

D3.11 Preliminary inventory of EU wetlands



***REstoration of WETlands to minimise emissions and maximise carbon uptake
– a strategy for long term climate mitigation***

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EXECUTIVE SUMMARY

Research and effective management of wetlands require access to diverse datasets from various sources, often presenting challenges due to differing data structures, formats, and accessibility. The REWET project addresses these issues through the development of WETSET, a comprehensive European data index designed to centralise information on wetland datasets at European, national, and regional levels.

WETSET represents a significant advancement in European wetland data accessibility, streamlining research and assessment efforts. The platform's centralised approach and detailed dataset characterisations empower stakeholders with the information needed for effective conservation and management. Continued development and community engagement will ensure WETSET's long-term value in understanding and protecting these critical ecosystems across Europe. Ultimately, WETSET aims to foster informed decision-making and contribute to the sustainable future of European wetlands.

To demonstrate WETSET's utility, a preliminary case study analysing the conservation status of wetlands in the Stiermark region of Austria was conducted using datasets accessible through the platform. This analysis will be upscale to continental Europe in the coming months and presented in next deliverable.



1. INTRODUCTION

1.1 DESCRIPTION OF THE DOCUMENT AND PURSUE

Wetlands are dynamic ecosystems distinguished by complex ecological, hydrological, and environmental dynamics. The fields of wetland research encompass numerous disciplines, such as biology, hydrology, climatology, and policy evaluation. These multifaceted characteristics of wetland ecosystems necessitate access to a wide variety of data sources, ranging from ecological observations to policy documents, often requiring access to different sources, including government agencies, environmental organisations, and academic institutions. Different structures, formats, languages, standards, and access protocols may be utilised by these data sources, making it difficult to efficiently locate and utilise the necessary data for research projects.

One of our main objectives in REWET is to address these challenges, that researchers, conservationists and managers face, by the creation of WETSET, a comprehensive European data index which centralises information on wetlands datasets from European, national, and regional databases. By offering detailed characterisations of these datasets, WETSET allows researchers to quickly determine their relevance, significantly reducing the time spent searching for dispersed information. This centralised approach streamlines the research process, making wetlands data more accessible and research more efficient, facilitating the assessment of these ecosystems at European level.

This document presents the development and implementation of the WETSET tool, a system designed to support the assessment of wetlands in Europe through an integrated data framework. Moreover, to showcase the usefulness of WETSET and contribute to the assessment of European wetlands at a continental scale, we use three datasets which are part of WETSET to analyse the conservation status of wetlands at continental scale.

The first section of this document makes a precise description and presentation of the WETSET development. Firstly, we set out the list of functional and non-functional requirements defined for the tool. Secondly, we describe the platform's architecture and review the different phases of its development. Thirdly, we present the preliminary results obtained after uploading all datasets identified in previous deliverables (i.e., D3.3, D3.4, and D3.5) and the general appearance of the WETSET's implementation. Finally, conclusions and next steps are outlined to guide future improvements and ensure the sustainability of the tool.

In the second section, to showcase the usefulness of WETSET we use several of the datasets to analyse the conservation status of European wetlands. Particularly, we investigated how Land Cover and Land Use (LCLU) has changed over time in these wetland areas and the degree of protection these ecosystems have under the Natura 2000 network. As a preliminary analysis we focused on the Stiermark region in Austria one of REWET partner countries, which will serve as a case study. In the next months we will escalate the analysis to the European continent, these results will be presented in D3.12 – Final inventory of EU wetlands.



1.2 WPS AND TASKS RELATED WITH THE DELIVERABLE

Deliverable 3.11 is part of Work Package 3 – Mapping wetlands status in Europe, which aims to characterise, analyse, and integrate multiple datasets across various spatial scales to centralise information on EU wetlands within a structured inventory. Contributing to the wetlands assessments and their conservation status analysis at continental scale.

Within WP3, Task 3.8 – Integration of results for the full assessment of wetlands results is directly related to this deliverable. This task focuses on the design, implementation, and deployment of a European dataset index to support wetlands assessment. Furthermore, this task is directly related to several previous tasks and deliverables already finished. Firstly, it builds up on the methodology defined in Task 3.1 to develop the data scheme for the index and leverages ontologies to enable semantic search capabilities through a dedicated API. Secondly, it uses the work related to Task 3.2, Task 3.3, Task 3.4 and Task 3.5, in which a characterisation of the datasets was created, to populate WETSET with all relevant datasets about wetlands and demonstrate its usefulness.



2. THE WETSET TOOL

ANNEX I contains an end-user manual so that anyone accessing [WETSET](#) can navigate through the platform easily and comfortably.

2.1 REQUIREMENTS OF THE WETSET TOOL

2.1.1 FUNCTIONAL REQUIREMENTS

Functional requirements (FR) define the essential features and capabilities that the software/system must implement to achieve the project's goals, specifying its internal operations [1]. The functional requirements for the WETSET tool are outlined as follows:

WS.D1.FR.001. Provision of a publicly accessible index of wetland datasets: WETSET must offer a publicly available index of datasets relevant for researchers, conservationists, managers, and policymakers working on wetlands.

- **WS.D1.FR.001-1. User registration service:** Users should be able to register within the WETSET platform.
 - **WS.D1.FR.001-1-1. New user registration:** A new user can sign up independently. The system must assign a role to the user, restricting access to certain operations.
- **WS.D1.FR.001-2. Login service:** Users can access the system by logging in with their credentials.
 - **WS.D1.FR.001-2-1. Login:** Users can authenticate themselves using their login credentials.
- **WS.D1.FR.001-3. Administration service:** Administrators have access to a menu for performing administrative tasks.
 - **WS.D1.FR.001-3-1. User creation by administrator:** Administrators can create new user accounts.
 - **WS.D1.FR.001-3-2. User modification by administrator:** Administrators can edit user details.
 - **WS.D1.FR.001-3-2-1. Updating basic user information:** Administrators can modify essential details such as username and email.
 - **WS.D1.FR.001-3-2-2. Assigning predefined roles:** Administrators can allocate predefined roles to users (User, Editor, Maintainer, or Admin).



- **WS.D1.FR.001-3-3. User deletion:** Administrators can remove users from the system.

WS.D1.FR.002. Accessibility for all stakeholders: The WETSET platform must be openly accessible to all relevant stakeholders, including researchers, conservationists, managers and policymakers.

- **WS.D1.FR.002-1. Anyone can list datasets:** Any WETSET user can list all the datasets.
- **WS.D1.FR.002-2. Access to related external websites:** Users can navigate to external resources, including:
 - Copernicus Land Monitoring Service (CMLS).
 - European Environment Agency (EEA).
 - European Geological Data Infrastructure (EGDI).
 - European Soil Data Centre (ESDAC).
 - Global Biodiversity Information Facility (GBIF).
 - Global Peatlands Initiative.
 - National Geoportals for focal countries.
 - International websites focusing on wetlands conservation and research.
- **WS.D1.FR.002-3. Access to the help section:** Users can refer to a contact section to make suggestions, report bugs or ask questions about the platform.

WS.D1.FR.003. Storing and managing relevant information of datasets. The WETSET platform must facilitate the registration, modification, and management of datasets in accordance with the defined ontology. This ontology was developed in task 3.1, improved in subsequent task 3.3, and explained in their corresponding deliverables (hereafter referred as the ontology). The system must also support seamless updates to align with future changes in the ontology. Each dataset should store key metadata, including fields like publisher spatial scope, resolution, frequency of updates, last available update, data license and access constraints.

- **WS.D1.FR.003-1. Register a new dataset:** Any user with an account can register a new dataset within the application. However, the level of control varies by role. *[Admin | DataManager]* users can fully register and publish datasets. *[User]* role holders may submit draft versions, which require validation by editors or maintainers before final publication.
 - **WS.D1.FR.003-1-1. Add information in a dataset:** A user *[Admin | DataManager | User]* can input all the necessary metadata when



registering a new dataset, following the structure defined by the ontology.

- **WS.D1.FR.003-2. Edit a dataset:**
 - *[Admin | DataManager]* users can modify any dataset.
 - *[User]* users may only edit the datasets they originally created.
- **WS.D1.FR.003-3. Remove a dataset:**
 - *[Admin | DataManager]* users can delete any dataset.
- **WS.D1.FR.003-4. Display a dataset:** Any user can view the details of a specific dataset, including all properties defined in the ontology.
 - **WS.D1.FR.003-4-1. Navigate to the dataset link:** Any user can directly access the dataset through its provided link.

WS.D1.FR.004. Researchers will be able to extend its scope with additional datasets: The WETSET platform must provide a mechanism for researchers to expand the tool's dataset coverage by adding new datasets. The ability to contribute will depend on the level of authorisation assigned to the researcher.

WS.D1.FR.005. Advanced search will be allowed: For experienced users, WETSET must provide an advanced search capability via a **Graphical User Interface (GUI)**, allowing to refine searches by selecting specific dataset attributes and values.

- **WS.D1.FR.005-1. Search the results by its title and any of its properties:** Users can search for datasets by title or any other defined metadata fields.
- **WS.D1.FR.005-2. Filter the results by date:** Search results should be sortable by date to help users locate datasets relevant to a specific timeframe.
- **WS.D1.FR.005-3. Filter the results by many properties:** Users should be able to apply filters based on dataset properties, refining search results according to their specific needs. The list of filtering options consists of Dataset Type, Producer, Publisher, Access Constraints, Data License, Temporal Extent, Language, Topic, Format, Continent and Country.

WS.D1.FR.006. Assign a location to a dataset: A user *[Admin | DataManager | User]* must be able to assign a geographic location or coverage area to a dataset. This will facilitate the discoverability of the dataset for the other users. This functionality is not implemented yet, it will be developed in the coming months and reported in D3.12 – Final inventory of EU wetlands.

- **WS.D1.FR.006-1. Modify dataset location metadata:** A user *[Admin | DataManager | User]* can update or refine the assigned location metadata of an existing dataset to reflect more precise or corrected spatial information.



- **WS.D1.FR.006-2. Display datasets on a map:** The platform must provide a general map-based visualisation feature where users can explore datasets based on their assigned locations.
 - **WS.D1.FR.006-2-1. Preview dataset from map:** Users should be able to select a dataset from the map and quickly preview the dataset's most relevant characteristics.
 - **WS.D1.FR.006-2-2. Navigate to dataset details from the map:** Users should be able to click on a dataset displayed on the map to access its full details.

WS.D1.FR.007. Comments Management: Each dataset characterisation will include a comment section where users can suggest and discuss modifications, facilitating peer review within the WETSET platform.

- **WS.D1.FR.007-1. Create a new comment:** Registered users can post new comments on the platform.

2.1.2 NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements (NFR) specify the qualitative aspects and constraints that define how the system should operate or perform to meet project objectives [2]. These requirements establish conditions that the WETSET tool must adhere to ensure reliability, usability, and overall system efficiency.

WS.D1.NFR.001. Predefined roles: The system must define a set of predefined user roles with specific authorisations to ensure controlled access and management of resources:

- **Admin:** Holds full access to all available resources, including administrative and IT-related aspects of the platform.
- **DataManager:** users in charge of reviewing dataset characterisations made by users with more restricted roles.
- **User:** Represents the most basic role, enabling users to create draft characterisations and engage through comments on existing characterisations.

WS.D1.NFR.002. Help popovers: The interface will include dedicated help buttons, which, when clicked, will display contextual information related to specific sections, features, or available actions. These help popovers aim to enhance user experience by providing on-demand guidance and clarifications.

WS.D1.NFR.003. Geographic Metadata and Visualisation: To enhance dataset accessibility and contextual understanding, the system must allow datasets to be associated with geographic metadata indicating their relevant spatial scope. This information will enable users to determine the geographic coverage of datasets and



support spatial analysis where applicable. Furthermore, the platform should provide a general map-based visualisation feature, offering an overview of datasets based on their assigned geographic locations. This feature will facilitate navigation through spatially distributed datasets and improve discoverability. While specific implementation details may evolve, the system must be designed with the flexibility to incorporate location-based dataset exploration in a way that aligns with user needs and technical feasibility. This functionality will be implemented in coming months and reported in D3.12 – Final Inventory of European Wetlands.

2.2 ARCHITECTURE

The WETSET tool has been developed as a monolithic application, where the frontend, backend, and data access layers are part of the same codebase [3]. Unlike REST-based architectures that separate these components, monolithic applications integrate all functionalities within a single system. This approach simplifies deployment, ensures tighter coupling between components, and allows for more straightforward internal communication without the need for explicit API calls between services.

Since all components operate within the same environment, WETSET does not require a separate API to provide access to its internal data. Instead, data retrieval and processing occur directly within the application, with the user interface dynamically interacting with the underlying business logic and database. This structure streamlines interactions and reduces latency compared to API-based architectures, where network overhead is involved in every request.

