



GOBIERNO
DE ESPAÑA

MINISTERIO
DE AGRICULTURA, ALIMENTACIÓN
Y MEDIO AMBIENTE

CONFEDERACIÓN
HIDROGRÁFICA
DEL MIÑO-SIL

WATER MANAGEMENT IN MIÑO AND LIMIA RIVER BASINS

Informative Summary of the Management Plan
Project 2009-2015 of Miño-Sil River Basin



Miño—Sil
WATER PLANNING
2009-2015

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Edition: Miño-Sil River Basin Authority.
Water Planning Office.

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1. THE AUTHORITY

The Miño-Sil River Basin District Authority

¿What is it? The River Basin District Authorities are public institutions, attached to the Ministry of Agriculture, Food and Environment, which have the **River Basin Management** competence in interregional basins, i.e. river basins which cover more than one Region.

The Miño Sil River Basin District Authority (MSRBD bellow) is the organization responsible for the management of the **Miño Sil River Basin District** which covers the Miño River Basin- with its main tributary river Sil- , and Limia River Basin in the Spanish side, and also the transitional and coastal waters.

The MSRBD Authority manage the continental waters (rivers, lakes and aquifers), the transitional waters (estuary) and coastal water (in the River Miño mouth) belonging to the Spanish side of the River Basin District. There are 278 surface water bodies and 6 groundwater bodies(aquifers).

Which are their duties? The conservation of the good status of the rivers and aquifers will depend on the water availability to attend all the current and future demands with enough quality and quantity. With this aim, the Spanish Water Law confer the “*elaboration, monitoring, revision of river basin management plan*” to the River Basin Authorities.

The River Basin Management Plan (RBMP) is the main method in the water management. The RBMP establishes priority of the different water uses and the plan of action to achieve the good status and the protection of the water bodies



Water Systems distribution in Miño Sil River Basin. *Own elaboration*

How do they manage the water resources? In order to accomplish a better water management in the River Basin District, the RBMP distinguishes 6 water resources systems: **Upper Miño, Lower Miño, Cabe, Limia, Upper Sil and Lower Sil.**

The water resources Systems consist on **water bodies** (surface and underground water), **hydraulic infrastructures** and **water use rules**. According to the water quality and the environmental objectives established, the RBMP determines the water availability for each system.

2. THE TERRITORY

The Miño-Sil River Basin District

The Miño Sil River Basin District is an **International basin**. The last 76 Km of the Miño River, the Trancoso Tributary River and also the Rivers Limia, Laboreiro and Salas (Limia tributary river) are managed by Spain and Portugal in a shared way.

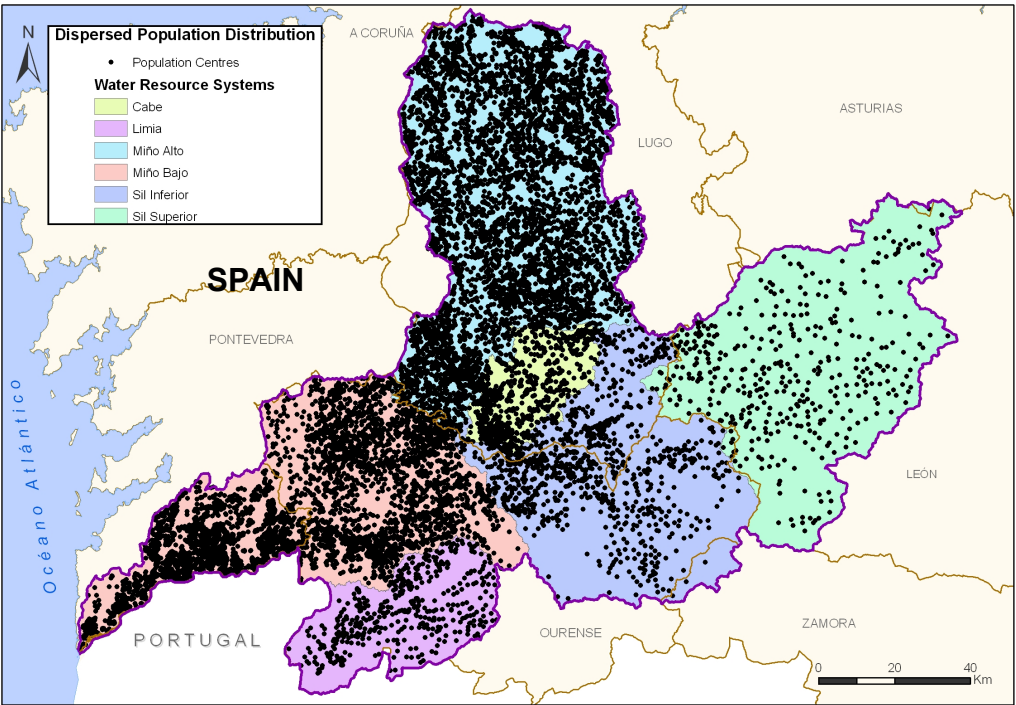
Apart from international basin, the MSRBD is an **interregional basin**. It covers 7 different Provinces from three Regions: Galicia, Castilla y Leon and Asturias. The total area is 17.619 km².

The Miño Sil River Basin District includes more than 200 municipalities. The MSRBD population is 858.310 residents and the population density of the basin is 49 residents per km², a value under the national average (88 residents/ km²)

The territory of the River Basin District has a widely dispersed population distribution, with about 11.703 population centres (cities, towns and villages). The 91% of the MSRBD municipalities have less than 10.000 residents and only in the cities of Lugo, Ourense and Pontevedra the population is more than 50.000 residents. The 25% of the Galician population live in small villages with less than 100 residents.

REGIONS	PROVINCES	EXTENSION	POPULATION
Galicia	Ourense	6139	304232
	Pontevedra	1165	153.710
	Lugo	6266	251817
	A Coruña	4	-
Asturias	Asturias	16	87
Castilla y León	León	3885	148071
	Zamora	144	393
Total River Basin Distidrográfica Miño-Sil		17619	858310

A widely dispersed population



Population centres distribution in Miño Sil River Basin. Own elaboration.

PROVINCE	P. CENTRES
ASTURIAS	1
LEON	391
LUGO	5997
OURENSE	3394
PONTEVEDRA	1917
ZAMORA	3
TOTAL MSRBD	11703

WATER RESOURCE SYSTEM	P. CENTRES
CABE	756
LIMIA	433
MIÑO ALTO	4884
MIÑO BAJO	4227
SIL INFERIOR	997
SIL SUPERIOR	406
TOTAL MSRBD	11703

3. THE WATER PLAN

The planning process: The current planning process starts with the approval of the **Water Framework Directive** (*Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy*) which precepts are integrated in the Spanish code of laws.

According to Water Framework Directive, the River Basin Authorities should elaborate the new River Basin Management Plans under **the water use sustainability** criteria. Promoting:

- The **integrated management** and long term protection of water resources
- The **prevention** of the deterioration of water status
- The **protection** and the improvement of the aquatic environment and aquatic ecosystems and reduction of pollution
- The **prevention** of the floods and droughts effects
- The **information** and public participation

Following the WFD, the Miño-Sil River Basin Authority developed and submitted to public consultation the initial documents. Afterwards the outline of mayor issues (ETI) was published; currently it is approved by the Government Committee of the MSRBD and the competent authorities Committee.

