Assessment: The recommendation cannot be assessed. Assessments of the data uploaded to WISE and the RBMPs and background documents did not allow conclusions to be drawn on harmonisation of methodologies within each RBD as the details of the assessment methodologies in each RBMP could not be analysed. However, since the first RBMP Germany has a new groundwater ordinance which stipulates uniform methodologies for status classification, trend and trend reversal assessment to all of Germany. This ordinance addresses chemical status and how to define it.

- Recommendation: *Report about groundwater bodies at risk (and the related parameters) as this is an important element in the status assessment and in the PoM.*

Assessment: The recommendation is partially fulfilled. Information on groundwater bodies at risk is available but not on the substances causing risks (Annex 0).

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

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

7.1.1. Designation of Heavily Modified and Artificial Water Bodies

Heavily modified water bodies and/or artificial water bodies are designated in all RBDs. The WFD requires a review of designation every six years. As a result there are several changes in the designations of river and lake heavily modified water bodies and artificial water bodies. For river heavily modified water bodies, there are changes in all RBDs. Specifically, there is a reduction of river heavily modified water bodies in eight RBDs (especially in the Warnow/Peene RBD from 61 % to 41 % of total river water bodies) and an increase in two RBDs (especially in the Ems RBD from 57 % to 66 % of total rivers water bodies). For river artificial water bodies, only minor changes (increase or decrease) are observed with the exception of the Warnow/Peene RBD where there is an increase from 7 % to 27 % of total river water bodies.

In terms of changes in the designations of lake heavily modified water bodies, the most notable ones are in the Rhine RBD where lake heavily modified water bodies increased from 28 % to 41%, in the Ems RBD where lake heavily modified water bodies decreased from 50 % to 17 % and in the Meuse RBD, where five lakes are now designated as heavily modified water bodies compared to none in the first cycle⁵⁹ (Figure 7.1). For lake artificial water bodies, there are no major changes except for the Danube RBD where five lake artificial water bodies from the first cycle have been de-designated and there are now no lake artificial water bodies.

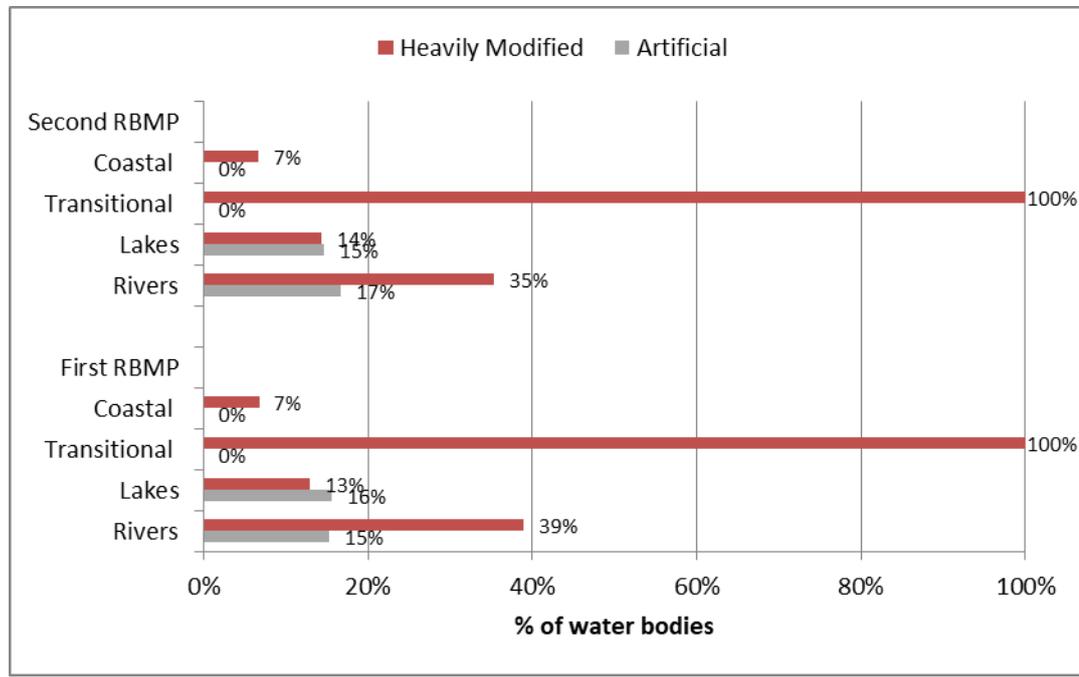
For coastal and transitional heavily modified water bodies, no changes are noted.

In 7 out of 10 RBDs, there are reservoirs which are designated as river or lake heavily modified water bodies. In all these seven RBDs, there are reservoirs which were originally rivers and are designated as lake heavily modified water bodies. According to the Common Implementation Strategy guidance on this issue, though, these should have been designated as river heavily modified water bodies. In four RBDs, there are reservoirs (originating from rivers) which are designated as river heavily modified water bodies. In three RBDs (Odra,

⁵⁹ German authorities have informed that this refers to reservoirs (Talsperren) which are now categorized as lakes according to a recommendation by LAWA, the German Working Group on water issues of the Federal States and the Federal Government.

Schlei/Trave, Warnow/Peene), there are no heavily modified water bodies which are reservoirs.

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



Source: WISE electronic reports

The methodology for heavily modified water bodies designation is explained for all RBMPs and includes all key aspects of the heavily modified water bodies designation method (criteria for the identification of substantial change in character, types of physical alterations and water uses considered, criteria for the assessment of significant adverse effect on the use, explanation of the assessment of better environmental options). The RBMPs state that in general the Common Implementation Strategy guidance no. 4 and a new national guidance document on heavily modified water bodies and artificial water bodies (of 2013) have been applied.

The main water use for which river water bodies are designated as heavily modified water bodies is agricultural land drainage in all 10 RBDs except one (Danube). Agricultural land drainage is followed in terms of importance for river heavily modified water bodies designation by flood protection and urban development. In the Danube RBD, the main use of river heavily modified water bodies is hydropower, followed by flood protection and land drainage.

Lake heavily modified water bodies are designated mainly due to flood protection, hydropower and other uses which are not specified in the WISE reporting. Coastal heavily modified water bodies are designated due to transport (navigation/ports) and transitional heavily modified water bodies in their majority due to transport (navigation/ports) and flood protection.

The main physical alterations of river heavily modified water bodies are channelisation / straightening / bed stabilisation / bank reinforcement, land drainage, dredging / channel maintenance and weirs/dams/reservoirs. For lake heavily modified water bodies, the main alterations are weirs/dams/reservoirs, followed by channelisation / straightening / bed stabilisation / bank reinforcement, land drainage and dredging / channel maintenance. In coastal heavily modified water bodies, the main physical alterations are land reclamation / coastal modifications / ports and in transitional heavily modified water bodies, channelisation / straightening / bed stabilisation / bank reinforcement and dredging / channel maintenance.

The new national guidance document provides a list of significant adverse effects of restoration measures on the use and the wider environment as well as a list of criteria on when effects are not significant. This information is provided for the main water users (shipping, recreation, water supply, hydropower, flood protection, etc.) and the wider environment.

The national guidance also provides a broad set of alternatives ("other means") along the main water uses (shipping, recreation, water supply, hydropower, flood protection, etc.) to check against in the different RBMPs. It also gives some guidance on how to assess technical feasibility and disproportionate costs related to other means. These are nationally applicable suggestions in order to have a common baseline across Germany.

Specific information on the outcome of the assessment of significant adverse effects and better environmental options is not given at water body level.⁶⁰

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

Good ecological potential is reported as defined in all 10 RBDs. In three RBDs (Danube, Rhine and Meuse), the Common Implementation Strategy Guidance approach is used to define good ecological potential (approach based on biological quality elements as illustrated in Common Implementation Strategy Guidance No 4). In the other seven RBDs, a hybrid approach combining elements of the Common Implementation Strategy Guidance and the Prague approach (based on the identification of mitigation measures) is used. In eight RBDs,

⁶⁰ German authorities have informed that some Federal States provide additional information by background documents.

definition of good ecological potential has been done for groups of heavily modified water bodies/artificial water bodies of the same use/physical modification. In two RBDs (Schlei/Trave, Eider), definition of good ecological potential has taken place at water body level.

A method for defining good ecological potential has been developed at a national level (harmonisation of the definition of good ecological potential based on the Common Implementation Strategy guidance no. 4), but there are also some methodological aspects reported at regional/RBD level. The national method focuses on river and lake water bodies but does not focus on specific water uses. In some cases, additional methodological documents have been developed and reported, but the link between these and the national guidance for good ecological potential definition are not entirely clear.

Good ecological potential is reported to be defined in terms of biology in all 10 RBDs but the biological quality elements for which biological values have been derived to define maximum ecological potential and good ecological potential differ. In seven RBDs, biological values have been derived for fish and benthic invertebrates. In one RBD, biological values are derived for fish, benthic invertebrates, phytobenthos and macrophytes. For two RBDs, values have been derived for up to seven biological quality elements (fish, benthic invertebrates, phytoplankton, phytobenthos, macrophytes, angiosperms, macroalgae).

Good ecological potential definition in terms of biology takes place on the basis of biological quality elements using assessment methods for ecological status. According to the methodological documents, biological quality elements are estimated in the same way as for natural water bodies. Information is provided on the techniques used for the estimation of biological values of biological quality elements for maximum ecological potential and good ecological potential, including available data and monitoring, statistical analyses and expert judgment.

Biological quality elements assessment methods sensitive to hydrological and morphological changes are reported for all water categories. For rivers, one method for fish (FIBS) and one for benthic invertebrates (PERLODES) are reported as sensitive to altered habitats due to both hydrological and morphological changes. For lakes, three methods are reported (one for fish, one for benthic invertebrates and one for macrophytes/phytobenthos) as sensitive to both hydrological and morphological changes. For coastal water bodies, two methods are reported for angiosperms which are sensitive to both hydrological and morphological changes. One method is reported for benthic invertebrates which is sensitive to morphological but not to hydrological changes. For transitional water bodies, one method is reported for fish and one

method is reported for benthic invertebrates, which are sensitive to both hydrological and morphological changes

Mitigation measures for defining good ecological potential have been reported for all 10 RBDs. However, there is no information on how the ecological benefits of the mitigation measures are assessed. In the national methodology document on definition of good ecological potential, it is stated that measures are part of the PoM and are subject to the local conditions.

A comparison between good ecological potential and good ecological status has not been done in any of the RBDs⁶¹.

7.2. Main changes in implementation and compliance since the first cycle

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

The reasons for changes in the number or size/area of water bodies designated as heavily modified water bodies and artificial water bodies since the first cycle are generally explained. The number of water bodies, their typology and characteristics have changed because of new mapping of the hydromorphological status and a basic revision of the natural and heavily modified water bodies. Changes in the number of heavily modified water bodies and artificial water bodies are also due to the application of a new methodology for designating heavily modified water bodies and artificial water bodies (national methodology of 2013), new designations of water bodies in general and improved data available.

Agricultural land drainage seems to have greatly increased in importance as a water use linked to the designation of heavily modified water bodies. However, a quantitative comparison with the uses for designation in the first cycle is not possible due to the lack of data from the first cycle.

Although a new methodology was developed and reported, the details of the changes to the methodology since the first cycle are not provided. The background paper to the new methodology explains why changes have been made but specific changes to the different designation steps are not described.

There are apparently also changes in the method used for good ecological potential definition. In the second RBMPs, the Common Implementation Strategy Guidance approach is used to

⁶¹ According to the WFD Reporting Guidance 2016, on the comparability between GEP and GES, see conclusions of the 2010 CIS HMWB workshop, paragraph 60A: <https://circabc.europa.eu/sd/a/cd419883-ff4d-4d43-a82b-aef3d33e04ed/Conclusions%20HMWB%20workshop%20Brussels%20March%202009.pdf>

define good ecological potential in three RBDs (Danube, Rhine and Meuse). In the other seven RBDs, a hybrid approach combining elements of the Common Implementation Strategy Guidance and the Prague approach is used. The situation was different in the first cycle, where the Common Implementation Strategy guidance approach was reported for the RBDs Eider, Schlei/Trave and the Danube (out of which only the Danube RBD reports the same in the second RBMPs). In the first cycle, the Prague approach was reported for the Odra, Meuse, Warnow/Peene, Ems, Weser and Elbe RBDs. In the Rhine RBD, both approaches were used in the first cycle, depending on the Länder involved.

A new methodological document is reported at national level (harmonisation of the definition of good ecological potential) which refers to improvements in the assessment methodologies related to fish and benthic fauna. The methodology incorporates the result of several research projects. This new methodology has been applied in all RBMPs.

7.3. Progress with Commission recommendations

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

Assessment: The methodology for heavily modified water bodies designation is explained for all RBMPs and includes all key aspects of the heavily modified water bodies designation method (criteria for the identification of substantial change in character, types of physical alterations and water uses considered, criteria for the assessment of significant adverse effect on the use, explanation of the assessment of better environmental options). The RBMPs state that in general the Common Implementation Strategy guidance no. 4 and a new national guidance document on heavily modified water bodies and artificial water bodies (of 2013) have been applied.

The national guidance document on heavily modified water body designation contains a list of examples of cases describing significant adverse effects on the use and better environmental options that can be used in the argumentation. However, specific

information on the outcome of the assessment of significant adverse effects and better environmental options is not given on water body level⁶².

This recommendation has been partially fulfilled.

- Recommendation: *"Review the designation of heavily modified water bodies, in particular taking into account restoration measures that would make it possible for water bodies to achieve good status, which will in turn provide a legal driver for restoration measures."*

Assessment: The designation of heavily modified water bodies has been reviewed and the reasons for changes in the numbers or size/area of water bodies designated as heavily modified water bodies and artificial water bodies since the first cycle are generally explained. The number of water bodies, their typology and characteristics have changed because of new mapping of the hydromorphological status and a basic revision of the natural and heavily modified water bodies. Changes in the number of heavily modified water bodies and artificial water bodies are also due to the application of a new methodology for designating heavily modified water bodies and artificial water bodies (national methodology of 2013), new designations of water bodies in general and improved data available.

