

NBS4AQUAMMISSION NewsLetter



Nature-based solutions for new problems:

NBS4AQUAMMISSION tackling emerging pollutants

What are emerging pollutants and why should we care?

In the Anthropocene era, humanity faces what the UN calls the “triple planetary crisis”: climate change, biodiversity loss, and pollution.

Regarding the latter, there is a category of particular concern: **emerging pollutants**. They are called this not because they are new—most are not—but because until now, we were unable to detect them. Pharmaceuticals (PP) and personal care products (PPCPs) are among them. These pollutants form a **dangerous cocktail** with serious consequences for aquatic biodiversity.

Taking the MISSION of safeguarding aquatic biodiversity in urban and rural waters exposed to pharmaceutical pollution (PP), the NBS4AQUAMMISSION project aims to leverage nature-based systems (NBS) to mitigate PP pollution impacts posed on the aquatic biodiversity and assess the NBS implementation effects over time and space.

Building the Future of Water Restoration!

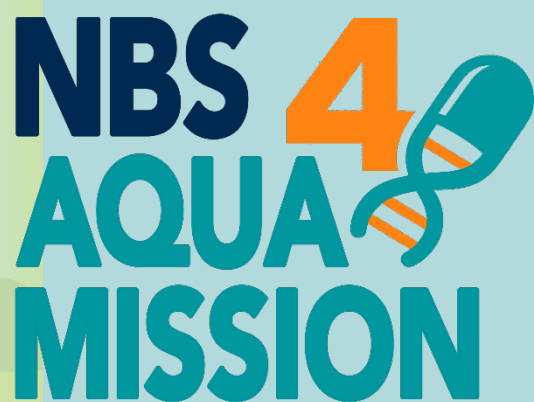
In this second edition, we explore the challenge of emerging pollutants and reaffirm our commitment to the EU Mission: Restore our Ocean and Waters. We take a closer look at our Spanish demo-site, CENTA, a cornerstone for testing our Nature-Based Solutions.

This issue also highlights our international presence at key scientific conferences in Italy, Paris, and Jaén, fostering key expert networks.

Finally, we sit down with Dr. Aura Istrate, one of our Work Package leaders for an exclusive interview and share our passion for science through outreach events like “Café con Ciencia” and “World Wetlands Day.

Join us as we advance our mission!

NBS 4 AQUA MISSION



Our Mission joins a European commitment: NBS4AQUAMMISSION adheres to the "Restore our Ocean and Waters" Charter

It is a pleasure to share with our community that NBS4AQUAMMISSION has been officially accepted as a supporting action for the EU Mission: Restore our Ocean and Waters by 2030.

By formally adhering to the Mission Charter, our project becomes a recognized actor within this European cooperation framework, designed to mobilize resources and align efforts around three critical objectives:

1. **Protect and restore marine and freshwater ecosystems and biodiversity**, in line with the EU Biodiversity Strategy 2030.
2. **Prevent and eliminate pollution of our ocean, seas and waters**, in line with the EU Action Plan Towards Zero Pollution for Air, Water and Soil.
3. **Make the sustainable blue economy carbon-neutral and circular**, in line with the proposed European Climate Law and the holistic vision enshrined in the Sustainable Blue Economy Strategy.

Specifically, NBS4AQUAMMISSION will contribute directly to **the first two of these objectives**.

This institutional endorsement, which can already be found on the [European Commission's official portal](#), validates our commitment to **Nature-based Solutions** as an effective way to eliminate pharmaceutical pollutants and protect life in our rivers and wetlands.

What does this mean for our consortium?

- **Transcontinental collaboration:** We are part of an innovation ecosystem that shares knowledge and data to accelerate the transition towards a sustainable blue economy.
- **Public engagement:** The Mission places a strong focus on public mobilization, which perfectly aligns with our outreach and awareness-raising efforts.
- **Real impact:** It places us at the forefront of European policies, ensuring that our research results have a direct path toward improving planetary health.

