COASTAL RIVER DISCHARGE DATA IN THE IBIROOS AREA

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1. Introduction

This report aims to describe the work done within the "Iberian-Biscay-Ireland Operational Oceanography System" (IBIROOS) region to fulfil de objectives of task 2.5.1 of ECOOP that are described below:

- ***S2.5.1 - Assessment of existing river run-off data***
  - *Evaluate the river runoff data, regional and pan-European, including volume transport and nutrient/pollutant loads.*
  - *Investigate the availability of both archived time series and data sources with near-real-time (NRT).*
  - *Use as an important source of information the Global Runoff Data Centre (GRDC). Add additional information from the regional association memberships.*
  - *Catalogue the information to be available to coastal users.*
  - *Establish an optimal list of observation stations for rivers influencing the coastal and regional seas (ECOOP River Station Lists).*
  - *Define an optimal list of the initial NRT data sets for the "ECOOP Data Management System".*

The IBIROOS region includes part of the Celtic Sea, the Bay of Biscay, the western Iberian margin, and the Gulf of Cádiz. Five countries are involved in this region: Portugal, Spain, France, UK and Ireland. More information on the IBIROOS programme and region is available at http://www.ibi-roos.eu/.

2. Methodology

To accomplish this task, the following actions have been performed:

1. Map the river basins limiting the coastal area of IBIROOS.

2. Review the existing data for the IBIROOS area within existing global or international hydrological datasets.
3. Search and analyse the existing national/regional river volume and river quality monitoring networks:
    a) Identification of data producers and analysis of national organizational issues.
    b) Search of stations providing data in near-real time or with historical data
    c) Selection of stations eligible for coastal studies.
    d) Search for average parameter values for these stations.

4. Populate the common formatted spreadsheet for ECOOP River Run-off inventory.

3. Results

a. IBIROOS Rivers and catchments

To map the river basins next to coastal areas, we firstly searched and analysed two river basin map sources:

- the European river catchments (ERC) version 1.01 GIS vector data from the EEA (European Environmental Agency) (http://dataservice.eea.europa.eu/dataservice/available2.asp?type=findkeyword&theme=Geographic)
- the river basins product from Hydro1k made by the USGS (US Geological Survey) (http://edc.usgs.gov/products/elevation/gtopo30/hydro/eu_basins.html)

As the ERC map is the most detailed one, it was retained to select those water basins limiting the shoreline (cf. Figure 1).

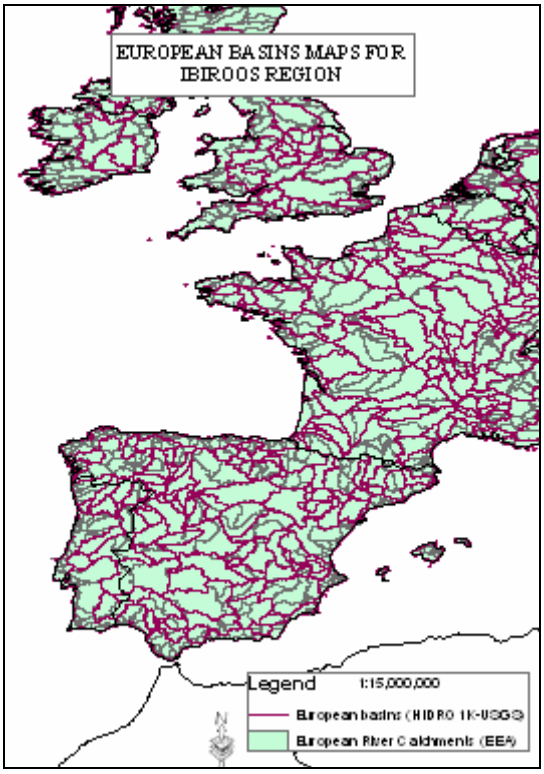


Figure 1. Comparison of river basin maps from ERC-EEA with HYDRO1k-USGS sources.

Besides, a search has been performed for river and streams or drainage networks maps. The sources found during our search are the following:

- Hydro1k-USGS streams map (http://edc.usgs.gov/products/elevation/gtopo30/hydro/eu_streams.html)
- National Drainage networks from the the Digital Chart of the World (DCW93) 1993. (http://www.maproom.psu.edu/dcw/)

The last one was retained since the number of features is more detailed than the former one. (cf. Figure 2).

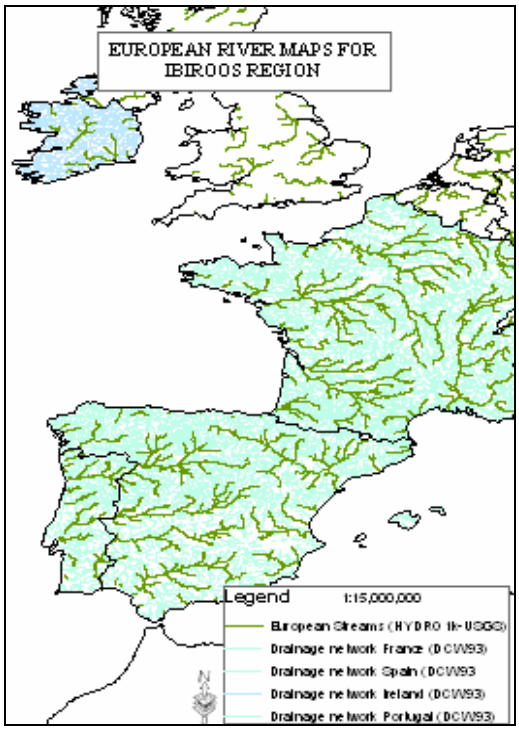


Figure 2. Comparison of river & stream maps from DCW93 and HYDRO1k-USGS sources.

Then, using GIS tools, we selected the basins from the ERC-EEA map that are next to the shoreline to produce a layer that will serve for the selection of the river monitoring stations. The most appropriate for coastal discharges monitoring. The resulting layer is mapped in figure 3.

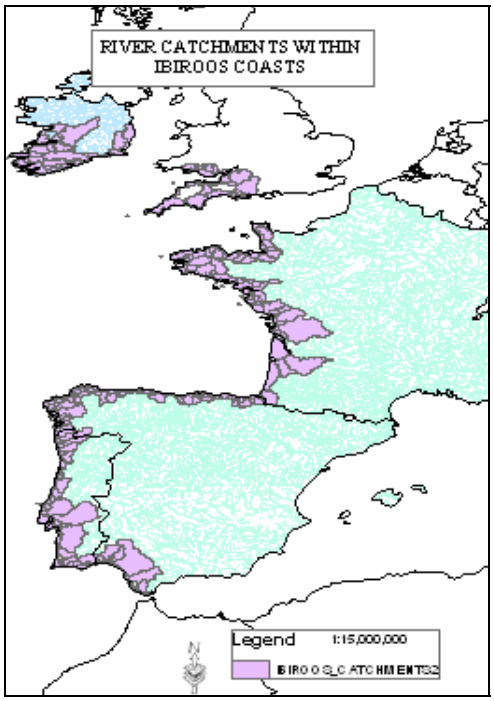


Figure 3. Coastal river basins in IBIROOS region.

b. European River Monitoring network and Datasets

The second step of the task consisted in searching and analysing the available Global or European large datasets of river monitoring stations. Among these large datasets, the following were downloaded and analysed:

1. Data from the Global Runoff Data Centre (GRDC) http://grdc.bafg.de/servlet/is/910/20071031_GRDC_Stations.zip?command=downloadContent&filename=20071031_GRDC_Stations.zip .
   The most updated station catalogue from GRDC was downloaded and plotted above the coastal river basin map (cf. figure 4). As a result, it was noticed that very few stations were located within the coastal basins.

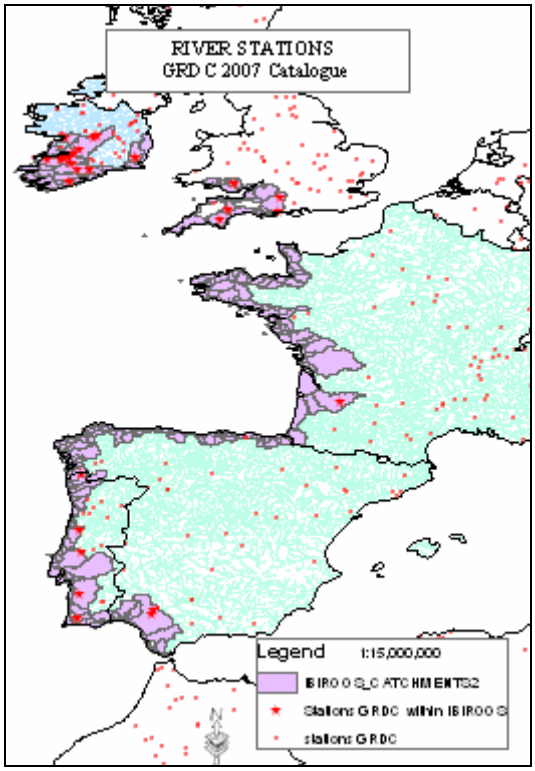


Figure 4. River monitoring Stations contained in the European Water Archive (EWA) Catalogue.

