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The Transnational Hub for Wetland Climate Solutions: insights on barriers & opportunities for policy uptake

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WETLAND 4CHANGE

Validate transferable solutions based on wetland conservation and restoration for climate adaptation and mitigation

Accelerate the capacities of wetland managers and policy makers through assessments, guidance, capacity building and experience exchange across borders

Enhance the institutional capacity of 13 organizations through cross-border cooperation activities, facilitating knowledge transfer and collaborative efforts in climate adaptation and risk prevention

Project outputs: two wetland-based solutions for carbon-sequestration and for flood regulation in 5 pilot sites

Delivered through: experimental transnational hub for wetland climate solutions as coordination and learning mechanism that facilitates exchange, joint testing and harmonization of approaches.

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The solutions

W4C solutions: GHG mitigation by wetlands restoration – The workflow

Prof. Dr. Antonio Camacho

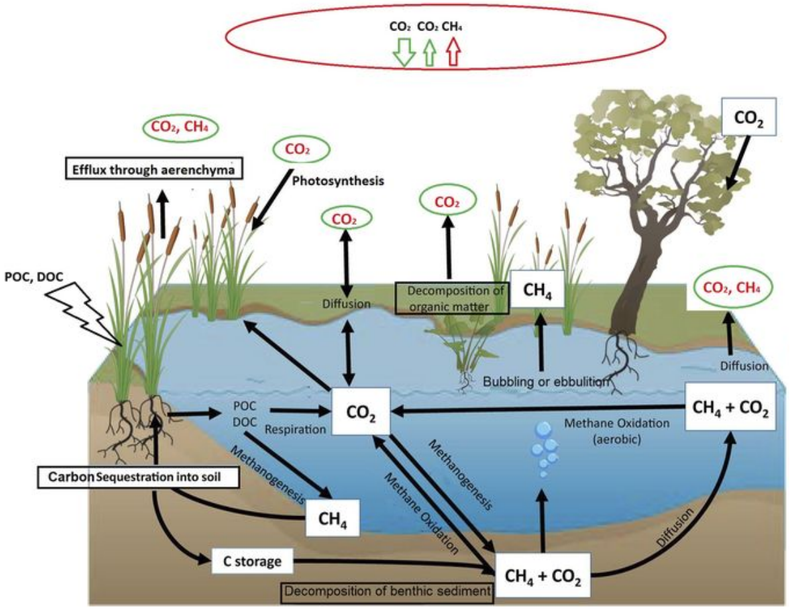
W4C solutions – GHG mitigation through wetland restoration

1. Environmental mapping

- Defining functional compartments by remote sensing, GIS, and field data.
- Capture wetland heterogeneity through gradients of flooding, vegetation, and salinity.
- Previuos serves as spatial basis for estimating and upscaling greenhouse gases (GHG) fluxes.

2. GHG flux quantification – Tiered approach

- Tier 1 – Basic mapping and default factors: Uses existing land cover and/or habitat classifications or wetland inventories to delineate broad types. Applies default GHG exchange factors by wetland type. Provides an entry-level, low-data option to estimate carbon balance.
- Tier 2 – Stratified and dynamic mapping: Incorporates temporal and environmental variability (i.e., hydroperiod, vegetation). Links mapped strata to the GHG factor database, assigning condition-specific CO_2 and CH_4 flux ranges.
- Tier 3 – Direct field measurements: Derives empirical flux data by performing in situ measures. Also, validates and refines modelling from Tiers 1–2.



Kumar et al 2023 Front. Environ. Sci. 10:1127269.doi: 10.3389/fenvs.2022.1127269

3. Integration into decision-support tools

- Provide decision-support information to evaluate the trade-offs and climate impacts of restoration strategies.

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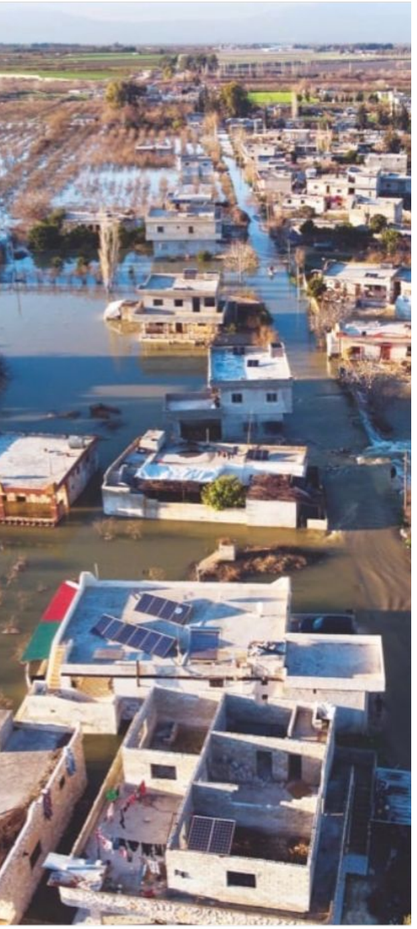
W4C solutions – Wetlands capacity for flood regulation