Finally, the documents that correspond to “ The Water Management Plan Proposal and Environmental Sustainability Report” of the water planning process for the Spanish part of the Minho-Sil River Basin were drafted and submitted to the official public consultation period (December 15, 2011). After the public consultation, in June 2011, the received contributions were analyzed - a total of 70 - and the final documents of the Water Management Plan ,that will regulate the management of river resources in the coming years , were drafted.

Planning to ensure the good status of the water bodies

The Miño-Sil River Management Plan project is composed by a **report** which consist of 14 chapters, 12 appendixes that develop each chapter and **specific regulations** to establish the legal framework of the uses, rights and obligations in respect to the water resources of the MSRBD.



Contents of the Management Plan

- **Overview** of the River Basin District
- Description of **usage, demands and pressures**
- **Use priorities** and allocation of resources
- Identification and mapping of **protected areas**
- **Control programmes** and status of the water bodies
- **Environmental objectives** for water bodies and assessment of compliance with environmental objectives
- **Economic analysis** of water uses and costs recovery
- Related **plans and programmes**, stressing in control plans of floods and droughts
- **Measures programme** to achieve the environmental objectives
- **Public participation**
- Monitoring of the river basin district management plan

4. THE RESOURCE

Pressures, impacts & measures to achieve the good status of water bodies

The Water Network

The main water network of the River Basin District is composed of the basins of rivers Miño, Sil and Limia. In the Spanish side of the basin there are **278 surface water bodies and 6 underground water bodies** (aquifers).

The surface water bodies are classified in four categories: *river (270), lake (3), transition water (4), coastal water (1)*.

The Miño River Basin covers the area from its source, in the north part of Lugo Province, to the mouth in Atlantic Sea, between the towns A Guarda –Spain- and Caminha -Portugal-. The Sil River is the main tributary to Miño river but also rivers Ladra, Neira, Avia, Deva, Arnoia and Tea are some other tributary rivers.

The 95 % of the Miño River Basin area is situated in Spain, but the last 76 Km are international waters which form the natural border between Spain and Portugal. These last 76 Km are managed in a shared way between Spain and Portugal through the **Convention of Albufeira** (*Convention about bilateral cooperation for the protection and the sustainable exploitation of the Spanish-Portuguese river basins*).



Portas Reservoir

The Limia River Basin is 108 Km long from its source to its mouth in the Atlantic Sea at the Portuguese City of Viana do Castelo. On its last 67 Km the river goes through Portuguese Territory. The 53 % of the Limia river basin is situated in Spain and the 47% in Portugal; the main tributary river is Salas river.

Pressures Study

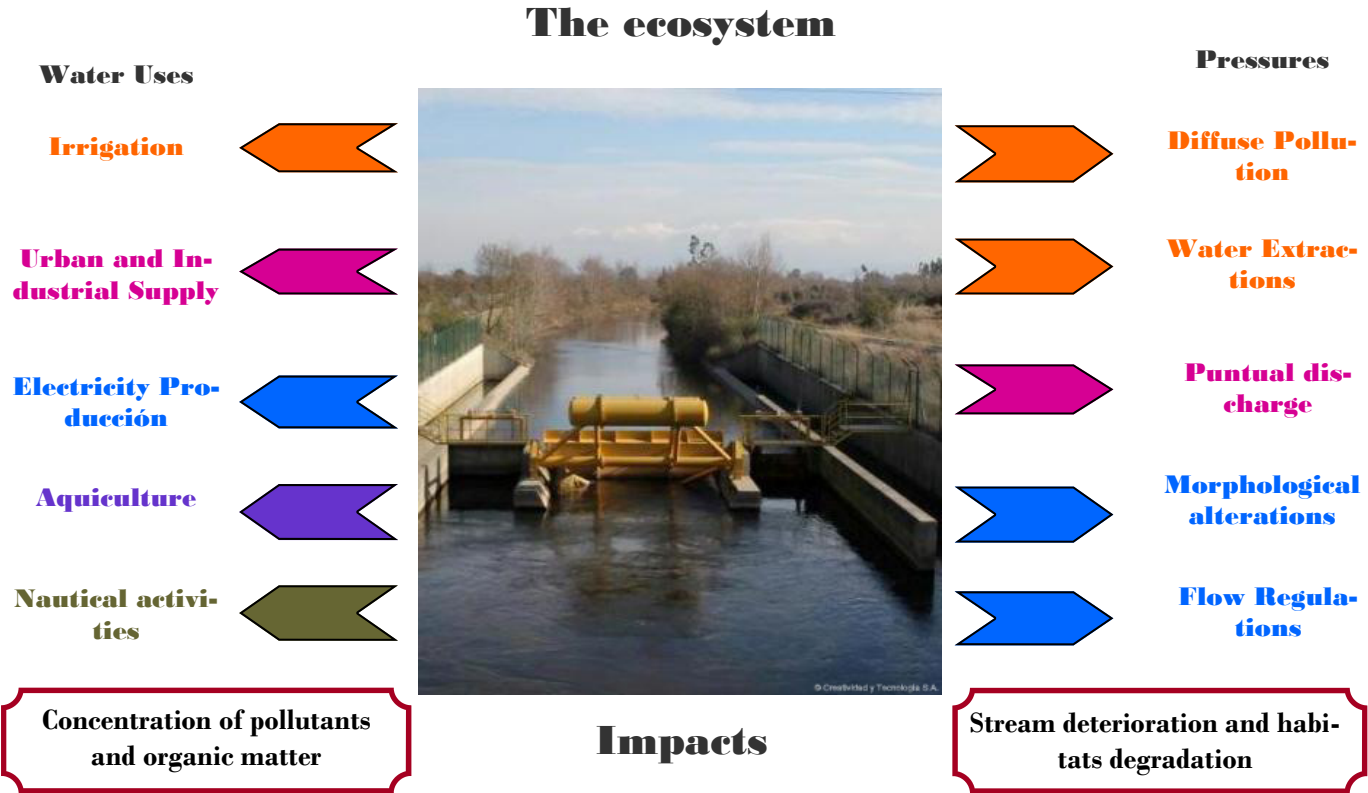
The availability of **enough quantity and quality of water** to attend our needs depends on the good conservation of the rivers and water bodies.

The Water Framework Directive establishes as **priority objectives** of water planning to achieve good water status, to protect aquatic ecosystems and to reduce pollution.

Consequently, the River Basin Management Plan contains an intensive **study** of the status of all water bodies of the River Basin District; which includes biological, physical, chemical, hydrological and hydro-morphological studies. This study examines, also, the pressures over the water resources made by different water uses and the impacts of these pressures.

Water uses are different kinds of resource utilization as well as any activity that has significant impact on water status. Water uses include: population supply, irrigation and other agricultural and livestock uses, electricity production and other industrial uses, aquaculture, recreational uses, navigation and water transport.