We join the European Union in this "Call for Action" so that, together, we can protect - 2 - our aquatic biodiversity!





The Spanish Demo-site: Experimental Center for New Water Technologies (CENTA)

The Experimental Center for New Water Technologies (CENTA), located in the Sevillian municipality of Carrión de los Céspedes, was established in 1990 and has been attached to the Andalusian Environment and Water Agency (AMAYA) since 2023. This center was designed for **research, training, and the dissemination** of scientific knowledge, aimed at raising awareness about the importance and necessity of treating and reusing our water. It features a wide variety of treatment technologies that can be combined in different ways.

Currently, the Center, which spans an area of 41,000 m², is undergoing a phase of expansion, modernization, and infrastructure improvement. CENTA participates in various regional, national, and European research projects, including NBS4AQUAMISSION. It also promotes international cooperation, enabling the creation of similar experimental centers in countries such as Morocco, Uruguay, Costa Rica, and Bolivia.

TREATMENT SCHEME FOR NBS4AQUAMISSION

The treatment process begins with pretreatment systems capable of managing flow rates around 500 m³/day, alongside Imhoff tanks designed for primary water treatment. As the centerpiece of the experimentation, different types of constructed wetlands will be used, notably a 227 m² subsurface vertical flow wetland and an aerated floating wetland, both of which are currently being upgraded to optimize water distribution and vegetation. Finally, the center features the Rhizosph'air system, an aerated constructed wetland that utilizes the *Phragmites australis* plant. This system is equipped with a specialized aeration network using blowers and polyethylene piping to maximize biological treatment efficiency.

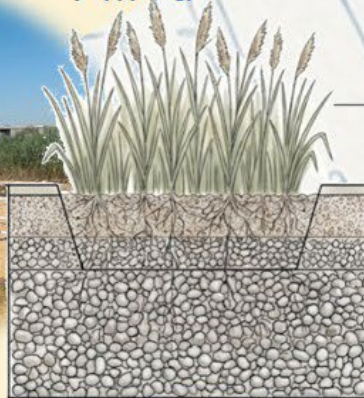
PRETREATMENT

500 m³/d



SUBSURFACE VERTICAL FLOW WETLAND

9 m³/d



— *Phragmites australis*

15 cm (Aggregate size 2-4 mm)

90 cm (Agg. Size 4-8 mm)

30 cm (Agg. Size 20-40 mm)

IMHOFF TANK

50 m³/d

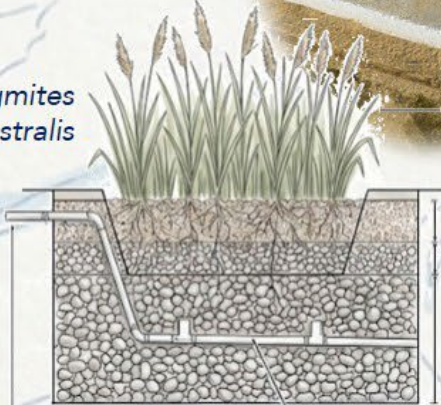


RHIZOSPHERE AIR SYSTEM®

15 m³/d



Phragmites australis



20 cm (Agg. Size 2-4 mm)

15 cm (Agg. Size 10-20 mm)

100 cm (Agg. Size 10-20 mm)

AERATION
(Blowers and PE pipes)

INLET
(160 mm PVC
pipes)

FLOATING AERATED WETLAND

15 m³/d



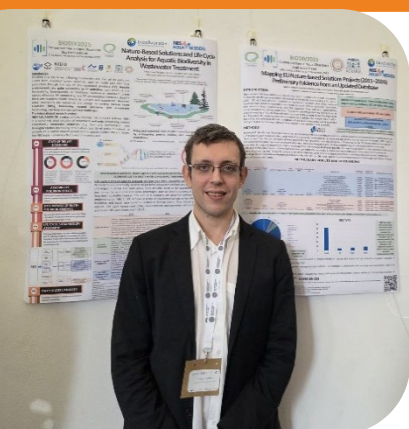
UNIRC Takes Center Stage at BioDiv 2025: Innovation for Aquatic Ecosystem Restoration



