



Brussels, 14.11.2012
SWD(2012) 379 final

12/30

COMMISSION STAFF WORKING DOCUMENT

Member State : Spain

Accompanying the document

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

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

River Basin Management Plans

{COM(2012) 670 final}

1. GENERAL INFORMATION

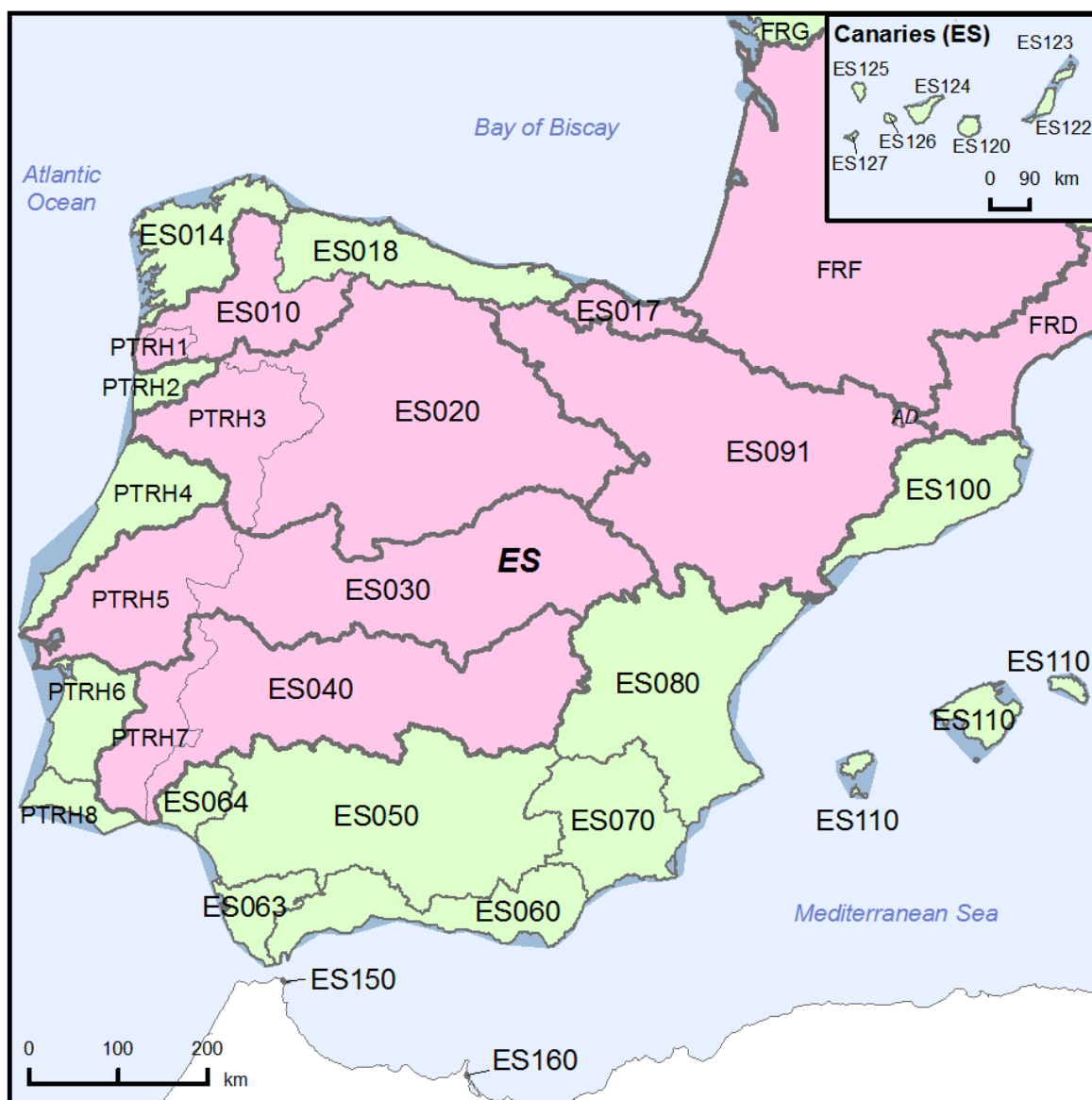
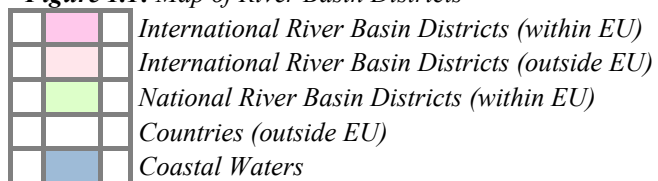


Figure 1.1: Map of River Basin Districts



Source: WISE, Eurostat (country borders)

The Total area of the country is 504782 km², with a population of 45.8 million people.

The country is divided into 17 autonomous communities (regions) which all have their own directly elected authorities. In Catalonia, the Basque Country and Galicia, the regional languages have official status alongside the national Spanish language, which is also called Castilian.

The 'Real Decreto Legislativo 1/2001', transposes the WFD (Directive 2000/60/EC), and defines River Basin District being updated in further legal documents. The [Real Decreto 125/2007](#) defines the territorial limitation of the RBD of Spain. The Real Decreto 266/2008, produces changes in the name of RBDs (from Miño-Limia and Norte to Miño-Sil and Cantabrico). Further, the Real Decreto 29/2011 subdivides Cantabrico into Cantábrico Occidental and Cantábrico Oriental.

The RBD defined in Spain:

RBD	Name	Size (km ²)	International	Countries sharing RBD
ES010	Minho-Sil	17574	✓	PT
ES014	Galician Coast	16372		-
ES017	Cantábrico Oriental	6412	✓	FR
ES018	Cantábrico Occidental	19003		
ES020	Duero	78859	✓	PT
ES030	Tagus	55772	✓	PT
ES040	Guadiana	55453	✓	PT
ES050	Guadalquivir	57731		-
ES060	Andalusia Mediterranean Basins	20021		-
ES063	Guadalete and Barbate	6468		-
ES064	Tinto, Odiel and Piedras	4930		-
ES070	Segura	20122		-
ES080	Jucar	45118		-
ES091	Ebro	85914	✓	AD, FR
ES100	Internal Basins of Catalonia	17980		FR
ES110	Balearic Islands	8741		-
ES120	Gran Canaria	2097		-
ES122	Fuerteventura	2871		-
ES123	Lanzarote	2106		-
ES124	Tenerife	2827		-
ES125	La Palma	973		-
ES126	La Gomera	525		-
ES127	El Hierro	520		-
ES150	Cueta	60		MA
ES160	Melilla	32		MA

Table 1.1: Overview of Spain's River Basin Districts¹

Source: River Basin Management Plans reported to WISE²: <http://cdr.eionet.europa.eu/es/eu/wfdart13>

¹ Spain redesignated the following RBDs in 2012: ES015 Basque Country Internal Basins and ES016 Cantabrian no longer exist; ES017 Cantábrico Oriental and ES018 Cantábrico Occidental are 'new' RBDs.

² This MS Annex reflects the information reported by the MS to WISE which may have been updated since the adoption of the RBMPs. For this reason there may be some discrepancies between the information reported in the RBMPs and WISE.

Shared catchments with other MS/third countries:

- With Portugal – Minho, Douro, Tejo and Guadiana.
- With France – Cantabrico and Ebro.
- With Andorra - Ebro.
- With Morocco – Ceuta and Melilla.

Name international river basin	National RBD	Countries sharing RBD	Co-ordination category			
			2		4	
			km ²	%	km ²	%
Miño/Minho	ES010	PT	16226	95.0		
Duero/Douro	ES020	PT	78859	80.7		
Guadiana	ES040	PT	55454	82.7		
Ebro	ES091	AD, FR			85534	99
Segre (Sub-Basin Ebro/Rhone)	ES091	AD, FR	18750	95.2		
Catalan	ES100	FR				
Lima/Limia	ES010	PT	1326	52.9		
Tajo/Tejo	ES030	PT	55772	78.3		
Garonne	ES017/ES091	FR	555	0.7		
Nive (Sub-Basin Adour-Garonne RBD)	ES017	FR	121	19.0		
Nivelle (Sub-Basin Adour-Garonne RBD)	ES017	FR	70	12.0		
Bidasoa (Sub-Basin Adour-Garonne RBD)	ES017	FR	689	97.0		

Table 1.2: Transboundary river basins by category (see CSWD section 8.1) and % share in Spain³

Category 1: Co-operation agreement, co-operation body, RBMP in place.

Category 2: Co-operation agreement, co-operation body in place.

Category 3: Co-operation agreement in place.

Category 4: No co-operation formalised.

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

³ 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).

