Duero Basin Management Plan

summary document

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE
CONFEDERACIÓN HIDROGRÁFICA DEL DUERO


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Valladolid, 2013

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MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE
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INDEX

1 Presentation

You are holding an informative issue of the Duero Hydrological Plan recently approved by the Council of Ministers.

Spain, unlike most EU countries, has a long tradition of water planning that has been entrusted to Water Confederations since 1927. However, this plan is the first to be made with the new sustainability criteria imposed by the Water Framework Directive.

To the Spanish classic concept of planning, based on quantitative balances, a list of demands and a catalogue of infrastructures to meet those demands, a review of the condition of water bodies, some environmental objectives for each of them and a program of measures to meet them are added in this Plan.

The Hydrological plan is not a plan of the Confederation, not even the Ministry of Agriculture, Food and Environment. It is a plan of the whole society living in the Spanish part of the international demarcation of the Duero. The extensive public participation process that, guided by the Water Framework Directive, has been promoted by this Water Confederation makes the final result something that belongs to everyone, something that everyone commits to.

Therefore this Hydrological Plan, with its limitations and its strengths, is the Plan of the citizens of the Duero basin, and that is why this booklet that aims to bring the whole society a continued and systematic work of data collection, analysis and proposal development is published. The entire document is also included in digital format for the expert to analyze, compare, study, draw conclusions and provide guidelines for improvement for the next revision of the Plan.

Before closing I would like to thank all those who have contributed to the preparation of this Hydrological Plan from various institutions, entities and social organizations and with different degrees of responsibility. In short I extend my thanks to the entire citizenry convinced that the improvement in the management of the Duero basin will also have their future collaboration.

I hope that this publication will invite to a better understanding of the Duero basin and inspire in readers a growing interest in the use of this limited and wonderful resource our lives depend on. And if poetry is able to reflect the best of human nature and the environment that shelter us, I close with a few lines from poet from Valladolid which are a tribute to this river.

José Valín Alonso.
PRESIDENT

Full of majesty and repose,
the abundant Duero
across the fields it expands:
reflects in its current the summer sun,
and the calm river
burnished silver ribbon it seems.

Now suddenly hides a mall
its gentle and leda march;
now a mill dam obstructs it,
and as a pony exalted by a brake,
stop, jump the dam
and continues his way rushing.

Gaspar Núñez de Arce

2 By way of introduction

The Hydrological Plan of Cuenca of the Spanish part of the Duero basin district is the culmination of a continuous work throughout the last decade, which has involved many people including technicians, users, or those simply affected by this planning.

Finally this work has been sanctioned by Royal Decree 478/2013, of June 21st, where the Hydrological Plan of the Spanish part of the Duero basin district is approved.

The water planning process has been conceived as a strategy that works repeating a six-year cycle of continuous improvement: plan, materialize as planned, check the results, and finally, after an analysis of the above, start a new cycle.

Its development is a function explicitly assigned to the Duero Water Confederation, while its approval by Royal Decree corresponds to the Government of Spain. This new Hydrological Plan (hereinafter PHD) is the key instrument for the implementation of the Water Framework Directive (DMA) in the basin.

Its general objectives can be grouped into three blocks:

Prevent further deterioration of waters and achieve good condition; that is, ensure that they are in a state that does not deviate significantly from their own conditions.

Meet the needs of water in the Duero basin aimed at enabling socio-economic uses that our society needs for its efficient and effective development.

Mitigate the adverse effects of floods and droughts.

The whole process is conditioned by an extensive and complex regulatory framework that includes provisions of the European Union, international agreements, Spanish rules from both autonomous communities and local administrations. In this context, a six-year planning cycle is organized around four main lines of action:

1 The hydrological plan itself.

2 The strategic environmental assessment that has to comply with.

3 The public consultation and participation that must accompany the procedure.

4 The programs of measures that the competent authorities should develop so that the goals specified by the Plan can be achieved.

It should not be ignored that all this work should lead to the expected results, in an specific and tangible way for common good and, moreover, we must be aware that Spain must account for these results to the European Commission who regularly reviews compliance with the formal requirements and the achievement of the objectives, and may exercise its disciplinary powers should the existence of a default be identified.

Obviously a process with such broad and time expanded objectives results in a significant amount of information in the form of documents, annexes, regulations, etc. Aware of the difficulty of Access that can represent both the variety of documents that conform the PHD as the volume of information and flow of data that they contain, we have tried to facilitate this reporting function.

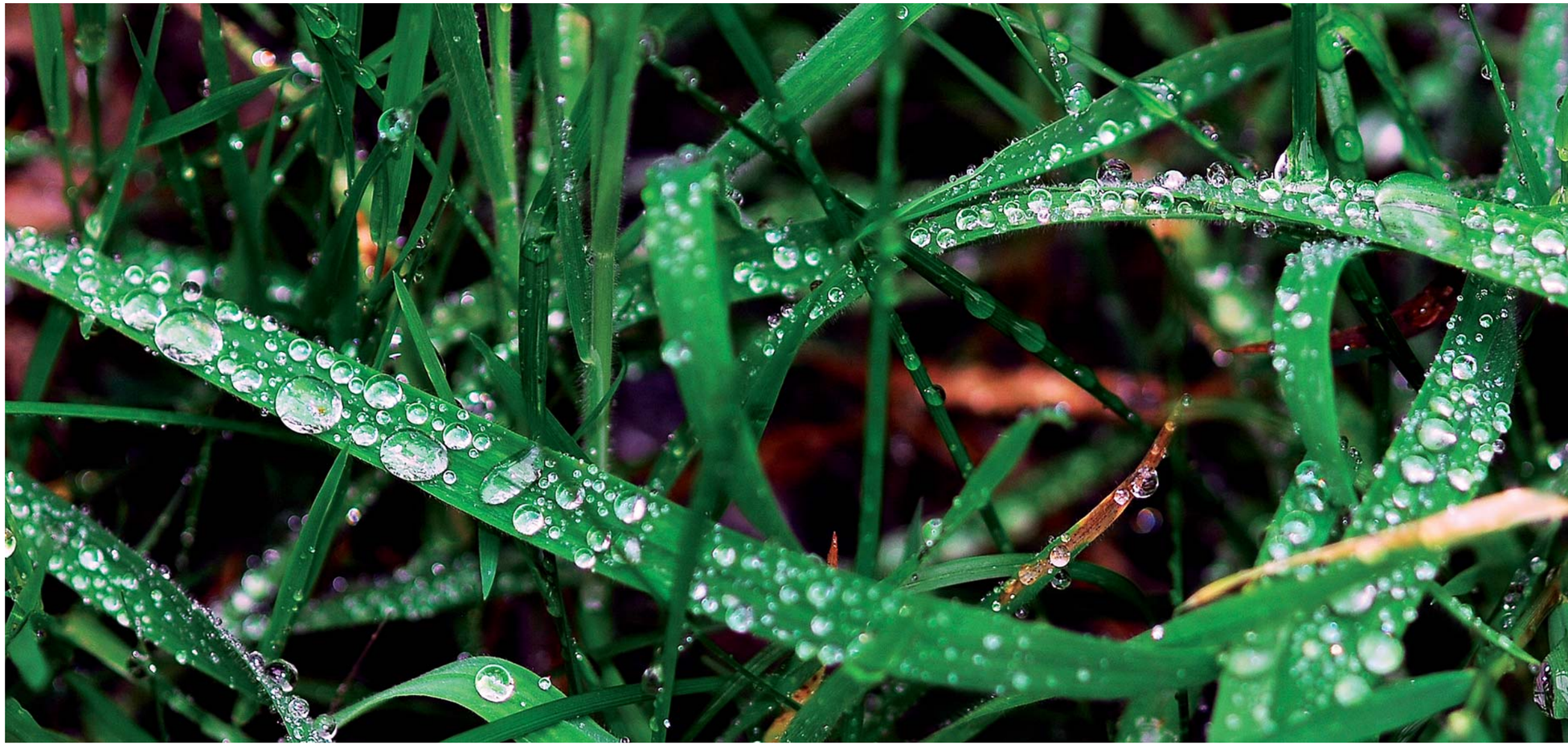
This document you hold in your hands aims at a friendlier approach to the before mentioned PHD intending to facilitate access to relevant information that each person may require at any time regardless of its connection to the subject of water and/or its management.

