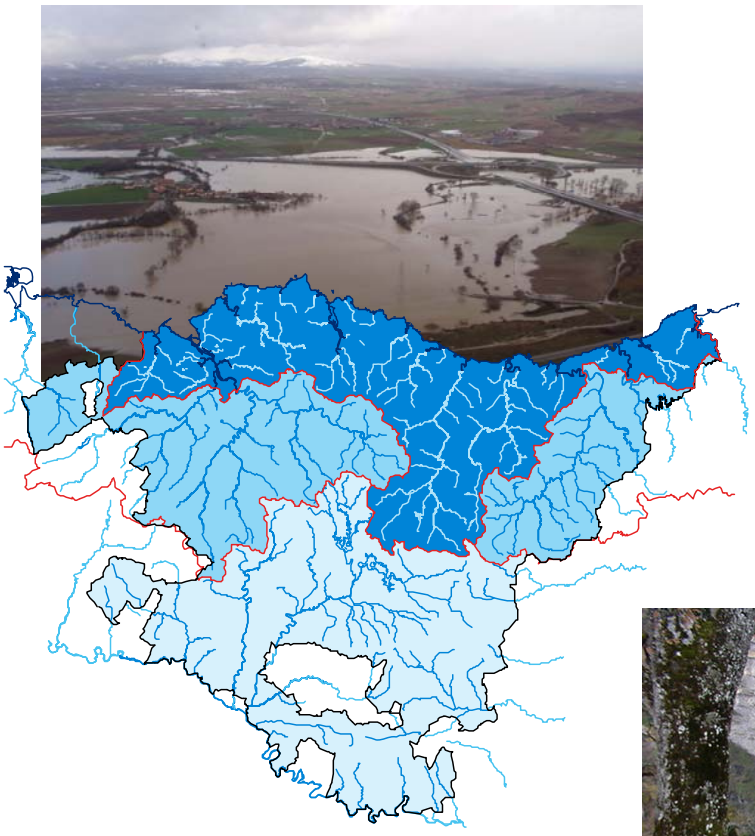
WATER STEWARDSHIP IN THE AUTONOMOUS COMMUNITY OF THE BASQUE COUNTRY



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1 INTRODUCTION

1.1. Background

The Autonomous Community of the Basque Country (ACBC) is situated in the north of the Iberian Peninsula. As will be described in the following sections, it is very heterogeneous as regards its topography, climate, population distribution, distribution of the economic activities, etc. which has notably influenced, and continues to influence, the management of the water resources.

The ACBC occupies fertile river plains in the basins flowing to the Cantabrian Sea (Bay of Biscay), has periods of drought followed by floods, strong industrial activity in the northern basins set against the agricultural activity of the southern basins, and has an extensive and heterogeneous institutional and competence framework. All this implies that the management of the water resources supposes a great challenge not without serious difficulties to which one must add the uncertainty generated by possible climatic change.

Nevertheless, and precisely for this reason, the Basque institutions have accepted the challenge with great enthusiasm. The first step is absolute commitment to the implementation of the European Parliament and of the Council Directive 2000760/EC of 23 October 2000 which establishes the framework for Community action in the field of water policy. This was followed by the passing in July 2006 of the Water Act, No. 1/2006 of 23 June of the Basque Country, which purports to establish "the mechanisms necessary for implementing European policy" and the subsequent creation of the Basque Water Agency as the central instrument for carrying out water policy in the Autonomous Community of the Basque Country and, finally, the autonomous administration's wholehearted involvement in combating climate change is embodied in the Basque Plan to Combat Climate Change. These steps have laid the foundation for the achievement of one underlying goal which is to bring about the effective stewardship of water.

The Basque administrations' support for the least privileged members of society should not go unmentioned. On 17 November 2004, the Basque Government agreed with the United Nations to commit to the Millennium Declaration through the signing of an agreement between the World Coordinator of the United Nations Millennium Campaign, Eveline Herfkens, and the Lehendakari (President) of the Basque Government, Juan José Ibarretxe. The Basque Government is following through on this agreement by seeking, through the Basque Water Agency, funding mechanisms to support Target 10 of Goal 7: to halve by 2015 the proportion of the people without sustainable access to safe drinking water and sanitation.

2 ACBC GENERAL DESCRIPTION

2.1 Location

The Autonomous Community of the Basque Country is situated in the north of the Iberian Peninsula, and is bathed by the Cantabrian Sea along 209 Km of coast. It covers 7,234 Km^2 and has a population of 2,129,339 inhabitants (2006), giving a population density of 294 inhabitants/Km^2 (Figure 1).

Figure 1 Location of the ACBC (EUSTAT - Basque Statistical Institute).

The ACBC is made up of three historical territories: Bizkaia with a population of 1,136,852 inhabitants and Gipuzkoa with a population of 686,665 inhabitants both in the north, and Araba, in the south with a population of 305,882 inhabitants (Figure 2).

2.2 Socio-economic features

2.2.1 Administrative situation

The ACBC enjoys a high level of self-government in important matters such as health, education, security, housing and taxation. This autonomy to decide how to organize itself emanates from the Statute of Gernika, ratified by referendum on 25 October 1979. This Statute recognizes the existence of a Government with executive powers and of a Parliament with general legislative capacity. Furthermore,

Euskadi (the Basque Country) has two territorial bodies inherited from the Basque foral tradition: the General Assemblies, with a regulatory and functional capacity similar to parliaments, and the Diputaciones Forales or Provincial Councils, their executive institutions. Their existence means that the Autonomous Community is decentralized in nature, similar to that of a confederation.

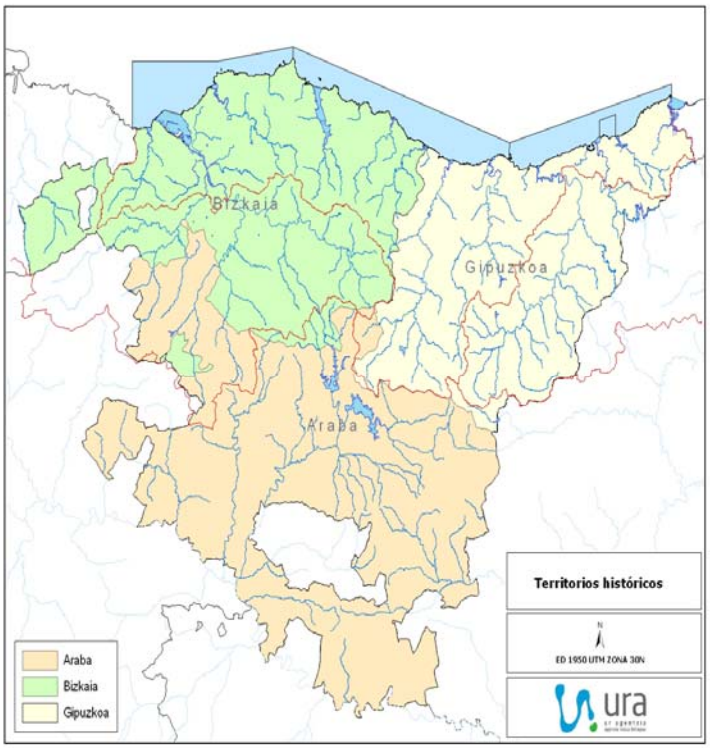

Figure 2 Historical Territories in the ACBC

For hydrological planning purposes it is divided between three Hydrographic Demarcations; the Internal Basins of the Basque Country, the Cantabrian and the Ebro demarcations. The configuration of the Internal Basins covers the area of the rivers which flow entirely through the ACBC and includes those which flow into the transition waters of other inter-community rivers. The hydrographic basins of the rivers Urumea, Bidasoa and Ibaizabal, the waters above the points which indicate the transition to the coastal waters, the river Endara in the Bidasoa and the basins of the rivers Agüera and Karrantza all belong to the Cantabrian Demarcation. The Ebro Demarcation includes all of the basins which flow to the Mediterranean Sea.

The resulting areas divide the territory of the Autonomous Community which causes considerable difficulties insofar as the handling of the available information is concerned (Figure 3).

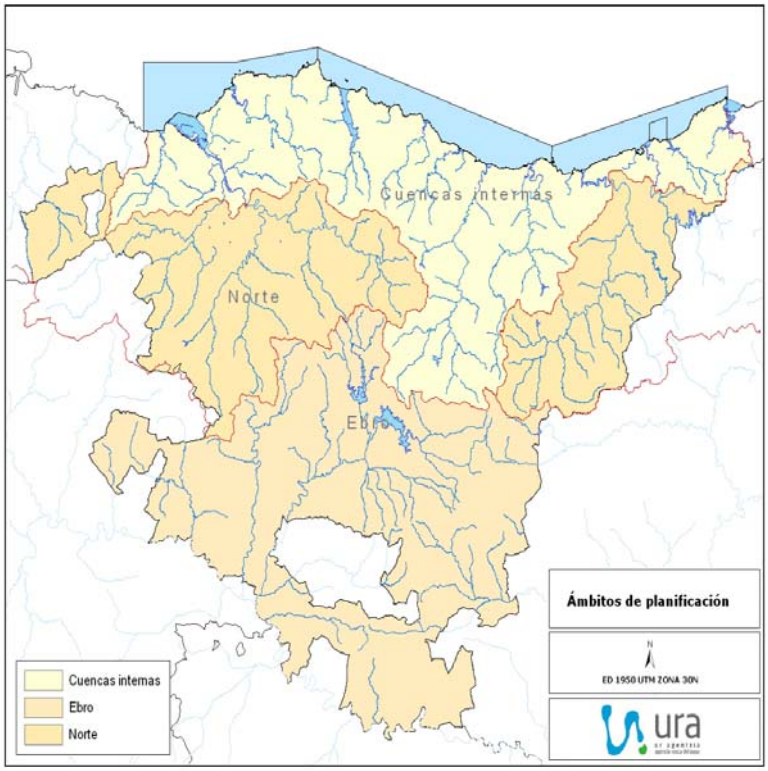

Figure 3 Hydrological planning domain in the ACBC.

2.2.2 Demography

Most of the Basque population is concentrated in the Basque capitals and their surrounding areas, and along the coast.

The Eastern Cantabrian drainage basin, which largely corresponds to the historical territory of Gipuzkoa, has a population density of some 360 inhabitants/km^2, and is home to 33% of the population of the ACBC. The Western Cantabrian drainage basin largely corresponds to the historical territory of Bizkaia, and has some 456 inhabitants per km^2, home to 54% of the population of the ACBC. In the Mediterranean part, which mostly corresponds to the province of Araba, this figure drops to 105 inhabitants per km^2, representing 13% of the population.

These differences in population density, together with an orography that varies from snug valleys with well-developed industrial activity, to expansive plateaux devoted essentially to agriculture, convey an initial idea of the nature of both the territory's socioeconomic make-up and the nature of the problems, or pressures, affecting water in its different categories and the aquatic environment generated around it.

According to the 2006 socioeconomic report on the Euskadi Autonomous Community published by EUSTAT (Basque Statistical Institute), "over the last two decades, the impact has been felt of a sharp decline in the fertility of the "baby boom" generation born between 1965 and 1981. As a result, the balance of the age structure has been deeply unbalanced because of the almost halving of the current generation of those under twenty in relation to the past. Added to this and equally important is the big increase in life expectancy over the last four decades, which means that those in the first stage of old age are gaining both in quantity and quality of life.

We can now without a shadow of doubt confirm that the low birth-rate and the high life expectancy, and the

resulting aging of the population, are the most significant demographic phenomena in Euskadi due to their intensity, trend and evolution and due to their present and future consequences".

According to the same study the birth-rate began to rise from 1996 and in the year 2004 for the first time, since the end of the decade of the 80s, the birth-rate now exceeds the mortality rate.

The life expectancy of the Basque population is, at present, one of the highest in Europe.

However, the mortality rate is growing mainly due to the demographic aging. The number of deaths in 2006 in the ACBC, according to provisional data of the EUSTAT (Basque Statistical Institute), was of 18,507, which is a death rate of 8.7 ‰.

As far as immigration is concerned, the total volume of immigrants has multiplied by five over the last eight years, going from 15,000 to almost 73,000 foreign residents.

According to Ikuspegi (Basque Immigration Observatory) in 2008 there were a total of 116,650 foreigners in the ACBC which amounts to 5.4 % of the total population.

2.2.3 Economic context

The ACBC's economic structure closely matches that of the main European Union countries, although it has a greater industrial component and its primary sector has relatively little economic weight.

The steady economic growth of the past few years, which has been running at over 3% per annum, has enabled the Basque Country to achieve a per capita GDP of € 30,967 /inhabitant (2007), which is 139.5% of the EU average, and is exceeded only by Luxembourg and Ireland.

The world financial crisis has also affected the ACBC with decreases in all sectors in general, but particularly in construction which has led to an increase in the rate of unemployment. Notwithstanding this, this situation is having a lesser impact on the ACBC than on other European countries thanks to its strong economy.

2.2.4 Health

The life expectancy of the Basque population is 78.3 years old for men and 85.6 for women, and has steadily increased over the last few decades.

The 2007 Health Survey published by the Basque Government Health Department provides plenty of information about the state of health of the Basque population and its evolution. Some conclusions from the survey are:

- The health of the Basque population is good and remains stable as regards 2002.
- Smoking has decreased amongst men and remains stable amongst women.
- The proportion of men regularly drinking alcohol has dropped and has not changed for women.
- Leisure time physical activity has increased for both sexes as regards 2002.
- 65% of the population eats fruit daily, but only the 30% eats vegetables daily.
- The frequency of obesity has increased.

Significant socioeconomic inequality was observed in 2007 (with worse indicators lower down the socioeconomic scale) in:

- Perceived health, disability.
- Smoking, physical activity, obesity and eating habits.

2.2.5 Education

Education in the ACBC is structured as follows:

- Voluntary infant education (0-6 years old) divided into two cycles, from 0 to 3 and from 3 to 6 years old.
- Free compulsory Primary education (6-12 years old) divided into three cycles of two years, and only one more year can be spent in each cycle, and only once during this stage.
- Secondary education:
- Free Compulsory Secondary education (12-16 years old) divided into two cycles of two years, and an extra year can be spent in each course, and the young people can be educated to the age of 18 years old.
- Post-Compulsory Secondary education:
- Post-compulsory and therefore voluntary Bachillerato or High School Diploma (16-18 years old), with four modalities (Arts, Natural Sciences and Health, Technology, Liberal Arts and Social Sciences), as well as the High School Diplomas in Music and in Dance.
- Also post-compulsory and voluntary Medium Level Post-Secondary Specific Vocational Training with a variable duration of between one and a half and two years.
- Post-Secondary education:
- Also post-compulsory and voluntary High Level Post-Secondary Specific Vocational Training with a variable duration of between one and a half and two years.
- University Education.

Which is completed with the adult education program.

Schooling rates

In the 2006/07 academic year the Infant Education schooling rate was 100 %, having continued the rising trend since the 68.2 % achieved five years ago. There still seems to be plenty of room for growth until the roof is reached.

The estimated rate for the Compulsory Primary and Secondary Education exceeds 100%. This is due to the fact that figures from two sources are compared (the recount of the presence of population in the educational system and the recount of population in the census) and collected at different moments (on the one hand, the figures of school population in each year and on the other hand the population forecasts based on various censuses).

63.1% of the population of the corresponding age studies for High School Diplomas and 6.5% vocational training. For higher education the rate of schooling amounts to 37.7%.

Distribution by gender

The proportion of males and females is almost half and half in the Compulsory Infant, Primary and Secondary Education; although in all the cases males are slightly predominant.

The proportion of women is higher in Adult Education (approximately three women for every two men) and slightly less in High School Diplomas. The predominance of women in Adult Education has diminished and, on the other hand, the predominance has increased of women in High School Diplomas. This means that the predominance of women in university education will be accentuated in coming years.

The proportion of men is still higher than women in the medium and higher Vocational Training. The predominance of the men in the Vocational Training is declining, with a clear trend towards comparable levels between the sexes.

2.3 Physiographic description

2.3.1 Topography

The ACBC is an especially mountainous territory, straddling the western end of the Pyrenees and the eastern end of the Cantabrian Mountains. The Cantabrian-Mediterranean watershed, formed by a succession of medium-altitude mountain chains, divides the territory and determines the area's geomorphology.

On the north-facing drainage basin, the morphology gives way to a series of river basins that continue in the direction of the Cantabrian Sea (Bay of Biscay) crossing an area whose height varies appreciably within short walking distance. The basins form valleys that, generally speaking, lie markedly in a north-south direction. Only the River Ibaizabal differs, due to the predominantly east-west direction of its course.

On the drainage basin flanking the Ebro, the relief is gentler with a lessening of the marked difference in altitude between the mountains of the watershed relative to the Cantabrian valleys. This is because of the higher base level of the Mediterranean rivers (around 600 m). The Alavese Plain constitutes a large central plateau, crossed by the River Zadorra and flanked by different mountainous areas, which separate it from the Ebro Depression (Figure 3).

2.3.2 Geology

The geology of the ACBC is characterized by a predominance of detritus sedimentary rocks from the Cretaceous period, in the shape of flyschoid series of sandstone, clays and loams which provide generally curvaceous reliefs. On the other hand, scattered around are large carbonated massifs and large karstic developments which form the highest contours and form more abrupt reliefs and less developed land. In fact, the main altitudes are situated in the limestone mountain ranges forming the Cantabrian-Mediterranean watershed.

The mountains that flank the central plateau of the Alavese plain can be grouped into two blocks: loam-limestone mountain ranges to the north, within a long synclinal prolongation of the Urbasa, and Cretaceous limestone ranges to the south, bordering with the Alavese Rioja.

The proportion of these lithologies is shown in the Table 1 and its geographic and structural layout in the Figure 4. With physical environment conditions characterized by high precipitation and by the existence of harsh orographic unevenness that the rivers have to tackle over very short distances, the water erosion constitutes the most active geomorphologic agent, above the karstification in the limestone ranges and the swell on the coastal cliffs. In the places where the valley widens and the slope diminishes, the rivers deposit their load of sediments forming quaternary flood plains.

The multiplicity of lithologies and microclimates and the predominance of steep mountainsides leads to different types of land with a predominance of the siliceous substrates, particularly on the northern slope, characterized by its acidity (pH around 4.5 - 5) and high percentages of organic matter and iron.

Generally speaking, the land is young and has been developed under the influence of a temperate-cold climate which has favoured the decomposition of the bedrock, intense washing and a slow accumulation of various components (clay, oxides, humus) in the deepest horizons. The appearance of toxic levels of aluminium and the lack of phosphorous is frequent with low pH. Traditionally these problems have been countered by spreading lime to improve the productivity.

On the Mediterranean side, the availability of water in the dry season is usually a determining factor in the land evolution. The mountainous areas do not usually experience droughts during the summer and, despite the domination of limestone substrates, the ground has marked acidity due to the intense washing. In the agricultural valleys, the predominant natural characteristics are summarized by high carbonate contents associated with limestone and loamy substrates.

Lithology	Surface area (km^2)	%
Alternating detritus	2,213.62	30,6%
Limestone	1,624.72	22,5%
Alternating loamy limestone and limestone	1,308.09	18,1%
Surface deposits	672.77	9,3%
Detritus rocks	542.95	7,5%
Loams	416.58	5,8%
Slate	159.92	2,2%
Volcanic rocks	82.26	1,1%
Dolomites	72.38	1,0%
Salt clays	57.21	0,8%
Ophites	45.72	0,6%
Igneous rocks	30.79	0,4%
Reservoirs and rivers	5.51	0,1%
Lodestuff rocks	0.92	0,0%
Sandy limestone	0.69	0,0%
Metamorphous rocks	0.46	0,0%

Table 1 Lithologies (modified of Ente Vasco de la Energía - Basque Energy Institute, 2003).

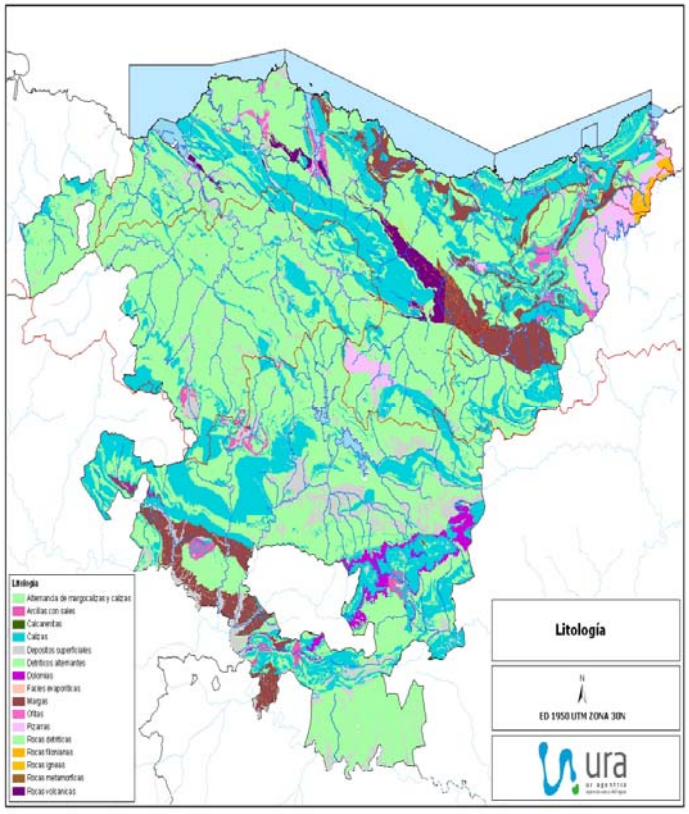

Figure 4 Lithological Map.

2.3.3 Land uses

The factors governing vegetation confer on the territory a propensity for the growth of woods. Only land in situations with very specific conditions -such as high salinity, rocky outcrops, predominant hydromorphy, and so on- is permanently suited to supporting lesser plant communities alone. The high rainfall throughout the area and the predominance of acidic soils over neutral or alkaline, result in the prevalence of acid-loving vegetation. Other aspects of the climatic system, such as frequent mists in the mountains, are responsible for characteristic features of ACBC vegetation such as the presence of mountain plants at low altitudes. Most of the current landscape has been considerably transformed and, with just a few exceptions, the spontaneous woody masses that exist are small and somewhat altered. The dominant landscape of the north-facing drainage basin is composed of meadows with cultivated parcels and areas reforested with conifer trees, amongst which Pinus radiata is by far the most widespread and abundant. The river and stream-bank vegetation is formed of mixed woodland dominated by alders, willows and ash trees. The Mediterranean-facing drainage basin is characterized by a greater presence of natural woods -although sometimes comprising bushy species- and by the presence of cultivated fields and, in amongst them, irrigation networks (Figure 5 and Table 2)

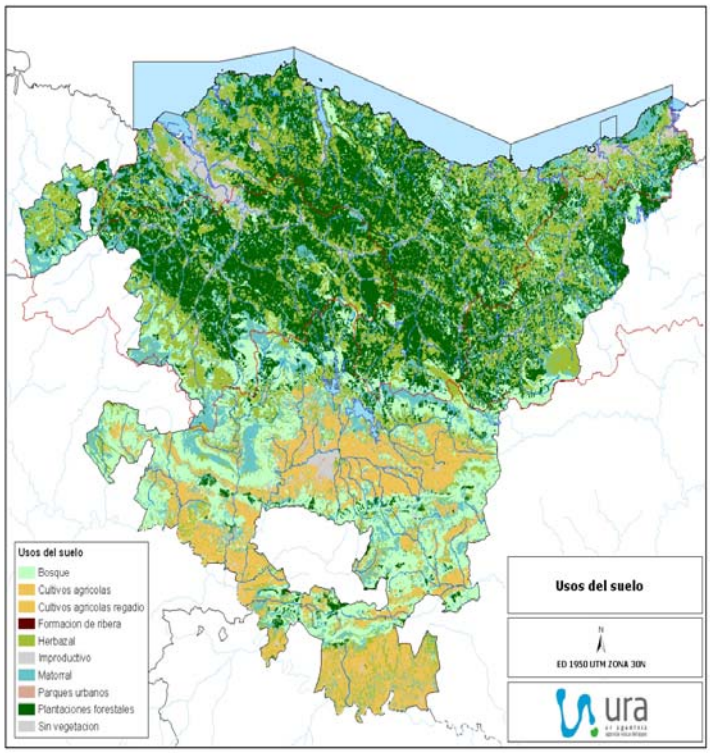

Figure 5 Land uses.

Usos del suelo	Superficie (km^2)	%
Plantaciones forestales	2,069.73	28.6%
Herbazal	1,586.04	21.9%
Bosque	1,530.81	21.2%
Matorral	842.82	11.6%
Cultivos agrícolas regadío	700.46	9.7%
Improductivo	280.32	3.9%
Cultivos agrícolas	157.38	2.2%
Embalse y ríos	33.97	0.5%
Sin vegetación	14.79	0.2%
Erosión	11.09	0.2%
Parques urbanos	7.16	0.1%

Table 2 Land uses

2.3.4 Climatology

The watershed of the Cantabrian and Mediterranean slopes, through its altitude and proximity to the coast, constitutes one of the principle determining factors for climate. This orographical (mountain) factor, which defines the territory's oceanic-continental nature, is one of the fundamental factors in precipitation and climate.

On the north-facing drainage basin the climate is of the mesothermal variety, with moderate temperatures

and significant rain. It belongs to the 'Atlantic climate' category, which is characterized by humidity without a dry season. Air masses, whose temperatures have become mild through contact with temperate ocean waters, reach the coast and tend to even out the temperature variations between night-time and daytime, or between summer and winter. The orographical factor (the presence of mountains) explains the high rainfall across the entire Atlantic-facing drainage basin of the Basque Country, between 1,200 mm and over 2,000 mm average annual precipitation.

The middle area, which occupies a large part of Araba, is a transition zone between the oceanic climate and the Mediterranean one, with Atlantic features predominating as a truly dry summer does not exist. In the south of the ACBC, in the area of the Ebro depression occupied by the Alavese Rioja, the climate is characterised by hot, dry summers of the Mediterranean type. Normally, due to its rather cold winters and scant precipitation, this climate is referred to as "inland Mediterranean" or "Mediterranean continental".

In general there is a notable positive slope going from west to east and another, although less pronounced and subject to numerous local variations, going from north to south. The areas with most annual rainfall tend to be convective and are therefore more local in character than the frontal type.

The year-on-year variability leads to wet years with almost 2,000 mm rainfall on the northern slope, as opposed to the dry years when only have that amount falls. On the Ebro-facing drainage basin, the fluctuations are less pronounced with maximums which reach 1,200 mm, and minimums of 700 mm. The lowest precipitations were at the end of the 80s and beginning of the 90s which, together with the period from 1940-50, coincide with the two most significant drought periods in the analysed records. There is no clear differentiation between the year-on-year patterns of rainfall between the different hydrological units, as seen in (Figure 6).

During the yearly periods there are double peaks for the maximums, one in November-December and the other in April. The minimums occur in June and July. This behaviour is similar on both slopes. What is noticeable however is the high summer rainfall in the most eastern basins.

As far as temperature is concerned, they are very moderate in the areas under the Atlantic influence, which is mainly manifested in their mild winters. The variations in the average monthly temperatures, although not important, are significant. On the coast the differences between the hottest months and the coldest months is only about 11º or 12º C, while inland it increases noticeably to between 17º and 18º C.

The minimum average temperatures are reached throughout the territory in January, although it should be noted that on the coast they are relatively high, at between 4º and 5º C. The absolute maximum difference from the same observatory was registered in Vitoria-Gasteiz, where the range between the absolute minimum and the absolute maximum was almost 60º C.

There is not much difference in the distribution of the absolute maximums which stand at around 40º C on both the coast and inland, normally as a result of southerly wind. The average number of days with frost varies considerably between territories. On the coast there are less than 20 such days although the number increases rapidly as one goes inland. On the other side of the dividing line, in the Alavese Plain, there are well over 40 such days. The geographical distribution of the average temperatures is shown in Figure 7.