Although the national guidance on heavily modified water bodies designation provides information on how to take into account of restoration measures that would make it possible for water bodies to achieve good status and how to assess the significant adverse effects of such restoration measures, specific information on the outcomes of this assessment are not provided in all cases⁶³.

This recommendation has been partially fulfilled.

⁶² The German authorities subsequently informed that some Federal States have provided additional information by background documents.

⁶³ The German authorities have informed that some Federal States have provided additional information by background documents.

Topic 8 Environmental objectives and exemptions

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

8.1.1. Environmental objectives

The environmental objectives are defined in Article 4 of the WFD. The aim is long-term sustainable water management based on a high level of protection of the aquatic environment. Article 4(1) defines the WFD general objectives to be achieved in all surface and groundwater bodies, i.e. good status by 2015. Within this general objective, specific environmental objectives are defined for heavily modified water bodies (good ecological potential and good chemical status by 2015⁶⁴), groundwater bodies (good chemical and quantitative status by 2015) and for Protected Areas (achievement of the objectives of the associated Directive by 2015 unless otherwise specified).

Environmental objectives for ecological and chemical status have been reported in all RBDs as well as for good quantitative and chemical groundwater status. Good ecological potential is defined and objectives for transitional waters and coastal waters are reported.

Assessments of the current status of surface and groundwater bodies in Germany are provided elsewhere in this report: for ecological status/potential of surface waters (Chapter 3); chemical status of surface waters (Chapter 4); quantitative status of groundwater bodies (Chapter 5); chemical status of groundwater bodies (Chapter 6); status of surface and groundwater bodies associated with Protected Areas (Chapter 15).

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

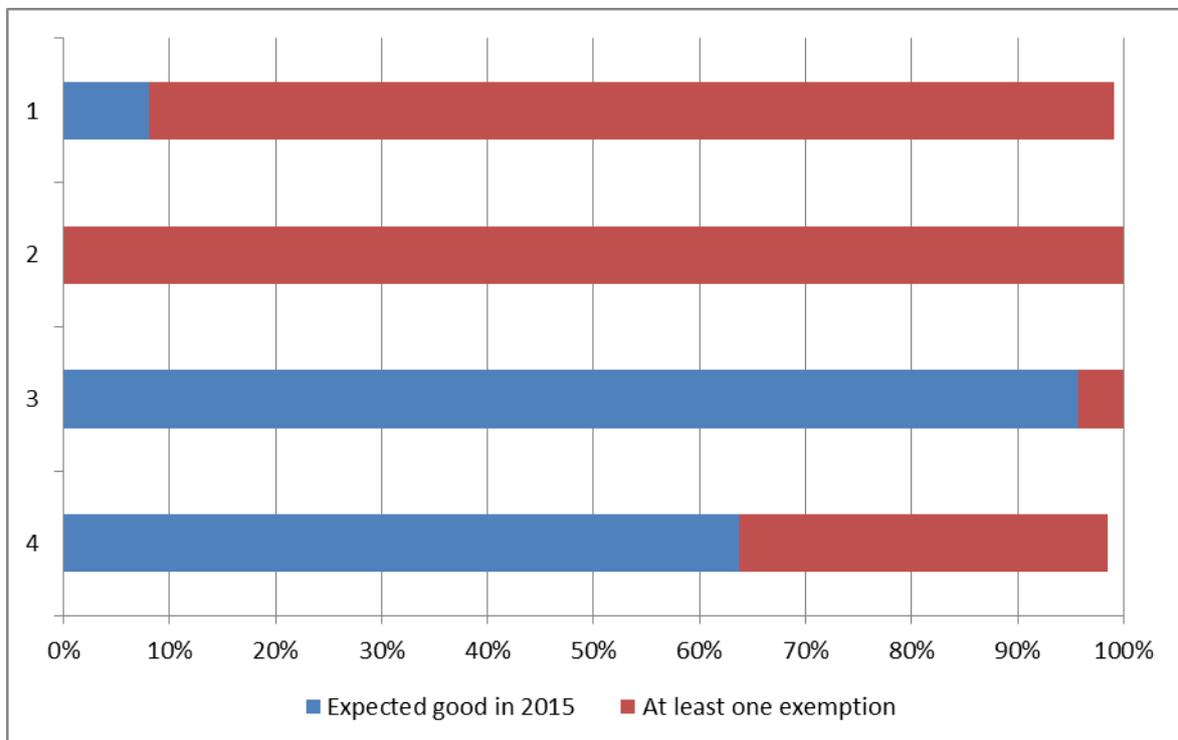
8.1.2. Exemptions

Where environmental objectives are not yet achieved exemptions can be applied in case the respective conditions are met and required justifications are explained in the RBMP. Figure 8.1 summarises the percentage of water bodies expected to be at least in good status in 2015 and

⁶⁴ For priority substances newly introduced by Directive 2013/39/EU, good status should be reached by 2027, and for the 2008 priority substances, for which the Environmental Quality Standards were revised by Directive 2013/39/EU, good status should be reached in 2021.

the use of at least one exemption in Germany for the four main sets of environmental objectives.

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



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

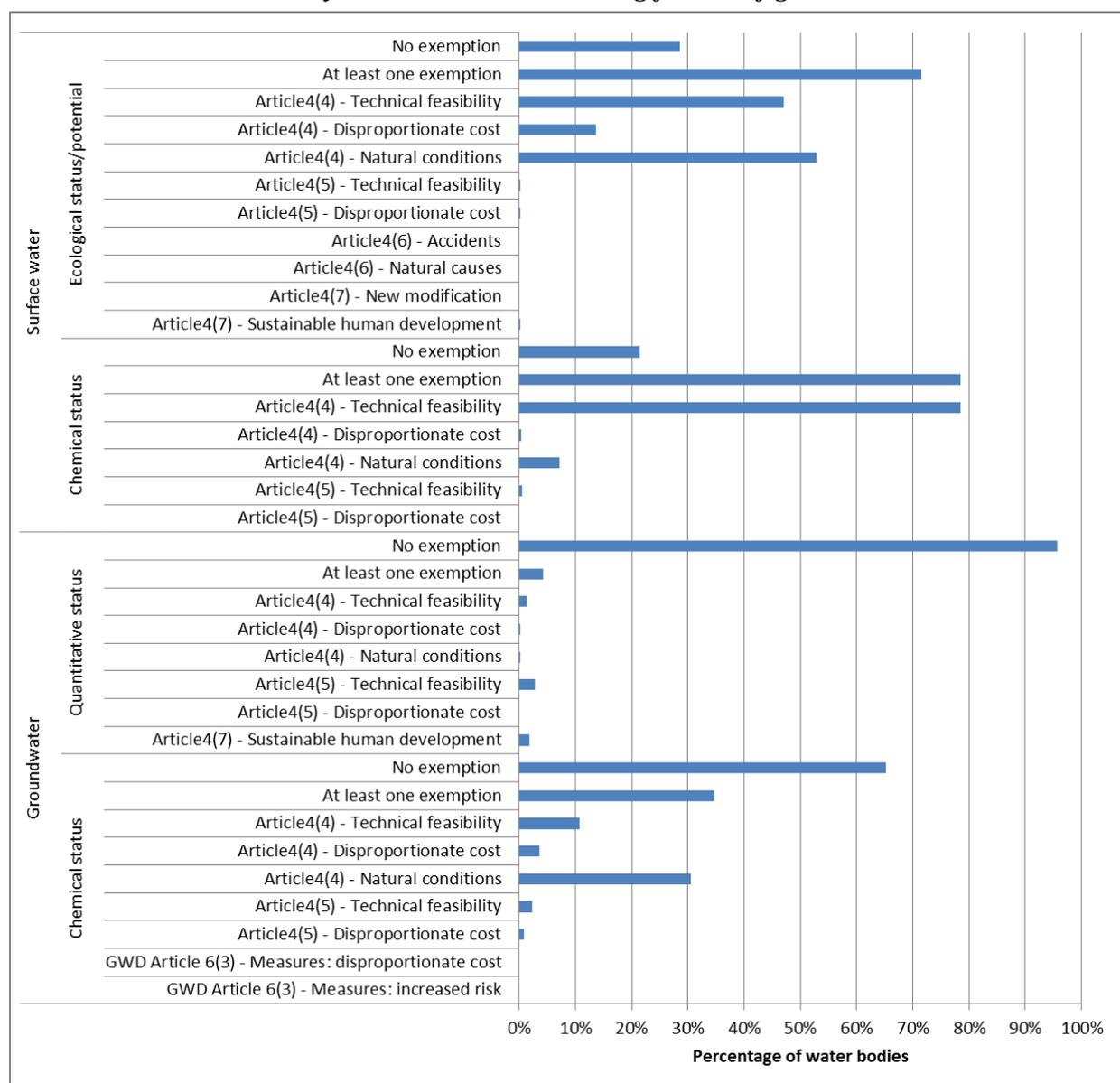
Article 4 of the WFD allows under certain conditions for different exemptions to the objectives: extension of deadlines beyond 2015, less stringent objectives, a temporary deterioration, or deterioration / non-achievement of good status / potential due to new modifications, provided a set of conditions are fulfilled. The exemptions under WFD Article 4 include the provisions in Article 4(4) - extension of deadline; Article 4(5) - lower objectives; Article 4(6) - temporary deterioration; and Article 4(7) - new modifications / new sustainable human development activities. Article 4(4) exemptions may be justified by: disproportionate cost, technical feasibility or natural conditions, and Article 4(5) by disproportionate cost or technical feasibility. In addition, Article 6(3) of the Groundwater Directive⁶⁵ allows Member

⁶⁵ Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0118-20140711>

States to exempt inputs of pollutants to groundwater from the PoM under certain specified circumstances.

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

Figure 8.2 *Type of exemptions reported to be applied to surface water and groundwater bodies for the second RBMP in Germany. NB - Ecological status and groundwater quantitative status exemptions are reported at the water body level. Chemical exemptions for groundwater are reported at the level of each pollutant causing failure of good chemical status, and for surface waters for each Priority Substance that is causing failure of good chemical status*



Source: WISE electronic reports

Application of Article 4(4)

The number of Article 4(4) exemptions for surface water bodies in all RBDs has increased in the second cycle⁶⁶. The number of Article 4(4) exemptions for groundwater shows a mix of increasing and decreasing trends among the RBDs.

Similar to the first cycle, the main reasons for applying exemptions according to Article 4(4) are technical feasibility and natural conditions. Disproportionate costs are less often used as a justification.

Technical feasibility is argued in all basins by the fact that it takes longer to fix the problem than time is available and the lack of technical solutions. For some basins it is also argued that there is no information on the cause of the problem.

According to WISE, disproportionate costs justifications are argued across the German RBDs by Cost-Effectiveness Analysis and/or distribution of costs and/or other arguments. In the RBMPs assessed in more depth (North Rhine Westphalia RBMP covering parts of the Rhine, Weser, Ems and Maas), the justification for disproportionate costs refers to the justifications provided in the CIS reporting guidance document and includes references to specific justifications such as “limiting factors from market mechanisms“ or “excessive burden for benefactors”.

The drivers behind the exemptions under Article 4(4) applied in surface waters are agriculture, industry and energy (in all RBDs), fisheries and aquaculture in the Danube, Rhine, Ems, Weser, Elbe, Meuse, Warnow/Peene RBDs), flood protection and urban development (Danube, Rhine, Ems, Weser, Elbe, Odra, Meuse, Warnow/Peene RBDs), forestry (Rhine, Weser, Elbe, Odra, Meuse, Warnow/Peene RBDs), tourism and recreation (Rhine, Ems, Weser, Elbe, Odra, Warnow/Peene RBDs) and transport in Danube, Rhine, Ems, Weser, Elbe, Odra, Warnow/Peene RBDs. The main driver behind the exemptions applied in groundwater is agriculture in all RBDs; other drivers are industry (all RBDs except Danube, Weser, Eider, Schlei/Trave and Warnow/Peene). Urban development is a driver in the Elbe and Rhine RBDs.

The pressures responsible for exemptions to the good ecological status in surface waters come from a broad range of activities including urbanisation, industry, agriculture, mining, atmospheric deposition and activities causing changes in hydromorphology. In the Elbe RBD, the number of pressures reported is by far the highest in all German RBDs. A similar range of significant pressures are responsible for exemptions in relation to chemical status (Table 8.1).

⁶⁶ Germany subsequently clarified that this is also because of the new delineation of water bodies in the second cycle.

Table 8.1 *Pressure responsible for Priority Substances in Germany failing to achieve good chemical status and for which exemptions have been applied*

Significant pressure on surface water bodies	Failing Priority Substances	Article 4(4) - Technical feasibility exemptions	Article 4(5) - Technical feasibility exemptions
	Number	Number	Number
1.1 - Point - Urban wastewater	10	312	0
1.2 - Point - Storm overflows	13	490	0
1.3 - Point - IED plants	10	42	0
1.4 - Point - Non IED plants	10	65	0
1.5 - Point - Contaminated sites or abandoned industrial sites	15	32	22
1.7 - Point - Mine waters	3	36	64
1.9 - Point - Other	10	140	0
2.1 - Diffuse - Urban run-off	10	35	0
2.10 - Diffuse - Other	17	2422	0
2.2 - Diffuse - Agricultural	8	236	0
2.4 - Diffuse - Transport	9	179	0
2.5 - Diffuse - Contaminated sites or abandoned industrial sites	2	5	0
2.6 - Diffuse - Discharges not connected to sewerage network	4	7	0
2.7 - Diffuse - Atmospheric deposition	7	11685	4
2.8 - Diffuse - Mining	2	9	0
8 - Anthropogenic pressure - Unknown	5	385	0
9 - Anthropogenic pressure - Historical pollution	10	165	61

Source: WISE electronic reports

For groundwater, the main pressures responsible for an exemption in relation to chemical status in all RBDs are point and diffuse pollution from atmospheric deposition, industry and agriculture (Table 8.2). For groundwater the main pressures responsible for an exemption in relation to quantitative status in all RBDs is abstraction.