2. STATUS OF RIVER BASIN MANAGEMENT PLAN REPORTING AND COMPLIANCE

With the exception of the River Basin District of Distrito Fluvial de Catalonia (ES100) Spain has not reported RBMPs to the Commission. A Court ruling of the European Court of Justice (ECJ) against Spain on the failure to adopt and report River Basin Management Plans for all of their respective River Basin Districts is expected by the end of 2012⁴.

The River Basin Management Plan of Distrito Fluvial de Catalonia was reported to the Commission on 14 October 2010. The intra-regional River Basin Management Plans of Tinto, Odiel y Piedras, Guadalete y Barbate, Cuencas Mediterraneas Andaluzas and Galicia-costa were approved on 14 September 2012 (Boletín Oficial del Estado (BOE) 223 of 15 September 2012).

The status of progress of the other (draft) RBMPs is provided below.

RBD	Name of RBD	Status consultation	Consultation dates	Status adoption
ES010	Miño-Sil	Completed	15/12/2010-15/06/2011	Pending
ES014	Galicia Costa	Completed	20/08/2010-20/02/2011	Adopted 14/09/2011, published in BOE on the 15/09/2012
ES017	Cantábrico Oriental (part responsibility of Basque Regional Authorities) (part responsibility of the State Authorities)	Completed	21/12/2010-21/06/2011 and 04/05/2011-04/11/2011	Pending
ES018	Cantábrico Occidental	Completed	04/05/2011-04/11/2011	Pending
ES020	Duero	Completed	15/12/2010-15/06/2011	Pending
ES030	Tajo	Pending		Pending
ES040	Guadiana	Completed	25/05/2011-25/11/2011	Pending
ES050	Guadalquivir	Completed	15/12/2010-15/06/2011	Pending
ES060	Mediterranean basins of Andalucía	Completed	21/5/2010-21/11/2010	Adopted 14/09/2011, published in BOE on the 15/09/2012
ES063	Guadalete-Barbate	Completed	21/05/2010-21/11/2010	Adopted 14/09/2011, published in BOE on the 15/09/2012
ES064	Tinto-Odiel-Piedras	Completed	21/5/2010-21/11/2010	Adopted 14/09/2011, published in BOE on the 15/09/2012
ES070	Segura	Pending		Pending

⁴ The Case has been referred to the Court of Justice since 29 March 2012 (case C-2012/151).

RBD	Name of RBD	Status consultation	Consultation dates	Status adoption
ES080	Júcar	Pending		Pending
ES091	Ebro	Pending	12/05/2012-12/11/2012	Pending
ES100	Cuenca Fluvial de Catalonia	Completed		Adopted 22/09/2011, published in BOE on the 22/09/2011 Reported to the Commission on 14/10/2010
ES110	Balears	Completed	30/09/2008-30/03/2009 and 20/03/2010-20/09/2010	Pending
ES120	Gran Canaria	Pending		Pending
ES122	Fuerteventura	Pending		Pending
ES123	Lanzarote	Completed	28/06/2011-28/12/2011	Pending
ES124	Tenerife	Completed	04/05/2010-04/11/2010	Pending
ES125	La Palma	Pending		Pending
ES126	La Gomera	Pending		Pending
ES127	El Hierro	Pending		Pending
ES150	Ceuta	Pending		Pending
ES160	Melilla	Pending		Pending

Table 2.1: Status of RBMPs in Spain.

Source: http://ec.europa.eu/environment/water/participation/map_mc/countries/spain_en.htm

A court ruling⁵ has been issued against Spain by the European Court of Justice (ECJ) because Spain had failed to notify all competent authorities in accordance with Article 3. In this case the Court also emphasised the importance of designating the River Basin Districts in accordance with the hydrological boundaries rather than administrative boundaries. Spain has since complied and the case is closed.

This document provides a summary on the assessment of RBMP of River Basin Distrito Fluvial de Catalonia (ES100).

3. GOVERNANCE

3.1 RBMPs - Structure, completeness, legal status

The RBMP for ES100 was adopted by the Government through a Royal Decree which is published in the Spanish Official Journal. Only the RBMP for the intra-community Catalonia RBD has been approved by Royal Decree 1219/2011, of 5 September. It is important to highlight that in practice the Royal Decrees are only an approval act and do not contain the

⁵ Commission vs. Spain (Case C-516/07, ruling of 7.5.2009)

whole text of the RBD. The **Real Decreto 907/2007** approved the structure of the RBMPs and set out the content of the RBMP.

3.2 Consultation of the public, engagement of interested parties

In Catalonia, the District water Council – the Council for the Sustainable Use of Water (Consejo para el Uso Sostenible del Agua-CUSA) – is the consulting body for water planning issues.⁶

It comprises municipalities, professional associations, ecologist groups, neighbours associations, user and consumer organizations, trade unions, universities, water supply companies, and recreational, industrial and agriculture users. The preparation and approval of the RBMP for the Catalanian Basin District included public consultation and the RBMP reflects the impact of this participation. The Reports shows how comments from the public consultation have been integrated in RBMP.

4. CHARACTERISATION OF RIVER BASIN DISTRICTS

4.1 Typology of surface waters

For ES100, water typology has been defined but it is not clear if this has been done with biological data.

Reference conditions have been established through a combination of spatially based and numerical methods. Expert judgement has also been used. Protocols for the establishment of reference conditions have been developed by the Catalan Water Authority.

Some of the types correspond to the types of the above order and others are specific:

RBD	Rivers	Lakes	Transitional	Coastal
ES100	10	11	14	7

Table 4.1.1: Surface water body types at RBD level

Source: WISE

4.2 Delineation of surface water bodies

There is no information on how small water bodies have been considered.

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)
ES100	261	15.1	27		25		37		39	288

⁶ Article 11.8 of Legislative Decree 3/2003, of 4 November, approving the Consolidated Water Law of Catalonia.

Table 4.2.1: Surface water bodies, groundwater bodies and their dimensions
Source: RBMP and Article 5 report

4.3 Identification of significant pressures and impacts

The RBMP considers the following point sources as significant pressures: the Urban Waste Water Treatment Plants which jointly increase the concentration in a water body by 5 mgDQO/L or more and phosphorous by 1 mg/L or more, or in the particular case in which a discharge from a treatment plant induces an increase of concentration of 20 mg DQO/L or more in relation to the reference condition. Also morphological changes, flow changes and use of the soil in the margins (> 20%) are considered to be significant pressures. For each of these pressures a threshold for “significant” was defined.

The RBMP has also considered as ‘significant’ pressures from diffuse sources as originated from solid waste (dimension of landfill or dumpsite), sludge from WWTP, cattle manure and exceedance of nitrogen (irrigation, farming and livestock), contaminated soil and extractive industry. For each of these pressures a threshold for “significant” was defined.

For water abstraction ‘significant’ is considered if for a given water body, the ecological flow drops below 50% of the natural regime that circulates in 50% of the days of the year. Agriculture, Public water supply and mini-hydro power plants are the pressures considered.

For water flow regulation and morphological alterations (flood defence dams, locks, weirs and others are considered together) a significant pressure occurs if the volume of the dam is larger than the accumulated natural flow for a given period.

ES100 followed the regional legislation of Catalonia.

According to ES100’s RBMP the main chemical pollution comes from industrial activity and urban wastewater: 138 water bodies affected by urban wastewater, 49 water bodies affected by industrial pollution and 18 water bodies affected by other causes.

4.4 Protected areas

RBD	Water category	Number of drinking water abstraction protected areas	Number of protected areas for several reasons ⁷
ES100	Rivers	38 (+7 Protected areas in reservoirs HMWB)	195
	Lakes	1 ⁸	18
	Transitional		24
	Coastal	2 ⁹	37
	Groundwater	39 ¹⁰	36

⁷ Some of these water bodies are protected also, but not only, for human consumption water abstraction.

⁸ Banyoles lake.

⁹ Abstracting point for intake to desalinisation plants in La Tordera and El Prat.

¹⁰ All GWB are considered protected areas for drinking water. There are 137 catchment sites within the 39 GWB.

Table 4.4.1: Number of protected areas of all types in each RBD and for the whole country, for surface and groundwater¹¹

Source: WISE

5. MONITORING

5.1 Monitoring of surface waters

For rivers all required BQEs are monitored though the RBMP indicates that an assessment method for macrophytes is yet to be developed. All required physicochemical QEs are monitored. Although the RBMP indicates that hydromorphological QEs are monitored it is not clear which individual elements are. Besides, the RBMP indicates that the evaluation (assessment) method (in terms of ecological status/potential) is yet to be determined.

In this RBD shallow lakes are classified as lakes, and coastal lagoons are classified as transitional waters. Together these water bodies constitute the sub-category wetlands, with specific indicators and a sampling protocol for evaluation of their status or ecological potential.

In lakes, all required BQEs are monitored. All physicochemical QEs are assessed (and presumably monitored). There is not enough information to determine whether morphological QEs are monitored.