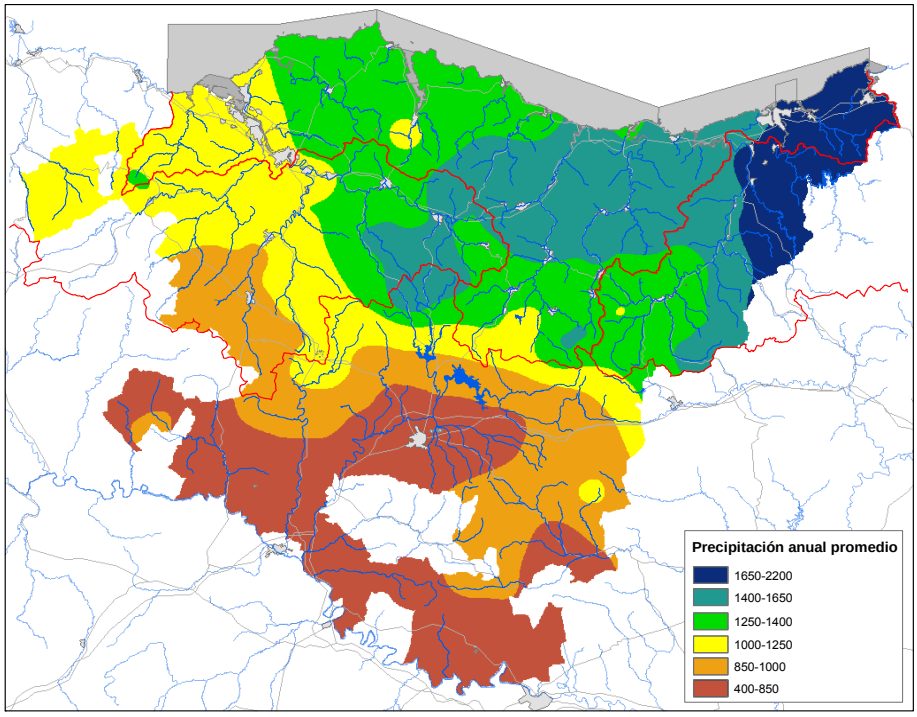

Figure 6 Average annual precipitation (Basque Government)

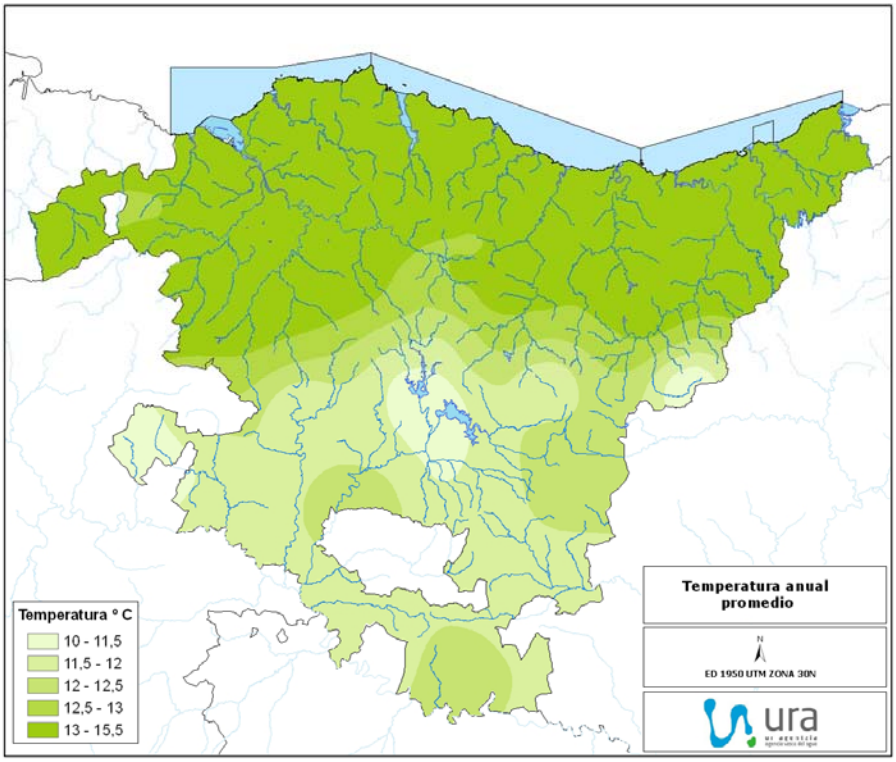

Figure 7 Average annual temperature.

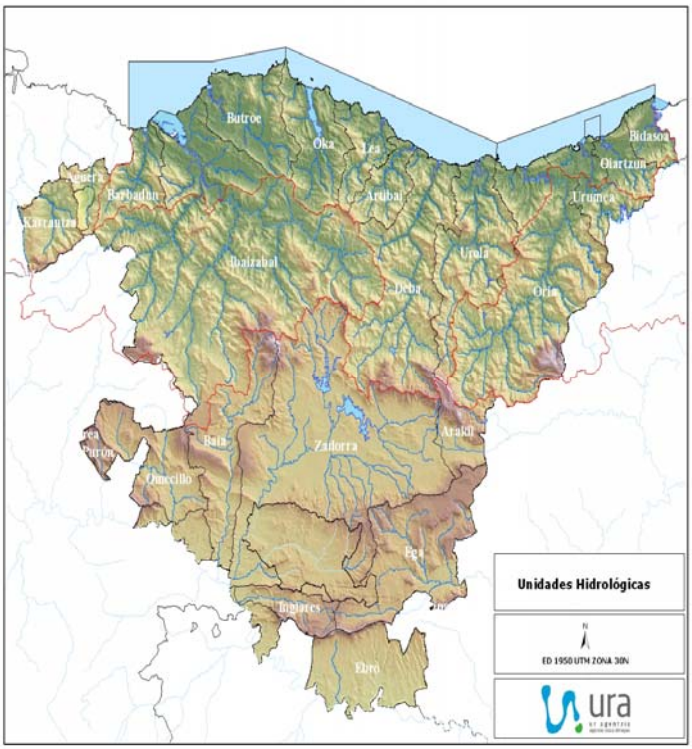

Figure 8 Hidrographic basins

2.4 Water environment

There are twenty-four significant Hydrographic basins or hydrological units, of which fourteen flow into the Cantabrian Sea and the rest into the Mediterranean. These are described as Hydrological Units (Basque Government, 2001), using the concept of Hydrographic Demarcations (areas), but without assigning the corresponding coastal waters (Figure 8). The water resources of each Hydrological Unit are described in Table 3.

The average rainfall in the ACBC is about 9,222 Hm^3/year. In the Cantabrian drainage basin is about 6,747 and in the Mediterranean drainage basin about 2,475.The proportion of the precipitation which returns to the atmosphere through evapotranspiration is conditioned by the edaphic balances and by the reference or potential evapotranspiration. The latter increases going inland and from east to west. Its variation is more moderate than the other factors conditioning the water cycle as, depending on the analysis methods, it varies by no more than 20-30% throughout the territory.

Out of all of the rain that falls, 4,634 Hm^3/year returns to the atmosphere via evapotranspiration and 4,575 Hm^3/year is converted into water resources. These figures mean that on the Cantabrian drainage basin the runoff coefficient reaches 53% and on the Mediterranean drainage basin it drops to an also very high 45%.

The very high combination of rainfall and runoff water coefficients in the north-eastern area means that it has the highest specific runoff in the region, with basins like the Urumea, Bidasoa and Oiartzun having natural resources of over 1,000 mm per year.

Going in the north-south and east-west diagonal, which marks the reduction in the runoff, we find the Oria, Urola, Deba, Artibai, Lea and Oka systems with specific runoff of between 730 and almost 900 mm.

Hydrological Unit	Area (Km²)	Water quantity (Hm^3)	Precipitation (Hm^3/year)	Real ET (Hm^3/year)	Potential ET (Hm^3/year)
Bidasoa	76.47	82.5	134.6	52.1	64.6
Oiartzun	93.32	106.0	175.3	69.1	78.4
Urumea	138.10	174.0	263.5	89.1	105.3
Oria	780.04	690.2	1,271.6	584.9	639.5
Urola	348.98	297.1	546.7	249.3	276.4
Deba	554.29	470.7	893.4	422.5	471.5
Artibai	109.67	83.3	165.6	82.0	88.3
Lea	127.76	93.6	176.3	83.0	92.6
Oka	219.16	159.2	305.6	146.3	166.5
Butroe	236.00	142.8	308.9	166.5	208.9
Ibaizabal	1,533.93	980.0	2,091.6	1,111.0	1,396.3
Barbadun	134.21	86.7	164.6	78.1	104.0
Aguera	49.29	32.9	63.5	30.8	38.9
Karrantza	140.34	90.5	186.1	95.5	110.5
Jerea	10.36	2.1	7.9	5.8	9.3
Puron	24.67	5.0	18.9	13.8	22.2
Omecillo	241.37	33.9	177.8	143.6	231.9
Baia	307.84	159.2	327.8	168.4	228.5
Zadorra	1,100.19	569.0	1,171.3	598.5	1,024.5
Inglares	97.95	10.8	72.1	56.9	100.2
Linares	0.52	0.2	0.5	0.3	0.3
Ega	407.00	162.3	365.7	197.9	268.7
Arakil	115.35	70.0	131.6	61.2	87.2
Ebro	387.79	73.4	201.8	127.7	390.7
Total	7,234.60	4,575.4	9,222.4	4,634.4	6,205.5

Table 3 Total Water Resources in the hydrological units (Basque Government)

The next group is made up of Barbadun, Butroe, Agüera, Karrantza and Arakil with slightly over 600 mm per year, and finally the rest of the Mediterranean rivers, with the lowest in the Omecillo, the ravines of the Ebro and the Inglares. The specific runoff is shown in Figure 9.

Another significant aspect in the balance is the differences between the real and the potential evapotranspiration. On the northern drainage basin the RET is very similar to the PET, which would in general terms indicate the practical absence of water stress on the vegetation, with the resulting growth and plant cover potential in the absence of human influence. In the Ebro, both values move further apart as the precipitation decreases, leading to water stress and plant cover typical of Mediterranean formations.

The distribution of the year's water resources, Figure 10, shows a maximum between the months of December and January, with a slight upturn in April, reflecting the variations in rainfall. The months with least water resources are July, August and September. Most of the water resources are concentrated during the period from November to April.

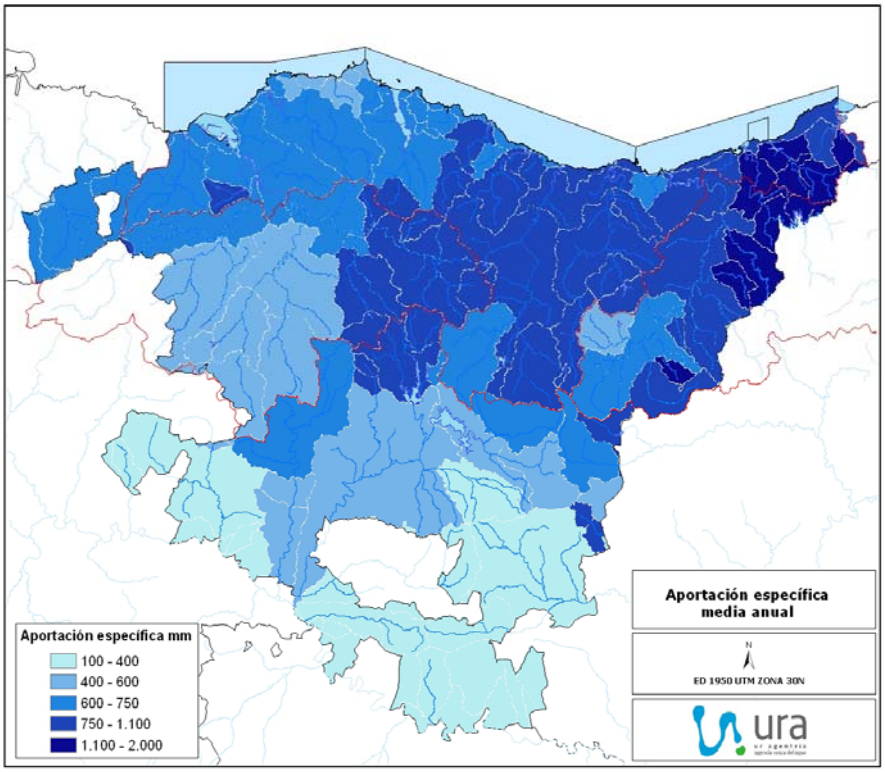

Figure 9 Average annual runoff.

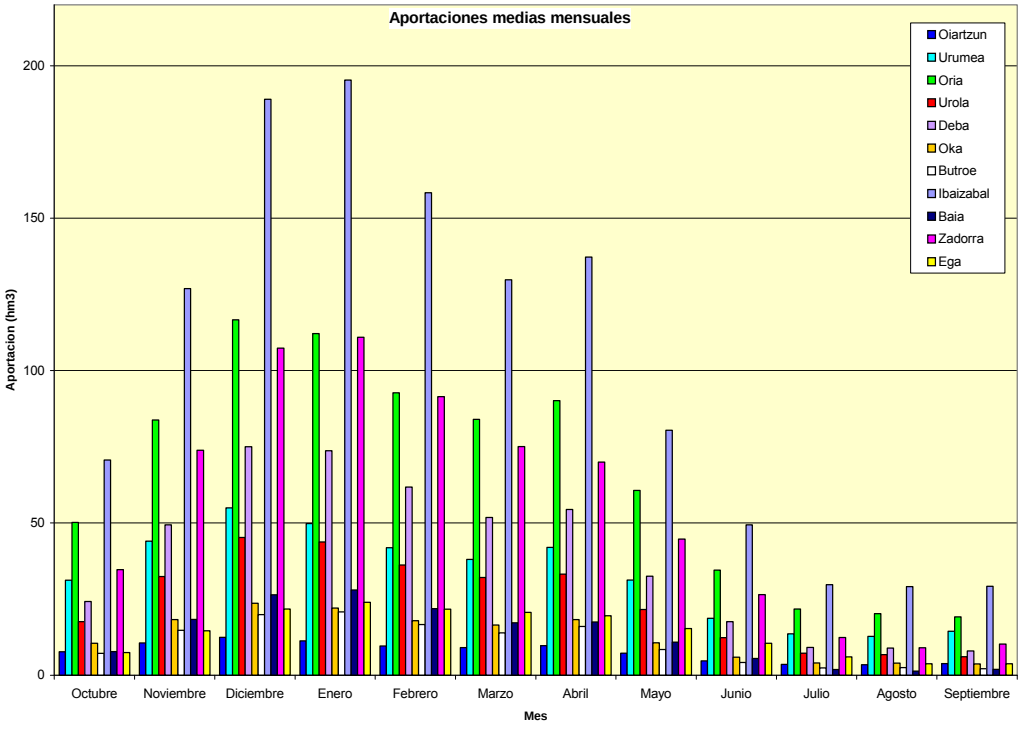

Figure 10 Average monthly runoff

For groundwater, the calculation of the water resource adds a new term, the available groundwater resource, defined by the WFD as "... the long term annual average rate of overall recharge of a body of

groundwater less the long term annual average rate of flow required to achieve the ecological quality for the associated surface waters specified under Article 4, to avoid any significant diminution in the ecological status of such waters and to avoid any significant damage to associated terrestrial ecosystems..."

The total recharge value of groundwater (infiltration of precipitation, infiltration by other runoff, relation with other masses and risk returns) for the ACBC as a whole is 1,468 Hm³/year and the available resource 1,205 Hm³/year. As such 263 Hm³/year of the renewable groundwater resources must be reserved in order to make it possible to achieve the environmental objectives in the surface rivers with which they are related.

The groundwater masses in the ACBC are those shown in Figure 11. Figure 12 shows the total water resources (hm^3/year) in the groundwater masses.

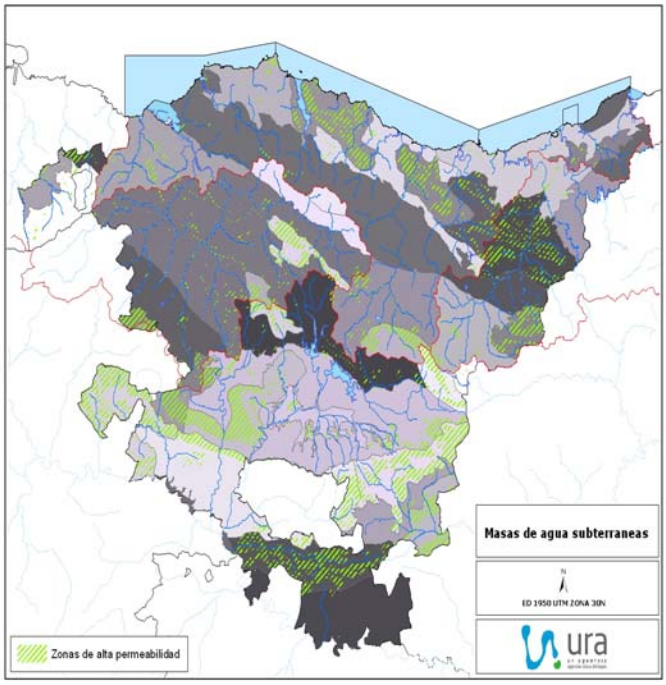

Figure 11 Groundwater masses (Basque Government)

It is the job of the Basque Water Agency to test and monitor the water quality of the Basque Country's internal basins, as necessary, for planning and managing water resources and their use. It likewise proposes and follows-up water quality targets and schemes, in coordination with the other departments concerned. The Basque Water Agency aims to ensure that the density of points -the parameters which indicate quality criteria and testing frequency- is sufficient to gain a consistent and comprehensive overview of the state of the ACBC's water masses, with special emphasis on the internal basins.

In the Figure 13 and Figure 14 are shown the surface water and groundwater control networks which are directly or indirectly managed or coordinated by the Basque Water Agency to monitor the state of the water masses in the ACBC.

There are also specific networks to monitor the protected areas, like the quality control Network for the water for human consumption, the quality control Network for water used for mollusc and shellfish farming, the quality control Network for bathing areas and the control Network of sensitive areas (Directive 91/271/EEC) in the Internal Basins of the Basque Country, all administered by different departments in the

Basque Government.

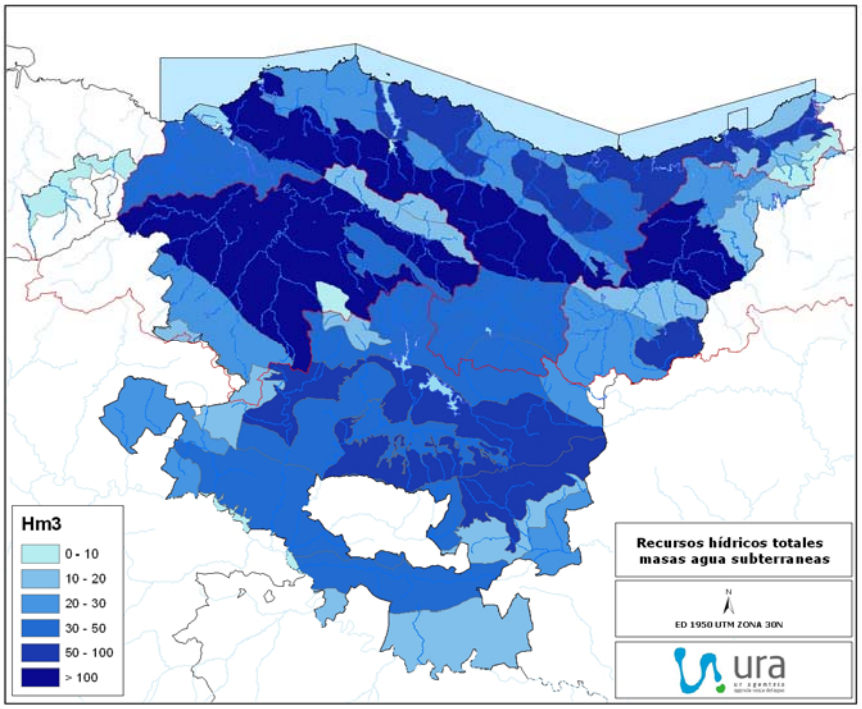

Figure 12 Total annual water resources of the groundwater masses (Hm^3/year) (Basque Government)

2.5 Monitoring networks

In the ACBC, it has become customary for multiple networks to coexist to monitor water quality and quantity, with different management bodies involved and relatively different aims and approaches. Thus, noteworthy activities have been carried out by the Basque Government, the Provincial Councils, the Hydrographic Confederations of the North and of the Ebro, state organisms, which play a role in the management of water, and Consortiums and Associations, amongst other bodies.

In response to the monitoring requirements of Article 8 of the WFD, the Hydrographic Confederation of the Cantabrian and the Hydrographic Confederation of the Ebro (operating in their sphere of competence within the ACBC) have designed networks for monitoring water masses and protected areas. They are designed in accordance with new obligations of the WFD and previous networks such as the Integrated Water Quality Network (Red Integrada de Calidad de las Aguas – Red ICA), the Environmental Variables Monitoring Network, the Network for Monitoring Surface Water for the Production of Drinking Water (Red de Control de Aguas Superficiales destinadas a la producción de agua potable – Red ABASTA), and the Automatic Hydrological Information System (Sistema Automático de Información Hidrológica-SAIH), amongst others.

The Provincial Council of Gipuzkoa manages the Gipuzkoa Water Quality Monitoring Network and the Gipuzkoa Estuaries Water Quality Monitoring Network, which are responsible for periodic physical-chemical and biological testing at different sampling points. The water quality monitoring networks managed by Management Bodies undertake testing in reservoirs and their principal tributaries.

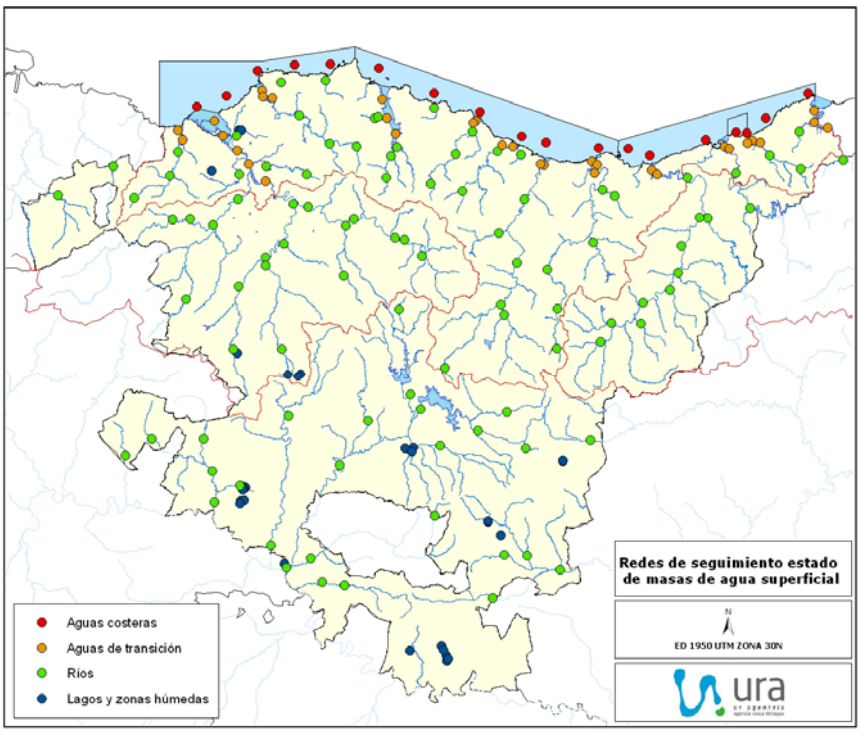

Figure 13 Monitoring networks coordinated and managed by the Basque Water Agency

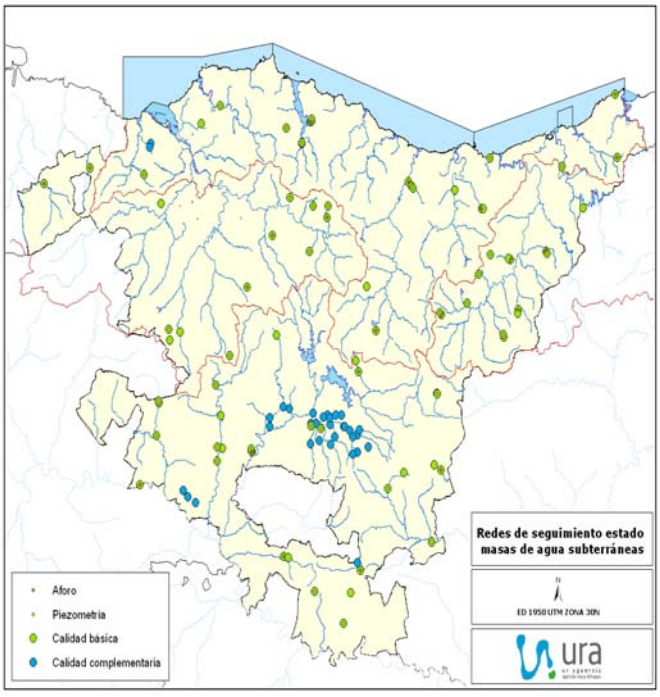

Figure 14 Monitoring networks coordinated and managed by the Basque Water Agency

This enables the monitoring of main intake points of water for human consumption, sensitive inland areas and certain water masses in the river category.

3 WATER ENVIRONMENT CONDITION

The analysis performed by the Basque Water Agency has shown that the most widespread pressure on the rivers of the Cantabrian basins of the Basque Country is currently of a hydromorphological nature. This is because the accented topographical relief of the Cantabrian basin area together with recent major industrial and urban developments have given rise to the progressive occupation of the river meadows and growing pressure on areas around rivers, all of which is clearly reflected by current indicators. Pressure in the Mediterranean basin is less and stems fundamentally from agricultural activities.

Thus, and although there are already territorial regulation instruments which make compatibility possible between river ecosystems and urban-industrial development, 34% of the river water masses are under significant morphological pressure. In fact, of the 122 masses in this category within the ACBC, 28 or 23% have been provisionally considered as VMWM due to morphological alterations.

Another less widespread form of pressure, in other words with a slightly lesser order of magnitude, is the discharge of effluent into the river system. Although plans to clean up rivers have led to a notable improvement in river water quality in the respective Demarcations (areas), in Demarcations where plans are incomplete the indicators are still giving high values for pollution such that the discharging of effluent still affects 40% of the river system to a greater or lesser extent such as the upper Nerbioi, the indicators show high values, which means that the discharges of effluent still, to a greater or lesser extent, affect a large part of the river network in the ACBC.

Although to a lesser extent, the rivers in the ACBC endure pressure from consumptive and non-consumptive extractions, as well as pressure agricultural and livestock sources.

Generally less significant are pressures from water abstraction, either for consumption or other uses. These are classed as significant for 20% and 25% of water masses respectively, although local impact may be more acute.

The Basque Country's transitional and coastal water masses are under significant pressure, due to the presence of major drivers, such as demography (population density), the large-scale presence of industry, and port development.

One of the biggest pressures on transitional water masses has been the loss of seashore area, as compared with its original extent in the post-Flandrian age. Both the introduction of nutrients and the formation of channels are pressures that continue to exert themselves on transitional (and, to a lesser extent, coastal) water masses. There is also considerable pollution of both waters and silts (moorings for watercraft may be added as a source of pollutants). Overall there are two main pressures: the discharge of pollutants, both urban and industrial, and morphological alteration (formation of channels and loss of shore area between the terrestrial vegetation line and the low tide line).

As regards the groundwater there are no significant quantity problems although the pressure on the chemical state is significant in various water masses, like Oiartzun, Gatzume, Zumaia-Irún, Gernika, Tolosa, Mena-Orduña, Cuartango-Salvatierra, Vitoria, Sinclinal de Treviño, Sierra de Cantabria, Lokiz and Miranda de Ebro, principally due to the livestock activities and/or potentially contaminating sites.

The pressures on the water masses in the ACBC cause a series of impacts which determine the state of the watery environment and which therefore show the environmental effect caused by said pressures on the water masses. In general, the assessment of the impact reflects the main detected pressures, in other words that the significant pressures have led to proven or probable impacts.

Various analysis have been performed in order to determine these impacts in order to assess the state of

the water masses in relation to the environmental objectives of the WFD from the results obtained at the control and monitoring networks, and with data obtained in non-periodic and specific studies to deal with specific aspects relating to characterising and evaluating pressures and impacts. An exhaustive study has for example been done on over 600 km of the river network which has managed to identify and subsequently describe any relevant pressure and which has provided information relating to the impact on stretches for which data was not previously available.

Figure 15 and Figure 16 show the impact assessment in the water masses of the Basque Country. In other words, on the one hand Figure 15 shows in a simplified manner the state of the rivers, transition waters and coastal waters, while Figure 16, shows the state of the groundwater masses from the chemical point of view.

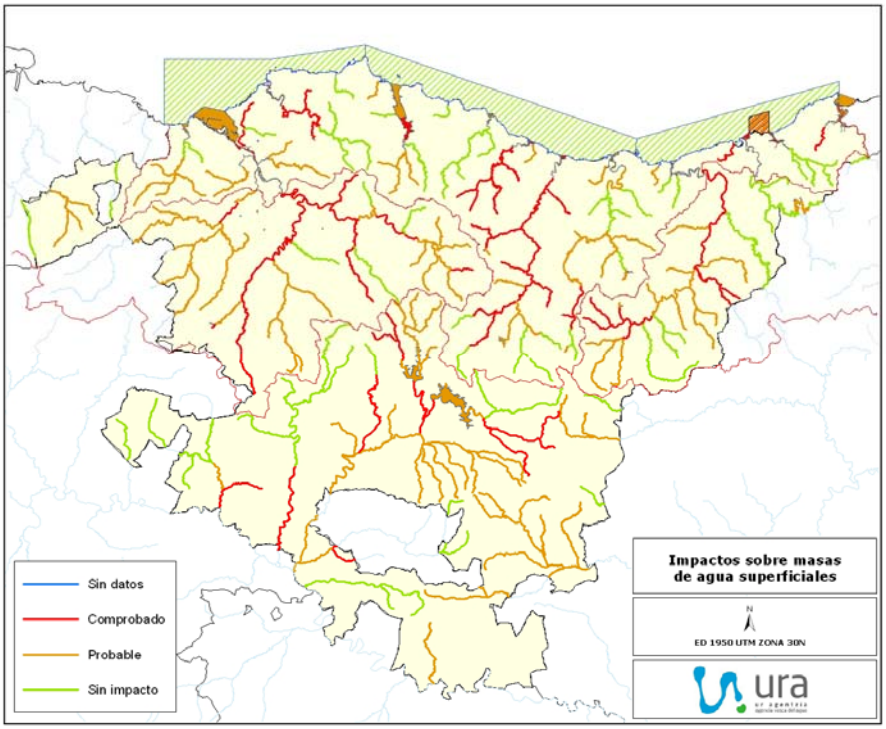

Figure 15 Impact assessment in the surface water masses

4 WATER USES AND WATER ENVIRONMENT

The following section sets out the main features of the sectors of economic activity that exert a decisive influence on the aquatic environment within the Autonomous Community of the Basque Country.