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

Significant pressure on groundwater	Number of failing pollutants	Number of exemptions				
		Article 4(4) - Technical feasibility	Article 4(4) – Disproportionate cost	Article 4(4) - Natural conditions	Article 4(5) - Technical feasibility	Article 4(5) – Disproportionate cost
1.5 - Point - Contaminated sites or abandoned industrial sites	16	17	8	18	15	12
1.6 - Point - Waste disposal sites	2	2				
1.7 - Point - Mine waters	14	21	12	25	28	28
1.9 - Point - Other	5	1	2	5		
2.1 - Diffuse - Urban run-off	7	3	4	16		
2.10 - Diffuse - Other	9	12	12	26		
2.2 - Diffuse - Agricultural	26	111	38	442	9	3
2.5 - Diffuse - Contaminated sites or abandoned industrial sites	3		1	4		
2.8 - Diffuse - Mining	17	36	16	46	91	32
3.2 - Abstraction or flow diversion - Public water supply	1	4		3		
6.2 - Groundwater - Alteration of water level or volume	1				1	
7 - Anthropogenic pressure - Other	2	8		8		

Source: WISE electronic reports

The main impacts from exemptions under Article 4(4) for surface and groundwater are chemical and nutrient pollution and hydro-morphological changes in surface water

Application of Article 4(5)

Article 4(5) exemptions for surface waters increased in those RBDs where it was applied already in the first cycle (Rhine, Weser, Meuse, Warnow/Pene). Article 4(5) is also newly applied in the Elbe and Warnow/Peene RBDs, but it is no longer applied in the Meuse RBD.

The number of RBDs where Article 4(5) is applied in groundwater increased from one (Meuse, Elbe) to six (Rhine, Weser Meuse, Elbe, Odra, Warnow/Peene). Exemptions under Article 4(5) to the achievement of good quantitative status in groundwater by 2015 have been applied in the Rhine, Elbe, Odra, Meuse and Warnow/Peene RBDs. Exemptions under Article 4(5) to the achievement of good chemical status have been applied in the Rhine, Weser Elbe, Odra, Meuse RBDs.

The justifications for applying Article 4(5) in surface waters and groundwater are technical feasibility and disproportional costs. Technical feasibility is more often used as a justification than disproportionate costs.

The German Working Group on water issues of the Federal States and the Federal Government has developed a guidance document including a methodology for proofing and justifying lower objectives. In the RBMPs assessed it is reported that this methodology has been applied and the justifications have been followed.

The drivers for the application of Article 4(5) are in surface water industry and agriculture in the Rhine, industry in the Weser, agriculture, energy, flood protection urban development and industry in the Elbe, industry in the Meuse and transport in the Warnow/Peene. For groundwater exemptions under Article 4(5) the drivers are industry and agriculture in the Rhine, industry in the Weser, agriculture, energy and industry in the Elbe, energy and industry in the Oder, agriculture and industry in the Meuse.

The pressures behind exemptions under Art 4(5) are similar to those related to Article 4(4).

Application of Article 4(6)

Article 4(6) exemptions are not applied.

Application of Article 4(7)

In the first RBMP, Article 4(7) exemptions were applied in the Rhine (NRW) RBD. According to the information reported to WISE, Germany applies Article 4(7) in the second RBMP in the Rhine and Meuse RBDs. From the assessed Rhine (NRW) RBMP, it becomes clear that the

Article 4(7) exemption has been applied to continue lignite mining. The impact on the status of water was assessed and continuing lignite mining was concluded to negatively impact the groundwater. Chapter 2 of the RBMP provides a detailed assessment of the quantitative and chemical status of groundwater. The impacts are analysed for: i) impacts before 2009; ii) impacts 2009-2015; iii) foreseeable impacts 2015-2027; and iv) long term impacts beyond 2027. There is a clear statement that lignite mining will be the only modification and so no cumulative effects can be expected. Alternatives to protect the groundwater have been assessed and there is argumentation on why these alternatives cannot be applied. Alternatives refer to alternative mining technologies, various technologies for reducing the lowering of groundwater tables (e.g. icing, dictation walls, etc.) material reallocation and pyritoxidation and various sealing approaches.

For surface waters, it is stated that the deterioration will only be temporary (no time frame provided) as several measures to mitigate the negative impacts are taken. The clarifications provided by the Weser court case⁶⁷ are already considered in the assessment.

Article 4(7)(c) requires that the new modification is justified because it is of overriding public interest / the benefits of the project outweigh the benefits of achieving the WFD Environmental Objectives. In relation to this Article, there is a clear description of the importance of lignite mining for generating energy in Germany. Lignite mining is the main source for primary energy production in Germany and also the main source for electricity. There is a discussion on alternative energy supply sources addressing nuclear and renewable energy. Germany will phase out nuclear energy by 2022. Renewable energy is constantly being developed but is still not sufficient to deliver the required quantities. It is further stated that the lignite policy is currently under development beyond 2030. It is also stated that coal is currently essential for industrial energy production.

Article 4(7) also requires better environmental options to be taken into account. The issue is discussed in the background paper related to lignite mining where such mining is considered to be an important factor for energy supply in Germany and the same arguments are put forward as for Article 4(7)(c).

Application of Article 6(3) Groundwater Directive

Exemptions to groundwater under Article 6(3) of the Groundwater Directive⁶⁸ have not been applied.

⁶⁷ <http://curia.europa.eu/juris/liste.jsf?num=C-461/13>

8.2. Main changes in implementation and compliance since the first cycle

In the first RBMP in the Rhine RBD, Article 4(7) of the WFD has only been applied in the North Rhine-Westphalia part of the RBD in a few exceptional cases for groundwater and for surface waters. In the second cycle, it is applied in the Rhine and Meuse RBDs. The number of Article 4(4) applications for surface water cases in all RBDs has increased. Use of Article 4(5) for surface water increased in those RBDs where it was applied already in the first cycle, and it is again applied in the Elbe and Warnow/Peene RBDs, but it is no longer applied in the Meuse RBD⁶⁹. The number of Article 4(4) applications for groundwater shows a mix of increasing and decreasing trends (a full comparison is not possible as the data in the first cycle is organized in a different way). The number of RBDs in which Article 4(5) is applied in groundwater increases from one (Meuse RBD) to five (Rhine, Weser, Elbe and Odra RBDs).

8.3. Progress with Commission recommendations

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

- Recommendation: *A significant number of exemptions have been applied in the first RBMPs. The application of exemptions needs to be more transparent and the reasons for the exemptions should be clearly justified in the plans.*

Assessment: Exemptions are shown at the water body level and the justifications provided are more detailed in the second cycle compared to the first cycle. However, a significant number of exemptions remains to be applied in Germany. The recommendation has partly been fulfilled.

- Recommendation: *Should all measures not be put in place in the second RBMP Germany is expected to provide better justification for exemptions to the achievement of environmental objectives (in particular as regards the assessment of affordability and disproportionate costs).*

⁶⁸ Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration
<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02006L0118-20140711>

⁶⁹ Germany subsequently clarified that the revised assessment for the second RBMP led to the conclusion that the objectives might be achieved for the surface water bodies concerned within the time horizon of time extensions according to article 4(4) WFD. Regarding the groundwater bodies concerned, article 4(7) WFD was applied instead of article 4(5).

Assessment: Exemptions are shown at the water body level and the justifications provided are more detailed in the second cycle compared to the first cycle. Some of the RBMPs include references to justifications such as “excessive burden for benefactors” in relation to disproportionate cost, which should be further specified. The recommendation has partly been fulfilled.

Topic 9 Programme of measures

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

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

A KTM may be one national measure but it would typically comprise more than one national measure. The 25 predefined KTMs are listed in the WFD Reporting Guidance 2016.

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

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

9.1.1. General issues

An indication as to whether or not measures have been fully implemented and made operational is when they have been reported as being planned to tackle significant pressures (at the KTM level). Significant pressures are also reported at the water body level. It would therefore be expected that there would be measures planned in the RBMP to tackle all significant pressures. Germany has reported significant pressures causing water bodies to fail to be of good status in groundwater and surface waters for all 10 RBDs, as well as KTMs where measures have been made operational.

In some RBDs no operational KTMs were reported for some significant pressures causing water bodies to fail to be of good status, for example for groundwater in the international RBD Danube: 2.10 Diffuse⁷⁰ – other and 3.3. Abstraction or flow diversion⁷¹ – industry; in the international RBD Rhine: 1.6 Point sources – waste disposal and 3.7 Abstraction or flow diversion – other; in the Weser RBD: 1.7 Point source – mining and 2.10 Diffuse – other; and in the Eider, Schlei/Trave and Warnow/Peene RBDs: 2.1 Diffuse – urban run-off; Schlei/Trave: 8 Anthropogenic – unknown.

On the other hand, it is indicated that KTMs have been put in place for significant pressures which have not been reported as causing water bodies to fail to be of good status⁷², e.g. in the Rhine RBD: 1.4 Point sources – non-IED plants; in the Weser RBD: 2.5 Diffuse – contaminated sites or abandoned industrial sites; and in the Schlei/Trave RBD: 7 Anthropogenic pressures – other; and Schlei/Trave and Warnow/Peene: 3.1 Abstraction or flow diversion – agriculture⁷³. It is possible that this is due to inconsistent reporting and that, for example the measures put in place in the Weser RBD under KTM type 2.5 (Diffuse - contaminated sites or abandoned industrial sites) are in fact intended to address the pressure 2.10 (Diffuse – other) that are causing a failure of good status. Similarly, in the Schlei/Trave RBD the measures identified as having been put in place to address “Anthropogenic pressures – others” may address the pressure “Anthropogenic pressures – unknown” as causing a failure of good status.

Similarly for surface water, no operational KTMs were reported for some significant pressures, e.g. in the Danube RBD: 1.3 Point source – IED plants, 3.5 Abstraction or flow diversion – hydropower, 4.2.3, Dams, barriers and locks – drinking water, 4.2.5 Dams, barriers and locks – recreation, 4.2.7 Dams, barriers and locks – navigation, and 5.1 Introduced species and diseases⁷⁴. On the other hand, a number of significant pressures that have not been identified in this RBD as causing water bodies to fail to be of good status have been addressed by KTMs, e.g. 2.5 Diffuse sources – contaminated sites or abandoned industrial sites, 2.8 Diffuse sources

⁷⁰ Germany clarified that whilst the pressure 2.10 – Diffuse – other occurs in the Danube RBD, it does not adversely impact the status of groundwater bodies and therefore no measures were deemed to be necessary.

⁷¹ Germany subsequently clarified that “water abstraction” was used in the reporting for the Danube just as in the WG ECOSTAT: Water abstracted because of e.g. hydropower and fed back to the water body downstream. Significant water abstraction with consumption (e.g. for irrigation) does not occur in the Danube area, thus no KTM were reported.

⁷² Germany subsequently noted that in the Elbe RBD measures have been included for water bodies that are in good status to prevent deterioration.

⁷³ Germany subsequently noted that an error had been made in the reporting to WISE and that the significant pressure 3.1 Abstraction or flow diversion – agriculture is responsible for causing failures of good status in one groundwater body in the Schlei/Trave RBD, and 3 groundwater bodies in the Warnow/Peene RBD.

⁷⁴ Germany clarified that whilst certain pressures occur in the Danube RBD, they do not adversely impact the status of water bodies and therefore no measures were necessary.

– mining, 3.6 Abstraction or flow diversion – fish farms, 4.3.6 Hydrological alterations – other, 4.5 Hydromorphological alterations – other, and 5.2 Exploitation or removal of animals or plants⁷⁵.

In the Weser RBD, no KTMs have been operational to address significant pressures causing a failure of good status in surface waters from: 1.5 Point sources – contaminated sites or abandoned industrial sites, 2.3 Diffuse – forestry, 3.2 Abstraction or flow diversion – public water supply, 3.3 Abstraction or flow diversion – industry, 9 Anthropogenic pressure – historical pollution. On the other hand, additional KTMs are put in place to address the significant pressures: 4.1.1 Physical alteration – flood protection, 4.3.2 Hydrological alteration – transport, and 4.5 Hydromorphological alterations – other, but these pressures have not been identified as causing a failure of good status in surface waters.

In the Eider RBD, no KTMs appear to have been adopted to address significant pressures causing a failure in good status in surface water from 2.5 Diffuse sources – contaminated sites⁷⁶ or abandoned industrial sites, although KTMs are in place to address the following significant pressures which have not been identified as causing a failure of good status in surface waters: 2.4 Diffuse sources – transport, 4.2.7 Dams, barriers and locks – navigation, 4.3.1 Hydrological alteration – agriculture, 5.2 Exploitation or removal of animals or plants, 7 Anthropogenic pressure – other.

The national measures have been mapped against KTMs in all 10 RBDs, and all include at least one KTM developed by Germany (see 9.1). Furthermore, 31 national basic measures and 110 national supplementary measures were mapped; and 19 % of basic measures were mapped against KTM1 - Construction or upgrades of wastewater treatment plants. 15 % of supplementary measures were mapped against KTM6 – Improving hydromorphological conditions of water bodies other than longitudinal continuity, and 13 % were mapped against KTM8 – Water efficiency, technical measures for irrigation, industry, energy and households. Basic measures are in place to address all the requirements of Article 11(3) of the WFD (see Table 9.2).

An inventory of national measures was provided as part of the electronic reporting to WISE.

Further clarification on the inclusion of information on basic and supplementary measures was sought in the assessment of the RBMPs and background documents. This found that the basic

⁷⁵ Germany clarified that in the Danube RBD measures have been adopted to control pressures not causing water bodies to fail to be of good status in order to maintain good status and to prevent deterioration.