However, despite not exposing an external API, WETSET maintains modularity within its codebase to facilitate maintainability and future scalability. Internal services handle dataset management, user authentication, and data visualisation, ensuring efficient operation while maintaining flexibility for potential integrations with other systems.

2.2.1 DATA PROCESSING AND USER INTERACTION

Users interact with WETSET through an integrated interface that provides access to dataset characterisations, advanced search functionalities, and visualisation tools. Since the platform is designed as a standalone system, all operations – such as dataset registration, metadata editing, and filtering – occur within the same application without relying on external clients. This ensures a seamless experience while maintaining a controlled environment for managing dataset information.

Authentication and authorisation mechanisms are embedded within the application, enabling role-based access control to different functionalities. This allows administrators, maintainers, and editors to manage dataset records effectively while ensuring data integrity and access restrictions where necessary.

For this project, the monolithic approach provides a robust, centralised system where all functionalities are contained within a single, cohesive application, ensuring



consistency and ease of deployment while addressing the specific needs of the project.

2.2.2 CONTAINERISATION AND DEPLOYMENT

To streamline deployment and improve scalability, the platform is containerised using Docker. The system operates within two separate containers: one dedicated to the application and another for the database. This architecture provides an isolated environment that enhances security and ensures that dependencies and configurations remain consistent across different deployments. With this approach, the platform can be deployed seamlessly across different environments, maintaining stability and reducing the risk of configuration-related issues.

The use of containerisation also facilitates integration with orchestration tools, enabling the possibility of automated scaling, monitoring, and fault recovery if required in future iterations of the platform. This method aligns with modern software deployment strategies, ensuring that the application remains adaptable and resilient.

2.2.3 SERVER-SIDE PROCESSING AND DATA MANAGEMENT

The application employs server-side rendering to manage user interactions and process requests efficiently. By leveraging the capabilities of the underlying framework, the platform ensures that computations, data retrieval, and business logic execution occur on the server, minimising the load on client devices. This enhances performance, particularly for complex operations, while maintaining a secure environment where sensitive data is handled in a controlled manner.

Data is stored in a relational database that operates within a dedicated container, ensuring data integrity and efficient query execution. This setup simplifies database management, allowing for optimised resource allocation and performance tuning. Additionally, the separation of concerns between the application and database layers enhances maintainability and security.

2.2.4 USER AUTHENTICATION AND ACCESS CONTROL

To ensure secure access to the platform, authentication mechanisms are implemented, managing user sessions and role-based permissions. This guarantees that only authorised users can perform specific actions within the system, safeguarding sensitive information and preventing unauthorised modifications.

By integrating secure authentication techniques, the platform maintains robust user management while providing a seamless experience for authorised personnel. Future enhancements may include additional authentication layers or integration with external identity providers to expand security capabilities.

The logout process in WETSET is managed through session cookies. By default, these cookies have a maximum validity period of three hours, after which they



automatically expire. If a user attempts to perform an action after the cookie has expired, the system returns an authentication error (401), prompting the interface to redirect the user to the login screen. When a user actively chooses to log out by clicking the logout button, the client sends a request to the backend to invalidate the session. This is achieved by modifying the authentication cookie with an expired timestamp. Once the browser processes the updated cookie, it automatically removes the session data, ensuring the user is logged out and redirected to the login screen.

2.2.5 SCALABILITY AND FUTURE CONSIDERATIONS

The platform's architecture supports adaptability, ensuring that it can evolve alongside project requirements. Further optimisations, such as database replication or load balancing, can be introduced to enhance performance and reliability, ensuring the system remains robust and efficient in various operational contexts.

2.3 WETSET DEVELOPMENT PROCESS

This chapter reviews all the stages that the WETSET platform has undergone throughout its development, from its initial design and interface construction to the integration of key functionalities and its deployment in a production environment. The development of WETSET has been a process of continuous evaluation, analysis, and refinement carried out by the partners involved. Regular testing, iterative improvements, and periodic monitoring meetings play a crucial role in identifying potential enhancements, resolving issues, and ensuring that the platform effectively meets its intended objectives.

2.3.1 DEVELOPMENT STAGES

The development of WETSET has gone through several well-defined stages, each contributing to the overall evolution of the tool. These stages can be summarised as follows:

Requirements and preliminary architecture definition (From October 2022 to May 2023)

The initial phase of the project involved defining the requirements and establishing the preliminary architecture of the platform. This stage set the foundation for all subsequent developments, ensuring that the system structure aligned with the overall project objectives and technological constraints.

Generation of the code projects and Docker files (January 2023)

Once the architecture was outlined, the development team proceeded with the creation of the core software components. During this stage, the code projects were initialised, including both backend and frontend components, and the necessary Docker files were defined to enable containerised deployment. This ensured



consistency across different environments and facilitated future updates and scalability.

User access control (From June 2023 to August 2023)

A crucial aspect of the platform was the implementation of user access control mechanisms. This phase focused on integrating authentication using cookies as the default mechanism. The system was designed to handle user authentication and session management efficiently, ensuring secure access to the platform.

WETSET GUI mockups and interface design (August 2023)

To ensure an intuitive and user-friendly experience, a set of mockups was created. These early interface designs provided a visual representation of the platform's structure and navigation flow. This stage allowed stakeholders to review and refine the user experience before development began.

GUI development and characterisation forms (From August 2023 to June 2024)

In this phase, the development of the WETSET interface using Blazor, as well as the creation of the characterisation forms, was initiated. The design and implementation were based on the properties defined by the ontology. Similar to the previous phase, this stage underwent continuous modifications throughout the entire process, driven by the ongoing improvements and changes introduced during the development. These adjustments were necessary to refine the functionality and ensure alignment with the project's evolving requirements.

WETSET dataset characterisation (From March 2023 to March 2025)

During this phase we reviewed many International, European, National and Regional databases, identifying the most relevant datasets containing information related to EU wetlands, peatlands and floodplains, as well as non-wetland-specific datasets that may be relevant for wetlands research activities (such as Copernicus Land Monitoring Service). We have identified and characterised 242 datasets in total (150 European-level datasets, 58 National and Regional datasets, and 34 datasets from previous EU research projects results). The detailed characterisation and analysis of these datasets can be consulted respectively in D3.3 – Characterisation of EU statistics datasets, D3.4 – Characterisation of national and regional data sources, and D3.5 – Characterisation of datasets from previous research projects. These datasets have already been included in the WETSET platform to serve as a robust baseline for the building of a significant data hub that centralises the available information on wetlands, peatlands and floodplains across Europe.

The dataset characterisations, initially collected in a spreadsheet, were loaded into the WETSET platform via a custom ETL process that transformed the data into the correct format and mapped the necessary properties to their corresponding Vocabulary Values.

2.3.2 DATABASE

The classification of the tables which can also be seen in Figure 1 is the following:



- **Vocabulary:** This table stores information about the vocabularies used within the system. Each vocabulary is a field in the datasets whose options are within a list of values called vocabulary values. For example, one vocabulary value could be language and its vocabulary values: English, Spanish, French... (Refer to the “Vocabularies” section in the WETSET user manual for more details)
- **Vocabulary_value:** This table contains the individual values that make up the vocabularies mentioned above (Further details can be found in the “Vocabularies” section of the WETSET user manual).
- **Dataset:** This table is the center of the data model and manages records of wetlands datasets (Refer to the “Description of WETSET Sections” in the WETSET user manual and the “Dataset” section in the WETSET data model guide for additional details).
- **Distribution:** This table organises dataset distributions (For more details, see the “Distributions” section in the WETSET user manual and the “Distribution” section in the WETSET data model guide).
- **Analysis_unit:** This table is responsible for storing different units of analysis associated with datasets.
- **Dataset_variable:** This table holds the dataset-related variables (See the “Variables Included” section in the WETSET user manual).
- **Keyword:** This table contains tags or keywords associated with the datasets available on the platform.
- **Comments:** This table contains the comments associated with the datasets available on the platform.



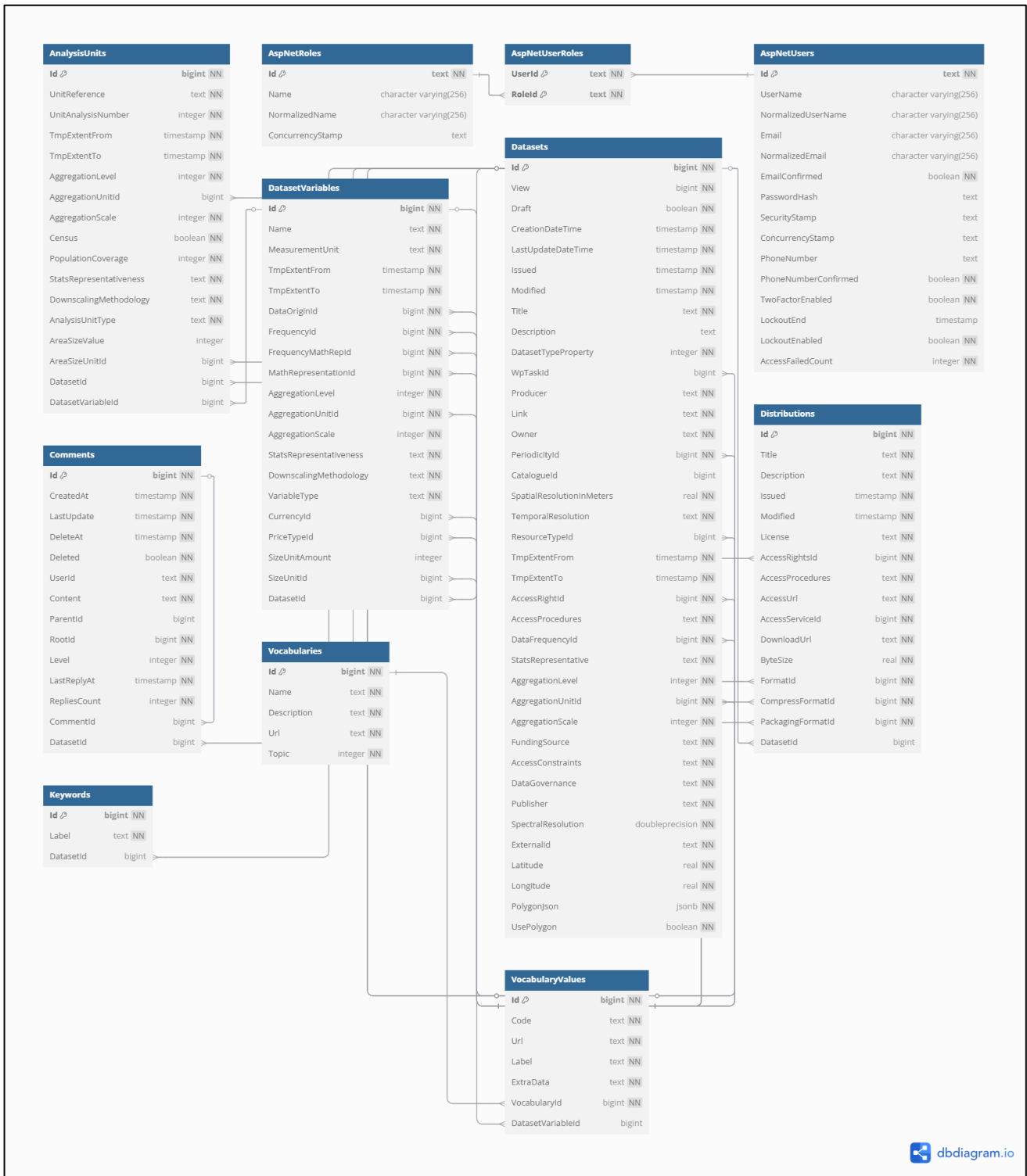


Figure 1. Provisional database structure that shows the different tables and its relationships. It includes three tables defined for authentication by the AspNet Framework

2.3.3 VOCABULARIES

One of the first steps in the development of the WETSET platform involved translating the ontology into the database schema. This process entailed transforming each class and property defined in the ontology into programming classes and objects that could be interpreted by the WETSET backend, thereby establishing the information models upon which the platform operates. During this translation, a new property, not part of the ontology, was defined: the vocabulary. Certain properties within the developed ontology require values derived from existing public vocabularies.

Vocabularies ensure that all institutions and users have access to and can make use of the same set of values, including multilingual vocabularies with terms in different languages. Figure 2 shows an example of a public vocabulary that includes the various types of currencies used worldwide [4].