4.1 Supply of water and removal of wastewater sector

The water services related to the supply of water and the removal and treatment of wastewater come under the Local Authorities, by virtue of Act 7/1985, Regulating the Bases of the Local System.

Despite this, there is a very widespread phenomenon through which many local authorities, including the most important ones, have ceded some (or all) of their competences to supramunicipal entities like associations or consortiums.

Although the current panorama is heterogeneous as regards the statutory formulas and as regards the scope of the competences assumed by each manager, a clear vocation is seen converging towards a

management model of the entire water cycle with sufficiently large scope in order for its adequate development.

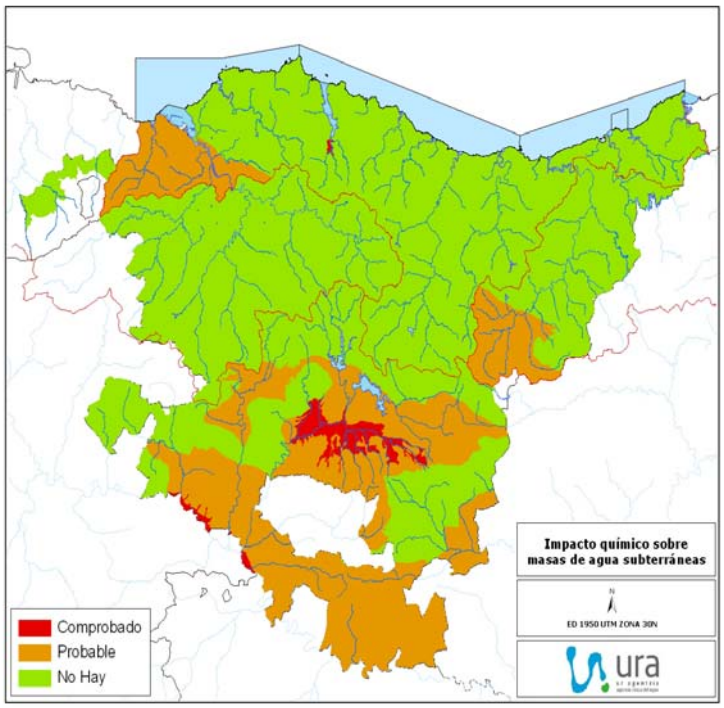

Figure 16 Impact assessment in the groundwater masses

As at the date of this report, the ACBC has 16 supramunicipal management bodies, while 35 Municipalities and 212 administrative agencies manage water directly, as shown in Figure 17.

The population serviced by the most representative consortia amounts to a total of 1,966,006 inhabitants, in other words 94% of the total population of the ACBC. The population served by supramunicipal bodies in the Internal Demarcation amounts to 95.4 %, while in the Cantabrian and Ebro Demarcations it is 90.4 and 96 % respectively.

4.1.1 Supply infrastructures

The main water regulation and transport infrastructure in the ACBC is associated with the urban supply systems. In general, supra-municipal systems collect the water from the lead reservoirs and distribute it to the towns generally situated in the lower areas of the basins.

The total useful reservoir capacity amounts to 299.38 Hm^3. The main reservoirs in the ACBC are Ullíbarri and Urrúnaga, in the Zadorra, reservoirs upon which most of the urban and industrial supply depends. Table 4 shows the main reservoirs currently existing. Some reservoirs situated entirely or partially in other Autonomous Communities have also been included given their relationship with the operating systems. It also includes the Ibiur reservoir, currently under construction.

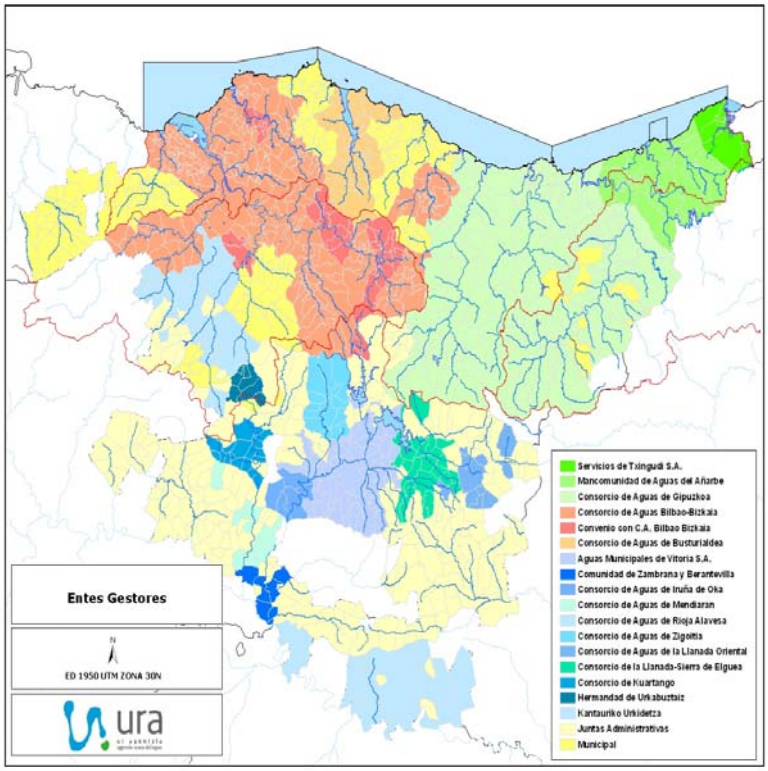

Figure 17 Supramunicipal entities.

The Infrastructure associated with the intake and distribution of groundwater is capable of abstracting some 48 hm^3/year, while surface water intakes contained within supply systems move approximately 313 hm^3/year.

On the other hand, an inventory has been made, throughout the ACBC, of a total of 342 operating systems which meet the supply condition for urban supply to 50 or more inhabitants. Of these, 25 have been classified as supramunicipal, 69 as municipal and 248 as population entity (Figure 18).

4.1.2 Current demand

The basic data about the current and future demand comes from the study “Characterisation and Quantification of the Water Demand in the ACBC and Prospective Study” (“Caracterización y Cuantificación de las Demandas de Agua en la CAPV y Estudio de Prospectivas”) (2003), which, in order to establish a tool to estimate the demand, analyse future demand and monitor the consumption, defines a simulation model of the demand which takes as base year for the initial calculation the census corresponding to the year 2001.

The evaluated demand structure clearly shows a predominately urban type of society and with a significant weight of industrial demand, both connected to the network and with their own intakes (Table 5). The agricultural demand also has a significant weight although in a limited ambit (Table 6).

Reservoir	Hydrological	Ambit	Basin	Annual	Useful	Destination

	Unit		area (Km^2)	natural water resources (Hm^3)	Capacity (Hm^3)	
San Anton	Bidasoa	Northern III	10.8	14.6	5.00	Txingudi
Anarbe	Urumea	Northern III	60.8	102.1	42.90	Lower Urumea
Arriaran	Oria	Northern III	9.3	5.3	3.20	Goierri
Ibiur	Oria	Northern III	11.5	8.8	6.50	Ibiur System (under construction)
Lareo	Oria	Northern III	0.3	0.2	2.40	Lareo System (Ataun) and Goierri
Barrendiola	Urola	Internal	4.0	3.6	1.48	Upper Urola
Ibaieder	Urola	Internal	29.0	25.3	10.70	Middle Urola
Urkulu	Deba	Internal	13.0	11.4	9.65	Upper Deba
Aixola	Deba	Internal	7.8	7.4	2.70	Eibar
Artziniega	Ibaizabal	Northern III	12.0	7.4	0.75	Artziniega System
Gorostiza	Ibaizabal	Internal	24.8	20.0	1.00	Gorostiza System
Marono	Ibaizabal	Northern III	21.5	11.9	2.46	Maroño System (Amurrio-Ayala-Llodio)
Undurraga	Ibaizabal	Northern III	31.3	26.6	1.79	CABB
Ordunte	Ibaizabal	Northern III	46.3	38.4	22.20	Kadagua-Bilbao
Albina	Zadorra	Ebro	9.8	5.9	5.35	Legutiano-Albina System
Gorbea II	Zadorra	Ebro	10.0	9.5	0.10	Vitoria Supply
Ullibarri	Zadorra	Ebro	272.5	154.1	121.50	CABB-Vitoria
Urrunaga	Zadorra	Ebro	142.0	109.4	60.80	CABB-Vitoria

Table 4 Main reservoirs (Basque Government, 2005)

Consumptive demand	(Hm^3)
URBAN	
Residential	100.38
Commercial	20.64
Industrial	20.92
Municipal	14.74
Private irrigation	0.91
Livestock	3.93
Total urban low-level network	161.53
Total urban high-level network (exit deposits)	265.20
Total urban high-level network (at water intakes)	275.80
OWN INTAKE INDUSTRIAL	
Bilbao – Bizkaia Consortium	12.08
Own intakes	58.08
Total own intake industrial	70.16
AGRICULTURAL IRRIGATION	
Agricultural irrigation	34.94
Golf	0.56
Total agricultural irrigation	35.50
RURAL LIVESTOCK	0.81
Total consumptive demand	382.27

Table 5 Distribution of the consumption demands, 2001 (Basque Government, 2005).

Non consuntive demands Hm^3	
Hydroelectric	6,320.70
Acuiculture	5.21
Total non consuntive demand	6,325.91

Table 6 Non consuntive demands, 2001 Hm^3.

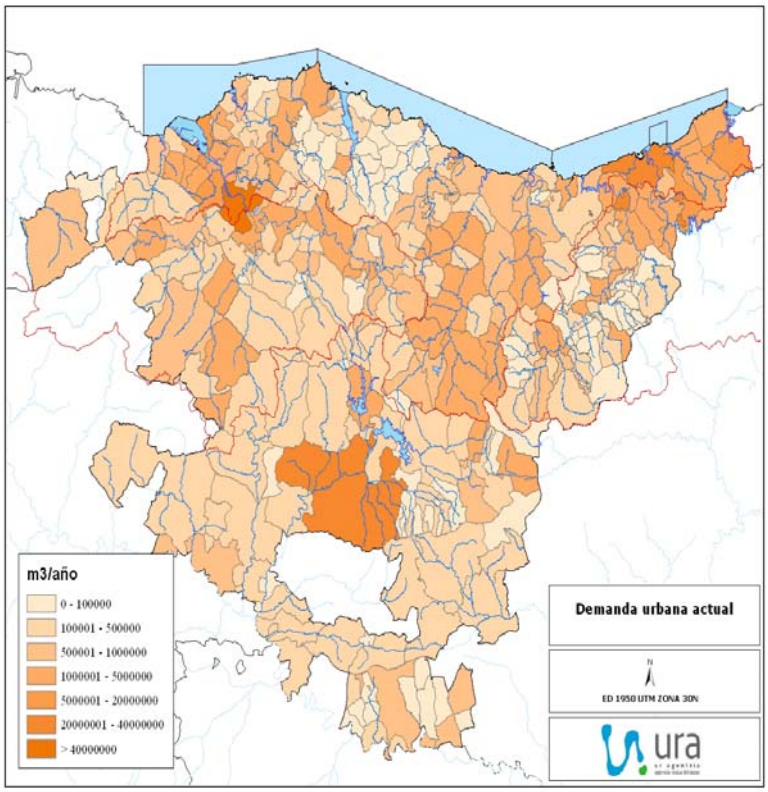

Figure 18 Distribution of the current consumption by municipalities, 2001 (Basque Government, 2005)

4.1.3 Future demands

The Characterisation and Quantification of the Water Demand in the ACBC and Prospective Study ("Caracterización y Cuantificación de las Demandas de Agua en la CAPV y Estudio de Prospectivas") (2003), calculates the most probable scenarios as regards the future water demands.

As a result of this analysis, it is estimated that the future demand will rise on the basis of the two accepted suppositions: an increase in the population, albeit moderate, and, more importantly, an increase in the mains-connected industrial demand until the future industrial areas are completed. However, this increase could be compensated, and could even decrease, through decisive action in one of the demand management aspects which requires most attention: reducing the "unchecked" cubic meterage, understood as the sum of the leakage, under-readings by faulty metering equipment, unaccounted-for consumption, fraudulent taking of water from the mains, etc.

One of the most important challenges is to achieve a balance between the demand and the water resources which could be reached by applying effective existing tools, and improving or developing new tools.

The administrations competent for the water supply and removal of wastewater have financial tools to control and reduce the demand (direct management of the demand), measuring the allocations and applying fair pricing which internalises the environmental costs.

Another challenge is to reduce the consumption through education and awareness of the domestic and private water users.

4.1.4 Wastewater removal

The process of installing specially designed purification systems shows that the established quality aims have not always been achieved. According to the results obtained via networks for monitoring the state of water masses, some sites where purification systems have been installed are still showing a shortfall in water quality. However, it is obvious that there are a significant number of other problems contributing to this circumstance.

The Guiding Plan for the Removal and Treatment of Waste Water in the ACBC (prepared in 1997 and revised in 1999) programmes a series of actions aimed to eliminating or reducing the effects of discharges of urban wastewater on the state of the related waters and ecosystems, in accordance with the obligations established in Directive 91/271/EEC.

It must finally be pointed out that the global vision of the ecological state of the water masses determined by the Water Framework Directive means that the wastewater removal and treatment requirements originally set out in Directive 91/271/EEC must be reconsidered. It is necessary therefore to deal with the definition of the wastewater removal solutions from the perspective of the ecological state finally expected in the receiving water masses, thereby going beyond the dimension of the area in question and automatically establishing the treatment requirements. On this matter, the Basque Water Agency is preparing a new wastewater removal and treatment plan, for 2015, which must include, apart from the pending actions required under Directive 91/271/EEC, those needed in order to contribute, from this sector, towards achieving the environmental objectives of the WFD.

The current degree of implementation of this plan leads to the results set out in Table 7 and in Table 8 and in Figure 19 and Figure 20.

<table>
<tr><td rowspan="2">88 waste water treatment stations inventoried</td><td>56 waste water treatment stations in service</td><td>1,712,584 inhabitants receive treatment</td></tr>
<tr><td>3 waste water treatment stations under construction + 29 planned waste water treatment stations</td><td>Planned incorporation 300,767 inhabitants</td></tr>
<tr><td colspan="2">Autonomous solution</td><td>69,236 inhabitants</td></tr>
</table>

Table 7 . Solutions for wastewater removal, and population served.

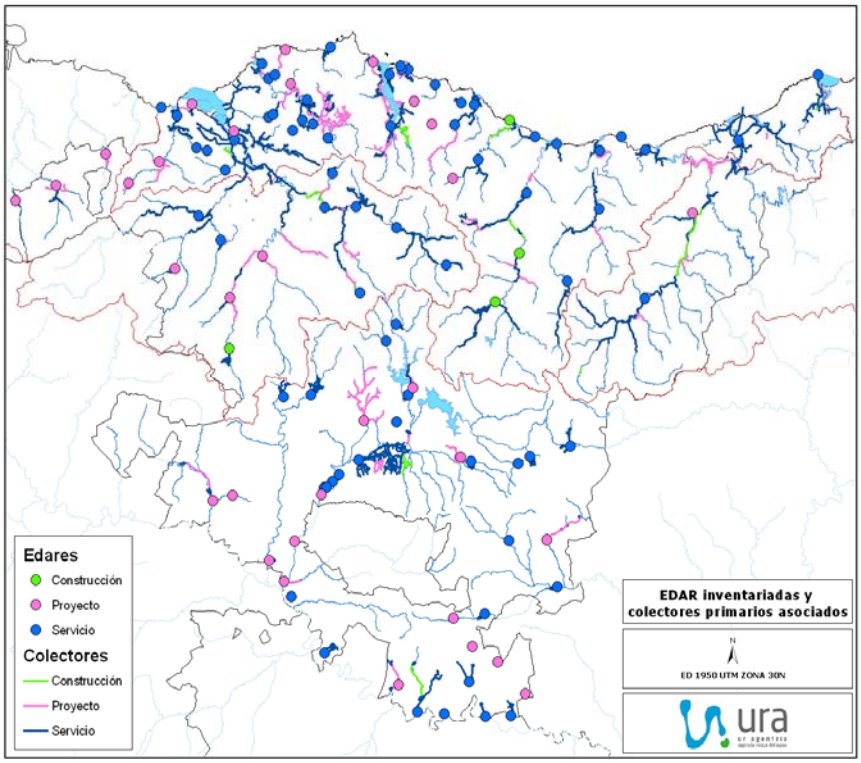

Figure 19 Wastewater treatment plants and associated sewers

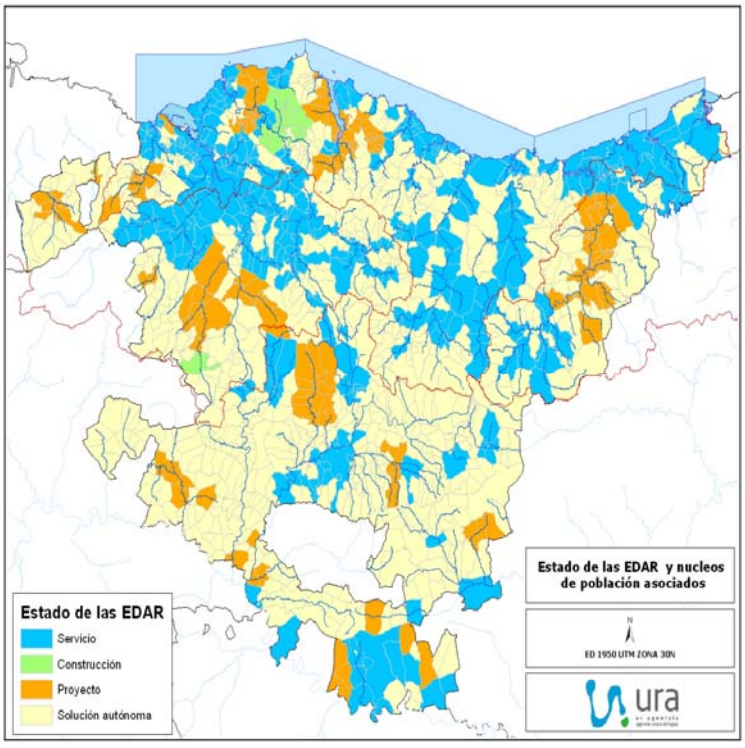

Figure 20 Wastewater treatment plants

State of the sewer	No. of sewers inventoried	Length (Km)
In service	179	484
Under construction	16	54
Planned	78	233
Total	273	774

Table 8 Wastewater sewers.

4.1.5 Problems related to the supply and removal

A series of problems have been identified related, in general, directly to the supply and removal which may impede or hinder the fulfilment of the Directive objectives. The most significant are as follows:

4.1.5.1 Impacts on the watery environment.

- Regulatory effect of the dams and detractions from flows.
- Insufficient wastewater removal and treatment solutions.
- Failure to comply with ecological flows.

4.1.5.2 Organisational and management aspects.

- Multiplicity of agents involved in the management.

4.1.5.3 Problems related to the creation of infrastructure.

- Deficiencies in the configuration of the supply infrastructure and in the provision of the service.
- Deficiencies in the use of the resource (unchecked).
- Deficiencies in wastewater removal and treatment solutions in service.

4.1.5.4 Problems related to the operation of infrastructure.

- Pending supply actions.
- Pending wastewater removal and treatment actions.

4.1.5.5 Administrative problems.

Deficiencies in the administrative regularisation of the discharge concessions and authorisations.

4.2 Water and industry

The ACBC represents one of the biggest concentrations of industry in the State. In 2005, its industrial sector represented 10.45% of the State's corresponding GDP, playing a particularly significant role in the sectors of special steels (90%), machine tools (80%), stamp forging (75%), capital goods (50%), casting (50%), steel production (40%), domestic appliances (40%), professional electronics (40%), automation (33%) and automotive (30%) and aeronautical industry (22%).

Industry plays a preponderant role in the Basque economy, although this has waned recently, albeit only slightly. During 2004, the sector produced 29.4% of Euskadi's GDP, a much higher percentage than the 15.2% it produced within the state or the 20.4% within the European Union.

Figure 21 shows that the industrial activity is not evenly distributed throughout the territory, but is in fact concentrated in relatively well-defined areas which have a long tradition in the activity. The agrarian sector, and to a lesser extend the tertiary sector, represents the complementary image.

The preeminence of the metallurgic activity and the manufacture of metal products is seen throughout Basque territory, particularly as regards employment; the 88,700 jobs in this area amount to 9.3% of the total employment and is only surpassed by the hotel and catering trade and the company services sector.

Having said that, each historical territory has its own specific characteristics as regards its industrial development. In Alava the automobile, rubber and plastics sectors are particularly important, as well as the beverage industry.

The industrial sector in Bizkaia is in general more diversified than in the rest of the Basque territory. The most important sectors as regards employment are, after the metallurgic sector, related to machine tools, electrical material, transport material, rubber, plastic and paper. As regards the Gross Added Value, many of these sectors are overtaken by other high-productivity sectors like electrical energy production and oil refineries.

The production in Gipuzkoa is dominated by metallurgy and machine tools which also generate the most number of jobs. Also significant as regards employment are the electrical material, transport material, paper, rubber and plastics, and food sectors which account for over 5,000 jobs.

The distribution by number of employed persons, Figure 22, shows the clearly predominant situation of the small and medium-sized enterprises.

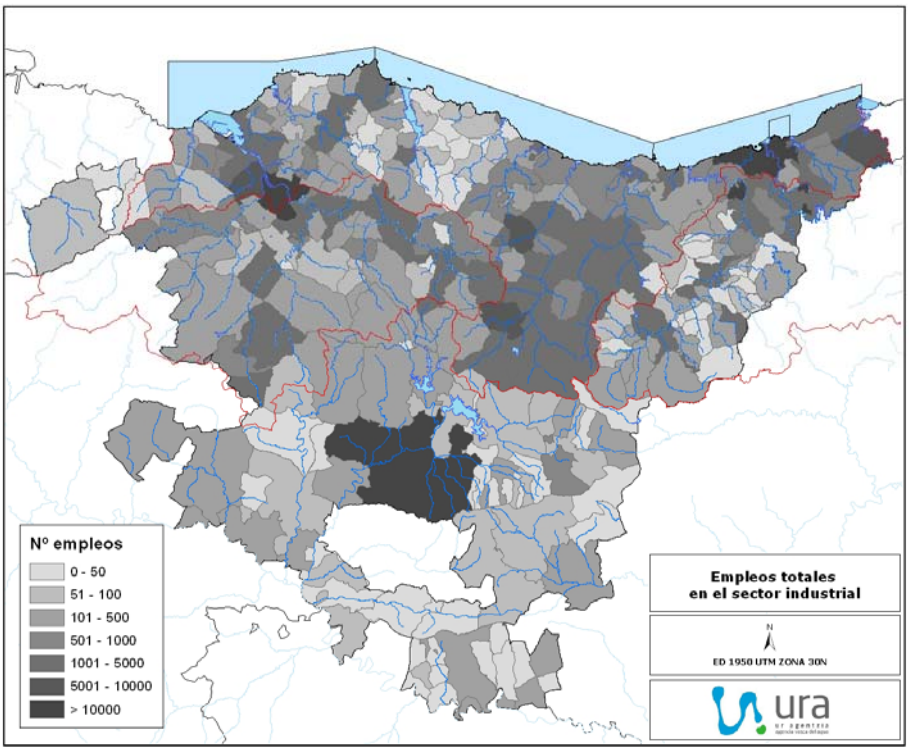

Figure 21 Employment in industrial sector.

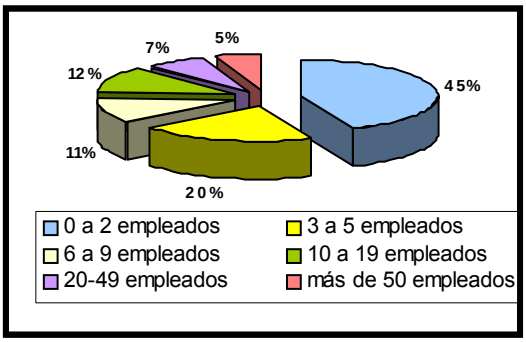

Figure 22 Number and size of industrial estabhlisment

4.2.1 Current Industrial Demand

Water is used as input in the industrial production processes. Generally speaking, those industries with the greatest demand for water have secured their supply by setting up their own intakes, whereas others for whom water represents a less significant input to their processes have tended to connect to the mains. Mixed schemes are also common, in which water for production processes is derived from the producer's own sources and the supply for other uses is drawn from the mains.

The surface waters are the main source of water resources used by industries, while groundwater is less represented. Heavy industry, like the iron and steel industry or metal products industry, as well as the paper industry which consumes vast amounts of water, usually have their own intakes, while those smaller establishments, principally in the manufacturing or food sectors, are mostly supplied via the mains.

Basque industry uses approximately 91 hm^3/year of which 58 hm^3 is collected by the industrial establishments' own intakes, while the urban mains supply the remaining 33 hm^3/year. If we apply to the mains supply the average proportion of 'unchecked' cubic metres that would relate to these infrastructures -that is, if we consider the volume of water collected at the catchments instead of the amount which the water works pumps into the distribution main- the sector's annual demand rises to 106 hm^3/year.

Considered by activity, the breakdown of the demand shows very different values, both as regards the parentage of total consumption (Figure 23).

Demand for water for industrial uses in the ACBC represents about 28% of total demand, a very high percentage when compared with recorded use in other autonomous communities. However, this figure drops to 17% if we consider industry's share of mains water.

The geographic distribution of this consumption represented on the municipal level, Figure 24, is once again a true reflection of the distribution of the industrial activity and of those with the greatest specific consumption.

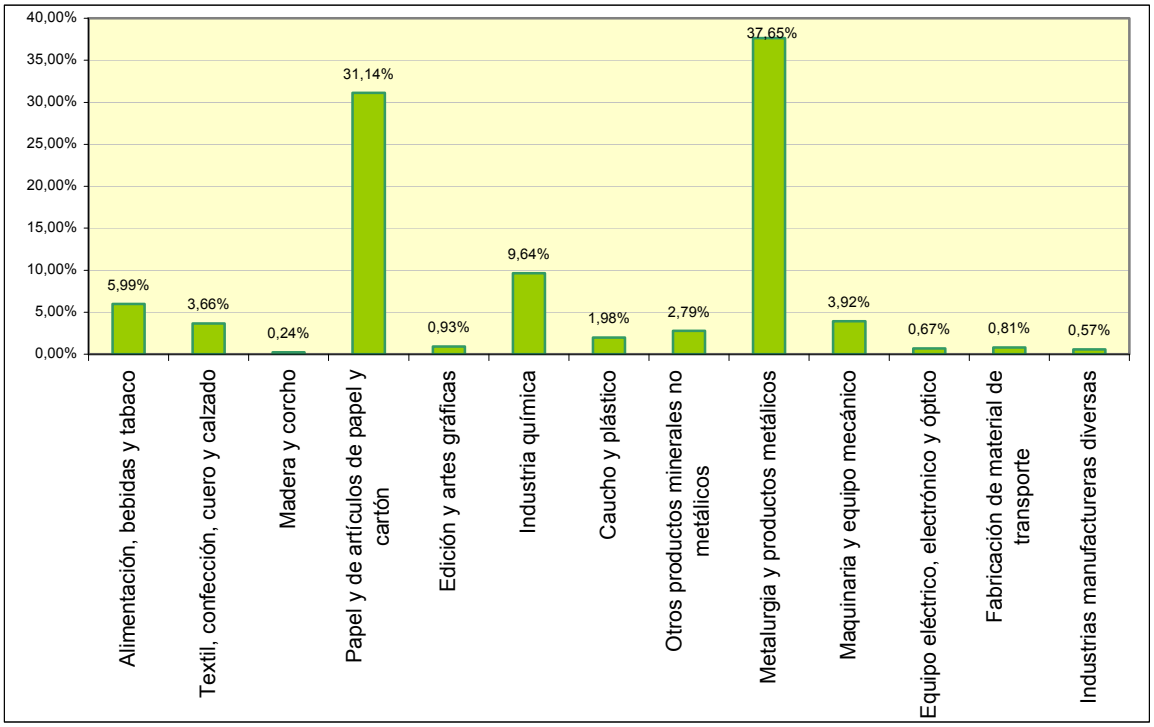

Figure 23 Water compsumption by industrial subsectors in the ACBC.

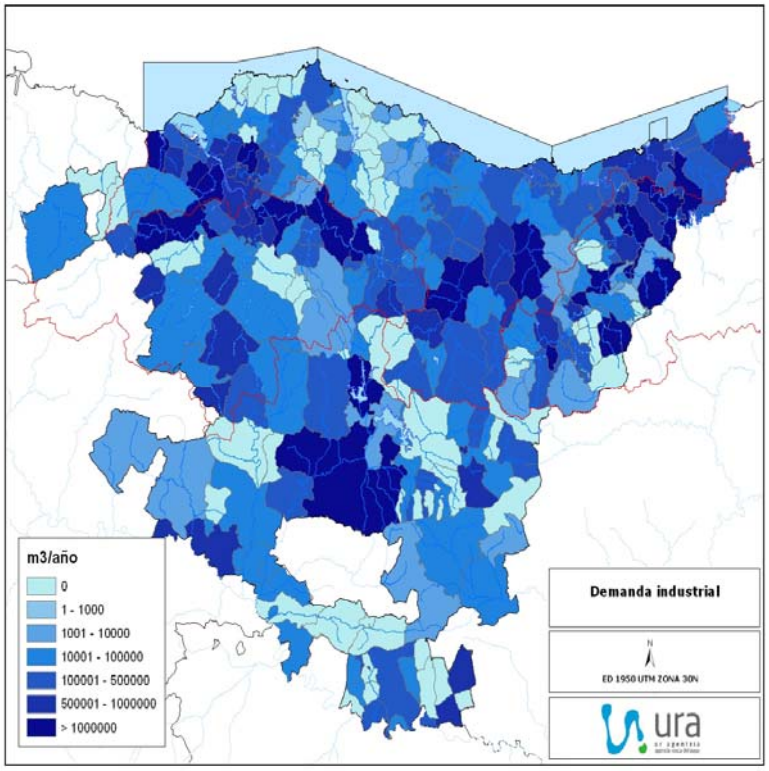

Figure 24 Industrial demand, 2001.