2. The next large dataset to be analysed was the dataset from the UNESCO-FRIEND (Flow Regimes from International Experimental and Network Data) project. http://typo38.unesco.org/en/about-ihp/ihp-partners/friend.html
   The FRIEND project management is divided into different sub-networks.

Figure 5. Sub-networks of the UNESCO FRIEND (Flow Regimes from International Experimental and Network Data) project.

The sub-network, which is located within the IBIROOS region is the Northern European Friend (NE_FRIEND), presently coordinated by the GRDC who maintains the NE-FRIEND database called the "European Water Archive (EWA)". We downloaded the station catalogue from EWA (http://grdc.bafg.de/servlet/is/2502/) and obtained the map shown in figure 6.

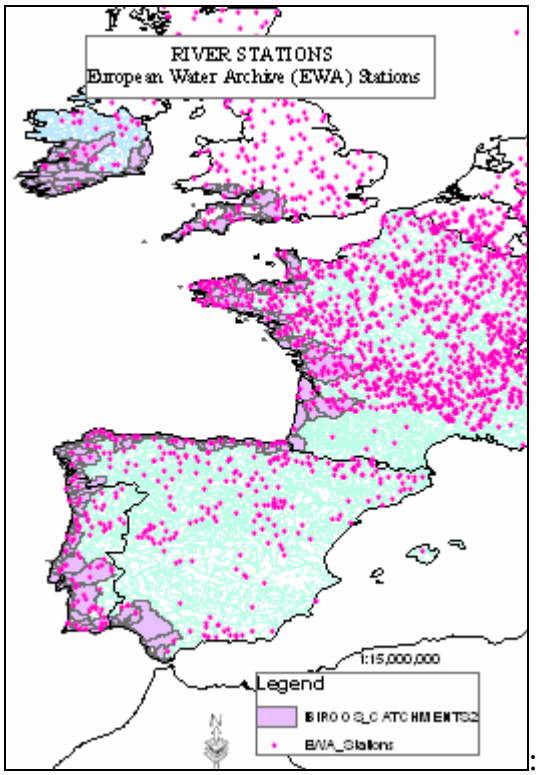


Figure 6. River monitoring Stations contained in the European Water Archive (EWA) Catalogue.

The number of stations included in this dataset is higher and has a better coverage within the coastal basins than the GRDC one. This dataset holds archival data from the early ninetees until 2003. The access to the database records is restricted to some conditions described at http://ne-friend.bafg.de/servlet/is/15740/

a. willingness to take part in FRIEND activities (conferences, workshops etc.);
b. acknowledgement of the use of FRIEND data in any publication or report based on the data;
c. to share new data with the FRIEND-EWA, if possible/ appropriate;
d. not to pass any data on to third-parties.

3. For near real time data, the GRDC is developing the European Terrestrial Network for River Discharge (ETN-R), which aims to be an information infrastructure for the automated collection, quality control and redistribution of near real-time river discharge and water level data from 33 European national and trans-boundary river basins, involving 36 countries. The river basins included in this project is shown in figure 7.

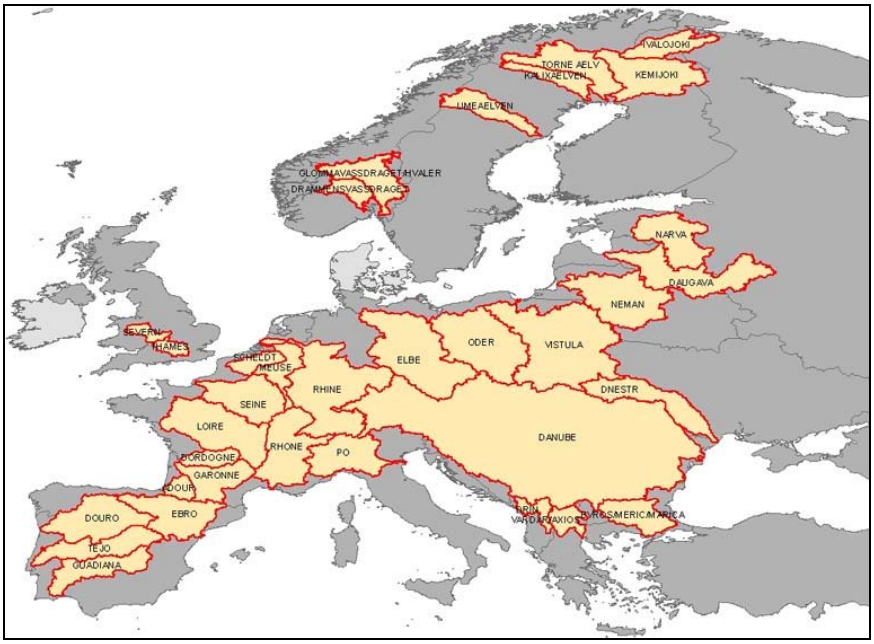


Figure 7: European river basins included in the European Terrestrial Network for River Discharge (ETN-R) project

Concerning ETN-R data access, many of the countries involved in this project have already signed Memoranda of Understanding related to confidentially testing the promising research results of EFAS, as the project already today produces twice daily a 10-day forecast for entire Europe on an operational basis. In order to improve this forecast, ETN-R aims at improving access to available data.

c. National and regional river monitoring networks and databases

Until this point, we found that big efforts are made to put together the river monitoring networks around Europe but they are still too general to use them in a coastal regional context as IBIROOS where in many coastal areas the land inputs come from little basins with non negligible runoffs.

Thus, the next step forward was lo look at national or regional hydrographic services to look for more populated and up to date river monitoring networks and found that most European countries or regions manage monitoring networks of river discharge and water quality of surface waters. Within these networks, there are both automatic an non automatic stations. Near Real time data are sometimes made available through Web applications . Archive data are also sometimes available through the web.

Portugal

The portuguese water institute (Instituto da Agua, http://www.inag.pt) is a national center in charge of execution of tasks dealing with the Portuguese water resources policies and management. It has developed the "Sistema nacional de informaçao de recursos hidricos (SNIRH)" which centralizes online (http://snirh.pt/) most of the information related with the Portuguese river monitoring network that is actually maintained by five regional CCDR (Comissão de Coordenação e Desenvolvimento Regional) (cf. Figure 8).

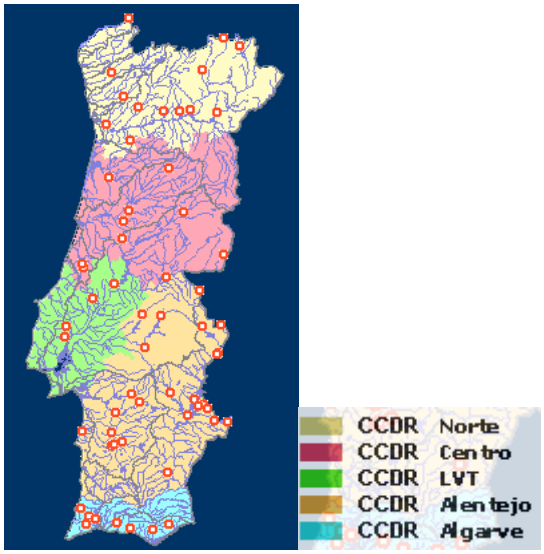


Figura 8: Portuguese Hydrographic management regions (coulored areas) overlayed on river basins (black lines) and rivers (blue lines).

There are three main river monitoring netwoks:

- The hydrometric network (cf. Figure 9a): This network has **384 active stations** and 337 extincted ones. There is an online availability of data updated on a **daily** basis. Parameters measured include the following:

  Instantaneous Flow m3/s
  Flow Yearly Max m3/s
  Daily average Flow m3/s
  Yearly Volume dam3
  Monthly Volume dam3
  Hydrometric instantaneous level m
  Maximum annual Instantaneous level m
  Average daily level m

- The water quality network (cf. Figure 9b): This network has **431 active stations** and 120 extincted ones. There is an online availability of data updated on a **monthly** basis. Parameters measured include the following:

