



DTO-BioFlow

Integration of biodiversity monitoring
data into the Digital Twin Ocean

Contribute to Building the Digital Twin of Our Oceans: Unlock the Power of Your Biodiversity Data

Why sharing your biodiversity
data matters for science,
policy, and the planet.



dto-bioflow.eu

Overview

Calling All Biodiversity Data Holders: make your data available to the European Digital Twin of the Ocean



The development of a digital twin of the ocean and all waters is the second target of the EU Mission "Healthy oceans, seas, coastal and inland waters"; it is built on EU assets such as **Copernicus satellite Earth Observation** and **in situ (non-space) data**, as well as **pan-European in situ marine environmental** (bathymetry, biology, geology, physics, chemistry and seabed habitats) and **human activities data** from **the European Marine Observation and Data Network (EMODnet)**.

The European Digital Twin of the Ocean (EU DTO) aims to model the ocean's multiple components, provide knowledge and understanding of the past and present and create trustable predictions of its future behavior. The **EDITO-Infra** ("**EU Public Infrastructure for the European Digital Twin**") project provides the foundation for the further development of the EU Public Infrastructure backbone for the EU DTO by upgrading, combining and integrating key service components of the existing EU ocean observing, monitoring and data programmes (i.e., Copernicus Marine Service and EMODnet) into a single digital framework.

EDITO hosts the deployment of multiple DTO applications from ongoing and future digital twin projects, supporting the deployment of new generation of ocean models (e.g. via Horizon Europe underlying models for the European DTO projects) and of the Mission lighthouses projects.

A digital twin is a digital representation of real-world entities or processes.

Digital twins use real-time, and historical, data to represent the past and present, and numerical models to simulate possible future scenarios.



**Copernicus
Marine Service**

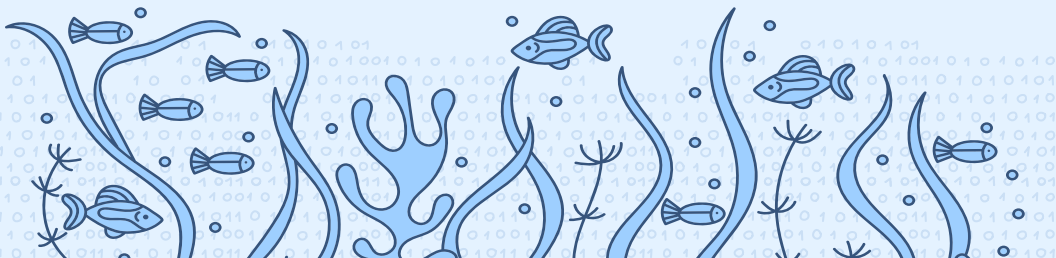


EMODnet
European Marine
Observation and
Data Network



EDITOInfra

The **DTO-BioFlow project** aims to collect, standardize and publish both "sleeping" data (i.e., data requiring further processing to become digital, and thus currently unavailable and inaccessible), as well as new biodiversity monitoring data (e.g., DNA-based observations, plankton imaging observations, passive acoustics, or biologging data), and establish semi-automated workflows for sustained data ingestion into the EU DTO. Thus, it will create essential components for a digital replica of marine biological processes, transforming new and existing data flows into evidence-based knowledge to support ecosystem conservation efforts. DTO-BioFlow is establishing data flows for several new biodiversity data types produced using different techniques and instruments which do not yet have established dataflows to make them available in long-term data repositories.



Why sharing biodiversity data is crucial

Do you collect or hold biodiversity data?

Are you aware of the global effort to bring biodiversity data to life?



Marine habitats are challenging to monitor, and many biodiversity data sources remain underused. The DTO-BioFlow project is working to address this by helping you to share your data, especially the "sleeping" data. In doing so you contribute to the European Digital Twin of the Ocean (DTO).



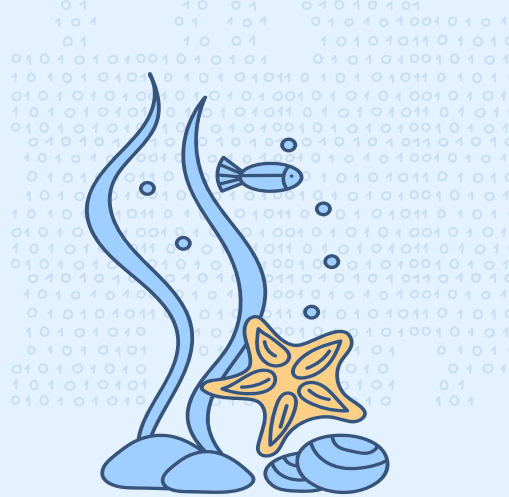
Policy Insight

This collaboration transforms data into knowledge, advancing scientific research, supporting conservation efforts, and informing policies. Your contribution helps model ocean scenarios, strengthening global efforts to protect marine biodiversity and support and support the UN Sustainable Development Goals and the EU Biodiversity Strategy for 2030, amongst others.