⁷⁶ Germany commented that this is a reporting error due to linking LAWA codes from maßnahmenkatalog to KTM.

measures in Germany are only those measures which fall under part A of Annex VI of the WFD⁷⁷. The LAWA has developed a catalogue of measures for the Floods Directive⁷⁸, WFD and Marine Strategy Framework Directive⁷⁹. The Länder can and have detailed them further. However, there is no stipulation as to what is mandatory or voluntary and in fact some measures can be both. For example, a buffer strip can be part of a basic measure and therefore mandatory, but also be part of a supplementary measure and therefore voluntary. The detailed implementation of measures is subject to different authorities (from federal to local level) responsible for either certain parts of the water body or responsible for certain activities (e.g. shipping, energy production). The measures are more oriented to addressing pressures, than specific sectors and therefore are often difficult to allocate. For example, re-naturation can address urban, flood protection and agriculture at the same time. In general, measures related to licensed activities (Urban Wastewater Treatment Directive⁸⁰, Hydropower) are more often mandatory as they are part of the licensing process.

The percentage of water bodies not expected to achieve good status/ potential by 2027 was reported for significant pressures on groundwater and surface water in all RBDs, including information for many sub-basins; it varies from “0”, to “0-10”; but “no information” is indicated for a large number of pressures in many RBDs and sub-basins⁸¹.

KTMs used to tackle significant pressures are listed against individual substances for groundwater for all RBDs except the Odra, Meuse and Warnow/Peene RBDs, although substances causing failure in groundwater (including the number of groundwater bodies failing) are listed for all RBDs⁸². Whilst KTMs are also listed against River Basin Specific Pollutants in surface waters for all RBDs, except the Meuse and Warnow/Peene, significant pressures in surface water bodies causing failure of objectives are not listed.

⁷⁷ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

⁷⁸ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

⁷⁹ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0056>

⁸⁰ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0271>

⁸¹ Germany commented that data in dashboard 9.8b seem to be partly incorrect for the RBD Elbe. For example: All of the 4 GWB with the pressure 2.1 will achieve the good status until 2027 (and not “no information” as listed in the dashboard).

⁸² Germany clarified that for the Warnow/Peene RBD there is no groundwater body in DE9650, where an exceedance of pollutants other than nitrate or ammonium caused the failure of achieving the objectives (WISE electronic reporting, RBMP DE9650, Chapter 4.3.2). Nevertheless KTM 2 “reduce nutrient pollution from agriculture”, 12 “advisory services for agriculture” and 14 “Research, Improvement of knowledge base reducing uncertainty” have been made operational for groundwater to tackle the significant pressures and to prevent deterioration

The main individual substances causing failures in groundwater are nitrate and pesticides and their metabolites; and these are addressed mainly with KTM12 – Advisory services for agriculture, but also with KTM2 – Reduce nutrient pollution from agriculture and KTM3 – Reduce pesticide pollution from agriculture. Other Pollutants include sulphate, chloride, and tri- and tetra-chloroethylene. Whilst these are addressed using various KTMs in the Elbe RBD, in others (e.g. the Rhine, Ems and Weser) they appear to be addressed mainly by KTM14 – Research, and the new KTM40 which addresses impacts from human activities. Some Priority Substances are also listed among the Pollutants as causing failure of objectives in groundwater but are not covered by KTMs.

KTMs have been reported for some Priority Substances causing failure of WFD objectives in surface water in all RBDs, except in the Warnow/Peene RBD although this RBD did identify the Priority Substances causing failure of objectives⁸³. However, many pressures are not addressed, e.g. for the Rhine only seven of 19 Priority Substances seem to be addressed, in the Ems five of nine have been addressed⁸⁴, in the Weser five of 10 have been addressed, and in the Elbe 14 of 27 have been addressed⁸⁵. Moreover, in many cases KTM14 – Research is identified as the KTM that will be used.

Cost effectiveness analysis is an appraisal technique that provides a ranking of alternative measures on the basis of their costs and effectiveness, where the most cost-effective has the highest ranking. A cost effectiveness analysis was undertaken in Germany during the development of the first PoM (2009-2015) for all measures and for all significant pressures. However, the following factors limited the use of cost-effectiveness analysis in the first PoM:

- Lack of information on the environmental effectiveness of some measures in terms of reducing pressures and improving water body status for some pressures.
- Lack of information on the regulatory effectiveness of some measures in terms of reducing pressures and improving water body status for some pressures.

⁸³ Germany clarified that for the Warnow/Peene RBD an error had been made in the reporting – measures are in place but were not reported against specific substances.

⁸⁴ Germany clarified that in the Ems RBD the four substances for which measures were not reported (diuron, nickel, cadmium and PAHs) only one water body is affected. It was further clarified that for diuron measures are in place (prohibition of use).

⁸⁵ Germany clarified that only some “Länder” of the RBD Elbe have reported measures for specific chemical substances causing failure of WFD objectives, but all of the Länder reported measures for pressures causing failure of WFD objectives. These pressures of course include specific chemical substances.

- Lack of information on the time-lag between making measures operational, the pressures being reduced and improvements being apparent.
- Lack of information on the costs of measures for some pressures.

The first RBMPs indicated that the cost-effectiveness analysis was one out of several selection criteria in the selection process, but it remained unclear to what extent it was used. For the second PoM, it was reported that qualitative cost effectiveness analysis was reported for eight RBDs, a quantitative analysis for one (the Odra RBD) and a combined analysis for the remaining RBD (the Schlei/Trave RBD). Links to relevant documents are provided for all 10 RBDs. This was further examined in the assessment of RBMPs and background documents where it was found that in Germany a cost-effectiveness analysis is only undertaken for some measures, at the level of the specific measure or combination of measures, and at the RBD/sub-basin/water body scale. No methodology is described. However, the RBMP further states that experience shows that the situation at the water body level is usually very complex, and that real alternatives are not always available in practice or are already at an early stage in the decision process for reasons of effectiveness or for practical reasons. Moreover, cost efficiency is not a fixed attribute of the individual measures, but a result of the entire measure identification and selection process. A ranking of individual measures according to a one-dimensional cost-effectiveness ratio is therefore only possible and appropriate under certain conditions. Given the large number of individual measures and bundles of measures, the explicit carrying out of cost-benefit analyses for each individual measure is considered to be disproportionate, primarily because of the procedural effort involved. Also the monetary expenditure for an explicit proof must be in relation to the actual measures costs. This is not the case, especially for small measures, which are associated with a low monetary cost. Therefore, instead of explicit computational efficiency studies, other methods integrated in the planning process are being used in Germany to ensure cost-efficiency in planning measures. Methodologically, this approach is based on the meta-criterion of organizational efficiency. The existence of existing water management structures and processes offers the possibility of pursuing other methodological ways to ensure cost efficiency. In Germany, the measures are identified or planned, selected and prioritized in firmly established and legally regulated water management structures and processes. Within these processes and structures, in turn, a large number of mechanisms and instruments already apply, which ensure the cost-effectiveness of measures. During the implementation of the measures for the implementation of the WFD through several planning or selection phases, the measures are gradually specified or prioritized. The question of the cost-effectiveness of the measures arises at all stages of action

identification and selection; ultimately, cost effectiveness analysis is part of the outcome of the entire planning and selection process.

Although the procedure for finding and selecting measures by state, by type of water, by type of measure, by natural region and many other parameters can vary, it is generally true in Germany that a variety of similar mechanisms at various decision-making levels come into play and thus (cost-) efficiency of measures is ensured in the decision-making process. Key tools and mechanisms that support the selection of cost-effective measures throughout the country include procedural rules for economic and economic implementation of public-sector projects. The budgetary law provides for reasonable cost-effectiveness analyses of government and municipal funding. In state-subsidized construction projects, a technical and economic examination is required in the grant procedure. Finally, by tendering measures in accordance with procurement rules, cost-efficiency in the execution of measures in market competition is also ensured. In addition to these requirements for explicit profitability studies, the existing structures and processes as well as their interaction play a role in the selection of cost-efficient measures. Thus, e.g. the organization or process organization of an institution involved in the decision-making process also contributes to the selection of cost-effective measures.

Germany did not hold data in the correct format to be able to report the costs of Basic Measures (Article 11(3)(a-1), Article (11)(4) or Article (11)(5)) for any cycle, nor was it able to include an indication of whether European Union funding had been obtained. Furthermore, no explanatory documents were provided where this information could have been presented.

Germany has provided an enormous volume of data entries relating to the gaps to be filled by KTMs and indicators for the scale and progress with implementation of measures until 2027. However, the data provided often represent the aggregation of data for a sub-set of sub-units only of the respective RBD and not for the entire RBD. Although Germany indicated this in its reporting the information reported could not be assessed sufficiently for providing a comparable picture at RBD level⁸⁶. However, some gap analyses have been reported, with gap indicators such as for example the number or length of water bodies, or the number of point sources failing, and also measure indicators in terms of number of water bodies or sites requiring measures or number of measures required. Gap values are often given for 2015 only, sometimes for 2015 and 2021, but not for 2027. In some cases some improvements are indicated for 2021.

⁸⁶ Germany clarified that the use of “9999” and “0” in the electronic reporting of this information to WISE was intended to indicate that the figures represented the aggregation of a sub-set of basins. Unfortunately, this method of reporting makes it impossible for the information reported to be assessed as it is not clear exactly what has been reported.

Co-ordination of the preparation of all RBMPs and PoM with the Marine Strategy Framework Directive⁸⁷ is reported for all of the RBDs whereas joint consultation on the RBMPs and Marine Strategy is indicated for three of the RBDs only – the Eider, Schlei/Trave and Warnow/Peene. Consideration of the need for additional or more stringent measures beyond those required by the WFD in order to contribute to the achievement of the relevant Marine Strategy Framework Directive objectives in coastal and marine environments was reported for four RBDs – the Danube, Rhine, Ems and Meuse, in all of which additional measures for nutrients and other substances were implemented.

KTMs that are relevant to the Marine Strategy Framework Directive are listed and the relevant KTM are listed for all RBDs except the Danube⁸⁸, with an indication of the type of measure, but not indicating the pressures they are addressing. The measures are predominantly supplementary (all in the Rhine, Ems, Weser, Meuse and Warnow/Peene), but some other basic measures are included in the other RBDs.

The RBMPs and Floods Directive⁸⁹ Flood Risk Management Plans have not been integrated into a single plan in any of the RBDs. However, coordination of RBMPs and Flood Risk Management Plans, consideration of the objectives and requirements of the Floods Directive in the second RBMPs and PoM was carried out on all RBDs. Win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and use of Natural Water Retention Measures have also been included in the PoM, and the design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, has been adapted to take account of WFD Environmental Objectives in all RBDs. No financial commitments have been secured for the implementation of PoM in the flood protection sector in any of the RBDs, nor has WFD Article 9(4) been applied to impoundment for flood protection. As such it could be an activity/use which should be subject to cost recovery under Article 9 in all RBDs.⁹⁰

⁸⁷ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0056>

⁸⁸ Germany clarified that KTMs that are relevant to the Marine Strategy Framework Directive were not planned because there were no reduction targets for N-concentration to the Black Sea. Modelling with the target value for N-concentration of 2.8 mg/l NO₃-N analogue to North and Baltic Sea indicates no significant N-pressure from German Danube RBD.

⁸⁹ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

⁹⁰ Germany subsequently informed that it does not consider this a requirement of any of the Directives and that the German definition of water services is in conformity with the WFD, following a judgment of the ECJ.

9.1.2. Measures related to other significant pressures

Most of the other significant pressures relate to unknown anthropogenic pressures – other, unknown, and historical pollution, exploitation of animals or plants, and introduced species or diseases. The indicator gaps are given for some of these as number of water bodies or lengths of water bodies for 2015, or in a few cases for 2021 (with some reductions indicated), but none for 2027. For the Ems and Weser RBDs no reductions are expected by 2021, where indicated. Similarly, indicator values for the KTM associated for each significant other pressures have been provided for some cases only and mainly for 2015, some also for 2021 but none for 2027, with some reductions indicated between 2015 and 2021.

9.1.3. Mapping of national measures to Key Types of Measure

It was expected that Member States would be able to report their PoM by associating their national measures with predefined Key Types of Measure. Key Types of Measure are expected to deliver the bulk of the improvements through reduction in pressures required to achieve WFD Environmental Objectives. A Key Type of Measure may be one national measure but it would typically comprise more than one national measure. Member States are required to report on the national measures associated with the Key Types of Measures, and whether the national measures are basic (Article 11(3)(a) or Article 11(3)(b-1)) or supplementary (Article 11(4)).

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

KTM have been mapped against the national measures in all 10 RBDs, and all include at least one KTM developed by Germany (KTM40 – Measures to prevent or control impacts from human activities). All significant pressures seem to be covered in a sample of the RBDs that were checked (Danube, Rhine, Ems and Weser). An inventory of national measures is provided (WISE electronic reporting).

The percentage of water bodies not expected to achieve good status or potential by 2027 was reported for significant pressures on groundwater and surface water in all RBDs, including information for many sub-basins; it varies from “0”, to “0-10”; but “no information” is indicated for a large number of pressures in many RBDs and sub-basins.

