Case study
Asturias, Spain

Government of the Principality of Asturias

Implementation of a DataHub for regional water cycle management

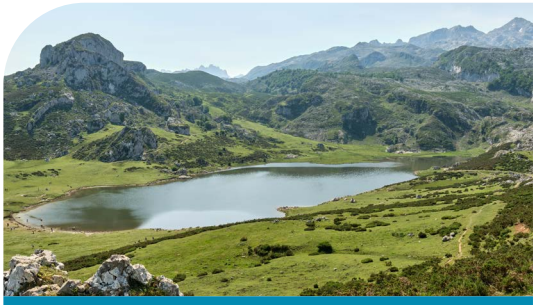
The Government of the Principality of Asturias, through its Regional Ministry of Mobility, Environment, and Emergency Management, manages **the water cycle and associated risks across the region's 78 municipalities, covering a population of over one million residents.** It uses data from more than 100 hydrometeorological stations operated by various agencies, along with administrative data on water use and discharges, water resource planning, and the management of extreme events.

The Regional Ministry has launched a **program to improve wastewater collection, wastewater treatment, and the water supply in many Asturian municipalities,** investing heavily in infrastructure and complementing projects with the creation of a **digital platform to comprehensively monitor the water cycle.** The Regional Ministry's objective was to achieve greater efficiency in water infrastructure operations, improve resource management, tackle drought, and reduce flood risk, while enhancing data governance in Asturias' river basins.

Challenges

The main challenge was to **move from a fragmented information model to a regional data governance framework that would enable rapid, traceable decision-making.** The coexistence of multiple data sources including the government of the principality, the CADASA public water authority, river basin authorities, meteorological agencies, and national government systems, each with different formats, recording frequencies, and quality levels, required a single, unified source of information and knowledge about water in the region. The objective was **to ensure coherent management of the resource, prioritize investments, ensure consistent delivery of drinking water and wastewater services, and comply with environmental requirements** throughout the region.

Fragmentation in the region was compounded by the need to improve the government's ability to **assess and anticipate future changes in water resources, rather than relying solely on individual measurements or historical data series in isolation.** A technical framework was required to combine hydrological and meteorological observations with forecasts and information on basin behavior, so that changes in water inflows across rivers and basins and their effects could be more accurately estimated. During rainfall events causing significant rises in river flows, the main challenge centered on **managing sewer overflows and discharges to the environment from wastewater systems.** At the other end of the spectrum, the region also experiences **significant reductions in water availability** associated with drought and water shortages.



Project highlights

- Integration of multiple data sources into a single model for 78 municipalities
- Real-time monitoring and unified operation of water supply and wastewater systems, with over 1,500 screens deployed
- GIS visualization and structured querying of over 160,000 inventoried assets
- Incorporation of predictive models to estimate river inflows at monitoring stations and analyze potential sewer overflow events.

Furthermore, **the project had to respond to a highly diverse regional landscape, with municipalities at different stages of digitization, using multiple types of available data, and applying management models** that were not always comparable. While some municipalities had historical data or aggregated remote meter reading consumption data, others had data related to storage tanks, wells, tides, municipal wastewater treatment plants, and other specific infrastructure. The challenge was to **build a regional environment capable of integrating this diversity without imposing a single, rigid model,** enabling the government to visualize and analyze the information available for each area according to its level of maturity and unique characteristics.

Solution

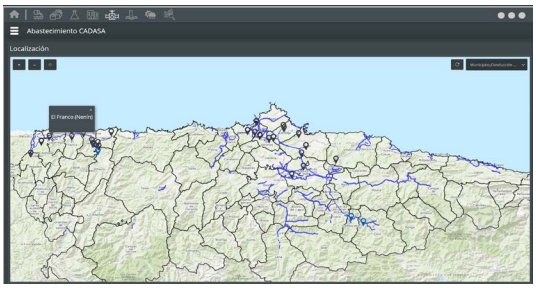
The solution, developed in collaboration with Idrica and Telefónica Tech, was set up as a **regional DataHub based on the Xylem Vue platform, designed to integrate and visualize water cycle information at regional level.** The system incorporates data from multiple sources including hydrological stations operated by river basin authorities; weather stations and forecasting models provided by the national weather agency; operational and environmental data from regional water operators; climate and seasonal forecasting models; water quality records, as well as data from remote meter readings, storage tanks, wells, tides, and municipal sources including wastewater treatment plants. This architecture provides a **common foundation for integrating, querying, and analyzing water cycle information from different data sources,** enabling the government of the principality to monitor water resources, water uses, and associated services throughout the region, providing traceability, security, and access control.