According to the water volume consumed, the most important water uses in MSRBD are agriculture, urban and industrial



What threatens our water?

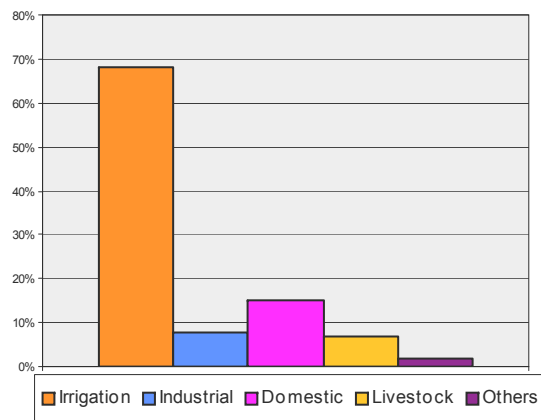
The results of the water bodies study show that **most of the MSRBD surface waters** (rivers, lakes and reservoirs, transitional and coastal waters) **are in good condition** (70.5%) and so does five out of six underground water bodies. However, there have been identified a total of **78 surface water bodies and one groundwater body in a status worse than good**.

The inventory of pressures included in the River Basin Management Plan identifies the following major pressures or problems on water: **pollution** (point and diffuse), **water extractions** and **hydro-morphological alterations** in rivers (for electricity production). These pressures reduce **water availability**, directly affect its **quality** and undertake the **fulfillment of environmental objectives**.

Agricultural and livestock activity has a high impact on the water bodies for two reasons: the consumption of water for irrigation of crops and pastures and diffuse pollution from the use of fertilizers and pesticides in agriculture and livestock.

Irrigation is the use in the MSRBD which consumes most water. Rainfed crops, in MSRBD, consume 297,4 hm³/year of water and an area of 26,086 ha. The consumption of livestock (mainly cattle, pigs and sheep and goats) derived from irrigated pastures and meadows. Agriculture accounts for almost 70% of water demand across the River Basin District. Livestock farmers use less than 10% of the volume of granted water.

Total demand (%) of water in MSRBD according to main uses



Diffuse water pollution is the load of nitrogen and phosphorus to soil and water bodies from agricultural activities and livestock, mining discharges and activities of soil pollution. The RBMP identifies 43 river-water bodies at risk of not achieving environmental objectives due to the effect of diffuse pollution and other pressures.

Which are the generated impacts?

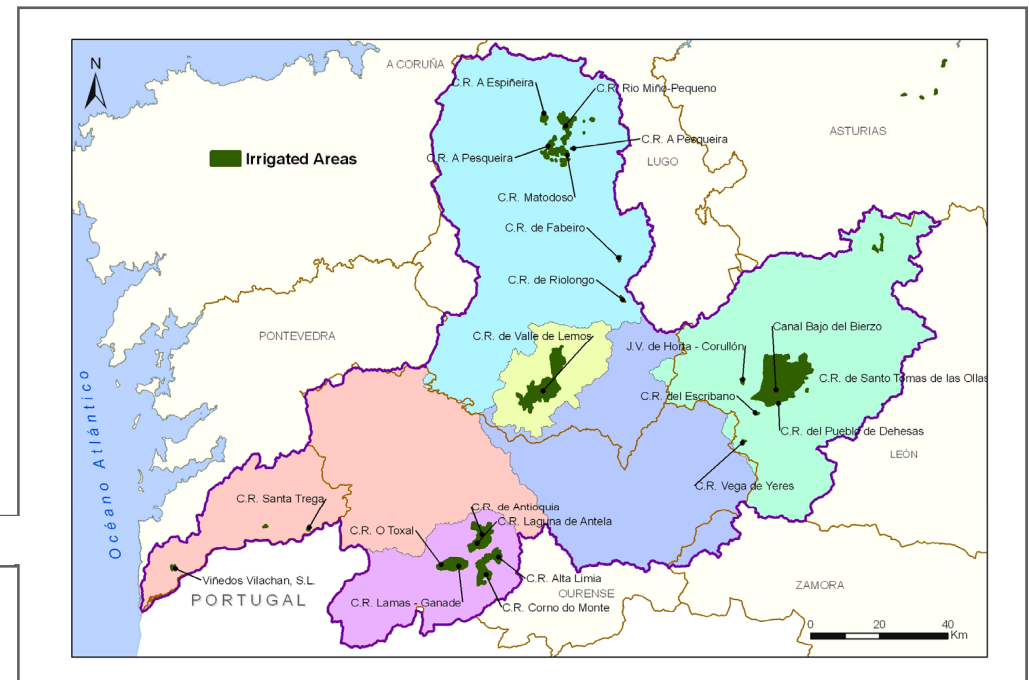
Water extractions produce stream deteriorations of rivers, affecting the availability of water resources in the basin, at the present time or at the future.

Diffuse pollution is responsible for the **eutrophication of lakes and reservoirs** by high concentrations of nutrients (ammonium, phosphorus...) and **surface water pollution** for organic matter (nitrogen and phosphorus) from the farms. This impact is detected mainly in the livestock districts of Upper Miño, Lower Miño and Limia.

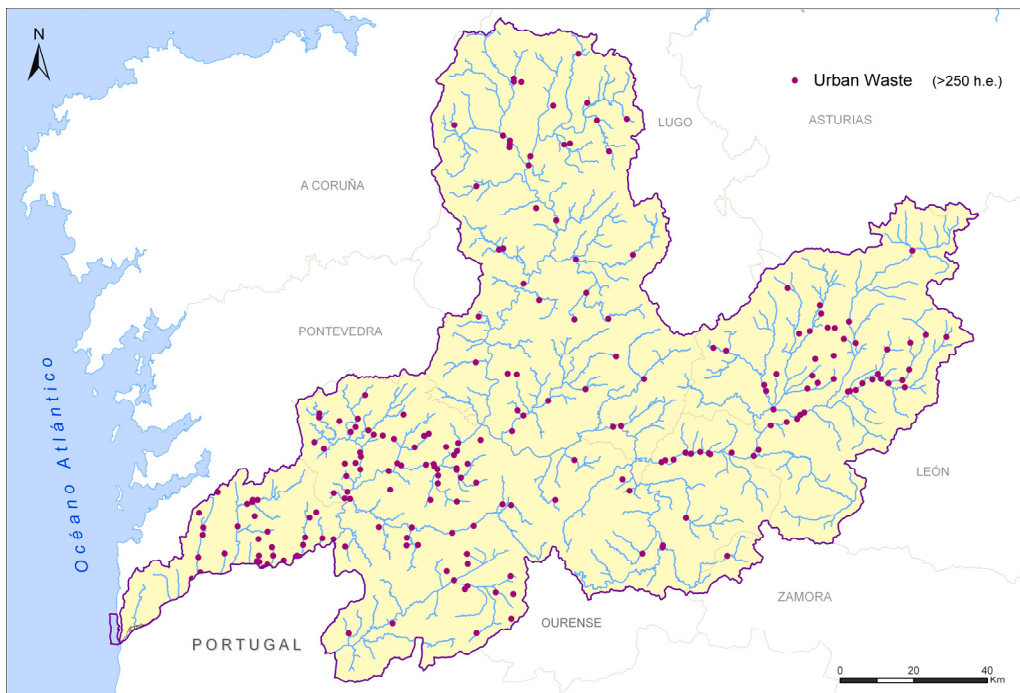
Which measures are envisaged?