Table 9.1 Mapping of the types of national measures to Key Types of Measure in Germany

Key Type of Measure	National basic measures	National supplementary measures	Number of RBDs where reported
KTM1 - Construction or upgrades of wastewater treatment plants	6	7	10
KTM12 - Advisory services for agriculture	2	3	10
KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)	1	4	8
KTM14 - Research, improvement of knowledge base reducing uncertainty	4	4	10
KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances	2	3	7
KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).	3	3	7
KTM17 - Measures to reduce sediment from soil erosion and surface run-off	2	2	10
KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases		1	6
KTM19 - Measures to prevent or control the adverse impacts of recreation including angling		1	3
KTM2 - Reduce nutrient pollution from agriculture	4	5	10
KTM20 - Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants		4	9
KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	1	10	10
KTM23 - Natural water retention measures		2	10
KTM24 - Adaptation to climate change		2	6
KTM25 - Measures to counteract acidification	2	4	7
KTM3 - Reduce pesticides pollution from agriculture.	2	2	10
KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)		6	8
KTM5 - Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams)		3	10
KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity	1	17	10
KTM7 - Improvements in flow regime and/or establishment of ecological flows	1	5	10
KTM8 - Water efficiency, technical measures for irrigation, industry, energy and households		14	8
KTM40 - Measures to prevent or control the adverse impacts of other human activities		4	10
KTM60 - Additional measures as may be necessary in order to achieve objectives		4	1
Total number of Mapped Measures	31	110	10

Source: Member States reports to WISE

Table 9.2 Type of basic measure mapped to Key Type of Measures in Germany

	Basic Measure Type							
Key Type of Measure	IPPC IED	Nitrates	Point source discharges	Pollutants diffuse	Pollutants direct groundwater	Protection water abstraction	Recharge augmentation groundwaters	Urban Wastewater
KTM1 - Construction or upgrades of wastewater treatment plants								6
KTM12 - Advisory services for agriculture		2			1			
KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)		1	1					
KTM14 - Research, improvement of knowledge base reducing uncertainty		4	1	2				
KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances		2	1					
KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).	3							
KTM17 - Measures to reduce sediment from soil erosion and surface run-off		1	2					
KTM2 - Reduce nutrient pollution from agriculture		4	4					
KTM20 - Measures to prevent or control the adverse impacts of fishing and other exploitation/removal of animal and plants				1				
KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure			3		1		1	
KTM23 - Natural water retention measures				1				
KTM24 - Adaptation to climate change				1				
KTM25 - Measures to counteract acidification		2						
KTM3 - Reduce pesticides pollution from agriculture.		1	2		1			
KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)			2					
KTM5 - Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams)				2				
KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity				7				
KTM7 - Improvements in flow regime and/or establishment of ecological flows				1		1		

Source: Member States reports to WISE

Key

‘IPPC IED’ = Integrated Pollution Prevention Control Directive (96/61/EC) and the Industrial Emissions Directive (2010/75/EU) .
‘Nitrates’ = Nitrates Directive (91/676/EEC).
‘Point source discharges’ = Article 11(3)(g): Requirement for prior regulation of point source discharges liable to cause pollution.
‘Pollutants diffuse’ = Article 11(3)(h): Measures to prevent or control the input of pollutants from diffuse sources liable to cause pollution.
‘Pollutants direct groundwater’ = Article 11(3)(j): Prohibition of direct discharge of pollutants into groundwater.
‘Protection water abstraction’ = Article 11(3)(d): Measures for the protection of water abstracted for drinking water (Article 7) including those to reduce the level of purification required for the production of drinking water.
‘Recharge augmentation groundwaters’ = Article 11(3)(f): Controls, including a requirement for prior authorisation of artificial recharge or augmentation of groundwater bodies.
‘Urban Wastewater’ = Urban Wastewater Treatment Directive (91/271/EEC) .

9.1.4. Pressures for which gaps to be filled to achieve the WFD objectives have been reported and the Key Types of Measures (KTMs) planned to achieve objectives

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

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

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

Member States were required to report which KTMs are to be made operational to reduce the gaps to levels compatible with the achievement of WFD environmental objectives. A number of indicators were predefined for each KTM. Values of the indicators for the second and

subsequent planning cycles were also to be reported to give an indication of the expected progress and achievements: the values for 2027 could be optionally reported. This means that the value of the indicator will be reduced with time as measures are implemented. A value of zero is comparable with 100 % good ecological status or potential or good chemical status.

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

9.2. Main changes in implementation and compliance since the first cycle

In general, the amount and quality of readily available information has improved between the two cycles because of the revised reporting schema. Often there is no equivalent information for the first cycle and it is difficult, therefore, to make direct comparisons between the two cycles, since the data has changed significantly.

Progress since the first RBMP was reported as “some measures completed”, but obstacles include Governance (one of the 10 RBD); lack of finance (four RBDs); lack of mechanisms (three RBDs), not cost effective (eight RBDs), and “other” (land availability) in all RBDs. A large number of significant pressures have been listed for different sources and sectors, and some gap analyses have been reported, although for a limited number of pressures (see also lack of progress concerning recommendations in section 1.3 below). Further information was sought in the assessment of RBMPs and background documents. Two RBDs were selected for assessment. In the first RBD, the Odra, although information had been provided addressing changes between the two cycles this did not address the PoM. In the second RBD, the Rhine, a sub-level C plan relating to Saarland was examined where it was identified that smaller urban wastewater treatment plants with phosphorus removal were planned. They also identified that the selection of measures in the second cycle was based more on monitoring data, rather than expert judgement which had been used in the first RBMPs.

No new legislation or regulations to implement the PoM in the first cycle was reported for any of the 10 RBDs⁹¹.

⁹¹ Germany commented that the implementation of the Programme of Measures is not needed to be under a legislation

9.3. Progress with Commission recommendations

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

- Recommendation: *“Ensure that the RBMPs clearly identify the gap to good status and that the PoM is designed and implemented to close that gap”*

Assessment: Whilst a large number of measures are now reported as operational, a limited number of gap analyses have been provided for some significant pressures and also for “Other significant pressures” for 2015 and for a smaller number also for 2021, with limited improvements predicted for 2021. This recommendation is partially fulfilled.

- Recommendation: *“Germany should include in the RBMPs a clear timetable for the measures to be implemented.”*

Assessment: There is no clear timeline for all the measures to be completed, except the indications from the gap analyses (see also assessment of Recommendation above). Some RBD’s have reported timelines for most important measures. This recommendation is partly fulfilled.

- Recommendation: *“Improve knowledge (in designing and making operational the measures for the second RBMP) on the link between pressures and impacts in order to refine the significance of the pressures by quantifying those which are likely to prevent the achievement of environmental objectives.”*

Assessment: Whilst national measures seem to be available for all significant pressures, no KTM were reported in some RBDs for several significant pressures (for details, see the assessment in section 1.1 above). More information is available in Chapter 2. This recommendation is partly fulfilled.

- Recommendation: *“Assess the reduction in pressures required to achieve environmental objectives”.*

Assessment: This has been addressed to some extent through gap analyses, although these are limited and not all pressures are covered (see the assessment in section 1.1 above). This recommendation is partially fulfilled.

- Recommendation: *“Apportion the source and clearly identify the responsible sectors/areas.”*

Assessment: A large number of significant pressures have been listed for different sources and sectors. This recommendation is fulfilled.

- Recommendation *“Provide more information in the RBMPs about the measures, especially the expected impact/effect on the water bodies’ status. Other information, such as the location, timing and financing would add a level of specificity to the second RBMPs that was a weakness in the first RBMP.”*

Assessment: Details of measures have been provided for each RBD, but their effects on water bodies’ status is not clear in many cases, due to limited gap analyses and lack of detailed/sectoral financial commitments. This recommendation is partially fulfilled.

- Recommendation: *“Meaningful information regarding the scope, the timing and the funding of the measures should be included in the PoM so that the approach to achieve the objectives is clear. All the relevant information on basic and supplementary measures should be included in the summary of the PoM to ensure transparency of the planned actions for the achievement of the environmental objectives set out in the WFD.”*

Assessment: A large number of KTMs have been reported to be operational, but no costs/funding or timing of measures were reported electronically to WISE. Overview information has been provided in some RBDs. This recommendation is partially fulfilled.

- Recommendation: *“Provide better information on how measures are selected and targeted towards a water body. While uncertainties related to the status and the effects of measures were provided in the first RBMPs it is expected that many of these obstacles should have been overcome in the second RBMPs.”*

Assessment: Adequate information is given in RBMPs and POMs for some RBDs. This recommendation is partially fulfilled.

- Recommendation: *“Provide more ambitious programmes of measures for the second RBMPs to increase the number of water bodies at good status by 2021.”*

Assessment: Gap analyses for some pressures indicate improvements by 2021, e.g. the number of point sources from urban wastewater is expected to reduce from 474 in 2015 to 12 in 2021 in surface water of the Rhine RBD, but others show no improvements and gap analyses are limited. This recommendation is partially fulfilled.

- Recommendation: *“Set out better information on the allocation of financial resources for measure implementation in the second RBMPs.”*

Assessment: Apart from an overall financial commitment to implement PoM in all RBDs, little detail on the allocation of financial resources have been provided. This recommendation is not fulfilled.

Topic 10 Measures related to abstractions and water scarcity

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

10.1.1. Water exploitation and trends

Water abstraction (understood as consumptive use) has not been identified as a significant pressure at the RBD level (or in significant portions of the RBD); however several RBDs have more than 10% of groundwater bodies in poor quantitative status (Odra, Meuse⁹² and Warnow/Peene⁹³ RBDs) or more than 20 % of surface water bodies with significant abstraction pressures (Danube RBD). The reported information on pressures and status are not conclusive. The Water Exploitation Index+ is not calculated; and water quantity data have not been previously reported to support the European State of the Environment Report. Water scarcity is not considered an issue at the international level. The RBMPs do not include a water resource allocation and management plan.

10.1.2. Main uses for water consumption

Germany has not reported the uses of water consumption as water quantity pressures are not reported as significant.

10.1.3. Measures related to abstractions and water scarcity

Regarding basic measures (Article 11(3)(e)), in Germany there is a permitting regime and a register of abstractions for surface water and groundwater and a concession, authorisation and/or permitting regime to control water impoundment and a register of impoundments. Furthermore, small abstractions are not exempted from these controls.

Measures for the efficient and sustainable use of water (Article 11(3)(c)) have been implemented in the first cycle and no new measures and/or significant changes are planned for the second cycle, except for the Weser and Odra RBDs where new measures are planned; however, these are not the RBDs facing the most relevant water quantity pressures.

Measures for the prior authorisation of artificial recharge or augmentation of groundwater bodies (Article 11(3)(f)) have been implemented in the first cycle and no new measures or

⁹² Germany subsequently clarified that deficits in the German part of RDB Meuse are due to the specific conditions in the lignite mining area.

⁹³ Germany subsequently clarified that in the RBD Warnow/Peene 5 groundwater bodies are in bad quantitative status. For three of them, the reasons are the anthropogenic pressures 'abstraction' and 'saline intrusion due to abstraction'. For the other two water bodies, the reasons are unknown and investigations are taking place to find the cause for the lowering of the water tables.

significant changes are planned for the next period for all RBDs, except for the Weser and Odra RBDs.

Complementary measures under KTMs are reported for addressing abstraction pressures, applying a rather varied set in the different RBDs. Measures under KTM8 - Water efficiency, technical measures for irrigation, industry, energy and households will address gaps in approximately 50 water bodies in the Danube, Rhine, Ems, Elbe, Schlei/Trave and Warnow/Peene RBDs. Measures under KTM7 - Improvements in flow regime and/or establishment of ecological flows as well as KTM13 and KTM14 are only foreseen for a limited number of water bodies in the Elbe RBD. Measures under KTM5, KTM6, KTM21 and KTM24 are planned in the Rhine RBD to address water abstraction pressures.

The list of measures under KTMs proposed for addressing water abstraction pressures seems rather casual and is very different between the RBDs, with some KTMs listed that do not necessarily have an apparent influence in reducing pressures (especially in the Rhine and Elbe RBDs). On the other hand, it is also noteworthy that water pricing is apparently not foreseen for any RBD.

10.2. Main changes in implementation and compliance since the first cycle

Measures for the efficient and sustainable use of water (Article 11(3)(c)) have been implemented in the first cycle and no new measures and/or significant changes are planned for the second cycle, except for the Odra RBD where new measures are planned (however, this is not one of the RBDs facing the most relevant water quantity pressures).

10.3. Progress with Commission recommendations

There were no recommendations from the first RBMPs for this topic.

Topic 11 Measures related to pollution from agriculture

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

Pressures and impacts on water quality from agriculture are reported in all RBDs and include pollutants such as nutrients (and associated eutrophication) and pesticides, as well as morphological modifications.

A gap assessment for the reduction in the number of applications of pesticides is only provided for the Rhine RBD. A gap assessment for loads of nitrogen/phosphorus to be reduced to achieve objectives was done in all RBDs but the values provided do not allow a detailed assessment for all RBD's⁹⁴.

Measures match the identified pressures: KTM2 – Reduce nutrient pollution from agriculture, KTM3 – Reduce pesticides pollution, KTM12 – Advisory services for agriculture, KTM13 – Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc.), KTM17 – Measures to reduce sediment from soil erosion and surface run-off, KTM23 – Natural water retention measures are applied in all RBDs. The LAWA⁹⁵ -BLANO Maßnahmenkatalog translates the KTM into national measures, which are voluntary and mandatory at the same time. This can be explained by the fact that the measures can be applied under the legal requirements (e.g. Nitrates Directive⁹⁶) but also on a voluntary basis (e.g. under the Rural Development Programme).

Implementation of basic measures Article 11(3)(h) for the control of diffuse pollution from agriculture at source is ensured in all RBDs where the same rules apply across the whole RBD. Supplementary measures are applied in all RBDs. General binding rules for microbiological/bacteriological pollution, nitrates, organic pollution, other pollutants, pesticides, phosphorus and sediments to control diffuse pollution from agriculture are set and applied in all RBDs.

The Rhine RBD has been checked to identify whether mandatory safeguard zones around Drinking Water Protected Areas have been established to protect drinking water sources from agricultural pollution and such zones are implemented.

⁹⁴ Germany subsequently stated that for some RBDs further explanation is provided in the RBMPs.

⁹⁵ The LAWA is the German Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry. www.lawa.de/index.php?a=2

⁹⁶ Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:31991L0676>

In these zones, mandatory measures in all RBMPs addressing the Rhine refer to measures under the Nitrates Directive without detailing them further. There is also a reference to the national plant protection regulation in all plans. Further measures are only voluntary⁹⁷.

Farmers/Farmers' Unions have been consulted under the Public Consultation process in all RBDs.

According to WISE, financing of measures is not secured in any of the RBDs and no information on potential costs is provided⁹⁸. Germany subsequently stated that this is a reporting error and that financing is secured. In WISE, there is also no information on potential sources of funding. For the Rhine RBD, which was assessed on an exemplary basis, the main sources of funding for the voluntary measures come from the Rural Development fund and revenues from water abstraction fees.

