

# Mediterranean wetland restoration: an urgent priority

**Restoring Mediterranean  
wetlands: the urgent  
and essential Nature-  
based Solution to the  
region's most pressing  
challenges**



Union for the Mediterranean  
Union pour la Méditerranée  
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## Authors:

Alessio Satta, Bruno Boz, Marianne Courouble, Giuseppe Dodaro

## Contributions:

Nelly Bourlion, Lisa Ernoul, Teresa Gil, Flavio Monti, Eva Tankovic, Carlota Viada



# 1. Mediterranean wetlands: current status and threats



Wetlands cover some 18.5 million ha in the Mediterranean region, between 1.7 to 2.4% of the total area of the 27 Mediterranean countries and 1 to 2% of the globe's total wetland area. All three categories in the Ramsar wetland type classification system — marine and coastal wetlands, inland wetlands and human-made wetlands — are present.

However, despite the vital roles they play, 48% of Mediterranean wetlands have been lost since 1970; while in the last decade the area occupied by coastal wetlands has shrunk by 10% (Global Wetland Outlook, 2021).

This is an indirect effect of the Mediterranean's

growing human population, which has increased by almost one-third since 1990 and is still on an upward trend. Consequently, natural wetlands have been rapidly transformed into human-made wetlands (reservoirs, salt pans etc.), croplands, built-up areas and sea waters (respectively 47%, 46%, 5% and 2% of the total wetland area converted) (MWO2, 2018; IPBES, 2019).

The change in land uses has severely impacted coastal and marine vertebrate populations, which have fallen by 52% since 1993; while 36% of wetland-dependent species — 41% of which are endemic — are threatened with extinction. Mediterranean wetland ecosystems are today among the most vulnerable ecosystems in the world.

# ! Biodiversity loss

The key drivers for biodiversity loss in the Mediterranean freshwater biome:

- dams and water abstraction (33%)
- climate change (21%)
- intensive agriculture and aquaculture (19%)
- urban development (19%)

Source: *Living Mediterranean Report, 2021*



Ulcinj salina, Montenegro. © MedWet / C.Amicio

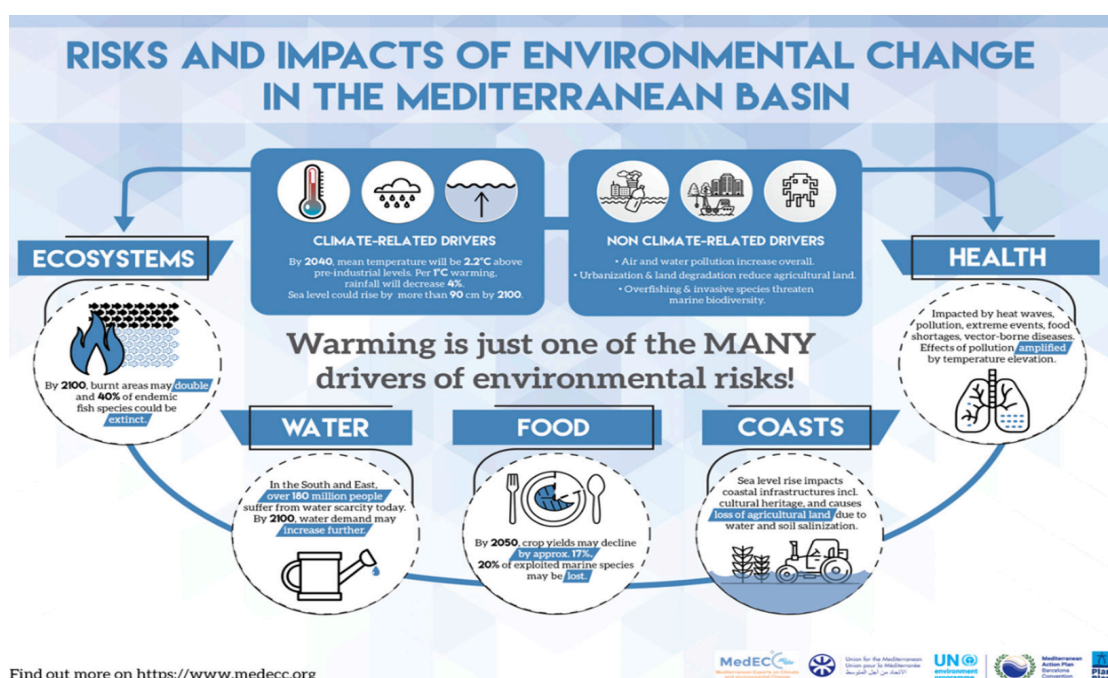


Figure 1 – Risks related to environmental change in the Mediterranean (Source: MedECC).

