# NATIONAL WATER RESOURCES INFORMATION SYSTEM

4th edition

ANA
NATIONAL WATER AGENCY

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# NATIONAL WATER RESOURCES INFORMATION SYSTEM

The National Water Resources Information System - SNIRH is one of the management instruments of the National Policy of Water Resources, established by Law no. 9.433/1997. This instrument is intended to: gather, give consistency, share data and information about the qualitative and quantitative status of water resources in Brazil, permanently update the information on the availability and demand of water resources, in addition to provide inputs for the elaboration of Water Basins Resources Plans.

In order to achieve its purposes, SNIRH comprises computer subsystems, integrated database, computer infrastructure, integrational plataform and human and organizational resources.

ANA, in compliance with the principles, purposes and guidelines of the National Policy of Water Resources, is responsible for organizing, implementing and managing the SNIRH (Art. 4, paragraph 14 of Law no. 9.984/2000).

## Human and Organizational Resources

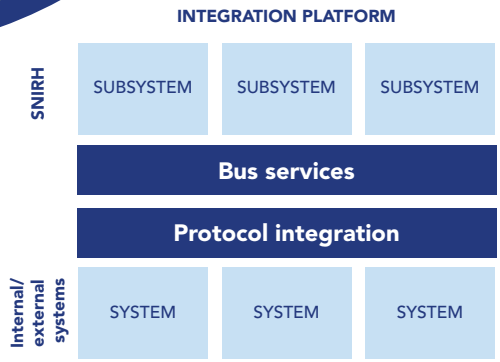
- User stakeholders
- Support and assistance
- Capacity
- Organization players

## Computational Infrastructure

- Servers
- Work stations
- Communication resources
- Basic software and system




| Surface Waters | Ground Waters | Hydrology complements |
|---|---|---|
| Planning and management | Hydric intelligence | |
| Usage regulation | Geographic intelligence | |
| Hydrologic network | Documentary intelligence | |
| Support elements (security, metadata,...) | | |






SNIRH

## SNIRH's SUBSYSTEMS

The subsystems components of SNIRH correspond to the computer applications which execute the functions conceived to comply with the several processes of management of water resources. These subsystems were classified as finalist-type and integrator-type, depending on its nature and specificity.

The finalist types are those directly related to management of information on water resources. The subsystems from this category are: Planning and Management (PLANN); Qualitative and Quantitative Data (QUALT); Regulation of Water Use(REGLA).

The other SNIRH's subsystems are integrators and in a certain extent are auxiliary to SNIRH's main task, which is to allow an integrated water governance of water resources. The subsystems of this second category are: Security Information (SGINF), Hydric Intelligence (IH), Documentary Intelligence(ID) and Geographic Intelligence (IG).

## PLANNING AND MANAGEMENT SUBSYSTEM

It's intended to provide visibility to planning and management processes of water resources and to allow for a systematic following-up of the country's water resources situation, as for water amount and quality, as well as the implementation level of the National Plan of Water Resources (PNRH).

It allows the construction of explanatory scenarios which provide inputs to the elaboration of water resources plans.





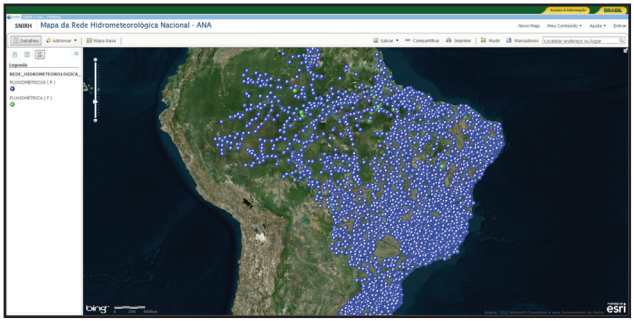

## SUBSYSTEM OF QUALITATIVE AND QUANTITATIVE DATA

This subsystem allows storing, collecting, treating, consisting and making available flow, rain, steam, sediment, water quality and underground monitoring, providing the knowledge of qualitative and quantitative characteristics of the watercourses, of aquifer systems and of pluviometric rates with its distributions in space and time.

Stores and processes all hydrometeorological data which will serve as inputs to other SNIRH's subsystems, for the information systems from the States and others entities.

Supports the administration, maintenance and operation of the country's wide hydrometeorological monitoring network.