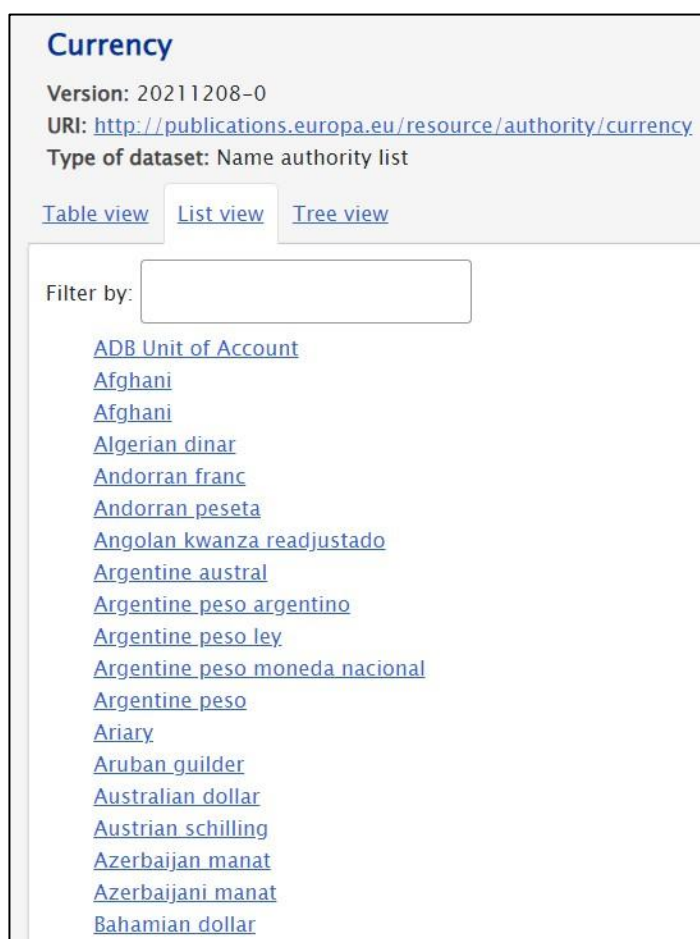


Figure 2. EU Authority tables example for currency vocabulary

The vocabularies in WETSET serve two primary purposes. The first is to provide users involved in the characterisation process with a set of predefined value lists associated with each property that requires them, allowing users to select the appropriate values to assign. The second purpose is to enable users to populate search filters with these values, facilitating queries to the WETSET backend in order



to search for characterisations based on one or more parameters. Figure 3 illustrates how the vocabularies are used within the WETSET platform to support the characterisation processes.

Vocabularies				
Id	Name	Description	Url	Topic
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
71	REPORT_TO_TASK	REPORT TO TASK vocabulary		REPORT_TO_TASK;
72	LANGUAGE	LANGUAGE vocabulary		LANGUAGE;
73	PERIODICITY	PERIODICITY vocabulary		PERIODICITY;
74	THEME	THEME vocabulary		THEME;
75	SUBJECT	SUBJECT vocabulary		SUBJECT;
76	PURPOSE	PURPOSE vocabulary		PURPOSE;
77	MATH_REPRESENTATION	MATH REPRESENTATION vocabulary		MATH_REPRESENTATION;
78	ACCESS_RIGHT	ACCESS RIGHT vocabulary		ACCESS_RIGHT;

1 - 8 of 23 items

Figure 3. Example of the vocabulary's admin view in WETSET platform.

Vocabulary: An entity representing the vocabulary, composed of the following attributes:

- i.**Id:** Unique identifier for the database (primary key).
- ii.**Name:** The name that distinguishes the vocabulary from others.
- iii.**Description:** A brief description of the vocabulary.
- iv.**Topic:** The dataset property to which the vocabulary is related to.
- v.**URL:** A link to the vocabulary on the internet.

Vocabulary value: An entity representing each value within the vocabulary, composed of the following attributes:

- i.**Id:** A unique identifier for the database (primary key).
- ii.**Code:** A short identifier of the value. It can be a combination of numbers and letters of 3 or 4 characters. Such as "v01" or "vc27".
- iii.**Label:** The text to be displayed in the dropdown menus.
- iv.**URL:** A link to the vocabulary value on the internet.
- v.**Extra data:** Additional information that distinguishes this value from the rest of the values in the vocabulary.
- vi.**Vocabulary id:** The unique identifier of the vocabulary to which the value belongs to.

2.3.4 USER INTERFACE (UI)

As an initial step in designing the WETSET interface, a thorough exploration of existing data portals was conducted to identify the most suitable structure for the platform. Several key platforms were analysed, including:



- **The Spanish Government's Open Data Initiative:** Supported by the Economy and Business and Territorial Policy ministries, this portal promotes the availability of public information and the development of advanced data-driven services. It hosts tens of thousands of datasets from a variety of sources and categories.
- **The U.S. Government's Open Data Portal:** The official data portal of the U.S. government, featuring more than three hundred thousand datasets across multiple domains.
- **The European Data Portal:** This serves as the primary access point for data published by EU institutions, agencies, and other bodies. With a repository exceeding one million datasets, its primary objective is to enhance transparency and accountability within EU institutions.
- **The French Government's Data Portal:** The official data portal of the government of France which is an open data platform with datasets from government and public organisations.
- **The NASA Open Data Portal:** NASA's official portal, which contains tens of thousands of datasets. Similar to WETSET, many datasets primarily store metadata, while the actual data is hosted on other NASA platforms.

Following the analysis of these platforms, several key structural components common to such portals were identified:

- **Dataset List Page:** A page displaying available datasets, equipped with filtering and search functionalities that allow users to query datasets based on various properties and attributes.
- **Dataset Details Page:** A dedicated page where users can view the metadata and attributes of a selected dataset, along with access or download links.
- **Other pages:**
 - **Contact:** A section with a contact form for users to submit inquiries, feedback, or report issues.
 - **Help/About:** A guide or help section explaining how to navigate and utilise the platform effectively.

Despite its absence in most of these portals, we determined a map page was essential for the aims of this project:

- **Dataset Map Page:** A page displaying available datasets in a map allowing users to access the datasets in a visual and intuitive way. This functionality will be implemented in the coming months and reported in D3.12 – Final inventory of EU wetlands.



2.3.5 COLOR PALETTE

The WETSET interface employs a colour scheme inspired by natural and environmental themes, reflecting landscapes associated with wetland restoration. These colours, combined with a neutral greyscale palette, reinforce the institutional character of the WETSET tools while ensuring clear content presentation.

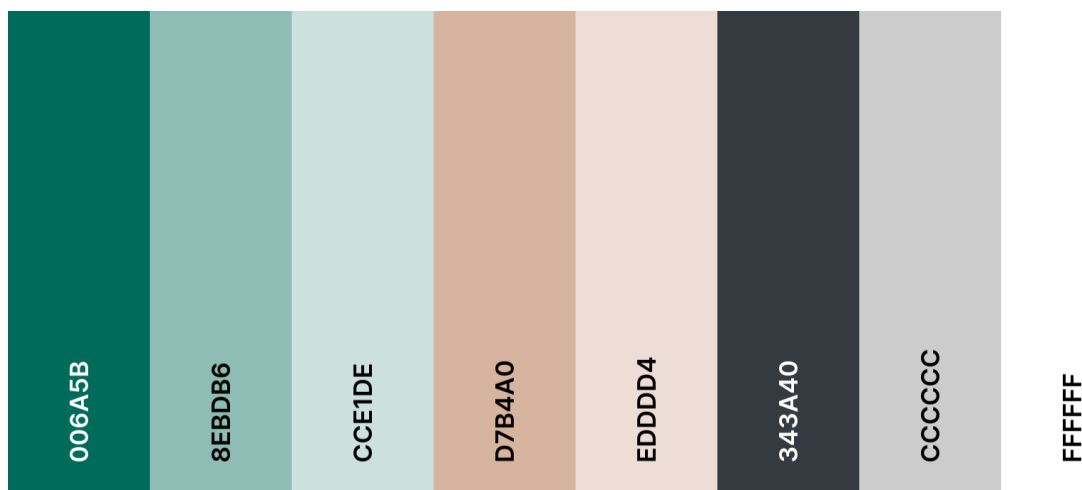


Figure 4. Colour palette used for the design of WETSET.

2.3.6 NAVIGATION

The organisation and navigation structure of the WETSET interface is designed based on insights gained from analysing existing web portals and is built around two key elements:

- **Public/Private Sections:** Certain sections and features of the platform are fully accessible to the public, while others require users to log in with an account to access or utilise them.
- **User Roles:** Once logged in, users may encounter restricted sections or functionalities based on their permissions. For example, administrative or maintenance-related sections are only accessible to users with the appropriate authorisation.

Figure 5 illustrates the operational flow that users follow when interacting with the platform. Green squares represent distinct views or screens within the platform, while yellow squares indicate subsections of a screen, such as buttons, navigation bars, overlays, or other interactive elements that do not result in a full-page change. Squares featuring padlock icons denote pages or elements that require authentication, and in some cases, specific user roles for access.



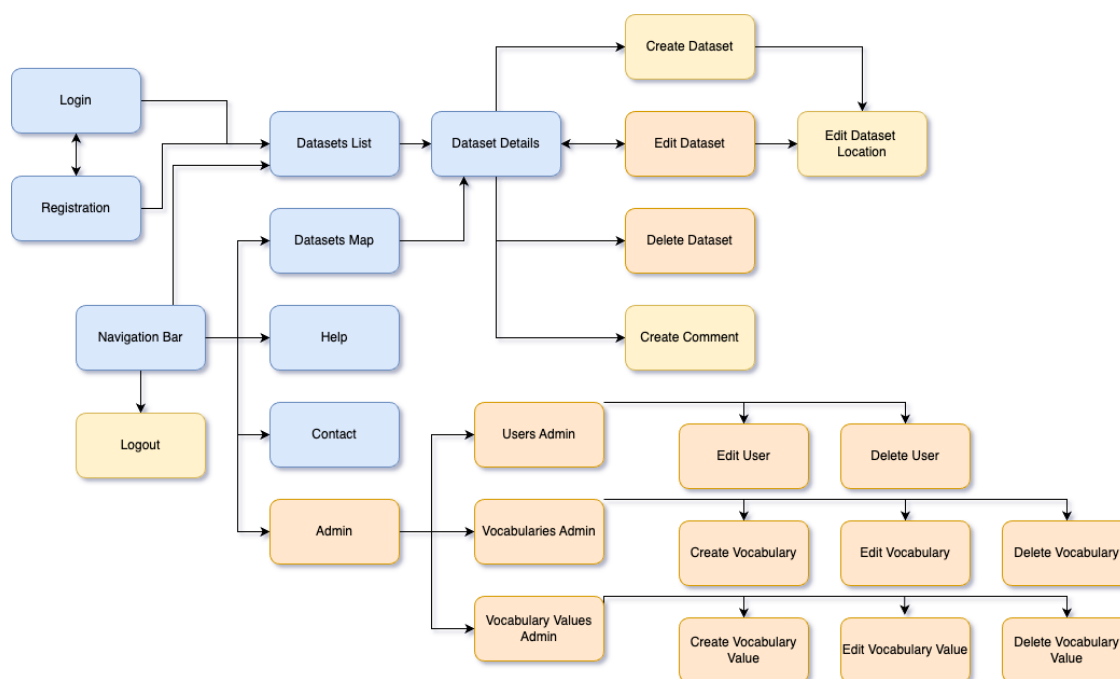


Figure 5. Operational flow.

In general, the platform is divided into the following sections:

- **User Access:** Includes screens for login, user registration, and password recovery.
- **Dataset:** Encompasses all pages related to viewing and managing datasets available on the platform.
 - **Dataset List:** A publicly accessible page where users can browse datasets registered on the platform and filter results using various parameters.
 - **Dataset Map:** A publicly accessible page where users can browse datasets registered on the platform within an interactive map. This section has not been created yet since the functionality is not ready but will be available in the coming months and reported in D3.12 – Final inventory of EU wetlands.
 - **Dataset Details:** Upon selecting a dataset from the list, users are directed to a detailed view displaying its metadata.
 - **Comments:** Each dataset includes a comment system where users can discuss questions, suggestions, errors, or improvements. Any registered user can add comments, while users with advanced permissions (e.g., admins and maintainers) can manage and delete comments.

- **Create a Dataset Characterisation:** After logging in, users can create new dataset characterisations using dedicated forms.
- **Edit a Dataset Characterisation:** Logged-in users can update or modify dataset characterisations through characterisation forms.
- **Management:** Users with maintenance permissions can manage key platform elements, including:
 - **Vocabularies:** Manage controlled vocabularies by creating new ones or editing existing ones.
 - **Vocabulary Values:** Manage controlled vocabulary values by creating new ones or editing existing ones.
- **Users:** Administer registered user accounts, including creation, modification, and deletion.
- **Help:** Provides a way for users to contact the platform administrators with suggestions, questions, or bug reports.

Upon accessing the platform, users land on the main screen, which presents an overview of the project and the WETSET platform, along with a login form and a guest access option.

The platform features a navigation bar (navbar) that provides access to all available sections. However, the content of the navbar may vary depending on whether the user is logged in or accessing as a guest, in which case certain sections and content will be restricted (Figure 6).