All this information is organized within an **architecture that combines IoT integration, asset inventory, GIS visualization, dashboards, and operational query screens.** The system records more than 160,000 inventoried assets in the Domain Master Data (DMD) layer, with characteristics, geometry, and organization defined by over 50 templates. In the UNM/IoT layer, more than 1,500 screens have been deployed across 77 SCADA systems, providing users with access to maps, customized menus, assets, locations, and other related data.

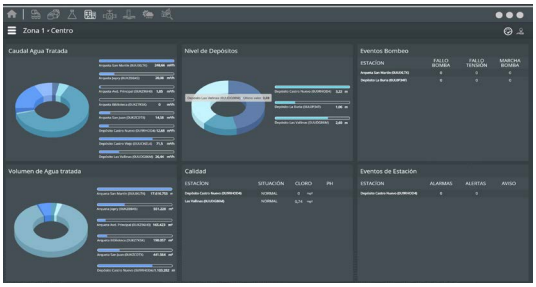
A **predictive analytics layer, visualized through Xylem Vue's Unified Network Management (UNM) application,** has been developed on top of this integrated database, enabling advanced hydrological analysis of observed and forecast data. Specifically, a **proprietary water resource management model capable of estimating inflows at monitoring stations** has been created based on observed data and long-term forecast scenarios, providing a technical framework for analyzing both potential increases in flow associated with flood events and significant reductions in water availability during periods of drought and water shortages.

In addition, a **system has been developed to predict potential sewer overflows to receiving waters based on recorded water levels and observed and forecast rainfall.** Thus, the platform serves as a regional framework for integration, visualization, and predictive analysis to support water resource planning and technical monitoring. Finally, the Operational Intelligence layer consolidates **dashboards, reporting, and KPI tracking for executive and operational management.**

Main menu for the data query and monitoring platform



Water supply network managed by the Government of the Principality of Asturias



Real-time monitoring of the status of municipal storage tanks and manholes

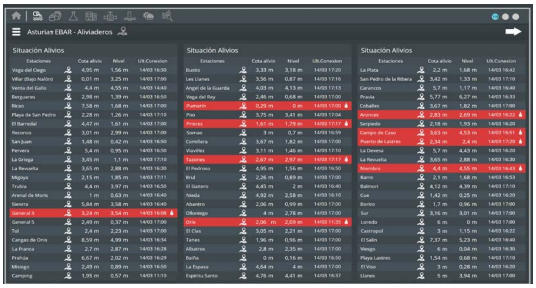
Results

The result is a **comprehensive, centralized view of the regional water cycle, which accelerates decision-making, especially in terms of inter-agency coordination.** Real-time monitoring and a common framework are now available to **monitor water resource status, water quality, and associated risks,** with an operational approach that encompasses periods of drought and heavy rainfall and is aligned with the Regional Ministry's Special Drought Plans.

At the performance level, **a set of KPIs measures adoption and implementation focused on data governance and operations,** including the percentage of integrated data sources (river basin authority, CADASA, meteorological data, etc.), number of connected and operational sensors/ data points, number of standardized water body balance and forecast reports (normal/drought conditions), and potential sewer overflows, **thereby helping to maintain the quality of the region's water bodies.**

Finally, it is worth noting that the DataHub provides **additional capabilities for proactive planning (3–6-month forecasts/scenarios) and greater transparency in water resource management** for citizens and businesses, supporting the gradual expansion of measurement points, variables, AI and machine-learning models, and reporting.

Asset Management - GIS - Inventory of geolocated assets



Real-time status of sewer overflows and monitoring of critical assets

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