Here's how sharing your data
can make a meaningful impact

Benefits

Key Benefits of Sharing Your Data



Sharing your data will:

- **Enhance the impact of your work** and increase your citation rates.
- **Add value to your data:** Combining data from multiple sources improves the quality of analyses and creates richer, more impactful data products.
- **Reduce data collection efforts:** Reducing repeated collections means less environmental impact and allows resources to be redirected to gathering new data or supporting other critical needs.
- **Support corporate social responsibility** by contributing to the greater good.
- **Meet funder requirements:** Data collected or generated with public funding should be openly accessible.
- **Safeguard your data:** Depositing your data in a repository ensures it is protected and reduces the risk of loss.

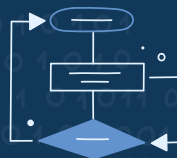
Better data leads to better decisions.
As a data provider, you retain full
ownership of your data! You also
control its availability and decide when
it should be made publicly accessible.

Opportunities

Opportunities for Your Data



data collection



open-access
repositories



impact conservation
and management
strategies



support authorities in
monitoring activities
and in fulfilling
environmental reporting
(e.g. Marine Strategy
Framework Directive)

Publishing data (and metadata) in online, open-access repositories transform them into invaluable assets for the scientific community. These repositories and data integrators serve as vital resources for advancing knowledge and driving real-world change.

The EU DTO will bring together data from different sources (e.g., biological, environmental, etc.) into a single platform, allowing users to access the available tools and applications, as well as to develop new ones based on their own needs.

Opportunities

Trainings

**By sharing your data,
you also gain access
to valuable training
opportunities!**



DTO-BioFlow

DTO-BioFlow training material will be made available on how to reformat, publish and quality control biodiversity data, while aligning them with international standards so that they can flow to (the European node of) the Ocean Biodiversity Information System ((Eur)OBIS) and the European Marine Observation and Data Network (EMODnet) ([Biology thematic portal](#)).

Best practices in data management will also be a part of the training material.

A [slide deck](#) created for the data training workshops for the recipients of the DTO-BioFlow grants for data holders is available at the project's website.

Other training opportunities

For dedicated self-paced trainings, you can visit the Ocean Teacher Global Academy, create your account and browse through the [Biological Data Management 2024 course](#) or the [Ocean Data Management 2024 course](#) or the [Contributing datasets to EMODnet Biology course](#).

For more detailed information, you can browse through the [online dataset submission form](#) of EurOBIS.

If you experience issues in making your data FAIR, you can find dedicated courses on the [Marine Training platform](#), such as the [FAIR DATA for marine sciences training course](#)

Opportunities

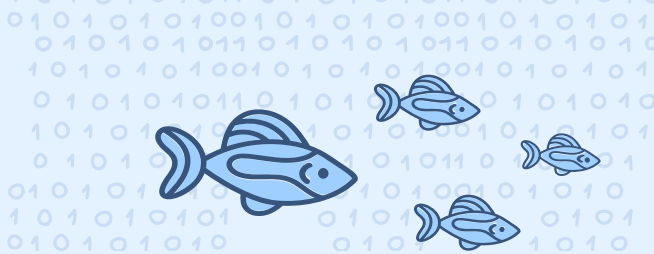
From Data to Action

The stored data can be used to:

- **Formulate conservation strategies** for flagship and endangered species.
- **Assess the long-term impact of human-induced threats** like global warming, ocean acidification, and pollution on biodiversity.
- **Prevent future biodiversity loss and mitigate habitat fragmentation.**
- **Advance progress towards global sustainability goals**, including the UN Sustainable Development Goals, the Convention on Biological Diversity (CBD), the Kunming-Montreal Global Biodiversity Framework, the Global Biodiversity Framework (GBF), and the EU Biodiversity Strategy for 2030.
- **Influence legislative frameworks and inform the development and implementation of policies** for biodiversity management and monitoring.
- **Support decision-makers and stakeholders** in making informed, scientifically sound, data-driven choices.
- **Identify critical knowledge gaps** (e.g., taxonomical or regional) to guide focused research efforts.
- **Answer a wide range of scientific questions** that contribute to the advancement of the field.

Opportunities

Practical Use Cases



Your data could support DTO- BioFlow's Demonstrator Use Cases!



Policy Insight

DTO-BioFlow develops **policy-relevant demonstrator use cases (DUCs)** to showcase the benefit of an end-to-end approach for biodiversity monitoring. Interfaces for new data flows, models and algorithms could be integrated in the EU DTO, providing knowledge outputs to inform the protection and restoration of ecosystems and supporting progress towards EU biodiversity goals.