  Acenafteno, Acenaftileno, Alacloro, Aldrina, Amoníaco, AmóniaTotal (em NH4), Antraceno, Arsénio total, Atrazina, Azoto Kjeldahl, Bário, Benzo(a)pireno, Benzo(b)fluoranteno, Benzofluorantenos Estimativa (<LD=LD) Benzofluorantenos Estimativa (<LD=0), Benzo(g-h-i)perileno, Benzo(k)fluoranteno, Benzo_p_p Estimativa (<LD=LD), Benzo_p_p Estimativa (<LD=0), Boro, Cádmio total, Carbono Orgânico Total, Carência Química de Oxigénio, CBO 5 dias, Chumbo total, Cianeto, Cloreto, Clorfenvinfos (e+z), Clorofila-a, Cobre total, Coliformes Fecais, Coliformes Totais, Compostos Fenólicos, Condutividade de laboratório a 20ºC, Cor, Criseno, Crómio total, Desetilatrazina, Detergentes aniónicos (LAS), Dialdrina, Dibenzo_ah_antraceno (ug/l), Drinas Estimativa (<LD=LD), Drinas Estimativa (<LD=0), Dureza total, Endossulfão I (Alfa-Endossulfão), Endossulfão II (Beta-Endossulfão), Endossulfão Sulfato, Endossulfão Total - Estimativa (<LD=LD), Endossulfão Total - Estimativa (<LD=0), Endrina, Estreptococos Fecais, Etilparatião (Paratião-etilo), Fenantreno, Ferro dissolvido, Fluoranteno, Fluoreto, Fósforo total, Heptacloro, Heptacloro Epóxido, Hexaclorobenzeno (HCB), Hexaclorociclohexano Total - Estimativa (<LD=LD), Hexaclorociclohexano Total - Estimativa (<LD=0), Hexaclorociclohexano-Alfa (ug/l), Hexaclorociclohexano-Beta (ug/l), Hexaclorociclohexano-Delta (ug/l), Hidrocarbonetos totais, Indeno(1-2-3-cd)pireno, Lindano (Hexaclorociclohexano-Gamma), Manganês total, Mercúrio total, Metolacloro Molinato, Naftaleno, Nitrato Total (em NO3), Nitrito Total (em NO2), Óleos e Gorduras, Ortofosfato Total (em P2O5), Oxidabilidade Oxigénio dissolvido – campo, Oxigénio dissolvido - campo (%), Oxigénio dissolvido - lab., pH – campo, pH - lab., Pireno, Propanil, Salinidade, Selénio, Simazina, Sólidos suspensos totais, Substâncias extractíveis por clorofórmio (mg/l), Sulfato, Temperatura da amostra, Temperatura do ar, Terbutilazina, Transparencia, Zinco total, 3,4-Dicloroanilina, 4-4 DDD, 4-4 DDE (ug/l), 4-4 DDT (ug/l).

- The automatic water quality network (cf. Figure 9b): This network has **118 stations**. There is an online availability of data updated on a **hourly** basis. Parameters measured include the following:

  Condutividade, Condutividade de Campo a 25ºC (Fundo), Condutividade de Campo a 25ºC (Meio), Condutividade média (6 horas) Oxigénio dissolvido – campo Oxigénio dissolvido - campo (%) Oxigénio Dissolvido - Campo % (Fundo) Oxigénio Dissolvido - Campo % (Meio) Oxigénio Dissolvido - Campo (Fundo) Oxigénio Dissolvido - Campo (Meio) Oxigénio dissolvido médio - campo (%) (6 horas) Oxigénio dissolvido médio - campo (6 horas) Oxigénio dissolvido mínimo diário (calculado) pH - campo

pH - Campo (Fundo) pH - Campo (Meio) pH médio - campo (6 horas) Potencial REDOX Potêncial Redox (Fundo) Potêncial Redox (Meio) Temperatura da Água (Fundo) Temperatura da Água (Meio) Temperatura da amostra Temperatura média da amostra (6 horas) Turvação Turvação (Fundo) Turvação média (6 horas) Turvação (Meio).

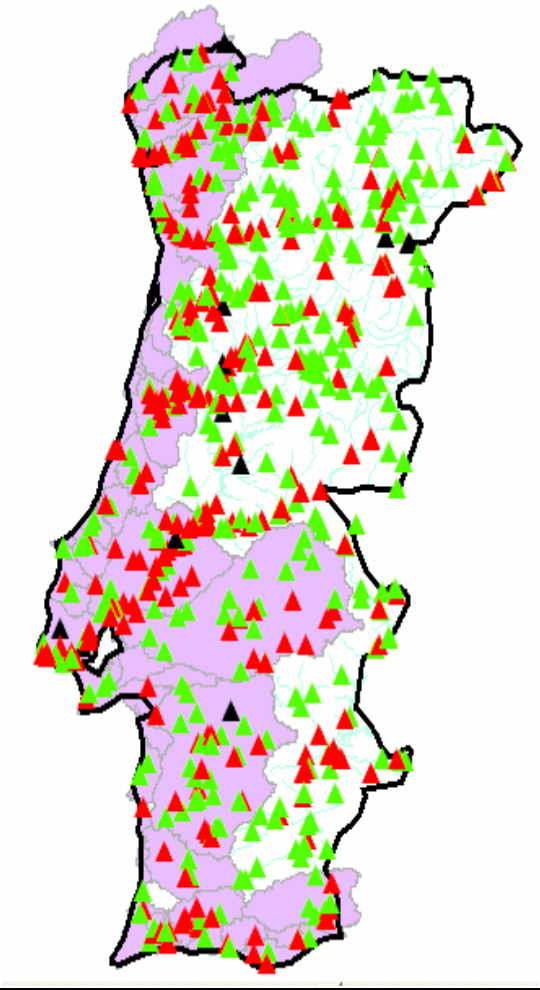
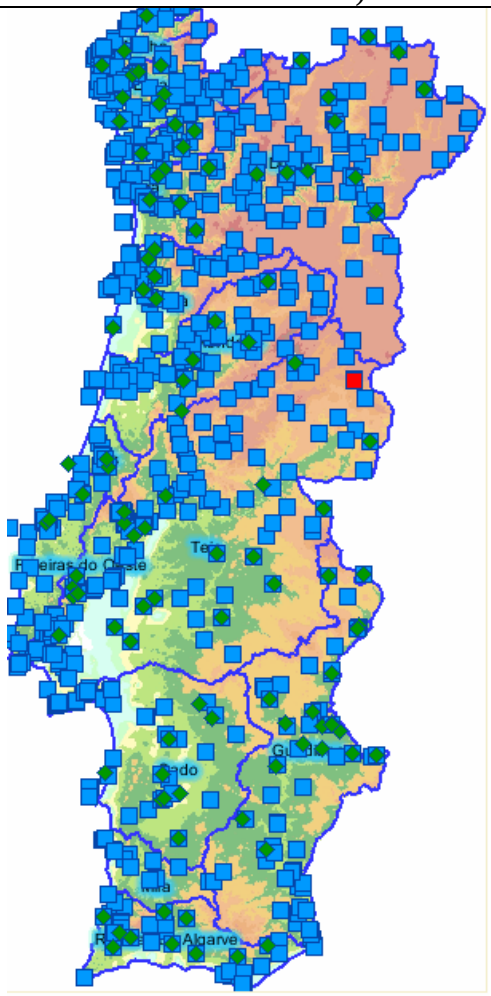
HYDROMETRIC NETWORK.	QUALITY NETWAORK (Non automatic & automatic)
	
Green triangles: Active Stations Red Triangles: Non-Active Stations Black Triangles: Unknown status	Blue squares: Stations from Water quality network Green dots: Stations from Automatic water quality network.

Figure 9: a) Portuguese hydrometric network stations. b) Portuguese surface waters quality stations, both automatic (green dots) an non automatic (blue squares)

A GIS online server with these data can be found at
http://www.snirh.pt/snirh.php?main_id=4

Ireland

The Minister for the Environment has the overall responsibility for the development and implementation of environmental policy in Ireland. The Department of the Environment formulates the relevant legislative framework to maintain satisfactory regulatory and monitoring systems for environmental protection and to secure the provision of infrastructural services necessary for both environmental and developmental purposes. The responsibility for implementing the monitoring of the environment rests with the local authorities, ie. the county councils and the county borough councils of which there are thirty-four in all. The local authorities operate under the aegis of the Department of the Environment.

To facilitate the implementation of the EU Water Framework Directive The Department of the Environment, Heritage and Local Government is promoting the establishment by Local Authorities of river basin management projects. Local Authorities will have the primary role in promoting, establishing and implementing these projects. In practice, River Basin Districts in Ireland will be determined by the natural grouping of hydrometric areas into water resource regions already familiar to Local Authorities and other public bodies.

The areas to be established as River Basin Districts are illustrated in Figure 10.

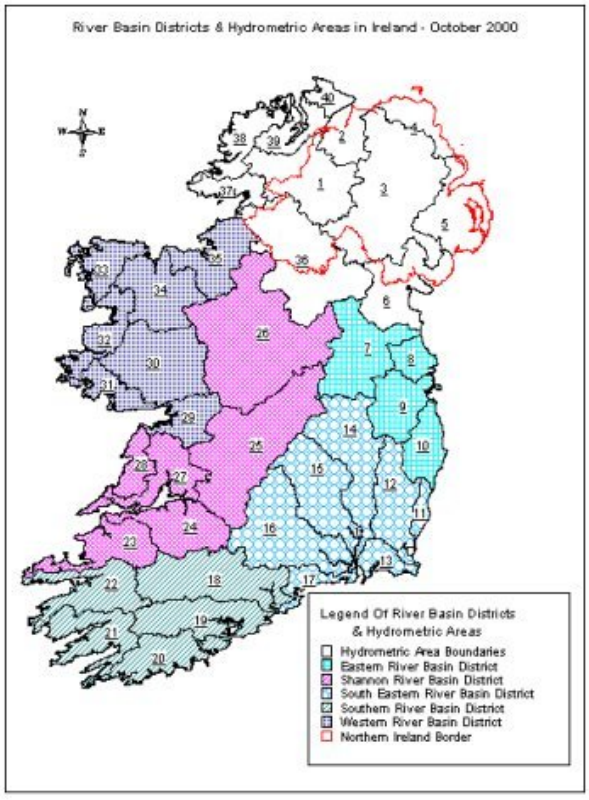


Figure 10: River basin districts & Hydrometric Areas in Ireland.

