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COVER NOTE

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Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the Implementation of the Water Framework Directive (2000/60/EC)

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

Figure 1.1: *Map of River Basin District*

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

Source: *WISE, Eurostat (country borders)*

Population: 82 million

Total area: 356854 km²

RBD	Name	Size[1] (km²)	% share of total basin in DE	Countries sharing RBD
DE1000	Danube	801000 (56259 in DE)	7	AT, BA, BG, CH, CZ, HR, HU, IT, MD, ME, MK, PL, RO, RS, SI, SK, UA, AL
DE2000	Rhine	197177 (105775 in DE)	54	AT, BE, CH, FR, IT, LI, LU, NL
DE3000	Ems	20246 (17117 in DE)	84	NL
DE4000	Weser	49063	100	-
DE5000	Elbe	150558 (99506 in DE)	65.5	AT, CZ, PL
DE6000	Odra	124000 (9600 in DE)	7.7	CZ, PL
DE7000	Meuse	34364 (3984 in DE)	11.6	BE, FR, LU, NL
DE9500	Eider	9202 (DE only[2])	-	DK
DE9610	Schlei/Trave	9218 (DE only[3])	99.95	DK
DE9650	Warnow/Peene	21088	100	-

Table 1.1: *Overview of Germany's River Basin Districts*
Source: *River Basin Management Plans reported to WISE[4]:* http://cdr.eionet.europa.eu/de/eu/wfdart13

[1] Area includes coastal waters.

[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.

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

The following provides an overview of German RBDS and the Länder they cover.

RBD	Federal State included in RBD	% of territorial share per Federal State
DE1000	Bavaria, Baden-Wuerttemberg	Bavaria (6%), Baden-Wuerttemberg (1%)
DE2000	Baden-Wuerttemberg, Rhineland-Palatine, Saarland, Hessia, North Rhine-Westphalia, Bavaria, Lower Saxony, and Thuringia	Baden-Wuerttemberg (not possible to determine), Rhineland-Palatine (2%), Saarland (1.7%), Hessia (6.1%), North Rhine-Westphalia (not reported in the plan), Bavaria (not possible to determine), Lower Saxony (not possible to determine), Thuringia (about 0.4%)
DE3000	North Rhine-Westphalia, Lower Saxony	23% in North Rhine-Westphalia, 61% in Lower Saxony
DE4000	Bavaria, Bremen, Hessia, Lower Saxony, North Rhine-Westphalia, Saxon-Anhalt, and Thuringia	Bavaria (0.1%), Bremen (0.8%), Hessia (18.4%), Lower Saxony (including transitional and coastal waters: 60.1%), North Rhine-Westphalia (10.1%), Saxon-Anhalt (1.4%), Thuringia (9.1%)
DE5000	Bavaria, Berlin, Brandenburg, Hamburg, Mecklenburg-West Pommerania, Lower Saxony, Saxonia, Saxon-Anhalt, Schleswig-Holstein, Thuringia	Information not reported in the plan[5]
DE6000	Mecklenburg-West Pommerania, Brandenburg, Saxonia	Information not reported in the plan[6]
DE7000	North Rhine-Westphalia	Information not reported in the NRW plan
DE9500	Schleswig-Holstein	100%
DE9610	Mecklenburg-West Pommerania, Schleswig-Holstein	Mecklenburg-West Pommerania (9.45%), Schleswig Holstein (90.55%)
DE9650	Mecklenburg-West Pommerania	100%

Table 1.2: *Länder governing the different German RBDs*
Source: *RBMPs*

[5] The German share of the basin is split into sections, of which multiple Länder are covered. Only the % of each section compared to the total % of the basin is mentioned in the plan.

[6] The German share of the basin is split into sections, of which multiple Länder are covered. Only the % of each section compared to the total % of the basin is mentioned in the plan.

Name international river basin	National RBD	Countries sharing RBD	Co-ordination category			
			1		3	
			km²	%	km²	%
Danube	DE1000	AT, BA, BG, CH, CZ, HR, HU, IT, MD, ME, MK, PL, RO, RS, SI, SK, UA, AL	56184	7.0		
Rhine	DE2000	AT, BE, CH, FR, IT, LI, LU, NL	105670	54.0		
Ems	DE3000	NL	15008	84.0		
Ems-Dollart	DE3000	NL	482	3.0		
Elbe	DE5000	AT, CZ, PL	99730	65.5		
Odra	DE6000	CZ, PL	9602	7.7		
Meuse	DE7000	BE, FR, LU, NL	3984	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

Table 1.3: *Transboundary river basins by category (see CSWD section 8.1) and % share in Germany*[7]
Category 1: Co-operation agreement, co-operation body, RBMP in place.
Category 2: Co-operation agreement, co-operation body in place.
Category 3: Co-operation agreement in place.
Category 4: No co-operation formalised.

Source: *EC Comparative study of pressures and measures in the major river basin management plans in the EU.*

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

The RBMPs were adopted on 22 December 2009 or earlier[8]. RBMPs were reported to the Commission in March 2010: the Danube, Elbe, Weser, Meuse and Schlei/Trave on the 4th; the Eider and Warnow/Peene on the 9th; the Odra on the 19th; and the Ems and the Rhine on the 22nd.

Germany is a federal state and this is reflected by the different approaches to co-ordination in the context of the WFD. Some Länder worked together to submit one plan, while other

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

[8] Depending on the international commissions and the Länder.

Länder produced individual plans for the same basin, sometimes to varying degree of detail. The result of these differences is only a patchwork of information on how the WFD is being implemented[9].

Nevertheless, one of the strengths of the plans is that they all follow a similar structure, making them easy to follow and compare. This has been helpful during the public participation phase. In general, the RBMPs are readable, even for non-technical persons. The German RBMPs are useful information tools that summarise the work being carried out under the WFD. Specific information on precise implementation is found in other documents, which have not been officially submitted.

On the other hand, the plans give only a limited picture of which methodologies have been used or which measures will be implemented. It is also not always clear what has been co-ordinated by the LAWA (LänderarbeitsgruppeWasser) with respect to monitoring, status and economic assessments. The information as regards methodologies required to implement the GWD is often missing but this could be explained by the fact the GWD had not been transposed into national law when the plans were drafted. In addition, the plans give a short summary regarding the work to be carried out under the programmes of measures. Information regarding the allocation of the financial resources to measure implementation is lacking, so it is unclear what will be achieved in the 1st planning cycle.

Strengths and Weaknesses of the German RBMPs were:

Of the river basin districts that fall within the borders of Germany – the Danube, Rhine, Maas, Ems, Weser, Oder, Elbe, Eider, Warnow/Peene and Schlei/Trave - eight extend into other countries, with only the Weser and Warnow/Peene being managed in Germany alone. Germany is a federal state made up of sixteen Länder sharing these 10 basins. This federal structure is reflected by the different approaches to coordination in the context of the WFD. The following is a summary of the main strengths and weaknesses of the German plans:

<u>Governance:</u>

The federal structure requires additional efforts for water management. A specific working group "Länderarbeitsguppe Wasser" was set up to co-ordinate among Länder. The aim was to develop common methodologies and approaches. In addition some Länder formed a national River Basins commission. So some "Länder" worked more closely together to submit one plan, while other Länder produced individual plans for the same basin, sometimes to varying degrees of detail and with different methodologies. The result of these differences is only a patchwork of information on how the WFD is being implemented. Nevertheless, the strength of the plans is that they all follow a similar structure, making them easy to follow and compare. This has been helpful during the public participation phase. In general, the RBMPs are readable, even for non-technical persons. The German RBMPs are useful information tools to get a general idea of the working being carried out under the WFD. Specific information on precise implementation is found in other documents, which have not been officially submitted.

<u>Characterisation of the RBDs:</u>

[9] The federal structure of Germany defines these competencies in the German Constitution.

In general the German RBMPs reported that typologies have been developed and are in place for all water categories in all river basins. Furthermore, a common approach was taken by all RBDs. However, some individual RBDs have no defined transitional water bodies and no information as to why is provided in the plans (Odra, Schlei/ Trave, Warnow/Peene).

A largely uniform nationwide approach LAWA (LänderarbeitsgruppeWasser), based on the EU CIS guidance, has been applied for the identification of pressures and impacts in the German RBDs, allowing for easy comparison. Yet, in some RBMPs specific criteria/thresholds to identify significant pressures are not described.

Reference conditions are well developed in all German RBDs with some shortcomings in some RBDs regarding the water categories "rivers, lakes and coastal waters".

Monitoring

The German plans indicate a high level of ambition with respect to monitoring: often the monitoring networks go significantly beyond the explicit and implicit WFD minimum requirements. The monitoring of chemical substances especially has been extensively addressed. Nevertheless, with respect to BQEs, there are unclear or inconsistent approaches to selected BQEs most sensitive to pressures, making it difficult to compare RBDs between Länder. In addition, not all monitoring sites measure BQEs.

Assessment of Ecological Status of Surface Waters

For the most part, nationwide standards and approaches (through LAWA and RAKON) have been developed and applied in the German RBDs for type-specific ecological status assessments. Previously lacking assessment methodology for BQEs have now been developed and especially sensitive BQEs have been identified. Despite the progress on methodologies, there are still some gaps in implementation for some water categories (e.g. lakes) and BQEs (e.g. macroinvertebrates). Transparency is still an issue as regards how ecological assessments are addressed for transitional and coastal waters. In the plans, information for the assessment of the status quality assurance is very general, making it difficult to judge whether uncertainties have been properly addressed.

Designation of HMWBs

The designation of HMWB mostly followed the steps in the CIS guidance. Information on methodologies for setting GEP was not that clear in all RBMPs.

Assessment of Chemical Status

The first assessment of chemical quality was supported by a comprehensive assessment of all priority substances. This serves as a strong basis for undertaking trend analyses in the future and developing future programmes on the basis of the trends. A very few substances, however, still lack proper analytical tools to make a proper chemical quality assessment. In addition, there appear to be different and partly non WFD compliant measurement frequencies for priority substances with too little information provided in the RBMPs.

Assessment of Groundwater Status

Strategies and approaches to assess groundwater status were harmonised at the national level but still enabled regions to take local circumstances into account. This has enabled a high

level of comparability between RBDs. The methodology for deriving groundwater threshold values is quite sophisticated as it can be applied to all types of substances and can take regional characteristics into account. On the other hand, information on groundwater status remains at a general level and provides few details. Moreover, RBMPs where Länder developed separate plans have not provided a comprehensive view of the whole basin.

Information regarding the status of groundwater bodies is missing in the plans although threshold values are exceeded at some monitoring points. It is not clear which groundwater bodies are at good status or at risk of failing good status.

Environmental objectives and exemptions

In total 80% of the German water bodies are subject to an exemption with 79% being subject to an extended deadline (Article 4.4.). Only for 1% of the water bodies will lower objectives be applied (Article 4.5). This seems to be a precautionary approach as there is a lot of uncertainty to the effectiveness of measures. The justification in relation to technical and natural reasons is well defined. For disproportionate costs, the justification provided is unclear as no detailed methodology was reported. Also new derogations under Article 4.7 will not be used.

Programme of Measures

As with the other sections of the RBMPs, the programmes of measures were developed at the national level under the LAWA. Measures have been developed for each respective theme (i.e. agriculture, groundwater, hydromorphology, water pricing, etc). On the one hand, this ensures a common approach in the Länder, especially in RBDs with multiple administrative districts. On the other hand, the information provided in the plans remains very general as only overarching categories of measures are provided. Detailed information on measures – for example, exactly what will be implemented, whether it will be implemented and how it will be financed – is missing in the PoM summaries found in the RBMPs. Although Länder level PoMs were developed in Germany, these were not officially reported, leading to a lack of transparency on what is being planned in the individual basins. Additionally, the implementation of the measures is the responsibility of the Länder, so it is hard to assess their comparability within a RBD.

With respect to the definition of costs, the plans are working with a narrow interpretation of water services and estimations of the contributions of the different water users to the costs of water services are lacking. Details regarding financial cost recovery are also lacking, as well as for environmental and resource costs. Nevertheless, significant efforts were made to coordinate work on Article 9 among the different Länder. Moreover, historically strong incentive structures through pricing and economic instruments had existed even before WFD implementation.

Climate change adaptation, water scarcity and droughts

Climate change as well as adaptation is addressed in all the river basins. A climate check was carried out by the majority of river basins to better align the setting of objectives and the selection of measures. However, the details of the methodologies to do so have not been presented.

3. GOVERNANCE

3.1 Timeline of implementation

The German draft RBMPs were made available to the public from 22 December 2008 until 22 July 2009. The final RBMPs were published on 22 December 2009. As stated above, the RBMPs were reported to the Commission in March 2010: the Danube, Elbe, Weser, Meuse and Schlei/Trave on the 4th; the Eider and Warnow/Peene on the 9th; the Odra on the 19th; and the Ems and the Rhine on the 22nd. There were no resubmissions.

3.2 Administrative arrangements - river basin districts and competent authorities

Based on the federal structure of Germany, the Federal States (and therein the relevant ministries) are responsible for water management within the Länder. The environmental ministries cover water issues as well as other water relevant sectors such as agriculture, energy or climate protection or health[10]. A division of competences among water categories is not applied in any of the "Länder"[11].

In cases where a RBD (all RBDs except the Eider, Meuse and Warnow/Peene) is governed by different Länder, bi- or multilateral agreements have been set up. Bavaria and Baden-Wuerttemberg co-ordinated their RBMPs for the Danube through the 'Co-ordination Group upper Danube'. In the German part of the Rhine RBD, the river basin management planning was structured into RBMPs for each Federal State, in accordance with the federal framework for the political, water law and administrative responsibilities in Germany. In preparing the RBMP, the competent ministries of the Federal States and their subordinate agencies were in charge and took over co-ordination tasks. More specialized agencies, e.g. regarding Nature Conservation, Agriculture and Forestry, Health, Consumer Protection and the Water and Shipping Administration of the federal government, were involved when required. For the national co-ordination of the implementation of the WFD in the Ems, Lower Saxony and North Rhine-Westphalia signed an administrative agreement setting up the Ems River Basin Commission (FGG Ems), consisting of the "Emsrat" and the management office Ems. For the Weser an administrative agreement between the Federal States for the establishment of the Weser river basin authority was signed in 2003 and updated in 2009. For the Elbe, the 10 Federal States set up a coordinating institution called 'FGG Elbe' in 2004 to co-ordinate the development of the RBMP and POMs (at the B-level) for the German part of the Elbe. The three Federal States that make up the German part of the Oder produced a common RBMP ('B level') without putting an 'official' co-ordination institution in place (like e.g. the FGG Elbe). The Schlei/Trave RBMP was developed under the co-ordination of the Federal State of Schleswig-Holstein (the Ministry for Agriculture, Environment and Rural Areas). The co-ordination with Mecklenburg-Vorpommern took place through the contacts between the two

[10] This differs from Land to Land.

[11] Reference to reporting on Art. 3 (8) in 2004 for every RBD, e.g. for Danube:http://www.wasserblick.net/servlet/is/36207/ANLAGE03_DONAU_KOMPLETT.pdf?command=downloadContent&filename=ANLAGE03_DONAU_KOMPLETT.pdf For an overview of reporting see:http://www.wasserblick.net/servlet/is/3477

ministries. An intensive exchange of information and data took place between the administrations so that a commonly developed RBMP exists.

The guidelines drawn up within the framework of the Common Implementation Strategy played an important role in Germany's efforts to ensure the uniform interpretation of key provisions of the WFD within Germany. In some cases, however, the discussion processes surrounding the CIS guidelines were still on-going whilst practical implementation work had begun at national level, driven by the ambitious timetable of the WFD. As such, full consideration could not be given to these guidelines in the first round of RBMPs. Additional national guidelines were prepared within the RBDs and in the "Länderarbeitsgemeinschaft Wasser" (LAWA). As a result, methodologies and approaches to the implementation of the WFD vary slightly among the Länder but the approaches are nevertheless all compatible with CIS guidelines. These differences can be mainly found in the following areas: inventory (including inventory of priority substance discharges), monitoring structures and methods, criteria for the designation of heavily modified water bodies and determination of good ecological potential, exemptions and the justification thereof, supra-regional management objectives, individual aspects of financial analysis, and reporting modalities. Being aware of different approaches taken among the Länder, in 2011 the LAWA initiated a further harmonisation of methodologies for the second management cycle within its work programme "River basin management (Flussgebietsbewirtschaftung)".

The co-ordination among the Länder has led to the following situation when it comes to the development of RBMPs:

- **Danube:** No common German plan (B-Level) was developed. Both Länder developed their own river basin management plans for their territorial share of the Danube basin.

- **Rhine:** No common German plan (B-Level) was developed. The following Länder submitted their own territorial plans for the Rhine: Baden-Wuerttemberg, Bavaria, Rhineland-Palatine, North Rhine-Westphalia, Saarland, Thuringia and Hessia. Lower Saxony has also developed its own RBMP[12] and its territory is covered by the international plan.

- **Ems:** No common German plan (B-Level) was developed. North Rhine-Westphalia developed its own territorial plan covering all the RBDs in its jurisdiction, including the Ems. Lower Saxony did not develop its own RBMP and its territory is covered by the international plan.

- **Weser:** One German plan (B-Level) was developed among the Länder. In addition, North Rhine-Westphalia developed its own territorial plan covering all the RBDs in its jurisdiction, including the Weser.

- **Elbe:** One German plan (B-Level) was developed among the Länder.

- **Odra:** One German plan (B-Level) was developed among the Länder.

[12] The C-Level Plan is available at: http://www.nlwkn.niedersachsen.de/download/25758/nds_Beitrag_zum_Bewirtschaftungsplan_Rhein.pdf

- **Meuse:** Only one Länder lies in the basin. North Rhine-Westphalia developed its own territorial plan covering all the RBDs in its jurisdiction, including the Meuse.
- **Eider:** The basin lies solely within one federal state.
- **Schlei/Trave:** One German plan (B-Level) was developed and co-ordinated by the two Länder included in the RBD.
- **Warnow/Peene:** The basin lies solely within one federal state.

3.3 RBMPs - Structure, completeness, legal status

The adopting authorities are the Federal States/Länder. The type of adoption act varies from one Federal State to another. Some laws of the Federal States lay down provisions that allow the adoption of parts of PoMs as legally binding ordinances if needed. There is a general obligation to take the RBMPs into account when individual decisions are taken, including when interpreting broad legal notions. There is no specific provision governing this interpretation and the situation varies between the Federal states, but the general consensus is that RBMPs and PoMs are binding for the authorities responsible for water management. The provisions of RBMPs and PoMs have, for example, specific determining effects as regards the management discretion of authorities when they decide on water use permits. Authorities may also invoke them to interpret and specify broad legal notions, for example the notion 'adverse changes to waters'.

At the Federal level, the legal effect is not regulated. At the level of the Federal State it is partly regulated. In Schleswig Holstein, the environment ministry may declare the entire or parts of RBMPs and PoMs legally binding for all authorities. In North-Rhine Westphalia all administrative decision related to the RBMPs and PoMs are legally binding for the parts of the river basins situated North-Rhine Westphalia. In other Federal States the legal effect of the RBMP is not regulated.

3.4 Consultation of the public, engagement of interested parties

According to Article 14 of the WFD, the Member States are responsible for public participation, and under German law this responsibility rests with the Länder. As such each federal state conducted its own consultation process. Public participation in accordance with the WFD has clearly shown the expediency of involving stakeholders and in some cases the general public, from an early stage in order to avoid or minimise conflicts of interest further down the line.

The consultation process on the draft RBMP was carried out through a number of different routes, including written consultation and web based comments (only in the Danube, Rhine, Ems and Warnow/Peene). In Baden-Wuerttemberg and Bavaria, several informal meetings with local and regional stakeholder groups took place before the formal public participation process. Information on the consultation process could be obtained through the media, internet, printed media, local authorities (not in Schlei/Trave or the Eider); round tables and cooperation between regions were also organized. The stakeholders involved in the consultation included a wide range of sectors, such as water and sanitation, agriculture, energy, fisheries, industry and NGOs. Involvement was through regular meetings as well as round tables and thematic working groups (Odra). Continuous involvement of these

stakeholders or the general public took place. The comments provided led to adjustments in specific measures (Danube, Rhine) as well as changes to the selection of measures (e.g. in the Danube, Rhine, Elbe). A full list of these changes as a result of the comments gathered during the public participation phase has not been provided in the individual RBMPs[13].

In consultations regarding the draft river basin management plans, in the case of international RBDs, German-language versions of the draft international plans have always been published as well, so that the general public has access to overview planning for the entire RBD. However, public participation experience has clearly shown that interest among organised interest groups and the general public tends to focus mainly on regional or local issues, and they are only motivated to become involved when such issues are under debate. Public participation became more active as the debate surrounding local changes and improvements became more detailed and opportunities were available to exert a direct influence.

Most often as a result of the consultations, additional information was added to the RBMPs. Only in the case of the Danube, Rhine and Elbe did the consultations lead to changes in the selection of measures or adjustments to measures. Changes in methodologies used were also reported in the Danube and the Rhine[14]. In the Baden-Württemberg part of the Rhine, some issues will be clarified in the 2nd planning cycle. Public participation in the consultations was very low in Eider and Schlei/Trave due to a previous consultation; as such the impact of the consultation on draft plans was considered low. Information for the Ems and Meuse was difficult to separate as North Rhine-Westphalia produced one plan for both basins; therefore, the impact of the consultations for the both basins is unknown as the information was not disaggregated[15]. However, the RBMP mentions that the comments have been integrated as far as possible.

3.5 International cooperation and coordination

As set out in Table 1.1, Germany contains 8 international RBDs. For the Danube, the Rhine, the Elbe, the Odra, the Ems and the Meuse international plans have been developed. These international plans have been part of the official reporting process.

The co-ordination and management of the international plans and the German level plans was split into three levels: Part A, Part B and Part C. Part A comprises the international RBMPs and includes information relating to the transnational significant water management issues (SWMIs) and environmental objectives. Part B is the German level plan where one plan was co-ordinated among all affected Länder (see section 1 for details). Part B plans focus on the national level and provide additional national level SWMIs, environmental objectives, etc.

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[13] Several RBMPs explicitly mention the outcomes of public participation (e.g. NI: http://www.nlwkn.niedersachsen.de/wasserwirtschaft/egwasserrahmenrichtlinie/ergebnisse_anhoerung/45590.html; BW: http://www.um.baden-wuerttemberg.de/servlet/is/49918/

[14] Most feedback took place during WFD advisory boards with participation of all stakeholders, not during the official public participation in accordance with Art. 14

[15] For the individual impact of public participation see: http://www.flussgebiete.nrw.de/Dokumente/NRW/Bewirtschaftungsplan_2010_2015/Bewirtschaftungsplan/09_BP_Zusammenfassung_des_Ma__nahmenprogramms.pdf , p 9-7 and Chapter 12.

Part C covers plans developed by individual Länder for each of the basins covered in their territory.

All the IRBDs in Germany except the Eider and Schlei/Trave co-operated to develop an international RBMP. International Commissions governed by international agreements have long been established to facilitate co-operation in these IRBDs, all[16] of which predate the WFD. To facilitate the developments of the international RBMPs, technical working groups were set up. Reference is made by the German plans to the two levels of the management for the international basins: Part A, parts of the river basin management plans in case of international RBD, established in co-ordination with all basin countries on international level, which deal with the umbrella management issues of the transboundary basin,; and Part B, the national plans for the national parts of the basins, which focuses on German management issues, objectives and measures. Most of the plans reflect the Part A plans and/or the umbrella management issues in the national plans (e.g., the Elbe and the Baden-Württemberg RBMP for the Danube).

The Eider and Schlei/Trave only share a very small part with Denmark and as such an international plan was deemed unnecessary. Co-ordination with Denmark, however, is regulated through an international agreement. As such, for both RBDs Germany and Denmark worked together on a number of topics, including monitoring, environmental objectives, development of PoMs, exemptions and public participation.