Lake Maggiore in Verbania Pallanza, Lombardy Region (Italy)

The Department of Agriculture of the **University Mediterranea of Reggio Calabria (UNIRC)**, a key partner in the NBS4AQUAMMISSION project, successfully participated in the **BioDiv 2025 Conference**. Held on November 6-7 in the stunning setting of Lake Maggiore (Verbania Pallanza, Italy), this significant biennial event was organized by Successione Ecologica and the Biodiversity Gateway of the **National Biodiversity Future Center (NBFC)**, in collaboration with the **National Research Council (CNR)** through its **Institute for Water Research (IRSA)** and the **Institute of Marine Sciences (ISMAR)**.

The core theme of BioDiv 2025 is of critical importance to our environmental future: **the restoration of ecosystem functionality**. This is a fundamental pillar of European environmental policies and a main focus of the **Nature Restoration Law**, which came into force in August 2024 across all European Union member states. The conference provided a unique opportunity for fostering exchange between the scientific community and young researchers, centering the discussion on ecosystem restoration and the sustainable use of resources.



UNIRC's Scientific Contribution

The **University Mediterranea of Reggio Calabria** actively contributed to the discussion by presenting results from its ongoing research. Within the framework of NBS4AQUAMMISSION, our colleague Cristian Soldati and the rest of the team presented two scientific posters that delve into the project's main goals, with a specific focus on **Work Package 4 (WP4)** regarding the **Life Cycle Sustainability Assessment (LCSA)** of our nature-based solutions.

NBS4AQUAMISSION expands its Scientific Network at the University of Paris-Saclay

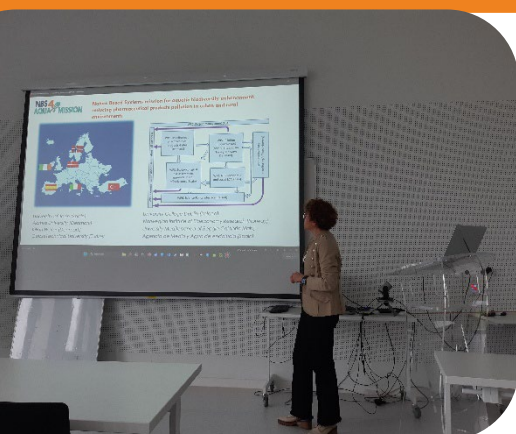


Photo by Jean-Bernard Emond

We are proud to announce that the NBS4AQUAMISSION project was recently presented at the prestigious **University of Paris-Saclay**, one of Europe's leading institutions for scientific research.

The event took place on November 7th, following a distinguished invitation from the **Institut Diversité, Écologie et Évolution du Vivant (IDEEV)**. This institution is a hub for cutting-edge research in biodiversity and ecosystem evolution, making it the perfect stage to discuss our project's goals. The session brought together twenty professors and researchers to discuss the project's progress in integrating Nature-Based Solutions for a sustainable water future. This international exchange at a leading center for biodiversity research strengthens our scientific network and aligns our mission with top-tier European expertise.

We extend our gratitude to the IDEEV for their hospitality and to all participants for the insightful dialogue.



NBS4AQUAMISSION in action

Our colleague, Dr. Gema Parra, presenting the project's innovative approach to Nature-Based Solutions before an audience of experts at the IDEEV.

Strategic Networking in Jaén: Connecting Science with Water Stakeholders



Last November, NBS4AQUAMISSION participated in a key conference at the **University of Jaén (UJA)**, organized by the **Mesa Social del Agua de Andalucía (Social Water Council)** and the **UJA Water Chair** (promoted by CREA-COAG).

The event featured the active collaboration of the **Andalusian Irrigators' Association (CREA)** and the **Coordinator of Farmers and Livestock Owners Organizations (COAG)**. The session, titled *Environmental diagnosis of water resources in the province of Jaén: from global to local*, provided a unique platform to engage with **key stakeholders**.