But also CHD tries to comply with the mandate of the Water Framework Directive, and it is not a minor issue, offering the user the opportunity to engage in the global governance of the resource.

Water governance has four dimensions:
a. Environmental: Sustainable use of water
b. Political: Equitable use of water
c. Economical: Efficient use of water
d. Social: equitable access to water

We do not want to steal any information and therefore, the entire planning document is attached in PDF format in electronic format to facilitate consultation of those aspects of interest to the user... It should be noted in this regard that the website of the Duero Water Confederation (www.chduero.es) offers through the information system MÍRAME-IDEDuero, all the information in the Hydrological Plan of Cuenca.

Water is a common good and to participate in its management is not only a right but also an obligation.



3 One watershed, one territory

Duero river basin is the largest of the watersheds in the Iberian Peninsula with an extension of nearly 100.000 km^2. It is administratively shared between Spain (80% of the territory) and Portugal (20%).

The largest property contribution to the Duero basin in the Spanish area is located in the Autonomous Community of Castile-Leon with more than a 98%. The remaining territories are shared by the bordering Autonomous Communities. The following map and table illustrate this scenario.

Autonomous Communities	Surfaces (km^2)	%	Population (hab)	%	Urban centres	%
Castilla y León	77.482,38	98,25	2.173.279	98,56	4.729	96,12
Galicia	1.134,02	1,44	30.498	1,38	169	3,43
Cantabria	97,95	0,12	1.346	0,06	21	0,02
Castilla-La Mancha	62,04	0,08	0	0,00	2	0,00
Extremadura	42,95	0,05	0	0,00	0	0,00
La Rioja	20,77	0,03	0	0,00	0	0,00
Madrid	15,68	0,02	0	0,00	0	0,00
Asturias	2,70	0,01	0	0,00	0	0,00
TOTAL	78.858,48		2.205.123		4.921	

This river basin collects, through an extensive surface drainage network, the available water resources. Besides rivers as an immediate reference of surface waters and flows, we cannot forget manmade river channels. Also we have spaces where water is stored in a either natural (lakes) or artificial way (reservoirs). In the same way we must consider certain geological formations that can be saturated by water resulting in formations of aquifers and entails a very estimable resource.

In any case, this Hydrologic Plan is limited to the Spanish area of the demarcation and 774 water bodies have been identified, characterized and differentiated by categories as mentioned in table located in page 16.

A body of water in a drainage basin is considered as a differentiated and meaningful part of either surface or ground water such as a river, reservoir, lake, channel, aquifer or a proportion of them, and is sufficiently enough to be considered in isolation.

In general, 13.530 km of river have been defined as water body that accounts for a significant network, among more than 83.000 km identified as a channel.

14 lakes defined such as body of water represent only a fraction of almost 2000 registered spaces classified as wet areas in the Spanish Duero basin.

Original category	Natural	Artificial and modified, classified as:		Total number of water bodies
		River	Lake	
River	608	38	42	688
Lake	12		2	14
Artificial		3	5	8
TOTAL surface	**620**	**41**	**49**	**710**
Groundwater	64			64
TOTAL				**774**

Bodies of groundwater cover the whole territorial scope of the Plan. They are organised into two overlapping horizons; the top one includes alluvial, "rajas" and badlands, whereas the inferior or also called general, includes the remaining aquifers identified in the basin.

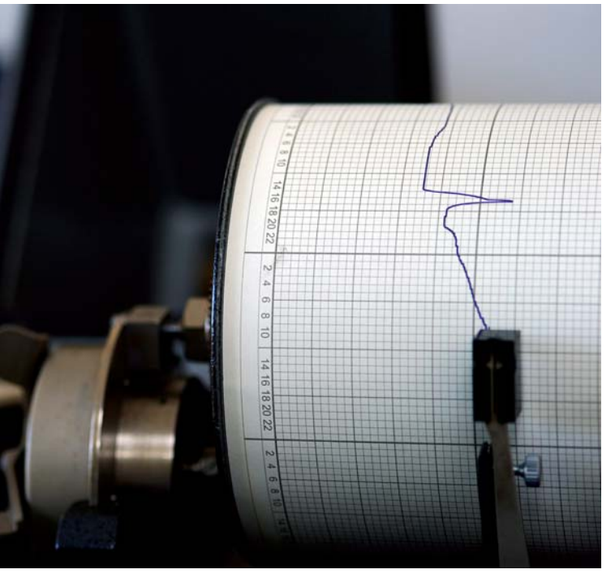
The totality of water resources has been evaluated recently and has a value of 12.600 hm^3/year which remarks the truly significant decreasement according to the figures given by the Hydrologic Plan of 1998 (Table 24 of the Memory).

Within the Duero's basin there are different types of protected areas, for different purposes and under the aegis of law of diverse nature. The "PHD" provides a summary of the "Register of Protected areas" from the Spanish side of Duero's basin backed up by MÍRAME-IDEDuero information system that includes the identification and maps of the types of protected areas indicated in the following table.

PHD assumes the particular objectives of these protected zones, which are established according to the protection purpose of each zone.