As regards discharge of effluent, the available information shows that the 91 hm^3/year used generates discharge of effluent in the region of 59 hm^3/year, which gives average consumption of close to 35%.

Table 9 is the result of classifying the consumption by sectors and average values of discharge generated, according to the discharge inventory available in the ACBC. The joint result of applying these average values to the consumption identified for each sector gives rise to Table 10, which estimates the total contaminating load, before treatment, generated by industry.

As can be seen, each sector's contribution is very different, as a result of the combination of the multiple factors involved. Hence, the Paper and Publishing sector, mainly due to the manufacture of wood pulp and the fact that it is the second most demanding activity, is that which generates the largest discharge percentage and which contributes one of the highest unit loads.

4.2.2 Future industrial demand

The forecast for water demand for industrial use is based on the following hypotheses:

- The demand connected to the mains increases to fully cover the planned industrial area; the same ratios have been used for this calculation as that used to calculate the current demand.
- It is estimated that the own intake demand will remain constant. This is because it has been noticed that the real consumption is slightly decreasing in recent years for those industries for which data is available, and also due to the fact of the growing environmental requirements and the improvement projects set up to comply with them.

From current consumption of water for industrial use it is possible to forecast an increase in demand to 105 hm^3 per annum by 2015. If the demand related to the high-level network (between the catchment and the water works) is expressed, the figure increases to 130 hm^3 per annum, assuming a constant percentage of 'unchecked' cubic meterage (i.e. losses from thehigh-level network through various causes).

This result implies major growth in industrial demand from the mains, that is, from 17% to 22%. However, industry's share of the overall demand for water consumption is steady at 28%, due to parallel growth in other types of demand, specifically crop irrigation.

As for discharge of effluents, it is estimated that volume will increase to 66.5 hm^3/year as a consequence of stepped-up industrial activity, representing an increase of 13%.

It is hoped that the implementation of initiatives begun under the Basque Sustainable Development Environmental Strategy (2002–2020), by the Basque Government's Department of the Environment and Territorial Management, may serve to correct the high loading of contaminated effluent in water being recorded at the present time.

The content of these initiatives can be summarised as follows:

• Voluntary Environmental Agreements, signed within the framework of the Basque Sustainable Development Environmental Strategy (2002-2020) between the Basque Government and a large number of companies in the IPPC industrial sectors for cooperation between companies and authorities, which establish commitments to reduce the load of contaminating effluent and toxic and hazardous substances into the aquatic environment and the control of the emissions into the environment. The following sectors are currently involved: Cement Sector, Chemical Sector, Steel Sector, Pulp and Paper Sector, Hazardous Waste Management Sector, Ferrous and non-Ferrous and non-Ferrous Metallurgy Sector, Glass, Ceramic and Lime Sectors, and Surface Treatment Sector.

Nat. Class. Economic Activities Group	m³	DBO	DQO	S.S.	N	P	Heavy

	(CNAE)	discharge/ m³ consumed				Total	Total	Metals
1	Food, beverages and tobacco	66%	539.33	2,376.24	793.38	184.41	24.56	1.70
2	Textile, tailoring, leather and footwear	92%	170.95	1,424.66	168.63	17.01	5.34	10.38
3	Wood and cork	40%	195.00	298.43	249.64	0.14	9.81	28.21
4	Paper; publishing and graphic arts	95%	290.24	1,085.15	466.91	9.08	2.70	2.57
5	Chemical industry	64%	101.69	501.25	56.19	14.15	2.40	0.76
6	Rubber and plastic	82%	36.83	102.98	63.4	3.28	4.27	0.63
7	Other non-metallic mineral products	33%	5.20	48.95	468.18	0.98	0.36	0.90
8	Metallurgy and metallic products	39%	91.23	249.31	140.23	18.30	3.21	29.72
9	Machinery and machine tools	58%	85.43	539.78	330.88	0.75	19.54	25.82
10	Electric, electronic and optical equipment	79%	46.83	210.04	40.18	0.28	14.93	3.67
11	Manufacture of transport material	80%	119.07	485.28	147.28	1.08	11.37	7.69
12	Different manufacturing industries	84%	108.88	370.44	111.61	0.20	8.39	3.06

Table 9 Industrial contaminating load by subsectors, mg/l (information prepared from the Inventory of Discharges in the Basque Country)

Nat. Class. Economic Activities Group (CNAE)		m3 discharge /m3 consumed	DQO	DBO5	Suspended solids	Nitrogen (NTK)	Phosphorus	Heavy metals
1	Food, beverages and tobacco	66%	2,488,971	564,913	831,017	193,161	25,727	1,785
2	Textile, tailoring, leather and footwear	92%	1,436,585	172,384	170,043	17,152	5,388	10,471
3	Wood and cork	40%	12,879	8,415	10,773	6	423	1,217
4a	Paper and cardboard	95%	22,235,053	5,947,113	9,567,031	186,035	55,302	52,613
4b	publishing and graphic arts	21%	107,883	28,855	46,418	903	268	255
5	Chemical industry	65%	1,129,990	229,239	126,661	31,899	5,408	1,711
6	Rubber and plastic	82%	61,513	22,001	37,868	1,959	2,549	374
7	Other non-metallic mineral products	33%	21,527	2,287	205,887	431	160	398
8	Metallurgy and metallic products	39%	1,366,425	500,039	768,596	100,288	17,582	162,912
9	Machinery and machine tools	58%	429,494	67,972	263,277	597	15,551	20,543
10	Electric, electronic and optical equipment	79%	31,965	7,127	6,115	43	2,272	558
11	Manufacture of transport material	80%	96,051	23,568	29,151	214	2,250	1,522
12	Different manufacturing industries	84%	50,008	14,698	15,066	27	1,132	413

Table 10 Industrial contaminating load by subsectors in the ACBC, kg/year.

• Sector reduction plans, managed by IHOBE, and aimed at improving the industrial processes from an environmental perspective. So far two projects have been carried out which have an impact on reducing the contamination associated with discharges of effluent: ALCO Programme to minimise discharges of oils from fish canning factories (1999- 2000), and the technical-environmental consultancy Programme for electrolyte coating processes (1997-1998).

• Individual reduction plans, deriving from the application of the Ekoscan programme, set up to implement environmental management systems in companies to guarantee "Continuous Environmental Improvement" in their production processes, and which includes the Basque List of Clean Technologies" which is a list of environmental equipment which generates significant environmental improvement in the areas of water, air, waste, noise, resources and/or land.

• Application of the Available Technical Improvements, considered in Council Directive 96/61/EC of 24 September, relating to the integrated pollution prevention and control, which establishes measures to avoid, or at least reduce, the atmospheric, water and land emissions from these activities; it regulates the legal regime for the integrated environmental authorisations which replace the environmental authorisations currently existing; and finally, and as one of its essential aspects, where the limit emission values and the available technical improvements are regulated. On this issue it establishes that the integrated environmental authorisation must fix the limit emission values for the polluting substances taking into account the available technical improvements (but without prescribing any specific technology), the technical characteristics of the installations and their geographic location.

Fulfilling these objectives would, for the ACBC as a whole, involve significantly reducing the global loads of biological elements, suspended solids and phosphorous, while the heavy metals and nitrogenated compounds would slightly increase (Figure 25).

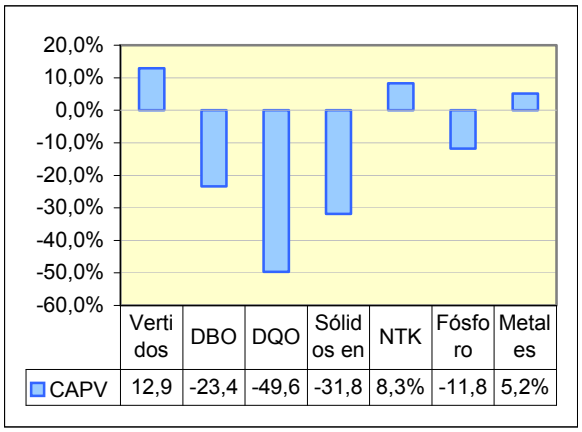

Figure 25 Variation of the contaminating discharges in the case of good environmental practices.

4.2.3 Problems related to the industrial activity.

- Contaminated land.
- Sporadic sources of discharge.
- Urban sewage removal and treatment.
- Ecological flows
- Occupation of the Public Water Supply (DPH in Spanish), and the Shoreline Public Domain

(DPMT in Spanish), and riverbanks.

- Satisfaction of the current and future demands.
- Administrative regularisation of discharge concessions and authorisations.

4.3 The role of water in arable and livestock farming

The agrarian sector has little weight in the economy of the Basque Country as a whole. It provides 0.9% of the production of the ACBC, which is much lower that the State average of 5.8% and even lower than the EU-25 average of 1.9%. Not even the historical territory of Alava (which is the most agricultural and which contains nearly all of the irrigated land in the ACBC) comes close to the State average, although is approximately in line with the EU average.

The sector's contribution to the Basque economy has furthermore been declining over the last decade, with a slight inflection in the 98/99 biennium and has gone from representing 1.8% of the production in 1995 – in terms of Gross Added Value – to 0.9% at present. Figure 26, shows the municipal distribution of the GAV in the agrarian sector.

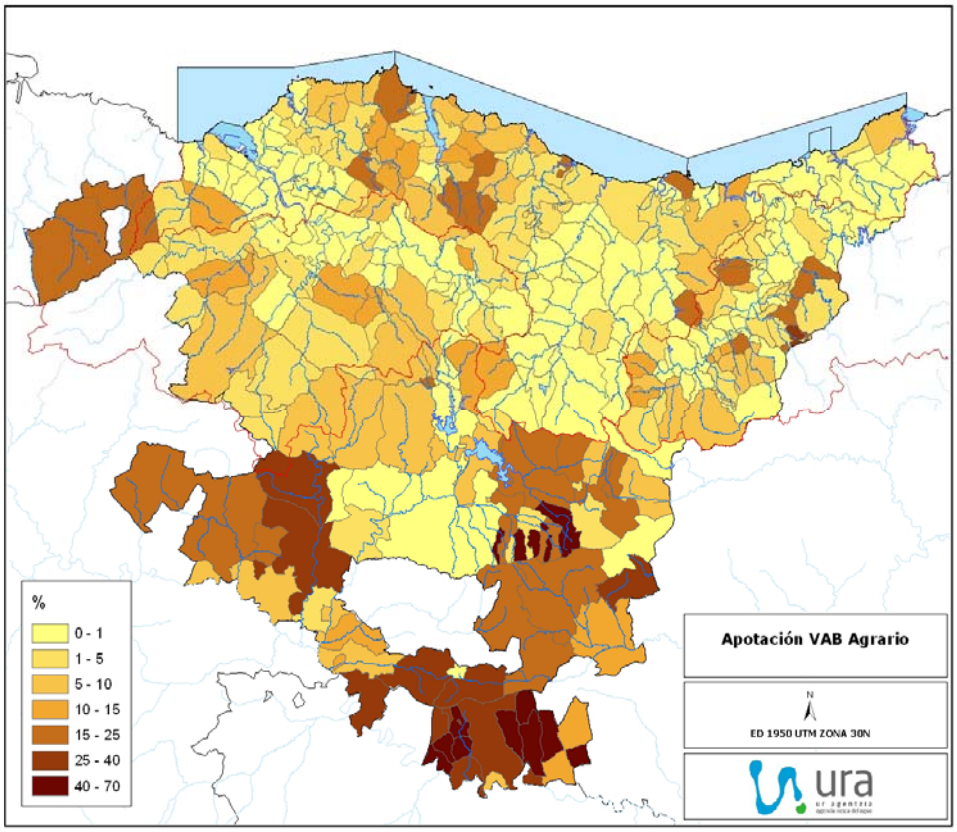

Figure 26 Contribution of agrarian GAV to municipal distribution of the GAV, %

	Ha.	%	Ha.	%	Ha.	%	Ha.	%
Cereal for grain	44,840	6.18	44,599	14.64	76	0.03	165	0.08
Leguminous plants for grain	1,181	0.16	874	0.29	165	0.07	142	0.07
Potato	2,302	0.32	1,892	0.62	215	0.10	195	0.10
Industrial crops	3,858	0.53	3,858	1.27	0	0.00	0	0.00
Flowers and ornamental plants	84	0.01	10	0.00	38	0.02	36	0.02
Fodder crops	8,997	1.24	4,179	1.37	2,400	1.08	2,418	1.22
Garden produce	2,508	0.35	973	0.32	1,029	0.46	506	0.25
TOTAL HERBACEOUS CROPS	63,770	8.79	56,385	18.50	3,923	1.77	3,462	1.74
Fallow	7,072	0.98	6,267	2.06	805	0.36	0	0.00
Citrus	1	0.00	0	0.00	1	0.00	0	0.00
Non-citrus fruit in regular plantation	1,307	0.18	273	0.09	543	0.24	491	0.25
Scattered fruit trees (No. trees)	45,4403		112,911		203,492		138,000	
Vineyards	13,478	1.86	13,038	4.28	220	0.10	220	0.11
Olive grove	182	0.03	180	0.06	0	0.00	2	0.00
Other woody crops	0	0.00	0	0.00	0	0.00	0	0.00
Nurseries	202	0.03	52	0.02	136	0.06	14	0.01
TOTAL WOODY CROPS	15,170	2.09	13,543	4.44	900	0.41	727	0.37
TOTAL FARMED LAND	86,012	11.86	76,195	25.00	5,628	2.54	4,189	2.11
Natural meadows	115,954	15.99	21,370	7.01	50,855	22.94	43,729	22.01
Pastureland	36,350	5.01	30,915	10.15	1,625	0.73	3,810	1.92
TOTAL MEADOWS AND PASTURES	152,304	21.01	52,285	17.16	52,480	23.67	47,539	23.93
Timber-yielding land	290,903	40.12	75,646	24.82	104,136	46.97	111,121	55.94
Open woodland	32,761	4.52	18,663	6.12	7,843	3.54	6,255	3.15
Woody land	67,660	9.33	38,778	12.73	16,824	7.59	12,058	6.07
TOTAL FOREST LAND	391,324	53.97	133,087	43.67	128,803	58.10	129,434	65.16
Uncultivated for pasture	21,070	2.91	17,725	5.82	3,345	1.51	0	0.00
Esparto land	190	0.03	0	0.00	190	0.09	0	0.00
Unproductive land	17,173	2.37	6,874	2.26	7,649	3.45	2,650	1.33
Non-agricultural land	50,921	7.02	15,138	4.97	22,573	10.18	13,210	6.65
Rivers and lakes	6,078	0.84	3,425	1.12	1,028	0.46	1,625	0.82
TOTAL OTHER AREAS	95,432	13.16	43,162	14.16	34,785	15.69	17,485	8.80
Used agricultural land (U.A.L.)	238,316	32.87	128,480	42.16	58,108	26.21	51,728	26.04
TOTAL AREA	725,072	100.00	304,729	100.00	221,696	100.00	198,647	100.00

Table 11 Agricultural areas by type of use. 2006. Statistics and Sector Analysis Service. Basque Government Agriculture, Fishing and Food Department.

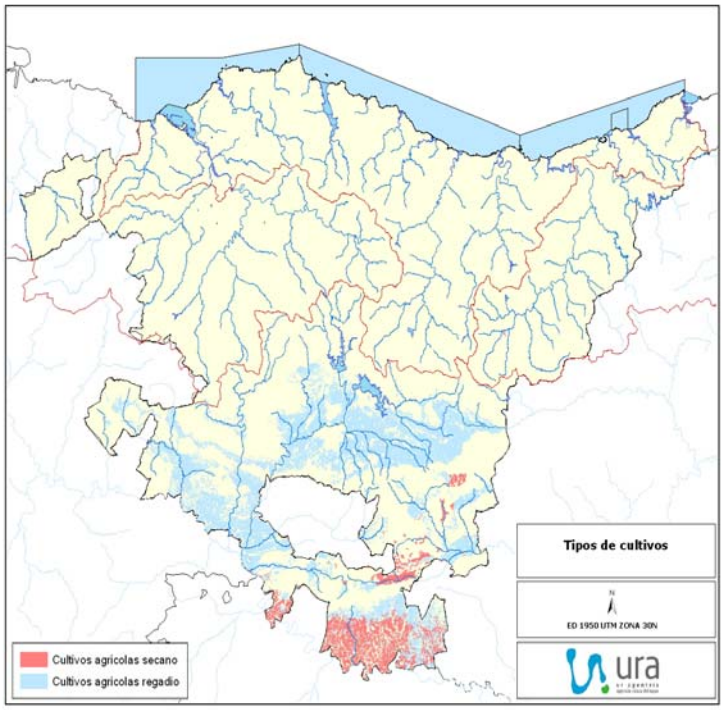

Figure 27 Distribution of irrigated and unirrigated lands in the ACBC.

The territory of Alava contains nearly all of the land which is irrigated as well as the vast majority of the unirrigated land used for growing cereals for grain, industrial crops and vineyards, a large proportion of the land devoted to fodder crops, and irrigated potato crops (Figure 27). The Cantabrian territories on the other hand devote the farmed land to growing fodder, garden produce, fruit, flowers and ornamental plants, and a small part to vineyards, in this case devoted to producing txakoli (a light, sharp Basque white wine) (Table 11).

Basque livestock farming is mainly based on beef and milk bovine operations (Figure 28). Industrial livestock farming, which like in the rest of the State was introduced in the 60s based on pig and fowl rearing, is currently in decline as evidenced by the figures contained in the last two census, covering the period between 1989 and 1999, which show a 25% global drop in the number of pigs and over 45% in the case of fowl.

Other lesser species also in decline are caprine and equine livestock. Ovine livestock on the other hand, which has a long Basque tradition, has, following a period of decline which coincided with the increase in industrial-type operations, increased in general aimed at the milk market, by about 20% according to the information contained in said census.

Cattle rearing shed operations are declining as a result of the restrictive measures introduced into the sector in response to the Common Agrarian Policy. The most affected cattle are those devoted to milk production which continues to drop in numbers; a total of 18% over the 1996-2004 period, which has had a particularly severe consequence on the Bizkaia operations. The beef production operations are doing better under the new competition conditions and have maintained stable and even significantly increasing the number of cattle units.

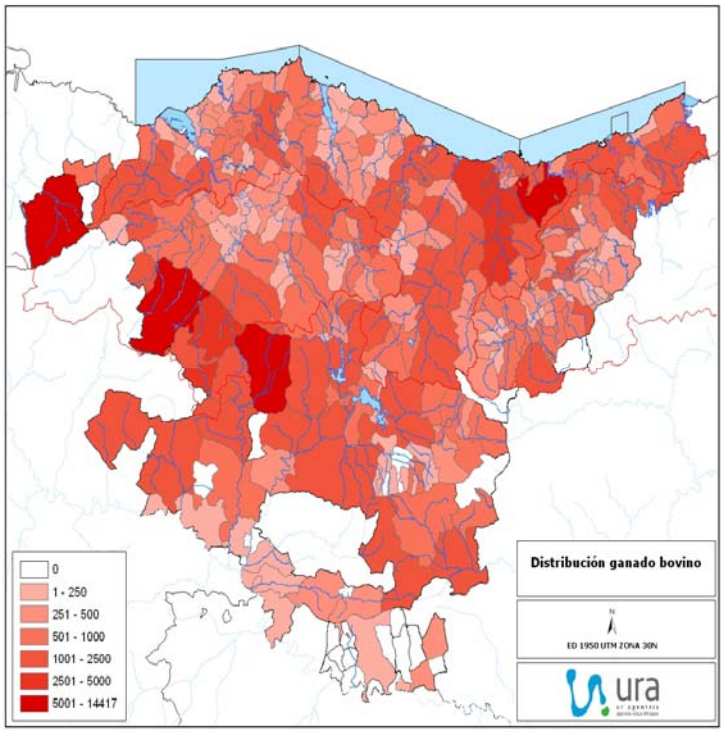

Figure 28 Distribution of ovine livestock.

Finally, in the large mountainous massif areas the production units are dedicated to silvopastoralism, with extensive livestock farming and wood operations.

According to the new Forestry Inventory (Basque Government, 2005), 55% of the territory in the ACBC is covered by wood forests. This area covers 396,700 hectares, which is an increase of about 7,000 hectares over the previous Inventory performed in 1996. This increase is due to the 18,000 hectares increase in the area occupied by leafy species (including plantations of eucalyptus and other allochtonous species), which has made up for the loss of areas covered by conifers, 11,000 hectares. This means that the area now covered by leafy species is 5,000 ha more than that covered by conifers (Figure 29).

4.3.1 Current agrarian water demand

Current water demand for agriculture amounts to 43.8 hm^3 per year, which corresponds to 11.5% of total water use in the ACBC. There are four components to this demand, according to the outline followed in the document “Characterisation and Quantification of the Water Demand in the ACBC and Prospectives Study” (“Caracterización y Cuantificación de las Demandas de Agua en la CAPV y Estudio de Prospectivas”) prepared by the Basque Government’s Department for the Environment and Territorial Management.

Irrigation is responsible for 80% of the sector’s water consumption. Average annual estimates show that some 13,600 hectares are watered out of a total of 30,475 potentially irrigable hectares, all of which are located in the Ebro Demarcation. These fields grow cereals, potatoes and beets in rotation, as well as market garden produce, while vineyard irrigation forms a large and increasing presence.

These irrigation operations are managed by over a hundred irrigating growers’ groups, who possess sprinkling systems (78% of the area) and trickle systems (the remaining 22%). Mainly surface water is used for irrigation, although 19% of the water used now is recycled wastewater (which is employed on 1,750 hectares in the Vitoria-Gasteiz district) (Figure 30).

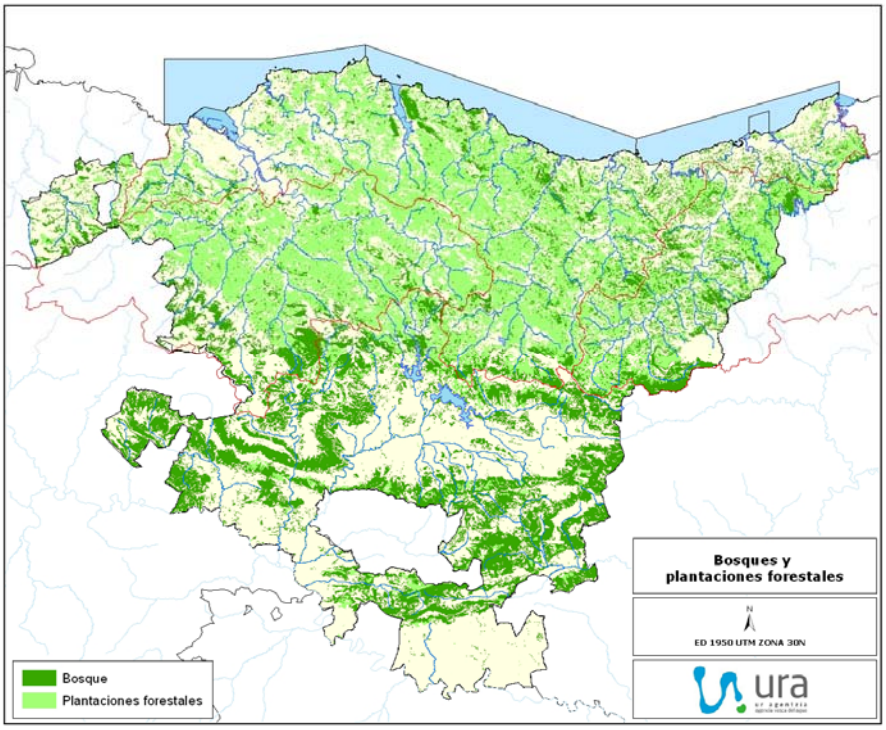

Figure 29 Forest and forestry plantations.

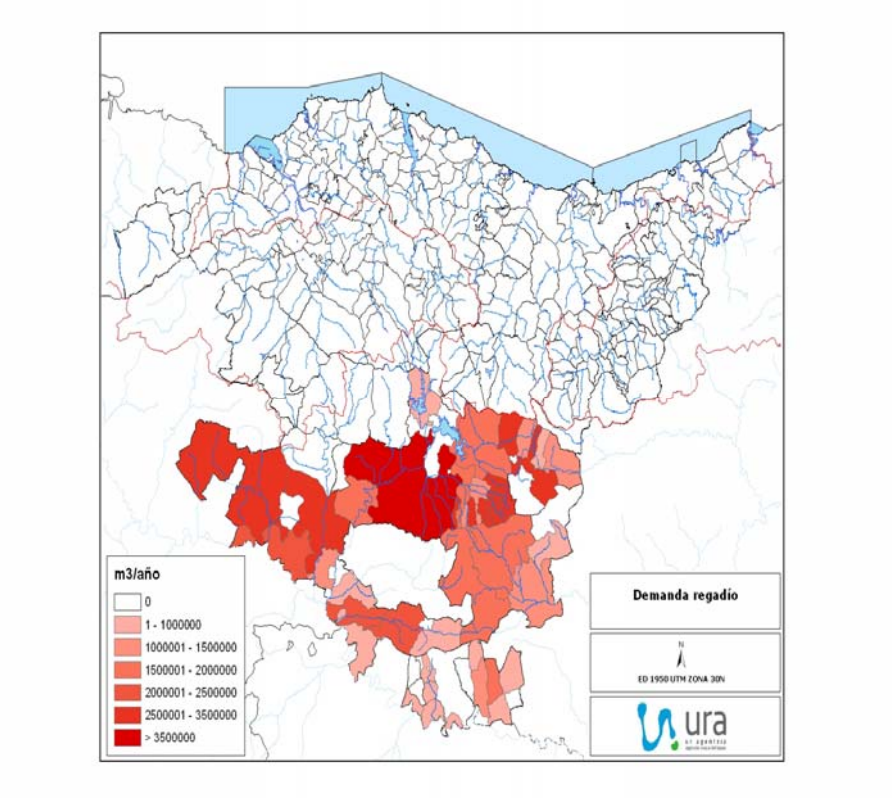

Figure 30 Water consumption in irrigated lands.

Most livestock farms have rearing sheds and keep dairy and beef cattle, pigs and fowl. They mainly run intensive production systems and obtain their water supply from the mains. These farms consume 15% of

all water used for agriculture and are mainly concentrated in the Internal and Cantabrian Basin Demarcations, the same as the livestock farms without rearing sheds although the latter are more extensive and have much higher consumption. The livestock farms without rearing sheds are mainly dedicated to sheep, horse and beef and is supplied through their own disperse intakes on each farm (Figure 31).

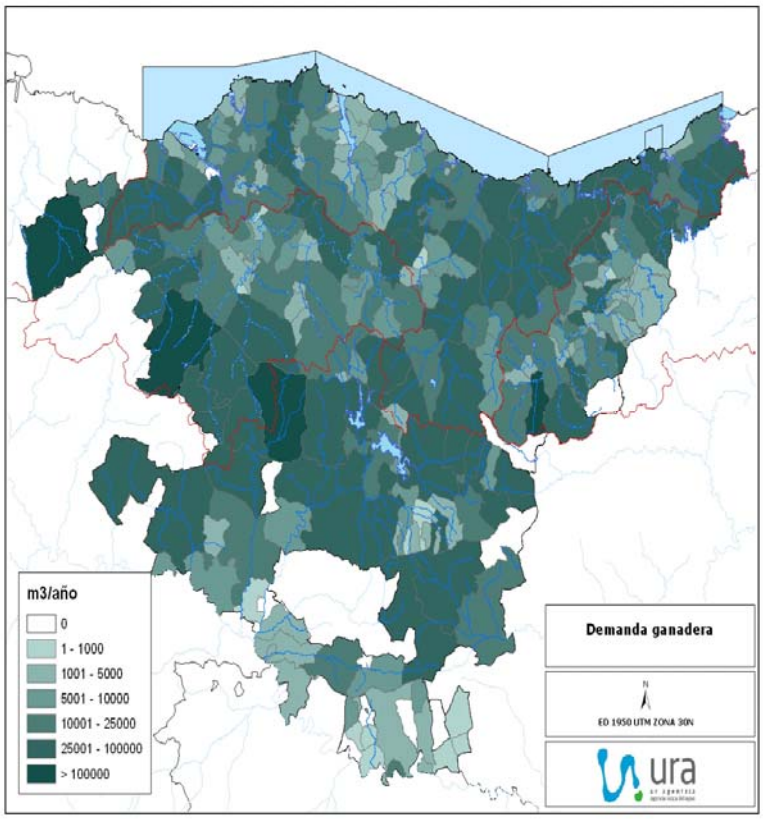

Figure 31 Agrarian water demand m^3/year.

Agrarian polluting load

One of the most significant and direct impacts of the farming activity on the ACBC's aquatic environment is the increase in concentrations of nutrients, especially nitrates, in both surface water and groundwater. This is a consequence of the washing off of fertilizers applied to the surface of the land. This increase, variable depending on different factors (type of crop and associated dose of fertilization, precipitations regime, type of substratum, etc.) may result in the modification of the chemical state, with possible failures to comply with the quality objectives in the water masses or in the protected areas, the appearance of possible eutrophication phenomena, and the alteration of biological indicators. This increase in the concentration of nutrients is usually accompanied by the appearance of pesticides.