The **Mesa Social del Agua** is a one-of-a-kind initiative in Spain, fostering dialogue between irrigators, trade unions, environmentalists, and academia to ensure fair and sustainable water management. During the event, we highlighted how Nature-Based Solutions (NbS) are essential to bridge the gap between global environmental goals and local agricultural needs. We are pleased to announce that **fruitful contacts** have been established with these **stakeholders**, opening doors for future collaborations to implement NbS in the regional water strategy.



Strategic Networking in Jaén:

Our colleague, Dr. Raquel Jiménez-Melero, connecting with key stakeholders from the Andalusian agricultural sector to bridge science and regional water management.



What life path has brought you to this point?

My path sits at the intersection of sustainable urbanism, urban planning, and informing policy and practice for more liveable cities. As Assistant Professor in Sustainable Urbanism and Urban Planning and as Program Director of MSc Urban Design and Planning at University College Dublin (UCD), I lead cross-disciplinary initiatives that connect education, research, and practice. I coordinate major networks and projects (C-NEWTRAL Doctoral Network; Horizon Europe REALLOCATE). I am also Principal Investigator in Ireland for biodiversity and nature-based urbanism initiatives, including NBS4AQUAMISSION. I lead the Liveable City Group at UCD, focusing on connected fields such as active and sustainable mobility, street vitality, nature-based urbanism, community vulnerability, and participatory planning under the liveability umbrella. This blend of academia, leadership, and hands-on research has brought me to NBS4AQUAMISSION to help scale nature-based solutions that protect biodiversity while strengthening liveability.



What is your role in the NBS4AQUAMISSION project?



As Principal Investigator in Ireland for NBS4AQUAMISSION, I lead a specific work package in the project that concerns Citizen and Stakeholder Engagement towards adopting nature-based solutions to decrease water pollution and increase resilience. My responsibilities include:

- Facilitating co-design and participatory activities
- Translating research findings into actionable guidelines, tools, and best practices, and informing policy (nationally and within the EU)
- Contributing to capacity-building activities to accelerate uptake of nature-based solutions
- Contributing to enabling the knowledge-exchange of partners
- Coordinate Irish research activities, mentoring researchers within the Irish team and collaborating with colleagues from other contributing institutions in NBS4AQUAMISSION

Get to know Dr. Aura Istrate, one of our Work Package leaders



How effectively are participatory environmental governance frameworks being implemented across Europe, including the principles set out in the Aarhus Convention?



Europe has developed strong participatory environmental governance frameworks, with the Aarhus Convention providing a key foundation for access to information, public participation, and access to justice.

However, despite that the EU has advanced transparency and participation mechanisms, the practical or inclusive implementation remains uneven. In some contexts, participation is well embedded through consultations, stakeholder engagement, and co-creation processes, while in others it remains limited or largely procedural.

Importantly, meaningful participation requires more than legal compliance: it depends on early engagement, accessible information, inclusion of diverse voices, and transparent evidence that citizen input has shaped outcomes.

This is exactly why projects like those within Biodiversa+ matter, including NBS4AQUAMISSION, in helping strengthening participatory approaches by bringing communities, researchers, and decision-makers together in the co-design of sustainable solutions. Going forward, adopting a more accessible language (i.e., not utilising specialised terms), providing clearer timelines for consultations, and better inclusion of marginalized groups would strengthen implementation.



In what ways can citizens participate in environmental decision-making processes?

There are multiple ways to support citizens to take part in environmental processes, including in participatory decision-making. Some of these means that can be made available at the project level are listed below:

- Public information and disclosure: access to timely, clear environmental data and project documents.
- Early-stage consultations: involvement during scoping and planning, not just at the end.
- Public hearings and citizen juries: facilitated forums to discuss options, trade-offs, and impacts.

Co-design and co-creation: direct participation in developing solutions, monitoring plans, and pilot sites.