The EPA (enviromental Protection Agency) is assisting the Department of the Environment, Heritage & Local Government in the implementation of the Water Framework Directive (2000/60/EC) that entered into force in December 2000.

In July 2001, the EPA appointed Compass Informatics Limited to develop guidance on information management and data interchange between these RBMS and other organisations involved in water management.

- Surface Water quality

In order to fulfil with the Water Framework directive, EPA has elaborated a planification programme that includes the specifications for the river monitoring networks: three networks will be stablished the OM (operational monitoring) nets and subnets, the SM (Surveillance Monitoring) nets and subnets and the IM (Investigation monitoring) nets. The detailed specifications of these networks are described in http://www.epa.ie/downloads/pubs/water/other/wfd/epa_water_wfd_monitoring_programme_main_report.pdf

A whole list of Stations, parameters, authorities responsible, etc can be found in annex 7.1:
http://www.epa.ie/downloads/pubs/water/other/wfd/appendix7-1-v1-4-20070503.zip

- Surface Water levels and flows

The Environmental Protection Agency Act 1992 requires the EPA, after consultation, to prepare a national programme for the collection, analysis and distribution of surface water quantity data. This programme is carried out with cooperation between the following organisations:

- The Environmental Protection Agency (EPA) in collaboration with Local Authorities
- The Office of Public Works (OPW)
- The Electricity Supply Board (ESB)
- The Geological Survey of Ireland (GSI)
- The Marine Institute
- Met Éireann

The EPA reviews the hydrometric requirements with each local authority, with each River Basin District and, at national hydrological meetings, with the other hydrological agencies, to review and discuss aspects of the hydrometric programme. This ensures that all requirements are met in the provision of an efficient service to the various local authorities, government agencies, consultants, private industry and the public.

The EPA also maintains the Register of Hydrometric Stations In Ireland.

The EPA collects and processes the data for the Local Authority hydrometric network. These data are available by contacting the Water Data Unit. (Tel: 00353 (0) 1 2680136/2680138).

EPA holds two INTERNET applications to query water quality products and monitoring stations metadata. Raw data are not available online (cf. figures 11 and 12):

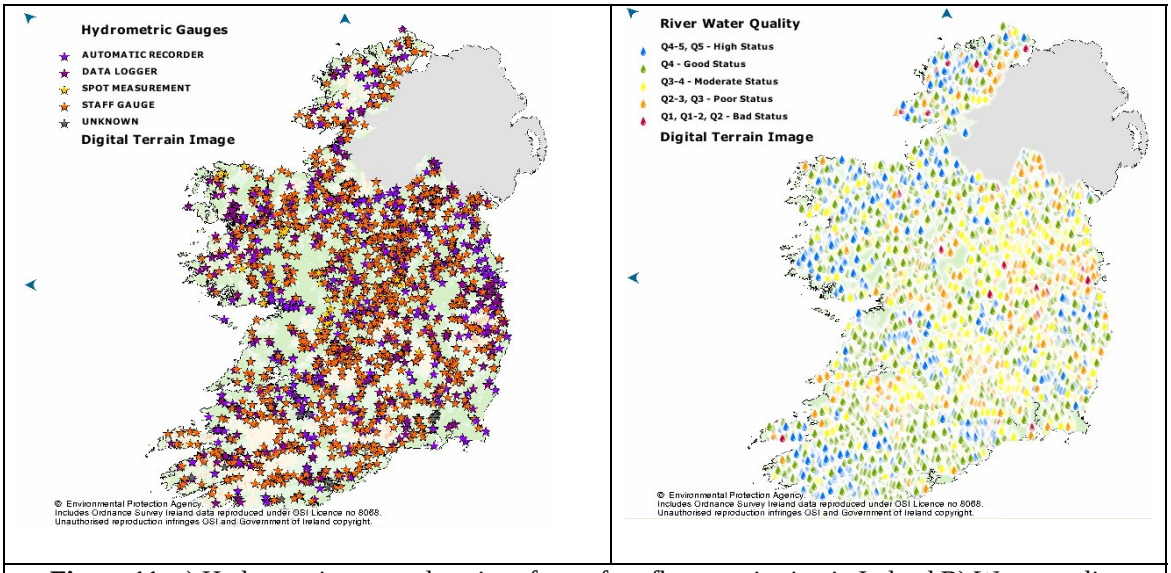


Figure 11: a) Hydrometric gauges locations for surface flow monitoring in Ireland B) Water quality station locations for river water quality monitoring in Ireland. Both maps are issued from web application: http://maps.epa.ie/InternetMapViewer/MapViewer.aspx .

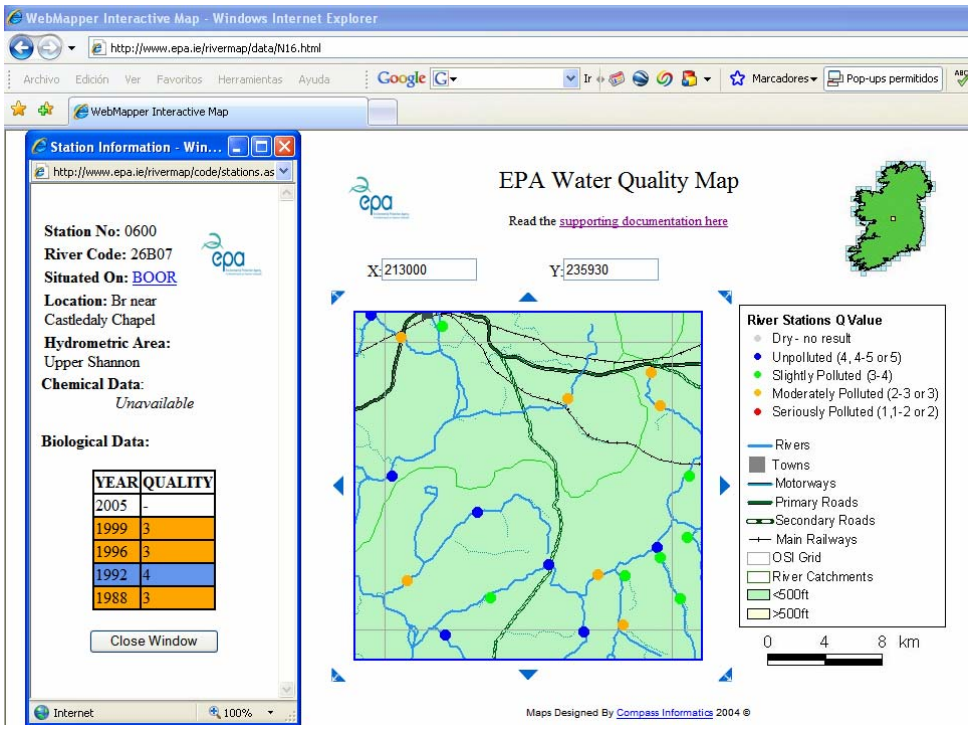


Figure 12: GIS application for Irish river quality data query.
http://www.epa.ie/rivermap/data/rivmaptop.html

Spain

In Spain the management of surface waters is shared among different public authorities (national, regional, and local) depending on the different issues and applications, and the specific agreements between the national government and each one of the "autonomous communities".

Most of management and observation issues depend on the nature of the basin: there are two kind of basins:

- ✓ the **intracomunitary basins** (the whole basin is inside one regional autonomous community,
- ✓ and the **intercomunitary basins** which are geographically in more than one autonomous community.

The intracomunitary basins are managed by regional and local authorities and the intercomunitary basins are managed by hydrographic confederations depending on the Ministry of Environment.

There are eight hydrographic confederations ("Confederaciones hidrográficas") that manage the intercomunitary basins shown in figure 13.