The Measure Programme contains 18 actions aimed to reduce water consumption through the **modernization** and replacement of irrigation systems for more efficient methods (sprinkler or drip) and improving drainage.

Improving irrigation channels will promote a greater efficiency in the transport of irrigation water. The planned investment is 88.654.450,15 €.



Main irrigated areas in Miño Sil River Basin



Main sources of Urban Waste contamination

Urban water use

It represents the 26% of water consumption in MSRBD, with a total water volume of 52 hm³/year. The households are responsible for the 56.7% of the total water for urban supply.

Urban water demand includes domestic use, industrial, commercial and tourist activities, and also the water consumption of municipal facilities and private irrigation and livestock.

Industrial activities

Industrial water demand is not very high in Miño-Sil River Basin except in Upper Sil, due to the importance of mining. The total volume of water extracted for industrial uses from surface water bodies is 11.58 hm³/year.

Industrial activities cause an important impact on water bodies of the MSRBD, resulting from industrial or mining discharges.

Point pollution

Industrial or urban waste water discharges generated by a deficiency of water treatment facilities.

46 river water bodies do not reach the good status due to the effects of **point pollution sources** or in combination with other pressures.

Impacts

Surface water pollution by discharges of priority substances or other pollutants and **discharges from dumps** due to percolation or infiltration of leachate and contaminated runoff.

Contaminated sediments: there have been registered 11 water bodies associated with potentially contaminated soils, located in the Upper Sil System and in Louro river. Contaminated soils can lead to a **contamination of groundwater:** an example is the Aluvial of Lower Miño.

Measures

Improvement of sanitation and water treatment: Installation and adaptation of WWTP (Wastewater Treatment Plants) in urban areas; drainpipe improvement and sewerage networks extension. The Measure Programme includes 646 actions and an investment of 362,447,428.41 € concerning sanitation.

Control networks of the water bodies: to accomplish regular controls about the status of surface water and groundwater; and also to prevent contamination and early warning.

Improvement of water supply networks: that guarantees the satisfaction of current and future water demands.

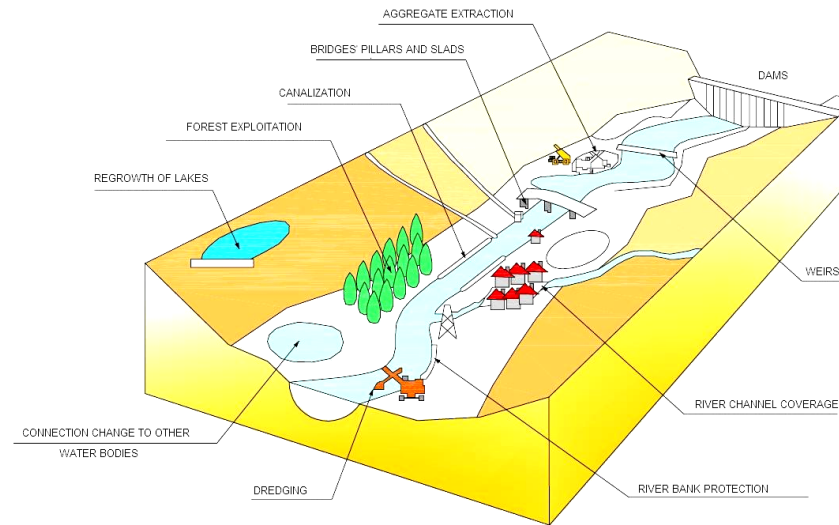
Integrated Water Cycle

The responsible people for urban water supply should **manage the resource** in order to be returned to the natural environment in the best possible conditions, the wastewater treatment is required.

Electricity Production

106 hydroelectric stations are located in MSRBD (36 out of all are big) and two power stations located in El Bierzo (Compostilla and Anllares). The MSRBD has an installed capacity of 4,402 MW. The whole capacity corresponds to 63% hydroelectric and 35% for thermal production of public service.

Water extractions: Water use in hydroelectric stations is a non-consumptive use and the estimated return volume is 100%. Power plants need for cooling large quantities of water and they return the water in higher temperature conditions.



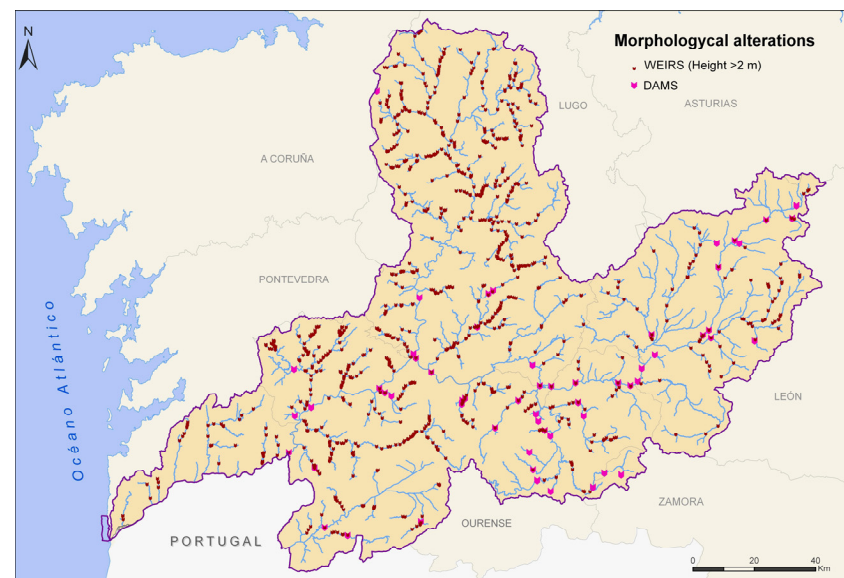
Morphological alterations in surface water

Impacts

48 water bodies (Rivers) do not reach the good status due to the effect of morphological and / or regulation of flow; another 40 water bodies (rivers) are not in good condition as a result of significant water extractions or other pressures.

The morphological alterations are the main pressure over the water in MSRBD. Dams disrupt the ecosystems and obstruct the flow of water and fish species that migrate upstream to reproduce (eel and salmon).

The high level of water extractions produces alterations of water flow, jeopardizing the availability of water in the future.



Main Pressures in Rivers for Morphological alterations

Morphological alterations and Flow Regulations

Dams: There are 59 dams higher than 10 meters and 2166 dams between 2 and 10 meters. There are only 10 with fish bypass.

Water transfers: water extractions in the donor river and water contribution to the recipient river. There are 3 water transfers from others river basins; the transferred water is used for supply.

Water diversions: There are 85 hydroelectric water diversions. The annual volume of derived water is 142.969 hm³/ year.

Dredging: Periodic actions to increase the drainage capacity or the riverbeds depth.