Type of protected area	Nº of zones	Extent or length
Surface water harnessing for water supply	361	
River sections protected for water supply	168	2.015 km
Reservoirs protected for water supply	37	254 km^2
Channel stretches protected for water supply	3	222 km
Safeguard Areas of ground water harnessing	4.459	
Safeguard areas of ground water catchment	3.302	503 km^2
Future water catchments for water supply	10	
Protected areas owing to water catchments for water supply	7	79 km
Catalogued piscicultural areas	21	682 km
Areas of recreational use (bathing water)	26	
Vulnerable areas	10	2.330 km^2
Sensible areas	36	292 km^2
Sites of community interest*	77	12.037 km^2
Special protection areas for birds*	53	14.262 km^2
Safeguard perimeters of mineral and thermal waters	31	165 km^2
River areas	24	502 km
Special protection areas	45	1.405 km
Wetlands	393	84 km^2
*Only those in which water is an important factor for preservation.		

4 Identify problems to find solutions



The Water Framework Directive lays down its priority objectives in protecting surface, ground, coastal and transitional waters.

Therefore, all the efforts of the Hydrologic Plan of Duero are focused on achieving good ecological status of surface water bodies as an expression of the good functioning of aquatic ecosystems. Also the plan monitors the good chemical and quantitative status of ground waters.

At an intermediate stage of the current planning process was adopted the so-called Schema of Important Issues. The purpose of this document was to describe and evaluate the main problems of the basin related to both current and foreseeable water. From there the action alternatives were analyzed for resolution, according to the programs of measures that falls to the competent authorities to elaborate, essentially those who belong to the National State Administration, among which you may find the basin organization, Autonomous communities and Local administrations.

30 problems grouped into four major blocks were identified:

Problems related to the environment	Problems related to the demands	Problems related to extreme events (floods and droughts)	Problems related to knowledge and governance

All of them are listed in the following table:

… related to the environment	Diffuse pollution of groundwater
	Exploitation of aquifers in the central región of the Duero
	Urban effluents
	Water flow drawdown from the rivers
	Implantation of ecological water flow areas
	Affections stemming from hydroelectric exploitation
	Deterioration and disappearance of wetlands
	Species threatened by actions on the water environment
	Poor state of the river area
	Eutrophication of Reservoirs
… related to the demands	Difficulties to meet the need of urban water supply in small towns
	Large urban supply systems
	Presence of arsenic in groundwater
	Low guarantee in attention of certain current irrigated lands
	Low efficiencies and not well known
	Insufficient guarantee to meet new demands
	Outstanding regulatory solutions
	Ecological water flows definition and other environmental restrictions
	Specific regulations for the protection of groundwater bodies
	Profitability of irrigated agriculture and consideration of the resource value
… related to droughts-floods	Delimitation and floodplain management
	Dam safety
	Complete and updating of the Special Drought Plan
… related to knowledge and governance	Creation of an information system
	Asessment of demands and volumes of water used in agriculture
	Inventory of pressures
	Assessment of water status
	Estimation of natural resources
	Rights for exclusive use of waters
	River nature reserves and areas with special protection regime

5 Water, what do we use it for?

The Spanish Duero basin, which covers 15% of Spain, is populated by about 2.200.000 people (4,7% of the Spanish population), with a slightly decreasing trend in recent decades, also showing a strong aging and population displacement towards larger urban centres at the expense of rural areas.

The gross added value generated annually in the basin is about 45.000 million euro (4,6% of the total Spanish economy), placed at the forefront are services, followed by industry and construction (Table 31 of the accompanying notes available in electronic format) are the most important sectors.

The gross added value is the economic macro magnitude which measures the added value generated by producers in the delivering of services or goods production of an economic area less costs of service delivery or production of those goods and services.

The quantitatively most important uses of water in the basin are those related to hydroelectric generation, in particular, harnessing the topographic elevation difference between the Castillian plateau and Portuguese lowland and irrigated lands. It is also meaningful the uses applied for the care of livestock y certain industrial uses. The summary of gross demands calculated for the current situation (horizon 2009) amounting to about 4.800 hm^3, can be seen in detail in this table.

Exploitation System	hm^3/year
Támega - Manzanas	17
Tera	142
Órbigo	667
Esla	954
Carrión	500
Pisuerga	352
Arlanza	110
Alto Duero	232
Riaza - Duratón	284
Cega - Eresma - Adaja	249
Bajo Duero	581
Tormes	664
Águeda	48
Total	**4.800**

Water demand for irrigation represents over 90% of total consumptive demand. This being the most relevant demand, significant actions of improvement can be focused on it. Its consumption, taking into account irrigation efficiencies, has been estimated at about 2.650 hm^3/year, of the 12.600 hm^3/year total resources of the Spanish Duero Basin.

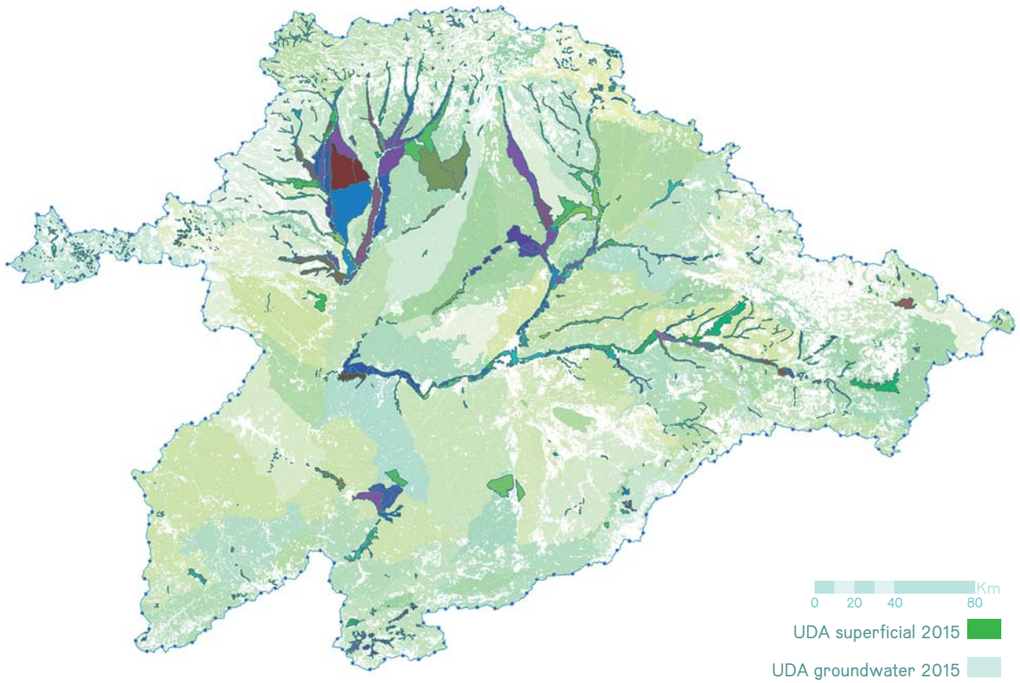
Irrigation is varied and vast as the basin itself, but there is a clear predominance of cereal, industrial and leguminous crops. In general production in irrigation with gross unitary allocations close to 8.000 m^3/ha/year, are clearly superior to those obtained in dry, resulting in a 2,6 times higher productivity.