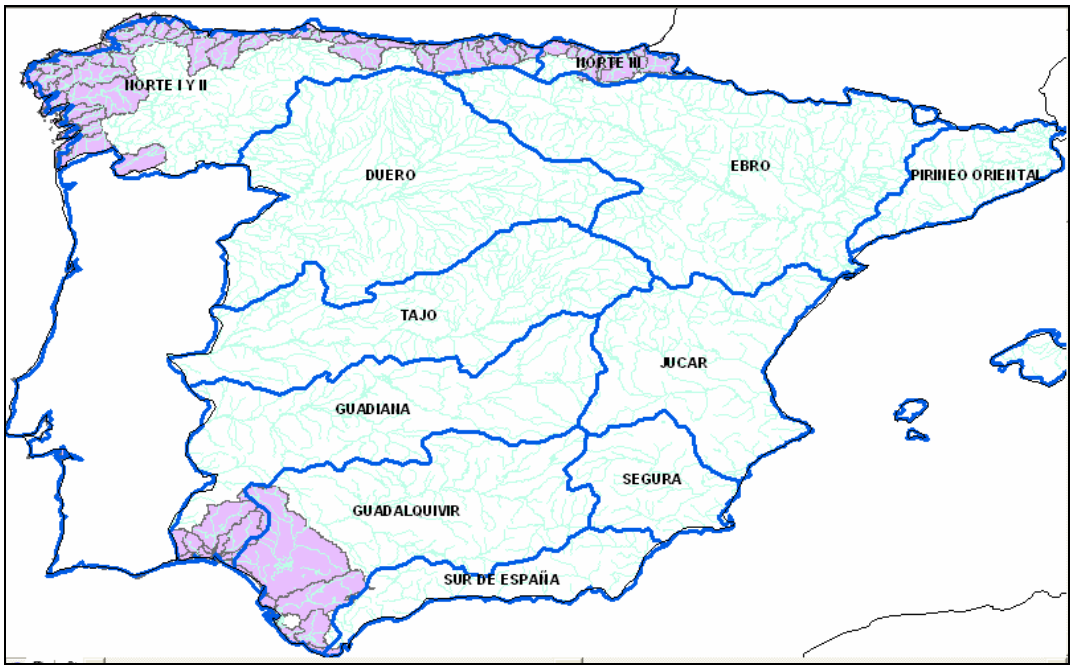


Figure 13: Spanish hydrographical confederation management limits

Whithin the IBIROOS area, the Hydrographic confederations concerned are the NORTE I, II, III, in the North, and the Guadiana and Guadalquivir hydrographic confederations in the south of the Iberian peninsula.

There are four main national networks that are managed by each of the confederations. Data of all the confederations are centralised in the "Centro de Estudios y Experimentación de Obras Públicas (CEDEX). The online availability of the data depends on the tools made available by each confederation.

- Surface waters flow network:

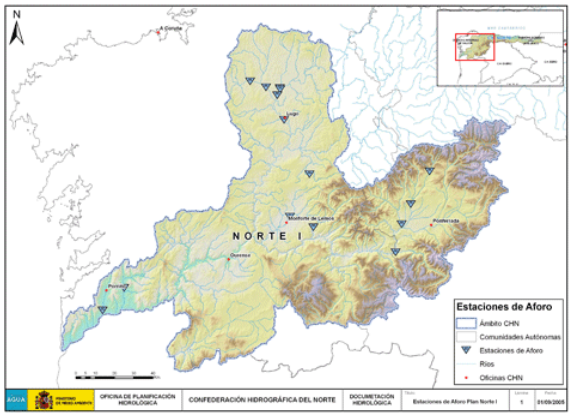
ROEA (Red Oficial de Estaciones de Aforo). They total 1200 stations (**730 active**). Data is centralised in the HYDROQ database hold by the "Centro de Estudios y Experimentación de Obras Públicas (CEDEX).

Among these stations there are a number of automatic stations whose data are communicated to an application called **SAIH (**Sistemas de Automáticos de Información Hidrológica), promoted by the DGOHCA (Dirección General de Obras Hidráulicas y Calidad de Aguas) and implemented by each hydrografic confederation. In practice the online access to these data depends on each confederation.

The whole dataset is centralised at http://hercules.cedex.es/general/default.htm, however access is restricted.

The three hydrographic confederations included in IBIROOS provide the following methods for data access:

- ✓ **SAIH** Guadalquivir (need to register for access to data): http://www.chguadalquivir.es/chg/opencms/chg-web/menu_izquierda/la_cuenca/informacion-hidrologica/saih/contenido.html
- ✓ **SAIH** Guadiana: still under development.
- ✓ **SAIH** Norte: still under development. The gauging locations are shown in figure 14.



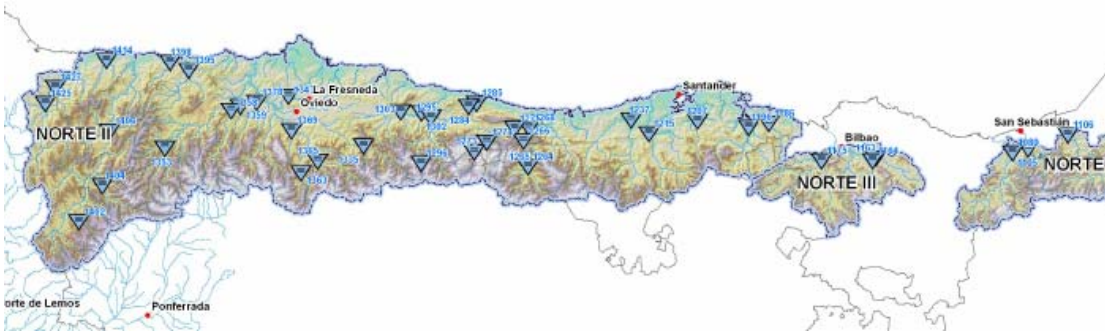
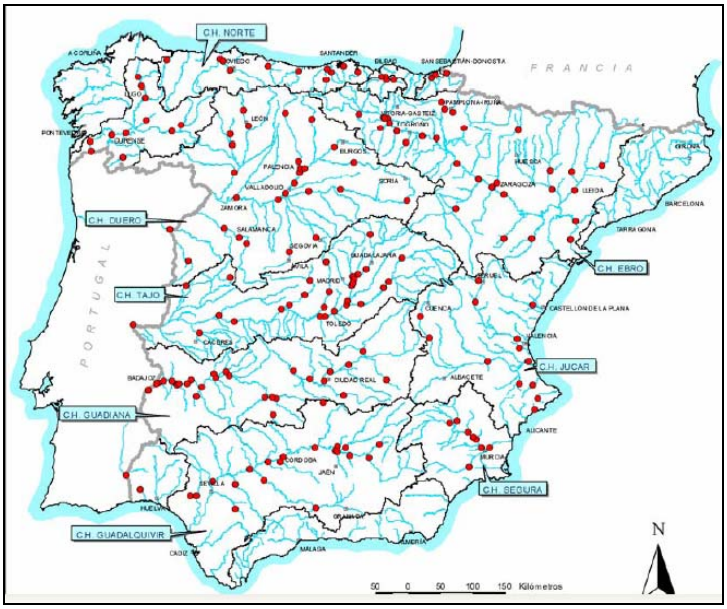


Figure 14. Gauging Stations of ROEA network in the NORTH I basin (top panel) and in Basins NORTE II and III (bottom panel).

- Quality networks

ICA network: This network involves the periodic sampling Stations (EMO) and the automatic alert stations (EEA) (whose data are managed through the system **SAICA** (Sistema Automático de Información de la Calidad de las Aguas).

The national EEA Stations in all the intercommunitary basins are shown in figure 15:



Confederación Hidrográfica	Centro de Control	Nº Estaciones
Norte	Oviedo	29
Duero	Valladolid	27
Tajo	Madrid	31
Guadiana	Ciudad Real/Badajoz	30
Guadalquivir	Sevilla	21
Segura	Murcia	8
Júcar	Valencia	13
Ebro	Zaragoza	30
Total		189

Figure 15: Automatic surface water quality stations from Spanish SAICA network.

The three hydrographic confederations included in IBIROOS provide the following methods for data access:

- ✓ **SAICA Guadalquivir (figure 16):** http://www.chguadalquivir.es/chg/opencms/chg-web/menu_izquierda/la_cuenca/informacion-medioambiental/sistema_saica/contenido.html

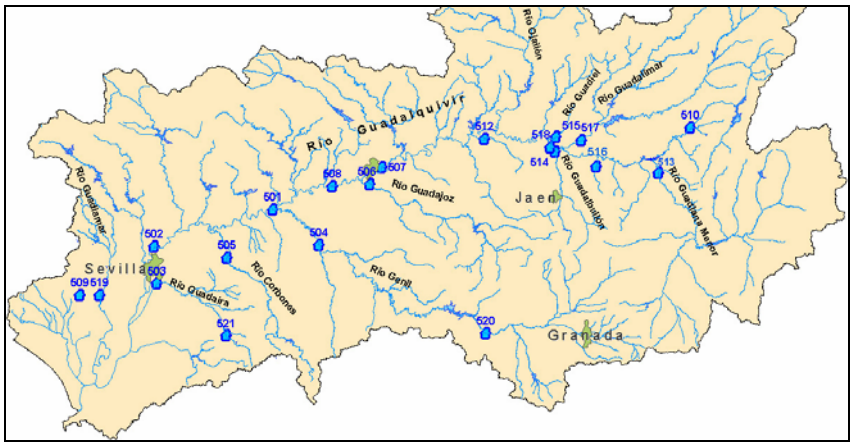


Figure 16: Surface Quality automatic stations from Guadalquivir basin.

- ✓ **SAICA Guadiana**: NRT available online: www.chguadiana.es/saica/saica.htm

Figure 17: Surface Quality automatic stations from Guadalquivir basin.