Although the RBMP indicates that there are 22 natural transitional water bodies, only wetlands are referred in terms of monitoring and evaluation of status. Wetlands appear to be only monitored and evaluated in terms of benthic invertebrates, physicochemical (all expected) and hydromorphology (only aggregated level and also for chemical status. To determine which hydromorphological QEs are monitored the index ECELS is used.

For coastal waters the RBMP indicates that all required BQE and physicochemical QEs are monitored and evaluated. However, there is no indication that hydromorphological QEs are monitored.

No detailed information is provided in the RBMP regarding the type of operational monitoring carried out. The RBMP states that in terms of operational monitoring: “The parameters that must be monitored in these cases are only the relevant indicators sensitive to the pressures detected”.

Priority substances and certain other pollutants are also monitored. The RBMP requires quite a significant number of substances but a complete list of specific individual substances to be monitored is provided in the 'Programa de Seguiment i Control' monitoring programme approved by the Catalan Government GOV/128/2008 on 3 June Therefore more specifications on how this is implemented will be required to ascertain how and which substances are monitored.

¹¹ 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.

Grouping is not mentioned in the RBMP. The RBMP provides the number of monitoring points in rivers, lakes, wetlands, dams and coastal waters, in accordance with the state of the water body (if at risk or not).

The monitoring programme has been approved by the *Acuerdo* Gov/128/2008 of 3 June, and the final monitoring programme has been defined at the time of elaboration of RBMP reportedly with some changes regarding the referred *Acuerdo*.

5.2 Monitoring of groundwater

There is monitoring established to measure water level and physical-chemical characteristics of the groundwater such as major cations and anions, temperature, pH, conductivity, and “components of the nitrogen cycle”.

A surveillance monitoring programme and an operational monitoring programme have been established for groundwater. Surveillance monitoring is linked to quantitative status, while the operational monitoring is performed in relation to chemical status.

The RBMP lists which elements are monitored in which water bodies but does not provide a clear explanation on which pressures the monitoring is based.

The RBMP does not mention the detection of significant and sustained upward trends in pollutants but in case of evidence of pollution operational monitoring is extended to the pollutant causing the failure.

5.3 Monitoring of protected areas

The RBMP states that depending on the type of protection of each water body the parameters monitored might change. These parameters are defined by the objectives of the water body and not all protected water bodies have specific parameters. In some cases the monitoring parameters are the same as the non-protected water bodies.

Regarding water bodies protected for abstraction of water for human consumption there are monitoring programmes both at surface waters and groundwater. Reportedly, some of the surface water monitoring points are coincident with the monitoring points for the surveillance monitoring. There are also monitoring points in coastal water protected areas for human consumption (desalination). The RBMP states that protected groundwater for water abstraction exists in all water bodies, and that these areas are protected by safeguard zones and are monitored. Monitoring of chemical parameters is carried out at the abstraction points. The RBMP states that the parameters monitored for the purpose of production of water for human consumption are the same used for monitoring of the chemical status of water bodies.

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

See Annexes XVIA and XVIIIA of the RBMP of ES100.

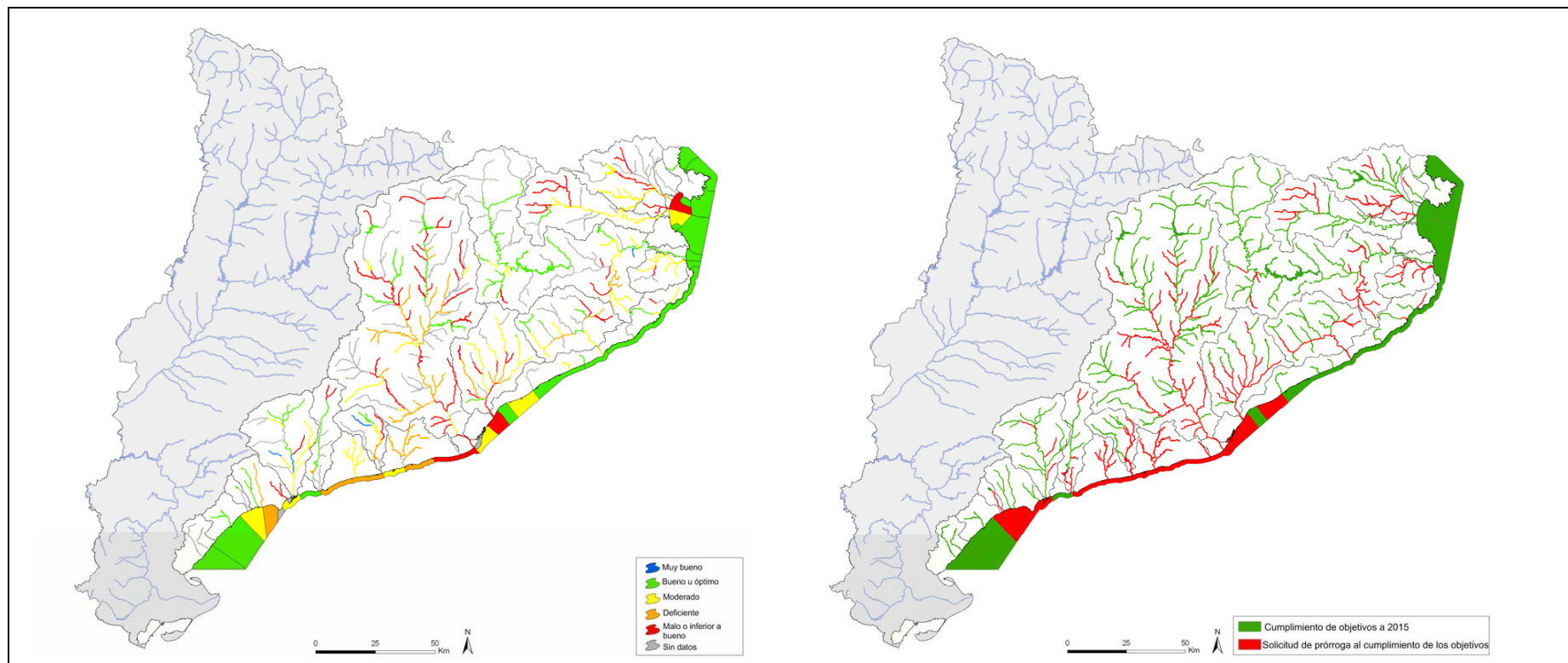


Figure 6.1: (left) Status in 2008; (right) Expected fulfilment of objectives in 2015 (surface water)
Source: RBMP