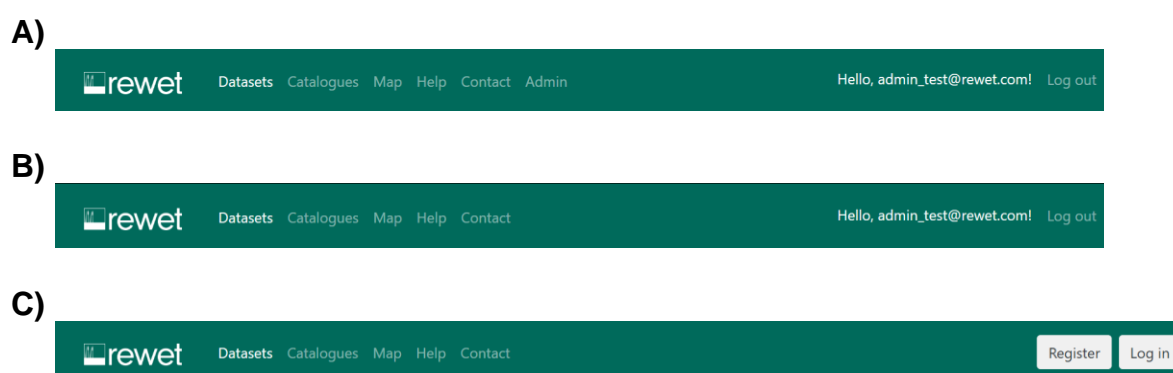


Figure 6. Appearance of WETSET navbar under different scenarios when A) a user is logged in as an Admin, B) a user is logged in as a User, and C) a user is not logged in.

As an additional navigation option, users can directly manipulate the website URL in their browser. By appending specific paths to the base URL of the platform, users can access different sections of the platform (Figure 7). For example:

- **Base URL + “/login”:** Redirects the user to the login page.
- **Base URL + “/datasets”:** Redirects the user to the dataset listing page.



- **Base URL + “/datasets_map”**: Redirects the user to the dataset map page.
- **Base URL + “/datasets/” + “id”**: Redirects the user to the details page of a specific dataset.

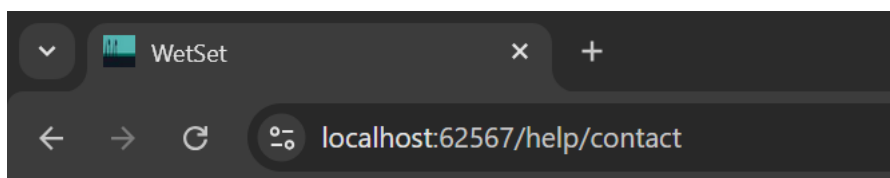


Figure 7. WETSET URL navigation example

2.3.7 AUTHORISATION

Authorisation on the platform is enforced across two layers: frontend and backend.

- **Frontend Management:**
 - Interface elements and content are dynamically shown or hidden based on the user's role.
 - Navigation to certain pages is restricted using a “guard” mechanism, which verifies the user's role before allowing access. If the required permissions are not met, navigation is blocked.
- **Backend Management:**
 - Each platform operation is controlled by verifying user roles. If a user attempts to perform an action they are not authorised for, access is denied, and an error response is returned.

2.3.8 RESOURCE GOVERNANCE

Access to the various resources available on the WETSET platform is regulated based on user roles. To manage access control and resource modification, four distinct roles have been defined:

- **ADMIN**: Superusers with full access to all platform resources and complete control over IT management aspects.
- **DATA MANAGER**: Users who review dataset characterisations submitted by users with lower permissions. When a **USER** creates a new dataset characterisation, it is stored as a draft and remains visible only to editors or maintainers. These roles ensure that characterisations are properly reviewed and validated before publication. Editors can also modify any dataset characterisation on the platform.



- **USER:** The basic role, allowing users to create and edit their own draft characterisations. However, these drafts require approval from an editor or a higher-level user before they can be published. Additionally, users can post comments on any existing dataset characterisation.

Beyond these predefined roles, not registered or unlogged users (guests) also interact with the platform. While authentication is separate from role-based permissions, the lack of login credentials affects access to certain platform resources.

Table 1 outlines the specific permissions assigned to each role for the various resources and functionalities of the platform.

Table 1. List of permissions according to user role. () only when the user is the creator of the dataset characterisation.*

	ADMIN	DATA MANAGER	USER	NOT REGISTERED
Login	Yes	Yes	Yes	Yes
Registration	Yes	Yes	Yes	Yes
Password Recovery	Yes	Yes	Yes	Yes
Dataset list	Yes	Yes	Yes	Yes
Dataset map	Yes	Yes	Yes	Yes
Dataset details	Yes	Yes	Yes	Yes
Create a new dataset characterisation (fully public)	Yes	Yes	No	No
Create a new dataset characterisation proposal (draft datasets)	Yes	Yes	Yes	No
Edit an existing dataset characterisation	Yes	Yes	Yes*	No
Edit an existing dataset location	Yes	Yes	Yes*	No
Delete an existing dataset characterisation	Yes	Yes*	No	No

	ADMIN	DATA MANAGER	USER	NOT REGISTERED
Search for draft dataset characterisations	Yes	Yes	No	No
Publish dataset characterisation proposals	Yes	Yes	No	No
Reject dataset characterisation proposals	Yes	Yes	No	No
List the comments of a dataset characterisation	Yes	Yes	Yes	Yes
Create new comments	Yes	Yes	Yes	No
Vocabulary list	Yes	Yes	No	No
Vocabulary details	Yes	Yes	No	No
Create a new vocabulary	Yes	Yes	No	No
Edit a vocabulary	Yes	Yes	No	No
Delete a vocabulary	Yes	Yes	No	No
Registered user list	Yes	Yes	No	No
Create a new user	Yes	No	No	No
Edit an existing user data	Yes	No	No	No
Edit an existing user role	Yes	No	No	No
Delete an existing user	Yes	No	No	No



2.4 RESULTS

The creation of the WETSET tool have been related to several deliverables and tasks within WP3. The progress of all this work has allowed a coherent and solid advance, based on all different stages of the development of the tool. Particularly, the following deliverables have been used:

- D3.1 Standardised methodology and set of ontologies for the characterisation of data sources.
- D3.2 Details and agreements for accessing the selected data sources.
- D3.3 Characterisation of EU statistics datasets.
- D3.4 Characterisation of national and regional data sources.
- D3.5 Characterisation of datasets from previous research projects.

These deliverables were conceived with two objectives in mind. On the one hand, to validate and confirm that the developed methodology is suitable for characterisation process and applicable to different types of datasets. And on the other hand, to populate the WETSET database with all the identified datasets.

The results of the deliverables allowed a total of 242 datasets to be added to the platform. From these, 62% came from D3.3 being the biggest information provider to the platform, followed by 24% from D3.4 and 14% from D3.5.

The work done in these deliverables allowed us to test the platform in its functionalities and incorporate all the information gathered in these documents. Moreover, it allowed us to identify errors and bugs that could have been missed in the development of the tool. As a result of this process all datasets identified in previous deliverables were uploaded to the platform (Figure 8). All the information gathered was added to the dataset's characterisation following WETSET procedures. Figure 9 shows an example of one dataset already created in the platform.



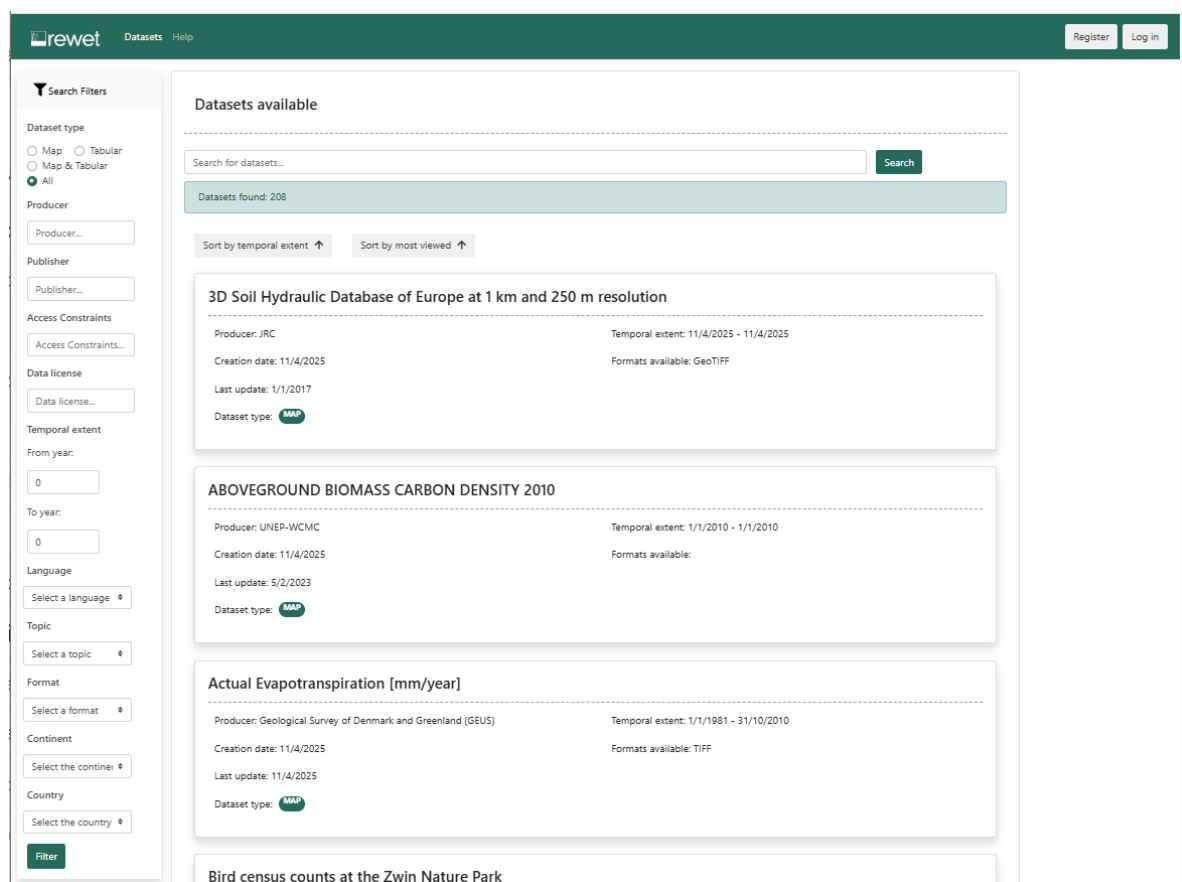


Figure 8. Screenshot from WETSET landing page.



Figure 9. An example of a dataset included in WETSET.



2.5 GOVERNANCE IMPLEMENTATION OF WETSET

The governance implementation of WETSET ensures efficient data management, compliance with regulations, and seamless integration within the REWET project framework. It establishes clear guidelines for data access, ownership, and interoperability while supporting the long-term sustainability of the platform. Key governance aspects include:

- **Data Access and Permissions:** WETSET defines role-based access controls to ensure that only authorised users can retrieve, modify, or manage data. Different permission levels are assigned based on user profiles, including researchers, policymakers, and data providers (see the previous Section 2.3.8).
- **Data Ownership and Licensing:** All datasets integrated into WETSET are linked to their respective owners, ensuring transparency and compliance with intellectual property rights. The platform supports various licensing agreements, defining usage constraints and data-sharing policies.
- **Interoperability and Standards Compliance:** WETSET adheres to open data standards and follows FAIR (Findable, Accessible, Interoperable, and Reusable) principles to enhance compatibility with external data sources and facilitate seamless integration with other environmental monitoring platforms.
- **Automated Data Retrieval and Updates:** The governance framework includes mechanisms for automated data ingestion, ensuring that wetland information remains up to date. APIs and data pipelines are established to retrieve new datasets while maintaining version control.
- **Security and Privacy Measures:** WETSET incorporates security protocols to safeguard sensitive information, following GDPR and other relevant data protection regulations. Secure authentication and encryption techniques are implemented to prevent unauthorised access.
- **Quality Assurance and Data Validation:** A governance model is in place to verify the accuracy and consistency of integrated datasets. Automated validation routines and manual review processes help maintain the reliability of wetland assessments.
- **User Responsibilities and Collaboration:** The governance framework promotes collaboration between different stakeholders, defining their roles in data contribution, review, and decision-making processes. Guidelines for data submission and feedback mechanisms are established to enhance engagement.
- **Sustainability and Future Development:** Governance measures include strategies for the long-term sustainability of WETSET, ensuring continuous support, maintenance, and potential expansion to accommodate new functionalities and datasets.



3. CASE STUDY: WETLANDS CONSERVATION ASSESMENT

The ultimate goal of WETSET is to be a tool to promote and facilitate the advance of research on wetlands to better understand their conservation status, ecological dynamics and best management strategies. To showcase the usefulness of this tool and advance in the scientific understanding of wetlands, we apply several of the characterised datasets in a case study to assess European wetlands conservation status. Particularly, we investigate how Land Cover and Land Use has changed over time in these areas and the degree of protection these ecosystems have under the Natura 2000 network. As a preliminary analysis we focused on the Stiermark region in Austria, which will serve as a case study. In the next months we will escalate the analysis to the European continent. These results will be presented in D3.12 – Final inventory of EU wetlands.