- ✓ **SAICA NORTE I,II and III:** NRT & ARCHIVE data up to 3 months available online) http://www.chnorte.es/index.php?page=3&opt=32&link=saica_localizacion http://www.chnorte.es/index.php?page=3&opt=32&link=saica_historico

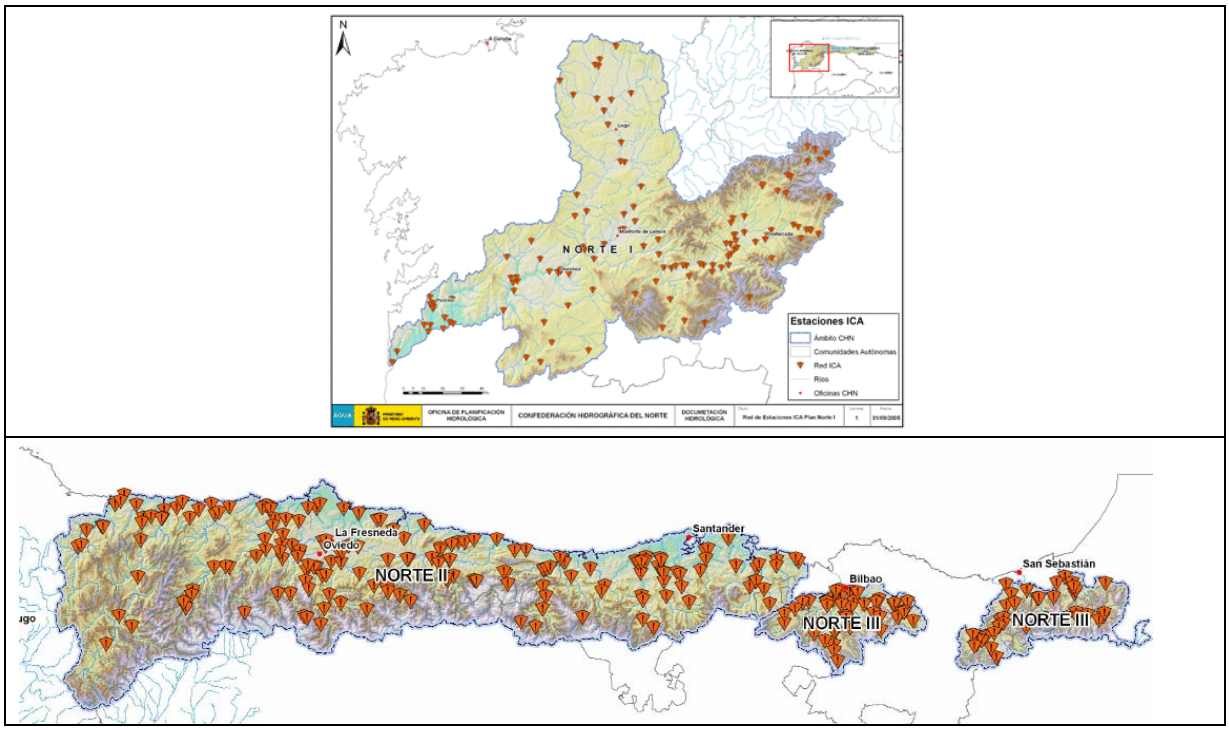


Figure 18. Surface Quality automatic stations in the NORTH I basin (top panel) and in Basins NORTE II and III (bottom panel).

Regarding the **intracomunitary** basins, there are two regions concerned with IBIROOS areas with these type of basins that are managed by local authorities. These areas are the following:

Basque country (SE Bay of Biscay): Within the Basque country, the river monitoring networks are developed and managed by province authorities. Two provinces are concerned:

- ✓ Gipuzkoa where the responsible organism for river monitoring is the "Dept. para el desarrollo sostenible. Diputación Foral de Gipuzkoa". Data are available online through teh website http://www4.gipuzkoa.net/oohh/web/esp/index.asp
- ✓ And Bizkaia, where the management of the networks is carried out by the "Dept. de Medio Ambiente de la Diputación Foral de Bizkaia". NRT data can be queried online at: http://www.bizkaia.net/Ingurugiroa_Lurraldea/Hidrologia_Ac/Datos_meteo.asp?Idioma=CA&Tem_Codigo=2679. Historical data can also be queried alter installing an application available at the same site.

The location of the overall stations from these networks are shown in figure 19.

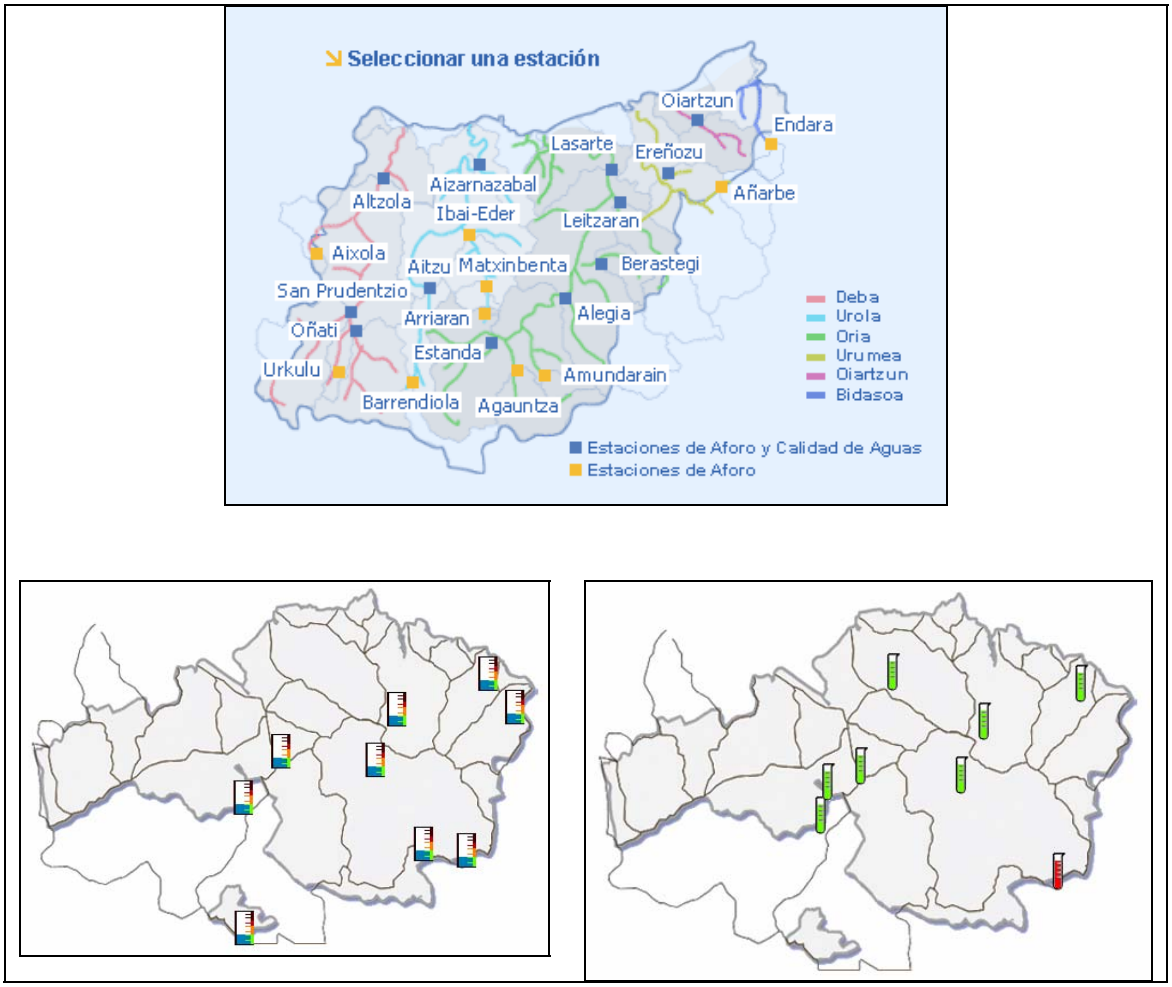


Figure 19: River Monitoring Networks in the Basque country. Top panel: stations managed in the Gipuzkoa province Orange squares: Gauges, blue squares are gauges and quality stations. Bottom-left: Gauges in Bizkaia Province, bottom right: Quality stations in Bizkaia.

Galicia (NW of Iberian peninsula): Within the Galician region, there are some intracomunitary basins monitored by the regional galician authority (La Xunta). There are two networks: the flow network includes 14 stations and the quality network includes 34 non-automatic stations. The location of these stations are shown in figure 20. This website provides statistical bulletins of flow data. No NRT or historical data are available online.

The parameters measured are the following:

Monthly: pH, Cor, Sólidos en suspensión, Temperatura, Conductividade, Olor, Nitratos, Cobre, Cobre soluble, Zinc, Cloruros, Fosfatos, Fenois, DQO (Dicromato), DQO (Permanganato), Tasa de saturación de osixeño disolto, DBO5, Amoníaco, Fósforo Total, Nitritos, Amoníaco ionizado, Cloro residual total,

Three months: Cloro orgánico total, Ferro disolto, Manganeso, Sulfatos. Axentes tensioactivos,, Nitróxeno Kjeldahl, Coliformes totais, Coliformes fecais.

Yearly: Fluoruros, Ferro disuelto, Boro, Arsénico, Cadmio, Cromo total, Chumbo, Selenio, Mercurio, Bario, Cianuros, Hidrocarburos disoltos ou emulsionados Hidrocarburos aromáticos policíclicos (PAHs) Plaguicidas totais Estreptococos fecais salmonellas.

