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Report on the implementation of the Water Framework Directive River Basin Management Plans
Member State: PORTUGAL

Accompanying the document

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The Water Framework Directive and the Floods Directive: Actions towards the 'good status' of EU water and to reduce flood risks

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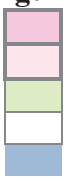
Figure 1.1: Map of River Basin Districts



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)

Portugal is a republic comprised of a continental part and two autonomous regions. The total landmass area of Portugal is 92 072 km², and the economic exclusive zone spans 1 727 408 km². The population in 2011 (date of last census) is about 10.6 million[1]. The Azores autonomous region has a population of 246 thousand across 9 islands, while the Madeira autonomous region has a population of 268 thousand across 2 islands.

There are three different administrative jurisdictions governing the Water Framework Directive (WFD) implementation in Portugal: mainland Portugal (PTRH1 to PTRH8) and the Azores (PTRH9) and Madeira (PTRH10) autonomous regions. At the time of preparation of

[1] www.INE.pt

the River Basin Management Plans (RBMPs) there were five independent regional water authorities in mainland Portugal (see below).

RBD	Name	Size (km²)[2]	Countries sharing borders
PTRH1	Minho and Lima	2465*	ES
PTRH2	Cávado, Ave and Leça	3584	-
PTRH3	Douro	19219*	ES
PTRH4	Vouga, Mondego, Lis and Ribeiras do Oeste	16981	-
PTRH5	Tejo	25665	ES
PTRH6	Sado and Mira	12149	-
PTRH7	Guadiana	11611	ES
PTRH8	Ribeiras do Algarve	5511	-
PTRH9	Açores	10047	-
PTRH10	Madeira	2248	-

Table 1.1: Overview of Portugal's River Basin Districts
* Area in Portuguese territory
Source: River Basin Management Plans reported to WISE[3]: http://cdr.eionet.europa.eu/be/eu/wfdart13

There are some peculiarities in some RBMPs. For PTRH4 there are two RBMPs, one for Vouga, Mondego, Lis and another for Ribeiras do Oeste. This is because the Ribeiras do Oeste RBMP was produced and implemented by the regional water authority of Tejo (PTRH5), while the Vouga, Mondego, Lis RBMP was produced by the water authority of the Centro (PTRH4)[4]. The Azores archipelago is composed of nine islands, comprising the PTRH9; there is a Characterisation and Diagnostic chapter including a study of status, pressures, monitoring and economic analysis for each island, summarised in the main RBMP.

Portugal shares four river basin districts with Spain: Minho and Lima, Douro, Tejo and Guadiana. There are no *joint* RBMPs with Spain but there has been some coordination with, in particular, the relevant Spanish River Basin District (RBD) authorities.

Name international river basin	National RBD	Countries sharing borders	Co-ordination category	
			2	
			km²	%
Miño/Minho	PTRH1 (Minho-Lima)	ES	817	5.0
Limia /Lima	PTRH1 (Minho-Lima)	ES	1220	47.1
Duero/Douro	PTRH3 (Douro)	ES	18650	19.3
Tajo/Tejo	PTRH5 (Tejo)	ES	25026	21.7
Guadiana	PTRH7 (Guadiana)	ES	11599	17.3

Table 1.2: Transboundary river basins by category (see CSWD section 8.1) and % share in Portugal[5].
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.

[2] Data was supplied by the PT authorities after the assessment of the RBMPs had been carried out.

[3] It should be noted that as submission of data to WISE occurred prior to the publication of the RBMP, and some changes were introduced between the two dates. Hence, there are some discrepancies between the information reported in the RBMPs and in WISE.

[4] See section 3.2 on administrative arrangements. According to the National Water Authority (June 2014) for the next programming cycle, the Ribeiras do Oeste water bodies will be integrated into PTRH5.

[5] 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).

Category 4: No co-operation formalised.
Source: EC Comparative study of pressures and measures in the major river basin management plans in the EU. Area data was supplied by the PT authorities after the assessment of the RBMPs had been carried out.

This Annex covers the RBMPs of mainland Portugal (PTRH1 to PTRH8), and of the Azores (PTRH9) and Madeira (PTRH10) autonomous regions.

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

The RBMPs for mainland Portugal were adopted on 22 March 2013 by a Resolution of the Council of Ministers (RCM) and were reported to the Commission in September 2013. The Azores RBMP was adopted on 27 March 2013 (Resolution of the Council of the Government[6] n.º 24/2013) and reported in September 2013 to the Commission. The Madeira RBMP was adopted on 20 February 2014[7] (Resolution n.º 81/2014) and was submitted to WISE from 1 to 4 April 2014.

RBD	RBMP Date of Adoption	RBMP Date of Reporting
PTRH1	22/03/2013	27/09/2013
PTRH2	22/03/2013	27/09/2013
PTRH3	22/03/2013	27/09/2013
PTRH4	22/03/2013	27/09/2013
PTRH5	22/03/2013	27/09/2013
PTRH6	22/03/2013	29/09/2013
PTRH7	22/03/2013	29/09/2013
PTRH8	22/03/2013	29/09/2013
PTRH9	27/03/2013	27/09/2013
PTRH10	20/02/2014	04/04/2014

Table 2.1: Adoption and reporting to the Commission of Portugal's RBMPs.
Source: RBMPs, WISE

While the RBMPs were reported to WISE in September 2013 (except for Madeira (PTRH10), as mentioned above), the XML data files had been reported in 2011 and 2012, hence prior to the conclusion of the RBMP. Data on WISE does not always match with the actual plans. In this report the source of data is clearly referenced.

2.1. Main Strengths

- The RBMPs are quite complete with detailed explanations on methodology, assumptions and approaches, complemented with maps, drawings and data tables.

- The RBMPs' development was subject to public participatory processes, including the creation of the multi-stakeholder River Basin District Councils for each river basin district. All documentation of the public participation, as well as the Strategic Environmental Assessment documents, is available at the same website as the RBMPs.

- In almost all river basin districts there is limited information on a number of water

[6] Resolução do Conselho do Governo in the original.

[7] The formal public consultation process of the PTRH10 RBMP was held from 19th August 2013 to 18th February 2014 – the RBMP states that only three written comments were received during the formal public consultation period. The last RBMP preparation public meeting was held on 4th February 2014.

bodies. In some river basin districts, monitoring programmes are not fully set up or only a limited number of parameters is monitored. However, the RBMPs show that efforts have been made to overcome the lack of data and to achieve classification of water bodies through alternative methods, such as modelling, expert judgment, etc. The methods used are explained with a fair degree of detail.

- The Programme of Measures is detailed with information on which measures will be applied in which water bodies. Furthermore, the justification for each measure is provided. This is particularly the case for PTRH6, 7 and 8.

- A significant number of measures aim to increase knowledge on the water bodies through research and strengthening the monitoring network, and through the update or improvement of inventories of pressures. The goal is to increase the data available in the next WFD programming cycle, and to be able to classify a larger number of water bodies and increase the precision of delimitation and classification in other cases.

- There has been coordination between Portugal and Spain for the international RBDs, although no joint plans or actions have been devised.

2.2. Main Gaps

- Overall there is limited information on water bodies and several water bodies could not be classified in terms of ecological and chemical status (see tables in section 6), or have only preliminary classification.

- Reference conditions for the classification of transitional and coastal waters have not yet been defined and the classification is thus considered preliminary.

- The monitoring network in Portugal has had maintenance challenges since 2009 and as a result has serious limitations, mainly for surface waters. In 2014 a new monitoring network contract was signed for new and revamped monitoring stations to be operational in 2015. For groundwater the monitoring network is more representative.

- With regards to biological assessment methods, only a few BQEs are used for the classification of water bodies. For example, only the phytobenthos and the benthic invertebrates are considered for the classification of river water bodies and only phytoplankton parameters (namely, chlorophyll a, total biovolume, % of cyanobacteria biovolume and a compositional index) are used in the classification of heavily modified water body (HMWB) lakes (there are no natural lakes in mainland Portugal). This decision is taken at the national level. Even if more BQEs are monitored in some RBMPs, they are not used for the assessment.

- There is limited information on the methodology to identify significant pressures. Also non-existent or very preliminary is the definition of ecological flow[8], information on groundwater dependent ecosystems, analysis of trends, and other issues requiring the existence of good data sets.

[8] The PT water authorities understand eflows as the water that dams have to release downstream in order to minimise environmental impacts (including to achieve WFD objectives).

- The links between pressures, status and measures are not clear. The lack of base information, together with a lack of analysis of the expected impacts of the measures renders unclear if and what WFD objectives will be attained for many water bodies.

- No comprehensive funding has been specifically secured under RBMPs for the implementation of the Programme of Measures (PoM). Nevertheless, some of the measures included in the PoM are derived from other ongoing plans, some of which have funds for implementation.

- As stated above, the WISE summary reports are not always up to date as data was uploaded prior to the conclusion of the RBMPs and some changes were introduced in the RBMPs after the submission of data to WISE. As a result, some information is missing and there are differences between data reported on WISE and data in the RBMPs.

3. GOVERNANCE

3.1. Timeline of implementation

RBD	Timetable	Work programme	Statement on consultation	Significant water management issues	Draft RBMP	Final RBMP
Due dates	**22/06/2006**	**22/06/2006**	**22/06/2006**	**22/12/2007**	**22/12/2008**	**22/12/2009**
PTRH1	01/02/2007	01/02/2007	01/02/2007	01/02/2009	03/10/2011	01/06/2012
PTRH2	01/02/2007	01/02/2007	01/02/2007	01/02/2009	03/10/2011	01/06/2012
PTRH3	01/02/2007	01/02/2007	01/02/2007	01/02/2009	03/10/2011	01/06/2012
PTRH4	01/02/2007	01/02/2007	01/02/2007	01/02/2009	01/10/2011	31/10/2012
PTRH5	01/02/2007	01/02/2007	01/02/2007	01/02/2009	22/08/2011	30/09/2012
PTRH6	01/02/2007	01/02/2007	01/02/2007	01/02/2009[9]	20/06/2011	22/03/2012
PTRH7	01/02/2007	01/02/2007	01/02/2007	01/02/2009	15/07/2011	22/03/2012
PTRH8	01/02/2007	01/02/2007	01/02/2007	01/02/2009	19/09/2011	01/06/2012
PTRH9	01/11/2006	01/11/2006	01/11/2006	01/02/2010	15/12/2011	15/06/2012
PTRH10	29/12/2005	19/10/2009	19/08/2013	02/08/2013	02/08/2013	25/02/2014

Table 3.1.1: Timeline of the different steps of the implementation process
Source: WISE Summary 1.3.2 for each RBD

3.2. Administrative arrangements - river basin districts and competent authorities

Between the conception and drafting of the RBMPs, the time in which the plans were finalised and published and the current implementation, some major institutional changes occurred, with impacts on the process. This is mostly reflected in the case of mainland Portugal.

In mainland Portugal the development of the RBMPs has been undertaken by five River Basin District Administrations (formerly the 'RBD Authorities'), vested at the time with administrative and financial autonomy. There was also the Water Institute which was

[9] According to PT authorities "There is a reporting mistake in WISE since all mainland Portugal significant water management issues were subject to public participation processes at the same time 01/02/2009"

Portugal´s National Water Authority. The latter focused on providing technical assistance and coordination, for example by issuing national guidelines.

From July 2011 to July 2013 (during the time in which the RBMPs were submitted for final review and were approved), there was a Ministry for Agriculture, Maritime Affairs, Environment and Spatial Planning (MAMAOT) in charge of defining and coordinating policies related to water (including coastal waters), as well as farming and fisheries. The organic law (Decree Law nº 7/2012, of 17 January 2012) set up a new institution – the Portuguese Environment Agency, I.P. (APA), in which the National Water Institute and the five River Basin District Administrations were included (Decree Law nº 56/2012, of 12 March 2012). As a result, the former RBD authorities are currently regional departments of APA, implementing water policy at a regional level. APA thus operates now as the single National Water Authority for all of Portugal's mainland RBDs.

Shortly after the publication of the RBMPs on 27 July 2013, the MAMAOT was split into the Ministry of Agriculture and Sea (MAS) responsible for marine affairs, and the Ministry of Environment, Spatial Planning and Energy (MAOTE), which included the water and coastal zone management legal competences. This is the present situation, whereby in particular APA retained its competences.

According to the water authority (APA), relations and contacts between the two ministries are excellent and constant ("helped by the fact that officials have worked together for decades"). Efforts are being made to consider coastal and transitional waters as a common concern. In particular, coordination and cooperation efforts are focused on:

- "Development of monitoring programmes and indicators, especially in the context of marine waters, including coastal waters, where the Portuguese challenges are higher considering the large area of jurisdiction and its deep sea nature;
- Reporting, including harmonised schedules and formats;
- Establishment of programmes of measures, including the required economic analysis and management procedures."

A further key player in Portugal's water management is the Water and Waste Services Regulatory Entity (ERSAR), established in 2006. ERSAR plays a crucial role in the definition of urban water cycle water tariffs, and also importantly in the implementation of the water resources tax. The regulator has newly revised statutes published by Law 10/2014 of 6 March 2014.

Other bodies, established by the Water Law (Law nº 58/2005), are the River Basin District Councils. The councils have an advisory role and played important roles in the development of the RBMPs, particularly in terms of technical assistance and advice. However, their competencies, composition and functioning will be set up in a specific legal act (yet to be published).

The General Direction of Natural Resources and Maritime Safety and Services (DGRM) of MAS is responsible for the licensing of activities in the public maritime space, as well as for the regulation, inspection, surveillance, coordination and control of the protection of marine resources, fisheries, aquaculture, maritime and port safety. Monitoring of the coastal and transitional waters is undertaken by the recently created Portuguese Institute of the Sea and

Atmosphere (which integrates the functions of the previous meteorology institute and the marine research institute).

The competences of the RBD authority of the Azores Autonomous Region have been approved by the Regional Regulatory Decree nº 23/2011/A, which establishes that the Competent Authority is the Regional Secretariat of Environment and the Sea, which as of March 2014 has become Regional Secretariat of Natural Resources (SRRN). Water is managed by the Directorate of Environment which is part of the SRRN. There is also a Regional Water and Waste Services Regulatory Entity established by Regional Legal Decree nº 8/2010/A of 5 March 2010.

The competences of the RBD authority of the Madeira Autonomous Region have been approved by the Regional Legislative Decree nº 33/2008/M, which establishes that the Regional Water Authority is the Regional Directorate of Environment, and that the coastal zone and safety issues (floods, safety and security related to dams) are administered by the Regional Secretariat of Social Equipment, except in ports in which the authority is the Port Administration of the Autonomous Region of Madeira.

3.3. RBMPs - Structure, completeness, legal status

Usually, the RBMPs for Portugal are composed of specific parts, and in each part specific chapters. The specific parts consist of characterisation and diagnosis, objectives and exemptions, prospective scenarios, economic analysis, the programme of measures, monitoring and evaluation. Each part has written documents, as well as complementary documents with maps and drawings. Each of the chapters within the parts can have hundreds of pages followed by annexes. The documents on complementary processes such as Strategic Environmental Analysis, Public Participation and Information Systems of Support to Decision Making, as well as a Non-technical summary are provided at the website of the Water Authority where the RBMP can be easily located[10].

The RBMPs are sectoral plans subject to the Spatial Planning legal regime, according to which their development is subject to guidelines set by the national programme planning policy, and shall also be compatible with regional plans. RBMPs stand at an intermediate level between the National Water Plan (the strategic water management which they implement) and the specific River Basin Management Plans that include measures to protect and enhance water resources. RBMPs cannot contradict national guidelines or decisions as their territorial scope is limited to the river basin and they are subject to the relevant applicable laws.

The Water Law (Law 58/2005) transposes the Water Framework Directive into Portuguese law, and also applies to the Azores and Madeira autonomous regions (Article 101). In the case of Madeira, the Regional Legislative Decree nº 33/2008/M adapts the water law to Madeira and DL 77/2006 complements it.

Article 63 of the Water Law (Law 58/2005) defines the following conditions and requirements for attribution of the right to use water: compliance with the standards and principles of the Water Law; compliance with the provisions of the RBMPs; compliance with

[10] Mainland Portugal: http://www.apambiente.pt/?ref=16&subref=7&sub2ref=9&sub3ref=834; Azores: http://www.azores.gov.pt/Gra/srrn-drotrh/conteudos/livres/PGRH-A%C3%A7ores.htm; Madeira: http://drota.gov-madeira.pt/berilio/berwpag0.listctn?pCtn=83

the instruments of territorial planning and specific water expanses management; and compliance with quality standards and discharge standards.

Article 62 of the Water Law establishes that the following activities in the private water domain require a previous licence and are specifically subject to the RBMPs: discharge of wastewater; waste immersion; recharge and artificial injection in groundwater; extraction of inert; landfills and excavations.

The legal regime for water uses was established by DL 226-A/2007, which is extended to the Azores by Regional Order Nº 67/2007. Madeira does not have an equivalent legislative act. The regime establishes that the competent authority may temporarily modify the titles for water use (licence or concession) whenever it is required to ensure their compliance with the RBMPs (Article 28 (d), DL 226-A/2007), or in case of drought or other natural disaster or *force majeure* (Article 67 (3), Water Law).

As a general rule the planning cycle defined under the Water Law is reflected in the legal regimes for the different uses specified below. In fact, water use requirements are mandatory for all water uses for which a permit is issued under the Water Law by the National Water Authority. This permit is necessary to gain an operating permit by activity sector.

However, regarding concessions, the DL 226-A/2007 which regulates water uses states that the new regime does not impact on the existing contracts. There are causes for modification or revocation of concessions; the obligation to comply with the applicable laws and regulations and with the instructions of the granter is one of them, but the compliance with the RBMP is not expressly mentioned in old concessions. The method followed in Portugal is to make amendments to requirements when concessions are renewed. The majority of the existing dams are old and in most cases their permits have several decades duration.

Dams for hydropower and/or for agriculture constitute examples of the above. Currently, in order to operate a new dam, a water use permit issued by the line minister for environment is a pre-requisite to the final licence. The old concessions were established by the line ministers of Energy (and/or Economy), Agriculture, or other.

Generally the period of time of the permits for water use and sectorial activity permits are compatible or the same. The Minister in charge of Agriculture shall grant concessions to use of public irrigation infrastructure for a period of 20 years in accordance with Order 1473/2007.[11] In these concessions there is a general clause stating that the granter reserves the right to review the concession's conditions in order to ensure their compliance, and any modification to the applicable legislation and rules on management of the hydro agriculture uses, water resources and environmental policy (Basis VI, Order 1473/2007).

The license for exploitation of an IPPC installation and its modifications can only be issued after the environmental license administrative decision which aims at ensuring prevention and control of pollution establishing the measures required to avoid, or if that is not possible, reduce emissions. Minimising water discharge is a *sine qua non* condition for the operation of the installation. Supplementary conditions in order to ensure compliance with the objectives of environmental quality (Article 18, DL 173/2008) are explicitly foreseen. The use of water

[11] Order 1473/2007, of 15 November 2007 which approves the template of the concession contracts for the conservation and exploitation of hydro agriculture works http://dre.pt/pdf1sdip/2007/11/22000/0850608514.pdf as amended by Order 1001/2009 of 8 September 2009: http://dre.pt/pdf1sdip/2009/09/17400/0611706117.pdf.

resources by an IPPC installation can be requested by the operator directly to the APA regional department, and the permit is annexed to the environmental license and shall comply with the legal regime for water uses (DL 226-A/2007 as amended) and the Water Law (Article 26, DL 173/2008).

3.4. Consultation of the public, engagement of interested parties

The section below takes into account that the River Basin District Authorities existed while the consultation process occurred. See above sections for information on changes that are ongoing. The details of future consultation processes are still not known in detail, although by-and-large they will reportedly follow established legal requirements and practice.

The general principle of participation is established under Article 84 of the Water Law according to which the State shall, through the Portuguese Water Authority and the River Basin District Authorities (RBDAs) (both now integrated into APA), promote active participation of natural and legal persons in establishing, reviewing and updating the RBMPs. This task is attributed to the Regional Secretariat dealing with Environment in the Azores and Madeira Autonomous Regions. Stakeholders are to be involved in drafting, reviewing and evaluating the RBMPs through the process of public discussion and representation of the users in water management advisory bodies.

The opening of the period of public discussion was announced through a note published in Portugal´s official journal and disseminated through the media[12]. This note includes the following information: (i) period of consultation (it has been fixed at six months for each RBMP); (ii) the scope of consultation (draft version of the RBMP including technical report and non-technical summary for each river basin; the environmental reports; and the non-technical summaries of the SEA); (iii) the competent authorities' websites. After the public discussion period, each RBDA shall assess the results and prepare the final version. The RBMP shall indicate the measures of information and public consultation including the results and amendments made to the plans accordingly.

In each RBD, the River Basin District Councils (RBDCs) play a central role in the public consultation process during the elaboration of the RBMPs. They are an advisory body of the RBDAs and can also receive claims and complaints from individual and legal persons. RBDCs include representatives from: the ministries; other bodies of public administration; municipalities with a direct interest; representative bodies of main users related to the consumptive and non-consumptive uses of water in the respective river basin - associations from different sectors such as users of water resources, agriculture, fisheries, tourism; technical and scientific organisations on environment and water resources; and non-governmental organisations on environment and water resources. The RBDC composition and operation is to be established in the Statute of each RBDA in accordance with the characteristics of each river basin district[13]. The frequency of meetings is to be determined by

[12] Example of the announcement by the RBDA North:
http://dre.pt/pdf2sdip/2011/10/195000000/4018140182.pdf.

[13] Order 394/2008 of 5 June, approves the Statues of the RBDA as last amended by Order 1311/2010 of 24 December.
http://dre.pt/pdf1sdip/2008/06/10800/0328603311.pdf
http://dre.pt/pdf1sdip/2010/12/24800/0592005922.pdf
The competences of the RBDA of Azores have been approved by Regional Regulatory Decree 23/2011/A[13] which approves the organic structure of the Regional Secretariat of The Environment and Sea
http://dre.pt/pdf1sdip/2011/11/22300/0497705006.pdf

the President of the RBDC in accordance with the general rules applicable to collective bodies under the Code of Administrative Procedures. The RBDC of the RBDA of Tejo, for instance, met three times in 2009 and 2010 and twice in 2011 - the reports and lists of participants are publicly available.[14]

The consultation period for all Portuguese RBMPs was compliant with the law referred to above and the WFD. Information for public consultation was provided through the media, internet, printed material and invitations to any interested parties. The consultation process took place through face-to-face meetings, written consultation and web-based submissions. Workshops and meetings with relevant sectors were held, as well as workshops for the general public.