3.1 CONTEXTUALISATION

Wetlands are among the most important ecosystems globally, providing invaluable ecosystem services such as water provisioning, buffering of runoff and river discharge, the production of food, and ecotourism [5,6]. However, despite their crucial importance, they have been subject to substantial destruction and degradation due to human activities [6,7]. This destruction has not been equally distributed across the globe, with areas like Europe, North America, and Asia being more severely affected. In Europe alone, it is estimated that over the last 300 years, the area occupied by natural wetlands has been reduced by 50% [8]. In recent years, their conservation importance has been increasingly recognised internationally through significant policy instruments such as the [1971 Ramsar Convention](#) and the inclusion of [Indicator 6.6.1 in the United Nations Sustainable Development Goals](#). Nevertheless, despite this growing awareness and these protective measures, wetlands continue to face significant threats and remain in danger of further loss and degradation.

Several threats are driving the destruction and degradation of wetlands. One of the main causes of this decline has been the conversion of these areas to human-modified landscapes. Particularly, during the past century, the transformation of wetlands into agricultural and urban areas has been a primary driver of change [8]. Furthermore, these ecosystems are not immune to other significant global threats that negatively influence their conservation status, such as pollution, invasive species, and overexploitation [5,6]. Despite covering a relatively reduced area, wetlands hold a central importance for both biological conservation and climate change, largely due to their rich biodiversity, crucial roles in water and carbon cycling, and the provision of numerous essential ecosystem services [9,10].

In this study, we focus on a region within Austria to assess the conservation status of European wetlands. Our objectives are to analyse: i) how land cover and land use have changed in wetland areas over the period from 2000 to 2018; and ii) the degree of environmental protection afforded by European legislation. To achieve this, we employ pan-European data, allowing us to escalate this analysis to a continental level in the coming months for our next Deliverable 3.12. Specifically, we utilise the



latest inventory of European wetlands [11], alongside the CORINE Land Cover dataset [12] and the Natura 2000 network of protected areas [13]. All these datasets are available through the WETSET tool. By analysing these parameters, we aim to gain information about the pressures exerted by human activities and the extent to which these wetlands are protected by the Natura 2000 network. This approach will enable us to provide insights into how well these areas are safeguarded from anthropogenic stressors, the degree of naturalisation or humanisation they exhibit, and the temporal trends in these characteristics.

3.2 METHODS

3.2.1 STUDY AREA

For this preliminary analysis we focused on a particular region of Austria called Stiermark (Figure 10), which is one of the partner countries in the REWET project. This region represented a good example since it includes the three types of wetlands studied: peatlands, floodplains and other inland wetlands and presented a big enough area covered to be representative of ecological and anthropogenic processes.

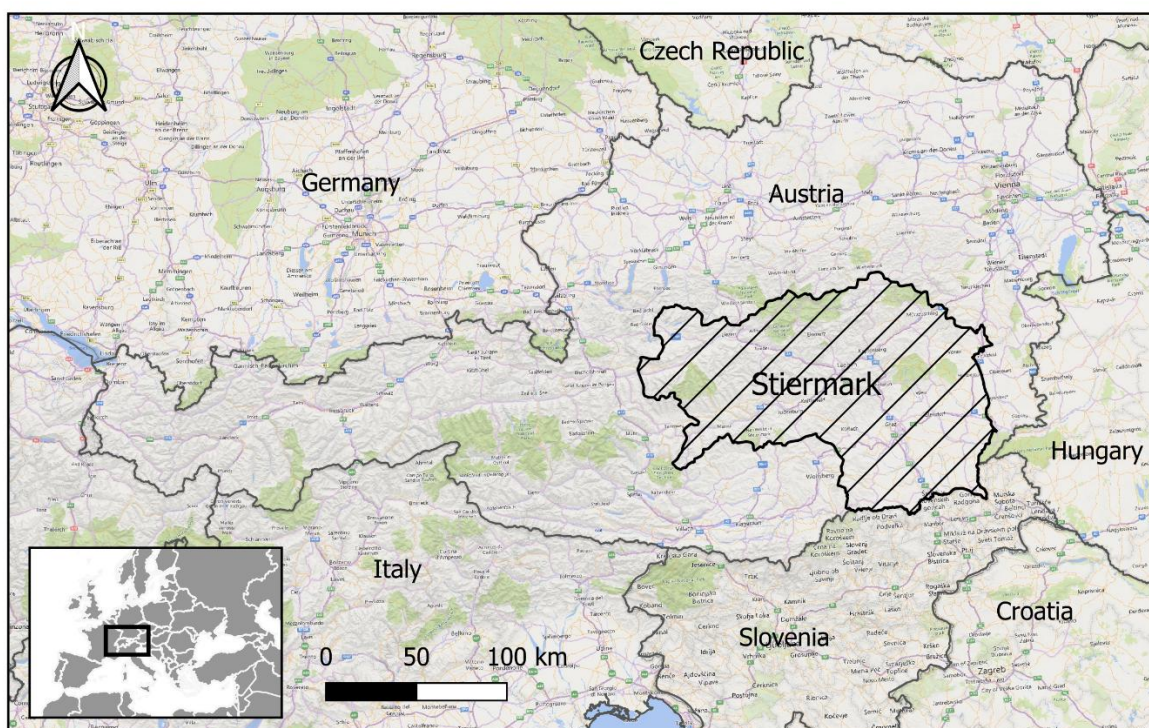


Figure 10. Location map of the study area

3.2.2 DATASETS

Three datasets included in WETSET were used for this analysis:

The European Wetland Map

The distribution of European wetlands was incorporated in our analysis using the recently published The European Wetland Map [11]. This is the latest effort to map all European wetland by unifying information from multiple sources. It integrates existing data, making it comprehensive and easily accessible, to increase the visibility of European wetlands and facilitate better analysis, understanding, and management. This product has been developed by the sister project [Alfa Wetlands](#). One of its key features is that it classifies wetlands in four typologies: floodplains, coastal wetlands, other wetlands and peatlands. Moreover, floodplains are divided into subcategories: maximum extent of floodplain, potential floodplain extent and actual floodplain extent. For this analysis, we selected those areas classified as: actual floodplain extent (hereafter floodplain), other wetlands and peatlands, which aligns with REWET objectives.

CORINE Land Cover

To incorporate information about LCLU at European level, we employed the CORINE Land Cover (CLC) dataset accessed through the [Copernicus Land Monitoring Service](#). This product is updated with new status and change layers every six years – with the most recent update made in 2018. Produced by the European Environment Agency (EEA) is a free to use product covering continental Europe. This product offers land cover and land use inventory defined in a 3-level hierarchical system, Level 3 including 44 thematic classes, which can be aggregated up to 15 classes at Level 2, and just 5 broad classes at Level 1. For the purposes of our study all spatial analysis were done at Level 3 and for clarity in some of our figures we grouped results into Level 1. Regarding the time span we used data from years 2000, 2006, 2012 and 2018.

The use of CLC for investigating long term time series like this present some challenges related to the technical specifications inherent these datasets and the progression methodology. To address this, a harmonisation approach has been formulated by the EEA. This methodology aims to establish a statistically robust foundation for the analysis of CLC time series through the creation of what are termed CLC accounting layers. These accounting layers are available as a ready to use product and were employed in our analysis following recommendations from data producers [12].

Natura 2000

To investigate the degree of protection of wetlands, we used the Natura 2000 network of protected areas across the European Union (EU). Managed by the European Commission's Directorate-General for Environment, it is legally supported by the [Birds Directive \(2009/147/EC\)](#) and the [Habitats Directive \(92/43/EEC\)](#), both transposed into national laws by EU Member States. It forms the core of EU nature and biodiversity policy and provides invaluable information about habitats and



species. For this analysis, we used the latest version of the Natura 2000 maps version 2022 [13].

3.2.3 SPATIAL ANALYSIS

By overlapping the distribution of wetlands with the different layers of CLC from each year, we were able to obtain accurate information about LCLU inside these areas and the change of this over time (18 years). We run this analysis separately for each of our focal types of wetlands (i.e., floodplain, other wetlands, and peatlands) and for all types combined. This allowed us to explore how different types of wetlands have been impacted differently by human pressure over a period of 18 years. We analysed the degree of protection by overlapping the Natura 2000 maps. This allowed us to calculate how much of these areas are catalogued as protected according to the EU directives. All analysis were performed in QGIS [14] and Rstudio [15].

3.3 RESULTS

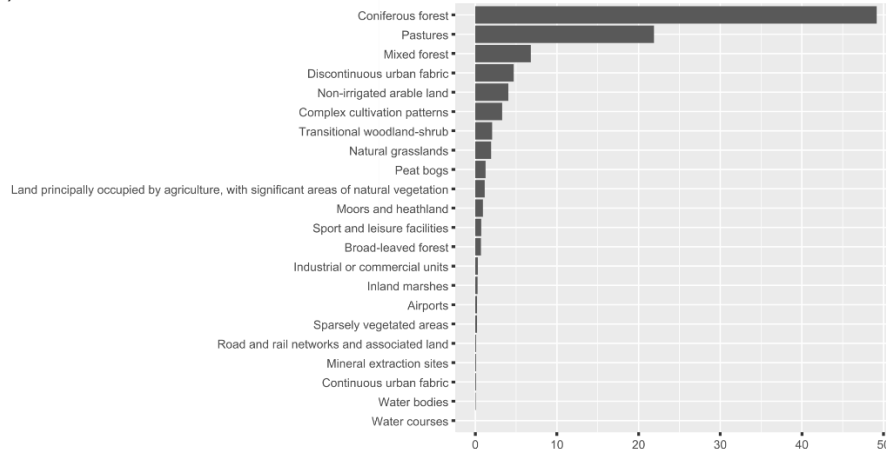
The analysis of CORINE Land Cover data for the year 2018 reveals distinct land cover patterns across the studied wetland ecosystems. In peatlands, the dominant land cover is coniferous forest, occupying the largest proportion (49.2%), followed by significant areas of pastures (21.9%) and mixed forest (6.8%). This suggests that forested areas are prevalent within the peatlands identified in this dataset, with relatively lower representation of open vegetation (Figure 11-A).

Floodplains also exhibit a high presence of coniferous forest (28.8%), followed by mixed forest (21.2%) and pastures (16.8%) (Figure 11-B). Similar to peatlands, forested land covers are major components of floodplains. In contrast, other inland wetlands are characterised by a dominance of broad-leaved forest (35%), followed by a remarkable importance non-irrigated arable land (17.7%) and pastures (13.6%). Forested land cover classes are less prominent in this category, indicating a greater prevalence of open vegetation and agricultural land uses (Figure 11-C).

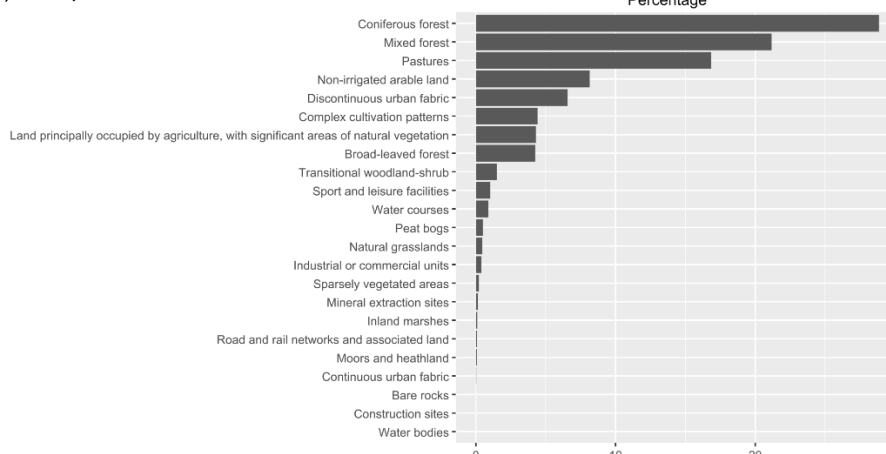
Overall, a similarity observed is the notable presence of different types of agricultural land across all three wetland types, highlighting agricultural activity as a relevant factor in these ecosystems. Coniferous and mixed forests are significant in both peatlands and floodplains, while other wetlands show a smaller influence of forests. These findings underscore the diverse land cover characteristics within different wetland types as classified by the CORINE Land Cover dataset.