The resulting agrarian loads are concentrated, as is logical, in the Ebro demarcation, mainly in the Llanada (Plain), Alaveses Valleys, Rioja Alavesa, etc.

On the other hand, the contribution of nutrients from livestock farming can also generate impacts on the water, depending on such factures as the management of the purines, the density of the livestock sheds, etc.

The nutrients loads from livestock farming are also fundamentally linked to the bovine production,

responsible for nearly 70% of this load. Other species with significant weight are sheep, fowl production and horse farming. As a result, the greatest pressures from livestock waste is in the Internal and Northern Basin Demarcations generally in mountainous areas, where the livestock farming constitutes a significant part of the economic activity.

Since the early part of the current decade, tests for pesticides have been carried out at specific points on rivers that cross the ACBC's agricultural areas. These tests have been undertaken essentially by the Basque Government's Departments of Health and the Environment, and by the Hydrographic Confederation of the Ebro.

The tests reveal the periodic appearance of herbicides of the atrazine family (atrazine, terbutri-ne, terbutilazine, metribuzine, simazine, etc.) as well as phenoxyacid herbicides (2-4 D, mecoprop, MCPA) in the waters of the high Zadorra basin and the Alegria, occasionally exceeding the limits established by existing quality standards for some of these substances.

The losses of land due to farming and forestry activities may exert very significant pressure on the state of the water, particularly in the areas of the headwaters and at the intake points of water for supplying the related populations, with the appearance of phenomena of muddiness and increase in the sediment which could affect the ecological state of the water masses (particularly invertebrates) and the quality of the water for human supply (cloudiness, microbiology, etc.).

The reference texts indicate that the greatest theoretical rate of erosion in the Basque Country and, therefore, the greater possibility of problems in the waters, is related to the forestry activities and in particular with clear cutting and land mechanisation before the next planting (factors which mean that the uncovered land is exposed to the rain) as well as the construction of the associated tracks, and not so much with the agricultural activities themselves.

The erosion rate related to the forestry activities will depend on a wide variety of factors intrinsic to the land (gradient, nature of the substratum, precipitation, etc.) but also on other factors deriving from the forestry management model used (species, duration between cuts, etc.).

The plantations producing Monterrey pines are the most common in the ACBC, with short cycle clear cutting, and are together with the eucalyptus plantations those which lead to the most erosion. The possible impact on the waters is concentrated during the months following the construction of removal tracks and the mechanisation of the land (for the eucalyptus the mass is regenerated by stump shoots so that the mechanisation only takes place in the first year).

4.3.2 Demand and future contaminating load

Given the sector's evolution forecasts the base scenario for the year 2015 is construed for each component of the agrarian demand under the following suppositions:

- It is envisaged that the water demand for urban irrigation will remain in line with the evolution guidelines deriving from population growth, varying to the same degree.
- Rural livestock farming: the current demand will remain the same due to the fact that this type of livestock farming remains stable.

As regards the productive irrigation farming it considers the new transformations in irrigation currently planned or being performed. The water requirements corresponding to the possible new irrigation actions analysed in the recent URA study are included in the future demands, although in view of that stated in the previous section it is possible that many of these actions will not finally be performed. This means

considering one of the highest values of the possible range as future demand.

These figures could increase if the impact of climate change is confirmed on the different variables which affect the water demand for irrigation. According to the provisional results from the study carried out by the Basque Government's Water Department as part of the water planning work, climate change could lead to an average temperature increase of about 1º C by 2015, an increase in evapotranspiration of about 3% and a precipitations scenario which could vary between maintaining the current levels and an average drop of 10%.

It is forecast that these climatic variations would lead to an increase in the requirements needed by the crops of between 4 and 14%, which would lead to an increase in demand of 1.5 to 5 hm^3 over the current 35 hm^3, in the event that irrigated surface remains the same. If all of the forecast transformations come true, the increase in the water demand due to climate change would be between 2.5 and 8.5 hm^3 over the 60.80 hm^3 estimated for 2015.

The final result is a global increase in the agrarian demand of 61% mainly due to the possible entry into use of the new irrigation systems envisaged for the Ebro demarcation which increase the demand for irrigation by 74%. Urban irrigation increases in absolute terms by 30.3%, 440,000 m^3, while the urban livestock using rearing sheds increases by 6.4% (Table 12).

	Internal	Ebro	Northern	ACBC
Agrarian irrigation	0.00	60.80	0.00	60.80
Urban irrigation	0.14	1.65	0.10	1.89
Livestock farming with rearing sheds	3.18	1.03	2.85	7.07
Rural livestock farming	0.32	0.16	0.33	0.81
Total agrarian consumption	3.64	63.64	3.29	70.57

Table 12 Future agrarian demand, hm^3/year

The forecast for the contribution of agricultural fertilizers in the future situation contains the change of alternative deriving from irrigating surfaces which are currently dry-farmed. The unitary dose of fertilizers has been maintained the same, although the suitability should be mentioned of adjusting the ranges established in the "Basque Country Code of Agrarian Good Practice" ("Código de buenas prácticas agrarias del País Vasco") - Official Gazette of the Basque Country 27/1/99 (Boletín del 27/1/99, BOPV).

The results obtained involve a global increase of 17% in the contributions of nitrogen and 19% in the phosphorous and potassium, mainly due to the high dose of fertilizers, as mentioned above, in the potato and beetroot crops or the irrigated garden produce. Said increase easily compensates the relative reduction due to the expansion in the areas of vineyard which requires much less fertilizers (Table 13).

CUENCAS		Internas	Ebro	Cantábrico	TOTAL
Secano	N (Tm)	163.3	5,456.6	98.8	5,719

	P_2O_5 (Tm)	123.6	3,287.5	78.4	3,490
	K_2O (Tm)	114	3,154.6	70.1	3,339
Regadío	N (Tm)	0	5,071.6	0	5,072
	P_2O_5 (Tm)	0	3,205.6	0	3,206
	K_2O (Tm)	0	3,112.7	0	3,113
Total	N (Tm)	163.3	10,528.2	98.8	10,790
	P_2O_5 (Tm)	123.6	6,493.2	78.4	6,695
	K_2O (Tm)	114	6,267.4	70.1	6,452

Table 13 contribution of agricultural fertilizers

As regards the livestock farming, the global increase in contaminating load would be around 5% and is exclusively due to the growth in livestock farming with rearing sheds principally located in the Internal Basins and in the Ebro demarcation (Table 14).

Demarcación		Internas	Ebro	Norte	CAPV
Estabulada	N	6.679	2.443	6.019	15.142
	P	2.826	1.008	2.476	6.311
	K	9.787	3.641	9.104	22.533
No Estabulada	N	1.796	847	2.040	4.683
	P	651	302	731	1.683
	K	1.696	809	1.940	4.446
Total	N	8.475	3.291	8.059	19.825
	P	3.477	1.310	3.207	7.994
	K	11.483	4.450	11.045	26.978

Table 14 Future livestock farming contaminating load.

4.3.3 Problems related to the agrarian sector

- Contamination by nutrients from agriculture
- Contamination by pesticides from agriculture
- Contamination by nutrients from livestock farming
- Murkiness related to forestry activities
- Affect on the hydrological regime due to intakes for agrarian use
- Affects on the state of the riverbank vegetation
- Irrigation policies and future water demand.
- Administrative issues.

4.4 Water and energy

4.4.1 Situation

The hydroelectric sector in the ACBC comprises little over 100 schemes with a total installed power of 150

MW and an annual production of some 360 GWh. Most of these schemes are mini-generating stations with no significant regulation. Only two produce over 10 MW: Despite the fact that the Barazar hydroelectric power station has its water intakes in the Ebro demarcation, its installations are in the Cantabrian demarcation using the waterfall produced by the inter-basin water transfer from the Zadorra, Ullibarri and Urrunaga reservoirs in the Ebro Demarcation to the Undurraga reservoir in the Cantabrian Demarcation used to supply the municipalities corresponding to the Bilbao-Bizkaia Water Consortium.

As seen in Figure 32 most of the generating stations are in the Territory of Gipuzkoa and particularly in the Deba, Oria and Urumea basins. The number of generating stations is significantly lower in Bizkaia (particularly in its intra-community basins) and even more so in the Territory of Araba.

The available data shows that the average size of the hydroelectric generating stations in the ACBC is 1.4 MW of installed power, although if we exclude the two largest generating stations the average is less than half a megawatt. The average annual energy production is 3.4 GWh per generating station.

The average hydroelectric demand in the ACBC has been estimated at some 6,300 hm^3 per annum (Basque Government, 2004). Logically, this figure includes the passage of the same volumes of water through successive turbines in different power stations along the same river.

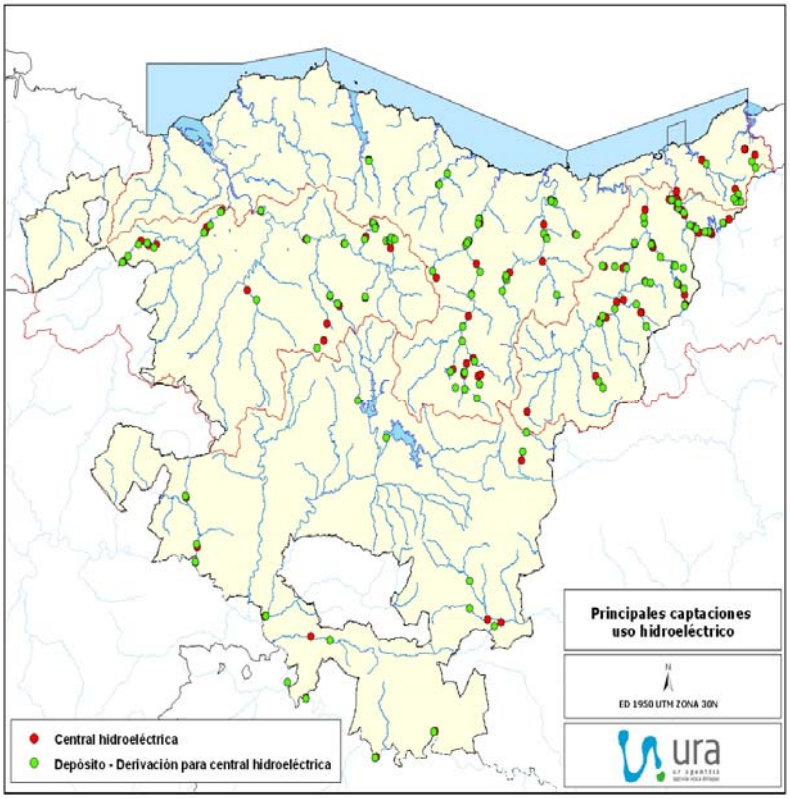

Figure 32 Main Hidroelectric intakes in the ACBC

The 52% if this volume (approximately 3,300 hm^3/year) passes through turbines from intakes in the Ebro demarcation.

The outlook for the further development of hydroelectric production in the ACBC may be gleaned from the Energy Plan 3E-2010, which outlines the strategy and aims leading up to the year 2010 in the Basque

energy sector. These aims include introducing efficiency schemes that make it possible to make savings and improve energy intensity; diversifying energy-generating sources; raising levels of self-sufficiency in energy; and substantially reducing the environmental impacts of energy-producing processes.

The main hydroelectric energy objective for 2010 is to promote the use of the water resources so as to achieve an installed power of 175 MW and obtain end production of 32,700 tep, with an 18% growth over the period.

4.4.2 Problems related to the hydroelectric sector.

- Affects on the watery environment.
- Insufficient flow in the By-pass area.
- Generation of migratory barriers for the fauna.

4.5 The watery environment and ecosystems

4.5.1 Ecological volumes of water

As stated in Article 59.7 of the consolidated text of the Waters Act, ecological volumes of water (in rivers, etc.) and environmental demands for water will not be classed as usage for the purposes of this article and those which follow. Rather, Article 59.7 must be regarded as a general restriction imposed on water abstraction systems. In any case, the rule on supremacy of use for the supply of populations, expressed in paragraph 3 of Article 60, also applies to environmental volumes of water. Environmental volumes of water shall be fixed in basin hydrological plans.

The Waters Act 1/2006, 23 June, defines the ecological or environmental volume of water as that flow or, if applicable, volume of water, which is able to maintain the functioning, composition and structure of the aquatic ecosystems under natural conditions.

Achieving the balance between the sustainable use of water and conserving the aquatic ecosystems has its difficulties, and one of them has been in determining the minimum water needs in order for a river to continue functioning as an ecosystem.

Given the difficulties mentioned above, at the time the Hydrological Plans currently in force in the Intercommunity Basins opted for a provisional solution: failing more rigorous and individual studies for each stretch of river, the ecological flow would be 10% of the average year-on-year flow under natural conditions, with a minimum of 50 l/s.

On this basis the internal basins of the Basque Country have prepared provisional estimations of the environmental requirements more in line with the objectives established by the WFD in order to determine the flows which must be maintained in a stretch of river so as to ensure an acceptable functioning level of the river ecosystems, in other words in order to achieve the good ecological state. This was done via the methodology known as Modular Ecological Flow (MEF). Even though this methodology will become applicable on the passing and publication of the Hydrological Plan for the Internal Basins of the Basque Country, it can presently be considered to form part of this Demarcation's management and planning process.

The Modular Ecological Flow applies a hydrological methodology which is very easy to calculate and appropriately reproduces the results of the ecological flows obtained with the biological methods. As such this tool provides a solution for the very complex system of obtaining environmental flows through

biological techniques. On the other hand, its results are completely in line with the natural hydrogram. In other words all of the premises set out above are fulfilled and it is also easy to calculate.

The MEF method defines three ecological flow values:

- Minimum. Applied in the Basque Country in the months of July, August, September and October.

- Average. Applied in the Basque Country in the months of May, June, November and December

- Maximum. Applied in the Basque Country in the months of January, February, March and April.

These values are calculated using a series of data on daily natural flows for each point of the river system using an application prepared for such purpose (although the method can be applied very easily using a spreadsheet). The application selects the daily flow values for each group of months and calculates the 10% percentile. The result obtained is the ecological flow for said period.

A detailed description of this method can be found in the document “Determination of ecological flows in the autonomous community of the Basque Country. Modular Ecological Flow (MEF). Methodology and general application principles” (“Determinación de regímenes de caudales ecológicos en la comunidad autónoma del País Vasco. Caudal Ecológico Modular (CEM). Metodología y principios generales de aplicación”) (Basque Government internal report, 2007).

The application of the modular method provides an approximate estimation of the environmental requirements in order to achieve the Good Ecological State of 873 Hm³/year for the river ecosystems of the ACBC as a whole, which is an average of 19% of the entire natural resources.

4.5.2 Protected areas

4.5.2.1 List of Protected Areas (LPA)

The WFD uses the registry of protected natural spaces as one of the basic pillars of protection for both surface water and groundwater and seeks to protect habitats and species which depend directly on the aquatic environment. This List of Protected Areas (Registro de Zonas Protegidas - RZP) includes the natural spaces related to the aquatic environments which are protected by EC regulations.

In the obligations chapter deriving from their designation, the water masses related to the LPA combine compulsory compliance with the general environmental objectives, achieving the good state or ecological potential, and the specific objectives applied to each of the protected natural spaces.

The following areas are to be included in the LPA, according to that contained in the WFD: Water intake areas for urban supply, Areas for the protection of aquatic species of economic interest, bathing Areas, Areas sensitive to nutrients and Areas designated for the protection of habitats.

The reason for including in the LPA the water masses used as water intakes for human consumption is to preserve the quality and quantity of the water for this use in particular and includes 903 intakes of which 372 are surface and 531 ground (Figure 33). Although there are more groundwater intakes, they provide little over 10% of the total volume used to supply the ACBC.

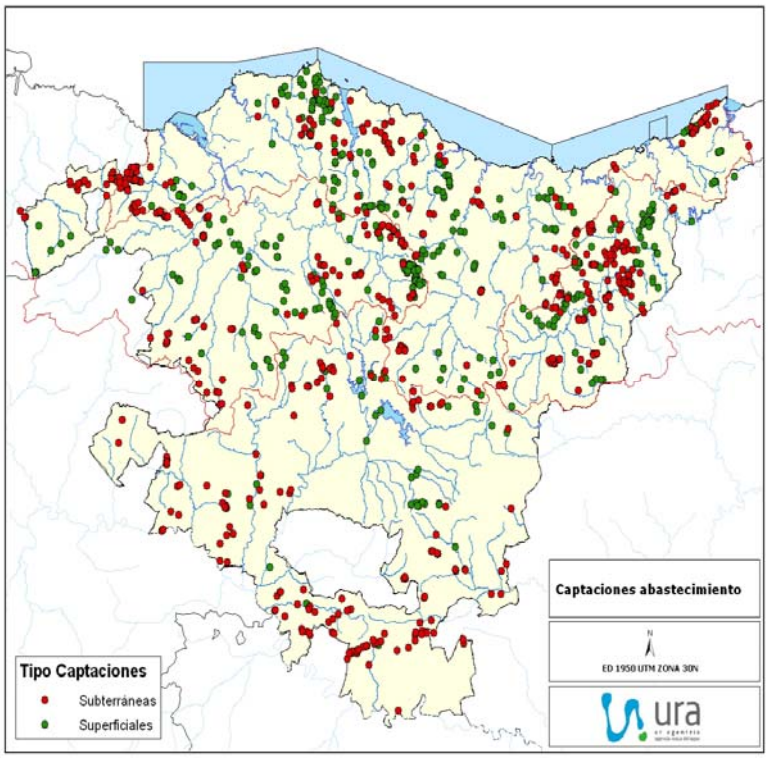

Figure 33 Intakes of water supply.

As regards the areas for protecting aquatic species of economic interest, deriving from Directive 79/923/EEC, one should mention its local importance due to the undeniable link between Basque Country history and certain fishing activities. Through various Orders of the Agriculture and Fishing Department (Order of 24 September 2001, Order of 26 September 2003) three areas are currently declared for the protection of molluscs, which affect the extraction and culturing of mussels, oysters, razor clams, cockles, clams and baby clams, all of which are in the Internal Basins Demarcation of the Basque Country, and located in the areas of the tidal inlets of Hondarribia (Bidasoa), Mundaka (Oka) and Plentzia (Butroe) (Figure 34).

The LPA also includes certain areas protected under Directive 76/160/EEC relating to the quality bathing waters, which classifies areas declared as such either as suitable or unsuitable for bathing based on a series of periodic analytic controls.

There are 40 officially declared bathing areas in the ACBC (Figure 35), five of which are in inland waters in the Ullibarri reservoir. The other 35 bathing areas correspond to beaches on the Basque coast from the La Arena beach, at the most western point of the coast, to Hondarribia beach in the east.

The protection of areas sensitive to nutrients refers to areas where the contribution of nutrients has or may have in the future particularly significant repercussions on the water masses. These areas derive on the one hand from Directive 91/271/EEC on the treatment of urban sewage which defines areas sensitive to the discharge of effluent as those environments which are or could be eutrophic in the near future unless protection measures are adopted, either due to limited exchange of waters or because they receive a large quantity of nutrients. They also derive from Directive 91/676/EEC on the pollution by agricultural nitrates, which defines what is known as vulnerable areas

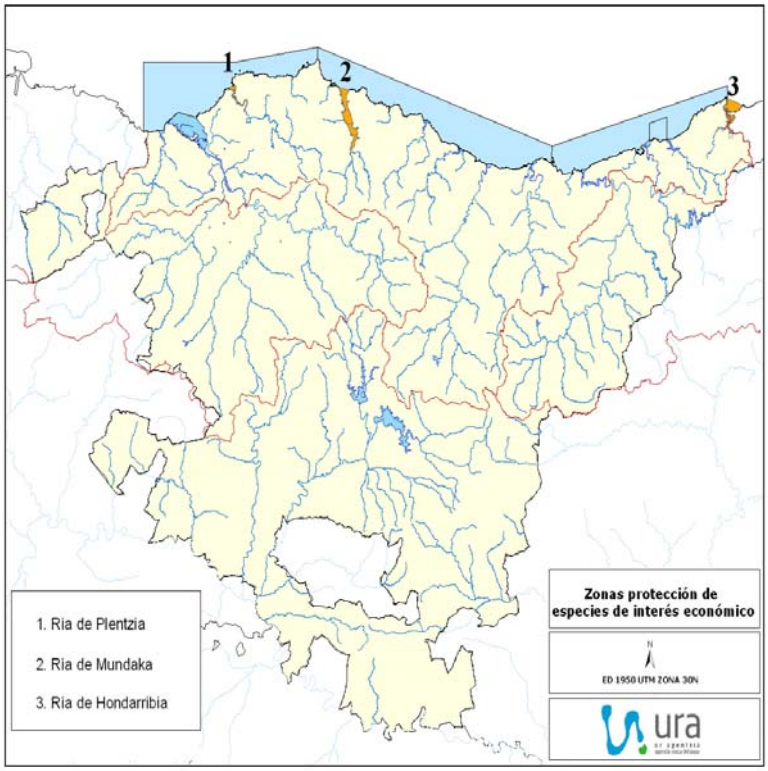

Figure 34 Areas for protecting aquatic species of economic interest, deriving from Directive 79/923/EEC

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11 sensitive areas have been declared in the ACBC: 6 estuaries due to the risk of eutrophization (Butroe, Oka, Lea, Iñurritza; Oiartzun and Bidasoa) and 4 reservoirs for water supply (Urkulu, Aixola, Ibaieder, Barrendiola and Zadorra System) (Figure 36).

The only area vulnerable to contamination from agricultural nitrates is the Western Sector of the Vitoria groundwater mass, with waters with over 50 mg/l of nitrates. It is envisaged that this vulnerable area will extend into the Dulantzi Sector.

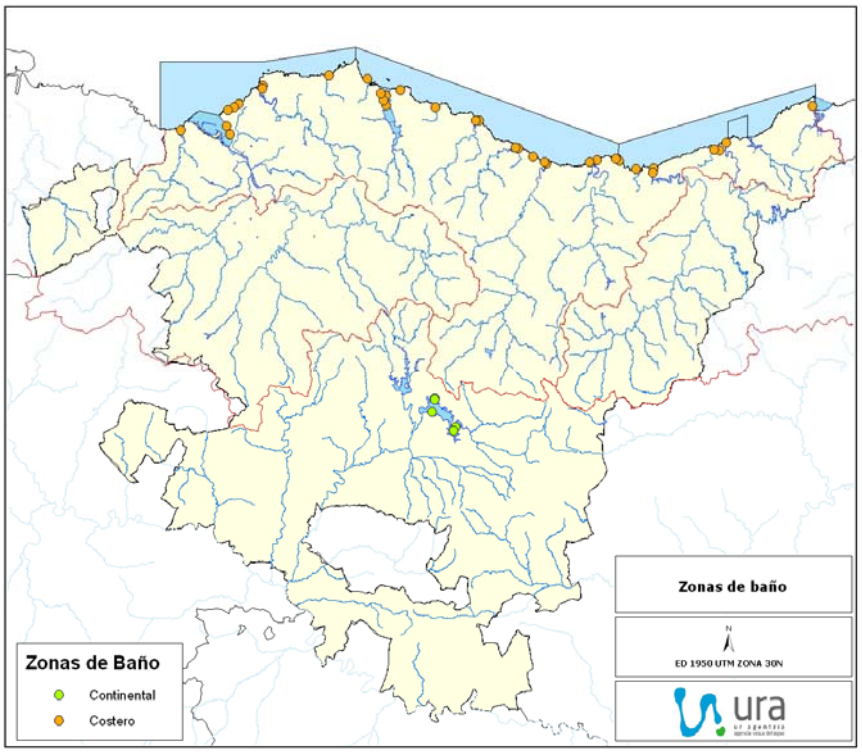

Figure 35 Bathing areas in the ACBC

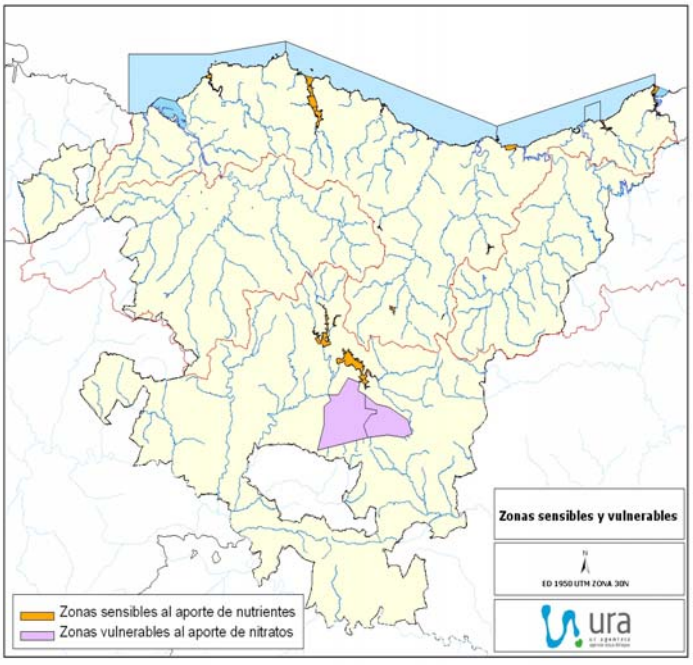

Figure 36 Sensitive areas

The areas designated for the protection of habitats or species derive from three EU directives. Under Directive 78/659/EEC on the qualities of fresh waters needing protection or improvement in order to support fish life, six stretches of cyprinid water have been designated in the ACBC located in ten river

water masses.

The designation of the special protection areas for birds (SPAB) and the Sites of Community Importance (SCI) derive, respectively, from Directive 92/43/EEC on the conservation of the natural habitats and wild fauna and flora which envisages the creation of a European ecological network of special protected areas (SPA) known as NATURA 2000, and Directive 79/409/EEC on the conservation of wild birds and their habitats. This network aims at guaranteeing the conservation or, if applicable, the reestablishment, in a favourable state of conservation, of the types of natural habitats and species of wild fauna and flora of community importance and their habitats.

As regards the areas for protecting fish life and in accordance with that contained in the last triennial report, the monitoring of the physical-chemical quality has led to results in line with the requirements of Directive 78/659/EEC in zones 6 and 125 (Ibaieder and Zadorra respectively). Zones 7, 8 and 126 (Artibai, Oka and Omecillo respectively) have registered punctual values of ammonia above the compulsory limit, although the results of the electric fishing surveys indicate the presence of Salmo trutta fario, Barbatula barbatula, and Phoxinus phoxinus in zones 7 and 8; and Gobio gobio, Salmo trutta fario, Barbas graellsii, Micropterus salmoides, Lepomis gibbosus, Procambarus clarkii, Salaria fluviatiis and Blenius fluviatiis in zone 126.

It can therefore be considered that the Directive's requirements have actually been fulfilled in all zones and that the risk of failing to achieve the environmental objectives is in fact low (Figure 37).

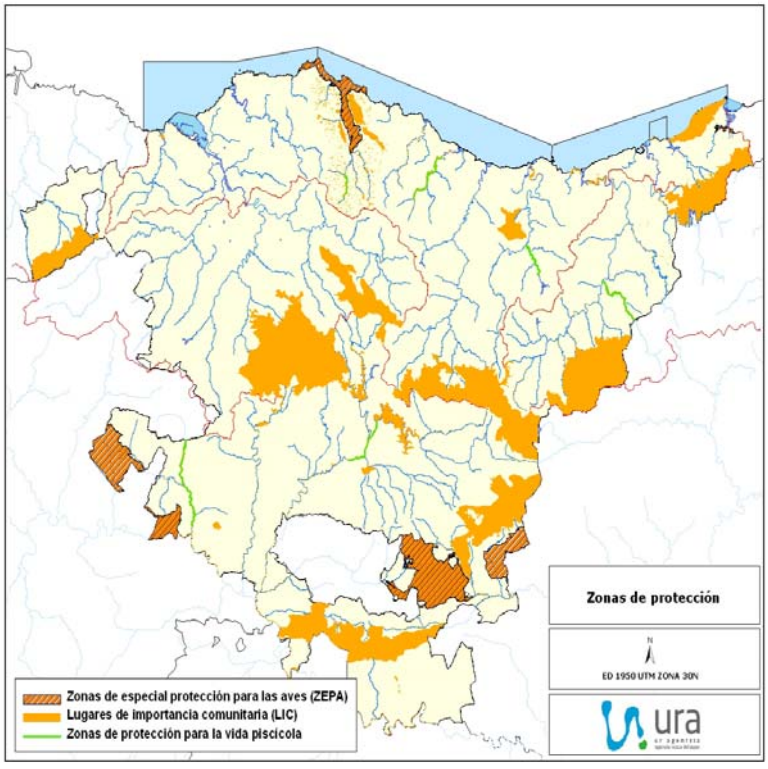

Figure 37 Other designated areas for the protection of habitats or species

4.5.2.2 Other protected areas

Other protected areas have been defined in the ACBC established under State and autonomous legislation, interventional conventions, etc. These are spaces of undeniable value linked to the aquatic environment and form part of the natural, landscape and historic heritage of the Basque Country, and must therefore be protected and conserved.

The first of the areas in this second category of protected areas derives from the Network of Protected Areas of the ACBC which covers 20.3 % of the area of the ACBC (146,695 hectares). In view of their relationship with the aquatic environment, eight Natural Reserves and five Protected Biotopes have been selected as part of this Network, but not the Singular Trees (Figure 37). Two specific areas are also included, namely the Urbaibai Biosphere Reserve and the Txingudi bay, which are examples of well-conserved, ecologically important wetlands.