The stakeholders involved in the consultation process included water companies, energy companies, farmers, ports, fisheries, industries, conservation bodies, local planning authorities, NGOs, consumer groups, universities and the general public.

The impact of the consultation process on the final plans resulted in changes to measures and changed information. There was also a parallel strategic environmental assessment with public participation.

The existing documentation for some RBMPs does not allow a clear distinction between the impact of the direct public consultation on the RBMPs and that of the SEA.

3.5. Cooperation and coordination with third countries

Portugal has four international RBDs shared with Spain: Minho, Douro, Tejo and Guadiana. No international RBMPs have been adopted or are being developed. However, there has been some cooperation between homologous water authorities.

Cooperation was arranged in terms of participation by Spanish and Portuguese water authorities in public meetings organised both in Spain and in Portugal on Significant Water Management issues, and by submission of comments by the Portuguese and the Spanish authorities on each other's RBMPs. This has occurred for PTRH1 and PTRH3 with Miño-Sil (ES010) and Duero (ES020); PTRH5 with Tajo (ES030); and PTRH7 with Guadiana (ES040).

Besides this, there is a bilateral agreement on the shared water resources safeguarding quantity and quality of water at the border[15]: the *Convenção de Albufeira*, 1998, revised in 2008 by Parliament Resolution (Resolução da Assembleia da República) nº 62/2008. Within the framework of the bilateral meetings of the Convention, the delimitation of the water bodies and river and reservoir typologies has been agreed.

An information platform is in place and several joint studies have been carried out. However, so far there has been no joint implementation of PoMs in Portugal and Spain. In some cases

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The competences of the RBDA of Madeira have been approved by Regional Legislative Decree 33/2008/M[13] which adapts to the autonomous region of Madeira Law 58/2005 of 29 December which approves the Water Law, as well as the DL 77/2006 of 30 March which complements its legal regime http://www.dre.pt/pdf1sdip/2008/08/15700/0563705645.PDF

[14] http://www.apambiente.pt/index.php?ref=16&subref=7&sub2ref=757

[15] http://snirh.pt/index.php?idMain=6&idItem=1

the Portuguese RBMP contains an overall measure which relates to Spanish authorities implementing their RBMP in order for the surface and groundwater at the border to be in good ecological status.

As the Portuguese Water Authorities report, for the new planning cycle (2015-2021), Portugal and Spain have agreed at the December 2013 plenary session of the Commission for the Implementation and Development of the Albufeira Convention (CADC), to enhance communication and coordination in the various stages of the process, in particular on:

- Updating the delimitation of boundary and trans boundary water bodies;
- Updating the classification systems;
- Status assessment of boundary and trans boundary water bodies;
- Defining common environmental objectives for boundary and trans boundary water bodies and related compliance timeframes;
- Harmonisation of PoMs;
- Definition of common elements for public participation processes of each RBMP (eg. Non-technical Summary, joint public meetings, etc.);
- Coordination on pressures and impacts, water body status and initial objectives (planned for October 2014).

3.6. Integration with other sectors

Water planning is subject, inter alia, to the principle of integration in accordance with which it shall be compatible with other administrative planning instruments at the same hierarchical rank in the environmental, spatial and economic fields.

The National Programme of Spatial Planning Policy (PNPOT), approved by Law nº 58/2007[16], prevails over all other instruments of spatial planning in force, establishing the guidelines for the elaboration of new sectoral plans. The PNPOT and the National Water Plan shall be coordinated in order to ensure the proper integration and compatibility of their policy options. On the other hand, the sectoral plans and programmes with significant water impacts shall integrate the objectives and measures foreseen in the water planning instruments. The water planning instruments are binding on the Public Administration and include development plans of public water reservoirs, coastal zone management plans and estuaries management plans.

The "National Programme of Dams with High Hydropower Potential" approved in October 2007, identifies and prioritises investments in hydroelectric power plants for the period 2007-2020, in order to meet European and national renewable energy and climate change targets – including post-2020. The general objective of the Portuguese Government is to achieve a total of 7 000 MW installed hydroelectric power by 2020, in order to accomplish the goals of Directive 2001/77/EC and Directive 2009/28/EC (31% of renewable energy in final energy

[16] Law 58/2007, approves the Programme of Land Policy Planning
http://dre.pt/pdf1sdip/2010/12/24800/0592005922.pdf

consumption). The RBMPs specifically refer to this Programme with regard to sectoral policy guidelines to which the RBMP must comply. The implementation of this Programme will have a strong impact on the RBD and some water bodies will have to be reclassified, particularly in PTRH3.

Besides links to the sectors above, the RBMP contains links to other policy sectors such as nature conservation, agriculture (including livestock and forest), rural development, maritime issues, climate change, water supply and wastewater services, solid waste management, tourism, and transport.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1. Water categories in the RBD

Nine of the ten assessed RBDs in Portugal contain rivers, lakes, transitional waters, and coastal waters. In mainland Portugal there are no natural lakes and the reservoirs are considered heavily modified lakes (see further below). For PTRH10 Madeira, there are only rivers and coastal waters and, although there are artificial waters (the "levadas"), the lack of information prevents their delimitation and characterisation.

The Azores (PTRH9) is a volcanic archipelago composed of nine islands. This characteristic explains the high number of coastal water bodies. The RBMP also explains that due to orographic and hydrologic characteristics of the islands, the lakes are represented in a larger number than rivers.

Water bodies were delineated according to the guidance in the CIS document "Identification of Waterbodies" – WFD CIS Guidance Document nº 2 (2003) and WFD CIS Guidance Document nº 4 (Identification and Designation of Heavily Modified and Artificial Water Bodies), in conjunction with a clustering method that takes into account natural characteristics, such as morphology or salinity and anthropogenic pressures, such as phosphorous and nitrogen loads and their impacts, organic matter load and dissolved oxygen.

4.2. Typology of surface waters

RBD	Rivers	Lakes	Transitional	Coastal
PTRH1	5	1	1	1
PTRH2	4	1	1	1
PTRH3	6	2	1	2
PTRH4	6	2	1	2
PTRH5	10	3	1	2
PTRH6	4	1	1	2
PTRH7	4	2	1	1
PTRH8	5	1	1	3
PTRH9	1	2	3	3
PTRH10	3	0	0	2

Table 4.2.1: Surface water body types at RBD level
Source: WISE Summary 2.2.2

All river water bodies were considered to have a minimum length of 2 km and drainage basin of 10 km^2. For the lake category a threshold of 0.4 km^2 (area) was used to identify water

bodies. Thus, no natural lake water bodies were identified in mainland Portugal; reservoirs were identified as water bodies and subsequently they were identified and designated as HMWB Lakes. As this was not in line with the WFD CIS guidance n°4 this will be changed in the second cycle and reservoirs will be considered as HMWB Rivers for reporting purposes.

For mainland Portugal the types of Rivers and reservoirs have been defined using System B of Annex II of the WFD to establish abiotic typology. Afterwards, the typology was checked against biological communities to see if they were compliant with the distribution of the biological quality elements in order to ensure that water status assessment was not biased by typology problems. Some adjustments were made in the case of some river types. The method is established in the national guidance document *Critérios para a classificação do estado das massas de água superficiais – rios e albufeiras* issued in 2009 by the former Portuguese Water Institute.

For rivers, the biological elements that were used are those typical of this water body category, i.e. benthic invertebrates, phytobenthos, macrophytes and fish populations. Data obtained from sampling conducted at reference points in the 2004 - 2005 campaigns was taken into account. The process led to the definition of 15 types of rivers for mainland Portugal.

The definition of the type of reservoirs was based on system B involving multivariate statistical analysis of 23 abiotic variables. The end result was the definition of three major types: North, South and Main Course.

For transitional waters, the process of typology definition was composed of a top-down expert judgment approach and a bottom-up cluster analysis approach using the tool "Deluxe Integrated System for Clustering Operations" (DISCO) Based on the guidance document “WFD CIS Guidance Document No. 5” (2003), mandatory and optional factors for water bodies greater than 1 km^2 were selected . In the expert approach, classification of transitional waters was performed by the B system. A team of national and international experts reached consensus on a list of types. Cluster analysis included obligatory and optional factors of the B system. The final typology was achieved through a comparison of the types obtained with the expert approach and cluster analysis. This resulted in two types: A1 - Stratified Mesotidal Estuary, present in the north of Portugal, where the rainfall regime is uniformly distributed over the winter months; and A2 - Homogeneous Mesotidal Estuary in the central and southern regions of the country, where intense precipitation episodes occur leading to irregular river flows.

The definition of types of coastal water bodies was performed using a similar methodology as for transitional waters. The definition of the types has been done by the project “Ticor: Typology and Reference Conditions for Portuguese Transitional and Coastal Waters.” By applying the B system, five types of coastal waters have been identified for mainland Portugal: two that correspond to coastal lagoons (A3 - Semi - closed Mesotidal pond and A4 – Shallow Mesotidal Pond) and three types for the open coast (A5 – Exposed Mesotidal Atlantic Coast, A6 - Moderately Exposed Mesotidal Atlantic Coast and A7 - Sheltered Mesotidal Atlantic Coast).

Both coastal and transitional water bodies' typologies were checked against biology using the methodology described in Bettencourt *et al*., (2004).[17]

According to the respective RBMPs, the water bodies of the archipelagos of Azores and Madeira present unique characteristics, not allowing a comparison with mainland water bodies or with the broad EU-types defined in the intercalibration exercise. In the Azores, system A of Annex II of the WFD was applied to transitional and coastal waters and system B was applied in natural lakes and rivers. In Madeira, system B was used for rivers, with the crucial differentiation parameter being precipitation, while system A was used for coastal waters, with the differentiation factor being depth (200 m).

The RBMP of the Azores states that although it would be logical to establish two types of river water body, according to altitude and variation of biological communities, the border between the two types could not be established due to limited available information (low number of monitoring points). Therefore, only one type of river water body was considered in the RBMP. For lakes, two types were defined according to geographical and physical factors and anthropogenic pressures, and relative abundance of the planktonic communities in relation to the coastal benthonic communities (phytobenthos and benthic fauna). Transitional waters are small coastal ponds, which receive freshwater inputs mainly from groundwater and constitute unique ecosystems. Three types of transitional water were defined: A-T-O/P Oligohaline waters with salinity in the range 0.5-5%, A-T-M/P Mesohaline water with salinity in the range 5-18%, and A-T-P/P Polihaline waters with salinity in the range 18-30%. The three types of coastal waters depend on depth: shallow, intermediate depth, and deep. For transitional and coastal waters the typologies were not checked against biology.

Madeira has defined three types of rivers according to the geographic location, altitude, geology, dimension (drainage basing larger than $1km^2$ in Madeira and $0.5km^2$ in Porto Santo), and precipitation. The typologies were not checked against ecological and chemical conditions. Two types of coastal waters have been defined, using salinity, depth and ecoregion as parameters. The differentiation factor of the two types is the 200m bathymetric level; the other two parameters are alike in the two types. The RBMP states that the 200 m bathymetric was used as it is the limit of the eutrophic zone where the majority of fisheries resources occur.

Regarding reference conditions, the work is not completed in several RBDs of Portugal, in relation with the existing gaps in monitoring and development of assessment methods. The work is more advanced in mainland Portugal. For the Azores and Madeira there is less data and the water bodies are different from the ones in the mainland and unique to the islands. Whenever possible Madeira used parameters' reference values as specified in the national guidance documents. In other cases reference values were obtained using expert judgement, results from different studies and ad-hoc methodologies. However, much work on defining reference conditions is yet to be done.

[17] Bettencourt, A. M., S. B. Bricker, J. G. Ferreira, A. Franco, J. C. Marques, J. J. Melo, A. Nobre, L. Ramos, C. S. Reis, F. Salas, M. C. Silva, T. Simas, W. J. Wolff (2004). *Typology and Reference Conditions for Portuguese Transitional and Coastal Waters Development of Guidelines for the Application of the European Union Water Framework Directive*. Ministério das Cidades, do Ordenamento do Território e Ambiente, Instituto da Água, I.P., e IPIMAR. 98 pp.

4.3. Delineation of surface water bodies

A minimum size threshold has been set for each category of surface water. Most of the delineation of the water bodies was based on the CIS EU Guidance No. 2, but there were some exceptions. For rivers, the threshold was set at a catchment area of 10 km^2 in mainland Portugal and in the Azores, but at 1 km^2 in Madeira Island. All reservoirs with an area larger than 0.4 km^2 were considered HMWB Lakes, in addition to some reservoirs with a smaller area, used for water supply. In the Azores a minimum surface area within the range of 0.01-0.5 km^2 was considered. Small water bodies with the same type and status were incorporated into adjacent water bodies. After that, based on expert analysis, water bodies were iteratively grouped so as to lead to a minimum number of water bodies for which it is possible to clearly establish the environmental quality objectives. For transitional and coastal waters, the typology described in Bettencourt *et al*. (2004)[18] does not consider the existence of small water bodies. However, the minimum size of water bodies considered is 1 km^2. In the second RBMPs, delineation of water bodies will be revised in all RBDs to account for improved data on hydromorphological pressures and consideration for smaller water bodies where relevant.

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)*[19]
PTRH1	56	9	3	5	10	4	2	29	2	1203
PTRH2	69	10	7	6	6	1	1	222	4	840
PTRH3	361	14	17	5	3	2	2	181	3	6274
PTRH4	236	16	9	3	10	13	8	387	30	510
PTRH5	395	17	24	6	4	92	2	191	12	2236
PTRH6	195	11	19	5	9	24	3	688	8	1050
PTRH7	222	14	16	20	5	7	2	9	9	1300
PTRH8	64	14	3	2	3	3	10	176	23	163
PTRH9	13	63*	24	0	3	0	27	286	54	*43*
PTRH10	94	6	-	-	-	-	8	181	4	*196*
Total	*1705*	*17,4*	*122*	*6*	*53*	*16*	*65*	*235*	*149*	*13815*

Table 4.3.1: Surface water bodies, groundwater bodies and their dimensions
Source: WISE (Summary 2.2.1.1 and 2.3.1.1 for each RBD)
* In PTRH9 all water courses inside the catchment area were considered for the overall length of the water bodies.

In PTRH7, the large size of lakes (reservoirs) is due to the Alqueva reservoir, the largest reservoir in Europe. In the first RBMP this reservoir was considered as one water body because not enough data was available to divide it into several water bodies. This will change in the second RBMP.

[18] Ibid. 17
[19] Data supplied by the PT authorities after the assessment of the RBMPs had been carried out

In PTRH5 the large size of transitional waters is due to the Tagus estuary, one of the largest estuaries in Portugal.

4.4. Identification of significant pressures and impacts

The methodology used for identification of significant pressures generally follows a national approach regarding the pressures to consider (Decree Law 77/2006). However, limited data regarding pressures, namely in inventories of point source pollution, water abstraction and hydromorphological pressures affect the results. The methodology to assess significant pressures includes a combination of numerical tools and expert judgment based on existing information which varies between RBDs. It is stated that significant pressures are those that produce an impact on the water bodies that causes the non-compliance with at least one of the established criteria for the classification of the Ecological Status/Potential and Chemical Status, and consequently contributes to status worse than "Good". The RBMPs do not provide information on all numerical values used and for some types of pressures (e.g. hydromorphological), different RBDs used different criteria.

For hydromorphological pressures, the decision of what is significant is done at RBD level but the rationale is not explained. National guidelines to assess hydromorphological pressures and impacts were developed, but they are broad and the rules used to assess significance are unclear. Besides this, the level of the existing information was not the same in each RBD and, as a result, RBDs have chosen some of the impacts (but never all of them) based on expert judgement and on limited information. For example, in PTRH3, hydromorphological pressures are moderate if there is at least one dam with a wall of 5 m, or the pressure is considered significant if at least one of the dams does not have a fish passage. In PTRH7, however, if a water body has a dam with a wall of 2 m it is considered that there is a significant pressure. Similarly, for the extension of a regulated stretch of river; for PTRH7 the existence of a regulated stretch of 500 m or more is significant; in the case of PTRH3 it is significant if the 500 m is bordered by vertical walls, or the riverbed is waterproof.

In PTRH9 there are some significant hydromorphological pressures, particularly in two water bodies with dam walls of 3 m (one of which is a cascade of dams). However, no HMWB was defined. In PTRH10 Madeira, 27 out of 97 river flow regulations were considered significant pressures (since they have an extension greater than 500 m), and two dams were considered to impose significant pressures as their wall is higher than 2 m (these data are included as river management in Table 4.4.1). However, no HMWB were defined in Madeira. The non-definition of HMWBs might be related to lack of data, but no further explanation could be found in the RBMP.

Flow regulation was assessed using expert judgment, along with GIS maps and pressure datasets, including the River Habitat Survey and their corresponding indicators (Habitat Modification Score).

For water abstraction, high regime uses, permits and estimates of self-use were taken into account. The RBDs acknowledge that the inventory of water abstraction is incomplete in terms of the number of abstractions and their characteristics, as a result of the available data at the time of the development of the first RBMPs. Meanwhile, there has been an improvement in the licensing procedures and it is expected that this data will improve for the second RBMPs.

Reported data from point sources was used to assess pollution pressure. Where there was no data, coefficients related to production in the municipality were considered. For the ports, a qualitative analysis was undertaken. In protected areas, "significant" means that the point sources prevent the quality norms of specific legislation from being achieved. For point sources, discharge permit values were converted to load values for different substances and concentrations were compared to relevant standards to identify risks to WFD compliance. For diffuse sources, information on land use cover, agricultural census data and water quality classification was used to provide a risk category.

The analysis shows that all existing pressures were unevenly covered in the different RBDs without harmonised criteria. The National Water Authority has committed to address this in the update of the analysis required under WFD Article 5.

The following chart indicates the significant pressures seen in Portugal. There is some regional variation. Given the difference in the number of water bodies in each RBD, it is better to look at the proportion of RBDs affected.

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.	%
PTRH1	52	73	1	1.41	10	14	0	0	12	17	0	0	0	0	0	0	5	7.04
PTRH2	61	73	9	10.84	17	20	0	0	11	13	0	0	0	0	0	0	1	1.2
PTRH3	265	69	17	4.44	103	27	0	0	80	21	0	0	0	0	0	0	24	6.27
PTRH4	174	66	52	19.77	62	24	0	0	26	10	0	0	0	0	0	0	10	3.8
PTRH5	217	51	138	32.47	208	49	3	0.7	76	18	10	2.35	0	0	0	0	0	0
PTRH6	31	14	132	58.41	183	81	9	4	77	34	1	0.44	7	3.1	0	0	0	0
PTRH7	16	7	138	56.33	209	85	6	2.5	155	63	0	0	2	0.82	0	0	0	0
PTRH8	3	4	34	42.5	76	95	4	5	58	73	1	1.3	4	5	1	1.25	0	0
PTRH9	42	63	0	0	19	28	1	1.5	4	6	3	4.5	0	0	2	2.99	0	0
PTRH10	63	62	7	7	10	10	3	3	0	0	28	27	0	0	0	0	0	0
Total	*924*	*48*	*521*	*27*	*887*	*46*	*23*	*1.2*	*499*	*26*	*15*	*0.8*	*13*	*0.7*	*3*	*0.2*	*40*	*2.1*

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

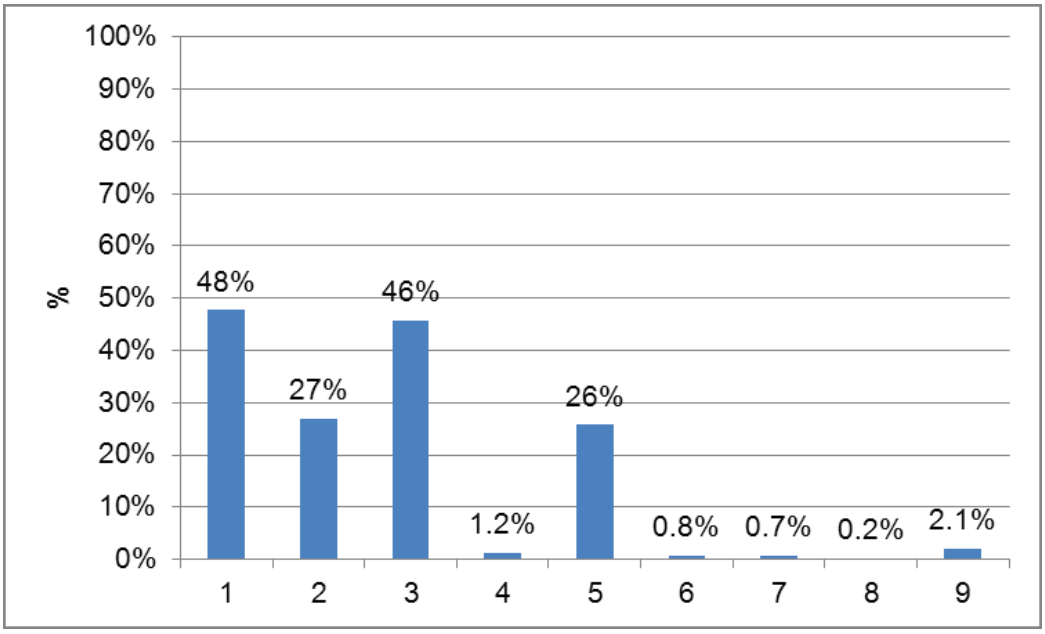

Figure 4.4.1: Graph of percentage of surface water bodies affected by significant pressures
1 = No pressures
2 = Point source
3 = Diffuse source
4 = Water abstraction
5 = Water flow regulations and morphological alterations
6 = River management
7 = Transitional and coastal water management
8 = Other morphological alterations
9 = Other pressures
Source: WISE SWB_PRESSURE (PTRH10 is not in SWB_PRESSURE WISE report. Data therefore extracted directly from WISE database)

The sectors which contribute most to chemical pollution include: wastewater treatment plants (WWTPs) and agriculture including livestock, particularly pig farming. In some RBDs abandoned mines or industrial sites needing environmental rehabilitation also pose pressures.

