

NEW EFLOW ASSESSMENT AND IMPLEMENTATION PROGRAMME IN SPAIN

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The implementation of the Water Framework Directive in Spain and the last changes of the hydrological planning national decrees have led, in the last few years, to the publication of new amendments to the Spanish Water Law. These have remarkably modified, among other topics, the previous methodologies for the assessment and implementation of environmental flows in the Spanish national and international basins.

These new methodologies have been discussed and finally agreed in a participative process (headed by the Ministry of the Environment and Rural and Marine Affairs), by a wide range of experts, namely from the afore-mentioned Ministry, the Water Basin Agencies, Research Centres, Universities and NGOs most involved in water topics in Spain.

In the last two years (2008-2010), this thorough methodology have been used to fulfil detailed analyses of the ecosystems requirements, in over 10% of the total water bodies network (fig.1). CEDEX, the national organism that supplies technical support to the Spanish government, has coordinated the technical and scientific development of the studies. These were conducted in rivers (perennial, intermittent and ephemeral), lakes, wetlands and estuaries, in order to integer the requirements of the diverse array of aquatic ecosystems. The components of the environmental flow regimes include the distribution of minimum flows, the distribution of maximum flows (specially downstream of HEPPs), the flood regime (e.g., effective geomorphic discharges) and the maximum rates of change.

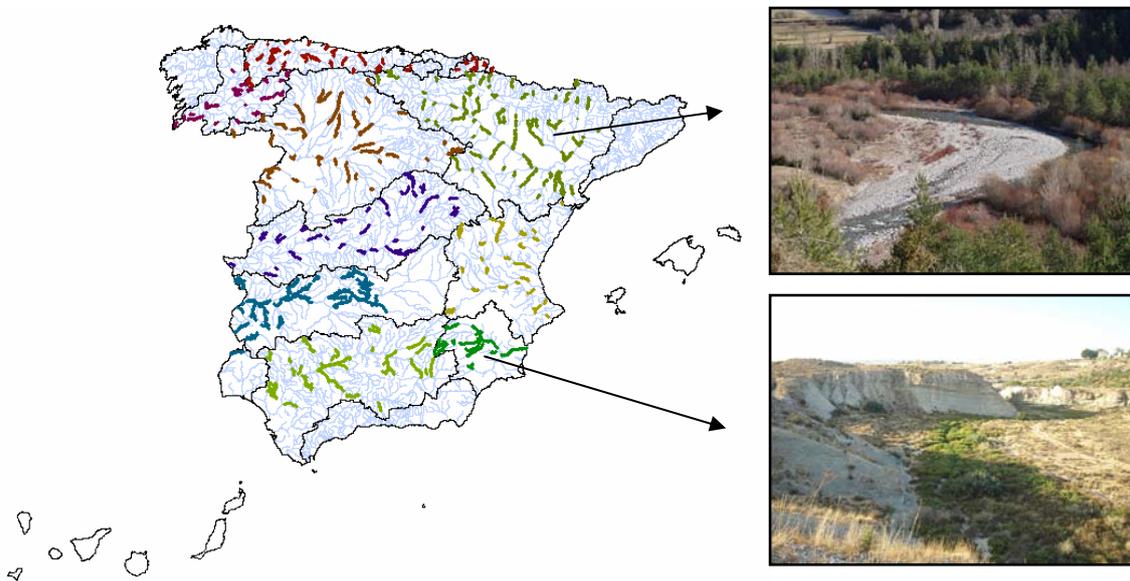


Fig.1.- The new assessment and implementation of environmental flows is being developed in many different water bodies throughout Spain. Regional governments with competence in water management have also fulfilled specific studies for their territories, which are not included in this map.

The development of these analyses has required a large number of additional studies, in order to obtain further information about the hydrological singularities of the different basins, the hydrological alteration of rivers (a specific software was created for this – IAHRS) and the water requirements of biological communities along the country (mostly

fishes, but other communities, e.g. riparian and wetland vegetation were also included in the suitability analyses) (fig.2).

Results of the studies enhance the incorporation of new environmental flow regimes to the Basin Management Plans. In general terms, the new regimes are higher in water volume and much more variable inter and intra-annually than the previous. Nevertheless, the application of the methodologies has shown scarce similarities between different basins. The physical and ecological features of the wide typology of the Spanish rivers (largely irregular and diverse flow regimes) have proved to difficult the application of traditional methodologies, and this made necessary specific adaptations.

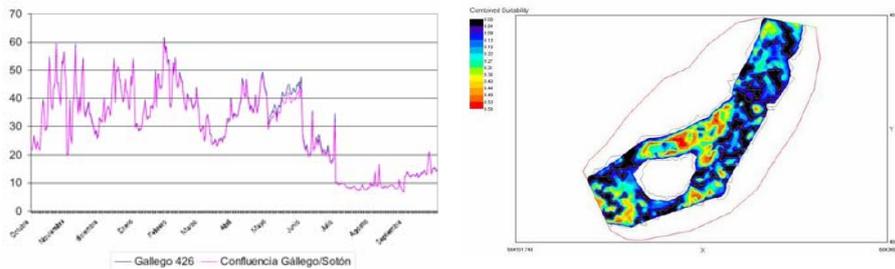


Fig.2.- The assessment of environmental flows was based on the flow series features and biological requirements of the water bodies.

The technical analyses, finished in the summer of 2010, will be followed by the public discussion of the environmental flow regimes calculated, and the adaptative management of its implementation. This process will facilitate the effective application of the regimes, and it will make possible its future improvement. Monitoring will be based on different hydromorphological and biological parameters.

The determination of environmental flow requirements integer WFD and BHD exigencies. The applied methodologies were developed in order to assure the maintenance or restoration of Good Ecological Status and Favourable Conservation Status in water bodies. This was considered in many different ways:

- Analyses were prioritized in Natura 2000 sites and protected wetlands.
- Reduction of environmental flows in extreme droughts, which were also calculated, will not affect Natura 2000 sites or protected wetlands
- Biological communities considered in the analyses include the wide range of protected-autochthonous aquatic (fish) species, but also riparian vegetation species and others.
- Environmental flow requirements were calculated according to water bodies typology and hydromorphological features.

The main problems arose in the calculation of the environmental flow requirements in southern aquatic ecosystems (specially in dryland areas), due to the lack of knowledge of the specific requirements of the whole range of autochthonous flora and fauna species. This was partially compensated by the analysis and assessment of the suitability of different flow scenarios for those species.

The implementation of the environmental flow requirements will be followed, as earlier mentioned, by an adaptative management of their effective application. However, this will require further guidance and support from many different water agents. Only a continued and detailed analysis of the response of water bodies to the discharge of environmental flows will fully adequate and calibrate these regimes in coming years.

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