Measures

Ecological Flows Regime

The Miño-Sil River Basin will consider the necessary measures to ensure the ecological flows and to combine use of the resource with the respect for the environment.

The River Basin Management Plan 2009-2015 includes some other corrective measures of the morphological alterations: **longitudinal permeabilization of the streams through fish bypasses, obstacles removal** in rivers or prevention measures like **environmental impact studies** for future actions.

Environmental Objectives

The pressures inventory made in the Miño-Sil River Basin, identifies a total of **78 water bodies of surface water and groundwater body in bad status**. In order to improve the status of the water bodies (rivers, lakes, and reservoirs) and to protect the whole stream network of the basin, the RBMP 2009-2015 establishes environmental objectives for surface water, groundwater and also for protected areas.

The environmental objectives are included in the **regulations of the RBMP**. In those water bodies where it is not possible to achieve good status it will be possible (giving adequate justification) to **postpone** the achievement of the objectives or to establish **less strict objectives**.

For surface water:

- To prevent deterioration of water bodies
- To protect, to enhance and to restore all surface water bodies with the aim of achieving good status
- To reduce progressively pollution from priority substances and to cease or phase out emissions, discharges and losses of priority hazardous substances

For groundwater:

- To prevent or limit the input of pollutants into groundwater and to prevent the deterioration of the status of all bodies of groundwater
- To protect, enhance and restore all bodies of groundwater and to ensure a balance between abstraction and recharge of groundwater
- To reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order progressively to reduce pollution of groundwater

For protected areas:

- To achieve compliance with the standards and environmental objectives

For artificial and heavily modified bodies of water:

- To protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status



Laboreiro River

Current status and environmental objectives for the surface water bodies

	Chemical Status			Ecological Status					
	Good	Worse than good	Non defined	Very Good	Good	Moderate	Poor	Bad	Non defined
Currently	56	7	215	69	126	52	22	4	5
2015	232			70	162				
2021	15				15				
2027	28				28				
Less strict objectives	3				3				
Total number of surface water bodies: 278									

Current status and objectives for groundwater bodies

	Chemical Status			Quantitative Status		
	Good	Worse than good	Non defined	Good	Bad	Non defined
Currently	5	1	0	6	0	0
2015	5	1	0			
2021	1	0	0			
Total number of groundwater bodies: 6						

5. THE RESOURCE MANAGEMENT

Priority of uses, ecological flows and balance of water resource systems

Priority of uses

In order to combine water uses with the conservation of the resources and the environment, the River Basin Management Plan establishes the order of preference between the different water uses. Apart from guaranteeing population supply, it will be given priority to actions aimed to: water saving, water resources conservation, community and cooperative projects.

Order of preference between the different water uses:

1. Population supply
 - a) Urban supply
 - b) Others population supplies
2. Other environmental uses
3. Irrigation a agriculture uses
4. Industrial uses for electric power
5. Industrial uses
 - a) Production Industries of consumer articles
 - b) Exploitation Industries
6. Aquiculture
7. Recreational Uses
 - a) Non consumptive water-uses
 - b) Spare time activities related to water in a indirect way
 - c) Uses which involve diverting water
8. Navigation and aquatic transport
9. Others non environmental uses

Ecological Flows

In order to achieve the good status or ecological status in Rivers and transition water, the RBMP 2009-2015 establishes a system of environmental flows for water bodies, it also estimates the flow rate that should be kept in a stretch of river to ensure the life of the fish fauna and the proper run of ecosystems.

The **environmental flow regime** has been calculated by hydrobiological methods in **24 priority water bodies** (9% of total) and by **hydrological methods in all mass ends** (270)

Once the studies are finalized, the implementation of the flow regime and the adaptive monitoring continues. An agreement process will be taken in case these flow regime affect water assignment. The defined minimum flows will be compulsory once the agreement process is finished. The implementation of the maximum flows, flood flows and exchange rates will be defined by Miño-Sil River Basin District Authority particularly in each case.

- **Minimum flows temporarily distributed:** It should be exceeded to keep the habitat diversity and the river connectivity
- **Maximum flows temporarily distributed:** It should not be exceeded to keep vulnerable native species
- **Flood flow:** It promote the different species abundance and the physicochemical and geomorphologic conditions of the water bodies
- **Exchange rate:** It avoids the negative effects of a sudden flow variation



ASHI Station in Limia River

Water balance of the water Systems

Due to the status and the quality of water resources, each water system has **an available amount of water** to attend the current and futures demands. The main features and the water resources balance of the **six water systems** are included in the water balance section.



Upper Miño

It covers the Miño River Basin from its source to its confluence with the Sil river, with a total area of 4,690.76 km². The Upper Miño system has 3,176.82 hm³/year surface water resources and a groundwater body in the upper area of the Miño river .

The main water demand in the system is irrigation and the second one is urban demand, essentially in Lugo City. The biggest reservoirs in Miño-Sil River Basin District (Belesar and Os Peares) are located in Upper Miño System and they are used for hydroelectric exploitation.

Resources Balance: The executed studies about available resources and the predicted water demands, show the enough capacity of Upper Miño System to satisfy the current urban demand, however the system could present problems to satisfy new agriculture demands. For that reason, the **Measures Program** foresees modernizations of irrigations, pollution reduction and the rationalization of the water consumption in order to promote a sustainable use of water for achieving the ecological flows and satisfying the futures water requirements.



Lower Miño

It covers the Miño River Basin from its confluence with the Sil river to its mouth at the Miño Estuary. Its total area is 3,592.81 km² and the main water contributions are the rivers Barbantillo, Avia, Tea, Arnoia and Louro. The Lower Miño System has also a groundwater body called “Aluvial of Lower Miño”. **In this System there is a transfer** from the Eiras Reservoir (Galicia-Costa River Basin District) that supplies the municipalities of Mos, O Porriño, and Salceda de Caselas. **There are 3 regulating reservoirs:** Velle, Castrolo and Frieira, their priority use is hydroelectric exploitation.

Resource Balance: The Lower Miño System satisfies the current water demands and the predicted ones for 2015 and 2027; it achieves the ecological flow and the minimums flow requirements defined in the Albufeira convention.



Cabe

It covers the Cabe River Basin from its source in Fontes (O Incio) to its confluence with the Sil river, in the province of Lugo. The total area of the system is 735.18 km² and the main water contributions are the rivers Mao, Cinsa y Carabelos. The **Vilasouto Reservoir** is located in this water system and supplies the Val de Lemos irrigation demand and urban demands of the towns Monforte and Bóveda.

Resources Balance: The water resources of the system are enough to satisfy the existing demands and the predicted ones for 2015 and 2027. It would be advisable to modernize the irrigations systems and to improve the sanitation and water treatment in order to guarantee the fulfilment of environmental objectives.



Upper Sil

It is formed by the Sil River Basin from its source to its confluence with the Cabrera river (León). It covers a total area of 3.976,68 km².

The most important water consumption in Upper Sil System is the agriculture demand of the irrigation communities **Canal Alto and Bajo of El Bierzo** and also the hydroelectric exploitation.

Resources Balance: The total water resources of the Upper Sil Water System are enough to satisfy the existing demands and to ensure the defined ecological flows if modern irrigation systems are installed.