Point and diffuse source pollution are considered stronger pressures in the south of Portugal. In the Azores point source pollution is not considered a pressure. However, looking at the number of water bodies affected it is clear that PTRH3 and PTRH5 are affected by diffuse source pollution. PTRH5 also has a large number of water bodies affected by point source pollution, as is expected due to existing industry and pig farming as well as human agglomerations. Water flow regulations and morphological alterations are considered significant pressures in the Douro (PTRH3) and Tejo (PTRH5) river basins due to the hydropower dams. Similarly, dams are significant pressures in PTRH7 due to the Alqueva-Pedrógão system and an upstream dam in Spain, and the south of Portugal in Alentejo (PTRH6) and Algarve (PTRH8) due to water scarcity and the dams and reservoirs required for agriculture and human consumption. For the Azores major pressures are related with diffuse source pollution (28%). The level of significant pressures from water abstraction is surprisingly low. According to the Portuguese water authority the abstraction inventory is incomplete in terms of the number of abstractions and their characteristics, as a result of the data available at the time of the development of the first RBMPs. With the improvements made on the licensing procedures it is expected that data will improve for the second RBMPs.

4.5. Protected areas

The following tables identify the protected areas within the scope of the Water Framework Directive in Portugal. Table 4.5.1 is derived from a different source to the subsequent tables and some differences do exist. Tables 4.5.2 onwards were provided by the Portuguese Water Authorities and did not include Madeira.

RBD	Number of PAs										
	Article 7 Abstraction for drinking water	Bathing	Birds	European Other	Fish	Habitats	Local	National	Nitrates	Shellfish	UWWT
PTRH1	33	15	2		7	6					
PTRH2	35	46	1		11	2			1		
PTRH3	79	46	5		9	13					4
PTRH4	56	106	5		22	14			2		2
PTRH5	43	57	9		19	16			2		2
PTRH6	23	33	10		5	8					2
PTRH7	52	4	11		6	7			2		1
PTRH8	18	103	4		2	8			2		1
PTRH9	193	52	15			22	78		8	34	
PTRH10	164	31	4	3		11		5			
Total	*696*	*493*	*66*	*3*	*81*	*107*	*78*	*5*	*17*	*34*	*12*

Table 4.5.1: Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater[20]
Source: WISE (PA_NB) and RBMPs for PTRH9 and PTRH10

[20] 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.

GWB: Number of Protected Areas			Number of GWB with Protected Areas		
RBD	**Article 7 Abstraction for drinking water**	**Nitrates**	**RBD**	**Article 7 Abstraction for drinking water**	**Nitrates**
PTRH1	25	0	PTRH1	2	0
PTRH2	23	1	PTRH2	2	1
PTRH3	29	0	PTRH3	1	0
PTRH4	25	2	PTRH4	25	2
PTRH5	12	2	PTRH5	12	3
PTRH6	19	0	PTRH6	6	0
PTRH7	43	2	PTRH7	3	3
PTRH8	16	2	PTRH8	1	5
PTRH9	207	0	PTRH9	39	0
Total	*399*	*9*	*Total*	*91*	*14*

Table 4.5.2: Number of protected areas in groundwater bodies in each RBD and number of groundwater bodies with protected areas
Source: Additional information provided by the PT authorities after assessment of RBMPs.

SWB: Number of Protected Areas									
RBD	**Article 7 Abstraction for drinking water**	**Bathing**	**Birds**	**European Other**	**Fish**	**Habitats**	**Local**	**Nitrates**	**Shellfish**
PTRH1	8	15	19	0	15	41	0	0	0
PTRH2	12	46	4	0	25	21	0	0	0
PTRH3	50	46	92	4	24	146	0	0	0
PTRH4	31	106	20	3	61	54	0	0	0
PTRH5	31	57	42	0	76	88	0	0	0
PTRH6	4	33	33	2	28	74	0	0	0
PTRH7	9	4	81	1	22	85	0	0	0
PTRH8	2	103	37	1	9	53	0	0	0
PTRH9	3	51	24	0		42	125	13	79
Total	*150*	*461*	*352*	*11*	*260*	*604*	*125*	*13*	*79*

Table 4.5.3: Number of protected areas in surface water bodies in each RBD
Source: Additional information provided by the PT authorities

Number of SWB with Protected Areas									
RBD	**Article 7 Abstraction for drinking water**	**Bathing**	**Birds**	**European Other**	**Fish**	**Habitats**	**Local**	**Nitrates**	**Shellfish**
PTRH1	6	5	19	0	15	39	0	0	0
PTRH2	9	6	4	0	24	21	0	0	0
PTRH3	43	14	91	4	22	137	0	0	0
PTRH4	21	26	20	3	53	51	0	0	0
PTRH5	26	19	42	0	69	86	0	0	0
PTRH6	4	4	31	2	28	72	0	0	0
PTRH7	9	3	76	1	22	84	0	0	0
PTRH8	2	9	35	1	9	45	0	0	0
PTRH9	3	13	19	0	0	31	38	13	25
Total	*123*	*99*	*337*	*11*	*242*	*566*	*38*	*13*	*25*

Table 4.5.4: Number of surface water bodies with protected areas in each RBD
Source: Additional information provided by the PT authorities

In mainland Portugal bivalve production areas were not designated as protected areas. This is because Portugal considers that they can only be classified as a direct result of the application of Directive 79/923/CE. However, specific associated constraints were considered in the application of other Directives, including the Urban Wastewater Treatment Directive and the licensing of wastewater discharges. For the second RBMPs the areas identified for production of shellfish (Dispatch Nº 15264/2013, 2nd grade, Nº 227 – 22 November 2013) will be classified as protected areas.

5. MONITORING

5.1. General description of the monitoring network.

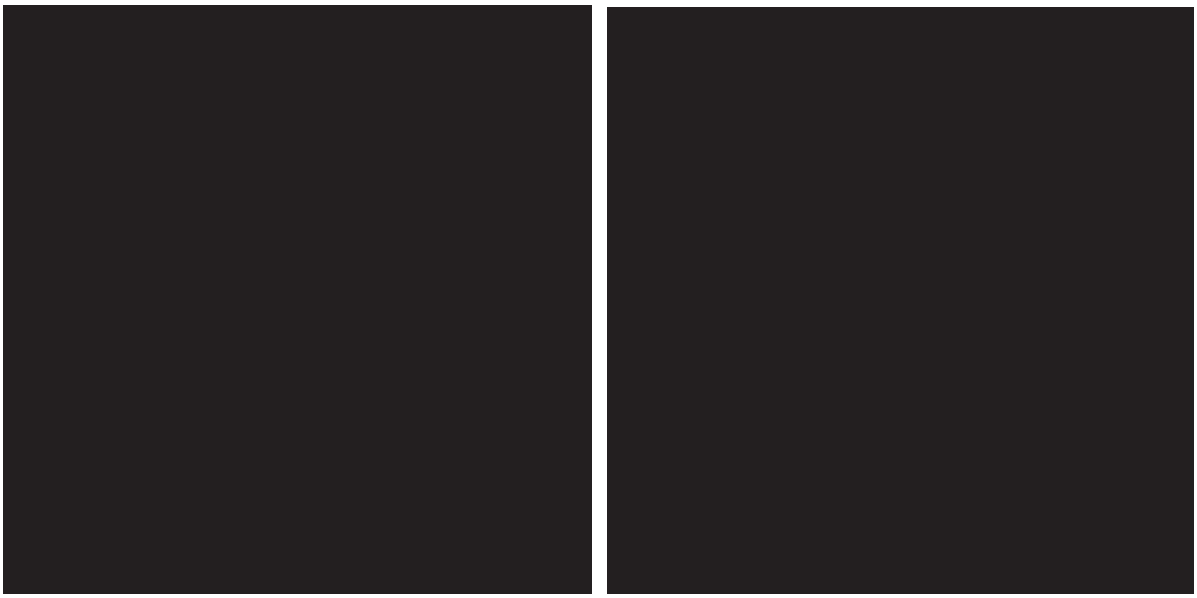

Figure 5.1: Maps of surface water (left) and groundwater (right) monitoring stations

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

Source: WISE, Eurostat (country borders)

The RBMPs do not show progress in comparison with the 2009 implementation report. Monitoring networks in several RBDs are not considered representative, and the PoMs for all RBDs include measures to strengthen the monitoring network.

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 Non 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
PTRH1							-				-							-				-
PTRH2							-				-							-				-
PTRH3							-				-							-				-
PTRH4							-				-							-				-
PTRH5							-				-							-				-
PTRH6							-				-							-				-
PTRH7							-				-							-				-
PTRH8							-				-							-				-
PTRH9	-	-				-	-				-						-	-				-
PTRH10											-	-	-	-	-	-	-	-	-	-	-	-

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
PTRH1							-				-						-	-				-
PTRH2							-				-						-	-				-
PTRH3							-				-						-	-				-
PTRH4							-				-						-	-				-
PTRH5							-				-						-	-				-
PTRH6							-				-						-	-				-
PTRH7							-				-						-	-				-
PTRH8							-				-						-	-				-
PTRH9							-				-						-	-				-
PTRH10	-	-	-	-	-	-	-	-	-	-	-											-

Table 5.1: Quality elements monitored

QE Monitored

QE Not monitored

\- Not Relevant

Source: WISE 4.1.7 and 4.1.8

RBD	Rivers		Lakes		Transitional		Coastal		Groundwater		
	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Surv	Op	Quant
PTRH1	19	7	1	0	1	0	0	0	6	0	4
PTRH2	16	23	6	2	7	0	1	0	9	23	8
PTRH3	58	62	4	12	3	0	1	0	12	0	10
PTRH4	65	62	4	5	9	0	3	2	117	57	86
PTRH5	83	84	10	14	3	5	1	2	222	52	163
PTRH6	21	31	2	7	9	0	3	0	20	0	8
PTRH7	16	41	3	9	4	0	1	0	30	52	26
PTRH8	20	12	3	0	3	0	2	0	59	31	115
PTRH9	23	0	23	15	3	0	42	0	100	0	-
PTRH10	22	0	-	-	-	-	0	0	-	-	-
Total by type of site	*343*	*322*	*56*	*64*	*42*	*5*	*54*	*4*	*575*	*215*	*420*
Total number of monitoring sites[21]	*665*		*120*		*47*		*58*		*1117*		

Table 5.2: Number of monitoring sites by water category.
Surv = Surveillance, Op = Operational, Quant = Quantitative
Source: Portuguese Water Authority (June 2014) and RBMP of Madeira (PTRH10)

[21] 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.

5.2. Monitoring of surface waters

In Portugal there are approximately 500 surveillance monitoring stations, and 400 operational monitoring stations. However, there are still approximately 1100 surface water bodies that are not monitored at all. The time series length varies between stations and some parameters are measured only in a limited number of stations and are not retained in the monitoring programme of the first cycle (despite data being collected). Madeira (PTRH10) is the most serious case, since only 22 river water bodies are monitored and only for general parameters.

For surveillance monitoring the WFD requires the assessment of all quality elements which are relevant for the respective water category.

Mainland Portugal

Parameters and monitoring frequency of the surveillance and operational monitoring for the surface water network and the network of quantitative and chemical status of groundwater is defined in Annexes VI and VII of Decree Law nº 77/2006, of 30 March 2006, which complements the transposition of the WFD. In situations where the monitoring stations simultaneously fit the criteria for the surveillance and operational monitoring networks, it has been decided to integrate them in the operational programme since the water bodies are considered to be at risk. Once the water bodies achieve Good Status or Good Ecological Potential, they will be integrated into the surveillance network. There is no international monitoring programme for surface waters in place for the international RBDs.

The limited knowledge on transitional water bodies led to the adoption of a surveillance monitoring programme that is more demanding than the operational programme. Stations were selected according to the following criteria: a) all water bodies whose typology was not covered by the intercalibration exercise, aiming at validating class boundaries of biological status of defined metrics and at confirmation of the ecological and chemical status[22]; b) all water bodies classified as in doubt or at risk within the intercalibration exercise systems, to confirm the degree of risk; c) representativeness of the water; d) transition points for coastal waters. The risk analysis on the chemical status was updated based on the draft Directive on Environmental Quality Standards and based on new monitoring data.

For coastal waters the selection of stations followed the same criteria of transitional waters. The locations were selected in order to: i) enable an overall assessment of the state of ecological and chemical quality; ii) detect significant pressures for the delineation of programmes of measures; iii) detect temporal changes in ecological and chemical status due to natural or anthropogenic factors; iv) verify compliance of the quality status with national and diverse EU legislation (EU Directives); and v) exchange information within the EU.

Regarding biological quality elements, for rivers, surveillance monitoring does not include phytoplankton since the high variability of the natural conditions of the Mediterranean Rivers, does not allow for the establishment of stable phytoplankton communities in Portuguese rivers. Therefore, Portugal considers it is not possible or adequate to use this biological quality element to assess water body status in the majority of Portuguese rivers. In reservoirs the surveillance monitoring excludes macrophytes, phytobenthos and benthic invertebrates. According to the RBMPs this is because macrophytes and phytobenthos are limited in

[22] Many transitional water bodies of the different RBDs are only provisionally classified, until further development of assessment methods and definition of reference conditions.

abundance and diversity in reservoirs, and the communities of benthic invertebrates at the margin are not representative of the water body situation.

A crucial aspect of operational monitoring concerns the selection of the biological quality element(s) considered to be most sensitive to a pressure. For rivers, where organic pressures and nutrients are the most important pressures benthic invertebrates are monitored each Spring, physico-chemical supporting elements and specific pollutants are monitored every three months. Where water bodies are also subject to important hydromorphological pressures (as well as the two pressures mentioned above), benthic invertebrates and fish fauna are monitored together with supporting hydromorphologic elements. For reservoirs it has been considered that organic pollution and nutrients were the most meaningful pressures, thus phytoplankton and physico-chemical supporting elements are monitored. Moreover, with regard to the hydromorphological quality elements and given the important nature of the residence time, it has been decided to also monitor the hydrological regime. Specific pollutants are monitored when they are expected to be discharged in significant quantities. The monitoring stations are located where concentrations of priority substances higher than the quality standards included on the proposal for a Directive on Environmental Quality Standards are known to have occurred.

According to the National Water Authority (June 2014), monitoring networks have been revamped and updated in order to fill some of the gaps identified in the first cycle plans. This revision retained the monitoring programmes of all the elements of the WFD and included water bodies that had not yet been monitored. Human and financial resources to address gaps in monitoring networks, in terms of coverage of surface water bodies and inclusion of all required biological, physico-chemical and hydromorphological quality elements, are still the main constraints. Recently, financial resources were approved to carry out the foreseen monitoring programmes and a new service provider contract was signed so as to ensure the new monitoring network is operational from 2015 onward.

Azores

The PTRH9 RBMP states that overall the monitoring network is insufficient to respond to the legal and technical requirements for an adequate evaluation of the ecological and chemical status of the surface water bodies.

The operational network in the Azores aims to evaluate the spread of cyanobacteria and the concentration of its toxins. The network covers 15 lake water bodies. The operational monitoring is done in the same stations as the surveillance monitoring, where the cyanobacteria toxins are measured every 3 months. There is no investigative monitoring in the Azores.

Madeira

The surveillance monitoring occurs only in 19% of the water bodies of Madeira, although they cover 67% of the RBD. Only the physico-chemical elements are monitored (except phosphates). There is no operational monitoring network, nor is there a monitoring network for coastal waters.

5.3. Monitoring of groundwater

The monitoring networks are based on the existing ones from the former National Water Institute, or the Regional Environmental Directorate of the Azores, prior to the Water Framework Directive. Hence their planning followed a common methodology. For most RBDs the monitoring network is not considered representative (as stated in the RBMPs).

A quantitative groundwater monitoring programme has been established in all RBDs of mainland Portugal. In PTRH9 (Azores) there is no quantitative monitoring network.

In PTRH10 (Madeira) there is no groundwater (quantitative or qualitative) monitoring network, and the piezometric and quality parameters levels are only monitored by the regional water supply company (a public company whose shareholders are the Madeira regional government and municipalities) at the abstraction zones. This monitoring occurs in protected areas for water abstraction for human consumption.

The monitoring of groundwater chemical status is designed to be able to detect significant and sustained upward trends, in particular for nitrates. This is considered to be the most problematic parameter. In the Azores there is a qualitative surveillance network, but pesticides are not monitored. 32 of the 34 monitored water bodies have a representative index below 80%.

In some RBDs, operational monitoring programmes are in place only in the water bodies considered at risk. The usual parameter being monitored is nitrates. Some RBDs have no water bodies considered at risk.

No international monitoring programme for groundwater is in place. In fact, the geological formations in the border of Portugal and Spain consist mainly of igneous and metamorphic formations, which correspond to fractured media with low hydraulic conductivities and reduced yields. The average flow of exploitation in this type of rock does not generally exceed the 1 L/s threshold, creating aquifers only with local importance. In these circumstances, transboundary groundwater bodies between Portugal and Spain were not identified.

Portugal recognised the need to increase the density of monitoring sites to improve the quantitative and chemical assessment of groundwater bodies, as well as maintaining the frequency and continuity of sampling sites. This is, however, subject to the available financial resources. For the second RBMPs Portugal intends to carry out the assessment of trend reversals for the groundwater bodies identified with poor chemical status in the first RBMPs.

5.4. Monitoring of protected areas

Figure 5.2: Map of monitoring stations for protected areas
Source: WISE database

The specific monitoring network for protected areas was not reported to WISE, and it is only possible to capture it in the RBMPs.

RBD	Surface waters									Ground-water drinking water
	Surface drinking water abstraction	Quality of drinking water	Bathing water	Birds sites	Fish	Habitats sites	Nitrates [23]	Shell-fish	UWWT	
PTRH1	11	11	15	5	6	5+18		2+6	-	6
PTRH2	13	13	46	1	16	1+10	22 (GWB)		7	9
PTRH3	50	50	47	32	9	40+30	7[24] (GWB)	7+9	9	12
PTRH4	38	38	106	16	23	16	4(GWB)	21	8	44
PTRH5	26	26	57	27	20	53	2 (GWB)	35	10	88
PTRH6	6	6	36	13	6	40	4 (GWB)	5	5	16
PTRH7	9	9	6	27	8	45	1 (GWB)	6	8	13
PTRH8	3	3	103	16	3	25	3 (GWB)	2	2	1
PTRH9	2	2	53	18			15			98
PTRH10	-		31							27
Total	*158*	*158*	*392*	*27*	*91*	*283*	*15 (SWB) 43(GWB)*	*93*	*49*	*314*

Table 5.3: Number of monitoring stations in protected areas[25].
Legend: surveillance + operational monitoring
Source: RBMPs, and PT Water Authority after assessment of RBMPs. The data provided on WISE is not correct.

Regarding protected areas designated for the abstraction of water intended for human consumption, the process of defining their protection perimeters is still ongoing. These perimeters need to be enacted by a legal instrument. As a result, many of the monitoring points referred in the table above are for monitoring of drinking water and not necessarily for drinking water protected areas.

According to the Portuguese National Water Authority:

- "Areas designated for the protection of economically significant aquatic species" – these areas are designated by the Freshwater Fish Directive (2006/44/EC). Until 2013 these areas were monitored according to the Directive (parameters and frequency). In 2014, the monitoring sites were all included in the surveillance or operational monitoring programmes.

- "Bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 2006/7/EC" – Portugal monitors all the bathing waters as required by the Bathing Waters Directive.

- "Nutrient-sensitive areas, including areas designated as Vulnerable Zones under Directive 91/676/EEC and areas designated as Sensitive Areas under Directive 91/271/EEC" – These

[23] In mainland PT nitrate vulnerable zones were only designated in terms of groundwater.

[24] Additional monitoring in the influence zones

[25] 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.

areas are included in the surveillance or in the operational monitoring programmes, and a specific set of parameters and their monitoring frequency were defined for the sites located in these areas.

- "Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC and Directive 79/409/EEC". The specificities of these areas were considered in the definition of the surveillance and operational monitoring programmes, particularly in selecting monitoring sites. However, no other monitoring requirements were considered besides the ones already included in the surveillance and operational monitoring programmes.

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

RBD	*Total*	*High*		*Good*		*Moderate*		*Poor*		*Bad*		*Unknown*	
		No.	*(%)*	*No.*	*(%)*	*No.*	*(%)*	*No.*	*(%)*	*No.*	*(%)*	*No.*	*(%)*
PTRH1	*61*	*0*	*0*	*44*	*72*	*10*	*16*	*5*	*8*	*1*	*2*	*1*	*2*
PTRH2	*65*	*1*	*2*	*33*	*51*	*16*	*25*	*9*	*14*	*5*	*8*	*1*	*2*
PTRH3	*356*	*1*	*0*	*251*	*71*	*79*	*22*	*21*	*6*	*3*	*1*	*1*	*0*
PTRH4	*239*	*5*	*2*	*150*	*63*	*41*	*17*	*25*	*10*	*5*	*2*	*13*	*6*
PTRH5	*368*	*20*	*5*	*178*	*48*	*56*	*15*	*30*	*8*	*15*	*4*	*69*	*19*
PTRH6	*171*	*4*	*2*	*71*	*42*	*69*	*40*	*23*	*13*	*3*	*2*	*1*	*1*
PTRH7	*206*	*4*	*2*	*85*	*41*	*71*	*34*	*41*	*20*	*2*	*1*	*3*	*1*
PTRH8	*70*	*6*	*9*	*29*	*41*	*17*	*24*	*6*	*9*	*3*	*4*	*9*	*13*
PTRH9	*67*	*27*	*40*	*16*	*24*	*16*	*24*	*7*	*10*	*0*	*0*	*1*	*1*
PTRH10	*102*	*25*	*25*	*24*	*24*	*18*	*18*	*21*	*21*	*0*	*0*	*14*	*14*
Total	*1705*	*93*	*5%*	*881*	*52%*	*393*	*23%*	*188*	*11%*	*37*	*2%*	*113*	*7%*

Table 6.1: Ecological status of natural surface water bodies.

Source: River Basin Management Plans. The data provided on WISE is not correct.

RBD	Total	High		Good		Moderate		Poor		Bad		Unknown	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
PTRH1	10	0	0	5	50	4	40	0	0	1	10	0	0
PTRH2	18	0	0	8	44	5	28	4	22	0	0	1	6
PTRH3	27	0	0	7	26	17	63	1	4	0	0	2	7
PTRH4	23	0	0	8	35	10	43	4	17	0	0	1	4
PTRH5	57	0	0	0	0	31	54	10	18	2	4	14	25
PTRH6	65	0	0	22	34	25	38	7	11	3	5	8	12
PTRH7	54	0	0	17	37	21	39	10	19	0	0	6	11
PTRH8	10	0	0	7	70	1	10	0	0	0	0	2	20
PTRH9	0	0	0	0	0	0	0	0	0	0	0	0	0
PTRH10	0	0	[*]	0	[*]	0	[*]	0	[*]	0	[*]	0	[*]
Total	264	0	0	74	28%	114	43%	36	13%	6	2%	34	13%

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

Source: River Basin Management Plans. The data provided on WISE is not correct.