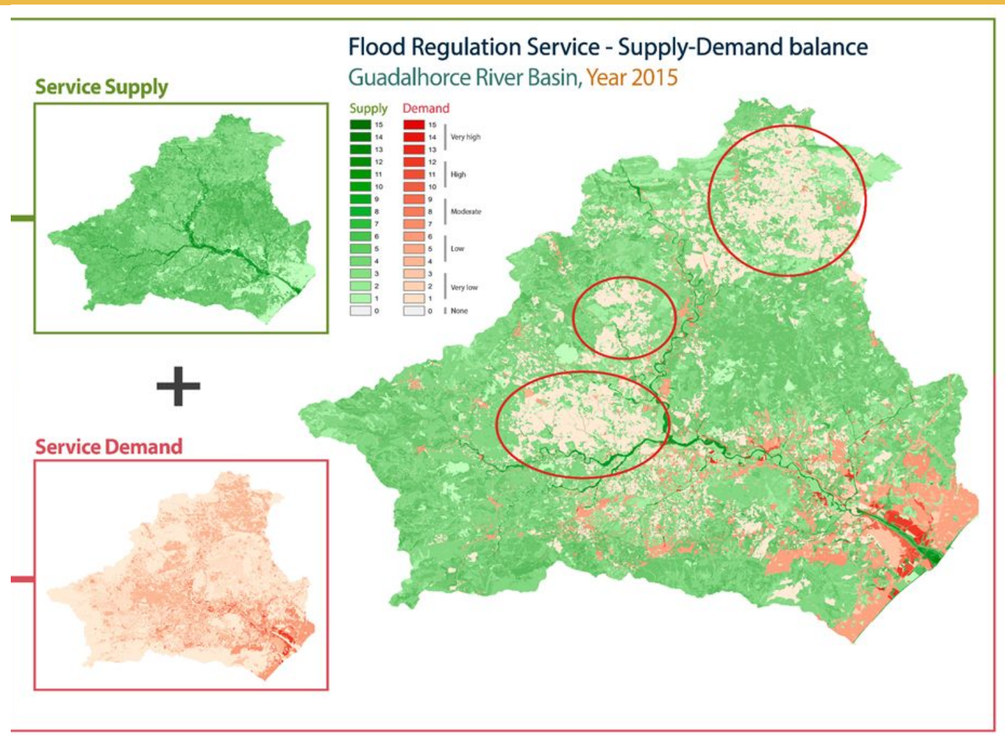


Goal:

Assess wetlands' capacity to regulate floods as a key nature-based solution for climate resilience.

Approach and activities:

Develop, test and validate a standardized, tiered methodology (environmental data + hydrological modeling + mapping) to map service **supply & demand for flood regulation** across five Mediterranean pilot sites at the catchment scale.



Expected Results:

- Harmonized and replicable indicator & maps of wetland flood regulation capacity.
- Identification of priority zones and efforts needed for protection/restoration.
- Policy-relevant tools linking science to wetland management.

Impact: Boost climate resilience through improved NbS knowledge and implementation

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Opportunities & barriers for policy uptake

Climate-mitigation benefits through restoration

1. Key concepts

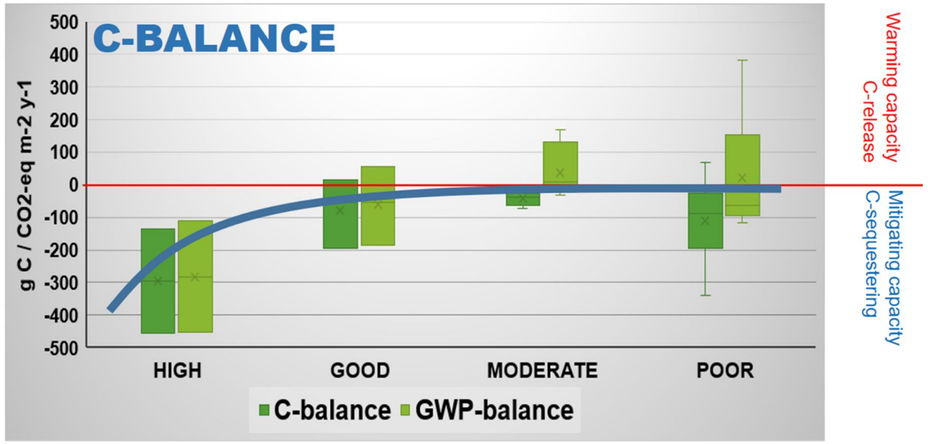
- Wetland restoration and proper management may reduce greenhouse gases (GHG) emissions, enhance carbon sequestration, and protect people and goods against flood hazards.
- Quantitative evidence exist that link ecological recovery with climate-mitigation benefits.