The destruction and degradation of wetland habitats is progressively reducing their ability to mitigate the effects of climate change (Figure 2). Wetlands currently store up to 40% of the world's carbon, but conversion can transform them from carbon sinks to carbon sources (Abdul et al., 2021).

## Mediterranean wetlands under threat

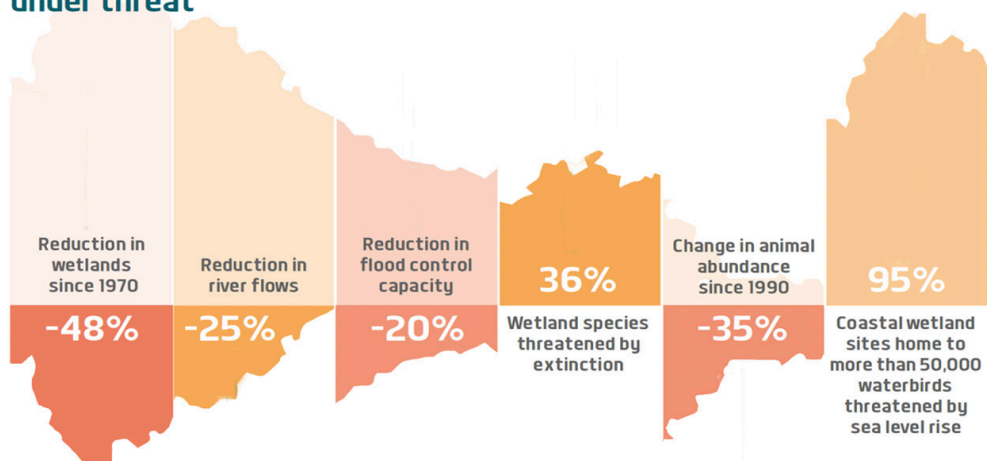


Figure 2 – Trends of different indicators on the status of Mediterranean wetlands (Source: MWO2, 2018).



## 2. Towards an integrated approach for wetland restoration

**Restoration refers to the implementation of concrete actions for the recovery of wetlands towards a more natural state (intended as the situation before significant disturbance and alterations due to human activities), by improving their ecological status.**

The objective is to recover a natural, self-regulating system that is integrated ecologically with the landscape in which it occurs. Often, restoration requires active processes and interventions. However, wetlands are dynamic and resilient environments, thus in some cases once human pressures are removed restoration follows as a natural process without the need for active interventions (this is known as passive restoration).

As a significant portion of the total wetland area has been drained for urban and agricultural development (areas have increased by 294% and 42% respectively in the region as a whole since 1970; MWO2, 2018), there is an urgent need today to stop the loss and degradation of remaining areas, paying special attention to the conservation of natural wetlands. Current levels of legal protection should be increased and regulations better enforced. This is particularly important for small wetlands, which are often overlooked despite their crucial ecological role. Creating new wetlands in areas previously drained is also strategically important, recreating native ecosystems in sites where they existed in the past. In addition, improving the condition of existing artificial wetlands that often host aquatic biodiversity – such as lagoons in sewage treatment plants, quarries or golf courses – is another promising way to increase the overall wetland area.

The overall approach of restoration should be to re-establish the ecological integrity and ecological functions of degraded aquatic ecosystems as far as possible, by favouring the natural processes and communities that have sustained native ecosystems through time. This includes designing for self-sustainability by understanding the natural potential of the system and by considering reference sites;

focusing on addressing ongoing causes of degradation by acting at the appropriate temporal and spatial scales and by working within the watershed and broader landscape context; and developing clear, achievable and measurable goals. It also requires the skills and insights of a multi-disciplinary team; and ongoing monitoring and adaptation when changes are necessary (see also Craft, 2015).

There is no one-size-fits-all recipe for wetland restoration, and interventions can be right or wrong depending on the specific problems, objectives and context.

The most common interventions (Merino et al., 2020) for ecological wetland restoration include:

- Restoring wetland hydrology: by reintroducing flooding, managing water levels and flows, managing the relationship between surface and groundwater, regulating salt water intrusion and the effects of rising sea level etc.
- Improving water and sediment quality: typically by intercepting and treating point and non-point sources of pollution, reducing sediment and nutrient loading in aquatic ecosystems through both natural and constructed buffer systems, and by increasing the self-purification capacity of the system through soil, vegetation and water management.
- Improving the conservation status of native species and habitats: by reintroduction project and interventions focused on targeted habitats and species.
- Controlling or eradicating invasive species: by applying specific agreed protocols.
- Connecting wetlands through blue and green corridors: by focusing on specific focal species.