This leads to the Duero farmer's interest in the irrigation of their lands, something that has been supported with great contributions of both public and private funds, especially in irrigation with groundwater case. In fact, irrigation is the only use of water in which a significant increase is expected according to the future scenarios that are being studied by the Hydrological Plan of Duero, passing from a surface of about 534.000 ha (current) to 543.500 ha in 2015 (See document in electronic format).

Various uses are grouped according to its use, location and point of supply in units of demand. The Hydrologic Plan of Duero defines 195 units of demand for water supply, 329 for irrigation, 172 for power generation and other less numerous grouped in other uses. All of them encompass the whole amount of demands for the purpose of incorporation in water balances that the Plan performs in order to allocate resources and establish reserves.

The unit of demand is an indicator used to identify water needs in a homogeneous way attending to one or more parameters such as territory, use and/or temporal space.

These uses of water exert pressure on natural environment, both by means of point source pollution (there are 5.000 discharge authorizations) and diffuse pollution. Water withdrawals also pose a significant pressure both those exerted from the river network as those conducted from aquifers, and especially the morphological alterations that involve, among them 3.600 barrier have been documented with varying degrees of passability for the ichthyofauna, more than 1.100 channelled sectors and about 600 reinforcements of riverbanks.



6 Water, for whom?

The HPD allocates available resources to current and foreseeable uses of water on the stage set for the year 2015. To do so, in clear consistency with the objectives set out by the DMA, firstly identifies the portion of the resource that cannot be used since it constitutes the necessary flow regimes to keep a good ecological status of rivers. These ecological flows are reflected in the Plan as values of minimum continuous flows for each of the twelve months of the year and each body of water for both regular hydrological situation and occasional situations of scarcity that must be respected if and when the situation allows.

Also flow regimes located in the Spanish part of the Basin constitute a restriction on water use, since they must reach Portugal as established in the Hispano-Portuguese Convention of Albufeira and allowances previously established in the National Hydrological Plan with regard to shared aquifers with neighbouring Ebro basin.

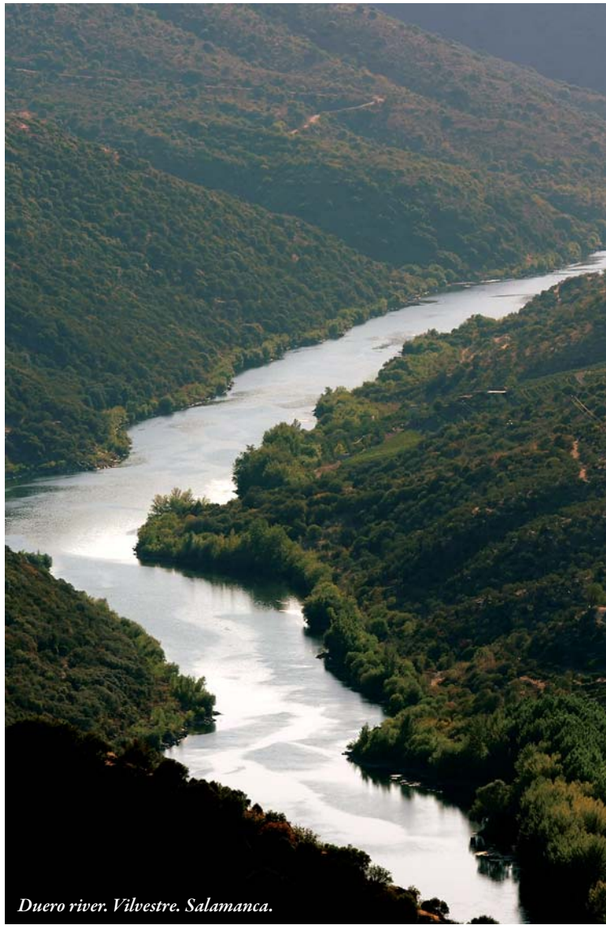
Prior to the calculation of balances of the configuration of distributions, it is a matter for the HPD to establish orders of priority among the different uses.

The basin organization initially proposed equalization within the same priority level of those uses that use water as a production factor, in order to enable the voluntary exchanges of rights of private use in times of shortage or insufficient resources for new concessions. This proposal was rejected during the public consultation on the draft of the HPD by different sectors of users and other stakeholders, so eventually a priority order similar to that adopted with the Hydrologic Plan of 1998 is maintained for all exploitation systems. (Art. 35. RD 478/2013)

In 1998 Spain and Portugal signed the "Cooperation Agreement for protection and el sustainable harnessing of the Spanish-Portuguese watersheds", better known as the Albufeira Convention. It does apply to the following rivers: Miño, Limia, Duero, Tajo y Guadiana. As a new feature of this Convention, Spain is committed to provide minimum annual contributions in accordance with the annual hydrological situation. For the Duero basin the minimum contribution in a normal year is 3.800 hm³

Before calculating the new allocation of resources, the HPD defines exploitation systems in which natural and artificial elements are functionally grouped that allow you to relate demand and supply of resources.They are listed and described in section 4.7 of the Memory (document attached in electronic format), already traditionally considered as such in the Duero basin.

An exploitation system is constituted of surface and groundwater bodies, works and hydraulic infrastructure, water use rules derived from the characteristics of the demands and rules of exploitation that, harnessing the hydraulic natural resources, and according to their quality, allow to establish water supplies that set the supply of resources available to the exploitation system.



Duero river. Vilvestre. Salamanca.

In short, it is about establishing reasonably homogeneous areas that allow a more coordinate action within the basin and improve in this way the management of water resources. Considering the above, the territory of the Spanish part of the Duero river basin is divided into thirteen exploitation systems or sub-grouped into five zones.

Finally, so as to calculate the new allocation demands, a scenario is set in year 2015 that has been designed incorporating a desired improvement in the overall efficiency in the use of water that, as a result of the application of specific measures, at least, should be of 60% on each unit of agricultural demand; and net water adapted to suit the requirements of areas and crops, bearing in mind the projections the European Union offers for the coming years.

All of this, making use of simulation tools which allow you to relate the different components of the exploitation systems and some relevant indicators of compliance with environmental objectives, the balance between available resource and demands is performed calculating volumes and water flows assigned to each unit of demand. The tool used to simulate the behaviour of exploitation systems in different horizons and scenarios was AQUATOOL, created and developed by the Institute of Water Engineering and Environment of Polytechnic University of Valencia.

The obtained result shows how the allocation expressed amount to a total annual volume of 3.792 hm^3, this figure represents a decrease of 15,5% over the assigned volume for human consumption purposes in the Hydrologic Plan of 1998.


Odra river. Fuenteodra. Burgos.