As regards wetlands, it includes those included in the Inventory of Wet Areas of the ACBC (Plan Territorial Sectorial de Zonas Húmedas) and those designated by the Ramsar Convention.

The Basque Catalogue of Threatened Species of Fauna and Flora contains species, subspecies and populations which require specific protection measures. From its 157 species of flora and 145 species of fauna, six animal species have been selected due to their relationship with the aquatic environment: the European mink, blenny, sand martin, Bonelli's eagle, Pyrenean desman and stripeless tree frog.

Another section includes all those elements related to the aquatic environment of historic-cultural interest and therefore protected in some way. They have been taken from the General Inventory of Basque Cultural Heritage and in general relate to hydraulic infrastructure from different periods, like waterwheels, iron foundries and bridges (Figure 38).

The protection parameters for mineral and thermal waters as regulated by the mining legislation and by the Decree on bottled drinking water. Protection perimeters have been established in the ACBC, with 3 located in the historic territories of Gipuzkoa and owned by Agua de Insalus, S.A., Agua de Alzola, S.A. and Balneario de Zestona, and one protection parameter, located in Araba, which is operated by Pepsico.

4.5.3 Biodiversity

The ACBC's bio-geographical position, lying between the Euro-Siberian and Mediterranean regions; the climatic gradient from the coast to La Rioja; and the differences in altitude of over 1,000 m, all produce a great wealth of flora and fauna, with over 3,000 plant species and over 400 species of vertebrates. Where fauna is concerned, there are numerous areas of interest. These are generally mountainous places with little human occupation and a significant presence of woodland masses. Rivers and streams are interesting places for fauna, mainly due to the presence of endangered species, such as certain fish and amphibians, the European mink, the Pyrenean desman (muskrat), and so on. Ecosystems associated with surface waters are home to wetlands which are of great interest to migratory birds as over-wintering and breeding grounds. Outstanding examples of these include the Txingudi Salt Marshes (Gipuzkoa) and the Urdaibai Biosphere Reserve (Bizkaia) in the Cantabrian Sea area; and inland, the tail ends of the Zadorra Reservoir System (Araba), Salburua (Araba) and the pools of Laguardia (Araba).

One unusual aspect of the river ecosystems of the north-facing drainage basin is that their character is largely determined by the relatively small area between their headwaters and their mouths, where they flow into the Cantabrian Sea. The result of this is a rapid succession of different ecosystems as the river makes its way to the sea. Within the space of a few kilometres one may go from a stretch with well-oxygenated waters low in nutrients, to areas with clear, open banks, and slow-moving waters rich in nutrients and silty beds. Indeed, the transition occurs within so short a distance that in some rivers there are almost non-existent ecosystems, especially in the middle-height and lower reaches. Mediterranean rivers have better-

defined ecosystems, as in general they are characterized by longer courses and more gradual transitions. Furthermore, they present marked seasonal low water levels, which in slow-moving rivers or where the low water level is combined with the presence of karstic swallow holes may cause the riverbed to dry up completely.

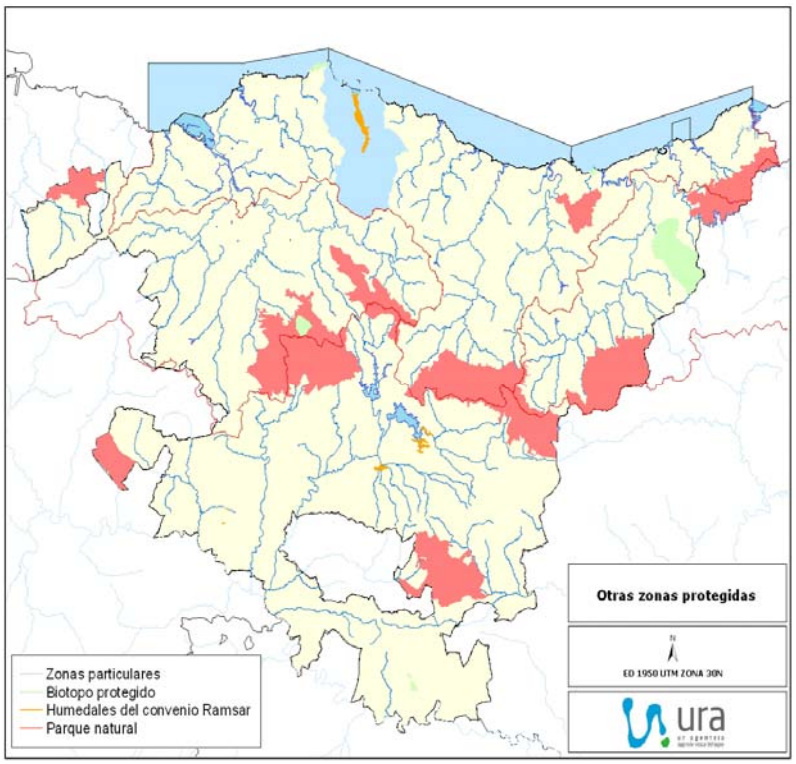

Figure 38 Other protected areas.

Logically this affects the distribution of the populations of species associated with ecosystems. This is the case of the cyprinids, like the barbel (Barbus graellsii), which has no significant populations in the Butroe, Lea and Oiartzun, although it does in the Oria, Urola, Artibai, Oka and Ibaizabal. On the other hand, although the appropriate habitats for cyprinids should be quite limited in the Cantabrian rivers, the anthropic alterations to the environment, particularly as regards the impoverished quality of the waters, lead to the extension of the cyprinicol waters towards the headwaters. This occurs to the detriment of the habitats appropriate for the salmonids, like the common trout (Salmo trutta) and the salmon (Salmo salar).

As these alterations are less severe in the Mediterranean rivers, both as regards the discharges of effluent and the changes to the course of the rivers, in said rivers the distribution of fish species is more in line with the natural distribution, with an abundance of cyprinids in the medium-level and low-level stretches and populations of salmonids towards the headwaters. In the case of the later, there are notable absences of common trout in long stretches of the Zadorra, both above the Ullibarri reservoir and below Vitoria and in some rivers of the Araba plains. In any event, it is a very affected species both from fishing and from the restocking, and as such its populations are very variable over time.

Plaice (Platichthys flesus) needs slow moving water with plenty of nutrients. It is present in the estuaries of the Cantabrian area which present these characteristics, with the added requirements that the seabeds have sandy areas where they can bury themselves. Another species with similar tendencies, the muble (Chelon labrosus), enjoys greater distribution in the coastal estuaries of the rivers in the ACBC due to its

greater tolerance to poor water quality.

The eel (Anguilla anguilla) also appears in the medium and low-level rivers and is particularly important as it is the only natural predator of the fish species in these stretches. As a natural regulator it contributes towards balancing the river ecosystems through predator activity and is a natural competitor of other introduced predators, like the pike (Esox lucius). Despite the fact that it is a migratory species, it is present in some Mediterranean rivers although in decline due to the large dams in the lower and medium stretches of the Ebro, which constitute effective barriers to the young fish's migration.

The mammals, particularly the carnivores linked to the aquatic environment, require areas of habitat which exceed those naturally available due to the habitat reductions deriving from human activity. Their populations are therefore very limited although there are notable exceptions in the protected areas, like the Urbaibai Biosphere Reserve.

Other exotic species are causing the very serious situation facing two autochthonous species linked to the aquatic environment, namely the white-clawed crayfish (Austropotamobius pallipes) and the European mink (Mustela lutreola), threatended by the introduction of the red swamp crayfish (Procambarus clarkii) and the American mink (Mustela vison), respectively.

As regards the birds, the differences between the Cantabrian side and the Mediterranean side are not so pronounced with the logical exception of the marine species. The diversity of the aquatic ecosystems in the ACBC allows for aquatic bird populations which in general present a more optimistic panorama than that described for the other species related to the aquatic environment. Here we should emphasis the wetlands which are highly productive ecosystems and keep the bird populations well-nourished.

4.5.4 Threatened species

The ACBC is home to populations of various species at risk on the EC level.

Salmon (Salmo salar) is however regaining its previous area of distribution thanks to the work that the various authorities are performing to favour its recovery.

Blenny (Blennius fluviatilis) is a species at risk of extinction in the ACBC. Although there is not much information about the species' biology and ecology, the available information does seem prove that the main reasons behind its decline are the loss of suitable habitat and the appearance of invader species like the American red swamp crayfish.

The stripeless tree frog (Hyla meridionalis) is found in the ACBC only in the wetlands of the Gipuzkoa coastal stretch. The disappearance of appropriate habitats (wetlands) and the natural vegetation of its breeding grounds are affecting its current situation, classified as "at risk of extinction".

The otter (Lutra lutra) can be found in the ACBC along the Ebro and in some of the lower and medium-level stretches of its affluent. The main factors threatening the species are the alteration of the habitat and the poor quality of the water in river stretches which could be colonised by the populations in the Ebro.

The sand martin (Riparia riparia) is a vulnerable species which is distributed scattered around Araba and with very small populations in Gipuzkoa. Its nesting habitat, mainly eroded riverbanks, is constantly being negatively affected by the authorities who are constantly controlling all types of erosions which occur naturally along the river banks.

The European mink (Mustela lutreola) is a vulnerable species found in the ACBC along rivers, irrigation channels, reservoirs and marshes, and even along river stretches which have been highly humanised. The main factors for the species' decline in Europe are the alterations to the habitat (water pollution, traffic

accidents), the drop in its potential prey and, above all, the competition from an invader species, the American mink.

The European storm petrel (Hydrobates pelagicus) is a marine species which nests in colonies along the coastal cliffs. In the ACBC there are 5 known breeding areas (Izaro, Aketz, Gaztelugatxe, Villano and Ogoño), all in Bizkaia, with no demonstrated nesting having been found so far in Gipuzkoa. The fact that it is so rare on the Basque coast could be down to various factors. On the one hand, the increase in the populations of Caspian gull (Larus cachinans) may be behind the higher predator levels on the storm petrel nests. The same occurs with the rats (Rattus spp.) which have led to the extinction of the storm petrel in various colonies in Cantabria. Lastly, we must emphasis the probable affect of the pesticides which have been found in the tissue of adults analysed in French colonies.

The common shag (Phalacrocorax aristotelis) nests on various small islands and coastal cliffs along the Basque coast, between Barrica and mount Igeldo. Its breeding habitat is along rocky cliffs and islets. Although there are no detailed studies on the issue, it appears that the population in the ACBC has not undergone significant changes and nor is it clear whether the variations which have been detected are due to the impact of human activities or merely due to natural oscillations in the numbers.

The Pyrenean desman (Galemys pyrenaicus) is considered a species of special interest due to its scarcity in the Autonomous Community and is an endemism of the Iberian Peninsula and northern foothills of the Pyrenees. Only located in a few river stretches of Gipuzkoa and, perhaps, in Araba, the principle problem for conserving the species lies in the lack of stretches of rivers with sufficient habitat quality to host this demanding species; problems with water pollution, reductions in the flow volumes, alterations to the riverbanks and their vegetation, presence of reservoirs, etc. all hinder the survival of this species.

Eriophorum vaginatum is plant linked to a special type of peat bog. Due to the fact that only one of these formations persists in the ACBC, the presence of the species is limited to few examples in a single place. The poor state of conservation of the enclave as a result of recurring fires, excessive pasturing, erosion caused by human activity, and a track with frequent traffic all place this species at serious risk of disappearing in the short or medium-term.

4.5.5 Invading species

The introduction of exotic invading species constitutes one of the main threats to conserving the biodiversity of the ecosystems throughout the world. By invading natural ecosystems, these species compete for the space with the native species and often significantly alter the natural processes of said ecosystems. Despite the fact that the casuistry is very varied, in general they involve a threat to the conservation of autochthonous species and lower the ecologic value of occupied habitats.

A species is allochtonous (synonym of exotic or introduced) when it is found in a region outside of its natural distribution area, in other words when it expands its area because some human activity moved live species or their propagates. The definition of invading species only includes those exotic species which, once installed outside of their natural distribution area, are able to propagate, without direct human existence, in natural or semi-natural habitats. The invading species use many ways of getting in to new territories:

- Deliberate introductions into the natural environment, for example of hunting or fish species.
- Introduction of species of agricultural or forestry value.
- Escaping farm animals.

- Expansion into the environment of exotic ornamental flora.
- Animals escaping from zoos.
- Releasing pets (e.g. turtles).
- Species (stowaways) which contaminate various shipments.
- Transport in ship ballast waters or those transported incrusted on their hulls.
- Parasites and pathogens which accompany shipments of agricultural, livestock farming or other types of products.
- Tourists and their baggage.

The introduction of invading species into natural ecosystems cause very different types of impact which often significantly alter their ecological processes, and significant losses of biodiversity. Below are some of the most important impacts:

- Health, due to colonies of harmful organisms and pathogen agents which cause damage to the autochthonous flora and fauna.
- Genetic, caused by hybridization with the autochthonous species and varieties, thereby reducing the genetic diversity of the biological community.
- Affect on autochthonous species due to different types of species-species interactions: predators, competition, introduction of new parasites and diseases.
- Effects on ecosystems due to the alteration of the structure of the habitat, changes to productivity, in the trophic chain, in the nutrient cycles and other ecological processes, or because they generate contamination and instability in the ecosystems.
- Indirect effects due to the use of pesticides and other control methods to combat these invading species.

There are a large number of species in the ACBC water masses which significantly contribute to worsening their Good Ecological State regulated by the Framework Water Directive. Some of the most significant date on this issue is discussed below:

4.5.5.1 Fauna

There are various fish species in the freshwater masses of the ACBC which were in general deliberately introduced to be used for sport fishing. Some of these cause significant changes to the fish communities in the affected rivers, particularly pike (Esox lucius), carp (Cyprinus carpio), goldfish (Carassius auratus) and bleak (Alburnus alburnus).

There are only two reptile species but despite this over the last few decades there have been indiscriminate releases of turtles used as pets into rivers and wetlands. The most common species which appears is the red-eyed slider or Florida turtle (Trachemys scripta elegans), and to a lesser extent the yellow-bellied slider (Trachemys scripta scripta).

There are less mammals insofar as number of species although the threat to the aquatic ecosystems is extremely significant:

- The nutria (Myocastor coypus), invades estuaries and waterways, mainly in the Internal Basins Demarcation and in the Northern III Basins Demarcation.
- The American mink (Mustela vison), invades estuaries and waterways, mainly in the Internal Basins, the Northern III Basins and the Ebro Basins. The presence of this species is particularly serious as it is the main threat to another mammal which is also present in the Basque rivers and is globally at serious risk of extinction; the European mink (Mustela lutreola).

Amongst the freshwater invertebrates living in the water masses of the ACBC, there is a long list of invading species about which little is known, but which have a serious impact on the conservation of the local fauna. The most prominent members of this group are the red swamp crayfish (Procambarus clarkii) and the signal crayfish (Pacifastacus leniusculus). Both species have brought the autochthonous white-claw crayfish (Austropotamobius pallipes) to the brink of extinction as they carry a deadly disease for the members of the latter species. The disease is called aphanomicosis and is caused by a fungal plague (Aphanomyces astaci) which is in turn another invading species from America.

Another invading invertebrate recently discovered in the ACBC (2006) is the zebra mussel (Dreissena polymorpha). This species occupies wetlands and waterways causing very significant damage to their biological communities and generates severe alterations to the ecological processes in these environments. If this were not enough, it also has a significant economic and social impact as it causes obstructions and other damage to the water mass infrastructure.

The presence of invading species is also relevant in the marine environment and in transitional waters. The following table shows a calculation of the exotic species and cryptogenic species (whose native or exotic origin has still not been clarified) which have been proved to exist in the Basque coastal area and adjacent sea beds.

Exotic species		Cryptogenic species
Invertebrates	Fish	
74	-	125
88	2	138

Table 15 Invading species-

4.5.5.2 Flora

There are around four hundred exotic superior plants in the ACBC, although only about seventy invading ones. The problems causes by the invading flora are particularly strongly felt in the lower Cantabrian slopes.

On the one hand, we could mention the problems caused by the introduction of various arboreal species (Eucaliptus globulus, Acacia dealbata, Platanus x hispanica) on the riverbanks which seriously alter the physical conditions of the riverbanks. This is partly due to the alteration of the plant cover and also due to the high rates of erosion of land and banks that they generate. The occupation of the banks by these species, with shorter root systems, seriously reduces the stability of land on the banks against the erosive force of the river flows. Their expansion causes extremely important risks of in situ erosion, together with the problems created downriver by the trees dragged by the current.

Certain species of flora (Baccharis halimifolia, Spartina patens, Stenotaphrum secundatum, Fallopia japonica, Carpobrotus edulis, etc.) should also be mentioned due to the fact that their development systems take up massive areas of land thereby preventing the development of other types of autochthonous flora, which is aggravated by the fact that this occurs in areas occupied by types of threatened vegetation or with threatened species of flora.

Below are some comments on the most important species:

- Fallopia japonica, massively invades riverbanks in the Demarcations of the Internal Basins and the Northern III Basins. It is mainly reported in the basins of the rivers Deba, Oria and Urola, where there are such dense populations that it has practically eliminated any trace of autochthonous vegetation.
- Acacia dealbata, commonly known as mimosa, is a fast growing tree which can reshoot. It is a very broad-topped ornamental tree which is invading the riverbanks mainly along the Cantabrian drainage basin. This species generates problems of erosion on the riverbanks and also hinders the natural regeneration of the bank vegetation.
- Robinia pseudoacacia, known as acacia, is a broad-topped, short-trunked deciduous tree which is very common on hillsides and riverbanks in the ACBC, and is displacing other autochthonous trees due to its capacity to rapidly colonise deforested land.
- Platanus x hispanica, also known as plane tree, is a very common tree in parks and gardens. The cultivated examples have massively spread throughout mountains and riverbanks on the Cantabrian slope of the ACBC and hinders the development of the natural forest communities.
- Baccharis halimifolia, is a plant in the asteraceae family, originally from Florida. It invades different estuary plant communities in the Internal Basins Demarcation and in the Northern III Basins, particularly in the Plencia tidal inlet, and the Urdaibai Wetlands in Bizkaia, and the Orio tidal inlet and the Txingudi bay in Gipuzkoa.
- Cortaderia selloana, commonly known as pampas grass, multiplies on dug ground, dumps, riverbanks and levelled areas near the coast. It also invades coastal riverbanks, estuaries and sandy areas in the Demarcations of the Internal Basins and Northern III Basins.
- Spartina patens, is a recently discovered grass and which is however quite frequently found invading coastal estuaries and sandy areas of the Internal Basins Demarcation, and the Northern III Basins Demarcation.
- Stenotaphrum secundatum, is a grass species used in gardening. In the Territory of the ACBC it is frequently found invading coastal sandy areas both in Bizkaia and in Gipuzkoa.

Quite a lot of invading algae are also present in the ACBC marine environment. Some of these species significantly affect the ecological state of the natural ecosystems, particularly the algae Centroceras clavulatum and Hypnea musciformis. Table 16 with the calculation of the exotic algae in the Basque coastal area.

4.6 Water and health

4.6.1 Control of water for public comsumption

The Autonomous Community of the Basque Country health monitoring and control of water for public consumption programme.

The purpose of the control and monitoring of waters for public consumption programme is to improve its quality and to eliminate the water-related health risks or reduce them to acceptable levels. In 2000 the objectives and lines of action were set out for the Health Plan in relation to water consumption which are an essential part of the annual control and monitoring programmes.

The quality of the water for consumption and its monitoring is now regulated. Royal Decree 140/2003 of 7 February, which transposed Directive 98/83, establishes the minimum quality and monitoring requirements for water for consumption. On the other hand, Decree 178/2002 of 16 July regulates the control, monitoring and information system for the water for public consumption in the Autonomous Community of the Basque Country (ACBC) and introduces two key issues. It establishes that all supply systems in the ACBC must themselves control the water quality and have control and monitoring units authorised by the Health Department and also sets out the bases for the water information system (EKUIS) which is conceived as a system open to all of the members of the Control and Monitoring Network, the local authorities and the citizens. 2005 saw the consolidation of the control and monitoring network, and of the EKUIS system which now includes all of the Control and Monitoring Units operating in the ACBC. In 2007 EKUIS was opened up to the citizens and as such everybody who wishes to can consult information about the waters throughout the Autonomous Community.

The Health Monitoring Programme includes a series of special monitoring processes. The entry into operation of the Control and Monitoring Units as entities responsible for performing the supply control and monitoring programmes required by Royal Decree 140/2003 allows the Health Department to focus on its own functions as health authority and direct its monitoring towards assessing the risks for the populations.

Decree 178/2002 establishes an obligation on the Control and Monitoring Units to prepare and perform control and monitoring programmes on their supply systems, coinciding with what Royal Decree 140/2003 later referred to as supply self-control and management protocol. In order to avoid confusion in the ACBC the name “Supply control and management programme” (‘Programa de control y gestión del abastecimiento’) will be used. Along similar lines, Decree 140/2003 establishes that the health authorities shall prepare the health monitoring programme and shall make it available to the managers. Taking into account the terminology used for years in the Health Department, in the Autonomous Community this programme will be called the Health Monitoring and Control of Waters for Public Consumption Programme of the Autonomous Community of the Basque Country.

The Health Department will keep performing the physical-chemical monitoring and microbiological analysis of all of the supply in the ACBC. The analysis profile used will be similar to that used for the Drinking Water Treatment Plants (DWTP) exit-control. The frequency of the analysis has been determined for each supply area (SA) according to its characteristics and the criteria of the public health centre. As a general recommendation the following frequencies have been established (Table 16):

Inhabitants/SA	Analysis/year

≤ 500	2
501 – 5,000	2 + 1/2,500 inhab. or fraction
5,001 – 50,000	4 + 1/5,000 inhab. or fraction
50,001 – 500,000	14 + 1/50,000 inhab. or fraction
≥ 500,001	52

Table 16 Analysis frequency

In the case of SA with new Control and Monitoring Units the regional centres will assess whether it is initially appropriate to monitor more frequently than that indicated in the above table.

All alterations to the supply which affect the potability shall systematically lead to more intensive monitoring and measures shall be taken in relation to the supply until the water quality recovers.

4.6.2 Bathing water

At the beginning of the 80s the Health Department designed the Beach Control and Monitoring Programme which was implemented at all beaches in the ACBC throughout the bathing season. Some beaches were sporadically monitored over longer annual periods for research purposes or to collaborate with the design of certain infrastructure with a clear impact on the quality of bathing water, like for example those relating to waste water management. The routine control of the public health quality of the water is performed by determining the microorganisms indicating faecal pollution: Total coliforms (TC), Faecal coliforms(FC), and Faecal streptococcus (FS). At the sampling points where previous bathing seasons have shown deficient water quality, the routine control will include the determination of Salmonella. The following chemical and physical-chemical parameters are also included: pH, colour, oils, foam, tensoactive agents, phenols, transparency and flotsam. All of these parameters are used for the momentary and global health qualification of the bathing water.

The health monitoring programme for beaches is aimed at studying the sanitary-hygienic conditions of both the water and the surrounding beach area so as to establish actions aimed at protecting the health of those who enjoy these leisure areas. The programme consists of four main activities: control of the quality of the bathing water, control of the quality of the surrounding beach area, information activities and accidents registry.

The marks obtained, both as regards the bathing water and the surrounding beach area, are sent as information to the media and to the Institutions or Associations with competence over beaches. Informative-educational leaflets are also distributed to promote actions aimed at reducing the morbidity and danger associated with the use and enjoyment of the bathing areas.

5 ELEMENTS OF CHANGE

5.1 Flooding and droughts

5.1.1 Flooding

Flooding produced by rivers, transitional waters and coastal waters is a natural process that plays an important role in modelling the lie of the land. The damage done to people and property is a consequence of the location and characteristics of human settlements and land uses.

There are frequent flood alerts in the ACBC and records of floods date back to the year 1403. In Bilbao, there are thirty-nine recorded incidents classed as disasters. Flood records also cover a widespread

geographical area, with similar phenomena having occurred at other points of Basque geography. Nearer in time to the present day and better known are the floods of October 1953, June 1975, June 1977, July 1988, February 2003 and, most notably, August 1983, which left thirty-four people dead, five missing and property damage estimated at over 1,200 million euros.

The factors that combined to cause these latter torrential rains were threefold: cold polar air reaching the high ground; the high surface temperatures of the Basque coastal waters, which produced a very unstable, hot and moist surface mass; and light winds from the north which, when stopped by the mountain profiles, triggered ascending air currents and instability. Rain gauges recorded precipitation of over 500 mm in twenty-four hours.

The Basque Water Agency has produced a map illustrating flooding liability, which differentiates between areas affected by the advent of return periods of 10, 100 and 500 years' (completion of the flooding cycle). This will serve as a geographical reference for applying land-use criteria according to the extent to which the land is liable to flooding.

Accordingly, the Basque Water Agency has drawn up the Criteria for Land Use according to degree of Liability to Flooding. In late 2007, the European Union passed Directive 2007/60/EC of the European Parliament and Council of 23 October 2007 concerning the evaluation and management of flooding risks. Furthermore, early 2008 saw the passing of Royal Decree 9/2008, modifying the Public Water Supply Regulations to introduce the element of risk management.

The structural measures carried out in the ACBC have comprised essentially: the creation of an infrastructure of drainage channels in heavily built-up areas for flood defence; the demolition of structures covering river beds to recover them for drainage; the removal of obstacles to the flow of water (obsolete bridges, disused hydraulic structures such as water wheels and dams, etc.) to regenerate river beds and improve drainage capacity; the diversion of covered-over streams within built-up areas, and so on.

5.1.2 Droughts

Drought is a normal and recurring feature of the climate and, although we tend to regard it as an unexpected and exceptional event, it may be looked upon as a seasonal anomaly within the natural range of climatic variations.

Other studies performed over the rain droughts in Gipuzkoa have shown that the drought between 1944-49 has a return period of approximately 25 years. The drought between 1900 and 1905 was also identified as the worst drought. It is inferred from these figures that the agronomic droughts are more frequent than those considered as significant periods of drought.

On the other hand, the rain droughts are not directly translated into hydrological droughts as the rain conversion process into runoff is not linear. Thus, according to the data from the Ebro Hydrological Plan, while there was a 11% decrease in rainfall over historic averages in the period between 1990 and 1994, the decrease in water runoff was found to be 22%.

Applying the same pluvimetric criteria as above, but this time to the series of runoff of the same systems, we obtained the Table 18.

Hydrological	Times that the	The drought starts	Total	Total

Unit	drought starts	every (years)	months of drought	Drought as % of the time
Bidasoa	26	1.92	58	9.67%
Oiartzun	28	1.79	57	9.50%
Urumea	24	2.08	61	10.17%
Oria	25	2.00	53	8.83%
Urola	30	1.67	58	9.67%
Deba	28	1.79	54	9.00%
Artibai	31	1.29	65	13.54%
Lea	23	1.74	55	11.46%
Oka	23	1.74	54	11.25%
Butroe	24	1.67	55	11.46%
Ibaizabal	31	1.61	66	11.00%
Barbadun	38	1.32	95	15.83%
Aguera	39	1.28	102	17.00%
Karrantza	40	1.25	112	18.67%
Omecillo	35	1.43	76	12.67%
Baia	27	1.85	60	10.00%
Zadorra	30	1.67	66	11.00%
Inglares	33	1.21	75	15.63%
Ega	33	1.52	78	13.00%
Arakil	29	1.72	62	10.33%
Ebro	41	1.22	99	16.50%

Table 17 Frequency and magnitude of the climatological droughts (Basque Government, 2005)

The direct application of the principle indicates that these hydrological droughts were more frequent and lasted longer. Now then, the 60% limit of the average is very strict as regards the runoff. As such when hypothesis are performed varying the runoff reduction % which must be achieved in order to declare the start of the drought the conditions vary. Table 19 reflects the hypothesis that the droughts are characterised by months with average monthly runoff of 30%.

Hydrological Unit	Times that the drought starts	The drought starts every (years)	Total months of	Total Drought as % of the

			drought	time
Bidasoa	42	1.19	139	23.17%
Oiartzun	35	1.43	127	21.17%
Urumea	43	1.16	132	22.00%
Oria	35	1.43	141	23.50%
Urola	38	1.32	148	24.67%
Deba	41	1.22	176	29.33%
Artibai	39	1.03	172	35.83%
Lea	41	0.98	153	31.88%
Oka	30	1.33	113	23.54%
Butroe	33	1.21	147	30.63%
Ibaizabal	38	1.32	154	25.67%
Barbadun	48	1.04	191	31.83%
Aguera	57	0.88	238	39.67%
Karrantza	45	1.11	209	34.83%
Omecillo	46	1.09	202	33.67%
Baia	50	1.00	205	34.17%
Zadorra	41	1.22	169	28.17%
Inglares	20	2.00	156	32.50%
Ega	32	1.56	213	35.50%
Arakil	47	1.06	188	31.33%
Ebro	36	1.39	120	20.00%

Table 18 Frequency and magnitude of the hydrological droughts (1) (Basque Government, 2005)

By reducing the drought start limit, the droughts become less frequent and, in the overall calculation, last for less time. Now then, under the same criteria as the climatological analysis, it is noted that the hydrological droughts are less frequent, starting every 4 or 5 years. This is due to the basins' natural capacity to regulate. As such, the larger basins are less vulnerable to drought. It must however be taken into account that these are global figures of the Hydrological Unit. Basins inside these large units will behave similarly to the smallest units. It can be inferred from the evolution of these indicators that, as the start criteria is relaxed, the behaviour is very similar in all of the Hydrological Units. Having said that, it could be summarised that the hydrological droughts are slightly more frequent and last longer on the Mediterranean-facing slope.