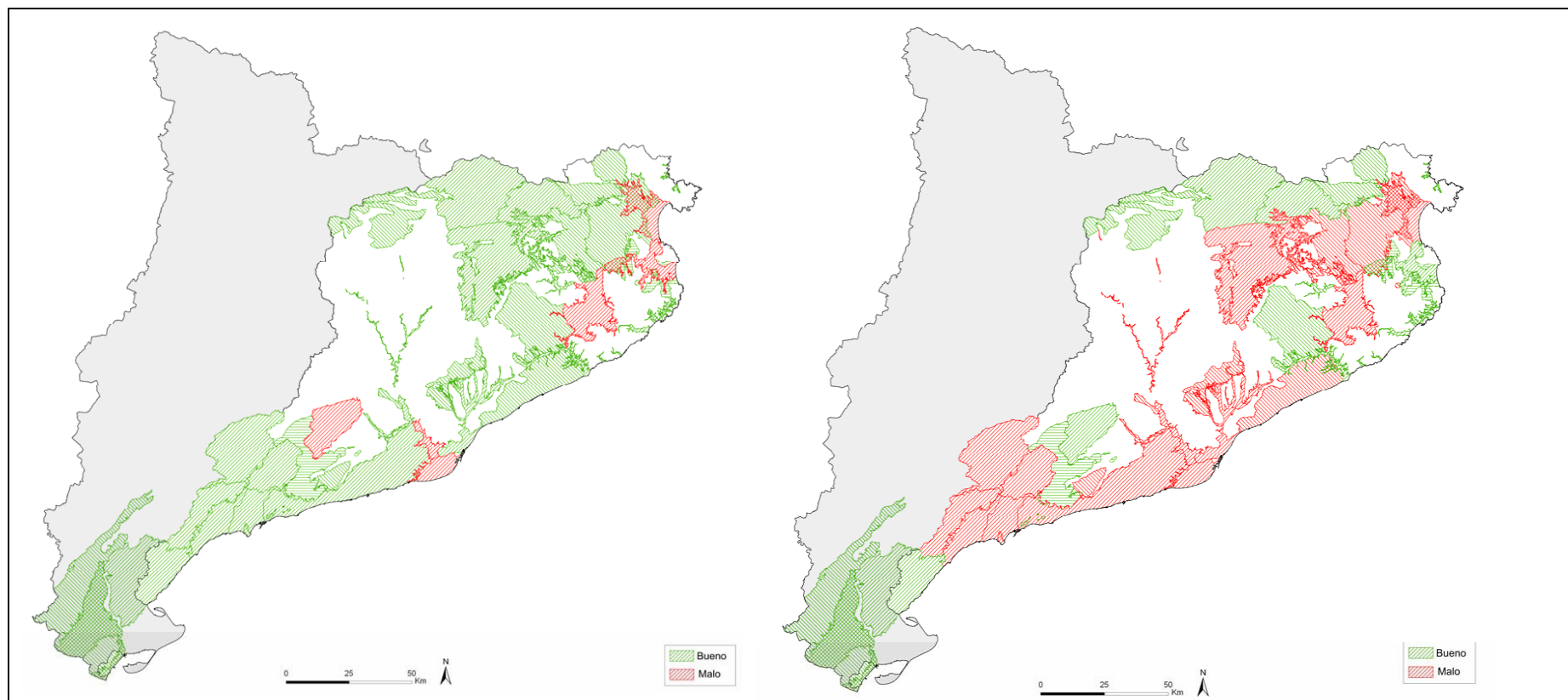


Figure 6.2: (left) *Quantitative status in 2008*; (right) *Chemical status in 2008*
Source: RBMP

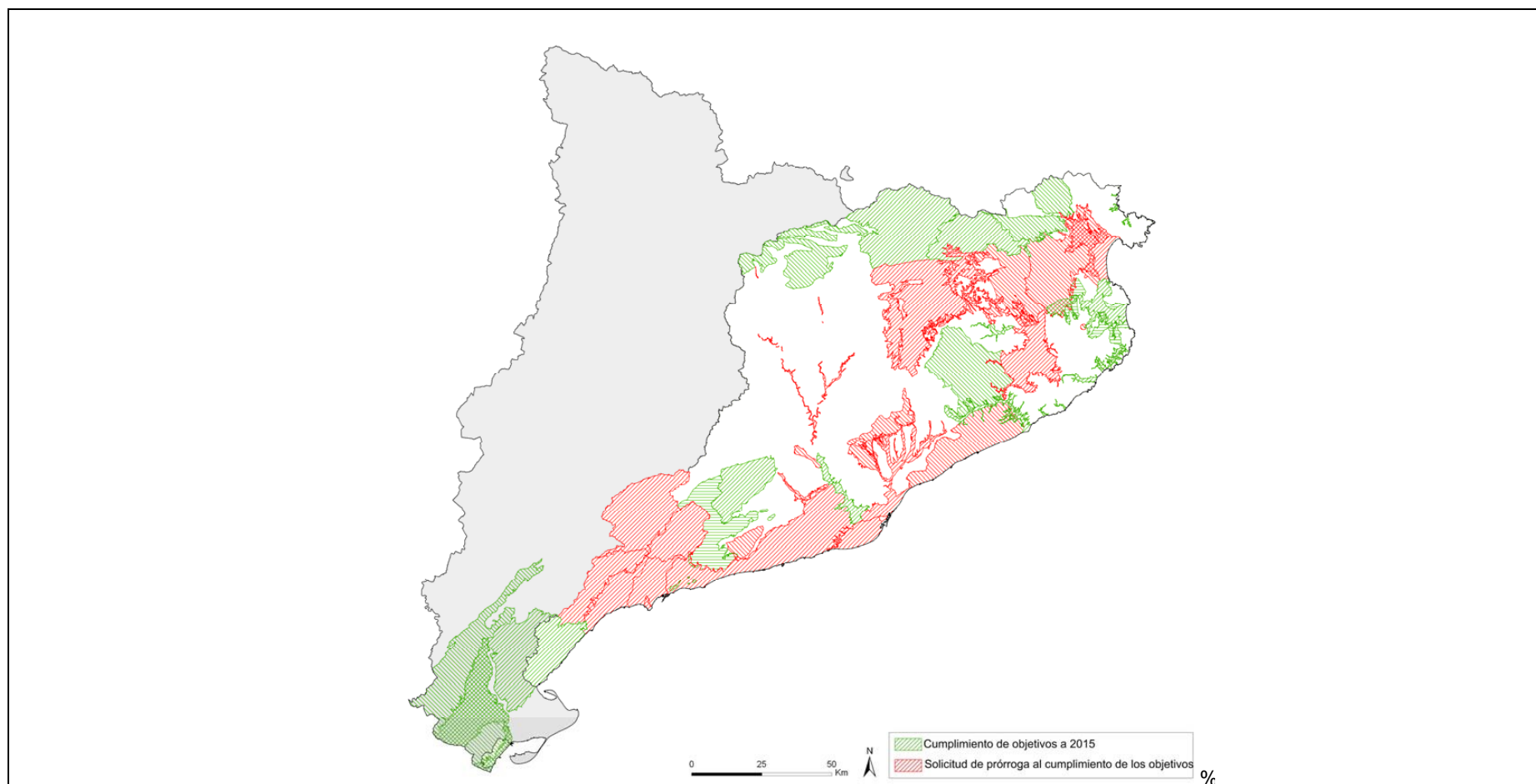


Figure 6.3: Expected fulfilment of objectives in 2015 (groundwater)
Source: RBMP

7. ASSESSMENT OF ECOLOGICAL STATUS OF SURFACE WATERS

A RBD specific approach to assessment of ecological status has been followed.

7.1 Ecological status assessment methods

Assessment methods are reported to be fully developed for all biological quality elements in lakes and transitional water, it is however not clear if this is the case. Assessment methods are partly developed for biological quality elements for all or some in rivers and coastal waters.

The ES100 RBMP does not indicate whether the biological classification system is relevant for all major pressures. Further information is required in order to analyse how the BQEs systems is sensitive to pressures and how this is considered in the Intercalibration exercise. The relationship is clearer between pressures and physical-chemical parameters (point and diffuse source pollution) and less clear with biological parameters.

The RBD authority has developed protocols related to physico-chemical and hydromorphological quality elements; however the protocols were not available. No link is made in the RBMP between those supporting quality elements and BQE. For low risk water bodies the supporting physico-chemical parameter used is the worse component of FAN. FAN is composed of salinity and conditions related to nutrients (nitrates, nitrites, ammonia, phosphates, silicates).

It is foreseen that during the implementation period of the current RBMP, a standardized protocol for the evaluation of hydromorphological quality in rivers can be achieved. For coastal waters the RBMP states that the Ecological Status is defined in terms of ecological and physico-chemical quality. Hence no HyMo conditions are considered.

No information on the setting of EQS is provided in the RBMP for rivers. There is no list of non-priority substances defined for rivers, only general organic charge, nutrient charge and salinity. For lakes and transition water it is unclear if EQS has been set for all relevant specific pollutants. One of the developed protocols, ECOZO, has an acidification status parameter, but it would be necessary to indicate which chemical elements or substances are used. For coastal waters, the RBMP includes a list of non-priority substances to which environmental quality norms are established. According to the RBMP these substances are those listed in Annex VIII of WFD (excluding priority substances), that are known to be discharged in significant amount into the water bodies of RDB, and which limit values are established by Law 42/2007 of 13 December. There are further environmental quality norms defined for chemical elements on groundwaters.

The one-out-all-out principle is used, since the quality level is equal to the worse result in the set of indicators used.

The ecological status could not be assessed for all water bodies. The RBMP provides no information on how to deal with uncertainty in classification results. The RBMP mentions the consequences of the lack of data (impossibility to determine status of some water bodies, impossibility to use a certain parameter etc.) and uncertainty.

Ecological status assessment methods have been partly developed for all or some water types in rivers and in coastal waters. For lakes and transition waters methods have been fully developed for all water types.

The RBMP states that the parameters used for rivers are usually intercalibrated, but it was not possible to reach a conclusion for one of the BQE used (IBICAT) as explained above. No information on intercalibration is provided for lakes. A study carried out by the Catalanian Water Authority in 2010 provides information for coastal waters. The RBMP does not specifically mention intercalibration, but EQR are provided.

The RBD has developed its own methodologies which present changes regarding the Guide of the working group ECOSTAT (*Overall approach to the Classification of Ecological Status and Ecological Potential*, 2003).