Citizen science: contributing local observations, data collection, and validation.

Help improve accessible language and formats: review information and ensure it is in plain language, infographics, dashboards, and translations.

Get citizens involved in advisory bodies and partnerships: by seating on local or regional advisory groups and steering committees.

Contribute to transparent decision-making: get citizens involved in rationales, get them informed through channels that allow appeal or challenging decisions.

Request explicit efforts to involve local and marginalized voices (e.g., coastal communities or other vulnerable groups)



Who are the main stakeholders of the NBS4AQUAMISSION

Local communities, residents: beneficiaries and users of nature-based solutions, whose livelihoods can be improved.

Researchers, universities, and research institutes: contribute expertise, generate knowledge, validate approaches, and monitor outcomes

Policy makers at EU, national, and regional levels: translate results into scalable policy and regulations

Environmental NGOs and civil society: advocate for biodiversity, climate resilience, and equity

Industry partners and service providers: equipment suppliers, feed companies, and tech developers supporting sustainable practices

Funding bodies and agencies: provide resources and accountability (e.g., EU programs)

Educators and communicators: disseminate findings and raise awareness, contribute to training.

Media and the public: broaden understanding and engagement.



To what extent do you think the project will help inspire a societal transformation?

NBS4AQUAMISSION holds strong potential to accelerate a shift toward sustainable, nature-based solutions to reduce water pollution derived from pharmaceuticals and improve resilience and liveability. By integrating biodiversity protection, climate resilience, and economic viability, it can:

- Demonstrate scalable Nature-Based Solutions (NBS) that improve ecosystem health and local livelihoods
- Support policy uptake and cross-border regulatory alignment
- Foster cross-sector collaboration (science, industry, government, and communities) through co-design and participatory processes
- Produce adaptable knowledge products and tools that other sectors and regions can adopt

Transformation is a long-term process requiring sustained investment, broad engagement, and policy support. With a continued focus on accessibility, transparency, and co-creation, the project can catalyse meaningful, lasting change toward sustainable blue economies and more resilient societies.

NBS4AQUAMISSION Goes Public

Last autumn, Dr. Carlos Soria and Dr. Ana del Arco, from our team at the University of Jaén (Spain), had the opportunity to share a very special breakfast with High School students, diving into a crucial topic for the health of our aquatic ecosystems: emerging pollutants and Nature-Based Solutions

Furthermore, more recently, to celebrate World Wetlands Day in February, Dr. Derya Ayrıl-Çınar, Dr. Emel Topuz, Dr. Ebubekir Yüksel, and Dr. Mehmet Salim Öncel, from our team at the Gebze Technical University (Turkey) led an awareness session highlighting the vital role of Nature-Based Solutions in restoring these fragile ecosystems.

In both events, we successfully showcased NBS4AQUAMISSION's goals to a wider audience, fostering environmental awareness and scientific curiosity



The scope of **NBS4AQUAMISSION** is clear: to tackle the growing pharmaceutical product (PP) pollution in our aquatic ecosystems, both urban and rural. These contaminants represent an invisible threat to biodiversity, ecosystem functionality, and human health, and conventional treatments (WWTPs) are often not designed to eliminate them entirely.

NBS4AQUAMISSION

Partners of the project:

- Center for Advanced Studies in Earth Sciences, Energy and Environment, University of Jaén, **Spain**
- Experimental Center for New Water Technologies (CENTA) and Environment and Water Agency of Andalusia, Junta de Andalucía, **Spain**
- Department of Environmental Science, Aarhus University, **Denmark**
 - Environment and Natural Resources, Hydrology and Water Environment, Norwegian Institute of Bioeconomy Research (NIBIO) **Norway**
- School of Architecture, Planning and Environmental Policy, University of Dublin, **Ireland**
- Department of Agriculture, University Mediterranea of Reggio Calabria, **Italy**
- Environmental Engineering Department, Gebze Technical University, **Turkey**
 - Kilian Water ApS, **Denmark**



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