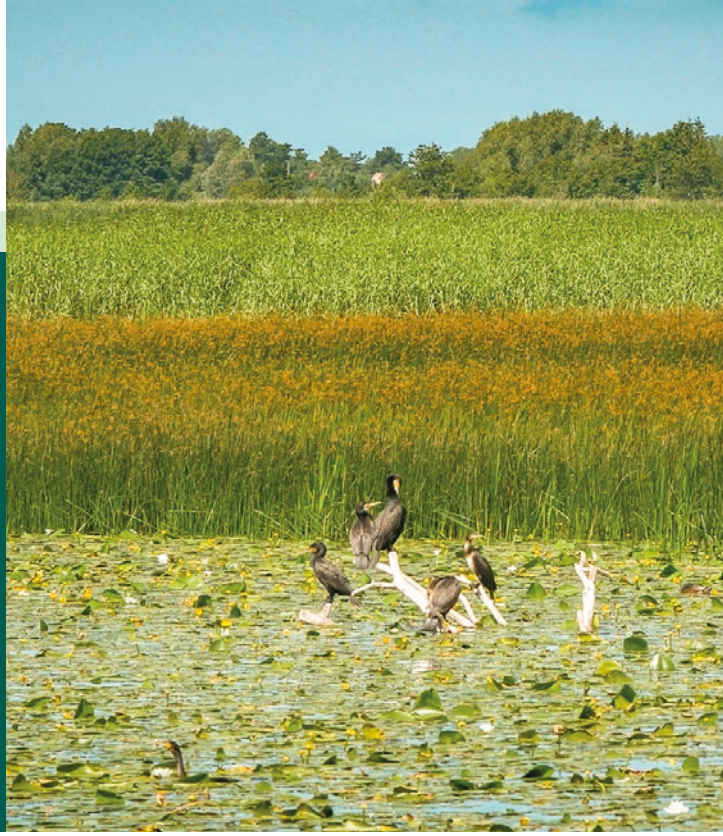
POLICY BRIEF

Unlocking potential of coastal wetlands in Europe: Integration into National Restoration Plans



South-West Dutch Delta, Netherlands. © Università del Salento / LifeWatch ERIC

Assessing results of restoration actions at coastal wetlands in Ria de Aveiro, Portugal. © Università del Salento / LifeWatch ERIC

KEY MESSAGES

- The development of National Restoration Plans under the EU Nature Restoration Regulation presents a unique opportunity to strengthen national efforts to restore coastal wetlands and enhance their role as effective natural climate solutions. Tailored restoration actions, adapted to the specific wetland site conditions, can enhance carbon storage, reduce greenhouse emissions, and deliver a range of co-benefits.

- National Restoration Plans should be accompanied by robust monitoring procedures to assess the effectiveness of restoration measures. Monitoring of coastal wetland restoration measures should include the collection and analysis of data on carbon storage and greenhouse gas fluxes (with particular attention to methane), in addition to monitoring the ecological status.

- To maximise the role of coastal wetlands for climate and biodiversity benefits, National Restoration Plans should be aligned more closely with actions planned under climate policy instruments, in particular National Energy and Climate Plans, national climate change adaptation strategies, and policies for carbon removal certifications.

RESTORE4Cs is a Horizon Europe project that aims to evaluate the effects of restoration actions on wetlands' ability to mitigate climate change and deliver a range of ecosystem services, using an integrative socio-ecological systems approach. More information is available at: https://www.restore4cs.eu/

Introduction

Reversing biodiversity loss and the deterioration of key habitats and species loss is among the European Union's central policy goals for the next decades. Scientists and policymakers alike recognise that achieving EU climate neutrality by 2050 will not be possible without significant efforts in nature restoration. The EU Nature Restoration Regulation (NRR) establishes binding targets to restore degraded ecosystems, focusing in particular on those with the greatest potential to prevent and mitigate natural disasters like floods and droughts, as well as on those best suited to capture, store and sequester carbon*, therefore acting as natural carbon sinks and preventing emissions from land degradation.

Europe's coastal wetlands are critical ecosystems which can play a crucial role in both climate change mitigation and adaptation[3]. When restored, they act as nature-based solutions: reducing greenhouse gas emissions (GHG), removing CO_2 from the atmosphere[4], and acting as natural sponges in the landscape that buffer the impacts of both floods and droughts. However, most coastal wetland habitats in the EU are either in poor ecological status or we lack sufficient information to assess their status. These ecosystems face multiple pressures associated to land-use transformations, sea level rise, droughts, eutrophication, invasive species, emerging pollutants and the expansion of economic activities. In this Policy Brief, we highlight how National Restoration Plans can support the restoration and protection of European coastal wetlands by recommending evidence-based restoration priorities and encouraging long-term monitoring and improved data collection on biodiversity and climate benefits of restored coastal wetlands.