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	
ES100																												

Table 7.1.1: Availability of biological assessment methods

-

Assessment methods fully developed for all BQEs

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

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

Water category not relevant

Source: RBMPs

7.2 Application of methods and ecological status results

The analysed parameters are the following (the codes are those reported in WISE electronic reports for QE used in surface water monitoring and for parameters used in groundwater monitoring): In rivers: QE1-2-4, QE1-3, QE1-4, QE3-1-2 to QE3-1-6, QE3-2. The RBMP states that Hydrology and Hydromorphology indicators to be monitored are to be defined. In rivers priority substances are also monitored in sediments. In Lakes: QE1-1, QE1-2-4, QE1-3, QE3-1-1 to QE3-1-6, QE3-2. The hydromorphological parameter monitored is Lake depth variation. The RBMP states the monitoring performed in wetlands, some of which are transitional waters: QE1-3, QE3-1-2 to QE3-1-6 and index ECELS (related to coastal morphology, hydrology and uses). For coastal waters: QE1-1, QE1-2-1, QE1-3, QE1-5, QE3-1-1 to QE3-1-4, QE3-1-6, QE3-2, QE3-3 For protected waters for human consumption, bathing and natural reserves further parameters are monitored.

Specific pollutants are specified in the case of coastal waters only: Terbutilazina, toluene, xyloene, ethilbenzene, 1, 1, 1 – Trichloroethane, arsenic, copper, chrome VI, selenium, zinc.

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

The number of heavily modified water bodies designated is 69 in rivers, 1 in lakes, 3 in transitional waters, and 5 in coastal waters.

No artificial water bodies have been designated.

8.1 Designation of HMWBs

Water category	Number of HMWB	% of total WBD of category
Rivers	69	26.4%
Lakes	1	3.7%
Transitional	3	12%
Coastal	5	15.2%

Table 8.1.1: Heavily modified water bodies in ES100

Source: RBMP

The RBMP considers highly modified water masses, based on hydromorphologic assumptions. It considers:

- Hydrological modifications, mainly due to water abstraction and river deviation to hydroelectric use;
- Morphological changes due to river channelling, for use of the margins (agriculture, urban development);

- River continuity - presence of dams, or any other construction that affects the continuity of the river;
- Dams as special water types;
- Construction of ports and other port related infrastructures;
- Coastal infrastructures against erosion;
- Change of connection to other water bodies.

Some steps of the stepwise approach as described in HMWB Guidance N° 4 have been followed. The RBMP uses the test methodology proposed by the EU. However, a check of the individual steps of the process shows that the step on "other means as better environmental options" was not followed.

The RBMP refers to the Instruction de Planificacion hidrológica del MARM (2008) only for the case of regulated water bodies. For all the other causes, the methodology has been developed by the Catalan Water Authority.

8.2 Methodology for setting good ecological potential (GEP)

GEP has been defined separately for dams, rivers, lakes, transitional waters and coastal waters.

The definitions followed a method of the Catalan Water Authority (CWA). For impoundments the ECOEM protocol from the CWA was used. This protocol is based on a comparison of the biological and physico-chemical parameters with maximum ecologic potential and is combined in the Ecological potential index. For other HMWBs (rivers), an attempt to use the Guidance Document N° 4 and Prague approach was done, but with no results and a specific method was devised. The determination is based on expert judgement on what would be the expected populations of fish, macro-invertebrates and diatoms, taking into consideration the hydromorphological changes to which the water is subjected to. It is also based on the assumption that all necessary measures would be taken to achieve a physico-chemical quality and chemical status compatible with the definition of good status for natural water bodies. With this method only the GEP was defined, but not the MEP. (A more detailed explanation is provided in the RBMP). For lakes and transitional waters, the CWA has defined quality indicators QAELS (quality of crustaceans and invertebrates) and ECELS (quality of biological, physico-chemical and hydromorphological elements). GEP is considered similar to the good ecological status of the respective water type. It should be noted that the reference values of QAELS depend on the type of wetland, while the reference value of ECELS corresponds to its maximum value: 100%. MEP is defined for transitional waters (Table II-7) but not for lakes. For Coastal Waters two groups are identified: water bodies closer to the coast and more offshore water bodies. For water bodies closer to the coast the reference conditions established for natural waters are used, and MEP corresponds to the reference conditions (average chlorophyll concentration and benthic invertebrate fauna) of the natural water bodies of the same type. For more offshore coastal waters a series of parameters were selected to assess the ecologic potential but the RBMP states that there was still no data to assess them and no MEP could be defined yet.

8.3 Results of ecological potential assessment in HMWB and AWB

The RBMP does not discuss the issue of uncertainty in relation to the designation of HMWB, nor future actions planned to improve the designation process (e.g. methodological improvements) which would also contribute to reducing uncertainty.

9. ASSESSMENT OF CHEMICAL STATUS OF SURFACE WATERS

9.1 Methodological approach to the assessment

For surface water the RBMP states the chemical status is assessed by analysing the priority substances included in Annex X of WFD (Decision 2455/2001/EC), modified by Directive 2008/105/CE, and with the objectives set by Directive 76/464/CEE (codified version: Directive 2006/11/CE). When a water mass presents a non-conformity on any of the priority substances, the chemical status is considered lower than good. However, the RBMP does not specify the process undertaken in practice to assess the chemical status, but rather focuses on the assessment of the physico-chemical status. It is also stated that for some substances the detection limits of the measurement instruments are higher than the limits established in the directive. The chemical status is assessed using the remaining parameters.

9.2 Substances causing exceedances

The indication of the substances causing the failure of good chemical status is only provided for rivers, including HMWBs. The RBMP provides the substances but not the number of water bodies each substance affects.

The substances are: (470-90-6) Chlorfenvinphos; (122-34-9) Simazine; (140-66-9) t-Octylphenol; (608-73-1) Lindane (g-hexaclorociclohexano); (7440-02-0) Dissolved Nickel; (2921-88-2) Chlorpyrifos; (1582-09-8) Trifluralin; (7439-92-1) Lead; (7440-43-9) Dissolved Cadmium.

9.3 Other issues

Mixing zones are used. The RBMP states that mixing zones have been considered for rivers and coastal waters. In coastal waters the zones have a radius of 50 meters around the outflow of the submarine emissary. In rivers the mixing zones comprise a stretch of river from the wastewater discharge point to 50 m downstream.

10. ASSESSMENT OF GROUNDWATER STATUS

The quantitative status has been calculated on the basis of water balance and taking into consideration the saline intrusion. According to the document IMPRESS (report on Art 5 of WFD) of Catalonia, the areas ecologically dependent on GWB are mostly wetlands and were designated protected water bodies. This aspect is not considered in the determination of quantitative status.

The following impacts have been considered – i) exceedance by the long term annual average rate of abstraction of the available groundwater resource and ii) Saline or other intrusions resulting from anthropogenically induced sustained changes in flow direction.

A comparison of annual average groundwater abstraction against ‘available groundwater resource’ has been reported to be calculated for **every** groundwater body.

10.1 Groundwater quantitative status

6 out of 39 groundwater bodies are in poor quantitative status in Catalonia. The problems are mostly linked to coastal water bodies.

The quantitative status has been calculated on the basis of water balance, and taking into consideration the saline intrusion. A comparison of annual average groundwater abstraction against ‘available groundwater resource’ has been reported to be calculated for every groundwater body.

According to the document IMPRESS (report on Art 5 of WFD) of Catalonia, the areas ecologically dependent on GWBs are mostly wetlands and were designated as protected water bodies. This aspect was not considered in the determination of quantitative status though.

10.2 Groundwater chemical status

Nearly two third of the groundwater bodies in Catalonia are in poor chemical status (64%), mostly due to the presence of nitrates (38.5%) and chlorides (20.5%).

The groundwater threshold values are computed for each water body, based on the risks and uses identified, in accordance with Royal Decree 1514/2009. Natural background levels of substances were also considered in the TV establishment and there is an explanation, how. The RBMP states that when a parameter is non-compliant in more than 20% of the surface area of the water body, the chemical status is considered being in poor chemical status. The RBMP provides information that there were TV exceedances also in GWBs considered being in good chemical status, but no details about GWBs and pollutants were reported.

Groundwater dependent terrestrial ecosystems and surface waters associated to groundwater were not considered in the groundwater chemical status assessment.

Trend assessments and reversals were not performed, methodologies for them were not established.

No transboundary groundwater bodies were identified.

10.3 Protected areas

According to the RBMP all the protected areas meet the specific objectives, both on drinking water and on other types of protection.

11. ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

Surface waters	RW	LW	TW	CW	SW
Number of natural surface water bodies reported in RBMP	192	26	22	28	268
Number of heavily modified plus artificial surface water bodies reported in RBMP	69	1	3	5	78
Number of all surface water bodies at good ecological status/potential or better now (2009)	44	5	6	17	72
Number of all surface water bodies at good ecological status/potential or better in 2015	157	10	9	19	213
Number of natural surface water bodies at good ecological status or better now	33	5	6	17	61
Number of HMWB/AWB surface water bodies at good ecological potential or better now	11	0	0	0	11
Number of surface water bodies at good chemical status now	145	NA	NA	32	177
Number of surface water bodies to which exemptions under Article 4.4 apply	104	18	16	14	152
Number of surface water bodies to which exemptions under Article 4.5 apply	0	0	0	0	0

Table 11.1: Surface water objectives

Source: RBMP

Groundwaters	
Number of groundwater bodies reported in RBMP	39
Number of groundwater bodies at good quantitative status now	33
Number of groundwater bodies at good quantitative status in 2015	39
Number of groundwater bodies at good chemical status now	16
Number of groundwater bodies at good chemical status in 2015	18
Number of groundwater bodies to which exemptions under Article 4.4 apply	21

Table 11.2: Groundwater objectives

Source: RBMP

11.1 Additional objectives in protected areas

Areas are protected in recreational waters (objectives of Directive 2006/7/EC), in areas of fish life (objectives of Directive 2006/44/EC for waters with species of economic value), vulnerable (Directive 91/676/EEC) and sensitive (Directive 91/271/EEC) areas to nutrient inputs, protected areas for species or habitats (Directive 92/43/EEC, and Annex I of Directive 2009/147/EC, that derogates Directive 79/409/EEC), and river natural reserve (areas presenting minimum impacts of human intervention). The water bodies considered to be protected are included in Natura 2000 networks and need to be 80% within the a Nature 2000 site.

Specifically there are protected zones of water abstraction for human consumption. There are also designated protection areas for mineral and thermal water abstraction as well as special protection zones for groundwater (this for over-exploited aquifers of strategic importance - not only for human consumption, and the recharge areas are also protected). Protected zones for human consumption water abstraction have been defined in a total of 42 zones within 34 rivers stretches, 7 impoundments and 1 lake, as they provide more than 10 m³/day of water for human consumption or serve more than 50 persons, or are expected to do so in the future. Also 39 groundwater bodies and 3 coastal water bodies have been protected as water for human consumption. In the case of the coastal waters, they have been protected as it is projected they will contain abstraction points for desalinators.

The RBMP states that additional objectives are set for drinking water protected areas in non-coastal surface water bodies. However the RBMP does not specify which objectives are these. It only states the objectives aim at matching the physico-chemical quality of the water to the minimum requirements of water treatment. The RBMP states that specific objectives related to drinking water protected areas were not considered necessary for groundwater and coastal water.

Although there are several coastal areas of Catalonia where shellfish protection zones have been established, no additional objectives have been established.

The RBMP states that in bathing water protected areas the quality objectives are those established in the Directive 2006/7/EC, concerning the management of bathing water quality. The PoM establishes some measures for this goal, namely increase in control of wastewater discharge and increased treatment during bathing season.

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

The River Basin District Management Plan does not establish lower objectives due mainly to lack of data. But it does not exclude that in the future they might be defined. The reasons for later deadline are (WFD Article 4(4)): lack of technical knowledge (one of the most common reasons in all water types, and 100% of requests for the coastal waters); wastewater due to limited capacity of dilution in the medium or due to such high urban concentrations that the treated effluent has a strong impact on the water type (about 50% of the requests for rivers, and 14.3% for groundwater), and the problem of wastewater discharge in rainy weather (responsible for 26.5% requests for rivers) and measures that are not foreseen for the 2010-2015 period due to priorities in other water masses (20% for rivers and 12.5% for transition waters). Diffuse sources of pollution from agriculture are responsible for 66.7% of the requests for groundwater, 100% for dams and 53% for lakes;. Industrial pollution is responsible for 28.6% of the requests for groundwater. Hydromorphology changes are responsible for 64.7% of the requests on lakes and 56.2% on transition waters. There are also other impacts and drivers as a large port or waste from salt mining, and for some water bodies the time required for the system to respond and achieve the good status is larger than 2015 (case of some groundwater bodies).

No indication of the cost analysis is undertaken in the context of Article 4.4 and 4.5 of the Directive.

“No technical solution” is invoked for lack of dilution of the medium. Possible solutions are under study to become technical and economically feasible. “It takes longer to fix the

problem than there is time available” is referred regarding the need to address all solvable wastewater treatment problems (much to do and needs to follow priority list). Also the time it takes for administrative measures in cases in which concessions or discharge license from some industry need to be changed. There are also cases in which “there is no information on the cause of the problem; hence a solution cannot be identified” namely WWTP Discharge in rainy weather and diffuse pollution from agriculture origin. There is also lack of technical knowledge to solve some problems.

11.3 Exemptions according to Article 4(6)

ES100 contains a description of the circumstances in which 4(6) can apply during the implementation of the RBMP.

11.4 Exemptions according to Article 4(7)

The RBMP states that there is the possibility of applying exemptions for new modifications, and provides examples of conditions and examples of what modifications there can be. However, it is not referred either in the RBMP or in the PoM that the exemption will be applied.

11.5 Exemptions to Groundwater Directive

The RBMP describes the reason why the exemption has been requested for 21 water bodies. Of these cases 3 are related to industrial wastewater discharge, and 2 cases are related with discharges into media with low dilution capacity and 14 with diffuse pollution of agrarian origin.

No exceptions were requested for drinking water protected areas as all protected areas already meet the objectives.

12. PROGRAMMES OF MEASURES

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

It therefore does not include a comprehensive assessment of compliance with the requirements of Article 11(3)¹² on basic measures. It focuses in particular on key sets of measures. Member States will report to the Commission by December 2012 on the full

¹² These are the minimum requirements to be complied with and include the measures required under other Community legislation as well as measures to achieve the requirements of other WFD Articles and to ensure appropriate controls on different activities affecting water management

implementation of their PoMs, including progress on the implementation of basic measures as required by Article 11(3). The Commission will assess what Member States report and will publish its assessment in accordance with Article 18 WFD.

12.1 Programme of measures – general

The measures are partly based on status assessments. This is because there is a lack of information on the status for about half of the water bodies. A significant portion of the measures aims at building knowledge on different issues, as impacts of pressures or ecosystem and hydromorphologic dynamics as well as climate variability and change. The PoM describes in general with different levels of detail the location where actions will be implemented.

The RBD lies in the territory of Catalonia region. ES100 lies completely within the territory of Catalonia and part of the Ebro River Basin includes territory of Catalonia. The PoM of ES100 provides indication of the measures that are applied to both RBD. Example of measure on the Regional Administrative Unit: Intervention programme in zones vulnerable to nitrates, of the total 118,8 million Euros, 55.2M€ are applied to the internal RBD and 63.6M€ in the intercommunitary RBD.

The PoM provides different degrees of details regarding the scope and location of the measures.

There are measures at the Autonomous Community level, measures at river basin level (e.g. measure in sub-basin: Implementation of minimum ecological flow in Baix Ter and in Daro) and measures at specific water bodies (e.g. Intervention in the water treatment plant of Ampolla).

There is information on the total cost. Costs for 2009-2015 (in millions of Euros) are estimated at 8728.5 million €. There is a breakdown of costs by groups of measures. There are 3 main groups and within them 5 to 7 sets of measures, totalling 18 sub-groups. Each of these groups addresses different sectors. Measures addressing water resource hydromorphologic and biological quality take up 6% of the total budget, measures adopted for the water resources management and water demand use 49% of the budget and measures for the improvement of water quality use 44.8% of the total budget. Within the later, the improvement of irrigation systems uses 16% of the total budget of the PoM.

The PoM shows that funds come mostly either from Catalonia Water Authority or Aigües de Ter -Llobregat (a public company dealing with water distribution) and some measures are co-financed by other public and private entities from national or local level. However, there is no indication to whether commitments have been done to mobilize funds.

The PoM is supposed to be implemented up to 2015. However, the PoM does not have a calendar and it is not clear what the volume of activities is in the different years to come. The RBMP and the PoM state that a part of the activities considered in the budget were already implemented from 2006 to 2010, and others are ongoing.

12.2 Measures related to agriculture

Agricultural use corresponds to about 32.4% of the water demand and livestock to about 1.7%. The pressures on water demand do not specifically mention agriculture, but agricultural use can be present in the pressures including water abstraction points, change of water flow in wetlands, and plantation of trees which roots reach the freatic level or flowers that use large amount of water. The RBMP states that there is a deficit of information on water abstracted for agriculture use. Moreover it is not possible to estimate the water abstracted for agriculture based on the demand, as there can be restrictions to water use in dry periods, or other conditions posed by coexistence of irrigation schemes and river delta ecosystems (e.g. there are examples of water return from irrigation being used to feed wetlands).

According to the RDBMP farming and livestock are the main source of diffuse pollution pressures. They are responsible for pressures in 31% of the rivers; 15% of dams; 37% of the lakes; 16% of transition waters and 15.2% of coastal waters. Besides, it is responsible for 76.9% of the pressures in groundwater. There is a specific programme addressing this pressure. The RBMP states that the major pollution pressures are nitrogen from agriculture and livestock, pesticides from agriculture and muds from WWTP.

Regarding morphological alterations, the issue is not specifically mentioned as a pressure. The use of soil in the river space affects 11% of the rivers but not all is due to farming.