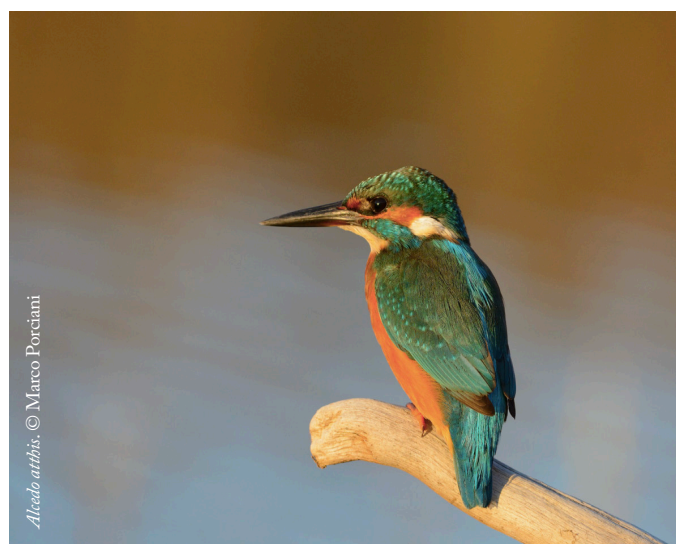




Ulinj salina, Montenegro. © MedWet/C. Amico

Integrating social and economic goals into wetland restoration projects is an important factor when it comes to the support and active participation of local people, as well as the availability of funding (Nesshöver et al., 2017). More specifically, the involvement of local stakeholders, private funders and regional administrations in effective local governance schemes can help mobilize funding and influence governments and decision-makers. Monitoring plans must be prepared in a preliminary phase of the process, so as to ensure adequate knowledge of the ex-ante and ex-post conditions and a correct assessment of ecosystem services, allowing for adaptation where changes are found to be necessary. The duration and scale of the monitoring activities depends on the spatial and temporal scales of the processes affected by restoration, much more ambitious monitoring programmes over larger spatial and temporal scales need to be developed (Liebaoult et al., 2019).

Once restored, the long-term maintenance of the wetlands should be set out in management plans, including regulation of permitted and prohibited uses, public access, potential as an educational tool, zoning, etc.



*Alcedo atthis*. © Marco Porciani



### 3. Wetland restoration as a Nature-based Solution to ensure the resilience of the Mediterranean Basin

The Mediterranean Basin is a global biodiversity hotspot, but it is also one of the most vulnerable regions in the world to the impacts of global warming – floods, sea level rise, extreme weather events, droughts etc. In this context it is vital to protect, restore and sustainably manage Mediterranean wetlands because they maintain and enhance crucial ecosystem services both for biodiversity and people – in other words, their restoration is an effective Nature-based Solution (NbS).

According to the IUCN, Nature-based Solutions are “actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity

benefits” (Figure 3). In the Mediterranean region, NbS offer an unmissable opportunity to increase the resilience of Mediterranean society in the face of rapid ecological changes.

Healthy, functioning wetlands ensure well-being for people in the Mediterranean by providing good-quality water, by mitigating the negative effects of extreme climatic events, by contributing to food production, and by preserving biodiversity.

These services are essential in a region characterized by strong demographic growth and densely populated, heavily developed coastal areas, particularly in light of the worsening climate crisis.

#### Nature-based Solutions

NbS

The concept of Nature-based Solutions consists of promoting the use of ecosystems through conservation or restoration interventions to address global societal challenges. They are real-world applications that demonstrate the benefits of nature and healthy ecosystems, providing a tangible return on investment and making a substantial contribution to human wellbeing.

**NbS concepts include:** Ecological restoration/ Ecological engineering/ Ecosystem-based adaptation/ Ecosystem-based mitigation/ Ecosystem-based management/ Natural infrastructure/ Area-based conservation/ Green infrastructure/ Climate adaptation services/ Landscape restoration/ Ecosystem-based disaster risk reduction



Figure 3 - NbS concept (source: IUCN, 2019)



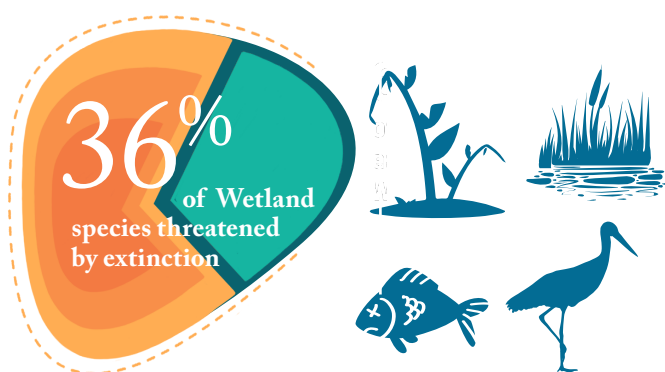


Ghar El Melh, Tunisia. © MedWet / C. Amico

Restoring wetlands is an effective solution to ensure the supply of essential ecosystem services for the Mediterranean Basin. This has been demonstrated by several successful experiences in the field.