Integration with other sectors

All RBMPs contain links to other sectors and related plans and programmes, mainly agriculture, through the Nitrates National Action Programme and the Rural Development Programmes, the chemical industry, through the IPPC licensing programme, and biodiversity through nature conservation plans.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1 Water categories in the RBD

All four water categories, rivers, lakes, transitional and coastal waters, occur in Germany. The four WFD water categories vary in occurrence over the 10 German RBDs. The following shows the water categories included in the respective German RBDs:

i) Danube, Rhine and Meuse: two water categories - rivers and lakes.
ii) Odra, Schlei/Trave, Warnow/Peene: three water categories - rivers, lakes and coastal waters[17].
iii) Ems, Weser, Elbe, Eider - four water categories - rivers, lakes, transitional and coastal waters.

[16] In all RBDs international commissions existed before; only in case of Meuse there has been a new treaty but a commission existed before.

[17] No delineation of transitional water bodies was undertaken.

4.2 Typology of surface waters

The RBMPs show that typologies have been developed for all water categories in the German RBDs. The following table shows the number of defined surface water types for each RBD and water category:

RBD	Rivers	Lakes	Transitional	Coastal
DE1000	21	8	0	0
DE2000	25	9	0	0
DE3000	15	3	1	5
DE4000	24	10	1	5
DE5000	24	11	1	4
DE6000	13	6	0	1
DE7000	11	1	0	0
DE9500	6	3	1	5
DE9610	9	6	0	4
DE9650	8	5	0	4

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

In general, the approaches follow the LAWA guidelines (Bund/Länderarbeitsgemeinschaft Wasser). LAWA documents that have been developed to identify typologies for the water categories of the German RBDs are the RAKON B - Arbeitspapier I_Entwurf_21-11-06 (typology, reference conditions, class boundaries) and RAKON B - Arbeitspapier II_Stand_07_03_2007 (thresholds for physical parameters), and RAKON B - Arbeitspapier III_Entwurf_22-11-2006. The LAWA documents were used as a common approach to define typology in the German RBDs.[18]

Abiotic typologies were validated against **biological data** for all water categories in each RBD except for the lakes and coastal waters in the Odra RBD and for coastal waters in the Elbe RBD. The reason for this was the on-going development of biological assessment methods and missing data on reference conditions for these water categories.

When it comes to the development of **reference conditions** in general, it can be summarised that these have been established for all water categories in most RBDs. However, it is reported that certain gaps still exist. The RBMPs report that reference conditions are not yet fully developed for rivers for the RBDs of Ems, Weser, Odra and Meuse nor for both lakes and coastal waters in the Odra RBD and coastal waters in the Elbe RBD. The reason for this relates to missing reference data regarding certain Biological Quality Elements (WISE chapter 3.1.1.1) when the RBMPs were drafted. For the Ems RBD it is reported that the process on reference conditions is not complete because the development of biological assessment and quantification methods in DE and NL is not fully complete. In addition, the RBMP of North Rhine Westphalia, covering parts of the Weser, Ems and Meuse RBDs, further clarifies the lack of reference conditions indicating the difficulties in defining these for certain basin sharing rivers in karstic areas, which seasonally fall dry. Missing data on reference condition assessment will be supplemented in the next WFD cycle. Therefore, respective results can be expected to be part of the 2015 RBMPs.

[18] http://www.gesetze-im-internet.de/bundesrecht/ogewv/gesamt.pdf

4.3 Delineation of surface water bodies

In the context of the LAWA, a common approach for most issues related to the delineation of water bodies has been developed that is based on the CIS EU guidance on Water Body Delineation. This approach has been applied in all German RBDs. Small water bodies have been taken into account for all RBDs within the delineation approach based on a requirement of the German water act that small waters also need to be addressed accordingly[19]. The minimum thresholds for delineation applied for the different water categories are the same for all RBDs. For rivers, the delineation was undertaken for catchment areas >10 km^2, for lakes >0,5 km^2, for transitional waters >10 km^2 and for coastal waters up to 1 sea mile off the coast. The indications on methods to delineate water bodies in transitional water bodies vary. While the delineation is not relevant for all RBDs (e.g. Danube, Rhine) other RBDs have not delineated transitional water bodies[20] (Odra, Schlei/Trave, Warnow/Peene). The respective RBMPs (Odra, Schlei/Trave, Warnow/Peene) do not outline why no transitional water bodies have been delineated[21]. For the other RBDs both the CIS guidance and the Coast guidance was used for water body delineation. The indicators eco-region, salinity and tidal action have been used for delineation.

For the Elbe RBMP, a comparison of water body numbers reported in WISE and the ones in the RBMP resulted in differences in relation to some pressures (e.g. diffuse pollution). This difference could be explained by differing survey structures and evaluation algorithms applied for statistical analysis. This will be eliminated in the next planning cycle[22].

Table 4.3.1 presents the numbers and areas of water bodies in the German RBDs/water category[23].

[19] After reporting the RBMPs, German authorities have provided more information about the reason for not delineating some of the transitional waters. On the basis of a common proposal of the Federal coastal States in Germany, the inner coastal waters of the Baltic Sea have uniformly been categorized as coastal waters since they are characterized by wind-driven current dynamics generic for the category *coastal waters*. Transitional waters are not identified. Transitional waters in terms of article 2 number 6 of Directive 2000/60/EC require an important influence by freshwater currents.

[20] As informed by the German authorities after the RBMPs reporting (please see footnote number 19).

[21] Transitional water bodies have not been designated in RBDs of Odra, Schlei/Trave, Warnow/Peene. All other relevant RBDs have designated transitional water bodies.

[22] As indicated by the German authorities after the RBMP reporting.

[23] Water bodies for Germany have been merged since 2009 and figures may differ in comparison to this table.

RBD	Surface Water								Groundwater	
	Rivers		Lakes		Transitional		Coastal			
	Number	*Average Length (km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*	*Number*	*Average Area (sq km)*
DE1000	621	31	50	6	0	0	0	0	46	1318
DE2000	2208	18	71	8	0	0	0	0	399	264
DE3000	502	11	6	2	2	98	6	518	40	351
DE4000	1380	12	27	3	1	208	6	263	144	328
DE5000	2773	12	359	3	1	395	5	511	224	445
DE6000	453	7	49	2	0	0	1	288	23	412
DE7000	227	7	1	1	0	0	0	0	32	125
DE9500	135	12	16	2	1	16	11	418	23	227
DE9610	274	7	51	3	0	0	25	124	19	426
DE9650	499	9	82	2	0	NaN	20	381	39	359
Total	*9072*	*14*	*712*	*3*	*5*	*163*	*74*	*309*	*989*	*372*

Table 4.3.1: *Surface water bodies, groundwater bodies and their dimensions*
Source: *WISE*

4.4 Identification of significant pressures and impacts

In the context of the LAWA a largely uniform nationwide approach has been applied for the identification of pressures and impacts in the German RBDs. The work was guided by the documents 'Arbeitshilfe zur Umsetzung der EG-Wasserrahmenrichtlinie', (2003) and the LAWA paper 'Significant Pressures – Signifikante Belastungen' (2003), that include criteria/thresholds to determine anthropogenic pressures from relevant drivers and to assess their impacts in time to report to the EC. The general method (contained in the mentioned documents) to define significance is based on the EU guidance and includes Länder specific approaches. In general, the DE approaches consider a pressure that is not of natural origin to be significant in the DE RBDs if it is likely to cause a water body to fail the '*good status'*.

RBD	No pressures		Point source		Diffuse source		Water abstraction		Water flow regulations and morphological alterations		River management		Transitional and coastal water management		Other morphological alterations		Other pressures	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
DE1000	155	23.1	110	16.39	352	52.46	88	13.11	386	57.53	0	0	0	0	0	0	42	6.26
DE2000	313	13.73	1403	61.56	1456	63.89	50	2.19	1767	77.53	0	0	0	0	0	0	250	10.97
DE3000	27	5.23	180	34.88	452	87.6	0	0	484	93.8	0	0	0	0	0	0	158	30.62
DE4000	88	6.22	296	20.93	1199	84.79	0	0	1303	92.15	0	0	0	0	0	0	0	0
DE5000	282	8.99	546	17.4	2385	76	42	1.34	2411	76.83	0	0	0	0	0	0	89	2.84
DE6000	52	10.34	40	7.95	369	73.36	3	0.6	367	72.96	0	0	0	0	0	0	1	0.2
DE7000	22	9.65	181	79.39	140	61.4	0	0	200	87.72	0	0	0	0	0	0	35	15.35
DE9500	7	4.29	0	0	156	95.71	0	0	136	83.44	0	0	0	0	0	0	0	0
DE9610	8	2.29	0	0	342	97.71	0	0	274	78.29	0	0	0	0	0	0	0	0
DE9650	53	8.82	6	1	518	86.19	0	0	499	83.03	0	0	0	0	0	0	0	0
Total	*1007*	*10.21*	*2762*	*28*	*7369*	*74.71*	*183*	*1.86*	*7827*	*79.36*	*0*	*0*	*0*	*0*	*0*	*0*	*575*	*5.83*

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

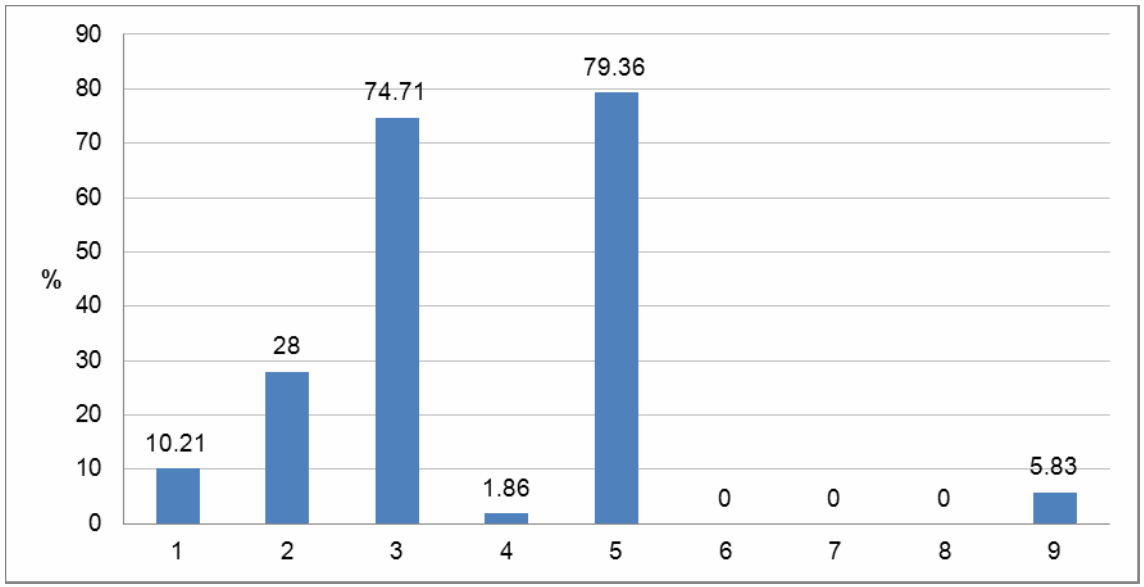

Figure 4.4.1: *Graph of percentage of surface water bodies affected by significant pressures*
1 = No pressures
2 = Point source
3 = Diffuse source
4 = Water abstraction
5 = Water flow regulations and morphological alterations
6 = River management
7 = Transitional and coastal water management
8 = Other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

Pressures from point and diffuse source pollution

Regarding ***point source pollution***, it can be summarised that for the Danube and Rhine RBD significance of pressures is assessed through a combined application of numerical tools and expert judgement, whereas for the Ems, Weser, Elbe, Odra, Meuse, Schlei/Trave and Warnow/Peene RBDs numerical tools have been used exclusively. Regarding significance of ***diffuse source pollution*** a combination of numerical tools and expert judgement has been applied for the Danube, Rhine, Weser, Meuse, Eider, Schlei/Trave and Warnow/Peene RBDs. Numerical tools have been used in the Ems, Elbe and Odra RBDs.

Respective information on approaches can be found in the Article 5 assessments as well as in the international RBMPs of the RBDs and in the above-mentioned German guidance documents. According to the LAWA document on 'Significant pressures – Signifikante Belastungen', the identification of pressure significance from point and diffuse sources is performed on the water body level based on emission data and via in-stream assessments. The estimated degree and type of pressures is assessed against in-stream data and thresholds.

Pressure assessments for **point sources** address urban wastewater treatment plants > 2000 PE, industrial emissions and other point source pollution like stormwater overflow. For **diffuse pollution** load estimations are undertaken to identify pressure significance. In case of absence of respective monitoring data for such estimates, expert judgement is applied. In consequence, two options are implemented to estimate if a pressure is significant regarding diffuse pollution: (i) the emission approach using different nutrient models like MONERIS, MOBINEG or MODIFFUS – (Modell zur Abschätzung diffuser Stoffeinträge in die Gewässer) to estimate the relevance of the diffuse pollution on the water body and (ii) the in-stream approach that aims to assess which pollution sources stem from point sources in order to estimate the remaining diffuse load. Threshold values – relevant for point and diffuse pollution - exist for specific chemical substances (WFD Annex VIII), nitrogen, phosphorous, for saprobic organic pollution, eutrophication, biological quality elements, salinity, acidity and water temperature.

The LAWA approach – outlined above - is applied for all RBDs and through the Länder as the basic national approach for the identification of significant pressures and impacts. In addition, the Länder undertook RBD specific variations/differences to adapt to specific situations, which included:

- The exceedance of in-stream and emission values was used to determine significance including values laid down in specific licences.
- Additional aspects to exceedance of emission values were applied in the RBDs and the Länder according to principles of the Directives 91/271 EEG and 76/464/EEG.
- Almost all RBDs and Länder used the basic principle that significance can be identified if the load from point sources has a major share to the overall load.
- Further, pressure significance in relation to point and diffuse sources has been defined in many RBDs and the Länder, if a biological quality element was less than *good status* due to a pressure (e.g. Ems, Elbe, Schlei/Trave, Warnow/Peene RBDs).
- For nutrients it is often stated that significance is defined where 20% of the total load comes from a specific source (e.g. Eider and Schlei/Trave RBDs).

- Regarding diffuse pollution, various models have been applied (e.g. MONERIS – Modelling Nutrient Emission in River Systems, Behrendt et al., 2000[24] in the Danube RBD and MEPHOS in the Rhine RBD).

Pressures from water abstraction, water flow regulation and morphological alterations

Regarding pressures due to ***water abstraction***, it can be summarised that for all German RBDs numerical tools have been applied for significance definition. Exclusively for the Warnow/Peene RBD a combination of numerical tools and expert judgement has been used. Regarding pressure significance caused by ***water flow regulation and morphological alterations***, a combination of expert judgement was applied for most of the RBDs except the Eider and Schlei/Trave RBDs where exclusively numerical tools have been used. The significance of other pressures has been estimated through expert judgement.

Respective information on approaches applied to determine the significance of all pressures above can be found in the Article 5 assessments as well as in the international RBMPs of the RBDs as well as in the above-mentioned German guidance documents. According to the LAWA document on 'Significant pressures – Signifikante Belastungen', guidance is provided for all pressures of water abstraction, water flow regulation and morphological alterations.

Water abstraction

According to the LAWA document, water abstraction larger than 1/3 of the Mean Low-Flow Discharge (MNQ) and unregulated abstractions of in-stream minimum flow have to be considered as significant pressure and respective information needs to be collected in follow-up[25]. Therefore, a water abstraction is considered significant when it causes a minimum flow that is less than 2/3 of the Mean Low-Flow Discharge[26] or it causes significant impacts on the biological quality elements.

It can be said that the above LAWA criteria for pressure significance due to water abstraction have been applied in all RBDs and by all Länder. Some variations occur to adapt to specific cases and data bases. In some cases additional criteria have been applied to the LAWA criterion (water abstraction larger than 1/3 of the Mean Low-Flow Discharge): therefore, significance was defined if 50 l/s were abstracted without recharge (e.g. Rhine RBD, Elbe, Eider, Weser, Odra; Hesse, Saxony-Anhalt). It is reported in the RBMPs, that significance was sometimes defined if 10% of the average flow was abstracted and not discharged back[27] (e.g. Ems RBD, Elbe RBD, LS/Bremen and Thuringia). The international Ems RBMP also refers to licenses and significance thresholds for the German Länder, which have to be met regarding water abstraction. However, the thresholds are not explicitly mentioned in the RBMPs and are reported to be set on case-by-case basis if needed.

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[24] http://moneris.igb-berlin.de/index.php/uba_en.html

[25] Next RBMP cycle.

[26] This criterion for significance ' a minimum flow = less than 2/3 of the mean flow discharge' is part of the LAWA document. In addition, some Länder also applied the significance criterion '10% of average flow abstraction' (e.g. see next paragraph). Comparable with 2/3 mean annual flow discharge criterion - directly referring to the abstraction.

[27] This criterion has been frequently used for significance determination. Now many EU MS apply further assessments/habitat effect modelling as a case by case approach (e.g. before granting licences for hydropower).

Water flow regulation and morphological alterations

The LAWA developed a classification scheme to assess morphological alterations for rivers and which has been implemented in all DE RBDs. The scheme includes various parameters and 7 classes. Whereas class 1 stands for rivers that are morphologically not altered, class 7 indicates complete alteration of river morphology. This classification scheme was used in all RBDs and by all Länder to assess significant pressures due to water flow regulation and morphological alterations. Additional respective criteria are outlined in the following paragraphs.

Water flow regulations that are assessed with classes 6 and 7 for the parameters 'difference in height (Absturzhöhe)' and/or class 7 in relation to the parameter impoundment according to the respective LAWA classification scheme for morphological alteration, are to be assessed in detail for pressure significance. For ***morphological alterations*** and according to the LAWA document, water bodies that have been allocated to classes 6 and 7 according to morphological alterations have been further investigated on the significance of pressures[28].

The following criteria determine the final significance of identified pressures as impacts from flow regulations and morphological alterations. Significance is defined if (i) classes 6 and 7 regarding overall morphological alteration according to LAWA are assessed, (ii) the biological quality elements are significantly impacted, and/or (iii) up- as well as downstream migration for fish and macroinvertebrates is hindered.

It can be said that the above LAWA criteria for pressure significance due to ***flow regulation and morphological alterations*** have been applied in all RBDs and also the Länder. A broad spectrum of criteria supports the definition of respective significant pressures. These include in summary connectivity, barriers, energy production, morphology, hydrological cycle, recreation, fishing, drainage, shipping, flood defence, water supply, agriculture and forestry, industrial activities, urbanisation, water transfers, agriculture and others.

In some RBDs and Länder additional criteria to LAWA were applied to define significance and to adapt to specific situations. The international Danube RBMP states significance criteria for the Danube mainstream and its tributaries regarding river continuity and habitat interruption and impoundments impacting on flow for the German parts. Baden-Württemberg and Bavaria also introduced several criteria to define significance for the Danube. Baden-Württemberg summarised these in a respective document (Methodenband – Bestandsaufnahme der WRRL in BW, LfZ, 2005). Significance was defined where the ecological water status was less than good (e.g. Odra, Schlei/Trave, Warnow/Peene RBDs). The Bavarian RBMP describes several drivers and impacts caused by morphological alterations. Criteria for pressure significance include changes in flow regimes, changes in river connectivity, and impacts due to channelling, bank modifications and river bed modifications. The RBMP does not, however, report the specific values for significance. North-Rhine Westphalia performed an additional assessment of continuity interruptions and their impact on upstream/downstream fish migration regarding passability for fish, correct operation of bypass channels and fish damage in turbines when migrating downstream. In Lower Saxony, Eider RBD, Schlei/Trave RBD and Warnow/Peene RBD continuity interruptions with a vertical drop > 30cm are considered as significant pressure. For the RBDs of Weser, Elbe and Odra not only was a classification of 6 and 7 according to the LAWA

[28] If significance is determined according to the mentioned criteria, (operational) monitoring has been undertaken to assess water status (using the most indicative BQE).

morphological classification scheme assessed as a significant pressure but also a class 5 assessment. When it comes to ecological assessment, all RBDs used the Biological Quality Elements fish, macroinvertebartes and macrophytes as monitoring indicators for flow regulation and morphological alteration.

Other pressures (besides the ones addressed above) have been partly reported in the RBMPs for almost all DE RBDs. No other pressures are mentioned for the Weser RBD and it is reported in the Warnow/Peene RBMP that no other pressures have been identified. Other pressures in DE RBDs include for example invasive species, scarcity and drought, climate changes, sediments transport and quality and thermal load[29]. The definition of significance was based on expert judgement for all RBDs and most of the respective approaches were based on a case-by-case approach (e.g. Ems, Elbe, Odra, Meuse, Eider, Schlei/Trave).

The sectors listed as contributing significantly to chemical pollution include: industrial emissions (directs and indirect discharges), households (including through sewage treatment plants), atmospheric deposition as well as several other sectors including contaminated lands comprising mining, acid-mine-drainage, corrosion of metallic surfaces as well as roofs and paved areas.

4.5 Protected areas

The below table provides an over view on identified protected areas in the German RBDs.

[29] German authorities have informed that significance criteria for temperature change are included in LAWA paper "Significant Pressures (2003)".

RBD	Number of PAs										
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates	Shellfish	UWWT
DE1000	78	345	59	10		376			26		
DE2000	732	516	210	98		1219			32		
DE3000	44	90	24	16		107			11		
DE4000	157	207	149	71		620			26		
DE5000	272	551	401	76		1818			29		
DE6000	21	70	111	1		384			9		
DE7000	35	13	1	8		45			2		
DE9500	12	61	7	9		61			1		
DE9610	17	211	27	4		135			2		
DE9650	50	207	33	2		113			1		
Total	*1418*	*2271*	*1022*	*295*		*4878*			*139*		

Table 4.5.1: *Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater*[30]
Source: *WISE*

[30] This information corresponds to the reporting of protected areas under the WFD. More/other information may have been reported under the obligations of other Directives.

5. MONITORING

5.1 Introduction

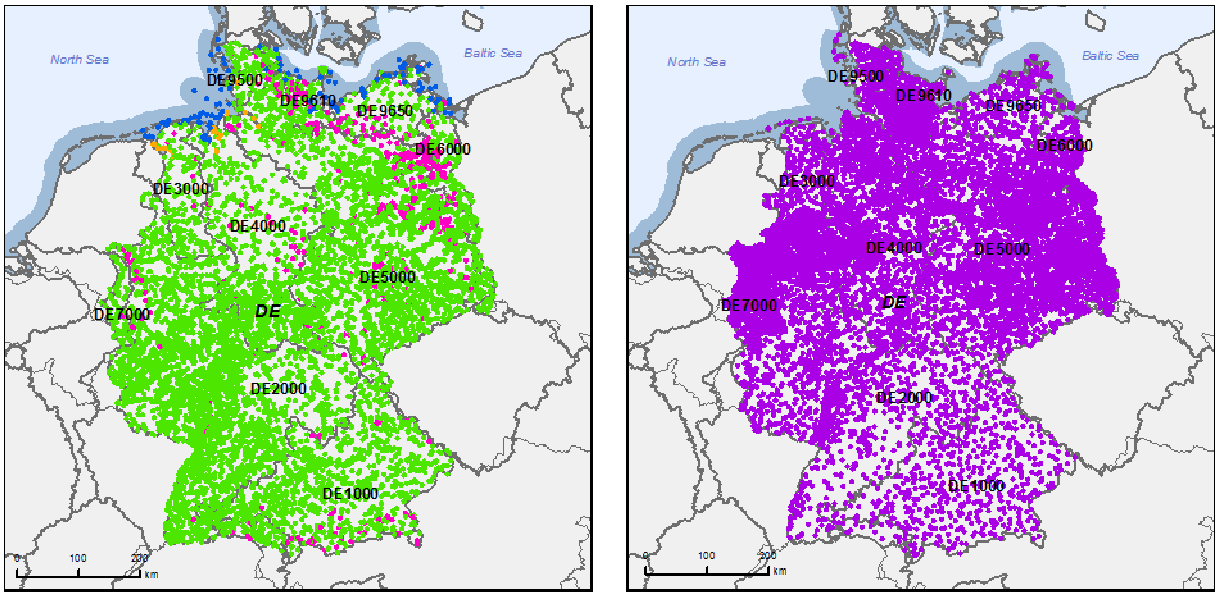

Figure 5.1.1: *Maps of surface water (left) and groundwater (right) monitoring stations*

- *River monitoring stations*
- *Lake monitoring stations*
- *Transitional water monitoring stations*
- *Coastal water monitoring stations*
- *Unclassified surface water monitoring stations*
- *Groundwater monitoring stations*
- *River Basin Districts*
- *Countries outside EU*

Source: *WISE, Eurostat (country borders)*

The German surface and groundwater monitoring network had already been organised by 2006 and integrated the WFD monitoring requirements. The design incorporates EU wide, national, RBD and Länder specific and historic considerations (in the sense that historic time series may contain information, relevant for the WFD implementation and should not be interrupted). Since 2006 it has undergone further modifications for different reasons and due to new legal requirements. Experience with the design and the results of the measurement programmes have led to changes in the programme and since 1.3.2010 there is a new German federal water act[31]. The federal water act has been developed as a consequence of the German federalism reform (2006).