11.2. Main changes in implementation and compliance since the first cycle

Pressures and impacts remain mostly the same as in the first cycle.

A gap assessment for the reduction in the number of applications of pesticides is only provided for the Rhine RBD. A gap assessment for load of nitrogen/phosphorus to be reduced to achieve objectives was done in all RBDs but the values provided do not allow a detailed assessment for all RBDs⁹⁹.

In the first cycle, there was some information on costs and funding of agriculture measures. This information is not provided in electronic reporting (see Annex 0) in the second cycle.

11.3. Progress with Commission recommendations

The Commission recommendations based on the first RBMPs and Programmes of Measures requested action on the following:

- Recommendation: *Check that their nutrient standards are consistent with biological requirements for the achievement of good status and set out a more coherent strategy in the second RBMPs that reflects for agriculture what will be achieved through measures to implement the Nitrates Directive, through basic measures under Article*

⁹⁷ Germany subsequently stated that in all drinking water protection areas, specific mandatory and detailed regulations exist to prevent water pollution. Those are supplemented by further voluntary measures (cooperative farmers unions).

⁹⁸ Germany subsequently clarified that this is a reporting error and financing of measures is secured.

⁹⁹ Germany subsequently stated that for some RBDs further explanation is provided in the RBMPs.

11(3) of the WFD, basic measures included in pillar 1 (GAEC, greening) of the CAP and supplementary measures under pillar 2 of the CAP.

Assessment: According to WISE, a gap assessment for loads of nitrogen/phosphorus to be reduced to achieve objectives was done in all RBDs. In the RBMPs from the Rhine (Bavaria) and Danube RBDs, it is stated that such an assessment is available for nitrate and phosphorous pollution as a result of the MONERIS¹⁰⁰ modelling exercise. This exercise was done for all of Germany but the relevant studies have not been reported to WISE. In the Bavaria RBMP for the Rhine RBD, some key figures are provided on the reductions in nitrates and phosphorous. It is stated that basic measures will not lead to any further reductions, but that the new fertiliser ordinance under the Nitrate Directive is expected to have a positive impact. Also measures such as buffer strips and measures to reduce erosion, and nitrate leaching into groundwater and surface water are likely to have an impact. The expected reductions are provided for nitrate and phosphorus on the sub basin level (planning unit). The plan of Baden-Württemberg (Rhine and Danube RBD) also refers to the MONERIS/More modelling exercise and refers to further details in a background document. The background document shows the different nutrient loads coming from various point and diffuse sources but provides no information regarding what could be achieved in terms of reduction through various measures. This is planned as a future activity. Mandatory measures are only foreseen under existing legislation (e.g. Nitrates Directive, Pesticides, Drinking Water Directive) or to reduce nutrients or pesticides and in Protected Areas. Most of the measures are voluntary and funded under the Rural Development Programme or by the water abstraction fees. This recommendation is partially fulfilled.

- Recommendation: *Germany should put in place a revised nitrates action programme under the Nitrates Directive that can address this issue meaningfully.*
- Assessment: In 2018 on the basis of the old fertiliser legislation, the European Court of Justice has declared “that, by failing to adopt supplemental or enhanced measures as soon as it became apparent that the measures of the German action programme were inadequate and by failing to review that action programme, the Federal Republic of Germany failed to fulfil its obligations under Article 5(5) and (7) of Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against

¹⁰⁰ MONERIS is a nutrient emission model, which is used for regional, national and international studies of water quality in catchment areas.

pollution caused by nitrates from agricultural sources”¹⁰¹. In the meantime, Germany has adopted a new fertilizer ordinance that led to a revision of its action programme. However, it is still considered as being not sufficient to protect water against pollution. This recommendation is not fulfilled.

- Recommendation: *Make a clear distinction in the RBMPs between mandatory measures (the minimum being basic measures to implement article 11.3.) and voluntary ones that will be funded e.g. under the EARDF.*
- Recommendation: *(first RBMP) Concerning Agriculture, i) a strategy mainly built on voluntary measures will not deliver. A right balance between voluntary actions and a strong baseline of mandatory measures needs to be set up, ii) the baseline for water protection needs to be very clear so that all farmers know the rules and the authorities in charge of the CAP funds can adequately set up Rural Development programmes and cross compliance water requirements.*

Assessment: In none of the plans assessed is it clearly stated which technical/physical measures are mandatory or voluntary measures¹⁰². However, in general, voluntary measures prevail before mandatory measures. Mandatory measures are only foreseen under existing legislation to reduce nutrients or pesticides and in Protected Areas. The LAWA-BLANO-Maßnahmenkatalog translates the KTMs into national measures, which can be both voluntary and mandatory at the same time. What this means is that the measures can be applied under the basic measures (minimum requirements to be complied with (e.g. Nitrates Directive) but also on a voluntary basis (e.g. under the Rural Development Programme). Thus, farmers know the rules and some of the measures are subject to cross compliance controls while others are voluntary and funded by the CAP, and so they depend on the uptake by farmers. These recommendations are partially fulfilled.

- Recommendation: *Make clear to what extent the full range of agriculture measures included in the RBMP will be sufficient to redress agriculture pressures to allow good status objectives to be achieved.*

Assessment: This recommendation has been partly fulfilled as a gap assessment has been carried out, but limited information is provided in the plans assessed as to what

¹⁰¹ See Judgment of the Court (Ninth Chamber) of 21 June 2018 — European Commission v Federal Republic of Germany (Case C-543/16)

¹⁰² Germany subsequently stated that it is not the case for all RBDs.

extent the full range of agricultural measures included in the RBMP will be sufficient to redress agriculture pressures to allow good status objectives to be achieved.

- Recommendation: *Review regulation on the use of pesticides (beyond nutrients) in order to prevent pollution at source and effectively reduce current levels of contamination of both surface and groundwater, making clear linkages with the implementation of the Directive on the sustainable use of pesticides. If the National Action Programme (to implement the SUD) is intended to fulfil the requirement to have controls on pesticide pollution as required by article 11(3) of the WFD, then the detail on these controls (mandatory measures) should be set out in the RBMPs and the PoMs.*

Assessment: A new national Action programme under the Directive on the sustainable use of pesticides was adopted on 15 May 2013. The programme refers to the federal and Länder control system as set out in the national legislation implementing the Directive on the sustainable use of pesticides. The assessed plans refer to the national adopted legislation. This recommendation has been fulfilled.

- Recommendation: *Mainstream across Germany good practices from some Länder on consistently addressing hydromorphological pressures through the Rural Development Programmes.*

Assessment: Such measures can be found in all German RBMPs and Rural Development Programmes. To what extent good practices have been mainstreamed into the latter has not been assessed, as this would rely on an in-depth assessment of the Rural Development Programmes.

- Recommendation: *Explore all opportunities to secure necessary funding to pay for RBMP measures, e.g. wider application of article 9, RDPs, national flood budget (with a priority for natural water retention measures), water company investment and industry measures to reduce chemicals at source..*

Assessment: All RBMPs refer to the issue of funding and address a wide range of funding options such as EU funds, Länder Funds, nature conservation funds, national flooding funds. Private investments are triggered due to internalising environmental costs (higher environmental standards) or quality requirements to drinking water. The wider application of Article 9 is not discussed in the plan. This recommendation is partially fulfilled.

- Recommendation: *(PoM) Define measures targeted to agriculture with a much better level of detail to ensure their uptake by farmers, their inspection by relevant agencies and to assist tracking of compliance. Basic measures are mostly presented as legislative acts and in the next RBMPs Germany should present detail on technical measures included in such acts.*

Assessment: The LAWA-BLANO-Maßnahmenkatalog (List of Measures) translates the KTMs into national measures which go some way towards making the measures more easily taken up by farmers. Under KTM12 – Advisory services for agriculture, advice continues to be made available to farmers to support their uptake and implementation of measures. This recommendation is partially fulfilled.

Topic 12 Measures related to pollution from sectors other than agriculture

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

In the context of this topic, pollution is considered in terms of nutrients, organic matter, sediment, saline discharges and chemicals (priority substances, river basin specific pollutants, groundwater pollutants and other physico-chemical parameters) arising from all sectors and sources apart from agriculture.

KTMs relevant to non-agricultural sources of pressures causing failure to achieve the WFD objectives have been reported for all RBDs in Germany. In total, 17 different KTMs have been reported including:

- KTM 1 - “Construction or upgrades of wastewater treatment plants”;
- KTM4 - "Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)";
- KTM15 – “Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances”;
- KTM16 – “Upgrades or improvements of industrial wastewater treatment plants (including farms)”;
- KTM 21 - “Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure”.

The WFD specifies that PoM shall include, as a minimum, “basic measures” and, where necessary to achieve objectives, “supplementary measures” when basic measures are not enough to address specific significant pressures (see the chapter 9 in this report). Quantitative information on basic and supplementary measures used to tackle pollution from non-agricultural sources is provided in all German RBMPs. Quantitative information on basic measures to tackle pollution from non-agricultural sources (number of measures per KTM) is provided for five measure types for five of the 10 German RBDs (Danube, Rhine, Weser, Elbe, Odra).

Germany provided more targeted information on basic measures required under Article 11(3)(c) to (k). Use of an authorisation and/or a permitting regime to control wastewater point source discharges (Basic measures Article 11(3)(g)) was reported for all German RBDs for surface and groundwater. The register of wastewater discharges (Basic measures Article 11(3)(g)) is available in all German RBDs for surface and groundwater.

In all German RBDs, there are no thresholds below which wastewater discharges do not require permits and are not subject to registration (Basic measure Article 11(3)(g)). According to the information reported electronically to WISE, some direct discharges to groundwater are authorised in accordance with Article 11(3)(j) in German RBDs (Danube¹⁰³, Rhine, Ems and Meuse¹⁰⁴). According to the reporting in WISE, there is no prohibition of direct discharges to groundwater in the other 6 RBDs in Germany. However, Germany subsequently clarified that, according to the Federal Water Act, discharges into groundwater are subject to authorisation and authorisation is only possible under specified conditions.

Measures to eliminate or reduce pollution from Priority Substances and other substances (Basic measures Article 11(3)(k)) are reported to be in place in all RBDs in Germany.

12.2. Main changes in implementation and compliance since the first cycle

In the first RBMPs, general measures did not target specific chemical substances but focused on industrial and household emissions. Additionally, the Danube and the Rhine RBMPs included emissions from agriculture and the Weser RBMP included emissions from potash mining. Information relating to substance-specific measures was not found in the RBMPs of the Rhine and Danube. However, some information on substance-specific measures was given in the other RBMPs.

For the second RBMPs, it was reported to WISE that KTMs are in place for significant pressures from specified Priority Substances causing non-compliance in nine out of ten RBDs. Further details were provided in the RBMPs regarding these measures, which do not always match the reported information. For measures for Priority Substances causing failure, the RBMP for the Schlei/Trave RBD refers to a measure called "Priority Substances national action plan for plant protection substances" because all Priority Substances causing failure except mercury are produced by agricultural activities. No specific measure related to mercury

¹⁰³ Germany subsequently clarified that the targeted questions regarding this point were ambiguously worded; in the Danube RBD only re-infiltration of thermally altered groundwater takes place, no discharge of chemical substances

¹⁰⁴ Germany subsequently clarified that no direct discharges into groundwater are known for the German part of the Meuse RBD and that this may have been a reporting error.

has been found. The measures in the Programmes of Measures are mainly legal actions and refer only to the Priority Substances as such without specifying single substances. Similarly, in the Elbe RBMP, the PoM does not explicitly link measures to single Priority Substances causing failure, although this was reported in WISE. The text in the PoM also refers just to Priority Substances without providing any further details. The RBMP states that "With regard to these pollutants, the measures aim at a gradual reduction and, with regard to priority hazardous substances, at ending or phasing out discharges, emissions and losses of these substances. The basic measures can help to ensure that the priority hazardous substances are no longer used and can therefore no longer be released into the environment." The same approach has been applied in the Danube and Rhine RBDs where the Programmes of Measures does not explicitly link measures (basic and supplementary) to single Priority Substances causing failure.

As far as measures for River Basin Specific Pollutants causing failure are concerned the RBMP for Bavaria refers to other substances beside Priority Substances but the measures are not linked to any specific substances. The same approach has been used in the Elbe, Schlei/Trave and Rhine RBDs.

The Programmes of Measures do not distinguish between surface and groundwater for chemicals, therefore do not link specific measures to individual pollutants in groundwater either, but rather consider measures in relation to groups of pollutants.

12.3. Progress with Commission recommendations

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

- Recommendation: *“Check that their nutrient standards are consistent with biological requirements for the achievement of good status and set out a more coherent strategy in the second RBMPs that reflects for urban areas: what will be achieved through compliance with the UWWTD and what will be required beyond this (e.g. tightening of standards, addressing storm water overflows). In particular it is expected that the second RBMPs, based on the necessary reduction in nutrient load, clearly identify the extent to which the measures already taken under the implementation of the ND and UWWTD contribute to the achievement of WFD objectives and which additional measures should be taken to actually achieve these objectives. A clear identification of basic (mandatory) measures is expected to be made transparent both to the sectors and the general public. Clarity on timescale of implementation of the measures is also expected.*

Assessment: Measures to tackle urban point sources are reported in each German RBD in the WISE electronic reporting. Gap assessments were carried out for nutrients covering point and diffuse pollution for the whole of Germany. For other chemical substances such assessment is only planned. In 2017 annual emissions were modelled for the following substance groups¹⁰⁵: nutrients (nitrogen, phosphorus), heavy metals (cadmium, chromium, copper, mercury, nickel, lead, and zinc), polycyclic aromatic hydrocarbons (Σ EPA-PAH16), bis(2-ethylhexyl)phthalate, pharmaceuticals (ibuprofen, diclofenac, iomeprol, sulfamethoxazol), industrial chemicals (nonylphenol), biocide triclosan and herbicide terbutryn. Furthermore, it is stated in all RBMPs assessed that the Urban Wastewater Treatment Directive and Industrial Emissions Directive¹⁰⁶ are fully implemented in Germany and that this significantly contributes to achieving the objectives of the WFD. Supplementary measures are taken at a few sewage treatment plants due to emission considerations, if the discharge into the aquatic environment produces a significant pressure that prevents achievement of the objective. This covers improved treatment technology, establishing higher degrees of connection of households, and improved operation and expansion of existing plants.