WHAT ARE COASTAL WETLANDS?

Coastal wetlands are areas along coastlines that are temporarily or permanently flooded by salt, brackish or fresh water. These ecosystems are characterised by phreatophylic and submerged vegetation. According to the Ramsar Convention, coastal wetlands include "water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters"[5]. European coastal wetlands include seagrass, tidal and freshwater marshes as well as tidal and non-tidal flats and creeks. These habitats can be found in coastal lagoons, estuaries, and other transitional waters, as well as in fjords, sea lochs, and embayments.[3]

Curonian Lagoon, Lithuania. © Università del Salento / LifeWatch ERIC

* Carbon sequestration is understood as "a long-term removal of carbon from the atmosphere, with secure storage on climatically significant time scales"[1] while "carbon storage" refers to a rather short-term retention of carbon in organismal tissues[2].

Nature Restoration Regulation and coastal wetlands

Danube Delta, Romania. © Università del Salento / LifeWatch ERIC

The **EU Nature Restoration Regulation** sets specific targets for wetland restoration, including **coastal wetland habitats**. The specific habitat types the targets refer to are listed in Annex I (e.g., estuaries, mudflats and sandflats, coastal lagoons, salt marshes) and Annex II (seagrass beds) of the Regulation.

The NRR establishes a comprehensive implementation framework based on three main pillars: **National Restoration Plans** (Articles 14-19), **monitoring** and **reporting** (Articles 20-21). By September 2026, Member States must submit their draft National Restoration Plans to the European Commission, outlining how they plan to achieve the restoration targets for all ecosystems addressed in the Regulation, including coastal wetlands. As soon as restoration measures are put in place, Member States must start monitoring the condition and condition trend of the habitat types, as well as the quality and quality trend of the habitats of species in areas subject to restoration or re-establishment of habitats. Reports covering the results of the monitoring must be submitted every six years, with the first one due by June 2031.

RESTORATION TARGETS OF THE NATURE RESTORATION REGULATION RELEVANT TO COASTAL WETLANDS

- **Article 4: Restore** at least 30% of Annex I habitats to good condition by 2030, increasing to 60% by 2040, and 90% by 2050. Priority is given to Natura 2000 sites until 2030. **Re-establish** Annex I habitat types in areas where they are absent, aiming to reach their 'favourable reference area'. **Restore habitats of species** listed in Habitats and Birds Directives, improving the habitat quality, quantity and connectivity. Once in a good condition, habitats should not significantly deteriorate.
- **Article 5**: Similar restoration targets apply to marine ecosystems listed in Annex II.
- **Article 9: Restore the natural connectivity of rivers and the natural functions of floodplains**, with the objective of restoring at least 25,000 km of rivers into free-flowing rivers in the EU by 2030. Measures to restore natural river functions and connectivity can benefit coastal wetlands by linking freshwater and marine environments.

This Policy Brief is also relevant to the implementation of the following policies:

- **National Energy and Climate Plans (NECPs) and the Land Use, Land-Use Change and Forestry (LULUCF) Regulation**, by highlighting the role of coastal wetlands as carbon sinks and by promoting their potential to reduce GHG atmospheric concentrations;
- **EU and national adaptation strategies**, by recognising that coastal wetland restoration and conservation measures can play a role as nature-based solutions;
- The **EU Carbon Removals and Carbon Farming Certification Framework (CRCF)**, which requires biodiversity and ecosystem co-benefits from carbon farming activities in terrestrial or coastal environments, by supporting better data collection and methodologies.

Valencian Wetlands, Spain. © Università del Salento / LifeWatch ERIC

September 2026

Member States submit draft National Restoration Plans (NRPs) covering the period until 2050.

March 2027

The Commission assesses the draft NRPs, acting in close cooperation with the Member State concerned.

September 2027

The Member States finalise, publish and submit the NRP within 6 months after receiving observations from the Commission.

June 2028

Every 3 years, Member States report on areas under restoration, extent of habitat deterioration & compensatory measures, barriers removed, contribution to planting 3 bln additional trees.