The concurrent legislative competence for water management is with the German federal authorities while in the new water act the execution remains the responsibility of the Länder.

[31] The new German water act came into force after the deadline for the RBMP.

Therefore, the Länder are responsible for the performing the measurements and monitoring programmes while the federal authorities (UBA, BfG for instance) are responsible for data compilation, reporting (EU, EEA) and harmonisation at the state level. Further changes with relevance for monitoring concern the transposition of Directive 2008/105/EC into national law (further details on this topic are contained in Chapter 9 Assessment of chemical status).

In order to ensure a harmonised approach to monitoring for the entire German territory and all German RBDs the Länderarbeitsgemeinschaft Wasser (LAWA) has issued a number of papers, defining the framework and modalities of surface and groundwater monitoring. Several aspects and further details of monitoring are also covered in guidance published by the Länder authorities. This top down approach will guarantee consistency across different legal and territorial units.

Due to the multidimensionality of monitoring networks (water categories, objectives, programmes, locations, parameters and frequencies) and the complexity of German administrative structures (Federal, RBD specific and Länder structures), requirements for WFD compliant monitoring are addressed in numerous ways, that can only be assessed in detail on a case-by-case basis.

The most significant change since the 2009 EC report on monitoring is the increase of the number of operational monitoring sites for rivers.

RBD	Rivers											Lakes										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 on priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.3 Macrophytes	QE1.2.4 Phytobenthos	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
DE1000																						
DE 2000																						
DE3000																						
DE4000																						
DE5000																						
DE6000																						
DE7000																						
DE9500																						
DE9610																						
DE9650																						

RBD	Transitional											Coastal										
	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants	QE1.1 Phytoplankton	QE1.2 Other aquatic flora	QE1.2.1 Microalgae	QE1.2.2 Angiosperms	QE1.3 Benthic invertebrates	QE1.4 Fish	QE1.5 Other species	QE2 Hydromorphological QEs	QE3.1 General Parameters	QE3.3 Non priority specific pollutants	QE3.4 Other national pollutants
DE1000																						
DE 2000																						
DE3000																						
DE4000																						
DE5000																						
DE6000																						
DE7000																						
DE9500																						
DE9610																						
DE9650																						

Table 5.1.1: *Quality elements monitored*

QE Monitored

QE Not monitored

\- *Not Relevant*

Source: *WISE*

RBD	Rivers		Lakes		Transitional		Coastal		Groundwater		
	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Quant
DE1000	54	948	12	37	0	0	0	0	499	67	179
DE2000	102	3388	5	35	0	0	0	0	1552	1088	1315
DE3000	9	137	0	8	1	10	3	17	344	359	489
DE4000	43	880	2	25	1	6	2	19	1180	698	903
DE5000	48	2321	28	246	2	4	5	5	1475	1208	4054
DE6000	8	328	6	34	0	0	1	1	94	108	844
DE7000	4	89	0	1	0	0	0	0	116	199	237
DE9500	3	62	0	4	1	0	7	8	75	52	200
DE9610	9	105	6	33	0	0	10	16	78	28	449
DE9650	7	90	8	26	0	0	4	34	59	61	293
Total by type of site	*287*	*8348*	*67*	*449*	*5*	*20*	*32*	*100*	*5472*	*3868*	*8963*
Total number of monitoring sites[32]	*8561*		*516*		*24*		*117*		*13088*		

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

5.2 Monitoring of surface waters

In Germany, roughly 400 surveillance monitoring stations have been established for surface water monitoring. For **surveillance monitoring** the WFD requires the assessment of all quality elements which are relevant for the respective water category. In Germany all the relevant QEs are monitored for the majority of the surveillance sites. In those cases where quality elements have not been assessed, the selection of quality elements depends upon the RBDs and Länder and the reasoning behind these selections is made transparent.

With regard to **biological quality elements**, all BQEs are monitored at river surveillance sites for 210 (out of 247[33]) sites across the entire German territory. This number results in an average area of 1700km^2 per river surveillance site with a full BQE programme the WFD requires one site per 2500km^2). Certain selected biological quality elements have not been monitored where no meaningful results were expected. In all these cases, justifications are provided. These justifications refer to, for example, the validity of an assessment method with respect to the specific character of individual water bodies or types. In Germany this concerns:

- QE 1-4 fish in extremely steep rivers (Danube/BY);
- QE 1-1 phytoplankton in transitional water bodies (Rhine RBD).

[32] The total number of monitoring sites may differ from the sum of monitoring sites by type because some sites are used for more than one purpose.

[33] Reported number WISE 2009, while 290 is the reported number in a publication of the German environmental agency (2010).

Whether phytobenthos is covered cannot be assessed in detail as it is summarised under the aggregated category QE1-2 and thus not distinguished from macrophytes at this reporting level. This is due to a specific method development based on a combination of QE1-2 parameters in DE[34].

All biological quality elements are monitored at 49 (out of 67) lake surveillance sites. This is also the case in 19 (out of 30) coastal and 1 (out of 3) transitional water bodies.

The situation regarding **chemical and physico-chemical parameters** (QE3) and **hydromorphological parameters** (QE2) which are required to be monitored at all surveillance sites depends on the specific Länder, due to the distribution of competences. If Länder-specific approaches are relevant, these are reflected in the RBMPs. Further differences result from (minor) inconsistencies between the exact locations of surveillance sites and those of previously existing monitoring networks. Level 2 reporting refers to aggregated information. Information is aggregated to 'groups' of quality elements but in some cases an unambiguous assessment would need to be based on single (level 3) quality elements and not on level 2 'groups' of quality elements. This applies, for instance, to QE 2-1 Hydrological regime – rivers where two level 3 parameters are differentiated; or to QE 1-2 where different water types need to be assessed for different level 3 elements of QE 1-2.

However, there is a common and WFD-compliant understanding of the role of QE 3-1 general parameters, which are a subgroup of QE 3 chemical and physico-chemical parameters. This common understanding is represented by a national guidance paper (RAKON II paper[35]) which was, according to the German authorities, duly implemented. The German approach covers the requirements of the WFD and the relevant CIS guidance to support biological assessment with the assessment of QE 3-1 (general physico-chemical parameters). This approach is described in detail in the RAKON II paper and can be summarised as follows. Type-specific 'background' values are defined to separate **high from good status** and orientation standards ('Orientierungswerte') are applied to differentiate **good from moderate status**. The interpretation of these quality elements is done systematically and jointly with the biological quality elements. The process and reasoning behind this methodology is extensively described in the RAKON II paper.

An indicator for the completeness of the surveillance monitoring is that the number of reported measurement results (for the relevant parameters) is equal to the number of surveillance sites. In the information reported by Germany and explained in the RBMPs, cases are described where there is a mismatch between the reported number of sites and relevant parameters/measurement and/or classification results. These include:

- Amalgamation of surveillance and operational monitoring (Elbe). The WFD allows for the simultaneous attribution of the same monitoring site to different

[34] The German assessment method for macrophytes and phytobenthos (PHYLIB) distinguishes between three different modules: macrophytes, phytobenthos without diatoms and with diatoms. In case one or two of these modules provide no reliable result then only the module(s) with reliable results is/are used for assessment. This specific approach (at level 3) has been handled in reporting by using the aggregated category QE1-2 - other aquatic flora.

[35] LAWA-AO, Rahmenkonzeption Monitoring, Teil B: Bewertungsgrundlagen und Methodenbeschreibungen; Arbeitspapier II: Hintergrund- und Orientierungswerte für physikalisch-chemische Komponenten.

monitoring programmes. Differences are possible in frequencies of monitoring and parameters monitored. For example, operational monitoring may consist of a subset of surveillance parameters but these are measured with a higher frequency. This way a site may produce surveillance and/or operational results depending on the year or monitoring cycle. In addition, the WFD allows, under certain circumstances, for reduced surveillance frequencies. Therefore, merely counting the number of results and comparing these with the number of surveillance sites may be ambiguous or even misleading. However, it is an indicator for the completeness of surveillance and better information is currently not available.

- There are cases where existing/traditional hydromorphological sites may not coincide with the exact location of surveillance sites, but may still be representative of them (Elbe). Two sites may be representative of different properties of the same water body but they may have different names/locations. There is no commonly accepted methodology to decide on representativity: expert judgement is often the only option.

- Different frequencies for different QEs at the same site (sometimes all e.g. every 6 years). Different (minimum) frequencies for different QEs are described in Annex V 1.3.4 of the WFD (from 3 months to 6 years). Different frequencies are allowed if minimum frequencies are maintained and the necessary level of confidence and precision requires an assessment with higher frequencies.

- For non-priority specific pollutants (QE3-3) and other national pollutants (QE3-4) in the Danube, Rhine and Elbe it is explicitly said that different programmes (i.e. different parameter selections) are due to heterogeneous pollution situations. For the other RBDs this topic is not explicitly mentioned. The Directive allows for such selections if pollutants are released in 'significant quantities' in the respective (sub)river basin. However, harmonisation within RBDs between the Länder, and nationwide, is considered as an on-going task as indicated by the German authorities.

Operational programmes have been established for all RBDs in Germany. Complementary to the generic nature of surveillance monitoring, operational monitoring relates to pressures. Therefore a crucial aspect of operational monitoring concerns the selection of the biological quality element(s) considered to be most sensitive to a pressure. This selection of the most sensitive BQE is complicated by the fact that most water bodies are subject to more than one pressure. In Germany the selection of the most sensitive BQE differentiates single pressures and pressure combinations. The information regarding significance for single pressures is compiled and made transparent in the assessment templates. It is not homogeneous across all Länder or Germany. There are different understandings concerning the selection of which BQE is most sensitive to a certain pressure. Reporting shows which BQEs have been selected for certain pressures but the differences in this selection process between the Länder and/or RBDs cannot be described in detail because the reporting does not provide the reasons for the selection. The reporting on this topic needs to cover 3 variables: 1) pressures, 2) water type (river, lake, transitional, coastal), and 3) location (RBD/Länder). For Germany this results in 248 possible situations (representing combinations of pressure, water type and RBD/ Länder). In 56 occurrences, information on the most sensitive BQEs for the respective situation is provided. For the remaining 190, theoretically possible combinations of information on the most sensitive BQEs are not available. Most of these combinations are irrelevant because they do not occur in reality. However, from the available sources it cannot be said whether the selection of the most sensitive BQE has been made for all practical situations.

An **investigative monitoring programme** has been established, comprising 375 river monitoring sites.

Concerning the **assessment of chemical status**[36], it has been reported for all German RBDs that all pollutant groups as listed in the WFD that discharged (in significant quantities) into the (sub)basin are monitored. The respective questionnaire and compliance assessment used the abbreviations QE 3-2, 3-3, 3-4 for these substance groups. The methodology for substance selection is summarised under section 9 Assessment of chemical status.

Priority substances (QE3-2) and other specific pollutants (QE3-3) are monitored in all German RBDs. Other nationally regulated pollutants (QE3-4) are reported to be monitored in 6 out of 10 RBDs (Rhine, Ems, Weser, Elbe, Oder, Meuse) in the frame of surveillance monitoring for rivers.

The approach to compile a list of RBD-specific substances[37] and the determination of corresponding EQS was initially based on a common list of 110 substances and co-ordinated by LAWA (2003-2006). For the selection of other specific pollutants (QE3-3) and other national pollutants (QE3-4) different approaches are reported for the Länder and the RBDs. Essentially this selection is based on past monitoring or screening results as an emission-oriented criterion, or on emission data and/or on modelling approaches (e.g. HE). As a general rule a substance is integrated into the monitoring programmes if past measurements showed that 50% of the EQS was exceeded. This 50% threshold value is a translation of the WFD term 'significant quantities'[38] into practical technical terms. Different parameter selections between Länder within an RBD are generally justified with spatially differentiated pressure situations (Danube, Rhine, Elbe). The transposition of the Directive 2008/105/EC (which was not legally binding at the time of designing and starting the monitoring programmes) into national law (notification to the EC under MNE(2011)55568) has led to harmonisations in the selection process. Although the process of selecting chemical parameters in a WFD-compliant way is transparent and well-developed, there is still an ambition for further harmonisation and streamlining of the selection methodologies. This harmonisation should lead to a further refinement of substance lists across RBDs and Länder. It is explicitly said to be desired and an on-going process for the Rhine and Elbe under the LAWA, the FGGs and/or the international River Basin Commissions.

For priority substances MS are required to monitor those that are 'discharged' into a river basin. In Germany the chemical monitoring is done at the Länder level and the subsequent reporting is done for RBDs at the federal level. A selection of priority substances has not been made but in a precautionary approach all priority substances have been measured. The reporting in this case is available at a detailed Länder-level for single parameters/substances. A compilation of all 33 priority substances across all 16 Länder provided by the federal authorities shows that only 5% of the substances were not monitored, either because of insufficient analytical tools or because they are not discharged (further details see under section 9 Assessment of chemical status). What is not evident from the above mentioned compilation is whether the priority substances are monitored within surveillance and/or

[36] The term 'chemical status' used in this context is not consistent with the WFD meaning of 'chemical status'.

[37] Term used for both, other specific pollutants (QE3-3) and other national pollutants (QE3-4).

[38] WFD Annex V 1.1.1-1.1.4 and 1.3.1-1.3.3.

operational monitoring with a WFD-compliant frequency. This means that the compilation mentioned above provides a good overview but it does not cover all important aspects.

Monitoring of **sediments and biota** for priority substances (according to the option described in Directive 2008/105/EC) has started without concrete results being reported. The preliminary programme entails sediments in the Rhine, Danube, Weser and Warnow/Peene RBD and biota only in the Danube RBD[39]. Monitored parameters include priority substances (QE3-2) but also some other relevant pollutants (QE3-3). The corresponding EQS determination, substance selection, method development and other specifications are only in only in an early phase and a complete and consistent picture cannot be given from the available sources.

Grouping of water bodies is mentioned in the RBMPs and the methodology is largely described in a consistent way. It either refers to the logic of the CIS guidance and allows for grouping according to similar/same type and pressure, or to a North Rhine-Westphalian (NRW) regional guidance document (Leitfaden Oberflächengewässer Teil B (2008)). This NRW guidance on monitoring goes beyond the usual approach to grouping by introducing a proposal for a validation of grouping. It is proposed in the NRW guidance to rotate monitoring sites and assess whether results are equivalent. There are remaining differences in the understanding and application of grouping of water bodies. Examples for different understandings and approaches to grouping are:

- Some Länder use the term 'grouping' if the result of the BQE assessment in one water body is considered to be valid for other neighbouring or similar water bodies, while other Länder (BW) state explicitly that this is not 'grouping'.

- In the Danube RBD grouping is mentioned as a tool in the RBMP but almost all water bodies are monitored, thus no extensive application of grouping has been made, while in other cases there is no reference to grouping in the RBMP but the monitoring results show that a significant share of status classification is based on grouping (Elbe, Schlei/Trave, Warnow/Peene, Odra, Elbe, Weser). The results mentioned above result from a comparison of the number of monitored water bodies with the number of classified water bodies.

Apart from the methodological approach, described above, the practical application of grouping is assessed at the RBD level, based on an evaluation of German reports on monitoring and status classification. These have been provided for all German RBDs. The evaluation shows that the importance of grouping is very different between the RBDs. For example, 95% of the water bodies in the Danube RBD have been monitored but only 18% of the water bodies in the Warnow/Peene RBD. The interpretation of these results needs to take the different water body sizes into account (mean size from 31 km (Danube) to 9 km (Warnow/Peene) for river water bodies).

There was no grouping of **transitional water bodies.** 82% of all **coastal water bodies** have been monitored.

For the Danube (IKSD), Rhine (IKSR), Elbe (ICPER), Odra (ICPO) and Meuse (IMC) international monitoring is covered in the national/international RBMP and/or reported to

[39] No information is provided on additional ones

WISE. The approaches to international monitoring are, however, different between the RBDs and information is provided at different levels of detail. For example: 1) Rhine mentions IKSR and provides a link while 2) Elbe considers all national monitoring as part of international efforts and gives details about shared stations; 3) neither the RBMP for the Ems nor the information reported to WISE refers to international monitoring co-ordination.[40]

The following papers are of relevance for monitoring and they are mentioned in reporting (even when they are named as drafts, they are duly implemented and taken into account by the 'Länder'):

- RAKON B - Arbeitspapier I_Entwurf_21-11-06.
- RAKON B - Arbeitspapier II_Stand_07_03_2007 (English version available)
- RAKON B - Arbeitspapier III_Entwurf_22-11-2006[41]

In addition there is a regional monitoring guidance for NRW, entitled:

- Leitfaden Oberflächengewässer Teil B (2008)

5.3 Monitoring of groundwater

The required groundwater monitoring programmes (quantitative, chemical surveillance/ operational) have been established. The table below compiles the reported basic summary and generic data for all German RBDs.

Reporting includes evidence collected at parameter level. Other pollutants (QE3) are reported in an aggregated way as a group.

As for all other topics the selection of parameters and the programme design for groundwater monitoring highlights the differences between the RBDs and Länder. The descriptions of design considerations are qualitative and they reflect the Directive and guidance. The design considerations emphasise that the selection of chemical parameters/other pollutants (apart from those that are compulsory) depend on the pressure situation/risks (Article 5), land use, trends and on past measurement results. It is also mentioned that threshold values for GWD Annex II pollutants have been applied and that the monitoring often goes beyond these substances.

In all plans trend detection is mentioned and since 2008 there is a LAWA[42] method for trend detection (most plans make an explicit reference to this method developed prior to the transposition of the GWD).

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[40] In the information provided to the Commission under the Pressures and Measures project it has been pointed by the German authorities that internationally coordinated monitoring will be in place

[41] all RAKON papers available under: http://www.wasserblick.net/servlet/is/42489/

[42] LAWA (UA GWTR), Bundesweit einheitliche Methode zur Ermittlung signifikanter und anhaltend steigender Schadstofftrends nach Artikel 5 und Anhang IV GWTR" (Teil 3) in LAWA-Ausschuss „Grundwasser und Wasserversorgung".

In some RBMPs trend (and trend reversal) detection is mentioned in the context of operational monitoring and in others as a design consideration for surveillance (depending on programme, RBD and Länder). This may pose some difficulties in establishing the link between long term trend detection and the assessment of the effect of measures. The sensitivity and performance of trend detection depends on the existence of long term time series and historical datasets. Due to missing time series (over at least the period of 6 years as required by the Directive) trend analysis could not be performed for all groundwater bodies/all substances of concern.

There is only one international groundwater body in the Danube catchment shared between DE and AT. There is a bilateral agreement for the management of the groundwater body.

References:

The LAWA document: FACHLICHE UMSETZUNG DER RICHTLINIE ZUM SCHUTZ DES GRUNDWASSERS VOR VERSCHMUTZUNG UND VERSCHLECHTERUNG (2006/118/EG) is mentioned regarding the topic of trend detection.

5.4 Monitoring of protected areas

In the case of surface water abstractions specific programmes have been established, mentioned and described in the RBMPs (with references to the DWD and Article 7 WFD). In other cases it was stated explicitly that no drinking water abstractions exist (Odra, Eider, Schlei/Trave, BW). For groundwater the general statement across all RBDs is that no additional monitoring arises in terms of station numbers, locations or parameters. The total number of groundwater monitoring sites associated with drinking water abstractions is reported to be 1338 (no stations in Eider, Schlei/Trave RBDs).

For the other protected areas the following numbers of surface water monitoring sites have been reported:

RBD	Surface waters									Ground-water drinking water
	Surface drinking water abstraction	Quality of drinking water	Bathing water	Birds sites	Fish	Habitats sites	Nitrates	Shellfish	UWWT	
DE1000	52	52	35	111	225	318	263	0	804	244
DE2000	429	429	21	403	391	890	3291	0	3520	510
DE3000	7	7	0	32	53	52	185	3	185	77
DE4000	119	119	7	144	156	223	978	1	978	408
DE5000	154	154	113	505	91	949	1954	2	1993	42
DE6000	3	3	16	186	0	245	340	0	340	12
DE7000	2	2	0	5	65	19	94	0	94	40
DE9500	0	0	2	15	2	14	66	9	67	0
DE9610	1	1	26	30	6	30	153	3	149	0
DE9650	42	42	41	64	7	81	169	0	169	5
Total	*809*	*809*	*261*	*1495*	*996*	*2821*	*7493*	*18*	*8299*	*1338*

Table 5.4.1: *Number of monitoring stations in protected areas*[43]
Source: *WISE*

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

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

The following information regarding the assessment of ecological status in Germany has been reported.