A significant involvement of stakeholders was sought for the development of the RBMP and PoM. First, workshops were held on WFD's Article 5 Report (Document IMPRESS). At a later stage workshops were organized to gather proposals on the subjects. About 148 entities of the sector of agriculture and livestock participated on the process. The RBMP contains an analysis of the measures proposed in discussion and public participation on pollution from agriculture and livestock. The reports on workshops on water saving, consumption and provision, and on hydromorphological and biological quality show participants from agriculture sector as well. Some of the measures of the PoM are supposed to be co-financed by farmers associations, and associations of water users.

Agriculture related measures are part of several sub-sets of measures within the PoM. There are also a few measures specifically related to agriculture as modernization of traditional irrigation and reducing pollution of agriculture origin. The following types of measures have been selected:

Part of the activities will be funded by other regional administration bodies and for agriculture measures; rural development funds will also be used. A list of all third party co-financers is not available - they can be private companies, associations, legal persons (farmers or others). It is also not clear if all the necessary investment will be available.

The PoM or its annexes only specify that the measures will be implemented up to 2015. Information on the timing of measures or a calendar for the implementation of measures is not provided.

The PoM provides for each measure the entity responsible for the implementation of the measure and entities responsible for the use of some of the measures (beneficiaries or users). However, the PoM or the RBMP do not refer specifically how a monitoring and evaluation system of the implementation of measures will be defined and implemented.

Measures	ES100
Technical measures	
Reduction/modification of fertiliser application	✓
Reduction/modification of pesticide application	✓
Change to low-input farming (e.g. organic farming practices)	
Hydromorphological measures leading to changes in farming practices	✓
Measures against soil erosion	
Multi-objective measures (e.g. crop rotation, creation of enhanced buffer zones/wetlands or floodplain management)	
Technical measures for water saving	✓
Economic instruments	
Compensation for land cover	✓
Co-operative agreements	
Water pricing specifications for irrigators	
Nutrient trading	
Fertiliser taxation	✓
Non-technical measures	
Additions regarding the implementation and enforcement of existing EU legislation	✓
Institutional changes	✓
Codes of agricultural practice	✓
Farm advice and training	✓
Raising awareness of farmers	✓
Measures to increase knowledge for improved decision-making	✓
Certification schemes	
Zoning (e.g. designating land use based on GIS maps)	✓
Specific action plans/programmes	✓
Land use planning	
Technical standards	
Specific projects related to agriculture	
Environmental permitting and licensing	
Additions regarding the implementation and enforcement of existing EU legislation	✓

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

12.3 Measures related to hydromorphology

Hydromorphological measures are related to uses and to pressures. An example is the measure for compensation of small hydropower producers and to farmers in case the implementation of minimum ecological flow impacts their production. Modifications on the substrate of the river are interpreted as sediment management and maintenance of the rivers' morphodynamics. There is a specific measure for flood prevention. Hydromorphological measures are undertaken even for natural waters to prevent or reduce their modification level. Explain if there has been an assessment on the **expected effects** of the proposed measures.

There is no detailed information on the expected effects of the measures. In the case of the implementation of the ecologically based flow regime, the set of measures intends to comply with the Plan of Maintenance of flow of Internal Basins of Catalonia (2006). For the other measures (such as river connectivity and rehabilitation of rivers and tributaries) just an overall statement that priorities are set according to biological requirements of the species, to the environmental importance of the water body or portion of the water body and the effectiveness of the measure.

The general programme on rehabilitation of rivers and tributaries, budgeted at 241 million euros, mentions specific measures for HMWB. On the contrary the set of measures on rehabilitation of Lakes and wetlands, budgeted at 51 million euros, states that there are certain interests in some water bodies that justify the maintenance of the "modification" and lead to define them as HMWB.

There is a set of measures to implement ecologically based flow regime, budgeted in 112.7 million euros. The set of measures includes the following groups of activities (the percentage of budget of this set of measures to be invested in each group of activities is provided in brackets): Installation of systems of control of ecological flow and flow within the system (4%); Reserve for economic compensation associated to the reduction production of hydropower, namely micro-hydro (49%); Subsidies for hydroelectric concessionaires to adequate infrastructure (9% of the programme); Compensation for losses in farming harvests (10%); Improvement of local irrigation infrastructure (17%); Change in to less water demanding crops (4%); Support to the management of irrigation systems (6%); Monitoring and control of water abstraction (1%); Elaboration of zonal plans (< 1%).

Measures	ES100
Fish ladders	✓
Bypass channels	✓
Habitat restoration, building spawning and breeding areas	
Sediment/debris management	✓
Removal of structures: weirs, barriers, bank reinforcement	✓
Reconnection of meander bends or side arms	
Lowering of river banks	✓
Restoration of bank structure	✓
Setting minimum ecological flow requirements	✓
Operational modifications for hydropeaking	
Inundation of flood plains	
Construction of retention basins	
Reduction or modification of dredging	✓
Restoration of degraded bed structure	✓
Remeandering of formerly straightened water courses	

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

12.4 Measures related to groundwater

The PoM includes measures to improve knowledge both on characterization of water bodies and impacts of anthropogenic activities, as there is still significant lack of data in the RBD. There are basic and supplementary measures to address over-exploitation. Although the PoM states that groundwater provide base flows for perennial rivers (despite the lack of rain for extended periods), and contribute to the maintenance of wetlands and other surface water bodies, there is no indication on how measures address the issue of groundwater dependent terrestrial ecosystems.

Basic measures include: register of registers update, aquifer recharge, and elaboration of management plans for water abstraction and use as well as promotion of cooperative management. Additional measures include: improving the knowledge through studies of the natural recharge of aquifers and impacts that may affect the status of groundwater ; running numerical models to assess the available resource in different scenarios (climate, water use etc), improving the monitoring through the register and control of piezometric levels; improving knowledge on the characteristics of water bodies at risk of not reaching WFD objectives; implement measures to prevent saline intrusion due to over-exploitation such as reduction of abstractions by connecting existing systems to other supply networks, the provision of new resources (desalination), redistribution of abstraction points, artificial recharge of aquifers and the development of hydraulic barriers to halt intrusion.

Measures are foreseen and reportedly some of the actions are already being implemented. The PoM presents a clear distinction on the actions to be implemented by the Catalan Water Authority and other regional authorities, as well as where private entities are expected to collaborate. Measures include: Identification of solid waste dumpsites, their improvement to become compliant and its control; similar action at other potentially polluted soils; soil decontamination; implementation of the protocol of action on the decontamination of groundwater in fuel stations; closing of wells.

Supplementary measures consist of further characterization of the water bodies status, risks and pressures, that should include information on the impact of human activity and, if appropriate, information on aquifer characteristics such as characteristics of the recharge zone and the determination of quantitative and qualitative parameters that define the natural background levels.

The PoM reveals that further studies are required to determine the quality of aquifers and to assess causes of the negative impacts. With the results of these studies, aquifer preservation criteria will be established.

12.5 Measures related to chemical pollution

There is an inventory of sources of pollution covering Priority substances and certain other pollutants, and nutrients. The analysis of pressures on the RBMP is based only on the impacts of Chemical Oxygen Demand (DQO in the original document), Nitrogen and Phosphorous. The document IMPRESS submitted by Catalonia (in compliance with Art 5 of WFD) contains in its chapter 4 the priority substances that are present and pose pressures in different river basins. Most common are 2921-88-2 Chlorpyrifos, 18-74-1 Hexachlorobenzene, 15972-60-8 Alachlor, 1912-24-9 Atrazine, 122-34-9 Simazine, 1582-09-8 Trifluralin

Measures include:

- Industrial emissions, namely subsidies to industry to improve wastewater treatment to more stringent levels than the imposed by the WFD; Decontamination of a river polluted by priority substances due to industry; Reduction of the pollution caused by salt mining in some river basins.
- Waste deposits on land/fields, namely in the Programme of rehabilitation of rivers which addresses the waste deposits with negative impacts in rivers.
- Households: Implementation of the Catalan Urban Wastewater Treatment Programme (2005), including its 2010 update.
- Measures also include: Treatment and management of wastewater treatment muds; Studies for tracing of pollution sources of priority substances in order to elaborate a pollution reduction plan; Measures for the reduction of the impact of WWTP discharges in rainy weather; and Measures for the reduction of pollution from agriculture sources.

The PoM does not specify which substances are targeted by each measure. Measures address priority substances from industry (still on a research phase), pollution from farming (nitrates, phosphates, pesticides), salt mining impacts and wastewater impacts (including the problem of WWTP discharge in rainy weather).