A) Peatlands



B) Floodplains



C) Other inland wetlands

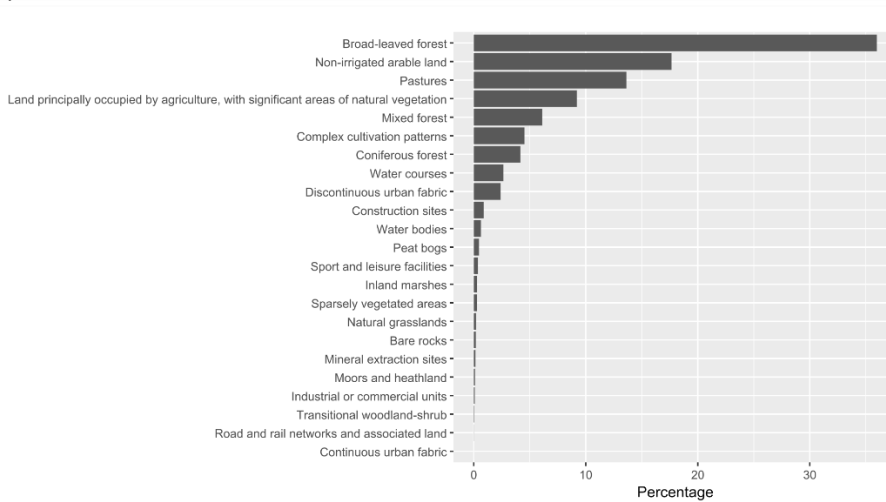


Figure 11. Percentage of LCLU thematic classes Level 3 CORINE Land Cover for the three types of wetlands; A) peatlands, B) floodplains and C) other inland wetlands



For the analysis of temporal dynamics of LCLU change, we grouped thematic classes in Level 1 which reduced from 44 thematic classes to 5 classes. This allows a better interpretation of results and analysis of dynamics. This analysis shows that forest and seminatural areas constitute the largest proportion of land cover throughout this period, maintaining a remarkably stable presence of approximately 58%. Agricultural areas also represent a significant portion of the European landscape, consistently occupying around 33 to 34% over the observed years, indicating a relatively stable agricultural footprint (Figure 12).

In contrast, artificial surfaces, which include urban and developed areas, demonstrate a clear trend of expansion. Starting at roughly 5.2% in the year 2000, this land cover type steadily increased to 6.5% by 2018. The proportion of land covered by water bodies remains consistently low and stable, hovering around 0.8% throughout the study period, suggesting no significant changes in the extent of these areas (Figure 12).

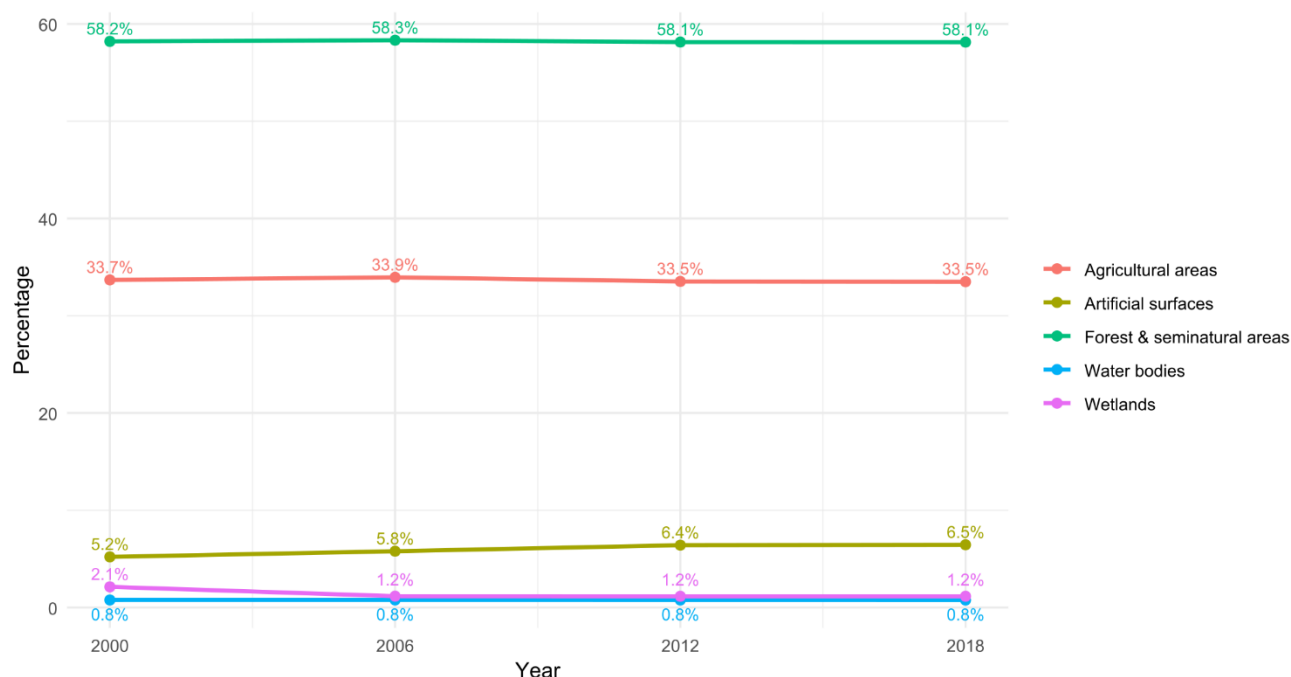


Figure 12. Temporal analysis of LCLU change covering the period from 2000 to 2018 based on Level 1 thematic classification from CORINE Land Cover.

Most significantly, the percentage of wetland areas exhibits a notable decline. From approximately 2.1% in the year 2000, the proportion of wetlands decreased to around 1.2% by 2018. This near halving of wetland areas over the 18-year period represents a substantial proportional loss of these crucial ecosystems. When translating this value into absolute area lost, we find that during the period covered wetland areas decreased by 4576 km². Interestingly, this amount is very similar to the absolute area increase of artificial surfaces which was of 5854 km². These results suggest that the decrease of wetland areas have been lost to the creation of urban areas. This significant decrease, occurring while other major land cover types remain relatively stable or even increase, underscores the vulnerability of wetlands

and the potential pressures they face from other land-use changes, such as the expansion of artificial surfaces.

The analysis about protected areas shows that only 17.36% of the wetlands surface is under the Natura 2000 network (Table 2). Revealing also a considerable variation in the degree of protection afforded to these different wetland ecosystems. Other inland wetlands exhibit the highest proportion of their total area under protection, with 42.03% designated as protected. In contrast, flooded plains show the lowest level of protection with 12.02% protected. Peatlands occupy an intermediate position, with 13.71% protected (Table 2).

Table 2. Protected areas under the Natura 2000 network.

	Protected Area (km ²)	Total Area (km ²)	Percentage Protected
Peatlands	36.5	265.8	13.71%
Flooded plains	16.5	137.12	12.02%
Other inland wetlands	28.97	68.93	42.03%
All wetlands	81.9	471.84	17.36%

3.4 DISCUSSION

The land cover dynamics across wetlands from this Austrian region, reflect complex interactions between ecological processes and anthropogenic pressures. The dominance of forests – especially coniferous – in peatlands and floodplains may result from historical afforestation and encroachment processes [16]. In contrast, other inland wetlands show higher agricultural use and less forest cover, highlighting their exposure to land-use intensification. While agricultural land cover appears stable in spatial extent, its persistent presence across all wetland types suggests enduring pressure from human land demands [17]. The sharp decline in wetland areas from 2000 to 2018, paralleled by the expansion of artificial surfaces, reinforces the link between urban growth and ecosystem loss – a trend echoed in other recent land change assessments across Europe [18].

Despite wetlands' ecological significance, only 17.36% of their area is under Natura 2000 protection, with floodplains particularly underrepresented. This aligns with critiques of spatial biases in conservation coverage, which often neglect dynamic ecosystems like wetlands [19]. Although recent advances in land monitoring enable more precise detection of landscape change, effective policy responses remain limited. The ongoing loss of wetland area, even amid improved environmental data, underscores the need for stronger regulatory mechanisms and targeted restoration policies to halt further degradation of these vulnerable ecosystems.



4. CONCLUSIONS

Deliverable 3.11 – Preliminary Inventory of EU Wetlands provides a comprehensive guide to understanding how the WETSET platform has been designed and implemented, detailing its functionalities and the application of the methodology defined in the project to characterise wetland-related datasets. Furthermore, the work carried out in previous tasks has enabled the successful integration of diverse data sources and allowed the harmonisation of wetland information and facilitating interoperability between datasets. The release of WETSET marks a significant step towards improving access to wetland data across Europe. Users can explore a consolidated collection of datasets, access key metadata, and will shortly be able to visualise wetlands through the platform's advanced mapping functionality that we are developing to be implemented in the final version.

Moreover, our preliminary analysis of wetlands conservation status serves as a crucial demonstration of WETSET's utility. By leveraging datasets readily available through the platform – the European Wetland Map, CORINE Land Cover, and the Natura 2000 network – the analysis effectively investigated land cover changes and protection levels within wetland areas. This initial investigation, highlighting the potential for assessing wetland conservation status using integrated data, provides a remarkable example of how WETSET can facilitate continental-scale analyses, with the promising next step of expanding this assessment across Europe.

Although the core development of WETSET is complete, further refinements and enhancements will be made to maximise its impact. These will include:

- Improving semantic search capabilities to enhance data discovery and accessibility.
- Refining the automated data ingestion and validation processes to ensure high-quality and up-to-date datasets.
- Expanding interoperability with external platforms and environmental monitoring tools.
- Final development of geographical functionalities including map-based visualisation and location assignment.

All these improvements and modifications will be further detailed in the final deliverable D3.12 – Final Inventory of EU Wetlands (M42), which will provide the complete and updated overview of WETSET's functionalities and impact.

Finally, as with any evolving digital tool, the features and functionalities described in this document may be subject to further updates and modifications. Continuous improvements will be implemented to ensure that WETSET remains a robust, reliable, and user-friendly platform, supporting wetland assessment and informed decision-making across Europe.



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6. ANNEX I: WETSET END-USER MANUAL

In all the following screens, the REWET icon shown in the top left corner serves as a button to return to the **Home** page. All the pages show the same footer as well, giving the user information about the project and linking the projects social media in the form of two buttons.

6.1 HOME PAGE (USER NOT LOGGED IN)

To access the WETSET tool click on this link: <https://wetset.idener.ai>, you will be welcomed by the **Home page**. The version shown to the user changes if the user is logged in.

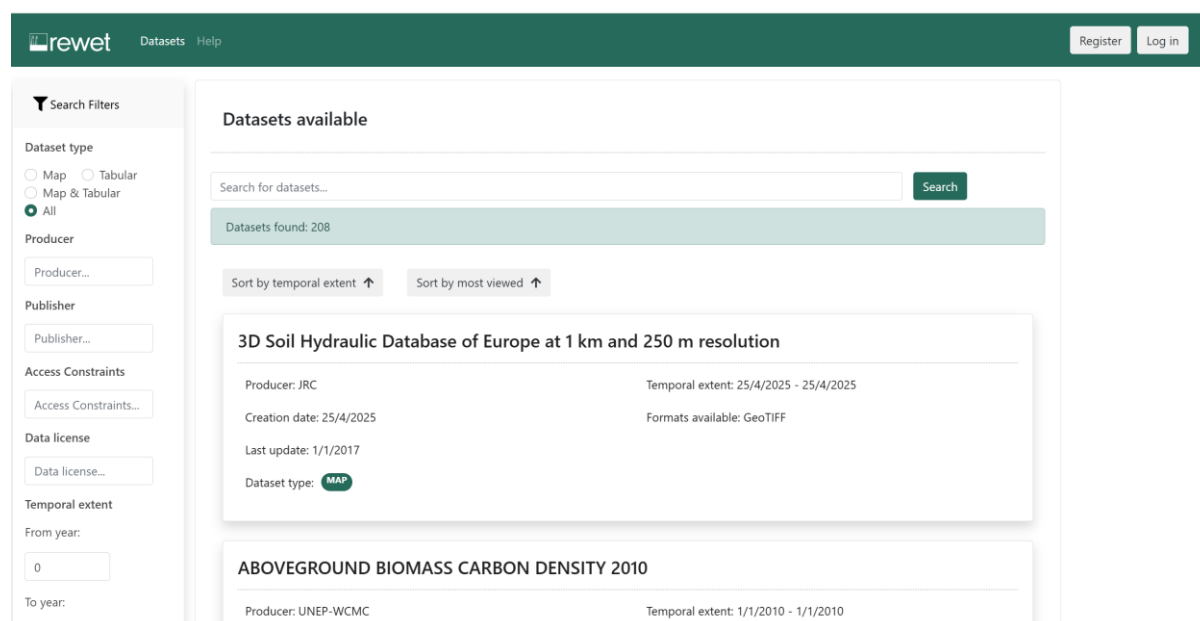


Figure 133. WETSET Home page.