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
DE1000	549	4	0.7	126	23.0	221	40.3	134	24.4	34	6.2	30	5.5
DE2000	1320	6	0.5	228	17.3	417	31.6	301	22.8	188	14.2	180	13.6
DE3000	95	0	0	11	11.6	19	20.0	32	33.7	31	32.6	2	2.1
DE4000	544	4	0.7	88	16.2	191	35.1	158	29.0	102	18.8	1	0.2
DE5000	1450	37	2.6	123	8.5	439	30.3	513	35.4	336	23.2	2	0.1
DE6000	230	5	2.2	15	6.5	70	30.4	88	38.3	52	22.6	0	0
DE7000	70	0	0	17	24.3	17	24.3	19	27.1	17	24.3	0	0
DE9500	27	0	0	0	0	12	44.4	9	33.3	5	18.5	1	3.7
DE9610	189	0	0	15	7.9	61	32.3	89	47.1	23	12.2	1	0.5
DE9650	258	20	7.8	33	12.8	90	34.9	100	38.8	14	5.4	1	0.4
Total	*4732*	*76*	*1.6*	*656*	*13.9*	*1537*	*32.5*	*1443*	*30.5*	*802*	*16.9*	*218*	*4.6*

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

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
DE1000	122	0	0	27	22.1	58	47.5	26	21.3	4	3.3	7	5.7
DE2000	959	0	0	77	8.0	214	22.3	275	28.7	335	34.9	58	6.0
DE3000	421	0	0	7	1.7	80	19.0	167	39.7	167	39.7	0	0
DE4000	870	0	0	18	2.1	204	23.4	324	37.2	317	36.4	7	0.8
DE5000	1688	0	0	93	5.5	561	33.2	672	39.8	359	21.3	3	0.2
DE6000	273	0	0	19	7.0	50	18.3	108	39.6	96	35.2	0	0
DE7000	158	0	0	9	5.7	24	15.2	43	27.2	81	51.3	1	0.6
DE9500	136	0	0	6	4.4	82	60.3	48	35.3	0	0	0	0
DE9610	161	0	0	0	0	94	58.4	67	41.6	0	0	0	0
DE9650	343	0	0	0	0	42	12.2	220	64.1	81	23.6	0	0
Total	*5131*	*0*	*0*	*256*	*5.0*	*1409*	*27.5*	*1950*	*38.0*	*1440*	*28.1*	*76*	*1.5*

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

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
DE1000	549	541	98.5	8	1.5	0	0
DE2000	1320	1003	76.0	142	10.8	175	13.3
DE3000	95	80	84.2	15	15.8	0	0
DE4000	544	375	68.9	40	7.4	129	23.7
DE5000	1450	1310	90.3	140	9.7	0	0
DE6000	230	225	97.8	5	2.2	0	0
DE7000	70	52	74.3	18	25.7	0	0
DE9500	27	27	100	0	0	0	0
DE9610	189	188	99.5	1	0.5	0	0
DE9650	258	258	100	0	0	0	0
Total	*4732*	*4059*	*85.8*	*369*	*7.8*	*304*	*6.4*

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

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
DE1000	122	115	94.3	1	0.8	6	4.9
DE2000	959	751	78.3	174	18.1	34	3.5
DE3000	421	384	91.2	37	8.8	0	0
DE4000	870	805	92.5	52	6.0	13	1.5
DE5000	1688	1558	92.3	130	7.7	0	0
DE6000	273	269	98.5	4	1.5	0	0
DE7000	158	114	72.2	44	27.8	0	0
DE9500	136	136	100	0	0	0	0
DE9610	161	161	100	0	0	0	0
DE9650	343	343	100	0	0	0	0
Total	*5131*	*4636*	*90.4*	*442*	*8.6*	*53*	*1.0*

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

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
DE1000	46	32	69.6	14	30.4	0	0
DE2000	399	256	64.2	141	35.3	2	0.5
DE3000	40	26	65	14	35	0	0
DE4000	144	105	72.9	39	27.1	0	0
DE5000	224	124	55.4	100	44.6	0	0
DE6000	23	9	39.1	14	60.9	0	0
DE7000	32	14	43.8	18	56.2	0	0
DE9500	23	13	56.5	10	43.5	0	0
DE9610	19	16	84.2	3	15.8	0	0
DE9650	39	25	64.1	14	35.9	0	0
Total	989	*620*	*62.7*	*367*	*37.1*	*2*	*0.2*

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

RBD	Total	Good		Poor		Unknown	
		No.	%	No.	%	No.	%
DE1000	46	46	100	0	0	0	0
DE2000	399	389	97.5	10	2.5	0	0
DE3000	40	40	100	0	0	0	0
DE4000	144	143	99.3	1	0.7	0	0
DE5000	224	216	96.4	8	3.6	0	0
DE6000	23	17	73.9	6	26.1	0	0
DE7000	32	22	68.8	10	31.2	0	0
DE9500	23	23	100	0	0	0	0
DE9610	19	19	100	0	0	0	0
DE9650	39	36	92.3	3	7.7	0	0
Total	989	951	96.2	38	3.8	0	0

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

RBD	Total	Global status (ecological and chemical)					Good ecological status 2021		Good chemical status 2021		Good ecological status 2027		Good chemical status 2027		Global exemptions 2009 (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 - 2015									Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	No.	%	No.	%	%	%	%	%
DE1000	671	157	23.4	275	41	17.6									58	0	0	0
DE2000	2279	293	12.9	571	25.1	12.2									67	1	0	0
DE3000	516	18	3.5	22	4.3	0.8									95	0	0	0
DE4000	1414	88	6.2	134	9.5	3.3									87	4	0	0
DE5000	3138	242	7.7	453	14.4	6.7									86	0	0	0
DE6000	503	39	7.8	51	10.1	2.4									90	0	0	0
DE7000	228	23	10.1	25	11	0.9									87	3	0	0
DE9500	163	6	3.7	86	52.8	49.1									47	0	0	0
DE9610	350	15	4.3	123	35.1	30.9									65	0	0	0
DE9650	601	53	8.8	53	8.8	0									91	0	0	0
Total	*9863*	*934*	*9.5*	*1793*	*18.2*	*8.7*									*79*	*1*	*0*	*0*

Table 6.7: *Surface water bodies: overview of status in 2009 and expected status in 2015, 2021 and 2027*[44]
Waterbodies with good status in 2009 fall into the following category:
1. Ecological status is high or good and the chemical status is good, exemptions are not considered
Waterbodies expected to achieve good status in 2015 fall into the following categories:
1. Ecological status is high or good and the chemical status is good, exemptions are not considered
2. Chemical status is good, and the ecological status is moderate or below but no ecological exemptions
3. Ecological status is high or good, and the chemical status is failing to achieve good but there are no chemical exemptions
4. Ecological status is moderate or below, and chemical status is failing to achieve good but there are no ecological nor chemical exemptions
Note: Waterbodies with unknown/unclassified/Not applicable in either ecological or chemical status are not considered
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[44] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	Ecological status					Good ecological status 2021		Good ecological status 2027		Ecological exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	549	130	23.7	235	42.8	19.1					55.6	0	0	0
DE2000	1320	234	17.7	460	34.8	17.1					56.7	0.8	0	0
DE3000	95	11	11.6	11	11.6	0					86.3	0	0	0
DE4000	544	92	16.9	150	27.6	10.7					71.9	0.4	0	0
DE5000	1450	160	11.0	247	17.0	6.0					83.0	0	0	0
DE6000	230	20	8.7	30	13.0	4.3					87.0	0	0	0
DE7000	70	17	24.3	18	25.7	1.4					71.4	2.9	0	0
DE9500	27	0	0	4	14.8	14.8					81.5	0	0	0
DE9610	189	15	7.9	41	21.7	13.8					78.8	0	0	0
DE9650	258	53	20.5	53	20.5	0					79.1	0	0	0
Total	*4732*	*732*	*15.5*	*1249*	*26.4*	*10.9*					*70.9*	*0.3*	*0*	*0*

Table 6.8: *Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2021 and 2027*[45]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[45] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

BD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	549	541	98.5	549	100	1.5					0	0	0	0
DE2000	1320	1003	76.0	1045	79.2	3.2					6.7	1.0	0	0
DE3000	95	80	84.2	84	88.4	4.2					11.6	0	0	0
DE4000	544	375	68.9	379	69.7	0.7					5.1	1.5	0	0
DE5000	1450	1310	90.3	1379	95.1	4.8					5.2	0	0	0
DE6000	230	225	97.8	225	97.8	0					2.2	0	0	0
DE7000	70	52	74.3	53	75.7	1.4					17.1	7.1	0	0
DE9500	27	27	100	27	100	0					0	0	0	0
DE9610	189	188	99.5	188	99.5	0					0.5	0	0	0
DE9650	258	258	100	258	100	0					0	0	0	0
Total	*4732*	*4059*	*85.8*	*4187*	*88.5*	*2.7*					*4.7*	*0.5*	*0*	*0*

Table 6.9: *Natural surface water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*[46]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[46] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	GW chemical status					Good chemical status 2021		Good chemical status 2027		GW chemical exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	46	32	69.6	42	91.3	21.7					9	0	0	0
DE2000	399	256	64.2	271	67.9	3.8					31	1	0	0
DE3000	40	26	65.0	26	65.0	0					35	0	0	0
DE4000	144	105	72.9	105	72.9	0					27	0	0	0
DE5000	224	124	55.4	142	63.4	8.0					37	0	0	0
DE6000	23	9	39.1	17	73.9	34.8					26	0	0	0
DE7000	32	14	43.8	14	43.8	0					50	6	0	0
DE9500	23	13	56.5	13	56.5	0					43	0	0	0
DE9610	19	16	84.2	16	84.2	0					16	0	0	0
DE9650	39	25	64.1	25	64.1	0					36	0	0	0
Total	*989*	*620*	*62.7*	*671*	*67.8*	*5.2*					*31*	*1*	*0*	*0*

Table 6.10: *Groundwater bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*[47]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[47] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total	Groundwater quantitative status					Good quantitative status 2021		Good quantitative status 2027		GW quantitative exemptions (% of all GWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	46	46	100	46	100	0					0	0	0	0
DE2000	399	389	97.5	390	97.7	0.2					0	0	0	0
DE3000	40	40	100	40	100	0					0	0	0	0
DE4000	144	143	99.3	143	99.3	0					1	0	0	0
DE5000	224	216	96.4	216	96.4	0					2	1	0	0
DE6000	23	17	73.9	17	73.9	0					22	4	0	0
DE7000	32	22	68.8	22	68.8	0					0	31	0	0
DE9500	23	23	100	23	100	0					0	0	0	0
DE9610	19	19	100	19	100	0					0	0	0	0
DE9650	39	36	92.3	36	92.3	0					8	0	0	0
Total	*989*	*951*	*96.2*	*952*	*96.3*	*0.1*					*2*	*2*	*0*	*0*

Table 6.11: *Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2021 and 2027*[48]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[48] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total HMWB and AWB	Ecological potential					Good ecological potential 2021		Good ecological potential 2027		Ecological exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	122	27	22.1	40	32.8	10.7					61.5	0	0	0
DE2000	959	77	8.0	151	15.7	7.7					77.7	0.7	0	0
DE3000	421	7	1.7	11	2.6	1.0					97.4	0	0	0
DE4000	870	18	2.1	29	3.3	1.3					95.9	0	0	0
DE5000	1688	93	5.5	217	12.9	7.3					87.0	0	0	0
DE6000	273	19	7.0	21	7.7	0.7					92.3	0	0	0
DE7000	158	9	5.7	12	7.6	1.9					91.8	0	0	0
DE9500	136	6	4.4	82	60.3	55.9					39.7	0	0	0
DE9610	161	0	0	82	50.9	50.9					49.1	0	0	0
DE9650	343	0	0	0	0	0					99.7	0.3	0	0
Total	*5131*	*256*	*5.0*	*645*	*12.6*	*7.6*					*85.8*	*0.2*	*0*	*0*

Table 6.12: *Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2021 and 2027*[49]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[49] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

RBD	Total HMWB and AWB	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all HMWB/AWB)			
		Good or better 2009		Good or better 2015		Increase 2009 -2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
DE1000	122	115	94.3%	116	95.1%	0.8%					0.0	0	0	0
DE2000	959	751	78.3%	813	84.8%	6.5%					11.4	0.3	0	0
DE3000	421	384	91.2%	390	92.6%	1.4%					7.4	0	0	0
DE4000	870	805	92.5%	810	93.1%	0.6%					0.5	4.9	0	0
DE5000	1688	1558	92.3%	1618	95.9%	3.6%					4.4	0	0	0
DE6000	273	269	98.5%	271	99.3%	0.7%					0.7	0	0	0
DE7000	158	114	72.2%	130	82.3%	10.1%					17.1	1.3	0	0
DE9500	136	136	100.0%	136	100.0%	0.0%					0.0	0	0	0
DE9610	161	161	100.0%	161	100.0%	0.0%					0.0	0	0	0
DE9650	343	343	100.0%	343	100.0%	0.0%					0.0	0	0	0
Total	*5131*	*4636*	*90.4*	*4788*	*93.3*	*2.9*					*4.8*	*0.9*	*0*	*0*

Table 6.13: *Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027*[50]
Source: *WISE (for data on status in 2009, 2015 and exemptions) and RBMPs (for data on status in 2021 and 2027)*

[50] Data for 2009 and 2015 extracted from WISE. Data for 2021 and 2027 established during the compliance assessment of the RBMPs.

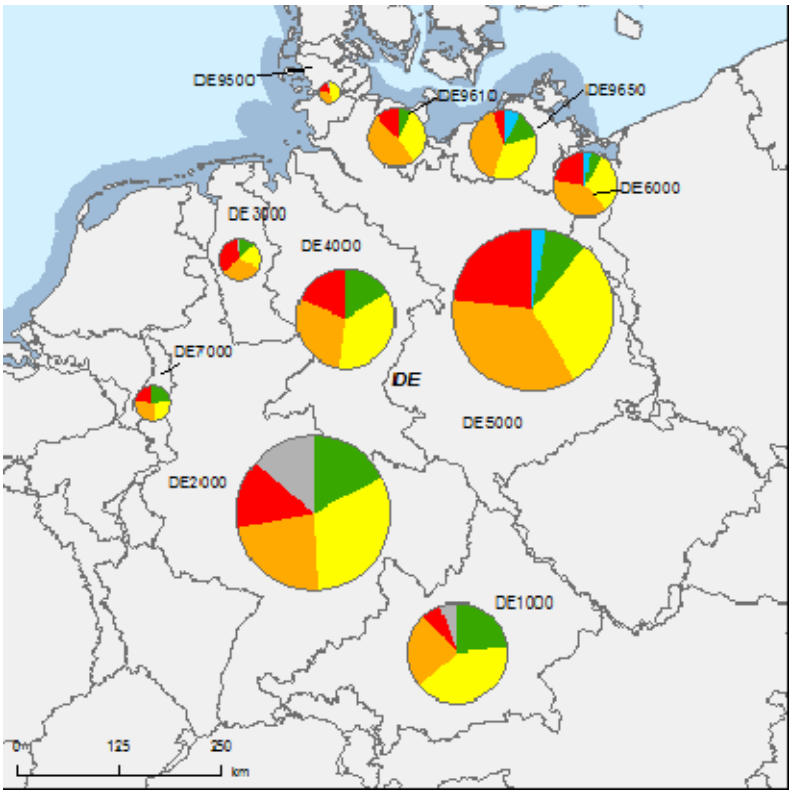


Figure 6.1: *Map of ecological status of natural surface water bodies 2009*

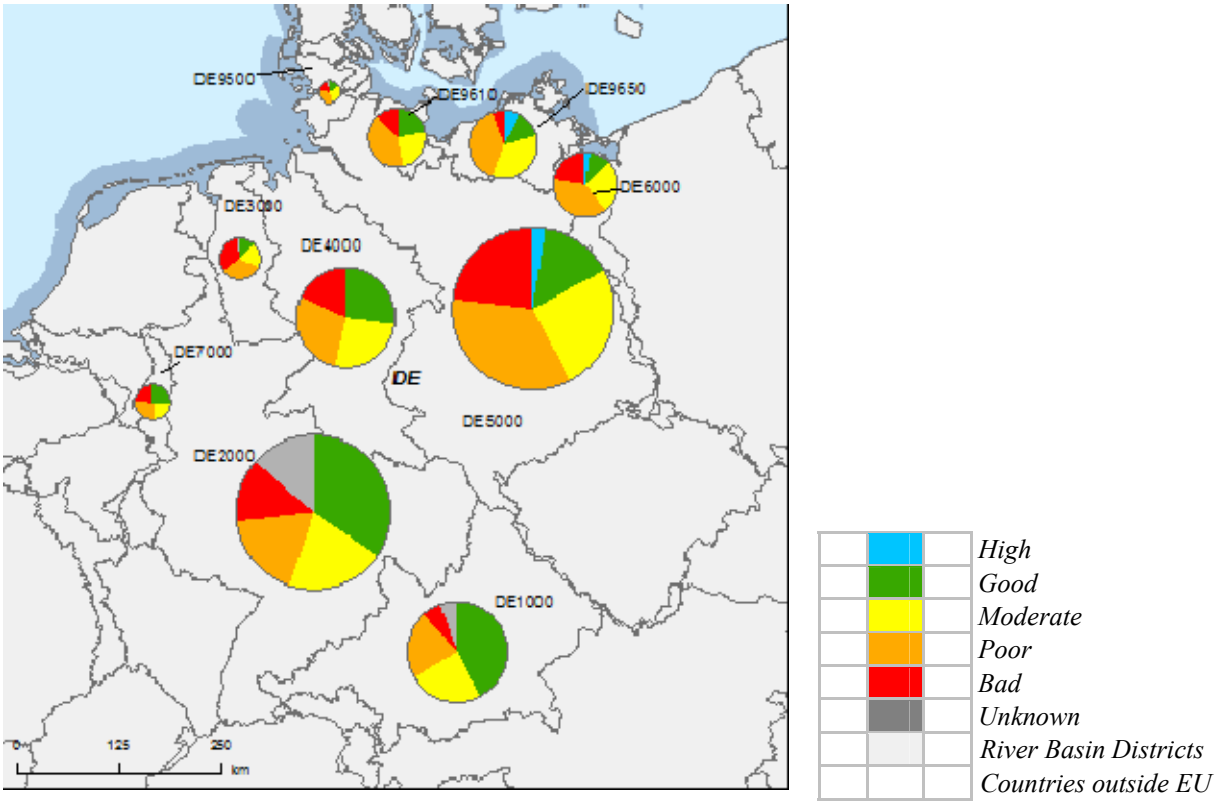


Figure 6.2: *Map of ecological status of natural surface water bodies 2015*
Note: Standard colours based on WFD Annex V, Article 1.4.2(i).
Source: *WISE, Eurostat (country borders)*

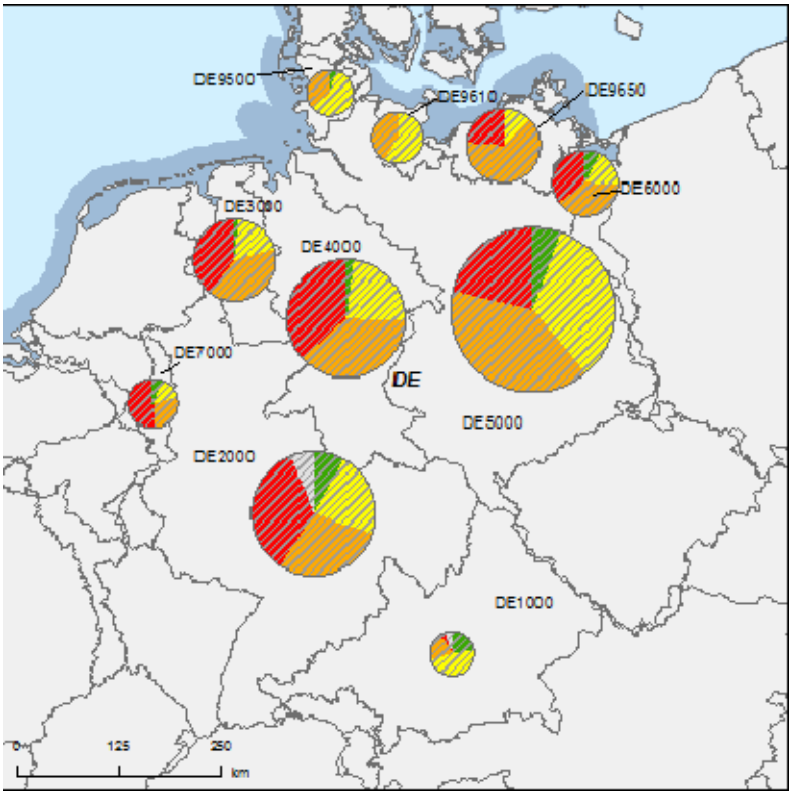


Figure 6.3: *Map of ecological potential of artificial and heavily modified water bodies 2009*

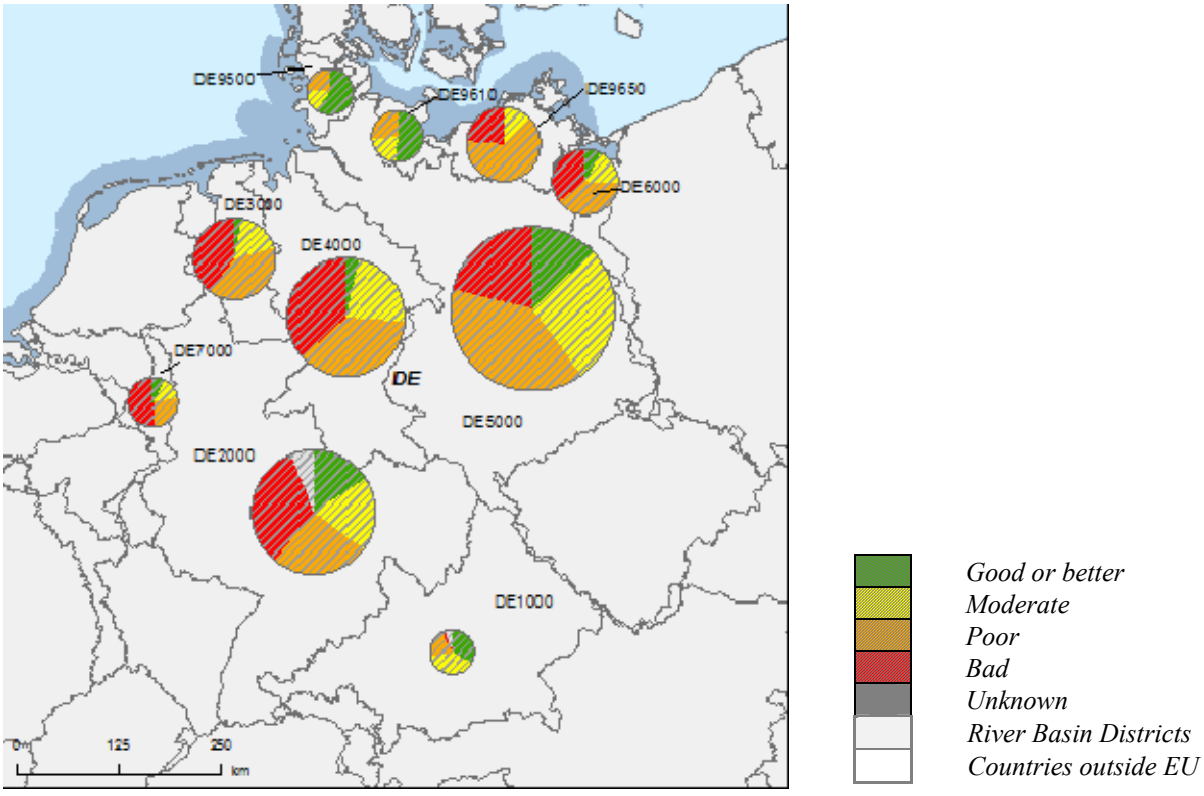


Figure 6.4: *Map of ecological potential of artificial and heavily modified water bodies 2015*
Note: Standard colours based on WFD Annex V, Article 1.4.2(ii).
Source: *WISE, Eurostat (country borders)*