June 2031

First national report on progress in implementing NRPs, restoration measures and meeting the NRR targets and obligations by 2030 is submitted. This report, submitted every 6 years, includes, i.a., the results of monitoring.

July 2032, 2042

NRPs are revised and supplementary measures are included before July 2032 & before July 2042.

2052+

At least once every 10 years thereafter, NRPs are reviewed and, if necessary, revised with supplementary measures included.

Strengthening the integration of coastal wetlands into national restoration plans

As EU Member States prepare their **National Restoration Plans**, they have a strategic opportunity to scale up the restoration and re-establishment of coastal wetlands, and to enhance their role in carbon storage, reducing GHG emissions and delivering a range of other co-benefits. To support the effective integration of coastal wetlands into National Restoration Plans, three priority actions are recommended.

Action 1

Restore coastal wetlands to unlock their potential in climate mitigation

National Restoration Plans can boost coastal wetland restoration efforts as **effective natural climate solutions** at both the national and regional level. Science generates evidence to support this process:

- Restoring degraded coastal wetlands can significantly improve their **capacity for carbon storage**[6], thus contributing to **climate change mitigation** efforts. Unlike degraded coastal wetlands, restored wetlands are expected to **reduce GHG emissions** to the atmosphere. RESTORE4Cs is currently assessing the effect of restoration in selected coastal wetland types across Europe, measuring how restoration actions in each site contribute to the abatement of GHG emissions.

- Certain restoration approaches for coastal wetlands, particularly those that **restore natural hydrology, vegetation coverage, and water quality**, can offer higher potential for **GHG reductions**. These insights can support prioritisation of restoration actions within the National Restoration Plans, ensuring that investments are directed toward the most effective climate mitigation outcomes.

Action 2

Improve knowledge base on climate benefits of restored coastal wetlands

Continuing to **improve knowledge** on the climate mitigation and the biodiversity co-benefits of restored coastal wetlands will support more effective restoration planning and inform the implementation of incentive mechanisms such as carbon farming certification. To address this:

- **Research, long-term monitoring and improved data collection** are needed to better understand the long-term carbon storage potential of coastal wetlands and its relationship to biodiversity benefits. This knowledge is critical for **improving carbon accounting methodologies** specific to these ecosystems. Research findings from the RESTORE4Cs project highlight key areas for further investigation, such as the **relationship between the conservation status, the type of alterations, and the effects of restoration**, as all of them relate to wetlands' GHG fluxes abatement and other co-benefits.

- National Restoration Plans must be accompanied by monitoring to assess the effectiveness of restoration measures. It is recommended that **monitoring for coastal wetland habitats** not only assesses habitat and species condition but **also gathers and analyses data on carbon storage and GHG emissions**, especially those with the strongest warming capacity such as methane, within a CO_2-equivalent balance approach. This will enable a clearer understanding of net climate benefits and support evidence-based decision-making in future updates of the Restoration Plans.

- The monitoring framework of the Restoration Plans should link to existing indicators for coastal wetlands (e.g., from the Water Framework and the Habitats Directives) to **maximise synergies with ongoing efforts** and be complemented with **new indicators**. **RESTORE4Cs** is developing **policy outcome indicators** for coastal wetland restoration and protection, which can inform this process.

Action 3

Maximise synergies between National Restoration Plans and climate policies

The EU Nature Restoration Regulation calls for **aligning restoration efforts** with existing EU environmental legislation, to **overcome fragmentation** at the national level and avoid conflicting or overlapping conservation efforts[7,8]. RESTORE4Cs findings highlight **growing policy support** for coastal wetland protection and restoration **within the climate policy domain**. To enhance the role of coastal wetlands in climate change mitigation and adaptation, National Restoration Plans should be more closely aligned with climate policy frameworks:

- Coastal wetland restoration and conservation measures can serve as effective **nature-based solutions** that help meet **GHG reduction** and **natural sink enhancement targets** set out in the NECPs, in line with national LULUCF commitments on sector-wide net GHG removal target. **National Restoration Plans should build on the updated NECPs and their measures for wetland restoration** and, in turn, reinforce these plans by quantifying wetland restoration targets by 2030 and 2050.
- Wetland restoration should be recognised as an **adaptation measure** in **national adaptation strategies**, which are required to promote nature-based solutions. As the EU Adaptation Strategy highlights, restoring wetlands and coastal areas is a **cost-effective solution for climate resilience**. Incorporating these measures into national adaptation strategies lays an important foundation for the National Restoration Plans to maximise the impact of restoration actions.
- Certifying carbon removals from restoration of coastal wetlands can support the National Restoration Plans by serving as a **lever to attract more funding**, as demonstrated e.g., by the results of the LIFE Wetlands4Climate project[9]. Regional initiatives such as the **Andalusia's carbon offset mechanism**[10] also illustrate how targeted policies can promote coastal wetland restoration to achieve both climate and environmental goals under the National Restoration Plans.