2. Key findings from Mediterranean wetlands

- Hydrological and vegetation recovery enhance CO_2 uptake and long-term carbon storage.
- Disturbed or drained wetlands act as GHG sources due to CO_2/CH_4 release and vegetation loss.
- Hydrological gradients define flux patterns: CH_4 may peak in shallow transition zones, water column buffers CO_2 exchange.
- Restoring floodplain wetlands enhance the overall capacity of river catchments to regulate flash floods
- Site-specific management is essential to align restoration with climate resilience goals.

3. Policy relevance

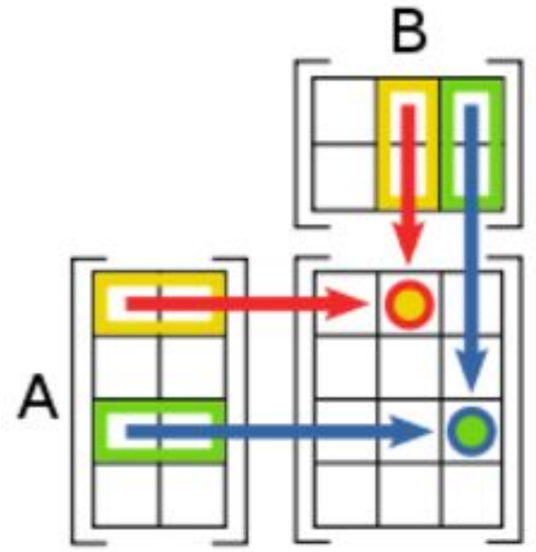
- Wetland restoration as a cost-effective nature-based climate solution.
- Supports integration of restored wetlands into national carbon accounting, voluntary carbon-credit schemes, and flood risk prevention plans.
- Aligns with EU Nature Restoration Regulation and the Green Deal's climate-neutrality objectives.



Camacho et al. (in prep.)

Management matrix: Bridging science and decisions

1. **Focus**
   - Links restoration measures with climate mitigation potential, biodiversity, and ecosystem resilience.
2. **Policy relevance**
   - Helps policymakers visualize trade-offs and co-benefits among restoration and management options under varied climatic and hydrological conditions.
   - Supports evidence-based prioritization of actions consistent with the EU Nature Restoration Regulation.
   - Supporting a Green Deal's sustainable finance agenda by translating monitoring results into verifiable metrics for climate investment.
3. **Continuation actions**
   - Make matrix results available through the project's shared knowledge platform, ensuring open and user-friendly access for policymakers and practitioners.
   - Facilitate transnational comparison and replication of effective wetland management strategies across the Euro-Mediterranean region.
   - Linking mitigation benefits with carbon-market mechanisms to support long-term restoration funding.



A: Ecological values/Ecosystem services

B: Management measures

Key institutional, technical and financial barriers

Barriers	Enabling conditions
Lack of consistent inclusion of wetlands and wetland solutions in main policy documents, management plans or strategies (e.g. river basin or flood risk management plans, Climate plans, etc.)	Joint policy advocacy for more integrated climate adaptation and mitigation strategies and plans.
Lack of coordination between different levels of management and within the decision-making process	Strengthen regional governance mechanisms
Lack of data, skills and equipment for monitoring GHG fluxes and flood regulation capacity for a climate mitigation centered management	Capacity building
No dedicated funding for wetland-carbon monitoring or NbS pilot actions => climate-smart wetland management	• Strengthen PA governance for stakeholder coordination and NbS support • Promote PES and carbon credits • Coordination between projects to achieve synergies of funding
Lack of incentives for wetland-compatible agricultural practices (CAP schemes)	Consistent delineation of wetland ecosystems in agricultural areas

Ways to leverage W4C's findings for cross-border collaboration

- **<u>Establishing a Harmonized, Science-Based Knowledge Base</u>**
  - Harmonised data collection and monitoring **methodologies** (tested and validated locally)
  - Creation of a Euro-Mediterranean **wetland geoportal** with information on wetland location, extent, condition, main threats and ecosystem services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Wetlands-based solutions for climate change adaptation, risk prevention and mitigation
Euro-MED0200309

RSO2.4: Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system based approaches

Protecting, restoring and valorising the natural environment and heritage

- Programme Priority: Greener MED -

Deliverable 1.1.1 : Preliminary study and technical guidance report for the mapping and assessment of C sequestration

- **<u>Fostering a Transnational Governance and Transfer Framework</u>**
  - Dynamic, User-Oriented **Transfer Plan**: designed to translate the project's scientific findings, tools, and best practices into accessible and implementable actions for wetland managers, policymakers, and local authorities across the region
  - **Capacity Building and Stakeholder Engagement** activities through local events and living labs that build a shared understanding and enhances the local capacity to implement restoration measures based on shared best practices

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For more information:

https://wetland4change.interreg-euro-med.eu/

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