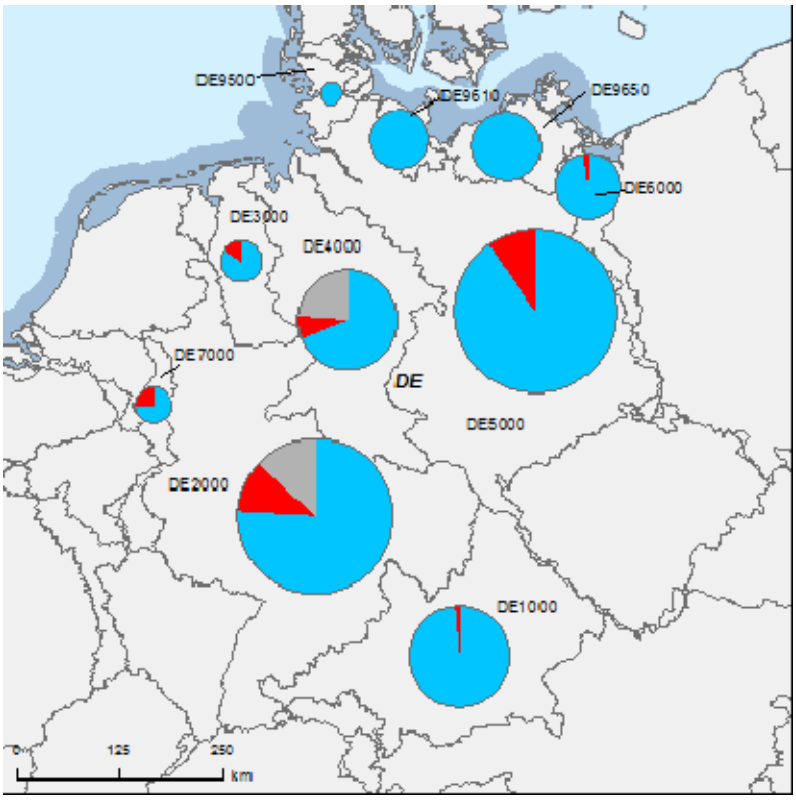


Figure 6.5: *Map of chemical status of natural surface water bodies 2009*

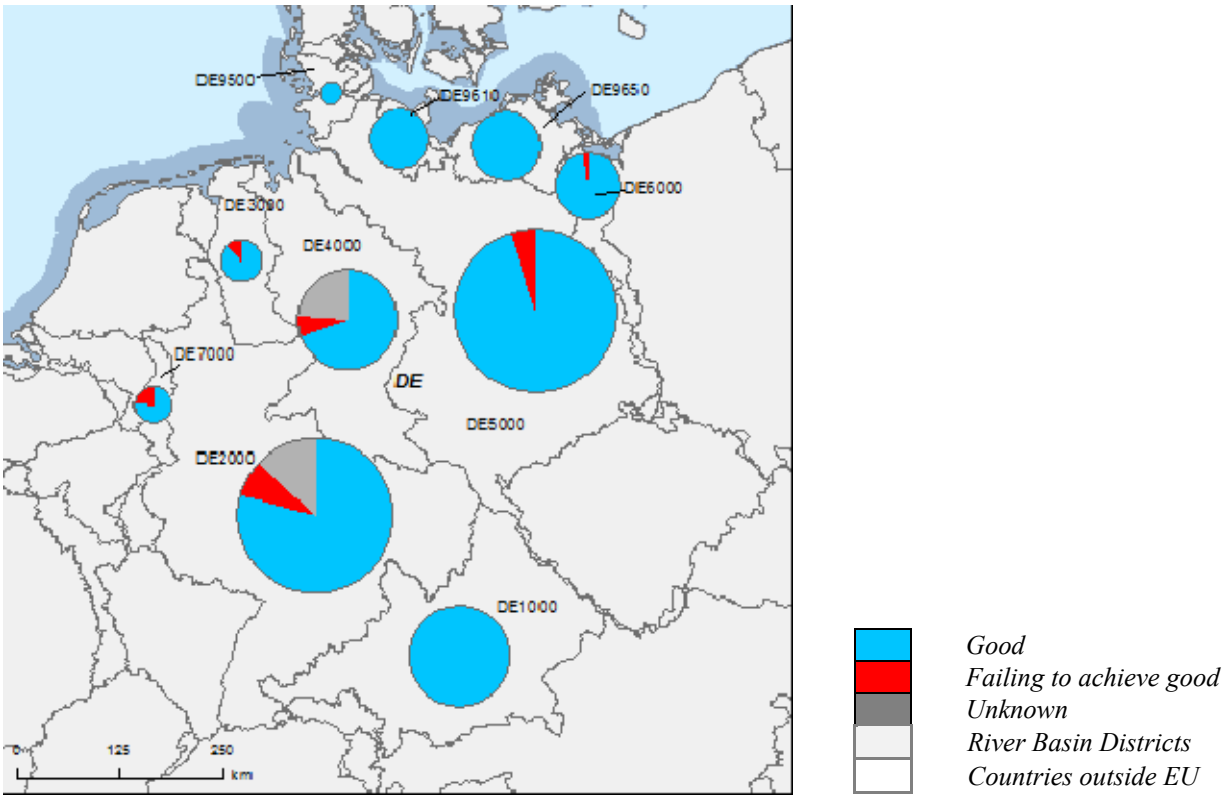


Figure 6.6: *Map of chemical status of natural surface water bodies 2015*
Note: Standard colours based on WFD Annex V, Article 1.4.3.
Source: *WISE, Eurostat (country borders)*

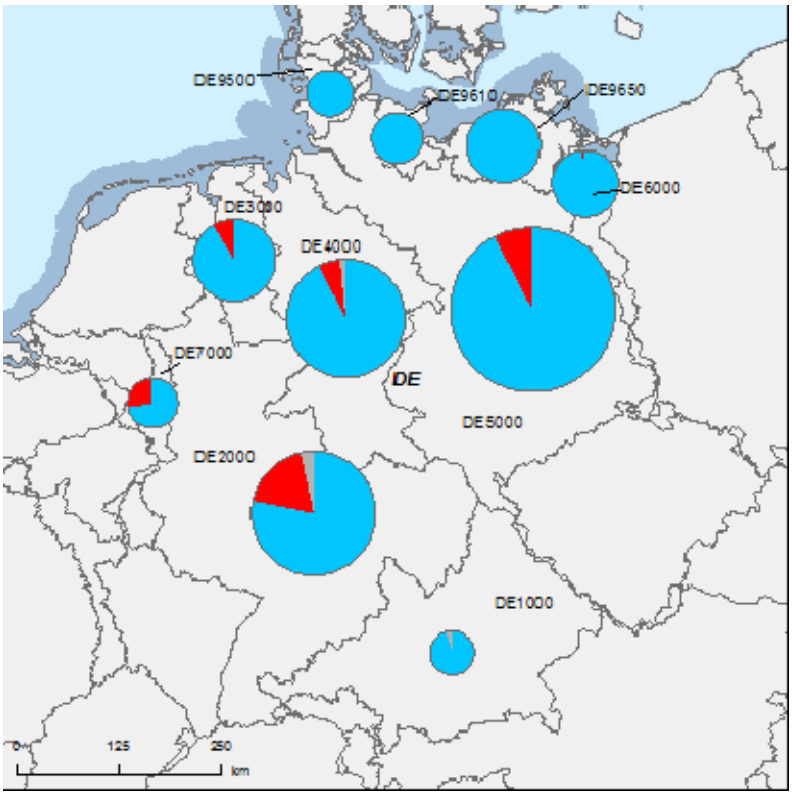


Figure 6.7: *Map of chemical status of artificial and heavily modified water bodies 2009*

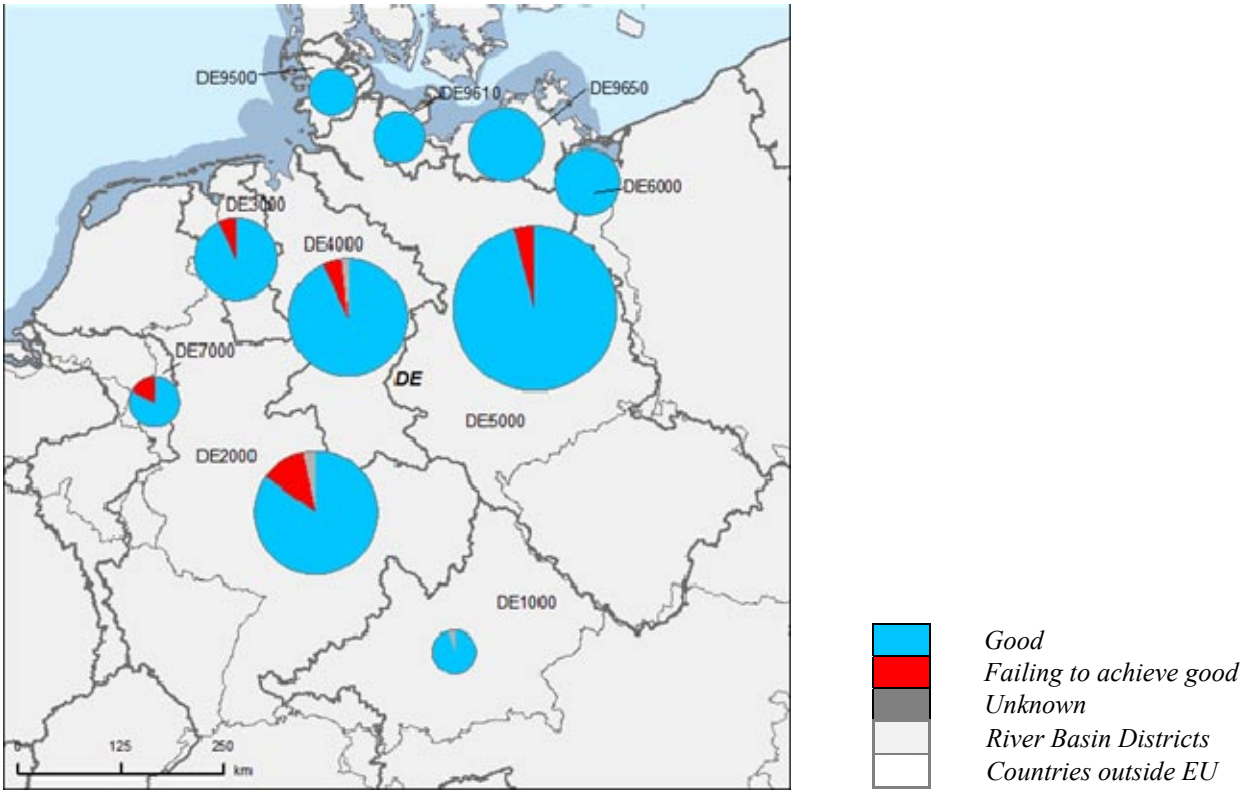


Figure 6.8: *Map of chemical status of artificial and heavily modified water bodies 2015*
Note: Standard colours based on WFD Annex V, Article 1.4.3.
Source: *WISE, Eurostat (country borders)*

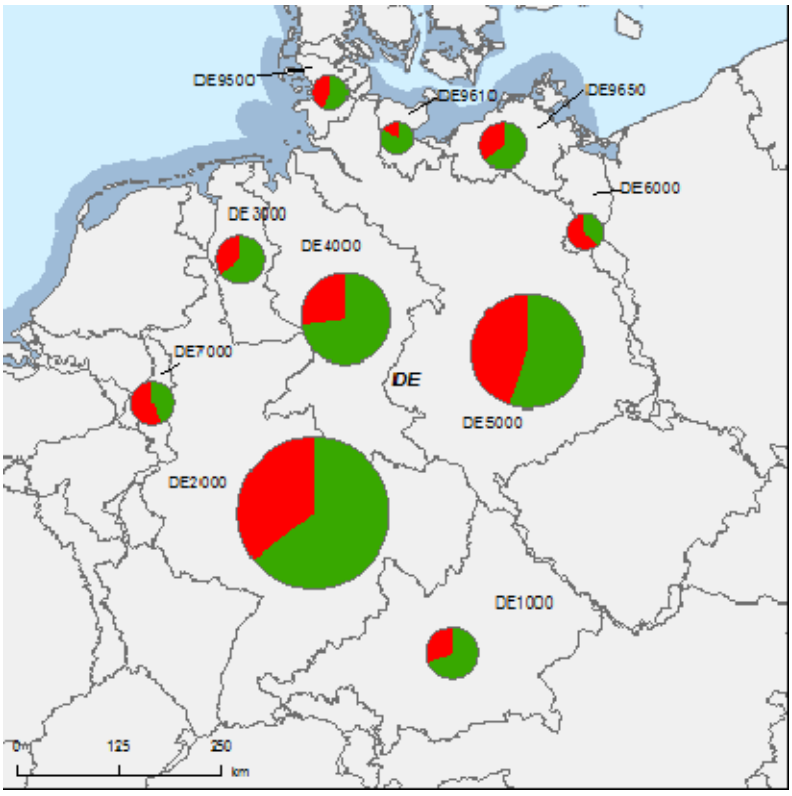
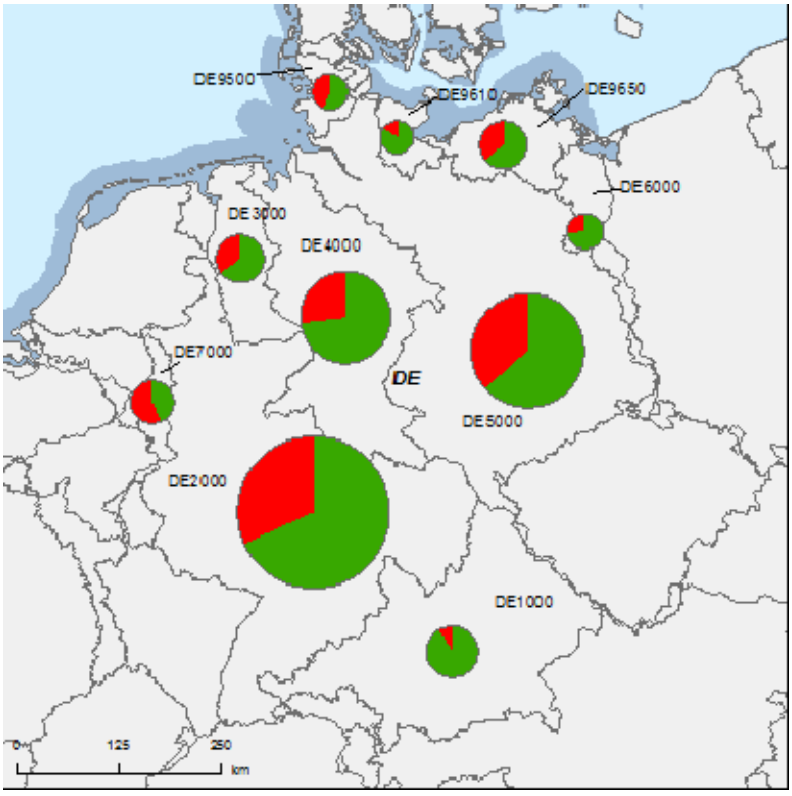
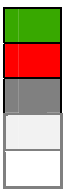


Figure 6.9: *Map of chemical status of groundwater bodies 2009*





Good
Poor
Unknown
River Basin Districts
Countries outside EU

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

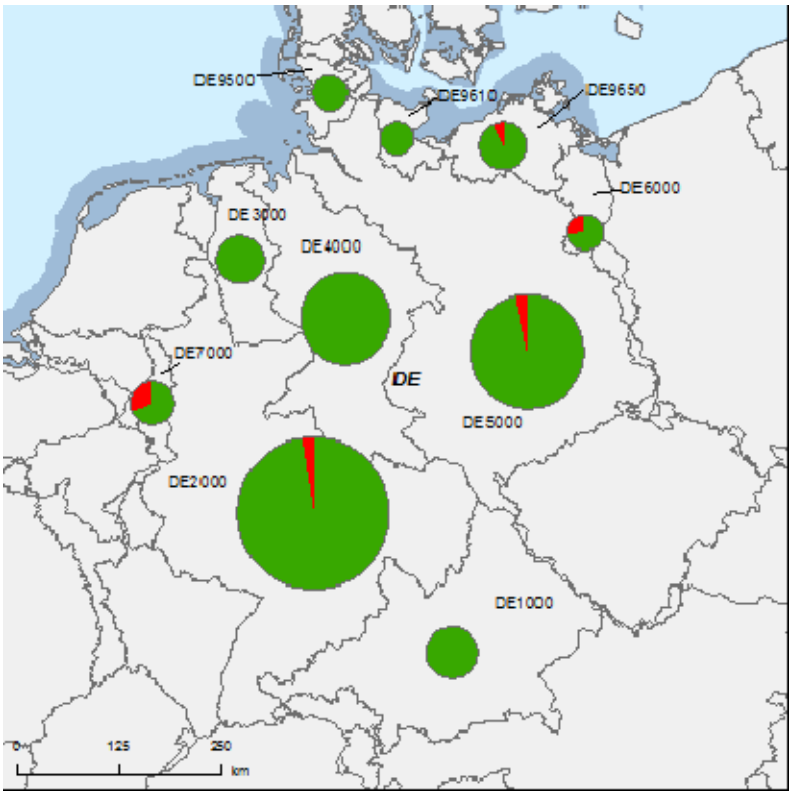


Figure 6.11: *Map of quantitative status of groundwater bodies 2009*

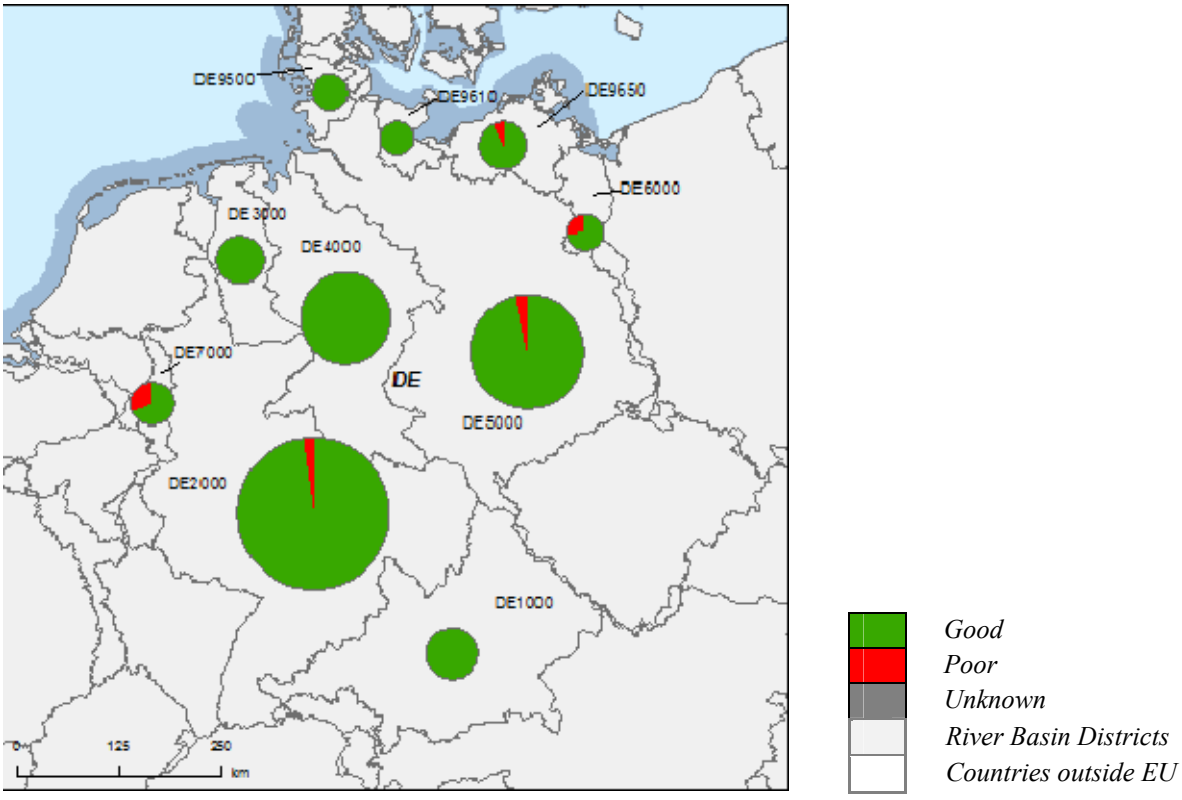


Figure 6.12: *Map of quantitative status of groundwater bodies 2015*
Note: Standard colours based on WFD Annex V, Article 2.2.4.
Source: *WISE, Eurostat (country borders)*

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

In general, national methodological approaches for ecological status assessment follow the LAWA guidelines (Bund Länderarbeitsgemeinschaft Wasser) for all RBDs and for all four water categories (rivers, lakes, transitional and coastal waters) in Germany. These guidelines are:

- RAKON B - Arbeitspapier I, Entwurf 21-11-06;
- RAKON B - Arbeitspapier II, Stand 07-03-2007;
- RAKON B - Arbeitspapier III, Entwurf 22-11-2006.

There was noticeable improvement when the situation on ecological assessment methods available for Germany in 2007 was compared to the assessment methods reported in all available DE RBMPs. Ecological assessment methods that were lacking for all BQEs and for all water categories in the RBDS Elbe, Weser, Ems and Odra in 2007 are now in place. Analysis and assessment methodologies were further refined. As per the end of 2009, across all water body categories and biological quality elements, a total of 12 out of 15 assessment methods required under the WFD had been nationally agreed and were ready to use- as pointed by the German authorities.

7.1 Ecological status assessment methods

EU WFD compliant assessment methods for ecological status in Germany are reported to be

- fully developed in all RBDs for the water category rivers and for all biological quality elements,
- partly developed for the water category lakes in all RBDs as methods for BQEs macroinvertebrates and fish are lacking;
- partly developed for transitional waters in the relevant RBDs of Eider, Elbe, Weser and Ems;
- fully developed in coastal waters in the relevant RBDs of Eider, Elbe, Odra, Weser, Ems, Schlei/Trave, Warnow/Peene.

Although assessment methods for ecological status are reported to be in place as outlined above, for some water categories and biological quality elements they are still missing. These are:

- Lakes in all RBDs: BQEs macroinvertebartes and fish.
- Transitional waters (RBDs Eider, Elbe, Weser and Ems): BQE phytoplankton.

For all RBDs it is reported in the plans that methods for the assessment on ecological status regarding fish and macroinvertebrates are under development. Various RBMPs state that some results still await the outcomes of the intercalibration exercises to ensure final confidence and precision of methods. Details are provided in the following paragraphs. In

general, all RBMPs refer to the national RAKON method for ecological assessment and also report them in specific national documents.

Also as outlined in Chapter 5 of this report (operational monitoring), the RBMPs report that specific sensitive biological quality elements are used to assess ecological status in relation to certain **key pressures and impacts** (eutrophication, organic enrichment, acidification, hydromorphological alterations, specific chemical pollutant).

Standards have been developed for the **general physico-chemical parameters** (QE 3-1), which are assessed in support of the biological quality elements. A guidance document, issued by the Bund/Länderarbeitsgemeinschaft Wasser (LAWA) describes the approach that has been implemented (RAKON B - Arbeitspapier II, Stand 07-03-2007). This guidance differentiates 'background' values which distinguishes high from good status. 'Orientation' values indicate boundaries between good and moderate as well as worse status.

The German methodological approach to deal with the supporting role of general physico-chemical parameters could be considered reasonable and in line with the meaning and the wording of the legal pieces[51].

Hydromorphological classification was undertaken in Germany to identify the significance of pressures for the water categories. However, specific standards or methods regarding hydromorphological quality elements for ecological status assessment are not reported in the RBMPs for all RBDs and all "Länder". In addition, no class boundaries for hydromorphology are yet reported to support biological elements in ecological status assessment. All of this is valid for rivers, lakes, transitional and coastal waters.

Specifically, for the water category of **rivers** all German RBMPs report that hydromorphological assessments support the BQEs in overall ecological status assessment but respective methods have not been reported[52]. In case a BQE is close to a class boundary, information for supporting elements is used to upgrade or downgrade the assessment class. It is outlined that a comprehensive method to determine and assess hydromorphological quality elements in rivers is not yet in place. A respective development will be undertaken in the second WFD implementation cycle. For **lakes**, no detailed methods on hydromorphological assessments are reported in the RBMPs for all the DE RBDs, neither for hydrological regime nor morphological condition. **Transitional waters** are relevant for the RBDs of Elbe, Ems, Weser and Eider. Although, it has been reported for all of these RBDs that hydromorphology supports the assessment on ecological status, the specific method has not been reported. **Coastal waters** are relevant for the RBDs of Elbe, Ems, Weser, Odra and Eider and in the RBMPs no specific method is reported on how hydromorphology supports the assessment on ecological status. For the RBDs of Ems, Weser, Elbe, Odra and Eider the hydromorphological quality element 'tidal regime' is mentioned in the context that the element needs 'yet to be measured'. No further specification is given.

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[51] The assessment of general physico-chemical parameters cannot overrule the biological quality elements but require joint interpretation. If there are contradictory results from the assessment of biological and physico-chemical QEs, the latter may only lead to a different classification if the BQEs are affected with high uncertainties.

[52] German authorities have informed after the RBMPs reporting that an overview about these relationships is given in the UBA research report "Further development of biological investigation procedures for consistent implementation of the EU Water Framework Directive" and will be published in the series „UBA-Texte".