This recommendation is thus considered largely fulfilled.

- Recommendation: *“Include in the second RBMPs a more consistent approach to substance-specific measures in the different Länder and put in place substance-specific and general measures to address pollutants at source.”*

Assessment: KTMs have been reported for significant pressures from specific Priority Substances causing non-compliance in nine out of ten RBDs. In Germany, for those substances where a European Union regulation/measure or national regulation/measure exists, a more consistent approach is taken. The German LAWA has developed a catalogue of measures from which the Länder can select the appropriate measures. However, there is still some flexibility in selecting and implementing measures due to the subsidiarity principle in Germany. For example, the new fertilizer ordinance sets maximum values for nitrogen in groundwater and requires certain measures. However, the Länder have the opportunity to apply stricter rules. No information could be found on measures for addressing pollution at source.

This recommendation is considered partially fulfilled.

¹⁰⁵ See <http://www.mdpi.com/2073-4441/9/4/239/htm>

¹⁰⁶ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32010L0075>

Topic 13 Measures related to hydromorphology

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

Significant hydromorphological pressures, and operational KTMs to address them, are reported for all RBDs. In most water bodies, the sectors related to significant physical alterations are flood protection and agriculture, however there is a significant number of water bodies where the sector/driver is unknown/obsolete or indicated as "other" (not specified as one of the key sectors in the WISE reporting). The main sectors related to dams, barriers and locks are hydropower, flood protection and irrigation. For the majority of water bodies affected by this pressure, the sector/driver is unknown/obsolete or indicated as "other". The main sectors related to significant hydrological alterations are agriculture, hydropower and "other".

There are many different KTMs which are made operational to tackle hydromorphological pressures. The most frequently applied are KTMs 5, 6, 7, 14 and 23. KTM24 (adaptation to climate change) is also applied for hydromorphological pressures in some RBDs. In addition to these, several other KTMs not typically related to hydromorphology are applied to tackle hydromorphological pressures in a few RBDs (these include KTMs 1, 2, 4, 8, 12, 16, 20 and 21).

The types of specific hydromorphological measures planned are diverse across the different RBDs, including reduction of abstractions, minimum water flow, restoration of continuity (e.g. via fish ladders, bypass channels, barrier removal), habitat restoration (including banks and river beds).

In terms of basic measures, there is an authorisation and/or permitting regime in place to control physical modifications in all RBDs, which covers changes to the riparian area of water bodies, according to WFD Article 11(3)(i) in all RBDs. There is also a register of physical modifications of water bodies in all RBDs.

Overall management objectives in terms of river continuity have been set and the KTM5 (Improving longitudinal continuity) is reported for all RBDs. Respective quantitative objectives (e.g. km of rivers connected, number of obstacles to be made passable) are set in all RBDs except in Odra according to the information reported in WISE.

Win-win measures in terms of achieving the objectives of the WFD¹⁰⁷ and Floods Directive¹⁰⁸, drought management and use of Natural Water Retention Measures are reported to be included in the PoM in all RBDs. The specific KTM23 on Natural Water Retention Measures is also applied in all RBDs to tackle significant hydromorphological pressures.

The design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, is reported to have been adapted to take into account the WFD objectives in all RBDs.

In seven RBDs (Danube, Rhine, Ems, Weser, Elbe, Odra and Meuse), ecological flows have been partly derived (for some relevant water bodies). In these RBDs, the ecological flows which have been derived have been implemented only in some relevant water bodies. Overall, the work on ecological flows is still on-going, but the second RBMPs do not provide further information on the timeline for completing the implementation of ecological flows. According to the information reported in WISE, in three RBDs (Eider, Schlei/Trave, Warnow/Peene¹⁰⁹), ecological flows have not been derived for the relevant water bodies¹¹⁰ and there are no plans to do so during the second cycle. Although the RBMPs refer to reducing abstractions and setting minimum water flows linked to authorisation permits for abstractions, it is not clear whether these measures are specifically targeting the achievement of ecological flows. Furthermore, no information was found on specific regulations to establish ecological flows or initiatives to set new standards for ecological flow definition according to the WFD objectives.

Some indicators on the gap to be filled for significant hydromorphological pressures are reported for 2015 and 2021 but not for 2027. From the information available, it can be concluded that there will be different levels of progress in the various RBDs in terms of closing the gap for different types of hydromorphological pressures by 2021. In many cases, the reduction in hydromorphological pressures between 2015 and 2021 is not yet known, and indicator values are not provided. In cases where some information is available on gap indicators, reductions in hydromorphological pressures can be expected at an average level of ca. 40 %, which varies for the different RBDs and different pressure types. In terms of barriers

¹⁰⁷ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

¹⁰⁸ Directive 2007/60/EC on the assessment and management of flood risks entered into force on 26 November 2007 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

¹⁰⁹ Germany subsequently informed that the information on the RBD Warnow/Peene is a reporting error and, in this RBD, ecological flows have been partly derived (for some relevant water bodies) and the work is still on-going.

¹¹⁰ Germany clarified that the permits for water abstraction are regulated by the existing water law.

incompatible with the WFD objectives, it is expected that there will be some reduction in their number from 2015 to 2021 in at least half of the RBDs.

13.2. Main changes in implementation and compliance since the first cycle

Due to the improved WISE reporting, the links between hydromorphological pressures, uses and relevant measures has become clearer.

The RBMPs indicate the hydromorphological measures which have been implemented in the first cycle, the ones planned for the second cycle and discuss progress made. Several measures of the first cycle which have not been implemented yet are related to hydromorphology, the reasons including lack of acceptance, lack of financial and human resources and issues related to land ownership.

13.3. Progress with Commission recommendations

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

- Recommendation: *Consider properly ecological flows wherever existing and planned abstractions may jeopardize the achievement of environmental objectives. This is particularly crucial when considering the review of water allocations and permits.*

Assessment: The work on deriving and implementing ecological flows is still on-going, but the second RBMPs do not provide further information on the timeline for completing this process. According to the WISE reports, in three RBDs (Eider, Schlei/Trave, Warnow/Peene¹¹¹), ecological flows have not been derived for the relevant water bodies and there are no plans to do it during the second cycle. Although the RBMPs refer to reducing abstractions and setting minimum water flows linked to authorisation permits for abstractions, it is not clear whether these measures are specifically targeting the achievement of ecological flows. Furthermore, the second RBMPs do not provide information on how ecological flows are defined and whether they are considered in the review of water allocations and permits.

Therefore, not enough information on progress regarding this recommendation could be found in the RBMPs.

¹¹¹ Germany subsequently informed that the information on the RBD Warnow/Peene is a reporting error and, in this RBD, ecological flows have been partly derived (for some relevant water bodies) and the work is still on-going.

- Recommendation: *Review the legislative base on morphology to ensure that controls exist to adequately prevent new morphological pressures.*

Assessment: In the second cycle, it is reported that there is an authorisation and/or permitting regime in place to control physical modifications in all RBDs, which covers changes to the riparian area of water bodies according to WFD Article 11(3)(i) in all RBDs. There is also a register of physical modifications of water bodies in all RBDs. However, no specific information was found that the legislative base on morphology has been reviewed since the first RBMPs.

Based on the information reported, this recommendation seems to be fulfilled in terms of basic measures under WFD Article 11(3)(i). However, it cannot be concluded on the basis of the information found, whether this is a marked improvement compared to the legislative base in the first RBMPs.

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

Assessment: The KTM23 on Natural Water Retention Measures is applied in all RBDs to tackle significant hydromorphological pressures. No information was found in the second RBMPs on a specific national or regional strategy that prioritises the implementation of Natural Water Retention Measures and green infrastructure measures.

This recommendation has thus been partially fulfilled.

Topic 14 Economic analysis and water pricing policies

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

Overall, there were no significant modifications regarding the implementation of Article 9 between the two cycles. There is limited information regarding the calculation of cost recovery rates, the contribution of different sectors and uses to cost recovery, and the calculation and internalisation of environmental and resource costs. The definition of water services has not changed.

The economic analysis has been updated in all RBDs, with the developments and trends in the baseline scenario being updated, and there are some improvements on the information on the incentive function of water pricing.

Due to the limited modifications in comparison to the first RBMP, no major improvements in implementation and compliance are noted.

14.2. Progress with Commission recommendations

- Recommendation: *The cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are "self-services", for instance self-abstraction for agriculture. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs should be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.*

Assessment: A general explanation is provided that through specific policies/instruments/legislation in place (charging, licensing etc.), the adequate contribution to cost recovery is ensured (no details are given for specific water services and/or contributions by specific water uses).

Financial Cost Recovery rates are provided for all RBDs, and are exactly 100 % for both water services, except in the Ems RBD where the cost recovery rates are 102 to 104 % for water supply and 102 to 114 % for water treatment.

However, it is not made clear how the Cost Recovery rates have been calculated, and it cannot be seen if such rates are "broken down" per water use sector. In all RBDs, the three water uses (households, agriculture and industry) are reported as contributing to the costs of both water services. In all RBDs, households and industry are reported as sectors benefiting from both water services. This also holds for agriculture regarding the water service "Drinking water abstraction (surface and/or groundwater), treatment and distribution". Regarding the water service "Sewage collection and wastewater treatment", most RBDs report agriculture as a sector benefiting, with the exception of the Donau, Rhine, Ems, Maas, and Warnow/Peene RBDs.

In the LAWA recommendations for the update of the economic analysis, it is stated that indirect discharges (from households and industry) to municipal sewage treatment plants have an impact on the cost of the water service. Depending on the type and amount of discharges, the effort required to provide the necessary infrastructure (wastewater treatment plants and pipeline network) varies. The appropriate contribution by the indirect initiators is made on the one hand via a basic fee (to cover the fixed costs) and also through a fee that is based on consumption. Rainfall water discharges are also taken into account in the calculation for indirect discharges from all areas. For industrial discharges into public sewage systems and sewage treatment plants, so-called heavy-pollutant contributions can also take into account the particular material loads of the sewage treatment plant. The special-law water associations, which are responsible for a considerable part of the wastewater treatment in North Rhine-Westphalia, also base their contribution assessment on causative levy scales, which take into account both the amount of waste water and the pollutant loads.

Water withdrawals (by households, industry and agriculture) from the public water supply network affect the provisioning costs of this water service. The tariffs for the provision of drinking water for the uses mentioned include basic prices to cover fixed costs and volume-based prices. In this respect, a reasonable contribution is assumed.

Diffuse substance inputs, especially from agriculture, into surface waters and groundwater often lead to an increased processing effort on the part of the water service "public water supply". Here, Article 9(1), second sentence, indent 2 of the WFD¹¹² calls for an "adequate contribution" to cover the costs of water services,

¹¹² Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

based on the economic analysis and taking into account the polluter-pays principle. It is stated that a legally required exact assignment of causation is impossible and tax law instruments do not exist so far in this area. Further it is stated that there are a number of regulatory instruments aimed at the prevention of inputs of substances and the preventive protection of waters (such as the prohibitions in water conservation areas, the designation of strips of water bodies with restrictions on use, regulations in the field of fertilizers and phytosanitary legislation) which indirectly lead to a partial charge to the polluter.

All German RBDs report for both water services that environmental and resource costs are calculated. Yet, not all RBMPs explain and present the relevant calculations. Additionally, it is stated that there is no harmonised methodology at EU level and that there are significant methodological problems with calculating environmental and resource costs. References to the Common Implementation Strategy for the Water Framework Directive Guidance Document No 1, Economics and the Environment¹¹³ are made. It is further stated that the waste water fee is based upon how harmful the waste water is (no further details are given). This approach is seen as a step towards the internalisation of the environmental and resource costs.

Most of the RBDs report for both water services that Environmental and Resource Costs are "partly" internalised (exceptions are the Danube, Eider, and Warnow/Peene RBDs, which report "Null").

In all RBDs and for both water services, the environmental and resource costs are not considered to be significant.

Regarding the internalisation of environmental and resource costs in the cost recovery, Germany states that this took place, but at the same time states that environmental and resource Costs are not significant. Approaches/methodologies for a calculation of the environmental and resource costs are not provided.

Regarding the incentive function of water pricing for all water services, Germany provided more details in the second RBMPs than in the first cycle, but the information is still on a general level (not per sector/water service).

It is further stated that the objectives of Article 9(1)(1) of the WFD have already been met, for three reasons:

¹¹³[https://circabc.europa.eu/sd/a/cffd57cc-8f19-4e39-a79e-20322bf607e1/Guidance%20No%201%20-%20Economics%20-%20WATECO%20\(WG%202.6\).pdf](https://circabc.europa.eu/sd/a/cffd57cc-8f19-4e39-a79e-20322bf607e1/Guidance%20No%201%20-%20Economics%20-%20WATECO%20(WG%202.6).pdf)

1. Due to the relatively high polluter-payment for drinking water supply and sanitation, water consumption per capita in Germany has been falling continuously for years.
2. High technical standards have been in place for years to reduce water losses in water services.
3. Environmental charges, such as the wastewater tax and regionally differentiated water abstraction levies are levied on a nationwide basis.

The German RBMPs mention the polluter-pays-principle (PPP) as a basic principle of German water pricing policy (but without providing details on where or how the PPP is realized in the water pricing policy) and as being reflected in the contributions of the different water users to cost recovery. No further details are provided.¹¹⁴

In summary, there is little progress on this recommendation.

¹¹⁴ Germany has informed the Commission that this is implemented, for example, through the Waste Water Charge regulated by Federal Law, water abstraction fees regulated by Federal State Law, local fees for water services. Moreover, any permit issued for water uses induces costs for implementing requirements stipulated in the permit by the permit holder.