[*] The RBMP states that there are artificial water bodies ("levadas") but there is no data available to define them.

RBD	*Total*	*Good*		*Poor*		*Unknown*	
		No.	*%*	*No.*	*%*	*No.*	*%*
PTRH1	*61*	*15*	*25*	*0*	*0*	*46*	*75*
PTRH2	*65*	*18*	*28*	*3*	*5*	*44*	*68*
PTRH3	*356*	*63*	*18*	*4*	*1*	*289*	*81*
PTRH4	*239*	*166*	*70*	*6*	*3*	*67*	*28*
PTRH5	*368*	*16*	*4*	*0*	*0*	*352*	*96*
PTRH6	*171*	*25*	*15*	*2*	*1*	*144*	*88*
PTRH7	*206*	*21*	*10*	*0*	*0*	*185*	*90*
PTRH8	*70*	*26*	*37*	*1*	*1*	*43*	*61*
PTRH9	*67*	*67*	*100*	*0*	*0*	*0*	*0*
PTRH10	*102*	*49*	*48*	*0*	*0*	*53*	*52*
Total	*1705*	*466*	*27%*	*16*	*1%*	*1223*	*72%*

Table 6.3: Chemical status of natural surface water bodies.

Source: River Basin Management Plans. The data provided on WISE is not correct.

RBD	*Total*	*Good*		*Poor*		*Unknown*	
		No.	*%*	*No.*	*%*	*No.*	*%*
PTRH1	*10*	*5*	*50*	*0*	*0*	*5*	*50*
PTRH2	*18*	*8*	*44*	*0*	*0*	*10*	*55*
PTRH3	*27*	*13*	*48*	*0*	*0*	*14*	*52*
PTRH4	*23*	*7*	*30*	*0*	*0*	*16*	*70*
PTRH5	*57*	*15*	*26*	*1*	*2*	*41*	*72*
PTRH6	*65*	*16*	*24*	*0*	*0*	*49*	*75*
PTRH7	*54*	*10*	*19*	*0*	*0*	*44*	*81*
PTRH8	*10*	*5*	*50*	*0*	*0*	*5*	*50*
PTRH9	*0*	*0*	*0*	*0*	*0*	*0*	*0*
PTRH10	*[*]*	*[*]*	-	*[*]*	-	*[*]*	-
Total	*264*	*79*	*30%*	*1*	*0*	*184*	*70%*

Table 6.4: Chemical status of artificial and heavily modified surface water bodies.

Source: River Basin District Management Plans. The data provided on WISE is not correct.

[*] The RBMP states that there are artificial water bodies ("levadas") but there is no data available to define them.

RBD	*Good*		*Poor*		*Unknown*	
	No.	*%*	*No.*	*%*	*No.*	*%*
PTRH1	*2*	*100*	*0*	*0*	*0*	*0*
PTRH2	*2*	*50*	*2*	*50*	*0*	*0*
PTRH3	*3*	*100*	*0*	*0*	*0*	*0*
PTRH4	*21*	*75*	*7*	*25*	*0*	*0*
PTRH5	*8*	*67*	*4*	*33*	*0*	*0*
PTRH6	*7*	*88*	*1*	*13*	*0*	*0*
PTRH7	*6*	*67*	*3*	*33*	*0*	*0*
PTRH8	*19*	*83*	*4*	*17*	*0*	*0*
PTRH9	*50*	*93*	*4*	*7*	*0*	*0*
PTRH10	*3*	*75*	*0*	*0*	*1*	*25*
Total	*121*	*82%*	*25*	*17%*	*1*	*1%*

Table 6.5: Chemical status of groundwater bodies.

Source: River Basin Management Plans. The data provided on WISE is not correct.

RBD	*Good*		*Poor*		*Unknown*	
	No.	*%*	*No.*	*%*	*No.*	*%*
PTRH1	*2*	*100*	*0*	*0*	*0*	*0*
PTRH2	*4*	*100*	*0*	*0*	*0*	*0*
PTRH3	*3*	*100*	*0*	*0*	*0*	*0*
PTRH4	*27*	*96*	*1*	*4*	*0*	*0*
PTRH5	*12*	*100*	*0*	*0*	*0*	*0*
PTRH6	*8*	*100*	*0*	*0*	*0*	*0*
PTRH7	*8*	*89*	*0*	*0*	*1*	*11*
PTRH8	*22*	*96*	*0*	*0*	*1*	*4*
PTRH9	*54*	*100*	*0*	*0*	*0*	*0*
PTRH10	*4*	*100*	*0*	*0*	*0*	*0*
Total	*144*	*98%*	*1*	*1%*	*2*	*1%*

Table 6.6: Quantitative status of groundwater bodies.

Source: River Basin Management Plans. The data provided on WISE is not correct.

RBD	Total	Global status (ecological and chemical)					Global status 2021		Global 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.	%	%	%	%	%
PTRH1	71	45	63	45	63	0	53	75	71	100	18	0		
PTRH2	83	39	47	40	48	1	70	84	78	94	41	0		
PTRH3	383	257	67	273	71	4	296	77	383	100	26	0		3
PTRH4	262	159	61	166	63	2	206	79	237	90	26	0		1.5
PTRH5	425	197	46	266	63	17	318	75	341	80	16	0		2
PTRH6	236	97	41	125	53	12	202	86	228	97	50	0		0.5
PTRH7	260	109	42	112	43	1	196	75	247	95	53	0		
PTRH8	80	42	53	50	63	10	61	76	69	86	29	0		1.3
PTRH9	67	44	66	48	72	6	61	91	67	100	28	0		
PTRH10	102	49	48	57	56	8	60	59	80	78	-	-		
Total	1969	1038	53%	1182	60%	7%	1523	77%	1801	91%	31	0		1

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

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: RBMPs (data in the RBMPs differs from WISE).

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.	%	%	%	%	%
PTRH1	61	42	69	46	75	6	48	79	61	100	16			
PTRH2	65	31	48	32	49	1	60	92	64	98	42			
PTRH3	356	251	71	242	68	-3	264	74	356	100	24			3
PTRH4	239	151	63	164	69	6	199	84	222	93	24	0.4		2
PTRH5	368	198	54	243	66	12	282	77	299	81	15			1
PTRH6	171	75	44	100	58	14	154	90	171	100	49			
PTRH7	206	89	43	100	49	6	168	82	206	100	51			
PTRH8	70	35	50	41	59	9	52	74	60	86	33			1
PTRH9	67	44	66	48	72	6	61	91	67	100	28			
PTRH10	102	49	48	57	56	8	60	59	80	78				
Total	1705	965	56%	1073	63%	7%	1348	79%	1586	93%	29	0.1	0	1

Table 6.8: Natural surface water bodies: ecological status in 2009 and expected status in 2015, 2021 and 2027

Source: RBMPs (data in the RBMPs differs from WISE).

RBD	Total	Chemical status					Good chemical status 2021		Good chemical status 2027		Chemical exemptions (% of all SWBs)			
		Good or better 2009		Good or better 2015		Increase 2009 - 2015					Art 4.4	Art 4.5	Art 4.6	Art 4.7
		No.	%	No.	%	%	No.	%	No.	%	%	%	%	%
PTRH1	61	15	25	46	75	50	48	79	61	100				
PTRH2	65	18	28	32	49	21	60	92	64	98				
PTRH3	356	63	18	242	68	50	264	74	356	100				
PTRH4	239	151	63	164	69	6	199	83	222	93				
PTRH5	368	16	4	244	66	62	283	77	300	82				
PTRH6	171	25	15	50	29	14	104	61	121	71	1			
PTRH7	206	21	10	32	16	6	100	49	137	67				
PTRH8	70	21	30	41	59	29	52	74	60	86	1			
PTRH9	67	67	100	67	100	0	67	100	67	100				
PTRH10	102	49	48	57	56	8	60	59	80	78	-	-	-	-
Total	1705	446	26%	975	57	31%	1237	73	1468	86%	0.2	0	0	0

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

Source: RBMPs (data in the RBMPs differs from WISE).

RBD	Total	GW chemical status					Good Global status 2021		Good Global 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.	%	%	%	%	%
PTRH1	2	2	100	2	100	0	2	100	2	100	0	0		
PTRH2	4	3	75	3	75	0	4	100	4	100	25	0		
PTRH3	3	3	100	3	100	0	3	100	3	100	0	0		
PTRH4	30	23	77	24	80	3	29	97	30	100	23	0		
PTRH5	12	8	67	9	75	8	11	92	12	100	25	0		
PTRH6	8	7	88	7	88	0	7	88	8	100	0	0		
PTRH7	9	6	67	6	67	0	8	89	9	100	33	0		
PTRH8	23	19	83	19	83	0	22	96	23	100	17	0		
PTRH9	54	50	93	50	93	0	54	100	54	100	7	0		
PTRH10	4	3	75	3	75	0	4	100	4	100				
Total	149	124	83%	126	85%	2%	144	97%	149	100%	14	0		

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

Source: RBMPs (data in the RBMPs differs from WISE).

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.	%	%	%	%	%
PTRH1	2	2	100	2	100	0	2	100	2	100	0	0		
PTRH2	4	4	100	4	100	0	4	100	4	100	0	0		
PTRH3	3	3	100	3	100	0	3	100	3	100	0	0		
PTRH4	30	29	97	29	97	0	30	100	30	100	3	0		
PTRH5	12	12	100	12	100	0	12	100	12	100	0	0		
PTRH6	8	8	100	8	100	0	8	100	8	100	0	0		
PTRH7	9	8	89	8	89	0	9	100	9	100	0	0		
PTRH8	23	22	96	22	96	0	22	96	23	100	4	0		
PTRH9	54	54	100	54	100	0	54	100	54	100	0	0		
PTRH10	4	4	100	4	100	0	4	100	4	100	-	-		
Total	149	146	98%	146	98%	0	148	99%	149	100%	3	0		

Table 6.11: Groundwater bodies: quantitative status in 2009 and expected status in 2015, 2021 and 2027

Source: RBMPs (data in the RBMPs differs from WISE).

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.*	*%*	*%*	*%*	*%*	*%*
PTRH1	*10*	*5*	*50*	*7*	*70*	*20*	*8*	*80*	*10*	*100*	*30*			
PTRH2	*18*	*8*	*44*	*8*	*44*	*0*	*10*	*56*	*18*	*100*	*39*			
PTRH3	*27*	*7*	*26*	*7*	*26*	*0*	*8*	*30*	*27*	*100*	*56*			
PTRH4	*23*	*8*	*35*	*12*	*52*	*17*	*17*	*74*	*23*	*100*	*44*			
PTRH5	*57*	*12*	*21*	*36*	*63*	*42*	*49*	*86*	*55*	*96*	*21*			
PTRH6	*65*	*22*	*34*	*25*	*38*	*4*	*48*	*74*	*57*	*88*	*51*			
PTRH7	*54*	*20*	*37*	*22*	*41*	*4*	*38*	*70*	*52*	*96*	*62*			
PTRH8	*10*	*5*	*50*	*8*	*80*	*30*	*8*	*80*	*8*	*80*				
PTRH9	*0*	*0*		*0*			*0*	*0*	*0*	*0*				
PTRH10	*[*]*	*[*]*		*[*]*			*[*]*		*[*]*					
Total	*264*	*87*	*33%*	*125*	*47%*	*14%*	*186*	*70%*	*250*	*95%*	*58*	*0*	*0*	*0*

Table 6.12: Heavily modified and artificial water bodies: ecological potential in 2009 and expected ecological potential in 2015, 2021 and 2027[26]

Source: RBMPs (data in the RBMPs differs from WISE).

[*] The RBMP states that there are artificial water bodies ("levadas") but there is no data available to define them.

[26] 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.	%	%	%	%	%
PTRH1	10	5	50	7	70	20	8	80	10	100				
PTRH2	18	8	44	8	44	0	10	56	18	100				
PTRH3	27	13	48	13	48	0	13	48	27	100				
PTRH4	23	7	0	11	48	48	16	70	22	96				
PTRH5	57	15	26	29	51	25	42	74	48	84				
PTRH6	65	16	25	19	29	4	42	65	51	78				
PTRH7	54	10	19	12	22	3	28	52	42	78				
PTRH8	10	5	50	8	80	30	8	80	10	100				
PTRH9	0	0	0	0	0		0	0	0					
PTRH10	[*]	[*]		[*]			[*]		[*]		-	-	-	-
Total	264	79	30%	107	41%	11%	167	63%	228	86%	0	0	0	0

Table 6.13: Heavily modified and artificial water bodies: chemical status in 2009 and expected status in 2015, 2021 and 2027[27]

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

Source: RBMPs (data in the RBMPs differs from WISE).

[*] The RBMP states that there are artificial water bodies (“levadas”) but there is no data available to define them.

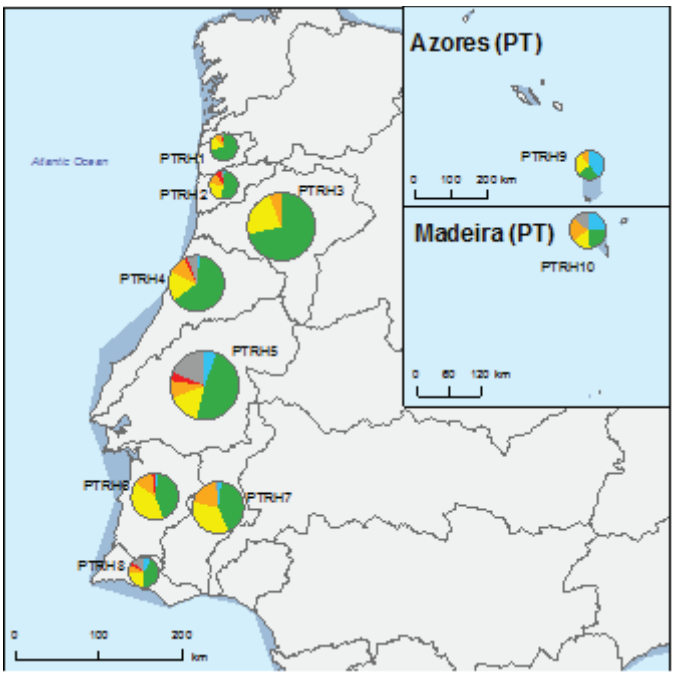

Figure 6.1: Map of ecological status of natural surface water bodies 2009

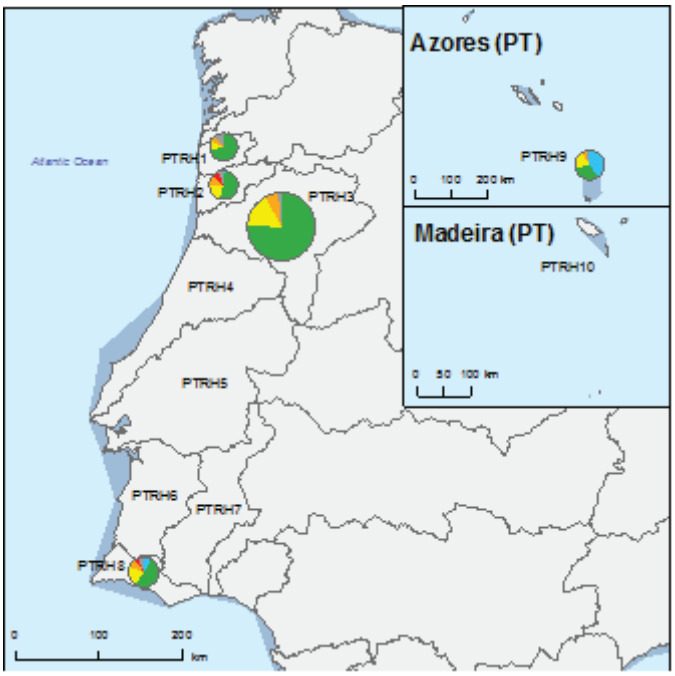

Figure 6.2: Map of ecological status of natural surface water bodies 2015

High

Good

Moderate

Poor

Bad

Unknown

River Basin Districts

Countries outside EU

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

Source: RBMPs, Eurostat (NB: some RBMPs do not contain sufficient detail to create accurate maps showing a detailed breakdown of status in 2015).

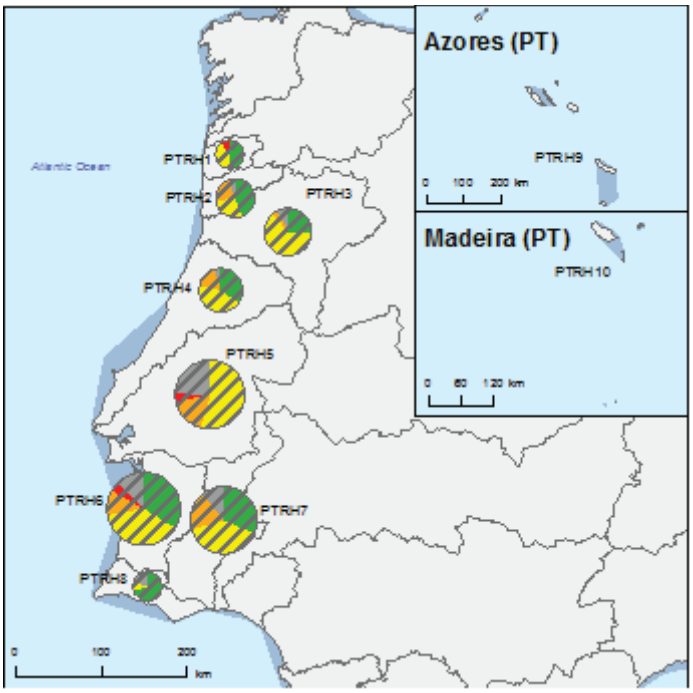

Figure 6.3: Map of ecological potential of artificial and heavily modified water bodies 2009

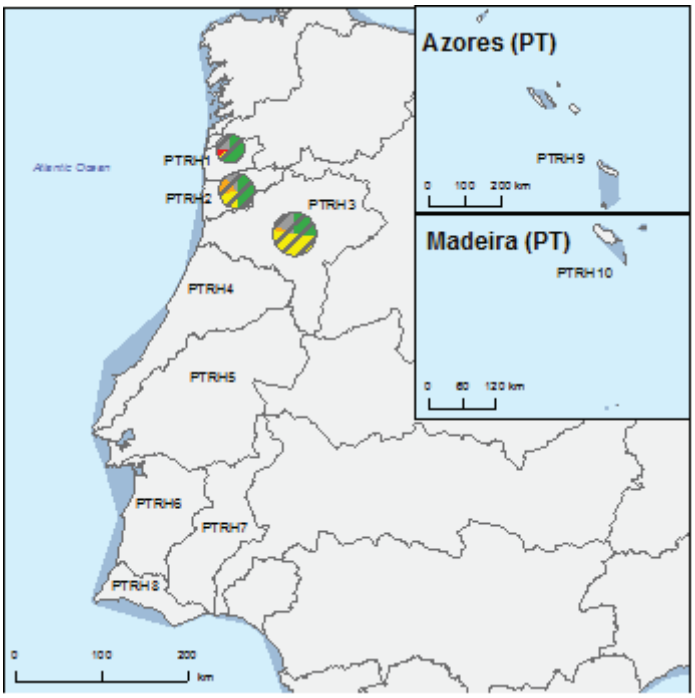

Figure 6.4: Map of ecological potential of artificial and heavily modified water bodies 2015

Good or better

Moderate

Poor

Bad

Unknown

River Basin Districts

Countries outside EU

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

Source: RBMPs, Eurostat (NB: some RBMPs do not contain sufficient detail to create accurate maps showing a detailed breakdown of status in 2015).

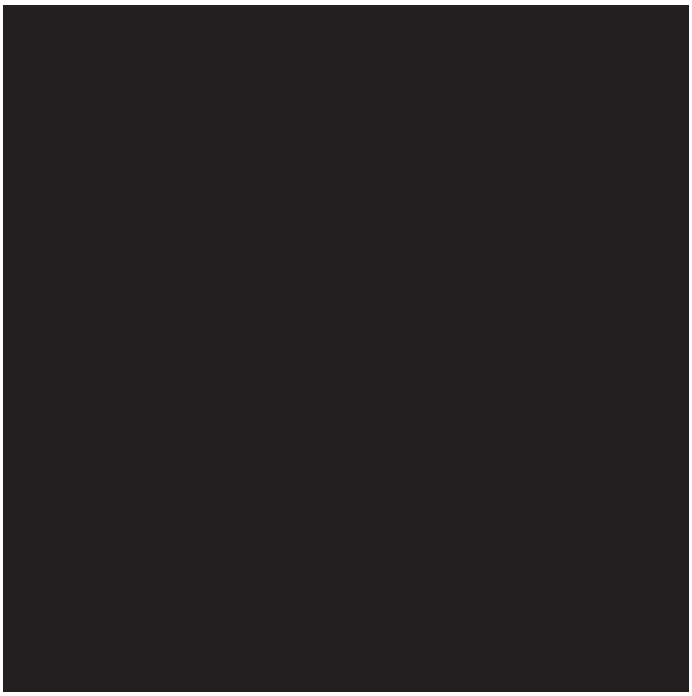

Figure 6.5: Map of chemical status of natural surface water bodies 2009

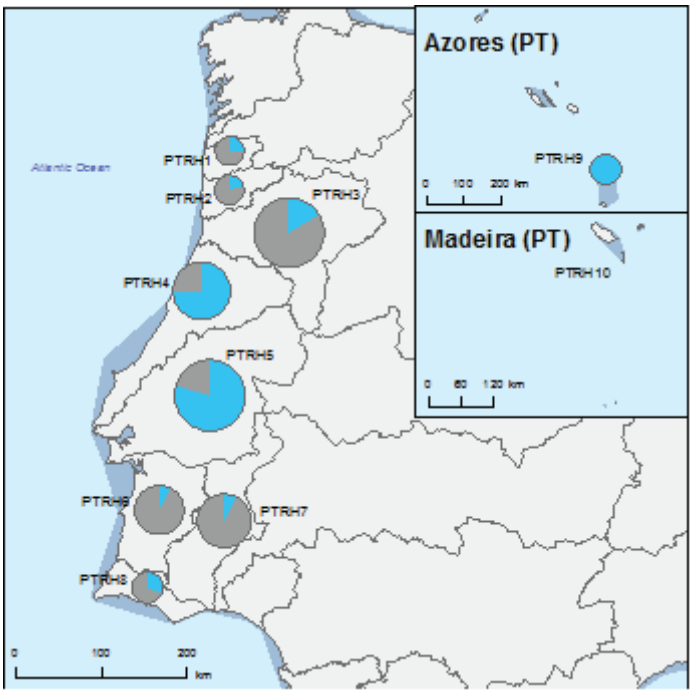

Figure 6.6: Map of chemical status of natural surface water bodies 2015

Good

Failing to achieve good

Unknown

River Basin Districts

Countries outside EU

Note: Standard colours based on WFD Annex V, Article 1.4.3.