From the demand point of view, drought must be analysed within the water supply systems. If the system is gauged to supply the water resources with an adequate guarantee, the distribution and magnitude of the deficit will be in relation to the hydrology. Now then, not all of the systems behave in the same way when faced with situations of hydrological drought due to the differences in the source of the water, the capacities for natural and artificial regulation and, logically, the type of demand.

On this matter, the second most significant of the droughts, the one at the end of the 80s and the beginning of the 90s, has been analysed in detail in various studies. They compare the behaviour of the supply systems in the ACBC with those in other areas which have suffered a similar climatological drought and they come to the conclusion that only in the ACBC were supply restrictions necessary for the main population centres, particularly Vitoria-Gasteiz and Bilbao and in the other areas supplied by the Zadorra reservoir system.

In order to mitigate the effects of possible extreme periods of drought various lines of working have been

developed by the different administrative bodies and adopted with the aim, on the one hand, of achieving better management of demand and resources for daily supply under normal conditions and, on the other, of resolving the extreme episodes of drought with as little disruption as possible. These measures will be adapted, as necessary, to the possible effects of climate change in the ACBC, especially on its Mediterranean-facing drainage basin. To this end the public administration of the ACBC has implemented a number of different studies and research projects.

Hydrological Unit	Times that the drought starts	The drought starts every (years)	Total months of drought	Total Drought as % of the time
Bidasoa	10	5.00	40	6.67%
Oiartzun	10	5.00	30	5.00%
Urumea	12	4.17	47	7.83%
Oria	15	3.33	46	7.67%
Urola	13	3.85	42	7.00%
Deba	12	4.17	45	7.50%
Artibai	23	1.74	92	19.17%
Lea	28	1.43	84	17.50%
Oka	9	4.44	23	4.79%
Butroe	14	2.86	54	11.25%
Ibaizabal	12	4.17	33	5.50%
Barbadun	17	2.94	60	10.00%
Aguera	36	1.39	152	25.33%
Karrantza	21	2.38	90	15.00%
Omecillo	16	3.13	64	10.67%
Baia	25	2.00	95	15.83%
Zadorra	12	4.17	32	5.33%
Inglares	8	5.00	68	14.17%
Ega	12	4.17	104	17.33%
Arakil	14	3.57	60	10.00%
Ebro	10	5.00	33	5.50%

Table 19 Frequency and magnitude of the hydrological droughts (2) (Basque Government, 2005)

All these projects look into measures for rationalizing use and harnessing additional resources, both under normal conditions and in exceptional situations. Examples of such measures include interconnecting different regulating systems (in some cases between intra-Community (internal) and inter-Community basins) or modifying the use of reservoirs and the abstraction of groundwater for each of the different situations and ranges of seriousness, determined according to the available resources and forecasts at each particular time.

In order to design preventive and palliative water use measures capable of overcoming the worst known conditions, historical records of drought situations are being taken into account, by simulating their coincidence with one another in the light of the available data series and infrastructure in operation today in each of the systems.

The most representative sample of this research work in the ACBC is the series of studies for improving

the supply to the metropolitan areas of Bilbao and Vitoria-Gasteiz.

5.2 Water costs

In accordance with that indicated in article 9 of the Water Framework Directive (2000/60/EC), the principle of water-related services costs recovery must be taken into account, including the environmental costs and the costs of the resource, according to the principle of those who contaminate must pay. It also indicates that when it comes to considering the principle of costs recovery, the water services to industry, homes and agriculture must be taken into account. It therefore establishes that at the very latest by 2010 a water price policy must be guaranteed which provides adequate incentives so as to encourage the users to use the water resources in a more efficient manner.

On this matter, the Basque Autonomous Community has incorporated the regulations deriving from the Water Framework Directive into its legislation by passing the Water Act 1/2006, of 23 June. In Chapter VIII, article 41 it establishes the obligation on the water management entities to apply tariffs which respect the principles of article 9 of the Framework Directive.

Chapter VIII, on the other hand, creates and regulates the Water Charge, an ecological tax earmarked for the protection, restoral and upgrading of the watery environment; to enhance collaboration between the competent authorities to achieve efficient supply and sewerage services; and to foster mutual aid between territories. It will be used to prevent pollution at source and to conserve, protect, upgrade and restore the environment and ecosystems connected to the aquatic environment. This includes maintaining ecological flows, and achieving a good ecological condition for water masses, as set out in Framework Directive 60/2000/EC; financing infrastructures listed as being of general benefit to water planning; allocating grants or financial resources to local corporations, to other bodies and to individuals for meeting the aims of water planning; and making investments intended to save water, with special emphasis on minimizing losses from distribution networks.

On 4 November 2008 Decree 181/2008 was passed which aims to regulate the financial system for the water charge, whereby it is managed, liquidated, collected and inspected by the Basque Water Agency.

The tax corresponding to the charge is established at six cents per cubic metre of water consumed.

The State has also incorporated the EC regulations into its water-related legislation.

As regards the management of water services related to the supply, sewerage and treatment of wastewater, the competence corresponds to the Local Authorities under Act 7/1985 Regulating the Bases of the Local System, and as such the town councils are competent for managing the water services, which includes fixing the rates. It should be stated that in the case of Alava, the management corresponds to the Juntas Administrativas in each municipality.

As already indicated in section 4.1 Supply of water and removal of wastewater sector, many municipalities, including the most important ones, have ceded some (or all) of the competences to associations or consortiums which are included in Figure 17 in said section.

The method for managing the income from the services they offer is homogeneous throughout the whole of their territory, regardless of whether the costs of providing these services are higher in some municipalities than in others. That is to say, these bodies follow principles of integrated management of their services, homogeneity in the quality of the services provided, and uniformity of tariffs within the territory under each body.

This means that the different user groups set up by each management body (municipalities, domestic users, and business or industrial users) support the same tariff ratio and, consequently, the same

percentage of the cost is assigned to them, no matter what their location or the real associated cost may be.

The ACBC's main management bodies, by which is meant principally the consortia and associations, operate an efficient management system that recovers a high percentage of the financial cost of the services they provide. For this purpose they review their tariff structure each year in order to establish prices that will enable them to recoup their budgeted costs in each financial year.

Public investment should be analysed separately. As already indicated, the large management bodies make a great effort to pass on the financial costs of the services to the users, including in most case the repayment of the self-financed investments. However, some of these projects require external finance from public institutions like the Basque Government, the Provincial Councils, the Ministry for the Environment and the European Union in order to perform all of the infrastructure needed to develop their activity, which in some cases are not fully recovered. On this matter, it should be mentioned that an exhaustive analysis would enable us to find out exactly the amount of the cost which is not passed on to the users. This is where work must be done in order to achieve in the future that the costs of the water services are entirely passed on to the users.

There are also groups of users who do not pay for the use of the water and are therefore being subsidised by those who do pay, although the consumption by most of these users, who often lack economic resources, charitable institutions, etc. is not significant. Included in this group are institutional uses, watering municipal gardens, street cleaning, etc. It is however an expense which should be taken into account.

A clear trend is observed amongst the large consortiums and associations towards combining the competences over water services in low-level networks which up until now were not ceded by their members. This tendency seems to be the most appropriate in order to achieve more homogenous and at same time efficient management of the water services.The low-level network tariffs (distribution mains) set by the municipalities and administrative agencies, which are served by consortia and associations, often have little or nothing to do with the high-level network tariffs (between the catchments and the water works) set by the latter. This means that multiple tariffs coexist in each consortium or association's areas. In many cases, these tariffs don't follow any financial criterion.

The data sets provided by the main management bodies, with which the study was carried out, are both high in volume and, generally speaking, quality. Nevertheless, the heterogeneous nature of the management systems used by the consortia and associations makes comparison difficult.

There is a large information gap when it comes to income and expenditure in some organizations engaged in managing high-level network water, especially in self-sufficient local authorities. However, these serve only 8% of the ACBC's total population (5% of the internal basins, 14% of the Cantabrian Hydrographic Demarcation and 10% of the Ebro Hydrographic Demarcation).

Where this information gap does matter, though, is in the low-level network where municipalities themselves are the managers. The management of water services there is often characterized by a lack of accountability, with the smaller municipalities presenting the biggest problems.

As far as the average tariffs that are applied in the ACBC are concerned, the Spanish Water Supply and Removal Association (Asociación Española de Abastecimiento de Agua y Saneamiento (AEAS)) estimates, for the full water cycle, an average tariff for domestic users in the ACBC of 0.95 €m^3 in 2006, divided into 0.47€/m^3 for the supply and 0.48 €/m^3 for the removal of wastewater.

As far as industrial use is concerned, the AEAS estimates that, for the same year, the average tariffs

amounted to 0.73 €/m^3 for the supply and 0.74 €/m^3 for the removal, which makes a total of 1.49 €/m^3 for the full water cycle.

71 shows the average tariffs for domestic users with an 13 mm calculated for an average home (2.75 inhabitants). Two consumption patterns are noticed, 60 litres per inhabitant per day which is estimated as the minimum for basic requirements, and 171 litres per inhabitant per day which is the average consumption in the State. The data shows higher tariffs per cubic metre for lower consumption as a result of the normal design of the tariffs structure which gives greater weight to the water bill's fixed instalment for the first cubic metres consumed.

2.75 inhabitants/home	Supply €/m^3		Removal €/m3		Water services €/m3	
	60 l/inhab/day	l/inhab/day	60 l/inhab/day	171 l/inhab/day	60 l/inhab/day	171 l/inhab/day
Bilbao	0.747	0.503	0.623	0.446	1.37	0.949
Vitoria-Gasteiz	0.724	0.456	0.548	0.378	1.272	0.834
Donostia/San Sebastián	0.446	0.384	0.343	0.218	0.788	0.601

Table 20 Average tariffs in the Basque capitals. 2006 (Spanish Ministry for the Environment)

Tariffs are usually stratified in consumption bands. One tariff covers up to a certain number of cubic metres, with a higher tariff covering above this level of consumption. Domestic users pay least, followed by business users and then industrial ones.

It should be pointed out that in the case of water for irrigation, it is the Irrigating Growers' Groups who guard this authority. Likewise, there are a large number of industries who have their own intakes with which they supply all or part of their own needs.

As set out in Article 9 of the WFD, the allocation of costs to water-related services must take into account environmental costs and those related to water resources.

For the purposes of this report it has been assumed that environmental costs may be likened to the costs of complying with existing environmental legislation. Amongst these are costs relating to the treatment and cleansing of wastewater, although later it will be necessary to take into account other costs, such as those relating to recovering used flows and restoring negatively-impacted ecosystems.

6 STEWARDSHIP

6.1 Managing water resources

Water is a public asset, essential to all. Water management is therefore a function of the Public Authorities, who lay down the conditions under which they grant licences for water use, as well as performing inspection duties and implementing a system of fines. The distribution of responsibilities for managing inland waters in the ACBC is very complex, with numerous authorities involved.

Responsibility for functions and services relating to water resources and their use, as well as permits and policing in the Public Water Supply -which, in Spain, is an asset owned by the state- falls primarily on the Basin Organs of the Spanish State (Hydrographic Confederations) for the Inter-Community Basins, and on the Basque Government for the Intra-Community (Internal) Basins. However, on the basis of a management order made by the State Agency in 1994, it is the ACBC that at present performs most of these functions throughout the Inter-Community Basin territory. However, the power to decide on the

matters entrusted by the order still lies with the Hydrographic Confederations (the HC of the North and HC of the Ebro), which fall under the State.

Local authorities are responsible for providing the municipal public services of water supply and sewerage as established in the Law Regulating the basis of Local Government (Ley de Bases de Régimen Local).

The provincial councils have the power to arrange and coordinate municipal water supply and sewerage services, so as to ensure that provision is integrated and adequate to meet needs.

The Shoreline Public Domain belongs to the state and comprises areas of tidal influence, beaches, sands and dunes; territorial coastal waters, with their seabeds and subsurfaces; cliffs; islands; land reclaimed from the sea, and so on.

Responsibility for management of the coastline lies with the Basque Government, together with the granting of permits for land-sea discharge of effluent and land use in the coastal buffer zones where protective easements apply.

6.2 Legislation

6.2.1 European legislation

The EU has designed and promoted an ambitious and integrated water resource policy. This is probably the most ambitious and innovative of all its environmental policies. Its key element is Directive 2000/60/EC of the European Parliament and Council dated 23 October 2000, also known as the Water Framework Directive, mentioned earlier. This lays down an EU-wide framework for protecting inland, transitional and coastal surface water and groundwater; preventing or reducing their contamination and promoting their sustainable use; protecting the environment; improving the state of watery ecosystems; and attenuating the effects of flooding and droughts.

The Directive's main aim is the improvement of the state of watery ecosystems, in order to achieve a good ecological state for water masses by 2015.

Other important European water regulations which establish specific objectives in their respective scope of regulation are and continue being (until the future repeal of some of the Directives within the time periods established by the Framework Directive) the following:

- Council Directive 75/440/EEC, and those which subsequently amended it, concerning the quality required of surface water for the abstraction of drinking water, which seeks to reduce and prevent the contamination of surface water for the abstraction of drinking water.
- Directive 76/464/EEC, on pollution caused by certain dangerous substances discharged into the aquatic environment; and those deriving from it 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC, 88/347/EEC and 90/415/EEC.
- Council Directive 76/160/EEC concerning the quality of bathing water and which aims to prevent and reduce the contamination of water for this use.
- Directive 78/659/EEC, on the quality of fresh waters needing protection or improvement in order to support fish life.
- Directive 79/923/EEC, on the quality required of shellfish waters.

- Directive 80/68/EEC, on the protection of groundwater against pollution caused by certain dangerous substances.
- Council Directive 91/271/EEC, amended by Commission Directive 98/15/EC, concerning urban waste-water treatment, which aims to harmonise, on a EU-wide scale, the measures relating to urban waste-water treatment, imposing specific waste-water removal objectives depending on the size of the populations and the vulnerability of the water masses into which the effluent is discharged.
- Council Directive 91/676/EEC, concerning the protection of waters against pollution caused by nitrates from agricultural sources which aims to reduce and prevent this type of presence and the consequences on the water masses.
- Council Directive 98/83/EC concerns the quality of water intended for human consumption, which its basic quality standards.
- Directive 2006/118/EC of the European Parliament and of the Council, of 12 December 2006, on the protection of groundwater against pollution and deterioration.
- Directive 2007/60/EC of the European Parliament and of the Council, of 23 October, on the assessment and management of flood risks.

6.2.2 Spanish legislation

The legislative framework for State water matters is defined by Royal Legislative Decree 1/2001, which was enacted on 20 July. This approves the consolidated text of the Waters Act, which in turn modifies the 1985 Waters Act, and has in turn been modified: article 91 of the Tax, Administrative and Social Measures Act 24/2001, 2nd Final Regulation of Act 16/2002, of 1 July, on integrated prevention and control of IPPC contamination, articles 122 and 129 of Act 62/2003, of 30 December, on Tax, Administrative and Social Measures, the first final regulation of Act 11/2005, of 22nd June, which modified Act 10/2001, of 5 July, on the National Hydrological Plan, Royal Decree Act 4/2007, of 13 April, which modified the consolidated Waters Act, Act 42/2007, of 13 December, on Natural Heritage and Biodiversity.

The Waters Act is regulated by Royal Decree 849/1986, of 11 April, which passed the Public Water Supply Regulations which develops preliminary headings I, IV, V, VI and VII of the Waters Act 29/1985, of 2 August, and has been successively amended, most recently by Royal Decree 9/2008, of 11 January, which modified the Public Water Supply Regulations, passed by Royal Decree 849/1986, of 11 April.

The Hydrological Plan is regulated by Royal Decree 907/2007, of 6 July, which passed the Hydrological Plan Regulations and its general objective is to: achieve the good state and adequate protection of the public water supply and the waters, the satisfaction of the water demands, balancing and harmonising the regional and sector development, increasing the availability of the resource, protecting its quality, economising its use and rationalising its uses in harmony with the environment and the other natural resources. (art. 1). Recently Order ARM/2656/2008, of 10 September, has been enacted which passes the Hydrological Plan Directive.

On the other hand, on 1 July 1994 the water resources and water supply were transferred to the Autonomous Community of the Basque Country: Royal Decree 1551/1994, of 8 July, on the transfer of

water resources and water supply function from the State Administration to the Autonomous Community of the Basque Country. Said transfer is protected by that established in the Spanish Constitution and the State of Autonomy of the Basque Country.

On this matter, the Spanish Constitution establishes that the State has exclusively competence over the legislation, regulation and concession of water resources and water supply when the waters flow through more than one Autonomous Community, and over the public works of general interest or when their execution affects more than one Autonomous Community (Article 149.1.22 and Article 149.1.24).

The Coasts Act 22/1998, of 28 July, determines as State-owned assets the shoreline area, the beaches, the territorial waters and the natural water resources in the economic zone and the continental shelf.

Article 26 of the Basque Country General Environmental Protection Act 3/1998, of 27 February, on the other hand states that the industrial discharges of effluent and pollutants into the territorial waters of the State on the Basque coast are subject to administrative authorisation being granted by the Autonomous Community environmental body.

6.2.3 Basque Legislation

The Statute of Autonomy of the Basque Country establishes that the Community holds exclusive competence over the public works which are not classified as of general interest or do not affect other territories - Article 10.33.

By virtue of said transfer, amongst other issues, the ACBC is competent for planning and managing the water resources of the rivers which entirely run through the territory of the Autonomous Community (intra-Community or internal basins), which represent 25% of those in the Community.

Developing the Basque State of Autonomy, the Mixed Transfer Commission Agreement of 28 July 1996 was passed by Decree 216/1996, of 30 August, on the transfer of functions on environmental and discharge issues from the State Administration to the Autonomous Community of the Basque Country. Decree 196/1997 was announced for these purposes on 29 August which regulates the procedure for granting permits for land-sea discharge of effluent and land use in the coastal buffer zones where protective easements apply. The supply, sewer system and wastewater treatment, this is under the competence of the Local Authorities by virtue of the Law Regulating the basis of Local Government , Act 7/1985 (Ley de Bases de Régimen Local).

Decree 390/1998 should also be mentioned as it announces regulations for declaring areas vulnerable to water pollution by nitrates from agrarian sources and passes the Good Code of Agrarian Practice. This Decree designates as Vulnerable Area the Eastern Sector of the Vitoria-Gasteiz Hydrological Unit. Additionally, Order of 18 October 2000 passes the Action Plan for these areas which includes setting out the specific requirements for agrarian activities, like limits, seasons and conditions for applying fertilizer, irrigation systems, water extraction, etc.

Significant amongst the Autonomous Regulations is Decree 168/2004 which declares the sensitive areas in the intra-community basins and in the maritime waters. In accordance with Directive 91/271/EEC, declaring an area as sensitive implies, insofar as treatment requirements are concerned, the obligation to rigorously treat the water in order to reduce the nutrients (nitrogen and phosphorous) when dealing with discharge coming from urban areas with over 10,000 inhabitants. The areas declared as sensitive are:

- Reservoirs: Urkulu, Aixola, Ibaieder, Barrendiola.
- Estuaries: Butroe, Oka, Lea, Inurritza, Oiartzun and Bidasoa.

The Basque Sustainable Development Environmental Strategy (Estrategia Ambiental Vasca de Desarrollo Sostenible – hereinafter EAVDS) assumes these objectives and includes specific, quantified objectives and undertakings on wastewater removal, reduction of contaminating loads discharged into the watery environment, classification of bathing areas, reduction of discharges of hazardous substances, reducing the nutrients content in the waters, ecological and chemical state of the waters, quality of groundwater, population supplied with drinking water, non-increase in the length of channelled stretches, conserving the forest areas which protect the basins, recovery of degraded landscapes, restitution of habitats associated with aquatic ecosystems, actions to repair the river courses and riverbanks and also to promote Plans related to the watery environment which are currently being prepared and processed.

Lastly, the current planning and that being prepared, specifically on water-issues affecting the ACBC, is found in:

- Hydrological Plan of the Internal Basins of the ACBC (Plan Hidrológico de las Cuencas Internas de la CAPV), currently being prepared.
- The 2015 ACBC Wastewater Removal and Treatment Plan must consider, when defining the wastewater removal and treatment plans, the new environmental quality objectives set out in the Water Framework Directive, which are currently being developed.The Sectoral Territorial Plan regulating the river and stream banks in the Autonomous Community of the Basque Country (Cantabria-facing drainage basin and Mediterranean-facing drainage basin) passed by Decree 415/1998 and Decree 455/1999, respectively, and currently being revised, designed on the basis of integrating the environmental, water and urban planning variables which have an impact on the territorial regulation of the riverbanks in order to make the urban planning potential compatible with the problems deriving from floods and with the conservation of the banks' natural conditions.
- Integral Flooding Prevention Plan (Plan Integral de Prevención de Inundaciones – PIPI in Spanish) and its revision.
- Sectoral Territorial Plan for Wetland Areas (Plan Territorial Sectorial de Zonas Húmedas), passed in 2004.
- Sectoral Territorial Plan for Protecting and Regulating the Coast in the CAPV (being processed).
- Northern II, Northern III and Ebro Hydrological Plans, passed although they must be revised in order to adapt them to the WFD.

6.3 URA (Basque Water Agency)

The Water Act, No. 1/2006 passed on 23 June, was published on 19 July 2006. Its purpose is to establish "the mechanisms necessary for implementing European policy and, at the same time, provide this subject with a suitable regulatory framework for the different public authorities involved to be able to put it into practice". This Act enables participation by the different historical territories of the ACBC. The ultimate aim is to create a single organization encompassing authorities and users, whilst respecting local powers and functions in the matter.

Its articles include measures for hydrological planning, protecting inland, coastal and transitory waters and their surrounding areas; on supply, wastewater removal and treatment, and irrigation; as well as on waterworks and the economic-financial regime. The Basque Water Act seeks to provide a holistic focus to the management of resources in the ACBC.

Chapter II of the Waters Act 1/2006, of 23 June, creates and regulates URA, the Basque Water Agency, a public entity governed by private law, which is constituted as the central instrument for carrying out the water policy in Euskadi. On the other hand, Decree 240/2007, of 18th December, passes the said Public Entity's Articles of Association and Decree 233/2007, of 18 December, regulates the start of activities of the Uraren Euskal Agentzia/ Agencia Vasca del Agua/Basque Water Agency, establishing the conditions for assigning the personal and material resources of the Administration of the Autonomous Community of the Basque Country to it.

As the entity responsibly for water-related issues within the scope of the competences corresponding to the Public Administration of the Autonomous Community of the Basque Country, the Agency performs the functions indicated in article 7 of the Act 1/2006.

The Agency performs its activity in accordance with the general principles indicated in article 3 of Act 1/2006 and in particular, guaranteeing maximum effectiveness in complying with its functions and in providing its services, in accordance with the principle of user participation and full respect for the competences corresponding to other administrations and the rights and interests of the individuals.

By setting up the Basque Water Agency, the Autonomous Community of the Basque Country has taken the necessary steps in order to adapt to the good governance concepts and advice deriving from the international studies, like the United Nations World Water Development Reports of 2003 and 2006. Establishing an institution exclusively entrusted with all issues relating to water policy, the planning, disaster prevention, etc. is one of the first steps proposed by the international studies in order to deal with water management.

The six keys to good governance proposed by the Second United Nations Report published by the World Water Assessment Programme in 2006 have been covered by establishing and starting the activities of the Basque Water Agency. Transparency (1), guaranteed by the presence of actors from different ambits on the consultative bodies and the obligation on the management bodies to report to them; coherence (2), bestowing on the Agency the capacity to handle all water issues in collaboration with the other administrations competent on this matter; sustainability (3), personified in the management policy of the demand already set out in the Case Study on the Basque Country attached to the Second United Nations Report in 2006; integral and holistic focus (4), providing the Agency's deciding bodies with a more complete vision through the sending of Reports and the Department in charge of Innovation; ethics (5), deriving from the strong principle set out in both the Basque Water Act and in the Agency's Articles of Association, which force the water policy in the ACBC to be based on consultation with the users or on the principles of gender equality and coexistence of the two languages, as well as its commitment to the Millennium Development Goals; and finally, participation (6) which is a key factor in the water policies of the ACBC which have been developed in the hydrological planning as required by the European Union Water Framework Directive, following the three stages of supply of information, public consultation process and active participation. The participation process is performed in two main phases: the participation for each basin and the sector group participation, subsequently crossing the results from the participation processes in order to modify the initial hydrological plan.

All of this means that the ACBC feels that it needs to share its experience with the other institutions and governments which, throughout the world, manage water-related policies. Following the path set out by the

Millennium Development Goals, the Basque Water Agency shall seek to export its experience and strike up supportive relationships between peoples like those specified below.

In view of such objectives, the main lines of action of the Uraren Euskal Agentzia/ Agencia Vasca del Agua/Basque Water Agency are as follows:

- To improve the ecological state of the water masses in the ACBC.
- Obtain a universal supply with sufficient quality and quantity.
- Fulfil the wastewater removal plans of the ACBC.
- Effectively administer the water.
- Research and sustainable use of the water resources.
- Promote and encourage innovative water technology.
- Information and training in order to improve the level of human resources involved in water management.
- Collaboration in international initiatives in order to achieve the water-related Millennium Goals.

6.3.1 Structure

The structure of the Basque Water Agency consists of the Board of Directors which is its main governing and management body, and the Director General and four Area Departments as management bodies. It also has a Management Committee which is responsible for coordination, as well as consultation bodies like the Users Assembly and the Water Council.

6.3.1.1 Users Assembly.

Regulated by Decree 220/2007 of 4 December and established by the Basque Water Act (Act 1/2006) of 23 June, the Users Assembly constitutes the Basque Water Agency's participation body. Its members are chosen by the Basque Parliament, which is the house of representation of the ACBC, by the Autonomous Administration of the Basque Country and by the authorities with competence over water and also includes representatives from users associations.

Its structure consists of a Chairperson, which corresponds to the head of the Autonomous Ministry competent for the Environment; a Vice-Chairperson, is the person responsible for the department to which the Basque Water Agency is attached at each time; and various Members distributed as follows:

- Two members appointed by the Basque Government.
- The Director of the Basque Water Agency.
- Three Deputy Ministers from the autonomous departments of treasury, health and transport.
- Three Members of the Basque Parliament each representing one of the Provincial Councils.
- A representative from the State Ministry competent over water.
- Two representatives from the supplier entities.

- A representative from the local authorities.
- And seven members appointed by the supplier entities (3), the industrial users (1), the energy industries (1), the agricultural industries (1) and by the users and consumers associations (1).

This Assembly meets at least once a year and its agreements are adopted by majority of votes, where each member has one vote and the Chairperson the casting vote.

6.3.1.2 Basque Country Water Council.

Regulated by Decree 222/2007 of 4 December, this is the deliberating and advisory body of the Agency. It includes representatives from the Administration of the ACBC, the Provincial Councils, the local authorities, the State, the user groups, the University of the Basque Country and conservation associations. Decree 222/2007 states that the users must make up at least one third of the members of the Water Board and that its Chairperson corresponds to the person responsible for the Autonomous Ministry competent for the environment, who will also have the casting vote.

According to Act 1/2006 its functions are to advise and to formulate proposals relating to water policies and to prepare reports on the planning and the projects as well as on the aquifers.

6.3.1.3 Board of Directors.

This is the governing body of the Basque Water Agency. It is regulated by Decree 221/2007 of 4 December, and consists of a Chairperson, which corresponds to the person responsible for the Autonomous Ministry competent for the environment, and the members who include representatives from the Autonomous Departments responsible for the environment and treasury and from the Provincial Councils, as well as the Director of the Basque Water Agency who attends with voice but no vote.

6.3.1.4 Directorate General.

Single-person body managing the Basque Water Agency. Its powers are specified by Article 7 of Decree 240/2007 on the Agency's Articles of Association. This person is entrusted with managing and coordinating the activities, and specifically authorised when it comes to granting concessions and permits relating to the intake and use of water and the discharges of effluent as well as the specific management tasks of the Agency.

To appoint the person of the Director General, the Autonomous Ministry responsible for the Environment must propose a name to the Basque Government after having heard the Board of Directors and having reported to the Users Assembly.

6.3.1.5 Area Departments.

URA has four departments that report to the Director General:

- Institutional Relations and Innovation Department. Its functions are established in article 10 of Decree 240/2007, of 18 December, which passes the Articles of Association of the Basque Water Agency.
- Administration and Services Department. Its functions are established in article 11 of Decree 240/2007, of 18 December, which passes the Articles of Association of the Basque Water Agency.

- Planning and Works Department. Its functions are established in article 12 of Decree 240/2007, of 18 December, which passes the Articles of Association of the Basque Water Agency.
- Public Water Supply Department. Its functions are established in article 13 of Decree 240/2007, of 18 December, which passes the Articles of Association of the Basque Water Agency.

6.3.1.6 Basins Offices.

The hydrological situation in the ACBC has led to the creation of three Basin Offices: the Western Cantabrian Basins Office, the Eastern Cantabrian Basins Office and lastly the Mediterranean Basins Office. These Offices are the Agency's management and representation bodies and are organised in a decentralised manner.