Topic 15 Considerations specific to Protected Areas (identification, monitoring, objectives and measures)

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

Germany has reported Protected Areas for all relevant directives in the second RBMPs except for the Nitrates¹¹⁵ and Urban Waste Water Treatment Directives in surface waters, for which a whole territory approach was applied. For groundwater, Protected Areas have only been associated with Drinking Water Protected Areas and Protected Areas designated under the Birds and Habitats Directives.

Table 15.1 *Number of Protected Areas of all types in each RBD of Germany, for surface and groundwater*

Protected Area type	Number of Protected Areas associated with				
	Rivers	Lakes	Transitional	Coastal	Groundwater
Abstraction of water intended for human consumption under Article 7	125	16			2833
Recreational waters, including areas designated as bathing waters under Directive 76/160/EEC ¹¹⁶	615	659	17	351	
Protection of species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 79/409/EEC (Birds) ¹¹⁷	527	110	10	23	584
Protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (Habitats) ¹¹⁸	2391	256	10	68	3229
Nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under	Whole territory	Whole territory	Whole territory	Whole territory	Whole territory

¹¹⁵ Germany subsequently clarified that a whole territory approach has been used to the designation under the Nitrates Directive so no individual Protected Areas are in place but monitoring is undertaken.

¹¹⁶ Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0007>

¹¹⁷ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>

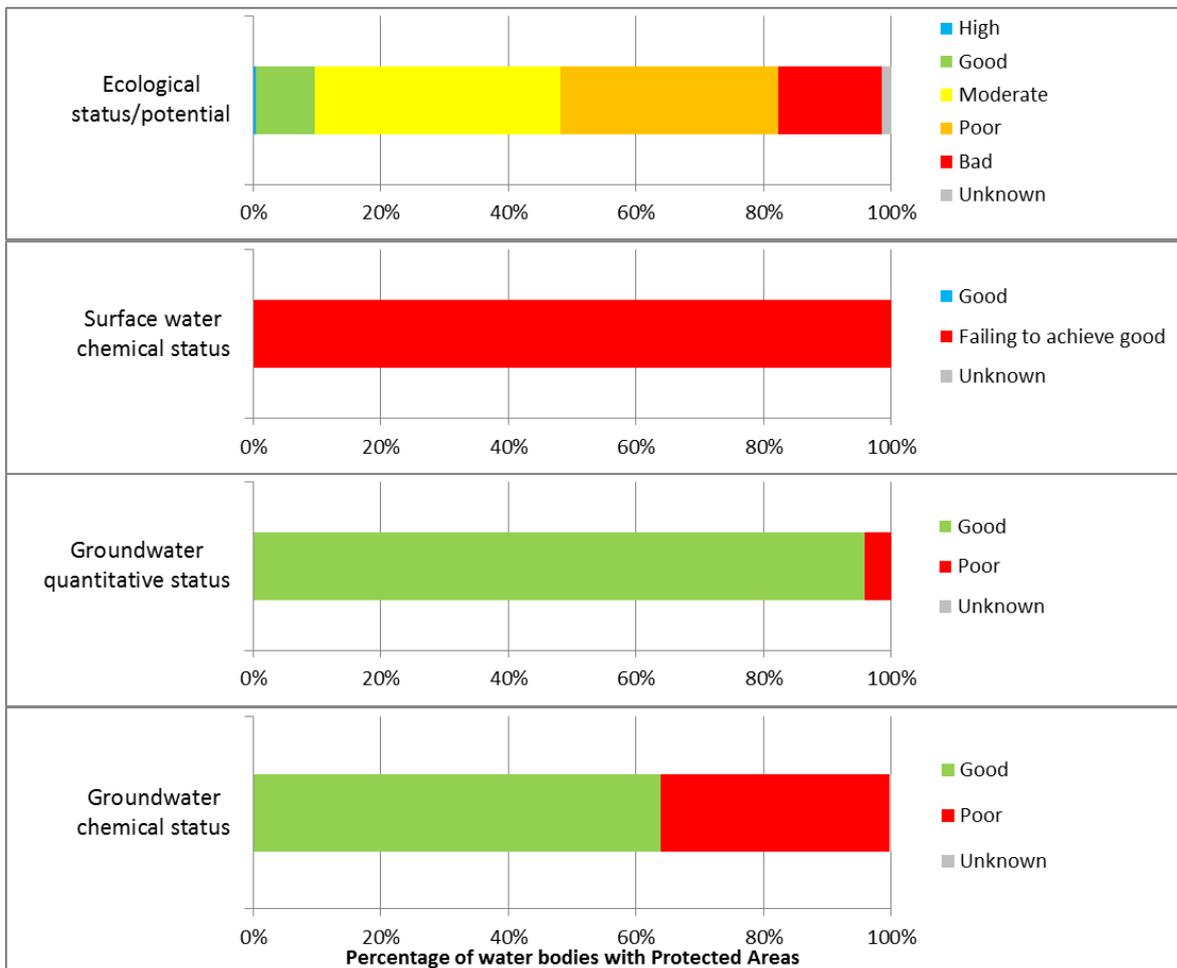
¹¹⁸ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043>

Protected Area type	Number of Protected Areas associated with				
	Rivers	Lakes	Transitional	Coastal	Groundwater
Directive 91/271/EEC					
Areas designated for the protection of economically significant aquatic species (fish and shellfish)	168	10	1	16	

Source: Member States reports to WISE

The status of water bodies associated with Protected Areas is comprehensively reported (Figure 15.1) with the status classification reported as being of high or medium confidence due to the presence of monitoring in a high proportion of Protected Areas.

Figure 15.1 Status of water bodies associated with the Protected Areas report for Germany. NB - based on status/potential aggregated for all water bodies associated with all Protected Areas



Source: WISE electronic reports

Germany reported that, for Protected Areas designated under the Birds and Habitats Directives some specific water objectives have been set to protect water dependent habitats or species but in other cases they had not because the additional needs of the interest features are not known. It is not possible to judge if this refers to the fact that it is not known if the objectives according to the WFD will also cover the objectives according to other European Union legislation. Overall, it is unclear which the unknown additional needs are. Germany has not indicated in the information reported to WISE whether the WFD objectives for water bodies associated with these Protected Areas is sufficient to also reach the objectives according to the parent Directives. This means that, in principle, all Protected Areas should have a specific additional objective¹¹⁹. Further work is required in the third cycle to determine whether additional objectives for water dependent interest features in Natura 2000 sites are required where they have not been set in the second cycle.

For Drinking Water Protected Areas, no additional objectives are set either. With respect to Protected Areas designated in relation to shellfish harvesting, additional objectives had been set in 2 RBDs (Ems and Weser) comprising microbiological standards that are identical to those in the repealed Shellfish Waters Directive. Additional objectives were not set in 3 other RBDs (Elbe, Eider and Schlei/Trave).

Monitoring sites of surface water associated with Protected Areas are only reported for those under Article 7 of the WFD, the Nitrates, Urban Waste Water, Habitats and Bathing Waters Directives (Table 15.2). No specific monitoring sites are reported as associated with other Protected Areas (those designated under the Birds Directive). Furthermore monitoring sites are only reported for surface freshwaters and not for transitional or coastal waters (which could partially account for the low level of monitoring in relation to bathing). No data are reported on monitoring sites of groundwater associated with Protected Areas, except for Drinking Water Protected Areas and nutrient sensitive areas under the Nitrates Directive. Further information on the purpose of monitoring sites for surface water and groundwater status assessment can be found in Chapters 3 and 4 (ecological and chemical status of surface waters) and Chapters 5 and 6 (quantitative and chemical status of groundwater) of this report. Monitoring is reported for Protected Areas designated under the Nitrates and Urban Waste Water Treatment

¹¹⁹ Germany subsequently clarified that the specific regulations in Protection Areas had been mostly set up already before the WFD. The application of these regulations was deemed to be sufficient to guarantee the appropriate level of protection, and therefore no specific additional objectives were considered necessary.

Directives¹²⁰. However the number of monitoring stations for the Nitrates Directive is relatively low (0.8 stations per km²).

The extent of monitoring of water sites associated with Protected Areas for the purpose of establishing status and progress towards meeting objectives is inadequate when compared to the number of Protected Areas reported.

For Drinking Water Protected Areas, there are safeguard zones in the 10 RBDs and there are no plans to change the regulations as a result of this RBMP. The measures to be taken in these are not clearly described in the RBMPs: reduction in nutrient pollution to be implemented by the competent authorities.

Table 15.2 *Number of monitoring sites associated with Protected Areas in Germany*

Protected Area type	Number of monitoring sites associated with Protected Areas in				
	Lakes	Rivers	Transitional	Coastal	Groundwater
Abstraction of water intended for human consumption under Article 7	4	76	NR	NR	374
Recreational waters, including areas designated as bathing waters under Directive 76/160/EEC	8	1	NR	NR	
Nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC	22	530	NR	NR	490
Nutrient-sensitive areas, including areas designated as sensitive areas under Directive 91/271/EEC	22	456	NR	NR	
Protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (Habitats)		19	NR	NR	

Source: WISE electronic reports. NR - Not reported to WISE

For Birds and Habitats Protected Areas, the description of measures in the RBMPs is very general. A comprehensive PoM is, however, not to be expected, as most of the areas do not have an additional objective, because the additional needs of the water dependent interest features are not known.

¹²⁰ As stated above Germany clarified that a whole territory approach has been used to designation under the Nitrates Directive so no individual Protected Areas are in place but monitoring is undertaken. Germany reported that with regard to the monitoring under the Nitrate Directive a significant change of the monitoring programme took place with the aim of achieving a more representative picture of the situation.

In general, as specific objectives are not set for Protected Areas, specific additional measures were not expected to be included¹²¹.

Exemptions are only used in two RBDs in Germany – Rhine and Weser with respectively 22 % and 44 % exemptions. The main justification of the exemptions is related to natural conditions and technical feasibility, whereas only 5% of the exemptions are explained by disproportionate costs.

15.2. Main changes in implementation and compliance since the first cycle

There seem only to be minor changes in relation to Protected Areas designated under Article 7 of the WFD (number increased in the second cycle) and those designated under the Bathing Water Directive (a decrease in the second cycle).

It should be noted that in the first cycle, the number of Protected Areas in relation to the Nitrates Directive was reported - this was not the case in the second cycle¹²². This is due to the fact that since the first cycle, Germany has adopted a whole territory approach.

Protected Areas related to economically significant species (fish and shellfish)¹²³ were reported neither in the first nor in the second RBMP. No areas related to the Urban Waste Water Treatment Directive were reported in the first cycle, but these were included in the second RBMP. It should be noted that the category "Other European" was used in the first RBMP for a small number of Protected Areas without indicating the specific European Union directive.

A very high number of monitoring sites in Protected Areas were reported in the first cycle RBMP covering all relevant Protected Areas - whereas the number in the second RBMP was very limited with gaps for certain types of Protected Areas¹²⁴.

15.3. Progress with Commission recommendations

There were no recommendations from the first RBMPs for this topic.

¹²¹ The Elbe RBD in Germany subsequently clarified that specific objectives are defined only when they have to be stricter than the objectives of WFD, and only then an extra monitoring has to be established.

¹²² Germany subsequently clarified that a whole territory approach has been used to designation under the Nitrates Directive so no individual Protected Areas are reported but monitoring is undertaken.

¹²³ Germany subsequently clarified that Protected Areas for economically sensitive species were suspended in 2013.

¹²⁴ Germany subsequently clarified that when it comes to the monitoring under the Nitrates Directive, a significant change of the monitoring programme took place with the aim of achieving a more representative picture of the situation.

Topic 16 Adaptation to drought and climate change

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

Climate change adaptation was considered in various ways in all RBDs. The Danube RBD which had not addressed climate change in the first RBMP did so now in the second cycle. The following specific climate change aspects have been considered:

- Danube, Rhine, Elbe and Meuse RBDs included climate change when assessing direct and indirect climate pressures and for Drought management and water scarcity, and Monitoring changes at reference sites.
- Rhine, Ems, Weser, Elbe, Odra, Meuse, Eider, Schlei/Trave, Warnow/Peene RBDs included climate change when checking the effectiveness of measures, forecasting the economics of water supply and demand and for the preferential selection of robust adaptation measures.
- All RBDs considered detection of climate change signals and flood risk management.

In the second cycle RBMP a climate proofing of measures was done in all RBDs and it is stated that the guidance on how to adapt to climate change (Common Implementation Strategy Guidance Document No. 24) was used. The Rhine, Ems, Weser, Elbe, Odra and Meuse RBDs all apply KTM24 – adaptation measures to address significant pressures. Sub-plans for climate change are not reported.

According to the 2012 Topic Report on Assessment of Water Scarcity and Drought aspects in a selection of European Union RBMPs¹²⁵, droughts are not relevant for Germany, except for the Danube RBD. No exemptions have been applied for Germany following Article 4(6) due to prolonged droughts.

Even though there is no legal obligation to prepare Drought Management Plans, many Member States have prepared them in order to cope with droughts.

No Drought Management Plan has been reported for Germany. This situation is similar to 2012 when such plans were not in place.

¹²⁵ <http://ec.europa.eu/environment/water/quantity/pdf/Assessment%20WSD.pdf>

16.2. Main changes in implementation and compliance since the first cycle

The climate change for the Danube RBD is addressed in the second while in the first one it was not. While in the first cycle RBMPs in all RBDs concrete adaptation measures were reported with the exception of the Ems RBD, this is now only the case for the Rhine RBD. The Rhine, Ems, Weser, Elbe, Odra and Meuse RBDs apply KTM24 to address significant pressures.

No Drought Management Plan has been reported for Germany. This is consistent with the conclusions from 2012 (Topic report on: Assessment of Water Scarcity and Drought aspects in a selection of European Union RBMPs¹²⁶), when such plans were not in place.

16.3. Progress with Commission recommendations

The European Commission made no recommendation regarding drought management.

¹²⁶ <http://ec.europa.eu/environment/water/quantity/pdf/Assessment%20WSD.pdf>