Source: RBMPs, Eurostat

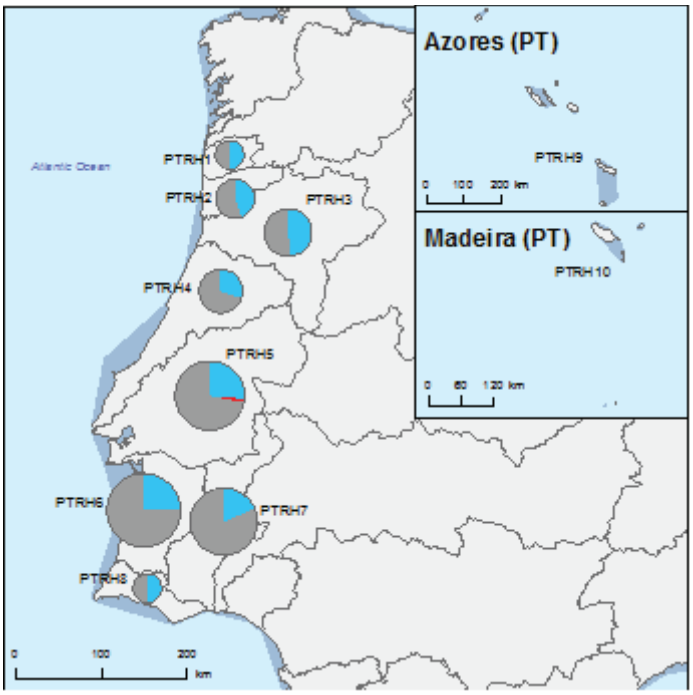

Figure 6.7: Map of chemical status of artificial and heavily modified water bodies 2009

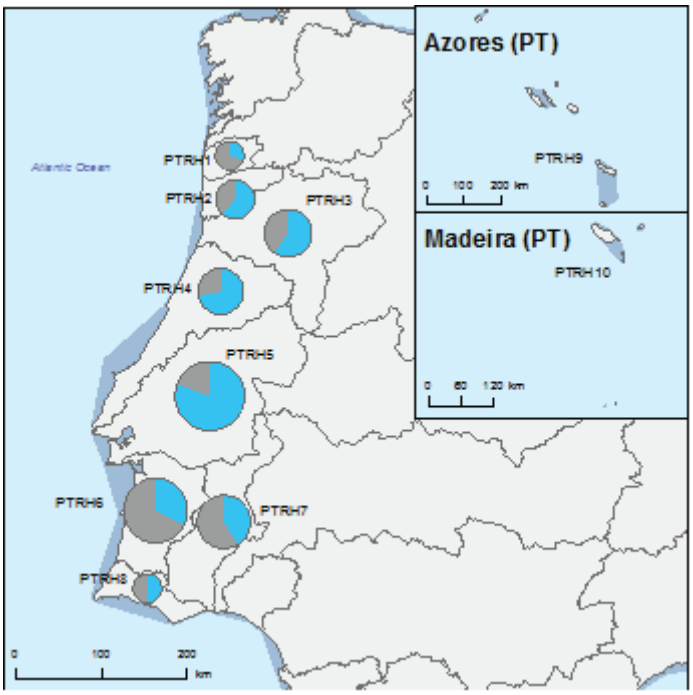

Figure 6.8: Map of chemical status of artificial and heavily modified water bodies 2015

Good

Failing to achieve good

Unknown

River Basin Districts

Countries outside EU

Note: Standard colours based on WFD Annex V, Article 1.4.3.

Source: RBMPs, Eurostat

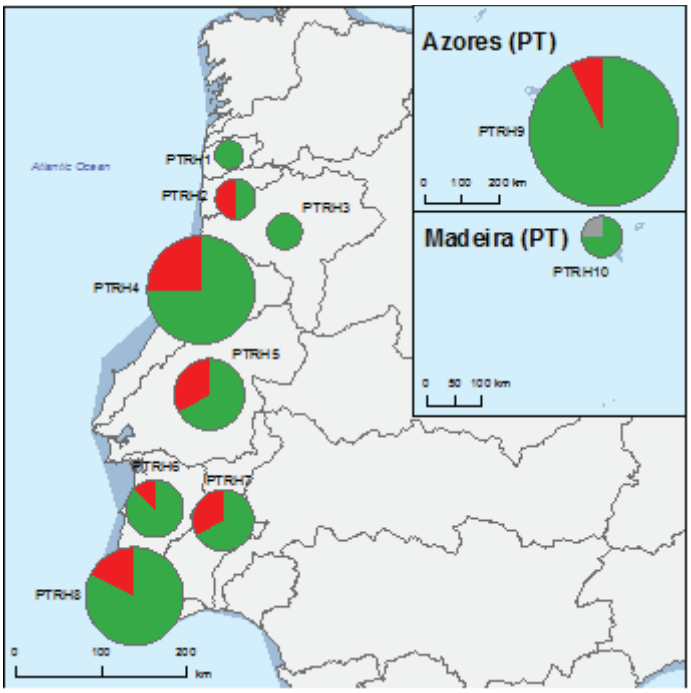

Figure 6.9: Map of chemical status of groundwater bodies 2009

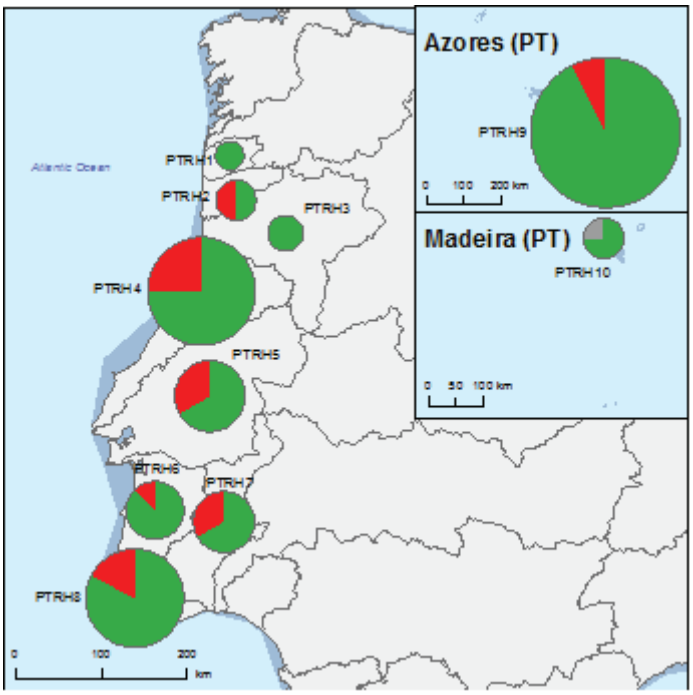

Figure 6.10: Map of chemical status of groundwater bodies 2015

Good

Poor

Unknown

River Basin Districts

Countries outside EU

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

Source: RBMPs, Eurostat

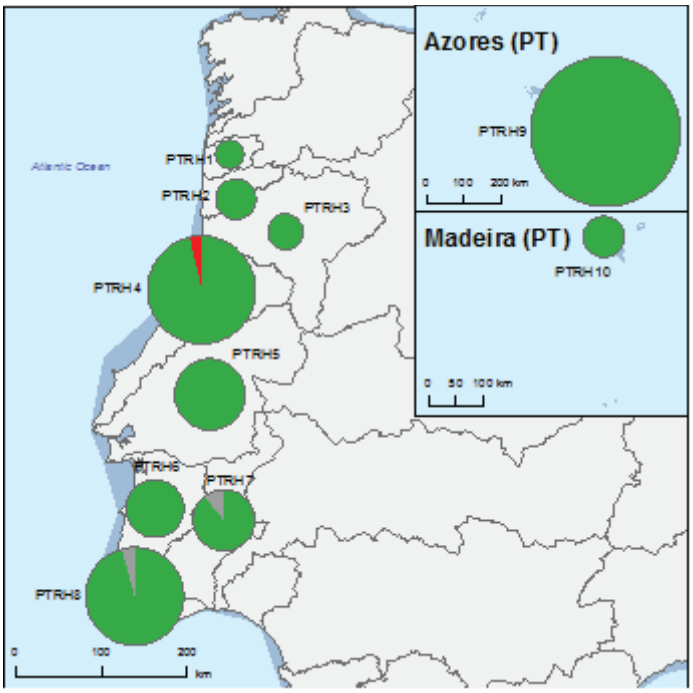

Figure 6.11: Map of quantitative status of groundwater bodies 2009

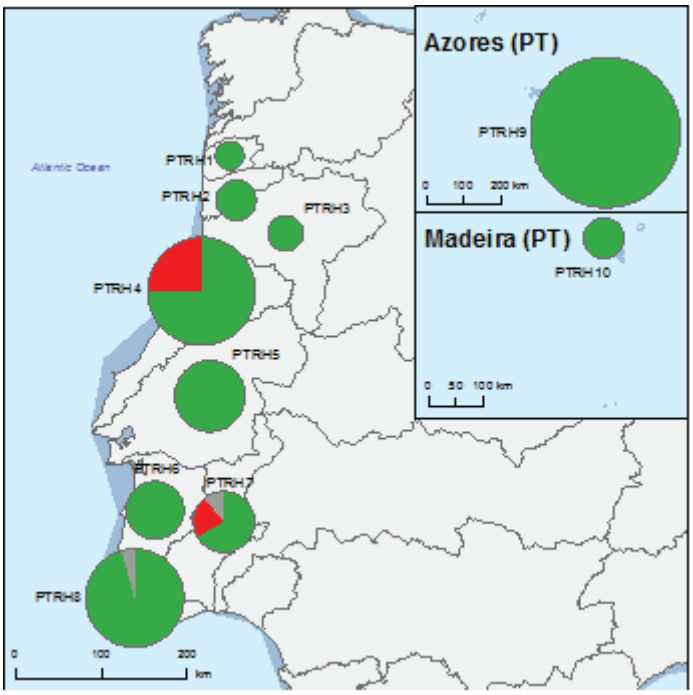

Figure 6.12: Map of quantitative status of groundwater bodies 2015

Good

Poor

Unknown

River Basin Districts

Countries outside EU

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

Source: RBMPs, Eurostat

6.1. Assessment of ecological status of surface waters

The assessment of ecological status of surface waters generally follows a national approach. In mainland Portugal, for rivers and lakes, it has been defined in a document titled: *Critérios para a classificação do estado das massas de água superficiais – rios e albufeiras,* issued in 2009 by the former National Water Institute. Assessment methods are only partially developed for rivers and reservoirs. Natural lakes only exist in the Azores (PTRH9) and these have not been considered in the national approach. However, the RBMP for PTRH9 took the national guidelines into consideration as much as possible. The RBMP for PTRH10 also takes into account the national methodology in terms of the specific pollutants to establish the chemical status.

While the RBMPs were being finalised, a project (*Avaliação do Estado Ecológico das Massas de Água Costeiras e de Transição Adjacentes e do Potencial Ecológico das Massas de Água Fortemente Modificadas*, POVT-12-0233-FCOES-000017) was ongoing at the national level, aiming to establish the assessment methods and threshold values for the characterisation of coastal and transitional waters, as well as determining the reference conditions for the ecological potential of HMWBs. It is therefore stated in the RBMPs that classifications are only preliminary. Some RBMPs classify these two categories of water using methodologies that vary for different RBDs as explained in the RBMP. Some RBMPs used preliminary results from the above mentioned study in the classification of some water bodies. Others used ad-hoc methods specifically developed for the RBD. For some other RBDs, no classification is achieved.

Overall, data is quite limited. Monitoring networks are not considered to be representative and available remaining data are scarce (see above comparison between number of water bodies and monitoring stations). The majority of water bodies have been classified using alternative methods derived in each RBD, according to available data, modelling, pressures analysis, bibliography analysis and/or expert judgment. The level of precision in these cases is rather low. In fact most of the PoMs contain measures such as further research and improved monitoring and inventory of pressures to be able to confirm the classifications of the water bodies and increase confidence and precision.

Since the elaboration of the RBMPs there have been changes in the licensing regime, as well as progress on the inventories of pressures, and the monitoring network has been improving. Hence it is expected that detection and reporting of pressures will be more precise for the second RBMPs.

6.2. Ecological status assessment methods

The one-out-all-out principle was used in all classifications. It can be stated that, with the exceptions of transitional waters, very large rivers and HMWBs, the vast majority of national types have a classification system (although not for all QEs). There are considerable gaps regarding full compliance with the WFD requirements. This section ends with a list of remaining gaps.

In mainland Portugal, following national procedures, only phytobenthos and benthic invertebrates are considered in the classification of river water bodies[28]. For reservoirs only

[28] According to PT Water Authority only the biological elements intercalibrated in the first exercise were used in the first cycle of the RBMPs.

phytoplankton is used. For coastal waters phytoplankton, macroalgae and benthic invertebrates are used, where available, in the classification.

In the Azores the classes for the BQEs of phytobenthos, macrophytes and benthic invertebrates in rivers are still to be developed. In lakes phytoplankton, phytobenthos, macrophytes and benthic invertebrates are used in the classification, but the classes for macrophytes are still being developed. In cases where no monitoring data exists, the analysis was done via pressures analysis and expert judgment. For transitional[29] and coastal waters, at the time of developing the RBMPs there were preliminary results for classification but no official data. In coastal waters, no BQEs were considered in the classification due to lack of data. All Azorean freshwater fish are introduced, so an autochthonous freshwater fish community does not exist. Since fish are absent in pristine situations, reference conditions for fish fauna cannot be set, and therefore cannot be used to assess water body status in the fresh water bodies of Azores.

In Madeira, for 33% of the river water bodies, the biological elements used were benthic invertebrates and bryoflora (macrophytes). It is not stated if the methods are fully developed. In cases where no monitoring data exists, the analysis was done via pressures analysis and expert judgment. For coastal waters only phytoplankton is used in the characterisation. The RBMP states that the indicators used are those that were intercalibrated with Azores (PT) and Canary Islands (ES).

For rivers and reservoirs, environmental quality standards (EQSs) have been set for some national chemical specific pollutants, and for some physico-chemical parameters. For the former, the guidance document states that "work still needs to be done with the Portuguese Environmental Agency (which is currently the National Water Authority) to define threshold values for some specific pollutants in accordance with 1.2.6 of Annex V of the WFD". For the latter, only border values between good and moderate and only for some parameters were defined. The national guidance document (also followed in Azores and Madeira) lists the parameters and the threshold values, but no information is found on the methodology to achieve them – hence it is not possible to ascertain whether the standards have been set in accordance with the procedure in the WFD Annex V 1.2.6. Transitional waters were monitored but no classification was established. For coastal waters the RBMPs state that the physico-chemical reference conditions are not yet established.

Regarding hydromorphology for rivers, the borders between classes were defined through relations between BQEs and expert analysis. The national guidance states that the River Habitat Survey methodology (version 2003) and its indicators Habitat Modification Score and Habitat Quality Assessment are to be used, but at the time of publication of the guidance, they were still being translated and adapted to the Portuguese situation. In mainland Portugal it was not possible to take hydromorphology into account in the classification of Ecological Potential.

In the Azores (PTRH9) where there are natural lakes, all water bodies were considered as having hydromorphological conditions suitable to support aquatic life. For transitional and coastal waters, there are no official limits for the classification of 'excellent' regarding hydromorphological elements. The bases of the analysis used were the significant morphological and hydrodynamic pressures used in the characterisation of significant pressures and anthropogenic incidences. In PTRH9 the RBMP states that despite the lack of

[29] In the Azores there are only three transitional water bodies, and all are located in the S. Jorge island.

information it was possible to assess that hydromorphological pressures were not significant.

In Madeira, there is neither monitoring nor assessment of the hydromorphological quality elements. For rivers, some hydromorphological elements have been used in the final classification of the non-monitored water bodies (namely the existence of bridges and jetties, and channelisation). For coastal waters no hydromorphological elements were used as "there is no available representative dataset". There is no information on when it is expected to have definitive classification criteria and it is not stated if all hydromorphological QEs will be developed in the future.

Portugal successfully intercalibrated the national classification methods for phytobenthos and macroinvertebrates in rivers (Official Intercalibration Decision document), the class boundaries are given in WISE 3.1.1, but the class boundaries vary slightly (some slightly more stringent, others slightly more relaxed) from those given in the IC Official Decision. For reservoirs the class boundaries given in WISE 3.1.1 are consistent with the intercalibrated class boundaries in the new official IC decision from 2013. For coastal waters the class boundaries given in WISE 3.1.1 are all compliant with the Intercalibrated class boundaries reported in the Official Intercalibration Decision from 2009. For transitional waters the intercalibration exercise is still on-going. The border values were intercalibrated and, where necessary, adjusted taking into account the COM Decision 2008/915/EC.

The Azores RBD (PTRH9) participates in the national intercalibration exercise, but cannot apply those results since the water types that exist in this RBD are different from the mainland water types and cannot be compared with another Member State. The RBMP describes the methods used to derive the threshold values. The RBMP of Madeira (concluded in 2013) states that there has been an intercalibration exercise with Azores and the Canary Islands regarding Coastal Waters.

According to the National Water Authority, the following gaps remain (some work is in progress to be used in the second generation of RBMPs which are being prepared):

Rivers: i) the classification system for very large rivers will be finished after the conclusion of the ongoing Intercalibration exercise; ii) for the remaining river types, gaps still exist in physico-chemical elements. Boundaries for all quality classes are still not available (only good/moderate boundary values were established) and thresholds for some parameters were not established. The work to review and to establish new standards for physico-chemical parameters is now starting.

Reservoirs - i) boundaries for all parameters of BQE phytoplankton for Southern Reservoirs are lacking (only chlorophyll *a* thresholds were established); ii) for run-of-river reservoirs the ecological potential assessment system is still not developed. This work is currently in progress; iii) gaps still exist in physico-chemical elements. Thresholds for some parameters were not established. The work to review and to establish new standards for physico-chemical parameters is now starting; iv) the assessment methods for hydromorphological quality elements are still not developed in reservoirs. This work is currently in progress at a national level, as well as at the ECOSTAT level.

HMWB (Rivers) – i) the development of the ecological potential assessment method will be finished after the conclusion of the work in progress for the harmonisation on GEP methods, which is being developed by the WG ECOSTAT.

Transitional and Coastal Waters – i) the Intercalibration Exercise will be finalised and a complete assessment system will be developed.

In the Azores, the process of enlarging the monitoring network[30] in rivers and lakes in all islands began in 2011, and it is expected to be concluded in the whole of PTRH9 in 2015. This will substantially increase the amount of data available to improve characterisation and assessment methods.

[30] http://servicos.srrn.azores.gov.pt/morhi/geografia.asp

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
PTRH1																											
PTRH2																											
PTRH3																											
PTRH4																											
PTRH5																											
PTRH6																											
PTRH7																											
PTRH8																											
PTRH9	-				-							-															
PTRH10								-	-	-	-	-	-	-	-	-	-	-	-	-	-						

Table 7.2.1: 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

6.3. Application of methods and ecological status results

For mainland water bodies, the situation is generally as follows:

- Rivers: Although macrophytes and fish are monitored in the surveillance monitoring programme, there are still no class boundaries determined for these BQEs and they cannot be used for the assessment of ecological status in this first RBMP.
- Reservoirs: For lakes (reservoirs) the phytoplankton, fish, general physico-chemical QEs and national specific pollutants are included in the surveillance monitoring, but only phytoplankton and general physico-chemical QEs and national specific pollutants are used for classification, as there is no classification system for fish.
- Transitional: although all QEs are included in the surveillance monitoring the classification system developed for all QEs except benthic invertebrates is preliminary and hence not validated by the national water authority for classification purposes.
- Coastal: All QEs are included in the surveillance monitoring but only phytoplankton, benthic invertebrates, general physico-chemical QEs and hydromorphological QEs were used for classification. As in transitional waters, it is stated that these are preliminary results.

Usually there is no long-term operational monitoring for coastal and transitional waters and classification is based on surveillance monitoring, rather than operational monitoring. For rivers and reservoirs, the parameters tend to be the BQEs used in the classification, together with hydromorphological data, physico-chemical data, and specific pollutants.

In mainland Portugal some parameters are measured but not used in the classification. This can occur when further investigations are conducted to assess reasons for a water body not achieving good status or, in other cases, to assess the consistency of some biological sampling results (e.g. electric conductivity to check electrofishing efficiency). Moreover, some QEs and BQEs are still not included in the national guidelines of classification, but are measured to be integrated in the future.

In the Azores (PTRH9) for all water categories the number of monitored parameters is higher than the parameters used for classification. The BQE fish has not been monitored or used because autochthonous freshwater fish communities do not exist in Azores waters. In the Azores, rivers are classified using phytobenthos, as well as general parameters (Q3-1) and the non-priority specific pollutants (Q3-3). Lakes are classified using only phytoplankton, general physico-chemical QEs and non-priority specific pollutants. Transitional waters are classified using only phytoplankton, hydromorphology and general physico-chemical QEs, although the WISE report states that all BQEs of the transitional water bodies are monitored. In coastal water bodies, only phytoplankton, hydromorphology and general physico-chemical QEs are used for classification. Operational monitoring is only carried out for lakes. The QEs being monitored and used for classification of ecological status are: QE1-1, plus physico-chemical data. Other parameters are monitored but not used for classification.

As stated above, there is no operational monitoring in Madeira (PTRH10), and the surveillance monitoring is very limited and does not include BQEs. In contrast, general parameters (QE3.1) are monitored in 18 stations, but they are not used in the classification.

6.4. River basin specific pollutants

The main pollutants causing failure of good status in Portugal are phosphorus, ammonia and nitrates. BOD5 is also causing failure to achieve good ecological status/potential in many RBDs.

Nonylphenol is an issue in the transitional waters of PTRH1, while fluorine is present in some dams of PTRH3. PTRH5 and PTRH6 have occurrences of tributyltin compounds and the southernmost RBD, PTRH8, has issues with lead and its compounds.

It should be noted that the uncertainty is high regarding the extent of these pollutants. This is more commonly due to lack of monitoring data, the monitoring network covering only a small part of each RBD's water bodies, or results being based in a single study and not on a time series. As such, no percentages are provided on the extent of the pressure.