This hydrometeorologial data is obtained in the following ways: conventional means (field observers) and automatic means (sensors by telemetry with transmission via satellite or telephone).

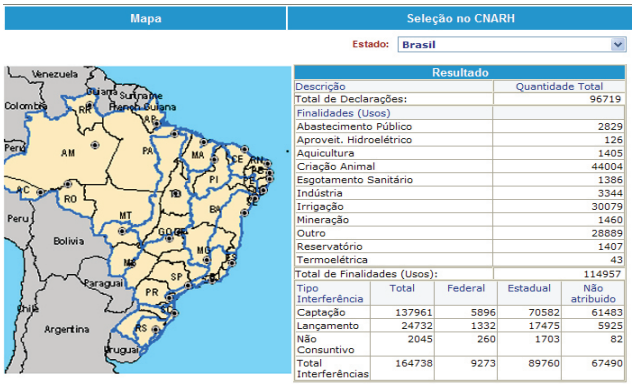


## WATER USE REGULATION SUBSYSTEM

Gathers information on the use of water resources, both superficial as well as underground from all over Brazil,focuses on supporting the process of water resources use regulation in hydrographical basins, considering the shared domains between the Federal and the State governments.

The processes associated to this subsystem are:

- Register water resource users;
- License water resources use;
- Charge the use of water resources;
- Manage collected resources;
- Inspect uses in water bodies.

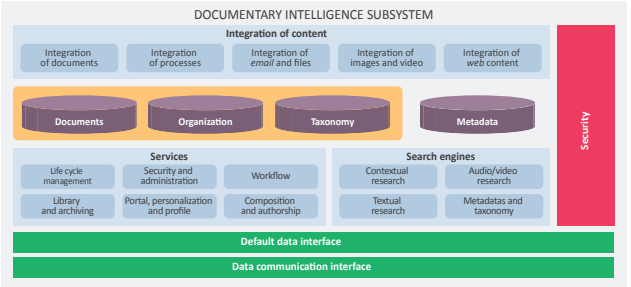



| Descrição | Quantidade Total |
|---|---|
| Total de Declarações: | 96719 |
| Finalidades (Usos) | |
| Abastecimento Público | 2829 |
| Aproveit. Hidroelétrico | 126 |
| Aquicultura | 1405 |
| Criação Animal | 44004 |
| Esgotamento Sanitário | 1386 |
| Indústria | 3344 |
| Irrigação | 30079 |
| Mineração | 1460 |
| Outro | 28889 |
| Reservatório | 1407 |
| Termoelétrica | 43 |
| Total de Finalidades (Usos): | 114957 |

| Tipo Interferência | Total | Federal | Estadual | Não atribuido |
|---|---|---|---|---|
| Captação | 137961 | 5896 | 70582 | 61483 |
| Lançamento | 24732 | 1332 | 17475 | 5925 |
| Não Consuntivo | 2045 | 260 | 1703 | 82 |
| Total Interferências | 164738 | 9273 | 89760 | 67490 |

## DOCUMENTARY INTELLIGENCE SUBSYSTEM

The Documentary Intelligence Subsystem focuses on storing and granting access to documental data regarding water resources, as well as making available documents produced within the extent of the Basin Committies and of state managing bodies.







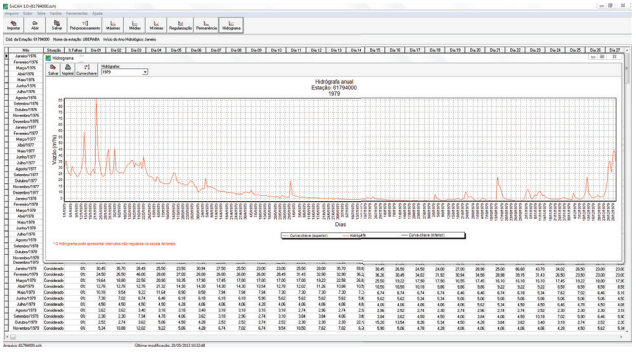

## HYDRIC INTELLIGENCE SUBSYSTEM

It's intended to store and provide functions of hydrological modeling for management of hydrological modeling for the management of regional hydrological models, reconstitution of average natural monthly flow and flow-rainfall models. These functions were developed collectively among a network of three research institutions, in partnership with the National Water Agency with the Ministry of Science, Technology and Innovation (MCTI), through the sectorial fund CT-HIDRO, as presented below:

- Assessments of Flow Regionalization, coordinated by Viçosa Federal University (UFV);

- Research and Development for Integration of Rain-Flow Modules, coordinated by Paraiba Federal University (UFPB);

- Construction of Spread out System for Reconstitution of Monthly Medium Natural Flows in Watersheds, coordinated by Fluminense Federal University (UFF).