Ecological Quality Standards have been set and applied for other **specific pollutants** (QE 3-3) and other national pollutants (QE 3-4) at the time of developing the RBMPs. This process was undertaken separately on the German "Länder" level but overall coordination at the federal level was done initially through the LAWA (2003-2006). For the selection of relevant pollutants a common list of substances was the starting point. The selection of relevant substances from this initial list was done at the "Länder" level and justified with regionally different pressure and in-stream situations. The selection was done based on data sources such as monitoring results, screening exercises, modelling and emission data, depending on availability of information. As a common rule, it was established that a substance is considered relevant if the concentration in past monitoring exercises exceeded 50% of the environmental quality standard. This is a technically sound approach to deal with the term 'discharged in significant quantities' from the WFD.

Ordinances on substance selection and EQS have been developed at the "Länder" level and the RBMPs of BY, MV, SH, RP also refer to these ordinances. Further references are made to the RAKON and LAWA guidances (without further details). In 2010, however, a draft ordinance for the German federal level was developed[53] that integrates and complements the "Länder" specific ordinances. This initiative shall lead to a harmonisation of the lists of relevant pollutants and the corresponding EQS. EQS are based on EU chemicals assessment and according to Annex V, 1.2.6 WFD. From valid long-term toxicity tests at different species levels the most sensitive value is selected for further processing. Many EQS are set for suspended matter/sediments due to analytical difficulties with very low concentration levels in the whole water sample.

The assessment of the ecological status for water bodies in relation to the different biological quality elements is clearly based on the **'one-out-all-out' principle** for all water categories and RBDs in Germany.

Concerning **confidence, precision and uncertainties for biological assessments**, in all German RBMPs reference is made to the RAKON III guidance paper, which exhibits a short section on quality assurance of biological data. This chapter only provides very general advice on how a quality assurance could be introduced, how it should look like and what should be included but it does not provide concrete advice, data or procedures. RBMPs of BY, NRW and others clearly state that the BQE methods are newly developed and not much experience exist to address the issue of uncertainty and its different sources. Although only some RBMPs state this fact of uncertainty explicitly, it applies to all RBDs. Longer time series or more assessments over the years and improved reference values are said to be the major factors to reduce uncertainty. However, different levels are differentiated in the Rhine, Danube and Elbe RBMPs and these levels are linked to the application of standardised methods. Level 1) low: the assessment is carried out by experts, 2) medium: LAWA and WFD compliant assessment methods have been used but not all assessment results for all QEs are ready, 3) high: The assessment has been fully performed with LAWA and WFD compliant assessment methods.

For temporal and spatial variability - as a general remark – the need to increase sampling number is mentioned, but no systematic approach is outlined. Temporal variability is said to be specifically an issue for Phytoplankton. The RAKON guidance paper on EQS for general physico-chemical parameters mentions the role of these parameters in case of highly variable

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BQE assessment results. Another aspect in the context of confidence/precision/uncertainty concerns the validity of grouping of water bodies. The NRW regional guidance document (Leitfaden Oberflächengewässer Teil B (2008)) proposes in this concern to validate the grouping approach. It is proposed to move the sampling site that is considered to be representative for the whole group of water bodies, from one water body to the next and to evaluate the differences found.

Regarding **type specific ecological assessment for all water categories**, the available German RBMPs report that ecological assessment methods address all types identified for rivers in the German RBDs and class boundaries are reported except for the Eider RBD. Lake types are addressed with ecological assessment and class boundaries are in place for most cases except for the Eider, Ems and Weser RBDs. For transitional and coastal waters the picture in how far different types are addressed with ecological assessment in the RBDs is not reported in full transparency as part of the respective RBMPs. Gaps can be identified but are not reported in specific in the RBMPs.

Comparing **intercalibration class boundaries** of the national German classification guidance (RAKON documents) with the boundaries of the EC Intercalibration Decision[54]certain issues remain open and are listed in the paragraph below. For rivers in the RBDs Danube, Rhine, Ems, Weser, Elbe, Odra, Meuse, Eider, Schlei/Trave, and Warnow/Peene class boundaries given for macroinvertebrates are aligned with those in the EC Intercalibration Decision (2008/915/EC).

The boundaries given for other aquatic flora indicate different sets of boundaries for same type and same metric. Only a few values are aligned to the boundaries of the EC Intercalibration Decision (2008/915/EC). However, the RBMPs refer to this inconsistency and report respectively for inconsistent boundaries that intercalibration is not yet completed. No further details are reported.

For lakes and the BQE phytoplankton in the RBDs Danube, Rhine, Ems, Weser, Elbe, Eider, Schlei/Trave, and Warnow/Peene class boundaries are consistent or even more stringent (0.8 for HG and 0.6 for GM) than boundaries in the official IC decision given for Chlorophyll-a (0.55 for HG and 0.32 for GM). The boundaries for other aquatic flora (macrophytes) are consistent with or slightly more stringent than those given for lake macrophytes in the EC Intercalibration Decision(2008/915/EC). Class boundaries reported for Chlorophyll-a in lakes of the Odra RBD are fully matching with the values of the EC Intercalibration Decision (2008/915/EC). No information on class boundaries for the reported lake in the Meuse RBD (also see Chapter 4 of this Annex) is reported.

For coastal waters of the Odra, Schlei/Trave and Warnow/Peene RBDs the reported class boundaries for both angiosperms and phytoplankton match the values of the EC Intercalibration Decision (2008/915/EC). For the RBDs Ems and Weser the reported class boundaries are partly aligned to the values of the EC Intercalibration Decision. For the Eider RBD the values are consistent. However, for angiosperms two sets of boundaries are reported for the same national type and only one of them has the consistent boundaries (0.9 for HG and

[54] 2008/915/EC: Commission Decision of 30 October 2008 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise (notified under document number C(2008) 6016).

0.7 for GM), whereas the other set has less stringent boundaries (0.8 for HG and 0.6 for GM) than the ones of the EC Intercalibration Decision.

Some open issues remain when it comes to the **translation of intercalibration results to the national German surface water types**. This is in particular the case for rivers, lakes and coastal waters in the RBDs of the Ems, Weser, Odra, Meuse and Eider. However, referring to the above paragraphs, class boundary values regarding macroinvertebrates for rivers are aligned with the values of the EC Intercalibration Decision for all RBDs. For lakes the intercalibration results are fully translated to national types in the Elbe, Schlei/Trave and Warnow/Peene RBDs and partly for the Danube RBD. Regarding coastal waters full translation of IC values to national types is given in the RBDs of Schlei/Trave and Warnow/Peene and partly in the Elbe RBD.

RBD	Rivers							Lakes							Transitional							Coastal					
	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Fish	Physico-Chemical	Hydromorphological	Phytoplankton	Macroalgae	Angiosperms	Benthic invertebrates	Physico-Chemical	Hydromorphological
DE1000															-	-	-	-	-	-	-	-	-	-	-	-	-
DE2000															-	-	-	-	-	-	-	-	-	-	-	-	-
DE3000																											
DE4000																											
DE5000																											
DE6000															-	-	-	-	-	-	-						
DE7000															-	-	-	-	-	-	-	-	-	-	-	-	-
DE9500																											
DE9610															-	-	-	-	-	-	-						
DE9650															-	-	-	-	-	-	-						

Table 7.1.1: *Availability of biological assessment methods*

Assessment methods fully developed for all BQEs

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

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

\- *Water category not relevant*

Source: *RBMPs*

7.2 Application of methods and ecological status results

The German RAKON guidance states clearly that all quality elements need to be monitored at surveillance sites. There is evidence about coverage of biological quality elements at surveillance sites. All biological quality elements have been reported for 210 surveillance sites at rivers, for 49 surveillance sites at lakes, 19 surveillance sites in coastal waters and 1 surveillance site in a transitional water body. Based on these numbers, a number of surveillance sites are not addressed and not all biological quality elements have been assessed. Justifications are reported that a BQE was not included in the monitoring programme if no meaningful result could be expected. For instance, this is the case for the BQE fish in rivers with extremely high slopes or in high mountainous altitude where the natural species composition is too poor for an assessment. Also the BQE phytoplakton in the plankton phase-out zone of transitional waters may result in implausible classifications. Further explanations for missing results of biological assessments were not found in the available RBMPs and sources.

All general physico-chemical parameters were assessed for all surveillance sites across the entire national territory. The same is true for other specific pollutants, which were measured at all 287 rivers, 36 lakes, 32 coastal and 5 transitional German surveillance sites. For hydromorphology the situation is very heterogenous and remains unclear for the different parameters and regional aspects. After the German RBMPs were officially reported, the German authorities indicated that a harmonised assessment method ("Strukturkartierung") was used and that the assessment of hydromorphology at surveillance sites was made by integrating elements of a distinct water stretch. The authorities concluded that an assessment at the site itself does not give useful results. This approach may result in slightly different site selections and hydromorphological parameters may therefore not be present for the exact location of a surveillance site, but still be transferable and valid for this site.

In general the most sensitive biological quality elements have been selected to detect key pressures and impacts and this is therefore reflected in the design of operational monitoring networks. Different understanding can be analysed concerning the decision, which BQE is most sensitive to a certain pressure/impact. For rivers of all RBDs Danube, Weser, Elbe, Meuse, Eider, Schlei/Trave, and Warnow/Peene the operational monitoring clearly uses the most sensitive BQE for ecological status assessment regarding specific pressures/impacts. The operational monitoring of the Odra RBD applies all BQEs for status assessment. Furthermore, it appears that for rivers in the Rhine, Ems and Weser RBDs that all BQEs are monitored for ecological status assessment.

Operational monitoring for lakes, transitional and coastal waters in the RBDs of Danube, Weser, Elbe, Meuse, Eider, Schlei/Trave, and Warnow/Peene uses the most sensitive BQE to investigate on specific pressures and impacts. Again for the Odra RBD, all BQEs are used for pressure related assessment of ecological status in the lakes and for coastal waters only the BQE of macroinvertebrates is applied plus an undefined supportive general quality element. For the Rhine RBD the most sensitive BQE is used for status assessment in lakes but it is not reported which ones. For the RBDs Ems and Weser it is reported that for lakes all BQEs except some elements like 'other species' and fish are included. Supporting quality elements are part of operational monitoring except elements like hydromorphology and other national pollutants. For the mentioned RBD's transitional waters, the BQEs phytoplankton, priority

substances, non-priority specific pollutants, and other national pollutants[55] are not addressed but all other BQEs and supporting QE are monitored. For related coastal waters all BQEs except elements like other species and hydromorphological quality elements are monitored.

When it comes to confidence, precision and uncertainty of monitoring results information is limited. It is reported for all RBDs and water categories that certain methods are applied without indicating in detail which ones. One indicated reason for many RBDs is that assessment methods have only recently been developed. Uncertainties in assessment relate to seasonal and inter-annual variability and sampling in certain times of the year increases the confidence (benthic and macrophytes, fish). Also several years of sampling will likely reduce uncertainty.

Improvement on the situation of uncertainties is reported to be planned in all RBMPs for all German RBDs. This includes the need to fill gaps in relation to missing reference sites and incomplete databases through the further development of assessment procedures/methods, the finalisation of the incomplete intercalibration processes and the increase data exchange.

7.3 River basin specific pollutants

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
DE1000		Bentazon	
DE1000		Chloridazon	
DE1000		Copper	Surface Water Body in Bavaria (Illerkanal)
DE1000		Dibutylzinn	1 Surface Water Body in Bavaria (Lech)
DE1000		Dichlorprob	
DE1000		MCPA	
DE1000		MCPA	BW: 1 WB (Stehebach)
DE1000		Mecoprob	
DE1000		Metolachlor	
DE2000		Bentazon	Bavaria - 'some' agricultural areas
DE2000		Bentazon, Chloridazon, linuron, Dimethoat, Dichlorprop, MCPa, Mecoprop, Parathionethyl	R-P RBMP, 61 WBs faling GES due to these substances - no dissagregation
DE2000		Heavy metals (Arsen, Chrome, Copper, Zinc)	Hessen RBMP, approx. 9 WBs
DE2000		MCPA	BW, Neckar, 2 WBs
DE2000		Mecoprop (MCPP)	BW, Neckar, 2 WBs
DE2000		Mecoprop, MCPA, Dichlorprop, Chloridazon, Bentazon	BW, Alpenrhine-Bodensee, agricultural areas; in 2 WBs GES is 'at risk', but not failing GES
DE2000		Non-priority heavy metals	NRW RBMP, 19,8% of the NRW Federal State area facing a 'signficant pressure' from these substances
DE2000		Non-priority PSMs	NRW RBMP, 3% of the NRW Federal State WBs failing the EQS

[55] Different indications are reported on non-specific pollutants regarding monitoring.

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)
DE2000		Parathion-Ethyl	BW, Neckar, 1 WB
DE2000		PCB	Hessen RBMP, 11 WBs
DE2000		PCB 153	R-P RBMP, no number of WBs
DE2000		polychloriertes Biphenylen (PCB) 138	R-P RBMP, no number of WBs
DE2000		PSM (pesticides)	Hessen RBMP, approx. 51 WBs
DE2000		PSM (pesticides) overall	BW, Main: 2 WBs, Oberrhein: 4 WBs failing GES
DE2000		Pyrazon (Chloridazon)	BW, Neckar, 1 WB
DE2000		Zinc	R-P RBMP, 3 SWBs
DE3000		Arsenic	4,1% of surface water bodies
DE3000		Copper	
DE3000		Nitrogen	
DE3000		PCB 52	
DE3000		Phosphorus	
DE3000		Zinc	
DE4000		Chloride	Werra and Weser
DE4000		Kalium	Werra and Weser
DE4000		Magnesium	Werra and Weser
DE5000			
DE6000			
DE7000		Arsenic	
DE7000		Chrome	0,1% of surface water bodies
DE7000		Copper	
DE7000		Dichlorvos	
DE7000		Fenthion	
DE7000		Hexazinon	
DE7000		MCPA	
DE7000		Mecoprop	
DE7000		Nitrogen	
DE7000		PCB 52	
DE7000		Phosphorsäuretributylester	
DE7000		Phosphorus	
DE7000		Zinc	
DE9500		Nitrogen	
DE9500		Phosphorus	
DE9610		Bentazon	7 WB
DE9610		Malathion	1 WB
DE9610		Mecoprop	1 WB
DE9610		Nitrogen	
DE9610		Phosphorus	
DE9650		Nitrogen	
DE9650		Phosphorus	

Table 7.3.1: *River basin specific pollutants causing failure of status*
Source: *RBMPs*

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

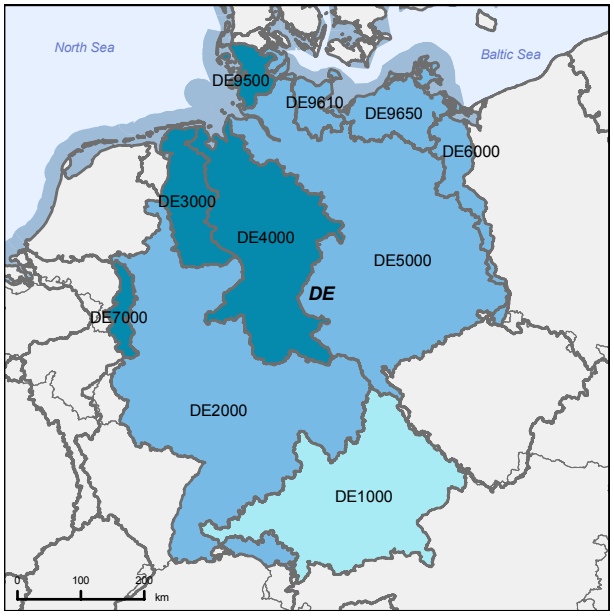

Figure 8.1: *Map of percentage Heavily Modified and Artificial waterbodies by River Basin District*

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

Source: *WISE, Eurostat (country borders)*

In Germany, the designation of the number of rivers as heavily modified ranges greatly among the RBDs: the Danube designated 11.59% of its rivers as HMWBs, whereas 62.56% of the river water bodies in the Meuse were designated as HMWB. The German wide average is 38.92%. For lakes the values range between 0% in the RBDs of the Odra, Meuse, Eider, Schlei/Trave and 50% in the Ems. The German average is 12.92%. Transitional water bodies are 100% HMWB and coastal water bodies (German average) to the extent of 6.76%.

In the case of AWB, designation ranges between 5.31% (Danube) and 36.64% (Odra) of the river water bodies; values for each RBD are presented in the figure below The German wide average is 15.29%. For lakes the values range between 0% in the RBDs of the Warrnow/Peene, Schlei/Trave and 100% in the Meuse. The German average is 15.59%.

8.1 Designation of HMWBs

The main water uses that have led to the designation are navigation, recreation, water supply, power generation, irrigation, water regulation, flood protection, land drainage and other human activities such as urban settlements and conservation of ancient monuments.

To enable the water uses mentioned above, different types of physical modifications to water bodies are needed, such as dams, weirs, polders, channelization, etc. The link between these physical modifications and a water body being designated as a HMWB or AWD was only reported in the Odra, the Warnow/Peenne, the Danube and the Weser. All basins mention weirs as leading to a water body being designated as a HMWB or AWD. The Warnow/Peenne RBMP also mentions channelization, bank reinforcement and land reclamation. The Weser RBMP mentions that agricultural land (including drainage) use has led to morphological changes in waters.

The overall designation process of HMWB water bodies followed the CIS Guidance nº4, either completely (Odra, Meuse, Eider, Schlei/Trave, Ems, Weser) or some but not all steps were carried out (Warnow/Peene, Danube, Elbe). For the Rhine the "Länder" also followed the CIS Guidance nº4 but not all "Länder" performed all steps as laid out in the guidance. The RBMPs did not report which uncertainties were considered in the designation process. A specific guidance document for Germany was developed "LAWA-ArbeitshilfezurUmsetzung der EG-Wasserrahmenrichtlinie (2003)" which is mentioned in WISE and some of the plans but has not been officially reported.

8.2 Methodology for setting good ecological potential (GEP)

All German river basins have defined GEP. When doing so to both approaches (the reference-based approach (according to the CIS Guidance), and the mitigation measures approach (Prague approach)) can be found. The reference-based approach was reported for the Eider, Schlei/Trave and the Danube. The Prague approach has been reported for Odra, Meuse, Warnow/Peene, Ems, Weser and Elbe. In the Rhine both approaches have been used, depending on the "Länder" involved. In the case of NRW both approaches are described but the Prague approach was applied. In BW and TH the RBMPs clearly state that the Prague approach was used. For HE it is not fully clear which approach has been followed but it is most likely the Prague approach. There is a statement that the GEP is defined as 70% of all measures that would be needed to achieve the Maximum Ecological Potential. No further details are provided. While the RP RBMP for the Rhine defines GEP, it does not report any information regarding the approach taken. The SL RBMP for the Rhine refers to a specific methodological handbook (Annex VI) for the methodology for HMWB designation. This handbook has not been submitted and found on the web. Therefore, in SL it remains unclear which approach has been used. In BY there is no clear mention of the CIS approach but the approach described refers to the fact that the GEP is based on the 'reference-based approach' (or 'CIS approach'). In other words, the GEP was assessed based on the definition and assessment of GES. In BY an additional check was performed if a use leads to a change in typology (e.g. from a river to a lake due to a dam). In cases where there is no change in typology a change in the 'class' was performed.

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

9.1 Methodological approach to the assessment

In all German RBDs the chemical status has been assessed against EQS. Almost all priority substances have been measured and assessed. Exemptions concern missing analytical tools e.g. Brominated diphenylether in BY, C1-13 chloroalkanes in BW and BY, Tributyltin

compounds (BY). The table below shows priority substances that have not been assessed in certain Länder. It becomes evident, that missing standards are the most important reason, no information for the missing analysis in SL was found. For PAH (polyaromatic hydrocarbons, substance 28 in Annex I of Directive 2008/105) the single substances falling under the group 'PAH' have been assessed in all Länder. This is sufficient to assess compliance with EQS (for the group parameter PAH there is no EQS in 2008/105).

CAS Number	Name of substance	Länder
32534-81-9	Brominated diphenylether*	BE, BW, BY, S,TH
85535-84-8	C10-13 Chloroalkane*	BE, BW, BY, HE, NW, SH, SL, TH
117-81-7	Bis(2-ethyl-hexyl)phthalate (DEHP)	SL
115-29-7	Endosulfan	SL
118-74-1	Hexachlorobenzene	SL
87-68-3	Hexachlorobutadiene	SL
608-73-1	gamma-Hexachlorocyclohexane	SL
84852-15-3	Nonylphenol	SL
140-66-9	4-(2,4,4-trimethylpentan-2-yl)phenol	SL
608-93-5	Pentachlorobenzene	SL
	Polycyclic aromatic hydrocarbons (PAH)**	HH, NI, NW, RP, SL
36643-28-4	Tributyltin compounds	BE, SL
12002-48-1	Trichlorobenzene	SL

Table 9.1.1: *Substances that could not be monitored in the "Länder" for the assessment of chemical status*
Source: *RBMPs*

Concerning EQS, in general (exemptions are described below) the Directive 2008/105/EC Annex I[56] has been applied although it was at the time not transposed to national law. Deviations concerned at the time of reporting single or few substances in some "Länder", but a case to case description would go beyond the scope of this summary. Depending on the substance, national standards at that time were sometimes equal to, higher or lower than the EU wide EQS. The Weser Plan and Lower Saxony (Ems) refer to the legally binding national regulations at the time only. For the Weser Plan this concerns national EQS for 3 substances. Mostly, both national and EU-wide EQS are reported separately and as a general approach, in most cases, national EQS and substances have been applied in parallel to the EU-wide substances and EQS.

For the international harmonisation of EQS, in some plans (e.g. Elbe) the differences in EQS (that occurred due to missing EU-wide threshold values at the time of reporting) between the riparian countries are made transparent.

For the entire German territory no evidence about the application of mixing zones is found. There is one indirect reference to the topic. Germany does not use mixing zones, but uses the concept of a monitoring station representative for the status of the whole water body. Only NRW refers to mixing zones as a criterion for the selection of monitoring sites.

The measurement frequencies and cycles for priority substances are not the same at all surveillance and operational sites (see table provided under the 'Monitoring of surface and groundwater' chapter). This results in different levels of confidence and precision of

[56] There is one deviation for Chlopyrifos (AA 0,1 instead of 0,03 and MAC 0,3 instead of 0,1). It is assumed that there is only a reporting but no technical error in the assessment/status classification.

calculated annual average values and also of detected maxima. No information was found in the existing reporting whether and how different levels of confidence and precision have been taken into account in assessing the compliance with EQS.

In compliance with Annex I Part B of the Directive 2008/105/EC, the assessment of chemical quality concerned the (filtered/whole) water sample. Assessment of hexachlorobenzene, hexachlorobutadiene and mercury for biota has not been reported in SL because of missing analytical tools/methods. For the same reason no assessments of priority substances in sediment have been reported in all RBDs. These assessments will be introduced as soon as the methods are available.

Bioavailability (according to Annex I Part B Point 3.b) has been mentioned for Cadmium in combination with water hardness in some RBDs. Whether the approach is applied across all RBDs/ "Länder" in a harmonised manner remains unclear.

Background concentrations have not been considered in the assessment (due to missing guidance on the setting of background levels). NRW addresses the future plans in this concern by starting to plan the introduction of background concentrations as soon as there are common standards.

Substances causing exceedances, affected water body (types).

A total of 811 water bodies (8%) of 9860 total number of water bodies in Germany fail to achieve good chemical status. Another 350 or 3.5% of the water bodies (mainly 300 natural river water bodies) are categorised as unknown/no information.

The following table[57] splits this total number according to RBD and aggregated substance groups (heavy metals, pesticides, industrial and other pollutants). Single substances cannot be assessed based on the available sources due to different structures of the RBMPs and reporting formats (% of river length, numbers of WBs). Other pollutants and heavy metals (mainly Pb-, Cd- and compounds) substance groups caused the major part of the failures to achieve good chemical status, followed by pesticides.

[57] Double counting is possible in the table if a water body fails good chemical status due to more than one substance group.