The general information of this network can be found at:
http://augasdegalicia.xunta.es/gl/7.3.htm

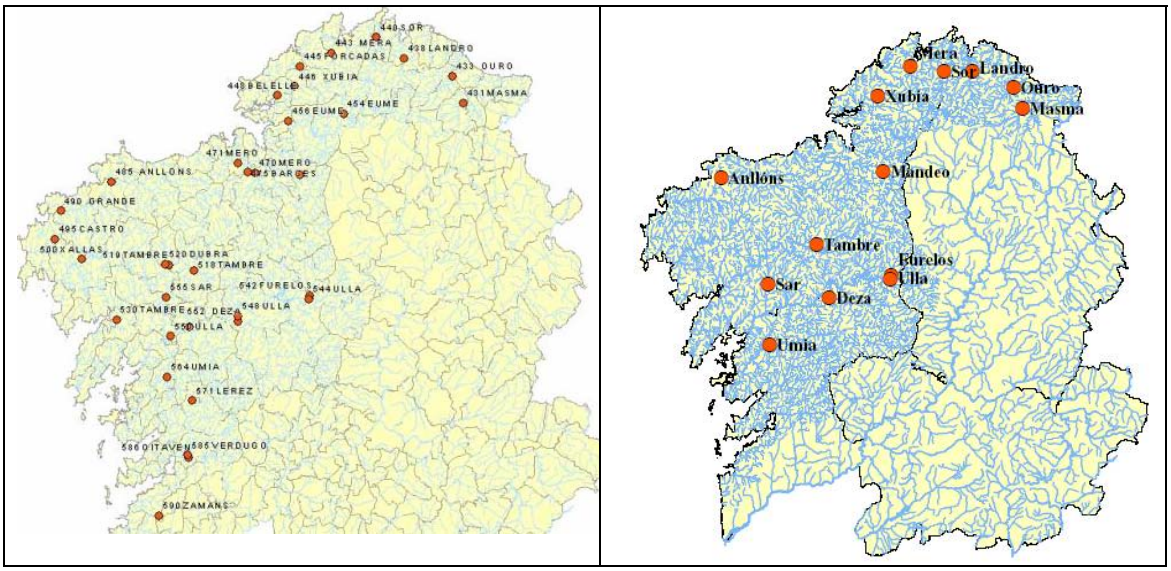


Figure 20: River Monitoring Networks in Galicia. Left: quality network stations. Right: Gauging Stations.

France

In France, there are six main basins which conform the administrative organisation of surface waters management. In each basin, there is a « comité de bassin », composed by local stake holders (like a “local water parliament”), which is in charge of making the water policy for each basin under national orientations, and the « agence de l’eau », which is in charge of executing this policy.(http://www.cnrs.fr/cw/dossiers/doseau/decouv/france/menuFrance.html)

The six water agencies and their addresses are shown in figure 21.

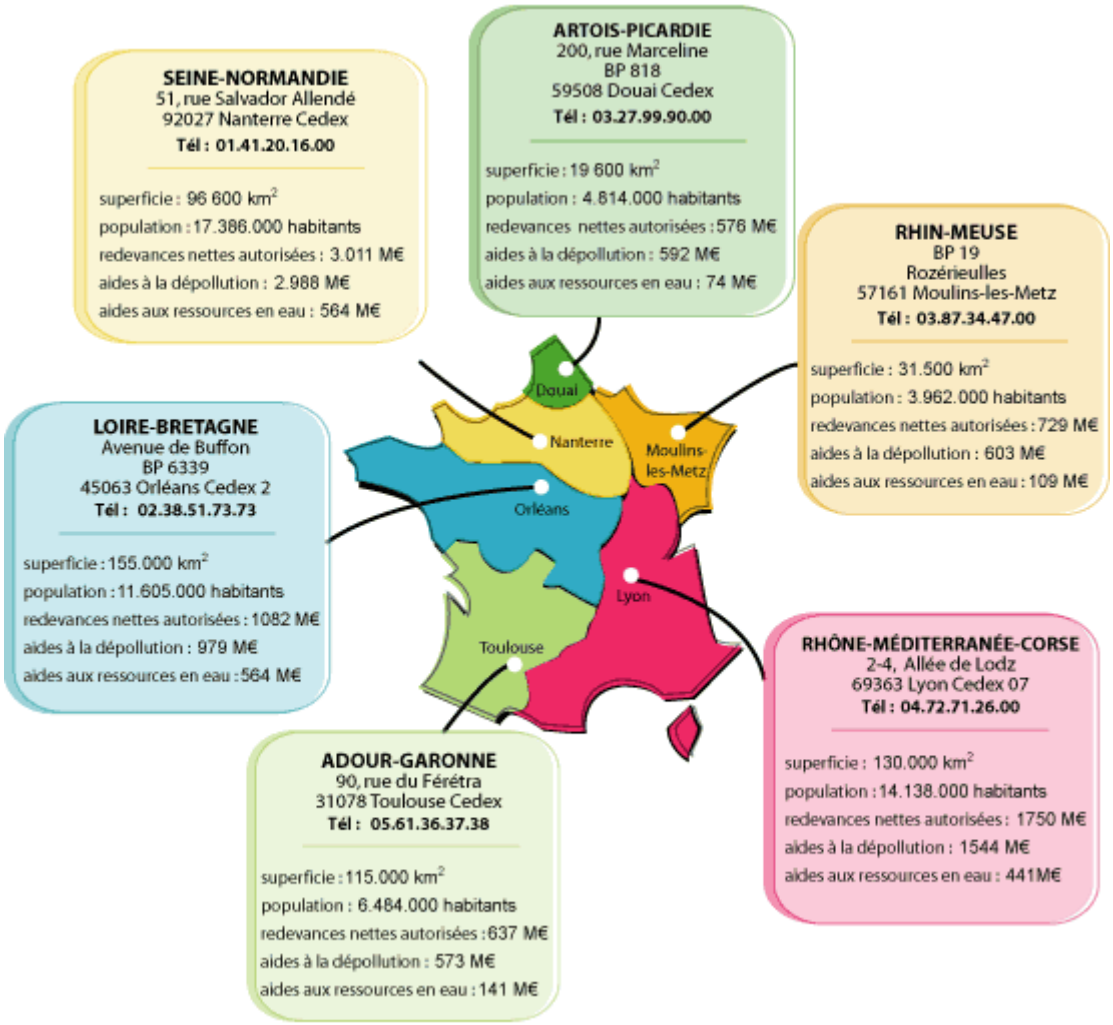


Figure 21: Administrative limits for basins management organisms (Agences de l’eau) in France.

For some years now, there is a nacional Project that federates all the databases dealing with water uses. This is the RNDE (Réseau national de donnees de l'eau). Parallelly, an integrative system has been also developed to provide access to all these data and informations. This system is called SANDRE (Service d'Administration Nationale des Données et Référentiels sur l'Eau).URL: http://sandre.eaufrance.fr/

From this site we can access to the catalogue of the different databases that are federated http://sandre.eaufrance.fr/disceau

Within RNDE are included data from the main surface waters observation networks:

- ✓ HYDRO network for surface water flows. http://www.hydro.eaufrance.fr/
- ✓ RNB (Reseau national de basin) for surface quality networks.

It also includes other datasets hold by local or regional authorities or private companies such as electrical companies.

Online access to these data is centralised through http://sandre.eaufrance.fr/geoviewer/#

The GIS application for each of the basins within IBIROOS are the following

LOIRE-BRETAGNE: http://carto.eau-loire-bretagne.fr/osur/top.jsp

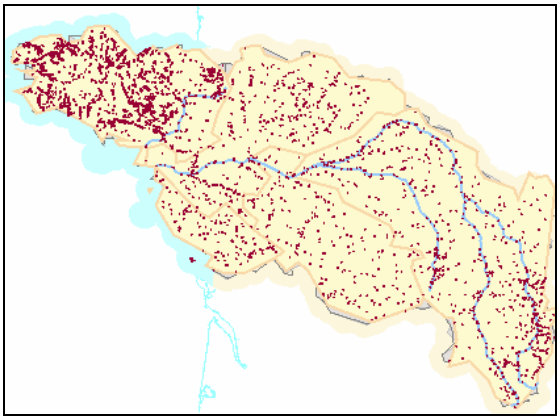


Figure 20: River Monitoring Stations in the LOIRE-BRETAGNE basin in France

ADOUR-GARONNE: http://aeag1.eau-adour-garonne.fr/scripts/hsrun.exe/aeag/MapXtreme/MapXtreme.htx;start=HS_avert_acces?origine=rnde&code=05201020