This decline is slightly lower than the 18,3% reduction in the estimate of natural resources. The annual volume allocated reaches the 31% of the evaluated resources. However, although the 98,6% of the requested flow is satisfied, it has not been possible to assign all the demand. In this way an average structural shortage can be recognized for the considered scenario in 2015 of 64 hm^3/year (1,7% of demand), which is the difference between the served average flow and the demanded one.

The CHD has set the development of a series of programs to diagnose the state of water bodies at all times, know its evolution and, in particular, to determine the effect that results from the measures included in the HPD.

The impacts resulting from pressures above mentioned, are generally very clear, showing themselves in the diagnosis of the current status of water bodies. The status of body water according to the Water Framework Directive is defined by the worst quantitative, chemical and/or ecological value. It is understood that the starting situation is the date of entry into force of the Directive so that, from this consideration, the different water bodies must be progressively improving.

But the determination of the status of a water body is tied to different parameters depending on the type of body water considered. That is, features needed to categorize surface body water such as a river have little to do with the data needed to be considered in order to establish this same status in a groundwater body.

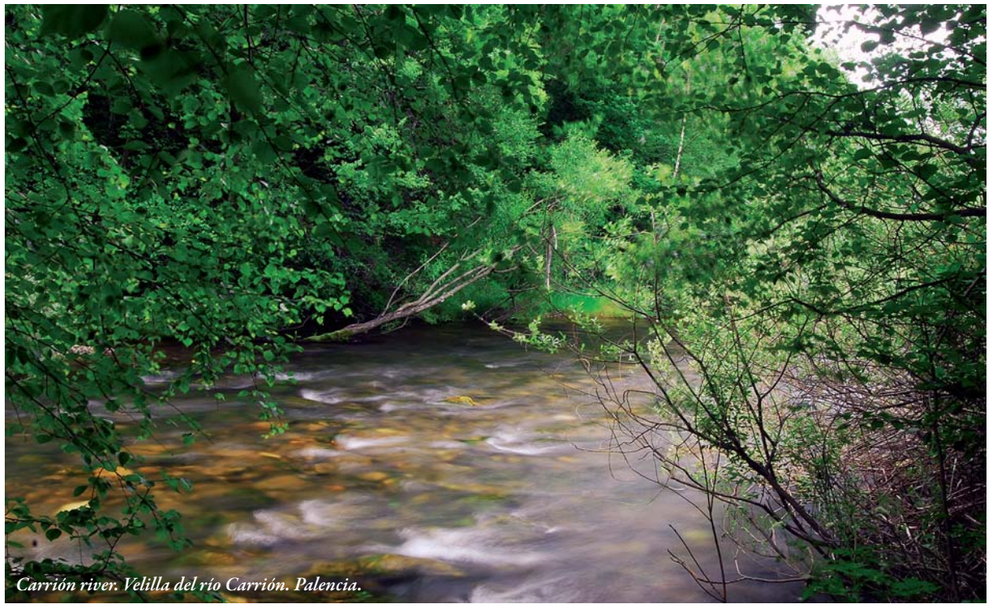
While a mass of groundwater is generally assessed considering quantitative and other qualitative aspects it is also necessary take into account its morphology, flow regime or associated ecosystems, along with other factors.

Although most water bodies (75%) are in good condition from a physicochemical point of view, only 22% of the 710 defined water bodies are classified as good condition. The main reasons that lead to a poor rating of water bodies are the hydromorphological pressures related to its uses, which is reflected by the value of the hydromorphological index and, to a lesser extent, biological and physicochemical indicators, the latter related to both point and diffuse pollution. The following table reflects this situation.

With respect to the 64 groundwater bodies, 16 do not reach the good state. The main pressures are due to an excess of withdrawals that make five masses to be found in bad quantitative status and chemical pollution, particularly nitrogen compounds which affects fourteen water bodies.

The right to have good status water carries the commitment to preserve it. This task concerns all of us, as citizens.

Mass of water category	Good status or better	Total
Natural rivers	123	608
Very modified rivers comparable to a river	1	38
Very modified rivers comparable to a lake (reservoirs)	20	42
Natural lakes	10	12
Very modified lakes	2	2
Comparable to lake (artif)	3	5
Comparable to river (artif)	2	3
Groundwater	50	64

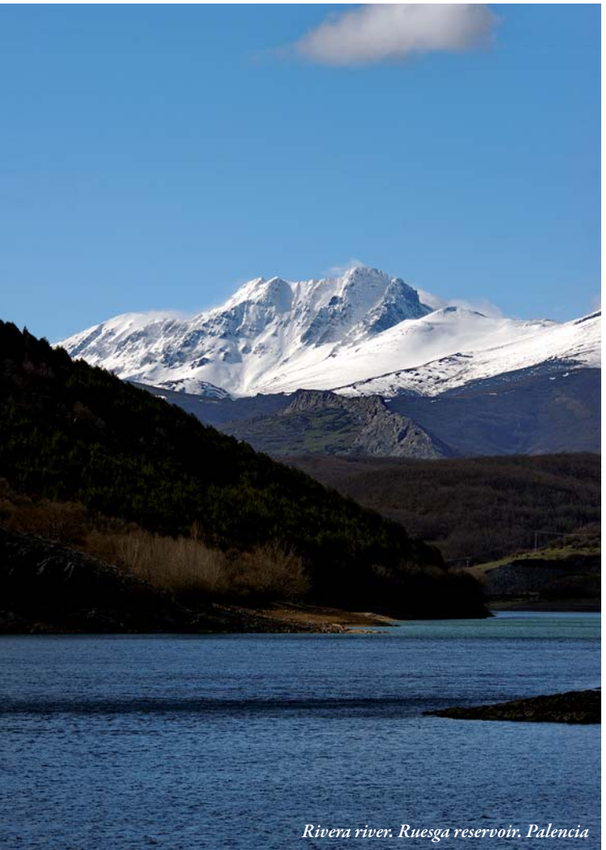


Carrión river. Velilla del río Carrión. Palencia.

8 Objective: Reach the Goal

We know the starting situation and it is a matter of obligation for a successful planning. But now, one wonders, where is the goal?

The environmental objectives of general character are set out in the 92.bis revised text of the Water Act. Deadlines to meet the objectives are indicated in the eleventh additional disposition of this regulatory text.



Rivera river. Ruesga reservoir. Palencia

In a very simplified way, objectives for 2015 are summarized in ensuring that all water bodies are at least, in good or equivalent situations.