Limia

The **Spanish area of the Limia River Basin** covers a total area of 1,328.43 km², from its resource to the border with Portugal. The hydroelectric exploitation is the main use in the Reservoirs: **Salas** (Salas river), **As Conchas** and **Lindoso** (Limia river).

Resources Balance: The total water resources of the System are enough to satisfy the current urban demands and the predicted ones for the years 2015 and 2027 and also to ensure the ecological flows.

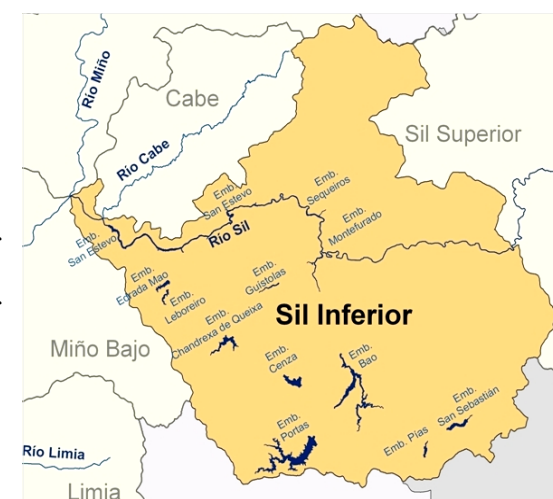
The surface water resources are not enough to satisfy the predicted agriculture demands. For that reason the RBMP plans modernizations of irrigation, rationalization of the water consumption and livestock waste management in order to improve the water resources of the system.



Lower Sil

It covers the Sil River Basin from its confluence with Cabrera river to its mouth at Miño River. The area of this water System covers part of the provinces of Lugo, Ourense and Zamora. The total area of the System is 3,278.56 km². There are **many hydroelectric power plants and plentiful water resources**.

Resources Balance: The total water resources of Lower Sil are enough to satisfy the current demands and the predicted ones for the years 2015 and 2027 and also to ensure the defined ecological flows (in implementation process).



6. THE RESOURCE PROTECTION

Protection Areas

The RBMP 2009-2015 establishes the protection of:

Water catchment areas: all water bodies used (currently or in the future) for human consumption with an average of more than 10 hm³/day, or supplying more than 50 people.

Production areas of economically significant species: shellfish production areas and stretches of river waters classified as salmonid waters (salmon and trout).

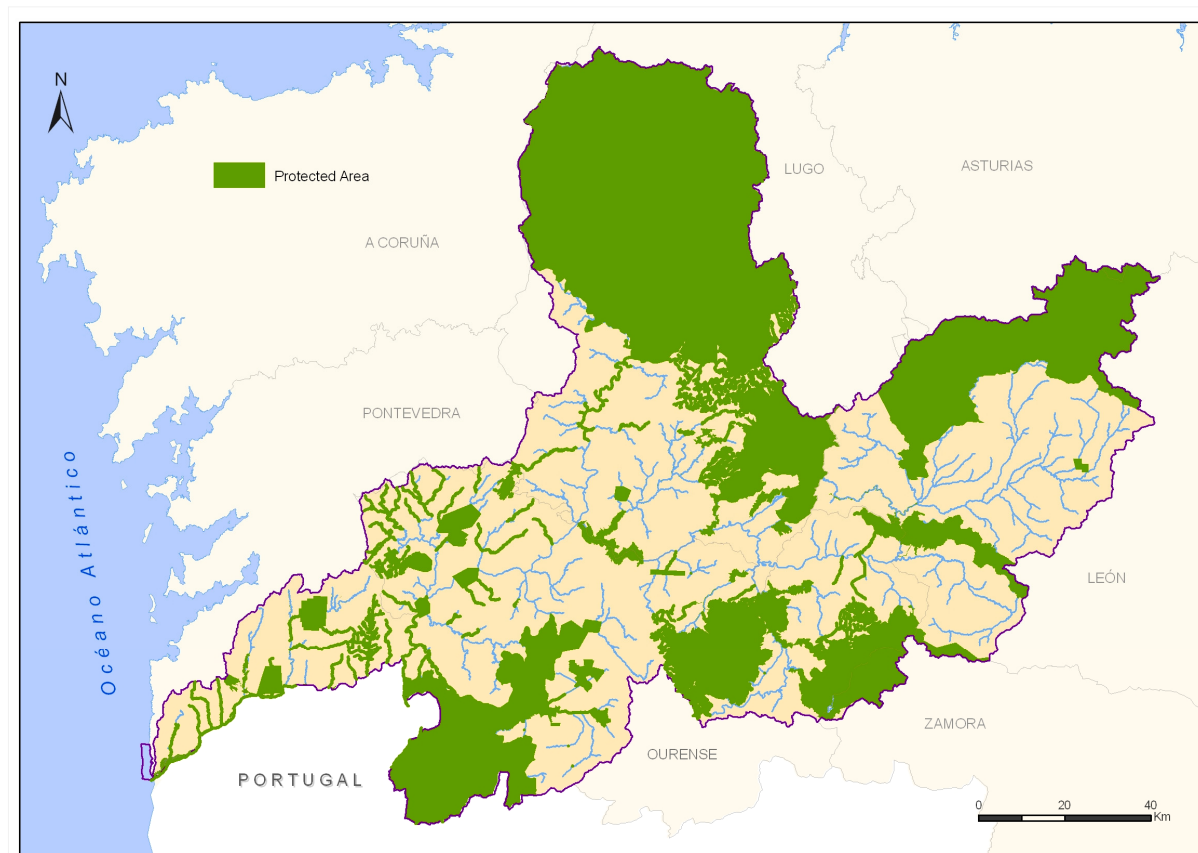
Sensitive and vulnerable areas: to diffuse pollution or wastewater discharges from urban areas.

Bathing areas: delimited stretch of a river, reservoir or coastal area.

Protection perimeters: of thermal and mineral waters.

Protected Natural Areas and Habitat or Species Protection Areas: protected areas where the maintenance or improvement of water status is an important factor to ensure their protection. The Special Protection Areas for Birds (SPA) are 13, the Sites of Community Importance (SCI) are 25 and form the Natura 2000 network, the wetlands and other relevant areas of environmental value.

Natural or environmental interest stretches: non-modified or undisturbed stretches in term of morphology, quality or flow regime.



Protected Areas considered in the Management Plan 2009-2015 of the Miño-Sil River Basin District

Biosphere Reserves

The MSRBD covers the territory of 9 Biosphere Reserves: Xurés Gerês, Terras do Miño, Eo River, Ocos and Terras do Burón; Allariz Reserve; Laciana Valley, Valleys Omaña and Luna; Somiedo and Babia.