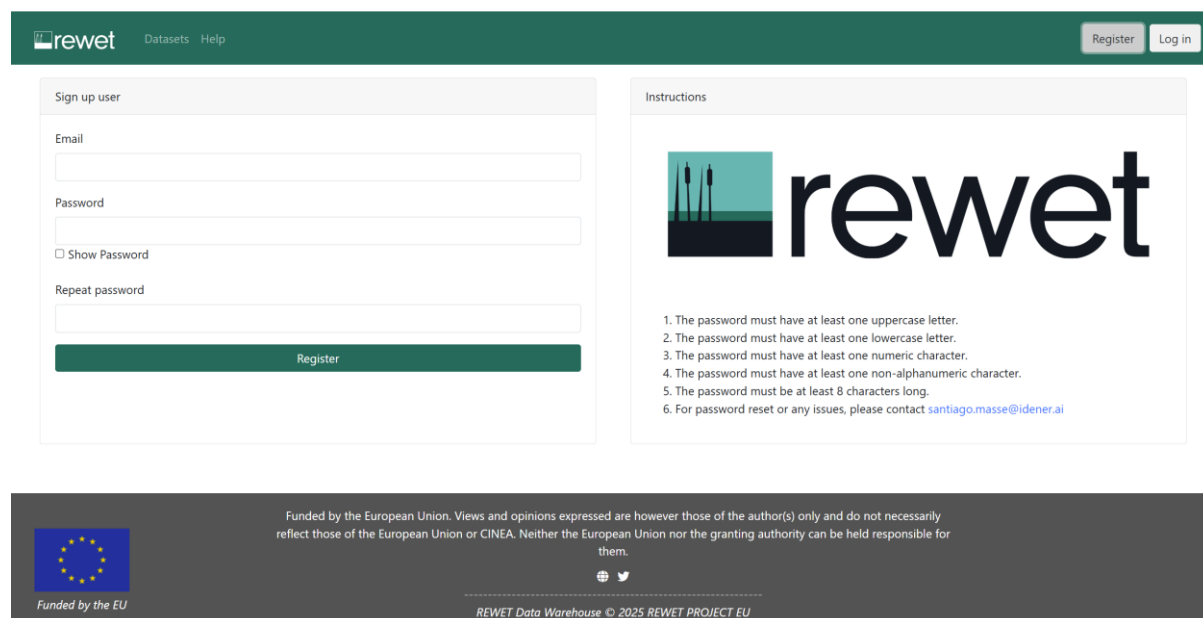
The actions available to the user in this stage are:

- i) **Register:** Create a user account using email and creating a password.
- ii) **Login:** Use account credentials to log in.
- iii) **Search dataset.** The user has different options:
 - a. Regular scrolling through dataset list.
 - b. Use the search bar to look for a specific dataset.
 - c. Predefined sort buttons to order the list of datasets.
- iv) **Filter datasets** (left vertical menu): Select between the main features of the datasets to filter the list shown to the user. These filters include:
 - a. Dataset type: Map, Tabular, and Map & Tabular.
 - b. Producer: Organisation responsible for creating the dataset.
 - c. Publisher: Organisation responsible for publishing the dataset.

- d. Access constraints: Organisation's policy to access datasets.
 - e. Data licence: Organisation's license for using datasets.
 - f. Temporal extent.
 - g. Language.
 - h. Topic: Land Use & Land Cover, Soil, Water, Vegetation, Fauna, Fungi, Biodiversity, Hydrology, Geomorphology, Management, Conservation, Climate, and Socioeconomic.
 - i. Format: available file formats.
 - j. Continent
 - k. Country
- v) Change to **Help page**: drives the user to the Help page.

6.2 REGISTER PAGE

The user registers its email address and creates an account using this page, only the **email address** and a **password** is needed to finish this process. **Instructions** can be found in the right side of the screen, telling the user the requirements needed to create a valid password and giving contact information in case any issues arise.



Sign up user

Email


Password

Show Password

Repeat password


Register

Instructions



1. The password must have at least one uppercase letter.
2. The password must have at least one lowercase letter.
3. The password must have at least one numeric character.
4. The password must have at least one non-alphanumeric character.
5. The password must be at least 8 characters long.
6. For password reset or any issues, please contact santiago.masse@idener.ai

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Figure 144. WETSET Register page.

The left side of the screen includes **three text boxes** to fill in with the required information. After completing them, the user clicks on the **register button** to finally register.



6.3 LOGIN PAGE

After being registered, the user will now be able to log in to its account. The screen is **user friendly** and only shows **two text boxes** to fill in with the user account credentials. After filling the information, the user clicks on the **Log In button** to finally log in to its account.

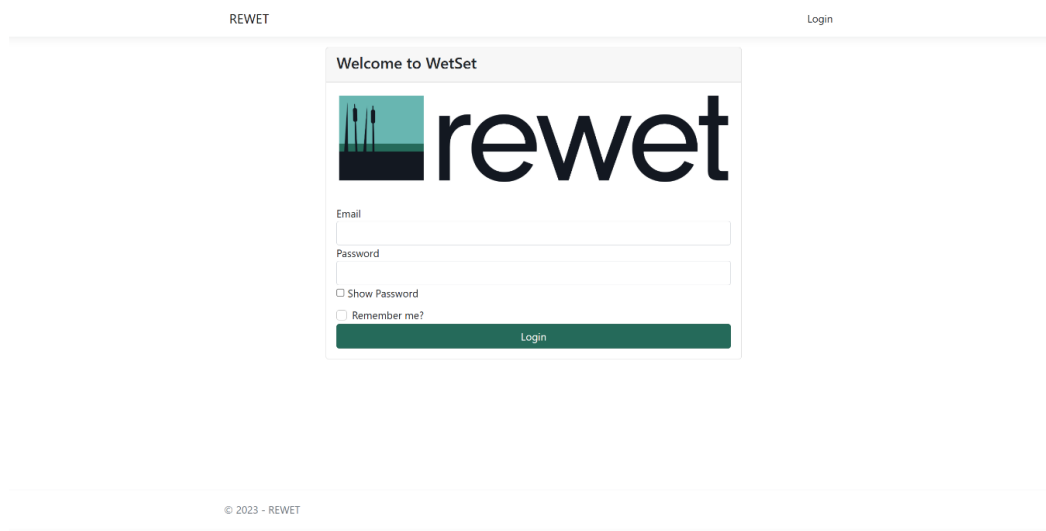


Figure 155. WETSET Login page.

Nonetheless, **two small checkboxes** are shown in the screen. If clicked, one shows the user the password, so the user can validate it is well written. The other checkbox, if clicked, makes the webpage remember the user credentials, so the login step can be skipped in future sessions.

6.4 HOME PAGE (AFTER LOGGING IN)

The home page presents a few changes after the user has logged in.

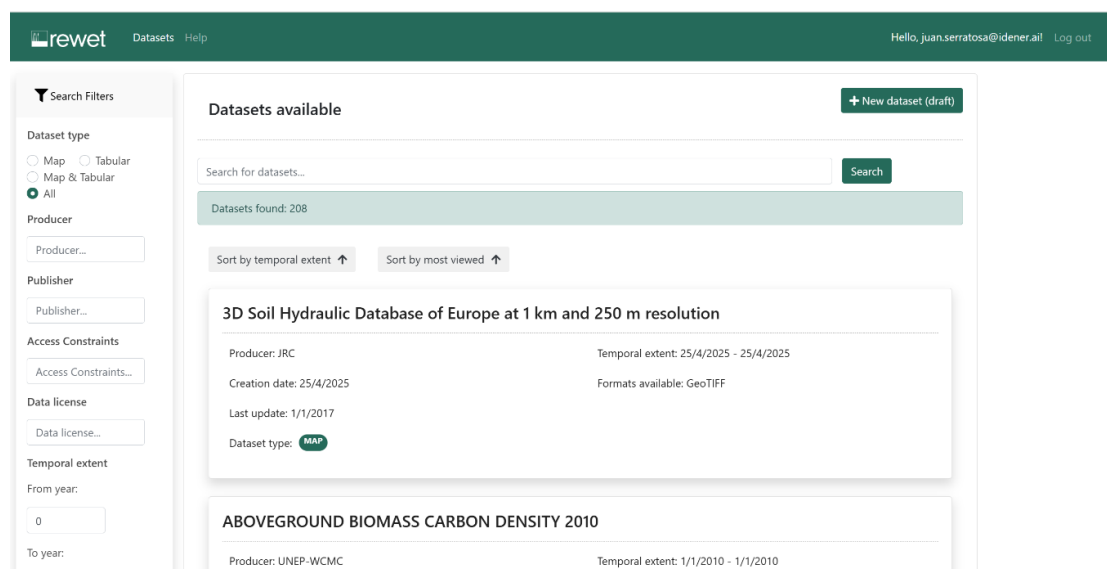
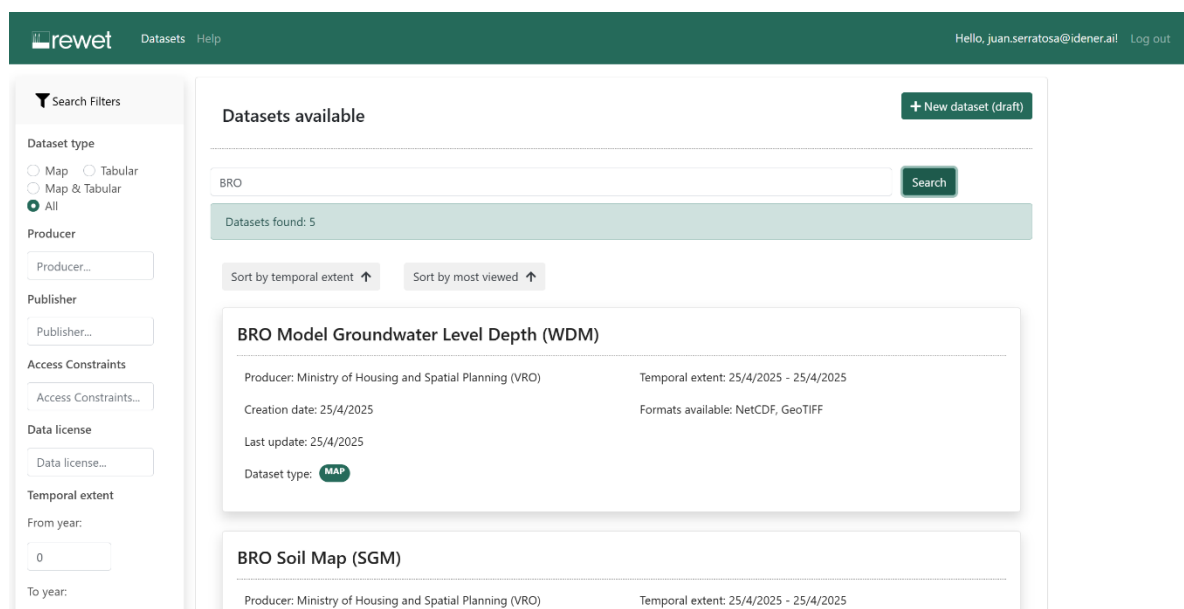


Figure 166. WETSET Home page (after login).

Admin button doesn't appear to regular users. There's now a message in the top left corner to identify the user, and the options to **register** and **log in** have now changed to **log out** and **register another user**. There's also a new button to create a **new dataset** and a checkbox to **show drafts** of different datasets.

6.5 DATASET PAGE

For this example, we've used the search bar to look for datasets which names contain the "BRO" word.