The RBMP of PTRH9 states that the majority of specific pollutants are not included in the physico-chemical quality elements monitored in Azores rivers and lakes; the monitoring of transitional and coastal waters is considered rather incomplete and, for the moment, insufficient to draw conclusions.

There is also a lack of monitoring data in Madeira. For coastal waters no specific pollutants were taken into account. For rivers, there are some monitoring stations – particularly linked to water abstraction – and no specific pollutants were found. Historic data showed high dissolved lead in one station, but more recent data do not confirm this value. It is the only water body where such an occurrence was detected.

RBD	CAS Number	Substance	Percentage Water Bodies Failing Status (%)*
PTRH1		Total Nitrogen	Rivers
PTRH1		Total Phosphorus	Rivers and reservoirs
PTRH1		BOD5	Rivers
PTRH1		Non-ionised ammonia	Transitional natural and HMWB
PTRH1	104-40-5	Nonylphenol	Transitional natural
PTRH2		Total Ammonium	
PTRH2		Total Phosphorus	
PTRH2		BOD5	
PTRH3		Total Nitrogen	Rivers
PTRH3		Total Phosphorus	Rivers and reservoirs
PTRH3		BOD5	Rivers
PTRH3		Non-ionised Ammonia	Transitional natural and HMWB
PTRH3		Phosphate	Transitional natural and HMWB
PTRH3	86-73-7	Fluorine	Reservoirs
PTRH3		Nitrate	Reservoirs
PTRH4		BOD5	7 RWB
PTRH4		Total Ammonium	7RWB
PTRH4		Nitrates	1 RWB
PTRH4		Total Phosphorus	3 HMWB
PTRH5	36643-28-4	Tributyltin	Reservoirs
PTRH6	36643-28-4	Tributyltin compounds	
PTRH6		Total Phosphorus	
PTRH6		Total Nitrogen	
PTRH6		BOD5	
PTRH7		BOD5	-
PTRH7		Total Phosphorus	-
PTRH7		Total Nitrate	-
PTRH8		BOD5	
PTRH8		Total Phosphorus	-
PTRH8		Total Nitrate	-
PTRH8	7439-92-1	Lead and its compounds	Rivers
PTRH9		Total Phosphorus	Rivers and Lakes
PTRH9		Total Nitrogen	Rivers and Lakes
PTRH9		COD	Rivers and Lakes

Table 7.4.1: River basin specific pollutants causing failure of status
Source: RBMPs.
* it is not useful to express in % since the classification of the majority of water bodies did not use monitoring data

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

The Article 5 (WFD) analysis, based on reports submitted in 2005 for mainland Portugal, indicated a number of artificial and heavily modified water bodies of 90 rivers downstream from dams: 97 are dams/reservoirs, 15 are transitional waters and one is a coastal water. There are a further 23 artificial water bodies in rivers and one in transitional waters.

The figures have since changed and in the 2009 RBMPs there are 102 rivers (6% of total rivers), 98 lakes (80% of lakes in the whole of Portugal; 100% of lakes in mainland Portugal), 14 transitional waters (26%) and 1 coastal water (<1%) that are designated as heavily modified water bodies. The number of artificial water body rivers decreased to 14 (< 1%) and the artificial transitional water has maintained its designation.

PTRH9 has not defined HMWBs. Indeed, the PTRH9 RBMP highlights that some coastal water bodies were considered natural although they are in the areas of influence of ports and might need to be changed. As the characterisation of reference conditions of ecological status is being developed, it has not yet been possible to identify HMWBs in this RBD. Nevertheless, the available data does not seem to indicate significant hydromorphological changes derived from physical changes in the coastal water bodies of PTRH9.

In Madeira there are “levadas”, man-made channels that derive from the geological characteristics of the island. However, the PTRH10 RBMP states that due to lack of data it has not been possible to delimit and characterise these water bodies.

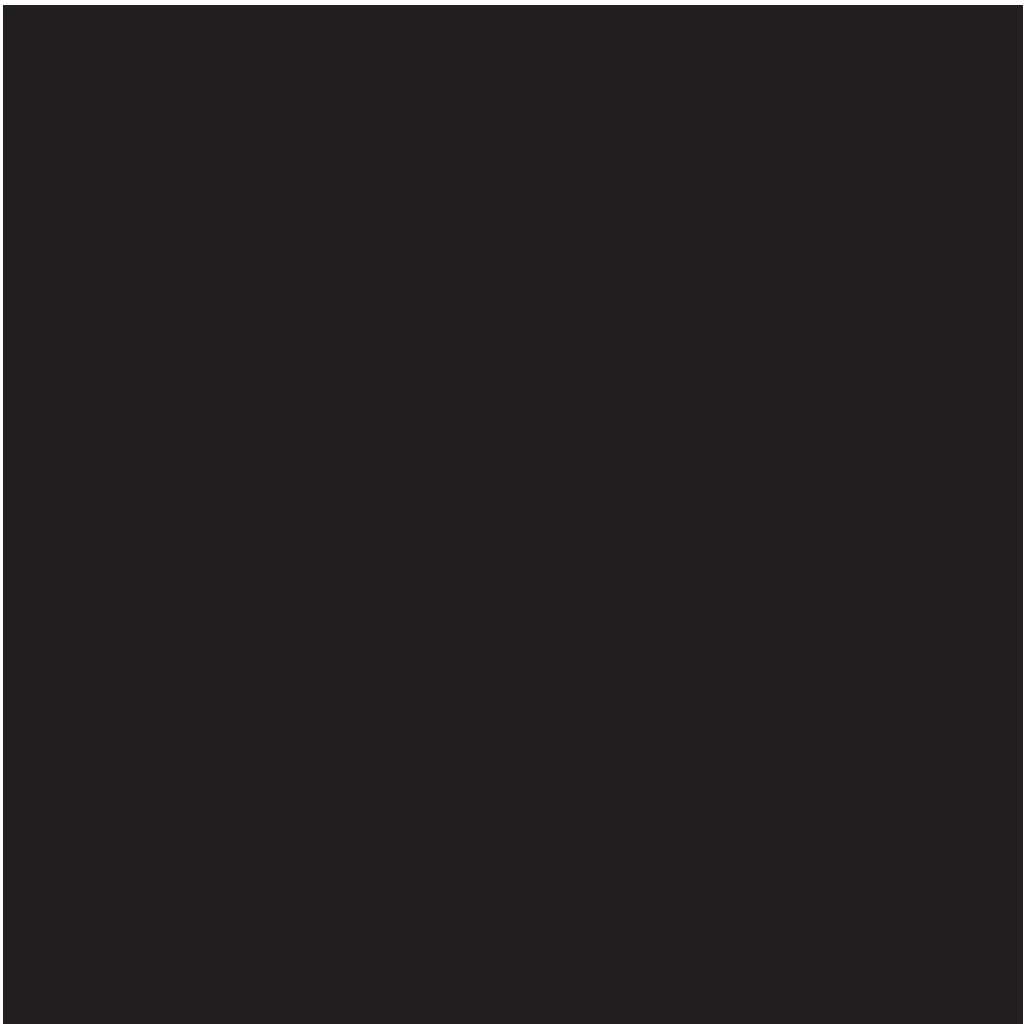

Figure 8.1: Map of percentage Heavily Modified and Artificial waterbodies by River Basin District

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

Source: WISE, Eurostat

7.1. Designation of HMWBs

HMWB or AWB	RBD	Water category									
		Rivers		Lakes		Transitional water		Coastal water		All water bodies	
		Number	% of category	Number	% of category	Number	% of category	Number	% of category	Number	%
HMWB	PTRH1	3	5.36	3	100	4	40	0	0	10	14
	PTRH2	9	13.04	7	100	1	16.67	0	0	17	20
	PTRH3	6	1.66	17	100	2	66.67	0	0	25	7
	PTRH4	9	3.81	9	100	4	40	0	0	22	8
	PTRH5	26	6.58	24	100	0	0	0	0	50	12
	PTRH6	28	14.36	19	100	2	22.22	0	0	49	22
	PTRH7	18	8.11	16	100	0	0	0	0	35	14
	PTRH8	3	4.69	3	100	1	33.33	1	33.33	7	9
	PTRH9	0	0	0	0	0	0	0	0	0	0
	PTRH10	0	0	0	0	0	0	0	0	0	0
	Total	*102*	*6.33%*	*98*	*80.3%*	*14*	*26.42%*	*1*	*1.75%*	*215*	*12%*
AWB	PTRH1	0	0	0	0	0	0	0	0	0	0
	PTRH2	0	0	0	0	1	16.67	0	0	1	1
	PTRH3	2	0.55	0	0	0	0	0	0	2	1
	PTRH4	3	1.27	0	0	0	0	0	0	3	1
	PTRH5	7	1.77	0	0	0	0	0	0	7	2
	PTRH6	0	0	0	0	0	0	0	0	0	0
	PTRH7	0	0	0	0	0	0	0	0	0	0
	PTRH8	2	3.12	0	0	0	0	0	0	2	3
	PTRH9	0	0	0	0	0	0	0	0	0	0
	PTRH10	*	*	-		-		-		-	
	Total	*14*	*0.87%*	*0*	*0*	*1*	*1.89%*	*0*	*0*	*15*	*1%*

Table 8.1.1: Number and percentage of HMWBs and AWBs.
Source: WISE
*Although Artificial water bodies do exist, lack of data prevents their delimitation and characterisation.

In mainland Portugal, the RBMPs state the water uses which have led to water bodies being designated as heavily modified or artificial. The most common water uses referred to are: navigation, storage for drinking water, storage for power generation, storage for irrigation and urbanisation of river banks. The types of physical modification that are considered for designation include weirs/dams/reservoirs, channelisation/straightening/bed stabilisation, bank reinforcement, land reclamation/coastal modifications/ports.

The methodology used for the designation of HMWBs has followed the stepwise approach of the CIS Guidance nº 4 in all RBDs that defined HMWB.

A water body from the river category was designated as a HMWB when:

1) As a result of the construction of a dam, significant changes occur on the water body in terms of hydromorphological characteristics: i) on the water body part downstream of a dam, as a consequence of the alteration on the hydrological regime; ii) on the water body part upstream of a dam, as a result of the creation of a reservoir (change of a lotic ecosystem to a lentic ecosystem), implying a "substantial change in character" of the water body and preventing it from reaching good ecological status, as defined for that river type; iii) urban river stretches, or transitional and coastal waters with significant physical and hydromorphological alterations; iv) ports and navigation channels.

   All reservoirs with an area larger than 0.4 km^2 were considered HMWB. Some reservoirs with a smaller area, used for water supply, were also included.

2) The elimination of a dam would imply a "significant adverse effect on the water uses" that cannot be guaranteed by other options, being also "the better environmental option" when a dam was constructed for:

   i) Hydroelectric production:

      a. Allows a rapid response to the increase of energy consumption at peak hours that cannot be reached by other sources of energy;

      b. Contributes to the goal defined by the Portuguese Government and the EU 2020 climate-energy legal framework concerning the proportion of electricity which is produced from renewable sources of energy: 31% in 2020;

      c. Allows the use of wind energy in low energy demand periods (pump-storage reservoirs).

   ii) Water supply and/or irrigation: due to the high variability of the hydrological regime in Portugal, it is essential to have an interannual and annual regulation of the hydrological regime to satisfy the water necessities for domestic consumption, industry and irrigation. This is guaranteed by reservoirs.

Portugal considered as permanent morphological changes:

- The existence of dams for water supply, irrigation, hydroelectricity and navigation;

- The existence of flood protection dikes and other longitudinal structures such as ports, long and significant channels and other infrastructures.

- River stretches downstream of a dam were considered as substantially changed if mitigation measures, such as ecological flows or fish ways, are not present.

The RBMPs assume that the use of existing dams and reservoirs will not be discontinued due to implementation of WFD. The RBMPs do not contain information regarding the consideration of all possible restoration measures that may allow good ecological status to be achieved without causing significant adverse effects on the water use or the wider environment. In particular the approach used by Portugal for implementation of ecological flows requirements[31] is as follows: i) All new dams (since 2008) must have an ecological flow established through the use of ecologically based methods; ii) When renewing permits for old dams, a revision or implementation of ecological flows established through the use of ecologically based methods is mandatory. Moreover the PT water authority states that if a water body has been designated as HMWB one cannot set measures that for reasons of technical feasibility or disproportionate costs may jeopardise the beneficial objectives for which the HMWB was designated.

There is no explicit mention of uncertainty in designation, but a quality check of the results of the designation process is described.

Fourteen transitional water bodies and one coastal water body are considered HMWB in mainland Portugal. Although there are coastal defences along the coast, they are often considered to have a localised effect that is insufficient to consider the whole water body as heavily modified.

7.2. Methodology for setting good ecological potential (GEP)

At the time of developing the RBMP, the project *Massas de Água Costeiras e de Transição Adjacentes e do Potencial Ecológico das Massas de Água Fortemente Modificadas* (POVT-12-0233-FCOES-000017 - ERDF) was ongoing at a national level, trying to establish reference conditions for the ecological potential of HMWBs in different water types.

GEP is being defined at the national level. The GEP for reservoirs is the most developed, but it has still not been defined for all types of reservoir. The northern reservoirs are mostly hydropower dams and for water supply, while the southern reservoirs are mostly used for water supply and irrigation (several reservoirs serve two or more purposes). The biological component of GEP for lakes derives from the inter-calibration exercise, and following the second phase of the intercalibration exercise it has been possible to define GEP with all components of phytoplankton (*Chlorophyll a* concentration, total Biovolume, % Biovolume of Cyanobacteria, and group of algae). For the southern reservoirs, only chlorophyll *a* (from BQEs) is currently integrated in the assessment of GEP. For the priority substances the threshold values are the same as those used in natural rivers. Regarding hydromorphological conditions, although the indicators are already defined, no reference values are yet established.

[31] An ecologically-based flow regime is established and implemented in many Portuguese water bodies, guidelines about ecological flow do exist and, where necessary, further guidelines about ecological flow establishment can be given by the Portuguese Environment Agency upon request. Some measures concerning ecological flow foreseen in the PoMs are already in place, others are in the process of implementation.

According to the National Water Authority, Portugal is developing a complete phytoplankton assessment system for southern reservoir types as well as for the third reservoir type existing in Portugal, the run-of-the-river reservoirs type.

For the majority of river types, GEP is assessed through the same requirements considered for ecological status. According to the National Water Authority, Portugal is currently working on the hydromorphological changes associated with hydropower, in order to include ecological flow (which is already in place) or hydropeaking mitigation (where in place) in GEP assessment of water bodies downstream from dams. However, this work will probably not be ready in time for the second RBMPs.

7.3. Results of ecological potential assessment in HMWB and AWB

As stated above, there is not yet a clear and complete definition of GEP for each water category. There is work in progress, but in many instances the GES references are supposed to be used also in GEP. As there are no natural lakes in mainland Portugal no GES references were defined, hence the RBMPs state that the definition of GEP depends on intercalibration exercises. At the time the RBMPs were published only one type of reservoir, out of the existing three, had all definitions for chlorophyll.

8. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

8.1. Methodological approach to the assessment

Guidelines for the methodology are provided by a national document. It states that the relevant QEs for the determination of chemical status are: priority substances indicated in Directive 2008/105/CE for which standards have been established; other hazardous substances for which standards have been defined at the national or EU level.

Overall, monitoring data is scarce and, as an alternative, historic data is used. Not all substances are measured and measurements are not carried out in all water bodies. The standards applied are those of the national legislation that transposes the Directive and are similar to those of the Directive. With the exception of PTRH4 and PTRH5, where on average 25% are not classified, in the RBDs of mainland Portugal indetermination is always larger than 67%, with three RBDs with a level of indetermination greater than 80%.

For PTRH9 it is stated in the RBMP that there is no data on the presence of most priority substances in the surface water bodies. The few water bodies that have been monitored (e.g. for zinc, cadmium and mercury) have concentration values below the limits of detection of the methods used. Despite the lack of knowledge, it was considered that all the surface water bodies have good chemical status.

In PTRH10, only ten river water bodies and two coastal waters had chemical monitoring data from a hazardous chemicals monitoring programme. There is very limited data to allow a WFD compliant characterisation. There are 17 substances and groups of substances of List I, and 114 substances and groups of substances of List II of Directive 76/464/EC which are analysed in this programme. Several List II substances showed concentrations above the ‘water for human consumption’ quality standards in rivers, and some showed concentrations above the shellfish water quality standards in coastal waters. However, the RBMP considers that there is no chemical risk in PTRH10. The only water body classified as uncertain is one river water body in which higher concentrations of dissolved lead occurred in 2009 but did

not occur in 2010 and 2011. The large majority of water bodies had no data and their classification (low certainty level) was achieved using a statistical model, the knowledge of pressures and expert judgment.

Overall, for all Portuguese RBDs no methodology is supplied for dealing with background concentrations. Atmospheric deposition was not taken into consideration. EQSs were not defined for mercury and hexachlorobutadiene. For hexachlorobenzene a sampling campaign has taken place in 12 beaches of mainland Portugal and results were below the limit of quantification. No reference could be found in the texts concerning how bioavailability factors of metals are considered in the assessment of compliance with EQS.

According to the National Water Authority Portugal has implemented a sediment monitoring network in order to evaluate monitoring trends of priority substances. Results are available from 2013 onwards and will be included in the second cycle of RBMPs.

8.2. Substances causing Exceedance

The substances causing water bodies to fail good chemical status are shown in Table 8.2.1.

Substance causing exceedance	Exceedances per RBD									
	PTRH1*	**PTRH2**	**PTRH3**	**PTRH4**	**PTRH5**	**PTRH6**	**PTRH7***	**PTRH8**	**PTRH9***	**PTRH 10**
Lead								1 (1%)		Prevent classification as good**
Nonylphenol		1 (1%)		5 (2%)						
Tributyltin compounds					1 (0.2%)	2 (0.9%)				
Nickel			1 (0.3%)							

Table 8.2.1: Substances responsible for exceedances
Source: WISE 5.5.b
* No data reported for this RBD
** Dissolved lead occurring in 2009 in one RBD

There is no indication in the RBMPs that mixing zones are being used. The National Water Authority states that "there are no plans to designate mixing zones at a national level. However, whenever justified, some mixing zones are being defined at a local level and linked with the wastewater discharge permits. The CIS Mixing Zones Guidelines and the Discharge Test software are being applied and until now all cases were tier 2 type."

9. ASSESSMENT OF GROUNDWATER STATUS

Status	Poor chemical status	Poor quantitative status	Good status
PTRH1	0	0	2 (100%)
PTRH2	1 (25%)	0	3 (75%)
PTRH3	0	0	3 (100%)
PTRH4	7 (23%)	1 (3%)	22 (73%)
PTRH5	3 (25%)	0	9 (75%)
PTRH6	1 (12%)	0	7 (88%)
PTRH7	3 (33%)	1 unknown	5 (56%)
PTRH8	4 (17%)	0	19 (83%)
PTRH9	4 (7%)	0	50 (93%)
PTRH10	1 unknown	0	3 (75%)
Total	*23 (15%)*	*1 (0.7%)*	*123 (84%)*

Table 9.1: Number and percentage of groundwater bodies and their status.
Source: WISE GWB_STATUS and WISE database

9.1. Groundwater quantitative status

Of the classified groundwater bodies, only one is in poor quantitative status and one undetermined. The methodology to assess the quantitative status of a water body is established in Order nº 1115/2009. This states that good quantitative status is achieved when the annual average abstraction rate is lower than 90% of the long-term annual average rate of overall recharge.

Analysing the text of the Order nº 1115/2009 and the specificities of the evaluation presented in the RBMPs, it can be concluded that Article 2.27 of the WFD is used. There is still very little knowledge about the needs of the terrestrial ecosystems associated with groundwater bodies. The general approach in Portugal was to establish that the ecological flow necessary for aquatic ecosystems and associated terrestrial ecosystems is 10% of the long-term annual average of recharge.

The impacts of abstractions have been considered by looking at the balance between the long-term annual average rate of abstraction compared with the available groundwater resource. For all groundwater bodies an analysis of the piezometric level tendencies was performed. Saline or other intrusions were also included in the assessment. In PTRH8 where the cases of water shortage in dry years were more frequent, actual and potential legitimate uses and functions of groundwater have also been considered.

In the case of the northern RBDs, the RBMPs state that such knowledge has not been

necessary to this assessment since by using other parameters (namely rate of abstraction much lower than the 90% limit) it has been determined that the water bodies are in good quantitative status. In southern mainland Portugal (PTRH7 and PTRH8) it is stated that some surface waters associated with groundwater and groundwater-dependent terrestrial ecosystems have been identified. There are measures in the POMs of all RBMPs aiming to increase knowledge on the groundwater dependent ecosystems.

9.2. Groundwater chemical status

It is important to note that for many RBDs the monitoring networks are considered non-representative. There are some water bodies without monitoring data, other water bodies have one single monitoring point. Only one of the water bodies is considered to have moderate precision data.

The groundwater chemical status assessment followed the principles of Guidance Document nº 18 (Guidance on Groundwater Status and Trend Assessment).The following procedure was followed and described in the RBMPs:

- ✓ The mean value for each relevant parameter and monitoring site in the groundwater bodies was calculated;
- ✓ If at least one monitoring point registered a mean value higher than the threshold value (TV) or quality standard (QS) an "appropriate investigation" (TESTS) was carried out;
- ✓ The relevant TESTS were applied – saline or other intrusion, surface water, groundwater dependent terrestrial ecosystems, general quality assessment;
- ✓ In the general quality assessment TEST, when the extent of the exceedance occurs in an area greater than 20% of the GWB the GWB was considered to have poor status. In general, the interpolation method used was the Inverse Distance Weighted (IDW).

The tool used for trend assessment is regression analysis. If the concentration of the parameter gets above 75% of the parametric value of quality or TV, the environmental objectives are considered to be at risk. It is clearly stated that no specific procedure was considered for the assessment of trend reversal.

TVs were established for the 10 parameters of part B Annex II of DL nº 208/2008 that transposes Directive 2006/118/EC to Portuguese law. There is a national document setting the procedure for the establishment of TVs. For one groundwater body situated in PTRH6 TVs were established for several hydrocarbons (21) including PAH. These TVs can also be used at a national level when necessary.

The causes of exceeding values are determined by analysis of causes and expert judgment. Background concentrations are considered. For example in PTRH1 there is a naturally high concentration of arsenic. For the analysis of background values specific studies were undertaken in the RBD.

The estimates and evaluations are done at the locations where data exist, and focus more on the parameters found above thresholds and its comparison with background levels, namely frequency of occurrence and concentration. Nitrate was considered to be the most challenging factor. The significant pressure is therefore agriculture and livestock.