Water Bodies Control and Monitoring

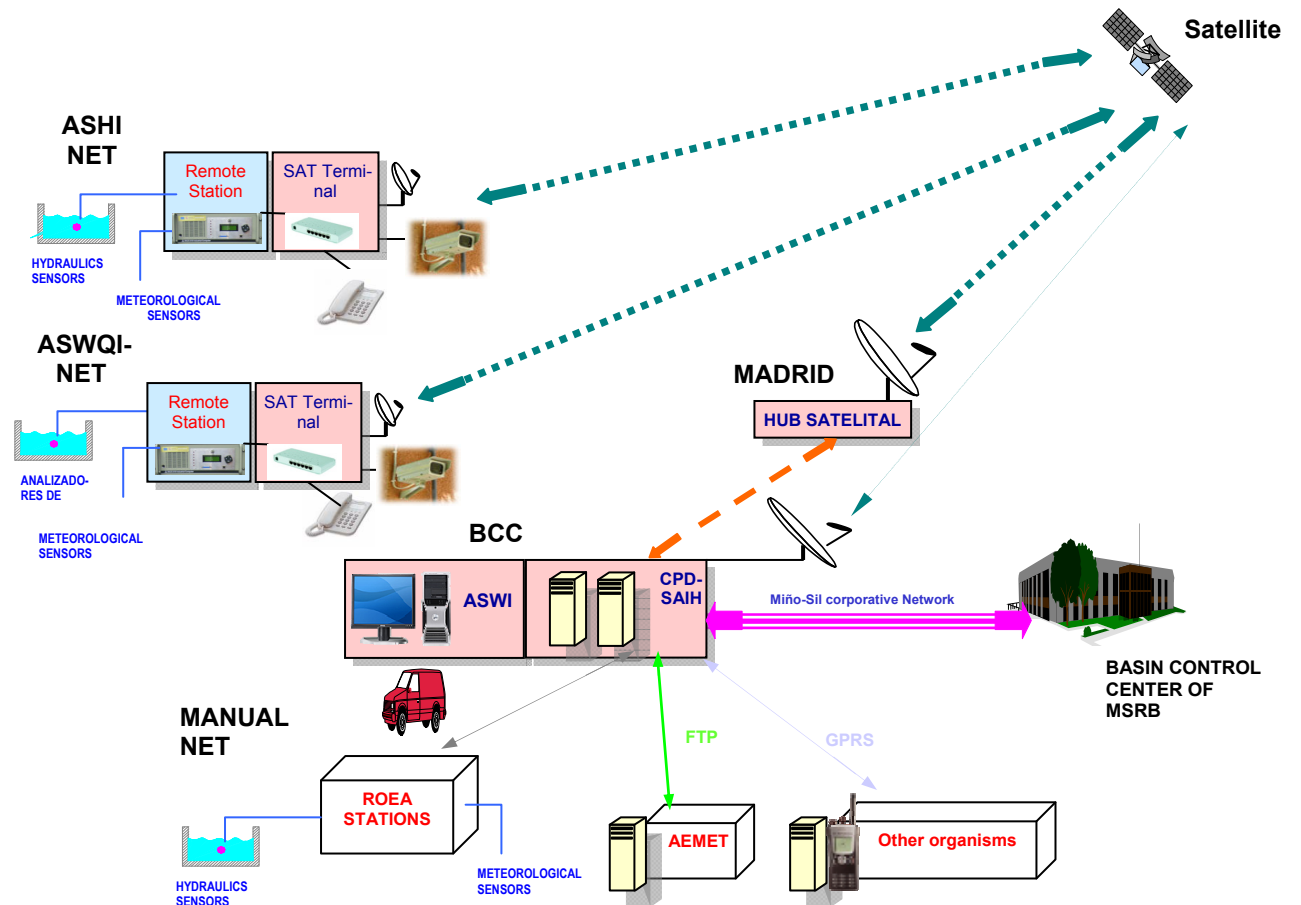
The RBMP 2009-2015 contains a description of the **network and control programs for monitoring, operational control and research** of surface water bodies and protected areas, in order to obtain an overview of their status. In the MSRBD there are:

- Surveillance monitoring network
- Operating control network
- Research Monitoring Network

The **control and surveillance network** aims to obtain a comprehensive overview of the status of water bodies. It measures biological, physical, chemical and hydromorphological indicators to determine the ecological potential and the chemical indicators to determine the chemical status of water bodies.

There are **51 monitoring stations** on the rivers of the MSRBD, **18 checkpoints** in lakes and reservoirs and **2 checkpoints** in transitional and coastal Waters.

PROVINCE	NUMBER OF CURRENT STATIONS	NUMBER OF STATIONS AFTER THE EXTENSION
LUGO	27	32
OURENSE	23	29
LEÓN	24	26
PONTEVEDRA	8	12
ZAMORA	1	1
TOTAL	83	100



Operational Scheme of the Basin Control Center

The Miño-Sil River Basin has an **Automatic System of Hydrographic Information (ASHI)**. This system controls the volume and level of the flow of different water masses, the hydrological and meteorological information. The **Automatic System of the Water Quality Information (ASWQI)** verifies the chemical and ecological status of the different water bodies (temperature, pH, conductivity, dissolved oxygen turbidity).

The **Control Network** of MSRBD consists of **83 ASHI stations** (11 out of the total are also ASWQI) and it will be expanded to 100 stations. The MSRBD will have a checkpoint for every 176 km² of basin and 90 km² of main streams. ASHI-ASWQI network is a major **advance in monitoring the water quality**. The Data Acquisition System processes and transmits the information collected, every five minutes, through Satellite to the Basin Control Center (BCC), in Ourense, as well as occurring alarms .

7. ECONOMIC ANALYSIS

Measures Programme

The RBMP considers a measures programme which prioritizes those actions to be performed on water bodies in bad status in order to carry out the proposed environmental objectives and **achieve good status or potential and meet deadlines**, considering criteria of economy and sustainability.

The proposed measures are grouped mainly in: **sanitation and water treatment**, **supply**, improvements of **irrigation**, **flood** prevention, hydrologic and forest **restoration**, **energy** and **administrative**. The Measures Programme considers a total of 1,564 actions includes in 1,112 measures with a total investment of **988,880,626. 46 €**.

TYOLOGY	INVESTMENT UNTIL 2015	PERCENTAGE
SANITATION AND WATER TREATMENT	362,447,428.41 €	36.7%
SUPPLY	169,450,763.59 €	17.1%
IRRIGATION	88,654,450.15 €	9%
FLOOD PREVENTION	36,720,203.45 €	3.7%
RESTORATION	307,453,983.35 €	31.1%
ENERGY	600,840.80 €	0.1%
ADMINISTRATIVE	23,552,956.70 €	2.4%
	988,880,626.46 €	100%

Total investment of Measure Programme

Main Actions

Supply

Measures concerning Water Treatment Stations, tanks and pumping; Improvement of supply networks, actions in dams, improvement of catchments and pipelines.

Sanitation and treatment

Projects on wastewater treatment plants; collectors, improvement sanitation networks.

Modernization of irrigations

Financing systems with lower water consumption, improvements of canals and ditches, regulatory measures and concessions.