### To support biodiversity:

By protecting wetlands, which cover only 2-3% of the basin's surface, it is possible to support more than 30% of the Mediterranean's vertebrate species, more than 40% of its endemic species, and 36% of its threatened species (Living Mediterranean Report, TdV 2021).



In the Camargue, France, newly emerged soils and waterways created by restoring an old salt production area back to a natural wetland ecosystem are offering 'new' homes for vegetation, fish, birds and other wildlife populations.



The Camargue Saltflats lagoons and marshes. © F. Larrey / Conservatoire du littoral, 2015

In Tyre, Lebanon, marine species in estuary waters are direct beneficiaries of the restoration of the Tyre Coastal Nature Reserve (TCNR) wetlands.



## To mitigate and adapt to climate change:

Wetlands have the capacity to create adaptive barriers or new paths in response to increased water flows during storms, and they hold more long-term carbon stocks (Figure 4) than any other ecosystems.

## Coastal wetlands

Sequester 100-200g CO<sub>2</sub> per m<sup>2</sup> per year

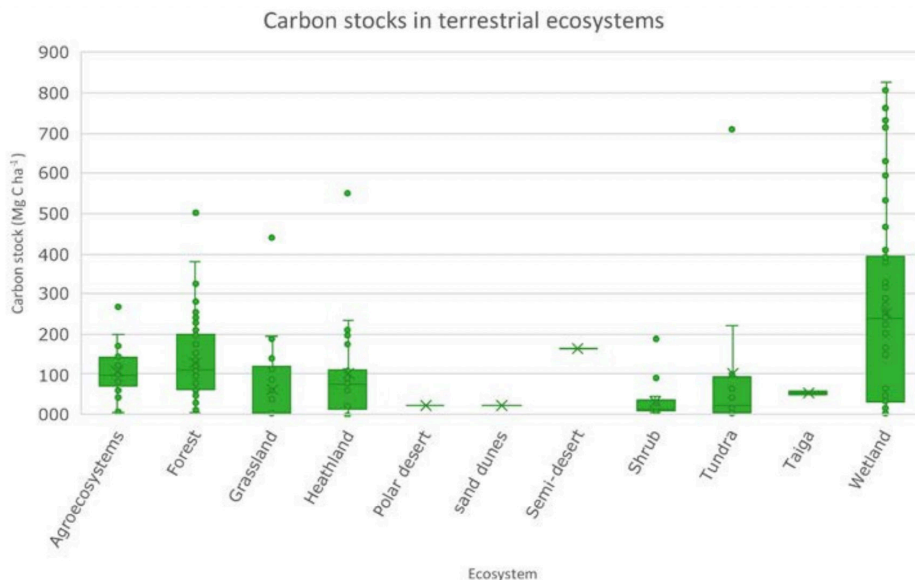
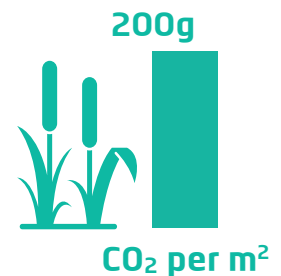


Figure 4 – Carbon stocks of terrestrial ecosystems (from Hendriks et al., 2020)

## To provide and to purify water for people, livestock and wild animals, and to provide soil regulating services:



In Albufera de Valencia, Spain, the restoration of 100 ha of marshlands has brought about a significant improvement in water quality both inside the restored areas and in their surroundings.

In Tyre, Lebanon, the TCNR wetlands provide freshwater with an estimated annual value of US\$2 million.

In Ghar El Melh, Tunisia, restoration activities have replenished water flows and now support the operation of traditional farming systems.

In the Venice Lagoon, Italy, the creation of 220 ha of new wetlands is mitigating flood risks with increased water storage capacity of some 1,800,000 m<sup>3</sup>. In addition, the long-term restoration programme retains and dissipates agricultural

pollutants before they enter the Lagoon (Gumiero et al., 2013).

Similarly, in Ras El Ain, Lebanon, agrochemical water and soil pollution was greatly reduced after restoration activities.

## To sustain local economies and livelihoods:

In the Camargue, France, the restoration programme has saved public funds of between €13 to €17 million for the reconstruction of dikes, €7 to €24 million for the construction of groins, and at least €800,000 in annual maintenance.

In Albufera de Valencia, Spain, the economic value of the ecosystem services provided in one restored area has been estimated at more than €20 million, including 50,000 visits to the restored site.