Associated surface waters and groundwater-dependent terrestrial ecosystems are considered in the assessment of chemical status. However, the existing knowledge is reduced and, as stated above, a research study is currently ongoing.

9.3. Protected areas

The procedures used for analysis of the water status in protected areas are not clear.

It should be noted that the delimitation of protection areas for drinking water consumption ("protection perimeters"), shall be established in specific legislation. The data listed below often correspond to water bodies in which such perimeters will be established.

For PTRH9 and PTRH10 the protection perimeters were still not published, thus the RBMPs show no data on the status of groundwater protected areas. In the case of Madeira, as the chemical monitoring is undertaken at the areas where water for human consumption is abstracted, there are quality data. Out of three groundwater bodies, two are in good quality (Category A1 of Annex I of DL 236/98) and one presents some non-compliances.

Groundwater bodies designated as vulnerable zones in the scope of the Nitrates Directive have been classified with status less than good.

RBD	Good	Failing to achieve good	Unknown
PTRH1	0	4	21
PTRH2	0	0	23
PTRH3	0	1	28
PTRH4	18	2	5
PTRH5	12	0	0
PTRH6	0	0	19
PTRH7	0	0	43
PTRH8	12	1	3
PTRH9	0	0	0
PTRH10	0	0	0
Total	*42*	*8*	*142*

Table 9.2: Status of groundwater drinking water protected areas
Source: WISE database

10. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

10.1. Additional objectives in protected areas

For surface waters and groundwater abstraction zones, objectives were established regarding the quality level of water until 2015, and the objective is to comply with the corresponding legislation (namely DL 236/98 on setting water quality uses in accordance with their uses; biological and physicochemical parameters established in Annex X of DL 236/98 are more stringent than the WFD). One of the main measures is to finalise the protection perimeters around abstraction areas. In specific water bodies subject to pressures, measures are

undertaken for the fast resolution of problems.

There are no shellfish protected areas in Portugal. However, there are shellfish zones, in which there is legislation on food security (Decree-Law nº 293/98, which transposes 91/492/EEC amended by Directive nº 97/61/EC of the Council) and control measures are taken.

For bathing waters the additional objectives are related to the maintenance of conformity of water bodies with specific legislation until 2015. Particularly in transitional water bodies and in reservoirs more stringent objectives are considered. Specific measures are defined.

The objectives of the zones designated for the protection of habitats and species are the same as the environmental objectives defined for the surface water bodies. The most recent definition of these protected areas are the Council of Ministers Resolutions 76/2000 and 135/2004 and the DL 49/2005. Portugal has decided that no other requirements besides good status are necessary to fulfil the objectives of the Birds and Habitats Directives.

10.2. Exemptions according to Article 4(4) and 4(5)

It is important to keep in mind that the data available to be used in the RBMPs is limited. Some water bodies were not classified (transitional waters) and others were provisionally classified (coastal waters). Overall in many cases the precision of the classification is low or moderate also for rivers and dams. For the water bodies in which status is undetermined, often no objectives were established. This is mirrored in the tables of section 6 of the present report.

Although WISE reports a derogation under Article 4(5), the RBMPs do not include any such derogation[32]. Also there are discrepancies between the exemptions due to Article 4(4) between data reported on WISE and data in the RBMPs. One example is PTRH4 which has two RBMPs, one for Ribeiras do Oeste and another for Vouga/Mondego/Lis. According to the RBMP, Ribeiras do Oeste applies Article 4(4) to 47 water bodies and Vouga/Mondego/Lis applies that Article to 41 water bodies; however only 68 are reported for the RBD as a whole in WISE.

The justifications for the use of exemptions under Article 4(4) are technical feasibility and natural conditions. In PTRH10 there is also justification based on disproportionate costs[33].

Measures are technically infeasible if a problem takes longer to fix than there is time available, if no technical solution is available, or if there is no information on the cause of the problem. The use of the “Article 4(4) - Natural conditions” refers to some water bodies where the ecological status is failing to achieve "good" due to biological quality elements. In some cases measures are foreseen, but it is uncertain that good status can be achieved by 2015 since the biological communities need an unknown period of time to recover to thresholds compatible with "good" status. In these cases the response from the biological communities to the implemented measures is not immediate.

[32] This might be an error as even in WISE Article 4(5) is referred to only once, while if it existed, it should be mentioned in several entries. There are however derogations related to Article 4(7).

[33] Madeira reports 39 derogations in WISE, all related to natural conditions. In the PTRH10 RBMP, the number of derogations in water bodies is 40, with the justification provided in Table 11.2.2.

RBD	Article 4(4)					Article 4(5)				
	R	L	T	C	GW	R	L	T	C	GW
PTRH1	12	1	0	0	0	0	0	0	0	0
PTRH2	33	1	0	0	0	0	0	0	0	0
PTRH3	87	13	0	0	0	0	0	0	0	0
PTRH4	57	3	8	0	4	1*	0	0	0	0
PTRH5	66	2	0	0	0	0	0	0	0	0
PTRH6	108	4	0	0	0	0	0	0	0	0
PTRH7	121	8	0	0	0	0	0	0	0	0
PTRH8	23	0	0	0	1	0	0	0	0	0
PTRH9	7	12	2	0	4	0	0	0	0	0
PTRH10	39									
Total	*514*	*44*	*10*	*0*	9	*1**	*0*	*0*	*0*	*0*

Table 10.2.1: Exemptions for Article 4(4) and 4(5)
*value believed to be an error when compared to the RBMP.
Source: WISE (SWB_STATUS_EXEMPTIONS and GWB_STATUS_EXEMPTIONS), and information provided by the National Water Authority after assessment of the RBMPs.

RBD	Global[34]					
	Technical feasibility		Disproportionate costs		Natural conditions	
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)
PTRH1					13	
PTRH2					34	
PTRH3					100	
PTRH4	66	1			2	
PTRH5	68				0	
PTRH6	25				111	
PTRH7	21				124	
PTRH8	1				23	
PTRH9	23				2	
PTRH10	1				39	
Total	222	*1*	*0*	*0*	448	*0*

Table 10.2.2: Number of Article 4(4) and 4(5) exemptions
Source: WISE database and RBMPs for PTRH8 and PTRH9

[34] Exemptions are combined for ecological and chemical status

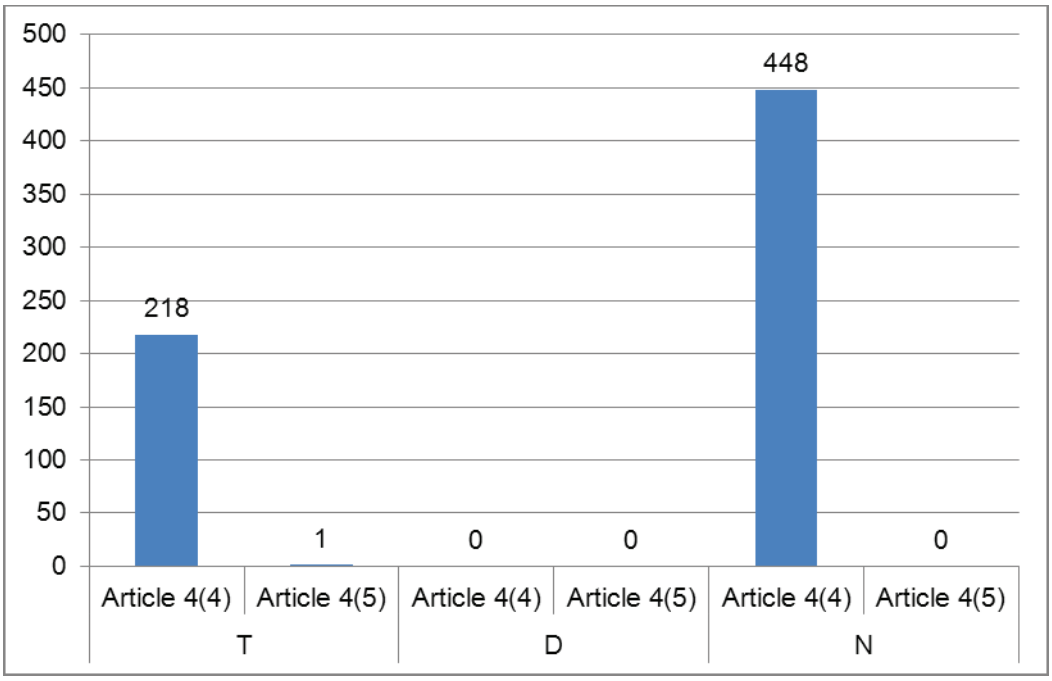

Figure 10.2.1: Numbers of Article 4(4) and 4(5) exemptions
T = Technical feasibility
D = Disproportionate costs
N = Natural conditions
Source: WISE database

The data in Table 10.2.2 and Figure 10.2.1 (above) have been extracted from WISE, while the data in Table 10.2.3 (below) was provided as additional information by the national water authority. There are discrepancies between the two sources of data.

RBD	Global						
	Technical feasibility		Disproportionate costs		Natural conditions		New modification
	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)	Article 4(4)	Article 4(5)[35]	Article 4(7)
PTRH1	0	0	0	0	13	0	0
PTRH2	0	0	0	0	34	0	0
PTRH3	0	0	0	0	100	0	11
PTRH4	66	1	0	0	3	0	4
PTRH5	68	0	0	0	0	0	2
PTRH6	23	0	0	0	111	0	0
PTRH7	21	0	0	0	124	0	0
PTRH8	0	0	0	0	23	0	1
PTRH9	23	0	0	0	2	0	0
Total	**201**	**1**	**0**	**0**	**410**	**0**	**18**

Table 10.2.3: Number of Article 4(4) and 4(5) exemptions
Source: Additional information provided by the PT authorities

[35] The values of this table are different from WISE. There was a mistake in the information initially provided. Article 4(5) was not used.

As a result of the communication process between the European Commission and national authorities, guidance has been issued stating that "Natural conditions should not be invoked when measures are not being implemented due to other reasons (e.g. lack of funds)". This might explain the discrepancies between tables 10.2.2 and 10.2.3.

10.3. Exemptions according to Article 4(6)

Article 4(6) has not been applied.

10.4. Exemptions according to Article 4(7)

According to the RBMPs, in mainland Portugal there was a significant number of water bodies in which Article 4(7) was applied due to planned construction of dams. In PTRH3 there are 30 river water bodies with derogations due to future hydropower dams, one in construction and the others with favorable EIAs. PTRH4 applied Article 4(7) in four water bodies; PTRH5 also applied this article in four water bodies. Data reported to WISE is different from what is reported in the RBMPs.

Some other RBMPs state that derogations are foreseen. In PTRH7 there is a plan for water transfer to PTRH6, which will also probably lead to derogations.

As the common cause of the application of Article 4(7) is dams of medium to large dimensions, it is likely there will be reclassification of water bodies in the next planning exercise. This is particularly the case of PTRH7 where the Alqueva reservoir was considered as one water body because there was insufficient data available to divide it into several water bodies, but this will be changed for the second round of RBMPs.

As stated above, the RBMPs do not present any analysis on how there could be mitigation measures so that the impacts of the foreseen dams are reduced (namely in water bodies downstream of the dams), nor do they assess alternatives to the construction of dams. It is stated that many foreseen dams have approved Environmental Impact Assessments.

10.5. Exemptions to Groundwater Directive

No information was supplied on the use of exemptions to the Groundwater Directive in the RBDs of Portugal.

11. PROGRAMMES OF MEASURES

According to Annex VII of the WFD, the RBMPs should contain a summary of the programmes of measures (PoMs), including the ways in which Member States expect to achieve the objectives of Article 4 of the WFD. The programmes should have been established by 2009 and were required to become operational by December 2012.

The assessment in this section is based on the PoMs as summarised by the Member State in its RBMPs, and the compliance of this with the requirements of Article 11 and Annex VII of the WFD only. The assessment focuses in particular on key sets of measures.

Member States reported to the Commission by December 2012 on the implementation of their PoMs, including on the progress in the implementation of basic measures as required by Article 11(3). The report submitted by Portugal had limited information.

11.1. Programme of measures – general

Measures focus mostly on identified pressures: point and diffuse source pollution, water availability, etc. The RBMPs include a cost-efficiency analysis, but the results presented are very broad. It is stated in some RBMPs that the prioritisation is not necessarily done on cost-effectiveness alone, but also on benefit or urgent need, but there is no clear indication on the criteria used for prioritisation. There is no clear evidence, particularly on the basic measures, that they will be applied with priority or more intensively on problematic water bodies.

A significant part of the measures relates to increasing knowledge on the water bodies, strengthening and expanding the monitoring network and improving the inventory of pressures. It is expected that once this is achieved, there can be progress on the assessment methods, on the establishment of reference conditions, on planning for water body objectives, and on monitoring the impact of the measures.

Measures are presented by type (basic, supplementary, complementary and additional); by operational programme (national programmes and plans); by theme (water quantity, water quality, monitoring, research, etc.); and by responsible entity. Information on the geographical scope of the measures is provided at a national, sub-basin or water body level, depending on the nature of the measure (contained in a national programme, or specific to the RBD).

It should also be noted that several RBMPs include as part of the PoM measures from existing plans and programmes, and investments in measures implemented since 2009. The entities responsible are public and private (mainly large companies dealing with water supply and sanitation or with hydropower generation). Agricultural measures will also have shared responsibility, being led by national authorities, but implemented by farmers and enterprises.

For the measures specifically created for the RBMPs, funds are often not secured and the RBMPs cite as possible sources of funding: structural, cohesion and rural development funds; other EU funds; state budget; and private investments. The economic and social crisis that has affected Portugal caused a reduction of public spending, and the collapse of many industries and agricultural businesses, and the situation also has an impact on the mobilisation of funds for the implementation of measures. However, according to the Portuguese Water Authority, the merging of water resource management and other environmental matters into APA allowed for an increase of the percentage of the organisation's overall budget that is dedicated to water resource management. This reflects water management's relative priority in terms of public environmental policy against the general backdrop of dwindling public resources both in human and financial terms.

There has not been any coordination between Portugal and Spain on the PoMs.

The National Water Authority recognises that the analysis of possible effectiveness of measures is a challenge. Nonetheless, since October 2012 a licensing system is in use that will greatly improve the knowledge on pressures and that checks in real time how many uses are present in a water body. According to DL 226-A/2007 water abstraction and wastewater discharges are subject to a permit process and other smaller scale uses need to be previously communicated. The National Water Authority states that a verification process is currently in preparation to evaluate if the identified measures are sufficient to address the identified pressures, particularly measures related to agricultural pressures and those related to chemical pressures (based on inventories of chemical pollution sources), and to clarify links between hydromorphological measures and specific hydromorphological pressures. This will be achieved through monitoring (including self-monitoring) and inspection. There is ongoing

communication and information sharing with the agriculture authorities and with the water and waste services regulator as well as with River Basin District Councils.

11.2. Measures related to agriculture

Agriculture is assessed as leading to pressures on water quality including eutrophication, water quantity, and hydromorphological changes. In mainland Portugal 386 surface water bodies and 11 groundwater bodies fail to meet good status due to pressures from agriculture (21% and 8% respectively).

Agricultural measures are often included in the measures aimed at reducing diffuse source pollution, and particularly in the RBMPs of southern mainland Portugal, there are also agricultural measures to address quantitative pressures. Measures addressing livestock are often included in the reduction of point source pollution measures. Measures are also included on communication and governance, and consist of awareness raising and training regarding best practices on agriculture (reduced use of fertilisers and pesticides, efficient water use, soil protection, etc.)

There have been consultative meetings and thematic meetings on agriculture during the preparation of the RBMPs. However, final measures have been revised in 2012, while finalising the RBMPs, with a view to reduce investments, and it is not possible to ascertain what key changes might have occurred.

A combination of technical measures, economic instruments and non-technical measures has been selected to address the pressures from agriculture in all the RBMPs of Portugal (See table 11.2.1).

Measures are generally designed for the RBD or sub-RBD. In the case of specific remediation projects, the scale can go to site or area. Information is provided on the timing for the implementation of the measures, or at least the period of implementation, e.g. until 2015.

The cost of measures has been broadly identified in some RBDs (e.g. PTRH7), but in others there is more detail (e.g. PTRH5). When only broad information is provided, the cost is identified for groups of measures, not for each single measure.

There is no clear financial commitment to implement several measures, gaps exist in the basic measures necessary to address agricultural pressures (pollution, abstraction, morphology) and Rural Development Programmes are considered the main instrument to support WFD measures in agriculture.

It is unclear to what extent the measures proposed for agriculture will be sufficient to address the pressures arising from this sector. Moreover, adequate resources to provide advice, control and enforce legislation and measures are not evident.

An ecologically-based flow regime is not defined for many water bodies and there are no national guidelines. As stated above this is being done at the time of renewing the concession contracts. For the time being, not all dams are proven to be compatible with the WFD objectives.

Measures	PTRH1	PTRH2	PTRH3	PTRH4	PTRH5	PTRH6	PTRH7	PTRH8	PTRH9	PTRH10
Technical measures										
Reduction/modification of fertiliser application						✓	✓	✓	✓	
Reduction/modification of pesticide application						✓	✓	✓	✓	
Change to low-input farming										
Hydromorphological measures		✓	✓	✓		✓	✓	✓		
Measures against soil erosion						✓	✓	✓		
Multi-objective measures		✓	✓	✓						
Water saving measures	✓	✓	✓	✓		✓	✓	✓	✓	
Economic instruments										
Compensation for land cover						✓	✓	✓		
Co-operative agreements										
Water pricing		✓	✓	✓						
Nutrient trading										
Fertiliser taxation			✓							
Non-technical measures										
Implementation and enforcement of existing EU legislation		✓	✓	✓		✓	✓	✓	✓	
Controls		✓	✓			✓	✓	✓		
Institutional changes					✓					
Codes of agricultural practice	✓			✓		✓	✓	✓		
Advice and training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Awareness raising	✓	✓	✓	✓	✓	✓	✓	✓		✓
Measures to increase knowledge for improved decision-making					✓	✓	✓	✓		
Certification schemes										
Zoning										
Specific action plans/programmes										
Land use planning										

Measures	PTRH1	PTRH2	PTRH3	PTRH4	PTRH5	PTRH6	PTRH7	PTRH8	PTRH9	PTRH10
Technical standards										
Specific projects related to agriculture										
Environmental permitting and licensing										

Table 11.2.1: Types of WFD measures addressing agricultural pressures, as described in the PoM
Source: RBMPs

11.3. Measures related to hydromorphology

The hydromorphology measures contained in the RBMPs are often broad in scope, such as habitat restoration or restoration of bank structure. These measures aim to realise the potential of natural water retention. Another measure that is contained in almost all RBMPs is setting minimum ecological flow requirements. In fact, although it has been a requirement of Portuguese legislation since 1989 namely in small dams, and since 2007 for all hydraulic structures, there is still limited knowledge of the different water bodies, particularly regarding dependent ecosystems and habitats.

Dredging has been a problem particularly in northern mainland Portugal, and management plans for sand and other inert extraction from public water domains are envisaged.

For some RBDs (particularly in mainland Portugal) the measures are those indicated in the environmental impact statements, particularly for large structures: this is the case for measures setting up fish ladders and bypass channels.

For many RBMPs the measures related to hydromorphological pressures are limited. This might be linked with the fact that there is limited knowledge of the impact of such pressures.

Measures	PTRH1	PTRH2	PTRH3	PTRH4	PTRH5	PTRH6	PTRH7	PTRH8	PTRH9	PTRH10
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 11.3.1: Types of WFD measures addressing hydromorphological pressures, as described in the PoM
Source: RBMPs

11.4. Measures related to groundwater

It is noted that both basic and supplementary measures are implemented in order to tackle groundwater over-exploitation, and to prevent inputs of any harmful substances which would affect groundwater quality in all RBMPs. Some measures may not be specific for groundwater, but nonetheless have an impact on achieving the objectives.

The basic measures implemented to address groundwater over-exploitation include controls on over abstraction and artificial recharge, and limits to licenses for groundwater use in the water bodies in which the annual volume of water abstracted is greater than 70% of the annual recharge. In those cases the permits are limited to water for human consumption. Other basic measures include:

- Promotion of water reuse, e.g. use of treated water in irrigation, reuse of industrial plants' treated water, and use of treated water in tourism (golf courses);
- Control the limit on the groundwater abstracted in function of the culture and the climate;
- Limit the use of potable water for uses other than human consumption in urban and peri-urban areas;
- Rehabilitation of community irrigation perimeters;
- Extension of services to promote efficient use;
- Promotion of more efficient technologies on water distribution;
- Economic incentives to efficient use; and
- The revision of the scarcity coefficient for the calculation of the Water Resources Tax.

Supplementary measures include evaluation of the piezometric tendencies, and prevention and control of abstraction in water bodies known to be vulnerable.

In PTRH9, the prevention of saline intrusion into groundwater bodies in the RBD is related to over-exploitation. A study is ongoing with participation of the University of the Azores, in order to characterise groundwater salinisation in Pico and Graciosa islands where some groundwater bodies are in poor chemical status. The objectives of this project are to: (1) characterise groundwater composition in the basal aquifer and the effects of mixture with seawater through major, minor and trace elements, as well as isotopic tools, (2) develop a hydrogeochemical model, (3) proceed to seawater intrusion risk mapping, and (4) define operational monitoring networks. Results are to be complemented by an overall analysis of this issue in the archipelago. The results will be the basis of an overall analysis of sustainable pumping rates in order to avoid bad practices and, if needed, to locate new wells to be drilled when necessary.

The basic measures implemented to prevent and limit inputs of pollution to groundwater include (from point source or diffuse source pollution):

- Strengthen requirements and monitoring/inspection regarding pig farming wastewater

treatment;

- Control of some closed and sealed landfill sites;
- Control of end-of-life vehicles deposit sites;
- Control of abandoned mines;
- Incentive to replace septic tanks with more efficient systems, depending on the type of wastewater and the vulnerability of the surrounding environment to infiltration (diffuse pollution);
- Implementation of measures in areas vulnerable to nitrate pollution (diffuse); and
- Technical advice to farmers on best practices of irrigation and fertilisation (diffuse).

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

11.5. Measures related to chemical pollution

The main contributors to chemical pollution reported in the RBMPs are households (via WWTP), industry, livestock, fuel stations (all mainly impacting on surface water), mining and waste deposits and uncontrolled landfill sites (mainly impacting on groundwater). Diffuse pollution originates mostly in agriculture, livestock, golf courses, aquaculture and ports.