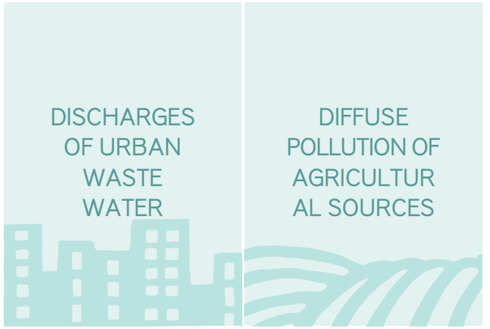
The objectives should be achieved before December 31 of 2015, with the exception of preventing deterioration objective of the status of surface water bodies which is mandatory since January 1 of 2004. However, in those masses of water where it is not possible to achieve the overall environmental objectives, legislation supports the possibility of derogations in deadlines (extensions) or exemptions in objectives (less stringent objectives).

A desirable goal:

In 2015 all bodies of water shall be at least in good status or equivalent situations.

The achievement of the objectives depends on several factors: nature of the problems that impede accomplishment, also on environmental characteristics in which there is a need to act in order to solve them and the degree of development that the measure program can reach. This program is basically oriented to eliminate or reduce pressures.

In the Spanish Duero basin the most significant problems of pollution in water are caused by:



The first case seeks to address by means of the strengthening of the scrubbing system and the second one by means of application of codes good practices in the most problematic areas; nonetheless, when the problem has clearly affected groundwater there are physical limits to the feasibility of correcting these problems in the required time because of the characteristics of the porous medium itself, aquifers entity in the basin and the difficulty in the subsurface environment.

On the other hand, other very significant problems are linked to serious hydromorphological deterioration of fluvial systems. This deterioration entails habitat loss, river occupation by opportunistic or invasive species, with severe loss of diversity.

Strictly hydromorphological indicators (artificial barriers, lateral connectivity, flow detraction, ...) have little importance when classifying the state of our rivers. Other indicators of ecological status, as the fish fauna, are sensitive to these pressures, and also it is not a common reference so this problem is partially masked.

On the basis of the above, objectives that could be achieved in 2015 have been simulated and future horizons under different hypotheses of pressures reduction. The results obtained in the solution considered as the most realistic are shown in chapter 8 of the Memory (Attached document in digital format).

Thus, under the considered working assumptions in the HPD, good status will be reached in 340 masses of water in year 2015, 44% of the total. Establishing extensions by 2021 of masses of water considered in river category and extensions by 2027 of other 331 masses of water. The postponement is justified, essentially because of the lack of financial means to develop depuration and restoration programs measures. For 97 masses of water, that is to say, a 12,5% of water bodies identified in the Spanish Duero basin are not considered to be possible to achieve a good status in 2027; consequently less stringent objectives are defined.

Nobody can expect to reach a goal without setting a proper programming and take the necessary measures to achieve it. From this general consideration, The HPD seeks to establish those programs and take the necessary measures to achieve the target already defined.

As seen above, in 2009, 27% of water masses meet the environmental objectives of the Spanish part of the demarcation of Duero; in 2015 the percentage of water bodies expected to reach the environmental objectives fixed in the HPD is the 44%.

This gap between the initial situation and the desirable goal to December 31 of 2015 requires determination. For this we have established a program of measures that can be both general regulatory instruments and management actions or specific actions that shall be done thanks to a certain financial investment.

Achieving the goals necessarily involves adopting the general instruments and carry out specific actions that various programs of measures in the HPD illustrate.

In order to carry out the management of waters towards achieving the objectives regulatory provisions are general instruments that are adopted. Specifically, those actions over the use and protection of hydraulic public domain adopted in the HPD itself and stand out in the Regulations document that goes along with the Royal Decree. Among these instruments, are also included those which are aimed at achieve objectives of proper care of water requirements, specified in a differentiated chapter inside the Regulations which regulates:

· Environmental flow regimes that are set out in the Plan

· Criteria on priority and compatibility of uses and assignation

· Resource reservation

On the other hand there are the specific actions related to basic infrastructure required by the Plan and essential to achieve the objectives.

These steps have been distributed into ten groups:

1 sewerage and depuration

2 water supply

3 modernizations of irrigation and new irrigation

4 hydraulic infrastructures

5 flood management

6 rivers and wetlands restoration

7 energy

8 regulation alternatives

9 planning and control

10 other measures

Furthermore, there are numerous sectoral planning raised by various authorities with concurrent jurisdiction over the territory of the Spanish part of the basin. In both the Hydrological Plan itself and the report of Environmental Sustainability that goes along with it, the relationship between plans and programs is analyzed, in order to synergize the actions that are programmed to promote the compliance of the HDP objectives.

Among the most relevant plans or programs for their relationship with the HDP stands out:

- National Plan for Climate Change Adaptation
- II National Sewerage and Wastewater Treatment Plan
- National Strategy for River Restoration
- Zero tolerance Plan against discharges
- Spanish Strategic Plan for the Conservation and Rational use of Wetlands
- National Strategic Plan for Rural Development
- National Strategy for Sustainable Modernization of Irrigated lands (2015)
- Planification of Electricity and Gas Sectors (2008-2016)
- Alberca Program and Water Register

There are specific plans to manage economic situations of drought and flood risk. In the first case, there is a **Special Plan in Situations of Alert and Temporary drought** approved in March 2007 and updated along with the PHD itself, secondly, **Plan of Flood Risk Assessment and Management** shall be adopted before the end of 2015.

The objective of **The Special Plan in Situations of Alert and Temporary Drought** of the Spanish part of the Duero river basin is to minimize environmental, economic and social impacts generated in situations of eventual drought.

Plan of Flood Risk Assessment and Management gives answer to the requirement established in the RD 903/2010 of July 9, in which the Spanish legal order is transposed to the directive 2007/60/CE, which propose an action divided in phases.

A database integrated in the system MÍRAME-IDEDuero was created in order to both organize and manage the Program of Measures and sector plans. It contains and describes about 1.500 specific actions, among which 1.261 should be carried out between 2010 and 2027.

Another key aspect of any planning is in the funding to develop the expected actions. The economic cost of the preliminary version of these measure programs of the PHD, amount to 1.500 million euro in 2012-2015. Among the measures, although its economic consideration is scarce, it is necessary to highlight the incorporation of complementary regulations in the Carrión, Órbigo and Esqueva systems. All of them are needed to meet the demands, even when consumption is reduced by the modernization of irrigation. The development of this infrastructure should include the previous environmental assessment that validates the procedure.

An important part of this budget, about 600 million euro, is required to adapt the current system of depuration to the demands of the Directive 91/271, about urban waste water system. With regard to the group of irrigation, strongly require modernization and finish of the new programmed transformations. In comparison with these huge investments, restoration actions in rivers with 130 million euro, stand out between the least expensive.