In Oristano, Sardinia, local fishers have become valuable guardians of the lagoon because they are directly involved in local wetland governance and want to see their economic assets preserved.

In the Venice Lagoon, the restoration programme has improved recreational opportunities for approximately 520,000 inhabitants.

## 4. Call to accelerate coordinated action for Mediterranean wetland restoration

The Mediterranean Basin is currently facing the most severe ecological and climatic crisis of its long history, with unprecedented biodiversity loss on land and underwater, water shortages, increasingly frequent storms and wildfires, coastal erosion and other major challenges (Figure 5).

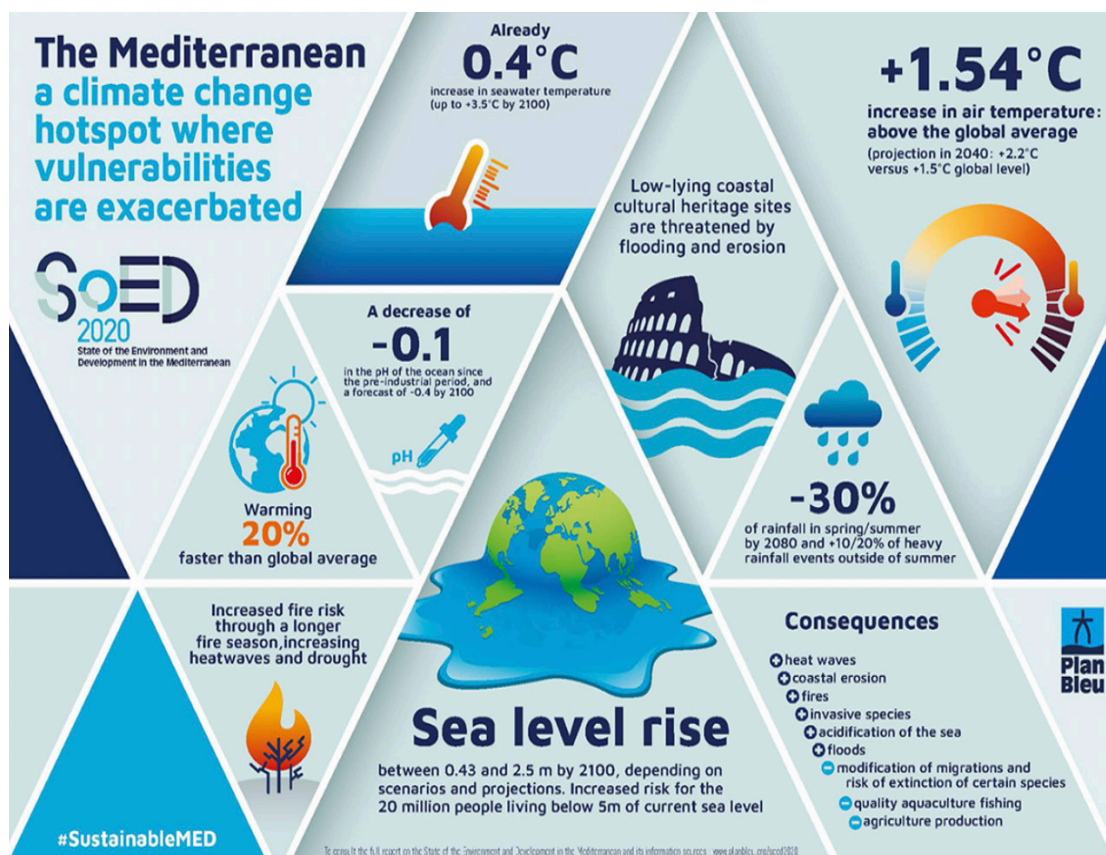


Figure 5 – Effects of climate change in the Mediterranean  
(Source: SOED, 2020)

If nothing is done to mitigate these impacts, the unique ecosystems of the region and its growing population will be seriously affected over the coming decades, with likely consequences including increased risks to populations from extreme climate events, health problems, natural resource conflicts, increased migration, economic collapse and political instability.

It is time for Mediterranean countries with their common history to join forces for their common future. There is an urgent need for governments, private companies, local communities, NGOs and international organizations to act now in a coordinated way to identify and support effective and sustainable local solutions.





# Together, we can reverse the trend of wetland loss and ensure a better future for people and nature in the Mediterranean



**ActForWetlands**

**Everyone has a role to play in achieving the effective restoration of degraded wetlands.**

**Specifically, we call on:**



## → All stakeholders

1. To recognize the importance of wetlands as highly productive and biologically diverse systems that enhance water quality, control erosion, maintain stream flows, sequester carbon, and provide a home to at least one-third of all threatened and endangered species.
2. To advocate with governments, financial institutions and private funders to mobilize NbS funding and systematically consider NbS as alternatives or complements to their financing of 'grey' infrastructure projects.
3. To work together to achieve successful restoration initiatives, robustly managed in the long term.