RBD	Heavy metals - aggregated		Pesticides - aggregated		Industrial pollutants - aggregated		Other pollutants - aggregated	
	No.	%	No.	%	No.	%	No.	%
DE1000	2	0.3	6	0.89			1	0.45
DE2000	103	4.52	106	4.65	14	0.61	125	5.48
DE3000	14	2.71	8	1.55			22	4.26
DE4000	52	3.68	24	1.7			14	0.99
DE5000	37	1.18	4	0.13	13	0.41	107	3.41
DE6000	2	0.4					5	0.99
DE7000	18	7.89	23	10.09	4	1.75	4	1.75
DE9500								
DE9610			1	0.29				
DE9650								
Total	*228*	*2.51*	*172*	*1.89*	*31*	*0.34*	*278*	*3.06*

Table 9.1.2: *Number and percentage of water bodies that fail to achieve good chemical status, differentiated according to RBDs*
Source: *WISE*

10. ASSESSMENT OF GROUNDWATER STATUS

At the time when the RBMPs were established, the Groundwater Directive (GWD) was not yet implemented into German legislation - as it is now - and the assessment was based on the requirements of the WFD and a guidance document about the technical implementation of the GWD; which was developed by the LAWA and is in compliance with the Water Framework Directive and the Groundwater Directive.

For Germany as a whole, for 2009 about 62 % (609) of the 989 groundwater bodies (GWBs) (representing 63% in terms of area) were reported to be both of good chemical and quantitative status which is expected to increase by 5% in 2015 (in terms of number of groundwater bodies and area). At the level of RBDs, the percentage of GWBs of good status in 2009 ranges between 26–84% (28–86% in terms of area) and is about to increase to 38–91% (28–96% in terms of area) in 2015. An improvement of good status between 2009 and 2015 was only reported to be expected in 4 of 10 RBDs (RBD Danube, Rhine, Elbe and Oder).

As the sizes of German groundwater bodies cover a broad range from 0.014 km² up to 5,577 km², the percentage of groundwater bodies of good status can considerably deviate from the percentage of represented area, e.g. in the RBD Oder about 26% of the groundwater bodies are of good status in 2009, but representing about 69% in terms of the total area of groundwater bodies in the RBD.

10.1 Groundwater chemical status

All RBMPs and sub-RBMPs reported that the groundwater chemical status was not only assessed on the basis of whether the extent of exceedance of groundwater quality standards and threshold values whether it presents a significant environmental risk, but also considering the impact of groundwater on associated aquatic and dependent terrestrial ecosystems and considering saline intrusion and the impairment of human uses of groundwater.

Regarding groundwater chemical status 620 (about 63 % in terms of number and area) of the 989 groundwater bodies were reported to be of good chemical status in 2009, with a range of 39–84% at RBD level (32–86% in terms of area). For two groundwater bodies in the Rhine the status is unknown. In total 365 groundwater bodies were identified of failing good status due to exceedances of quality standards or threshold values and in 4 groundwater bodies saline intrusions were causing poor status. Neither failure to meet environmental objectives in associated surface water bodies or significant diminution of the ecological or chemical status of such bodies, nor significant damage to terrestrial ecosystems which depend directly on the groundwater body was reported to cause poor status at any groundwater body.

Information on the number of groundwater bodies or groups of bodies characterised as being at risk, and on the pollutants and indicators of pollution which contribute to this classification, was rarely reported. Baden-Wuertemberg and Bavaria are the only two Länder (covering the Danube and Rhine parts of their territory) that reported such information. This information had been updated by the results of the surveillance monitoring and presented in the RBMPs in the form of maps. Regarding the consideration of ecosystems, although they were considered in the assessment, neither further detail was provided about the definition of significant diminution of aquatic ecosystems and significant damage to terrestrial ecosystems, nor about the procedure of the assessment.

In all German RBMPs, the assessment of the extent of exceedance of quality standards and threshold values followed a unified national approach which is clearly described in a guidance document of the LAWA and summarised in WISE. No information was reported regarding groundwater bodies which are considered of good chemical status although quality standards or threshold values were exceeded. Recent information from the German authorities provided a general list of the occurrence of exceedances of substances at ‘Länder’ level was provided but not at the level of RBDs or groundwater bodies.

Germany established groundwater threshold values at the national level, which were uniformly considered in all RBDs and reported to WISE. All values are laid down in a well-documented guidance document of the LAWA (Geringfügigkeitsschwellenwerte). It includes values for all Annex II substances except for ammonium, for which a threshold value was established later by the LAWA. The guidance document lists threshold values for in total 71 substances or groups of substances including those listed in Annex II, which are identified relevant of posing a threat to groundwater in Germany, not only in connection with the implementation of the WFD. The values are derived from eco-toxicological (aquatic and terrestrial ecosystems) and human-toxicological (drinking water standards) criteria values in accordance with the requirements laid down in Annex II of the Groundwater Directive. For naturally occurring substances, German-wide natural background concentrations were considered within the threshold values. The procedure for the derivation of the German-wide natural background concentrations is clearly explained in a separate document. In case a groundwater body exhibits natural background concentrations higher than the threshold values (e.g. in the RBD Elbe), then the natural background level is taken as threshold value

for this particular case, following a procedure outlined in the guidance document. These individual threshold values deviating from the national TVs were not reported in the RBMPs.

Not all of the national threshold values laid down in the LAWA guidance document (Geringfügigkeitsschwellenwerte) were considered for status assessment in each RBMP. Only those which were identified relevant within the risk assessment were considered.

All RBMPs reported of having considered the uniform procedure for trend and trend reversal assessment laid down in a LAWA guidance document in detail. Trend assessment was performed for all groundwater bodies identified at risk and for the substances contributing to this assessment. Due to the lack of sufficiently long time series (6 years) trend assessment could not be performed in all RBDs for this first RBMP. The starting point for trend reversal of 75% of the threshold values was only established after the RBMPs were prepared.

10.2 Groundwater quantitative status

Regarding groundwater quantitative status 38 (about 4 % in terms of number and 3 % in terms of area) of the 989 groundwater bodies were reported to fail good quantitative status in 2009, with a range of up to about 30% at RBD level (in terms of number groundwater bodies and area). Main reason for poor groundwater quantitative status is that groundwater abstraction exceeds the available groundwater resource at 35 groundwater bodies, for 2 groundwater bodies groundwater abstraction leads to significant diminution of the status of surface waters and for one groundwater body good status failed due to saline or other intrusion.

In the RBD Danube, Ems, Eider and Schlei/Trave all groundwater bodies are of good quantitative status.

The assessment of groundwater quantitative status is in all RBMPs based on the comparison between long-term average abstractions and long-term average rates of recharge and the analysis of temporal developments of groundwater levels (as far as appropriate time series are available). Indications of impacts of groundwater quantity on the health of associated aquatic and groundwater dependent terrestrial ecosystems and saline intrusion were considered as far as relevant. The assessment methodology is described in WISE but not in the individual RBMPs.

10.3 Protected areas

In total 870 drinking water protected areas are connected to groundwater bodies. Each protected area is associated to only one groundwater body and each groundwater body is associated to exactly one protected area. All drinking water protected areas are in good status.

RBD	Good	Failing to achieve good	Unknown
DE1000	45		
DE2000	325		
DE3000	34		
DE4000	143		
DE5000	208		
DE6000	21		
DE7000	26		
DE9500	12		
DE9610	17		
DE9650	39		
Total	*870*	*0*	*0*

Table 10.3.1: *Number and status of groundwater drinking water protected areas.*
Source: *WISE*

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

In Germany 9.5% of all surface water bodies are currently in good or better status. The percentage of the share varies widely among the RBDs with the lowest values in the Ems (3.5%) and the highest values in the Danube (23.4%). The situation is expected to improve until 2015, where 18.2% of the German water bodies are foreseen to be in good or better status. The biggest improvements are expected to happen in the Eider (49.1% of improvement). For further details see table below.

RBD	Category	Total	Good or better 2009	Good or better 2009 (%)	Good or better in 2015	Good or better in 2015 (%)
All RBDs	All categories	9863	934	9.5	1793	18.2
Danube	All categories	671	157	23.4	275	41
	River	621	128	20.6	246	39,6
	Lake	50	29	58	29	58
Rhine	All categories	2279	293	12.9	571	25.1
	River	2208	276	12.5	543	24.6
	Lake	71	17	23.9	28	39.4
Ems	All categories	516	18	3.5	22	4.3
	River	502	17	3.4	21	4.2
	Lake	6	1	16.7	1	16.7
	Transitional water	2	0	0	0	0
	Coastal Water	6	0	0	0	0
Weser	All categories	1414	88	6.2	134	9.5
	River	1380	78	5.7	120	8.7
	Lake	27	10	37	14	51.9
	Transitional water	1	0	0	0	0
	Coastal Water	6	0	0	0	0
Elbe	All categories	3138	242	7.7	453	14.4

RBD	Category	Total	Good or better 2009	Good or better 2009 (%)	Good or better in 2015	Good or better in 2015 (%)
	River	2773	114	4.1	284	10.2
	Lake	359	128	35.7	168	46.8
	Transitional water	1	0	0	1	100
	Coastal Water	5	0	0	0	0
Odra	All categories	503	39	7.8	51	10.1
	River	453	25	5.5	29	6.4
	Lake	49	14	28.6	22	44.9
	Coastal Water	1	0	0	0	0
Meuse	All categories	228	23	10.1	25	11
	River	227	23	10.1	25	11
	Lake	1	0	0	0	0
Eider	All categories	163	6	3.7	86	52.8
	River	135	0	0	75	55.6
	Lake	16	6	37.5	11	68.8
	Transitional water	1	0	0	0	0
	Coastal Water	11	0	0	0	0
Schlei/Trave	All categories	350	15	4.3	123	35.1
	River	274	7	2,6	113	41.2
	Lake	51	7	13.7	8	15.7
	Coastal Water	25	1	4	2	8
Warnow/Penne	All categories	601	53	8.8	53	8,8
	River	499	0	0	0	0
	Lake	82	53	64.6	53	64.6
	Coastal Water	20	0	0	0	0

Table 11.1: *Surface water bodies per water type that are at good status and how the situation might involve until 2015.*
Source: *WISE*

For groundwater 61.6% of all groundwater bodies are in good status, with a variation of 26.1% in the Odra to 84.2% in the Schlei/Trave. As for surface waters, the status is also expected to be improved to 66.5% in 2015. The biggest improvements are expected to happen in the Odra basin where an improvement of 30.4% is expected.

Within the seven international German basins, transboundary cooperation on the establishment of the environmental objectives has taken place. For the Danube, Rhine, Ems, Elbe and Odra, this has been done in the context of an international river basin commission. In the Schlei/Trave, where no such Commission exists, coordination was based on the existing cooperation with DK. None of the RBMPs in international basins reported whether coordination took place regarding the methodologies or criteria to apply exemptions. Within Germany the LAWA developed a common position paper on how to apply and justify

exemptions according to Article 4.5 and Article 4.5[58]. However, its application within the Länder remains unclear as information has not been reported in the plans.

11.1 Additional objectives in protected areas

The protected areas found in Germany include drinking water protected areas, shellfish waters (only in the Rhine, Weser, Elbe, Eider and Schlei/Trave), bathing waters, and Natura 2000 sites. Most of the German plans do not make any explicit statement on the establishment of additional objectives in protected areas. The Eider RBMP states for bathing water areas there is a transition period until 2011 to implement the new bathing water Directive. For E-Coli and Enterokokken lower thresholds (Maßnahmenwerte) have been set. If these thresholds are exceeded more controls and bathing restrictions will be set. Regarding the objectives from the Shellfish Directive, the aim is to achieve all relevant objectives by 2015, except in two RBDs (Eider and Schlei-Trave), for which it is stated that the shellfish water quality objectives have already been achieved.

Regarding the objectives from the Shellfish Directive, all RBDs with Shellfish PAs include the requirement to comply with the Directive (transposed into Federal State regulations, where appropriate, e.g. Lower Saxony). The aim is to achieve all relevant objectives by 2015. In two RBDs however (Eider and Schlei-Trave), shellfish water quality objectives have already been achieved and thus don't need additional measures.

There is no mention of EU Hygiene Regulations or the three different levels (A, B, C) of designated shellfish production areas, nor is there any specific indication whether all Shellfish PAs correspond to Shellfish production areas.

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

The application of exemptions according to Article 4(4) and 4(5) varies widely across the German RBDs. In total 80% of the German water bodies are subject to an exemption with 79% being subject to an extended deadline. Only for 1% of the water bodies lower objectives will be applied. The basin with the lowest exemptions applied is the Eider (47%), the one with the highest is the Ems (95%). The main reasons for applying exemptions according to Art 4.4 are technical feasibility and natural conditions. Disproportional costs are less often used as a justification.

[58] See LAWA- Ausschuss Oberirdische Gewässer und Küstengewässer - Ad hoc-Unterausschuss „Wirtschaftliche Analyse“ -Gemeinsames Verständnis von Begründungen zu Fristverlängerungen nach § 25 c WHG (Art. 4 Abs. 4 WRRL)und Ausnahmen nach § 25 d Abs. 1 WHG (Art. 4 Abs. 5WRRL).

RBD	Global[59]					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
DE1000	146	0	160	0	282	-
DE2000	1246	18	277	5	215	-
DE3000	479	0	14	0	273	-
DE4000	1204	52	29	0	912	-
DE5000	2023	0	103	0	2461	-
DE6000	307	0	0	0	452	-
DE7000	143	7	61	0	16	-
DE9500	65	0	3	0	22	-
DE9610	146	0	45	0	173	-
DE9650	47	1	0	1	546	-
Total	*5806*	*78*	*692*	*6*	*5352*	-

Table 11.2.1: *Numbers of Article 4(4) and 4(5) exemptions*
Source: *WISE*

[59] Exemptions are combined for ecological and chemical status.

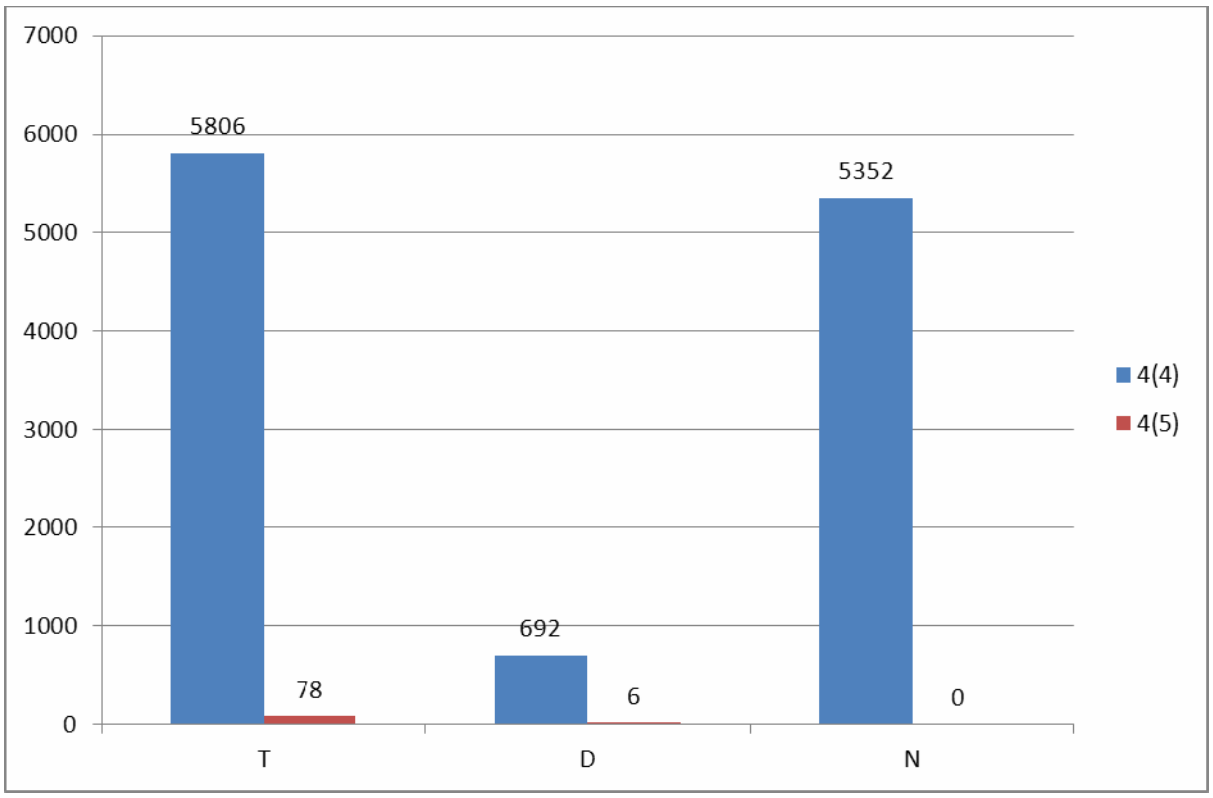

Figure 11.2.1: Numbers of Article 4(4) and 4(5) exemptions
T = Technical feasibility
D = Disproportionate costs
N = Natural conditions
Blue = Article 4(4) exemptions
Red = Article 4(5) exemptions
Source: *WISE*

Technical infeasibility can be further explained by mainly: i) the lack of technical solutions (Danube, Rhine, Ems, Weser, Elbe, Meuse, Warnow/Peene), ii) the fact that it takes longer to fix the problem (all basins) and iii) no information on the cause of the problem (Danube, Rhine, Ems, Weser, Elbe, Meuse, Schlei/Trave). In the case of natural conditions, the main, more detailed reasons are the ecological recovery time of surface (all basins) and ground water (Danube, Rhine, Ems, Weser, Elbe, Meuse, Warnow/Peene).

In case where disproportional costs have been argued (all basins except Odra and Warnow/Peene) the reported methodologies/arguments behind the judgements are not very obvious. Only a few "Länder" reported some hints.BY (Danube, Rhine) makes a brief reference to taking into account the financial impact on the entity paying for the measure. NRW (Rhine, Ems, Weser, Meuse) reported that affordability was considered as well as cost benefit ratio of bundles of measures; however, the details remain unclear as too little information was reported in the NRW RBMP. TH (Rhine) mentions comparing costs and benefits. Reference is made to financial burden on water users and the public budget. RP (Rhine) makes a reference to LAWA criteria, such as financial burden on waters and public budget, cost-benefit analysis, uncertainties about effectiveness of measures. In the Schlei/Trave a check of the ability to pay from the state budget was carried out. The exclusion of basic measures from the judgment of disproportional costs is only clearly

reported in the case of the Ems, Meuse, Elbe and the NRW part of the Rhine and the Weser. In all other cases no information was reported. However, the common position paper on exemptions by the LAWA clearly states the exclusion of basic measures from the judgment of disproportional costs is not possible.

11.3 Exemptions according to Article 4(6)

In all German RBDs Art 4.6 has not been applied so far. In the future, the NRW plan covering parts of the Rhine, Weser, Ems and Mosel states that the application of Art 4.6 will be further developed in the next planning cycles. In the Eider and Schlei/Trave future potential reasons for the Art 4.6 and prevention measures are reported in WISE. Potential reasons for applying Article 4.6 mentioned it includes exceptional natural causes such as extreme floods or extreme weather conditions. Unforeseen accidents include fires, accidents, technical failure or operator error in industrial enterprises, sewage treatment plants or pipelines, and shipping accidents and accidents with discharge of pollutants in coastal waters or in navigable inland waters. Prevention measures include: technical protection measures at facilities for storage and transfer of water polluting substances; safety inspections and monitoring of water-polluting substances; and establishment of early warning systems for chemical water pollution. During extreme natural events or unforeseeable accidents, fire trucks, technical assistance and central commands will be in a constant state of readiness to act if necessary. Coastal federal states and federal government keep combat ships and other equipment on hand to deal with oil or chemical spills in coastal waters including equipment to clean up contaminated beaches. There is also the possibility of using the Federal Army and private companies to help deal with big ship accidents and catastrophes on the ocean. In all other basins no further information on Art 4.6 is reported.

11.4 Exemptions according to Article 4(7)

The RBDs Eider, Ems, Schlei/Trave, Warnow/Peene, Elbe, Odra, Weser, clearly state that there is no application of Art 4.7. In the Danube the BY plan specifically mentions that Article 4.7 is not being applied at this time. BW does not mention article 4.7 in its chapter on exemptions. Until now, in the Rhine less stringent environmental objectives pursuant to Article 4.7 of the WFD have only been applied in the NRW part of the Rhine RBD in a few exceptional cases for groundwater and for surface waters. The exemption clause pursuant to Article 4, paragraph (7) of the WFD has not otherwise been used in the German part of the Rhine RBD. The NRW RBMP explicitly states that use has been made of Article 4, paragraph (7) in conjunction with lignite mining in NRW. This concerns the catchment areas of both the Rhine and the Maas. Unlike the consequences of open-cast lignite mining, exemptions from the “non-deterioration principle” on the basis of Article 4, paragraph (7) of the WFD are not envisaged.

11.5 Exemptions to Groundwater Directive

None of the German RBDs has reported on an inventory of exemptions from measures required to prevent or limit inputs into groundwater.

12. PROGRAMMES OF MEASURES

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

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)[60] on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full implementation of their PoMs, including on the progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

12.1 Programme of measures – general

The selection of measures was most importantly based on the status assessments in combination with significant pressures and the respective environmental objectives. Additional criteria were also taken into account such as impact of the measure; synergies with other directives and initiatives; cost-efficiency; implications of non-action; certainty/uncertainty of measures ("no-regret-measures"); measures that can be implemented in a short time span; urgency of the problem to be solved by the measure; financing; and public acceptability.

With the exception of the Schlei/Trave RB, all other German river basins coordinated with their international counterparts to draw up international RBMPs; this work was largely carried out under the auspices of international river basin organisations. Within the Elbe, Danube, Rhine, and Ems, the PoMs have been coordinated to different degrees (see section 1 for detailed information on coordination). For the other basins the information regarding international coordination in the development of PoMs was not reported in the plans. At international level a cost-effectiveness analysis was not reported in any of the basins.

The RBMPs do not provide information about the percentage between basic and supplementary measures or the ratio of measures based on sector/pressure. WISE lists the supplementary measures, but instead of indicating the type of measure, a number code is provided that refers to the German federal LAWA catalogue of measures[61].

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

[61] In Germany, the LAWA working group developed a generic catalogue of measures at federal level where each measure is assigned a code. The measures are general in nature, e.g. measures to address water abstraction or measures to address diffuse pollution from agriculture. These general categories were used in the summary chapter regarding PoMs in the RBMP. The PoMs for each RBD, which have not been officially reported, define in more detail sub-measures within each general category.

Measures are to be implemented on a number of levels; the geographic scope for implementation varies from the national level, the RBD level and the sub-basin or water body level. National and local authorities as well as private stakeholders (enterprises, farmers and individuals) will share responsibility for measure implementation, depending on the type or measure and sector in which it applies. Information regarding energy-related measures is not clear as they are not listed separately. Regional authorities are not involved in navigation related measures in Schlei-Trave. Local authorities cover all sectors except navigation and energy (except in the Elbe).

There is no information on the costs of the PoM reported at river basin level. A total cost estimate of the planned measures has been provided for the Federal Republic of Germany. The budget needed to finance the measures where regional agencies are concerned are included in the respective budget plans of the Federal Government, "Länder" and local authorities. Non-public agents are also involved in the implementation of measures. These measures may be funded by private sources or with the help of funding programmes of the EU, Federal Government or "Länder". Some "Länder" provide cost information at state scale (e.g. BW, NRW) but this is not disaggregated according to the river basins. With the exception of the Danube and Rhine (where information was either unclear or not reported), the other river basins reported carrying out a cost-effectiveness analysis of measures. All measures listed in the LAWA catalogue of measures are deemed to be cost-efficient; therefore, to a certain degree, in all RBDs in Germany the cost-efficiency of measures has been considered.