Group	Nº of actions (until 2015 / 2027)	Investment in million of euro			
		2010-2015	2016-2021	2022-2027	Total
Drainage and Depuration	172/575	371.500	211.072	444.841	1.027.413
Water Supply	41/60	110.517	53.263	14.109	177.889
Modernization of Irrigations	23/47	359.493	145.976	253.468	758.937
New irrigated lands	7/41	102.712	241.782	938.981	1.283.474
Hydraulic infrastructures	31/46	353.201	52.643	194.382	600.226
Floods Management	6/6	6.781	4.000	0	10.781
Rivers restoration and wetlands	301/328	92.665	39.727	8.034	140.426
Energy	3/3	646	0	0	646
Regulation alternatives	4/4	3.147	0	0	3.147
Control and Planification	25/27	62.712	1.037	214	63.963
Other measures	72/129	33.899	84.421	15.000	133.320
TOTAL	685/1266	1.497.274	833.920	1.869.029	4.200.223

To prioritize actions, a cost/benefit analysis has been carried out, considering as an efficiency indicator the number of water bodies that improves the state because of the measure or group of measures that are being analyzed. In this way the measures that offer the best relation cost/efficiency are those of Sewerage and Depuration (Group 1) and those of restoration of rivers and wetlands (Group 6).

The measures program now considered has been affected because of the contradiction generated as a consequence of the current economic crisis.

Progressive reduction of potential investments before 2015 has led to new calculations of allocations of resources and environmental objectives, estimating all through new simulations for new scenarios that correspond to future horizons.

In view of an estimation of cost for each measure, and identification of the responsible agents for their realization, it can be offered a table which synthetically reflects the origin of the proposed financing.

INVESTMENT BETWEEN 2010-2015 (in million of euro)						
Group / Agent	State Total	Total CC.AA.	Local Administration Total	Total users	Other	TOTAL
Group 1	277.215	46.595	47.690	-	-	371.500
Group 2	18.667	74.103	10.933	4.762	2.053	110.517
Group 3.1	184.289	96.438	-	78.766	-	359.493
Group 3.2	30.997	71.715	-	-	-	102.712
Group 4	321.235	31.966	-	-	-	353.201
Group 5	6.606	175	-	-	-	6.781
Group 6	87.040	4.112	1.444	-	70	92.665
Group 7	646	-	-	-	-	646
Group 8	3.147	-	-	-	-	3.147
Group 9	60.580	338	1.794	-	-	62.712
Group 10	11.910	21.990	-	-	-	33.899
TOTAL	1.002.332	347.430	61.861	83.528	2.123	1.497.274

The referral from the CHD of the PHD's proposal to the Ministry of Agriculture, Food and Environment, implies the agreement of the Committee of Competent Authorities. Such conformity assumes that public Administrations involved are committed to the development of the program of measures.

Uces river. Masueco. Salamanca.

10 How much water costs?

Water is a common good of inestimable value, apparently has no cost. It is a natural resource without a direct economic cost; however there are many indirect costs attributable to water management to fulfil its social purpose.

One of the requirements of the HPD is the quantification of the level of cost recovery invested by the Public Administrations in the provision of water services, so that to determine the different final beneficiaries' contribution to the total amount.

Any fool can confuse price with value

Antonio Machado

This contribution should be aimed to promote efficient use of resources and proper participation of users in the cost of services they enjoy. The basic objective is to protect the environment and ultimately promote social welfare. This view is in line with the Water Framework Directive which states that, by 2010, Member States should ensure that water prices incorporate incentives to achieve an efficient use of water and a proper contribution of the different uses at the cost of the services they require and condition.

The total annual water services in the Spanish Duero basin have been assessed at 963 million euro. The calculation was made based on budgets and cost estimates of the different Administrations, institutions, companies and individuals who contribute to the benefit of the above mentioned services, which is 714 million/year in total, plus 249 million of annual euro as an estimation of the environmental cost not internalized in current expenditures.

Revenues for services are estimated at about 441 million of annual euro, which comes from final users in form of taxes and the self-service cost that users provide themselves, and logically, support.

As a result, the level of recovery obtained is about 46% of total costs, value that amounts to 62%, if environmental costs, not internalized, are not considered.

Annual cost of water in the basin of Duero	Incomes, due to water services in the Duero
963 M€	441 M€

11 Participate. Is more than a right

As water users, each of us has the right to know and where appropriate participate in decision-making over the resource management. Certainly there are mechanisms for the establishment of management organisms with specialized personnel that ensure compliance of the regulations both in what affects the resource conservation and what is referred to equitable distribution of water. However, as mentioned this is not incompatible with an active participation in the elaboration processes of Hydrologic Plans.

The main novelties of this new era of water planning supervised by the European Union are focused in a prominent interest in achieving environmental objectives, the application of the cost recovery principle of the water, transparency and strong mechanisms for consultation and public participation.

In terms of public participation, it has been identified three differentiated levels of action:

1 The providing information

2 The public consultations

3 The active participation

The CHD made between the initial documents of the HPD who were formalized in March 2008, a Project of Public Participation where organization and procedures in order to obtain an effective public participation in the planning process; this document is available at the website of the basin Organism.

The actions of information supply related to the planning process and, especially, as to the content of the PHD itself and supporting information used, preferably have been channelled through the web portal of CHD (www.chduero.es) and information system portal MÍRAME-IDEDuero (www.mirame.chduero.es).

Additionally, the major milestones of the process have been highlighted in the media with greater presence in the basin, various brochures have been published and several public acts have been made in order to generate interest in more people who may be affected.

Public consultation actions lead to a higher participation level than the simple provision of information, because a response of the interested person is expected in form of allegations or suggestions to improve the analyzed document.

Active participation seeks direct involvement of stakeholders in the preparation, adjustment and consolidation of the documents.

All contributions received have been assessed and answered in a global document for each of the phases of consultation. These documents, as it is a requirement, are integrated into an annex of the HDP itself. Moreover, both the allegations and response documents are available on the website of CHD within the Planning section. It should be highlighted in this context that an independent organization as International Transparency is has recently given the highest assessment to water planning process that CHD develops.

For any issue related to obtaining information or providing allegations, comments or suggestions about the Spanish Hydrological Plan of the Spanish part of the Duero river basin, the contact information is located in the Office of Hydrological Planning in the Duero River Basin.

FOR YOUR RIGHT TO INFORMATION AND PARTICIPATION REMEMBER:

www.chduero.es

www.mirame.chduero.es

oph@chduero.es

The main issues discussed during the final phase of preparation of HPD are highlighted in the following tables.

Topic under discussion	Main Agents that raise the issue	Processing of the Claim	Allegation's Approach
Adequacy of the PHD rules	General Administration of the State	The enabling of the plan is discussed to regulate certain content that should be adjusted in a general way.	A deep analysis is made in order to adapt it to the modification of the Hydraulic Public Domain Legislature, to the allegations of the concerned ministers and the opinion of the State Council.
Demands	Agricultural users and Local Authorities	The cataloging and quantification of units of agricultural and urban demand is not sufficiently clear.	The documentation provided is reviewed in order to make it clear and transparent.
Ecological Flows	Hydroelectric sector users	The imposition of regimes and economic uncertainties in the hydroelectric generation business must be compensated in agreement.	The ecological flows are a restriction fixed in the Law. The compensation exigency or concessional term increase is regulated by the general regulation. Hydrologic basin Plan It does not have to modify it. Nonetheless, in case of a necessary arrangement, the PHD limits the implantation of the regimes to its essential components (monthly regimen at certain points), leaving the remaining components for review in 2015.
	Agricultural users	It is considered that environmental flows should not impose a penalty for the irrigation sector. Proposed values are discussed in certain sectors, in particular, in sub-basis of Órbigo and Carrión.	Certain values have been reviewed, even with new field works, setting finally closer values to the indications given by the users.