In addition to that, the Water Intelligence Subsystem allows the management of database, makes viewing available, services and hydrological analysis and integrates functions among other SNIRH's subsystems.

## GEOGRAPHIC INTELLIGENCE SYSTEM

It's intended to store and provide geographical information to support the management of water resources and play an integration role among other SNIRH's subsystems. The IG subsystem is divided in a modular way:

***· MANAGEMENT OF GEOGRAPHICAL AND TABULAR ELEMENTS OF GEOGRAPHICAL DATABASE***

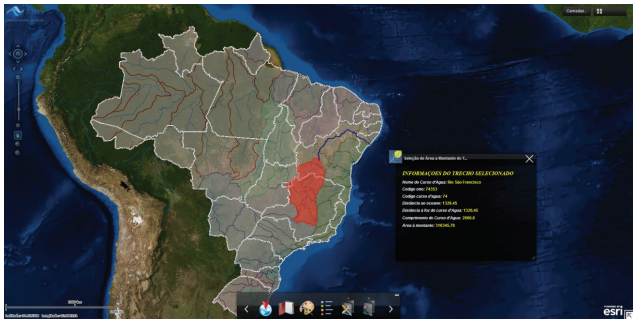
This module contains functionalities related to the database load, the metadata management, the geographical consistency and the information processing.

***· GEOGRAPHICAL SERVICES***

It comprises a set of services (Web Services), regarding the management of metadata, viewing and navigation, geographical consultations, consultation of downstream and upstream information, spatial association (association of point – georeferencing and hydro referencing - by means of point-line relation and polygon-polygon relation), non-spatial association (non-spatial line and non-spatial polygon relations).

***· TOOLS FOR ANALYSIS, VIEWING AND MANIPULATION OF GEOGRAPHICAL INFORMATION***

A module composed of functionalities of spatial data manipulation (geoprocessing) for desktop environment and customized applications for viewing and manipulation of geographical information for WEB environment, that allows executing the main operations available in a usual corporate Geographical Information System (GIS).



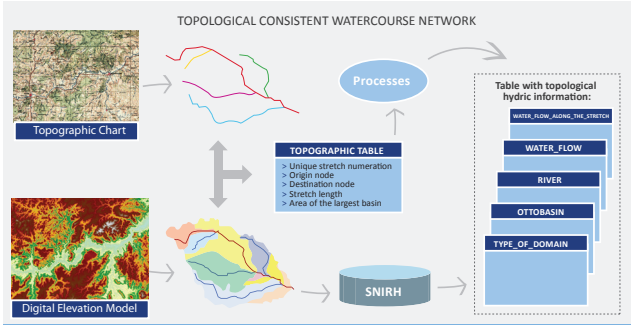





## CONSTRUCTION OF THE OTTOCODIFIED HYDROGRAPHIC BASE

Among the efforts of compliance to SNIRH's objectives, particularly regarding the modeling and treatment of geospatial data of hydrographic network, which comprises the database of this system, the National Water Agency (ANA) has developed the Ottocodified Watershed Base (BHO) and started using it as a support to the management in its internal processes. Since then, the construction of the BHO has been internally improved at ANA and adjusted to the needs of integration with spatial database.

The construction of the Ottocodified Watershed Base consists of a set of processes geared towards the topological treatment of the watercourse network based upon the Otto Pfafstetter codification, allowing associating and extracting information downstream and upstream of each stretch of the watercourse network.




The methodology of the BHO construction, the processes of Hydro referencing and the concepts of Watershed topology in the National Water Resources Information System (SNIRH) are contained in the document called "Watershed Topology: Method of Construction and Modeling the Watercourse Base for support and Management of Water Resources", available for download at ANA's Virtual Library (www.ana.gov.br).

This methodology is geared mainly to professionals of the areas of Information Technology and Geoprocessing applied to water resources, in addition to university members, state managers and watershed committees. Also, ANA offers SINGREH's members (constituents of National Water Resources Management System) regular training on the process of construction of the Ottocodified Watershed Base.

**Information**

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