Several RBMPs established an inventory of sources of pollution, taking into account national conditions and circumstances. Some of the inventories include diffuse pollution. The most complete ones have priority substances and certain other pollutants, non-priority specific pollutants or main pollutants identified at the RBD-level and nutrients. However, in some RBDs only nutrients were considered.

Measures include:

- Identification of problems in WWTP and intensive pig farming;
- Establish cooperation protocols with timetables and targets to achieve in order to solve problems;
- Implementation of actions aiming at compliance with the law;
- Improvement of urban wastewater treatment plants, improvement of sewerage, improvement of the treatment systems, works for the control of non-authorised discharges;
- Incentives to the implementation of measures to reuse the waste (WWTP sludge, liquid discharges);
- Improvement of WWTP of wine producing plants;

- Revision and control of the effluent discharge conditions of industry;
- Implementation of auto-control measures for WWTP;
- Licensing of WWTP discharges;
- Establishment of systems of alert for cases in which the flow arriving to the WWTP is higher than its capacity, in order to minimise discharges of untreated or partially treated wastewater;
- Definition of good practice codes and technical guidelines for farmers;
- Code of good practice for the agro-livestock industry and monitoring of its implementation;
- De-contamination of aquifers and prohibition of direct discharge into aquifers;
- Strengthening inspections of the activities prone to affect water bodies;
- Prevention and minimisation of the effects of accidental pollution;
- Optimisation of the control of emissions;
- Monitoring of pressures of abandoned mining sites;
- Strengthening the control and improving the WWTP of intensive pig farming;
- Development of pilot projects for the application of WWTP sludge and organic waste in farming and golf courses;
- Information to farmers on adequate use of fertilisers and watering to increase production;
- Compensation to farmers for using agri-environment practices; and,
- Improvement of the inventory of pressures.

Even if there might be some measures related to specific substances, the RBMPs do not make such links. However, the National Water Authority reports the substances identified as exceeding their EQS in Table 11.5.1.

RBD	SWB	SWB_NAME	Category*	Chemical Status	Chemical Exceedances
PTRH2	PTCOST2	CWB-I-1B	CW	3	3.10 Nonylphenol
PTRH3	PT03DOU0367	Rio Tinto	RW	3	1.4 Nickel
PTRH4	PTCOST4	CWB-II-1B	CW	3	3.10 Nonylphenol
PTRH4	PTCOST6	CWB-II-2	CW	3	3.10 Nonylphenol
PTRH4	PT04LIS0704	Lis	TW	3	3.10 Nonylphenol
PTRH4	PT04VOU0536	Ria Aveiro-WB4	TW	3	3.10 Nonylphenol
PTRH4	PT04VOU0547	Ria Aveiro-WB2	TW	3	3.10 Nonylphenol
PTRH5	PT05TEJ0939	Albufeira Nisa - Povoa	LW	3	4.17 Tributyltin compounds
PTRH6	PT06SAD1195	Ribeira da Marateca	RW	3	4.17 Tributyltin compounds
PTRH6	PT06SAD1229	Rio Xarrama	RW	3	4.17 Tributyltin compounds
PTRH8	PT08RDA1706	Ribeira da Quarteira	RW	3	1.2 Lead

Table 11.5.1: Substances identified as exceeding their EQS
Source: Additional information provided by the Portuguese authorities

These occurrences are being addressed by the implementation of the following measures:

- Environmental remediation of abandoned metallurgical and chemical industry mining constituting historic pollution hotspots;
- Strengthening licensing requirements:
    - Revision of water use permits for the activities responsible for chemical pollution;
    - Revision of discharge limits for industrial units connected to municipal sewers;
    - Issuance of unfavourable decisions for the application of sludge to agricultural land affecting water bodies; and
    - Requiring rehabilitation and construction of industrial wastewater treatment plants.
- Improving Inspection through:
    - Increased controls;
    - Evaluation of the implementation status of the Best Available Techniques provided in the context of Environmental Licenses (IPPC); and
    - Increased control of port activities, namely effluents produced by activities such as maintenance and repair of boats.

Besides the above, Ordinance n. º 50/2005, of 20 January 2005 approved reduction programmes and controls for the following hazardous substances in the aquatic environment:

anthracene, 2,4-D (2,4-dichlorophenoxyacetic acid), MCPA (2-methyl-4-chlorophenoxyacetic), simazine, tributyltin oxide, 2,4,6-trichlorophenol, ammonia, phosphorus compounds, nitrites, 1,2-dichloropropane, Linuron, Naphthalene, 2,4,5-T (2,4,5-trichlorophenoxyacetic acid), atrazine, cyanides.

11.6. Measures related to Article 9 (water pricing policies)

Cost recovery levels were calculated for urban water supply systems (AA) and drainage and wastewater treatment (DTAR) and for water supply (AA) in Agriculture. For the urban water system, total cost recovery has been calculated: AA; DTAR; DTAR + AA (combination of the two[36]). Each of these three items has been disaggregated into two groups: (i) domestic sector; (ii) other sectors. The latter (other sectors) includes manufacturing / industry and all other sectors served in the context of urban systems (e.g., commercial, tourism, services, institutions, agriculture and livestock).

Regarding self-service water supply and sanitation regimes, it has been assumed that this includes fisheries, aquaculture, golf and extraction of public water resources. For the industry under self-service, a full cost recovery of the investments (assuming that there are no subsidies) was assumed. Total costs were separated from non-subsidised costs in the case of hydropower. For agriculture, cost recovery data focuses on the special public irrigation perimeters whose name can be translated as State Hydro Agriculture Potentials (AHCE).

Cost recovery is essentially based on financial costs (capital costs, depreciation, operational & maintenance costs, replacement costs). At the time of developing the RBMPs, Portugal did not have enough reliable information to estimate environmental and resource costs. Although a water resources tax integrated to some extent environmental and resource costs, the tax was quite new at the time of finalisation of the RBMPs and its implementation analysis was preliminary.

The Water Resources Tax (*Taxa de Recursos Hídricos* – WRT) implements the basic idea that the user of water resources must compensate the cost generated to the community and/or restore the benefit the community grants (polluter pays and user pays principles). The WRT is due on a yearly basis, and the debtor entity is the user of water resources. The WRT compensates: (1) the advantage resulting from the private use of public water, (2) the environmental costs related to the activities likely to cause a significant impact on water resources, and (3) the administrative costs regarding planning, management, supervision and water quality and quantity assurance.

The five components of the WRT correspond to: (1) the different contribution that each economic sector should be required to provide for sustainable management of water resources, (2) the different shortage of water resources in different parts of the territory; (3) concerns among user groups in terms of social and economic distress. The five components are as follows:

A - The abstraction of public water for private uses. It is calculated by multiplying the base value of the respective use by the volume of water drawn, diverted or used expressed in cubic meters, and by the applicable shortage coefficient. The coefficient of shortage is applied differently by River Basin Region (1 for PTRH1, PTRH2 and PTRH3; 1.1 for PTRH4 and PTRH5 and 1.2 PTRH6, PTRH7 and PTRH8). This component is applicable

[36] It often occurs that cost recovery from AA is larger than 100% while DTAR is not fully recovered.

to the following sectors: agriculture, fish farming, aquaculture, mariculture, hydraulic energy production, thermal energy production, public water supply systems and other cases;

E - The direct or indirect discharge of effluents on water resources which may cause significant impact. It is calculated by multiplying the base value of the effluent to the quantity of toxicity or pollution loads contained in the discharge, expressed in kilograms for oxidisable matter, total nitrogen and total phosphorus;

I - The aggregate extraction of public water resources, calculated by multiplying the base value by the volume of aggregate extracted, expressed in cubic meters;

O - The land occupation of the public water resources and/or the occupation and creation of water expanses, calculated by multiplying the base value of the respective use by the occupied area, expressed in square meters. This component is applicable to the following sectors / situations: electric power production, fish farming equipment located in the sea, creation of water expanses (e.g. a dam); agriculture, fish farming, aquaculture, mariculture, infrastructure and support equipment to traditional fisheries, sanitation, public water supply and electricity generation; industry; residential/dwellings; temporary beach constructions and casual occupations of commercial, tourist or recreational nature for profit purposes; permanent beach constructions and lasting occupations of commercial, tourist or recreational nature for profit purposes and other cases;

U - The private use of water, whatever its nature or statutory regime, subject to planning and public management, which may cause significant impact. It is calculated by multiplying the base value of the respective use by the volume of water drawn, diverted or used, expressed in cubic meters. This component is applicable to the following sectors: agriculture, fish farming, aquaculture, mariculture, hydraulic energy production, thermal energy production, public water supply systems and other cases.

The tax rate of the WRT is determined on the basis of self-monitoring and values estimated by users (effective use) or, failing that, by the maximum values included in the permits issued by APA as the water authority as all water resource uses must be subject to a permit. Indirect calculation methods, including users' indicators by activity sector and similar production methods are also used in cases lacking evidence of use.

The WRT collects funds for public environmental purposes[37], and has a clear intention of guiding private users´ behaviour: (1) towards more efficient water use and (2) to favour water use in more worthy economic activities. The WRT covers costs related to public urban water services (using tariffs); hydro-agricultural irrigation collective supply (HAICS); environmental costs and resource costs (by river basin region and by sector); the abstraction of public water for private uses; the direct or indirect discharge of effluents to water resources; the aggregate extraction of public water resources; the land occupation of the public water resources and / or water expanses.

Diffuse pollution from agriculture is very difficult to measure in physical terms and has not been included in the RBMP. In fact, there are no direct economic mechanisms to evaluate

[37] According to Water Authority, the WRT was based on the estimated costs supported by APA in order to manage water resources. These costs were estimated at approximately 40 M€/year, approximately half of which are reinvested in water resource management in Portugal by public and private entities through the Fund for the Protection of Water Resources (FPRH).

diffuse pollution but there are some indirect measures (such as taxation and other economic instruments) related to a negative incentive that can be applied to substances that pollute water and soil. The costs of pollution reduction include the costs of lab analysis (from sampling in vulnerable zones designated under the Nitrates Directive); the loss of income because of the adoption of antipollution measures that implies production reduction, can be captured by the Water Resources Tax "O" component.

Incentive water pricing and social considerations have been reflected in block tariffs combining the increasing price per cubic metre of water with increasing water consumption.

In Portugal, municipalities or companies provide water to the end user. These service providers establish the price of water. Recently the water and waste regulator issued guidelines for an assessment trying to harmonise the water price, in which variations can occur for less favoured people or regions.

Cross-subsidisation exists but is not explicit in the NRC estimates. In the case of investment subsidies, only the net depreciation allowance is incorporated in the tariff. However, regarding operational and maintenance costs, cross-subsidisation was not considered. In fact, operating subsidies are considered in total annual revenues. Although Portugal considers that cross-subsidisation in the supply of water and waste services should be avoided, it is still present in several operators when the income level of service is insufficient to cover the cost level. According to the National Water Authority, in the next generation of RBMPs, Portugal will seek to demonstrate that cross-subsidies are explicit in the cost recovery calculation.

As there were no derogations, Article 9(4) is not applied.

In Portugal all users supplied by public systems pay for water services individually. Water bills make explicit the type of services paid as well as the metering and volume of water consumed. Water services providers charge a service access fee, a progressive rate on water consumption (which means that higher tariffs are charged in the higher consumption blocks) and a wastewater rate. In the case of industry, pricing is derived from self-measurement of volumes or the maximum volume awarded in a water abstraction permit. In the case of agriculture, water consumption is measured through self-monitoring, by the volume awarded by the water abstraction permit, or through volumes provided by farmers' associations. The measures and incentives to promote efficient water use focus on information, education and teaching of good practices to all citizens and sectors, as well as institutional public capacity building in efficient water use. The National Plan for the Efficient Use of Water[38] (PNUEA) 2012-2020 is focused on reducing water losses and optimising water use. The focuses of the PNUEA are urban, agricultural and industrial sectors and the Plan aims at minimising the impacts of climate change and water stress and at the same time promote the conservation and protection of natural resources. In addition the PNUEA highlights the importance of reducing direct or indirect discharge of effluents on water resources which may cause significant impact on the environment.

The measures foreseen on efficient tariffs and incentives for efficient water use were tariff analysis, collection and processing information for all operators, regulation of service quality and regulation of water quality, issuing of recommendations, and tariff regulation. The

[38] http://www.apambiente.pt/index.php?ref=16&subref=7&sub2ref=9&sub3ref=860

publication of information on service quality benchmarking induces operators to be more efficient in the various stages of the value chain of service. This has been done for 2011, 2012 and 2013.

11.7. Additional measures in protected areas

Measures in protected areas are essentially aiming at increasing knowledge of the pressures, strengthening supervision and monitoring of the activities that could affect water bodies, improving hydromorphological conditions of surface water bodies; and conserving and rehabilitating river systems, coastal areas, estuaries and wetlands.

The specific measures foreseen in the PoMs regarding protected areas are the following:

Surface water and groundwater abstraction areas

- Legal definition of the protection perimeters for drinking water abstraction zones, for both surface and groundwater, and the use of restrictions for these areas.
- Priority use in licensing procedures and management of water resources.

Bathing waters

- Development of bathing water profiles and implementation of a review process according to the periodicity established in Decree-Law no. 135/2009, of 3 June 2009.
- Making operational an alert system against accidental pollution incidents, including bathing water contamination.

Fresh waters to support fish life

- Measures to improve ecological status.

Nutrient-sensitive areas, including vulnerable zones and sensitive areas

- Update of the vulnerable zones and sensitive areas.
- Implementation of action programmes.
- Implementation of auto control programmes and reinforcement of the inspection of wastewater discharges from wastewater treatment plants, with priority to the wastewater treatment plants which serve a population equal to or greater than 10,000 population equivalent, particularly the ones which discharge into sensitive areas.

Protected areas (habitats and birds)

- There are several measures coming from the Protected Areas Management Plans which aim to fulfil the guidelines of the Habitats Directive and the Biodiversity and Conservation of Nature National Strategy (e.g. Recovery of the peat bog of Bertiandos and São Pedro de Arcos Protected Landscape).
- Development of a study to define the hydrologic regimes in lagoons, hydrographic networks and peat bogs.

- Development of a management plan regarding the natural habitats of marsh, rush bed, cane thicket, riparian gallery, humid slacks, etc.).

As seen above, Portugal has not established shellfish protected areas. However, areas for shellfish production are classified according to different legislation (food security/safety). Protection of classified sensitive areas for shellfish is ensured under the Urban Wastewater Treatment Directive (91/271/EEC), criteria c) areas where further treatment than that prescribed in Article 4 of this Directive is necessary to fulfil Council Directives. This means that UWWTP discharging into sensitive areas must comply with additional parameters under national licensing procedures.

It is clearly stated in the RBMPs that zones at risk in protected areas will be given priority in the implementation of the programme of measures.

12. CLIMATE CHANGE ADAPTATION, WATER SCARCITY AND DROUGHTS, FLOOD RISK MANAGEMENT AND OTHER EMERGING AND LINKED ISSUES AS PART OF THE RBMP

12.1. Water Scarcity and Droughts

Water scarcity is relevant in PTRH5 and in all RBDs to the south of it. Droughts are also relevant in PTRH7 and PTRH8. Episodes of water scarcity occur mainly due to lack of storage capacity in the south where rain is more concentrated in fewer days during the year, and the "normal" year corresponds closely to a "dry" year.

Usually, even in the driest years, there is no water deficit if the whole year is considered. However, in the Algarve (PTRH8) where the problem is more significant, a proportion of the used water comes from inter-basin water transfer. If there was no water regulation, water deficit could happen.

Regarding droughts, in PTRH7 about 7000 inhabitants (3% of the population of the RBD) live in areas potentially affected by droughts, about 4% of the total urban areas are located in zones with drought risk, and about 11% of the areas under construction in the RBD are in zones with higher risk of occurrence of droughts.

In PTRH8 water scarcity and drought is compensated by exploitation of one groundwater body in which the level of abstraction is 144% of its long term recharging capacity. Water use for tourism, particularly irrigation of golf courses, is an increasing pressure. This already accounts for 5% of the surface water consumed in the RBD.

Future water demand and availability or trend scenarios were done for all the RBMPs. The analysis describes scenarios for the different water uses: agriculture, households (including trade and services), industry, tourism, including self-service. The scenarios include pressures on surface water and on ground water. According to the RBMPs, there is no water shortage foreseen even in the worst case scenario regarding water availability (PTRH8). However, water regulation needs to be foreseen in order to avoid water shortage or the need to transfer water from PTRH7.

There are concrete measures for: protection of the maximum infiltration zones; control of over-exploitation of surface water and groundwater; reformulation of the water quantity monitoring network; studies, research and pilot projects to solve water scarcity problems and improve the response to drought; reformulation of water tariffs and water use permits.

There are also measures related to aquifer recharge, including: assessment of the best potential sites for aquifer recharge; establishing a monitoring protocol for artificial aquifer recharge; analysing the possibility on karstic areas (namely in flooding areas) to inject water into the aquifers; pilot studies for a potential increase of groundwater reserves through artificial aquifer recharge.

In PTRH9 water scarcity and droughts do not constitute a significant issue. The worse cases are five cases of severe drought on Pico Island and three cases of extreme droughts in S. Miguel Island between 1980-2010, as measured by the Standardised Precipitation Index which measures standard deviation in relation to historic average.

PTRH10 is composed of the inhabited islands of Madeira and Porto Santo. While in the island of Madeira there are sufficient groundwater resources, and groundwater enters into the surface water system in a natural way, in Porto Santo there is water scarcity. Most of the fresh water in Porto Santo derives from desalination and water reuse.

12.2. Flood Risk Management

Floods are mentioned in a number of places in the RBMPs. Flood protection is listed as a reason for designation of HMWBs, and increased flooding is listed as a risk under climate change scenarios. However, flooding is not listed as a pressure related to hydromorphological measures.

12.3. Adaptation to Climate Change

There is a national climate change strategy and national plan of action. Water resources are one of the priorities. There have been two studies SIAM and SIAM II (Climate Change in Portugal: Scenarios, Impacts and Adaptation Measures) and studies by the former National Water Institute (INAG) specific for PTRH7. In addition, there is the Integrated Coastal Zone Management Strategy which includes climate change measures.

The RBMPs address climate change, and refer to the above mentioned documents. The climate change section is part of the ‘Characterisation’ volume. The issues discussed include: impacts on water status due to climate change (water quality and biodiversity in aquatic systems); uncertainties related to climate change (e.g. with respect to status assessment or effects of measures); impacts on coastal zones; water availability and water demand; drought risks; water scarcity and flood risks.

The PoMs identify the measures which are directly or indirectly considered as adaptation to climate change. However, the plans do not indicate whether a 'climate check' of the PoMs has been carried out. Examples of measures related to adaptation include: measures to control the demand and security of water distribution; measures aiming at the good status of the water bodies (control of point source and diffuse pollution, law enforcement, recharge of aquifers, protection of surface water and rehabilitation of aquifers); increasing knowledge and monitoring; measures of information, education and communication; measures of increasing cooperation with Spain; and (for the coastal zone), the implementation of the Integrated Coastal Zone Management Strategy, which includes climate change.

The National Water Authority states that in the next round of RBMPs there will be a full integration of climate change in assessing the evolution of the status of water bodies, the risks of floods and droughts and the definition of the PoMs’ protection and enhancement of water

resources. Portugal will include information on adaptation to climate change pursuant to the 2010 National Strategy for Adaptation to Climate Change (Resolution of the Council of Ministers Nº 24/2010), which includes a set of four strategic objectives and 13 specific objectives, on which measures will be derived.

13. RECOMMENDATIONS

Portugal should:

- Make basic measures should be legally binding and clearly identified in the 2nd RBMPs to allow for a clear assessment of the need for additional measures, e.g. on agriculture or wastewater treatment.
- Promote good coordination between public administration and other stakeholders, in particular involving the existing River Basin Councils, to improve the planning and implementation of PoMs and to monitor their effectiveness.
- Develop the RBMPs for international RBDs in close cooperation with Spain, in particular for what concerns identification of pressures and impacts, design of monitoring networks, methodologies used to assess status and development of PoMs.
- Complete the development of methods for the status assessment of water bodies and determination of reference conditions and apply them through the implementation of robust monitoring programmes. An adequate WFD-compliant assessment and monitoring framework is a necessary pre-requisite to design effective PoMs and ultimately to achieve the WFD objectives.
- Include in the 2nd RBMPs estimations of when WFD objectives will be achieved.
- Include in the RBMPs the justification for the exemptions applied. Portugal should in particular improve the justifications regarding the disproportionate costs and the technical feasibility, as well as the cost-efficiency analysis.
- Ensure that the RBMPs clearly identify the gap to good status, and that the PoMs are designed and implemented to close that gap. Exemptions should be adequately justified at water body level (in particular, natural conditions should not be invoked when measures are not being implemented due to other reasons, such as lack of funding).
- Ensure that diffuse sources of pollution in the agricultural sector are controlled, including mandatory requirements for farmers where necessary.
- Deal with phosphate pollution and not just nitrates. Portugal should ensure that measures taken will be sufficient to address agriculture nutrient pressures to the level needed to secure nutrient conditions consistent with good status.
- Review all existing permits for abstractions and flow regulations, including dams and, where necessary, amend them to ensure that they are compatible with the WFD objectives.
- Improve the designation of Heavily Modified Water Bodies and avoid the automatic designation of water bodies downstream big dams. A methodology to establish Good Ecological Potential should be developed. Its application should be documented in the RBMPs.

- New hydro-morphological modifications, such as new hydropower plants, should comply with the requirements for exemptions of Article 4(7) and should be adequately justified, in particular for the assessment of alternative options and include all necessary mitigation measures.
- Consider and prioritise the use of green infrastructure and/or natural water retention measures that provide a range of environmental (improvements in water quality, increase water infiltration and thus aquifer recharge, flood protection, habitat conservation etc.), social and economic benefits which can be in many cases more cost-effective than grey infrastructure.
- Develop fully the economic analysis of water use, including the calculation of Environmental and Resource Costs and ensure that the combination of water tariffs and the Water Resources Tax lead to adequate recovery of the costs of water services.
- Ensure that the measures foreseen are clearly prioritized in terms of cost-effectiveness, whether measures are voluntary or obligatory and available funding, exploring the possibility of using EU funds (e.g. RDP funds, Structural and Investment funds and LIFE Integrated Projects) to implement PoMs.
- Ensure that climate change is adequately considered in the assessment of pressures and status of water bodies and that the objectives of the National Strategy for Adaptation to Climate Change are properly taken into account in the design of the PoMs.