## → International institutions

1. To develop, under existing regional conventions, agreements and protocols, binding objectives for restoring at least 50% of the wetlands lost since 1970 in the Mediterranean.
2. To accelerate the restoration of Mediterranean wetlands by promoting ambitious, large-scale and integrated sustainable water management and hydro-morphological restoration measures of the entire connected watershed, as well as biodiversity recovery measures.
3. To identify, upscale and replicate successful wetland restoration projects in the Mediterranean to other sites designated as priorities for restoration; and ensure coordinated actions at the regional level to exchange good practices and lessons learnt, in particular through existing networks.

## → National governments

1. To develop and implement government programmes or public-private partnerships to protect and restore wetlands that also support the achievement of water, energy and food security objectives along with the related UN 2030 SDGs.
2. To develop legislation that identifies binding objectives for the restoration of wetlands by 2030, in line with the objectives of the EU Biodiversity Strategy 2030 and the UN decade on ecosystem restoration.
3. To systematically integrate the restoration, protection and/or creation of new wetlands into climate change adaptation strategies, and allocate specific funds to increase the resilience of coastal territories.
4. To adopt programmes that give incentives to companies to quantify their financial and non-financial contributions to the natural capital and ecosystem services from which they benefit, and introduce fiscal tools which favour companies investing in wetland restoration.
5. To carry out effective processes of involvement and discussion with local governments, to facilitate the implementation in the territories of concrete restoration actions.

## → Local governments

1. To fully integrate wetland conservation into land-use planning, and address biodiversity loss, coastal erosion, wetland degradation, water abstraction and climate change as priority objectives in the coming years.
2. To promote strong wetland governance involving all local stakeholders to effectively support conservation management and implementation, including capacity-building.
3. To encourage local authorities to systematically integrate wetland ecosystem services into physical planning.

## → Private sector

1. To operate more sustainably and create socio-economic opportunities which help bend the curve of loss and degradation by restoring wetlands and the relationship between humans and nature for future generations.
2. To sustainably manage resources and reinvest significantly into wetland conservation and restoration.

## → Non-governmental organizations

1. To lobby governments and other sectors to ensure effective policies for wetland restoration and funding.
2. To raise awareness among decision-makers and local populations of the benefits for nature and people that arise from the restoration and maintenance of healthy wetlands.
3. To use a 'red alert' system to highlight aquatic ecosystems which face immediate threats and need urgent attention.

## → Research and education institutions

1. To improve and share the wetlands knowledge base and ensure it helps authorities to make informed decisions which take into account wetlands' importance to biodiversity, sustainable practices and management, and their potential as NbS.
2. To assess and identify priority wetland sites to be restored using the latest scientific knowledge.
3. To contribute to long-term monitoring programmes for evaluating the impact of restoration measures on biodiversity and ecological processes.



## 5. Annex 1: Tools and material relating to wetland restoration

**ETC-UMA webpage** providing information on projects and resources including wetland inventories, monitoring, management and restoration: [http://www.etc.uma.es/wetlands/?\\_page=3](http://www.etc.uma.es/wetlands/?_page=3)

**A selection of LIFE projects** concerning wetland restoration in Europe, including a dedicated chapter on Mediterranean wetlands: <https://ec.europa.eu/environment/archives/life/publications/lifepublications/lifefocus/documents/wetlands.pdf>

**Fact sheet by MedWet** “Wetlands restoration: unlocking the untapped potential of the Earth’s most valuable ecosystem” to assist restoration efforts by governments, policymakers and practitioners and including notable examples of wetlands restoration: [https://medwet.org/wp-content/uploads/2021/06/factsheet\\_wetland\\_restoration\\_general\\_062021\\_e\\_0.pdf](https://medwet.org/wp-content/uploads/2021/06/factsheet_wetland_restoration_general_062021_e_0.pdf)

**Handbook “The Governance of Coastal Wetlands in the Mediterranean – a Handbook”:** <https://medwet.org/publications/handbook-on-governance-of-mediterranean-coastal-wetlands/>

**Handbook “Evaluating the impact of Nature-based solutions, a handbook for Practitioners”** [https://progireg.eu/fileadmin/user\\_upload/Evaluating\\_the\\_impact\\_of\\_nature-based\\_solutions\\_-\\_Handbook\\_for\\_practitioners.pdf](https://progireg.eu/fileadmin/user_upload/Evaluating_the_impact_of_nature-based_solutions_-_Handbook_for_practitioners.pdf)