Topic under discussion	Main Agents that raise the issue	Processing of the Claim	Allegation's Approach
Ecological Flows	Autonomous Administration (environmental) General Administration of State (environment) Conservationists groups Investigation centers	Environmental flow regimes provided by PHD are clearly incomplete because some of the components specified in the regulations are ignored, and are also too low, its timing is too flat and do not guarantee the integrity of the affected protected areas.	Further work was carried out to try to improve water regime in headwater sections. Only the basic components of minimum monthly water regime are considered to study its suitability in this first cycle. The commitment to strengthen the definition of environmental flows in the next revision of the plan, when more consistent information will be available, is highlighted.
User priorities	Agricultural users and hydroelectric Autonomous Administration (agricultural)	There is no need to group the different uses of water in the same level of priority.	The allegation is accepted and the same priority is proposed that is mentioned in the current water Plan.
Poplar plantations	Local Administration and business sector	Any economic limitation is rejected.	PHD is just limited to little bordering areas to the fluvial river bed we must protect.
Arid manufacturers	Business organizations of the sector	Limitations on extractions are rejected due to the economic benefits that this activity provides.	
New regulation increases	Autonomous Administration (agricultural)	Increase the availability of resources regulated in the Órbigo, Carrión and Cega...	Several measures are included in the actions of these 3 systems already mentioned in order to be carried out in 2021.

Topic under discussion	Main Agents that raise the issue	Processing of the Claim	Allegation's Approach
New regulation increases	Autonomous Administration (agricultural)	The improvement of the groundwater through artificial recharge regulation, and changes in the source of supply to reduce the effect of removals should also be considered.	These actions are incorporated into the new definition of systems of explotation. Especially for the areas of Tormes, Lower Duero and Cega-Eresma-Adaja.
Target efficiencies	Autonomous Administration (agricultural)	Target efficiencies for irrigation adopted by the PHD are not accompanied by the modernization measures that would enable its achievement.	It does not seem logical to establish assignments assuming the inefficient use hypothesis.
Assessment of the status of water bodies	Autonomous Administration (environmental) General Administration of State (environment) Conservationists groups Investigation centers	The estimation of the state is excessively optimistic, that does not recognize the real deterioration that our rivers, wetlands and aquifers present. The error is due to the use of incomplete sets of indicators expected in the legislation to determine the state. There is no use of ichthyofauna between the biologic indicators of the ecologic state. It is also highlighted the difference with other European Plans	The status of water bodies is assessed taking into account the best consideration of hydromorphologic indicators of state; Moreover, Characterization of fish fauna works has already started whose results are expected to be incorporated in the first revision of the PHD.
Costs Recovery	Agricultural and hydroelectrical users	It is not understood and the estimation is wrong about the degree of cost recovery. The PHD cannot modify the economic regime that is established in the Water Law.	A new estimation of of the level of costs is incorporated in order to make it clear, accurate and objective. In the Legislature the chapter of economic regime is modified in order to be in line with what the Water Law establishes.

Topic under discussion	Main Agents that raise the issue	Processing of the Claim	Allegation's Approach
Programme of measures viability	General Administration of State Autonomous Administration	While recognizing the statutory obligation to adopt certain measures that are considered to be basic, the lack of budget availability precludes its materialization. The hydrological plan must be credible and realistic, priority must be given to investments on the required issues for the accomplishment of environmental objectives, so that it achieves the virtuality of collecting the action programme to be developed in upcoming years.	That way has been tried to establish. However, the progressive reduction of budget makes the definition of the programme to be highly uncertain and Public Administrations to be reluctant to formalize their action programmes.

To manage the whole process of development of a River Basin Plan in its different phases, the concept of competent authority is outlined in the Water Framework Directive.

While apparently this concept is not defined in the WFD, a contrasting reading leaves no doubt about the intention of the legislature to establish a single competent authority which in our case is the basin organization, that is to say, Duero River Basin. With all the indications to be a coordinator element of other “authorities” that due to territorial matters or content, maintain link with basin's water.

Thus, making extensive use of the term, competent authorities would be understood as every Public Administrations with government powers, in this case, on the Spanish Duero Basin within the three levels established by the Spanish Constitution :

General State Administration

Administration of the Autonomous Communities

Local Government

To establish a favourable framework for cooperation between all of them, the Committee of Competent Authorities of the Spanish part of the Duero river basin was created and formed on December 18, 2008, which includes representatives of the three administrative levels.

12 Revise to improve

The legislation stipulates that is going to be done a tracking of the Hydrologic Plan informing to the Council of Water of Duero River every year about the results of it. This monitoring should informed about the evolution of water bodies, the progress of the program of measures, resources evolution, demands, and the degree of compliance with the environmental flow regimes.

When monitoring data reflects a significant deviation with regard to the scenarios established by the Hydrologic Plan, The Water Council may decide to review it, in any case, should be carried out in 2015, and episodically, each 6 years.

In order to address the successive revisions to a progressive improvement of the HPD, the Duero River Basin has established a self-evaluation model which can diagnose the Plan and identify that area where it shall be more effective to focus improvement actions.

Actually, water planning is a continuous process of review and improvement of measures adopted for a better governance of water in the basin.

Tormes river. Almenara de Tormes. Salamanca.

13 By way of conclusion

The Duero River Basin, as provided in Article 23 of the revised Water Law text, has made the Hydrologic Plan of the Duero basin (HPD) satisfying the requirements set out in our legal system.

This new water plan is the first since the entry into force of the Water Framework Directive in Europe. After the public discussion of the initial draft is expected and desired by the River Basin Authority to get a consolidated HPD unanimously accepted and defended by all parties concerned.

The main purpose was to obtain a useful document to face the management of the Duero basin in the coming years and essentially that is effective to achieve the transcendent goals of good water body's status, socio-economic development and social welfare.

> *Member states will ensure so that a River Basin Hydrologic Plan can be elaborated to each water demarcation situated completely within its territory.*
>
> Water Framework Directive. Article 13.1

The distance travelled is important but we are still far from the goal and get to humbly know our shortcomings encourages us to persevere in the path initiated that we consider correct, and therefore invite all citizens to join this common challenge. Water is life and we must work together, not only keeping it, but to give it to future generations in the very best conditions.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