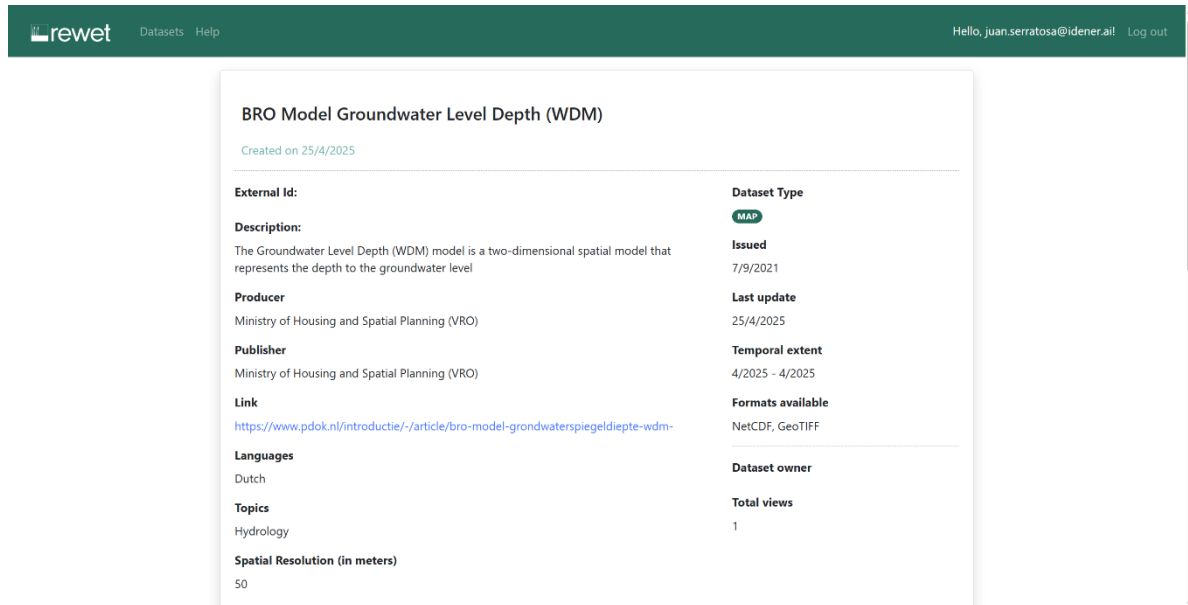


The screenshot shows the WETSET Datasets page. The header includes the 'rewet' logo, 'Datasets' and 'Help' links, and a user greeting 'Hello, juan.serratos@idener.ai!' with a 'Log out' link. On the left, there are search filters for Dataset type (Map, Tabular, Map & Tabular, All), Producer, Publisher, Access Constraints, Data license, and Temporal extent. The main content area is titled 'Datasets available' and features a search bar with 'BRO' entered and a 'Search' button. Below the search bar, it indicates 'Datasets found: 5'. There are two sorting options: 'Sort by temporal extent' and 'Sort by most viewed'. The first search result is 'BRO Model Groundwater Level Depth (WDM)', with details: Producer: Ministry of Housing and Spatial Planning (VRO), Temporal extent: 25/4/2025 - 25/4/2025, Creation date: 25/4/2025, Last update: 25/4/2025, and Dataset type: MAP. The second result is 'BRO Soil Map (SGM)', with details: Producer: Ministry of Housing and Spatial Planning (VRO), Temporal extent: 25/4/2025 - 25/4/2025.

Figure 177. WETSET Dataset page.

After clicking the first result, we can watch the screen containing the dataset information. In this screen we can find the information describing the selected dataset, including all the fields described before and adding new information like the External Id, a brief paragraph to describe the dataset, or the link to locate the dataset.





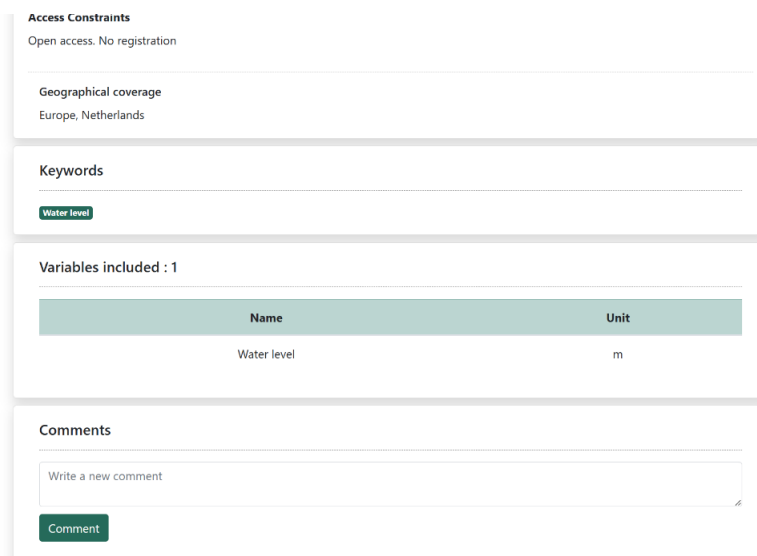
The screenshot shows the WETSET dataset page for 'BRO Model Groundwater Level Depth (WDM)'. The page is titled 'BRO Model Groundwater Level Depth (WDM)' and was created on 25/4/2025. It includes the following information:

- External Id:** (blank)
- Description:** The Groundwater Level Depth (WDM) model is a two-dimensional spatial model that represents the depth to the groundwater level.
- Producer:** Ministry of Housing and Spatial Planning (VRO)
- Publisher:** Ministry of Housing and Spatial Planning (VRO)
- Link:** <https://www.pdok.nl/introductie/-/article/bro-model-grondwaterspiegeldiepte-wdm->
- Languages:** Dutch
- Topics:** Hydrology
- Spatial Resolution (in meters):** 50
- Dataset Type:** MAP
- Issued:** 7/9/2021
- Last update:** 25/4/2025
- Temporal extent:** 4/2025 - 4/2025
- Formats available:** NetCDF, GeoTIFF
- Dataset owner:** (blank)
- Total views:** 1

Figure 188. Example WETSET Dataset page.

Scrolling down the page we can find a few more segments of information, including:

- i) **Keywords:** Identifying relevant information shown by the dataset.
- ii) **Variables included:** a section listing all variables included in the dataset with their units.
- iii) **Comments section:** Text box where different users can leave their comments on the dataset.



The screenshot shows the lower part of the WETSET dataset page, including the following sections:

- Access Constraints:** Open access. No registration
- Geographical coverage:** Europe, Netherlands
- Keywords:** Water level
- Variables included : 1**

Name	Unit
Water level	m
- Comments:** Write a new comment

Figure 199. Continuous example WETSET Dataset page.



6.6 NEW DATASET PAGE

As mentioned before, one of the actions allowed to users is the creation of new datasets, which is enabled after logging in to the user account. This page shows a layout like the one described just before in section 6.5.

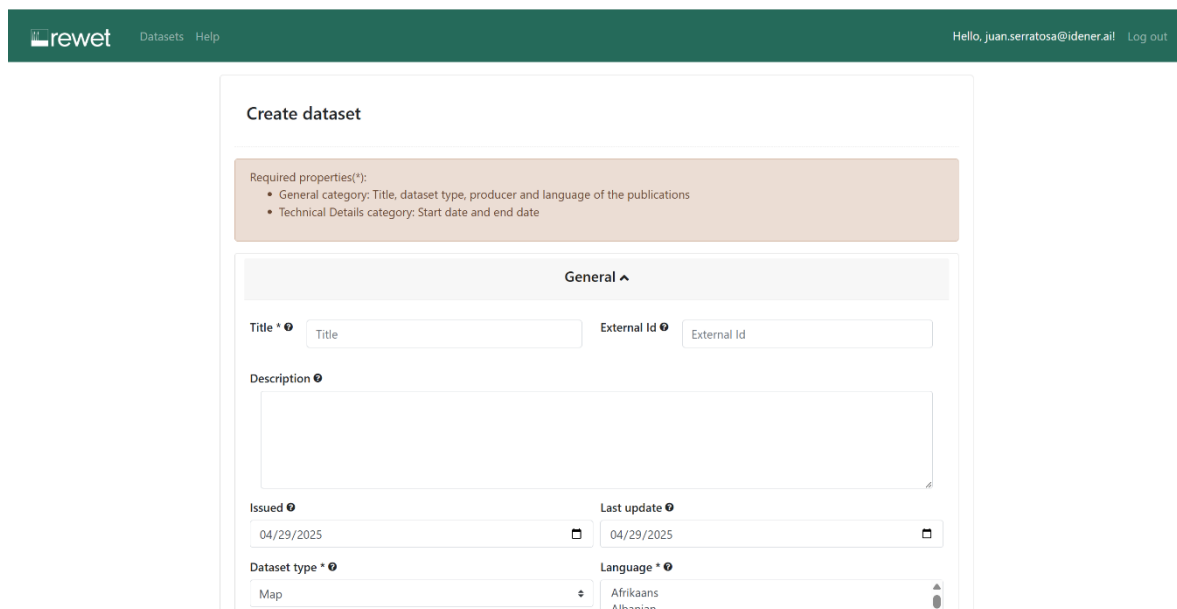


Figure 20. WETSET New Dataset page.

A warning message guides the user to fill in the required fields for the dataset creation. These fields are:

- i) Title
- ii) Dataset type
- iii) Language
- iv) Producer
- v) Publisher
- vi) Start and end date (Technical details section)

The rest of the fields are optional, but highly recommended to fill. This way the filters in the platform will work better and the dataset will have a higher visibility as well as giving the user more information about the data gathered and how to use it. Two more sections are defined in this page, these are: technical details and dataset variables. Also, a small text is shown to the user if the mouse is moved towards the question marks signs, briefly explaining each field of the form.



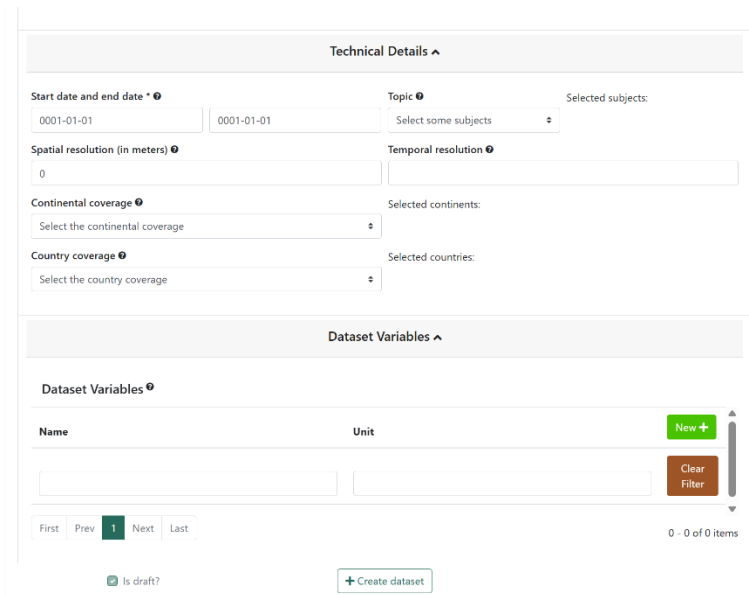


Figure 21. WETSET Continuous New Dataset page.

These sections are collapsed when the user first enters the page and are found just under the main section. They provide a higher level of detail for the dataset. When clicking the **New** button to add variables to a dataset, a quick form pops up asking the user to fill in the mandatory values for name and unit of the variable.

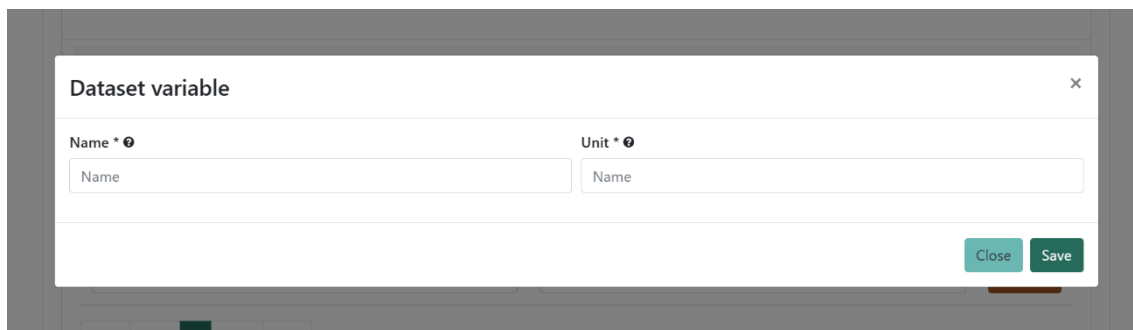


Figure 22. WETSET Dataset variable.

If the user tries to add the dataset without filling the required segments, the missing fields will be underlined in red colour, meanwhile, the filled in fields will be underlined in green colour.

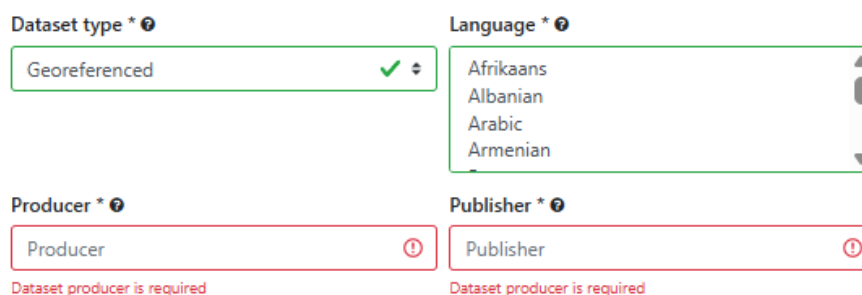


Figure 23. WETSET Missing fields example.



6.7 HELP PAGE

This page shows a brief text to support users if any issues are found during the use of the platform.



Contact

In case of technical difficulties, please contact our support team at jose Luis.delpino@idener.ai for assistance.

Figure 24. WETSET Help page.

6.8 ADMIN PAGE

This page is not shown to regular users, but it is important to notice that these regular users can request changes in the ontologies and the vocabulary values shown by contacting with an administrator of the system. These administrators are shown the list of ontologies and vocabulary values in this page, giving them an easy way to:

- i) Edit an existing ontology or vocabulary value.
- ii) Add a new ontology or vocabulary value.
- iii) Delete existing ontologies or vocabulary values.