**Webpages** listing the main publications provided by the Mediterranean Wetland Observatory <https://medwet.org/observatory/publications-observatory/>  
<https://tourduvalat.org/en/media/brochures/>

**EU Platform** on Natural Water Retention Measures including case studies map and factsheets <http://nwrm.eu/>

**Potential wetlands to be restored in Mediterranean countries, results from an online survey:** a survey produced in the framework of the project “Strengthening the Restoration of Mediterranean Wetlands for Nature and People” funded by the MAVA Foundation under the M3 Action Plan “Enhancing the conservation of coastal wetlands (2019-2022)”: [https://www.wwf.es/nuestro\\_trabajo/agua/humedales/potential\\_wetlands\\_to\\_be\\_restored\\_in\\_mediterranean\\_countries/](https://www.wwf.es/nuestro_trabajo/agua/humedales/potential_wetlands_to_be_restored_in_mediterranean_countries/)

**Short selection of bibliographical references to technical guidelines and protocols on wetland restoration:**

An S. & Verhoeven J.T.A. (2019). Wetland Functions and Ecosystem Services: Implications for Wetland Restoration and Wise Use. In: An S., Verhoeven J. (eds) Wetlands: Ecosystem Services, Restoration and Wise Use. Ecological Studies (Analysis and Synthesis), vol 238. Springer, Cham. [https://doi.org/10.1007/978-3-030-14861-4\\_1](https://doi.org/10.1007/978-3-030-14861-4_1)

Kentula M.E. (2000). Perspectives on setting success criteria for wetland restoration, Ecological Engineering, Volume 15, Issues 3–4, 2000, pp. 199–209, ISSN 0925-8574, [https://doi.org/10.1016/S0925-8574\(00\)00076-8](https://doi.org/10.1016/S0925-8574(00)00076-8).

McInnes R., Joyce C., Comín F. & Andersson K. (2013). Perspectives on European wetland restoration. Wetland Science & Practice.

Merino A., Doni S., Evelpidou N., Ferreira T., Arias A.-I., Masciandaro G. & Rodriguez-Gonzales P. (2020). Best Practices in Evaluation and Restoration of Degraded Mediterranean Environments.

Zedler J.B. (2000). Progress in wetland restoration ecology. Trends in Ecology & Evolution, Volume 15, Issue 10, 2000, pp. 402–407, ISSN 0169-5347, [https://doi.org/10.1016/S0169-5347\(00\)01959-5](https://doi.org/10.1016/S0169-5347(00)01959-5).

## 6. Annex 2: Legal and regulatory frameworks for coastal wetland conservation and restoration in the Mediterranean

### **The Ramsar Convention, in particular:**

- **Strategic Plan 2016-2024** highlighting the important ecosystem services that wetlands provide, to contribute to food security, healthy living, water quality and supply, water security, disaster risk reduction, adaptation to climate change, and biodiversity.
- **Resolution XII.13** on Wetlands and disaster risk reduction which welcomes initiatives that support the conservation and restoration of coastal wetlands and encourages engagement in such activities.
- **Resolution XI.14** on Climate change and wetlands: implications for the Ramsar Convention on Wetlands, which urges Contracting Parties to maintain or improve the ecological character of wetlands to promote their ability to contribute to nature-based climate change adaptation.
- **Resolution XIII.14** on Promoting conservation, restoration and sustainable management of coastal blue-carbon ecosystems, highlighting the value of wetlands as natural carbon sinks.

**The Mediterranean Wetlands Initiative (MedWet)** encourages and supports wetland managers and governments to adopt policies and take action on the ground to drive the conservation and sustainable use of Mediterranean wetlands. Founded in 1991, MedWet was the first – and remains the leading – regional initiative officially recognised under the Ramsar Convention. Geared to long-term collaboration, MedWet is the only platform where institutions and civil society share knowledge and technical capacity for the benefit of wetlands in the Mediterranean. It includes the 27 Mediterranean Contracting Parties to the Ramsar Convention, as well as Palestine, the Ramsar Secretariat, intergovernmental institutions, NGOs, and specialist national wetland organizations.

**The Union for the Mediterranean** and its **Greener Med Agenda** for 2030 adopted in 2021.

**The 2030 Agenda for Sustainable Development** requiring large-scale restoration of degraded terrestrial, freshwater and marine ecosystems.

**The Barcelona Convention**, in particular its **Action Plan** now fully integrating Mediterranean wetlands and the **Integrated Coastal Zone Management Protocol** to enhance the resilience of Mediterranean coastal areas.

**The framework for defining Nature-based Solutions (NbS)** adopted at the World Conservation Congress in 2016 by Resolution 6.069 and the IUCN Global Nature-based Solutions adopted in 2020 (WCC-2020-Res-060).