Floods preventions

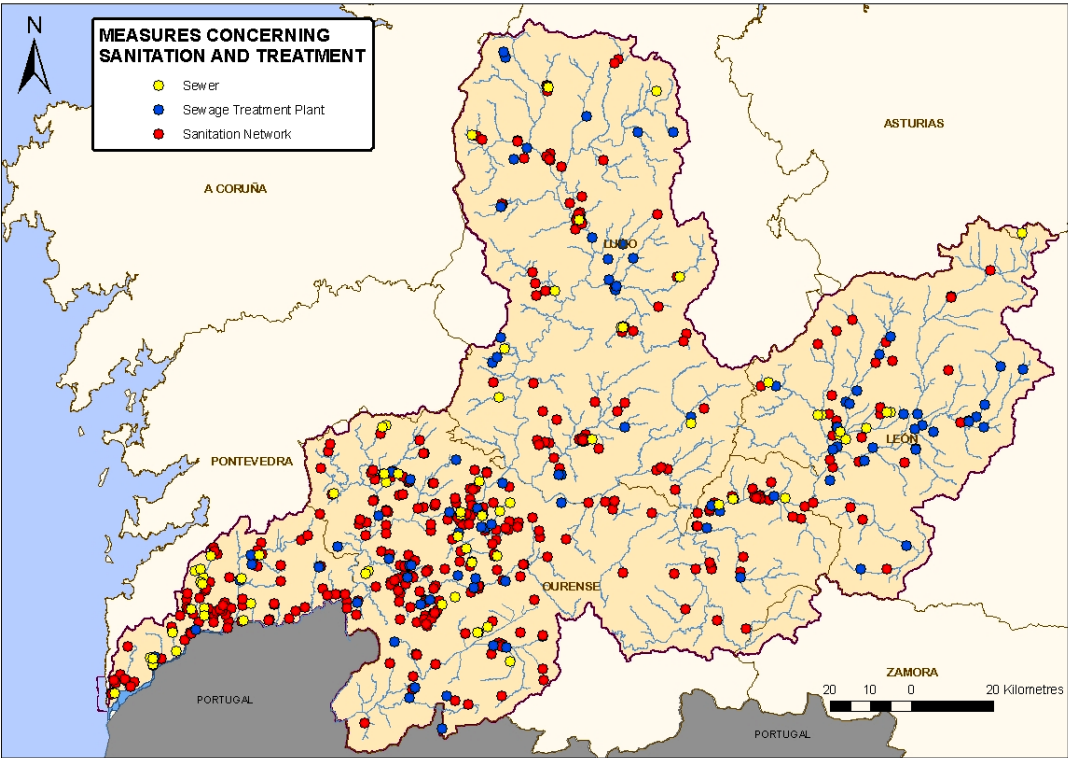
Early Warning System; Preventions Plans; actions in dams, rivers and protections.

Restoration

River restoration, bank recovery, wetlands restoration

Administrative Measures

Monitoring Water Networks (ASHI-ASWQI); cost recovery and rate updates; laws and regulation of uses, development of codes of good practices, awareness campaigns and environmental education.



Measures concerning the improvements of sanitation and treatment considered in the Meassures Programme

Costs Recovery

The European Union wants to encourage consumers to become aware of their consumption, adjusting rates to the real cost of water. The Water Framework Directive establishes that water prices should be adjusted to real cost of water services, incorporating incentives for efficient and rational use of the resource. **Cost recovery** is a way to achieve an efficient use of resources and an adequate contribution to the cost of the services.

The supply of an amount of water to each user entail a cost called "cost of water" and it has effect on the final consumer through the price. The price of the water quantifies the cost of service per unit of water consumed (cubic meters).

The RBMP considers the following services:

- **Water supply mains**
- **Urban water services**
- **Water services for irrigation**

Services	Costs recovery Mechanisms
Water supply mains	Canon of Regulation Water use rate User fees
Urban Water services	Supply Tariff Sewer Tax Sanitation Tax Irrigation tariffs
Flood Prevention	Public service, no economic impact over the beneficiary
Environmental Protection	Canon of waste control to Water Public Domain Canon of waste land-sea
Water Administration	Canon for utilization of assets of Water Public Domain Canon for occupation and exploitation of the Water Public Domain

Costs recovery Mechanisms per service



Water supply mains

It refers to the collection, storage and water transport through regulation works and conductions from the catchments .

Cost recovery in water supply mains correspond to the amortization of investment costs and the cost of maintenance, operation and management.

The MSRBD applies the fee of regulation and the water utilization rate to major users: communities of irrigators, hydroelectric and other domestic and industrial uses.

Water for irrigation

It refers to the use of irrigation water in agriculture and includes the conduction from the point of delivery of supply mains and the distribution within the irrigation area.

The cost recovery mechanisms are similar to those in supply mains.

Urban services

It refers to drinking water by public networks, including the adduct, purification, water supply and sanitation (sewerage and sewage treatment plants).

Cost recovery is for the amortization of investment costs and the cost of management and operation services.

With this objective, municipalities (or other responsible authority) impact these costs through rates of supply and sewage and sanitation canon.

8. PUBLIC PARTICIPATION

The citizen involvement in the water Plan elaboration

Water is a public resource which concerns to everyone. Therefore, the Miño-Sil Authority sought to ensure the involvement of all the stakeholders during the water planning: public administrations, employers, enterprises, farmers, consumers, environmentalists, affected by the infrastructures, neighbourhood associations and water user communities, citizenship.

The Minho - Sil River Basin District conducted, from December 2009 to June 2011, fifteen conferences of public participation : 6 regional conferences, 9 sectoral tables and an information day, "The responsible management of water for a Sustainable Future ", which involved the presentation of the Draft Water Management Plan and the beginning of the public consultation. The MSRBD has published on its website the "Report of Information Actions, Public Consultation and Participation" developed at different phases of water planning.

An open process to the citizens

The Minho - Sil River Basin District has achieved, through the sectoral conferences of public participation, reaching a total of **7 regions and 102 municipalities** in the MSRBD. In the sectoral tables participated **a hundreds of experts and representatives of the main sectors interested and stakeholders**.

A total of 814 people representing the local government, business associations and traders, trade unions, farming and agricultural organization, wine sector, irrigation communities, hydroelectric industry and slate industry participated in the process. Also stresses the active participation of environmental and conservationists organizations, water brought communities, resident and socio-cultural association,.

Contributions: It was collected about 150 proposals and suggestions that a greater or lesser extent, have been incorporated into the Water Management Plan (Appendix XI.7)



Public Workshop held at Tomiño (BaixoMiño)

Three levels of involvement

Public Information: the official documents and the informative publications done to facilitate the comprehension of the RBMP are available for the public through the website.

Public consultation: reference documents of the Water Management Plan such as: • Initial water planning documents, Provisional Outline of Major Issues in water management, Initial document with the Strategic Environmental Assessment, Project for River Basin District Management Plan and the Environmental Sustainability Report.

Active involvement: open sessions and sectoral tables in those treated pressures and problems relevant to each region or sector, environmental objectives, proposed measures and regulations document.

Water Planning Office

MIÑO-SIL RIVER BASIN AUTHORITY

Ministry of Agriculture, Food and Environment

Avenida Habana, 28 Bajo. 32003 – Ourense—Spain

Telephone: 988399410

www.chminosil.es

Email: oficina.planificacion@chminosil.es