DUCs will build on the data collected under the EU DTO and on its workflows and virtual laboratories (vLabs), to run virtual experiments, support and enhance decision-making. Currently, there are eight conceptualized DUCs focusing on:

**INVASIVE SPECIES
MANAGEMENT**

**IMPACT FROM OFFSHORE
INFRASTRUCTURES**

**HUMAN IMPACT ON
PELAGIC BIODIVERSITY**

**SPATIAL PLANNING OF
SUSTAINABLE MARICULTURE**

**ECOSYSTEM-BASED SPATIAL
PLANNING AND MANAGEMENT
OF MARINE PROTECTED AREAS**

**ECOSYSTEM SERVICES
(INCLUDING CARBON
SEQUESTRATION)**

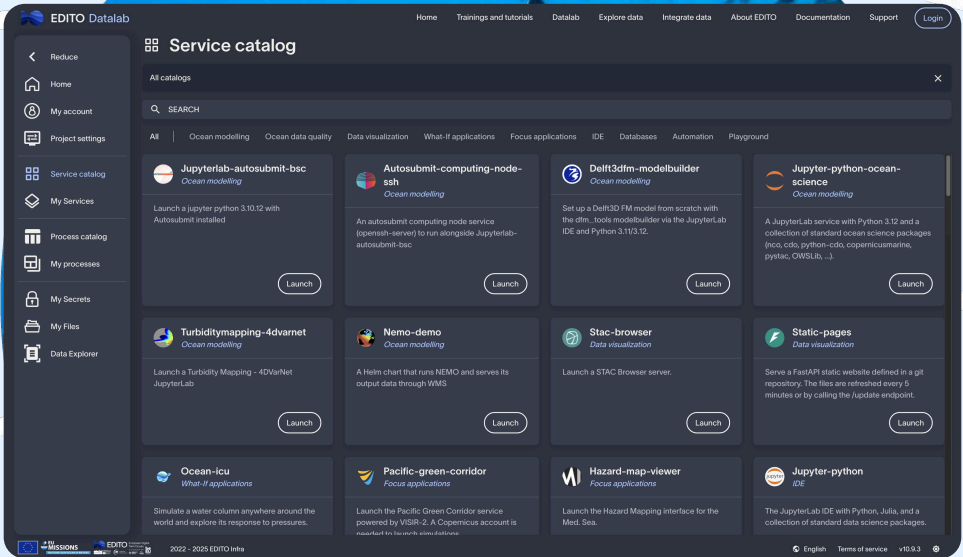
**LOWER-TROPHIC LEVEL
BIOMASS MONITORING**

**MACHINE LEARNING FOR
OCEAN COLOUR FORECASTING**

DTO workflows and vLabs, combined with artificial intelligence and high-performance computing, **will be available to end users and data providers**, so that they can integrate all the available data from all the different data sources to create their own custom data products!

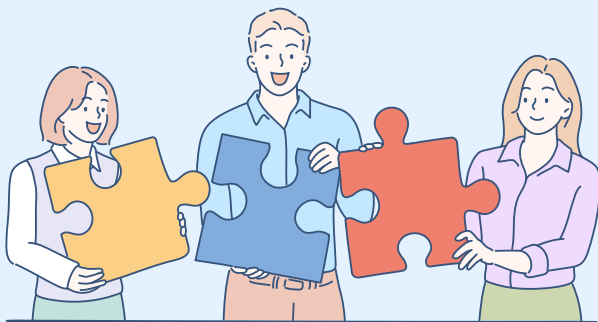


Explore the currently available applications and become a beta tester of the EDITO-infra platform!



A guide

How to Contribute Your Data



Have we made a compelling case?

Below is a step-by-step guide to submitting your data.



Identify a suitable repository for your dataset.

For example, marine species distribution data of Europe should be submitted to **EuroBIS/EMODnet Biology**. A non-exhaustive list of data repositories and integrators is available on the [DTO-BioFlow Blueprint](#), which will be publicly available in 2025.

Format the dataset based on the proper standard.

In case of marine species distribution data, the used standard is **Darwin Core**.

Submit the data!

For **EuroBIS** and **EMODnet Biology**, data submission can go through the Integrated Publishing (IPT) Toolkit or e-mail. For EMODnet, an additional option is submitting data through the [EMODnet Data Ingestion Portal](#).



Policy Insight

EuroBIS publishes distribution data on marine species, collected within European marine waters or collected by European researchers outside European marine waters. It is an online marine biogeographic database compiling data on all living marine creatures. The principle aims of EuroBIS are to centralize the largely scattered biogeographic data on marine species collected by European institutions and to make these data freely available and easily accessible.



Policy Insight

EMODnet is the European Commission (EC) in situ marine data service of the EC Directorate-General Maritime Affairs and Fisheries (EC DG MARE) and funded by the European Maritime Fisheries and Aquaculture Fund. Established in 2009, EMODnet plays a pivotal role as a trusted source of in situ marine environmental and human activities data and data products, serving a diverse user base across various sectors.

Your biodiversity data can make the difference!

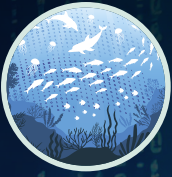
Biodiversity is crucial for a sustainable planet, but its rapid decline threatens ecosystems, food security, and economic stability. Tackling this issue requires global cooperation, knowledge sharing, and **data integration**.

By contributing your data to initiatives like the EU Digital Twin of the Ocean, you play an essential role in shaping informed strategies for biodiversity conservation.



Join the effort today!

Share your data and be part of
the solution for a healthier planet.



DTO-BioFlow

Integration of biodiversity monitoring
data into the Digital Twin Ocean

Consortium



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Funded by
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