**The Paris Agreement of 2015 under the UN Framework Convention on Climate Change (UNFCCC)** including provisions for wetland restoration as National Determined Contributions (NDCs).

**The UN Decade on ecosystem restoration (2021-2030)** that mainstreams the restoration of ecosystems into international conservation policy.

**The EU Habitat, Water Framework and Flood Directives** including provisions for EU Mediterranean countries which have adopted an integrated water resources management (IWRM) approach focusing on the recovery and conservation of the ecological status of rivers, lakes, wetlands and coastal waters.

**The EU Green Deal and its 2030 Biodiversity strategy**, including a strong EU restoration plan to reverse the degradation of land and sea ecosystems.



## 7. References

- Convention on Wetlands. (2021). Global Wetland Outlook: Special Edition 2021. Gland, Switzerland: Secretariat of the Convention on Wetlands.
- Craft, C. (2015). Creating and restoring wetlands: from theory to practice. Elsevier.
- Fader M., Giupponi C., Burak S., Dakhlaoui H., Koutroulis A., Lange M.A., Llasat M.C., Pulido-Velazquez D. & Sanz-Cobeña A. (2020). Water. In: Climate and Environmental Change in the Mediterranean Basin – Current Situation and Risks for the Future. First Mediterranean Assessment Report
- [Cramer W., Guiot J. & Marini K. (eds.)] Union for the Mediterranean, Plan Bleu, UNEP/MAP, Marseille, France, pp. 181-23.
- Galewski T., Segura L., Biquet J., Saccon E. & Boutry N. (2021). Living Mediterranean Report – Monitoring species trends to secure one of the major biodiversity hotspots. Tour du Valat, 2021. France.
- Geijzendorffer I., Chazée L., Gaget E., Galewski T., Guelmami A., Perennou C., ... & McInnes, R. (2018). Mediterranean wetlands outlook 2 (MWO2): Solutions for sustainable Mediterranean wetlands. Secretariat of the Ramsar Convention.
- Gumiero B., Mant J., Hein T., Elso J.N & Boz B. (2013). Linking the restoration of Rivers and Riparian zones/Wetlands in Europe: sharing knowledge through case studies. Ecological Engineering, 56: 36-50, ISSN 0925-8574, DOI: 10.1016/j.ecoleng.2012.12.103. – ISI listed Journal. Impact Factor: 2.958 (2012).
- Hemes K.S., Chamberlain S.D., Eichelmann E., Knox S.H., and Baldocchi, D.D. (2018). A biogeochemical compromise: the high methane cost of sequestering carbon in restored Wetlands. Geophys. Res. Lett. 45, 6081–6091. doi: 10.1029/2018GL077747
- IPBES. (2019). Global Assessment Report on Biodiversity and Ecosystem Services.
- IUCN. (2019). Towards Nature-based Solutions in the Mediterranean.
- Liébault F. et al. (2019). Monitoring of hydromorphological restoration: open problems and perspectives Output O.T.3.1 - FACTSHEET 5 – HyMoCARES Project INTERREG Alpine Space [https://www.alpine-space.org/projects/hymocares/download/o.t3.1\\_factsheet\\_1\\_remote-sensing.pdf](https://www.alpine-space.org/projects/hymocares/download/o.t3.1_factsheet_1_remote-sensing.pdf)
- Malak Abdul D., Marin A.I., Trombetti M. & San Roman, S. (2021). Carbon pools and sequestration potential of wetlands in the European Union. European Topic Centre on Urban, Land and Soil Systems, Viena and Malaga, ISBN 978-3-200-07433-0.
- Merino A., Doni S., Evelpidou N., Ferreira T., Arias A.-I., Masciandaro G. & Rodriguez-Gonzales P. (2020). Best Practices in Evaluation and Restoration of Degraded Mediterranean Environments.
- Nesshöver C., Assmuth T., Irvine K., Rusch G., Waylen K., Delbaere B., Haase D., Jones-Walters L., Keune H., Kovacs E., Krauze K., Külvik M., Rey F., van Dijk J., Vistad O., Wilkinson M. & Wittmer H. (2017). The science, policy and practice of nature-based solutions: An interdisciplinary perspective. Science of The Total Environment, Volume 579, 2017, pp. 1215-1227, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2016.11.106>.
- United Nations Environment Programme/Mediterranean Action Plan & Plan Bleu. (2020). State of the Environment and Development in the Mediterranean: Summary for Decision Makers. Nairobi.



Buna delta, Albania. © MedWet / C. Amico

The project ‘**Wetland-based Solutions**’ is part of an ambitious programme, supported by the [MAVA Foundation](#), which aims “to enhance the conservation of coastal wetlands in the Mediterranean Basin”.

To know more: <https://wetlandbasedsolutions.org/>

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