All the RBMPs stated that the PoMs will become operational in 2012, with the exception of the Elbe where no information was found to this effect.

12.2 Measures related to agriculture

The pressures on water from agriculture include pressures on water quality from diffuse sources of pollutants such as nutrients (and its associated eutrophication) and pesticides, as well as morphological modifications. Water abstraction is only mentioned in the Odra but without a clear link to agriculture; no other RBDs mention water abstraction as a pressure.

Technical measures selected to address agricultural pressures include: fertilizer and pesticide reduction (e.g. restrictions on applications), low input farming (e.g. organic farming), and hydromorphological measures like floodplain restoration and re-meandering measures. Soil measures were found in half of the basins and water savings measures were only found in the Danube river basin. Economic measures include: compensation for land cover and cooperative agreements. Non-technical measures include codes of good practice, training, and to some extent awareness and knowledge raising. Detailed information on non-technical measures is not provided, as only general categories are reported. A more detailed list of the agricultural measures mentioned is presented in the table below. There was an extensive public participation programme put in place for the development of the first RBMP in the different Federal States (see section 3 for more details). Public participation of the agricultural sector has been considered through participation of agriculture stakeholders in

Advisory boards. Nevertheless, the NRW river basin management plan refers in detail the specific approach taken with regard to agriculture[62].

The geographic extent of the application of measures is provided in all river basins except Warnow/Peene. A mix of sub-basin and water body level is used. In terms of the timing of the implementation of measures, information provided by the river basins and "Länder" vary. Some indicate that measures will be operational in the period 2009-2015, while some river basins (Elbe, Weser) and "Länder" (LS in the Ems) did not report information to this effect. Information was not reported on how gaps, if any, will be addressed in the future.

General information is provided regarding funding of agricultural measures, e.g. through EU, national and communal level funds. Within the same basins, some "Länder" indicated general sources of funds while others do not report information to this effect. For example, in the Ems, NRW mentions user fees and multi-level government funding, while LS does not provide any information to this effect. In the Rhine, the Federal States, with the exception of TH and SR, mention various financing sources; HE indicates a working group on funding at "Länder" level but its RBMP does not report any details. Funding information is provided by both German "Länder" (BV and BW) separately for the Danube. General funding information was stated in the plans of the river basins where only one RBMP was developed (i.e. Weser, Elbe, Eider, Warnow/Peene and Schlei/Trave). With the exception of the Weser, all the PoMs mention that the river basin will take advantage of Rural Development Regulation (RDR) financing, although Art. 38 is not referenced by any of the plans.

62http://www.flussgebiete.nrw.de/Dokumente/NRW/Bewirtschaftungsplan_2010_2015/Bewirtschaftungsplan/12_BP_Information_Anh__rung_und_Beteiligung_der___ffentlichkeit____ffentlichkeitsbeteiligung.pdf

Measures	DE1000	DE2000	DE3000	DE4000	DE5000	DE6000	DE7000	DE9500	DE9610	DE9650
Technical measures										
Reduction/modification of fertiliser application	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reduction/modification of pesticide application	✓		✓	✓	✓	✓	✓	✓	✓	✓
Change to low-input farming (e.g. organic farming practices)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydromorphological measures leading to changes in farming practices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measures against soil erosion	✓				✓	✓		✓	✓	✓
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)										
Technical measures for water saving	✓									
Economic instruments										
Compensation for land cover	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Co-operative agreements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water pricing specifications for irrigators										
Nutrient trading										
Fertiliser taxation										
Non-technical measures										
Additions regarding the implementation and enforcement of existing EU legislation										
Institutional changes										
Codes of agricultural practice			✓	✓	✓	✓	✓	✓	✓	
Farm advice and training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Raising awareness of farmers	✓	✓		✓						
Measures to increase knowledge for improved decision-making			✓	✓			✓		✓	✓
Certification schemes										✓
Zoning (e.g. designating land use based on GIS maps)										
Specific action plans/programmes										
Land use planning										
Technical standards										
Specific projects related to agriculture										
Environmental permitting and licensing										

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

12.3 Measures related to hydromorphology

All of the German plans link hydromorphological pressures to uses to varying extent (e.g. connectivity and dams, lack of flood protection due to hydropower, and cross profile construction for navigation). In the Ems the link between measures and pressures or measures and uses was not specified in the plan. In the Rhine the different "Länder" provide different levels of information regarding the links between pressures, uses and measures: for example, in NRW, BW, BY and RP measures are linked to overarching categories of pressures (i.e. water abstraction, morphology). In SL and TH no information on the link between measures and pressures was reported.

With the exception of the Ems and Warnow/Peene, measure to address hydromorphological pressures will be implemented in all water body types, also including HMWBs and AWBs. In the Ems and Warnow/Peene RBMPs, the information provided is not detailed enough to determine whether hydro-morphological measures will only be implemented in natural water bodies or in HMWBs as well. The measures included in the plans are listed in the table below:

Measures	DE1000	DE2000	DE3000	DE4000	DE5000	DE6000	DE7000	DE9500	DE9610	DE9650
Fish ladders	✓	✓								
Bypass channels	✓									
Habitat restoration, building spawning and breeding areas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sediment/debris management	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Removal of structures: weirs, barriers, bank reinforcement	✓	✓		✓	✓	✓	✓	✓	✓	✓
Reconnection of meander bends or side arms	✓	✓	✓	✓	✓	✓	✓			✓
Lowering of river banks										
Restoration of bank structure					✓			✓	✓	✓
Setting minimum ecological flow requirements	✓	✓		✓	✓	✓	✓			
Operational modifications for hydropeaking		✓					✓			
Inundation of flood plains	✓	✓								
Construction of retention basins		✓								
Reduction or modification of dredging	✓			✓	✓					
Restoration of degraded bed structure		✓		✓	✓	✓			✓	
Remeandering of formerly straightened water courses										

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

Although most of the RBs do not mention whether there are guidelines on defining ecologically based flow regimes, all of the PoMs include specific measures to achieve such flows. Some measures are very explicit – for example "Measures to guarantee minimum

ecological flow" found in the Danube, Rhine, Weser, Elbe, Odra, Meuse and Warnow/Peene – while other measures will lead to improved flow regimes (e.g. natural retention or natural hydromorphological dynamic of the river, etc.). With respect to guidelines, the BV Danube plans briefly references a proposal for guidelines to determine an ecologically and economically balanced minimum flow proposal for existing small hydropower plants. In the BW Danube plans, reference is made to guidelines establishing minimum flow 'Gemeinsames Amtsblatt 2007, p.105 ff) but no details are provided.

12.4 Measures related to groundwater

Groundwater quantitative status

According to the information on the strategic concepts of the programmes of measures which was provided to WISE, basic measures are implemented in all RBMPs, for surface waters and for groundwater independently of the status of groundwater bodies. They cover controls of water abstraction and recharge, measures to promote efficient and sustained water use and measures for the recovery of costs for water services. The basic measures mostly already existed, mainly in the form of federal legislation and individual "Länder" laws and by-laws regulating permits, authorisations, registers etc. This means that in RBDs shared by several "Länder", the operative measures vary from one 'Land' to another.

Supplementary measures tackling over abstraction were reported to be needed and established in the RBDs Rhine, Elbe, Oder and Maas regarding the reduction of water abstractions (mainly from mining), and in the RBD Warnow/Peene.

Groundwater chemical status

All RBMPs reported the implementation of measures to prevent inputs of hazardous pollutants and to limit inputs of non-hazardous pollutants into groundwater. A main national measure is the general prohibition of any discharge to groundwater with adverse effects on groundwater and requirements regarding the storage of such substances established in the federal law. In addition, further laws and by-laws tackle point and diffuse source pollution, like preventing significant losses of pollutants from technical installations and preventing and/or reducing the impact of accidental pollution. Compliance is checked by water inspection authorities.

Supplementary measures were established in all RBDs, mainly supplementary to the Nitrates Directive, tackling agricultural activities, both from diffuse pollution and point sources of pollution from fertilizers and pesticides. Further supplementary measures tackle point source pollution from contaminated sites and diffuse pollution from mining activities, leaking sewers and the implementation of specific measures in safeguard zones.

Further frequently reported and supplementary measures cover the establishment or adaption of support programmes, advisory programmes, further investigations, voluntary co-operations, information and education programmes.

No RBMP reported specific measures being established in that part of groundwater bodies where quality standards or threshold values were exceeded, although the groundwater body is of good status.

During the international coordination in the Danube RBD the effect of national measures on the Danube basin-wide scale is estimated and presented. The Elbe RBMP shows only limited coordination regarding the PoMs. In Rhine RBD there are linkages between national PoMs and Rhine level activities, but their effect on each other are not clear.

12.5 Measures related to chemical pollution

In the WFD, chemical pollution is regulated through Art.10 (stating the combined approach principle for the control of both point and diffuse sources of discharges); Art. 11 on programmes of measures and Art.16, which requires the establishment of a list of priority substances (Annex X). As there is no reporting requirement, no inventory of sources of chemical pollution is mentioned in any of the German RBMPs. Bavaria refers to the webpage of the German Federal Environment Agencies´ Pollutant register in its plans for the Rhine and Danube; no other plan or "Land" does the same. Most of the RBMPs mention chemical pollution and its source in the chapters on anthropogenic pressures. Significant pressures can be found in relation to DOC, N, chloride, fluoride as well as lead, copper, zinc, cadmium and nickel (mentioned in the RBMPs of the Odra, Elbe, Rhine and Danube (no heavy metals). Some RBMPs (e.g. Weser (NRW), Elbe, Odra, Eider, Schlei/Trave, Warnow/Peene) mention point sources only and some also describe diffuse pollution from nutrients (nitrogen and phosphorus).

General measures do not target a specific chemical substance but focus on industrial and household emissions. Additionally, the Danube and the Rhine include emissions from agriculture and the Weser includes emissions from potash mining. In the Danube and the Rhine, there was no common approach among the "Länder" in developing and reporting on general measures to address chemical pollution. For all the RBDs, WISE mentions basic and supplementary measures. The basic measures cover regulations/laws/by-laws that regulate permitting/emission standards (combined approach) aiming at industrial point sources and waste water treatment plants. Examples of supplementary measures from WISE (from a list of many) are: 'measures for the reduction of pesticide pollution from agriculture'; 'realization and continuation of specific water protection measures in drinking water areas'; 'conceptual measure: development of concepts / studies / expert reports'; 'conceptual measure: conducting R&D and demonstration projects'; 'conceptual measure: information and training measures'.

Information pertaining to substance specific measures was not found in the RBMPs of the Rhine and Danube due to a lack of a common approach[63] among the "Länder"). However, some information on substance-specific measures is given in most RBMPs.

12.6 Measures related to Article 9 (water pricing policies)

"Water services" have been narrowly defined in Germany based on a legal interpretation of the legal definition[64]; it is explicitly stated that only water supply and sanitation (waste water

[63] E.g. for ubiquitous substances there is none available.

[64] This issue is the subject of infringement actions by the Commission against a number of Member States, including Germany.

collection and treatment) are considered as water services for the purposes of Art. 9. Only Baden-Wuerttemberg mentions also industrial self-supply, agricultural water supply (irrigation) and direct discharges from industry qualifying as water services but without analysing their cost recovery further. Certain activities are explicitly mentioned as not being water services such as impoundments for navigation, flood protection and hydropower generation.

In all RBD/Federal States, at least households, industry and agriculture are defined as water uses.

The cost recovery is calculated for both water services identified, that is water supply and sanitation. The obligation to cover the cost of water supply and wastewater disposal is anchored in all community charges legislation in the Federal States, and is supplemented in individual cases by measures within the framework of the enforcing authorities' managerial discretion.

Within cost recovery calculation operational costs are included. It is not clear whether other financial costs such as investment costs, maintenance costs, and administrative costs were taken into account.

Subsidies are included in cost recovery calculation. It is stated that cross-subsidization between different user groups of water services is largely avoided by a differentiated charging; selected analysis suggests that, overall, at an aggregate level no cross-subsidization between user groups (households, industry, agriculture) and between the water services (water supply, sanitation) is taking place. It is planned to extend the calculation of cost recovery regarding operational costs and subsidies in more transparent way in the second implementation cycle of the WFD.

Environmental and resource costs were not explicitly quantified for the cost recovery calculation, with the explanation that a practicable method is not available for this and in view of a lack of data, whose rectification would have necessitated a disproportionately high input of time and financial resources. Environmental and resource costs are reported to be kept as low as possible/as not existent via licensing conditions and retrospective charges, and at a national level, internalisation of those by the originators through waste water charges and water abstraction fees and administrative laws. German authorities reported that efforts are underway to improve the data situation for the second management cycle.

The polluter-pays-principle is mentioned in most RBMP as a basic principle of German water pricing policy and as being reflected in the contributions of the different water users to cost recovery. At the same time, calculations of the contributions of the different water users to the cost recovery have not been done, only limited water services were taken into account and ERC were not calculated what put into question implementation of polluter pays principle.

Regarding if adequate incentives are provided by the water pricing policy for users to use water resources efficiently, only general statements can be found, but no precise information given on how this was done. It is stated that the incentive effects of the water pricing system is evidenced through the continuous decrease in water consumption and water body contamination in Germany.

The provisions of Art 9(4) and flexibility provisions of Art 9 have not been used in Germany.

Overall, a predominantly national approach to Art 9 implementation has been taken in Germany. Thus, significant efforts were done in coordinating the work done on Art 9 in the different Federal States. Efforts were reported regarding international cooperation on Art 9 issues, focussing mainly on exchanges of experiences on Art 9 implementation.

12.7 Additional measures in protected areas

None of the RBDs clearly identified water bodies and protected areas in need of additional measures. Also, none of the RBMPs mentioned included additional measures to reach the more stringent objectives of other EU environmental objectives (Birds, Habitats, Shellfish, etc.).

For Shellfish protected areas, for example, details of additional measures have either not been provided or have not even been set as the objectives had already been reached and it was therefore deemed unnecessary to establish them. Measures to comply with the WFD status seem sufficient (Elbe). In one RBDs however the additional measures aim to comply with regional regulation transposing Directives 2006/113/EC and 2006/44/EC, i.e. Lower Saxony.[65]

With respect to the need for additional measures in protected areas, the general concept is that improving the status of water bodies within the meaning of the WFD supports the area-specific protection targets. The planning of specific measures always entails a comparison between the objectives of the WFD and those of the respective protected areas. Because the implementation of the Natura 2000 Directives was delayed, however, the conservation targets were often not yet defined at the time PoMs under the WFD were prepared. Synergies are taken into account with the selection of measures (e.g. creation of passability, habitat improvements in the shore and water body zone).

In the process of establishing the Rhine PoMs, it was checked if the WFD-measures are in correspondence with protected area measures. In the seldom cases where there was a contradiction between objectives, the relevant authorities cooperated to find solutions or to prioritize objectives. In the Danube, the BY RBMP mentions that additional measures could potentially be necessary but states that detailed information is currently not available, while the BW RBMP mentions a general need for additional measures. The Elbe and Odra RBMPs mention that by improving the ecological status of water bodies 'usually' specific objectives of other Directives are supported and that “no contradicting goals exist”. These RBMPs also state that the analysis of the effects of the WFD and other directive´s measures on each other will be conducted within the individual “Länder”. The RBMPs of the Weser and Warnow/Peene do not provide information to this effect. The Meuse and Ems RBMPs only state that additional measures are not necessary.

In all German river basins with the exception of the Danube safeguard zones are reported to have been established for water bodies supplying drinking water; these are corresponding to the protection zones according to Art. VII (3) WFD. Three river basins – the Ems, Weser, and

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

Meuse - mention the implementation of an additional measure to protect surface and groundwater bodies in drinking water protection areas. However, none of the plans provide information regarding the scope of the measure or the water body/bodies affected. In the Ems, while NRW mentions establishing zones and implementing additional measures, LS did not submit information to this effect.

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

13.1 Water Scarcity and Droughts

Water scarcity and droughts are not significant problems in the German river basins with only a few exceptions. In the Elbe and the Danube RBDs there are local/sub-basin drought occurrences but these are not considered to be significant. Empirical analyses of the overall water availability in the Elbe river basin suggest that water scarcity is of no concern in the basin as a whole, although locally (especially in mining areas) surface and groundwater bodies seem to be negatively affected. The Elbe RBMP concludes that in the near future (until 2015) droughts will be of no relevance in the river basin; in the long-term, however, it could become relevant. Although in the Odra and Meuse RBDs several groundwater bodies are reported to have bad quantitative status in WISE, this is not the result of water scarcity or drought; rather, lignite mining in the region is responsible for the large-scale lowering of the groundwater level due to over-abstraction.

Also rare extreme meteorological events such as the heat wave in summer 2003, which temporarily caused low water levels in some regions, did not have any significant consequences for the general public or industry. There were no serious, lasting limitations on the water supply for industry and households; only the cooling water supply to some power plants was temporarily restricted. Quite contrary to this topic, the trend in Germany is moving towards an increase in water availability due to the decrease in consumption by industry and households.

According to the information in the plans, water scarcity and drought might become relevant in 5 river basins due to climate change after 2015 (Rhine, Ems, Weser, Odra and Meuse). Current and future drivers of water scarcity and drought issues are linked to irregular rainfall patterns in the Danube, Rhine, Ems, Weser, Elbe, Odra and Meuse. The RBMP Rhine of Saarland, Rhinland-Palatinate and Hessen do not report information on future drivers of WS&D. Although most of the German basins do not consider WS&D a significant issue, the RBMPs acknowledge that changing future hydrological regimes should be taken in account in long-term planning.

To determine the future water scarcity potential of basin, water demand and availability trends were reported in the RBMs with varying approaches:

- All the basins provide water demand trend scenarios itemised by water use.
- In the German part of the Danube, future water demand is projected using low - medium - high consumption scenarios and descriptions in qualitative terms.

- In the Rhine, the approaches per federal state is as follows: In North Rhine-Westphalia demand scenarios are based on assumptions of the future economic growth; in Rhineland-Palatine, Baden-Wuerttemberg and Bavaria, future water demand is projected using low - medium - high consumption scenarios and descriptions in qualitative terms; in Thuringia and Saarland future water demand scenarios, are provided for agriculture and the domestic sector; and in Hessen, future water demand is provided via three different scenarios, but not itemized by water use.

- In the North Rhine-Westphalia part of the Ems and the Meuse, future water demand scenarios are based on assumptions of the future economic growth; water consumption scenarios are provided for the whole federal state are not aggregated by river basin. Lower Saxony did not report any details to this effect.

- In the Elbe, future water demand is described qualitatively, using aggregated data on population and economic growth, as well as assumptions on more efficient technologies being used.

- In the Odra, demand trend scenarios are provided itemized by sector until 2015.

- In the Eider, Schlei/Trave and Warnow, Peene, future water demand scenarios for the domestic sector and industry, without stating concrete numbers assume that water demand will be lower in the future (i.e. 2015).

- With respect to water availability trends, the Rhine, Ems, Weser, Odra, Meuse and Warnow/Peene basins provide water availability trend scenarios (not itemised by water use). No data on future water availability trend scenarios are provided in the Ems, Elbe, Eider and Schlei/Trave RBMPs as existing data are deemed too inconclusive to draw conclusions.

As all German plans indicate a low importance of water scarcity and droughts, WS&D measures have for the most part not been included in the RBMPs. The Rhine, Weser, Elbe, Eider, Schlei/Trave and Warnow/Peene river basins reported these measures as not relevant given the low pressure. In the Danube, Bavaria and Baden-Württemberg mention additional research is needed to develop concrete actions. No information was reported on the existence or not of WS&D measures in the Ems, Odra and the Meuse.

Although water scarcity and drought problems in Germany are only found at the local level, nevertheless international cooperation took place in the Danube, Rhine, Elbe and Meuse with respect to future challenges arising from climate change; coordination did not take place in the Ems as WS&D have not been identified as basin-wide problems.

13.2 Flood Risk Management

Floods are mentioned in a number of places in the RBMP. Flood risk management is considerable concern across much of Germany in the context of climate change. Measures to reduce flood risk were identified in all the river basins with the exception of the Elbe although no explicit climate change adaptation measures are mentioned. Examples include: renaturation of wetlands, increasing water retention and the reallocation of dykes.

Flooding has been used a reason for HMWB designation in the Odra, Meuse, Danube, Rhine, Weser and Elbe. Germany is not applying article 4(6) or 4(7) at this time (except NRW, see chapter 11).

13.3 Adaptation to Climate Change

For the first management period up until 2015, current findings suggest that no significant impacts from climate change are anticipated, however climate change as well as adaptation is addressed in all the river basins. The following issues are mentioned in relation to adaptation to climate change:

- Climate change scenarios focusing on change in temperature and precipitation were reported in all river basins; Uncertainties related to climate change (e.g. with respect to status assessment or effects of measures) were at the same time reported.
- Impacts on water status due to climate change (Water quality and biodiversity in aquatic systems) were reported in all river basins with the exception of the Elbe.
- Impacts on coastal zones were reported in the Ems and Eider RBMPs.
- Water availability and water demand issues were reported by all the river basins with the exception of Schlei/Trave RBD.
- Water Scarcity and drought risks were reported by the Danube, the Rhine, Weser, Elbe, and Meuse (droughts only) river basin disctricts.
- Flood risks were reported with the exception of the Eider, Schlei/Trave and Warnow/Peene RBMPs.
- Vulnerability of certain sectors/water uses were reported in the Danube, Rhine, Ems, Weser, Odra, Meuse and Eider RBDs.

In addition, concrete adaptation measures were reported in all the basins with the exception of the Ems RBD. The focus is mostly on flood risks with measures included such as water retention, reallocation of dykes, revitalization of wetlands, and river restauration. Additional measures include more efficient use of water (Odra) and control of ground water abstraction (Rhine).

A climate check of the Programmes of Measures was carried out by the majority of river basins to better align the setting of objectives (with the exception of the Weser and the Meuse) and in the selection of measures (with the exception of the Danube and Weser RBDs). However the details of the methodologies to do so have not been presented. In the Danube climate change was not included due to continued uncertainties surrounding the impacts of climate change. Given the lack of clarity regarding the impacts of climate change, the comprehensive progress in scientific findings and the short monitoring period of the management plans until 2015, the German river basins intend to update the climate change related information for the next management cycle. Targeted analyses are planned for subsequent management cycles, including in particular RBD-wide analyses. The International Commission for the Protection of the Rhine against Pollution and the International

Commission for the Protection of the Danube against Pollution are working on this, with Germany's active involvement.

14. RECOMMENDATIONS

Despite some shortcomings of the RBMPs, the German plans show that considerable efforts have been made and the plans already indicate that issues will become clearer in the 2nd cycle.

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

To deliver successful water management requires linking these different steps. Information on **pressures** and risks should feed into the development of **monitoring programmes**, information from the monitoring programmes and the **economic analysis** should lead to the identification of **cost effective programmes of measures** and justifications for exemptions. **Transparency** on this whole process within a clear governance structure will encourage **public participation** in both the development and delivery of necessary measures to deliver sustainable water management

To complete the 1st river basin management cycle, and in preparing for the second cycle of the WFD, the following recommendations are made:

- Better address each RBD individually when providing relevant information via the 'electronic' WISE templates. In addition the information in WISE and the plans should be more streamlined.
- 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 would 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.
- Fill existing gaps regarding lacking reference conditions.
- Provide more transparent information regarding how waters were classified in order to avoid gaps (e.g. why no transitional water bodies have been identified).
- 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 BQEs for pressure/impact assessment and aligning the assessment results to the intercalibration class boundaries of the EC Intercalibration Commission Decision in a transparent way.

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

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

- 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.

- Report about groundwater bodies at risk (and the related parameters) as this is an important element in the status assessment and in the programme of measures.

- The frequency of chemical monitoring should be harmonised across the "Länder"/RBMPs according to the requirements of the WFD.

- Mercury, hexachlorobenzene and hexachlorobutadiene are indeed 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.

- 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.

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

- 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.

- 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.

- 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.