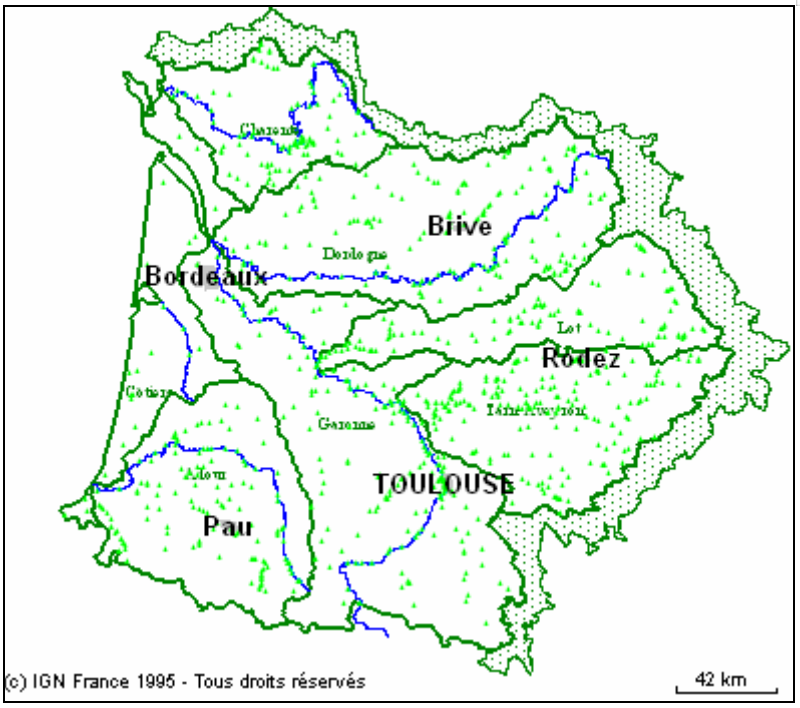


Figure 21: River Monitoring Stations in the ADOUR-GARONNE basin in France

NRT Surface waters flow data at a national level are available online at:
http://www.vigicrues.ecologie.gouv.fr/

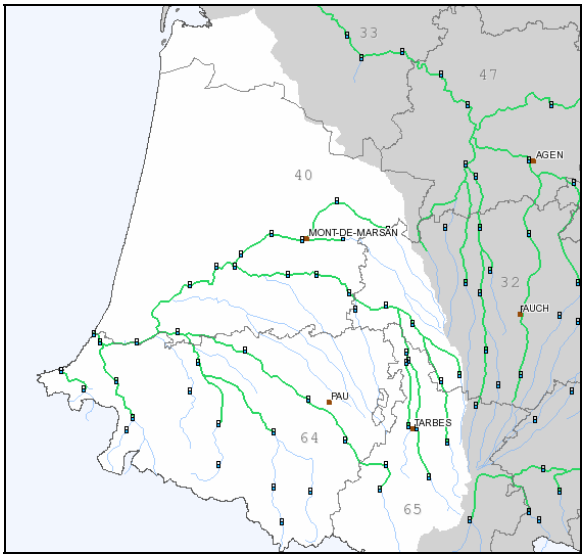


Figure 22: Flow Stations with NRT online data in the SW of France from Vigicrues WEB application.

ARCHIVE DATA on surface flows can be queries at http://www.hydro.eaufrance.fr/ .

UK

In UK, river basins management is based on regional hydrological boundaries managed by the Environment Agency in England, the Environment Agency of Wales, the Scottish Environment Protection Agency the Rivers Agency (flow), and the Water Management Unit of Environment and Heritage Service (quality) in northern Ireland.

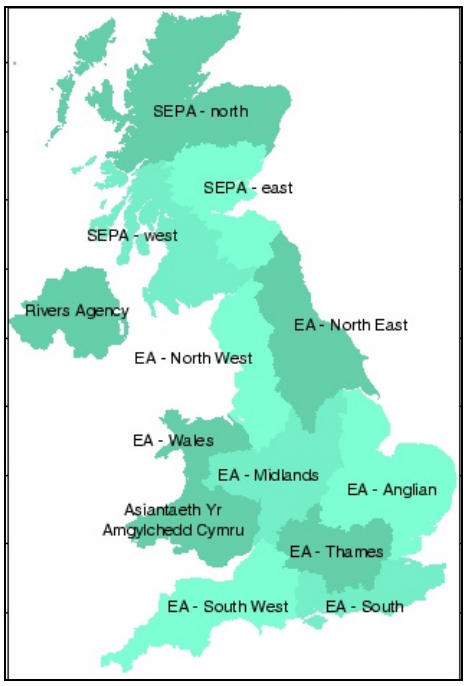


Figure 23: Administrative limits for basins management organisms in UK.

- Surface Flow Networks in UK

The UK National River Flow Archive (NRFA) centralises the 1300 gauging stations provided by all these institutions. The National River Flow Archive is maintained by CEH at Wallingford. These data are made at the following sites

- River Flow Data: Time Series Downloads
- UK Gauging Station Network
- Dates of activity for each station: http://www.nwl.ac.uk/ih/nrfa/station_summaries/sum.html

ARCHIVE DATA: http://www.ceh.ac.uk/data/nrfa/river_flow_data.html

Within the IBIROOS area the hydrological basins concerned are mainly the Southwest and South basins, which have the gauging stations shown in Figure 24.

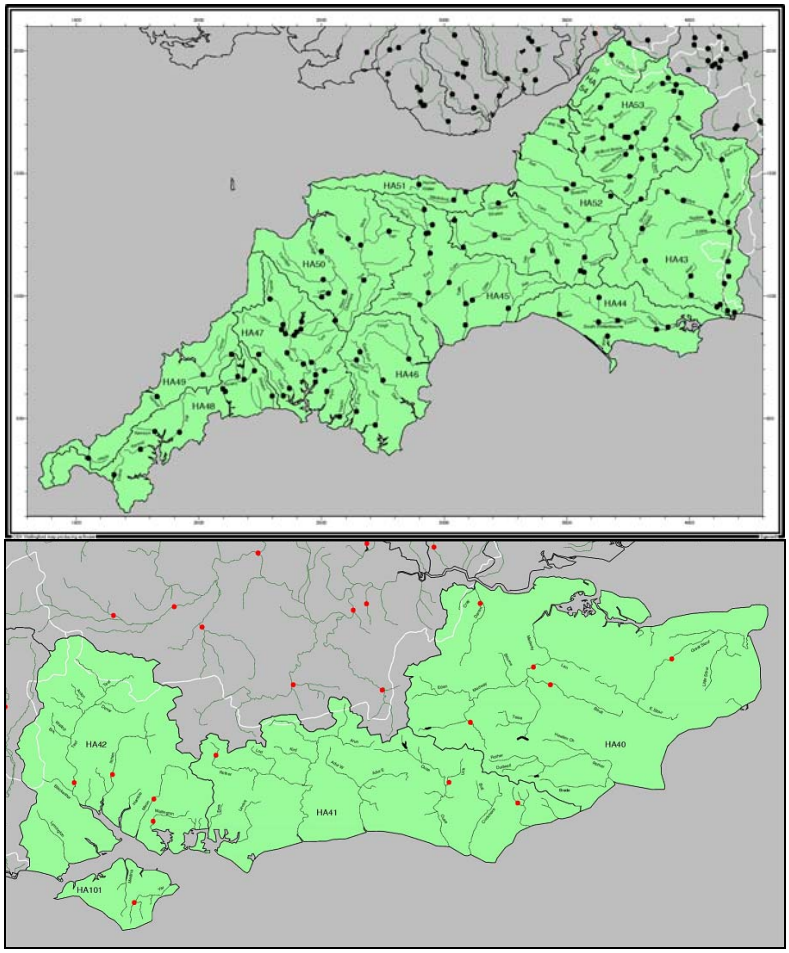


Figure 24: Gauging Stations in the UK Southwest basin (top) and within the south Basin (bottom)

- River quality network in UK

The Harmonised Monitoring Scheme (HMS) was established to provide an archive of water quality data for Great Britain. It is used to provide information for international obligations, including the long-term trends of some determinants and the estimation of riverborne input of selected determinants to the sea. The HMS commenced in 1974 and has been administrated and maintained by the Environment Agency since 1998. The sampling network includes 230 sites, which are mainly located at the tidal limits of major rivers or at the points of confluence of significant tributaries.

Statistical data from the HMS can be found in DEFRA (Dept for Environmental Food and Rural Affairs) website: http://www.defra.gov.uk/environment/statistics/inlwater/iwhmsdb.htm
No online data has been found on station locations and data for Southwest and south basins.

4. Conclusions

After the analysis performed in this study, some conclusions may be drawn regarding the availability of river discharge data in the IBIROOS region:

1. Large international datasets gather data from main basins in Europe with very aggregated information.

2. Taking into account that within IBIROOS area the river discharges often come from numerous small basins, we conclude that data from large international datasets are not sufficient for coastal dynamics within the IBIROOS Area.

3. Fortunately, very high amounts of monitoring stations exist in these basins. The management and data issued from these stations are managed by national or local water authorities.

4. Query or access to these data is very diverse among all these networks. However there seems to be a general tendency to standardise and integrate all these data at the national level and to make them available to the public. At the present the availability of these data is mainly through statistical bulletins or through NRT web services. Raw archives need generally a request.

5. There are several projects with the objective of integrating these networks at international level (GRCD, ETN-R, EWA, EIONET, etc). It should be advisable that these networks also integrate data from small basins.

6. Finally, two type of networks have been analysed: the surface water flow networks and the surface water quality networks. The last ones seem to be under well developped rates driven by the requirements made by the Water Framework directive which seems to be a very efficient driving and integrative tool.