URA started its activity in January 2008 when it inherited, amongst others, the functions previously performed by the Directorate of Water of the Basque Government Department for Environment and Spatial Planning. The following is a brief summary of the key aspects performed over the last year:

- Preparation of the Hydrological Plan of the internal basins of the Basque Country, and in particular as regards starting up the entire participation process required by the Water Framework Directive. Completion of the public participation phase for the preparation of the "Outline of the Important Issues" of the Hydrological Plan.
- Completion of other requirements and actions determined by Directive 2000/60/EC and others, relating to the planning and management of the water resources and ecosystems. Continuation with the programmes to study the aquatic environment.
- Preparation and monitoring of projects considered in the water works framework agreements signed with the three Provincial Councils, and of the agreements signed with different water Management Bodies.
- Definition, monitoring, control and management of water infrastructure works.
- Definition, monitoring, control and management of flooding prevention works.
- Definition, monitoring, control and management of restoration works of the water masses in the ACBC.
- Inter-institutional coordination actions and decision-making assistance in the event of flooding.
- Management and processing of the different sector policy proceedings for concessions, permits, charges, sanctions and control.
- Collaboration with the Zaragoza 2008 Universal Water Expo, focused on the "good governance" of the water resources.
- Collaboration with international bodies in order to achieve the water-related Millennium Goals.

6.3.2 Challenges

- Participation in different water coordination or management bodies.
- Propose and develop water-related education, training and awareness activities.
- Promote relationships with different European Union bodies and international organisations in fields related to water.
- Propose, encourage, coordinate and perform cooperation programmes and projects, particular those relating to cooperation for water-related cooperation and solidarity, according to the indications set by the water-related Millennium Development Goals.
- Prepare studies and keep a water-related documentation centre.

6.3.3 Human Resources

By 31 December 2009, the envisaged workforce will amount to 158 persons, distributed in the following categories: 1 director, 37 graduates, 57 technicians, 58 administrative assistants, 5 operatives and junior employees.

The technical team is multidisciplinary and includes people with qualifications in: Engineering, Technical Engineering, Biology, Geology, Geography, Chemistry, Economy, Law, etc.

6.3.4 Financial Resources

The investments covered by the capital budget mainly derives from the collaboration agreements signed with the local and provincial authorities, and bring us closer to fulfilling the wastewater removal and the supply plans for the ACBC.

Necessary investments for irrigation are also considered so as to comply with the agreements signed with the Araba Provincial Council.

As regards flood prevention, the investments set out in the different plans on this issue shall continue so as to progressively eliminate the black spots in the ACBC hydrological network.

The financial resources will have particular impact on the normal lines of work of URA – Basque Water Agency which are seen as more urgent and necessary in order to solve the problems deriving from the risks of flooding faced by the current urban settlements subject to possible freshets and, on the other hand, on achieving an adequate ecological state of the water masses, thereby complying with the Water Framework Directive 2000/60/EC and the other applicable regulations, by performing work aimed at morphologically and functionally restoring the ecosystems associated with the aquatic environment and the appropriate wastewater removal and treatment work.

6.4 Public participation

The WFD marks a milestone as it considers that only with citizen participation will it be possible to progress towards sustainable, environmentally-friendly water management. For this purpose it regulates the social participation process as well as the access to the information so that the different social agents can participate in taking the final decisions, thus requiring that water management is open to proactive citizen participation.

The implementation of the WFD encourages the proactive participation of a whole multidisciplinary range

of social agents, opening interactive channels with the water authorities at different levels of the hydrological planning. The ordered and prudent management of the water resources must therefore consider the active participation of all social sectors within the framework of a new citizen debate. All of the agents involved and particularly those most affected and those with the greatest difficulties in making themselves heard must participate in this new participation framework. In view of the fact that it is a public utility, water management becomes an issue of citizen responsibility, where awareness and education as well as participation must become one of the main pillars of good governance. We must remember that many of the problems of accountability have occurred precisely due to the lack of transparency and citizen participation. Concerted effort is therefore required from all relevant groups, local authorities, unions, private sector, civil society organisations, environmental groups, individual citizens, etc. In fact, Preamble 14 of the WFD states precisely that "the success of this Directive relies on [...] information, consultation and involvement of the public, including users".

Adapting our law to the WFD cannot be limited to merely transferring consultation phases established therein, but rather it must loyally and generally accept the "active" participation mandate. We are not therefore dealing with the reactive models of waiting for a response to a closed proposal, but the new proactive models which incorporate the public right from the beginning and support its autonomous and equitable participation vis-à-vis the promoting party. We are dealing with a widely demanded social requirement whereby public participation involves considering the opinions of the duly informed citizens and taking them into account during the preparatory processes of the hydrological planning. This will achieve an active and socially participated planning in which the opinions of the citizens are taken into account. The citizens are called to be an essential part in the planning process puzzle, involved in the issues and contributing towards the solution. Public participation is a basic component of the WFD as it recognises that the solutions to the current water problems are based both on the "top down" approach and on the "bottom up" approach. The new water governance must consider going from technocratic management towards a more participative management, based on the understanding that water management is not only a matter for the experts. In the water management, society must be incorporated into a proactive participation process provided with sufficient resources in order to activate citizen interest in the participation. When the water management debate is revolving around whether to centralise or decentralise, it forgets that the water management must be essentially participative. The water management puzzle must involve new participative agents so that society feels committed to defining the type of water administration that it wants and participates in it.

Having said that, it is of course the different public authorities who must open the way, and coordinate and collaborate with each other, as seen by the Basque Water Agency and the Hydrographical Confederations acting in the Autonomous Community of the Basque Country in the exercise of their competences. From this perspective, the Basque Water Agency, following the criteria of the WFD, has started a public participation process in relation to water with the aim of preparing a more participative hydrological planning agreed by society as a whole. This participative process aims to provide an institutional example and also reinforce the complicity between the water authorities and the driving forces behind change, in particular the social movements and the scientific community.

Within this action framework, the participation process designed and led by the Basque Water Agency considers two participation channels. On the one hand, it has developed a webpage showing information about the process and opening a virtual participation forum.

A more selective participation process aimed at the agents who are directly involved in water-related issues. This participation process is structured in a series of working sessions for the active participation of the agents previously identified as water-related representatives.

On the basis of the information provided to the various social agents in the form of territorial and sector "diagnosis documents" and through the participation process, the "Outline of Important issues in relation to Water Management in the Internal Basins of the Basque Country" ("Esquema de Temas Importantes en Materia de Gestión de Aguas en las Cuencas Internas del País Vasco") documents have been prepared which are currently, by decision of 30 July 2008 of the Director General of the Basque Water Agency, subject to a public consultation period of six-months from publication in the Official Gazette of the Basque Country (2 September 2008).

A document called "Autonomous Community of the Basque Country Contribution to the preparation of the Outline of Important Issues in the Inter-Community Basins of the Basque Country" ("Contribución de la Comunidad Autónoma del País Vasco a la elaboración del Esquema de Temas Importantes en las Cuencas Intercomunitarias del País Vasco") has also been prepared.

Following the public consultation period and after the contributions have been taken into account, the Hydrological Plan of the Internal Basins document will be prepared which must be published by the end of 2009.

The Basque Water Act also considers the existence of the Users Assembly as participation body of the Basque Water Agency and the Basque Country Water Council as the deliberative and advisory body.

6.5 Lines of action

During the preparation process of the Hydrological Plans for each hydrographical demarcation (water basins or their groups) and which are the principle tools for achieving the objectives for each "water mass" included in the demarcation, a procedure has been developed which must follow a series of steps established by the regulations. One of the most relevant elements in this procedure, as already mentioned in previous sections, is the Outline of Important Issues in Relation of Water Management which aims to focus, using the technical knowledge of the environment and through the consultation deriving from the public participation process, on identifying the main present and future problems in relation to water management in the demarcation, as well as on defining the action strategies in order to solve the identified problems and to achieve the established environmental objectives.

These strategies have resulting in the design of general lines of action which will be the basis for the next stage, namely the preparation of the Hydrological Plan document. The general lines of actions set out below are aimed at dealing with the current problems relating to water management in the ACBC.

Many of the identified actions must be performed by the water administrations, but others are within the competence of sector administrations or require the collaboration of the sector in question. On the other hand, some of the actions included have already been started and are not therefore all new actions. In this case, they need to be continued and/or reinforced.

The proposed lines of action are structured in four sections:

- Actions relating to the impacts on the watery environment.
- Actions relating to the supply of the demands.
- Actions relating to the problems of extreme phenomena.
- Administrative, organisational and management issues.

6.5.1 Actions relating to the impacts on the watery environment.

- Physical-chemical alterations

The ACBC wastewater removal and treatment Plan 2015 (Plan de saneamiento y depuración de la CAPV 2015) must take the new environmental quality objectives set out in the Water Framework Directive into account when defining the wastewater removal and treatment plans.

- Adaptation of the discharge of effluent permits.
- Implementation of the Basque Sustainable Development Environmental Strategy.
- Reduction of the global volume of discharges.
- Improve knowledge about the cause/effect relationship between water pollution and potentially contaminating sites.
- Actions to control and monitor pollution from agrarian sources.
- Actions to promote sustainable agrarian practices.
- Actions to manage the waste related to agriculture.
- Actions to reduce the impact from forestry sources.
- Hydromorphological alterations
- Plan to establish the Ecological Flows in the ACBC.
- Actions relating to managing the demands.
- Application of the land use Criteria according to the degree of flood risk.
- Environmental restoration of surface water masses.
- Demarcation of the Public Water Supply.
- Designation of the Very Modified Water Masses (VMWM).
- Environmental adaptation of fauna migration barriers.
- Actions relating to the impact on habitats and species of community importance.
- Actions relating to the impact on threatened species.
- Actions relating to the fight against invading species.

6.5.2 Actions relating to supply of the demands.

- Implementation of protection perimeters at the water intakes to supply towns.
- Improvements to the treatment systems.

6.5.3 Actions relating to the problems of extreme phenomena.

- Actions to prevent flood damage.
- Actions to fight against drought .

6.5.4 Actions relating to administrative, organisational and management aspects and other actions.

- Actions to integrate sector policies and coordination between administrations.
- Actions to improve the organisational and management aspects of the urban and industrial supply and sewage systems.
- Actions to recover the cost of the water-related services.
- Actions for the administrative regularisation of water intakes and discharge into the Public Water Supply.
- Awareness and training plans.

6.6 Financing Millennium Development Goals

Basque society participation in what we now know as development cooperation is not a new phenomena: our cooperation extends back to the work of Basque men and women throughout the world over many decades. Thanks to this experience, whether through missionaries or for humanitarian or political reasons, we have got to know other peoples and in turn we have become known to them. In many cases we have effectively combined preserving enriching cultural diversity and committed collaboration in the development processes of other cultures.

As public cooperation, the work of the Basque Government dates back to the eighties in response to the demands of civil society petitioning the autonomous institutions to progressively apply 0.7% of their budgets to cooperation with the poor countries. Hence, for the first time in 1985 a part of the budget was specifically devoted to development aid.

Years later, in 1990, the Cooperation and Development Aid Fund (FOCAD) was set up with the participation at that time and over the following years of the three Provincial Councils, as well as the Basque Government. The quantitative object was to achieve 0.7% of the Basque Government's operating budget which led to a significant increase in the volume of funds during the nineties.

After 2001 when Development Cooperation became part of the Department for Housing and Social Affairs, the Basque Government took over the task of continuing towards quantitative growth while at the same time reinforcing the quality and impact of its cooperation policy, seeking to make its instruments more structural.

On 17 November 2004, the Basque Government agreed with the United Nations to commit to the Millennium Declaration through the signing of an agreement between the World Coordinator of the United Nations Millennium Campaign, Eveline Herfkens, and the Lehendakari (President) of the Basque Government, Juan José Ibarretxe. This agreement ends with the following commitment by the Basque Government: "We adhere to the Millennium Declaration assuming its character as a guideline for the design, practice and assessment of our political actions, for both external and internal policy, in each of the affected sectors."

It is therefore an undertaking by the Basque Government as a whole and by each of its Departments, each within their own framework of competence, to design, apply and evaluate their policies in accordance with international efforts to achieve the Millennium Development Goals.

Following a long process of social dialogue, on 22 February 2007 the Basque Parliament passed the Development Cooperation Act 1/2007, which for the first time regulates solidarity with other peoples via a law in our region. We can therefore consider that development cooperation is now consolidated as a public policy promoted by the Basque Government and the Basque institutions as a whole. It also places the Basque Government's quantitative commitment to cooperation at 0.7% of its total budget, as a progressive objective for the year 2012.

At present (2009), the challenge lies in developing our system of cooperation with the transforming and quality approach contained in the Act, as well as establishing the various instruments deriving from said Act, both in relation to our own management and in the administration of the resources. Specifically, the Act plans the creation of the Basque Development Cooperation Agency and the implementation of a planning system based on the master plan and the annual plans.

This Act defines the legal framework to establish the guiding principles of the cooperation policy, the sector and geographic objectives and priorities, as well as the cooperation agents, the organisation and planning, and the instruments.

We should mention that the regulations governing the various instruments used by the Development Cooperation Department have been modified in order to adapt them to new situations. The General Objective established by the Strategic and Master Plan for the period from 2008 to 2011 is "a development cooperation policy with a transforming, quality, coordinated and coherent identity, focused on eradicating structural poverty". It is therefore a long-term strategy, combating poverty by strengthening the capabilities of the North and of the South, aligned to the 20/20 commitment, and committed to the Millennium Development Goals, as a necessary condition albeit insufficient.

Water and sanitation are contained as a sub-sector in the Basic Social Needs Sector in said Master Plan, which also has as transverse lines Ecological Sustainability, Gender, Human Rights and increasing participation.

In the 2007 financial year, the Basque Administration dedicated a budget package of 27,700.000 euros to calling projects, of which 80% will be dedicated to cooperation projects.

As regards the projects relating to water management, close to 10.37 million euros has been invested in the 2003-2008 period in projects in 20 countries (many of them in Latin America, but also in countries like Sudan, Afghanistan, Ruanda, Congo or Ethiopia) organised by 13 entities, which is an example of the solid commitment to achieving the MDG for water and sanitation.

The commitment of other institutions and agents in the Basque Country within the framework of cooperation is also important, like for example the provincial (foral) councils who are implementing their cooperation through a joint plan. The Basque local authorities also provide a good example of cooperation, and often work in a bilateral manner with specific municipalities. Euskal Fondoa, the Association of Basque Local Entity Aid Workers (Asociación de Entidades Locales Vascas Cooperantes) also performs significant work in this area by promoting, helping and facilitating local cooperation actions. The Strategic Plan of this organisation, made up of 94 local bodies, stresses that water and sanitation must be one of its priority actions up until 2011. It is not a coincidence that many Basque local representatives who participate in Euskal Fondoa also participate in the decision-making bodies of many Basque water operators.

Like in other developed countries, the Basque water operators have often promoted water and sanitation

cooperation actions, generally by providing their know-how and knowledge to projects developed by Basque cooperation organisations. One good example is the Municipal Waters of Vitoria (Aguas Municipales de Vitoria AMVISA), which has ample experience in cooperation going back to 1991 and works with the Vitoria-Gasteiz City Council Cooperation Office, devoting 1% of its budget for such purposes. Other operators like Servicios de Txingudi S.A. have also developed actions very much in unison with local NGDOs providing structural and technical support to their projects. The prospect of obtaining greater commitment from the operators became a reality in December 2008 with an agreement between the main Basque operators to develop cooperation actions in the near future, always together with, and using the experience of, development organisations.

6.6.1 The Millennium Development Goals for water and sanitation

As mentioned above, and like in other developed countries, in the ACBC there is a wide panorama in which different agents (those responsible for the official development cooperation policy, local bodies or NGDOs) are all development water and sanitation actions. All of these initiatives directly or indirectly contribute towards achieving the Millennium Development Goals, in particular Target 10 of Goal 7 “Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation”.

However, since Euskadi committed to the Millennium Declaration in 2004, no reference activity has been expressly specified in order to directly contribute to the Millennium Development Goals.

The Millennium Development Goals refer to eight problems that international society set out to solve by 2015, but which all aim at achieving one single objective: eradicating world poverty. They include poverty and hunger, education, gender equality, infant mortality, maternal health care, HIV/AIDS, environmental sustainability and the final objective of developing a global partnership for development. Solving these problems would alleviate the lives of billions of people, but they require a joint effort by the entire international community.

Each Goal has a series of corresponding targets which control how to measure it and fulfil it. Hence, target 7C amongst others corresponds to the sustainability goal and proposes: “Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation”. This indicates lack of water and sanitation as one of the main global problems which, essentially in poor countries, undermines peoples’ lives and prevents them from fulfilling their potential.

According to the 2008 Report on the Millennium Development Goals prepared by the United Nations, there about 2800 million people who currently live in water basins with some sort of water shortage and some 2500 million who live without access to basic sanitation. The demographic increase throughout the world is not accompanied by an equal increase in water use; the increase in water use has doubled the democratic increase, thereby contributing towards making the problem even more serious.

Although the Millenium Development Goals are not hierarchical in nature, there is increasing agreement amongst the international community that the target for water and sanitation to a large extent conditions the other Goals. The inequality associated to gender for example is particularly shocking when we associate gender and water shortage. On this issue, the UNDP 2006 Human Development Report translates the main figures and indicators offered by other monitoring reports into more practical aspects. Water and sanitation deficiencies produce related and multiplier effects which end up limiting human development, in other words depriving them of the realisation as individuals, and a chronic limitation on the progress of groups, peoples and countries. The relationship between water and human development is clear: we need water for life, but also for economic development and to achieve a means of supporting ourselves.

Geographically, the region with the most water and sanitation problems is sub-Saharan Africa where over a third of the population lacks improved supply of drinking water. The percentage of those with basic sanitation services is not in excess of 31% although the Millennium target set by the international community is 63%. Furthermore, as regards drinking water, Africa should reach 2015 with 76% of its population supplied while the fact is that today it stands at hardly 58%. If this continues, sub-Saharan Africa will not achieve the Goals by 2015.

The one reason which prevents global progress in achieving this target for water and sanitation is none other than the problems associated with water management practices. The United Nations Reports on world water development indicate that the water governance shortcomings reflect deficiencies on the institutional, financial, technical, legal and even water information level. Governance, understood by the UNDP as the "way in which a society organises itself to making and implement decisions - achieving mutual understanding, agreement and action". The water problem is therefore a political problem and not due to any natural scarcity as stressed by the aforementioned HDR 2006 in its title 'Beyond scarcity: Power, poverty and the global water crisis", and as always it is the most disadvantaged who lose out the most in this global crisis. Do to achieve an adequate water supply to a population suffering from scarcity as well as achieving basic levels of sanitation is a political question and can therefore be solved through the support processes like those being formulated in relation to international cooperation in order to achieve the Millennium Development Goals.

6.6.2 Basque Solidarity Initiative for Water and Sanitation

During the key global period of the United Nations International Decade for Action "Water for Life" 2005-2015, and also taking the opportunity of the recently created Basque Water Agency and focusing on its international solidarity mandate – "Collaborate with international initiatives to achieve the Millennium Goals for water" - the Basque Government is committed to starting up an innovative initiative to support for MDG for water and sanitation.

In this scenario in which various Basque agents are developing or have committed themselves to developing water-related cooperating actions, the Basque Water Agency also wishes to show its commitment to those most affected by the global water crisis within its possibilities and capabilities.

In this global context, with established specific objectives and difficulties when it comes to mobilising the necessary resources, there are many global, regional, state and autonomous strategies which are trying to be implemented. However, focusing on the objectives for water and sanitation, many experts coincide in indicating, like the Camdessus Panel report, that the water authorities and the regional or local governments are essential actors for this task. It is estimated that Official Development Aid for water and sanitation is nearly 14,000 million dollars per year, but this far from sufficient. We must be capable of mobilising greater resources and making more efficient use of them.

The efforts in order to achieve universal access to water and sanitation must be reinforced with the active participation of non-state actors, placing value on the enormous capacity of multilateralism. Civil society, as well as local and regional entities, must align themselves with the United Nations and feel committed and proactive in the search for innovative participation and innovative initiatives to mobilise extra funding in addition to the Official Development Aid.

Europe, in particular, has seen a recent rise in decentralised forms of finance that are aimed at increasing access to water in third-party countries. Such initiatives are being promoted by local authorities, water management bodies or NGOs, based on the principle of solidarity. These initiatives can take on different forms depending on the collection method applied: establishing a fixed tax to contribute to the Millennium Goals per cubic metre consumed, depositing into a fund the savings produced due to awareness, using the

voluntary 0.7% contributed by the users, using part of a consortium's budget for the MDGs. These Solidarity Finance Mechanisms are accurately reflected in the Oudin-Santini Law in France which allows the local water management bodies to dedicate up to 1% of their budgets to cooperation projects. Regional governments like those in Wallonia and Emilia-Romagna have sought different types of innovative formulas to obtain additional funding for water. The Basque Government, through the Basque Water Agency, inspired by the above multilateral experiences, continuing its commitment to the Millennium Development Goals and encouraged by the words of the ex-Secretary General of the United Nations, Kofi Annan, in which he highlighted non-State actors as the new global bases with which the United Nations must increasingly interact, has proposed to support work of the international community with a new innovative initiative to support the enjoyment of the human right to water.

Thus, the Basque Government agreed at its cabinet meeting on 28th July 2008 to dedicate 5% of the proceeds from its Water Tax in the ACBC (regulated by Decree 181/2008) to support, via water and sanitation projects, the achievement of the Millennium Development Goals for Water and Sanitation, target 10 of Goal 7, through multilateral cooperation.

The value of the initiative, apart from aligning Euskadi/Basque Country with the global challenges through direct support for the United Nations, with its own voice and participation, is to provide innovative ways of actively and positively relating the management of its own internal challenges (Basque Water Act 1/2006 and the Water Tax on excess consumption) to the universal challenges embodied in the Millennium Objectives.

This solidarity initiative, which is independent from but complements the aid devoted to development cooperation in the ACBC, is implemented through the United Nations Development Programme (UNDP) in its efforts to reduce the number of people without access to drinking water or basic sanitation.

For this work supporting the UNDP projects, the Basque Government has entrusted the Basque Water Agency which, in compliance with point number 8 of its objectives set out in its articles of association, works to establish a relationship with the UNDP which can bring this support to fruition.

This innovative and supportive initiative set up by the Basque Government to collaborate towards achieving the Millennium Development Goals is implemented through an agreement between the Basque Water Agency and the UNDP, signed on 2009 april 6th, to support its water governance programme and seeking to stop the water-related problems at the base and by promoting long-term strategies. The Basque Government also wishes to provide experience and at the same time be permeable and enrich itself from the new lessons that can be learnt from the relationship with the UNDP through these projects. It thereby seeks to strengthen the local and national potential so as to make water governance more effective.

Lastly, the support is aimed at a specific geographical area, sub-Saharan Africa, the region furthest from achieving the Millennium Development Goals.

This initiative, in line with the Basque Government's position towards the international development of access to water and sanitation as an expressly recognised and enforceable Human Right, was publicly presented within the framework of the International Exposition ExpoZaragoza2008 'Water and Sustainable Development", in July 2008.

This solidarity initiative aims to encourage transformations in modes of thinking and behaviour amongst Basque citizens in order to universally eradicate poverty. It also seeks to promote development and other innovative multilateral initiatives among other regions and countries to support the Millennium Development Goals.

6.7 Climate change and water resources

The main consequences of climate change on water resources are the increase in temperature, the drop in rainfall in regions which are already affected by water shortages, the increase in their variability, the change in snow distribution and cover, the increasing frequency of floods and droughts and the rising sea level.

Greater knowledge about the possible consequences has increased the urgency to adopted measures in relation to the water system. The European Union is soon going to present its Green Book on Adaptation. The implementation of the Water Framework Directive in the coming years must be used to expressly introduce the requirements deriving from said adaptation.

The impacts of climate change on water infrastructure may lead to problems associated with the increase in demand, its distribution, losses of drinking water, increased problems relating to quality, increased flood risks, and the overflowing of the sewerage system, etc.

The construction of large water infrastructure as a result of the climate change scenario is generally controversial due to the uncertainty surrounding the climatic impact and the environmental, social and economic cost involved. The specialists propose avoiding or postponing such constructions until we are sufficiently sure about the magnitude of the hydrological changes that can be expected. Instead, they propose "non-regret" measures – measures to manage the demand, information and awareness programmes, applying prices which internalise all of the costs, improving the long-term institutional planning measures, participation of the interested parties, preparation for severe droughts and floods, improvements to the procedures for a fair water distribution, etc. – which will always benefit society by optimising the resource management processes.

The experts also emphasise the importance of including the climate change variable in the design phase for the water infrastructure. Vulnerability and risk assessments must replace the exclusive reliance on historical data. The engineers currently use historic data when designing the infrastructure. If the rainfall patterns change, the urban drainage system for example may fail leading to overflowing sewage systems.

These considerations make it essential to promote the inclusion of the climatic variable in the information and assessment work of the Basque Water Agency.

The ACBC's Department of the Environment and Spatial Planning understands that combating climate change must be made an urgent and essential priority of any government action. The Department has therefore taken primary responsibility for this commitment, which has been built into the Basque Sustainable Development Environmental Strategy 2002–2020. It has also been crystallized through the setting up, in early 2006, of the Basque Climate Change Office and the drafting of the Basque Plan to Combat Climate Change.

As part of this initiative, the Basque Water Agency has initiated an ambitious study to determine the water resource measures that need to be taken in the event of climate transformation, looking ahead to the period 2011–2040.

A series of recommendations and suggestions have been set down in a preliminary report. Among these, attention should be drawn in particular to the need for the Basque Water Agency to receive regular technical advice, while working with the adaptation programmes arising out of the Plan to Combat Climate Change. Such advice will enable it to steadily and systematically incorporate and update its ever-growing leading-edge knowledge of impacts, in order to progressively align itself with the best international practices for adapting to climate change.

Said report refers to the studies performed by the Spanish National Meteorological Institute on regionalised forecasts of the climate models on the territorial scale which allow for an analysis to be started of the foreseeable impacts in the different Autonomous Communities in the State and, specifically, in the Basque Country. The statistically more robust forecasts refer to the last third of the 20th century, although forecasts are available for closer planning horizons, specifically for 2011-2040.

The south of Europe, and the Iberian Peninsula in particular, appear as one of the areas on the planet which is most affected by the increase in temperature and the drop in rainfall in the global climatic models and in the regional forecasts deriving from them. The average atmospheric temperature is already rising in the Iberian Peninsula, and has in fact increased by 0.48º C per decade since 1973.

The Basque Country is going to benefit due to its geographic proximity to the Cantabrian Sea (Bay of Biscay) and the fact that most of the territory has an oceanic climate. As a result, both the temperature increases and the foreseeable drop in rainfall are going to be somewhat softened, but there is no doubt that they will be significant. For the period from 2011-2041 it is forecast that the average temperature will increase - as regards the period from 1961 to 1991- , by between 1 and 2º C, which will particularly affect the summer months.

The forecast impact is expected to be slightly more severe as we go through the 21st century. According to the climate models and the scenarios set out in the study, the temperature increases will approach 2-3º C in the second third (2041-2070) and 4-5º C in the last third (2071-2100). If these forecasts are fulfilled, Euskadi's climate will undergo a radical modification in the second half of this 21st century; bear in mind that there was only five degrees difference between the climate in the 20th century and the climate during the last glacier period.

The rainfall forecasts for the Iberian Peninsula are presently not very robust for the period between 2011-2040. For the last third of the 21st century there are more reliable statistical forecasts and which indicate a considerable reduction, following a north-south gradient. In the Basque Country the average rainfall reduction forecast in the period from 2011 to 2040 is around 10%, particularly affecting the south of the Community. For the area closest to the Cantabrian Sea and for this period, the forecast drop is even less than said 10%. Notwithstanding this, increased variability in the precipitation is forecast which will without doubt significantly affect sectors like agriculture where it is essential to have sufficient water at critical times of the plants' biological cycle. Furthermore, and directly associated with the increase in average atmospheric temperature, an increase in evapotranspiration is expected which will have a direct impact on decreasing the water resources.

To complement this first report, the Basque Water Agency has prepared another three reports in order to find out the impacts deriving from climate forecasts for the ACBC: "Adaptation to climate change: Climate change impact on water infrastructure in the Basque Country ("Adaptación al cambio climático: Incidencia del cambio climático en las infraestructuras de agua del País Vasco"), "Adaptation to climate change in the ACBC: analysis of possible climate change impacts on the urban water supply and removal infrastructure in the Basque Country for the horizon 2020-2040-2070" ("Adaptación al cambio climático en la CAPV: análisis de posibles impactos del cambio climático en las infraestructuras de abastecimiento y saneamiento de agua urbana en el País Vasco en el horizonte 2020-2040-2070") and "Possible improvements to the water storage and distribution system in the ACBC faced with the scenarios of the Spanish National Meteorological Institute" ("Posibles mejoras en el sistema de almacenamiento y distribución de agua en la CAPV ante los escenarios del INM"). These reports show that at present the water infrastructure in the Basque Country does not have any particularly important weak points as regards the supply. Given the current strengths and the current adaptation capacity, it is considered that the overall vulnerability of the water infrastructure system in the ACBC to climate change is relatively low.

Notwithstanding this, it is important to note that the adaption potential must be mobilised in an ordered manner and the resources must be duly assigned in order to minimise the negative impact deriving from the climate alteration.

It should be pointed out on this matter that there is significant potential to improve the use of the resource if improvements are carried out aimed at reducing the unchecked cubic meterage.

It is recommended to perform a strategic planning for the water supply and removal system with a time horizon of 100 years. As such the forecast average drop in rainfall, its greater seasonal variability, the greater frequency of droughts, and the rising sea level, must all be taken into account in the decisions over the coming years related to the water infrastructure system in the Basque Country.

On the other hand, the possible impact of rising sea levels on some wastewater removal infrastructure near the coast will require specific technical studies, performed on a specific geographic scale, in order to analyse their possible vulnerability and if appropriate necessary adaptation measures should be adopted.

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