12.6 Measures related to Article 9 (water pricing policies)

The RBMP defines water services as all activities related to water management that enable water use, such as abstraction, desalination, storage, channelling, rehabilitation, treatment and distribution of surface and ground water, as well as the collection and treatment of wastewater that are later discharged into surface water. Water services also include activities related with flood protection of persons and goods. The definition is wide, but it seems that for the purpose of art 9 water services are related only to services provided by regional government, that's why self-abstraction and abstraction for irrigation seems not to be included.

Industry, households and agriculture have been identified as water uses. The water uses have been defined taking into account the need to plan the management of water resources, within a context in which the frequency and magnitude of drought events constrain the management of water resources. The RBMP states that the management of water resources aims at improving the guarantee of supply to all uses and enable the compliance with environmental requirements. There is a need to sustainably use the aquifers and preserve the ecological flow in the rivers.

In the model that has been developed for the purpose of determining the cost recovery in the region of Catalonia the services follow a different aggregation from the definition mentioned above. The model aggregates water services as follows: medium (environmental/water resources preservation, flood protection, rehabilitation of river ecosystems), water availability (impoundments, desalinates, reuse of resources, rehabilitation of aquifers both quality and recharge, storage, water network), transport and purification (high regime), distribution to the

final consumer (low regime), sewerage of domestic/industry and rain water and wastewater treatment.

It is not clear if an adequate contribution of different water uses (disaggregated at least into industry, households and agriculture) to the cost recovery is ensured. The RBMP presents a cost-recovery dynamic model and states that it aims at estimating the current cost-recover level and establish a basis with which to initiate a debate and a review of the existing management models.

12.7 Additional measures in protected areas

There is indication of specific measures for protected areas namely on the set of measures to maintain an ecological flow, measures to control invasive species and measures on coastal zone. The measures are mostly undertaken in programmes of the Department of Environment and Housing of the Regional Government of Catalonia and are not described in the PoM with detail on type and magnitude.

The PoM includes a full set of measures on the control, prevention and eradication of invasive species. The PoM also refers the elaboration of plans for the protection and management of protected areas, detailing the foreseen measures in beaches, in coastal area, in marine reserves, and in coastal lagoons.

There is almost no specific information on measures on potable water. There are activities included in the measures on energy efficiency in the water cycle, activities on urban water consumption reduction, and nitrate elimination on potable water. In Annex II of PoM it is possible to find some isolated measures on potable water as improvement of water treatment stations, or desalination, but nothing on reducing water treatment per se.

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

13.1 Water Scarcity and Droughts

The PoM states "The RBD of Catalonia suffers from a chronic deficit of water available for the uses, which can be aggravated as population and economic activity increases". Available water resources are estimated at 2610 hm³/year, while water uses reached 1138 hm³/year in 2007 and are foreseen to be 1228 hm³/year in 2027. The RBMP states that the percentages of water bodies affected by abstraction are - 22% for rivers,, 37% for lakes, 60% for transitional waters and 72% for groundwater. Throughout the sub-programmes of measures (there are 4) increasing water availability is a constant. One of the sub-programmes of measures addresses the management of water demand and water resources. Another large set of measures deals with maintenance of ecologic flow. In this way water scarcity is felt as relevant.

Data since 1940 indicate two dry periods i.e. 1944-1950 and 1999-2008. The periods 1999-2002 and 1985 to 1987 were especially dry. The documents mention recent droughts in 2003-2004 and in 2008. The Ter-Llobregat suffered five drought episodes in the last 15 years. Since 1940 overall rain follows a decreasing trend. Climate change models indicate decreases

up to 20% on aquifer recharge in 2070-2100. One of the 6 specific plans and programmes referred in the RBMP is the Droughts management plan. So it is considered important.

Water demand trend scenarios are provided based on estimated figures of water use. Water uses considered are domestic use, industry use, agriculture and livestock, and recreational use. The uses are consumptive or non-consumptive. Consumptive uses are: household, industry, agriculture and recreational. Non-consumptive uses are: hydropower and industrial cooling. The methodology to derive the assumptions on future demand is also explained.

Measures identified include measures for maintenance of ecological flow, measures for the issuing of licenses and permits for water use on agriculture and hydroelectric production, hydromorphological measures (river connectivity), measures for the rehabilitation of rivers and of wetlands as well as measures for flood prevention. There are also measures to create new water resources and measures for the re-use of water, and improvement of irrigation schemes, namely reducing water losses and increase efficiency of water use. Also there are measures on the improvement of water quality and for the protection and management of aquifers.

13.2 Flood Risk Management

The PoM includes a sub-set of measures on flood prevention. These measures include territorial planning and soil use zoning, revision of technical criteria for flood prevention, urgent interventions for the maintenance of run-off capacity and for the protection against floods. It also include other longer term and non-expected interventions of this sort, generation of knowledge and elaboration of the floods management plan.

PoM states that the measures on flood prevention aim at achieving the objectives of the WFD, but also set the basis for the elaboration of the flood risk management plan foreseen in the Floods Directive.

Extreme Flood: The PoM contains a subset of measures to avoid floods.

13.3 Adaptation to Climate Change

The RBMP includes climate characterization and climate change tendencies. Different climate scenarios are analysed. No national climate change strategy is cited by the plan.

There was no climate check of the PoM.

The PoM does not have specific measures addressing climate change. The RBMP states that for 2015 climate change scenarios are not considered due to the current high degree of uncertainty on water bodies characterization and the fact that historic variability already measured is much higher the potential impacts of climate change could be in 4 years. Only for 2027 climate change is considered as a reduction of flow of 5% at most, on average. In dry years and in the dry season the reduction could be even 20%, while in wet years there can be an increase of 5%. The set of measures addressing management of aquifers refers to running models to increase knowledge on the possible impacts of climate change.

Scenarios were created for 2015 (no change) and 2027. The RBMP states that further research is needed, both to establish baselines for water bodies and study possible impacts of climate change.

14. RECOMMENDATIONS

The most urgent recommendation is that all Spanish RBMPs should be adopted and reported. Given the lack of adoption of the plans in many Spanish regions, it is difficult to ensure that there is an effective coordination in the implementation of the WFD, including the setting of objectives and exemptions, and the definition of the necessary measures. The implementation of the WFD shall be coordinated across the RBDs, including with third countries in the international RBDs, to ensure the achievement of the environmental objectives established under Article 4, and in particular all programmes of measures need to be coordinated for the whole of the RBD, including within a Member State.

The following recommendations are only based on the RBMP of Distrito Fluvial de Catalonia. In summary, based on the RBMP reported by Distrito Fluvial de Catalonia, the following can be recommended:

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

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

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

- The assessment of water bodies needs to be completed.
- Monitoring gaps should be filled (hydromorphological parameters; analytical methods for priority substances and other pollutants, including the use of biota monitoring where relevant to overcome problems with limits of detection; monitoring methodologies to identify groundwater pollution trends, etc).
- The identification of river basin specific pollutants needs to be more transparent, with clear information on how pollutants were selected, how and where they were monitored, where there are exceedances and how such exceedances have been taken into account in the assessment of ecological status. It is important that there is an

ambitious approach to combating chemical pollution and adequate measures are put in place.

- Assessment methods for ecological status should be further developed that respond to the relevant pressures taking into account the work on Intercalibration and hydromorphological quality elements.
- The designation of HMWBs should comply with all the requirements of Article 4(3). The assessment of significant adverse effects on their use or the environment and the lack of significantly better environmental options should be specifically mentioned in the RBMPs. This is needed to ensure transparency of the designation process.
- The biota standards for mercury, hexachlorobenzene and hexachlorobutadiene in the EQSD, or standards providing an equivalent level of protection, should be applied if not already used. The requirement for trend monitoring in sediment or biota specified for several substances in Article 3(3) of the EQSD will also need to be reflected in the next RBMPs.
- Where there are currently high uncertainties in the characterisation of the RBDs, identification of pressures, and assessment of status, this needs to be addressed in the current cycle, to ensure that adequate measures can be put in place before the next cycle.
- The application of exemptions needs to be more transparent and the reasons for the exemptions should be clearly justified in the plans
- It is necessary to have more information on the Programmes of Measures, in particular calendar and concrete actions and how the implementation of measures will be monitored.
- Concerning agriculture, it is important to have more information on the link with relevant pressures (such as water abstraction) in order to address those pressures appropriately in the PoM.
- The cost-recovery should address a broad range of water services, including impoundments, abstraction, storage, treatment and distribution of surface waters, and collection, treatment and discharge of waste water, also when they are "self-services", for instance self-abstraction for agriculture. The cost recovery should be transparently presented for all relevant user sectors, and environment and resource costs should be included in the costs recovered. Information should also be provided on the incentive function of water pricing for all water services, with the aim of ensuring an efficient use of water. Information on how the polluter pays principle has been taken into account should be provided in the RBMPs.
- Uncertainty should not prevent Catalonia from taking action to prevent the negative impacts of climate change on waters.