ANDALUSIAN CARBON OFFSETTING MECHANISM AND COASTAL WETLAND RESTORATION

In Andalusia, Spain, a voluntary mechanism for carbon offsetting projects was introduced in 2018 to support projects that contribute to climate mitigation. This initiative includes the **restoration and conservation of coastal ecosystems, including coastal wetlands**, as eligible activities. In addition, a management and evaluation of GHG methodology was introduced, specifically emphasising natural carbon sinks within protected areas. In particular, the development of a blue carbon offset methodology specifically tailored to wetlands and seagrasses was facilitated. The Andalusian Climate Action Plan 2021-2030[11] complements this initiative, further developing the Catalogue of Emission Offset Projects, monitoring provisions and outlining tools to support the integration of **blue carbon projects into CO_2 emissions offsetting initiatives**.

References

1. IPCC, 2019. Annex I: Glossary (N. M. Weyer, Ed.). In H.-O. Pörtner, D. C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, & N. M. Weyer (Eds.), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (pp. 677–702). Cambridge University Press. https://doi.org/10.1017/9781009157964.010
2. Bax, N., Sands, C. J., Gogarty, B., Downey, R. V., Moreau, C. V. E., Moreno, B., Held, C., Paulsen, M. L., McGee, J., Haward, M., & Barnes, D. K. A., 2020. Perspective: Increasing blue carbon around Antarctica is an ecosystem service of considerable societal and economic value worth protecting. *Global Change Biology*, *27*(1), 5–12. https://doi.org/10.1111/gcb.15392
3. Otero, M., Camacho, A., Abdul Malak, D., Kampa, E., Scheid, A., Elkina, E., 2024. How can coastal wetlands help achieve EU climate goals? Policy Brief. *Restore4Cs project*.
4. Reise, J., Siemons, A., Böttcher, H., Herold, A., Urrutia, C., Schneider, L., Iwaszuk, E., McDonald, H., Frelih-Larsen, A., Duin, L. & Davis M., 2022. Nature-Based Solutions and Global Climate Protection. Assessment of their global mitigation potential and recommendations for international climate policy. Climate Change 01/2022. *German Environment Agency*, Dessau-Roßlau.
5. Ramsar Convention, 1971. *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Art. 1). Ramsar, Iran. https://www.ramsar.org/sites/default/files/documents/library/current_convention_text_e.pdf
6. Morant, D., Picazo, A., Rochera, C., Santamans, A.C., Miralles-Lorenzo, J., Camacho-Santamans, A., Ibañez, C., Martinez-Eixarch, M. & Camacho, A., 2020. Carbon metabolic rates and GHG emissions in different wetland types of the Ebro Delta. *PLoS ONE 15*(4): e0231713. https://doi.org/10.1371/journal.pone.0231713
7. Perissi, I., 2025. Assessing the EU27 Potential to Meet the Nature Restoration Law Targets. *Environmental Management* 75, 711–729. https://doi.org/10.1007/s00267-024-02107-9
8. Aubert, G. & Noebel, R., 2022. How will nature restoration help fulfil EU environmental policy objectives? *IEEP*. https://ieep.eu/wp-content/uploads/2023/01/3_-Nature-Restoration-and-Synergies-with-EU-environmental-policies.pdf
9. Wetlands4Climate, n.d. Wetlands as Carbon Sinks. *Wetland 4ClimateLIFEProject*.https://fundacionglobalnature.org/wetlands4climate/en/inicio-english/
10. Junta de Andalucía, n.d. Andalusian system for emissions offsetting (SACE). https://www.juntadeandalucia.es/medioambiente/portal/web/cambio-climatico/indice/-/asset_publisher/hdxWUGtQGkX8/content/sistema-andaluz-de-compensaci-c3-b3n-de-emisiones-sace--1/20151
11. Junta de Andalucía, 2021. Andalusian Climate Action Plan 2021-2030 (Decree 234/2021). https://www.juntadeandalucia.es/boja/2021/587/1

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